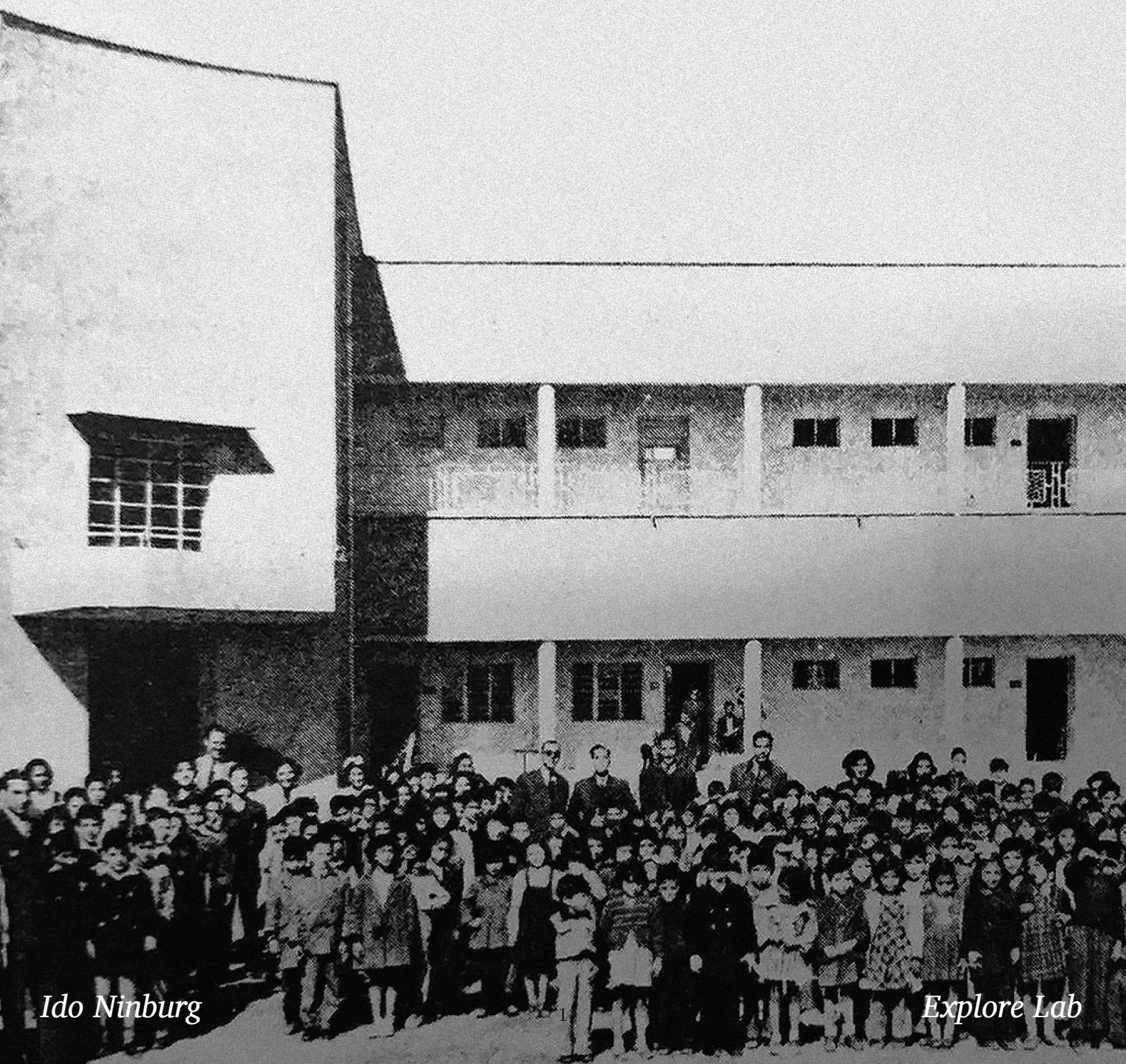


What We Left Behind

מה שהותרנו מאחור

ما تركناه وراءنا

The architectural heritage of Jewish Baghdad



Ido Ninburg

Explore Lab

What We Left Behind

מה שהותרנו טאחור

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Rescuing the Jewish Architecture of Baghdad

*Patterns from the Jewish Neighbourhoods of Baghdad
as a Tool for Architectural Reactivation*

Graduation Report

Master of Science in Architecture, Urbanism and Building Sciences

Architecture track · Explore Lab studio

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Contents

Abstract	2
Part 1. Introduction	2
1.1 Historical overview: Jewish Baghdad and its three settings	2
1.2 Problem statement	3
1.3 Relevance	5
1.4 Aim and motivation	5
1.5 Research and design questions	5
1.6 Scope and limitations	6
Part 2. Approach	6
2.1 Theoretical framework	6
2.2 Methods: building the patterns	7
Part 3. Results	9
3.1 The pattern booklet and the pattern field	9
3.2 The salon: from research to programme	12
3.3 Architectural positioning and urban approach	14
3.4 The library: a public salon in the existing building	16
3.5 The courtyard and the new mass	20
3.6 The café as a fragmented salon	23
3.7 The basement: the nim and the mikvah	26
3.8 The workshops: material culture as programme	29
3.9 Technical and material development	31
Palm wood	31
Palm wood as a structure	33
Façade composition: brick below, timber above	34
Climate strategy	35
Re-use: the urban terrazzo	36
3.10 The residences (Live)	37
Part 4. Conclusion and discussion	40
4.1 Answer to the research and design questions	40
4.2 Main architectural conclusions	40
4.3 Technical and material conclusions	41
4.4 Implications and transferability	41
4.5 Reflection	41
4.6 Ethical issues	42
Appendices	43
Appendix A. Pattern booklet	43
Appendix B. Data Management Checklist	76
References	76
Acknowledgements	77

Abstract

In the early 1950s almost the entire Jewish community of Baghdad left within a few months. Roughly ninety thousand people, about a quarter of the city, gone. What they left behind was not empty space. It was a built communal environment shaped and refined over centuries: houses, courtyards, schools and synagogues that encoded a way of living attuned to Baghdad's heat and to the rules of a dense communal life. The community is gone. The architecture, where it survives, still holds the spatial knowledge that produced it, but it has been abandoned, cut off from the use and the spatial logic that once set it in motion.

How can we reactivate this architectural knowledge? To test this, the corpus is read indirectly, through archival drawings, photographs, surviving objects, and interviews with the Baghdadi-Jewish diaspora, and analysed into twenty-two recurring spatial patterns. They work in three fields. Climate, as the relation between the body and its surroundings, set against Baghdad's hot weather. The threshold, which regulates the distance between the resident and the street, treated as exposed and unclaimed, turning on the question of protection. And gathering, which organises the relation between a person and their community.

These patterns are then put to work through interventions in the last building that gave the Jewish community a space of assembly, a kind of urban *salon* known as the Frank Iny School, with the aim of bringing it back into use. The patterns are read as principles rather than fixed forms. Read this way, they allow classical means to be used again within a contemporary context, and they open up an inquiry into materials and techniques that lost their place over the years. The building, left in abandonment and neglect, becomes again a place to stay, to make, and to gather. The knowledge studied in these buildings returns to life not as historical reconstruction but as a living principle for present-day residents. The method is offered as a procedure for any architectural corpus that is dispersed, partly destroyed or closed to direct visit.

Part 1. Introduction

This graduation report was written as part of my master's graduation project in Architecture at TU Delft, within the framework of Explore Lab, which allows students to define an individual research subject and to develop an architectural project from a personal field of inquiry rather than from a pre-defined studio brief. I chose to work on the architectural heritage of Jewish Baghdad because of my grandmother, who was born and raised in the city and left it in her late youth. The project also continues from my earlier historical thesis, supervised by John Hanna, which studied the Jewish community of Baghdad and the Frank Iny School as a symbol of modernity and progress, shaped by a specific social, religious and political climate. In this graduation project, that historical research is extended into architectural design: from understanding what the building and its community represented, toward asking what spatial knowledge they still contain and how this knowledge can be reactivated today.

1.1 Historical overview: Jewish Baghdad and its three settings

The Jewish community of Baghdad developed continuously over more than a millennium, constituted about a quarter of the city's population, and was the largest single ethnic group within it (Al-Khafaf, 1992; Goldstein-Sabbah, 2021). It developed throughout the city from north to south in three main anchors that evolved in a linear way over the years: the dense quarter inside the old city walls, the family-scale bourgeois neighbourhood outside them, and the institutional spine that tied the community together. These three anchors were bound by a daily rhythm in which families were dispersed across the neighbourhoods and moved between them to fulfil the various functions of communal life (Golany, 1994).

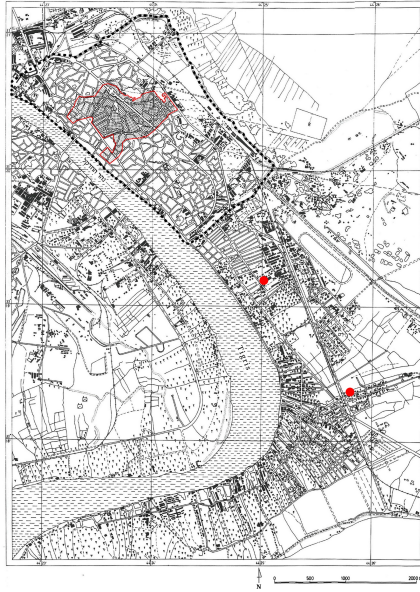


Figure 1. A map of Baghdad, March 1942, with the Jewish presence marked, traced from Gideon S. Golany's analysis (Source: traced by author after Golany, 1994).

The first setting is the Jewish quarter (*Al-Taht*), the northernmost area inside the old city walls, where the community concentrated until the modern era. It is characterised by a dense and complex urban morphology: a network of narrow, winding, dead-end alleys, with most surviving buildings dating from the eighteenth and nineteenth centuries. Three features define it. Its compact form packs buildings closely so that they shade and protect one another from heat and sun. Its path pattern of narrow, winding alleys keeps the streets in shade through most of the day. And its sub-surface spaces, the *sardab* and related rooms below ground, were inhabited during the hottest hours because the ground temperature is more stable and lower than the air above.

The second setting is Al-Bataween, the neighbourhood outside the old city walls, whose development was enabled by the British Mandate in the 1930s and by the emergence of an educated, mercantile middle class in which the Jewish community was strongly represented. Its houses were more modern in their provision of ventilation, water and services, and the neighbourhood was laid out on orthogonal boulevards, yet the buildings retained the same classical domestic typologies found inside the walls. The third setting is the New Al-Alwiyah neighbourhood, a modern district of institutions that includes the Frank Iny School, a Jewish school that operated from the late 1940s (Rajab, 2023). This was the setting in which the community placed its most modern and “advanced” building, and it is the case study of this project.

1.2 Problem statement

These three settings ceased to function as they had in the 1950s, when most of Baghdad's Jews, roughly ninety thousand people, about a quarter of the city, left within a few months (Meir-Glitzstein, 2024). After the community contracted, only a handful of Jews remained through the later decades of the twentieth century. The buildings they left behind testify not only to a numerical loss in the city's population but to an architectural and urban rupture on a large scale: areas that had been comparatively prosperous, architecturally refined and of high value declined into neglect, and some descended into conditions of severe urban decay (Al-Khafaf, 1992).



Figure 2. *The old Jewish quarter today: neglect (Source: photograph by Mohammed J. for the author, 2026).*

Today, the three studied settings are in varying states of disintegration. Some abandoned buildings were occupied by minority populations pushed into Baghdad by oppressive forces, who sought shelter in a vacant building. The Frank Iny School itself, now operating as the Al-Nizamiyya School for Boys, is only partly in use, with some of its classrooms converted into storage. Its present use as a boys' school stands in direct contrast to the historical logic the project recovers, in which the building organised three distinct domains (public, semi-public and private) that the intervention later reconstructs. Where the quarter shows the diversity across a whole urban fabric, the Frank Iny School shows it within the walls of a single institution.



Figure 3. *The Frank Iny School today, in partial use as the Al-Nizamiyya School for Boys (Source: photograph by Mohammed J. for the author, 2026).*

The starting condition for the intervention is therefore the gap between the spatial and material potential of these buildings and the absence of sustained public life inside them. The buildings that remain are no longer animated by the social logic that produced them; their intelligence, although still present, is silent. The project does not claim a definitive solution to that condition. It is a spatial exploration that tests how such a space might be reactivated.

1.3 Relevance

The project operates at the intersection of several debates and carries relevance on more than one register. Its architectural and disciplinary relevance lies in the question of how historical architectural knowledge can be translated into a contemporary design tool. The architecture of Baghdad's Jewish community has received historical and typological attention, yet it has had almost no operational architectural treatment. Where the buildings are vanishing, and their intelligence survives only in fragments (partial drawings, old photographs and family memories), making this knowledge portable and operational contributes to the disciplinary conversation about pattern languages.

Its historical and cultural relevance lies in documenting and structuring a body of spatial knowledge that is disappearing alongside the last generation to have experienced it directly; the project treats this knowledge not as a museum object but as a living resource. Its social relevance lies in the proposition that the spatial intelligence of a departed community can serve a present and different public in Baghdad: the reactivation is addressed not to the original community, which is not returning, but to whoever now uses the building. Its material relevance lies in the recovery of construction knowledge and materials, palm wood above all, that lost their place over the twentieth century, and in the reuse of the building waste that the abandonment itself produced.

1.4 Aim and motivation

The aim is to identify the spatial, climate and cultural patterns embedded in the Jewish-Baghdadi built environment and to organise them into a coherent pattern language that can serve as a tool for reactivation. The work has two outputs that move together. The first is a pattern booklet that documents and structures the corpus. The second is a design action at the Frank Iny School that puts the patterns to work and tests what they can produce.

I came to this corpus with a personal connection. My grandmother was born and raised in Baghdad, and her generation was among the last living archives of the spatial protocols of Jewish life there; the reliance on oral testimony set out in Part 2 follows from that proximity. My earlier architectural-history thesis on the Frank Iny School (Ninburg, 2025) analyzes the building as an agent of culture into modernisation and transnational Jewish networks (cf. Goldstein-Sabbah, 2021). This project extends that line from interpretation toward action: from what the architecture means toward what it can still do, and from a single building toward the wider built environment that produced it.

1.5 Research and design questions

The project is driven by a question of reactivation: how to bring the spatial intelligence these buildings carry back into operation in a way that produces contemporary architectural space and avoids nostalgic restoration. This resolves into one main research question, two research sub-questions and one design question.

Main research question. What patterns can be identified in the Jewish architecture of Baghdad, and how can they be organised into a coherent pattern language capable of serving as a tool for contemporary design?

This opens into two sub-questions. The first concerns identification: what are the recurring spatial, typological and climate principles that define the corpus across its three urban settings? The second concerns structure: how do these principles interact within a pattern field, and how do they encode the social relations between public and private, family and guests, and exposure and protection that shaped the protocols of communal life?

Answering the second sub-question requires acknowledging the significant social and cultural role that buildings, both private and public, played in the Jewish architecture of Baghdad. Jewish spaces in Baghdad were community-oriented, and so was the Frank Iny School, which was selected as the case

study because it was the very last Jewish community building in Baghdad, meaning that many people now living were educated there.

Design question. How can the identified pattern language be used as a design tool to reactivate the Frank Iny School, through intervention in the existing building and the addition of a new wing, so that the historical patterns produce spatial qualities that respond to contemporary programmatic, climate and cultural needs?

The Frank Iny School is the case study of the research. The choice is part of the project's internal logic: it is one of the community's significant institutional buildings, built in an early International Style, set within a functioning urban fabric and only partly in use today. The patterns drawn from the corpus inform how the building can be read, and the design action examines what an intervention in this building, together with an addition to it, can mean when guided by those patterns. The operational programme is organised around the *salon*, a layered space of assembly developed in Part 3.

1.6 Scope and limitations

The corpus comprises a select set of representative buildings from the three settings that once shaped the community's spatial system: the Jewish quarter inside the old city, Al-Bataween, and the later institutional buildings, chief among them the Frank Iny School. These three layers are read together because Jewish-Baghdadi life functioned as a single urban-communal axis across them, and the patterns the booklet seeks recur across all three.

The project does not attempt an exhaustive inventory of all Jewish sites in Baghdad, nor does it not engage questions of ownership or sovereignty. Direct access to the sites is unavailable and official Iraqi documentation is partial. This constraint is part of why the pattern language is the appropriate method: it allows architectural knowledge to be handled without depending on the integrity or even the accessibility of any single building.

Part 2. Approach

2.1 Theoretical framework

To extract patterns from a built environment, one needs a way of reading it. This project reads the corpus through three connected architectural positions, which together turn twenty-two patterns into a design tool for the present.

The first position is the mobility of architectural knowledge, which is rooted in the pattern language itself. Knowledge is broken into discrete units that can travel, be understood at different points within the corpus, and be recombined in new configurations. Instead of keeping expertise tied to a single building, a pattern corpus lets a designer share, modify and recombine spatial strategies across contexts and scales. This is information mobility in the precise sense the project intends: the transfer of spatial knowledge rather than the mere replication of built form.

The second position is reactivation rather than preservation, following George Arbid's argument that heritage work should move beyond surface commemoration and instead understand the processes that produced the built fabric (Arbid, 2026). Looking at the processes that lead to the patterns, rather than at the pattern in its finished form, gives the project its theoretical foundation.

The third position is the layering of meanings, captured by the concept of the *culturescape*: a system of spatial, social, historical and political relations through which a community's architecture organises its protocols of life, and through which those protocols remain legible after the community has departed. The term extends Hayden and Walker's *religioscape* (2013), which, in turn, extends Appadurai's framework of *scapes* (1996). The extension from *religioscape* to *culturescape* is necessary because what organised Jewish-Baghdadi space was as much cultural and communal as it was religious; it allows the three studied settings to be read as one network. A *culturescape* survives the departure of its

community and becomes the substrate for new readings to be layered. Pieri's account of Baghdad as the vulnerable sum of a composite history and identity (Pieri, 2008) makes this concrete at the scale of the city, and the project applies the same principle at the scale of the building: reactivation activates the multiplicity of meanings rather than selecting a single interpretation.

The unit that makes these positions operational is the pattern. Following Alexander, Ishikawa and Silverstein (1977) and the later development of the pattern language as a tool for design education and research at TU Delft by Rooij and van Dorst (2020), each pattern bridges a recurring spatial problem and a spatial response, carries both a theoretical basis and a concrete application, and relates to other patterns within a *pattern field*. A pattern is a basic unit of accumulated knowledge about a recurring problem, grounded in psychological, social and physical needs. Patterns can reinforce or conflict with one another, forming a structured repertoire from which a designer can select, test, adapt and combine, at scales ranging from the design of a door handle to the way buildings on a street face one another.

What the project adds back to this framework is the condition of the corpus. The buildings are partly destroyed, the community is dispersed, and direct access is constrained, so the frame of reference cannot be built from direct survey. It has to be assembled from a combination of archive, material culture, memory and surviving fabric. Building a frame of reference under these conditions is itself a methodological move, and the four evidentiary layers set out below are the practical answer to it.

2.2 Methods: building the patterns

The pattern booklet is based on four complementary evidentiary layers. The first three feed the fourth, and together they let the project read indirectly a corpus that is closed to direct reading.

The first layer, archival analysis, collects primary documentation accessible outside Iraq. It builds on the historical thesis on the Frank Iny School (Ninburg, 2025), which analyzed original drawings by the engineer Saleh Youssef from 1957 together with photographs and institutional records. For the wider corpus the layer draws on Golany's aerial analysis (1994), the early documentation of Langenegger (1911) and Reuther (1910), and recent research on Baghdadi domestic architecture (Al-Azzawi, 1994; Al-Haidary, 2008; Warren & Fethi, 1982). The method of work was largely one of tracing: re-drawing existing material to reconstruct elevations, sections and floor plans that no longer exist in usable form. Declassified KH-9 satellite imagery from 1984, available through Soar. Earth, complements the ground documentation by exposing the urban fabric at a time when more buildings were still intact.

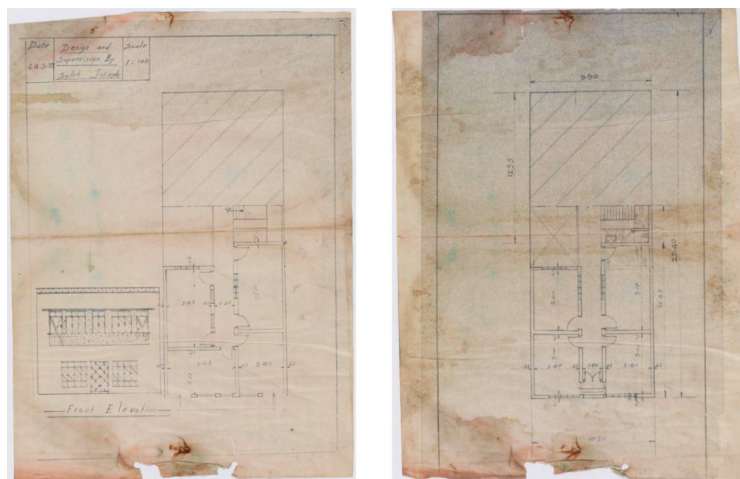


Figure 4. Front elevation, floor plan and material description for an addition to the Frank Iny School, by Ir. Saleh Youssef, 24 May 1957 (Source: Iraqi Jewish Archive).



Figure 5. *The method illustrated: tracing from an archival drawing of the Schaiek family house, Al-Bataween, twentieth century (Source: drawn by author, based on drawings by A. Schaiek).*

The second layer, material culture, examines objects and images that carried the community’s spatial practices beyond the buildings themselves: postcards, photographs, household items and ritual objects gathered through diaspora networks and online archives. Façades were closely examined in photographs to understand how materials, building technology and design values defined the community. These objects record practices that architectural documentation alone cannot capture: how rooms were inhabited, how thresholds were used, and how climate devices such as the *hab* were positioned. As part of this layer I built a website to organise the photographic and testimonial material of the Frank Iny School, so that I could read and understand a building I cannot visit.

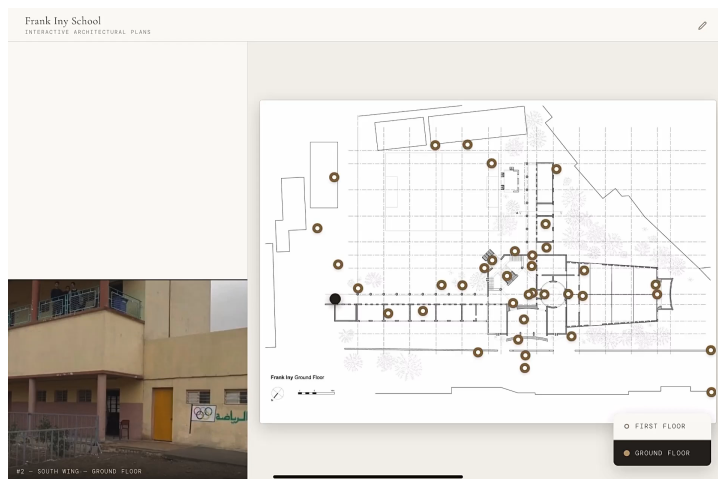


Figure 6. *photos from Frank Iny School, organised by the author into a website built from photographs (Source: by author).*

The third layer, oral architecture, is built from interviews with former users of the buildings, most of whom are members of the Baghdadi-Jewish diaspora now living in Europe, Israel and elsewhere. The interviews focus on how the spaces were used, which practices took place in them, and how everyday and communal life moved between them throughout the day and across seasons. Testimony is treated as primary evidence for spatial protocols and is cross-checked against archival and material sources before any pattern is admitted to the booklet. Memory becomes an operational architectural tool here because direct experience is unavailable, and the proximity to my own family’s generation is

part of what makes this layer accessible.



Figure 7. *Saleh, interviewed former student of the school, living in Amstelveen (Source: by author).*

Arranging the information in a Pattern construction, organises the outputs of the previous three into the structured pattern booklet. Each pattern is written in four short components (a spatial description, supporting evidence, a diagrammatic or photographic representation, and references) in a format adapted from Rooij and van Dorst (2020). The booklet is the project’s frame of reference, and its findings are presented in Part 3. The same four layers also structure the planning of the work: the booklet was assembled first as the research output; the design at the Frank Iny School then tested it; and the cross-cluster pattern field and the detailed design were developed together toward the final assessment.

The working method of the first layer is most visible in the act of tracing, where a fragmentary archival drawing is redrawn into a usable plan, section, or elevation, and where the gaps in the source become decisions the reconstruction has to make explicit.

The material and oral layers were held together in a single working archive, a website built from the photographs and interviews, which let a building that cannot be visited be read as if from the inside.

Part 3. Results

3.1 The pattern booklet and the pattern field

The booklet contains twenty-two patterns identified across the three urban settings. They are organised into three clusters that together describe the operating logic of the Baghdadi house: the climate-spatial system, the threshold and boundary system, and the system of intermediate and gathering spaces. The full treatment of each pattern, with sources, evidence, diagrams and photographs, appears in the pattern booklet included as Appendix A. The summary below sets out how the clusters work together; the design sections that follow show how individual patterns are deployed.

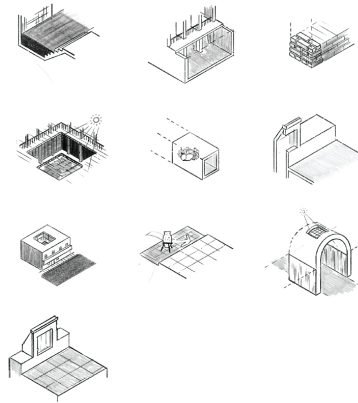


Figure 8. The twenty-two patterns arranged in a booklet, with the pattern field across the three domains of climate, threshold and gathering (Source: diagrams by author).

Arranging the patterns into clusters also reveals the values that governed Jewish building in this period. Climate patterns regulate the relationship between the user and the weather, the sun and the wind, for example, by providing a source of cool water for refreshment in summer. Gathering patterns regulate the relationship between a person and the community, for example, through spaces for conversation among four or five people set aside in larger rooms. Threshold patterns regulate the relationship between a person and the street, for example, through window screens that allow a view out while concealing the interior.

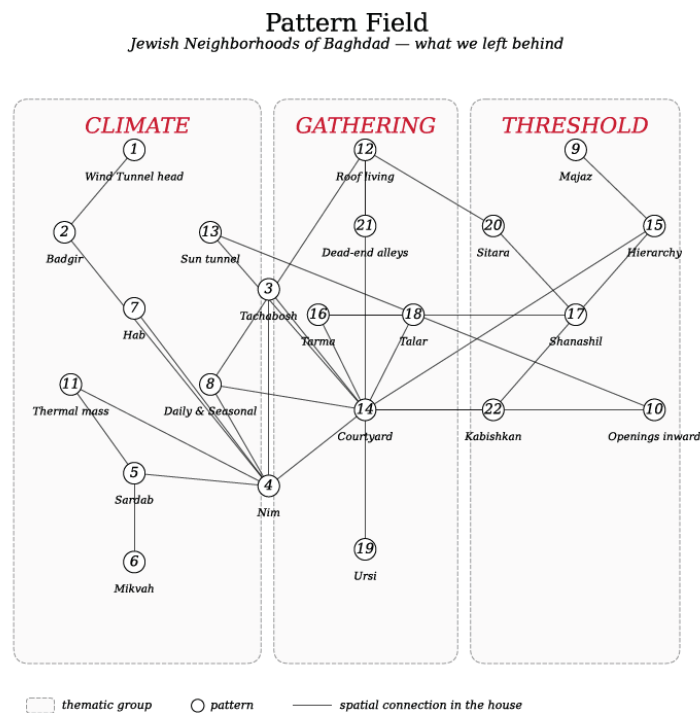


Figure 9. Pattern Field, 3 main domains. Patterns work together, in relation to the 3 domains (Source: diagrams by author).

The climate-spatial cluster describes the thermal logic of the Baghdadi house as a vertical sectional

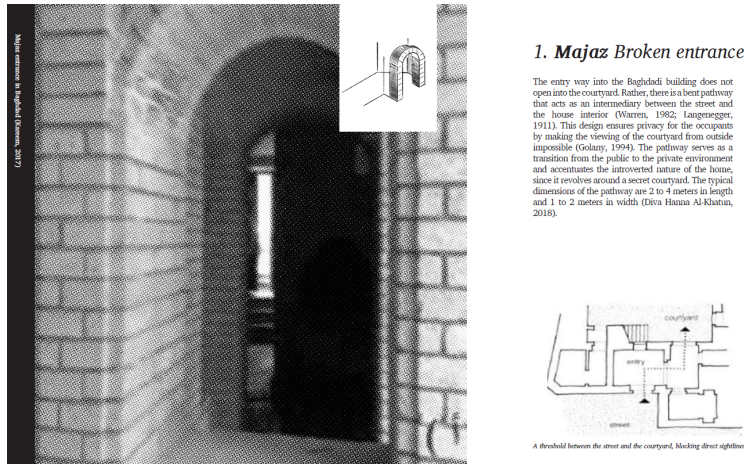
system that extends from the roof to the water table. It includes the wind-catchers (*badgir*), the sequence of sub-surface spaces (*tachabosh*, ground-level balcony; *nim*, semi-underground cooling room; *sardab*, underground cooling room; and *mikvah*, groundwater ritual bath), and the complementary climate elements of thermal mass, the *hab* as a portable evaporative cooling device, deep light-tunnels and shaded recessed openings. The daily and seasonal cycle pattern captures the cyclical movement of residents between levels according to hour and season. Summer thermal differences between zones reach about thirty degrees Celsius (Golany, 1994), so the cycle is the only way the house remains livable. The *mikvah* sits at the deepest point, near the water table, and serves a specifically Jewish function alongside its climate function.

The threshold cluster concerns how space regulates the relations between public and private, exposure and protection. The *majaz*, a broken entrance corridor that blocks a direct view from the street into the courtyard, defines a continuous spatial threshold. The principle of openings inward and closures outward turns the house into a body with a rich interior and an opaque envelope. The hierarchical spaces system adds a stepped progression from the street into the heart of the house. The *shanashil* (screened wooden balcony) and the *kabishkan* (observation mezzanine room) allow views outward, or into adjacent interior spaces, without exposing the observer. On the urban scale, the morphology of the Jewish quarter, with its dead-end alleys and its network of connected roofs, extends the same logic to the neighbourhood, where extreme density forces vertical growth around small courtyards and the connected rooftops act as a second public space protected from the street and from the heat of the alley.

The gathering cluster focuses on the mediating spaces and the spaces of encounter. The courtyard (*hosh*) is the social heart of the house and the organising principle of the entire typology. The *tarma* (shaded upper gallery) and *talar* (shaded summer salon) are open spaces that face the courtyard and let the inhabitants dwell at the edge of the house. The *ursi* (open salon), a room with an openable glass façade, *Kharda-kar* inlaid wood and coloured glass, holds together winter closure and summer openness within one space. The roof belongs to this cluster as well, since its central role is social even though it also forms part of the night-ventilation system: it is a space for living and sleeping on summer nights, continuous with the neighbours' roofs, and an arena in which a significant part of community life unfolded. The *sitara* (roof parapet screen), typically 1.5 to 1.8 metres high and often perforated to let the northern wind pass through, enables the social use of the roof while maintaining privacy, and in the dense Jewish quarter, it was usually built higher in response to the closeness of neighbouring roofs.

Three observations bind the clusters into a single field. First, several patterns belong to more than one cluster; the roof is the clearest example, since it sits socially in the gathering cluster while the daily climate cycle cannot exist without it. These cross-cluster relations form the basis of what Alexander called a *pattern field*, and they are explicitly mapped in the booklet. Second, a number of patterns carry a distinctly Jewish dimension that sets the corpus apart within the wider Baghdadi typology (Ragette, 2011): the *mikvah* most directly, together with the raised *sitara* of the dense quarter and the particularly closed *shanashil*. These are folded into the booklet rather than separated from it. Third, the booklet documents the purpose of each pattern in the context in which it was created, keeping the patterns operational for design while preserving their meaning.

A single pattern spread shows how each entry works at the scale of one element. The *majaz*, the broken entrance, is presented with its spatial description, its evidence and its diagram, so that the principle (a liminal space that gives a sense of security from the street) can be read independently of any one building.



1. Majaz Broken entrance

The entry way into the Baghdadi building does not open into the courtyard. Rather, there is a bent pathway that acts as an intermediary between the street and the house interior (Warren, 1982; Langenegger, 1911). This design ensures privacy for the occupants by making the viewing of the courtyard from outside impossible (Golany, 1994). The pathway serves as a transition from the public to the private environment and accentuates the introverted nature of the house, since it revolves around a secret courtyard. The typical dimensions of the pathway are 2 to 4 meters in length and 1 to 2 meters in width (Diva Hanna Al-Khatun, 2018).

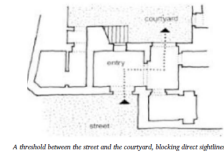


Figure 10. Pattern 1, the Majaz: the broken entrance as a liminal space that gives a sense of security from the street (Source: from the pattern booklet, by author).

3.2 The salon: from research to programme

Read together, the three clusters converge on a programmatic concept that bridges research and design: the *salon*. The corpus analysis suggests the urban salon as the carrier of Jewish heritage in Baghdad, and historical research identifies the Frank Iny School as the city’s last Jewish salon. This is the hinge of the whole project, so it is worth setting out as a sequence rather than as a claim. Houses and other building types in Jewish Baghdad always had public aspects. A large house such as the Menachem house hosted, at its centre, events to which many members of the community were invited; a house of this kind was expected to receive dozens of guests, which places it within the definition of an urban salon. The same plan also contained spaces of making and spaces of living, so that a single domestic structure operated as public, semi-public and private at once.

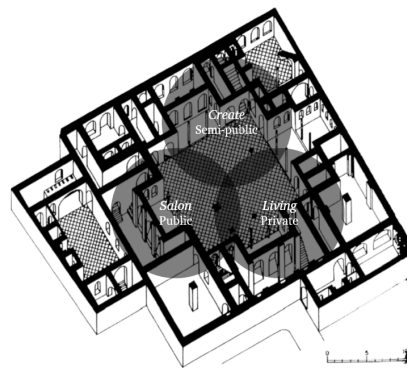


Figure 11. Diagram, 3 domains of the Baghdadi Jewish building co-existing. Example: mechmecham house, (Source: Golany, 1983).

The historical salon has been studied mostly as a domestic space directed at the public, with most attention given to seventeenth- and eighteenth-century Europe, where aristocratic women led regular gatherings for conversation, exchange and the production of knowledge. Habermas describes the salon as one of the spaces in which private people came together as a public (Habermas, 1989): spaces that belonged to the house yet were no longer devoted to domestic life and that played a significant role in forming the public sphere. Baghdad of the early 19-20th century didn’t have a formal salon, yet equivalent functions existed within the urban environment since forever: firstly, the synagogue (*beit kneset*, literally house of assembly) and the Baghdadi courtyard functioned in exactly this way, hosting social, political, communal and ceremonial gatherings that were cultural as much as religious in substance.

When one studies what happened in these spaces, it is notable that they were built around the hosting of guests through the art of conversation and the exchange of ideas, much as the European salon was.

This heritage of gathering spaces continues with its spatial logic into the twentieth-century buildings of the nuclear family, where the meeting space of the salon developed into clubs, cafés and cinemas. All with the same goals and tools of the urban salon.



Figure 12. *The Laura Kadoorie Club café, a modern interpretation of the classical salon (Source unknown, circa 1940).*

The Frank Iny School stands at the end of this lineage. Like other Jewish buildings, it contained large spaces (the lobby, the courtyard and the auditorium) that functioned as general assembly spaces, changing their form according to the community's needs; a theatre performance in 1964 and a wedding in 1965 both took place in the building next to a sports and reading club and off-school-hours living room (Saleh, 2025). Frank Iny remained the last active assembly space of this kind until the departure of the last group of Jews in the 1970s. The building is therefore the final link in the chain of flexible spaces I call the urban salon, and this is the value claim that drives the site election.



Figure 13. *Frank Iny, the last Jewish community space in use. A theater play. (Source: Oded Amit, 1964; Ferrial and Sami Ballas, 15 June 1965).*

The domestic origin of the idea is clearest in the plan of a large family house, where the ground floor can be read in three layers at once: a *create* layer of making (semi-public), a *salon* layer open to guests (public), and a *live* layer kept private.

The same logic reappears in the twentieth-century institutions, where the salon left the house and took

the form of the club and the café. The Laura Kadoorie Club is a direct, modern interpretation of the classical salon: a public room dedicated to encounter and conversation.

At the end of this lineage stands Frank Iny itself, whose large rooms were repeatedly reconfigured for community life, and whose use as an assembly space is documented up to the final leave under the Saddam Hussein era.

In this project, the salon is read as an architectural mechanism of layering: a space built to hold several meanings that the user activates. In a museum or gallery, meaning is curated and transmitted to a viewer; in the salon, meaning emerges through use. Conversation, reading, eating, rest, chance encounter and debate coexist within the same spatial conditions, and none is directed from above. The architecture creates the conditions in which stories can emerge, intermingle and live alongside one another. This is the direct application of the layered-meaning argument from Part 2, where the same space holds simultaneous readings and the reading depends on the observer.

Within this reading, the booklet opens up. The courtyard, the *majaz*, the *tarma* and the *shanashil* become systems of thresholds open to layered use. A courtyard can be used by different domains in different ways: from an individual staying on the grass or a couple having a conversation, a small group of artists bringing their woodwork outside to paint it, or a big group of people taking part in a religious ritual or performance.

The architecture of the multilayered space needs to allow the spatial conditions that can allow this kind of use. The brief therefore operates in three parallel modes (dwelling, making and living), which act as layers of use that residents and visitors move between according to their own choice, the time of day and the season. The salon also carries a contemporary argument: in a period when social media produces constant connectivity that often hardens into polarisation, a building organised as a salon offers a model for community formed around ideas through face-to-face encounter, and through conversation that is warm, enjoyable and seriously meant.

3.3 Architectural positioning and urban approach

If the research established the patterns and the salon established the programme, the site is where the two are brought to bear on a specific architectural problem. The salon programme lands at the Frank Iny School in the New Al-Alwiyah neighbourhood, a formal area of the city next to a large movement axis, characterised by workshops, embassies and a small amount of housing. The choice follows from the value claim developed in Section 3.2, that Frank Iny is the last building in which the urban salon of Jewish Baghdad remained active. Selecting it as the site therefore tests the project's central proposition directly: whether a spatial intelligence that was interrupted in the 1970s can be made to operate again for a present public.

The urban reading sharpens the problem. The building is, explicitly, the largest in its surroundings, yet there is a marked gap between the scale of the building and its plot and its current urban importance, a gap that mirrors at the scale of one building the wider rupture described in the problem statement. The intervention is addressed to that gap: where the problem statement diagnosed a built environment whose social logic had been switched off, the site offers the clearest single instance of it, a formal public building, prominently placed, but only partly inhabited.



Figure 14. *Site plan: the Frank Iny School in the New Al-Alwiyah neighbourhood, set in a formal area of the city next to a large movement axis (Source: Google Maps, 2025, redrawn by author).*

The existing fabric already carries much of the typological vocabulary the patterns describe, which is what makes the building legible through them. It is organised around an internal courtyard, with a grand entrance lobby, a large auditorium, long arcades and the high ceilings typical of Baghdad's early modernism. The high, impressive street façade reads as that of a formal public building, while the inner façade faces the courtyard, the inward-facing logic of the *hosh* recast in an institutional and modernist register. Because direct access is impossible, the documentation of the building proceeded from photographs and testimony, from which elevations and floor plans were reconstructed, so that the site analysis is itself an extension of the four-layer method.



Figure 15. *The Frank Iny School, outer and inner façades, reconstructed from research (Source: by author).*

3.4 The library: a public salon in the existing building

The first focus of the design is the public function. The Jewish clubs and cinemas of 1960s Baghdad are genuinely captivating, but they are functions that no longer exist in the city in 2026. Instead, the design takes another space that follows the idea of the salon: the library. In a certain sense, the library is among the most public spaces in the urban experience. It is not tied to a particular socio-economic class or driven by commercial use, making it a suitable function for a developing salon. The most appropriate location for the public function is a large space close to the street, and the existing auditorium is the best candidate.

The existing lobby leads to both the courtyard and the auditorium, and the auditorium itself is a very high space with a sloped ceiling, vertical windows and a stage at its end; over the years, an additional floor was inserted as a gallery. An interesting circular space mediates within the existing auditorium, and a section through it shows the opportunity the height presents.

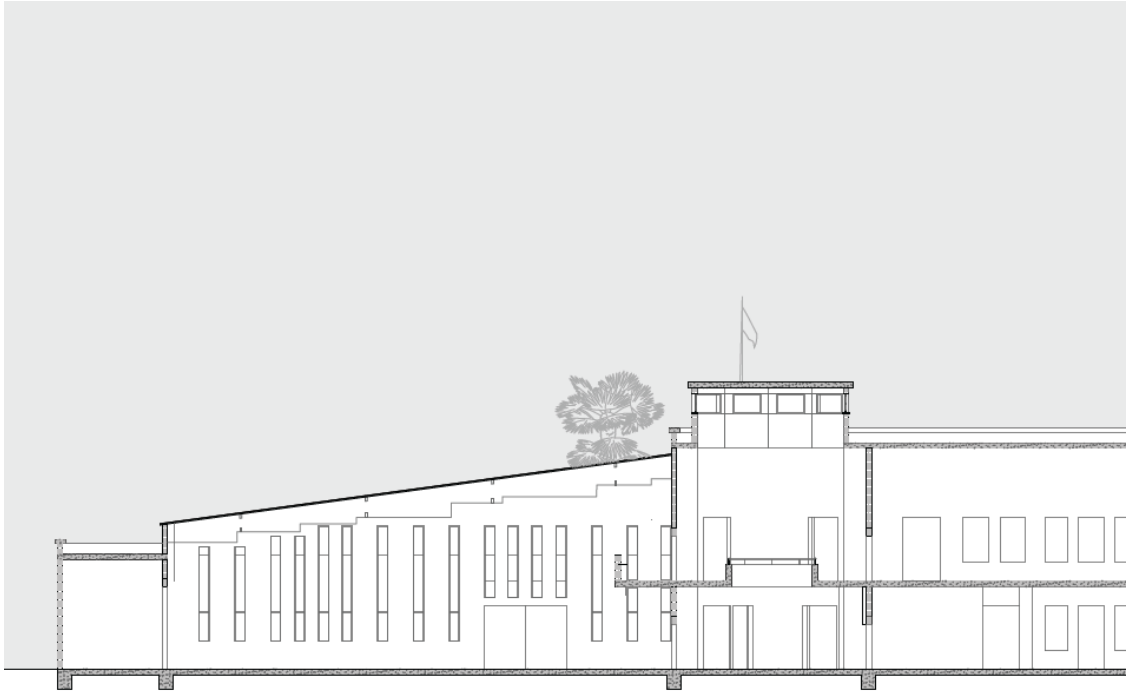


Figure 16. *The theatre hall: current section, showing the height available for intervention (Source: by author).*

The design proposal divides the volume into a gallery, creating an open space facing a closed one, with a stair at the centre that connects the ground to the first floor. The section makes the move legible: the height of the former auditorium is enough to carry two levels of reading space without losing the sense of a single tall room.



Figure 17. *The library: design proposal section, dividing the volume into a gallery with a central stair connecting the ground and first floors (Source: by author).*

Structurally, the intervention requires the introduction of columns and interior façades; such an intervention requires new foundations, but it is feasible, and the existing roof can be retained with added insulation. An exploded view sets out the parts: the new columns and interior façades, the new founda-

tions they stand on, and the retained, insulated roof above.

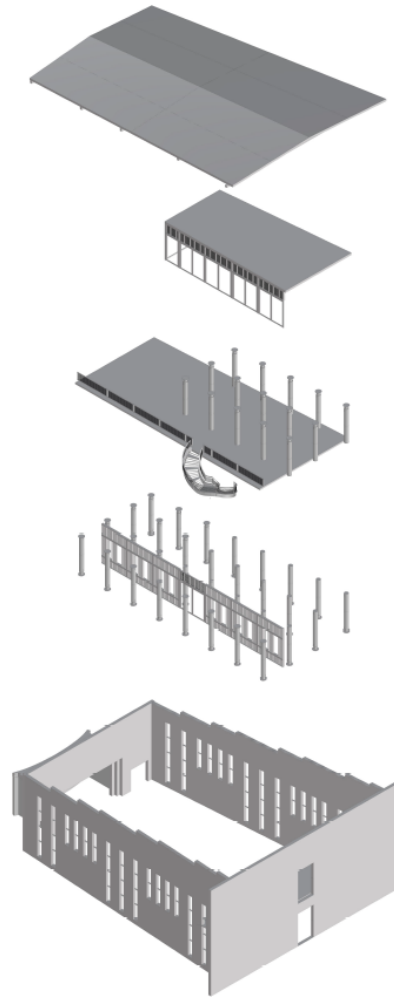


Figure 18. Exploded axonometric of the library construction: new columns, interior façades and foundations, with the existing roof retained and insulated (Source: by author).

The decisive move is to treat the entire library as a complete Baghdadi structure, with its central public space read as a *hosh*, the void in relation to which the patterns work. Defining the void at the centre makes it possible to define the other spaces and to build a spatial narrative through them. The *majaz*, the broken entrance, defines the central space as private by entering it through a curved space rather than head-on. The *hosh* is constituted by the void, from which a set of typological relations is then defined. The *talar*, in effect a recessed salon, leads to smaller spaces for sitting and quieter conversation. The *tarma*, the arcade, allows seated dwelling at height looking toward the *hosh*. The *kabishkan* allows viewing from concealment: the space between the bookshelves becomes a *kabishkan*, a viewing place toward the centre from behind cover, while the study space at the back faces outward through the bookshelves as a *shanashil*. The façade with narrow windows and an interior façade reproduces the logic of the inward-facing house. Throughout, the patterns are interpreted in the service of a narrative of togetherness (what possibilities of conversation, dwelling and freedom they offer the user) rather than reproduced as fixed shapes.

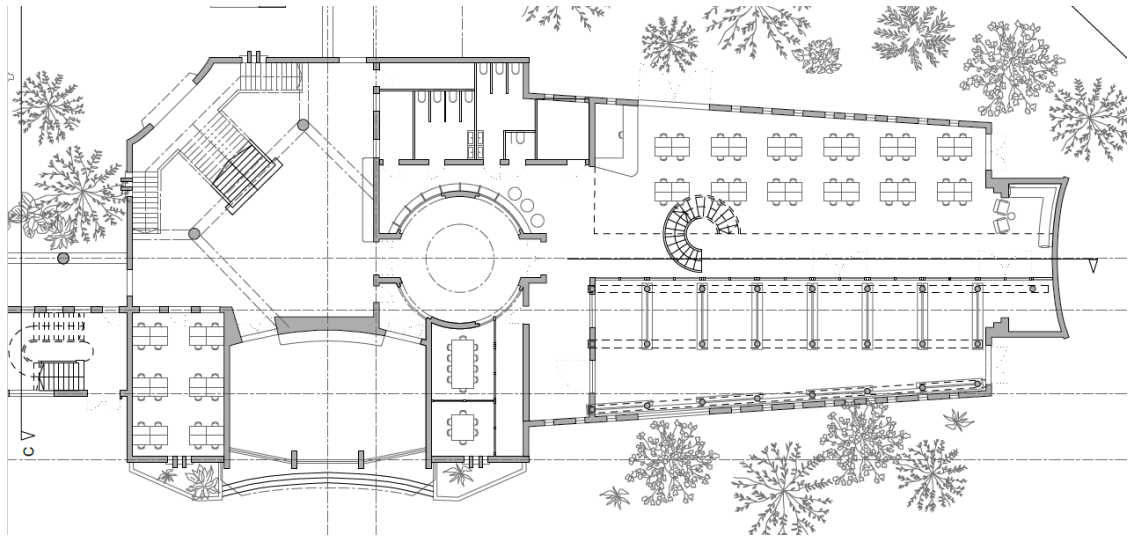


Figure 19. *The library, ground floor plan, with the deployed patterns labelled: 1. Majaz, 4. Kabishkan, 6. Inward-facing, Talar, 9. Tarma (first floor), 10. Hosh, 22. Sun-tunnel openings (Source: by author).*

Seen in three dimensions, the same logic reads as a room organised entirely around its central void, with the bookshelves drawn up to define its edge and to form the thresholds between reading, sitting and observation.



Figure 20. *The library organised around its void, with the bookshelves defining the edge (Source: by author).*

At eye level, the intervention is experienced as a sequence of sitting areas gathered around the entrance to the interior, where the new façade announces the threshold between the public street side and the quieter depth of the room. That inner façade is not only a spatial device but also a climatic one, mediating light and heat between the tall central void and the rooms behind it, in the same way the

inward-facing house mediates between the courtyard and the interior.

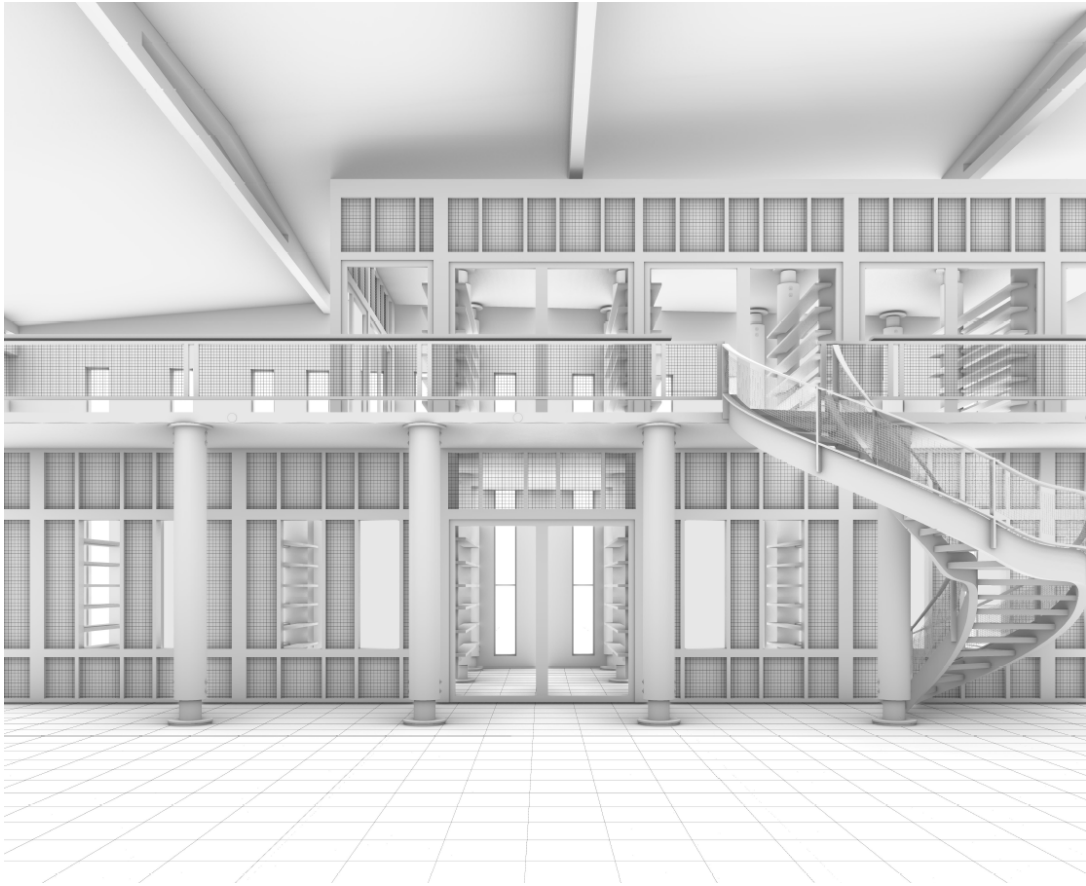


Figure 21. *Render of the sitting areas and the entrance to the interior, showing the façade of the intervention (Source: by author).*

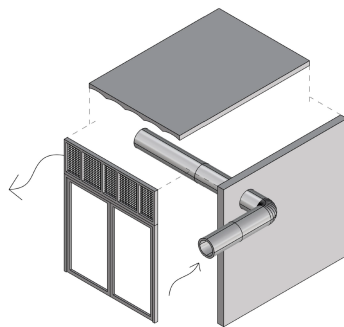


Figure 22. *The inner façade as a climate element (Source: by author).*

3.5 The courtyard and the new mass

The public sequence that begins in the library continues into the courtyard, where the same pattern language is used again, this time in a more literal sense. Here, the courtyard itself is the *hosh*, and the spaces around it, together with their relationships, are the patterns. This is the public axis of the building, so a public element is introduced again, this time a café (the commercial salon), which is by nature somewhat less public than the library.

Creating the courtyard requires adding a mass that encloses the space. The new mass runs across a ground floor, a first floor and a small basement. It contains the most public part on one side and

the semi-public part, the workshops, on the other, and it matches the existing building in height and rhythm so that the addition reads as continuous with the old.

The principal urban move is the introduction of a second courtyard through the new volume. The new mass splits the existing courtyard into two figures: a public courtyard connected to the library and the street, and a private courtyard connected to the residences and the workspaces. This produces a clear spatial hierarchy while maintaining continuity between the two courtyards, and it deploys patterns from all three clusters simultaneously. The enclosed courtyard has four principal elements: a stage; a water source (related to the mikvah in the pattern booklet); a closed garden; and a café fragmented across several spaces.

The private courtyard also works as a tool for building community. A consistent body of research shows that community gardens produce social capital, strengthen local belonging and thicken networks of mutual support (Glover, 2004; Kingsley & Townsend, 2006), and Veen et al.'s study of seven Dutch community gardens (Veen et al., 2016) found that the social effect held across every configuration tested, even where participants had no social aim, because the activity around the growing cycle of sowing, watering, harvesting and sharing produced familiarity and mutual help. A herb garden in the private courtyard therefore works as a double tool, anchoring the residents around a shared activity and contributing to the thermal section of the courtyard through shading and evapotranspiration.

Two studies of the courtyard concept test how the enclosure behaves at multiple levels, examining the relationship between the public and the private figures that the new mass creates.

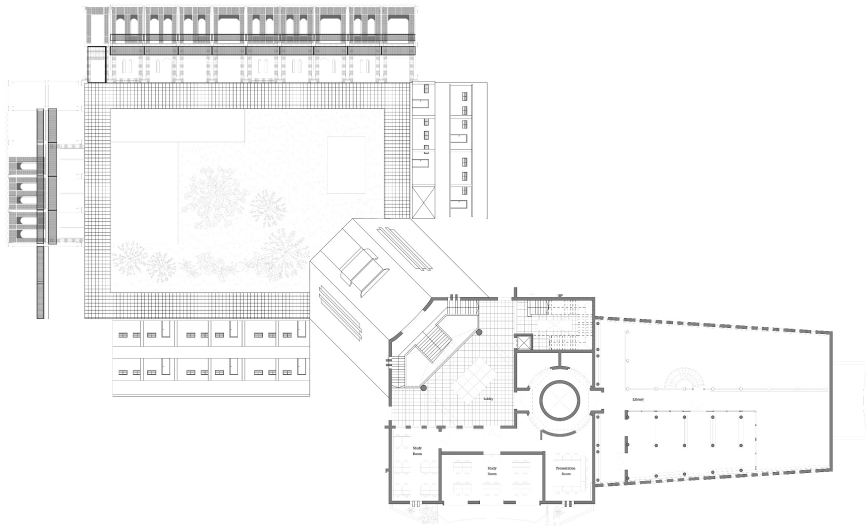


Figure 23. *Two variations on the courtyard, exploring the design concept on two levels (Source: by author).*

The final layout came out of three tries. In the first, I set a new mass parallel to one of the existing wings. The majaz worked, and coming in through the arcade gave me a broken threshold. But the tarma fell apart because there was no complete courtyard for it to wrap around, and neither courtyard ended up feeling more important than the other.

The second try added a diagonal mass. That brought back the circularity, and the ground floor could

now be read as an urisi. The trade-off was that the leftover outdoor space had no clear shape, the line between the library and the addition got squeezed, and facing south-east put it at odds with the climate. Therefore, the third time, I pulled the mass back onto the building's grid. The courtyard opened up, its proportions made sense, and you could finally follow the spaces in order: public library, then the shared courtyard, then the semi-public workshops, and finally the private residences. Taken together, the three tries are the laboratory doing its job. Each move showed me what a given pattern actually demanded once it landed in a building that has little in common with the vernacular it came from. In its built form the new mass is a compact three-level volume (a ground floor, a first floor and a small basement) dimensioned to match the height and structural rhythm of the existing building so that old and new read as one fabric.

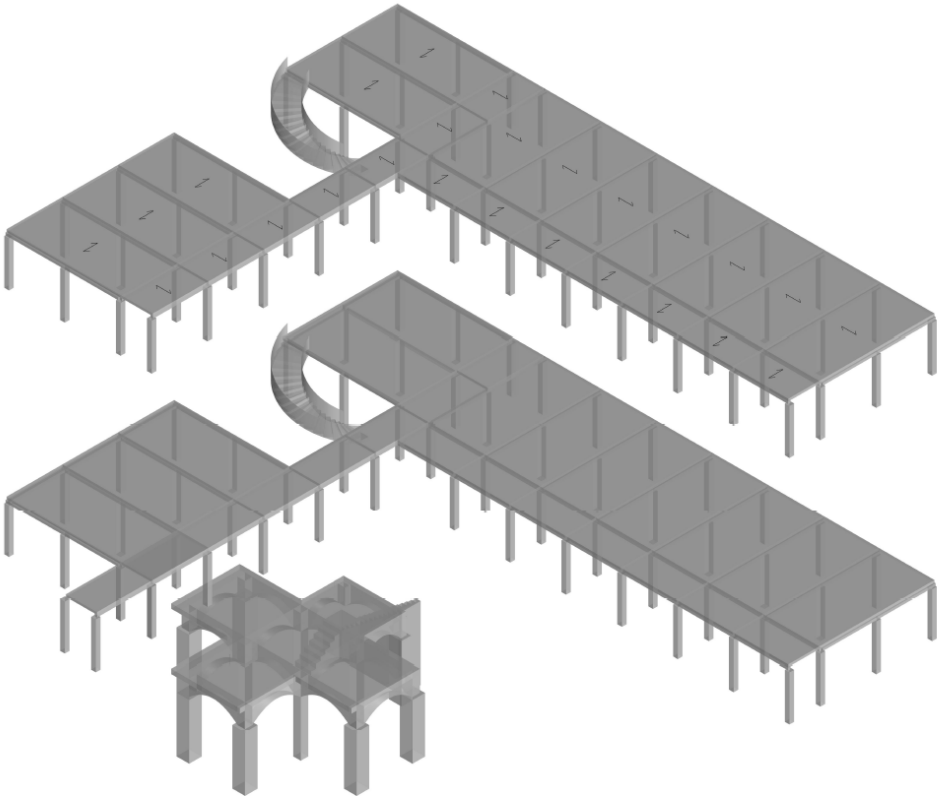


Figure 24. Construction diagram of the new mass: ground floor, first floor and a small basement, matching the existing building in height and rhythm (Source: by author).

In plan, the enclosed courtyard sets out its four elements in relation to one another (the stage, the water source, the closed garden and the fragmented café) so that the outdoor room can itself be read as a salon.

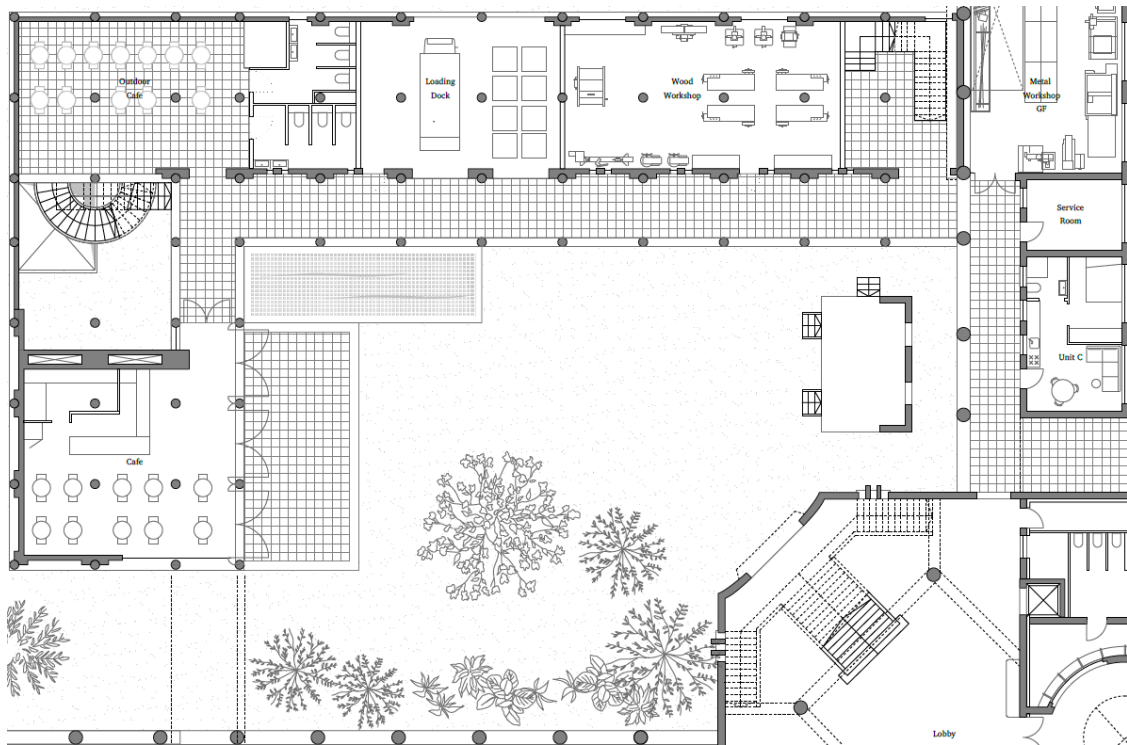


Figure 25. Courtyard floor plan, showing the four elements: stage, water source, closed garden and café (Source: by author).

3.6 The café as a fragmented salon

The most public element in the courtyard is the café, the space that defines it as an outdoor salon. The café is designed as an *ursi*: a façade that opens fully to the courtyard and closes when required, a threshold that changes character with the season and the hour. Because the café is more public than the interior rooms, its façade does not recede in the same way as the inner façades; it is a more public façade based on the element of the door, with pivot doors that perform the function of the *ursi*.

The concept tested in the café is drawn directly from Baghdadi space. Rather than making a single space that provides climatic comfort throughout the year and the day, the classical Baghdadi house takes a different approach: ground-floor rooms suit summer, with fewer openings and walls built of Iraqi-Baghdadi brick, while other levels suit other times. This builds on the pattern of daily and seasonal separation, where the Baghdadi courtyard building regulates heat through solar gain, radiative cooling and air movement, adapting to day-night cycles.

The consequence is that the café breaks into a sequence of smaller spaces, each suited to particular hours and seasons and correlated with the other patterns. Across a vertical section the café is distributed into spaces read as *ursi*, *talar*, *tarma*, *nim* and roof. The *ursi* offers a formal space that blurs inside and outside, opening in spring, while for the rest of the year, it is closed and mechanically conditioned. The space then continues to the *talar*, set back toward the rear, which offers privacy within the public sphere and a shaded summer living room connected to the *hosh*. Finally, the *tarma*, the arcade, offers seating and observation toward the *hosh*. Each sub-space has its own time (morning, midday heat, evening and summer night) so that the Baghdadi daily and seasonal cycle reappears inside a single programme. The design discovered this outcome through the process, which is precisely what the laboratory is meant to produce.

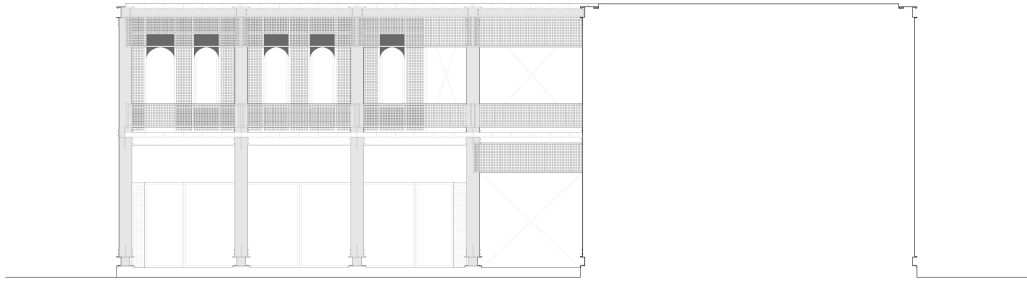


Figure 26. *Elevation of the new mass, the café side: a more public façade based on the element of the door (Source: by author).*

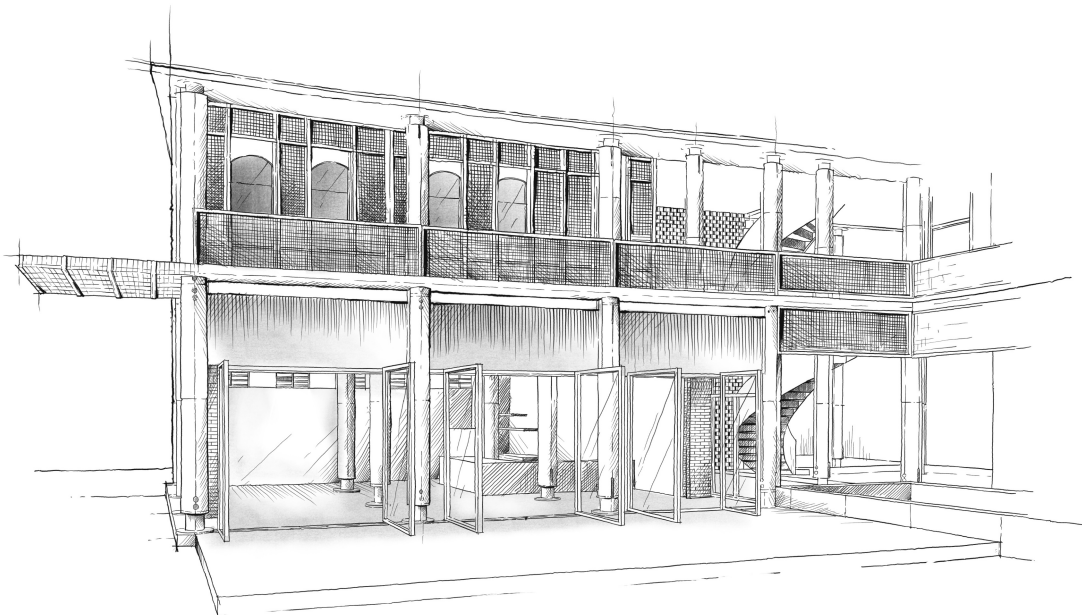


Figure 27. *The café: general view from the courtyard (Source: by author).*

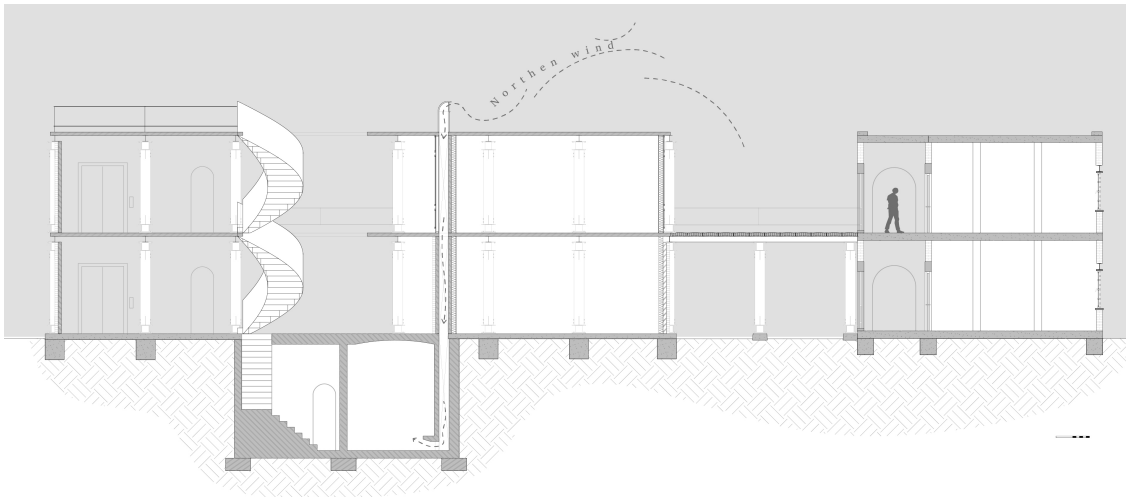


Figure 28. Section through the café, showing the sub-spaces across a vertical section, each activated at a different time of day and season: *ursi*, *talar*, *tarma*, *nim* and roof (Source: by author).

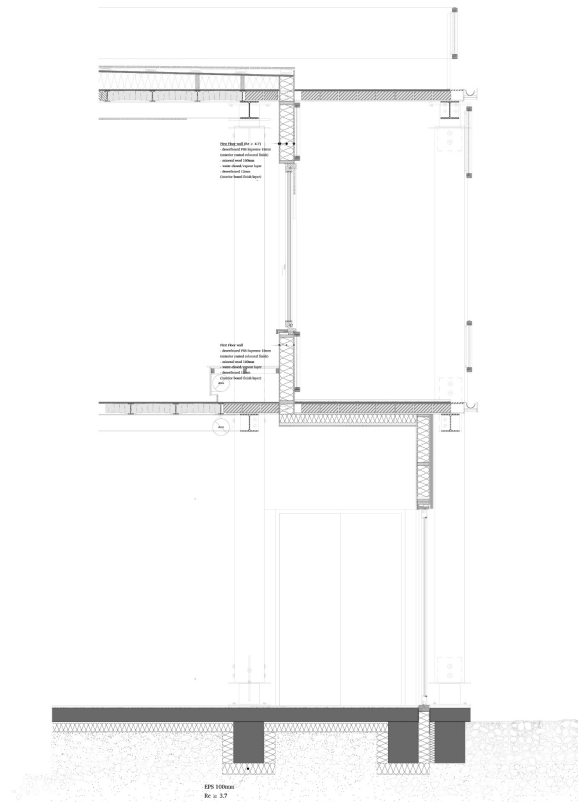


Figure 29. Section of the café façade: pivot doors functioning as an *ursi* (Source: by author).

3.7 The basement: the nim and the mikvah

The basement is my interpretation of a complex and remarkable sequence of underground spaces found in Jewish Baghdad. In the original houses, this network reaches a depth of about eleven metres into the earth; my interpretation is more restrained and reduces the sequence to its two principal spaces, the *nim* and the *mikvah*. The purpose of the basement is to use the thermal mass of the earth to create a cold space, with the temperature difference from the roof exceeding thirty degrees at the start of the Iraqi summer (Golany, 1994). The vertical movement from the cold basement to the warm roof is the spatial expression of the daily cycle, and a section through it shows the arcade (*tarma*) looking back onto the courtyard from each level.

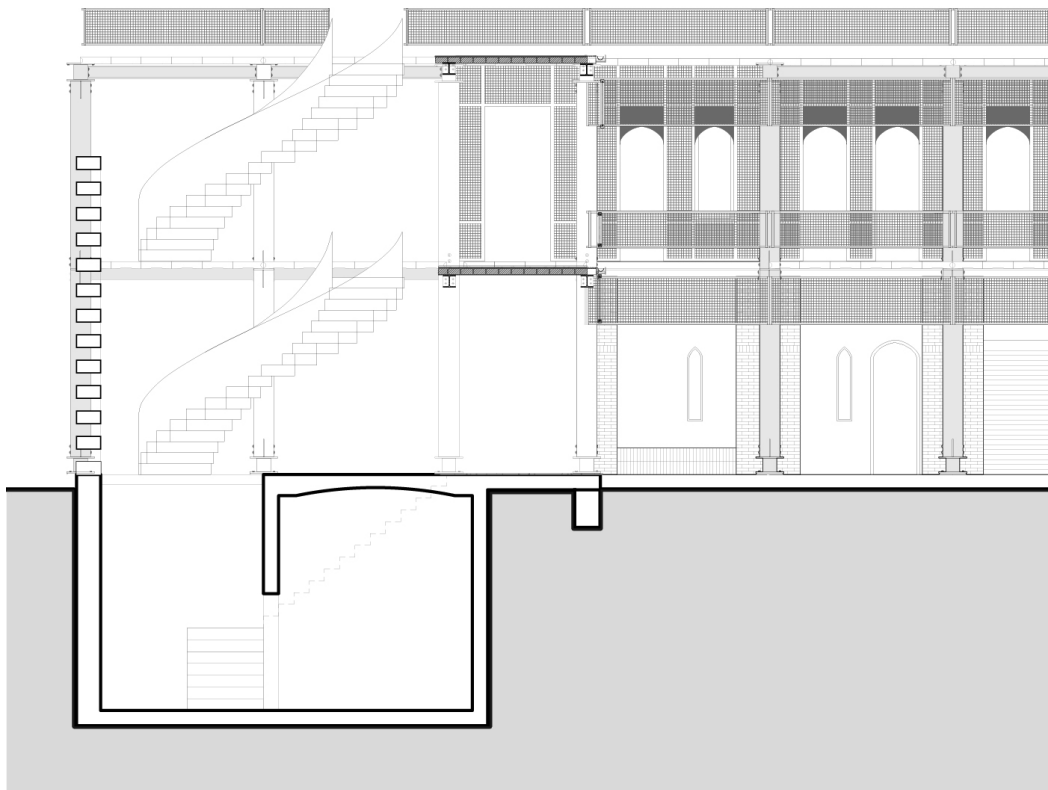
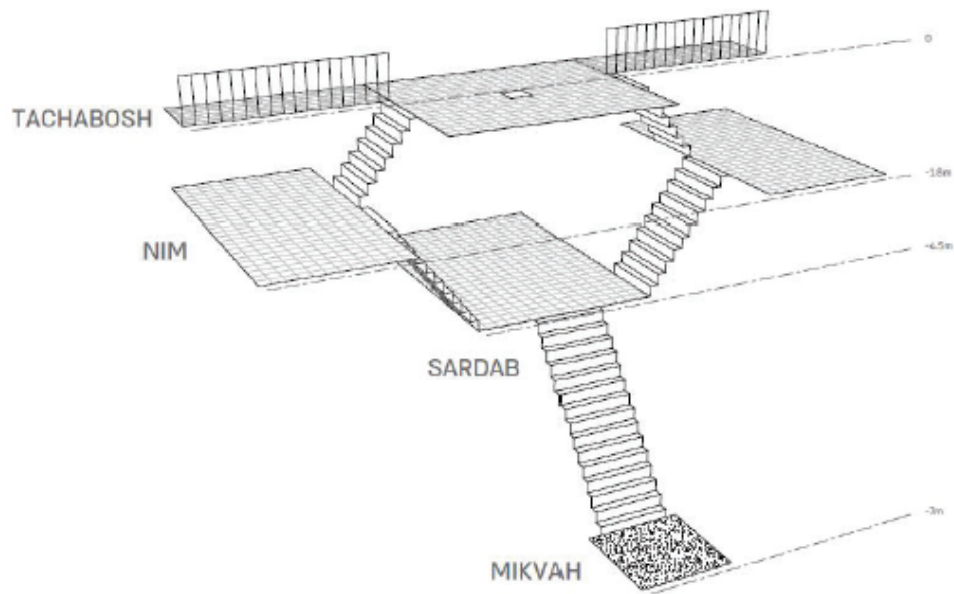


Figure 30. Section of vertical movement from basement to roof, showing the arcade (*tarma*) looking onto the courtyard (Source: by author).



Sardab is connected to the nim, and in jewish houses can lead to a mikvah

Figure 31. *The complex underground summer spaces, with more than thirty degrees of difference at the start of the Iraqi summer, after Golany (1994) (Source: by author).*

The *nim* was a sub-surface space defined chiefly by the *badgir*: a double wall through which cool air enters the space from the north in summer. At its upper end is a decorative opening, and at its lower end a kind of sealed window through which the cool air enters. From the archival images, it appears that people would sit at this lower window, which led me to design built-in benches with ventilation drawn from below, since the basement space is intimate and humid. The dark, damp space is lit by a small window, and the built benches both move air and provide a pleasant place to come to at the start of summer.

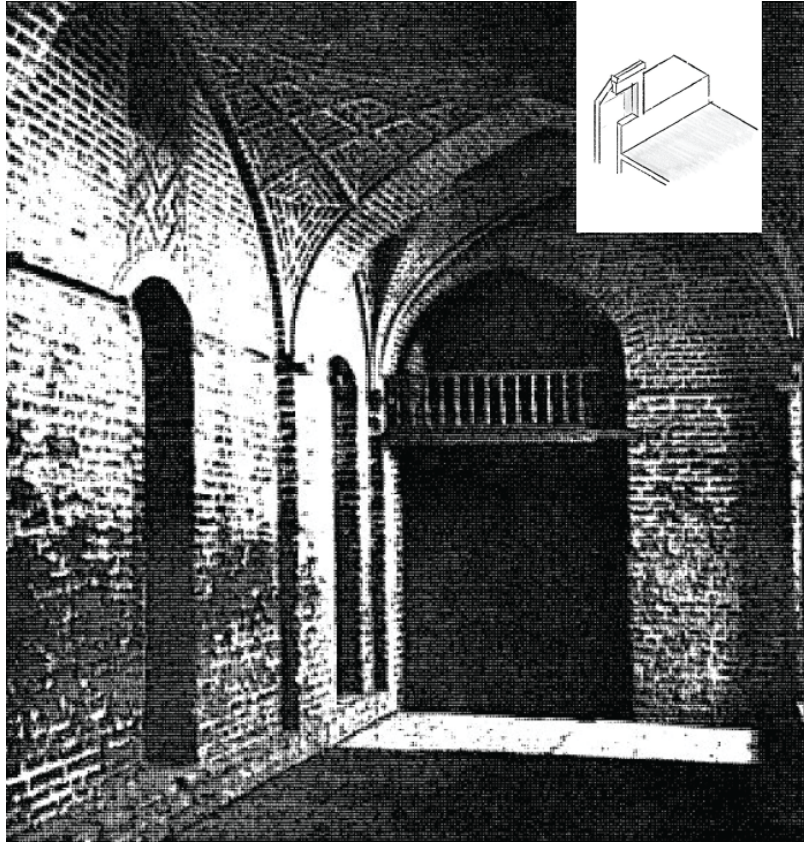


Figure 32. *The nim: cool passive summer space, with the opening of the badgir, after Beit Menachem (Source: by author).*

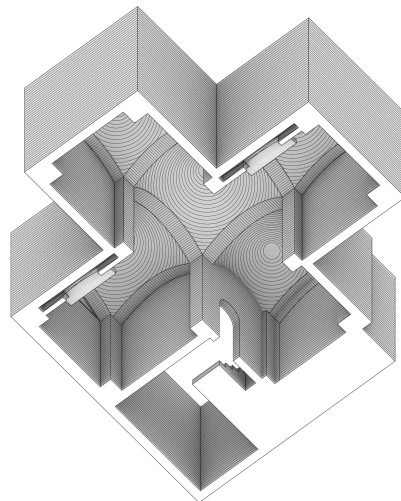


Figure 33. *Worm's-eye axonometric view of the basement: the nim, with the structural arches concept and the arrangement of the brickwork, showing the entrance space and the pockets for conversation (Source: by author).*

The second pattern being brought from the underground spaces is the *mikvah*. The idea of water is interpreted here as a centre of the space, a place that can provide climatic comfort through air movement. Although it is moved out of its original context as a deep underground space toward the surface, its spatial logic of proximity to the *nim* is retained. Its position outdoors, set in relation to the wind, leads to the cooling of the dwelling spaces around it, the café and the workshops. The water reaches it in part through a gutter. In this way, the historical relationship between *nim* and *mikvah* is preserved,

while the pair is given a new climatic role within the intervention.

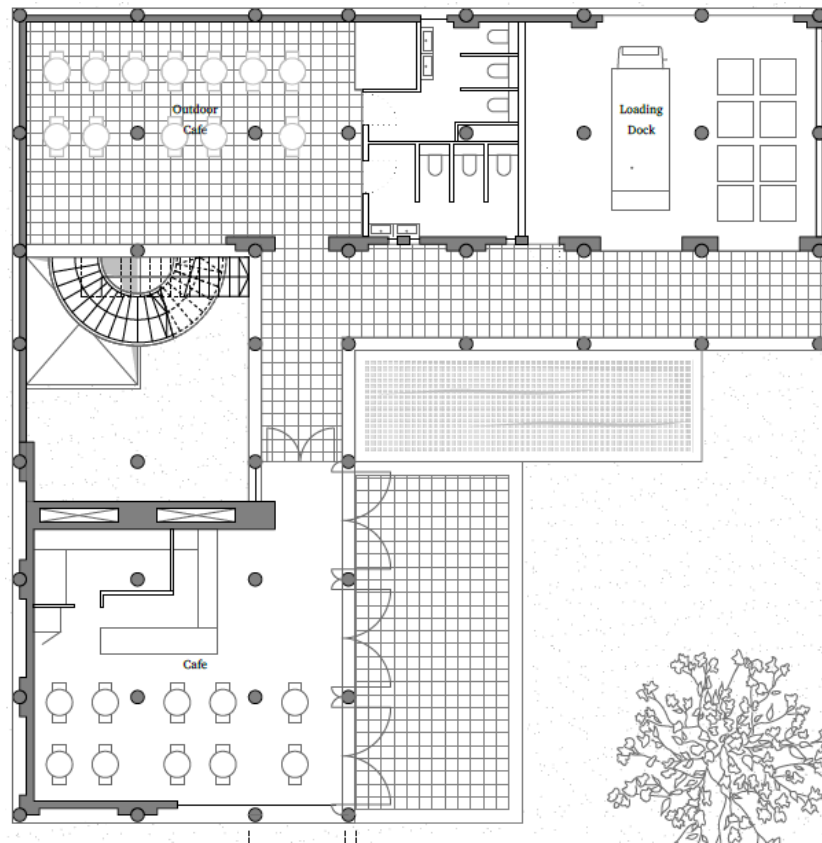


Figure 34. The mikvah used as a centre and a cooling device, keeping the historic relation between *nim* (basement) and *mikvah* (water source); the water is fed in part through a gutter (Source: by author).

3.8 The workshops: material culture as programme

If the library and the café reactivate the spatial intelligence of the corpus, the workshops reactivate its material intelligence, and the two operations are deliberately parallel. The spaces surrounding the courtyard hold three workshops that engage the material culture identified in the research as constitutive of the Jewish-Baghdadi culturescape. They are organised by the three materials that dominated that culture: wood and metal on the ground floor, and ceramics on the first floor. The vertical arrangement follows the same climatic reasoning the patterns encode, keeping the heavier, more ventilation-dependent crafts of wood and metal at ground level and the lighter activity of ceramics above, so that the programme is distributed through the section in the way the Baghdadi house distributed life through its thermal levels.

The choice of these three materials is grounded directly in the material-culture layer of the research. They are the materials through which the culturescape was physically expressed: the *Kharda-kar* inlaid woodwork of the *ursi*, the metal grilles and fittings of the *shanashil*, and the ceramic tilework of the courtyards. Reactivating them as a living craft is the material counterpart of the project's central argument about patterns. The pattern booklet and the workshops are, in this sense, two versions of the same operation: one translates spatial knowledge into language, the other translates material knowledge into practice.

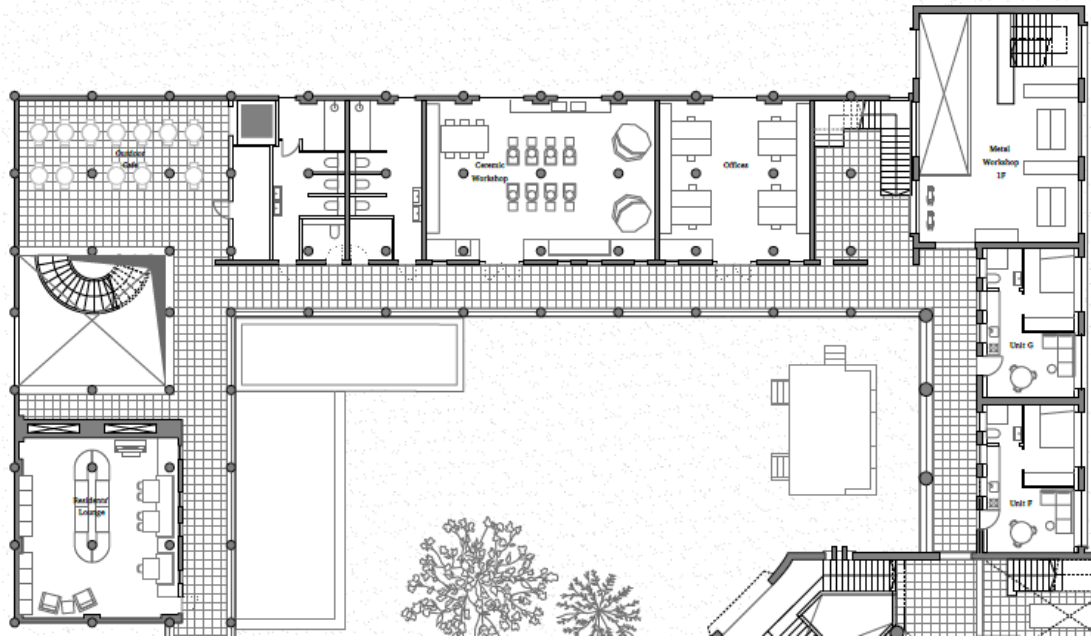


Figure 35. *Three different workshop types, first floor: ceramics (Source: by author).*

Inside, the ceramic workshop is fitted out for daily use, with shelves for work in progress and a built-in bench that belongs to the same family of ventilated, inhabited edges found throughout the project.



Figure 36. *Render of the ceramic workshop, with shelves and a built-in bench (Source: by author).*

The workshops also bind the three programmatic modes of the salon into a single social system. They are operated by the people who live in the complex as part of the residency, which ties the making mode to the living mode and, in turn, feeds the public dwelling mode of the library and café. In this way, the building is not a set of separate functions but a circuit, in which the inhabitants' making sustains the public life of the courtyard, the contemporary form of the layered, self-supporting community that the historical salon once held.

3.9 Technical and material development

Palm wood

The material strategy begins with the *shanashil*. The screened balcony, which allows masking (to see and to be seen), was widely used on the more open lower floors of Baghdad. It was made of wood, frequently palm wood, which is today almost out of use. Palm wood quickly became the focus of the material investigation: a locally available material whose use had been discontinued. It is not, however, a conventional timber. Botanically, palm is not a conventional tree; its fibre structure produces a material that is dense and hard at the periphery and soft toward the core, and very soft when young. Its use was discontinued in the modern era due to the lack of uniformity in density, both within a stand of trees and a single trunk. With modern tools, this can be tested, and using the denser outer A and B layers can secure a material strong enough for structural use.



Figure 37. The neglect of shanashil work, made in palm wood (Source: photograph by Mohammed J. for the author).

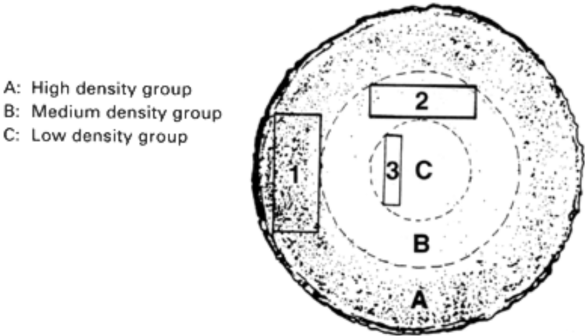


Figure 38. Density areas of the palm tree: A, high-density group; B, medium; C, low (Source: Killman & Fink).

The material can also be processed into OSB boards, as a company in the UAE proposes (Desert Board), which are used in the detailed design; these boards demonstrate that the fibrous, non-uniform raw material can be engineered into a predictable building product.

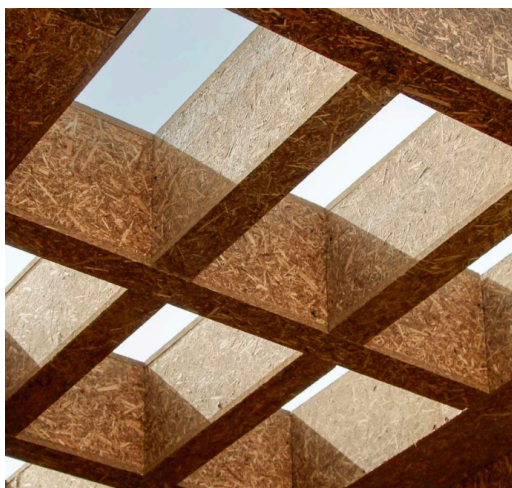


Figure 39. OSB boards made from palm (Source: Desert Board).

The softer parts of the fronds can be used for the building's façade. The pulp is extracted by cutting the head of the tree, removing the hard layers of plant tissue, removing the soft tissues and serrating the pulp (Jawad and Audai M. Qasim).



Figure 40. Date-palm pulp extraction: (1) cutting the head of the tree, (2) removing the hard tissue layers, (3) removing the soft tissues, (4) serrating the pulp (Source: Jawad and Audai M. Qasim).

When the *shanashil* is made from the material, the thick stems give it a rough appearance while the dried fronds give a uniform one. These are combined in the façade to create a form of masking for the railing of the first floor, the sun-shading of the arcade, and the façade itself.



Figure 41. Palm-wood shanashil made from stems and dried fronds (Source: Eman Darwish).

Palm wood as a structure

A second use of palm wood is structural. Originally, palm was used as a beam (from the Iraqi nomadic house made entirely of palm wood, to the later house where it served as ceiling beams and columns), but here it is used differently, as a load-bearing column combined with steel in a hybrid arrangement. This is not unheard of for palm in general, but it is innovative for Baghdadi timber. It leads to very heavy and dramatic columns, which suit the appearance I wanted for the ground floor: columns of 400 mm every 3.6 metres. This sits reasonably well with the existing building, whose concrete columns I estimate at 500 to 600 mm every 3.6 metres.

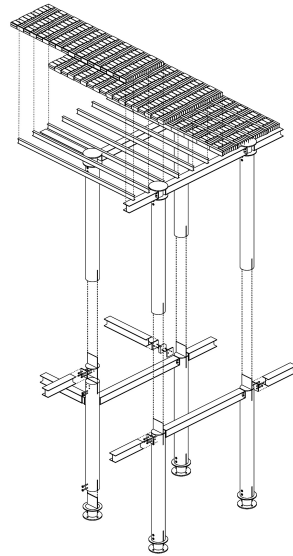


Figure 42. *Structural diagram: steel and palm in a hybrid column (Source: by author).*

I ran a feasibility estimate rather than a full structural calculation, simply to test whether the hybrid column is plausible at this scale. The dimensions would still need to be verified by a qualified structural engineer before any design is developed. The estimate assumes a two-storey public building, with storey heights of around 3.5 metres on a 3.6 by 3.6 metre grid. Each column then carries a tributary area of about 13 m². At a floor load of 5 to 7 kN/m², the axial load is roughly 180 kN, and, against a conservative compressive strength, a 400 mm section proves sufficient. The compressive strength of palm itself ranges from 20 to 40 MPa, depending on the age and moisture content of the material. The main difficulty lies in the connections, where the soft core is prone to splitting. For this reason, I chose a knife-plate steel connection, which relies less on the soft core and instead engages the stronger outer fibres. As with any timber, the material also needs treatment against moisture and insects. It should also be noted that palm is amply available in the region, and it is also renewable. It requires little to no industrial processing beyond drying and surface treatment, and its embodied energy is negligible compared with that of steel or reinforced concrete.



Figure 43. A palm tree used as a column, ending in a 400 mm column every 3.6 m (Source: after Killman & Fink).

Façade composition: brick below, timber above

The two storeys are treated differently. The ground floor is brick, built with the yellow Baghdadi brick still produced locally. Here, the columns sit recessed within the façade, so they remain visible and contribute to the building's heavy appearance. The first floor must read as lighter, so the column stays in place while the façade moves slightly forward to cover it, producing a façade with depth between its layers. In this upper zone, benches face the space, with built-in ventilation that emerges from the lower part of the bench. The façade is based on a frame that closes against an outer frame, so that it can be repaired if damaged.

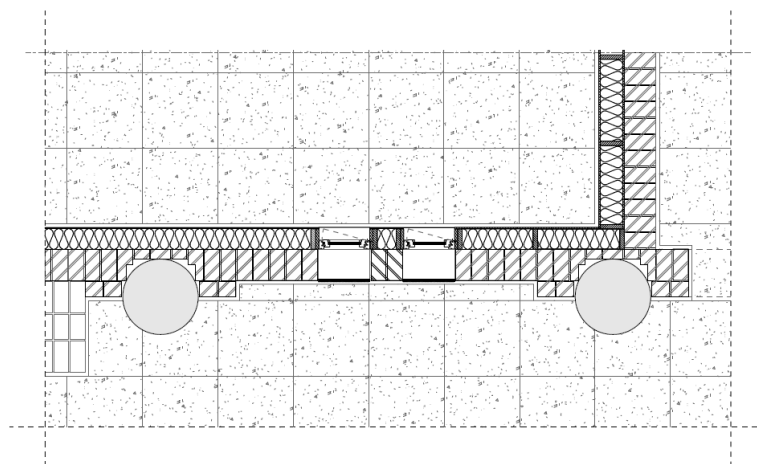


Figure 44. Horizontal façade section, ground floor: yellow Iraqi brick and stucco, with openable windows and the recessed column (Source: by author).

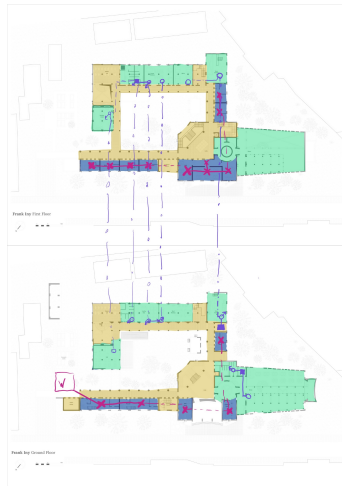


Figure 47. *Climatic separation diagram: yellow, outdoor; green, air ventilation; blue, floor cooling (Source: by author).*

Re-use: the urban terrazzo

Finally, a great deal of building waste is scattered through the Jewish buildings across Baghdad and within the Frank Iny School itself, and how to use this waste is an important consideration in the intervention. The brick that frames the ground floor is the same yellow Iraqi brick still manufactured locally, which keeps the heavy base of the building within the region’s living construction culture.



Figure 48. *Yellow Iraqi brick, of local manufacture (Source: The National).*

The proposal develops the waste into a terrazzo, an “urban terrazzo”, in which tiles are made from the building waste of the abandoned Jewish buildings. The material thereby carries the history of the buildings forward, recovered from neglect into use, and is deployed in the residence floors and elsewhere in the project.



Figure 49. *Terrazzo tiles from building waste: the “urban terrazzo” (Source: They Feed Off Buildings).*

3.10 The residences (Live)

The residences complete the salon’s third mode, living, by reusing the part of the existing building least suited to public life: the former classrooms in the existing wings. Placing the dwellings here turns a constraint of the inherited plan into an argument, since the arcade that once served the classrooms becomes the space of transition into the dwellings. This is a direct reactivation of the *tarma*, the shaded gallery that in the Baghdadi house mediated between the rooms and the courtyard. In total there is room for two family apartments and five studio apartments, so that about eighteen people can live in the complex, the two family units formed by combining three classrooms each into a two-storey apartment. A resident population of this size is enough to keep the building continuously inhabited and to staff the workshops, which is the practical condition on which the salon depends.

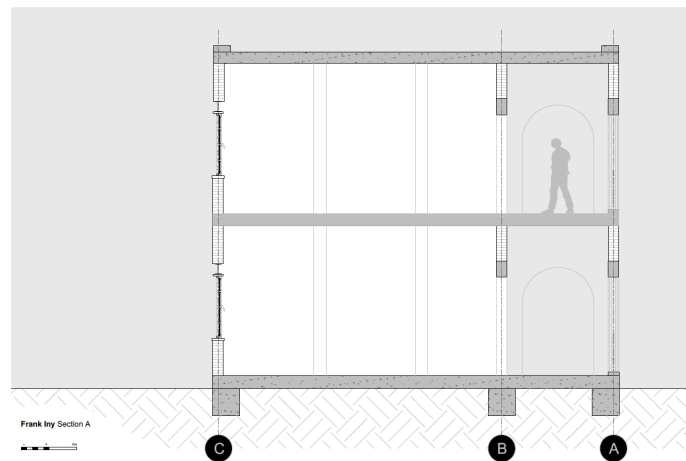


Figure 50. *Section of the wing, reconstructed from research (Source: by author).*

It is the arcade itself, the high gallery that once served the classrooms, that becomes the route to the dwellings and the reactivated *tarma* of the project.



Figure 51. *First floor, left wing: the high arcades that become the route to the dwellings (Source: Google Maps, 2021).*

The family apartments are made by combining three classrooms each into a two-storey unit, so that the inherited grid of the school is re-read as the grid of a home.

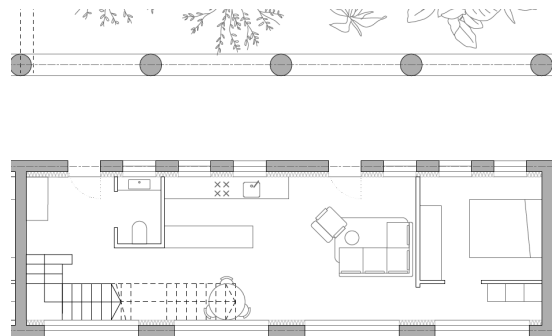


Figure 52. *Ground floor: two-storey dwellings combining three classrooms into a family apartment (Source: by author).*

The placement of dwellings beside the public and workshop functions produces a real conflict, principally of noise, and the design treats that conflict as a technical problem to be solved rather than avoided. Sound insulation is introduced between the dwellings and the active spaces, and floor heating is run between the apartments, so that the section can carry living and making in close proximity without one disturbing the other. This is where the technical building design serves the programmatic idea directly: the layering of uses that the salon requires is only liveable because the construction is detailed to absorb the friction between them.

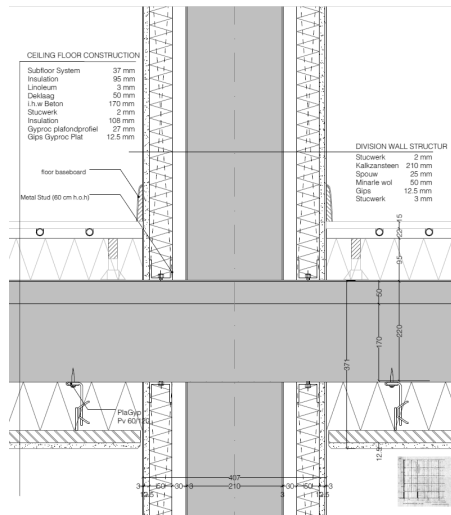


Figure 53. *Detail between two apartments: sound insulation and floor heating (Source: by author).*

The residences are given two gathering spaces of their own, which reproduce the salon's logic at the most private scale of the project. The first is a living room on the first floor; the second is a garden to one side, the private courtyard's herb garden discussed in Section 3.5, which ties the residents to the making mode through shared cultivation and contributes to the thermal section of the courtyard.

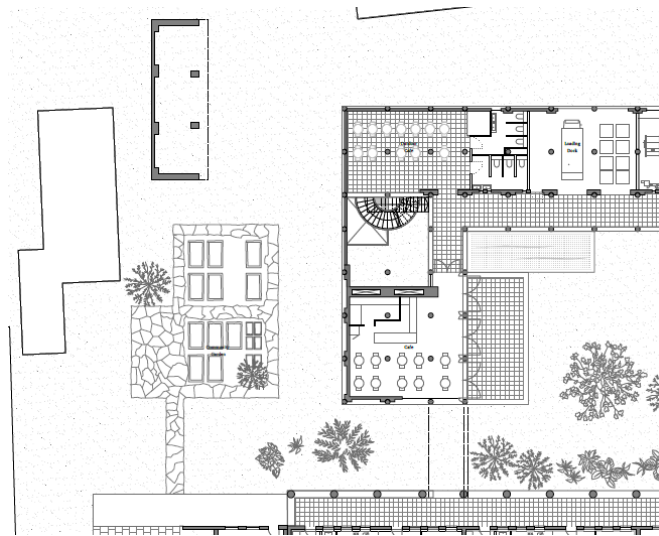


Figure 54. *The residence garden, floor plan (Source: by author).*

The dwellings are surfaced in the urban terrazzo developed from the building's own waste, so that the material narrative of the project (recovery from neglect into use) reaches even the most private rooms, and the resident lives, quite literally, on a floor made from the rubble of the abandonment the project sets out to reverse. Read across the whole site, the plan shows the three modes (dwelling, making and living) sharing one continuous spatial system.

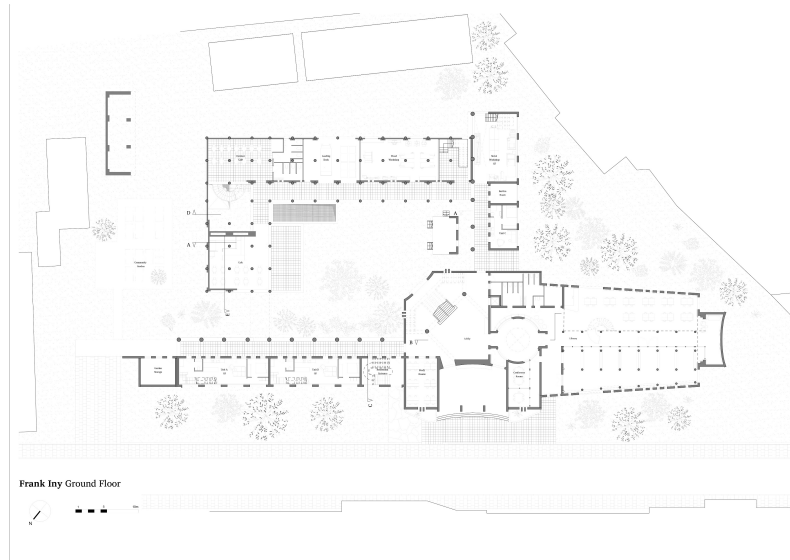


Figure 55. General floor plan of the whole intervention (Source: by author).

Part 4. Conclusion and discussion

4.1 Answer to the research and design questions

The main research question asked what patterns can be identified in the Jewish architecture of Baghdad and how they can be organised into a coherent pattern language capable of serving as a tool for contemporary design. The project answers it with a booklet of twenty-two patterns across three clusters (the climate-spatial system, the threshold and boundary system, and the system of intermediate and gathering spaces) bound into a single pattern field through the cross-cluster relations recorded in the booklet. The patterns were built from archive, material culture and oral testimony, and the method held even though it could not rely on the integrity, or the accessibility, of any single building. This answers the two sub-questions: the recurring principles were identified across the three settings, and they were shown to encode the social relations of public and private, family and guests, exposure and protection within a connected field.

The design question asked how the pattern language could be used to reactivate the Frank Iny School. The design answers it through the salon: a layered space of assembly that gathers a library, workshops and artists' residences around a public and a private courtyard, addressed not to the departed community but to whoever uses the building now. The central finding of the design process is that patterns operate as spatial principles rather than as fixed forms. The *ursi*, the *majaz* and the daily cycle are each a set of relations (between inside and outside, public and private, time and use) that can be reconstructed in a different material and typological context once the underlying logic is understood. This distinction between form and principle is the project's primary contribution to the disciplinary question of how historical architectural knowledge can be translated into contemporary design tools.

4.2 Main architectural conclusions

Spatially, the reactivation produces a legible sequence from the street into the depth of the building. The library occupies the auditorium next to the street as the most public room, treated as a complete Baghdadi structure with its central void read as a *hosh*. The public courtyard, addressed by the café read as an *ursi*, becomes the outdoor salon. The new volume of workshops mediates between public and private and forms the second, private courtyard, which holds the herb garden and serves the residences in the long existing wing. The three modes of dwelling, making and living share one spatial system and keep the building continuously inhabited, which is the practical form the salon takes at the

Frank Iny School.

4.3 Technical and material conclusions

The café shows the difference between form and principle most clearly. A single programme is split across a vertical section, moving through the *ursi*, *talar*, *tarma*, *nim* and roof. This recreates the Baghdadi daily and seasonal cycle within one space. The point was to rebuild the logic behind it, the idea that a room can change character as the hours and seasons change.

The same way of reading carries over from space into construction, and that continuity is why the technical work belongs to the project rather than sitting beside it. Palm wood, a discarded local material that stem from the material-culture research, is reworked from a beam into a hybrid load-bearing column. Its weak point is the soft fibrous core, which the knife-plate connection sidesteps by gripping the stronger outer fibres. This reactivates a pattern as a principle instead of reproducing it as a form, keeping the material's cultural life intact while giving it a new tectonic role. The façade carries the climate logic of the corpus down into the section.

The climate strategy follows the Baghdadi model of spaces tuned to particular hours and seasons. The library, café and workshops are handled mechanically where the programme calls for it; the shaded and transitional spaces are left to passive means. The urban terrazzo, in turn, brings the argument full circle, taking the building waste left behind by abandonment and turning it into a finished surface, so the very rupture the project responds to ends up built into its answer. Read together, the research, the design and the technical resolution are not three parallel tracks but one argument followed all the way down to the detail.

4.4 Implications and transferability

The pattern language developed here is not limited to Baghdad or to the Jewish corpus, and this is where the project's contribution reaches beyond its own site. Its method (building operational knowledge from archive, material culture and oral testimony, without depending on the integrity or even the accessibility of any single building) applies to any architectural corpus that is dispersed, partly destroyed or closed to direct visit. This is the condition of a growing number of architectural legacies worldwide, whether through conflict, displacement or environmental loss, and the project offers a tested procedure for handling such knowledge rather than only mourning it.

A resulting recommendation is to treat heritage as a process that can be reactivated, in Arbid's sense, rather than as an object to be preserved, and to treat the pattern as the unit that makes such a process portable across contexts. Another recommendation concerns the project's answer to its question of contribution, which generalises into a claim that the spatial intelligence of a departed community can legitimately serve a different one, provided the architecture reactivates principles rather than restages a vanished life. For future work, the booklet can be extended to corpora beyond the Jewish-Baghdadi setting, and the relationship between a frame of reference and a design laboratory, which this project treated as its core method, can be tested on other building types and other displaced architectures.

4.5 Reflection

The project began as a question about buildings and developed into a question about knowledge. The buildings of Baghdad's Jewish community are disappearing, and the question of the project is what form of knowledge can survive their loss. The pattern language is the carrier of the intelligence that produced the buildings, able to operate when the buildings themselves are gone.

Within the methodology, research and design were related as a frame of reference and a laboratory. The booklet and the design informed each other, and the most important design insight, the distinction between form and principle, emerged from the friction between them. The three iterations at the Frank Iny School were the mechanism of that friction, since each move tested a pattern against a building that pushed back. The approach worked where the patterns were treated as principles open to

reinterpretation, and it strained where a pattern was carried over as a shape, the lesson the form-and-principle distinction records.

Two limitations of the argument should be stated plainly. Sometimes, it seemed to me that the distinction between form and principle depends to some extent on its success in design, and therefore it is not a tool that predicts success, but a tool that distinguishes between failure and success after its deployment in design. For example, the *maja* currently existing in the building in the lobby (the large stairs that break the angle of view to the inner courtyard) lacks any spatial logic and is therefore a 'form' and after the introduction of a courtyard, it becomes a 'principle'. Second, how can the user read the use of a space that contains different layers of knowledge and interpretation. That is, how can a visitor sitting in the cafe next to the mikveh, a charged Jewish space, experience the full thought behind the architecture? Indeed, climatically it is easy to understand how he would benefit from the lowering of the temperature and spatially how the water source would help me understand that this is the center of the public space, but in terms of heritage it seems that he would have a very difficult time reading the different uses of the space. This leaves me with the understanding that architecture can serve as a platform for layers of knowledge and life practices but has difficulty making this knowledge fully legible.

4.6 Ethical issues

The project is surrounded by ethical questions that shape its scope and its method. Working with the heritage of a displaced community means dealing with politically and emotionally controversial material, or as a researcher told me, "I'm not sure there is an ideological group for whom such a project would sit well on the scale of values." This led to the decision to set aside questions of ownership, sovereignty, and not to elaborate in depth on the life of the user, so that the work could remain within the framework of an architectural question of reactivation. This boundary became and shaped a position according to which architecture would activate intelligence and structure without restoring or re-negotiating the past.

Relying on oral testimony brought a more immediate duty of care to the interviewees, and this is where research methodology and ethics meet. Because the project processes data from human participants through interviews, it falls under the data management and research ethics requirements of the faculty, and the relevant considerations are listed in the data management checklist in Appendix B. In practice, this meant working only with consenting adult members in the diaspora, using first names with consent, and not processing special categories of personal data. Added to this was the fear that Iraqi authorities would act in some way against people in the field who were interviewed via the internet. Therefore, the information they presented methodologically was marked as an evidence and an existing written source was found to be the main source instead.

In terms of the question of the values that the project promotes, first of all as found. Respect for the use of the existing over innovation, in addition, looking at the heritage and the architectural life of a building not as a frozen relic but as a living process. That is, a design that places a living spatial intelligence in a place higher than mere preservation. At the same time, the value of the presence of spatial knowledge of a community that has disappeared and is not for that community, has a generosity towards the people in the place today and towards the heritage of the community in the past, in a certain sense the starting point is generous and conciliatory. Loss becomes the future.

Appendices

Appendix A. Pattern booklet

The complete pattern booklet contains the full treatment of all twenty-two patterns, each written as a spatial description, supporting evidence, a diagrammatic or photographic representation and references, together with the explicit map of the pattern field across the three clusters. It is reproduced in full below.

Patterns from the Jewish Neighborhoods of Baghdad



what we left behind.

Ido Ninburg

When the Jews of Baghdad left in the 1950s, they left behind a vast built space that was suddenly abandoned. In this study, I tried to go through the accessible content and locate the patterns of life encoded in their living environment. I conducted interviews, reviewed all the accessible literature in Hebrew, Arabic, English and German, and sent people to take pictures of the environment under study.

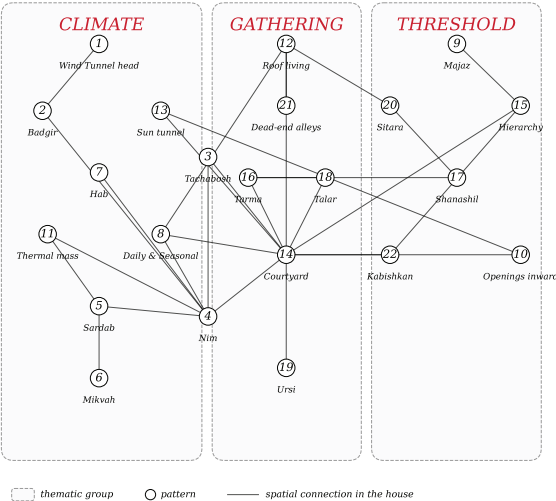
I discovered that the community's built environment was an active factor in shaping a unique local identity, in which spatial patterns that existed from various constraints such as density together manage a space in which the individual and the community are intertwined.

An environment that regulates relationships, determines spaces for gathering, and offers climatic solutions to the harsh Baghdad heat.

Why pattern language?

The methodology that underpins the design research is based on Christopher Alexander's idea of "A Pattern Language" and was developed into a pedagogical tool in the context of TUDelft by Dean Van Dorst and Rooij. Analysis of patterns and connections in space becomes templates, rules of thumb that allow for generalization of the built environment. By combining several patterns, patterns that arise from a particular context can be revealed.

Pattern Field
Jewish Neighborhoods of Baghdad — what we left behind



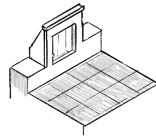
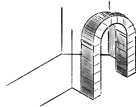
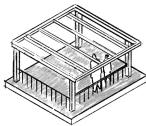
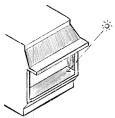
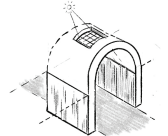
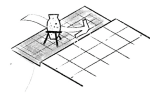
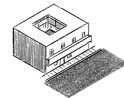
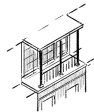
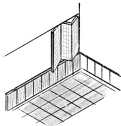
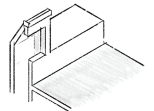
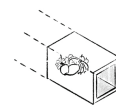
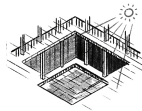
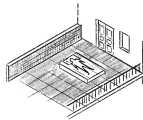
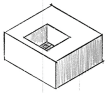
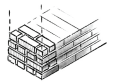
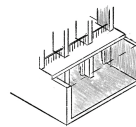
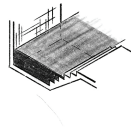
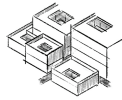
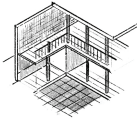
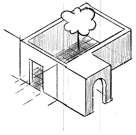


Table of contents

Threshold

- | | | |
|---|----------------------------------|---|
| 1 | <i>Majaz</i> | <i>Broken Entrance</i> |
| 2 | <i>Hierarchical Space System</i> | <i>Privacy Sequence</i> |
| 3 | <i>Shanashil</i> | <i>Screened Wooden Balcony</i> |
| 4 | <i>Kabishkan</i> | <i>Observation Mezzanine Room</i> |
| 5 | <i>Sitara</i> | <i>Roof Parapet Screen</i> |
| 6 | <i>Inward-Facing House</i> | <i>Street Closure, Courtyard Openness</i> |

Gathering

- | | | |
|----|------------------------|------------------------------|
| 7 | <i>Ursi</i> | <i>Open Salon</i> |
| 8 | <i>Talar</i> | <i>Shaded Summer Salon</i> |
| 9 | <i>Tarma</i> | <i>Shaded Upper Gallery</i> |
| 10 | <i>Hosh</i> | <i>Courtyard Typology</i> |
| 11 | <i>Sath</i> | <i>Roof as Living Area</i> |
| 12 | <i>Dead-End Alleys</i> | <i>Neighborhood Interior</i> |

Climate

- | | | |
|----|---|--|
| 13 | <i>Badgirkopf</i> | <i>Wind Tunnel Head</i> |
| 14 | <i>Badgir</i> | <i>Wind Tunnel</i> |
| 15 | <i>Tachabosh</i> | <i>Ground-Level Balcony</i> |
| 16 | <i>Nim</i> | <i>Semi-Underground Cooling Room</i> |
| 17 | <i>Sardab</i> | <i>Underground Cooling Room</i> |
| 18 | <i>Mikvah / Beit al-Tabil</i> | <i>Groundwater Ritual Bath</i> |
| 19 | <i>Hab</i> | <i>Sweating Vase</i> |
| 20 | <i>Daily & Seasonal Residential Use</i> | <i>Daily and Seasonal Separation
Thermal Stability</i> |
| 21 | <i>Thermal Mass</i> | <i>Deep Shaded Apertures</i> |
| 22 | <i>Sun Tunnel Openings</i> | |

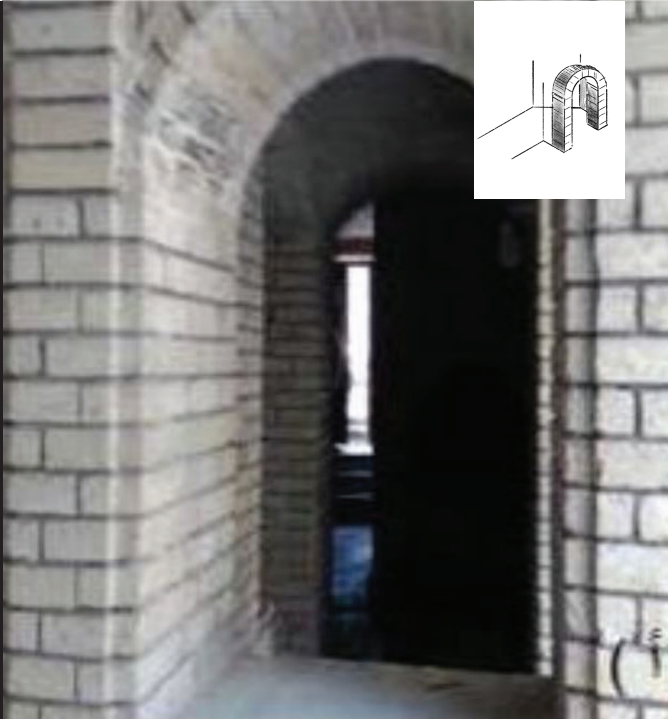
I Threshold

Architecture sets the privacy in Baghdadi's building through a series of spatial mediations and divisions. Not only does one find the front door but also a system where the first floor facade is almost closed off to the street (Reuther, 1910, pp. 6, 113), one could observe his movements from the balcony through the dense Shanshil. But following the front door called "Majaz", the curved entrance L-shaped blocks the courtyard view (Raeuther, 1910, pp. 26-27). In conjunction with other elements, architecture becomes the basis for using Indirection as the key principle. This architecture highlights the inner facade rather than the outer facade (Reuther, 1910, pp. 23, 37). The building becomes less understandable

as a linear sequence and more like a gradient of elements.

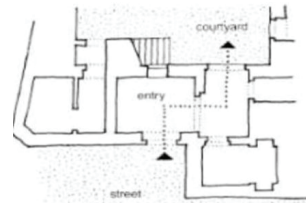
The above point becomes even more true when considered in light of the Jewish Quarter. The built texture of the older Jewish sections was tight, with paths that were narrow, winding, shady, and minimized sunlight while maximizing the closeness of the buildings (Golany, 1994, pgs. 60-61). The Shanashil enabled the residents of a building to view the streetscape without their actions on the inside becoming evident from outside the building (Golany, 1994, pgs. 103-105; Reuther, 1910, pg. 113). The ground-floor wall itself was constructed as a blank, windowless brick wall, an architectural form which Golany

specifically describes as a solution to the spatial need for privacy (Golany, 1994, pgs. 105-106). While the spatiality of the Jewish Quarter did not only magnify a previous issue, it created a situation where the mediations needed to be adjusted.

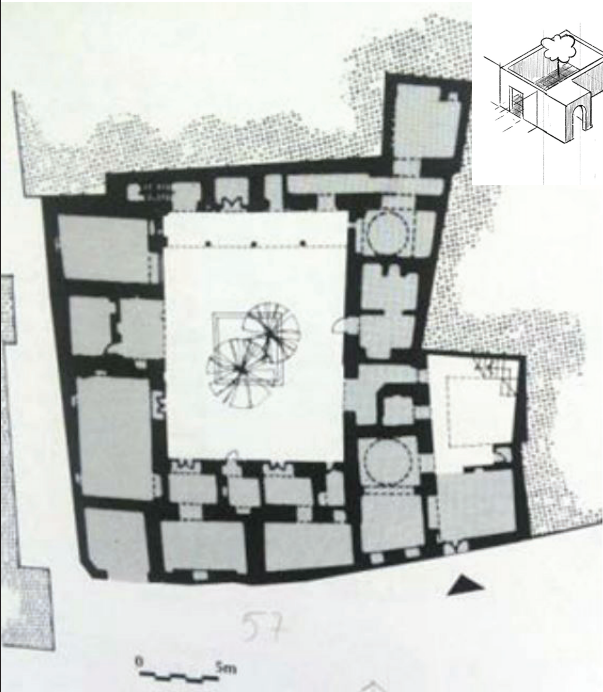


1. Majaz Broken entrance

The entry way into the Baghdadi building does not open into the courtyard. Rather, there is a bent pathway that acts as an intermediary between the street and the house interior (Warren, 1982; Langenegger, 1911). This design ensures privacy for the occupants by making the viewing of the courtyard from outside impossible (Golany, 1994). The pathway serves as a transition from the public to the private environment and accentuates the introverted nature of the home, since it revolves around a secret courtyard. The typical dimensions of the pathway are 2 to 4 meters in length and 1 to 2 meters in width (Diva Hanna Al-Khatun, 2018).



A threshold between the street and the courtyard, blocking direct sightlines.

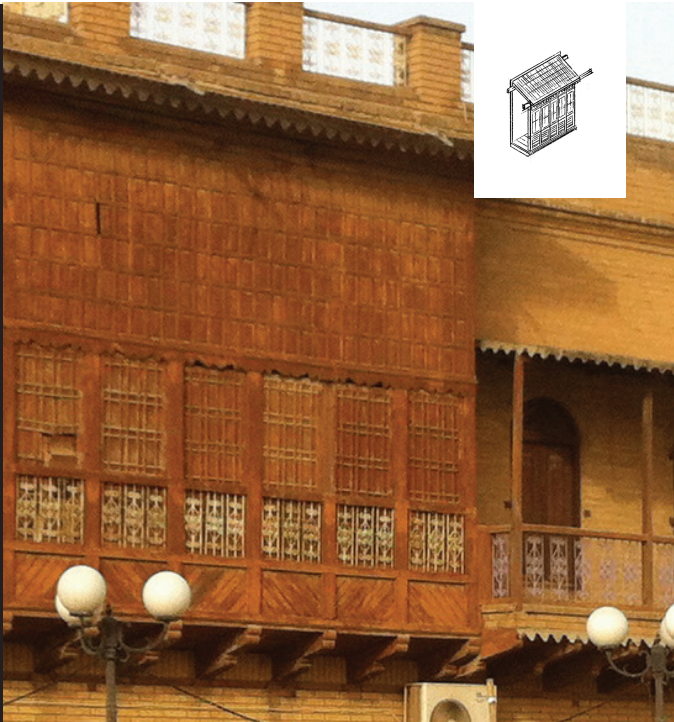


2. Hierarchical spaces system

Movement becomes an ordered process involving movement through different spaces in the house according to increasing degrees of privacy. Movement from the external environment begins in an L-shaped corridor or path, which does not provide a view of the interior space (Golany, 1994).

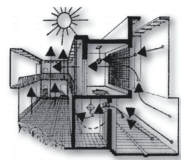
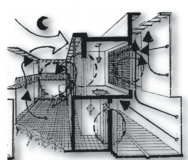
creating a barrier between the courtyard and the room spaces.

The flow then opens up to the courtyard space, the main flow space for the rooms around it. Design features such as the use of L-shaped passages, the use of smaller doors, and small steps to enter the rooms emphasize this ordering process and inhibit entry to the more private areas (Al-Azzawi 1978). Utility rooms and corridors surround the courtyard,



3. *Shanshil* Screened Wooden Balcony

The wooden balconies typical of Baghdad are made from a combination of local and imported woods (Almusaed & Almsad, 2021). Their goal is to open up as many ventilation options as possible while maintaining privacy with the help of various wooden screens (Golany, 1994). Reuther explained that in the densely populated Jewish neighborhood, their widespread use can be seen when the balconies of neighboring houses almost touch each other. In Jewish houses he finds a balcony not far from the entrance allowing to see who is at the door from a safe place.



Shanshil position in the Baghdadi house (Almusaed & Almsad, 2021).

a one sided view to the entrance (Ragette, 2011).

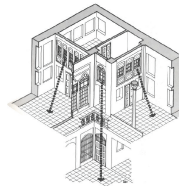


4. *Kabishkan Observation Mezzanine Room*

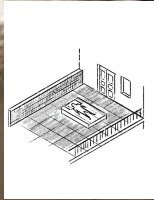
A principle formulated by Fathi and Warren (1983) as a recurring design rule in traditional domestic architecture, particularly in Baghdad, is the concept of the kabishkan. Based on the spatial organization of entrances to rooms through arched elements, this system often generated a relatively dense network of corridors. Some of these corridors were subsequently adapted into mezzanine levels, typically positioned within corner spaces.

These intermediary rooms frequently overlooked adjacent interior volumes and, within a Muslim socio-cultural context, were often designated for use by women. Architecturally, such spaces can

be identified by their comparatively small openings facing the street, which both ensured privacy and signaled their specific functional and social role within the domestic layout.



Looking towards other common spaces.
(Fathi and Warren, 1983)



5. Sitara Roof Parapet Screen

A brick parapet that surrounds the roof of traditional Baghdad houses provides privacy while allowing the roof to function as a living and sleeping space on summer nights.

Typically 1.5meter high, it blocks views from neighboring roofs and the street while maintaining openness to the air and sky. In many cases, the sitara incorporated perforated brick patterns that allowed the Shimal, the prevailing north wind, to pass through and ventilate the roof. In Baghdad's densely populated Jewish Quarter, sitaras were often built at greater heights to ensure improved privacy between adjacent houses (Golany, 1994).

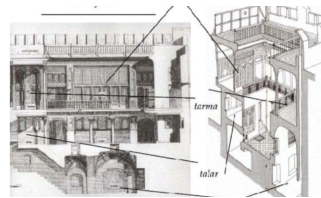


A section of Iraqi house.



6. Inward-Facing House

The façade of the house towards the street is often relatively opaque both overall and especially at the ground floor level, whereas large openings are oriented towards the interior courtyard (Langenegger, 1911). This maintains the privacy of its inhabitants and helps create a sheltered interior space that remains cool and free of dust.



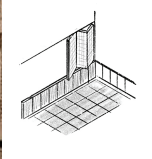
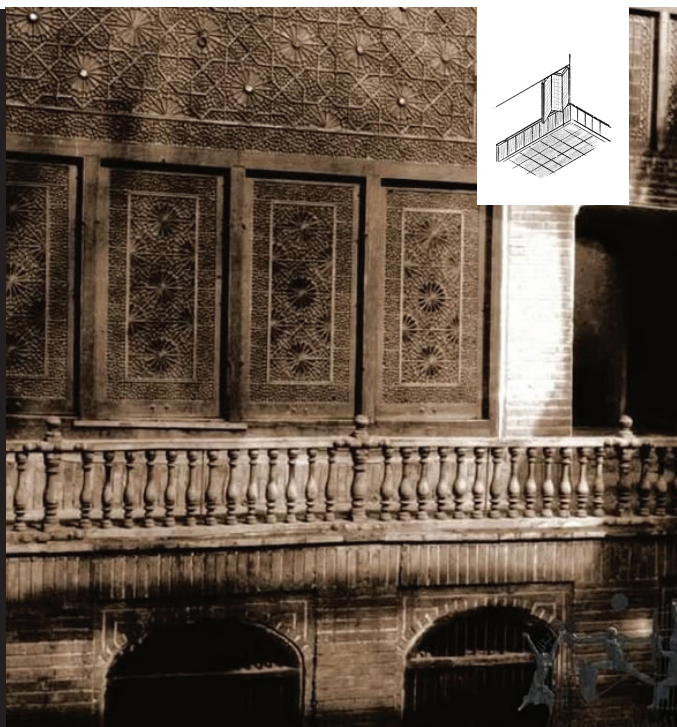
Iraqi traditional house components, Al-Haidary, 2008

II Gathering

In the Baghdadi-Jewish context, gathering spaces can be defined by their closure or openness in relations to other spaces. Mechanisms of limitation for the purpose of shared presence such as a brick railing, or a dead-end alley.

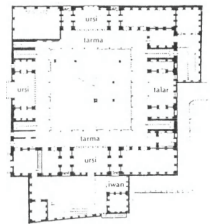
Spatially, the courtyard is the heart of the gathering. Reuther says that the main architectural development actually occurs in the interior facades of the building, such as the tarma (Reuther, 1910, pp.32, 37). These facades, some of which are set back: Tarma, Talar, Ursi, Kabishkan and others, define gatherings at different levels of privacy and different openness to the outside. Some link

many of these patterns to security, Golany links the morphology of closed alleys to looting habits (golany, 1994, pp.60-61) while Golshtein Sabah links it to the need for communal space, (2021, pp. 26-27).

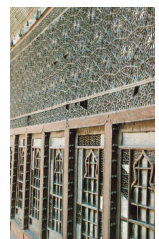


7. Ursi Open salon

A living room used in winter and defined by a large façade of sliding windows, from which it takes its name, facing the Tarma (Reuther, 1910, p.6). Intricate woodwork, mirrored glass, and patterned stained glass created the most decorative and impressive façade of the house (Warren & Fathi, 1983, pp. 70-71). When fully opened, it becomes (almost) a balcony, connecting a closed room to the courtyard and allowing for a transition between closure and openness.



Iraqi traditional house components (Al-khafaf, 1992).



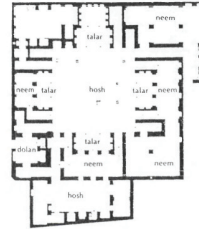
An elaborate ursi before repair (Warren & Fathi, 1983)



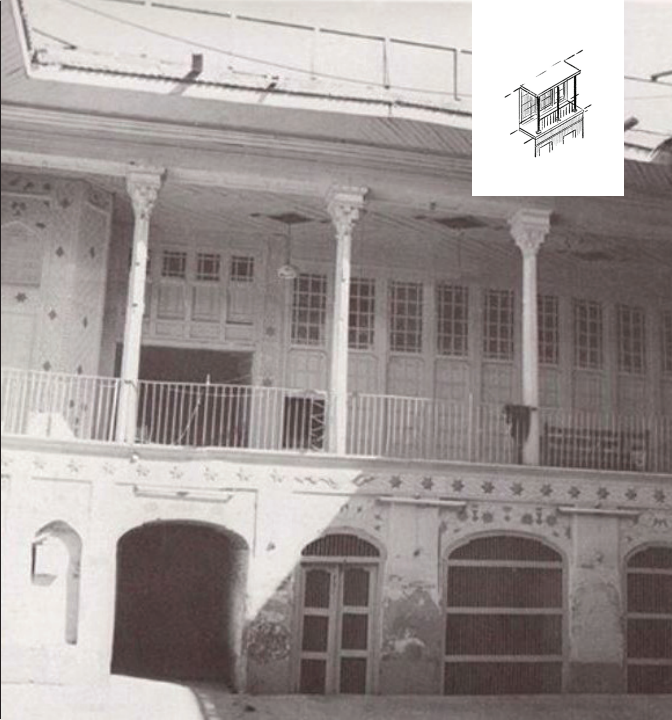
8. Talar Shaded summer salon

An open summer salon, usually located on the upper floor and oriented toward the courtyard. Reuther describes it as a room enclosed by walls on three sides and opened on the fourth side through a row of columns toward the Tarma or the courtyard (Reuther, 1910, p. 7). Warren and Fathi also place the Talar within the courtyard-facing arrangement of the Baghdadi house, where upper-floor rooms and galleries frame the central open space (Warren & Fathi, 1983, pp. 46-47). This makes the Talar a defined interior space, but one that gathers through openness rather than enclosure. Its columned facade allows air, shade, and visual connection to pass between the room and the central courtyard.

As a gathering pattern, the Talar works as an intermediate space between the private room and the collective life of the house. It is more open than the Ursi, but still more spatially framed than the courtyard itself. Reuther notes that Talars could function as summer or winter rooms depending on their orientation: when facing north, they became shaded and airy halls suitable for summer use (Reuther, 1910, p. 7). The Talar therefore combines climatic performance with social use. It creates a place for sitting, receiving guests, and remaining connected to the courtyard, while still offering shade, elevation, and architectural definition.



Iraqi traditional house components (Al-khafaf, 1992).



9. Tarma Shaded Upper Gallery

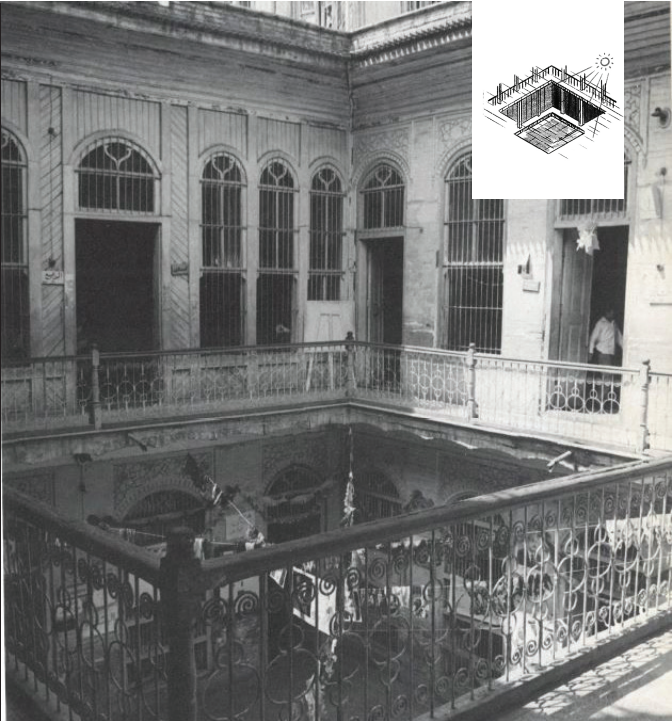
The Tarma is a covered column gallery in the traditional Baghdadi building, usually located on the upper floor along the edge of the courtyard. It is a semi-open space: shaded and protected, but still visually connected to the central life of the house. Reuther describes the Tarma as a key element of the courtyard house, sometimes forming a continuous gallery around the courtyard (Reuther, 1910, p. 12).

observe, and remain connected to the house while staying in shade and privacy. It also connects related spaces such as the Ursi and Talar, making the upper floor a continuous social layer around the courtyard (Reuther, 1910, pp. 6-7), (Warren & Fathi, 1983, pp. 46-47).

As a gathering pattern, the Tarma works as the inhabited edge between rooms and courtyard. Its thin wooden columns, railing, roof cover, and elevated position allow people to sit, move,



Iraqi traditional house components (Al-khafaf, 1992).



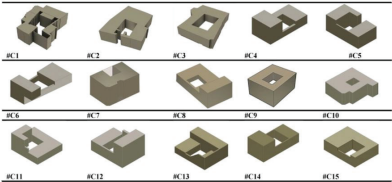
10. Hosh Courtyard typology

The Hosh is the central courtyard of the traditional Baghdadi house and the main organizing space around which domestic life is arranged. Langenegger describes the common urban house plan as a grouping of rooms around an almost square courtyard, whose verandah roofs are supported by slender wooden column arcades (Langenegger, 1911, p. 9). The Hosh is therefore not simply an empty open space, but the spatial center that gives order to the rooms, galleries, and upper-floor living areas around it.

and Fathi describe the Baghdadi house as a courtyard system in which rooms and galleries face the central open space rather than the street (Warren & Fathi, 1983, pp. 46-47). Reuther similarly emphasizes that the courtyard facade receives greater architectural attention than the street facade, because the courtyard functions as a living space within the house (Reuther, 1910, pp. 32, 37).

The Hosh allows light, air, and human flow while allowing exterior of the house to remain relatively closed.

As a gathering pattern, the Hosh works by producing an inward-facing world. Warren



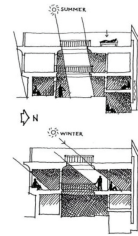
Iraqi traditional house components, Al-Haidary, 2008



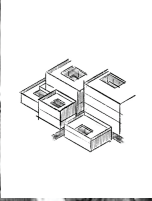
11. *Sath* The roof as a living area

The roof of the Baghdadi house is a significant gathering space. In the summer, daily domestic life moves upstairs: sleeping, sitting, and social activities often take place on the roof terrace (Reuther, 1910, p. 5).

The roof creates an open surface for interpretation, where the household gathers at sunset, the protection it offers is through the *sitra*, from the railings that define the view of the neighbors (Langenegger, 1911, p. 61) and allow air to enter. Adjacent roofs created a (essentially loose) network of high spaces) so that it also operates at the urban level.



Use of roof during summer (Diler & Serbest, 2017)



12. Morphology of dead-end alleys

The Jewish Quarter in Baghdad presents a dense morphology, Al-Ta'at, the Jewish Quarter creates a network of narrow and shady alleys, many of which have no exit. Golany describes the quarter as a compact urban fabric in which limited land space pushes buildings to develop vertically around private courtyards at the expense of the spatial logic of the alleys, which remain winding, narrow and shady (1994, pp. 60-71).

slowing down traffic, limiting exposure and daily contact points between neighbors, so that social life is very close to the center of the house (Golany, 1994, pp. 60-71, Warren & Fathi, 1983, pp. 46-47). It's interesting to see that the structures redefine her while she defines them.

That is to say, the alley is a semi-closed neighborhood space between the house and the city. Similar to other patterns, but on a larger scale, the alley operates through proximity,



two Shanshal "kissing" (Al-Saffar, 2020)



Iraqi traditional house components, Al-Haidary, 2008

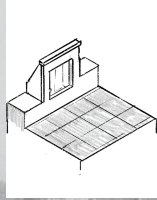
III Climate

The Baghdadi house was a climatic instrument as much as a dwelling. Thermal comfort could not be produced at the room scale; it had to be produced through the section. Heat propagates through the ground as a slow thermal wave, taking approximately three months to reach a depth of ten metres (Golany, 1994, pp. 126-127), and the house exploited this directly by developing four underground and semi-underground spaces at distinct thermal levels (Reuther, 1910, pp. 16, 19).

Reuther identifies the organising principle: rooms are distinguished not by social function but by their thermal character at different hours and seasons. "One moves, according to the season or time of day, from the cellar up to the roof" (Reuther, 1910,

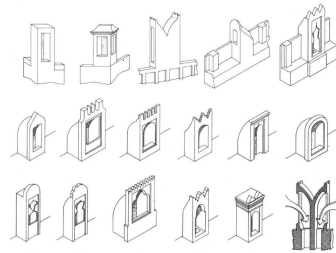
p. 5). The ten patterns follow this descent. The Badgir wind-catcher captures the north-northwest wind at roof level and channels cooled air down through the wall into the Nim at roughly minus two metres, the primary summer gathering space (Langenegger, 1911, pp. 179-182; Reuther, 1910, p. 16). The Tachabosh, a mezzanine platform at courtyard level, intercepts rising cool air for those unable to descend further (Reuther, 1910, p. 19). Below the Nim, the Sardab serves cold storage and afternoon retreat; at the base, the Mikvah reaches the water table and in Jewish houses doubles as a ritual bath (Reuther, 1910, pp. 16, 19). The Hab, a porous clay vessel in shaded north-facing niches, cools water by evaporation (Reuther, 1910, p. 25).

The household moved vertically through this stack across the day and the seasons, with a thermal differential between roof and Sardab approaching thirty degrees Celsius in summer (Golany, 1994, pp. 126-127).

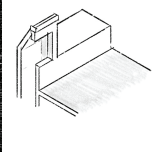
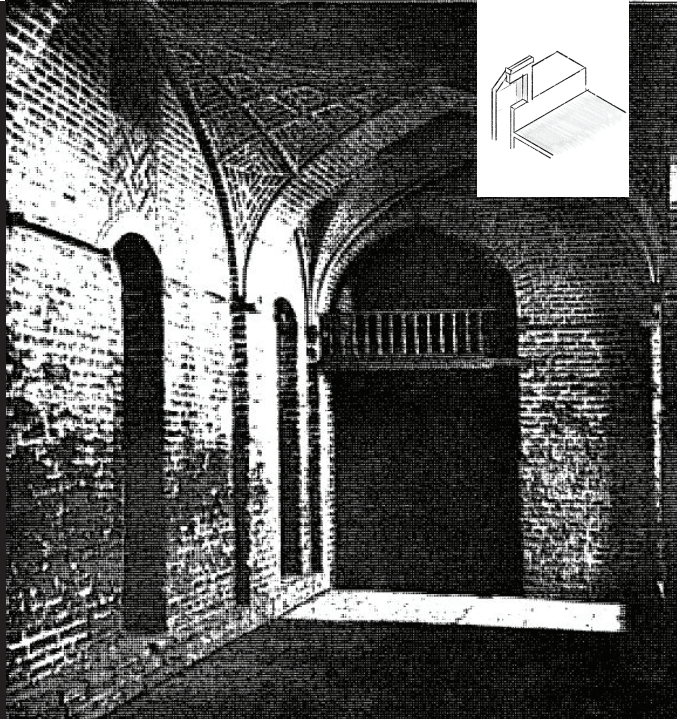


13. *Badgirkopf* Wind Tunnel head

The upper part of the Badgir is a wind-facing, window-like opening set at roof level. It is usually oriented toward the north, where the prevailing winds approach Baghdad, and is positioned along the edge of the roof (Reuther, 1910, pp. 26-28, 96). In Iraq, this element often appears not as a single opening, but as a series of three to six wind tunnel heads. When the opening cannot face true north because of site limitations, alternative orientations or adjusted forms can be used to capture the available wind (Langenegger, 1911, pp. 179-182).

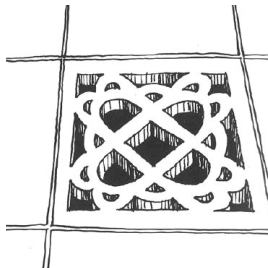


Windcatchers with various forms of wind intakes, Baghdad, Iraq (Golany, 1994, p.124)

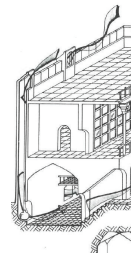


14. Badgir Wind Tunnel

An interior wall and an exterior wall with a space between them creates a channel through which air passes, leads directly to the Nim floor (Langenegger, 1911 ;Golany, 1994, p. 126; Reuther, 1910, p. 23). The channel is only horizontal and exists in a single wall. At the end is a decorative opening. These chimneys often came about 11 meter long, with a section of 1mx0.5m (Golany, 1994).



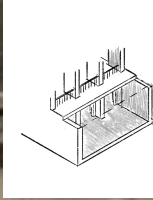
Badgirs outlets and scoops (Warren & Fehi, 1983).



scheme (Golany, 1994, p.125)



Drawn by the author

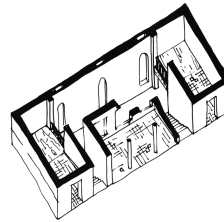


15. Tachabosh Ground level balcony

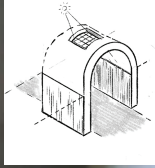
The Tachabosh is a raised platform within the Nim, positioned around courtyard level and overlooking the cooler semi-underground space below. Reuther describes it as a timber floor inserted into the Nim, creating a higher estrade or gallery above the main lower room (Reuther, 1910, p. 19). It allowed people to benefit from the cooler air of the Nim while remaining above the dampness of the floor.

in the Baghdadi house, where imported or non-local timber was often used for structural and interior elements despite the scarcity of local wood (Reuther, 1910, pp. 96-97).

As a climatic pattern, the Tachabosh works as an intermediate level between the courtyard and the deeper summer rooms. It is not as cool as the Nim or Sardab, but it offers a more accessible place to sit, rest, and remain connected to the lower cooling system. Because it was built as a timber platform, it also reflects the selective use of wood



Tachabosh and Nim axonometric



16. Nim -2 meter

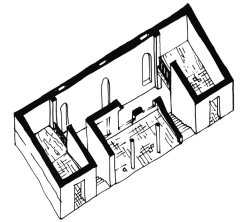
An underground space used within the summer cooling scheme of the typical Baghdadi House. According to Reuther, the Nim differs from the deeper Sardab in that, whereas the Sardab is entirely underground, the Nim is a lower floor beneath courtyard level, yet still connected to the upper parts of the house (Reuther, 1910, p. 16). By utilizing the thermal mass of the earth to generate cooler surroundings in summer, the Nim remains more accessible than the rooms further below.

from the courtyard or adjacent openings, and could be connected to ventilation shafts or Badgir systems that directed air toward the lower parts of the house. Because it was larger and more accessible than the Sardab, the Nim could become a central summer room for sitting, resting, and sleeping during the hottest hours of the day. In winter, when cooling was no longer needed, these lower spaces could shift toward storage use (Reuther, 1910, pp. 16, 19; Golany, 1994, pp. 126-129).

The Nim works through depth, shade, and air movement. It often received limited natural light

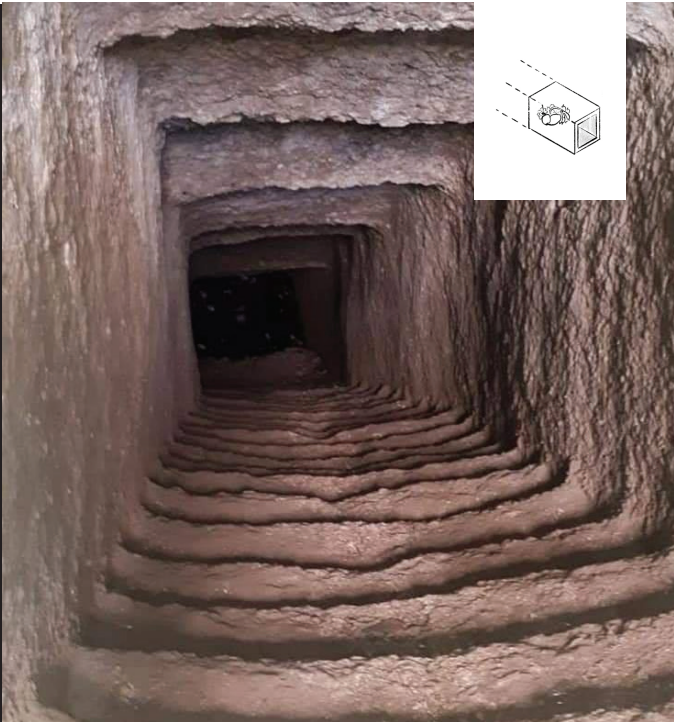


Opening in the Nim double wall. Image by Kammunah, *The impact of architectural heritage on the development of Najafi architecture.*



Tachabosh and Nim axonometric

The Sardab is connected to the Nim and, in Jewish houses, can lead to a Mikvah.

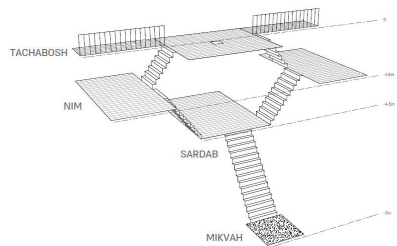


17. Sardab -4.5m

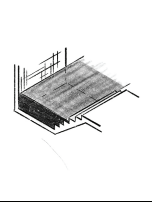
Sardab refers to the entire underground space used as a cooling place within the Baghdad-type house. As noted by Reuther, this term derives from the Persian sard-ab, which means cold water, and contrasts itself with Nim in that whereas Nim is partially under the surface, the Sardab is totally beneath the courtyard and gets light through openings at courtyard level (Reuther, 1910, p. 16).

and storage of fruits, meats, and vegetables during the hot season. Being connected to the Nim above it, Sardab was an integral part of the vertical summer area in the house: during winter it became storage, and during summer one of the coldest places in the house (Reuther, 1910, p. 19; Golany, 1994, p. 126).

In terms of its climatic behavior, the Sardab relied on depth, darkness, and thermal inertia. In that regard, being very near the surface and groundwater, it served the purpose of body cooling



Sardab is connected to the nim, and in Jewish houses can lead to a mikvah

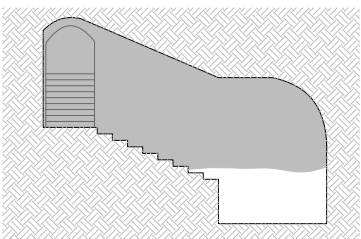


18. Mikvah / Beit al tabil -7m

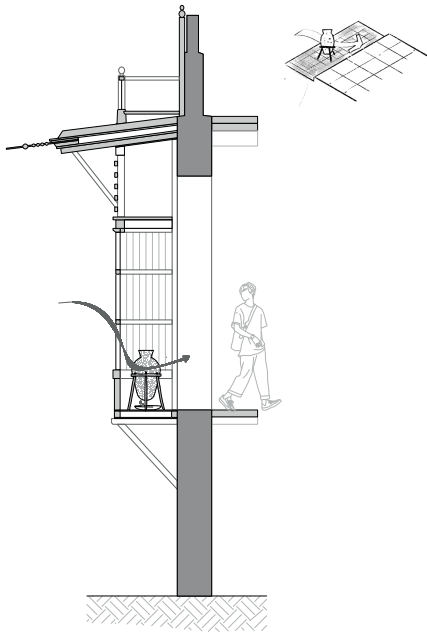
The Mikvah, or Bir al-Tabil, is the space that reaches the greatest depth within the vertical section of the traditional Baghdadi Jewish house. It is linked with the Sardab and leads downwards to the level of groundwater, which, in Baghdad, can be accessed after a few meters' descent below the level of the courtyard. According to Reuther, in Jewish houses, the Sardab is usually connected to a facility for washing called Bir Et Tebile, and the level of groundwater must be accessible by stairs (Reuther, 1910, p. 19).

the Nim, after the Sardab, and very near the coolness of the earth and its groundwater. While the Nim and the Sardab functioned on a general cooling purpose, the Mikvah provided an extra Jewish dimension to the whole subterranean complex.

As a climatic and ritual phenomenon, the Mikvah is the lowest point in the house: it comes after



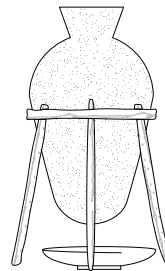
Mikvah section



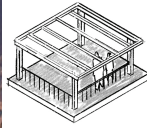
19. The Hab Sweating Vase

A Hab was an ancient vessel made from porous, unglazed ceramic clay that functioned by allowing water to slowly pass through its microscopic pores before being evaporated on the surface of the container (Golany, 1994). Through evaporation, heat from the vessel would be absorbed, and therefore, the water kept inside would cool. It is similar to the cooling method applied in contemporary times. The cooled water that had either dripped off or condensed on the surface could then be caught in a bowl and served as drinking water because it was the coldest water available (Niran, 2026).

The Hab would be situated in a well-ventilated shady location like balconies or windows within exterior walls, semi-subterranean rooms known as the nim (Niran, 2026; Warren, 1982), and even at the openings of the building due to the airflow aiding the evaporation process (Golany, 1994). The practice was common in both private and public dwellings and was one of the passive cooling techniques employed in the Iraqi hot environment (Warren & Fethi, 1982, 1982; Niran, 2026).



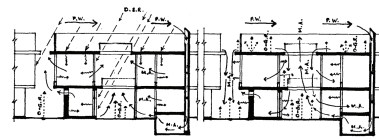
The hab, CAD drawing



20. Daily and Seasonal Separation

A regular Baghdadi home followed a pattern for residence, which is due to the weather conditions of Iraq (Golany, 1994). As the summer approached, there were changes in the locations where the family lived depending on the rise in temperatures during the day. In the early mornings and late in the evenings, they stayed in the interior courtyard of the house since the weather would cool down rapidly once it was cloudless. However, in the afternoons, the weather temperatures would be at their highest, and this made them relocate to cooler places like the underground nims and sardab (Al-Azzawi, 1994; Reuther, 1910). In the evenings, they would move to the top floor since it cooled earlier than the other locations, and on some occasions, they even used it for sleeping at night.

During winter months, the pattern of usage was the opposite, since nims and sardab were not used much and sometimes served as storage areas, whereas life was centered at the top floors and areas that had direct access to solar light. The courtyard was used in daytime, and the roof served the purpose when sunlight was available in order to warm people. In spring months, there was a possibility to flood the underground parts, which reduced their usability significantly. Hence, through such flexibility, the house allowed for adapting living practices according to seasonal changes of climate (Golany 1994; langenegger 1911).

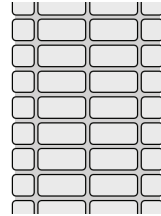


Al-Azzawi (1996) shows that the Baghdadi courtyard house regulates heat through solar gain, radiative cooling, and air movement via the Balgje and Nim / Sardab adapting between day and night cycles.

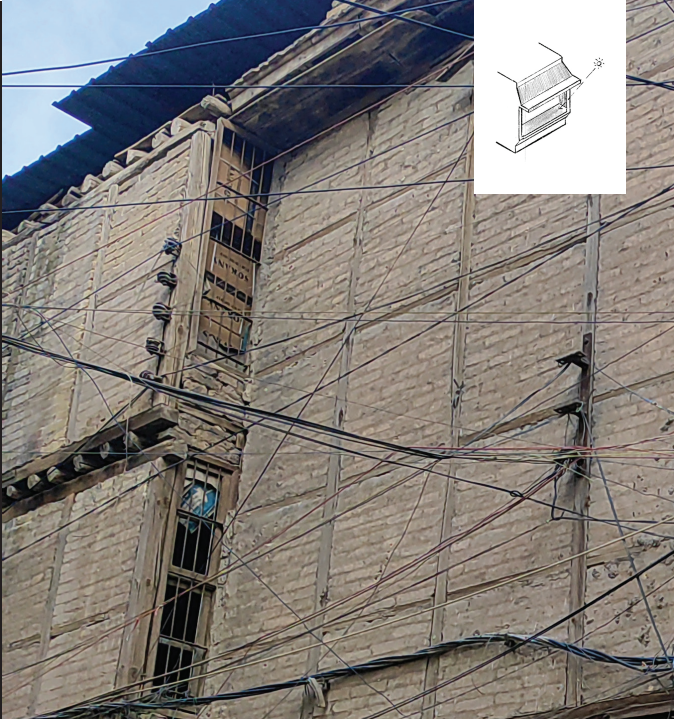


21. High thermal energy

Thick walls and areas that are below ground level use the thermal storage quality of the earth and building material to ensure stability in indoor temperatures and thereby help maintain cooler conditions even in hot weather conditions (Golany, 1994).



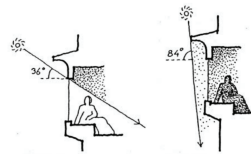
a section of a wall of a Baghdad house, thick with a big thermal resistance



22. Sun Tunnel Openings

Sun tunnel openings are the deep, shaded openings of the Jewish Baghdadi building, designed to filter most light and heat in order to gain enough to light a room and ventilate it. windows that are set back, covered through layers of arches, balconies, wooden screens (Reuther, 1910, pp. 6, 37, 113).

These openings function by delaying and reducing. Langanger claims that a small protrusions can cast sharp shadows under a scorching Iraqi sun, showing how small typological facade depth can have a strong climate effect (1911, p. 62). Therefore, the opening becomes a short shaded passageway for the light.



South-looking alcove at noon in winter and summer (Raquette, 2011).



The Great Synagogue in Baghdad The windows in the rooms recede into the central space. Designed by Professor of Architecture David Cassato

From Patterns to Design

The different patterns dominate different scales and different needs, they work together and in relation to each other.

With the help of the analysis, it is possible to describe and understand how architecture organized Jewish life in Baghdad, how the courtyards became a daily living space that cools, regulates the private and public, and constitutes a gathering space at once.

Each of these patterns was built over centuries and contained certain knowledge in response to processes. The next step is to evaluate those processes, examine their relevance, and understand how these tools can contribute to them today in 2026.

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- Author. *Hab Cooling Vessel Diagram*.
- Author. *Badgir Wind Tunnel Diagram*.
- Author. *Mikvah Section*.

Image Credits

Al-Ghalib, A. (2018). *Courtyard (Hosh) and Tarma*.

Appendix B. Data Management Checklist

The first section of the faculty Data Management Checklist was completed during the planning of the graduation project. Because the project processes data from human participants through interviews, question 3 is answered “yes”, which means that Section B and an application to the Human Research Ethics Committee (HREC) apply to the oral-architecture layer.

Section A. General considerations	Yes / No
1. Is the graduation project conducted as part of an internship (at a company), or as part of a research project at TU Delft?	No
2. Does the project involve conducting (part of) the research outside the Netherlands?	No
3. Will the research involve processing data from humans, such as interviews, surveys or workshops, collecting data through social media or internet forums, or re-using existing datasets about humans?	Yes

Because question 3 is answered “yes”, the project keeps the level of risk low by working with the testimony of consenting adult members of the diaspora, by using first names only and with consent, by not processing special categories of personal data, and by storing testimony in line with the faculty data-management guidance.

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