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Analysis of Users' Level of Permeability and Wayfinding in Museum Hotel Building Typology

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Abstract

Space syntax is a method of analyzing the relationship between spaces. In analyzing a building's spaces, the spatial configuration plays a significant role in analyzing permeability and wayfinding. The study analyses users' level of permeability and wayfinding for mixed-used buildings, a museum hotel typology. The Museum Hotel Antakya, Turkey, was chosen as the case study due to its typology of a museum on the ground floor that sits on the archaeological site and a three story hotel on the upper floor. Based on the graph of space syntax, the measurable scale of hotel guests and museum visitors, the Linkert scale, and the spatial configuration analysis show that overall, the level of wayfinding and permeability for this building being the mixed-used with prominent dual usage is infrequent when it comes to the area and spaces that mixed both uses but in spaces that is clear in its usages such as the museum at the ground floor and the hotel at the upper floor, the level of permeability and wayfinding is straightforward.

Discipline: Architectural Engineering.

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1 Introduction

Building typology affects the function, affecting human behavior and activity (Sanusi, 2020). The building typology studied in this paper is a building of a hotel typology sitting on a historical, archaeological site in Antakya City, Turkey. The 34,000-square-metre hotel consisting of 199 rooms, was constructed on an area of archaeological discoveries. It is a one-of-a-kind hotel

typology that considers and respects history in its sense (Arolat, 2019). Therefore, a museum has been incorporated into the building, taking the archaeological finding's presence and advantage.

It is the world's first modern revival of an ancient heritage site and has been awarded an Honorable Mention in Architectural Design by The Design that Educates Awards 2020. It was designed by an AGA Khan Award-winning architect to practice, Emre Arolat Architecture (EAA), Istanbul, Turkey. The architect, Emre Arolat, takes the initiative of designing a building where a museum and a hotel can coexist together in a sort of a public archaeological park and a private hotel in one building. The dual programmatic codes in a building create uniqueness in socio-spatial and human behavior.

2 Literature Review

According to Ephes (2006), permeability is defined as the flow of spaces from one to another. Permeability is described as the peoples' opinion in satisfaction of the spaces based on the environment's properties (Yavus et al., 2012). As for wayfinding, it is the users' experience of the context (Abrams and Brandom, 2010). The fundamental for a practical user experience on wayfinding will be on the environment's visual-spatial feature. Therefore, the accessibility to spaces and their visual-spatial quality will be analyzed in this study to achieve the study's objective.

Finding one's way around public buildings such as airports, hospitals, offices, or university buildings often proves to be a tedious and frustrating task (Holscer et al., 2012). With dual prominent usages in a building, a hotel, and a museum, there are issues of segregating permeability and wayfinding for museum visitors and hotel guests. Therefore, the depth study on wayfinding and permeability and how it affects the building's socio-spatial is analyzed.

Spatial organization in traditional built and domestic environments has evolved to meet the socio-cultural beliefs, needs, rituals, and daily practices of its users and respond to the entire built environment (Ragette, 2012). In other words, the arrangement of spaces in a building has more to say about the social and cultural gist of the place or the site chosen. Social and cultural behavior often attracts tourists into going to such places to learn and experience the environment itself. Thus, buildings' spatial arrangement affects how people use them (Hassan, 2004). In space syntax, spaces are understood as voids such as streets, squares, rooms, and fields between walls, fences, and other things that restrain pedestrian movement or the visual field (Hassan, 2020)

Figure 1: Exterior view of the Museum Hotel Antakya (Coutersy of ArchDaily.com).

The concept of mixed uses has been recognized as essentially requiring three elements: two or more significant revenue-producing uses, a significant functional and physical integration, and conformance to a coherent plan (ULI, 2011). The Museum Hotel Antakya is designed for public and private use with a mixed-used typology. The archaeological site beneath the hotel is open to the public while the hotel is private. The unique building program that came into existence in this way and which enabled the togetherness of different social classes feeding each other reinforced the idea of a smooth coexistence of public and private (Erolat, 2019). The mixed-use condition results in spatial adaptability that creates a symbiotic relationship between the building and the visitor behavior. Building adaptability and mixed living/working functions have demonstrated the symbiotic relationship between building and economy, whereby functional and design flexibility respond to locational context (Hollis, 2015)

The building typology for the Museum Hotel Antakya is a hotel and a public museum with the programmatic codes defining both typologies. The critical determinant that constituted the project's contextual and physical structure was the conflict between the importance of archaeological discoveries, their constraints, and the hotel's strict programmatic codes. This pressure subverted the traditional hotel typology, and the concept of incorporating a public museum that would display the restored archaeological object was put forward (Erolat, 2019).

3 Museum Hotel Antakya

The Museum Hotel Antakya is located in Turkey's southernmost province Antakya. A city on the Turkish border with Syria (Dogruel, 2013). Antakya, known as Antioch during the ancient period, is significant in Turkey's historical urban contexts (Rifaioglu, 2014). Antakya used to be known during the Roman Empire's reign as the world's fourth-largest developed city. Thus, the site has advantages of the richness of archaeological values. The site is 20,000 sqm and is close to the landmark of the most important pilgrimage sites for Christians, St. Pierre Church.

3.1 Museum Hotel Antakya Building

The building was designed in 2010by a Turkish architect, Emre Arolat, from EAA-Emre Arolat Architecture, with the construction completed in January 2020. With a significant event on the site, the architect envisions the potential of the hotel and museum together. It has 200 rooms, and hotel facilities such as a ballroom, spa, meeting room, restaurant, public archaeological museum, and an archeo park. This building has won an award, the Honorable Mention in Architectural Design by The Design that Educates Awards 2020.

It is a four-story building with its ground floor serving as the public museum with the archaeological museum and archeo park; the second floor is the common public areas of the hotel with lobby and restaurant, the third floor is hotel rooms, and the fourth floor with ballroom, spa, meeting room and a restaurant with pavilions and courtyards as the open communal spaces. The hotel rooms are 3 tier stacks of prefabricated containers like hotel rooms. The building is designed so that with passive design usage, the need for mechanical air conditioning in the corridor is eliminated. This building is facade-free, letting the air circulate between the corridor and rooms.

The glass slab and wall are used to keep the hotel and museum's visibility visible and the archaeological museum safe.

The Museum Hotel Antakya is a mixed-used development combining a museum and a hotel under one roof, as shown in Figure 2 showing the segregation of spatial usage in each level under one canopy. Due to the location that sits on the archaeological site comprising 2,300 years of history, the architect uses that gist to enhance the place's value and the hotel itself. With the world's largest single-floor mosaic (1,050 square meters), the ground floor was designed with a link bridge as the circulation for the visitor to view the mosaic floor without making physical contact with it. The hotel consists of 199 hotel rooms with facilities on rooftop terraces such as a swimming pool, gym, spa, restaurant, and meeting rooms. The construction of the Hotel Museum Antakya used prefab modules to minimize work on-site to conserve the archaeological site. The ground floor is open to the public with the upper floor as it is limited to hotel guests only.

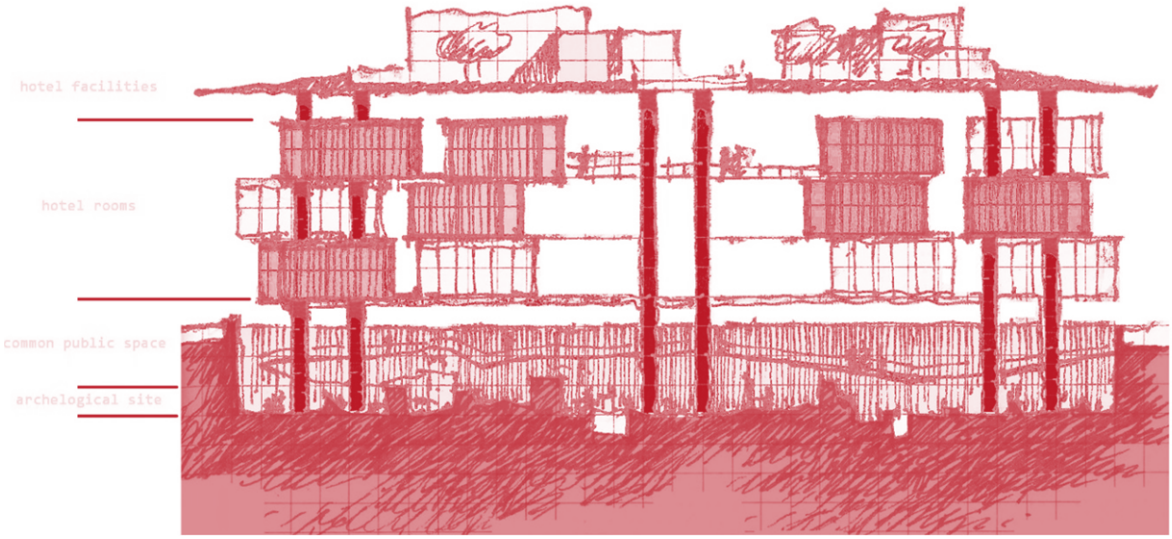

Figure 2: Section of the Museum Hotel Antakya

4 Method

The research methodology is to collect and analyze data to develop an integral part of this research. A qualitative data collection technique was adopted in this research study to survey the space syntax by a justified graph as its measurable factors. The justified graph is being used to analyze permeability and wayfinding. The level of permeability was measured by identifying the spaces from Public to Semi-Public to Semi-Private and Private. In contrast, wayfinding was being measured from the level of accessibility from easy to moderate to difficult. The analysis was transferred to the justified graph for a comprehensive understanding. Likert scale is a rating scale used to assess the survey or data that has been collected into a quantitative version. As for the level of permeability and wayfinding from the justified graph, a Likert scale will focus on the depth and level of permeability and wayfinding.

Table 1: Likert Scale for Space Syntax Analysis of each measurable scale graph

Likert Scale Numbering	Level of Permeability	Level of Wayfinding
0-2	Public	Easy
3-5	Semi-Public	Medium
5-6	Semi-Private	Medium
7-8	Private	Hard

In Figure 3, a justified graph was used to analyze the level of permeability and wayfinding. The level of permeability was measured by identifying the spaces from Public to Semi-Public to Semi-Private and Private. In contrast, wayfinding is being measured from the level of accessibility from easy to moderate to difficult. The analysis is transferred in the justified graph for a comprehensive understanding.

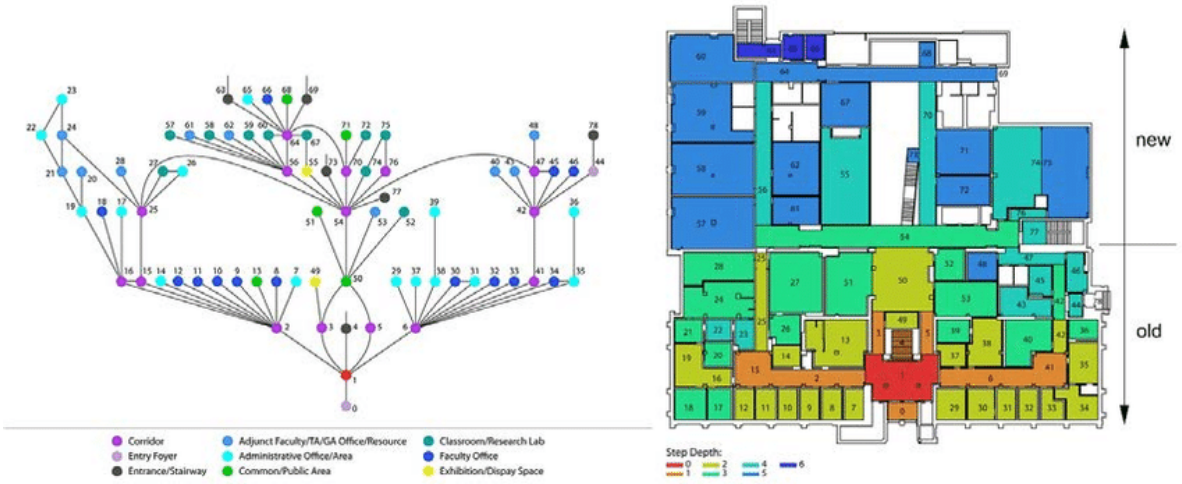

Figure 3: Example of Justified Graph.

The justified plan graph (JPG) was the first practical analytical method developed as part of Space Syntax's theory, which purported to provide a graphical, mathematical, and associated theoretical model for analyzing buildings' spatial configuration. (Ostwald, 2011)

The method used is a justified graph. Plans are being traced and labeled with a number and color of the zoning (public, semi-public, semi-private, and private) for ease of identifying and analyzing the level of permeability wayfinding. For a justified graph, the number will be labeled in colors to differentiate the user for each space and help transfer that data into the justified graph.

5 Result

5.1 Space Syntax Analysis

A related theme in space syntax study is understanding configured space itself, particularly its formative process and its social meaning (Bafna, 2003). In brief, space syntax attempts to establish a configuration theory by generating a theoretical understanding of how people make and use spatial configurations to express a social or cultural meaning and how spatial configurations generate social interactions in built environments. Wayfinding is the key to the layout and permeability mechanism to connect the overall spatial configuration's exterior and interior. (Jiang & Liu, 2010)

Figure 4: Site plan of the Museum Hotel Antakya, Turkey

Referring to the site plan (Figure 4), all four sides of the building perimeter are circulation to get into the building with one side for services and three sides for the public to access the building's main entrance. The one access into the building controls the visitor ingress and egress. The main entrance's location at the side of the main road is visible from the roundabout helping in the easy wayfinding to the building from outside. With the mixed-use of hotel and museum, user categories are a mix of public and private with scarce semi-public and private spaces due to the complexity of usage with the museum for the public and private for hotel guests and the need for privacy and exclusivity of the hotel itself.

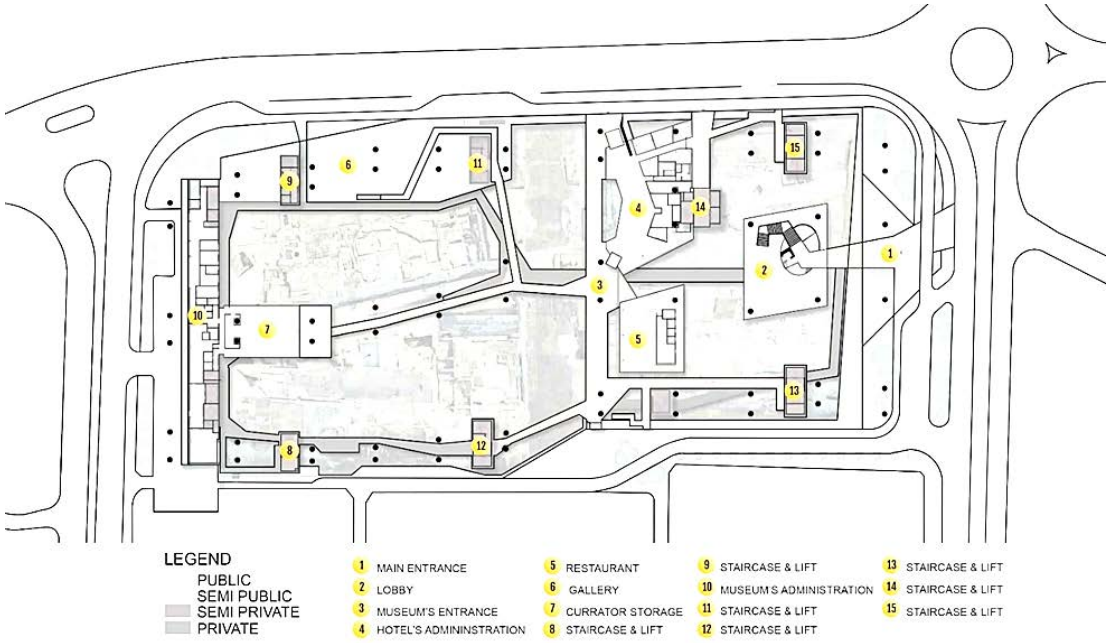

Figure 5: Ground Floor Plan of the Museum Hotel Antakya, Turkey.

As for the ground floor (Figure 5) where the main entrance to the building is, with the main road's entrance facing the roundabout, the wayfinding is straightforward, then going into the

building with one main entrance leading to the museum entrance and the hotel lobby. The measurable scale is presented in Figure 6. Although the wayfinding is straightforward, the user's permeability is difficult due to the complexity of both usages, and the lobby's location for both usages located side by side leads to confusion. The museum is open to the public while the hotel is only for the hotel guests. The lobby on the ground floor also serves the roof terraces' access with the restaurant open to the public. With the museum on the ground floor, the user roams around the archaeological site via link bridges that allow the visitor to view the mosaic floor. On the opposite side of the main entrance is the services access with two vertical access going to the upper floor. The wayfinding is straightforward and mixed up of user categories can be prevented from this planning.

Table 2: Likert Scale for Space Syntax Analysis of Ground Floor Plan

Area	Depth of Space from Entrance/Exit	Level of Permeability	Level of Wayfinding
1	0-3	Public	Easy
2	1	Public	Easy
3	2-4	Public	Easy
4	4-6	Semi-Private	Medium
5	4-6	Semi-Public	Easy
6	2-6	Semi-Public	Easy
7	1-6	Semi-Private	Easy
8	6-7	Semi-Private	Easy
9	6	Semi-Private	Easy
10	6	Private	Easy
11	6	Semi-Private	Easy
12	6	Semi-Private	Easy
13	6	Semi-Private	Easy
14	6	Semi-Private	Easy
15	6	Semi-Private	Easy

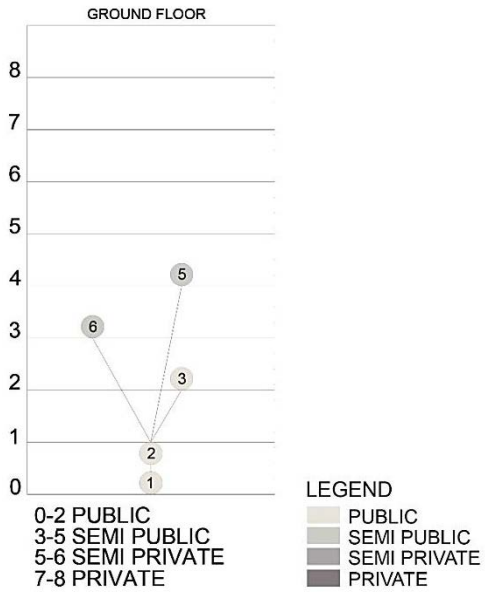

Figure 6: Measurable scale of museum visitors' wayfinding

Levels two, three, and four (Figure 7) consist of hotel rooms in private with the usage for hotel guests and administration only. Therefore, as seen in the justified graph (Figure 8), the depth

levels are semi-private and private only with semi-private for vertical and horizontal access before entering an individual room. With an average of 65 rooms per floor, ten (10) access for hotel guests, and two access for the back-of-house services, wayfinding is easy for the user for both categories. The permeability is straightforward as there is no obstruction of other usages at the level other than hotel rooms.

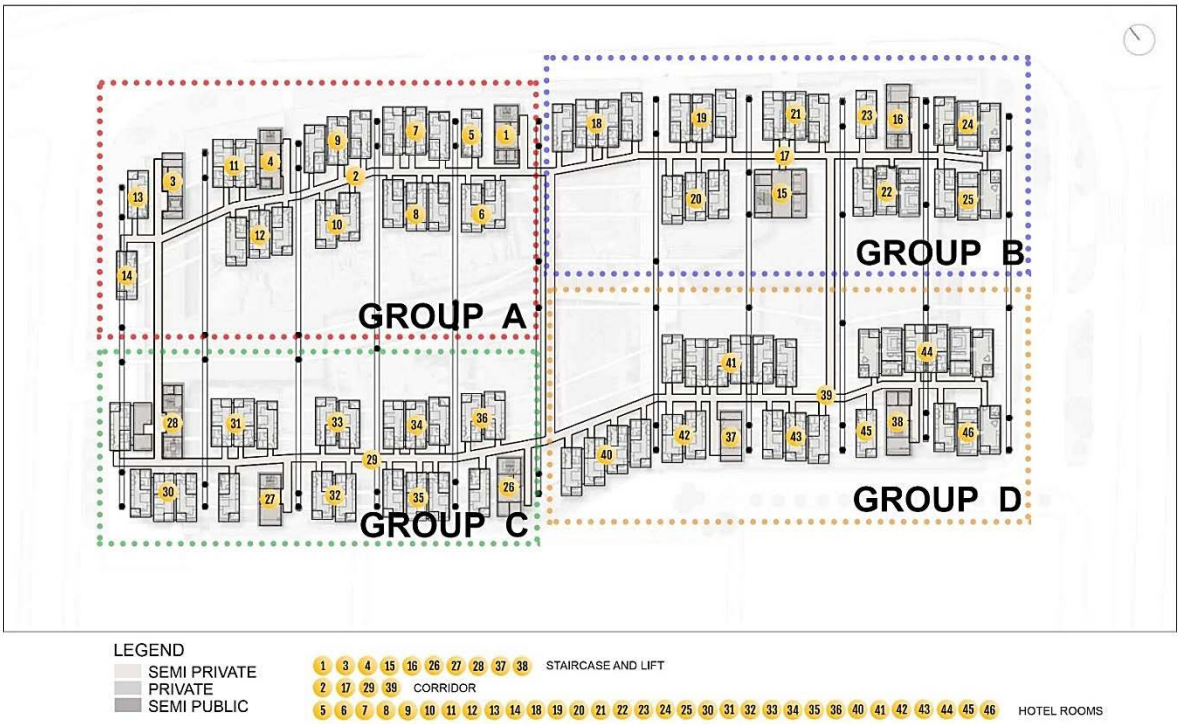

Figure 7: First, Second, and Third Floor Plan of the Museum Hotel Antakya, Turkey

Table 3: Likert Scale for Space Syntax Analysis of first, second and third floor

Area	Depth of Space from Entrance/Exit	Level of Permeability	Level of Wayfinding
Staircase and lift	6	Semi-Private	Easy
Corridor	7	Private	Easy
Hotel rooms	8	Private	Easy

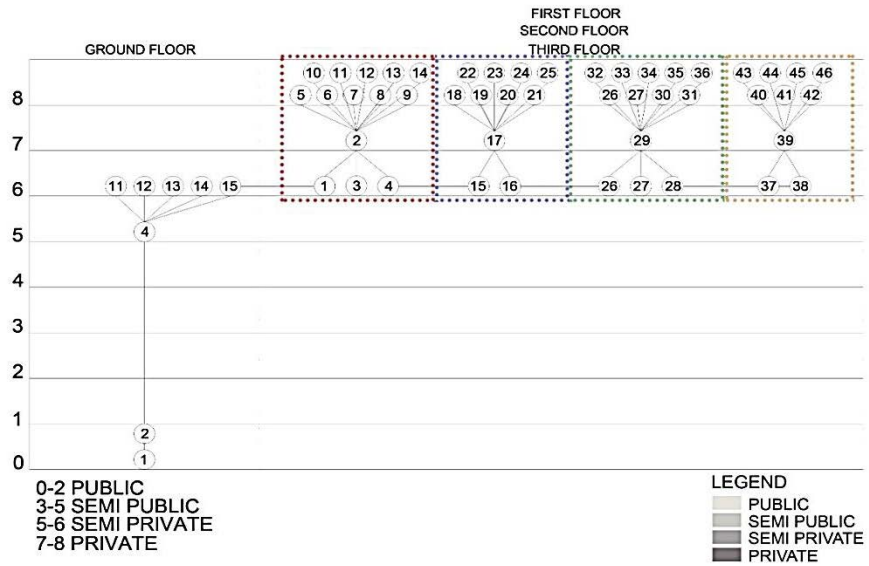

Figure 8: Measurable scale of hotel guests' wayfinding

The roof consists of hotel facilities such as a ballroom, meeting rooms, spa, gym, swimming pool, and restaurant (Figure 9). The restaurant is joined together with a night bar that is open to the public. Therefore, the mix of user categories occurs in the area. The wayfinding is easy with the vertical access from the ground floor, but the permeability is scarce with the mix usages when most of the space is for private usages and spaces. Without a clear visual direction and limitation of access, wayfinding to public and private spaces can be confusing due to the mix of users and spaces on one floor. To limit the restaurant's wayfinding, it is located at the end of the planning facing the main road.

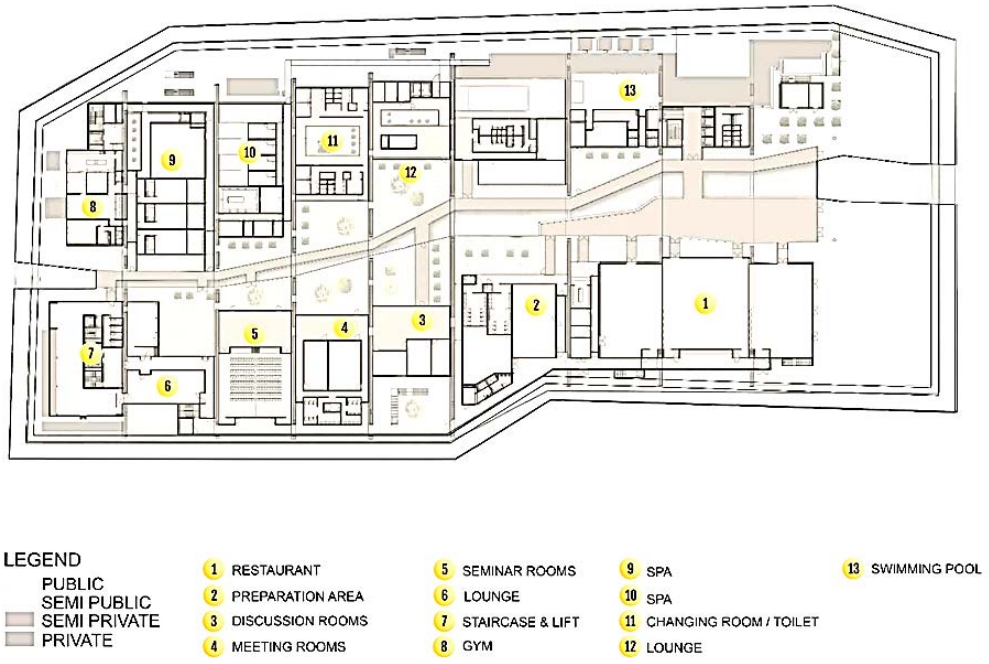

Figure 9: Roof Terrace Plan of the Museum Hotel Antakya, Turkey.

Table 4: Likert Scale for Space Syntax Analysis of the roof terrace

Area	Depth of Space from Entrance/Exit	Level of Permeability	Level of Wayfinding
1	3	Semi-Public	Easy
2	7	Private	Easy
3	4	Semi-Public	Medium
4	4	Semi-Public	Medium
5	4	Semi-Public	Medium
6	2	Public	Hard
7	1	Public	Hard
8	7	Private	Medium
9	7	Private	Medium
10	7	Private	Medium
11	7	Private	Medium
12	7	Private	Medium

6 Discussion

Based on the overall justified graph (Figure 10), an almost symmetrical pattern can be seen with the middle floor first, second, and third-floor plan (Figure 7), consisting of the hotel rooms as the axis due to the similarity of spaces and circulation for the particular floors. The ground floor

plan and roof terrace both have similarities in the categories of user and depth of the space. For the permeability level in The Hotel Museum Antakya, as seen from the analysis, the hotel level of permeability is straightforward with 100% private semi-private. The permeability is designed in such a way as to control the privacy of the space, which suits the usage of these three levels, hotel rooms. As for the ground floor plan, the level of permeability can be seen as difficult due to the mixed user categories and the shared lobbies and entrances at the ground level. The same scenario occurred on the roof terrace's permeability level; the mixed user categories led to difficulty in categorizing spaces and user categories. With the apparent gap in the level of permeability, user wayfinding plays a vital role in minimizing the gap of permeability. The Hotel Museum Antakya's wayfinding can be defined as easy despite the difficulties of permeability. The level of wayfinding on the ground floor is easy due to the apparent separation in public and private entrances at both ends of the building. Only one main entrance is used for the visitor to enter the building. This not only controls the circulation but also sets clear wayfinding for the user. As for the hotel room on levels two, three, and four, the level of wayfinding is easy with the number of access both vertical and horizontal is sufficient for the hotel guests and back-of-house services. The roof terrace might have scarce wayfinding for the small portion of the space, which is the restaurant, but the location at the end might have lessened the confusion and the difficulties of the level of wayfinding. With two different typologies in one building, a hotel, and a museum, the depth of spatial configuration and navigation of wayfinding are crucial due to both typologies have additional user categories and usage of spaces—effective spatial planning and navigation help in controlling the user navigation for a building with mixed typology.

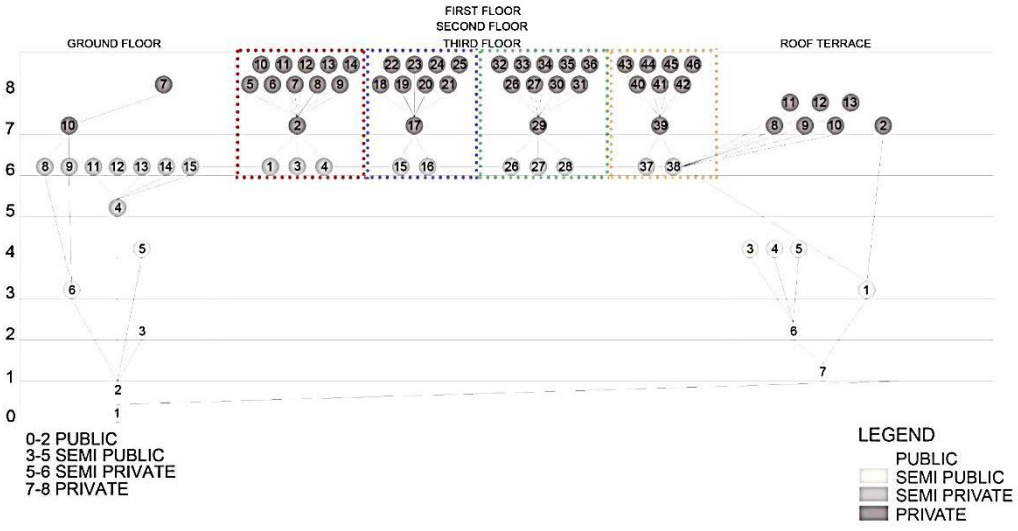

Figure 10: Overall justified graph for the Museum Hotel Antakya.

7 Conclusion

The analysis based on the graph of space syntax, the measurable scale of hotel guests and museum visitors, the Likert scale, and the spatial configuration analysis shows that overall, the level of wayfinding and permeability for this building being the mixed-used with prominent dual

usage is scarce when it comes to the area and spaces that mixed both usages but in spaces that is clear in its uses such as the museum at the ground floor and the hotel at the first, second and third floor, the level of permeability and wayfinding is straightforward. As a museum, the ground floor spatial planning suits the spatial adaptability with having entrances at three (3) sides of the building and clear entrances from the outside, but towards the lobby where there is a junction that separates the museum and hotel, the level of permeability has to be clear to segregate the hotel guest and museum visitor. As for the three (3) story hotel, the wayfinding is straightforward and easy with a corridor in between rooms and a corridor leading to every room without obstruction. Meanwhile, the rooftop terraces happen to have significant issues since the mixing of usages occurs in a specific area.

The permeability level is crucial in a mixed-used building to have straightforward wayfinding for the building user. This contributes to spatial planning, spatial adaptability, and the quality of spaces.

8 Availability of Data And Material

All relevant information is included in this work.

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