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Aal Configuration of a Museum Typology with a Case of the Audain Art Museum Canada

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Abstract

An art museum, sometimes known as an art gallery, is a building or place dedicated to the exhibition of art, usually from the museum's collection. It could be public or private property, and it could be open to the public or restricted. The three primary roles of collection, research and public program are inextricably linked in the concept of an art museum, and the museum's management, generally its director, seeks to achieve and maintain a proper balance between them. (Wikipedia, 2021) This paper will focus on the study of space syntax to extract the level of permeability and wayfinding of a museum in Canada named the Audain Art Museum. Audain Art Museum is a 56 thousand-square-foot private museum located in Whistler, British Columbia. The site is located at the Creek floodplain in a rural area. This article will apply the space syntax technique, which will be further developed into a justified graph to gain a better knowledge of the museum's spatial structure. Audain Art Museum illustrates hard accessibility and is designed with semi-private permeability to serve the building purpose. The museum is considered a semi-public and semi-private space because the public is not allowed to enter the building without purchasing a ticket. The spaces allocated for the services are too much for a small museum. The exhibition space of the museum should be extended and reduce the space for services and storage. It is important to maintain the flow of visitors.

Discipline: Architecture

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1 Introduction

1.1 Building Typology

An Art museum which is also known as an art gallery is a space with unaided communication with its visitors. (Art Museum, n.d.) The collections of an art museum are comprised of paintings, sculptures, and decorative arts where the aesthetic value is the major consideration in accepting these collections. The intention and philosophy of the curator can be seen in the display of artworks which is believed to convey a visual message to the viewer through art pieces.

1.2 Case Study

The case study chosen for this research is the Audain Art Museum located in Whistler, British Columbia. It is a 56, thousand-square-foot private museum. The reason this building is chosen to be the case study is due to the contemporary design of the museum, the integration of the museum with nature, and the ways how the building is designed simply and directly by projecting a volume of consecutive public spaces and galleries into an existing linear void within the attractive but difficult site in Whistler surrounding forest and the challenge of having the massive snowfall of approximately 15 feet depth throughout the year. (Audain Art Museum / Patkau Architects, 2021) All these characteristics of the contemporary museum give the visitors to feel the different space arrangement compare to other museums.

1.3 Research Objective

The goal of this study is to study the design of spaces of a selected art museum in terms of the users' configuration and space functionalities. The objective of this research is to better understand the function of spaces so that the ideal layout as guidelines for the art museum typology can be determined using the space syntax technique. The spaces and graphs are indicated with alphabetical and numerical symbols to provide a

systematic approach to measuring the level of permeability and wayfinding. (Mustafa et al., 2010) According to the floor levels, the graph is used to determine the connectedness and links of each area (Bafna, 2003).

2 Literature Review

2.1 Space Syntax

2.1.1 Permeability and Wayfinding

The space syntax is a method to determine the connections between human activities and the spaces inside a habited space (Bafna, 2003). The basic goal of space syntax is to investigate the spatial transition of human movement from one location to another. During the evaluation, transition spaces and connectedness are frequently encountered; space syntax analysis is frequently represented by the level of permeability found in building design (Mustafa et al., 2010). The building's design, on the other hand, is based on the designer's planned purpose and functions. The level of Wayfinding can be derived using space syntax analysis, which is a study of accessibility

within graphs (Yusoff, 2019). In his book "The Image of the City," Kevin A. Lynch (1960) described wayfinding as the "consistent use of an organization of definite sensory indications from the external world." To put it another way, space syntax enables people to study the interaction between human activities and spaces in a variety of ways based on the structure of the inhabited area (Penn, 2003). To organize themselves, habitual societies frequently employ space as the keyword and essential information. Permeability and wayfinding are variables in the space syntax that can be used to express or measure patterns of behavior within space (Hillier & Hanson, 1984).

2.1.2 Background of the Case Study

The Audain Art Museum contains the administration and back-of-house support operations and is elevated a whole story above the ground with a sharply slanted roof. Starting from the village stroll, the pedestrian spine of the Whistler Village, to Blackcomb Way, traveling to and past the Museum, and then across the site to Fitzsimmons Creek park, the building design, and placement work together to form a public walkway link. A sky-lit museum entry porch can be reached via a bridge that rises through the forest from Blackcomb Way. From there onwards, guests can either continue their journey across the site by descending to the forest floor and the central meadow, or access the museum lobby and event area. Inside, visitors can stroll through a glazed walkway that overlooks the meadow below to obtain access to the permanent collection galleries, followed by the galleries that house occasional displays. (Audain Art Museum / Patkau Architects, 2021) The permeability of the space is the privacy and security to protect the art pieces.

2.1.3 Building Typology, Location, and Building Style

It is a private art museum that served the public. Visitors need to purchase entry tickets before entering the museum. The museum aims to exhibit selected art pieces from the owner of the art gallery to the visitors. The museum is divided into public space which is spaces before entering the exhibition area, semi-public places which are the tea room and broad room, and there are also some private places such as office and caretaker suite. Furthermore, the security of an art museum must be good to protect the high-value items and ensure the privacy of the museum. (Art Museum, n.d.) The site in the Whistler is located within the Creek floodplain in a rural area, surrounded by evergreen forest foliage and having massive snowfall weather of 15 feet yearly accumulation depth. (Audain Art Museum / Patkau Architects, 2021). The building style of the museum is Minimalist and modern. The style of the building can be identified by the simple and direct design of a linear void volume of sequential public space and gallery within the surrounding forest. The Audain Art Museum's shape and character are purposefully constrained to give a serene, simple backdrop to the art inside and the surrounding natural setting. The basic exterior is encased in a dark metal envelope that blends into the shadows of the surrounding woodland. The black metal is topped by an attractive light wood casing where this envelope is opened, to enable access in the entry porch or a view from the glazed walkway to the galleries. This warm bright materiality is continued in the

interior public spaces that are visible from the outside. (Audain Art Museum / Patkau Architects, 2021)

3 Method

3.1 Permeability and Wayfinding Analysis

The Audain Art Museum is chosen as the case study for this paper. A preliminary analysis of the space was undertaken to utilize the Space Syntax theory for this study. A base CAD design is created by utilizing AutoCAD to redraw the layout plans for the case study to undergo analysis and then post-editing with the Adobe Photoshop software.

By examining the layout plans of the case study, space syntax analysis is used in this work to document the level of permeability and wayfinding. Following that, the important facts and information were acquired using a qualitative analysis method. The permeability and wayfinding were studied using the Likert scale and graphs with a numbering system. The ideal strategy for completing this wayfinding challenge is to investigate spatial hierarchies by leveling in a quantifiable scale graph (Brandon. J, 2010). In the measurable scale graph, the leveling system is depicted.

The level of permeability and wayfinding is investigated by drawing justified graphs with two axes, X and y, to visualize the depth level of the spaces (Figure 1). The first step, according to Hillier, Hanson, and Peponis (1984), is to decide what information should be gathered from the market museum. The spatial description will next expose the adaptive features that allow for social item justifications. The identification and depiction of spatial elements, the categorization of spatial interactions, and the modeling of commons will all be considered in these descriptions.

The spaces will be segmented according to the zoning of the spaces to determine the level of wayfinding and permeability between them. For example, there is a degree of permeability from public to semi-public, and semi-private to private space, particularly in the art museum. The depth of the spaces will be determined by comparing the spaces according to the permeability levels (as shown in table 1) and the depth of the spaces will be determined by utilizing the justified graphs (as shown in Figure 3).

Figure 1: An elementary representation for space syntax analysis- "a" represents minimum depth (symmetric system), "b" a linear sequence of maximum depth (asymmetrical system)

Ten colors are used to denote typologies or groups of spaces in all of the tables under the case study section. For example, the pink and red colors denote the building transit system, while the green denotes commercial spaces and the dark blue denotes the entrance. Light blue denotes toilets and brown color denotes caretaker suites. Purple denotes the office, grey denotes the car

park and orange denotes the services and storage within the buildings. The rest of the numbering which is in black denotes ordinary spaces which accommodate mostly the public. It is critical to identify the different zones of the spaces not only with a number or alphabetical symbol but also with a color code. The objective for this is to achieve a better understanding of how spaces are linked depending on their functionalities.

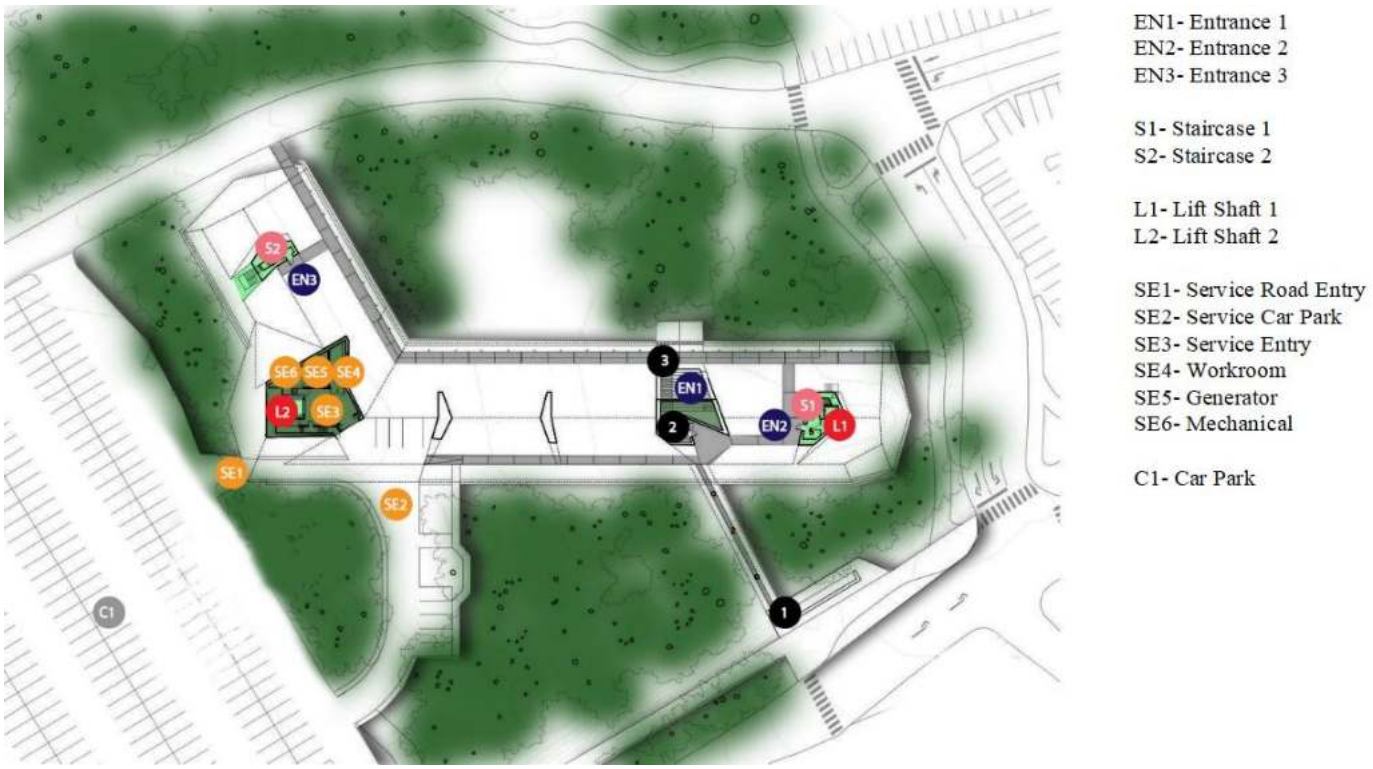

Figure 2: Site Plan Redrawn from Original Plan

The Audain Art Museum has three entrances in total to reach the exhibition area. EN1 is the main entrance straight from the drop-off where visitors are led to the lobby (4) on the 1st floor through terraced seating/stairs. The lower part of the terraced seating is used as temporary storage (SE1) to store art pieces. There is two verticle access which were marked in light green colorations at both ends of the building. S1, L1, and S2 can be found as the verticle access points at the end of the building. The services lift lobby (L2) and services (SE3, SE4, SE5, SE6) are located in the middle of the building with a service entry (SE2) leading to the services lobby. This part is considered semi-private which is used for the services of the building. The car park is located just beside the museum to ease the visitors' access to the museum (Figure 2).

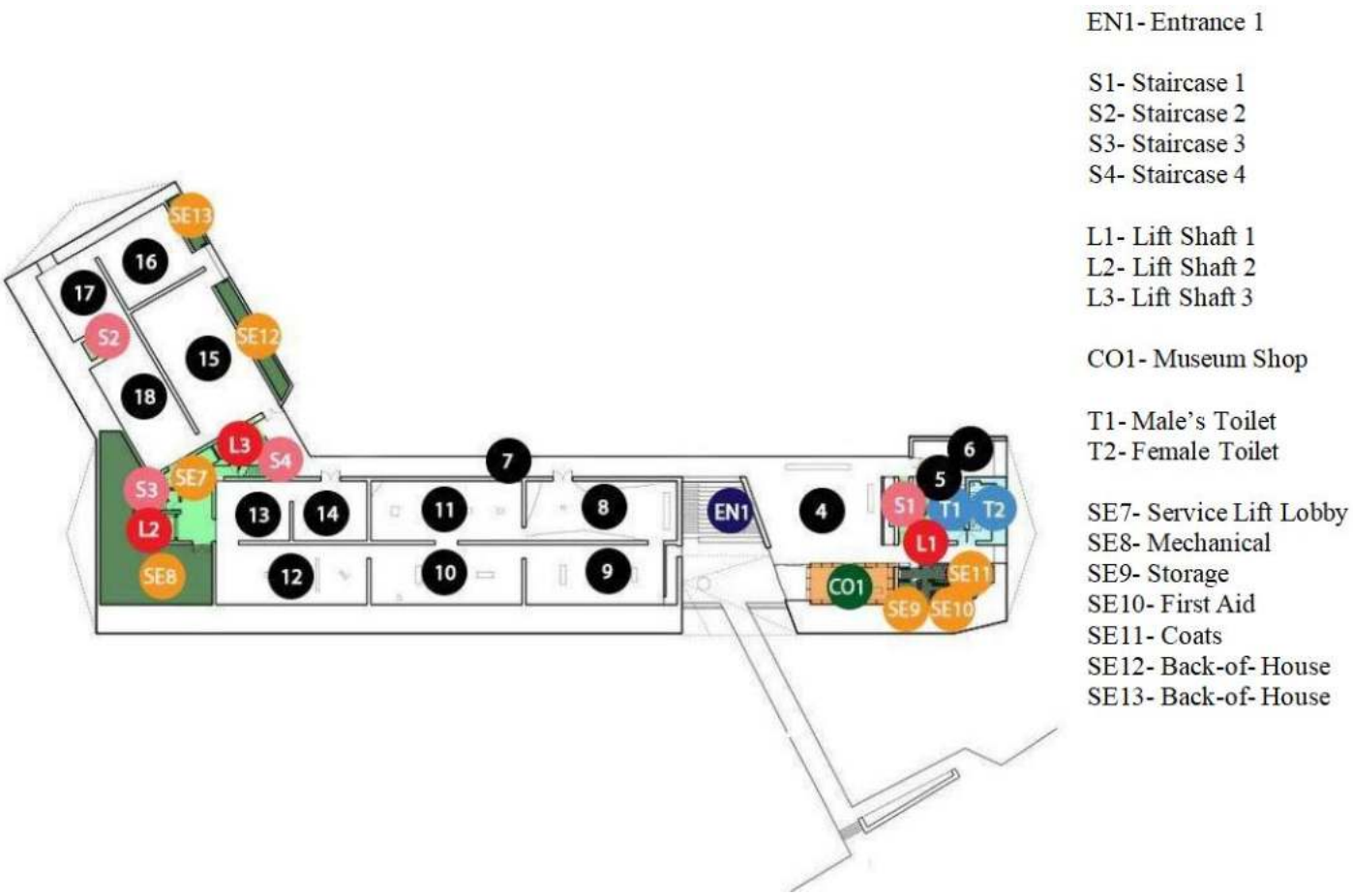

Figure 3: 1st Floor PlanRedrawn from source: (Audain Art Museum / Patkau Architects, 2021)

Going up from the ground floor from EN1, visitors will reach the lobby (4) first to proceed with registration. Besides the lobby, there is a souvenir shop (CO1) for visitors to purchase gifts. The Catering (5) and education spaces (6), as male and female toilets (T1, T2) are located behind the lobby. The Storage, First Aid, and Coats are located behind the museum shop too. Visitors will reach the exhibition corner(8,9,10,11,12,13,14,15,16,17,18) through a long corridor (7) where the back-of-house(SE12,13) is located behind the exhibition corner at the end of the building. The first floor of the museum is considered a semi-public space of the building as it caters the visitors after purchasing their tickets (Figures 3 and 4).

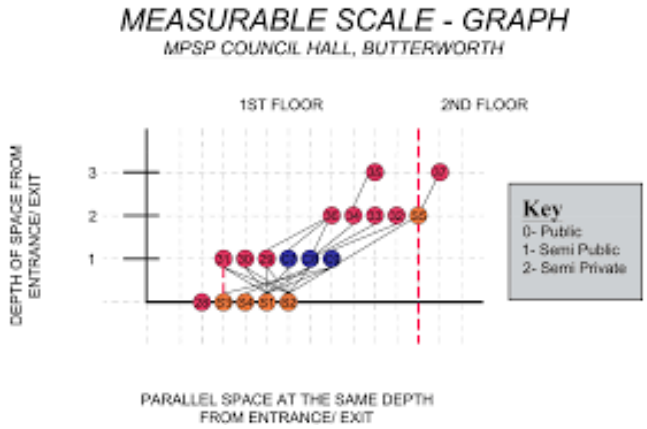

Figure 4: Justified Graph showing Ground Floor Plan and First Floor Plan circulation of MPSP Council Hall, Butterworth.

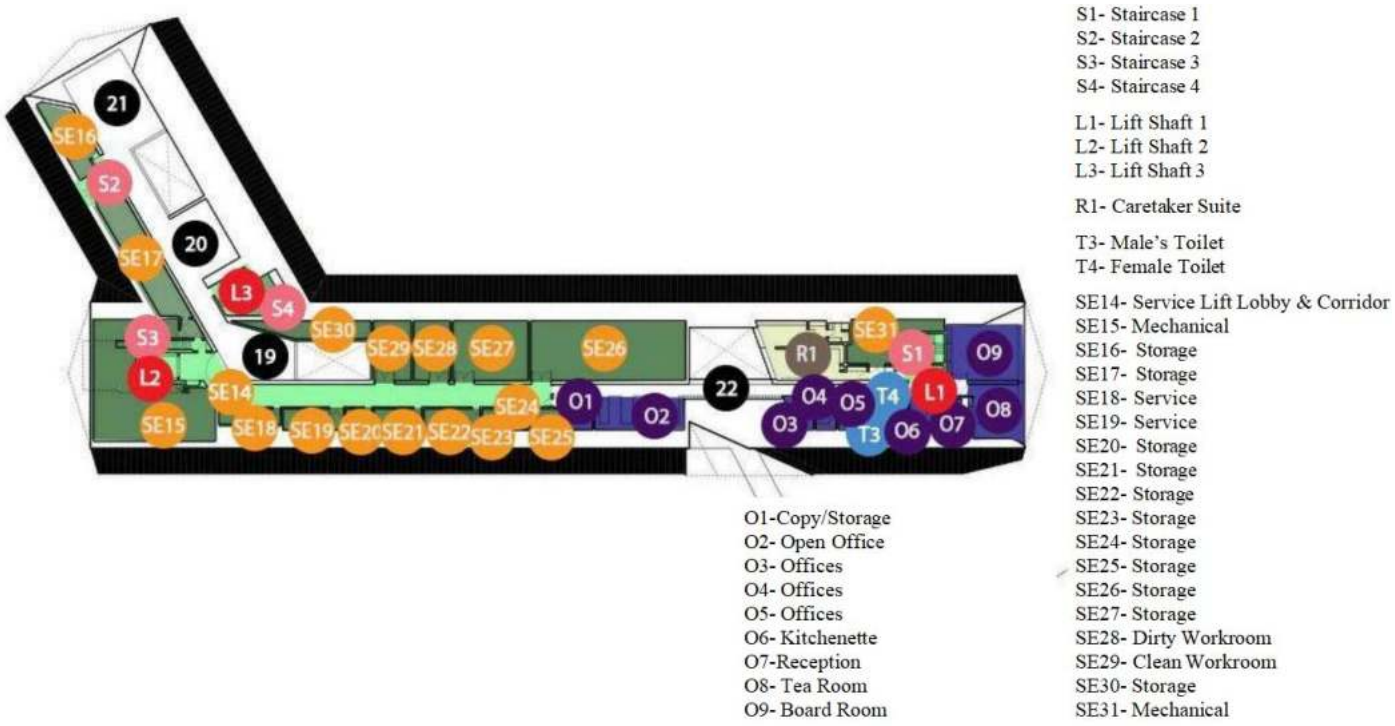

Figure 5: 2nd Floor PlanRedrawn from source: (Audain Art Museum / Patkau Architects, 2021)

There are two staircases (S2, S4) and one lift(L3) that lead the visitors to the second floor of the museum. For the 2nd floor only part of the building act as the exhibition space to exhibit art pieces while another two part of the 2nd floor act as the services and storage (SE14-31) and offices(O1-O9) (Figure 5). There are two toilets provided for the office staff on the second floor. Furthermore, a Caretaker Suite (R1) is provided on the top floor.

SITE PLAN

Table 1: Scale of the level of permeability

Level of Permeability	Level of Wayfinding	Depth Level of Space
Public	Very Easy	0
Public	Easy	1
Public	Easy	2
Semi-Public	Moderate	3
Semi-Public	Moderate	4
Semi-Private	Hard	5
Semi-Private	Hard	6
Semi-Private	Hard	7
Private	Very Hard	8

Figure 6: Scale of Depth for Permeability

4 Result

Figure 7 shows the overall result of space syntax. The user categories are public visitors, office staff, and caretaker/owners of the museum. The permeability level depth and the wayfinding rate of the space are determined through visitors, staff, and caretaker usability purposes.

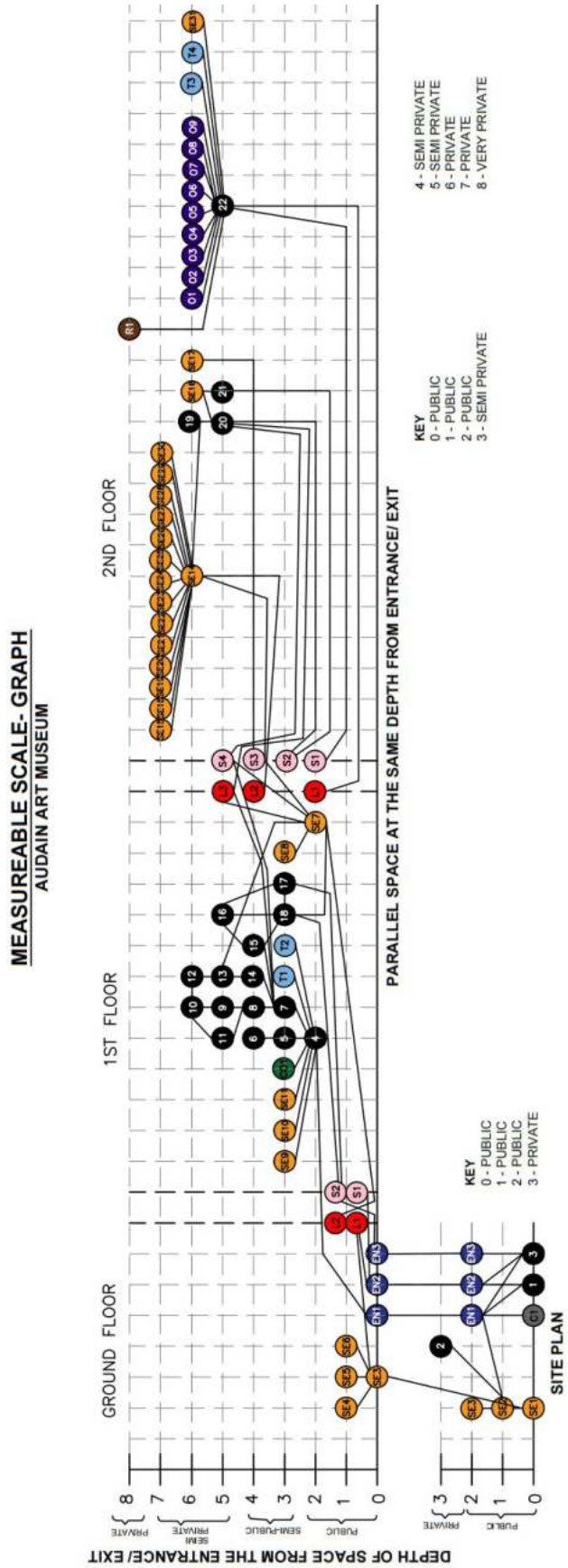

Figure 7: Overall Justified Graph for Audain Art Museum

4.1 Level of Permeability and Wayfinding Analysis

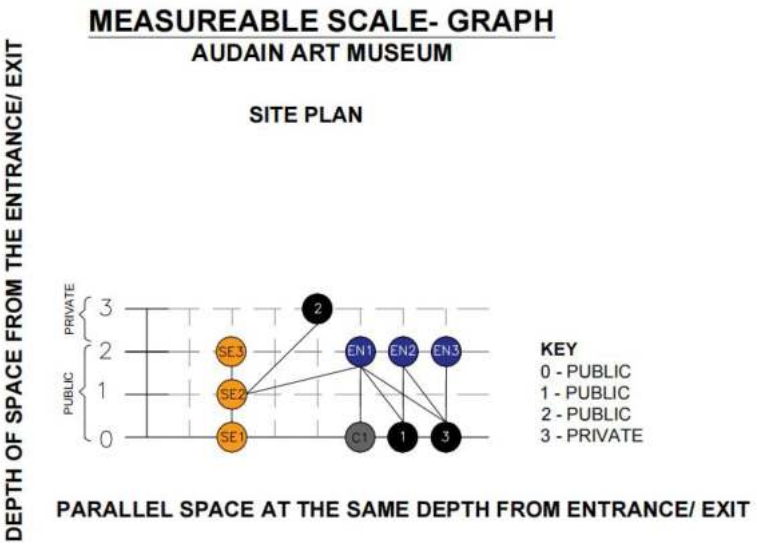

Figure 8: Justified Graph of Audain Art Museum for Site Plan

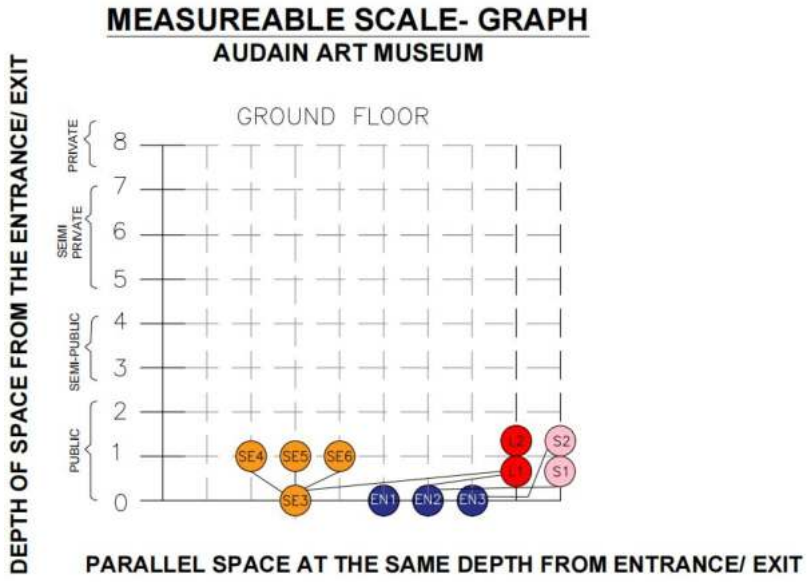

Figure 9: Justified Graph of Audain Art Museum for Ground Floor

Table 2: Space Syntax Analysis for Ground Floor Plan

Level of Permeability	Level of Wayfinding	Depth Level of Space	Code of Space
Public	Very Easy	0	SE1, C1, 1, 3
Public	Easy	1	SE2
Public	Easy	2	SE3, EN1, EN2, EN3
Private	Moderate	3	2

The justified graph has a two-depth level for the site plan (figure 8), designed for simple accessibility. The ingress and egress area for the visitors is the main drop-off (1) or from the side corridor (3). Visitors can also park their car at (C1) before entering and reach their museum's main entry at (EN1, EN2). (EN3) is an exit entry only for the museum. Services entry is located at (SE3). There is a storeroom (2) located on the ground floor also (Figure 9). The depth level of permeability for SE1, C1,1, 3, SE2, SE3, EN1, EN2, and EN3 are considered public, while 2 is considered private

for staff or worker access. Table 2 shows the easy level of wayfinding easy is for visitors' accessibility while moderate is for staff or worker accessibility.

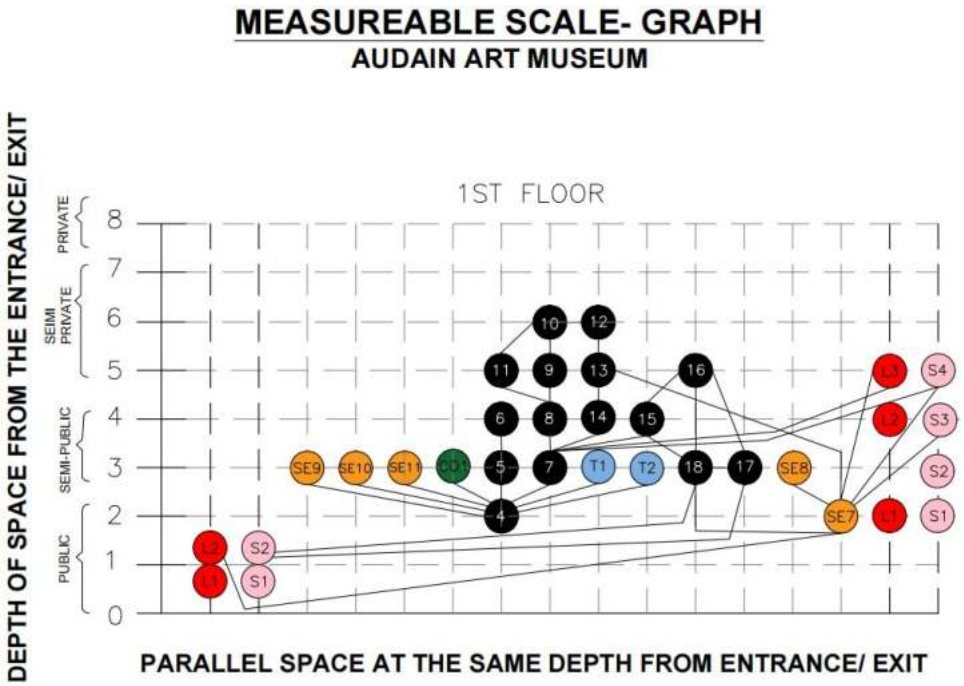

Figure 10: Justified Graph of Audain Art Museum for First Floor Plan

Table 3: Space Syntax Analysis for First Floor Plan

Level of Permeability	Level of Wayfinding	Depth Level of Space	Code of Space
Public	Easy	2	4
Semi-Public	Moderate	3	SE9, SE10, SE11, CO1, 5, 7, T1,T2,18,17,SE8
Semi-Public	Moderate	4	6, 8, 14, 15
Semi-Private	Hard	5	11, 9,13, 16
Private	Hard	6	10, 12

Table 3 shows 5 levels of depth of permeability for the First Floor Plan, including public to private spaces. The First Floor's wayfinding levels are mainly easy as it is designed for a more welcoming and serving configuration layout at the receptionist (4) (Figure 10).

There are toilets (T1, T2), a shop (CO1), and services such as storage(SE9), First Aid (SE10), and coats (SE11) on the first floor. The level of wayfinding on the first floor is considered moderate to hard which is the exhibition area where the permeability is considered semi-private to private.

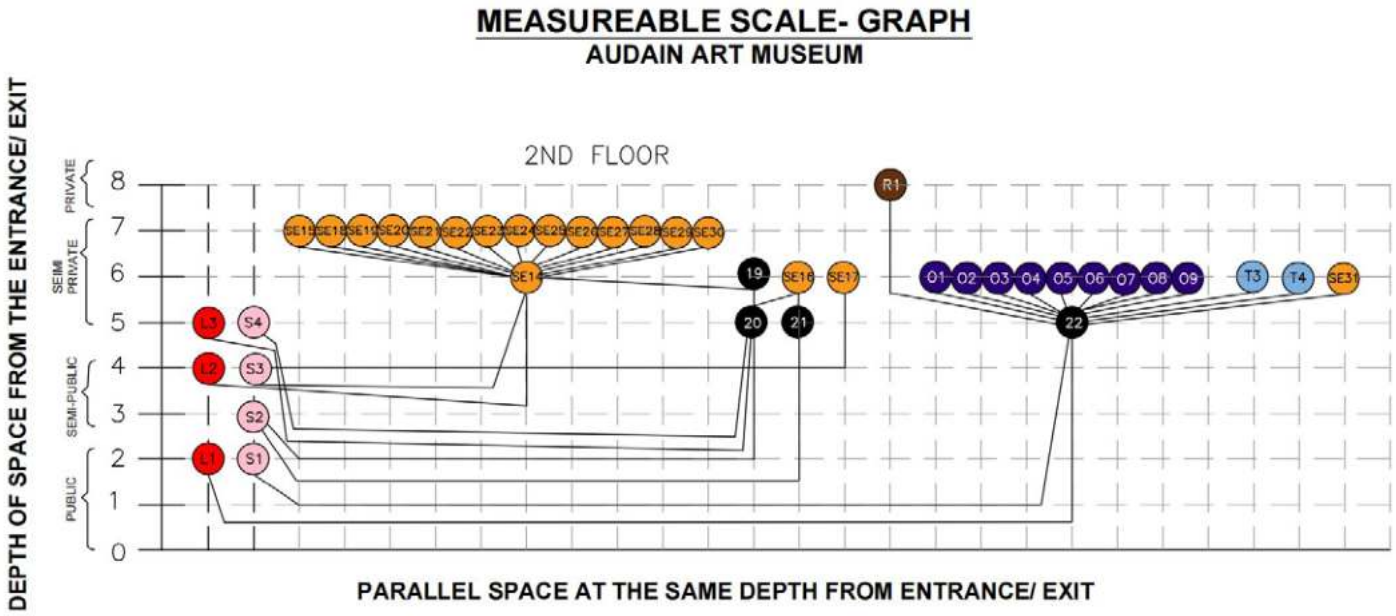

Figure 11: Justified Graph of Audain Art Museum for Second Floor Plan

Table 4: Space Syntax Analysis for Second Floor Plan

Level of Permeability	Level of Wayfinding	Depth Level of Space	Code of Space
Semi Private	Hard	5	20, 21, 22
Semi Private	Hard	6	SE14, 19, SE16,SE17, O1,O2,O3,O4,O5,O6,O7,O8,O9, T3,T4,SE31
Semi Private	Hard	7	SE15,SE18,SE19,SE20,SE21,SE22, SE23,SE24,SE25,SE26,SE27,SE28,SE 29,SE30
Private	Very Hard	8	R1

There are 4 depth levels on the second floor (Figure 11). 19, 20,21 is still the exhibition area of the museum. 22 is the corridor of the office which is connected to the service corridor of SE14. All the services, mechanical and storage range from SE15-SE31 while the office area range from O1-O9. There is 2 toilet T3, T4 on the 2nd floor which is provided for the office staff. There is one caretaker or room for the museum owner at R1. All the spaces on the second floor are considered semi-private and have a hard level of wayfinding except R1 which has a private level of permeability and a very hard level of wayfinding.

5 Discussion

The museum is considered a semi-public and semi-private space because the public is not allowed to enter the building without purchasing a ticket. Most of the exhibition place is a semi-public space where the number of people entering the museum is under control. The administrative part of the museum which is the office located on the uppermost floor of the building is a semi-private place, only staff of the museum are allowed to enter the area. According to the study, art museums allocate quite a big space for their service area too for storage, workroom, mechanical, and services.

Clear patterns of wayfinding behavior across the museum can be seen through the analysis. This is because the circulation presented, influences the users' accessibility and permeability,

which is the study's objective. The Audain Art Museum's wayfinding research revealed the pattern's intricacy. It's a small art gallery with varying levels of privacy since each level serves a different purpose. The majority of the areas are accessible after visitors purchase their tickets, except for some of the places on the second level, which is the museum's administrative area and is only accessible by staff.

When it comes to the site plan, includes large spatial arrangements within the development and the surrounding parts. Architectus applied the method of creating EN1 and EN2 paths that can access the entry from all around the perimeter to make it open. The many entrances are visible on the ground floor level, as can be seen in the Site Plan. According to Table X, the highest permeability is not restricted to 0 for public areas but has a depth of 2 due to the art museum's privacy.

Table 5: Types, Number and Percentage of Rooms According to Privacy Level

Depth of Space	Level of Permeability	Types of Rooms	Number of Rooms	Percentage of Rooms (%)
0	Public	SE1, C1, 1, 3	4	6.06
1	Public	SE2	1	1.52
2	Public	SE3, EN1, EN2, EN3, 4	5	7.58
3	Private / Semi Public	2, SE9, SE10, SE11, CO1, 5, 7, T1,T2,18,17,SE8	12	18.18
4	Semi-Public	6, 8, 14, 15	4	6.06
5	Semi-Private	11, 9,13, 16, 20, 21, 22	7	10.61
6	Semi Private	10, 12, SE14, 19, SE16,SE17, O1,O2,O3,O4,O5,O6,O7,O8,O9,T3,T4,SE31	18	27.27
7	Semi Private	SE15, SE18,SE19,SE20,SE21,SE22,SE23, SE24,SE25,SE26,SE27,SE28,SE29, SE30	14	21.21
8	Private	R1	1	1.52
Total			66	100

According to the study, the overall outcome of permeability and wayfinding properties is shaped by visitors and staff's usability circulation. Audain Art Museum illustrates hard accessibility and is designed with Semi-private permeability to serve the building purpose. The level of permeability is based on the result in Table X, the highest levels are semi-private,59.09% and most of the semi-private is on the first floor and the second floor. Next, the second higher-level percentages are semi-public, which is on the first floor. The tertiary level is public, 15.15% with most of the public level on the ground floor. The lowest percentage level is private 1.52% which is located on the ground floor and second floor.

Based on the result shown in Table y, The connecting space through the ground floor consists of 3 entrances surrounding the layout, two lifts and 2-3 staircases linking from the both ending and center of the building. Services, mechanical, and storage are semi-private as there are more in-depth the level of permeability which occupied the major part of 59.09% of the permeability level. A private storeroom with easy wayfinding on the ground floor to keep artwork collected from the loading bay. Most of the exhibition areas have a moderate,24.24% wayfinding

and a hard level of wayfinding in the office area which only allow the entry of museum staff. There is the most difficult wayfinding which has a very hard level, 1.52% is a caretaker suite on the 2nd floor.

Table 6: Percentage of level Permeability and Wayfinding

Depth of Space	Floor	Level of Permeability	Percentage of Level Permeability	Level of Wayfinding	Percentage of Level Wayfinding
0	Ground Floor	Public	Public: 10/66 x100% = 15.15%	Very Easy	Very Easy: 4/66 x100% = 6.06%
1	Ground Floor	Public		Easy	Easy: 6/66 x100% =9.09%
2	Ground Floor & First Floor	Public		Easy	
3	Ground Floor & First Floor	Private / Semi-Public	Private: 1/66x100%= 1.52%	Moderate	Moderate : 16/66 x100% = 24.24%
4	First Floor	Semi-Public	, Semi-Public: 15/66 x100%= 22.73%	Moderate	
5	First Floor & Second Floor	Semi-Private	Semi-Private : 39/66 x100% = 59.09%	Hard	Hard: 39/66 x100% = 59.10%
6	First Floor & Second Floor	Semi-Private		Hard	
7	Second Floor	Semi-Private		Hard	
8	Second Floor	Private	Private: 1/66 x100% = 1.52%	Very Hard	Very Hard : 1/66 x100% = 1.52%

6 Conclusion

The museum is considered a semi-public and semi-private space because the public is not allowed to enter the building without purchasing a ticket. Most of the exhibition place is a semi-public space where the number of people entering the museum is under control. The administrative part of the museum which is the office located on the uppermost floor of the building is a semi-private place, only staff of the museum are allowed to enter the area. According to the study, art museums allocate quite a big space for their service area too for storage, workroom, mechanical, and services. Throughout the research, the design of spaces of a selected art museum in terms of the users' configuration and space functionalities is studied. A better understanding of the function of spaces is achieved using the space syntax technique and the research can be used as an ideal layout as guidelines for the normal art museum typology. The overall space syntax performance of the museum is considered a semi-public to semi-private space which only allows people with ticket entry to enter the exhibition. The permeability of an art museum is considered semi-public to semi-private. A normal art museum has moderate to hard wayfinding. This research can be a good guideline for students doing art museum typology. They can take this space configuration as a reference. The spaces allocated for the services are a bit more for a small museum. The exhibition space of the museum should be extended or reduced space allocated for services and storage as it is important to maintain the flow of visitors. The limitation of the study when conducting the research study is that cannot have the actual visit to the site due to pandemics and there is not enough data to be analyzed that get from Archdaily.

7 Availability of Data And Material

Data can be made available by contacting the corresponding authors.

8 Acknowledgment

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