SEMIOTICS IN ARCHITECTURE OF THE JOHOR BAHRU INCLUSIVE LEARNING CENTRE

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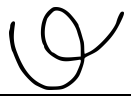

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A thesis submitted in fulfilment of the
requirements for the award of the degree of
Bachelor of Science in Architecture

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DEDICATION

To those who believed in me and showed me constant love and support.

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First and foremost, I would like to express my deepest gratitude towards my workbase master, Dr. Lim Yong Long, for providing me with his guidance and teachings throughout the completion of this design subject. His unique outlook on architecture encompassing its theories and philosophies has taught me of the many ways to appreciate architecture as a whole. For this, I am extremely grateful as it has opened my eyes to the many possibilities to design buildings which should not be limited to the constraints of the mind as stated by him, "...if the building touches the ground, it can be built". His passion, patience and dedication towards his students radiates with his every action, from extending crit sessions beyond working hours to providing students with guidance through online messaging. He is consistent and never fails to show interest in the works produced by his students which has truly inspired me to produce my best work this semester.

I would also like to extend my heartfelt thanks to my parents for their love, prayers and everyday sacrifices they have made to provide me with a proper education. Without them, I would not have this opportunity to graduate with a bachelor's degree in Architecture. I am also thankful for the supportive peers I am surrounded with, who share my beliefs and thoughts and provide me with constant motivation to complete my architectural degree. And finally, I would like to thank those unnamed who have provided me with a great source of inspiration to design with meaning and create something that I truly believe in.

ABSTRACT

The proposal of the Johor Bahru Inclusive Learning Centre was initiated from the consideration of the role of architecture as a representation of culture, lifestyle and belief systems which include social, economic and political ideologies. This indicates that besides just serving as a space, architecture should also convey a message to its users and communicate to its audiences. The design attempts to convey the impact of socio economic status on an individual's opportunity of attaining a proper education. It also delves into the socioeconomic divide in the surrounding educational institutions as well as the growing class tensions evident in a modern capitalist society. The design tackles these issues by means of architecture as a communication device. It provokes discourse surrounding the social, political and environmental challenges faced in achieving equity in education through the design programmes and spaces throughout the building. It also explores the philosophical ideologies of Robert Venturi and the content of his works in defining semiotics of architecture and its symbolism as an expression of culture. Hence, the concept of the design - 'journey towards unity' - explores the journey of achieving tolerance amongst individuals from different income households through a four-part design scheme: division, collision, reflection and unity. As such, the Johor Bahru Inclusive Learning Centre is a space to cultivate an enriching learning experience which promotes inclusivity and educational equity amongst individuals of different socioeconomic status.

ABSTRAK

Cadangan Pusat Pembelajaran Inklusif Johor Bahru merupakan inisiatif yang mementingkan peranan seni bina dalam aspek budaya yang merangkumi ideologi sosial, ekonomi dan politik. Hal ini menunjukkan bahawa seni bina tidak hanya berfungsi sebagai ruang, malah seni bina mampu menyampaikan pesanan kepada penggunanya. Reka bentuk seni bina ini berusaha untuk menampilkan isu kesukaran individu dari status ekonomi rendah untuk memperoleh pendidikan yang sewajarnya. Selain itu, subjek ini juga ingin menunjukkan jurang sosioekonomi yang wujud di institusi pendidikan berdekatan tapak kajian serta perbezaan kelas sosial dalam kalangan masyarakat kapitalis moden pada hari ini. Hasil dari penggunaan seni bina sebagai alat komunikasi, reka bentuk bangunan ini berusaha untuk mengatasi masalah isu sosial, ekonomi, dan politik untuk memperoleh ekuiti dalam pendidikan melalui program dan reka bentuk ruang dalam perancangan bangunan. Di samping itu, reka bentuk bangunan juga meneroka teori falsafah Robert Venturi dan kandungan karyanya yang mendefinisikan semiotik dalam konteks seni bina dan simbolisme sebagai ungkapan budaya. Oleh itu, konsep reka bentuk - ‘perjalanan ke arah perpaduan’ - meneroka cara perancangan bangunan untuk mencapai toleransi antara individu dari latar belakang sosio ekonomi yang berbeza melalui skema reka bentuk empat bahagian iaitu: pembahagian, perlanggaran, refleksi, dan perpaduan. Oleh itu, Pusat Pembelajaran Inklusif Johor Bahru merupakan ruang pembelajaran yang mempromosikan inklusiviti dan ekuiti pendidikan dalam kalangan individu dari latar belakang sosioekonomi berbeza.

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CHAPTER 1

INTRODUCTION

The site is located at the intersection of the urbanised city centre, old residential areas and the Royal Gardens in Johor Bahru which displays a strong sense of character and distinctive identity unique to its location. It also displays the diversity of the locals' culture, ethnicity and socioeconomic status which commands the necessity of an inclusive, unprejudiced space for community integration.

1.1 Background of Study

Figure 1.1 Map of educational institutions around the site

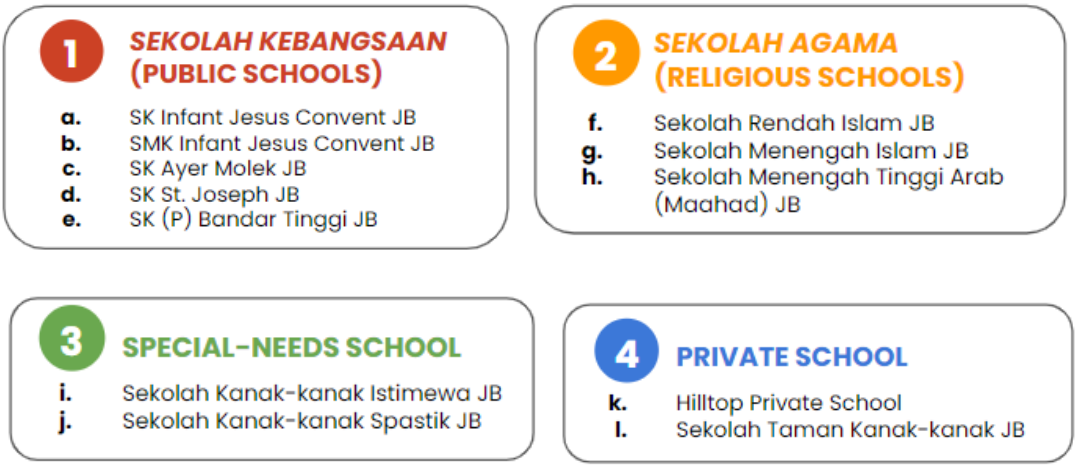

Figure 1.2 List of educational institutions around the site

The location of the site is situated amongst a variety of educational institutions consisting of public schools, religious schools, special-needs schools and private schools. This makes it a suitable place to establish a learning centre as a pivotal point for students to come together through learning and recreational activities.

The students from these schools come from a diverse range of social and economic backgrounds which could result in a lack of understanding and empathy towards the hardships faced by each individual. Hence, it is important that a space is provided to encourage engagement and interaction amongst students from these different educational institutions.

1.2 Issues and Problem Statement

Three main issues were identified on site based on the background study which consists of (i) the lack of a proper educational environment for individuals from lower income households; (ii) the socioeconomic divide in surrounding educational institutions; and (iii) the growing class tensions which exist in a modern capitalist society.

i. Individuals of lower income households lack a proper educational environment.

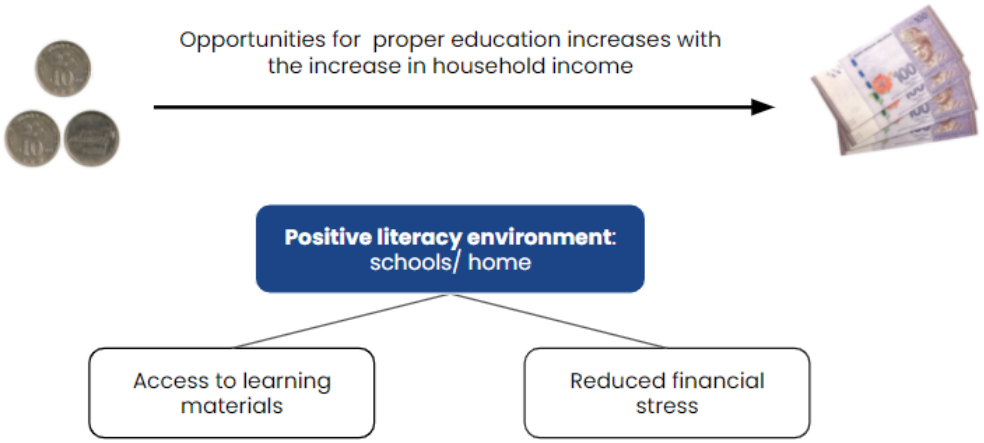

Figure 1.3 Infographic on the opportunities for proper education associated with household income

According to the American Psychological Association, socioeconomic status is defined as the social standing or class of an individual. This socioeconomic status is an indication not just of household income but also financial security, impressions of social status as well as educational accomplishments of which could be affected by societal, cultural, and geographical factors ("A Research Synthesis of the Associations Between Socioeconomic Background, Inequality, School Climate, and Academic Achievement - Ruth Berkowitz, Hadass Moore, Ron Avi Astor, Rami Benbenishty", 2017). Socioeconomic status can play an important role in affecting a person's quality of life as opportunities and privileges are usually easily obtained by individuals of higher income and social standing in society ("Education and Socioeconomic Status Factsheet", 2021).

Individuals from lower socioeconomic status households tend to acquire academic competency at a slower rate than their peers from higher socioeconomic status households ("Education and Socioeconomic Status Factsheet", 2021). This could be due to multiple factors such as the lack of access to learning materials and a positive literacy environment which indirectly correlates with the importance of education placed by the parents in

the lower socioeconomic status households. It could also be due to school conditions whereby a conducive classroom environment is essential in developing an individual's academic skills as well as the availability of well-qualified teachers ("Education and Socioeconomic Status Factsheet", 2021).

Based on the statistics gathered from the Department of Statistics Malaysia (DOSM), Johor Bahru consists of an uneven distribution of decile household groups which shows a large gap in household income when comparing the median income of a T20 household compared to a B40 household. As such, socioeconomic status and its role in obtaining a proper education is relevant in the site context, especially since the site is located in an area where educational institutions are concentrated.

ii. Socioeconomic divide in surrounding educational institutions

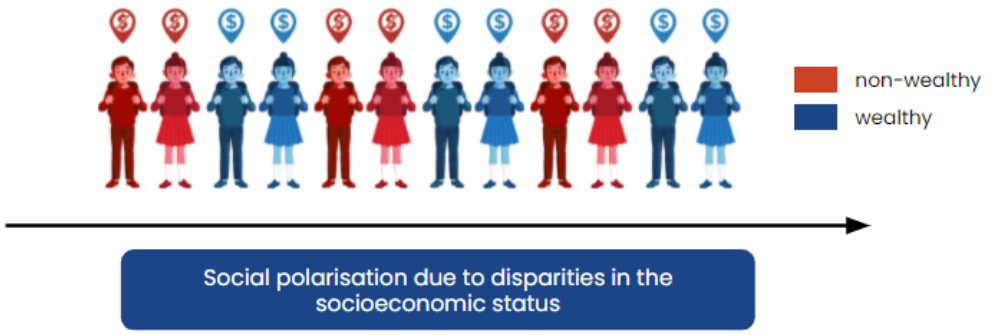

Figure 1.4 Infographic on social polarisation among students from different socioeconomic backgrounds

The term social mobility or typically known as vertical mobility refers to the shift in an individual or group's social standing from one standing to another which can either be higher, lower, intergenerational, or intra-generational ("A Research Synthesis of the Associations Between Socioeconomic Background, Inequality, School Climate, and Academic Achievement - Ruth Berkowitz, Hadass Moore, Ron Avi Astor, Rami Benbenishty", 2017). This can be achieved through varying methods, one of

them being social capital, whereby it facilitates the opportunities to acquire status and wealth through social networking.

According to a post from social media ("Education and Socioeconomic Status Factsheet", 2021), Malaysians from the B40 and M40 households are known to send their children to international or private institutions which are considered more elite due to their relatively higher school fees compared to public or government institutions. This is an effort to provide their children with opportunities to engage and form connections with peers from higher income households (T20) as a means of gaining social capital and improving their social standing in life.

Based on the netizen's observation, parents perceive this act as an investment towards their children's future, even comparing it to the Malaysian New Economic Policy adopted from 1971 to 1990 whereby individuals from the B40 income group were given scholarships and opportunities to study overseas under government aid. However, Malaysian's current economic status has seen a decrease in scholarships provided, hence compelling the citizens to explore other means of gaining social capital ("Education and Socioeconomic Status Factsheet", 2021).

iii. Growing class tensions in modern society as exhibited in ‘Parasite’

Figure 1.5 Infographic on the parasitic relations between the wealthy and non-wealthy based on the movie ‘Parasite’

The movie displays an environment of extreme wealth disparity whereby a family of lower class income exploits and takes advantage of a family of higher class income. At first glance, the title of the movie represents the way the members of the lower class leech off the good nature and generosity of the higher income family, but the plot reveals that the latter also lives comfortably off the labour of the former. Hence, it begets the question: in the late capitalist society, who are the real parasites in the community?

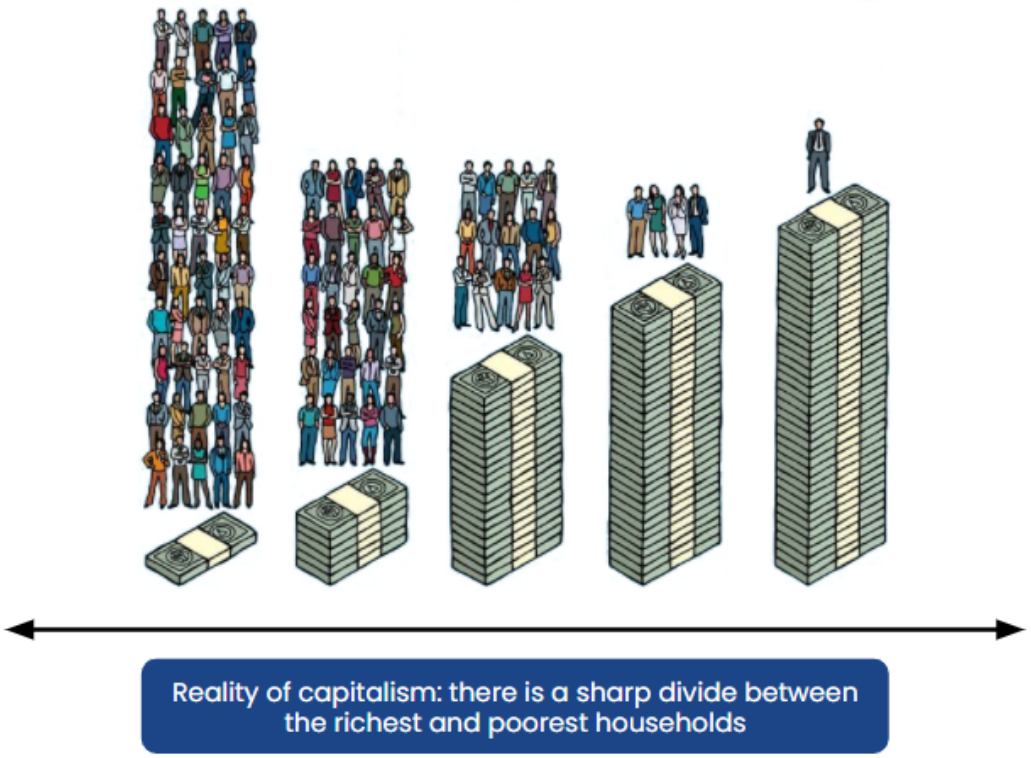

Figure 1.6 Infographic on the unequal wealth distribution that exists in a capitalist society ("Social Mobility | Boundless Sociology", 2021)

Figure 6 depicts the reality of capitalism today whereby there is a sharp divide between the richest and poorest households in a community which is viewed as a societal norm. The socio-economic divide can be traced back to the inefficiency of Malaysian economic policies and taxation system which benefits the higher income group and because they are unaffected by the unequal policies and prefer to remain within their privileged bubbles ("Social Mobility | Boundless Sociology", 2021). Hence, it is important that the community at large acknowledges the socio-economic divide as indifference towards the matter would only exacerbate the wealth disparity among Malaysians.

1.3 Thesis Statement and Aim of Study

There is a difference in level and quality of education based on an individual's socioeconomic background. The contradictions are evident in the access to learning materials and learning environment whereby the higher income individuals are often provided with better opportunities to succeed academically.

Figure 1.7 Collage displaying the differences in socioeconomic status in relation to education

The thesis statement, 'Semiotics in Architecture of the Johor Bahru Inclusive Learning Centre', aims to highlight the social polarisation evident in the current Malaysian society due to the disparities in socioeconomic status and its challenges in constructing an equitable education system. The inclusive development of students' academic skills regardless of their social standing and family background is important for the surrounding community of Johor Bahru. Hence, it is essential that a space for individuals of different backgrounds to assimilate with one another is provided in order to encourage empathy and understanding of the sufferings and

hardships faced by lower income households. The design project attempts to bridge the educational gap by constructing an inclusive learning environment which breaks free from the traditional classroom setting and provides students with a more enriching educational experience regardless of their socioeconomic status.

1.4 Design Objectives

i. To provide an enriching learning space which caters towards students of lower income households and equips them with the proper tools required to further their academic skills.

ii. To provide an inclusive learning centre focused on integrating individuals of different socioeconomic status hence fostering tolerance and empathy.

iii. To provoke discourse and debate surrounding the social, political and environmental challenges faced in achieving equity in education through the programmes and spaces throughout the building.

1.5 Significance of Study

This design hopes to establish a more thorough understanding of the role of semiotics in architecture and its symbolism as an expression of culture in Malaysian context. It brings to light the issues surrounding educational opportunities and privileges associated with socioeconomic status by provoking discourse and debate around this topic through architecture. This could set a precedent for future buildings to be designed through the lens of Robert Venturi's design philosophies encompassing symbolism in architecture and using architecture as a means of expression to convey messages to the general public. It also displays the importance of architecture as an art form which is overlooked by many architects and the public as it is more often perceived for its utilitarian functions instead of architecturally. As such this project should provide a deeper appreciation towards architecture as well as emphasising its importance as an expression of culture and its symbolism of an era.

1.6 Methodology

The research for this design project was carried out through the following methods:

i. online research;
ii. physical site observation and collection of data; and
iii. physical and on-call interviews.

Online research was employed to research for information on the literature review, case studies and precedent studies in order to obtain the necessary information to guide the design project. The site study, however, was carried out through physical site visits and the use of various equipment to collect the scientific data required. Lastly, physical and on-call interviews were held to seek the personal perspectives and experiences of people located near the site in order to provide a better insight on the site.

CHAPTER 2

LITERATURE REVIEW

Semiotics is the study of miscellaneous systems of signs which allow communication between individuals. When we look at architectural forms and its visual language the surface shows us its facade or composition, but it is the underlying meanings and values behind its symbols which bring forward the importance of semiotics in architecture (Arquinétpolis.com, 2021). Hence, this chapter explores Robert Venturi's approaches towards semiotics of architecture through his theoretical works: 'Complexity and Contradiction in Architecture' as well as 'Learning from Las Vegas: The Forgotten Symbolism of the Architectural Form'.

2.1 Semiotics in Architecture

A panoramic view through history reveals that man has made architecture and cities for political reasons, religious purposes, or for the public good (Khan Academy, 2021). For example, the ancient Egyptians created the pyramids for their deceased rulers, whilst the ancient Greeks created temples for worshipping and amphitheatres or stadiums for public use (Khan Academy, 2021). These examples clearly reveal that architecture has always been a by-product of its time acting as a means of expression for mankind to convey meaning and their worldviews into permanent form.

However, any culture eventually decays or perishes when people no longer practice it. Architectural forms on the other hand leave a permanent imprint on a place and are often used as a way for humans to express their needs, beliefs and desires. Therefore, architecture should be seen as a means of expression and a way

for mankind to convey their message, informing future generations of the culture and contents of our present time (Khan Academy, 2021).

An architect usually designs a building with a concept in mind, but it is through its architectural language that the architect conveys the intrinsic meaning of the building to the general public. The modes of reception and meaning that is translated to the audience is what we define as architectural semiotics as the building manifests the message of the architect to its audiences (Khan Academy, 2021).

Architecture is not just a mere profession or hobby, it is a way of life and a belief system that encompasses the geographic, social, political and economic context of a place. The intrinsic meaning behind the architectural language of any building is in itself a value; both artistically and culturally if it manages to overcome the economic barriers and limitations of design. These barriers prove significant in the reality of architecture as architecture is not usually conceived as a means of communication hence often designed purely for its utilitarian functions. A subjectively 'good' design should be perceived as more than just a building, but an art form capable of provoking emotions and feelings from the users of the building (Arquinétpolis.com, 2021). Hence, architecture can be defined as a cultural product or an art form possessing utilitarian character and should be used with an ulterior purpose to convey a message or a meaning to the public.

2.2 Complexity and Contradiction in Architecture

Venturi along with his wife Denise Scott Brown established their career from their rejection towards their modernist past and the prevailing modernist philosophies of architectural institutes and establishments of their time (Stierli et al., 2021). The modernist architecture referred to was in relation to the 'international style' which was most often distinguished by its minimalistic design, lack of decoration and ornamentation as well as possessing a 'pure' form. Their two major theoretical works, Complexity and Contradiction in Architecture and Learning from Las Vegas, puts forward their critiques and their application of their original ideas in their own built work (Stierli et al., 2021).

In association with the Museum of Modern Art, Complexity and Contradiction was published in 1966 which was the collective result of Venturi's teaching at Princeton, as well as the extensive research he carried out as a fellow at the American Academy in Rome (Stierli et al., 2021). The urban facades of Italian architecture, with their continuous changes to cater towards inside and outside, and their interaction with all the streetscape and everyday life, seemed to have been his principal inspiration (Stierli et al., 2021). The book was a critique towards modernist architecture whereby he characterizes modern architecture as orthodox, dogmatic and lifeless. He refuted the fundamental ideology of the modern movement whereby architecture is reduced to a formal organization of spaces and unitary logic in order to fulfill its own sense of aesthetic. He also claimed that the tenets of modernism promising solutions to actual problems through design was merely a utopian rhetoric that was used to advocate it, but was never fulfilled (Stierli et al., 2021).

To Venturi, modernist architecture or its more famously known counterpart, the 'international style' was a mere abstraction that could be made relevant anywhere (Stierli et al., 2021). This trait would prove its irrelevance everywhere as its shortcoming would be its lack of character and sense of place. He believes strongly that architecture which adapts to its surroundings is architecture which best serves the people (Stierli et al., 2021). An interesting architecture is one which is artistic and abstract instead of simple and bland and this is stated clearly in his book whereby he prefers architecture which is plural, complicated, paradoxical, incongruous and self-effacing (Stierli et al., 2021).

Complexity and Contradiction criticises and publicly addresses the issues faced by modernism but it never advocates for a certain style. With his book, Venturi regards the necessity for recognition of history in design, but he does not advocate for historical styles or old architecture. Rather, he was advocating for a non-orthodox modern architecture which engages with its context and invokes paradox and ambiguities in its design through references from the past (Stierli et al., 2021).

The main target of criticism in his book is what he terms as orthodox modern architecture as he proceeds to describe them with the words: purity, cleanliness, unity, directness, and clarity. He asserts that the contemporary world implores

architecture which acknowledges complexity and contradictions (Stierli et al., 2021). Though simplicity is a virtue, Venturi believes that oversimplifying the complex challenges of a building's programme is irresponsible and leads to ‘bland’ architecture.

According to Venturi, a building should address the issues of a site instead of focusing purely on the form following the building’s function which was the tagline of the modernist movement - ‘form follow function’. Instead of striving for geometric perfection, a building’s exterior should inspire the interior whilst concealing its function (Stierli et al., 2021). An example of Venturi’s own work which was included in the book was the Vanna Venturi House which served as a manifesto for postmodern architecture, putting forth his theories into physical form.

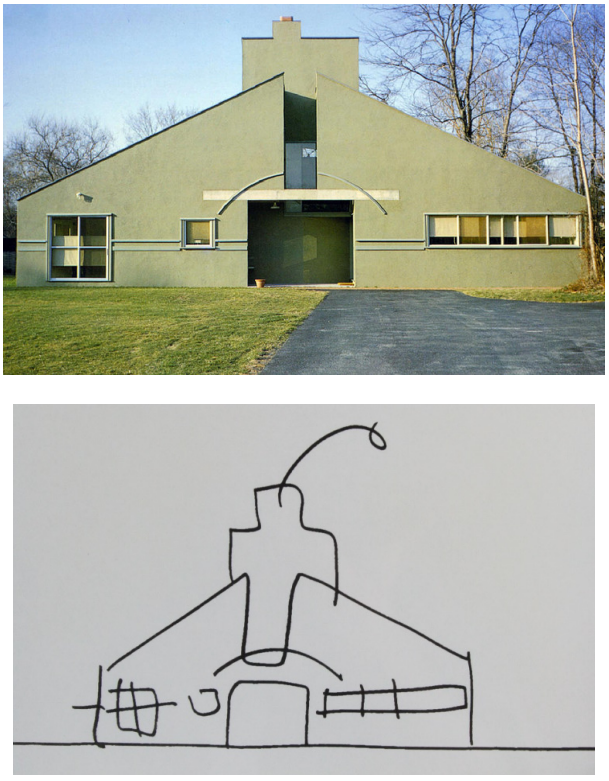

Figure 2.1 Vanna Venturi House by Robert Venturi ("AD Classics: Vanna Venturi House / Robert Venturi", 2021)

Venturi sought to reintroduce the familiarity of a house that had been lost in the modern movement. The massing and roofline was used effectively to communicate its programme and display the correct signs which depict a home.

From figure 8, the house can be seen portrayed in a childlike manner which signifies a child's drawing as a sign to represent his relationship with his mother as the building was designed for her. The house also utilises a pitched roof instead of a modernist flat roof reflecting the idea of mannerism in architecture and a complete rejection of the modernist movement ("Analysis of the Post-modern Features Robert Venturi Used on the Design of 'vanna Venturi House'", 2021).

From the facade, the entrance can be seen located at the center, which creates a sense of symmetry but the irregular placement of windows and the chimney slightly offset from the center creates a sense of asymmetry ("AD Classics: Vanna Venturi House / Robert Venturi", 2021). Venturi uses an arch over the main entrance to indicate historical symbolism as the arch usually marks an entrance and shows structural integrity. However, the arch in the Vanna Venturi House is used purely for its symbolic value as it does not serve as a structural element, but instead a decoration ("Analysis of the Post-modern Features Robert Venturi Used on the Design of 'vanna Venturi House'", 2021).

Besides that, both the fireplace and the stairs in the interior of the building compete with one another to serve as the core of the house, resulting in both vertical elements contorting in shape to make room for one another ("AD Classics: Vanna Venturi House / Robert Venturi", 2021). Venturi also experimented with scale by contorting the size of certain elements in the interior of the house such as the door and windows with low height in comparison with the grandness of the entrance of the space. The house was a composition of rectangular, curvilinear, and diagonal elements combined and contrasted in a way that inevitably creates complexity and contradiction in architecture ("AD Classics: Vanna Venturi House / Robert Venturi", 2021).

2.3 The Forgotten Symbolism of Architectural Form

According to remarks made by Dean Maxwell during a Princeton University symposium, “Robert Venturi’s infamous treatise extolling the semantic richness of the urban strip in Las Vegas - Learning from Las Vegas: The Forgotten Symbolism of the Architectural Form - ushered in the application of semiotics to architecture in the sixties.” He claimed that Venturi successfully integrated semiotics and communication to give birth to the postmodern architectural style (Stierli et al., 2021). With his emphasis on creating ‘meaning’ through architecture and his apprehension of the disconnect between a reductive architecture and a complex culture, Venturi paved the way for the future of postmodernism (Stierli et al., 2021).

Learning from Las Vegas, published in 1982, was an analysis of the new native, organic, gauche vernacular American architecture surfacing in Las Vegas. The book was a critique towards architecture at the time which was largely dominated by modernist ideologies (Stierli et al., 2021). As a result of the research findings, Venturi and Scott Brown deduced that buildings could either be ‘ducks’ - buildings with forms expressive of what they are; or ‘decorated sheds’ - buildings with generic forms but inculcating the use of signage to express what they are (Stierli et al., 2021). They both advocated for the decorated shed even though it is commonly perceived as ‘ugly and ordinary’ - as compared to the duck which is more commonly perceived as ‘heroic and original’ - because they believe that these buildings effectively engage with the present world through media and symbols which makes it more practical than modernist buildings claim to be (Stierli et al., 2021).

The Guild House designed by Venturi is seen as a decorated shed due to its explicit symbolism which makes it not superior, but simply more relevant to the public. This is because it was designed as a conventional shelter that uses symbols to explicitly address its purpose through the large signage above the main entrance of the building as seen in figure 9 (Verma, 2021).

Figure 2.2 Guild House by Robert Venturi (Verma, 2021)

The symbol of ordinary is exhibited throughout the 6-storey building through its well proportioned and symmetrical composition with its stepped facade which responds to the line of the street. The use of dark red bricks complements the dark smudged bricks of the neighbourhood buildings whereas a column made of black granite located at the middle of the entrance welcomes users into the building (Verma, 2021). The Guild House manages to superimpose a monumental composition supported by its conventional elements onto a typical residential building which Venturi believes better serves the people as it provides the users a sense of familiarity towards the image of the building (Verma, 2021).

2.4 Summary

This chapter summarises the relevance of semiotics in architecture through Robert Venturi's theoretical works: 'Complexity and Contradiction in Architecture' as well as 'Learning from Las Vegas: The Forgotten Symbolism of the Architectural Form'. It explains the true purpose of architecture to convey a message or a meaning to the public which has been seen throughout history whereby the geographic, social, political and economic context of a place is taken into consideration. Besides that, it delves into the design philosophies of Robert Venturi who advocated for architecture which acknowledges complexity and contradictions as can be seen through the design of the Vanna Venturi House. It also explores Venturi's believe that 'ordinary' buildings effectively engage with the present world through media and symbols, hence making it more relatable to the audience as compared to 'heroic' buildings

CHAPTER 3

CASE STUDY AND PRECEDENT STUDY

The two case studies selected were the Mill Owners' Association Building designed by Le Corbusier and the Smart School Educational Complex designed by CEBRA Architects. The former was selected for its architectural language and use of architectural elements to trigger emotions from its users whereas the latter was selected for its spatial planning and building programmes to be referenced for the design project.

3.1 Mill Owners' Association Building (Ahmedabad, India)

Figure 3.1 Exterior perspectives of Mill Owners' Association Building ("AD Classics: Mill Owners' Association Building / Le Corbusier", 2021)

This case study exhibits the use of juxtaposed compositions in the visual aesthetic and overall planning of the building. On the building facade, the repetitive pattern of the brise-soleil invokes rhythms which are violently broken by the entrance void, the ramp, and the stairs ("AD Classics: Mill Owners' Association Building / Le Corbusier", 2021). This causes contradictions in the visual experience

whereby the diagonals and perpendiculars create contradictory directions as well as the large void which modifies the rhythm and slightly softens the meeting of the ramp and stairs ("AD Classics: Mill Owners' Association Building / Le Corbusier", 2021).

This architectural language is carried out throughout the design of the building whereby juxtaposed compositions can be seen in every aspect of the building.

Figure 3.2 Ramp and staircase of Mill Owners' Association Building ("AD Classics: Mill Owners' Association Building / Le Corbusier", 2021)

The ramp and sculpted staircase forms part of a continuum which alters the users' perception of space as they enter the building. This also creates a directional space for the users as they enter the building ("AD Classics: Mill Owners' Association Building / Le Corbusier", 2021).

Figure 3.3 Interior perspectives of Mill Owners' Association Building ("AD Classics: Mill Owners' Association Building / Le Corbusier", 2021)

Different views and spaces in the building expose the duality of public and private through the blurred boundaries of the exterior and interior.

Figure 3.4 Shadow casting of Mill Owners' Association Building ("AD Classics: Mill Owners' Association Building / Le Corbusier", 2021)

The use of sculptural elements and structural framing produces a playful composition between shadow and light.

Figure 3.5 Geometric shapes of Mill Owners' Association Building ("AD Classics: Mill Owners' Association Building / Le Corbusier", 2021)

The structural columns and load bearing walls create contrasting geometric shapes between sharp, angular forms and curves. These elements allow users to be more aware of their surroundings as the spaces created provide an interesting architectural experience that surprises the users as they explore each space throughout the building ("AD Classics: Mill Owners' Association Building / Le Corbusier", 2021).

3.2 Smart School Educational Complex (Irkutsk, Russia)

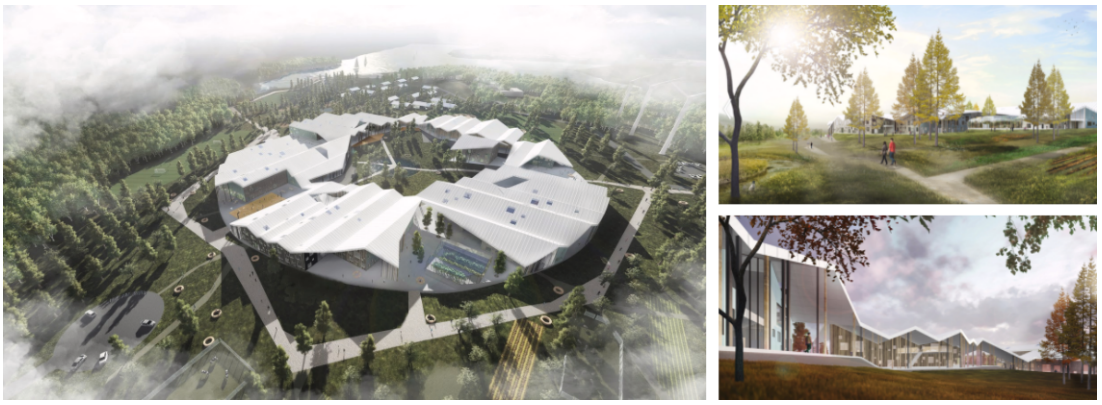

Figure 3.6 Rendered perspectives of Smart School Educational Complex ("SMART SCHOOL - EDUCATION | CEBRA architecture", 2021)

The building programmes of the Smart School Educational Complex was planned around the 9 types of intelligence as it is believed that a student's learning curve should not be based purely on their logical mathematical skills ("SMART SCHOOL - EDUCATION | CEBRA architecture", 2021).

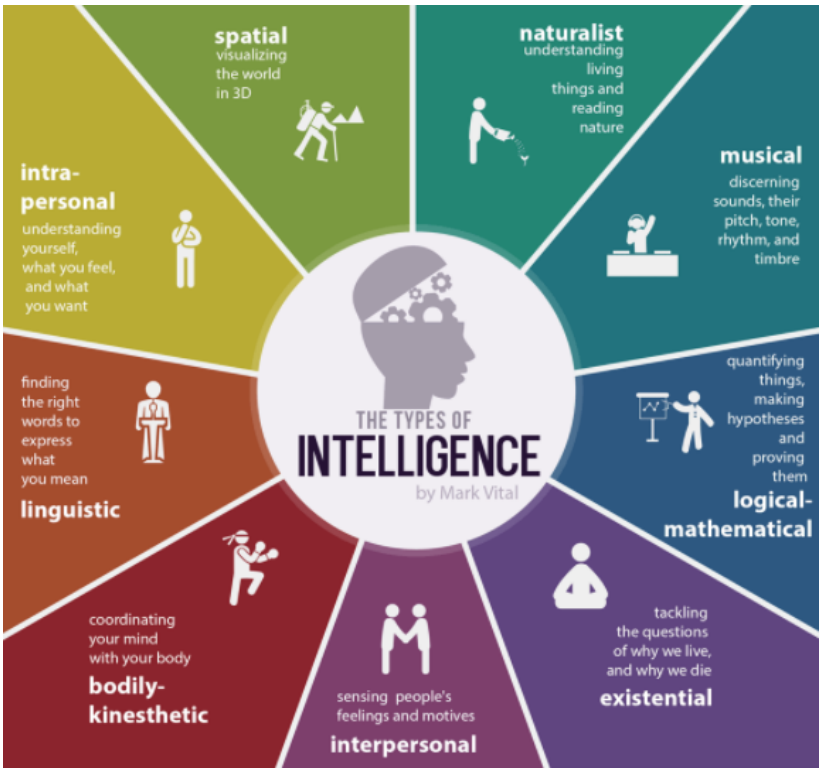

Figure 3.7 The types of intelligence by Mark Vital (Adioma, 2014)

How do we perceive the everyday functionality at the school? Schools should be a responsive space which adapts to the changing needs of the students. Hence, the design of this case study building responds to the needs of the students by reinventing the concept of educational space in the form of a school park that actively interacts with the surrounding society ("SMART SCHOOL - EDUCATION | CEBRA architecture", 2021).

Figure 3.8 Building programmes of Smart School Educational Complex ("SMART SCHOOL - EDUCATION | CEBRA architecture", 2021)

The approach of the Smart School Educational Complex is activity based functionality whereby the different spaces hold different spatial qualities. This is because the architects believe that the classic division of subjects divides our perception of how things work in reality hence the building was designed so that the different disciplines should be capable of co-relations and interchange and spaces should fit the activities, not the classic subjects ("SMART SCHOOL - EDUCATION | CEBRA architecture", 2021).

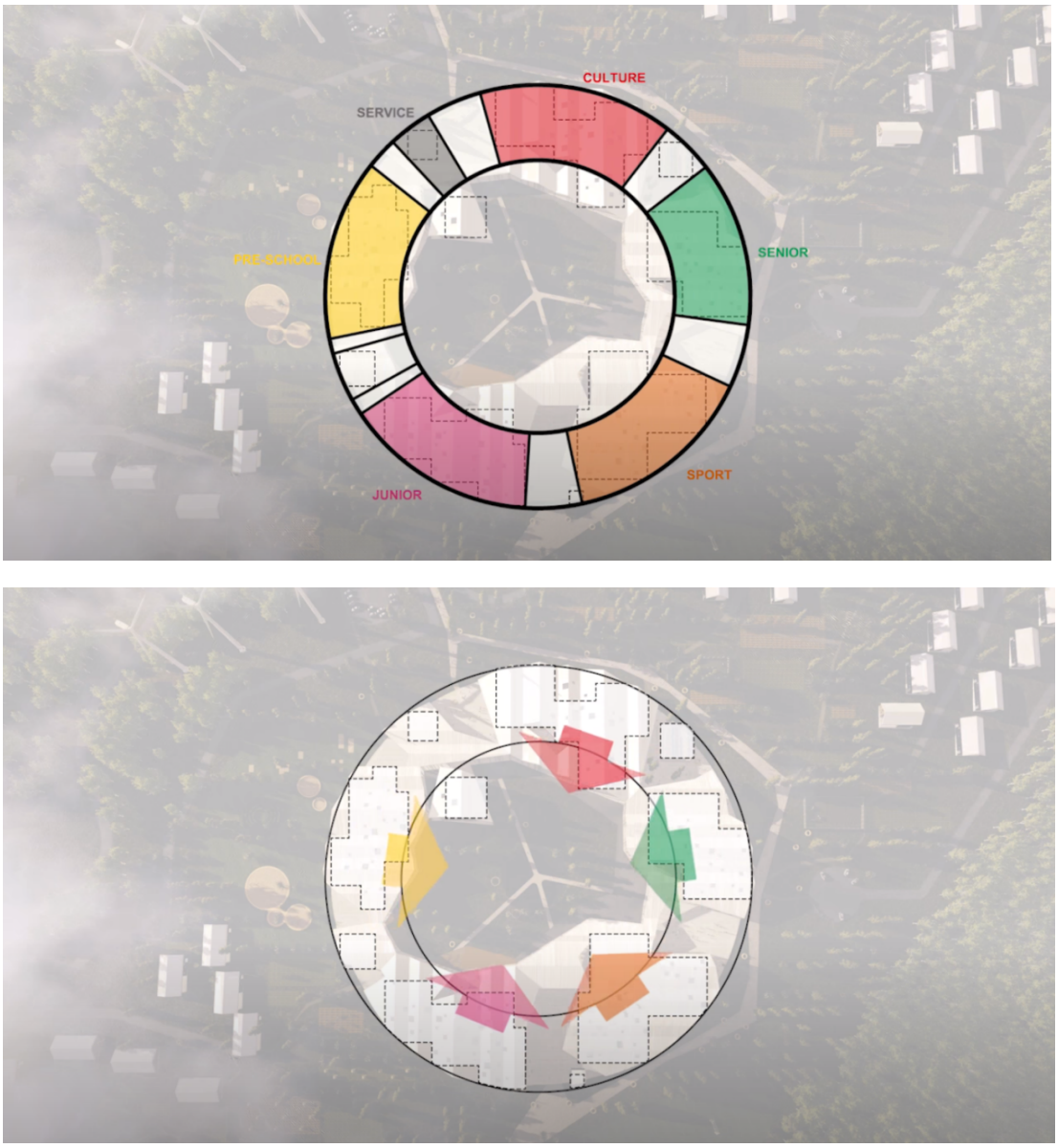

Figure 3.9 Spatial planning of Smart School Educational Complex ("SMART SCHOOL - EDUCATION | CEBRA architecture", 2021)

From aerial view, the permeable ring of buildings containing main functions can be seen grouped around a permeable outdoor space. The emerging central area becomes an interconnected space of cross-functional relations and the gaps between the buildings make the meadow both visually and physically accessible from the outside. This provides a diverse arena for experiential learning and pedagogical synergies through its active central campus ("SMART SCHOOL - EDUCATION | CEBRA architecture", 2021).

3.3 Summary

In this chapter, two case studies were selected – the Mill Owners' Association Building designed by Le Corbusier and the Smart School Educational Complex designed by CEBRA Architects – as reference for the Johor Bahru Inclusive Learning Centre. The Mill Owners' Association Building exhibits the use of juxtaposed compositions in the visual aesthetic and overall planning of the building which was elaborated in Venturi's Complexity and Contradictions in Architecture. This was seen through the architectural language of the building such as the directional space, duality of public and private, playful composition between shadow and light as well as the contrasting geometric shapes. The Smart School Educational Complex exhibits the importance of adapting to the changing needs of the students. This was essential as the Johor Bahru Inclusive Learning Centre is meant to be catered towards students.

CHAPTER 4

SITE STUDY AND ANALYSIS

The selected site is located along Jalan Seri Lalang and Jalan Yahya Awal (1°27'51"N, 103°45'20"E) in Johor Bahru. The site is within lot 1944 and lot 4455 in the Central District of Johor Bahru under the authority of Johor Bahru City Council (MBJB) where it occupies 1.8 acres of land that adjoins Sekolah Menengah Kebangsaan Infant Jesus Convent Johor Bahru and Penjara Reman Johor Bahru.

4.1 Site Location

Figure 4.1 Key plan

Figure 4.2 Location plan

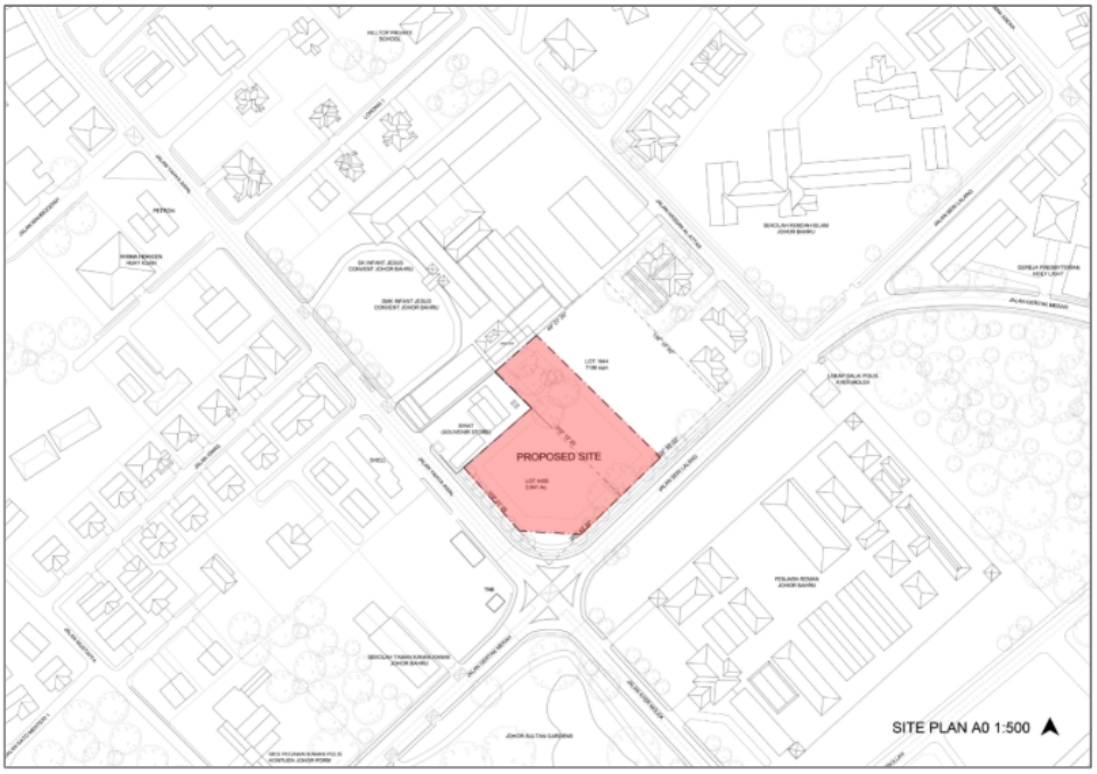

Figure 4.3 Site plan

4.2 Historical Chronology and Morphology of Johor Bahru

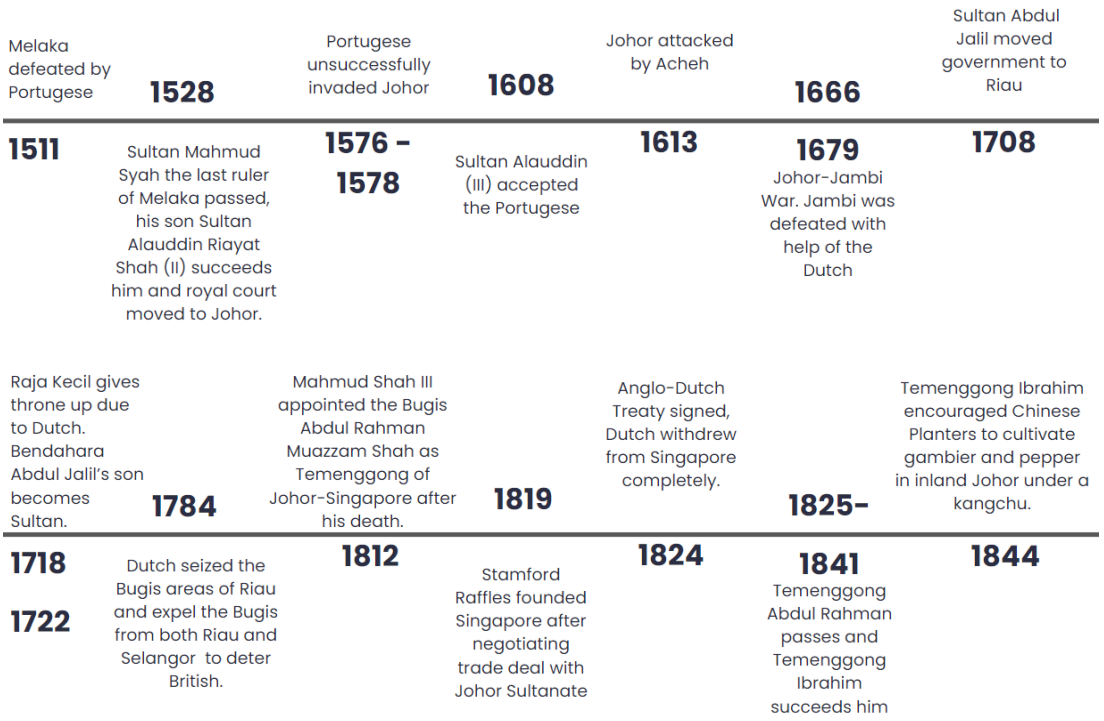

Figure 4.4 Historical Chronology of Johor Bahru from 1511-1844

As the Sultanate replaced the Malacca Sultanate, it followed that the extent of its territorial area covered the southern Malay peninsular, parts of south-eastern Sumatra and the Riau Islands and its dependencies. The administrative centre of the empire was at various times at Sayong Pinang, Kota Kara, Seluyut, Johor Lama, Batu Sawar and Kota Tinggi; all on mainland Johor and later at Riau and Lingga

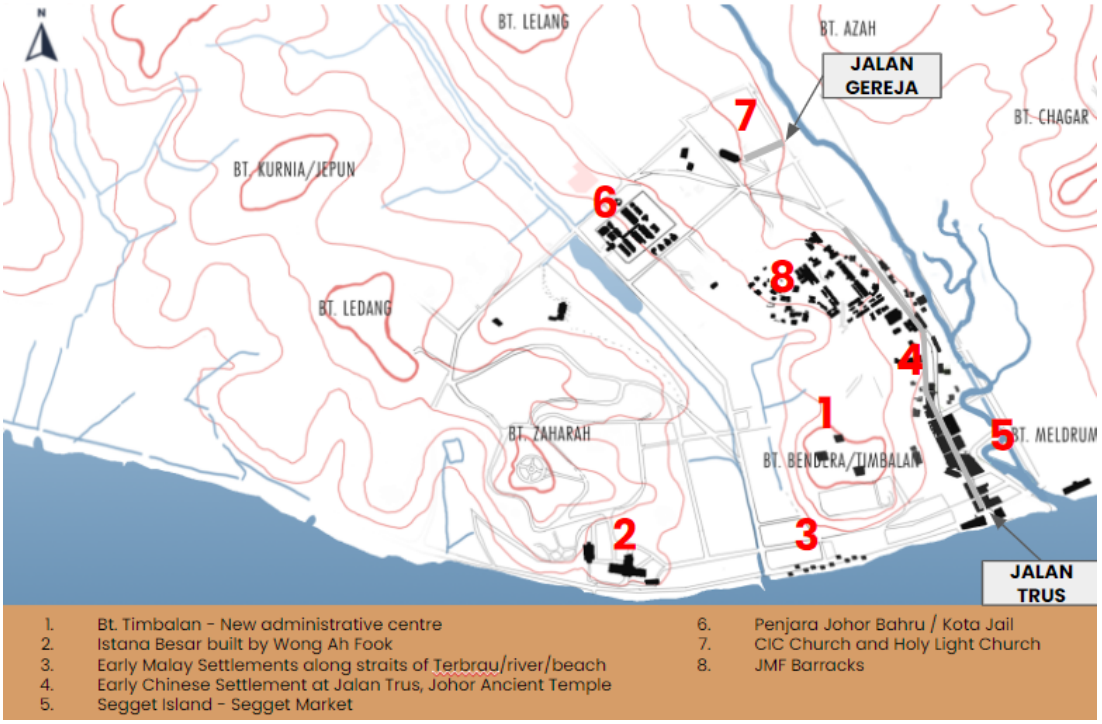

Figure 4.5 Urban morphology of Johor Bahru from 1855-1890

The early settlements were concentrated along rivers, as it was both within a valley and the river eased transportation of goods from Singapore, where Johor Bahru at the time served as a secondary town when compared to the bustling Singapore port town. It can be synthesised that the early Johor Bahru was segregated into several distinct places, such as the Chinese settlements around Sg Segget, the Istana Besar area around Bukit Zaharah, the government district on Bukit Bendera and the Prison on the outskirts of the town.

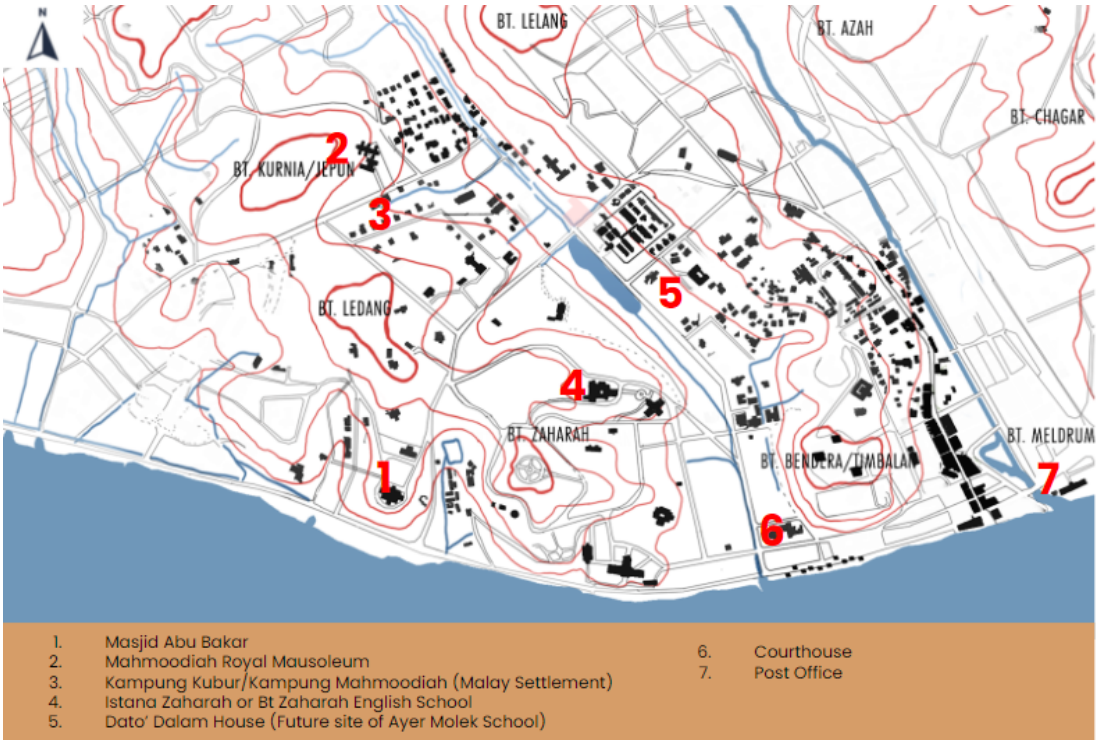

Figure 4.6 Urban morphology of Johor Bahru from 1890-1919

In this period it can be synthesised that an abundance of public buildings were constructed in this time, such as the courthouses, post office, Sultan Abu Bakar Mosque, palaces such as Zaharah palace, and the Royal Mausoleum. The town also saw mass expansion within this timeline, with both Chinese and Malay settlements expanding in size. This could be seen as Sultan Abu Bakar's effort in maintaining his governance through construction of public work's buildings prior to the British intervention in state affairs in 1914.

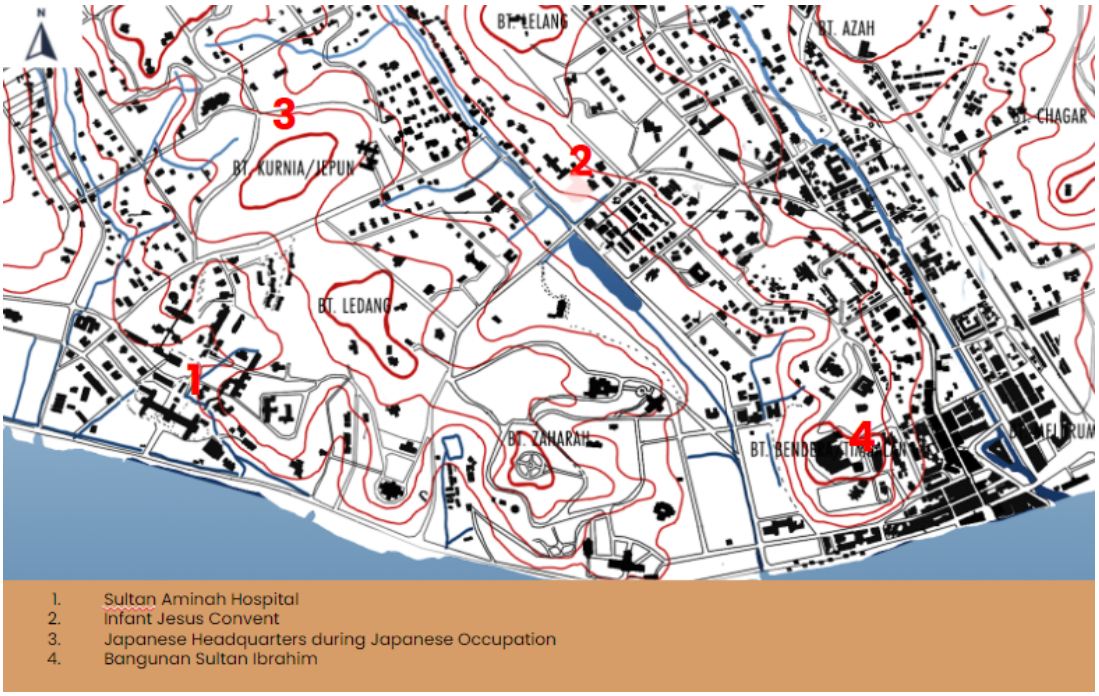

Figure 4.7 Urban morphology of Johor Bahru from 1920-1950

In this period it can be synthesised Johor Bahru was quickly expanding, with increase in residential housing, schools, the construction of Sultanah Aminah Hospital, Bangunan Sultan Ibrahim, and the Singapore-Johor Causeway being constructed. However, the development hit a stop due to the turbulent times during the Japanese occupation which saw many innocent lives lost, this saw many public buildings being used during the occupation, forced education on Japanese culture, outflux of Chinese to Kota Tinggi. As well as another outflux of residents during the postwar period which saw an increase in communism, which resettled the Chinese population to New Villages such as Paloh.

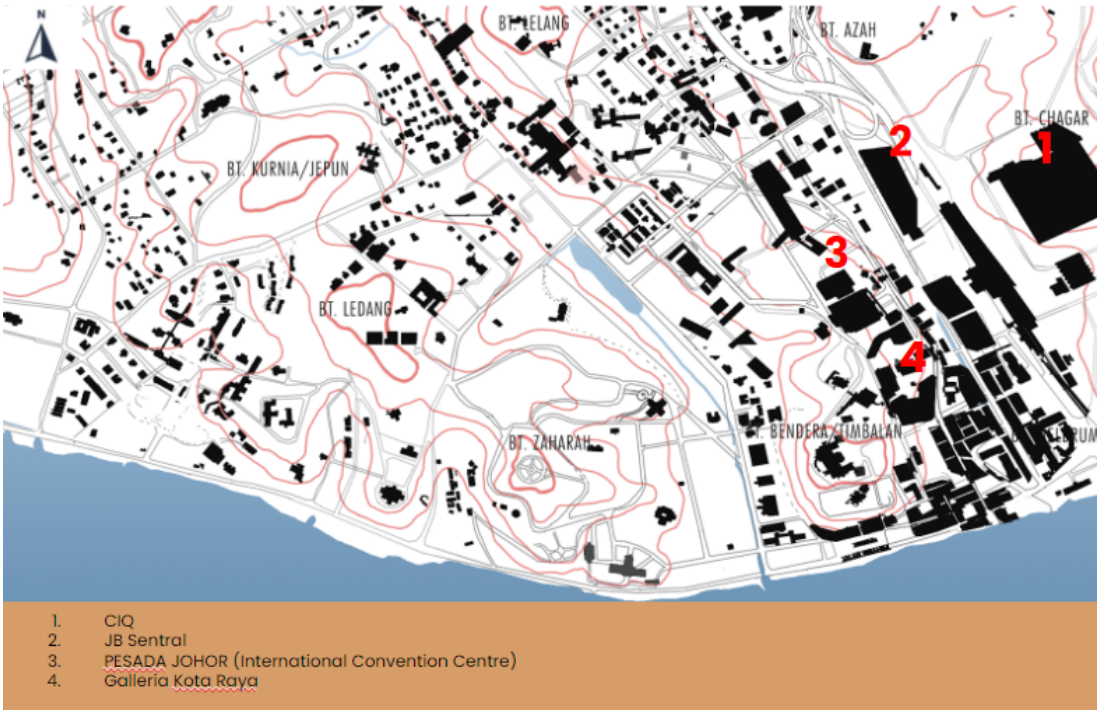

Figure 4.8 Urban morphology of Johor Bahru from 1950 to present

Construction of large-scale buildings forming towns form base on focus building. Urban design began to change in proportion to scale building. Segget river closed half. Built the buildings and road. Road around Sultan Ibrahim Building was built for easy access to other nearby buildings. The site currently sits in between the various differing districts of Johor Bahru City, acting as a border between the Royal grounds, Prison, Schooling district, Commercial Zones, and residential areas.

4.3 Demographic of the Site

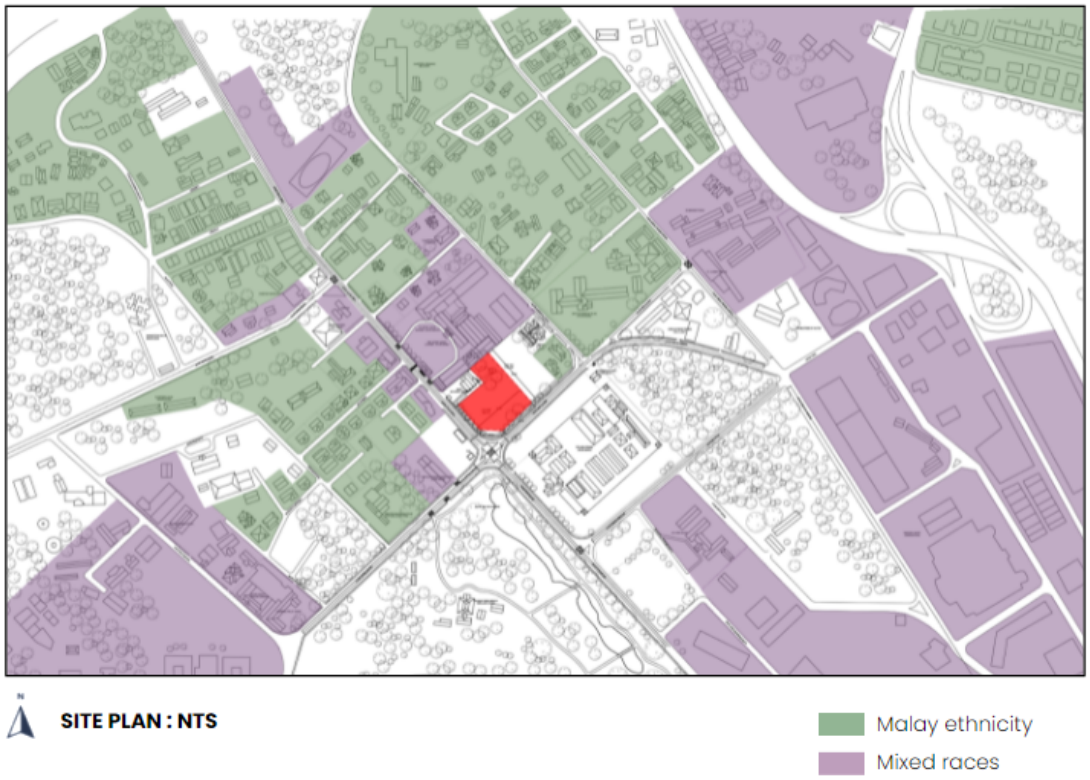

Figure 4.9 Zoning of ethnicity groups based on observation

Based on observation, The site is located in a lower density area due to residential areas and schools located nearby. Compared to the urban city centre located southeast of the site, the population near the site is lower. Based on interviews with the locals, most of the residents in the area are of Malay ethnicity. The other races are more likely to visit the area for school and work.

4.4 Macroclimate and Microclimate

i. Macroclimate

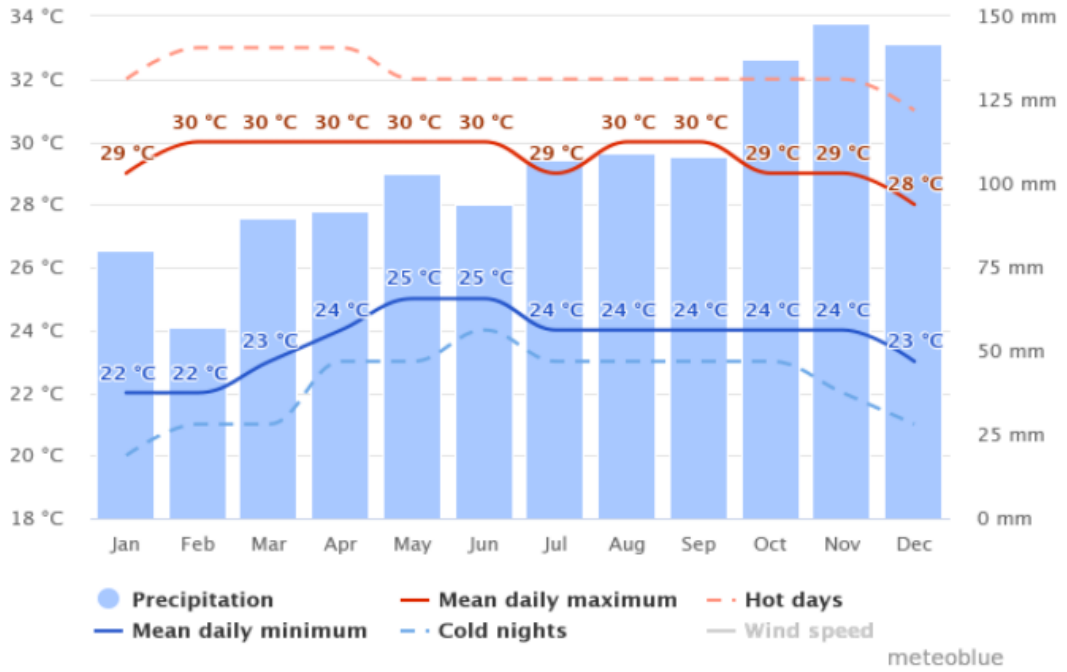

Figure 4.10 Average temperature and precipitation in Malaysia

Based on figure 29, the average temperature in Malaysia is relatively constant throughout the year. It shows that the highest temperature is 30°C from February to June, and lowest at 28°C in December. Precipitation or also known as rainfall is shown to be relatively high ranging from 22°C to 25°C throughout the year and highest in November and December. Hence, the design should be able to adapt with Malaysia's hot and humid climate in order to maximise user comfort.

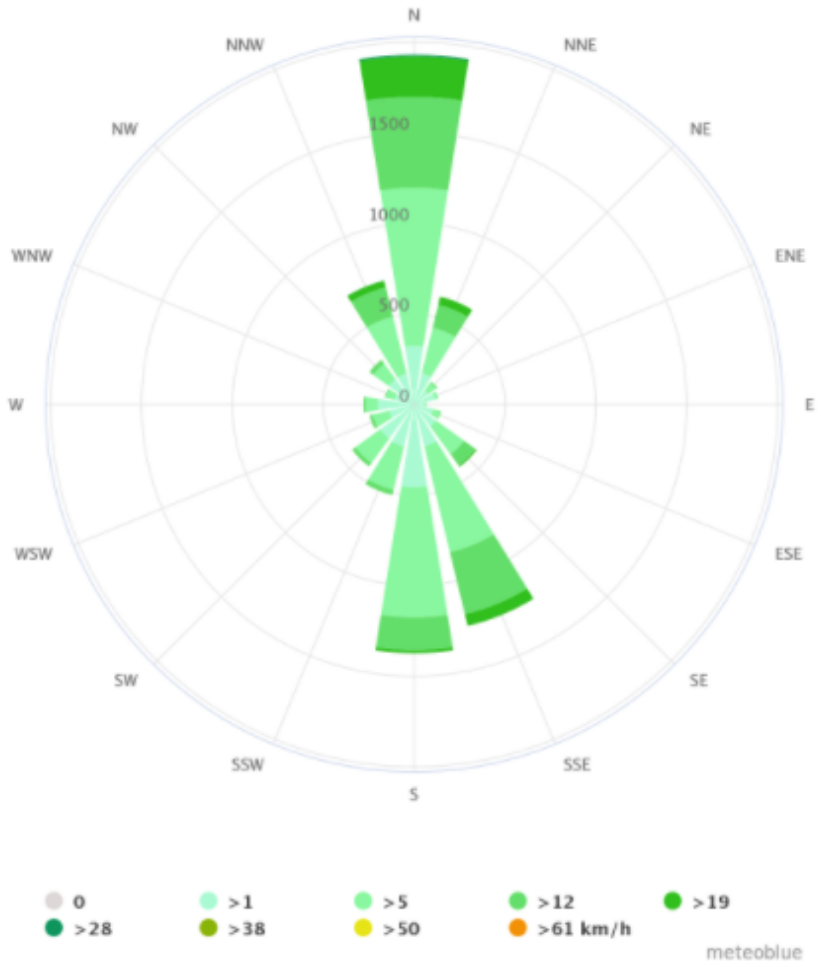

Figure 4.11 Wind rose data in Malaysia

Based on figure 30, from August to March (northeast monsoon), the wind speed levels are higher from the northern direction. Meanwhile, from April to September (southwest monsoon) the wind speed levels are higher from the southern direction. The wind speed in Malaysia is considered low, hence the design needs to utilize this wind direction to maximise natural ventilation.

ii. Microclimate

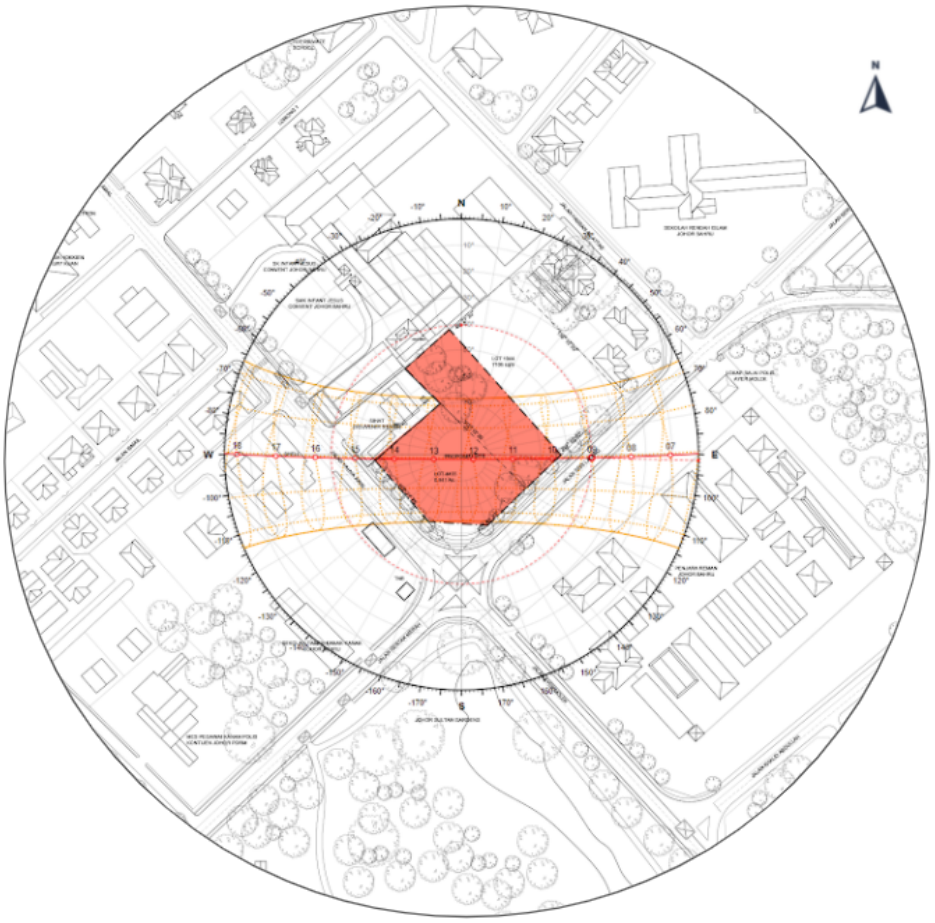

Figure 4.12 Sun path diagram at the site

Based on figure 31, the site is exposed to sunlight from the east and west direction. The proposed building design should respond to this by reducing the amount of sunlight penetrating the building in order to ensure user comfort.

Figure 31 shows the shadow casting on site at 9am, 12pm and 5pm. Based on the figures, the site receives shading from the trees on the site but not from the adjacent buildings at 9am and 5 am. However, at 12pm there is no shadow formed as the sun is directly on top of the site.

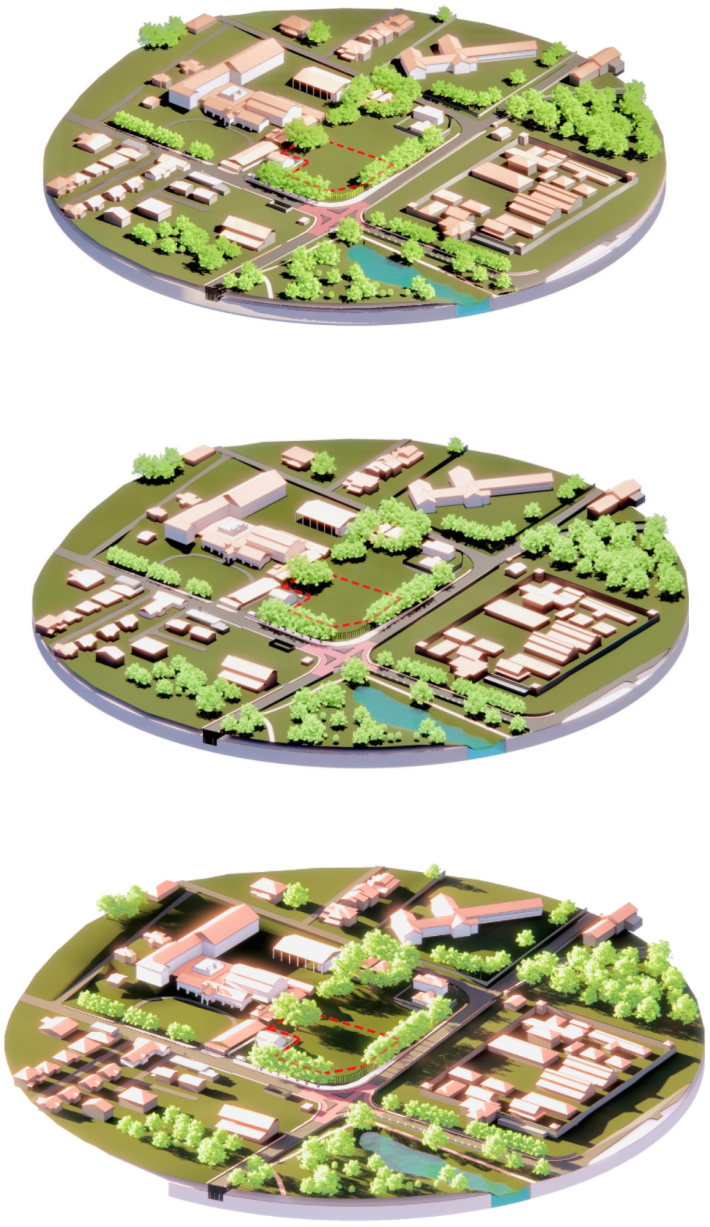

Figure 4.13 Shadow casting at 9am, 12pm and 5pm

TIME/READINGS		9.00 AM	12.00 PM	5.00 PM	AVERAGE
POINT A	TEMPERATURE (°c)	28.0°c	29.3°c	30.5°c	29.3°c
	WIND SPEED (ms)	1.5ms	3.0ms	1.0ms	1.8ms
	HUMIDITY (%)	47.3%	51.9%	63.0%	54.1%
POINT B	TEMPERATURE (°c)	29.1°c	32.5°c	31.6°c	31.1°c
	WIND SPEED (ms)	3.0ms	2.5ms	3.0ms	2.8ms
	HUMIDITY (%)	51.5%	67.3%	63.0%	60.6%
POINT C	TEMPERATURE (°c)	30.4°c	33.0°c	31.2°c	31.5°c
	WIND SPEED (ms)	1.0ms	0.7ms	0.4ms	0.7ms
	HUMIDITY (%)	52.3%	66.7%	62.4%	60.4%
POINT D	TEMPERATURE (°c)	30.7°c	33.4°c	31.7°c	31.9°c
	WIND SPEED (ms)	0.6ms	0.4ms	0.4ms	0.5ms
	HUMIDITY (%)	51.4%	68.0%	62.0%	60.5%

Lowest data recorded for humidity
Highest data recorded for humidity
Lowest data recorded for Temperature
Highest data recorded for Temperature
Lowest data recorded for Wind speed
Highest data recorded for Wind speed

Figure 4.14 Temperature, wind speed and humidity level data on site

Figure 33 shows that the highest temperature recorded is 33.4°C at point D at 12.00pm with highest humidity level (68.0%) and lowest wind speed level (0.4ms). The lowest temperature recorded is at point A at 9.00 am with the lowest humidity level (47.3%) recorded. This shows that the site receives more direct sunlight and has higher humidity in the afternoon compared to the morning and evening.

4.5 Site Topography

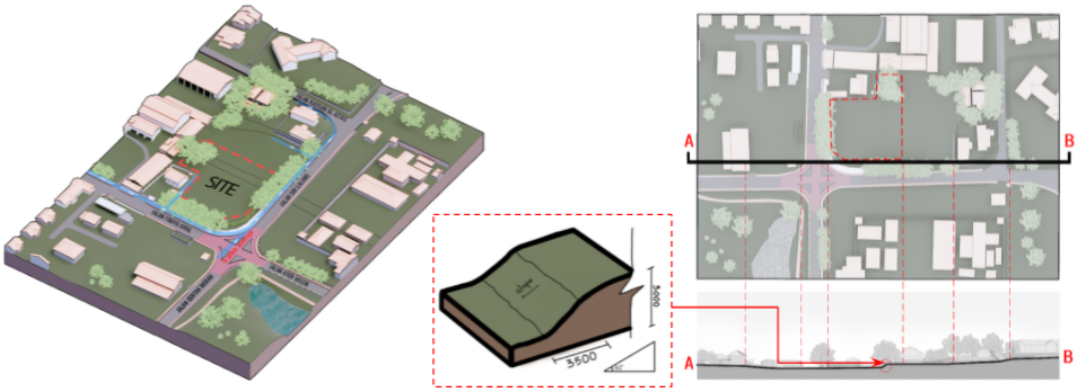

Figure 4.15 Site topographic profile

Based on figure 34, the proposed site is located on a slope of 3 metres high and 3.5 metres wide which combine two gradual sloping plains.

4.6 Site Circulation

Figure 4.16 Vehicular access to the site

The site is surrounded by two adjacent main roads; Jalan Seri Lalang and Jalan Yahya Awal which receive heavy traffic due to the surrounding school vicinity.

Figure 4.17 Pedestrian access to the site

The site also shows heavy dispersion of pedestrians from the surrounding schools and local eateries. Therefore, the site planning should take into consideration the safety of pedestrians and also traffic congestion.

4.7 Zoning and Neighbourhood Context

Figure 4.18 Solid and void zoning on site

The solid and void zoning of the site plan exhibits the segregation of building typologies. The duality of the zoning shows two distinct urban patterns of the proposed site which are clustered and detached. The clustered buildings consist mostly of commercial areas and shop lots whereas the detached buildings consist of school and residential buildings.

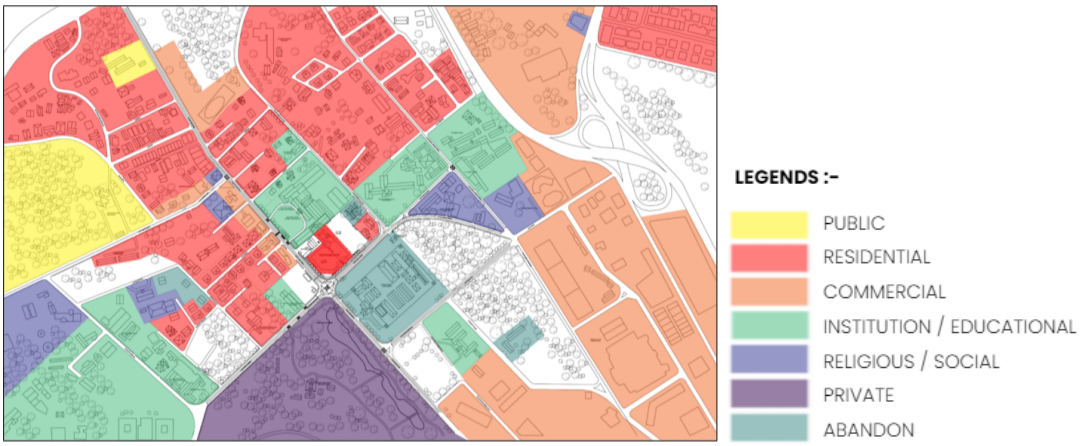

Figure 4.19 Building typology zoning on site

Figure 37 shows that the area surrounding the site consists of various building typologies. The most prominent typology is the institutional zoning which surrounds the site as well as the residential area which is adjacent to the schools.

4.8 Sociology and Human Culture

Based on interviews and online surveys, we were able to identify the human behavior on site as well as the public perception of the area surrounding the proposed site. From that, we were able to identify the essential and non-essential activities of users on site as well as the daily timeline of human movement on site as can be seen in figure 38. The dominant user groups on site are students and working citizens due to the high density of schools in that area and the neighbouring commercial area where the offices are located.

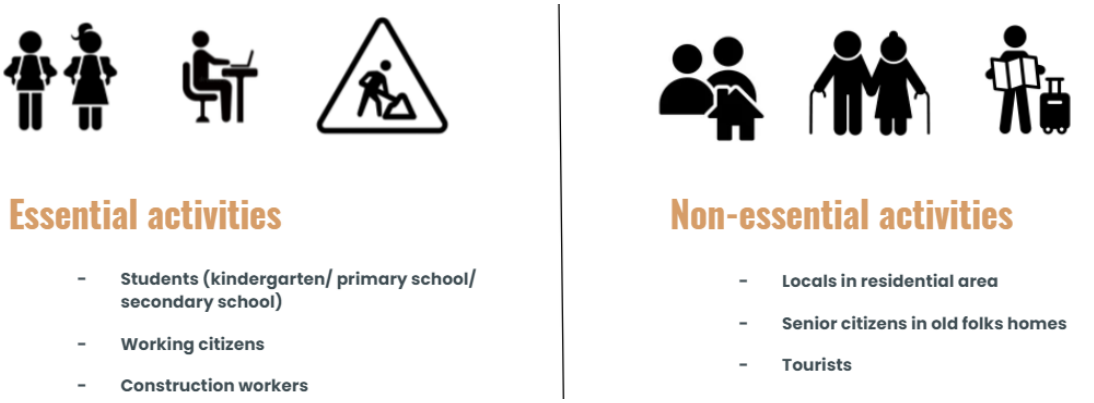

Figure 4.20 Essential and non-essential activities on site

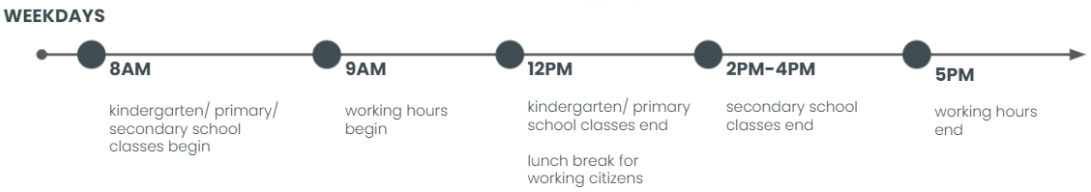

Figure 4.21 Daily timeline of human movement on site

The site also consists of various churches which stem from different branches of Christianity, each having their own set of beliefs and teachings. Most of the churches carry out their services on Sundays and Saturdays in order to avoid clashing with schooling and working days. Besides that, there are several areas around the site which serve as social or cultural venues. These communal activities help to create a sense of community amongst the locals hence increasing their interaction with the site. However, these activities are located relatively further away from the site.

The public perception of the surrounding area was collected based on four categories which are history and culture, sense of community, public amenities and safety as well as opinions and way-forwards.

Table 4.1 Public perception surrounding the proposed site

History & Culture	Johor is too focused on westernizing the place due to Johor royalties being long associated with Western culture. Hence, the area is slowly going through a process of gentrification.
	Hope to see more of Johor's cultural identity being displayed in events such as Zapin and Kuda Kepang.
	The Johor government should revitalise heritage sites and buildings such as Balai Zaharah.
Sense Of Community	Surrounding area does not provide enough placemaking qualities or points of interest to attract locals. Hence, users do not engage actively or interact with the site.
	Many areas have been closed off to the public such as Istana Gardens and Stadium Larkin (located further away). The people need more spaces serving the public and less spaces serving the elite.
Public Amenities & Safety	Absence of proper amenities such as walkways or bus stops and lack of an organised and dependable public transport system .
	Lack of sufficient car parking facilities leading to traffic congestion on Jalan Yahya Awal and Jalan Hassan Al-Attas.
	Generally safe due to the residence of Ketua Polis DiRaja and Saujana Kediaman JB located nearby.
Opinions & Way-forward	Johor needs a socially interactive vicinity that could become a pivotal point for its inhabitants to represent and reflect the local culture.

	Hope to build the younger generation's moral values and diversify the community to enhance people's quality of living.
	Hope to see more recreational areas to serve the surrounding school vicinity and build a more robust sports culture.

4.9 Strength, Weakness, Opportunity and Threat (SWOT) Analysis

Table 4.2 Overall SWOT analysis

Strength	Site located strategically bordering the urban city centre, the royal gardens and traditional residences.
	Strong site character surrounded by a mixture of heritage buildings featuring vernacular Malay architecture from the residences, classical revival architecture from buildings built during the British era, and gothic revival from the church.
Weakness	Lack of parking facilities which lead to traffic congestion along Jalan Yahya Awal and Jalan Hassan Al-Attas.
	Lack of proper public transport management and planning such as no bus stops nearby and unreliable public bus routes and timing which causes inconvenience to users.
	Lack proper communal spaces for the community to interact and engage with each other.
	Lack recreational spaces to cater to the need of students' sport activities.
Opportunity	Daily movement of students around the site from surrounding school areas which could serve as potential target users.

	Area near the site is undergoing multiple redevelopment plans which could improve the outlook of the surrounding area, potentially bringing in more tourists.
	Government proposes heritage trails and conservation of heritage buildings to preserve the site's strong history.
Threat	Abandoned and decrepit buildings serve as breeding grounds for wild animals such as snakes.
	Inconsistent pedestrian pathways which cause potential harm for students walking on busy roads.
	Uncontrolled development encroaching the residential area could lead to loss of identity and the site's natural character.

4.10 Summary

In summary, this chapter elaborates on the site study and analysis of the site which includes the site location, its historical chronology and morphology, the site demographic, macroclimate and microclimate, site topography, circulation, zoning and neighbourhood context, sociology and human culture, and SWOT analysis. This information is important in order to design a building that is responsive to its site context as emphasized by Venturi (refer Chapter 2: Literature Review).

CHAPTER 5

CONCEPT

This chapter explains the arrival of the concept 'Journey Towards Unity' which was inspired by Robert Venturi's design philosophies. It delves into the design strategies applied throughout the design of the project.

5.1 Robert Venturi's 'A Gentle Manifesto'

In his book - Complexity and Contradictions in Architecture - Robert Venturi observed that modern architecture during the 1960's had become dull and no longer achieved its initial purpose of breaking old traditions. He claims that in their search for newness of modern functions, they ignored all the complications and complexities that arrived hand in hand. According to Venturi, modernism had instead separated from the broader and deeper meaning of architectural culture resulting in a mundane architecture which advocated the separation and exclusion of elements, rather than the inclusion of various requirements and their juxtapositions.

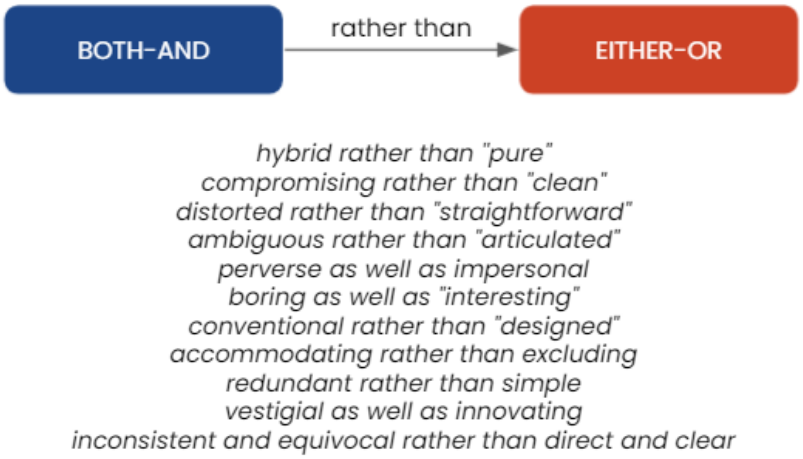

Figure 5.1 Snippet from 'A Gentle Manifesto'

As such, in his ‘gentle manifesto,’ he puts forward his belief that complexity and contradiction in architecture should always be prioritised over incoherence or arbitrariness of architecture. Venturi used the phrase ‘both-and’ to ‘either-or’; further elaborating that he prefers both black and white, and sometimes gray instead of either black or white. He created this metaphor as a way to justify that ‘good’ architecture should evoke many levels of meanings as perceived by its users. It explains how polemic architecture is able to relate contrasting and otherwise irreconcilable elements and contain opposites within a whole. The architecture itself is a collision of ideas which creates polemic, hence challenging audiences and provoking them to ask questions.

5.2 Design Strategies

Similar to ‘A Gentle Manifesto,’ the building adopts the use of ‘both-and’ in its design scheme as a way to represent that education should be inclusive rather than exclusive. The building is a manifestation of both-and whereby the plan of the building is symmetrical yet asymmetrical with its seemingly square planning around a courtyard space, but overall it is a rectangular plan.

Figure 5.2 ‘Symmetrical yet asymmetrical’

Besides that, the four structural walls at the entrance are incorrect as they are bisected by two arched walls which meet at a column at the centre. This fragmentation produces a duality which decreases their unity, however, the center column is reinforced by contrast and increases the overall unity of the building composition.

Figure 5.3 'Duality yet a unity'

Both-and is also displayed through the scale of the building which relates to the streetscape, while the disproportionate scale of the tower in the middle relates to the whole town.

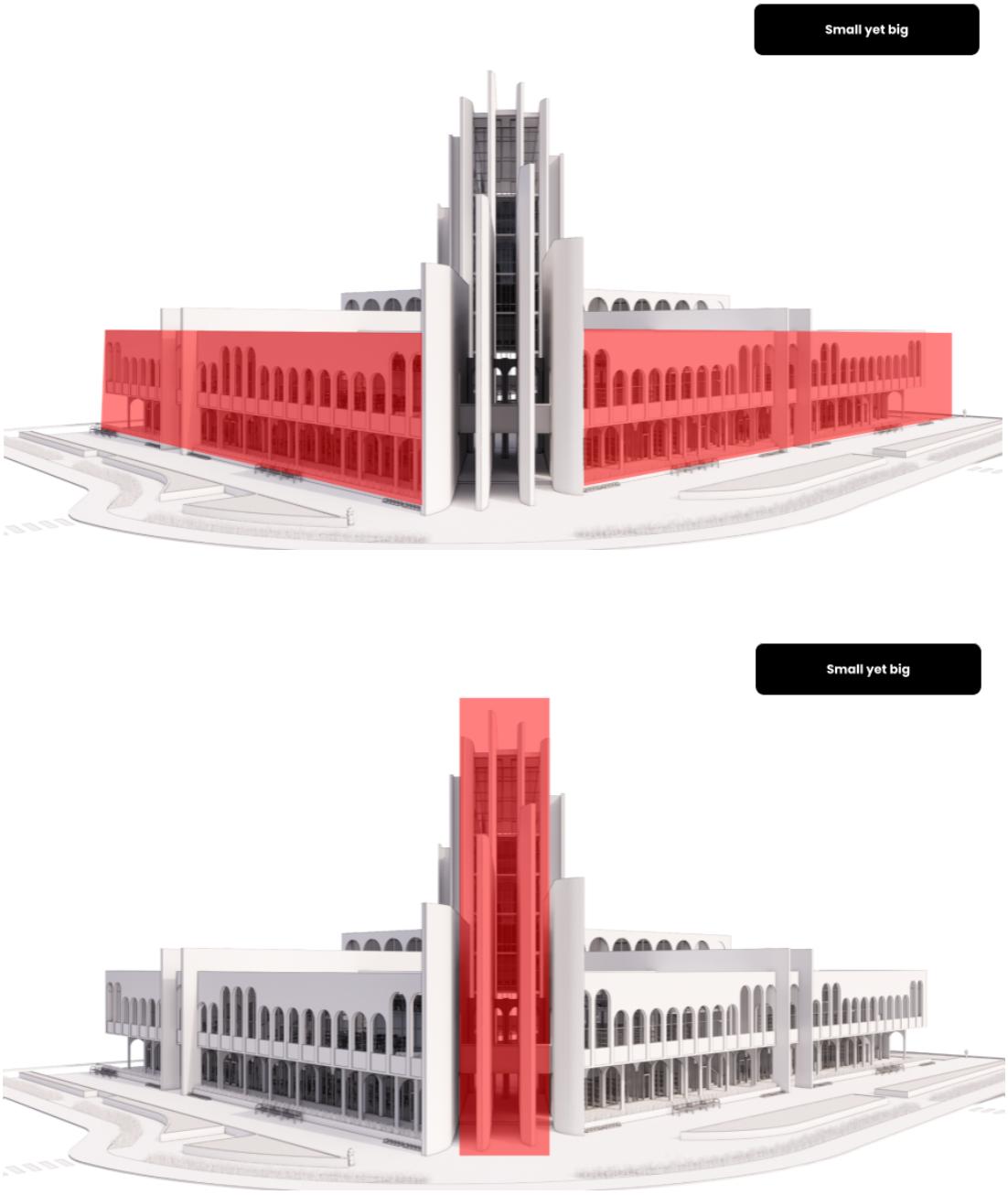

Figure 5.4 ‘Small yet big’

Lastly, the repetitive arches throughout the building dictates a classical architecture, but the monumental glass tower is more contemporary and possesses modern values.

Figure 5.5 ‘Classical yet contemporary’

5.3 Concept: Journey Towards Unity

The building comprises a four part design scheme mapping the journey out from division, collision and reflection to unity. The foundational value of the concept being that education should be inclusive rather than exclusive. It should accommodate individuals of different socioeconomic backgrounds and reduce the educational gap which exists within the society.

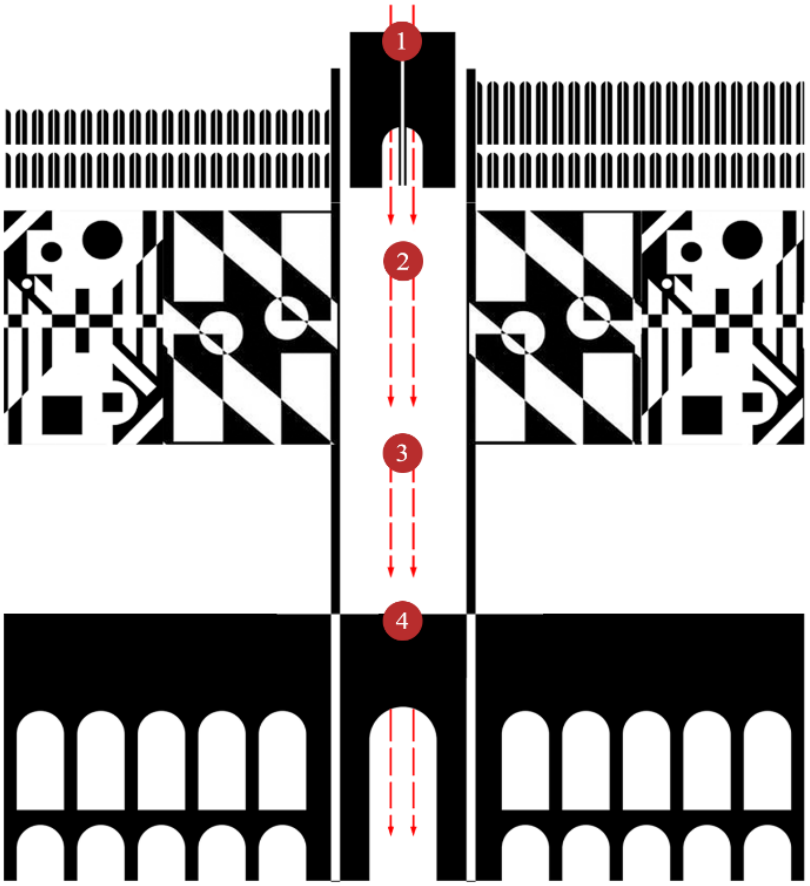

Figure 5.6 'Journey towards unity'

The first part, division, is meant to signify the issue of educational equity which is obvious but never acknowledged. Hence the division is displayed on the facade of the building which features broken arches representing the segregation of different social classes. The higher arches placed on top of the lower arches represent the overbearing feeling of the lower social classes constantly being exploited and oppressed by the elite.

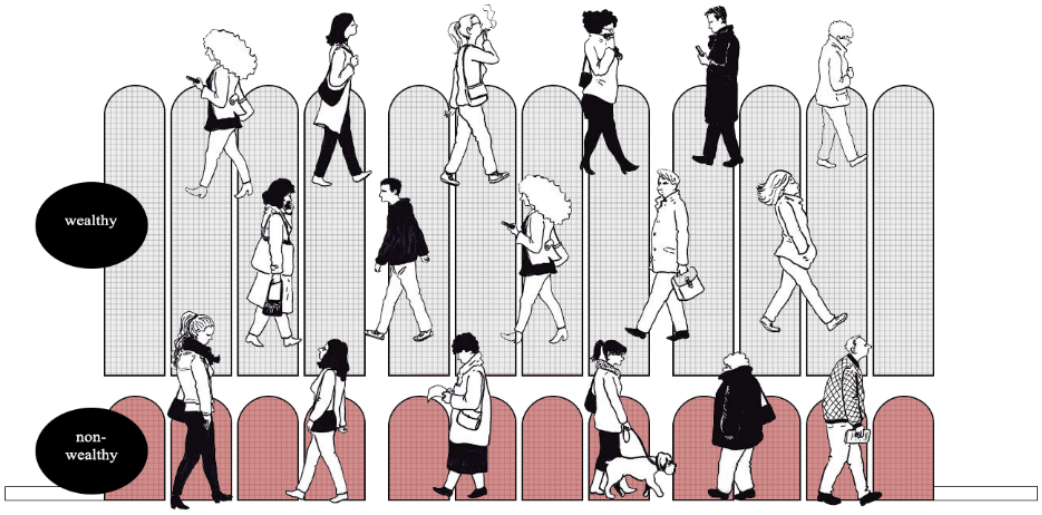

Figure 5.7 Conceptual diagram of division between social classes

Figure 5.8 Facade of the building

The division is also displayed through the programmes whereby the ground floor features informal commercial spaces which serve the common folk, in contrast, commercial spaces on the first floor are more established and high end.

The second part is collision which portrays the collision of conflicting ideas amongst different social classes and the obstacles faced when trying to communicate their differences. It is most blatantly displayed by the placement of the

column obstructing the path at the main entrance into the building and the side entrances which feature double-swing glass doors with a glass panel placed in between the doors.

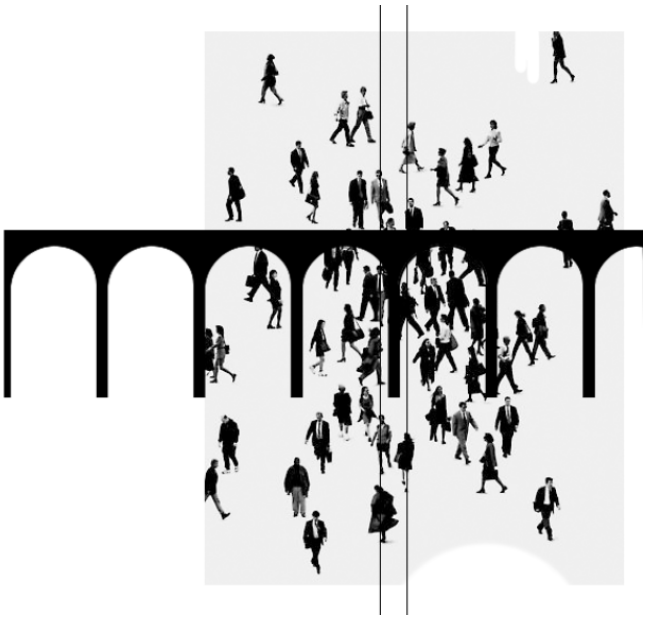

Figure 5.9 Conceptual diagram of collision of conflicting ideas

Figure 5.10 Placement of the column obstructing the path (left); and double-swing glass doors at side entrances (right)

This ambiguity or architectural language is a representation of a collision which triggers people to stop and question why it was designed that way. Similarly, when encountering the issue of educational equity it is important to stop and question the customs that people have conformed to and encourage discourse in order to find the best solution to the problem.

Figure 5.11 Courtyard space (left); and main lobby (right)

The violent collisions eventually transition into a courtyard space leading up to a large voidal space which is the main lobby. It is a place of emptiness and silence which is a phase necessary after a discourse or debate in order to understand the concerns of the opposing party and not fall too quickly into a state of defensiveness or offensiveness. The space allows users to pause for a moment of quiet reflection and identify a common ground between them and individuals who were brought up from a different family background.

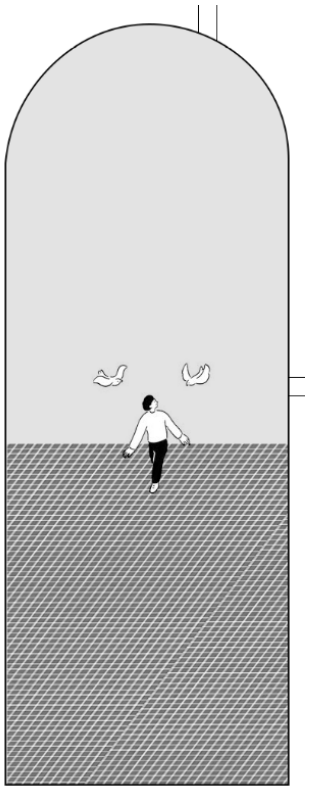

Figure 5.12 Conceptual diagram of reflection space

The users finally arrive at the monumental glass tower manifesting the message of unity through its visual order and organization of elements. Two staircases run along the breadth of the tower sandwiched between two structurally reinforced concrete walls featuring a harmonious blend of classical and contemporary architecture with the use of concrete, glass and steel.

Figure 5.13 Monumental glass tower (left); and open staircase along glass tower (right)

Users are forced into a narrow space which is the staircase before spreading out into the educational spaces located on the second to the 6th floor inside the tower. This signifies the main message of the building which is to breed tolerance and inclusivity amongst individuals of different socioeconomic backgrounds in order to tackle the pressing issue of educational inequity together.

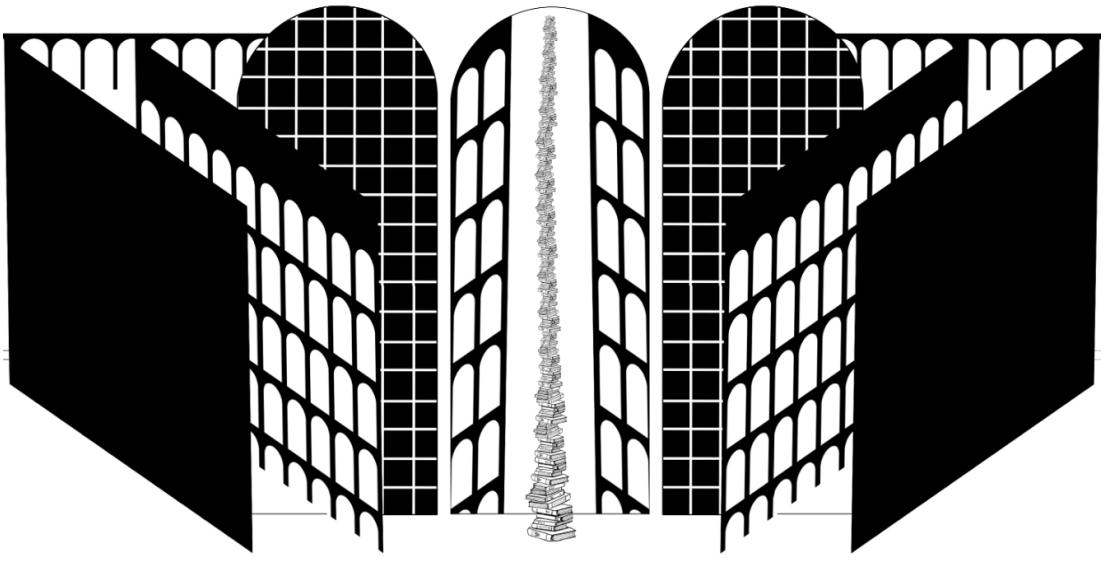

Figure 5.14 Conceptual diagram of unity

5.4 Summary

To conclude, ambiguous architecture is valid when it reflects the complexities and contradictions of content and meaning. The confusion of experience involves struggles and hesitations for the observer, and makes his perception more vivid. As Louis Kahn once remarked "architecture must have bad spaces as well as good spaces." because the irrationality of a part will be justified by the resultant rationality of the whole.

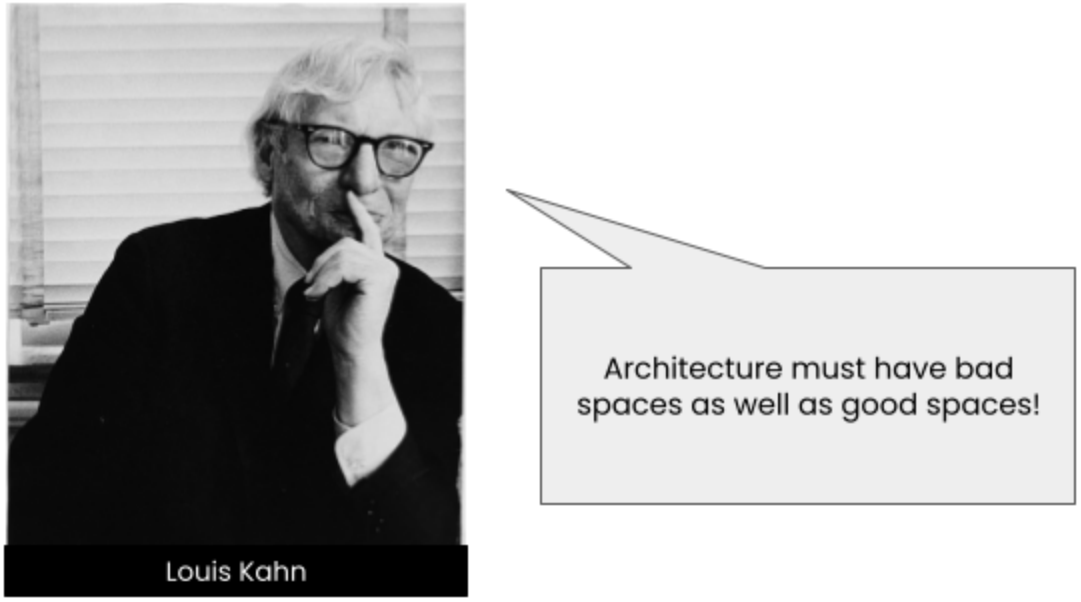

Figure 5.15 Quote by Louis Kahn

CHAPTER 6

FINAL DESIGN SOLUTION

This chapter explains the target users, client, building typology and programmes, and spatial planning accompanied by drawings to elaborate the final design solution of the project

6.1 Target Users

The target users of the building are:

i. Students - to encourage students who are eager to learn yet lack the tools and facilities to do so.
ii. Professional educators - to encourage students who are eager to learn yet lack the tools and facilities to do so.
iii. Public - to encourage community involvement and attract potential sponsors.

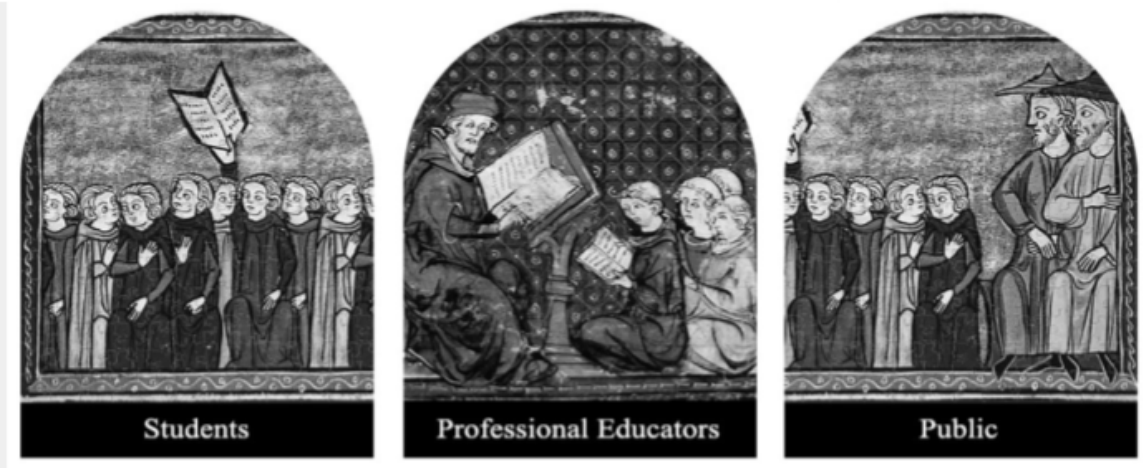

Figure 6.1 Target users

6.2 Client

Figure 6.2 Client's logo

The client of the building is Teach For Malaysia which is an independent, not-for-profit organisation on a mission to give all children in Malaysia the opportunity to attain an excellent education. Their areas of impact include working to combat education inequity in Malaysia, where they focus on creating sustainable, long-lasting impact in three key areas:

i. students;
ii. community; and
iii. the education system

6.3 Building Typology and Programmes

Figure 6.3 External perspective of proposed building

Proposed building: 'Palace of Equity' Johor Bahru Inclusive Learning Centre

Building typology: Student learning centre

Table 6.1 Building programmes

Spaces	Building programmes
Educational Zone	- Library - Multimedia Rooms - Discussion Rooms - Lecture Rooms - Staff Room And Pantry
Workshop Zone	- Student Exhibition Space - Event Space/ Informal Theatre - Rehearsal Rooms - Music Studio - Art Studio - Carpentry Workshop - Gallery - Student Lounge And Pantry
Commercial Zone	- Canteen - Student Co-op - Convenience Store - Local Kopitiam - Unisex Barbershop - Bakery - Starbucks - Cafe & Bistro - Family Mart - Patisserie - Village Grocer
Supporting Spaces	- Toilet (Male/ Female/ Oku) - Musolla (Male/ Female) - Refuse Chamber - Fire Pump Room - Switch Room - Genset Room - Control Room - Reception Office - TNB Substation - Lift (Service/ Public) - Fan room - Staircase

6.4 Spatial Planning

The spatial planning throughout the building was designed so that spaces on the ground floor are more public and moving upwards, the spaces are more private.

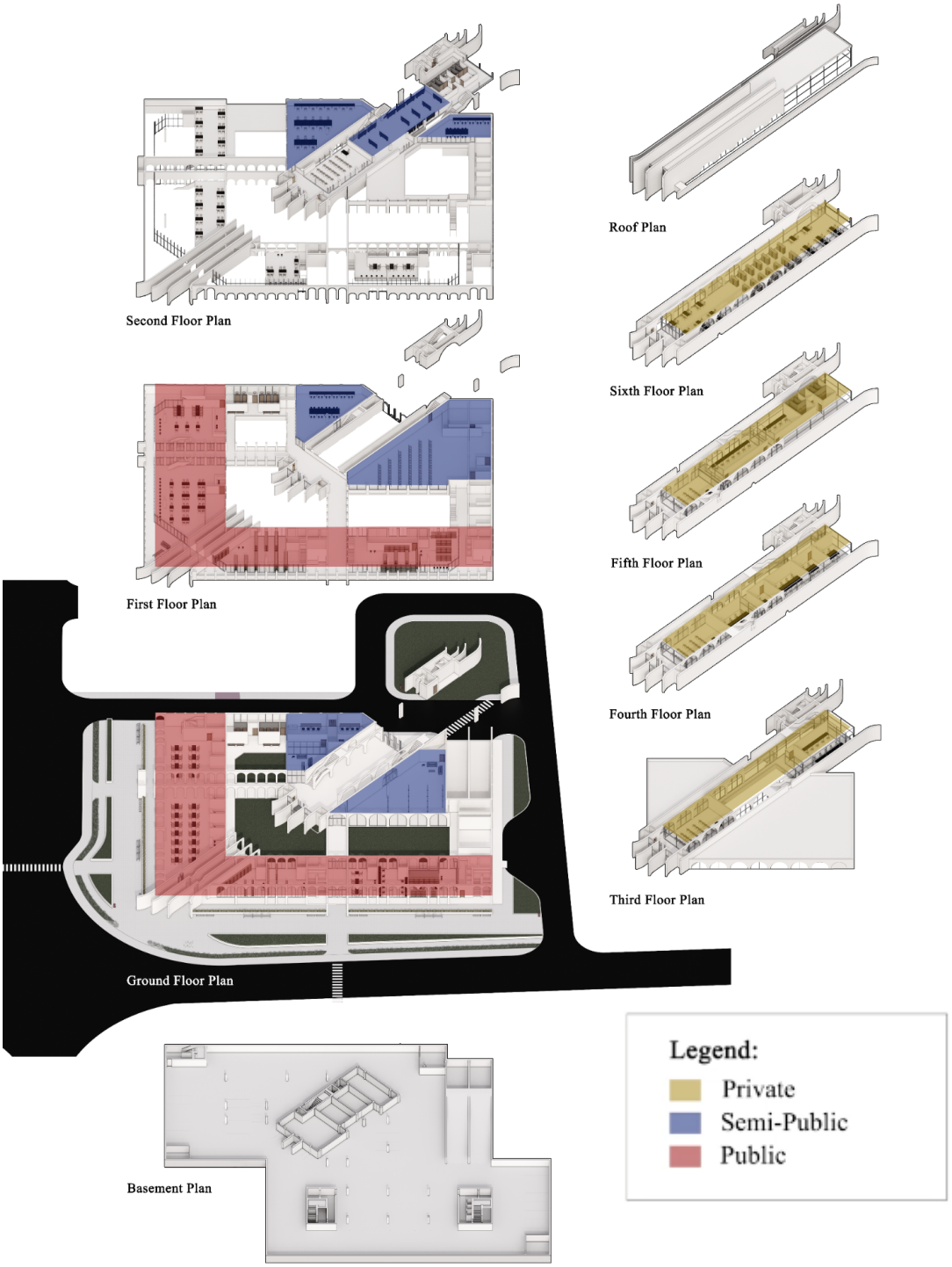

Figure 6.4 Spatial planning diagram

6.5 Schematic Drawings

i. Plans

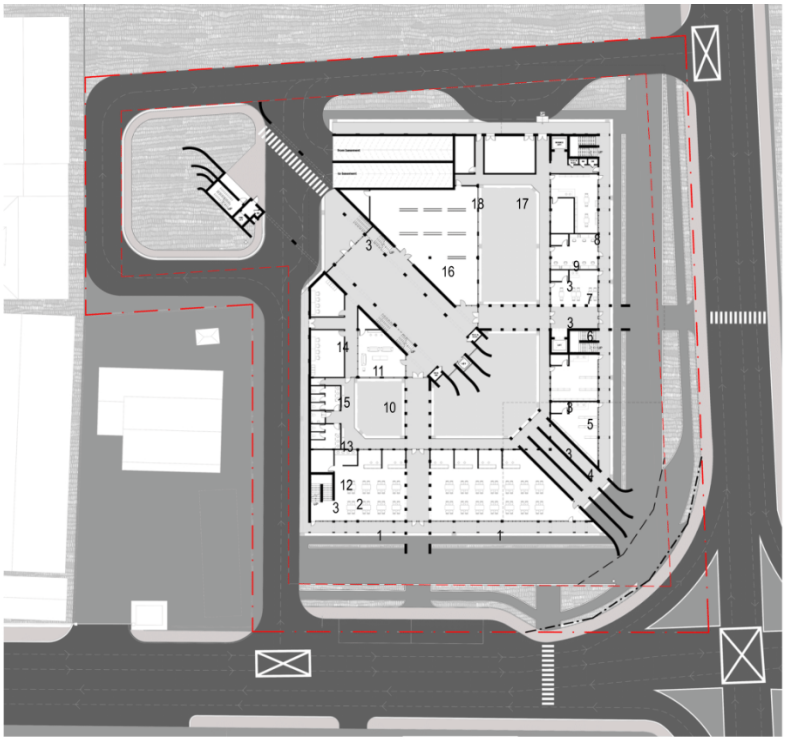

Figure 6.5 Ground floor plan

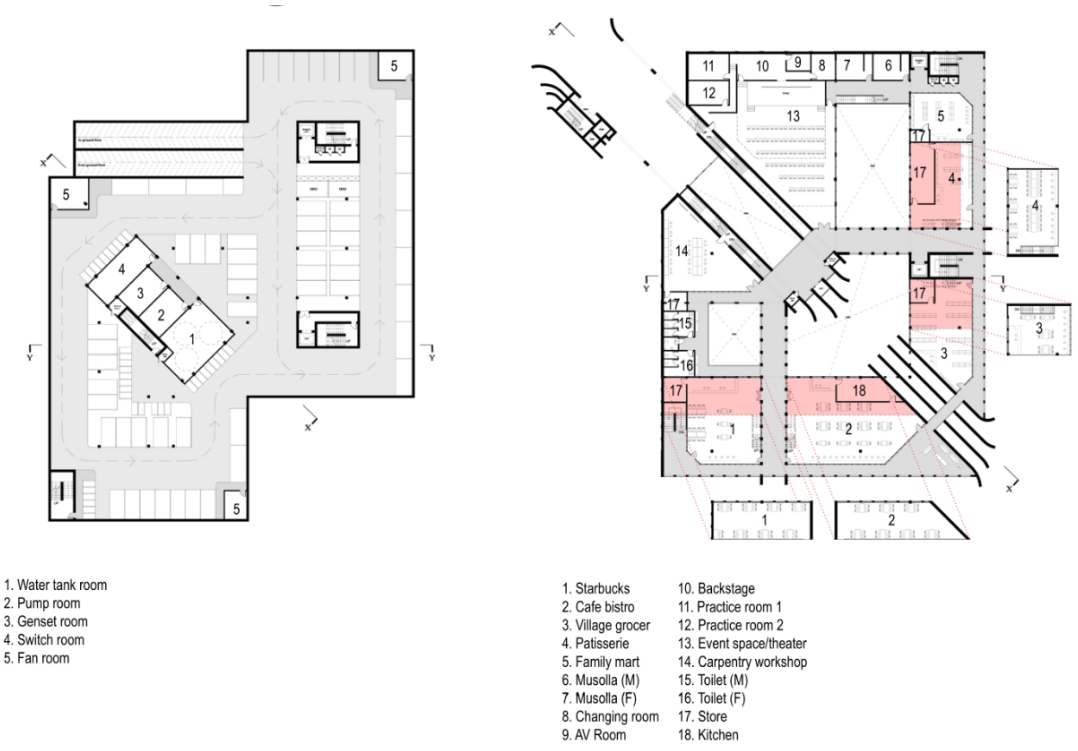

Figure 6.6 Basement floor plan (left); and first floor plan (right)

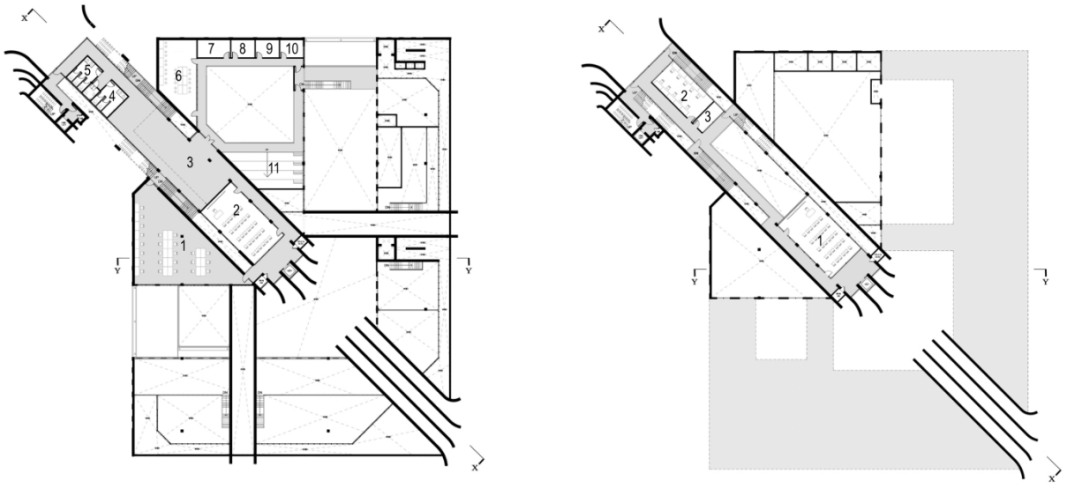

Figure 6.7 Second floor plan (left); and third floor plan (right)

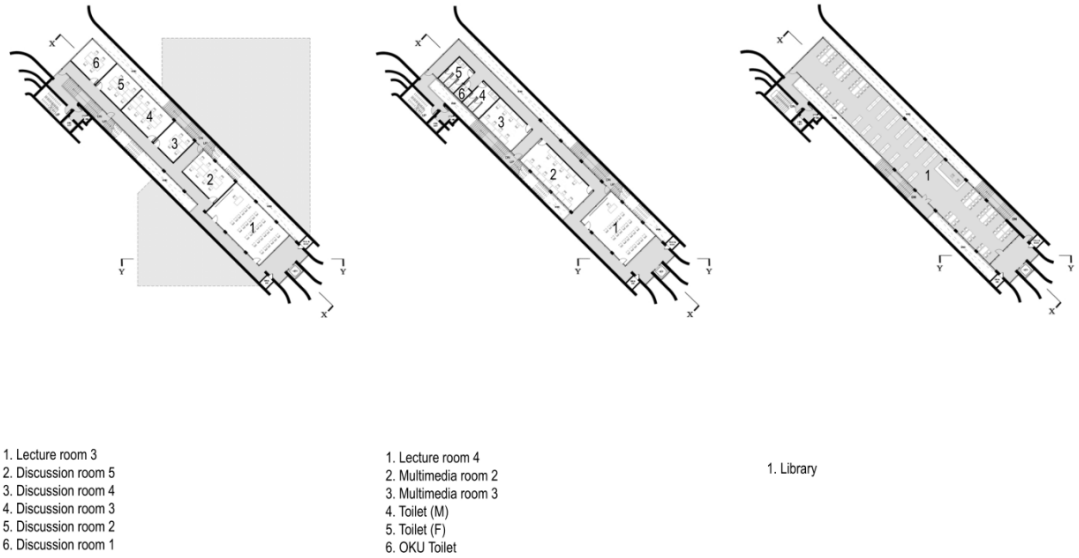

Figure 6.8 Fourth floor plan (left); fifth floor plan (middle); and sixth floor plan (right)

ii. Sections

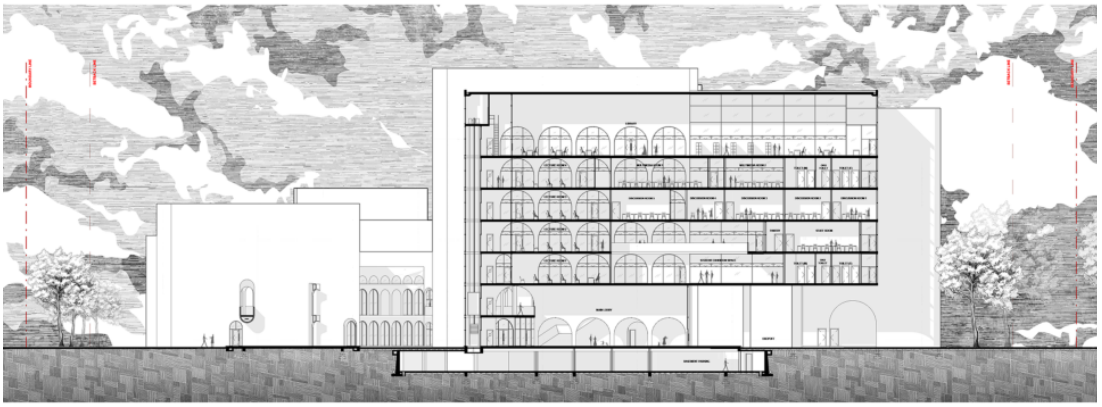

Figure 6.9 Section X-X (longitudinal section)

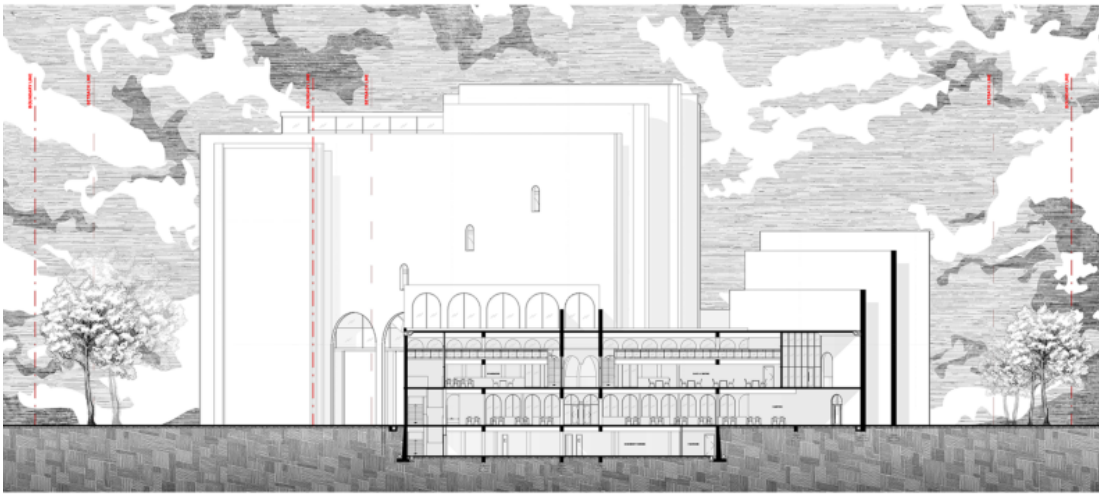

Figure 6.10 Section X-X (cross section)

iii. Elevations

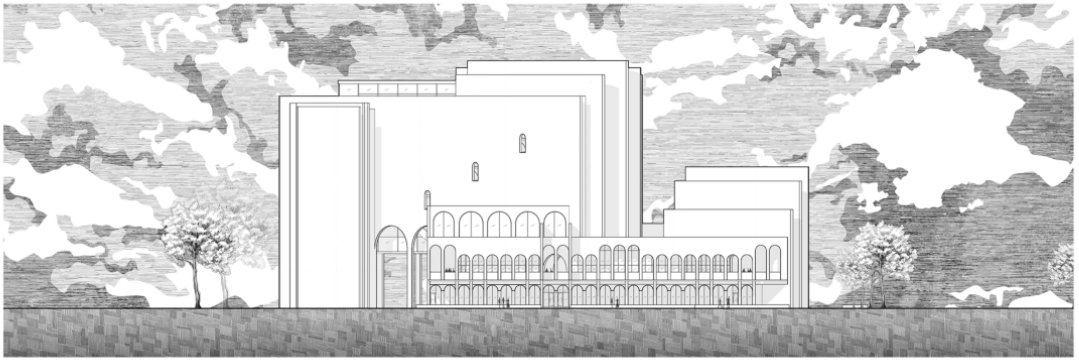

Figure 6.11 Southwest elevation

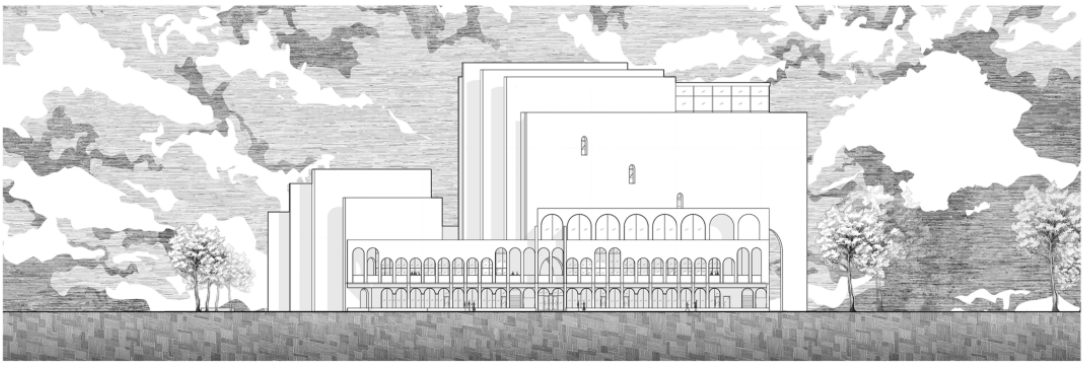

Figure 6.12 Southeast elevation

CHAPTER 7

TECHNICAL ASPECTS

This chapter explains the technical aspects of the building including the structural details, special details, building services, and compliance with the required laws.

7.1 Structural Details

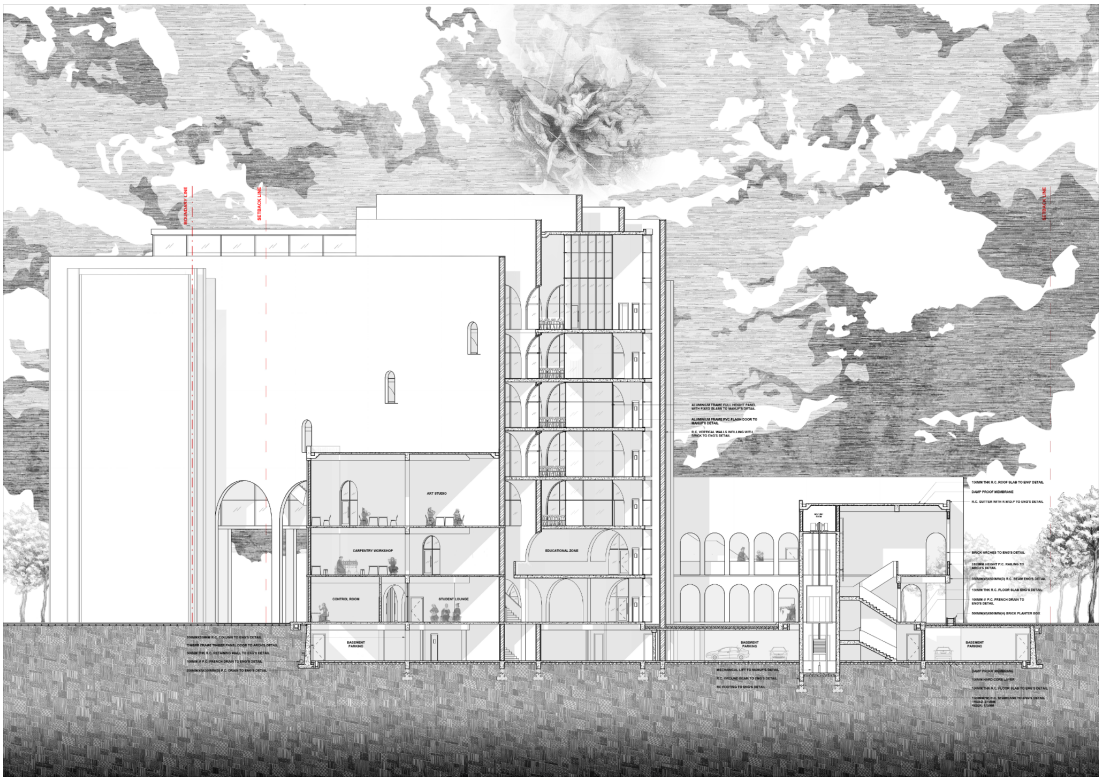

Figure 7.1 Full detail section

The building utilises the conventional post-and-beam construction throughout the building as well as structurally reinforced concrete and flat slab for the tower

construction. Besides that, brick and mortar is used for the external walls and arched structure in order to produce a more cost-efficient building. The foundation of the building utilises the reinforced concrete footing in order to support the load of the building as well as occupants inside. Lastly, the roof structure is formed using reinforced concrete flat roof slabs with reinforced concrete gutter.

7.2 Special Details

The special details of the building include the reinforced concrete gutter which functions to prevent water from flowing into the fabric of the building by diverting rainwater away from the exterior of the walls and their foundations. The water is discharged into the the concealed drainage located beneath the floor pavement on ground floor.

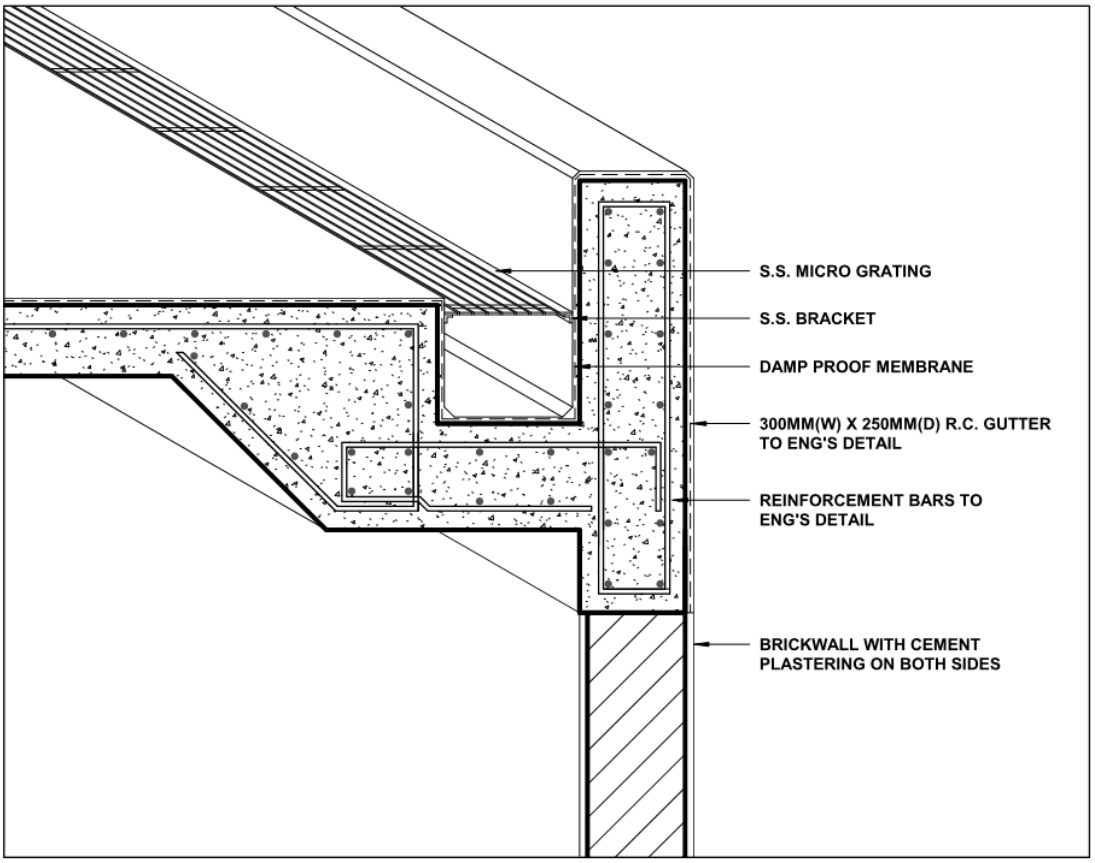

Figure 7.2 Reinforced concrete gutter detail

Next, is the planter box detail which utilises brick masonry with cement plastering on both sides. The planted box is located external to the building in order to separate the building from the streetscape whilst also providing a space for greenery as a visual aesthetic.

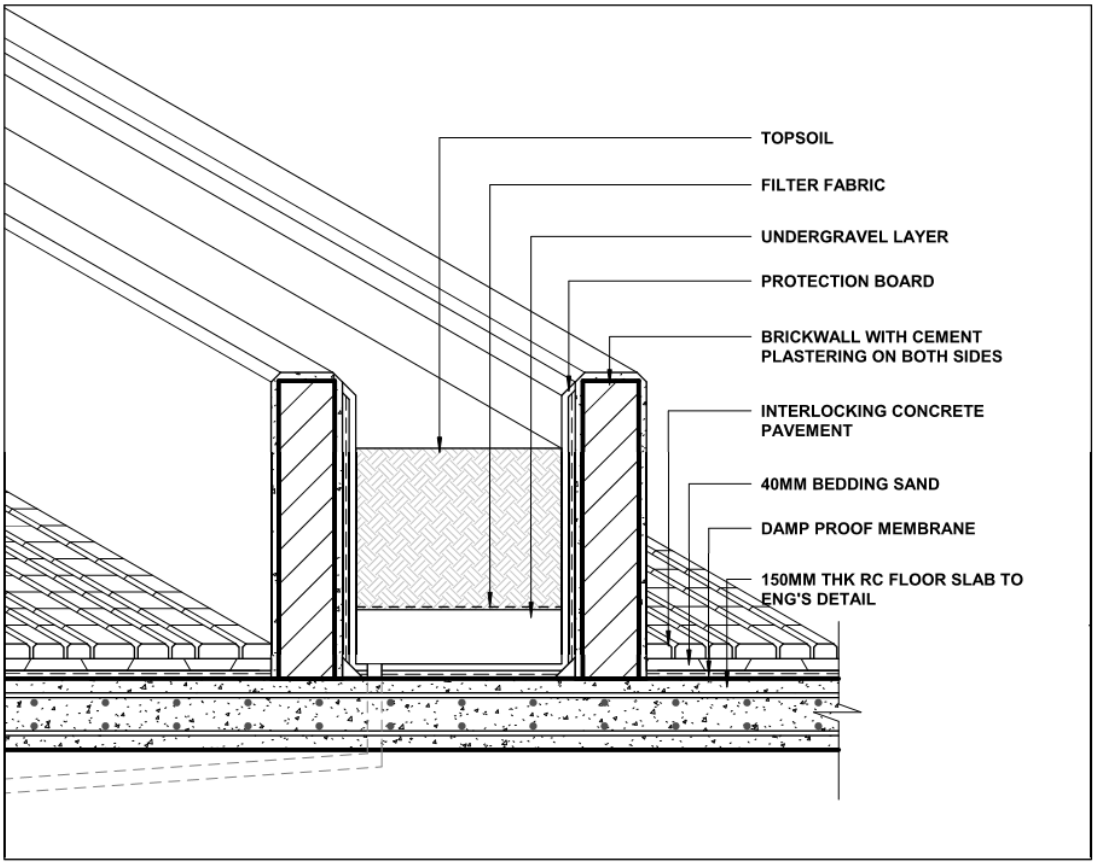

Figure 7.3 Planter box detail

7.3 Building Services

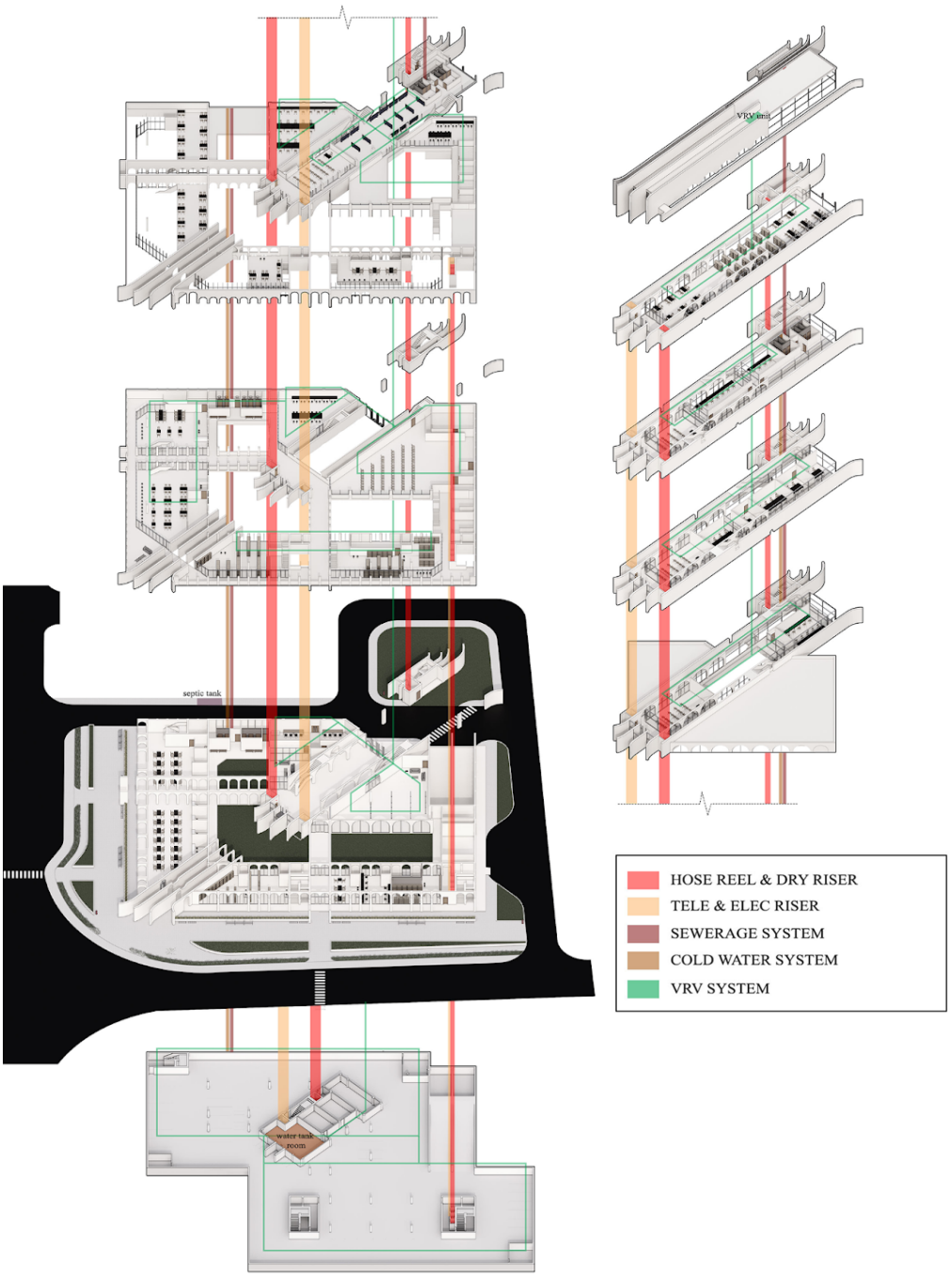

Figure 7.4 Building services diagram

The building services provided are according to the respected laws as stated in Uniform Building By-Laws 1984. This includes the risers (dry riser, telecommunication riser and electric riser), cold water supply system, sewerage system, and air conditioning (VRV) system.

7.4 Fire Fighting Systems

The fire fighting system of the building includes fire appliance access, passive containment, evacuation exits from the building and active intervention. The requirements are based on the by-laws as stated in Universal Building By-Law 1984.

i. Fire Appliance Access

Total net floor area: 10,410 sqm

Total building volume:

= 10,410 sqm x 4m (height)

= 41,640 cubic metre

***Based on UBBL By-Law 140, volume of building within the range of 28000 to 56000 cubic metre requires a minimum **one-fourth perimeter of building for fire appliance access**.

Based on the diagram below, the building fulfills the requirement for fire appliance access.

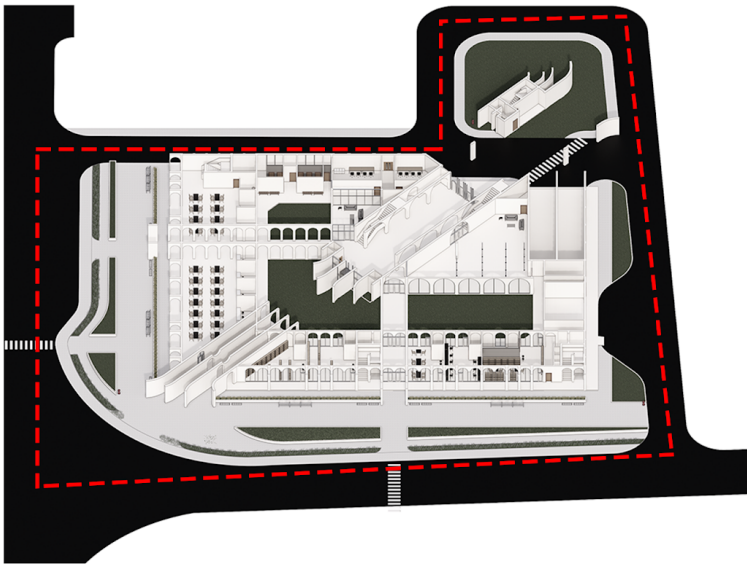

Figure 7.5 Fire appliance access on site

ii. Passive Containment

Based on UBBL 1984: Fifth Schedule (By-law 136), for **purpose group II** (Institutional), the provision of compartment walls and compartment floors for the dimensions of buildings and compartments are required for:

1. Height of building is **any height**
2. Floor area of storey in building or compartment (in m^2) is **2000m^2**
3. Cubic capacity of building or compartment (in m^3) is **no limit**

According to by-law 136, other walls and floors to be constructed as compartment walls or compartment floors.

a) Any floor in a building of Purpose Group II (Institutional)

c) Any wall or floor separating part of a building from any other part pf the same building

which used or intended to be used mainly for purpose falling withing different group

d) Any Floor immediately over basement storey if such basement storey has an area exceeding

100 square meters.

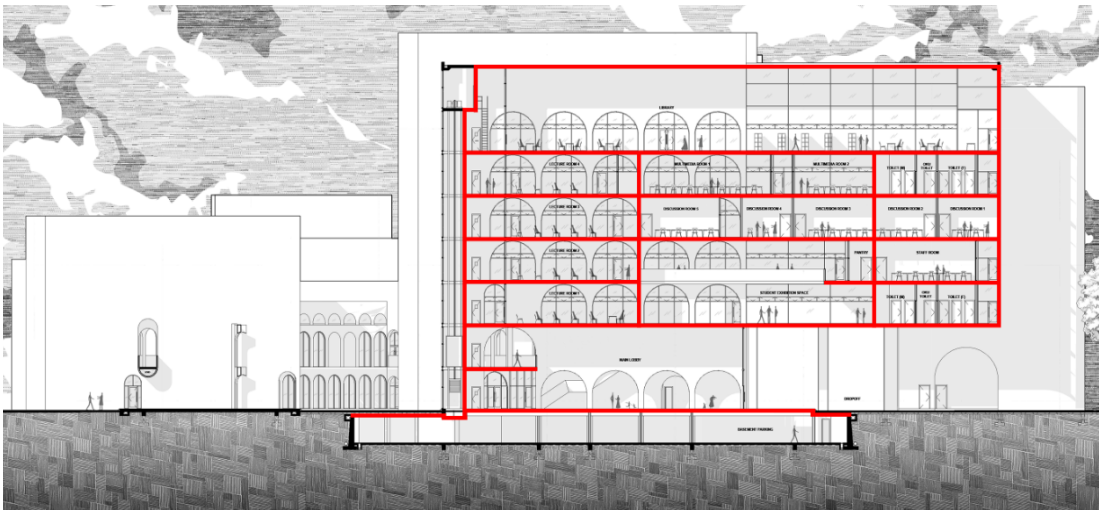

Figure 7.6 Provision of compartment walls and compartment floors

iii. Evacuation

The evacuation of occupants from a building includes the calculation for storey exit width, travel distance and dead-end limit.

Storey exit width calculation:

Table 7.1 Storey exit width calculation for ground and first floor

Ground/ First Floor	
Based on UBBL 1984: Seventh Schedule, for **purpose group V** (Shops): 1. occupant load per square metre is **6 gross** 2. capacity exit width for stairs is **60**	
Gross floor area	2328 sqm
Occupant load	2328 sqm ÷ 6 = 388
Storey exit width	388 ÷ 60 = 6.46 units (1 unit = 550mm) 6.46 x 550 = **3557mm**
Number of staircase calculation:	Complying with UBBL By-Law 177, Number and width of stairs provided: **3 open staircase (1500mm)**

Table 7.2 Storey exit width calculation for second floor to sixth floor

Second/ Third/ Fourth/ Fifth/ Sixth Floor	
Based on UBBL 1984: Seventh Schedule, for **purpose group II** (Institutional): 1. occupant load per square metre is **4.5 net.** 2. capacity exit width for stairs is **22**	
Net floor area	437 sqm
Occupant load	437 sqm ÷ 4.5 = 97
Storey exit width	97 ÷ 22 = 4.4 units (1 unit = 550mm)

	4.4 x 550 = **2420mm**
Number of staircase calculation:	Complying with UBBL By-Law 177, Number and width of stairs provided: **2 open staircase (1650mm) and 1 fire staircase (1200mm)**

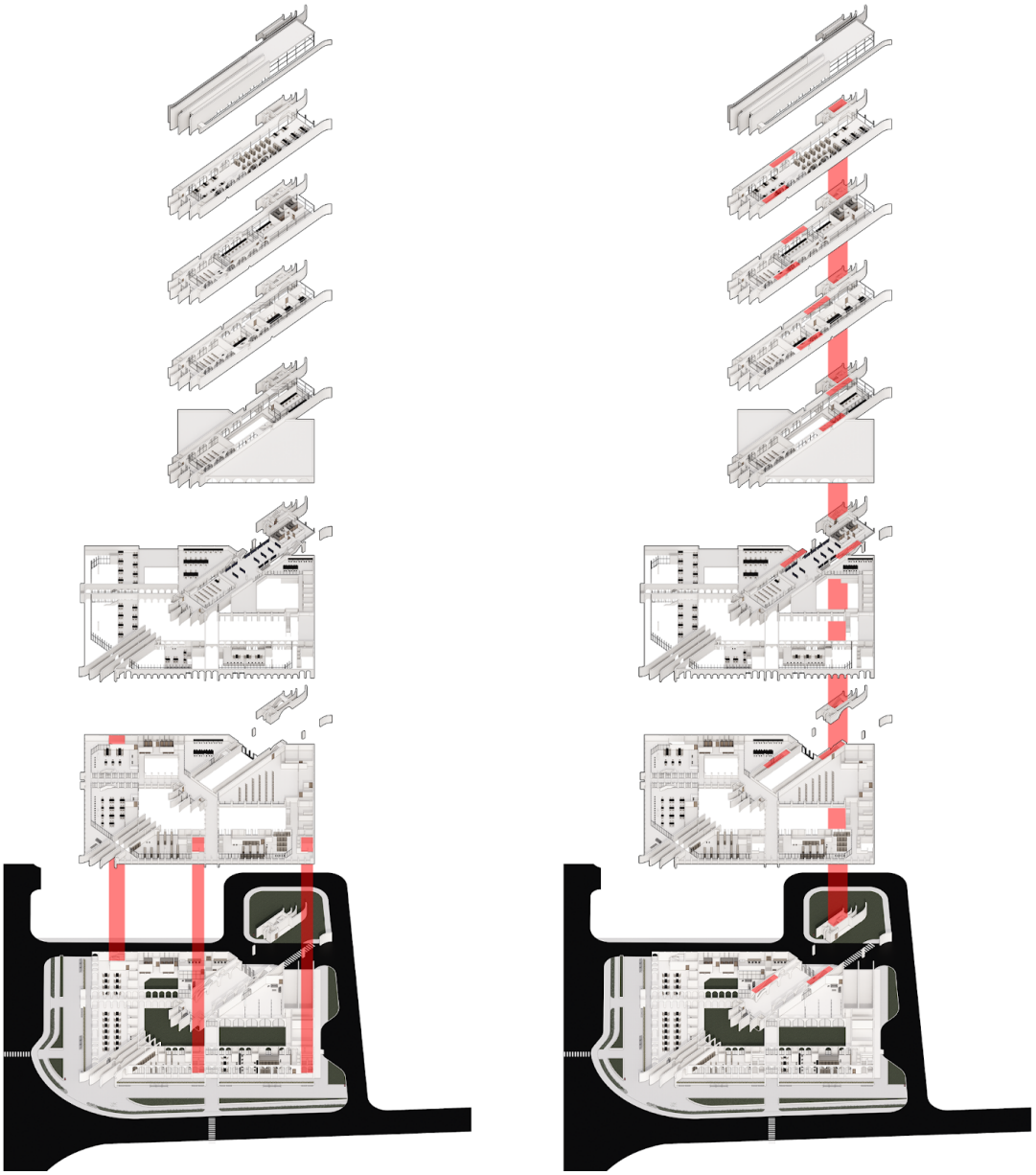

Figure 7.7 Staircases provided from ground to first floor (left); staircases provided from ground to sixth floor (right)

Travel distance and dead-end limit:

Based on UBBL 1984: Seventh Schedule,

purpose group II (Institutional-Open Plan)	Dead-end limit: No requirement Travel distance (Unprinklered): 30m
purpose group V (Shops)	Dead-end limit: 15m Travel distance (Unprinklered): 30m
purpose group VII (Places of Assembly)	Dead-end limit: No requirement Travel distance (Unprinklered): 45m

iv. Active Fire Fighting System

Active intervention systems applied in the building in accordance with UBBL requirements are portable fire extinguisher, hose reel system, fire lift and dry riser system.

Table 7.3 Active intervention systems required

Portable Fire Extinguisher	According to **by-law 227**: •Fire extinguisher positioned one exit route to be visible from all directions. • Maintained and serviced annually • Achieve SIRIM requirement
Hose Reel System	Referring to **UBBL 10th schedule:** • Designed based on MS 1489 Part 1 1. Extinguishing system: Hose reel (30m radius) 2. Fire alarm system: Manual electrical fire alarm system 3. Emergency lighting: Signal point units
Fire Lift	According to **by-law 229 & 243:** • The building with the top most floor more than 18.5m requires fire lift.
Dry Riser System	According to **by-law 230 & 232:** • The building with minimum height of 18.3m and maximum of 30.5m requires a dry riser system. • Designed with a fire lobby with staircase access.

CHAPTER 8

CONCLUSION

Architectural forms leave a permanent imprint on a place and are often used as a way for humans to express their needs, beliefs and desires. Therefore, architecture should be seen as a means of expression and a way for mankind to convey their message, informing future generations of the culture and contents of our present time. This elaborates the importance of semiotics in architecture which strives to convey meaning through architecture as most prominently seen in Robert Venturi's design and his philosophies.

The 'Palace of Equity' Johor Bahru Inclusive Learning Centre references these theories in order to tackle the pressing issue of educational inequity in hopes of fostering inclusivity amongst students and the public. The design attempts to convey the impact of socioeconomic status on an individual's opportunity of attaining a proper education. It also delves into the socioeconomic divide in the surrounding educational institutions as well as the growing class tensions evident in a modern capitalist society.

The design tackles these issues by means of architecture as a communication device. It provokes discourse surrounding the social, political and environmental challenges faced in achieving equity in education through its concept, design programmes and spaces throughout the building. As such, the Johor Bahru Inclusive Learning Centre is a space to cultivate an enriching learning experience which promotes inclusivity and educational equity amongst individuals of different socioeconomic status.

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Appendix A (Presentation Boards)

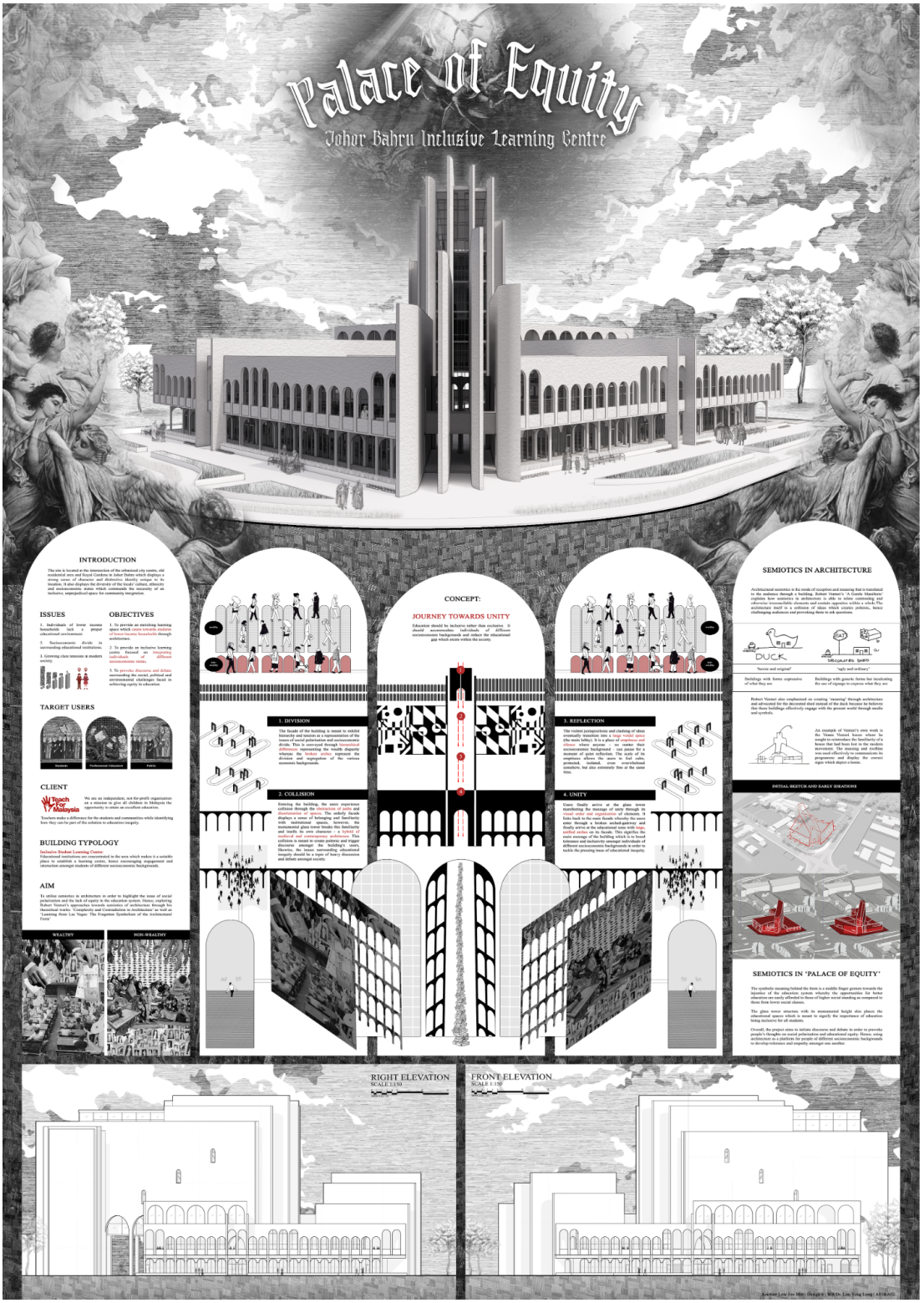

Figure A.1 Presentation board 1

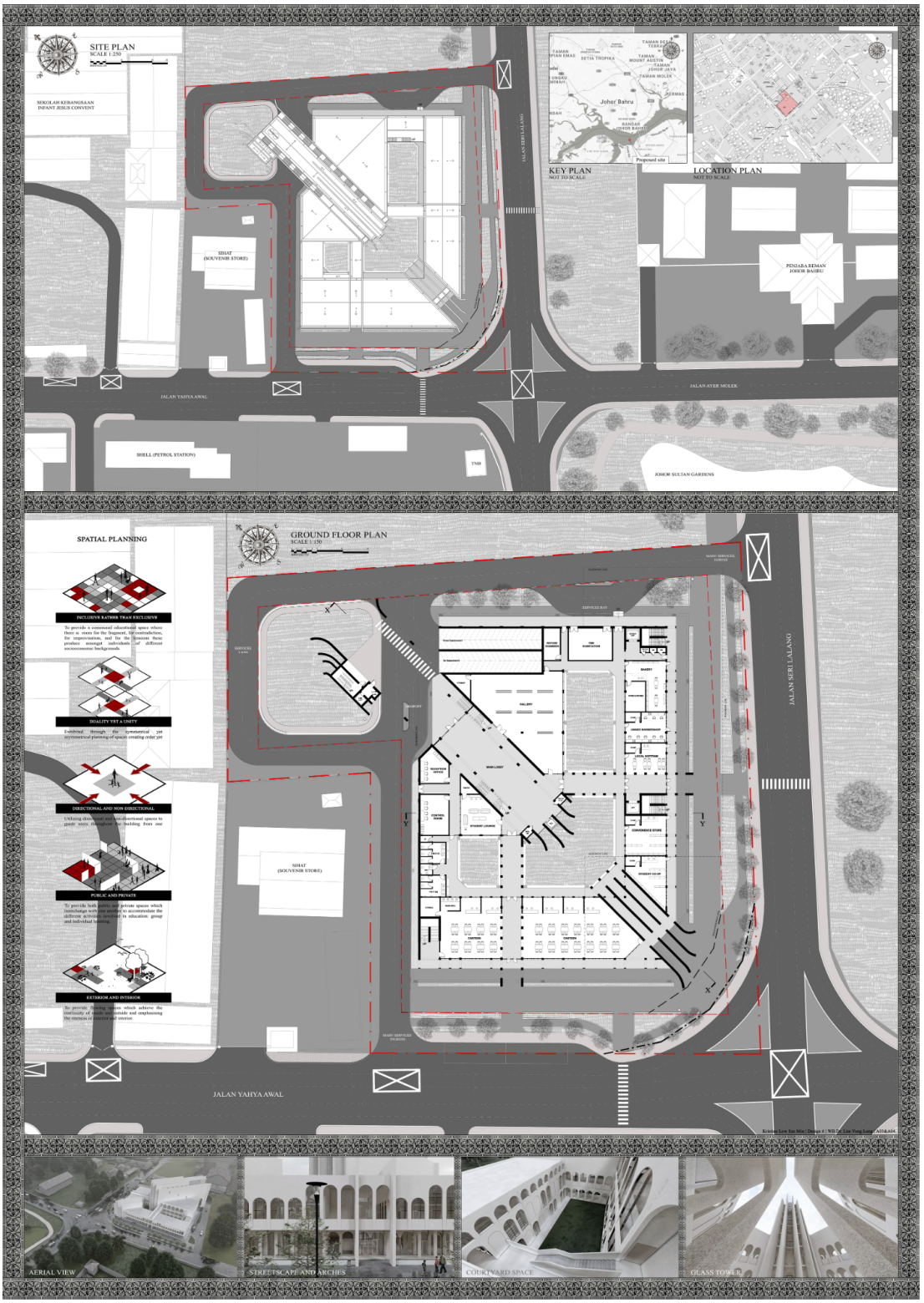

Figure A.2 Presentation board 2

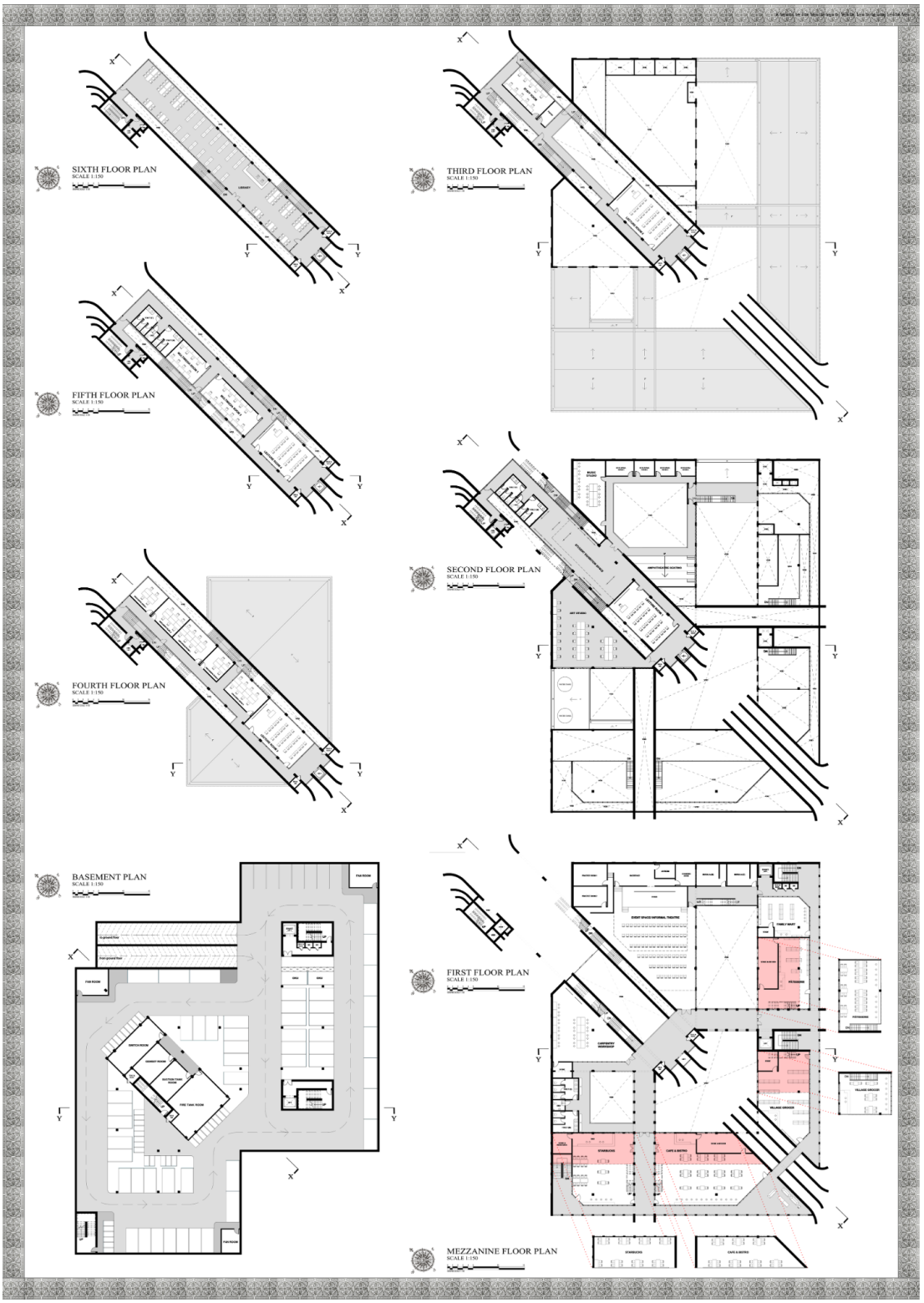

Figure A.3 Presentation board 3

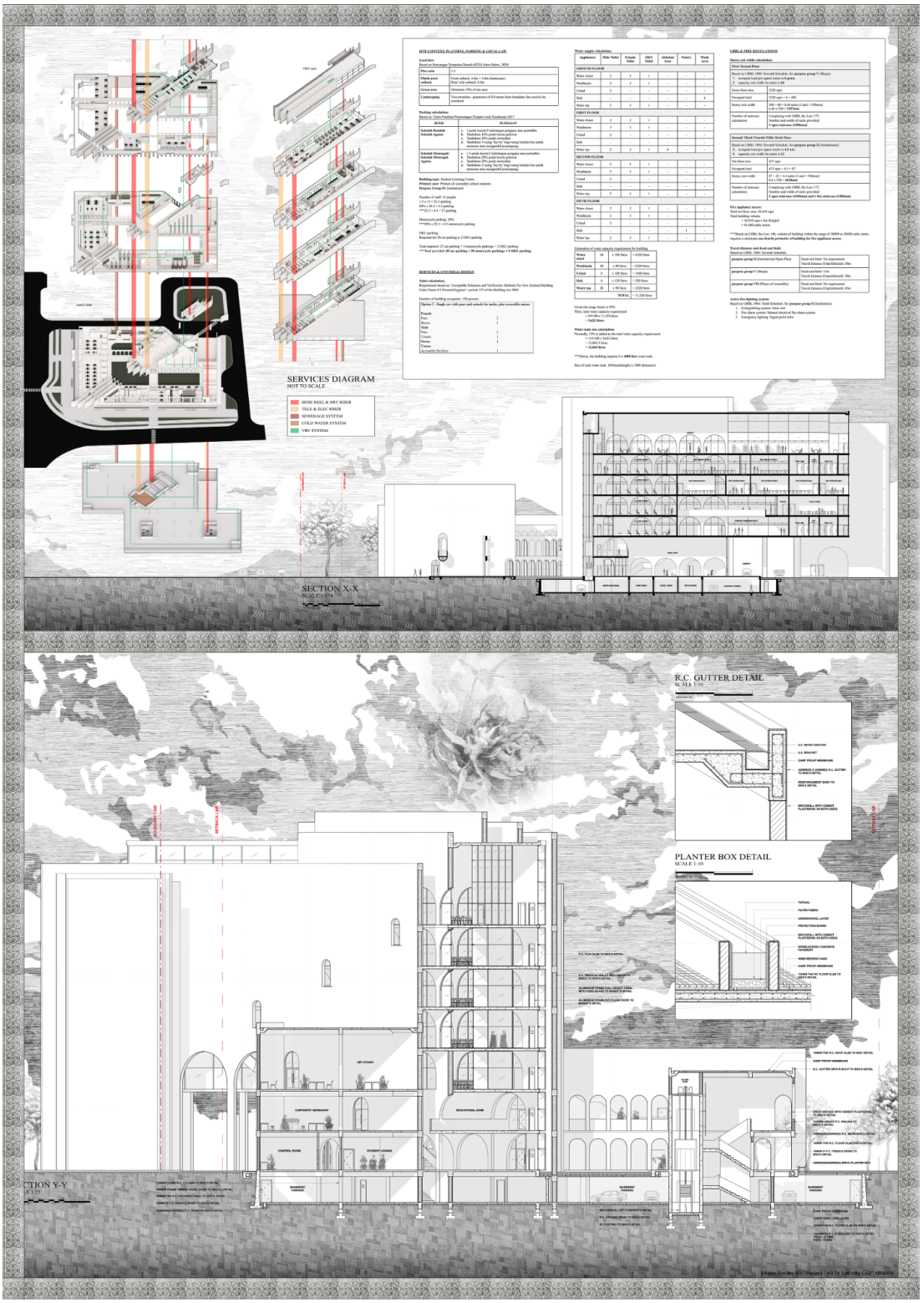

Figure A.4 Presentation board 4

ABSTRACT

The proposal of the Johor Bahru Inclusive Learning Centre was initiated from the consideration of the role of architecture as a representation of culture, lifestyle and belief systems which include social, economic and political ideologies. This indicates that besides just serving as a space, architecture should also convey a message to its users and communicate to its audiences. The design attempts to convey the impact of socio economic status on an individual's opportunity of attaining a proper education. It also delves into the socioeconomic divide in the surrounding educational institutions as well as the growing class tensions evident in a modern capitalist society. The design tackles these issues by means of architecture as a communication device. It provokes discourse surrounding the social, political and environmental challenges faced in achieving equity in education through the design programmes and spaces throughout the building. It also explores the philosophical ideologies of Robert Venturi and the content of his works in defining semiotics of architecture and its symbolism as an expression of culture. Hence, the concept of the design - 'journey towards unity' - explores the journey of achieving tolerance amongst individuals from different income households through a four-part design scheme: division, collision, reflection and unity. As such, the Johor Bahru Inclusive Learning Centre is a space to cultivate an enriching learning experience which promotes inclusivity and educational equity amongst individuals of different socioeconomic status.