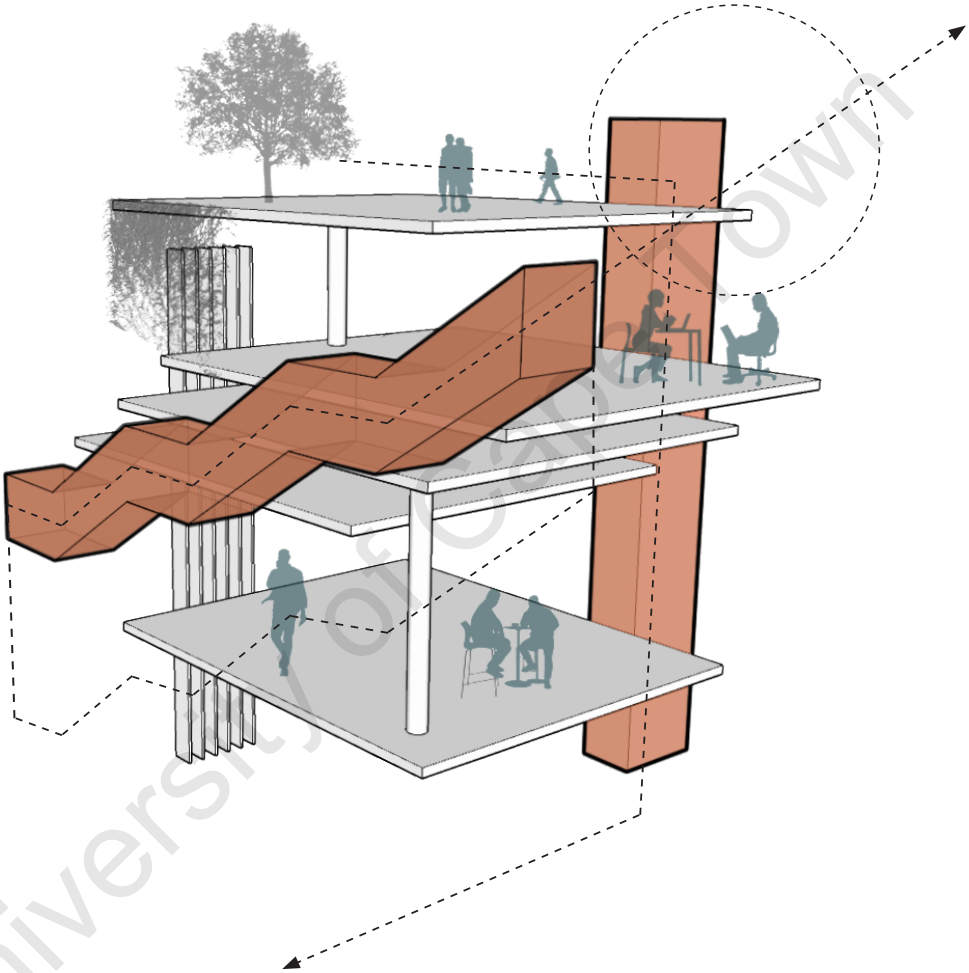
DESIGNING FOR HEALTH AND WELL-BEING:

Implementing Human Centered Design principles into an existing workplace precinct through adaptive re-use practices.



Henk Pretorius Malherbe | Author

Stella Papanicolaou | Supervisor

This dissertation is submitted in partial fulfillment of the requirements for the degree of Master of Architecture (Professional) at the School of Architecture, Planning and Geomatics, University of Cape Town.

Plagarism Declaration

Name : Henk Pretorius Malherbe

Student number : MLHHEN002

Course : APG5088Z

Declaration :

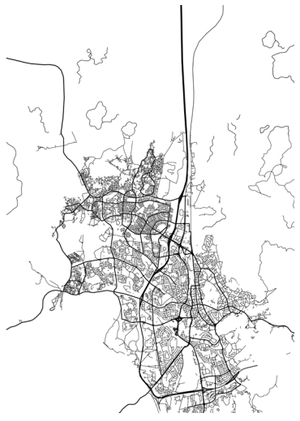
I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own. I have used the Harvard method for citation and referencing. Each contribution to, and quotation in, this paper from the work(s) of other people has been attributed and has been cited and referenced. This Theory & Technology research paper is my own work.

Signature : Signed by candidate

Date : 10 / 26 / 2023

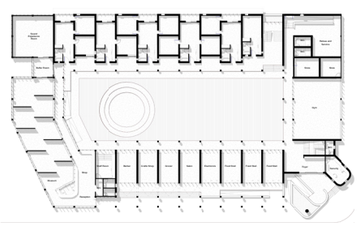
An Organism
Muscular Structure

Informed by



A City
Street Structure

Responds to



A Dwelling
Plan Structure

Abstract

This paper aims to investigate the role of architectural interventions in promoting human-centered design principles and creating healthier buildings. With more than half of the global population now residing in urban areas and sedentary lifestyles becoming prevalent, there has been a global surge in chronic diseases and mental well-being decline as a result of lack of movement and stimulus to nature. Through understanding the historical significance of design strategies which played a part in shaping this behavior, this paper will critically analyze existing research to identify comprehensive interventions that can address contemporary health challenges, specifically lack of physical movement and access to nature.

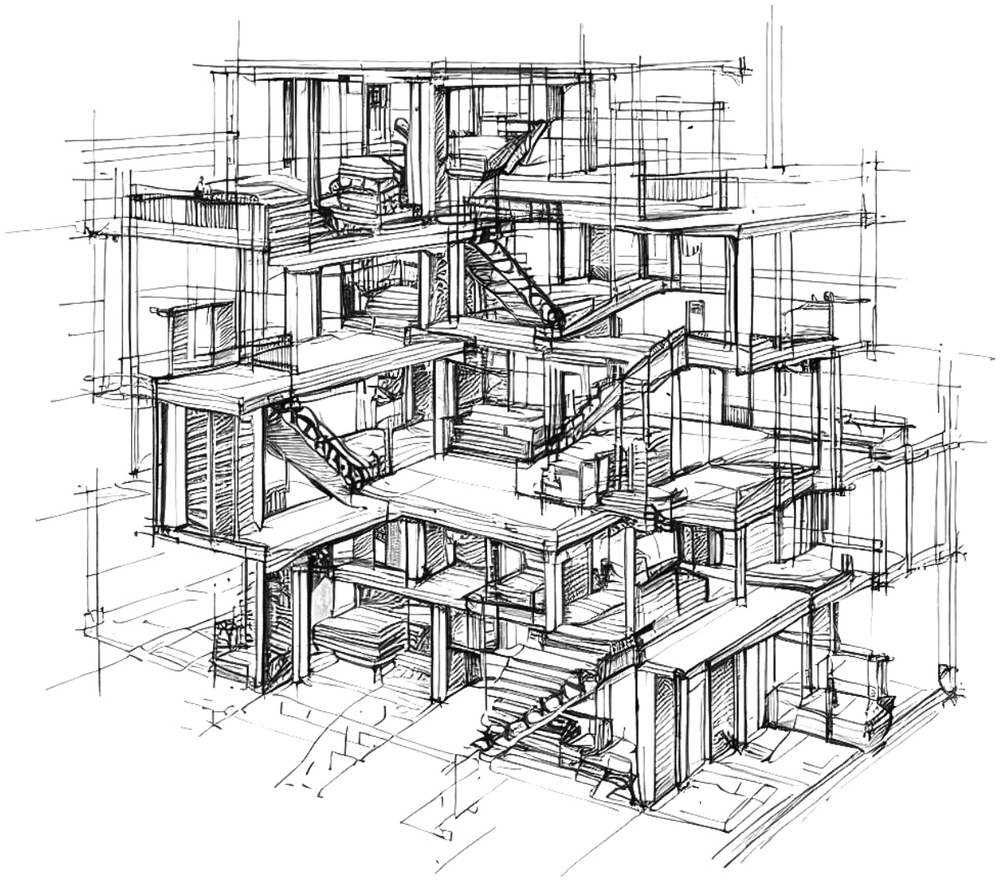
To contextualize the research, a historical analysis will explore how environmental design and architecture played a crucial role in restricting our movement patterns, and segregating our communities. The built environment, at its core, holds immense sway over human health and physical activity. It encompasses vital factors such as air quality, natural light, and our general state of well-being.

Table of Contents

Introduction

This dissertation aims to investigate the role of environmental design and architectural interventions in promoting physical movement within buildings. The movement patterns of a population are affected by issues which are proliferated not by architecture in itself, but by aspects of infrastructure, urban design, lifestyle decisions, and other socio-economic factors. As chronic diseases are results of sedentary lifestyles, the built environment cannot be held completely responsible for this behavior within a population as the outcomes are results of individual decision-making.

However, because of the time we spend within architectural spaces in our everyday lives, the historical impact on health and wellbeing the built environment has always strived to improve, and the opportunity it can provide individuals to engage in behavior which would lead to improved health outcomes, architecture remains an important factor to consider in acting as a catalyst to nudge the activity levels in a population through providing choice and opportunity within circulatory routes. In order to understand the scope of this project, a series of studies will be used to underpin the various factors which contribute to the problem statement. From these a set of principles will be used from the theoretical basis to inform the practical application of the design development in the form of an architectural response.



Research Question(s)

How has the built environment made us more sedentary?

How can the built environment be a catalyst for improved physical activity and ultimately sustained well-being?

The aim with these questions is to critically analyse architectural frameworks and form an understanding of how the built environment may have influenced individuals to become more sedentary, and simultaneously examine interventions which can lead to building occupants making decisions in favour of higher levels of physical activity.

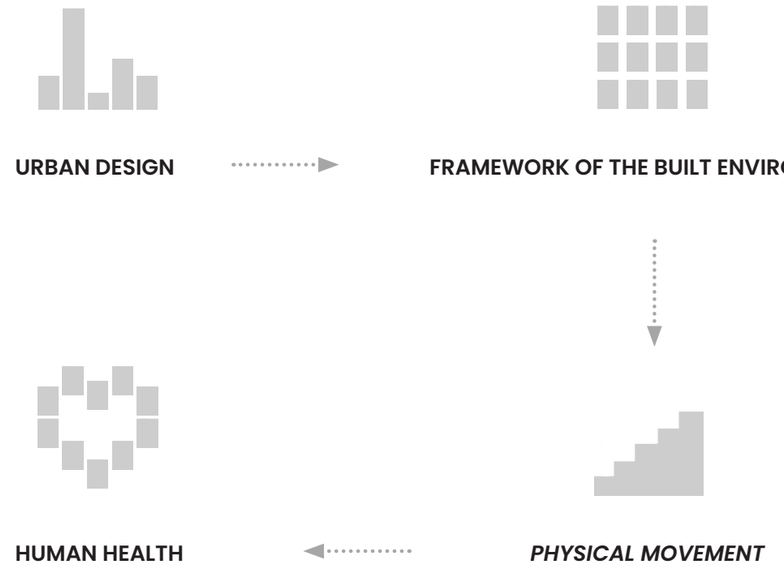


Figure 1: Movement Diagram.
(Produced by Author)

Problem Statement & Architectural Focus

Cardiovascular disease ranks as the third leading global cause of mortality, exacerbated by sedentary behavior and lifestyle choices (American Heart Association, AHA). In an era marked by urbanization and with the majority of our daily lives confined within buildings, it is paramount to explore how the built environment can serve as a vital agent in alleviating the risks associated with this global health crisis. This entails not only addressing physical activity but also promoting mental wellness, as the implications of chronic diseases on mental health are increasingly recognized.

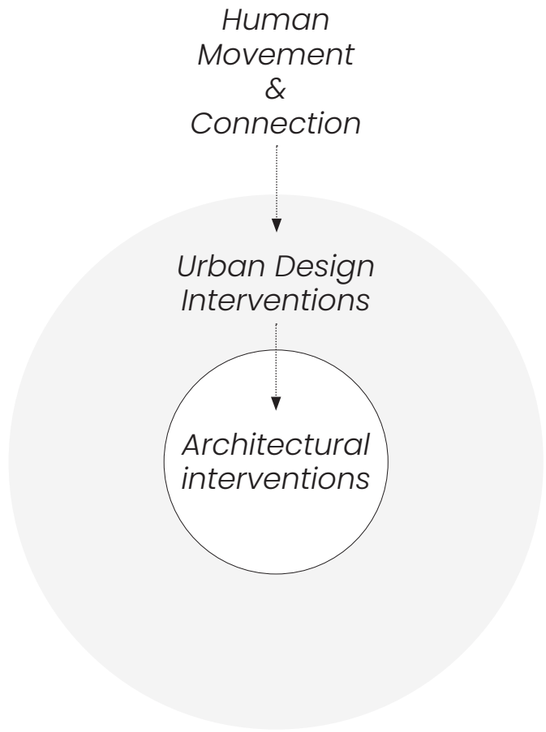


Figure 2: Factors affecting movement and connection.
(Produced by Author)

The Path of least Resistance

A brief history on the emergence of the first urban environments

Figure 3: The Path of Least Resistance, Human and Animal Trail.
(Source: Tenesse Valley Authority, Image from website, Available: https://www.tva.com/environment/recreation/small-wild-areas, Accessed 19 June 2023)

This section of the paper briefly examines the events in human history which lead to the formation of the first cities and urban centers. It briefly investigates the shift from hunter-gatherer lifestyles to that of agriculturalists. The aims of this section is to lay the foundation for the following studies which highlights how modern humans have become increasingly distant from the physically active and nature-connected beings we evolved to be due to processes of industrialization and modernism.

Humanity has long exhibited an inherent drive to follow the path of least resistance as a means of conserving energy. This instinctual behavior can be traced back to the early days of human existence when our ancestors lived as hunter-gatherers. In this nomadic lifestyle, early humans roamed across diverse landscapes, seeking food, water, and shelter in an energy-efficient manner (Fernández-López de Pablo, J. et al., 2020). However, a significant turning point occurred with the discovery and adoption of agricultural practices, which revolutionized human settlements. The transition from a hunter-gatherer lifestyle to settled agricultural communities allowed humans to establish permanent dwellings and cultivate crops (Cribb, J. 2018).

This fundamental shift enabled early humans to settle in one place, as the cultivation of crops provided a reliable and steady food supply. With the stability and surplus of resources, the human population began to increase, leading to the development of the first cities and the concentration of mass amounts of people within close proximity to one another (Wilkinson, T. J. 2017). As agricultural practices facilitated larger populations, the benefits of living in close quarters, such as social interaction, economic exchange, and shared resources, became apparent (Scott, J. C. 2017). This marked the birth of urbanization, with cities becoming centers of innovation, cultural exchange, and human development (Jacobs, J. 1969). The development of urban centers occurred within a remarkably short period of time when considering the vast duration of human history spent living as hunter-gatherers. This rapid transformation highlights humanity's capacity to alter the state of our natural world.

To understand the stark contrast between our evolutionary heritage and the modern urban dweller, we can examine the lifestyles of the San Bushman of Southern Africa. The San Bushman, who have retained aspects of the hunter-gatherer lifestyle, provide a valuable reference point. Their daily lives are characterized by constant physical activity, including hunting, gathering, and

traversing the natural landscape (Pontzer, H. et al., 2016). In contrast, modern city dwellers find themselves in highly structured urban environments where physical activity is often limited due to sedentary work and reliance on transportation systems that prioritize convenience over active mobility (Owen, N. et al., 2010). These hunter-gatherer groups walk an average of 12-16 kilometers per day to collect water and food (Gurven, M., et al., 2010). This forms a compelling disparity to the average person living in a city, who walks about 0.6 kilometers per day (Brownson, R.C., et al., 2005).

In 2014, The John Hopkins University School of Medicine conducted a study involving high-resolution imaging of bone joints from modern humans, chimpanzees, and fossils of extinct human species. The findings revealed that extinct humans maintained high bone density for millions of years, which only significantly decreased in recent modern humans. This research, published in the Proceedings of the National Academy of Sciences, indicated that the decline in bone density was more prominent in the lower limbs compared to the upper limbs. This suggests that the transformation is linked to the shift in modern humans' lifestyle from a foraging way of living to a sedentary, agricultural one (Ryan, T.M., et al., 2014).

In today's world, driven by convenience, humans have gradually distanced themselves from the physically active and nature-connected beings we evolved to be. This growing gap between our ancestral lifestyles and modern urban living emphasizes the importance of reassessing our built environments and advocating for designs that foster active lifestyles, promote connectivity with nature, and enhance overall well-being.

6% - *The percentage of our existence as homo sapiens spent in urban environments.*

25% - *The decrease in bone density we've undergone since living in urban environments.*

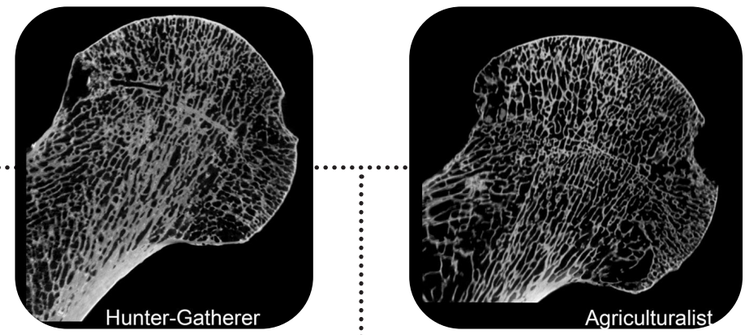


Figure 3.1: Bone Density Comparison
(Source: https://www.researchgate.net/figure/Cross-sectional-slice-through-the-a-orangutan-femoral-head-and-b-human-femoral-head_fig2_268452577, Accessed 19 June 2023)

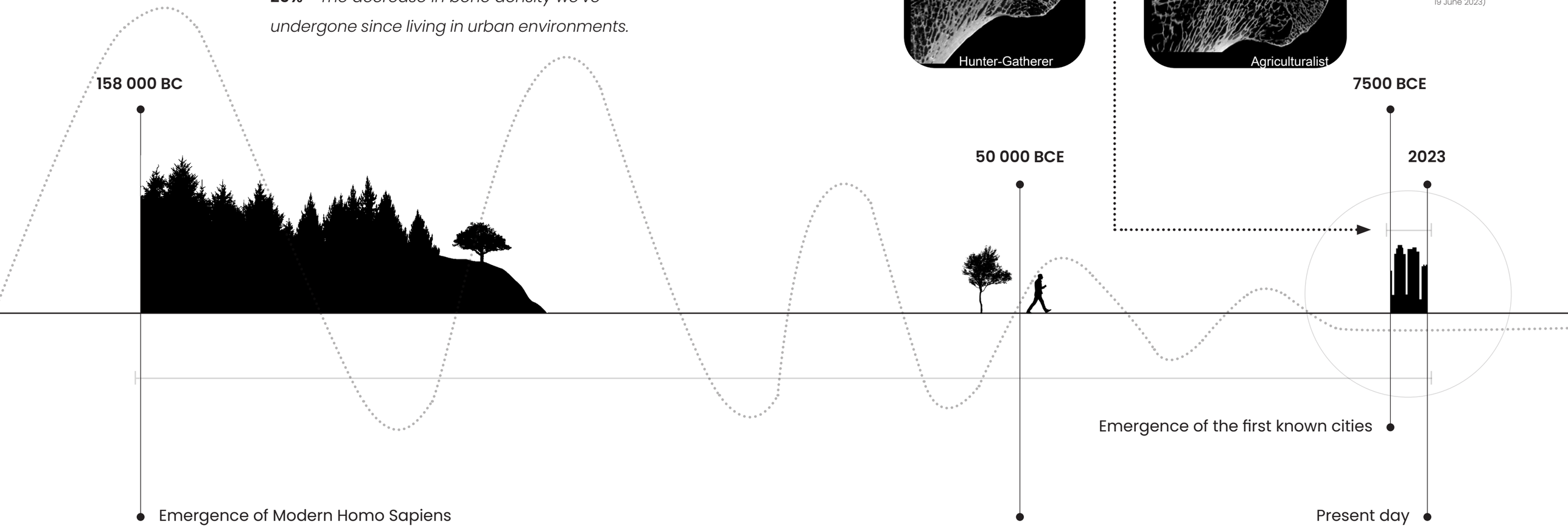


Figure 3.2: Timeline Home Sapiens
(Produced by Author)

The Lifestyle of least Resistance

The modernist movement as a dictator in shaping human behavior in urban spaces

Figure 4.1: Pedestrians walking through streets of New York.
(Source: Gopnik, A. 2015. Naked Cities: The death and life of urban America. *The New Yorker*. Available: https://www.newyorker.com/magazine/2015/10/05/naked-cities, Accessed 19 June 2023)

This section of the paper delves into the inclination of humanity to gravitate towards the path of least resistance, particularly during the process of modernization. Building upon prior discourse that centers on the genesis of urban hubs, this section aims to explore the exacerbation of detachment between urban dwellers and their ancestral ways of life brought about by modernization. It investigates the potential impact of modernist urban design principles on human behavior by imposing constraints and limitations on patterns of movement.

Informed by the reading on 'Architecture Facing Modernity' by Hilde Heynen's critique of modernism (1999), the study aims to emphasize the elements and factors which have influenced the behaviors and lifestyle decisions of present day urban populations within the Global South and that of South Africa.

During the first half of the nineteenth century, a significant division emerged between modernity as a historical stage characterized by scientific and technological progress, industrialization, and capitalist-driven socioeconomic changes, and modernity as an aesthetic concept (Heynen, H. 1999). The relationship between these two modernities has been marked by hostility, but it has also given rise to mutual influences that have shaped their respective trajectories.

Western modernity, as a concept, embodies a break from tradition and represents a departure from the past, driving towards a future defined by its unique qualities. While modernity has introduced innovations that have undoubtedly improved convenience and efficiency, it has also had profound effects on our lives and identities as a civilization. The modernist movement in architecture, shaped by influential figures such as Le Corbusier, Walter Gropius, and Ludwig Mies van der Rohe, has played a pivotal role in transforming the design of our cities and architectures of today (Heynen, H. 1999).

Le Corbusier, an influential pioneer of modern architecture, advocated for functionalism, rationality, and standardization. In his writings, such as "Towards a New Architecture (Le Corbusier. 1923)," he compared war to an insatiable client, always demanding better and driving innovation in design. Le Corbusier viewed houses as "machines for living" and called for a rational approach to architecture, arguing that the problem had not been adequately addressed in the field.

Walter Gropius, through the Bauhaus movement, emphasized the integration of art, craft, and technology in architecture. He advocated for the use of standardized industrial materials and modular design principles to create affordable and accessible housing. Gropius prioritized simplicity, functionality, and the elimination of unnecessary ornamentation in his approach (Heynen, H. 1999).

Ludwig Mies van der Rohe embraced minimalism, epitomized by his philosophy of "less is more." His designs emphasized clean lines, open spaces, and the use of industrial materials like steel and glass. Mies aimed to create spatial experiences that evoked a sense of calm and clarity, relying on simplicity and modern construction techniques (Heynen, H. 1999). While these modernist architects' theories and practices transformed the way individuals interacted with their surroundings, they also tended to dictate how modern individuals should live and behave. Le Corbusier's vision of the Radiant City, for example, aimed to address urbanization and mass housing challenges through efficient organization, functionality, and the separation of functions using high-rise buildings and extensive green spaces. However, the resulting urban fabric often hindered social interaction and community cohesion (Fishman, R. 1982).

The city of Brasília provides an example of the challenges and limitations associated with the implementation of a modern utopian vision. The city planner, architect Lúcio Costa, took the approach of designing its conformity not with its environment but with those modernist utopian theories of the rational, sterile "Radiant City" as proposed by Le Corbusier. (Schwarz, B. 2010).

The rigid zoning and separation of functions, characteristic of modernist urban planning, created a fragmented urban fabric that hindered social interaction and walkability. The vast distances between residential, commercial, and administrative areas fostered a car-dependent city with limited accessibility

Figure 4.2: Desire lines across the city of Brasilia.
(Source: Hasan, D. 2009. Re-inventing Brasilia: making it more pedestrian-friendly. *Ideas inspiring innovation*. Available: https://https://ideasinspiringinnovation.wordpress.com/2009/11/24/re-inventing-brasilia-making-it-more-pedestrian-friendly/, Accessed 19 June 2023)

and mobility options in which the body remains sedentary (Maricato, E. 2001). The reliance on private automobiles, coupled with the lack of comprehensive public transportation systems, contributed to issues of traffic congestion, pollution, and social exclusion (Smith, A. 2012). Additionally, the monumental architecture of Brasília, while visually impressive, often failed to prioritize human scale and the creation of comfortable, livable spaces that enhance the well-being of its occupants (Holston, J. 1991).

The disconnect between modernity and our relationship with nature, traditions, and culture is further exacerbated within the framework of modernism. Architecture must acknowledge and confront the resulting sense of alienation and unease (Heynen, H. 1999). In the case of Brasília, the architecture itself governs movement, inhibiting the organic relationship between occupants and

their surroundings. This rigidity is evident in desire lines created by pedestrians seeking the most direct route between points, exposing deficiencies in pedestrian infrastructure and highlight the need for improved sidewalks, crossings, and other elements of the pedestrian environment (Ross, K.D. & Lowry, M.B., 2012; Waters, N.M., 2017). These pathways are socially constructed by the logic of efficiency and discovery, reflecting a social act of solidarity with other users of space (Smith, A.L., et al., 2017).

The dominance of car-centric design and the separation of functions in modernist cities like Brasília have resulted in significant distances between residential areas, commercial centers, and public amenities. The lack of interconnected street networks and mixed-use developments has hindered pedestrian-friendly environments, making walking impractical and inconvenient (Gehl, J. 2010). This car-oriented approach is not unique to Brasília; it is a recurring phenomenon observed in many modernist-influenced cities across the global south, further exacerbating a lack of public spaces conducive to walking and social interaction (Hillier, H. 1996).

In Southern Africa, particularly in South Africa, cities have been shaped by the combination of modernist planning principles and historical practices of segregation and access control. European powers imposed their urban planning principles and spatial ideologies during the colonial era, leading to the development of racially segregated townships and cities. Spatial control over group interaction and racial control was exercised through the Group Areas Act (1950) and its amendments. As illustrated in figure 4.3, cities within South Africa were developed using a conceptual model of a mono-centered, commercial-industrial segregated city.

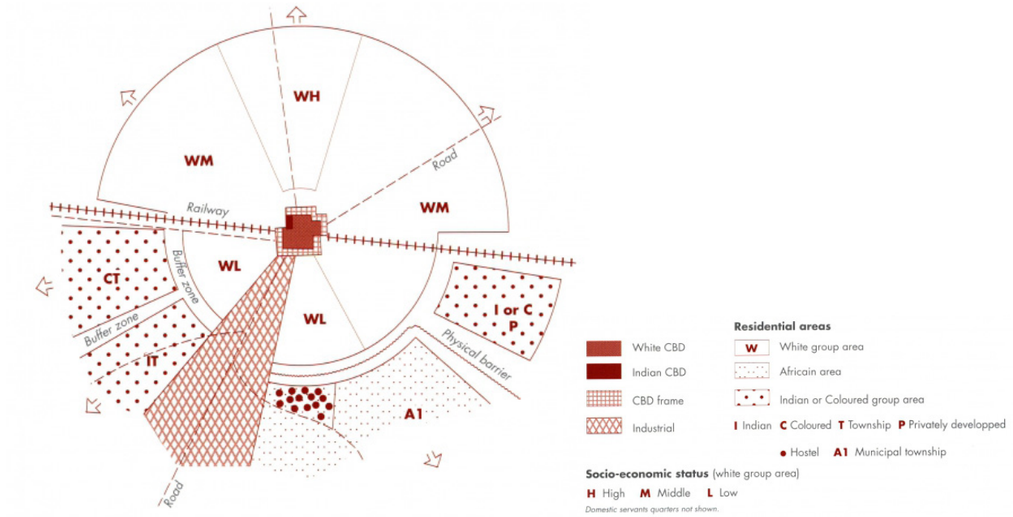


Figure 4.3: Segregated City Concept Model.

(Source: R.J. Davis, 1981. Figure 9 – The model of the apartheid city according to Davies, Available: https://books.openedition.org/irdeditions/1807, Accessed 19 June 2023)

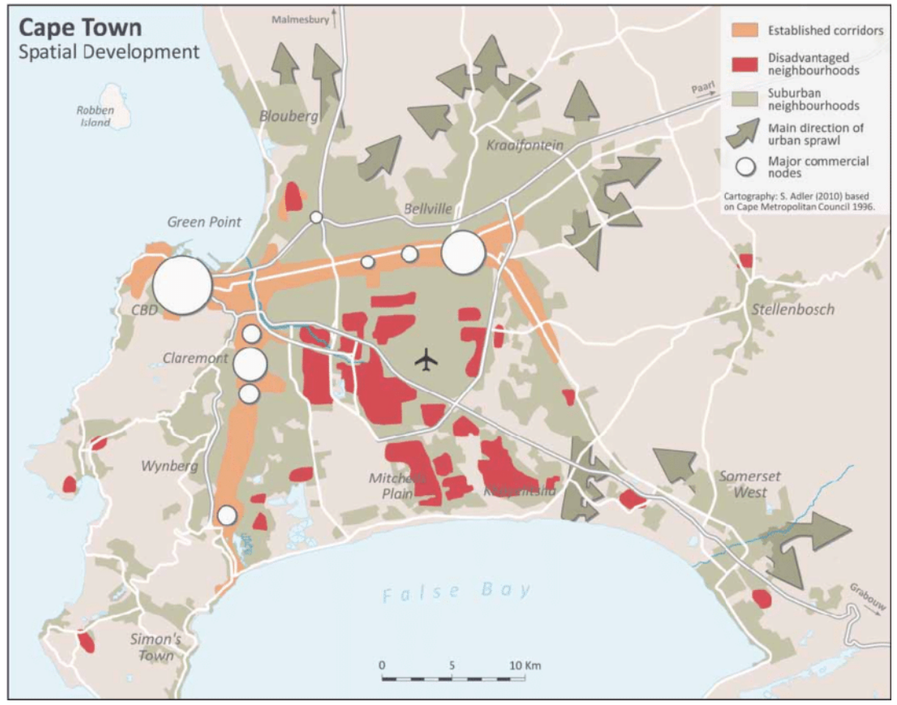


Figure 4.4: City of Cape Town Spatial Development.

(South Africa under FIFA's reign: The World Cup's contribution to urban development - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Map-showing-Cape-Towns-spatial-structure-and-directions-of-urban-growth_fig3_233013366 [accessed 23 Jul, 2023])

Rapid urbanization, population growth, and economic forces further influenced the development of these cities, often resulting in informal settlements and inadequate infrastructure (Vargas, J.R., 2003; Akinbode, A.F., 2016). Additionally, globalization, modernism, and neoliberalism have introduced concepts like urban renewal, privatization, and gated communities, leaving a lasting impact on the spatial organization, infrastructure, and socio-spatial dynamics of Southern African cities (Dahiya, S. & Srinivasan, S. 2020).

Figure 4.4 demonstrates a spatial development map of the city of Cape Town, clearly illustrating the established corridors which circulates into the city center, and how this becomes interwoven with suburban areas, excluding disadvantaged neighborhoods from major commercial nodes. The urban development of Cape Town presents a compelling case study that elucidates the challenges associated with planning policies and issues in fostering a walkable city in South Africa. Cape Town faces a variety of challenges related to accessibility and inclusion, not only due to historic segregation and its economic factors, but due to geographic location, all of which hindering the creation of a pedestrian-friendly environment. The historical context, natural barriers, and urban planning choices have played a significant role in shaping the city's current state and the lifestyles of its inhabitants.

The division between modernity as a historical stage and modernity as an aesthetic concept has shaped the trajectory of Western civilization. Modernist architects have played a crucial role in transforming the design of cities and structures, emphasizing functionality, rationality, and simplicity. However, the implementation of modernist urban planning principles has resulted in challenges such as social fragmentation and car dependency. This disconnect from nature, traditions, and culture within the framework of modernism has exacerbated the sense of alienation and unease experienced in modern societies. To address these issues, urban planning needs to adopt a more nuanced approach that integrates social, environmental, and human-centric considerations, moving beyond purely aesthetic and functional aspects.

Infrastructure as an Obstacle: Learning from townships

There lies an important disparity to note between demographics within the population. South African cities, like many others in the Global South, have experienced rapid urbanization and population growth within a rather short period of time, leading to increased demand for public transportation (Vargas, C., 2003). However, the development of comprehensive and efficient public transport systems has often lagged behind, leaving residents with limited options and resulting in extensive walking distances between transport nodes. This lack of proper infrastructure has contrastingly forced people to traverse long distances on foot, leading to issues of physical strain, reduced accessibility, and limited mobility for many inhabitants (Akinbode, O. O., 2016).

While physical movement is an important aspect of our daily lives, the reality for many South Africans are the divided economic opportunities which forces a majority of the population to rely on walking great distances between public and informal transportation opportunities due to lack of alternatives. This situation contrasts significantly with urban inhabitants in the Global North, where cities and spaces are thoughtfully designed for the human scale (Gehl, J., 2010). This requires for the implementation of strategies for active transportation which involves a thoughtful understanding of the local context, the needs of the community, and a balance between convenience and human scale.

Interestingly, the development of townships and informal areas which exists outside of the commercial districts of the city can provide valuable insights into creating walkable, social, and communal environments for inhabitants. The organic growth of these townships has often been a result of community-driven initiatives and adaptive responses to the specific needs and cultural context of the residents (Franco, M., 2018). By studying how townships have evolved through incremental development and communal efforts, urban planners and architects can gain inspiration from the inherent social cohesion and sense of

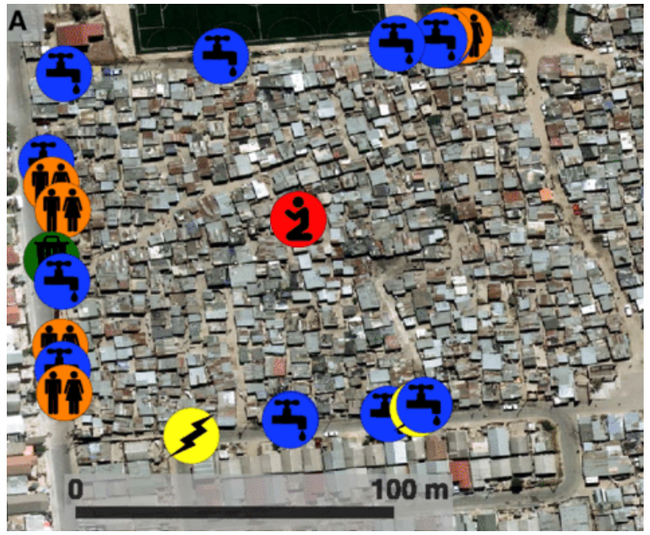


Figure 4.5: Khayelitsha neighborhood topology.
(Source: Toward cities without slums: Topology and the spatial evolution of neighborhoods - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Neighborhood-topology-and-the-access-networks-of-informal-settlements-A-An-informal_fig2_327291737 [accessed 23 Jul, 2023])

belonging that have naturally emerged over time which was often overlooked in modernist urban planning initiatives.

Embracing the local knowledge and cultural values present in the organic development of townships allows for the co-creation of spaces that reflect the unique identity and aspirations of the community (Carmona et al., 2010). By promoting walkability, social interactions, and community engagement, urban planners and architects can move away from the prescriptive nature of modernist planning and foster a more people-centered approach to urban design. A study was done by Christa Brelsford et al. in "Toward cities without slums: Topology and the spatial evolution of neighborhoods" which highlights the neighborhood topology and the access networks of Khayelitsha, a township in Cape Town, South Africa (Figure 4.5).

Like many informal settlements, essential city services like electricity, water, toilets, and waste collection (represented by yellow, blue, orange, and green symbols, respectively) are situated solely along the existing roads at the edges

of the block. In contrast, community-generated public areas, such as religious and community centers (depicted in red), are positioned closer to the center of the block (Bresfold, C. 2018). The interconnectivity of Khayelitsha was compared in relation to topology of places and city block complexity. This was done through examining the schematics of city blocks and its characterization in terms of a hierarchy of movement in the form of weak dual graphs. Whilst the study itself analyzes these contextual scenarios in greater depth, the purpose of this reference highlights the interconnectivity which exists in the relationship between organic settlement design and that of modular city grids. Figure 4.6 demonstrates the spatial relations of Khayelitsha, whilst figure 4.7 illustrates the street layouts of a neighborhood in New York City, Prague, and Harare. Interestingly, the movement network of Khayelitsha exists purely on the basis of walking. Car dominant neighborhoods, characterized by high-speed vehicular traffic, tend to prioritize efficiency and convenience. Conversely, walkable spaces encourage pedestrians to navigate at a slower pace, fostering a more intimate connection with the surrounding environment and affording opportunities for spontaneous social encounters (Gehl, J., 2010). The interplay between movement speed and social interaction could be what lies at the heart of urban design, influencing the degree of connectivity and community engagement within neighborhood spaces. The increased movement speed of vehicles creates physical barriers and disconnection between neighboring areas, making it challenging for residents to interact organically. Additionally, the slower pace of walking allows for a conducive environment for eye contact, greetings, and casual conversations, contributing to a heightened sense of social cohesion and community identity (Jacobs, J., 1961).

It becomes evident that embracing the diversity and cultural richness of communities, alongside thoughtful urban interventions, can pave the way for the development of resilient and socially cohesive neighborhoods that enhance the quality of life for their inhabitants. The examination of movement speed and its impact on societal interconnectivity is vital in creating urban environments

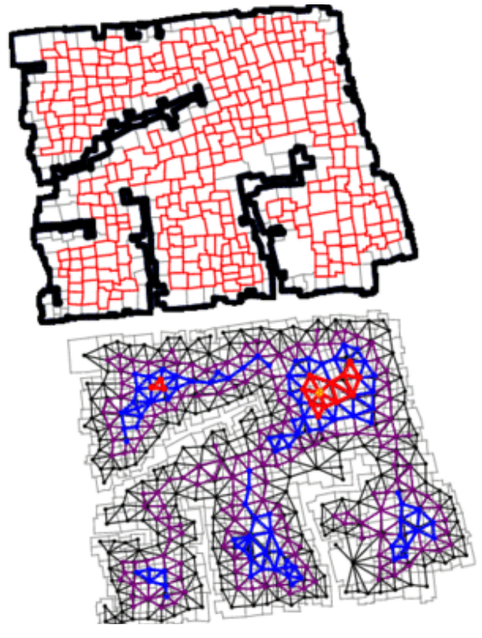


Figure 4.6: Khayelitsha movement network.
(Source: Toward cities without slums: Topology and the spatial evolution of neighborhoods - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Neighborhood-topology-and-the-access-networks-of-informal-settlements-A-An-informal_fig2_327291737 [accessed 23 Jul, 2023])

Figure 4.7: New York, Prague, Harare movement network.
(Source: Toward cities without slums: Topology and the spatial evolution of neighborhoods - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Neighborhood-topology-and-the-access-networks-of-informal-settlements-A-An-informal_fig2_327291737 [accessed 23 Jul, 2023])

that foster a strong sense of community and belonging. The contrasting social dynamics observed in car dominant neighborhoods and walkable spaces emphasize the significance of designing for slower movement speeds to promote social cohesion. However, the interconnectedness of these spatially segregated areas within the context of the city of Cape Town remains a prevailing issue which needs to be addressed by urban planners and architects.

The purpose of this section was to highlight the factors which have contributed to movement and accessibility restrictions in cities of the Global South in order to formulate an understanding of the complexities which exist in transforming urban environments to be more pedestrian friendly. Addressing the issues of movement around cities for the sake of increasing activity levels have proven successful in multiple cities from the Global North.

However, because of infrastructure constraints, segregated zoning areas, and lack of mixed-use developments within cities from the Global South, specifically South Africa, this paper continues the exploration of sedentary behaviors at a more intimate, architectural scale. By taking the approach of analyzing where individuals spend most of their time, the following section “The workplace of least resistance” examines the modern day workplace, and the factors which has influenced the behaviors within these spaces.areas within the context of the city of Cape Town remains a prevailing issue which needs to be addressed by urban planners and architects.

The purpose of this section was to highlight the factors which have contributed to movement and accessibility restrictions in cities of the Global South in order to formulate an understanding of the complexities which exist in transforming urban environments to be more pedestrian friendly. Addressing the issues of movement around cities for the sake of increasing activity levels have proven successful in multiple cities from the Global North.

However, because of infrastructure constraints, segregated zoning areas, and lack of mixed-use developments within cities from the Global South, specifically South Africa, this paper continues the exploration of sedentary behaviors at a more intimate, architectural scale. By taking the approach of analyzing where individuals spend most of their time, the following section “The workplace of least resistance” examines the modern day workplace, and the factors which has influenced the behaviors within these spaces.

The Workplace of least Resistance

The repercussions of Modernist workplace environments and layouts

Figure 5: Office design in the late to contemporary period.
(Source: Si, S. 2014. How Office Design Has Changed Over the Years. Available: https://workplays.ph/blog/office-design-changed-years/, Accessed 19 June 2023)

Corporate buildings are regarded as the least active, most sedentary spaces within the built environment. This section of the paper investigates the least active environment which exists within modernist-influenced cities, and the influences which played a part in shaping their design outcomes, and how this might have influenced its users.

The influence of the modernist movement has been profound, shaping the built environment in numerous ways. However, amidst the sleek lines, minimalist aesthetics, and functional efficiency of modernist office design, a concerning issue has emerged: the repercussions on occupant health and well-being. One specific consequence of modernist office design that warrants investigation is its contribution to the sedentary behavior and inactivity prevalent among office workers. This section seeks to explore the relationship between modernist office design and the rise of sedentary behavior, with a particular focus on the concept of sick building syndrome. By examining the principles of modernist design and their impact on occupant activity levels, this study aims to shed light on the need for a reevaluation of office design paradigms in order to foster healthier and more dynamic work environments.

The concept of sick building syndrome (SBS) provides an important framework for understanding the adverse effects of modernist office design on occupant health. SBS refers to a range of symptoms experienced by individuals who occupy a specific building or space, typically office environments, and cannot be attributed to any specific illness or cause (Eisenberg, A. J. 2008). These symptoms may include fatigue, headaches, respiratory issues, and a general sense of discomfort among occupants. While the exact causes of SBS are multifactorial and can involve factors such as indoor air quality and lighting, the design of the built environment itself plays a significant role in influencing occupant well-being (Norberg-Schulz, C.1985). Modernist office design, with its emphasis on efficiency, uniformity, and standardized layouts, has inadvertently contributed to the development of SBS symptoms. The open-plan layouts and minimalist aesthetic, characteristics of modernist design, have led to a reduction in spatial differentiation and the incorporation of fewer opportunities for physical movement (Duffy, F. 2014). The absence of designated spaces for physical activity and limited access to daylight and nature, in combination with the often monotonous and repetitive nature of office work, have fostered a sedentary culture.

Driven by convenience and aided by technological advancements, Modernist Architecture has created a lifestyle of comfort and ease for the urban population (Hall, E. E. et al., 2018). However, this pursuit of convenience now has unintended consequences in architectural design choices and workplace culture, rendering these spaces among the least active (Hall, E. E. et al., 2018). The advent of elevators, air conditioning, and computer technology coincided with this architectural movement, transforming the design and operation of commercial buildings (Heinonen, J. et al., 2017). Tall office towers emerged, accommodating the growing urban workforce in dense areas. However, their layouts often prioritize efficiency and collaboration over physical movement (Patterson, R. et al., 2018). Open-plan spaces, minimal partitions, and hierarchical workstations aimed to foster connectivity and efficiency but neglected privacy, individual focus, and ergonomics (Francis, R., 2019; Evans, M., 2003).

Modernist architecture and its associated office building layouts have received substantial criticism within architectural theory, theorists Robert Venturi and Denise Scott Brown challenged the prevailing modernist principles by offering insightful perspectives, advocating for an approach that considers the complexities and contextual nuances of architectural design. In their influential work “Learning from Las Vegas,” (Venturi, R., & Scott Brown, D. 1972) they questioned the simplicity and uniformity of modernist aesthetics, asserting the need for architectural complexity and diversity. According to Venturi and Scott Brown (1972, p. 16), modernist architecture often neglects the human scale, fails to engage with the surrounding context, and overlooks the importance of creating buildings that are visually stimulating and meaningful to people.

They criticized the sterile and generic nature of modernist office layouts, emphasizing the necessity of accommodating individual privacy, human interactions, and ergonomic considerations (Venturi, R. et al., 1977, p. 107). By integrating the ideas of Venturi and Scott Brown, it becomes evident that modernist architecture and office building layouts frequently disregard the rich

tapestry of human experiences, resulting in spaces that prioritize functional efficiency over the well-being and vitality of their occupants.

There were notable architects who influenced modern day office layouts and adopted their own approaches to space making. Frank Lloyd Wright is acknowledged as the pioneer behind the creation of the inaugural commercially successful "Taylorist" office, designed for a mail order soap company in 1904. This office, known as the Larkin Administrative Building, accommodated 1,800 workers who processed 5,000 orders daily, operating within a central open space located at the heart of the building. The concept of the Taylorist office was inspired by the assembly line approach used in factories during that era, where it involved assigning simple, repetitive manual tasks to clerks, executives, and associates from various fields such as law and accounting firms, insurance companies, and government agencies. The objective was to establish a smooth and continuous workflow within these offices (Droste, M., 2002). Mies van der Rohe, another notable architect, showcased his modernist principles of simplicity and functionality in designs like the Seagram Building and the Barcelona Pavilion, utilizing open layouts, flexible spaces, and materials such as glass and steel (Droste, M., 2002). While his designs embraced modernist ideals, the focus on aesthetic simplicity sometimes overshadowed the consideration for human well-being, as critiqued by Robert Venturi and Denise Scott Brown.

During the 1950s, corporate America played a significant role in shaping modernist architectural movements, particularly in New York, where meticulous control over details, including room temperature, became a prominent aspect (Franco, F.M., 2018). The emphasis on controlling environmental factors sometimes compromised the comfort and well-being of the office occupants.
In Germany, the Bürolandschaft ideology, introduced by the Schnelle brothers in the 1960s, emphasized the creation of large and cohesive spaces based on an open-plan layout, strategically allocating appropriate areas within the space (Ward, S. V., 2016). This approach, influenced by a nuanced understanding of human relations and contrasting with the Taylorist approach, aimed to enhance collaboration and social dynamics among the workforce.

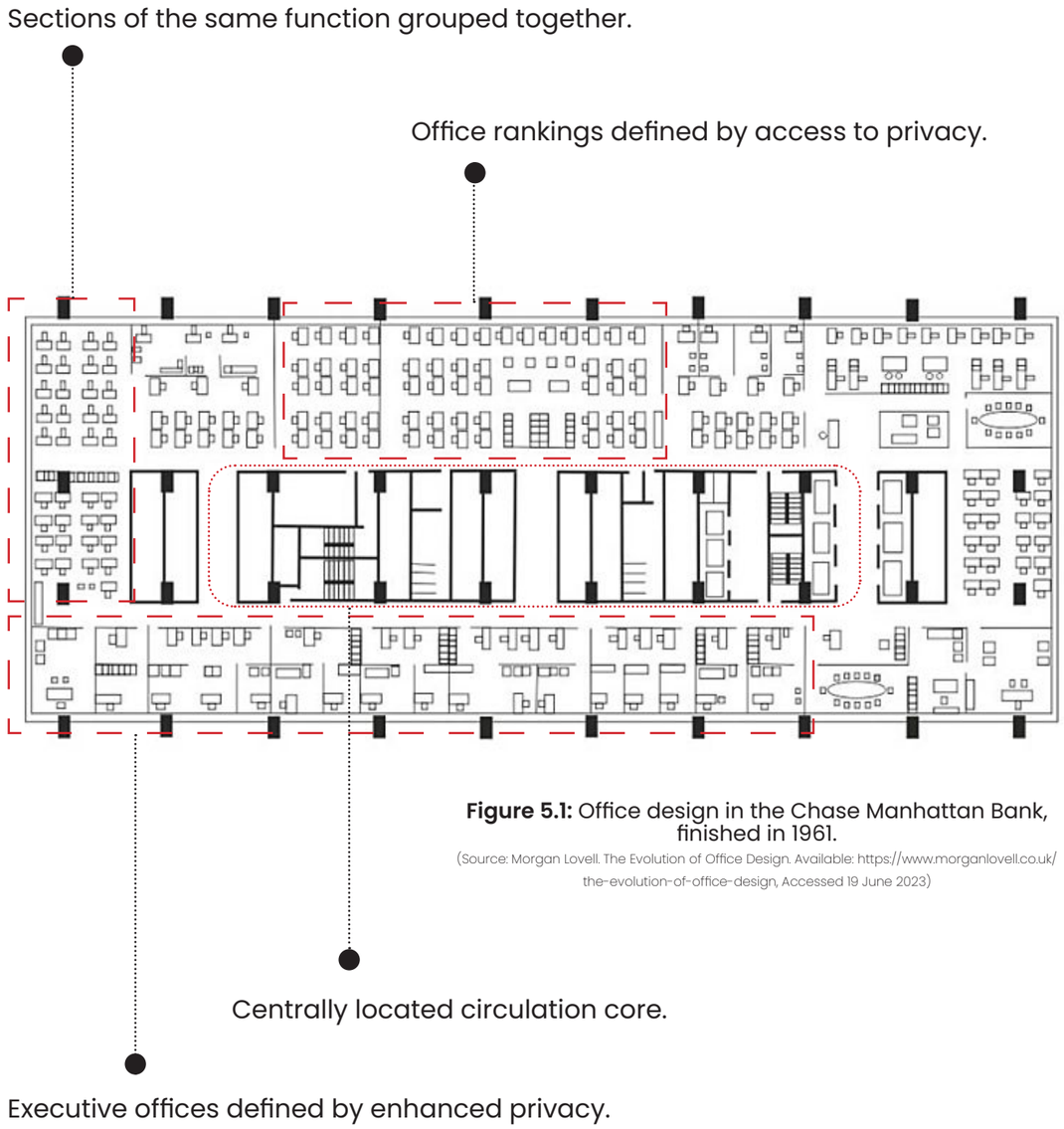


Figure 5.1: Office design in the Chase Manhattan Bank, finished in 1961.
(Source: Morgan Lovell. The Evolution of Office Design. Available: https://www.morganlovell.co.uk/the-evolution-of-office-design, Accessed 19 June 2023)

The 1960s witnessed design schemes like Action I & II, drawing inspiration from artists such as Andy Warhol and Roy Lichtenstein. These schemes featured communication-oriented stations within small co-working spaces (Franco, F.M., 2018). However, this shift towards more private spaces and individual focus resulted in a potential lack of social interaction and reduced physical movement around the building.

During the 1960s to 1970s, the European Structuralist Office adopted an anthropological perspective, creating a culturally organic "working village" structure that fostered a sense of community without displacing individuals (Ward, S. V., 2016). This approach, illustrated in figure 5.3, prioritized human connection and interaction, aiming to provide a balance between privacy and collaboration.

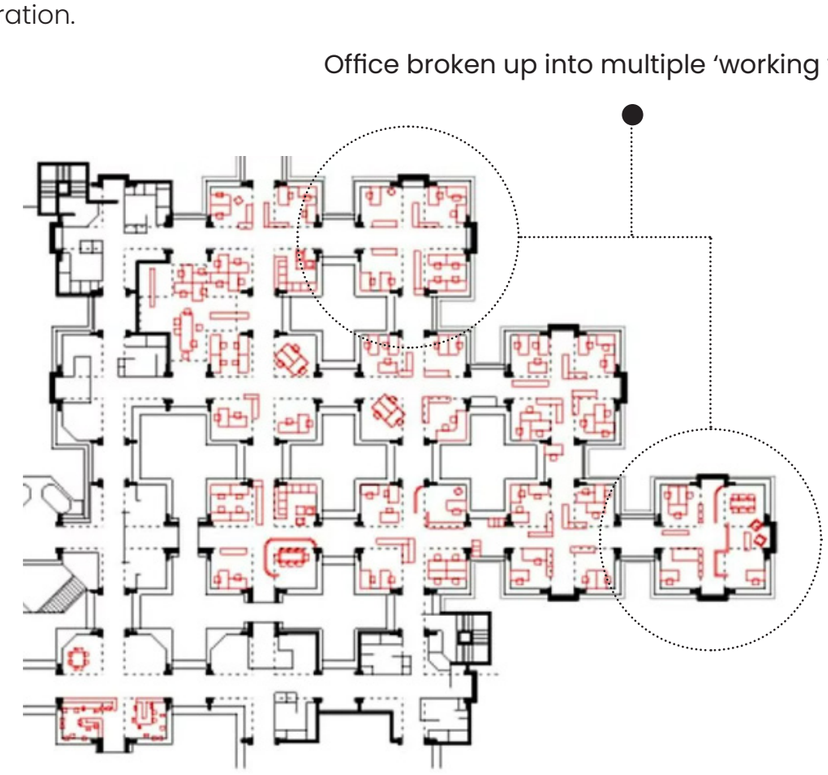


Figure 5.3: Structuralist Office Design in Herzberger's Centraal Beheer.
(Source: Morgan Lovell. The Evolution of Office Design. Available: https://www.morganlovell.co.uk/the-evolution-of-office-design, Accessed 19 June 2023)

However, towards the late 1970s, a notable rejection of the Bürolandschaft approach occurred in Continental European, British, and American offices. The preference shifted towards smaller groups, secluded workstations, and more private areas (Franco, F.M., 2018). This change in office design reflected a growing recognition of the need for individual focus and privacy as suggested by the writings of Robert Venturi and Denise Scott Brown.

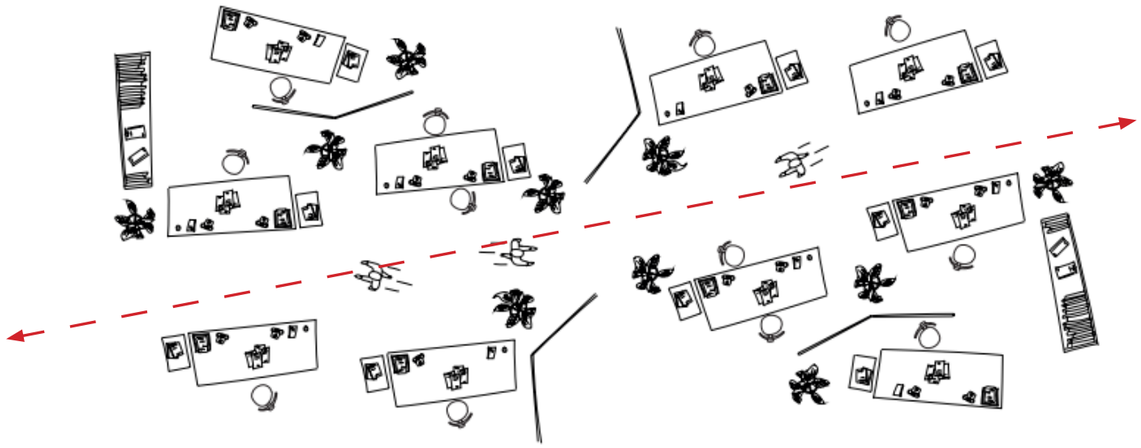


Figure 5.2: Bürolandschaft office concept.
(Source: Morgan Lovell. The Evolution of Office Design. Available: https://www.morganlovell.co.uk/the-evolution-of-office-design, Accessed 19 June 2023)

Furthermore, the 1980s witnessed a significant shift through the emergence of the "Cubicle Farm", introducing layouts that emphasized more private spaces for individual focus and increased productivity (Francis, R., 2019). This design approach coincided with the integration of desktop computers and laser printers, which became ubiquitous in office settings (Francis, R., 2019). The adoption of this approach, while enhancing productivity, further contributed to sedentary behavior and reduced physical movement.

Christopher Alexander, in “A Pattern Language,” emphasizes the importance of creating environments that promote human well-being and foster a sense of community. Alexander (1977, p. 9) criticizes the monotonous and homogeneous nature of modernist office layouts, especially after the emergence of the ‘cubicle’, asserting that they lack the essential qualities that make spaces truly livable and meaningful. The introduction of open-plan workspaces, cubicles, and enclosed offices in the modernist era significantly limited the circulation of building occupants.

Moreover, the prevalence of sedentary work tasks, such as computer-based work, further intensified the sedentary environment within the workforce (Chau, J. Y., et al., 2015). The convenience offered by technology within the office, such as email, teleconferencing, and online document sharing, reduced the need for face-to-face interactions, resulting in decreased interpersonal meetings and the need to move around for engagement.

Since the 1990s, corporate culture has undergone further transformation, with greater emphasis on social and collaborative endeavors as key drivers of success (Francis, R., 2019). Technological advancements have played a central role in shaping the layouts of offices, leading to the proliferation of hot-desking, in addition to the creation of multi-purpose meeting spaces (Francis, R., 2019).

The contemporary office setup, with its emphasis on a largely inactive way of life, carries significant implications for individual well-being and health. The extended periods of sitting associated with this lifestyle have been closely associated with various health hazards, such as obesity, heart diseases, and musculoskeletal issues (Thorp, A. A., et al., 2012). Furthermore, the sedentary habits also cast adverse effects on mental health, work productivity, and overall life quality (Hall, E. E., et al., 2018). For a majority of city dwellers working in towering commercial and office complexes, the challenge of maintaining an active and healthy routine amidst the pressures of work and convenience is steadily increasing.

The introduction of technological innovations, traceable back to the modernist movement’s embrace of new technologies and materials, has further shaped these sedentary environments within the realm of architecture (Hall, E. E., et al., 2018). It has become increasingly important to consider design interventions in the form of an architectural response to combat the rise of chronic diseases as a direct result of sedentary behavior.

Christopher Alexander emphasizes the paramount importance of designing environments that prioritize human well-being and foster a strong sense of community (Alexander, C., et al., 1977). According to Alexander, the key to achieving this lies in understanding the inherent connection between the physical environment and human experience (Bodnar, G., 2012).

Alexander goes on to state that effective space design lies in prioritizing the needs and preferences of the people who use them, fostering their **physical, mental, and social well-being** (Alexander, C., et al., 1977). To realize this vision, Alexander puts forth the idea of “patterns” – fundamental design principles that steer the creation of spaces that are practical, comfortable, and conducive to human interaction (Bodnar, G., 2012). These patterns encompass diverse elements, including the arrangement of buildings, street design, public space creation, and incorporation of natural features (Alexander, C., et al., 1977). By seamlessly integrating these patterns into the urban landscape, architects and city planners can cultivate communities where individuals feel connected, supported, and engaged with their surroundings, thereby enhancing their overall quality of life.

Perceptions of Proximity

Exploring Levels of Intimacy and Horizontal Connections in Architectural Spaces

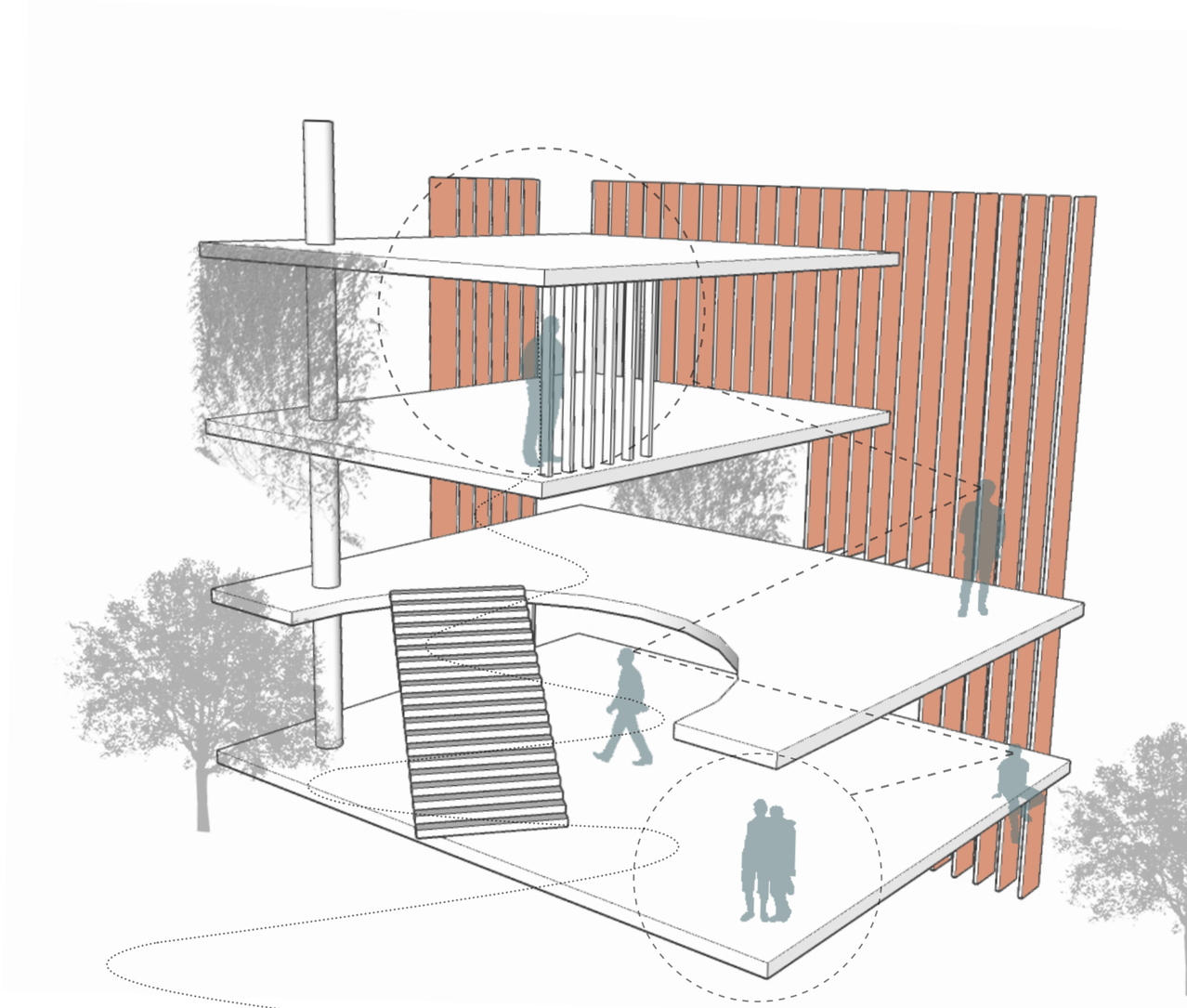


Figure 6: Perceptions of Proximity.
(Drawing by Author)

Layers of Intimacy

Numerous investigations have been dedicated to examining how characteristics of work spaces, such as noise, lighting, air quality, thermal comfort, indoor plants, and workspace arrangement, impact workers' perception, behavior, and productivity. Notably, as traditional enclosed workspaces began giving way to open-plan designs in the 1970s, researchers have honed in on aspects like spatial density, interpersonal distance, and the sense of crowding within the workplace. Several empirical studies indicate that elevated spatial density, limited privacy, and the perception of crowding have adverse effects on workers' satisfaction, health, and performance (Park, S.Y., 2023).

Numerous investigations within the realm of workplace design have explored the ramifications of spatial parameters on the productivity, contentment, and overall well-being of employees. This body of research can be categorized based on whether the primary variable under scrutiny, indicating workspace size, pertains to objectively quantifiable spatial density—measured in square meters — or involves a more subjective evaluation of density, gauged through feelings of crowding (Sundstrom, E., 1978). This is illustrated in the figure below.

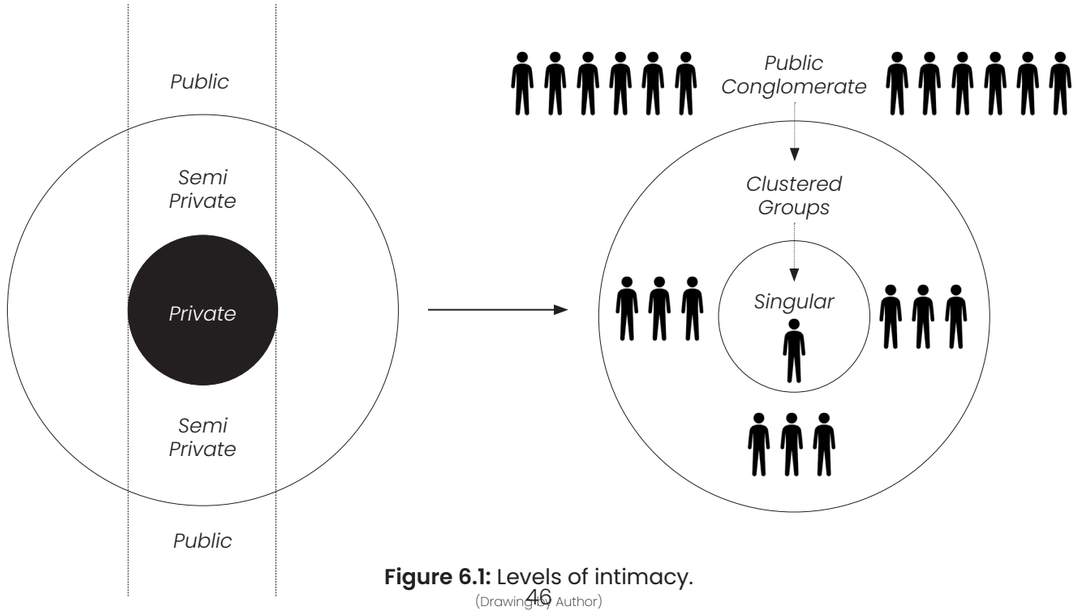


Figure 6.1: Levels of intimacy.
(Drawing by Author)

Elevated spatial density within work environments has been associated with the emergence of feelings of crowding, and this, in turn, is markedly linked to diminished work satisfaction, suboptimal job performance, and an increased likelihood of employees contemplating turnover (Charles, K.E, 2002).
The focus of some researchers has extended to interpersonal distance, with studies by Kraut et al. suggesting that reduced interpersonal distance can augment unnecessary cognitive load during work. Conversely, conflicting research posits that closer proximity among colleagues fosters enhanced communication and collaboration (Kraut, R.E., 2002).

In the examination of spatial openness as a variable indicative of workspace size by Charles K.E at the National Research Council of Canada, this concluded that factors such as the number and height of partitions have been identified as determinants affecting openness and subsequently influencing privacy, distraction levels, and overall satisfaction (Charles, K.E, 2002). A research study conducted by So Yoen Park et. al. at the Department of Urbanism, Faculty of Architecture and the Built Environment, Delft University of Technology makes mention that various scholars have approached the interpretation and definition of crowding in diverse ways, delineating it as social overload, behavior constraint, unwelcome interaction, resource scarcity, and the inability to attain the desired level of privacy. In a conventional office setting, the overarching notion of crowding may manifest through factors such as the physical proximity to co-workers, the burden of unwanted interactions, or the extent of privacy achieved (Park, S.Y., 2023).

An important factor of re-envisioning the design of workplaces involves providing individuals with choice and opportunity, as mentioned before in nudging individuals to be more active. A workplace should provide multiple methods of conducting work, catering to a larger group of individual needs as well as providing opportunities to switch environments based on user needs throughout the day, these environments should house a multi-functional

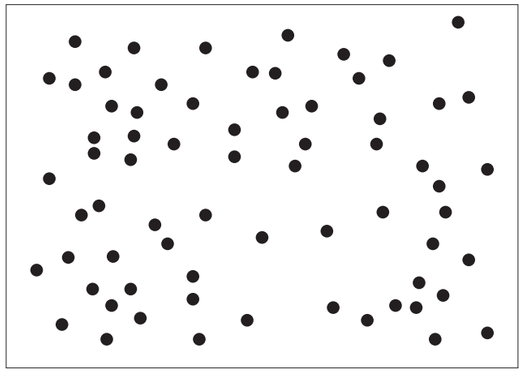
landscape of varying methods to not only conduct work, but engage in other activities which would stimulate users through play and creativity.

A research study conducted by So Yoen Park et. al. at the Department of Furthermore, So Yoen Park et. al. highlighted the importance of providing individuals with a higher number of options rather than a fixed dedicated desk. Although this study looked at mental health and productivity performance in individuals who work from home, the conclusion confirmed that house size and the number of rooms played a more decisive role in determining the satisfaction of individuals rather than the workspace size itself. This was because individuals felt they had the option to move around the whole house and had some form of control towards the amount of crowding within their proximity in addition to switching seating arrangements with ease.

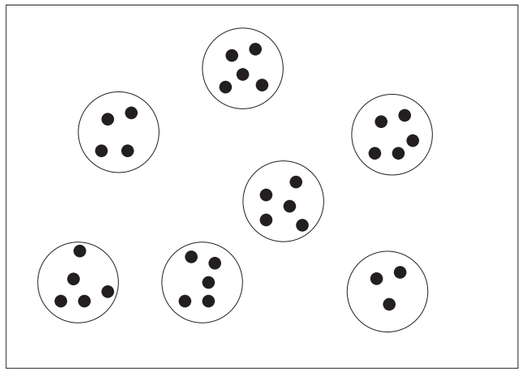
Translating this research of crowding into plan through my own interpretation in workplace design, figure xxx illustrates an environment where individuals are moving freely and organically, to interact with a set of public interventions which exist within the plan. This allows for a larger scale of cross-polination of social interactions to occur within a community environment.

The clustered plan, similar to the 'structuralist office layout' involves grouping individuals together (at their own choice), or creating environments which encourage individuals to group together to perform collaborative tasks. This is done through providing areas within the plan where smaller groups of individuals can congregate together to perform creative, or collaborative tasks, and maintian a level of privacy which is distinguised from the public.

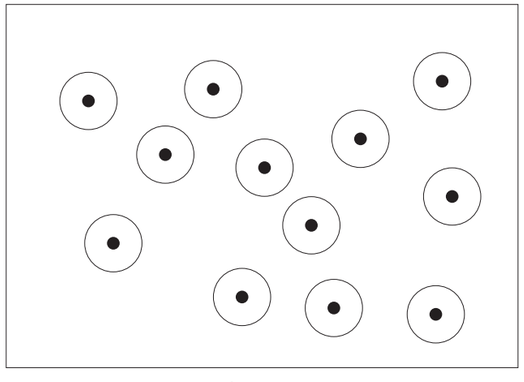
The intimate plan illustrates an environment where the individual is at the center. This allows users to confide in spaces which provides them with a higher sense of privacy within which they can limit social interactions and disruptions, thus, reaching higher levels of focus. An important consideration is that individuals are provided with options, and might seek varying levels of crowded floors dependent on the individual's needs and work that is being carried out.



Public Plan



Clustered Plan



Singular / Intimate Plan

Figure 6.2:
Levels of Crowding.
(Drawing by Author)

On Horizontal Connections

Christopher Alexander delves into the concept of office connections in his work, exploring the correlation between different human groups and how they should be positioned within a spatial framework to design an effective internal layout for a work community. He highlights the use of a proximity matrix in contemporary architectural methods, which assesses the level of interaction between individuals and various functions within an office or hospital space. The idea is that if two areas of an office are too distant, people are less likely to move between them as frequently as required, and if they are situated on different floors, physical communication between them becomes nearly nonexistent. Alexander suggests that these existing methods held to the assumptions that functions or departments which had the most movement between them should be grouped together, and that this concept of placement was completely invalid. This modernist spatial layout was first informed by the Taylorist approach, described by Alexander as, "a kind of Taylorian quest for efficiency". In his work "A pattern language," Alexander expresses the view that a person confined to sitting all day within a building would inevitably feel restless, unable to work efficiently. He emphasizes that optimal productivity is achieved when individuals are in good physical and mental health. Moreover, he argues that it is not just beneficial for one's well-being, but also crucial to provide people with opportunities to break away from their immediate surroundings and experience a change of scenery and atmosphere. Such breaks allow individuals to contemplate matters beyond their current environment, enabling them to reflect on details from their morning's work or ponder everyday human issues encountered in an office setting.

However, when designing office spaces and placing collaborative departments apart, this could likely become a nuisance towards the human groups who require movement and communication between them. The level of perceived effort and convenience is required to balance with individual user's capacity of energy output which determines their willingness to participate. Within Alexander's writings on office connections he puts forward the theory that the nuisance of a walking distance between human groups depends on the relationship between length and frequency. He explains this as "you can walk 10 feet to a file many times a day without annoyance; you can walk 400 feet occasionally without becoming annoyed" (Alexander, C. 1977).

Researchers conducted a study at Berkley City Hall, gathering data from 127 participants. These individuals were asked to describe the routine trips they had to make within their office premises during a typical work week. They were also asked to mention the frequency of these trips and how they were affected by them. Based on this data, a graph was created, displaying the median distances that were considered troublesome for each different frequency of trips.

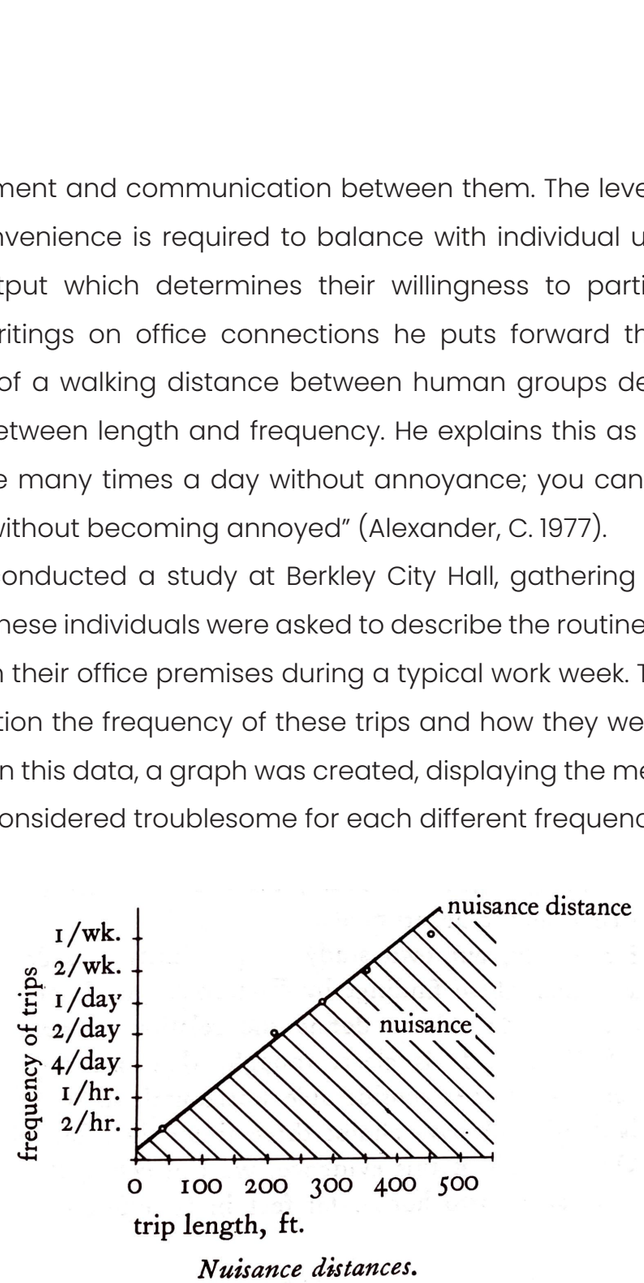


Figure 6.3: Graph Measuring Nuisance Distances. 1977.
(Source: Christopher, A. 1977. Scan from Public Outdoor Rooms illustration. A Pattern Language. New York. Oxford University Press. 1977.

The study indicated that individuals, on average, would reach a threshold in their relationships with walking distances and frequency of trips during work sessions. Out of the 127 observations a median calculation suggested that movement would be considered a nuisance to individuals having to walk an average of 15 meters twice an hour; 30 meters once an hour; 60 meters twice a day, and 100 meters twice a week.

Vertical Circulation

Factors affecting vertical circulation,
Staircases Design for improved use
& Invitational Movement

.

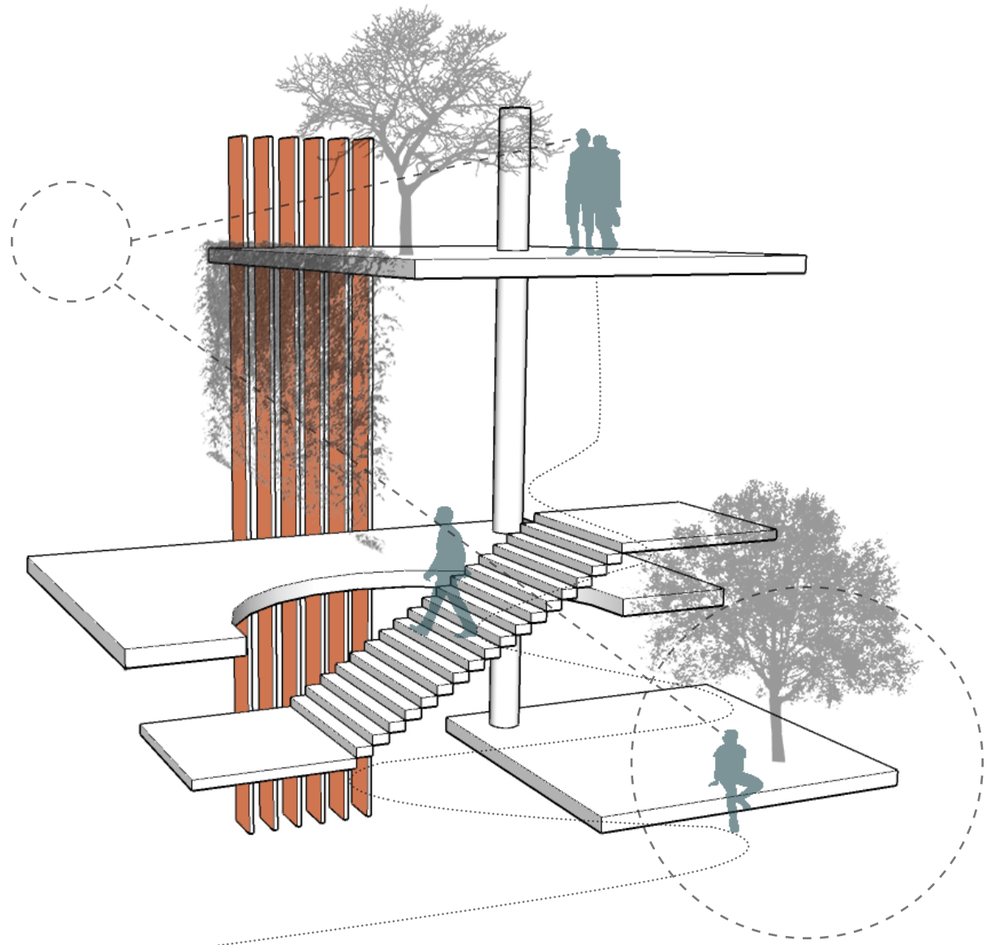


Figure 7: Vertical Circulation.
(Drawing by Author)

On Vertical Connections

Perhaps one would wonder how the proximity of vertical distances are experienced by users, and what sum of horizontal distance equates to one flight of stairs. What would have to be the ideal proximity of stairs in conjunction with horizontal distance before users consider this a nuisance? Marina Estabrook and Robert Sommer conducted a study, which remains unpublished, revealing that stairs hold a more significant importance for users than architects might assume. They found that people perceive using stairs as a much more physically demanding activity than expected. To gather data, the researchers observed a three-story university building that housed different departments. They asked users to identify and name individuals they knew or were acquainted with outside their immediate social group.

These individuals of the same human group knew 12% of other groups on the same floor, 8.9% one floor apart, and only 2.2% when they were in departments two floors apart. This suggests that if departments were situated at a vertical distance greater than or equal to two floors, there was virtually no informal contact between departments. Christopher Alexander had also conducted a study of the same nature, before he was aware of the above findings, suggesting that two flights of stairs had three times the perceived energy output for users when compared to one single flight of stairs. This equates that one flight of stairs would be perceived as a distance of 100 horizontal feet, or 30 meters of walking for the user, and two flights of stairs would be equal to 300 horizontal feet, or 90 meters of walking. This provides insights into the scale of vertical distances which should be presented for users of a space to foster participation in stair climbing. Figure 8.3 demonstrates a vertical distance of two floors maximum in order to foster social connectivity and circulation vertically across floors.

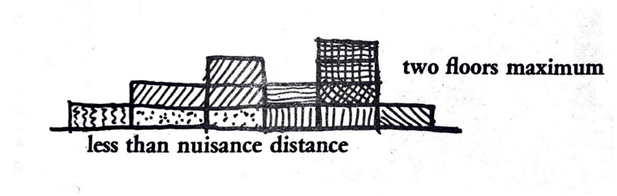


Figure 7.1: Vertical Distances. 1977.
(Source: Christopher, A. 1977. Scan from Office Connection (82) illustration. A Pattern Language. New York. Oxford University Press. 1977.

On Designing Staircases

This framework starts to provide an understanding of the user's relationship with active living and choice architecture within the context of the built environment, as suggested by the title of this thesis. In order to understand this relationship, in the case of vertical movement distances, Christopher Alexander puts forth the following principle "To establish distances between departments, one must calculate the number of trips per day made between each two departments of human groups; then retrieve the 'nuisance distance' from the previous figure; through this make sure the physical distance between the two departments is less than the nuisance distance measuring one flight of stairs as 100 feet / 30 meters, and two flights of stairs as 300 feet / 90 meters" (Alexander, C. 1977)

Building on the principles set forth by Christopher Alexander, Dr. Karen Lee in her writings on the principles of active design brought forward her own framework on the use of vertical distances, she suggests that the integrated vertical circulation system of high-rise buildings should be designed in such that staircases should be used to travel to adjacent floors, so that elevators are used only for vertical travel between four floors or more. This coincides with Christopher Alexander's suggestion that buildings which house departments which require interaction and communication should be in line with a four-story limit; and get their shape from the building complex. Lee continues by stating that architects should focus on incorporating stair climbing into everyday use within buildings, suggesting

that daily stair climbing of users should be increased by designating at least one stair in the building for everyday use, within the main circulatory path.

A study featured in the Hong Kong Medical Journal shed light on the impact of stair climbing interventions on occupants of buildings. The research delved into the physiological benefits of stair climbing, which have been explored in epidemiological studies. According to their estimates, a person weighing 80kg who climbs a 3m flight of stairs approximately 10 times a day would burn around 28 calories daily, amounting to 10,035 calories per year, equivalent to fasting for four days. Though the act itself may seem inconsequential, this can lead to a buildup of unused energy, equivalent to storing 1.36kg of fat in a year (Eves, Masters & McManus, 2008; Eves et al., 2009). These findings underscore the potential advantages of encouraging users to embrace stair climbing through subtle nudges.

However, it is crucial to note that there is limited research on the specific amount of stair climbing that can yield physiological benefits and the extent to which these benefits can be obtained. It is important to note that there are various methods of designing staricases, all of which would have a varying experiential effect on users. If the design itself is perceived to be inviting and accomodating and does not present itself as a nuisance to users this could create a positive relationship with users. Both Christopher Alexander and Karen Lee discuss the design of stair interfaces and propose methods of design to enhance user comfort and experience. Christopher Alexander in his writings on "Staircase as a stage" proposes that staircases aren't just means of traveling from one floor to the next, it remains to be part of a space and should be celebrated as an area for interaction and activity or these spaces would become dead spaces. Staircases and their adjoining spaces become places for social gathering; areas to congregate; spaces for dramatic entrances, to speak, to observe others and to be seen; a transitional space where individuals from different departments have the opportunity of interaction whilst passing by, and the only place within a building which is capable of providing this naturally occurring transition (Alexander, C. 1977).

Stairs should be designed as such that it wraps around the outer perimeter of a room, allowing the stairs itself to become socially connected to the space and provide a sort of a vantage point of observation as one descends, and have a sense of discovery as one ascends. Stairs should not be enclosed to break the transition from the room below, users should always be given the opportunity to observe where they are heading as this is demonstrated in figure 8.4 on the following page. Stairs should be designed in such a way that the next floor is always visible to the user, and limit the amount of directional changes and enclosure which occur on the path of travel.

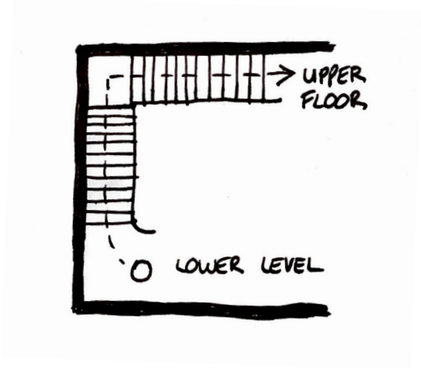


Figure 7.2: Wrap Around Staircases.
(Source: Created by author)

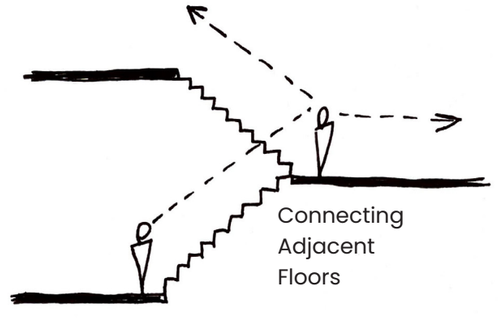


Figure 7.3: Staircases with visual connections.
(Source: Created by author)

In addition, the placement should be set within the parameters of a horizontal distance proximity which does not hinder occupants or become perceived as a nuisance as examined in the previous sub-heading 'On Horizontal Distances'. Stairs should be immediately visible from the front door; and within buildings with multiple floors and rooms, as many of these rooms should be within viewing distance of the stairs, to act as a sort of connectivity axis users can keep in their minds (Alexander, C. 1977).

Karen Lee presents similar ideas, emphasizing the integration of stairs with the main areas of orientation and movement within a building. According to her research, architects should ensure that stairs are easily accessible from public areas of the building. She suggests that stairs should be located within 25 feet (approximately 7-8 meters) of an entrance and should be encountered before the elevator, as this increases their likelihood of everyday use (Lee, K. 2014). In her discussions, Lee also addresses the dimensions of these stairs, advocating for a width of at least 1420mm. This width would comfortably accommodate two people conversing or traveling together, or two people moving in opposite directions. It is noted that wider stairs with more generous spacing have been associated with an increase in stair usage (Lee, K. 2014). This creates an interesting contrast when comparing these requirements to that of the South African National Standards Part M (SANS 10400-M:2018) which states that "the width of any stairway, measured to any enclosing wall or balustrade, shall be not less than 750 mm".

Karen Lee refers to studies which suggest that staircases with risers measuring 175 mm and treads measuring 280mm offer the most comfortable experience for the majority of individuals. The South African Building regulations suggests, "the going and width of any tread shall be not less than 250 mm, provided that where the stairway does not have solid risers, and the rise of any step shall not exceed 200 mm" (SANS 10400-M:2018). This extract is represented in Figure 7.11, from the South African Building regulations on stairway design.

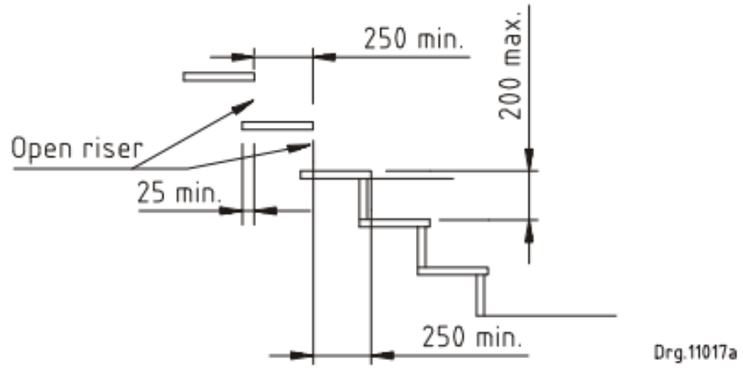


Figure 7.4: SANS Dimensions of treads and risers on stairs.
(Source: Extract from SANS 10400-M:2018 Edition 3.1)

Furthermore, a study on "Hazards, falls and safer design" from John Templer at Massachusetts Institute of Technology in 1992 recommended to include at least one intermittent landing between floors to accommodate those who may find using stairs physically challenging. This study also noted the importance having no more than 11 risers between landings to ensure optimal usability and accessibility for all users. The South African National Building Regulations recommends "no flight of stairs shall have a vertical rise greater than 3 m between landings". By dividing a 3000mm vertical height by the recommended minimum of 200mm, this equates to a landing every 15 risers.

Interestingly, comparing these standards makes one question the implementation and usage of minimum building requirements in the built environment. Designers and developers would often opt for the catering of minimum standards driven by economic reasons and cost saving. While the aims of building within economic limitations are understandable, especially in the global south, one should question whether these existing standards might have become dated, and if the regulations implemented at the time should be reassessed and viewed through a more current lens.

Invitational Circulation

The layout and organization of a workplace greatly influence patterns of circulation and movement among occupants. Designing spaces that facilitate movement and encourage physical activity is crucial. Incorporating features such as well-placed staircases, centrally located amenities, and open collaborative areas can promote incidental physical activity and facilitate social interaction (Sallis, J. F., et al., 2016).

There are various methods of creating focal points or 'attractors' within circulatory routes that would draw users towards them or nudge users to engage with interventions. As mentioned in the previous sub-heading 'On Active Transportation Strategies', the biophilia hypothesis could be an important factor of consideration in order to facilitate movement within architectural environments. Incorporating a connection with nature around interventions such as staircases would likely drive users towards this space.

Karen Lee proposes various active design strategies, some of which include incorporating grand staircases and interconnected open stairs whenever feasible. In cases where space limitations prevent a large grand staircase, the design and distinctive features of elements like balustrades, handrails, and landings can be utilized to attract visitors and encourage engagement with the stairs. To encourage stair usage, it is suggested to position stairs in close proximity to elevator lobbies, making them visible from these areas. Signage at decision points can further reinforce the connection between stairs and elevators, encouraging those waiting for elevators to consider taking the stairs instead. However, the key to success lies in providing direct accessibility and visibility of the stairs from elevator waiting areas, atriums, entry vestibules, and other frequently used public spaces within the building (Lee, K., 2014).

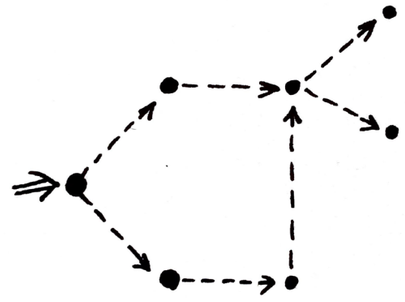


Figure 7.5: Reception nodes.
(Source: Created by author)

This form of arranging activity nodes was used in mental health clinics in where reception points were always arranged to be visible from one another, in the case that patients would not be frightened or confused and could easily be directed from one point to the next visible reception point (Alexander, C. 1977). The concept of reception nodes could prove to be an important consideration when designing layouts for workspaces as individuals tend to walk towards what's within their sight, as mentioned earlier in this section. Perhaps in the context of creating vertical circulation, staircases, along with other activity nodes should be at all times visible to users of a space. In addition, the 'journey' of the circulation path is to be considered in creating 'nudges' or 'invitations' to move towards a reception node.

Learning from the Guggenheim: Case Study

The Guggenheim in New York, Designed by the modernist architect Frank Lloyd Wright, provides a dynamic circulatory system which innately guides occupants through fostering environments of experiential discovery. The entranceway converges into an intimate space with a low ceiling through which visitors are provided with a focal point of natural light in the direction of the atrium. After passing through a narrowing corridor, visitors are greeted by an atrium that

reaches a height of 28 meters, culminating in an expansive glass dome. Along the sides of this atrium, a continuous ramp unfurls, gradually ascending six stories and stretching over a quarter-mile in length.

The deisgn intent aimed for a seamless flow between floors, enabling one level to seamlessly merge with the next. This “ramp of discovery,” plays a crucial role in guiding visitors through the exhibition spaces and creating a flow of movement through a continous ‘upward journey’. As visitors ascend the ramp, they are treated to a gradual unfolding of the artworks displayed on the walls (reception nodes), creating a sense of discovery and anticipation (Hoffmann, D., 2001).

Figure 7.6: Guggenheim Interior Photograph.
(Source: USA, March 2019. Photos by The Sturgheons. Available: https://www.thesturgheons.com/design-architecture-guggenheim-2019 19 June 2023)

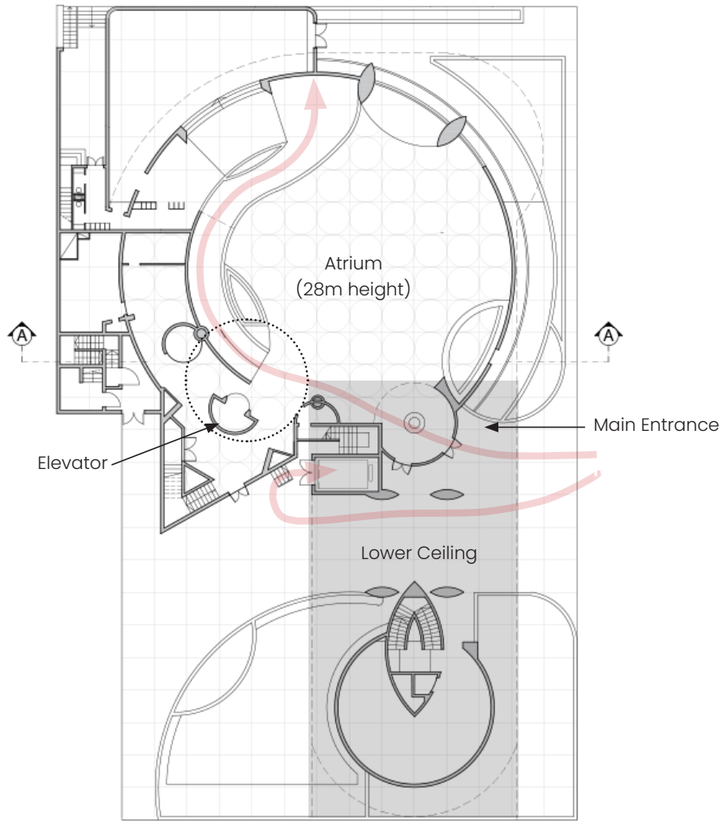


Figure 7.7: Guggenheim Floor Plan.
(Source: DWG Lab, project from website, Available: https://www.dwglab.com/projects/famous-architectures/frank-lloyd-wright/solomon-r-guggenheim-museum/ 19 June 2023)

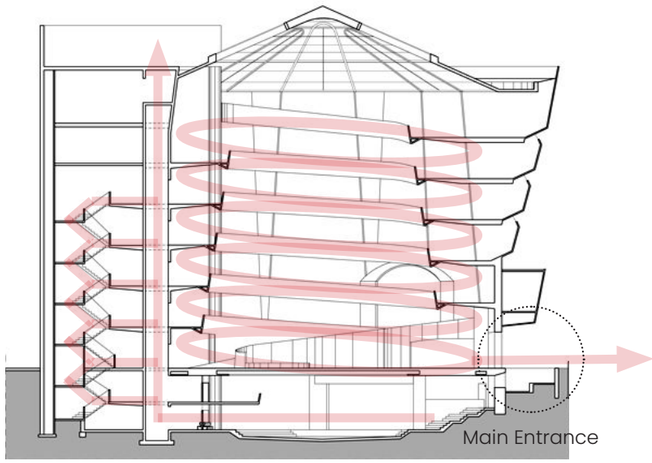


Figure 7.8: Guggenheim Section.
(Source: DWG Lab, project from website, Available: https://www.dwglab.com/projects/famous-architectures/frank-lloyd-wright/solomon-r-guggenheim-museum/ 19 June 2023)

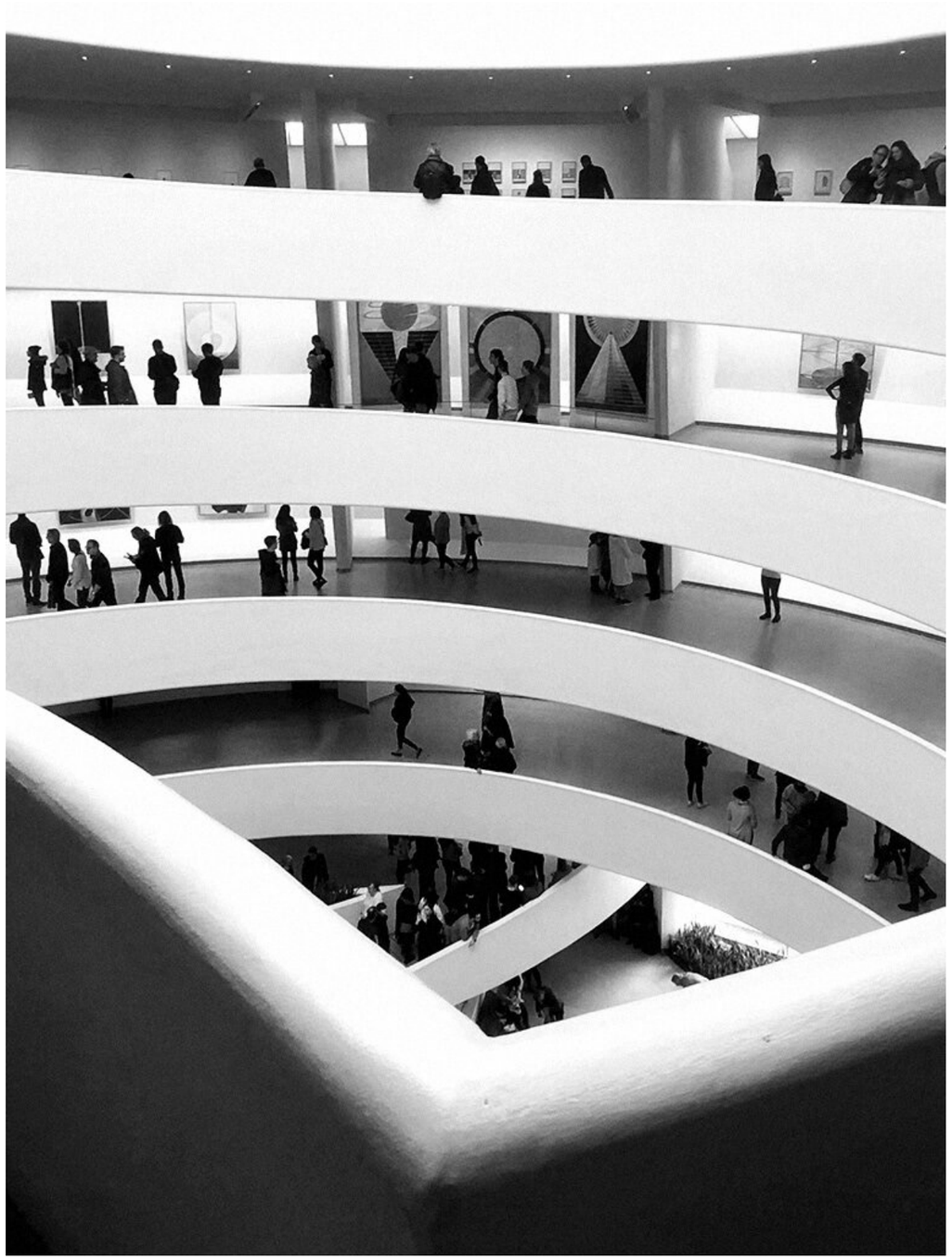


Figure 8.2: Guggenheim Interior Photograph.
(Source: USA, March 2019. Photos by The Sturgheons. Available: https://www.thesturgheons.com/design-architecture-guggenheim-2019 19 June 2023)

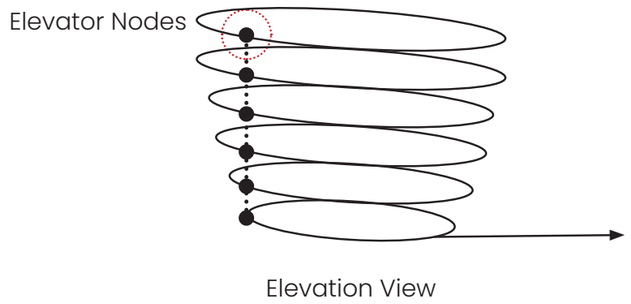


Figure 7.9: Guggenheim Sectional Circulation.
(Source: Created by Author)

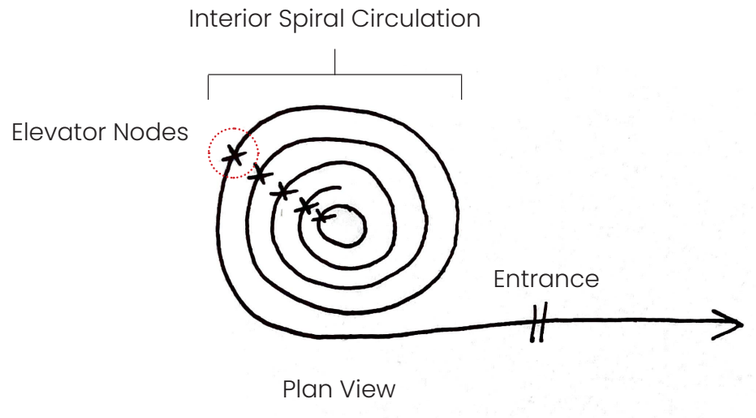


Figure 8: Circulation in Plan.
(Source: Created by Author)

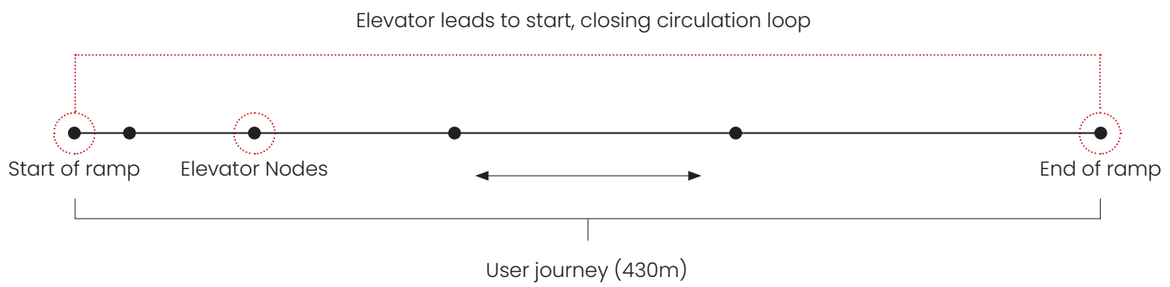


Figure 8.1: Guggenheim Reception Nodes.
(Source: Created by Author)

Towards an Active
& Human Centered
Architecture

The Vertical Public

Activating Urban Rooftops

The Podium, Rotterdam

Expo 2000 Case Study

MVRDV Rooftop Cataloge

CopenHill Case Study

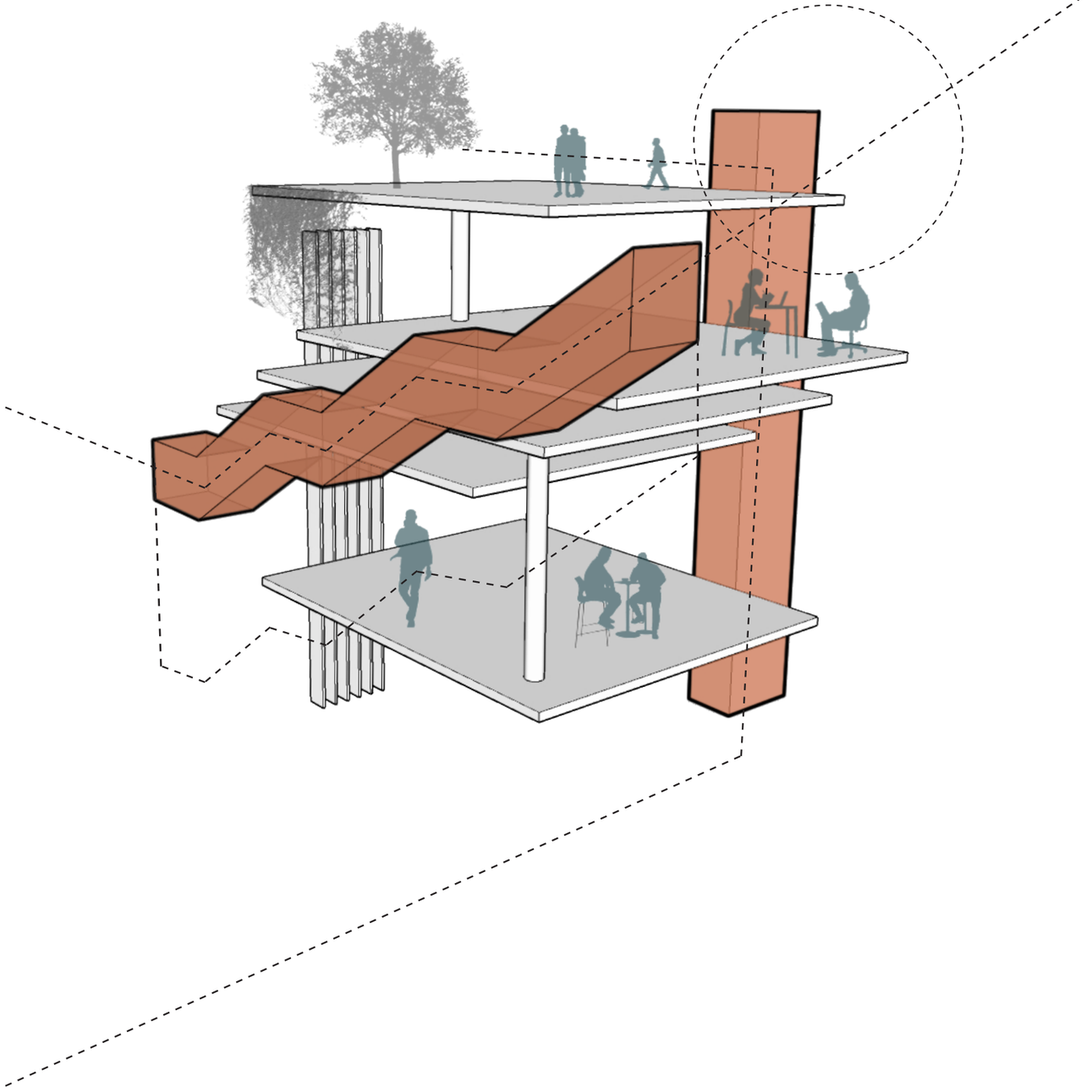


Figure 9: The Vertical Public.
(Drawing by Author)

Activating Urban Rooftops

The pandemic has compelled a reevaluation of the paramount significance of outdoor access, offering an additional "third place" where employees can relish fresh air, bask in natural light, and seek an alternative workspace removed from the urban clamor, thereby unveiling the hitherto concealed urban rooftops. This transformative perspective underscores a shift in the role of office buildings, adapting to the emergent hybrid workstyle, where individuals divide their time between home and the office. It is now evident that tenants prioritize outdoor spaces as sanctuaries of safety and well-being (Smith, J. 2022). Consequently, buildings must reimagine their design to facilitate effortless connections and accessibility to these exterior spaces, transcending the limitations of private terraces to enhance the overall tenant experience, positioning rooftops as a practical solution to expand public areas.

In some countries such as the Netherlands this prospect has been explored by numerous architecture firms. As rooftops represent a significant percentage of a city's total land area, occupying this space as a public entity creates another dimension of the cityscape. In the city of Rotterdam, Rotterdam Rooftop Days and architecture practice MVRDV has created a rooftop walk for the public. This innovative installation invites visitors to experience the city from a second vantage point, courtesy of a 30-meter-high aerial bridge that stretches across a range of urban rooftops. These include the rooftop of The Bijenkorf department store and the peak of the World Trade Centre plinth as seen in Figure XXX. The primary objective of this endeavor is to highlight the potential of rooftops as an additional layer of public infrastructure within a densely populated urban environment where conventional public spaces are limited (S., Dima, 2022). The comprehensive program intends to enhance visitors' understanding of the possibilities associated with rooftops, which can serve as an additional urban layer, rendering the city "enhanced in terms of livability, biodiversity, sustainability,

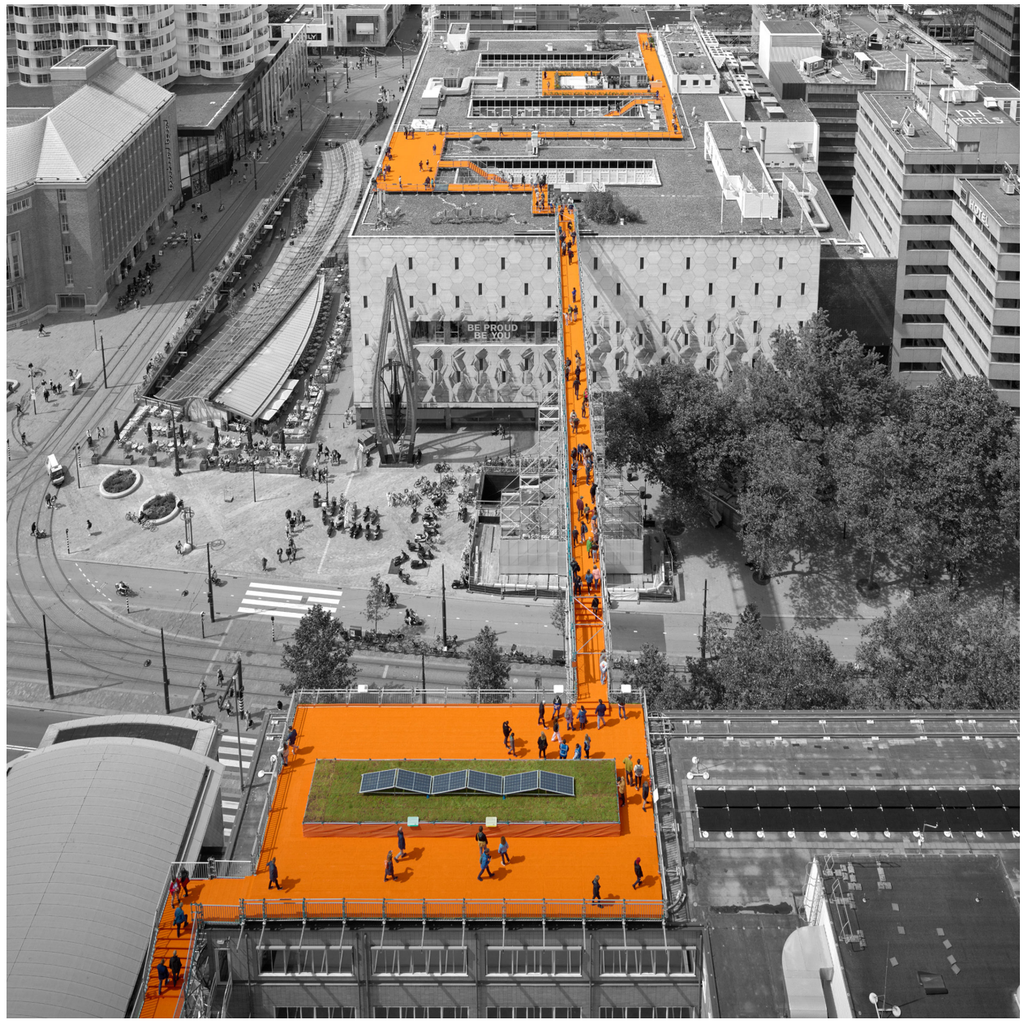


Figure 9.1: MVRDV Rooftop Walk.
(Rotterdam Rooftop Walk, Archdaily. Available: https://www.archdaily.com/982681/mvrdvs-rotterdam-rooftop-walk-has-opened-to-the-public, Accessed 15 July, 2023.)

and well-being." The introduction of rooftop initiatives can play a crucial role in bringing important environmental and societal concerns to the forefront, including climate change, housing shortages, and the shift toward renewable energy sources. The Rooftop Walk focuses attention on these issues, particularly within a city like Rotterdam, where 18.5 square kilometers of flat rooftops lay untapped.

Figure 9.2: MVRDV The Podium.
(The Podium. MVRDV. Available: https://www.mvrdv.com/projects/878/the-podium, Accessed 15 July, 2023.)

The Podium, Rotterdam

Another example by MVRDV in transforming the rooftop to a multi-functional public space is the Podium in Rotterdam. Standing at an elevation of 29 meters, The Podium offers transient access to the roof of Het Nieuwe Instituut via an external staircase comprising 143 steps. Painted in a vibrant shade of pink for enhanced visibility, MVRDV's design introduces a temporary 600 square meter communal area, effectively becoming the focal point of the June 2022 Rotterdam Architecture Month. Throughout the following months, July and August, The Podium transforms into a coveted venue for a diverse array of events, including jazz concerts and yoga sessions boasting panoramic city views. It also hosts a range of engaging activities for Rotterdam's youth, including a summer camp, ensuring a multi-functional and dynamic utilization of this innovative rooftop space (MVRDV Maas, W. et al., 2023).

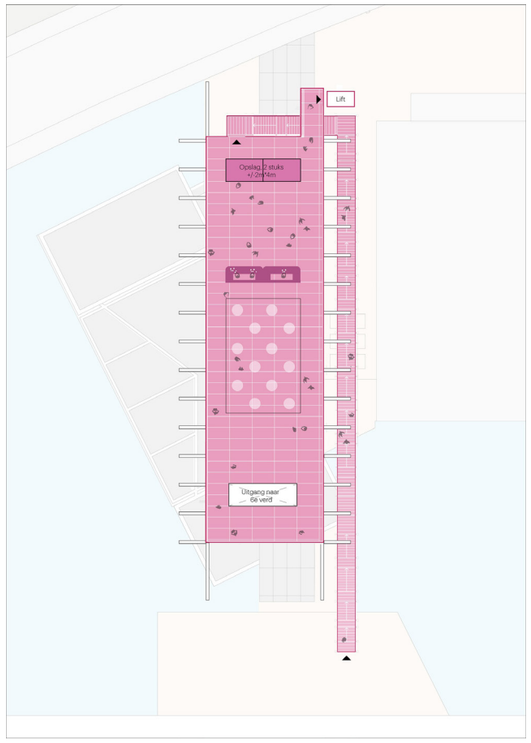


Figure 9.3: Exhibition.
(The Podium. MVRDV. Available: https://www.mvrdv.com/projects/878/the-podium, Accessed 15 July, 2023.)

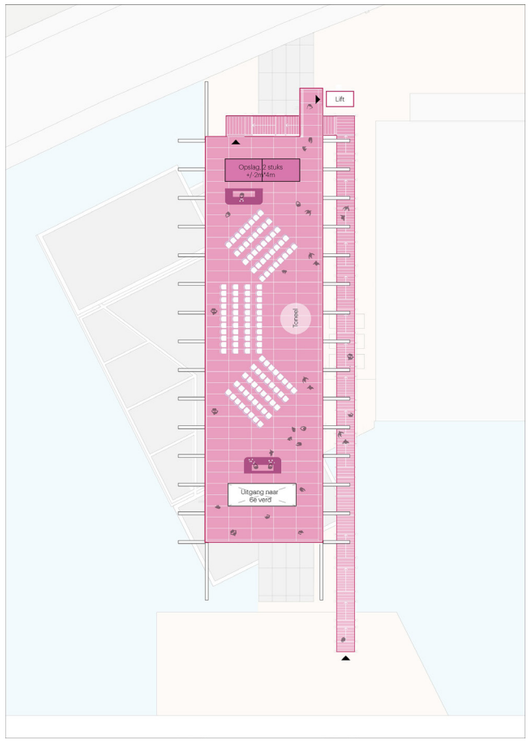


Figure 9.4: Performance.
(The Podium. MVRDV. Available: https://www.mvrdv.com/projects/878/the-podium, Accessed 15 July, 2023.)

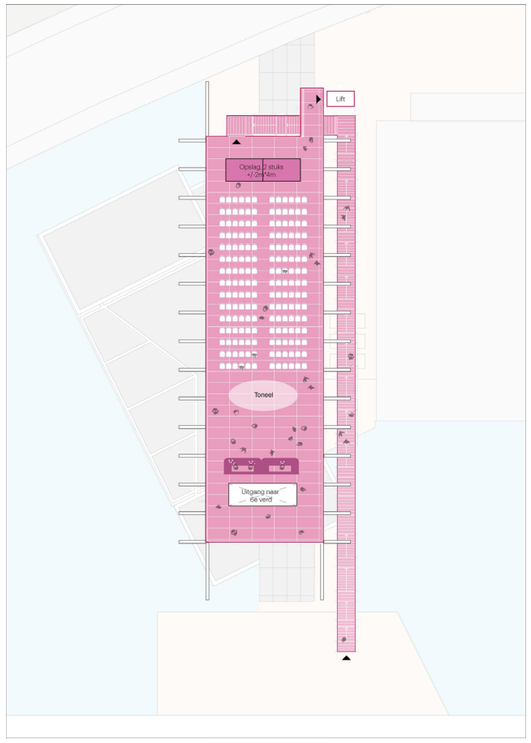


Figure 9.5: Event.
(The Podium. MVRDV. Available: https://www.mvrdv.com/projects/878/the-podium, Accessed 15 July, 2023.)

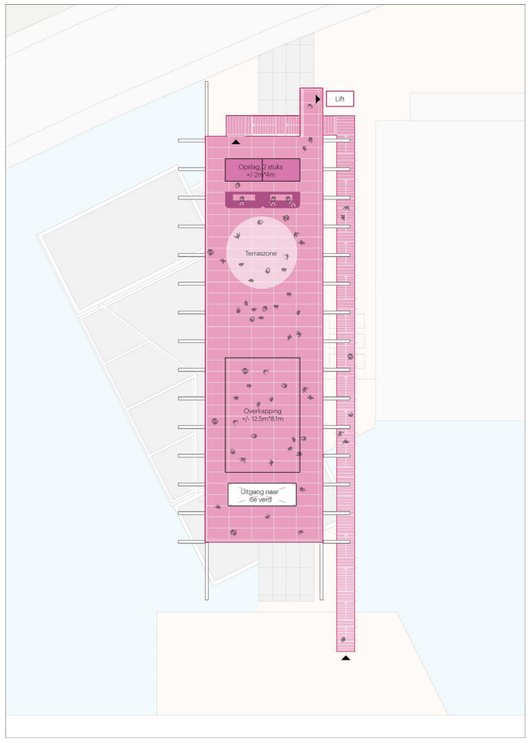


Figure 9.6: Dance.
(The Podium. MVRDV. Available: https://www.mvrdv.com/projects/878/the-podium, Accessed 15 July, 2023.)

Figure 9.7: MVRDV Expo Pavilion 2.0.
(Expo 2000. MVRDV. Available: https://www.mvrdv.com/projects/432/expo-pavilion-20, Accessed 15 July, 2023.)

Case Study: Expo 2000

Another example of public place-making superimposed onto an existing precinct can be seen through MVRDV's Dutch Pavilion featured at the 2000 World Expo in Hannover. This ambitious undertaking seeks to repurpose the former Expo Pavilion into a co-working office facility, accompanied by the incorporation of two novel structures situated within the immediate vicinity of the pavilion. The architectural blueprint remains committed to preserving the distinctive characteristics that initially propelled the pavilion into iconic status during the 2000 World Expo, with a particular emphasis on the verdant forest environment adorning the third floor. In tandem, it endeavors to reinterpret and reimagine the fundamental concept of the original project, carefully integrating these principles into the design of the two additional structures (MVRDV Maas, W. et al., 2023).

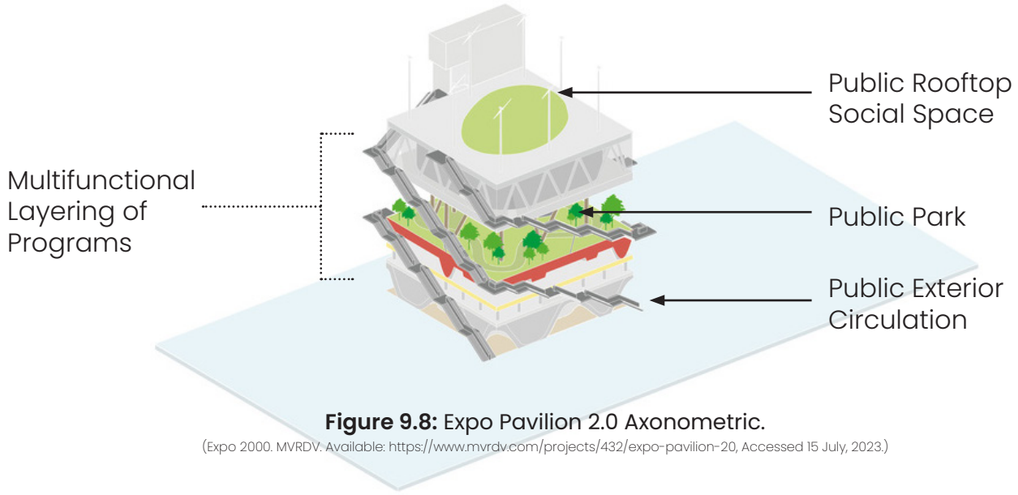


Figure 9.8: Expo Pavilion 2.0 Axonometric.
(Expo 2000. MVRDV. Available: https://www.mvrdv.com/projects/432/expo-pavilion-20, Accessed 15 July, 2023.)

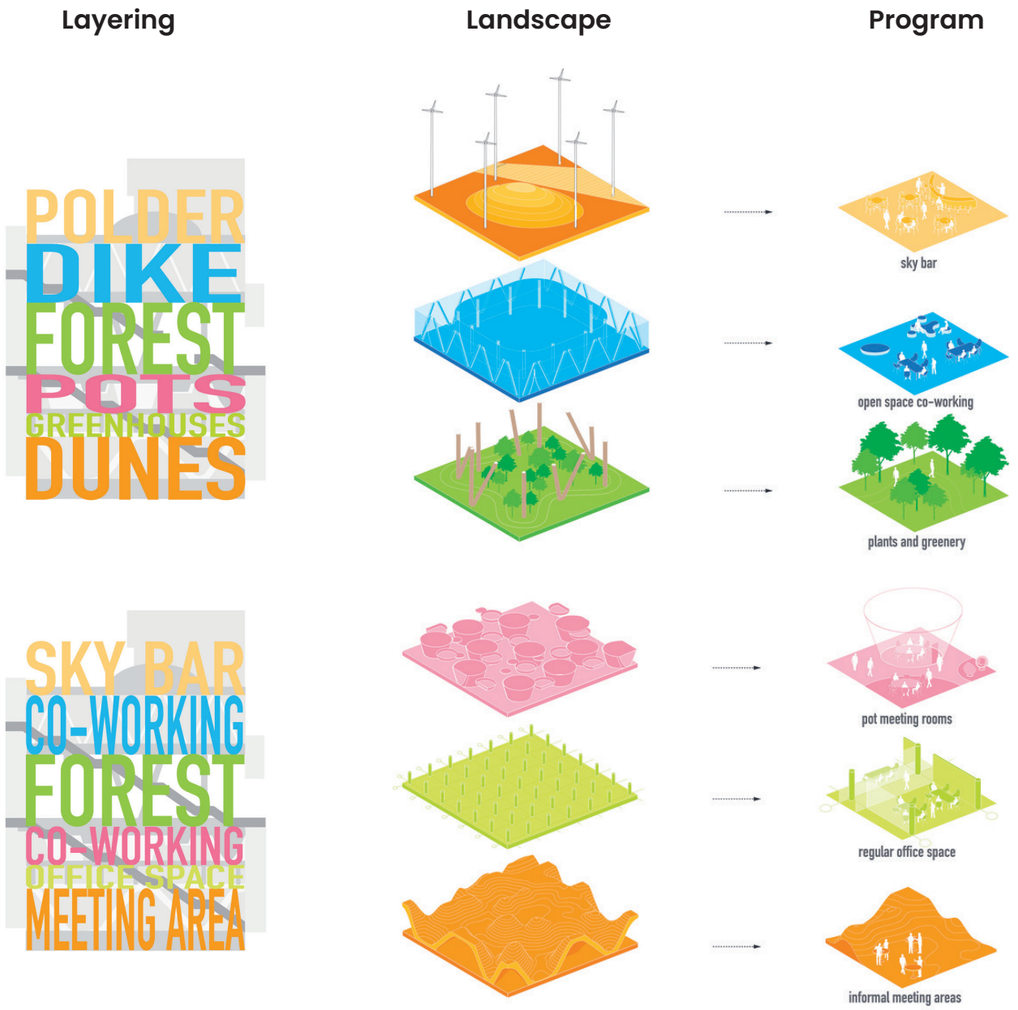


Figure 9.9: Expo Pavilion 2.0 Sectional Program.
(Expo 2000. MVRDV. Available: https://www.mvrdv.com/projects/432/expo-pavilion-20, Accessed 15 July, 2023.)

Figure 10: Plan Diagrams.
(Expo 2000. MVRDV. Available: https://www.mvrdv.com/projects/432/expo-pavilion-20, Accessed 15 July, 2023.)

MVRDV's Rooftop Cataloge

Underscoring an unexplored spatial asset, MVRDV has additionally curated an inventory of 130 inventive concepts for the activation of vacant horizontal surfaces within Rotterdam, epitomizing a prospective phase in the city's evolution (MVRDV, Rotterdam Rooftop Days, 2023). As an initiative commissioned by the City of Rotterdam in collaboration with Rotterdam Rooftop Days, the Rooftop Catalogue elucidates how the reconfiguration of rooftops serves as a multifaceted solution to issues encompassing land scarcity and climate change. Furthermore, the catalogue aptly addresses practical considerations, encompassing construction methodologies and suitable locations for repurposing these spatial assets within the urban fabric. This comprehensive endeavor underscores the pivotal role of architectural intervention in the optimization of underutilized rooftop spaces, encapsulating their transformative potential within the city's development narrative. Some of these rooftop solutions are illustrated below, taking the typologies of a Mid-Rise Tower, Ubran Office Block, as well as a Large Urban Block into consideration and exploring various public programs which can be retro-fitted onto the roofscapes of these structures.

Figure 10.1: Rooftop Catalogue: Starting Points.
(Rooftop Catalogue. MVRDV. Available: https://www.mvrdv.com/stack-magazine/3878/rotterdam-rooftop-catalogue-interview, Accessed 15 July, 2023.)

Explorative Rooftop Interventions

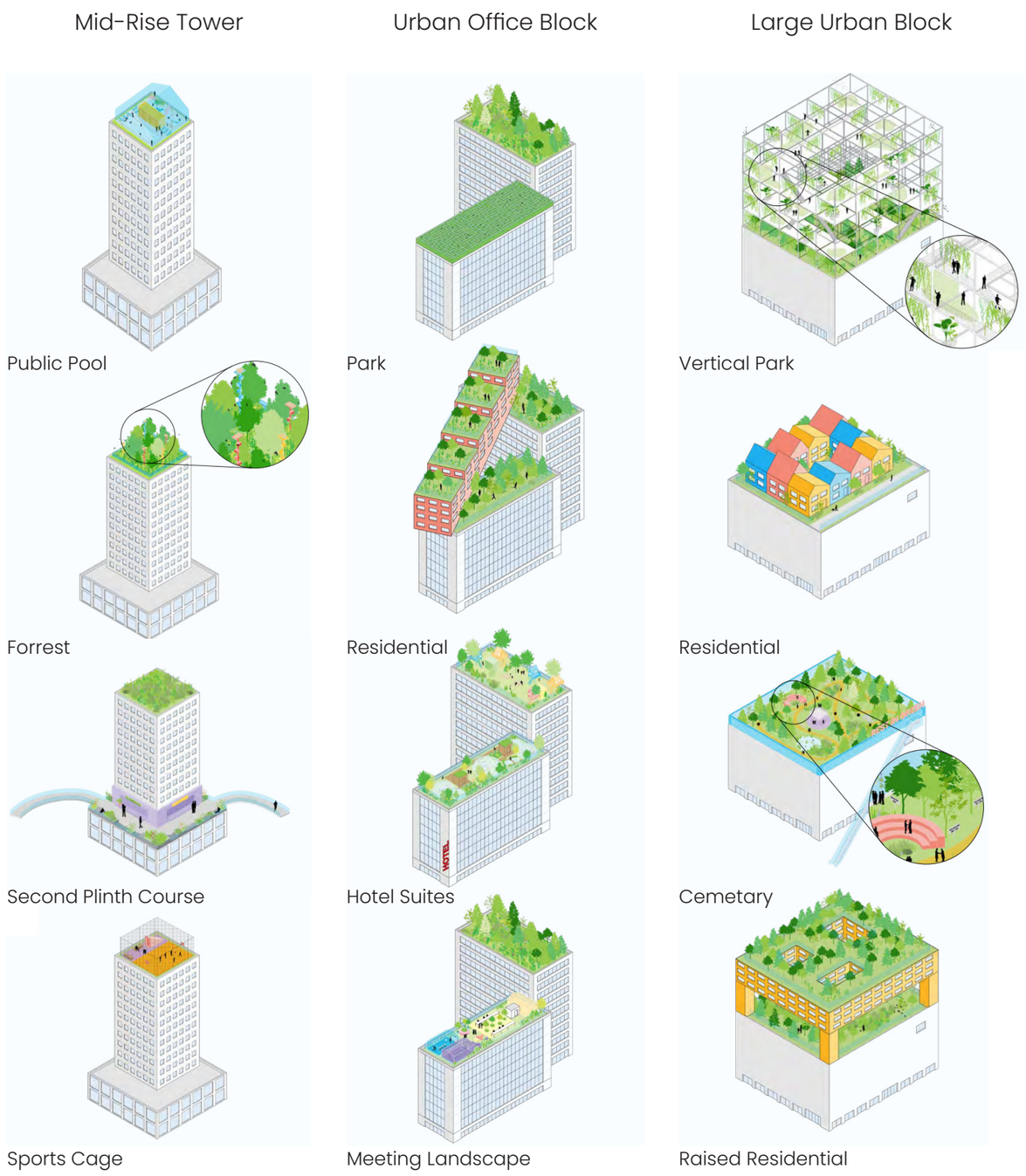


Figure 10.2: Rooftop Catalogue: Application by building typology.
(Rooftop Catalogue. MVRDV. Available: https://www.mvrdv.com/stack-magazine/3878/rotterdam-rooftop-catalogue-interview, Accessed 15 July, 2023.)

Case Study: CopenHill

CopenHill, designed by BIG Architects, exemplifies an innovative approach to creating public connected space, creating an environment that guides occupants through a unique and engaging experience. At the heart of this design is the incorporation of a ramp or slope that not only facilitates public participation but also fosters an active outdoor environment. The inclusion of a ramp allows for seamless movement and encourages individuals to explore the various levels of the building in an interactive and dynamic manner.

Figure 10.3: CopenHil Power Plant, BIG Architects
Nast, C. 2023. Inside a sustainable power plant with a ski slope on its roof, Architectural Digest. Available at: https://www.architecturaldigest.com/video/watch/unique-spaces-inside-a-sustainable-power-plant-with-a-ski-slope-on-its-roof (Accessed: 20 May 2023).

Hedonistic Sustainability & Active Design

Hedonistic sustainability, as defined by Bertolini and Brömmelstroet (2017), involves the incorporation of sustainable practices and principles into a design that enhances the overall user experience and enjoyment of the space. This concept goes beyond functionality, emphasizing the contribution of design to the pleasure, well-being, and quality of life of the occupants. In the case of CopenHill, the integration of biophilic elements and recreational activities nudges individuals to engage in active design practices, making them more accessible and appealing to a wider audience.

The design incorporates various sustainable features, including the harvesting of local resources, such as rainwater, as well as maximizing daylight and natural airflows. One prominent example is the expansive 10,000m2 green roof, which not only addresses the challenging micro-climate of the 85m high park but also focuses on rewilding a biodiverse landscape while

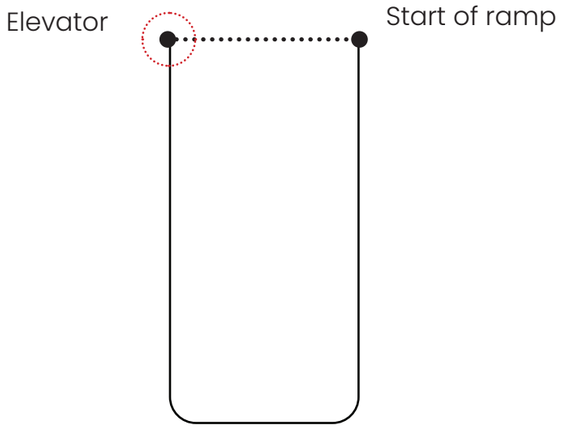
Figure 10.4: CopenHill Ski Slope.
(Source: CNN Travel, image from website, Available: https://edition.cnn.com/travel/article/ski-slope-powerplant-copenhagen-denmark/index.html 19 June 2023)

Figure 10.5: CopenHill Exterior Stairs.
(Source: CNN Travel, image from website, Available: https://edition.cnn.com/travel/article/ski-slope-powerplant-copenhagen-denmark/index.html 19 June 2023)

Circulatory System

By integrating a ramp into the design, CopenHill provides an alternative means of circulation that diverges from the typical stairs or elevators. The sloping surface which measures nearly half a kilometer in distance invites occupants to walk, run, or even ski, promoting physical activity and an active lifestyle (Tomas, R., 2020). This unique approach to circulation design not only facilitates movement but also adds an element of playfulness and adventure to the experience of navigating the building. The gradual slope allows for easy access to different levels, eliminating barriers and providing a sense of equality in movement throughout the space.

Figure 10.6: CopenHill Circulation Plan
(Source: Created by Author)



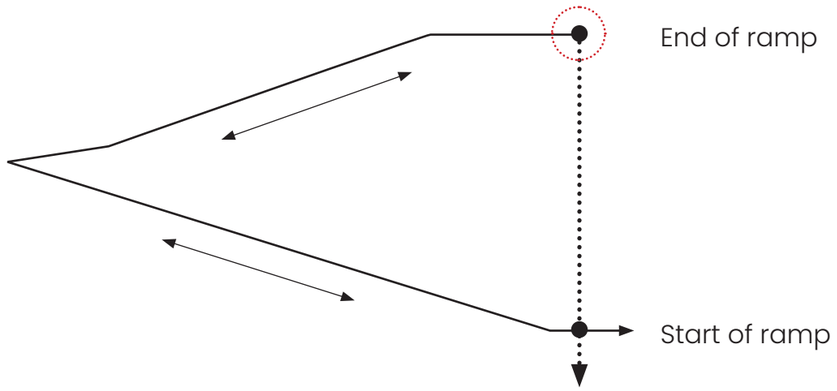


Figure 10.7: CopenHill Circulation Plan
(Source: Created by Author)

Figure 10.8: CopenHill Circulation Routes
(Source: MiesArch.com, CopenHill, Image from website, Available: https://miesarch.com/work/4819, Accessed 19 June 2023)

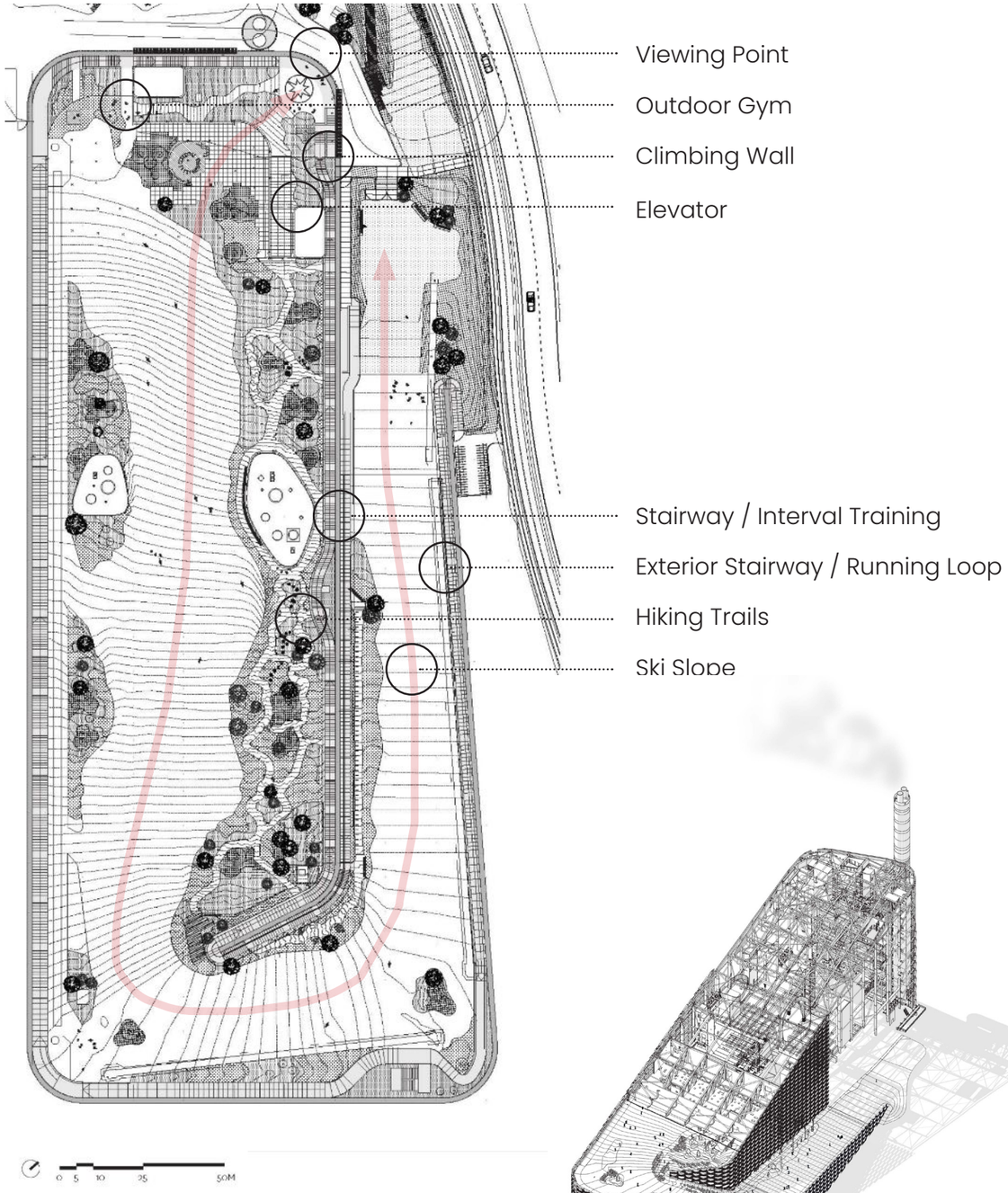


Figure 10.9: CopenHill Structural Axonometric
(Source: MiesArch.com, CopenHill, Image from website, Available: https://miesarch.com/work/4819, Accessed 19 June 2023)

On Additional Interventions

Beyond traditional architectural interventions, a comprehensive approach that embraces both spatial design and non-architectural elements is warranted. Architects should consider furniture and interior design as an integral part of spatial planning. This builds on the notion of "Gesamtkunstwerk" by Alvar Aalto, introduced in an earlier section of this paper, integrating these elements becomes vital in creating a harmonious environment for the users. Amenities should seemlessly be interwoven into the architecture of a building. Introducing flexible furniture design such as standing or adjustable-height desks which allow employees to alternate between sitting and standing positions, which would foster a dynamic and fluid workspace (Buckley, J. P., et al., 2013).

Adjusting existing technological interventions such as elevators may further motivate users to engage in movement and provide additional energy-usage benefits. Skip-stop elevators operate by selectively serving specific floors rather than stopping at every floor in a continuous sequence. This design encourages occupants to use stairs and walk between the skipped floors (Rackham, N., 2016). In addition to the architectural implications of skip-stop elevators, their introduction calls for careful way-finding and signage design, such as using the concept of reception nodes as previously mentioned, to ensure that occupants are aware of the options for movement between floors and can easily access stairwells (Reidy, P., et al., 2017).

To further limit sedentary behavior, providing easily accessible and well-designed communal areas for relaxation, or active breaks can invigorate the workplace and enhance social interactions among occupants. The availability of exercise facilities within the building along with change rooms further provides users with the choice and opportunity of engagement. The strategy follows on the thought that through providing accessibility and convenience users are more likely to engage in active behavior.

Additionally, promoting active transportation options such as biking or walking to work contributes to overall physical activity and reinforces a connection with the surrounding urban fabric (Thompson, D., et al., 2018). Incorporating walking meetings would further encourage physical activity in addition to enhancing creative thinking and collaboration (Oppezzo, M. & Schwartz, D. L., 2014). Implementing these diverse interventions in tandem reflects a profound understanding of the complex interplay between humans and their environment, as championed by Christopher Alexander, ultimately leading to workspaces that inspire movement, energize occupants, and cultivate a healthier and more vibrant work culture.

Urban Connection & Site Response

Existing Fabric, Urban Context, Street Interface & Architectural Response

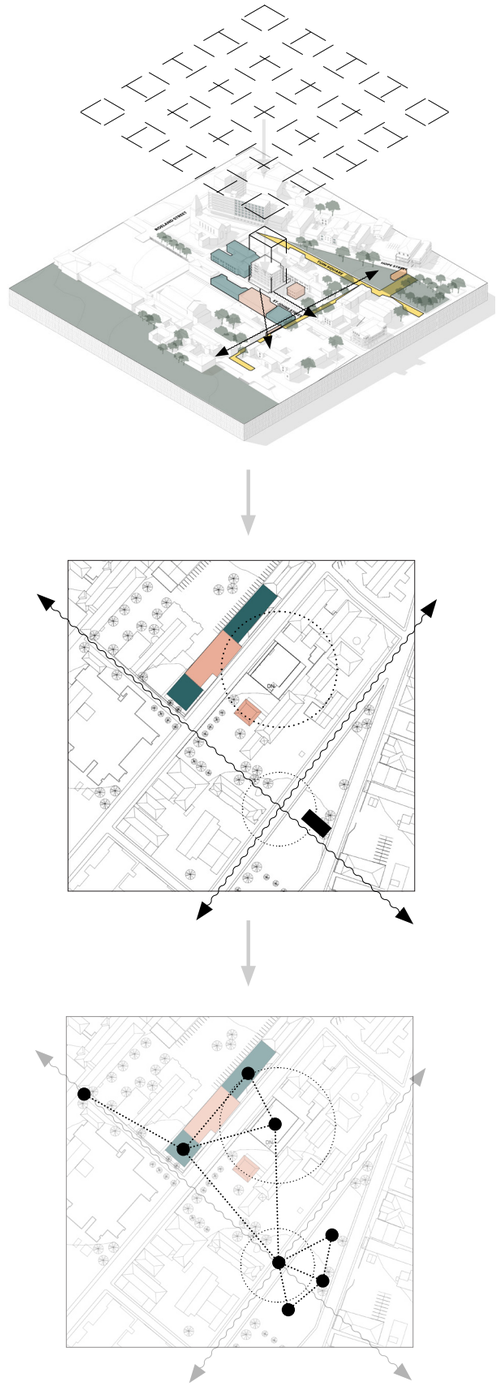


Figure 11: Site Response Diagram.
(Drawing by Author)

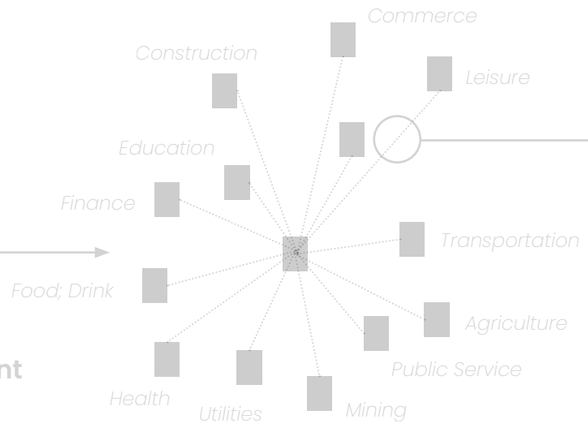
Defining the Program

Selecting an area of intervention at an Architectural Scale

The Built Environment

- *Infrastructure*
- *Urban Planning*
- *Architecture*

The Framework of the Built Environment



Options to the modern man

Transportation & Infrastructure as a program?

(The area between programs as an opportunity for physical movement)

In which environment do we spend most of our time?

No

Yes

Urban Design Interventions

- *Superblocks*
- *Walkable Streets*
- *Improved public transport*
- *Bicycle friendly lanes*
- *Park connections*

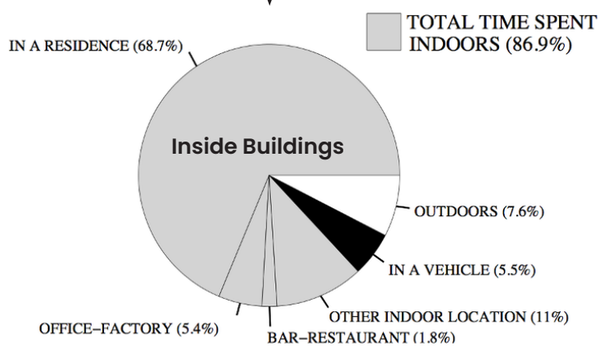


Figure 11.1: Time Spent Indoors, Building Green

Roberts, T. 2016. We spend 90 percent of our time indoors, says who. Building Green. Available at: https://www.buildinggreen.com/blog/we-spend-90-our-time-indoors-says-who (Accessed: 20 May 2023).

Which indoor *(program)* **activity do we lend most of our time to?**

- *Sleeping (7.8 Hours)*
- ***Working (8.8 Hours)***
- *Leisure (2.6 Hours)*

What are the most sedentary work environments?

Corporate **office buildings** and commercial high-rises

- *Administrative work*
- *Finance*
- *IT*
- *Customer Service*
- *Professional Services*

Gardens, Cape Town CBD

Site Selection

Selecting a site was led by the theoretical base of this research. In order to apply the principles explored in my theoretical base through repairing the historical relationship which exists between the architecture of workspaces and that of sick building syndrome required a site which demonstrates evidence of these disconnects.

Greater Cape Town Area

Cape Peninsula

Figure 11.2: Site Location.
(Drawing by Author)

Figure 11.3: Site Photograph.
(By Author)

A Relic of the Modernist Workspace

Constructed in 1971, the building initially served as a multi-storey printing office until its operations ceased in 2019, leaving it in a state of disuse and disrepair. This architectural relic, with its historical background and the challenges it presents, offers a compelling opportunity to delve into the transformative capabilities of architectural intervention. The primary goal is to cultivate more vibrant and healthier environments for those who will ultimately occupy the revitalized space.

Designed within the context of a past era's perception of the 'workplace,' the building reflects the inexorable progression of time. It also reveals the limitations inherent in architectural design when confronted with the evolving nature of work in a world shifting away from print media. These adaptive inadequacies underscore the pressing need for innovative reimagining and rejuvenation. This architectural endeavor extends beyond mere construction; it signifies the intersection of history, evolution, and an exploration into the future of workspaces.

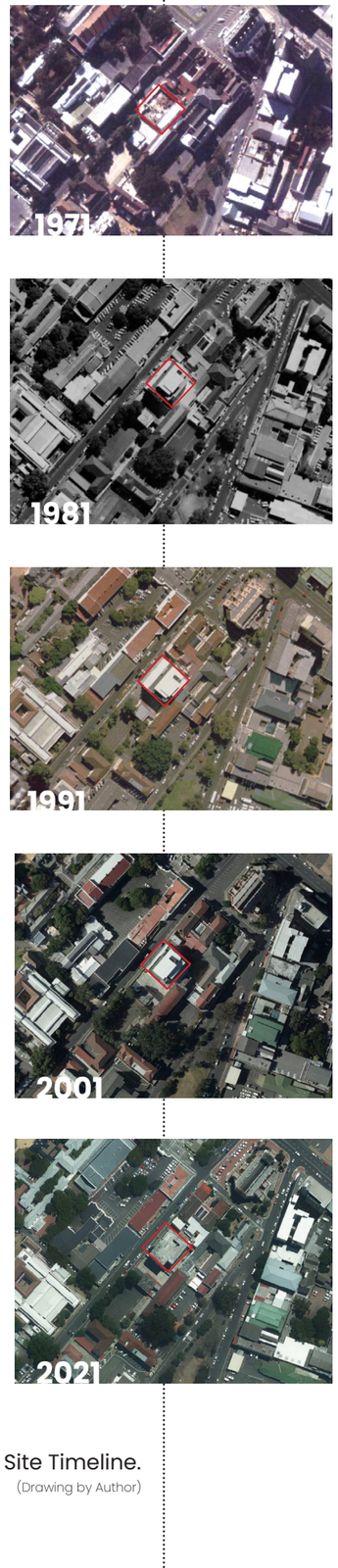
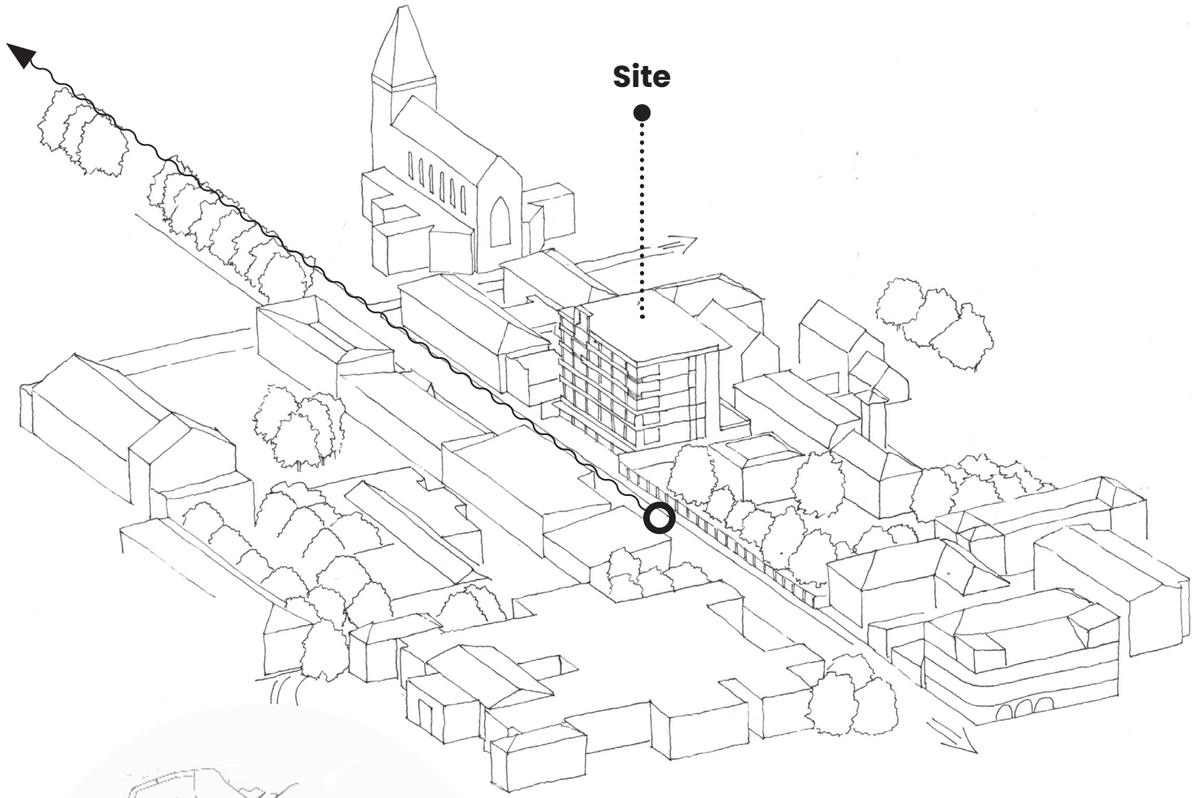


Figure 11.4: Site Timeline.
(Drawing by Author)

Figure 11.5: Street Photograph.
(By Author)

Site Exploration Sketches



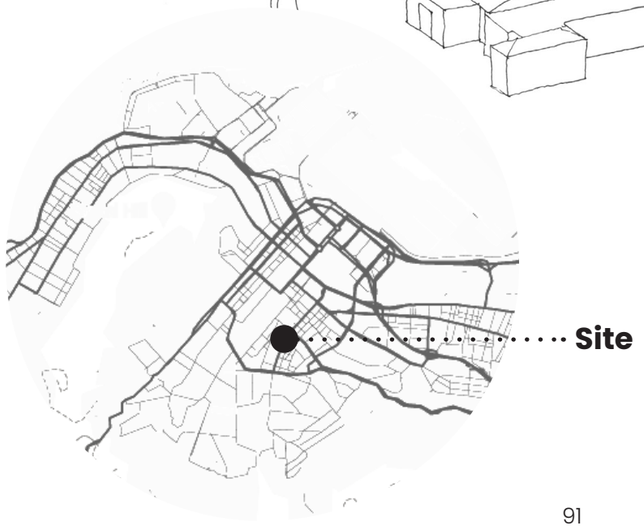


Figure 11.6: Site Exploration.
(Drawing by Author)

Site Exploration Sketches

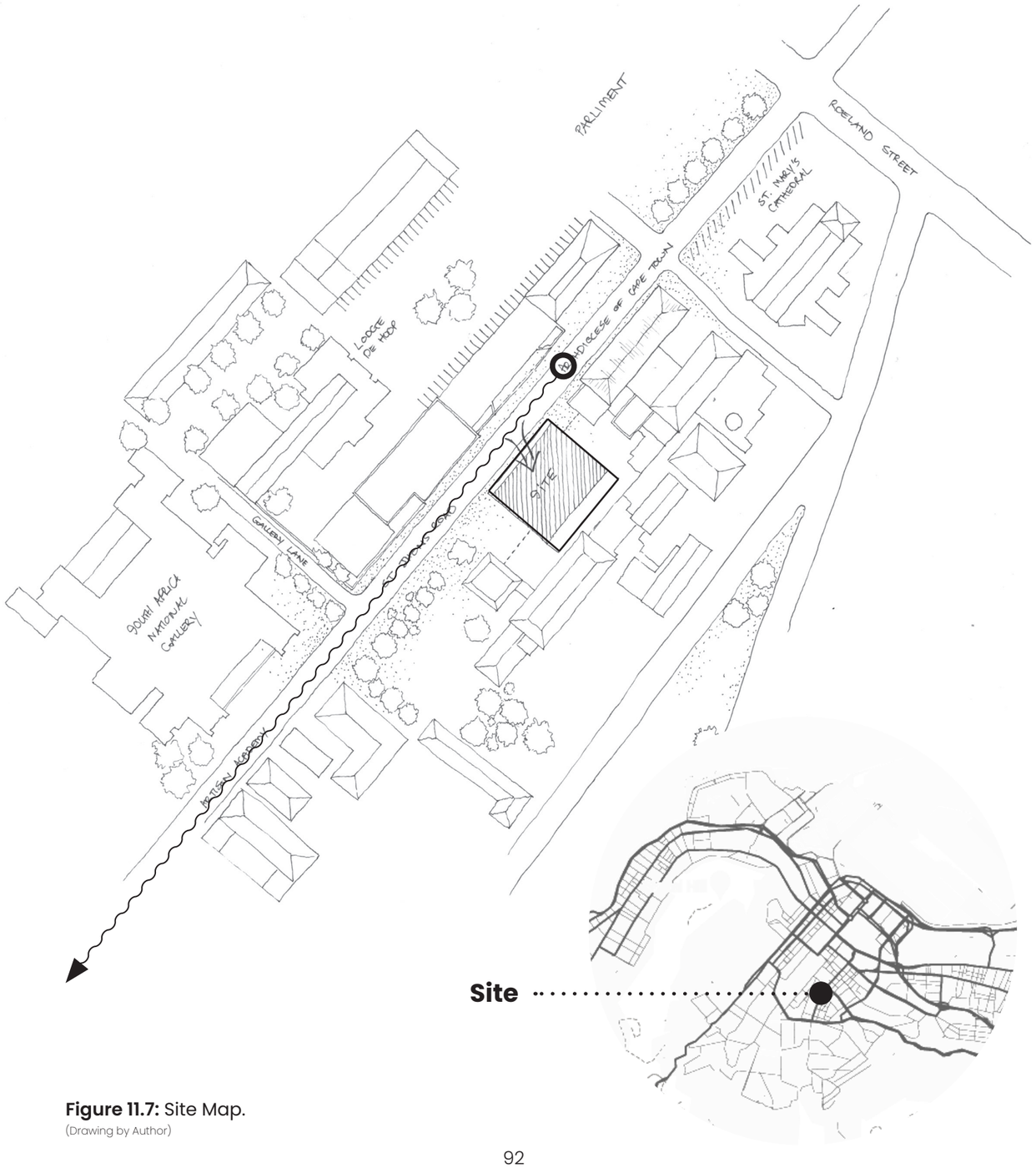
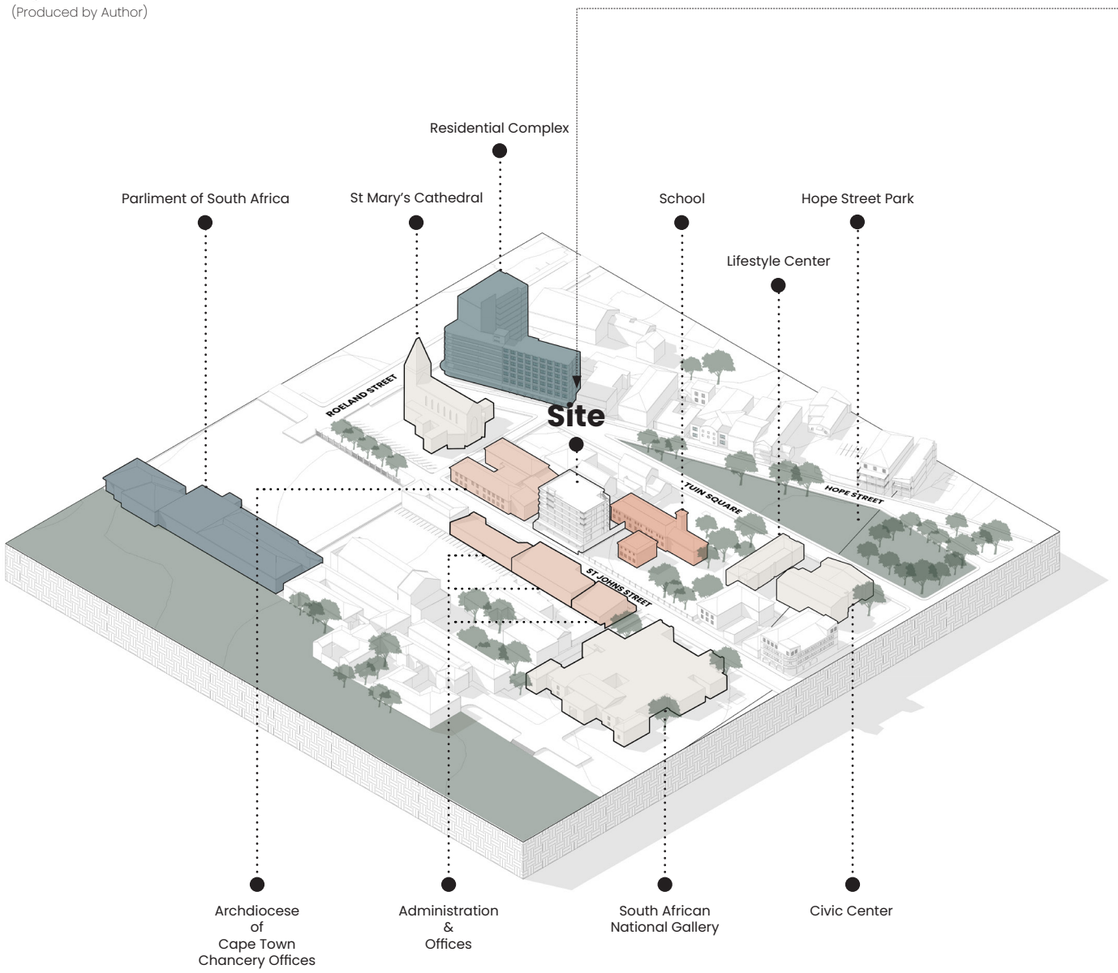


Figure 11.7: Site Map.
(Drawing by Author)

Figure 11.8: Site Photograph 2.
(By Author)

Figure 11.9: Site Axonometric.
(Produced by Author)



This project constitutes a design intervention aimed at the revitalization of the surrounding urban fabric. The site's significance lies in its proximity to multifaceted urban elements, including a school, the parliament, existing offices, housing developments, the South African National Gallery and Natural History Museum. From an architectural perspective, it's imperative to understand that this transformation isn't merely about the structure itself but is an architectural dialogue with the larger urban context.

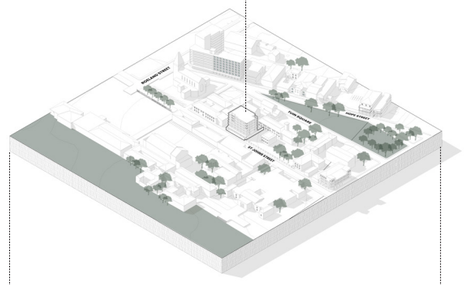
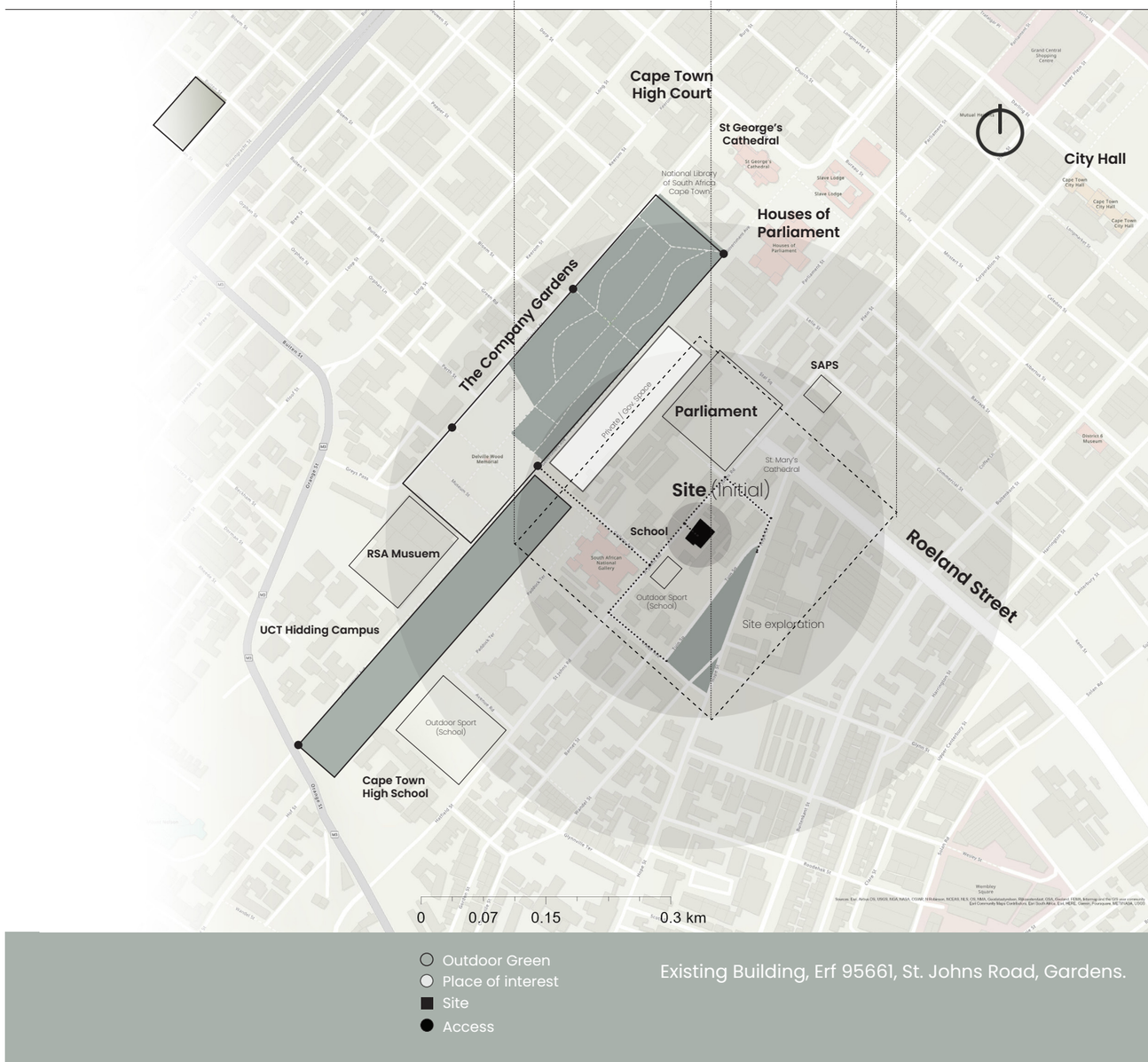
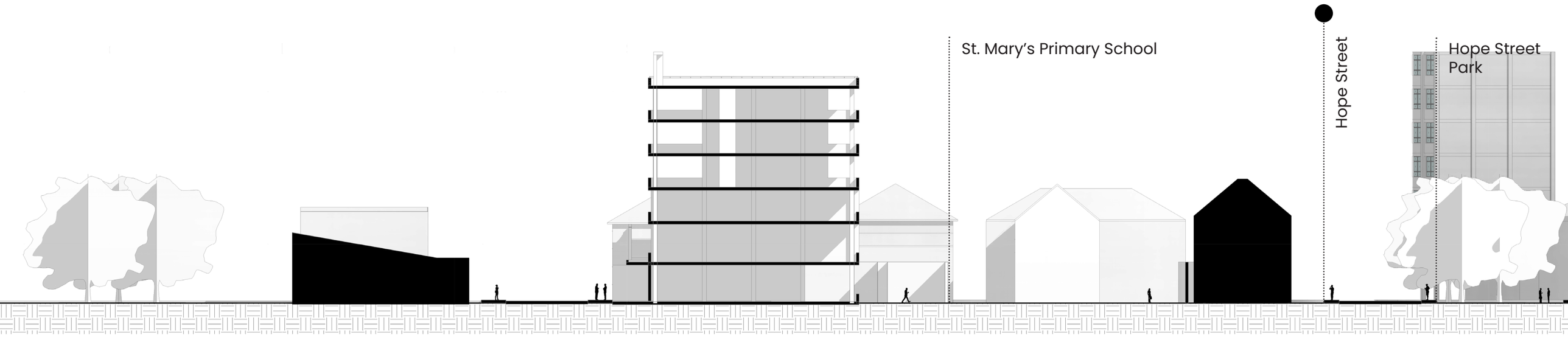


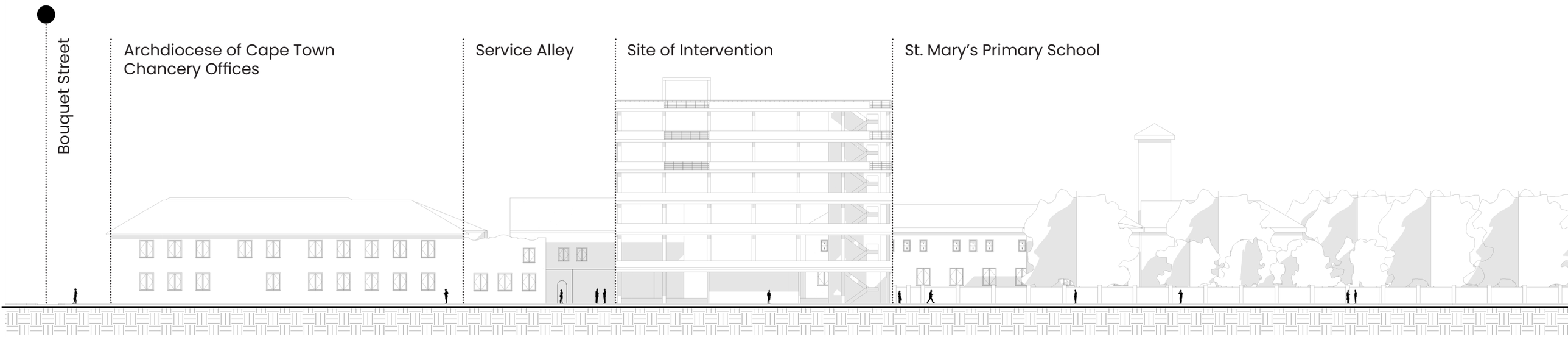
Figure 12: Site Plan.
(Compiled by author with reference to (CoCT, 2023)



Existing Building, Erf 95661, St. Johns Road, Gardens.



Site Section 1:200



Street Elevation 1:200

Activity Nodes in Cape Town CBD

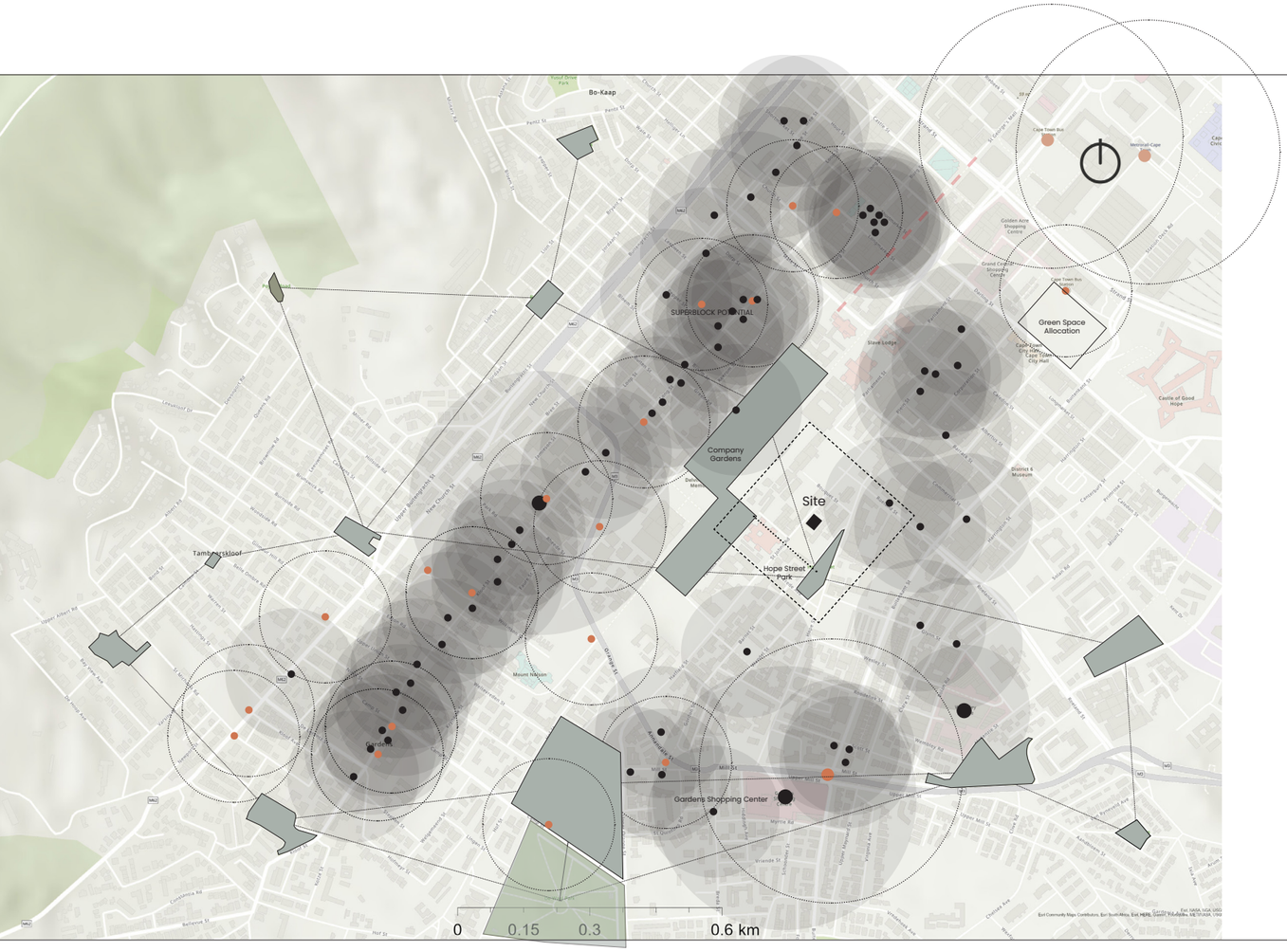


Figure 12.1: Activity Node Map.
(Compiled by author with reference to (CFM, 2023)

Mapping Activity Nodes (Food / Drink / Transportation) to explore how choice architecture can be used to create bridges from one activity zone to the next.

Connecting Outdoor Public Spaces

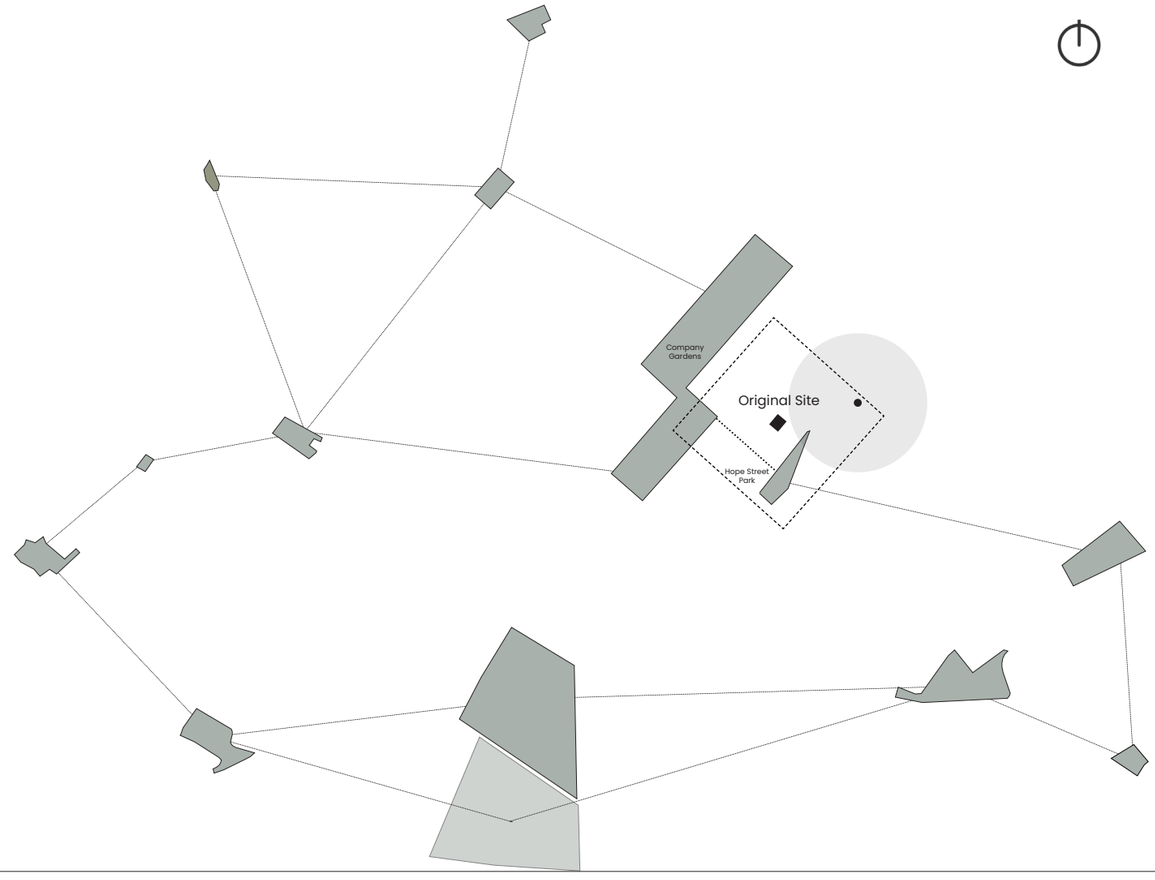


Figure 12.2: Connecting Outdoor Public Space.
(Compiled by author with reference to (CFM, 2023)

Connecting Green Spaces and Parks to determine distances and accessibility to outdoor public spaces.

Repairing the Underutilized Urban Precinct

This project constitutes a design intervention aimed at the revitalization of the surrounding urban fabric. The site's significance lies in its proximity to multifaceted urban elements, including a school, the parliament, existing administration offices, housing developments, the South African National Gallery and Natural History Museum. From an architectural perspective, it's imperative to understand that this transformation isn't merely about the structure itself but is an architectural dialogue with the larger urban context.

A Community Innovation Hub

The architectural treatment strives to not be limited to the internal spaces but manifest as an active contributor to the community. The architectural choices focuses on creating a sense of belonging and inclusivity. It aims to offer spaces for communal events, workshops, and exhibitions, encouraging interaction and cultural exchange. The architecture, thus, becomes a bridge connecting people, fostering a sense of unity and cohesion in the locality.

The architectural language places a strong emphasis on knowledge sharing and learning. The building strives to foster a sense of curiosity and intellectual discourse. Spaces should be fluid and adaptable, catering to various learning and working styles. The architectural design strikes a balance between functionality, technological integration, and artistic expression, acting as an embodiment of the innovative spirit it aims to nurture. The architectural narrative should allow students, co-workers, and community members in close proximity, to observe and engage with a dynamic and vibrant community of thinkers as this hub becomes a gesture of community development more than a revival of workplace.

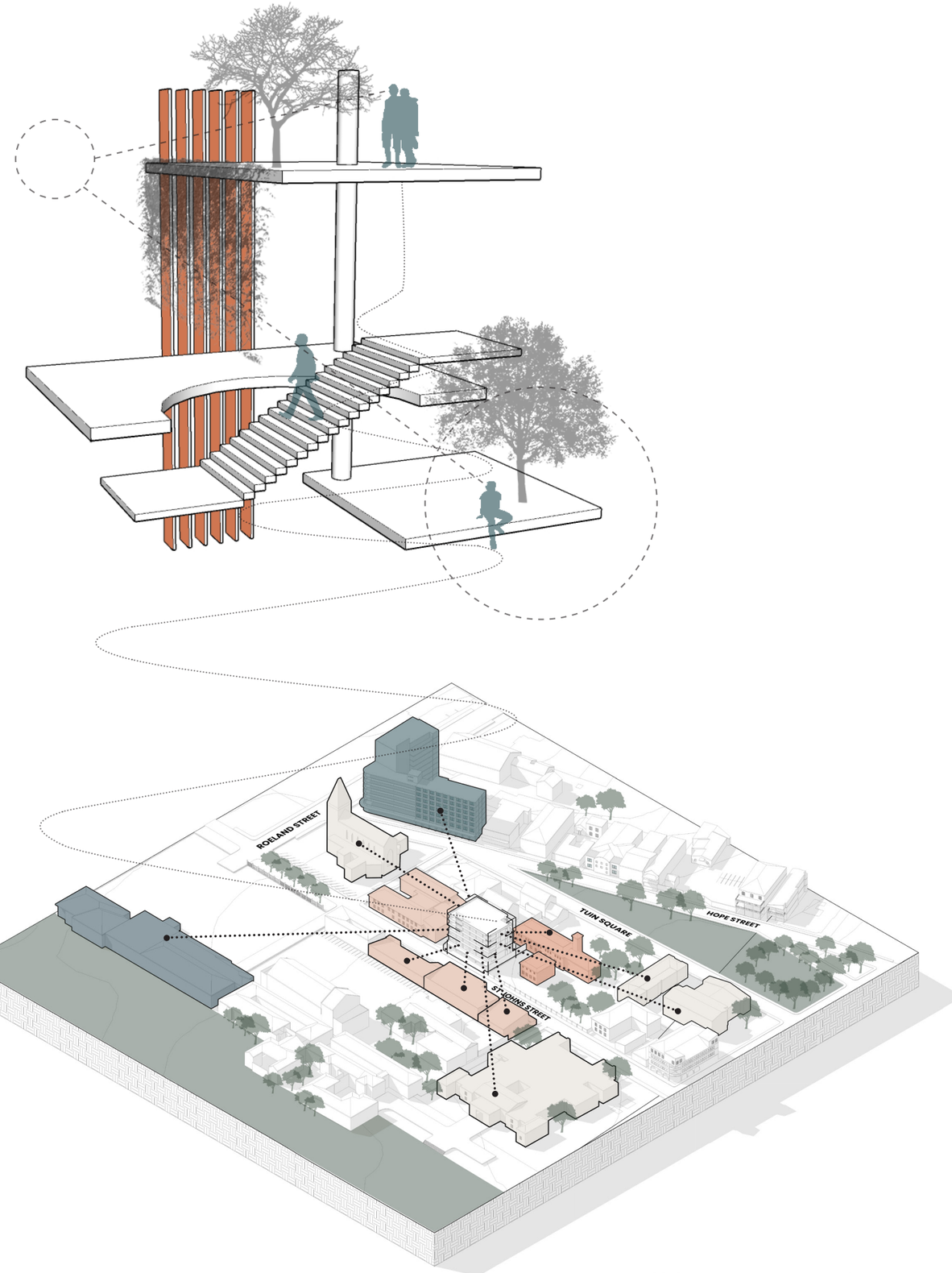
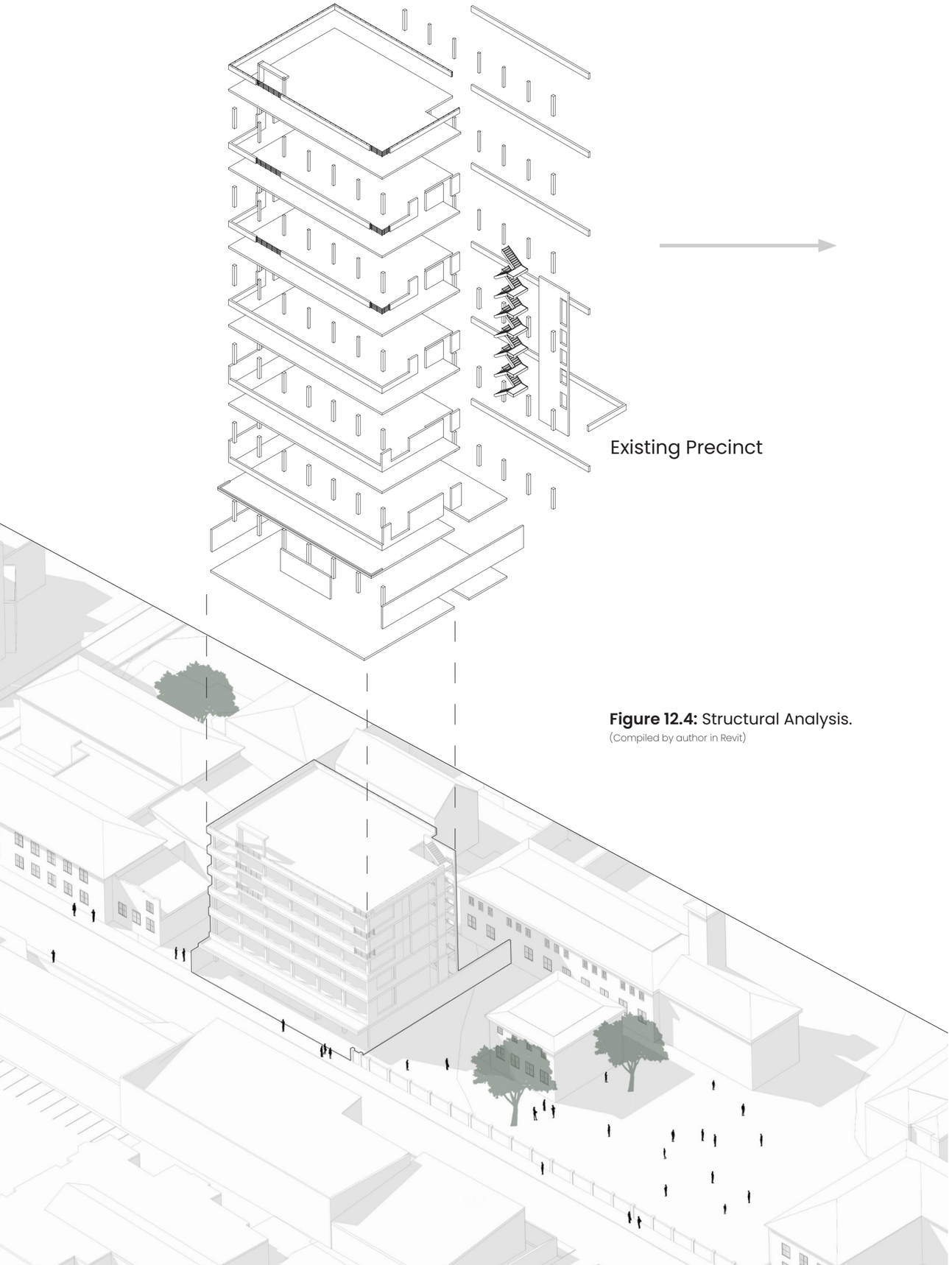
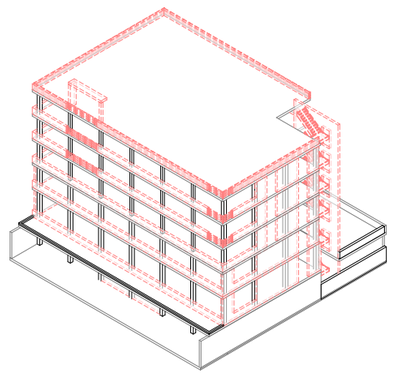


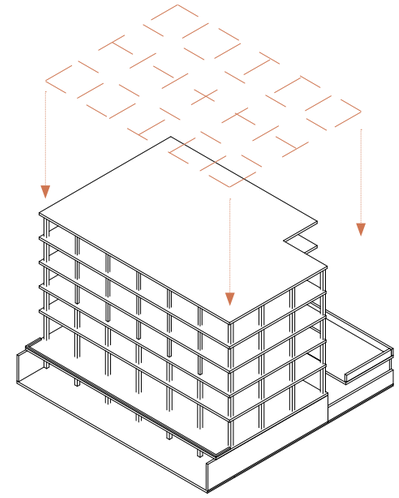
Figure 12.3: Program Connections.
(Drawing by Author)



Existing Precinct



Demolition Works



Re-Use of Existing Structure and Grid

Figure 12.4: Structural Analysis.
(Compiled by author in Revit)

Adaptive Re-Use and the Existing Precinct

In line with the principles of urban revitalization, the architectural strategy aims for harmonious integration with the existing urban landscape. This intervention purposefully makes use of an existing precinct in order to demonstrate specific structural adjustments which can be made for a more human-centered architecture. As the intervention aims to complement the neighboring structures, the approach intends to make use of the maximal of the existing fabric, hence only constructing what is necessary.

PLACE MAKING x **ADAPTIVE RE-USE**

The metamorphosis of otherwise underutilized surfaces into an interactive and dynamic canvas explores bridging the chasm between the educational environment and the ever-evolving demands of modern pedagogy.

1. Reimagining the access of roofspace becomes a vibrant hub for community interaction and environmental stewardship. With the incorporation of indigenous flora, sculptural art, and functional zones that encourage communal engagement, all while embracing an eco-conscious approach deeply rooted in the region's history and culture. By blending urban living with natural elements, this design move redefines the urban narrative and creates a space that reflects the spirit of the locale. It fosters bonds, nurtures sustainability, and encapsulates the essence of architecture's role in shaping a harmonious, imaginative, and eco-friendly urban future.

2. A climbing wall, etched vertically upon the structures South-Western face, not only infuses vitality into the school yard, but extends an earnest invitation for students to engage with their educational surroundings. It's an ode to the philosophy that education exists not merely within the confines of a classroom but in the embrace of an enriched environment.

Moreover, the climbing wall serves as an embodiment of a larger idea: the integration of art and athleticism within the building's very façade. It is a statement of purpose, where the architecture becomes a medium for the embodiment of physical activity, artistic expression, and the fusion of education with recreation. The climbing wall, reminiscent of a challenging puzzle, instills in students a sense of adventure, resilience, and collective camaraderie.

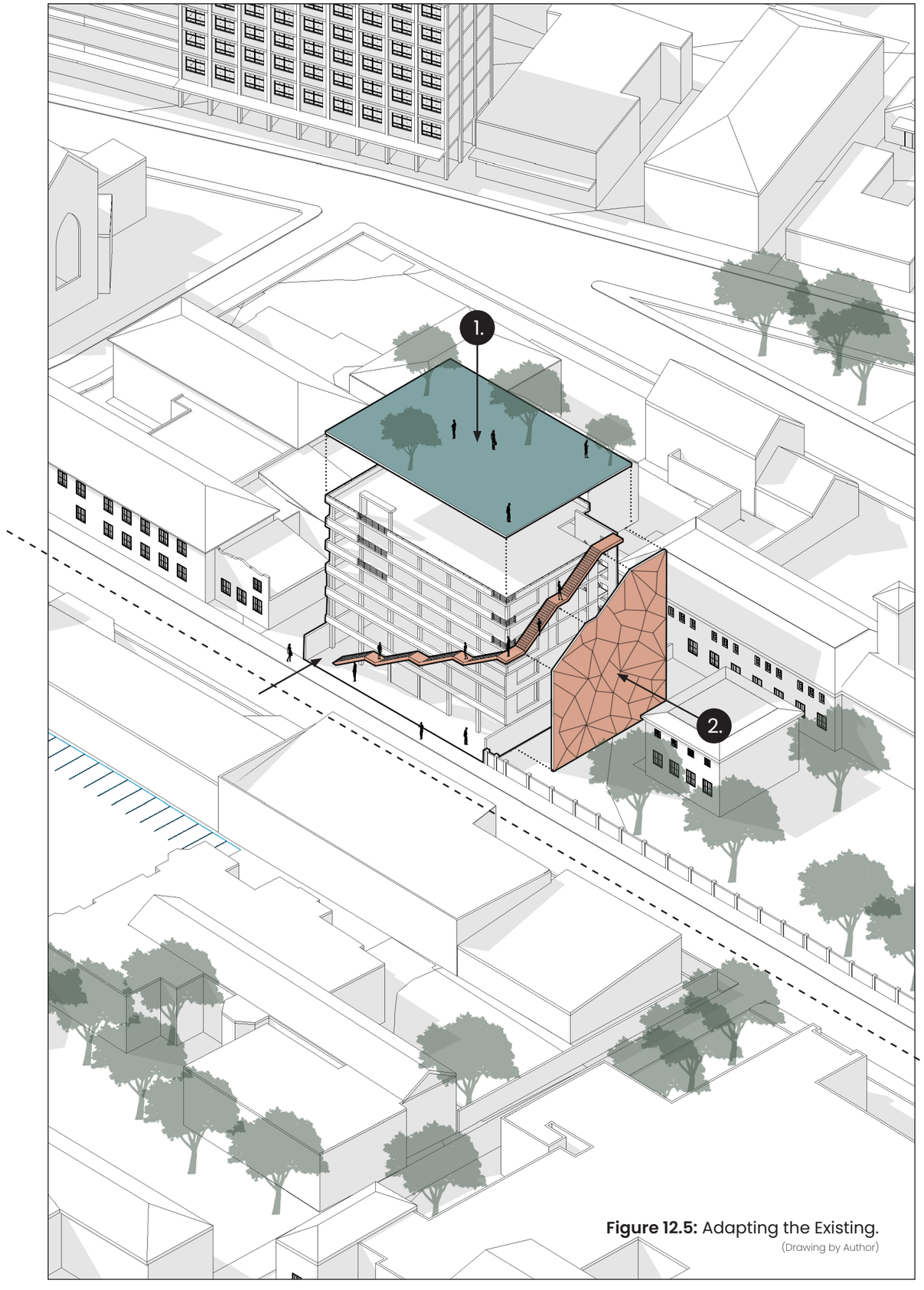


Figure 12.5: Adapting the Existing.
(Drawing by Author)

Threading the Theoretical Base

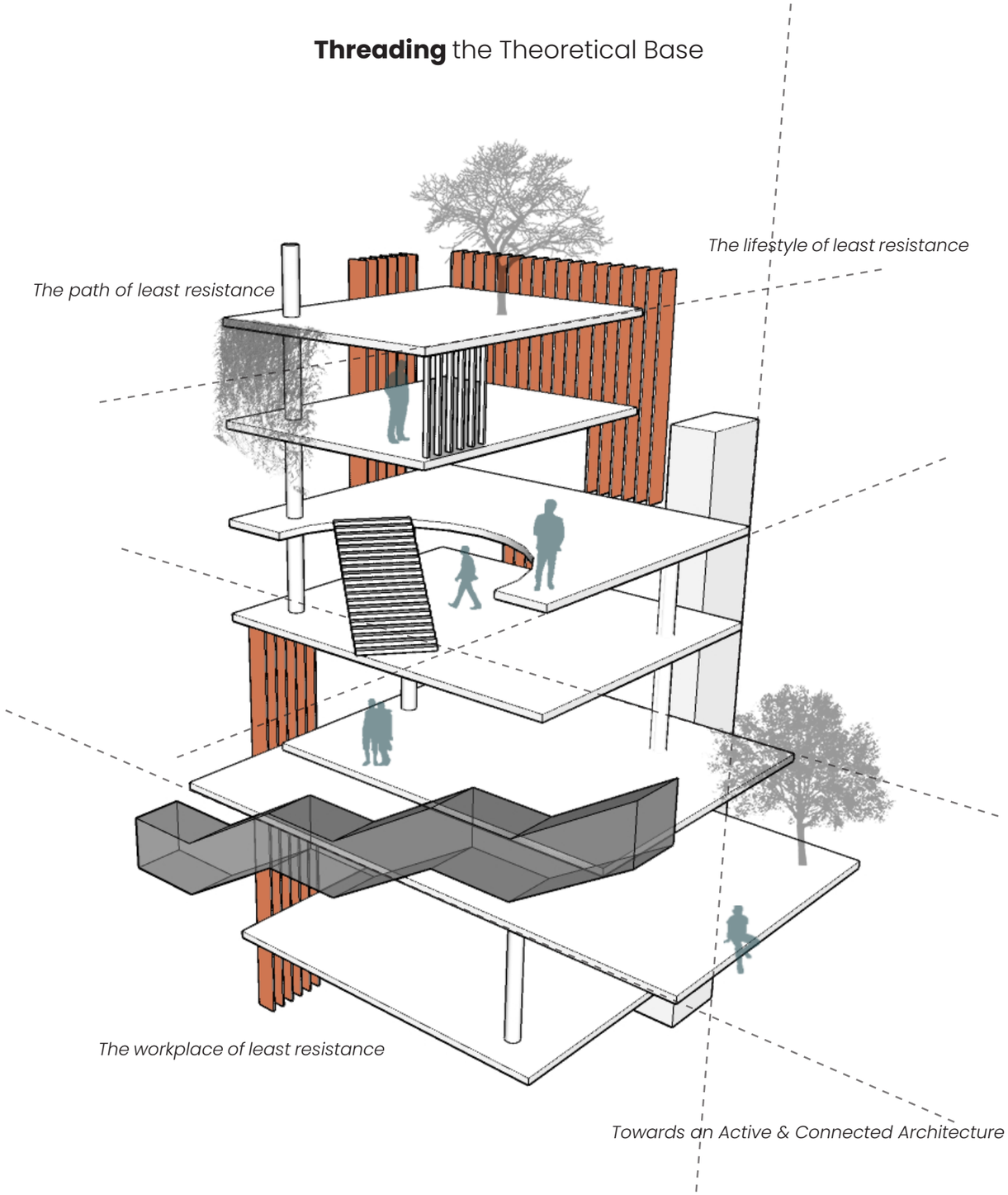


Figure 12.6: Theoretical Thread.
(Compiled by Author)

COMMUNITY + **WORK** + **WELLNESS**

(social connection) (focus & productivity) (physical & mental health)

Design **Concept**

The design intent involves focusing on a holistic approach to the evolving nature of workspaces, in addition to that of community and wellness, fostering a sense of empowerment, collaboration, and well-being among occupants. This concept positions the redesigned workspace as a hub for innovation, adaptability, and community building in the post-COVID era.

Defining Program

The program for the intervention is informed by the urban fabric and the surrounding precinct. As the intent for this building is to create spaces which houses social & collaborative work environments with additional areas of activation which would serve both the public and the individual. The approach involved dividing up floor areas to account for certain programs which would require different modes of activation, these modes are defined as the public, the collaborative environment, and spaces for focus.

Program List

Collab

Lounge / Casual Encounters
Open Co-Work Areas
Workshop Venues
Entertainment Areas
Communal Kitchen
CAD-Lab
Print Room
Showers and Toilets
Storage

Focus

Private Offices
Conference Room
Co-Work Area
Storage
Teaching

Community

Gym / Yoga
Cafeteria / Restaurant
Outdoor Area
Exhibition Area
Workshop Venues

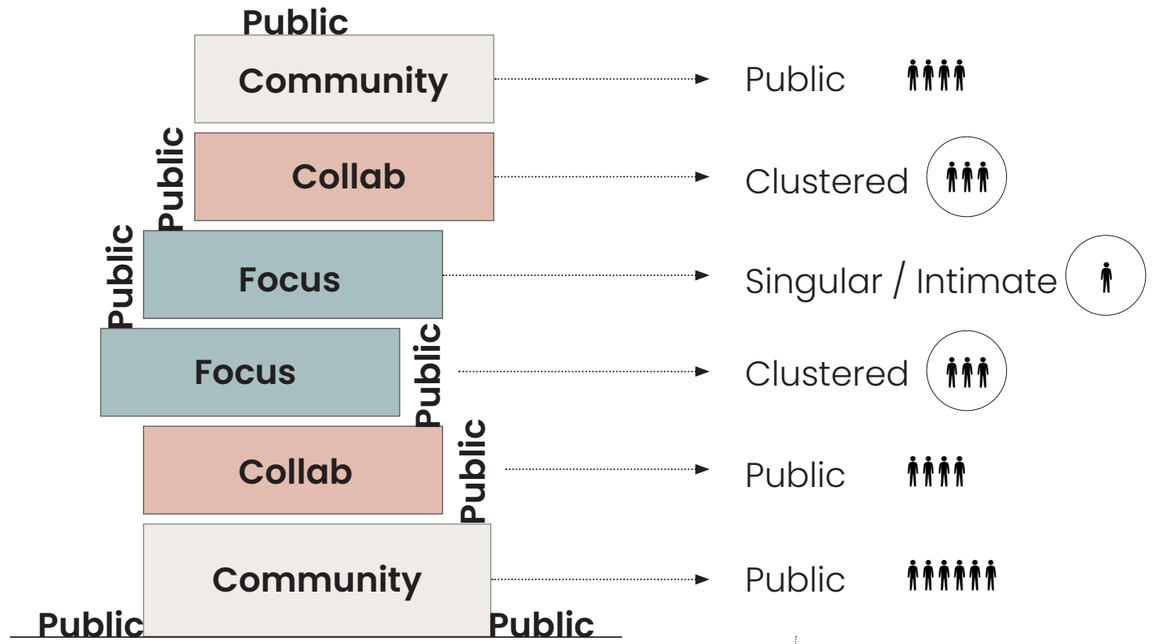


Figure 12.7: Program Layering.
(Compiled by Author)

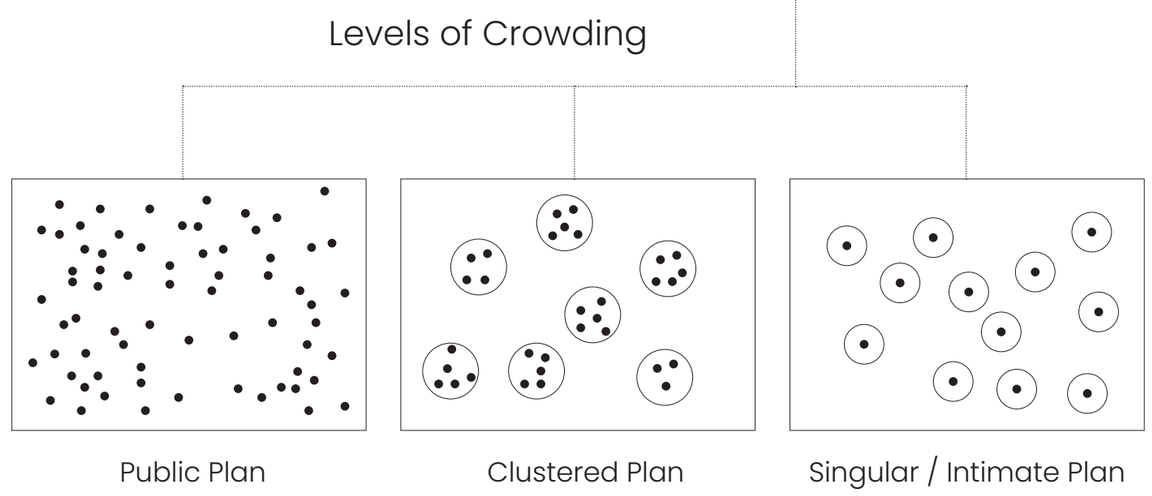
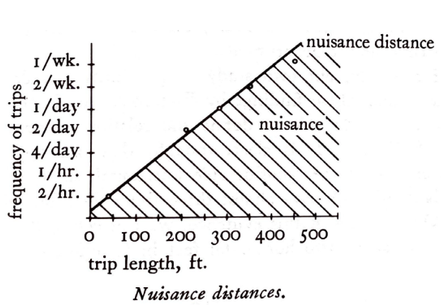


Figure 12.8: Levels of Crowding.
(Compiled by Author)

Applying Theory to the Precinct

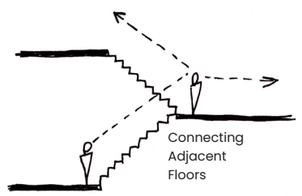
Circulation and Movement Speeds

As the programs account for various types of activation, through a technical lens, movement speeds and circulation became an important factor in determining spatial activation. The theoretical base informs the placement of the floors and aims to maximize occupant circulation across spaces. These sketches explore the main circulatory routes across the building and how they are informed by the principles of vertical and horizontal connection.



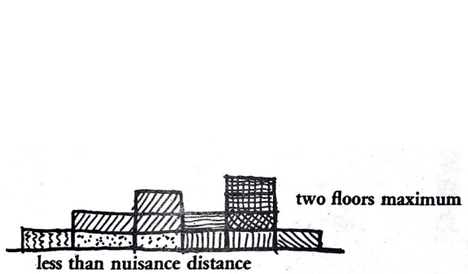
Nuisance Distances

Figure 6.3: Graph Measuring Nuisance Distances. 1977.
(Source: Christopher, A. 1977. Scan from Public Outdoor Rooms illustration. A Pattern Language. New York. Oxford University Press. 1977.



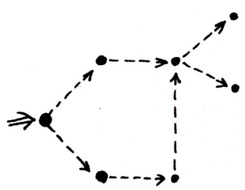
Staircases and Visual Connections

Figure 7.3: Staircases with visual connections.
(Source: Created by author)



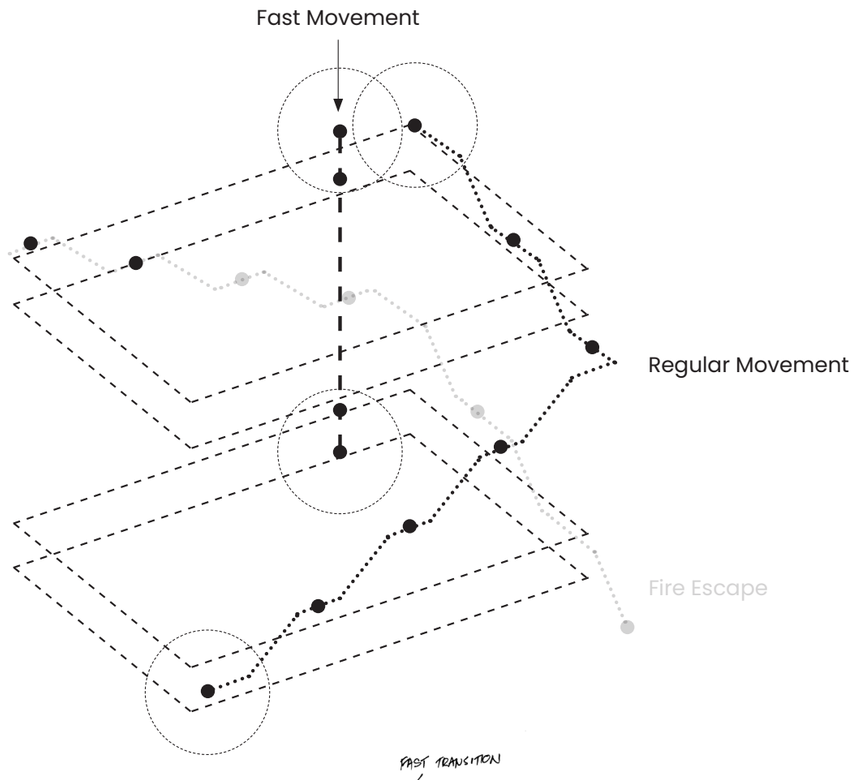
Vertical Distance Connection

Figure 7.1: Vertical Distances. 1977.
(Source: Christopher, A. 1977. Scan from Office Connection (82) illustration. A Pattern Language. New York. Oxford University Press. 1977.



Reception nodes

Figure 7.5: Reception nodes.
(Source: Created by author)



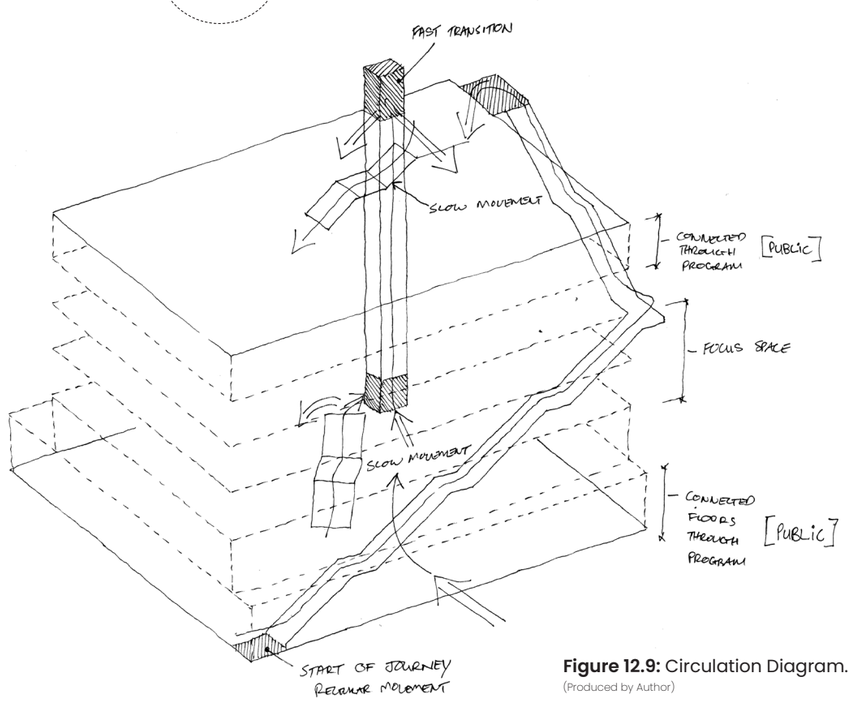
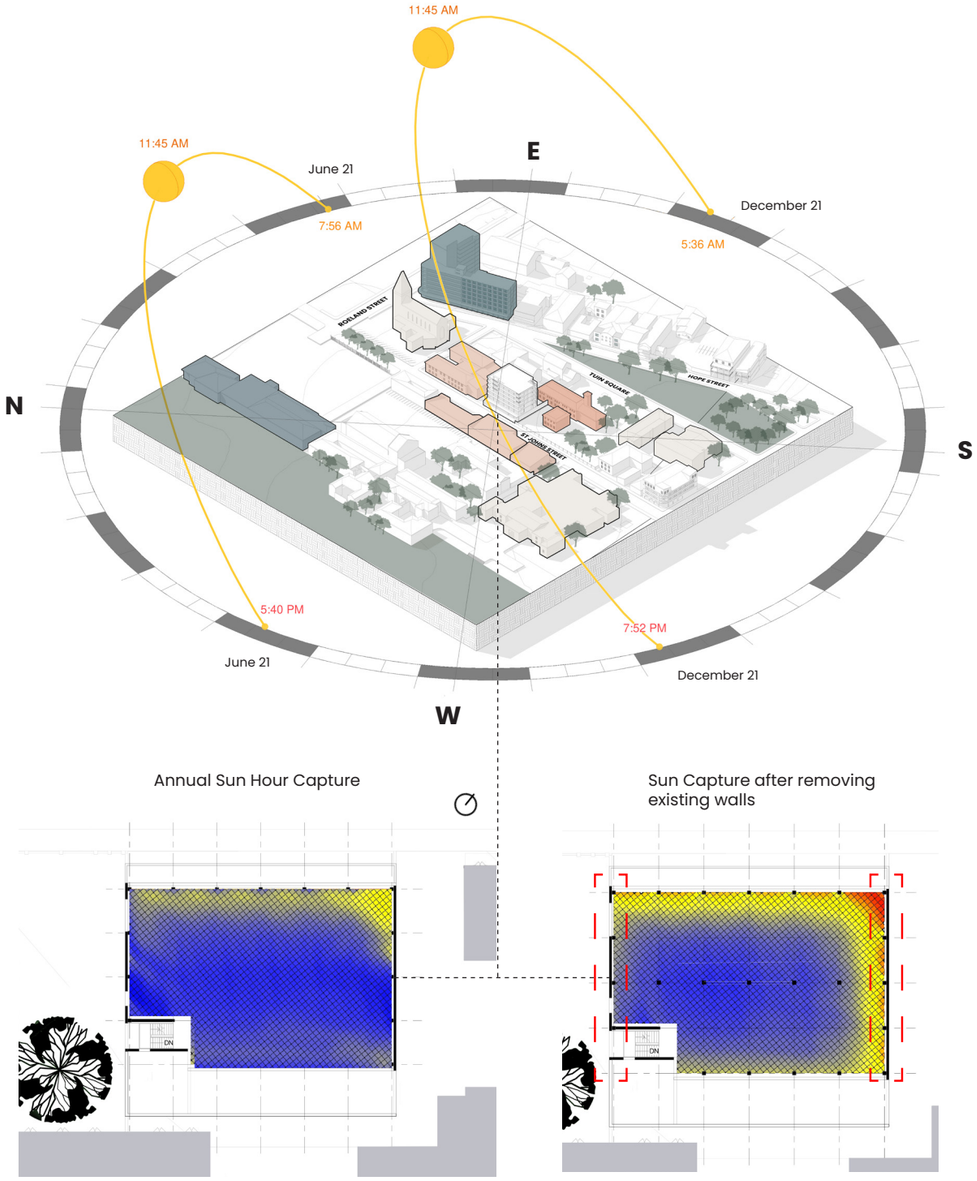
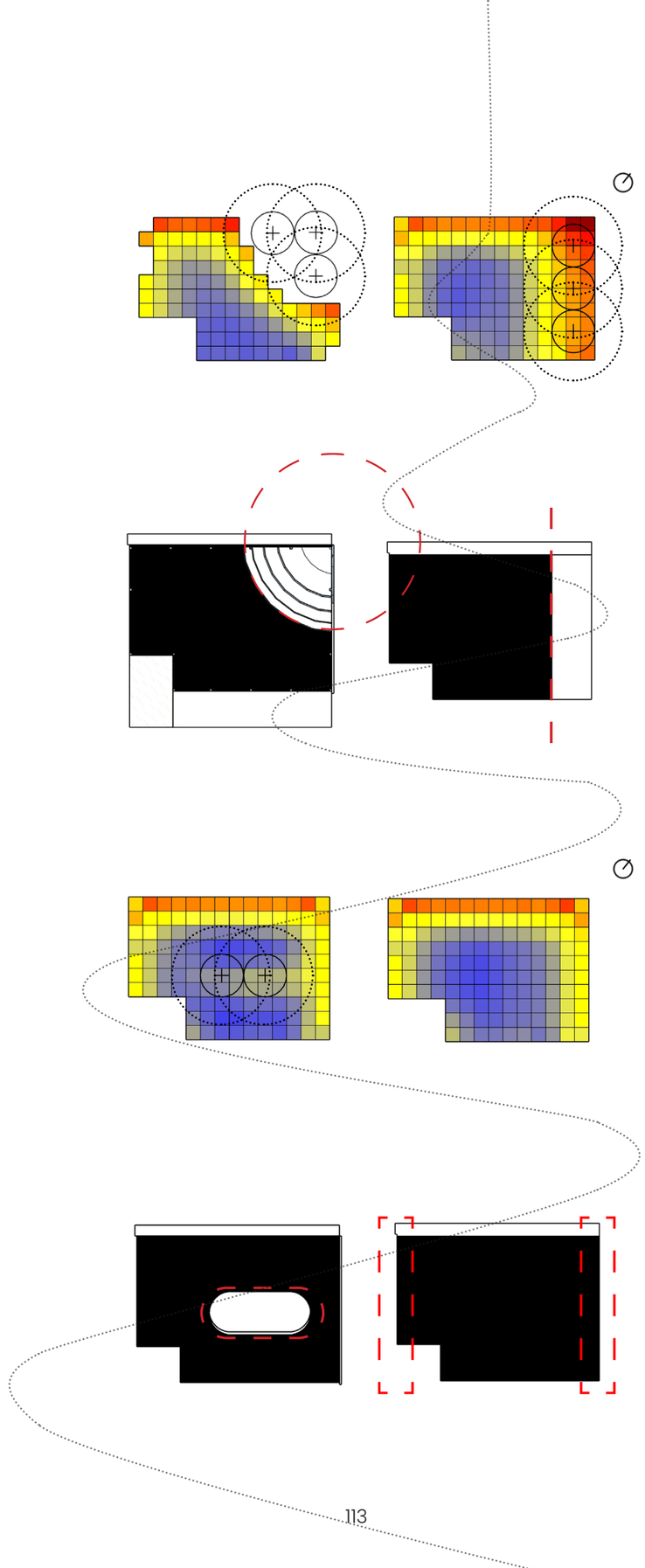


Figure 12.9: Circulation Diagram.
(Produced by Author)

Lighting Analysis Testing & Floor Layouts

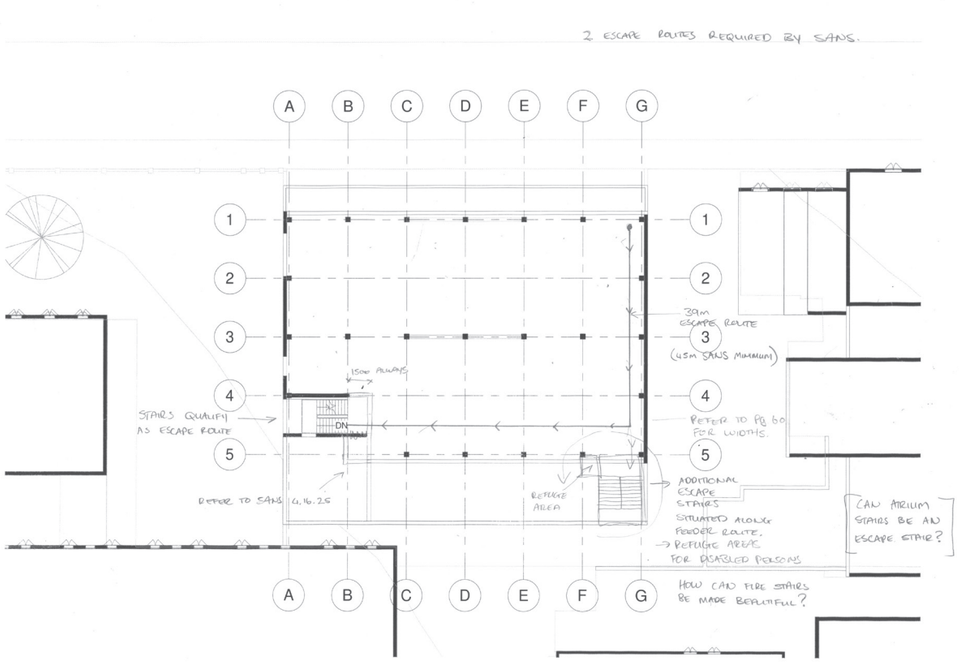
Before iterating floor layouts an analysis was done in order to develop an understanding on how these spaces capture sunlight. The annual sun hour capture study depicted areas significantly lacking natural light, after which multiple tests where conducted to understand how various slab cut-outs affect the lighting quality within the existing building.



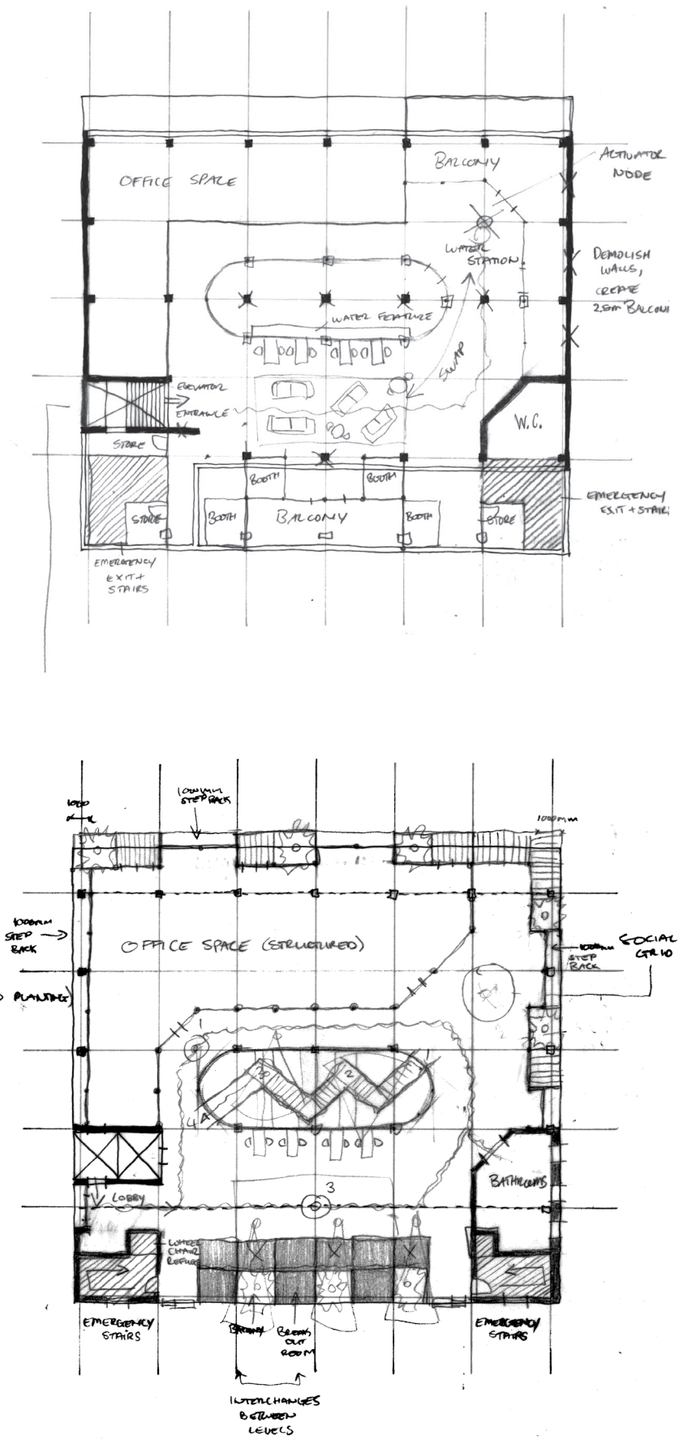


Floor Layout Flexibility & The Typical Plan

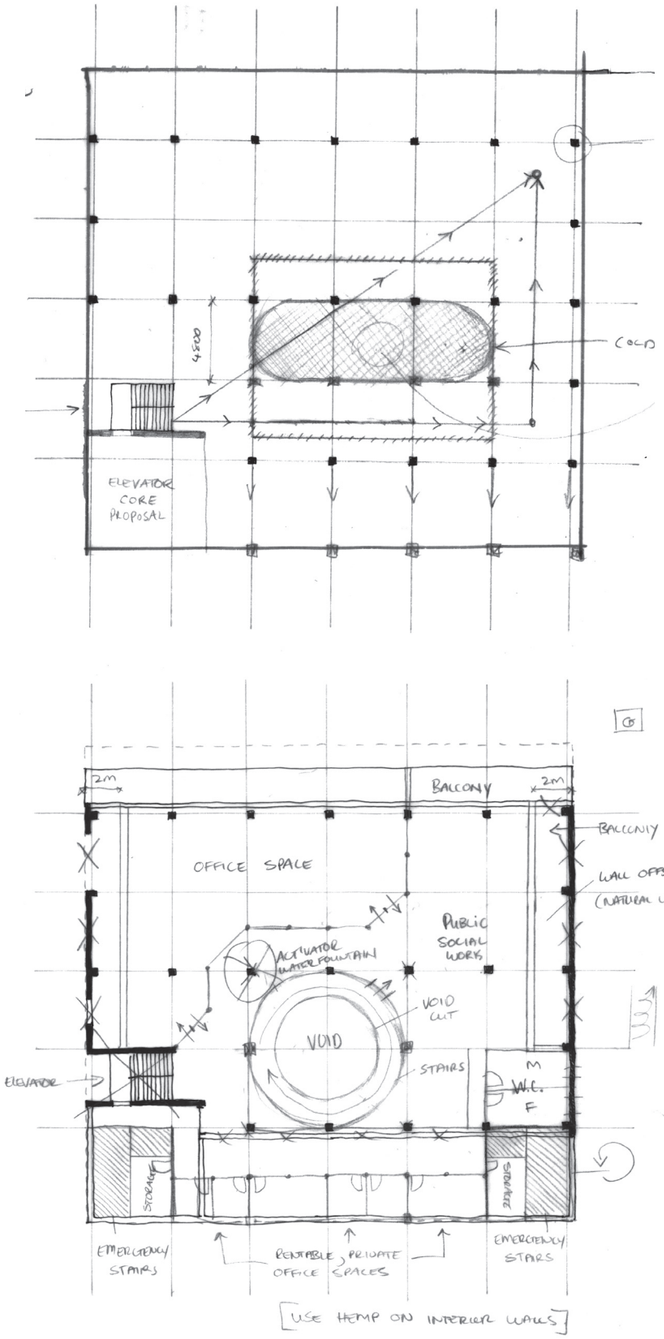
Adaptability and the versatility of spaces are essential prerequisites for accommodating the inherently unpredictable and constantly evolving nature of events within social spaces. Space that lacks adaptability not only constrains its capacity to host diverse events but also restricts the potential for rich and multifaceted interactions within its confines. However, on the contrary extreme, excessive flexibility can lead to spaces that lack definition and a clear identity. This became a challenge in interogating a suitable floor layout dedicated to the programs which exist on each floor.



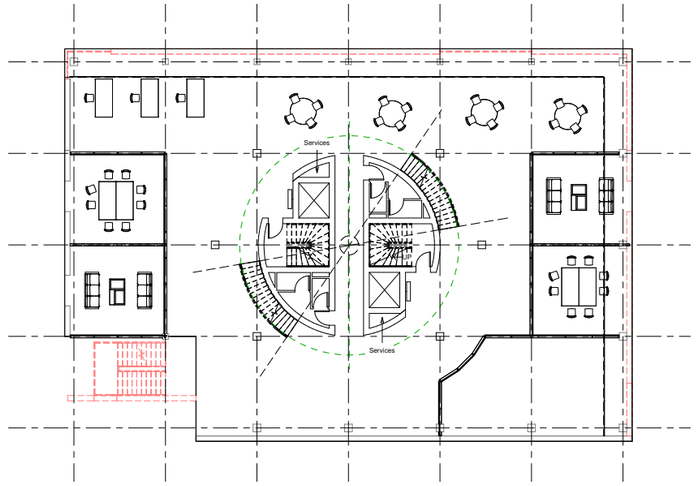
Plan Exploration Sketches

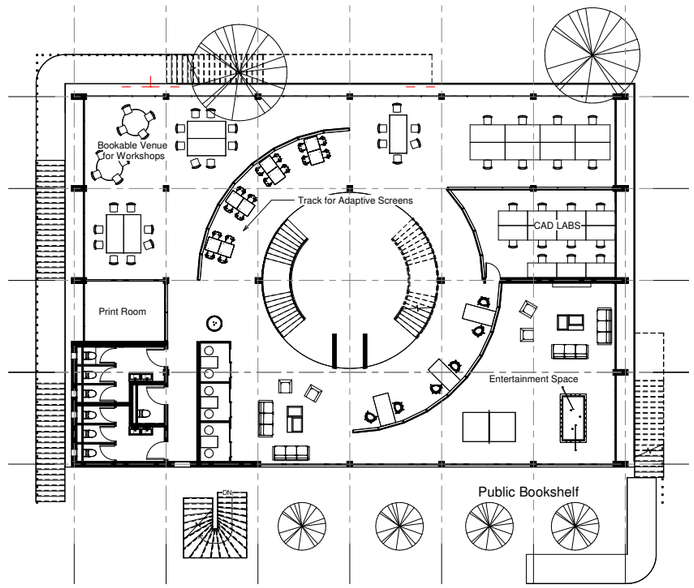


Plan Exploration Sketches



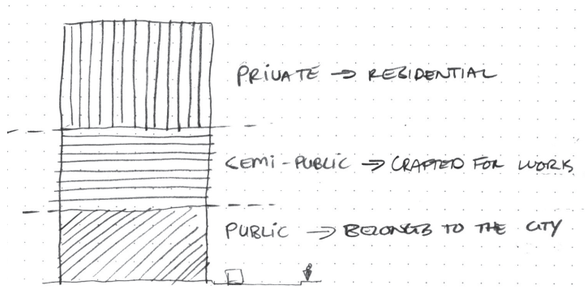
Plan Exploration Sketches

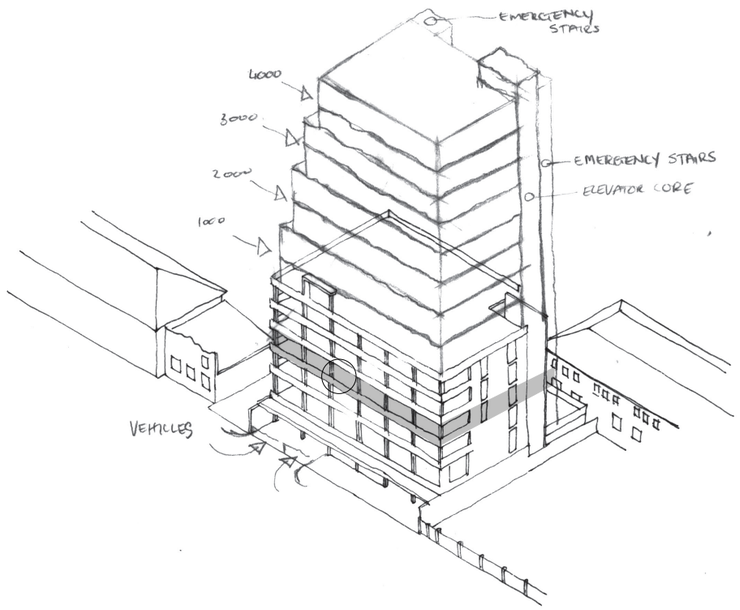


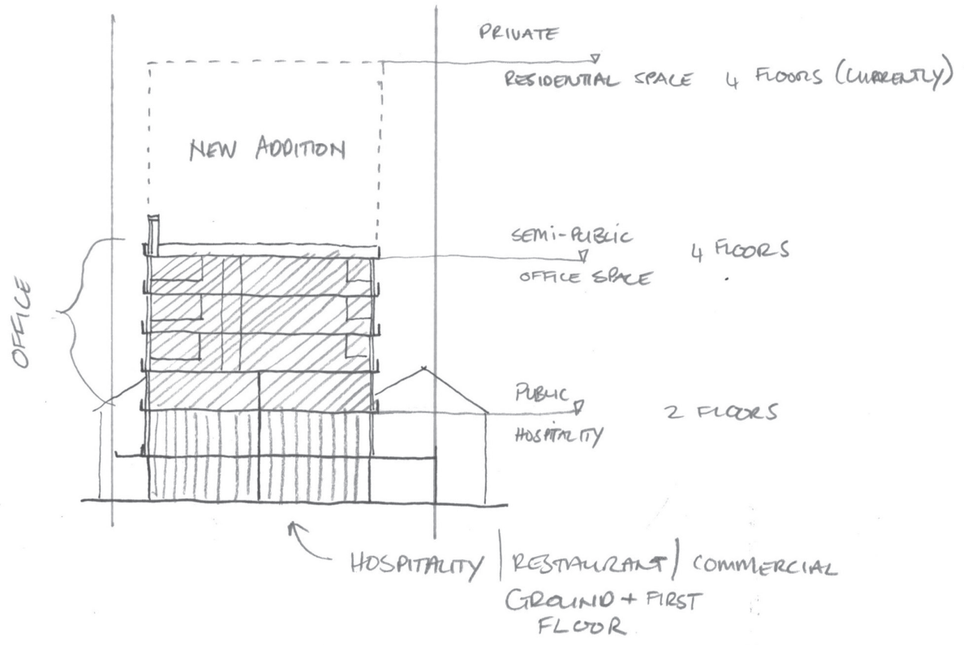


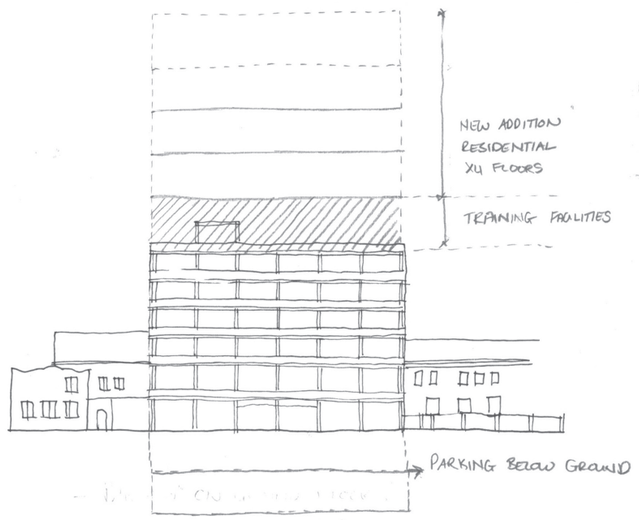
Exploring Structural Potential: Process Work & Sketch Design

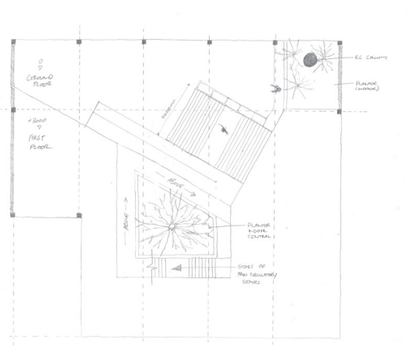
The design process involved exploring several design iterations in plan and three dimentional form finding. The aim of this process was to iterate a number of design possibilities in order to understand the potential of the existing structure and investigate what can be added and subtracted in order to bring value to the site.

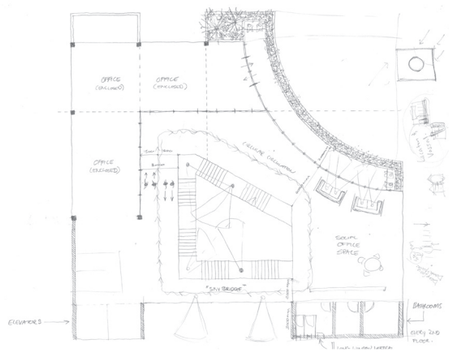


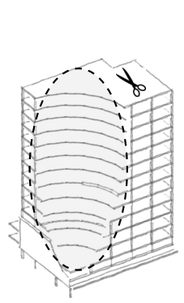




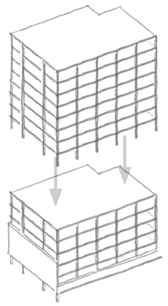




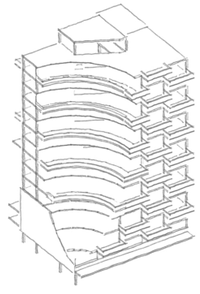




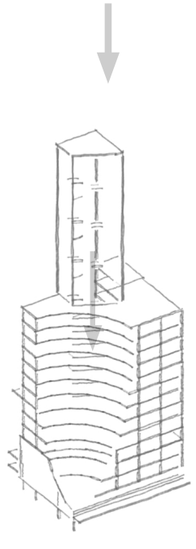
Void Cut



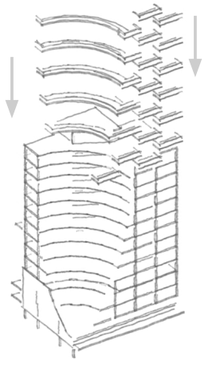
Floors Added to Existing Frame



Finalized Massing

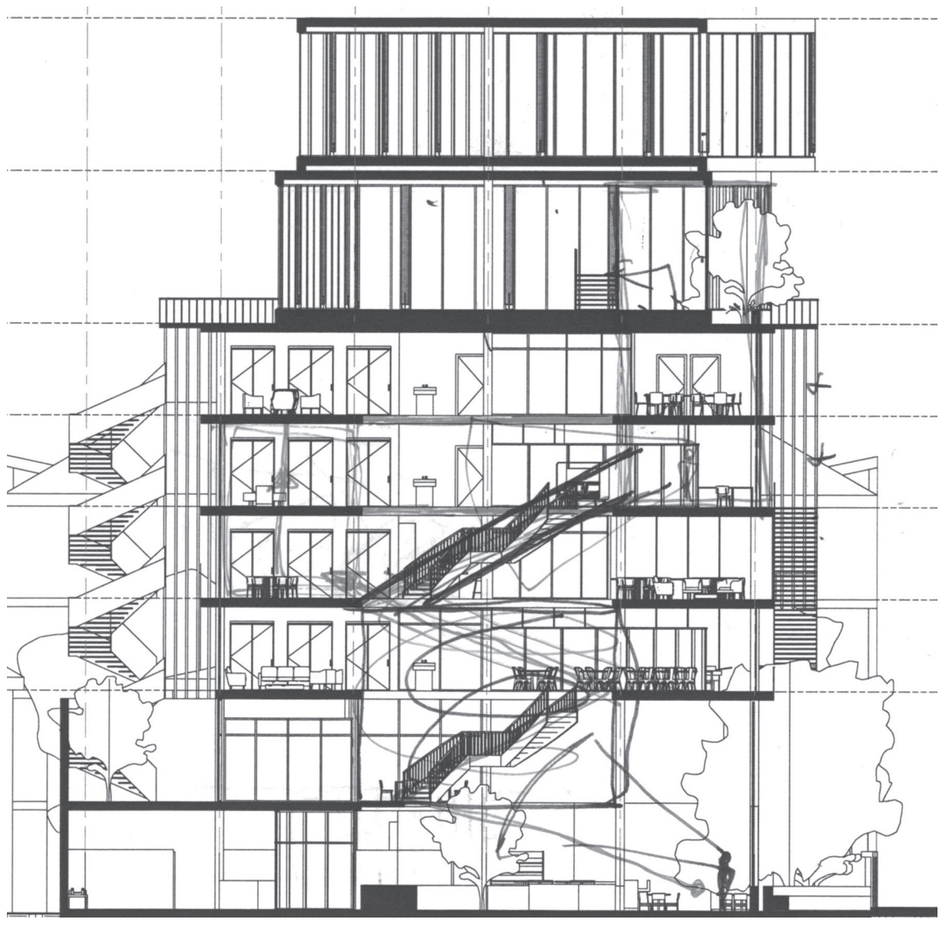


Circulation Core Insertion



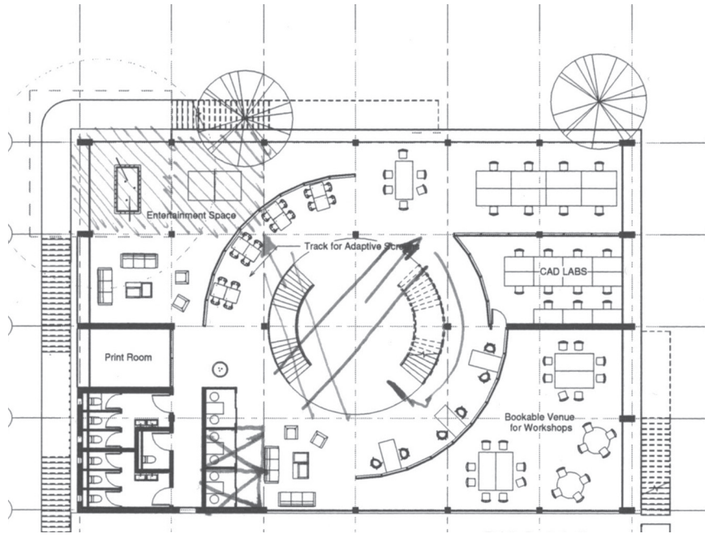
Facade Planter Attachment

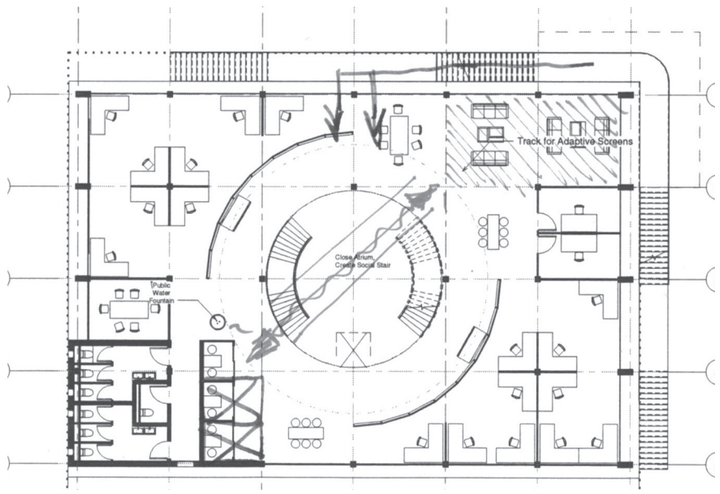
Section Exploration Sketches

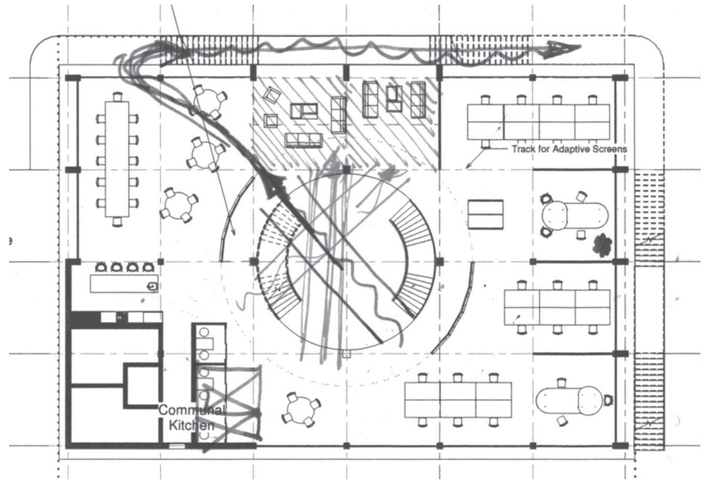


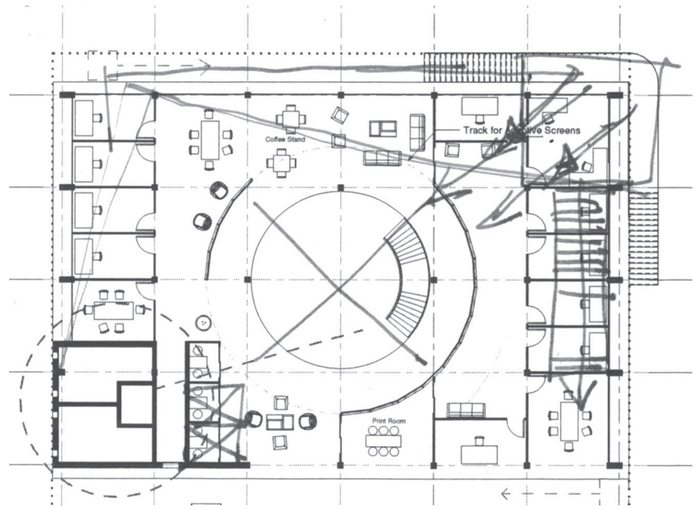
Plan Exploration Sketches

Exploring various methods of creating spaces across floors which connects occupants whilst housing varying levels of intimacy.

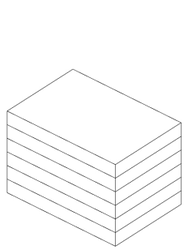




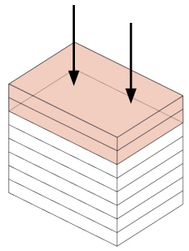




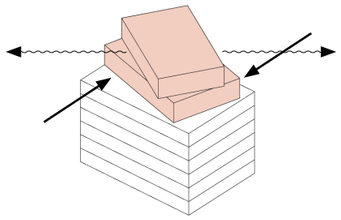
Conceptual Form Finding & Massing



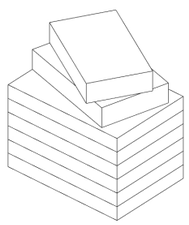
Existing Mass



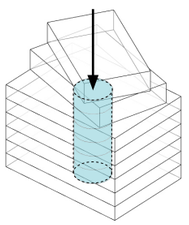
Superimpose
Additional Floors



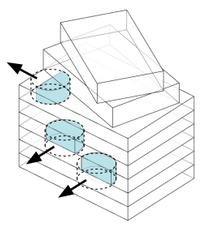
Twist to Embrace Views
& Define Roof Terraces



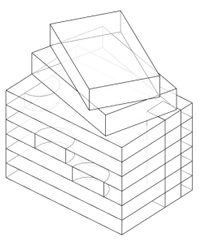
Existing Mass
with New Additions



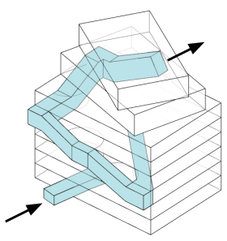
Atrium Insertion



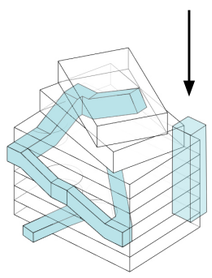
Atrium Offset



Existing Circulation

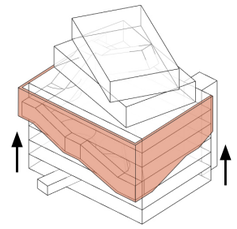


Main
Circulatory
Journey

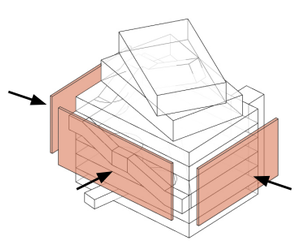


Emergency Exit

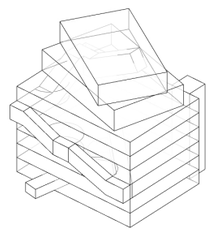
Final Iteration



Framed with Staircase



Shading Device

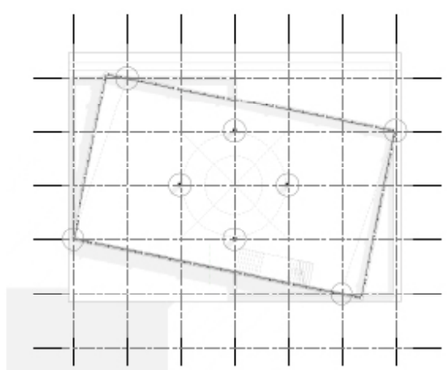


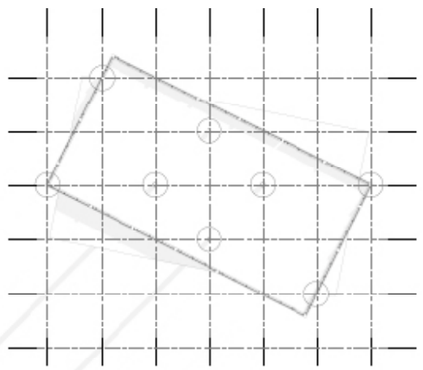
Undefined Facade

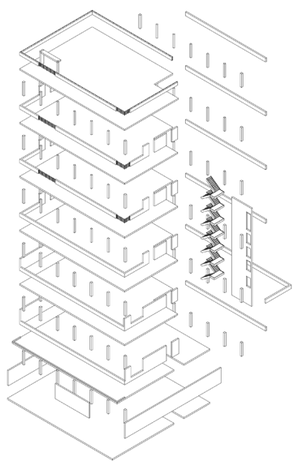
Technical Development

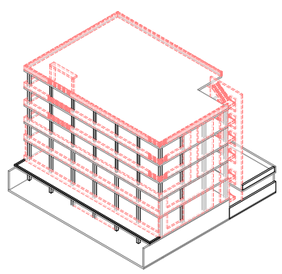
Timber and Steel Lightweight Structures

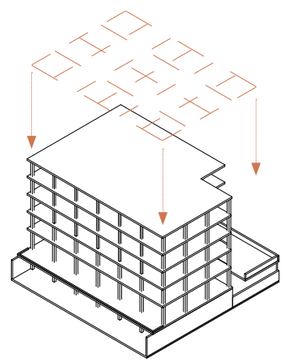
Exploring the potential for superimposing a structure onto the existing building in order to expand usable floor area. The twisting form of the superimposed structure creates a contrast between new and existing whilst simultaneously defining roof terraces and embracing views of the central business district to the North and Table Mountain to the South. This timber frame structure aligns with the existing grid and columns in order to transfer the loads.









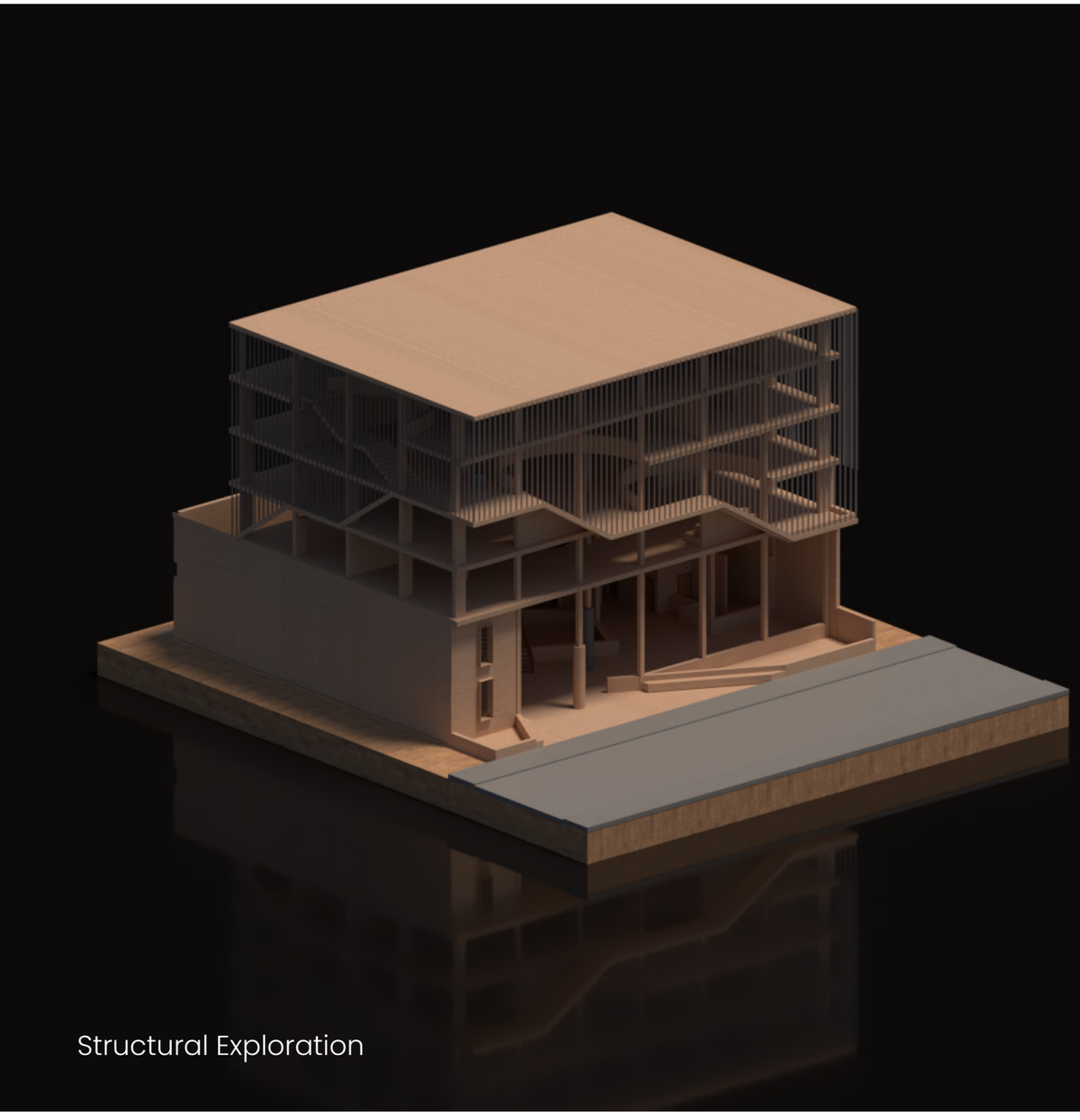


Structural Analysis

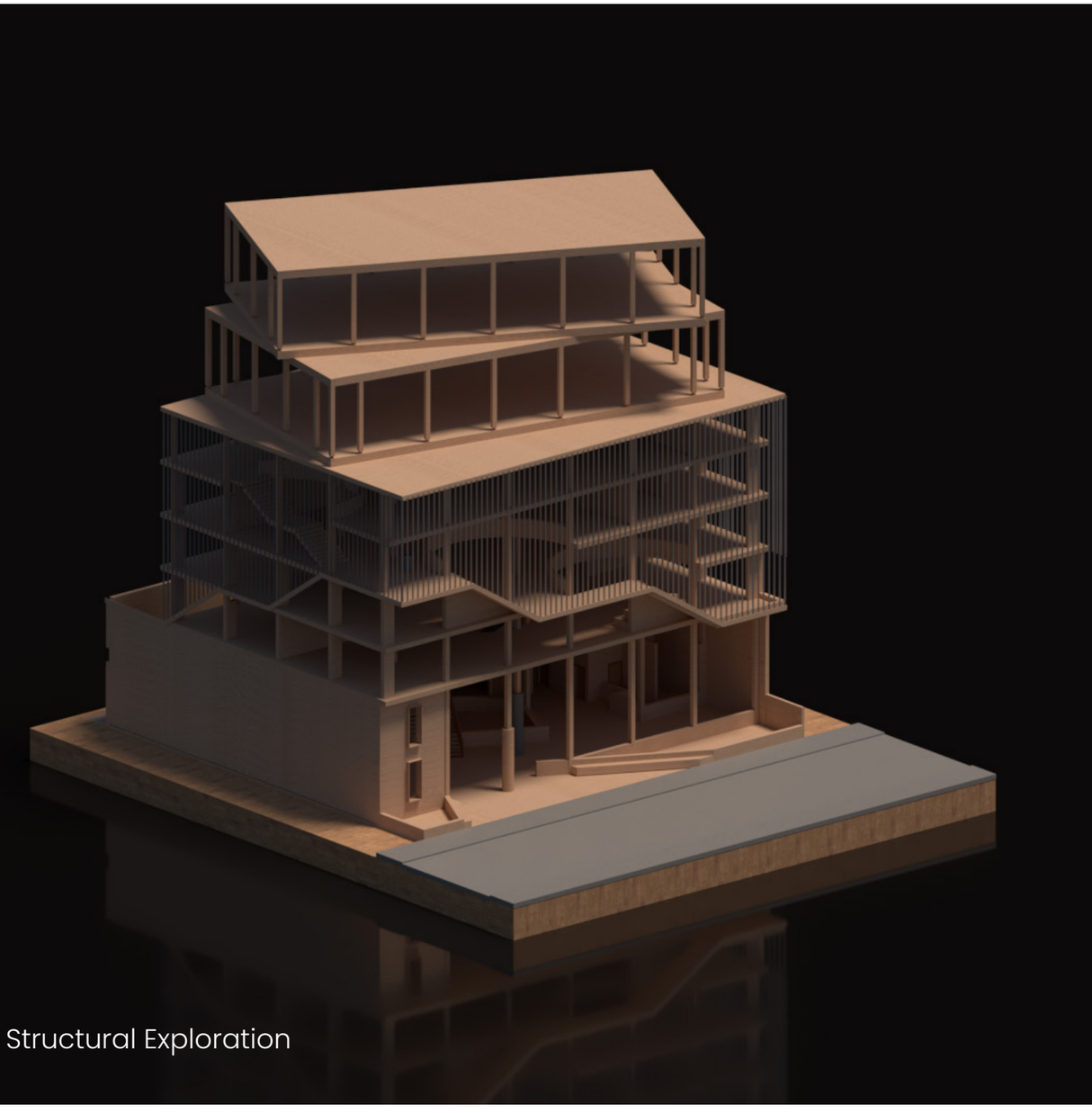
Demolition Works

Re-Use of Existing Structure and Grid

Figure 13: Structural Model.
(Built by Author)



Structural Exploration



Structural Exploration

Technical Development

Hemp Bricks as Interior Walls

The utilization of hemp bricks in this project aims to explore a sustainable solution that transcends traditional construction materials. When used as bricks, hemp provides excellent thermal insulation, fire resistance, and acoustic properties. This becomes invaluable in this retrofit project, enhancing the building's energy efficiency and safety. Moreover, the lightweight nature of hemp bricks minimizes structural loads, making them ideal for maintaining structural integrity. By integrating hemp bricks into the interior walls, one not only enhances the building's environmental performance but also elevates the quality of space, creating a harmonious, sustainable, and safe environment.

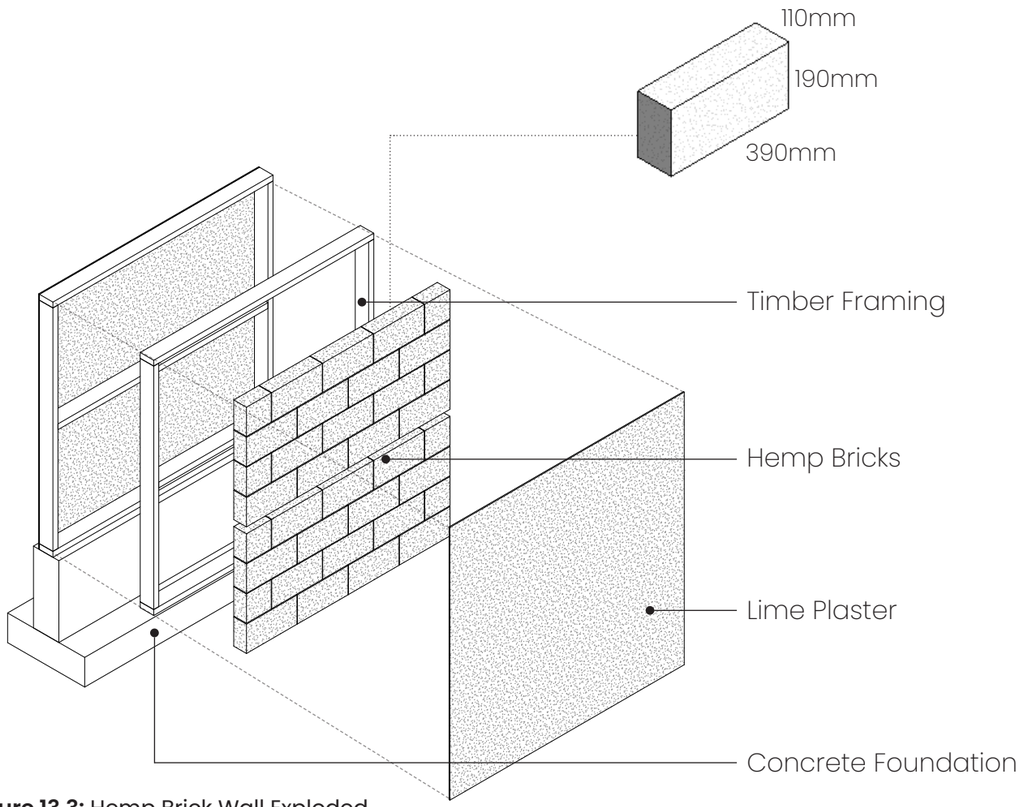


Figure 13.3: Hemp Brick Wall Exploded.
(Produced by Author)

Case Study: 84 Harrington

The 84 Harrington building forms part of a retrofit project, featuring stairwells and lift cores constructed with concrete and exterior walls built with standard masonry bricks. The hemp bricks used on site were extracted from the raw hemp fibers and material provided by the Hemporium, bricks were then manufactured by Afrimat Hemp and delivered on site. These bricks were stacked and plastered between structural members and tied together with the use of a lime-based mortar on top of existing concrete slabs to achieve the appropriate finish.

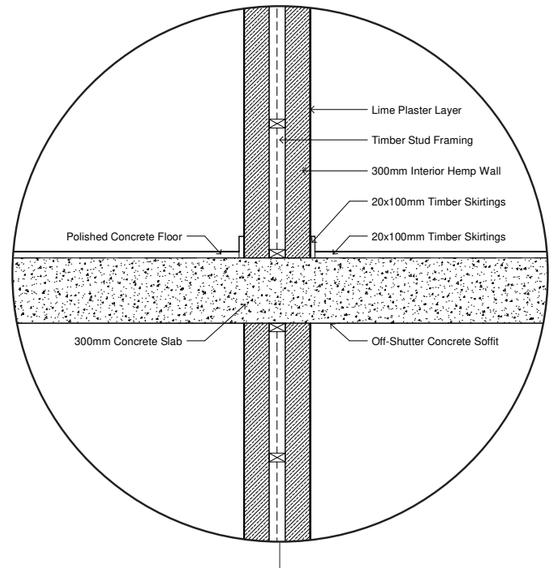


Figure 13.1: Hemp Wall Detail.
(Produced by Author)

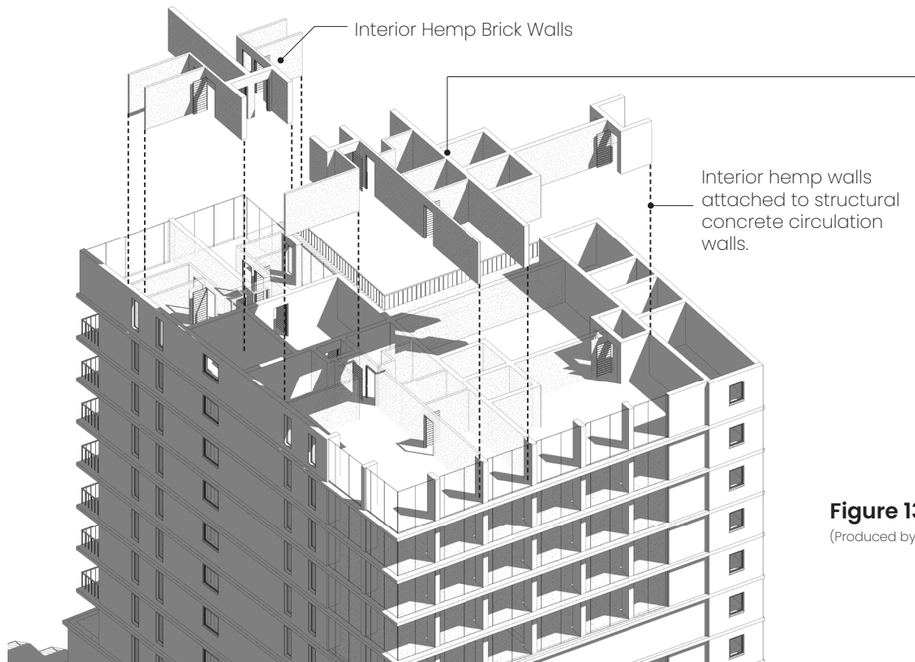
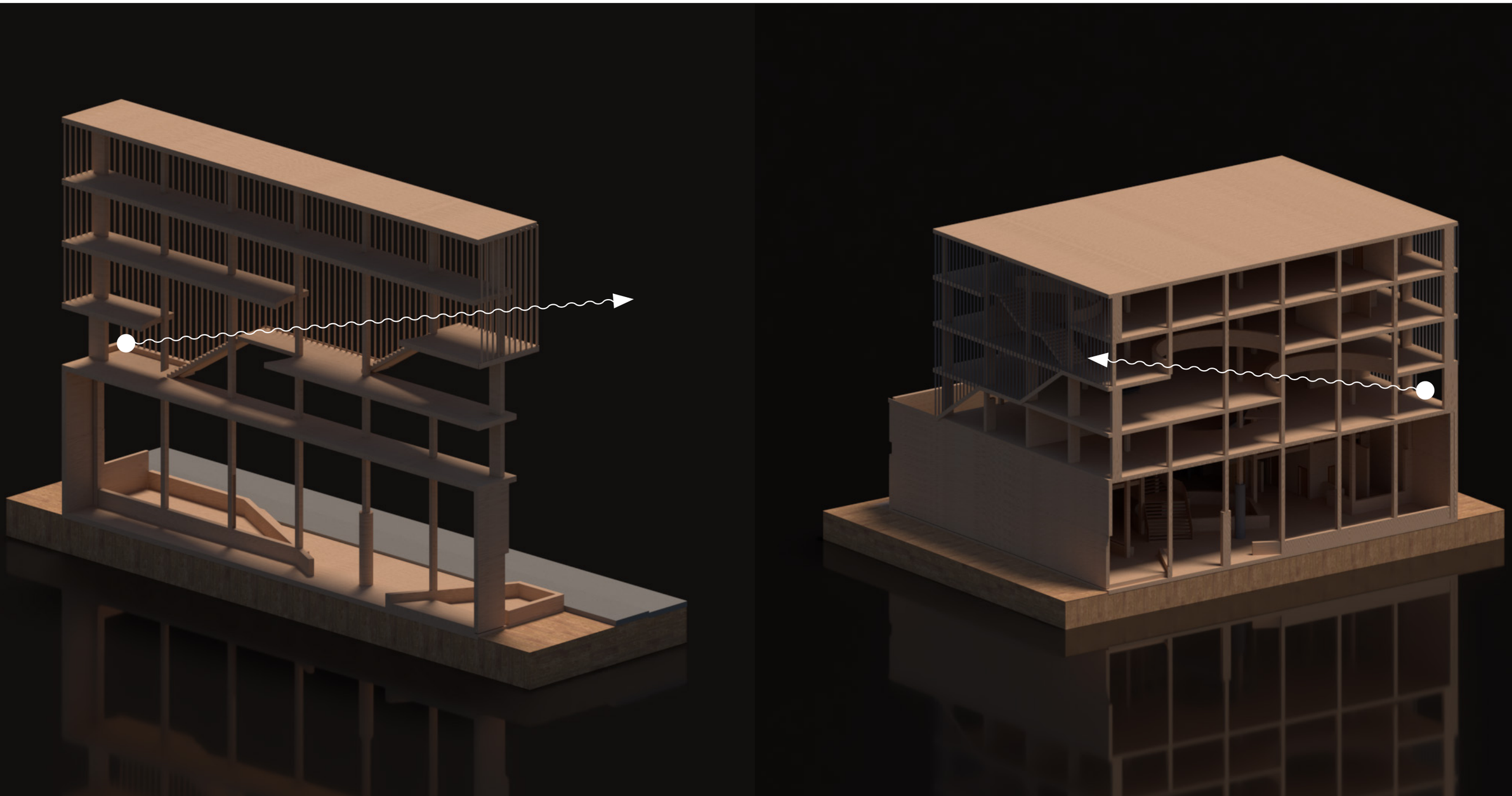


Figure 13.2: H84 Axonometric.
(Produced by Author)

Facade Screening

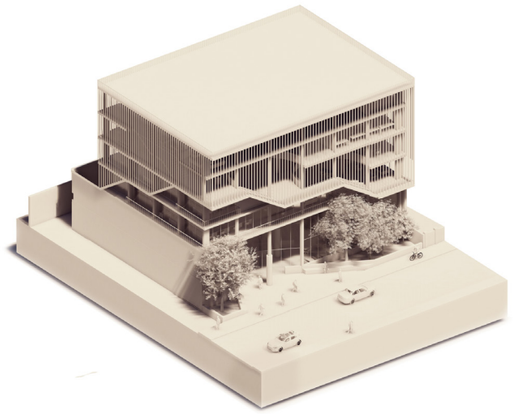
Enhancing the existing structure with a new building envelope has allowed me to envision a dynamic transformation of the building's street front. This innovation not only expands the floor plates, but also addresses the need for a lively circulation network and communal spaces that seamlessly link the building's various levels. The facade addition embraces a blend of steel and timber components, integrated into the building's original facade. In addition, this intervention serves a crucial role in bolstering the structure to accommodate increased loads.



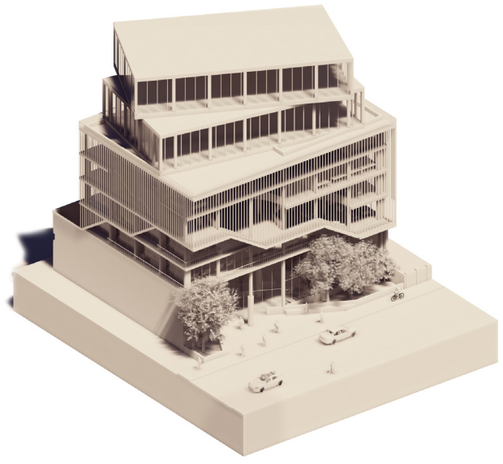
Adaptable Roofscape

The concept of an adaptable roofscape embodies a transformative paradigm. Such an approach facilitates the utilization of the structure's rooftop for diverse functions and future additions, harnessing the otherwise underutilized vertical space.

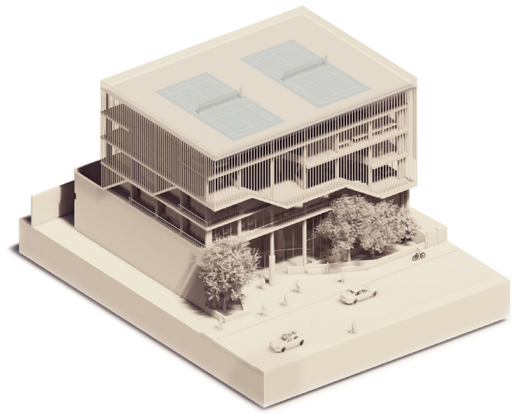
Undefined Roofscape.



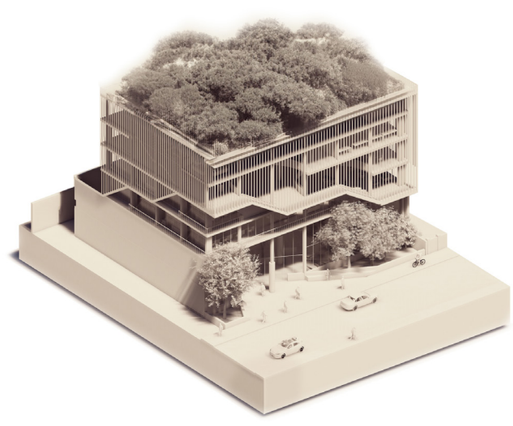
Lightweight Structure.



Sports Fields.

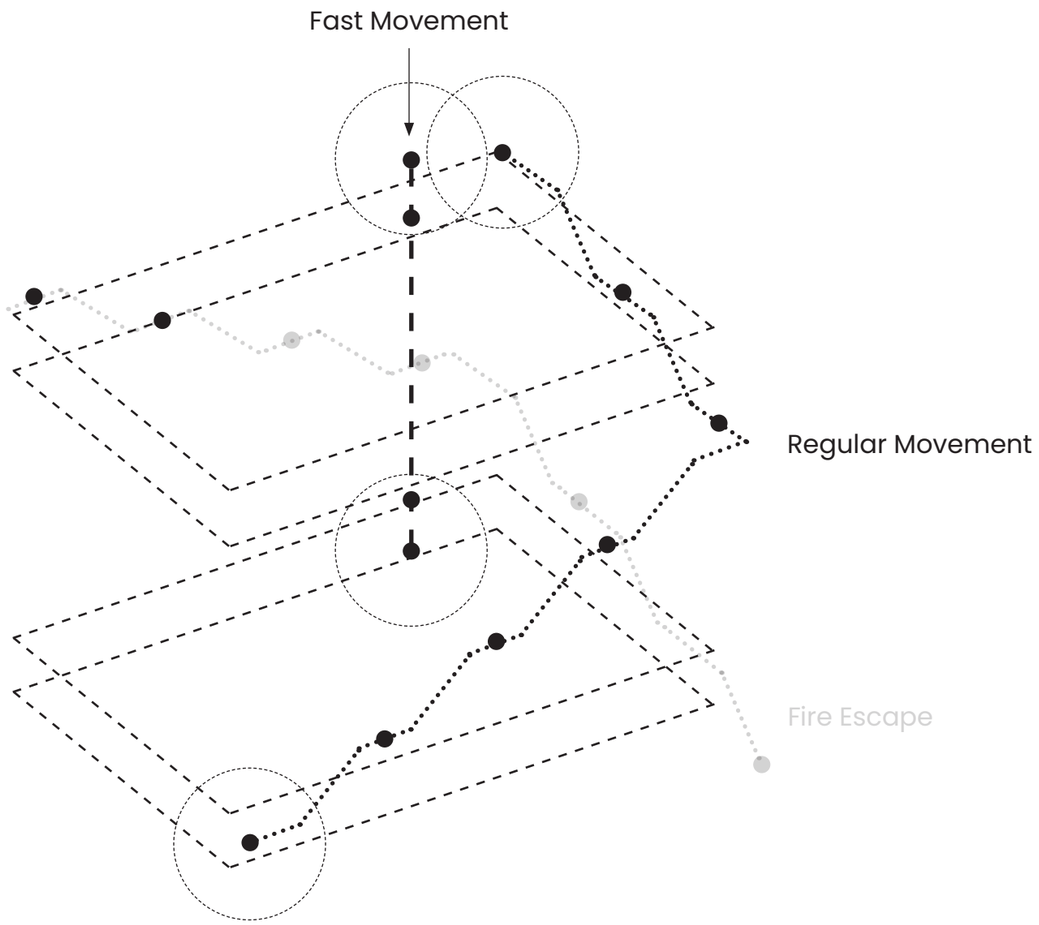


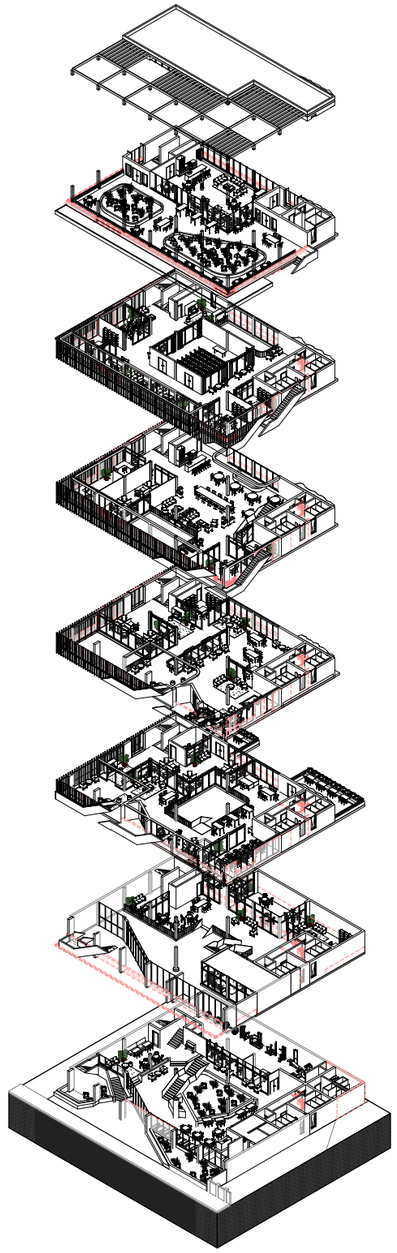
Urban Rewilding.



Circulation Journey and Floor Programs

The circulation throughout the structure takes occupants through various programs designated to different floors. An important aspect which is being explored involves the movement speeds which are required on these floors to entice casual encounters and enable users to engage in activities and foster a connection to different spaces and the users which occupy them.

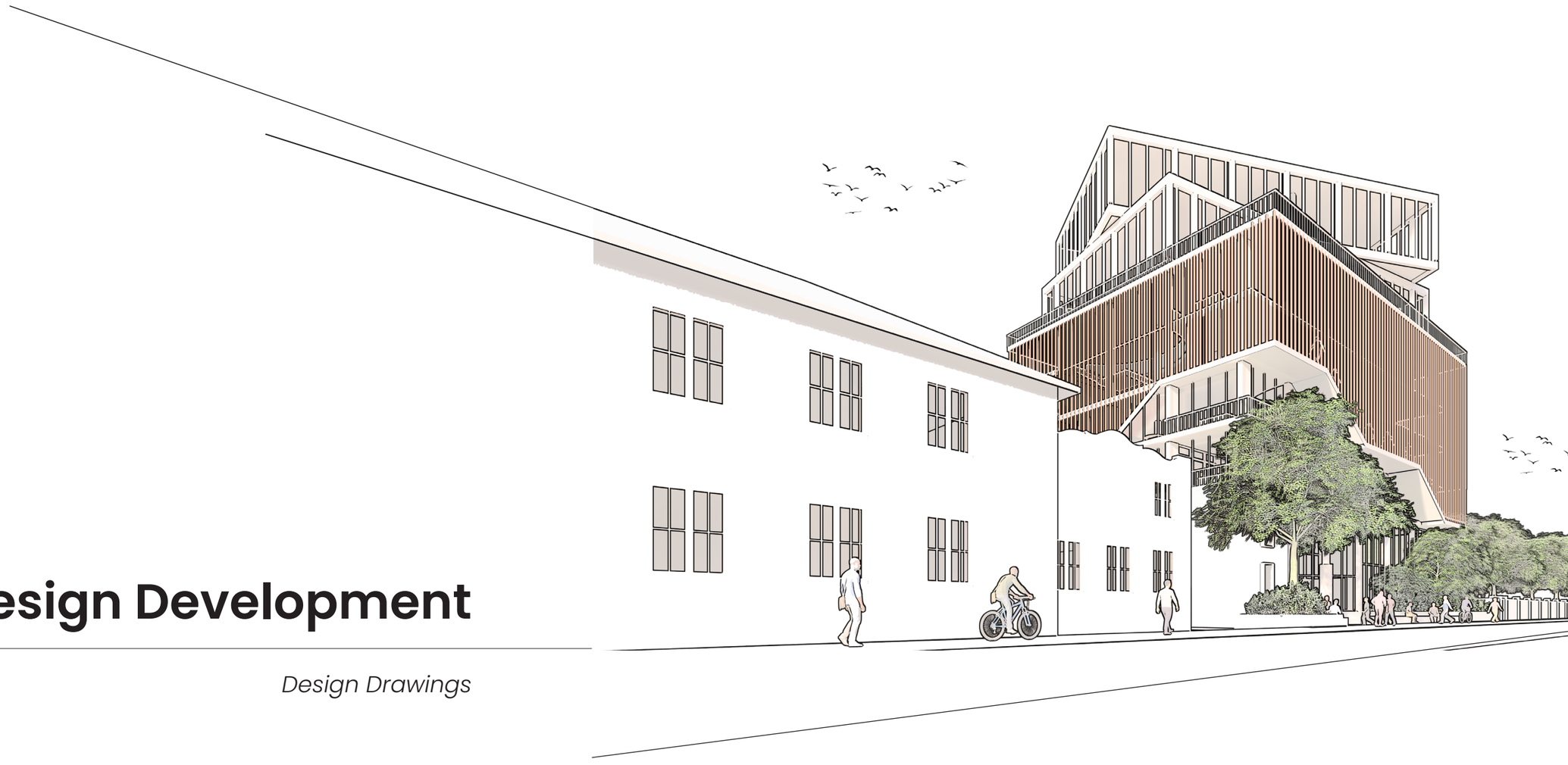


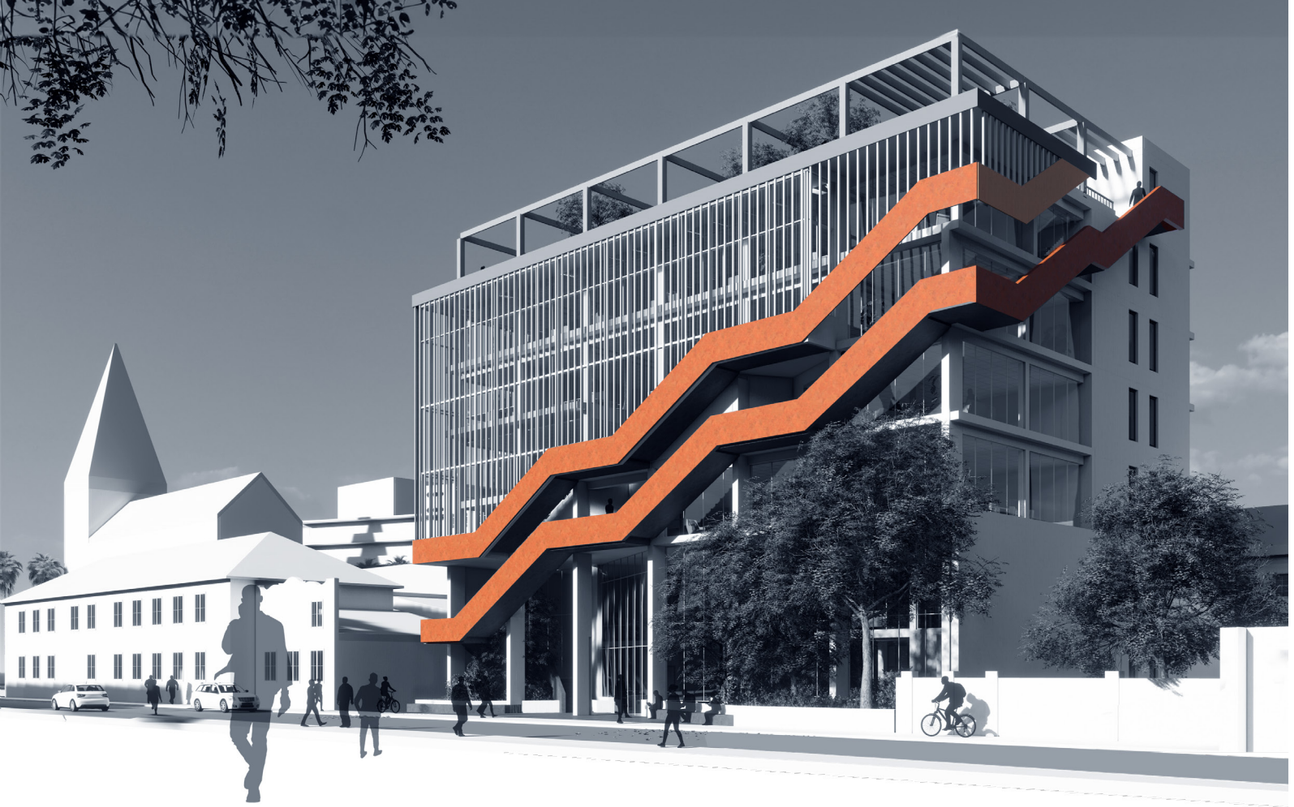


Exploded Axonometric - Demolition and Complete Phases
(Work in Progress)

Design Development

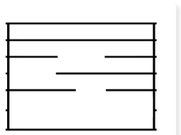
Design Drawings



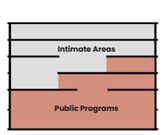


Terra Verticale Innovation Hub

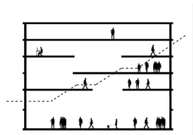
Levels of Proximity and Crowding used to establish a flow of circulation from one floor to the next.



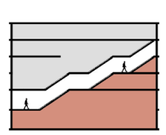
Vertical Divisions



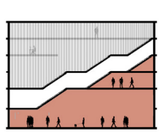
Program Layouts



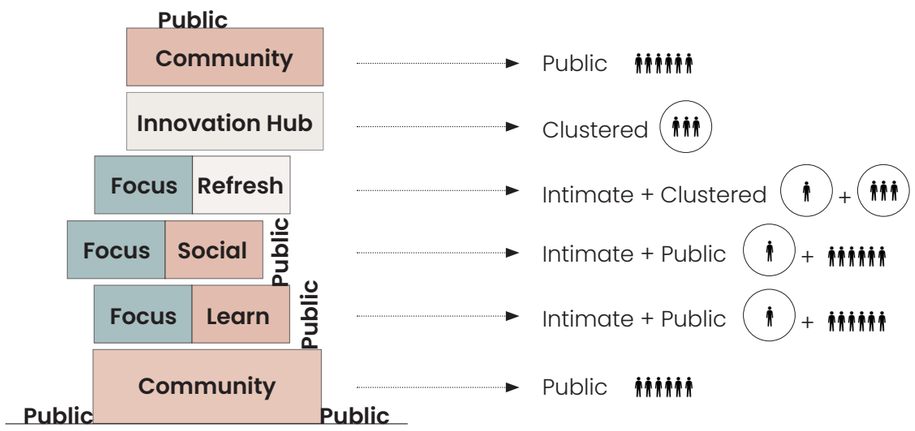
Crowding Consideration



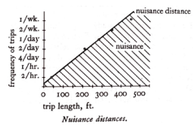
Indoor / Outdoor Staircase



Defines Facade Privacy Levels

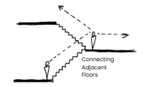


Design Parameters
Applying the Theoretical Base



Nuisance Distances

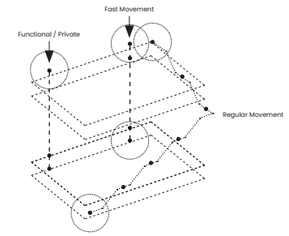
Vertical Distance Connection

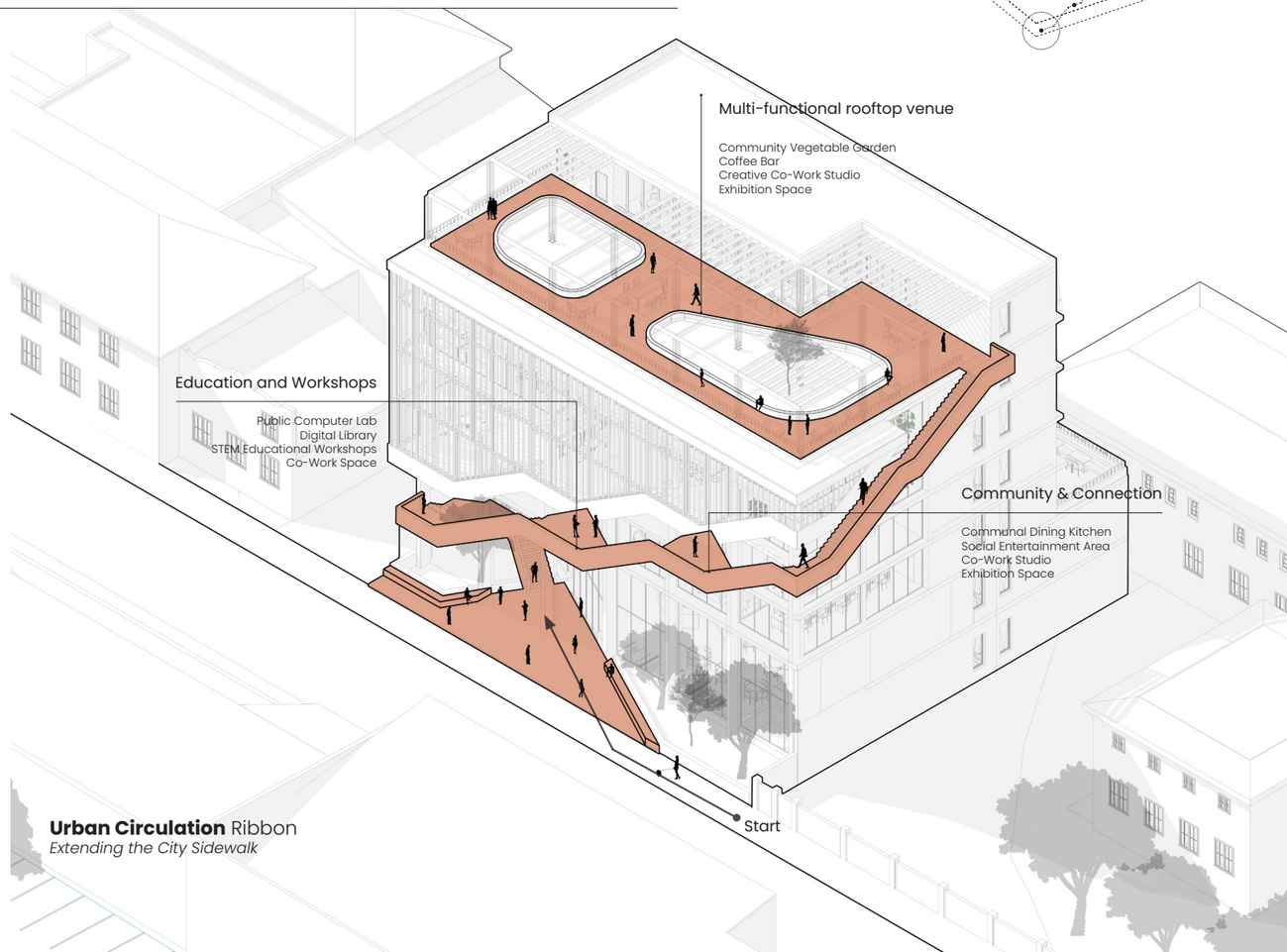


Staircases and Visual Connections

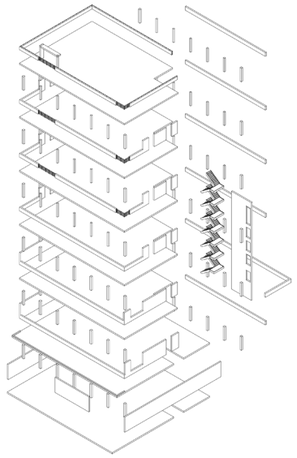
Reception nodes

Layers of Intimacy

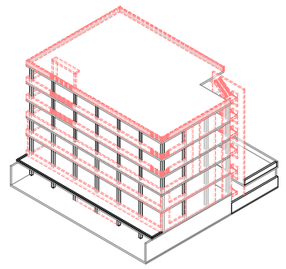




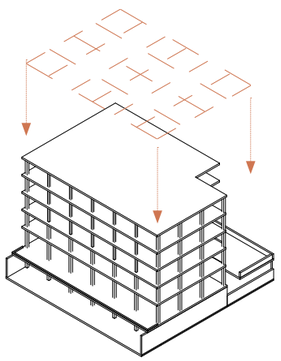
Urban Circulation Ribbon
Extending the City Sidewalk



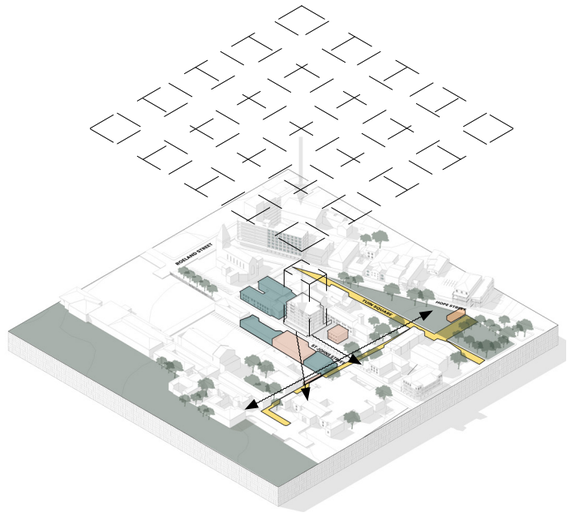
Structural Analysis

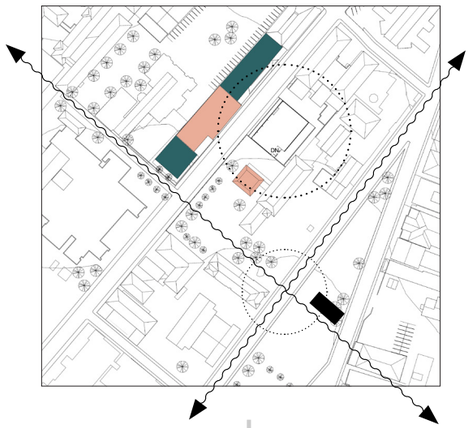


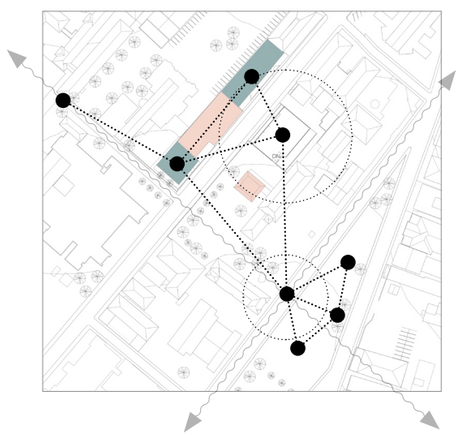
Demolition Works

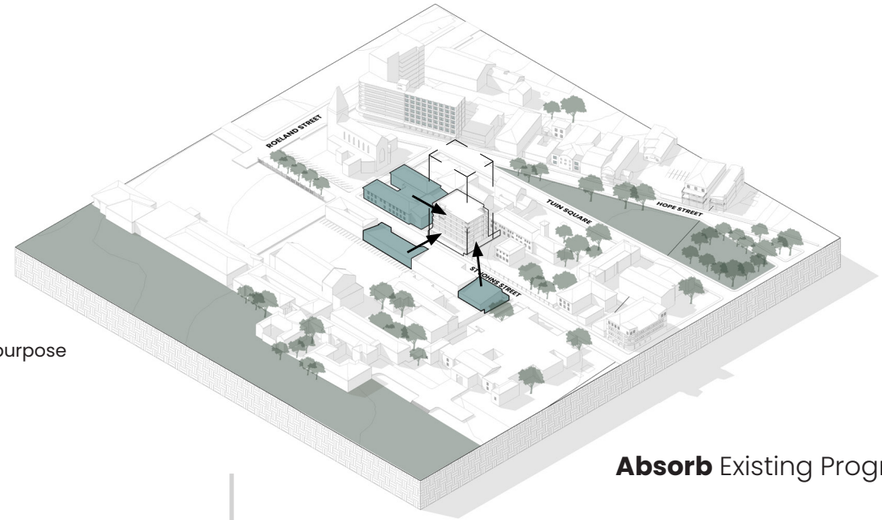


Re-Use of Existing Structure and Grid



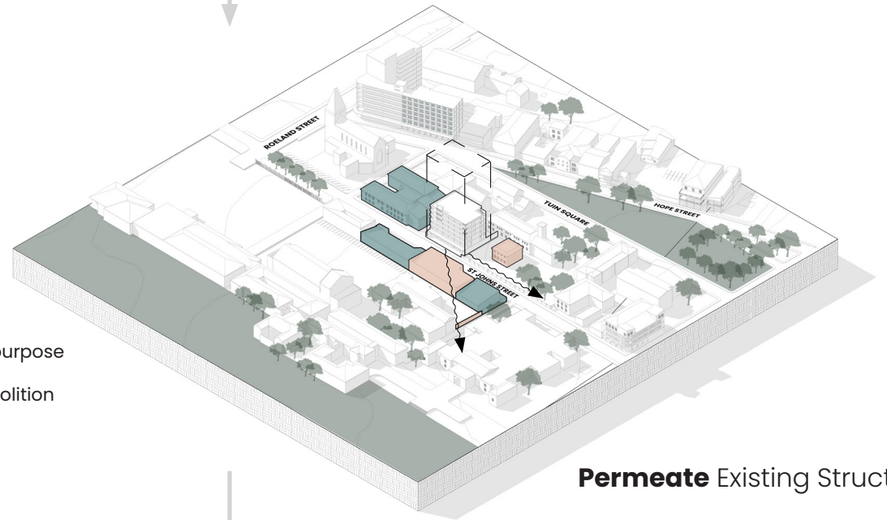






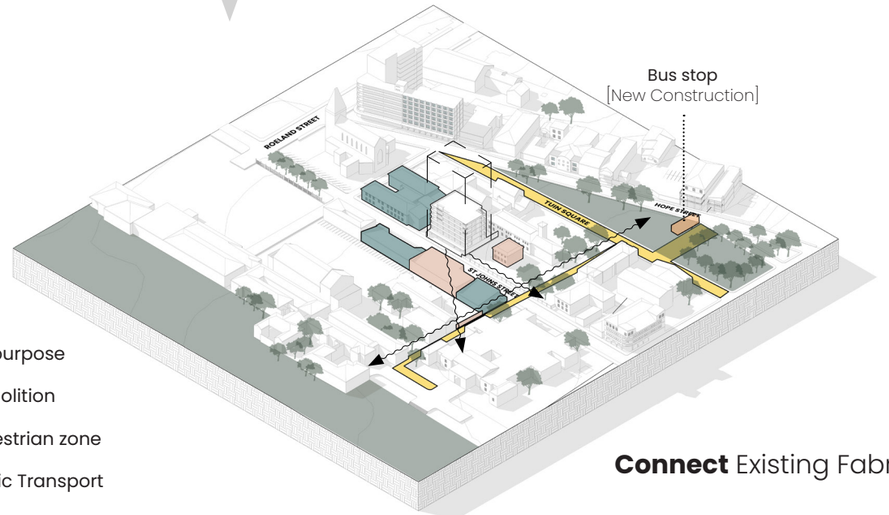
Re-purpose

Absorb Existing Programs



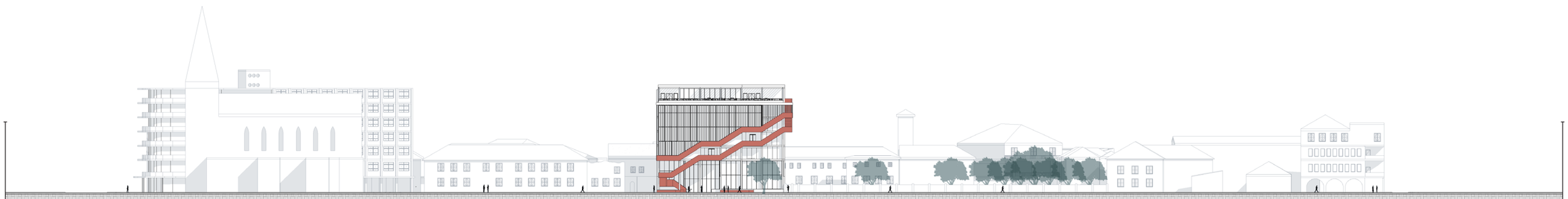
Re-purpose
Demolition

Permeate Existing Structures



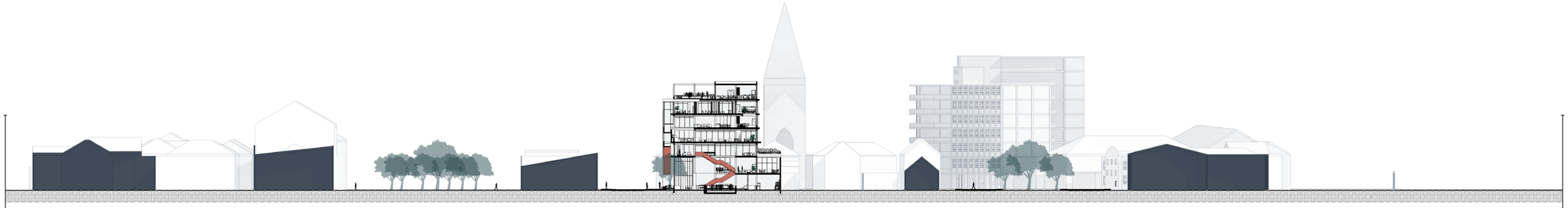
Re-purpose
Demolition
Pedestrian zone
Public Transport

Connect Existing Fabric



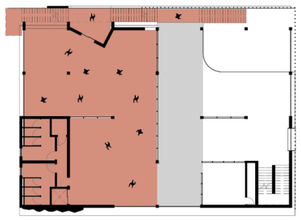
Street **Elevation** 1 : 500

Site **Section AA** 1 : 500

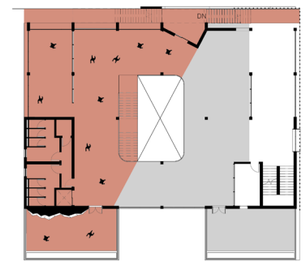


Site **Section BB** 1 : 500

Section **AA**
1 : 100

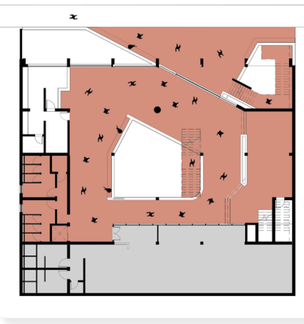


Third Floor

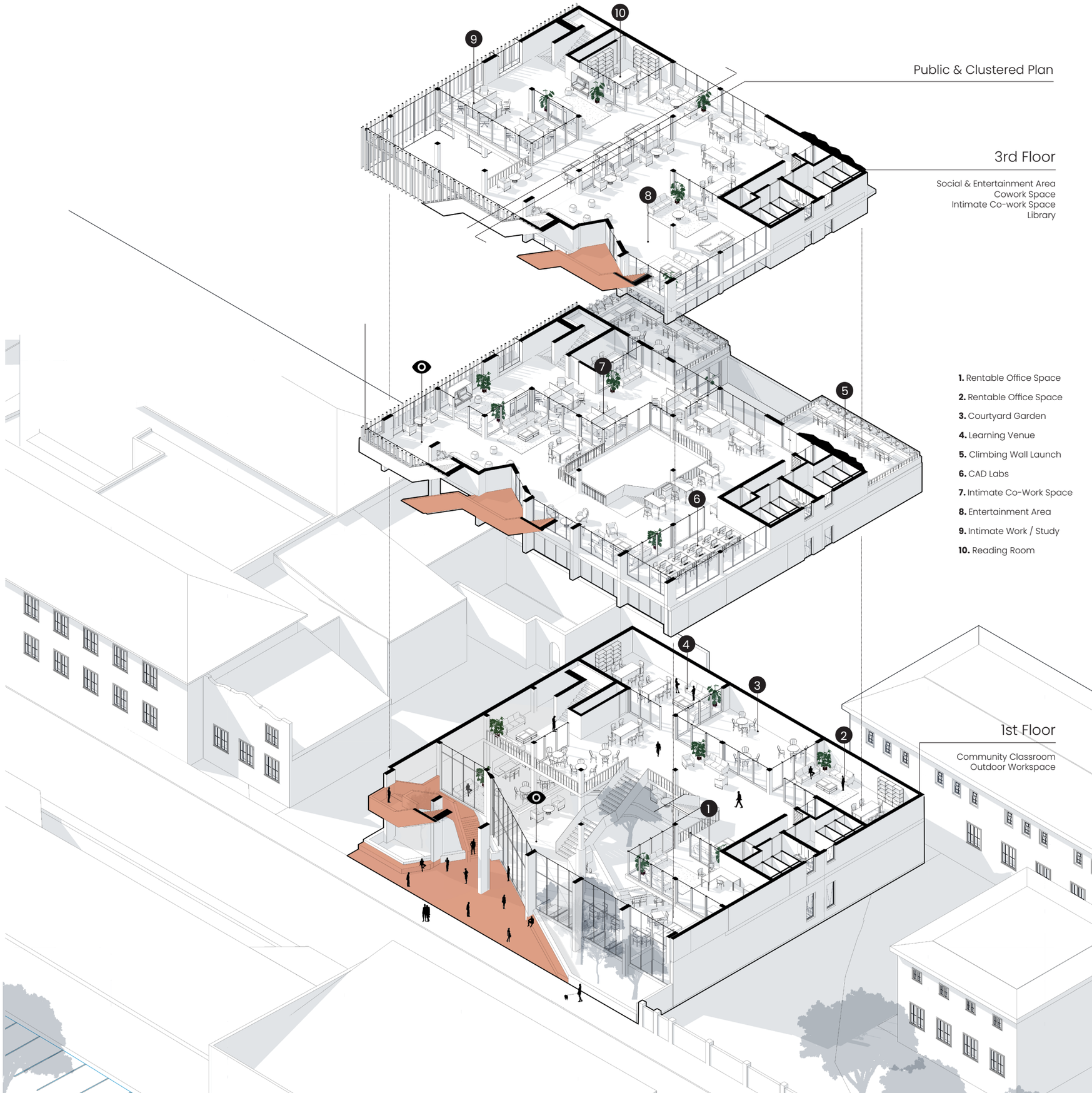


Second Floor

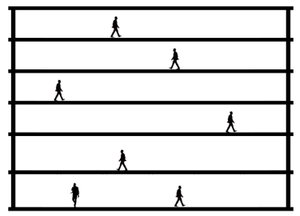
First Floor



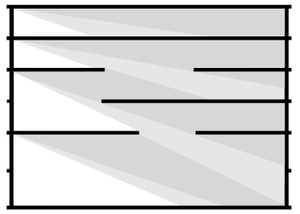
Ground Floor



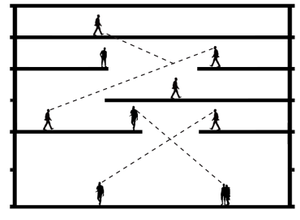
Design Section **BB**
1 : 100



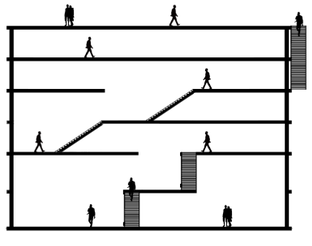
Original Structure



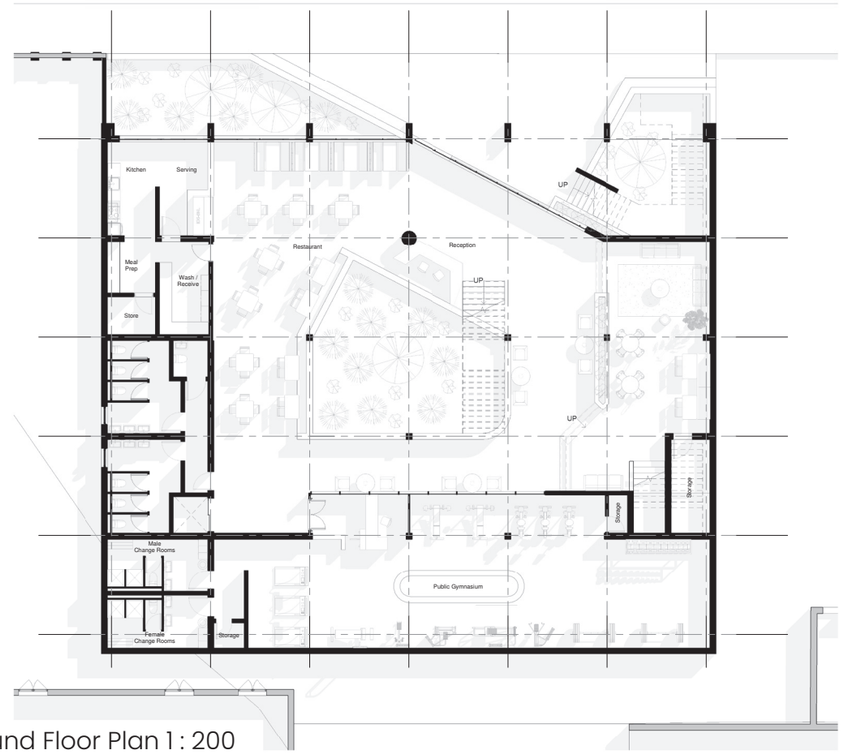
Increased Sunlight Penetration



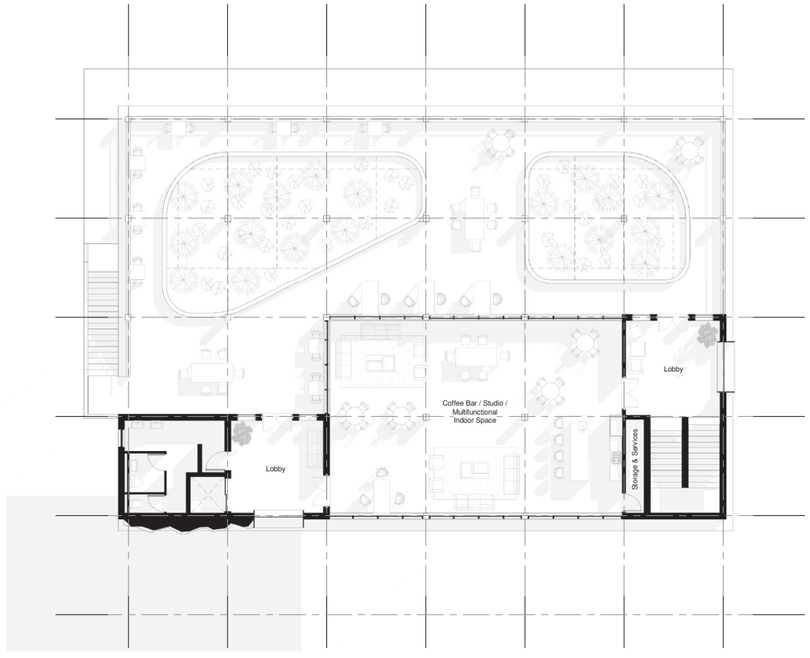
Visual Connection



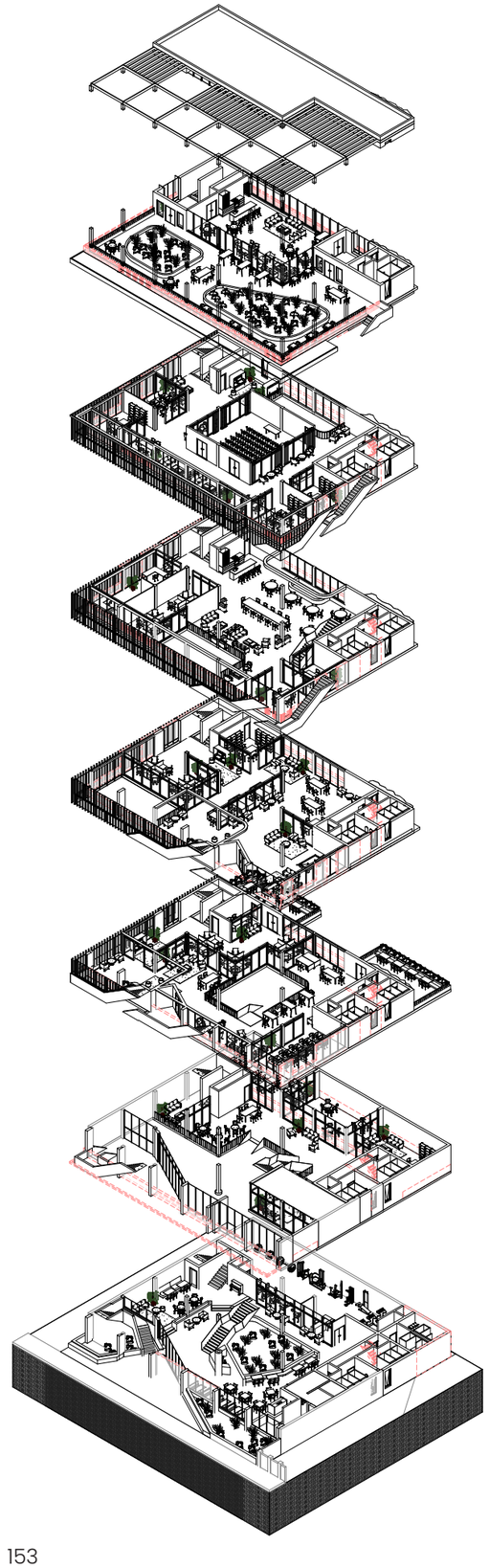
Spatial Connection

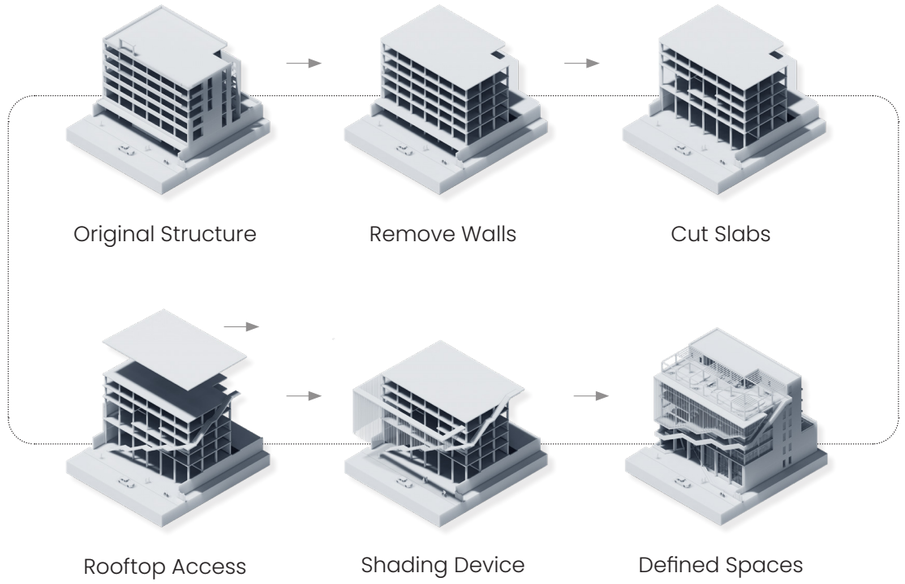


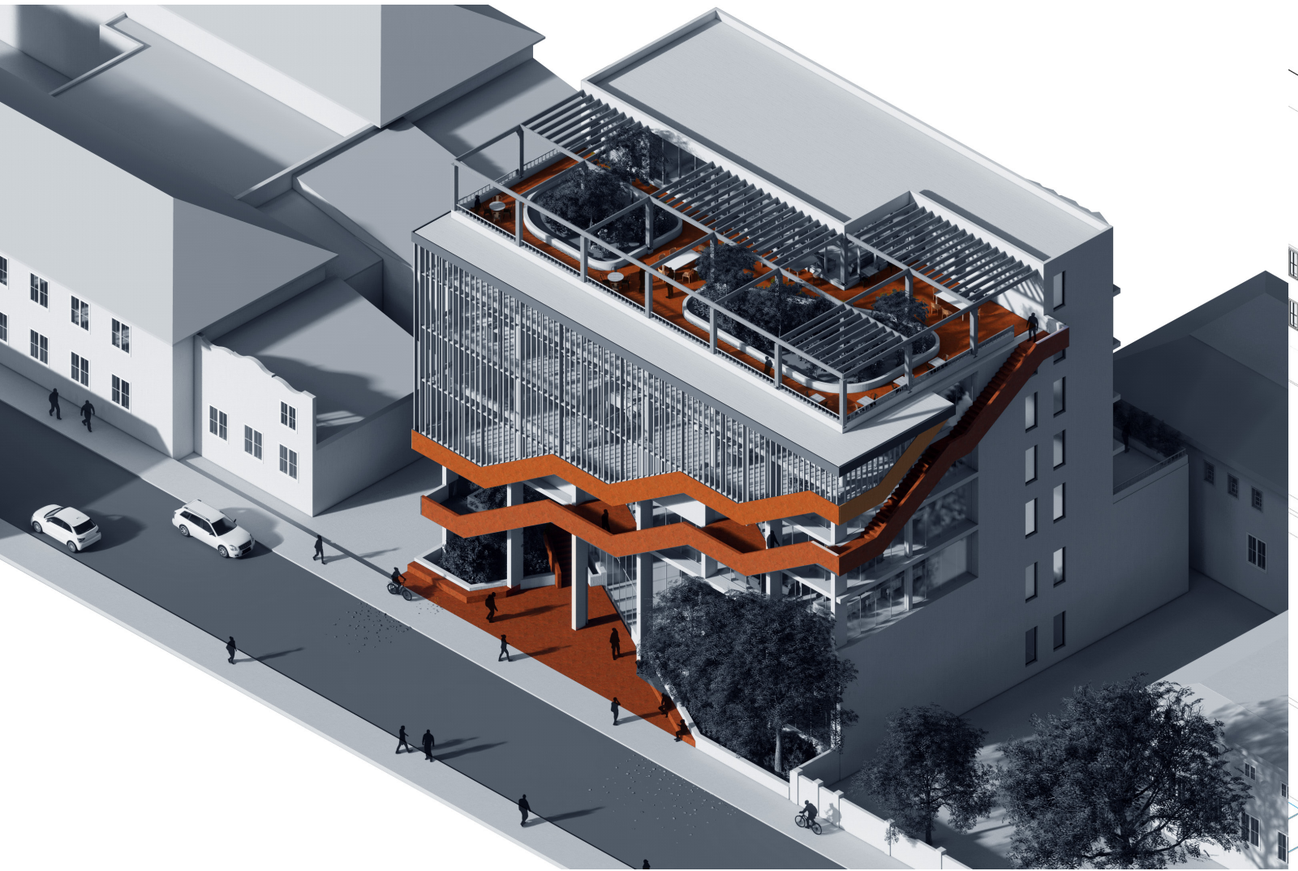
Ground Floor Plan 1 : 200

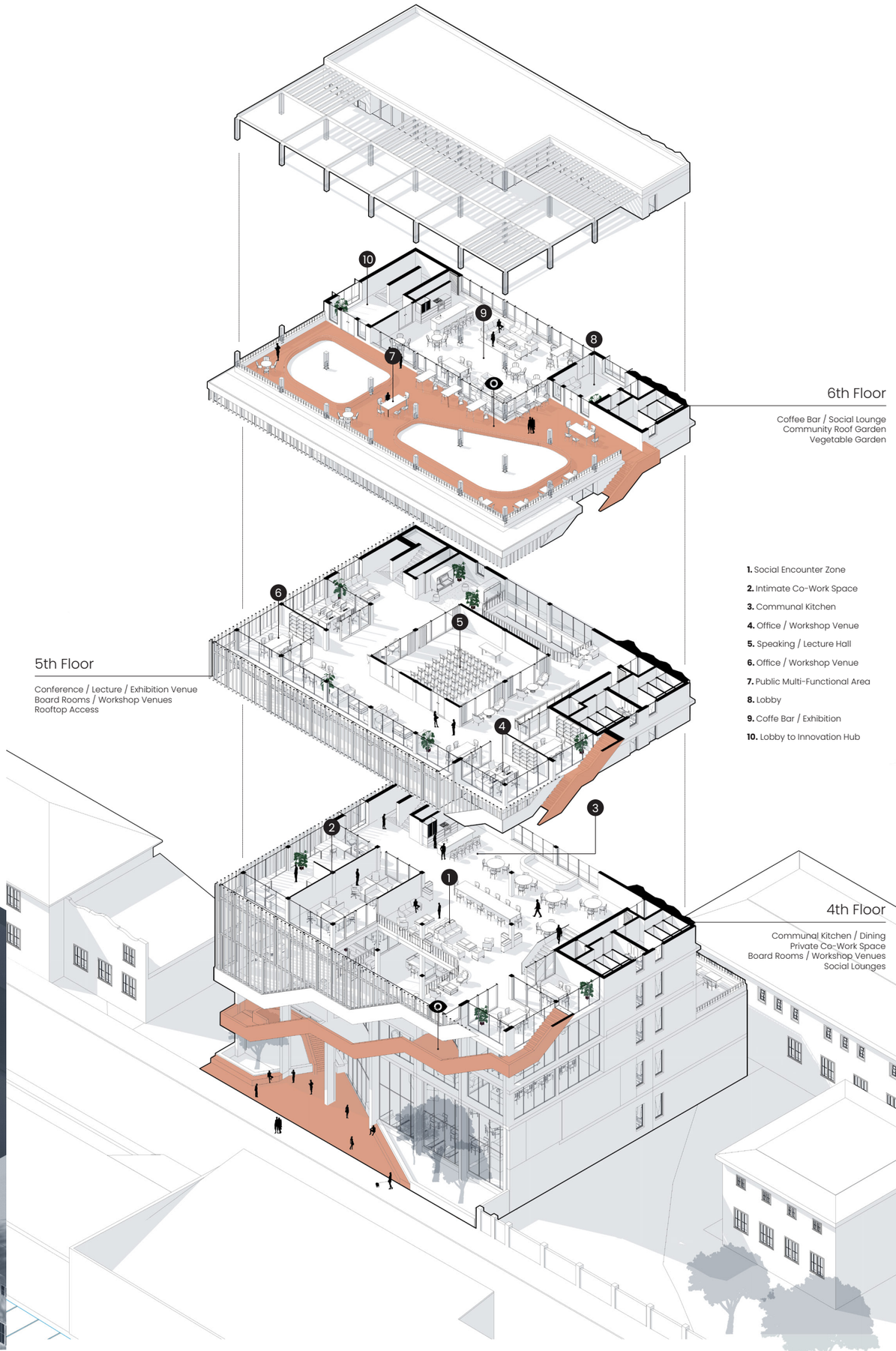


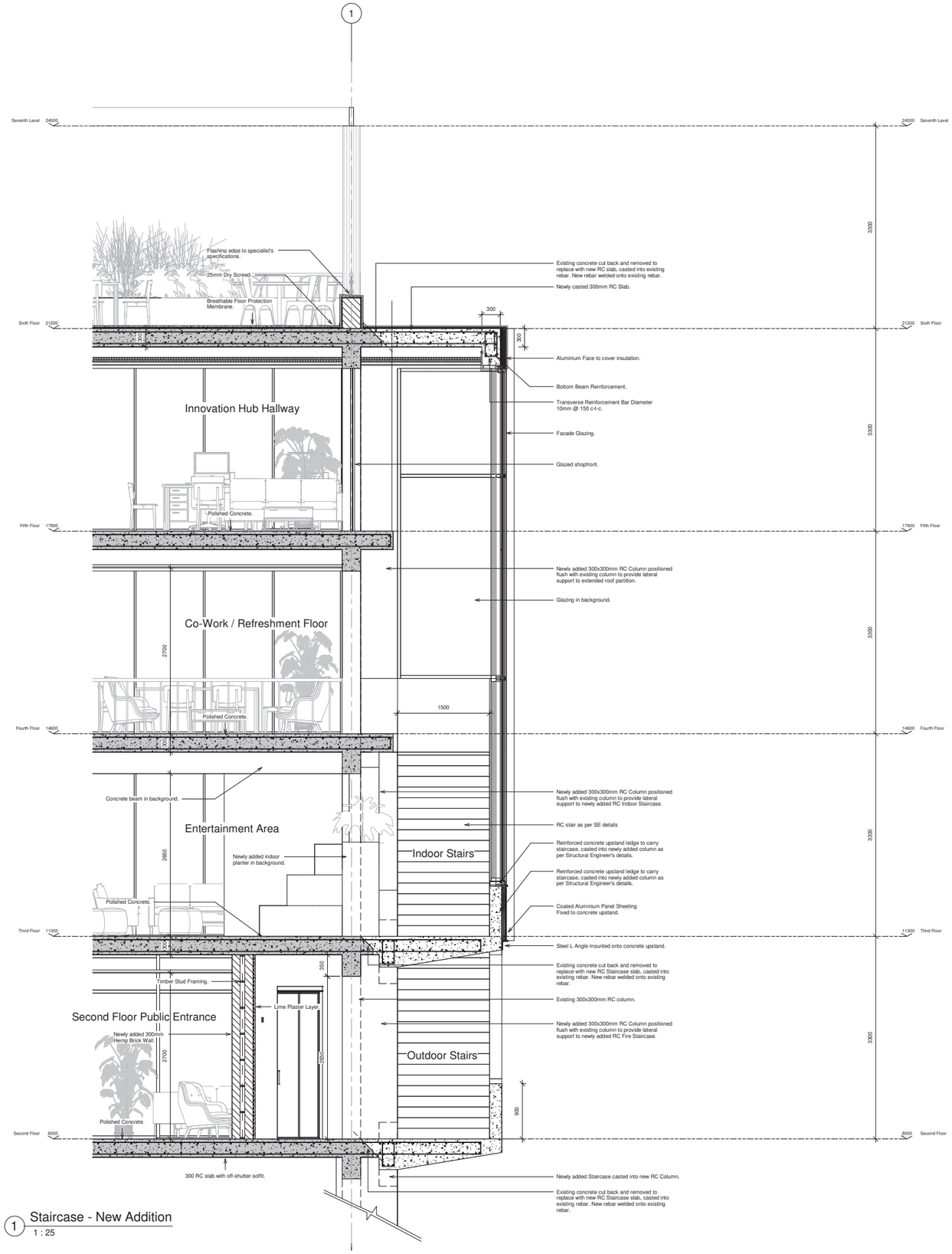
6th Floor Plan 1 : 200



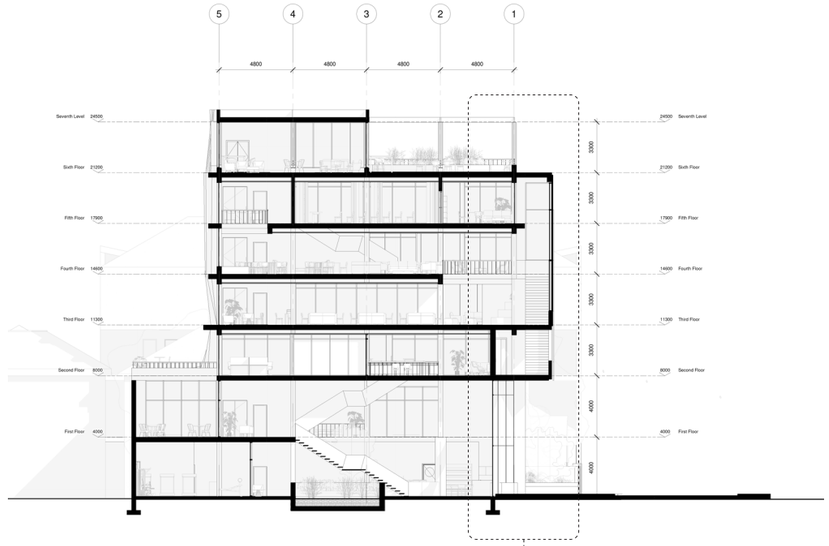

Original Structure
Remove Walls
Cut Slabs
Rooftop Access
Shading Device
Defined Spaces



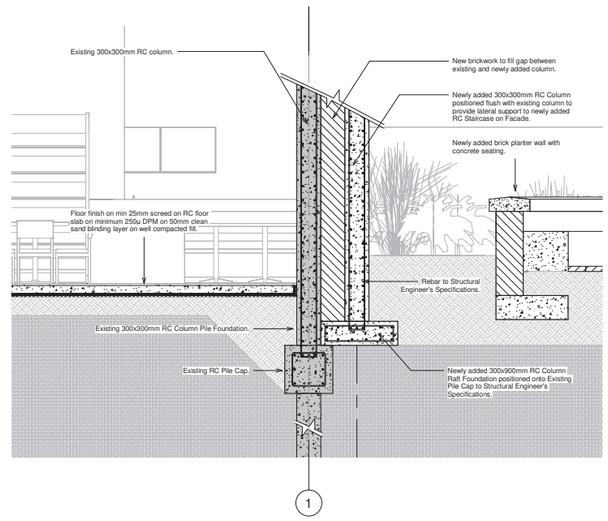

6th Floor
Coffee Bar / Social Lounge
Community Roof Garden
Vegetable Garden
5th Floor
Conference / Lecture / Exhibition Venue
Board Rooms / Workshop Venues
Rooftop Access
4th Floor
Communal Kitchen / Dining
Private Co-Work Space
Board Rooms / Workshop Venues
Social Lounges
1. Social Encounter Zone
2. Intimate Co-Work Space
3. Communal Kitchen
4. Office / Workshop Venue
5. Speaking / Lecture Hall
6. Office / Workshop Venue
7. Public Multi-Functional Area
8. Lobby
9. Coffe Bar / Exhibition
10. Lobby to Innovation Hub



1 Staircase - New Addition
1 : 25



Strip Section **AA**



2 Column Foundation Section
1 : 25

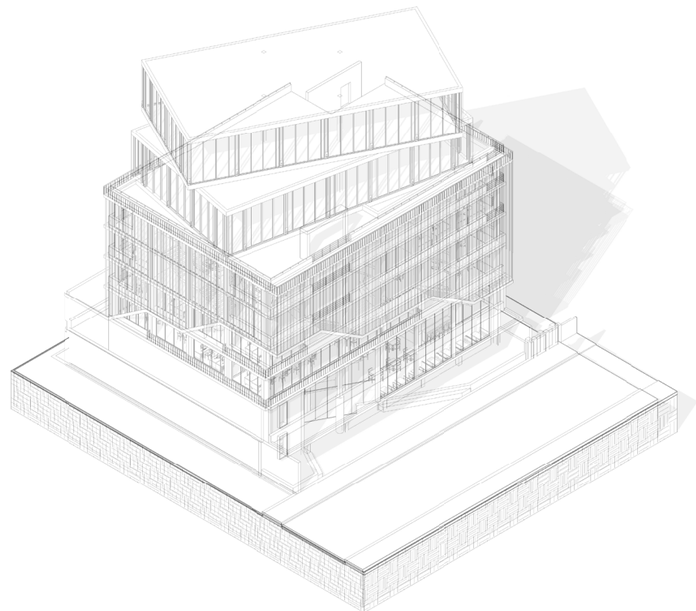
Conclusion

This dissertation embarked on a journey with a fundamental inquiry: How do architectural environments influence our physical mobility and, potentially, contribute to sedentary lifestyles? As the research unfolded and delved deeper into the theoretical base, a tapestry of interconnected factors began to emerge, shedding light on the profound influence of urban design on our lives beyond the confines of our workplaces. It became evident that mobility is more than just a physical act; it's intrinsically linked to social and public engagement, presenting individuals with choices and opportunities for interaction.

Throughout this research, I navigated the intricate web of influences that define human connectivity, circulation patterns, and the profound impact of our environment on overall well-being and physical health. The themes explored in the theoretical foundation sought to offer insights into the multifaceted factors shaping our movement behaviors. As I examined the historical influences stemming from urban planning and workplace design and proceeded to unravel architecture's intimate role in configuring spatial use. This led to reevaluating perceptions of proximity, vertical circulation, and the untapped potential of rooftops as vibrant and underutilized public spaces capable of fostering connections across the urban landscape.

The application of these theories allowed me to explore and test methods of design which is informed by various principles underpinning my design concept. The process of application in design has allowed me to build a refined understanding of how we occupy space and how this changes over indeterminate periods of time, indicating that as we evolve, so does the spaces we occupy, and how we use them.

In conclusion, this architectural thesis has provided a comprehensive perspective on the profound role of the built environment in shaping human movement and interaction, emphasizing the need for thoughtful, people-centric design in our urban landscapes. The ever evolving nature of workplaces requires a flexible and adaptable approach, ensuring that they remain relevant and supportive in the face of changing demands. By embracing flexibility, we empower individuals and organizations to thrive in an environment that can readily respond to new challenges, fostering innovation, productivity, and an architecture which accommodates the evolution of urban population.



References:

Adelyn Perez. “AD Classics: Solomon R. Guggenheim Museum / Frank Lloyd Wright” 18 May 2010. ArchDaily. Accessed 22 Jun 2023. https://www.archdaily.com/60392/ad-classics-solomon-r-guggenheim-museum-frank-lloyd-wright ISSN 0719-8884

Akinbode, O. O. (2016). Urbanization, the spatial economy and the transformation of African cities: Urban development policies in Nigeria. Habitat International, 55, 55-64.

Akinbode, A. F. (2016). Population growth and urbanization in Africa: Implications for sustainability. Journal of Sustainable Development in Africa, 18(3), 49-62.

American Heart Association (AHA). (No date). Cardiovascular Disease. Retrieved from https://www.heart.org/en/health-topics/consumer-healthcare/what-is-cardiovascular-disease

Appleyard, D. (1981). Livable Streets. Berkeley, CA: University of California Press.

Barbieri, F. (2015). Hospital architecture in Renaissance Italy: A case study of Brunelleschi’s Ospedale degli Innocenti. Buildings & Landscapes: Journal of the Vernacular Architecture Forum, 22(1), 1-19.

Beery, T. H., Katcher, A. H., & Morelli, G. A. (2015). The biophilia hypothesis and life in the 21st century: Increasing mental health or increasing pathology? Journal of Social, Evolutionary, and Cultural Psychology, 9(3), 15-30.

Bertolini, L., & Brömmelstroet, M. (2017). Sustainability in a hedonistic world: Can hedonism drive sustainability transitions? Sustainability, 9(12), 2350. doi:10.3390/su9122350

Bertolini, L., & Spit, T. (2018). Cities on the move: A world bank urban transport strategy review. World Bank.

Bjarke Ingels Group (BIG). (n.d.). CopenHill. Retrieved from https://big.dk/#projects-cop

Bodnar, G. (2012). Christopher Alexander and the Search for a New Paradigm in Architecture. Environment and Planning B: Planning and Design, 39(1), 19-37.

Brownson, R. C., Boehmer, T. K., & Luke, D. A. (2005). Declining rates of physical activity in the United States: What are the contributors? Annual Review of Public Health, 26, 421-443. doi:10.1146/annurev.publhealth.26.021304.144437

Buckley, J. P., Hedge, A., Yates, T., Copeland, R. J., Loosemore, M., Hamer, M., & Dunstan, D. W. (2015). The sedentary office: an expert statement on the growing case for change towards better health and productivity. British Journal of Sports Medicine, 49(21), 1357-1362.

Carmona, M., Tiesdell, S., Heath, T., & Oc, T. (2010). Public Places, Urban Spaces: The Dimensions of Urban Design. Routledge.

Chapman, J.E., Arthurs-Brennan, M.J., and Blevins, R.L. (2019). Elevator usage in a university building. Transportation Research Interdisciplinary Perspectives, 1, 100008.
Chau, J. Y., Daley, M., Srinivasan, A., & Dunn, S. (2015). The effectiveness of sit-stand workstations for changing office workers’ sitting time: Results from the Stand@Work randomized controlled trial pilot. International Journal of Behavioral Nutrition and Physical Activity, 12(1), 1-11.

Cohen, J. (2019). BIG’s “Waste-to-Energy” Plant Incorporates a Public Ski Slope. ArchDaily. Retrieved from https://www.archdaily.com/927201/bigs-waste-to-energy-plant-incorporates-a-public-ski-slope
Cribb, J. (2018). Historical Perspectives on Agriculture and Food Security. In R. W. Dixon, A. Garratt, & R. B. Sherman (Eds.), The Future of Agriculture: Challenges and Adaptive Strategies in the Global South (pp. 5-20). Springer.

Crawford, F. (2004). The Paimio Sanatorium: A masterpiece of modernism. Architectural Research Quarterly, 8(2), 137-146.

Cribb, J. (2018). Historical Perspectives on Agriculture and Food Security. In R. W. Dixon, A. Garratt, & R. B. Sherman (Eds.), The Future of Agriculture: Challenges and Adaptive Strategies in the Global South (pp. 5-20). Springer.

Dahiya, B., & Srinivasan, S. (2020). Examining the role of urban planning and transport infrastructure in shaping energy demand and carbon emissions in Indian cities. Energy Research & Social Science, 60, 101352.

Davidson, C., Liu, Y., & Gu, H. (2019). Embodied energy and carbon footprint analysis of adaptive reuse. Building and Environment, 149, 285-295.

Davis, K. (2017). The Ecology of Architecture: A Complete Guide to Creating the Environmentally Conscious Building. Routledge.

Duffy, F. (2014). Sedentary behavior and the built environment: A review. London Journal of Primary Care, 6(5), 84-88.

Droste, M. (2002). Mies van der Rohe: The Built Work. Birkhäuser.

Eisenberg, A. J. (2008). Sick building syndrome. International Journal of Hygiene and Environmental Health, 211(3-4), 356-364.

Ewing, R., & Cervero, R. (2010). Travel and the Built Environment: A Meta-Analysis. Journal of the American Planning Association, 76(3), 265-294.

Evans, M. (2003). Privacy and open-plan offices: A historical review. Environment and Behavior, 35(3), 296-318. doi:10.1177/0013916503035003001

Evans, G. W. (2003). Nearby nature: A buffer of life stress among rural children. Environment and Behavior, 35(3), 311-330.

Fernández-López de Pablo, J., González-García, A., Fuentes, M. A., & Baena, M. M. (2020). Energy Behaviour of Early Human Settlements: Towards a More Efficient Design of Contemporary Settlements. Sustainability, 12(15), 5923.

Fishman, R. (1982). The Urban Utopias of the Twentieth Century. In D. Pinder (Ed.), The City Reader (pp. 346-355). Routledge.

Fleischmann, M. (2016). Historical building renovation—Between sustainability and cultural heritage. Frontiers of Architectural Research, 5(2), 238-245.

Frampton, K. (2001). Modern architecture: A critical history. Thames & Hudson.

Francis, R. (2019). Spaces for Innovation: The Design and Science of Inspiring Environments. Princeton University Press.

Francis, R. (2019). The impact of open-plan office design on workplace productivity. Journal of Workplace Design and Management, 20(2), 78-89.

Francisco, V., & Talen, E. (2018). What is social life like in cities today? Journal of Urban Design, 23(5), 563-574.

Frank, L. D., Sallis, J. F., Saelens, B. E., Leary, L., Cain, K., Conway, T. L., & Hess, P. M. (2010). The development of a walkability index: Application to the Neighborhood Quality of Life Study. British Journal of Sports Medicine, 44(13), 924-933.

Franco, F. M. (2018). From Bürolandschaft to cubicle farms: The evolution of office design. The Journal of Architecture, 23(6), 921-942. doi:10.1080/13602365.2018.1531908

Franco, M. (2018). Informal Settlements and Planning in South Africa: Reflecting on the Role of the Urban Planner. Planning Theory & Practice, 19(1), 91-105. doi:10.1080/14649357.2017.1390216

Gehl, J. (2010). Cities for People. Washington, DC: Island Press.

Gehl Architects. (2018). Amsterdam: Creating Pedestrian-Friendly Streetscapes. Retrieved from https://gehlpeople.com/projects/amsterdam-creating-pedestrian-friendly-streetscapes

Gurven, M., Kaplan, H., & Zelada Supa, A. (2010). Mortality experience of Tsimane Amerindians of Bolivia: Regional variation and temporal trends. American Journal of Human Biology, 22(6), 758-769. doi:10.1002/ajhb.21043

Hamilton, D. K. (2008). Evidence-Based Design for Multiple Building Types. John Wiley & Sons.

Hamilton, D. K. (2008). Evidence-based design for multiple building types. John Wiley & Sons.

Hall, E. E., Chomistek, A. K., McAuley, E., & Matthews, C. E. (2018). Sedentary time and cognitive function in older adults: A systematic review. Aging & Mental Health, 22(7), 914-922.

Hall, P. (2002). Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century. Blackwell Publishing.

Hamilton, D. K. (2008). Evidence-Based Design for Multiple Building Types. John Wiley & Sons.

Hansen, M., Andersen, L.B., and Brøgger, J. (2019). Changing patterns of active transportation during leisure time in the adult Danish population: A cross-sectional study from 1995 to 2013. Journal of Transport & Health, 14, 100573.

Harvey, D. (1989). From Managerialism to Entrepreneurialism: The Transformation in Urban Governance in Late Capitalism. Geografiska Annaler. Series B. Human Geography, 71(1), 3-17.

Heinonen, J., Junnila, S., & Mutanen, A. (2017). Emergence of tall buildings: The ecology of verticality. Cities, 60, 321-330.

Heynen, Hilde, 1999, Architecture and Modernity; A Critique MIT Press, Cambridge, Massachusetts, London, England

Hoffmann, D. (2001). Frank Lloyd Wright's Guggenheim Museum: A Ramp of Discovery. In G. Stone & M. Zarucchi (Eds.), Reading Frank Lloyd Wright: Critical Perspectives (pp. 238-249). University of Chicago Press.

Holston, J. (1991). The Modernist City: An Anthropological Critique of Brasília. University of Chicago Press.

Hillier, B., 1996b. Cities as movement economies. Urban Des. Int.
1, 41e60.

Jabareen, Y. (2006). Sustainable Urban Forms: Their Typologies, Models, and Concepts. Journal of Planning Education and Research, 26(1), 38-52.

Jacobs, J. (1961). The Death and Life of Great American Cities. New York, NY: Random House.

Jacobs, J. (1969). The Economy of Cities. Vintage Books.

Jones, M. (2020). Adaptive reuse: Preserving our past, building our future. Journal of Green Building, 15(1), 1-12.

Kellert, S. R., Heerwagen, J., & Mador, M. (2008). Biophilic design: The theory, science and practice of bringing buildings to life. John Wiley & Sons.

Kim, S., & Do, J. (2021). Post-pandemic design strategies for workplace environments: A literature review. Sustainability, 13(4), 2059. https://doi.org/10.3390/su13042059

King, A. C. (2001). Interventions to promote physical activity by older adults. Journal of Gerontology Series A: Biological Sciences and Medical Sciences, 56(Special_Issue_2), 36-46.

King, A. C., Castro, C., Wilcox, S., Eyler, A. A., Sallis, J. F., & Brownson, R. C. (2002). Personal and environmental factors associated with physical inactivity among different racial-ethnic groups of US middle-aged and older-aged women. Health Psychology, 21(3), 354-361.

Klepeis, N. E., Nelson, W. C., Ott, W. R., Robinson, J. P., Tsang, A. M., Switzer, P., ... & Engelmann, W. H. (2001). The National Human Activity Pattern Survey (NHAPS): a resource for assessing exposure to environmental pollutants. Journal of Exposure Science & Environmental Epidemiology, 11(3), 231-252.

Lee, K. K. (2016). Active Design: Shaping the Architecture of Health. Journal of the American Planning Association, 82(1), 5-7. doi:10.1080/01944363.2015.1120179

Lorenzo, G., & Capolongo, S. (2020). Designing resilient urban environments in post-COVID era: A review. International Journal of Environmental Research and Public Health, 17(23), 9030.

Maricato, E. (2001). The Social Function of Property and the Dilemma of Planning in Brazil. International Journal of Urban and Regional Research, 25(1), 155-167.

Marmot, M., & Wilkinson, R. G. (2005). Social determinants of health. Oxford University Press.

McCormack, G.R., Giles-Corti, B., Lange, A., Smith, T., Martin, K., and Pikora, T.J. (2010). An update of recent evidence of the relationship between

McKenzie, T. L., Cohen, D. A., Sehgal, A., Williamson, S., & Golinelli, D. (2006). System for Observing Play and Recreation in Communities (SOPARC): Reliability and feasibility measures. Journal of Physical Activity and Health, 3(Suppl 1), S208-S222.

Mendelsohn, A. 2017. Guggenheim Museum Website. Illuminating Details from Frank Lloyd Wright's Guggenheim Blueprints. 6 June 2017. Available: https://www.guggenheim.org/blogs/checklist/illuminating-details-from-frank-lloyd-wrights-guggenheim-blueprints

Monson, K., 2008. String block vs superblock patterns of dispersal in
China. Architect. Des 78, 46e53

MVRDV, Rotterdam Rooftop Days. (2023). Rooftop Catalogue: Reprogramming Rotterdam's Urban Roofscape. Rotterdam.

Nieuwenhuijsen, M.J., Khreis, H., 2016. Car free cities: pathway to healthy urban living.
Environ. Int. 94, 251–262. https://doi.org/10.1016/j.envint.2016.05.032.

Norberg-Schulz, C. (1985). The concept of dwelling: On the way to figurative architecture. Electa/Rizzoli.

Oliver, P. (2006). Built to meet needs: Cultural issues in vernacular architecture. Architectural Press.

Oppezzo, M., & Schwartz, D. L. (2014). Give your ideas some legs: The positive effect of walking on creative thinking. Journal of Experimental Psychology: Learning, Memory, and Cognition, 40(4), 1142-1152.

Owen, N., Humpel, N., Leslie, E., Bauman, A., & Sallis, J. F. (2010). Understanding environmental influences on walking: Review and research agenda. American Journal of Preventive Medicine, 27(1), 67-76.

Pallasmaa, J. (2009). The thinking hand: existential and embodied wisdom in architecture. John Wiley & Sons.

Patterson, R., McNamara, E., Tainio, M., de Sá, T. H., Smith, A. D., Sharp, S. J., ... & Ogilvie, D. (2018). Sedentary behavior and risk of all-cause, cardiovascular and cancer mortality, and incident type 2 diabetes: A systematic review and dose response meta-analysis. European Journal of Epidemiology, 33(9), 811-829.

Park SY, Newton C, Lee R. How to Alleviate Feelings of Crowding in a Working from Home Environment: Lessons Learned from the COVID-19 Pandemic. Int J Environ Res Public Health. 2023 Jan 6;20(2):1025. doi: 10.3390/ijerph20021025. PMID: 36673782; PMCID: PMC9859247.

Peponis, J., Feng, C., Park, J., 2017. Diversity and scale in superblock design. Urban Des 5, 30e41.
Poli, S. (2020). Reconsidering urban design principles in the aftermath of COVID-19: A critical review. Sustainability, 12(15), 6274.

Poli, S. (2020). Reconsidering urban design principles in the aftermath of COVID-19: A critical review. Sustainability, 12(15), 6274.

Pontzer, H., Raichlen, D. A., Wood, B. M., Mabulla, A. Z., Racette, S. B., & Marlowe, F. W. (2016). Hunter-gatherer energetics and human obesity. PLoS ONE, 7(7), e40503.

Rackham, N. (2016). Discontinuous elevators: Why they work, how they work, and how to design them. Council on Tall Buildings and Urban Habitat (CTBUH) Journal, 5, 52-58.

Rimmer, P. J. (2015). Planning for Regional Development in the Global South: Concepts and Practices of International Cooperation. Routledge.

Rueda, S. (2017). The Barcelona Superblock. Retrieved from https://www.sciencedirect.com/science/article/pii/S2352146517305308
Roberts, M., Tiesdell, S., & Talen, E. (2020). Tactical Urbanism: Short-term Action for Long-term Change. Routledge.
Ross, K. D., & Lowry, M. B. (2012). Examining pedestrian desire lines on a college campus. Journal of Transport Geography, 23, 39-45. doi:10.1016/j.jtrangeo.2012.05.009

Ryan, T. M., Shaw, C. N., & Jankauskas, R. (2014). Hominin femoral diaphyseal curvature. Proceedings of the National Academy of Sciences, 111(39), 14018-14023. doi:10.1073/pnas.1401782111

Sallis, J. F., Floyd, M. F., Rodríguez, D. A., & Saelens, B. E. (2012). Role of built environments in physical activity, obesity, and cardiovascular disease. Circulation, 125(5), 729-737.

Sallis, J. F., Owen, N., Fisher, E. B., Glanz, K., & Rimer, B. K. (2008). Ecological models of health behavior. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), Health Behavior and Health Education: Theory, Research, and Practice (4th ed., pp. 465-486). Jossey-Bass.

Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. Medicine and Science in Sports and Exercise, 32(5), 963-975.

Schwarz, B. (2010). Brasília: A modernist utopia. Journal of Urban Planning and Design, 36(2), 123-137. doi:10.1080/01944363.2010.491080

Schildt, G. (1984). Alvar Aalto: A Life's Work. MIT Press

Shepley, M. M., O'Hara, L. M., Watkins, N. E., Nanda, U., & McCarthy, W. J. (2017). The VA national design guide for hospitals and clinics: A critical analysis. Health Environments Research & Design Journal, 10(2), 74-97.

Smith, A. (2012). Towards Carfree Cities: Brasilia and Curitiba as Case Studies in Sustainable Urban Development. Journal of Transport Geography, 20(1), 48-55.

Smith, A. L., Croft, D. P., & James, R. (2017). Exploring the role of the environment in determining sociality in a wild population of blue tits. Behavioral Ecology, 28(2), 515-523. doi:10.1093/beheco/arw176

Smith, P. (2018). The art of reuse: A history of adaptive reuse in architecture. Journal of Architectural Education, 71(1), 22-32.

Smith, J. (2022). Rethinking Office Spaces Post-Pandemic. Architectural Perspectives, 5(2), 45-56.

Templer J. The Staircase: Studies of Hazards, Falls and Safer Design. Cambridge, MA: Massachusetts Institute of Technology; 1992.

Tomas, R. (2020). CopenHill: BIG's Danish Power Plant That Doubles as a Ski Slope. Architizer Journal. Retrieved from https://architizer.com/blog/inspiration/industry/copenhill-big-bjarke-ingels-group/

Thomson, C. (2015). Navigating taxis in Cape Town: Everyday geographies of post-apartheid mobility. Journal of Transport Geography, 47, 35-43.
Tomas, R. (2020). CopenHill: BIG's Danish Power Plant That Doubles as a Ski Slope. Architizer Journal. Retrieved from https://architizer.com/blog/inspiration/industry/copenhill-big-bjarke-ingels-group/

Thompson, D., Batterham, A. M., Peacock, O. J., Western, M. J., & Booso, R. (2018). Multimodal countermeasures for sedentary office workers: a randomized crossover trial. Medicine and Science in Sports and Exercise, 50(5), 1005-1011.

Thorp, A. A., Owen, N., Neuhaus, M., & Dunstan, D. W. (2012). Sedentary behaviors and subsequent health outcomes in adults: A systematic review of longitudinal studies, 1996–2011. American Journal of Preventive Medicine, 41(2), 207-215.

Twombly, R. (1979). Frank Lloyd Wright: His Life and His Architecture. John Wiley & Sons.

Twombly, R. (1996). Frank Lloyd Wright: His Life and Architecture. John Wiley & Sons.

Ulrich, R. S. (1991). Effects of healthcare environmental design on medical outcomes. Journal of Environmental Psychology, 11(2), 137-163.

Ulrich, R. S. (1991). Effects of interior design on wellness: Theory and recent scientific research. Journal of Health Care Interior Design, 3(1), 97-109.

Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (2008). Stress recovery during exposure to natural and urban environments. Journal of Environmental Psychology, 11(3), 201-230.

U.S. Department of Health and Human Services. (2018). Physical Activity Guidelines for Americans, 2nd Edition. Retrieved from https://health.gov/our-work/physical-activity/current-guidelines

Vargas, J. R. (2003). Rapid urbanization in Southern Africa. Habitat International, 27(4), 523-547. doi:10.1016/S0197-3975(03)00043-3

Vargas, V. (2003). The new urbanism and the culture of criticism. Town Planning Review, 74(2), 159-182.

Venturi, R., & Scott Brown, D. (1972). "Learning from Las Vegas." Architectural Review, 151(903), 95-101.

Venturi, R., Scott Brown, D., & Izenour, S. (1977). "Learning from Las Vegas: The Forgotten Symbolism of Architectural Form." Cambridge: The MIT Press.

Ward, S. V. (2016). Planning Office Spaces: A Practical Guide for Managers and Designers. Routledge.

Waters, N. M. (2017). The power of pedestrian desire lines: A study of walkability. Journal of Urban Design, 22(6), 800-815. doi:10.1080/13574809.2017.1330452

Wainwright, O. (2020). How Tuberculosis Shaped Modernist Architecture. The Guardian. Retrieved from https://www.theguardian.com/artanddesign/2020/feb/25/how-tuberculosis-shaped-modernist-architecture

Wells, N. M., & Evans, G. W. (2003). Nearby Nature: A Buffer of Life Stress among Rural Children. Environment and Behavior, 35(3), 311–330.

Wilkinson, T. J. (2017). The Rise of Complex Society in Southwest Asia and Beyond: The Transition from Neolithic Farmers to Early Urban Societies. Cambridge University Press.

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

PRE-SCREENING QUESTIONNAIRE OUTCOME LETTER

STU-EBE-2023-PSQ000456

2023/06/29

Dear Henk Malherbe,

Your Ethics pre-screening questionnaire (PSQ) has been evaluated by your departmental ethics representative. Based on the information supplied in your PSQ, it has been determined that you do not need to make a full ethics application for the research project in question.

You may proceed with your research project titled:

DESIGNING FOR HEALTH AND WELL-BEING: Exploring the relationship between Active Living and Choice Architecture in Urban Environments

Please note that should aspect(s) of your current project change, you should submit a new PSQ in order to determine whether the changed aspects increase the ethical risks of your project. It may be the case that project changes could require a full ethics application and review process.

Regards,

Faculty Research Ethics Committee