



## abstract



The "Climate Activism and Disaster Management Centre" is a multifaceted initiative with a primary goal of establishing a grassroots hub within a single building. This center aims to raise awareness about climate change and provide effective disaster management in times of crisis. It goes beyond these immediate objectives to conduct climate change research, address local vulnerabilities in the Tshwane region, and offer training to the community, empowering them to tackle the challenges posed by climate change.

In a broader context, the project aspires to be a crucial community resource in the urban environment, disseminating vital information and fostering civic engagement. It emphasizes six key aspects, including a didactic approach for educational content, pedagogical teaching, hydrophilic and biophilic design, remediation, ecological sustainability, and climate resilience.

The project is situated in a climate change context where South Africa has experienced 82 natural hazards in the past four decades, and these hazards are projected to become more frequent and intense. Africa's urbanization exacerbates these issues, making retrofitting and resilience crucial. The project accounts for the temporal dimension, considering both present and future climate conditions.

The proposed site is strategically located within the UNISA Sunnyside campus, offering access to key nodes in the region. It involves retrofitting a 12-story building to serve as the project's centerpiece.

Local vulnerabilities and hazards are addressed, including urban growth vulnerabilities, flooding, drought, fire, and extreme heat. Future projections show an increase in challenges, especially with drought and fire.

The project incorporates a theoretical framework symbolized by a kaleidoscope, representing change, balance, and harmony. It aims to immerse visitors in a dynamic and vibrant space, staying in constant dialogue with natural surroundings.

Environmental considerations guide the building's design, taking into account wind direction and site-specific qualities. Educational and functional aspects of the center include disaster management resources and open-air spaces for education and inspiration.

Architectural innovation focuses on creating a state-of-the-art research facility that fosters collaboration and knowledge-sharing. Sustainable features such as walkways, eco-friendly design, and renewable energy sources are integrated into the project to promote ecological sustainability and climate resilience.

In conclusion, the "Climate Activism and Disaster Management Centre" is a visionary project that addresses climate change and disaster management comprehensively. With innovative design, a commitment to sustainability, and a focus on community education and resilience, it aims to make a significant impact in addressing climate-related challenges in the Tshwane region.



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Proposing the "Climate Activism and Disaster Management Centre" is a multifaceted endeavor with a primary aim of becoming a grassroots initiative housed within a single building. This building will serve as a hub for raising awareness about climate change while also accommodating a Disaster Management Centre that can respond effectively in times of crisis. The central mission encompasses not only these immediate goals but extends to conducting research on climate change, addressing local vulnerabilities and hazards specific to the Tshwane region, and providing training to the public and building occupants. In doing so, the project seeks to equip the community with the skills and knowledge to confront the escalating challenges posed by climate change.

In a broader context, the project aspires to transfer, cultivate, and apply knowledge on climate change and strategies for adaptation. It aims to serve as an essential community resource within the urban environment, making it a focal point for the dissemination of critical information and a center for civic engagement.

To effectively address the complex challenges presented by its chosen context and the uncertainties of future climate conditions, the project emphasizes these key aspects: Didactic Approach, Pedagogical teaching, Biophilic Design, Remediation, Ecological Sustainability & Climate Resilience.



# intro to site // 01

The proposed project site is strategically situated within the boundaries of the UNISA Sunnyside campus, which acts as a gateway to Pretoria, sandwiched between Pretoria CBD, Sunnyside, and Muckleneuk. The project centers around the retrofitting of an existing 12-story building that has never been completed or occupied and currently remains in a state of disrepair.

Adjacent to significant nodes within a 20-minute walking radius such as museums, the Pretoria train station, bus stations, and public parks, positions it as a crucial component of the region's spatial development framework. It is closely aligned with proposed linear zones and transport-oriented development, emphasizing its strategic significance within the urban landscape.



# 02 //

The presence of a critical biodiversity area and its location within a substantial stormwater catchment area toward the Apies River emphasizes the importance of a "sponge city" concept within the project. This innovative approach utilizes vegetation and wetlands to decelerate stormwater flow, reducing the risk of flooding and mitigating its potential destructive effects.



The urban strategy aims to create multiple green corridors that seamlessly integrate into the broader urban framework. This initiative connects neighborhoods divided by extensive highways, enhancing pedestrian access and promoting mixed-use development within underutilized spaces.



Over the past four decades, South Africa has faced an alarming tally of 82 natural hazards, resulting in significant impacts on millions of people. Moreover, scientific evidence points to a disturbing trend in which these hazards are becoming not only more frequent but also more intense. The consensus among experts is that this trend is expected to persist based on current climate projections.



Africa's rapid urbanization compounds these challenges as an increasing number of cities and towns become increasingly vulnerable to the adverse effects of climate change. The project acknowledges the need for retrofitting existing structures, originally designed for different climate contexts, to enhance their resilience to the changing climate conditions.



Considering the temporal dimension of the project is critical. It is vital to recognize and plan for two distinct time frames: the present climate condition and the future one. By applying the Koppen-Geiger climate classification system, projections indicate that Tshwane will undergo a transformation, transitioning to a hot arid climate within the next two to three decades. This alteration in classification is a direct consequence of climate change and is based on predictions following the RCP (Representative Concentration Pathway) low mitigation scenario.

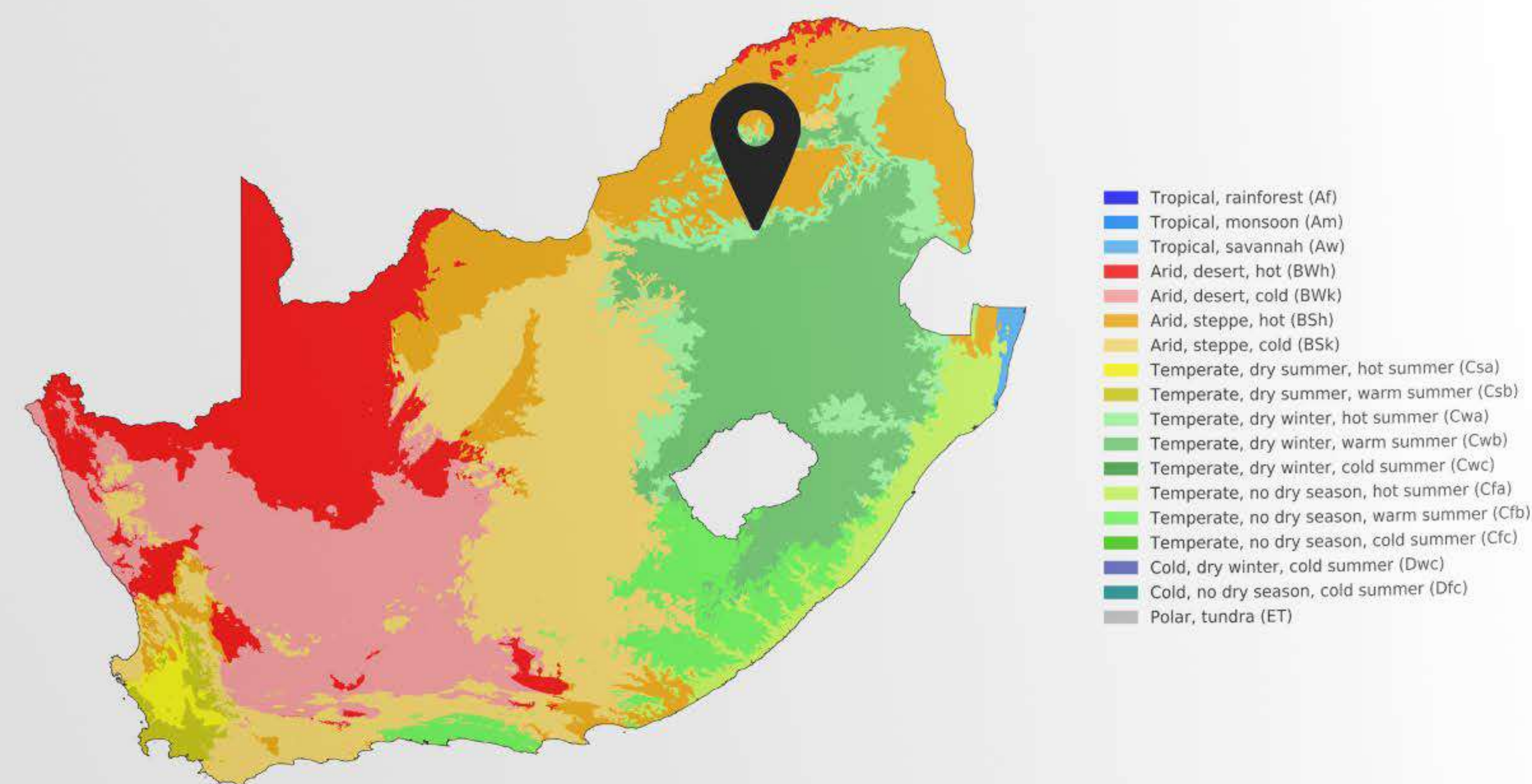


context  
CURRENT CLIMATE SCENARIO

05

Information derived from the Greenbook by CSIR provides insight into the local vulnerabilities and hazards specific to the project's location. In the current climatic condition, urban growth emerges as particularly vulnerable, with hazards such as flooding, drought, fire, and extreme heat posing significant threats.

Cwa – Temperate, Dry Winter, Hot Summer (Tshwane Present Classification)  
The coldest month has a temperature greater than -3 °C but less than +18 °C. The wettest month precipitation in summer is more than ten times that of the driest month precipitation in winter, while the wettest month precipitation in winter is less. The warmest month had a temperature greater than or equal to +22 °C (Chen & Chen, 2013).

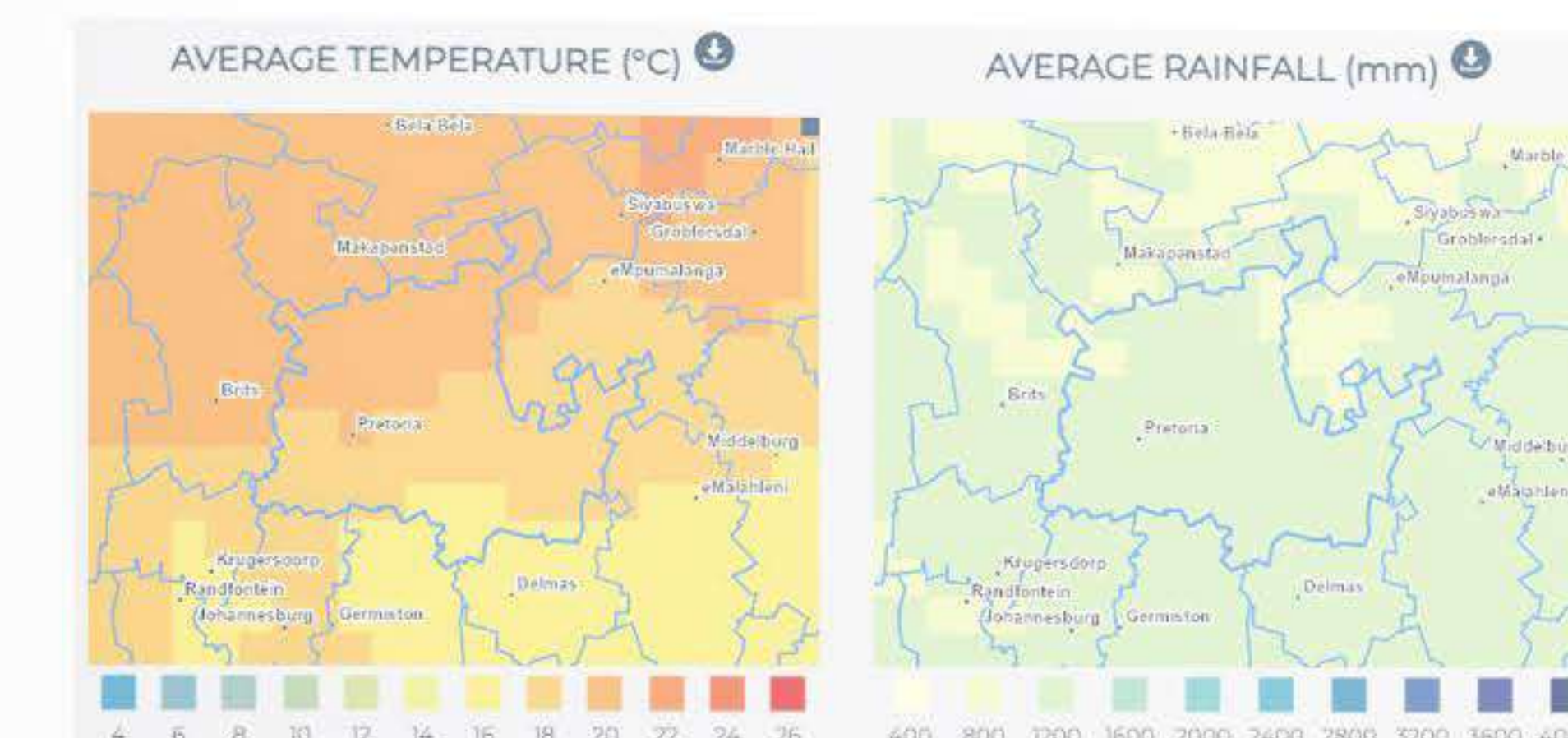


06

Baseline



Settlement Vulnerability



Climate

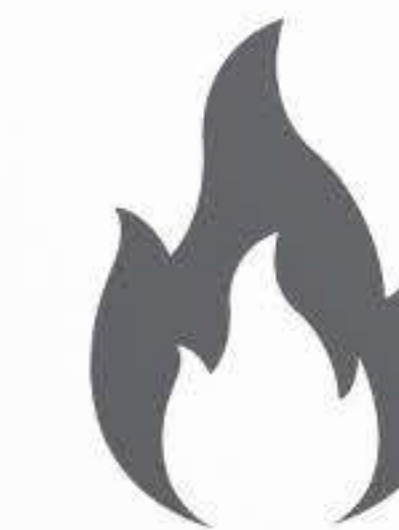
Hazards



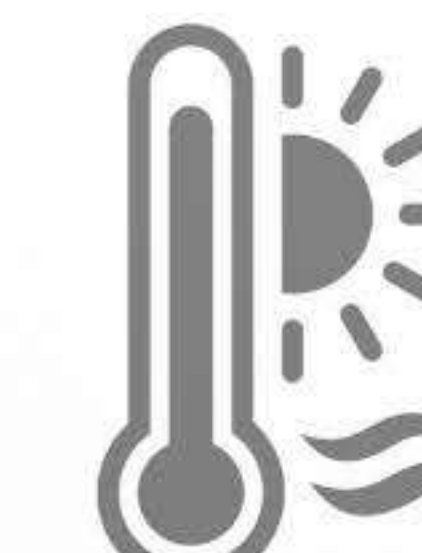
Flooding



Drought



Fire



Heat Extremes



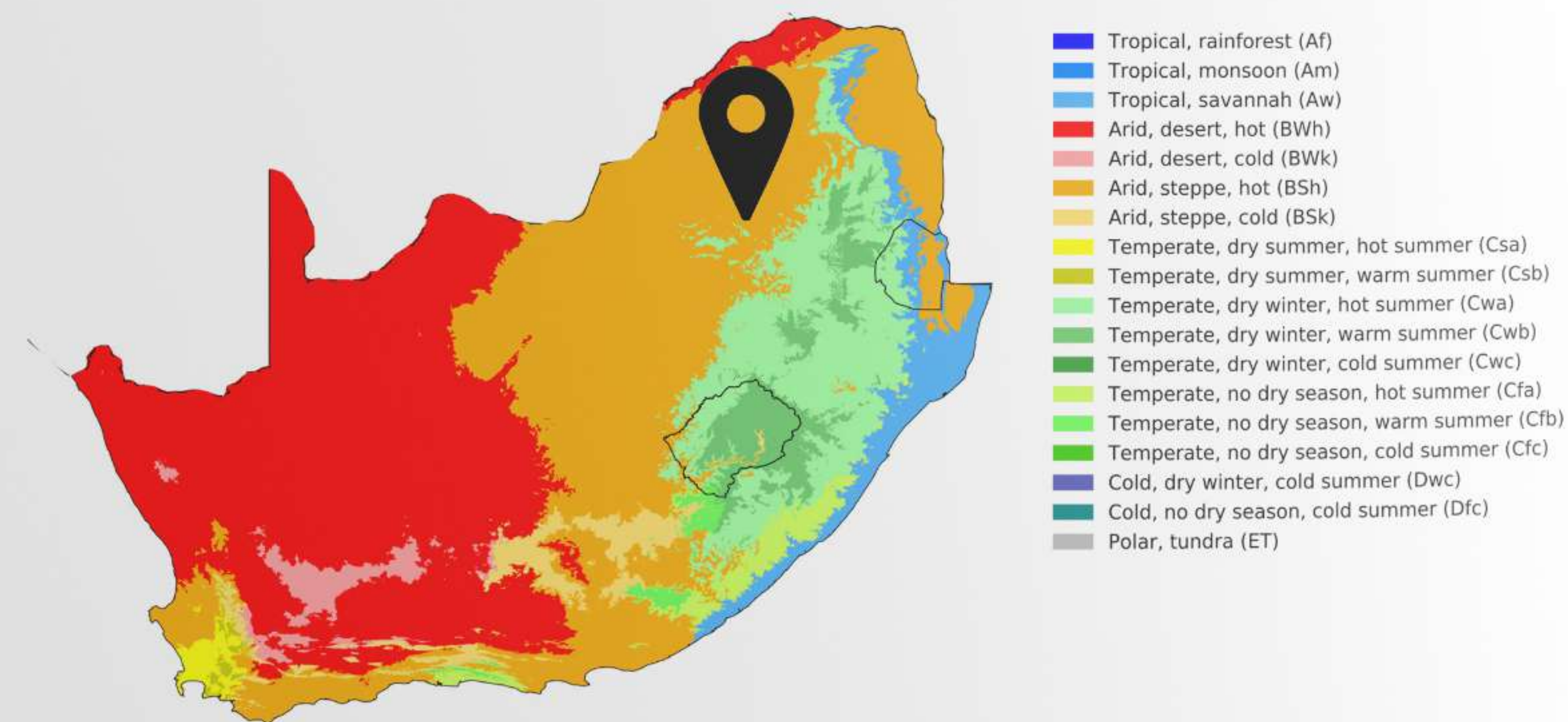
Key Resources: Water Supply; Agriculture; Economy; Surface Water; Groundwater

context  
FUTURE CLIMATE SCENARIO

07

Future projections further underscore the increasing challenges. While flooding and heat extremes show a slight increase, drought and fire are expected to experience a much higher frequency, making it essential to implement proactive measures to address these threats effectively.

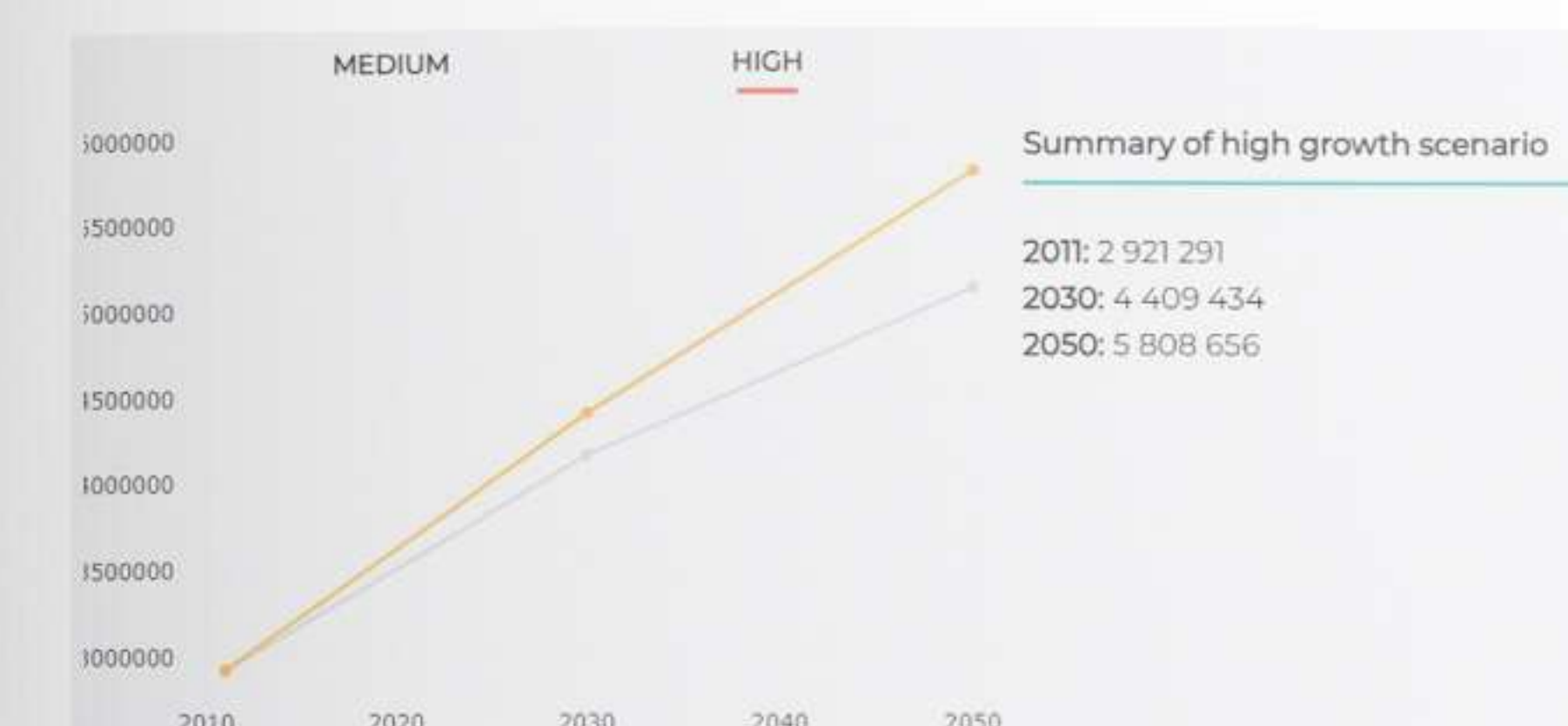
BSh – Arid, Steppe, Hot (Tshwane Future Classification)  
Total annual precipitation is greater than 5 times the dryness threshold. The dryness threshold is stated in millimetres and is proportional to the annual mean temperature (Tann) in degrees Celsius. It is determined as follows: if at least two-thirds of the annual precipitation falls during the winter, the dryness threshold is 2Tann; if at least two-thirds of the annual precipitation falls during the summer, the dryness threshold is 2Tann + 28; otherwise, the dryness threshold is 2Tann + 14.



Source: Beck et al.: Present and future Köppen-Geiger climate classification maps at 1-km resolution, Scientific Data 5:180214, doi:10.1038/sdata.2018.214 (2018)

08

2050



Projected Changes in annual average temperature  
RCP 4.5: 2.23°C – 2.81°C  
RCP 8.5: 2.72°C – 3.16°C

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RCP 4.5: 2.23°C – 2.81°C  
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Average Rainfall & Extreme Rainfall Days will increase slightly, with a big increase in very hot days.

Population Growth Projections - Pretoria High Pressure

Hazards



Flooding - Slight Increase



Drought - High Increase



Fire



Heat Extremes

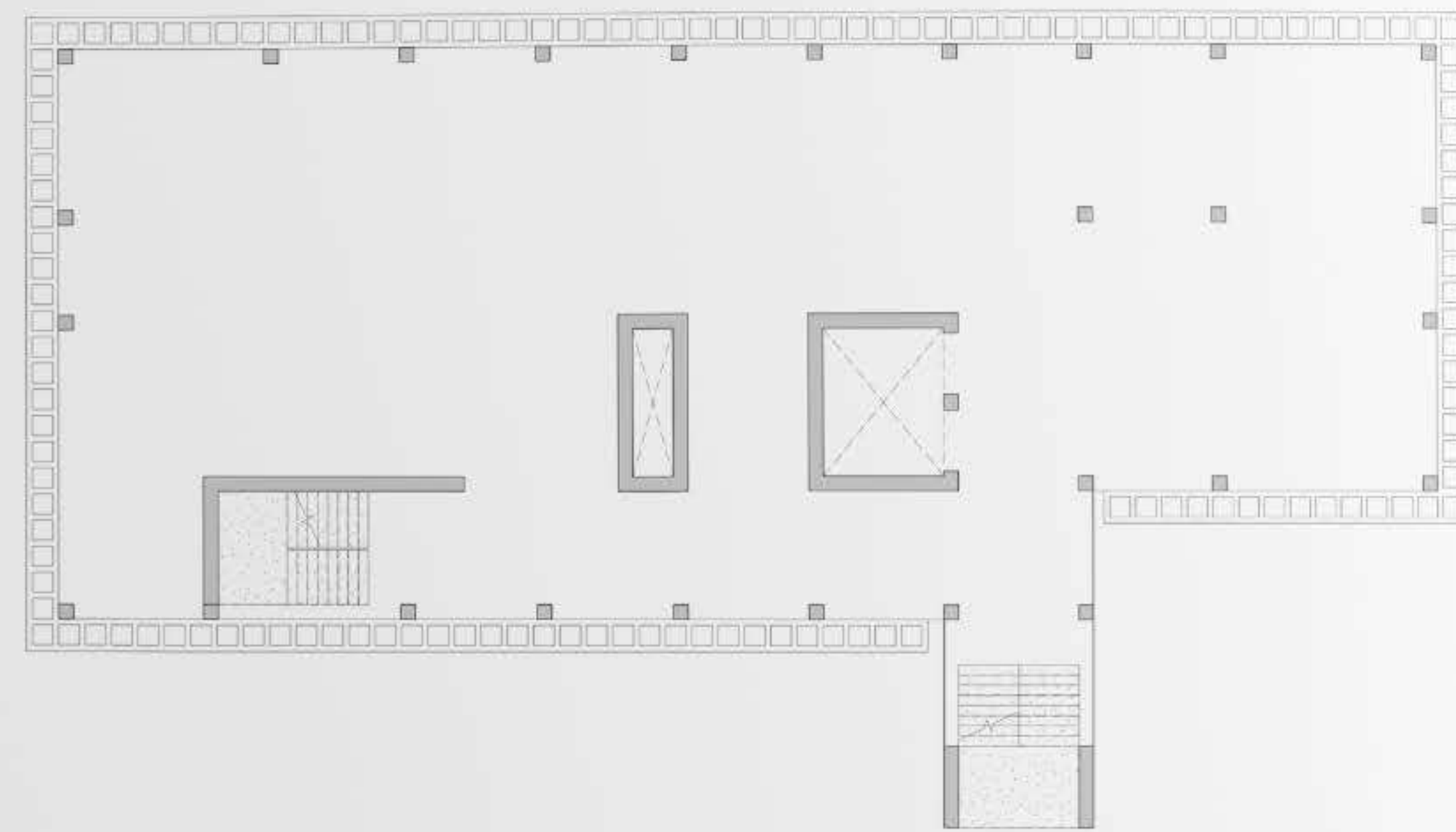


site  
existing condition



09

Existing Building Footprint to be Retrofitted



Infill walls to  
be demolished



Existing wetland



New facade



Existing ramp to  
lower ground



10



concept  
THEORETICAL FRAMEWORK

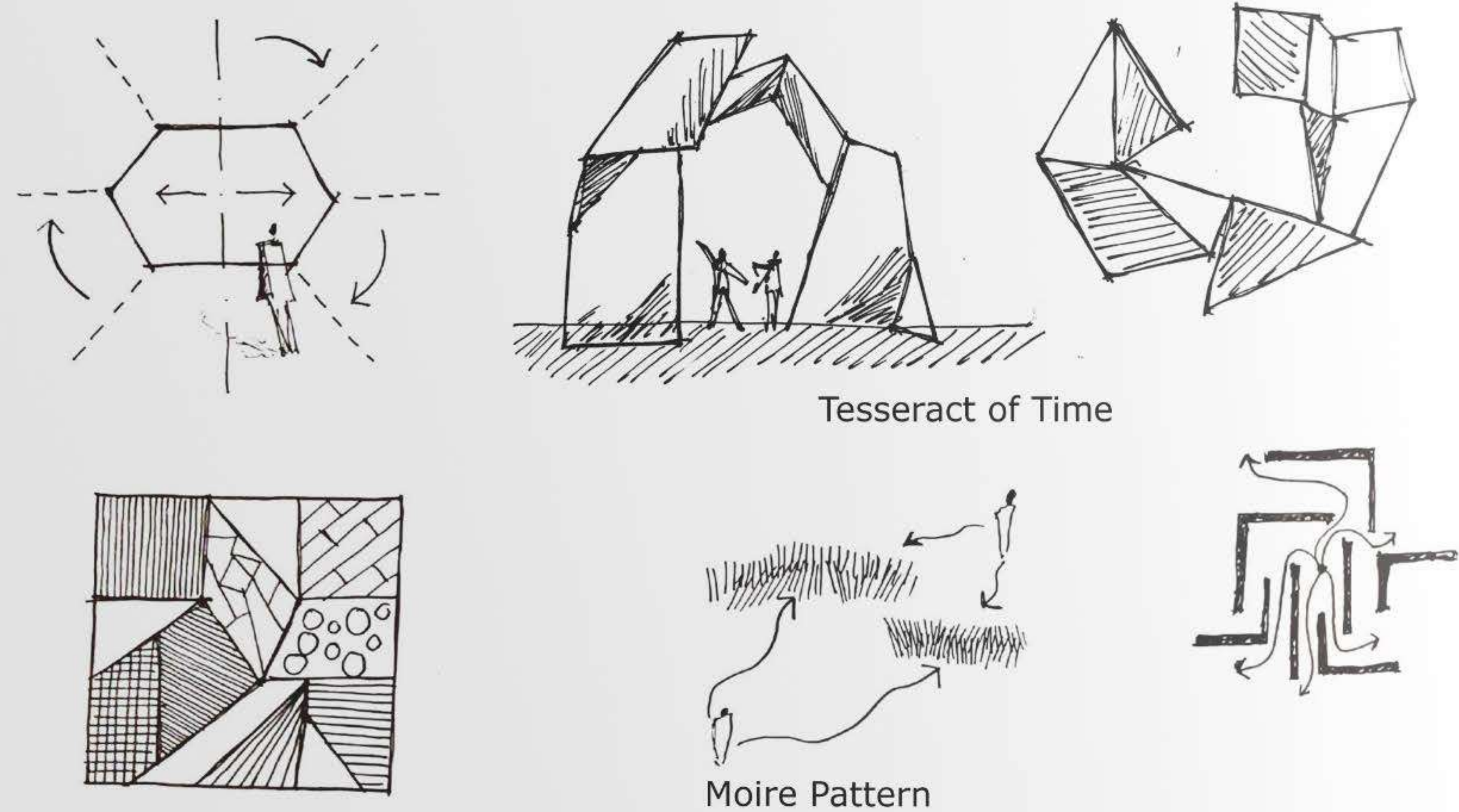


# KALEIDOSCOPE

The project's core concept is symbolized by a kaleidoscope, representing change, balance, and harmony. The dynamic symmetry of the pattern reflects its transformative nature, constantly shifting, integrating past, present, and future elements. Its multilayered and holistic attributes convey a circular system, creating a unique and dynamic visual experience.



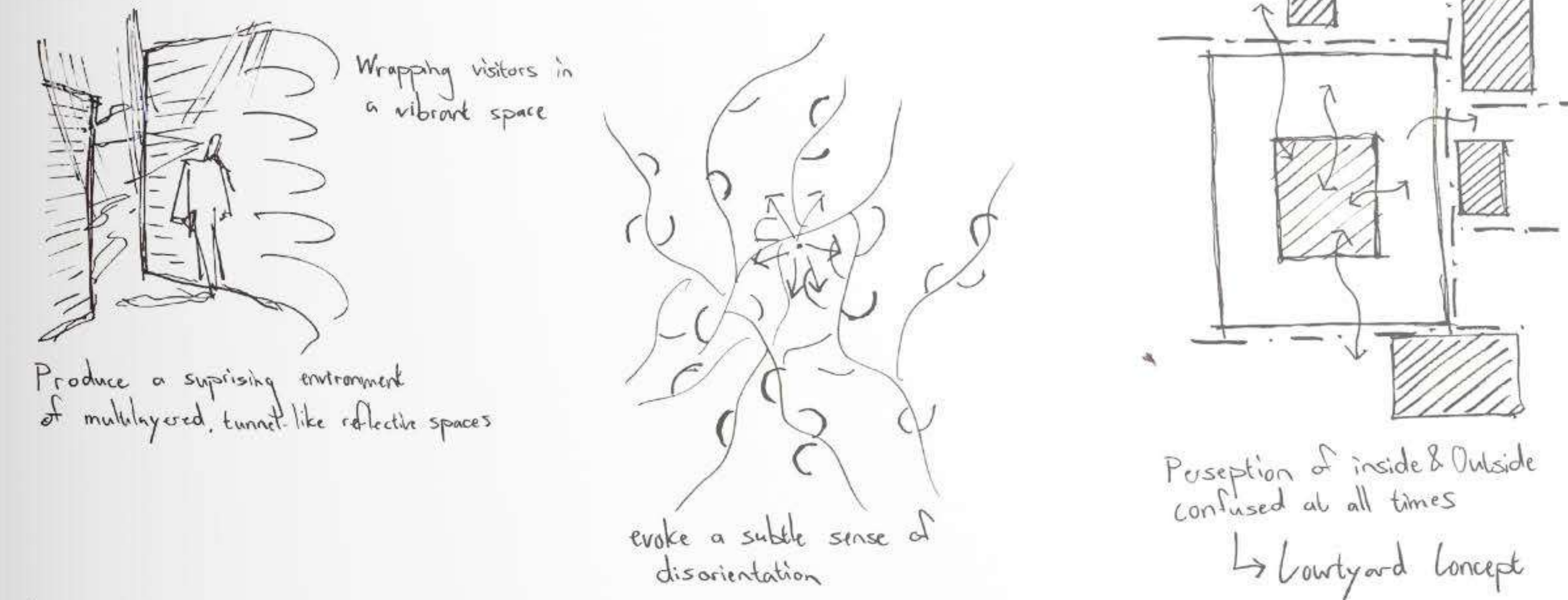




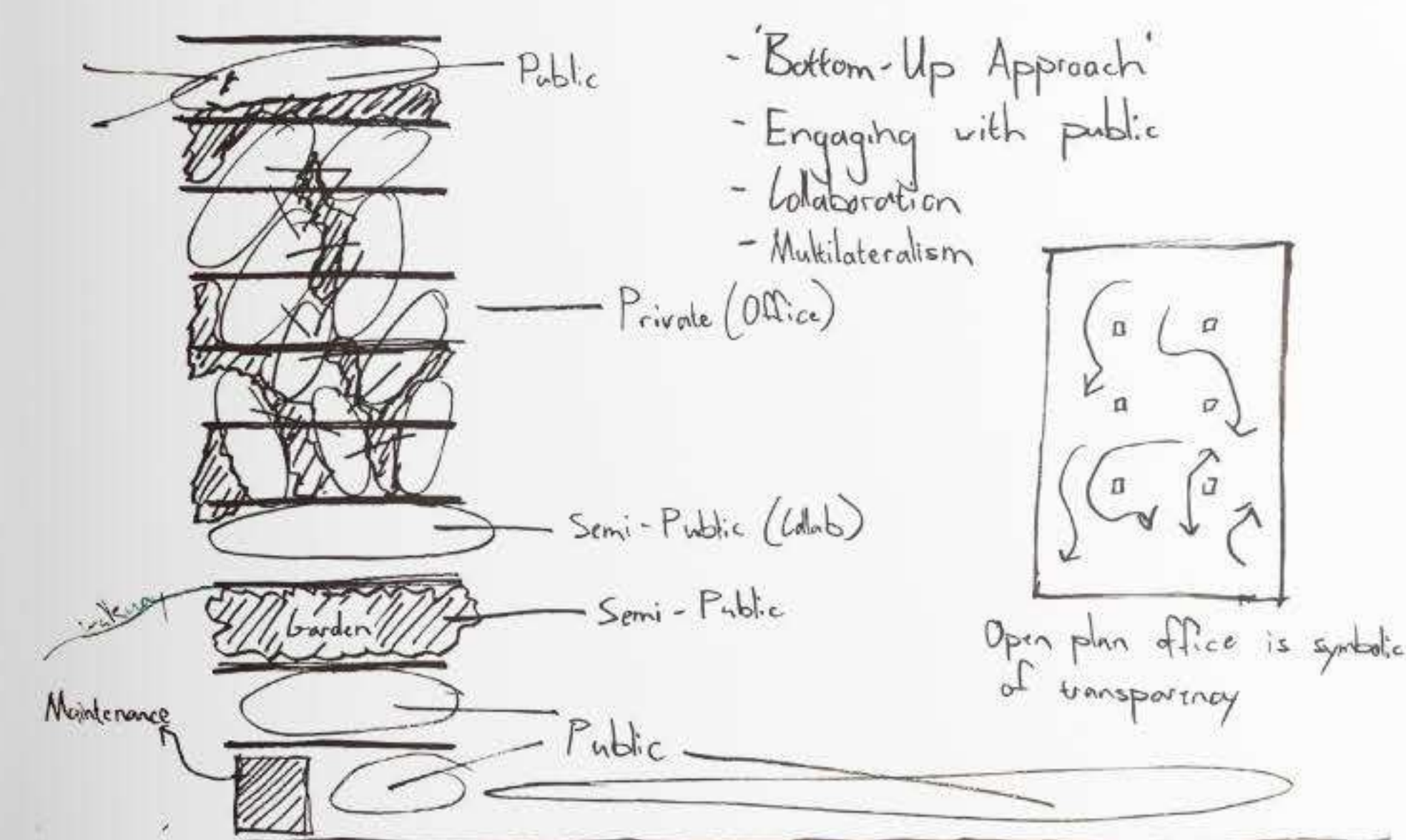
Tesseract of Time

Moiré Pattern

The interplay of materials, angles, and shapes within the project results in a complex interaction of light, color, and shades. As visitors move around and through the site, the alignment of various elements shifts, causing new colors and tones to emerge, akin to a moiré pattern. This immersive and dynamic approach aims to evoke a subtle sense of disorientation, enveloping visitors in a vibrant and captivating space.



The project is designed to be in constant dialogue with its ever-changing natural surroundings. The site's natural condition, characterized by its variability, serves as a source of inspiration for architectural elements that adapt and respond to these natural forces.



client

user

client & user



- Department of Environmental Sciences  
- Department of Geography



office worker



pedestrian



student & scholar



volunteer



researcher

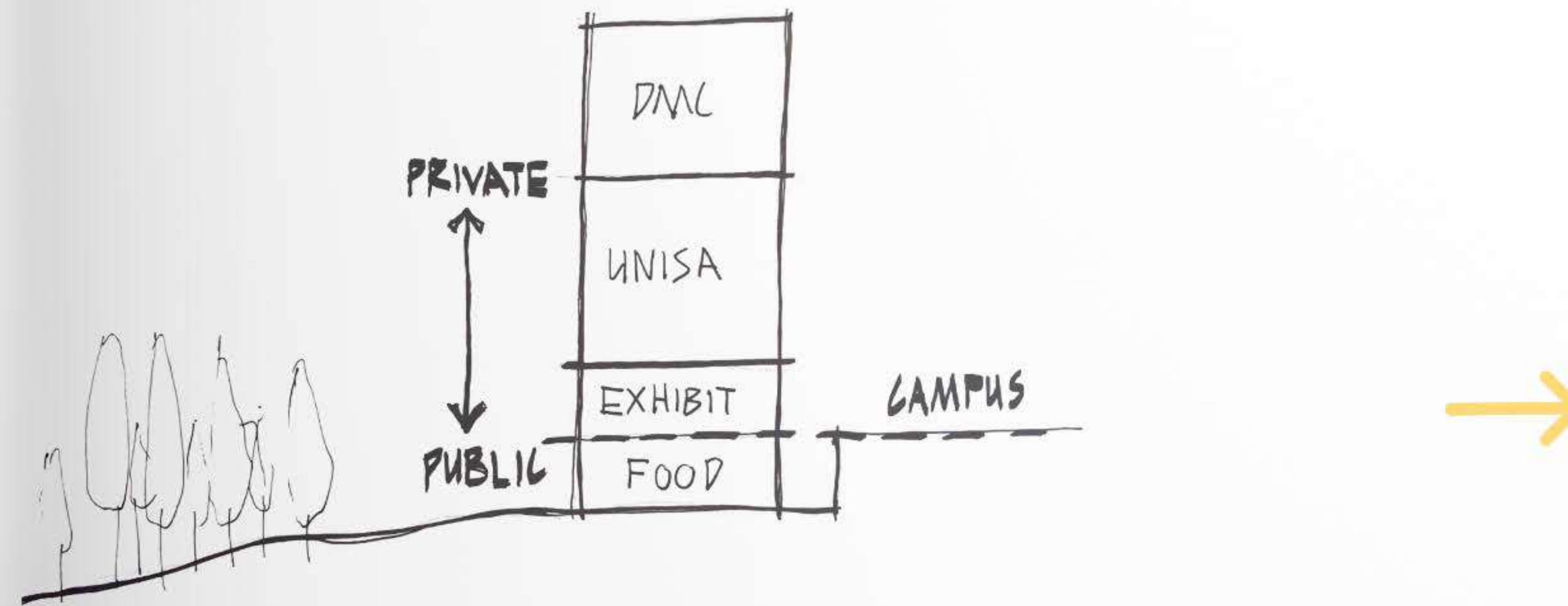
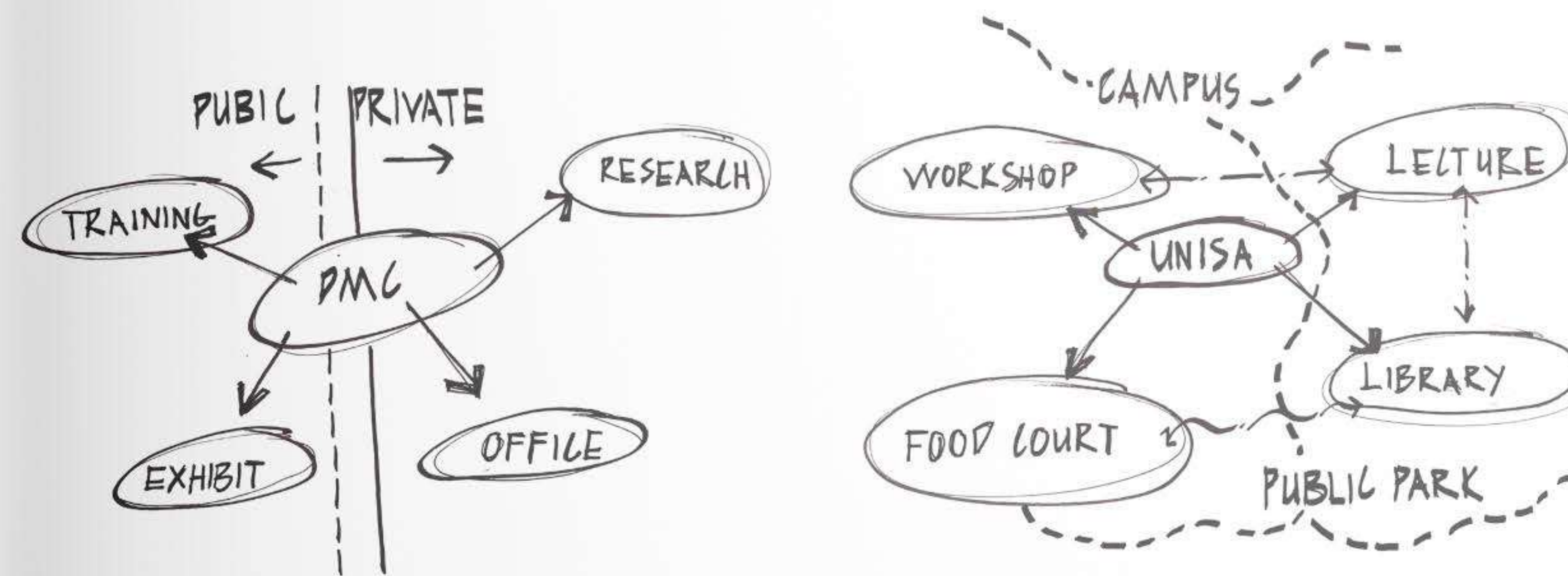


tourist

// 13

// 14

spatial planning  
DIAGRAMMES



#### Environmental Considerations:

The direction of the wind on the site significantly informs the shape and orientation of the proposed building. The design aims to emulate the forms and forces found in nature, fostering a dynamic relationship between the human experience and the natural world.

The project enhances awareness of the site's specific qualities, directing attention to the natural elements that shape it. The case study of a project in China demonstrates the implementation of a cut and fill strategy to create terraces, promoting flood resilience and providing space for lush, seasonally adaptive vegetation. The riverfront project emphasizes the transformation of the site into a natural water treatment system, enhancing water quality for downstream development.

#### Educational and Functional Aspects:

The proposed center is envisioned as a hub for education and disaster management. It is equipped with educational resources, including audiovisual equipment, simulation systems for recreating natural disasters, and essential first aid supplies and emergency communication systems. Effective disaster prevention hinges on reliable communication networks.

The design revolves around an open-air courtyard that serves as an outdoor playground while maintaining a continuous connection with nature. It aims to educate, entertain, and inspire a diverse audience, offering a unique experience that blends science, education, art, and entertainment.

#### Architectural Innovation:

The proposed building is envisioned as a state-of-the-art research facility with innovative architecture. It creates an optimal framework for world-class research, intending to become a landmark in Pretoria. This endeavor seeks to forge connections between UNISA and the surrounding neighborhoods and the wider city, fostering an environment of collaboration and knowledge-sharing.

To create a venue for world-class research, the design emphasizes spaces that facilitate interactions across different disciplines, accommodating both the general public and the research community. This approach aims to enhance communication about ongoing research activities, fostering knowledge-sharing and inspiring new and groundbreaking research.

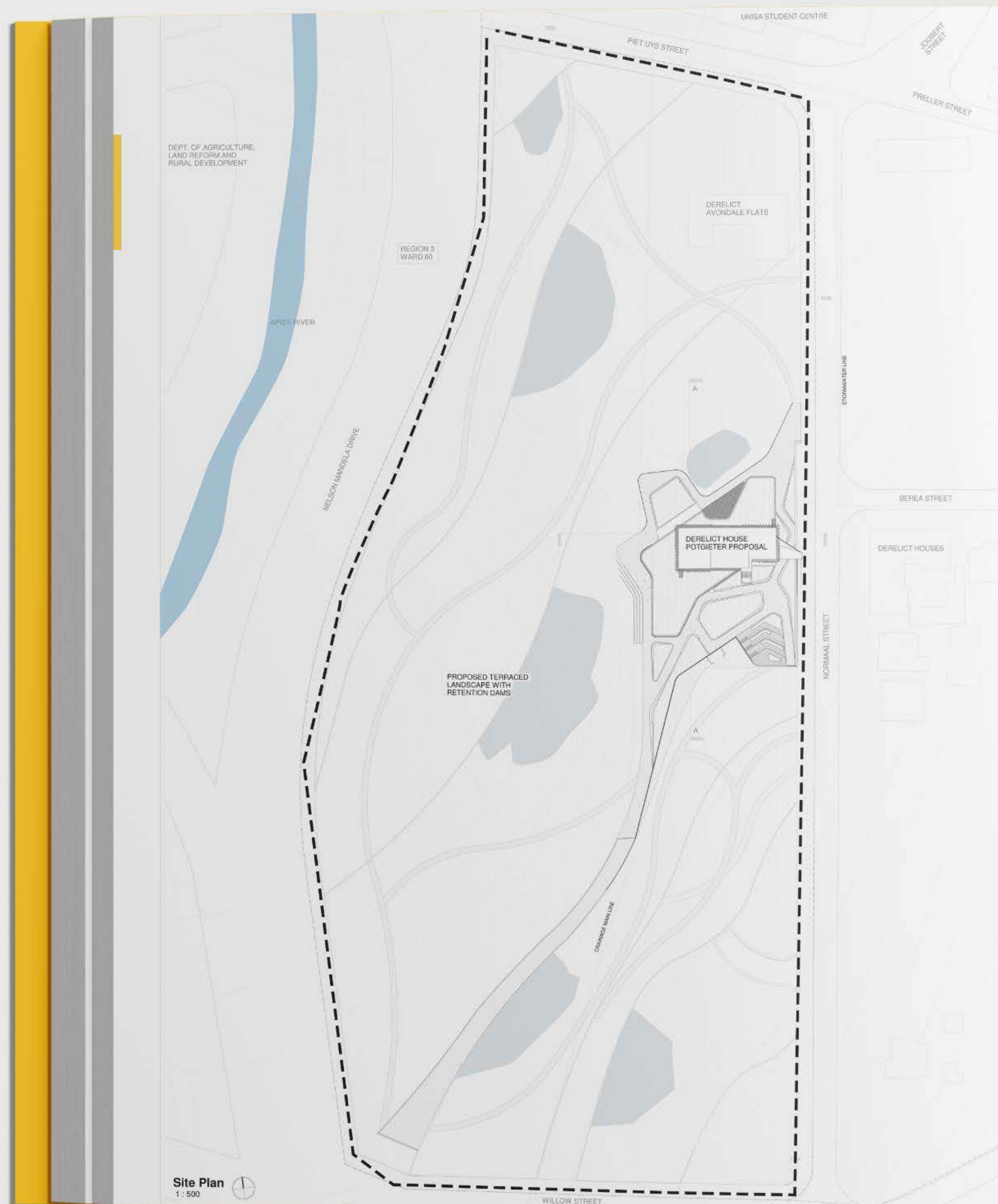
#### Sustainable Features:

A distinctive feature of the new Campus Park is a walkway that allows pedestrians and cyclists to traverse the landscape, offering close proximity to the building and researchers. This feature creates a new connection between UNISA and its surrounding context, enhancing accessibility and interaction.

Sustainability is a fundamental consideration, with the project integrating numerous eco-friendly elements. Design interventions are informed by the microclimate on-site, ensuring climatic responsiveness. The building's program is structured to have lower floors open to the public, connecting seamlessly with the landscape, while upper floors house more private areas like offices and research labs. The building envelope is designed with sun protection in mind, using louvered screens, cavity walls, and curtain walls. Additionally, the landscape captures and utilizes water during the summer, and renewable energy sources like wind turbines and solar panels are incorporated into the roof design. Passive strategies are deployed to ensure thermal comfort within the building, aligning with the project's overall commitment to ecological sustainability and climate resilience.

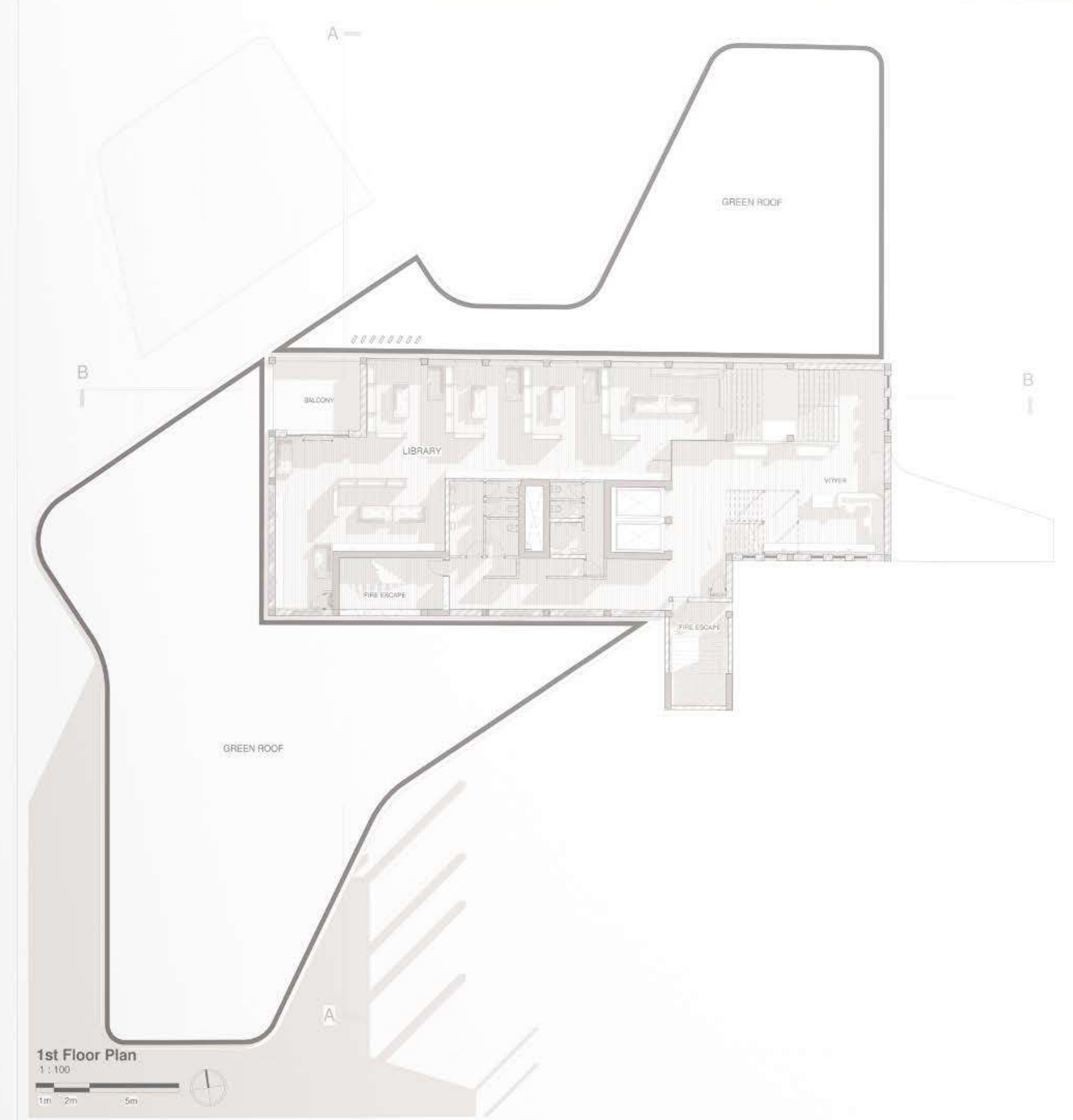
In conclusion, the "Climate Activism and Disaster Management Centre" is a visionary project with a multifaceted mission. It aims to address the pressing challenges of climate change and disaster management while serving as an educational and community resource. Through innovative design, ecological sustainability, and a commitment to resilience, this project is poised to make a significant impact in the fight against climate change and its associated hazards.







Ground Floor Plan  
1:100

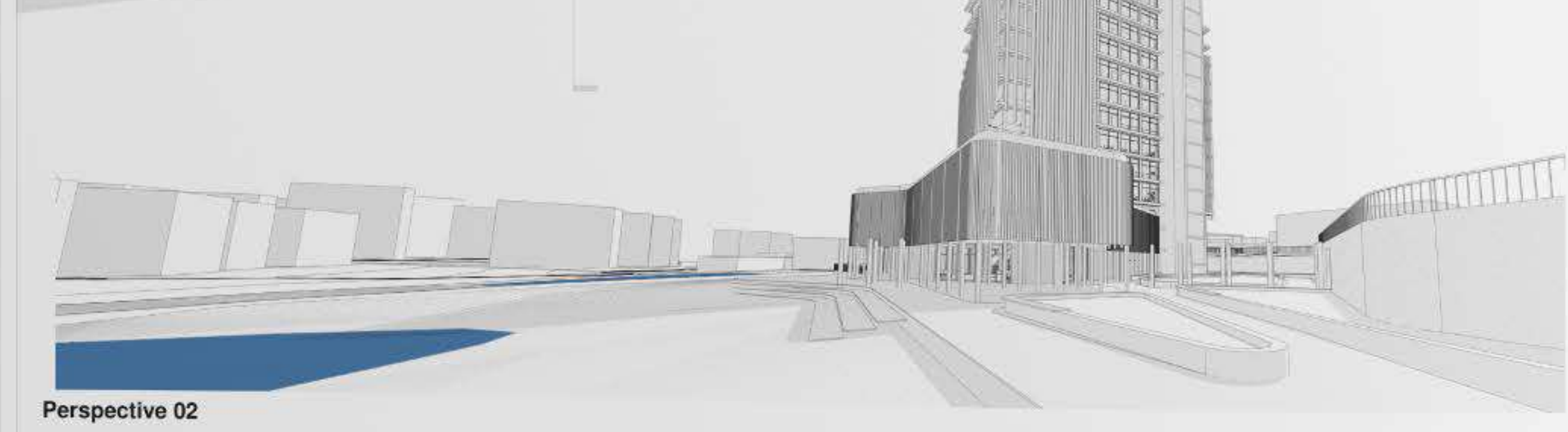


1st Floor Plan  
1:100

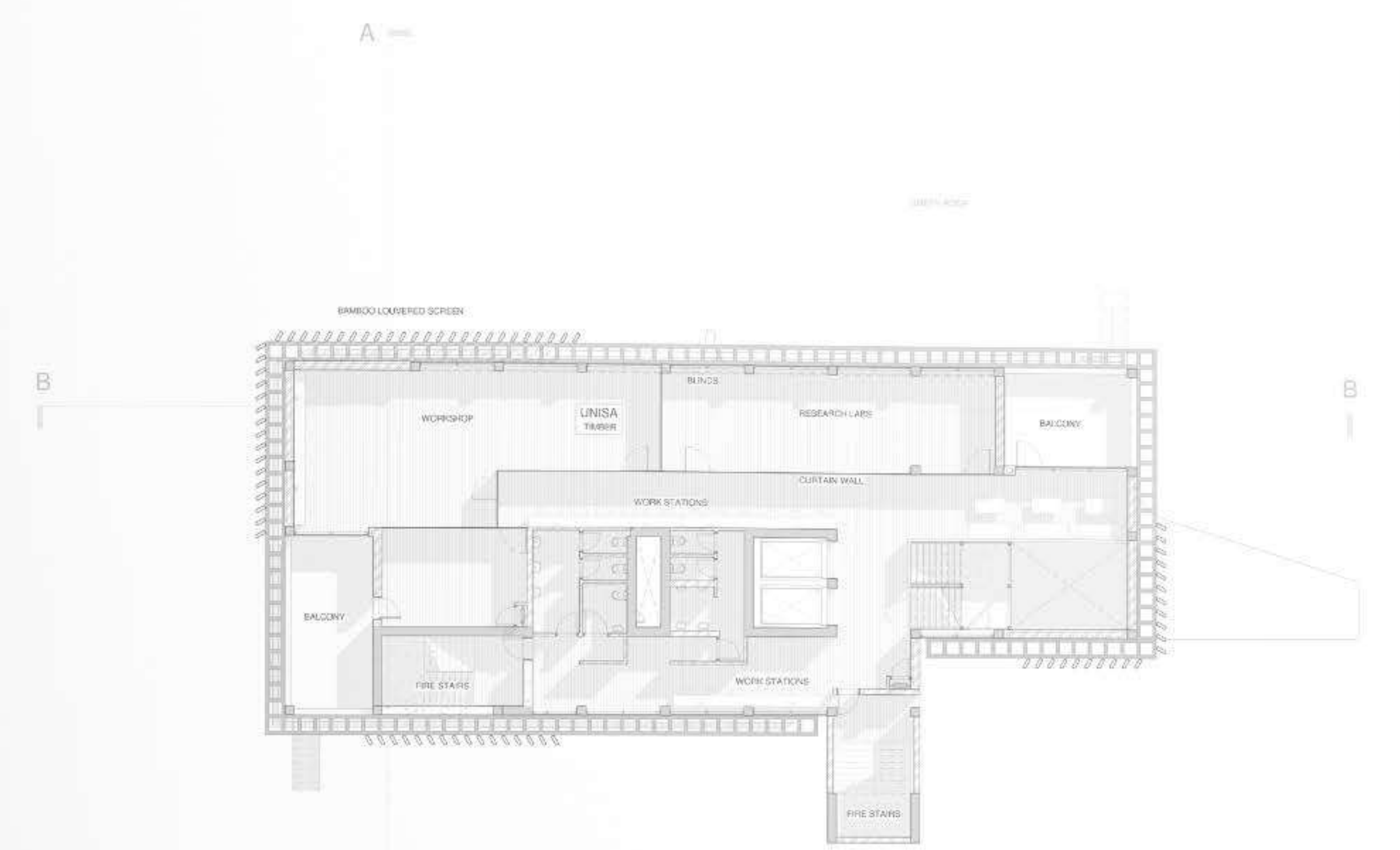




2nd Floor Plan  
1:100



Perspective 02



3rd Floor Plan  
1:100



Perspective 03

## critical reflection

### MINI-PROJECT



The exploration of architectural experience presented in this reflection unveils the profound interplay between design and human interaction, providing a foundation for critical reflection within the context of an architecture project. The acknowledgment of drawing as an embodied cognitive process is particularly impactful. Recognizing drawing as more than a communicative tool, but as a means of engaging with and exploring the environment, underscores its crucial role in the architect's creative process. This understanding prompts a reevaluation of drawing as a dynamic, thought-provoking act that fosters a tangible and conceptual connection between the architect's vision and the surrounding world.

Moreover, the reflection's emphasis on place as a meaningful, culturally significant space adds depth to the discourse. When applied to a larger architecture project, this concept invites a reconsideration of how spaces are designed, urging architects to transcend the conventional and infuse cultural and personal narratives into their creations. By prioritizing the creation of places that foster a sense of belonging and identity, the architect becomes not only a designer but a storyteller, weaving the threads of history and culture into the fabric of the built environment.

The idea of architecture as a layered experience, a palimpsest reflecting time, history, and memory, presents an opportunity for architects to engage with the temporal dimension of their projects. This notion invites an exploration of how the past, present, and future converge within a design, encouraging architects to create spaces that transcend temporal boundaries.

Embedded memory further augments the critical reflection for an architecture project. The realization that buildings are repositories of memory underscores the architect's responsibility as a custodian of cultural heritage. This insight challenges architects to design structures that not only serve functional purposes but also contribute to the preservation and transmission of cultural narratives.

Sense of place emerges as a pivotal consideration, urging architects to delve beyond the physicality of space and consider the emotional and psychological connections individuals forge with their surroundings. In a larger project, prioritizing the creation of spaces that evoke a profound sense of place becomes a strategy for fostering meaningful connections between users and their environment.

Finally, the inclusion of phenomenology and sensuous experience broadens the scope of architectural reflection, emphasizing the importance of designing spaces that engage all the senses. For a larger project, this calls for a holistic approach to design, ensuring that the sensory experience aligns with the intended emotional and cultural resonance.

In conclusion, this reflection offers a robust framework for critical reflection in architecture projects. By incorporating these elements—drawing, place, layered experience, embedded memory, sense of place, phenomenology, and sensuous experience—architects can transcend conventional design boundaries, creating spaces that resonate on a profound and meaningful level within the larger context of the built environment.

