AR3AP100 Public Building Msc3 / Msc4

The Vertical Campus

A public hub of the future in The Hague

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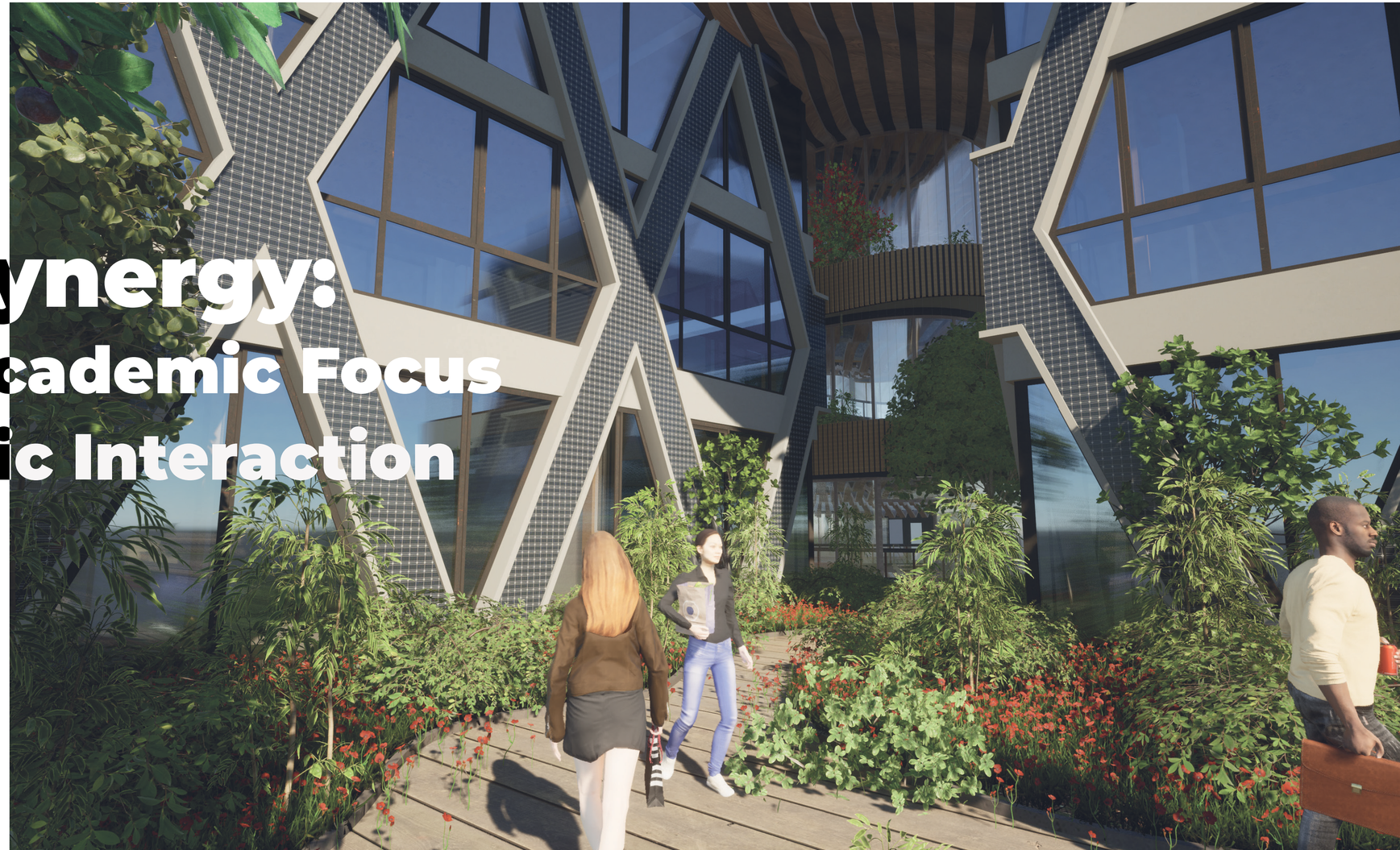
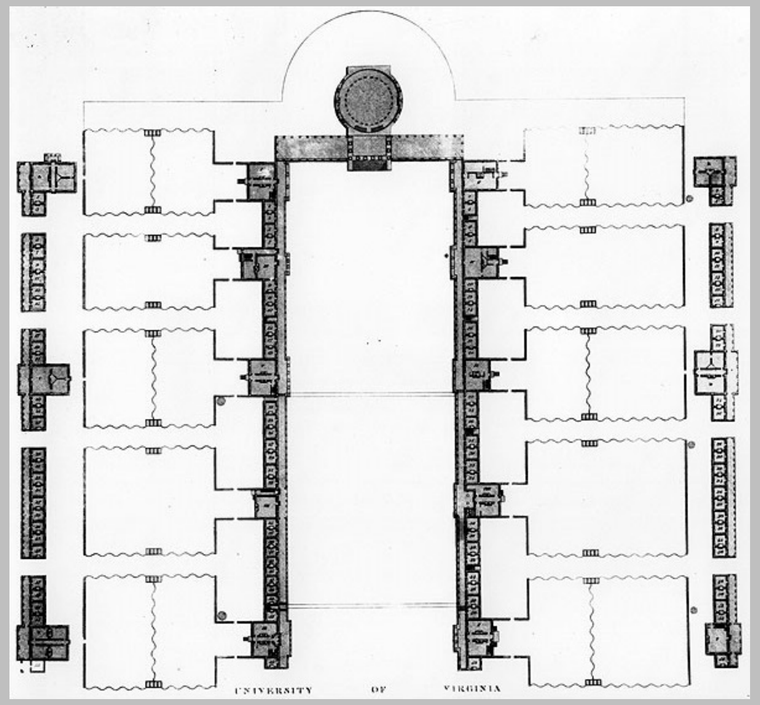
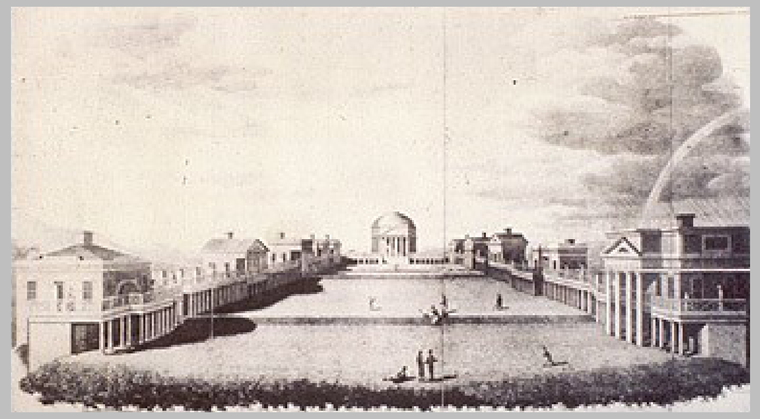
04-07-2024

Urban Synergy:
Merging Academic Focus and Organic Interaction







University Virginia, Thomas Jefferson

Introduction

The traditional campus

“It is safer to have the whole people respectably enlightened than a few in a high state of science and the many in ignorance.”

-- Thomas Jefferson

He imagined that an **“academical village”** clustered around a **tree-lined lawn** would provide an ideal setting in which to pursue higher education. The **focal point** of such a village would be a **Temple of Knowledge** that would house the university library.



Change

Digitalization of Education

With the digitalization of the world and the increased reliance on the internet, the educational system has drastically changed. **From** the university being the **central point** of knowledge today **anyone can learn from any where in the world.**

The **TU Delft** is a great example of this., with an **online** student base of **over 3 million students**, while the student base **at the campus** itself is **around 25,000.**

Future proof Campus

How have these changes over time and the ambition of this studio changed the traditional campus?



Horizontal
campus

From a long stretching footprint of the campus



Vertical
campus

To a small footprint for the campus and stacking functions



Decentralized
learning

Designing for a new way of studying with smaller groups and online education



Cultural
hub

Implementing multiple functions to assist the campus and stimulate interaction

Main theme:

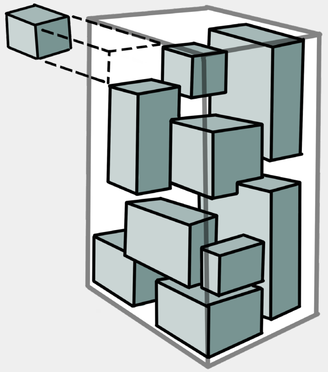
Interaction

Based on this new approach for the usage of campuses, I formulated the main design ambition for the project to be the interaction between people using the campus.

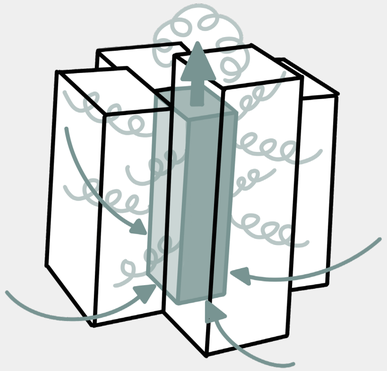
“Designing for Social Interaction Means Emphasizing the Spaces In Between”

-- Henning Larsen

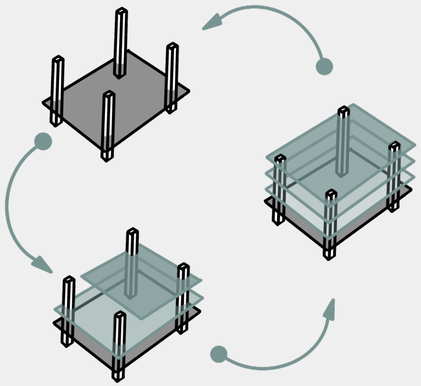
Design principles



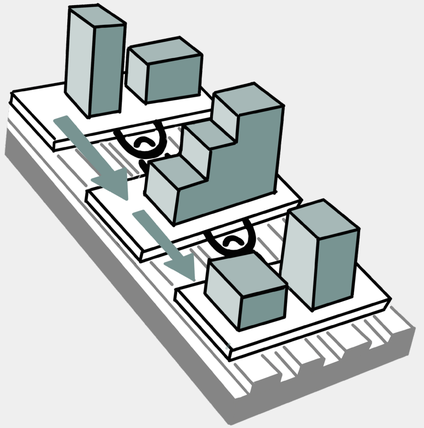
Interaction by diverse functions



Interaction by nature implementation



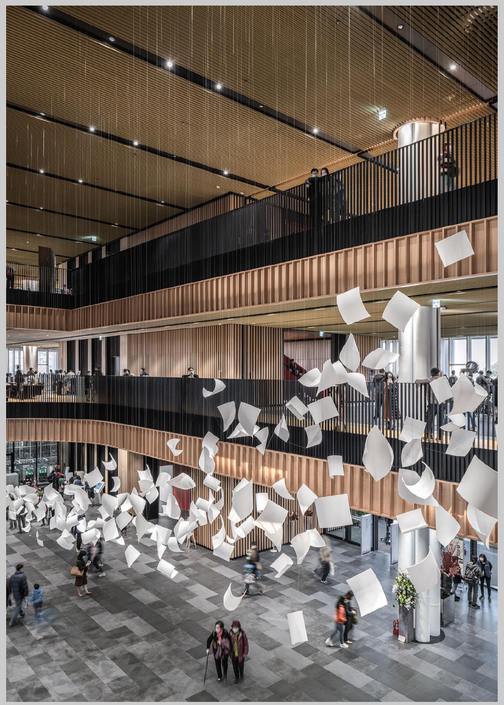
Interaction by flexibility



An expantion blue print

This interaction explained:

The cultural hub







WHAT IS THIS CULTURAL HUB?

“A clustering of cultural venues, workspaces, educational functions and secondary attractions including food and retail”

-- Bibli Insight_

The hub functions as a meeting space for people and therefore connects the people.

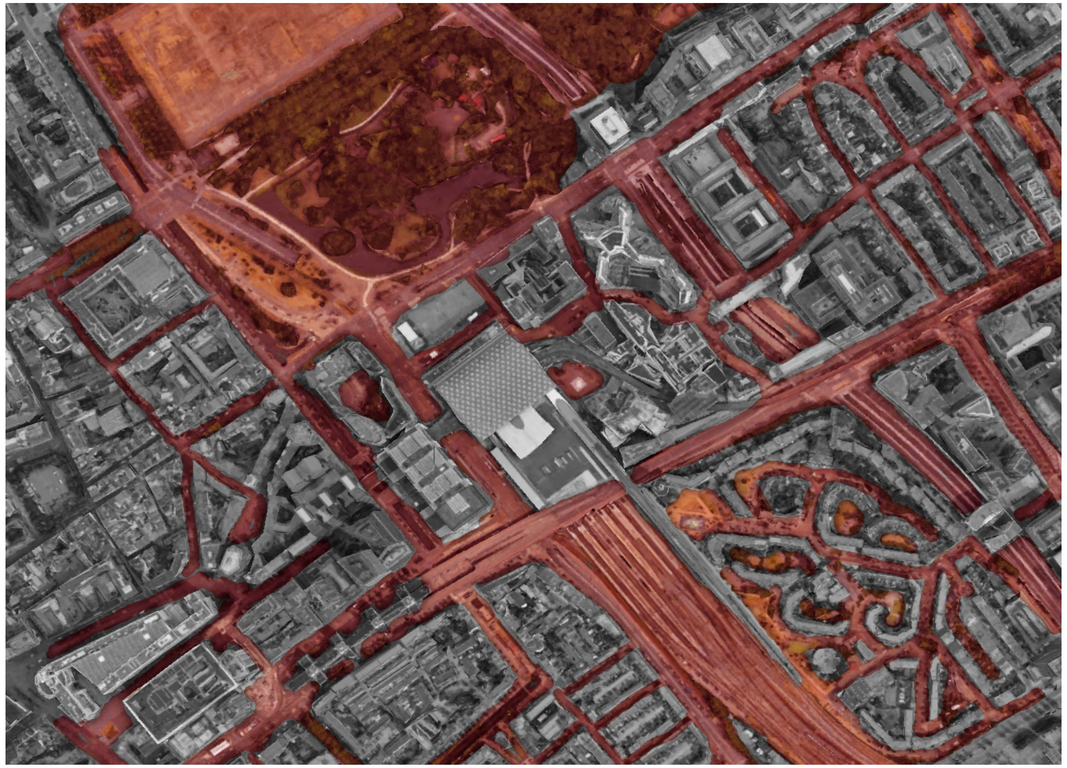
The hub also provides a connection to the neighborhood through the public nature of the building.

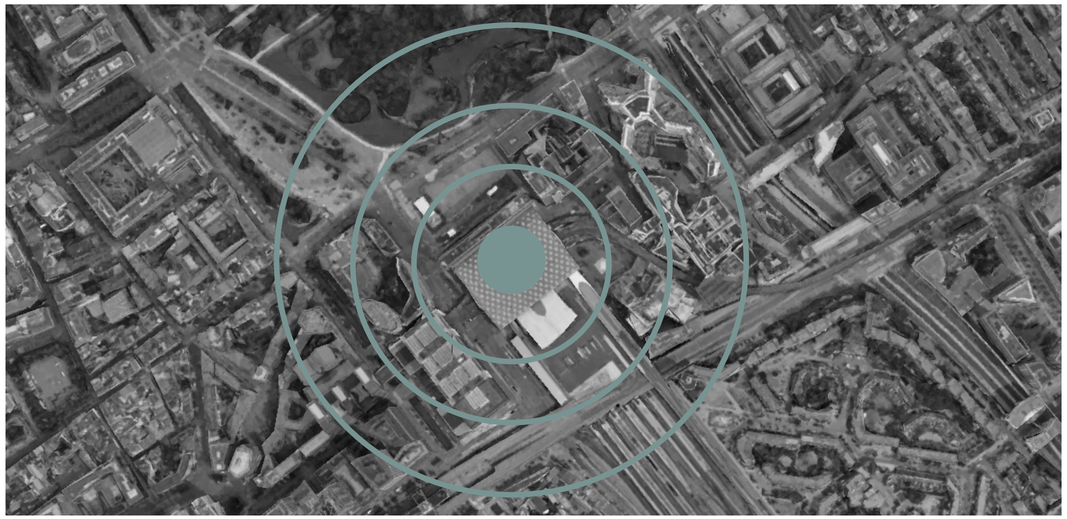
My Plot

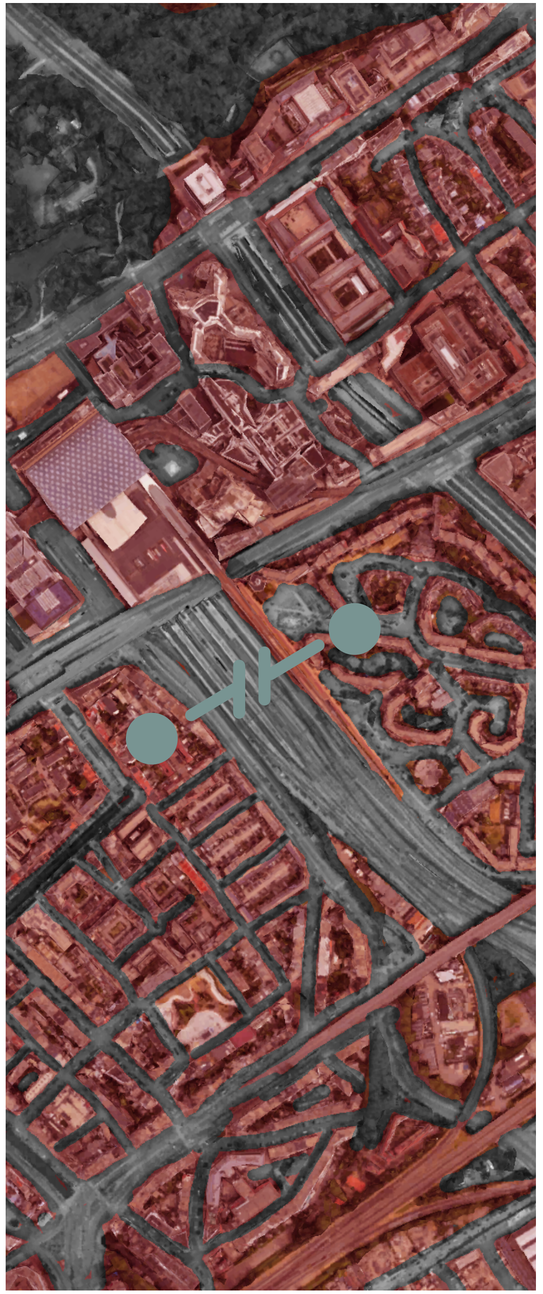
ANALYZING THE AREA

With these different ambitions and qualities mapped out, the site for my plot becomes clear. When looking at the map of The Hague center, where there is still space left, you notice that these are the roads, train tracks and Het Haagse Bos. The last one can be counted out since I don't want to infringe on existing qualitative public space.

With the accessibility zones mapped out from The Hague Central Station and the barrier between the neighborhoods, all these ambitions point to a plot over the train tracks of The Hague as the ideal space for a cultural and meeting hub.







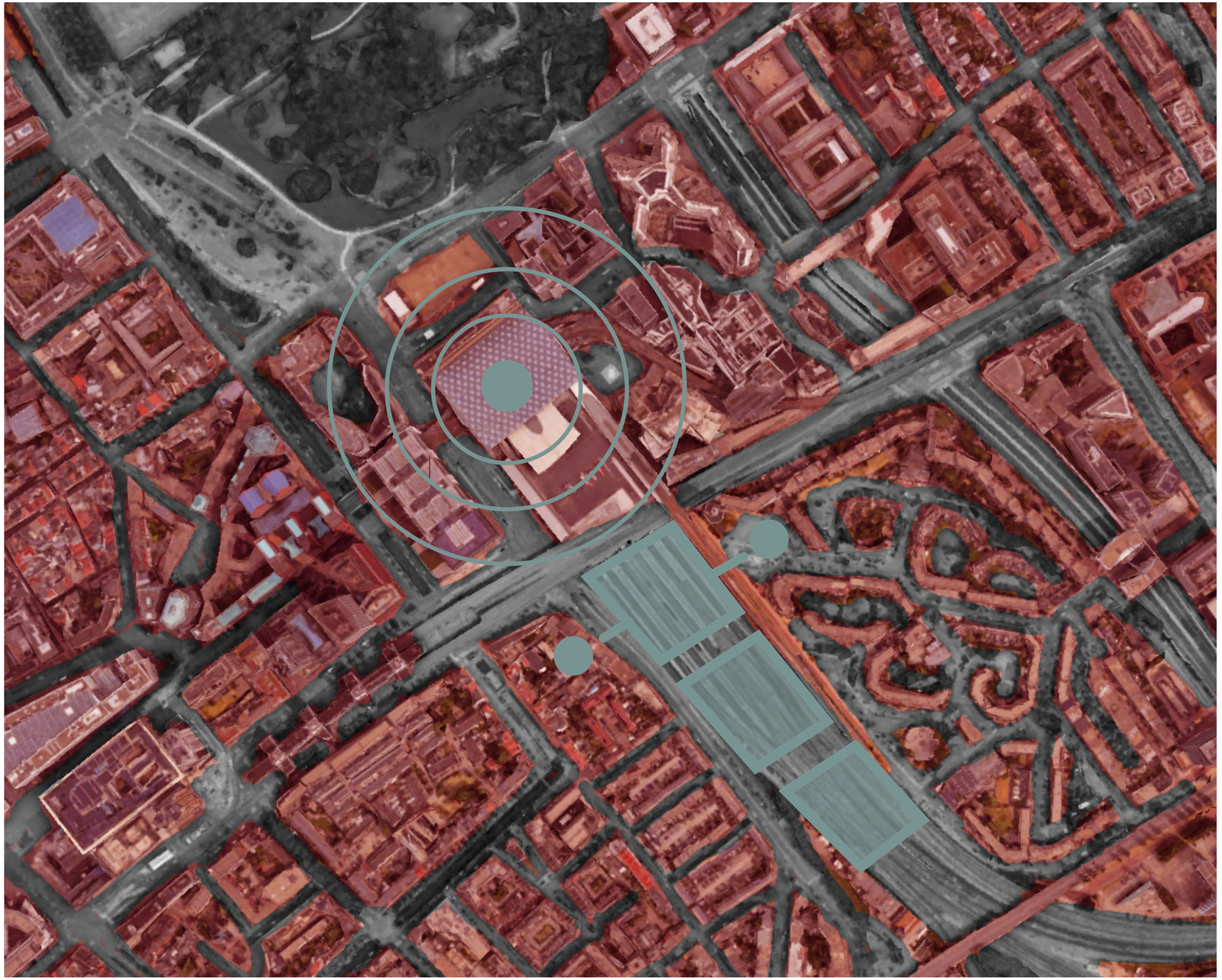
My Plot

ARGUMENTATION

- This plot allows me to add qualitative public space to the city without infringing on existing qualitative public space.

- It enables me to create a blueprint for the new way of densifying cities with future projects over the train tracks in The Hague.

- It allows me to create a solution to the connectivity barrier that the train tracks pose for the neighborhoods on both sides, creating a more connected city.



Constrains

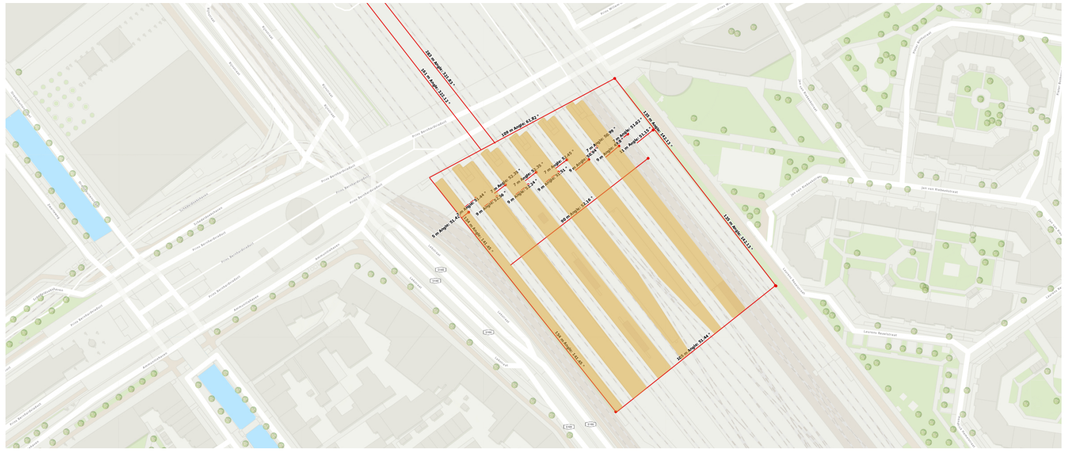
WHAT ARE THE CHALLENGES?

- The main challenge is the structure of the building, constrained by the train tracks where no columns can be placed.

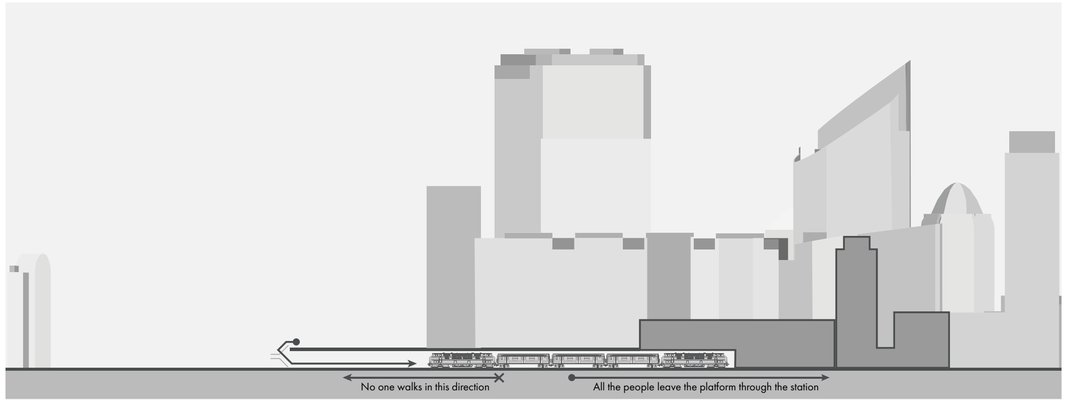
- The existing connections are all vertical along the line of the train tracks.

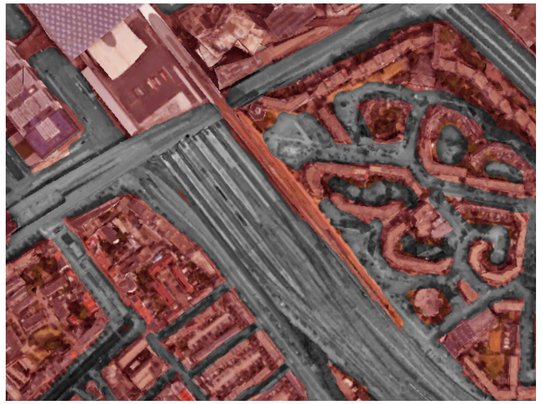
- Connecting the different levels poses a challenge, including access to the platforms, the flyover, and creating new horizontal connections.

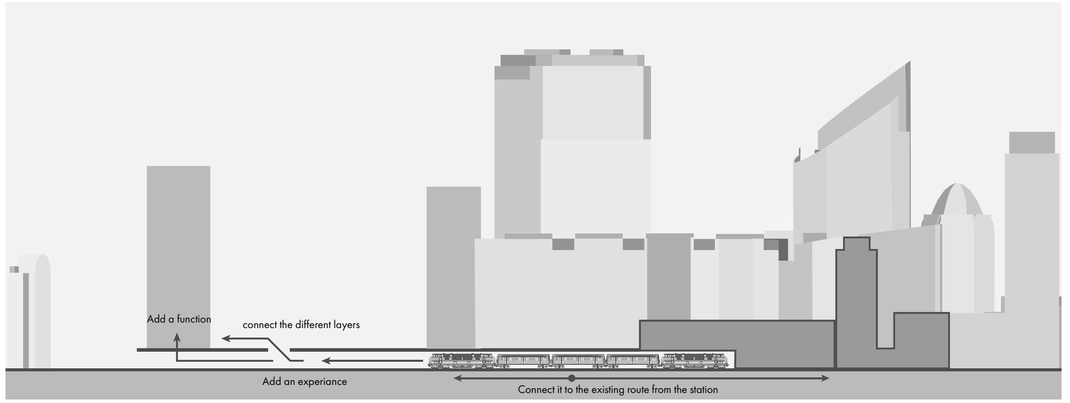
- The metro line to the right of the plot and the car tunnel to the left also present significant constraints for the design.











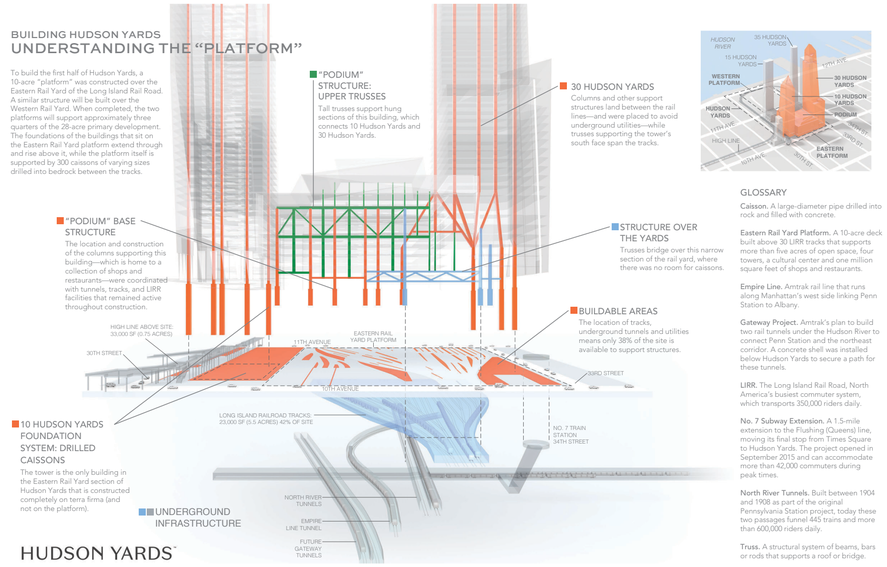


Research

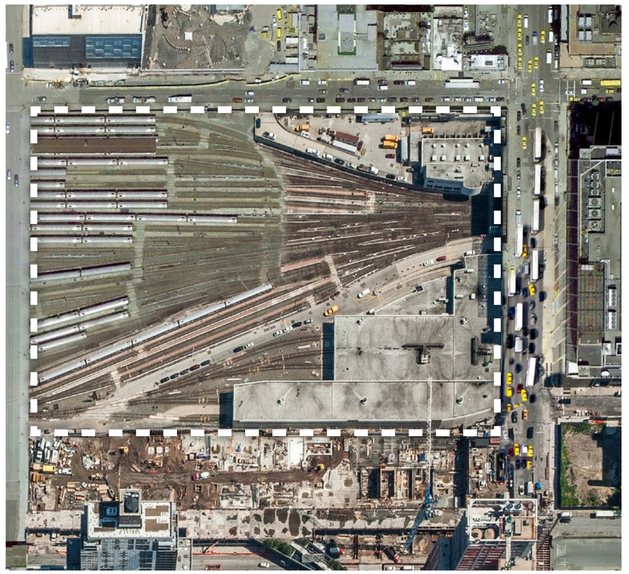
IS IT EVEN POSSIBLE?

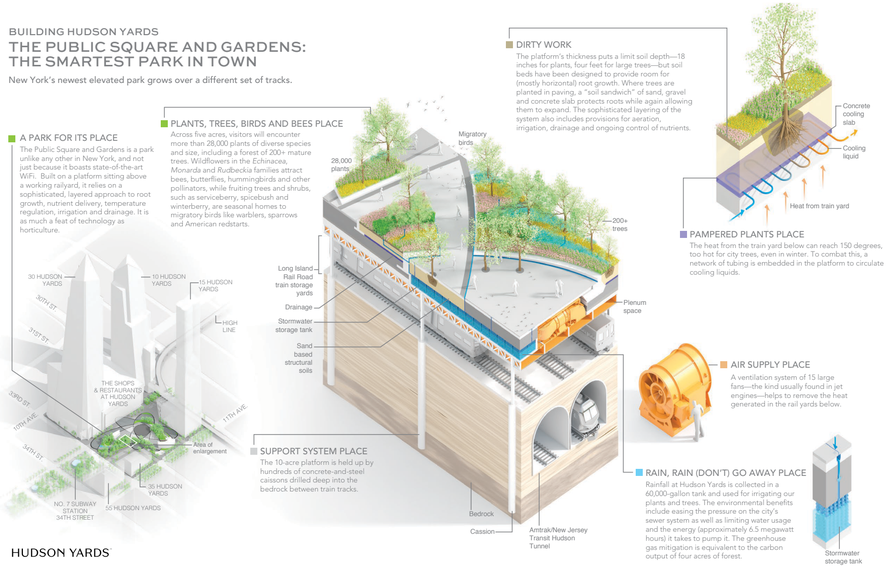
With my ambition for the plot clear, the next questions arose. To gather information about the challenges at hand, I analyzed Hudson Yards, as this project also addressed similar issues.

- Is this construction even possible?
- How did they deal with the construction of the buildings?
- How did they connect the different levels?







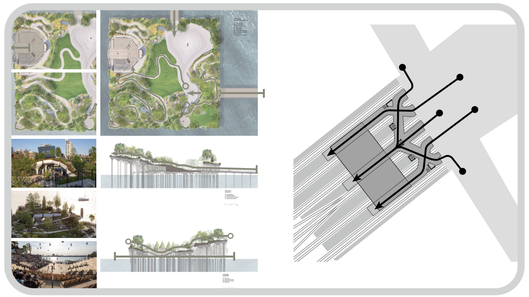


Research

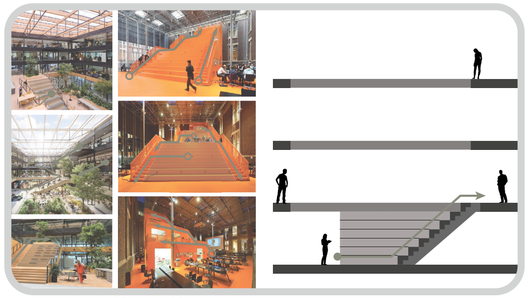
WHAT HAS BEEN RESEARCHED?

With all the information and constraints mapped out, I began my research into how to realize my ambitions. This research involved analyzing reference projects during my design process, based on the following principles:

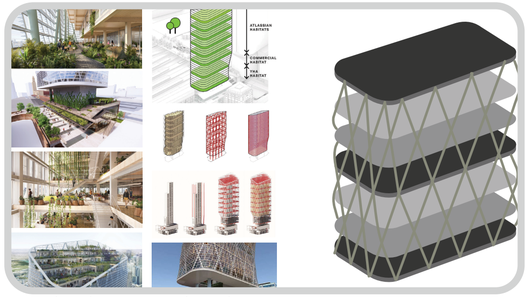
- How to design for and stimulate interaction?
- How to create interaction by flexibility in the design?
- How to create interaction by contrast?
- How to create interaction by connecting the different layers?



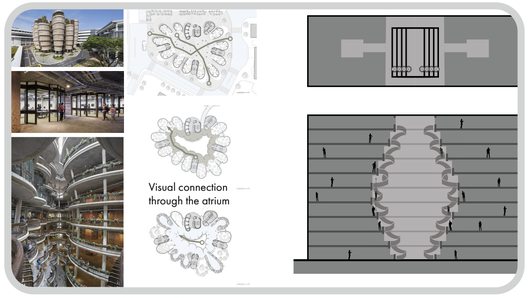
Little Island park, New York



Next Delft, Delft



Atlassian Central, Sydney



Learning Hub, Singapore

REFFERNCE PROJECTS et al.

Delft Centraal Station,



in Delft
Francine Houben
2013- 2016

MARRIOTT MARQUIS,



in New York
John Portman
1982- 1985

KJ Plein Powerhouse,



in Den Haag
Angelo Haemers
2024- 2027

DE WEENATUNNEL,



in Rotterdam
Maarten Struijs
2006- 2009

IBM Powerhouse,



in Amsterdam
Nanne de Ru
2023- ongoing

HS2 EUSTON STATION,



in London
Grimshaw Arch.
Concept

PARKROYAL HOTEL,



in Singapore
WOHA
2011- 2012

AMARE,



in Den Haag
Thomas Offerman
2017- 2021

FORUM GRONINGEN,



in Groningen
NL Architects
2011- 2019

HUIS VAN DE STAD,



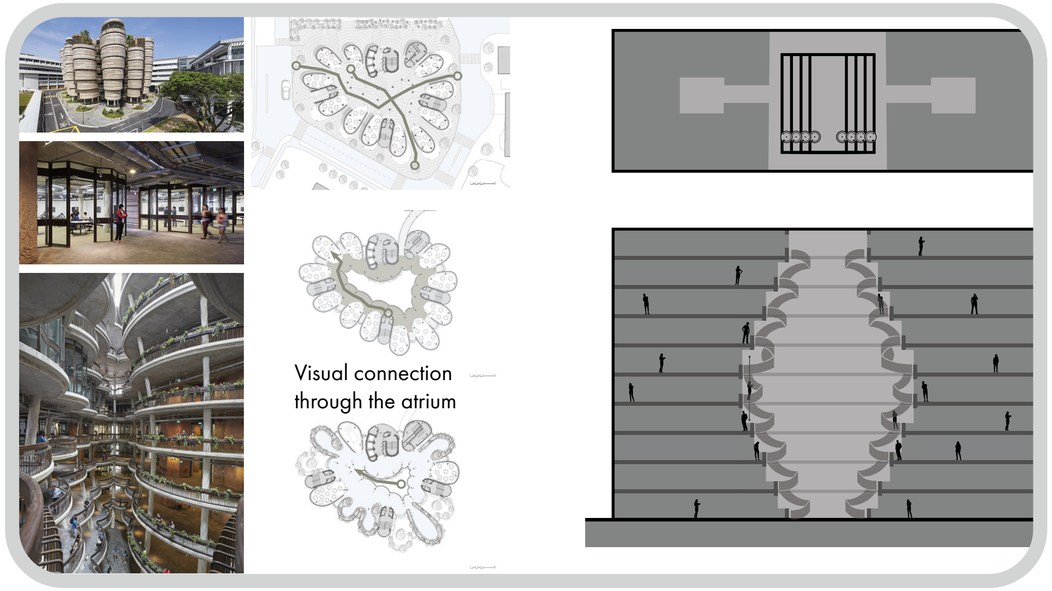
in Gouda
Jos van Eldonk
2010- 2012

Research

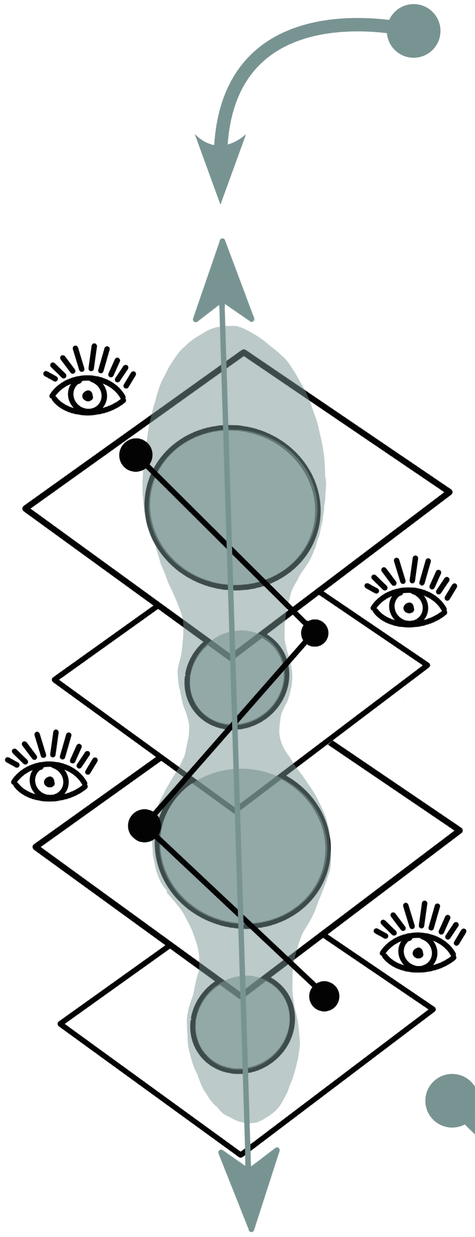
HOW TO STIMULATE INTERACTION?

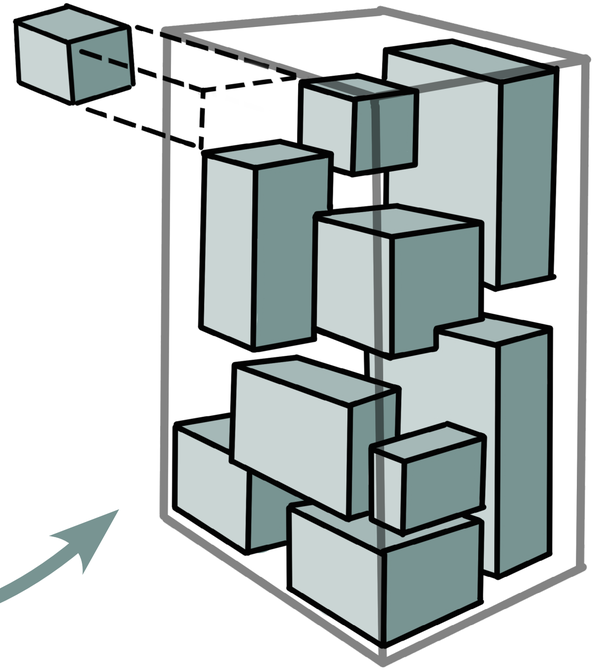
The project The Learning Hub in Singapore stood out to me with how they simulated interaction in the design. The entire design was focused on creating this interaction. They achieved this by implementing:

- A central navigation system with all the functions around this system.
- Creating visual lines of sight with a curved atrium in the center.
- Diversely placing the different functions within the building.



Learning Hub, Singapore



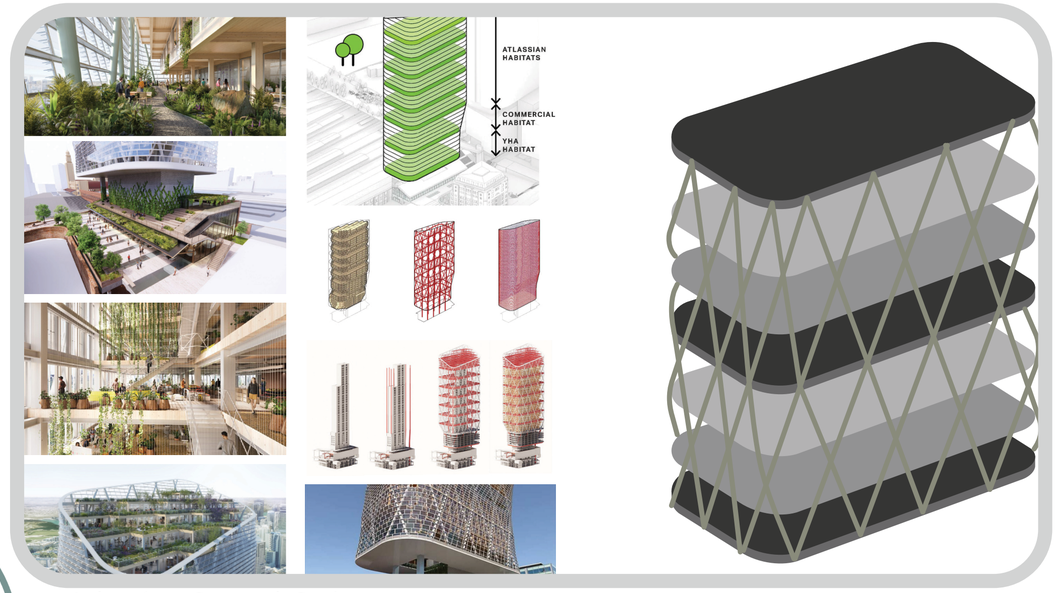


Research

HOW TO CREATE INTERACTION BY IMPLEMENTING FLEXIBILITY?

The project Atlassian Central in Sydney introduced me to a building structure system that offered extreme flexibility within the building. It allowed for the creation of large voids anywhere in the building and adaptation over time. This was achieved by implementing:

- A main steel load-bearing structure with steel floors.
- Implementing a wooden substructure between the steel floors.
- Implementing an exoskeleton for facade stability and thereby flexibility in the floorplans.



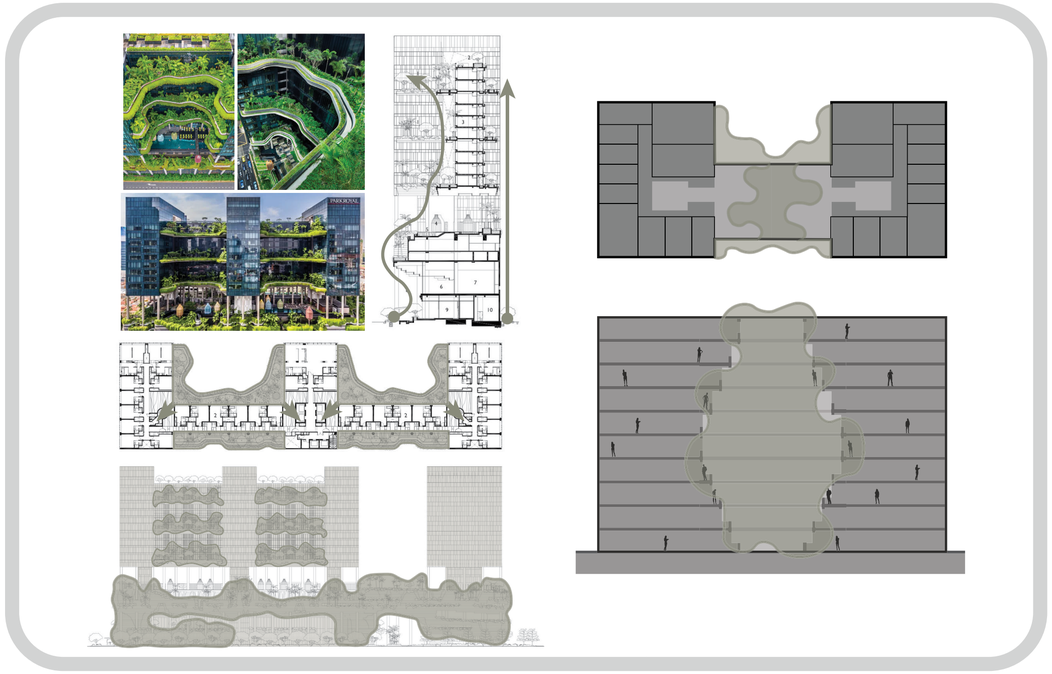
Atlassian Central, Sydney

Research

HOW TO CREATE INTERACTION BY CONTRAST?

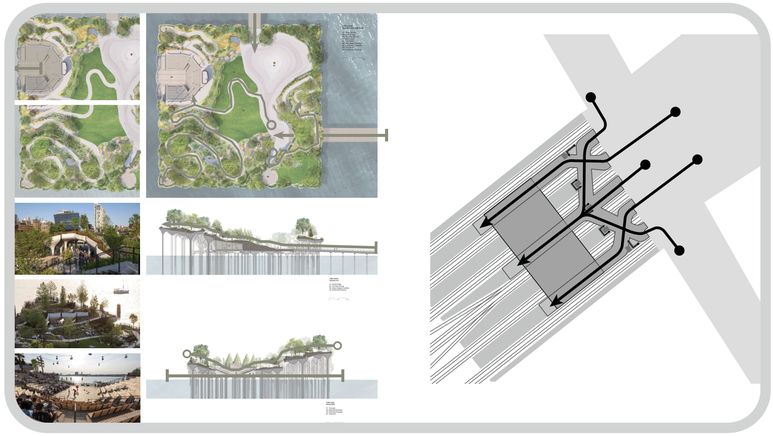
The Royal Park Hotel project in Singapore visualized the ambition to create a contrast between focused work functions and communal interaction functions within the building. This laid the basis for implementing the contrast between organic nature and sleek architectural volumes. This was achieved by:

- Utilizing organic shapes for the greenery between the buildings.
- Using straight and rigid contours for the building volumes.
- Giving the greenery purpose by implementing walking routes through them.

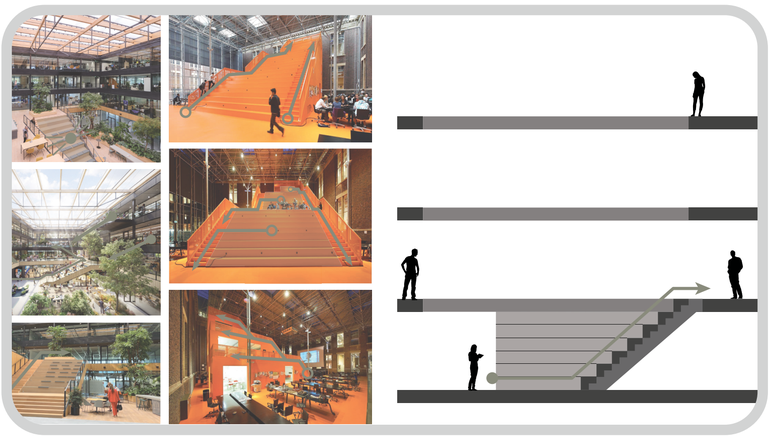


ParkRoyal Hotel, Singapore

Research



Little Island park, New York

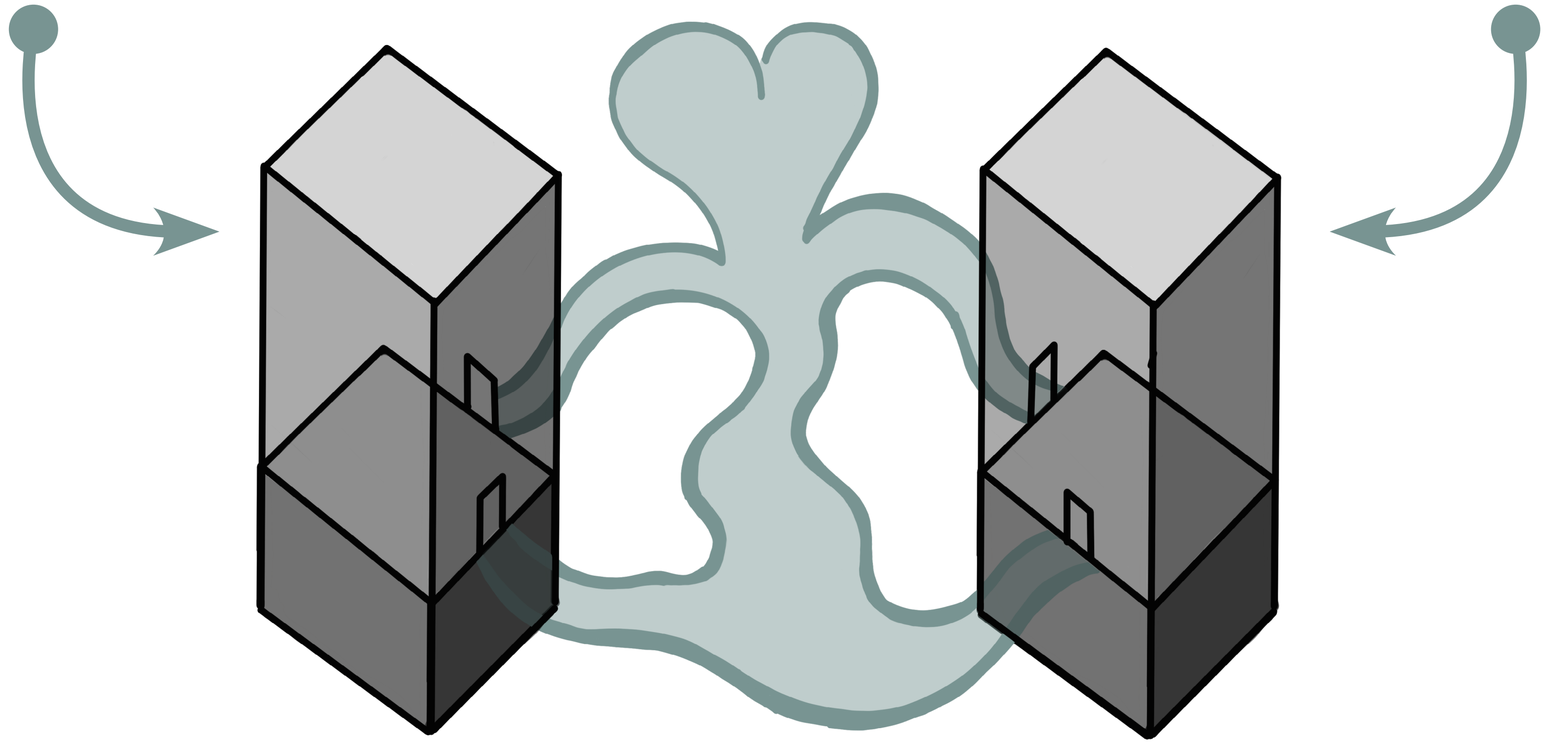


Next Delft, Delft

HOW TO CREATE INTERACTION BY CONNECTING LAYERS?

The projects Little Island park in New York and NEXT Delft in Delft exposed me to a way of connecting different levels. They elevated this navigational route to a place to stay and actively use. This was achieved by implementing:

- Adding functions along the navigational route.
- Implementing different lines of sight along the route.
- Weaving the navigational route among the different functions.



Boundary Conditions

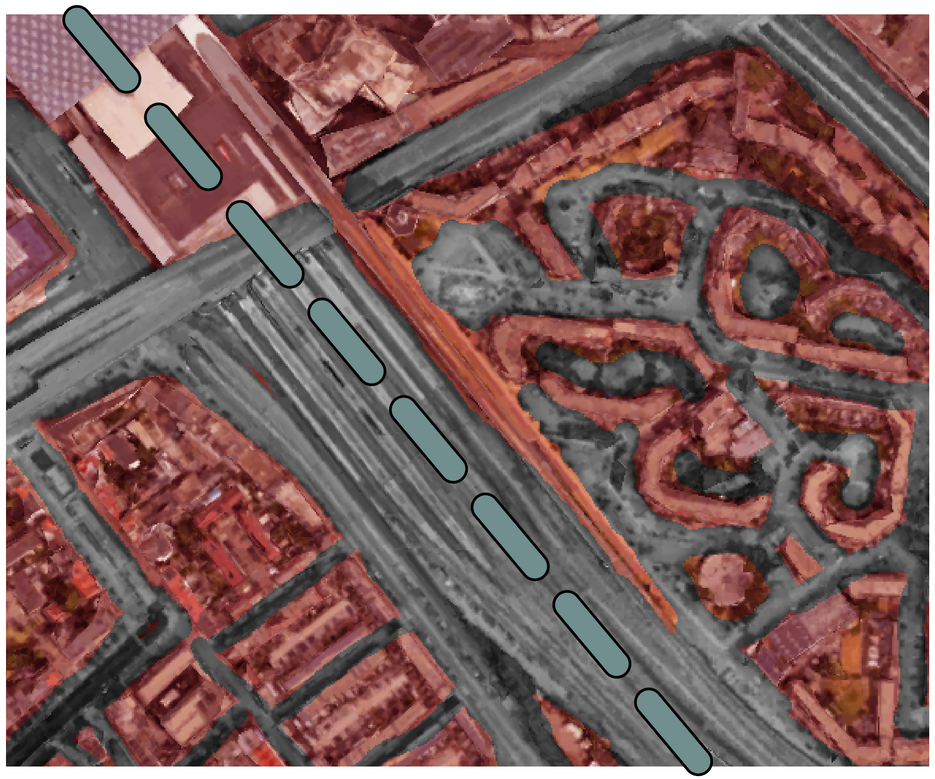
WHAT ARE THE RESULTS?

- The research into the plot revealed a very strong axis that resonated with me. This axis divides the two neighborhoods and acts symmetrically due to the train tracks. This is a concept I carried forward into the design.

- With the campus' function shifting towards more interaction due to digitalization, it creates a juxtaposition between two worlds: interaction and focus. I aim to express this collision of opposing worlds in the design.

- The interaction between different levels and their proper connection is crucial. Adding a park and tunnel layer to the existing infrastructure aims to facilitate a seamless flow between the train platforms, the flyover, and the building layer.





2 WORLDS

INTERACTION

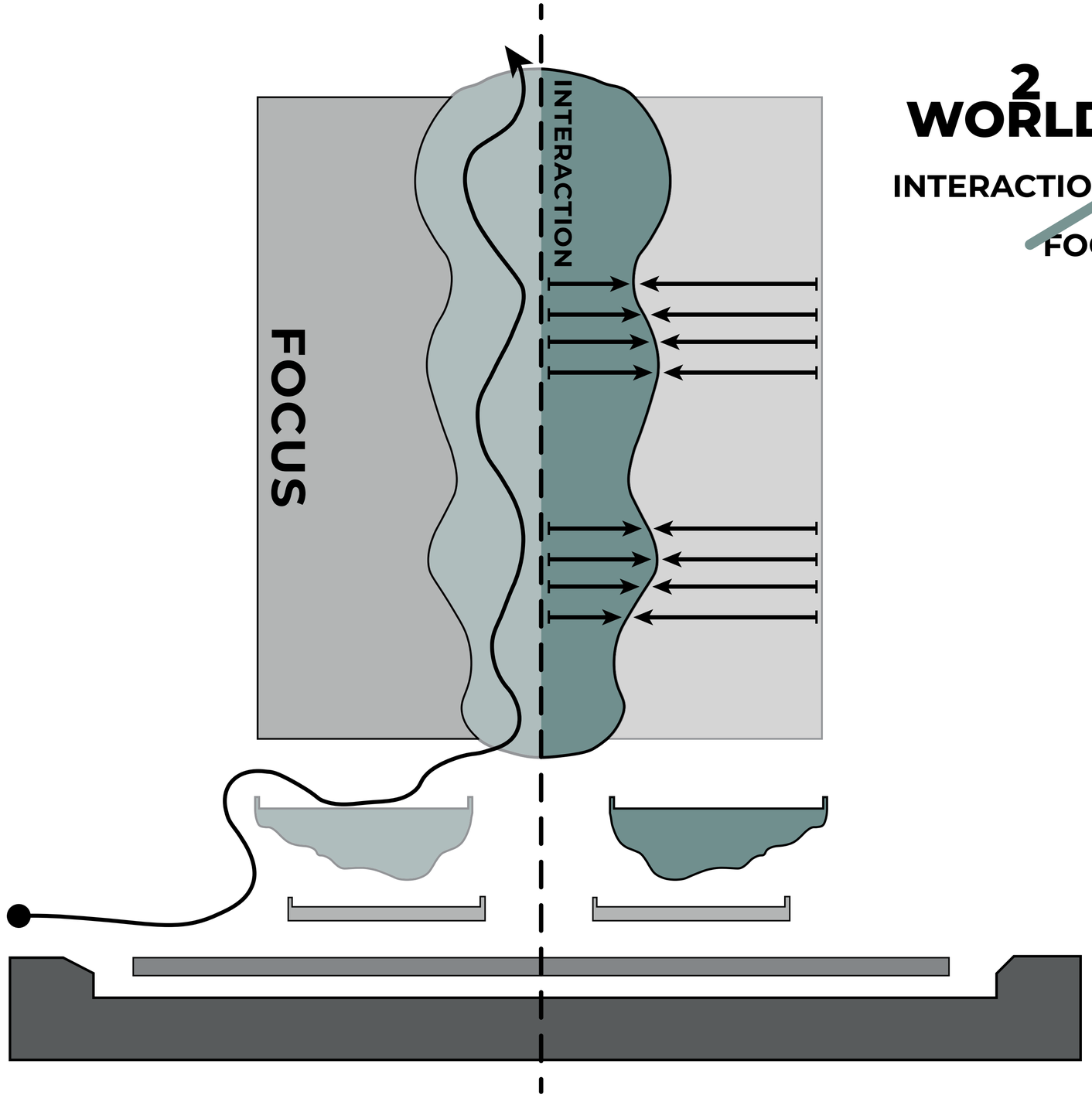
FOCUS



Boundary Conditions

EXPRESSED IN AN ARCHITECTURAL DESIGN PRINCIPLE DIAGRAM

- Designing for interaction by connecting the different layers both visually and physically.
- Designing for interaction by incorporating nature into the building.
- Designing for interaction by integrating flexibility to accommodate a diverse range of functions within the building.
- Designing for interaction by introducing contrast in the architectural expression of the building.



2 WORLDS

INTERACTION / FOCUS

Architectural design language

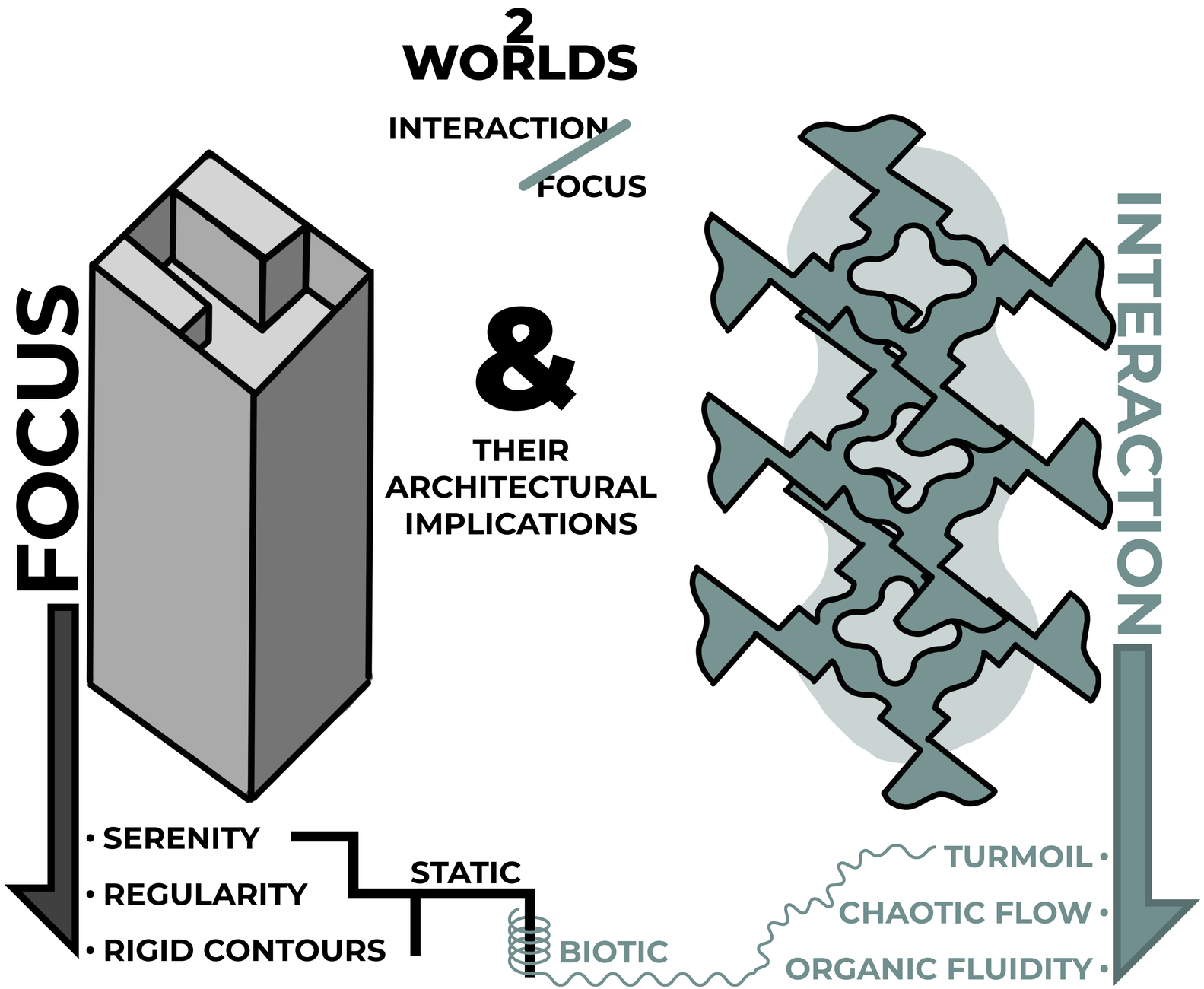
CREATED BY THE ARCHITECTURAL DESIGN CONCEPT

The juxtaposition between the two worlds of focus and interaction is expressed through distinct design languages.

- Focus is characterized by serenity and regularity, embodied in rigid contours and a sleek appearance.

- Interaction is portrayed through turmoil and chaotic flow, featuring organic fluidity and a biotic appearance.

These two worlds converge at various intersection points, where biotic shapes grow around the static forms.

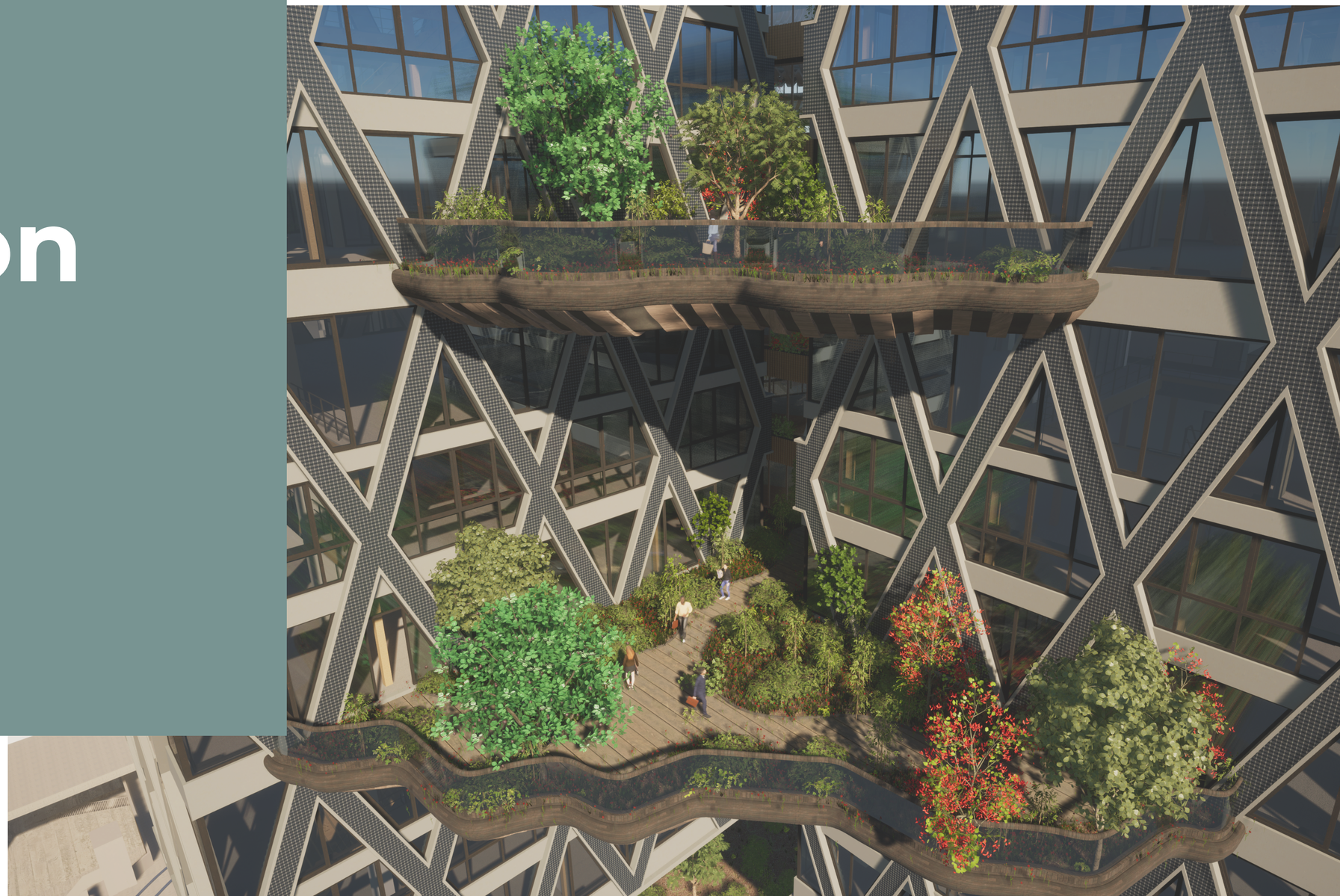


DESIGN

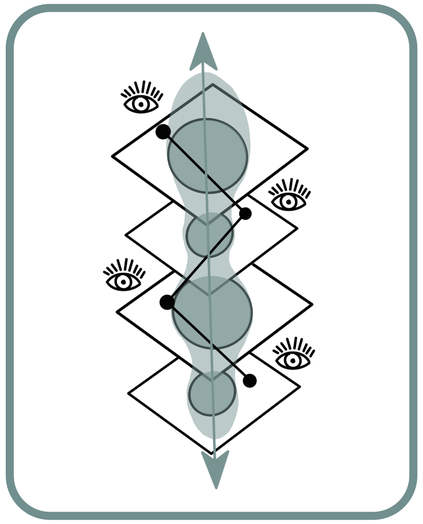
Interaction

The product

With all the information, contrains, ambitions and research combined this design was formed.

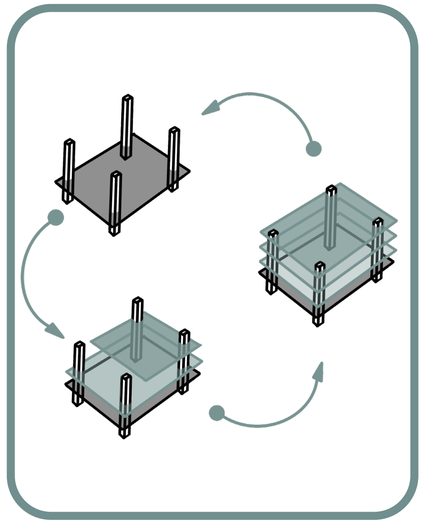


The Design Staples



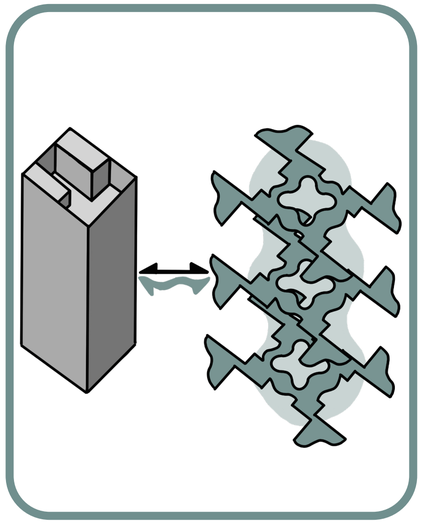
INTERACTION BY
CONNECTION

The basis



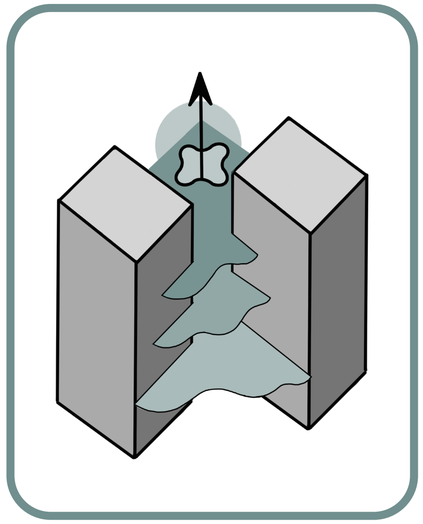
INTERACTION BY
FLEXIBILITY

The backbone



INTERACTION BY
CONTRAST

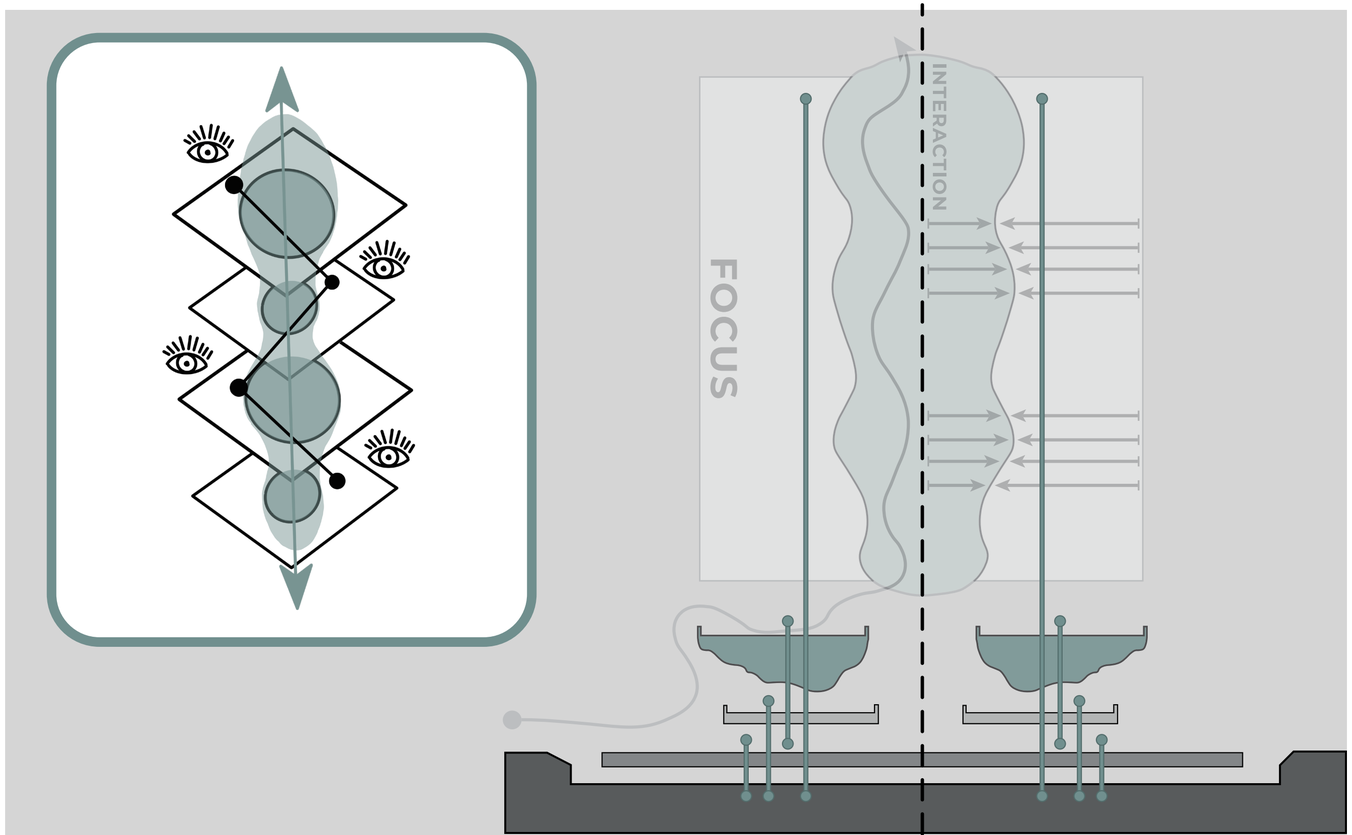
The concept



INTERACTION BY
NATURE

The experience

The Design Staples



INTERACTION BY
CONNECTION

The basis

Connection lies at the basis of the design for how people interact with the building.

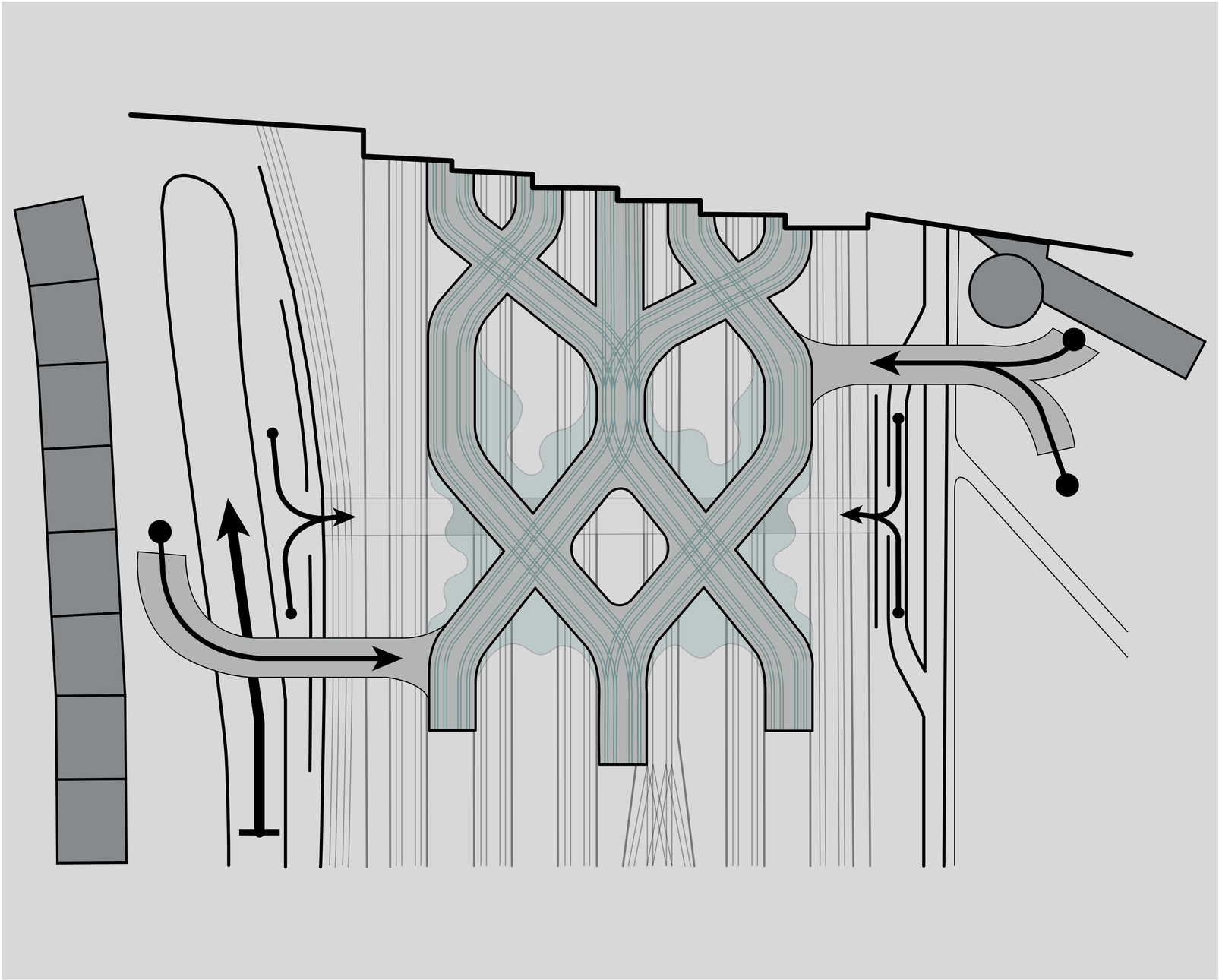
First Layer

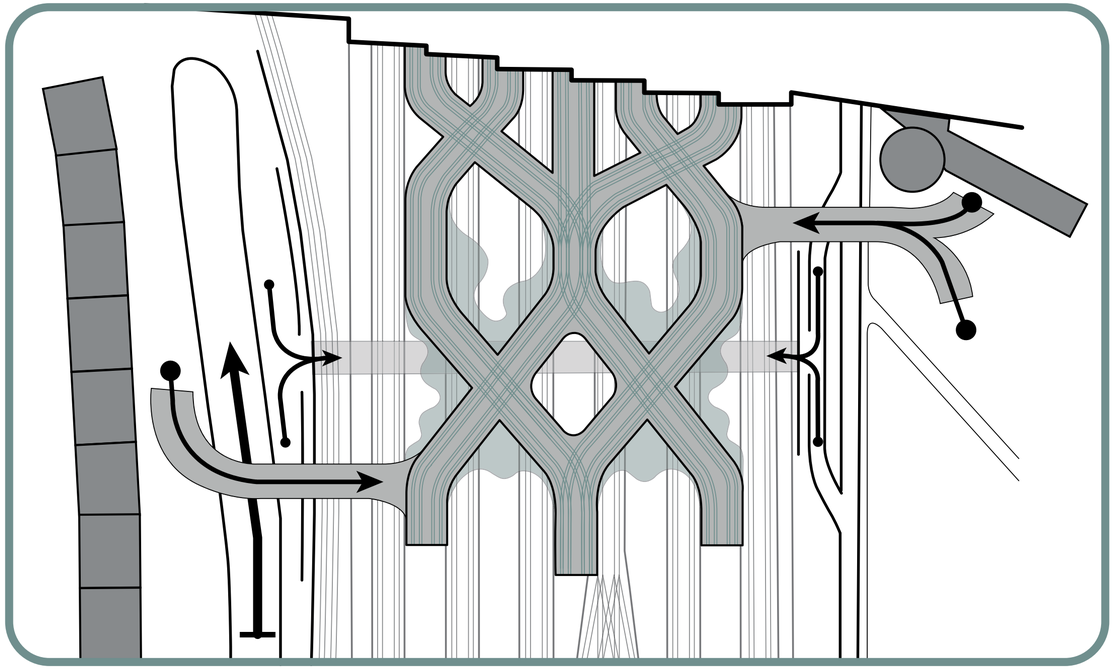
A NEW SYSTEM

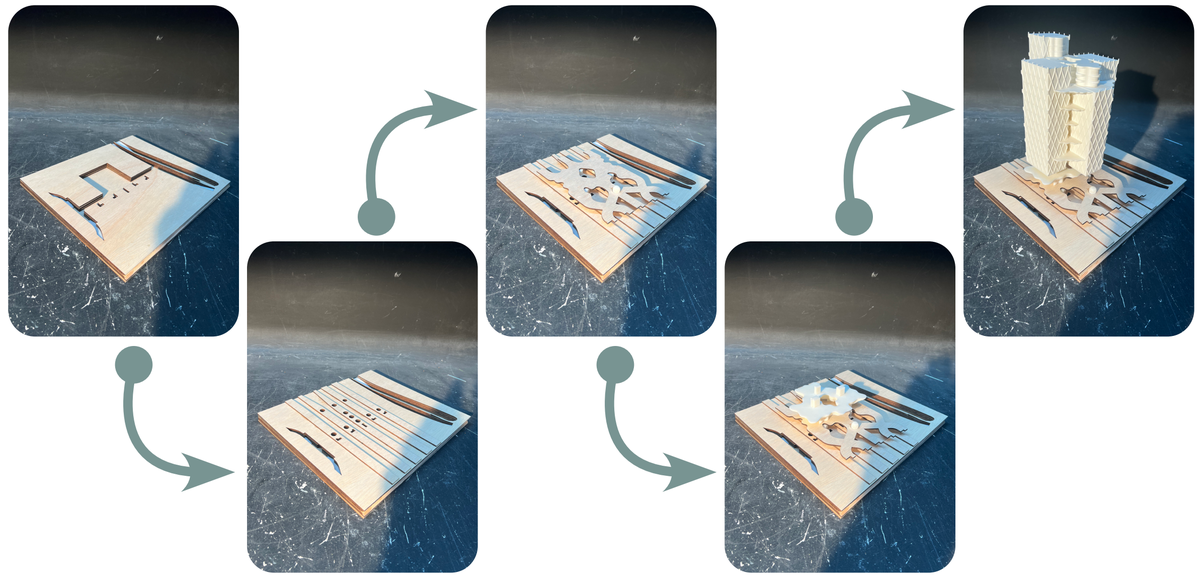
Based on the analysis of the area, the missing connection between the two neighborhoods on either side of the train tracks was identified. To address this barrier, the following actions have been taken:

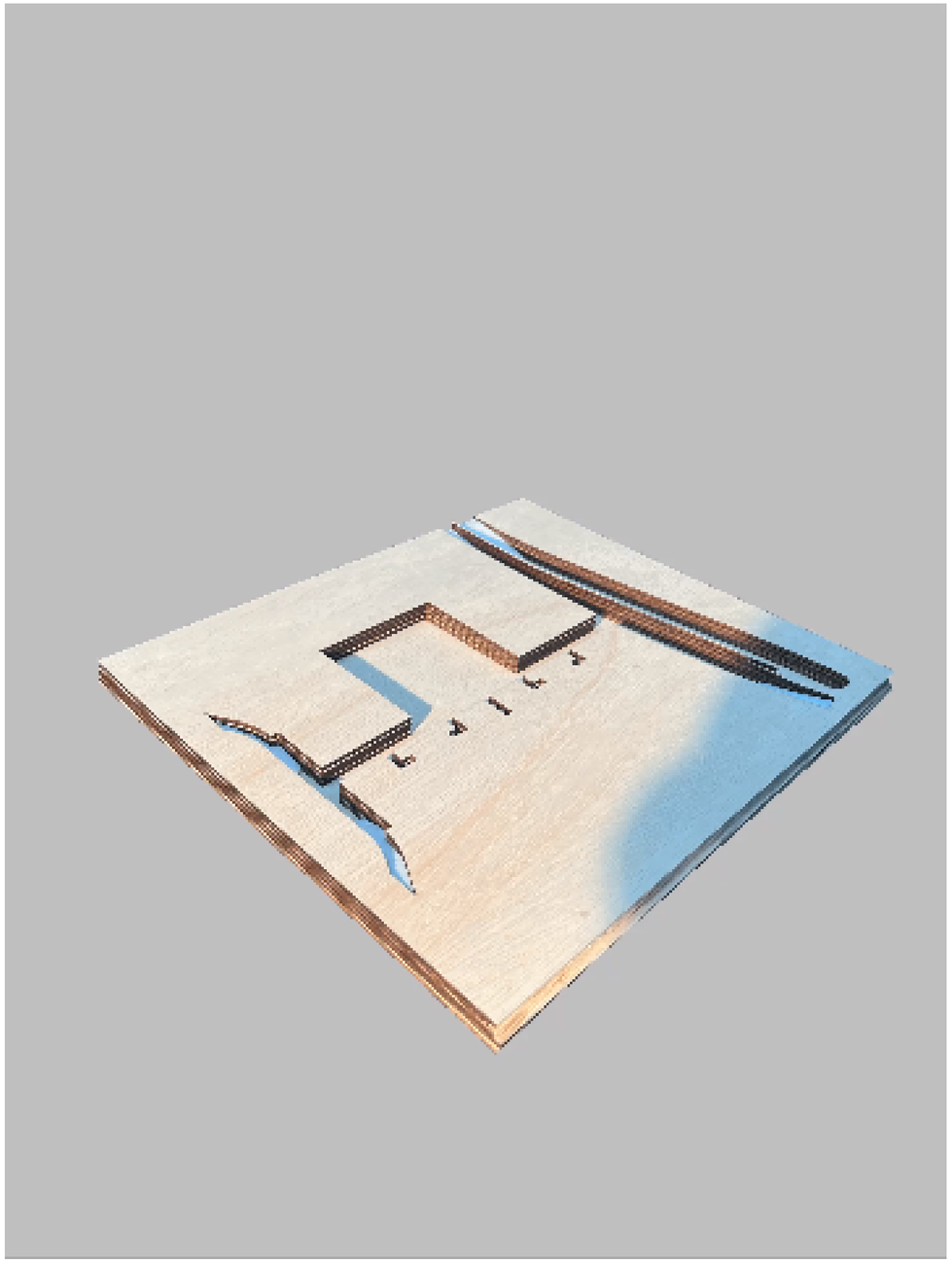
- Creating a tunnel underneath the plot and train tracks to establish a direct connection between the neighborhoods.

- Developing a public walkway over the train tracks, integrating functions and walk routes within the elevated park.









Connection

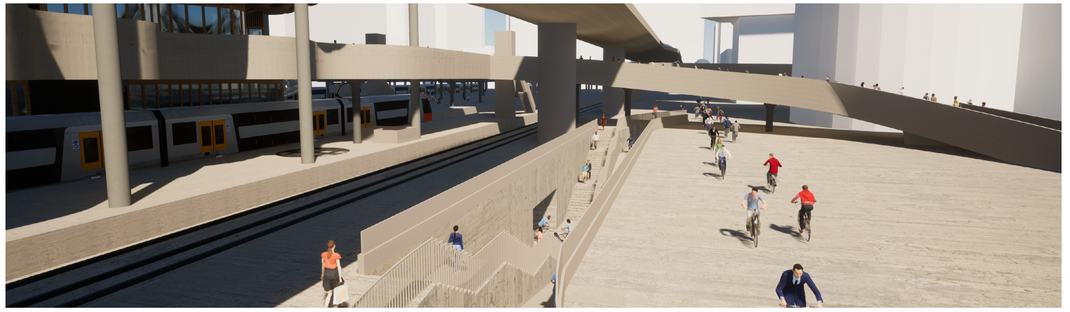
THE CONNECTING AXIS

The tunnel is achieved by creating downwards sloping ramps on both the left and right sides of the train tracks, forming a bike path leading down to the tunnel level.

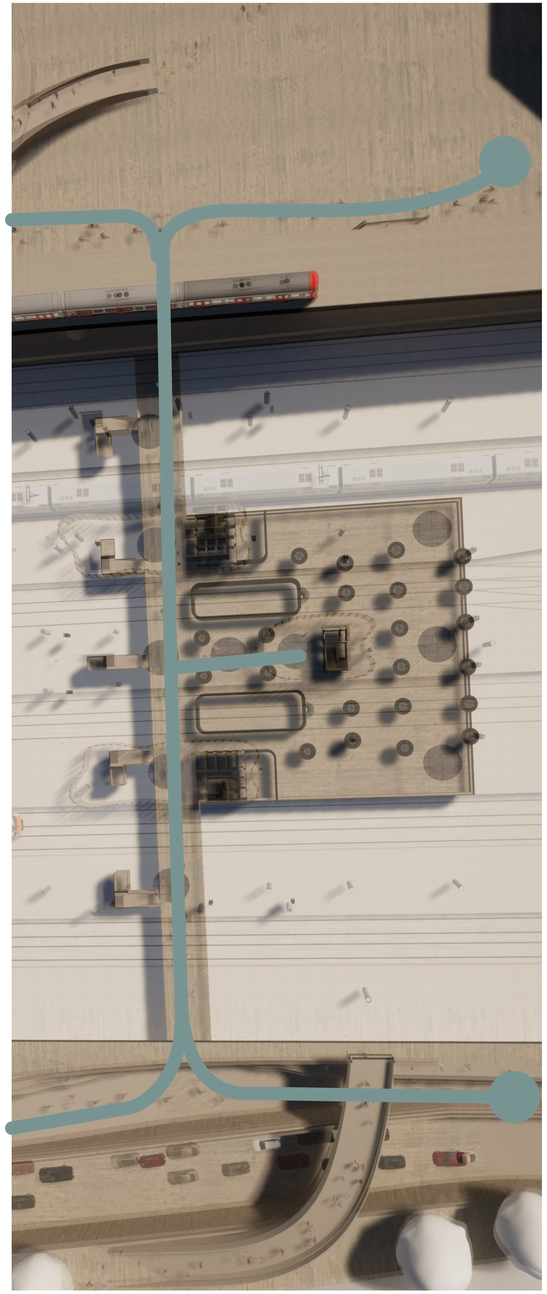
This tunnel runs underneath the project building and connects to the cores of the building for navigation.

Connected to this bike tunnel underneath the project building is an underground bike parking facility to facilitate bike storage for building users.









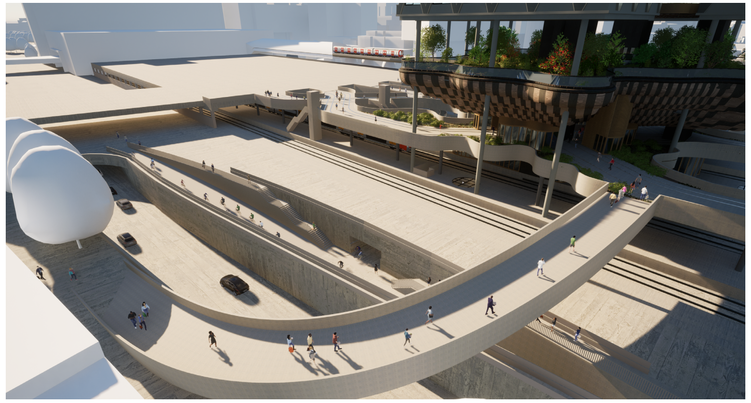
Connection

THE CONNECTING AXIS

The public walkway over the train tracks is created by extending the existing car tunnel to accommodate a walkable slope crossing the road and tram, reaching the elevated park. It fits underneath the existing metro line by hugging the circular flat.

This design creates walkways to destinations over the park, with the building situated at the center.

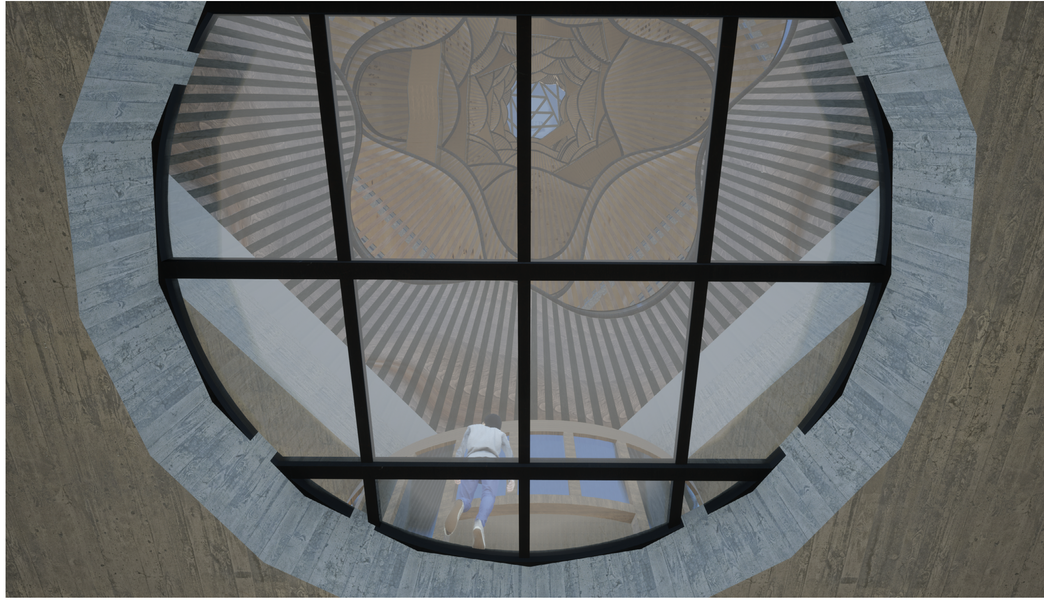
The building itself does not obstruct these walk routes, as it is elevated from the park, allowing for future expansions over the tracks without obstruction.







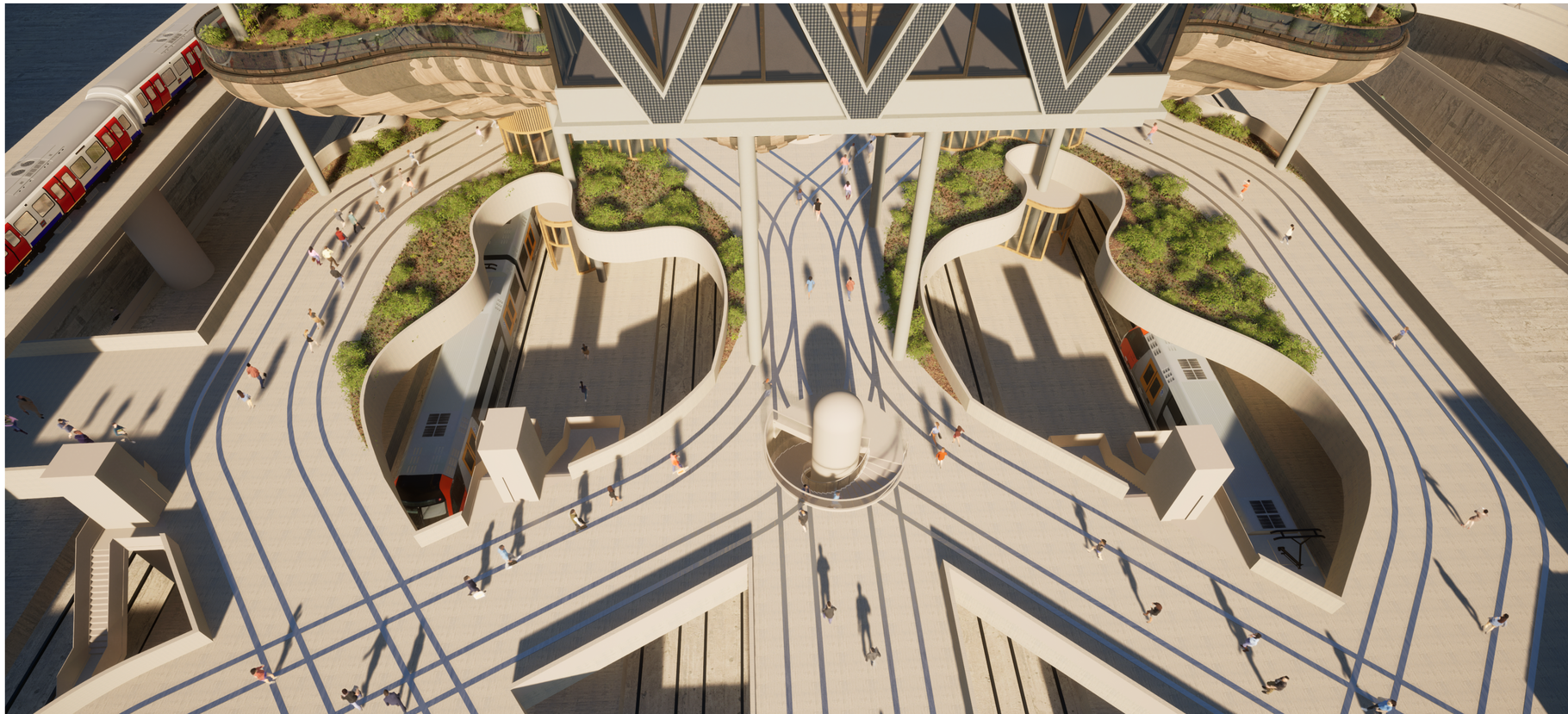
Visual connection



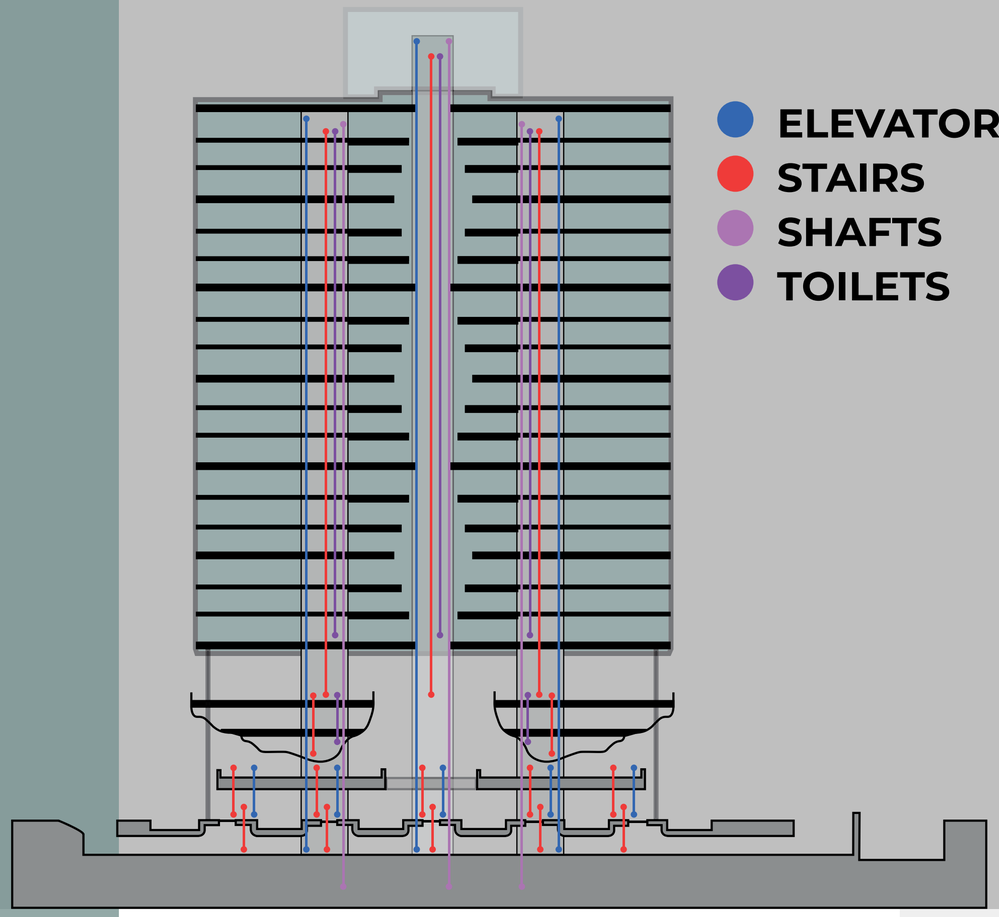
CONNECTING LAYERS

Due to significant height differences between the various layers, physical connections struggle to link them coherently. To emphasize the connection of these layers, visual connections have been established between them.

To enable these visual connections, the design of the elevated park had to be modified to create a central viewpoint linking the lowest layer, the underground tunnel, to the atrium of the building.

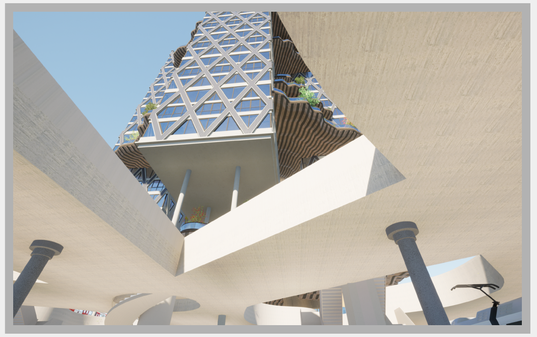


Connecting layers

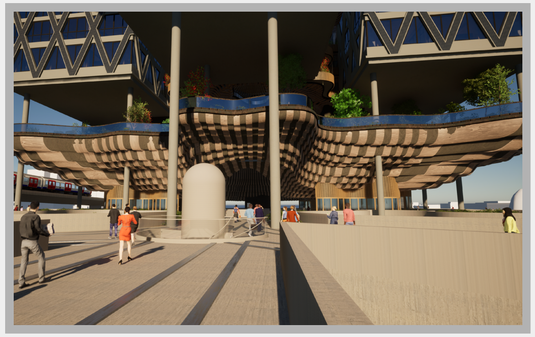




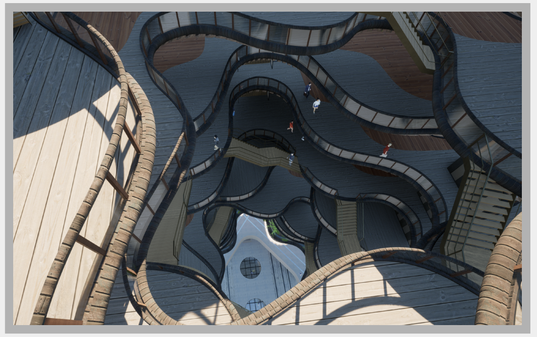
The Tunnel



Train Platforms

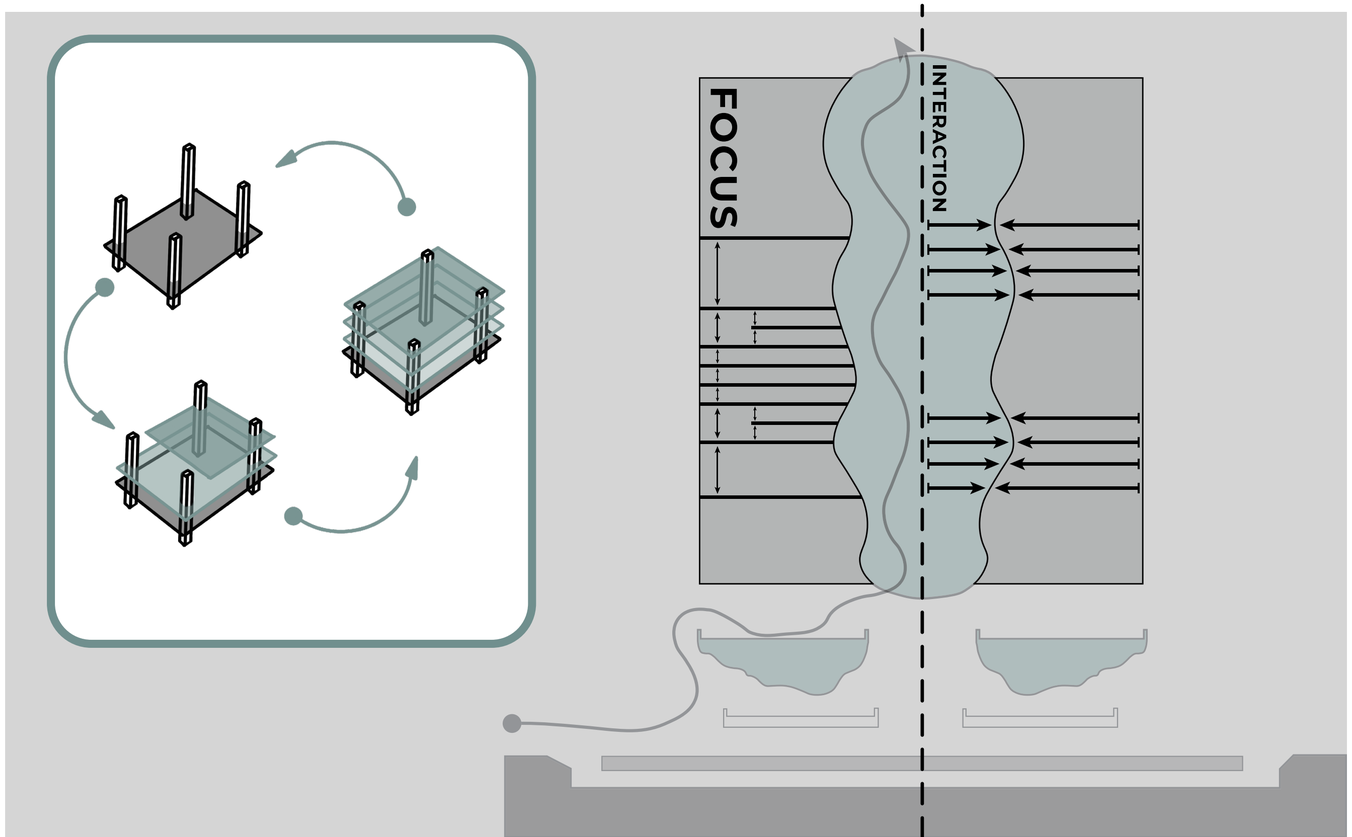


The elevated park



The Building

The Design Staples



INTERACTION BY
FLEXIBILITY

The backbone

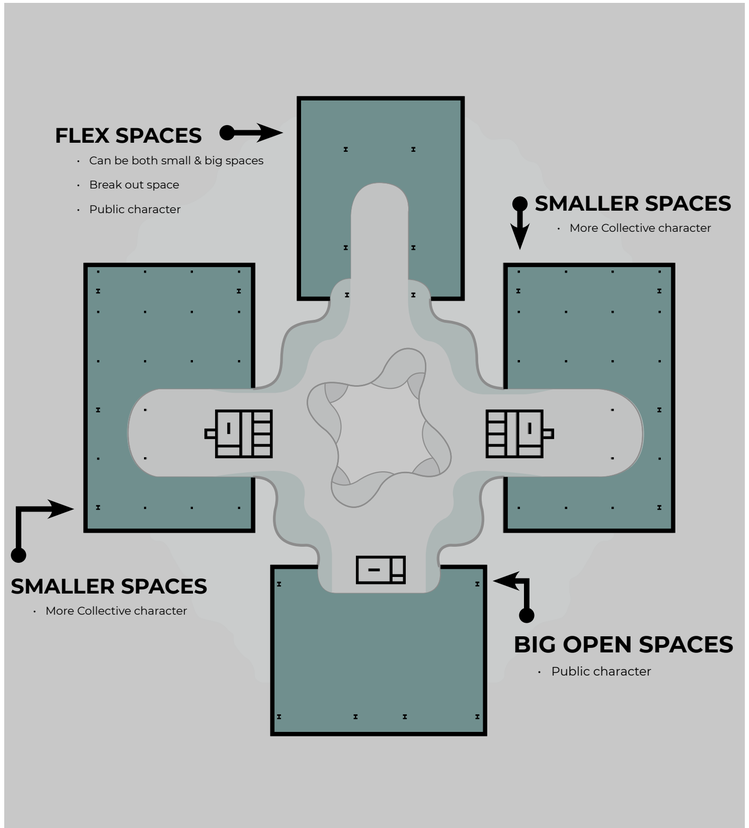
A flexible building accommodates a diverse set of functions that can evolve over time.

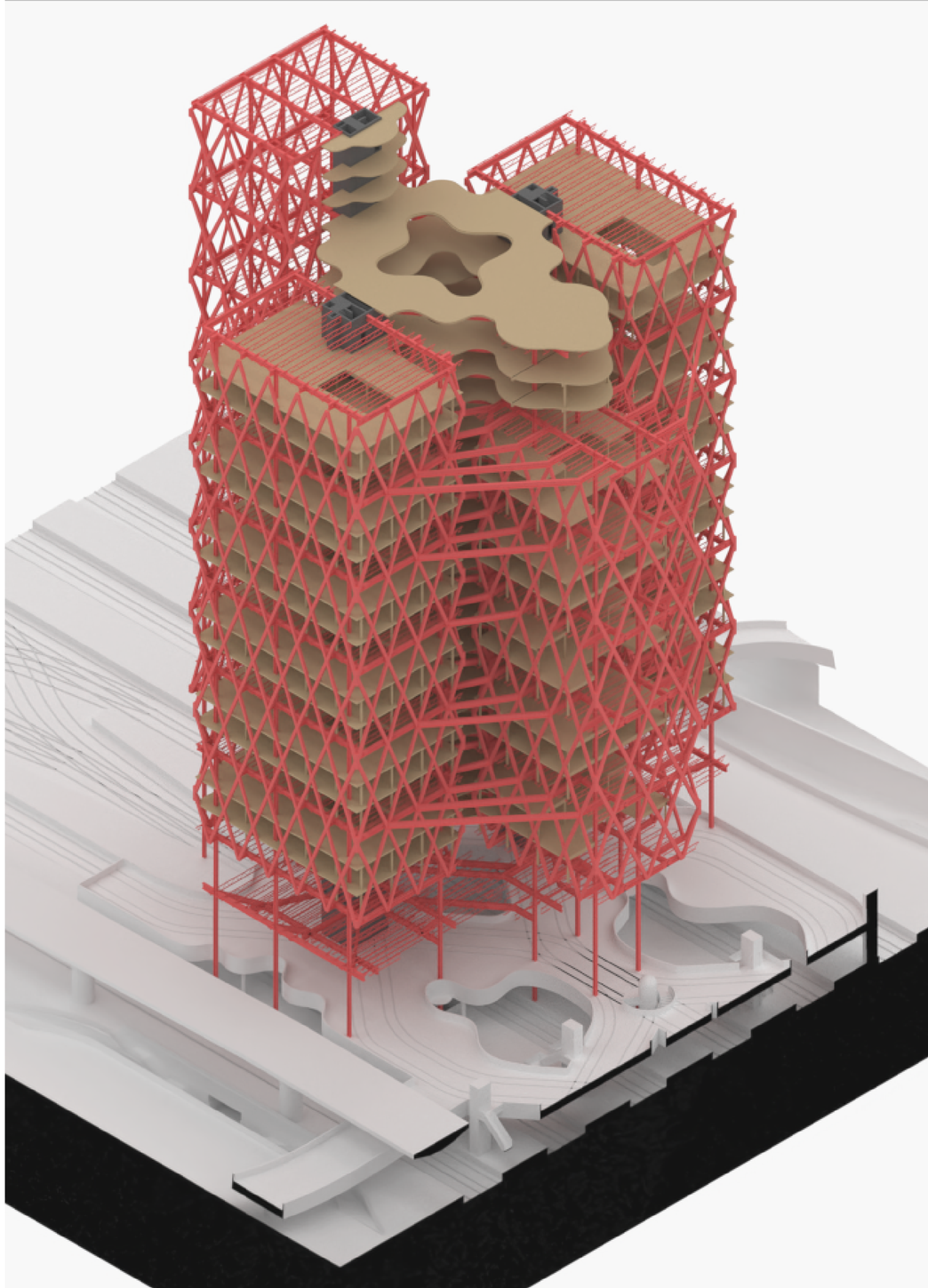
Construction Principle

THE BACKBONE

The construction principle of the building is heavily influenced by the constraints of the train tracks. This, combined with the approach to create different space sizes within the building, led to a rigid steel pancake-style main load-bearing system.

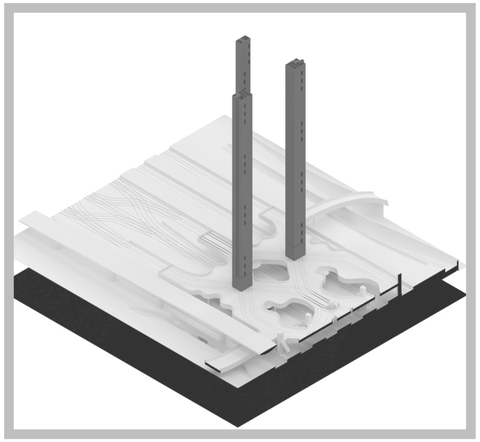
This allowed for as few columns as possible reaching the ground level. Within this steel main load-bearing system, a secondary wood sub-load-bearing system is created to form smaller spaces.





Construction Principle

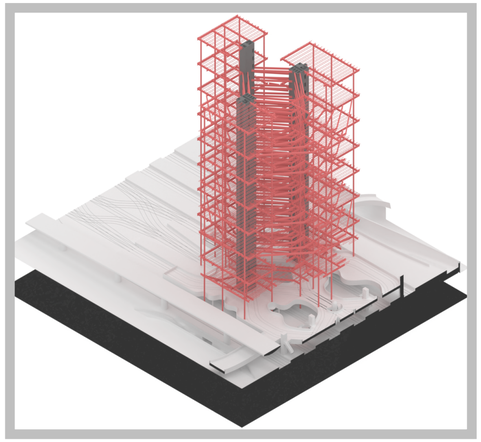
The construction principle of the building emphasizes creating flexibility while also implementing a sustainable and future-proof structure. These combined ambitions are represented in the following construction principles for the building.



CONCRETE

The basis

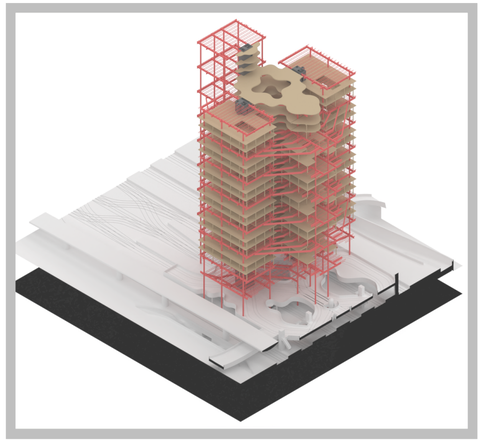
The concrete cores form the basis of the building, housing the elevators and ventilation shafts.



STEEL

Main load bearing

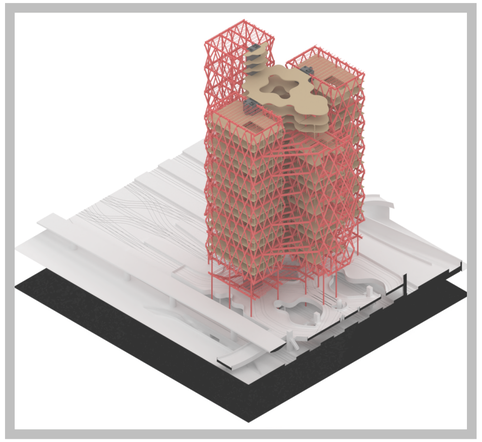
The steel structure serves as the main load-bearing system, requiring few columns.



WOOD

Sub structure

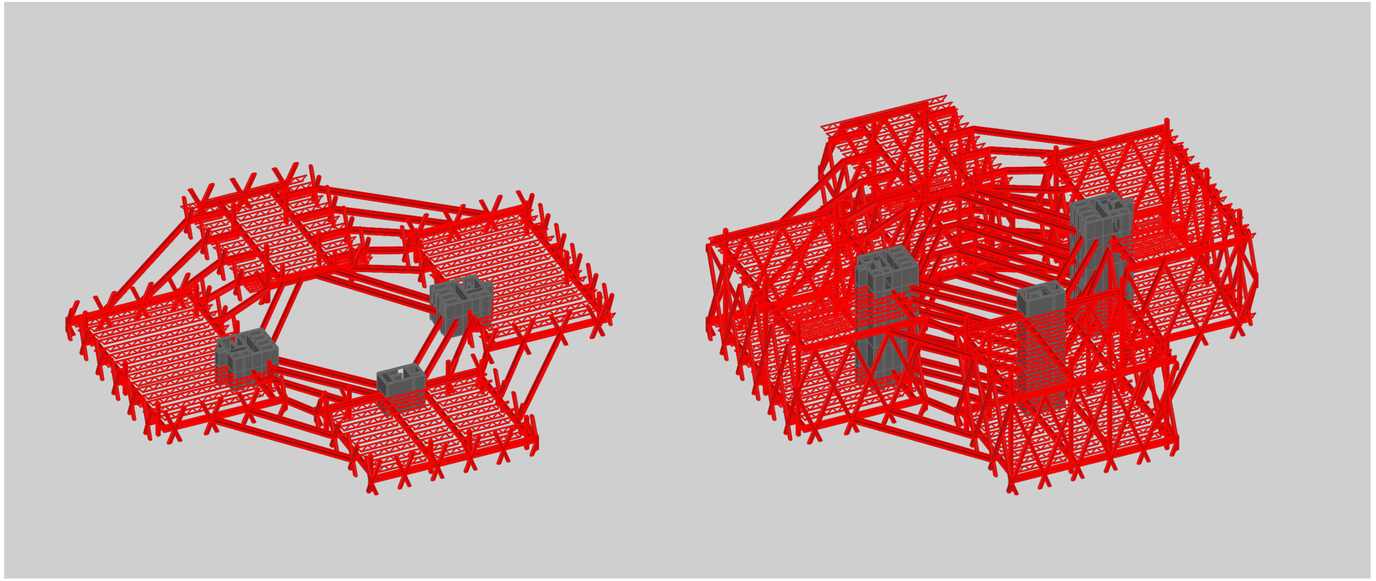
The wood structure divides the three-story high steel structure into subfloors and smaller rooms.



EXOSKELETON

Stability

The exoskeleton provides stability to the building by rigidly connecting the steel floors.

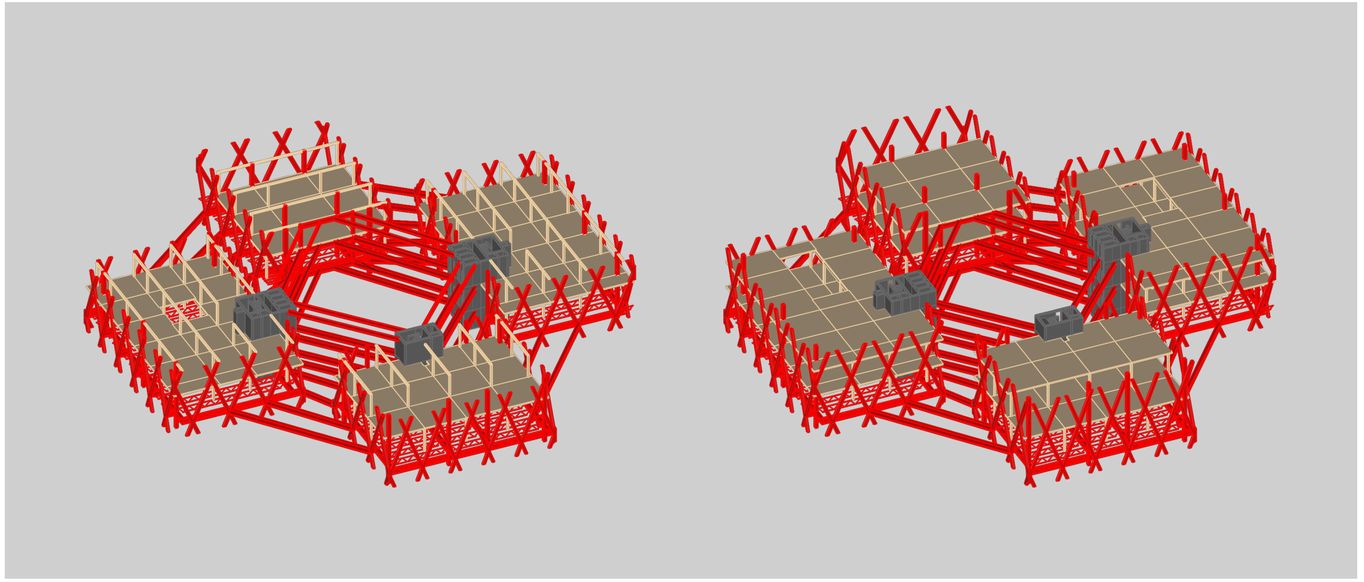


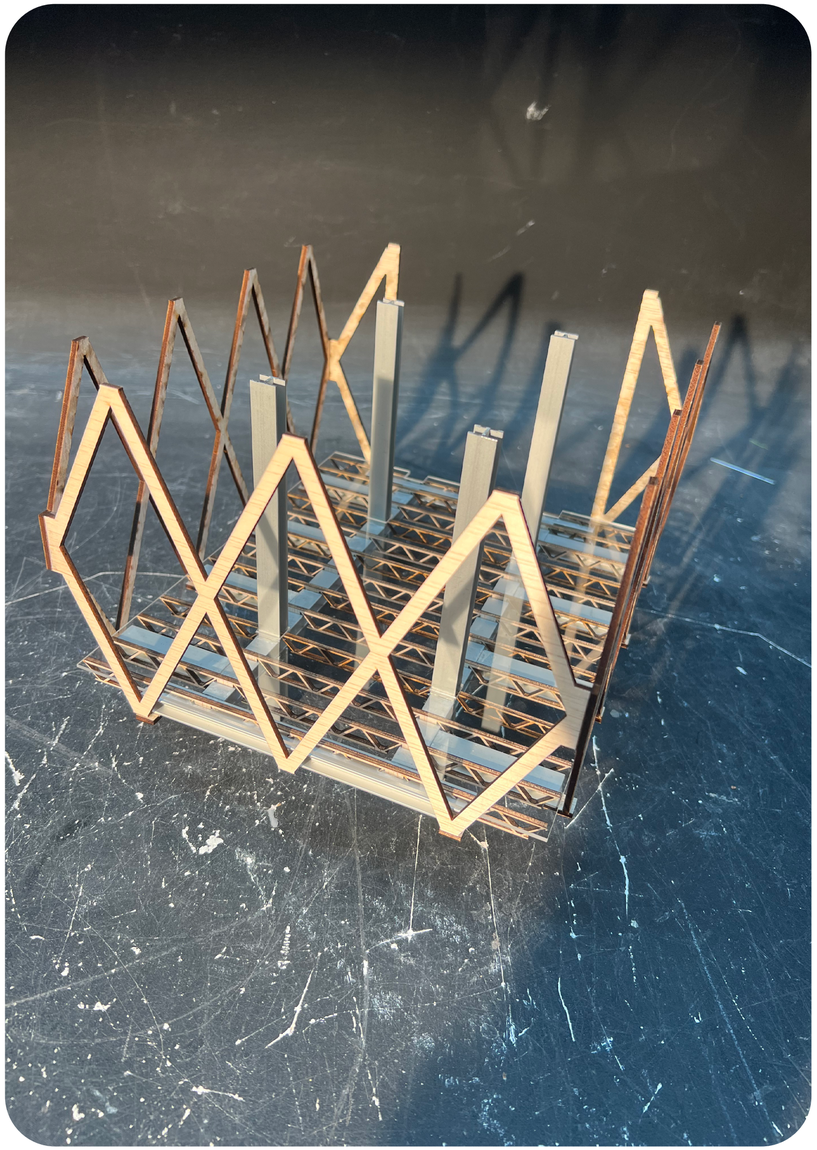
THE STEEL STRUCTURE

The spans of the steel structure are visible here, showing how the exoskeleton connects back to the main steel load-bearing structure.

THE WOOD STRUCTURE

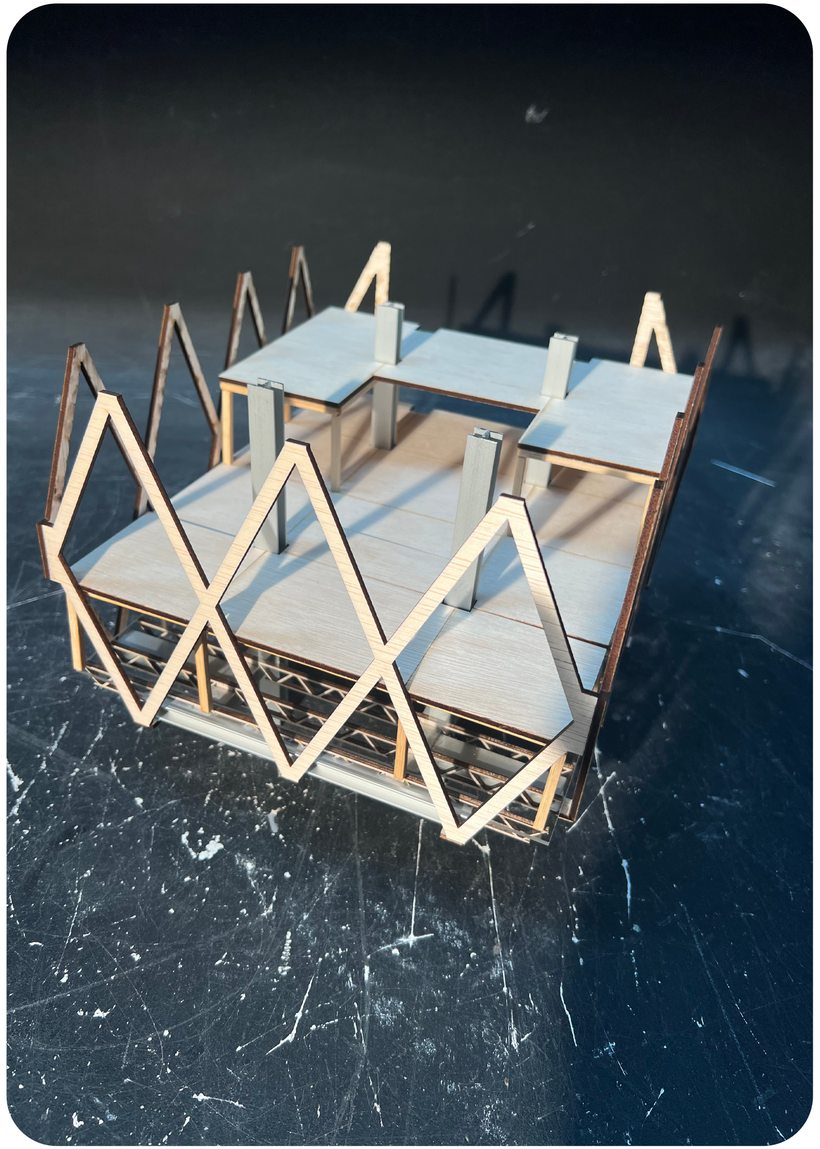
The spans of the wood structure are visible here, illustrating how it can create openness to facilitate connections between layers and vary at higher levels.





THE STEEL STRUCTURE

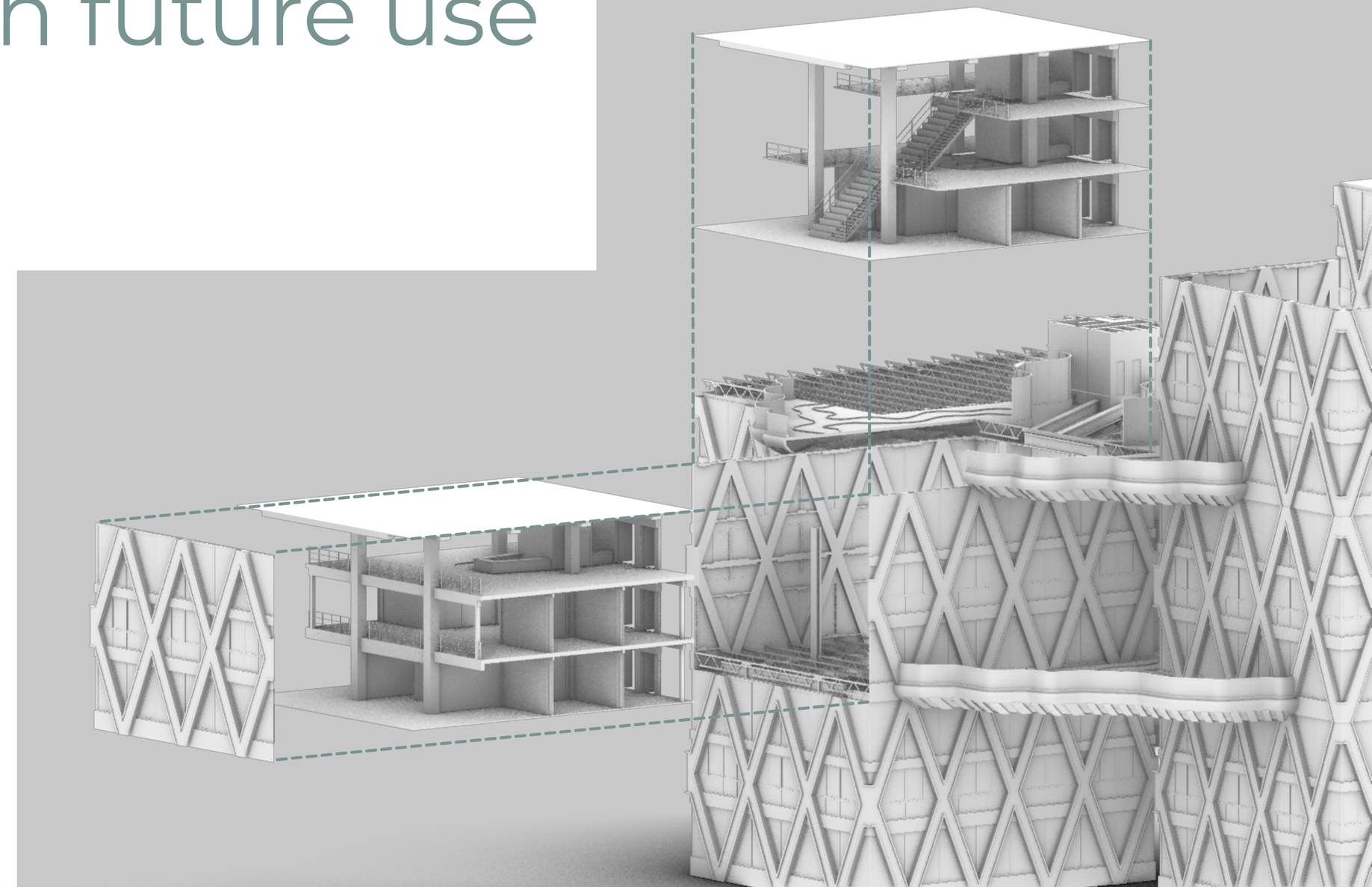
THE WOOD STRUCTURE

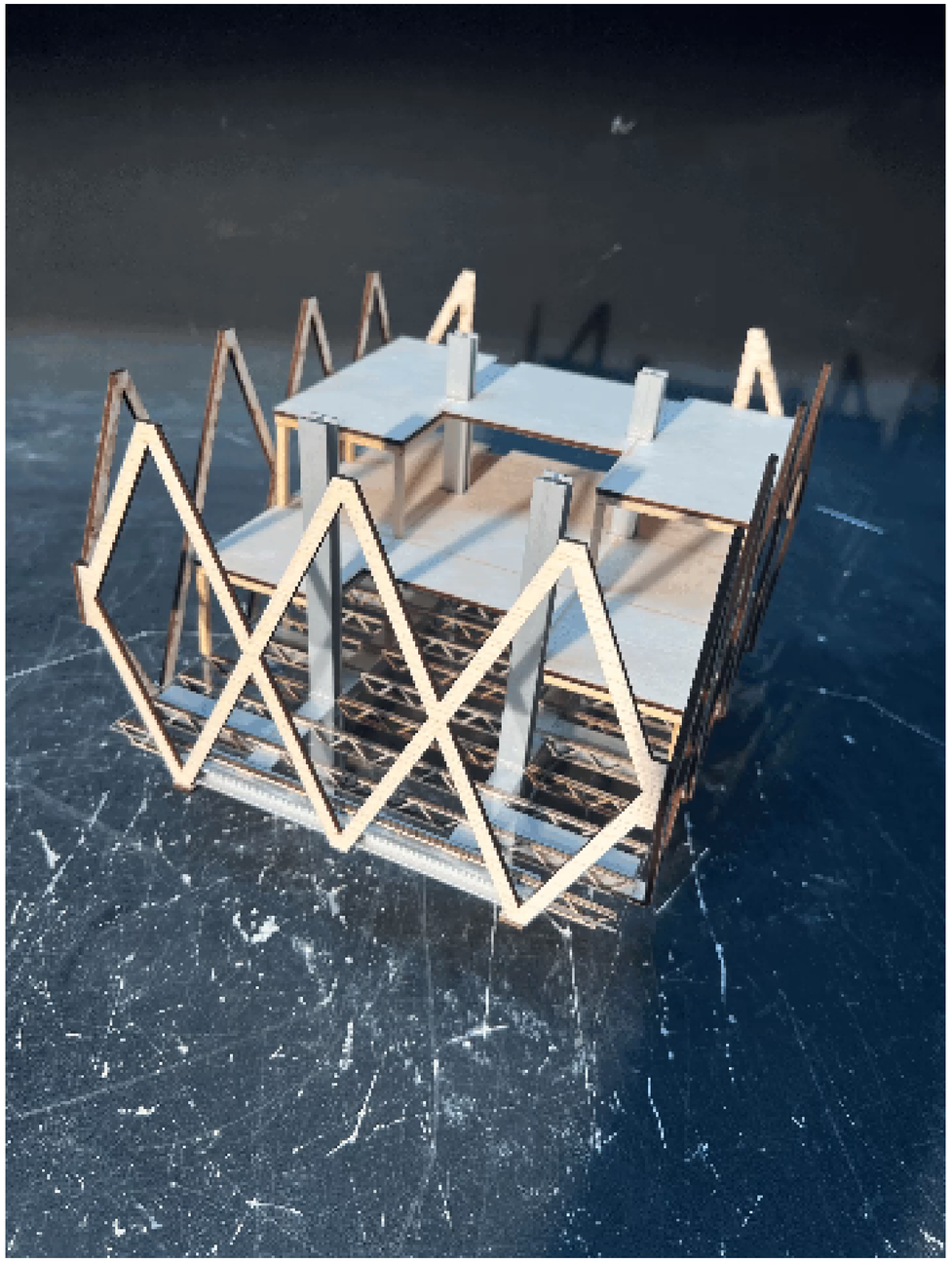


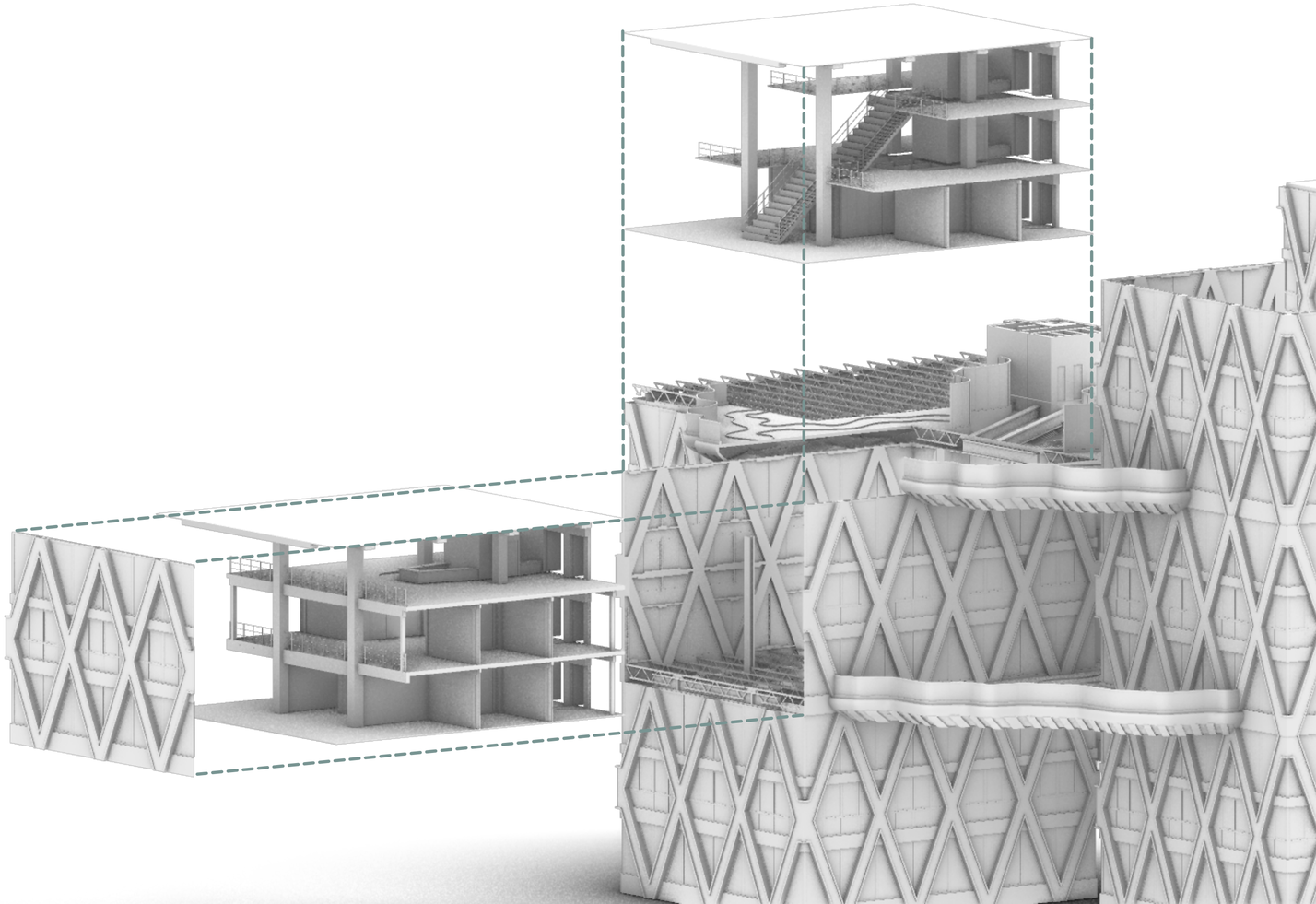
Flexibility in future use

A DEMOUNTABLE NATURE

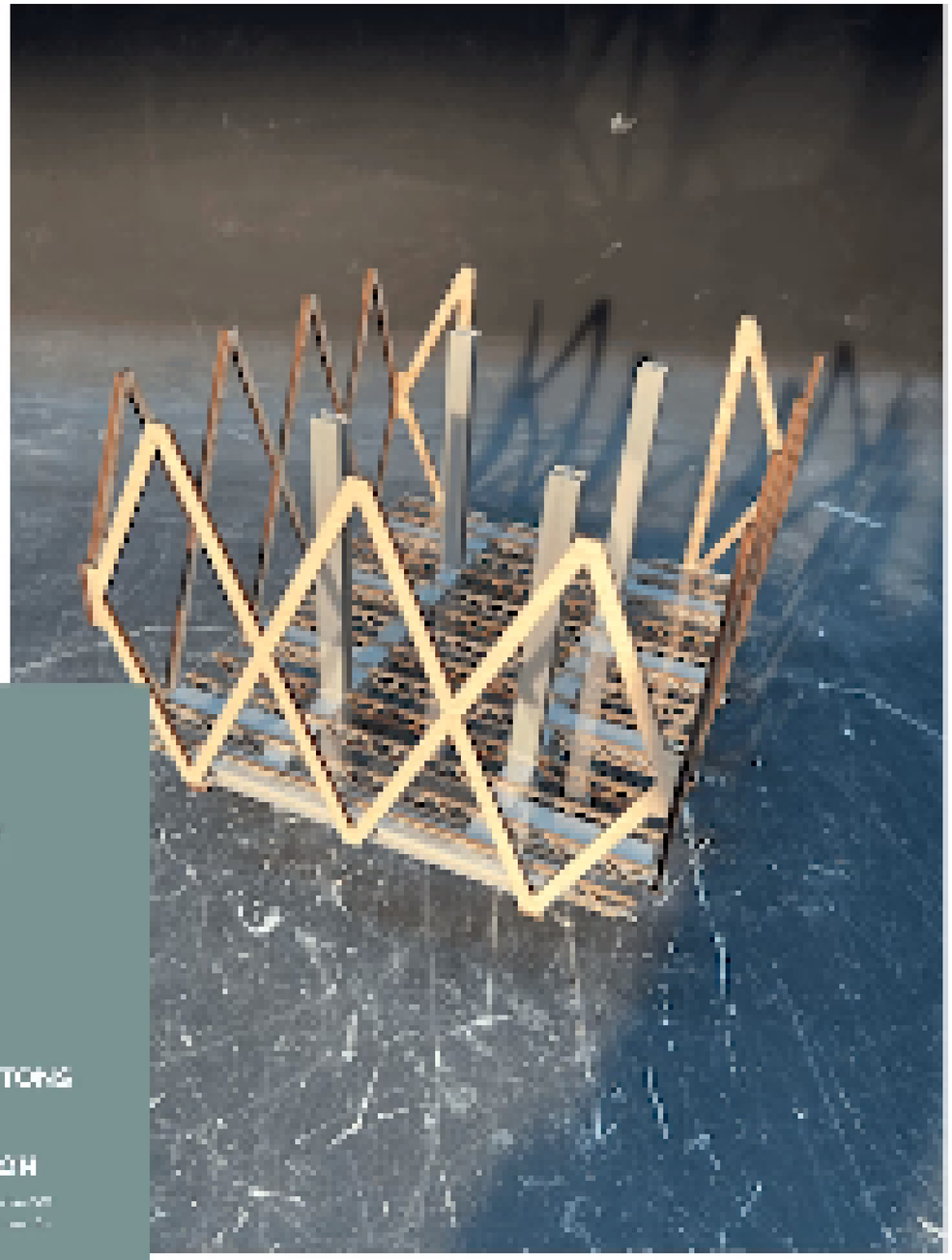
The facade elements of the building are prefabricated demountable elements. This, in combination with the wood substructure built between the steel main load-bearing structure, allows for a complete functional change by removing the existing facade and wood structure and replacing it with new infill to suit the desired function.











Sustainability

REDUCING

40.0 %

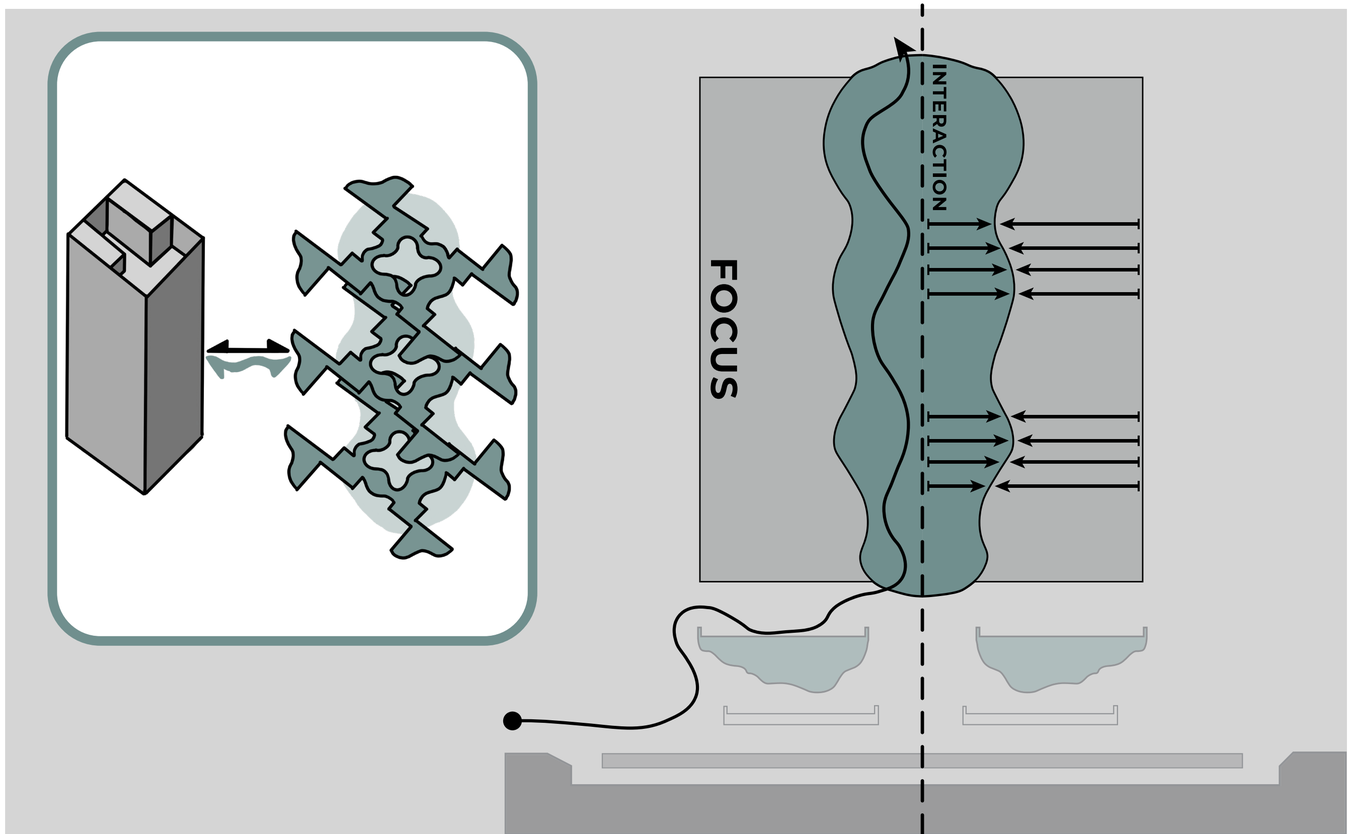
EMBODIED CO_2

SAVING

5.0k TONS

CO_2 PRODUCTION

The Design Staples

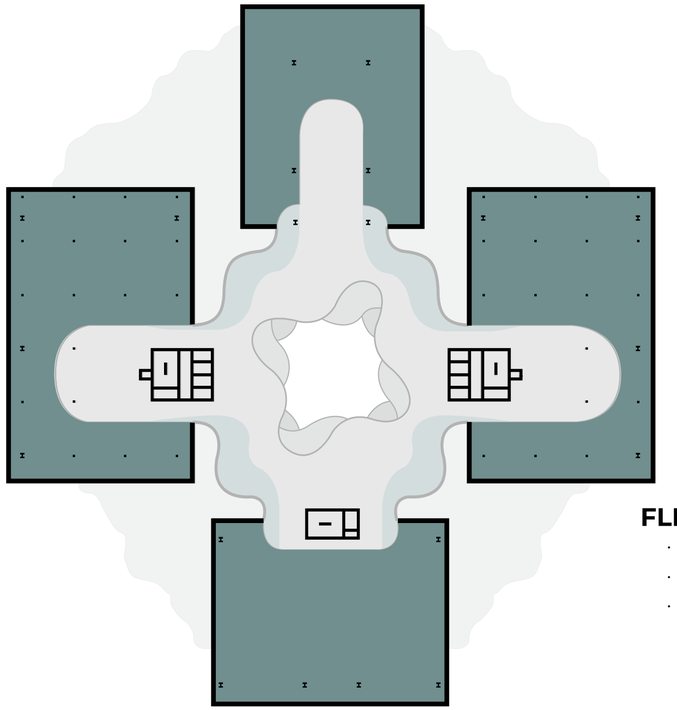


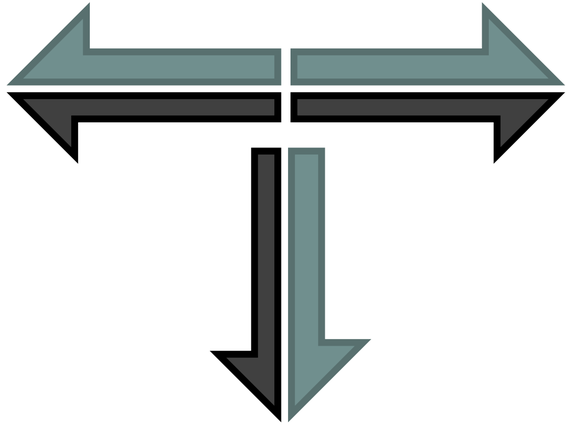
INTERACTION BY
CONTRAST

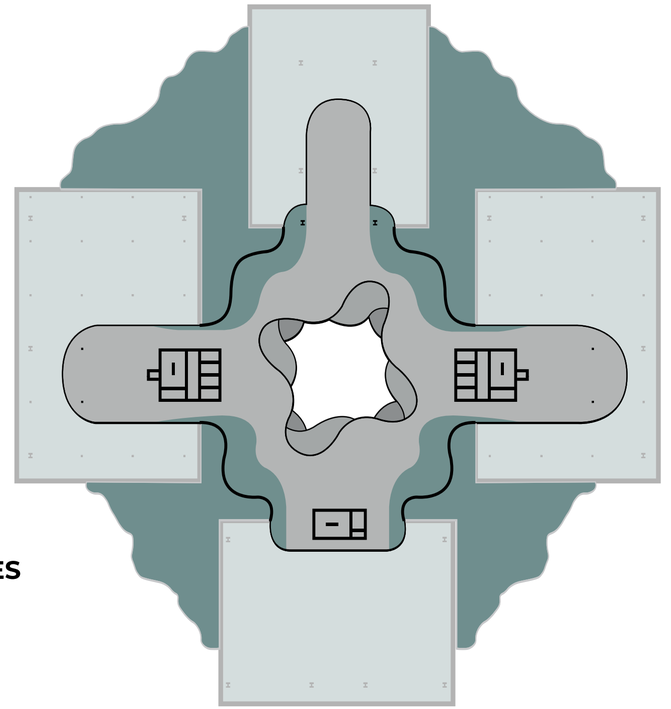
The concept

The contrasting architectural language visualizes the different functions to enhance the user experience.

FOCUS



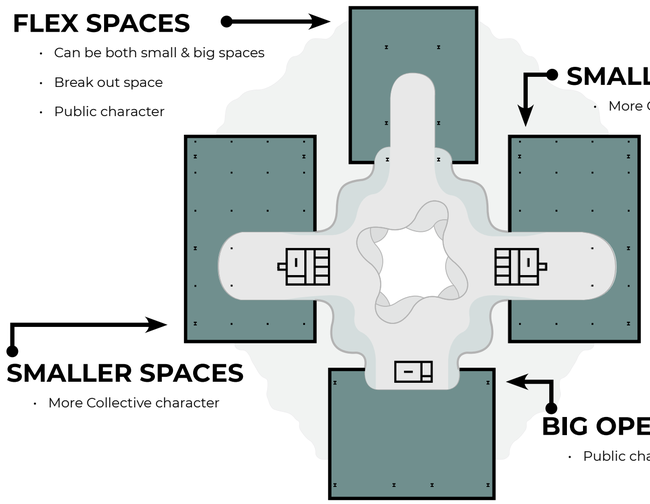




INTERACTION

FLEX SPACES
- Can be both small & big spaces
- Break out space
- Public character

SMALLER SPACES
- More Collective character



SMALLER SPACES
- More Collective character

BIG OPEN SPACES
- Public character

- **SERENITY**
- **REGULARITY**
- **RIGID CONTOURS**

STATIC

BIOTIC

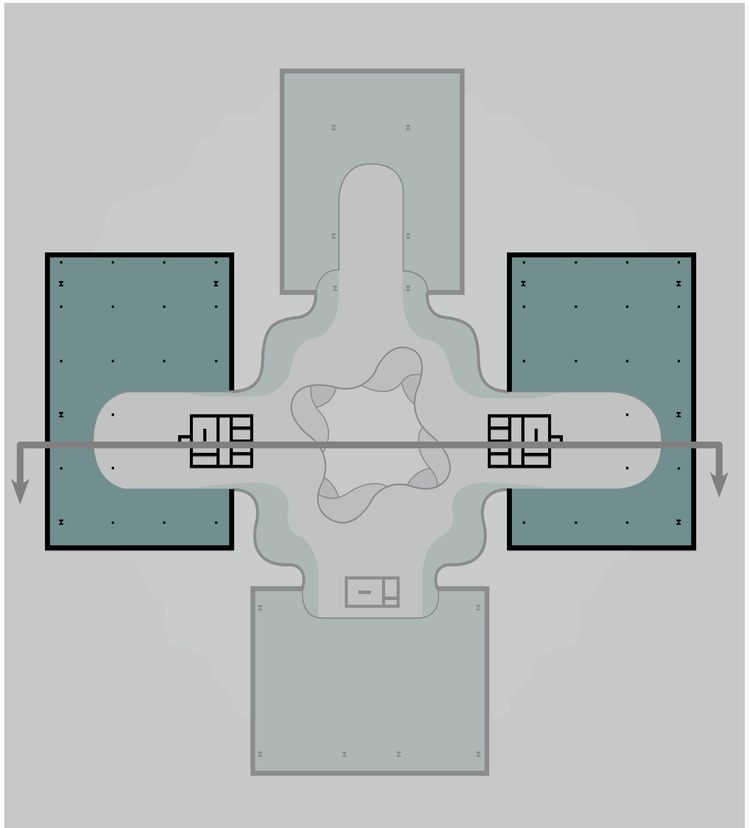
- **TURMOIL**
- **CHAOTIC FLOW**
- **ORGANIC FLUIDITY**

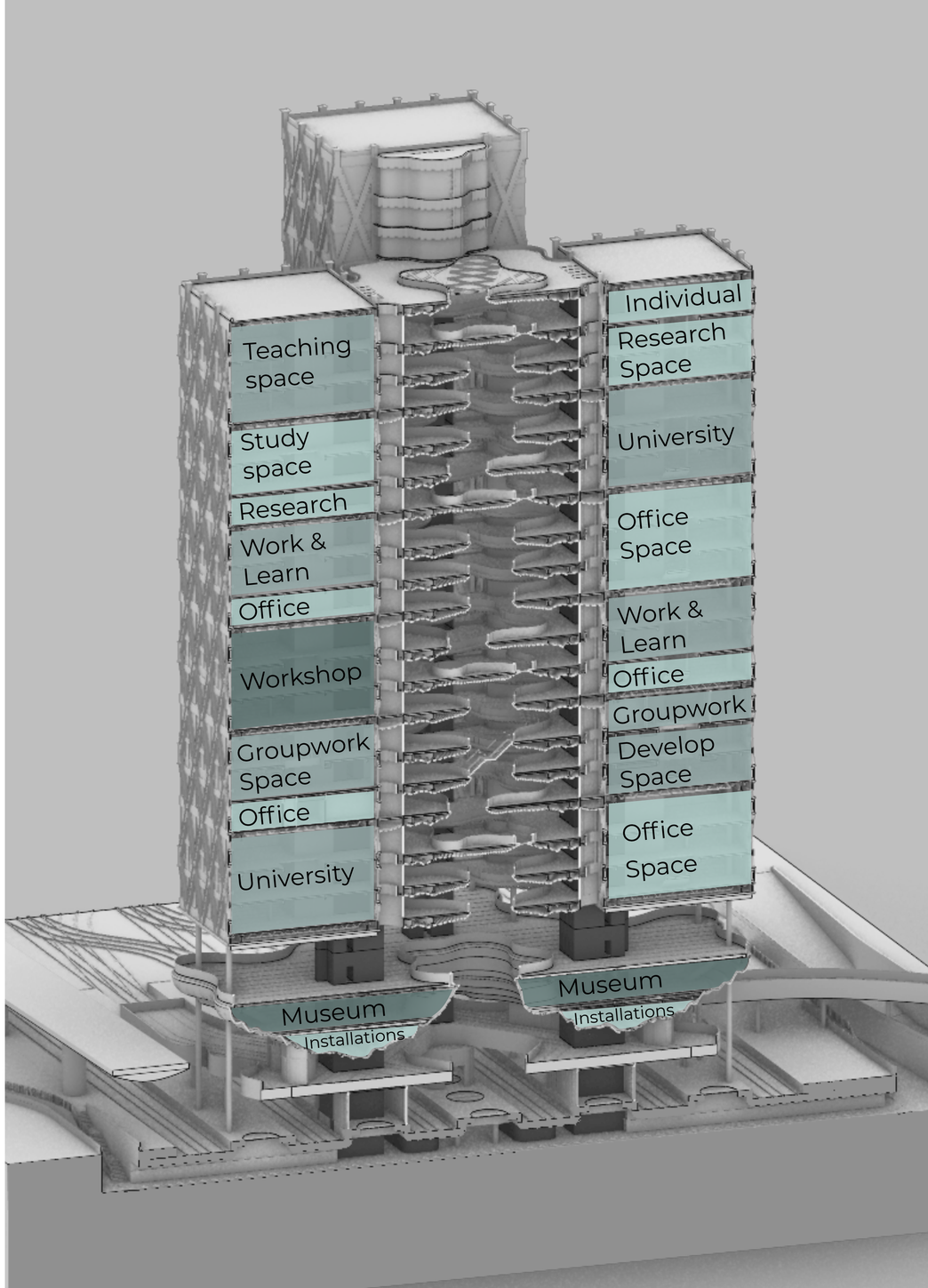
Function layout

PROGRAMMATIC PLACEMENT

As seen on the diagram on the side, the building is divided into different sub-zones. The functions placed in the zones left and right of the atrium are more collective in nature, including:

- Office spaces
- Study spaces
- Group work spaces
- Individual spaces
- Teaching spaces
- Work & Learn spaces
- Research spaces
- Workshop spaces



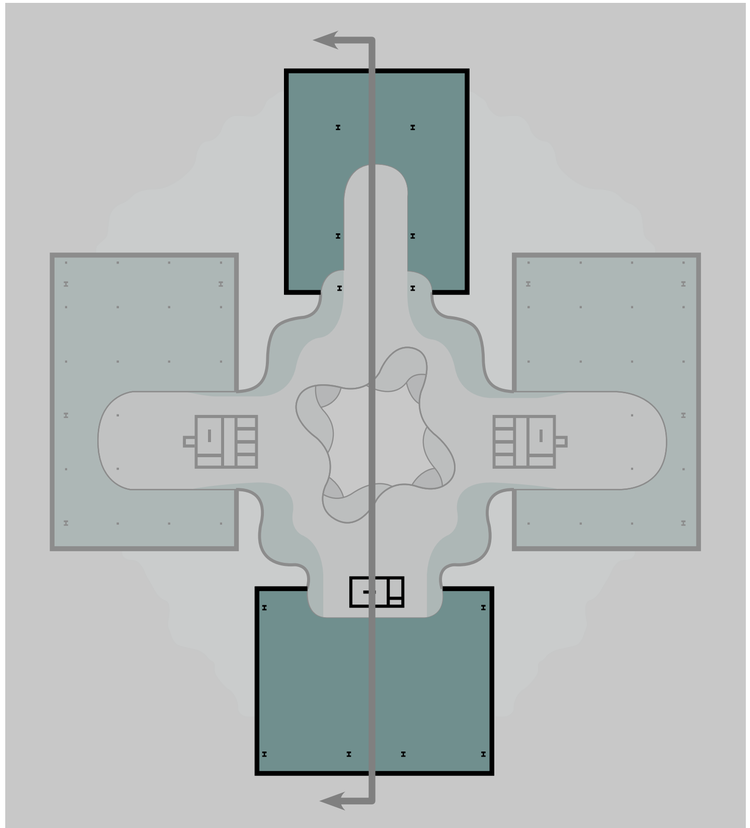


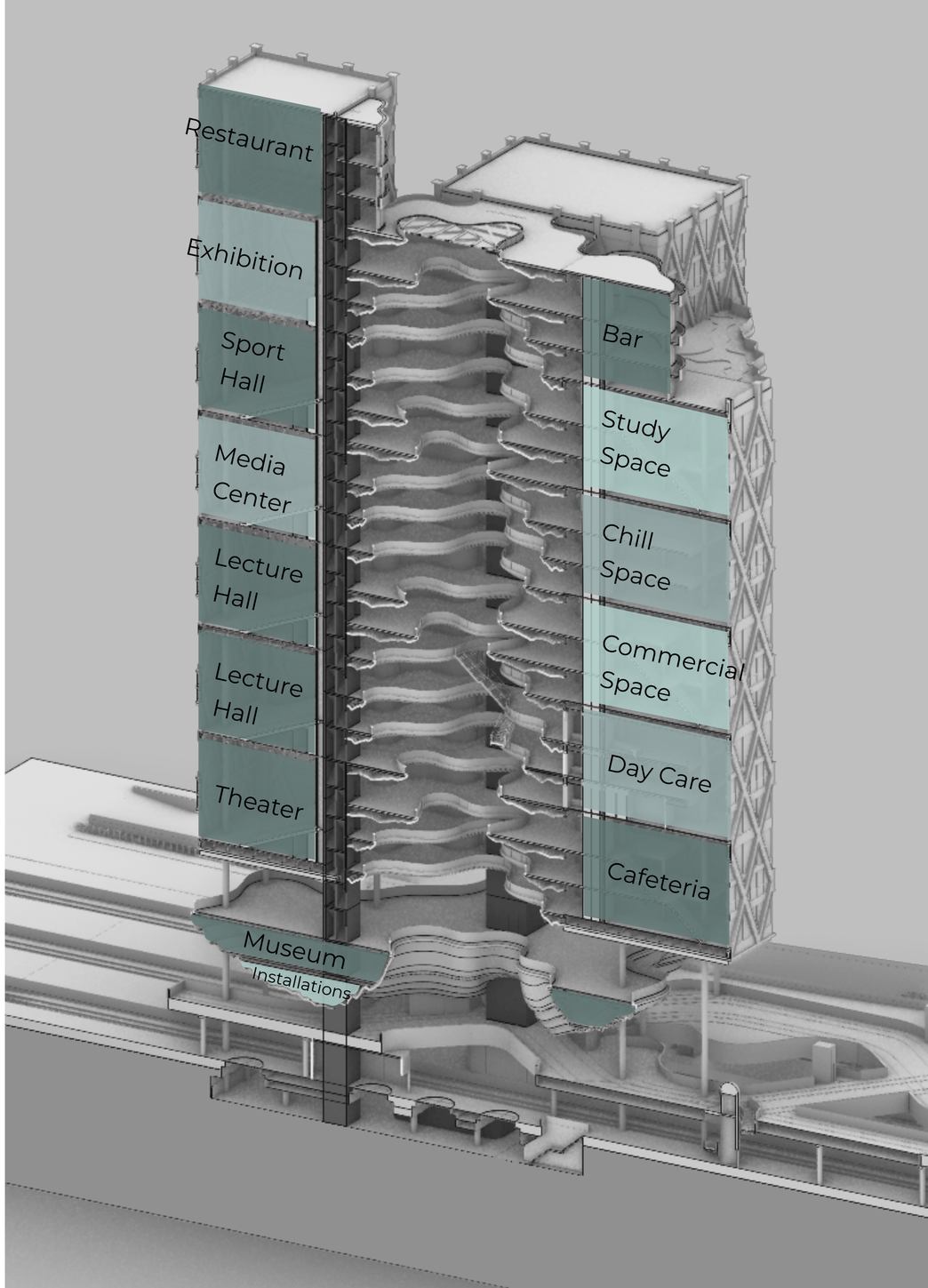
Function layout

PROGRAMMATIC PLACEMENT

As seen on the diagram on the side, the building is divided into different sub-zones. The functions placed behind and in front of the atrium are of a more public character, including:

- Lecture halls
- Theatre halls
- Sport hall
- Expo areas
- Media Center and Library
- Open workspaces / chill area
- Bar & Cafeteria
- Commercial spaces



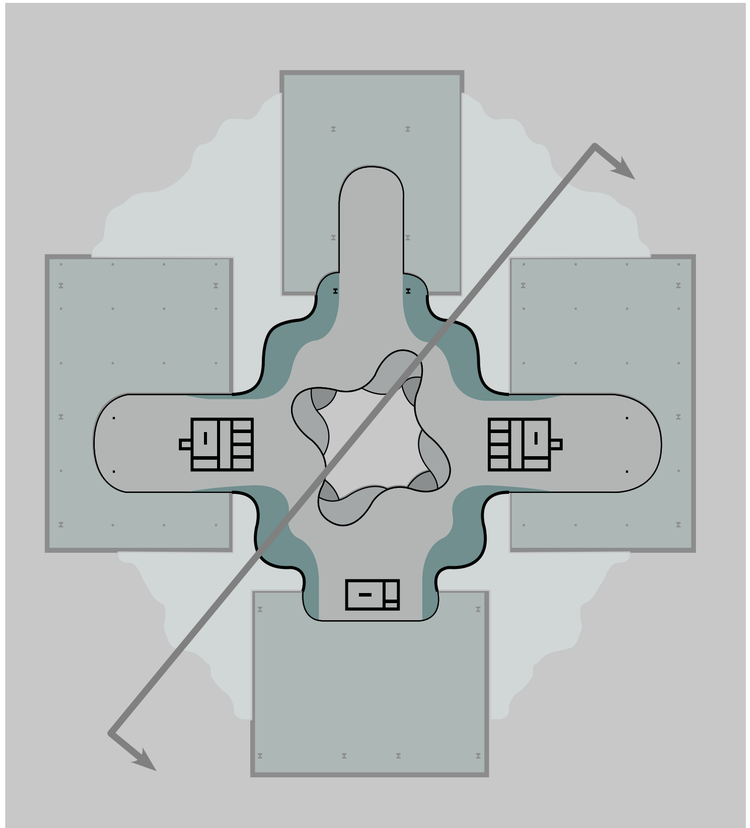


Atrium function

A PLACE TO STAY

The atrium is the heart of the design, where the main design principle of interaction comes to fruition. To successfully achieve this, the space needs to be an area not just to pass through but also to stay. This is accomplished by adding functions:

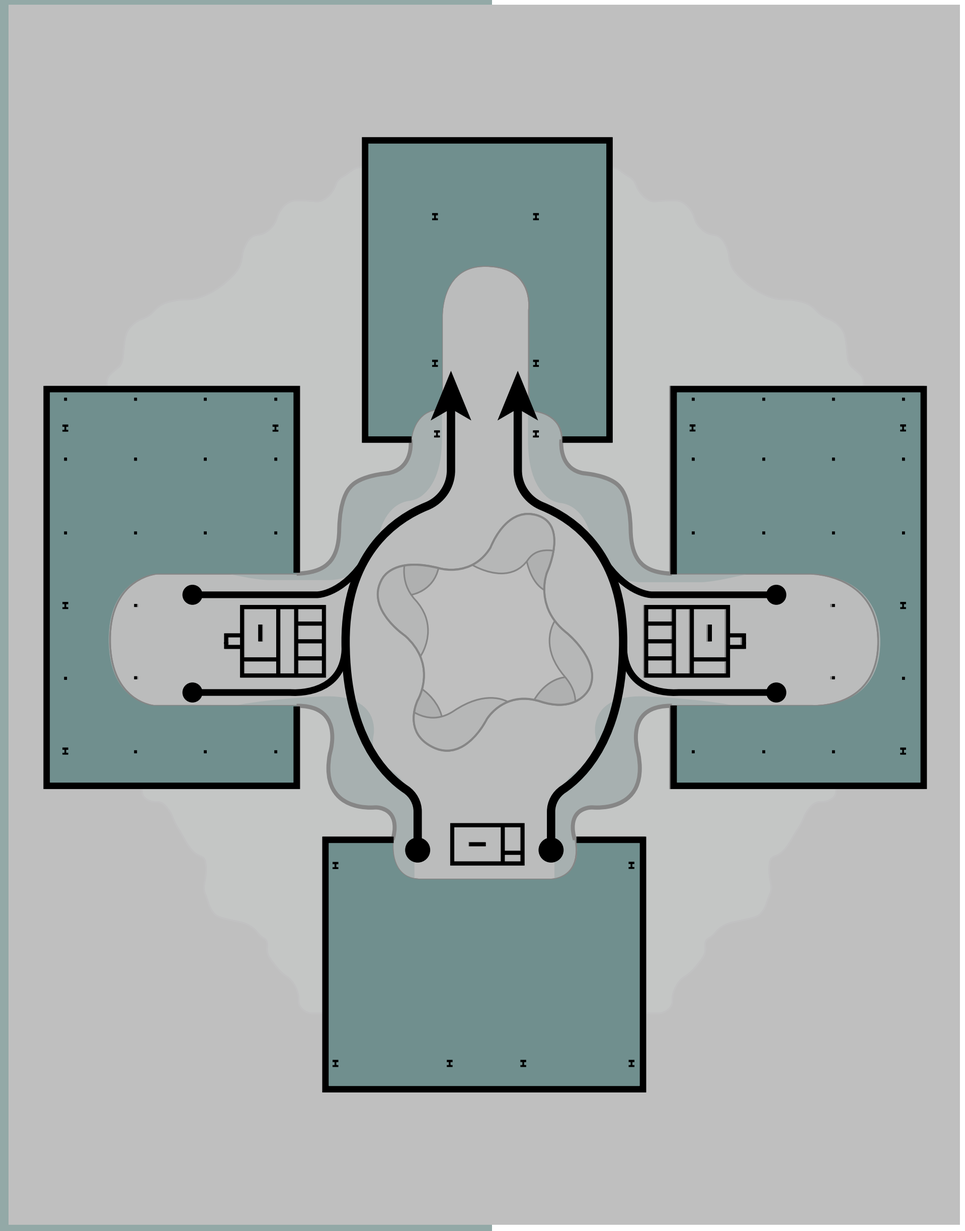
- Coffee corner
- Book corner
- Open work spaces
- Entrance to the terraces with a bar
- Sit spaces
- Call booths
- Small expo areas
- Soft close-able spaces









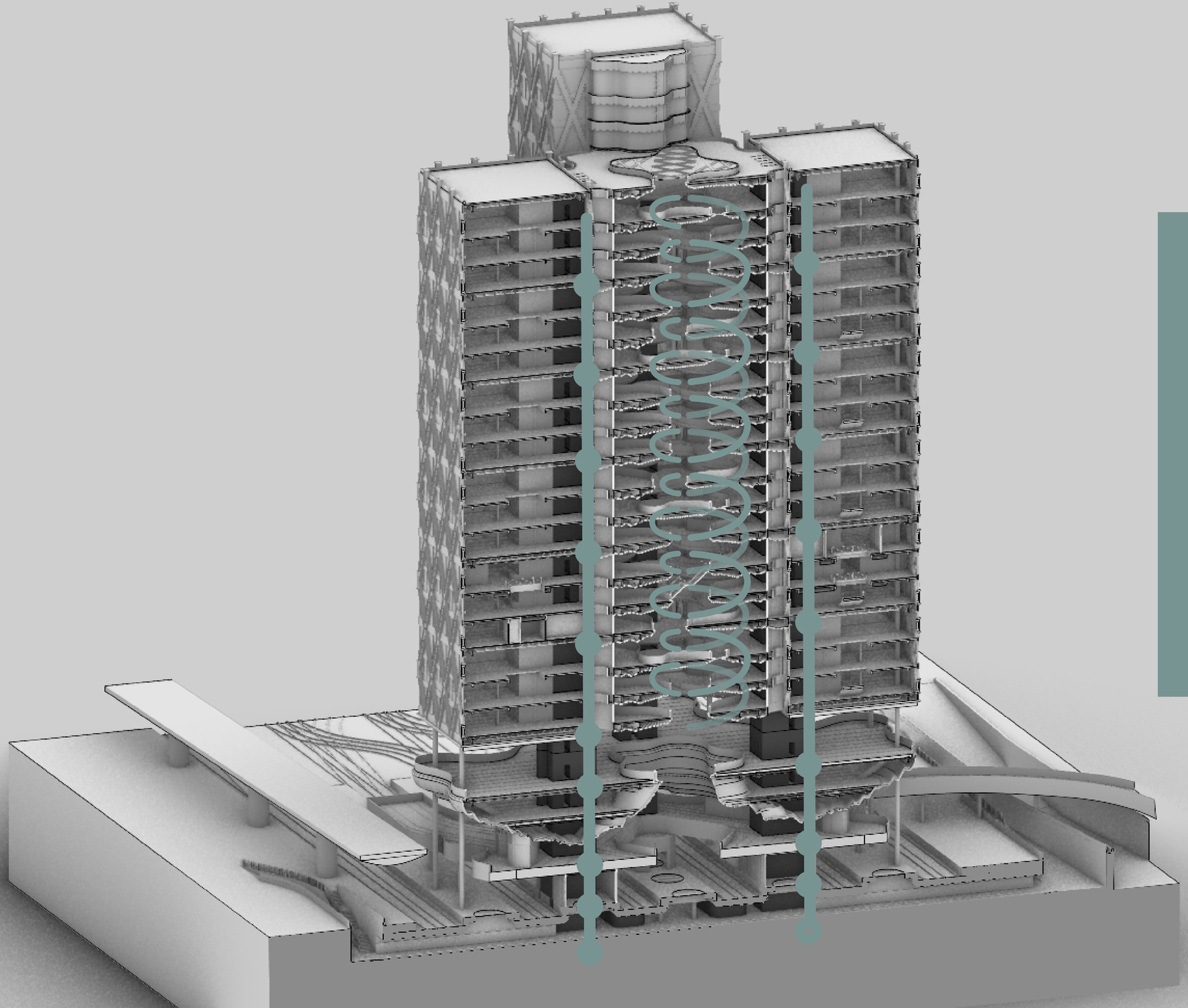


Flow

Functions create the Flow

These different zones for functions and uses in the building create a flow centered around the atrium. This is where I aim to foster interaction.

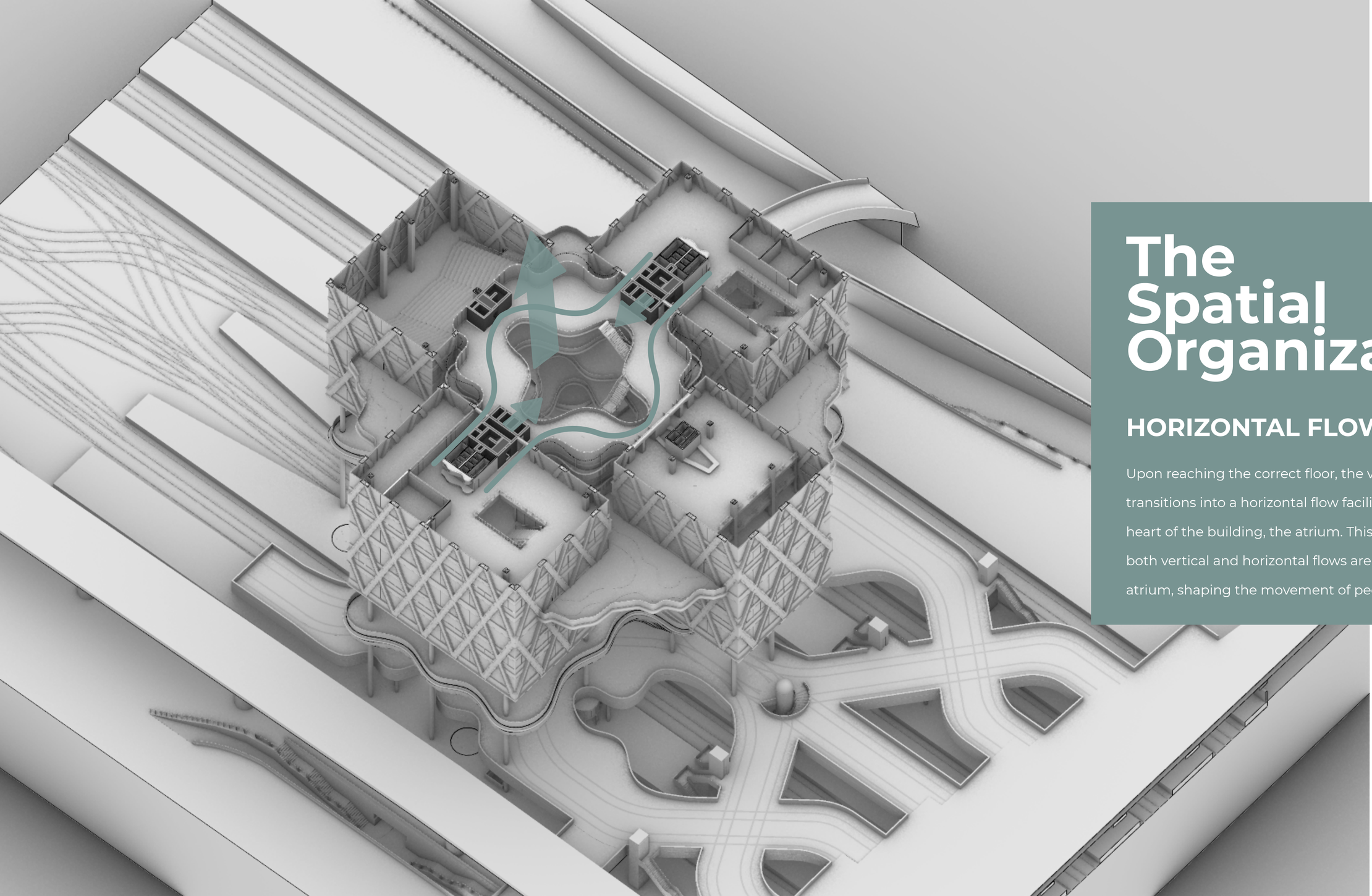
The size of the openings linked to the atrium determines whether the functions behind them are more public or collective in nature.



The Spatial Organization

VERTICAL FLOW

The creation of sub-zones in the building determined the functional layout. These functions also have a reciprocal relationship that dictates the vertical flow of the building. At the heart of the building facilitating this vertical flow is the atrium.



The Spatial Organization

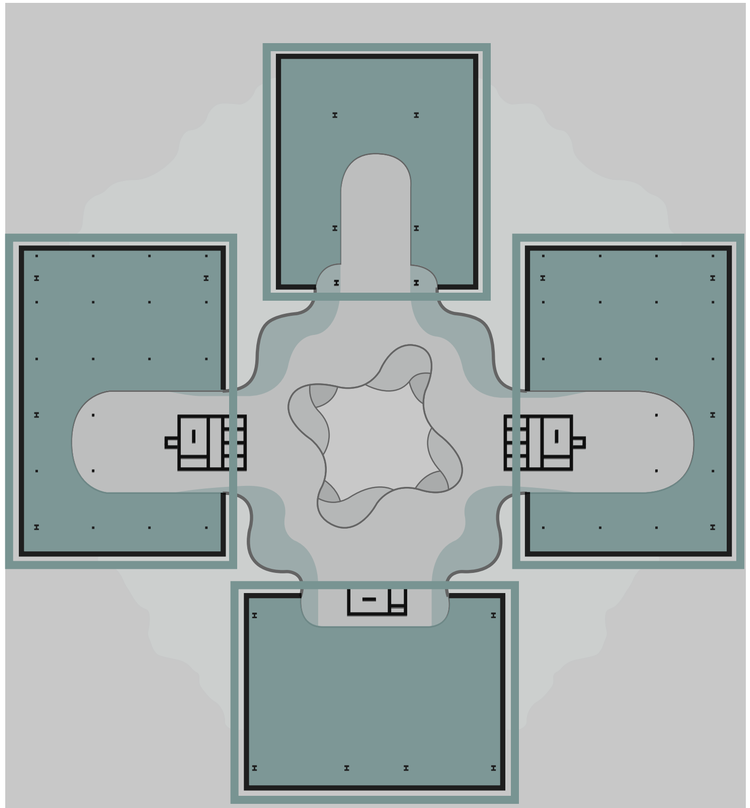
HORIZONTAL FLOW

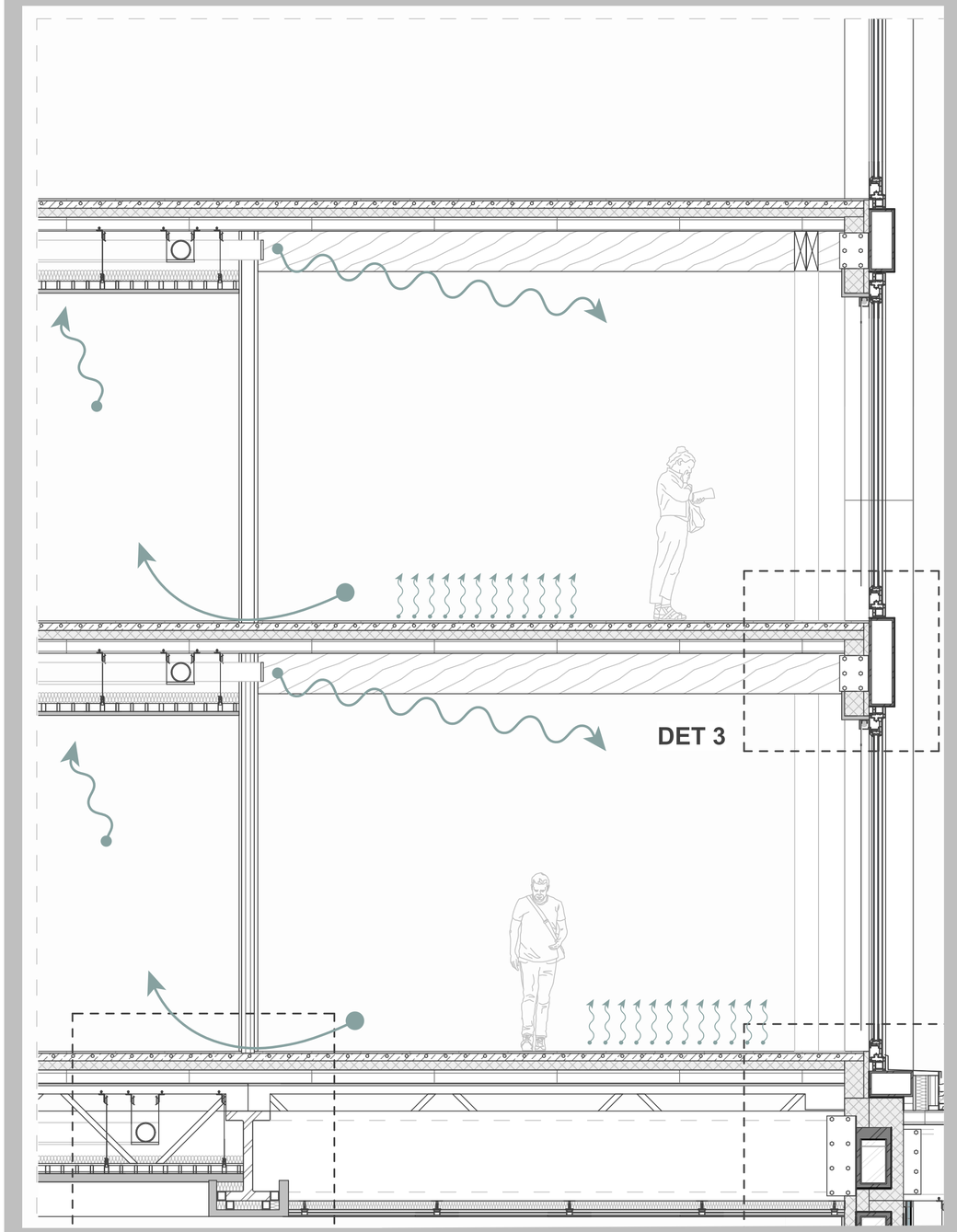
Upon reaching the correct floor, the vertical flow of people transitions into a horizontal flow facilitated around the heart of the building, the atrium. This illustrates that both vertical and horizontal flows are determined by the atrium, shaping the movement of people.

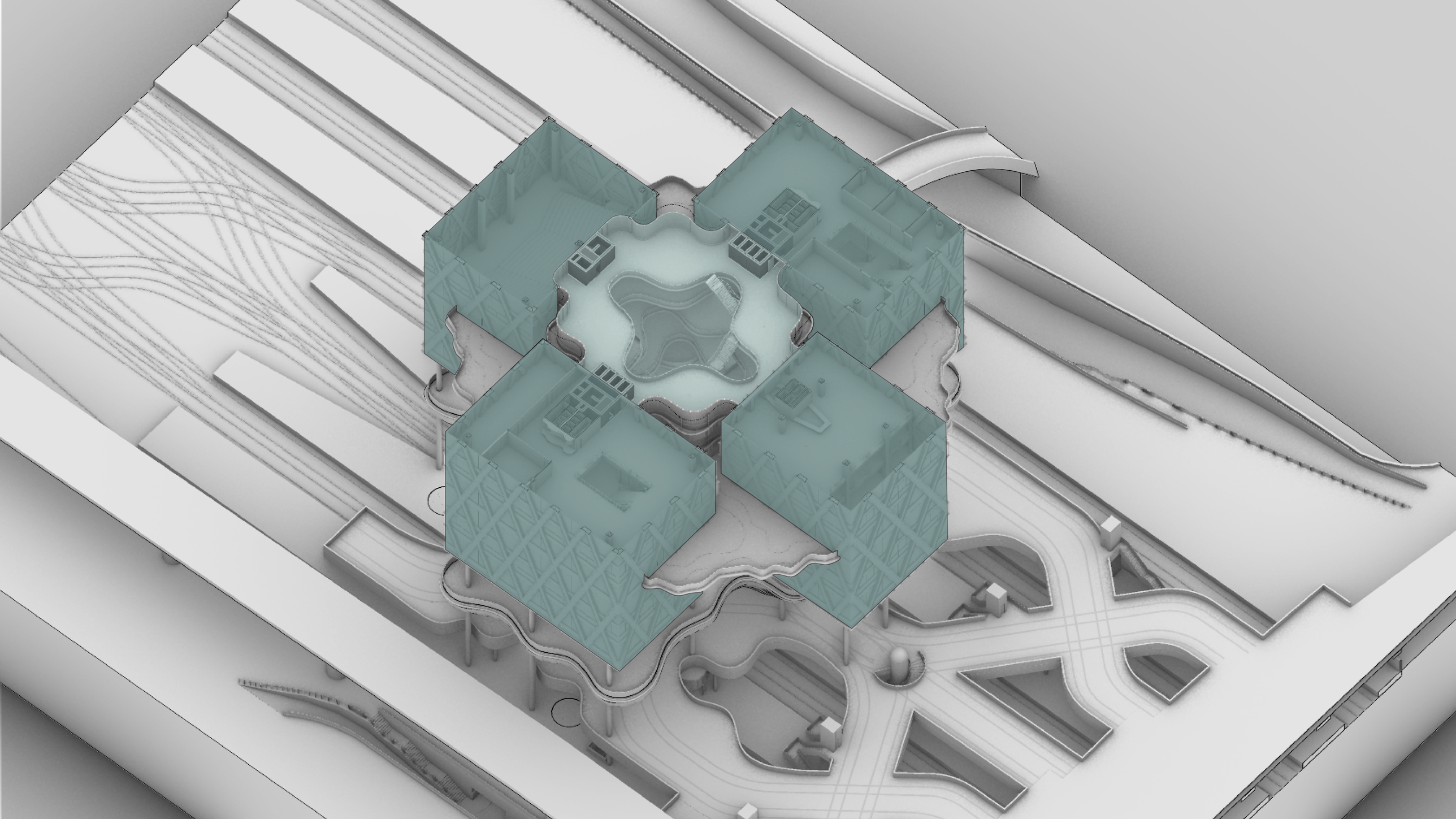
Climatic system

A NEED DRIVEN SYSTEM

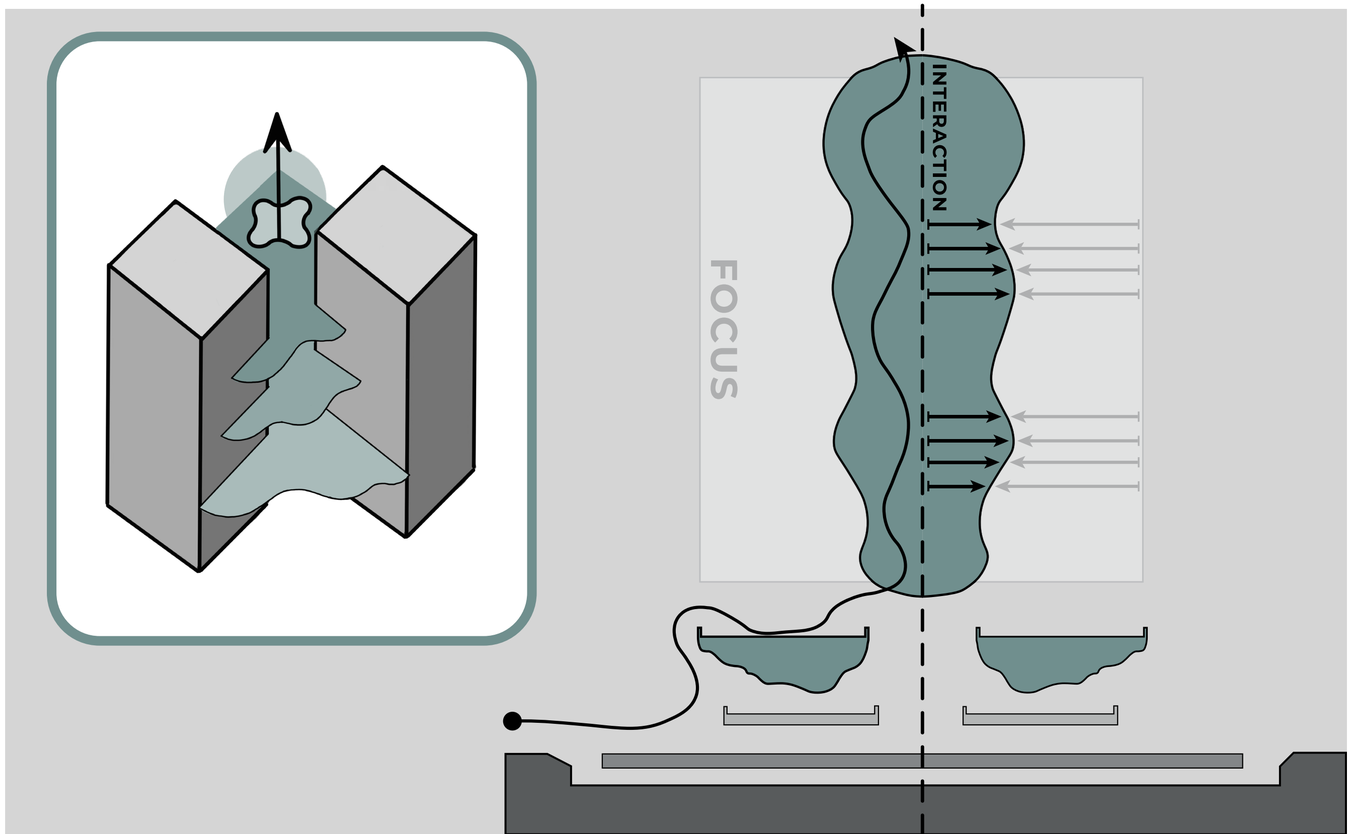
The division of the building into 5 sub-zones is a sustainable intervention that allows each zone to be climatically driven based on its specific needs. This provides sustainable advantages as certain sub-zones do not require active cooling when they are, for example, on the shaded side of the building. This prevents unnecessary cooling or heating of the different sub-zones.







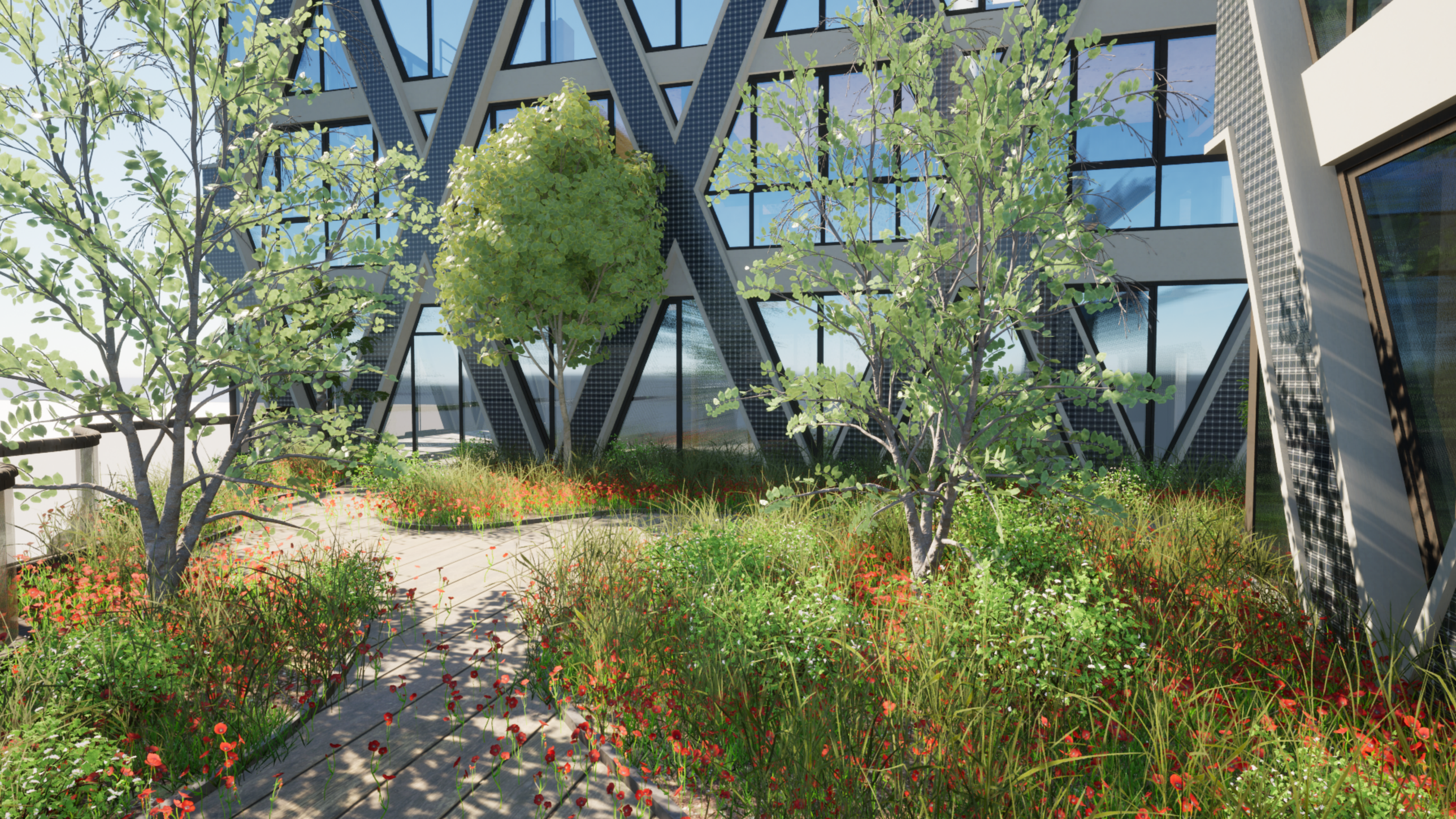
The Design Staples



INTERACTION BY
NATURE

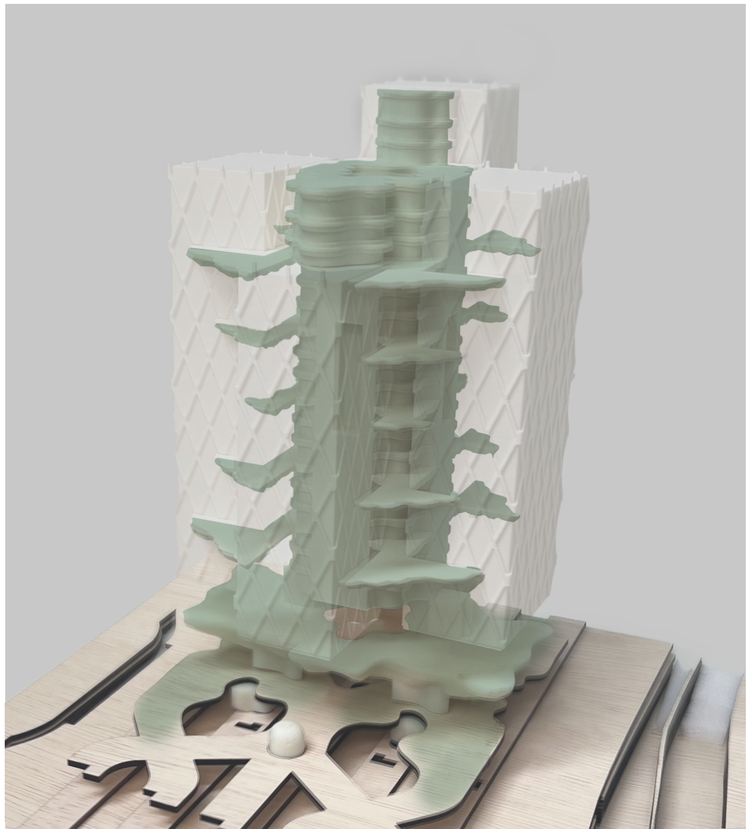
The experience

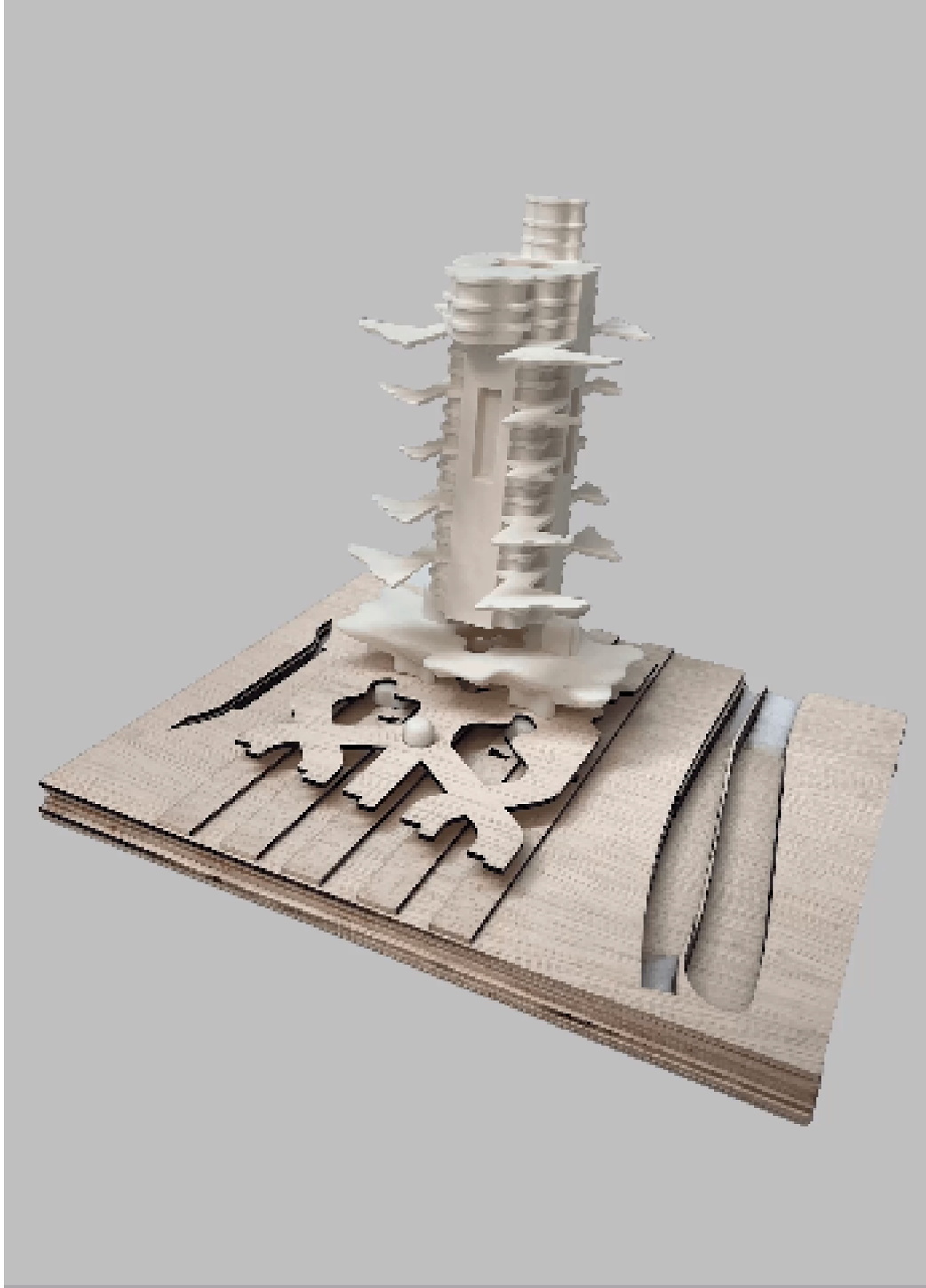
Incorporating nature benefits all users and counters the urbanization process.



The Multiplicit nature







The 3 min. Nature Connection

ADDING TO THE BIODIVERSITY

The building facilitates a diverse mix of biodiversity covering a large area. This enhances the city's green quality and provides health benefits to the building's users. This addition is a staggering:

ADDING

7.9k m²

QUALITATIVE GREEN

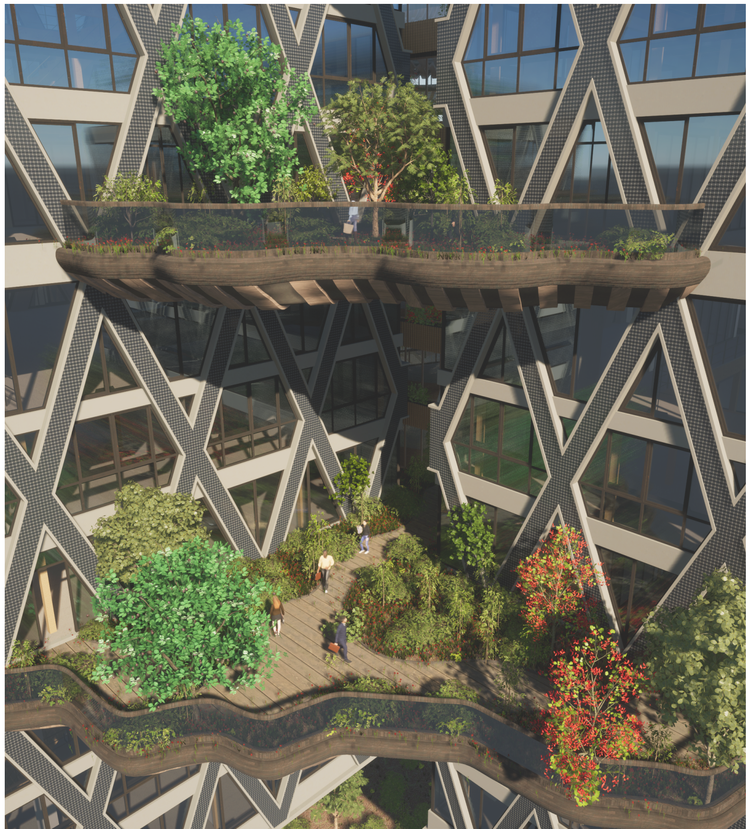
over the entirety of the building.

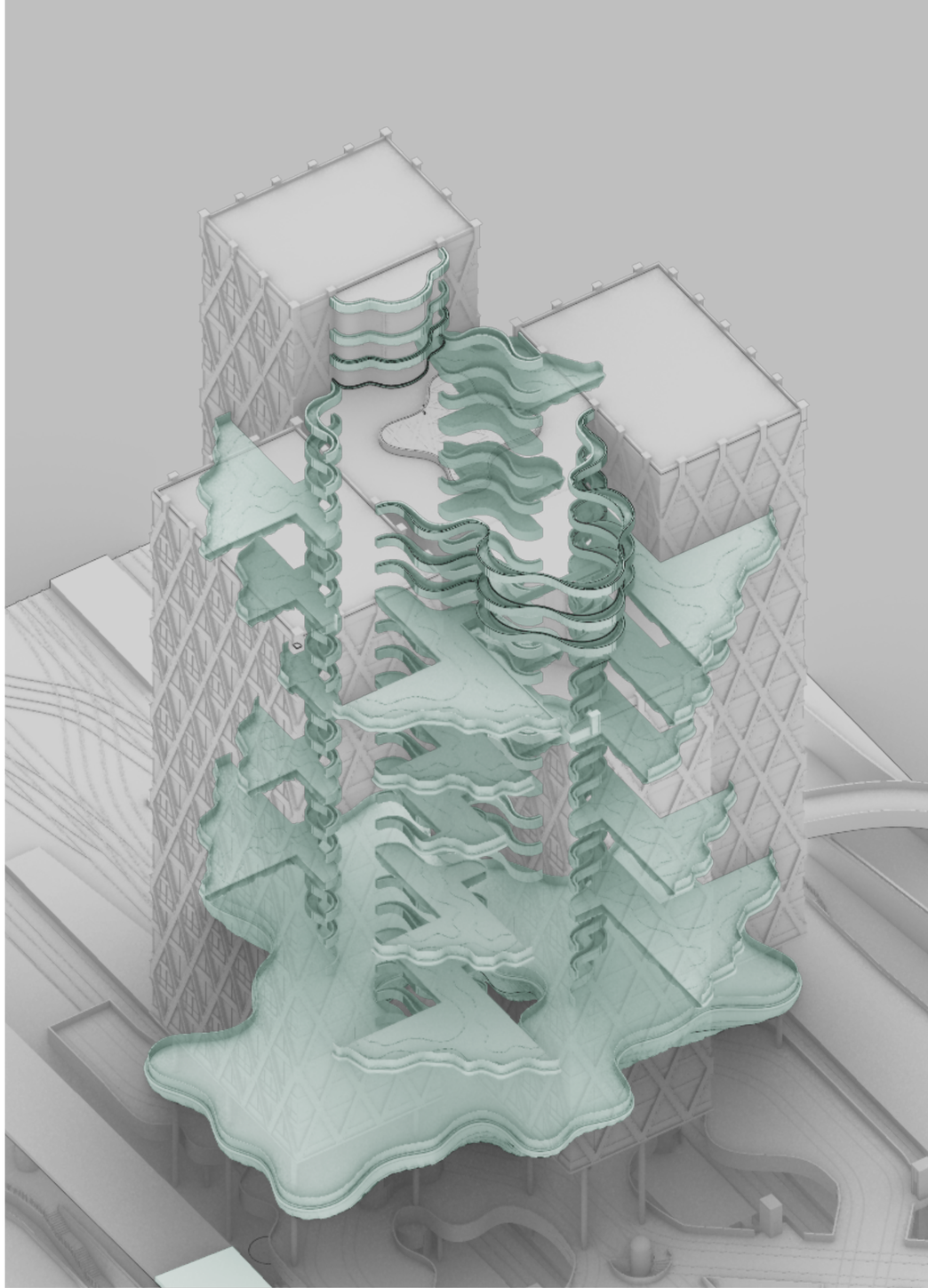
TOTALING

3.15 x

THE FOOTPRINT

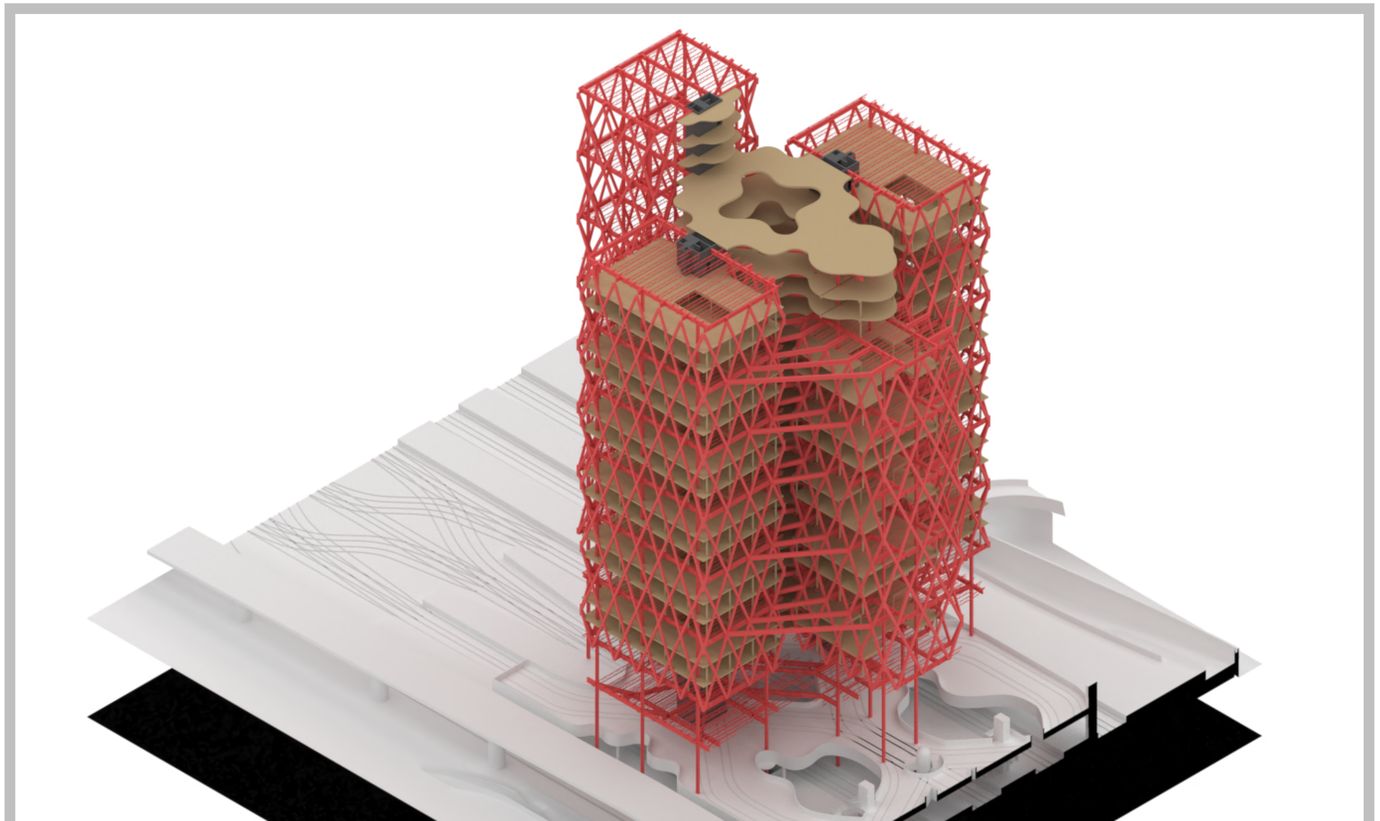
off the building.







The Structural Impact



ACTION & CONSEQUENCE

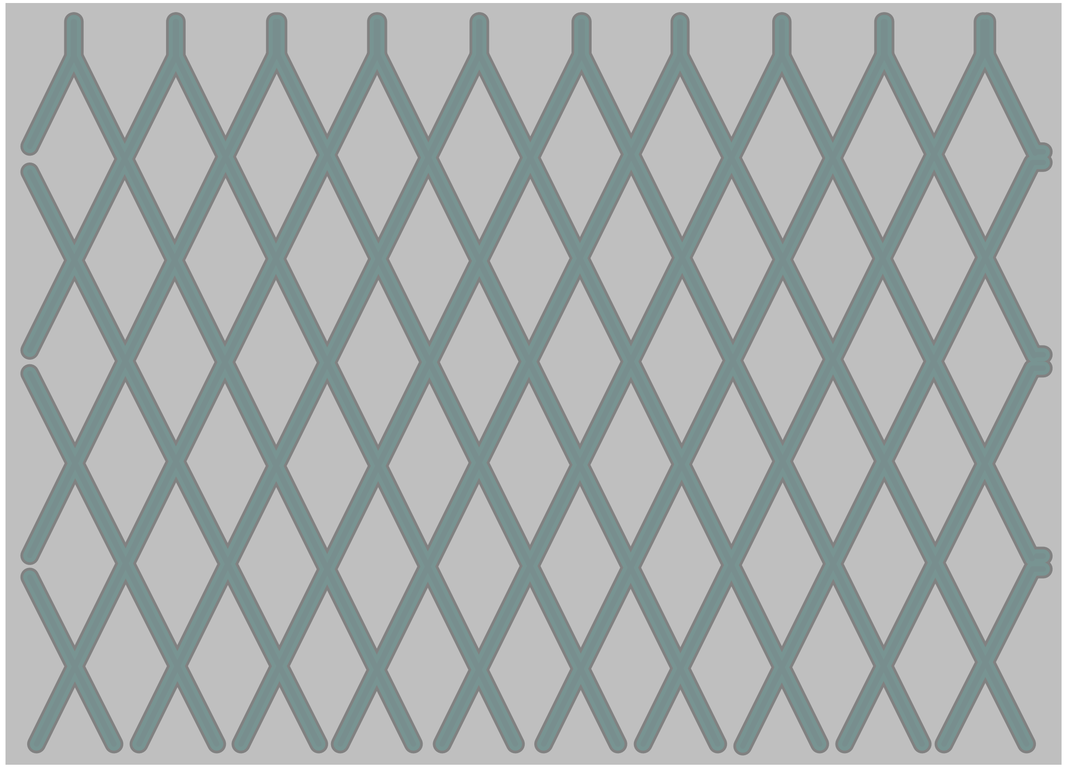
The choice of construction principle has tangible and visible consequences for the facade of the building. The exoskeleton of the building projects a grid onto the surface, significantly influencing the look and feel of the facade. This aesthetic choice contributes to the juxtaposition of focus and organic expression of the building’s facade.

Facade

FROM GRID TO DESIGN

The exoskeleton structure, creating a grid that dictates the facade design, largely predetermined a significant portion of its appearance. However, leveraging this grid as a backbone, the facade could still be designed to offer diverse looks and feels.

The vision was to emphasize the juxtaposition of focus and organic expression in the rigid facade that holds back the embodied organic nature and heart of the building. With this in mind, the relationship to the existing context was considered, particularly noting the New Babylon building, which also features a grid in its facade design.



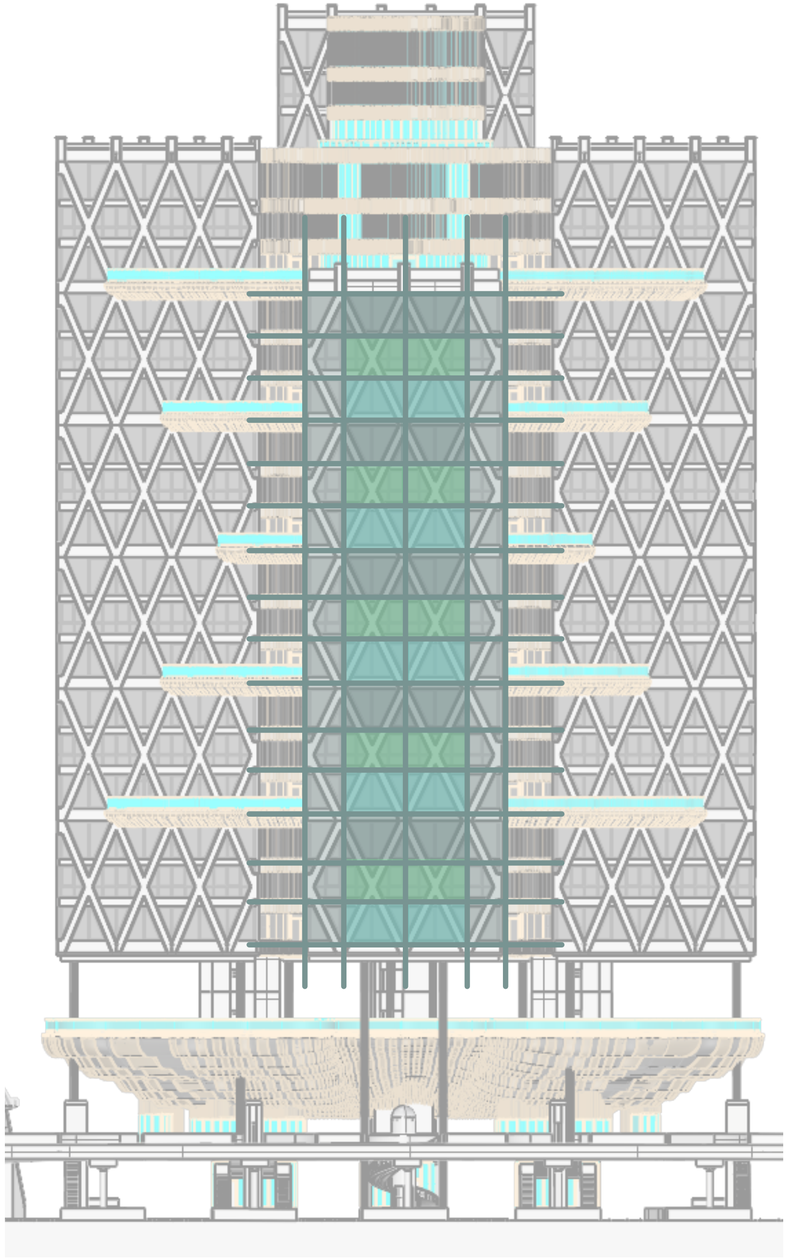


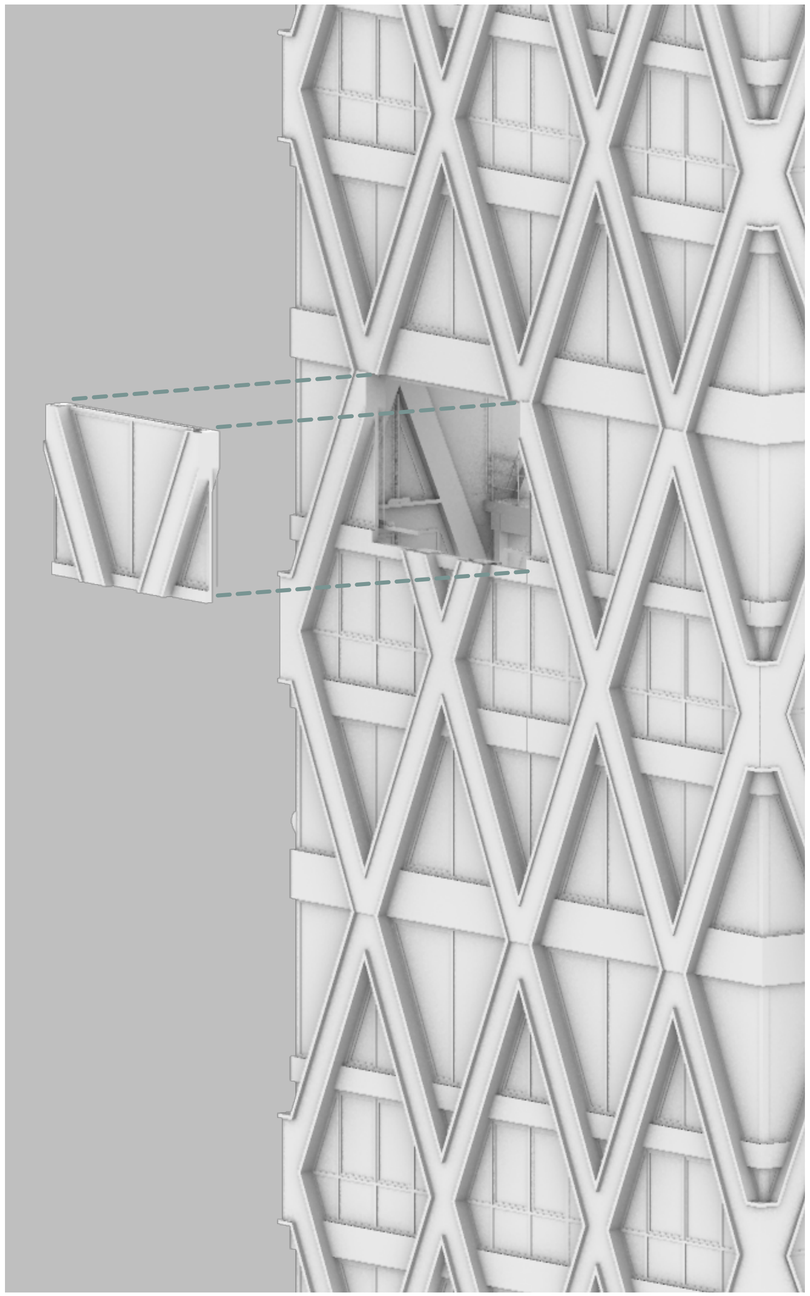


Just in Time

TIME IS MONEY

In projects like these, especially in a busy city center, construction is under immense time pressure due to financial constraints and minimizing disruptions. My project is designed to reduce both construction time and disruption to the city and its residents by implementing prefabricated facade components. These components are transported just in time to the construction site using the train tracks located underneath.





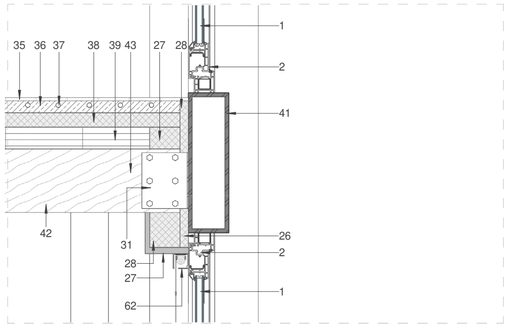
Details

ON A DETAIL SCALE

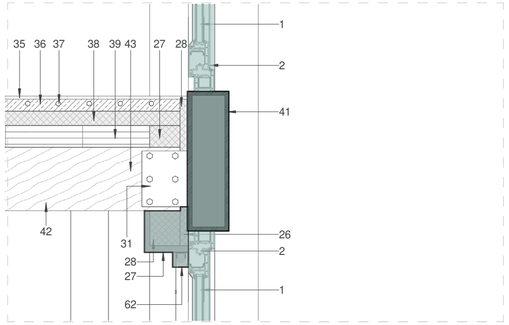
The demountable nature of the facade is achieved by creating various prefab elements that connect together to form the facade modules.

This is illustrated in the architectural details on the side, where the different prefab elements are highlighted. These include:

- Structural elements.
- Window elements.
- Front facade cladding elements.
- Back facade cladding elements.



DET 3_ 1:20



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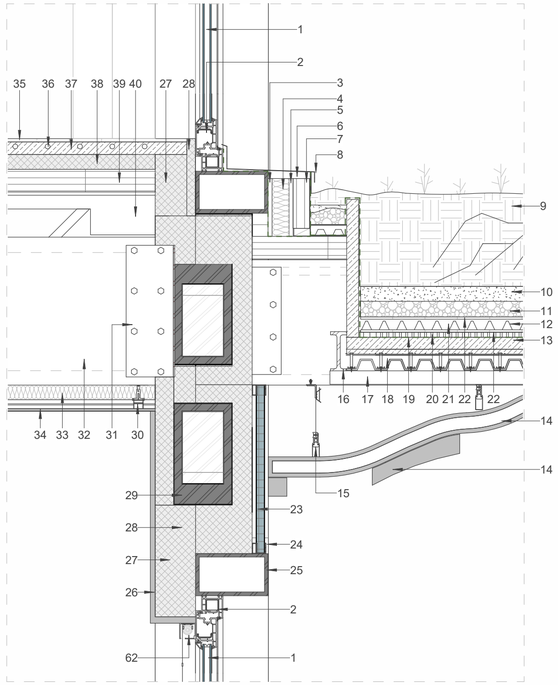

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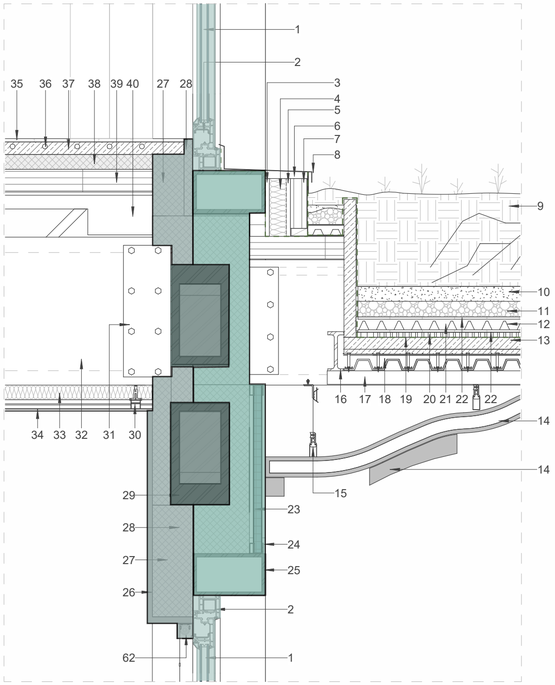
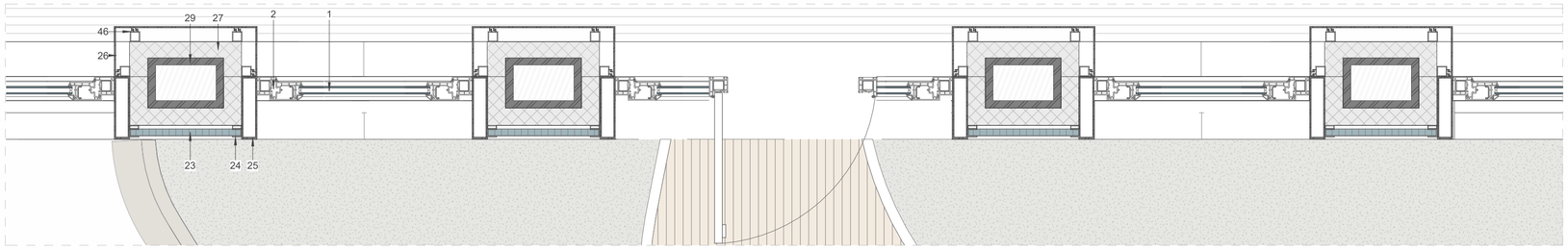
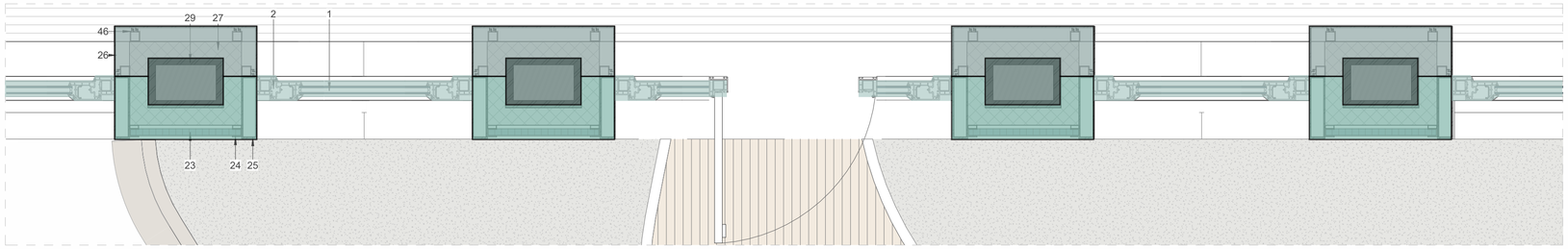


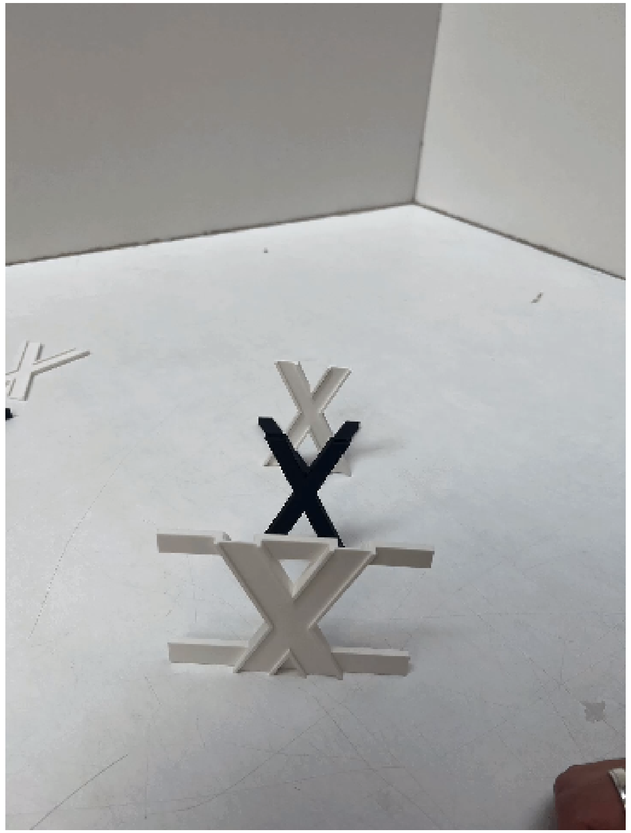
DET 1_ 1:20

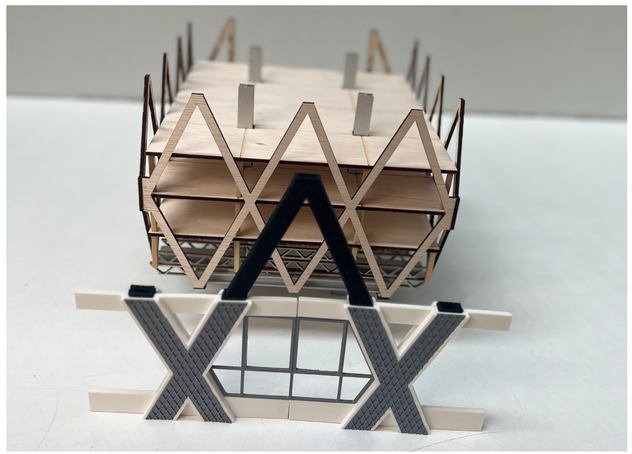


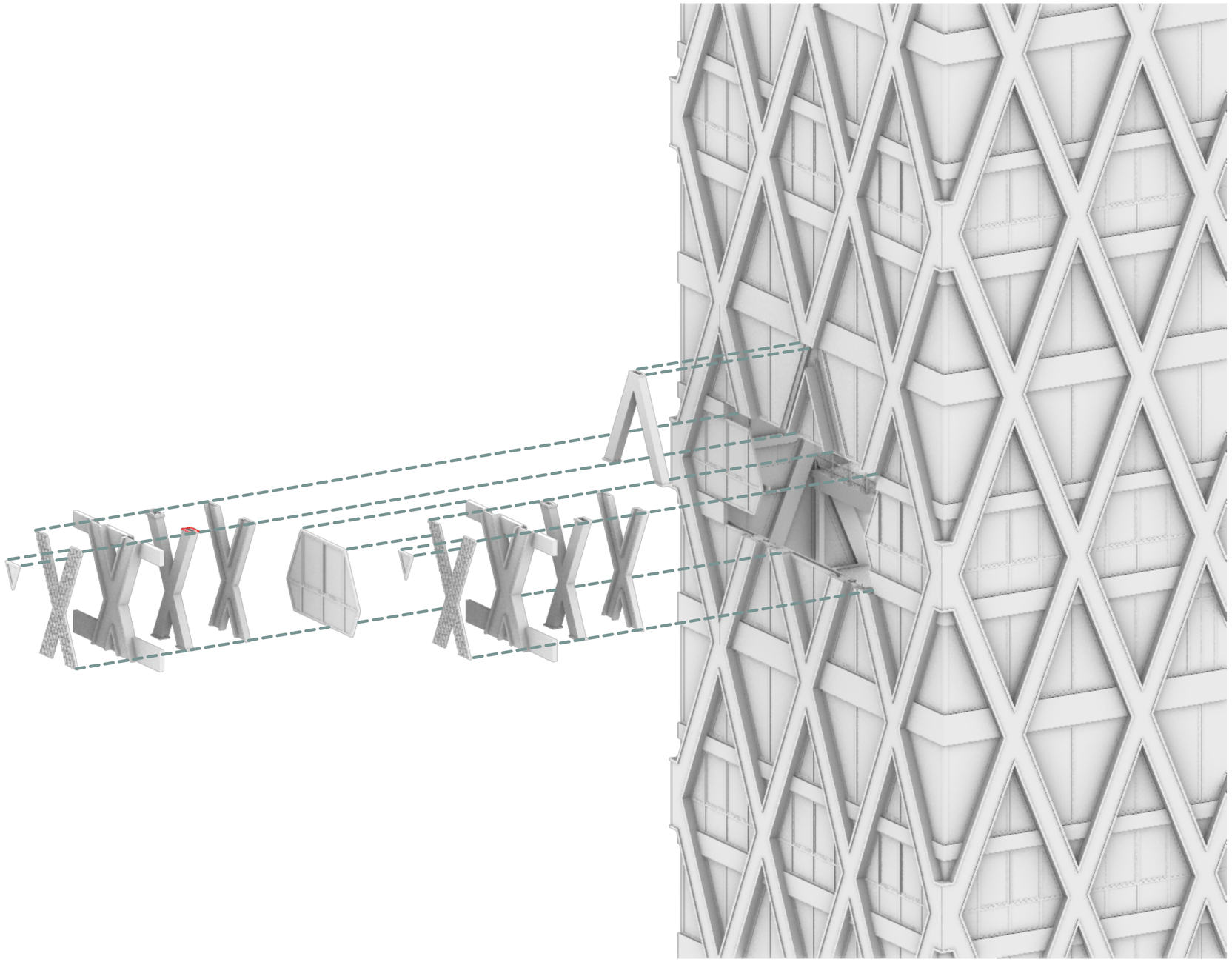
DETAIL PLAN 1:20



DETAIL PLAN 1:20







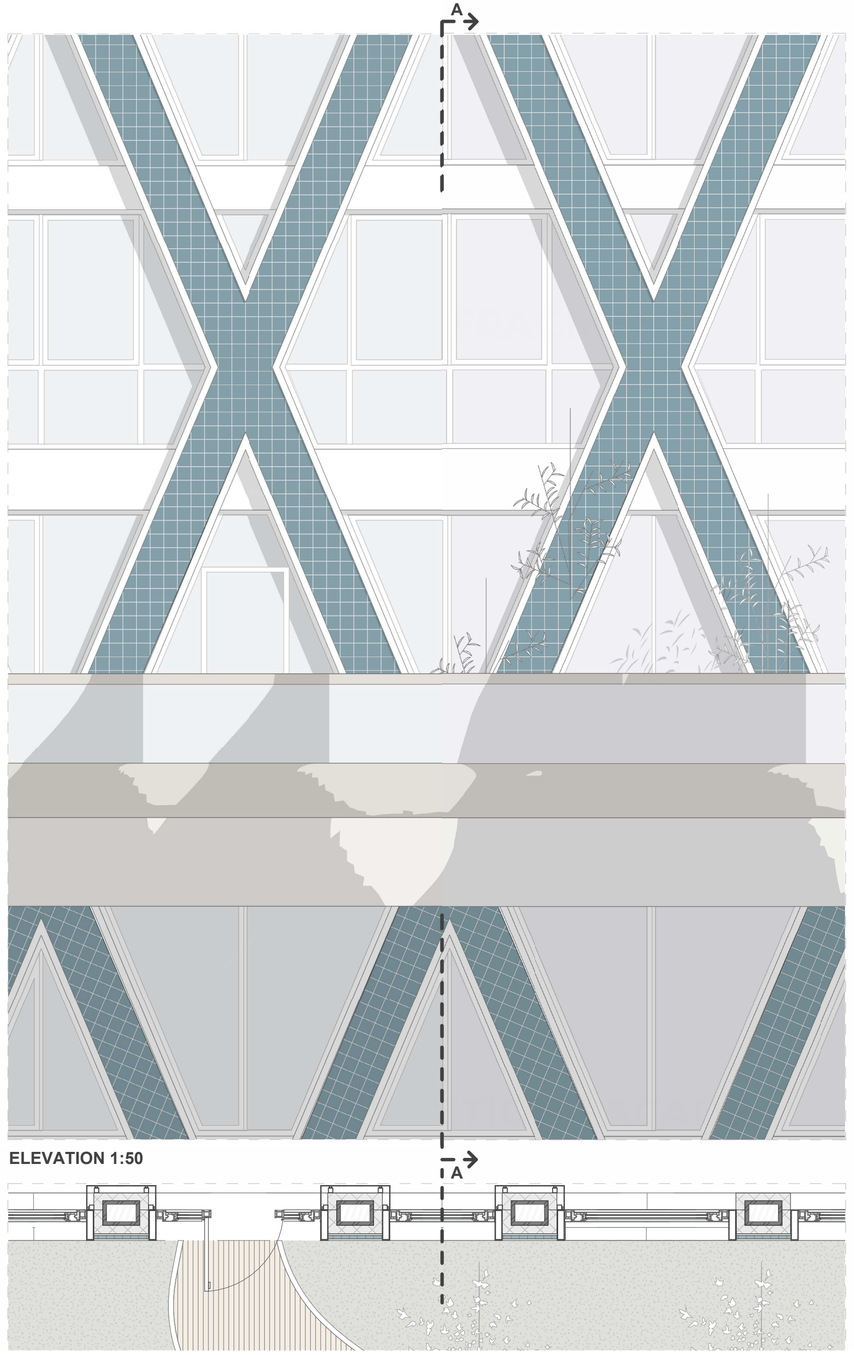
Elevation

ON A DETAIL SCALE

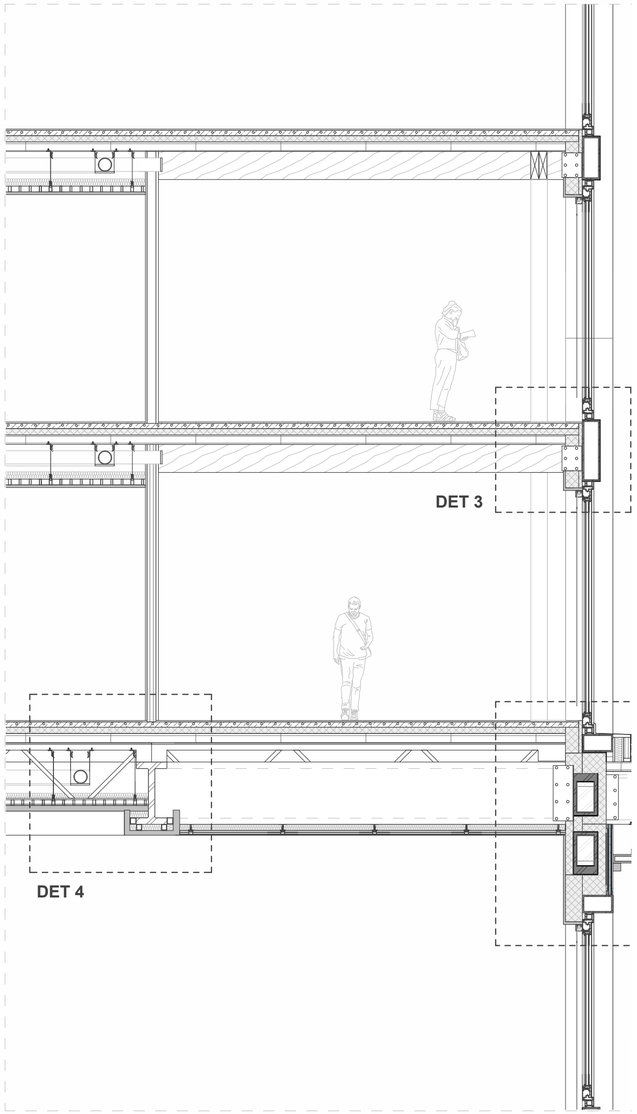
This results in the following elevation, showcasing the integration of sustainable features such as PV panels at the detailed level.

The details demonstrate how the various windows and solar heat prevention measures are user-operable, allowing users to control both airflow and solar heat gain according to their preferences.

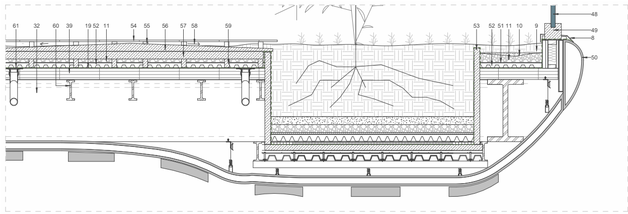
Furthermore, this detail explains the water retention and drainage system, illustrating how water collected from the roof is guided through the plants integrated into the facade.



ELEVATION 1:50



SECTION A-A 1:50



Renewable energy

GENERATING GREEN ENERGY

The building features a large area of PV panels on its surfaces and facades, generating green renewable energy to meet the building's energy consumption needs.

ADDING

8.2k m²

PV-PANEL AREA

over the entirety of the building.

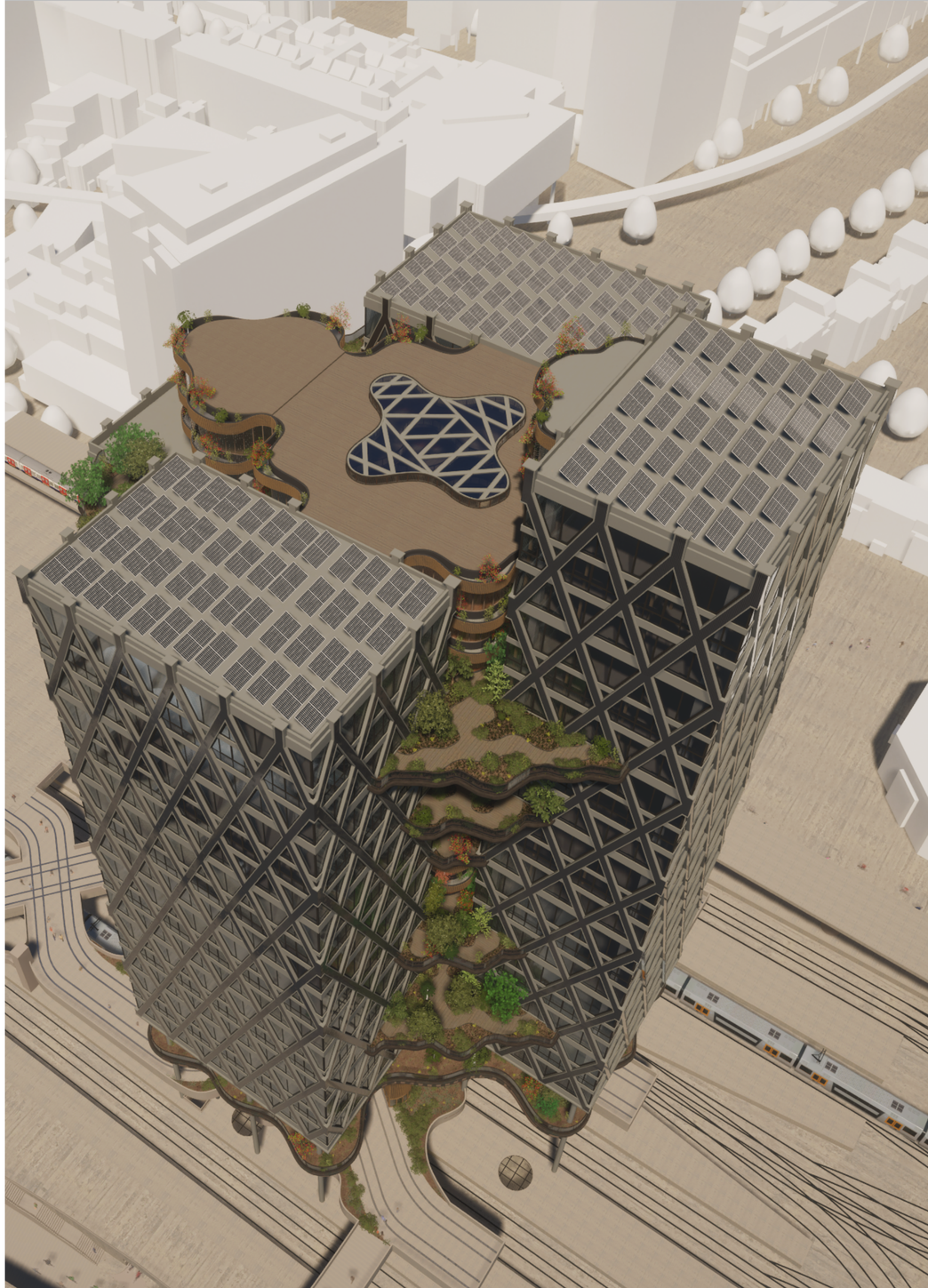
TOTALING

3.30 x

THE FOOTPRINT

off the building.





Facade

STATIC & BIOTIC

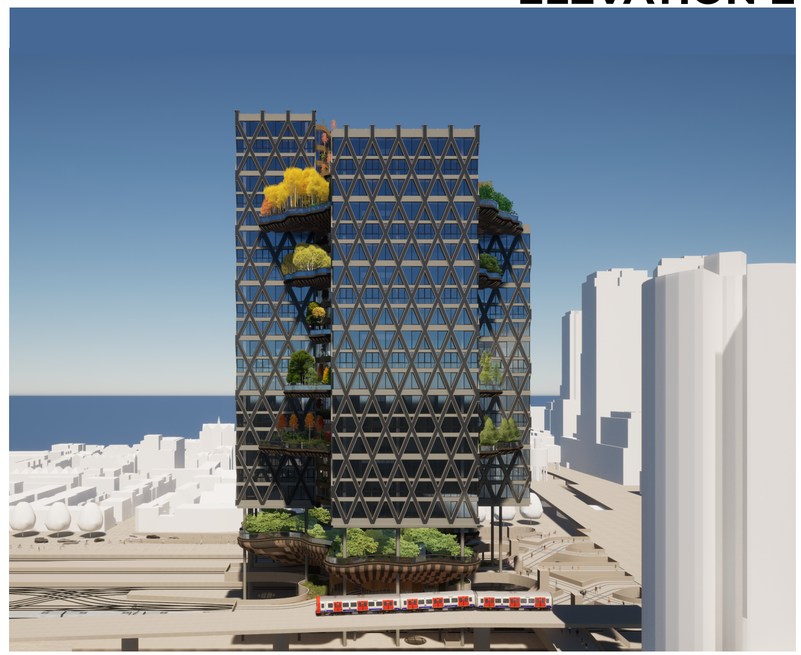
The facades of the building reflect the exoskeleton that determined its form factor, emphasizing the grid pattern. This construction principle is highlighted in the facade views to remind users of the building's structural concept. Rather than conventional windows, these elements echo the building's architectural principle.

This static facade is 'holding back' the biotic hart of the building sort of suppressing it but not managing to at some point where the organic terraces break out.

ELEVATION N

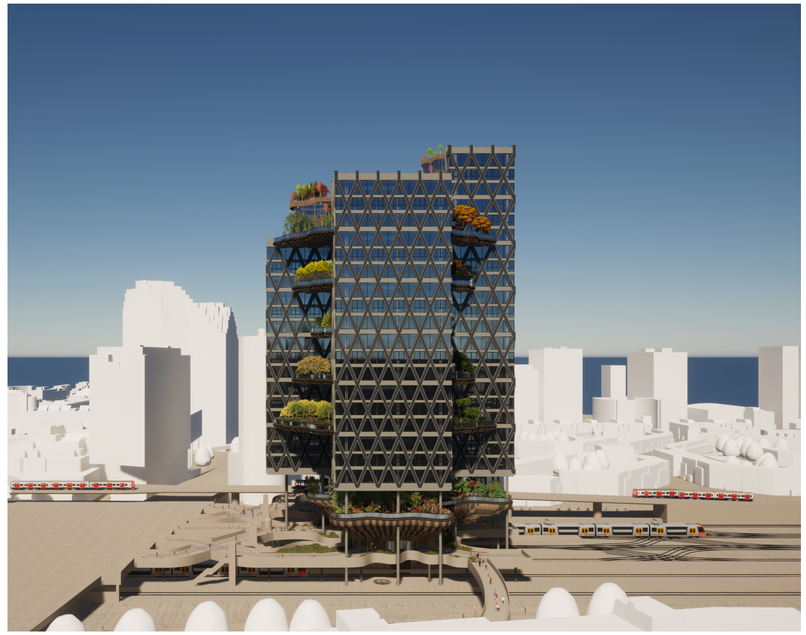


ELEVATION E

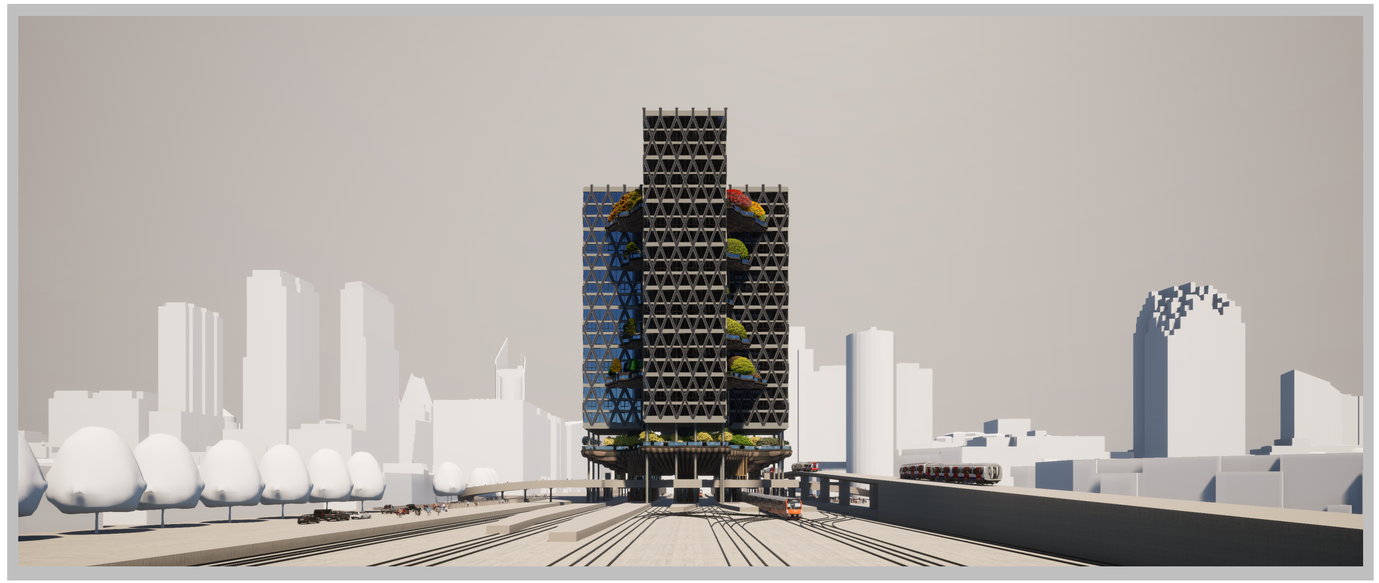




ELEVATION S



ELEVATION W

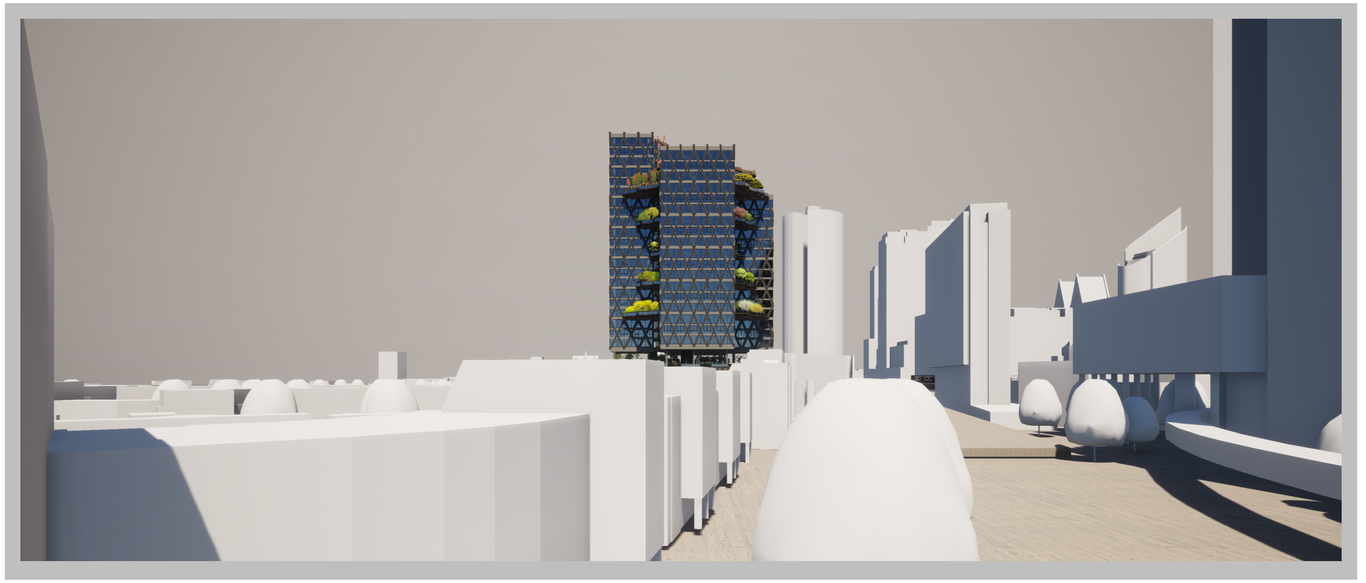


IN THE URBAN CONTEXT

The project is somewhat exceptional yet also blends into its surrounding context. This is attributed to The Hague's 'high line', where a series of skyscrapers each feature their own distinct design and style. From a frontal view, the building harmonizes with this unique skyline despite its distinct design.

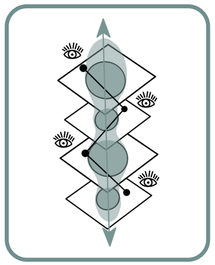
BLEND VS THE EXCEPTION

However, when viewed from the side, the building stands apart from the 'high line' and exists within a lower surrounding context. Here, its unique design makes it an exceptional standout.

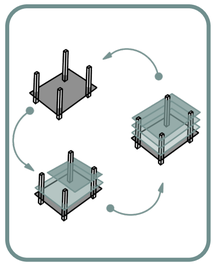




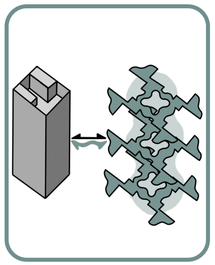
Recap



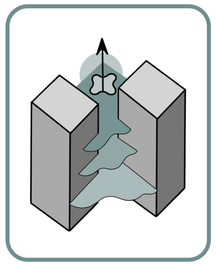
INTERACTION BY
CONNECTION



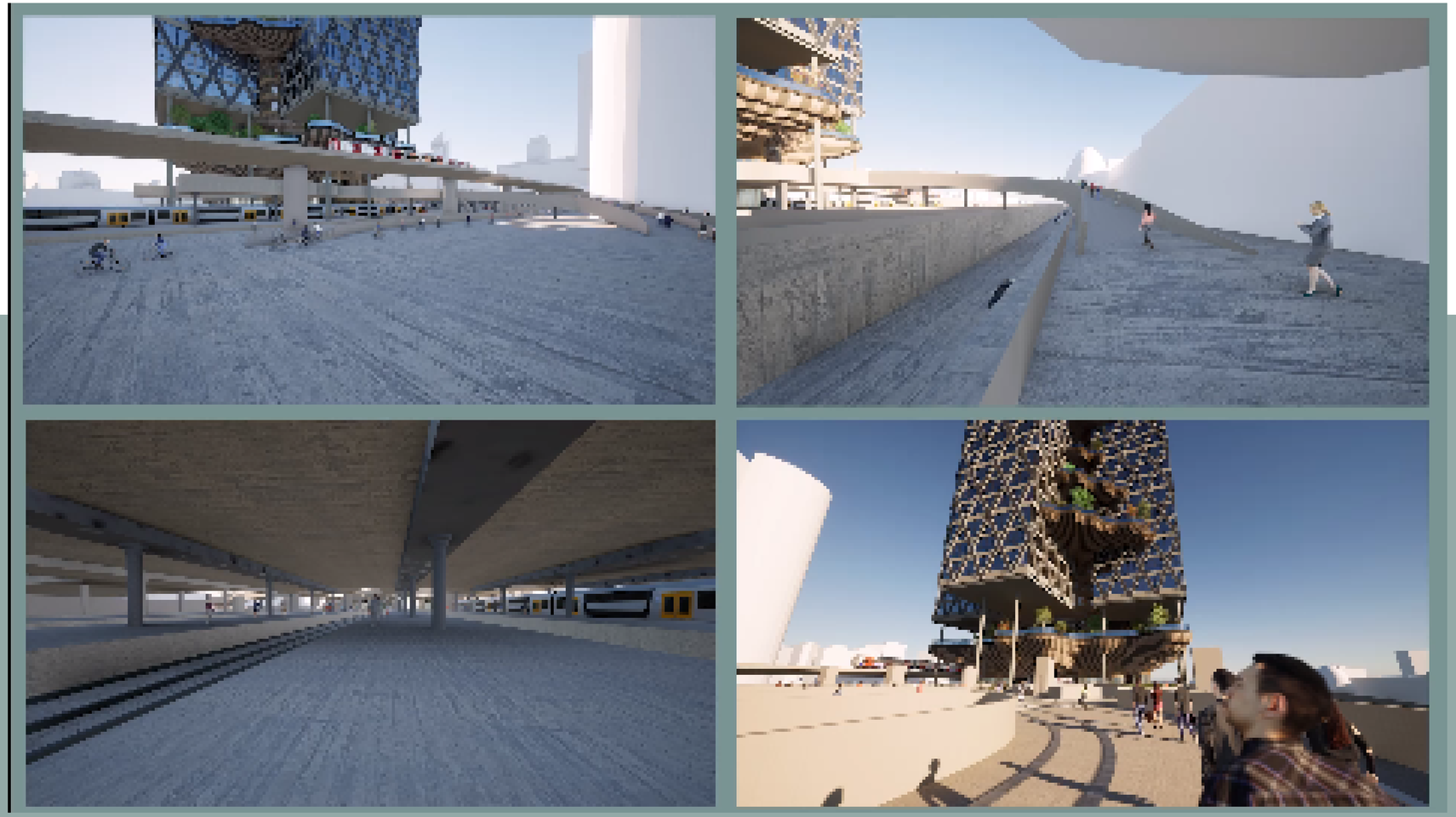
INTERACTION BY
FLEXIBILITY



INTERACTION BY
CONTRAST



INTERACTION BY
NATURE



END

THANK YOU!