

**Reimagining Dubai's
Underused Public Spaces**
for Climate and Social Responsiveness

P5 Presentation TU Delft
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Introduction

genesis of research

The genesis of this research stems from personal experience of living in a global city, then uncovering the environmental, social, and economic challenges posed by car-centric urban design, particularly in rapidly developing cities like Dubai.

Dubai and Singapore both **utilize economic-driven urban planning models**, but they have tailored their approaches to fit distinct goals and regional contexts.



Singapore (Source: Singapore Business Review)



Dubai (Source: Dubai Zipline)

“Wasted” Infrastructure

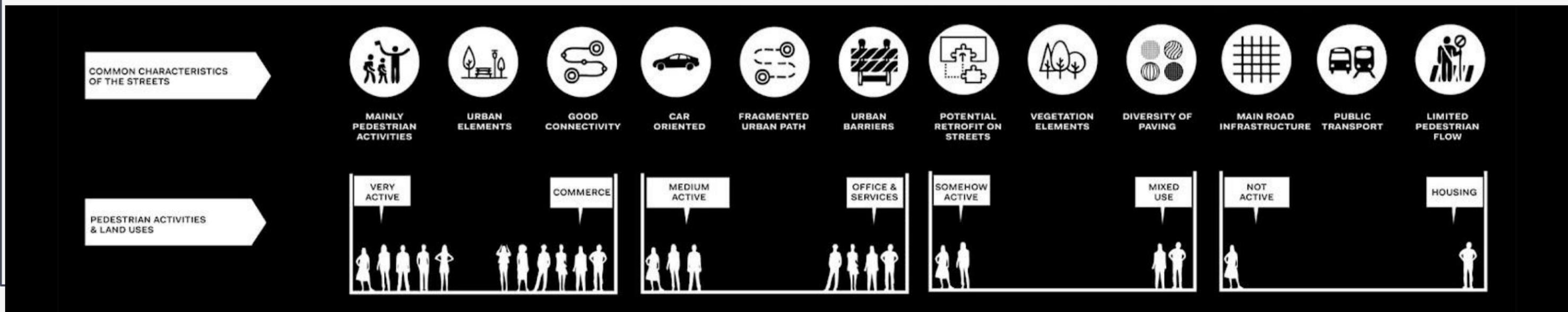
Dubai’s urban development has prioritized iconic architecture and infrastructural growth designed for affluent citizens and expatriates, while leaving lower-income areas, particularly those inhabited by migrant workers, in substandard conditions.



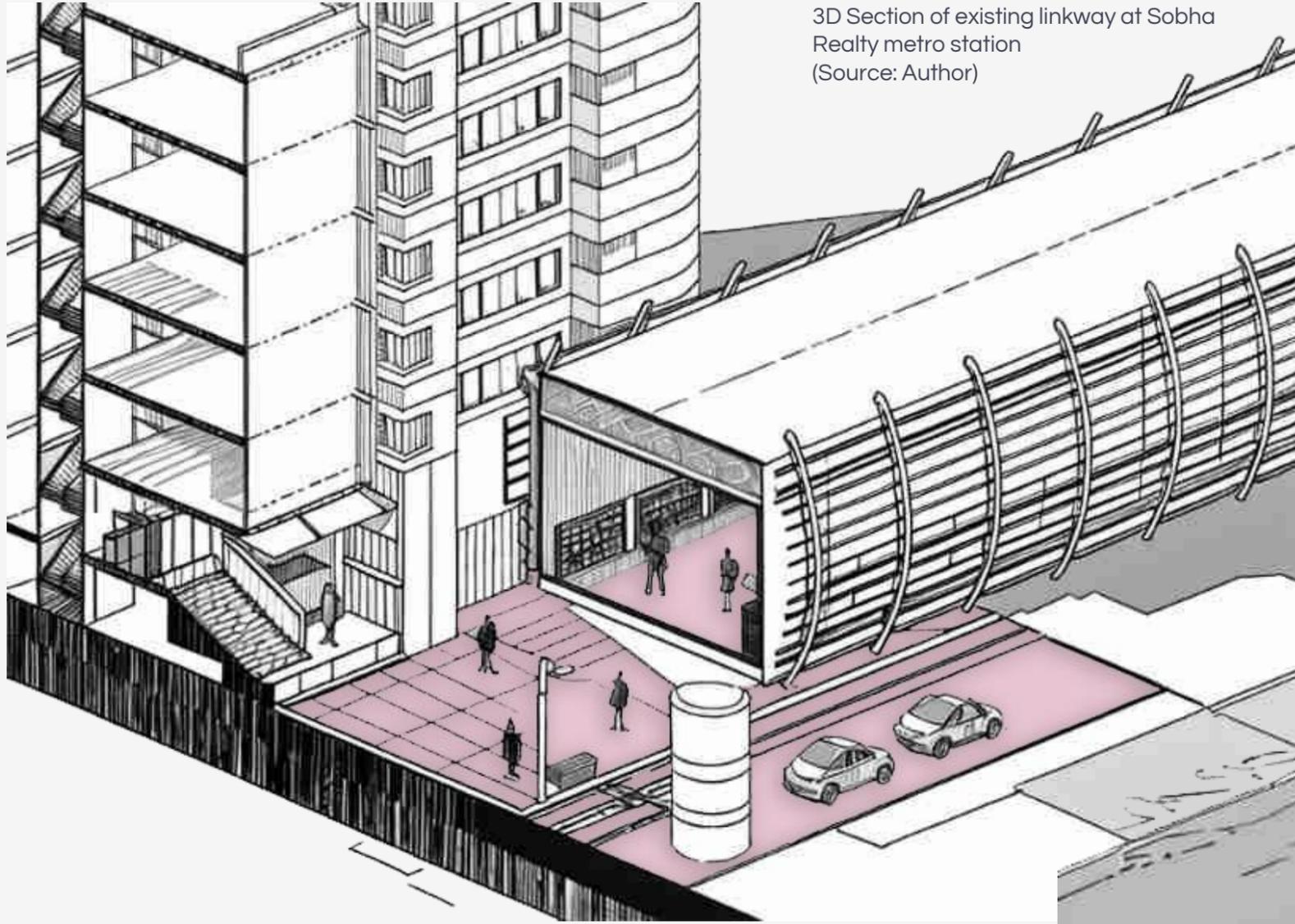
Abundance of linkways and empty pavements

On a broad scale, they occupy a huge area on the map. In a close-up look, they are not fully utilized as there is a lack of accessibility and the full usability of the space is not realized.

Dubai’s street analysis (Souce: Transform Transport, a non-profit research foundation)

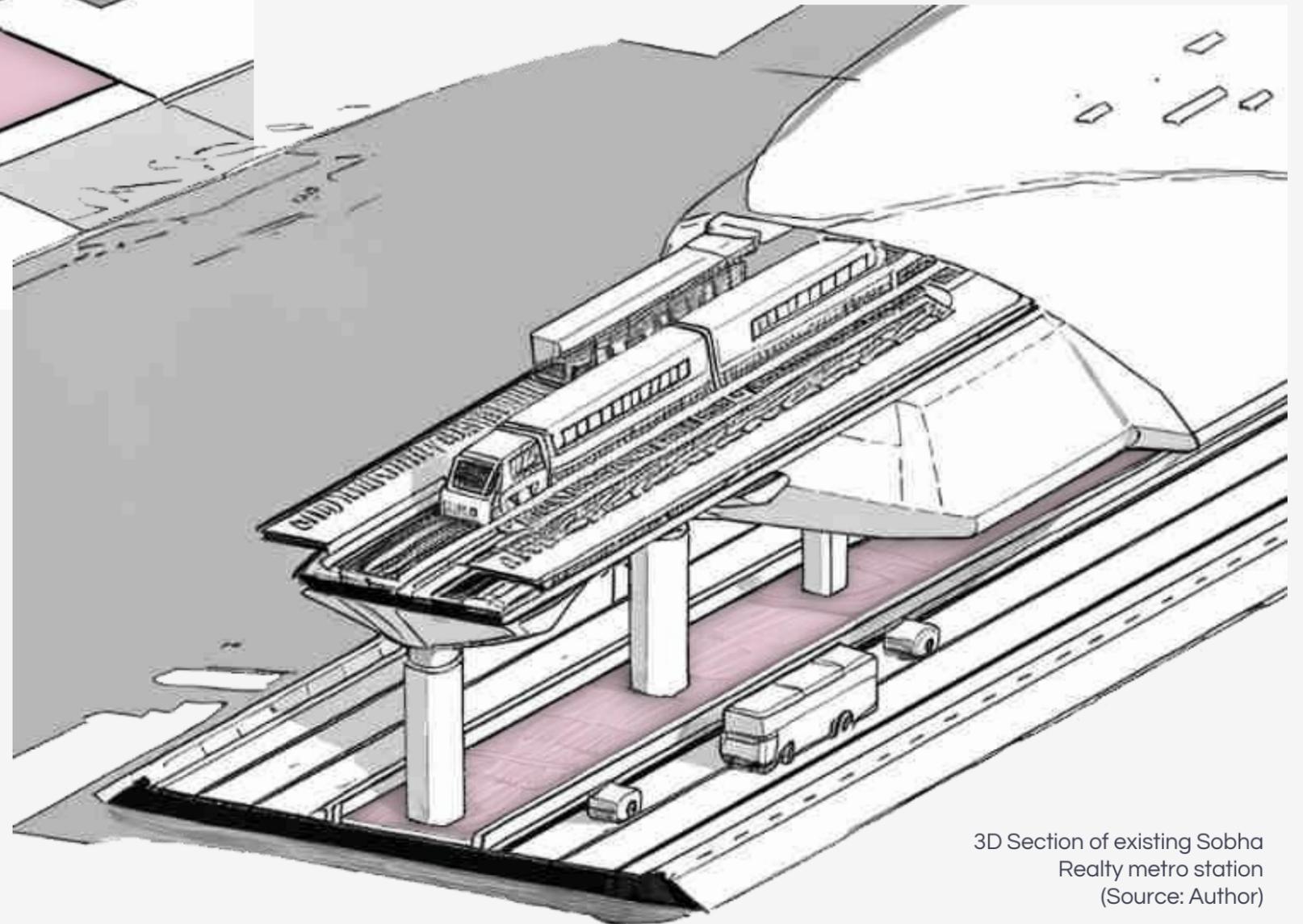


3D Section of existing linkway at Sobha Realty metro station
(Source: Author)



underutilised pocket spaces

The increasingly **fragmented urban language** of the city has interrupted the connection between the built environment and the people.



3D Section of existing Sobha Realty metro station
(Source: Author)

design ideology

The proposed design aims to transform underutilized public spaces at Sobha Realty Metro Station into an interconnected, climate-sensitive **“inverted green deck.”**

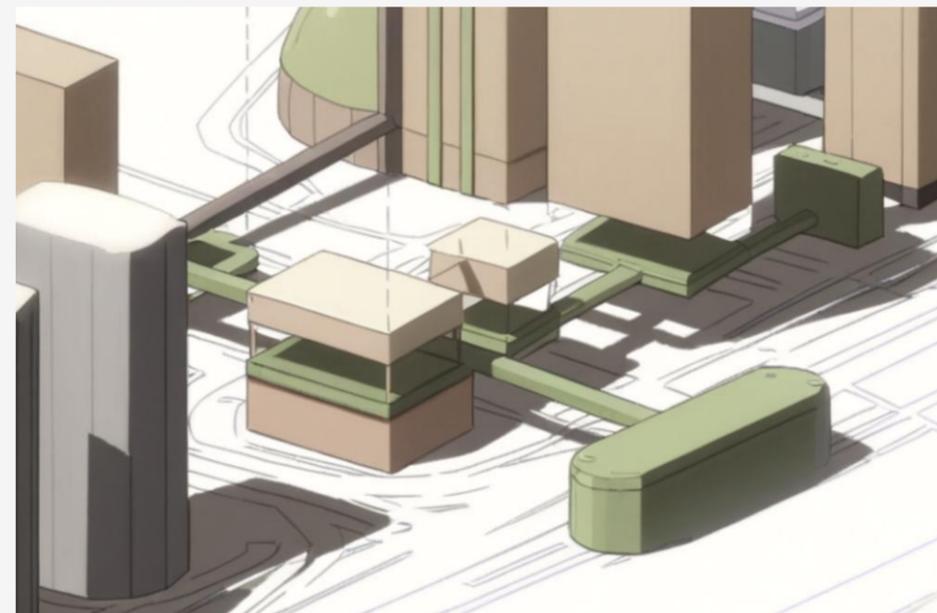
Unlike traditional green decks that are fully exposed to the sun and sheltering the cars, this proposed intervention **capitalizes on sheltered areas** such as linkway bridges, spaces underneath metro tracks, and indoor building zones to create indoor pathways optimized for thermal comfort and greenery.

It is presented as a form of escape and sanctuary from the city within itself.

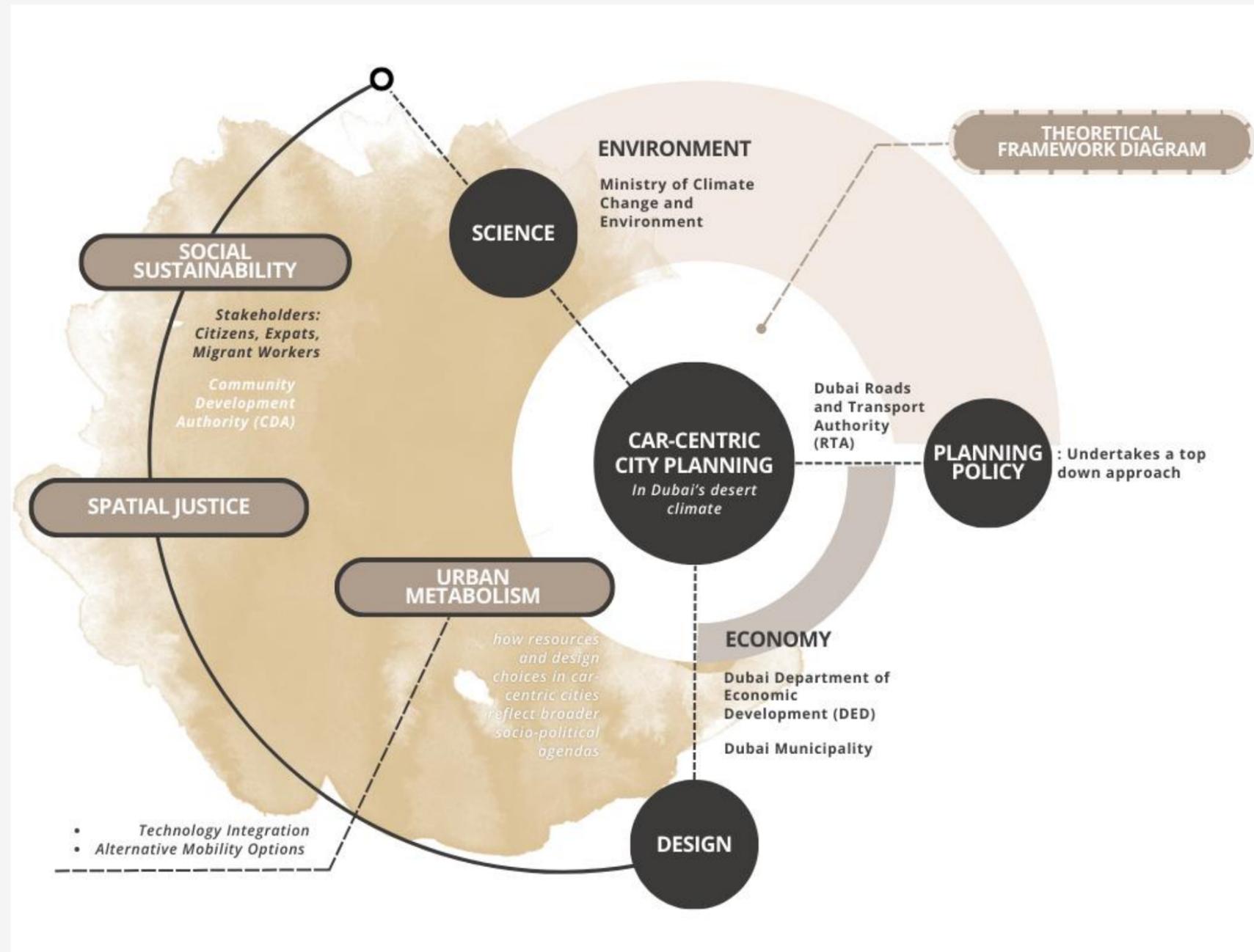
Traditional Green Decks:



Conceptual Inverted Green Deck:



theoretical framework



Social Sustainability

Social sustainability focuses on creating equitable, inclusive urban environments that promote social cohesion, equal access to resources, and the well-being of all residents. (Kanna, 2011).

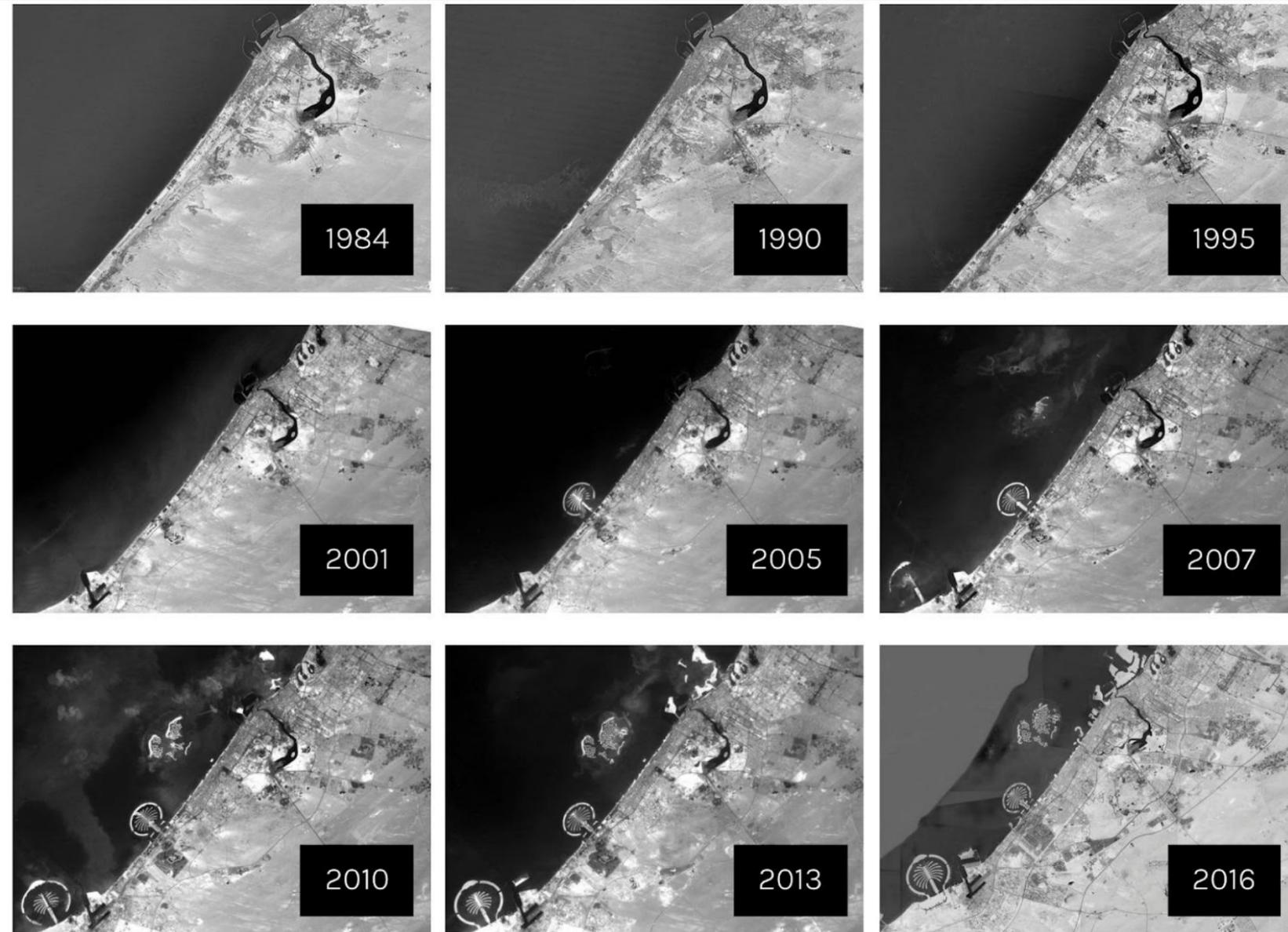
Spatial Justice

Henri Lefebvre's concept of *The Right to the City* asserts that all urban inhabitants, including marginalized groups such as Dubai's vulnerable working class, should have the right to participate in and shape the urban environment (Butler, 2012).

Urban Metabolism

It looks at how a city's infrastructure, resources, and energy flow interact to support its functions and growth. In Dubai's case, its infrastructure shapes the physical city and influences global perceptions (Easterling, 2014).

rapid urbanism



Dubai's urban growth from 1960 to the present has been marked by rapid transformation driven primarily by the discovery of oil and subsequent economic diversification.

Decentralization of the city
=
Opportunity to strengthen and revive new neighborhoods

Sequence of Dubai's urban growth: 1970, 1990, 2000, 2005, 2008 and envisioned
(Source: NASA)

main transport lines

- sheikh zayed road
- red and green metro lines



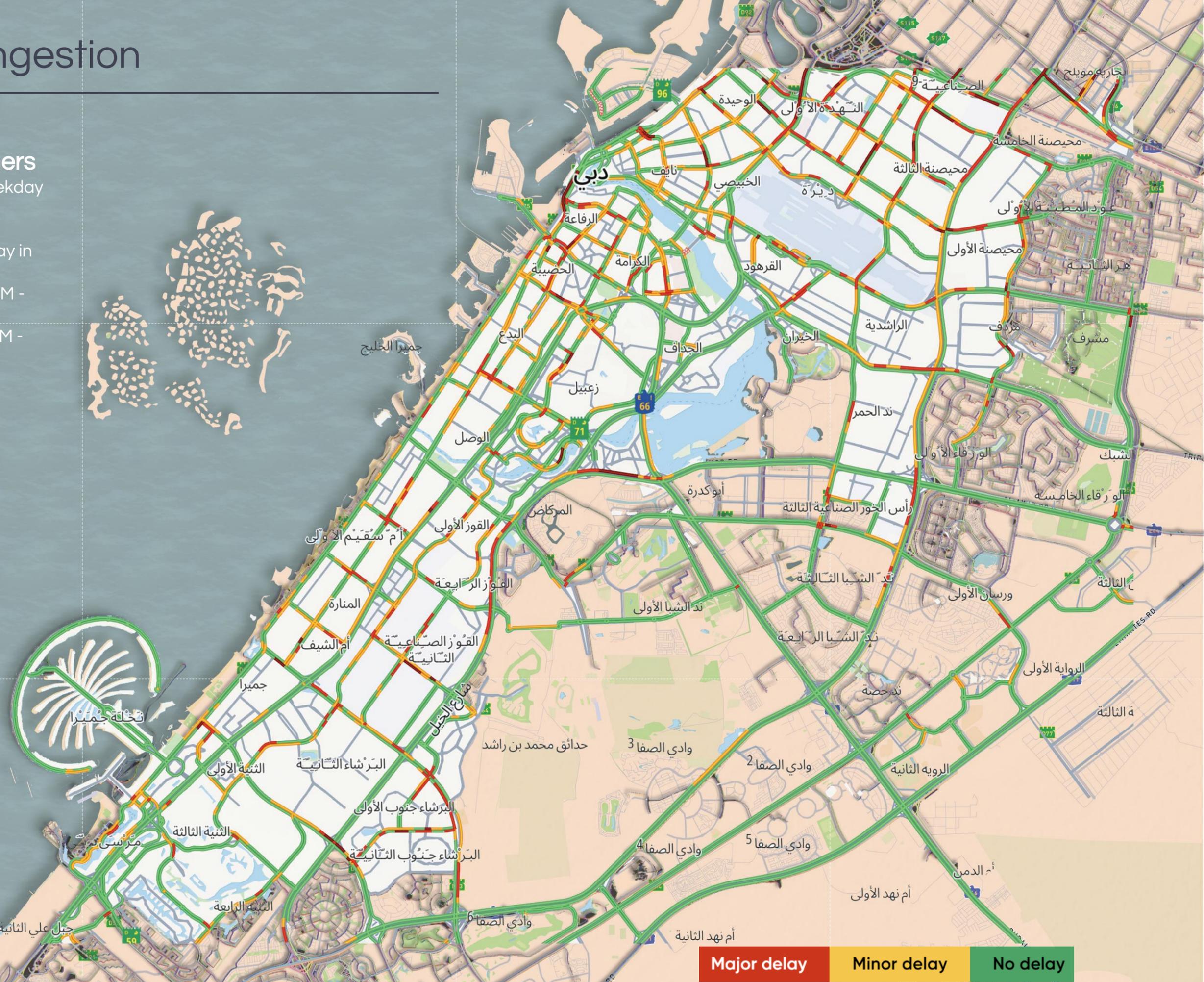
traffic congestion

seen mostly in
junctions & corners

(data collected on weekday
8:00 AM)

Busiest hours of the day in
Dubai:

- Morning Peak: 7:00 AM - 9:00 AM
- Evening Peak: 5:00 PM - 7:00 PM



Major delay Minor delay No delay

Source: TomTom Traffic Index

zoning and transport

- multi-district centre (mixed-use)
- national housing
- residential
- industrial
- tourism & resorts
- open space & recreation

The city's urban planning model, characterized by large-scale, segregated land uses such as distinct areas for residential, commercial, and industrial purposes limits connectivity and pedestrian access.

Average Rent:

Palm Jumeirah
AED 25,167

JVC
AED 6,988

Dubai Marina
AED 14,685

Business Bay
AED 12,277

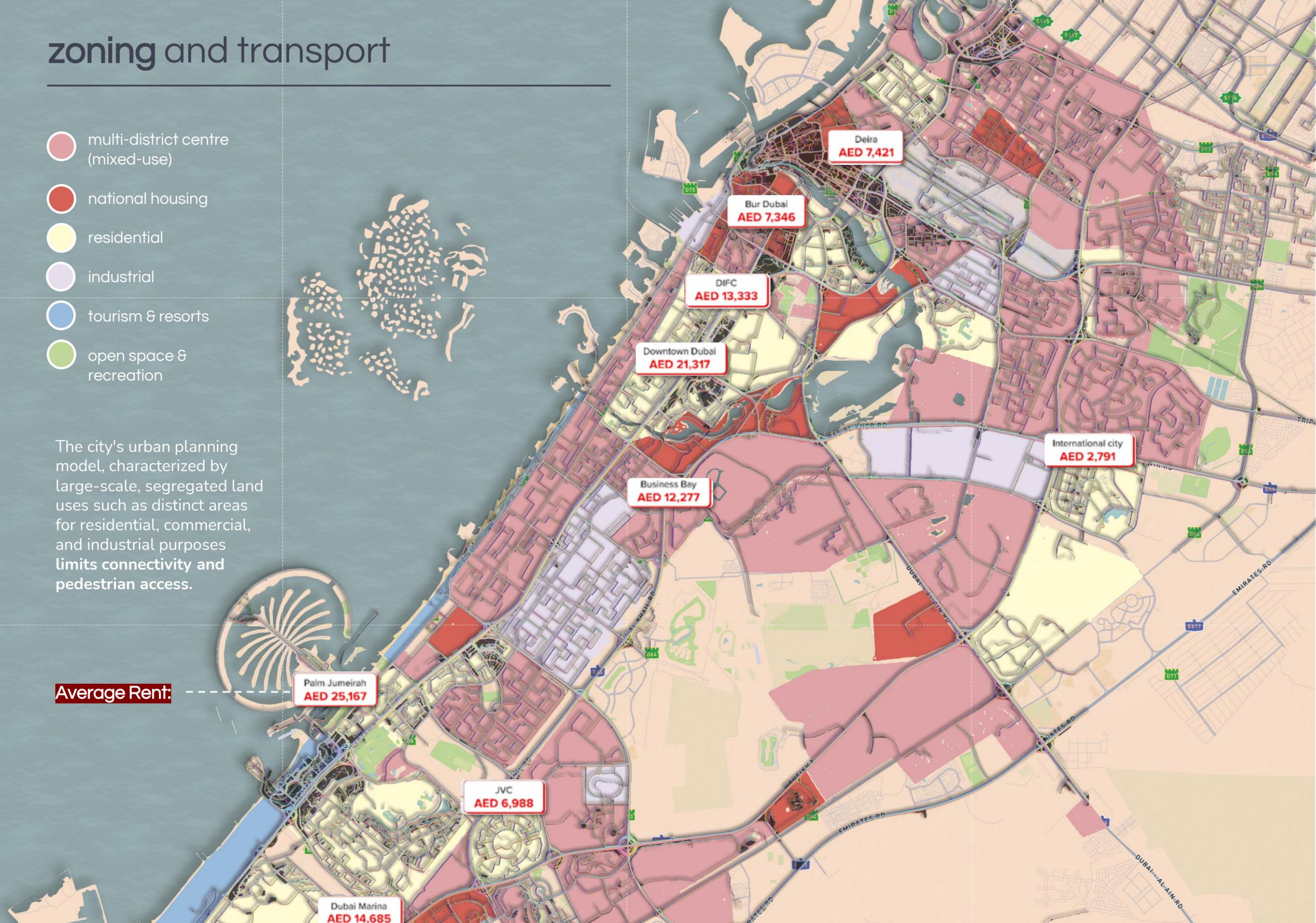
Downtown Dubai
AED 21,317

DIFC
AED 13,333

Bur Dubai
AED 7,346

Deira
AED 7,421

International city
AED 2,791



walkability in dubai

While central areas and tourist spots like Downtown Dubai and the Palm Jumeirah feature pedestrian-friendly spaces, many parts of the city, particularly in suburban and residential zones, lack proper sidewalks, crossings, and pedestrian infrastructure.

**AL SEEF,
OLD CITY, THE CREEK**

**BURJ KHALIFA,
DOWNTOWN DUBAI**

**MALL OF THE
EMIRATES**

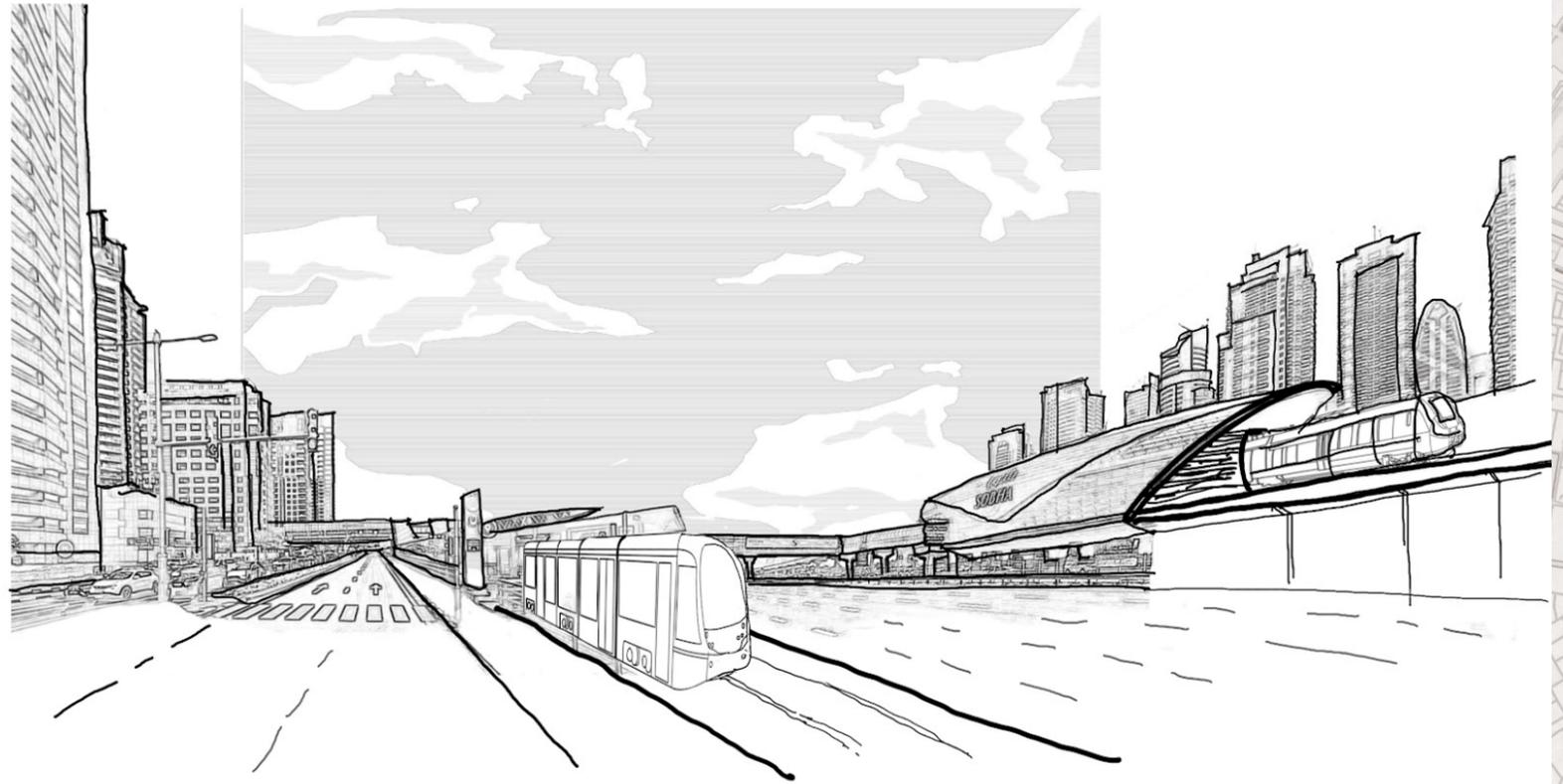
JUMEIRAH RESIDENCE



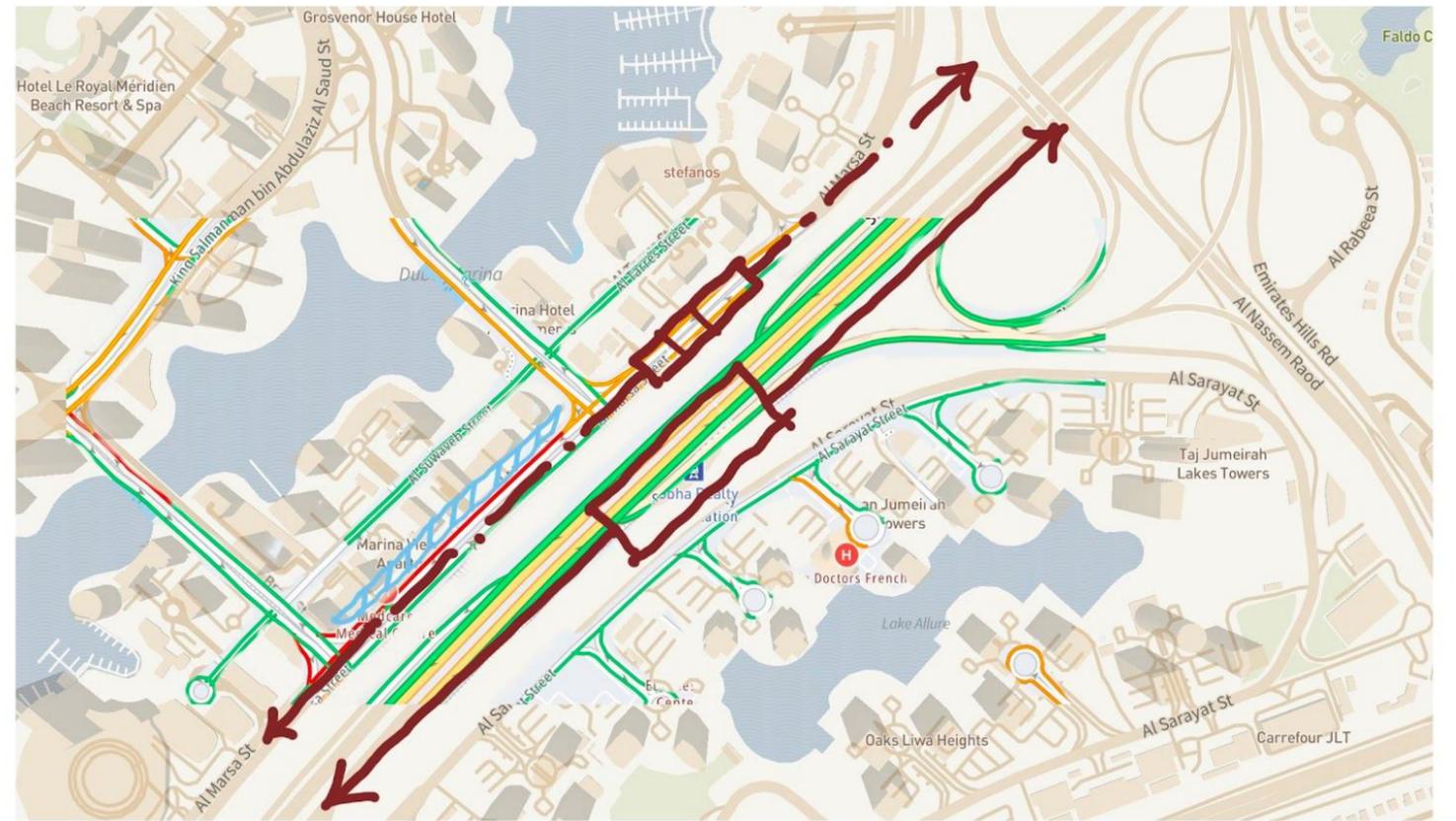
sobha realty metro station



SOBHA REALTY METRO STATION



Source: Author



Source: Open Street Map, edited by Author



Areas with higher pedestrian activity



Percentage breakdown of amenities in the area:

- Parks and Recreation: 25%
- Shopping Centres: 20%
- Restaurants and Cafes: 15%
- Healthcare Facilities: 10%
- Educational Institutions: 10%
- Public Transport Facilities: 10%
- Gyms and Fitness Centres: 5%
- Entertainment Venues: 5%

Source: Author

site elevation–materials & facade visual analysis

International architecture style: a mix of modern construction materials commonly used in high-rise architecture.

Source: Google Earth, collage by Author

1. Glass Curtain Walls

– Many of the buildings have reflective or tinted glass facades.

2. Aluminum Cladding

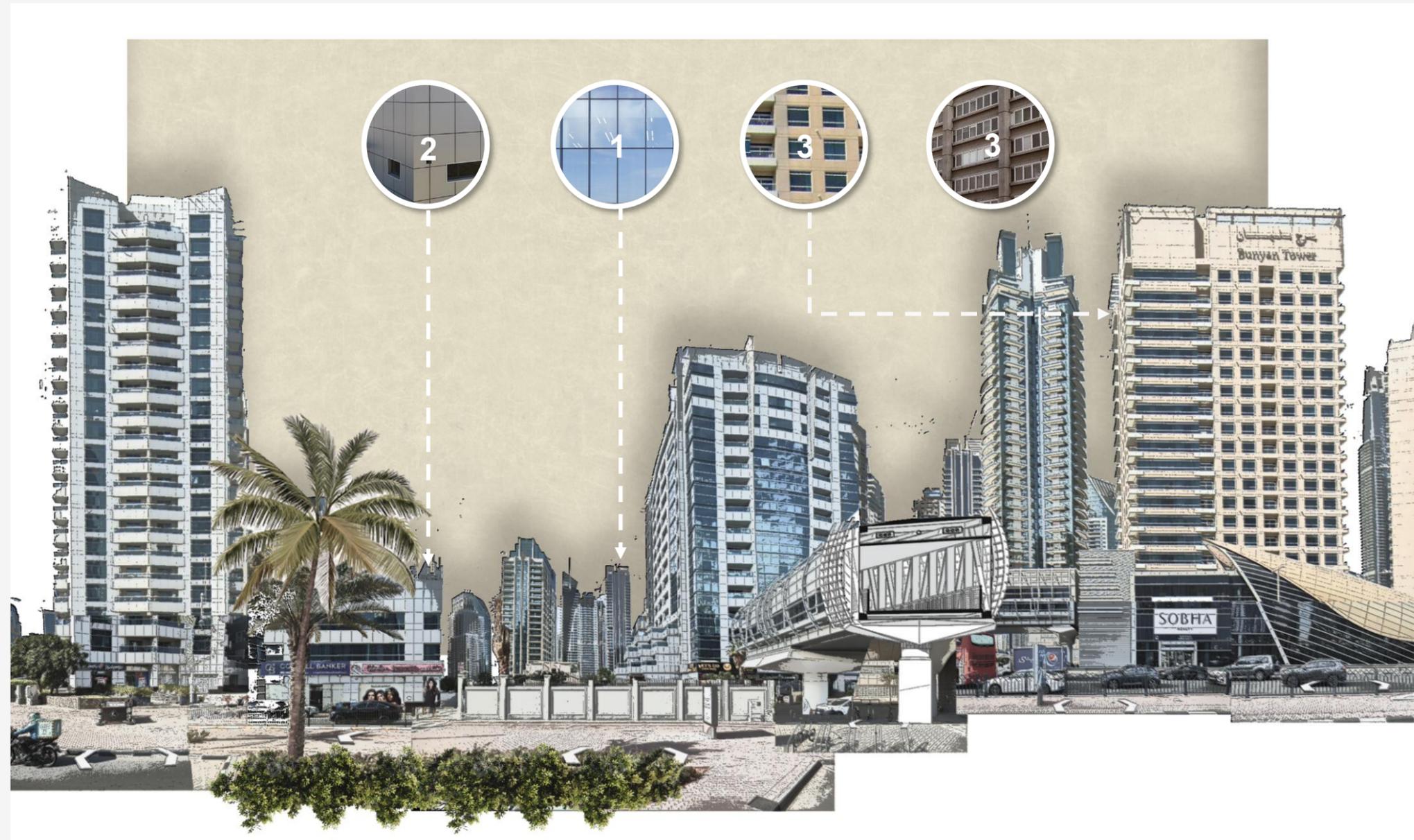
– Used in combination with glass, aluminum panels.

3. Concrete and Precast Panels

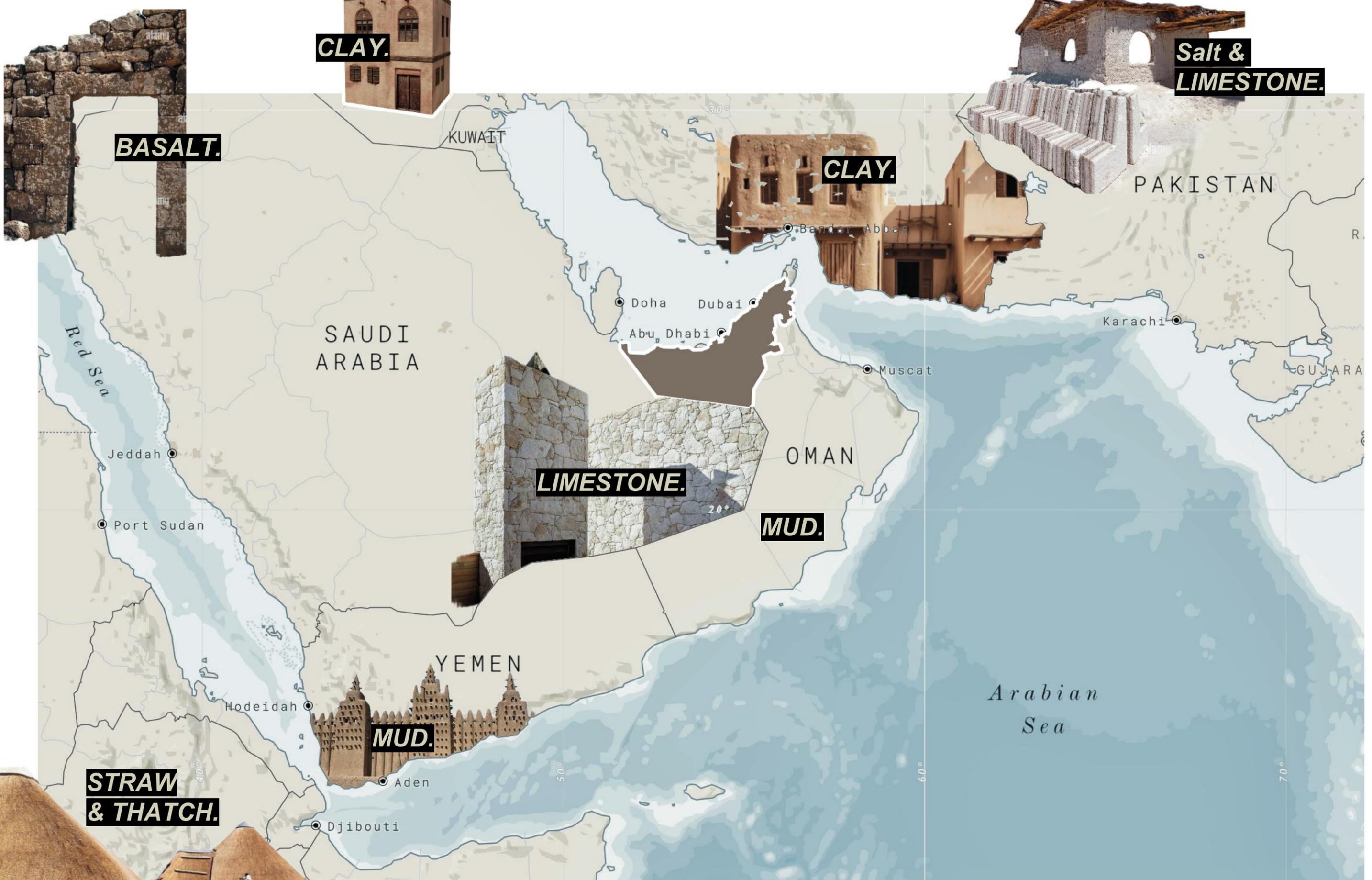
– Some buildings, particularly the beige-colored ones (e.g., Banyan Tower), appear to use concrete or precast panels.

4. Steel Structures

– Elements such as metro station features, pedestrian bridges, and some facade elements incorporate steel for strength and support.



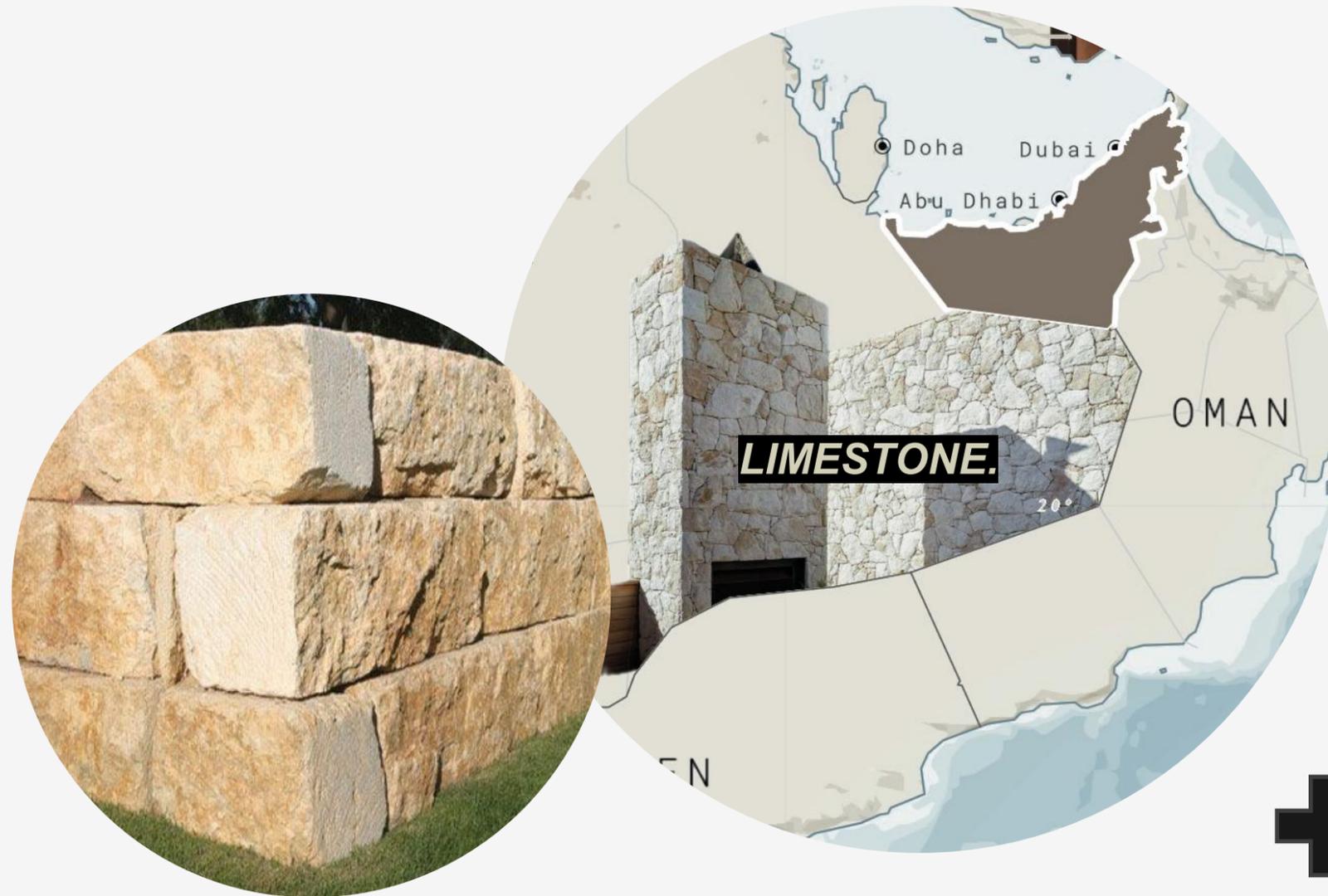
Some roadside planting, minimal trees (palm trees)



material map of the middle east

Source: Google Earth, collage by Author

use of local material: limestone



Limestone is commonly found in Saudi Arabia and within the Middle East region

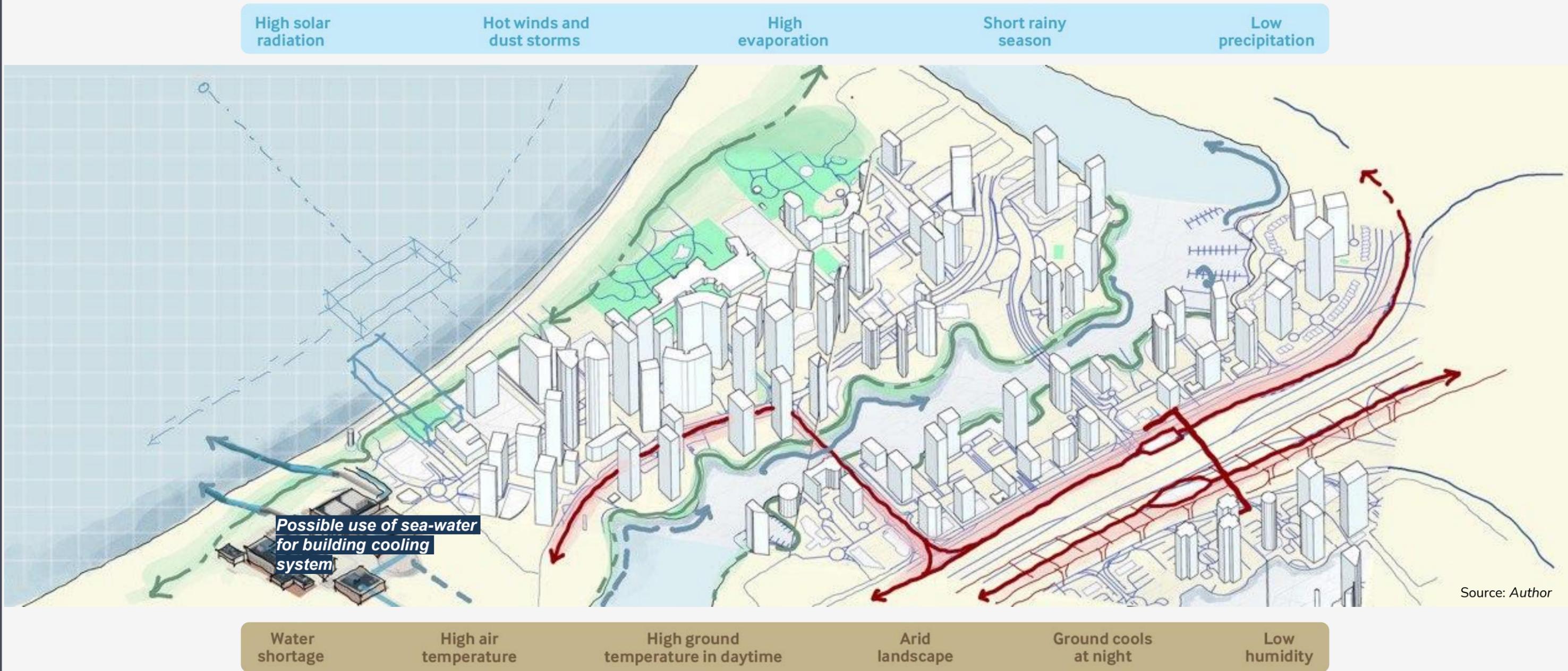
Timber as another primary building material: mainly sourced from Iran and Turkey



use of local material: limestone

Advantage	Description
Thermal Insulation	Helps to keep interiors cooler
Heat Resistance	It doesn't absorb or retain excessive heat
Durability	Withstands harsh sun, sandstorms, and temperature fluctuations
Low Maintenance	Resists wear and staining in dry climates; easy to clean
Aesthetic	Light, natural tones complement Dubai's architecture and reflect sunlight
UV Resistant	Doesn't degrade or discolor easily under intense UV exposure
Sustainable	Locally available in the region, reducing transport emissions
Slip Resistance	Textured finishes can provide traction in outdoors
Breathability	Porous structure allows for moisture regulation, preventing surface damage
Sound Insulation	Dense material helps in reducing outside noise, beneficial to site issues

sobha realty metro station—climate challenges



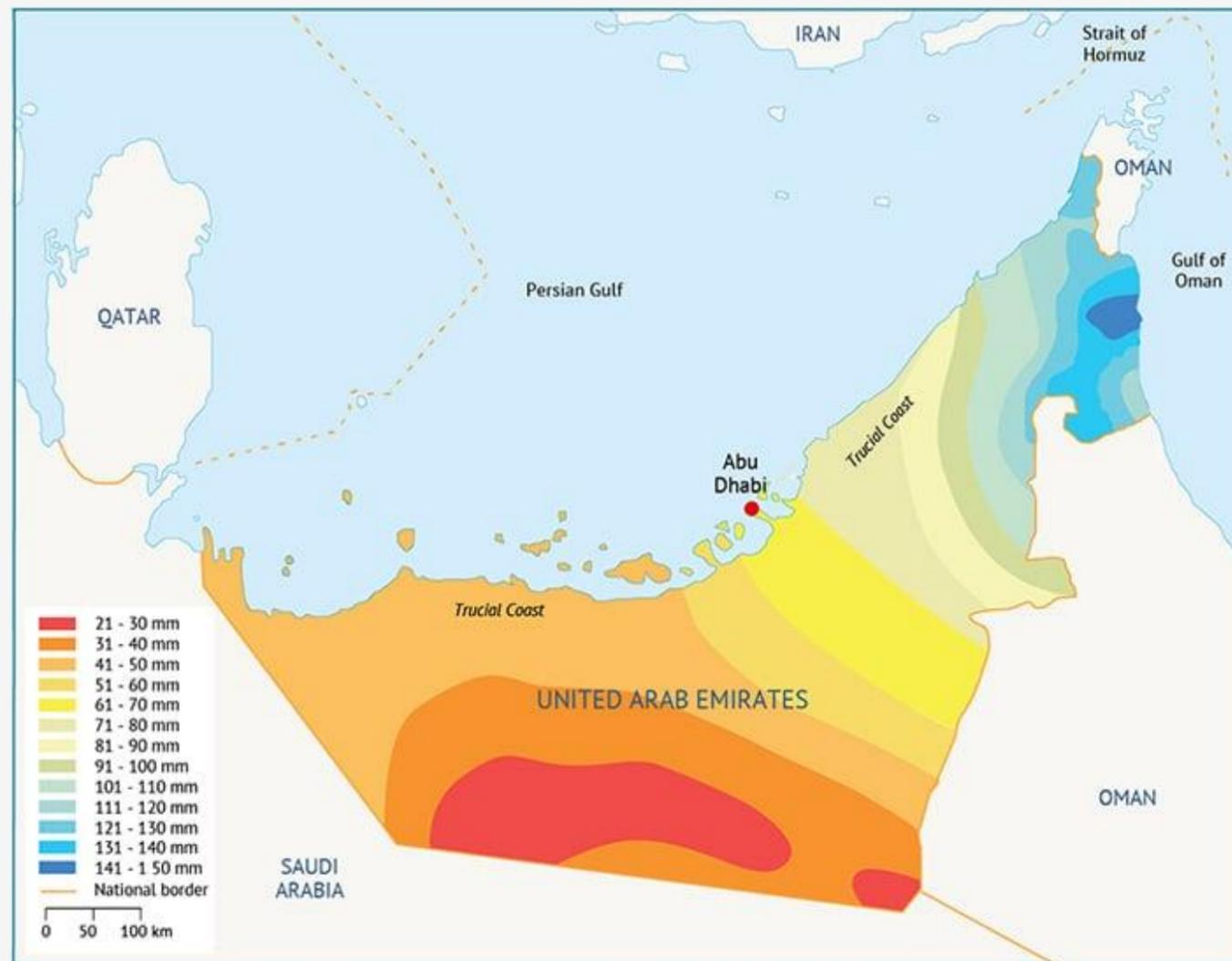
main challenges:

Thermal discomfort & heat stress is caused by high temperatures and high solar radiation

Green spaces are hindered by severe water shortages, extended hot summers, and potentially high evaporation

Compared to cities in temperate and tropical climates, cities in dry climates have more significant night-time **urban heat island effect**

rainfall coverage



Source: Ministry of Environment and Water, UAE State of Environment Report.

Table 1. Annual and average rainfall.[3]

	Area (km ²)	Variation in annual rainfall (mm)	Average rainfall (mm)	Volume (km ³ /year)
UAE	83,600	80-160	78	10

The average annual precipitation is illustrated in Map 2. Over 80% of the annual rainfall occurs during the winter (December to March). The mean maximum temperature reaches over 40°C in the summer and high relative humidity is more than 97%.

UAE's freshwater supply:

1. Desalination Plants

- Main source of water due to scarce freshwater resources.
- Dubai uses energy-intensive desalination to convert seawater into potable water.

2. Treated Wastewater

- Recycled water is used for irrigation, landscaping, and industrial purposes.
- Reduces dependency on desalinated water for non-potable needs.

3. Efficient Irrigation Systems

- Drip irrigation and treated water are used to sustain greenery in the desert climate.
- Helps reduce water wastage in landscaping.

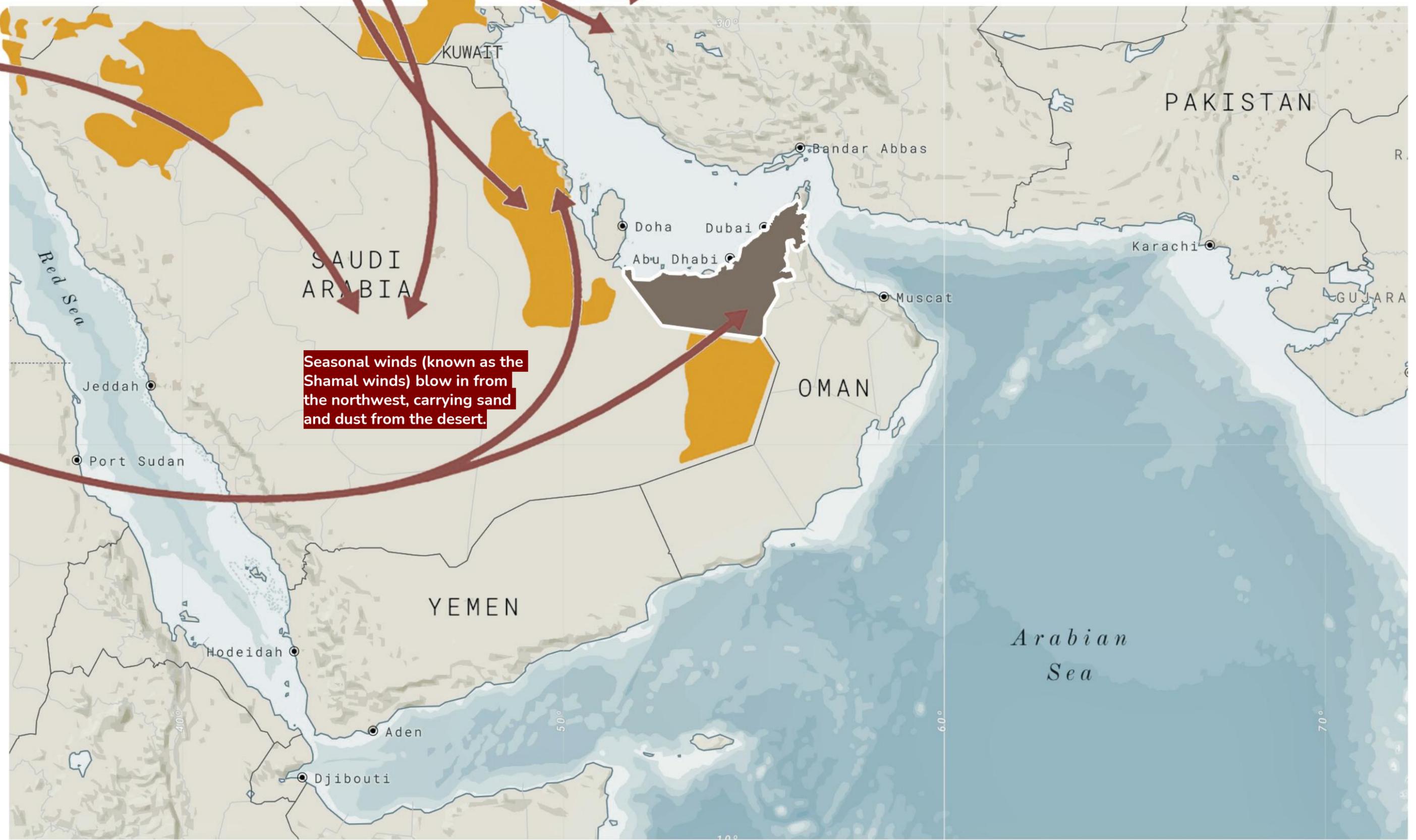
4. Groundwater Management

- Limited groundwater reserves are protected through conservation efforts and reduced extraction.

Sand and dust storms in Dubai are relatively common, especially during the transitional months from **March to May** and **September to November**.

■ Sand and dust storm sources **➔ Main storm paths**
Source: World Bank

The Economist

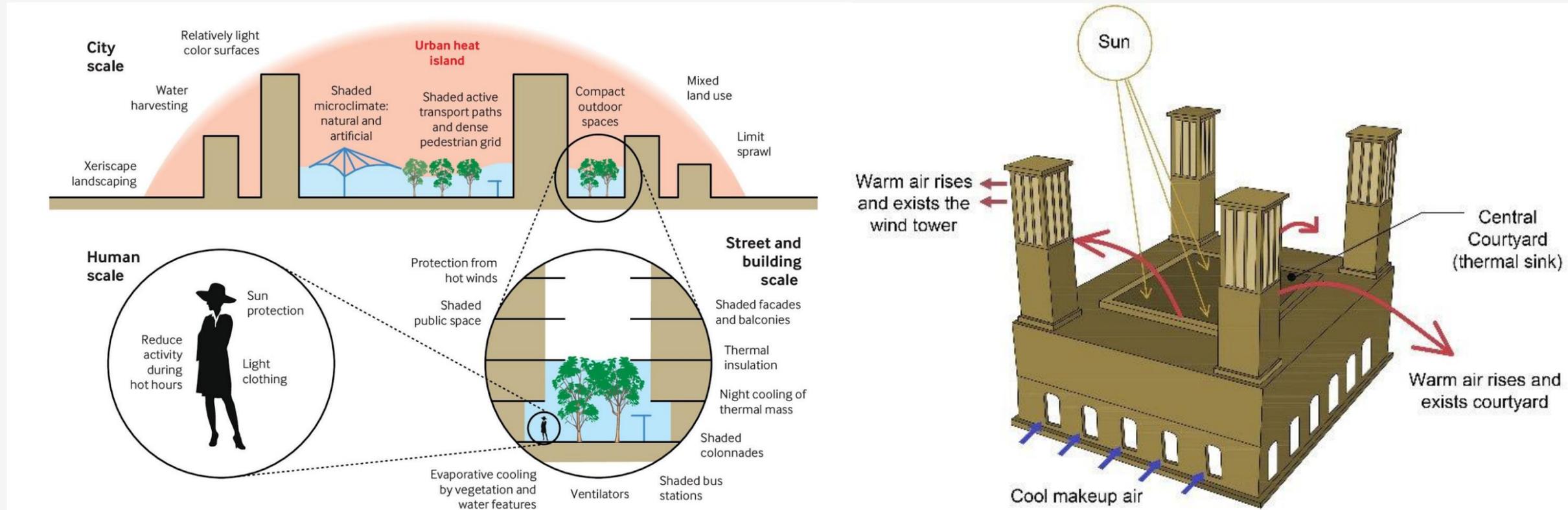


Seasonal winds (known as the Shamal winds) blow in from the northwest, carrying sand and dust from the desert.

climate – sand storms

These storms can vary from light dust in the air to more severe storms that affects air quality, transportation, and outdoor activities.

weather mitigation



Source: BMJ 2020

Source: Rashdan 2019

1. Courtyards (Sahn)

- **Central Space:** Traditional homes and mosques often feature an open-air courtyard at the center of the structure.
- **Microclimate:** Courtyards promote natural ventilation, creating a cooler environment by allowing hot air to rise and escape while drawing cooler air into shaded areas.
- **Privacy:** High walls around the courtyard ensure privacy, especially in family-oriented cultures.
- **Greenery and Water Features:** Often adorned with gardens, fountains, or pools, courtyards enhance thermal comfort and provide a tranquil ambiance.

2. Wind Towers (Barjeel)

- **Passive Cooling:** Wind towers are tall, hollow structures that funnel wind into interiors, effectively cooling the building.
- **Ventilation System:** These towers expel warm air while drawing in fresh air, often combined with underground cooling tunnels.
- **Cultural Identity:** Wind towers are iconic features of Gulf architecture, symbolizing ingenuity in sustainable design.

3. Thick Walls and Small Windows

- **Thermal Mass:** Walls made of mud, stone, or coral are thick to absorb heat during the day and release it at night, keeping interiors cooler.
- **Minimized Heat Gain:** Windows are small and often covered with wooden screens (mashrabiya) to limit sunlight while allowing air circulation

weather mitigation

use of succulents

Succulent plants thrive in intense, dry heat because they store water in their leaves, stems, or roots. climate



saguaro cactus

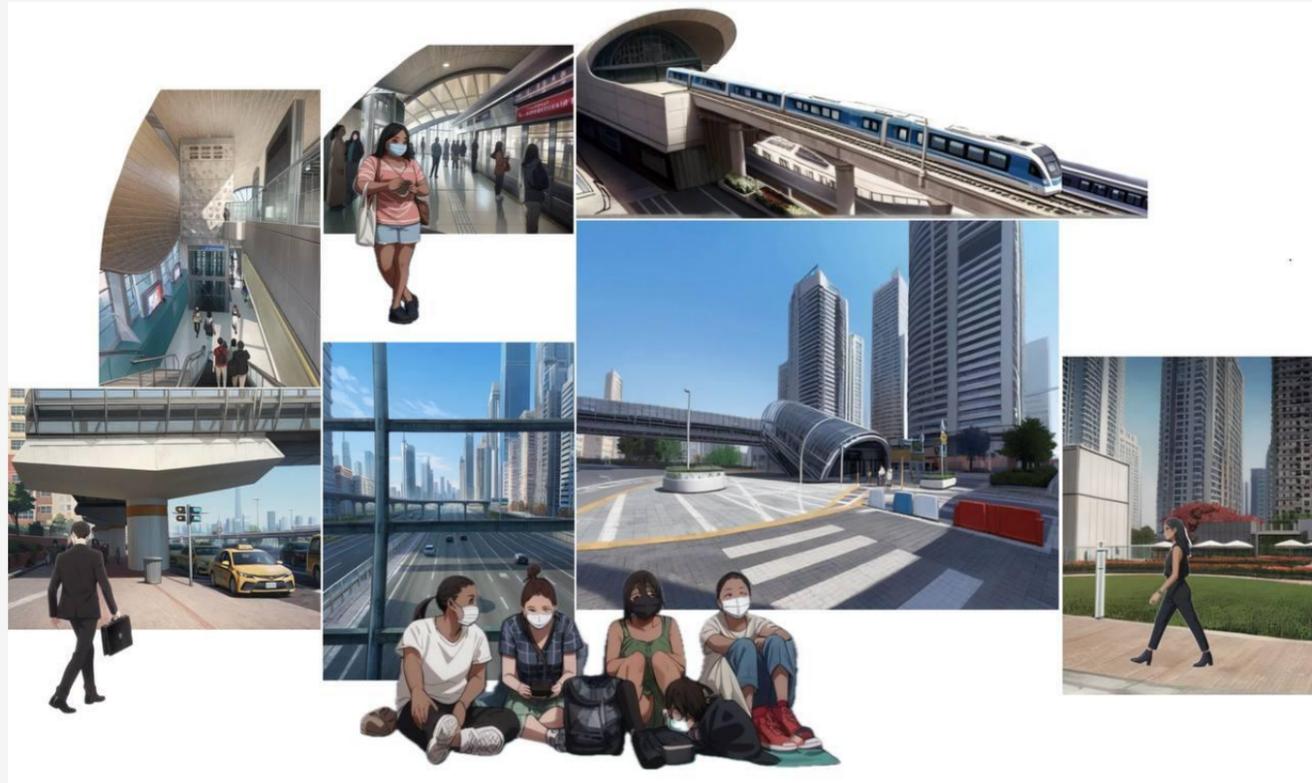


algave

trees native to Dubai



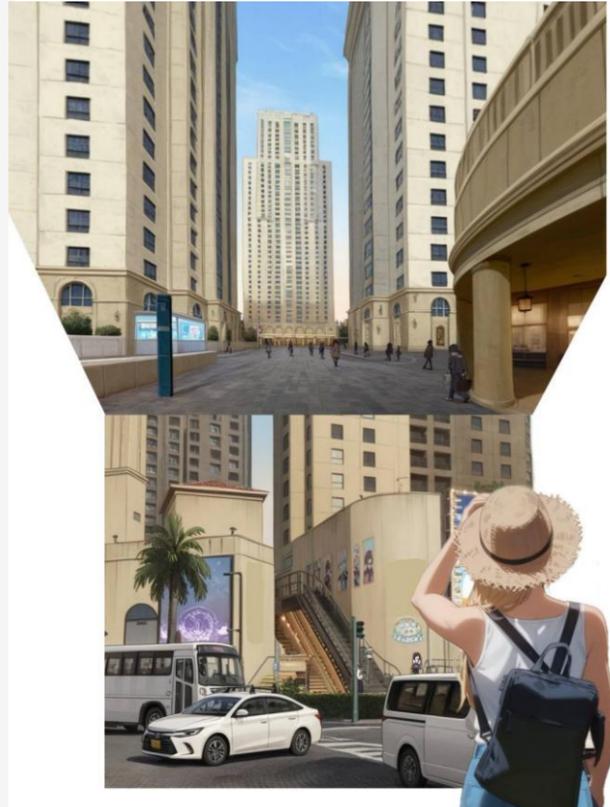
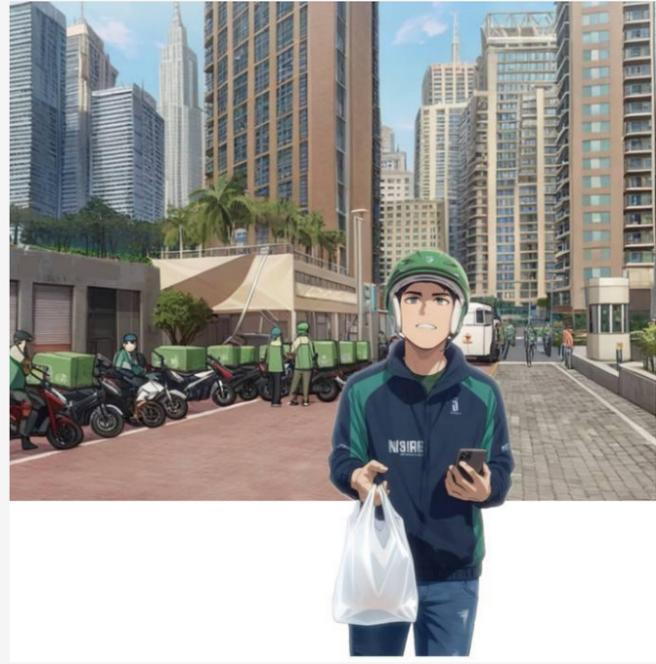
site visit and visual narrations



The spatial experience is purely transitional. But in these overlooked corners of pause where workers wait and lean and rest, there is the faintest flicker of place-making. A reminder that even in motion, people seek presence. And perhaps, by noticing these moments, by acknowledging the linkway not just as a route but as a space, the journey might once again come into focus



The irony is striking. In a district that markets itself on luxury and seamless convenience, this roadside scene reveals the machinery behind that promise, one made possible by the very people for whom the space provides nothing. The riders' presence is tolerated but unacknowledged, their needs invisible in the broader planning logic. And yet, they reshape the space through use, carving out a social zone in a setting that was never meant to accommodate them.



For the design of the inverted green deck, this becomes a moment of reconsideration. It reveals the delicate balance between spatial shelter and social engagement. Protection from climate does not automatically equal usability. Microclimate alone cannot generate community unless the space also facilitates encounters, offers programmatic flexibility, and feels embedded in a larger circulation pattern. It suggests that visibility, porosity, and continuity of movement must be integral to its design. If not, the intervention risks becoming an elegant but empty platform.

site demographics

Age Groups

- 0-14 years: 18%
- 15-24 years: 12%
- 25-44 years: 30%
- 45-64 years: 25%
- 65+ years: 15%

Employment Sectors

- Technology: 20%
- Healthcare: 15%
- Education: 10%
- Retail: 12%
- Manufacturing: 8%
- Finance: 10%
- Other: 25%

Indicates presence of working adults and families

55% of the population (25–64) is in their prime working years, suggesting high economic activity and a likely demand for office space, coworking, business services. These are potentially stable residents with purchasing power

Growing tech scene attracts a younger, educated, globally mobile population. This diversifies the city but may also lead to cultural shifts or gentrification. With the rise of digital nomads, remote work and startup culture enable global talent relocation, boosting demand for flexible housing and coworking spaces.



The urban block at Sobha Realty Metro in Dubai is a mature, economically active neighborhood with a strong presence of professionals, some families, and a notable aging population. It's not dominated by youth or students, which points to longer-term residents and high potential for stable urban development, mixed-use planning, and smart infrastructure.

work from home & co-working spaces

East Asian cities like Japan and Taiwan has pioneered the concept of coworking in metro stations and café spaces.

Global Trends in Remote Work (WFH) & Coworking Spaces

- Hybrid Work is Becoming the Norm
- Coworking Spaces Are Adapting & Growing Fast
- Tech-Driven & Flexible Workspace Infrastructure
- Wellness and Sustainability

Metro stations are often underutilized spatially, especially in non-peak hours. Embedding workstations activates these spaces, increasing foot traffic and supporting ancillary services (cafés, retail, etc.). Encourages a multi-functional use of infrastructure, aligning with smart city strategies.

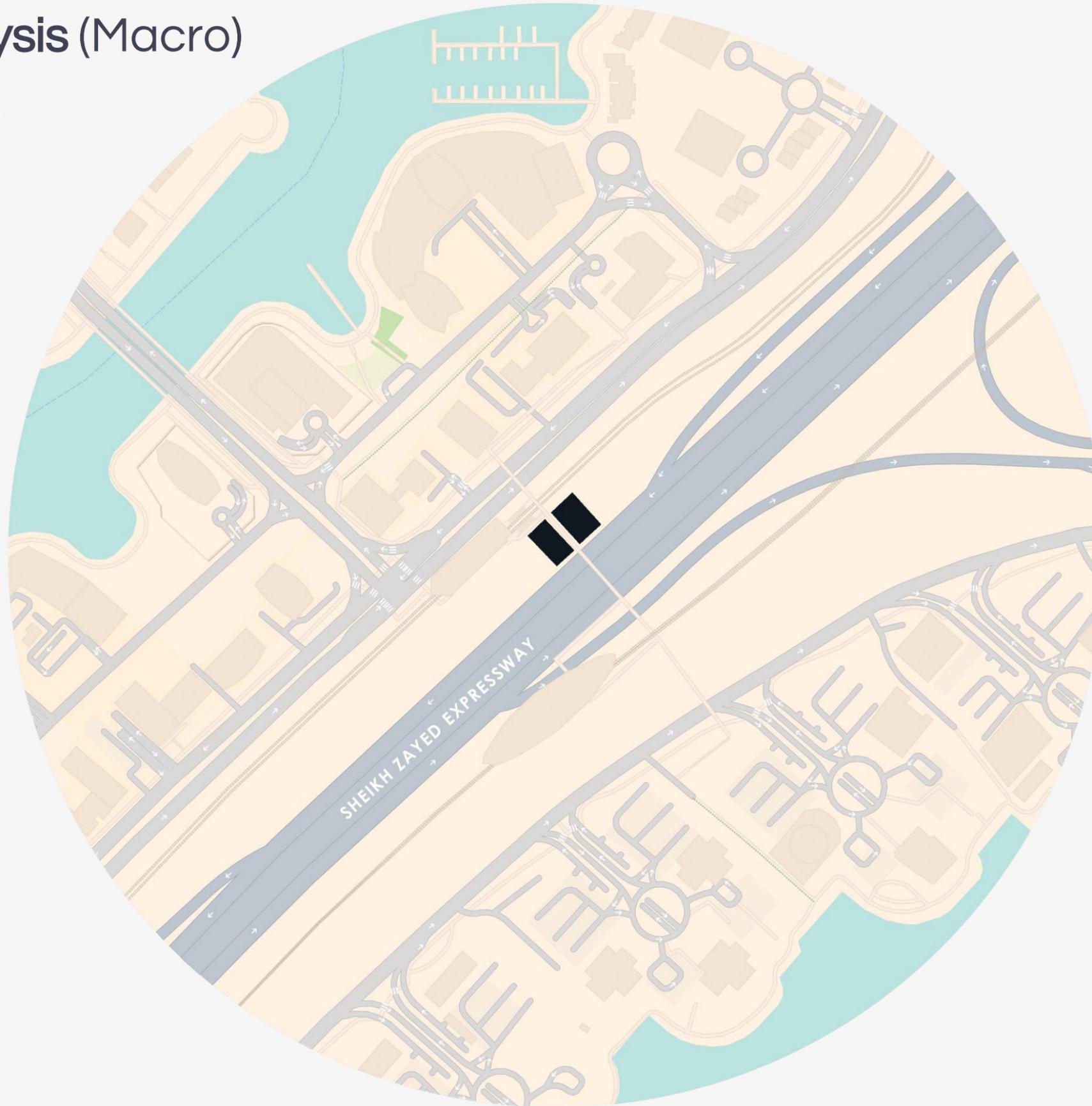
These workstations provides access to quiet, semi-private workspaces in high-density zones, including for people who may lack adequate space at home (e.g. shared apartments). It also activates public and semi-public spaces, fostering social interaction and community connectivity.





Site Analysis (Macro)

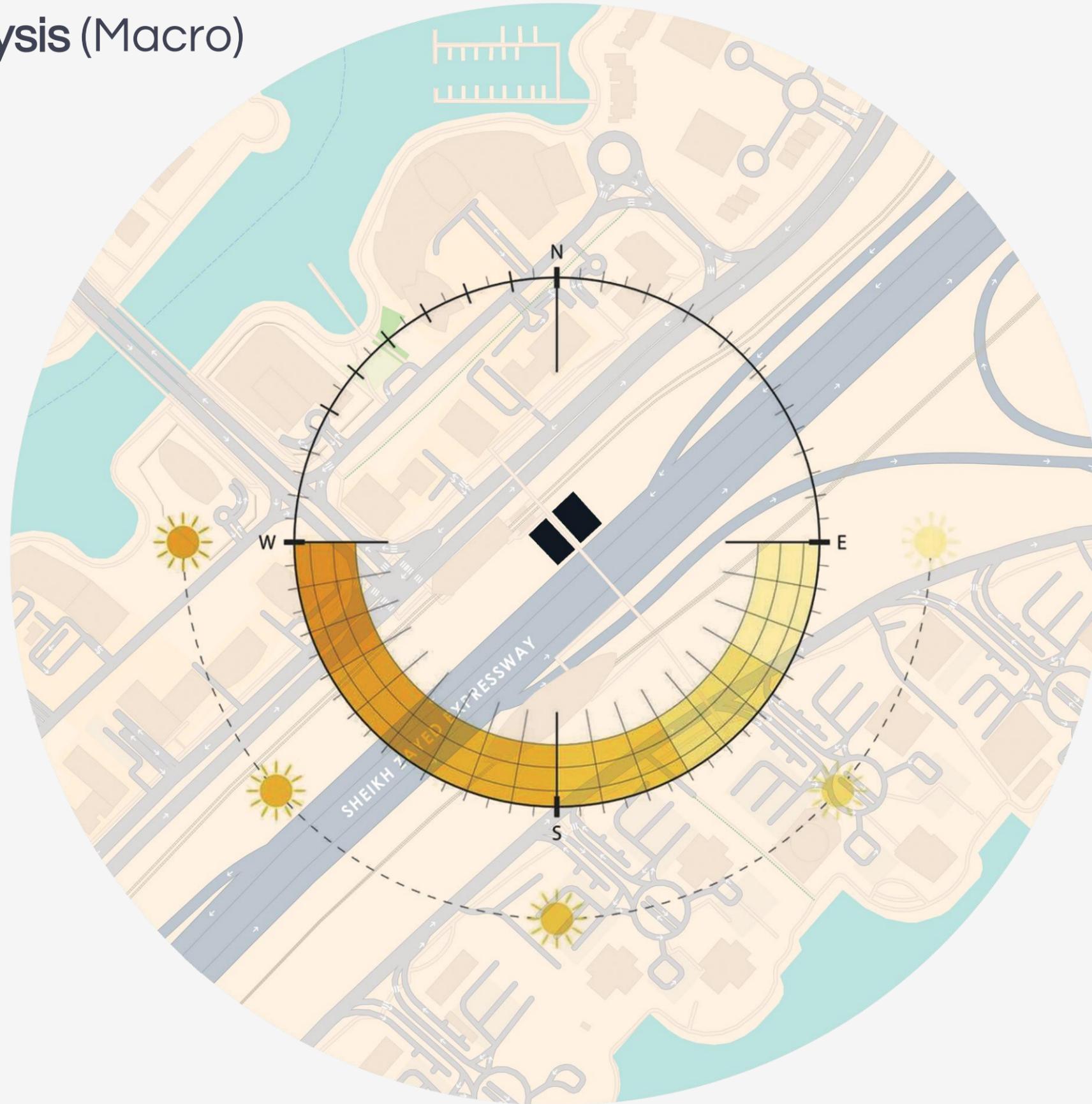
Types of Buildings:





Site Analysis (Macro)

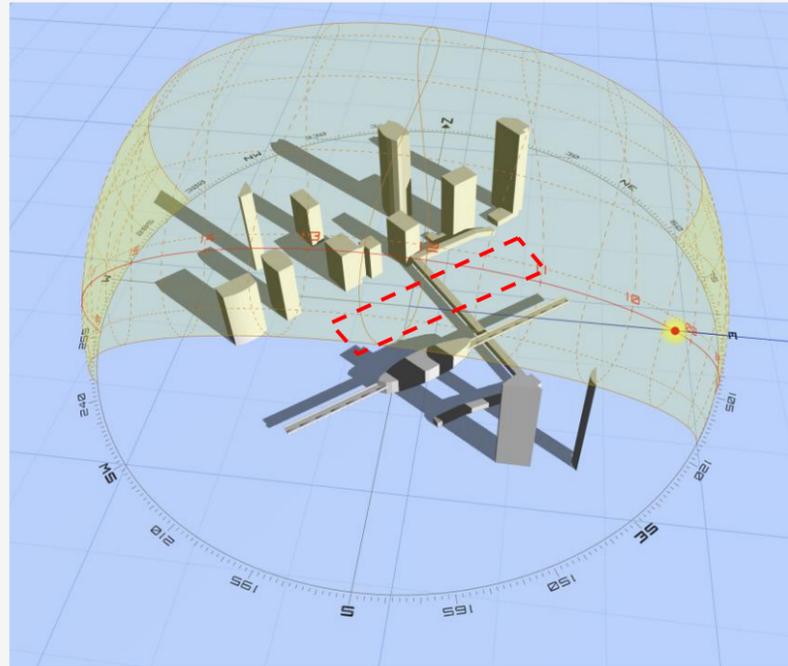
Sun Path



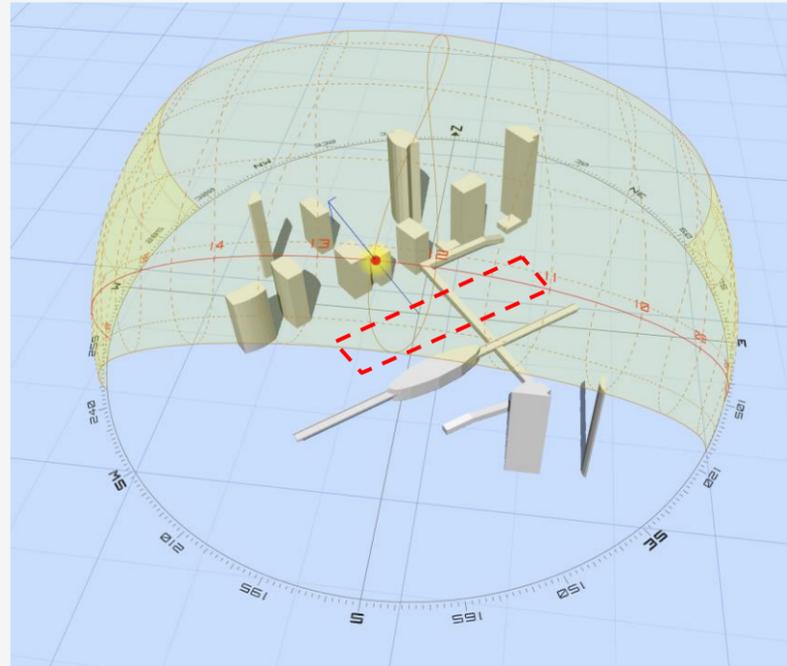
Site Analysis (Macro)

Shadow Studies

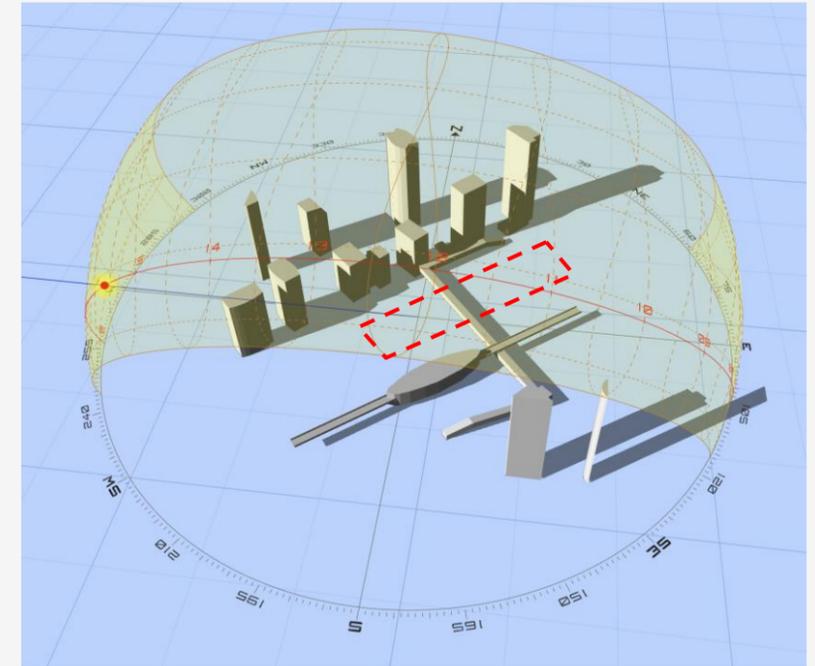
WINTER SOLSTICE
FEBRUARY



9AM

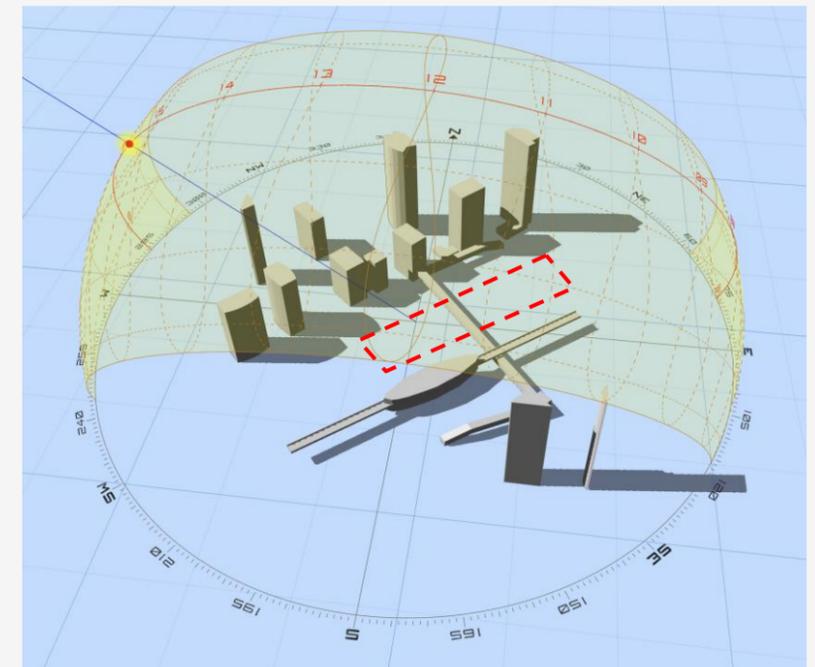
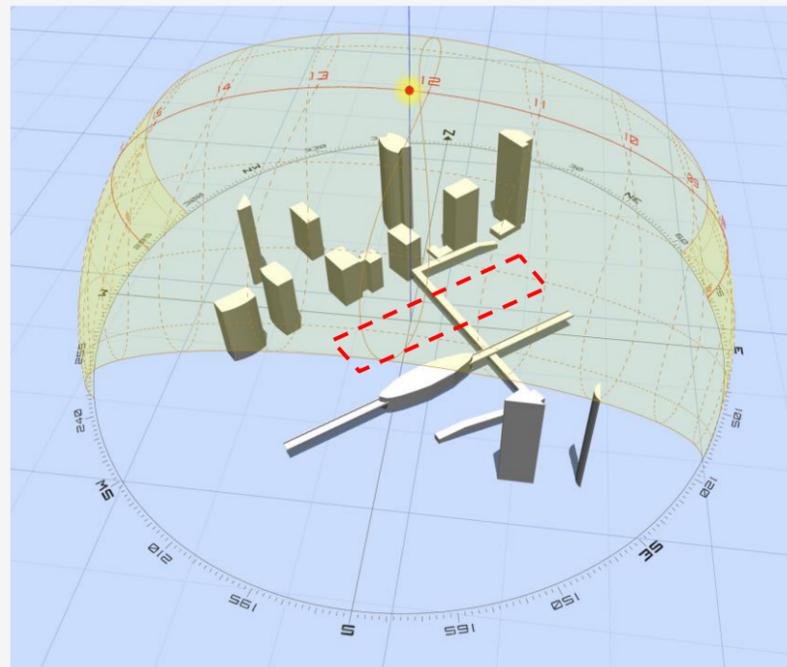
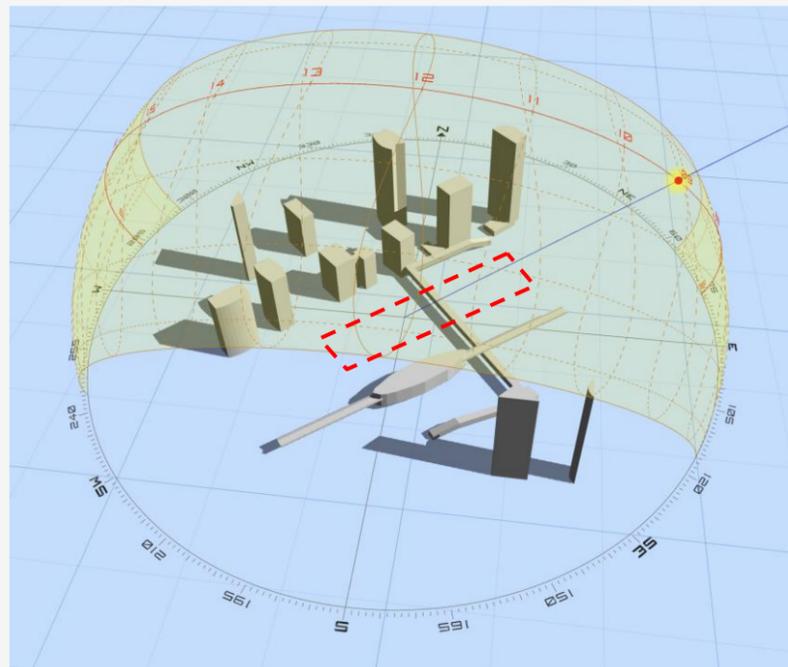


12PM



3PM

SUMMER SOLSTICE
AUGUST



Site Analysis (Macro)

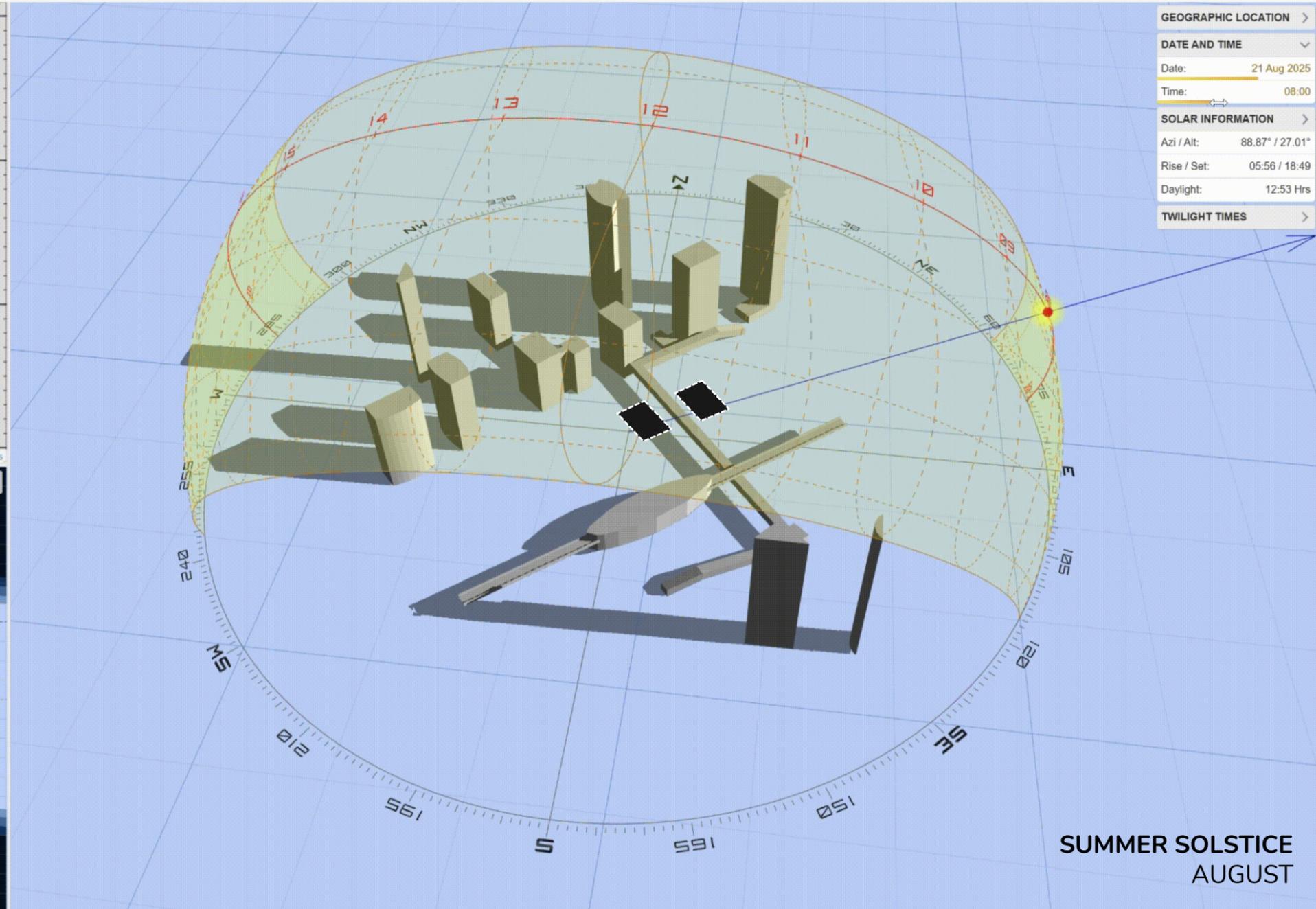
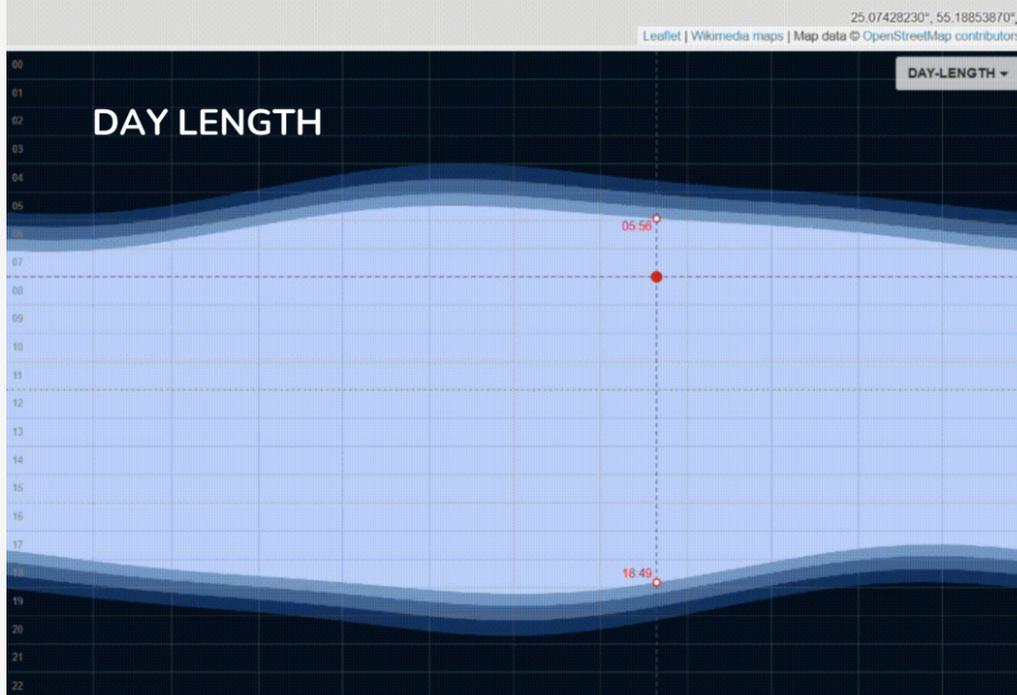
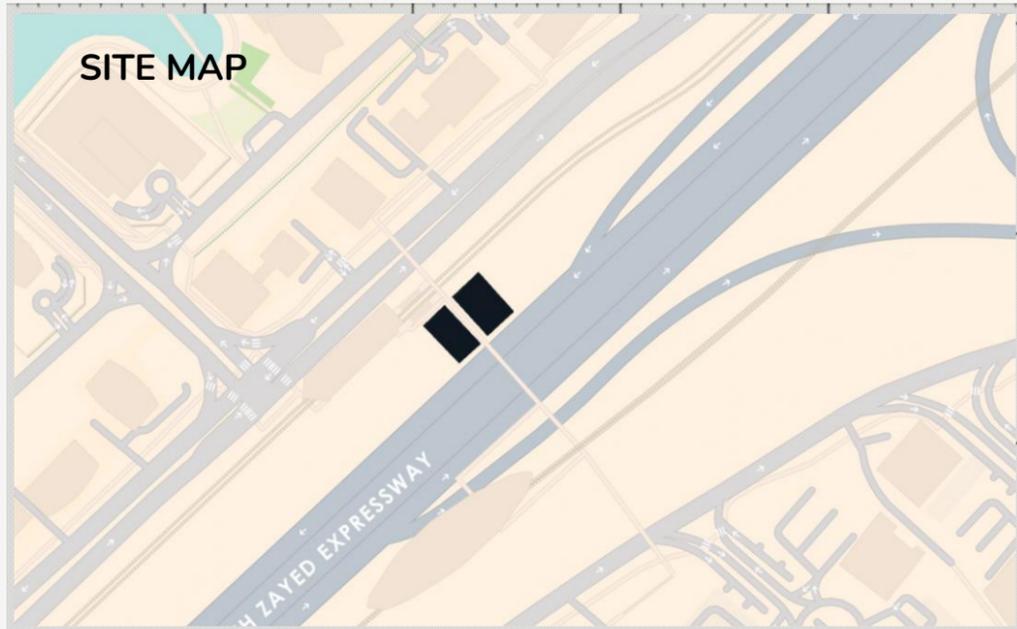
Shadow Studies

Key Design Strategy Takeaways:

Orient the longer axis east-west to reduce east/west exposure and maximize north/south orientation.

Use deep overhangs, vertical fins, and screens to shade façades.

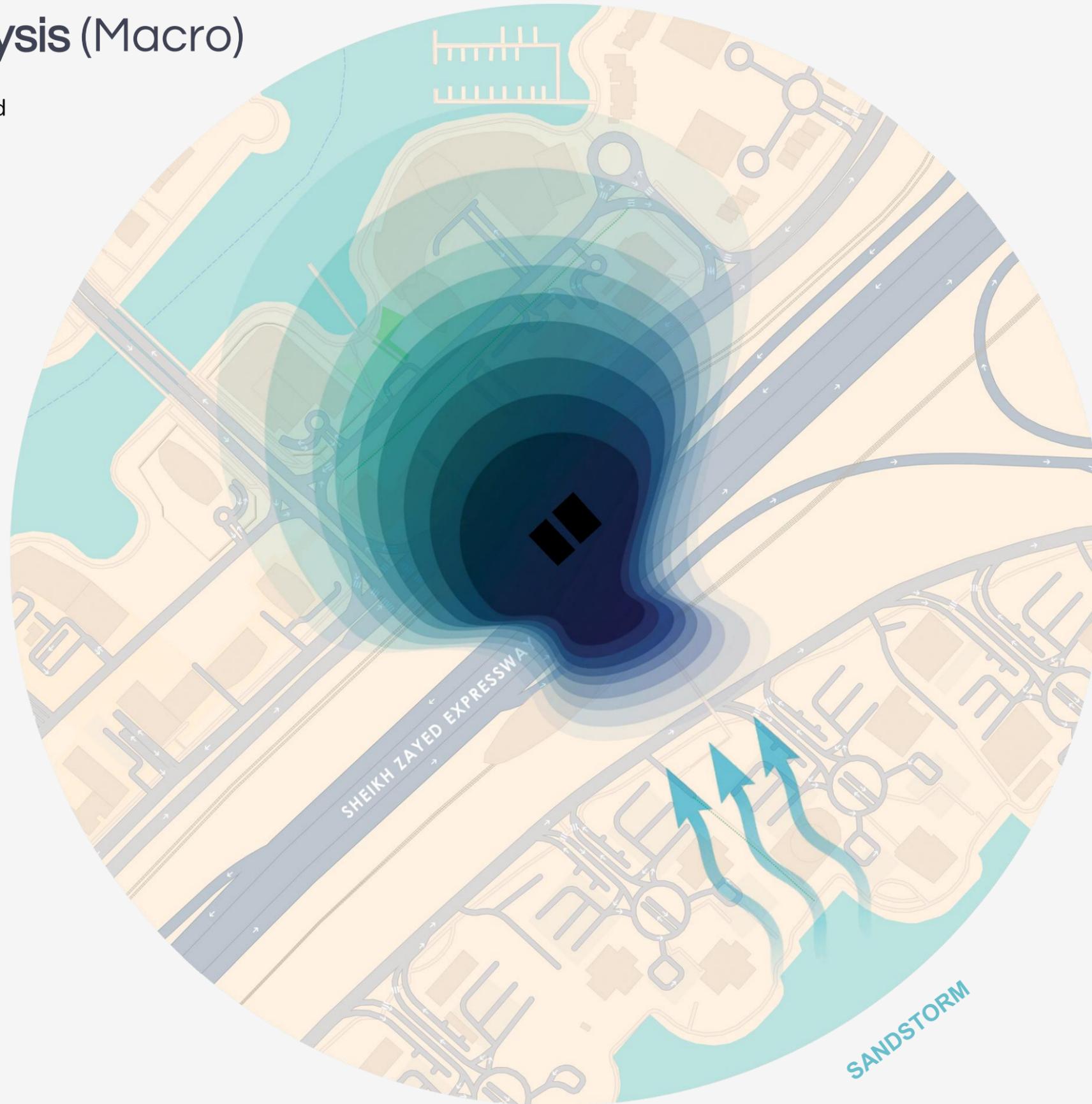
Incorporate courtyards and atriums for indirect light and shaded ventilation.



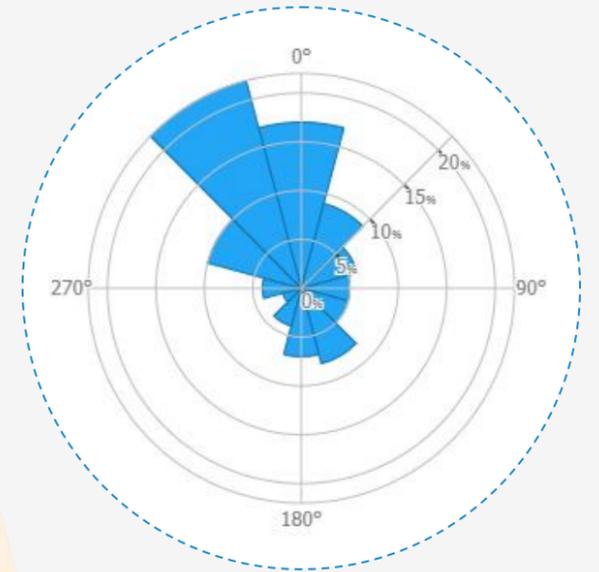


Site Analysis (Macro)

Wind Direction and Sandstorms



WIND ROSE



Design Strategies for Mitigating Weather

Gathered through literature review, environmental analysis and site visit

Factor

Goal

Design Response

Sun (undesirable) →

Reduce heat gain →

Orientation, **shading devices**, **reflective surfaces**

Wind (desirable) →

Enable passive cooling →

Indirect capture, filtering, wind towers

Sandstorms (problem) →

Minimize dust infiltration →

Filtered air paths, angled openings, **screens**

Thermal mass →

Delay and reduce heat transfer →

Heavy materials, insulated envelopes

Behavioural Patterns →

Create habitable resting areas →

Oriented to views, secure, peaceful, thermally comfortable

Form efficiency →

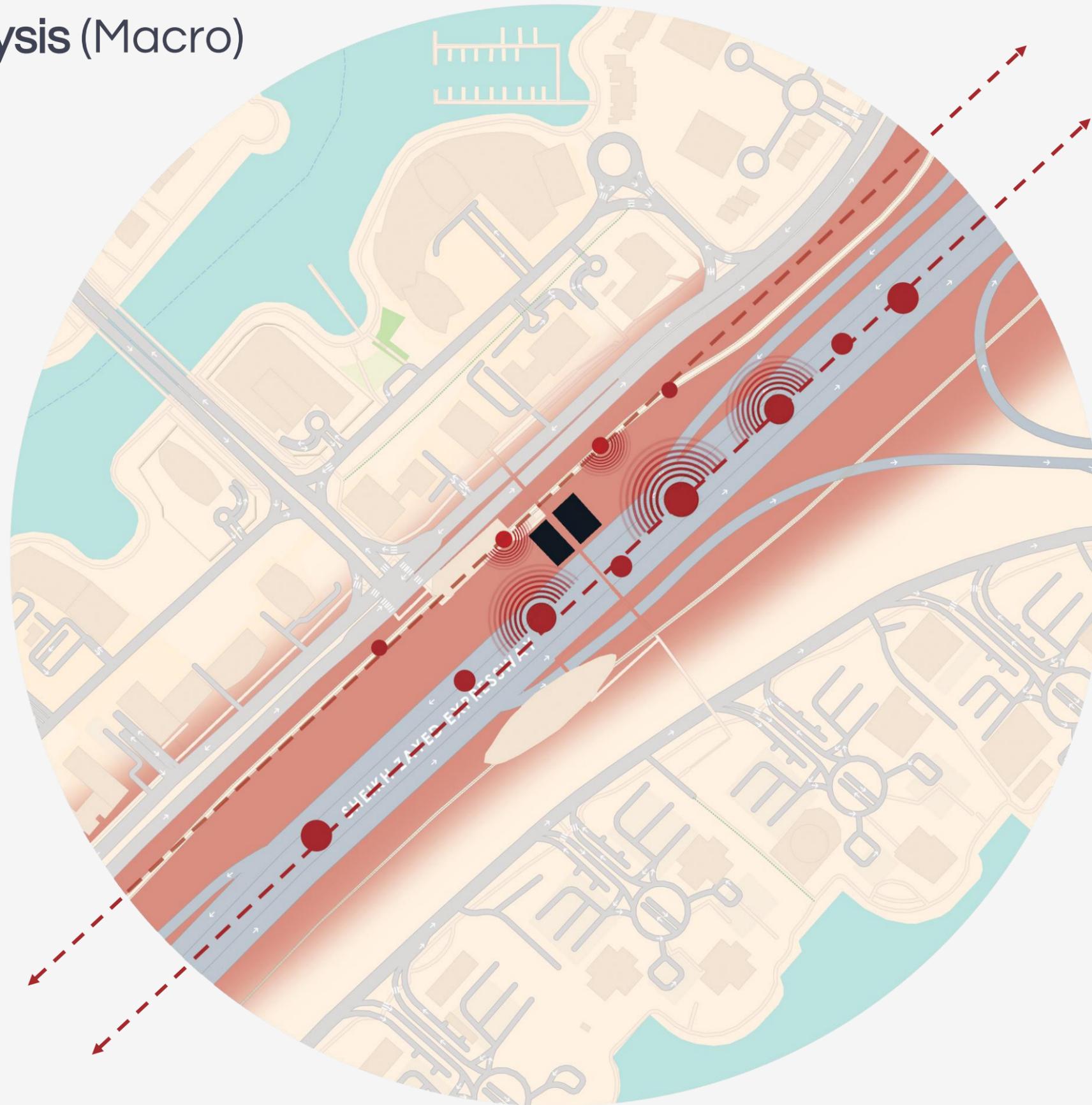
Reduce solar exposure →

Compact, **courtyard**, stepped massing



Site Analysis (Macro)

Noise Map



LINEAR SOUND SOURCE



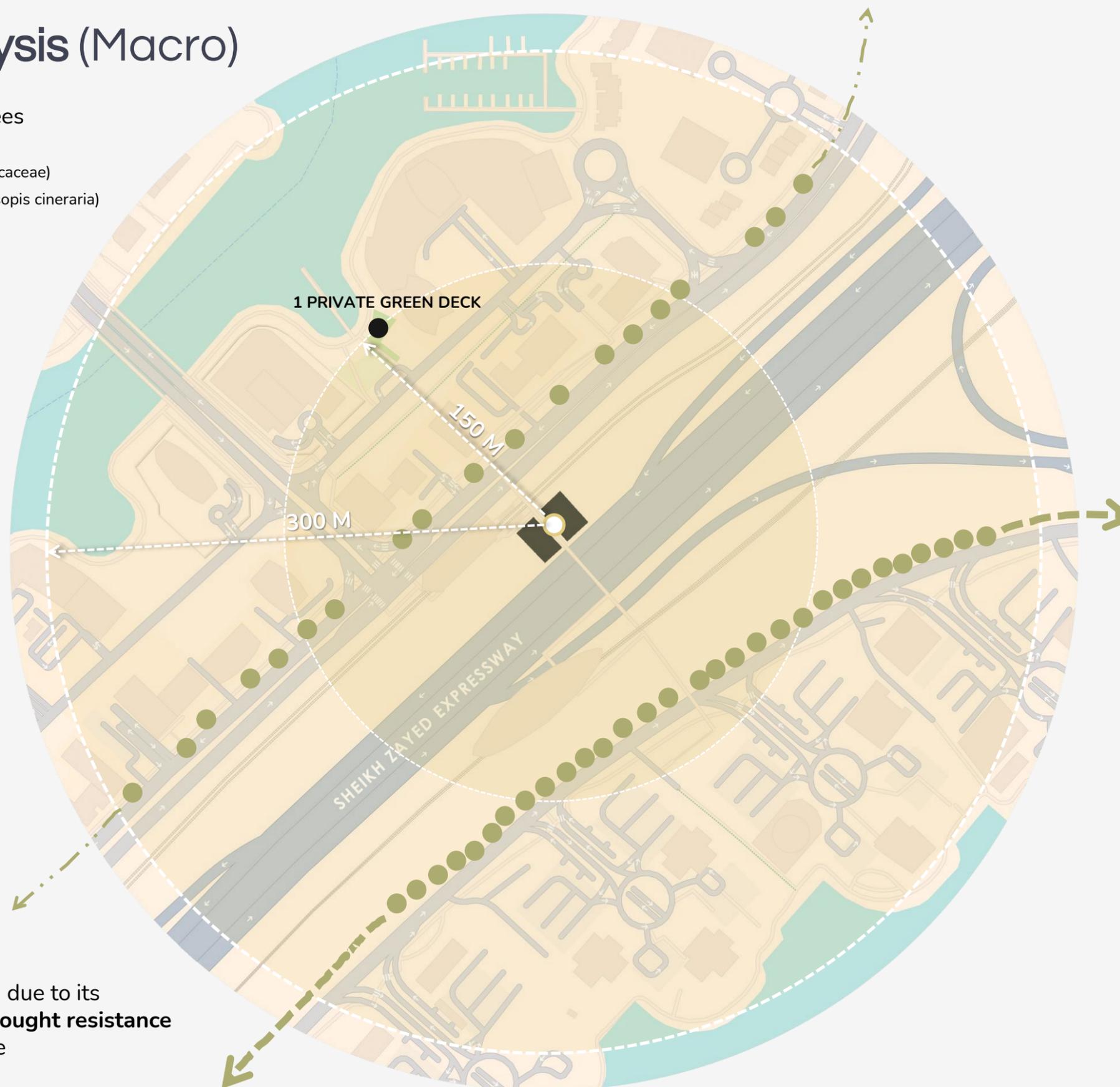
Site Analysis (Macro)

Landscape and Trees

1. **Palm Tree** (Arecaceae)
2. **Ghaf Tree** (Prosopis cineraria)
3. **Sidr Tree**



Trees were chosen due to its **heat-tolerance, drought resistance** and aesthetic value



Lack of nearby green spaces or garden

The World Health Organization (WHO) recommends that every urban resident should live within **300 meters (5-min walk)** of a green space that is at least 0.5 hectares (5,000 m²) in size.

Need for more pocket green spaces

Multiple small green spaces are preferred over a few large ones in high-density, high-rise areas because they're more accessible.

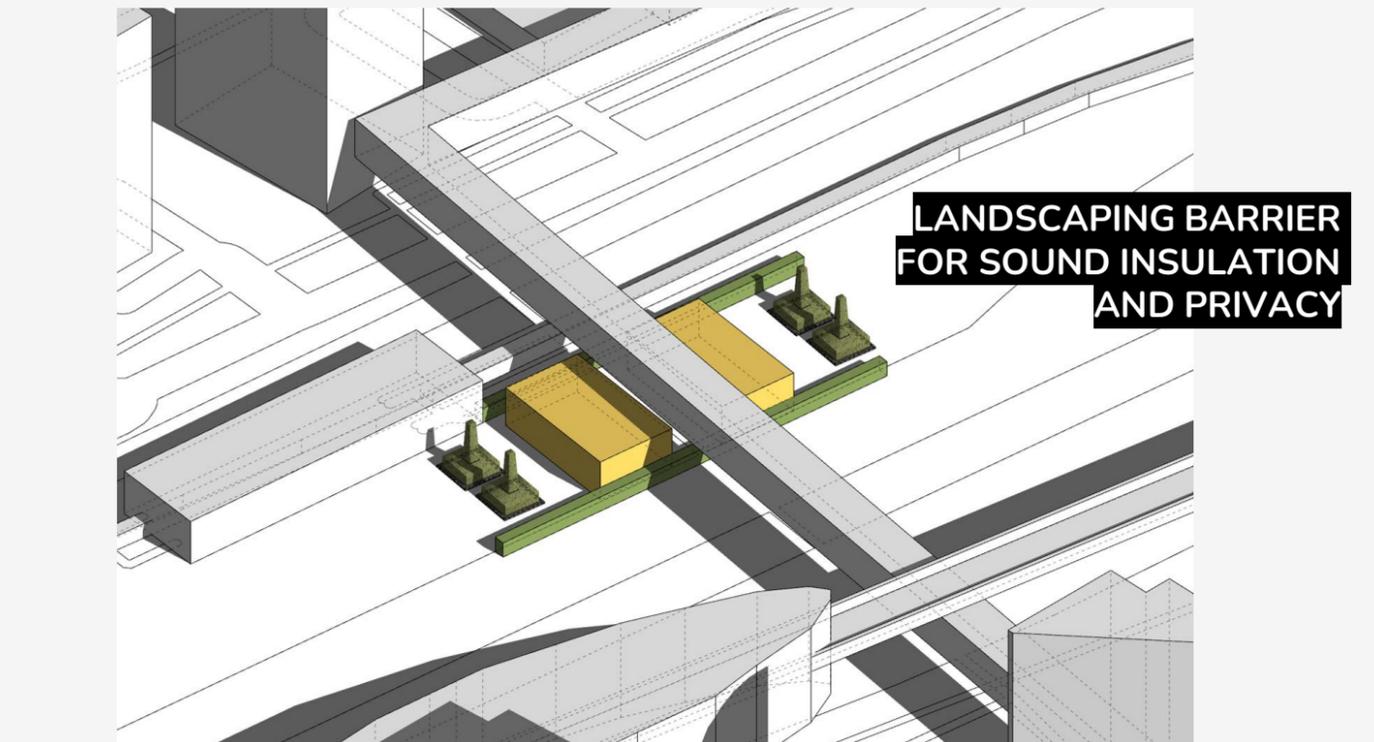
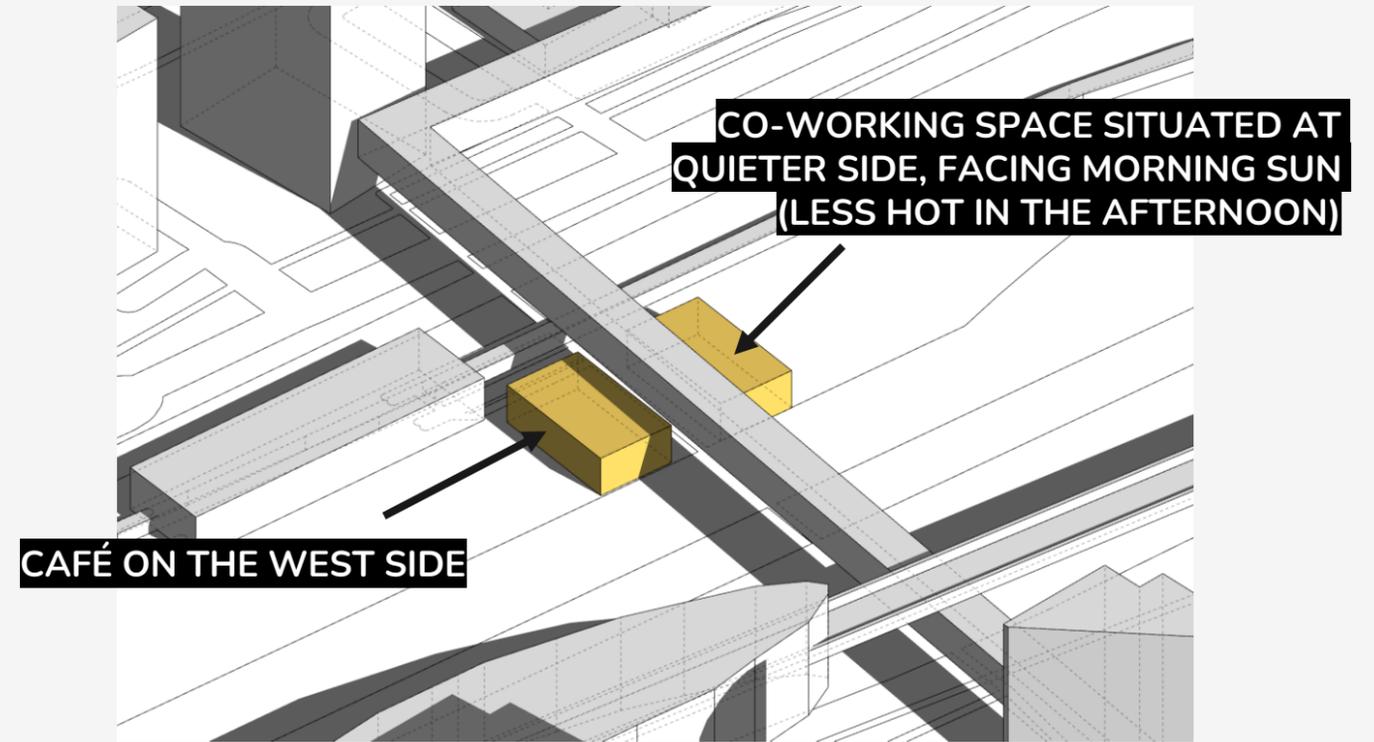
Social equity

Ensure equitable access for all income groups especially renters in towers.

Health and wellbeing benefits

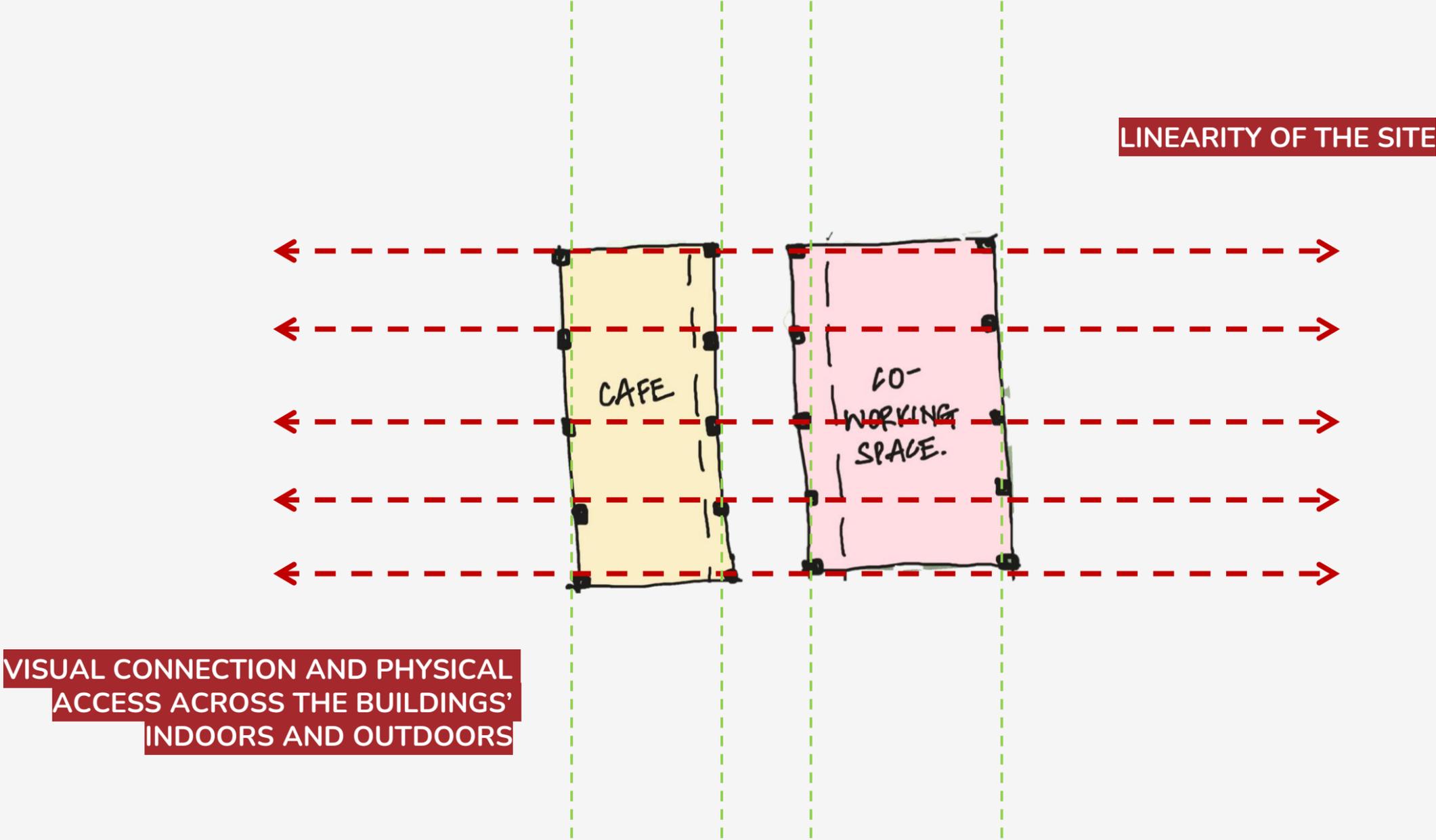
Studies show improved mental health when green space is within a 300m radius.

Massing Process: Begins with 2 Masses



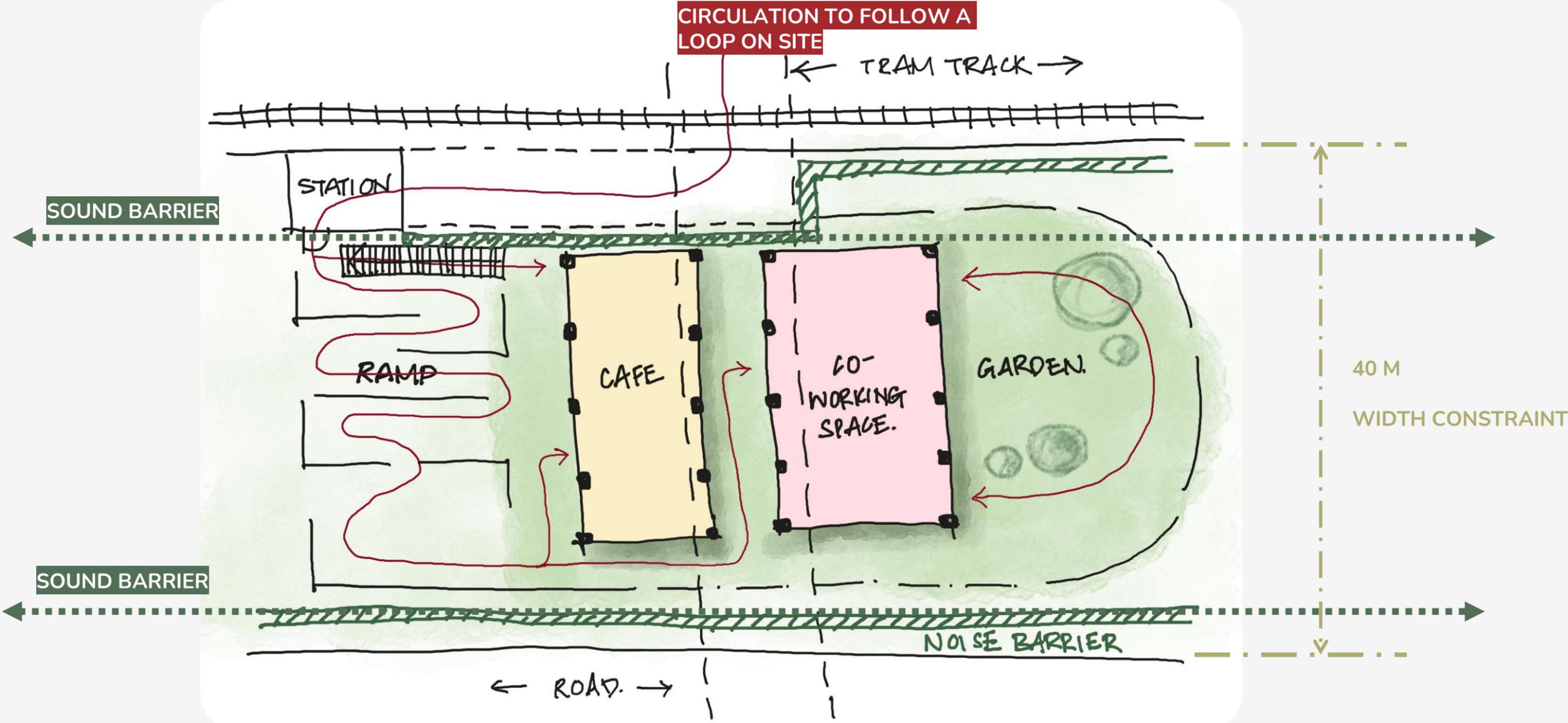


Diagrammatic Concept Plan



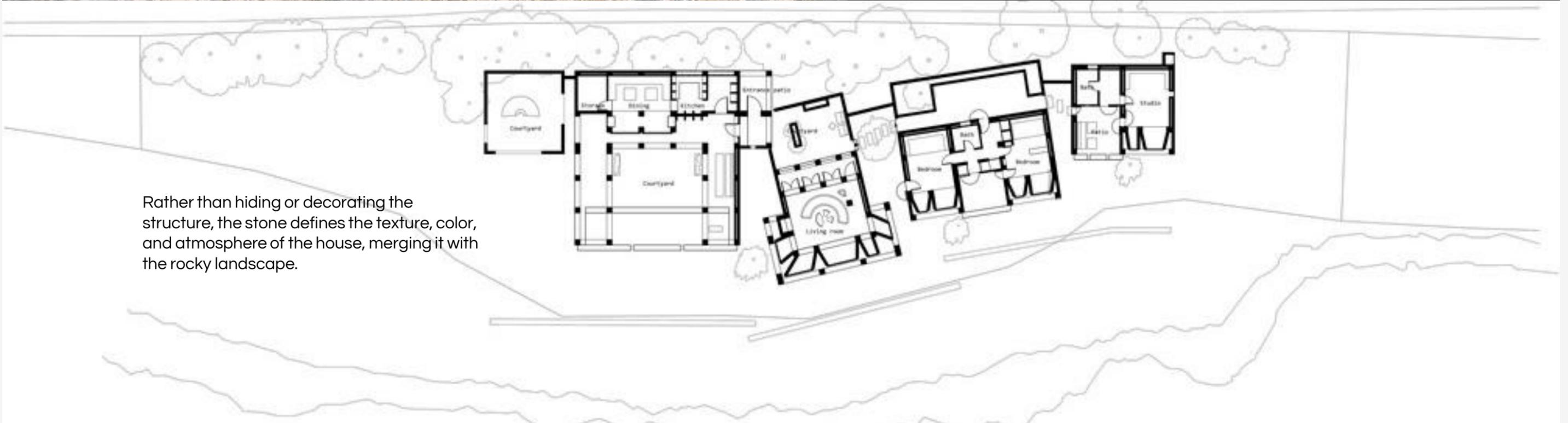


Diagrammatic Concept Plan



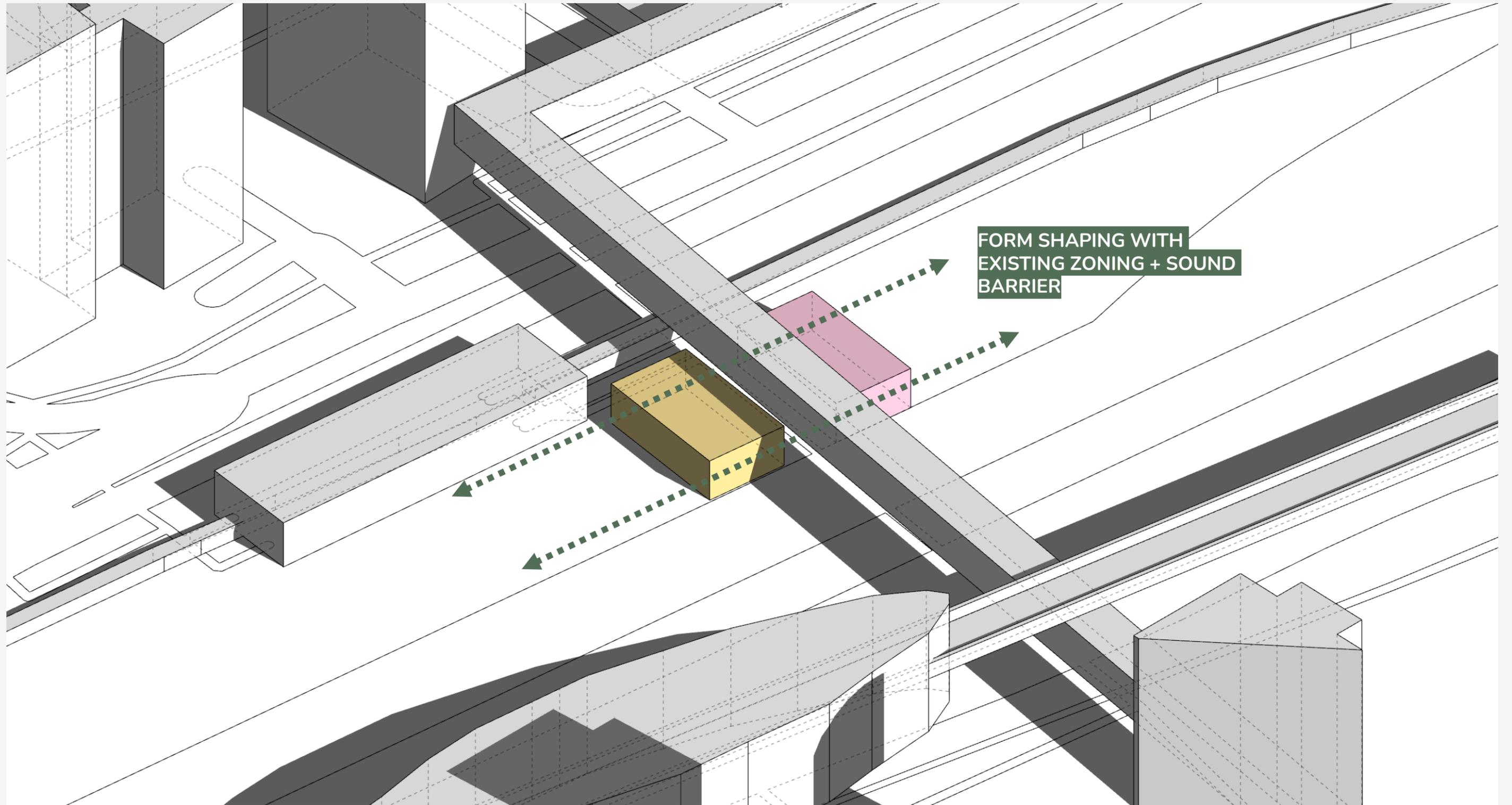
Can Lis by Jorn Utzon Case Study for Natural Stone

Utzon carefully composed the experience of the sea and sunlight through framed openings and spatial sequences.

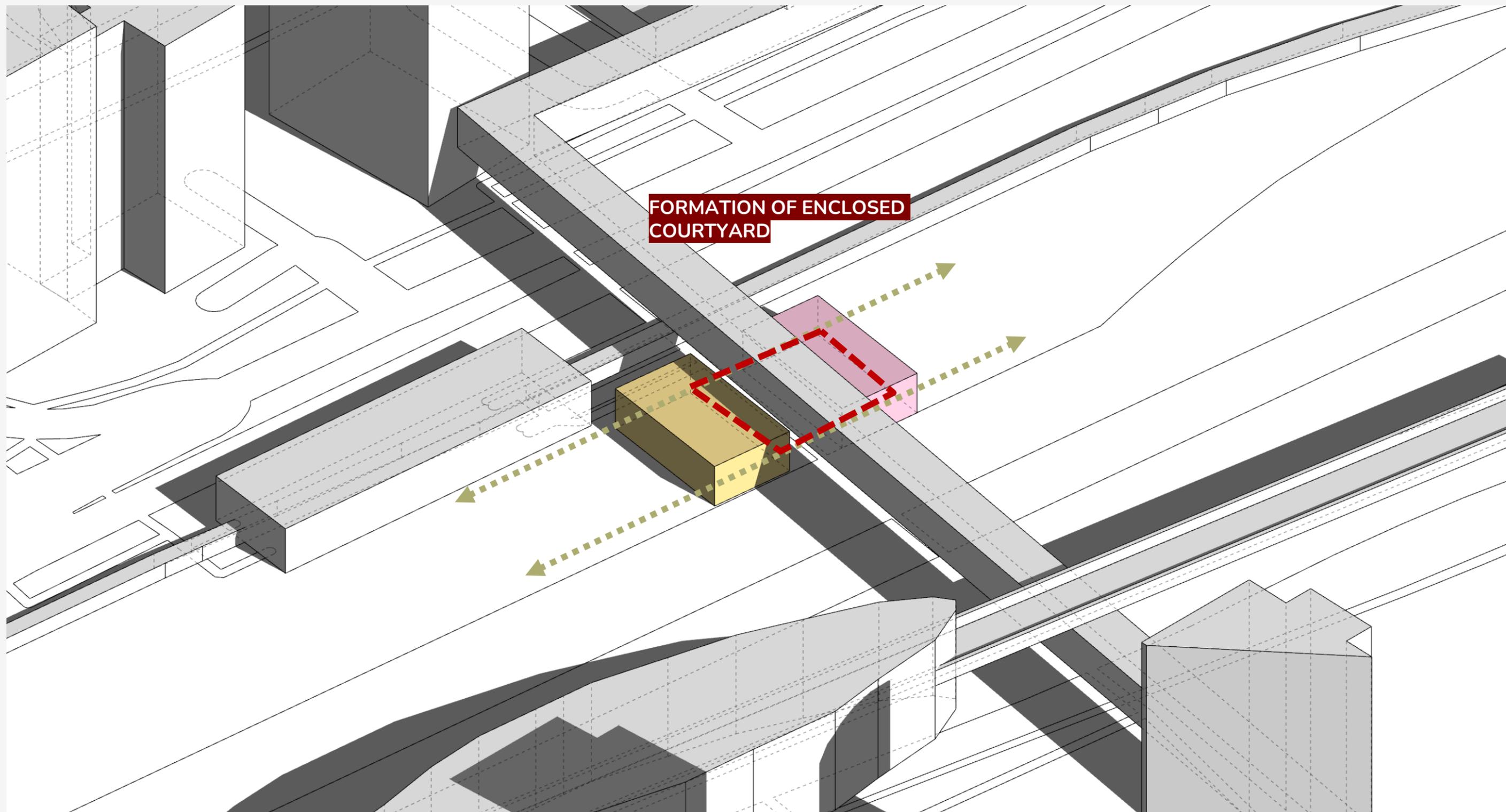


Rather than hiding or decorating the structure, the stone defines the texture, color, and atmosphere of the house, merging it with the rocky landscape.

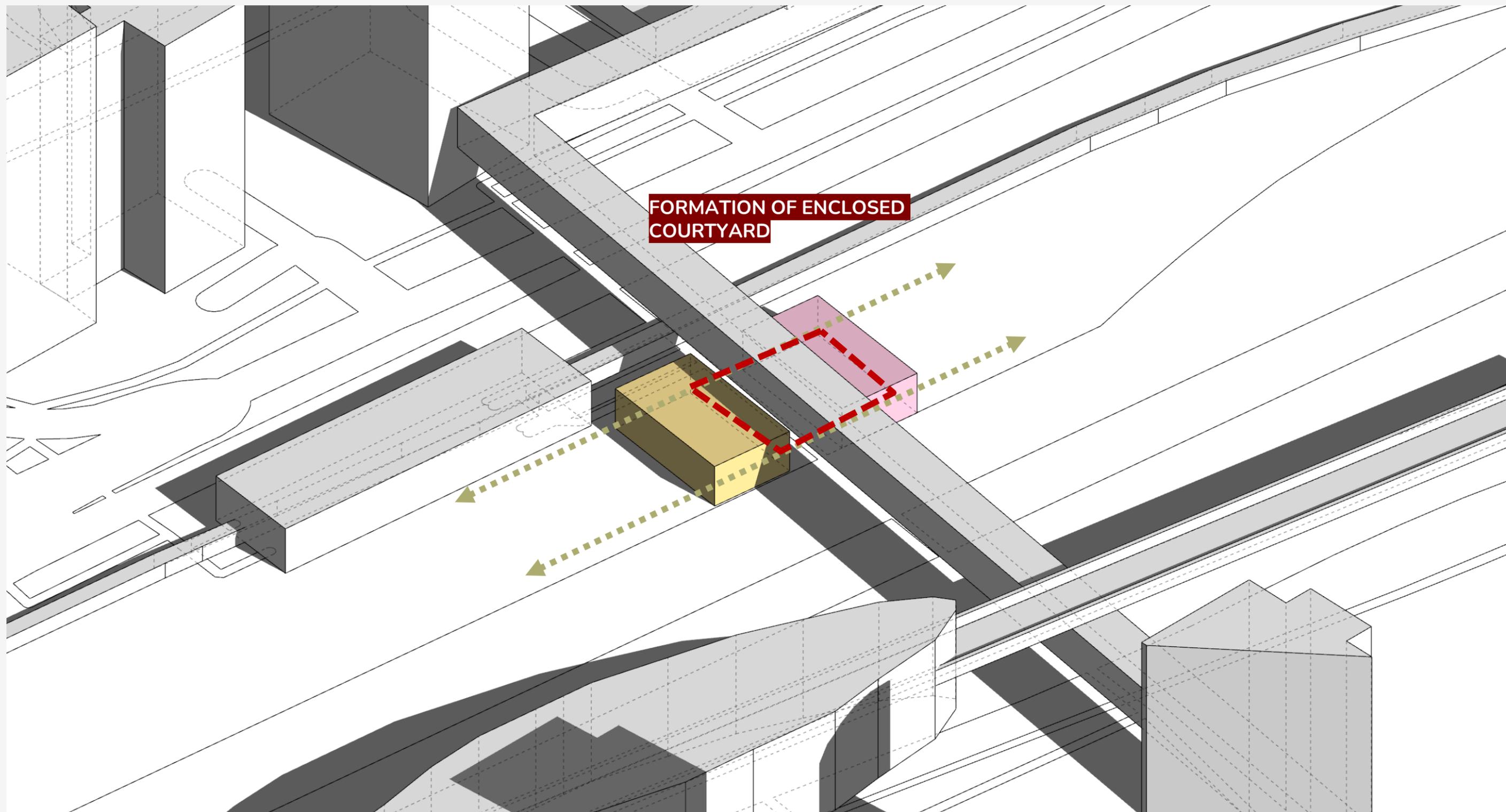
Massing Development



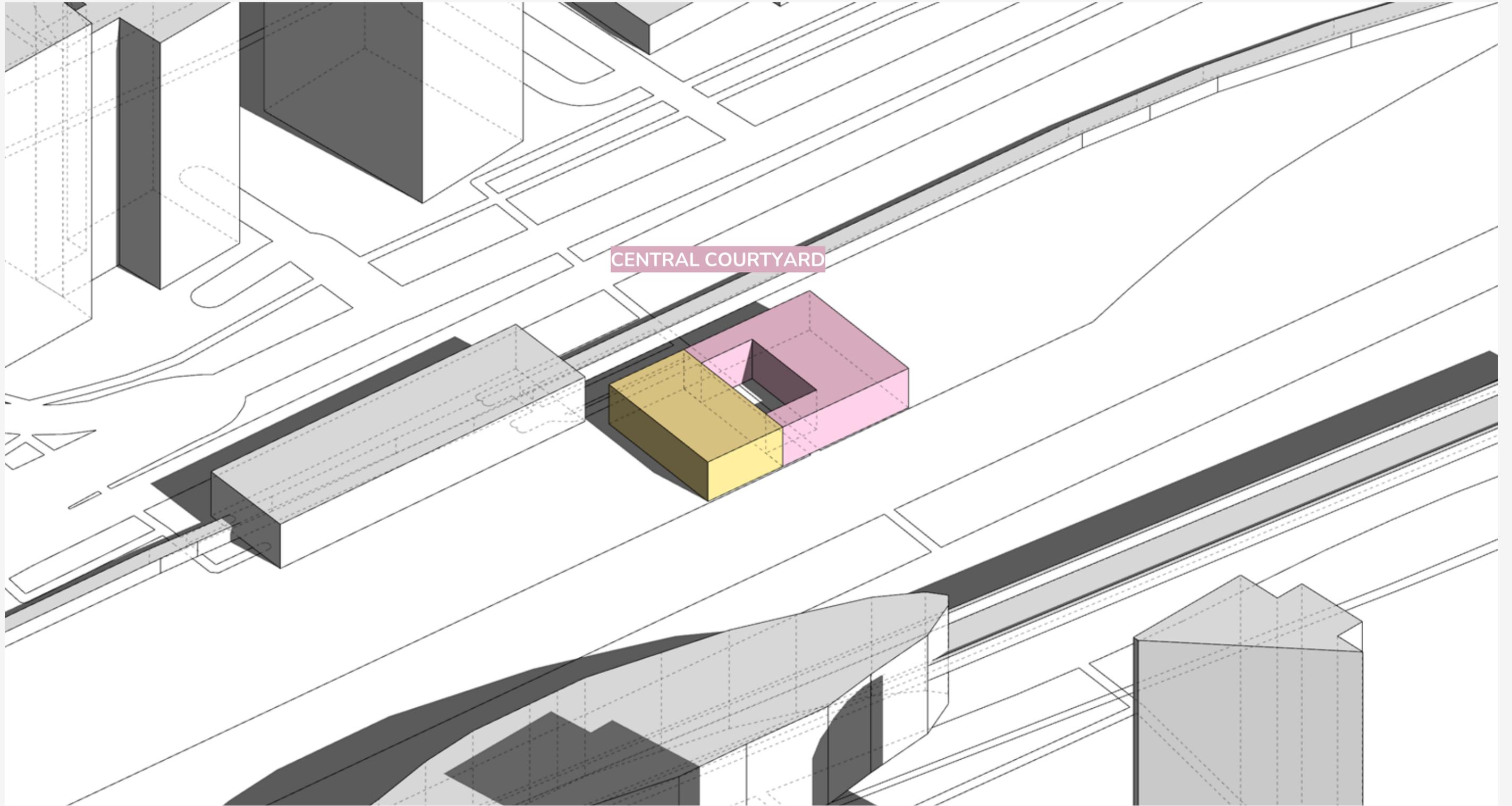
Massing Development



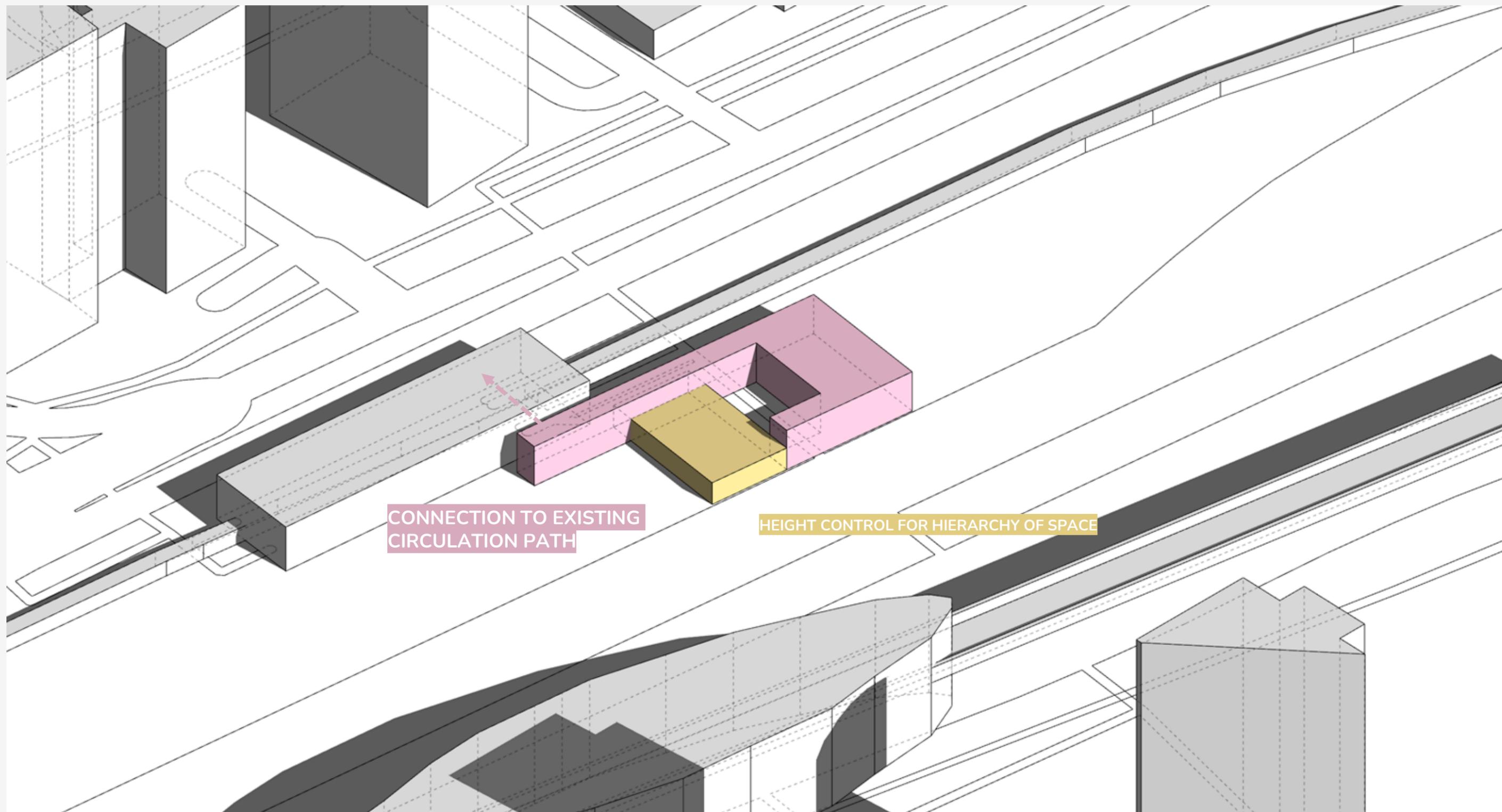
Massing Development



Massing Development



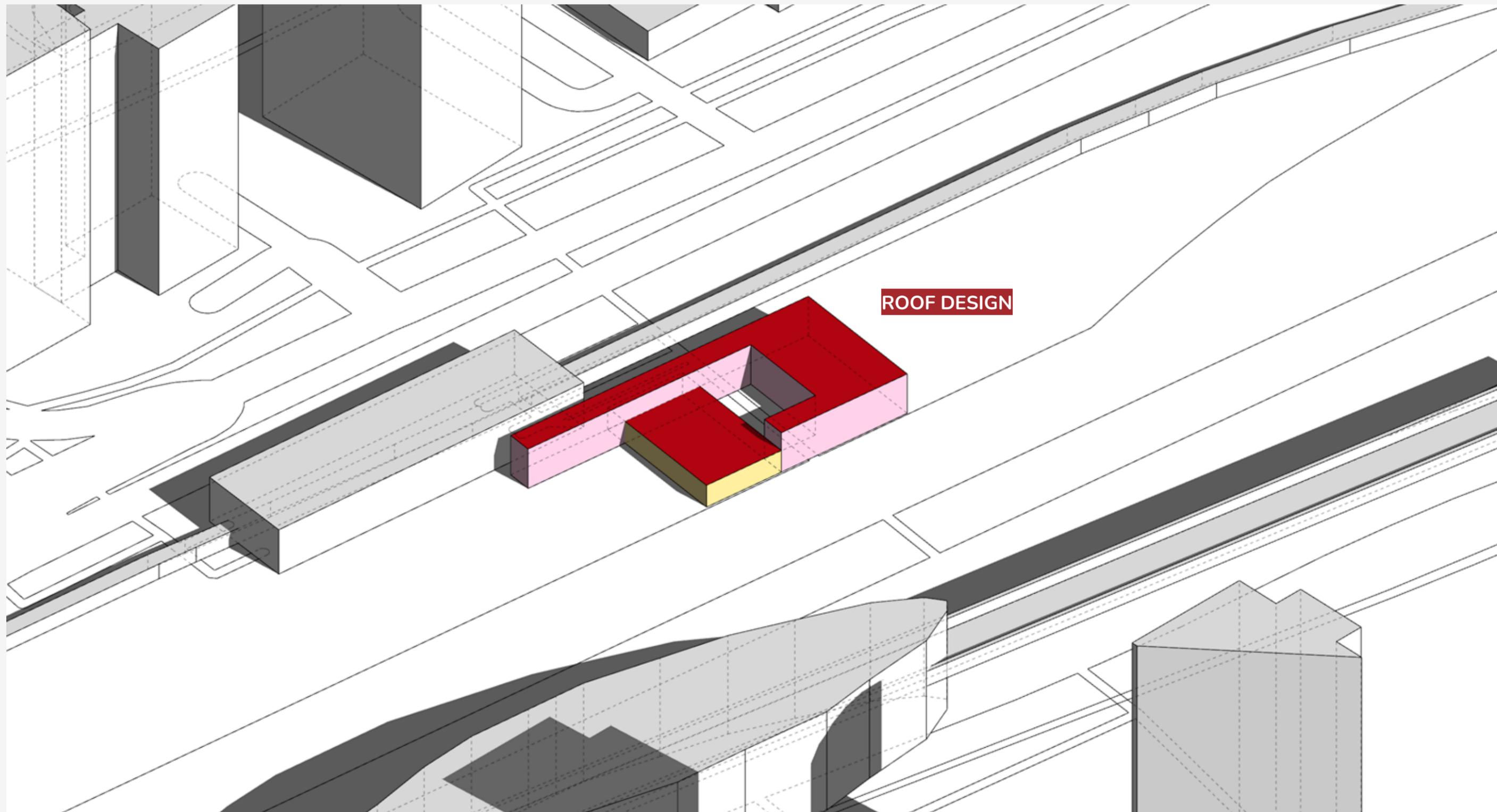
Massing Development



CONNECTION TO EXISTING
CIRCULATION PATH

HEIGHT CONTROL FOR HIERARCHY OF SPACE

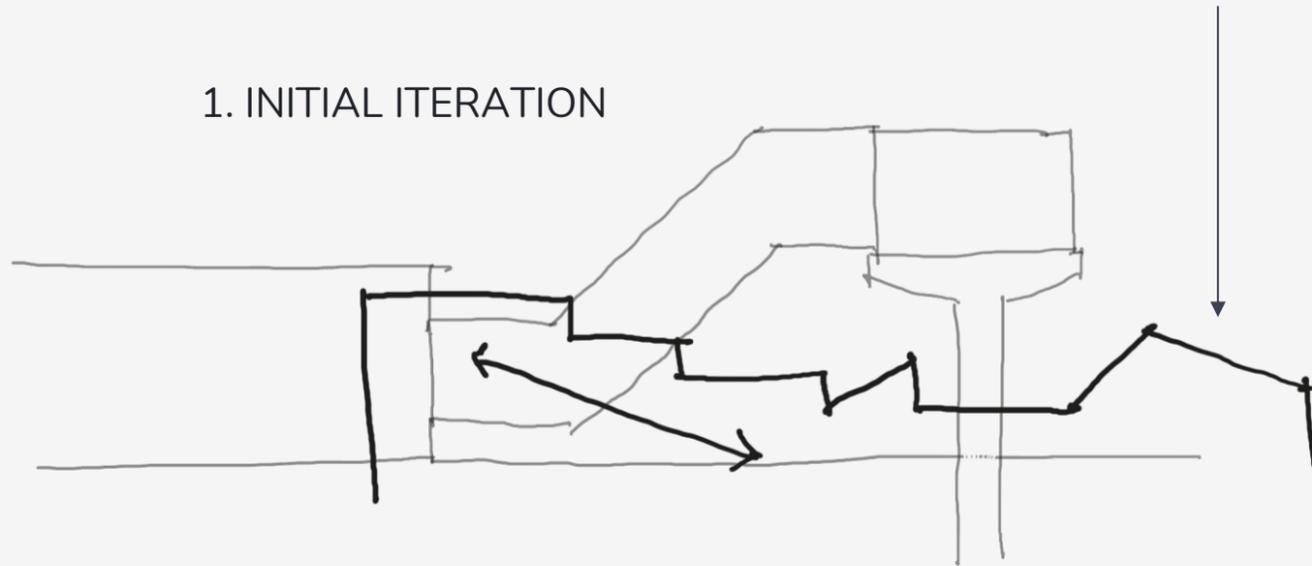
Massing Development



Roof Form Development

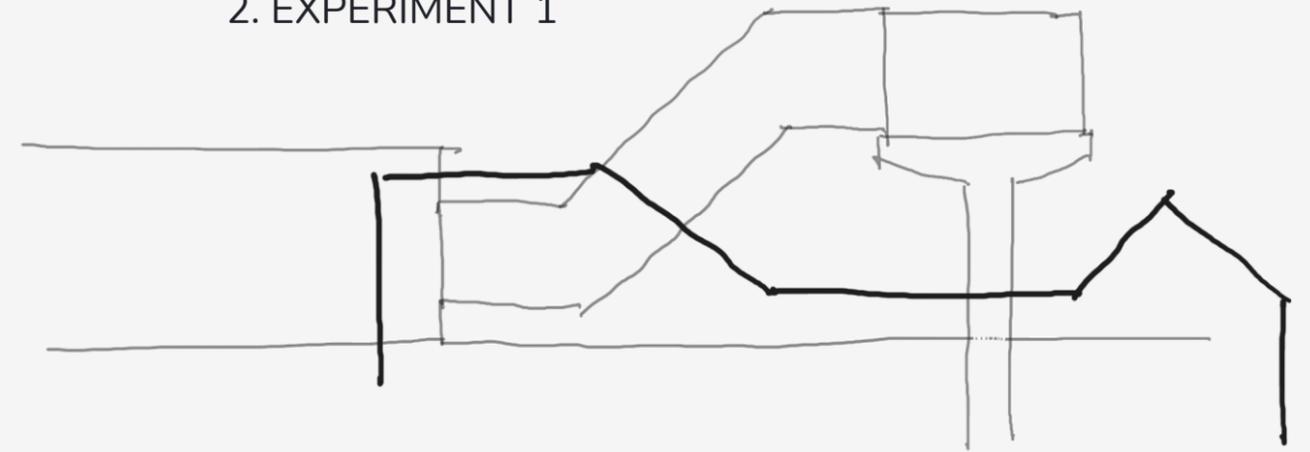
PITCHED ROOF AS A RESPONSE TO EXISTING LINKWAY

1. INITIAL ITERATION

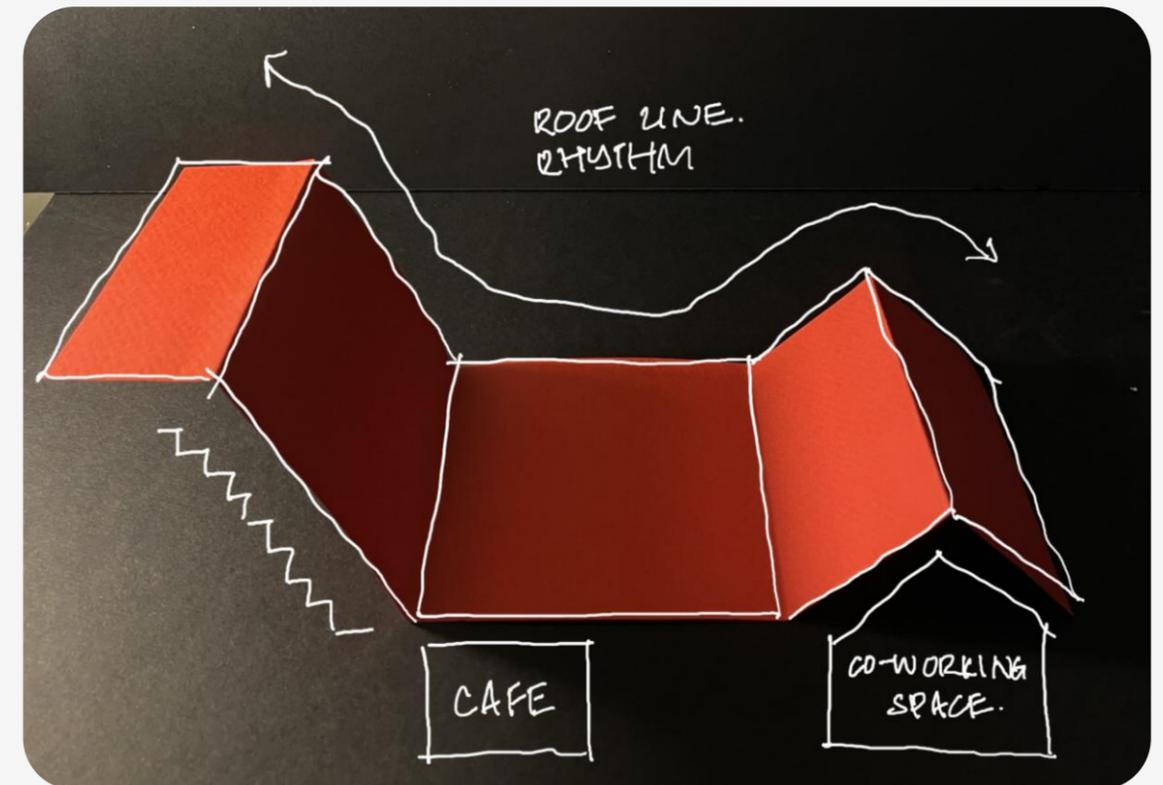
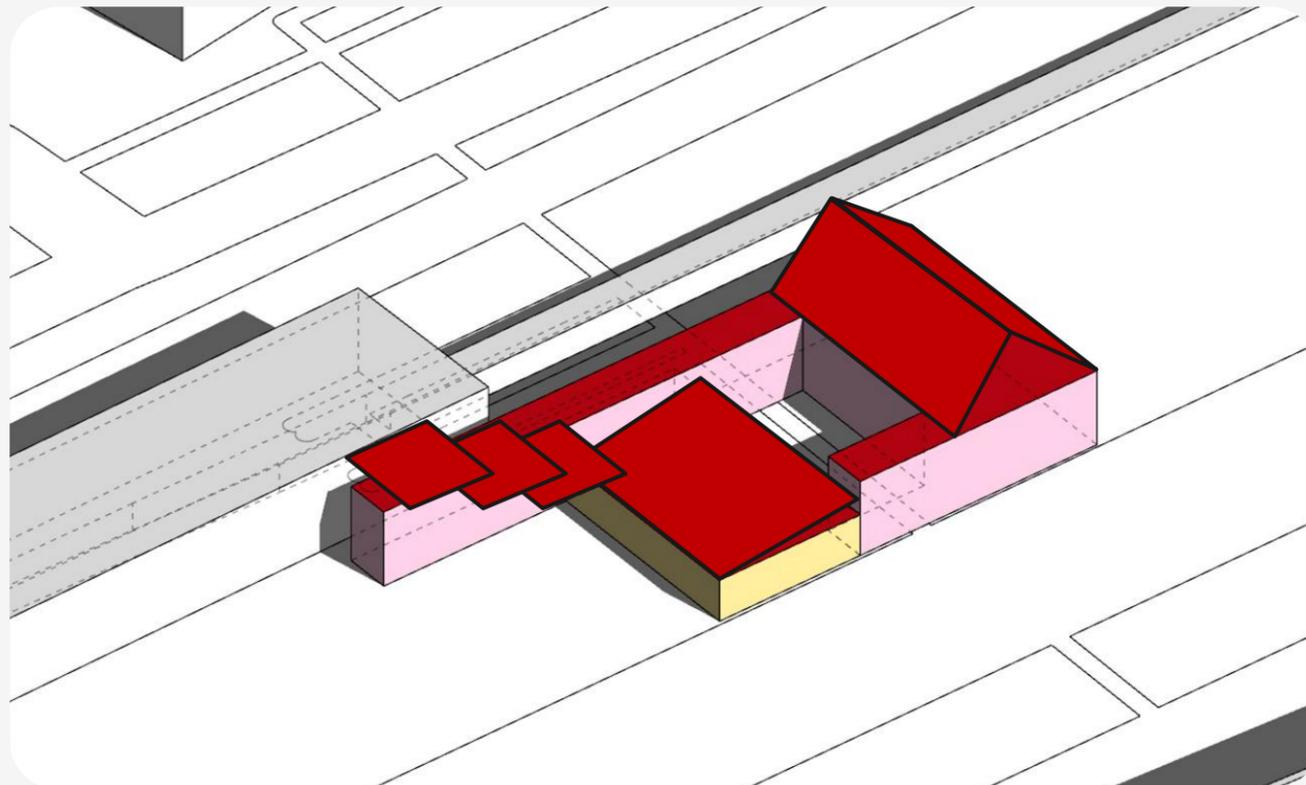


TERRACING CAUSES AN INTERRUPTION ON THE BUILDING PROFILE

2. EXPERIMENT 1

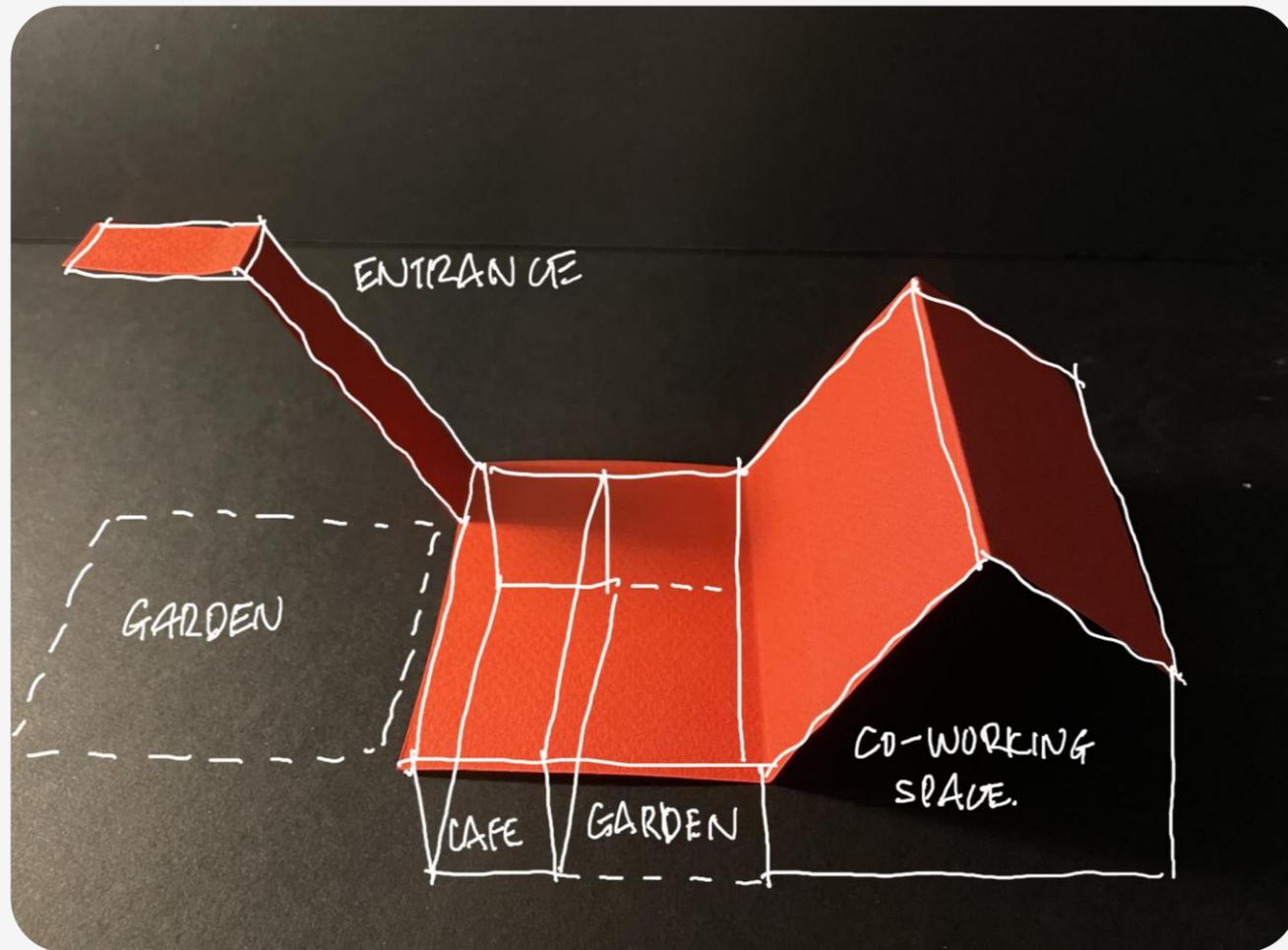


FLOWING LINES CREATES A SENSE OF HIERARCHY AND MAKES DIRECTION MORE READABLE



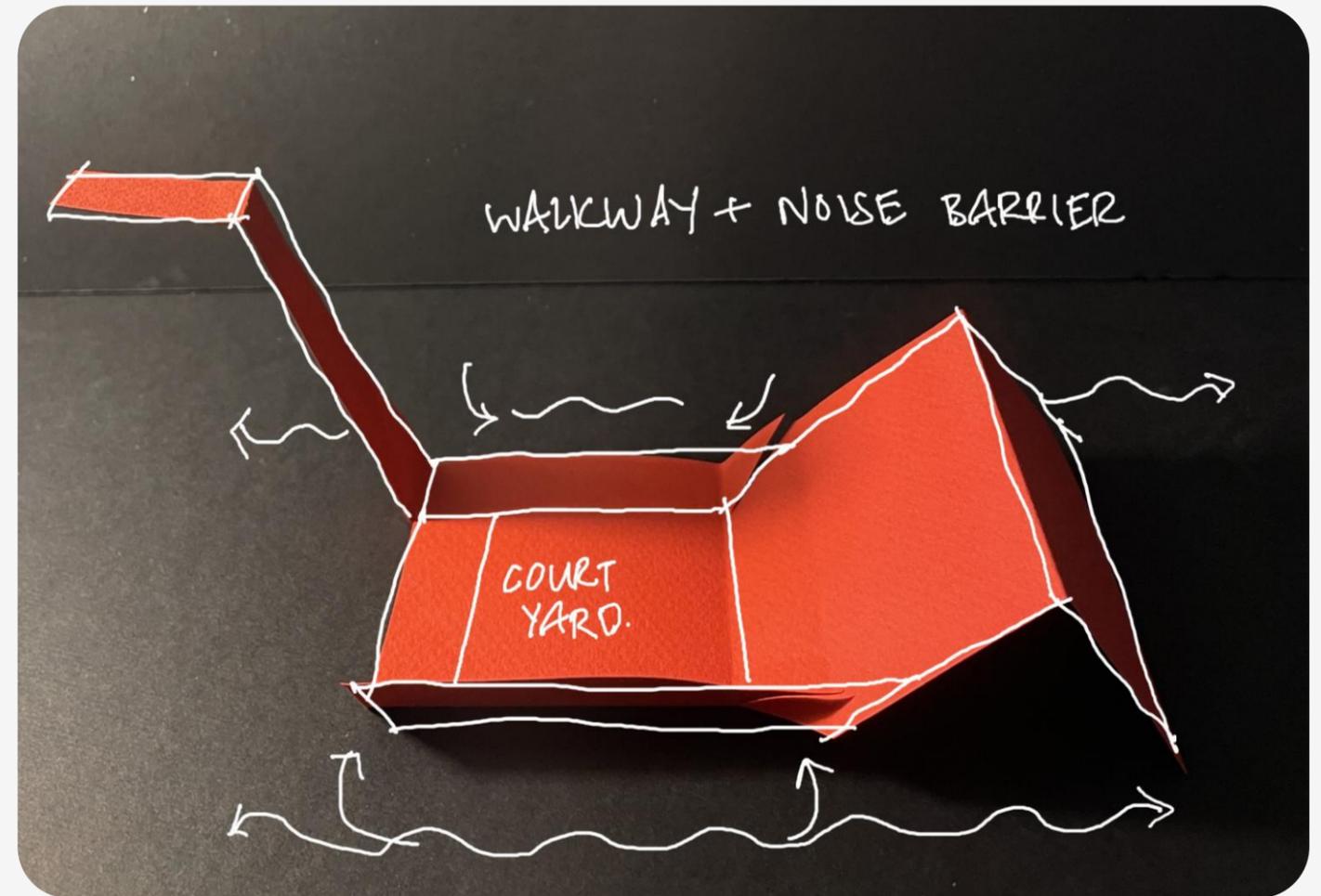
Roof Form Development

EXPERIMENT 3



TERRACING CAUSES AN INTERRUPTION ON THE BUILDING PROFILE

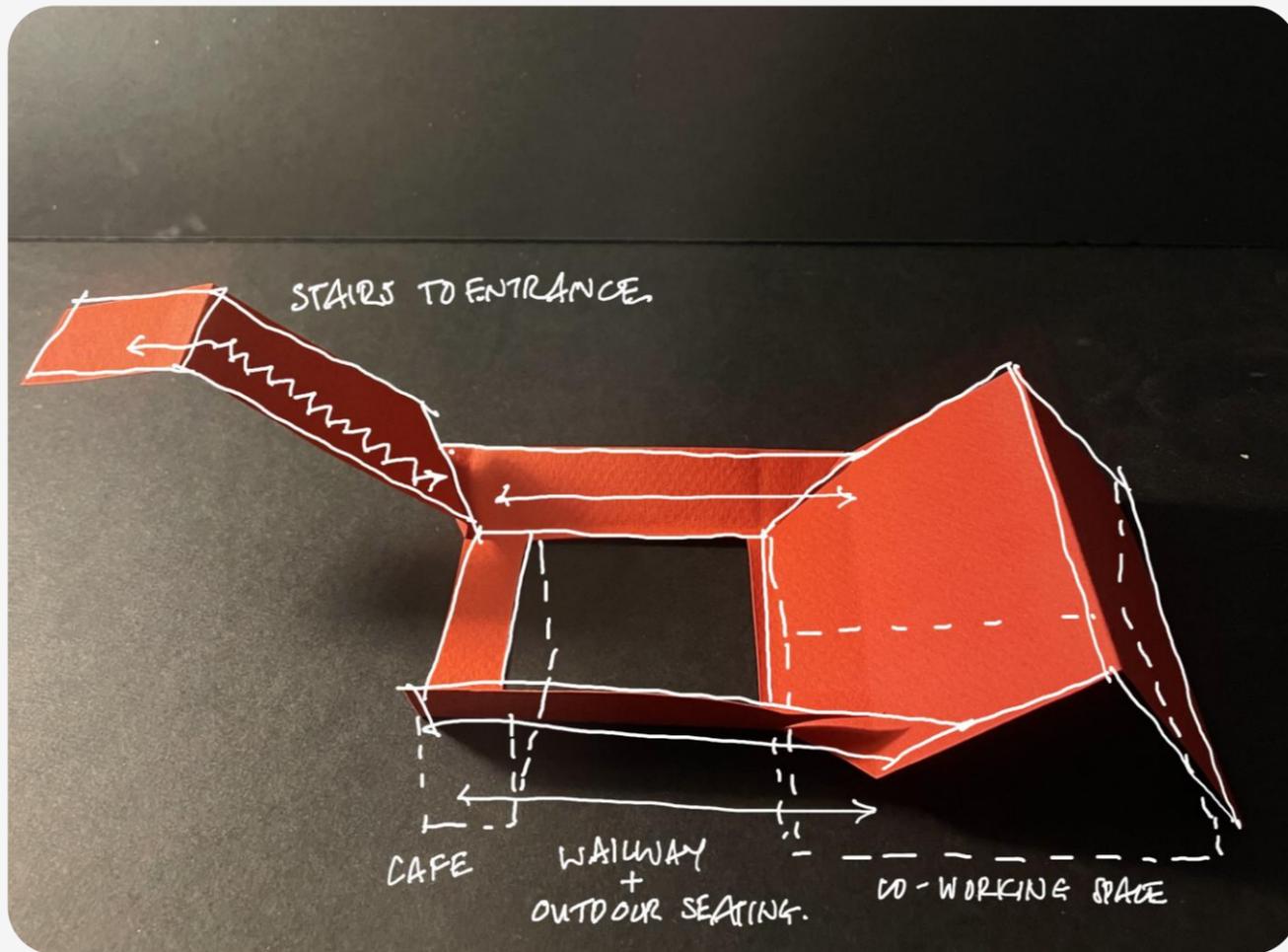
EXPERIMENT 4



SMOOTHER LINES MAKE A SENSE OF HIERARCHY AND DIRECTION MORE READABLE

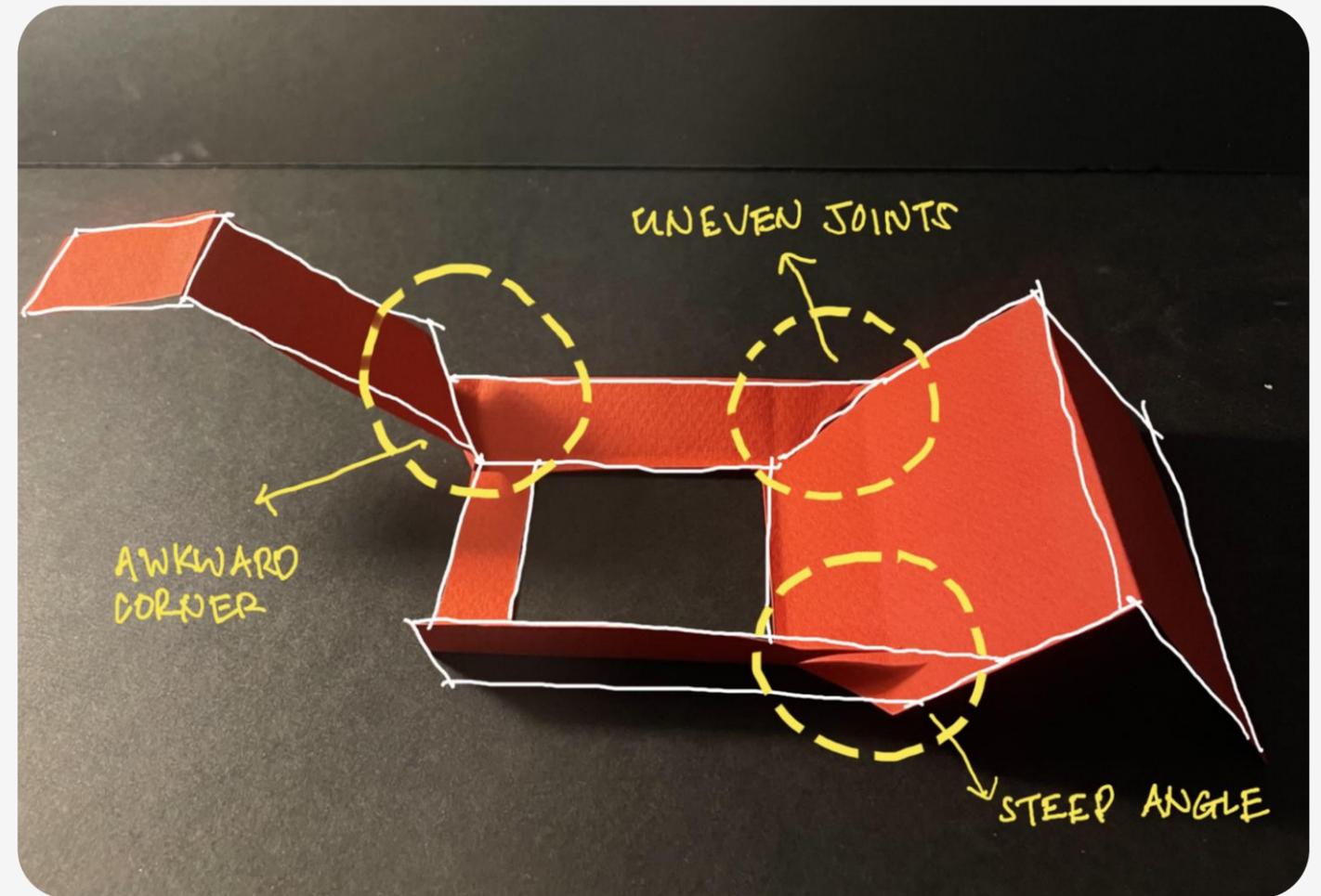
Roof Form Development

EXPERIMENT 4



TERRACING CAUSES AN INTERRUPTION ON THE BUILDING PROFILE

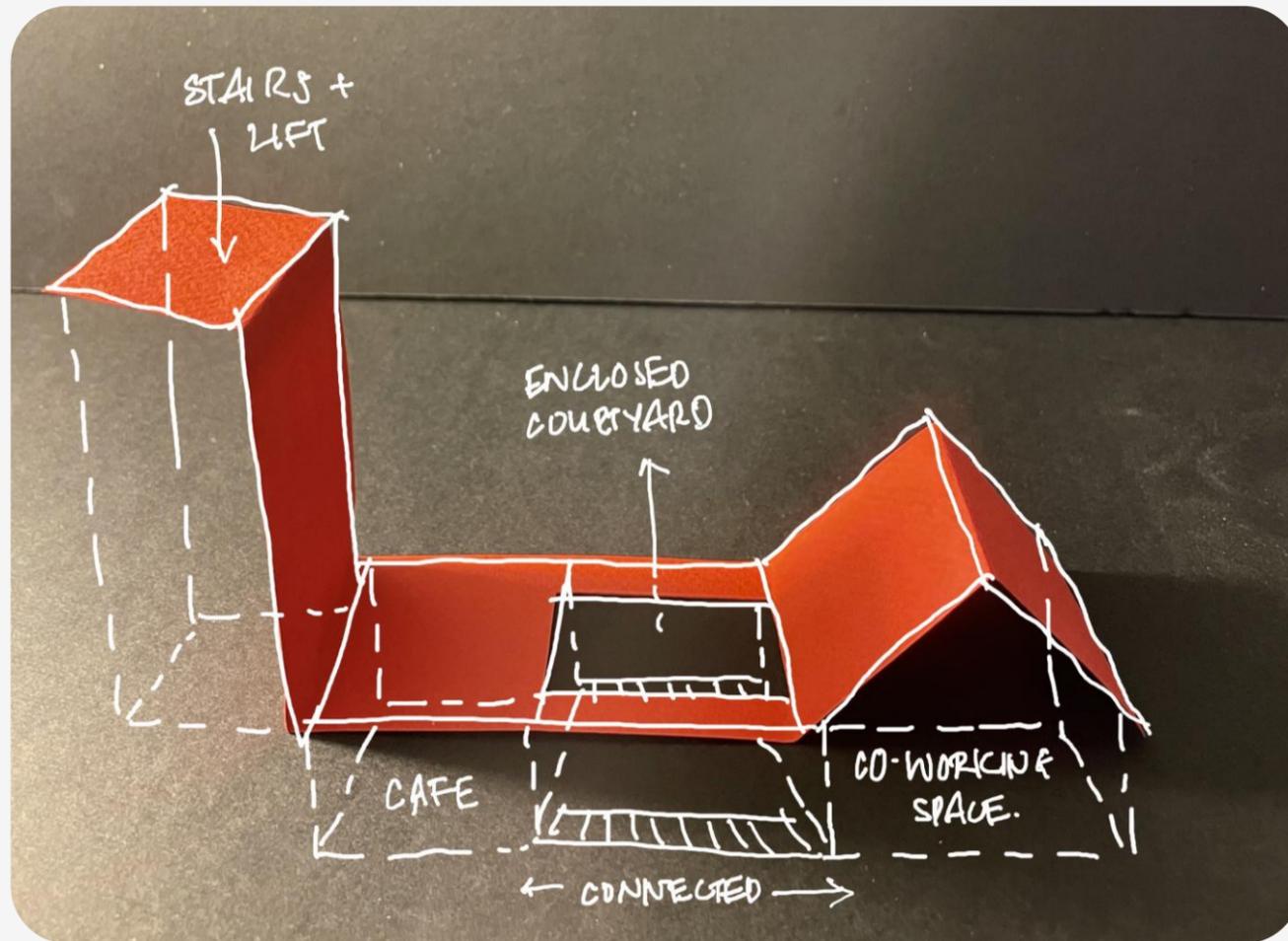
EXPERIMENT 4



SMOOTHER LINES MAKE A SENSE OF HIERARCHY AND DIRECTION MORE READABLE

Roof Form Development

EXPERIMENT 5



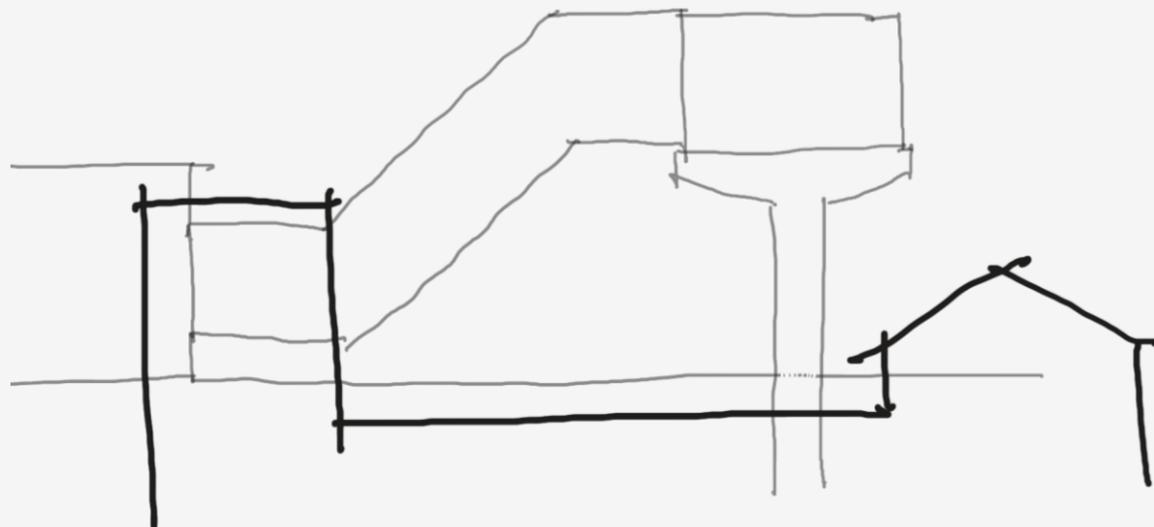
CONSISTENT ROOF LINES ARE MORE READABLE ON URBAN AND HUMAN SCALE

WAY-FINDING IS MADE SIMPLER WITH ROOF HIERARCHY

SPACE SIZING MADE IN ACCORDANCE TO **FUNCTION OF SPACE**

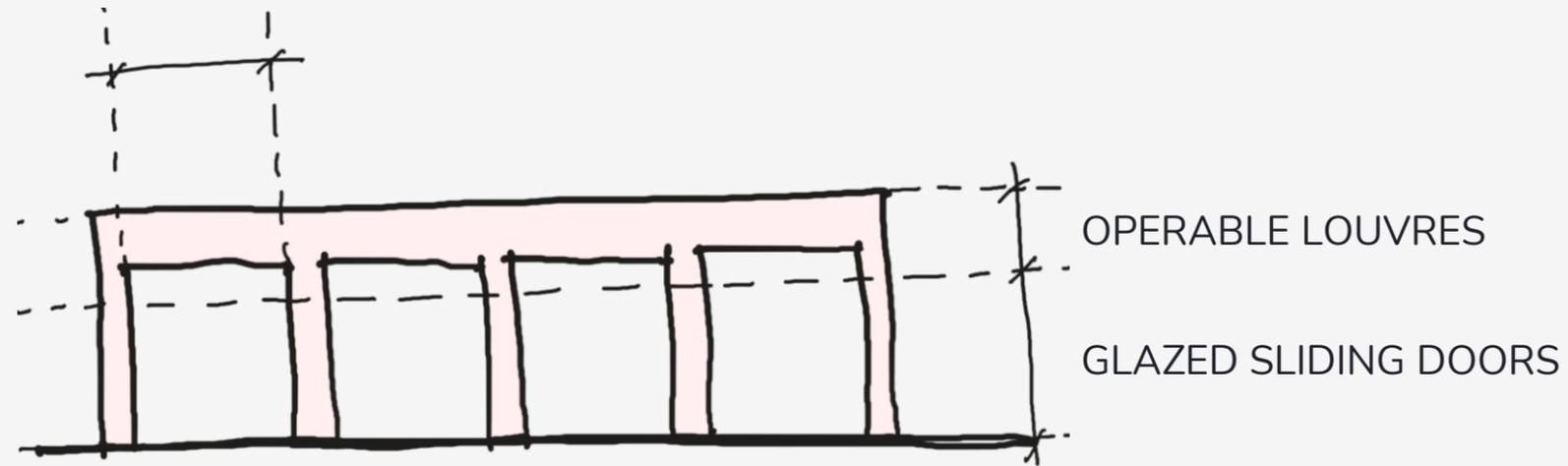
WHOLE NETWORK FEELS MORE LIKE A **COMPLETE LOOP**

REDUCTION IN ANGLED JOINTS MAKE IT EASIER FOR **MODULAR DESIGN**

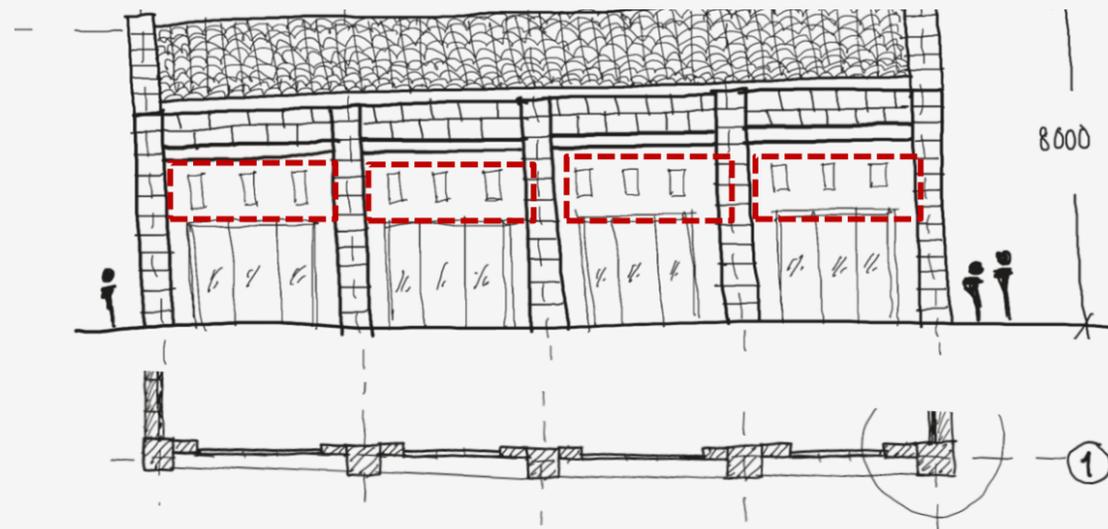


Façade Aim: TO BE PERMEABLE AND OPENABLE, FOR THERMAL COMFORT AND EASY CIRCULATION

COLUMNS FRAME THE VIEW TO OUTSIDE



OPERABLE LOUVRES TO FACILITATE AIR FLOW AND HEAT STACKING
(HOT AIR FLOATS, COOL AIR SINKS)

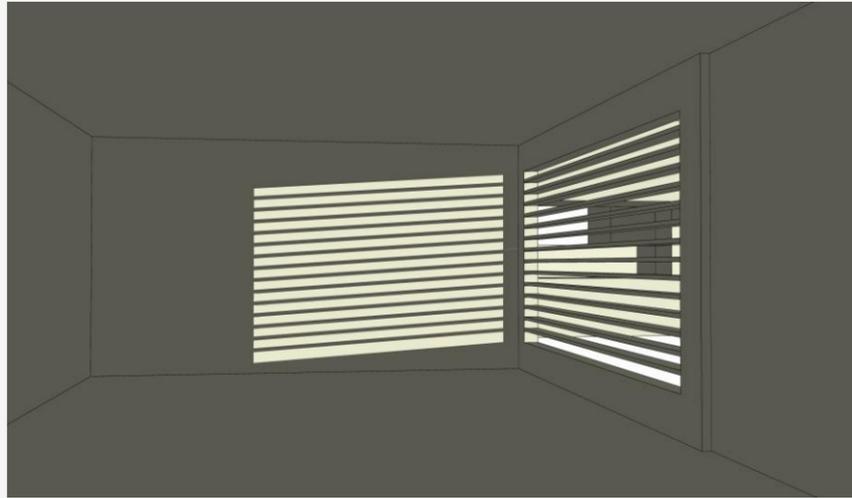


(LIMITED) FIXED WINDOW OPENINGS ON SOUTH FAÇADE TO LET LIGHT IN

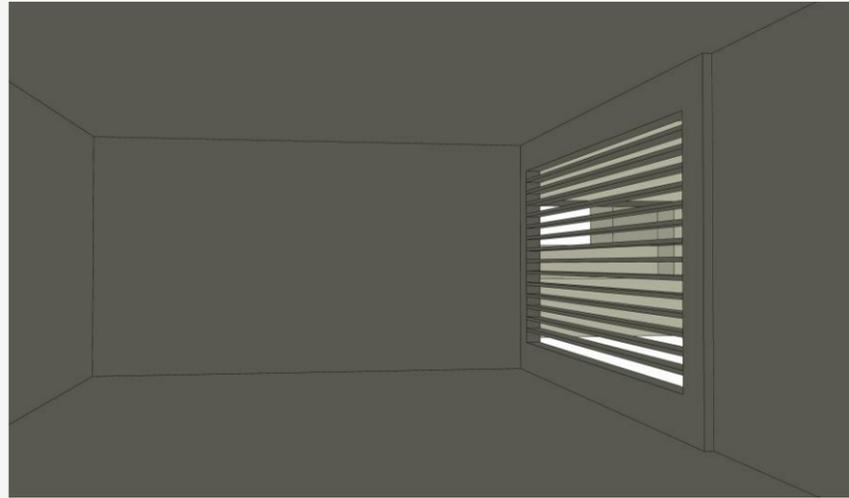
Louvre Testing

Straight Horizontal Louvres, East Facing (exposed to morning sun)

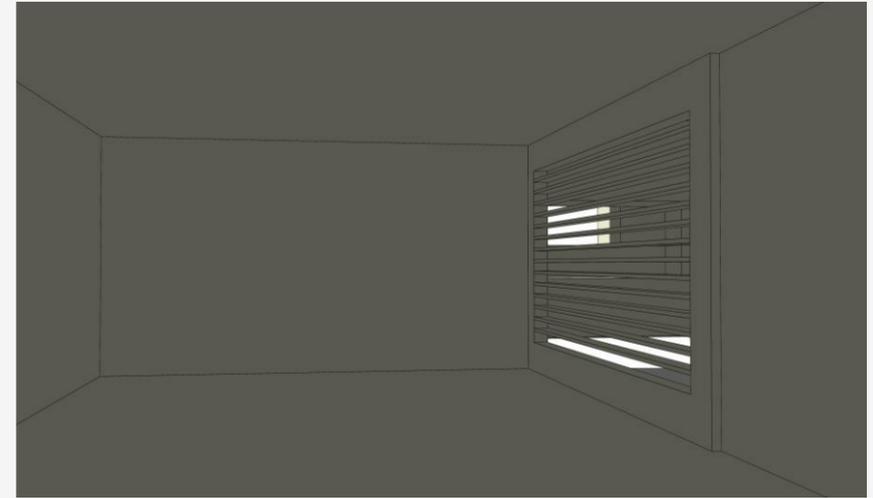
WINTER SOLSTICE
FEBURARY



7AM

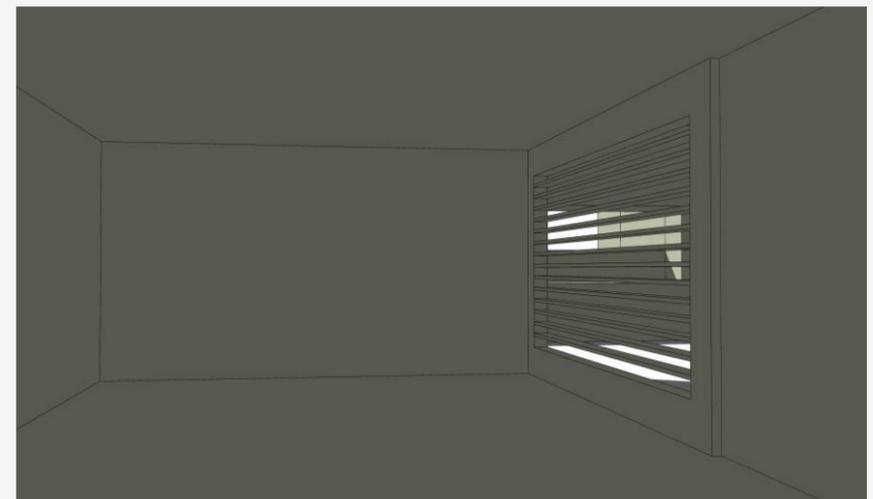
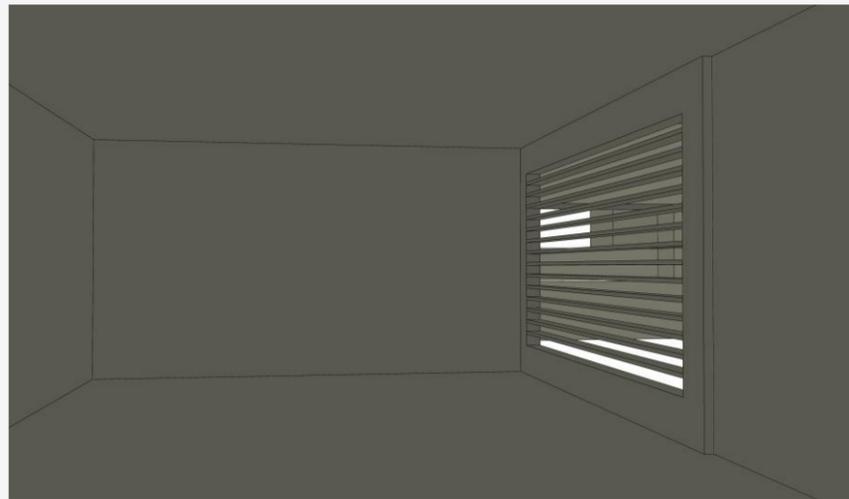
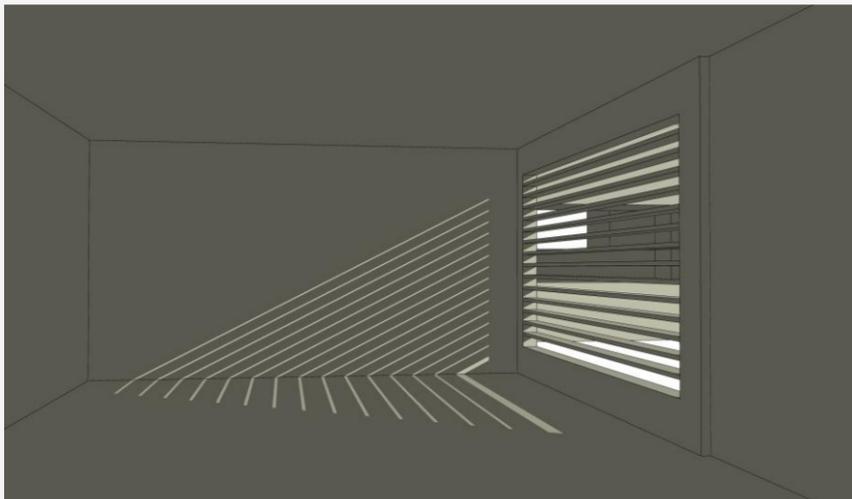


12PM



3PM

SUMMER SOLSTICE
AUGUST

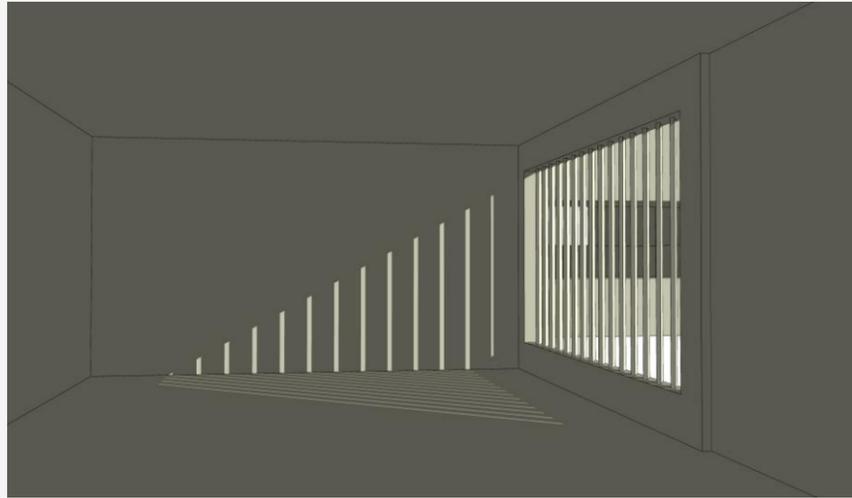


- Blocks high-angle sun in summer while allowing low-angle winter sun (passive solar gain)
- Provides good daylighting while minimizing glare

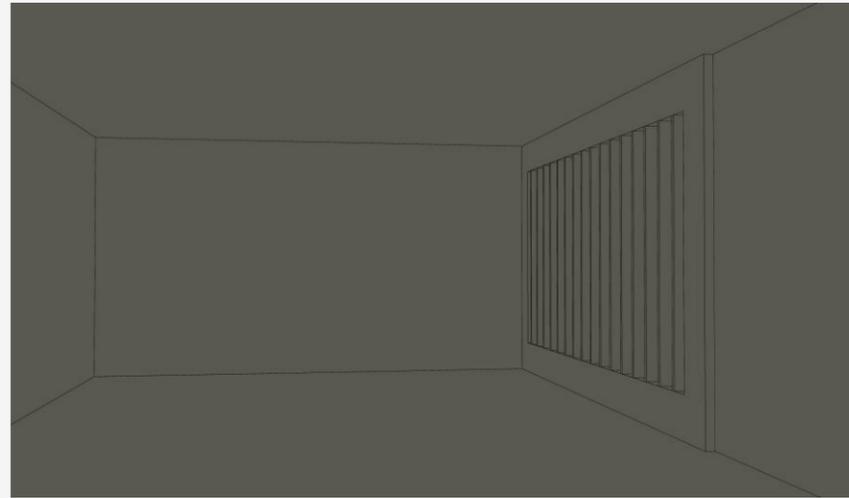
Louvre Testing

Rotated Vertical Louvres, East Facing (exposed to morning sun)

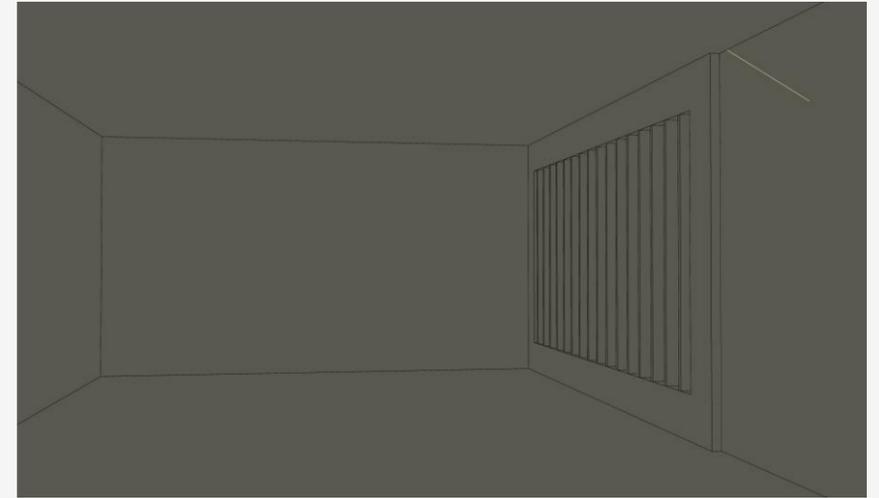
WINTER SOLSTICE
FEBURARY



7AM

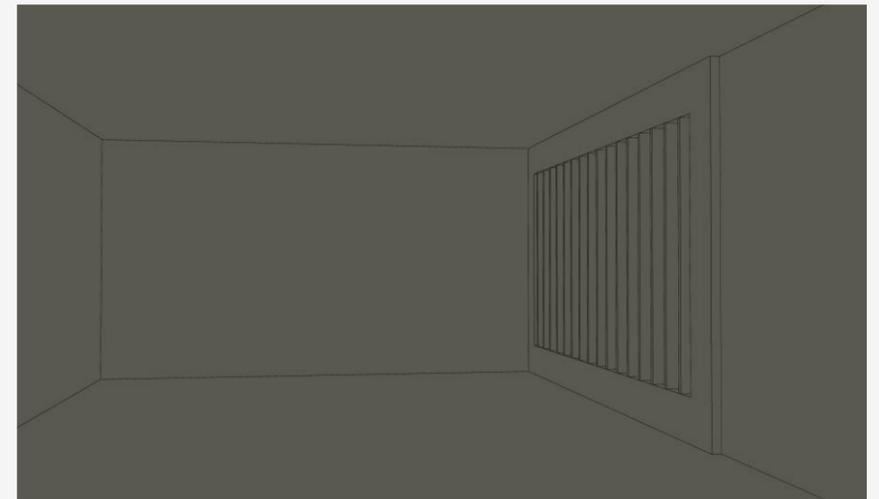
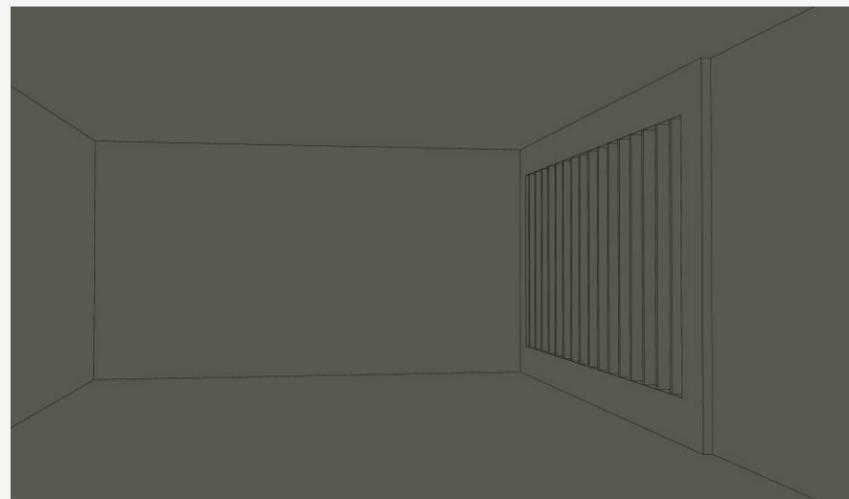
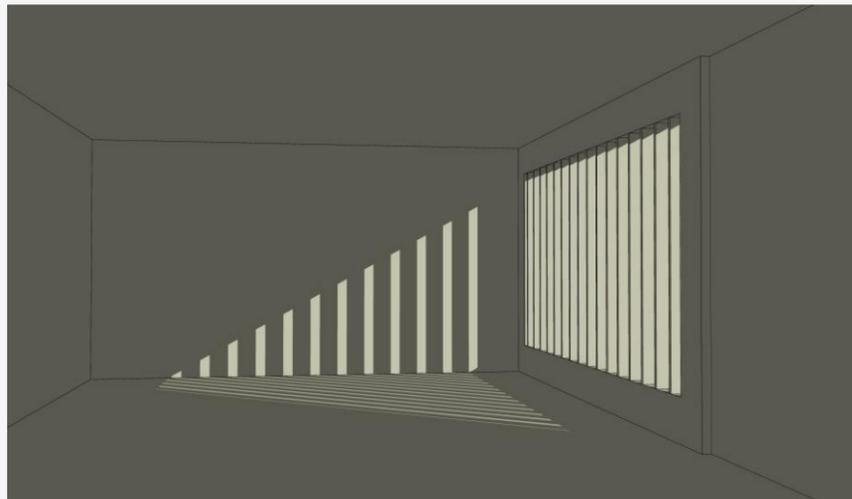


12PM



3PM

SUMMER SOLSTICE
AUGUST

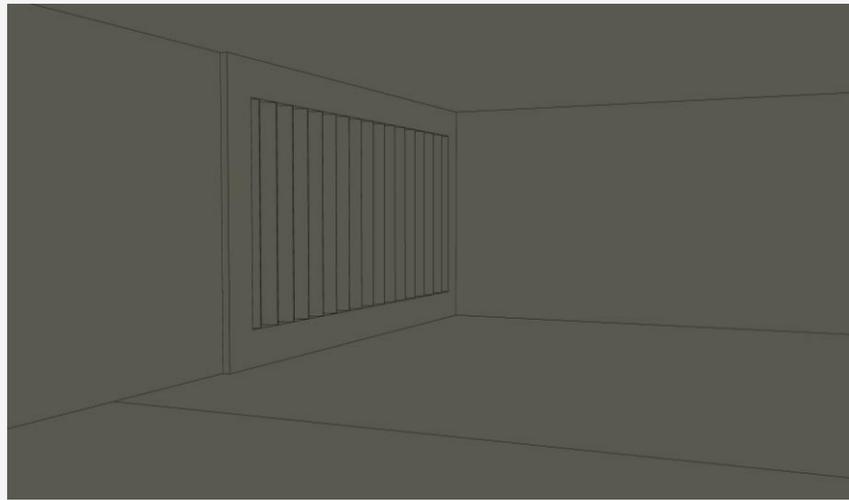


Horizontal louvres are more suited for the east facing façade

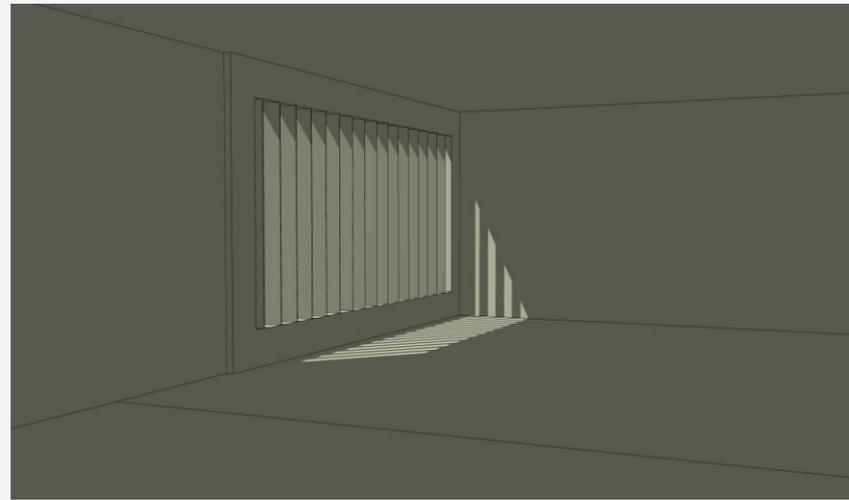
Louvre Testing

Rotated Vertical Louvres, West Facing (exposed to afternoon sun)

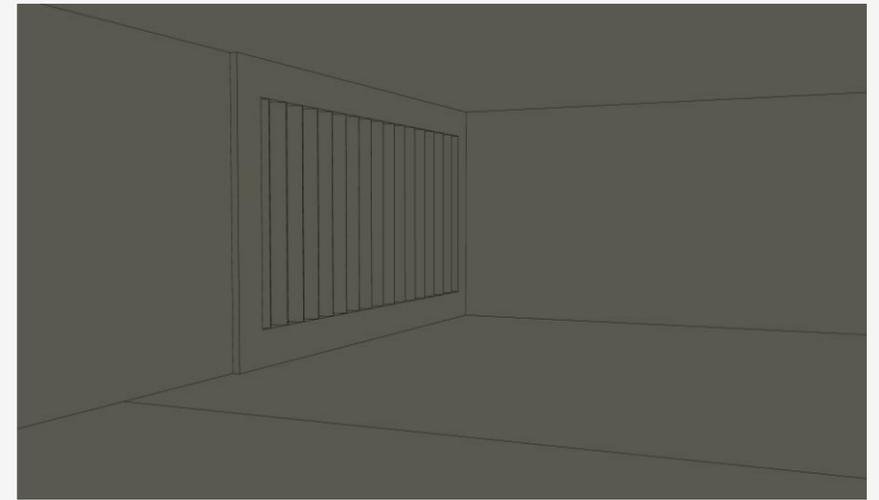
WINTER SOLSTICE
FEBRUARY



7AM

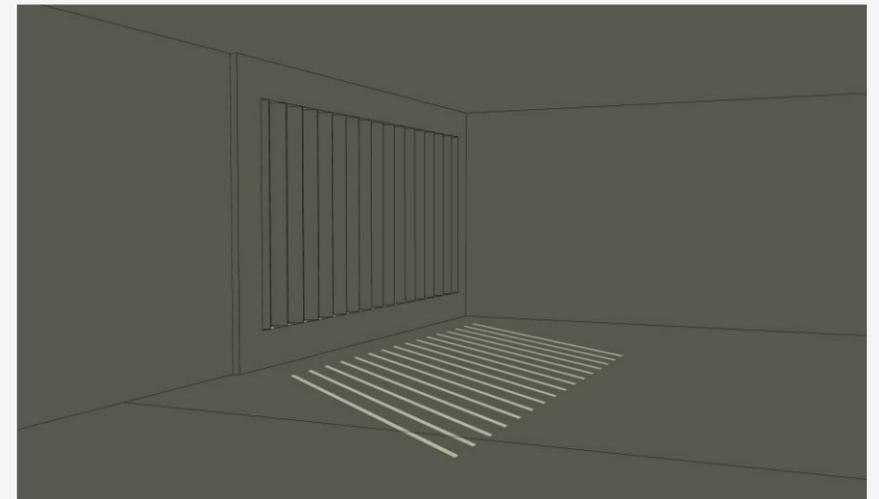
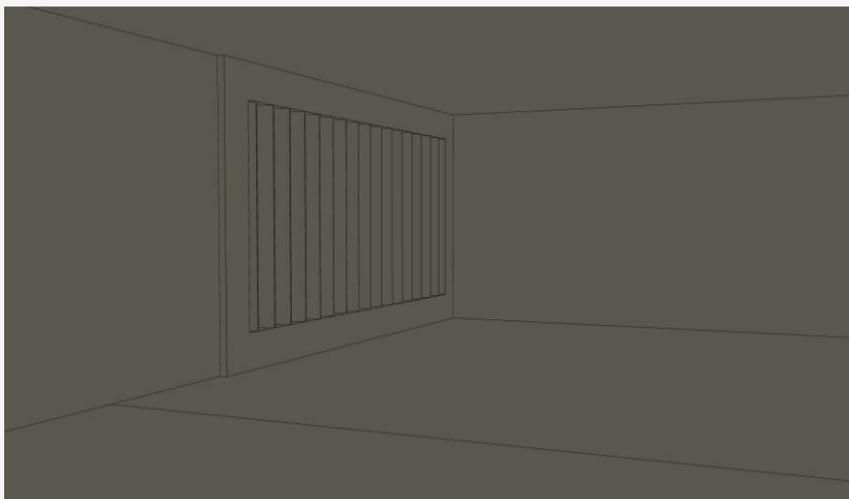


12PM



3PM

SUMMER SOLSTICE
AUGUST

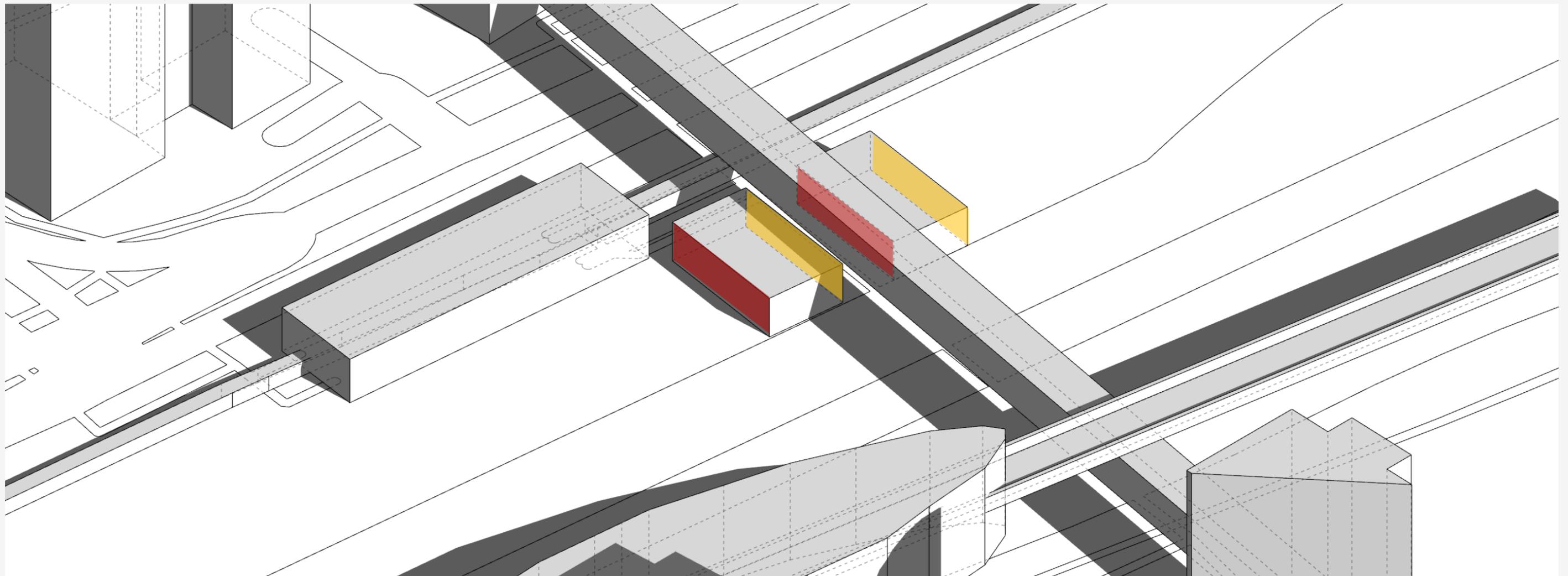
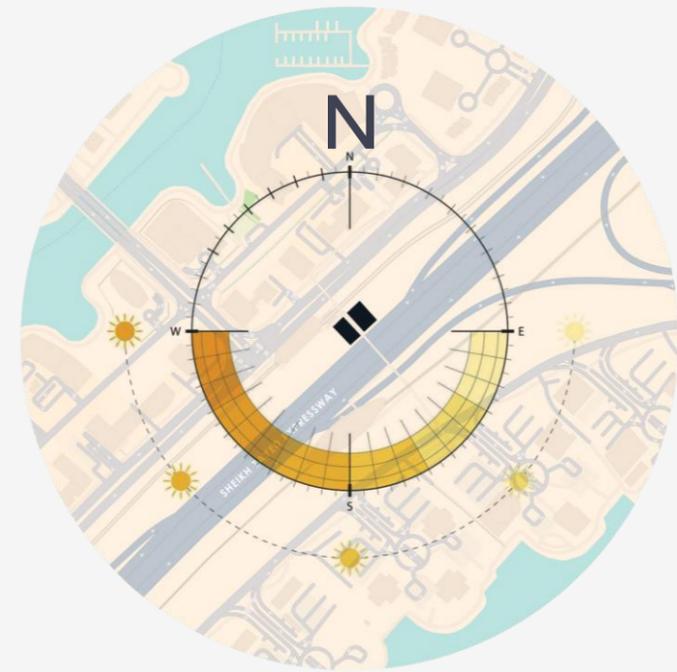


- Blocks low-angle morning and afternoon sun
- Better suited for sun control throughout the day (especially in tropical/hot climates)

Louvre Placement Study

VERTICAL Louvres, West Facing (exposed to afternoon sun)

HORIZONTAL Louvres, East Facing (exposed to morning sun)



Research Design Strategies

Gathered through literature review, environmental analysis and site visit

Factor

Goal

Design Response

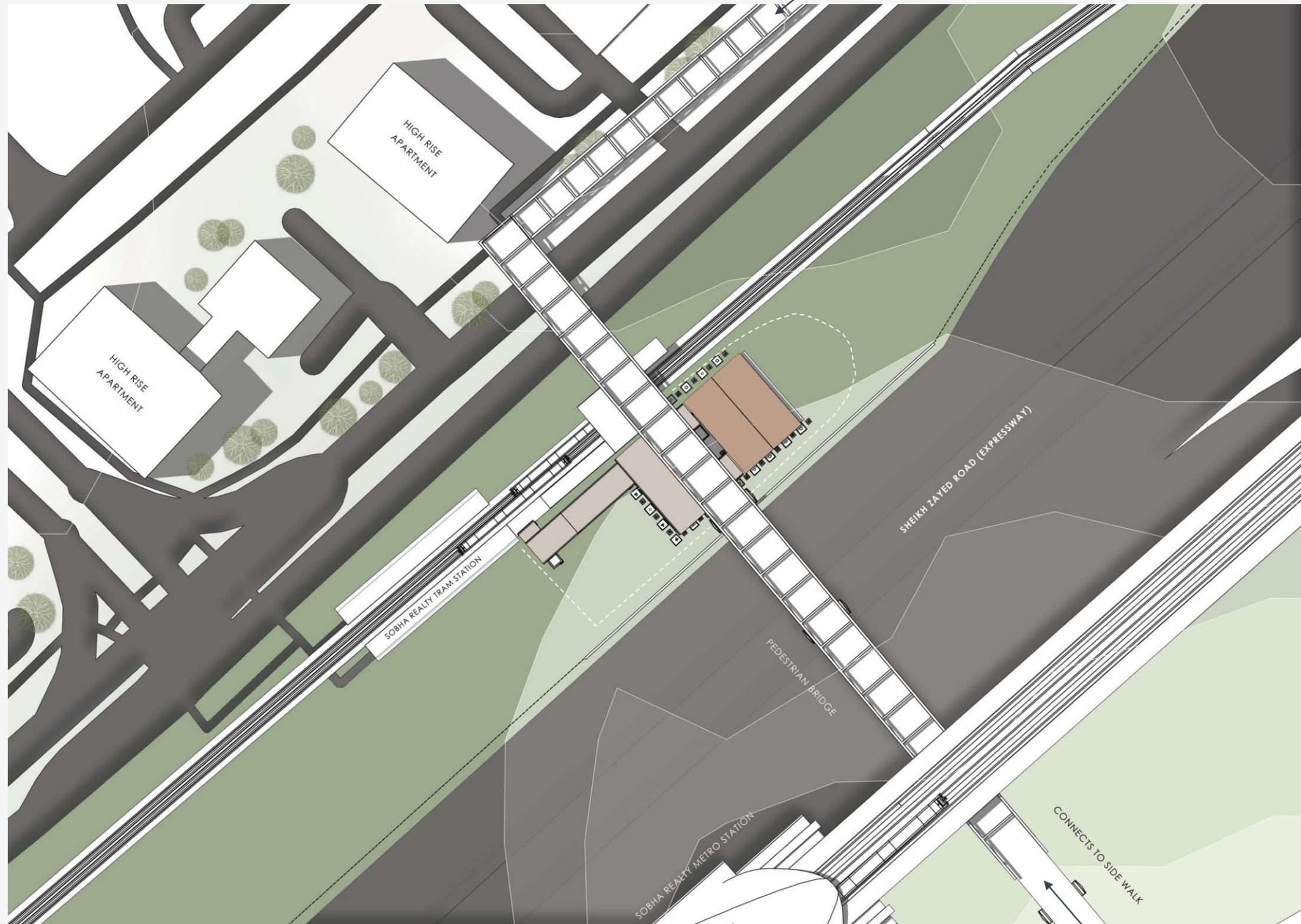
Sun (undesirable) →	Reduce heat gain →	Orientation, shading devices , reflective surfaces
Wind (desirable) →	Enable passive cooling →	Indirect capture , filtering, wind towers
Sandstorms (problem) →	Minimize dust infiltration →	Filtered air paths, angled openings, screens
Thermal mass →	Delay and reduce heat transfer →	Heavy materials , insulated envelopes
Behavioural Patterns →	Create habitable leisure and work areas →	Oriented to views, secure, peaceful, thermally comfortable
Form efficiency →	Reduce solar exposure →	Compact, courtyard , modular design
Seating Preference →	Provide seating options →	Introduce various seating types, outdoors and indoors
Pedestrian Safety →	Promote safe public spaces →	Visual openness, presence of activities that brings diversity



Site Plan

1:1000

SITE IS ACCESSED FROM THE PEDESTRIAN BRIDGE ON SIDEWALK



SITE IS ACCESSED FROM THE PEDESTRIAN BRIDGE ON SIDEWALK



Site Plan Cross Section

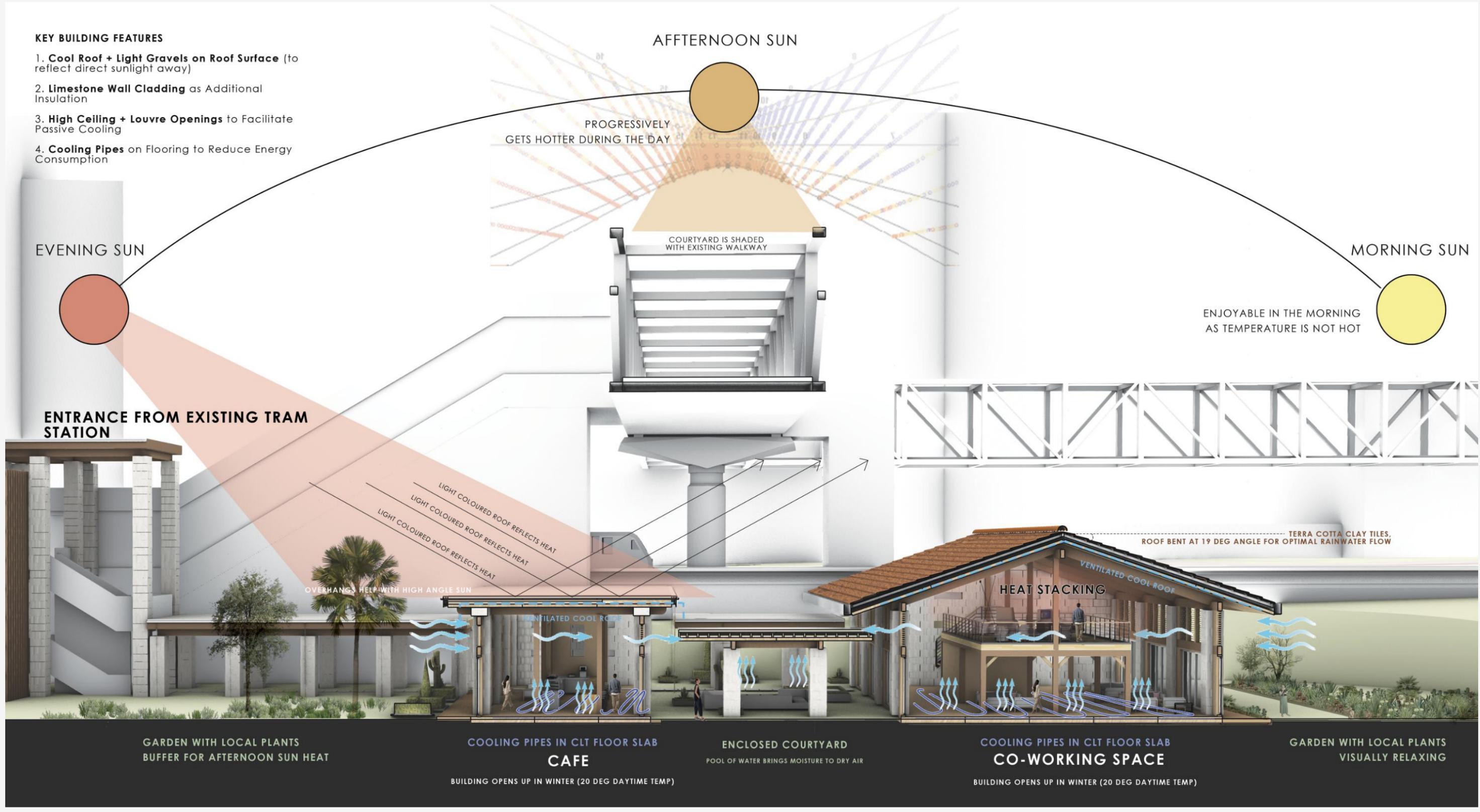
1:1000



Key Building Features (refer to poster)

KEY BUILDING FEATURES

1. **Cool Roof + Light Gravels on Roof Surface** (to reflect direct sunlight away)
2. **Limestone Wall Cladding** as Additional Insulation
3. **High Ceiling + Louvre Openings** to Facilitate Passive Cooling
4. **Cooling Pipes** on Flooring to Reduce Energy Consumption



GARDEN WITH LOCAL PLANTS
BUFFER FOR AFTERNOON SUN HEAT

COOLING PIPES IN CLT FLOOR SLAB
CAFE

BUILDING OPENS UP IN WINTER (20 DEG DAYTIME TEMP)

ENCLOSED COURTYARD
POOL OF WATER BRINGS MOISTURE TO DRY AIR

COOLING PIPES IN CLT FLOOR SLAB
CO-WORKING SPACE

BUILDING OPENS UP IN WINTER (20 DEG DAYTIME TEMP)

GARDEN WITH LOCAL PLANTS
VISUALLY RELAXING

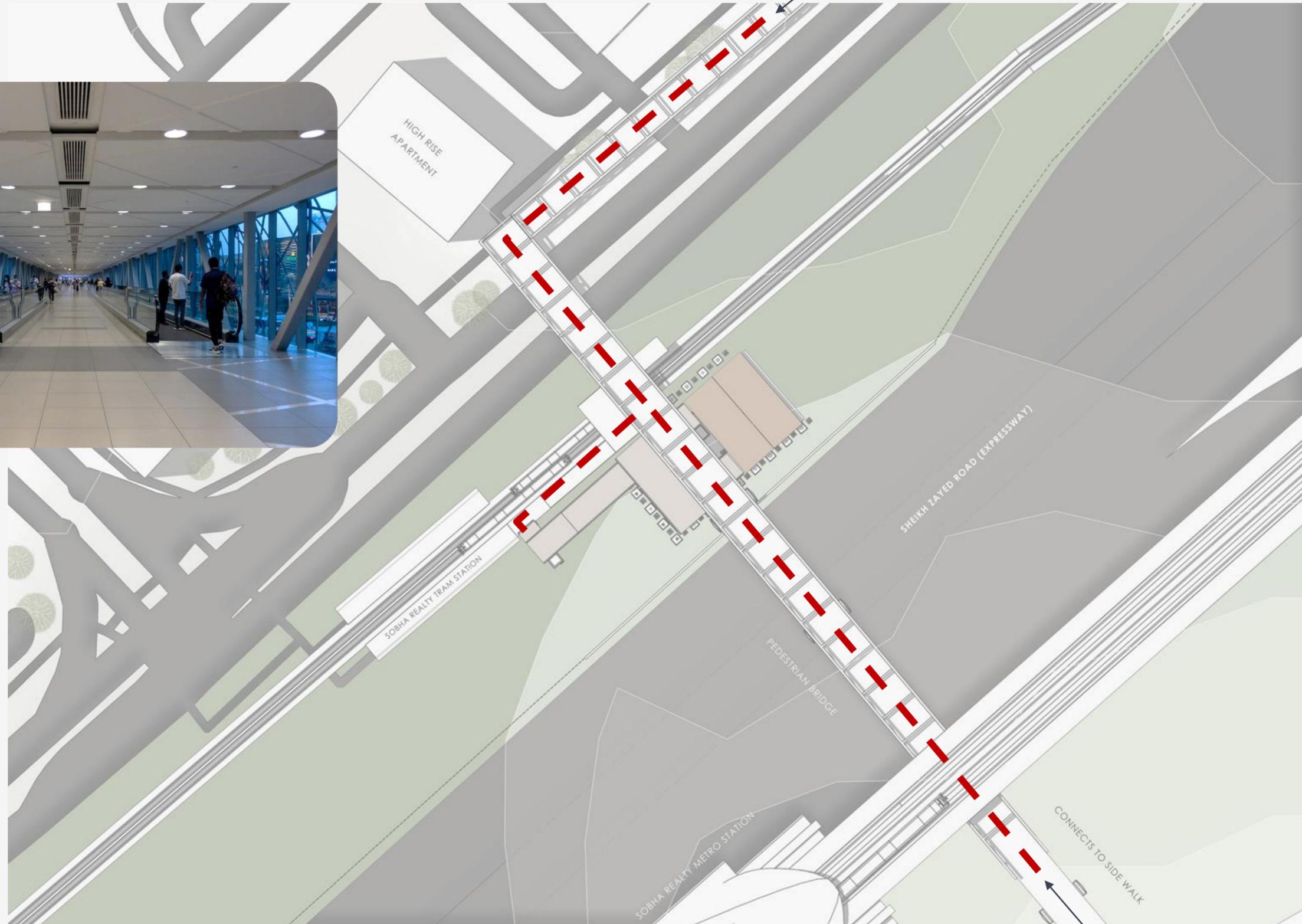


Site Plan

1:1000



SITE IS ACCESSED FROM THE PEDESTRIAN BRIDGE ON SIDEWALK

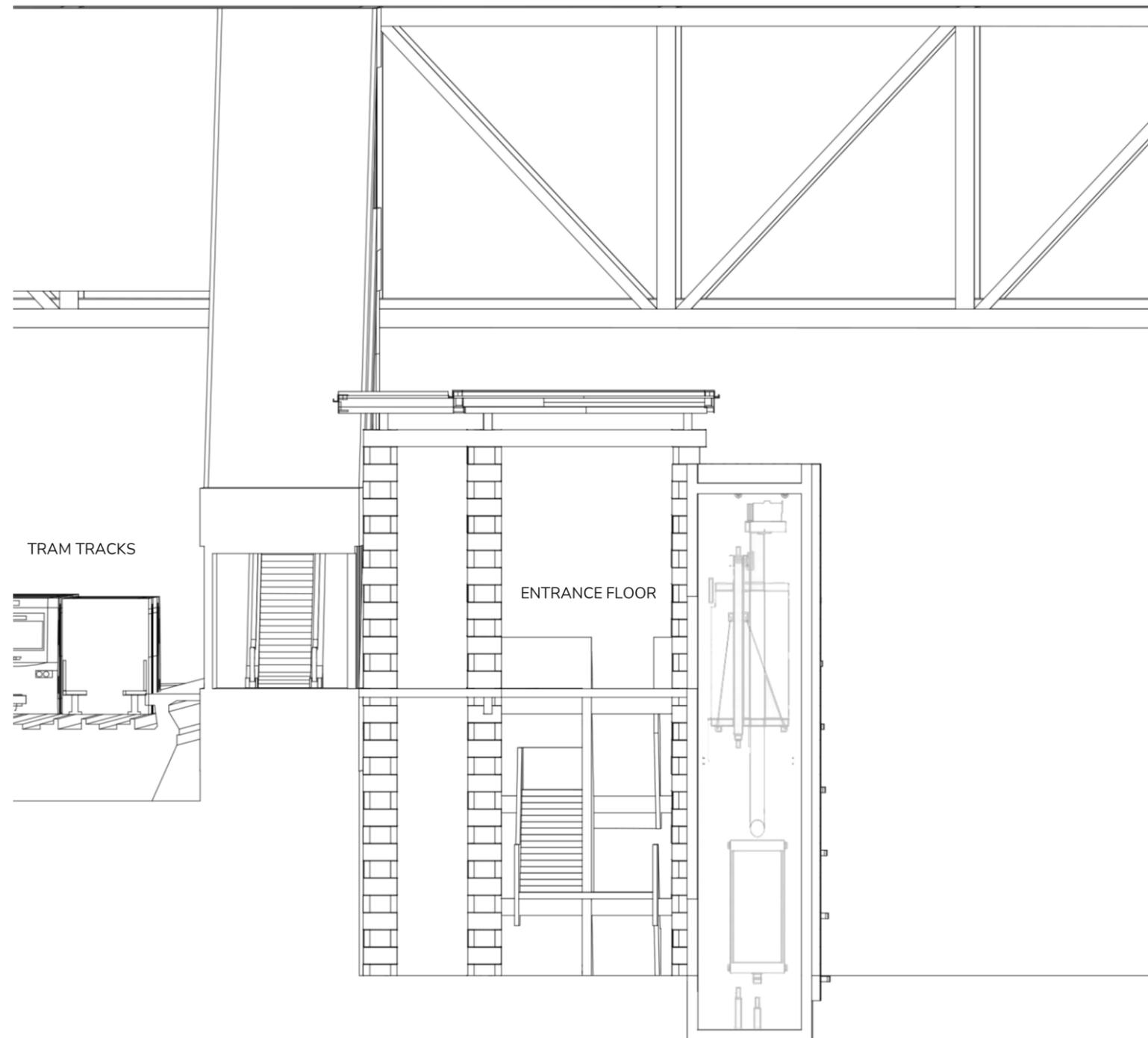


SITE IS ACCESSED FROM THE PEDESTRIAN BRIDGE ON SIDEWALK

Cross Section CC Entrance Stairs

1:100

SITE IS ACCESSED FROM THE PEDESTRIAN BRIDGE ON SIDEWALK



Perspective From Entrance Walkway

SHADED WALKWAY LEADING TO CAFÉ
AN ESCAPE FROM THE CITY WITHIN ITSELF





Ground Floorplan SEATING PATTERNS

1:100

TO LINKWAY

TRAM TRACK ABOVE



ESCALATOR ABOVE FROM LINKWAY

USE OF ROOF AREA

TO TRAM STATION

OUTDOOR GARDEN

LONG SECTION

ENTRANCE

SHELTERED WALKWAY

RECEPTION

CO-SHARING OFFICE SPACE

WC

PANTRY

COURTYARD

CAFE KITCHEN

BAR SEATING

OUTDOOR PICNIC

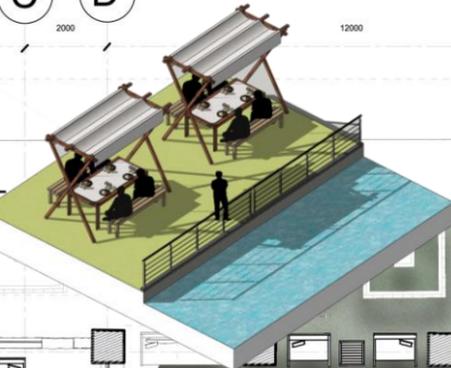
ENCLOSED INDOOR SEATS

CO-SHARING OFFICE SPACE

TOWARDS VIEW

CAFE INDOOR SEATING

ROUND SEATING - LARGE GROUPS



CROSS SECTION BB

CROSS SECTION AA

5

2

3

4

Perspective from Café

OPENESS AND PERMEABILITY
FRAMED VIEWS THAT LOOK OUTWARDS



Cross Section AA Cafe Building

1:100

SITE IS ACCESSED FROM THE PEDESTRIAN BRIDGE ON SIDEWALK

FLAT ROOF WITH SOLAR REFLECTIVE CHIPPINGS

5

4

3

2

1

5000

5000

5000

5000

GREEN BUFFER

INDOOR CAFE

CAFÉ COUNTER

BACK OF KITCHEN

INDOOR CAFE

SERVICES, BACK OF HOUSE



Perspective from Café

OPEN PLAN CONCEPT
CAFÉ COUNTER INTERACTS WITH VISITORS' CIRCULATION



Perspective from Courtyard

ENCLOSED SANCTUARY
SHADED OUTDOOR SPACE THAT CONNECTS THE FUNCTION OF
CAFÉ AND CO-WORKING SPACE



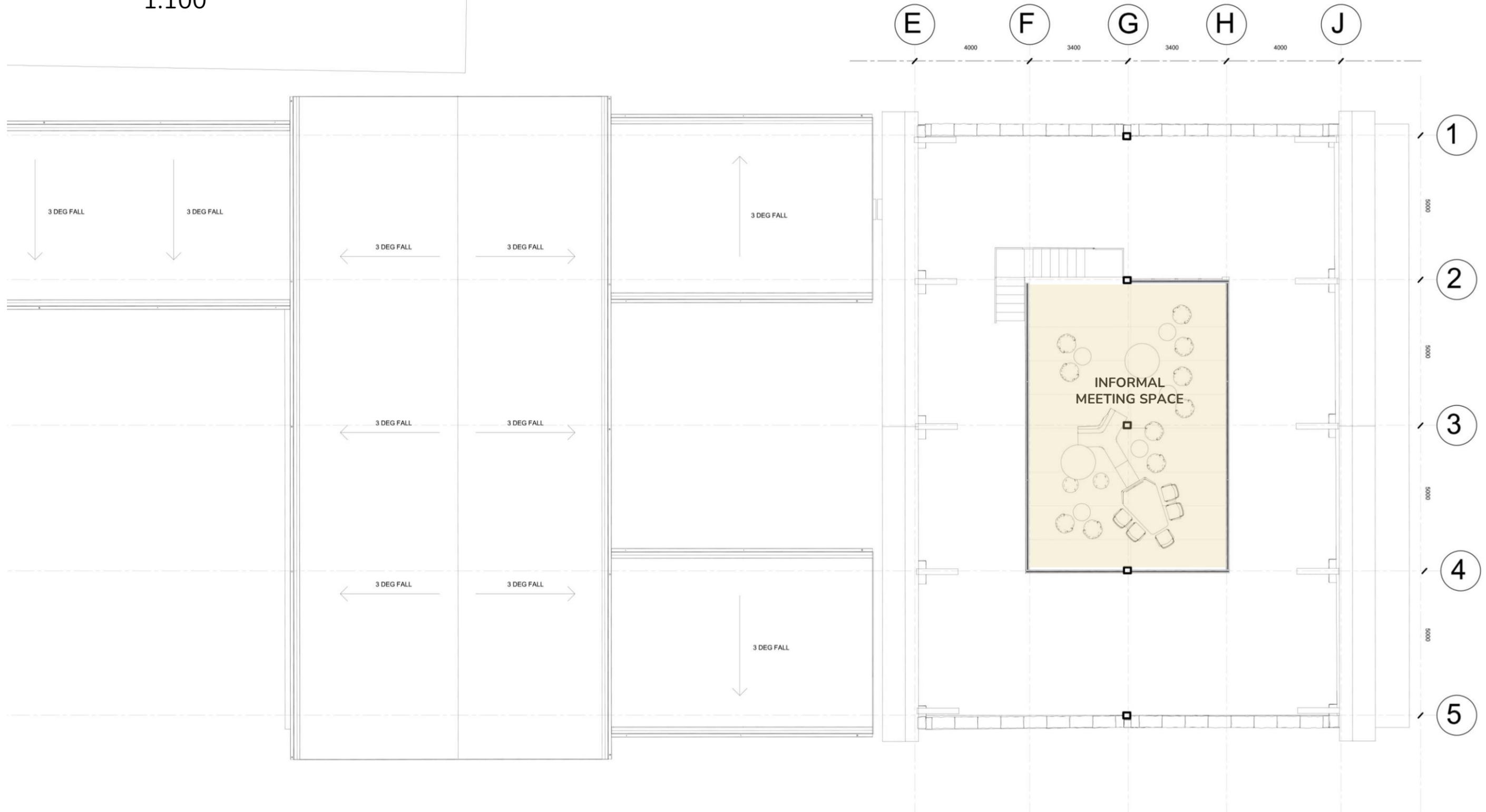
Perspective from Co-working Space

ENCLOSED SANCTUARY
SHADED OUTDOOR SPACE THAT CONNECTS THE FUNCTION OF
CAFÉ AND CO-WORKING SPACE



Upper Floorplan

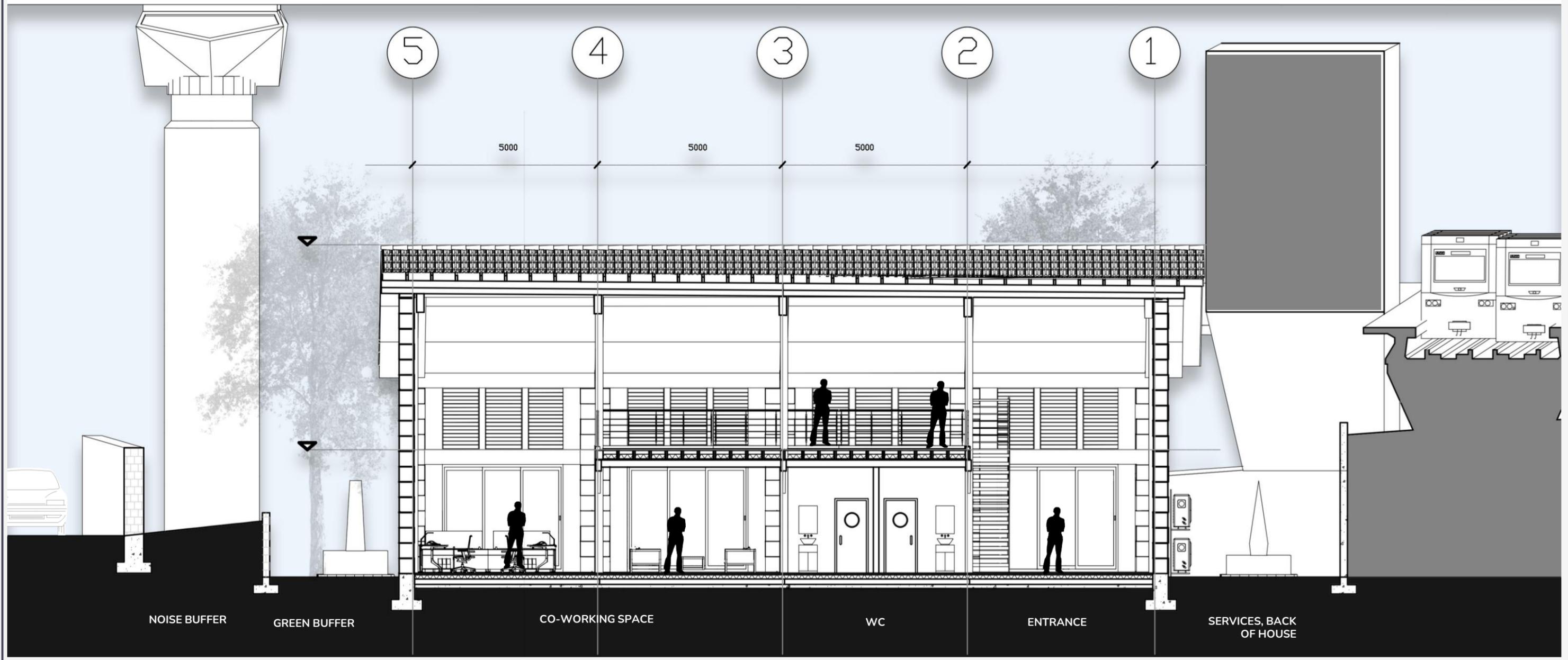
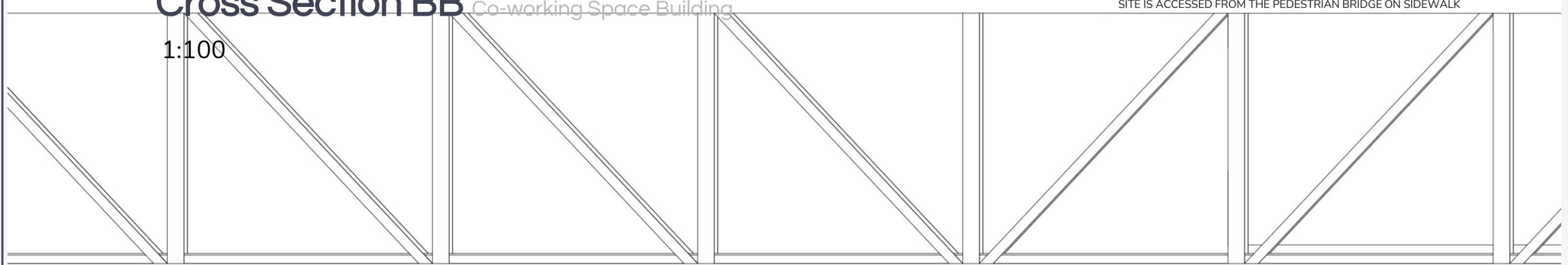
1:100



Cross Section BB Co-working Space Building

SITE IS ACCESSED FROM THE PEDESTRIAN BRIDGE ON SIDEWALK

1:100



NOISE BUFFER

GREEN BUFFER

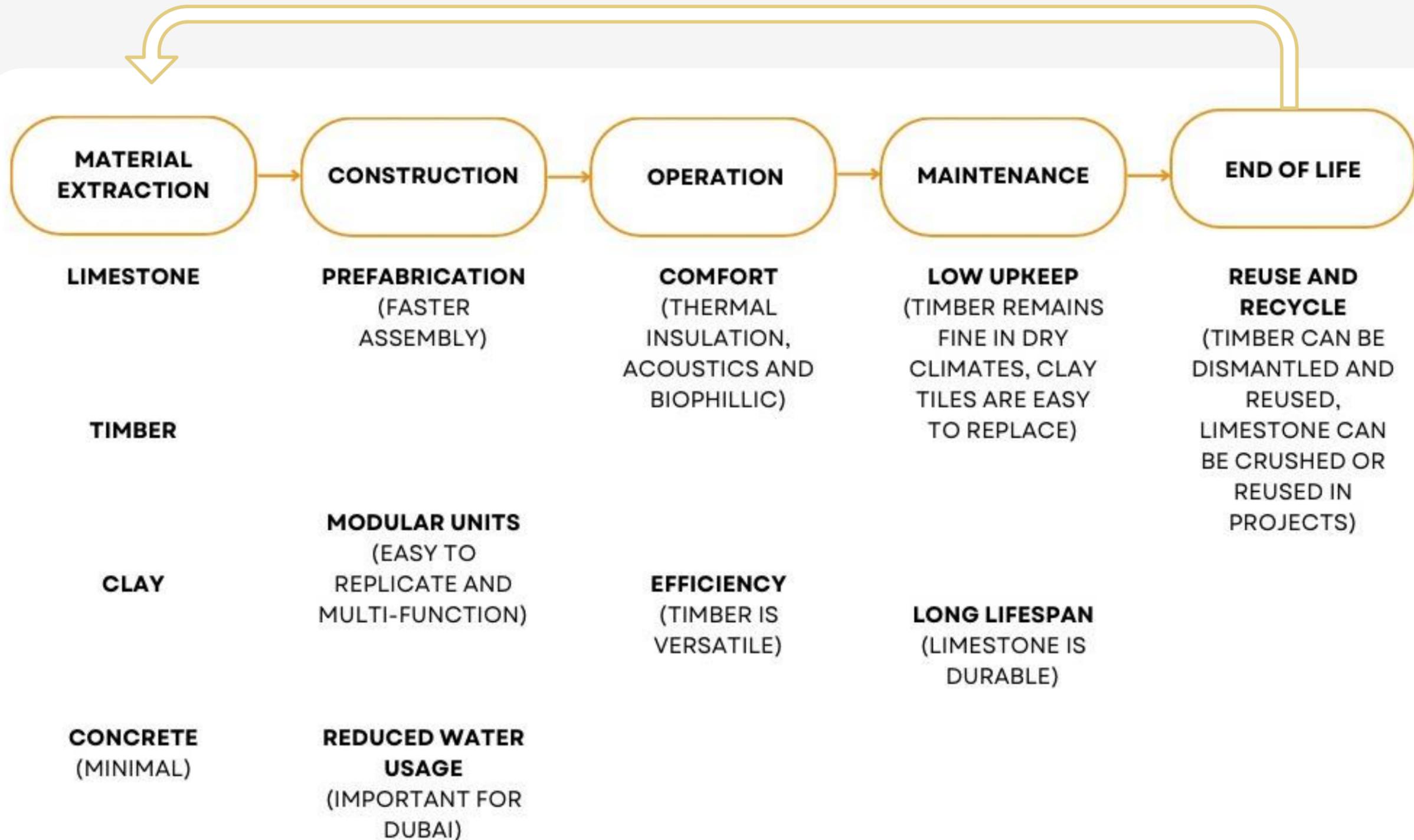
CO-WORKING SPACE

WC

ENTRANCE

SERVICES, BACK OF HOUSE

Building Life Cycle : with reference to climate section

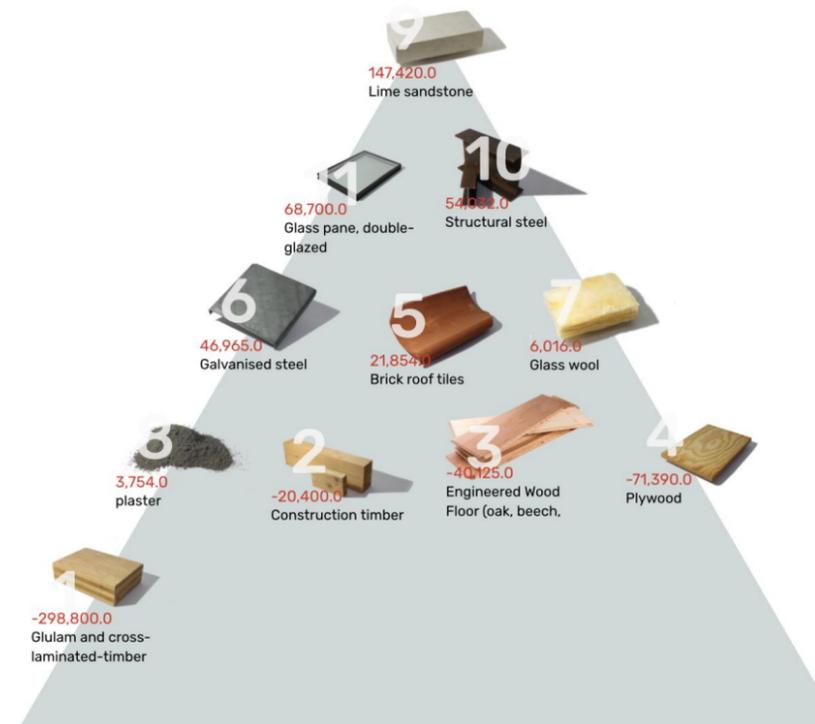


Building Carbon Footprint

(estimate)

- The project achieves a net negative carbon footprint due to the use of timber-based materials
- Glulam, CLT, plywood, and engineered wood significantly reduce embodied carbon, acting as major carbon sinks
- Although timber is imported, its carbon sequestration benefits outweigh the emissions from long-distance transport in most scenarios
- Lime sandstone, while the highest emitter among the materials, is locally sourced and performs well in Dubai's hot climate due to its thermal mass properties
- The material strategy is aimed at a **balanced approach between reducing embodied emissions and enhancing operational energy efficiency**

THE CONSTRUCTION MATERIAL PYRAMID



| kg CO₂ eq
| module A1-A3

Your pyramid:
-81,974.0 kg CO₂ eq

60,580 (lower) as compared to using concrete

	material	group	impact / m3	volume [m3]	area [m2]	thickness [mm]	result
1	Glulam and cross-laminated-timber CLT	trae	-664.0 kg CO2eq/m3	450 m3			-298,800.0 kg CO ₂ eq
2	Construction timber	trae	-680.0 kg CO2eq/m3	30 m3			-20,400.0 kg CO ₂ eq
3	Engineered Wood Floor (oak, beech, ash)	biobaseret	-535.0 kg CO2eq/m3	75 m3			-40,125.0 kg CO ₂ eq
4	Plywood	trae	-649.0 kg CO2eq/m3	110 m3			-71,390.0 kg CO ₂ eq
5	Brick roof tiles	mineralsk	624.4 kg CO2eq/m3	35 m3			21,854.0 kg CO ₂ eq
6	Galvanised steel	metal	23482.5 kg CO2eq/m3	2 m3			46,965.0 kg CO ₂ eq
7	Glass wool	mineralsk	12.8 kg CO2eq/m3	470 m3			6,016.0 kg CO ₂ eq
8	plaster	mineralsk	187.7 kg CO2eq/m3	20 m3			3,754.0 kg CO ₂ eq
9	Lime sandstone	mineralsk	226.8 kg CO2eq/m3	650 m3			147,420.0 kg CO ₂ eq
10	Structural steel	metal	5403.2 kg CO2eq/m3	10 m3			54,032.0 kg CO ₂ eq
11	Glass pane, double-glazed	komponenter	4580.0 kg CO2eq/m3	15 m3			68,700.0 kg CO ₂ eq
							-81,974.0 kg CO₂ eq

Construction Exploded Axo

Hybrid System

1. Material Optimization by Function

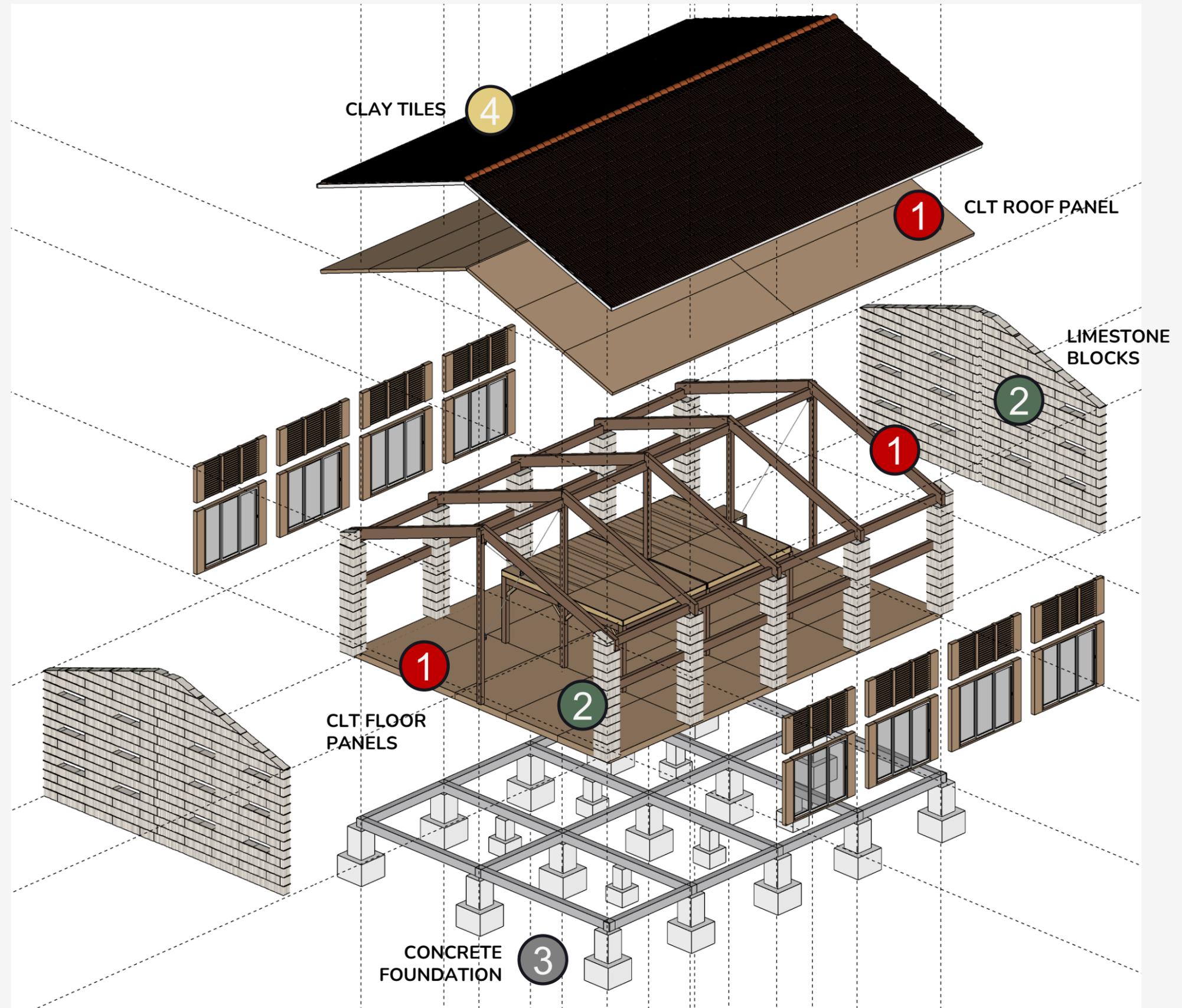
Limestone columns are used only for compressive loads, which aligns with the material's structural strengths. Timber handles tensile and lateral loads, offering flexibility, seismic performance, and carbon savings.

2. Carbon-Optimized Design

CLT (Cross-Laminated Timber) floors provide significant carbon sequestration, contributing to the building's net-negative carbon footprint.

3. Thermal and Environmental Performance

Limestone's thermal mass enhances passive cooling, reducing HVAC loads in Dubai's hot climate. The combination of massive walls (thermal lag) and lightweight interior timber (faster conditioning) creates a responsive thermal envelope.



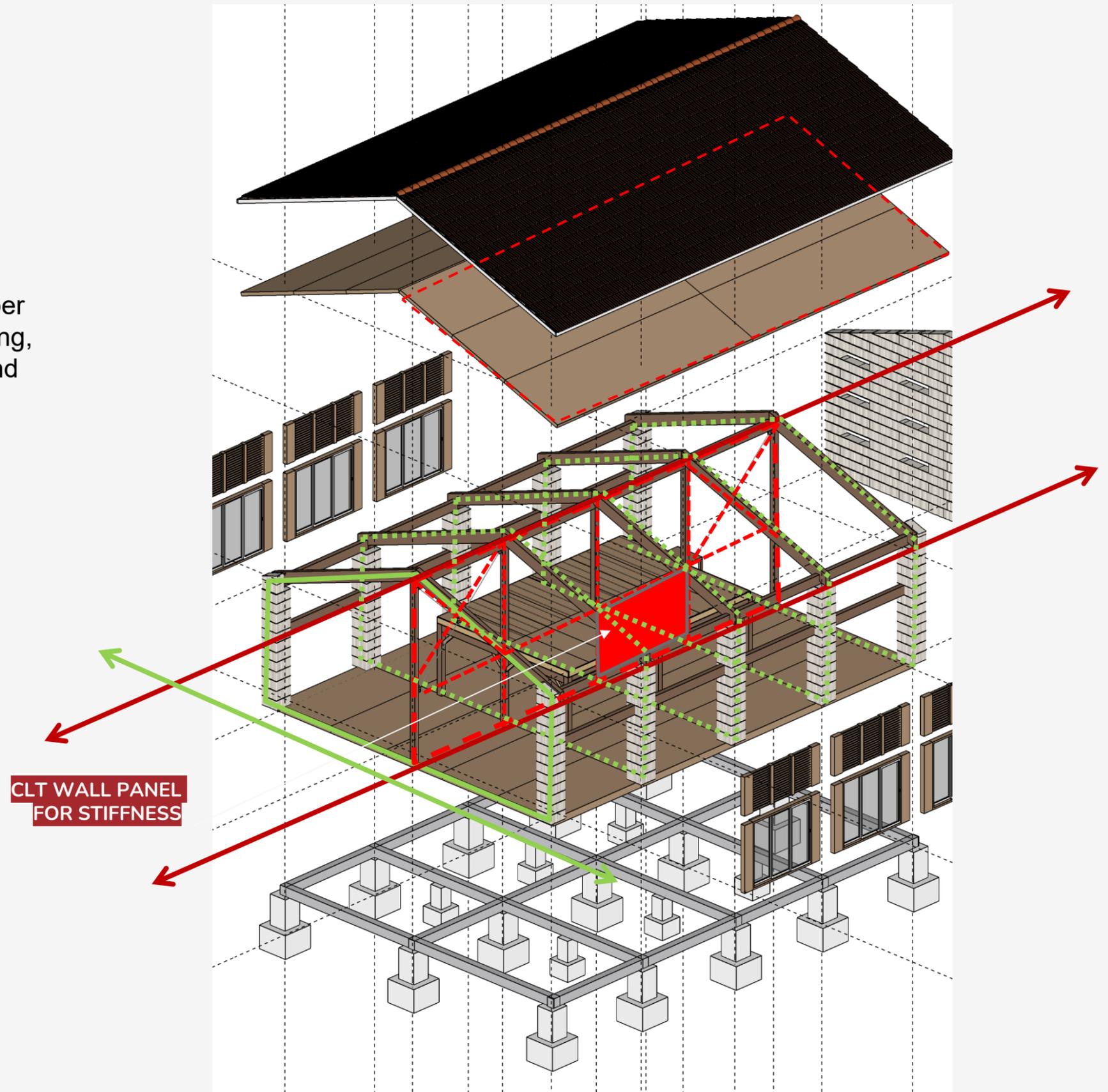
Construction Exploded Axo

Hybrid System

4. Structural Stability

The inclusion of a cable truss system between timber columns and CLT walls provides bidirectional bracing, tensile reinforcement and lateral stability under wind or seismic loads.

The CLT deck and roof ties the structure together and adding stiffness.



Construction Exploded Axo

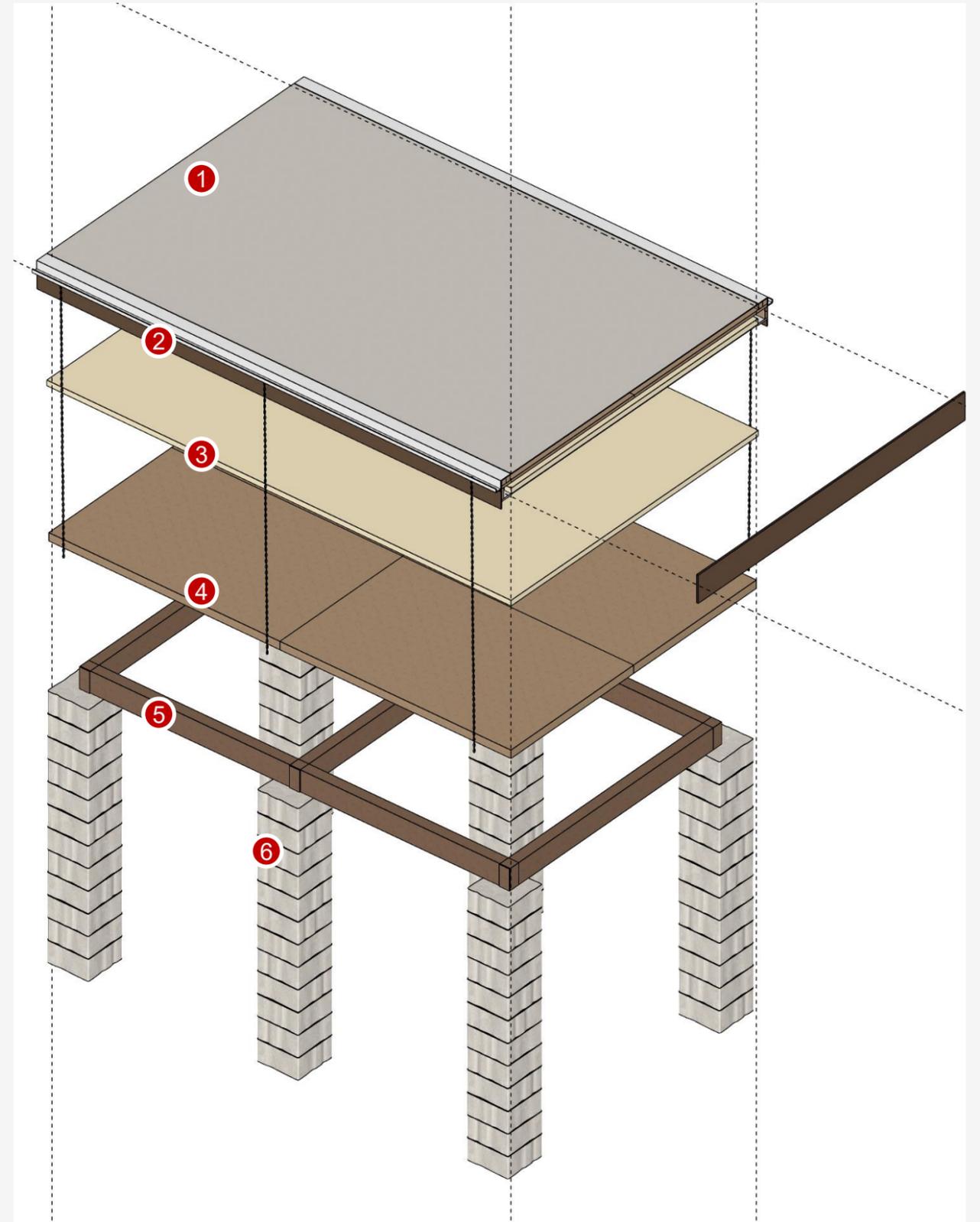
Hybrid System

5. Modularity (grid)

Limestone column build up, joined with cement and mortar. 800 x 800 limestone blocks.



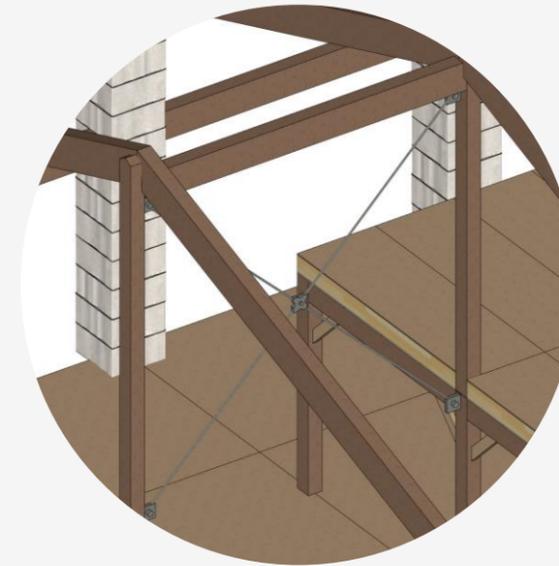
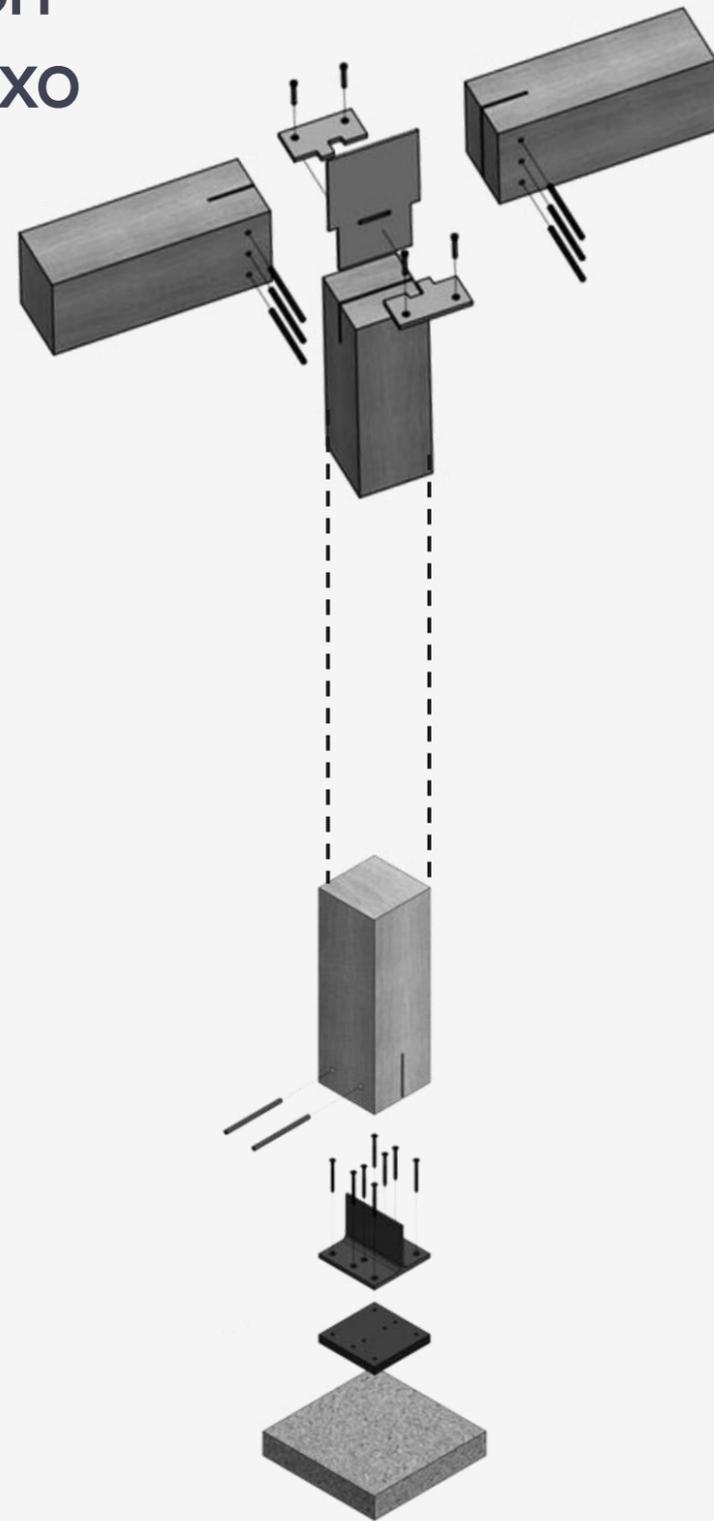
Shown in photo: Can Lis by Jorn Utzon.



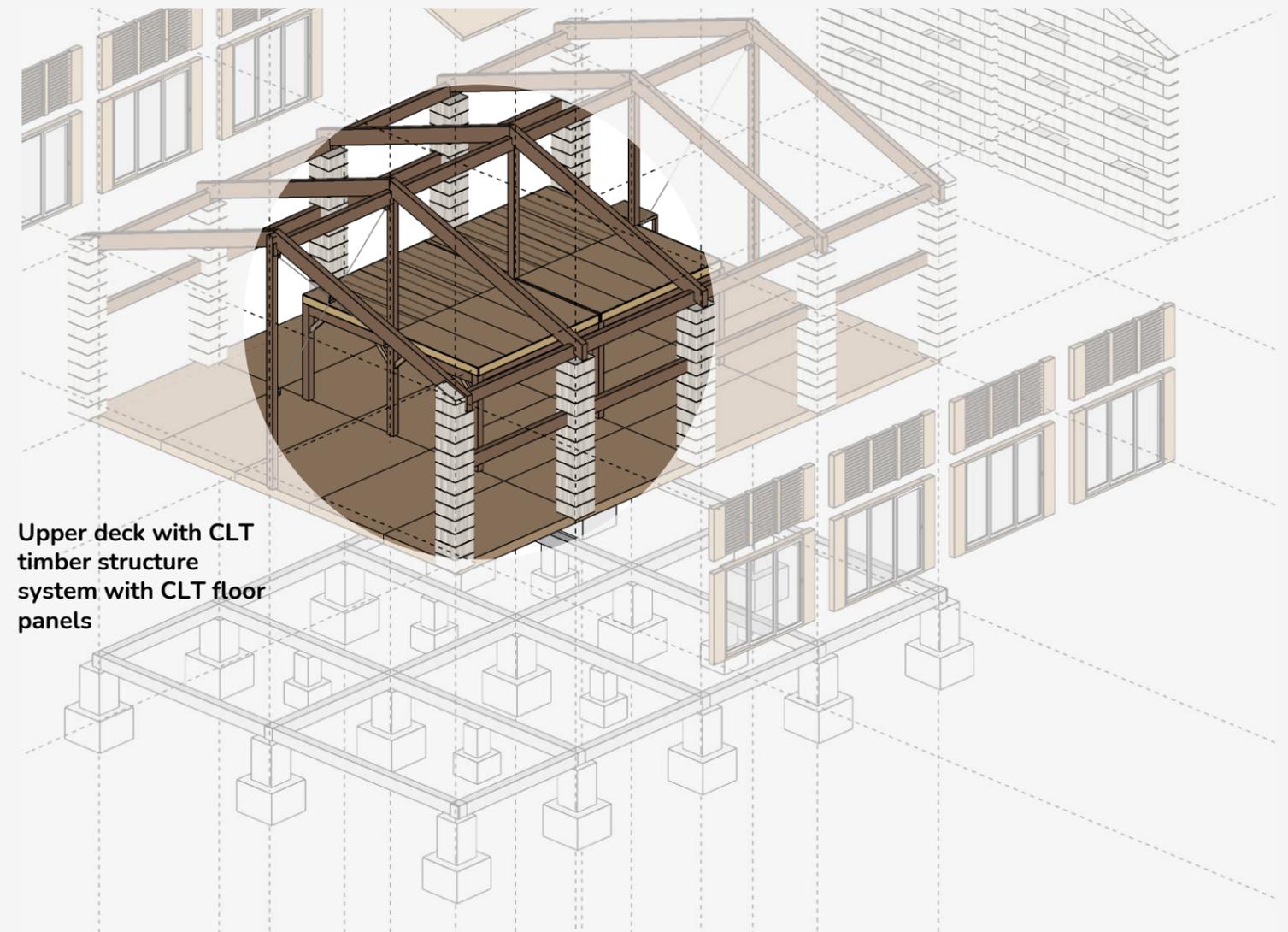
Construction Exploded Axo

Hybrid System

Timber Joints and Cable Bracing to be held by bolted stainless steel plates for simplicity



Stainless Steel Cable Bracing, held by steel plates



Upper deck with CLT timber structure system with CLT floor panels

Simplified Logistics and Transportation

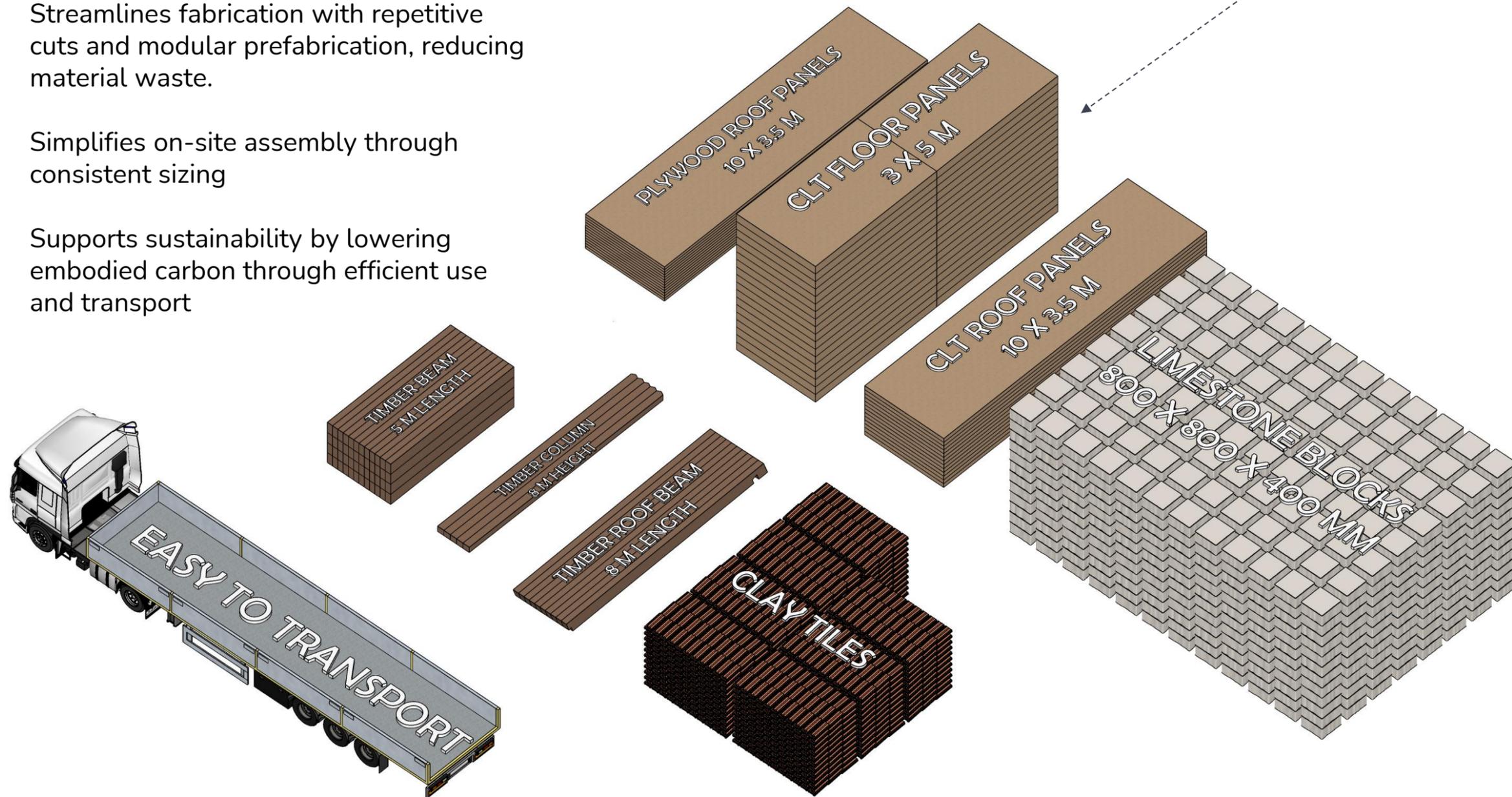
Hybrid System

Eases transportation by enabling bulk shipping and compact packing, especially for imported timber.

Streamlines fabrication with repetitive cuts and modular prefabrication, reducing material waste.

Simplifies on-site assembly through consistent sizing

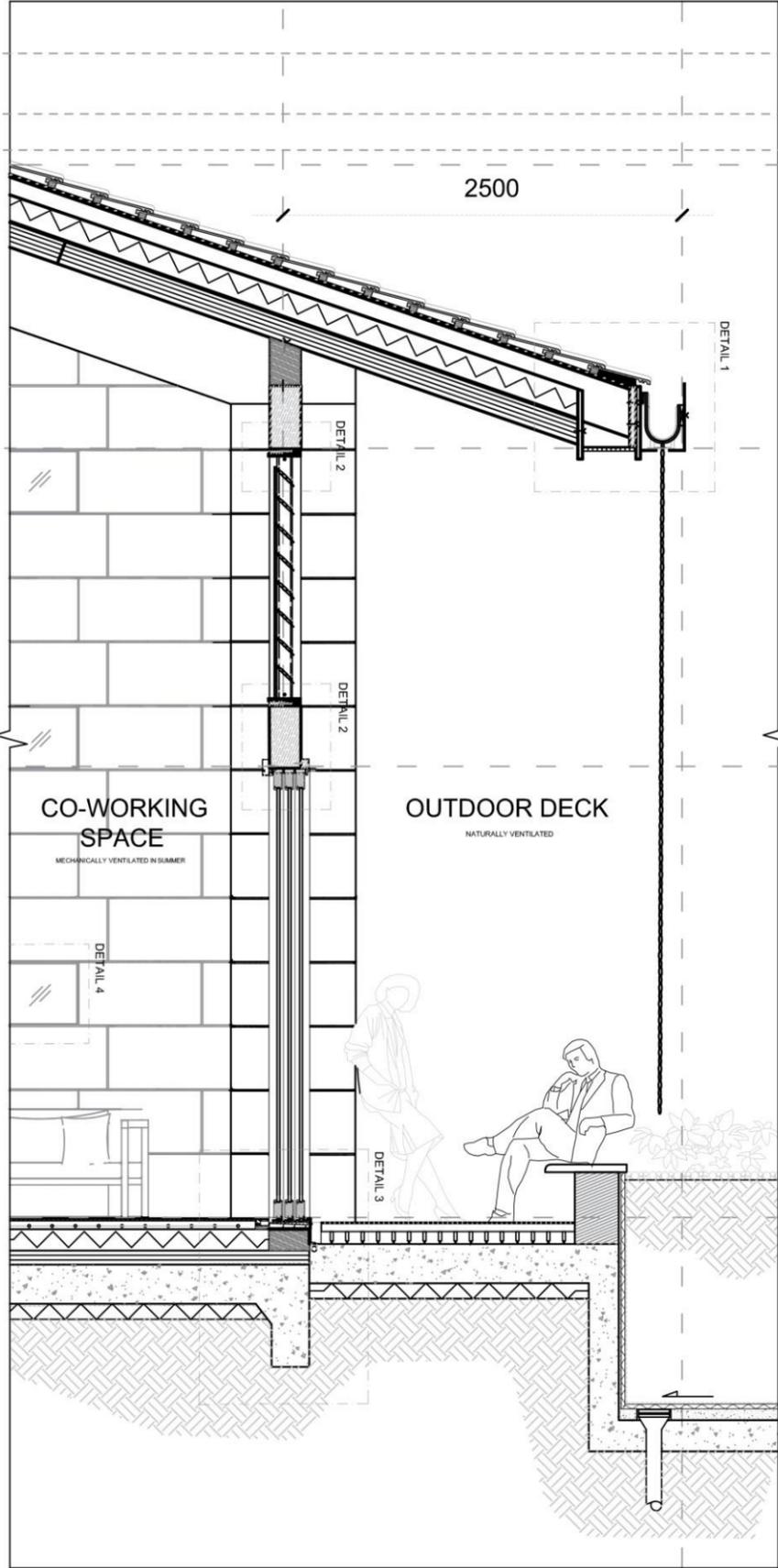
Supports sustainability by lowering embodied carbon through efficient use and transport



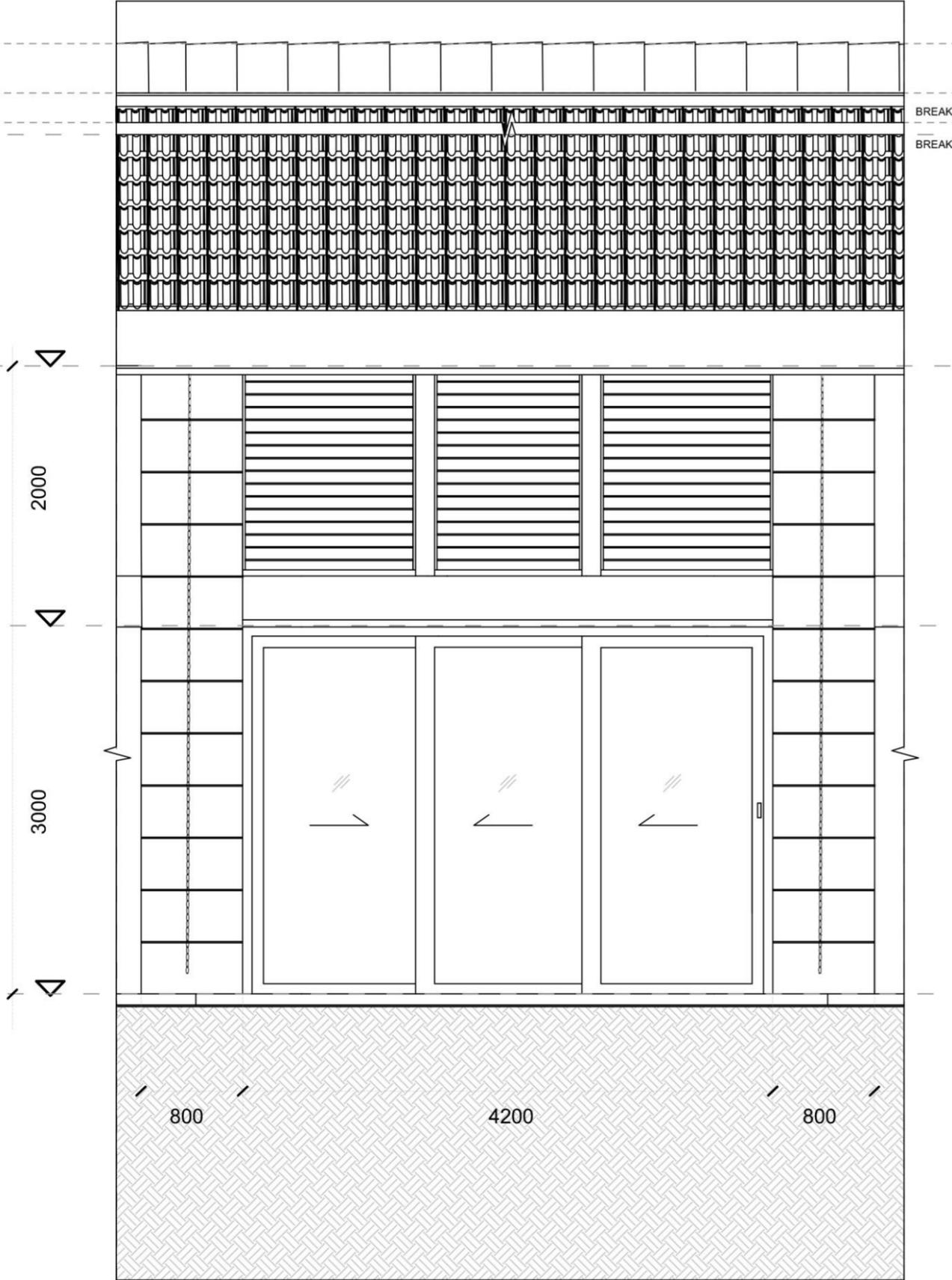
Fragment

Co-working Space

Work area that looks outwards to the deck, garden and the skyscrapers beyond



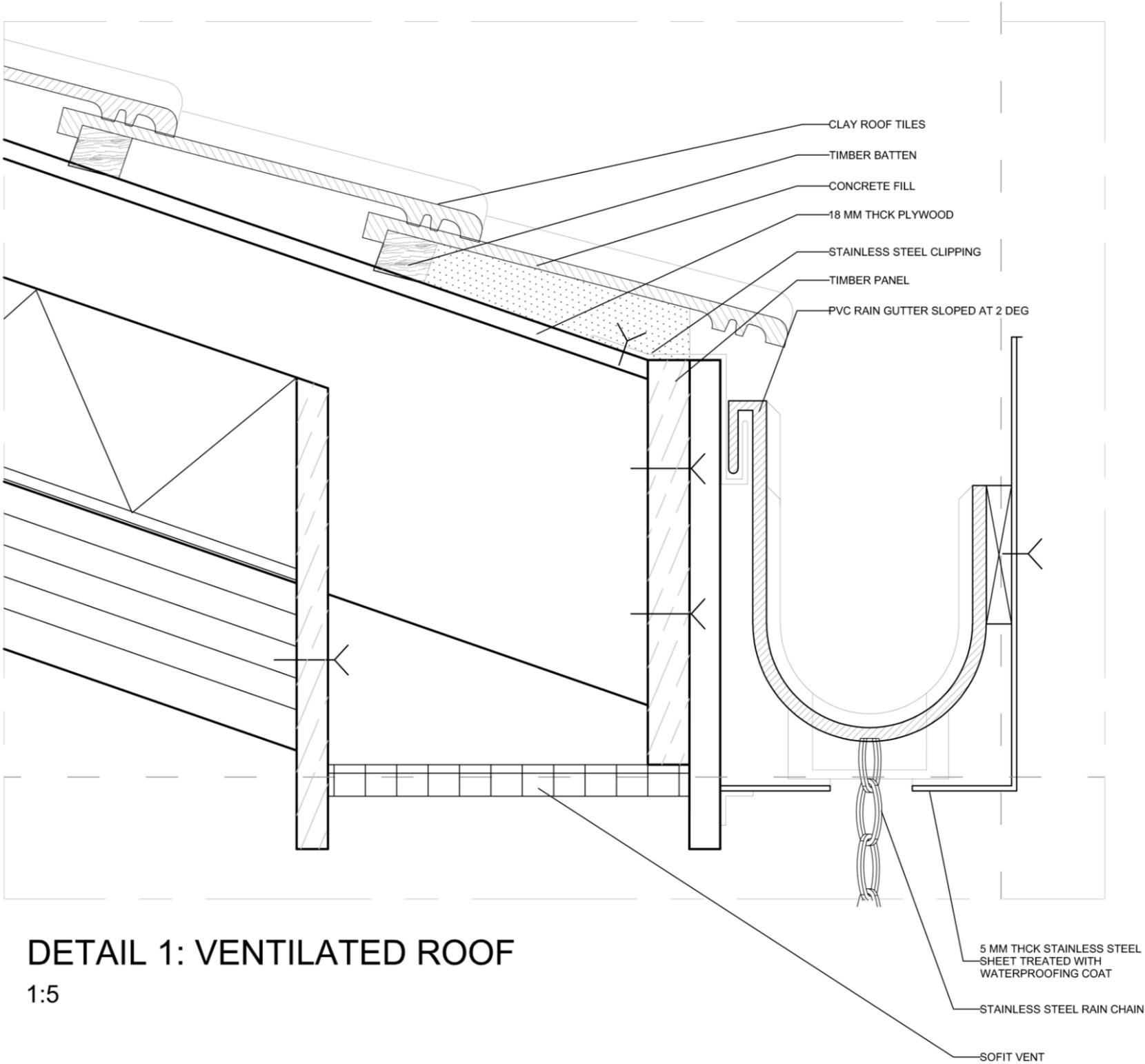
FACADE FRAGMENT SECTION



FACADE FRAGMENT ELEVATION

Details

Co-working Space



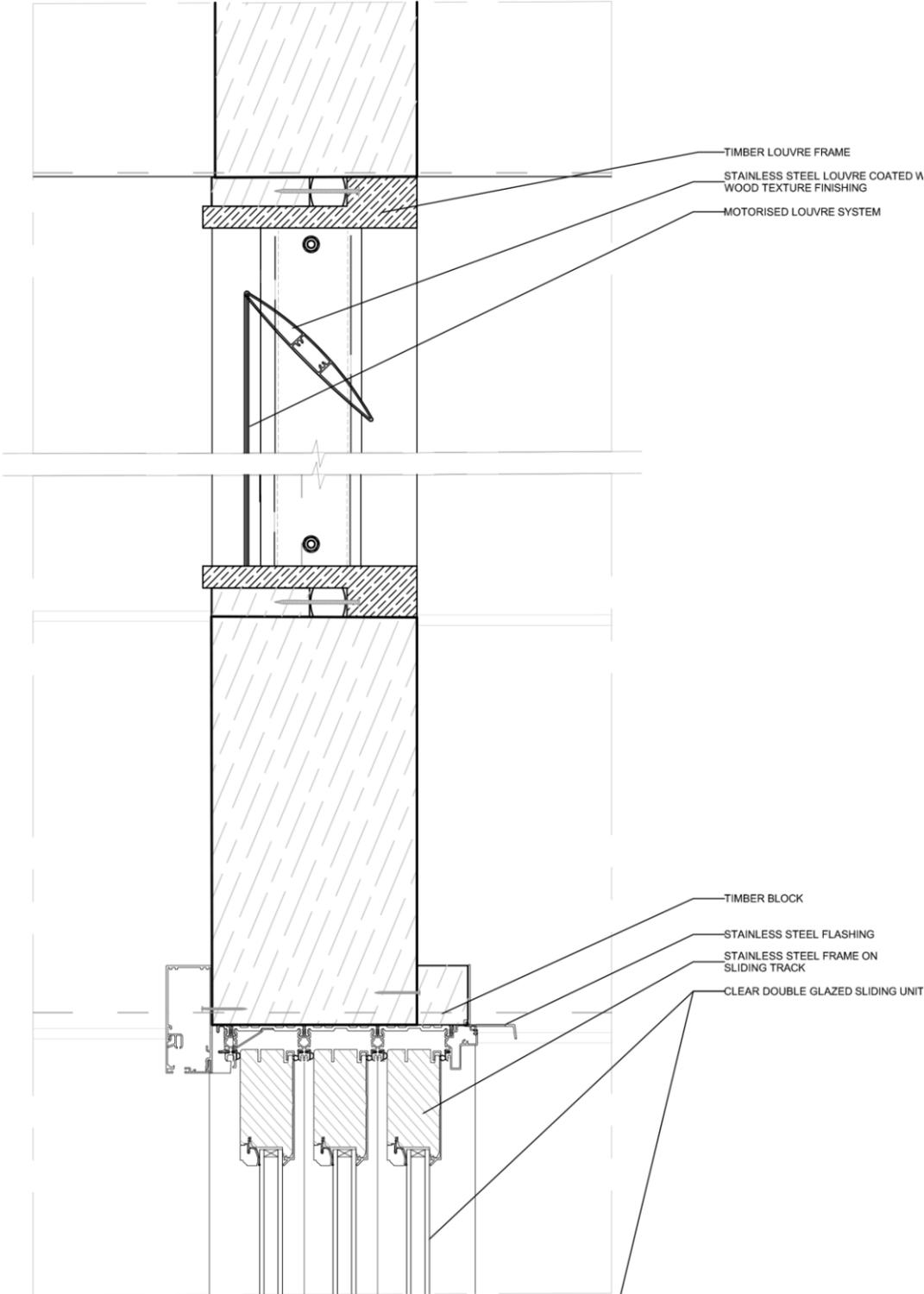
DETAIL 1: VENTILATED ROOF

1:5

Details

Co-working Space

Motorised Louvres and
Sliding Doors



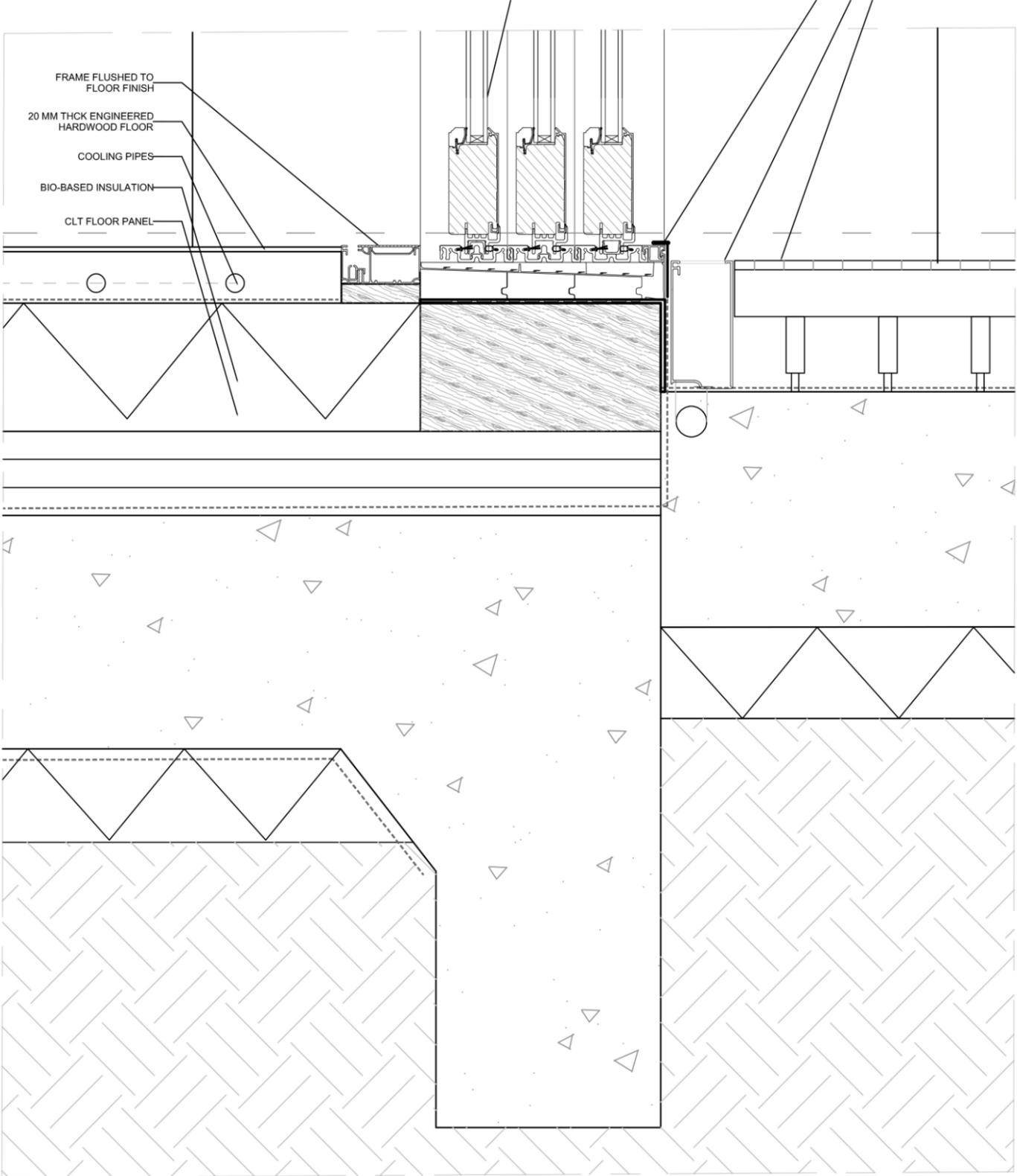
DETAIL 2 & 3: OPERABLE FACADE

1:5

Details

Co-working Space

CLT with Cooling pipes and outdoor timber deck



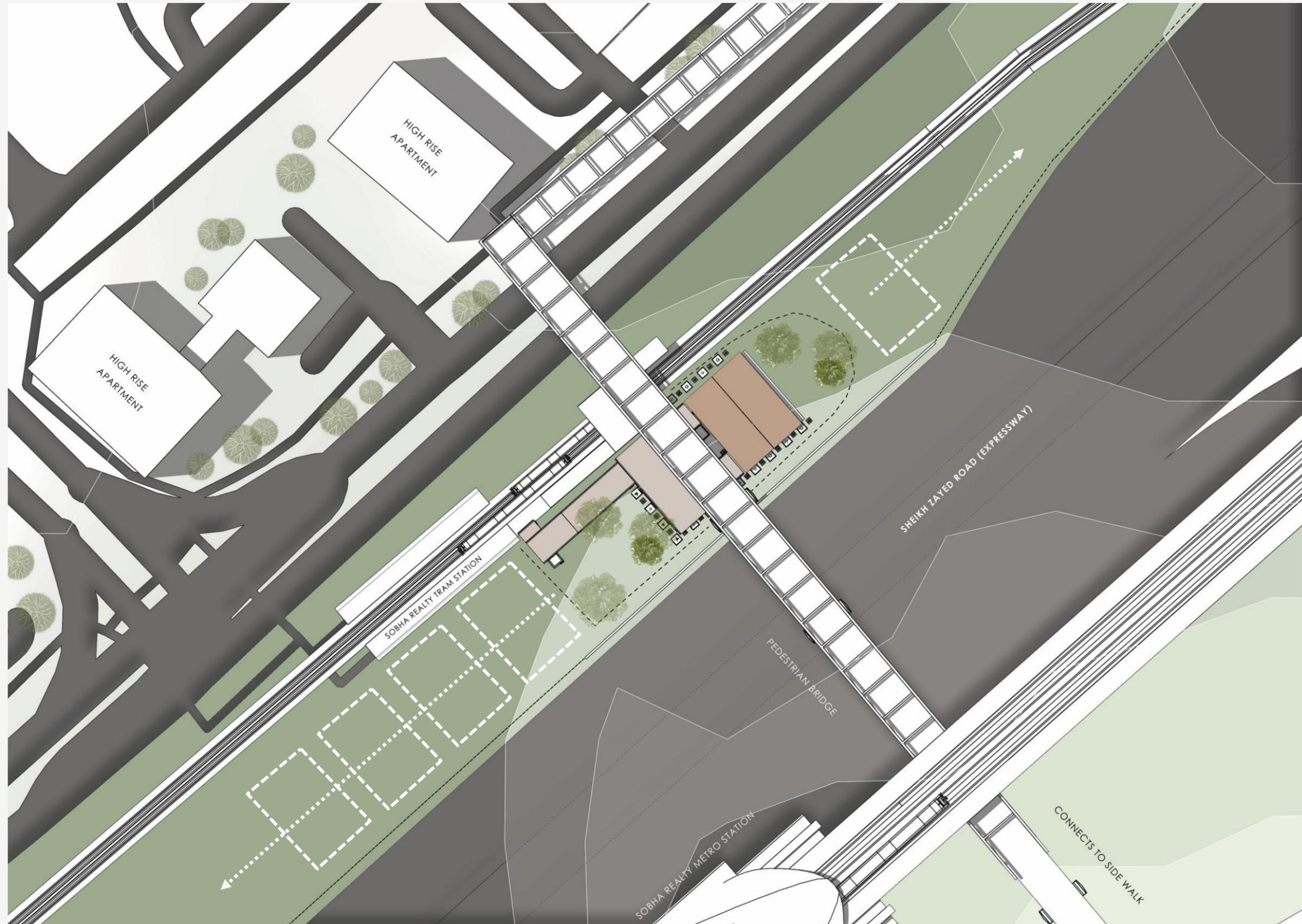
DETAIL 4: GROUND DETAIL

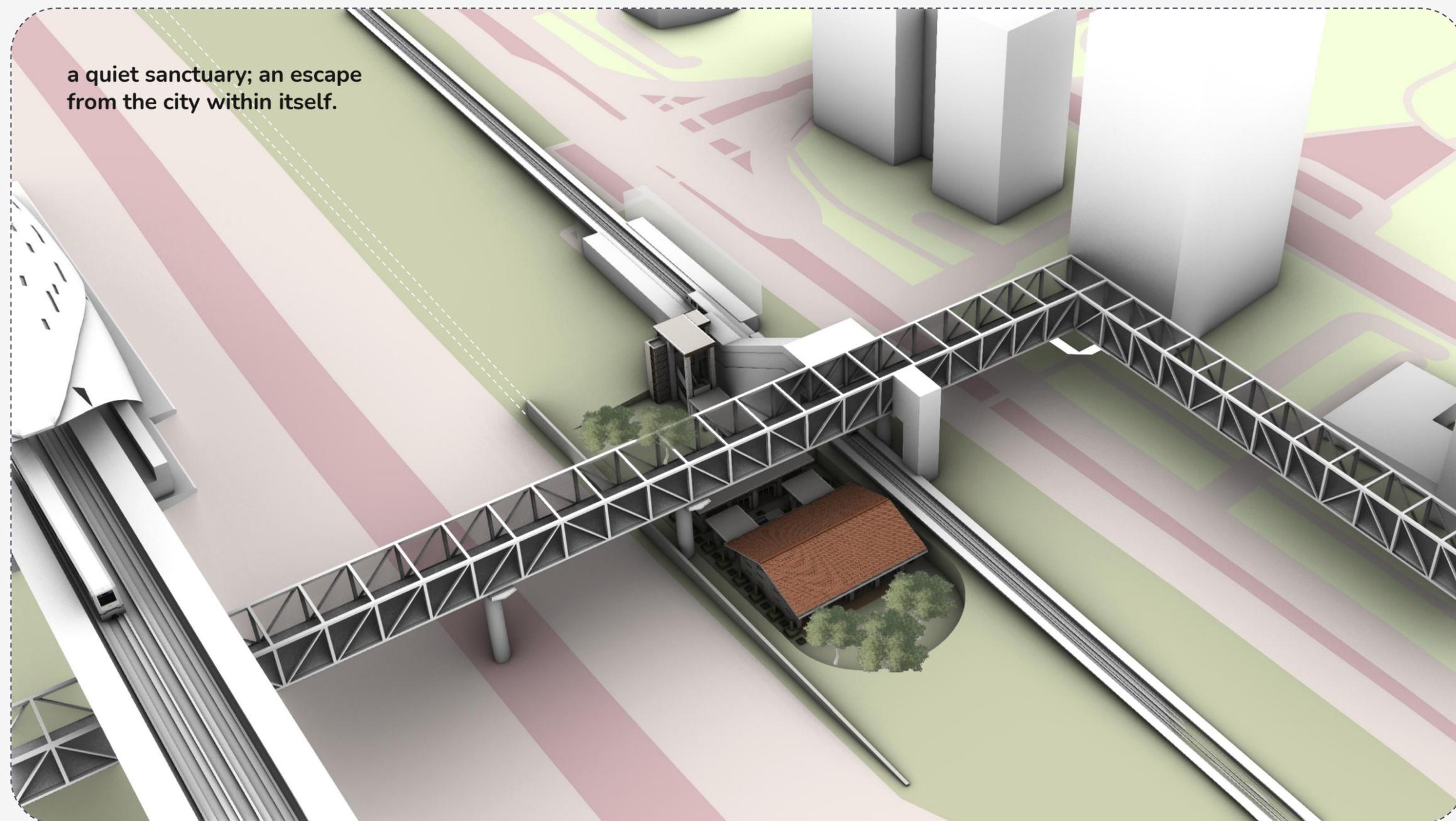
1:5



Site Plan: Future Expansion

1:1000





a quiet sanctuary; an escape
from the city within itself.

End.