ARCHITECTURE STUDENT CONTEST

21st INTERNATIONAL EDITION, BELGRADE 2026

Team 21 – Lebanon

FRAMES OF MOTION

A LINEAR HABITAT FOR ATHLETIC LIVING

Jihad Chihane

Teacher: Architect Antoine Younan

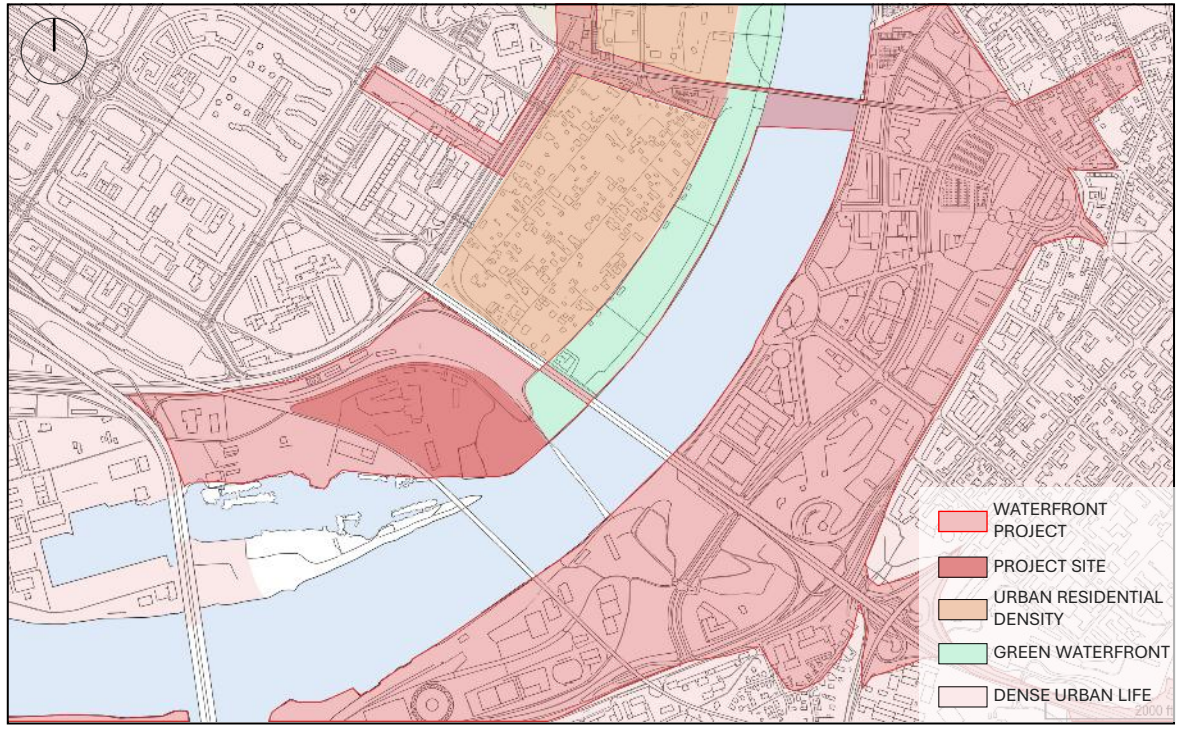
SUMMARY

INTRODUCTION

Core Idea

Zoning

Project Goal



Situated at the edge of Belgrade's riverfront, the site lies within a transitional zone shaped by former industrial use, fragmented infrastructures, and open green landscapes.

While close to major urban flows, it remains underactive, creating a disconnect between the city and its waterfront. This condition reveals a strong potential to reconnect landscape, mobility, and public life within an evolving urban context.

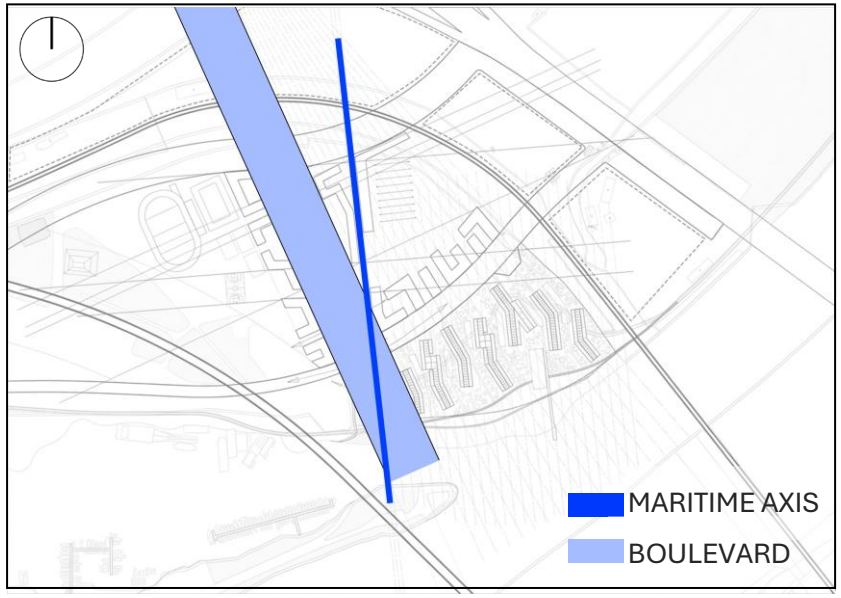
CORE IDEA

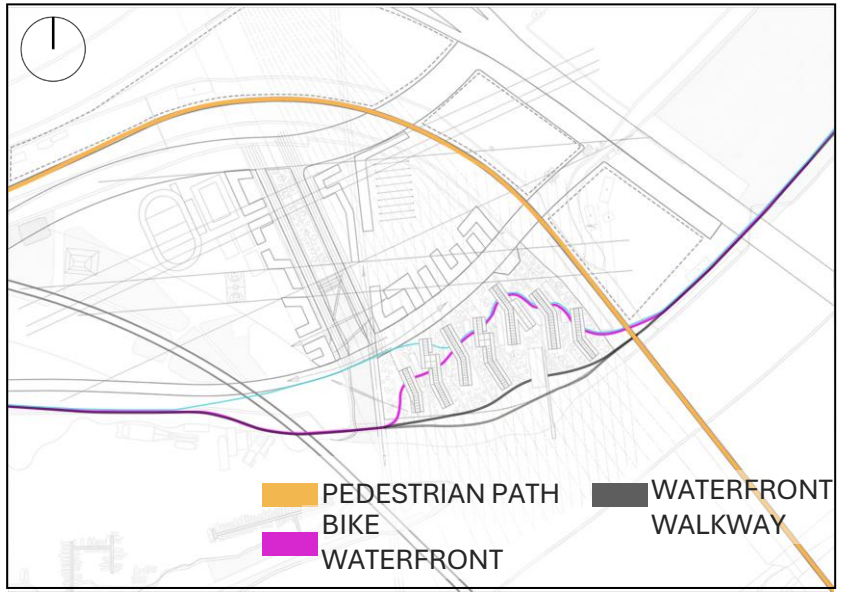
The project begins at the edge of the **Sava river**, where the **existing green landscape** is not interrupted, but **extended** into the site.
This **green passage** becomes a continuous ground that draws people from the waterfront into the project.

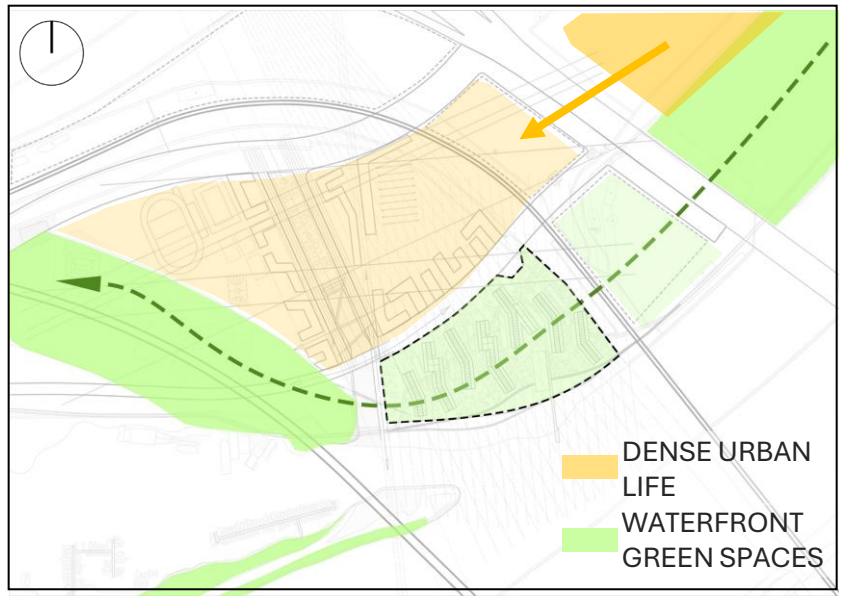
As one moves through this landscape, a subtle **grid** begins to appear, not as a rigid structure, but as an ordering system that **guides movement**, views, and connections.
This grid acts as a mediator between the **natural flow** of the river and the **urban logic** of the city.

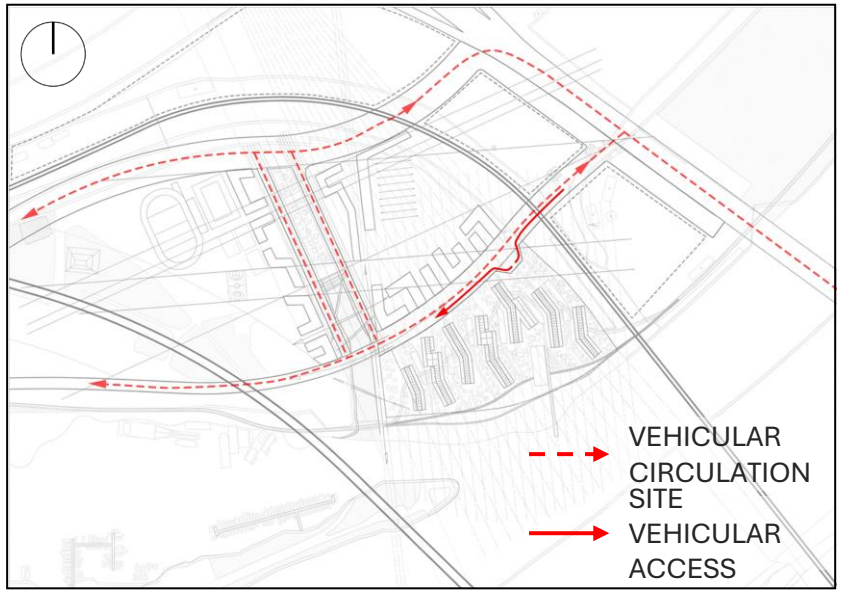
Within this framework, volumes emerge along the grid, forming a sequence of spaces that **open**, **frame**, and **orient** themselves toward the water.

Their structure reflects the logic of **wooden boats** and the **skeleton of sea creatures**. The architecture does not sit on the site; it grows from it. The continuity of **green**, **structure**, and **water** creates a unified spatial experience where landscape, movement, and built form become one.







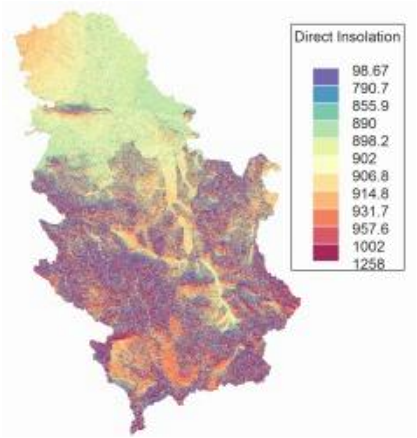


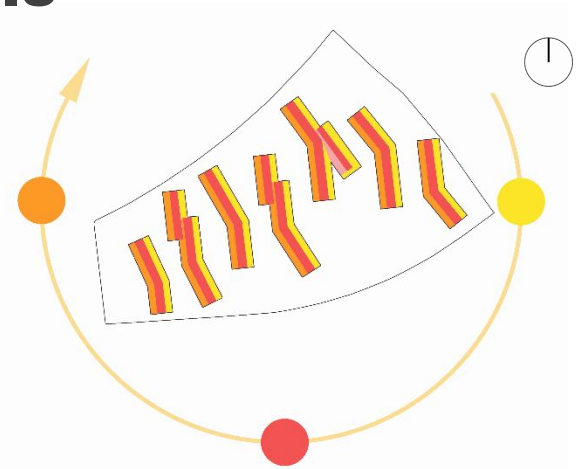
ZONING

The site is structured by a maritime axis and boulevard, complemented by a train line transformed into a pedestrian connection linking the city to the waterfront, alongside continuous bike and walkway paths that connect to the existing bike path from the Japanese Garden.

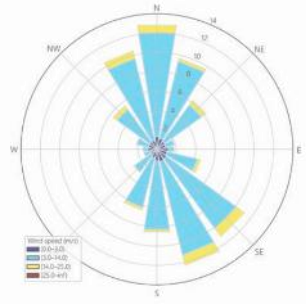
A green waterfront corridor extends into the site to form a coherent landscape, while a denser urban and industrial edge is concentrated along the North side of the Site. Vehicular access is primarily from the north of the site, whereas soft mobility flows, pedestrian and bike run along the southern waterfront, connecting from the northeast and continuing westward.

CLIMATIC DATA ANALYSIS



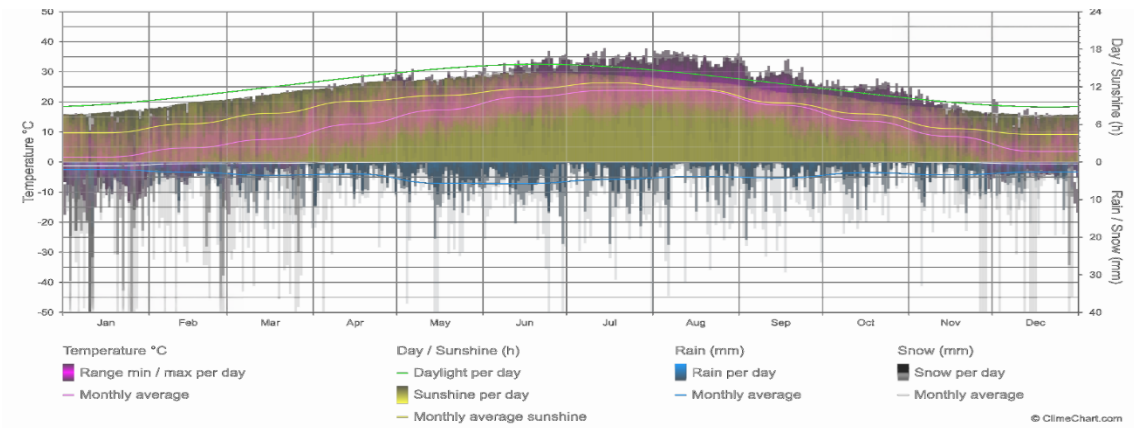


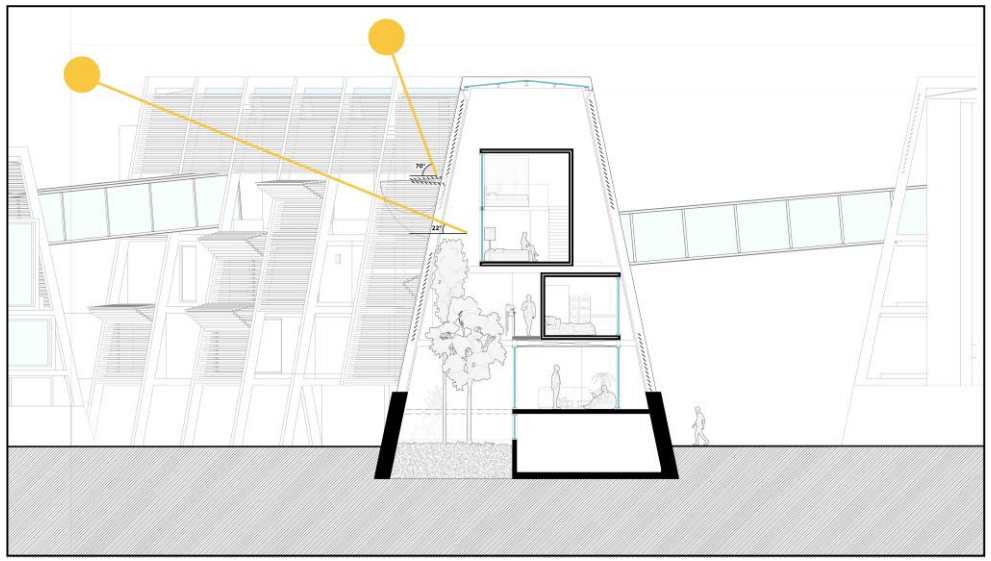
The north–south orientation ensures balanced daylight throughout the day, while the articulated roof geometry maximizes solar exposure for optimal BIPV performance.



Climate zone according to PHPP	Opaque envelope[1] against ground: Insulation	Opaque envelope[1] against ambient air: Exterior insulation	Opaque envelope[1] against ambient air: Interior insulation[2]	Opaque envelope[1] against ambient air: Exterior paint[3]	Windows (including exterior doors): Overall[4]	Windows (including exterior doors): Glazing[4]	Windows (including exterior doors): Solar load[4]	Ventilation: Min. heat recovery rate[7]	Ventilation: Min. humidity recovery rate[8]
	Max. heat transfer coefficient (U-value)			Cool colours	Max. heat transfer coefficient ($U_{W(installed)}$)	Solar heat gain coefficient (g-value)	Max. specific solar load during cooling period	Min. heat recovery rate[7]	Min. humidity recovery rate[8]
	[W/(m²K)]			-	[W/(m²K)]	-	[kWh/m²a]	%	
Cold	Determined in PHPP from project specific heating and cooling degree days against ground.	0.12	0.30	-	0.65	0.75	0.80	100	80%	-
Cool-temperate		0.15	0.35	-	0.85	1.05	1.10		76%	-
Warm-temperate		0.30	0.50	-	1.05	1.10	1.20		76%	-
Warm		0.50	0.75	-	1.25	1.30	1.40		-	-
Hot		0.60	0.75	Yes	1.25	1.30	1.40		-	60 % (humid climate)
Very hot		0.25	0.45	Yes	1.05	1.10	1.20		-	60 % (humid climate)

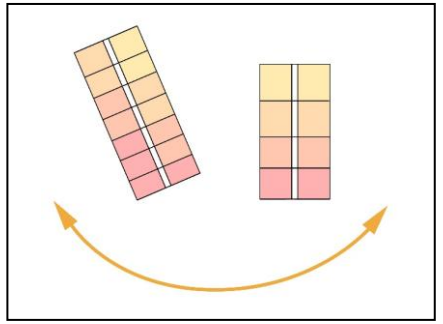
U-values, glazing performance, solar heat gain, and ventilation targets adapted to Serbia's warm-temperate climate zone.

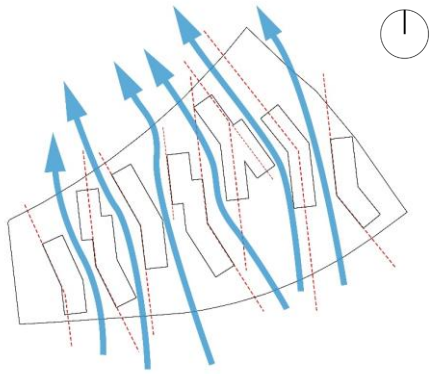




Sun Angle

Low winter sun angles (22°) allow deep solar penetration through Saint-Gobain high-performance glazing, generating passive heat gain within the living spaces, while high summer sun angles (70°) are filtered by the adaptable folding façade to reduce overheating and control solar exposure.





Unit Orientation

North–south orientation ensures balanced sunlight for all units.

PROJECT GOAL

The project aims to develop a contemporary accommodation for athletes that carefully balances privacy with collective life.

It provides a protected living environment while integrating shared sports facilities and activity spaces that support training, recovery, and social interaction. At the same time, the design establishes a strong relationship with the water.

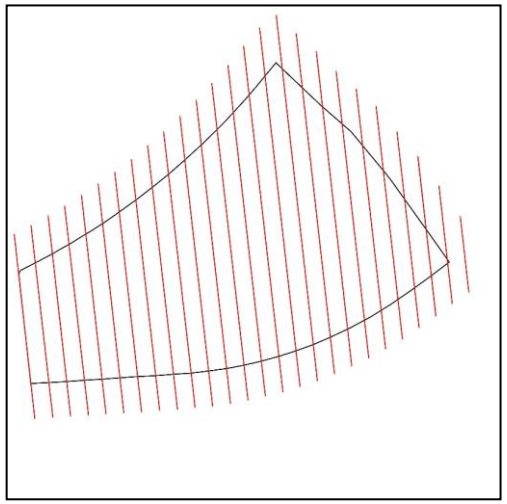
At this point, we should create clear physical and visual connections to the public promenade, the city, and the sailors' club, the project transforms the site into a point of exchange, where private living, athletic performance, and public life intersect in a cohesive urban landscape.

02
APPROACH

Site Logic

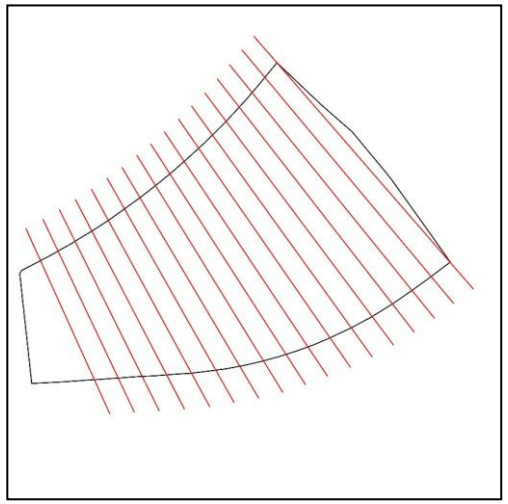
Architectural Approach

SITE LOGIC - ORIENTATION



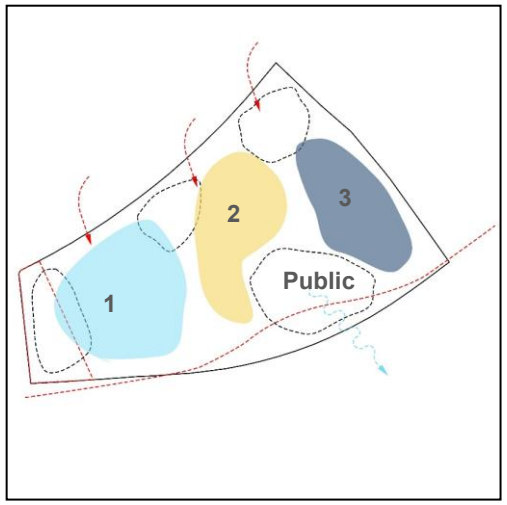
1. Urban Axis

Axes are derived from the existing urban fabric and site orientation.



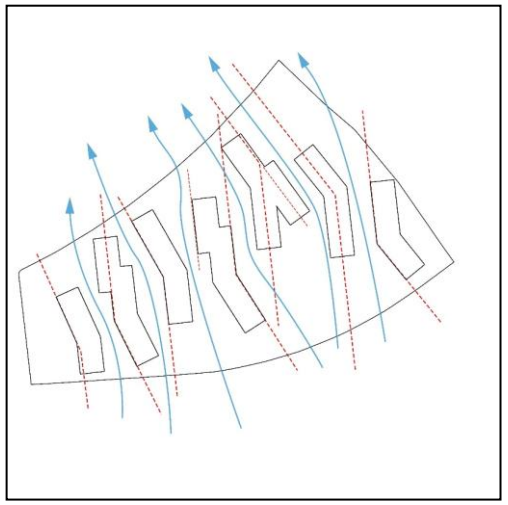
2. Boulevard Grid

The boulevard direction introduces a second layer, forming the project grid.



3. Zoning & Connection

Three accommodation zones and one main public space are organized around a north–south link toward the river.



4. Unit Placement

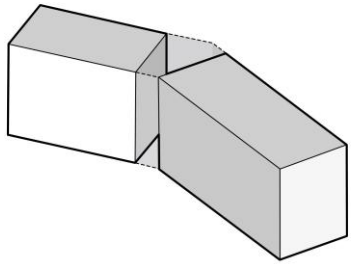
Units follow the grid and zoning, forming clusters that allow ventilation corridors and reduce southern solar exposure.

ARCHITECTURAL APPROACH

Local Context

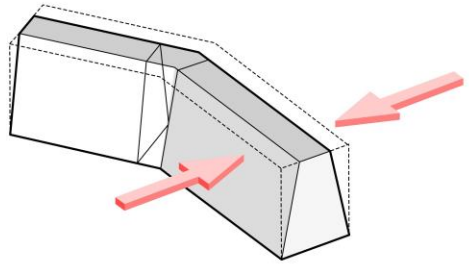
The project draws from the **local context** through a **solid stone base** supporting a **lighter wooden structure**, reflecting traditional construction logic. Patterns derived from regional textiles introduce an underlying ordered system, informing the project's grid. Structural elements are inspired by boat construction and skeletal frameworks. Finally, The river defines the project's spatial relationship.

ARCHITECTURAL APPROACH



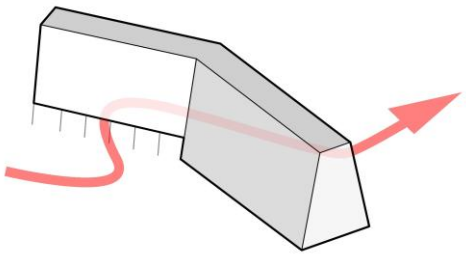
Step 1 - Initial Volumes

The gap between the two volumes is activated as a linear circulation space



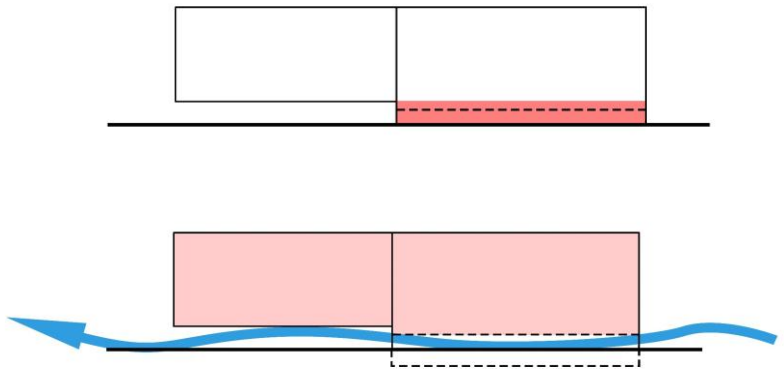
Step 2 - Tilt

Reduced footprint and inclination lighten the mass and improve solar response.



Step 3 - Lift

Raised volume creates entry and shaded circulation below.



Step 4 - Base

The base ensures stability and flood protection.

03
POJECT PARAMETERS

MASTER PLAN

1 – 7 Athlete's Units
8 – Gym / Public Space
9 – Cafeteria / Gathering Space
10 – Museum
11 – Bridge (Old Train)
12 – Sava River
13 – Deck / Platform
14 – Waterfront Walkway
15 – Tennis / Running Course
16 – Volleyball Court
17 – Basketball Court
18 – Green Park
19 – Water Boulevard
20 – Bridge
21 – Olympic Pool
22 – Sailor's Club
23 - Extension
24 – Bird Watch Tower
25 – Train
26 – Accommodation Extension
27 – Volley Court
28 – Tennis / Basketball Court
29 – Water Sports Extension

SITE PLAN

1 - 7 Athlete's Units

8 – Cafeteria

9 – Gathering Space

10 – Public / Gym Space

11 – Tennis / Basketball Court

12 – Volleyball Court

13 – Maritime Museum

14 – Walking Passage (Old Train)

15 – Sava River

16 – Deck / Platform

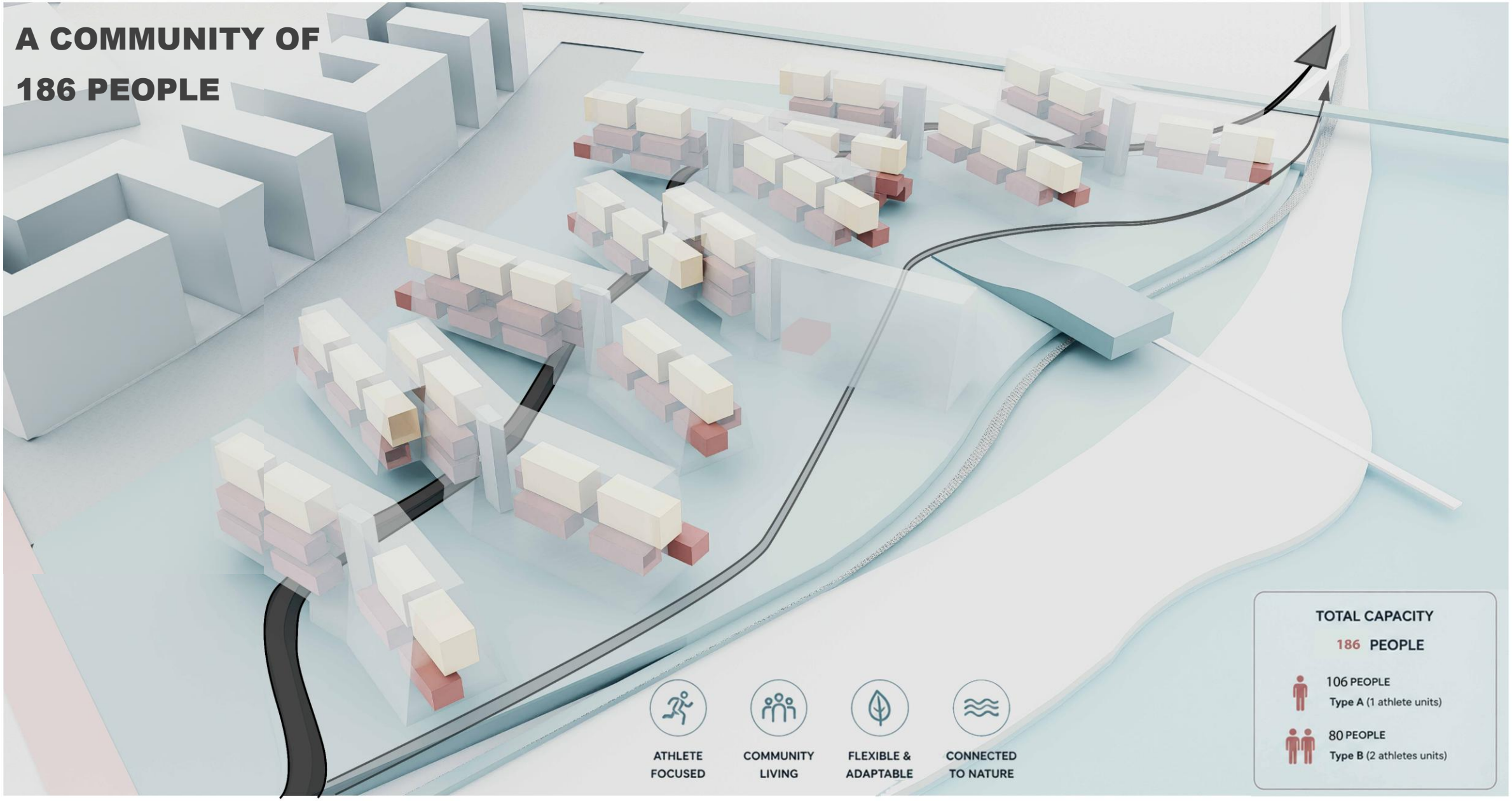
17 – Bicycle Pathway

18 – Bridge

19 – Water Sports Extension

20 – Accommodation Extension

A COMMUNITY OF 186 PEOPLE



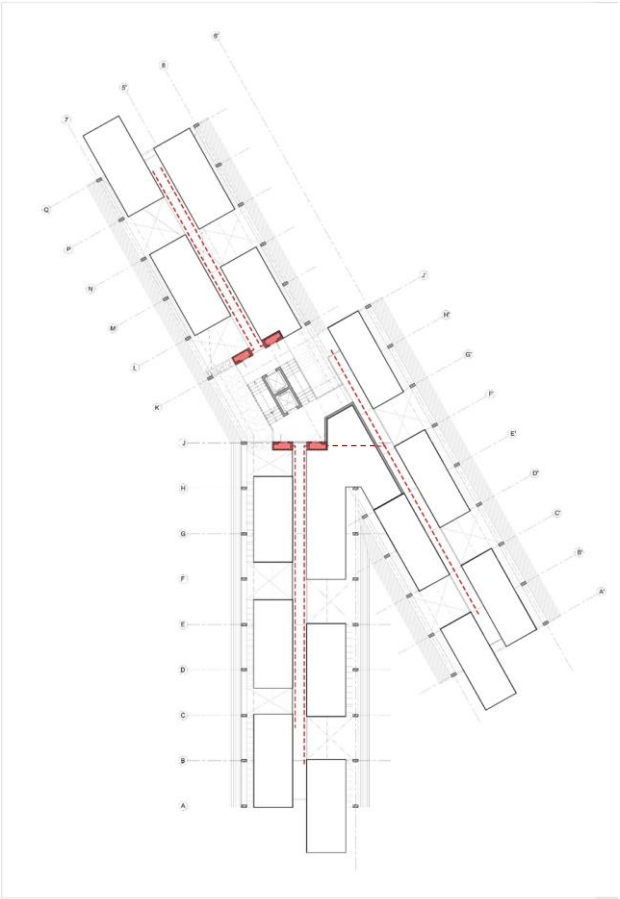
ADAPTIVE COMMUNITY GROWTH

The project begins as a community of **144 athletes**, organized within a clear modular structure. Through the addition of new units along the edge, the accommodation capacity can expand to **186 people**, without changing the main logic of the project.

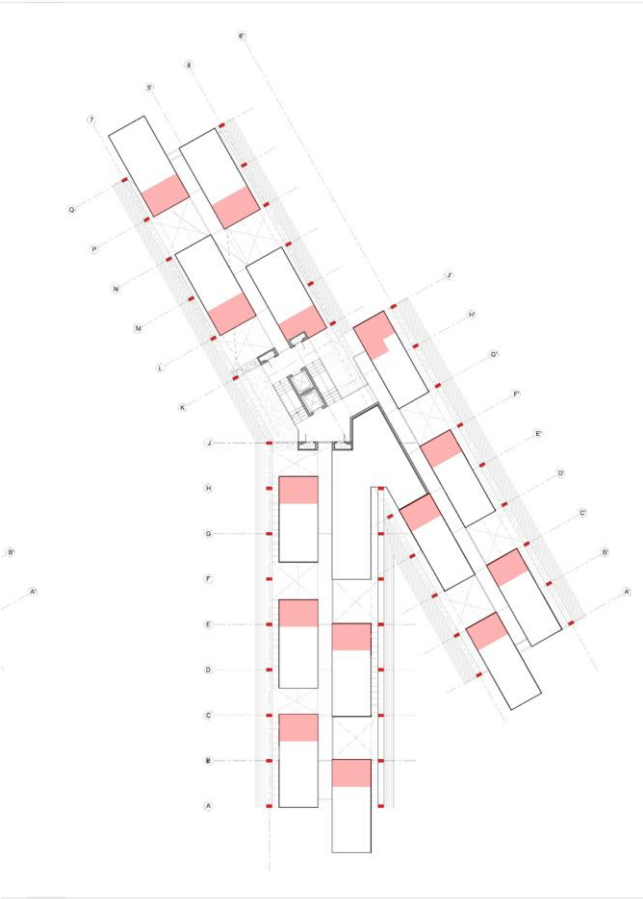
If more capacity is needed, the system can grow further. By adding extension units and activating the ground floor with additional accommodation spaces, the community can increase from **186 to 260 athletes**.

This creates a flexible residential system that can adapt over time: starting as a smaller athlete village, then expanding according to future needs, while preserving the same architectural framework.

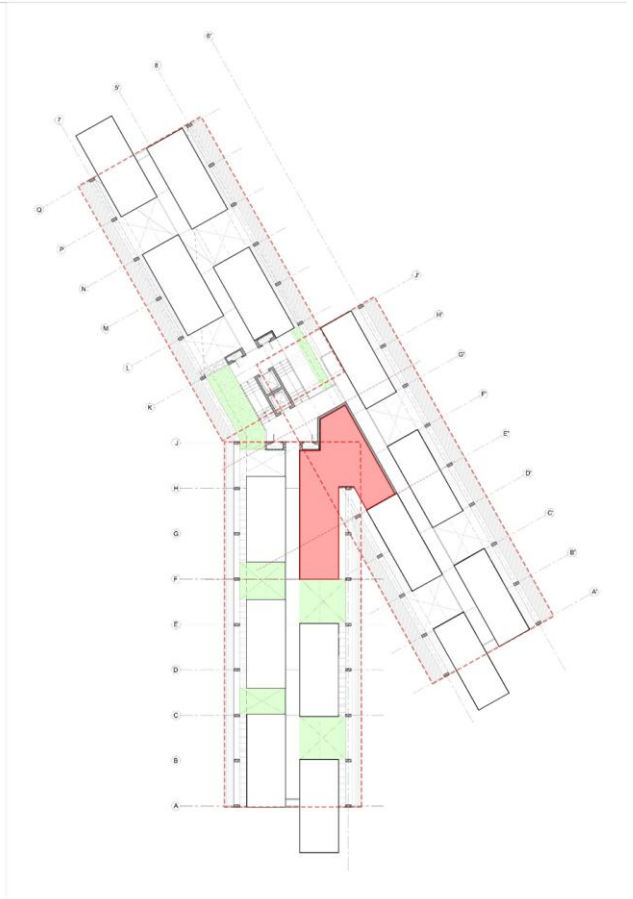
SERVICE CORE OPTIMIZATION



Core
The service spine is positioned at the intersection of the grid, ensuring efficient distribution and long-term adaptability.



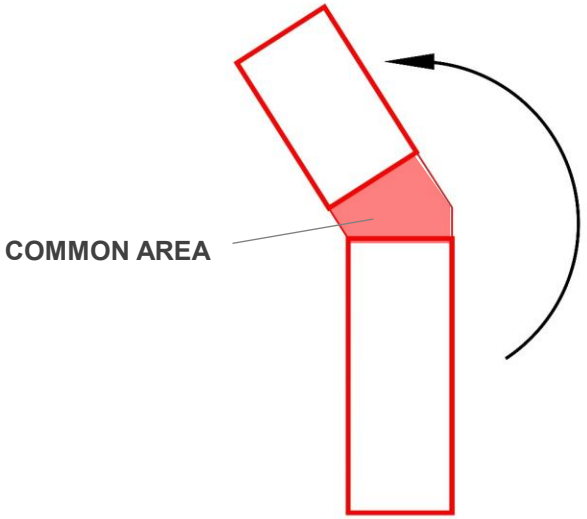
Services
Bathrooms are aligned along the core axis, allowing direct access to services and minimizing technical complexity.



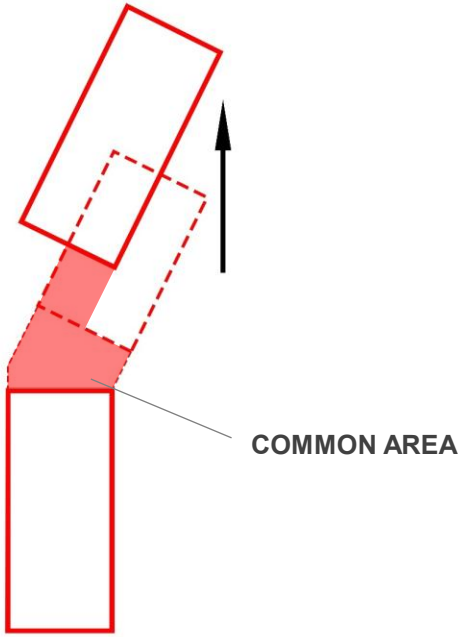
Collective Program
Shared functions reduce duplication, while service spaces are separated to maintain comfort in living areas.

VARIATIONS

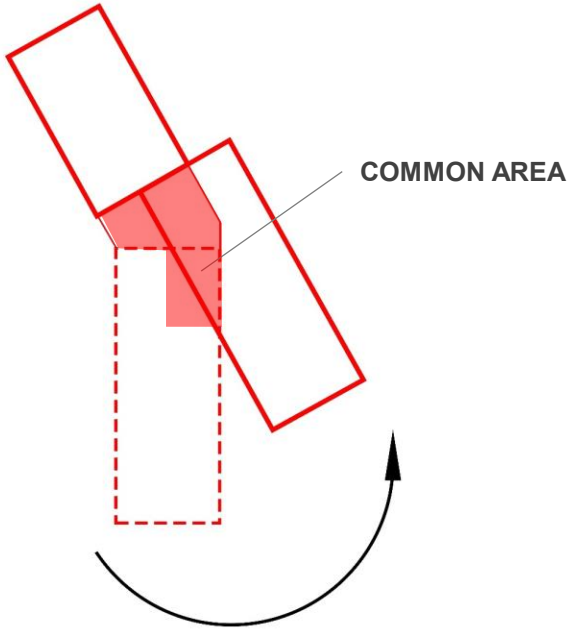
VARIATION 1



VARIATION 2



VARIATION 3

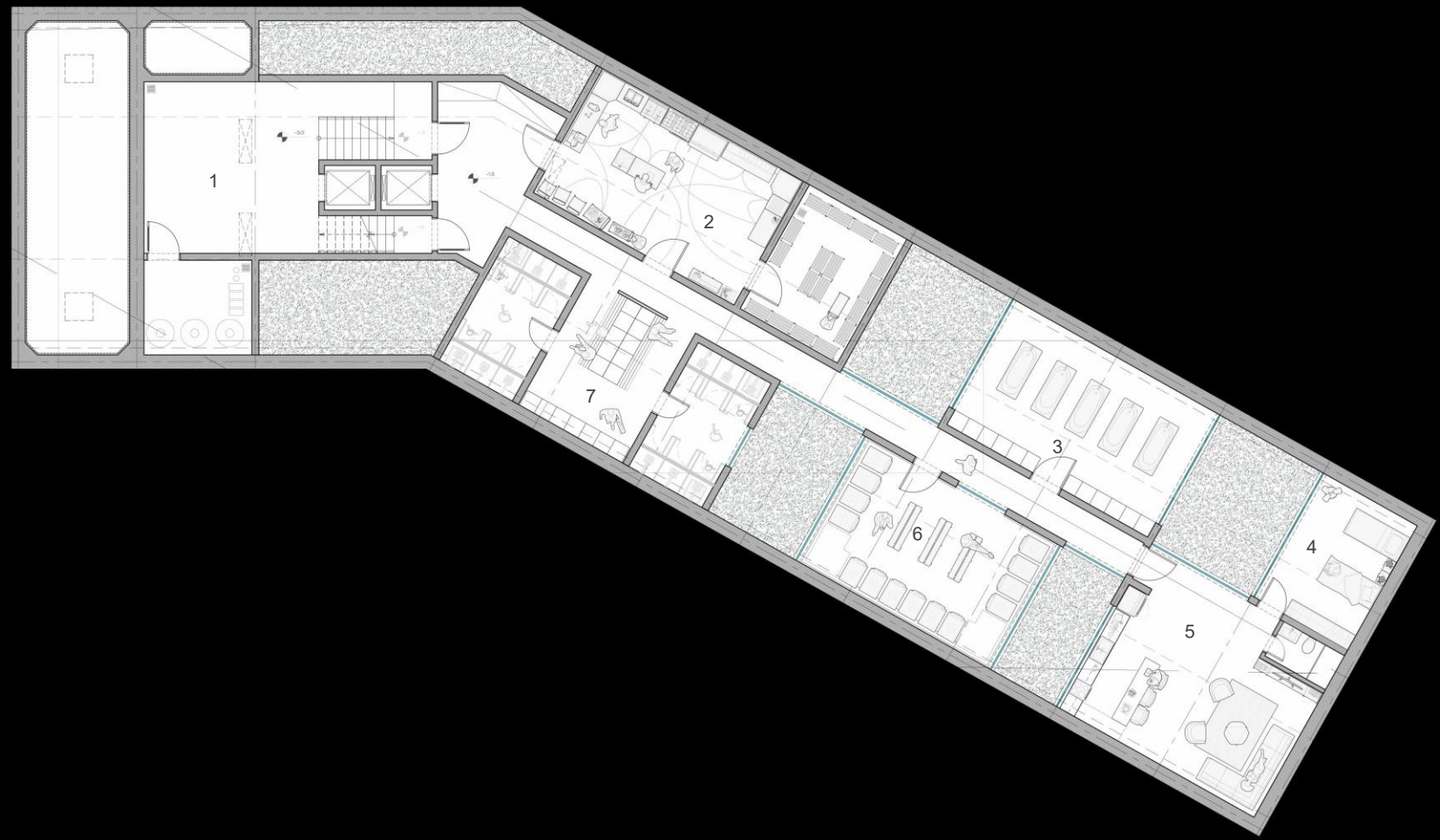


OPENS TO THE LANDSCAPE

THE ARTICULATED PLANS, INSPIRED BY ATHLETIC MOVEMENT, SHAPE LIGHT, AIRFLOW, AND COLLECTIVE SPACES.

BASEMENT PLAN

LEVEL -1.5



1- TECHNICAL ROOM

2- CENTRAL KITCHEN

3- RECOVERY ROOM

4- STAFF BEDROOM

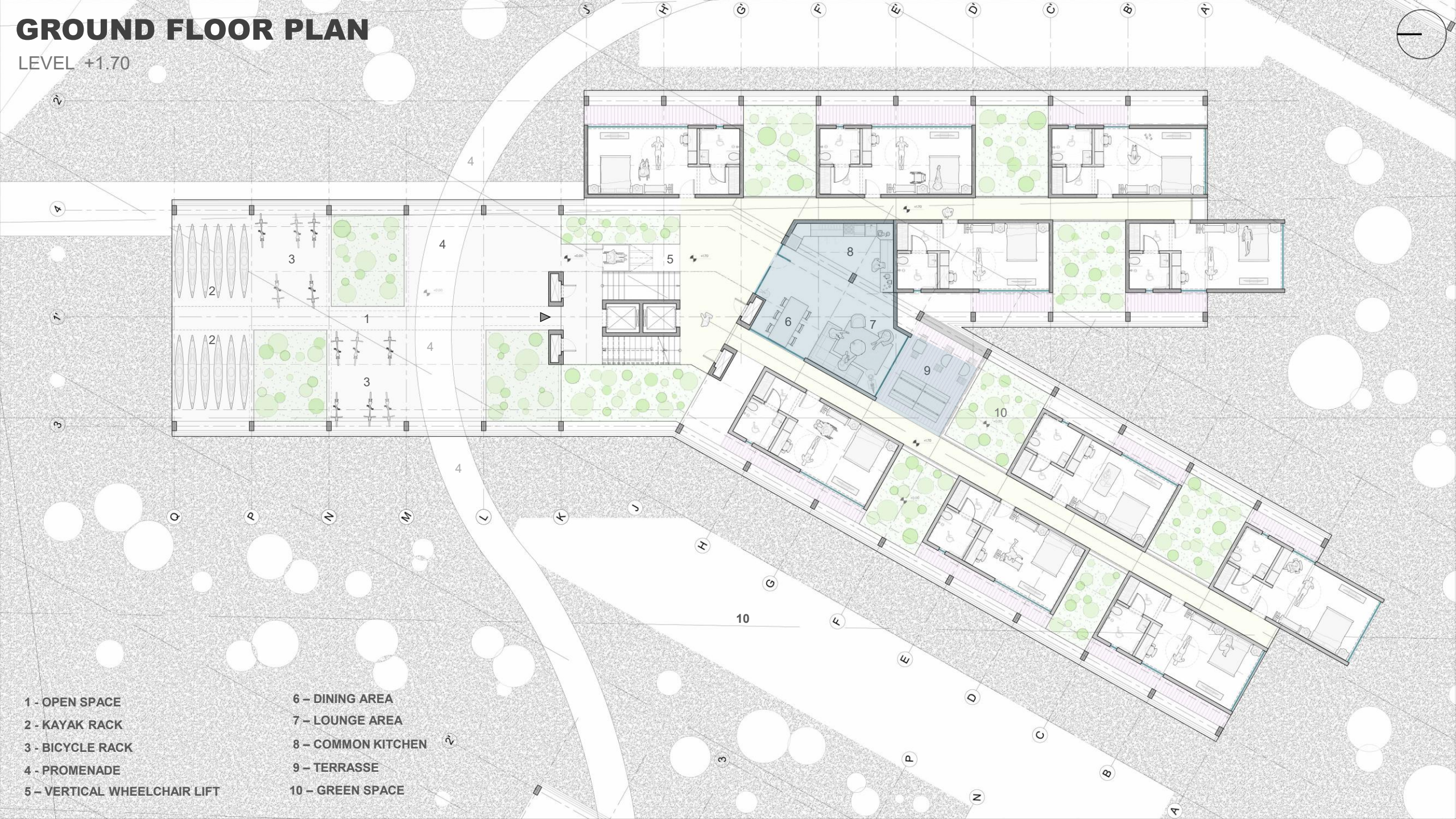
5 – STAFF ROOM

6 – LAUNDRY ROOM

7 – LOCKERS / SHOWERS

GROUND FLOOR PLAN

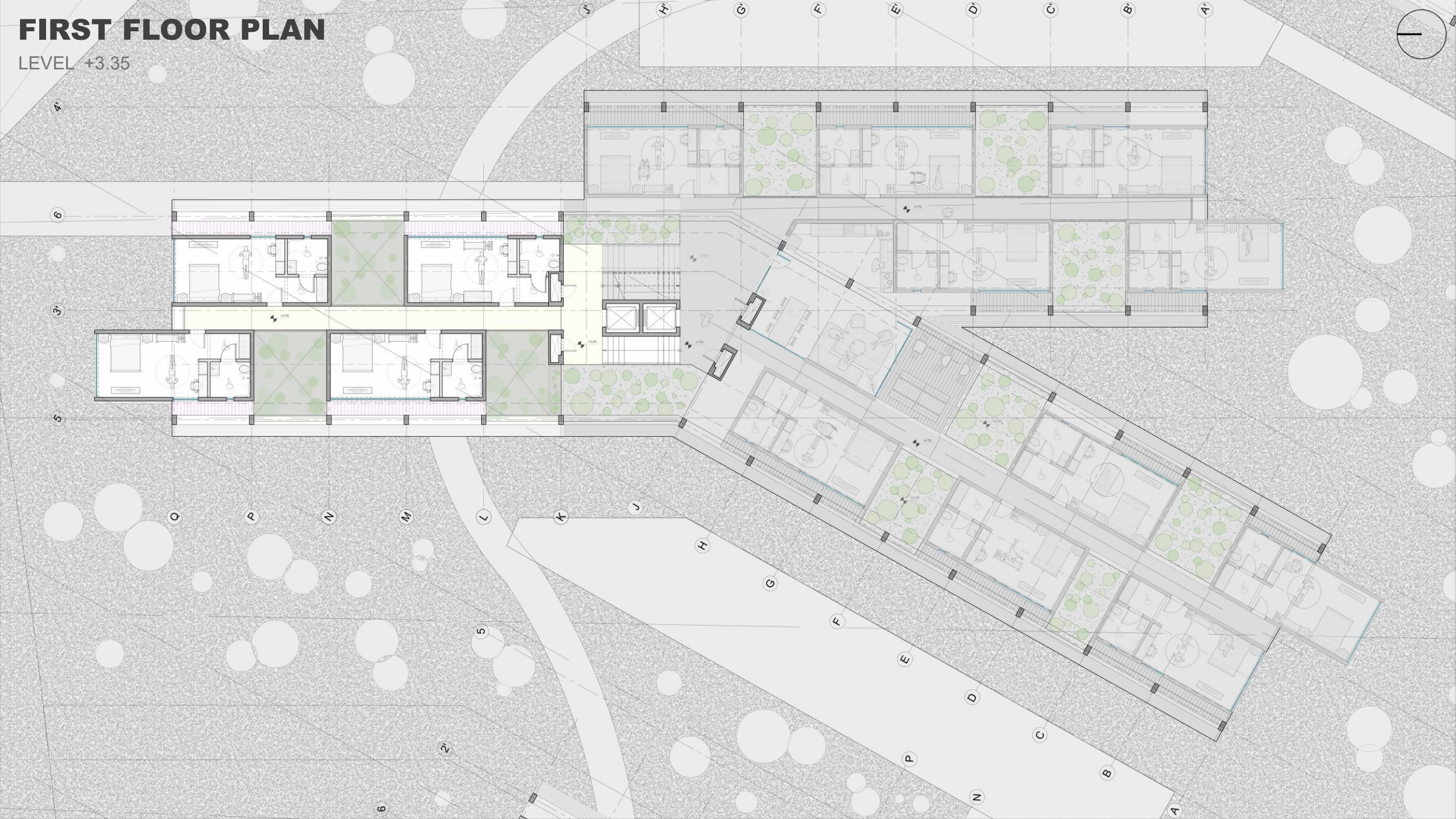
LEVEL +1.70



1 - OPEN SPACE
2 - KAYAK RACK
3 - BICYCLE RACK
4 - PROMENADE
5 – VERTICAL WHEELCHAIR LIFT
6 – DINING AREA
7 – LOUNGE AREA
8 – COMMON KITCHEN
9 – TERRASSE
10 – GREEN SPACE

FIRST FLOOR PLAN

LEVEL +3.35

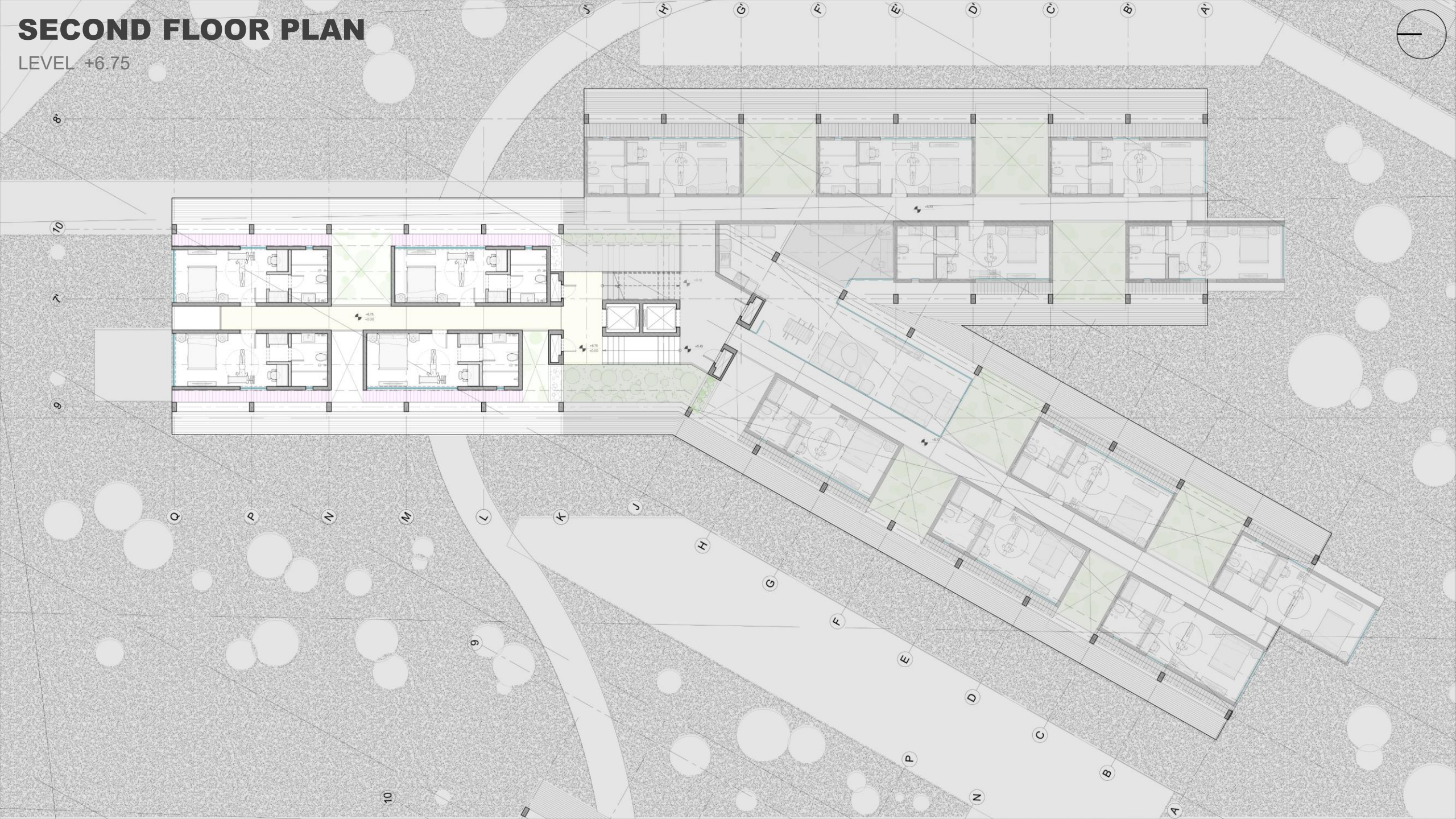


FIRST FLOOR PLAN

LEVEL +5.1

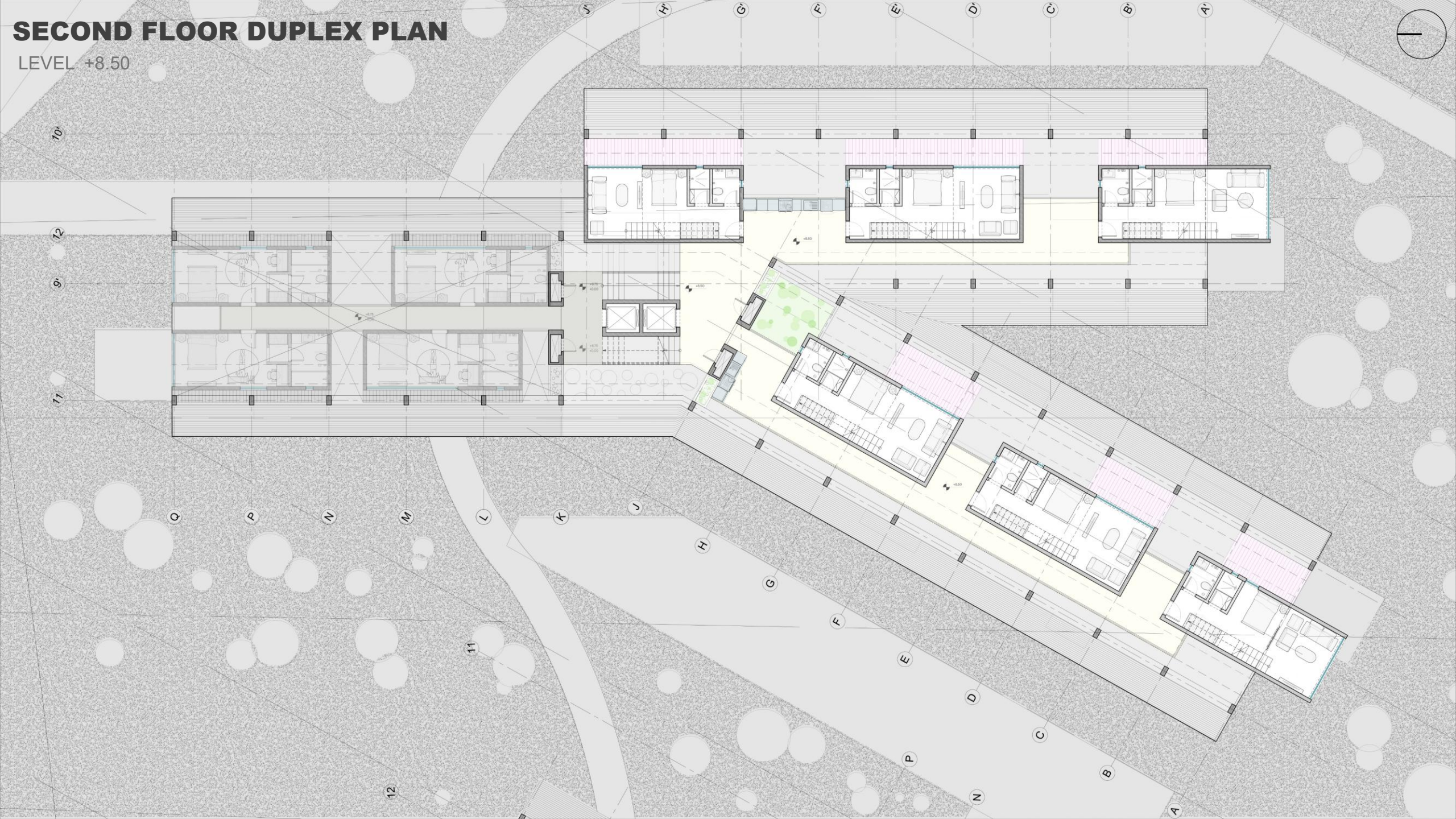
SECOND FLOOR PLAN

LEVEL +6.75



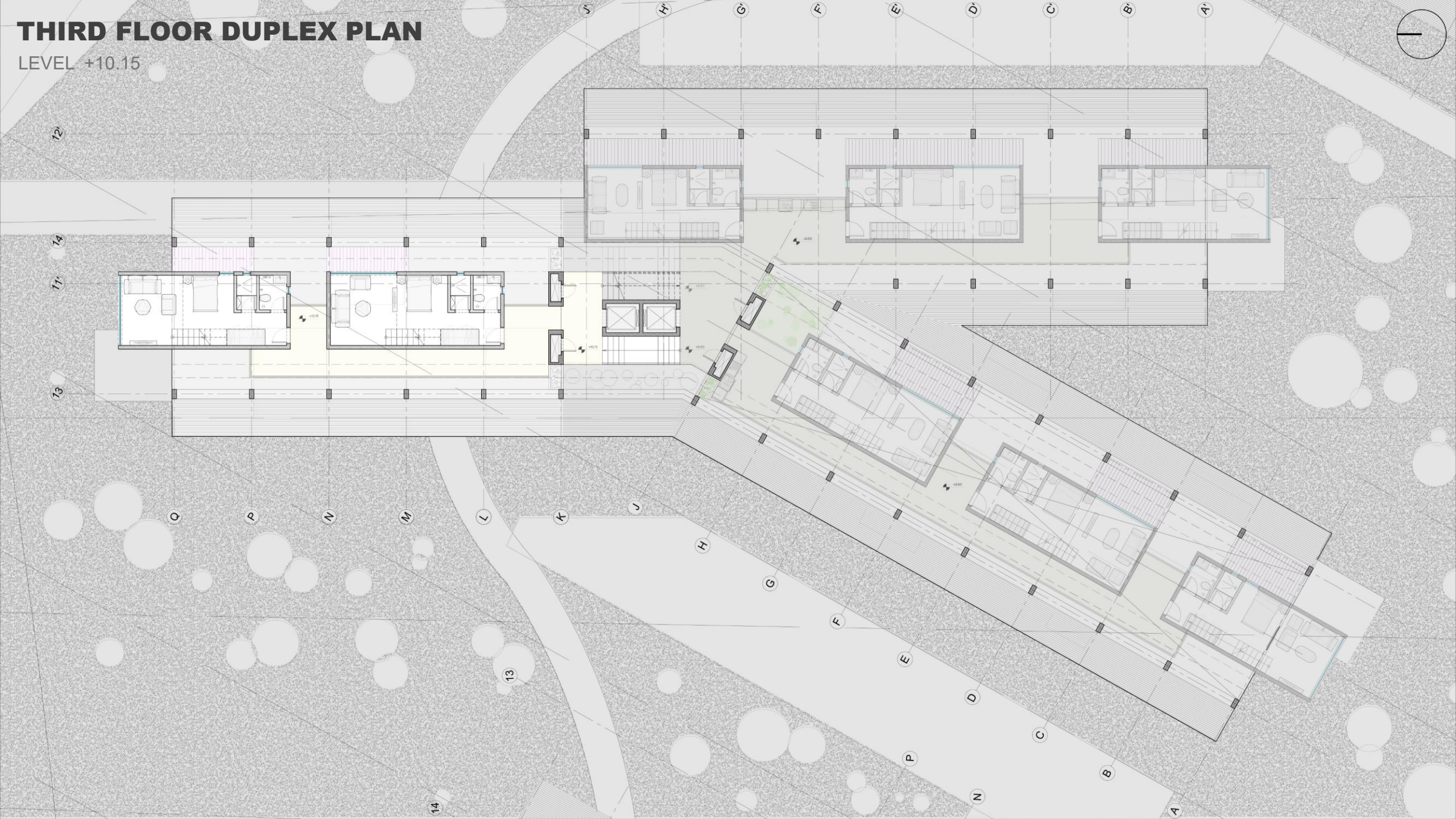
SECOND FLOOR DUPLEX PLAN

LEVEL +8.50



THIRD FLOOR DUPLEX PLAN

LEVEL +10.15

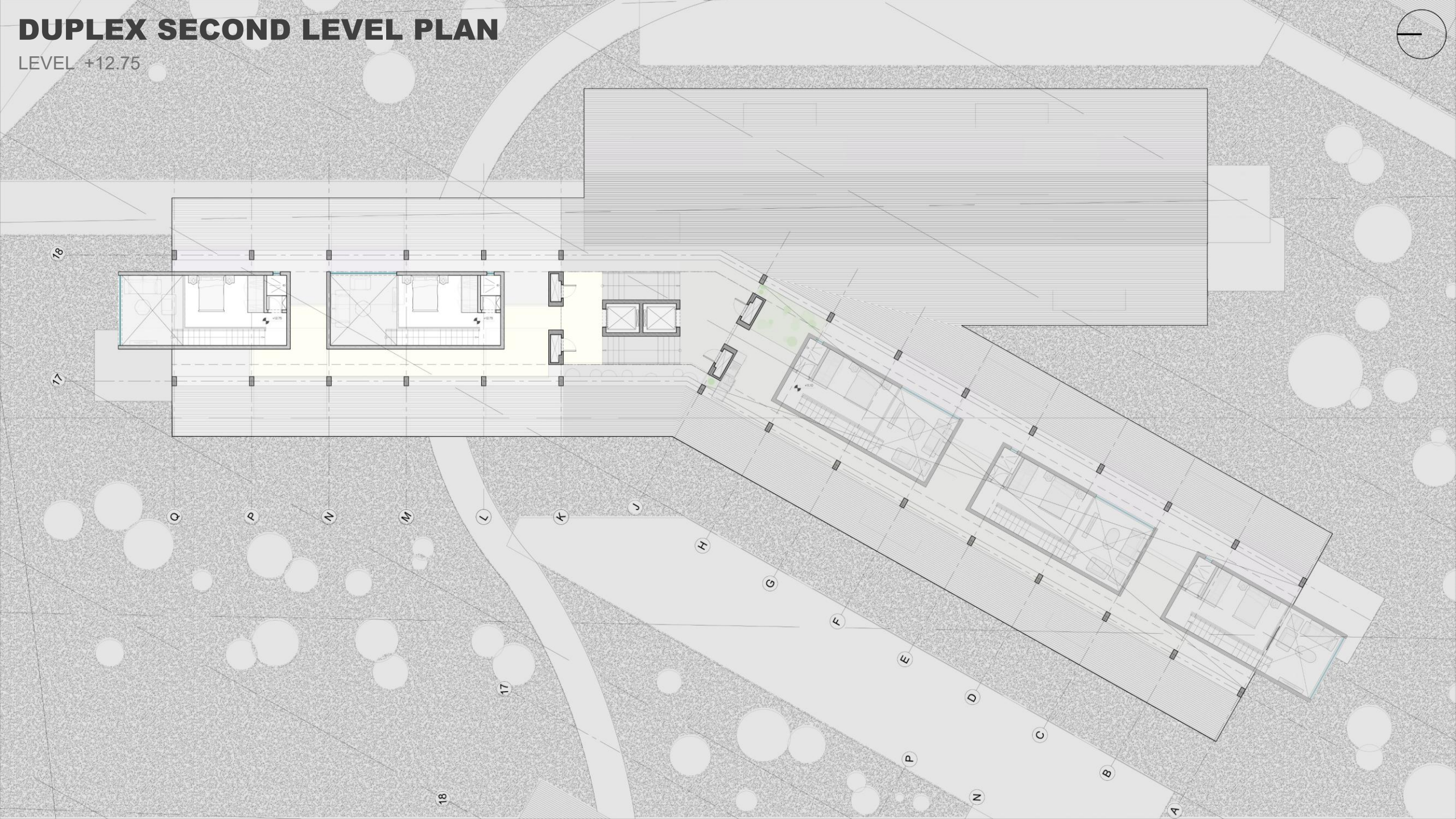


DUPLEX SECOND LEVEL PLAN

LEVEL +11.10

DUPLEX SECOND LEVEL PLAN

LEVEL +12.75



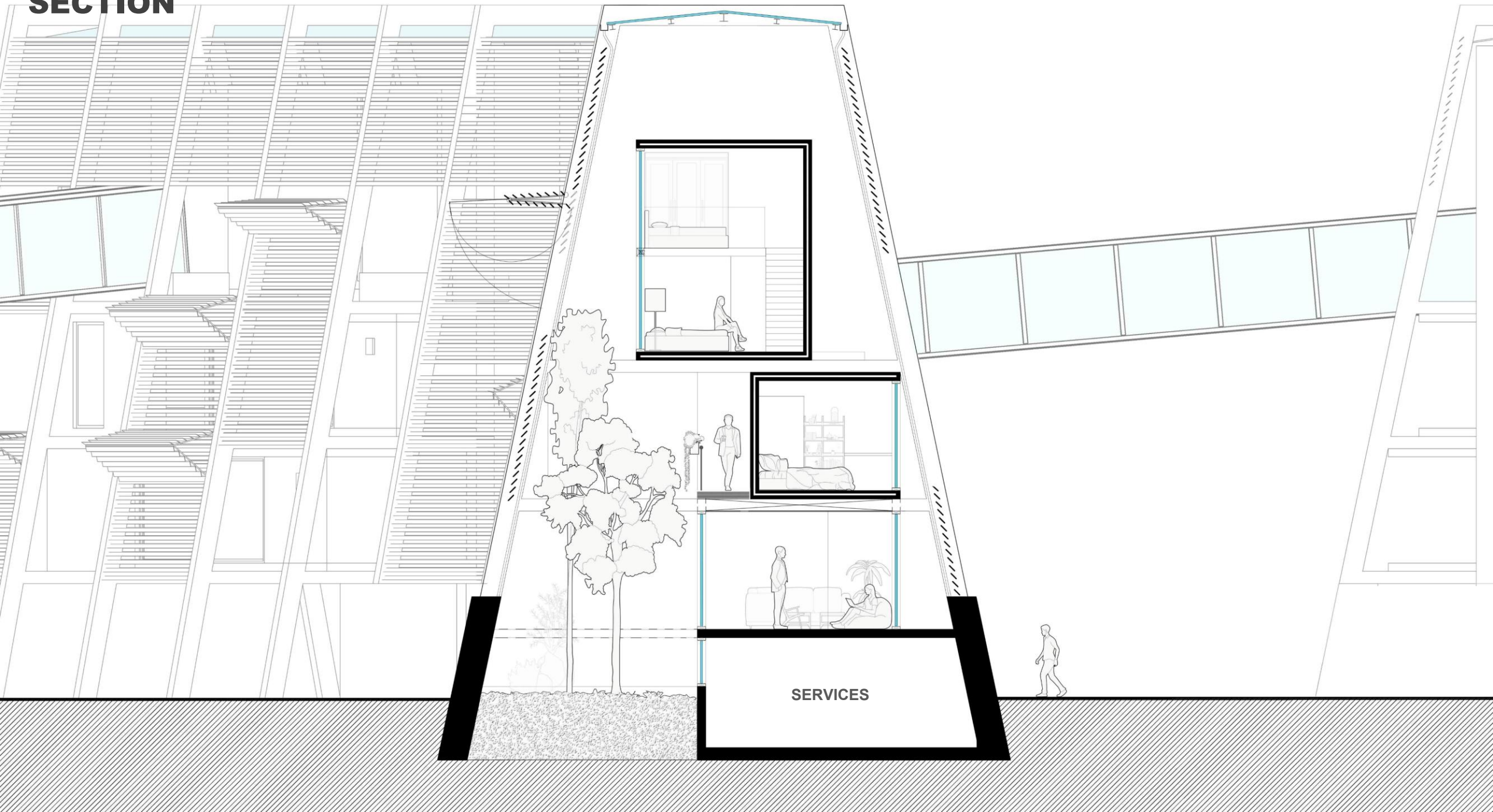
FOCUS

PAUSE

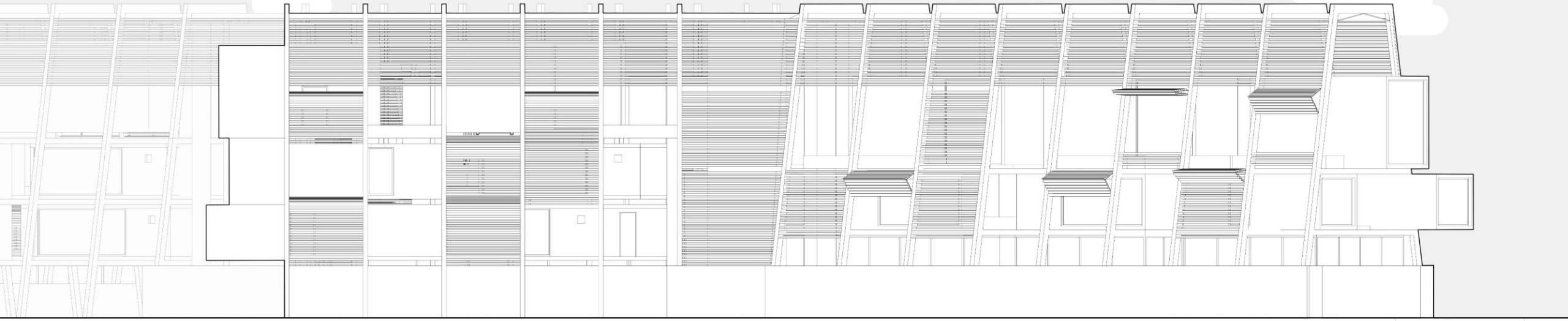
PREPARE

RECOVER

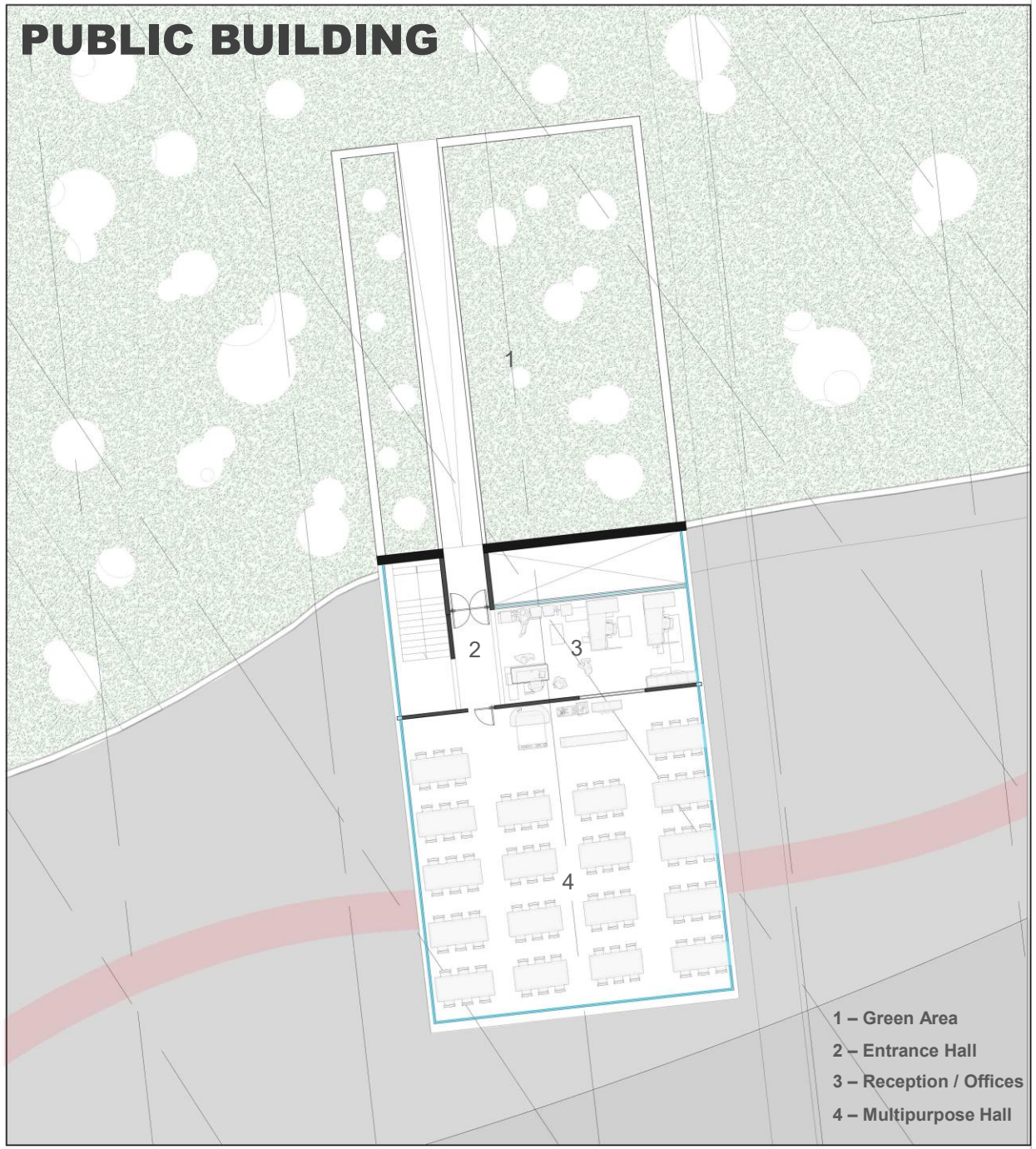
SECTION

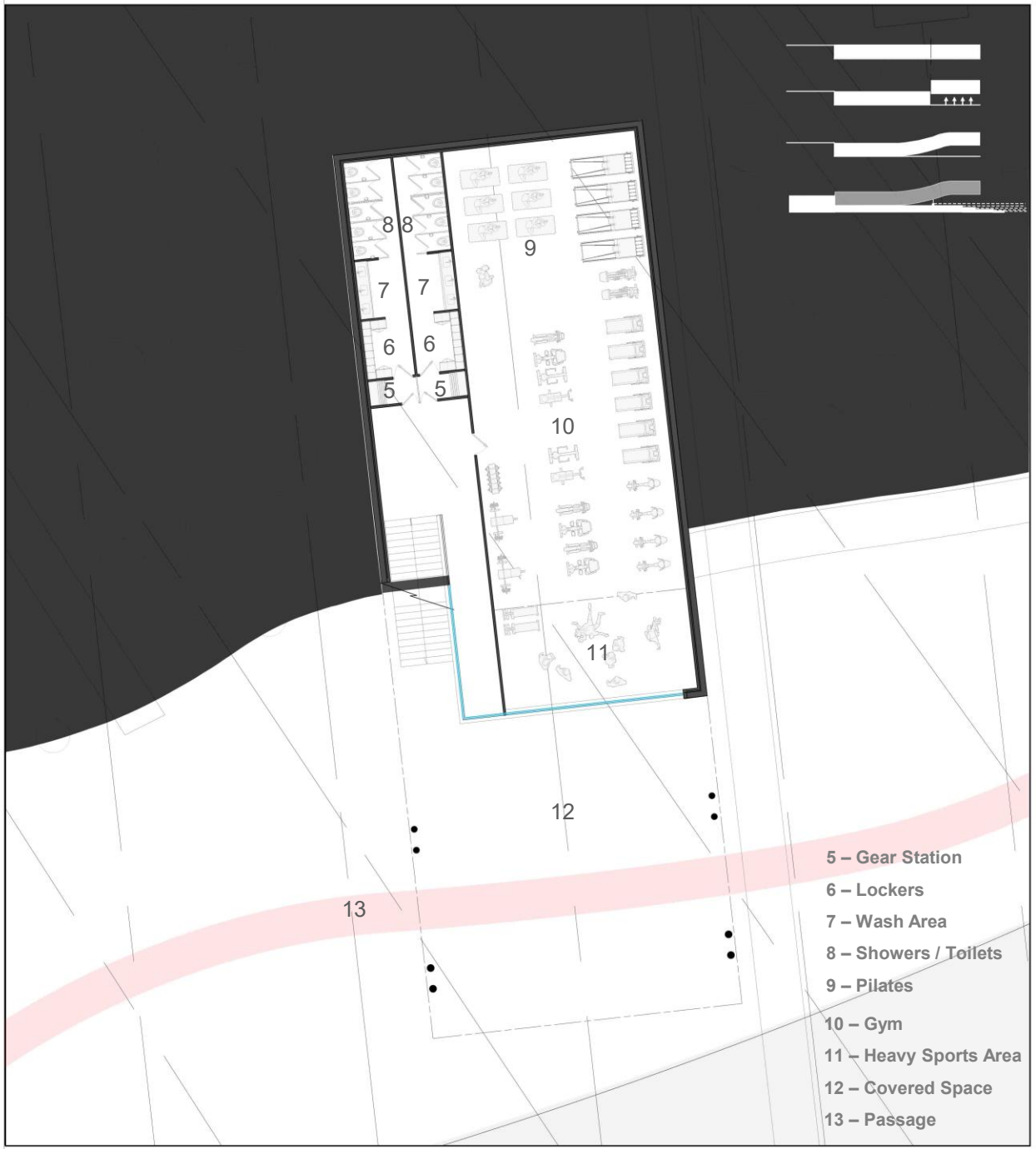


WEST FACADE

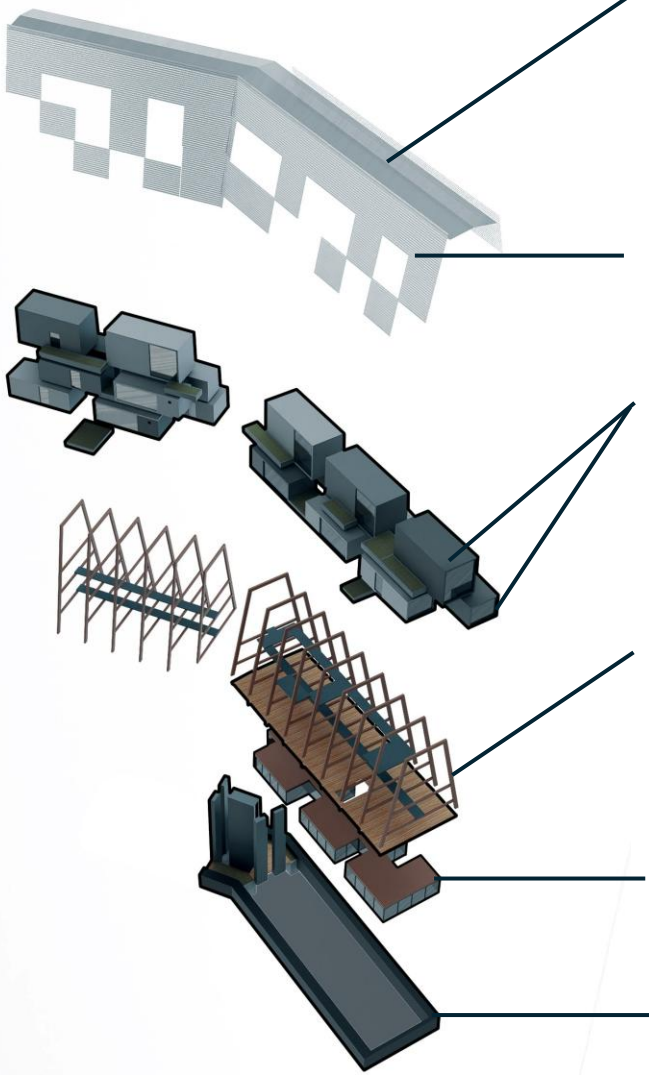


PUBLIC BUILDING





CONSTRUCTION PROCESS



Roof
Continuous covering spanning **350–600 m² per building**, unifying the overall composition

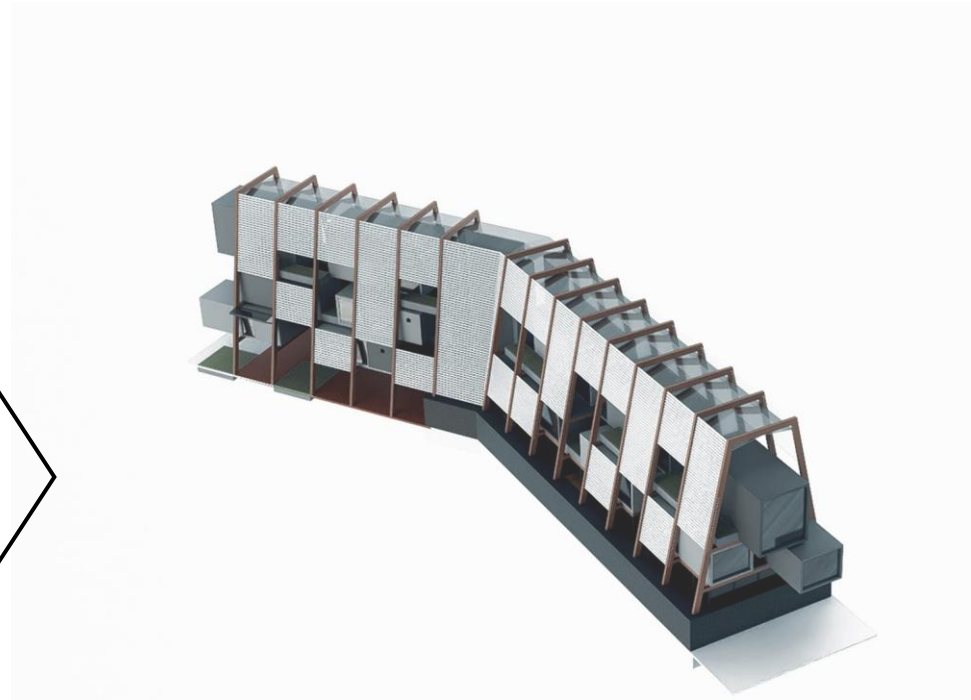
Envelope
Lightweight permeable skin defining the façade and mediating light and ventilation

Units
Modular residential units (**1-bedroom / 2-bedroom**) organized in clusters across the structure

Structure
Rhythmic frame inspired by boat construction, expressing lightness and repetition

Glass / Common Space
Transparent shared zones activating the ground level, enhancing visibility, daylight, and collective interaction

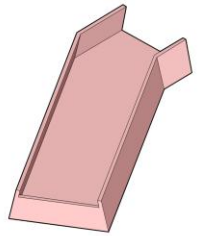
Base
Solid Concrete plinth anchoring the project to the ground



ONE BUILDING CONTAINING 14 [ONE BEDROOM] UNITS AND 5 [DOUBLE BEDROOM]

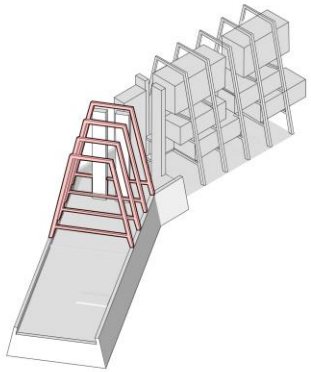
CONSTRUCTION PROCESS

ASSEMBLY SEQUENCE



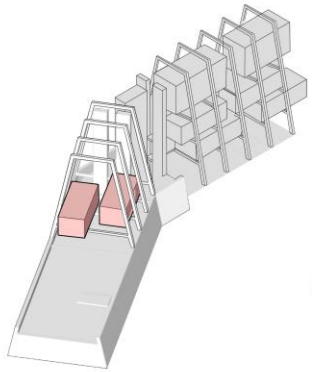
chryso SAINT-GOBAIN

STEP 1 – Concrete Base Installation

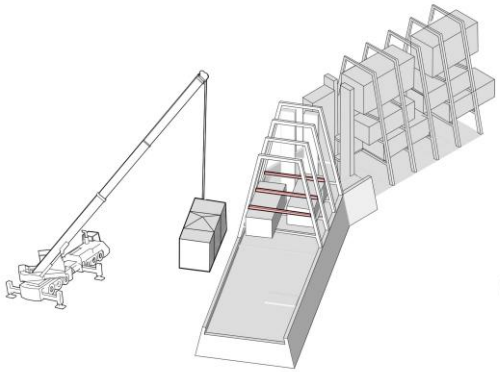


pasquill SAINT-GOBAIN

STEP 2 – Primary Structure

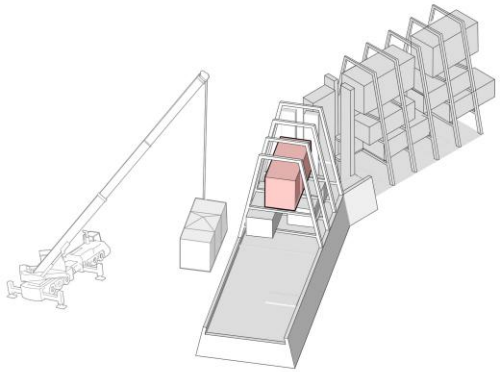


STEP 3 – Modular Unit Placement

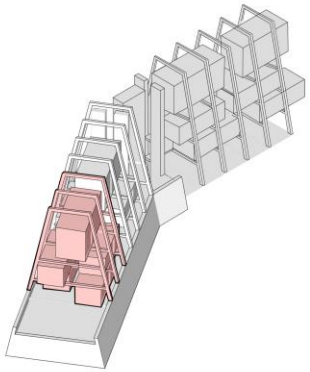


pasquill SAINT-GOBAIN

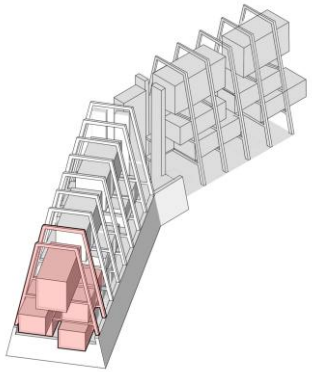
STEP 4 – Upper Structure



STEP 5 – Duplex Unit Integration



STEP 6 – Sequential Section Expansion



STEP 7 – Sequential Section Expansion

Adaptive Framework

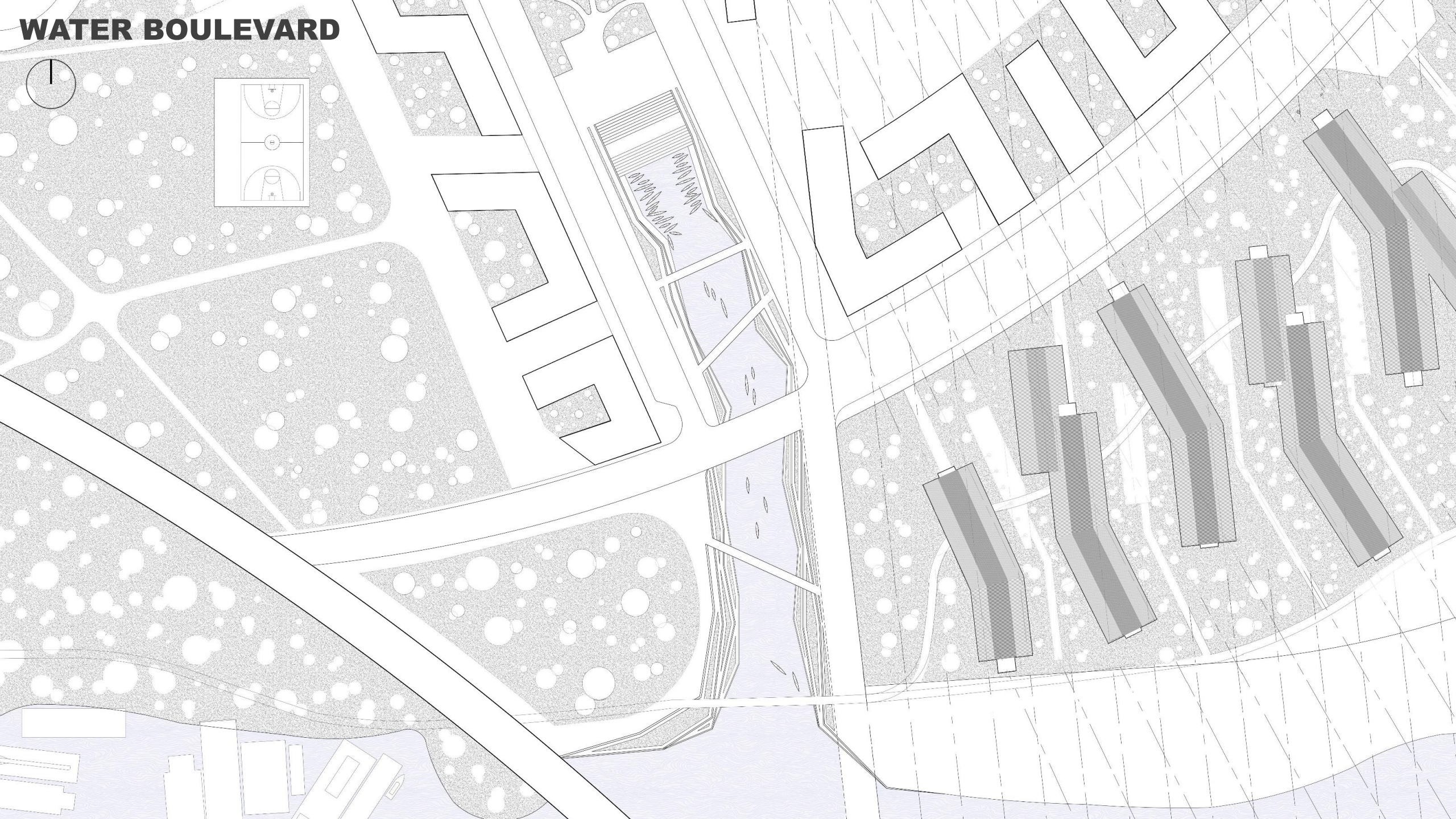
Each building begins with a stone base, followed by a vertical timber structure where modular units are stacked section by section. Instead of expanding horizontally, the project grows through repeated vertical frames, allowing units to be added, removed, replaced, or extended over time.

The use of prefabricated timber and modular construction systems reduces material waste, simplifies assembly, and enables components to be reused or reintegrated into future building extensions. This adaptable system supports long-term flexibility while minimizing the need for large-scale demolition.

LOUVERS ADAPTIBILITY

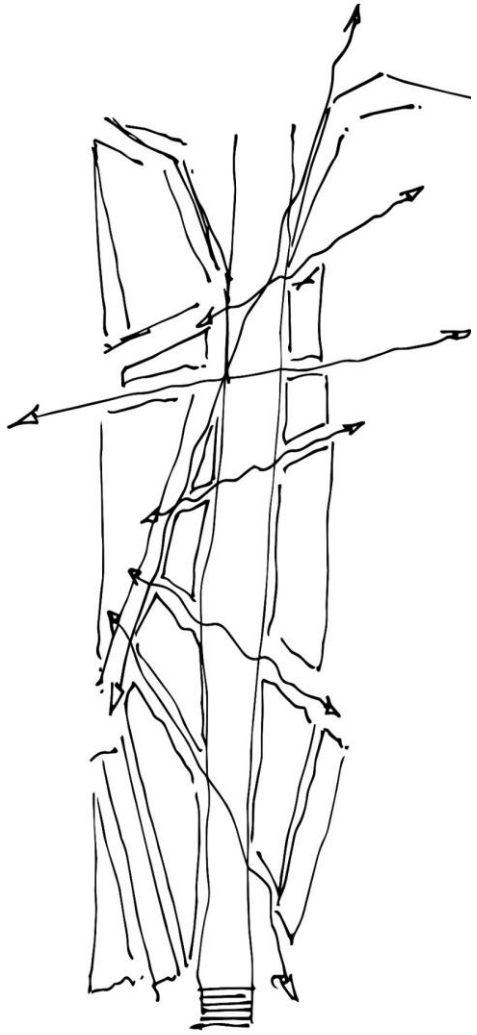
SITE PLAN

1 - 7 Athlete's Units
8 – Cafeteria
9 – Gathering Space
10 – Public / Gym Space
11 – Tennis / Basketball Court
12 – Volleyball Court
13 – Maritime Museum
14 – Walking Passage (Old Train)
15 – Sava River
16 – Deck / Platform
17 – Bicycle Pathway
18 – Bridge
19 – Water Sports Extension
20 – Accommodation Extension

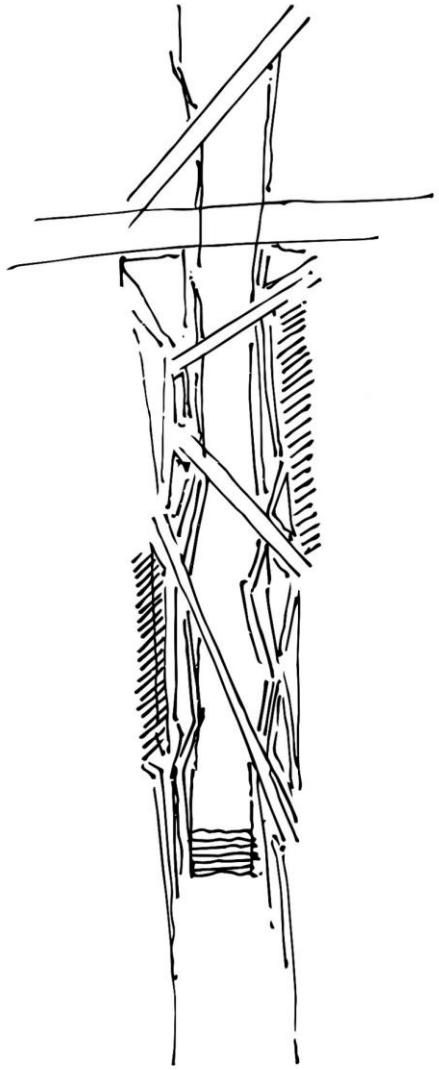

WATER BOULEVARD

WATER BOULEVARD

CONCEPTUAL SKETCHES



Flow Network



Layered Zones

Adaptive Edge

A sequence of **terraced levels** forms a gradual transition between the boulevard and the water, allowing the space to **adapt to fluctuating water levels** without losing **accessibility**.

These **stepped landscapes** operate as both **protection** and **activation**, transforming the edge into a usable public ground. The water boulevard becomes a dynamic civic platform, **a launch point for kayaking**, **a connector to the Sava River**, and **a central courtyard for the project.** It establishes a strong urban hub where infrastructure, landscape, and public life merge.

RIVER CONTINUUM

BLUE VEIN – NORMAL WATER STATE

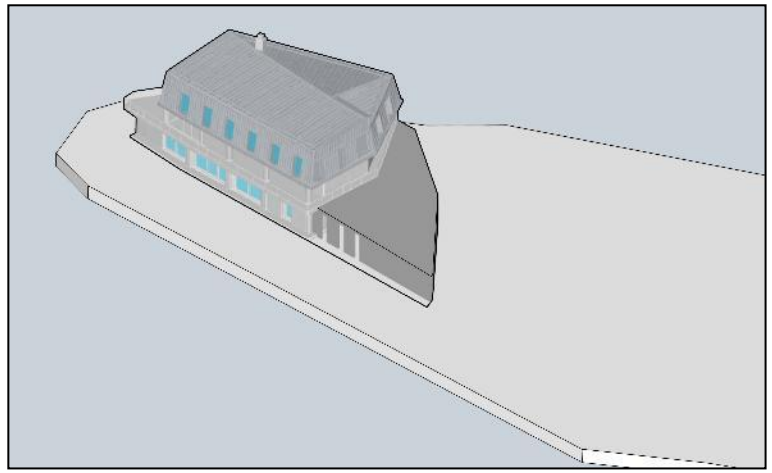
RIVER CONTINUUM

BLUE VEIN – RISING WATER STATE

RIVER CONTINUUM

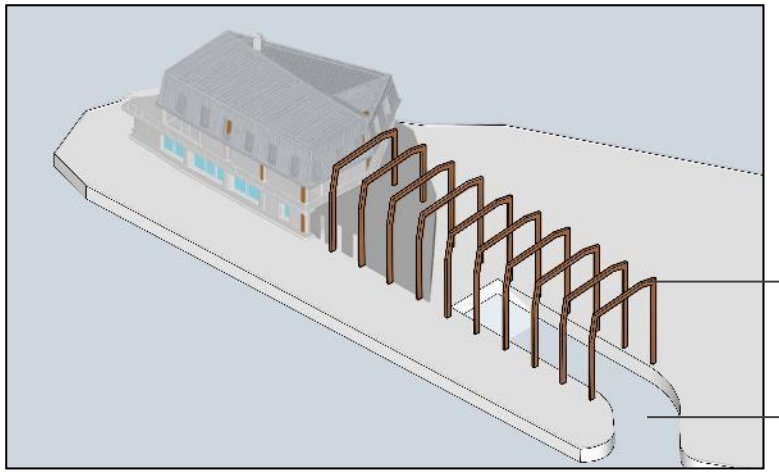
BLUE VEIN – EXTREME CONDITION

YACHTING CLUB



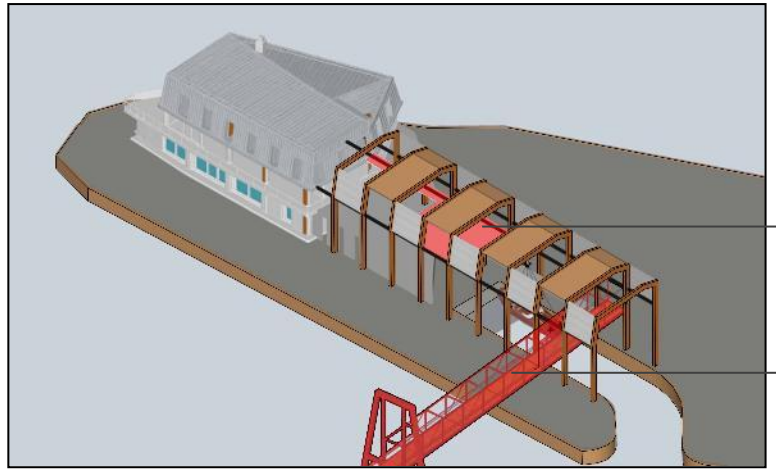
Existing Club

unaltered base



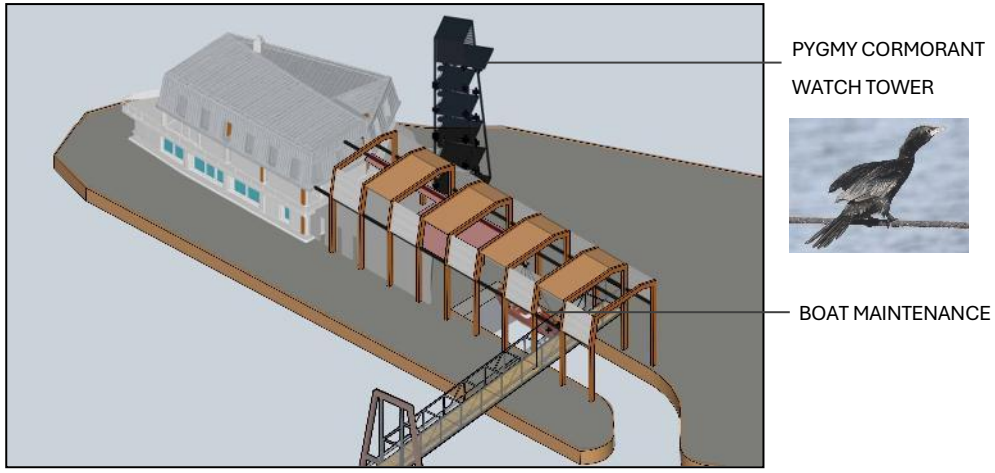
Structural Extension

skeletal rhythm



Platform Projection and Bridge Connection

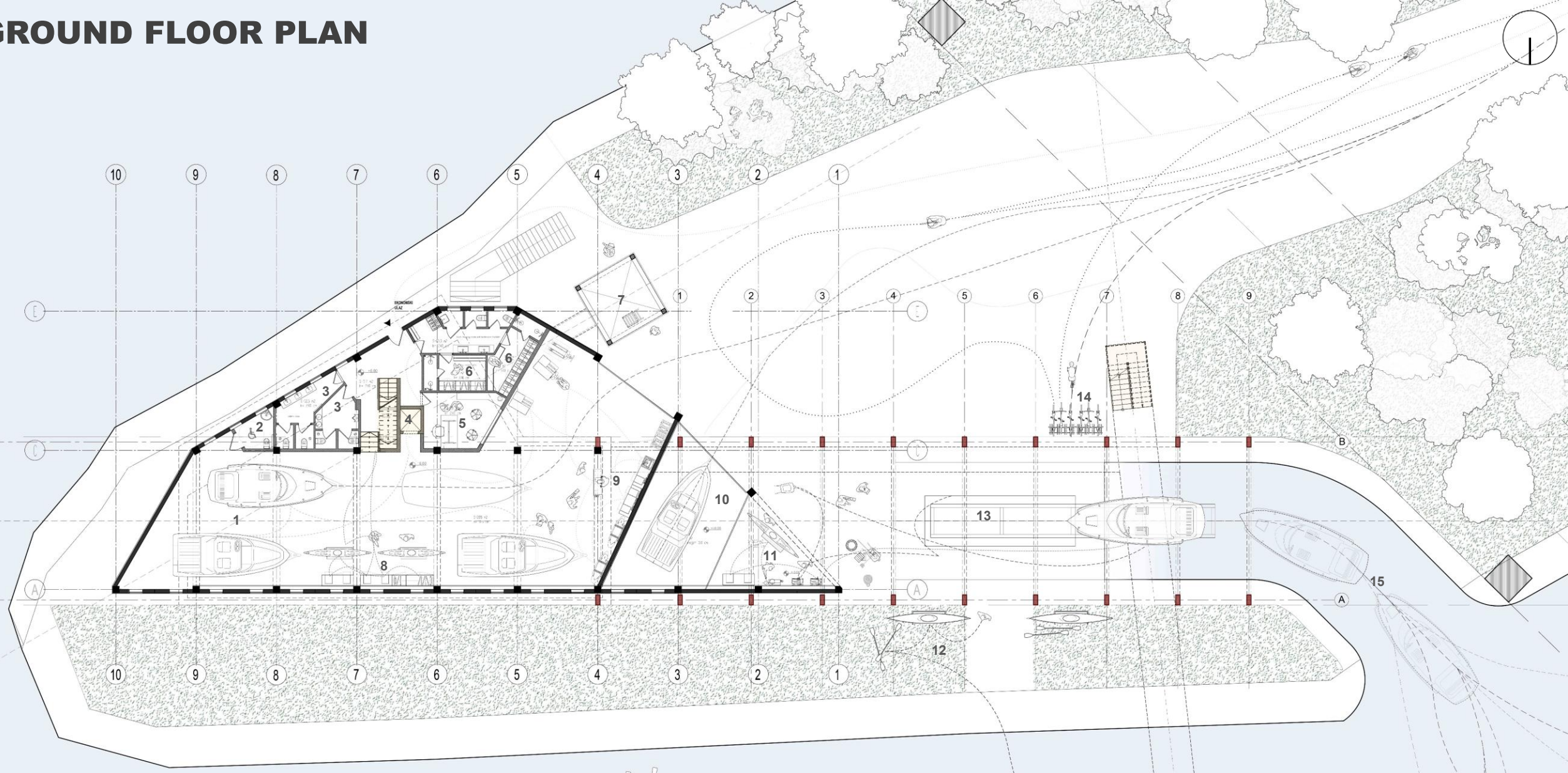
plaza expansion and Connecting the bridge to it



Maritime Hub

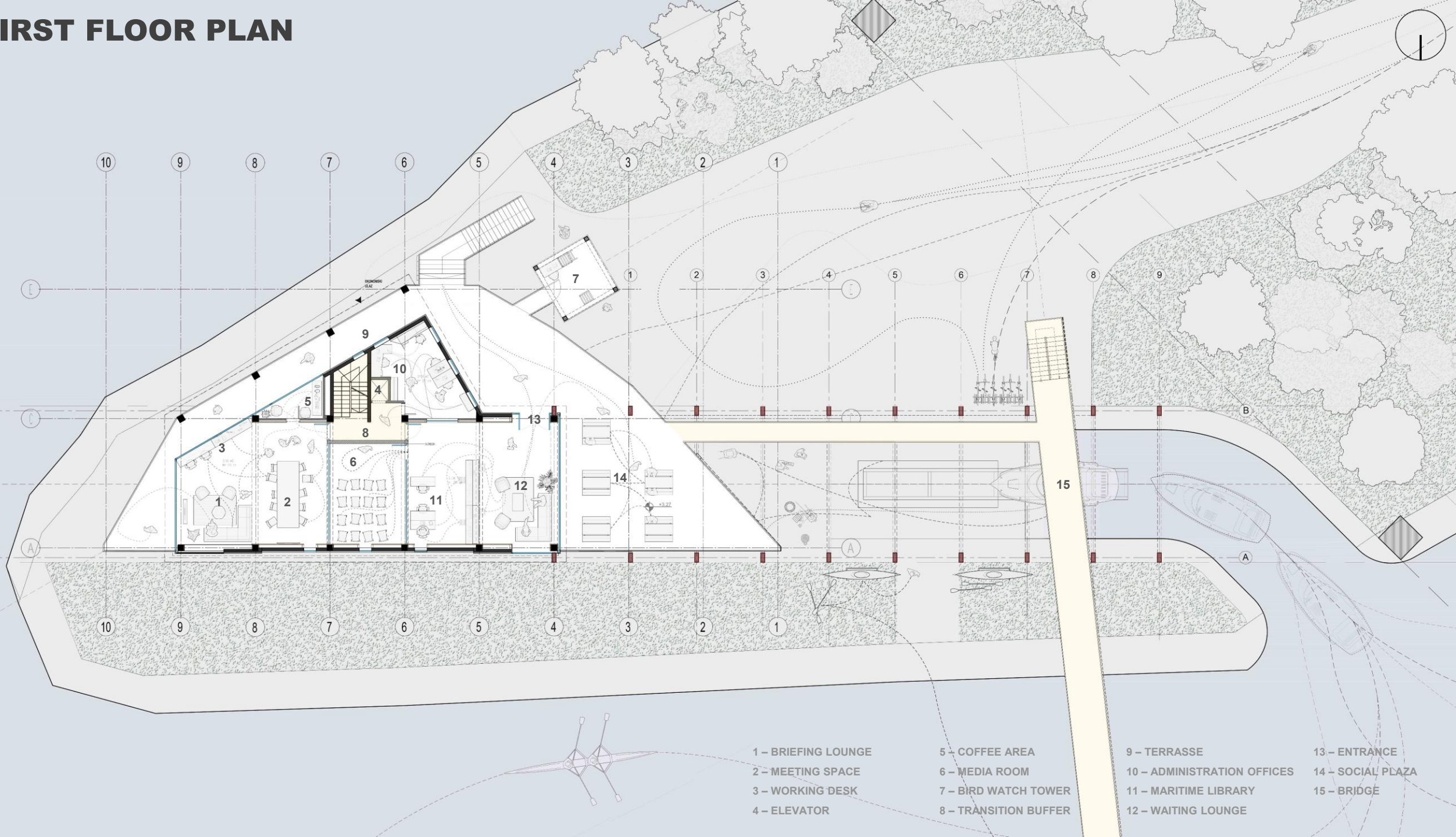
Arrival, kayak racks, suspended boats, Maritime Maintenance

GROUND FLOOR PLAN



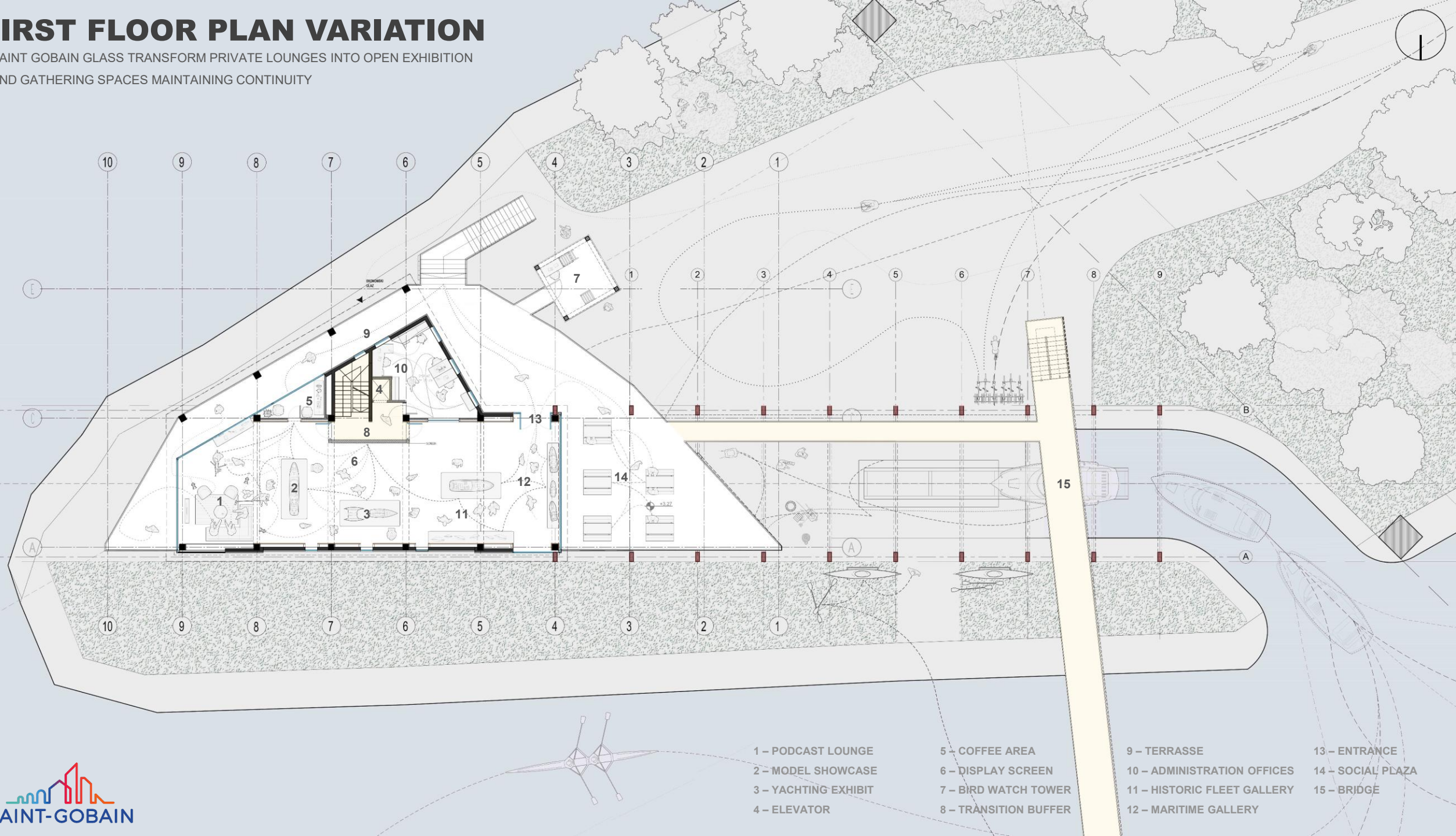
1 – BOAT STORAGE
2 – ACCESSIBLE TOILET
3 – TOILET
4 – ELEVATOR
5 – OFFICE
6 – SHOWERS
7 – BIRD WATCH TOWER
8 – BOAT MAINTENANCE
9 – BOATYARD WORKSHOP
10 – BOAT STORAGE
11 – COVERED SERVICE BAY
12 – KAYAK RACKS
13 – BOAT SERVICE BAY
14 – BICYCLE RACKS
15 – BOAT ENTRACE

FIRST FLOOR PLAN



FIRST FLOOR PLAN VARIATION

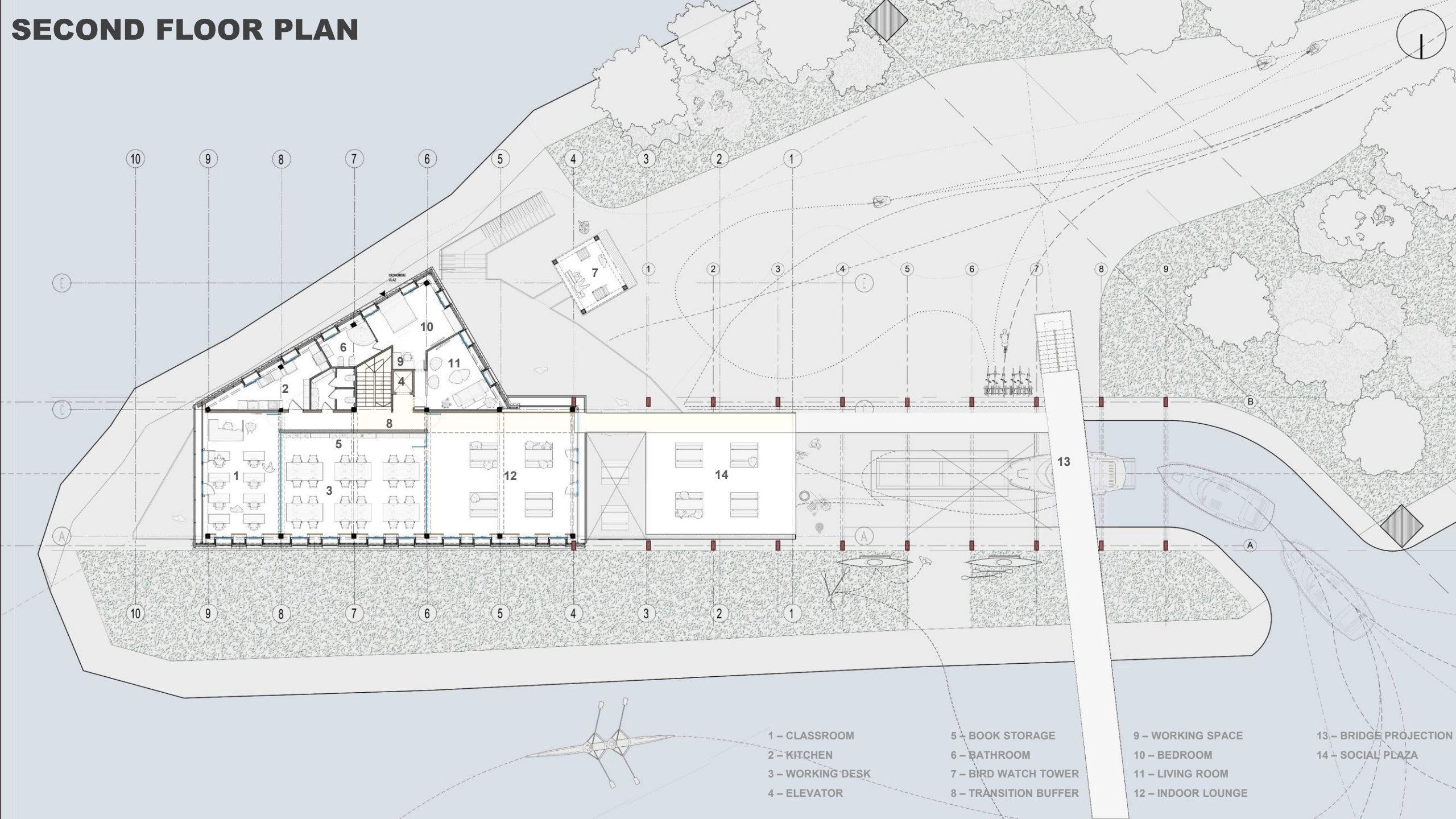
SAINT GOBAIN GLASS TRANSFORM PRIVATE LOUNGES INTO OPEN EXHIBITION
AND GATHERING SPACES MAINTAINING CONTINUITY



1 – PODCAST LOUNGE
2 – MODEL SHOWCASE
3 – YACHTING EXHIBIT
4 – ELEVATOR
5 – COFFEE AREA
6 – DISPLAY SCREEN
7 – BIRD WATCH TOWER
8 – TRANSITION BUFFER
9 – TERRASSE
10 – ADMINISTRATION OFFICES
11 – HISTORIC FLEET GALLERY
12 – MARITIME GALLERY
13 – ENTRANCE
14 – SOCIAL PLAZA
15 – BRIDGE

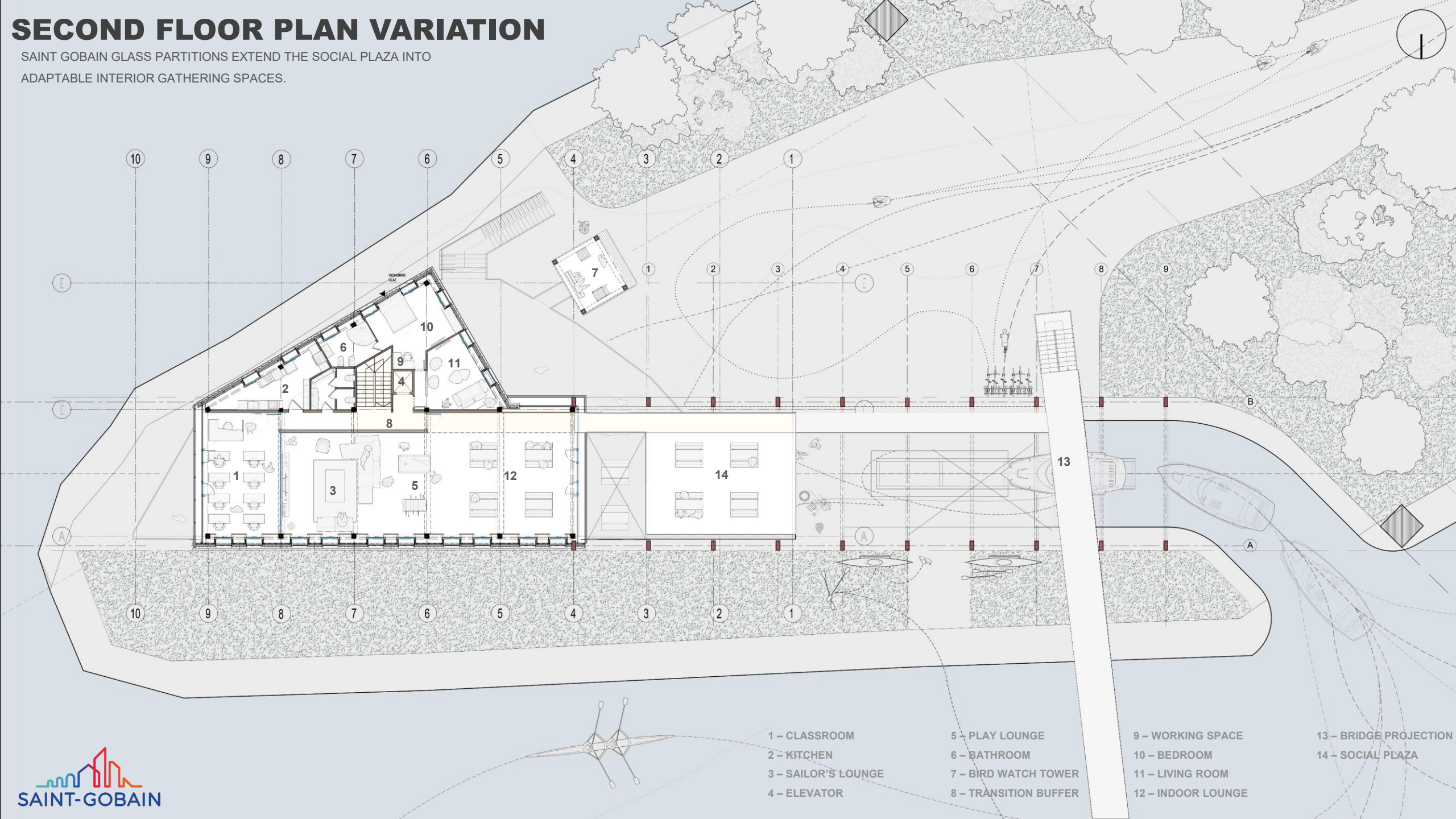
SAINT-GOBAIN

SECOND FLOOR PLAN



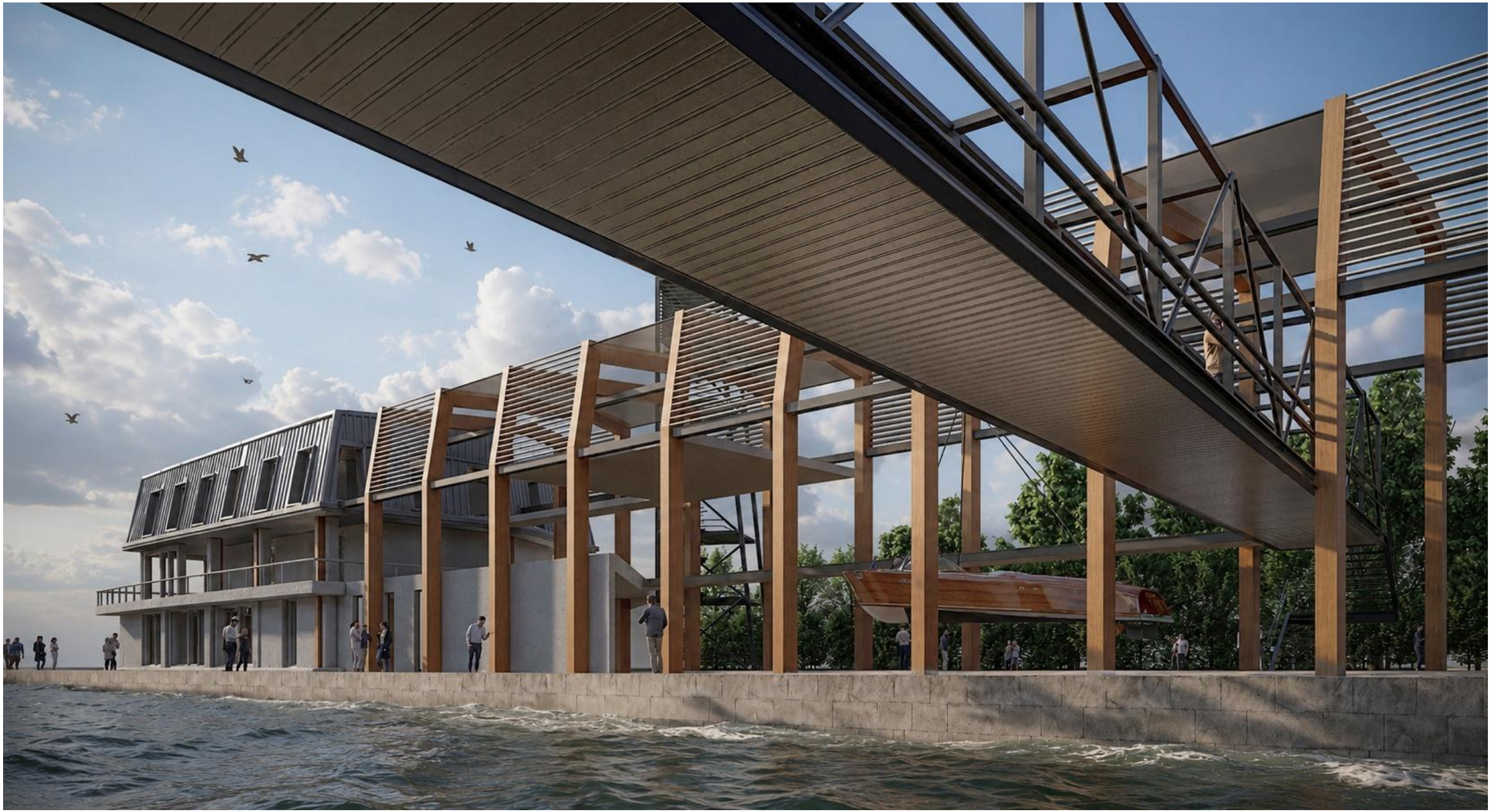
SECOND FLOOR PLAN VARIATION

SAINT GOBAIN GLASS PARTITIONS EXTEND THE SOCIAL PLAZA INTO ADAPTABLE INTERIOR GATHERING SPACES.



SAINT-GOBAIN

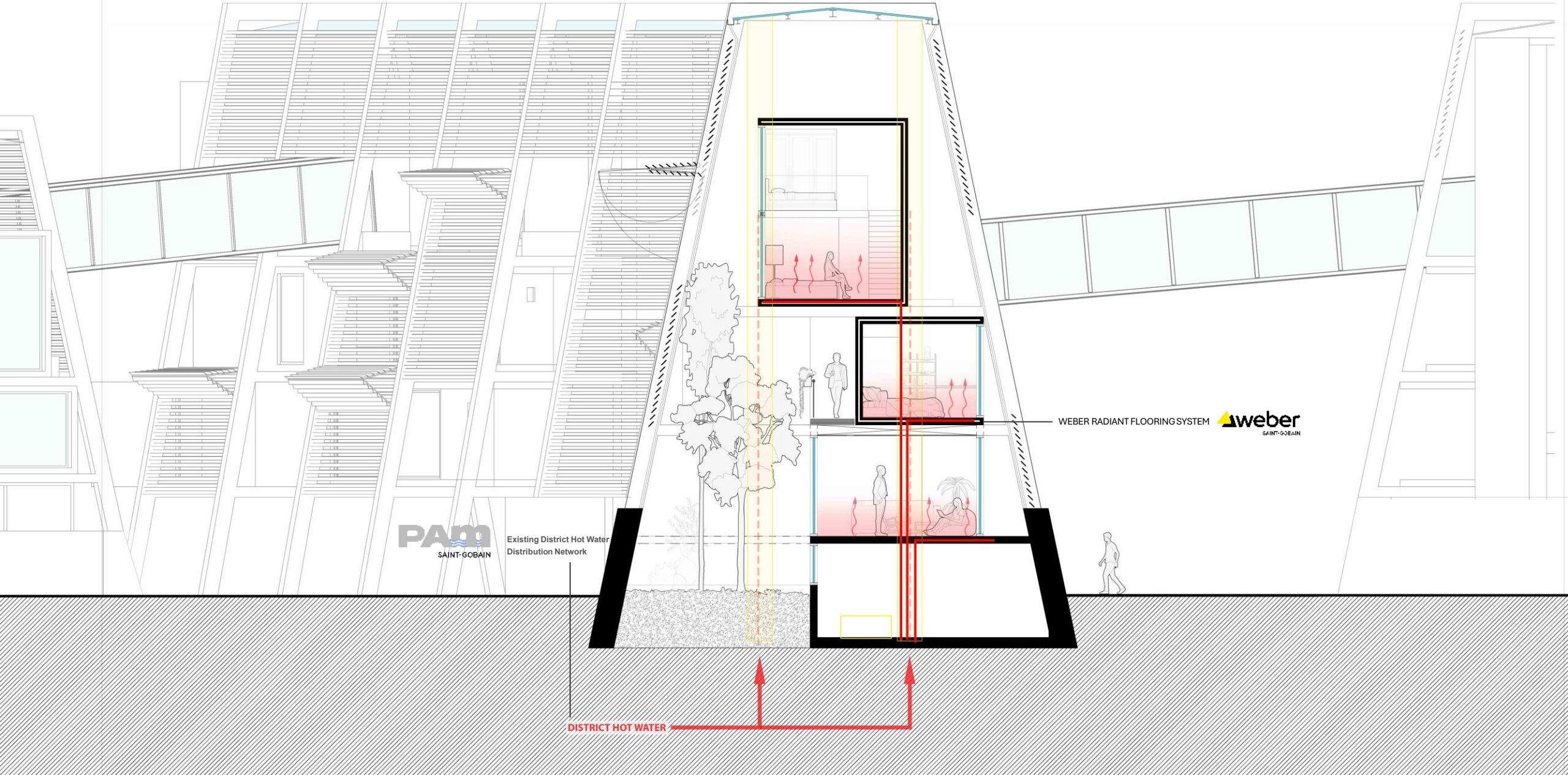
YACHTING CLUB



04
ENERGY AND TECHNIQUES

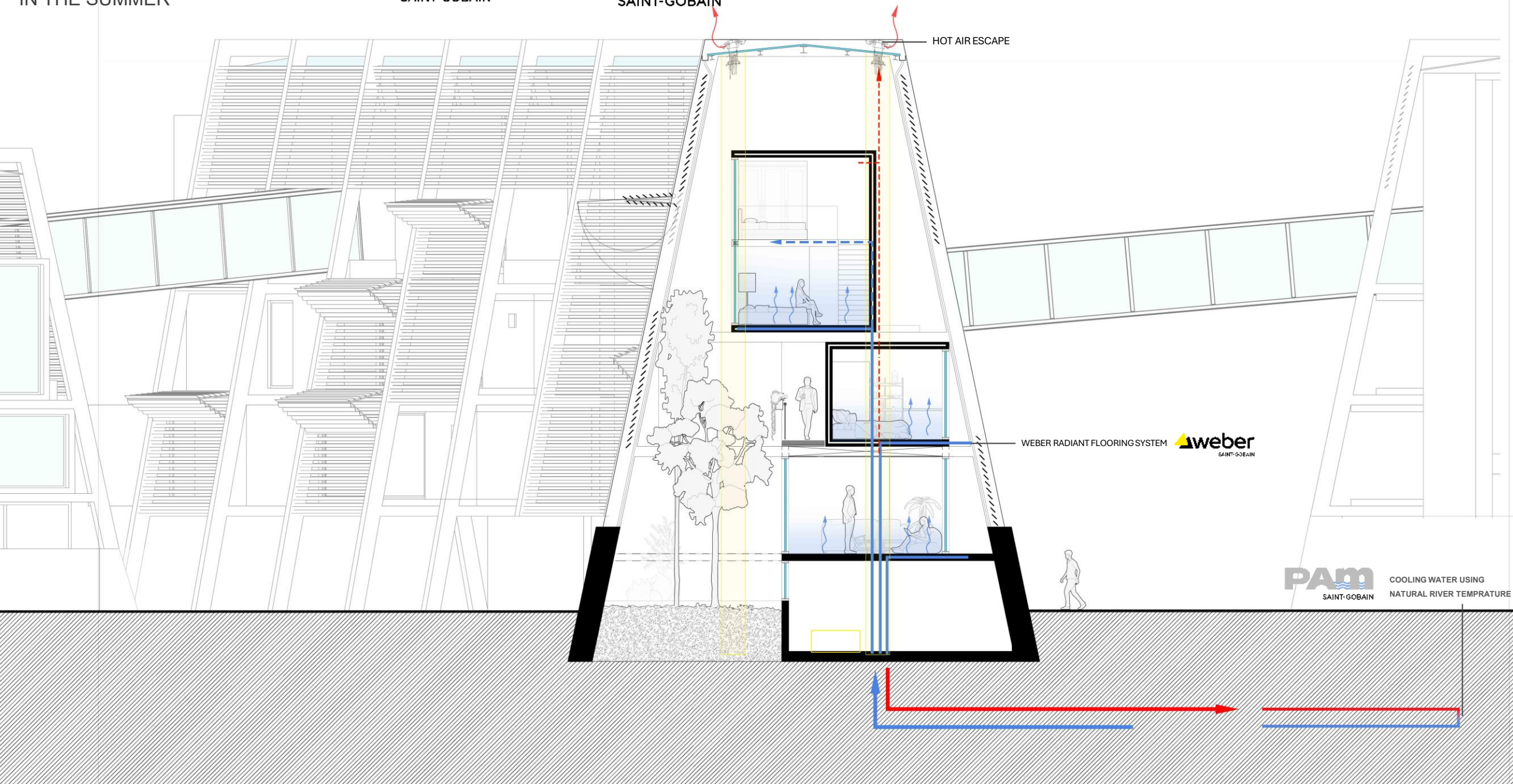
HOT DISTRICT WATER

THERMAL NETWORK



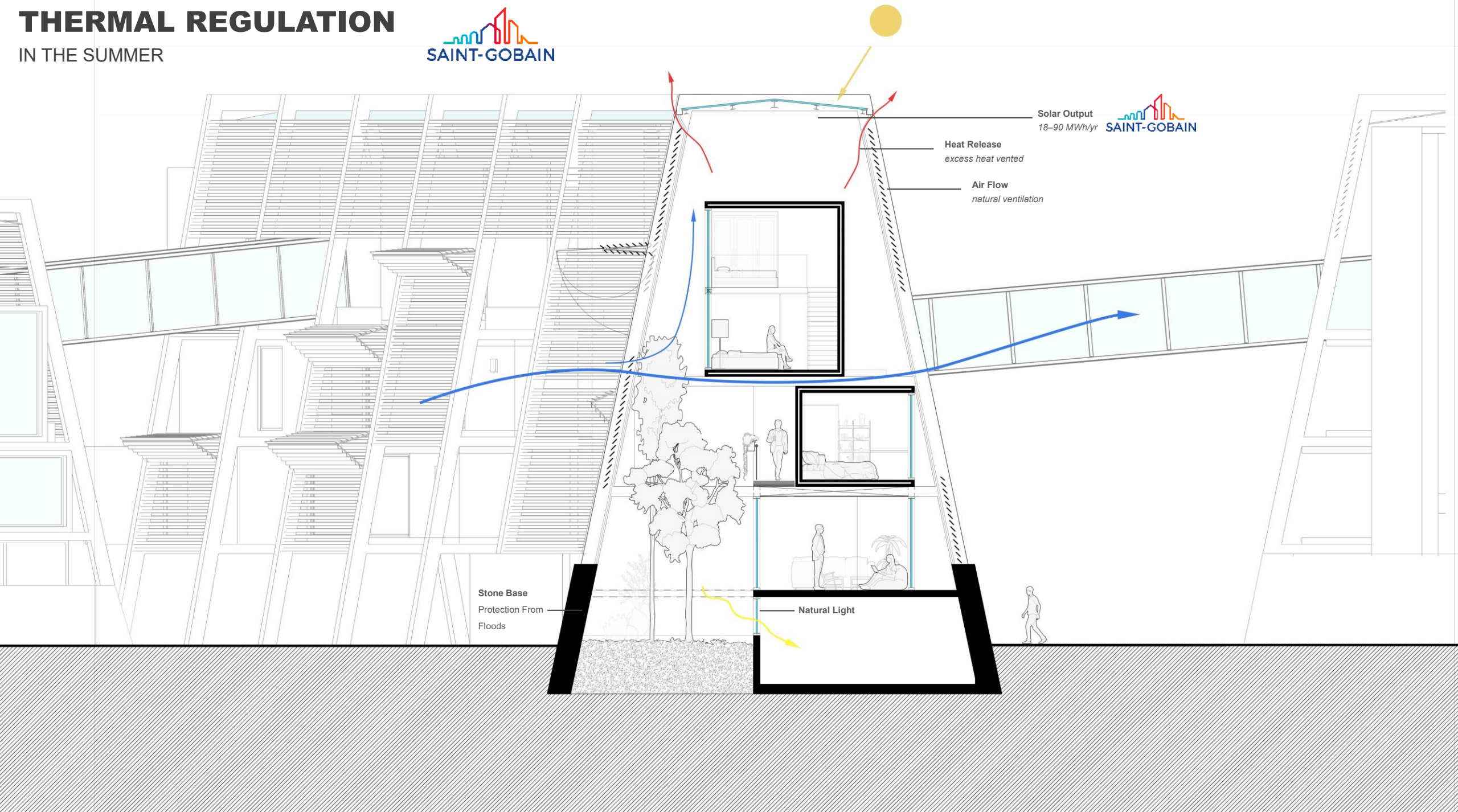
RIVER COOLING

IN THE SUMMER



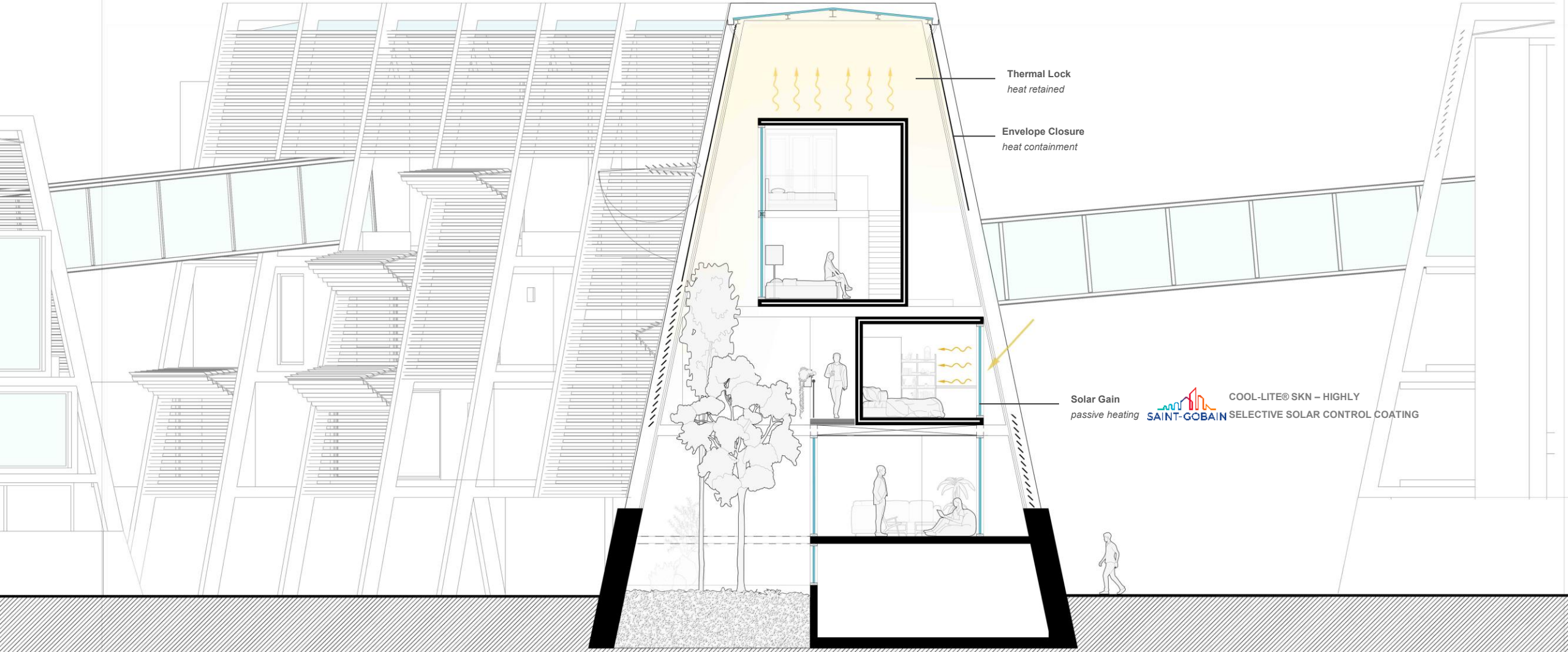
THERMAL REGULATION

IN THE SUMMER



THERMAL HARVEST

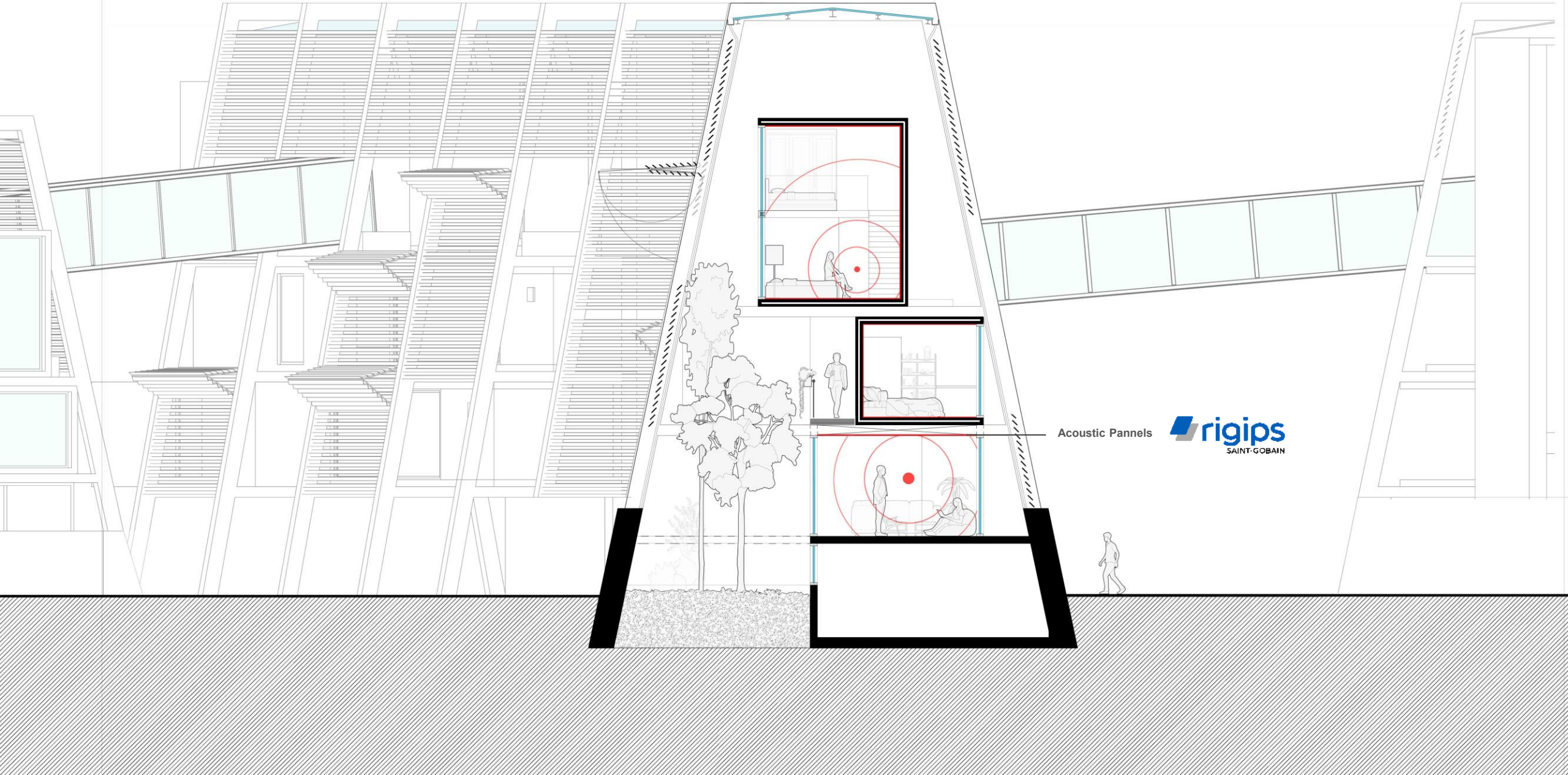
IN WINTER



ACOUSTIC INSULATION

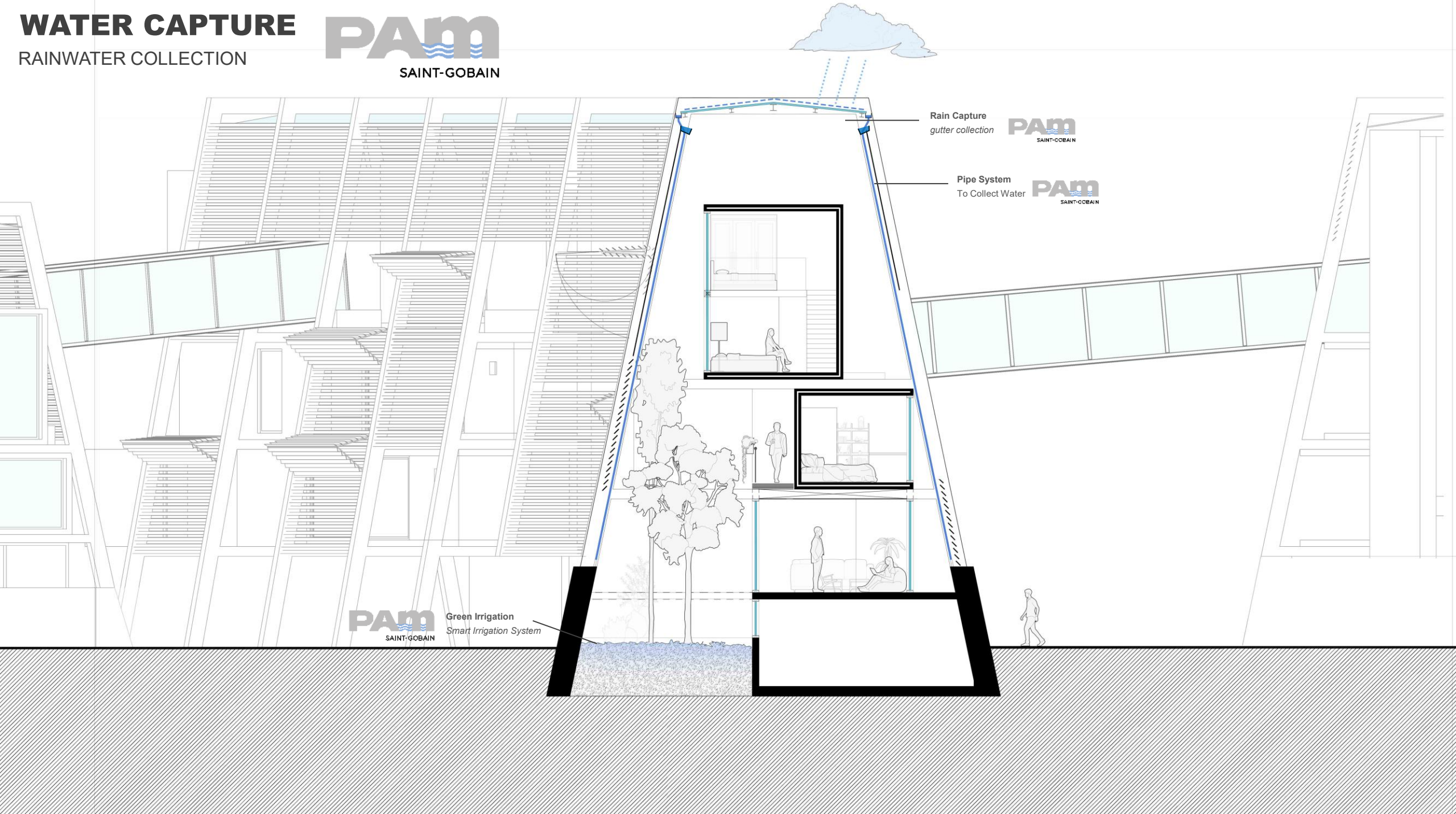
SOUND CONTROL

rigips SAINT-GOBAIN

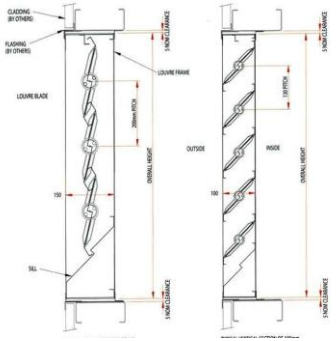


WATER CAPTURE

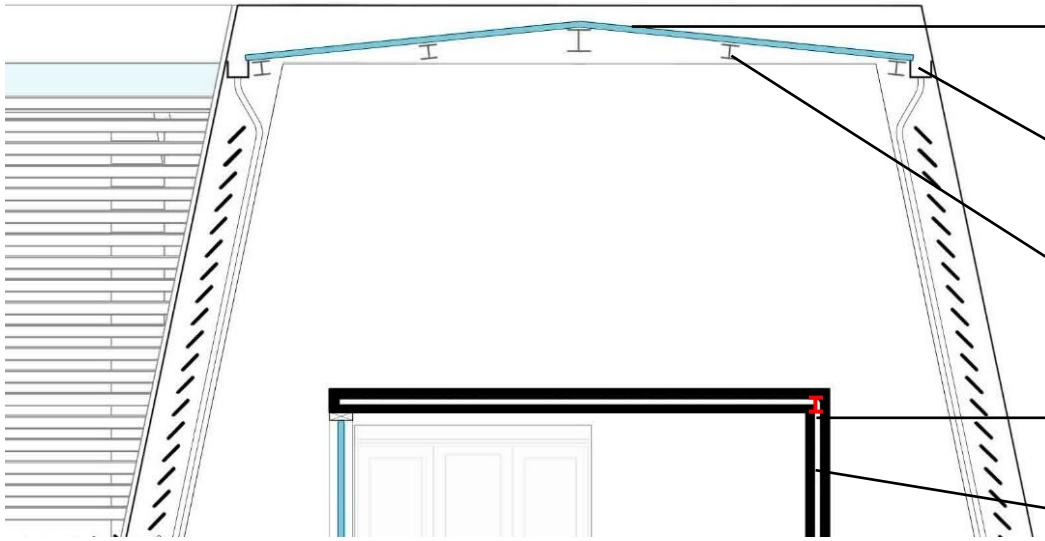
RAINWATER COLLECTION



SECTION



Climate-responsive system: Automated louvers adjusting to sun, wind, and temperature



BIPV panels: Integrated photovoltaic Skylight generating renewable energy while acting as a cover

Gutter system: Integrated edge drainage collecting and redirecting rainwater from the roof surface

Metal support frame: Primary steel structure supporting and fixing the BIPV panels

Hybrid wall system: Timber–metal composite wall combining structure and architectural finish

Insulation layer: insulation ensuring thermal performance and acoustic comfort

WALL SECTIONS

Building Integrated Photovoltaics

BIPV Façade Panels

Function: Façade + energy generation

System: Solar modules integrated into building skin

Applications: Curtain walls, ventilated façades, glazing, **skylights**

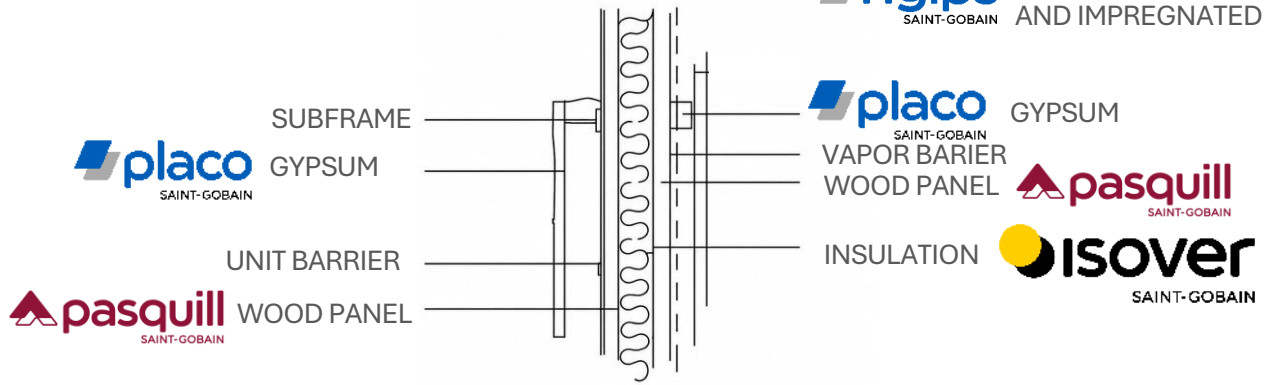
Performance: Reduces energy demand + produces electricity

Design: Custom colors, transparency, sizes

Between: 30 to 150 watts per sqm
18000 to 90000 kwh/year for each Building

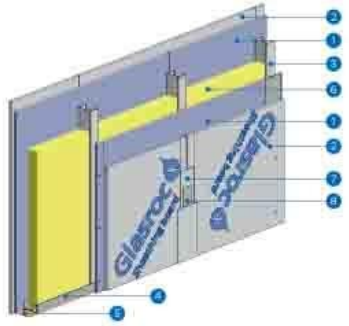
SAINT-GOBAIN

EXTERNAL WALLS



INDOOR PARTITIONS

rigips SAINT-GOBAIN



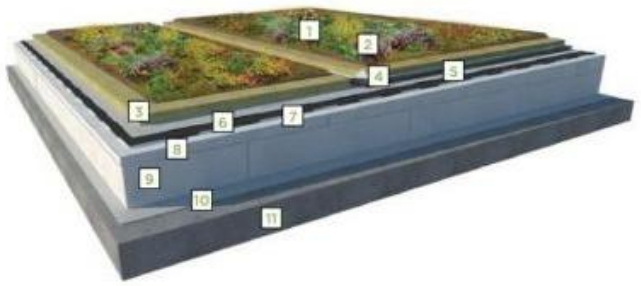
A1 EI 120
FEASIBLE WALL HEIGHT 4 METRES

Legend

1. Duraline Blue DB plasterboard
2. Glasroc® X sheating board
3. R-CW 75 Rigiprofil
4. R-UW 75 Rigiprofil
5. Acoustic tape for profile
6. Mineral wool insulation
7. Vario joint filler
8. Jointing reinforcement glass tape

WALL SECTIONS

GREEN ROOF



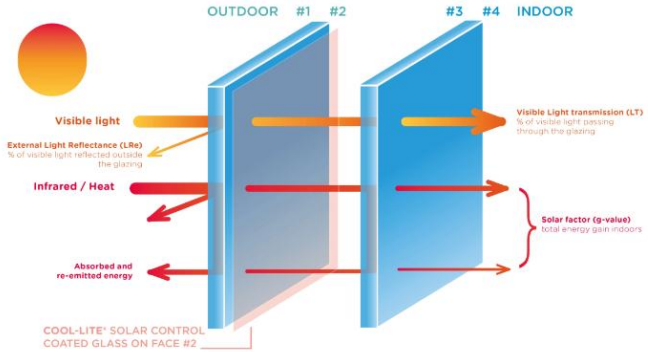
ISOVER ENERGY-EFFICIENT ROOF EXTENSIVE GREEN ROOF

1. Extensive vegetation – sedums, sempervivums, succulents
2. Extensive mineral substrate, 30 mm thick
3. Isover Flora hydrophilic panels, thickness 50 mm
4. Filter fabric, 120 g/m²
   (only used with dimpled membrane)
5. Drainage dimpled membrane (use depends on drainage capacity calculation)
6. Protective geotextiles, 300 g/m²
7. Waterproofing resistant to root penetration
8. Isover EPS 150 thermal insulation gradient wedges
9. Isover EPS 100 thermal insulation
10. Vapour barrier
11. Supporting roof structure

+ Rainwater retention
+ Most affordable
+ Easy implementation
+ Low maintenance
+ Low weight
- Limited choice of vegetation
- Can't be walked on at all times

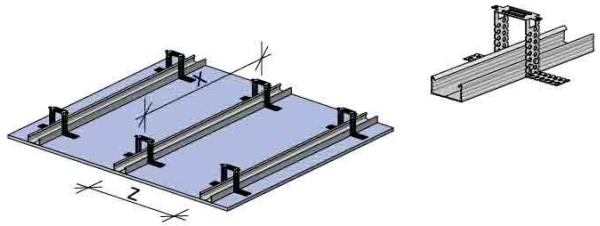
The most common type of green roofs are compositions with low xerophytic vegetation. They are low maintenance and also the most affordable. Recommended plants include sedums, sempervivums and other plants that can tolerate extreme roof conditions. The appearance and colour of sedums changes throughout the year. This type of green roof retains more water than a roof without plants. It is also lightweight and suitable for the reconstruction of houses, pergolas, etc.

COOL-LITE® SKN – HIGHLY SELECTIVE SOLAR CONTROL COATING



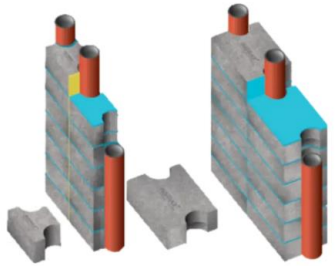
This is the range of double silver solar control glass reaching a selectivity up to 2,0. This means that they provide the perfect balance between a high solar protection and light transmission.

SUSPENDED CEILINGS WITH DURALINE BLUE BOARD



MODULAR MEP SHAFT INTEGRATION

Belly Brick System



- Simple assembly
- High thermal conductivity
- High corrosion resistance by material type
- Mechanically stable at high temperatures
- Compatible with a wide range of tube diameters and spacings

ONE CLICK LCA

Cradle to grave (A1-A4, B4-B5, C1-C4)	kg CO_2e/m^2
(< 420) A (420-485) B (485-550) C (550-615) D (615-680) E (680-745) F (> 745) G	419