



NEW URBAN FRONT

P5 Presentation - O.F.S.F. Türkcan (4309634)



complex projects

22/01/2021

fall semester

Jelmer van Zalingen (1st mentor)
Sjap Holst (2nd mentor)
Hrvoje Smidihen (3rd mentor)
Alexander Wandl (external examiner)



ROTTERDAM

Introduction

A WATER CITY



A WATER CITY



A WATER CITY



A WATER CITY



A WATER CITY

AD

NIEUWS

REGIO

SPORT

SHOW

VIDEO

FUN



▲ Sinds 2001 is de containeroverslag in Brabant met gemiddeld 16 procent per jaar gestegen. © RV

Onderzoekers: Rotterdamse haven is veel belangrijker voor Nederland dan gedacht

De Rotterdamse haven is belangrijker voor de Nederlandse economie dan tot nu toe aangenomen. Dat concluderen onderzoekers van de Erasmus Universiteit Rotterdam in een rapport dat zij vandaag presenteren.

vanz& Leon van Heel 18-12-18, 07:00 Laatste update: 09:25

A CITY SYNONYMOUS WITH WATER

ROTTERDAM



A CITY SYNONYMOUS WITH WATER

ROTTERDAM



WATER CITY



HARBOR MENTALITY



MANHATTAN AAN DE MAAS



HISTORIC ROTTERDAM



INSEPERABLE LINK TO WATER



UNTIL DISASTER SET THEM APART



THE DESTROYED CITY



'50s: RECONSTRUCTION



REMOVING WATER FROM THE CENTER



'60-'90s: HARBOR MIGRATION



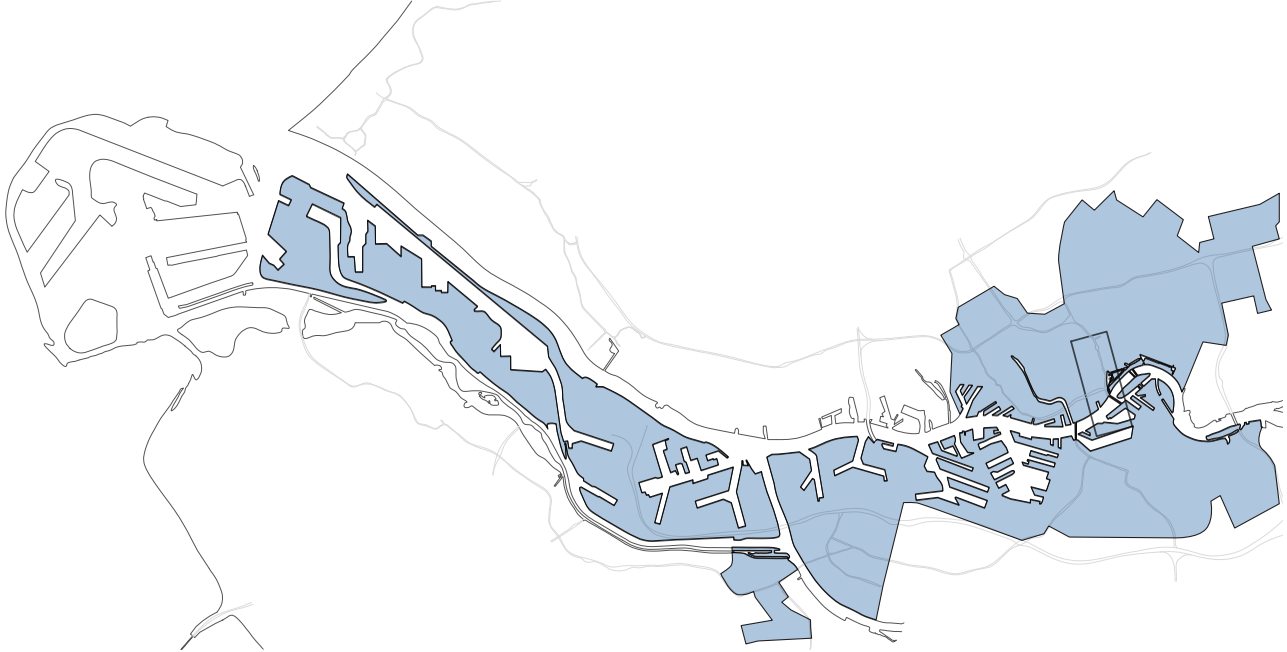
1940



1960



1980





>'90: HARBOR TRANSFORMATION



DENSIFICATION



GENTRIFICATION



NEW CITY CENTER



"CENTER"?



Inaccessible water

Not allowed & not possible

"CENTER"?



Inaccessible water

Not allowed & not possible



Maas as non-place

The river feels like a highway

"CENTER"?



Inaccessible water
Not allowed & not possible



Maas as non-place
The river feels like a highway



Lack of character & scale
Industrial? Modern? Mixed?

Introduction
"CENTER"?



Inaccessible water
Not allowed & not possible



Maas as non-place
The river feels like a highway



Lack of character & scale
Industrial? Modern? Mixed?



No programmatic relation
Program does not relate to Maas

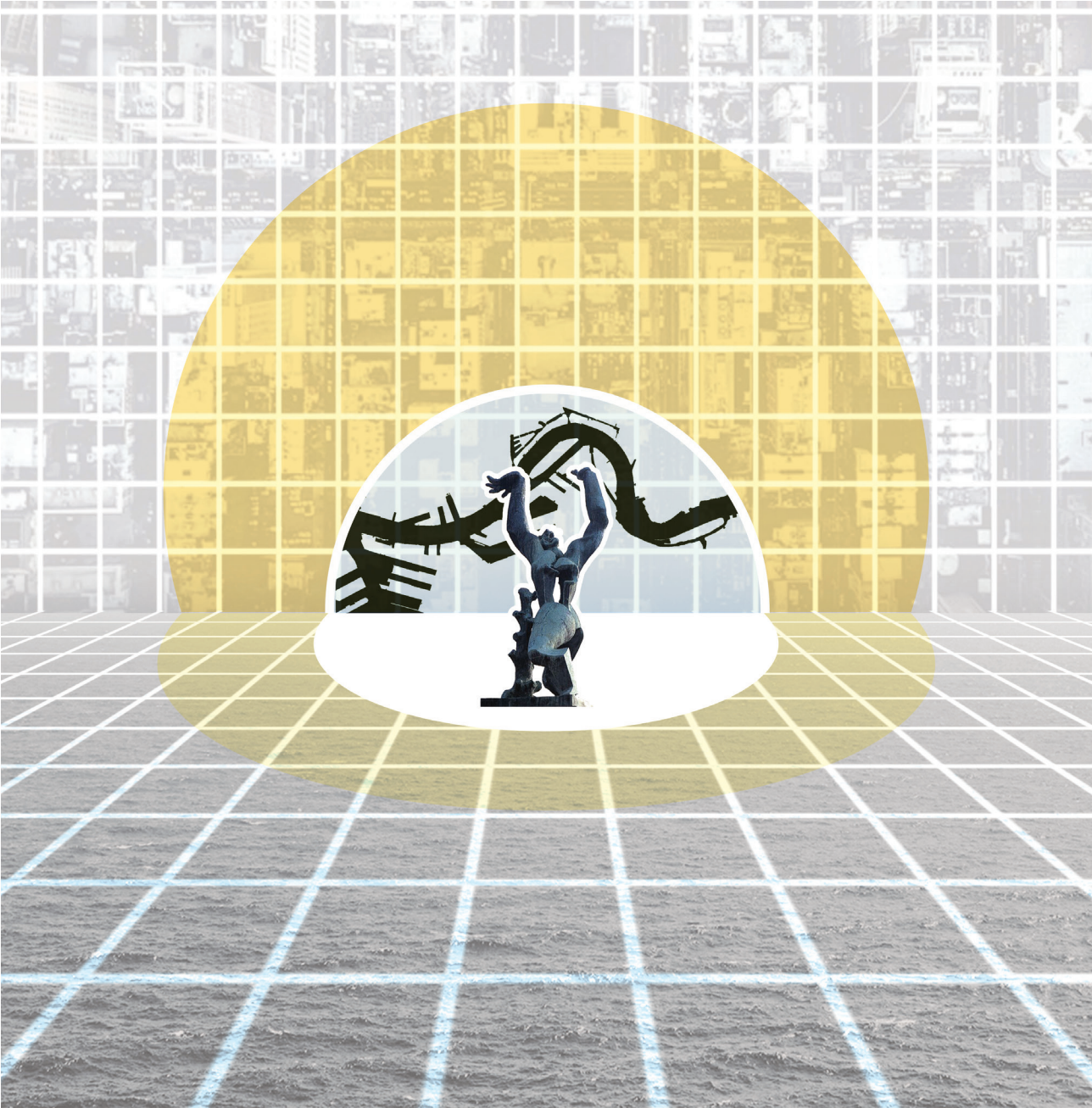
WHAT IF: ACCESS TO WATER



WHAT IF: ATTRACTION AT WATER



WHAT IF: MAAS AS CENTER IN URBAN MEMORY



RESEARCH QUESTION

**How can waterfront densification
contribute to interiorizing the Maas river?**

NEW URBAN FRONT



Introduction

Research

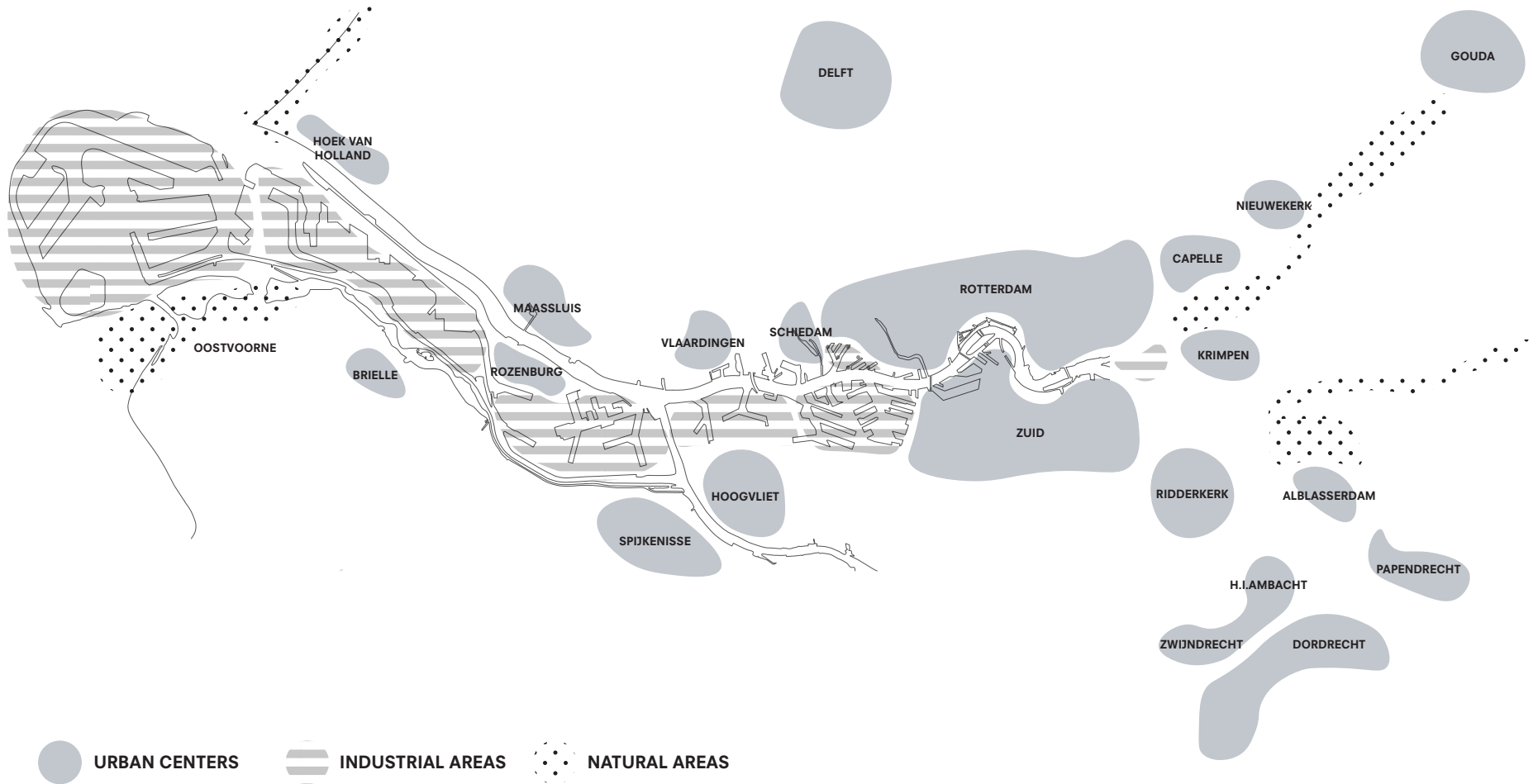
Design Brief

Design

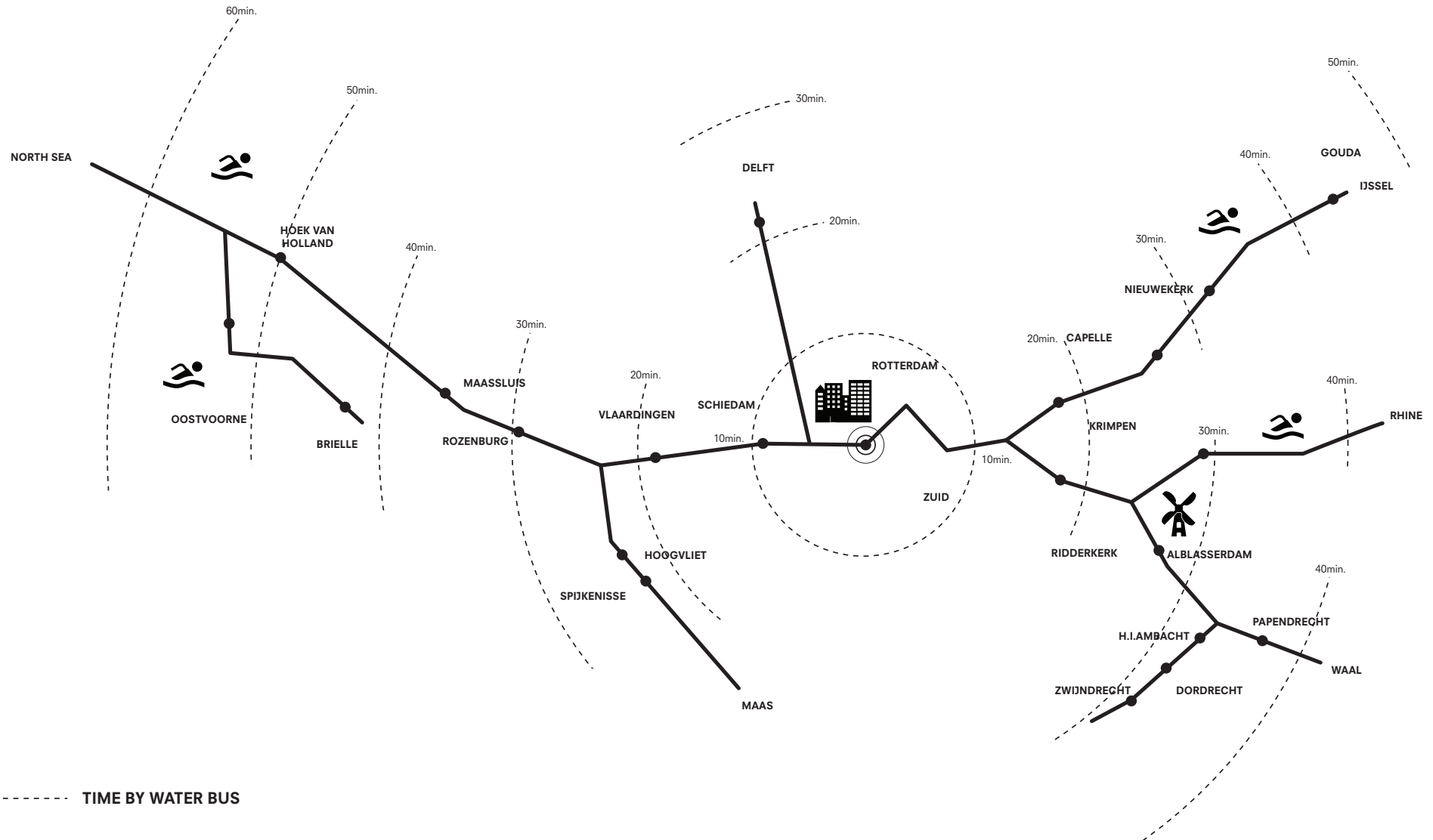
Conclusion

INDEX

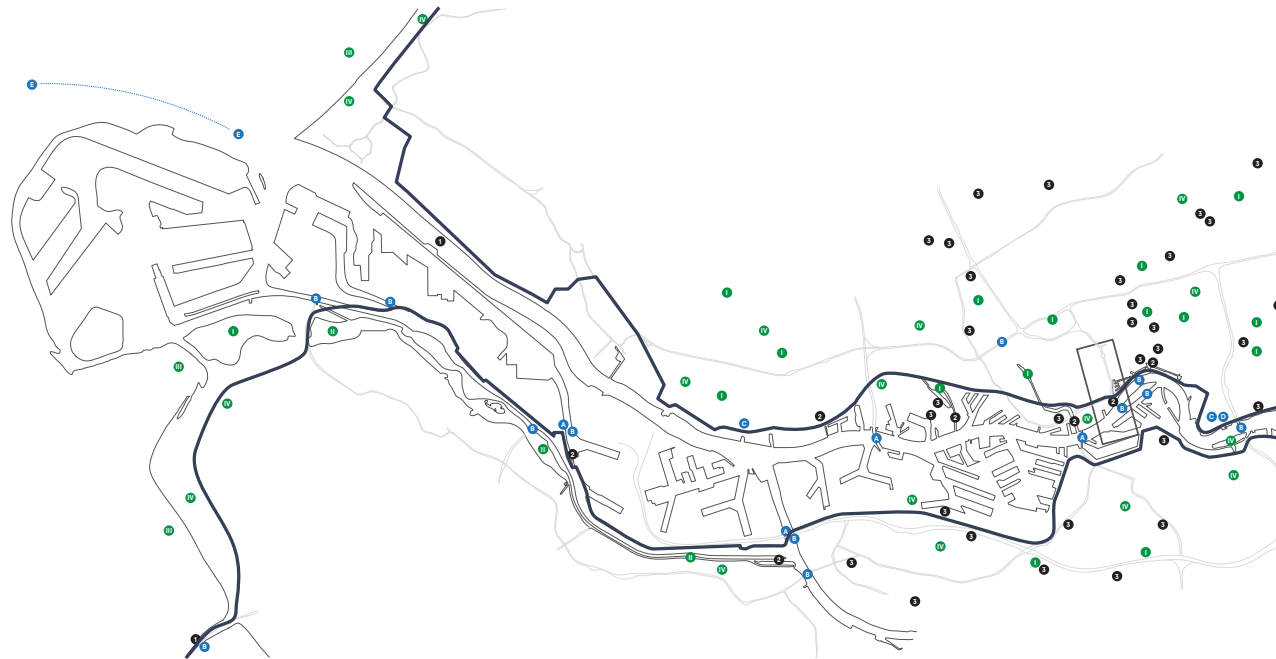
REGIONAL WATER NETWORK



LEISURE & CITY CONNECTION



TECHNICAL WATERFRONT

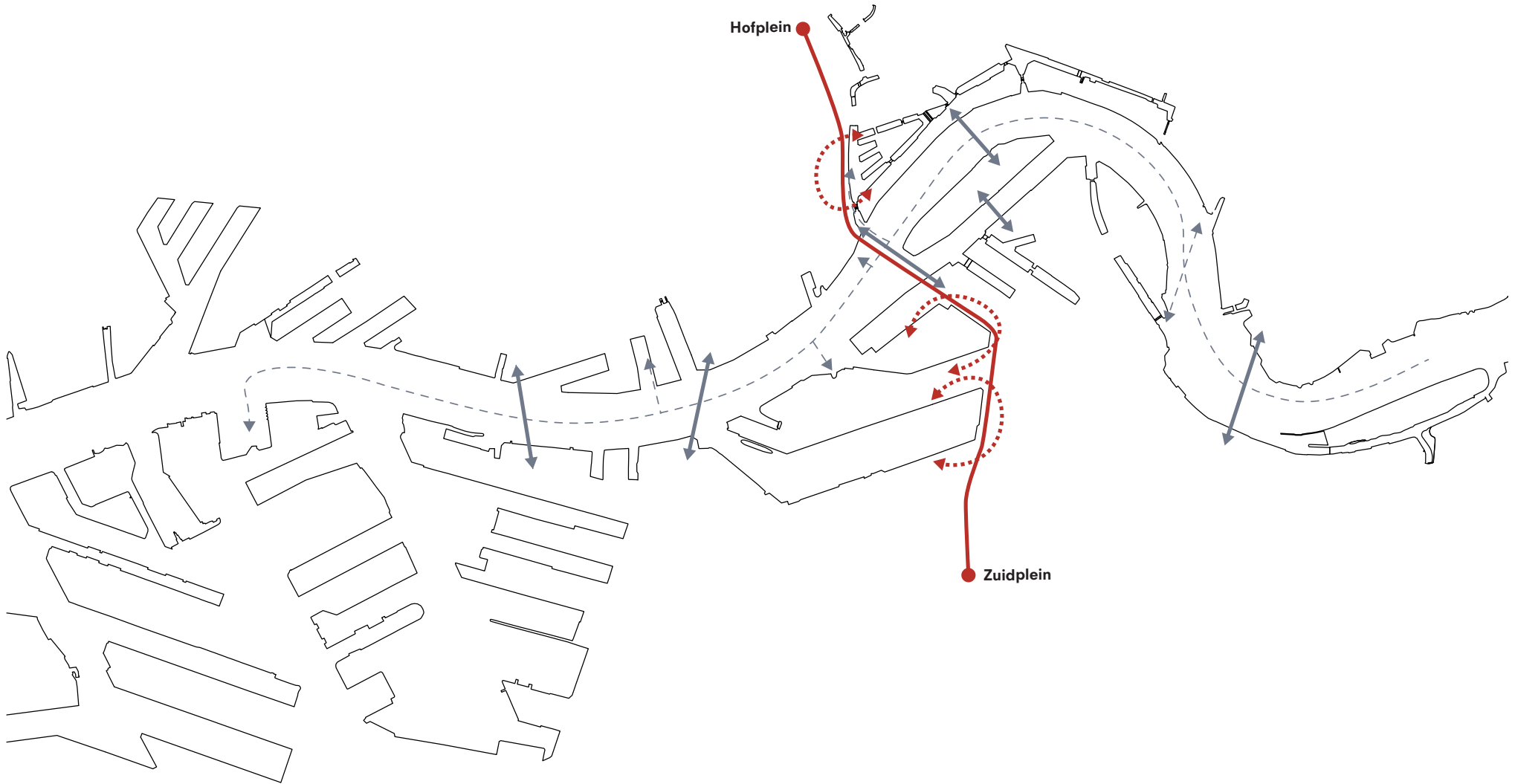


- | Water safety | Water utility | Water ecology |
|-------------------------|----------------------------|----------------------|
| ① Active water defences | A Large tunnel | I Large water bodies |
| ② Water locks | B Large bridge | II Parallel streams |
| ③ Pumping station | C Sewage water treatment | III Uiterwaarden |
| — Primary dikes | D Drinking water treatment | IV Large green areas |
| Secondary dikes | E Shipping passage | V Small water bodies |

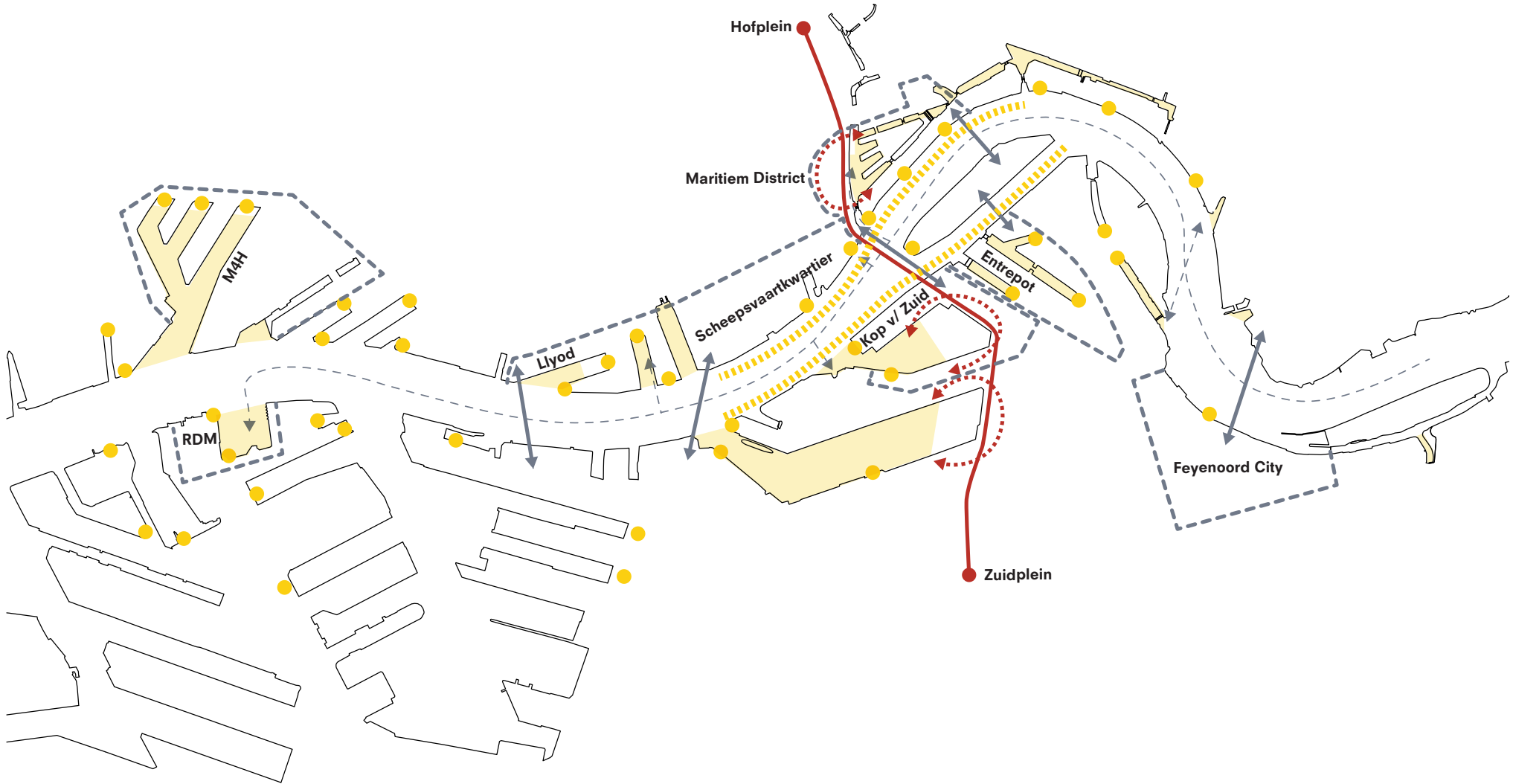
MUNICIPAL VISION



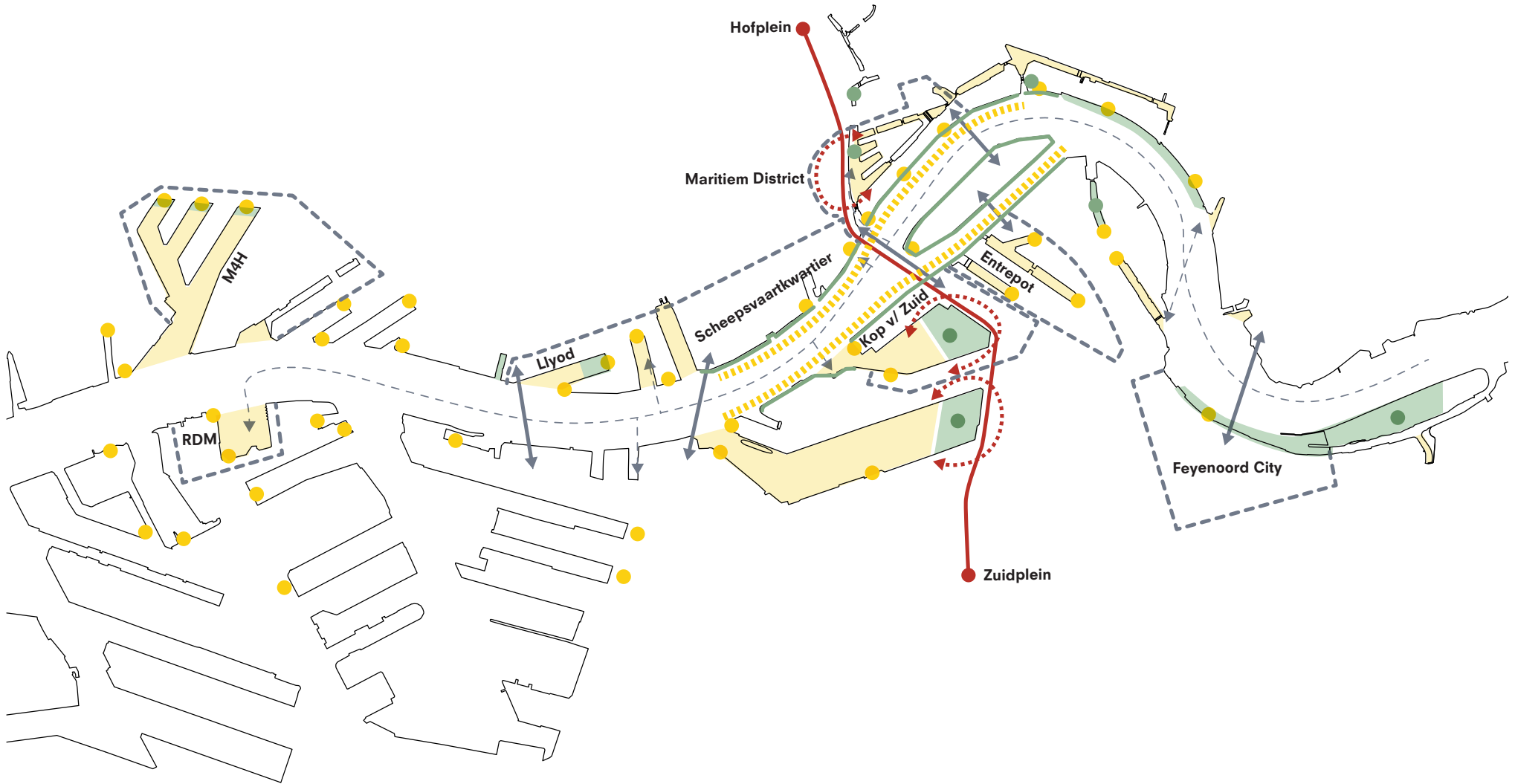
IMPROVE CONNECTIONS



ADD POINTS OF ATTRACTION



ADD URBAN GREEN



WHERE IS WATERFRONT ARCHITECTURE?



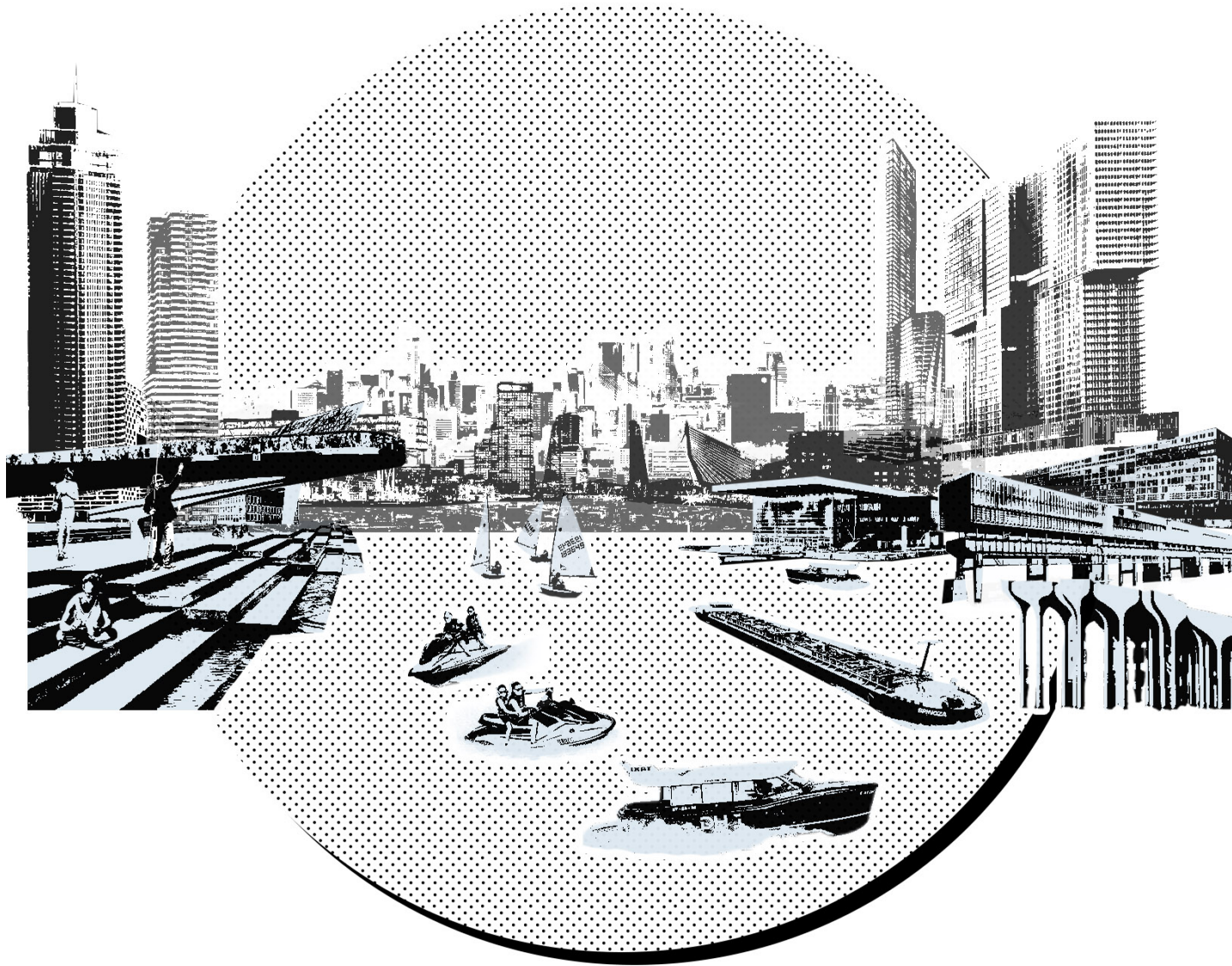
AMBIGUOUS DEVELOPMENT

**What is the architectural ambition
for Rotterdam's waterfront?**

PRESENT CHARACTER



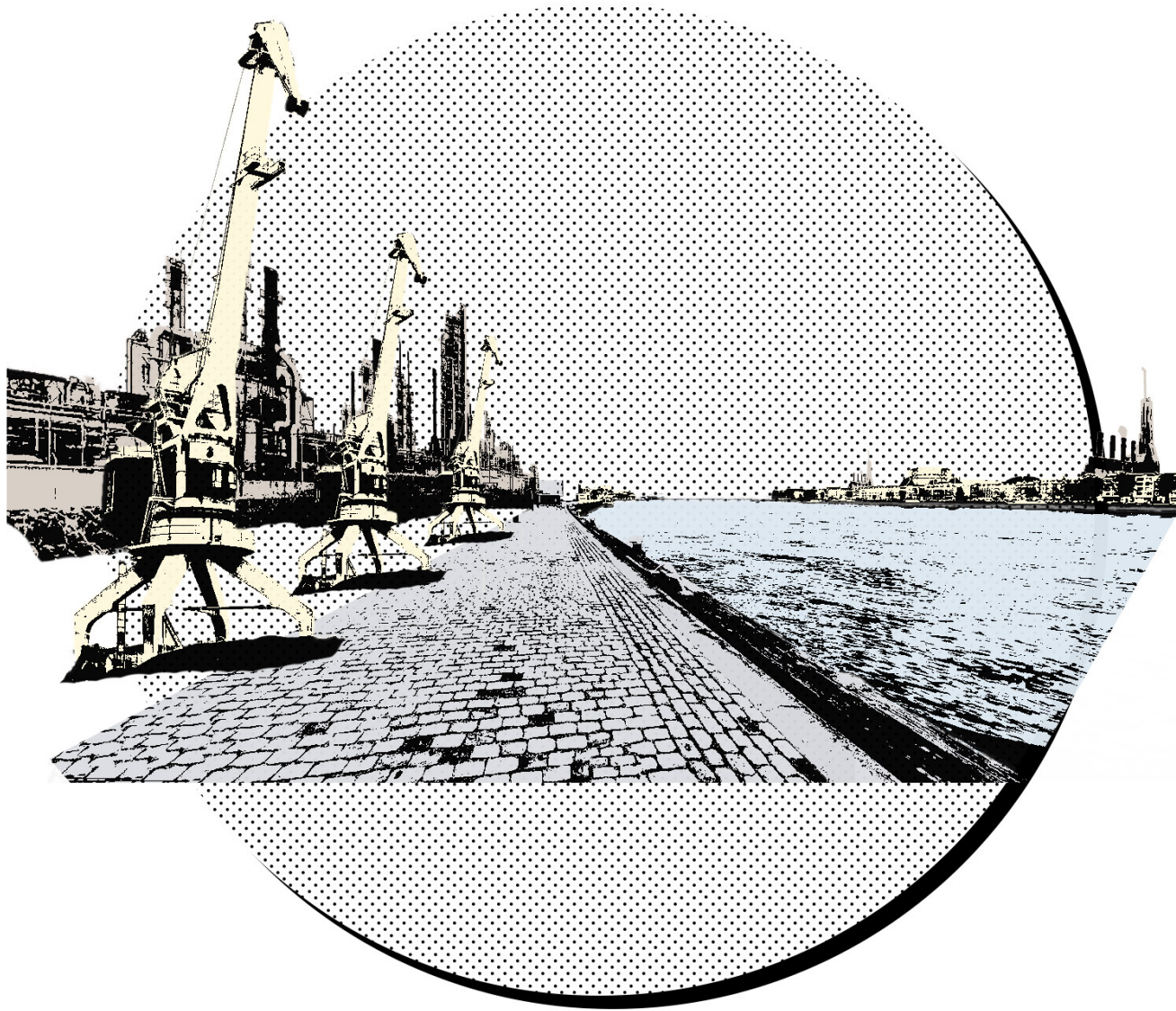
AN ARCHITECTURAL WATERFRONT?



PRESENT-DAY CHARACTER...



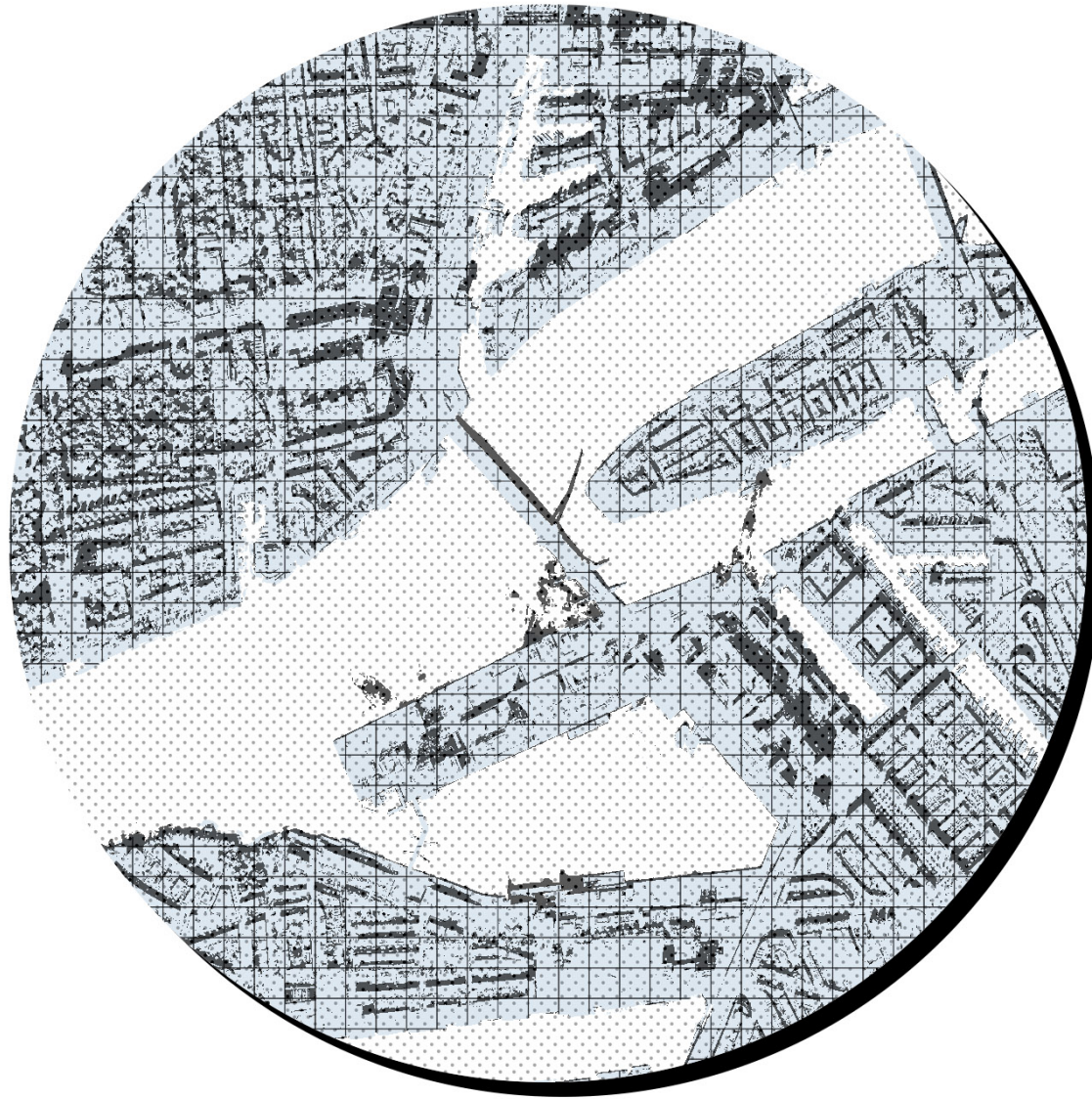
...REALLY DIFFERENT THAN WHAT IT USED TO BE?



SOLUTION: LOAD ARCHITECTURE TO THE MAAS?



URBAN GRID OF ROTTERDAM



INTERIORIZING THE MAAS



Introduction

Research

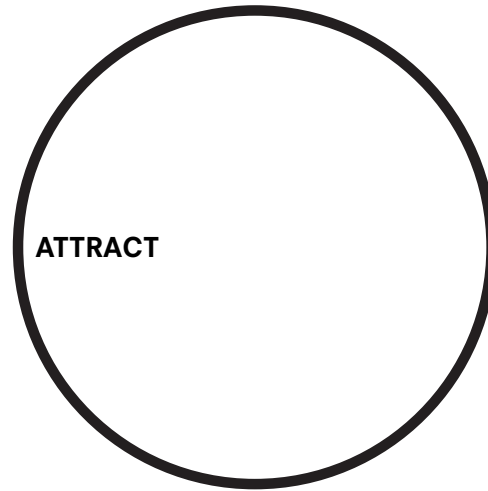
Design Brief

Design

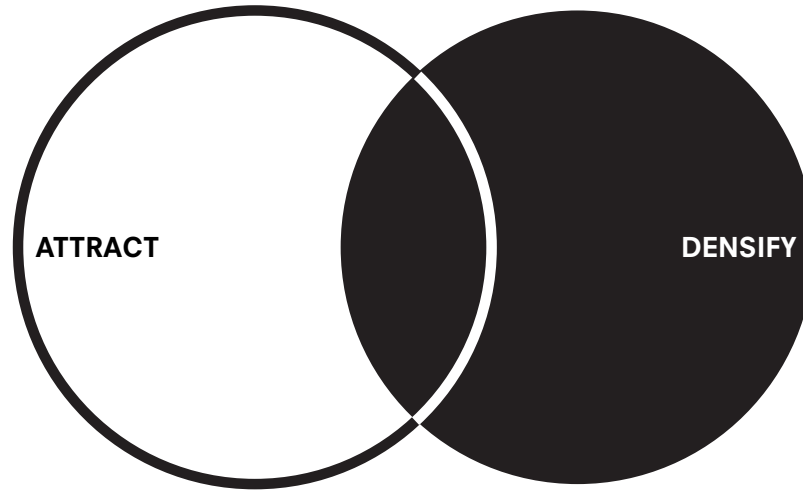
Conclusion

INDEX

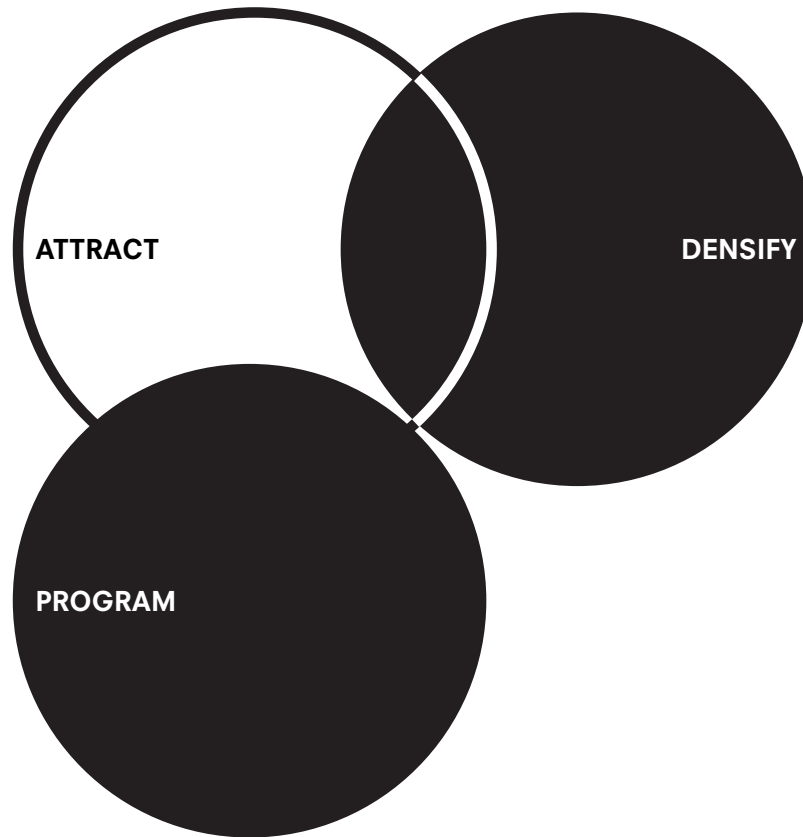
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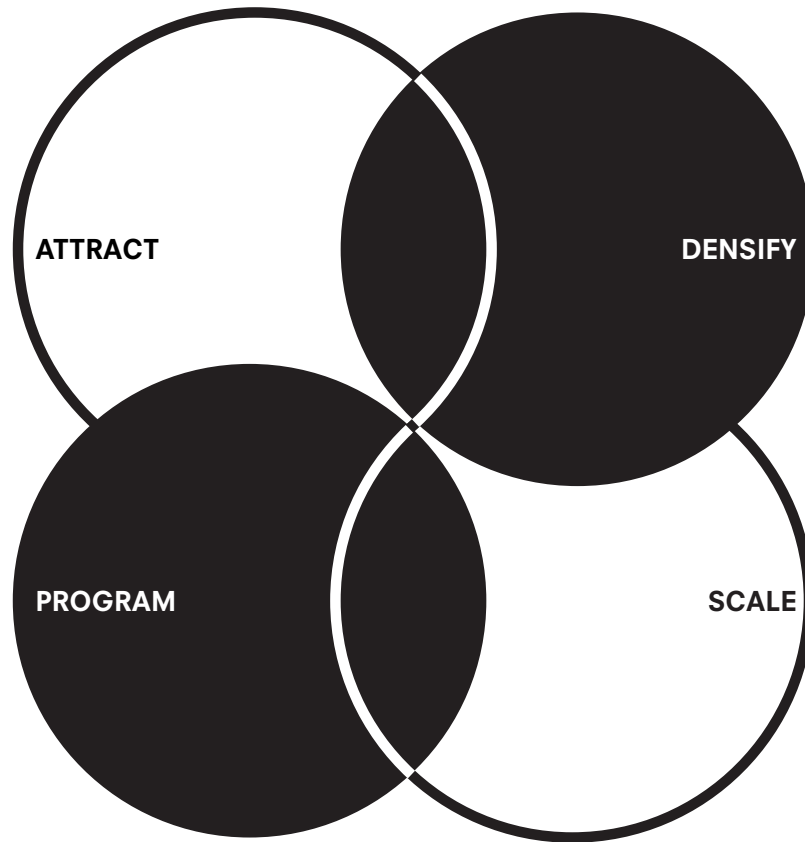
DESIGN PRINCIPLE



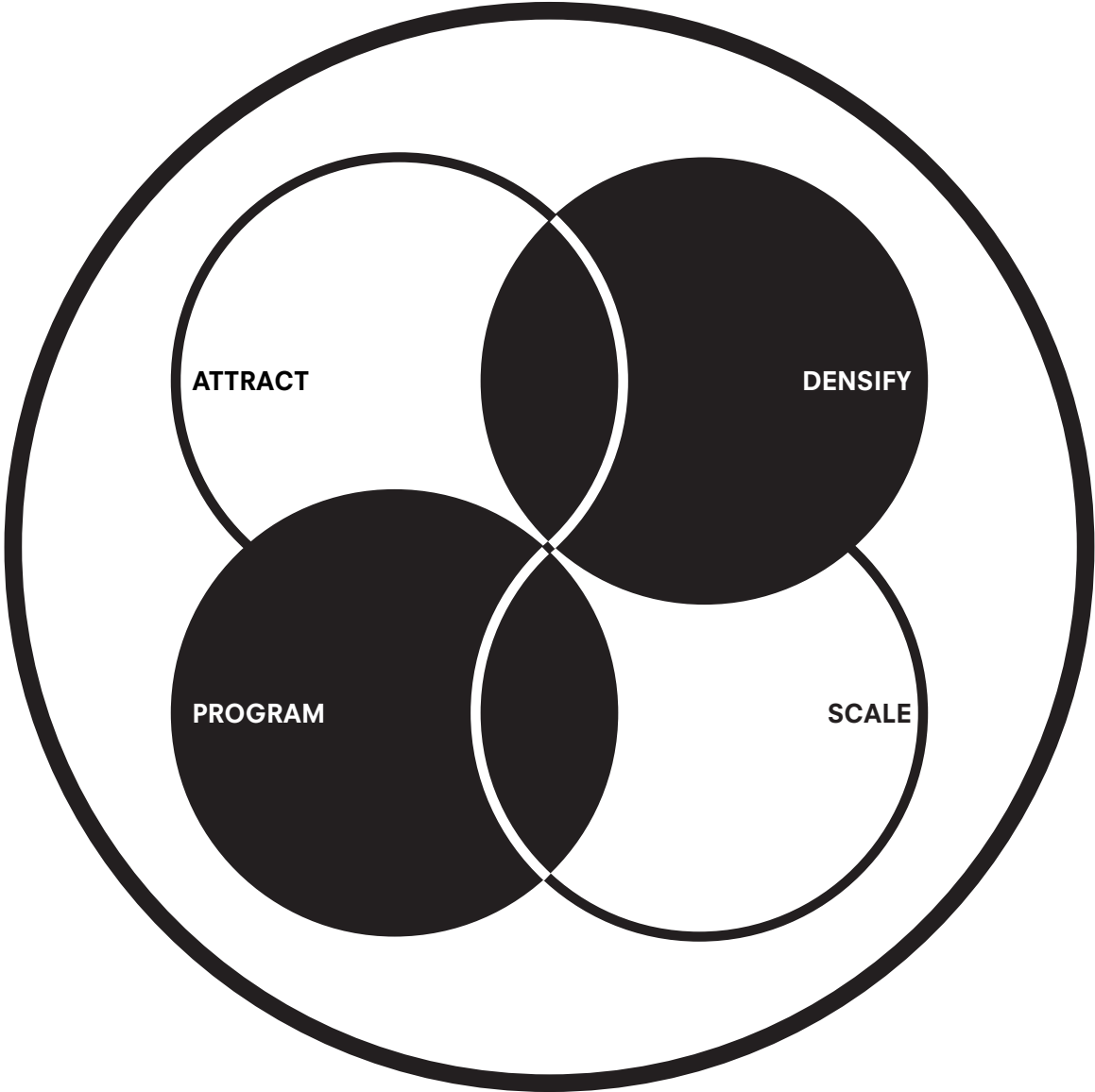
DESIGN PRINCIPLE



DESIGN PRINCIPLE



THE INTERIORIZED WATERFRONT



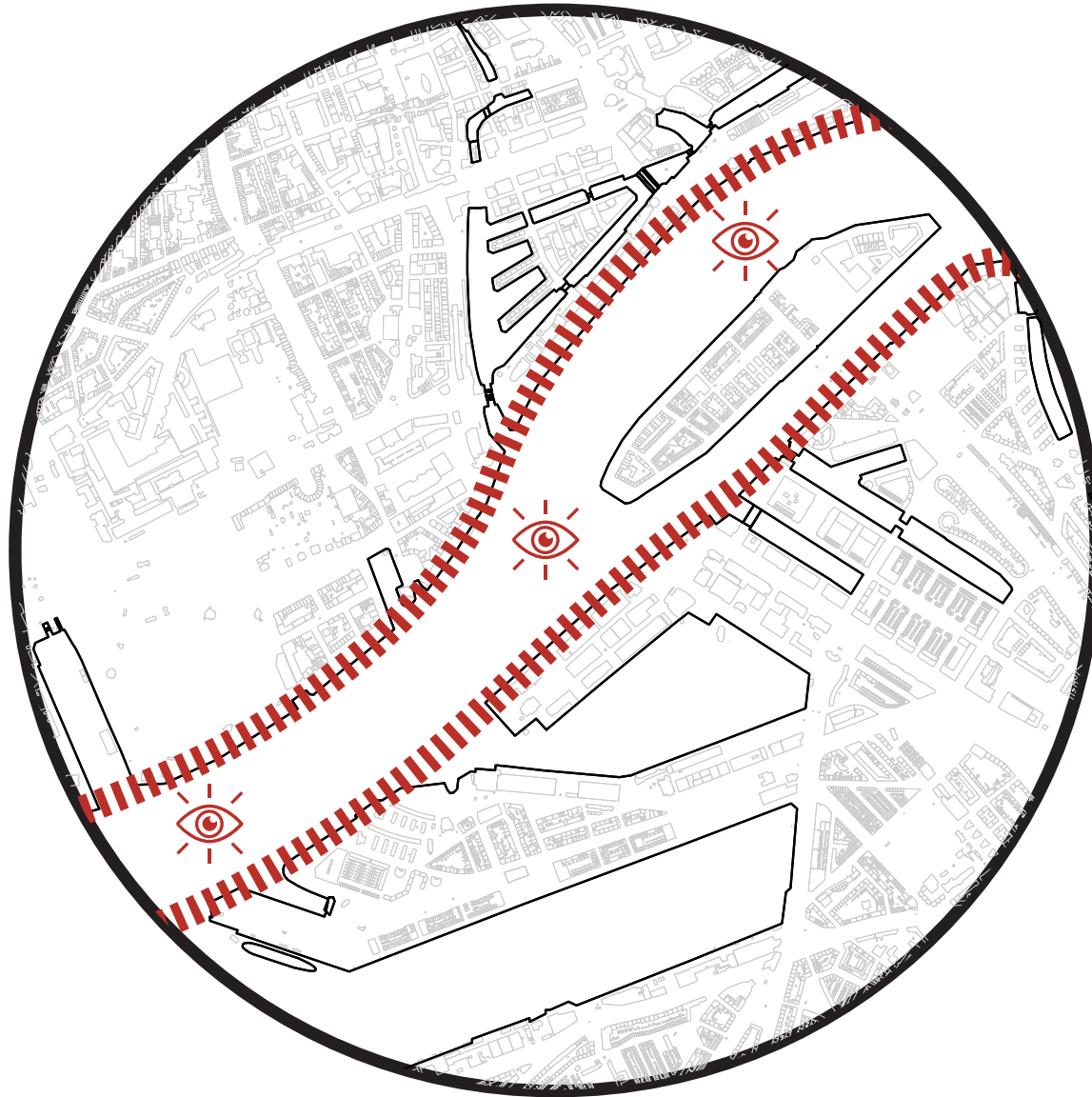
GROUP VISION



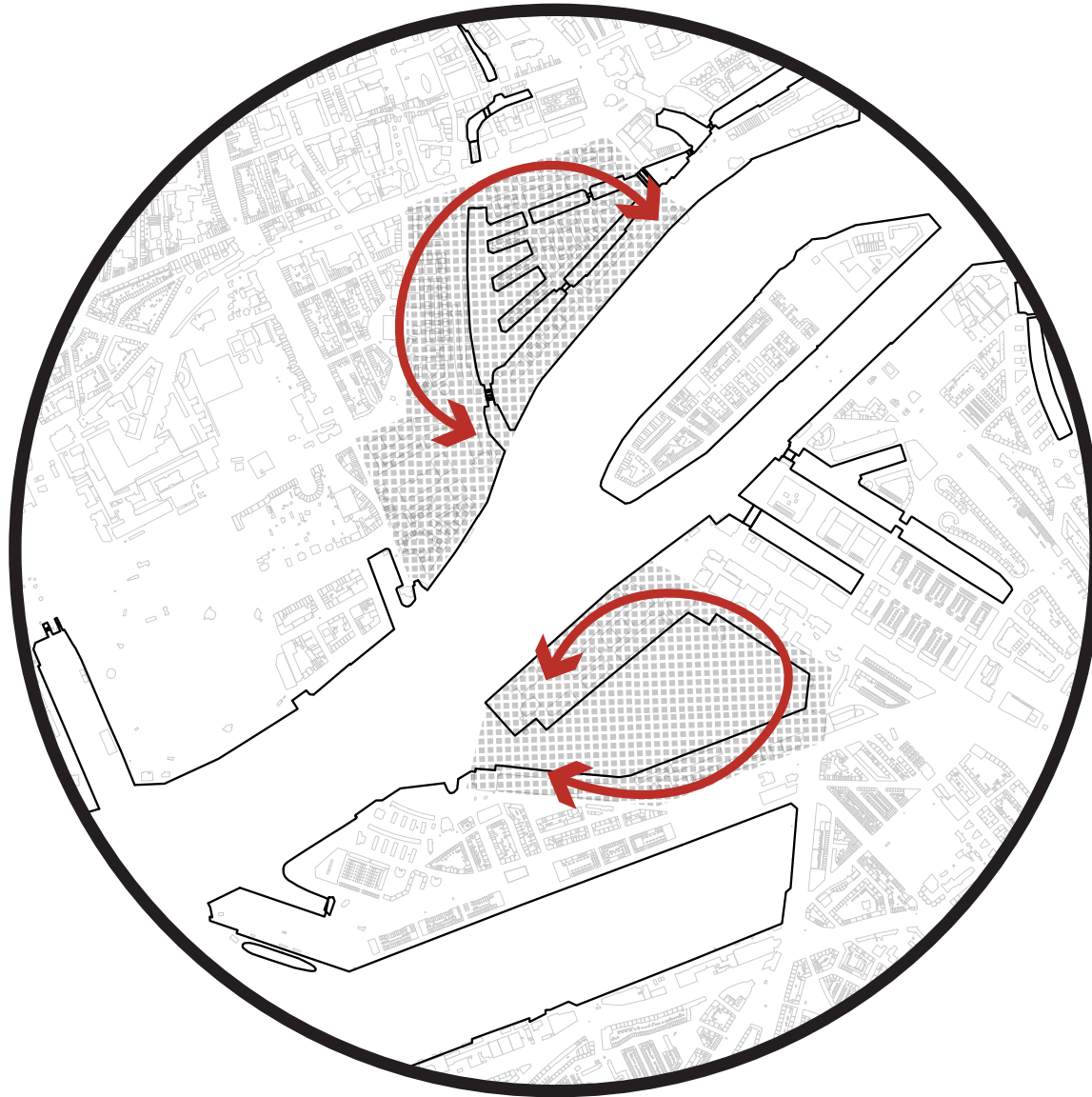
SITE EXPLORATION



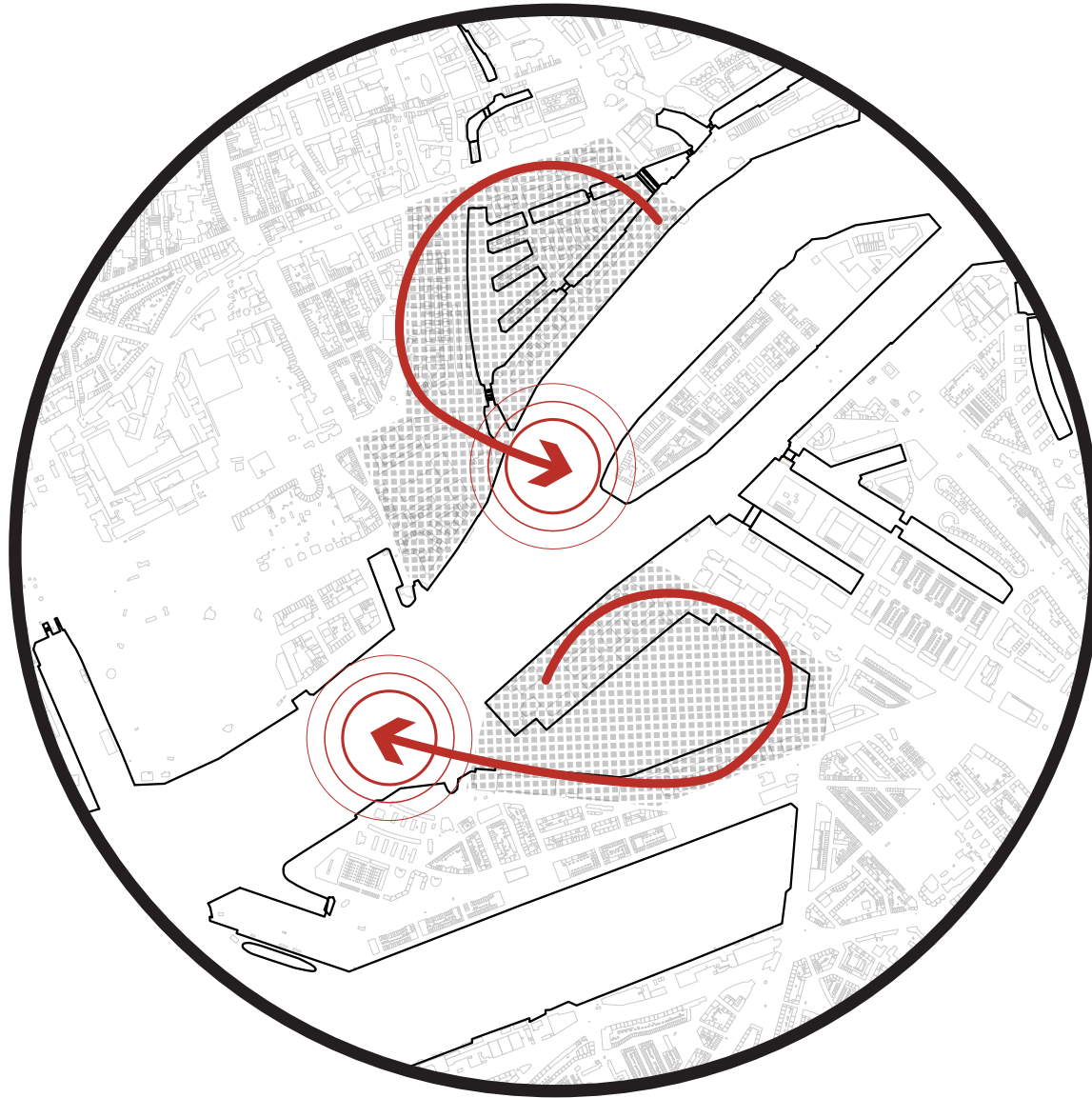
URBAN BALCONY



HARBOR DENSIFICATION



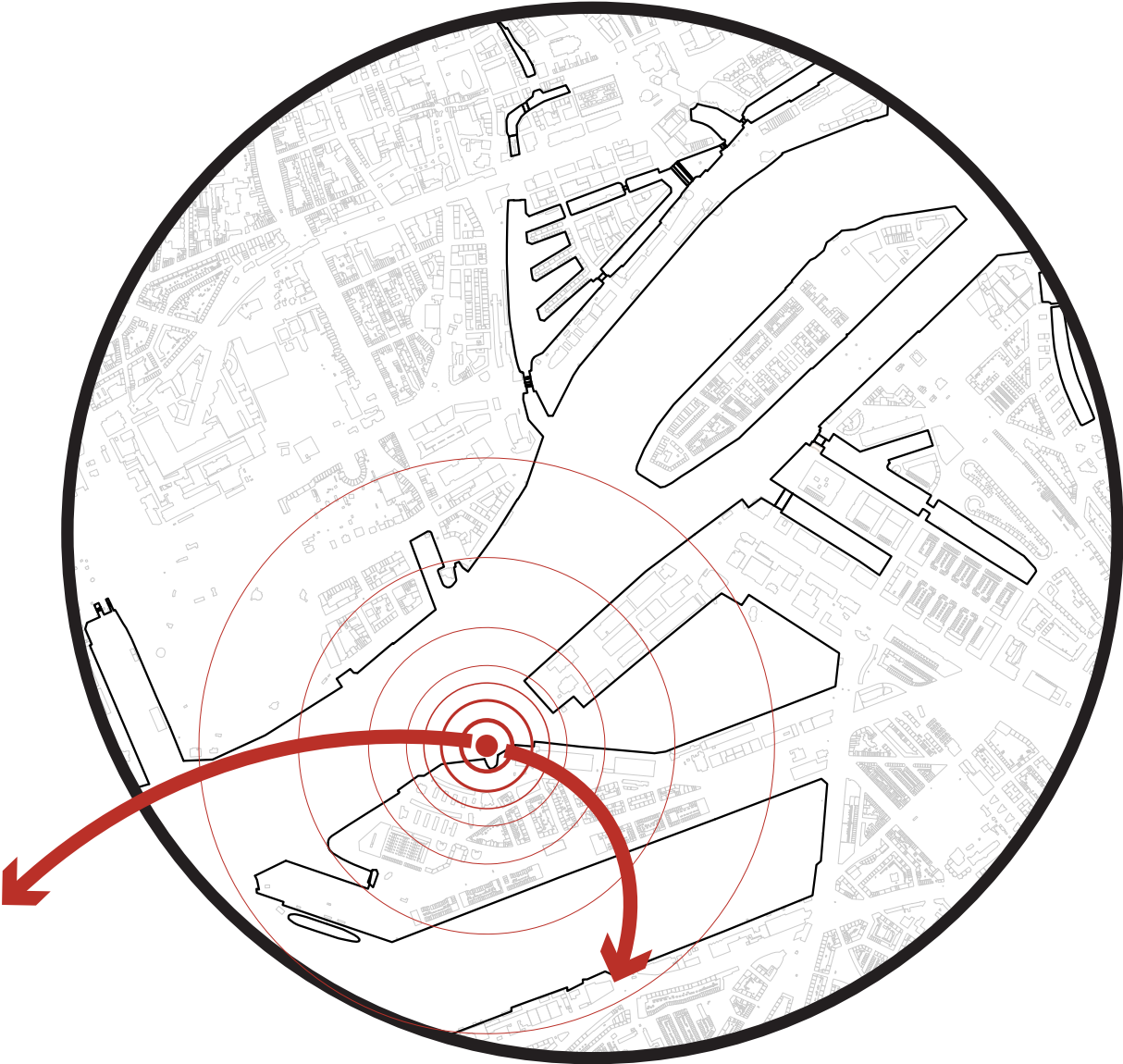
LINK HARBORS - MAASFRONT



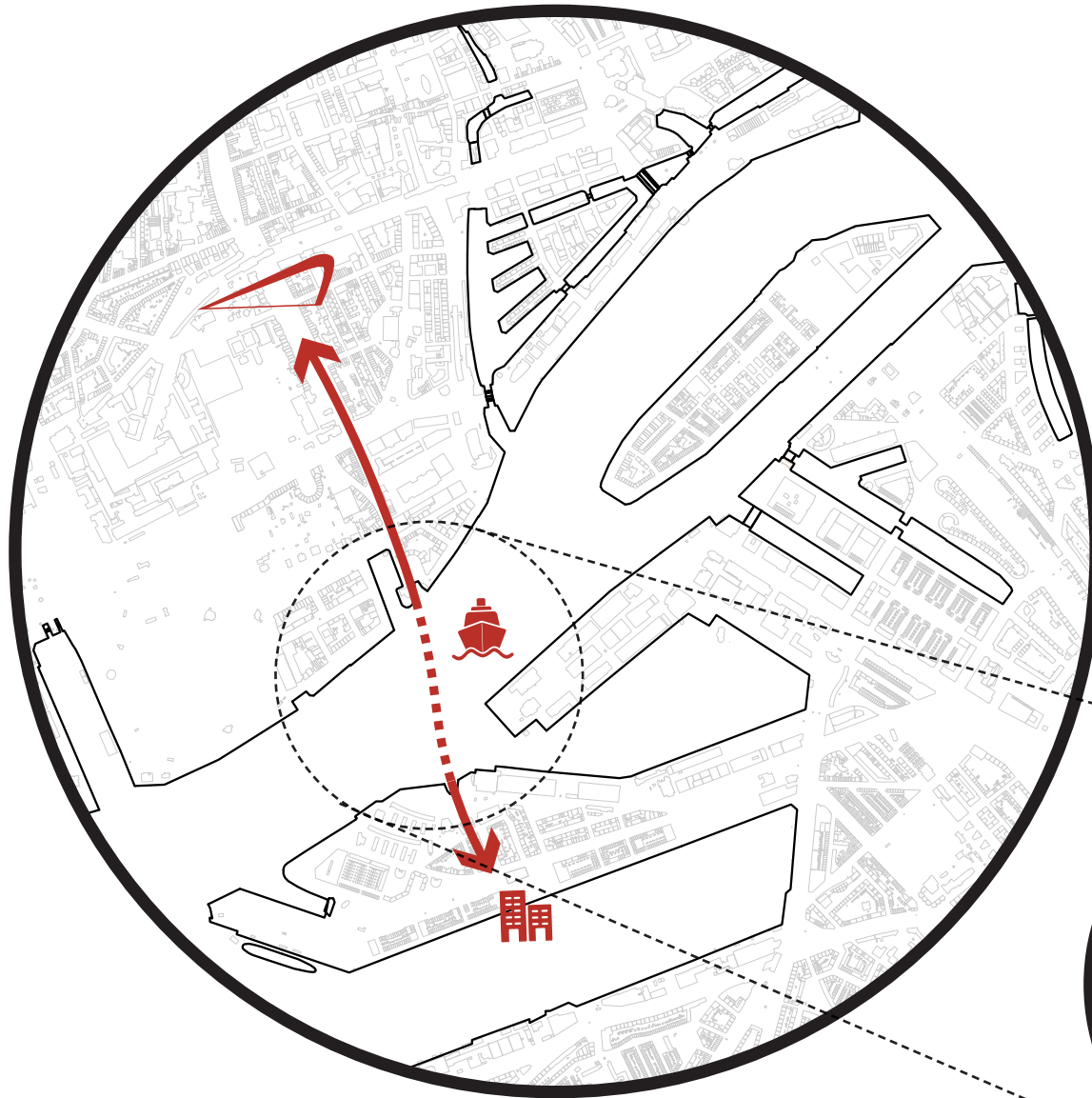
PROJECT LOCATION



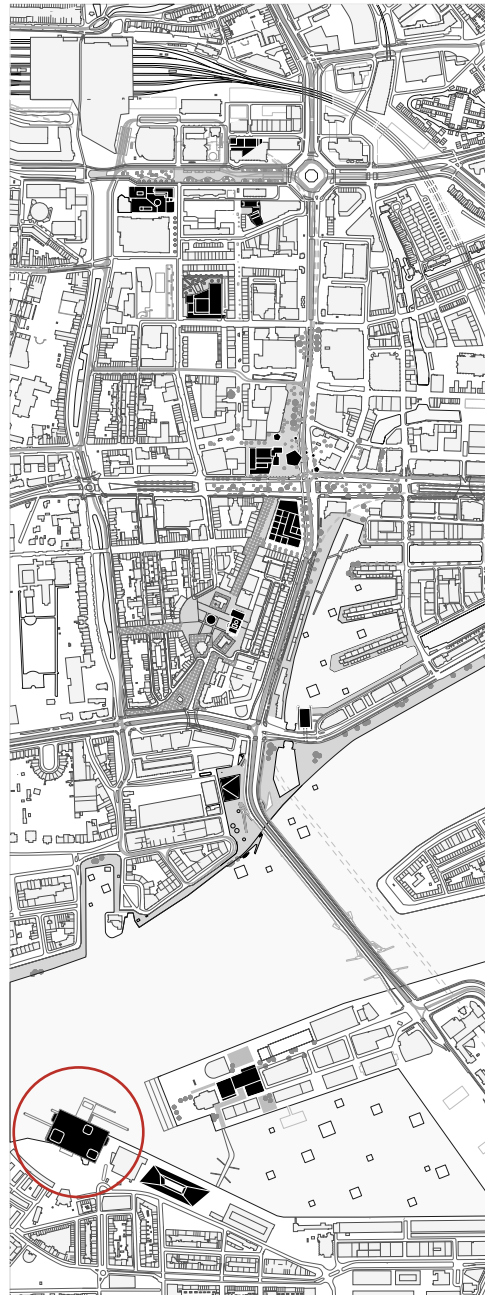
WATERFRONT DEVELOPMENT CATALYST



HISTORIC MAAS CROSSING



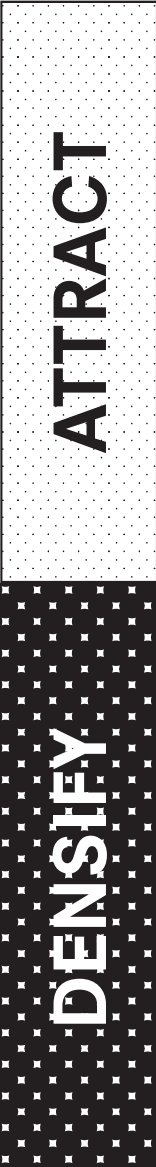
LOCATION



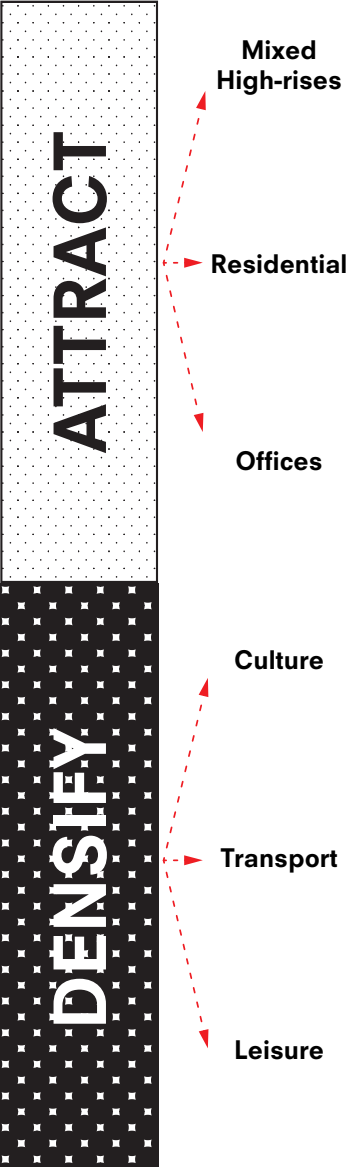
PROGRAM



WATERFRONT TYPOLOGIES STUDY



WATERFRONT TYPOLOGIES STUDY



WATERFRONT TYPOLOGIES STUDY

ATTRACT

DENSIFY

Mixed High-rises



De Rotterdam
OMA



Marina Bay Sands
Moshe Safdie



Red Apple Rotterdam
KCAP & JdB

Residential



Fenixloods
Mei Architects



Silodam
MVRDV



IJdock
Mecanoo & SeARCH



Pontsteiger
Arons & Gelauff



Hotel Jakarta
SeARCH

Offices



De Brug
JHK Architecten



Antwerp Port Authority
Zaha Hadid



Maastoren
Dam & Partners

Culture



Elbphilharmonie
Herzog & de Meuron



Skuespilhuset
Lundgaard & Tranberg



Oslo Opera House
Snohetta



Sydney Opera House
Jorn Utzon



Guggenheim Helsinki
Moreau Kusunoki



A. Fearnley MOMA
Renzo Piano

Transport



Yokohama Terminal
FOA



Ocean Terminal
Foster + Partners



Ferry Terminal
Marge Arkitekter

Leisure



Aarhus Harbor Bath
BIG



Copenhagen Bath
BIG + JDS



Faaborg Bath
UA + JDS + CREO



Zaryadye Park
Diller + Scofidio



Kalvebod Waves
JDS + KLAR



Kvaesthus Pier
Lundgaard + Tranberg



Chicago Riverwalk
Chicago Dpt. of Trs.

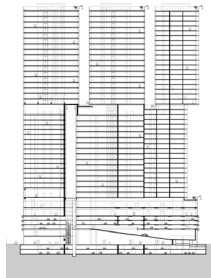


Shanghai MOMA Park
YIYU Design

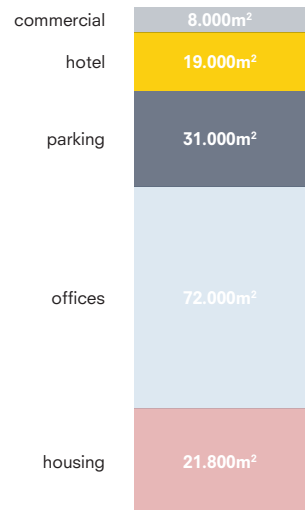


TYOLOGY EXAMPLE

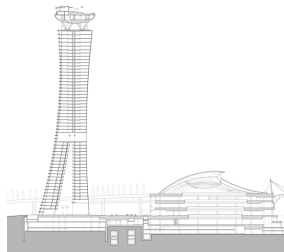
De Rotterdam
OMA



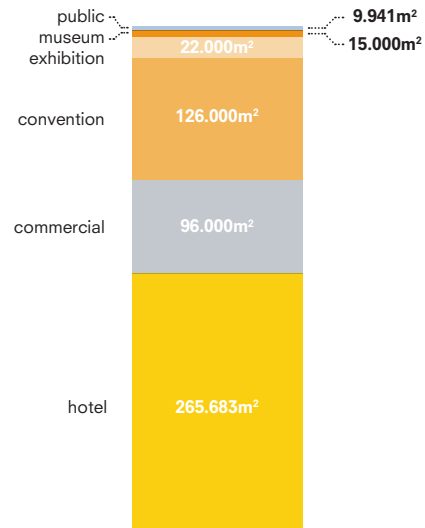
164.500m²



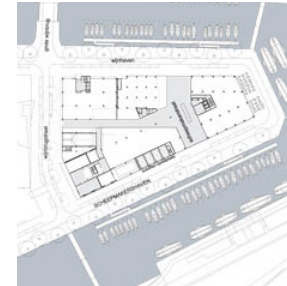
Marina Bay Sands
Moshe Safdie



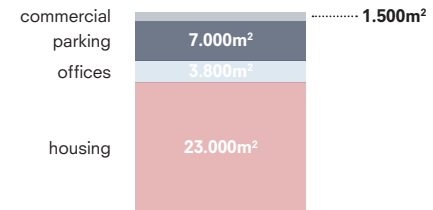
534.624m²



Red Apple Rotterdam
KCAP & JdJ



35.300m²



TYOLOGY LESSONS



Aarhus Harbor Bath - BIG

Water-based public functions

TYOLOGY LESSONS



Aarhus Harbor Bath - BIG

Water-based public functions



Yokohama Terminal - FOA

Program pulls towards water

TYOLOGY LESSONS



Aarhus Harbor Bath - BIG

Water-based public functions



Yokohama Terminal - FOA

Program pulls towards water



Elbphilharmonie - Herzog & de Meuron

Icon with maritime character

TYOLOGY LESSONS



Aarhus Harbor Bath - BIG

Water-based public functions



Yokohama Terminal - FOA

Program pulls towards water



Elbphilharmonie - Herzog & de Meuron

Icon with maritime character



De Rotterdam - OMA

Scale and de-scale of Maas

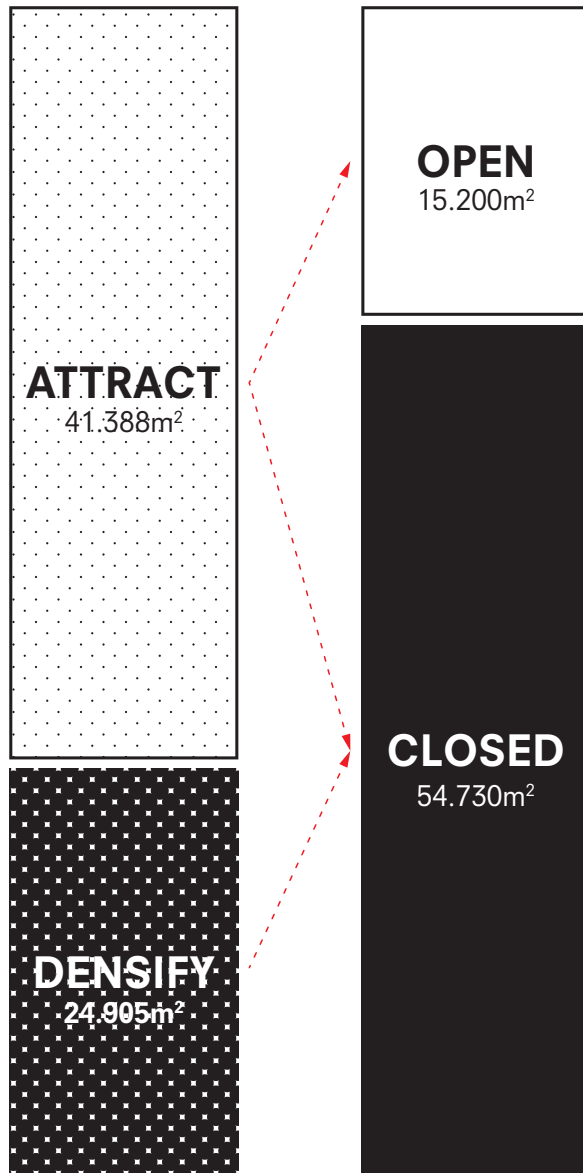
FINAL PROGRAM

ATTRACT
41.388m²

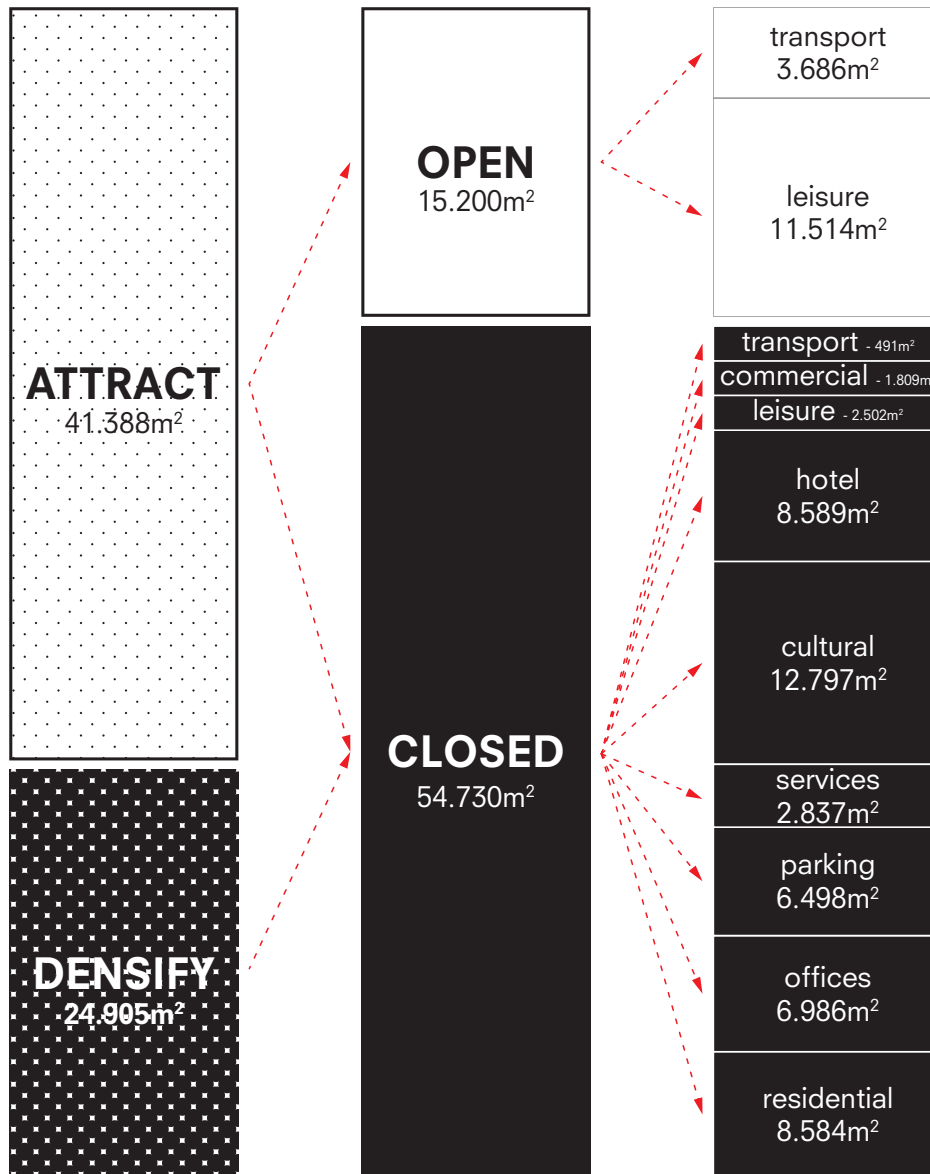
DENSIFY
24.905m²



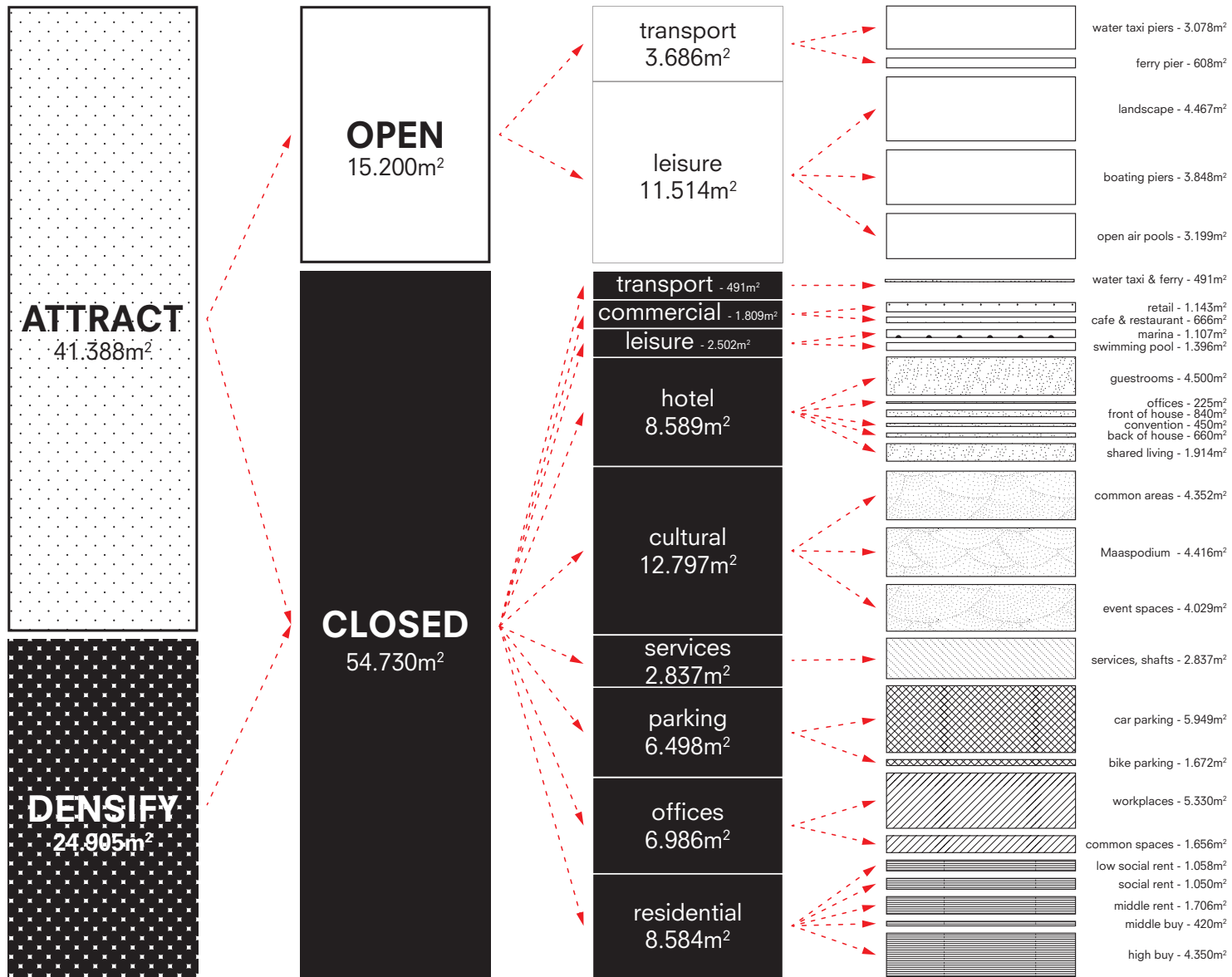
FINAL PROGRAM



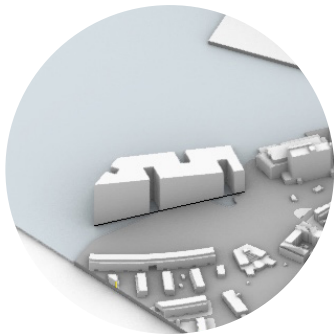
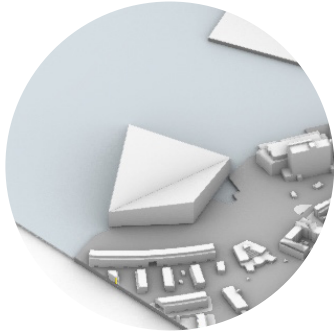
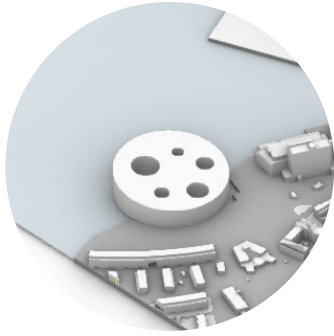
FINAL PROGRAM



FINAL PROGRAM

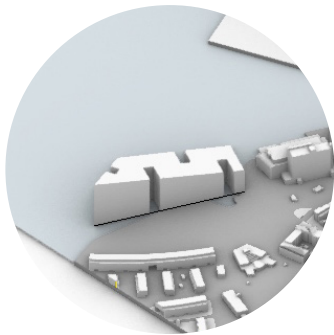
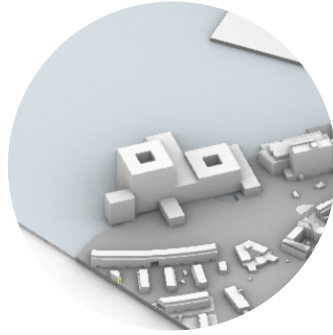
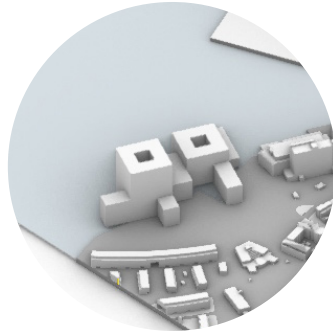
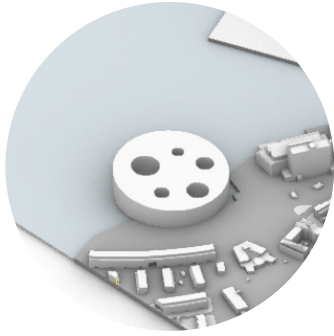


MASSING STUDIES

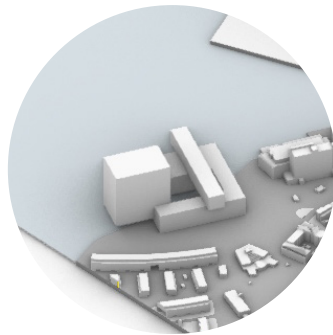


Monolithic

MASSING STUDIES

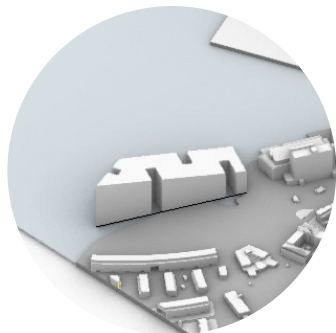
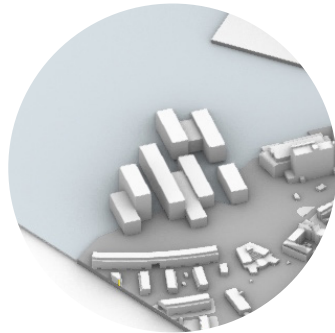
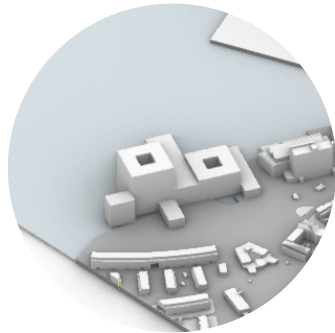
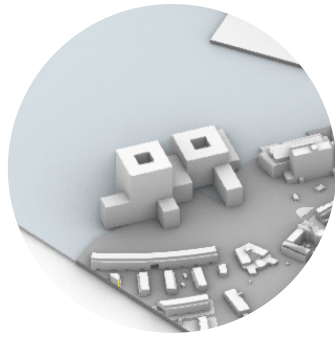
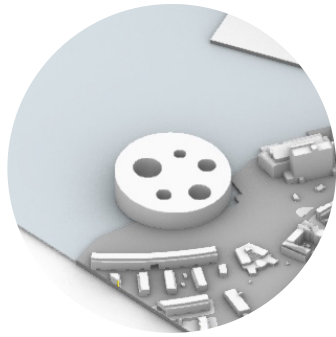


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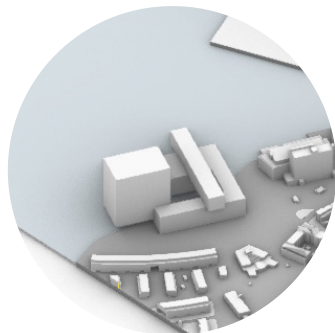


Plastic

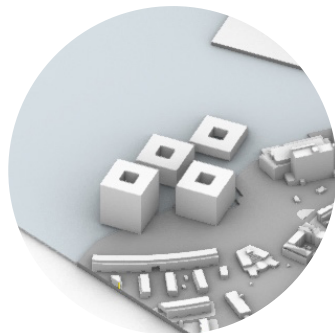
MASSING STUDIES



Monolithic

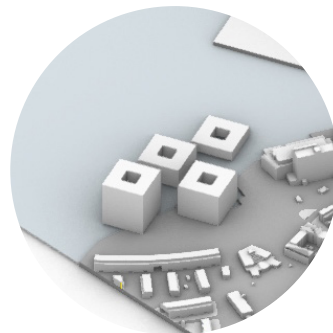
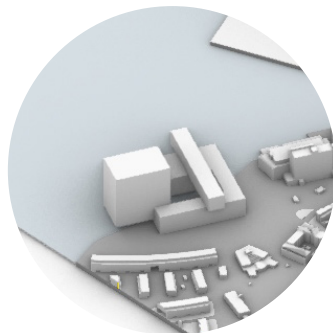
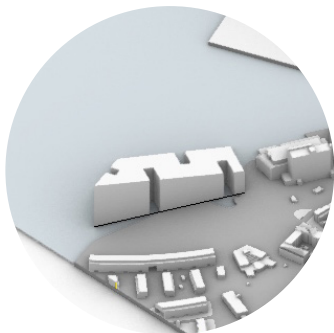
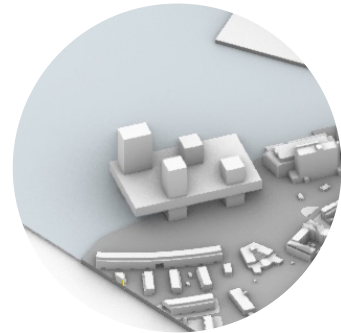
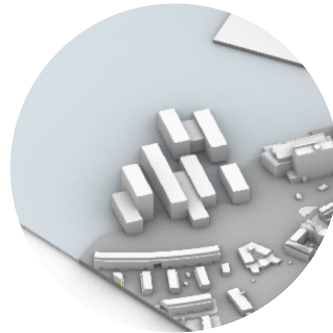
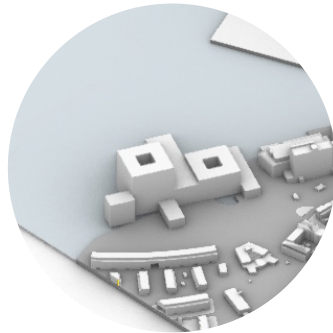
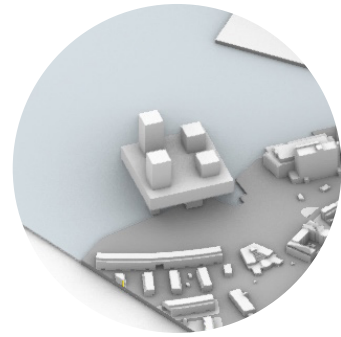
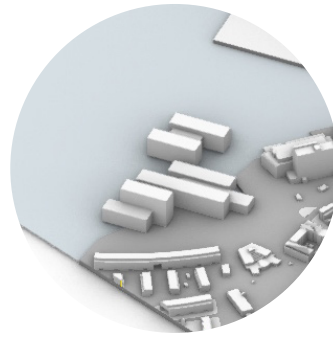
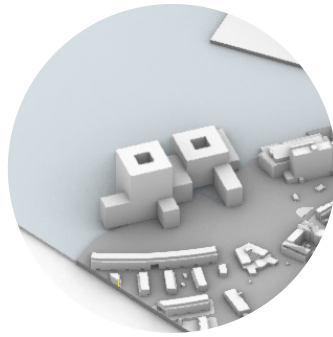
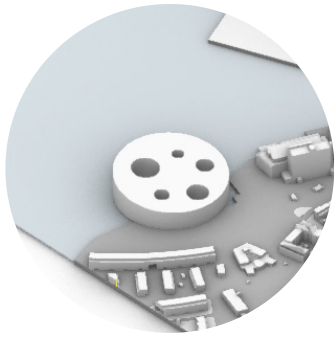


Plastic



Fragmented

MASSING STUDIES



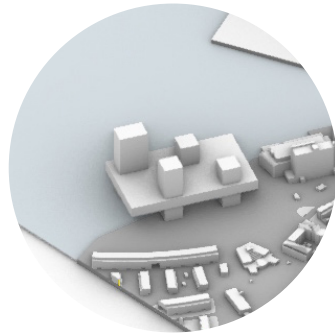
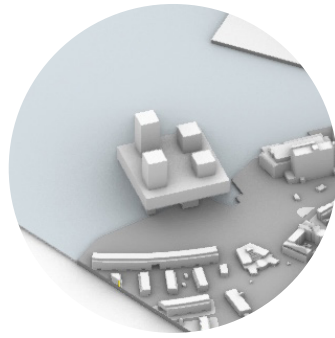
Monolithic

Plastic

Fragmented

Oil Rig

SELECTED MASSING



Monolithic

Plastic

Fragmented

Oil Rig

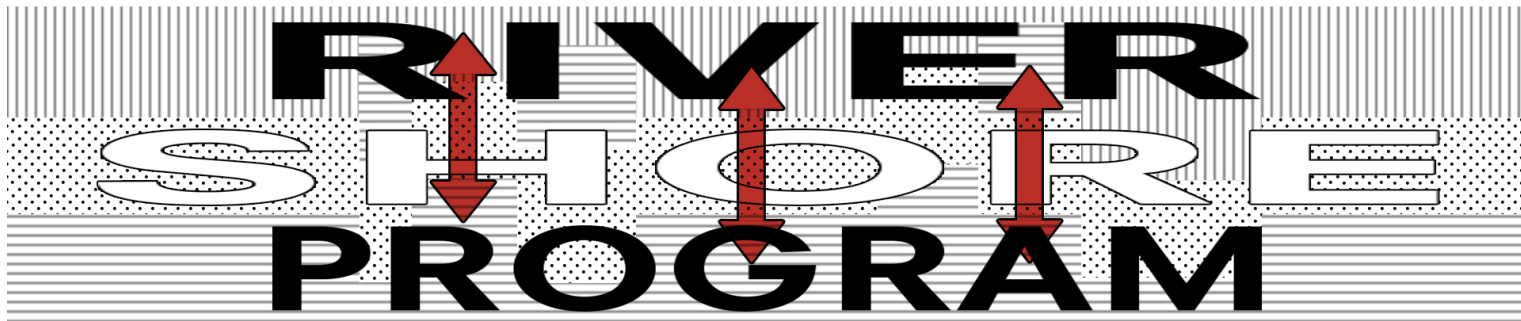
SPATIAL PRINCIPLE

RIVER
SHORE
PROGRAM

PROGRAMMATIC CUT



SPATIAL PRINCIPLE



Introduction

Research

Design Brief

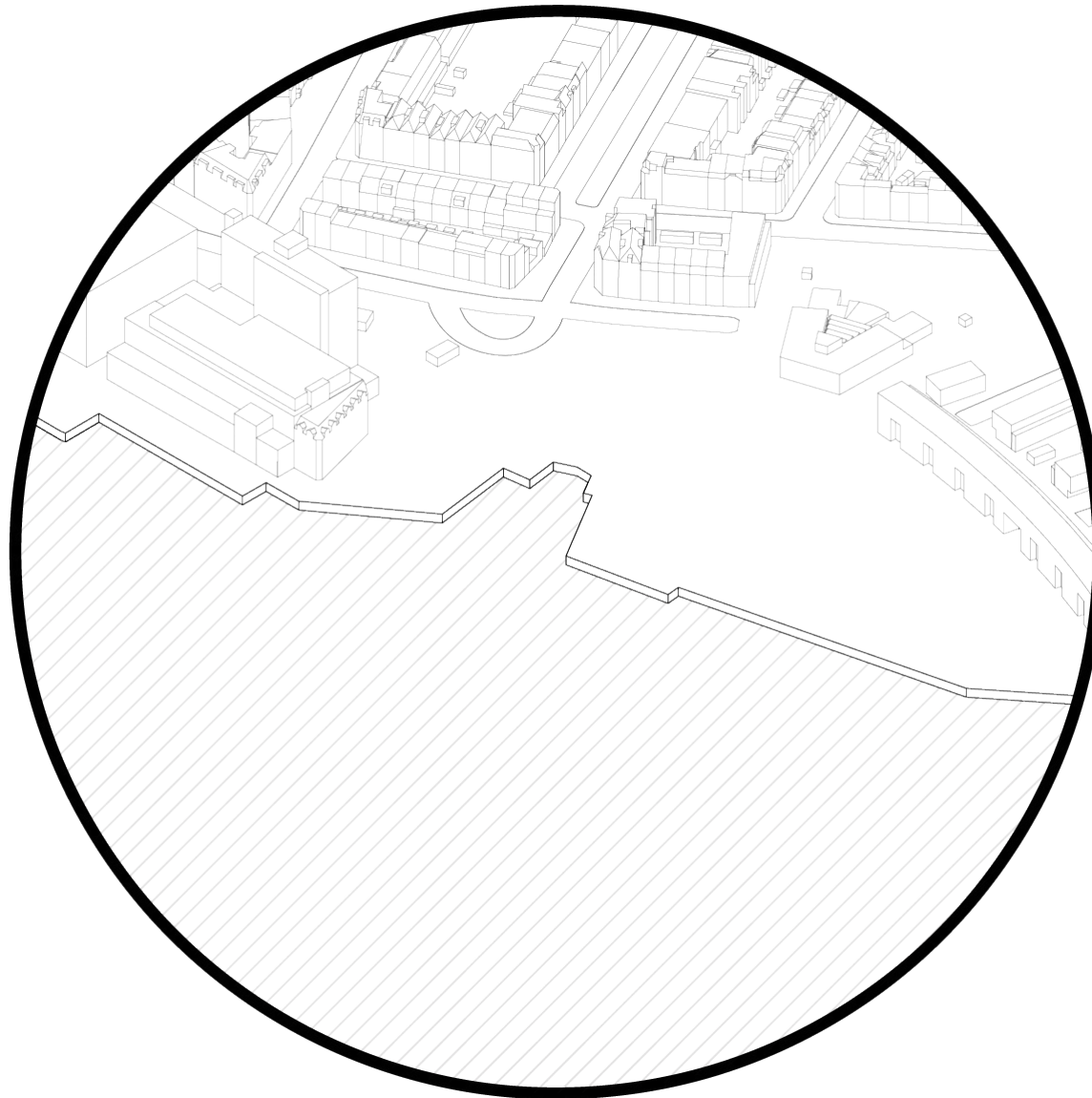
Design

Conclusion

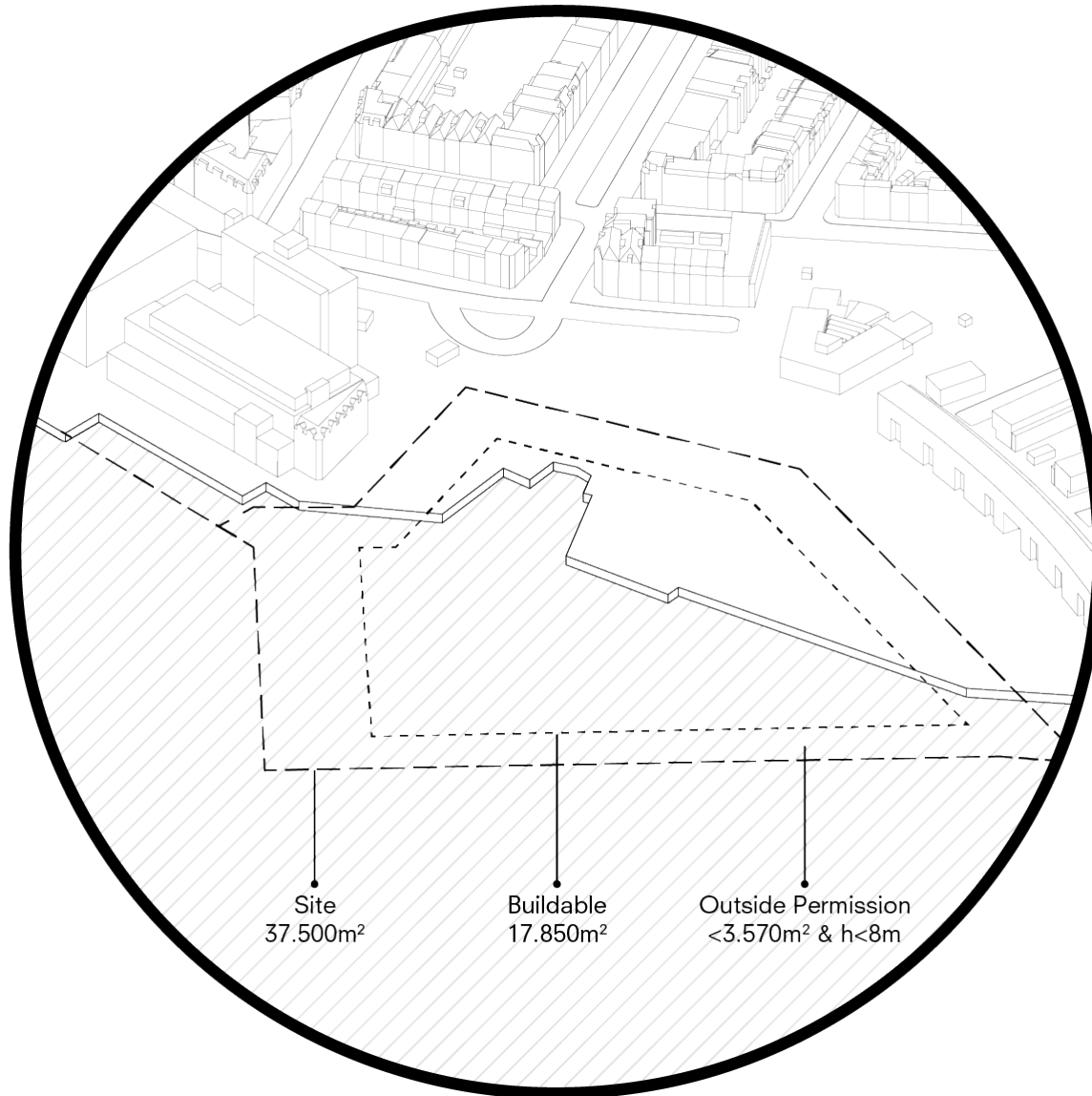
INDEX

Design

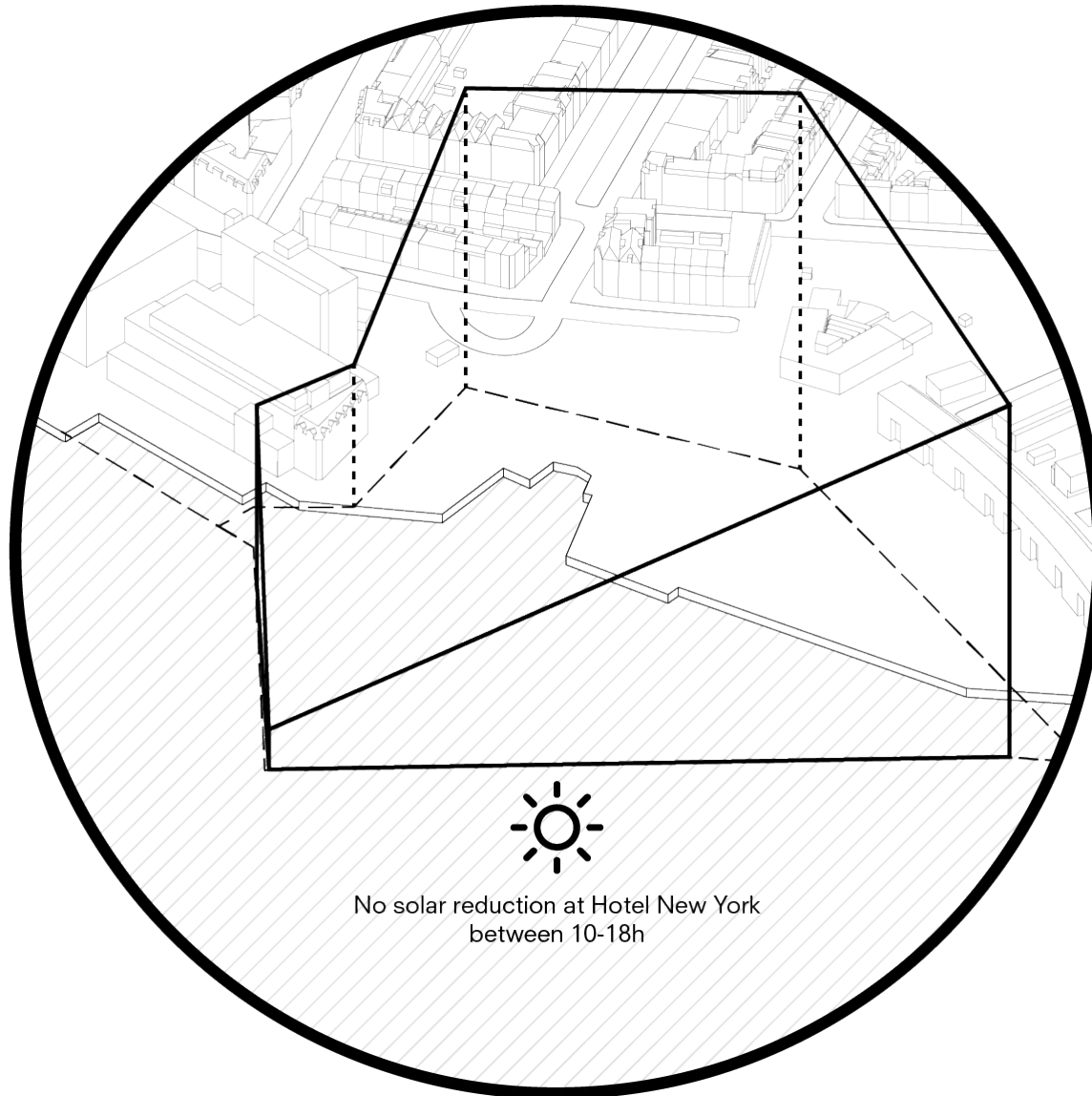
SITE



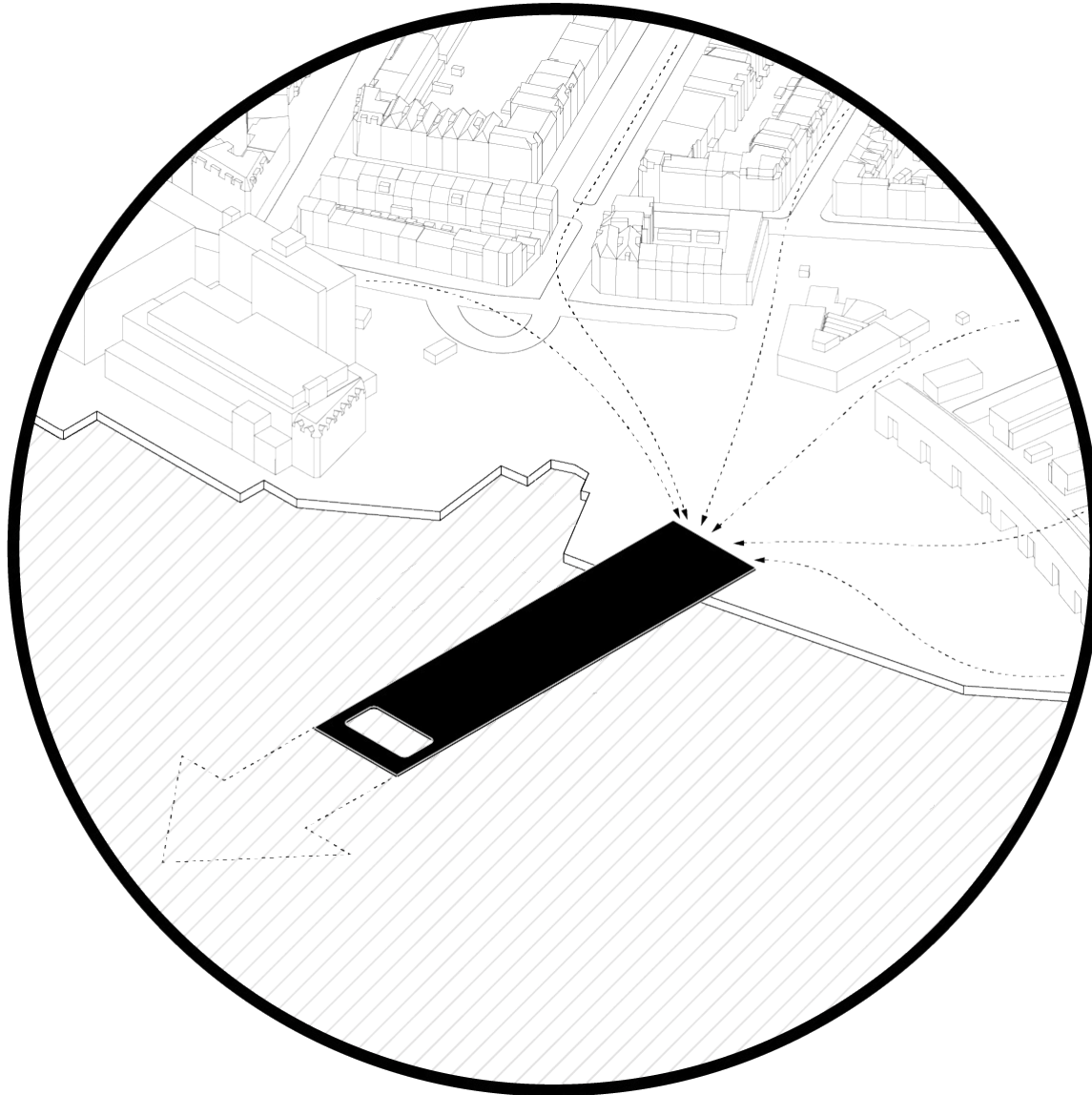
PROPOSED BOUNDARY



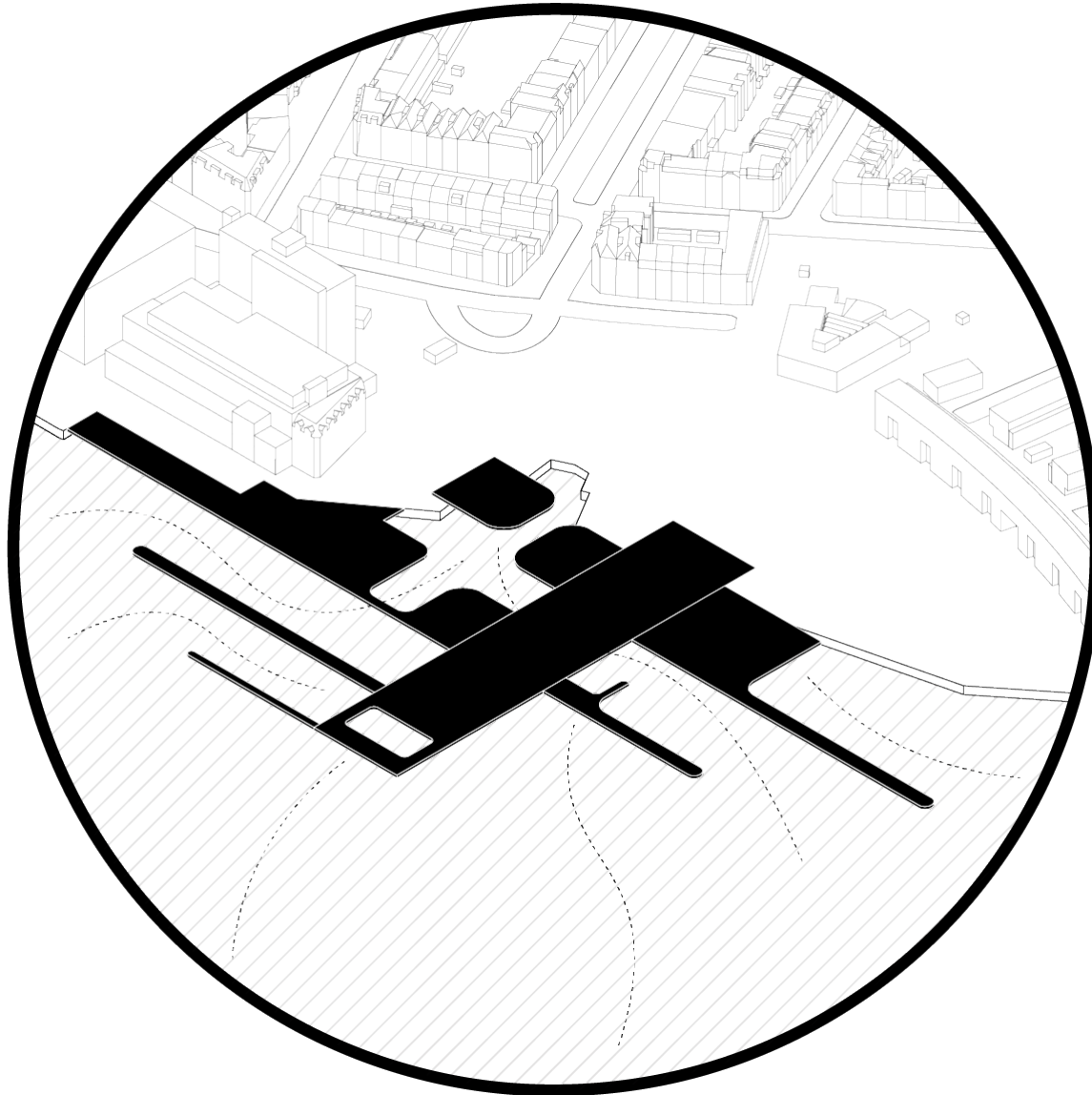
SOLAR ENVELOPE



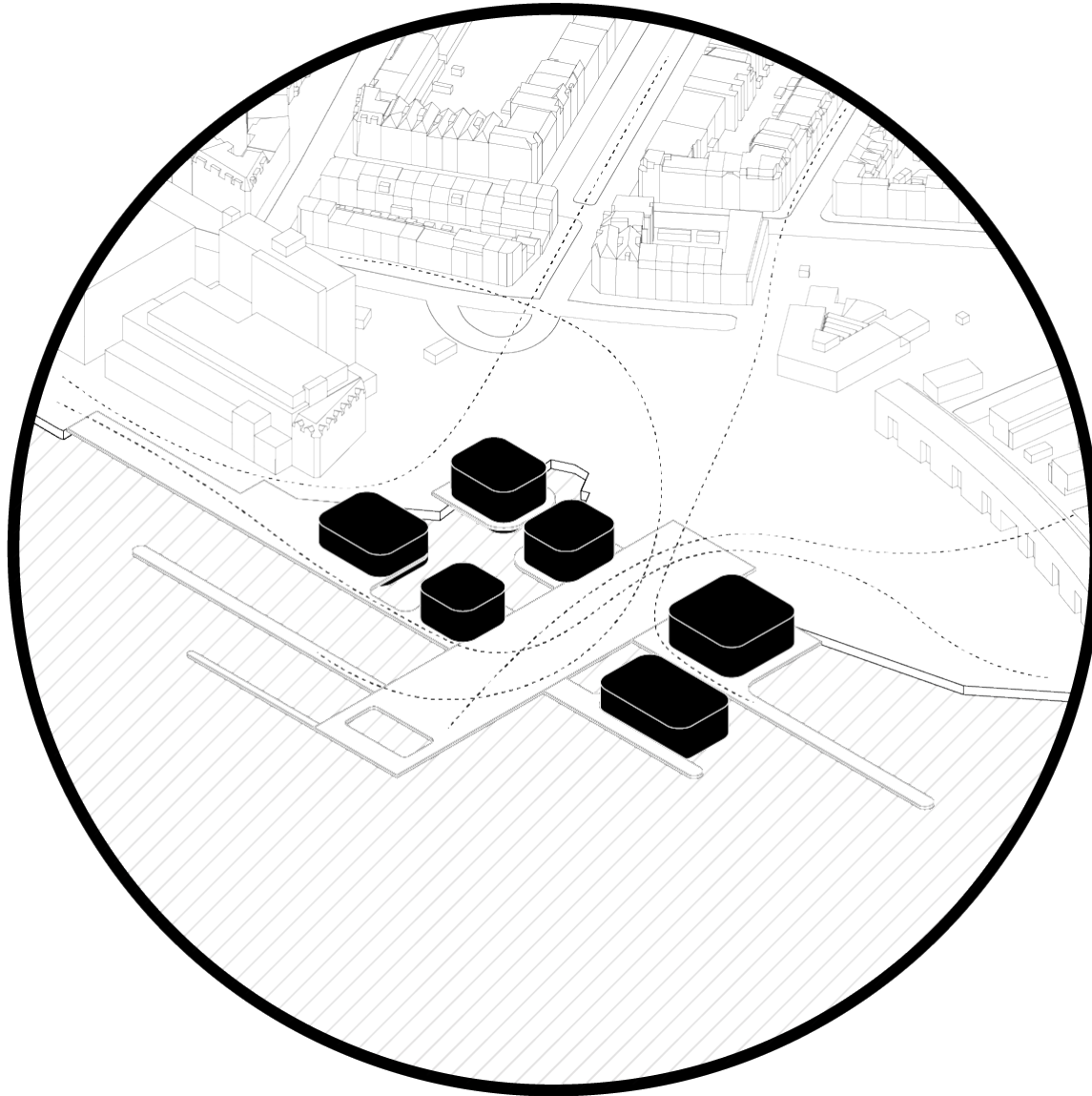
PUBLIC PLINTH



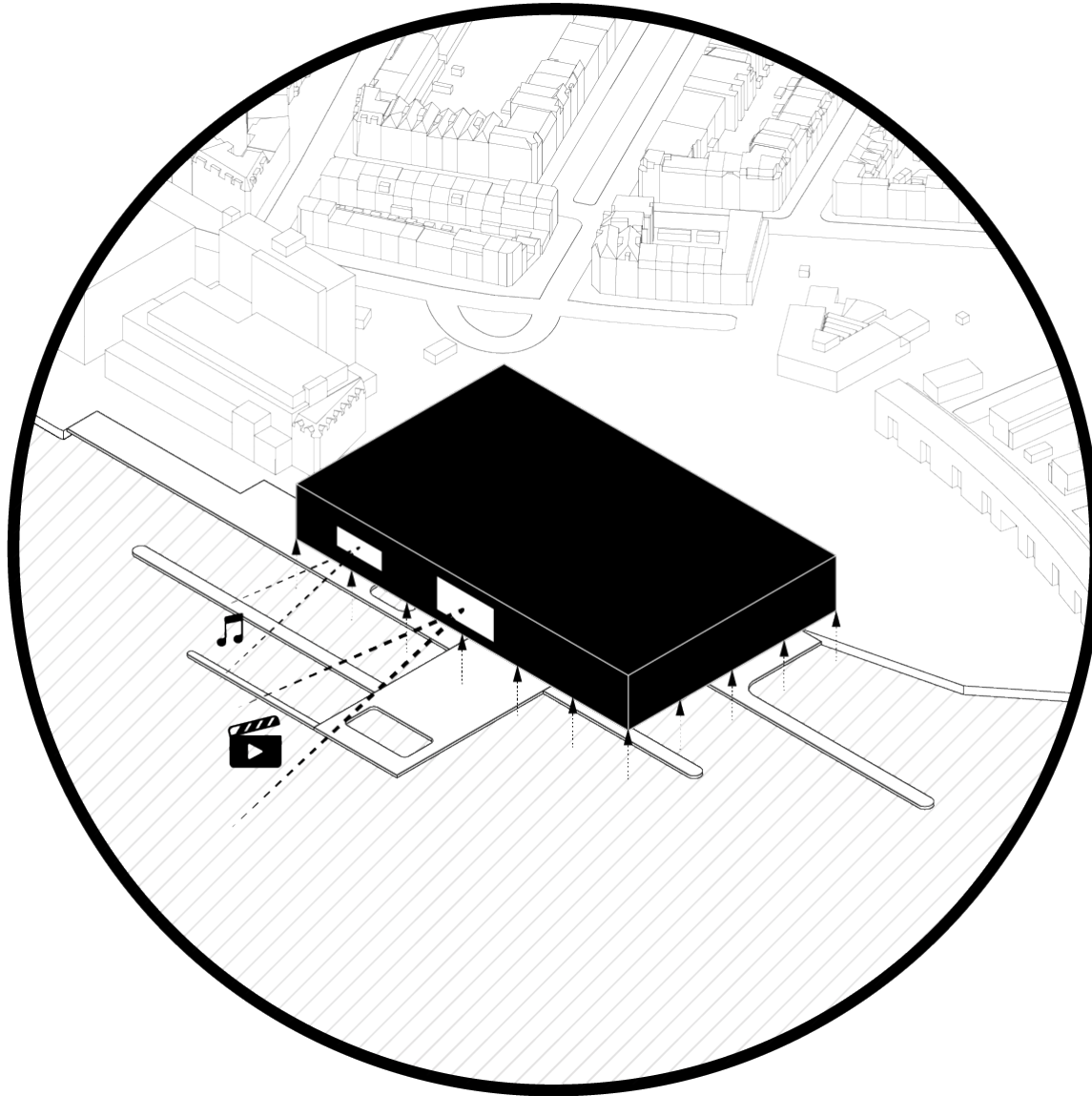
SITE & WATER CONNECTIONS



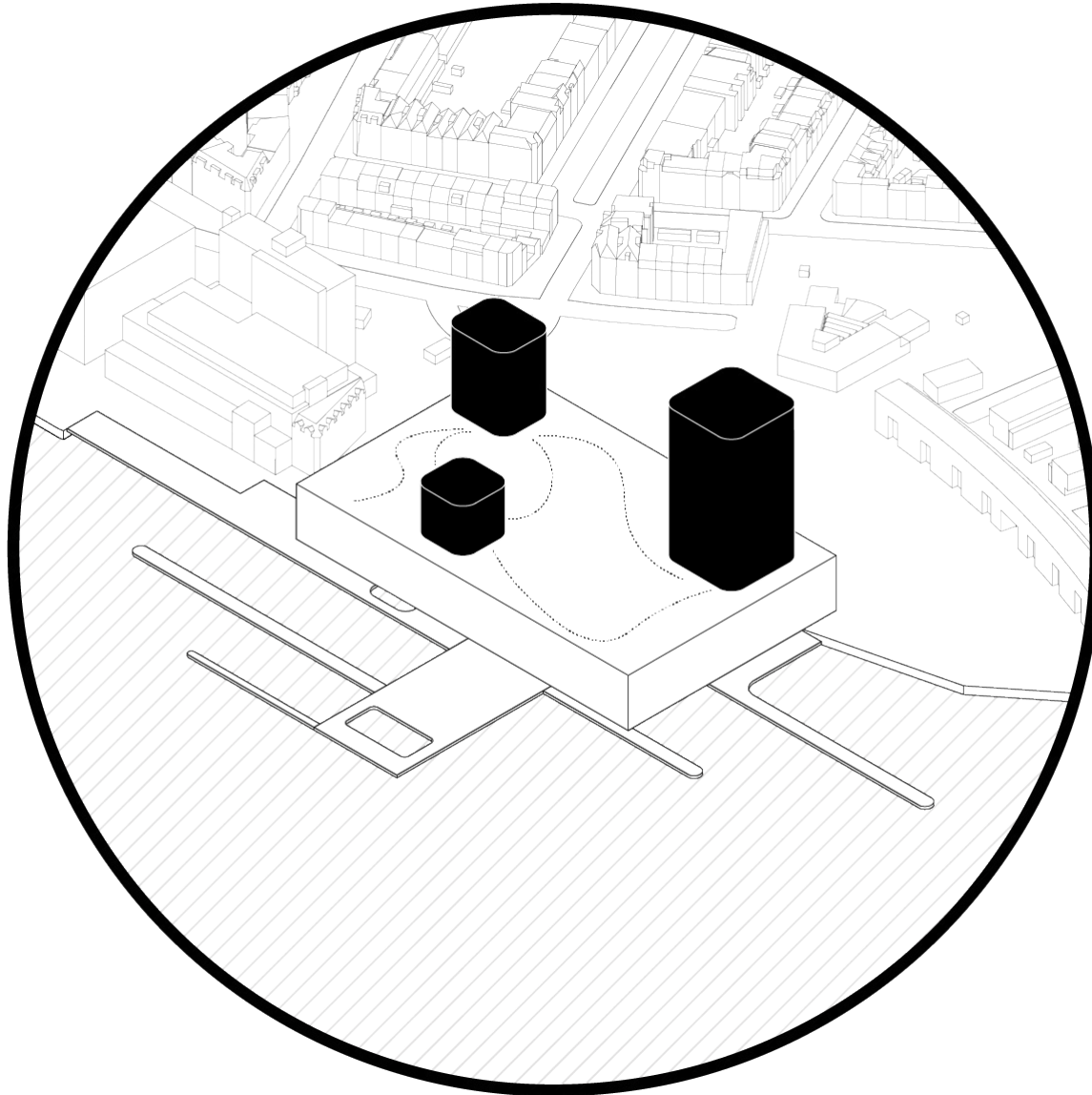
SECTIONAL BASE



RAISED PLINTH

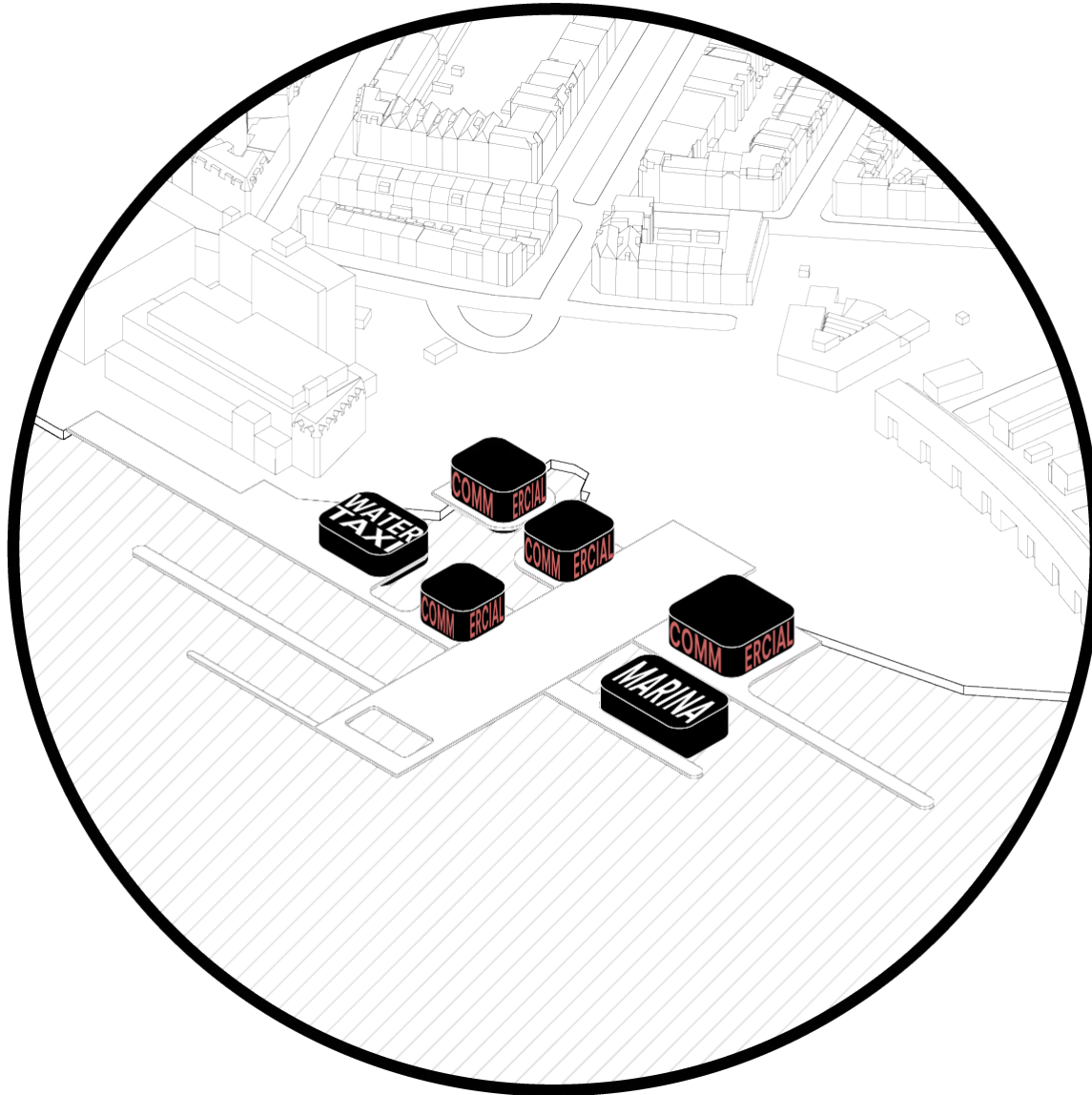


URBAN SCALE TOWERS



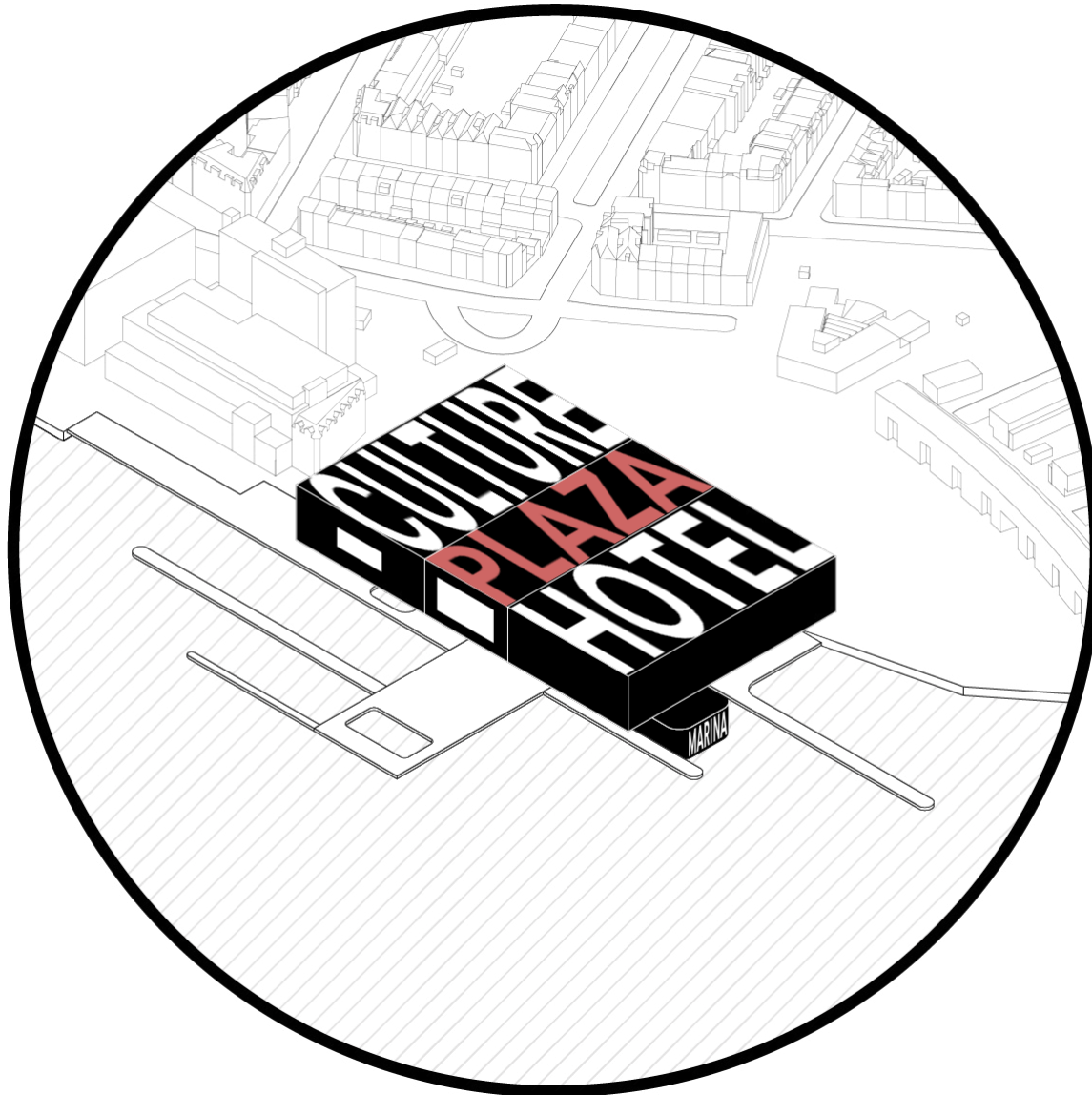
Design

PROGRAM



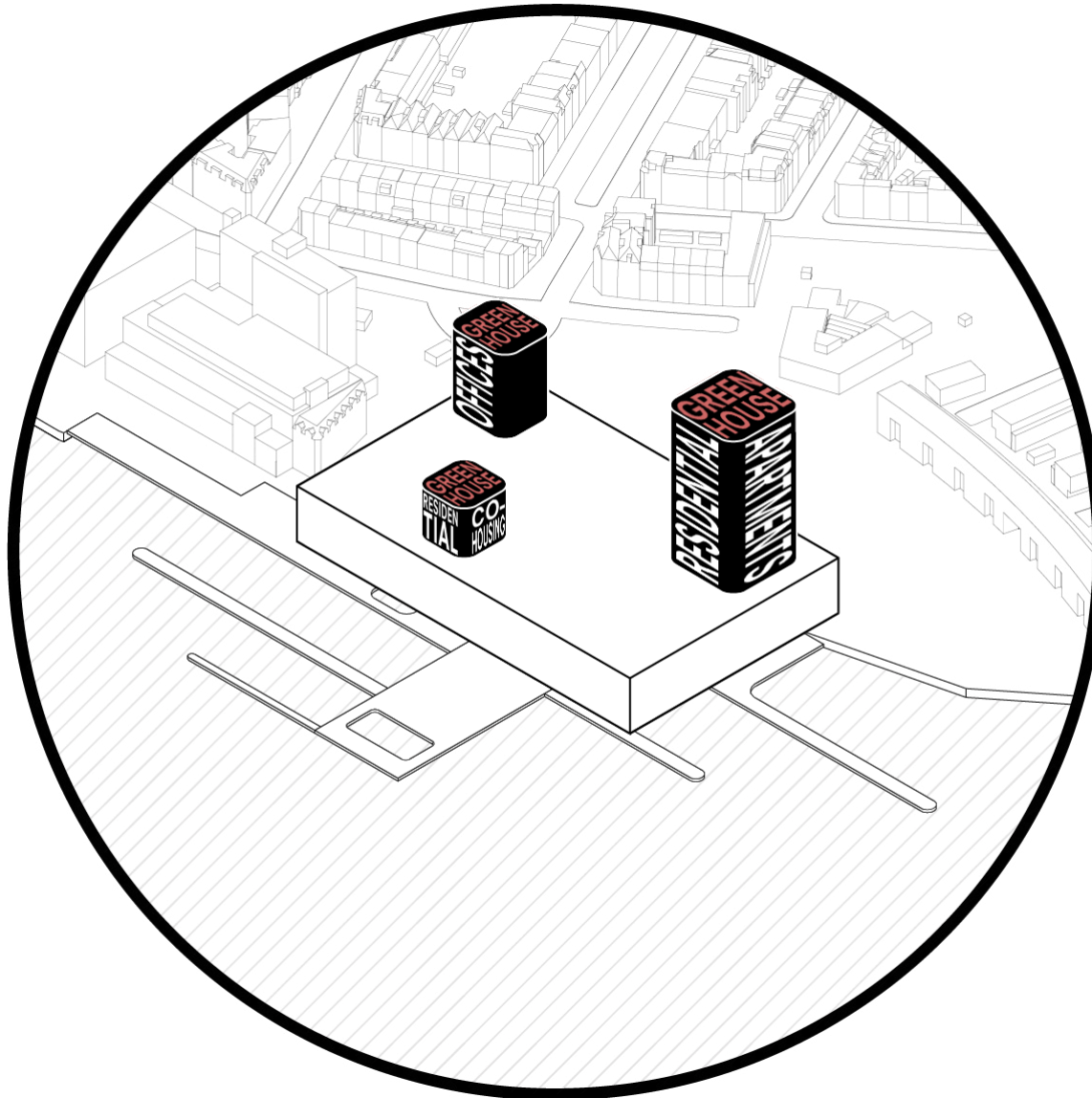
Design

PROGRAM

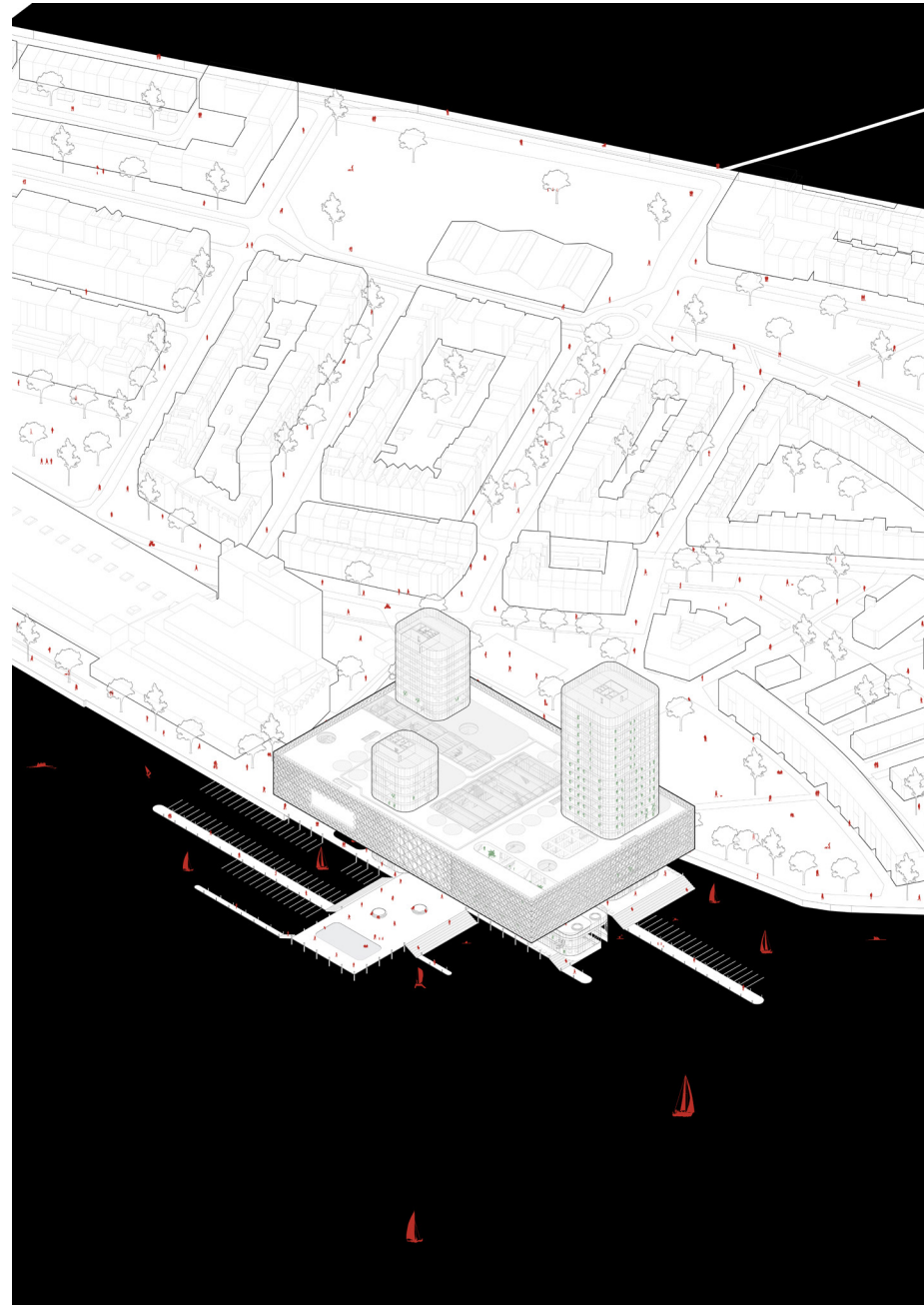


Design

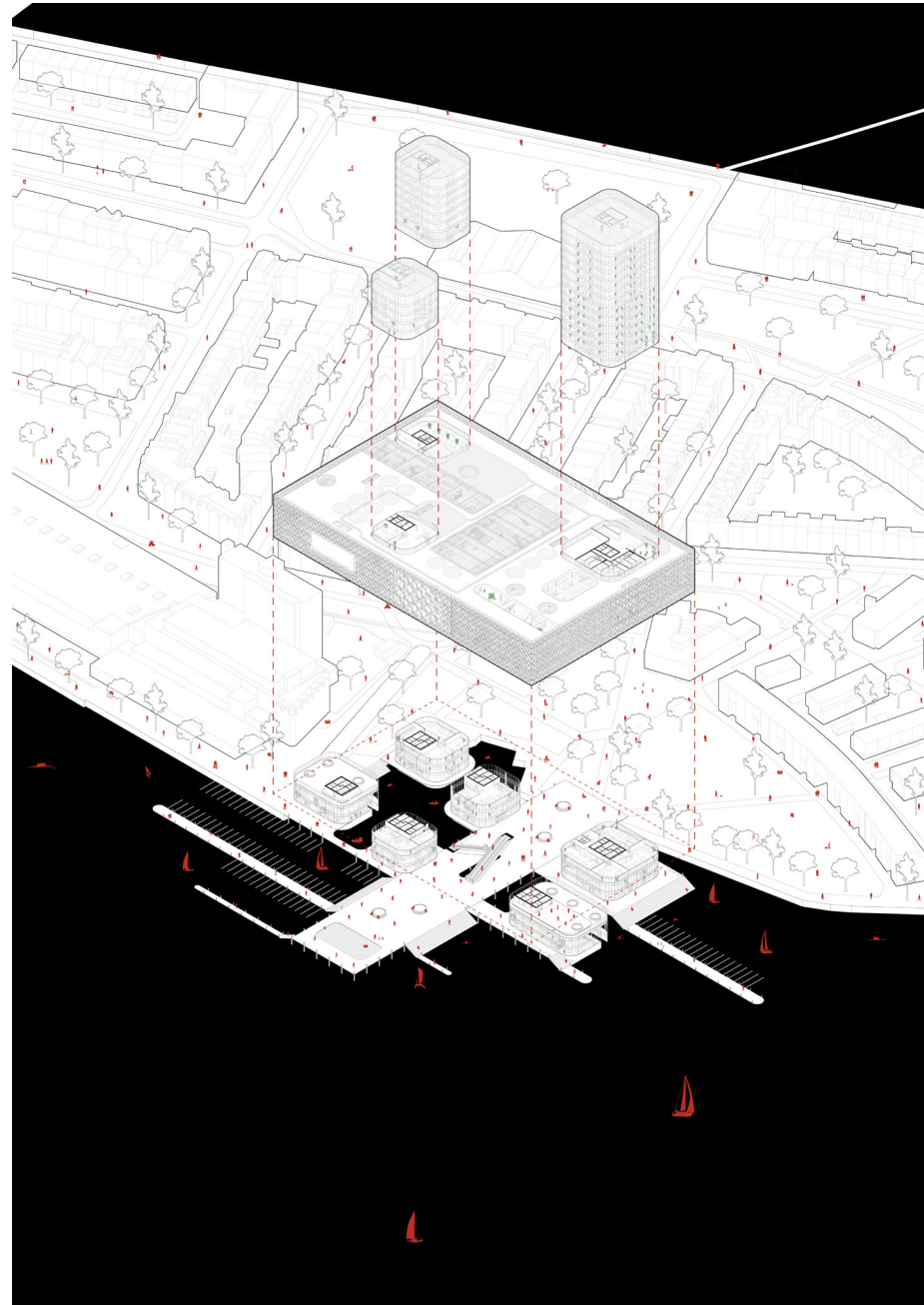
PROGRAM



NEW URBAN FRONT

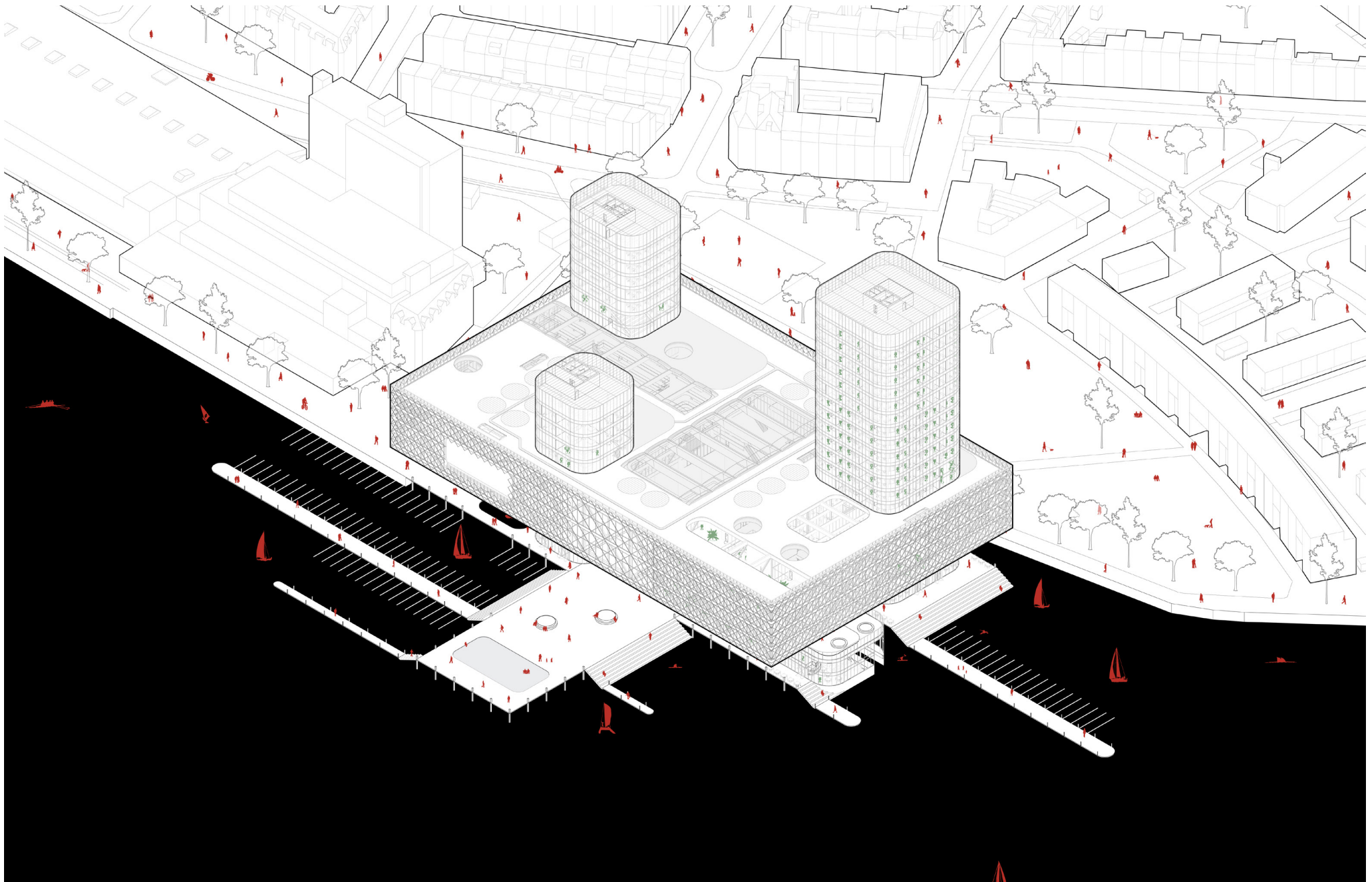


EXPLODED AXONOMETRIC



Design

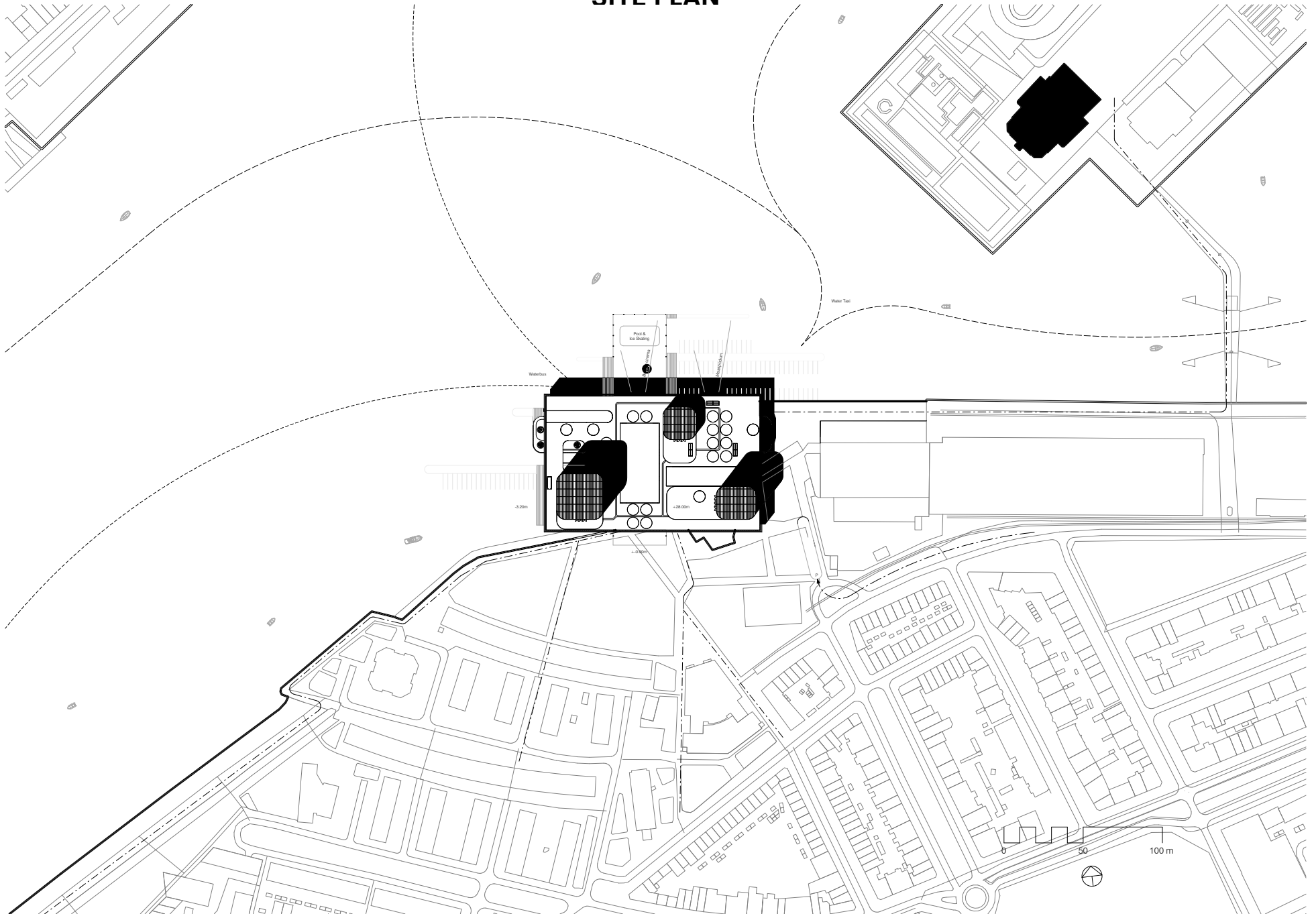
AXONOMETRIC



Design
PROPOSAL

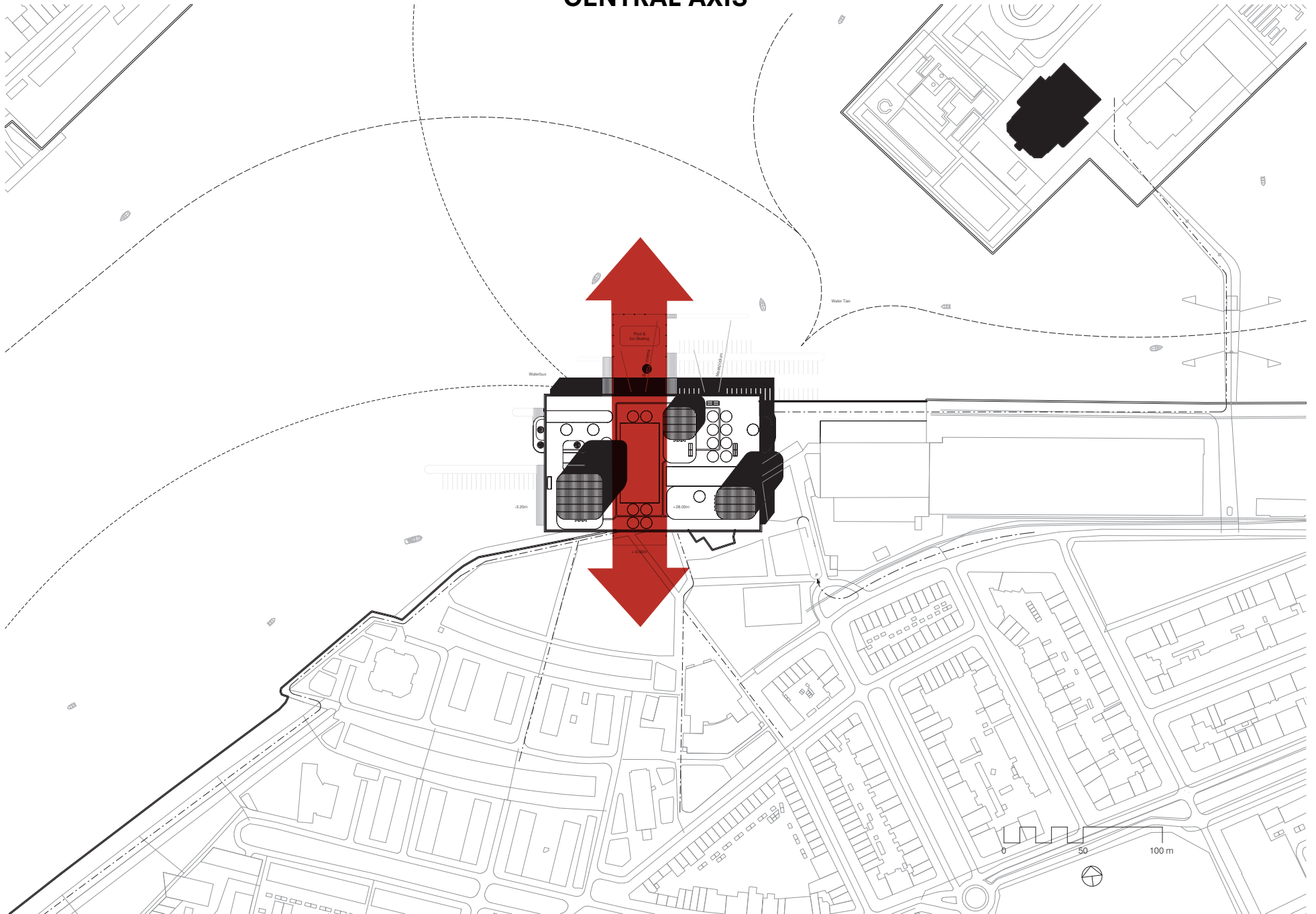


SITE PLAN

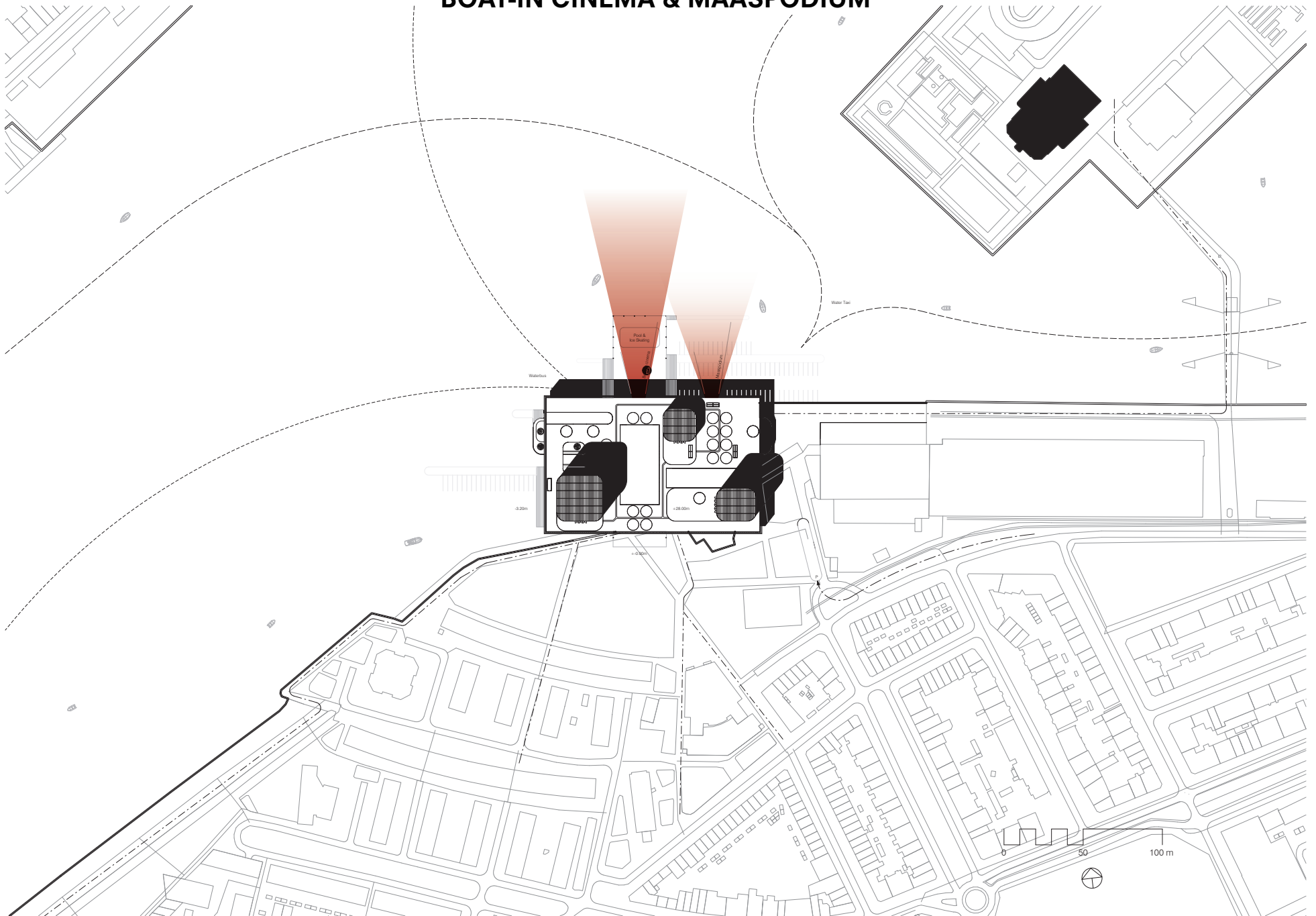


Design

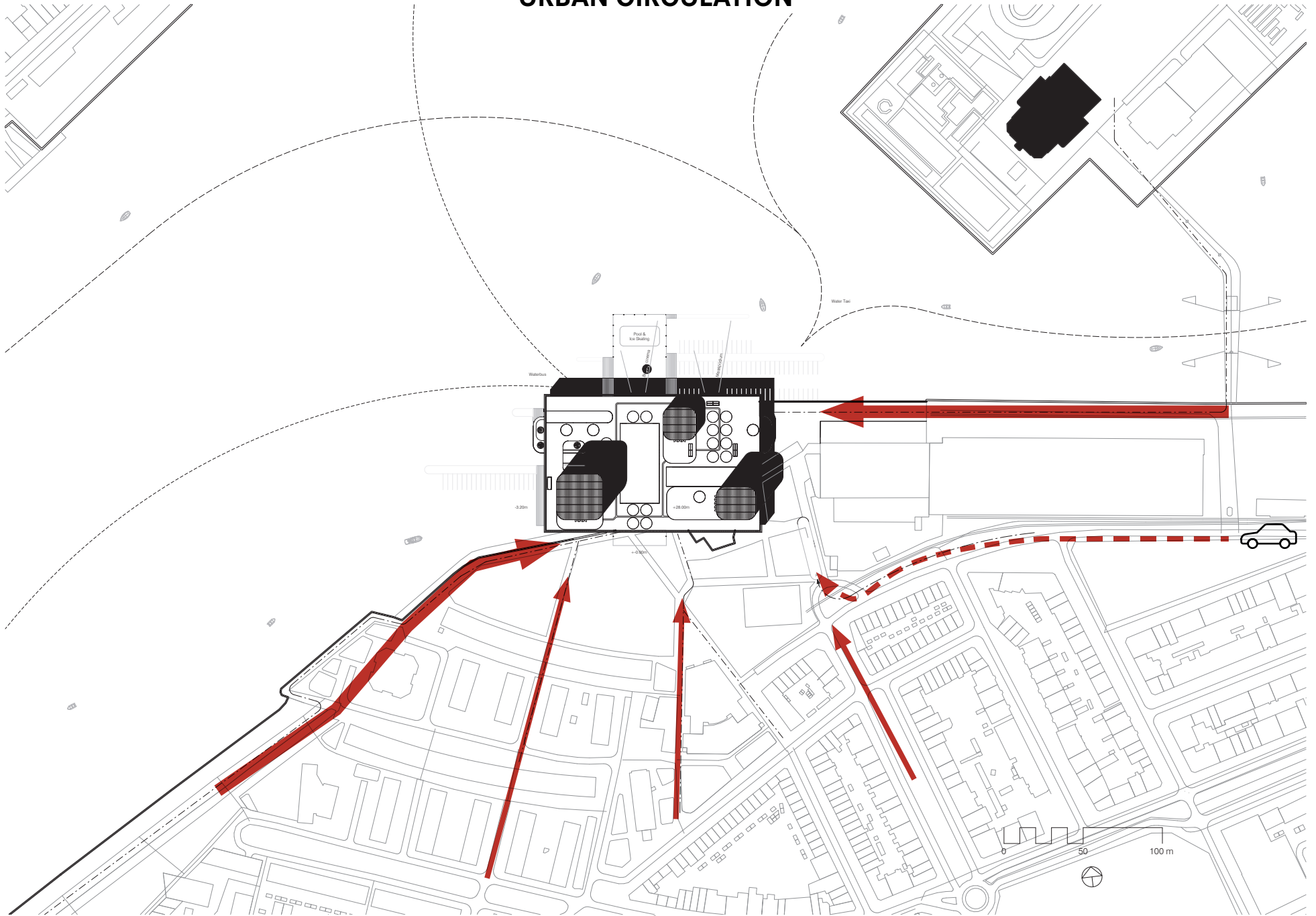
CENTRAL AXIS



BOAT-IN CINEMA & MAASPODIUM



URBAN CIRCULATION



VIEW FROM HOTEL NEW YORK



Design

VIEW FROM WEST PIERS

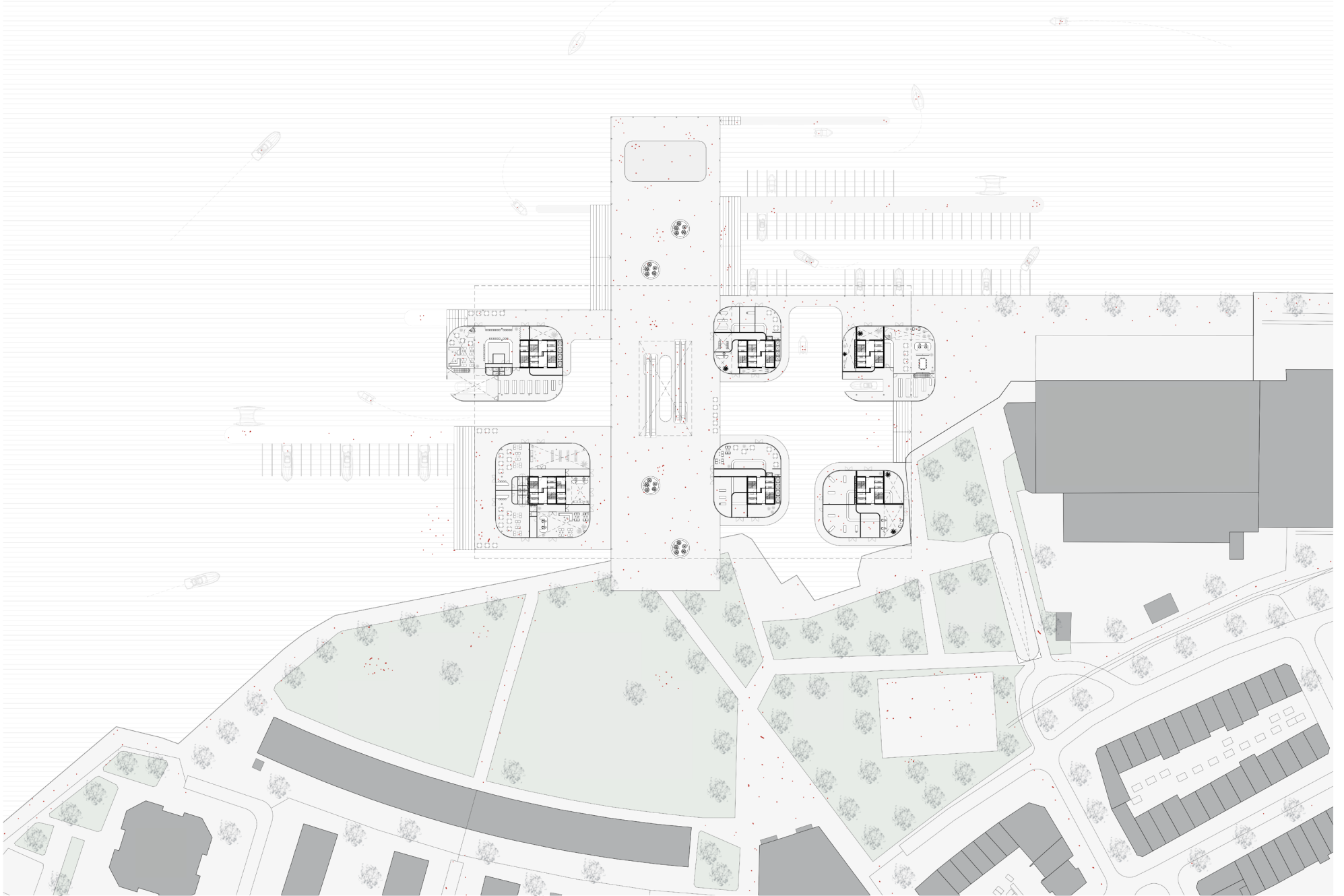


Design

VIEW FROM PARKKADE



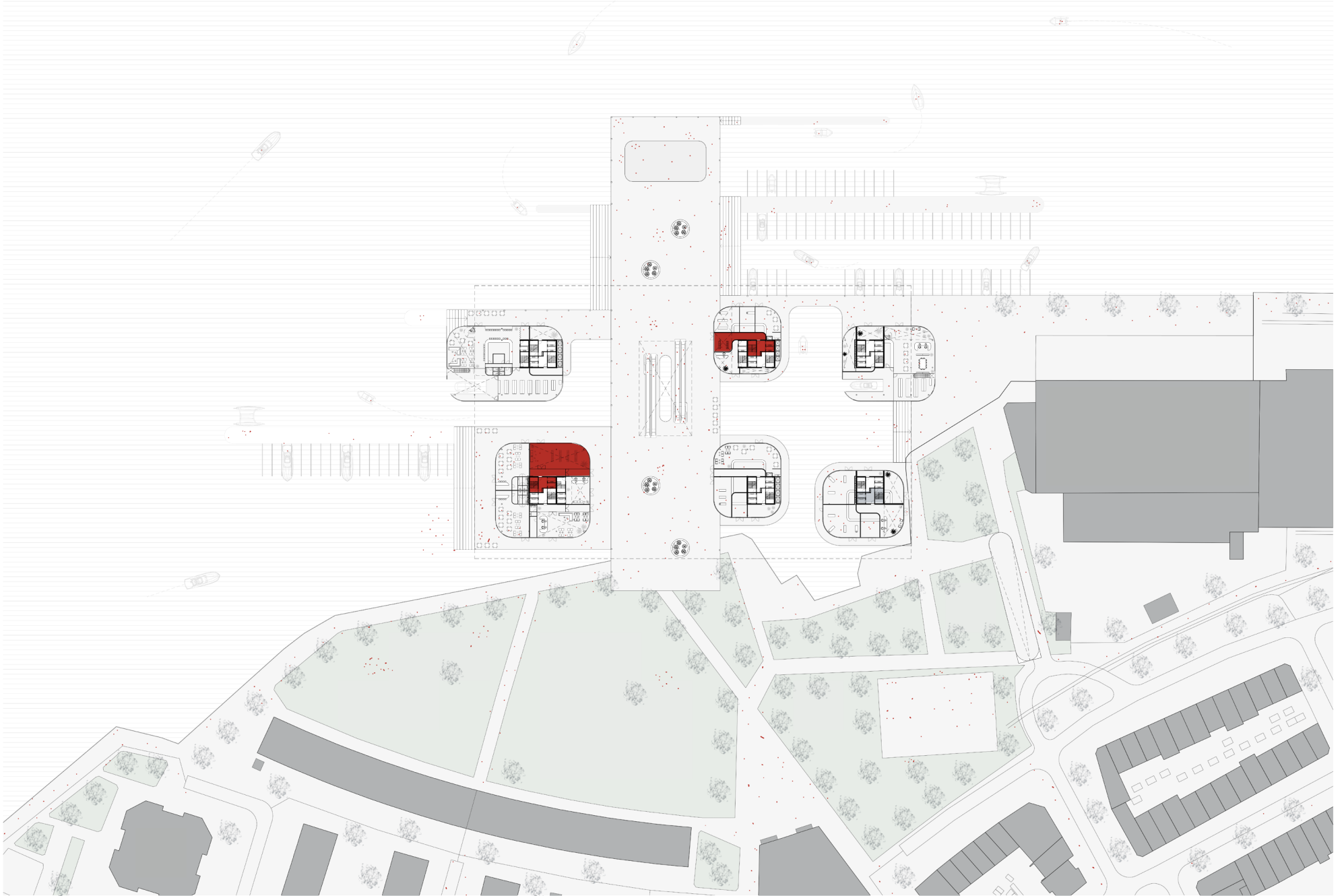
GROUND FLOOR PLAN



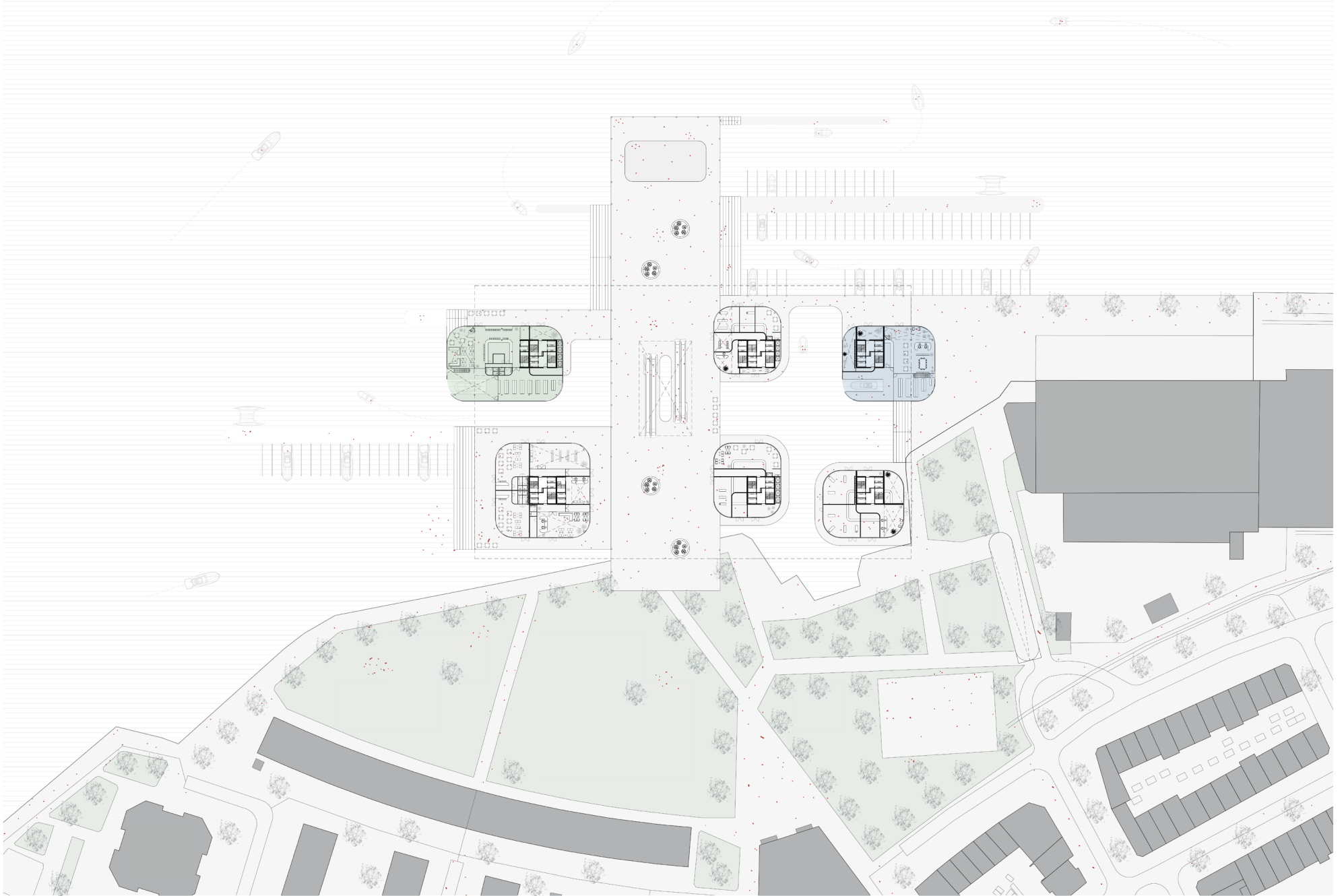
HOTEL & CULTURE ENTRANCES



TOWER ENTRANCES



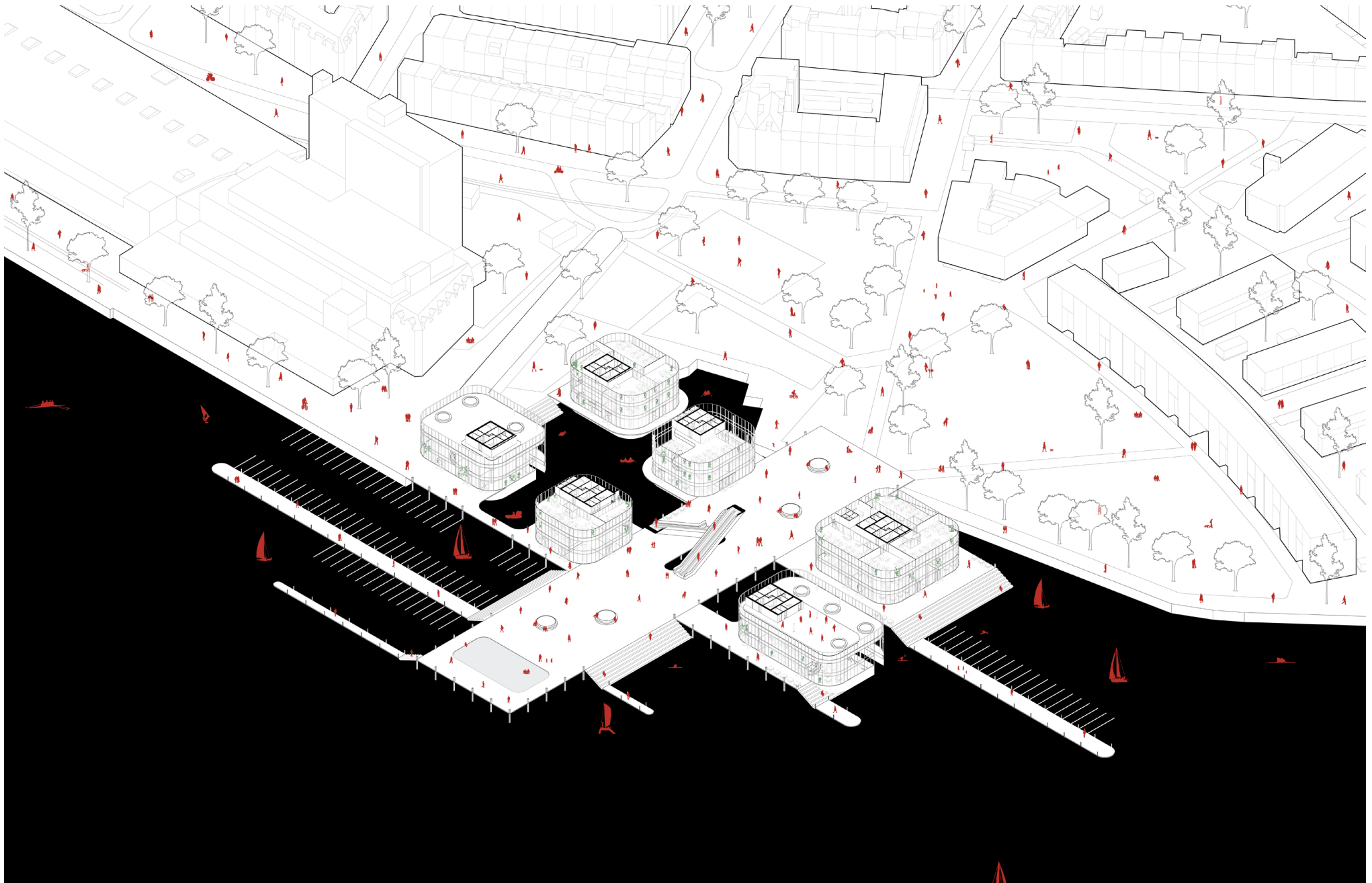
MARINA & WATER TAXI



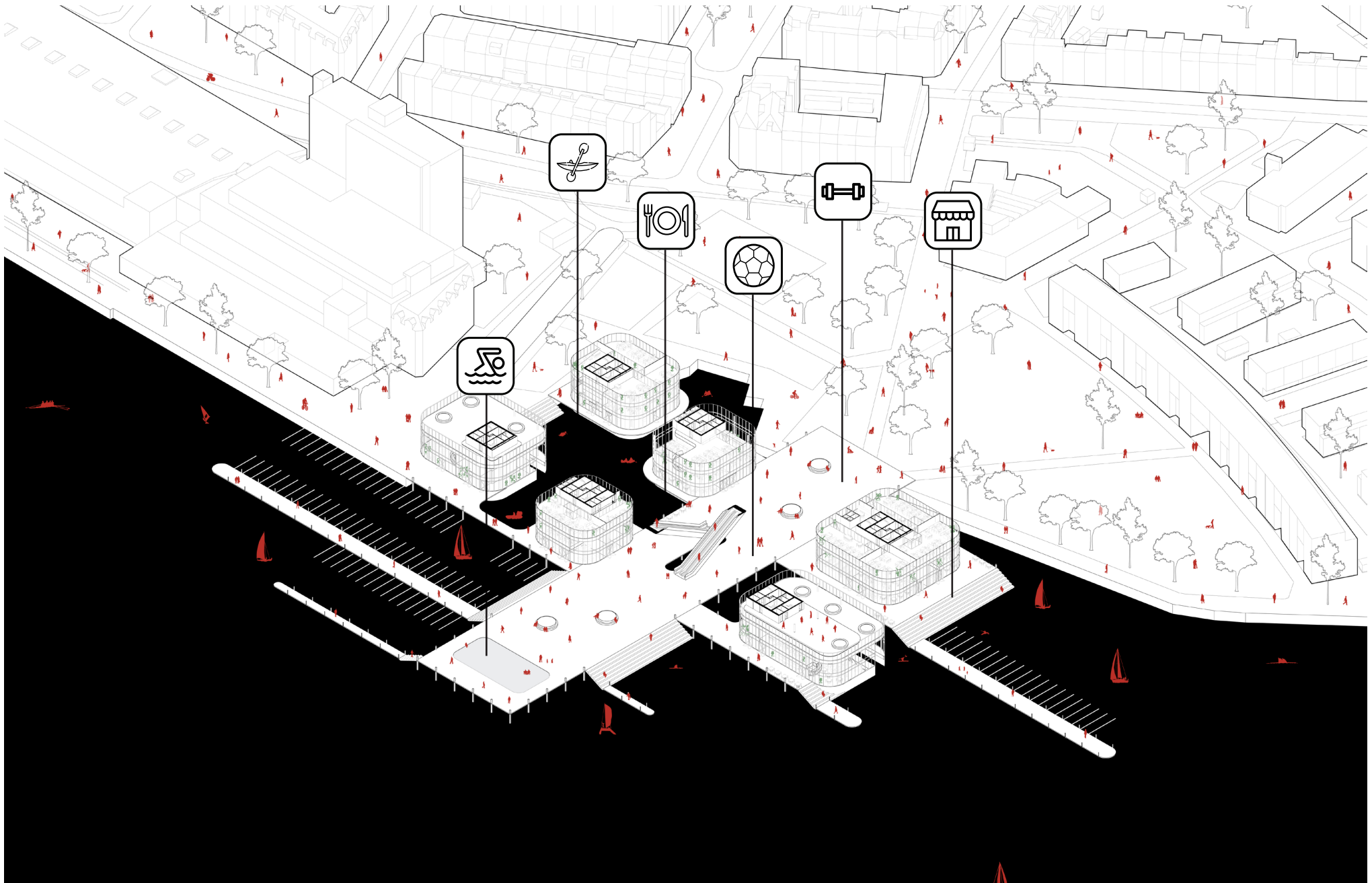
SECTIONAL BASE AND FIFTH FACADE



PLANE OF URBAN ACTIVITY



PLANE OF URBAN ACTIVITY



Design

SUMMER: OUTDOOR POOL



Design

WINTER: ICE SKATING RINK



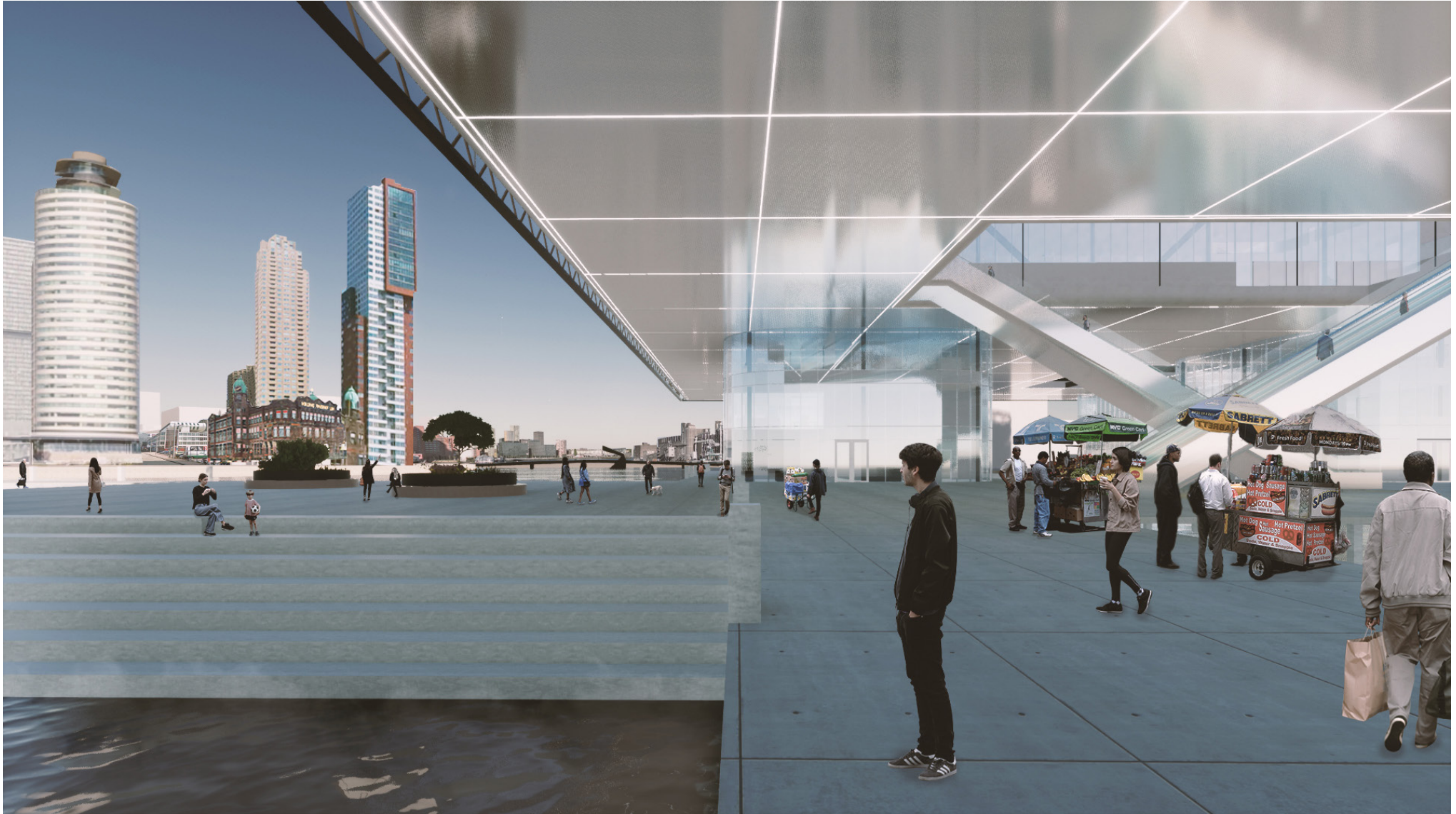
Design

YEAR-ROUND: URBAN CINEMA



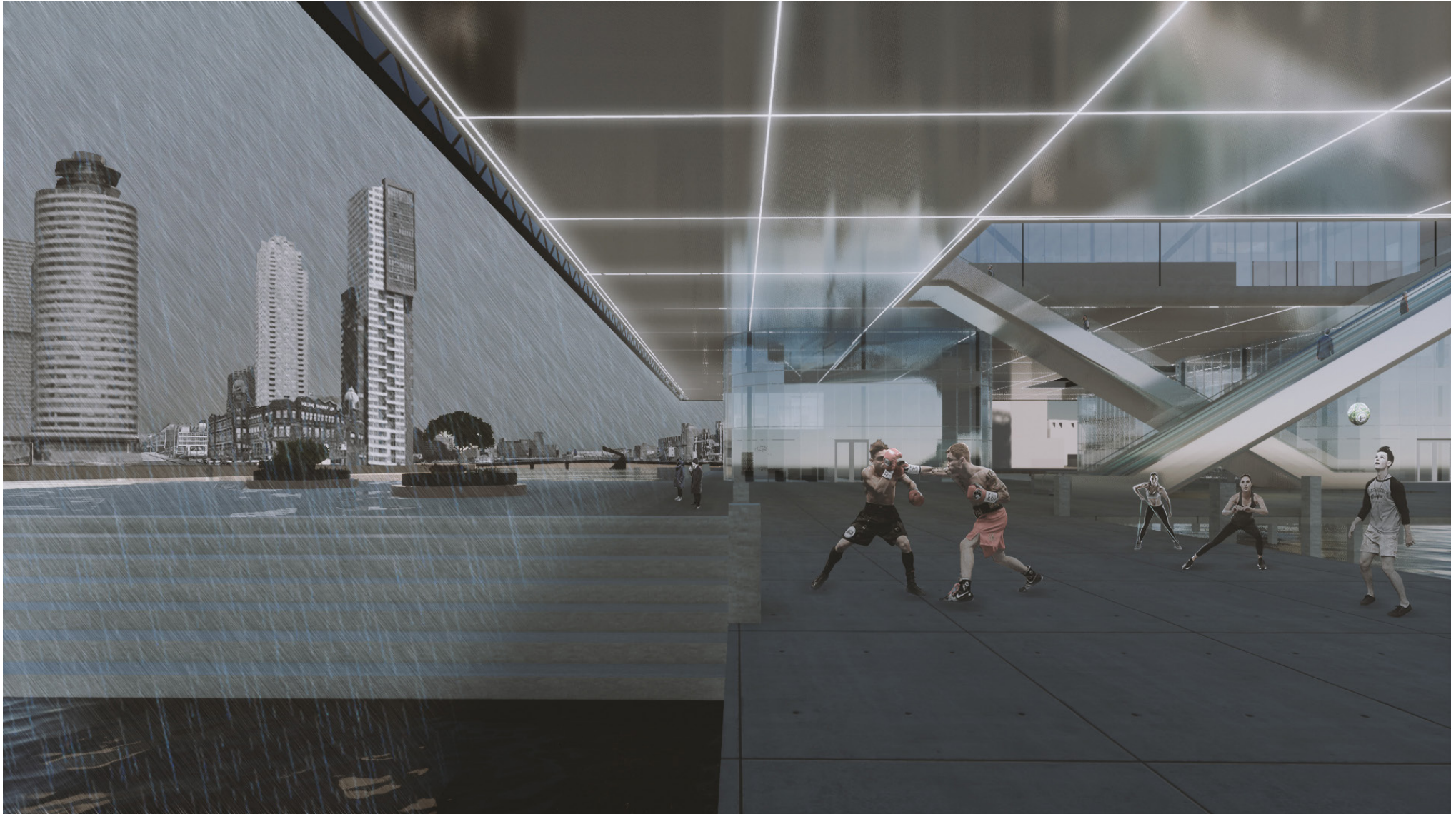
Design

A PLANE OF URBAN ACTIVITY

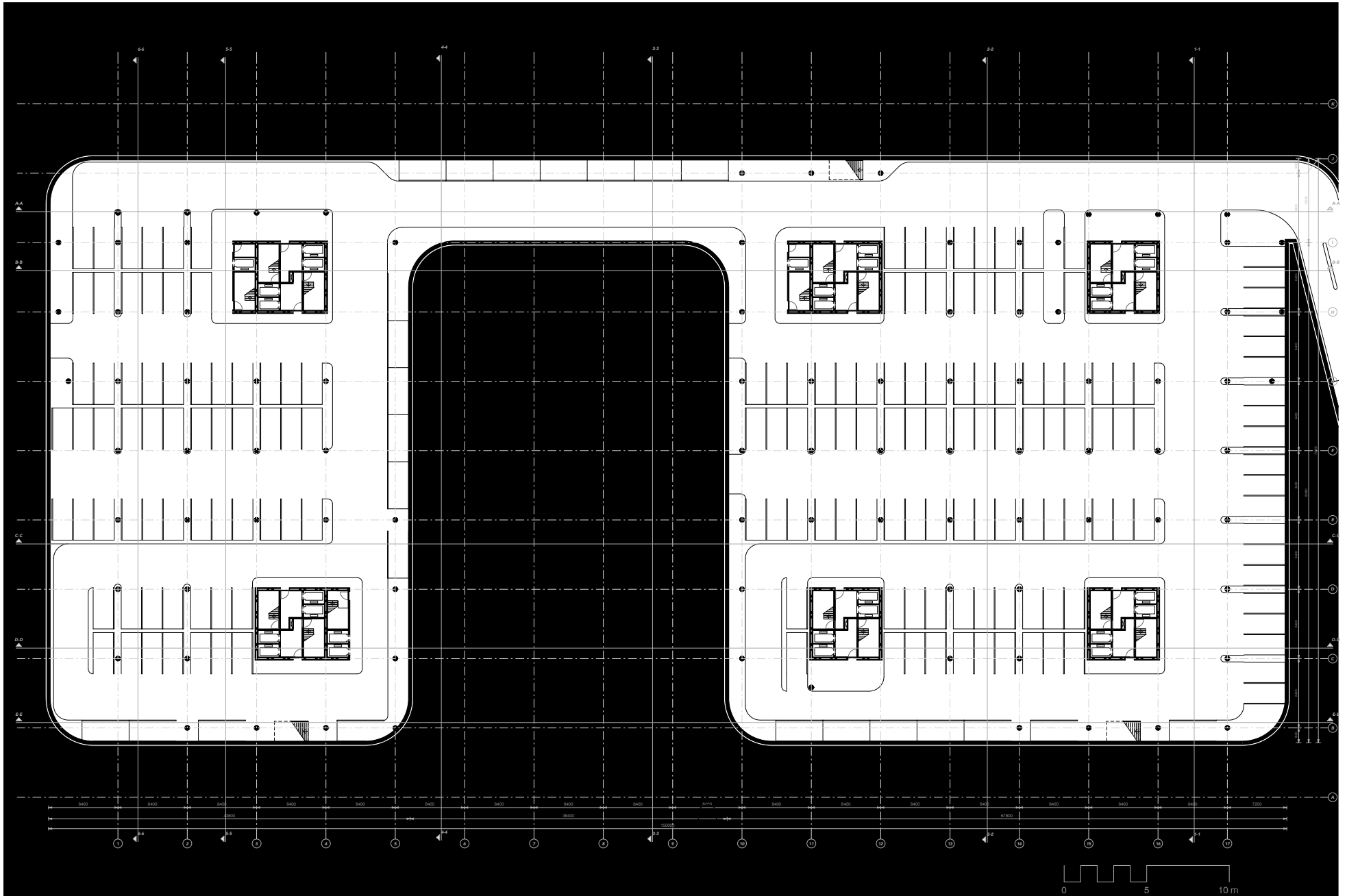


Design

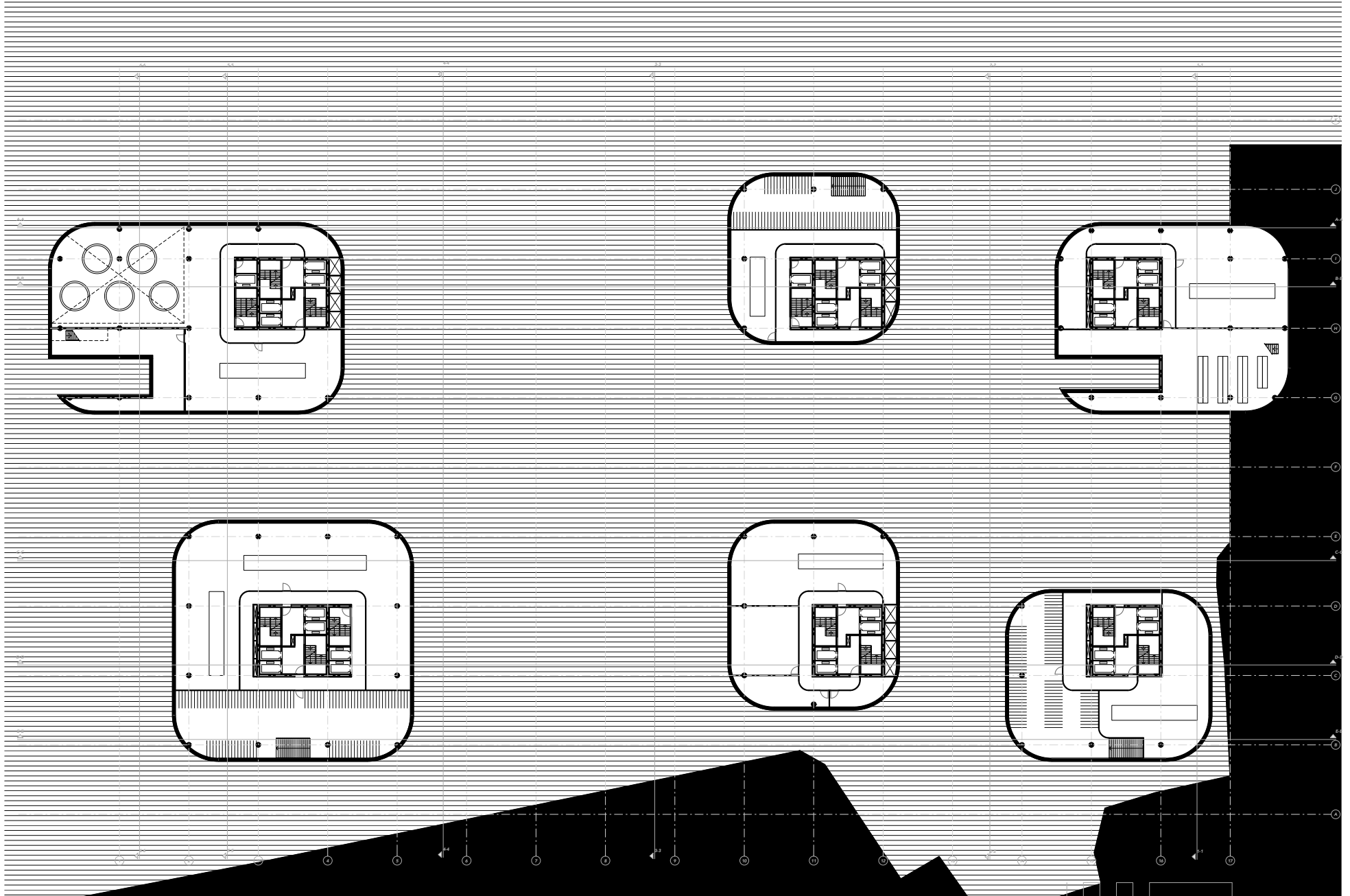
...EVEN IN DUTCH WEATHER



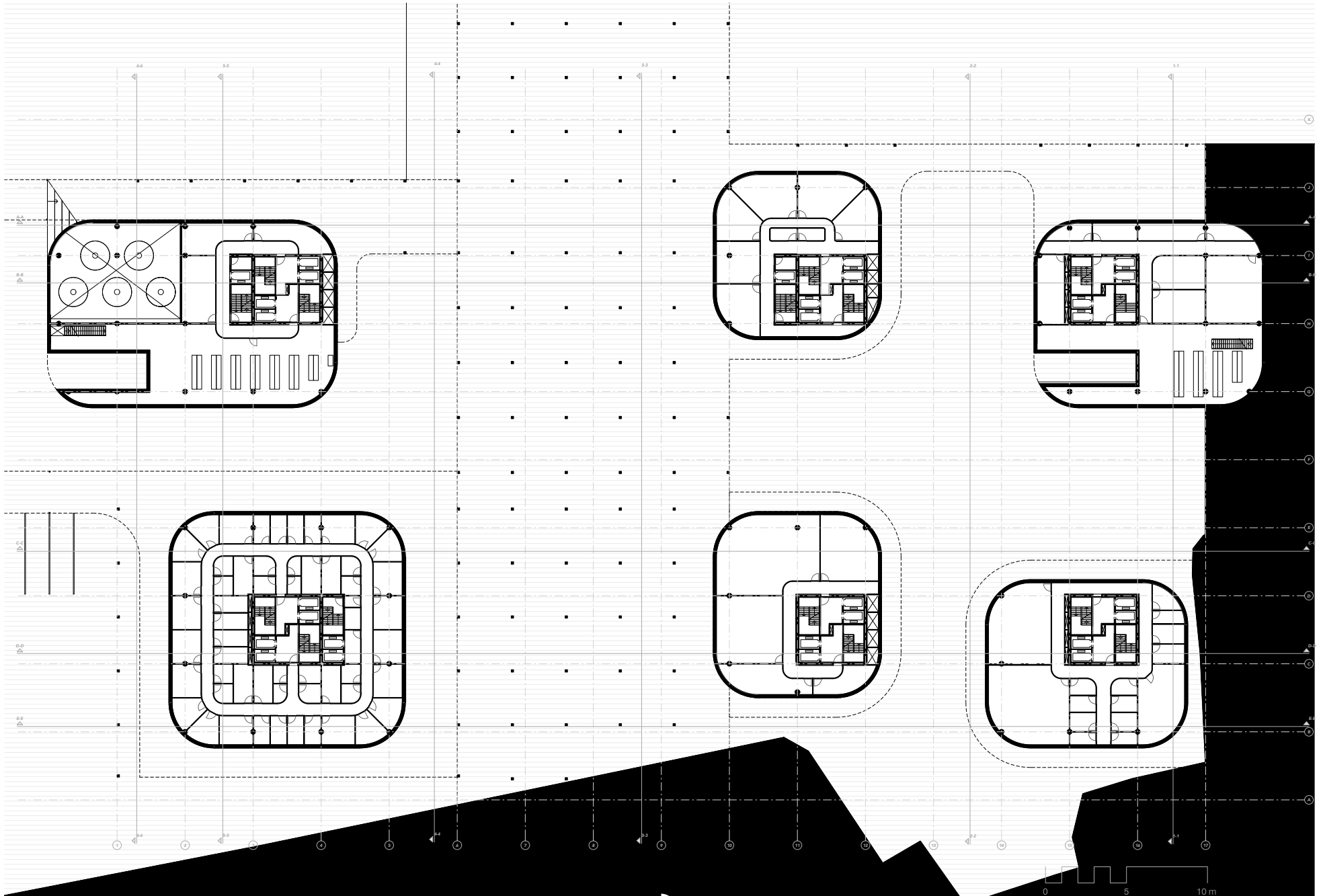
BASEMENT -3



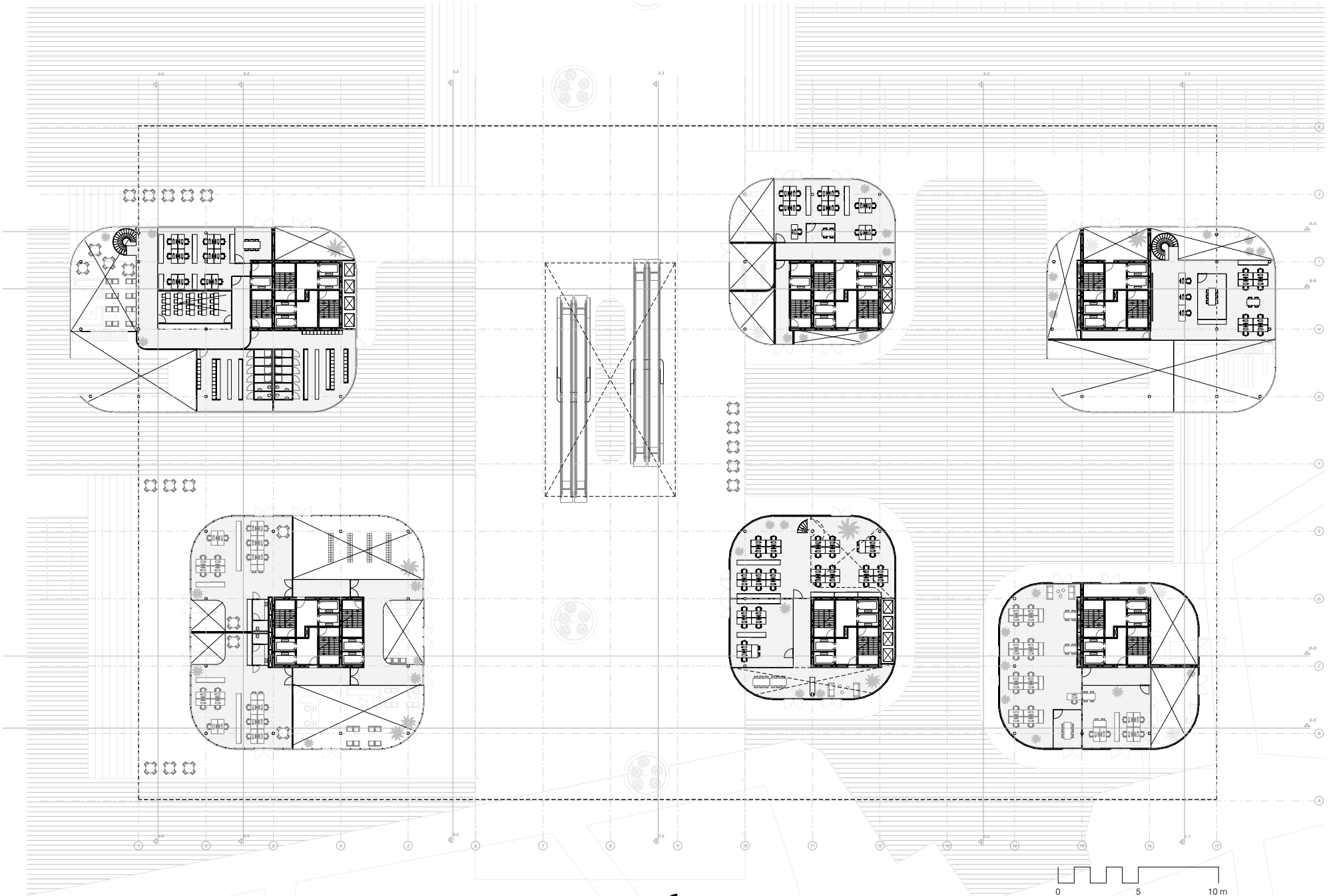
BASEMENT -2



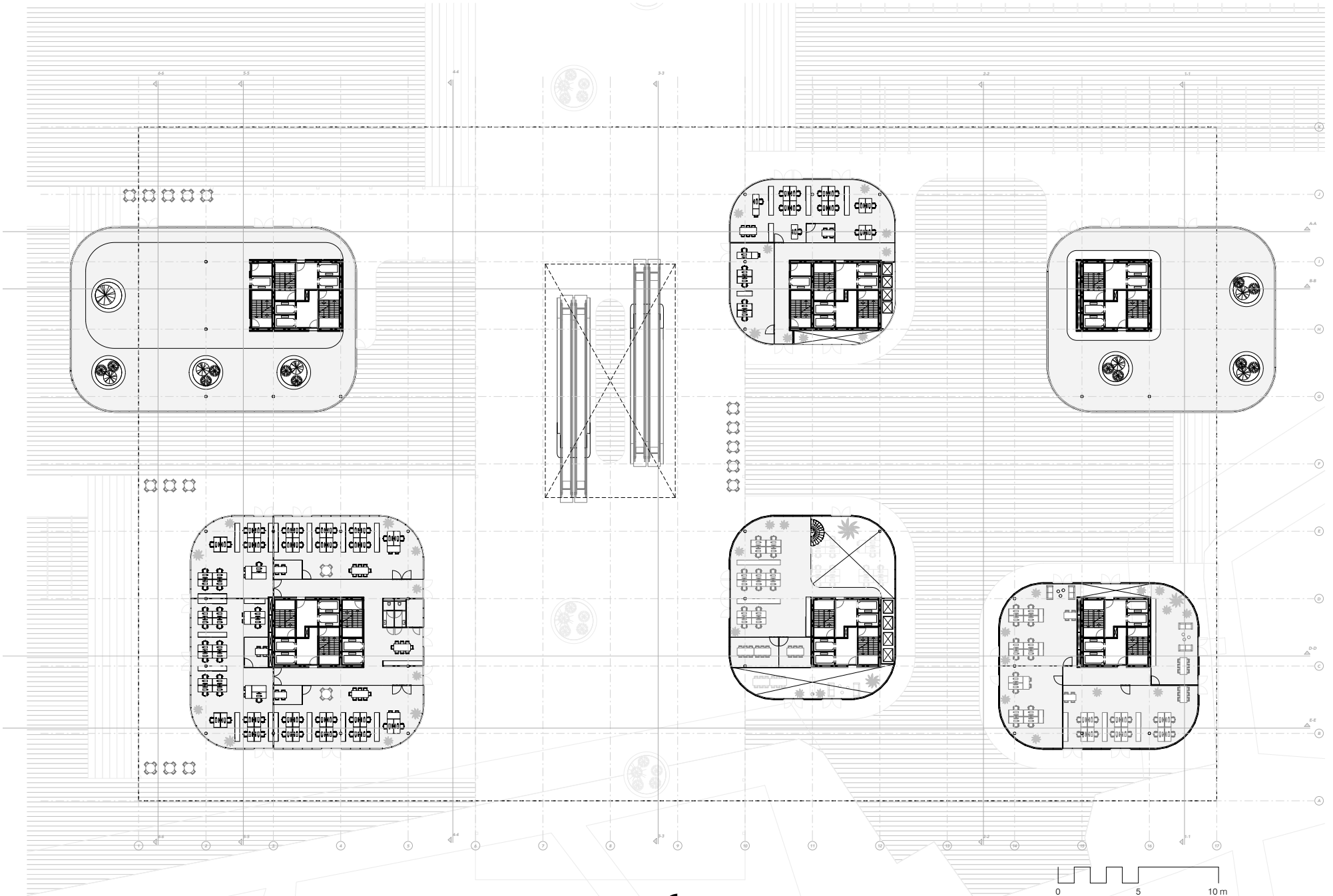
BASEMENT -1



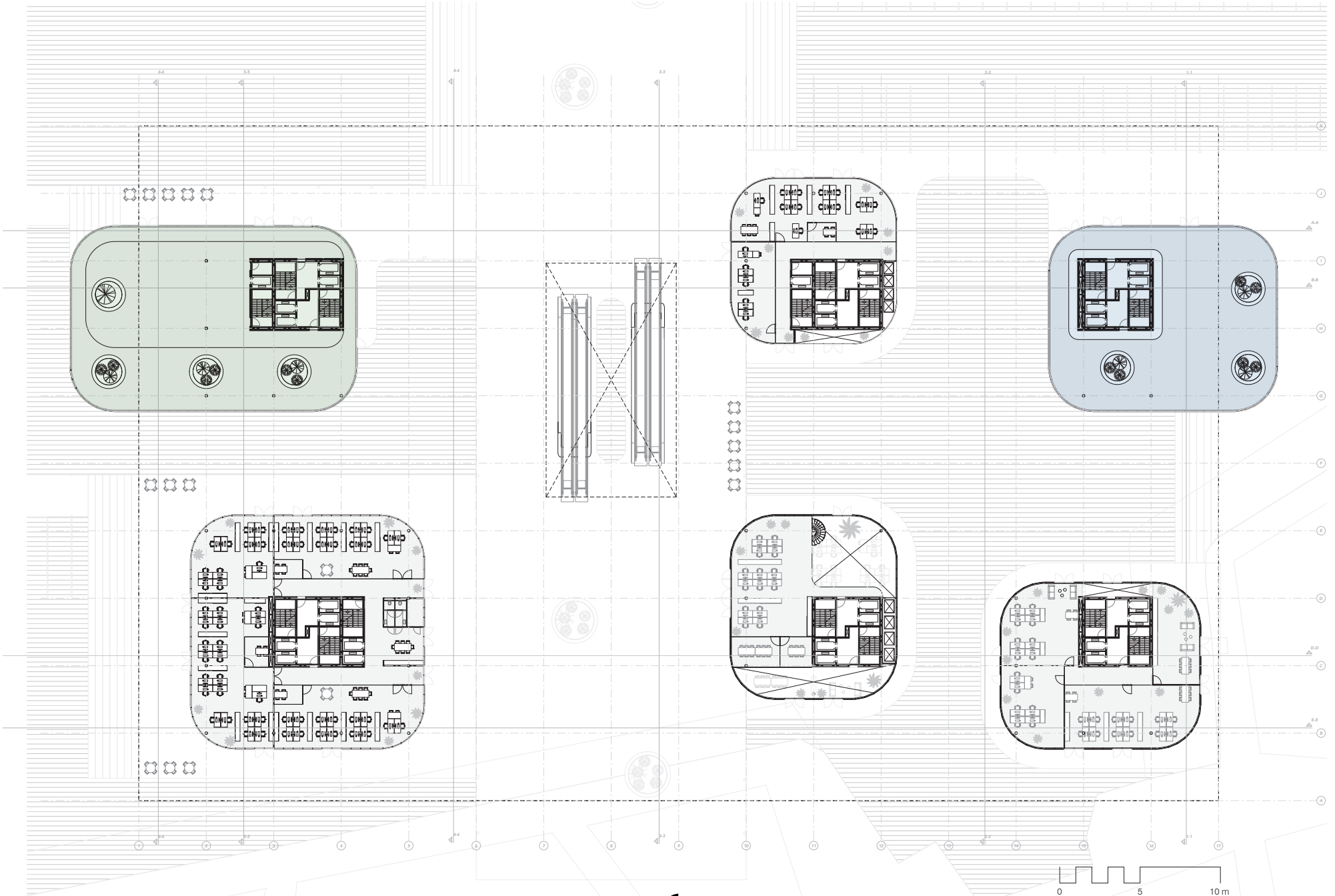
FIRST FLOOR PLAN (+4.00m)



SECOND FLOOR PLAN (+8.00m)

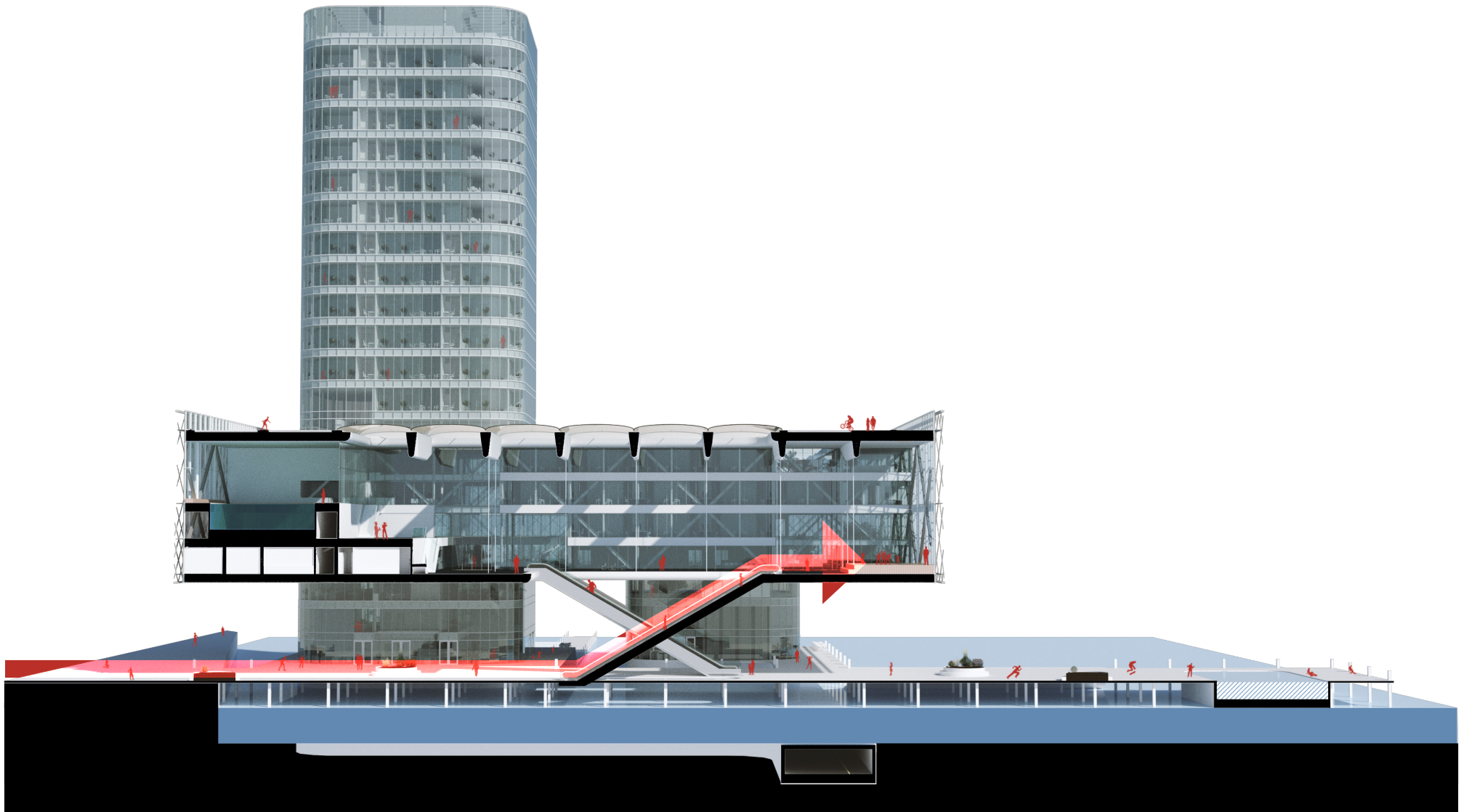


SECOND FLOOR PLAN (+8.00m)

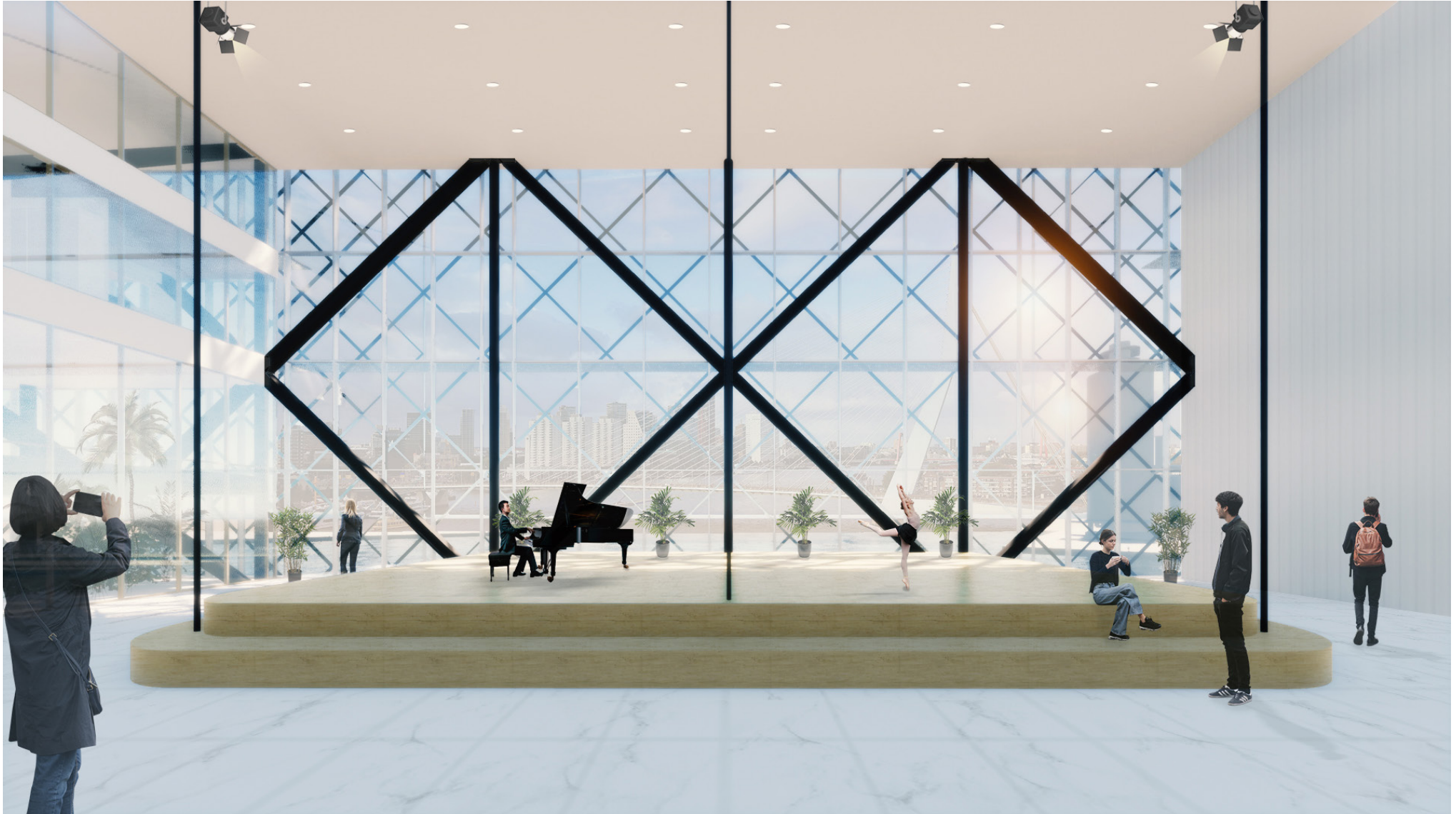


Design

ROUTE UPWARD



Design
PUBLIC PODIUM



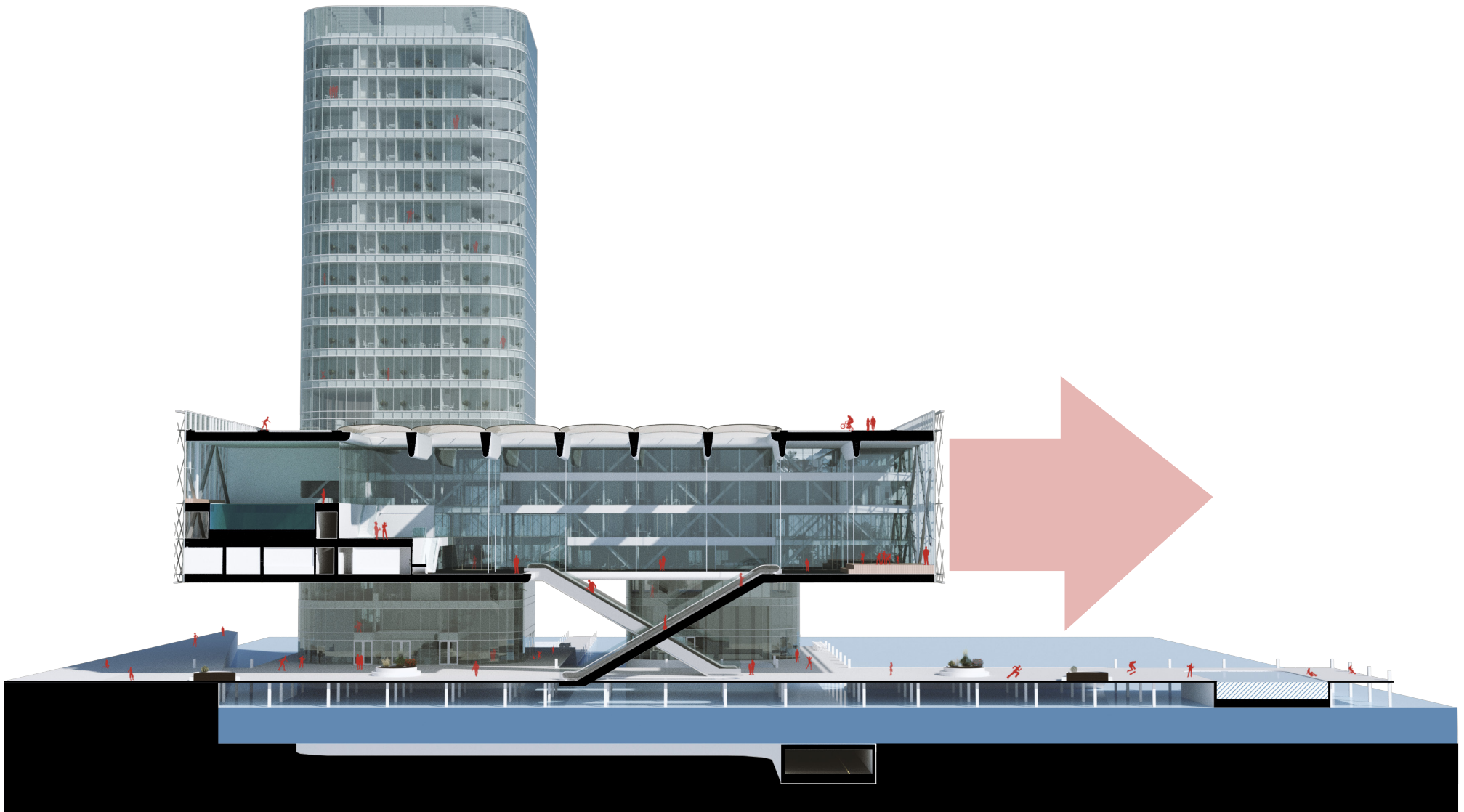
Design

PUBLIC PLAZA



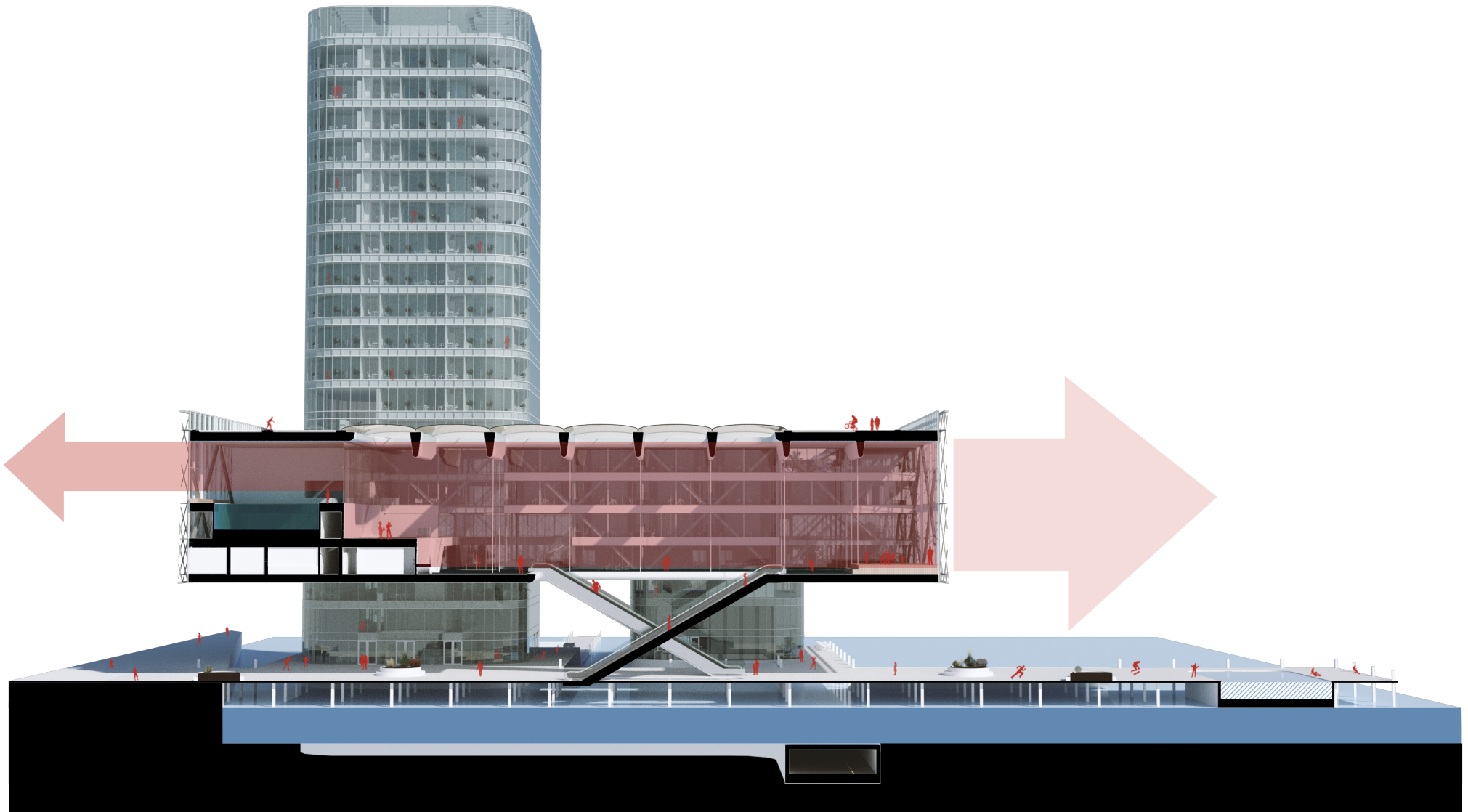
Design

PUBLIC SCREEN

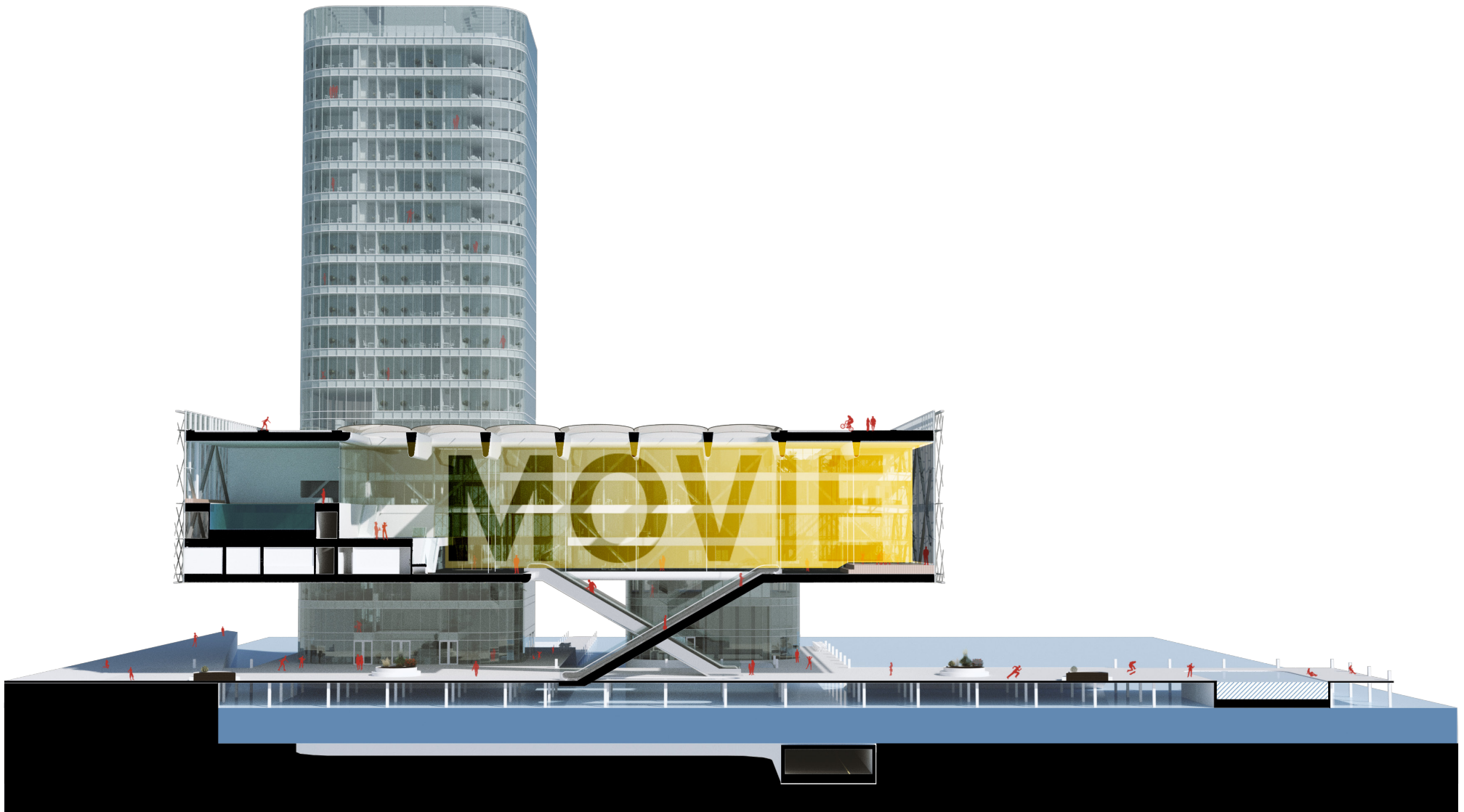


Design

PUBLIC INTERIOR

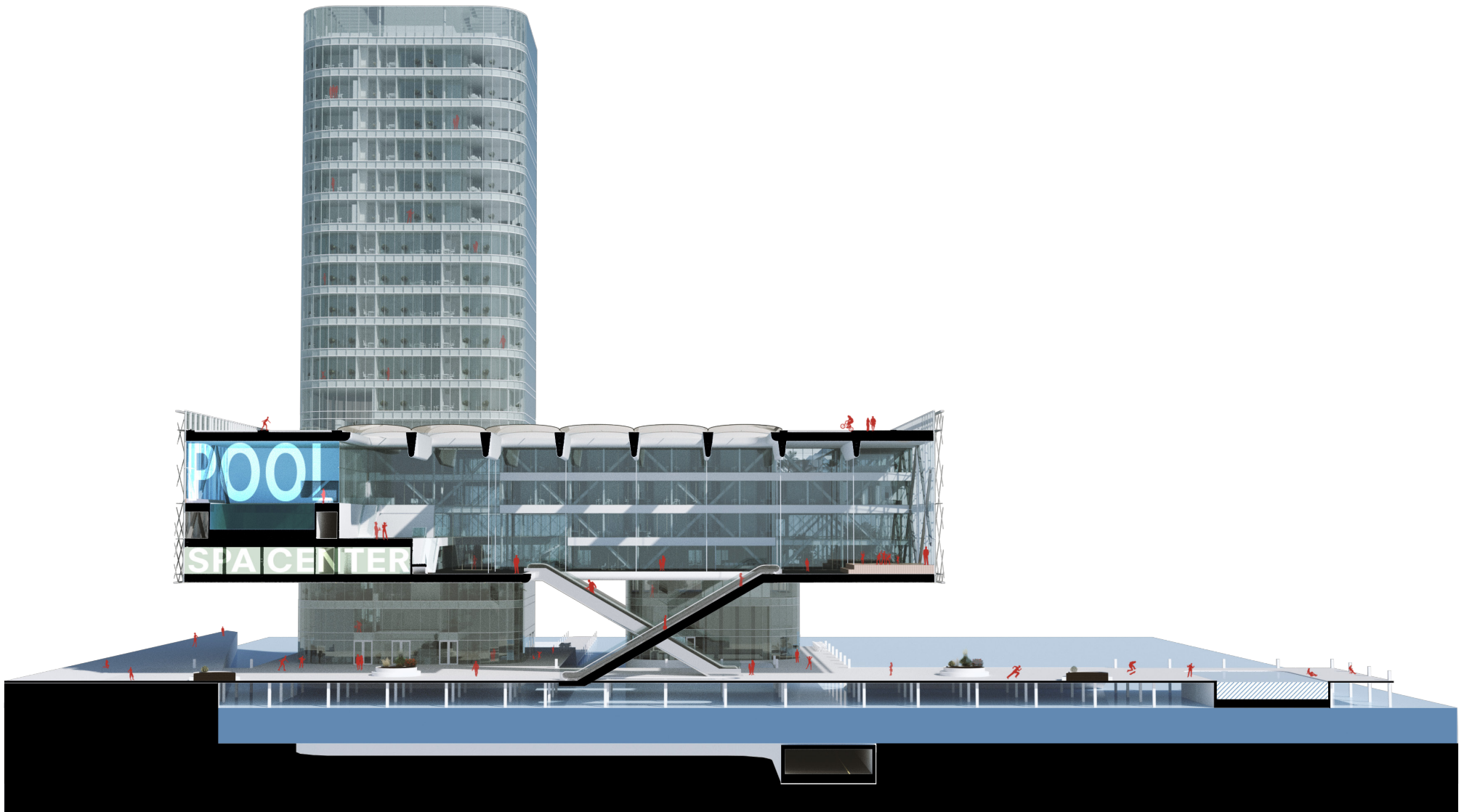


Design
MOVIES



Design

PUBLIC SPA & POOLS



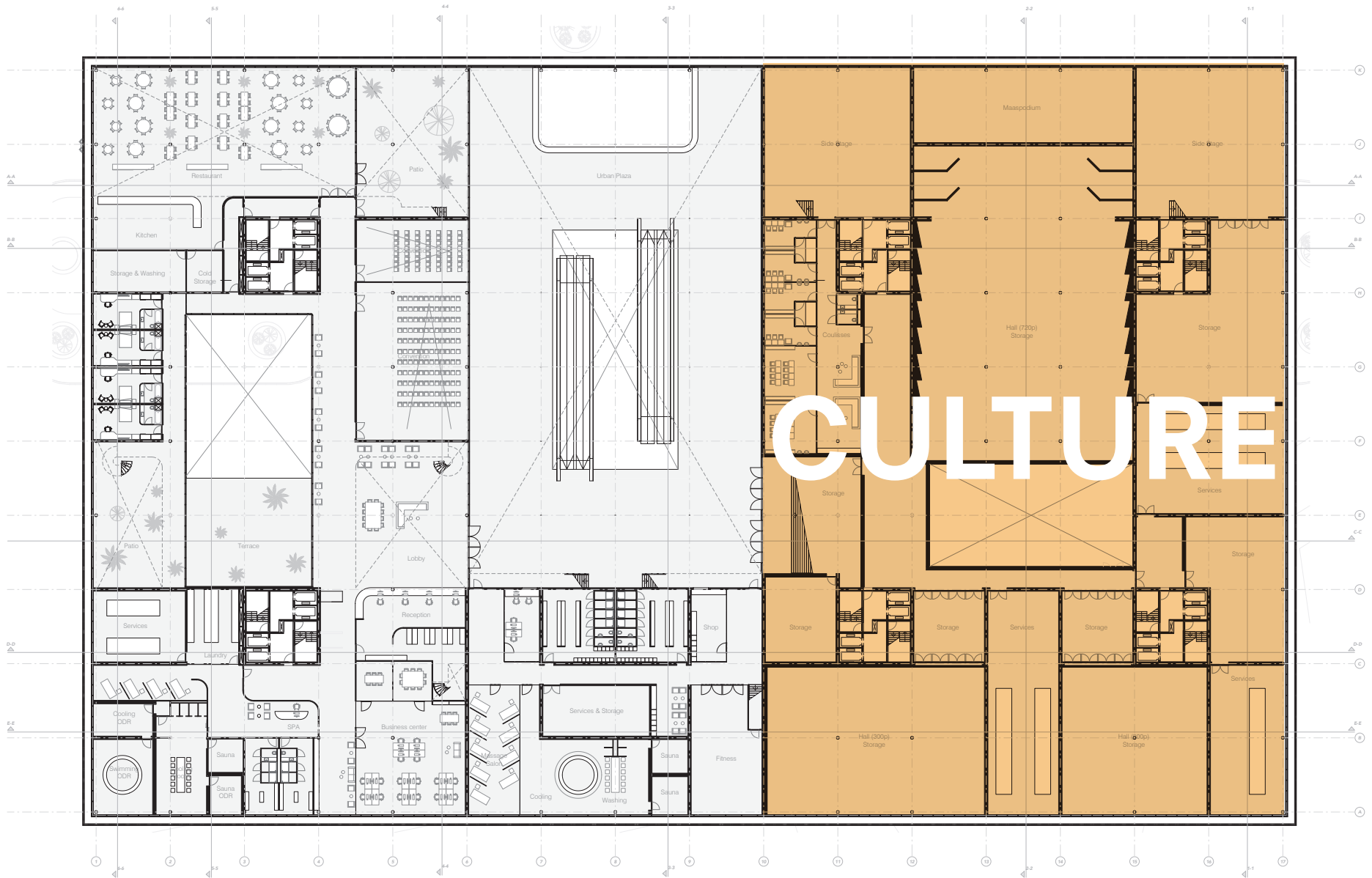
Design

POOL WITH A VIEW

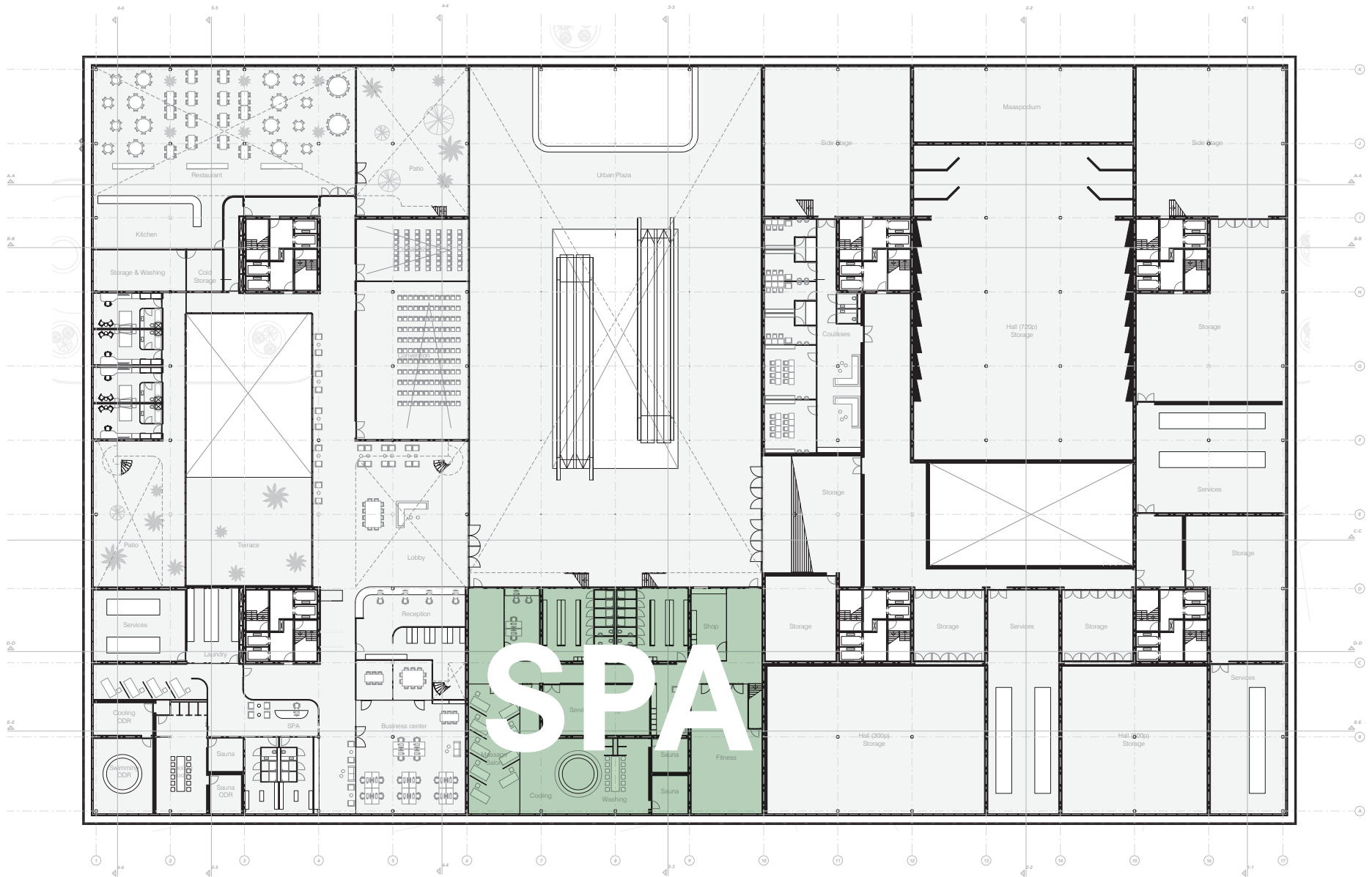


Design

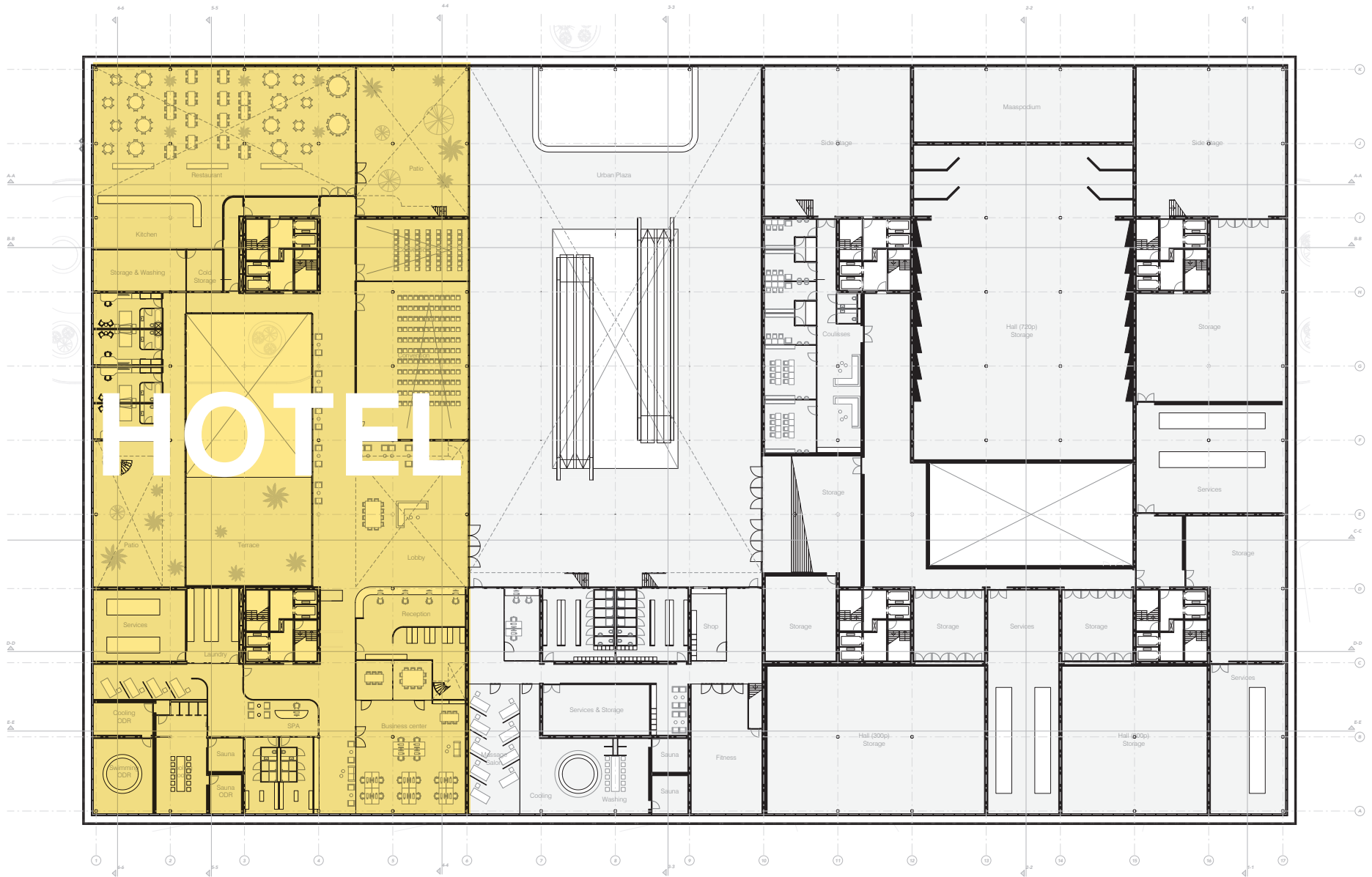
CULTURAL CENTER



SPA & POOL CENTER



Design
HOTEL

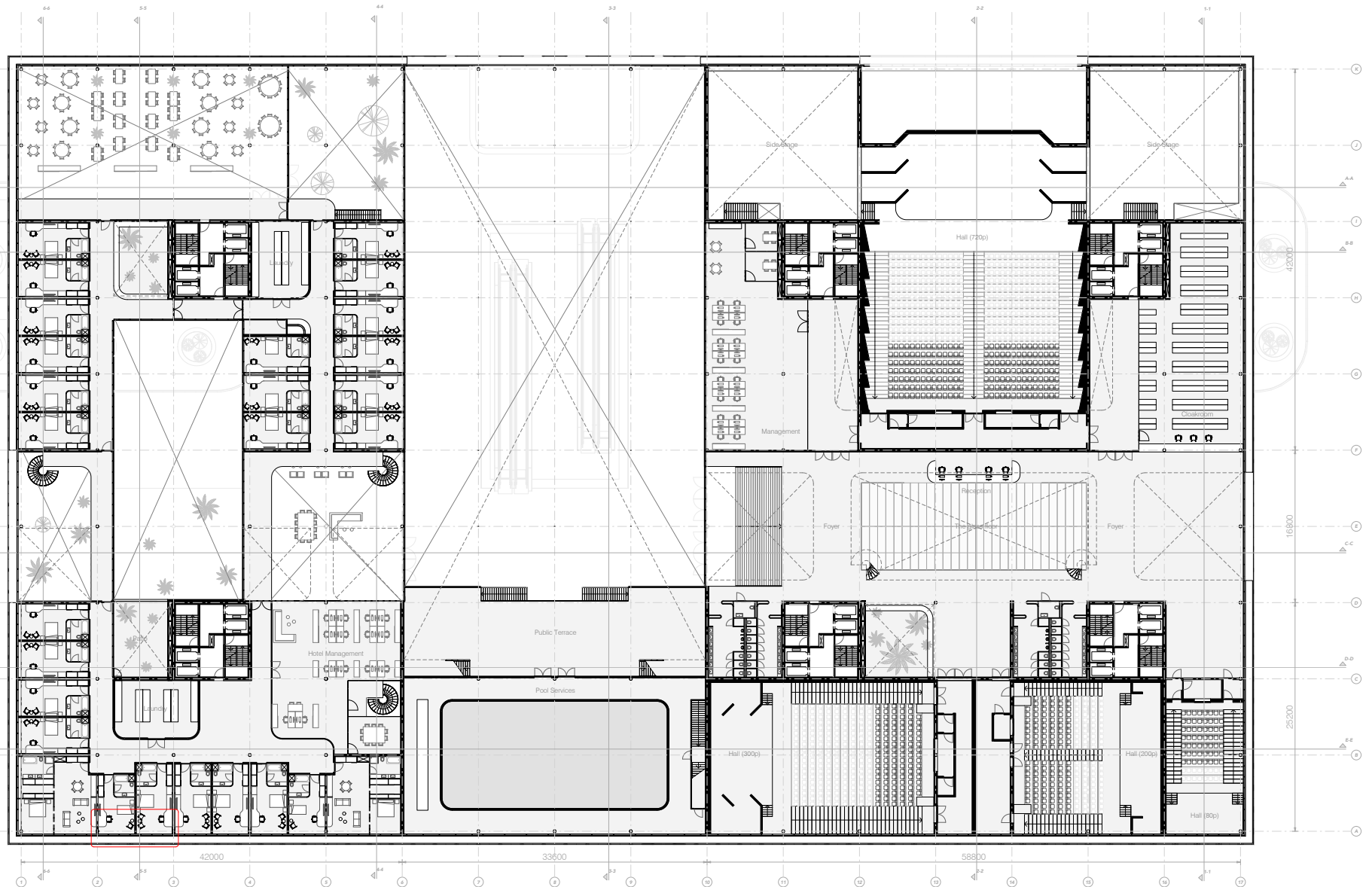


HOTEL



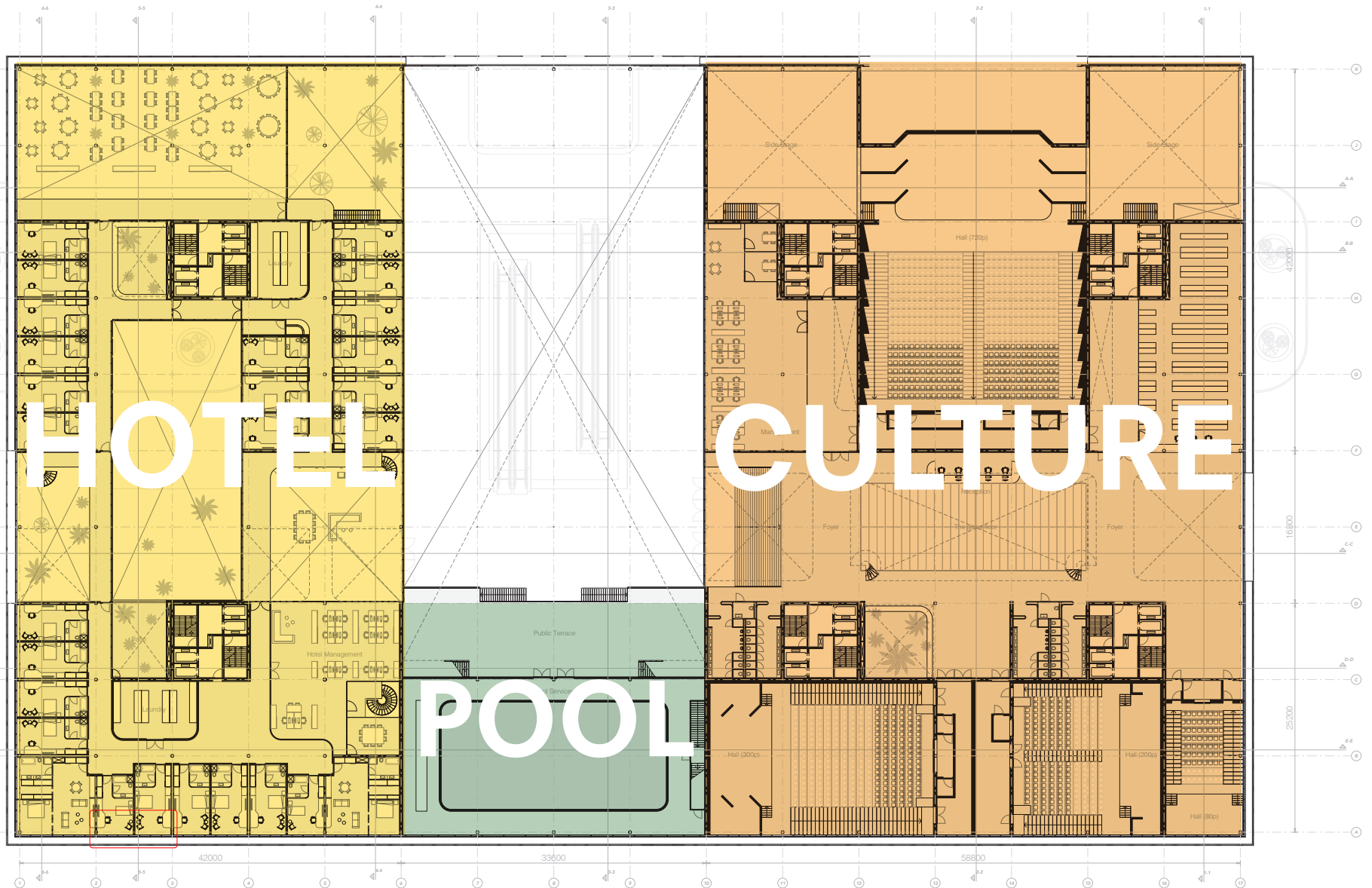
Design

+16.00M PLAN (LV4)

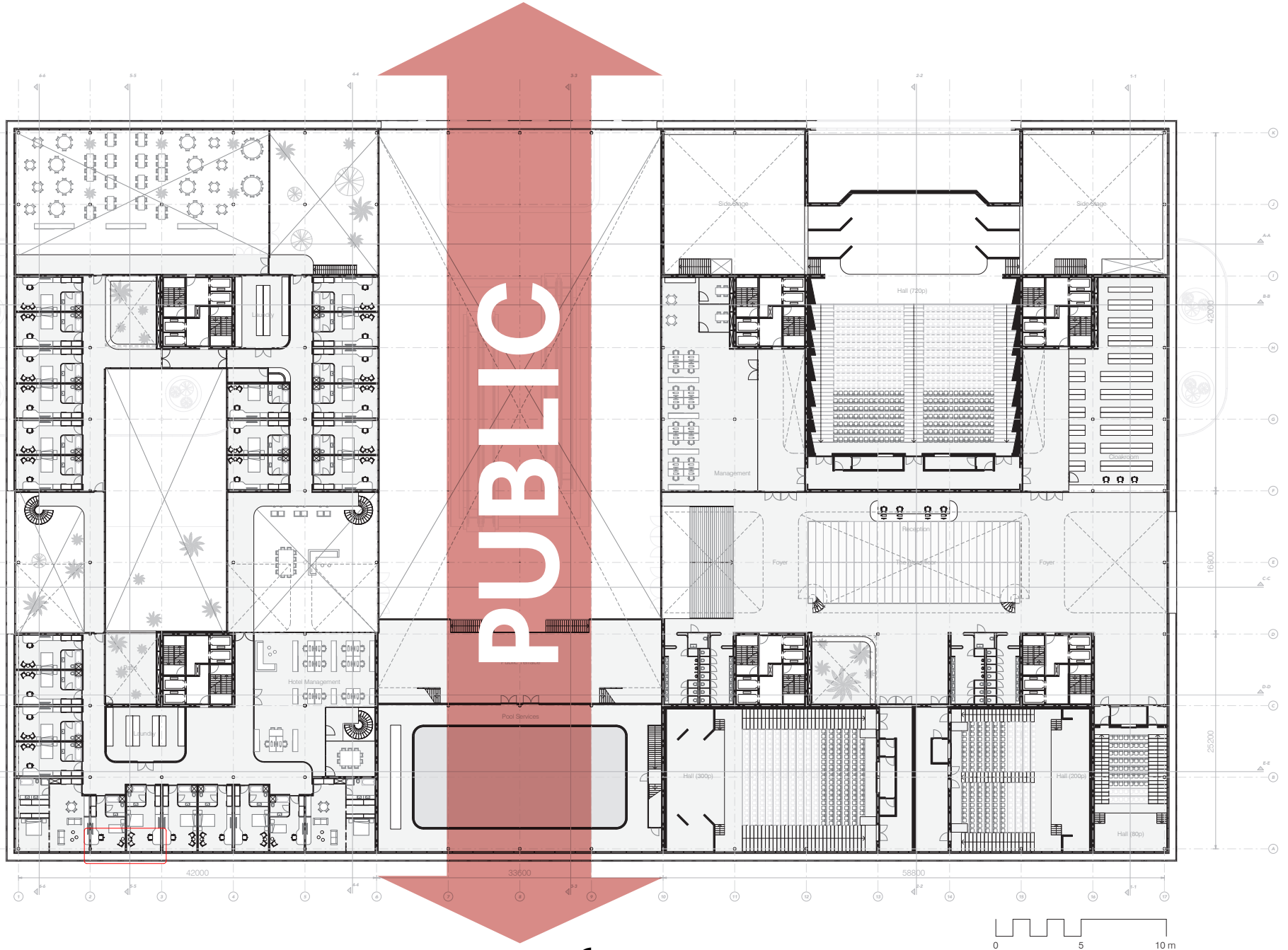


Design

+16.00M PLAN (LV4)

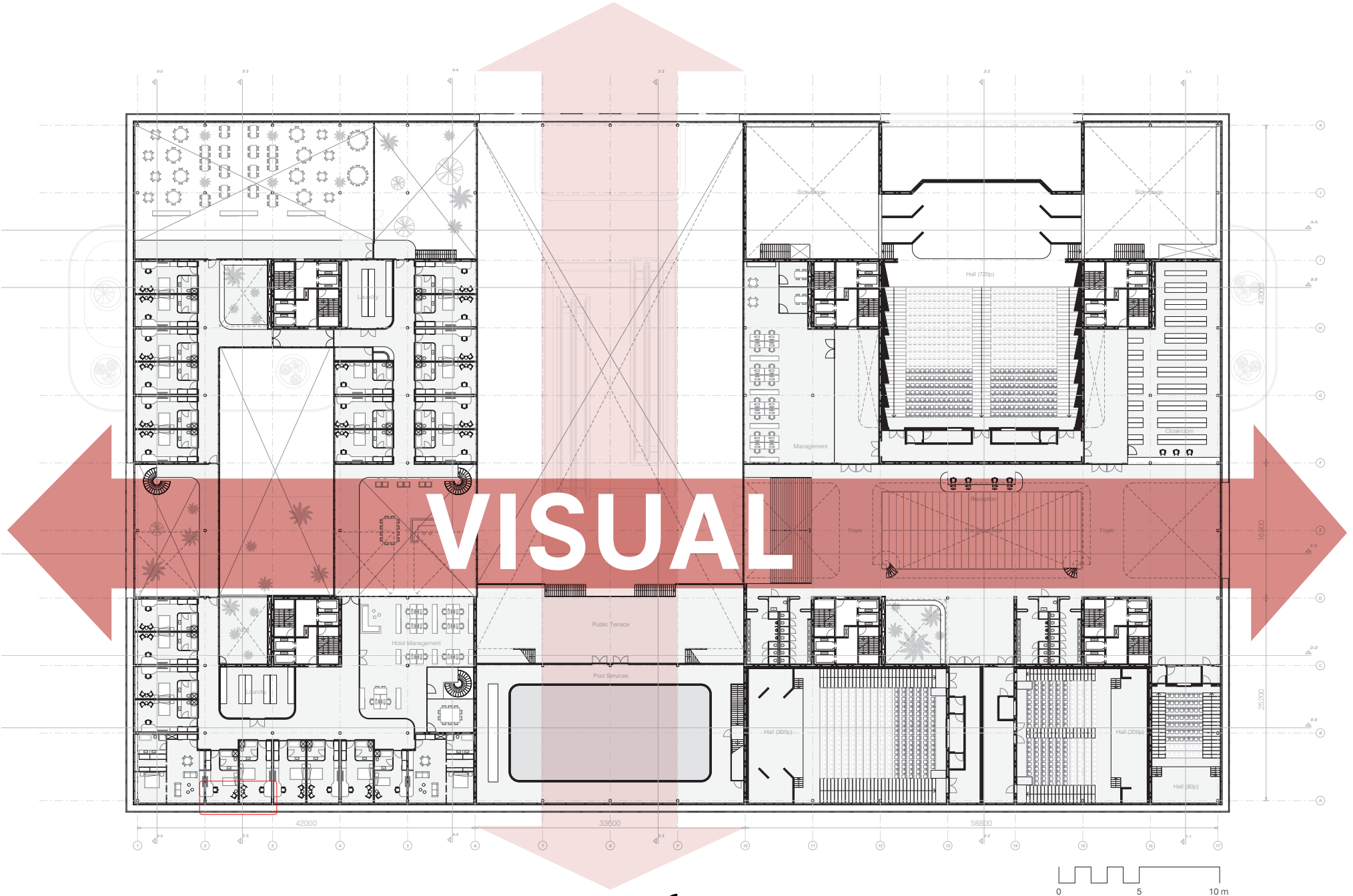


TRANSVERSAL PUBLIC AXIS

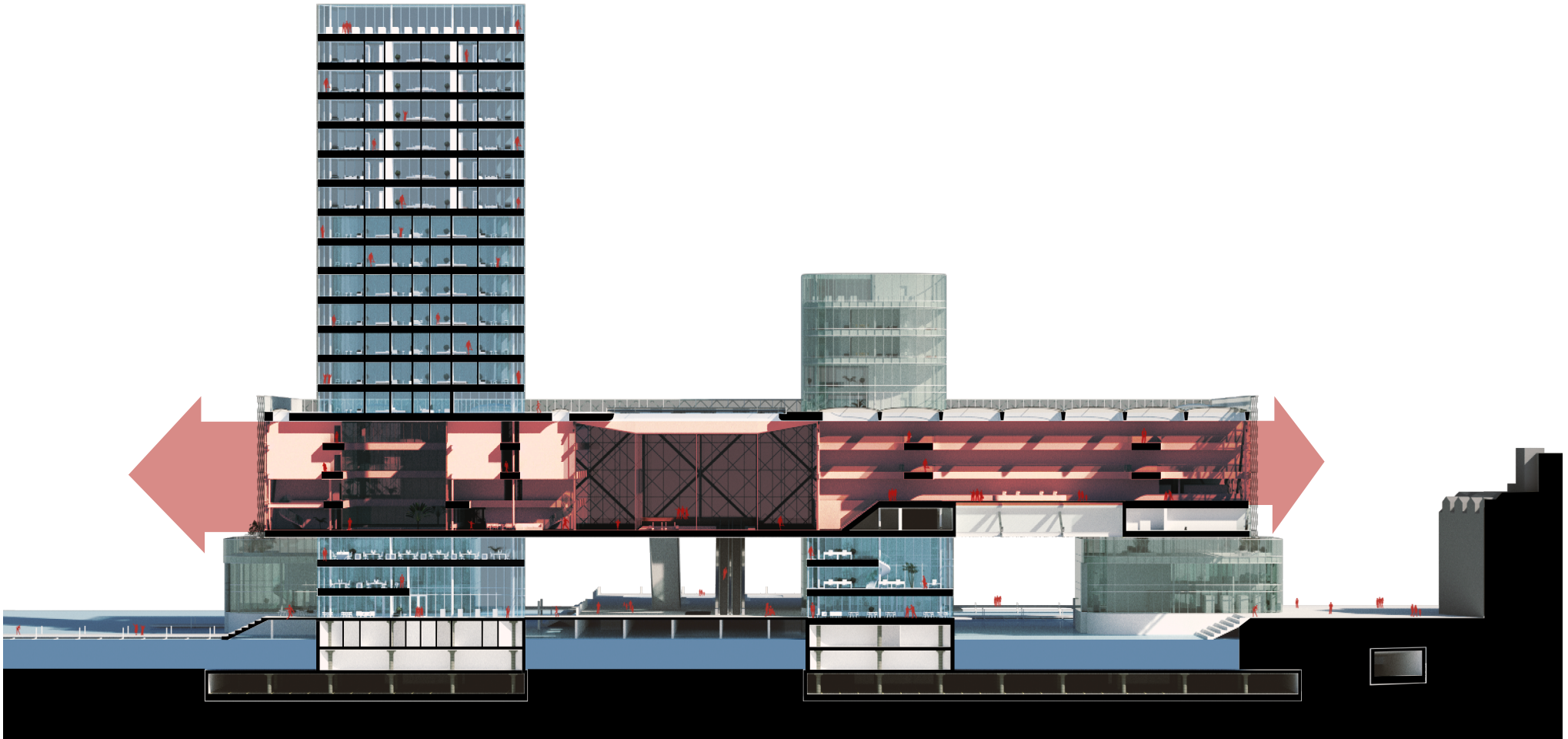


Design

VISUAL AXIS



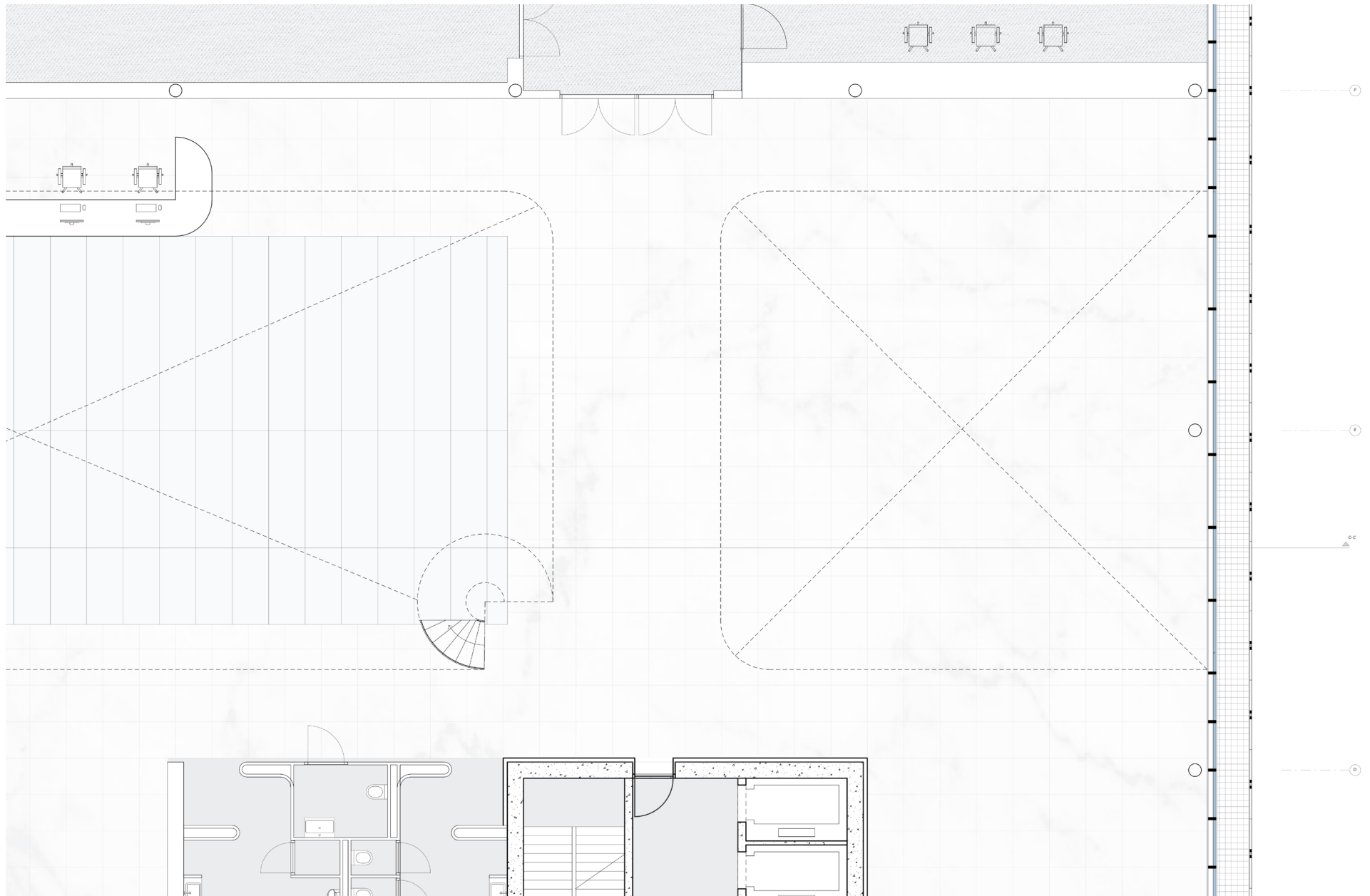
VISUAL AXIS



VISUAL AXIS

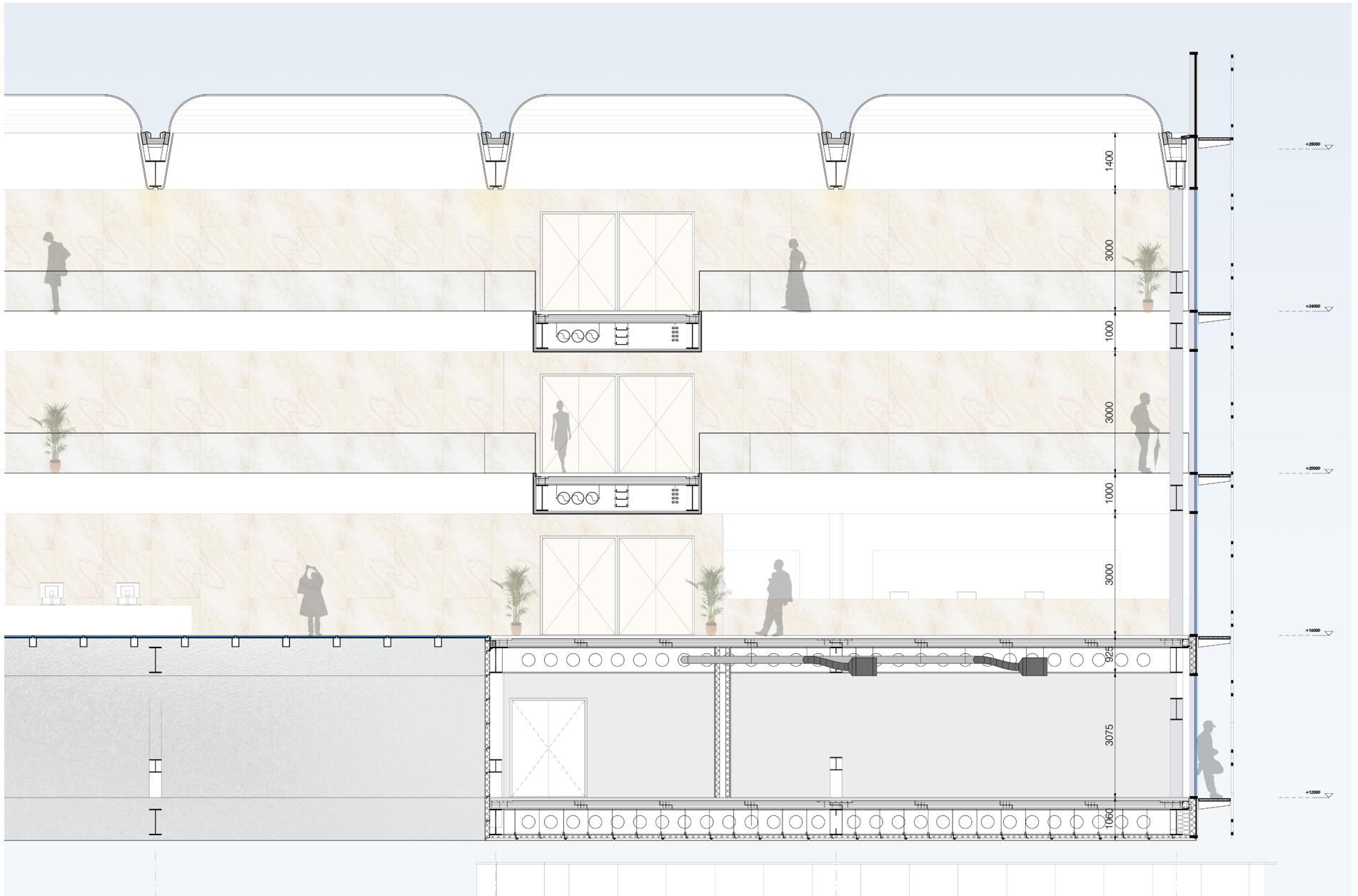


FOYER FRAGMENT



Design

FOYER FRAGMENT



Design
FOYER



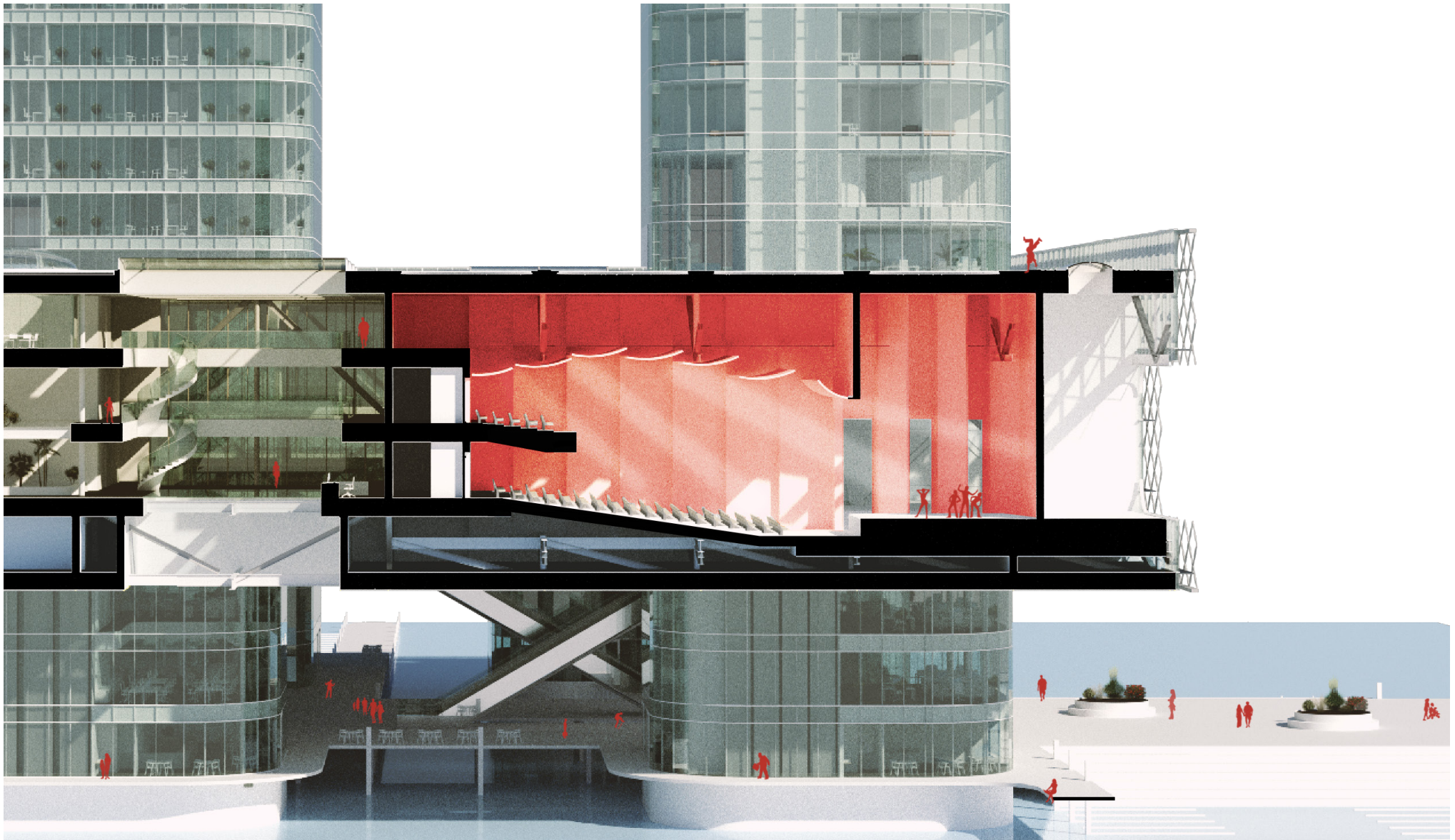
Design

CULTURAL CENTER



Design

MAASPODIUM



Design

MAASPODIUM



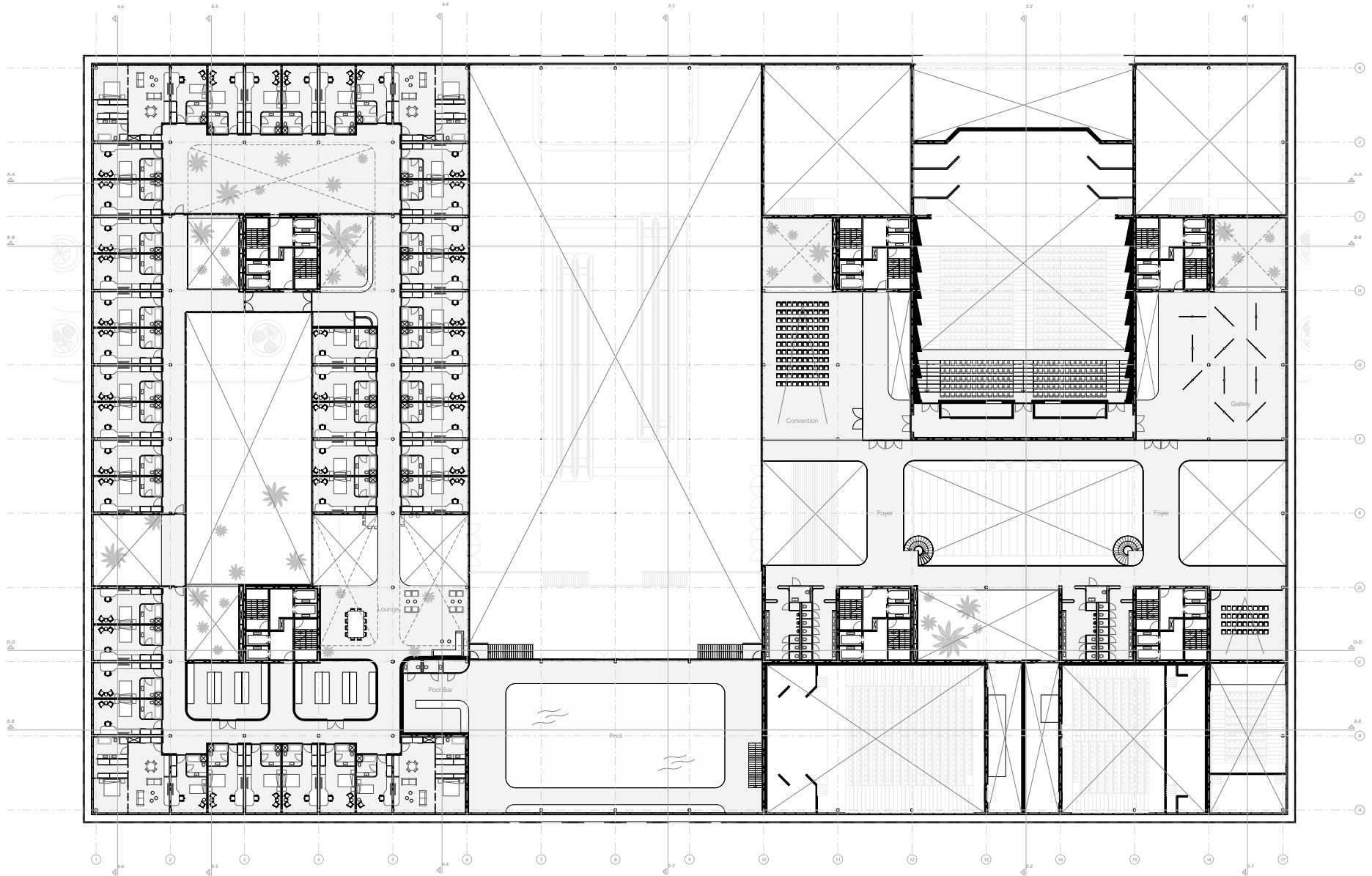
Design

MAASPODIUM

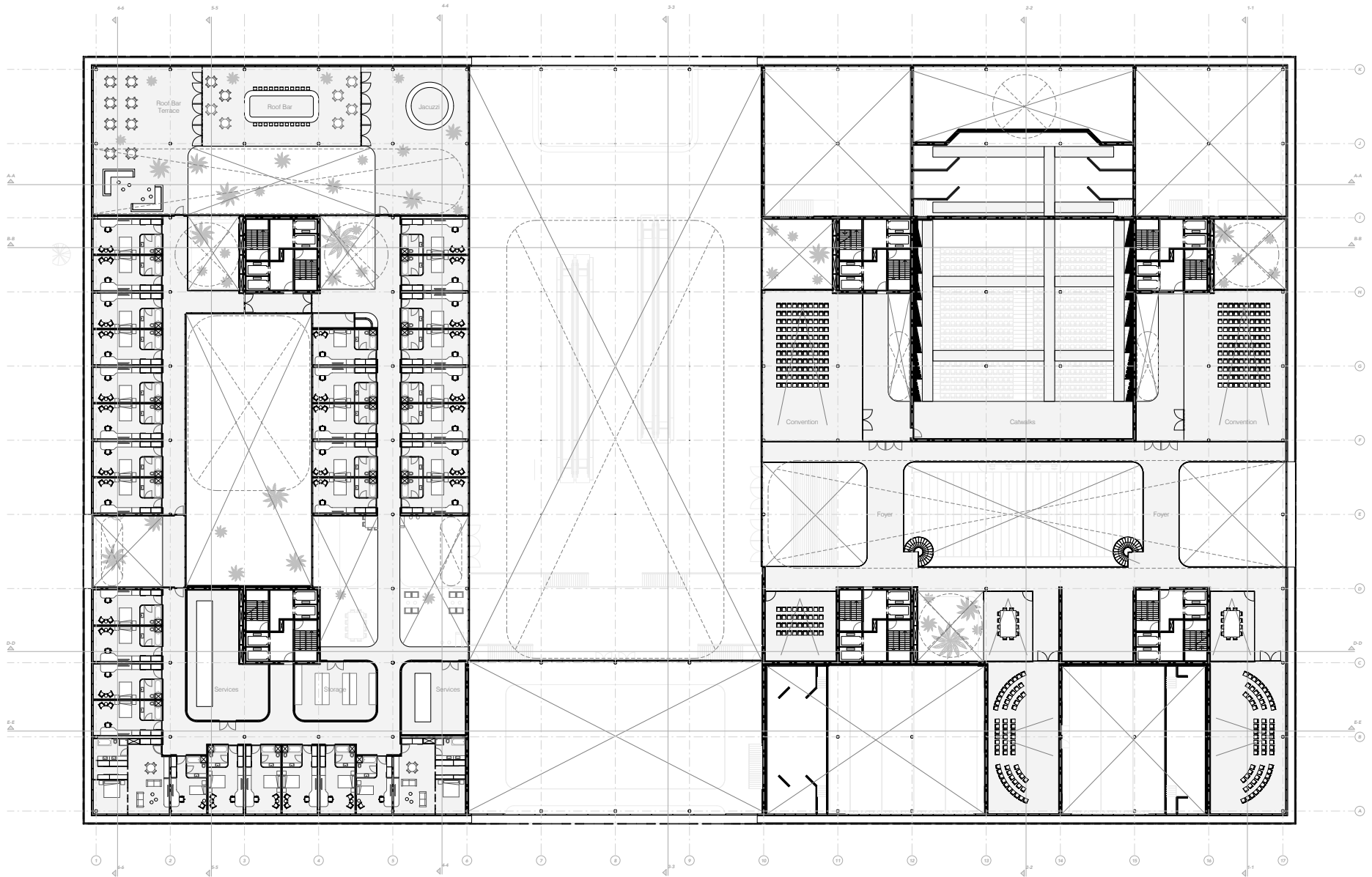


Design

+20.00M PLAN (LV5)

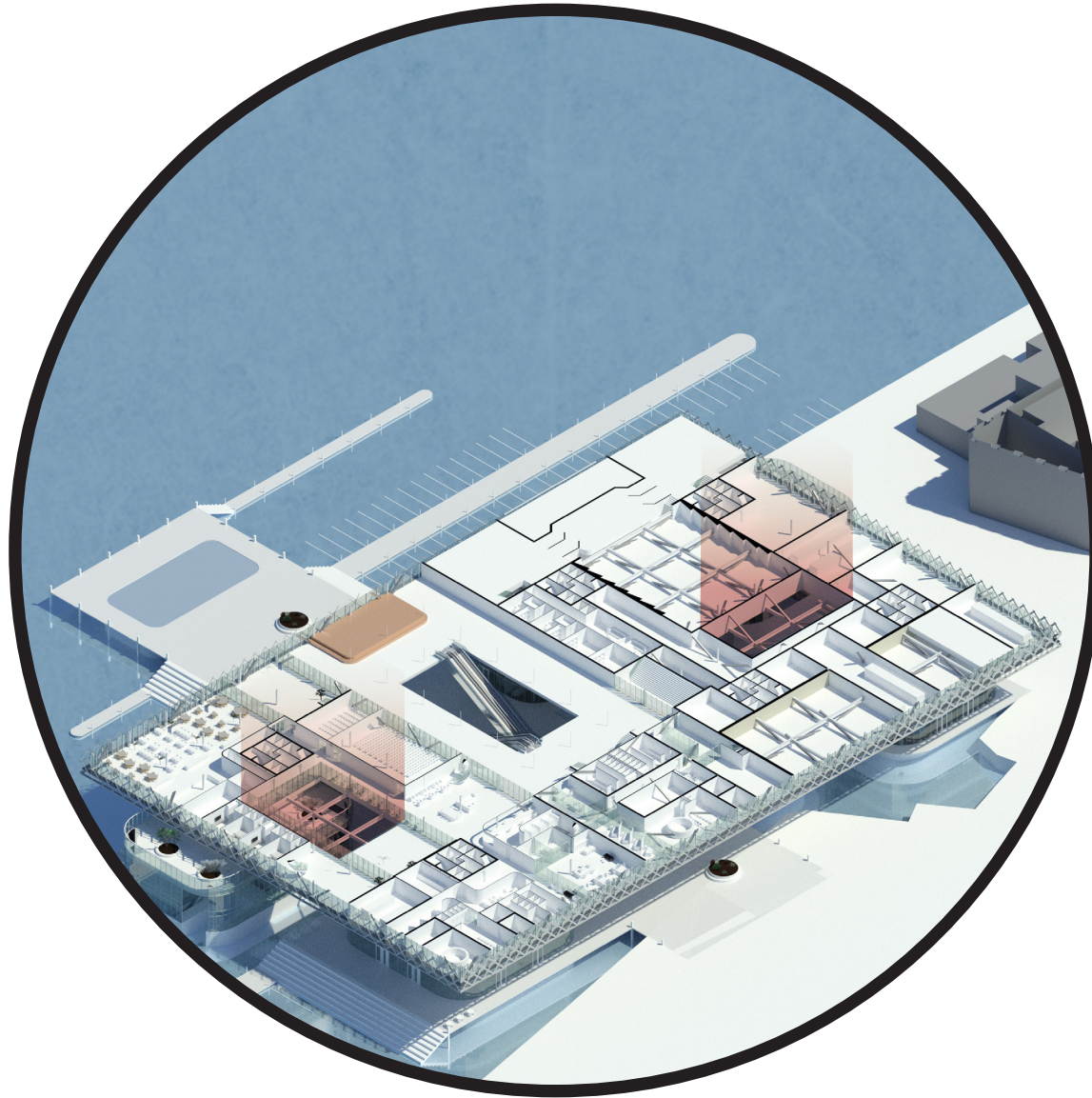


+24.00M PLAN (LV6)



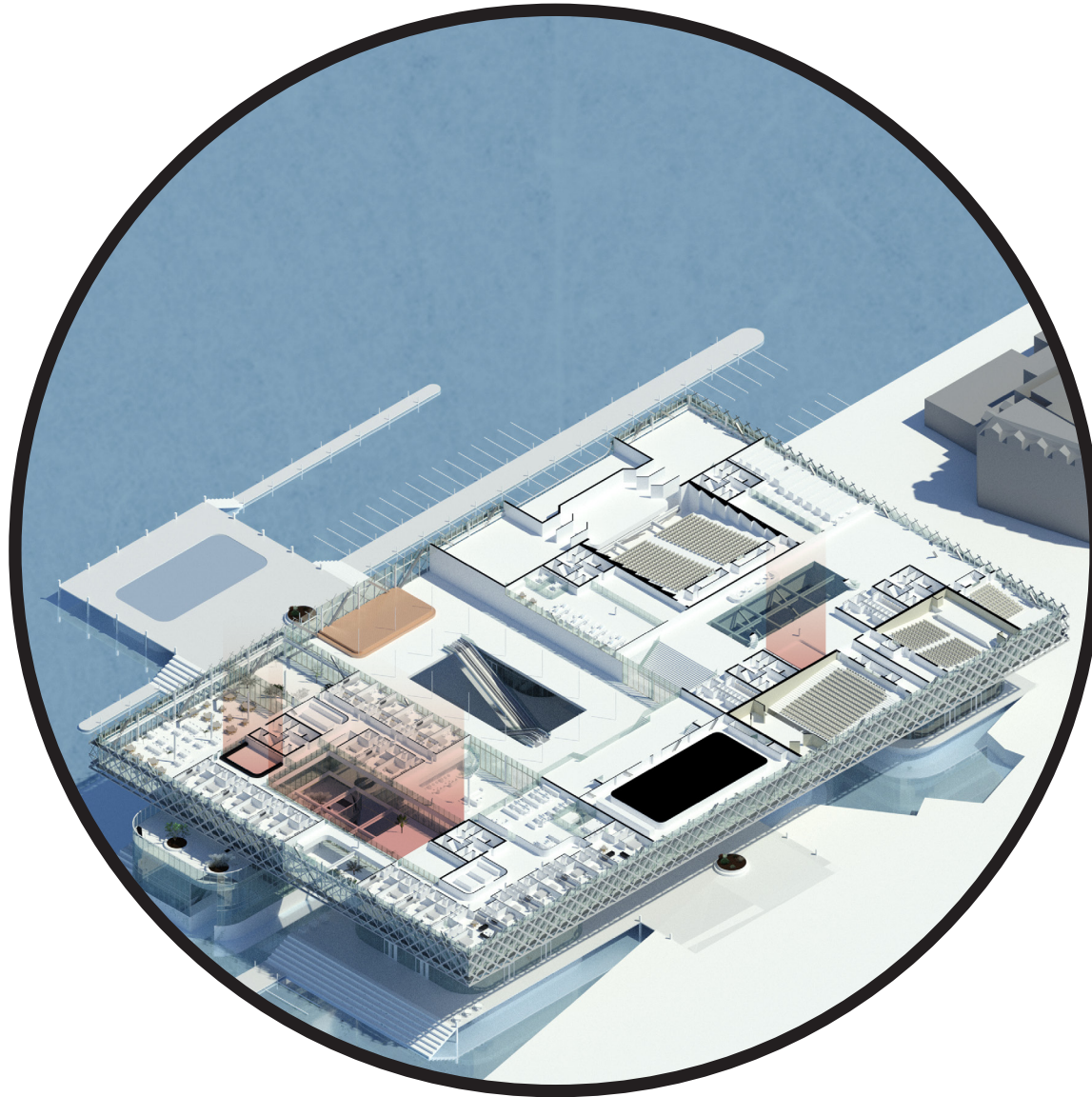
Design

VOLUMETRIC BASE +12.00m



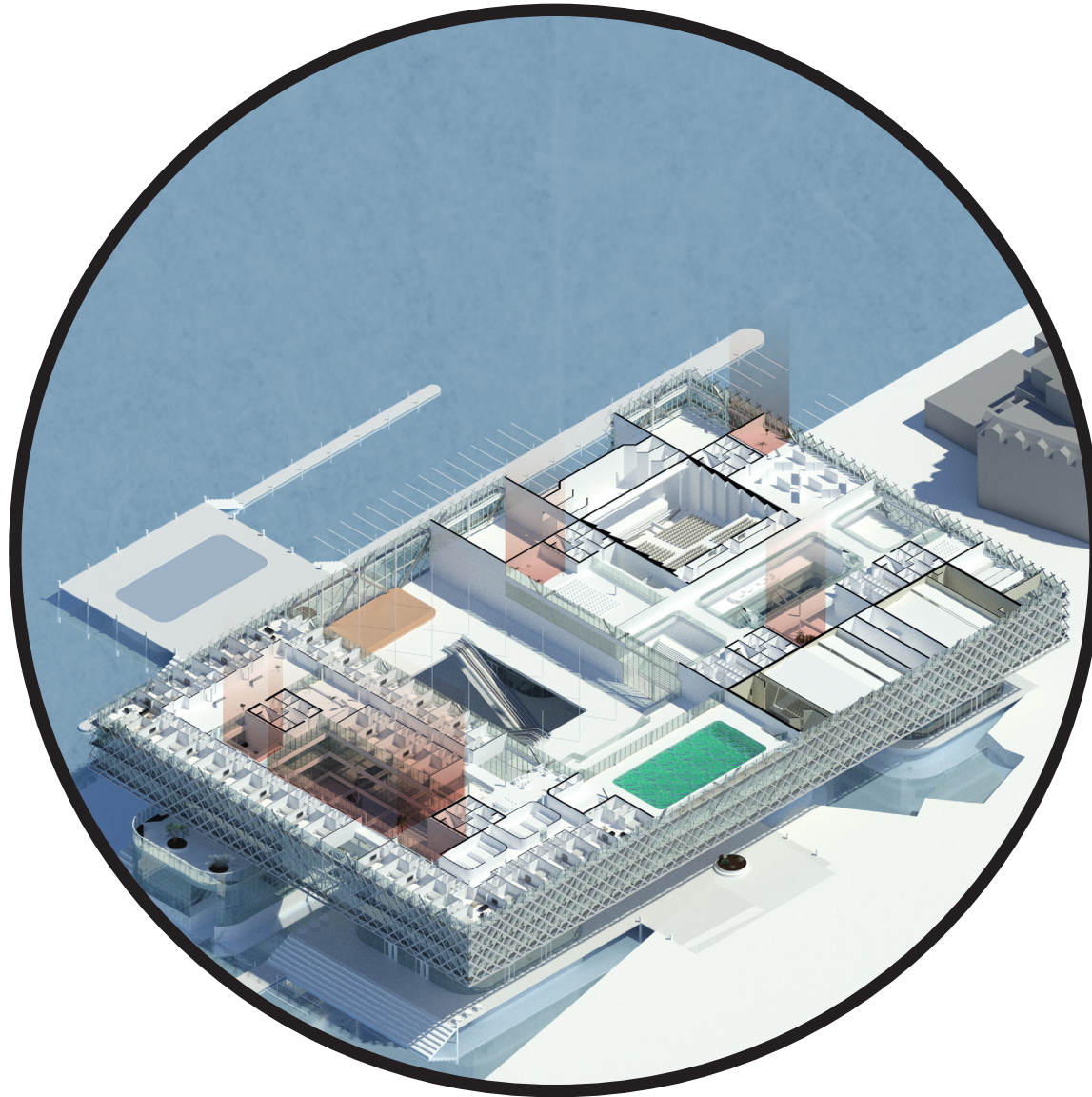
Design

VOLUMETRIC BASE +16.00m



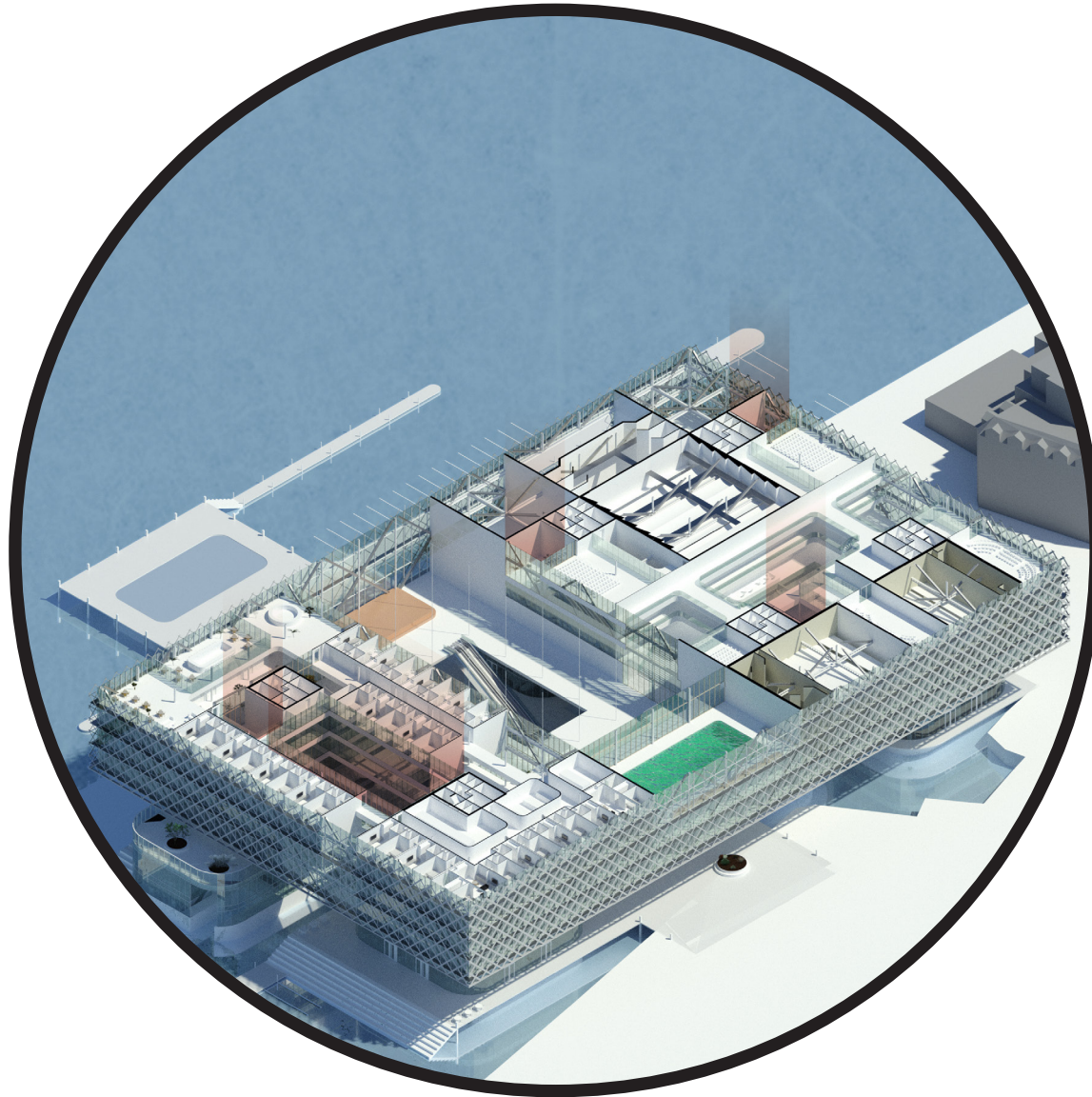
Design

VOLUMETRIC BASE +20.00m



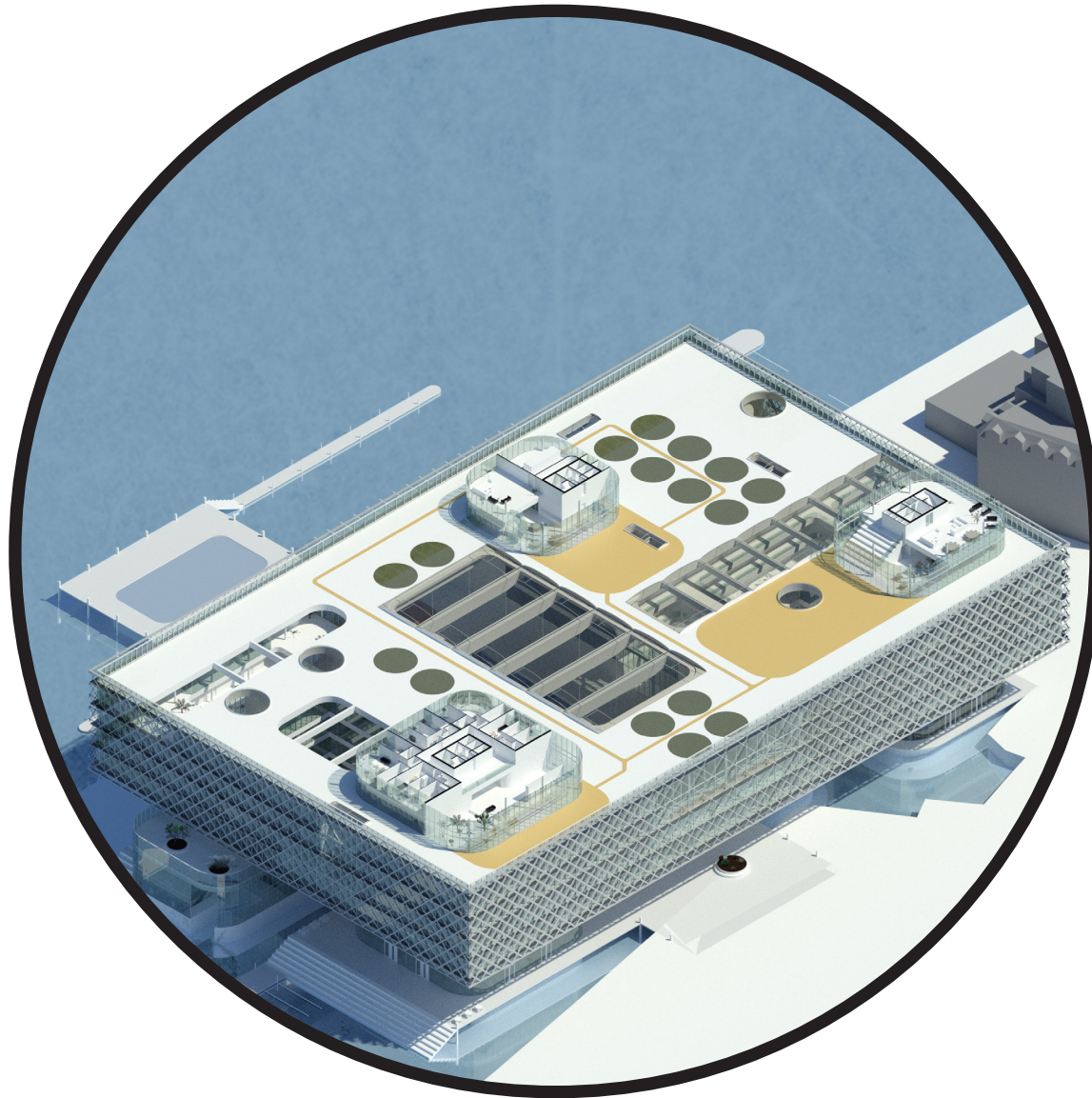
Design

VOLUMETRIC BASE +24.00m

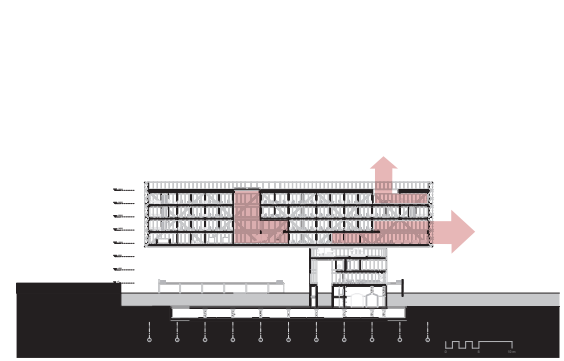
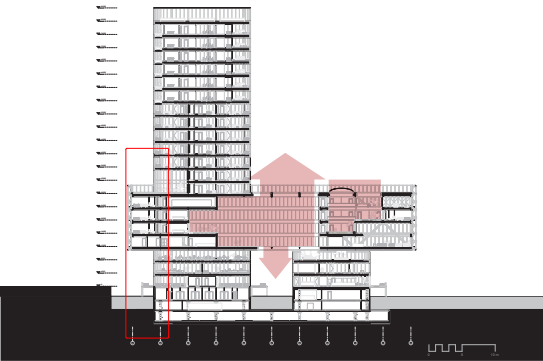
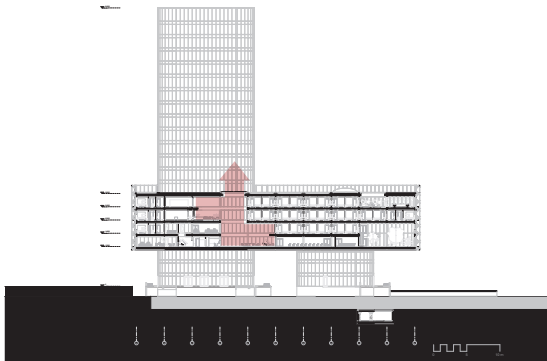
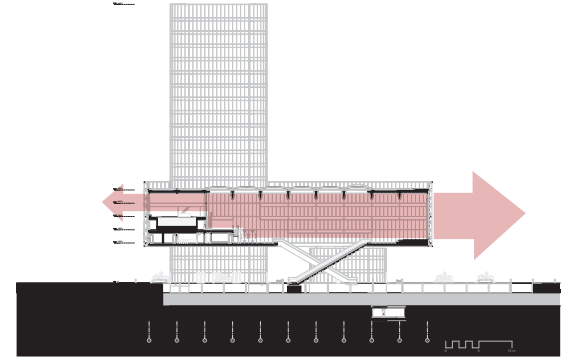
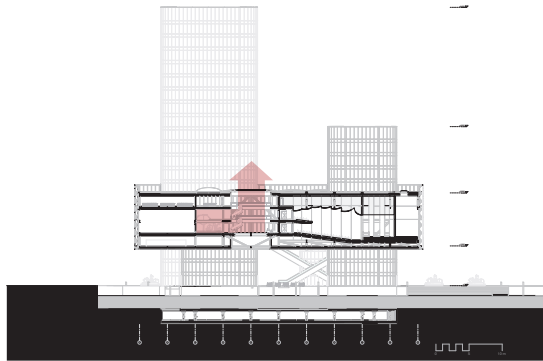
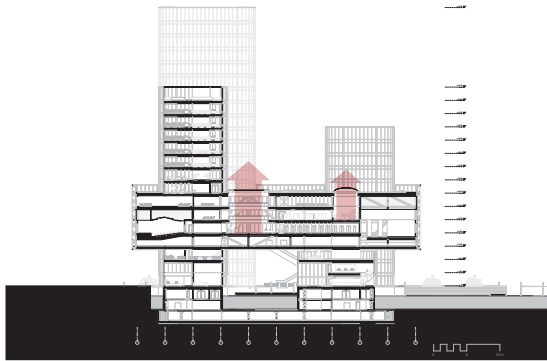


Design

VOLUMETRIC BASE +28.00m



VOLUMETRIC BASE

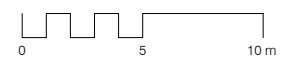
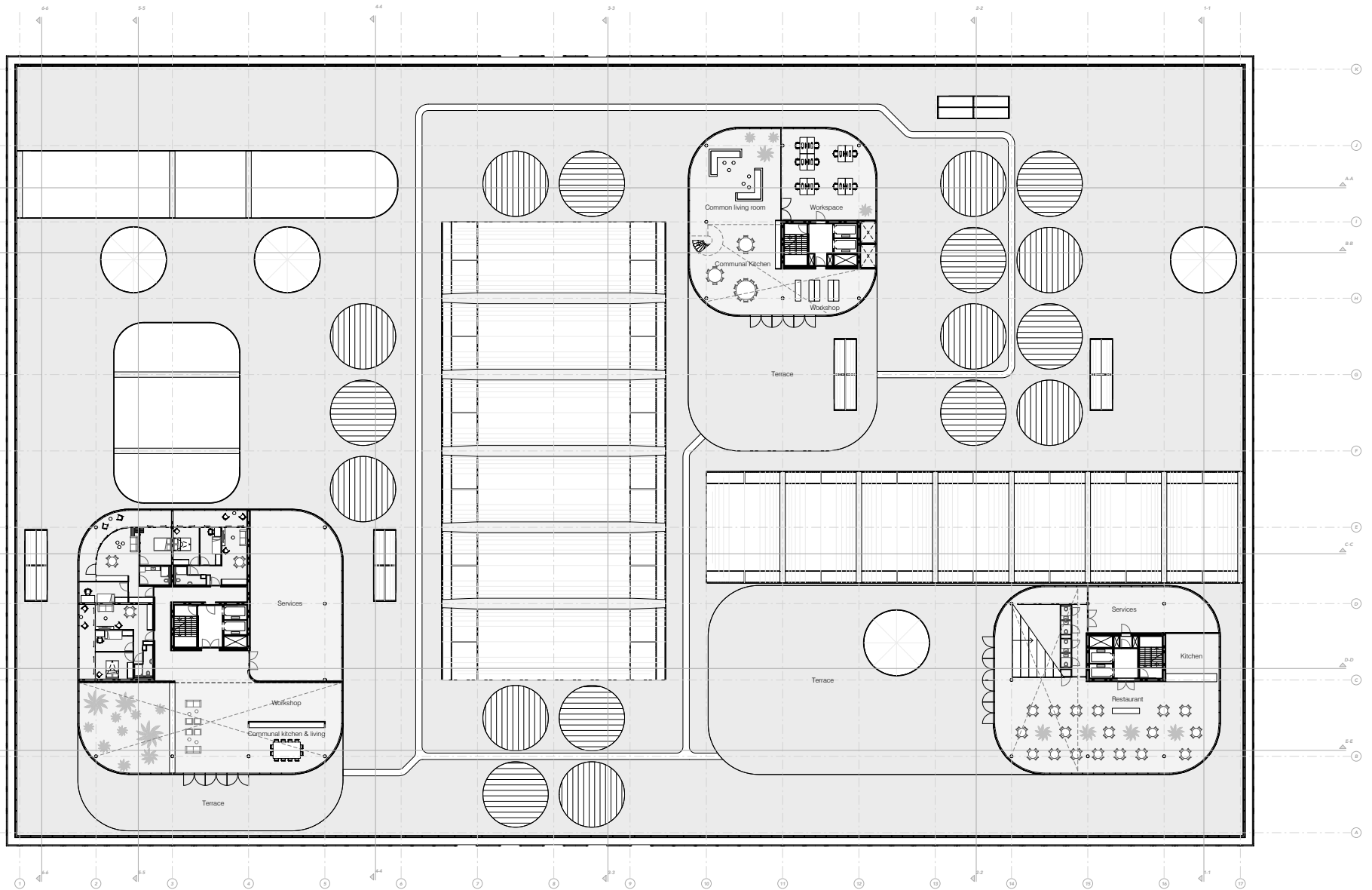


Design

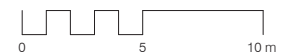
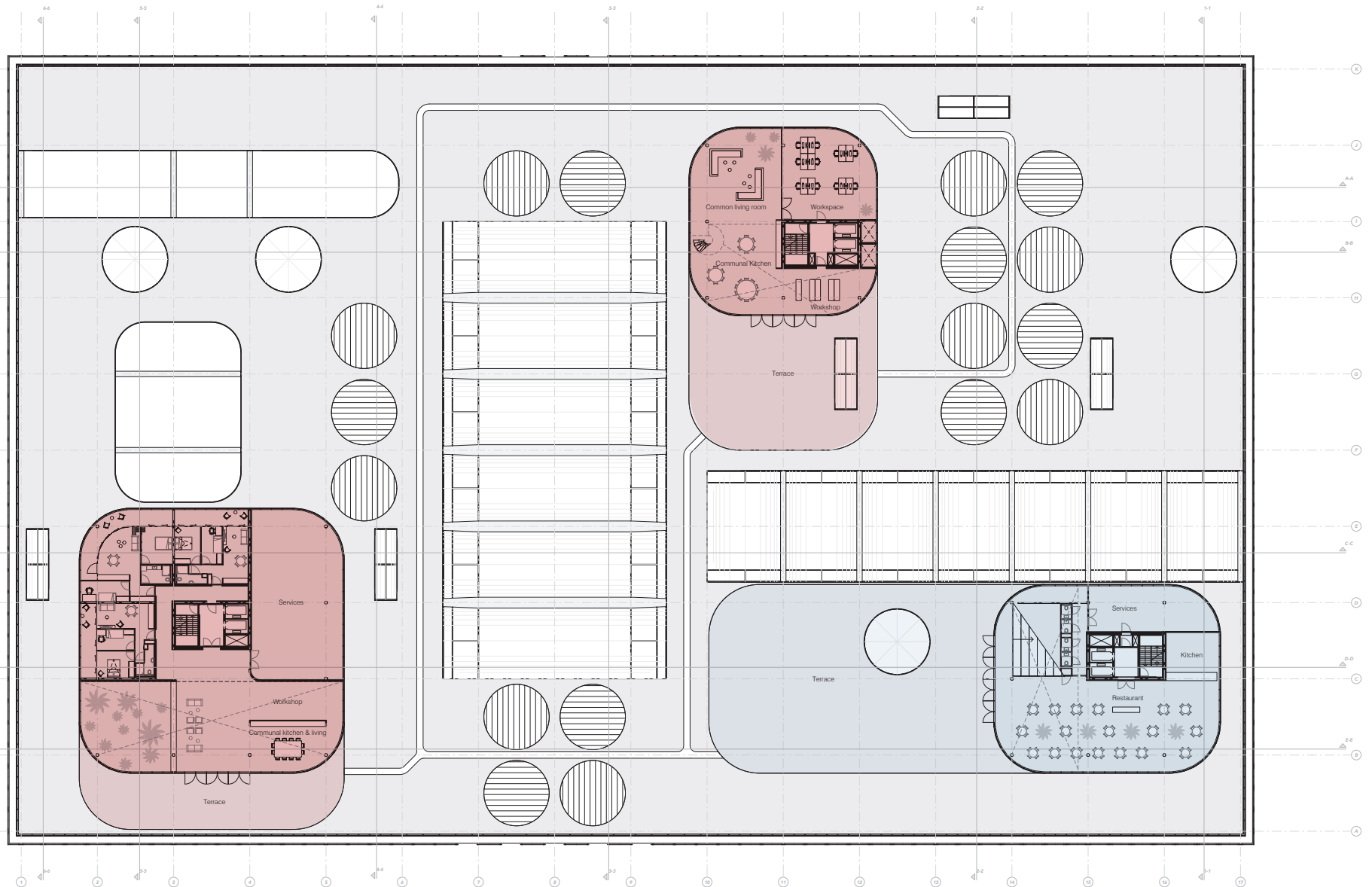
INDOOR GARDENS



COMMUNAL ROOF (+28.00m)



+28.00M PLAN (LV7)



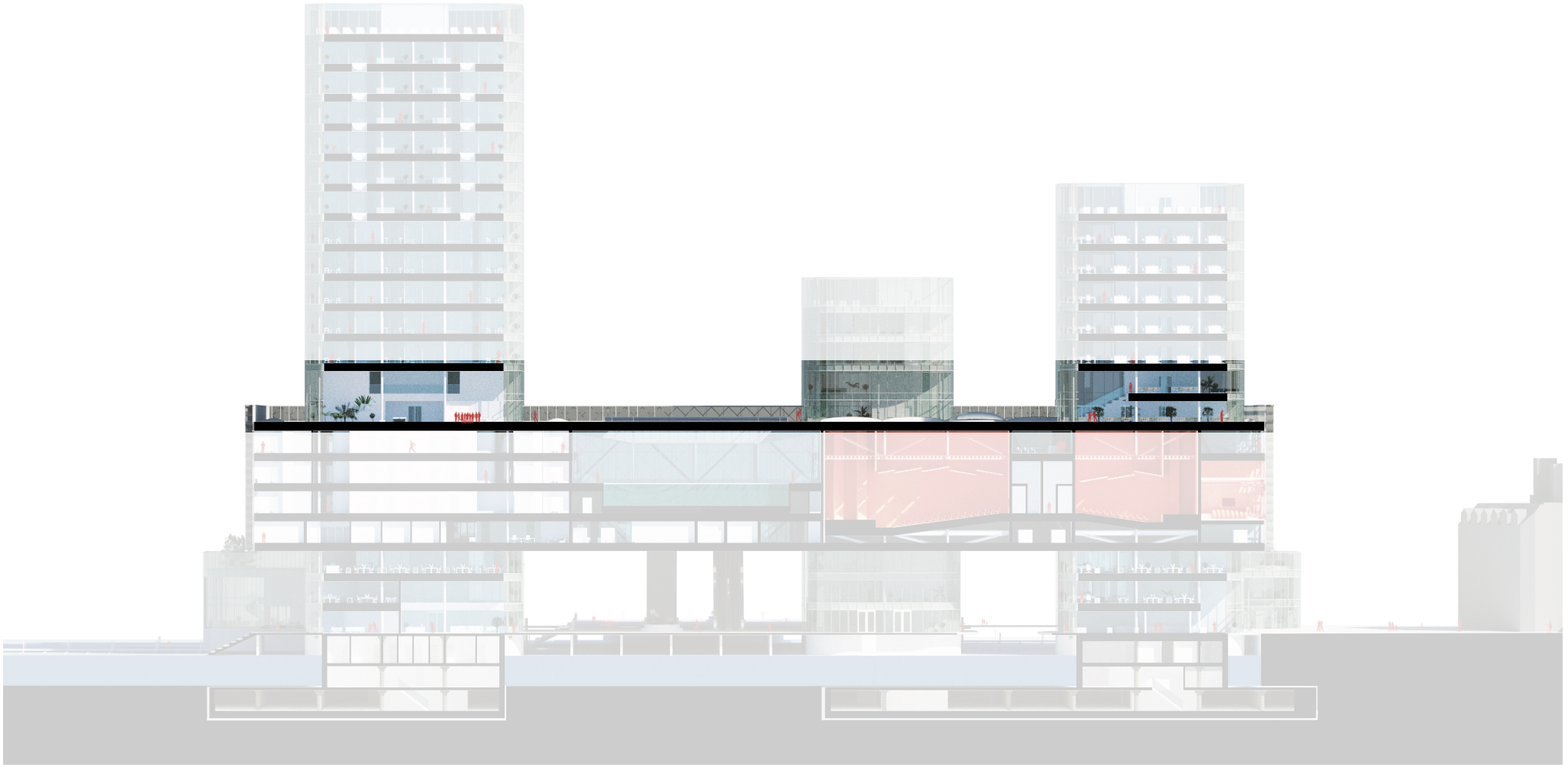
Design

COMMUNAL ROOF



Design

DOUBLE-HIGH CONNECTORS

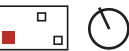
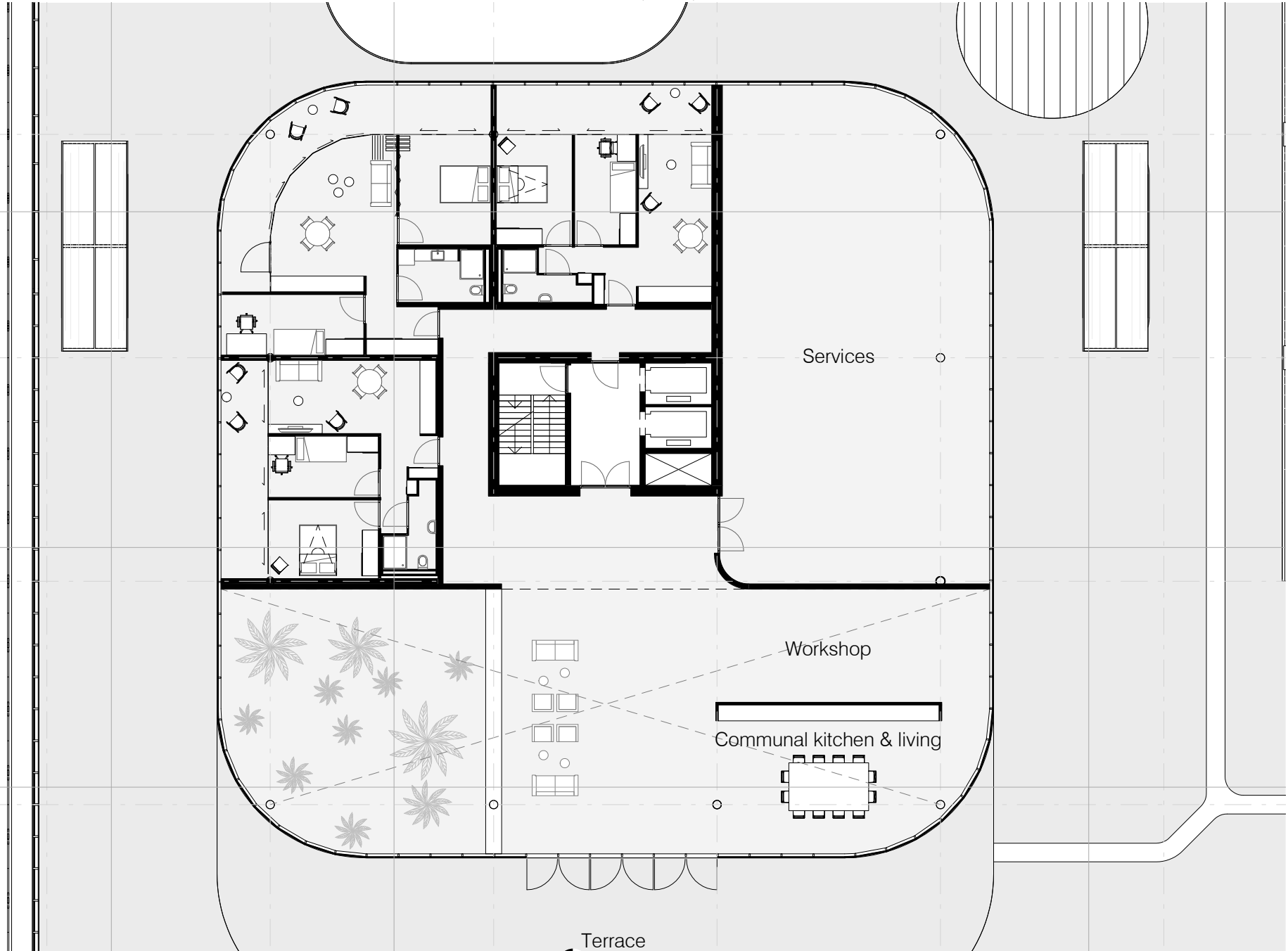


Design

COMMUNAL ROOF

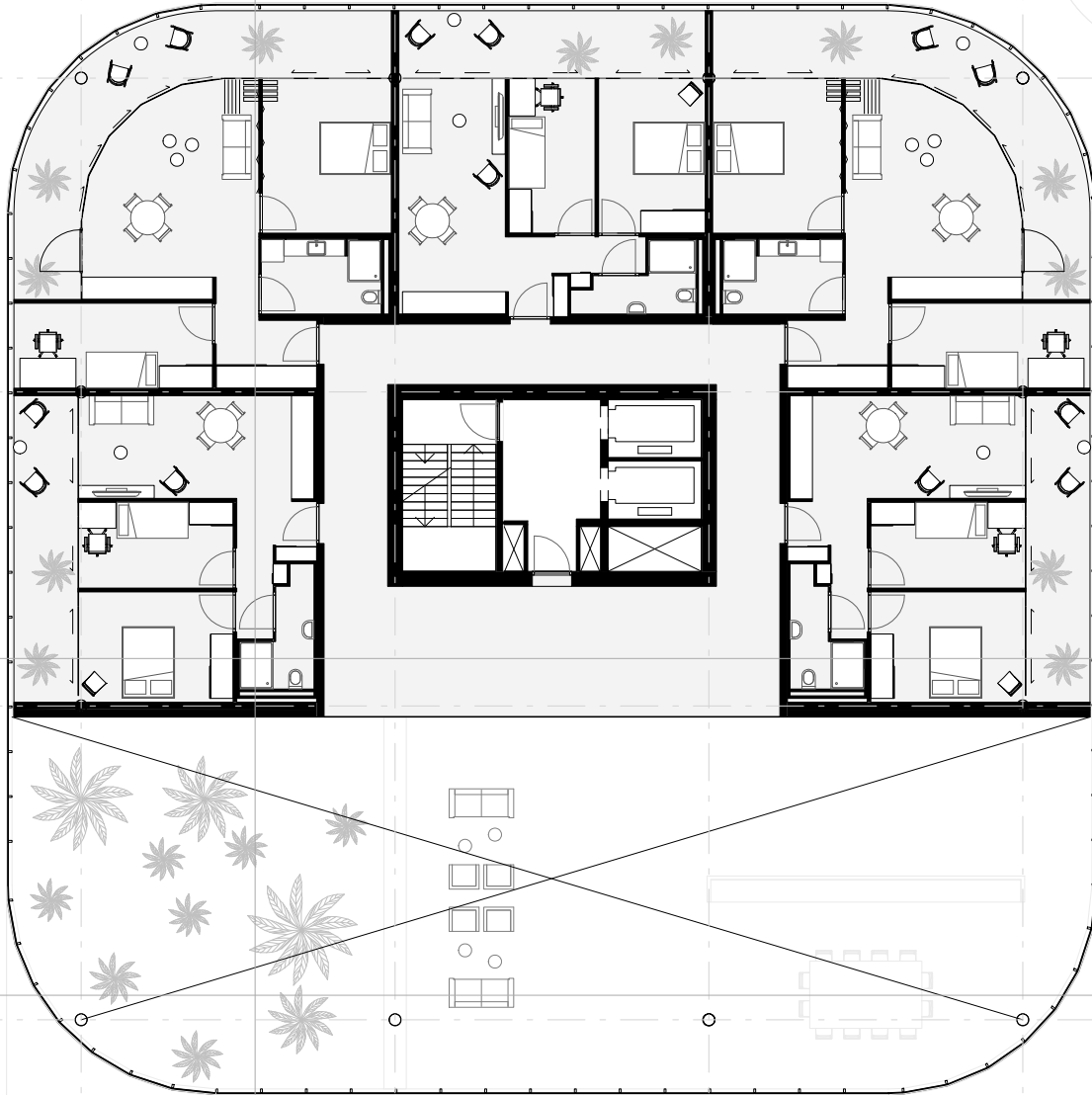


+28.00M PLAN (LV7)



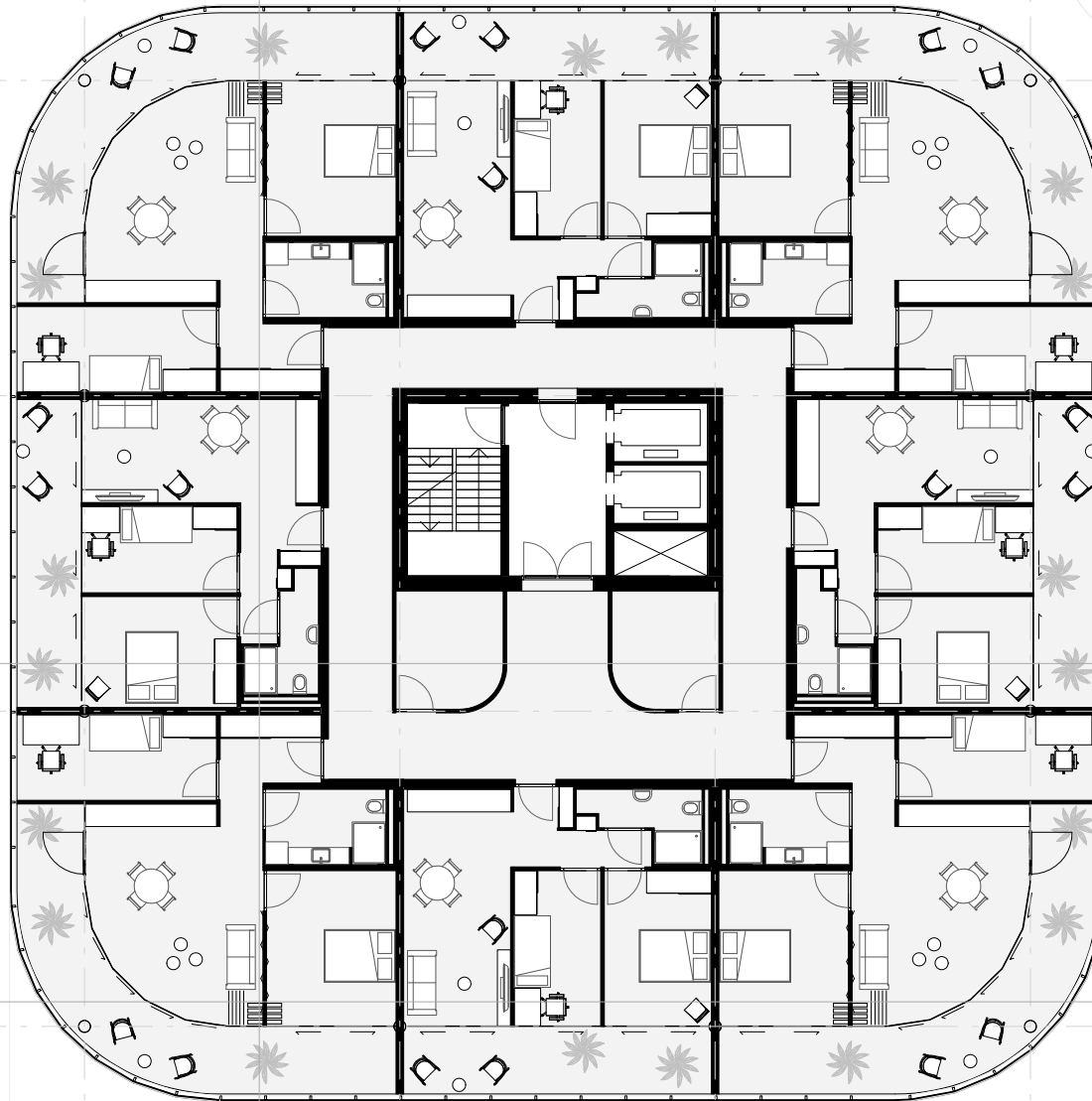
Design

+32.00M PLAN (LV8)



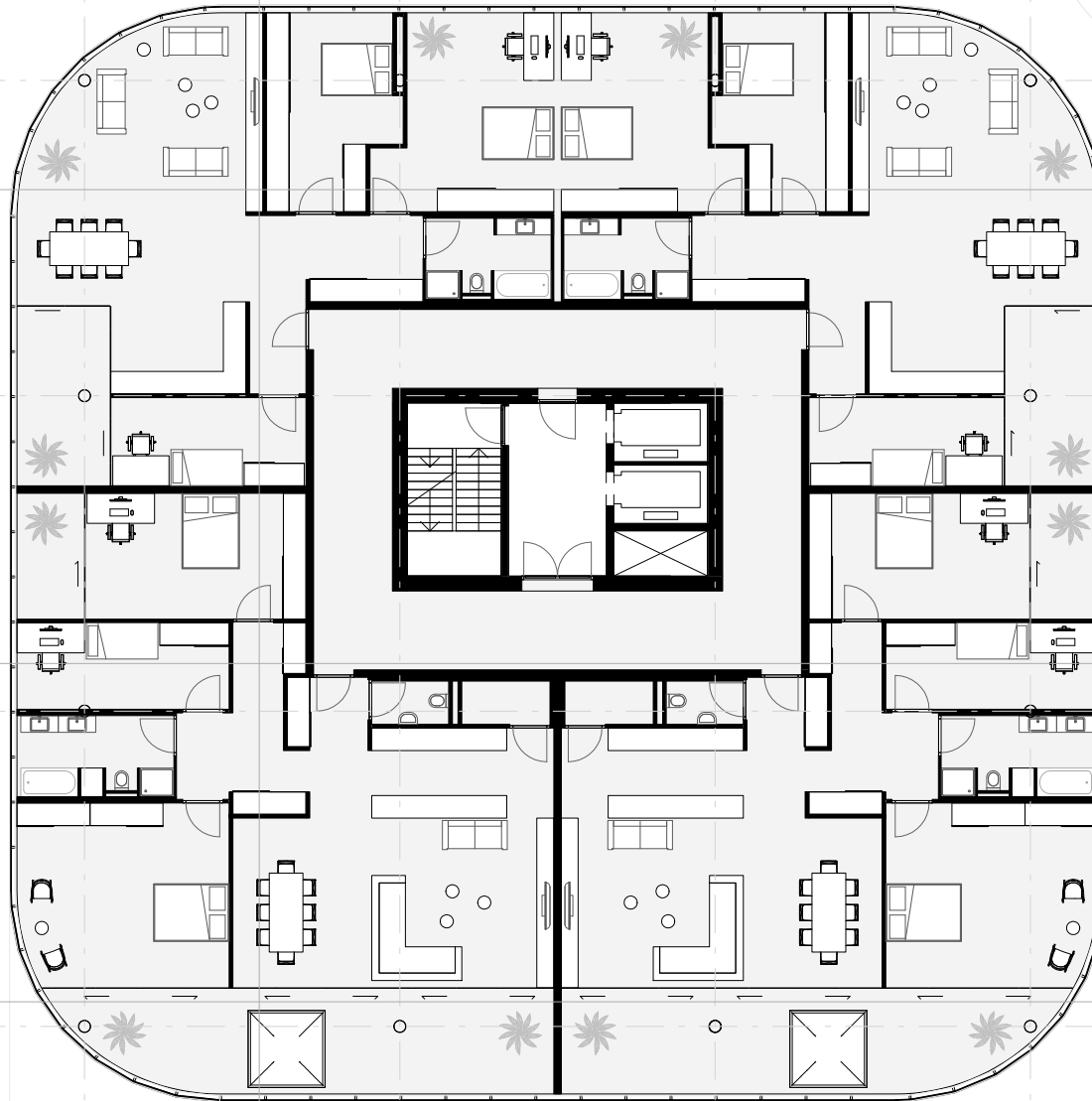
Design

+36.00M PLAN (LV9)



Design

+56.00M PLAN (LV14)



Design

CORNER RESIDENCE



Design

JACUZZI BALCONY



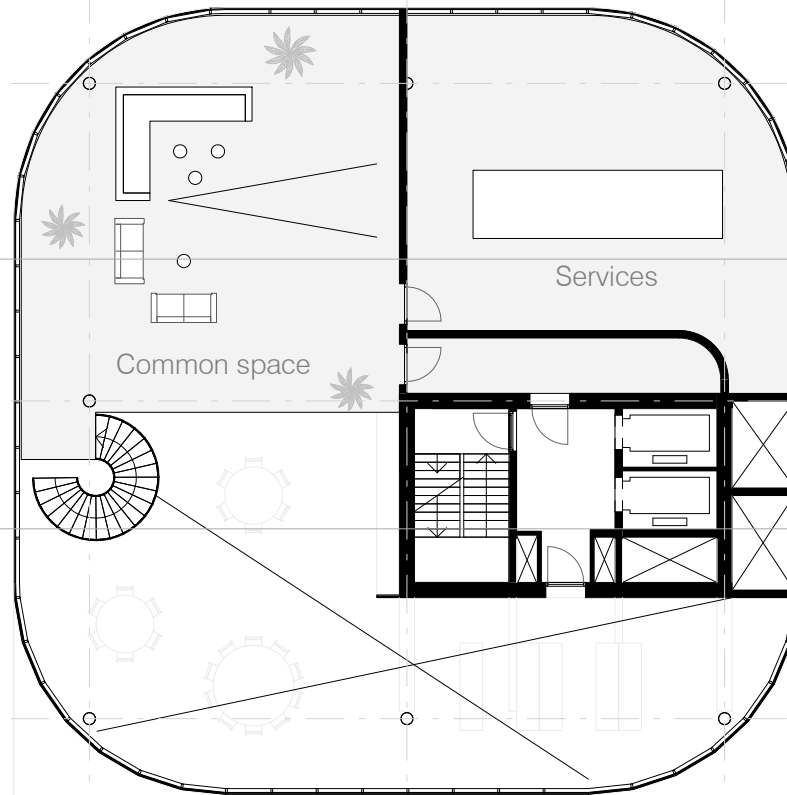
+28.00M PLAN (LV7)



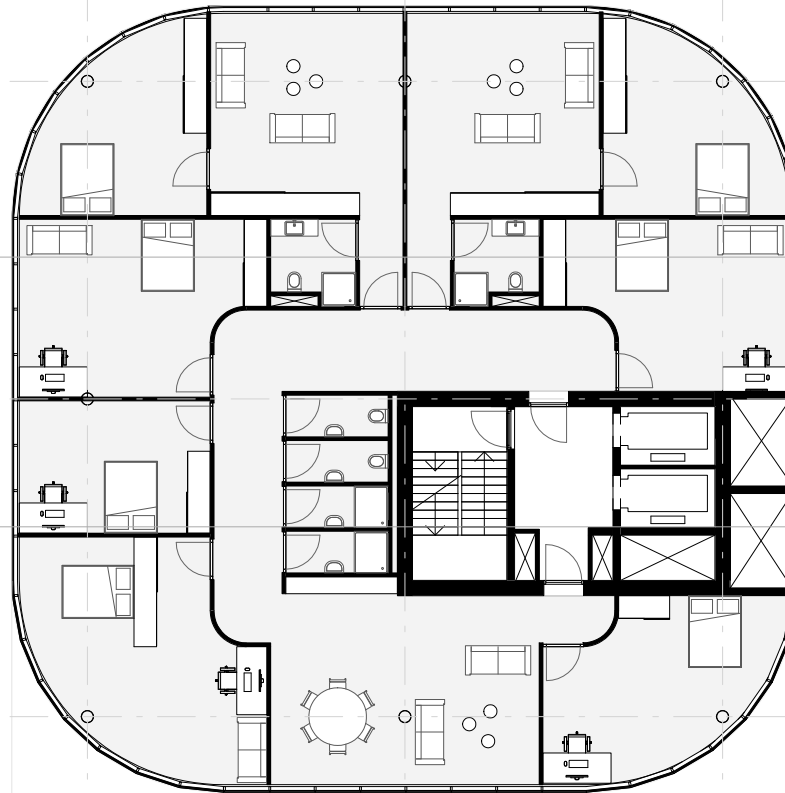
Terrace



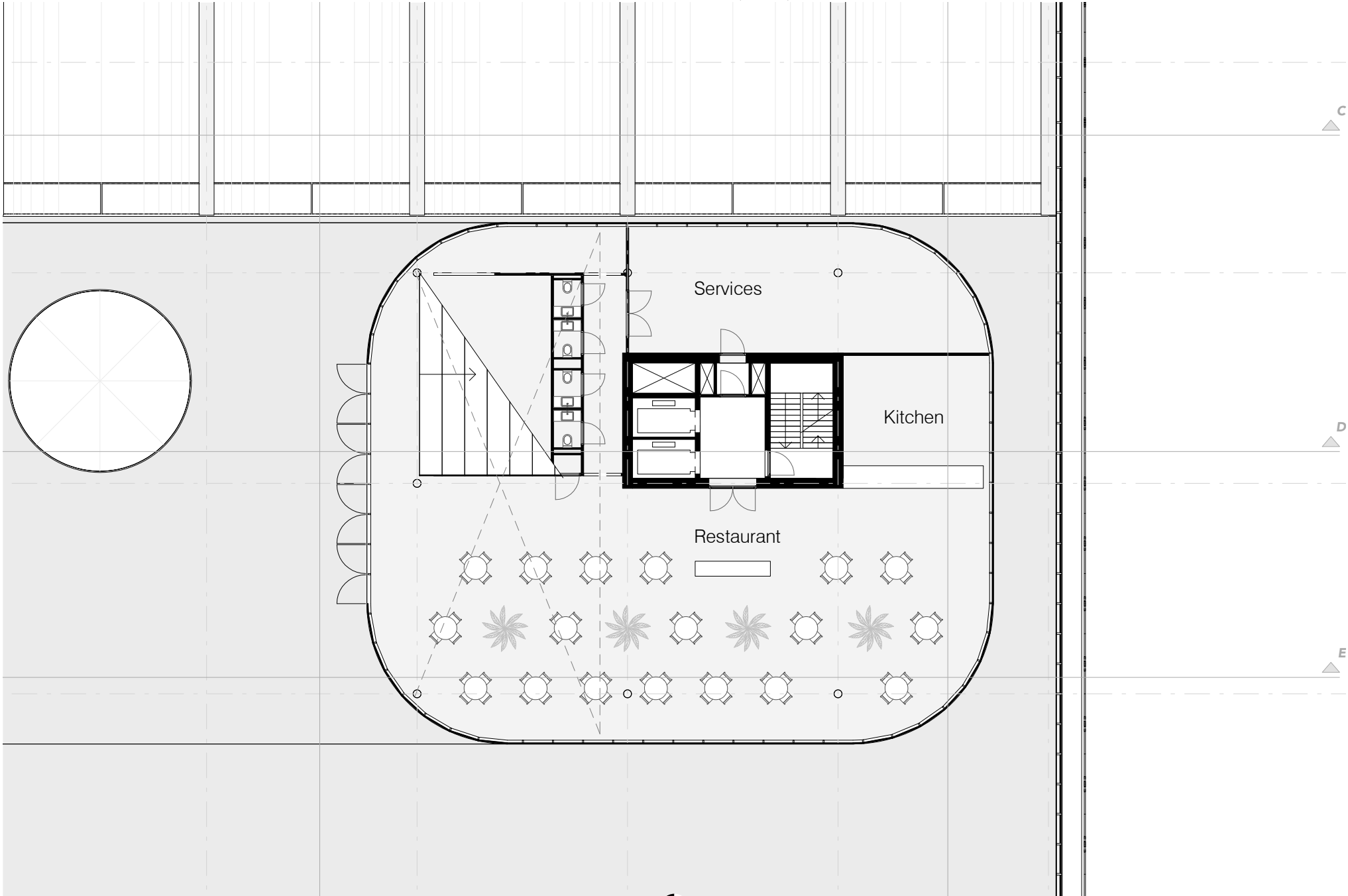
+32.00M PLAN (LV8)



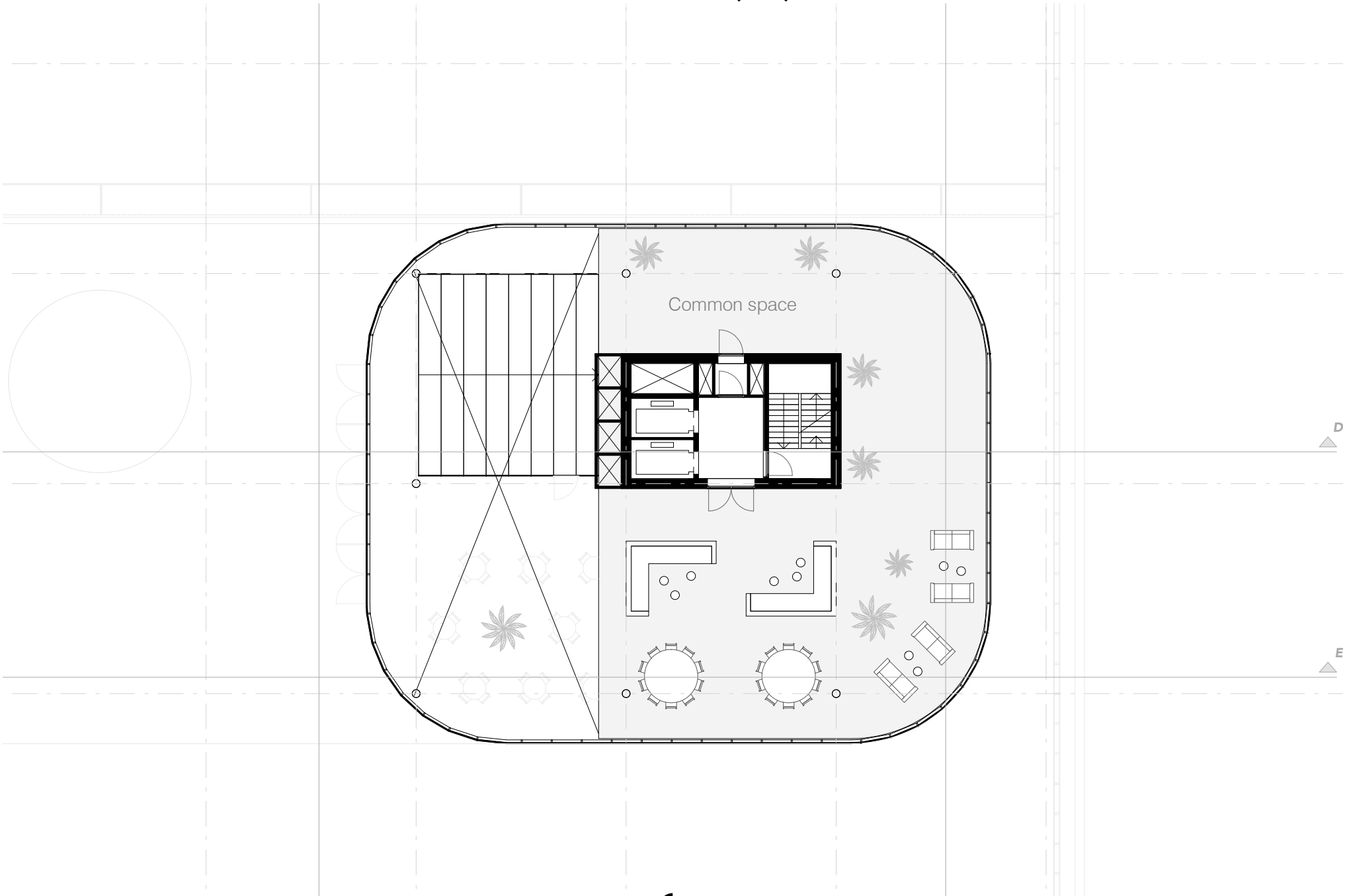
+36.00M PLAN (LV9)



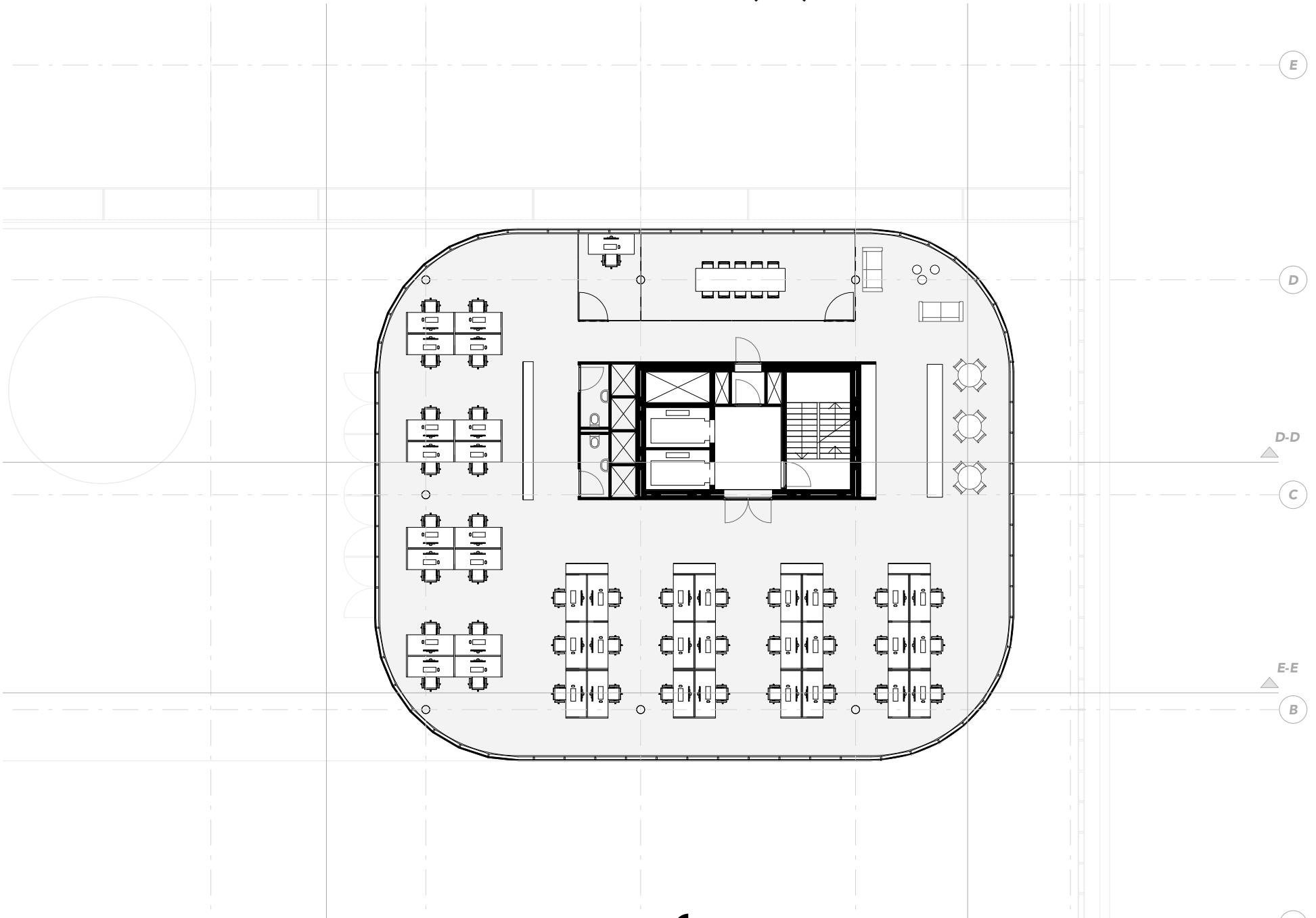
+28.00M PLAN (LV7)



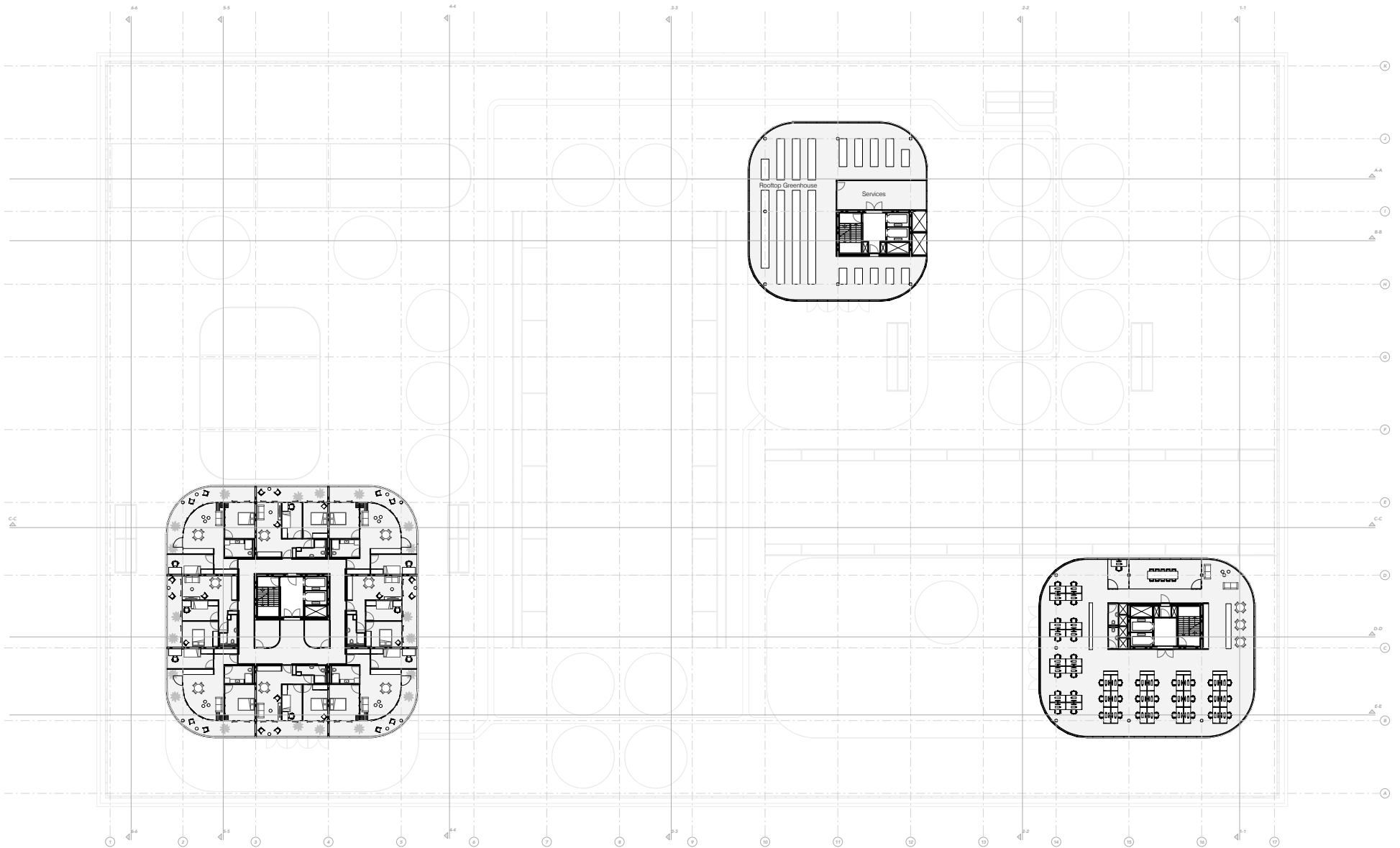
+32.00M PLAN (LV8)



+36.00M PLAN (LV9)

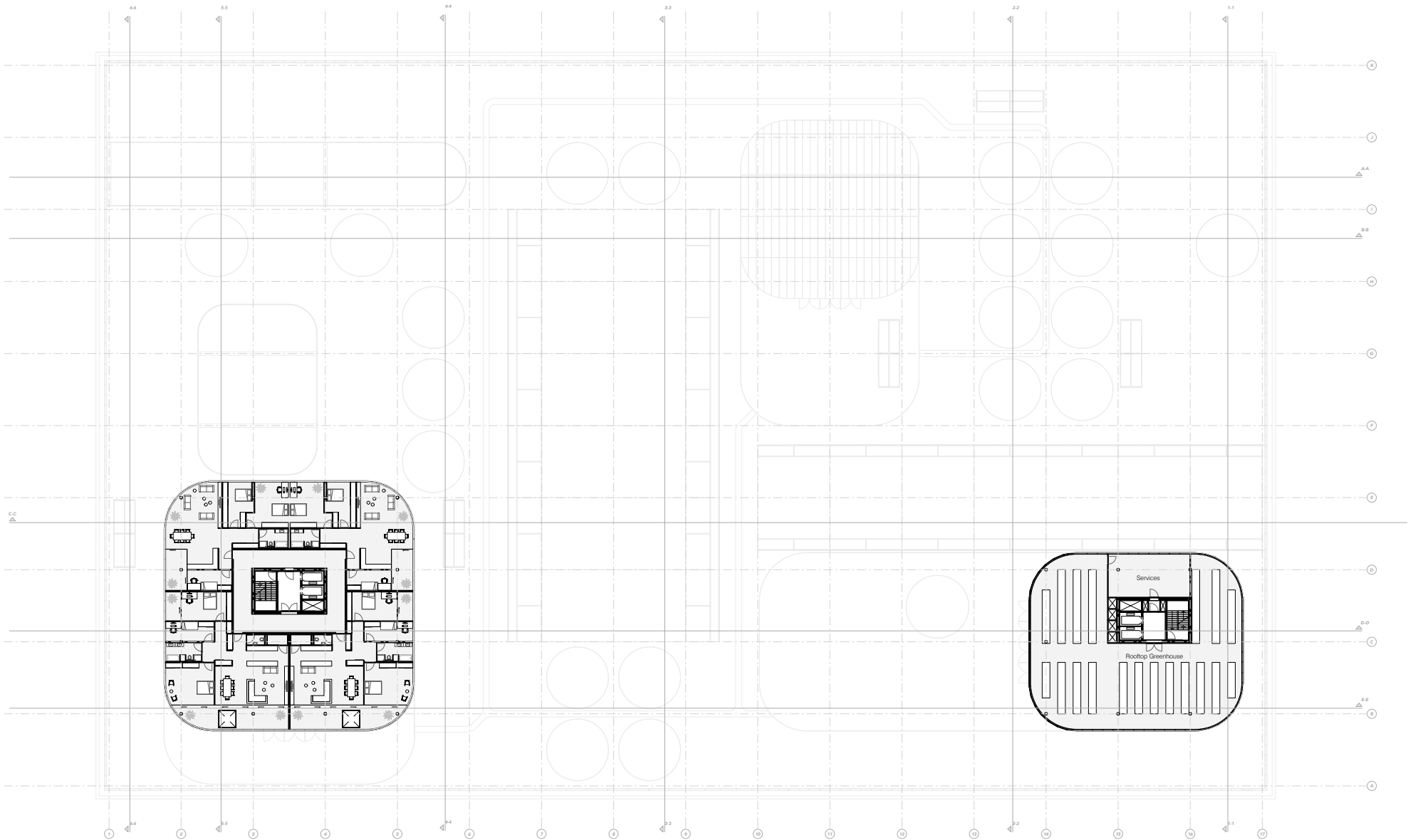


+44.00M PLAN (LV11)



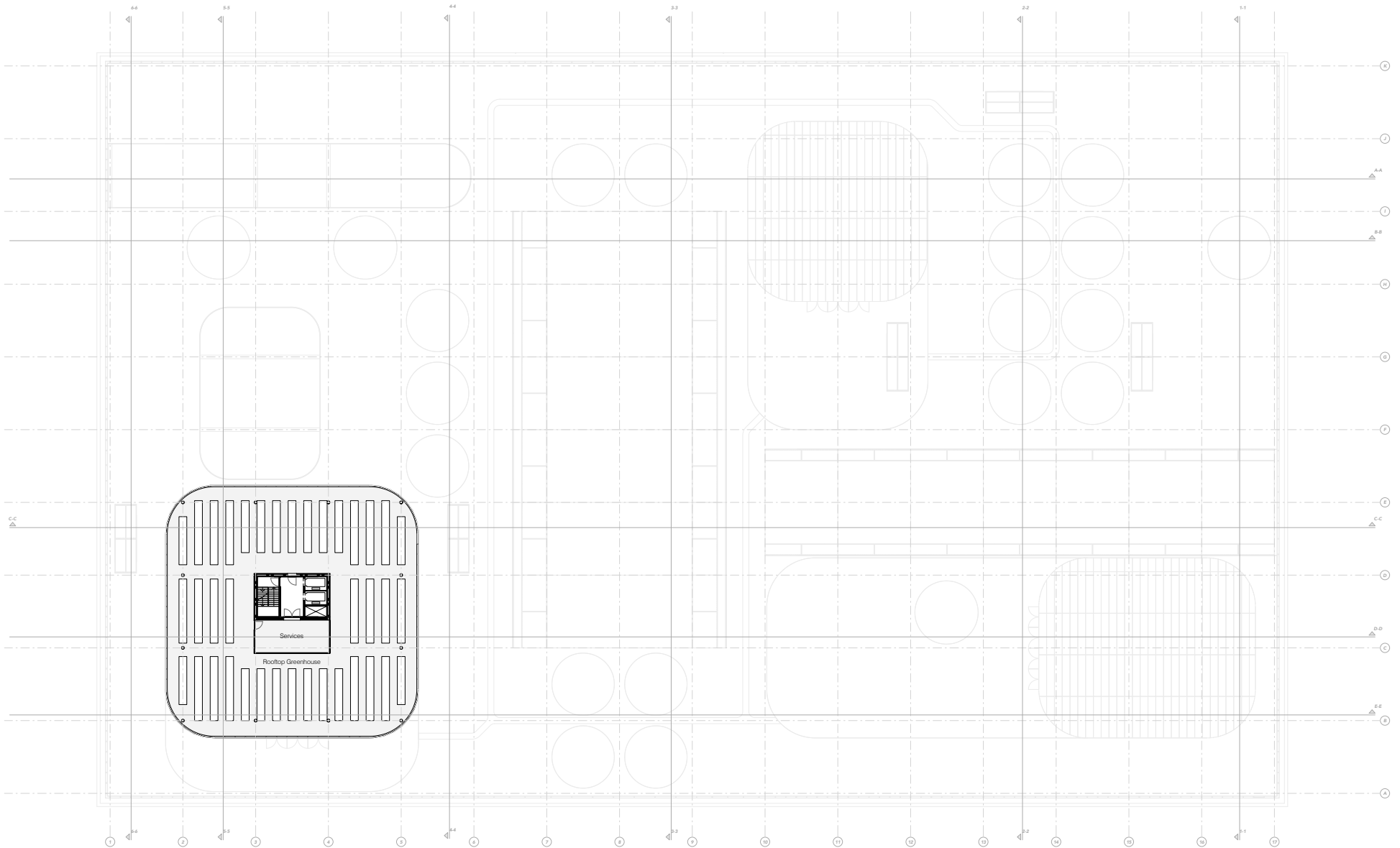
Design

+56.00M PLAN (LV14)

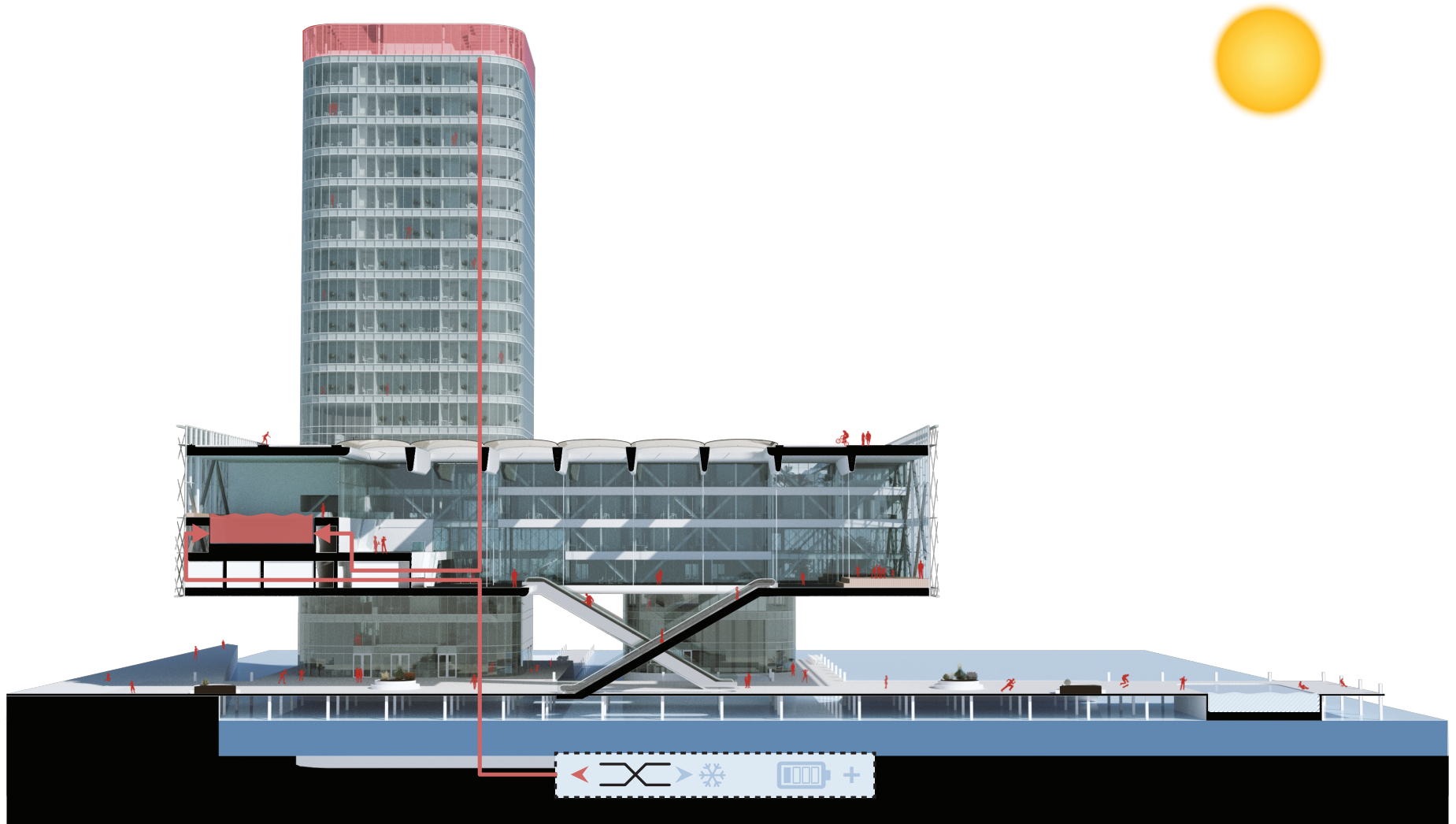


Design

+80.00M PLAN (LV20)

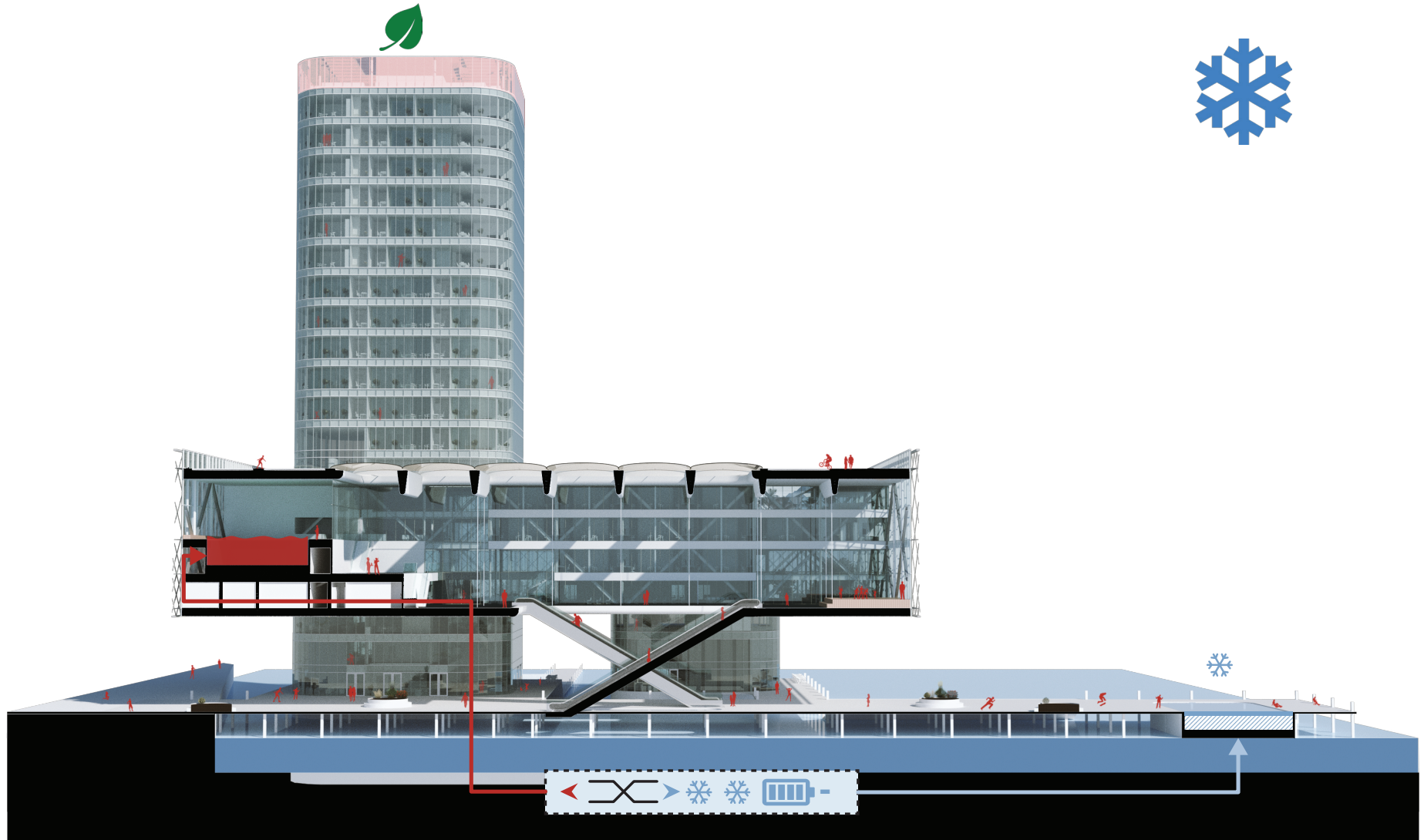


ICE BUFFER - SPRING/SUMMER/AUTUMN



Design

ICE BUFFER - WINTER



SUSTAINABLE FEATURES

Rooftop Greenhouse

Food production and exhaust ventilation



Rooftop Farming

Food production and communal gardens



Waste Collection

Waste is separated within the complex and composted or reused



Biodiversity

Shallow water provide for regeneration of biodiversity in old harbor area



Skylights

Roof openings and atria provide for much natural light



Prefabrication

Elements within the main structure are prefabricated and shipped to site



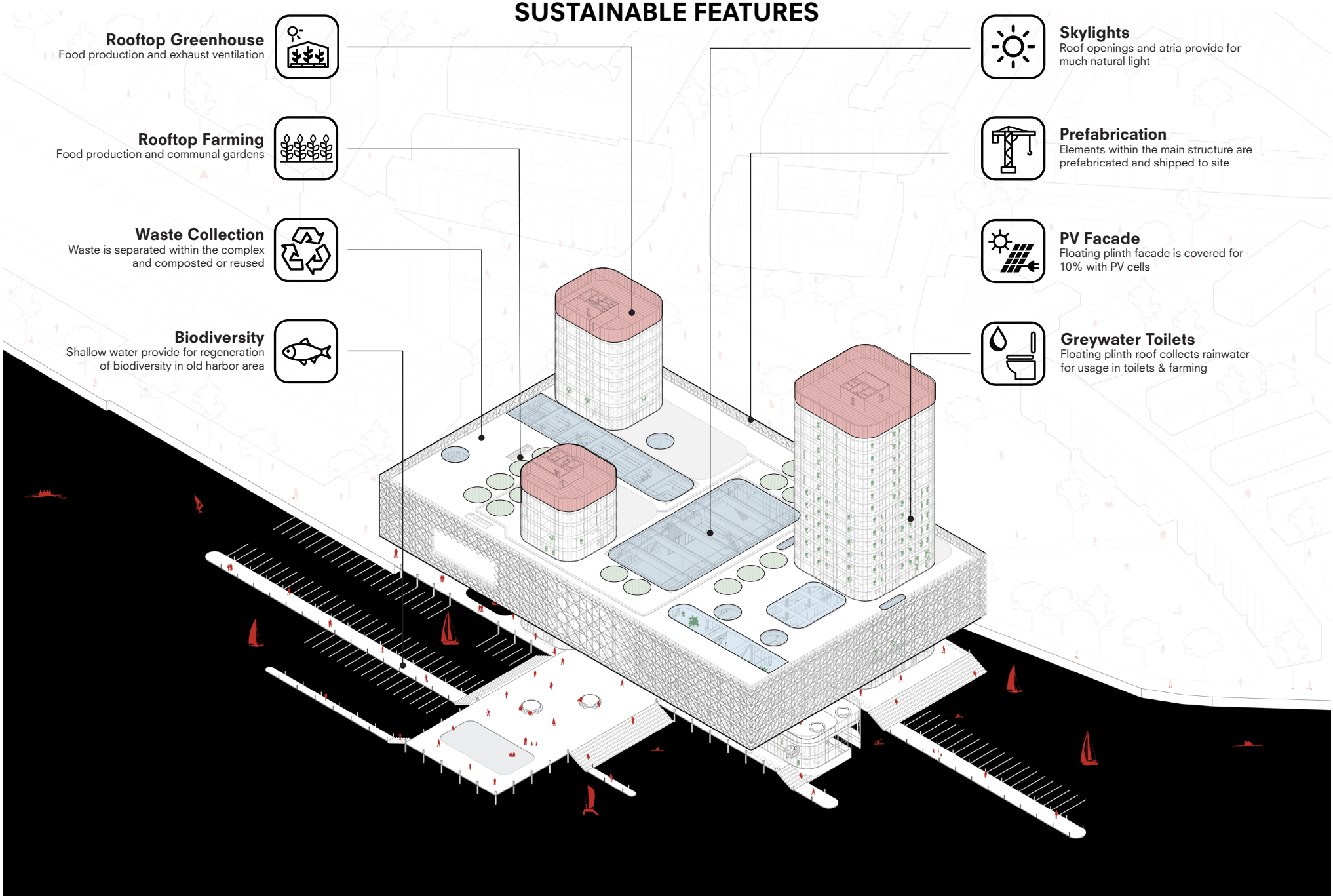
PV Facade

Floating plinth facade is covered for 10% with PV cells



Greywater Toilets

Floating plinth roof collects rainwater for usage in toilets & farming



CLIMATIZATION PRINCIPLES

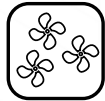
Enclosed Balconies
At towers per floor and high insulation



Low-temperature Systems
All HVAC systems are low-temperature for high efficiency and comfort



Decentral Ventilation
Localized AHU's with low pressure and maximum use of natural ventilation



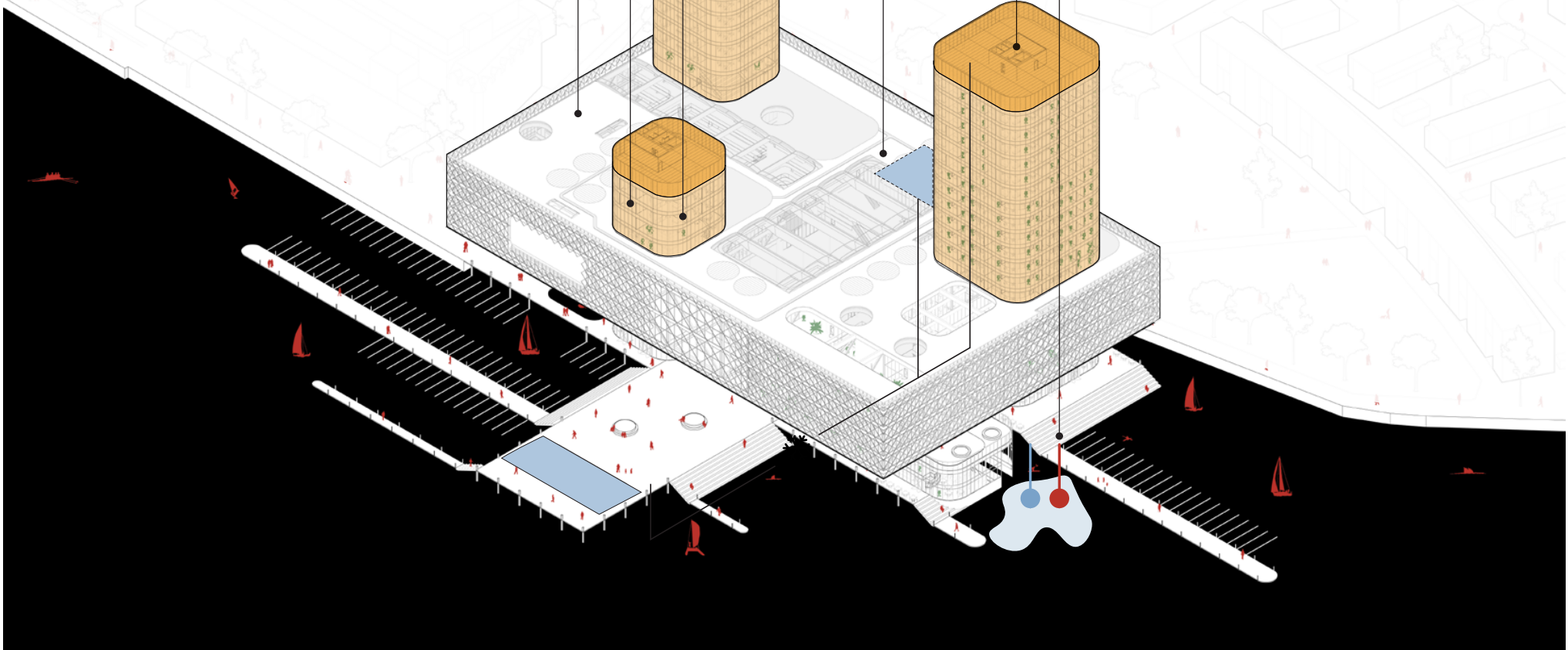
Ice Buffer Between Pools
Ice buffer creates heat sink between pools and usage for ice skating



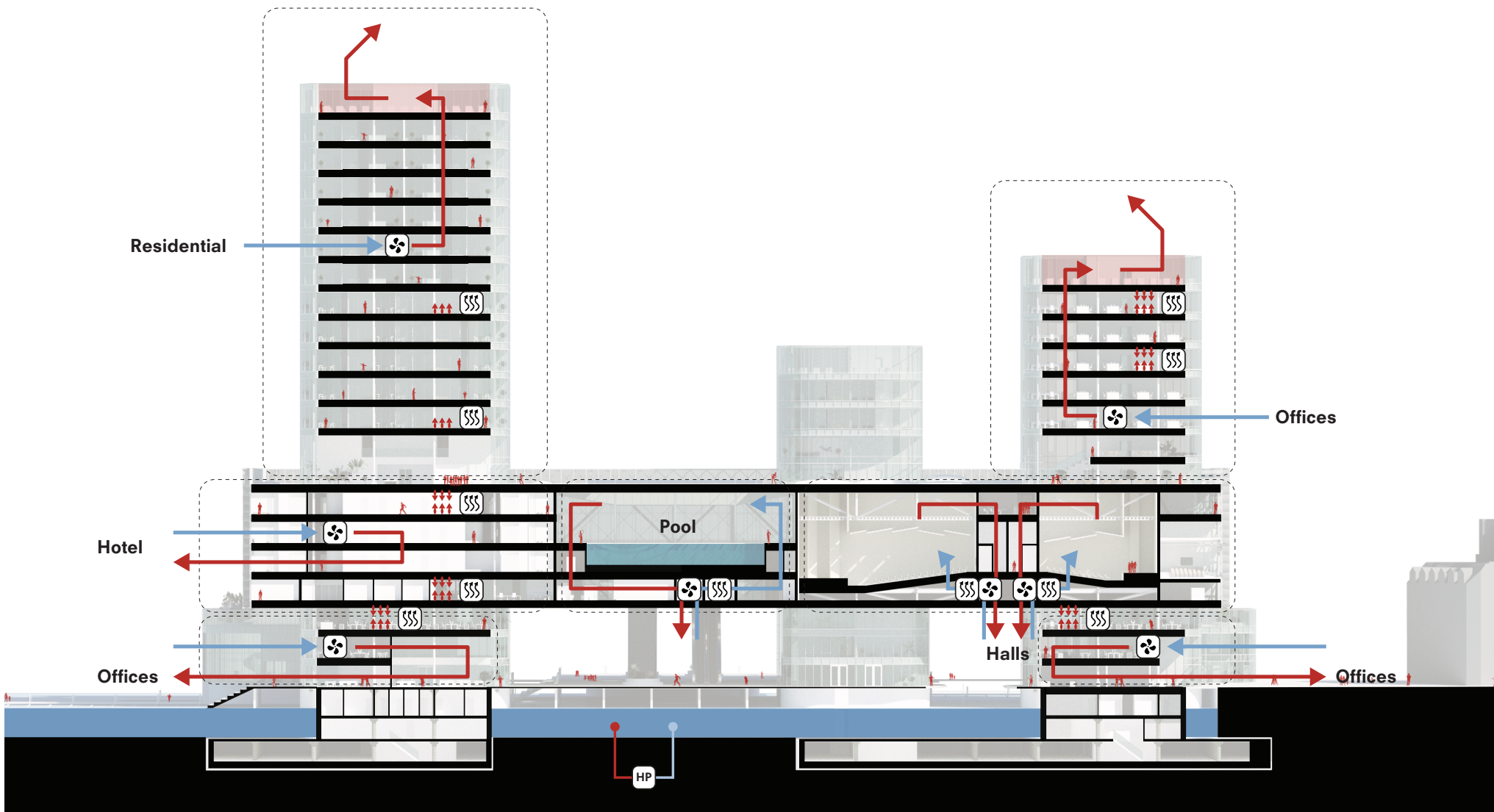
Rooftop Greenhouse
Heat sink for pools with ice buffer



Maas River
River water as heat sink for heat pump for HVAC systems

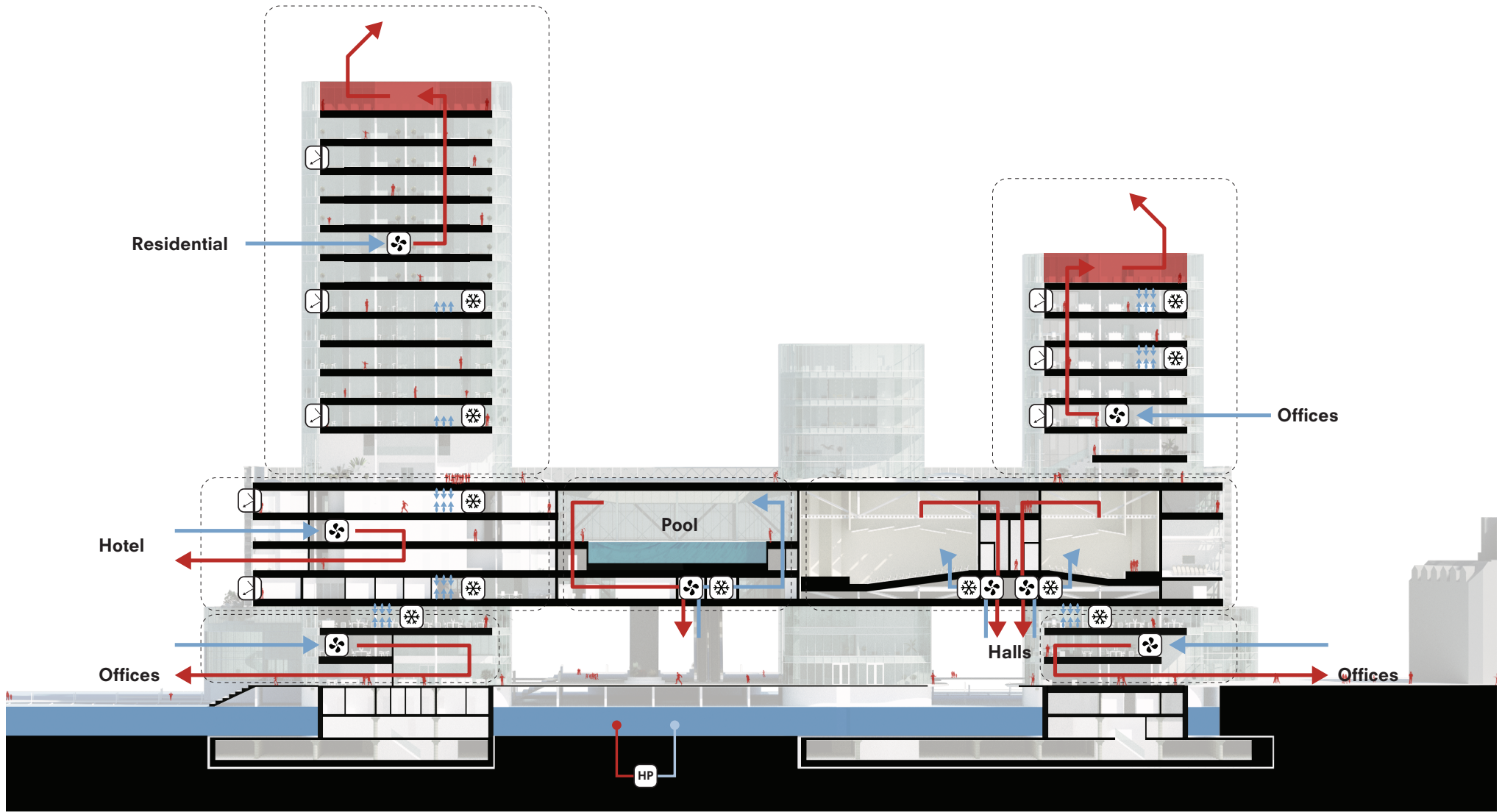


CLIMATE - SPRING/AUTUMN

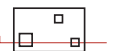


 Mech. vent. (heat rec., CO₂)  HP Heat pump (Maas)  Heating

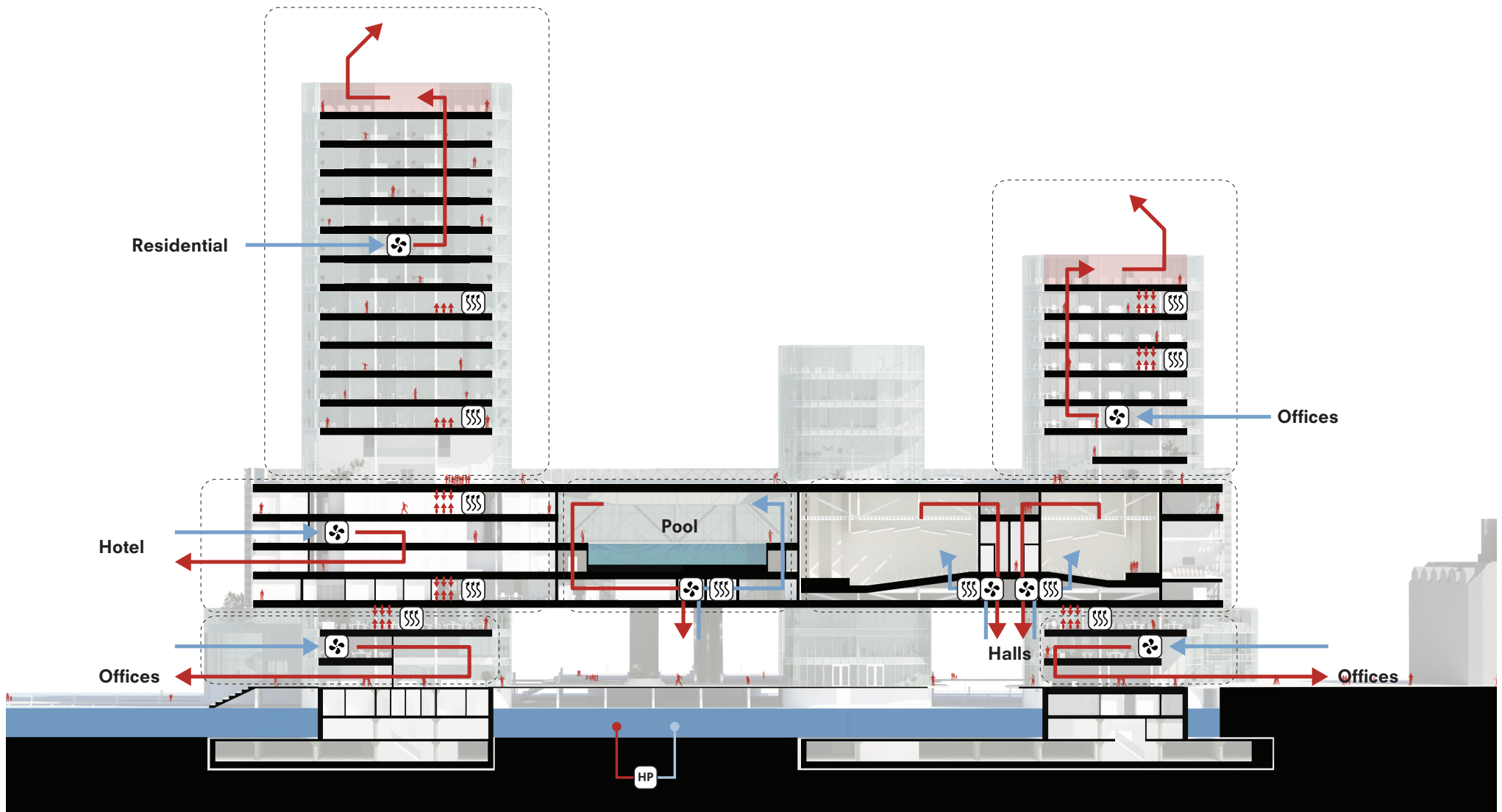
CLIMATE - SUMMER



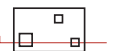
Mech. vent. (bypass, CO₂) Heat pump (Maas) Shading Cooling



CLIMATE - WINTER

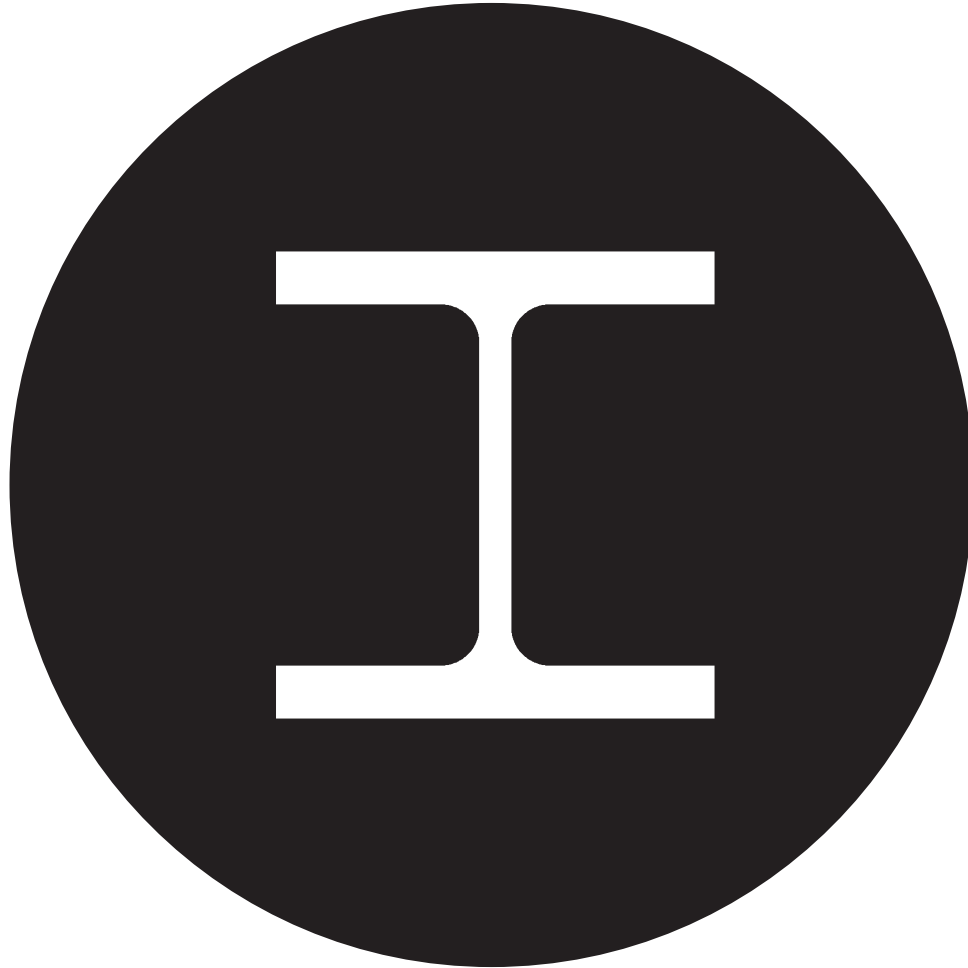


 Mech. vent. (heat rec., CO₂)  HP Heat pump (Maas)  SSS Heating

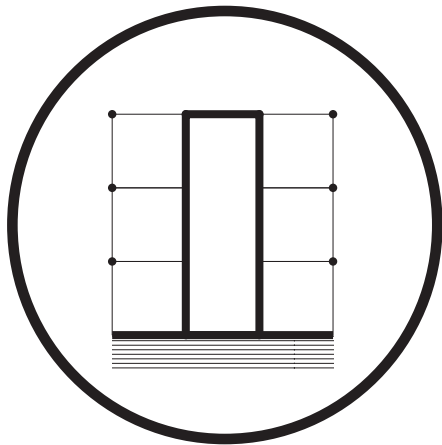


Design

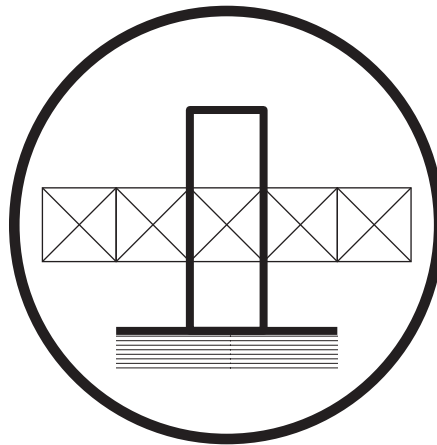
STRUCTURAL DESIGN



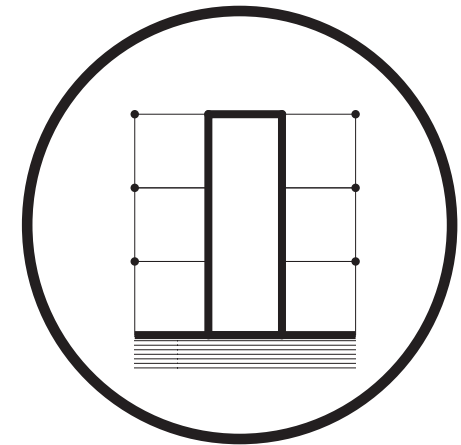
STRUCTURAL CONCEPT



Sectional Base
Core + Columns

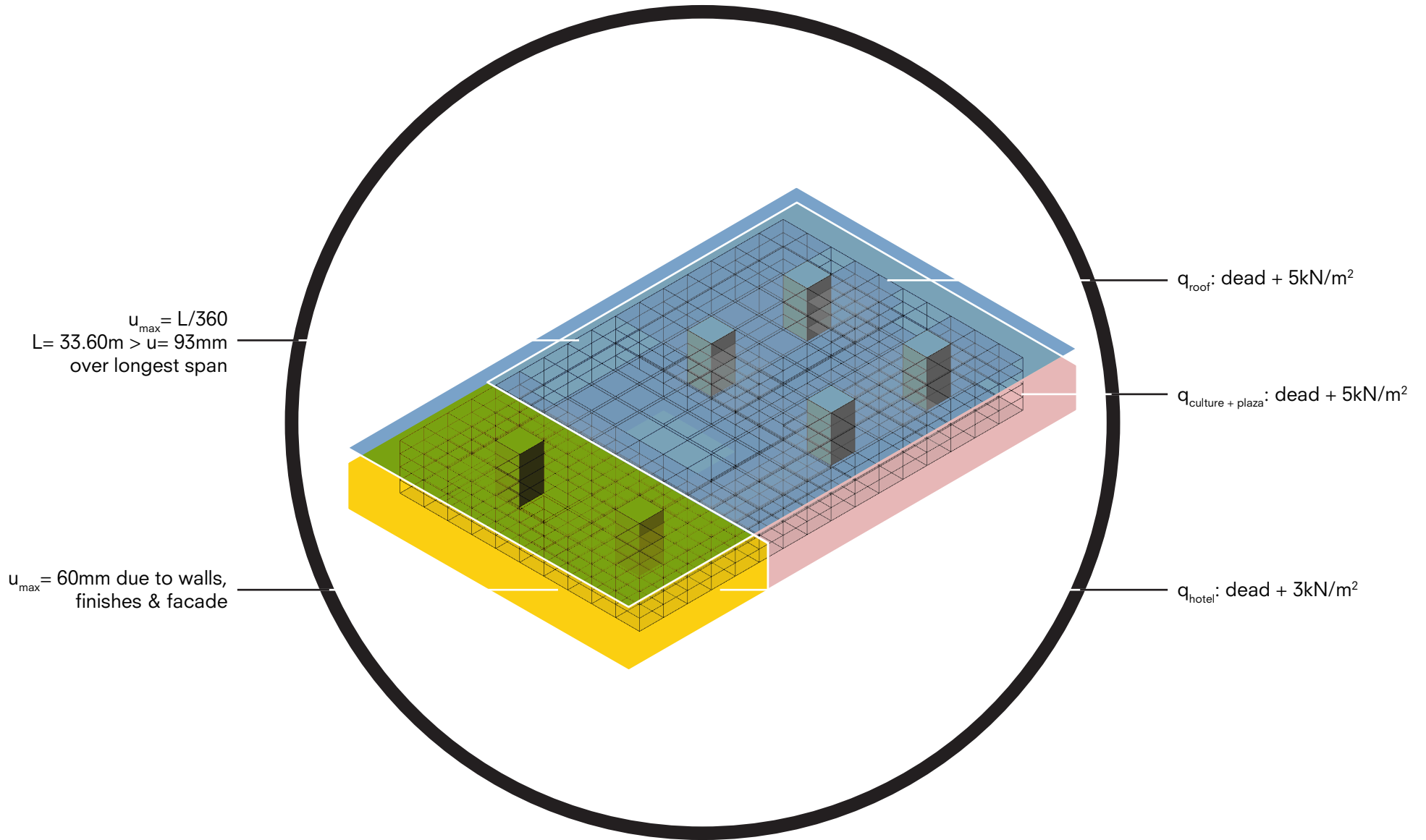


Raised Plinth
Cores + Braced Frame



Visible Towers
Core + Columns

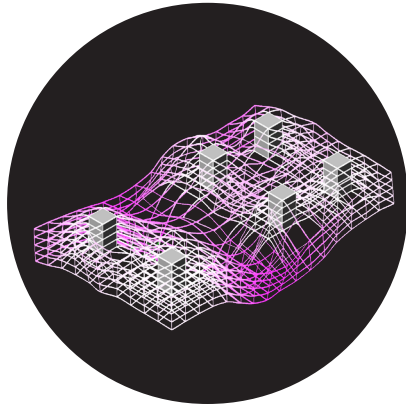
ANALYSIS SETUP



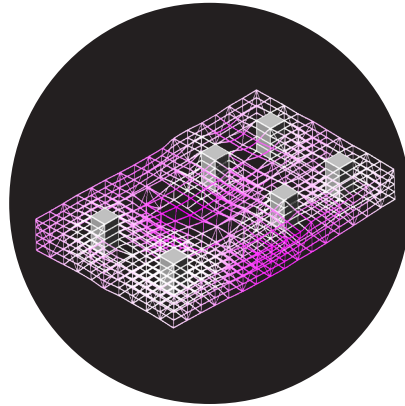
First order structural analysis for small deflections

Rhino + Grasshopper + Karamba3D

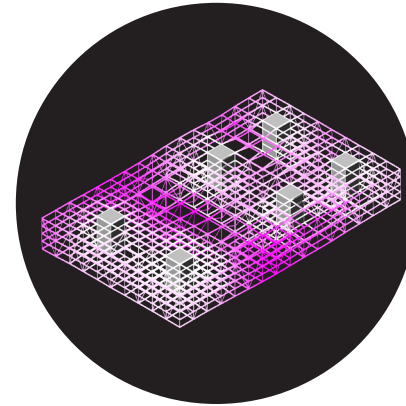
ANALYSIS RESULTS



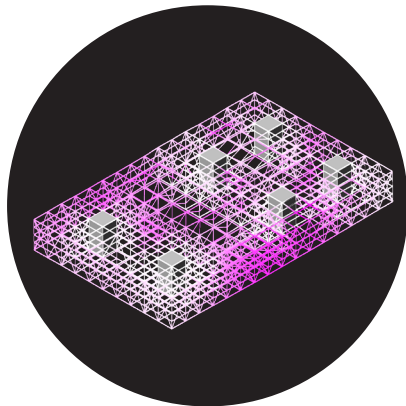
-1227mm
Vierendeel



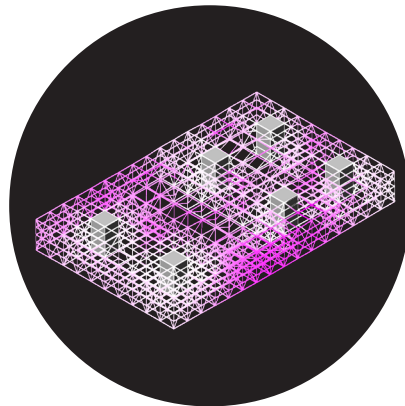
-371mm
Facade Truss



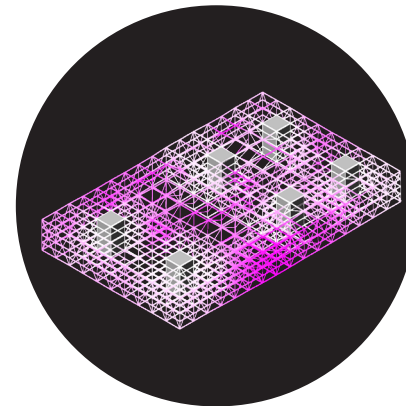
-308mm
Plaza Reinforcement



-187mm
Facade Reinforcement



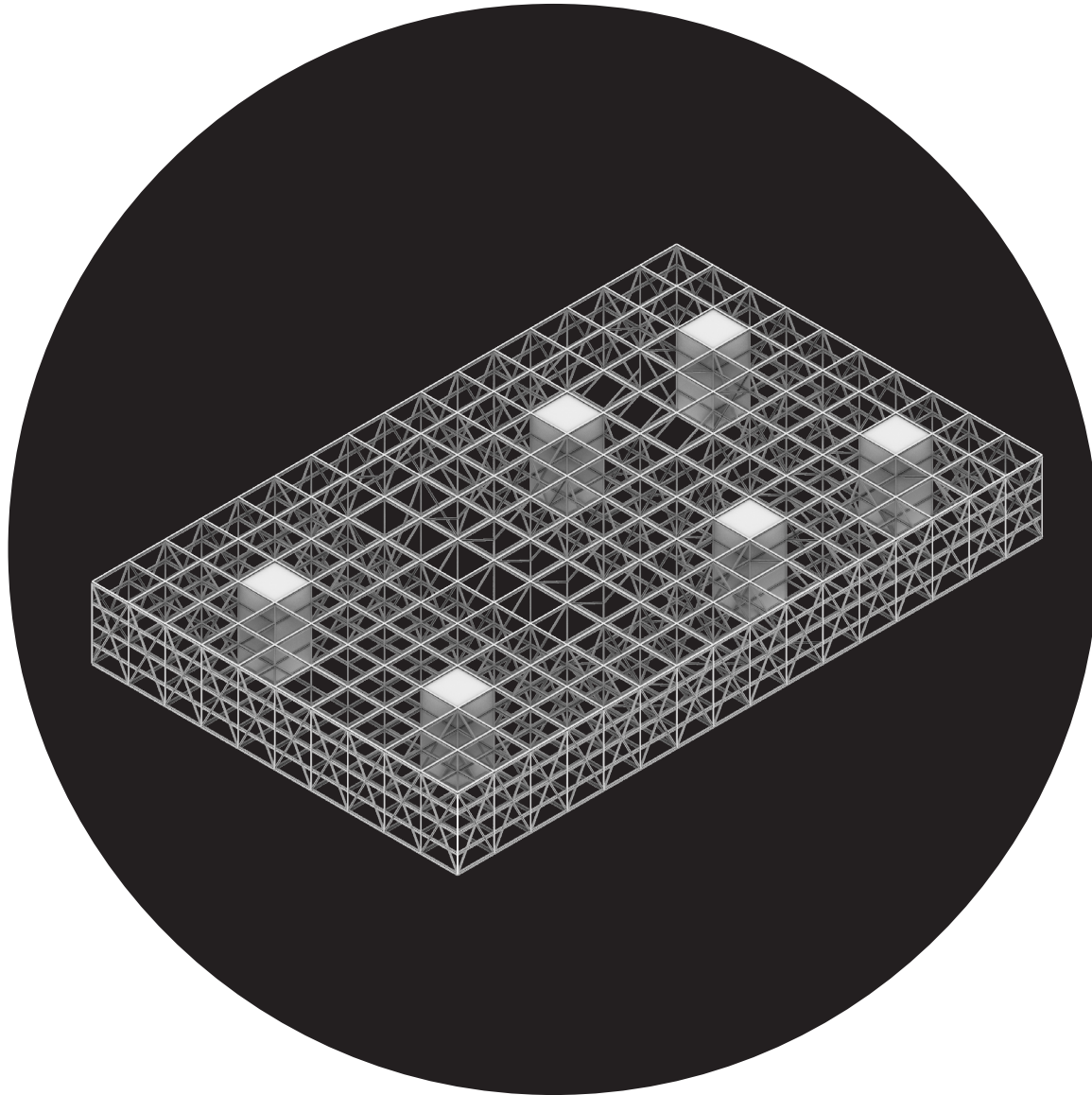
-111mm
Cores + Braced Frame



-59mm
Cores + Braced Frame

Design

FINAL STRUCTURE



CHS324x20



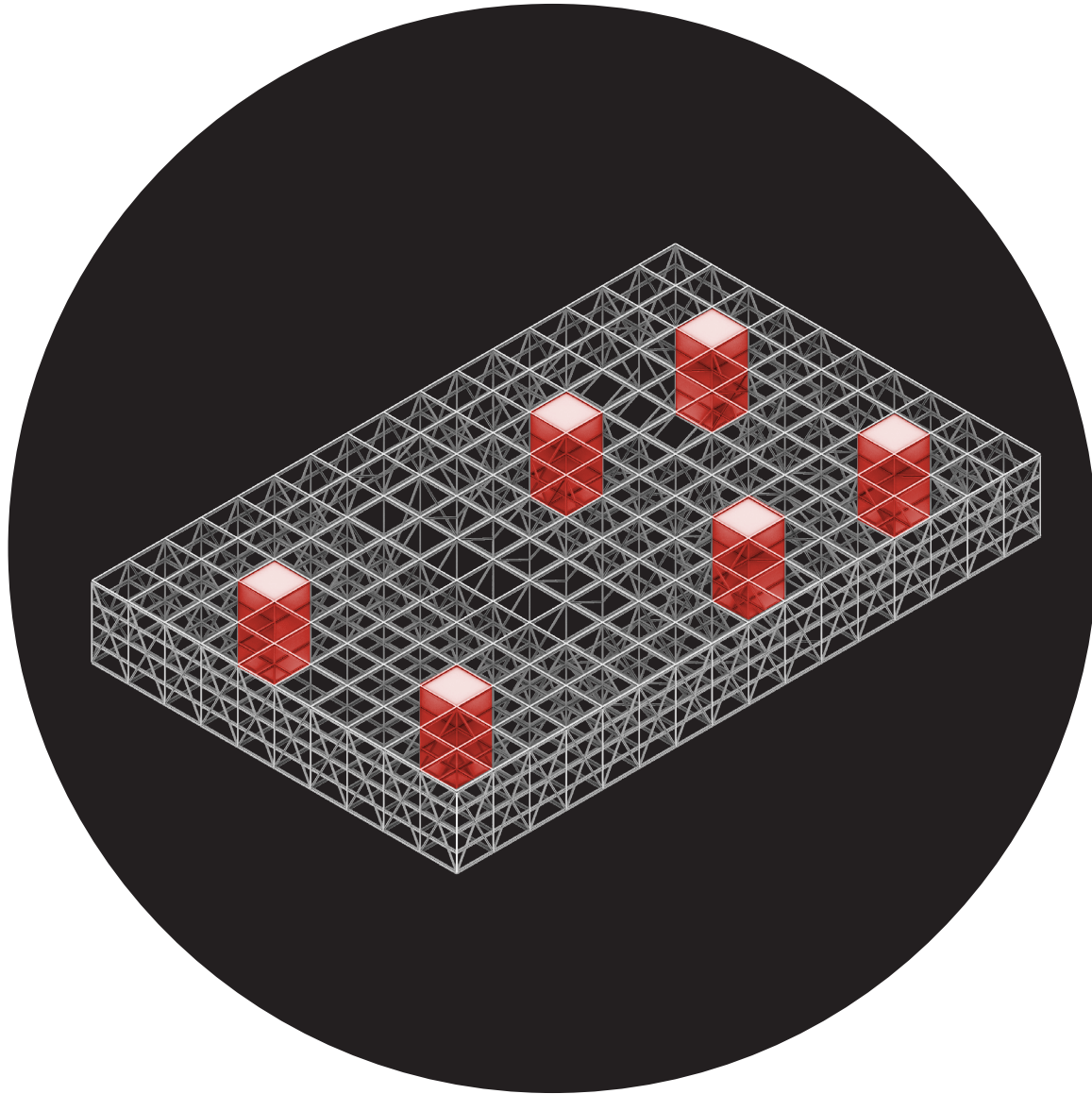
HEB400



HEB650

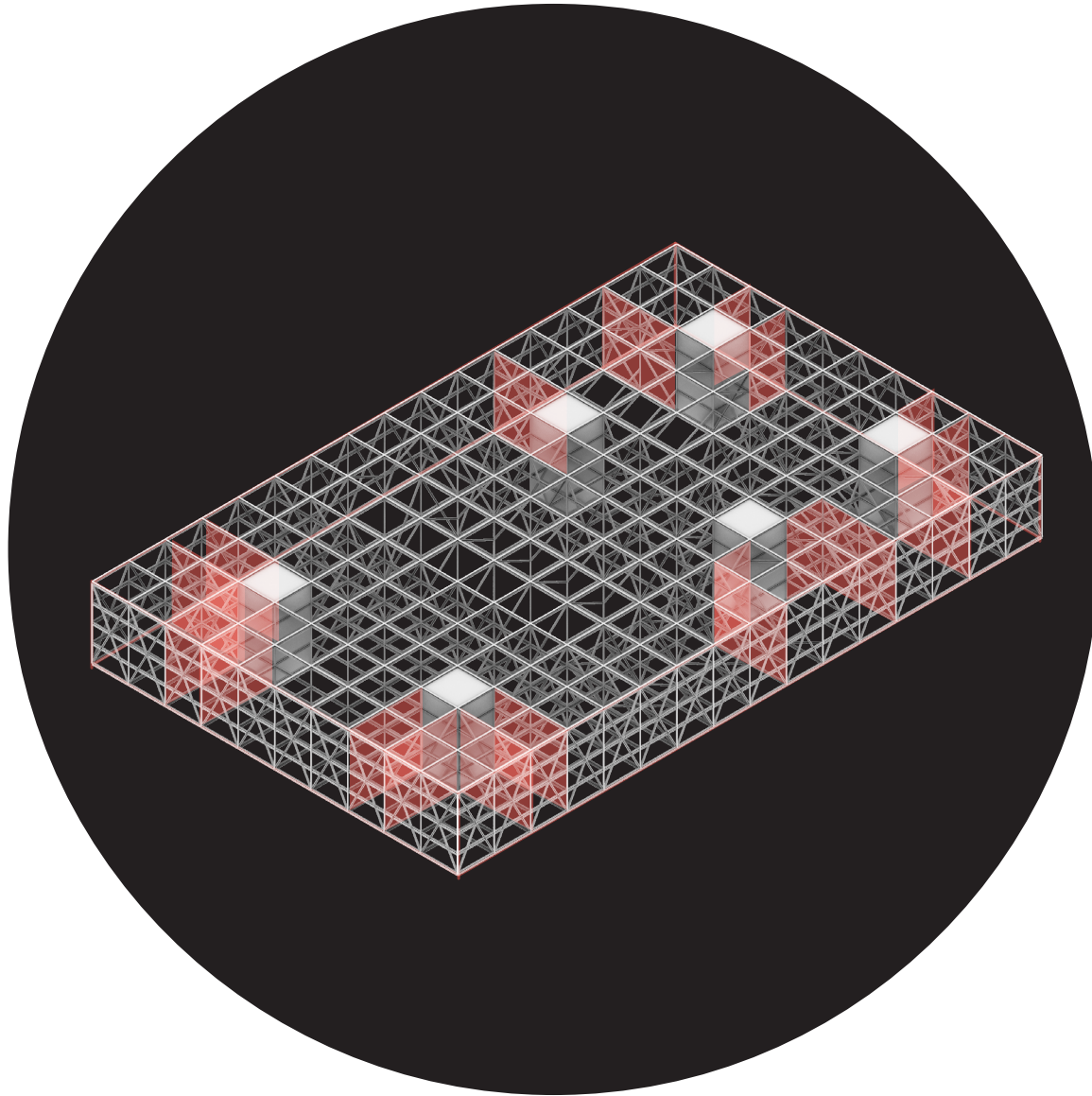
Design

CONCRETE CORES



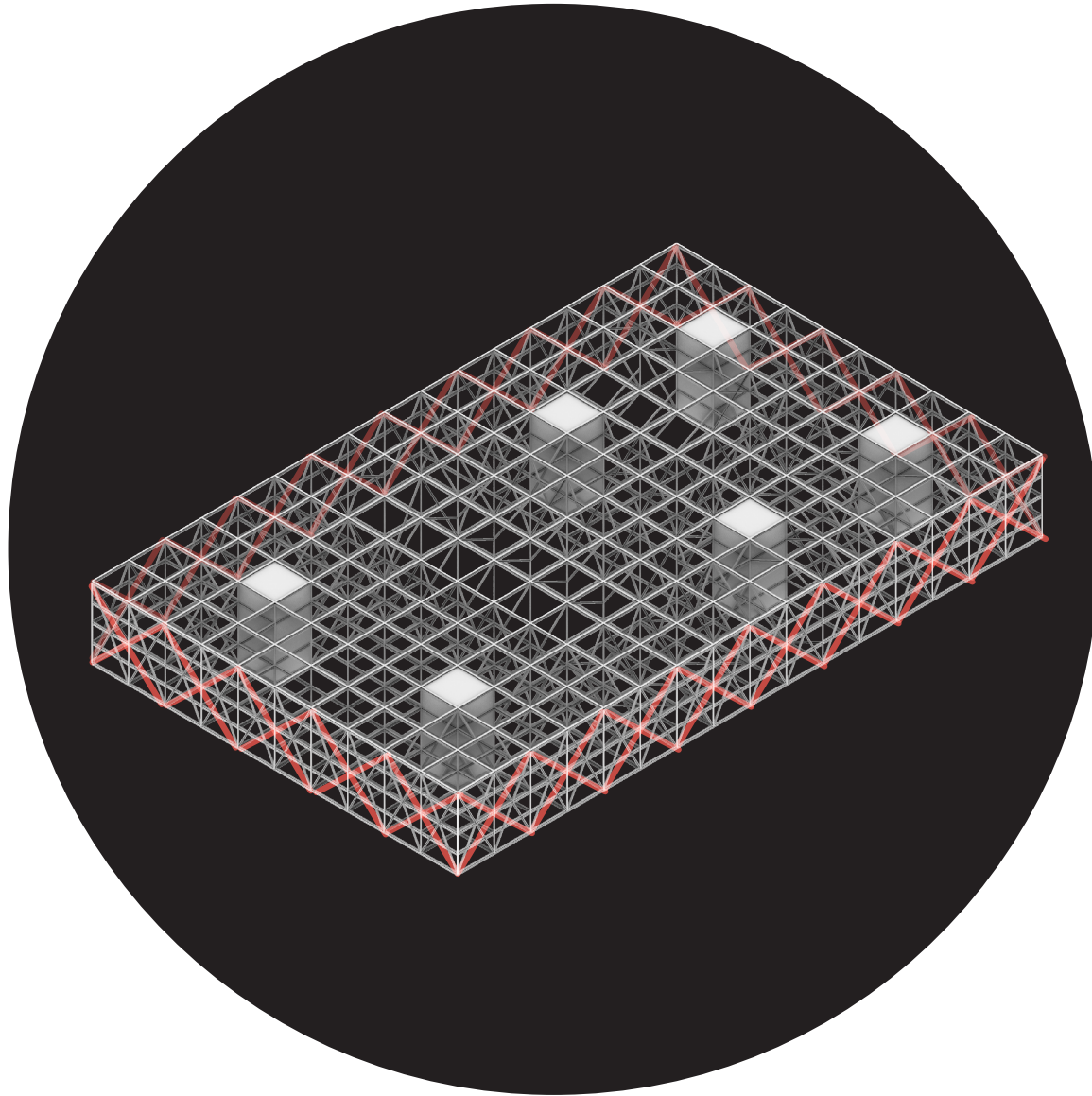
Design

FACADE-CORE CONNECTION



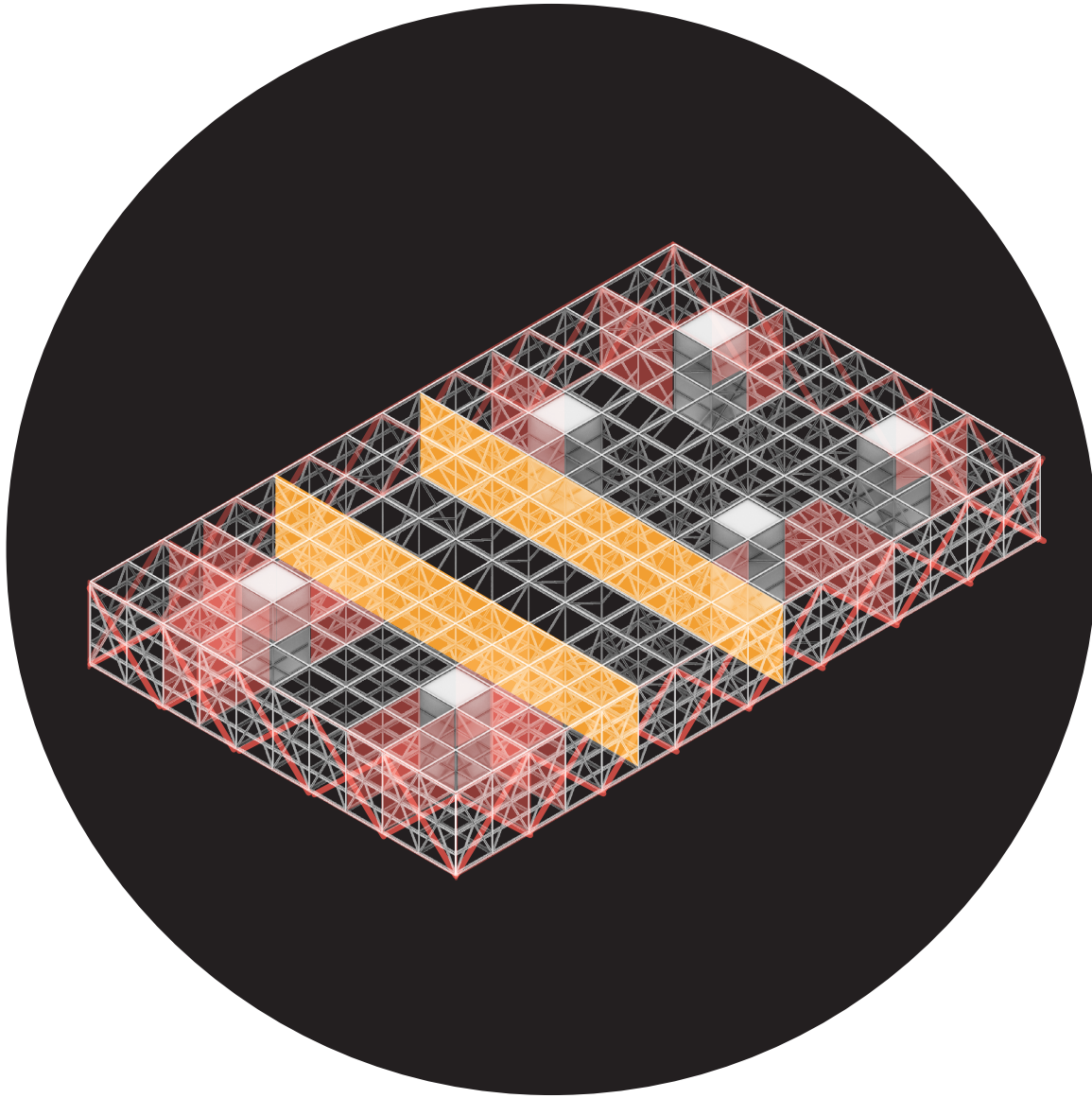
Design

FACADE BRACES



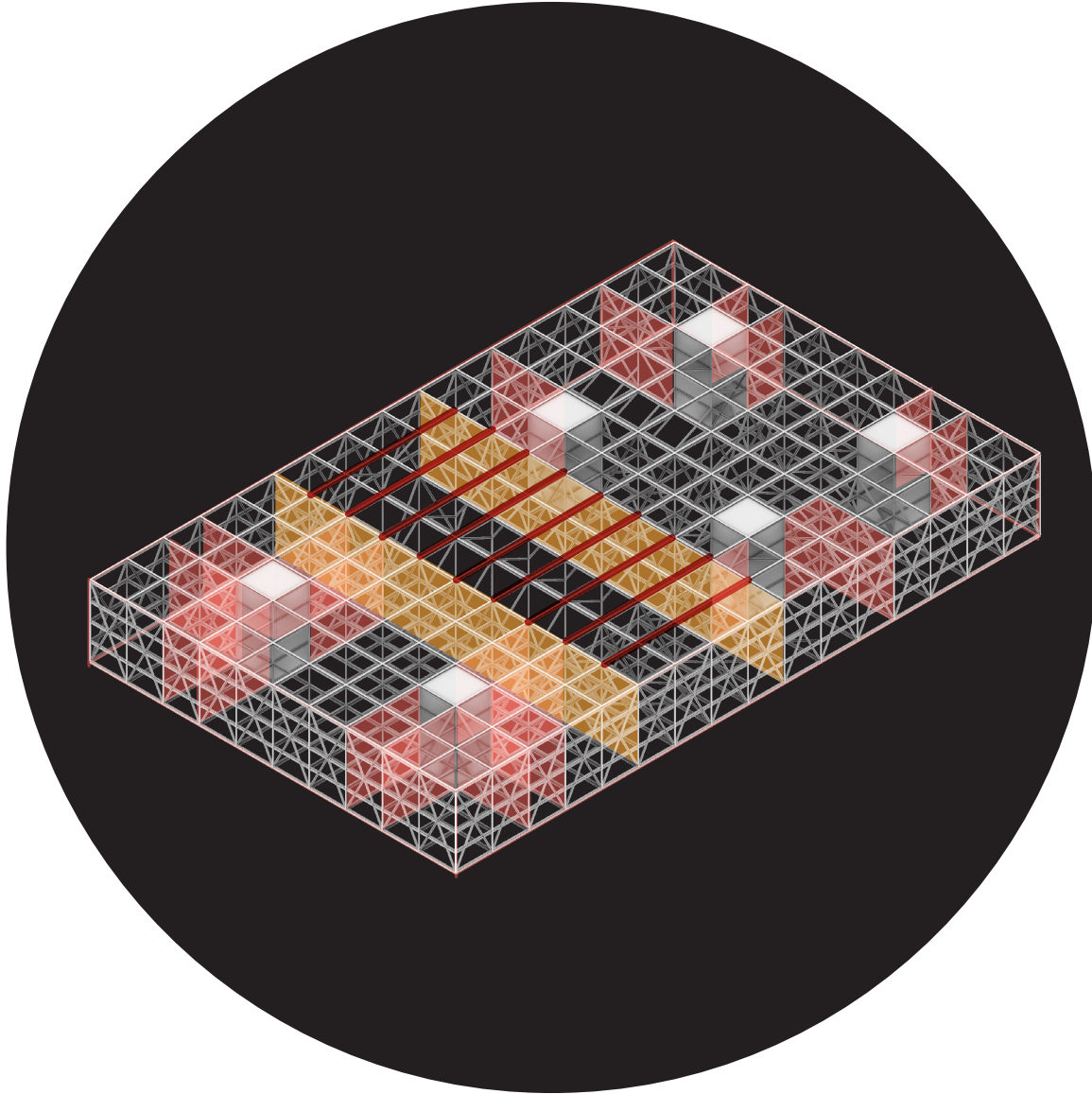
Design

PLAZA TRUSSES



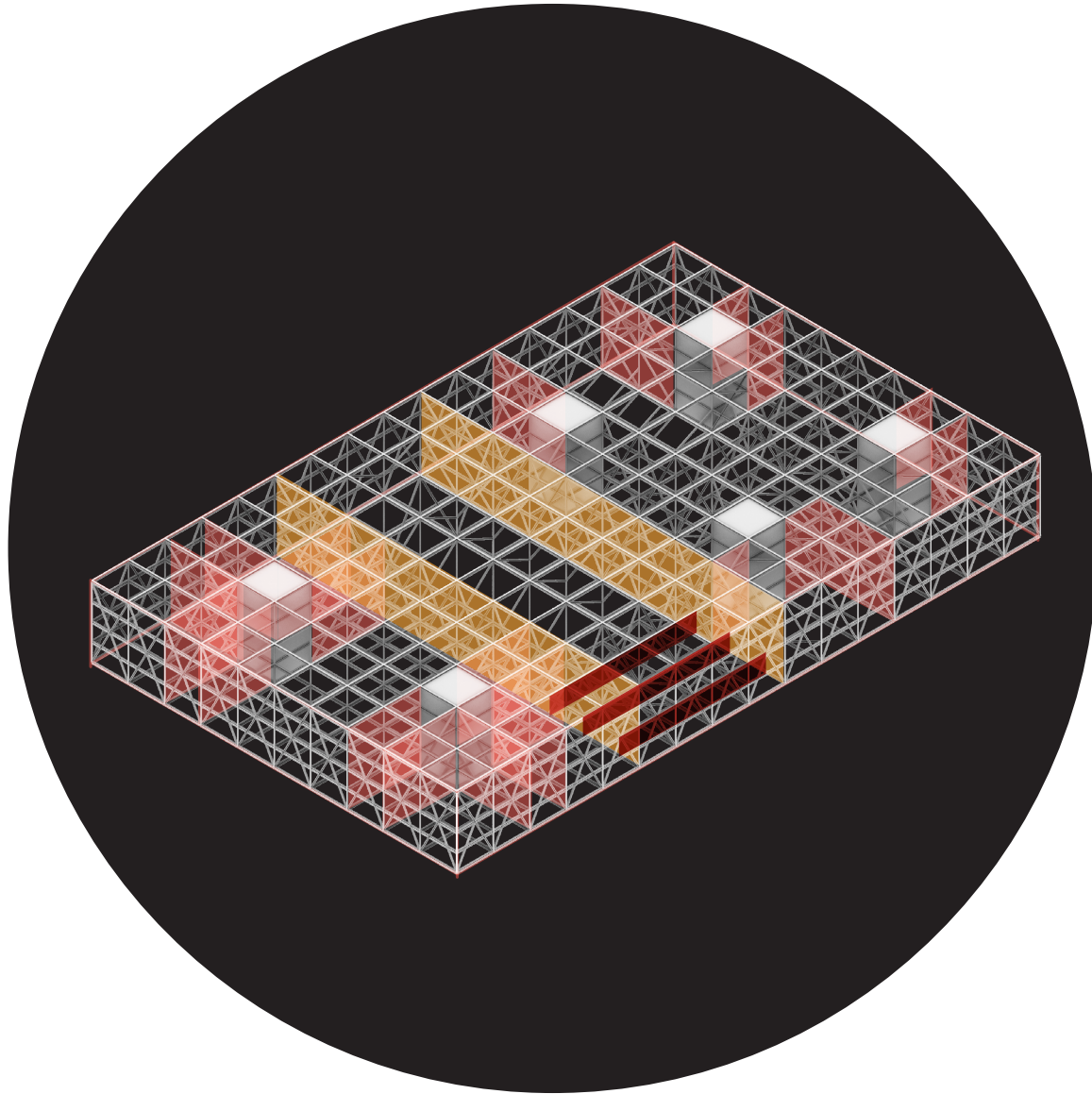
Design

PLAZA ROOF TRUSSES



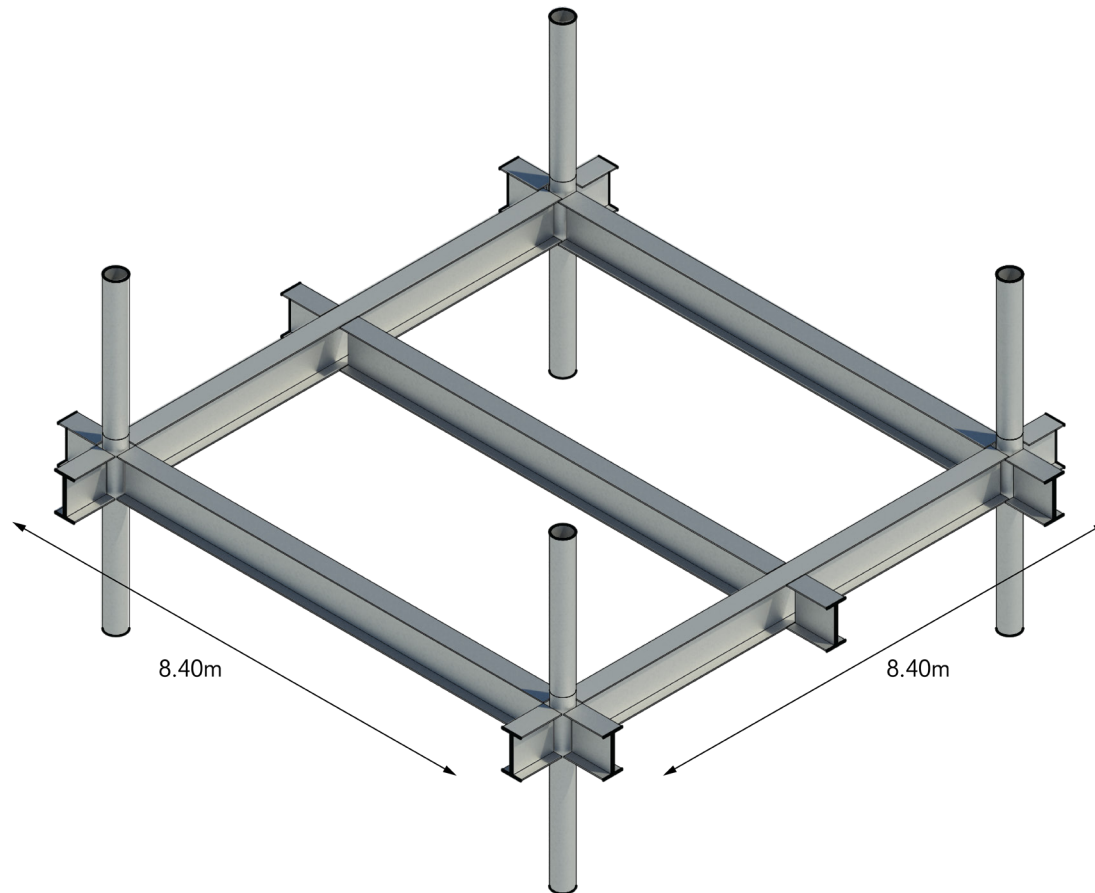
Design

POOL TRUSSES



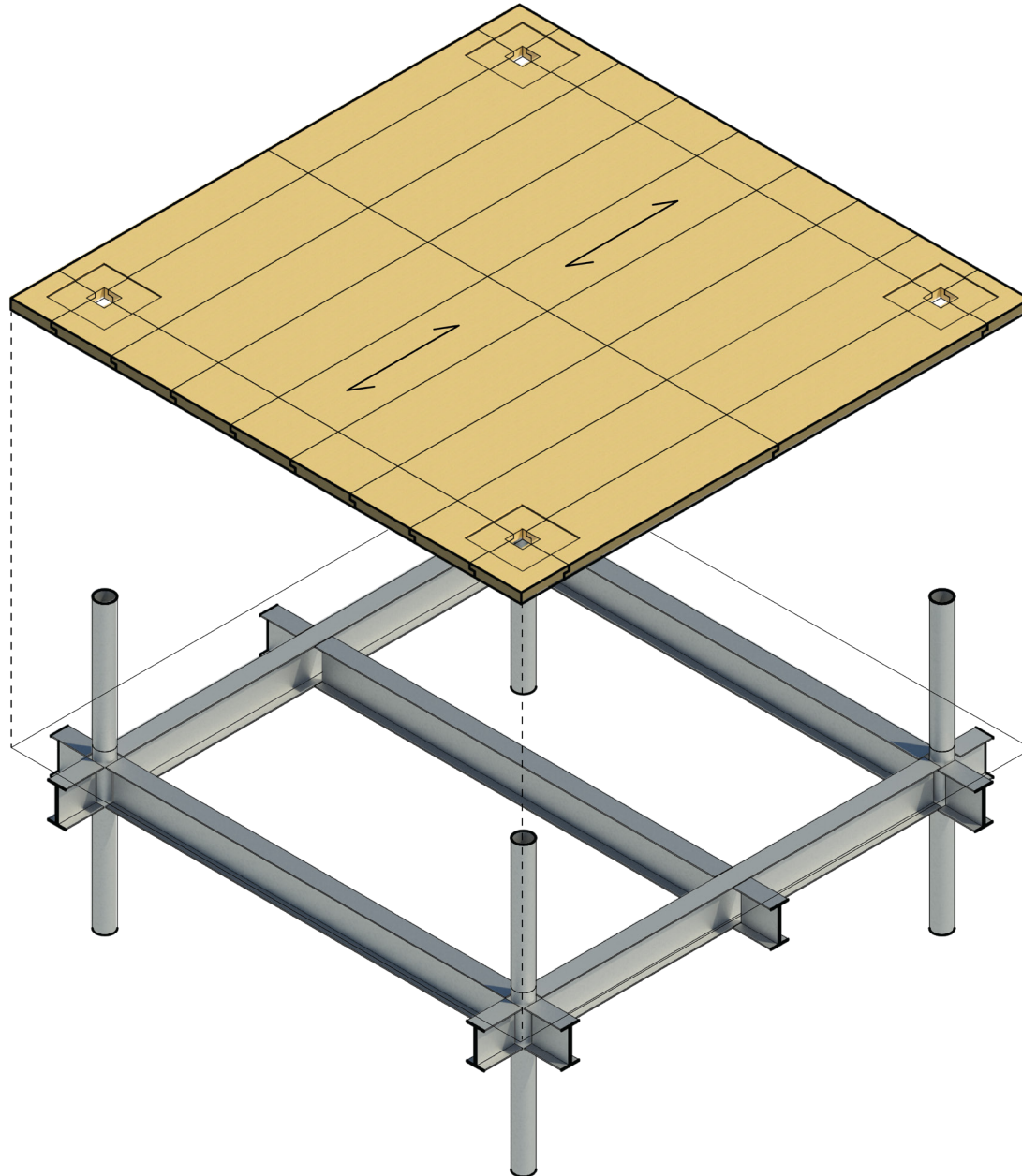
Design

BEAM LAYOUT



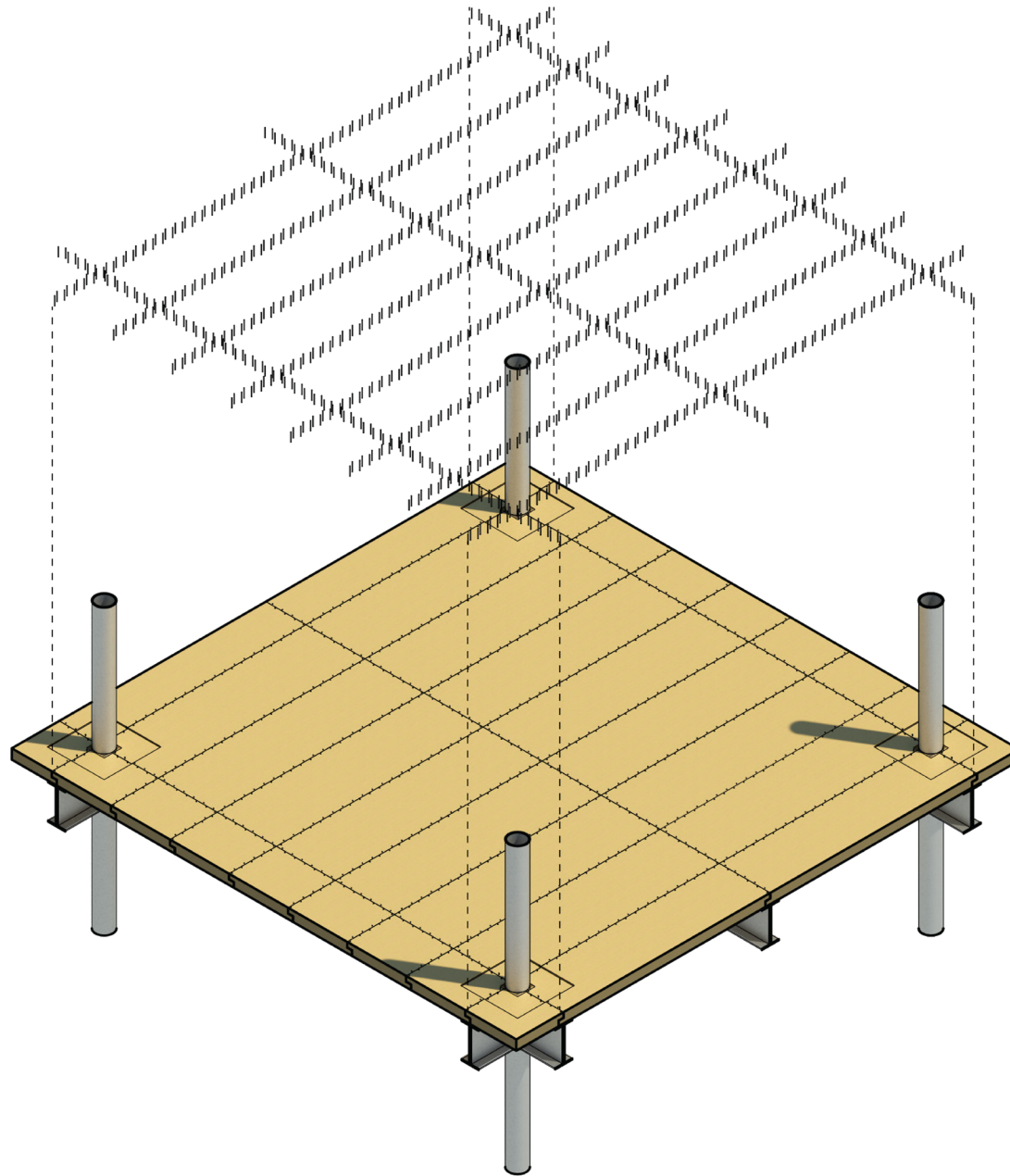
Design

CLT SLABS



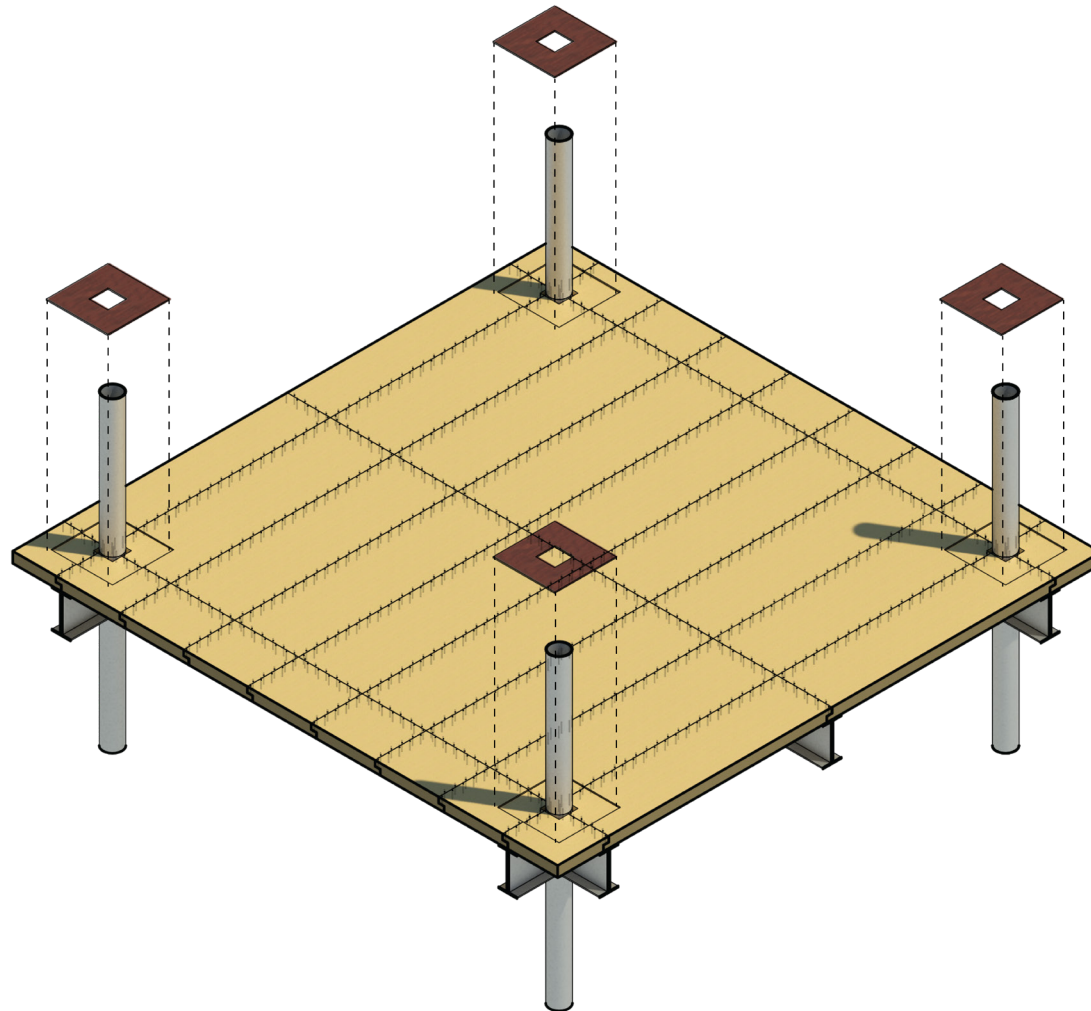
Design

SELF-TAPPING SCREWS



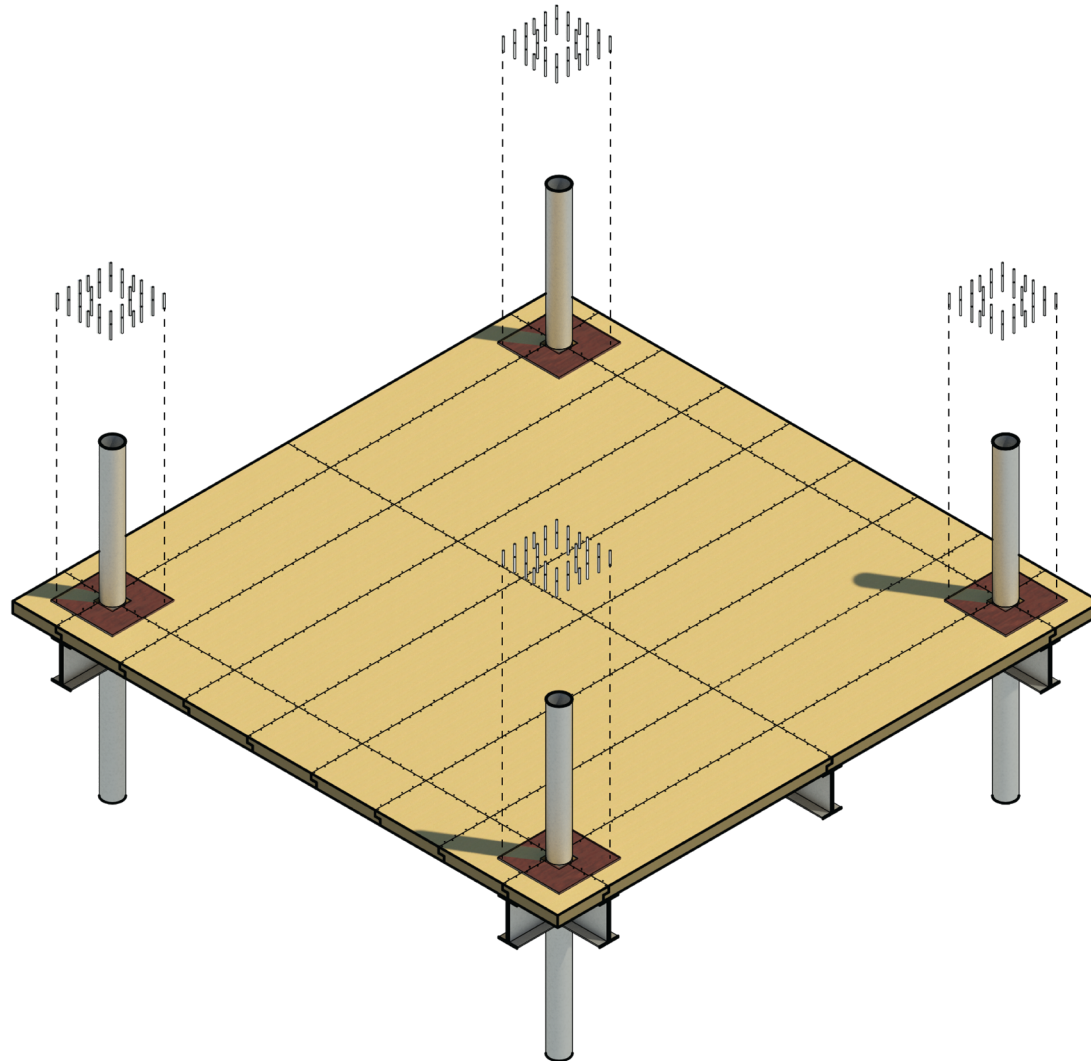
Design

HARDWOOD PANELS



Design

BOLTED CONNECTORS

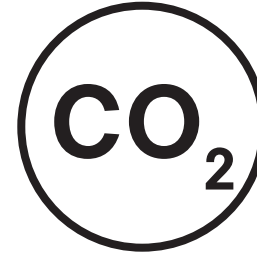


Design

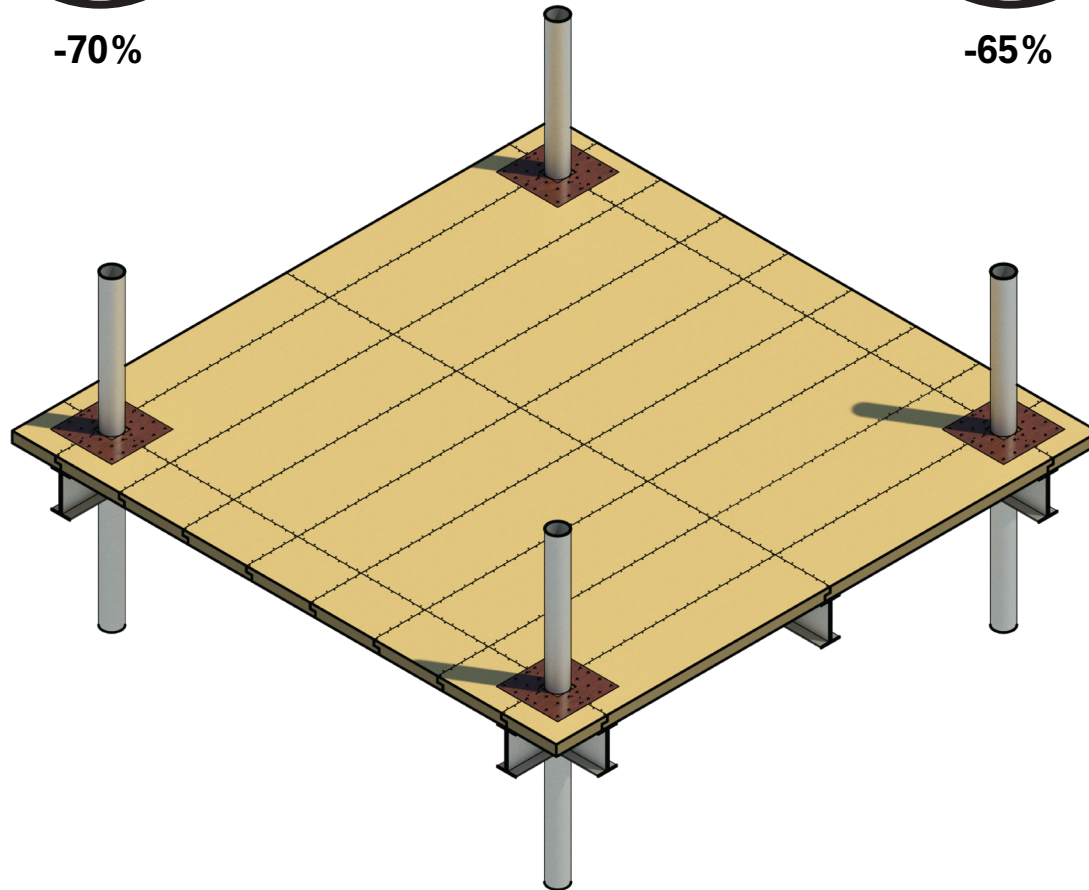
HYBRID CONSTRUCTION



-70%

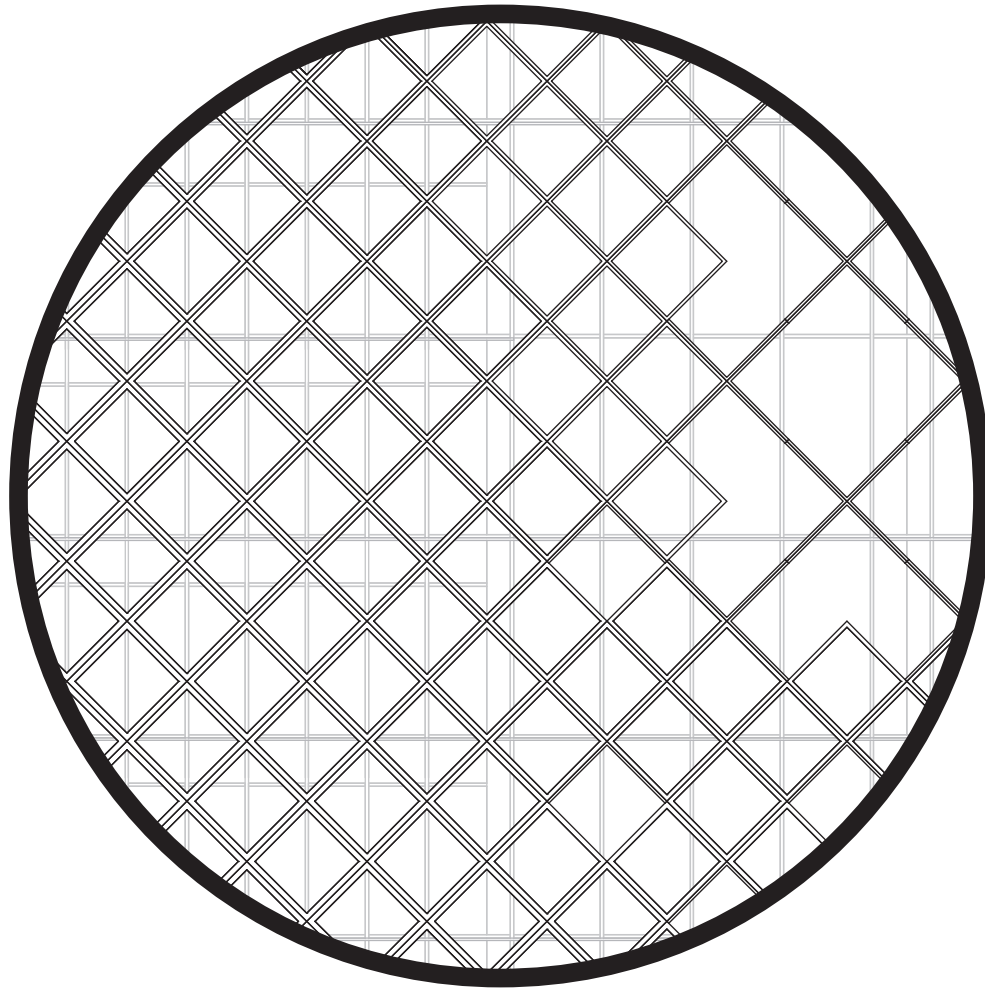


-65%



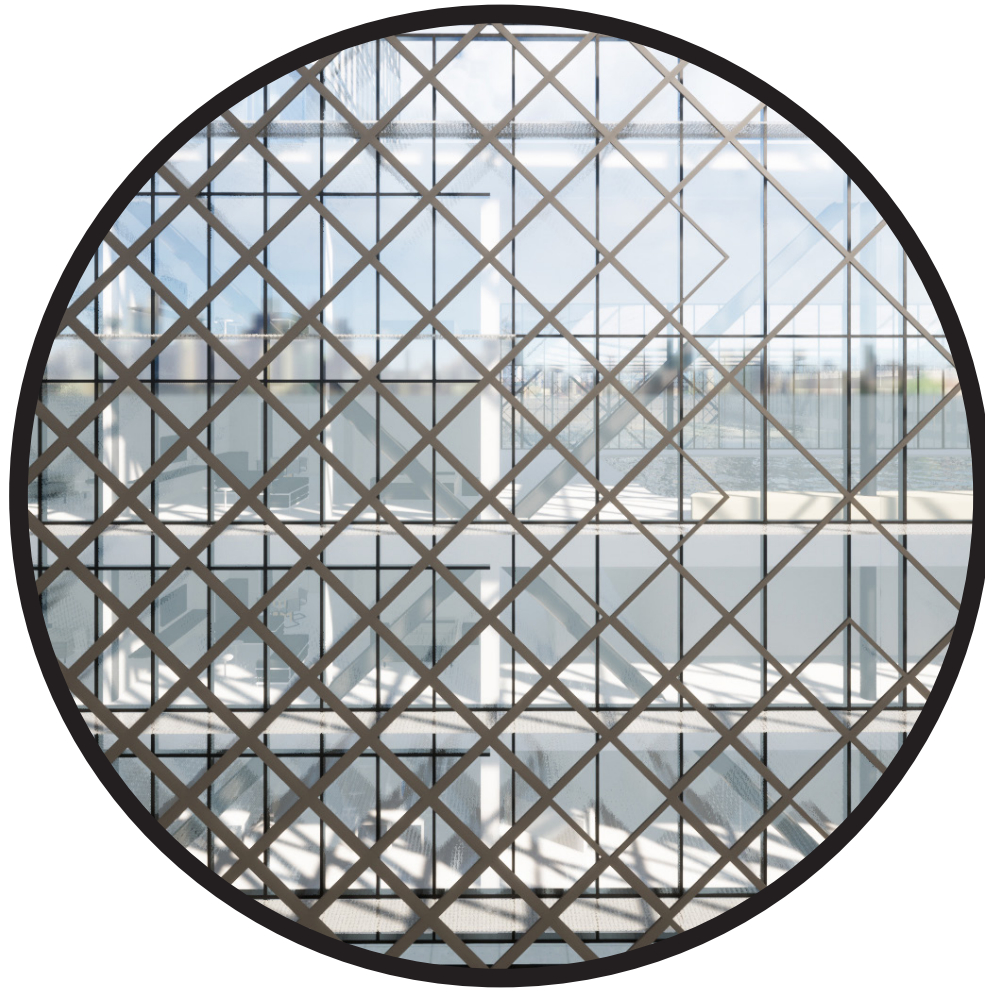
Design

FACADE DESIGN



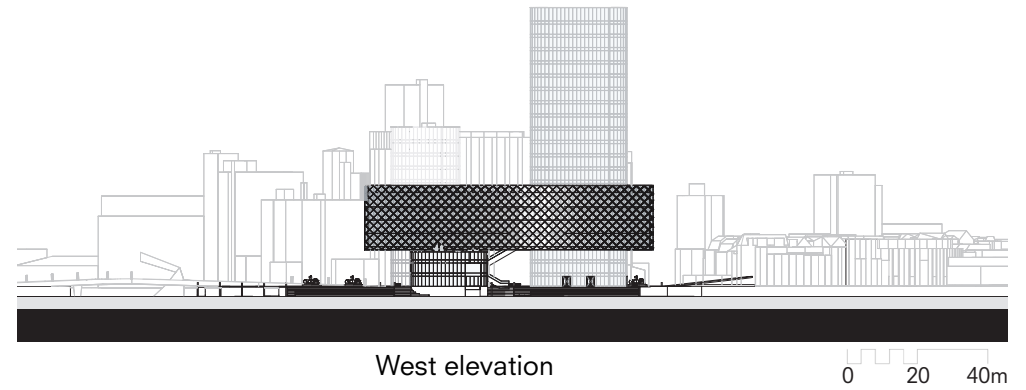
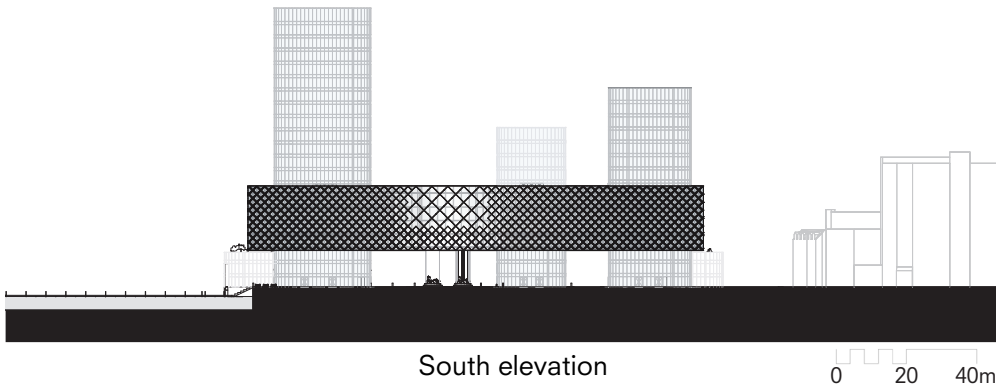
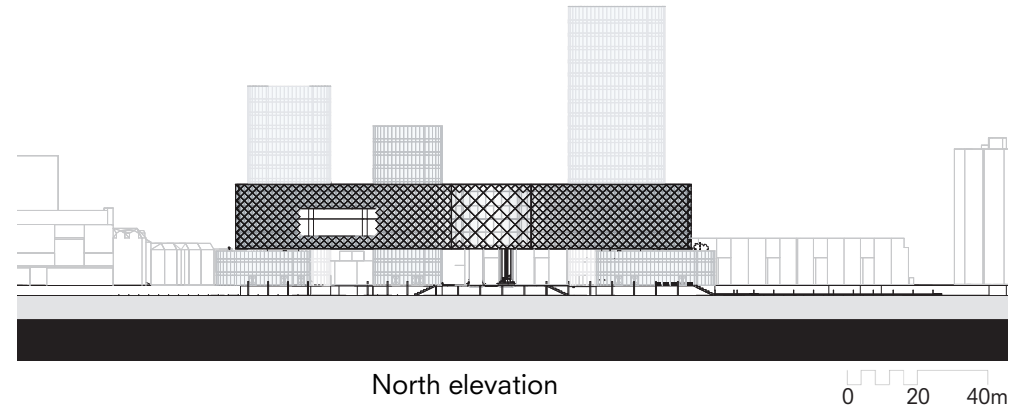
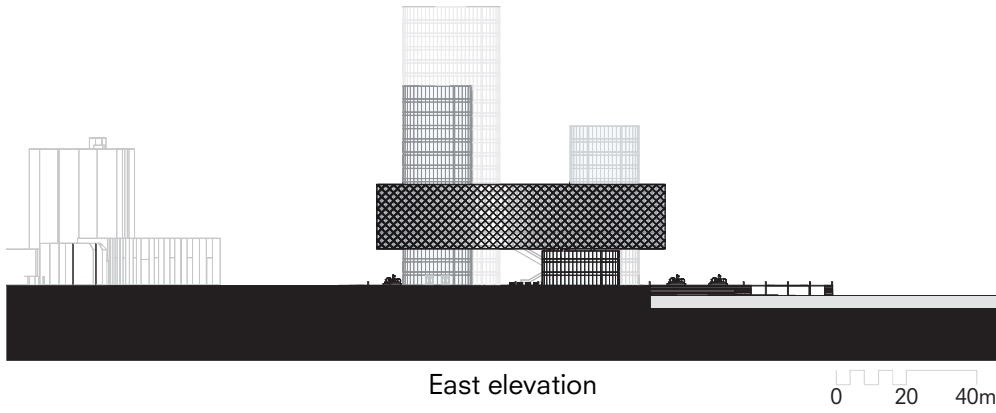
Design

PARAMETRIC FACADE



Design

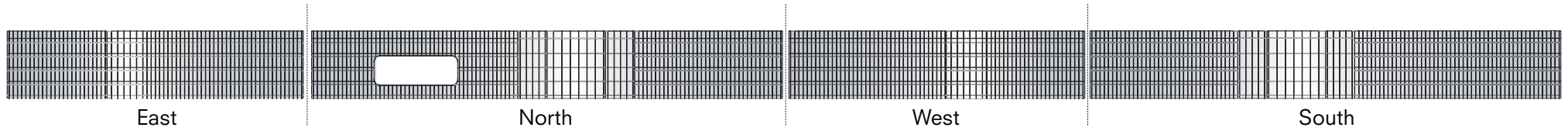
TRANSPARENT & CLOSED



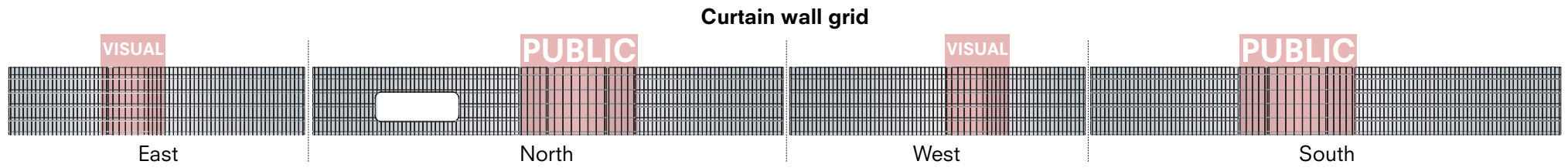
Design

FACADE DESIGN

Curtain wall grid

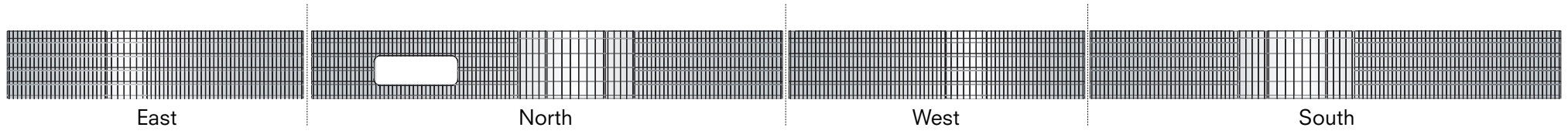


FACADE DESIGN

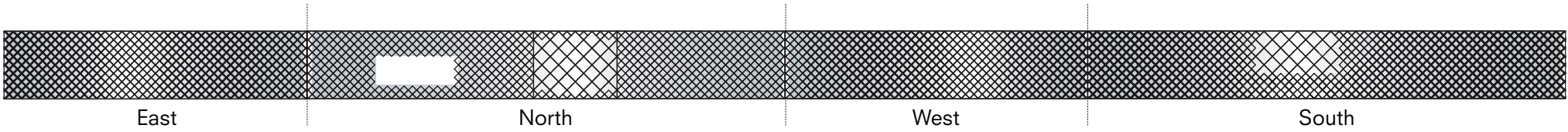


FACADE DESIGN

Curtain wall grid

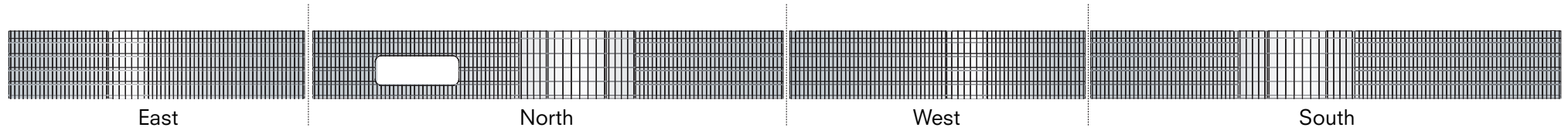


PV facade

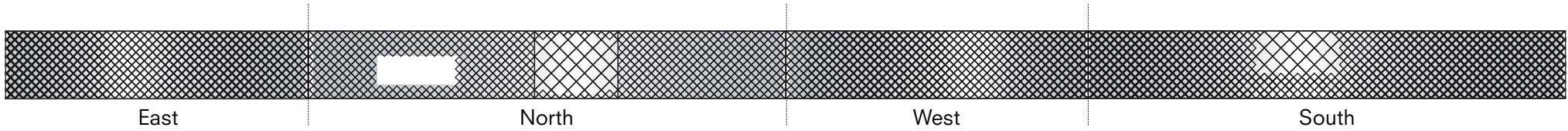


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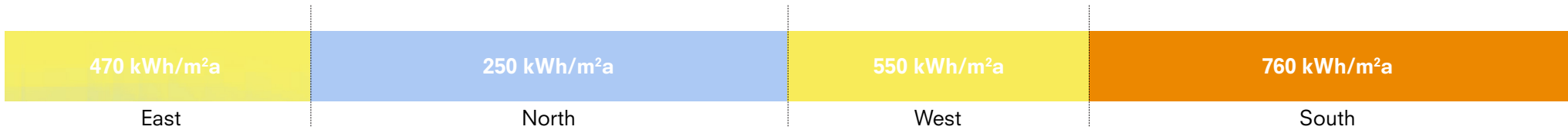
Curtain wall grid



PV facade

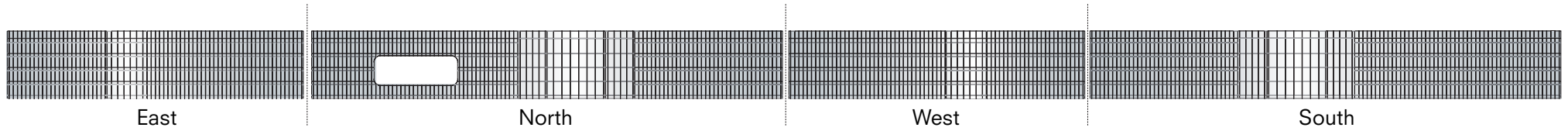


Base solar radiation

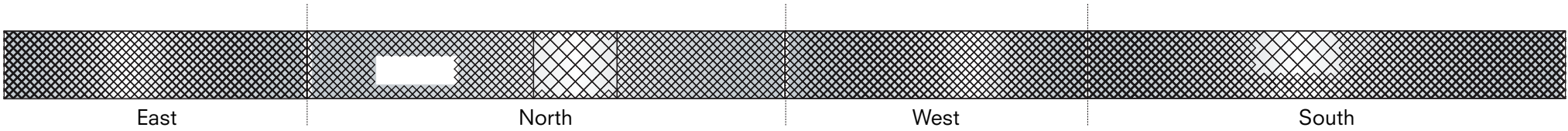


FACADE DESIGN

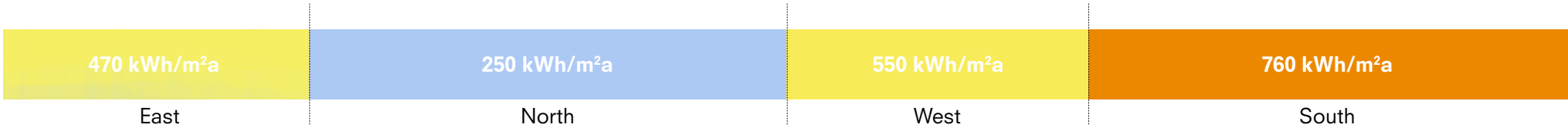
Curtain wall grid



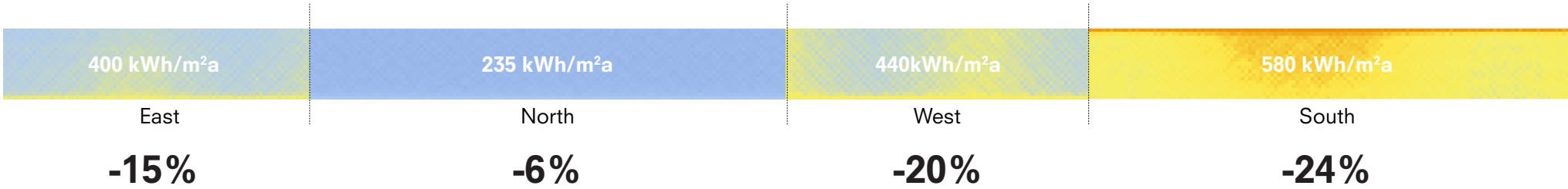
PV facade



Base solar radiation

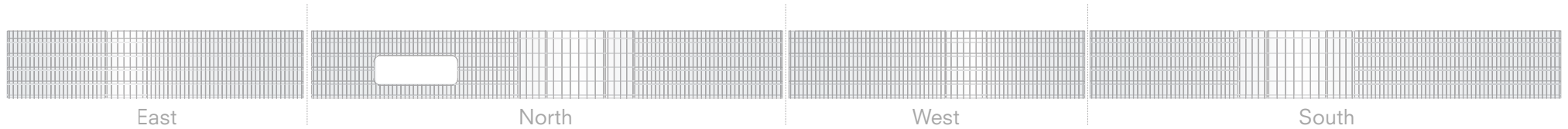


Solar radiation with PV facade

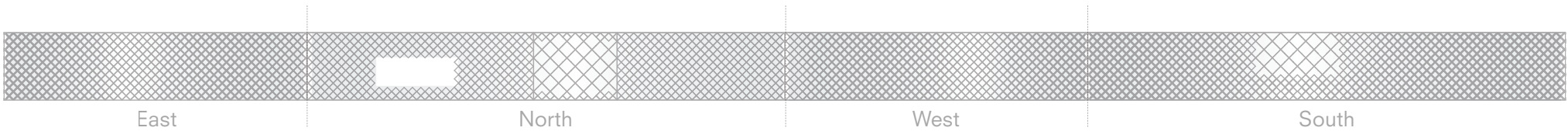


PV ELECTRIC YIELD

Curtain wall grid



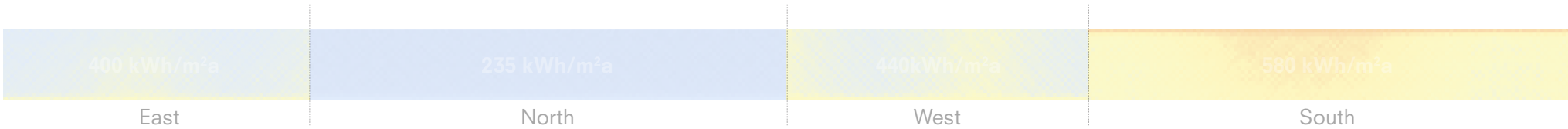
PV facade



Base solar radiation



Solar radiation with PV facade



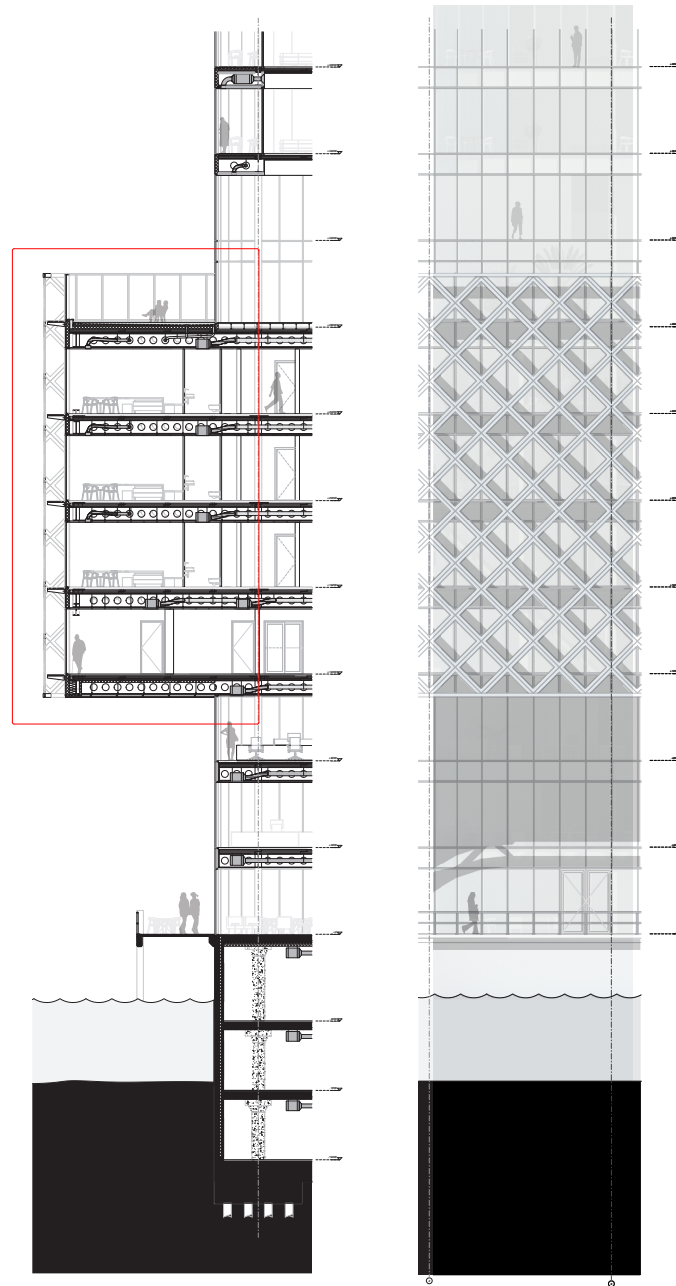
-15%
15.6 MWh

-6%
5.3 MWh

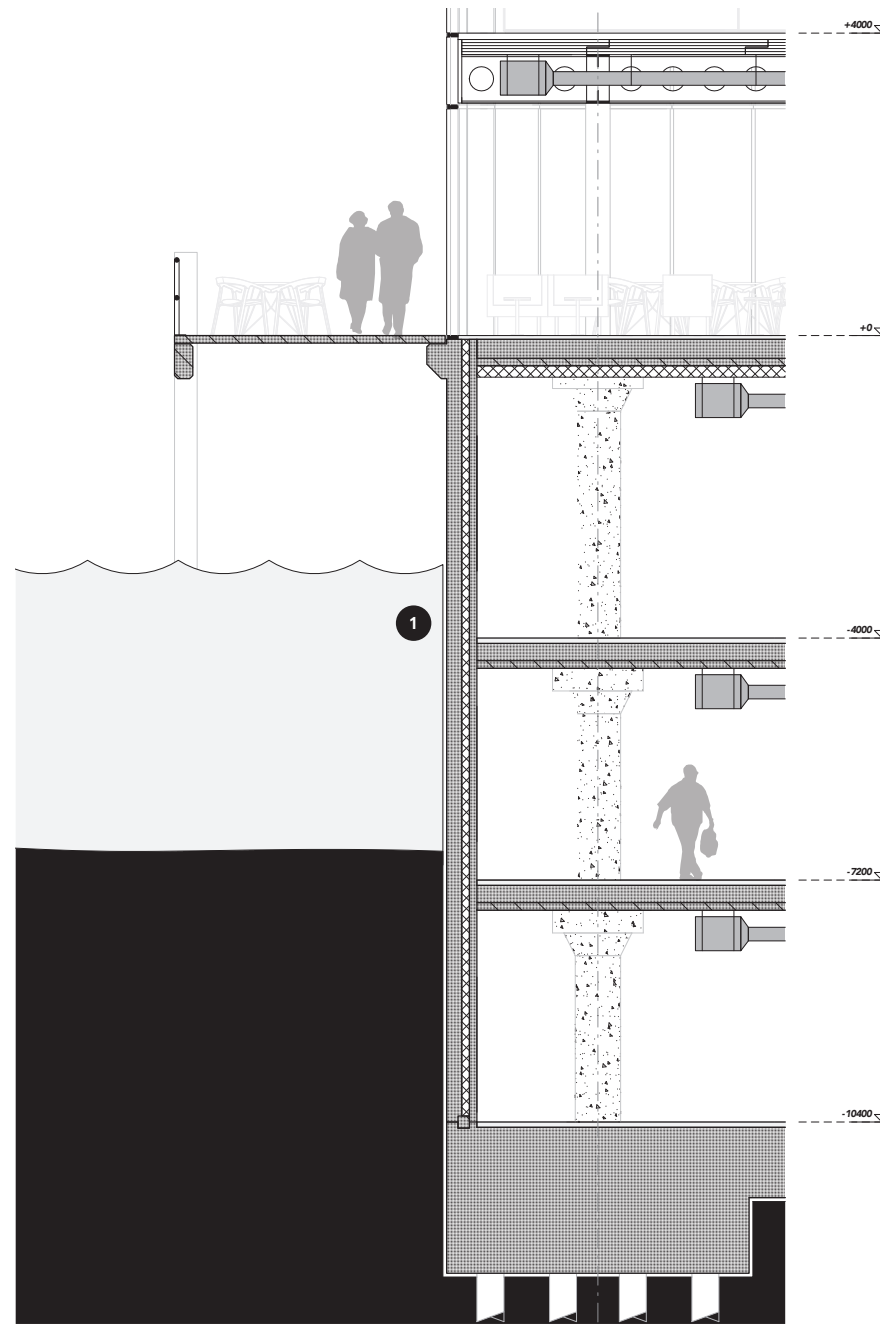
-20%
24.5 MWh

-24%
64.6 MWh

FACADE FRAGMENT 1:50

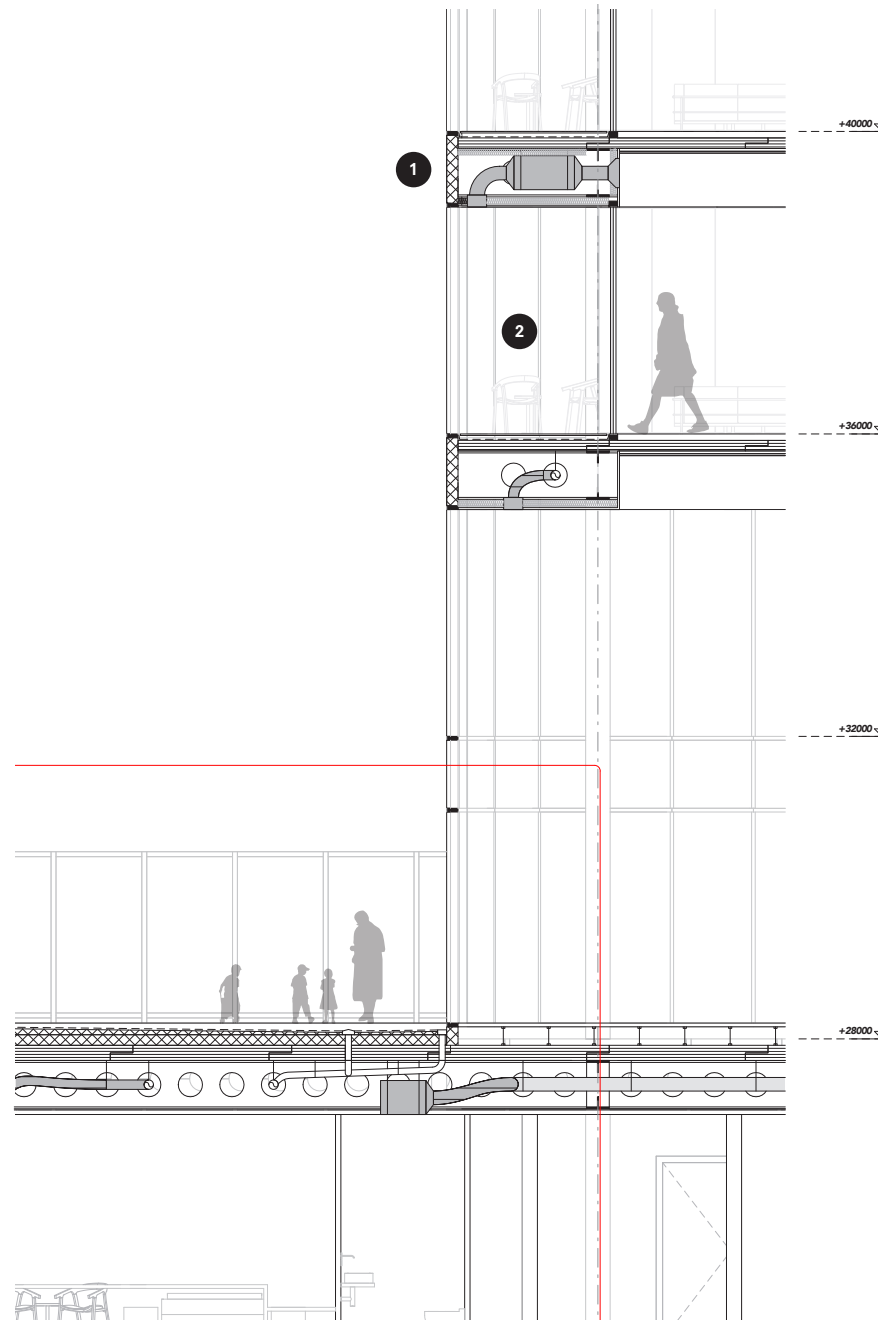


BASEMENT



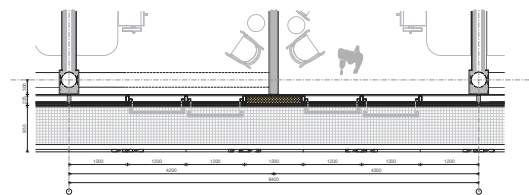
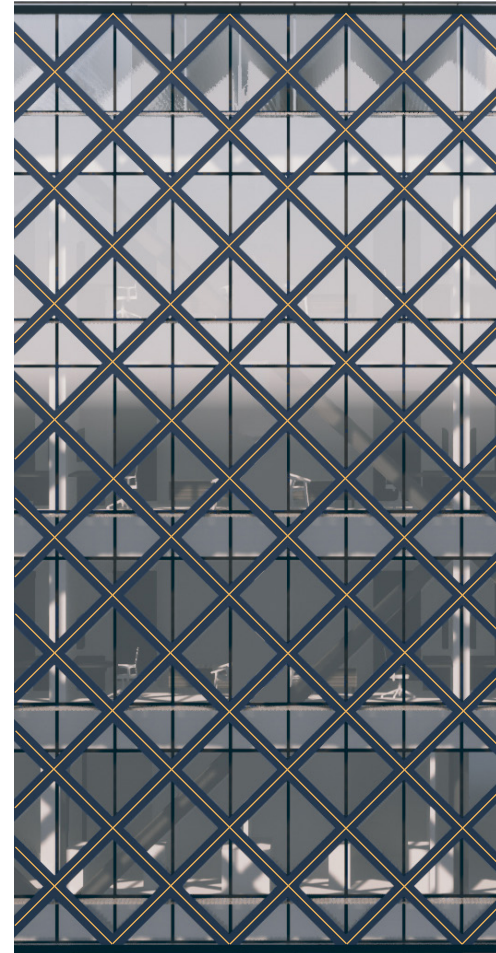
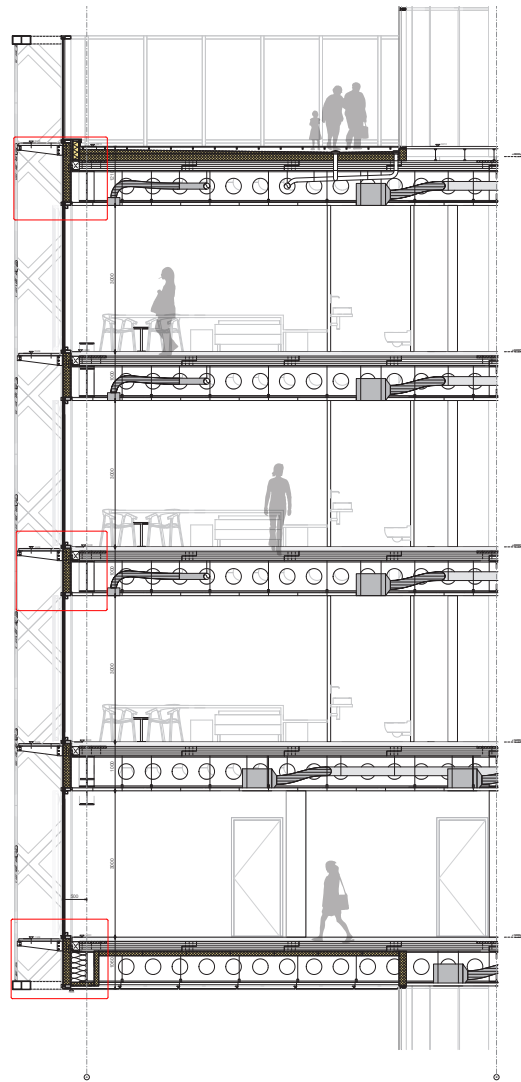
- 1 Cast in-situ concrete water-repellant wall, 200mm outer leaf, 100mm PIR insulation, 100mm inner leaf, $R_c = 4.5\text{m}^2\text{K/W}$

RESIDENCES

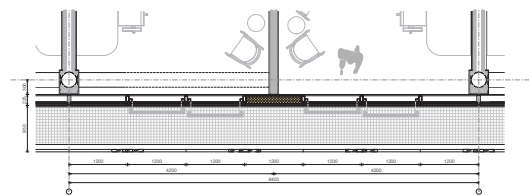
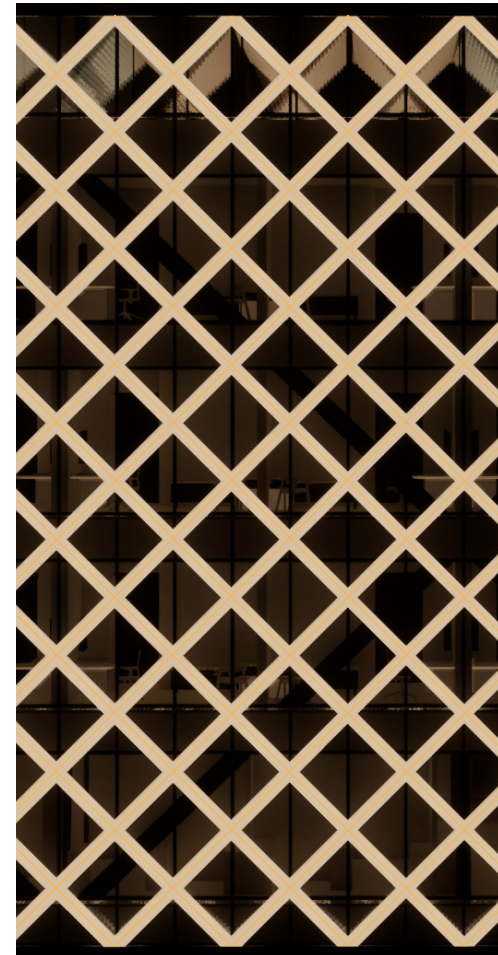
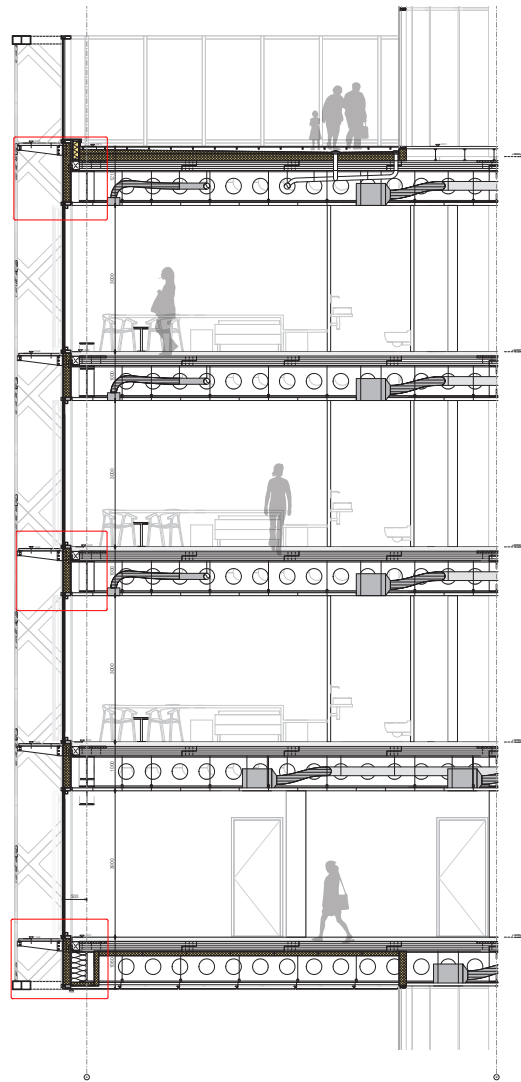


- 1 Decentralized HRU ventilation units integrated into ceiling in terrace
- 2 Balcony as intermediate climate space

FLOATING PLINTH FRAGMENT

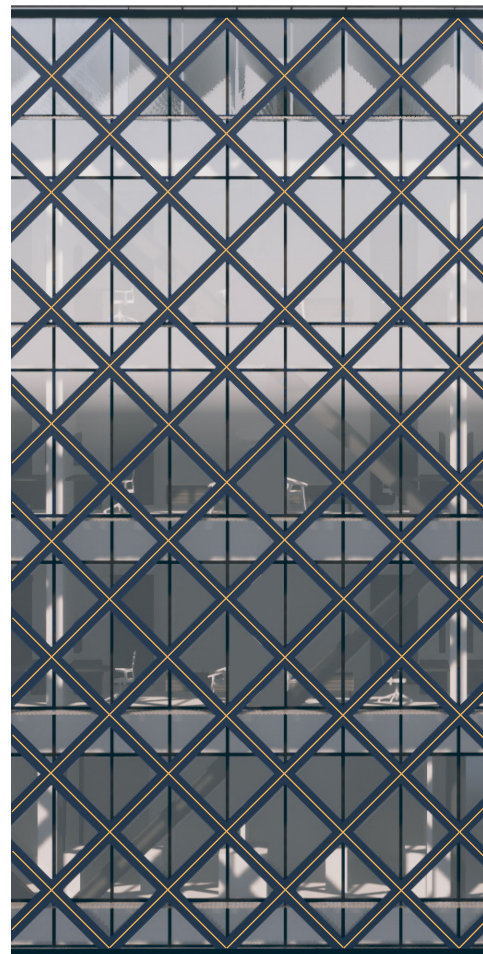
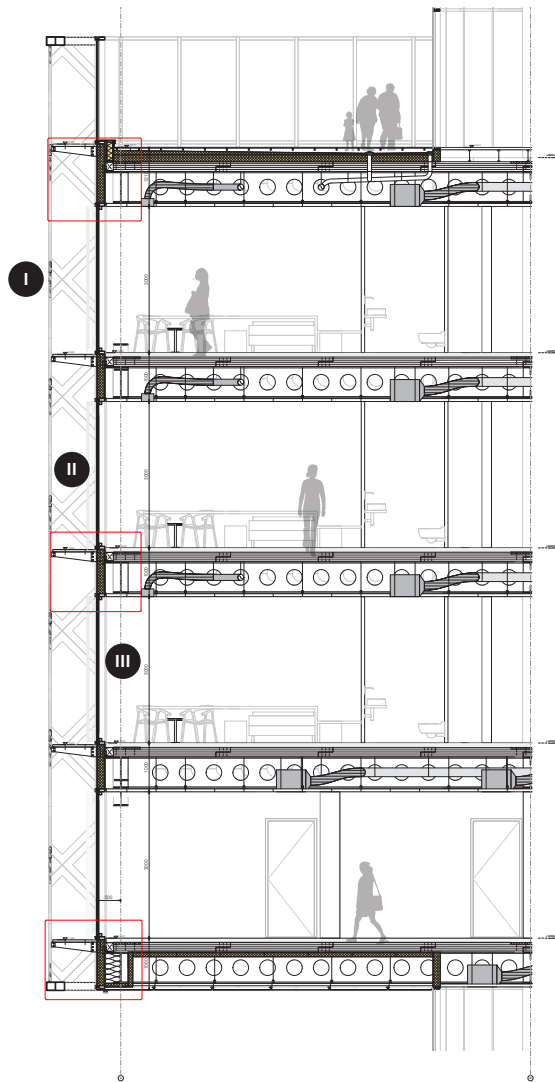


FLOATING PLINTH FRAGMENT



LAYERED SHADING

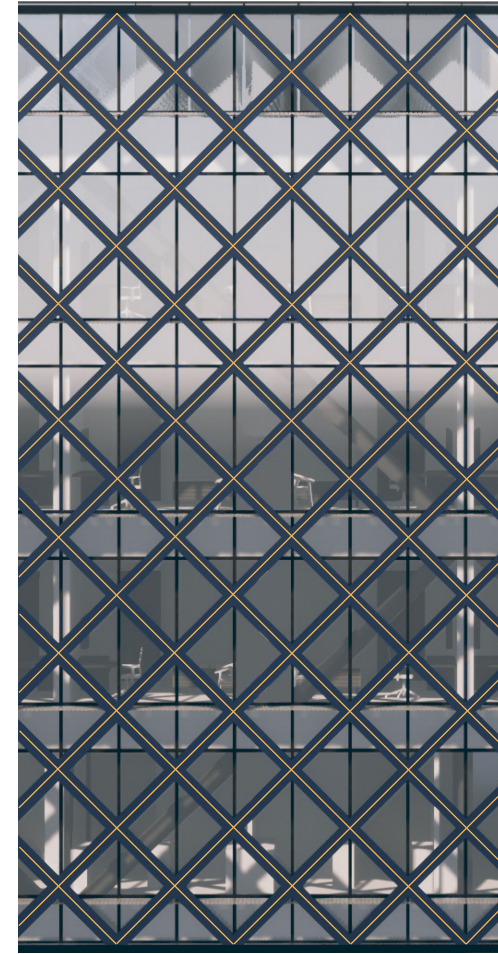
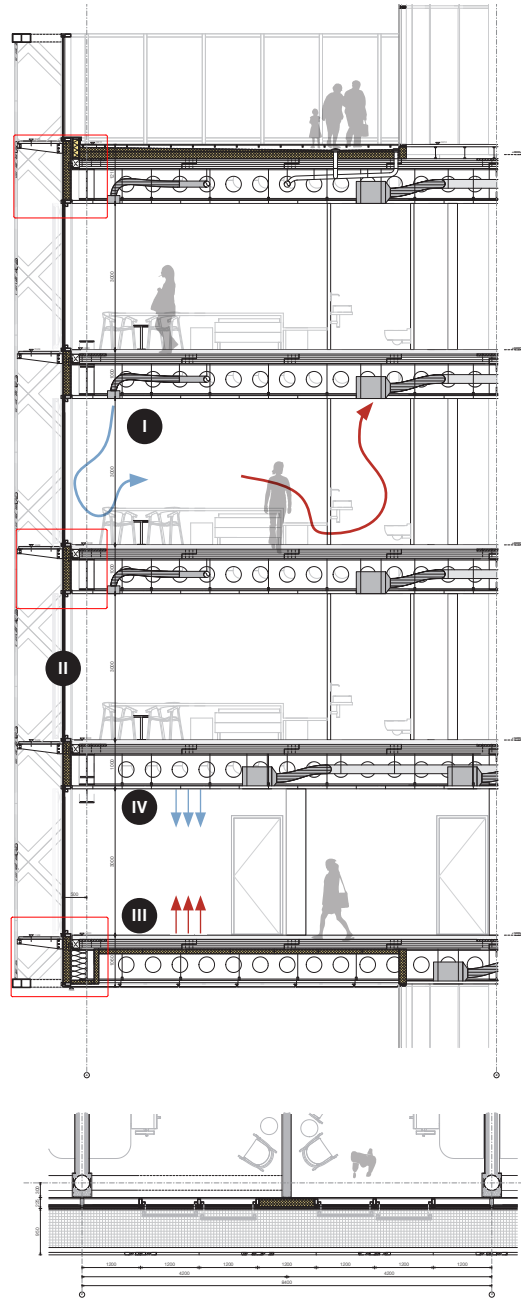
- PV shading (passive) **I**
- Low SHGC glass (passive) **II**
- Indoor shades (electric with manual override) **III**



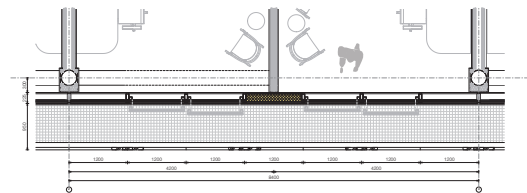
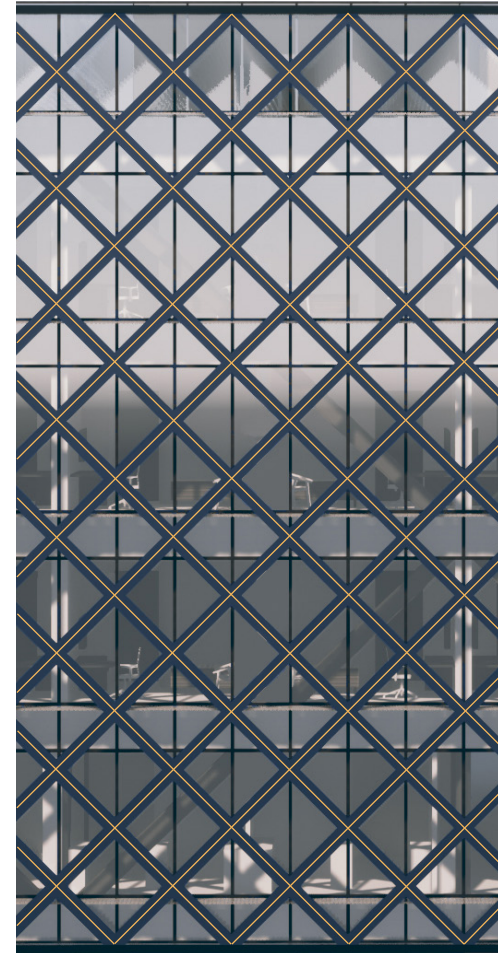
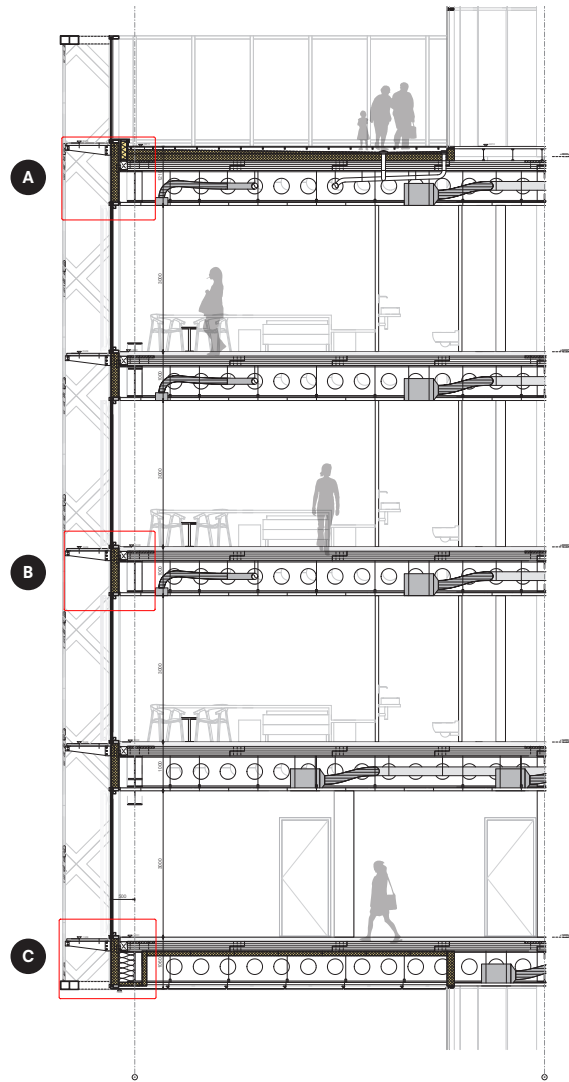
Design

HVAC

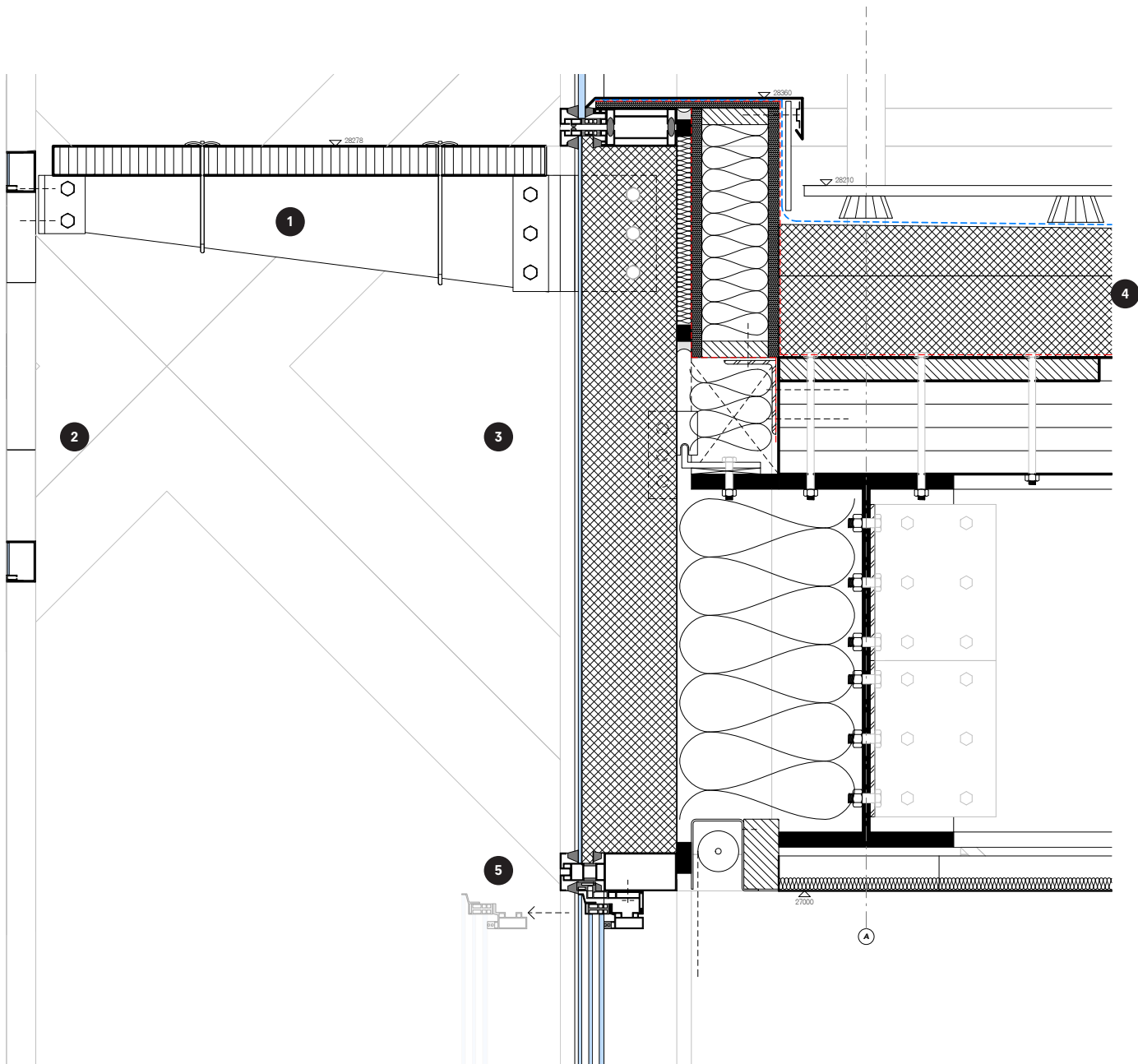
- Mechanical ventilation **I**
- Electrically-operable windows **II**
- Floor heating/cooling **III**
- Climate ceilings **IV**



DETAILS

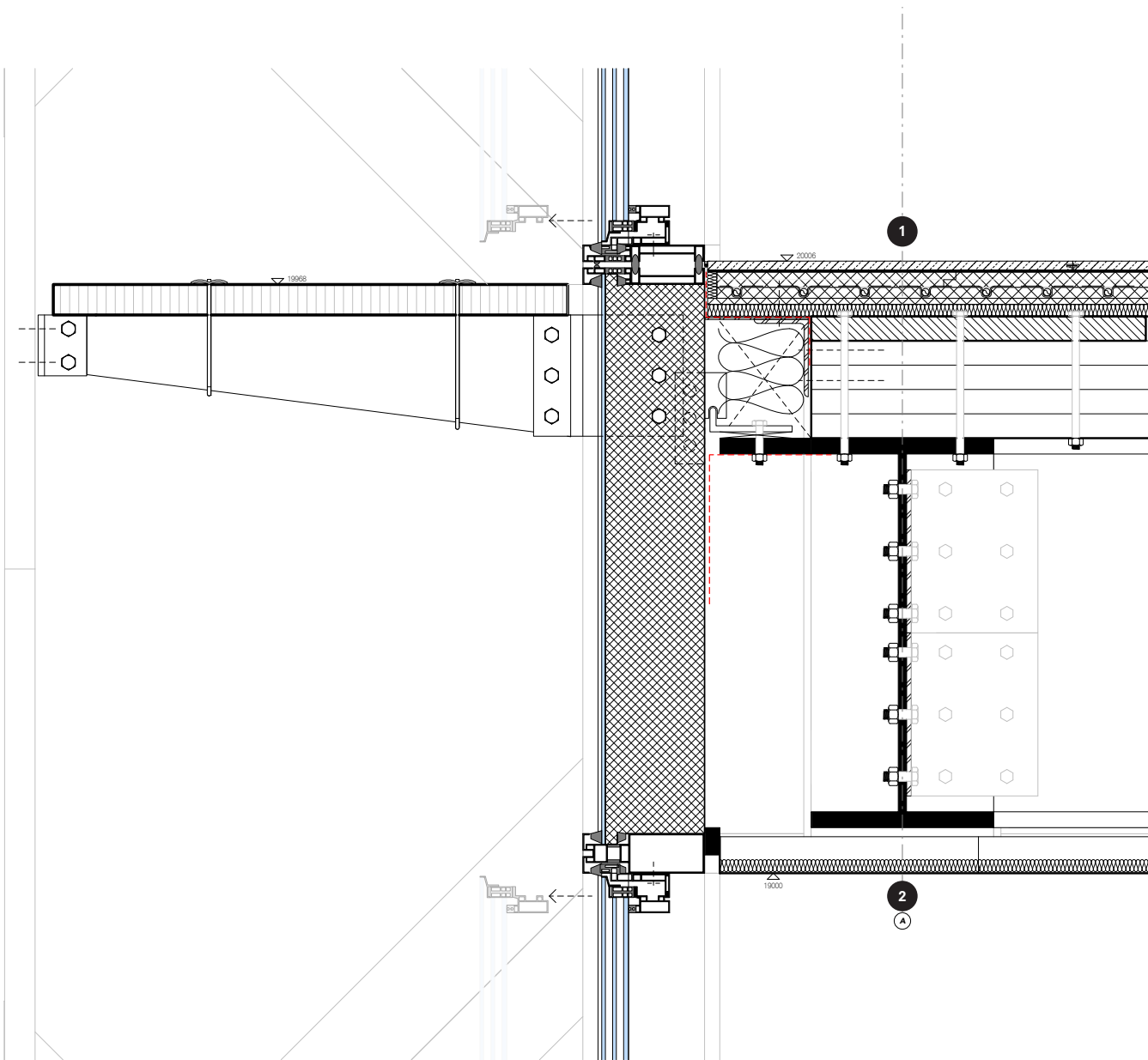


DETAIL A



- 1 Cantilever extension (12mm steel plate) attached to curtain wall with CFRP thermally broken Y connector. 25x3mm steel grate floor connected with J struts.
- 2 PV facade, 900mm from curtain wall with maintenance catwalk.
- 3 Unitized aluminum curtain wall, 67x200mm framing with laminated triple glazing (4*4-12Kr-6-12Kr-4)
- 4 Roof buildup: timber decking on plastic feet, 2mm EPDM roofing, 140+60mm sloped FM approved PIR insulation, vapor barrier, CLT200 floor plates
- 5 Parallel opening window with structurally glazed insert

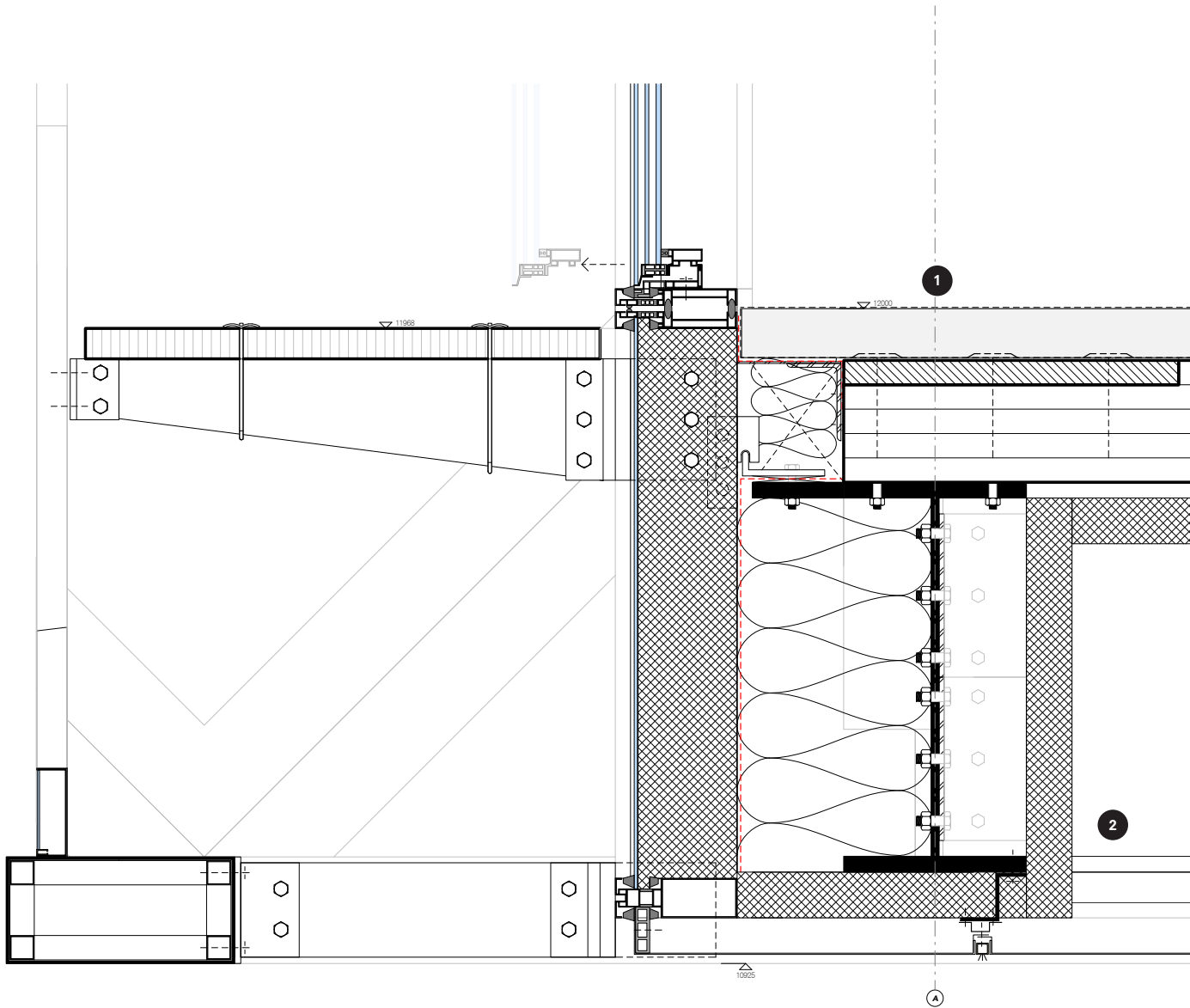
DETAIL B



1 Dry floor buildup: 18mm clicking natural stone tiles (900x900mm), double layer gypsum fiber board (25mm), 18mm pre-cut gypsum fiber board with floor heating with aluminum fins, 10mm gypsum fiber board, 20mm hard-press rockwool, CLT200 floor slab with hardwood connector plates

2 Acoustic climate ceiling

DETAIL C



- 1 Wet floor buildup: 50mm cement screed, watertight lining, CLT200 floor slab
- 2 Floating plinth ceiling: 70mm PIR insulation attached to CLT floor, mirror panels suspended from omega mounting profiles (100x20mm) and L mounting profiles (40x40mm) attached to Z hooks, mirror reflective ceiling panels (1200x1200mm) (3mm thick sandwich with mirror coating)

Introduction

Research

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INDEX

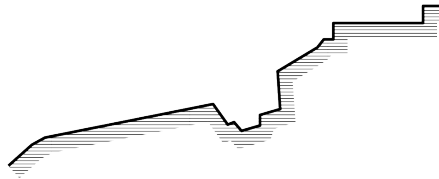
A WATER CITY IN SEARCH OF A WATERFRONT



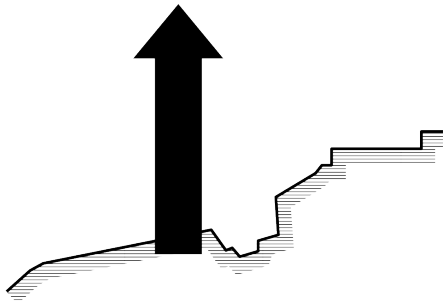
RESEARCH QUESTION

**How can waterfront densification
contribute to interiorizing the Maas river?**

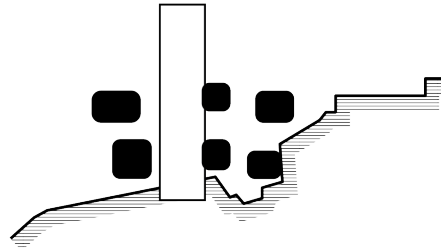
TRANSVERSAL APPROACH



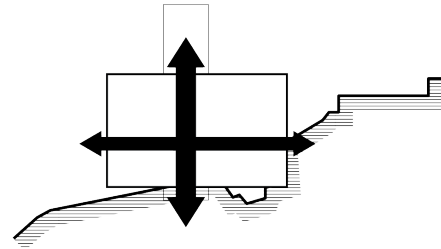
SITE



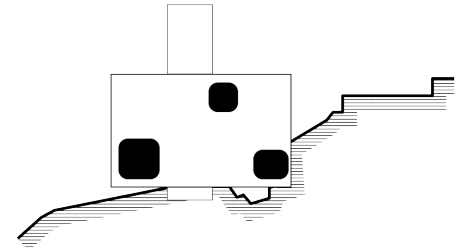
PUBLIC PIER



SECTIONAL BASE

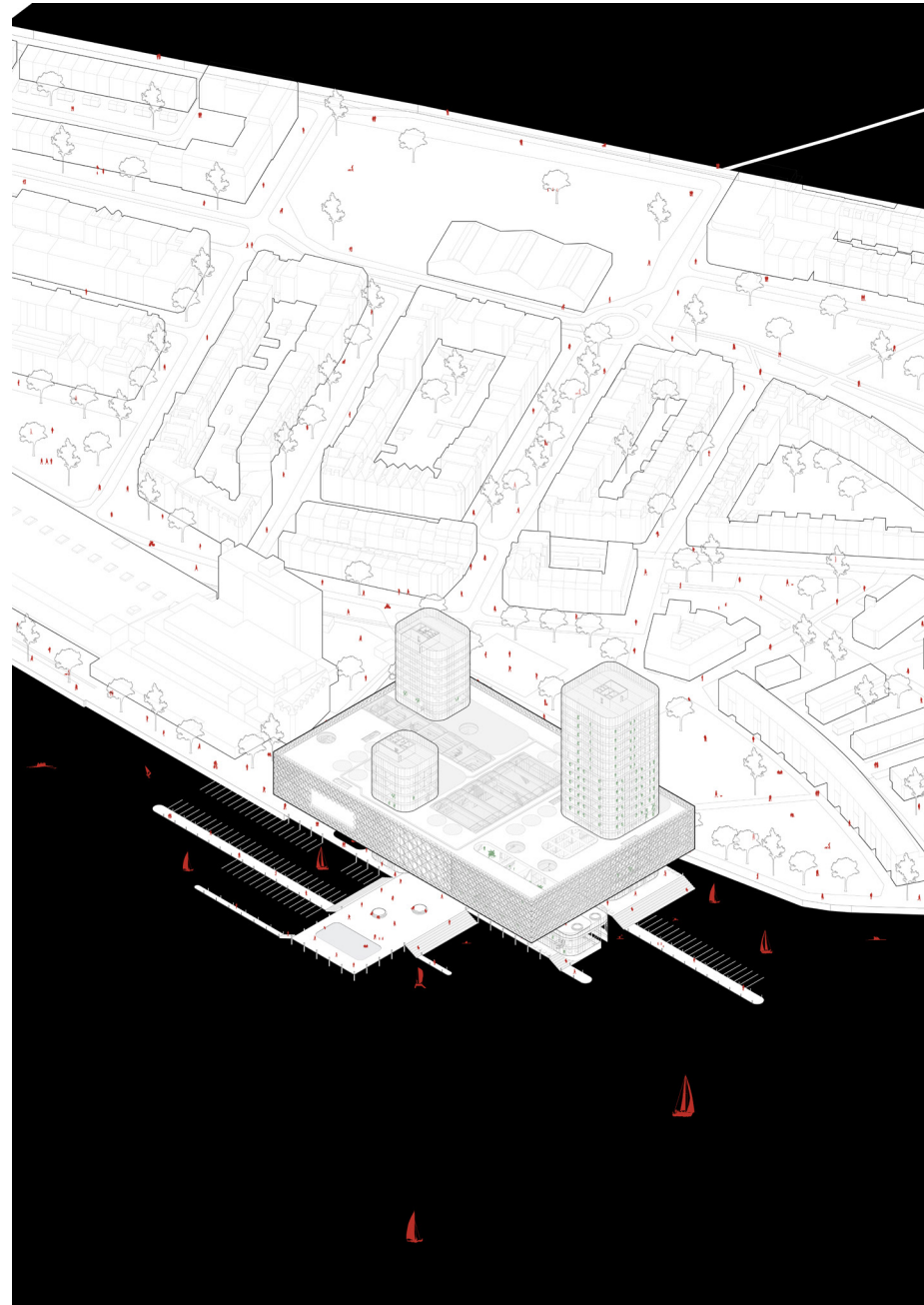


RAISED PLINTH



URBAN TOWERS

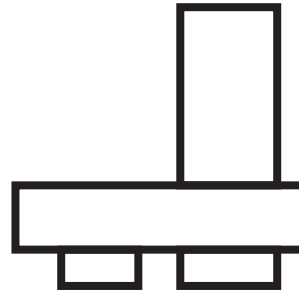
NEW URBAN FRONT



Conclusion

INTERIORIZING THE MAAS





THANK YOU



complex projects