P5 Presentation

Stage of the City
a resilient new theatre in Gouda



Nicole Hartmann | Architectural Engineering Graduation Studio | 10 - 11 - 23
Tutors: Design - Thomas Offermans | Building Technology - Pierre Jennen | Research - Fransje Hooimeijer



FOTO: HANS VERSTEEG

De natste oktober in De Bilt sinds 1906

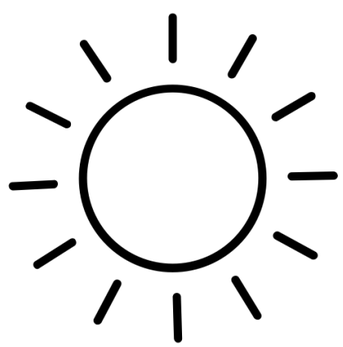
31 oktober 2023

De maand oktober was zeer zacht en zeer nat. Oktober eindigt op de zesde plek in de top 10 van warmste oktobermaanden sinds 1901 met een gemiddelde temperatuur van 13,2 graden in De Bilt. De maand was de natste oktober in De Bilt met circa 220 millimeter sinds de start van de neerslagmetingen in 1906.

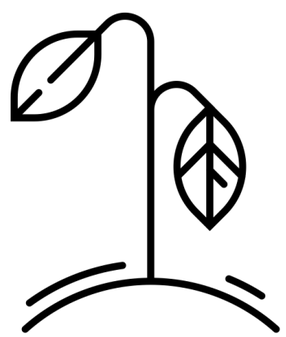
KNMI CLIMATE SCENARIOS



heavy rainfall



sun & heat



dry periods

URBAN PLUVIAL FLOODING



Gouda Market after heavy rainfall in 2021 (Hans Tibben Fotografie)

SUBSIDENCE





Damage and disconnection in Gouda

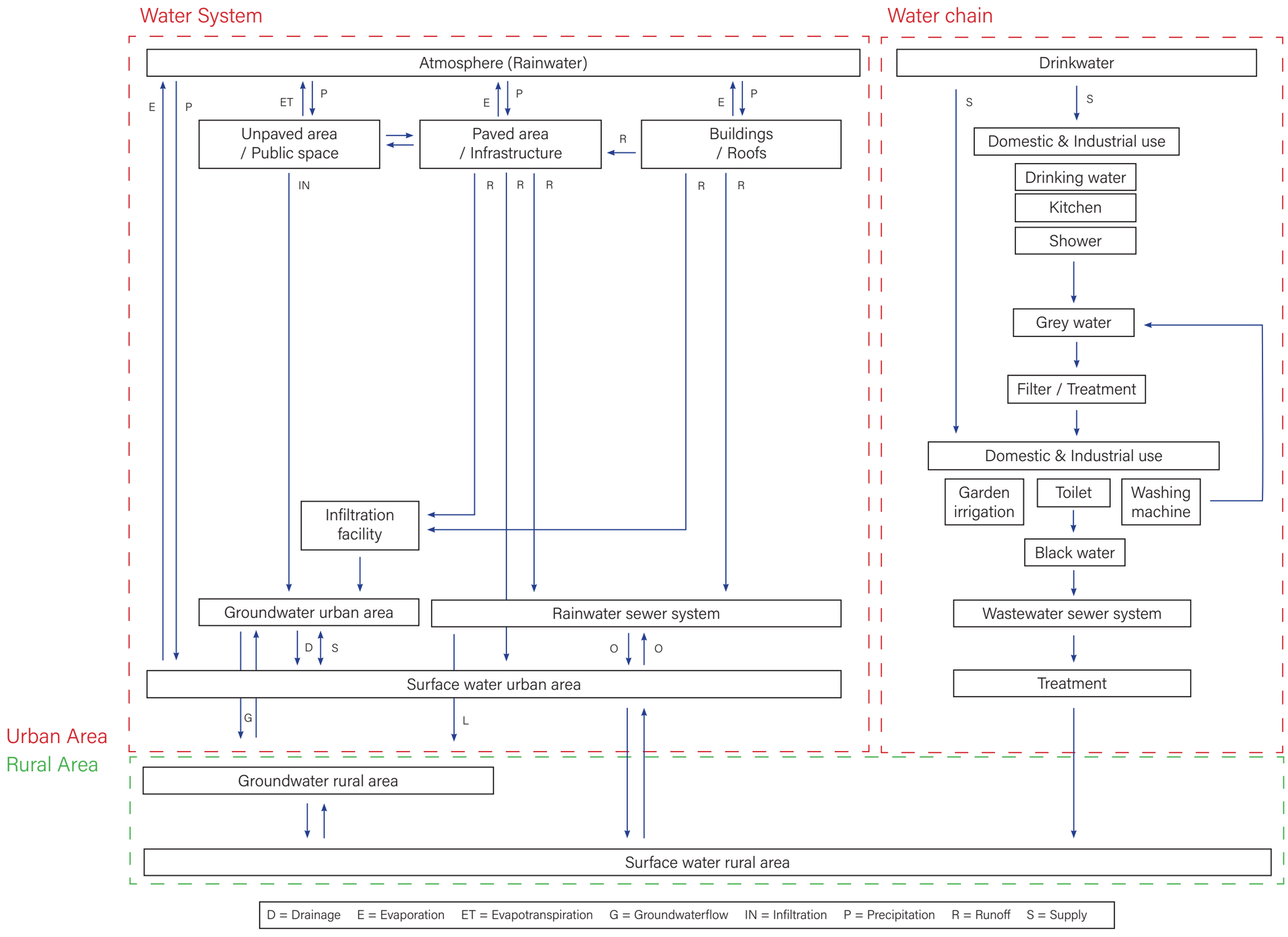
URBAN SCALE



BUILDING SCALE

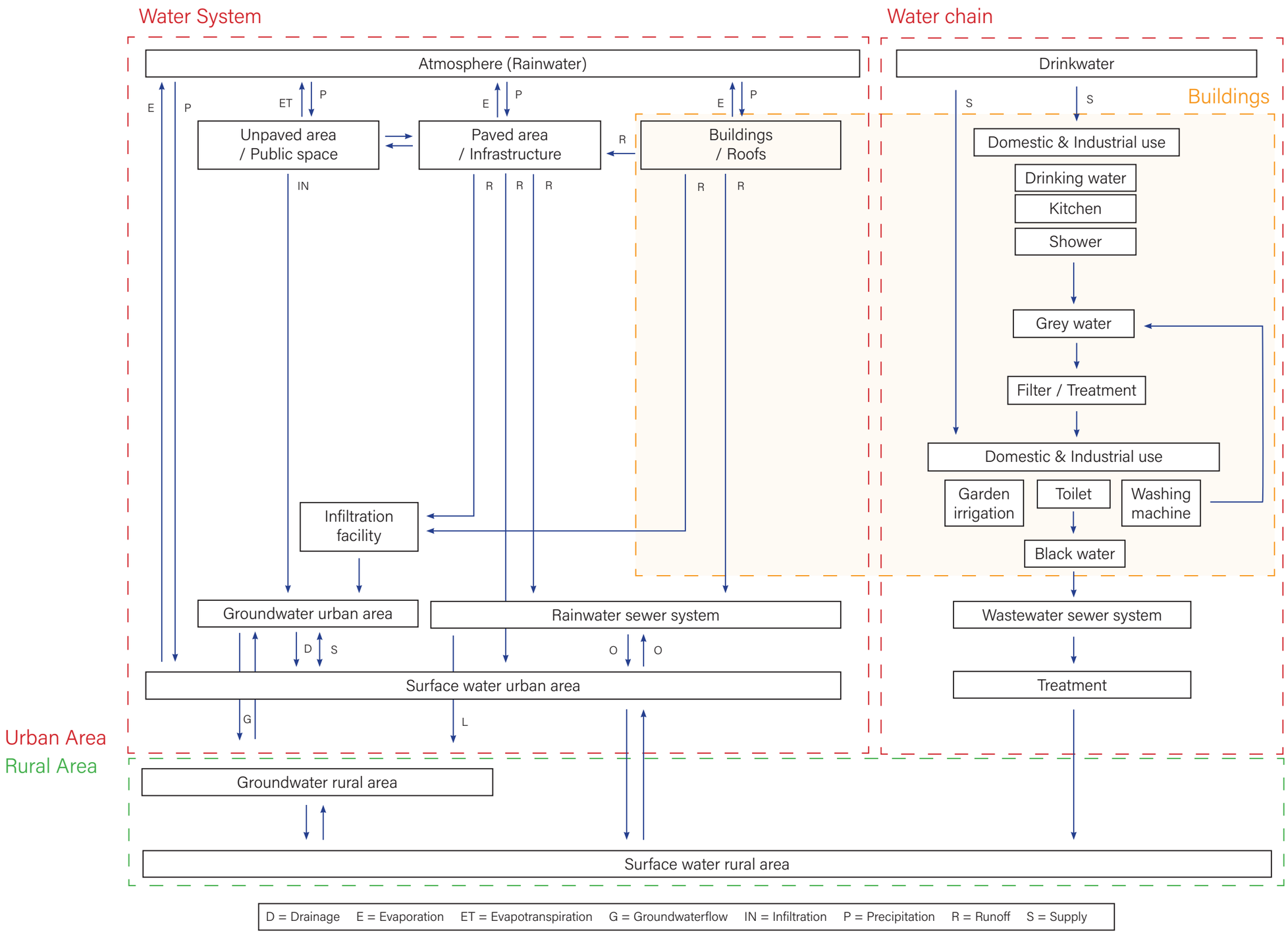


URBAN WATER SYSTEM



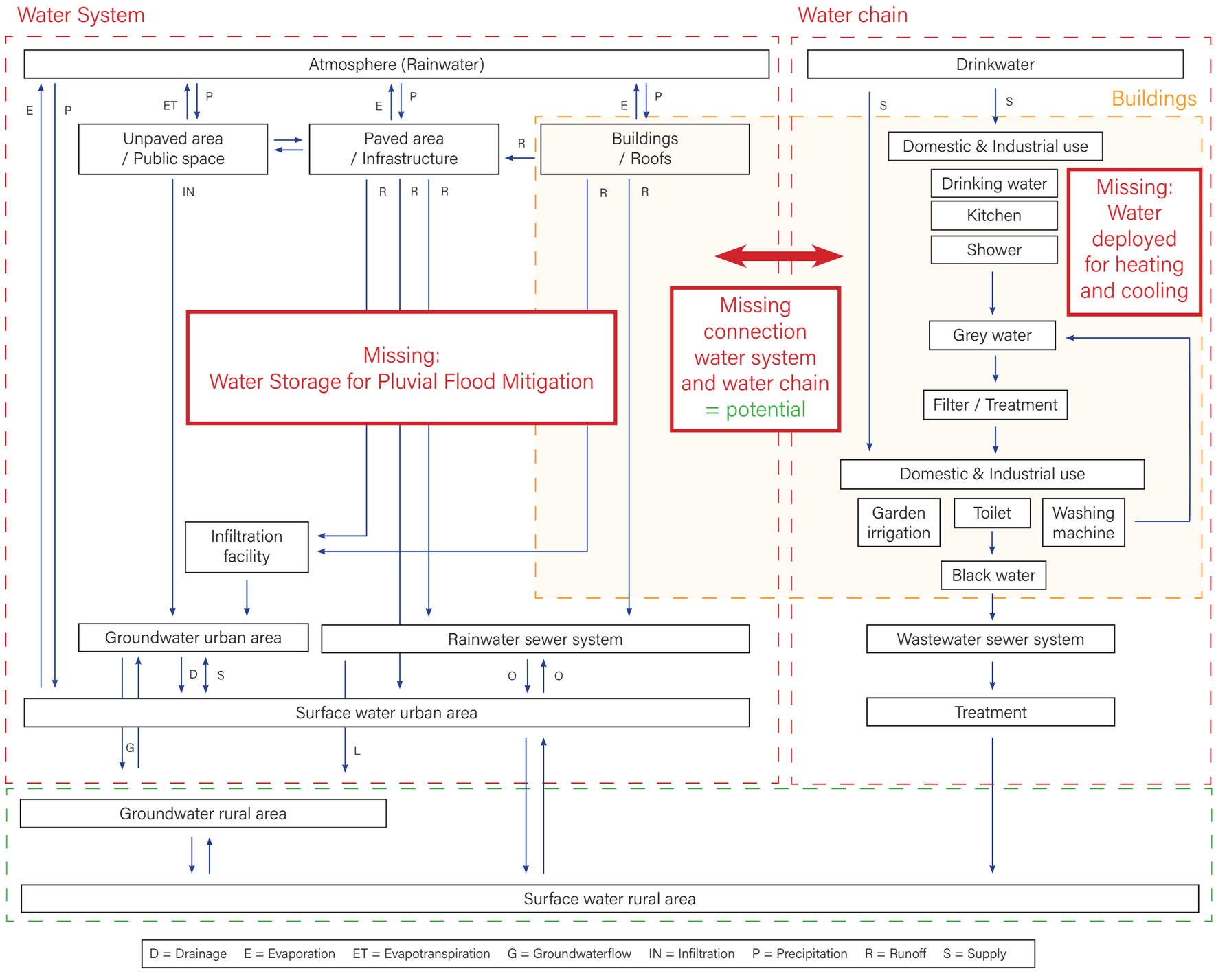
Based on schematisations by Rutger de Graaf & Jules van Hoof

THE URBAN WATER SYSTEM



Based on schematisations by Rutger de Graaf & Jules van Hoof

THE URBAN WATER SYSTEM



Based on schematisations by Rutger de Graaf & Jules van Hoof

RESEARCH

What measures can cities take on a smaller scale to mitigate the impact of pluvial flooding?

How can we see the abundance as an opportunity instead of a threat?

How can rainwater be harvested and reused?

How could rainwater can play a role in the climate systems for heating and cooling building?

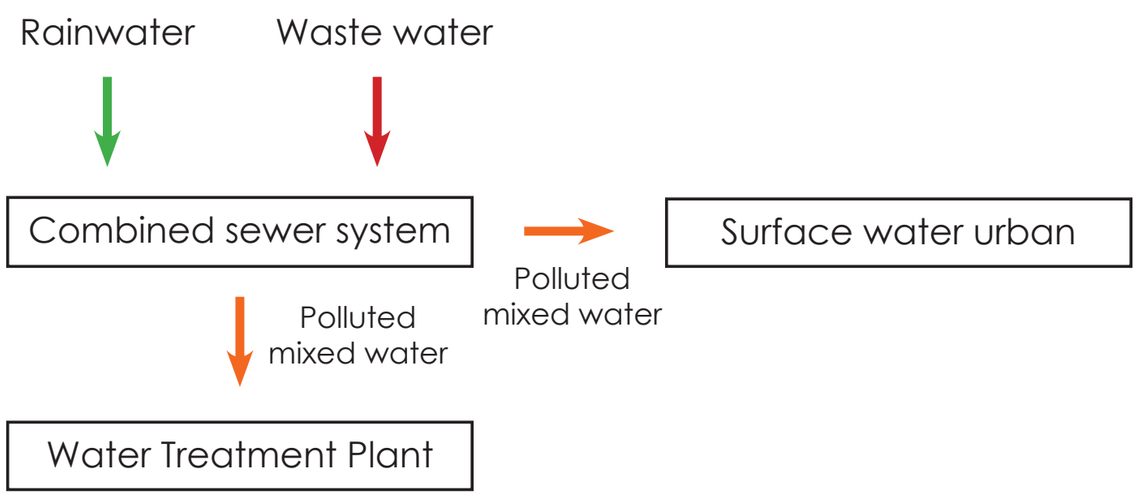
RESEARCH QUESTIONS

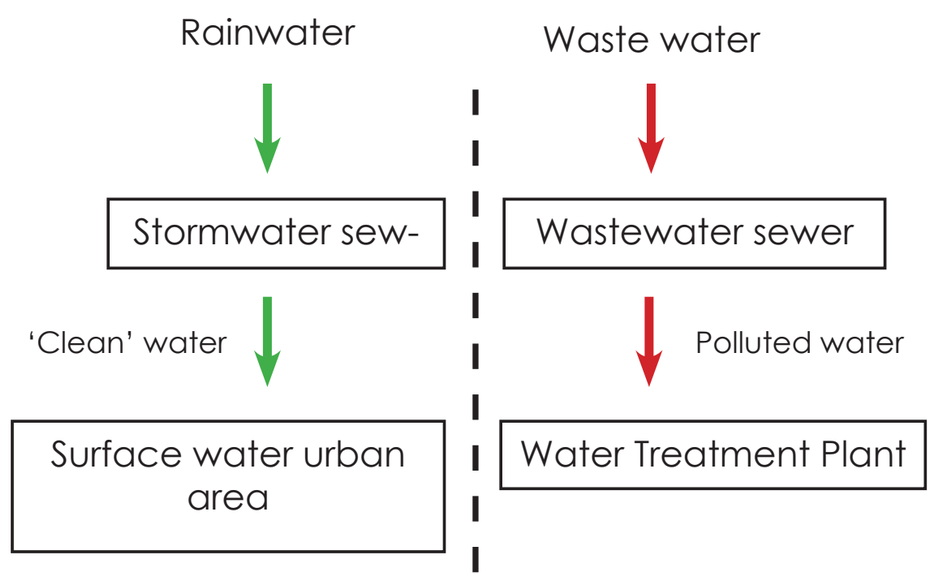
What role can architecture play in water management?

How can the position of buildings in the Urban Water System be improved to create a stronger connection between the water system and water chain, to mitigate urban pluvial flooding & benefit from the water?

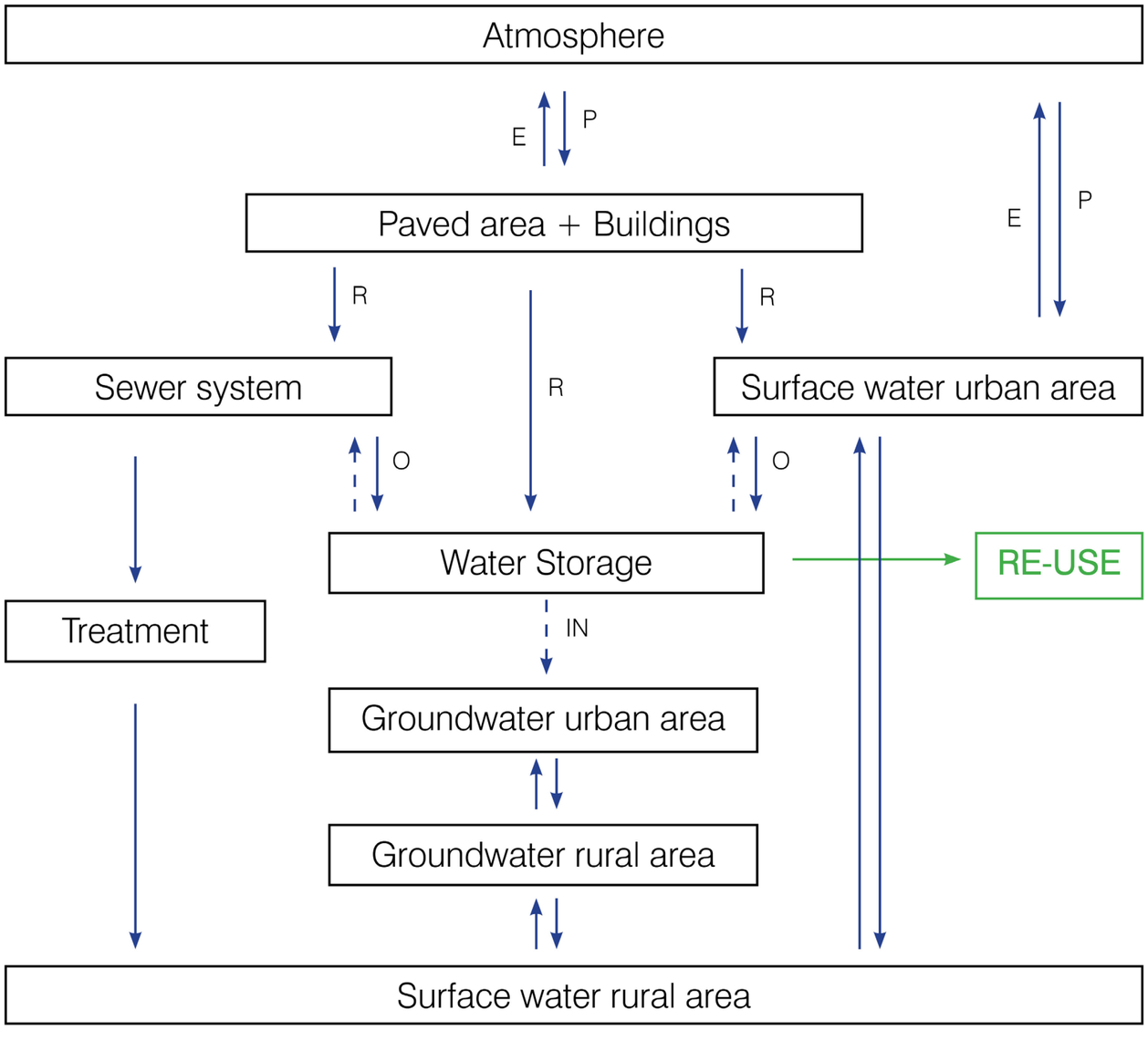
Could rainwater harvested from storage facilities to mitigate urban pluvial flooding be re-used in a building, specifically for heating and cooling?

SEWER OVERFLOW



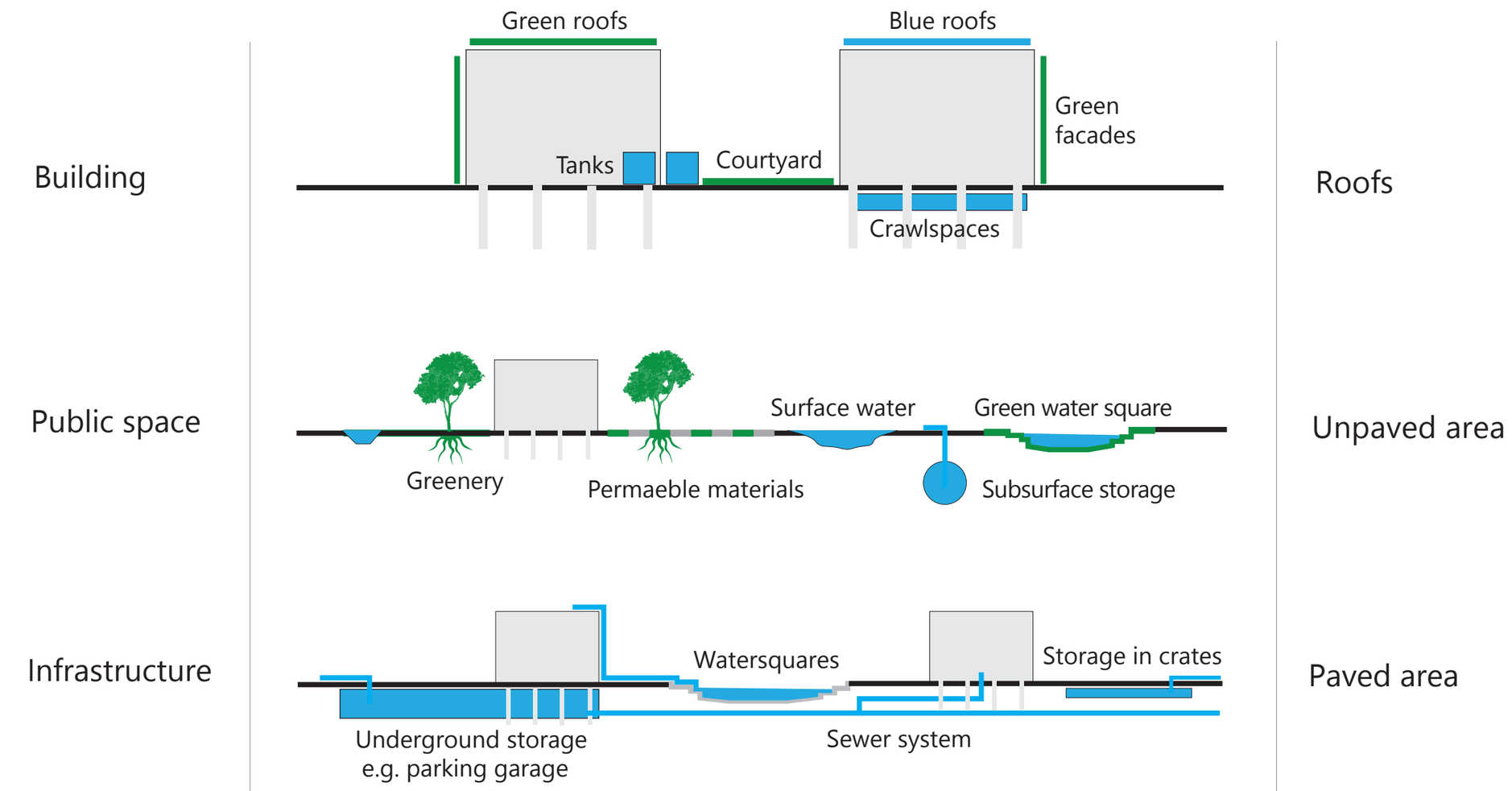


RAINWATER STORAGE



D = Drainage
E = Evaporation
ET = Evapotranspiration
G = Groundwaterflow
IN = Infiltration
P = Precipitation
R = Runoff
S = Supply

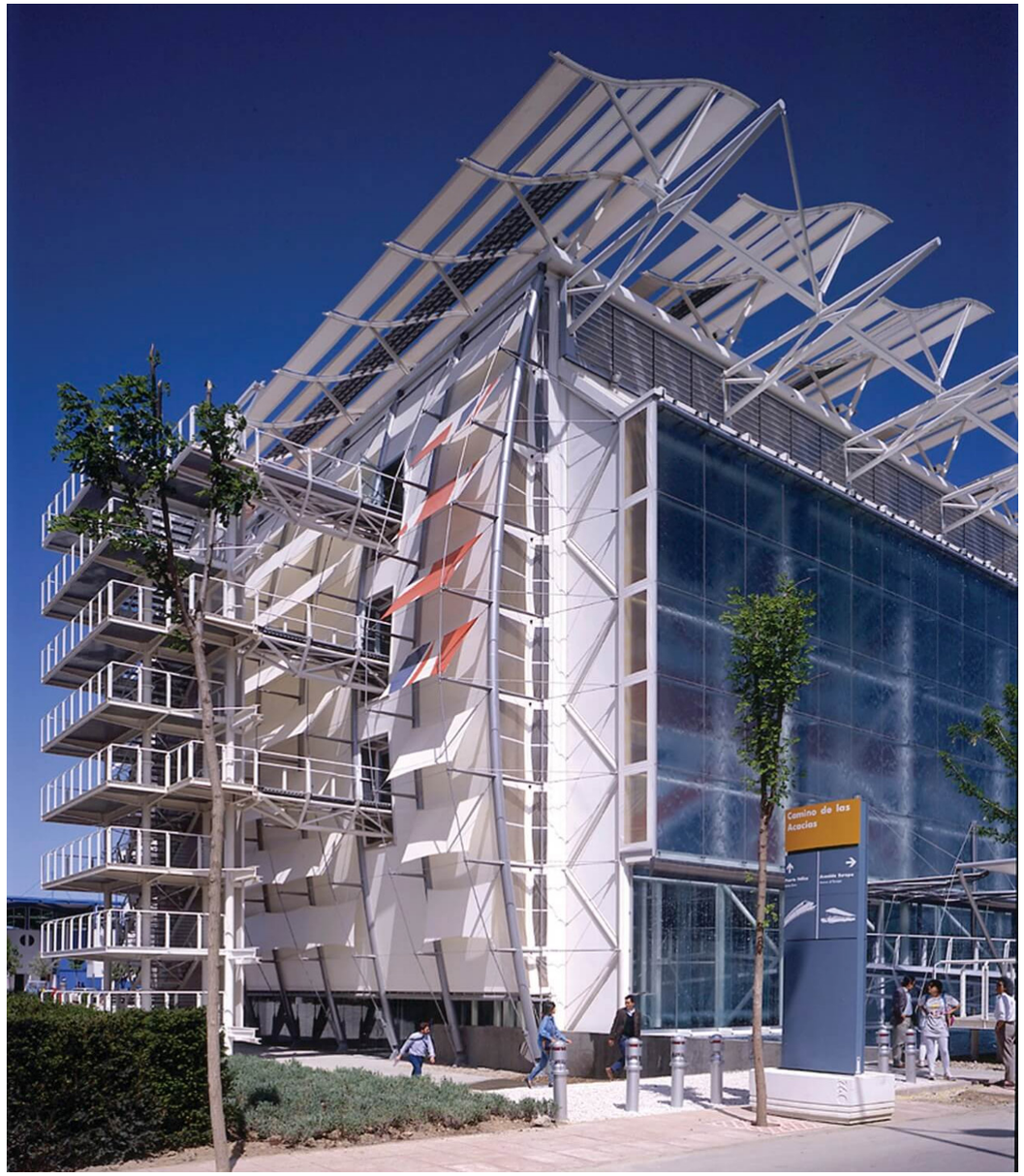
COLLECTION AND STORAGE



Layers	UWS Elements
Building	Roofs
Public space	Unpaved area
Infrastructure	Paved area

CLIMATE SYSTEMS

Aquathermia



Evaporative cooling

British Pavillion Expo 1992, Sevilla - GRIMSHAW

WATER AS SOCIAL OBJECT

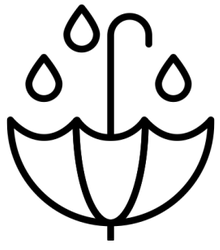




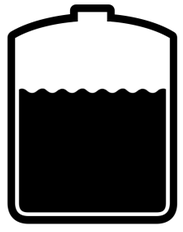




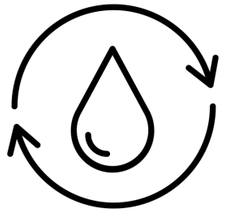
DESIGN OBJECTIVES



Collection



Storage



Harvesting



Leisure



Environmental



Aesthetic



Utilitarian



Symbolic



Social

LOCATION



GOUDA CITY CENTRE



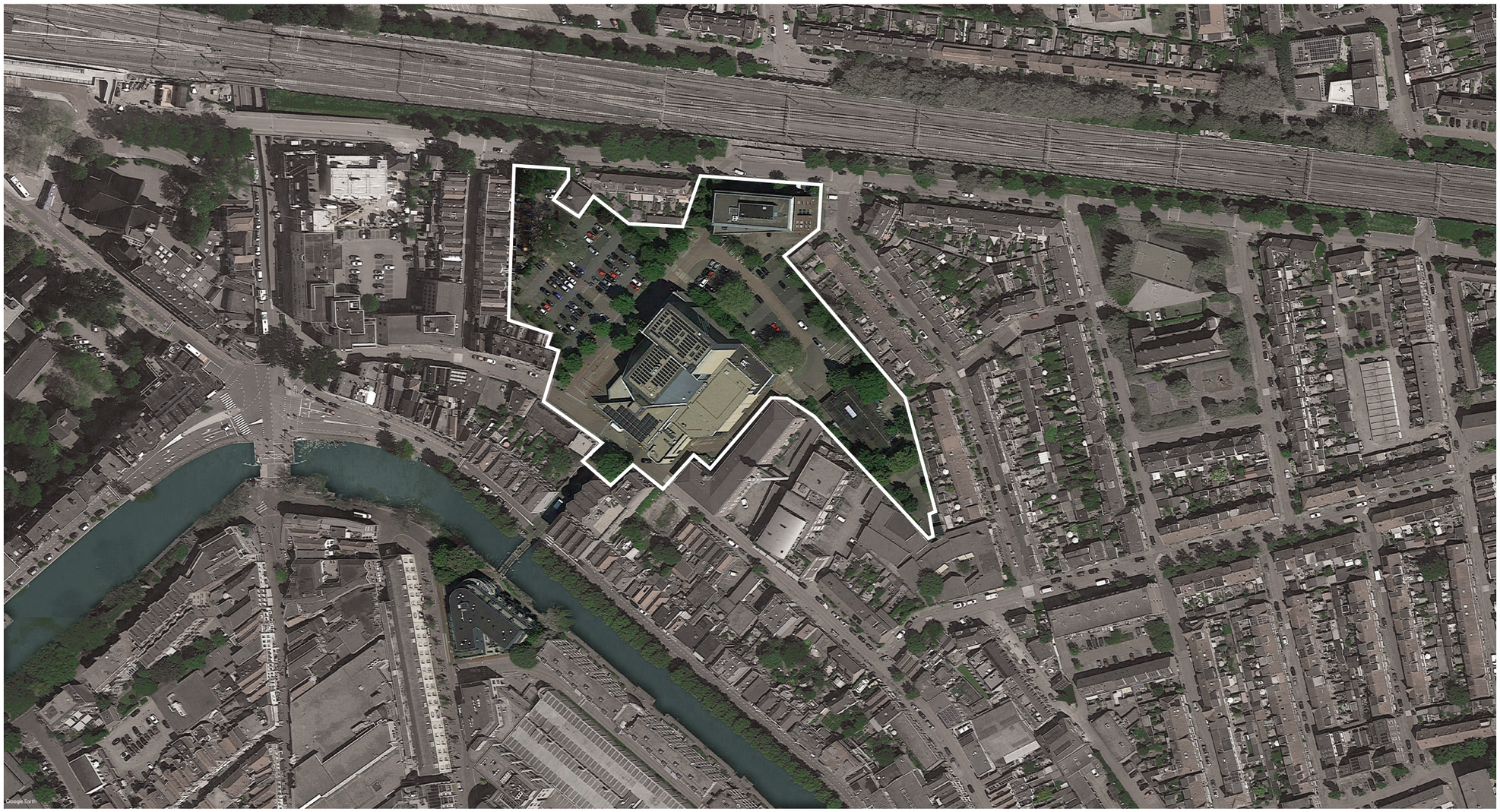
KADENBUURT



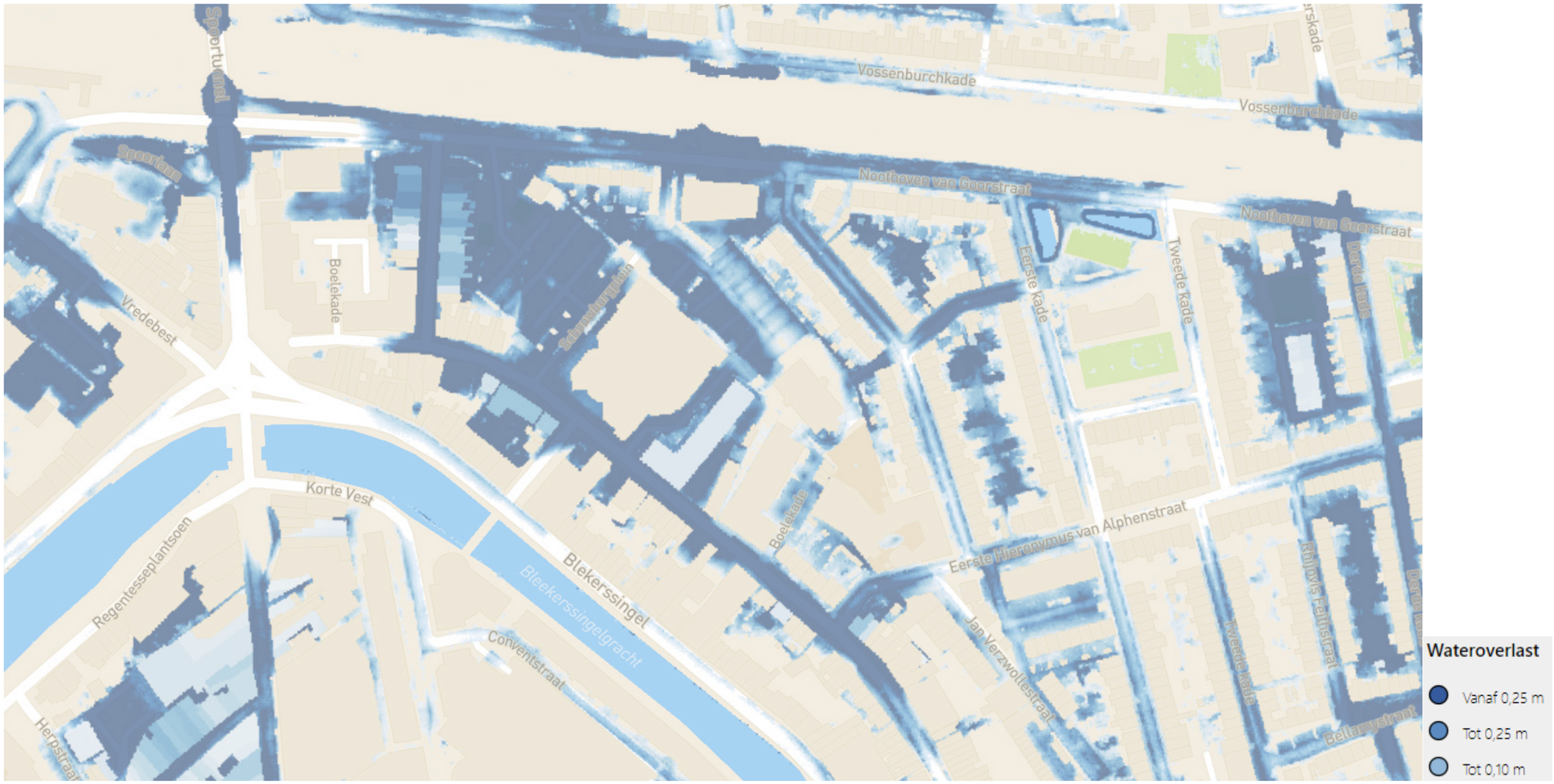
SCHOUWBURGPLEIN



SCHOUWBURGPLEIN

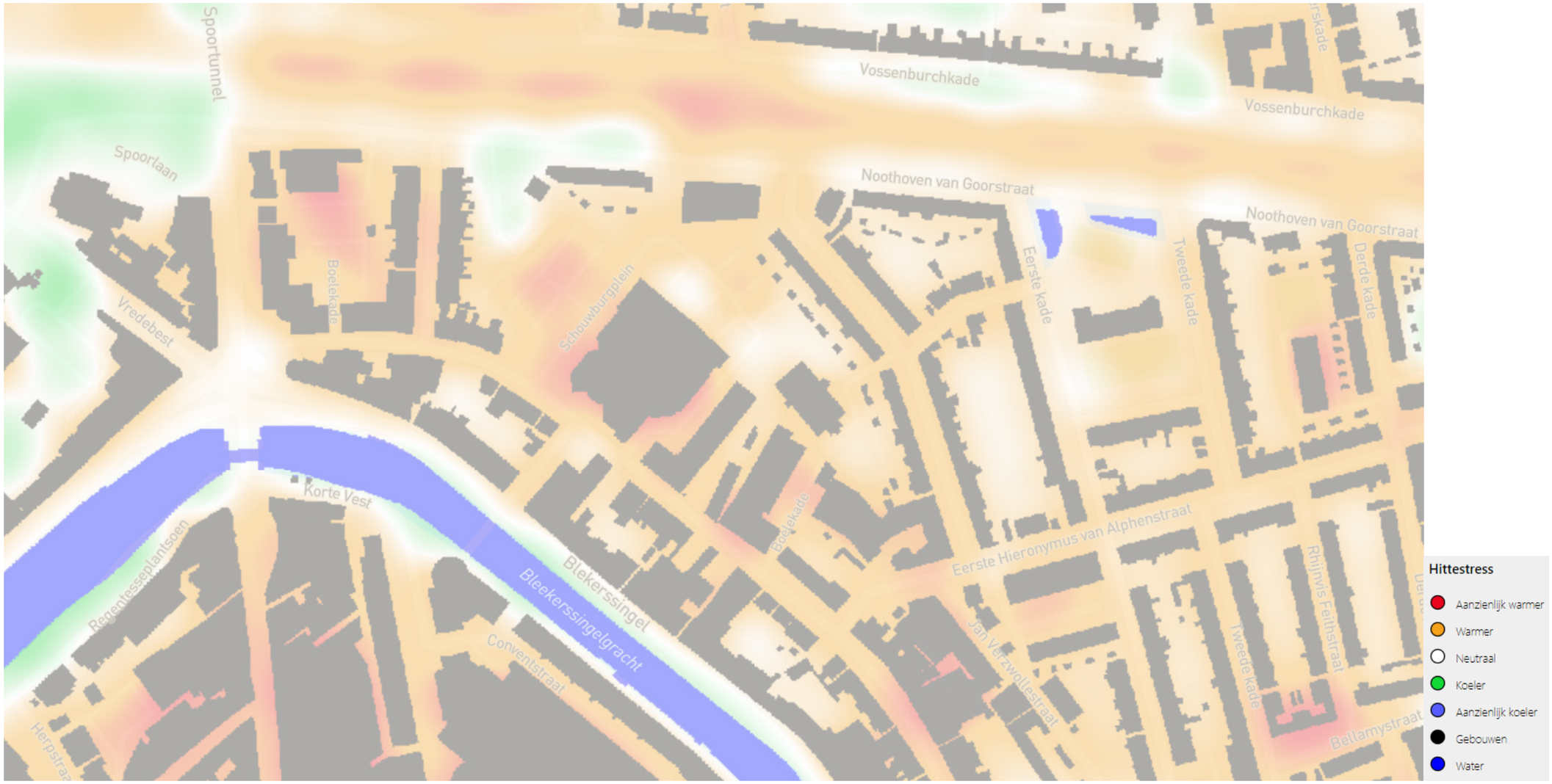


WATER NUISANCE



Klimaateffectatlas

HEAT STRESS



Klimaateffectatlas

PROBLEMS



highly paved, no green, only parking function



no public functions, people with small gardens trying to make living

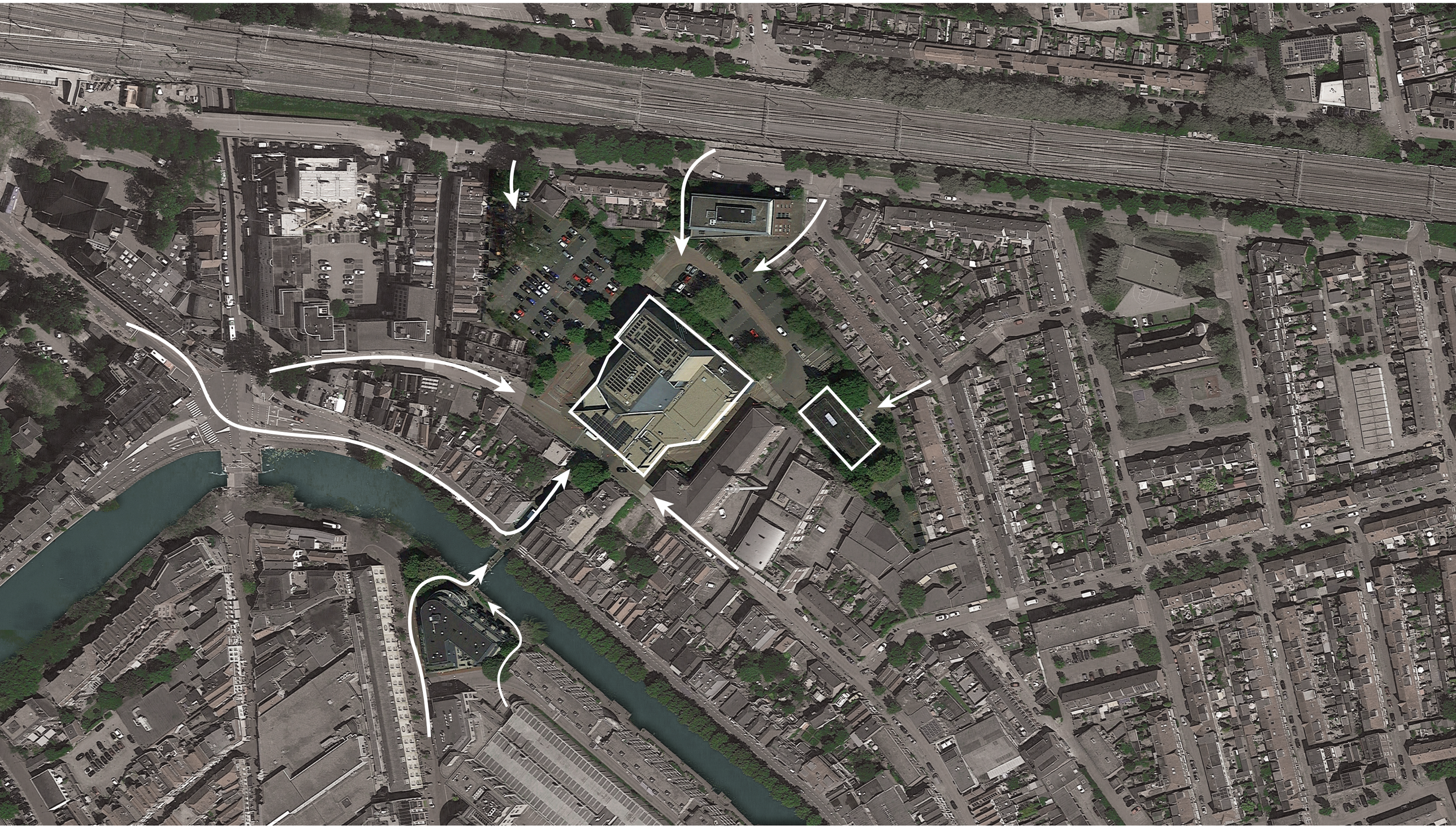


no connection to neighbourhood, fences





unapproachable buildings, closed facades, no interaction



DE GOUDSE SCHOUWBURG





schouwburg gouda



main axis from city centre



‘backside’ from parking





halls & theatre tower experienced as very positive by audience and users



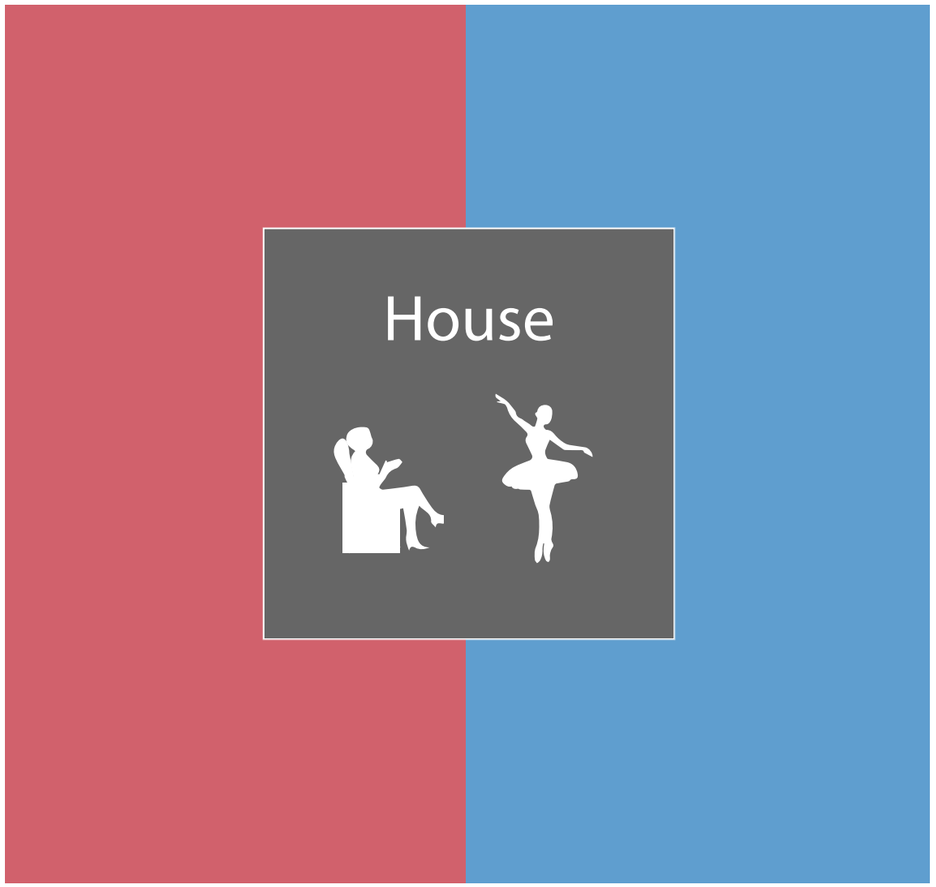


outdated & inflexible interior

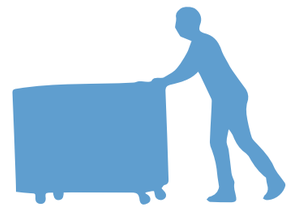
TYPICAL FLOORPLAN



front of house

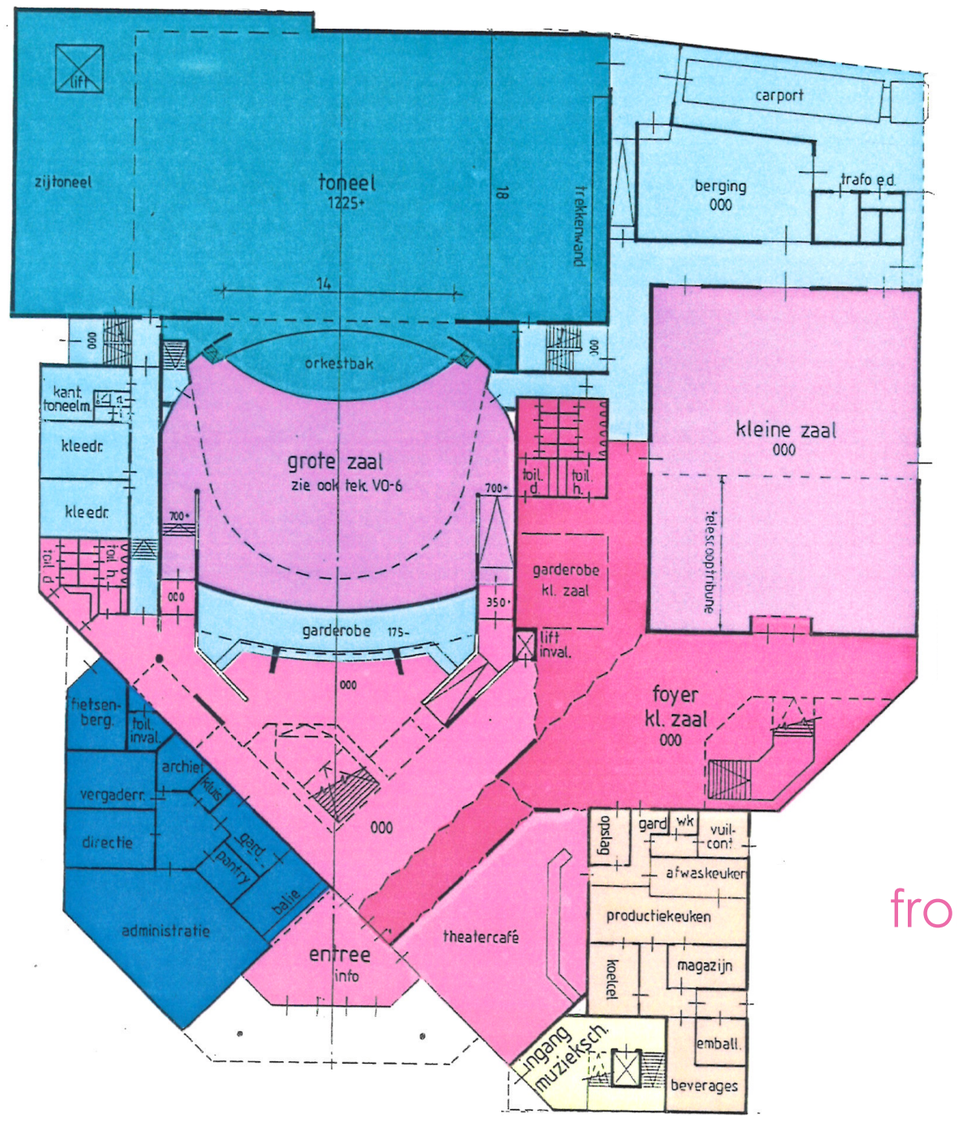


back of house

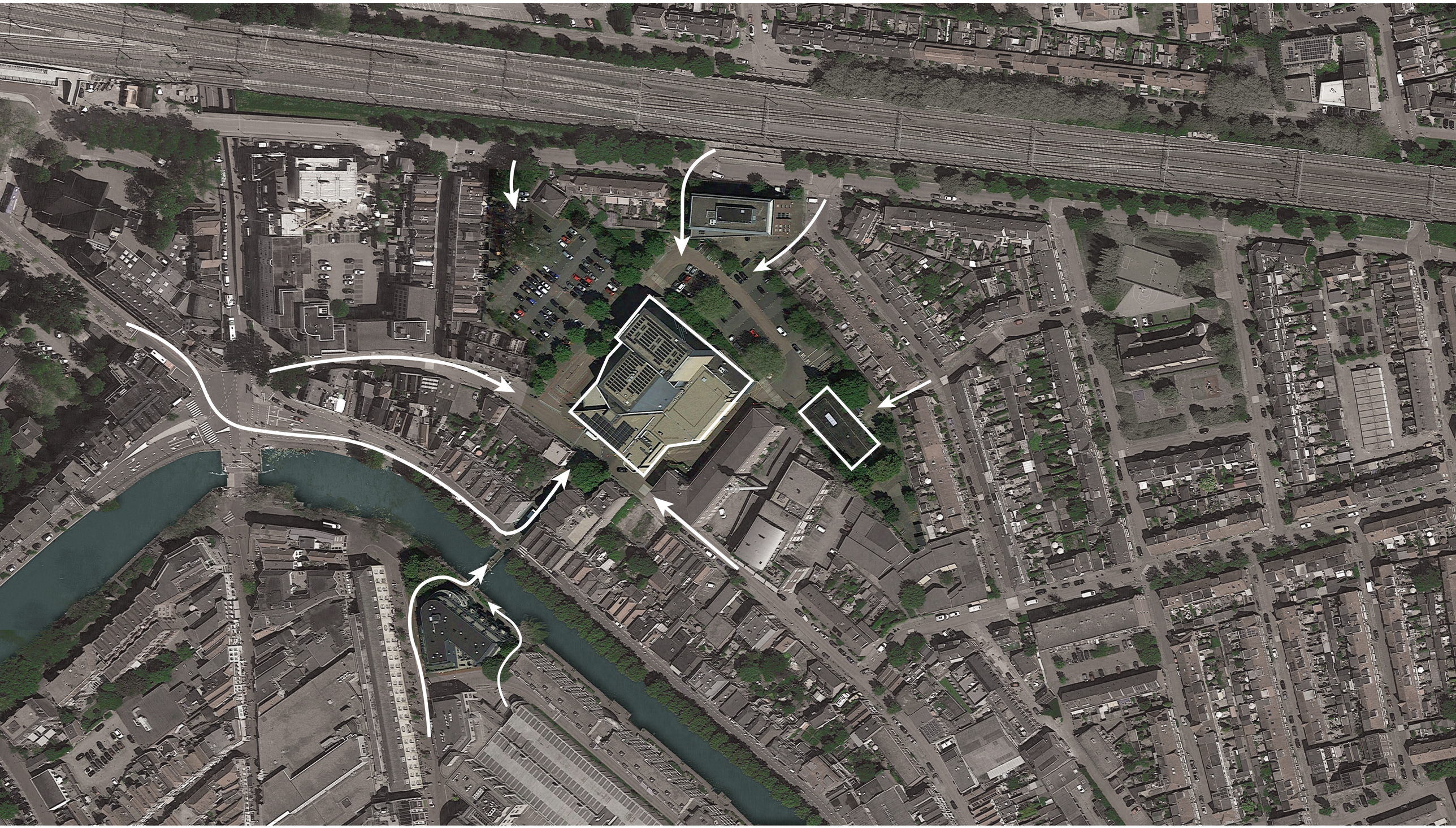


CURRENT FLOORPLAN

back of house



front of house



COMMUNITY CENTRE DE KADE






Frites





COMBINE FUNCTIONS



COMMUNITY



AUDIENCE



ARTISTS + PRODUCTION



THEATRE STAFF

PROGRAMME









COMMUNITY

living room
dance / music room
billiard room
course room
meeting room

AUDIENCE

foyers
cafe

gardarobe

ARTISTS + PRODUCTION

dressing rooms
rehearsal rooms
artist foyer

loading dock
storage rooms
tech. rooms

THEATRE STAFF

office rooms
canteen
storage rooms
tech. rooms

kitchen

DESIGN INPUT



COMMUNITY

welcoming
barrier to visit
casual



AUDIENCE

theatre feeling
elegant
intimate



ARTISTS + PRODUCTION

short routes
warm vs. cold areas
larger artis foyer
more storage



THEATRE STAFF

more offices
flexible spaces
options for events

DESIGN CHALLENGES

combine functions & improve logistics

water nuisance & subsidence

water as opportunity & design element

DESIGN CHALLENGES

combine functions & improve logistics

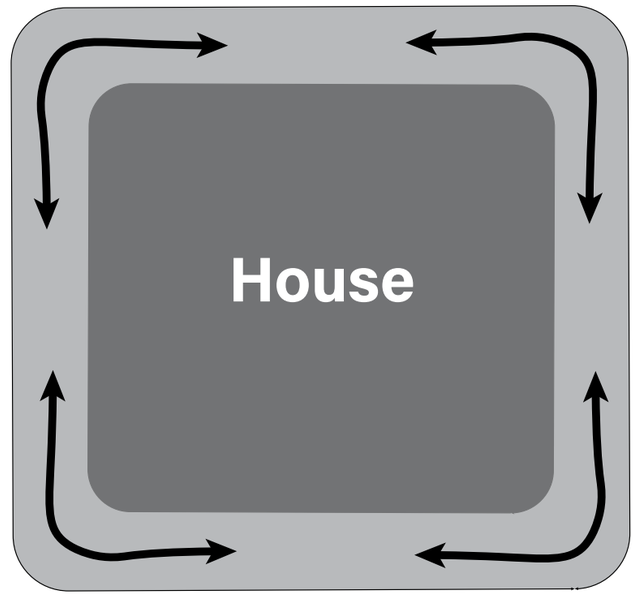
water nuisance & subsidence

water as opportunity & design element

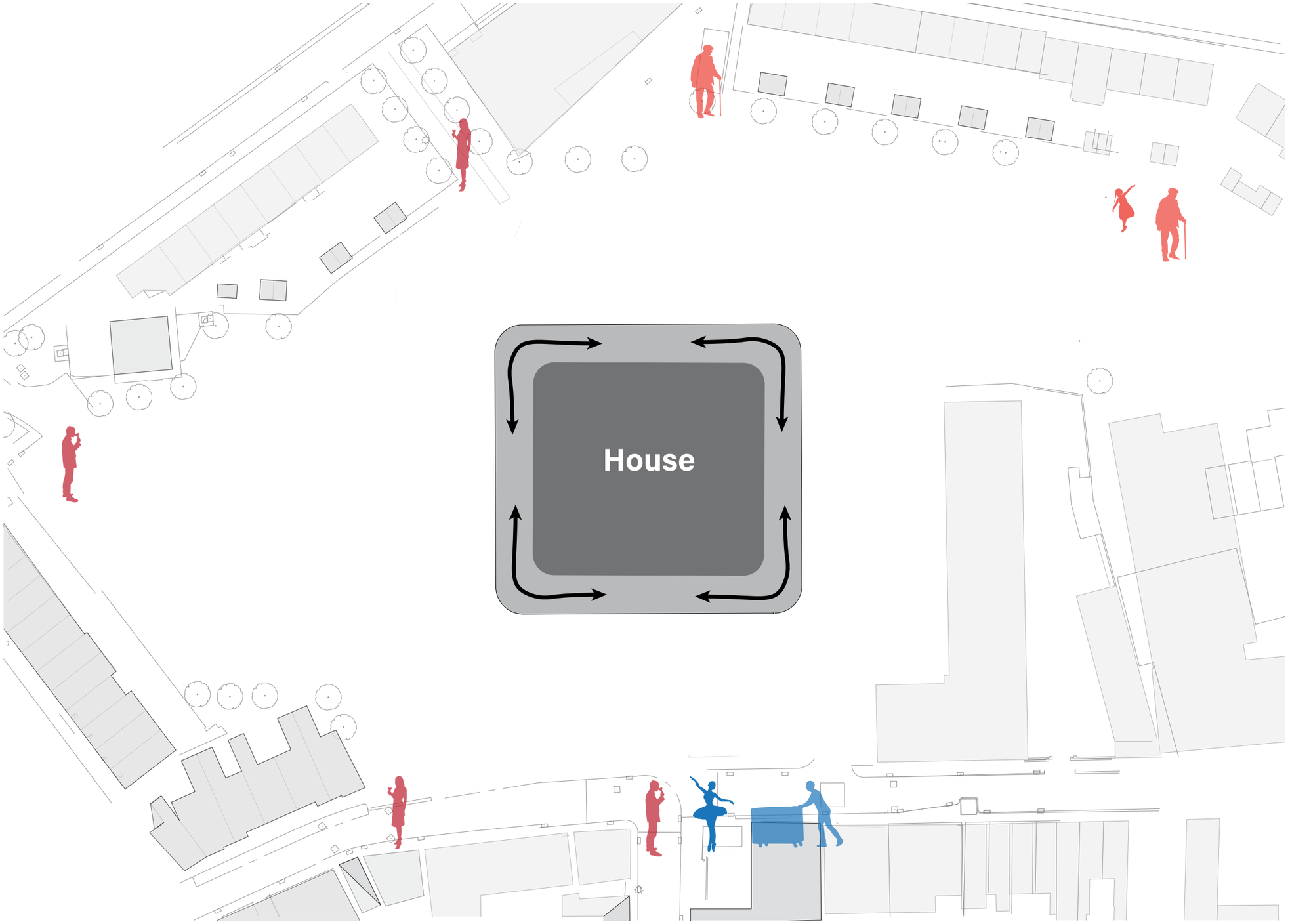
FLOORPLAN CONCEPT



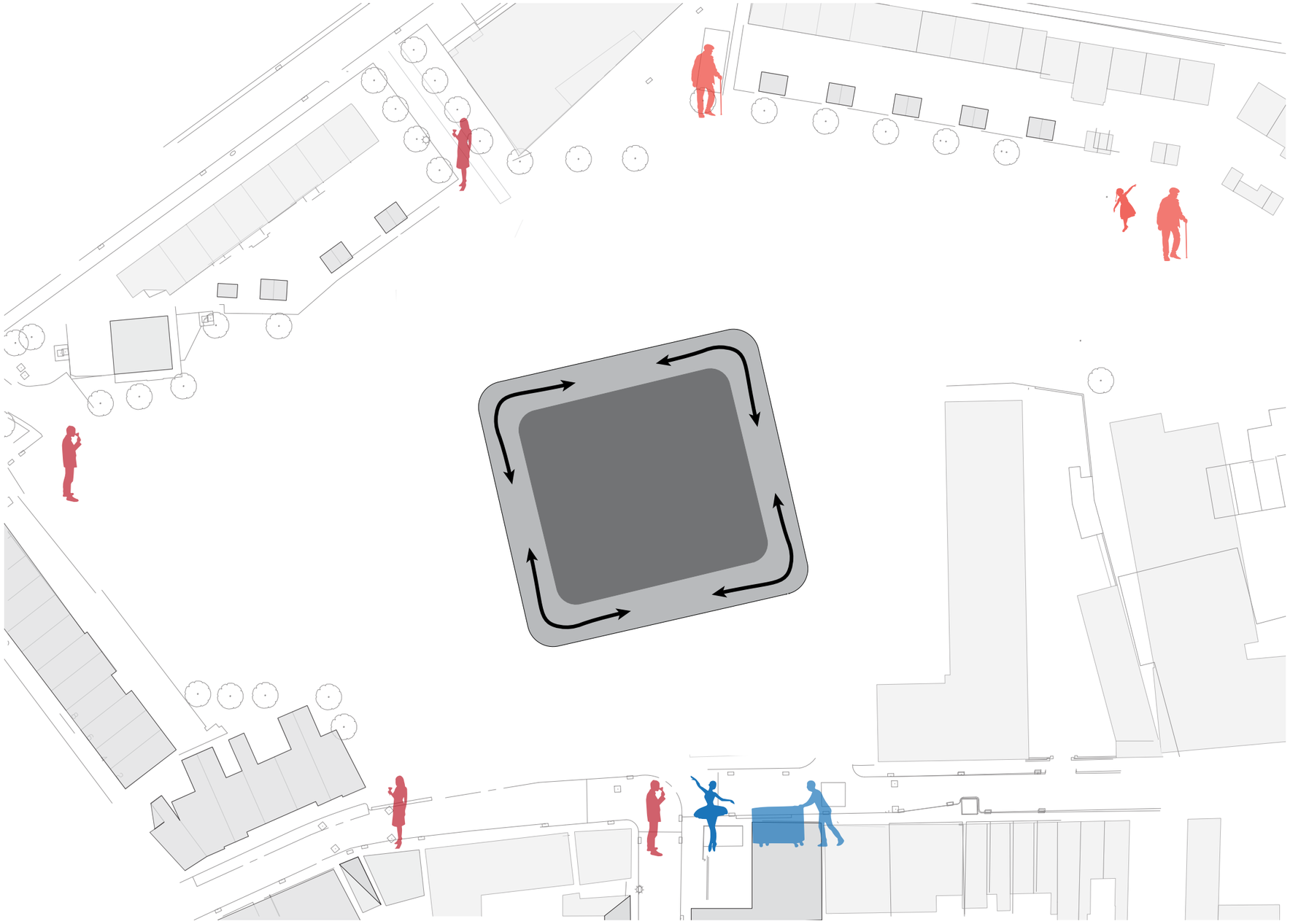
heart of the building



logistic ring

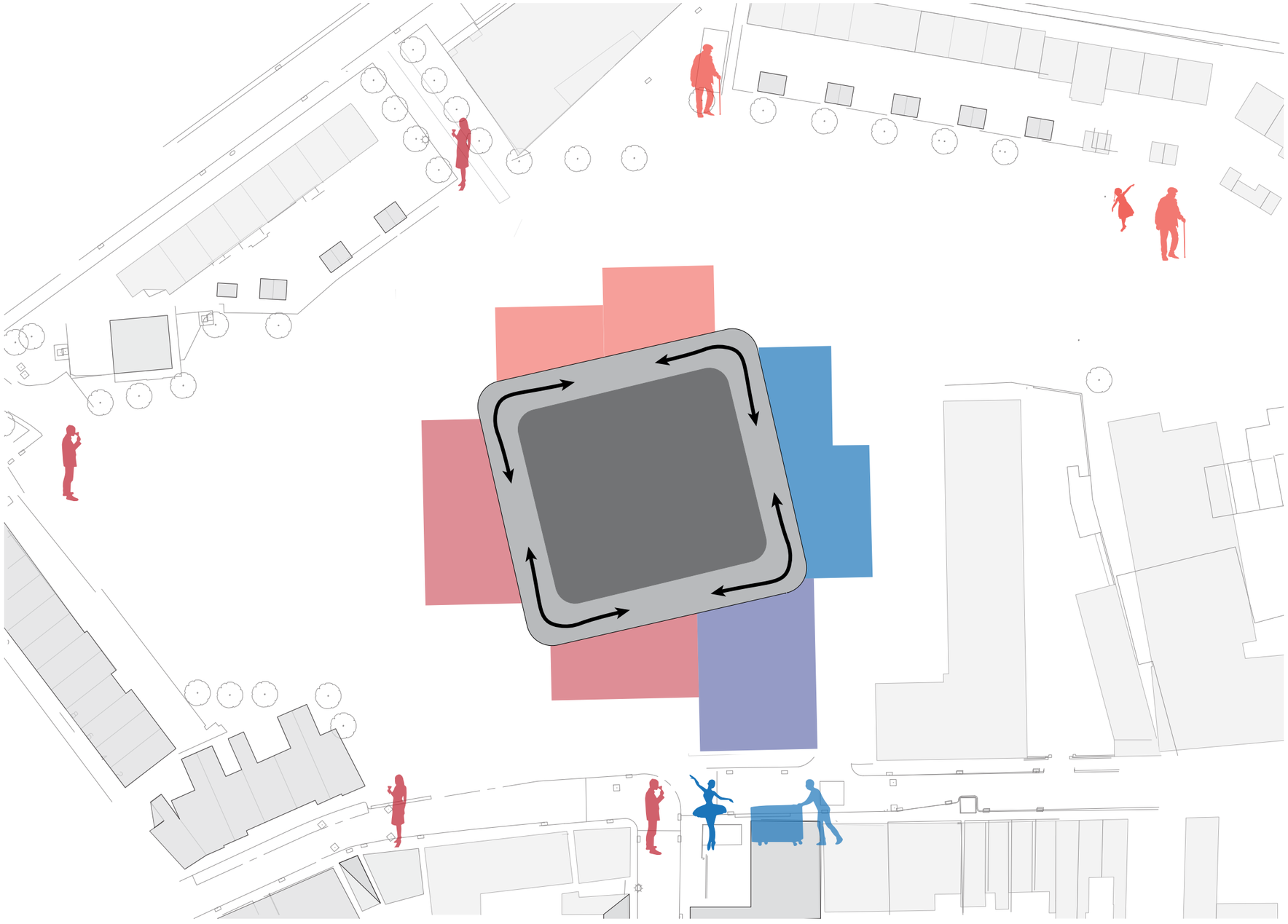


urban fabric

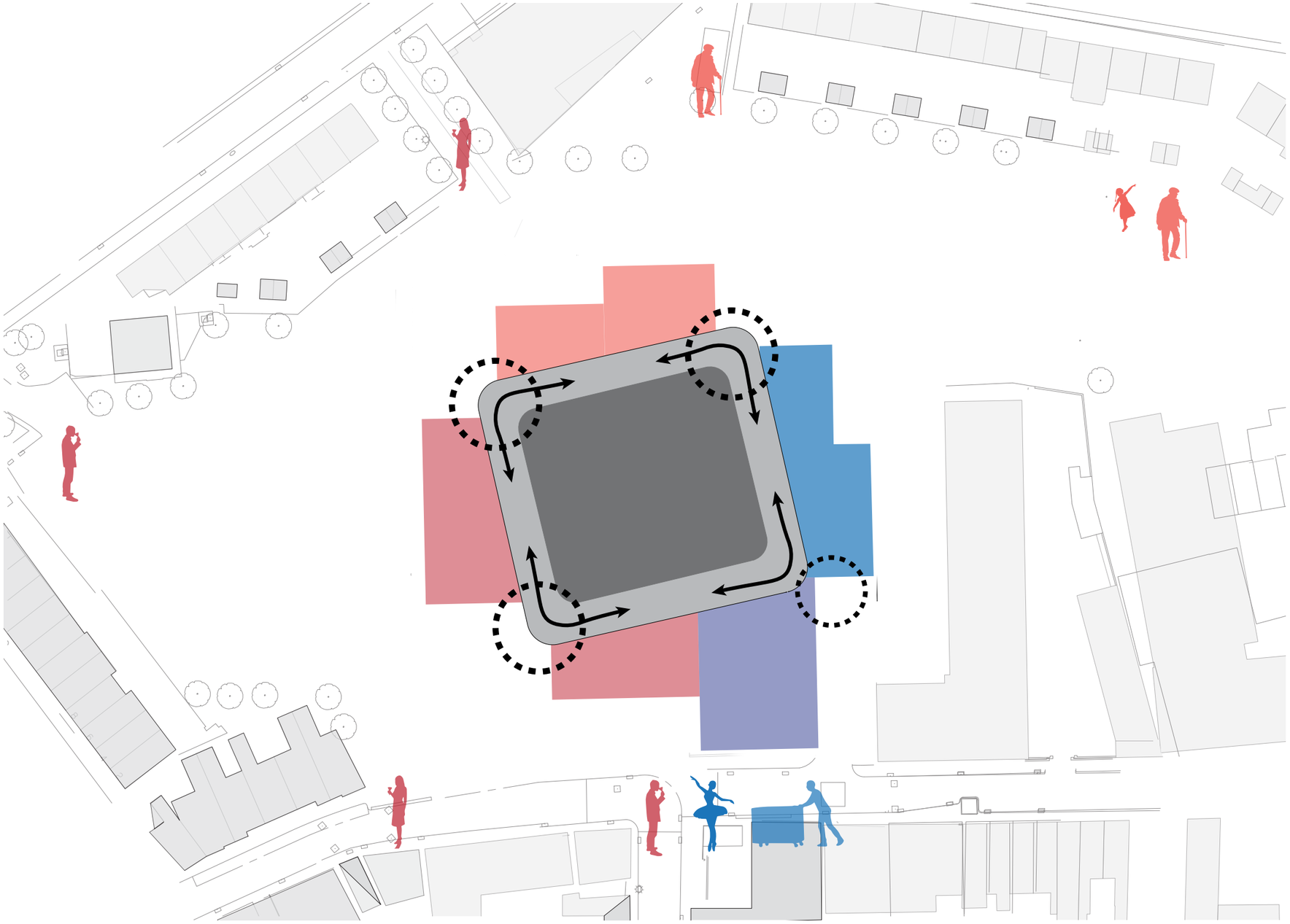


urban fabric

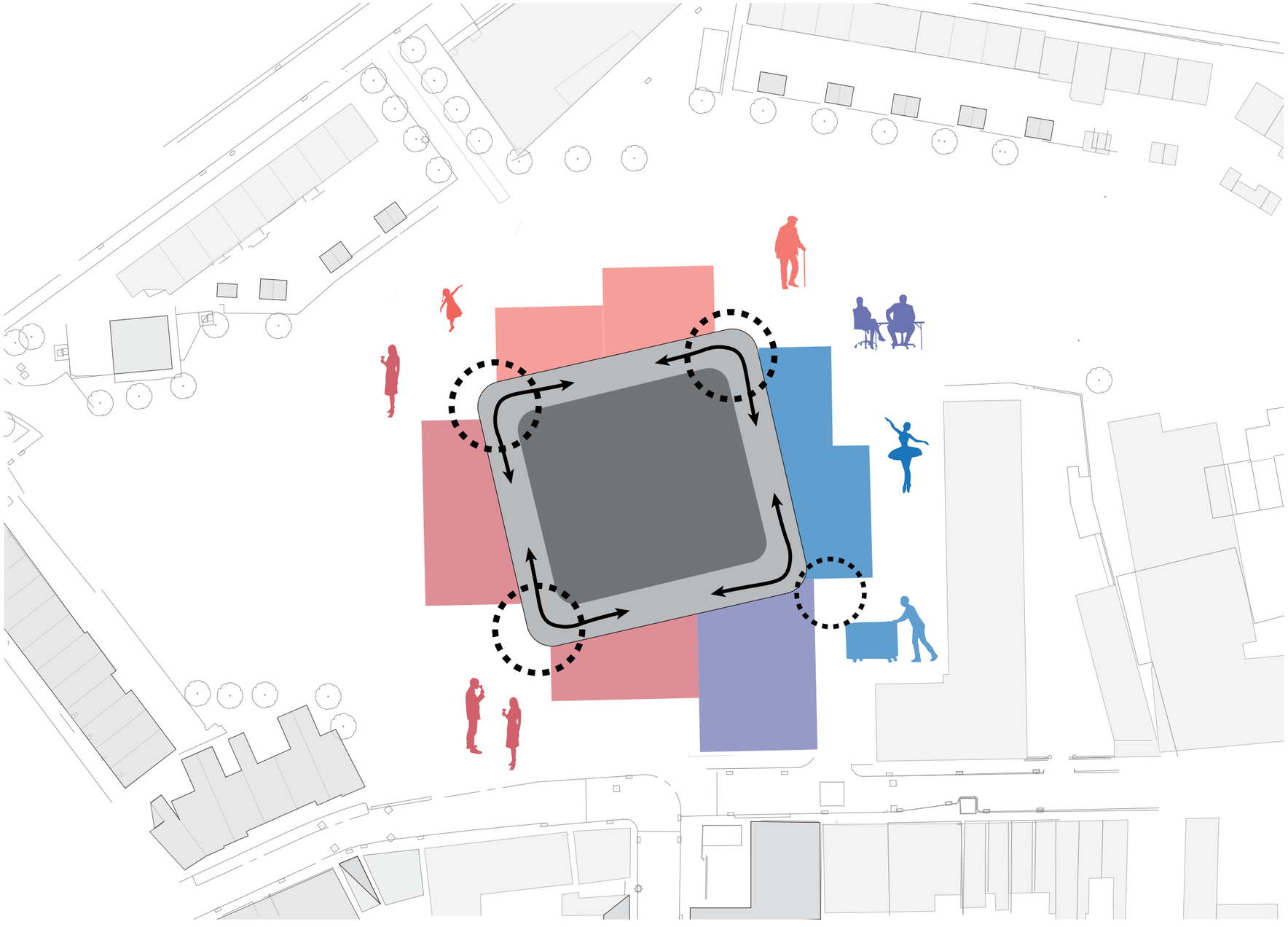
FLOORPLAN CONCEPT



smaller volumes- front of house & back of house

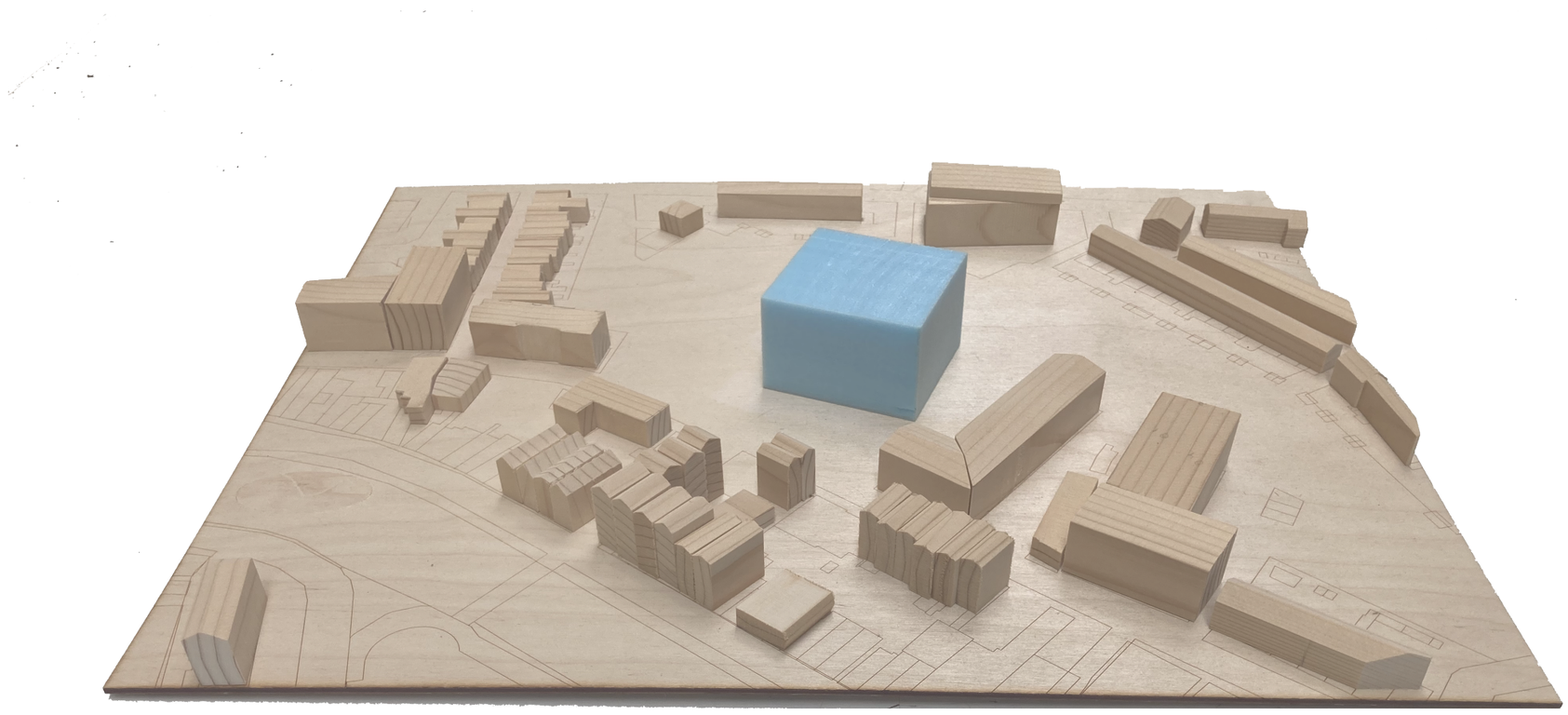


entrances on corners main volume



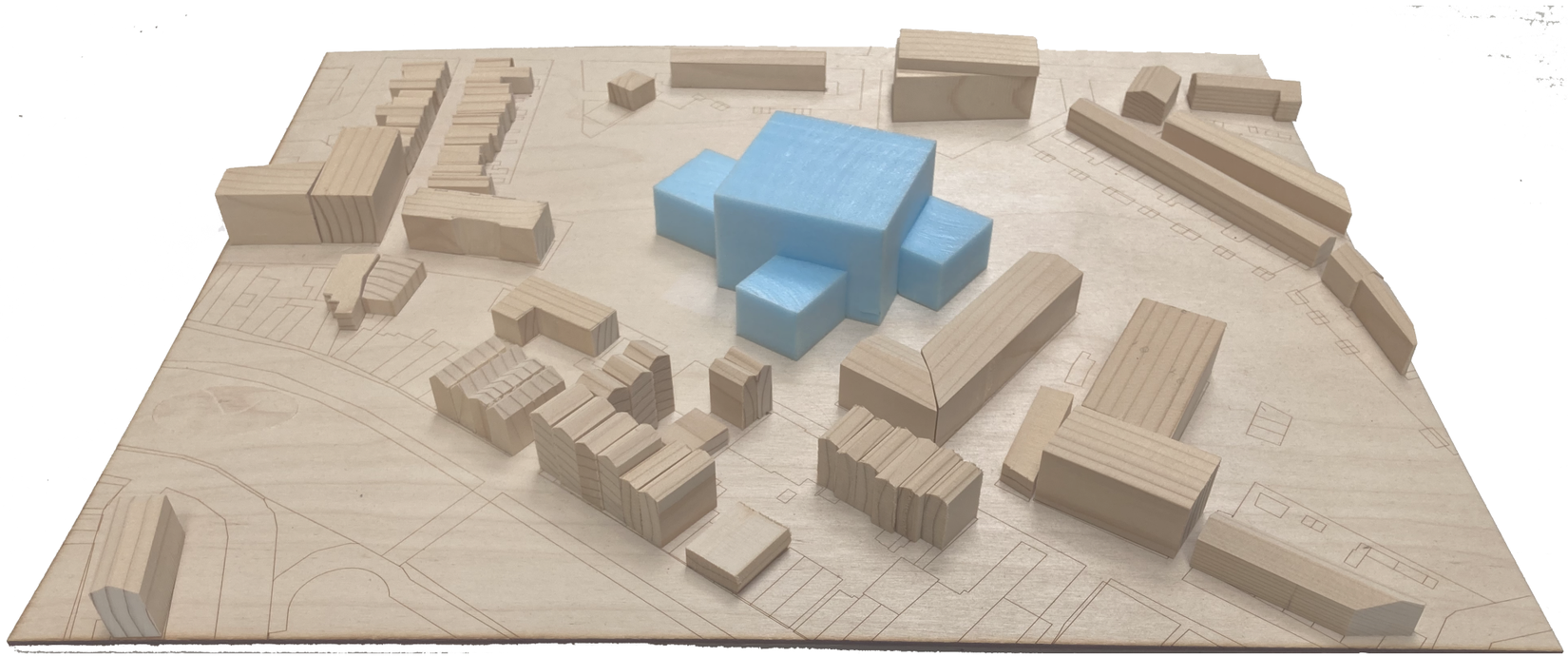
approachable for all users

URBAN SCALE



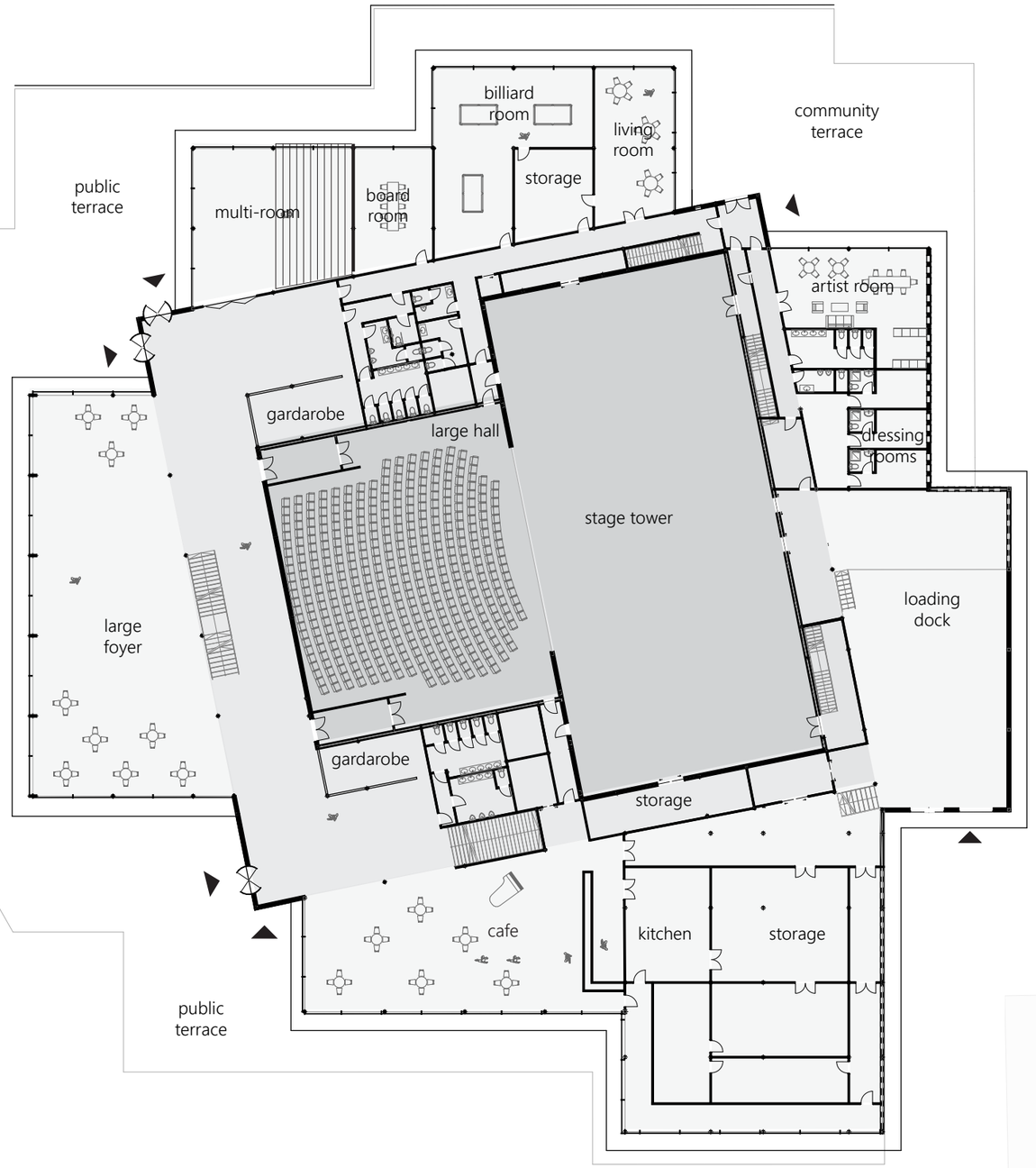
large public building, beacon

URBAN SCALE

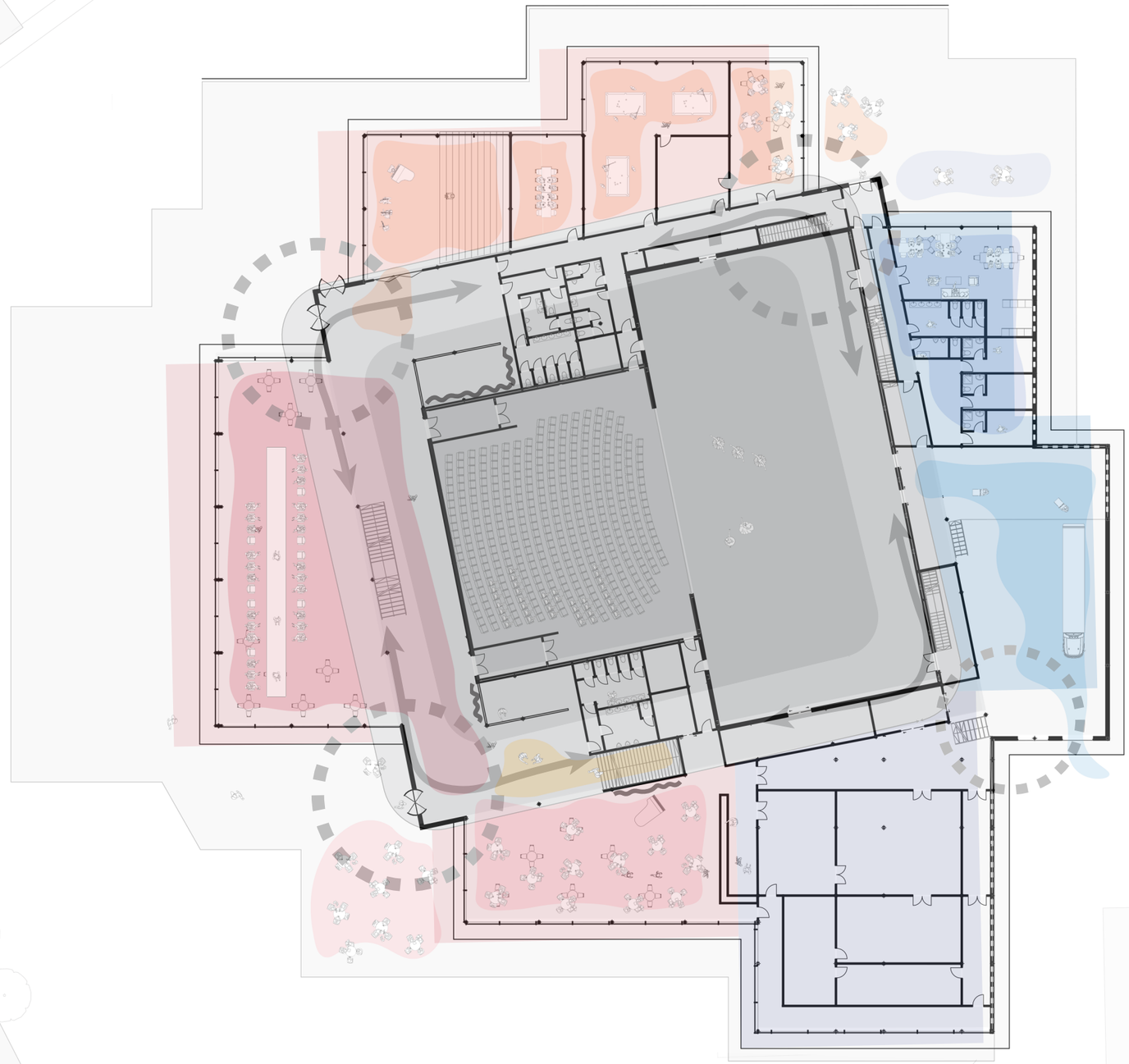


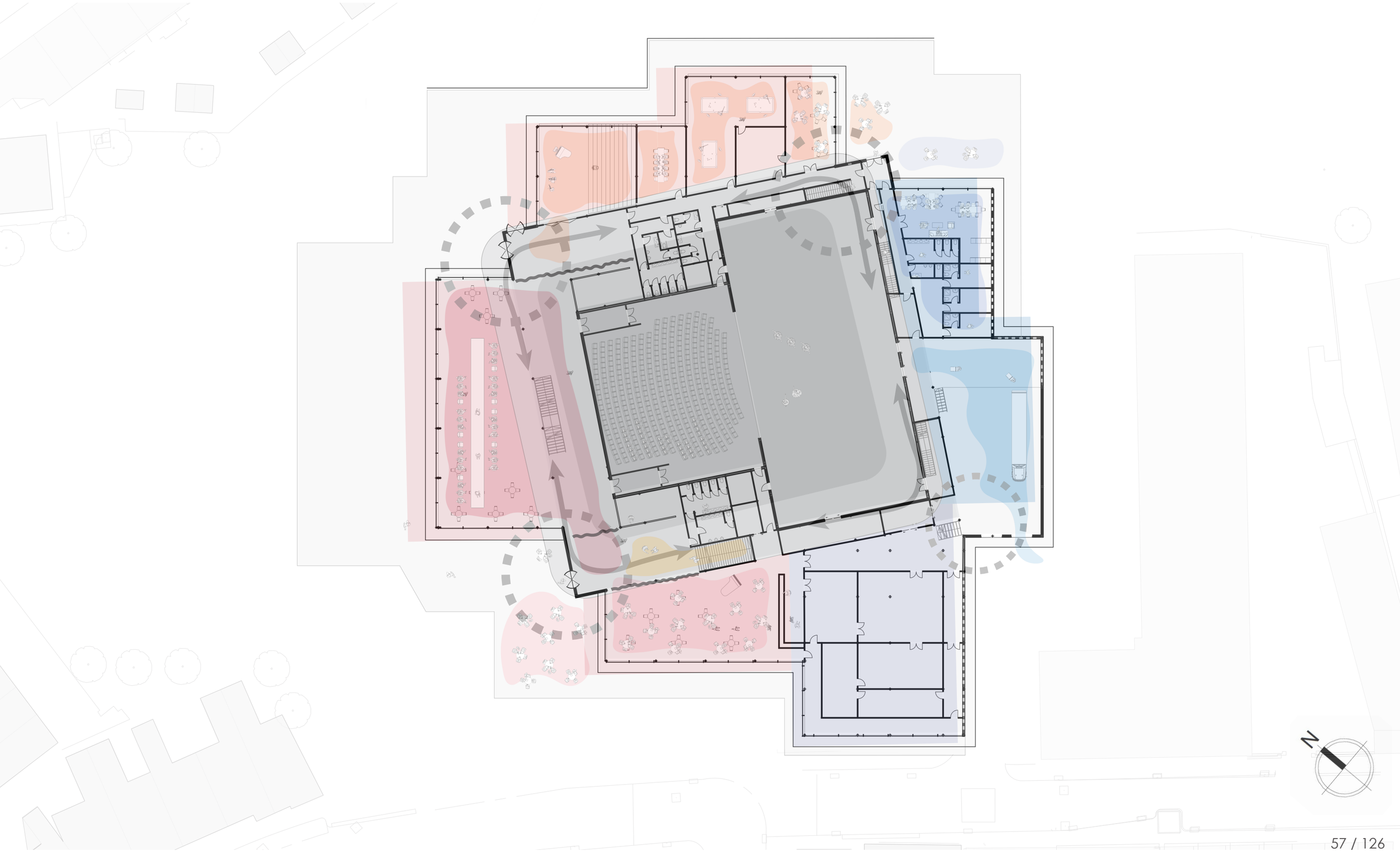
neighbourhood scale, approachable

GROUND FLOOR (+1225)

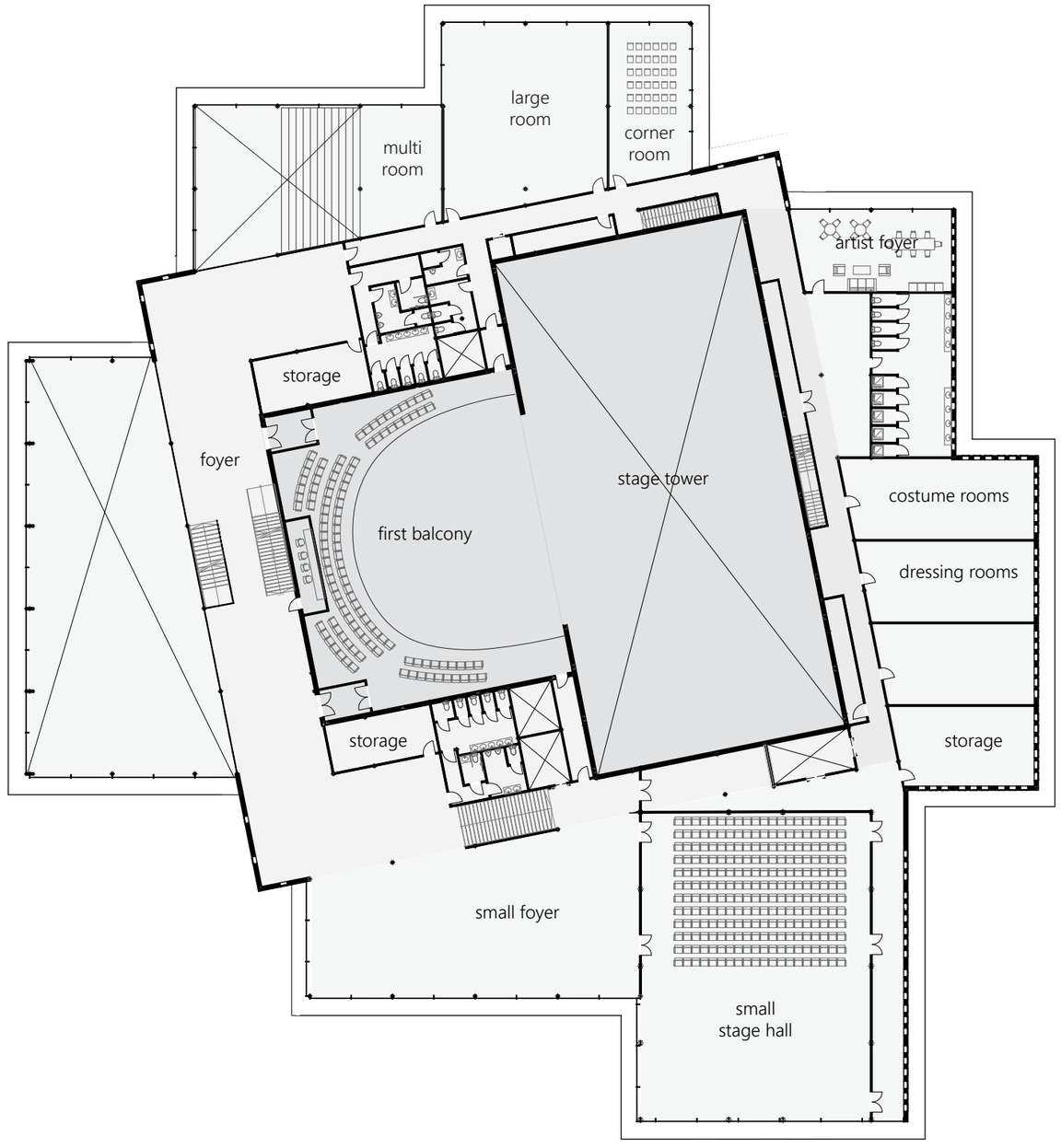


VARIOUS AUDIENCES



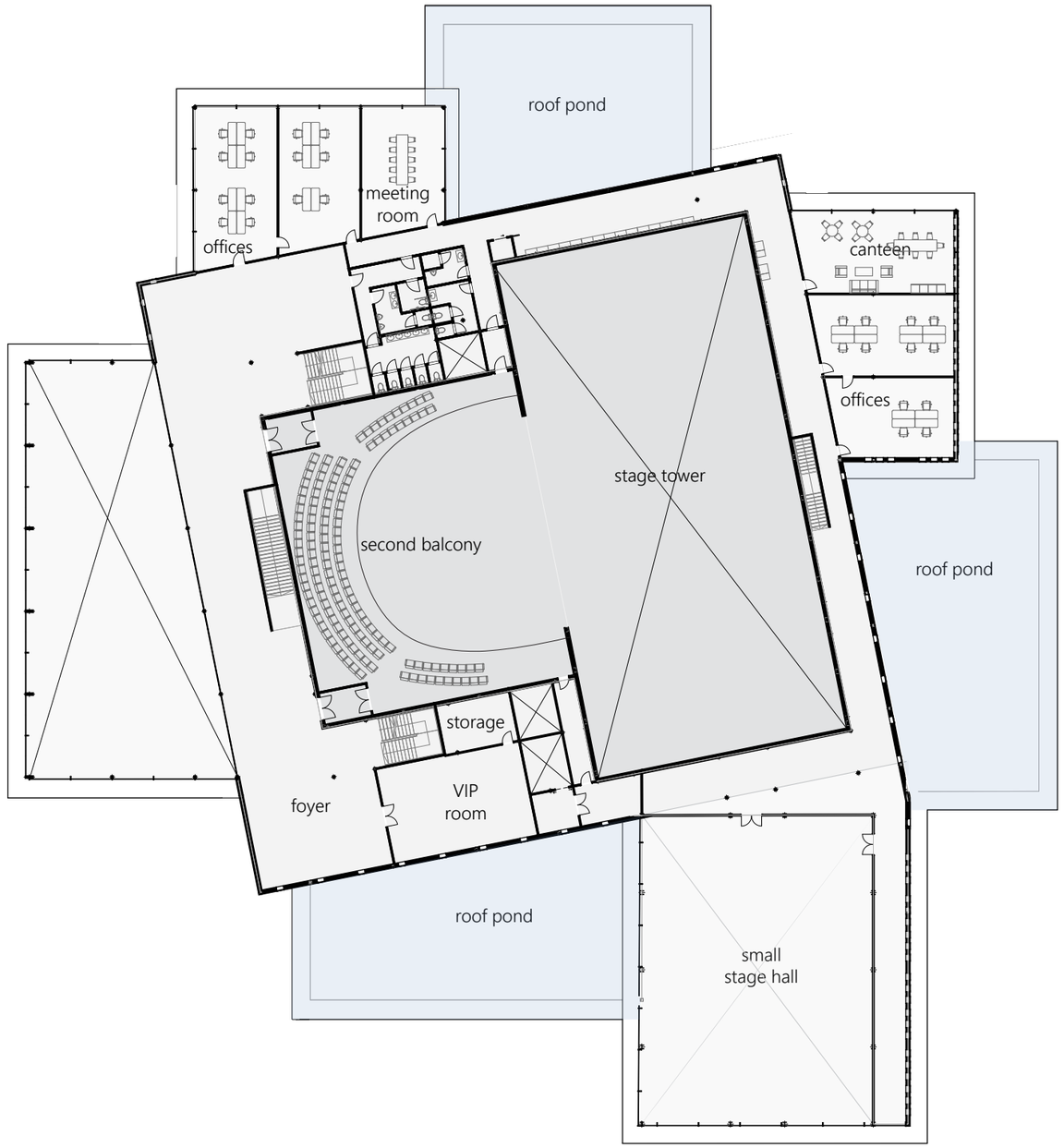

N

FIRST FLOOR (+5200)



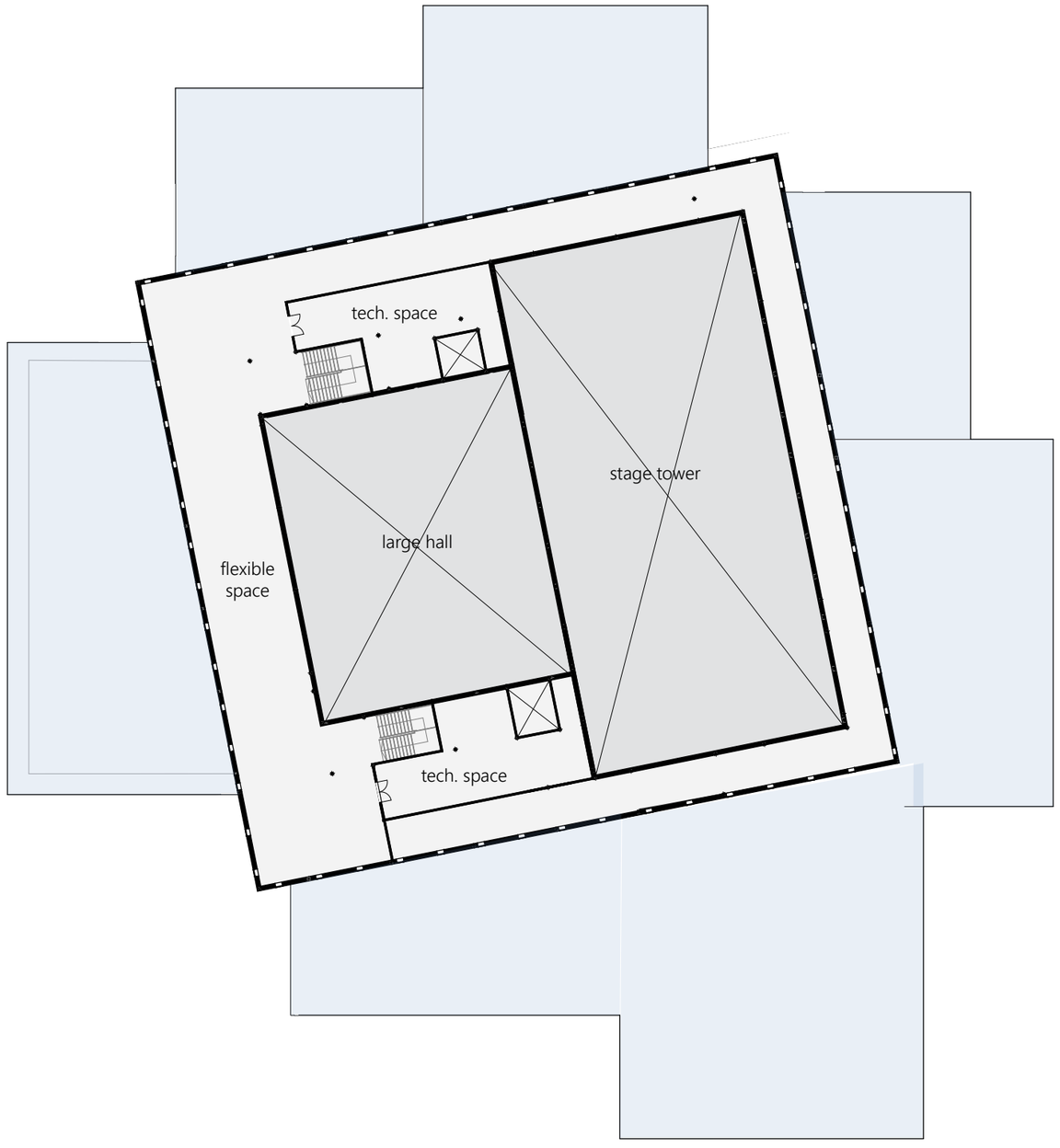
artist rooms & foyers

SECOND FLOOR (+9000)



office rooms & foyers

THIRD FLOOR (+12800)



tech. rooms

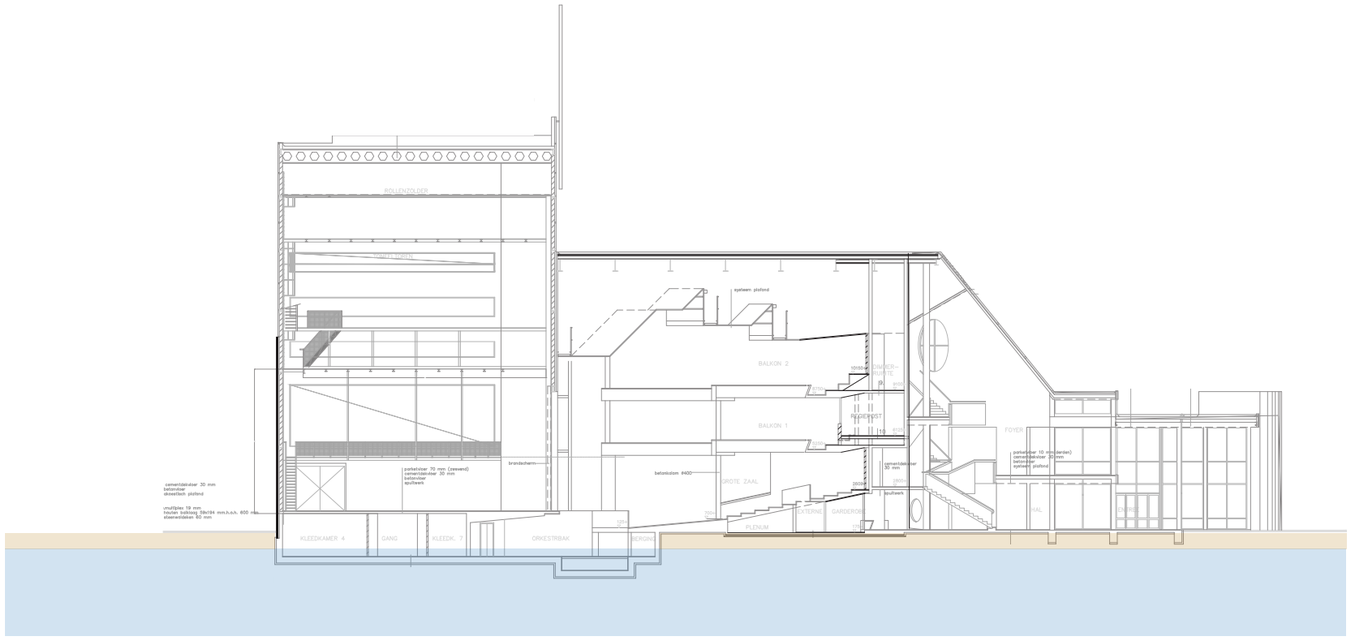
DESIGN CHALLENGES

combine functions & improve logistics

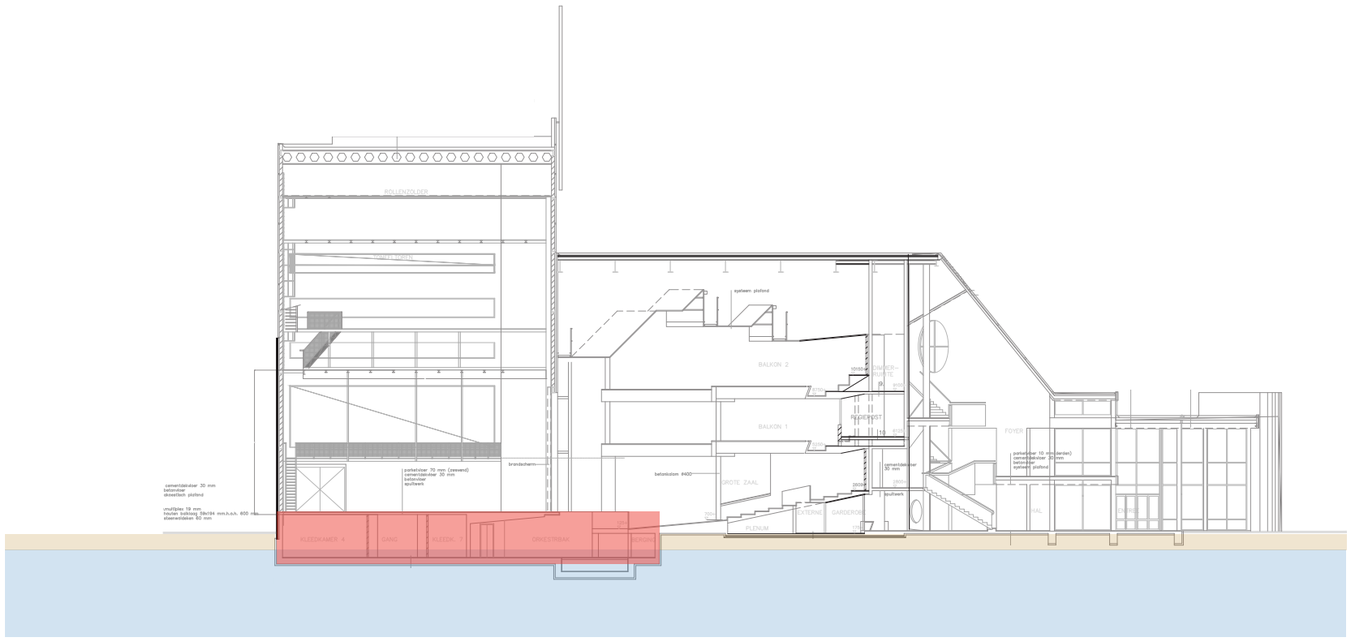
water nuisance & subsidence

water as opportunity & design element

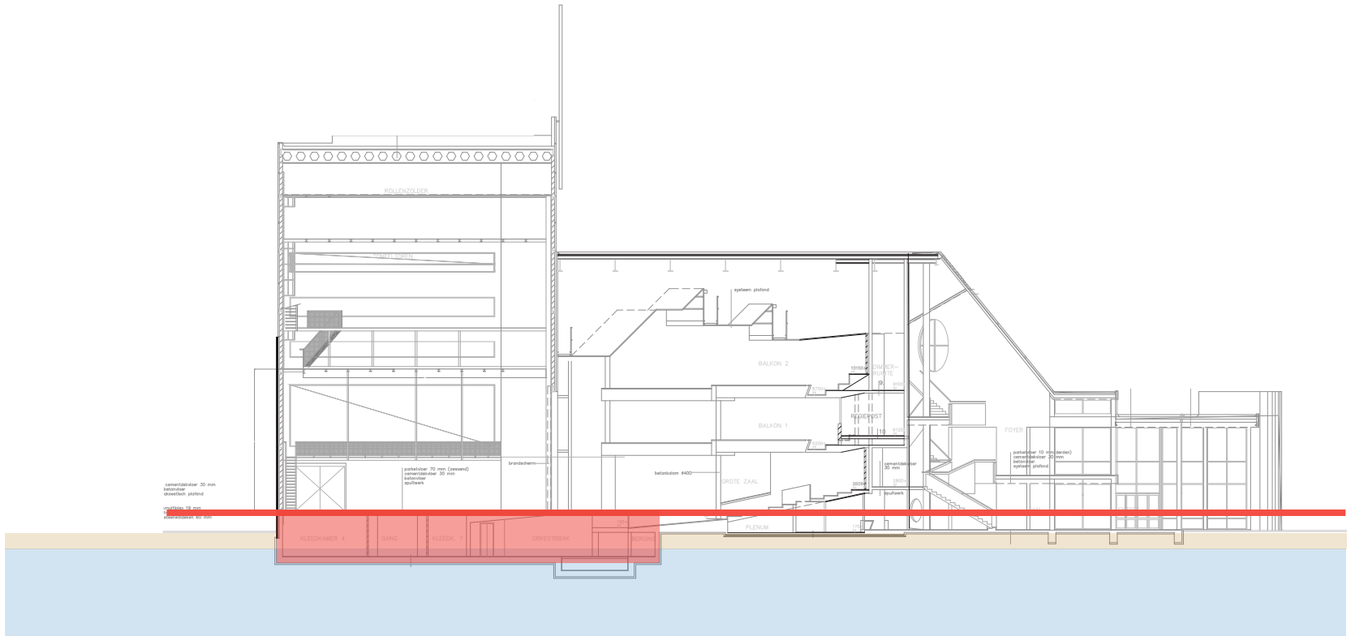
WATER NUISANCE & SUBSIDENCE



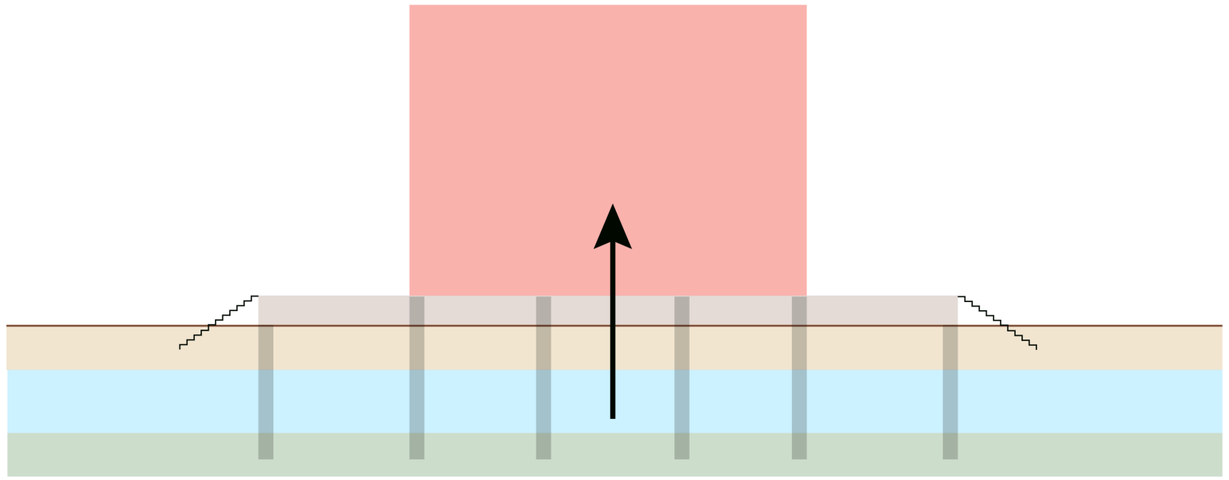
section current building



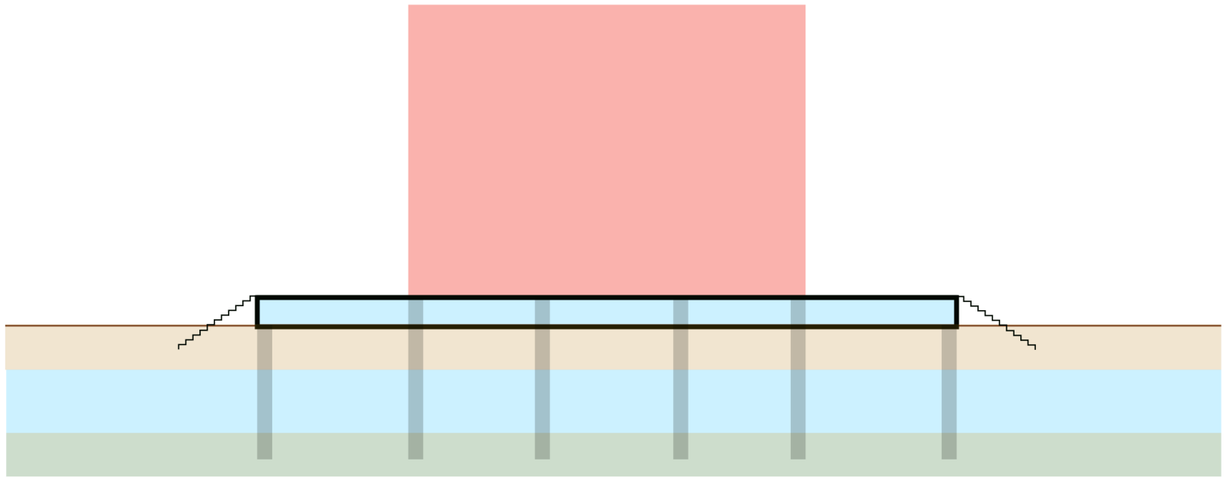
souterrain below stage



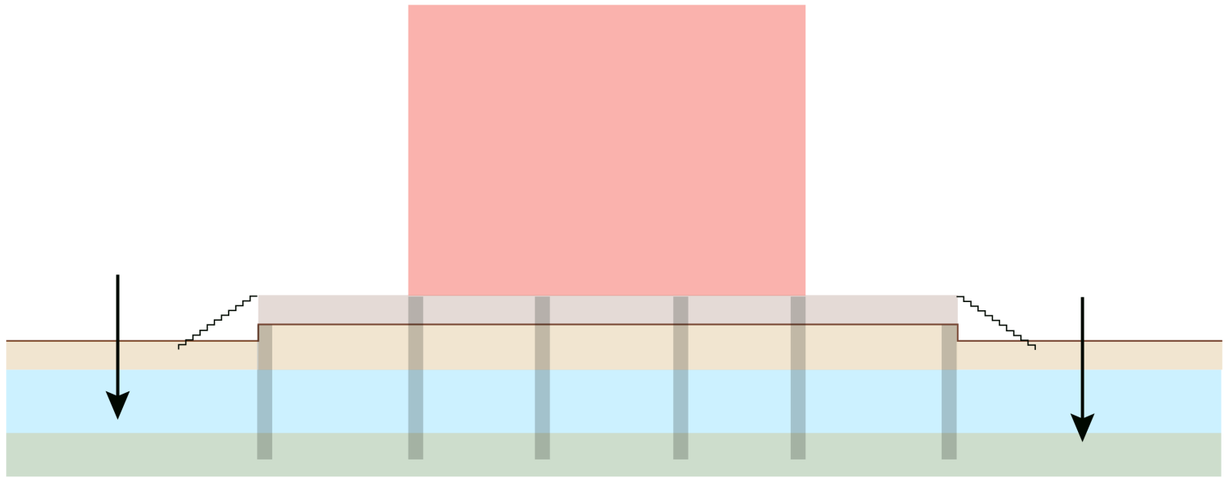
expand stage



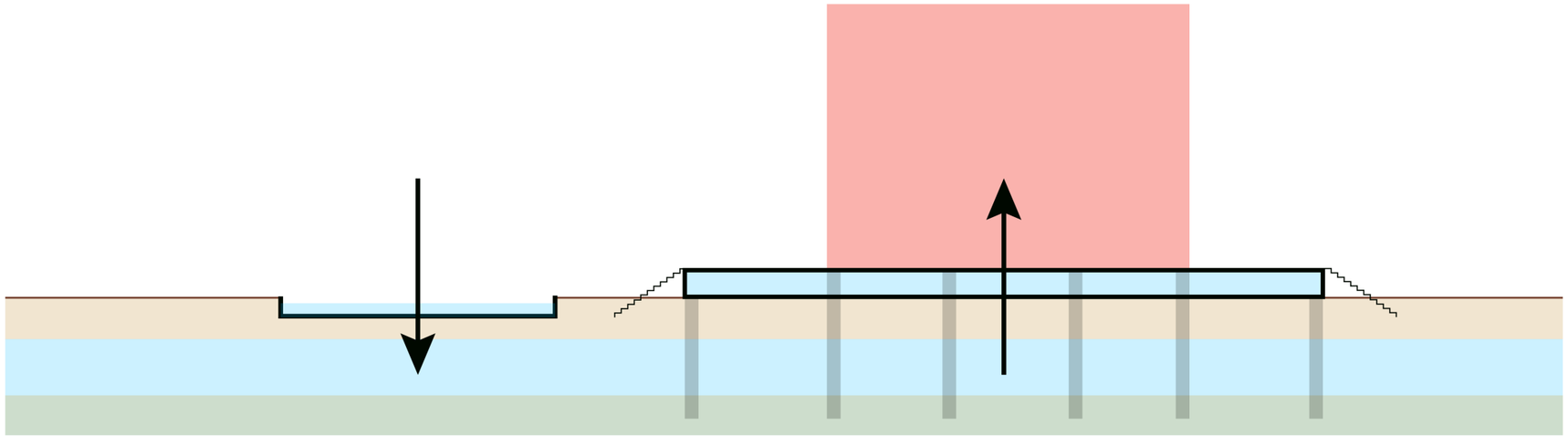
elevate building



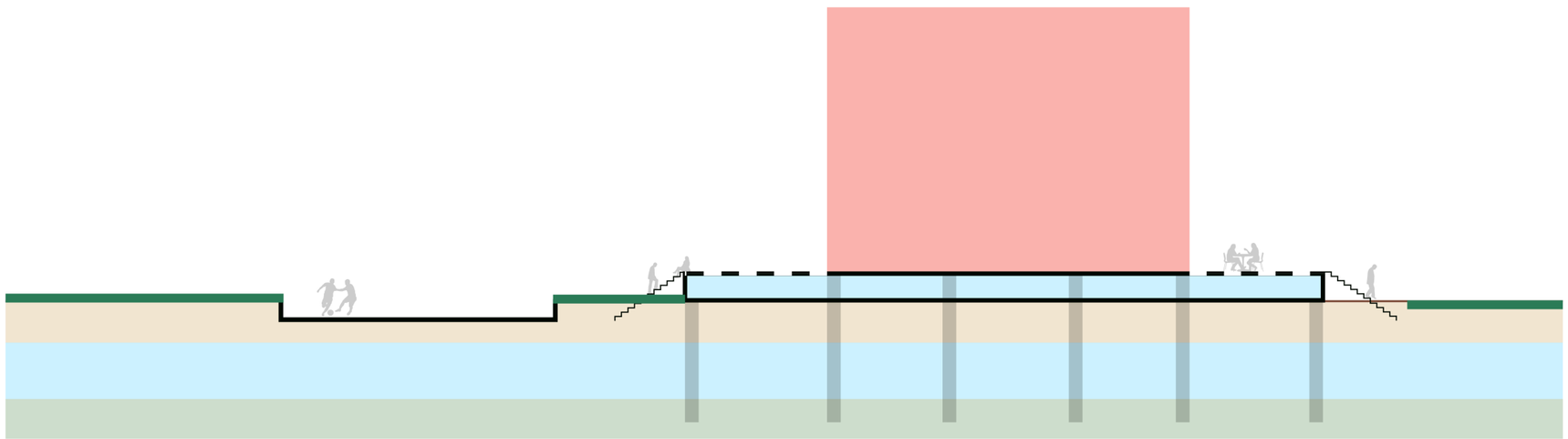
rainwater storage below building



connection to street remains after subsidence

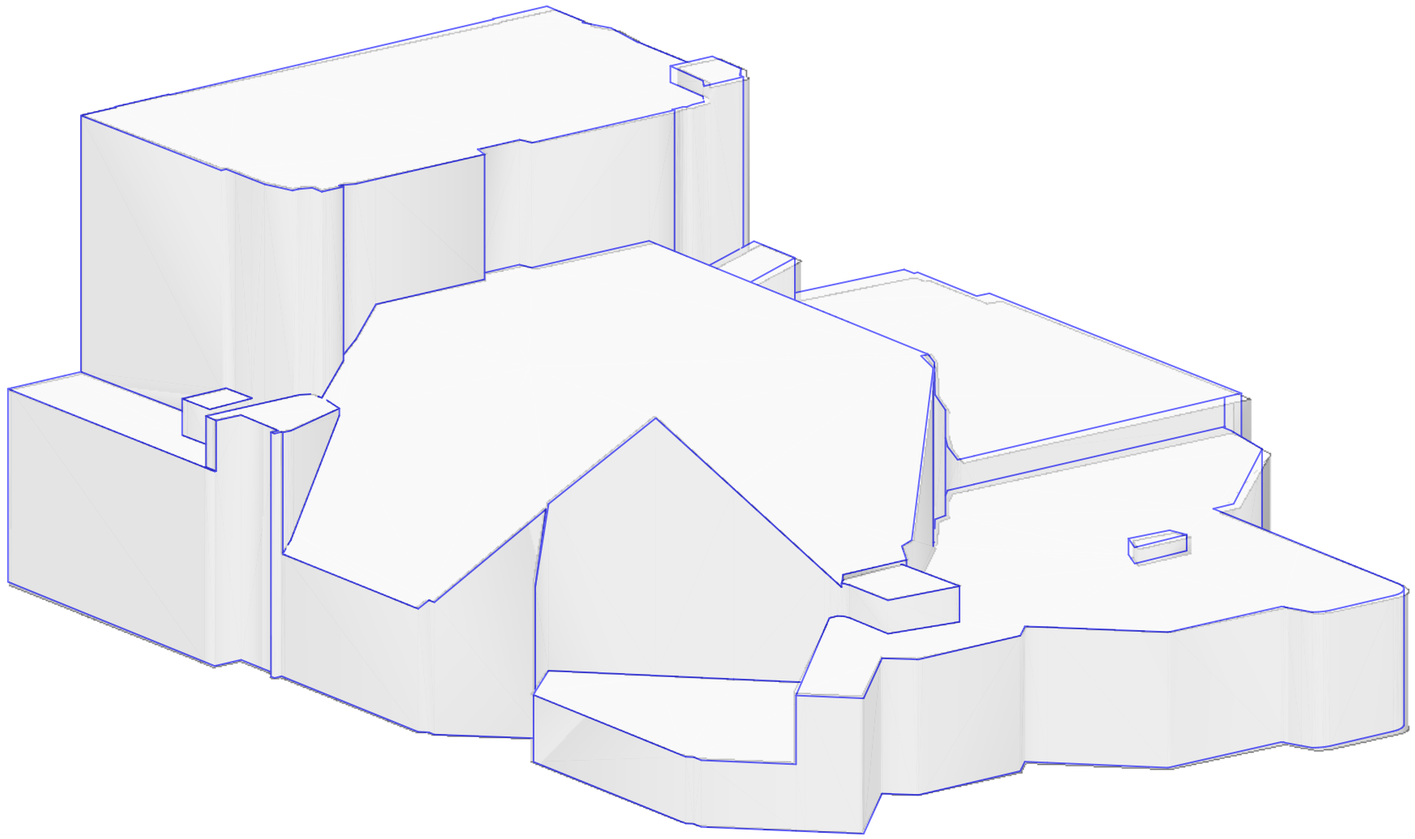


create space for water in building & urban space

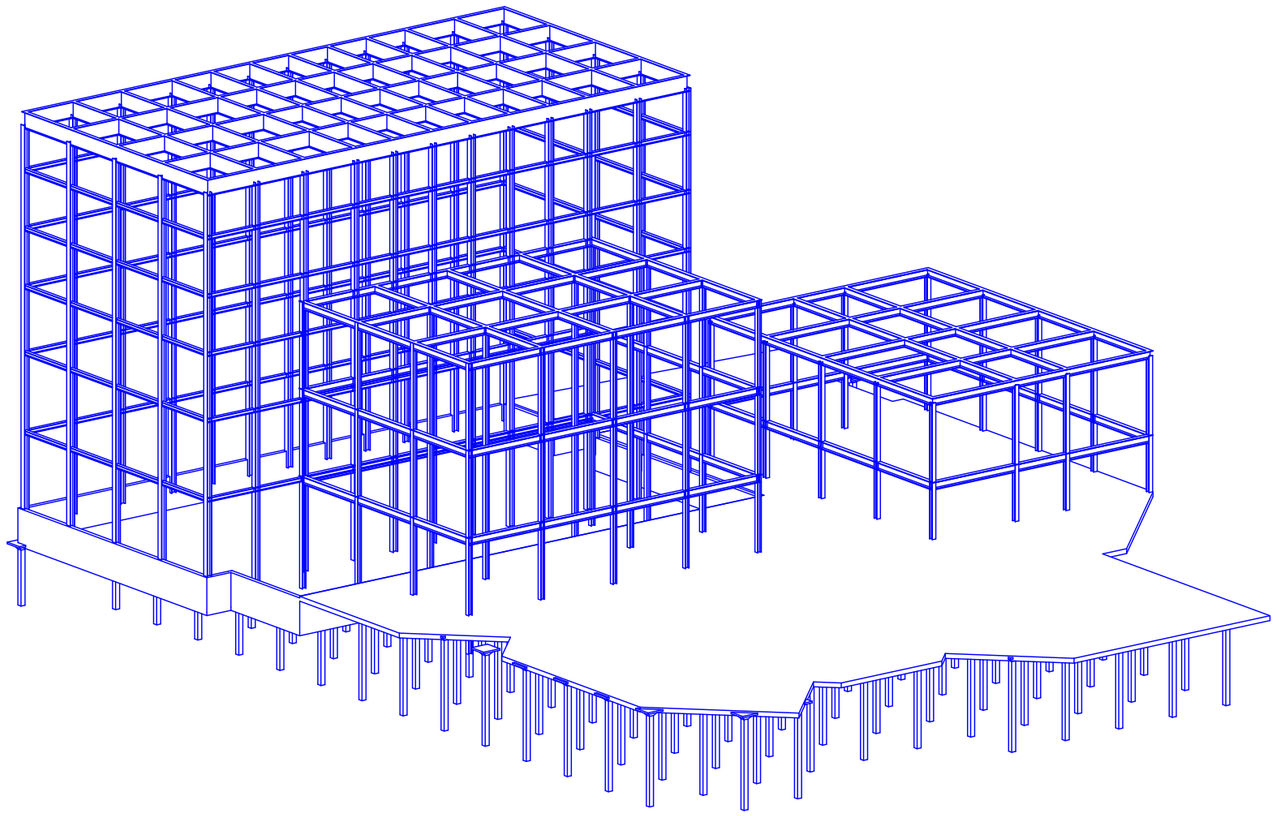


urban life on elevated terraces and stairs

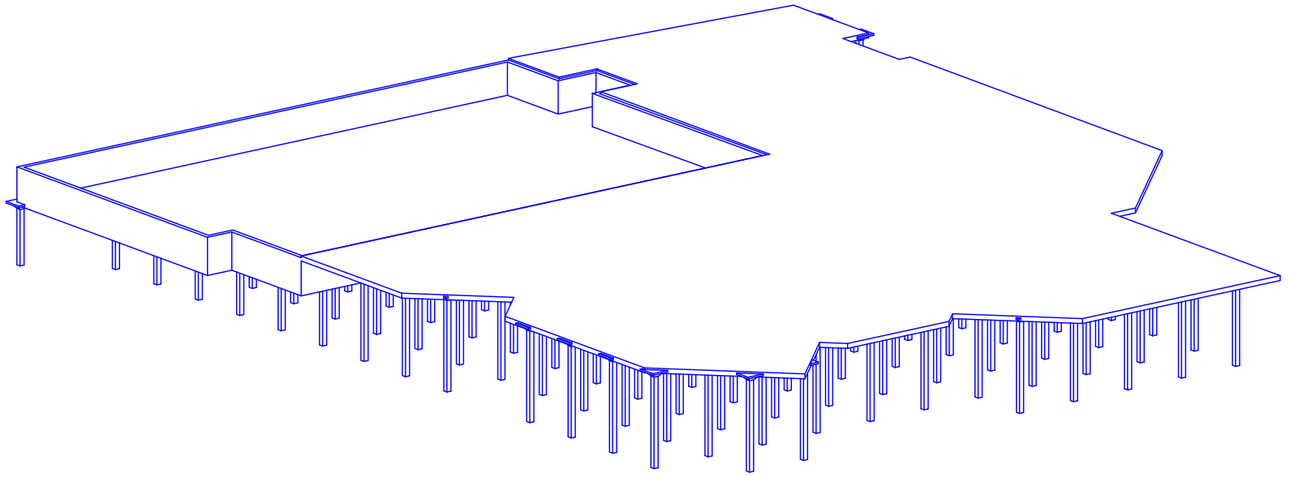
STRUCTURE



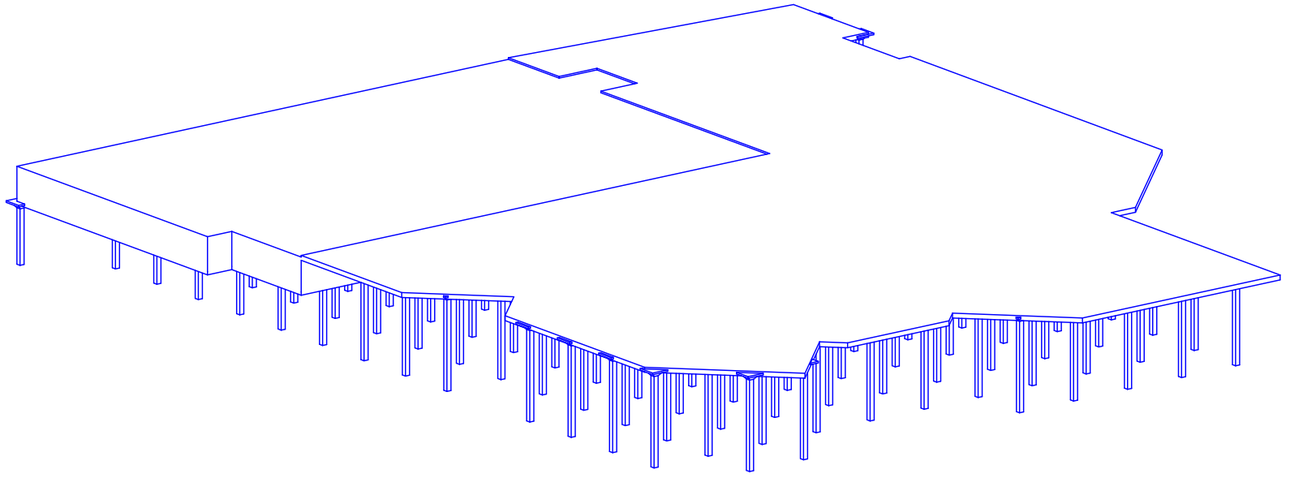
current theatre building
concrete foundation - steel structure - concrete floors - brick facade



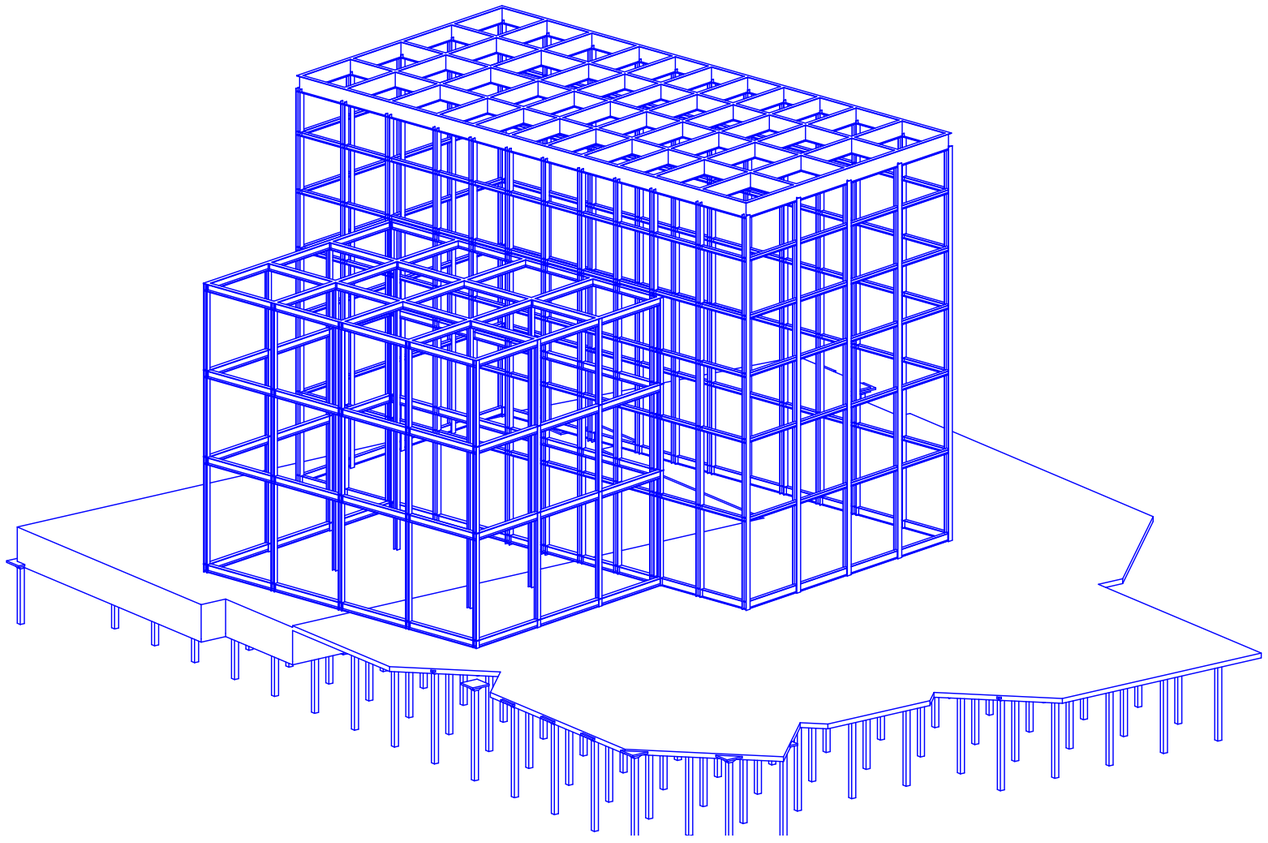
concrete foundation - steel structure



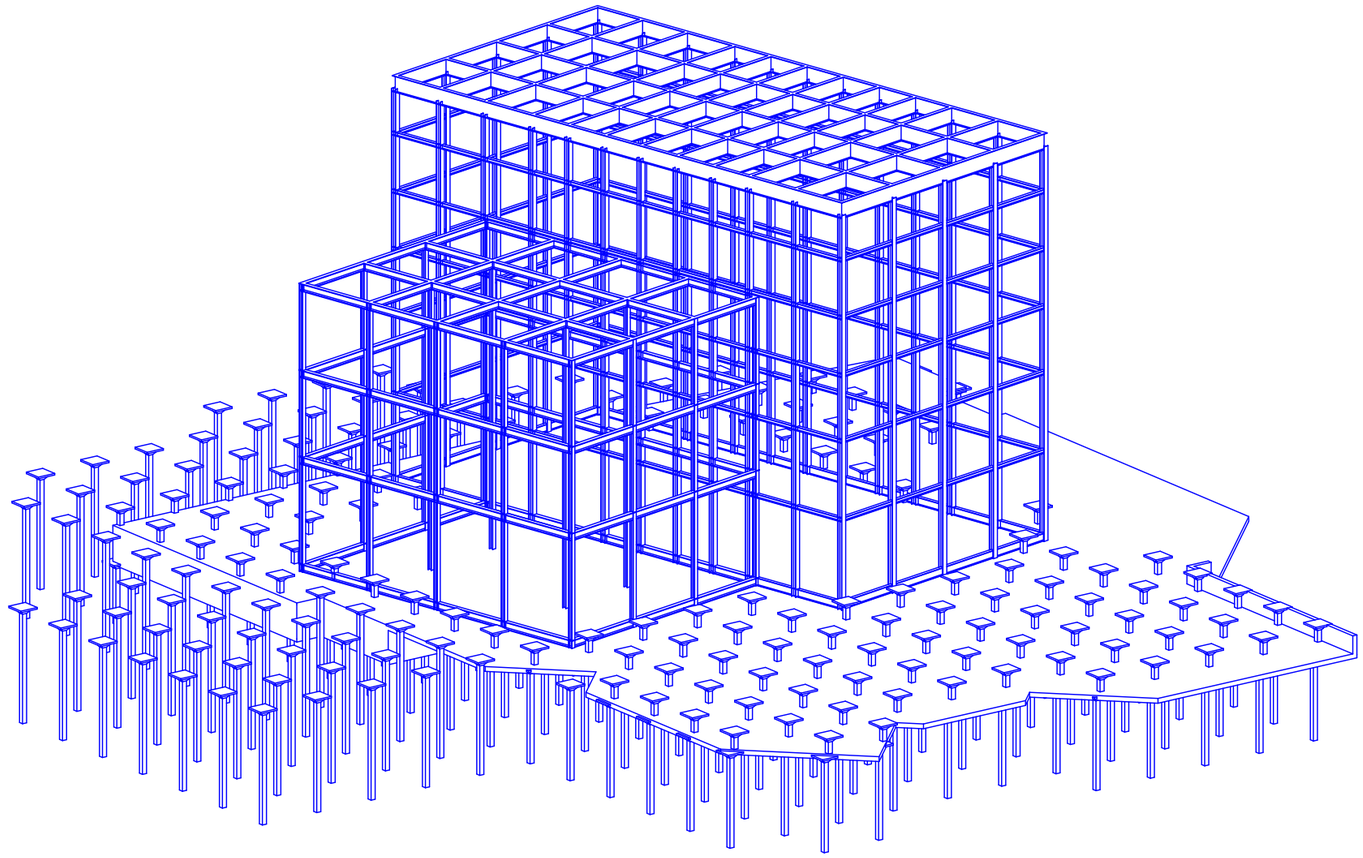
concrete foundation poles (16 - 23 m till supporting ground layer)
concrete ground floor + soutterain



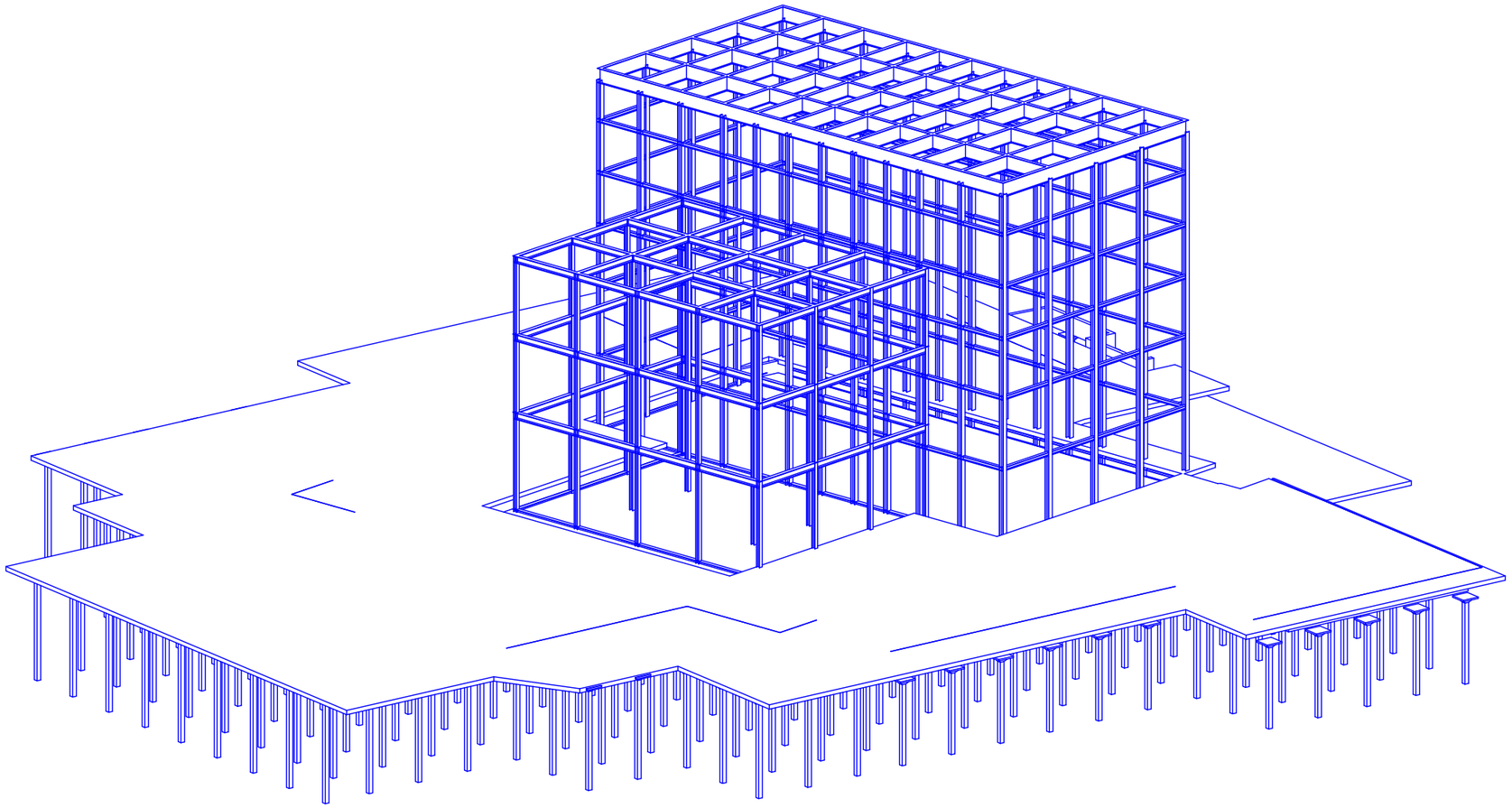
seal soutterain --> rainwater storage
concrete ground floor



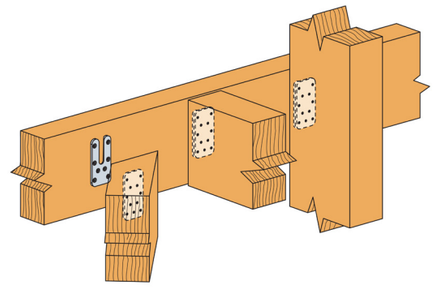
rebuild original steel structure theatre halls
+ add ring beam to divide load



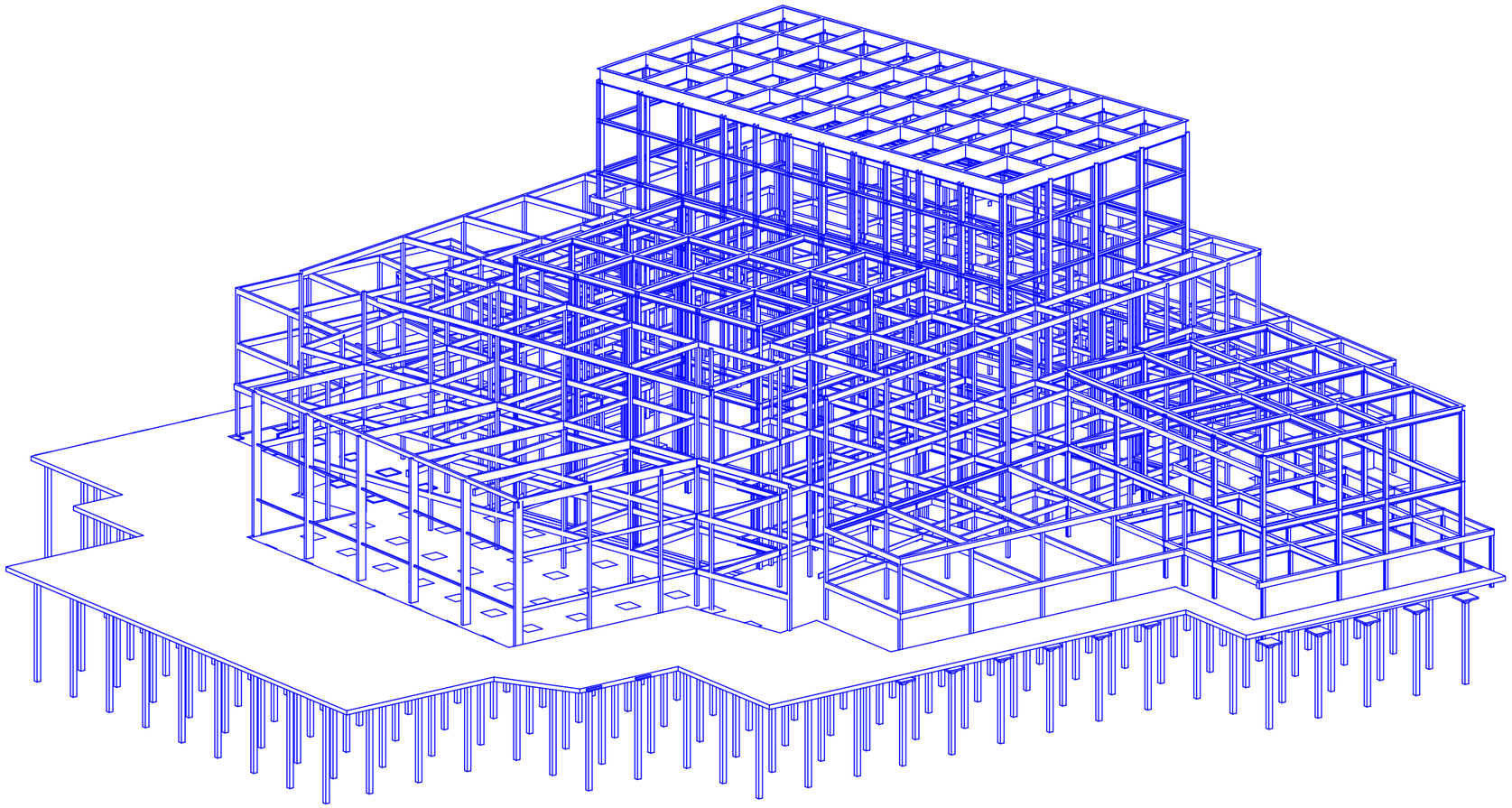
increase length of foundation piles
to support new elevated ground floor



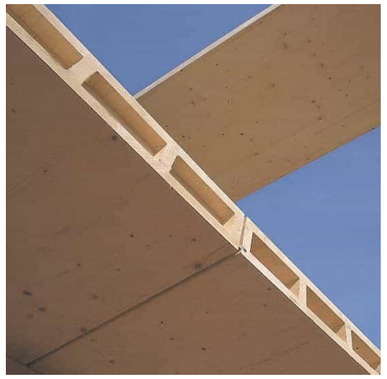
new concrete ground floor (+ 1225)



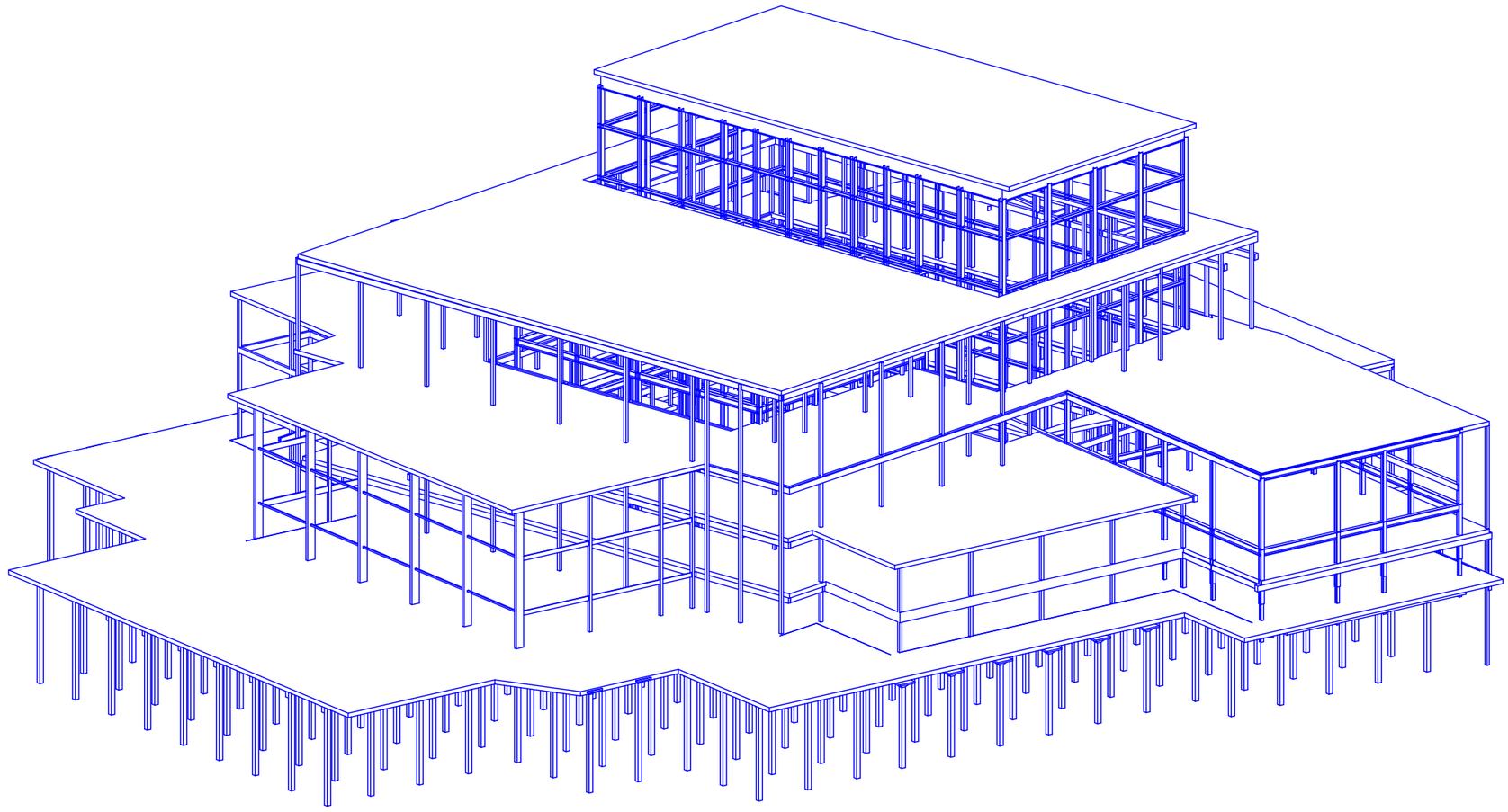
strongtie



new glulam column and post structure with sealed steel connections
5800 x 5800 grid



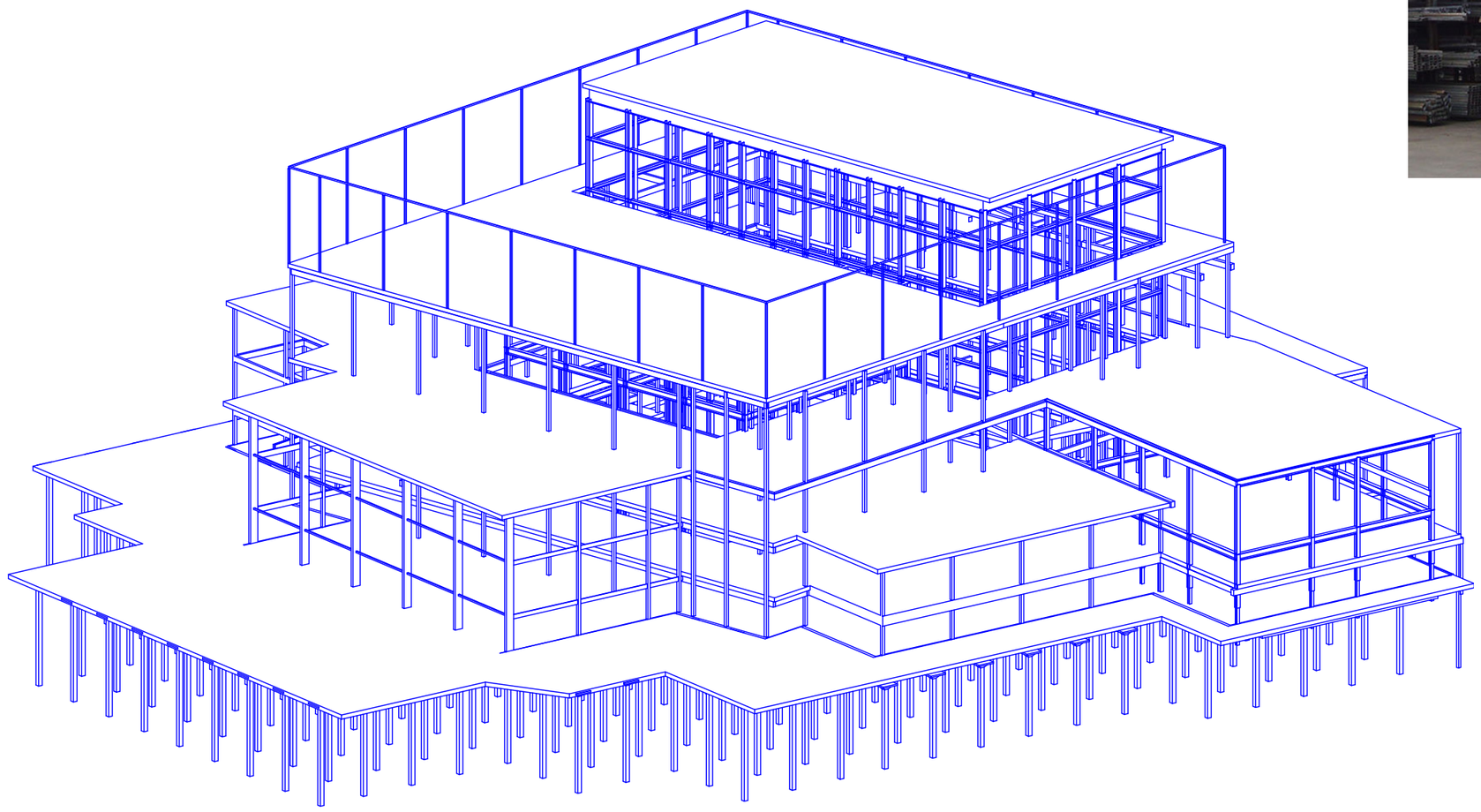
lignatur



new floors and roofs
Linatur surface elements (LFE)



Geraerts Kassensloop, 2023



additional structure on roof to support rod system for plants
re-used greenhouse materials (steel profiles)

DESIGN CHALLENGES

combine functions & improve logistics

water nuisance & subsidence

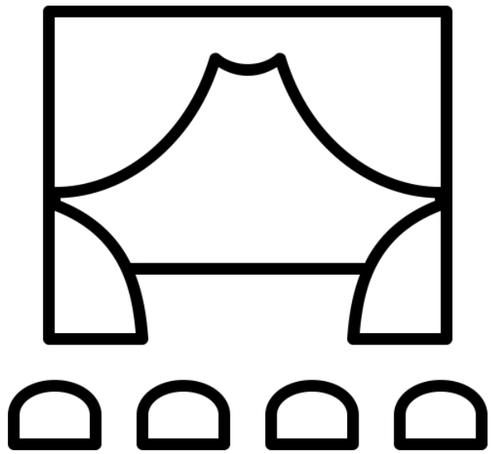
water as opportunity & design element

WATER AS DESIGN ELEMENT



rainwater

+

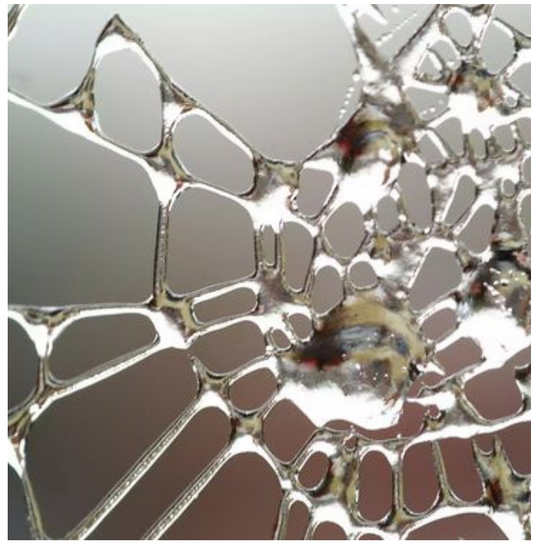


theatre

RAINWATER DRAINAGE AND RETENTION



japanese rain chain



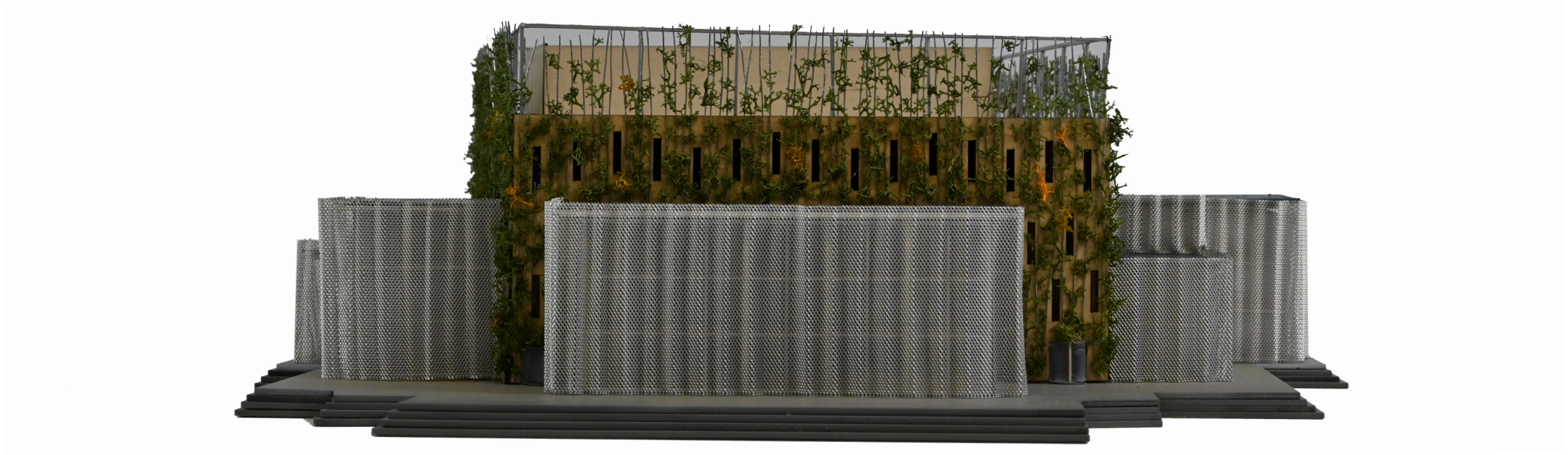
raindrops in spider web

STAGE CURTAINS

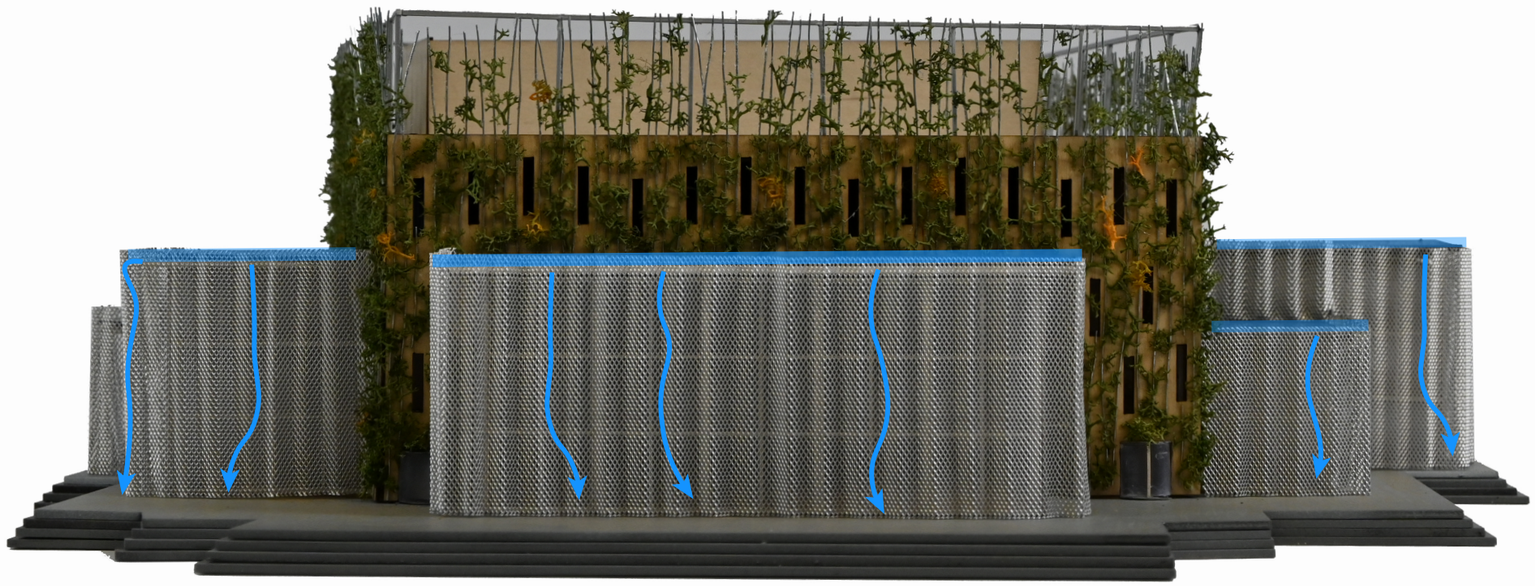


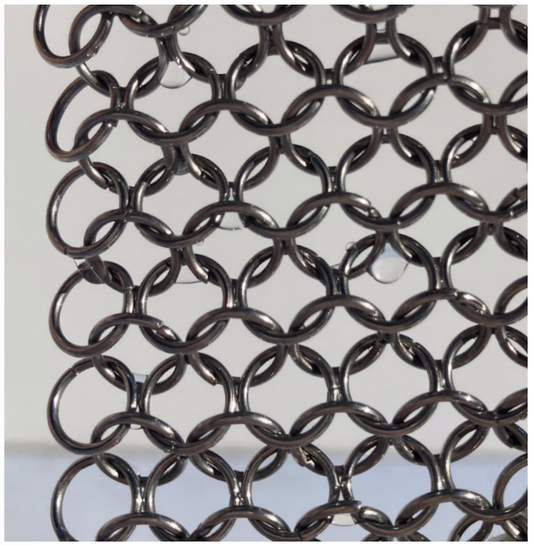
Large Hall De Goudse Schouwburg Wendy van Bree Fotografie

RAINCURTAIN FACADES



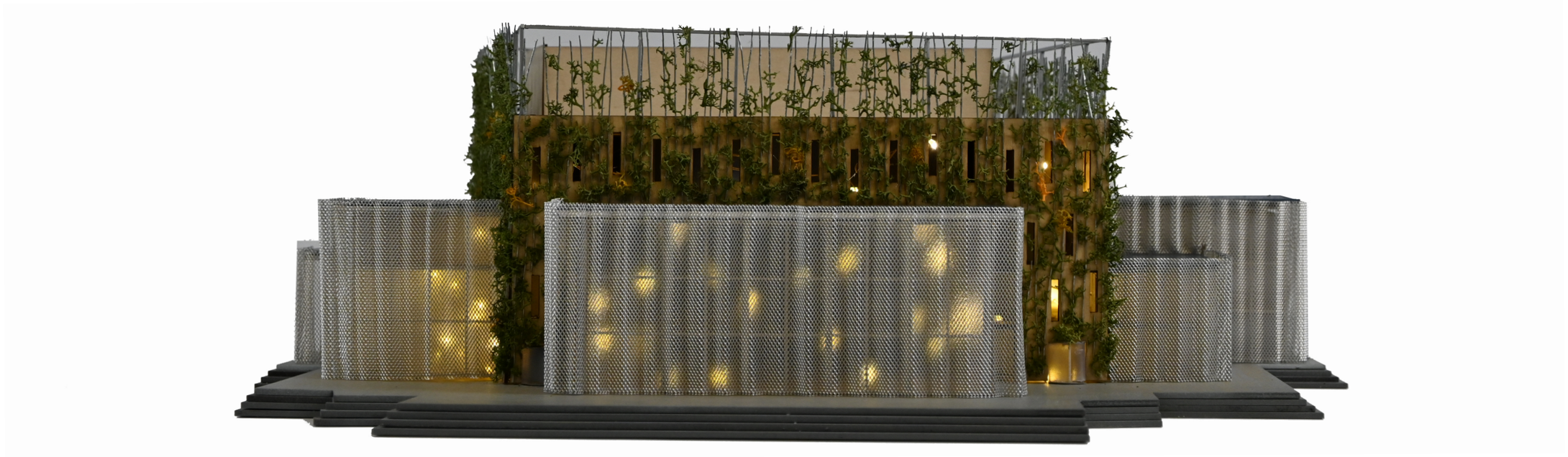
RAINCURTAIN FAÇADES



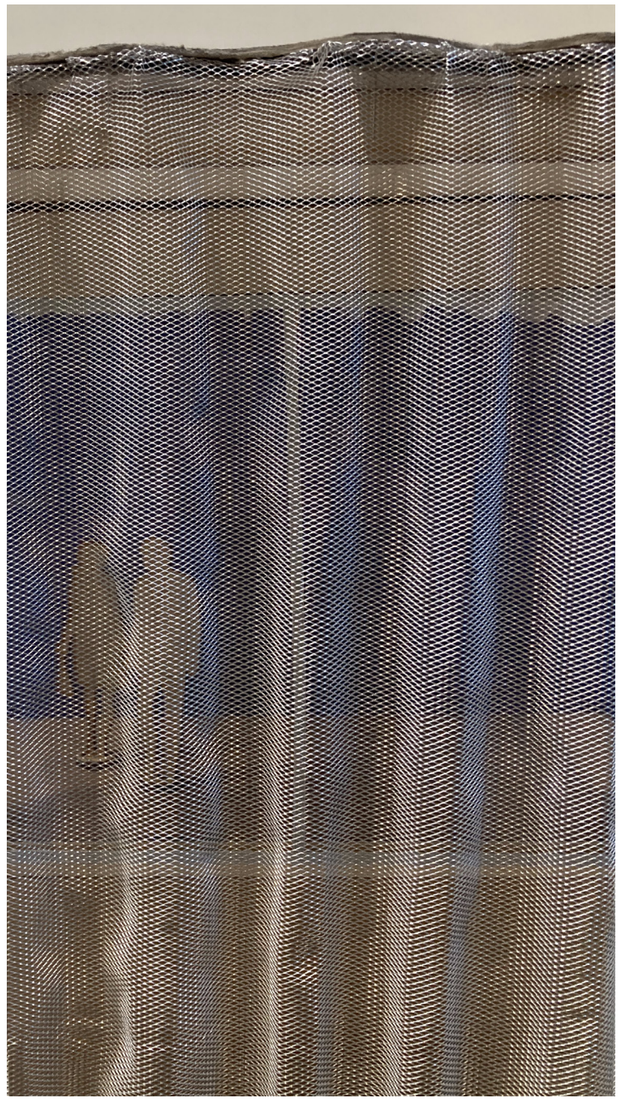


ring mesh rain curtain

TRANSLUCENT FAÇADES



TRANSLUCENT FAÇADES



outside view



inside view

TRANSLUCENT FAÇADES



sunlight

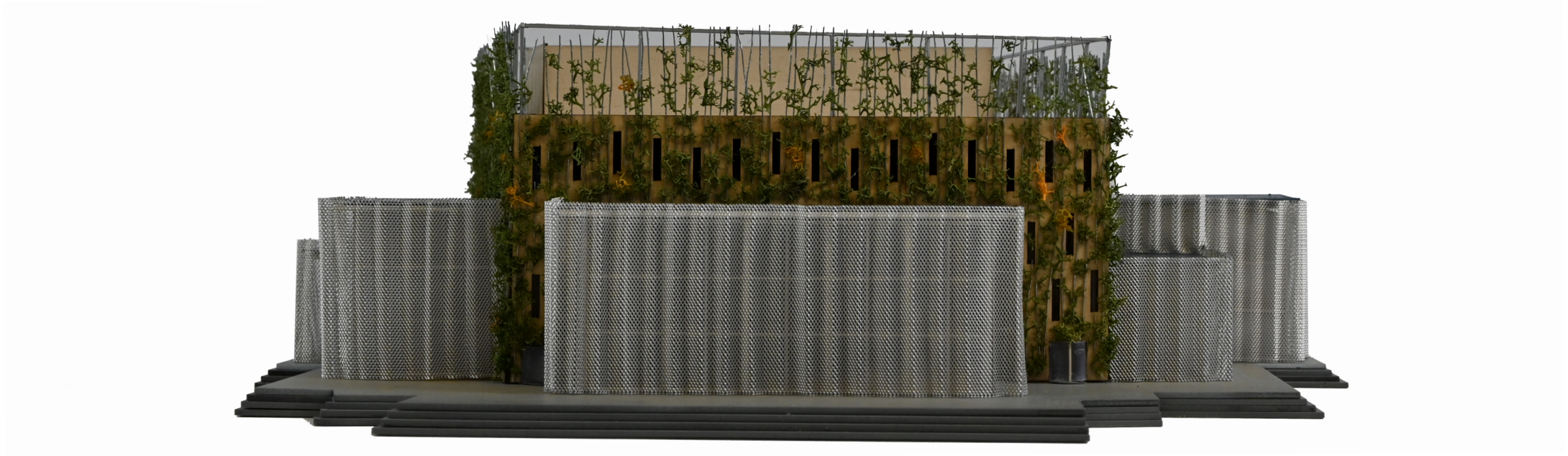


spotlight

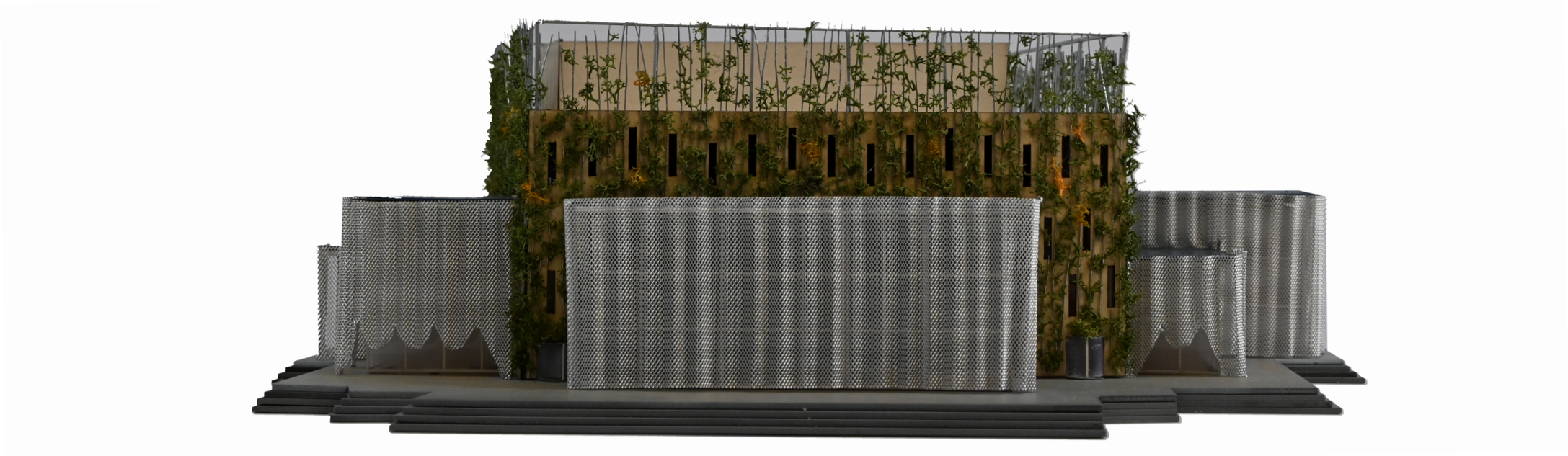


evening light

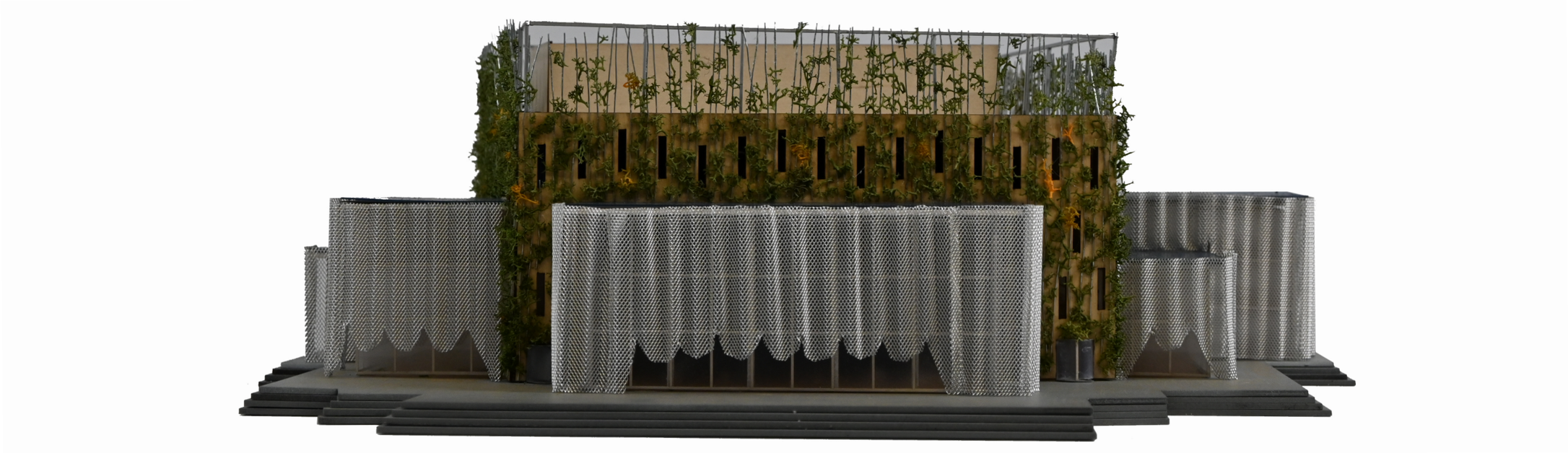
FLEXIBLE FAÇADES



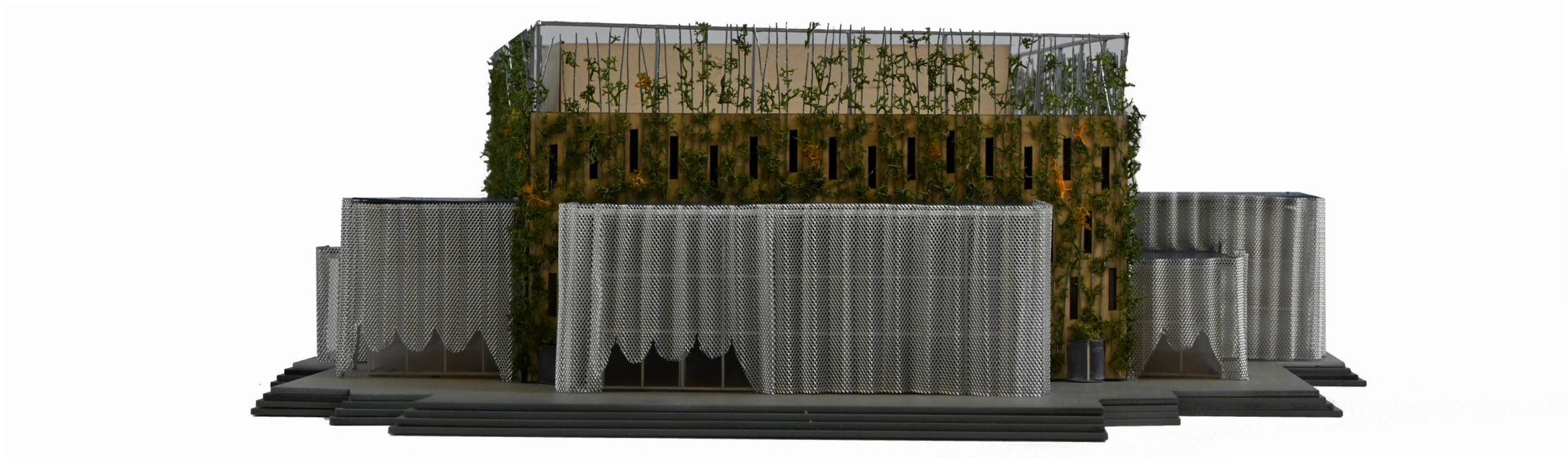
FLEXIBLE FAÇADES



FLEXIBLE FAÇADES



FLEXIBLE FAÇADES

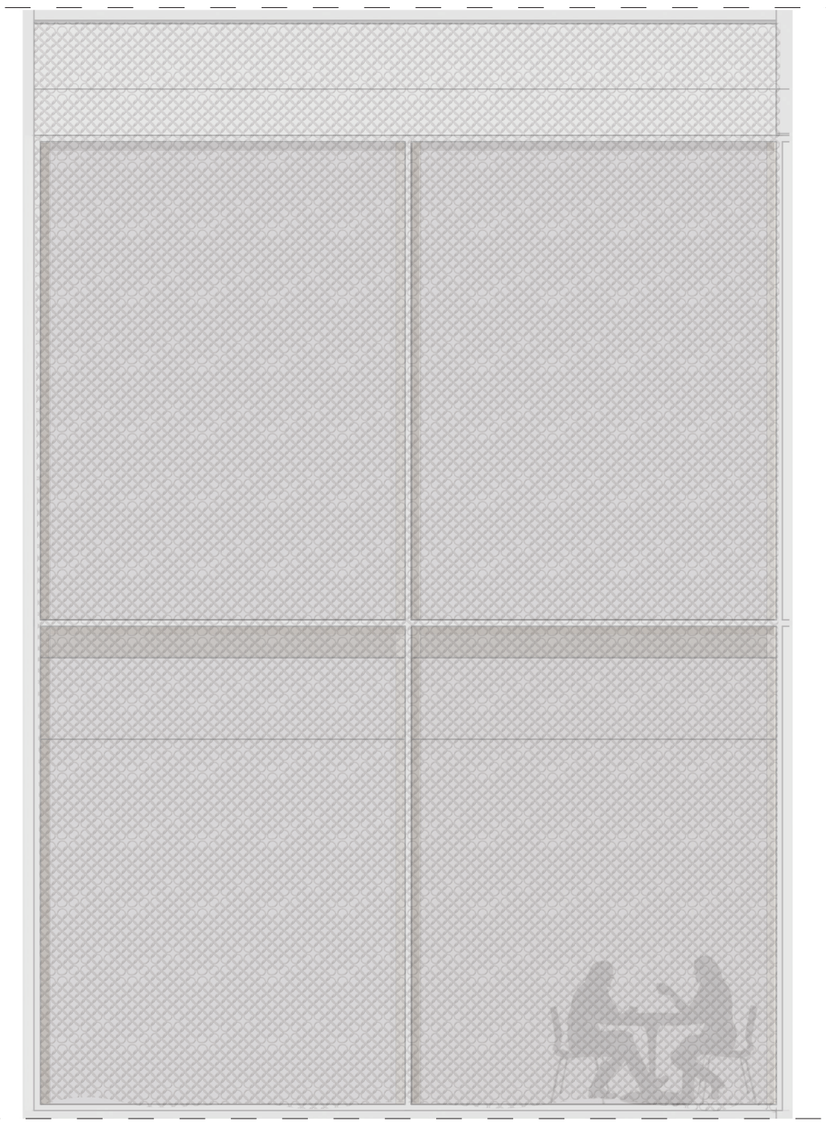


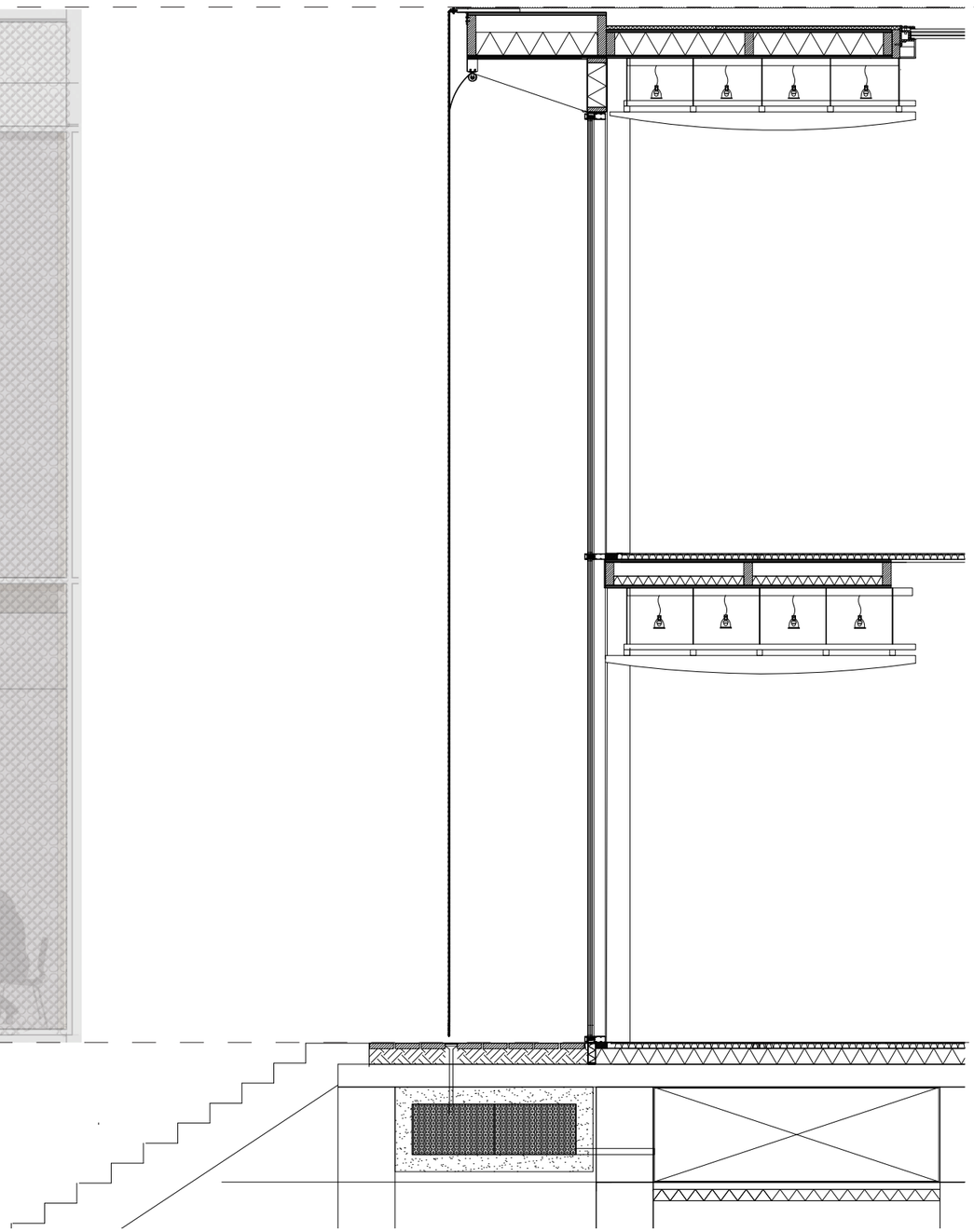
CURTAIN FAÇADES



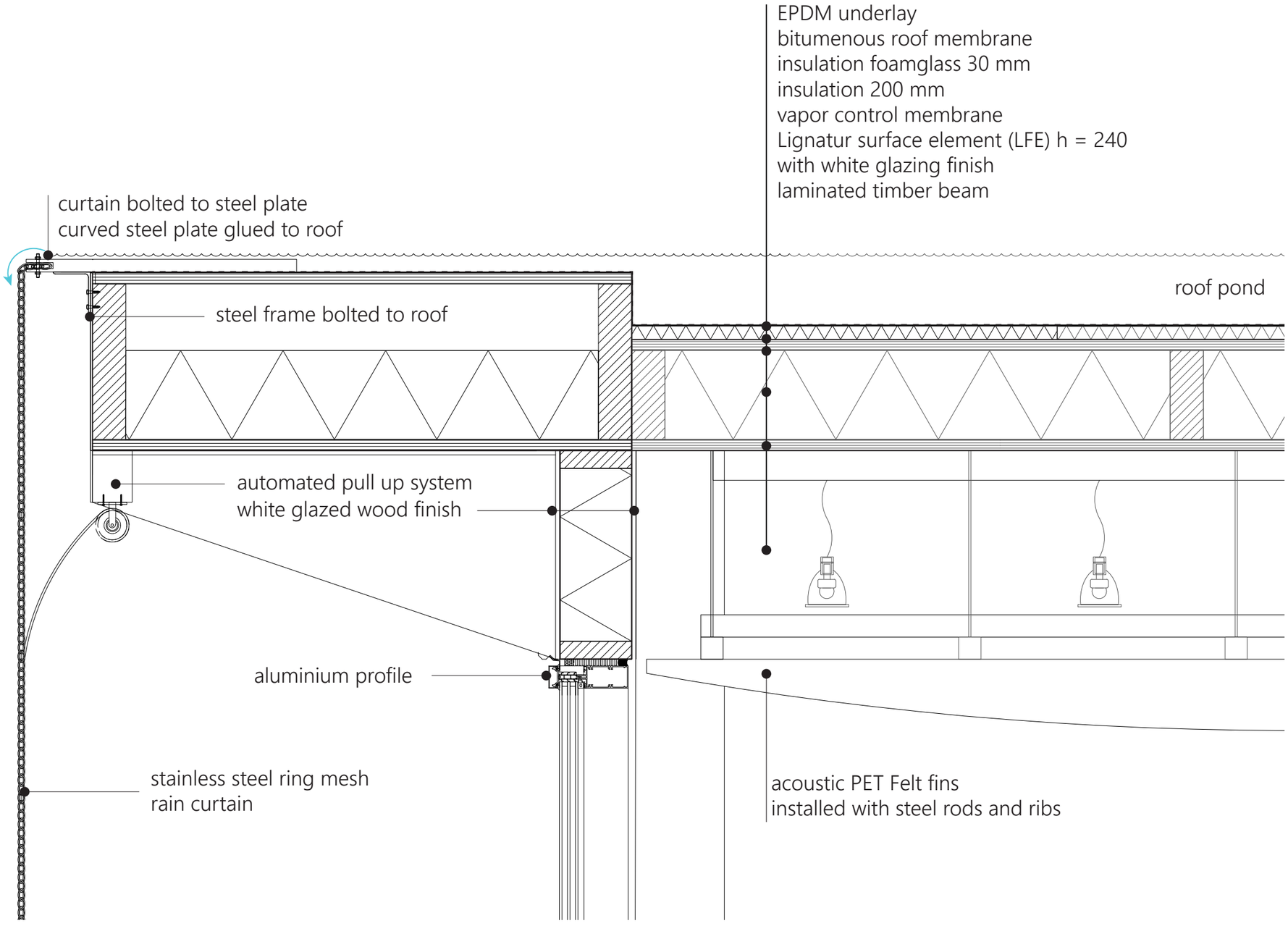
FAÇADE FRAGMENT

curtain façade

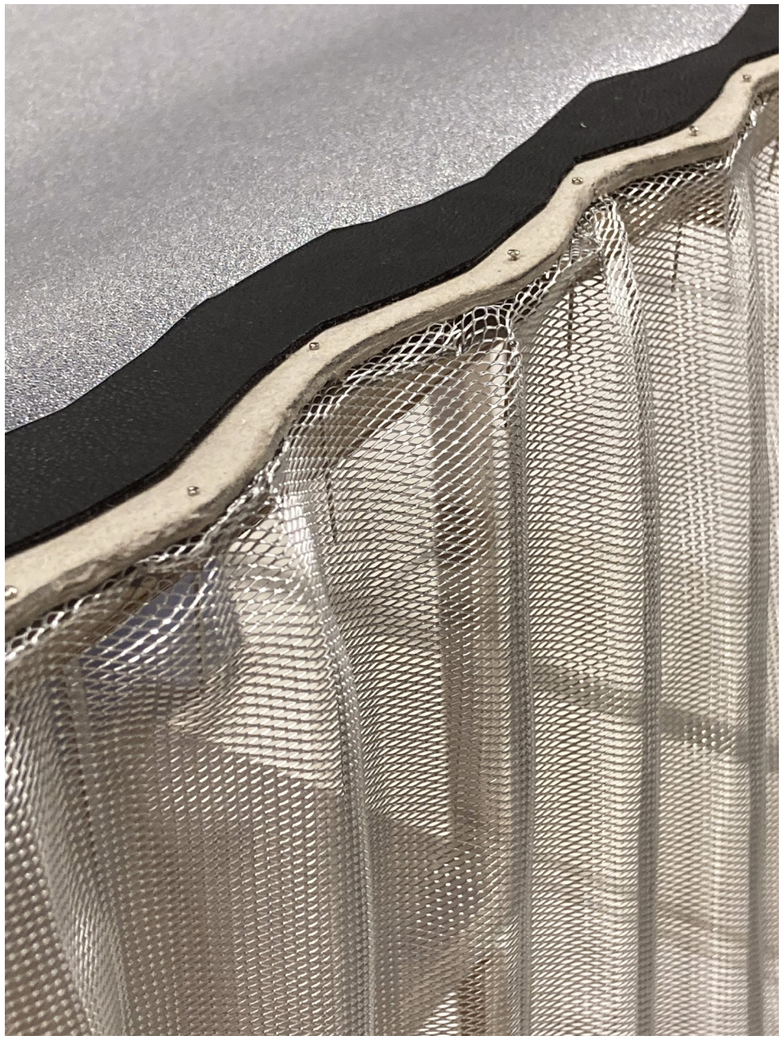


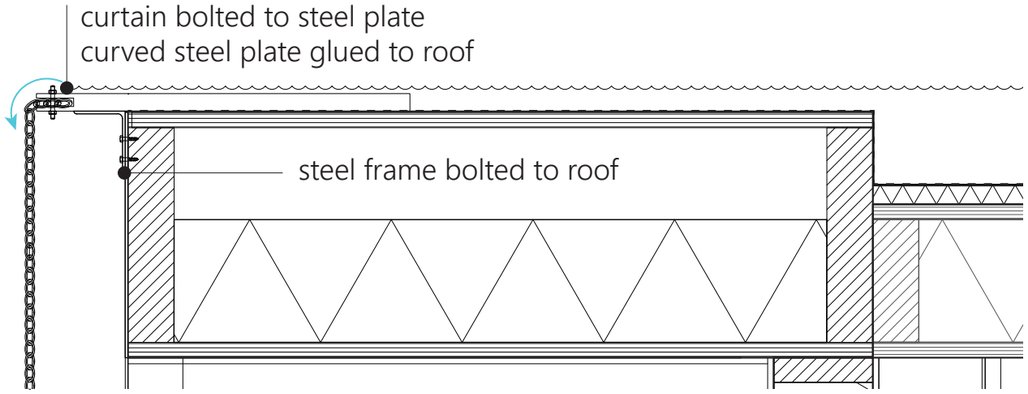


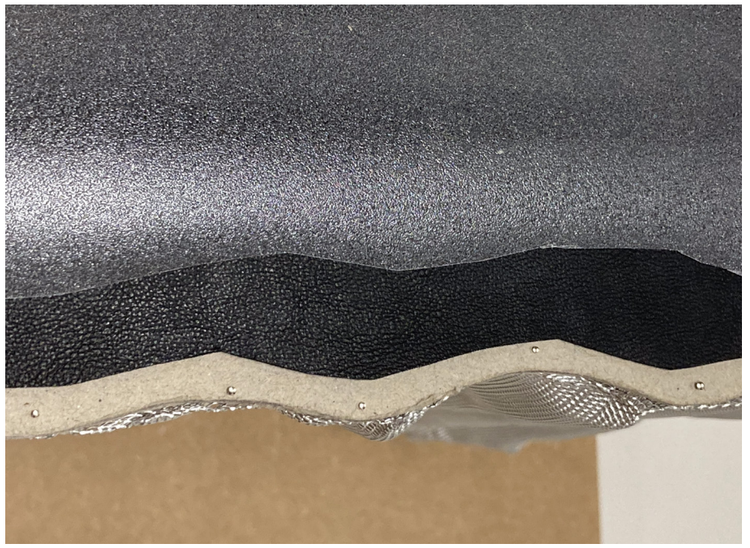
DETAIL
roof edge



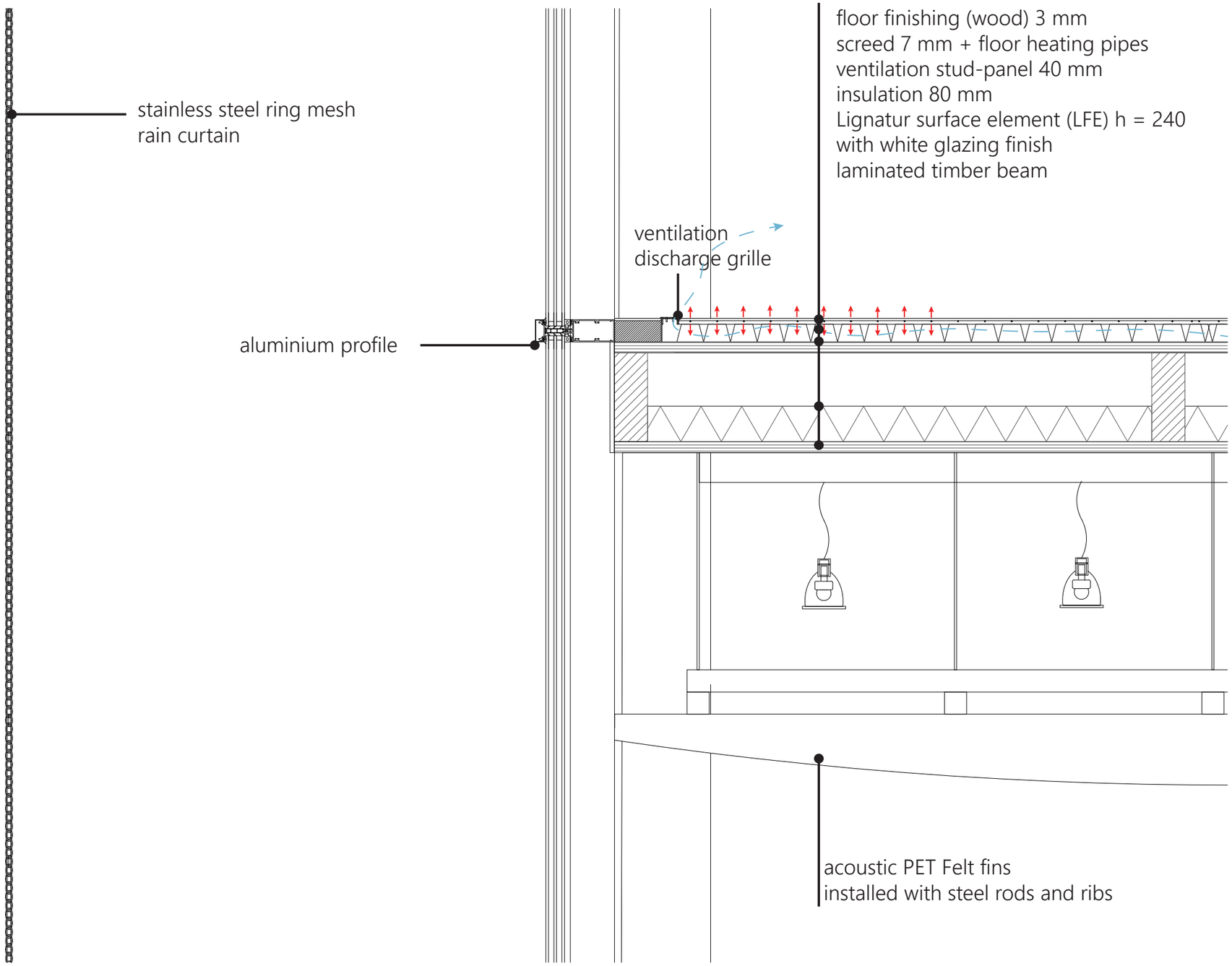
DETAIL
roof edge



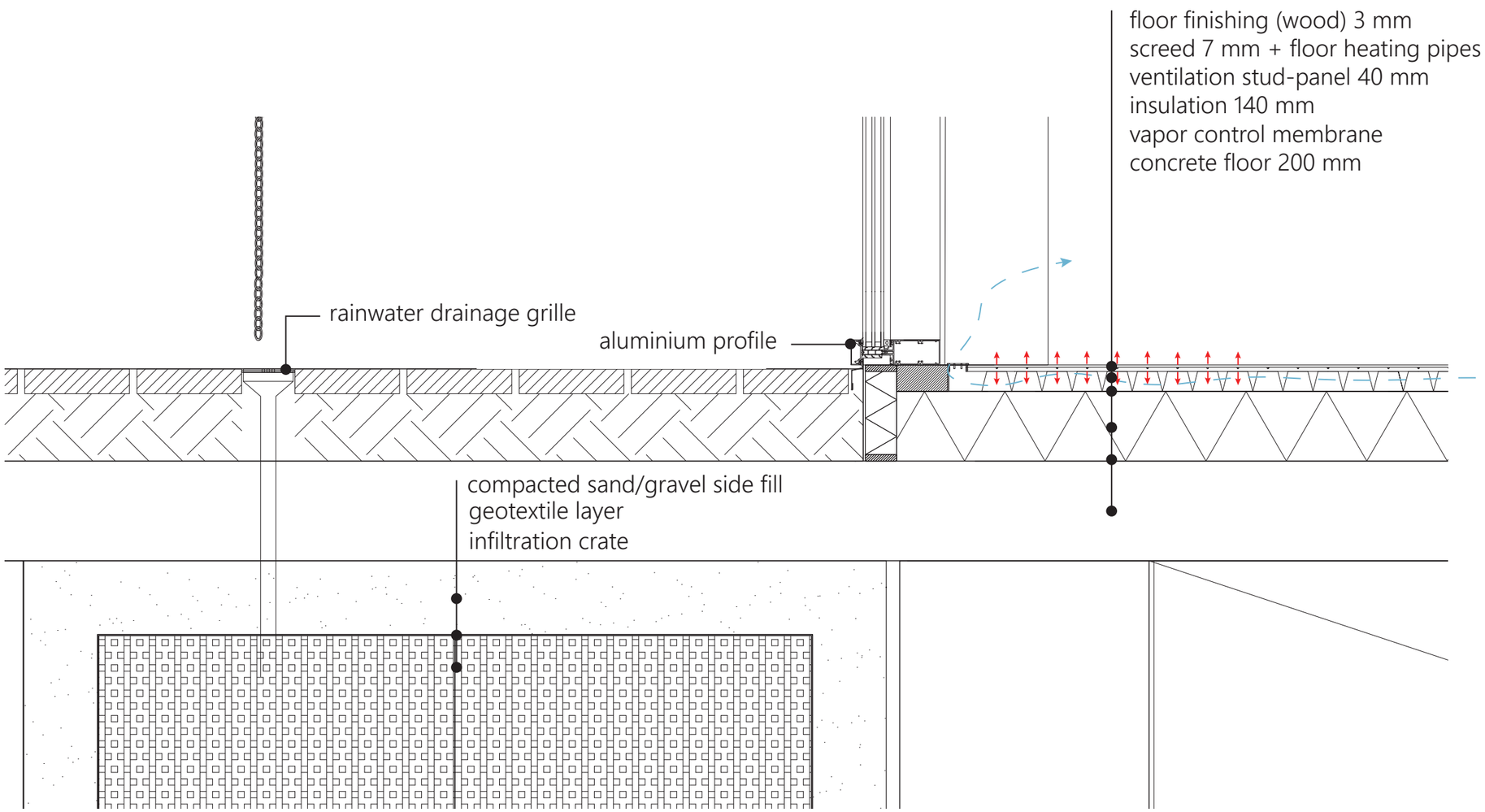




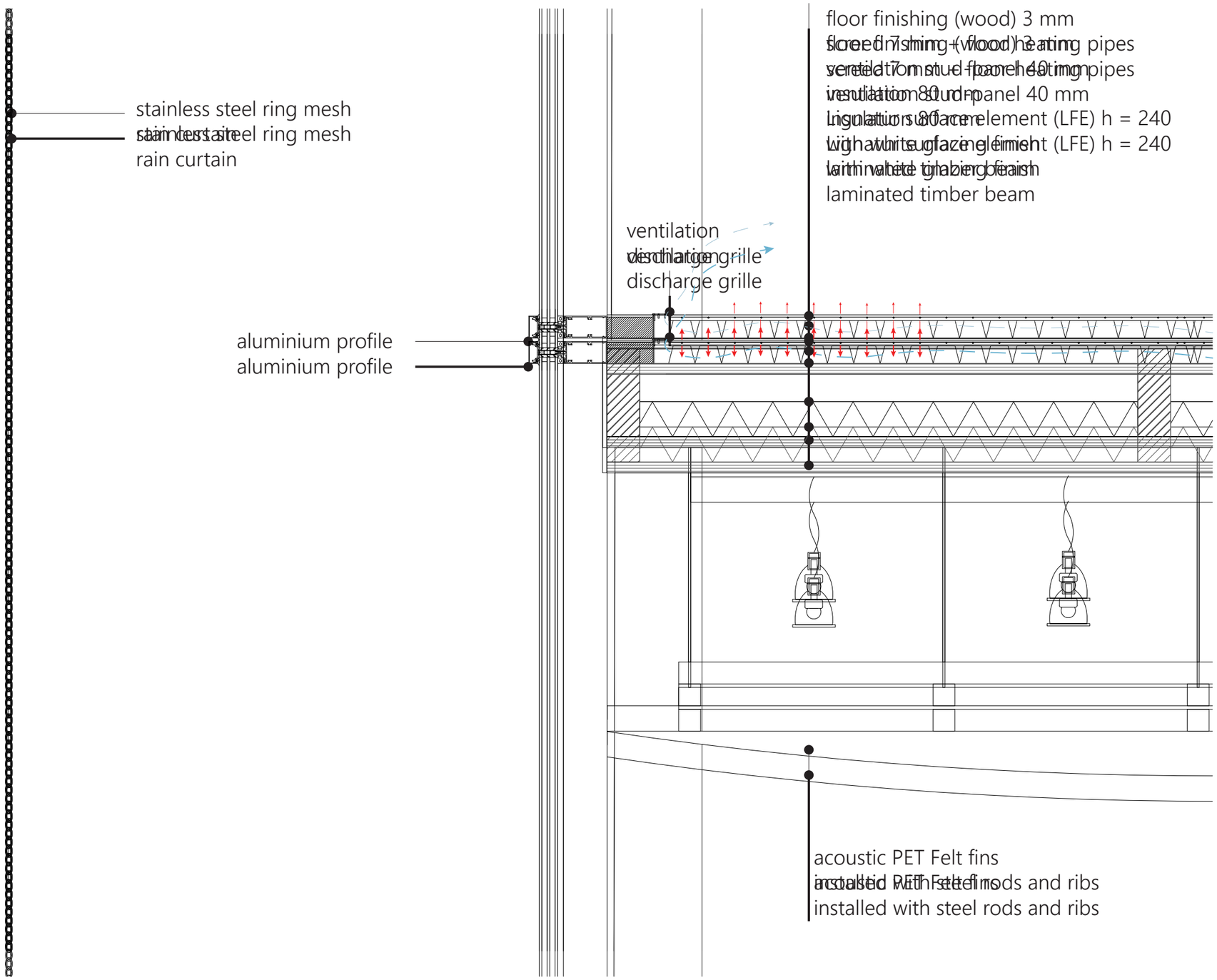
DETAIL
first floor



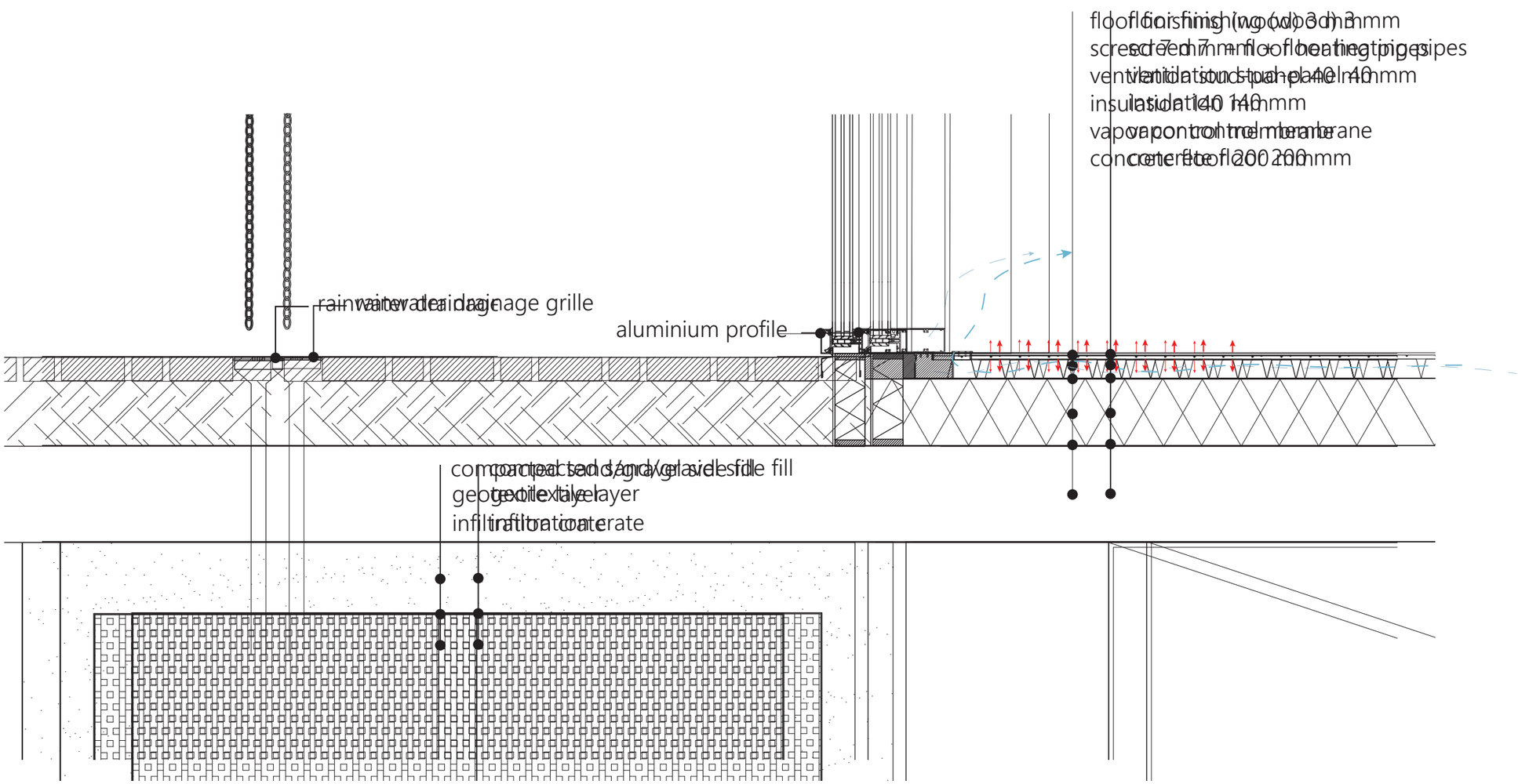
DETAIL
ground level



DETAIL
first floor



DETAIL
ground level



GREEN FAÇADE



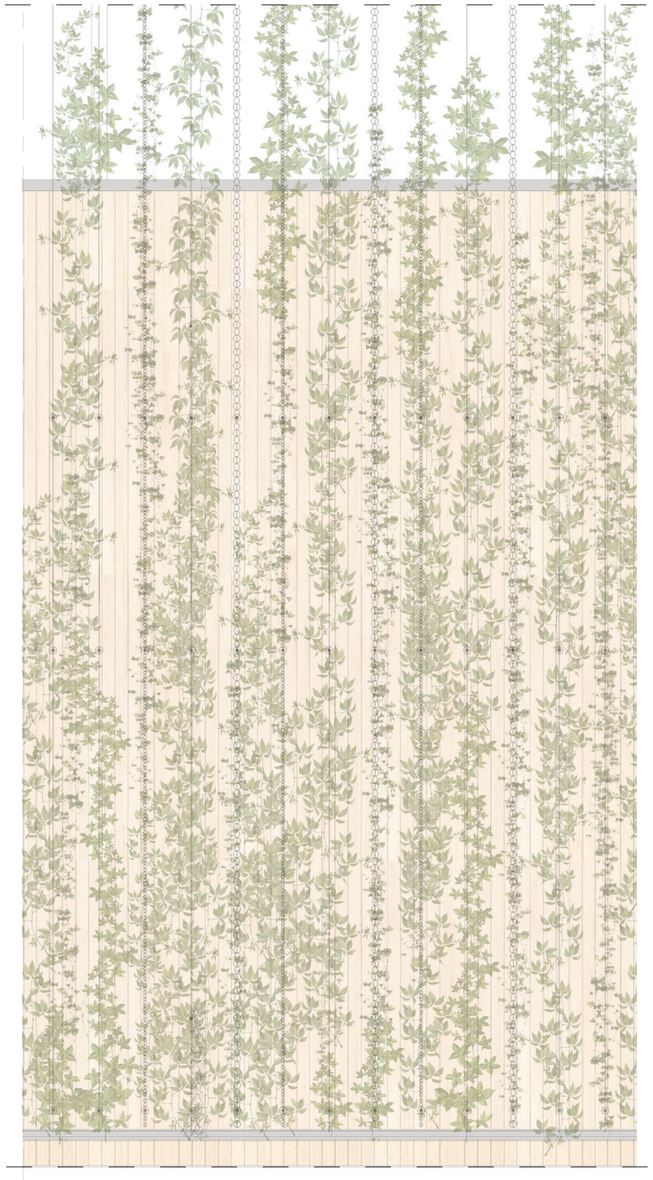
FAÇADE FRAGMENT

indirect green façade











FAÇADE FRAGMENT

indirect green façade







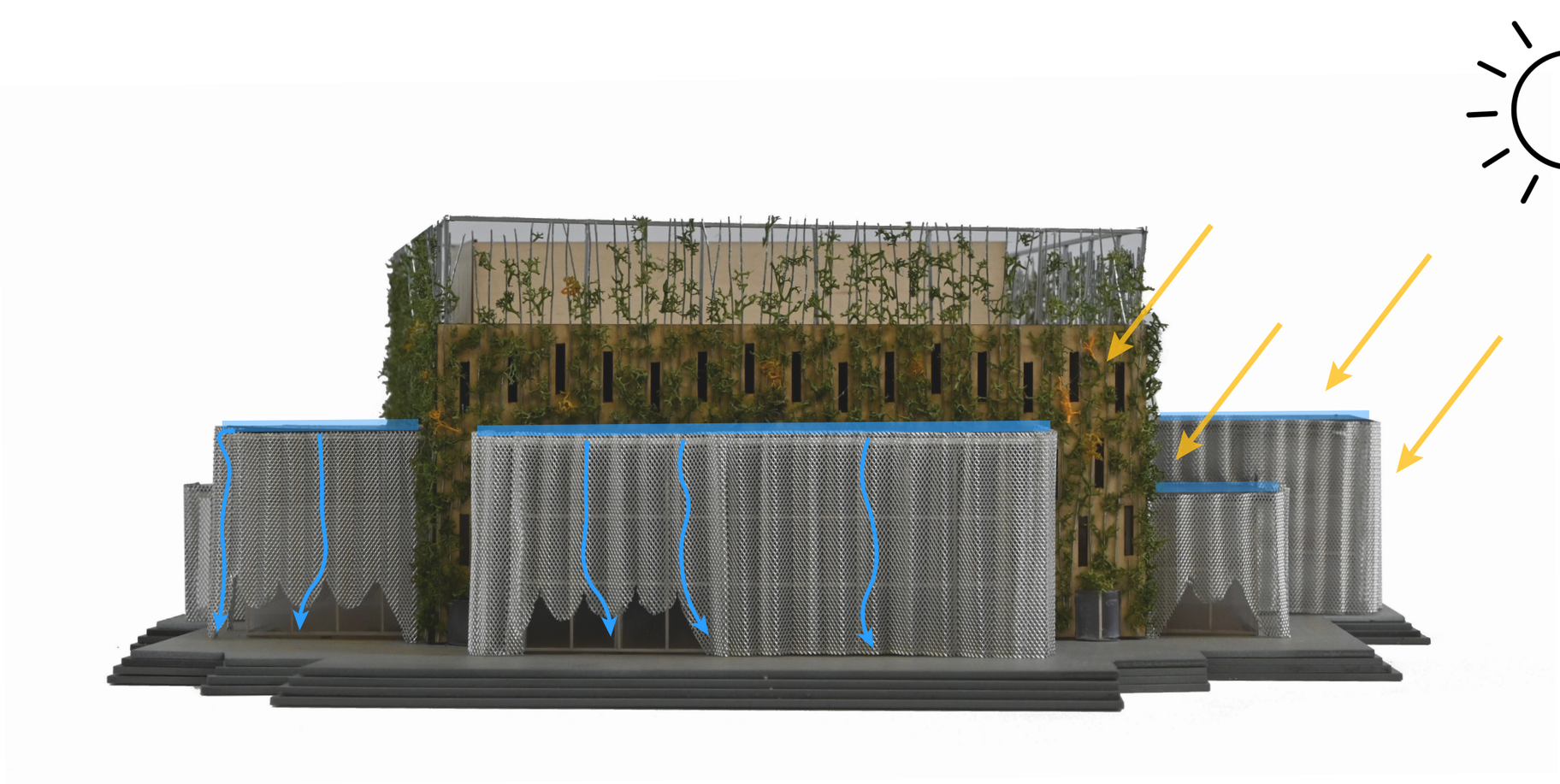




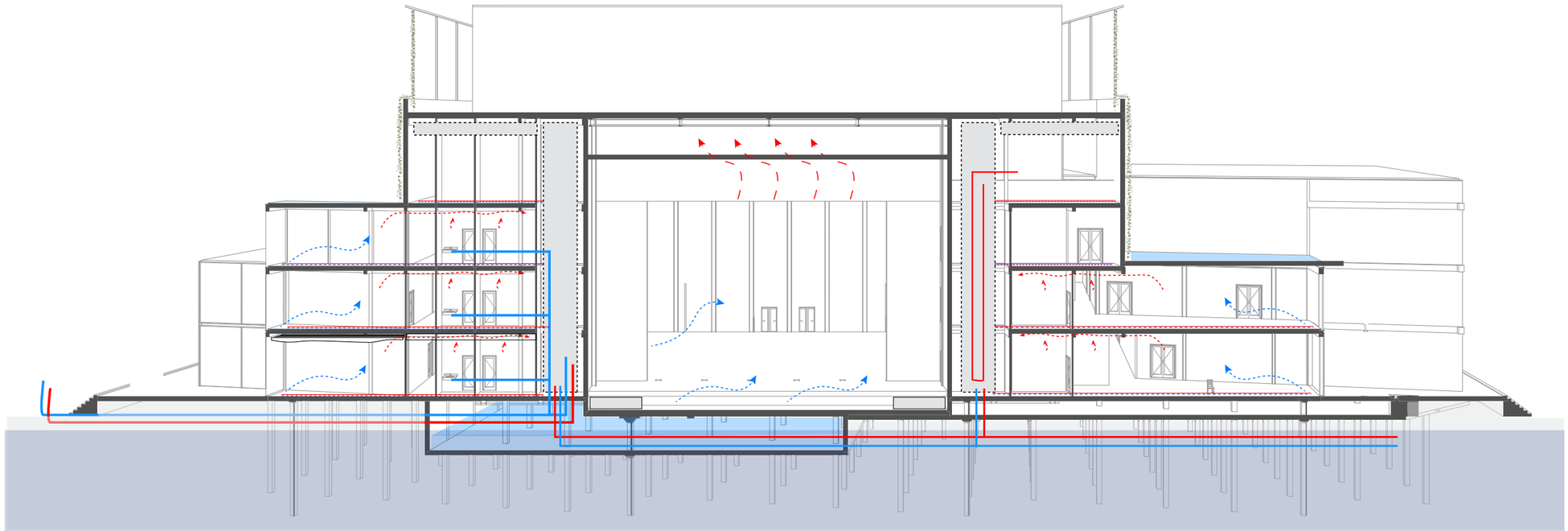




CLIMATE CONCEPT



CLIMATE CONCEPT



ventilation air pre-cooled or heated by stored water

horizontal ground heat exchanger



1.400.000 liter in underground storage

URBAN CONCEPT

dry



3



4



1 lowered + elevated square as open air theatre
2 park + wadi's
3 pond + water playground
4 recycled bricks from old facade for pavement
5 parking spots community centre + artists
6 elevated terraces

URBAN CONCEPT

wet



1

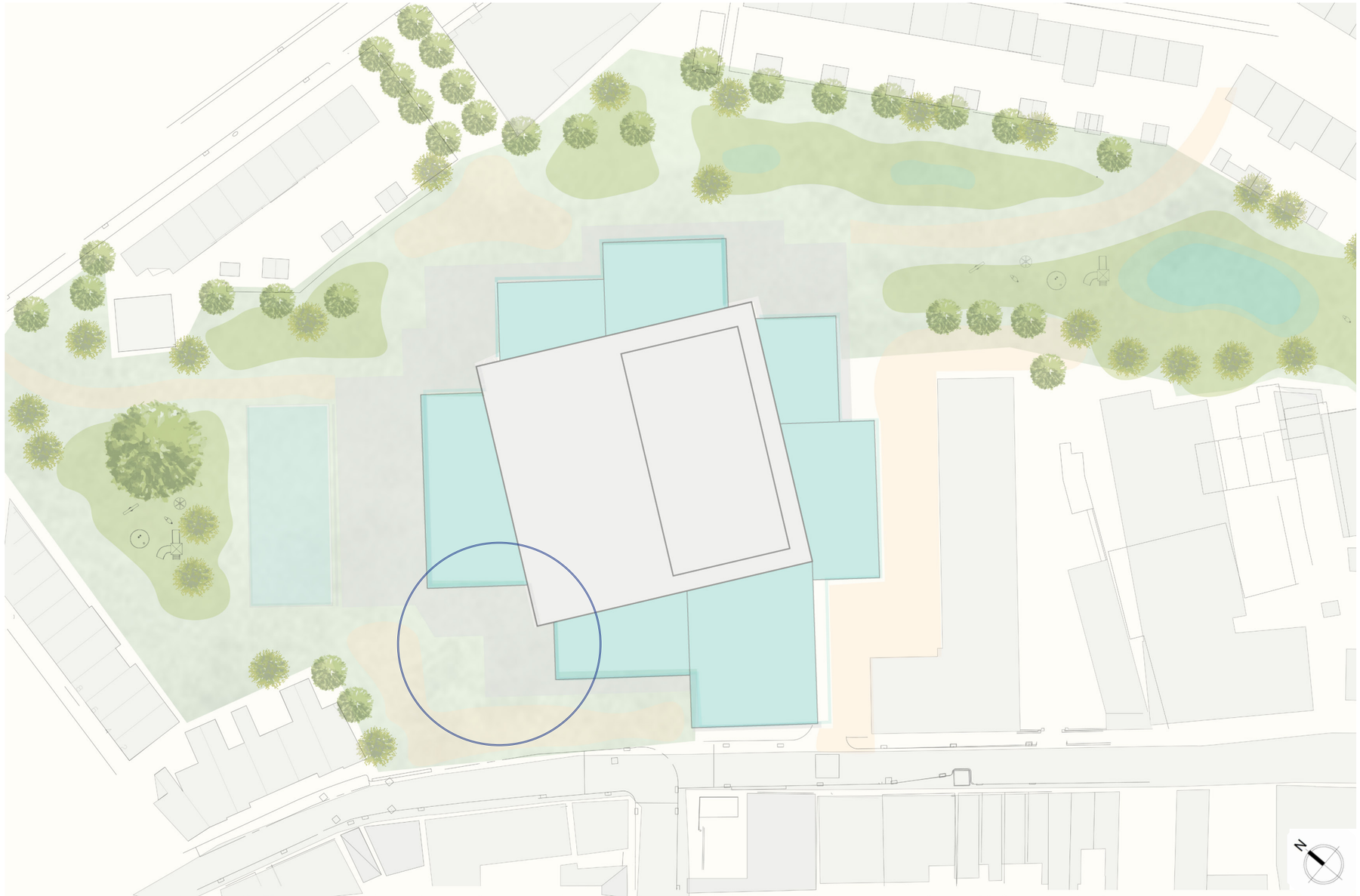


4



1 open air theatre turns into water square
2 wadi's
3 pond + water playground
4 pervious (open joint) pavement
5 parking spots community centre + artists
6 water from elevated terraes drained towards underground storage

URBAN CONCEPT



1



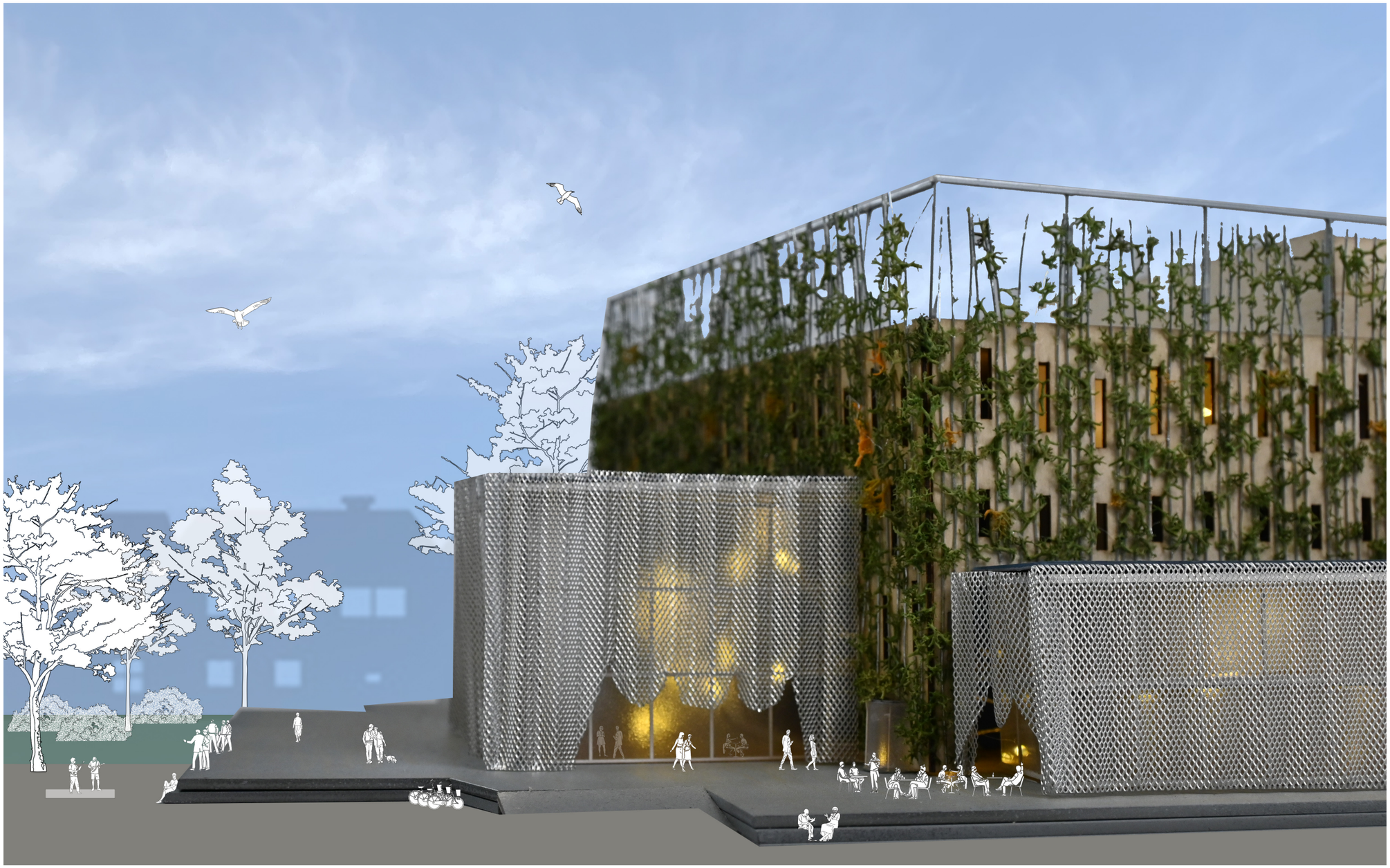
4



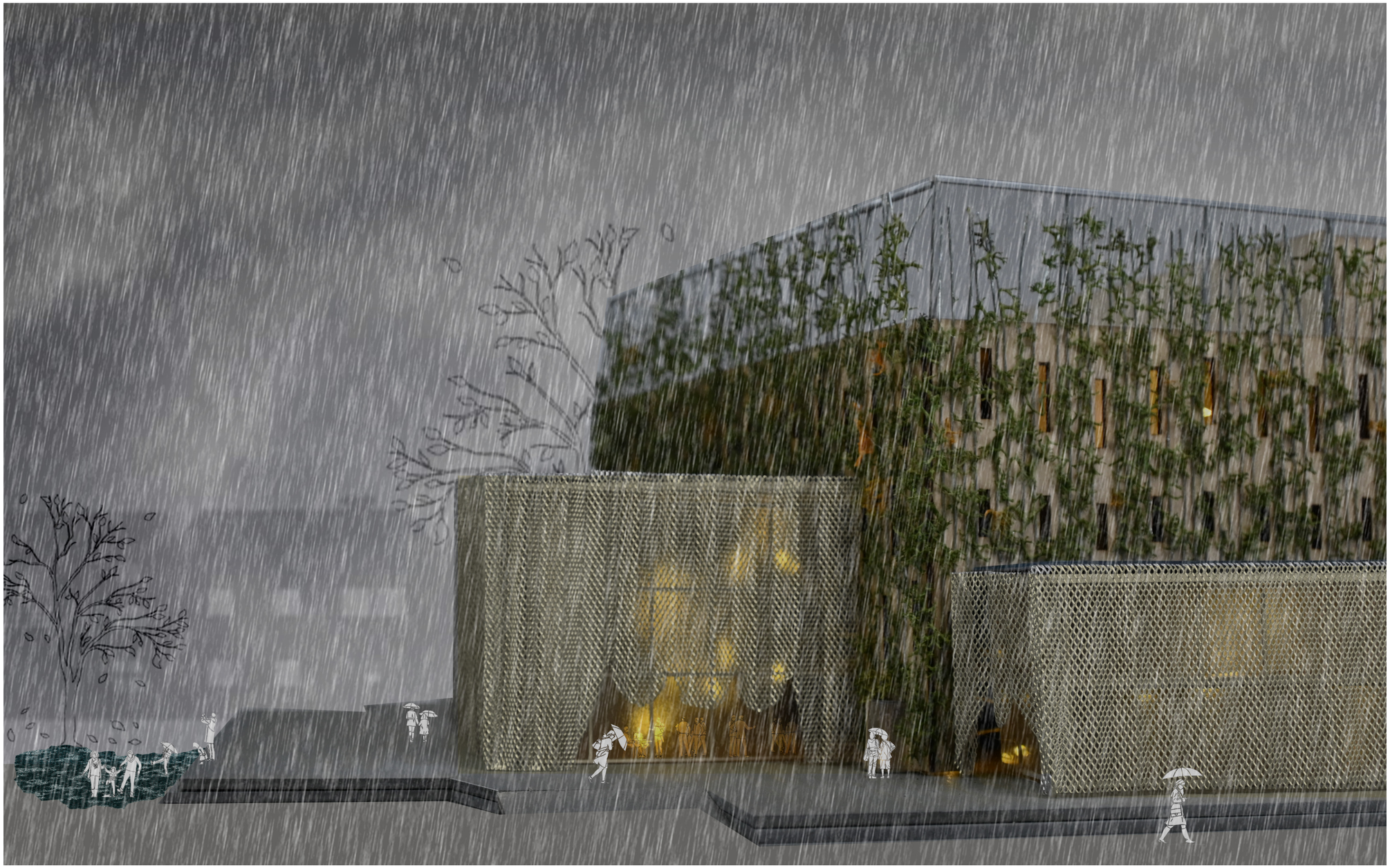
1 open air theatre turns into water square
2 wadi's
3 pond + water playground
4 pervious (open joint) pavement
5 parking spots community centre + artists
6 water from elevated terraes drained towards underground storage

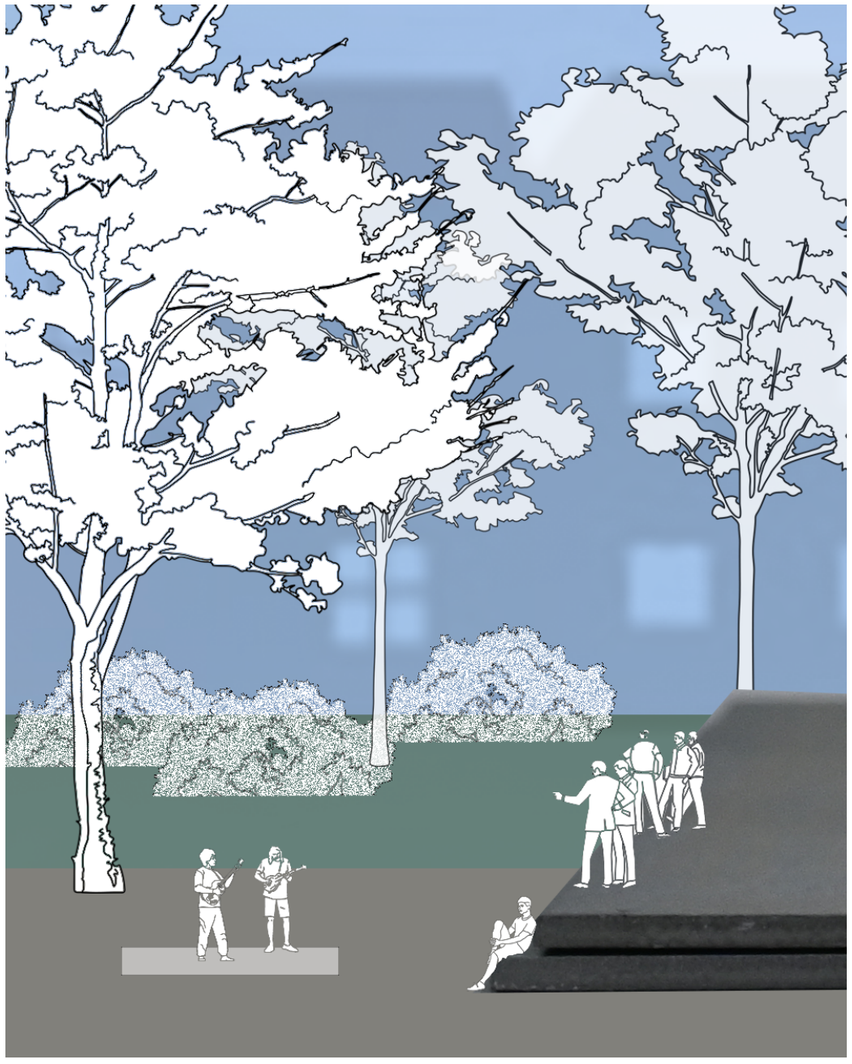


view from Boelekade



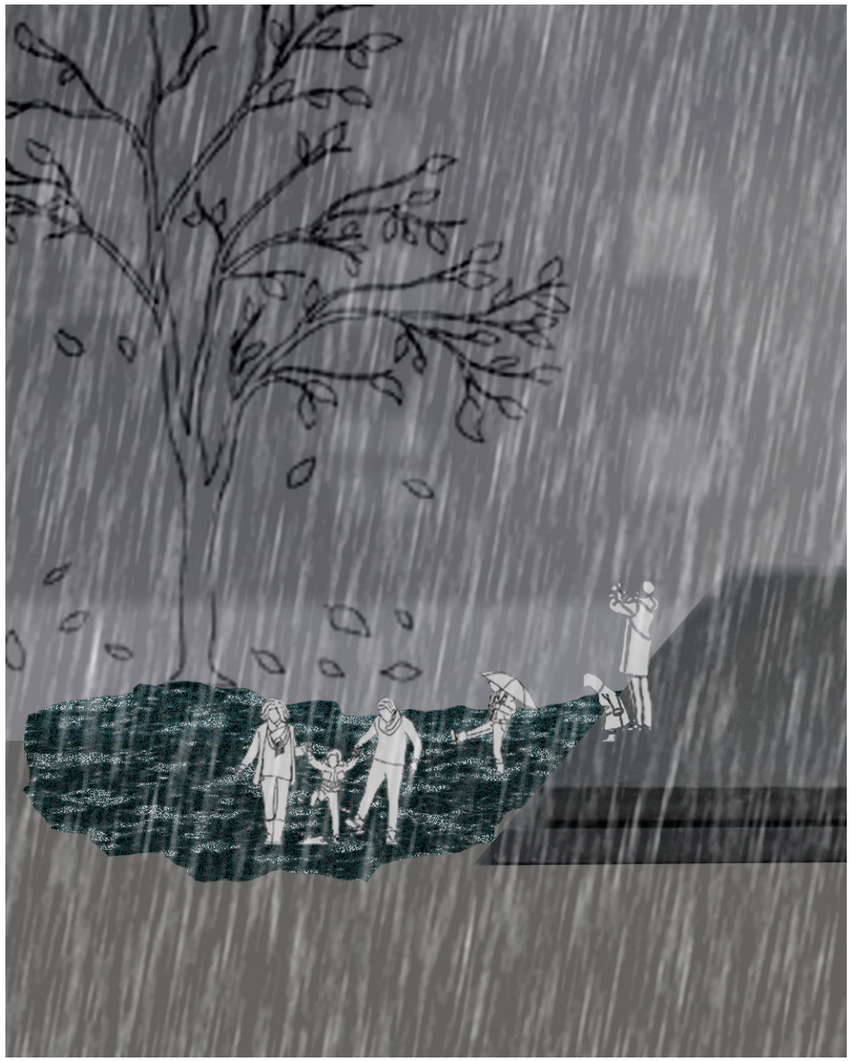
public terrace & city centre side entrance







open air theatre & public terrace





water square

URBAN CONCEPT

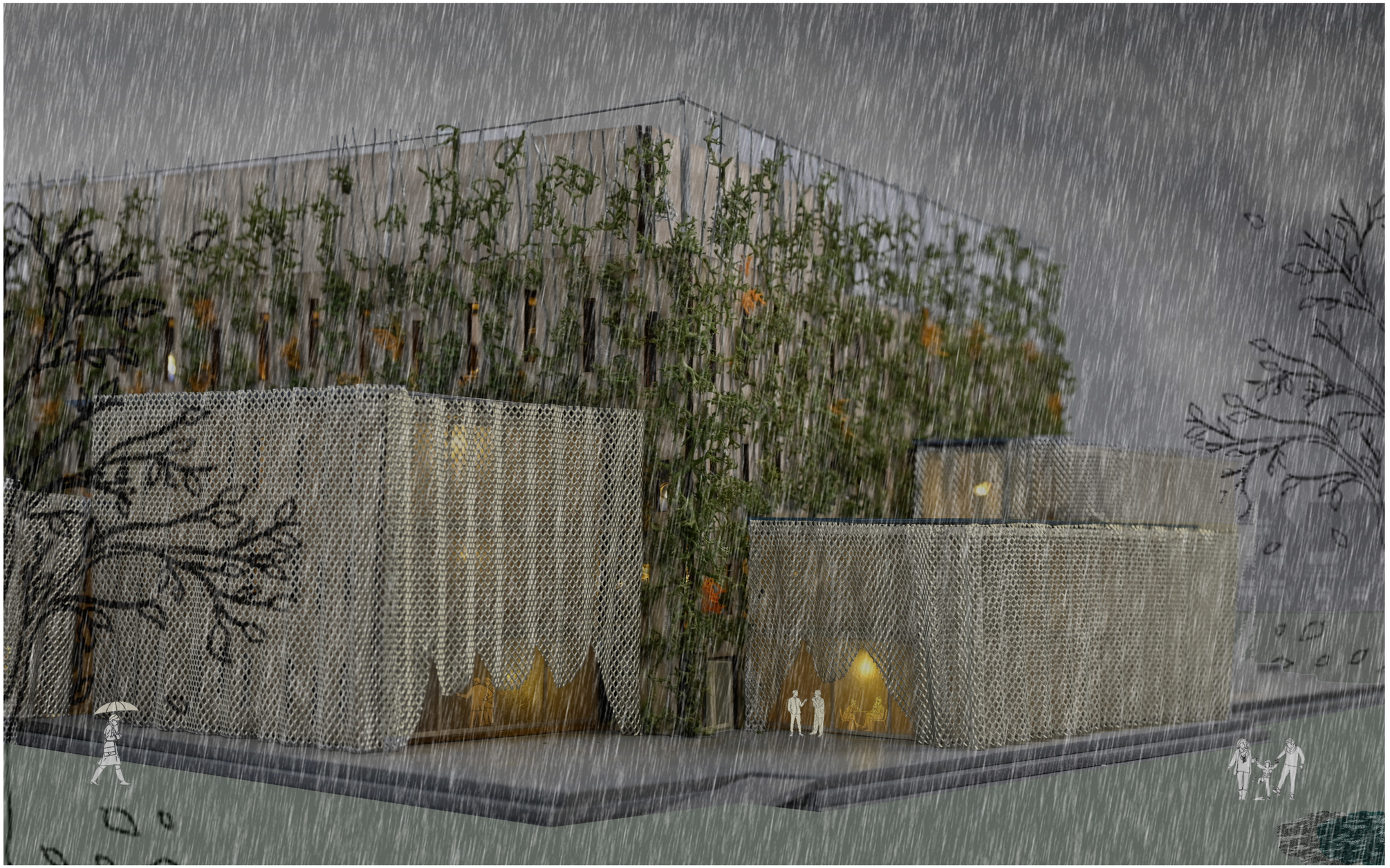




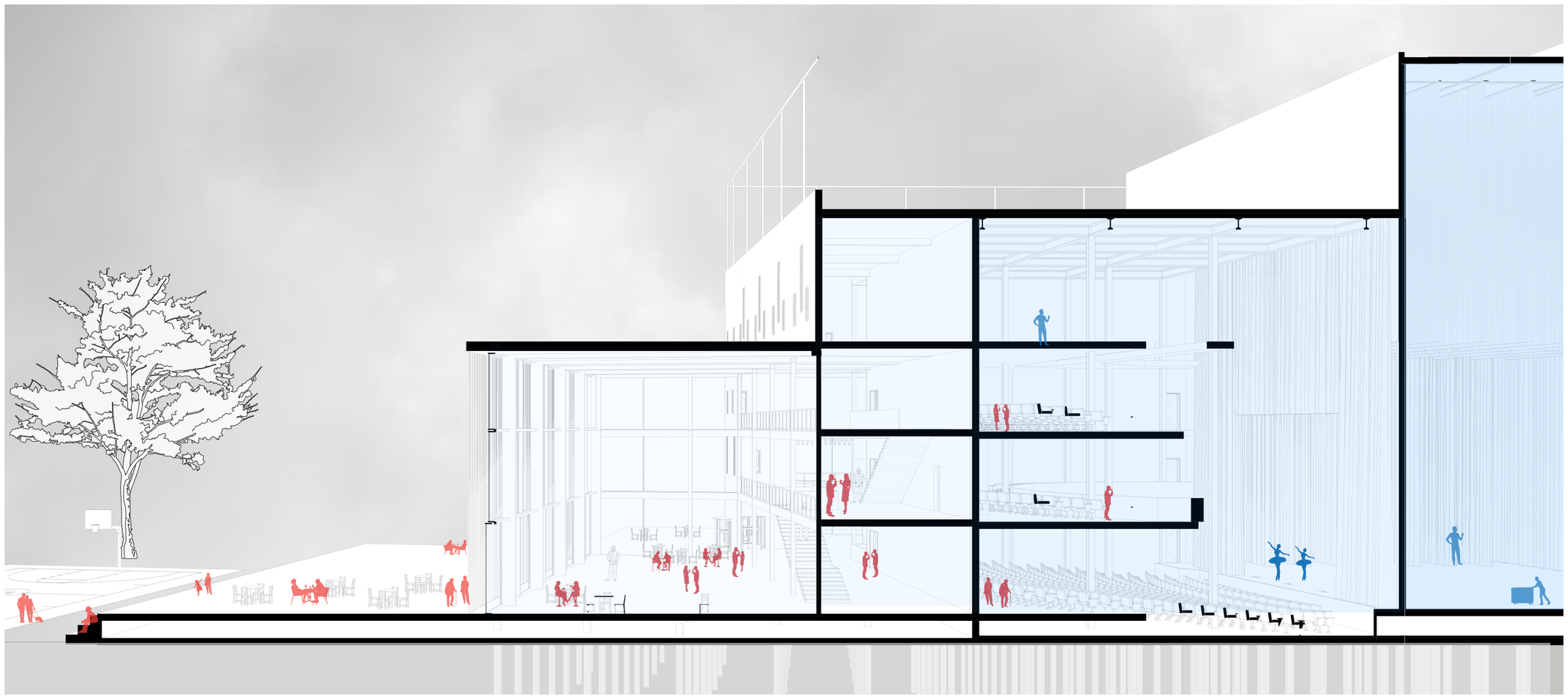
neighbourhood ‘back’ side



artist / community centre entrance & community terrace



artist / community centre entrance & community terrace



open / public → closed / private

INTERIOR
Design Input



COMMUNITY

welcoming
intimate

flexible



AUDIENCE

theatre feeling
elegant
intimate



ARTISTS + PRODUCTION

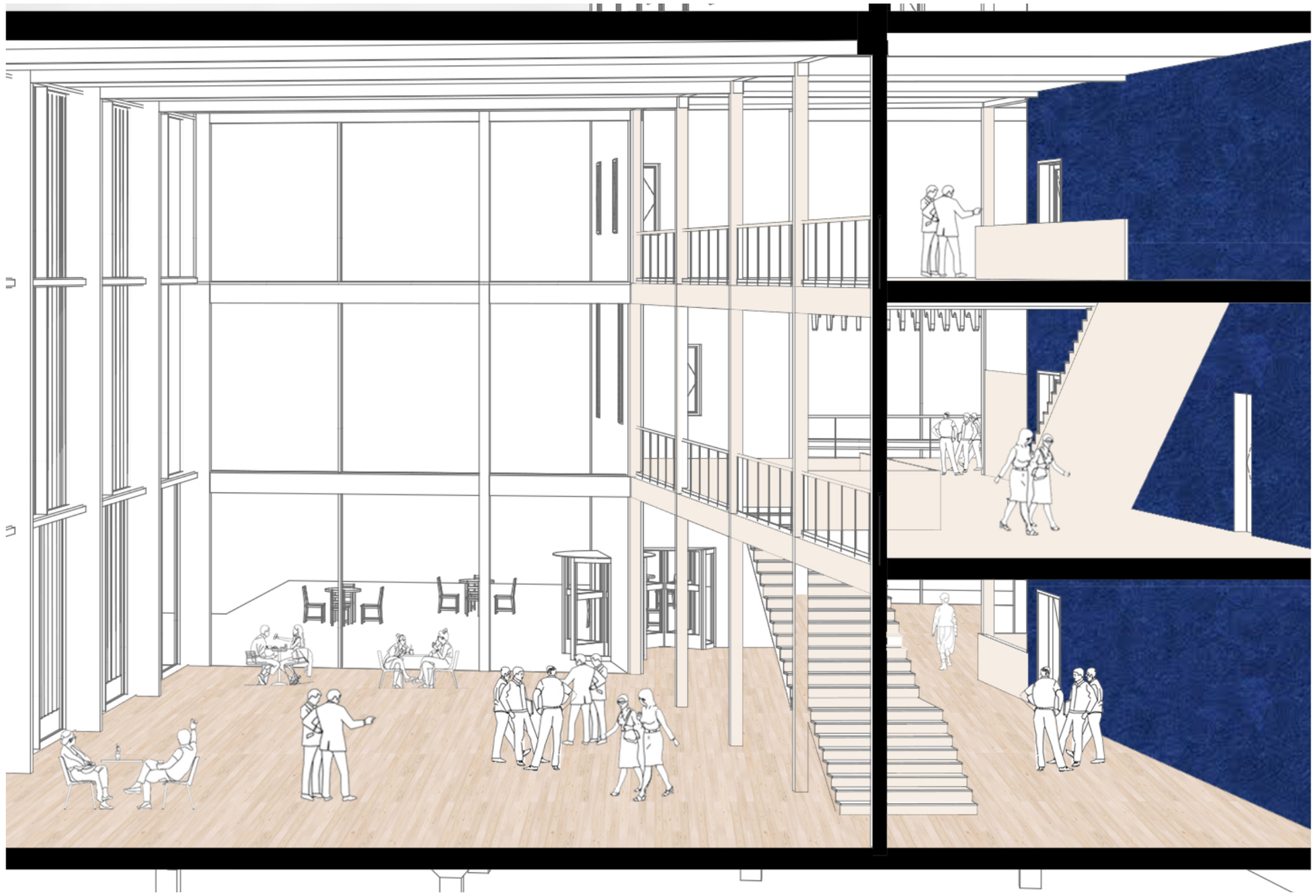
make theatre everywhere
flexible



THEATRE STAFF

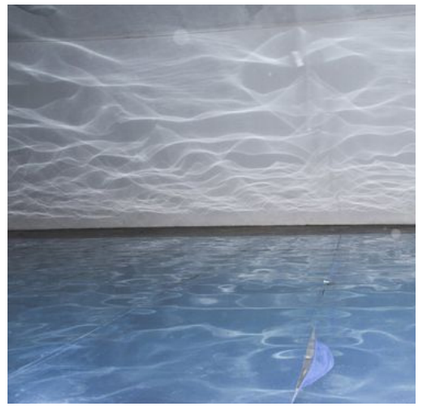
flexible

natural materials

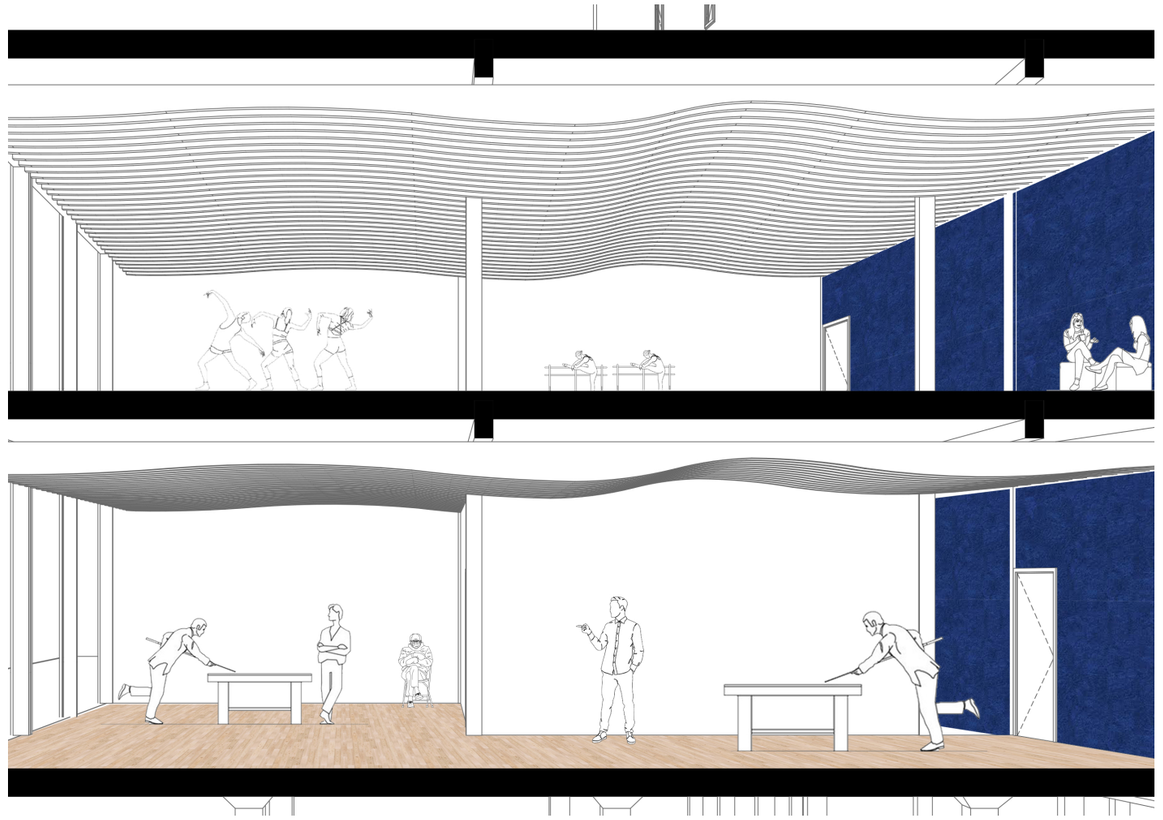


Grand theatre foyer

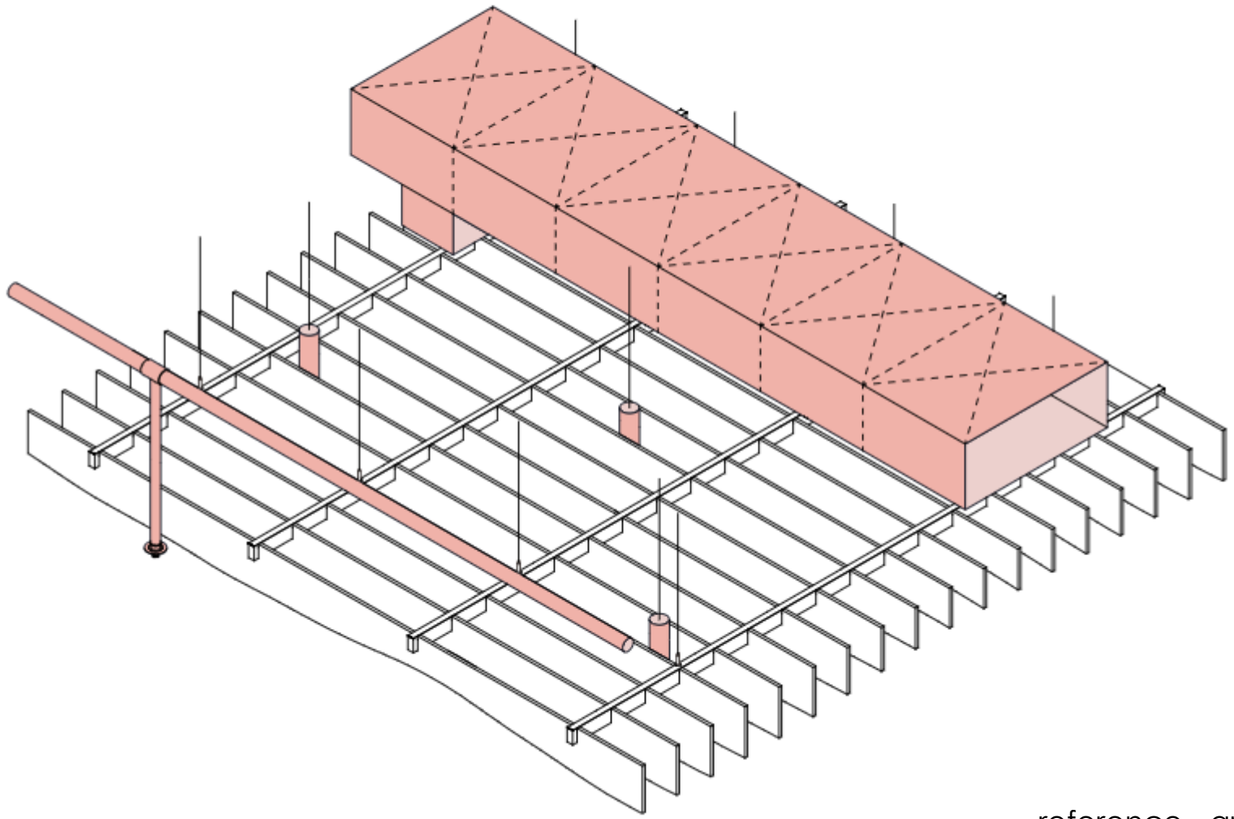








intimate smaller spaces

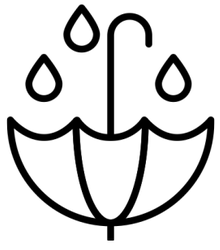


reference - arktura

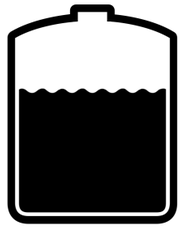


baffles + tech. ceiling

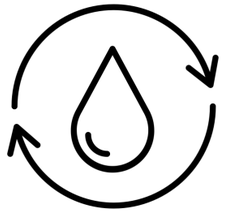
CONCLUSION



Collection



Storage



Harvesting



Leisure



Environmental



Aesthetic



Utilitarian

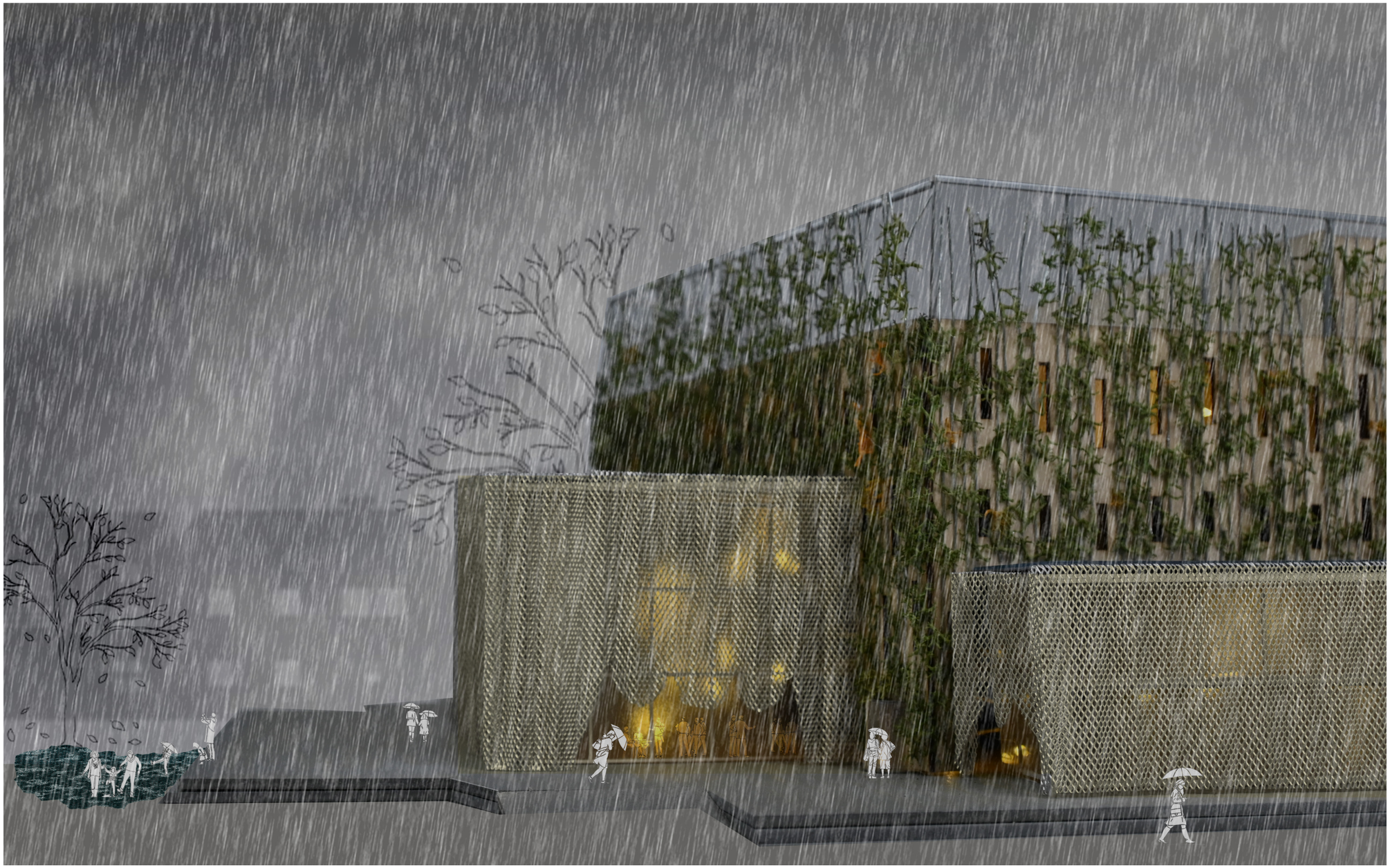


Symbolic



Social

CONCLUSION



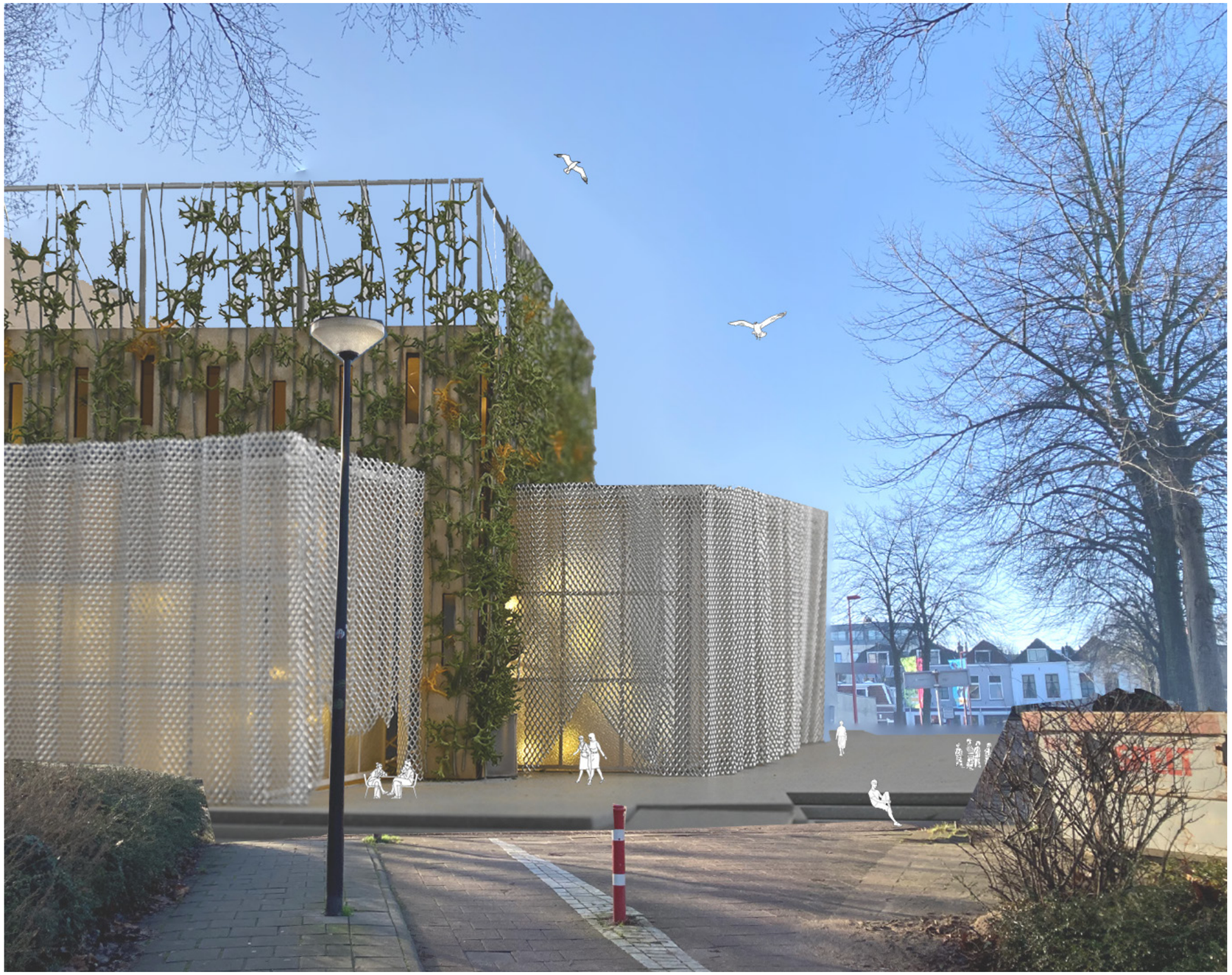
ROUTE FROM CITY CENTRE





ROUTE FROM PARKING





THANK YOU!

