R.E.C. Building

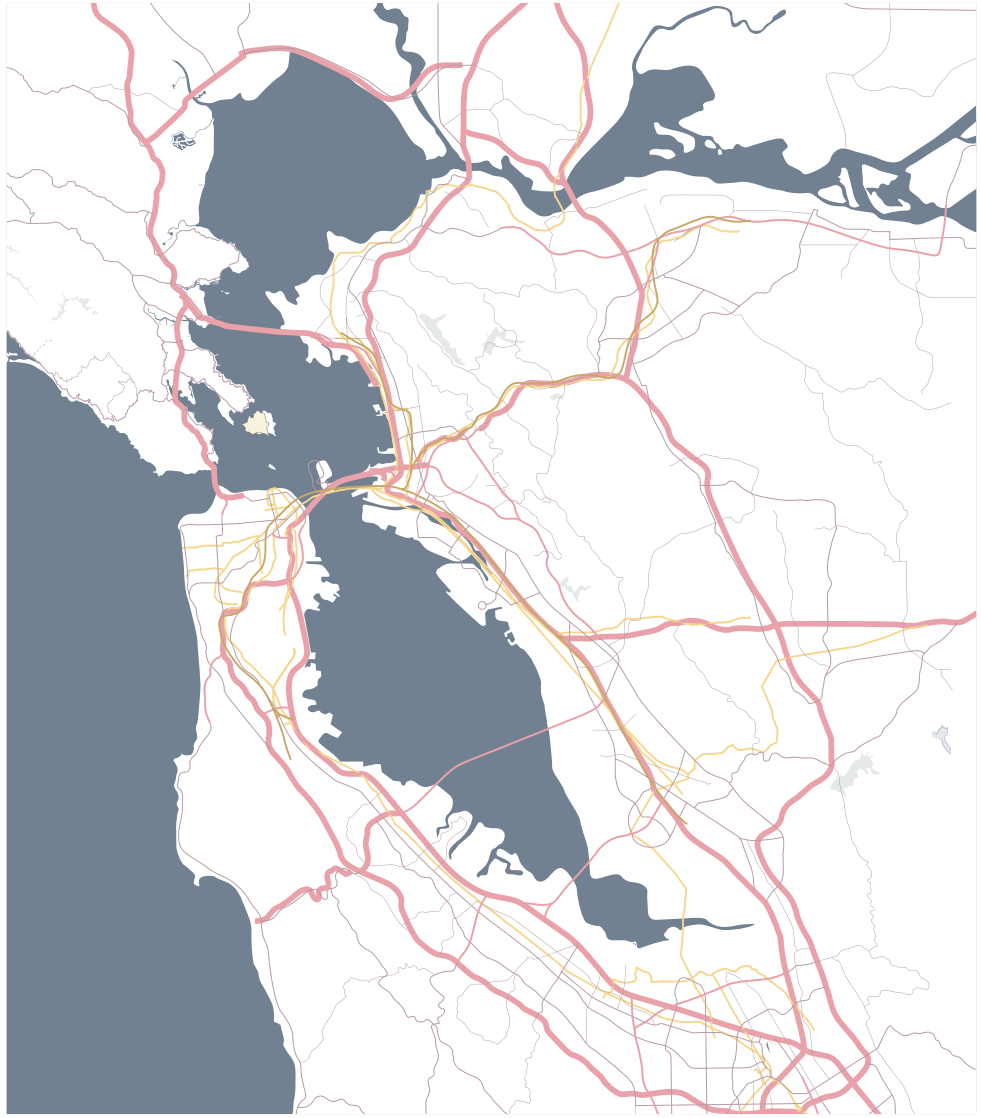
Institute for Water Research, Education and Creation

Carolina Pastor

TU Delft

SAN FRANCISCO BAY

- beauty, contradictions and challenges -



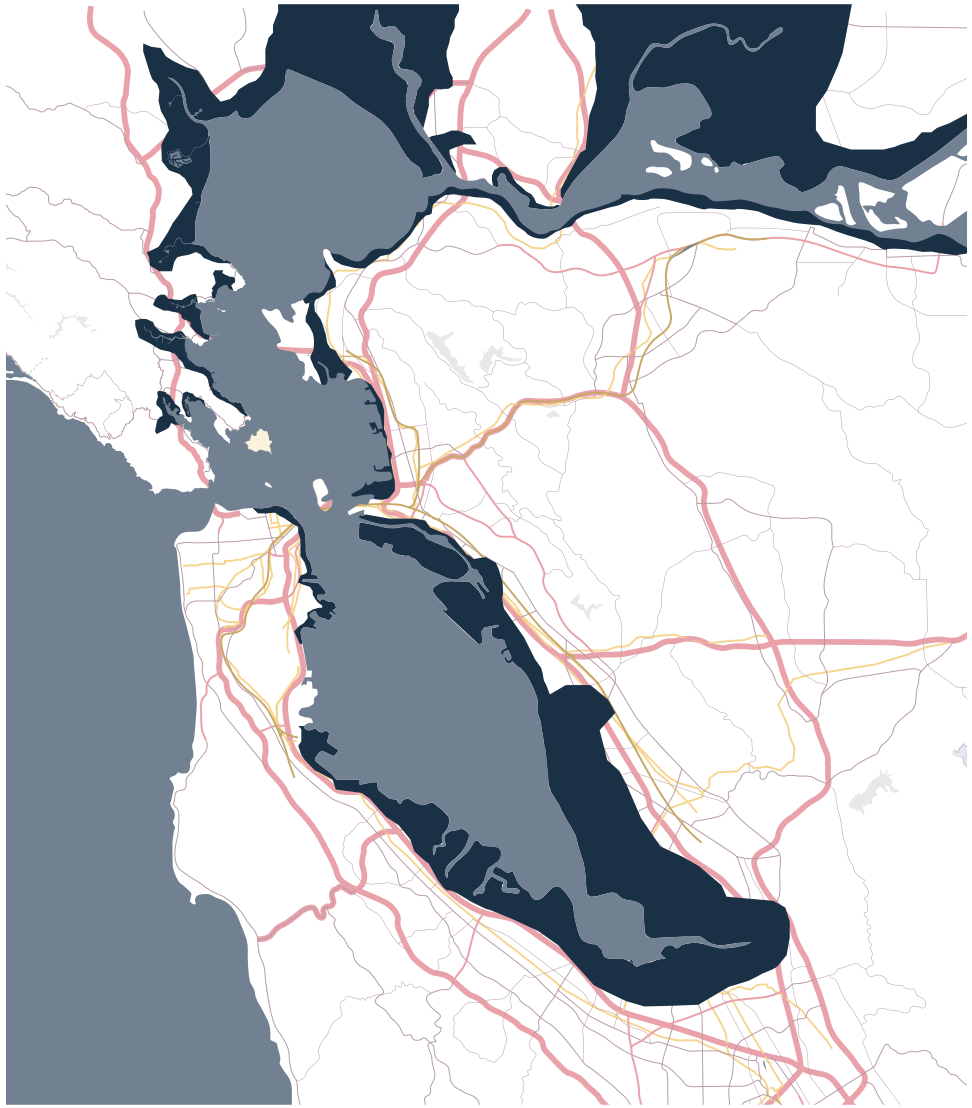
SAN FRANCISCO BAY

SAN FRANCISCO BAY

- BEAUTY -

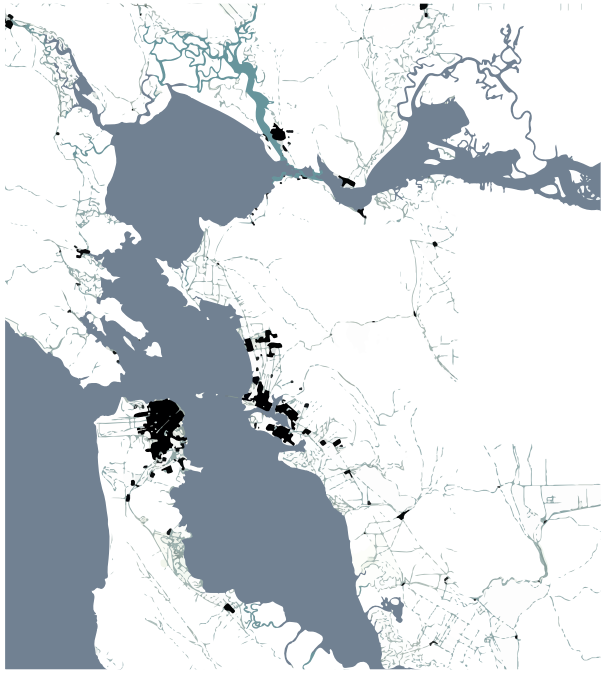
SAN FRANCISCO BAY

- CHALLENGES -

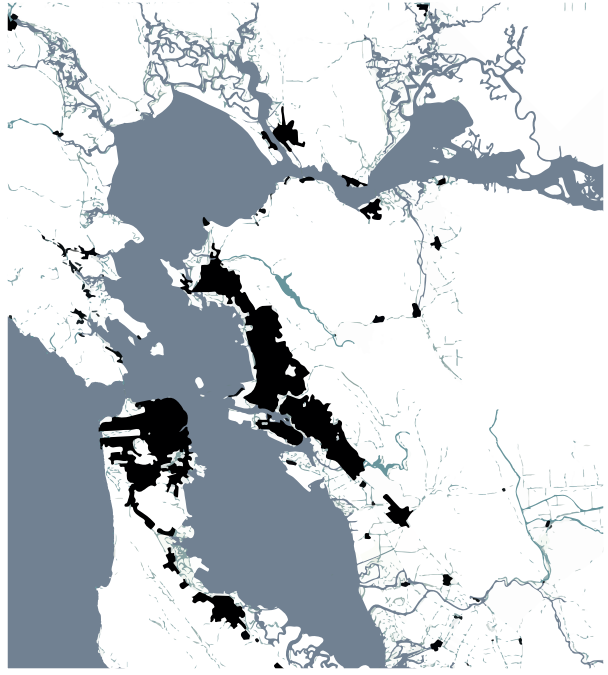


FLOODING

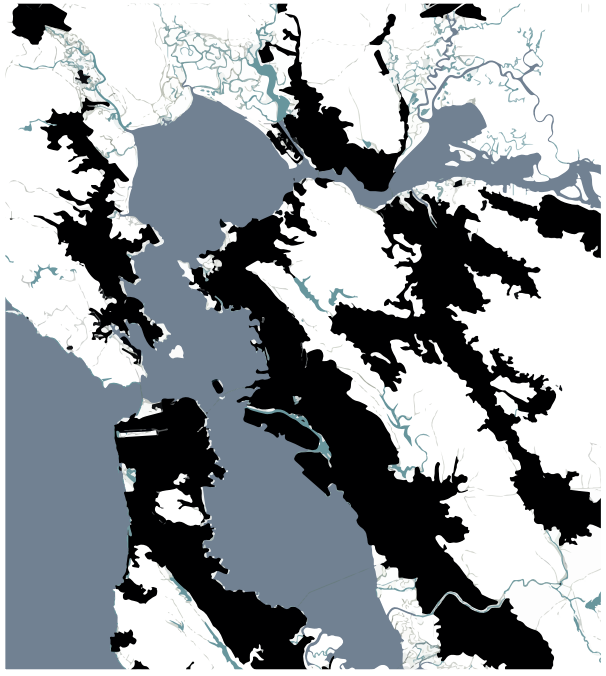
1900



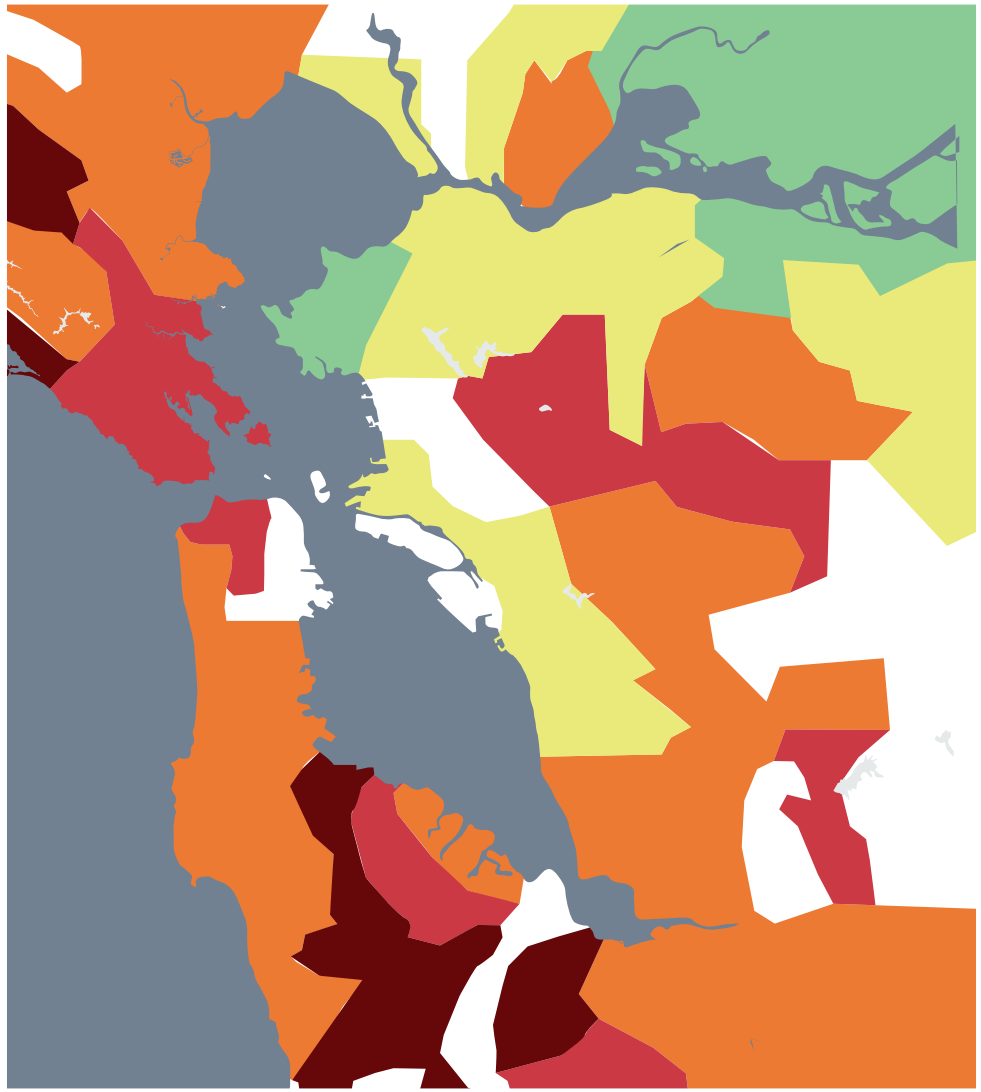
1950



2010



URBAN SPRALL



MEDIA HOME PRICE

1.5M <75K

UNAFFORDABLE HOUSING

SAN FRANCISCO BAY

- CONCLUSIONS -

TRAFFIC

as a consequence of
urban sprall

UNAFFORDABLE
HOUSING

URBAN SPRAWL

as a consequence of
unaddordable houding

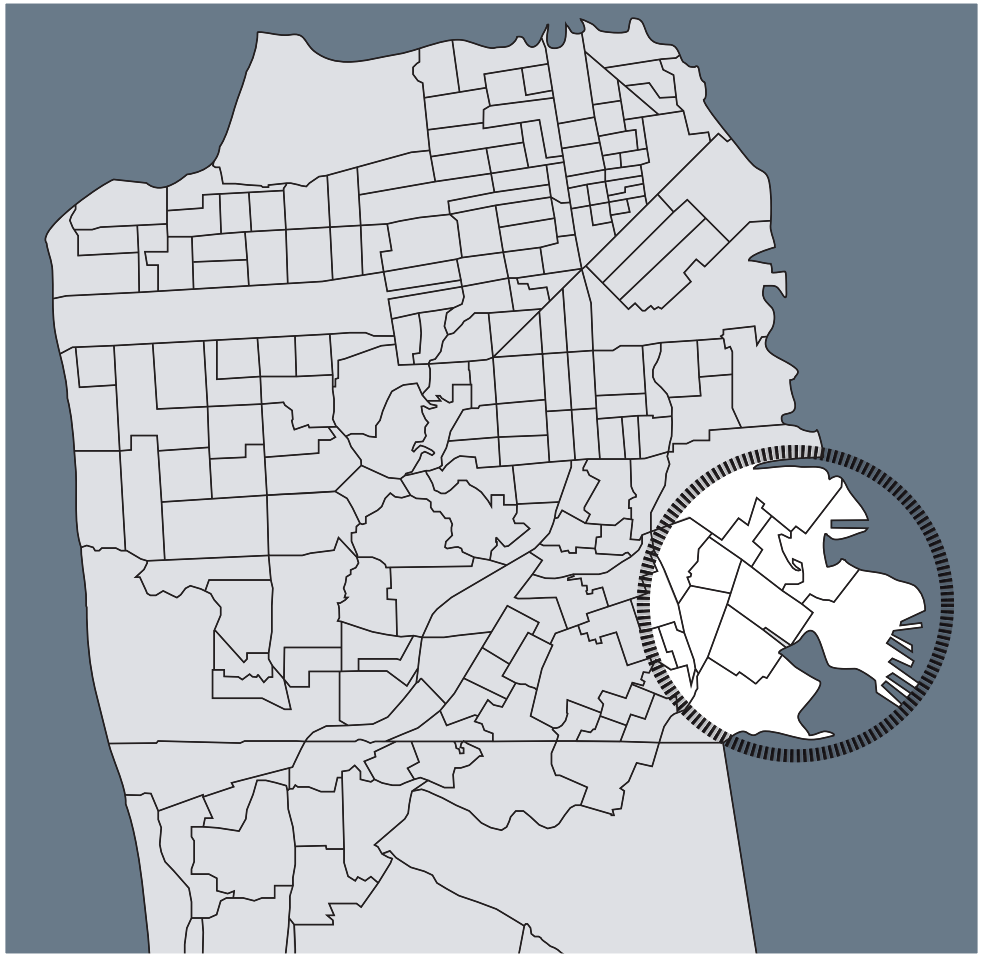
FLOODING

as a consequence of
occupation and land fill

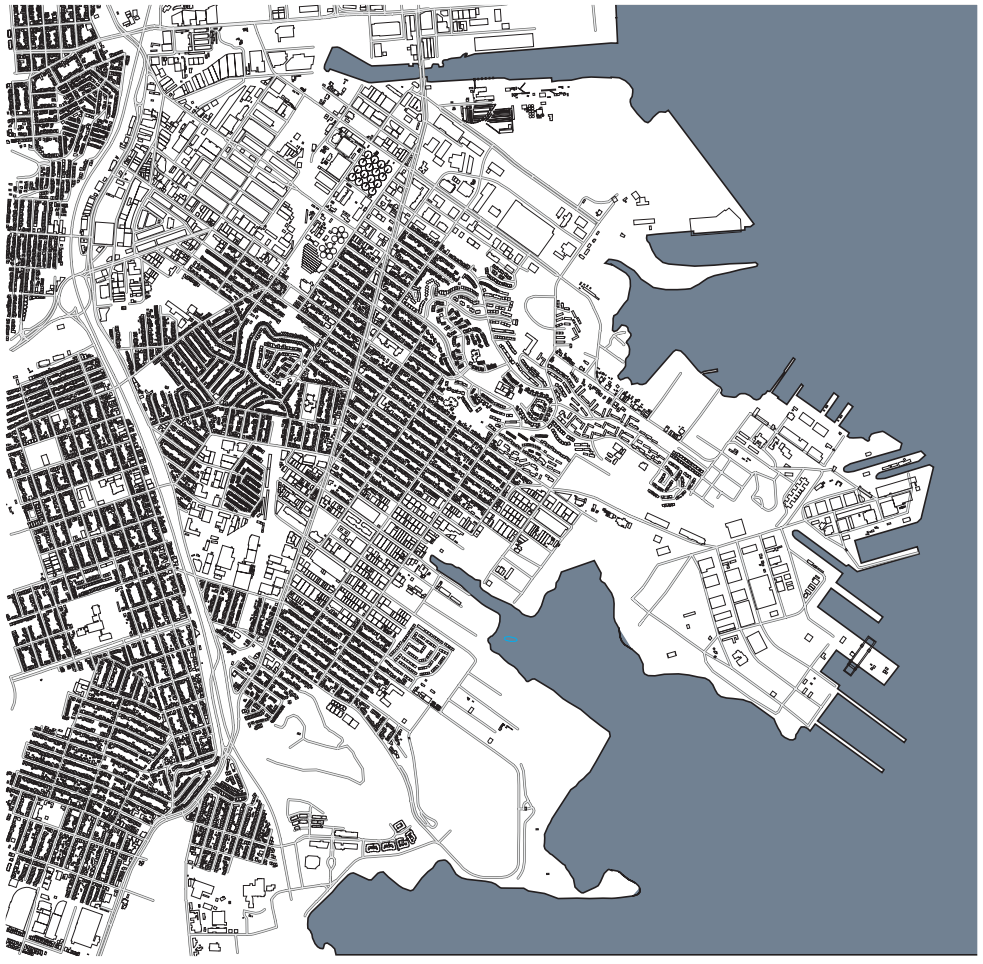
SAN FRANCISCO BAY

- SITES OF COMPETITION -

SITES OF COMPETITION



SAN FRANCISCO



HUNTERS POINT

HUNTERS POINT

HUNTERS POINT

- DEMOGRAPHY -

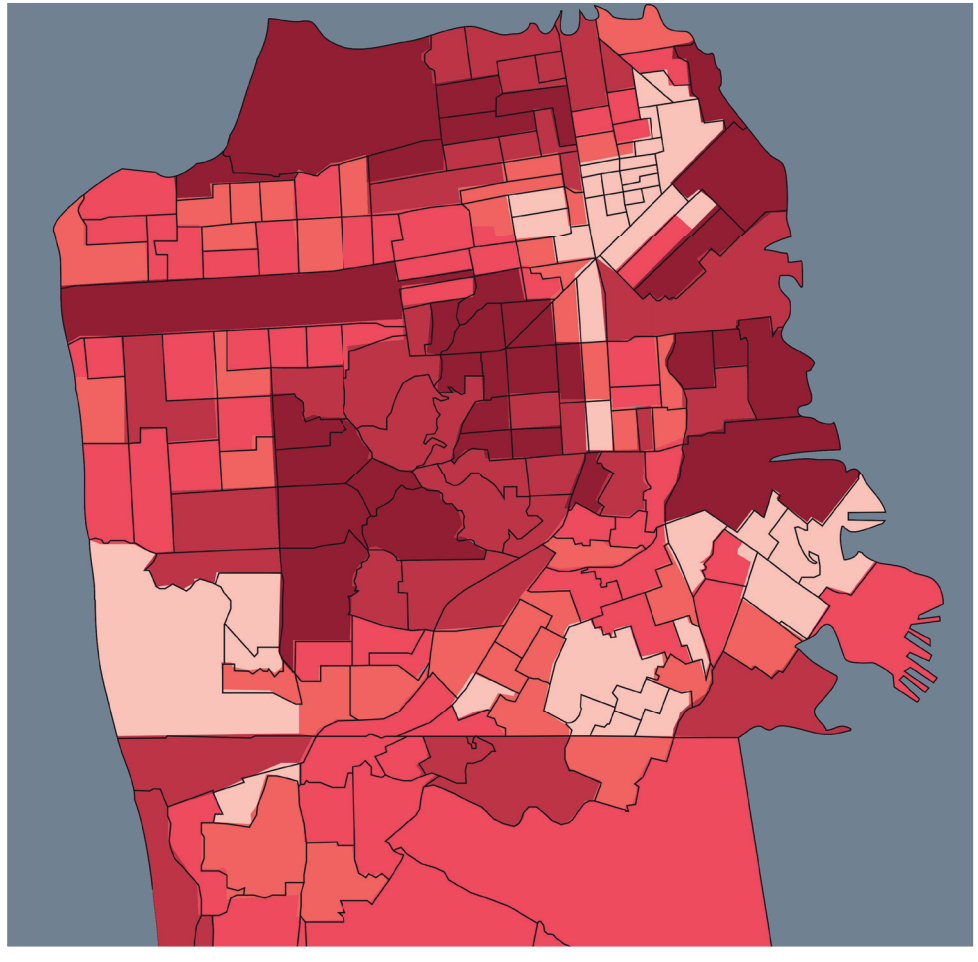
SEPARATION

2,550 4,400 6,910

POPULATION

SAN FRANCISCO

SCALE - 1 : 70,000



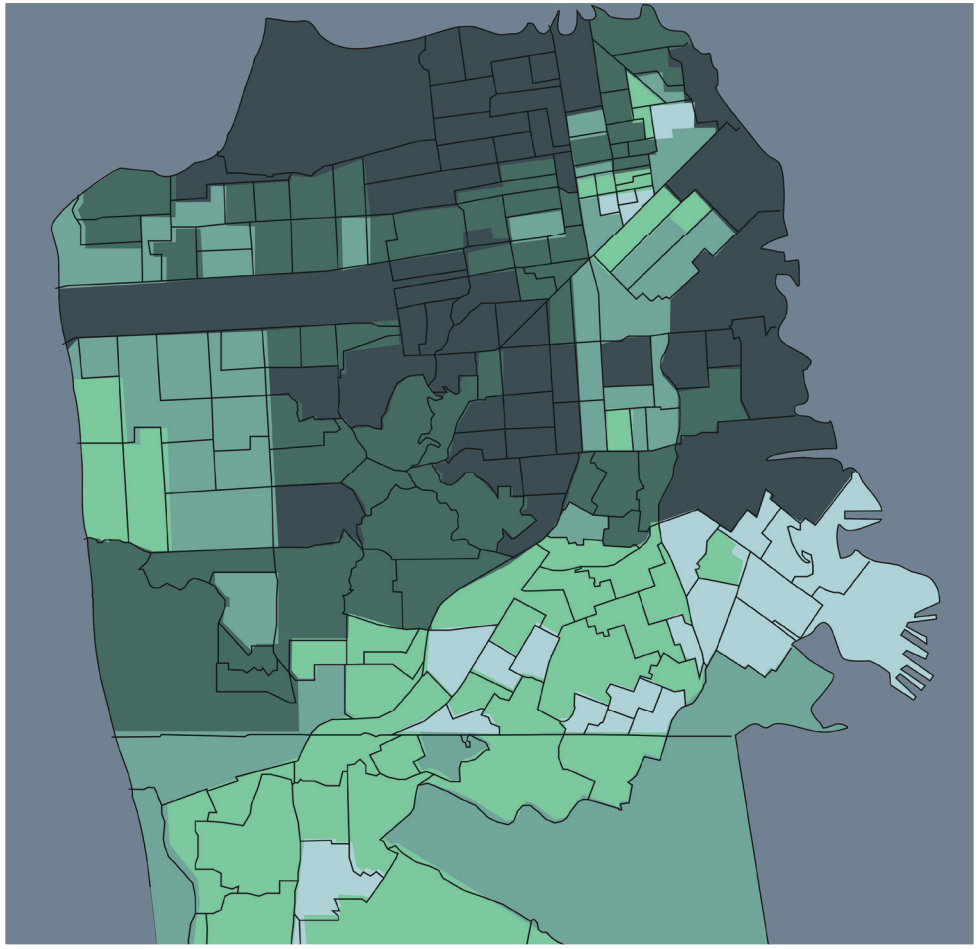
$42,560 $80,070 $133,470

MEDIAN HOUSEHOLD INCOME

SAN FRANCISCO

SCALE - 1 : 70,000

EDUCATION



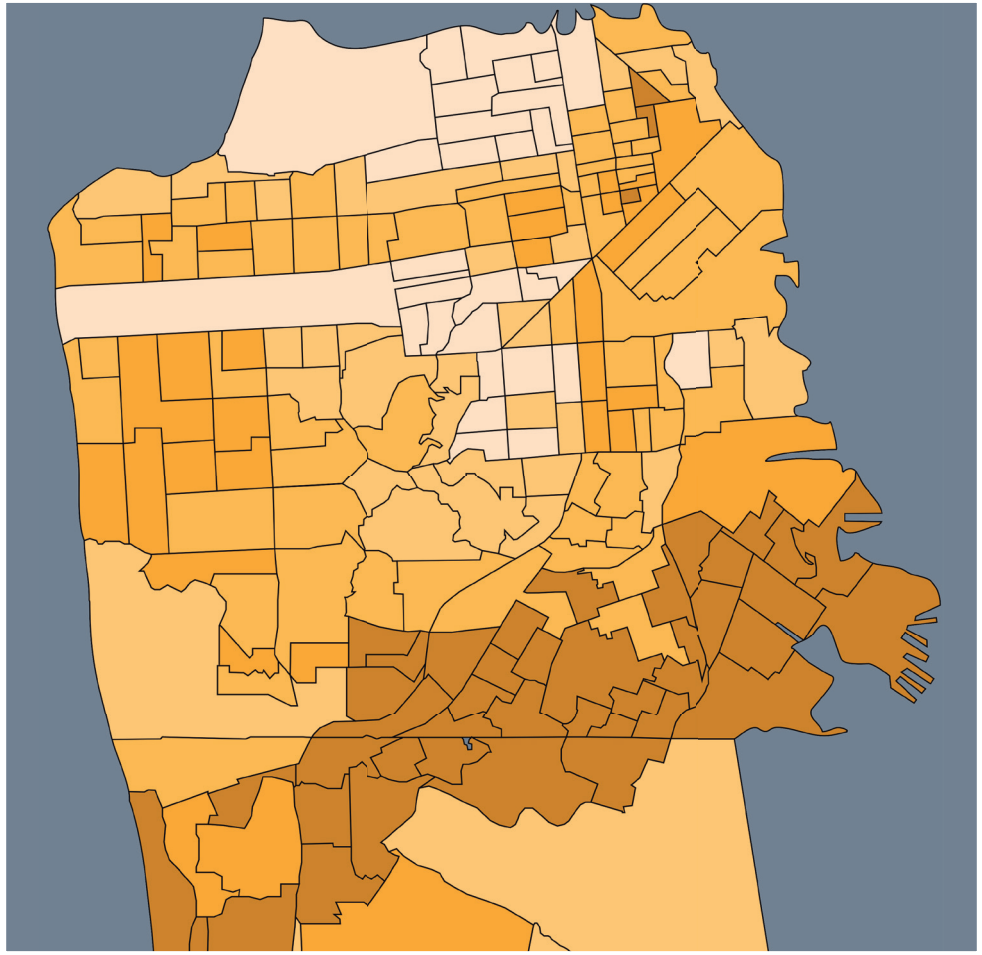
EDUCATION

SAN FRANCISCO

15% 41% 74%

SCALE - 1 : 70,000

SEGREGATION



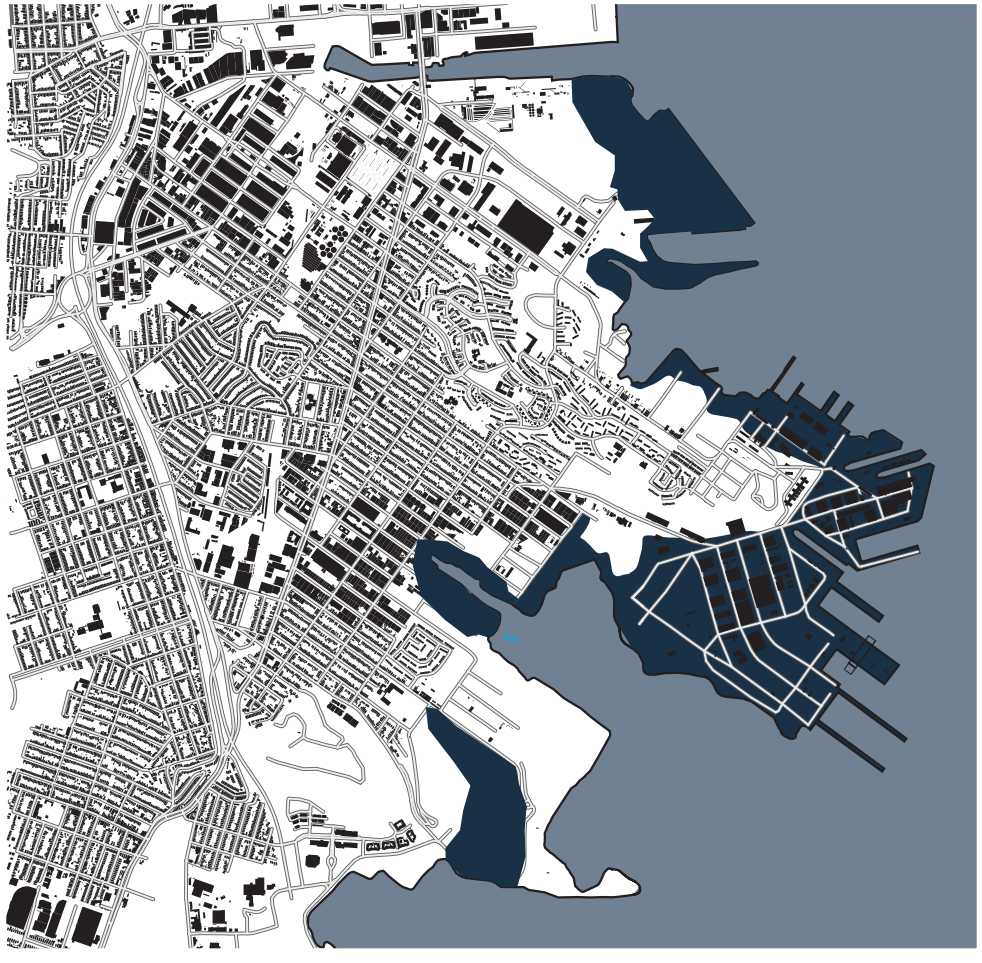
NON-WHITE POPULATION

SAN FRANCISCO

18% 37% 63%

SCALE - 1 : 70,000

SEA LEVEL RISE FORECAST
- Flooding



FLOODING

HUNTERS POINT

2 m sea level rise

Scale - 1 : 20,000

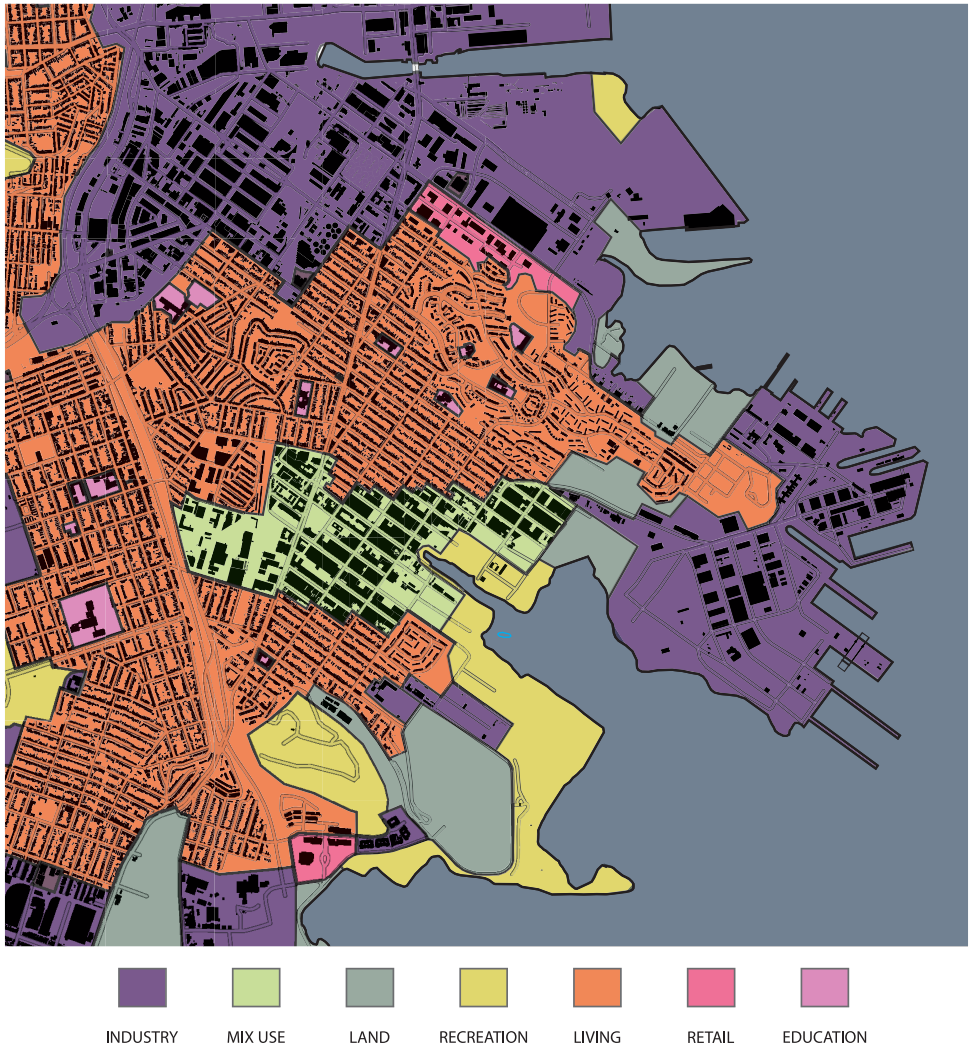
INFRASTRUCTURE
- Disconection

PUBLIC TRANSPORTATION

HUNTERS POINT

Scale - 1 : 20,000

LAND USE
- Inhabitable



LAND USE

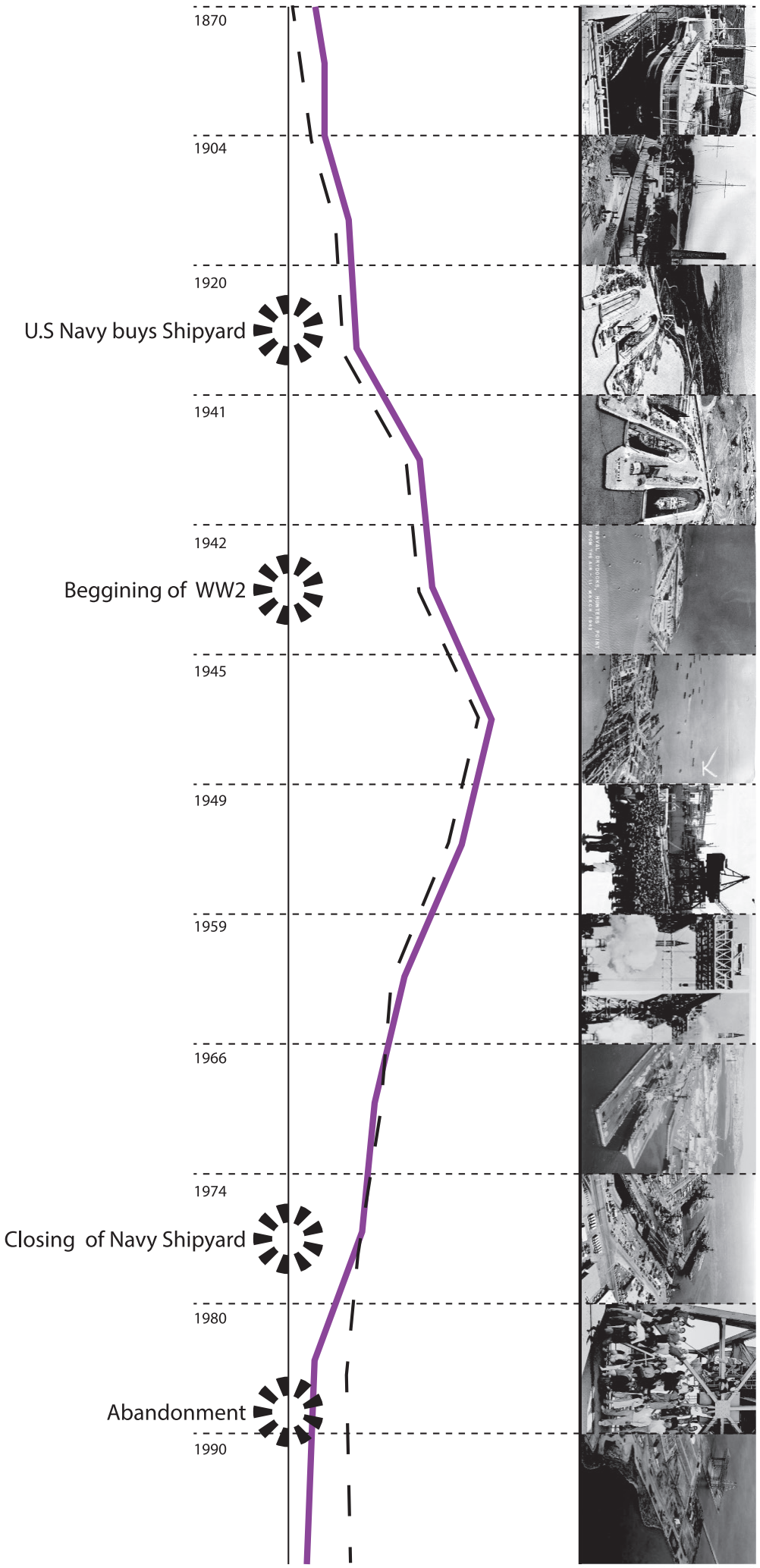
HUNTERS POINT

Scale - 1 : 20,000

SHIPYARD

Scale - 1 : 20,000

HUNTERS POINT SHIPYARD - History

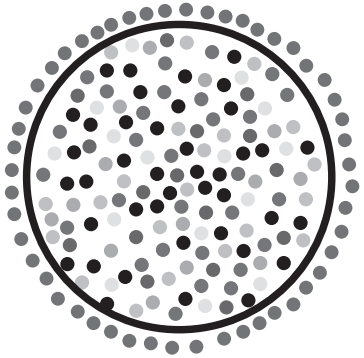

1870
1904
1920
U.S Navy buys Shipyard
1941
1942
Beggining of WW2
1945
1949
1959
1966
1974
Closing of Navy Shipyard
1980
Abandonment
1990

HUNTERS POINT
CURRENT SITUATION
- Abandonment

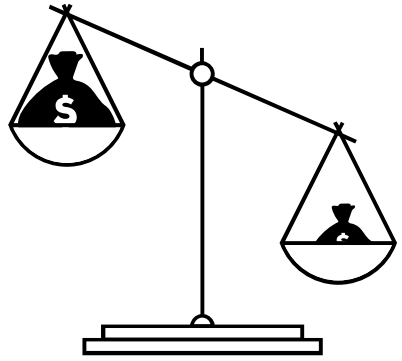
HUNTERS POINT

- CHALLENGES -

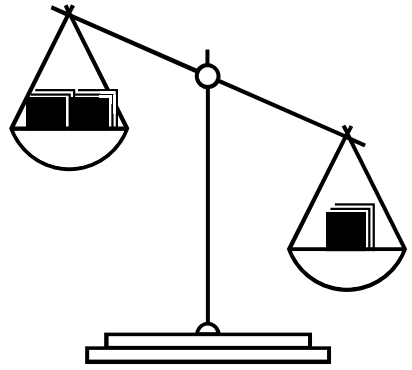
Spatial Exclusion



Economic Gap



Educational Gap



Lack of Spacial Identity

Rooding

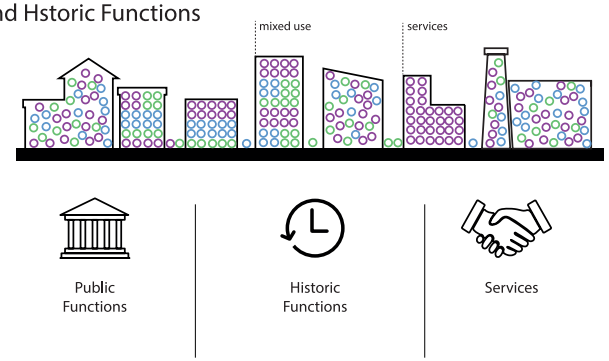
MASTERPLAN

THE NEW SPACE

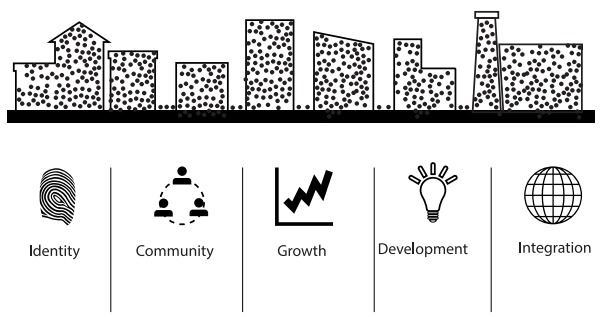
- SPACE WITH HISTORIC VALUE
- SPACE WITH IDENTITY
- SPACE FOR GROWTH

Abandonment - Current Situation

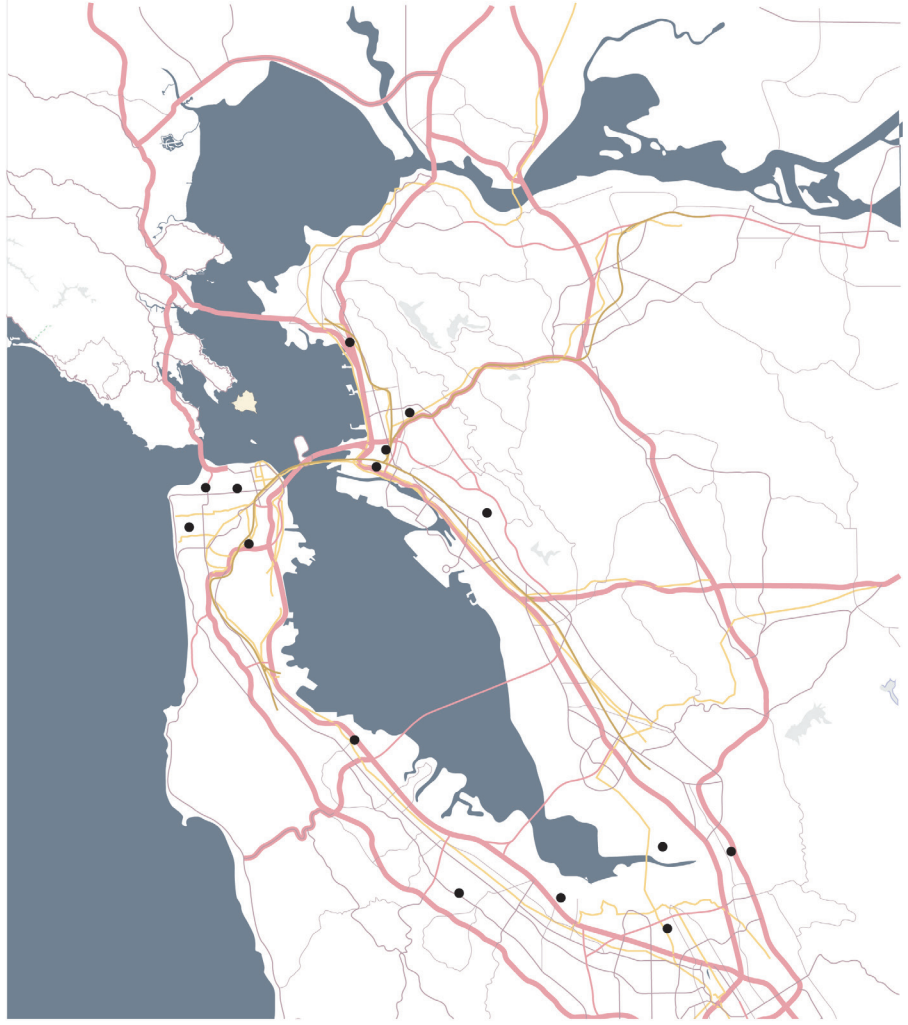
Insertion of New and Hstoric Functions



Creation of a Space

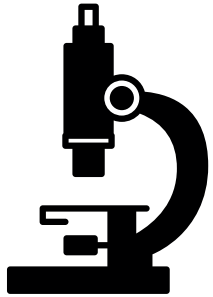


KNOWLEDGE AND COMMUNITY HUB - Water Knowledge Hub

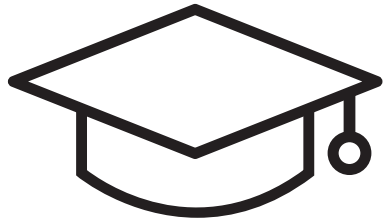


WATER INSTITUTIONS ON THE
SAN FRANCISCO BAY

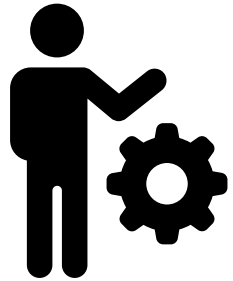
Water Knowledge Hub



RESEARCH



EDUCATION



PRACTICE

GOVERNMENT

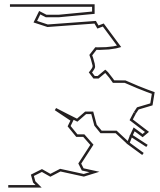
Global

San Francisco Bay

Hunters Point

Hunters Point Shipyard

Impact



CLIMATE CHANGE

INTERACTION

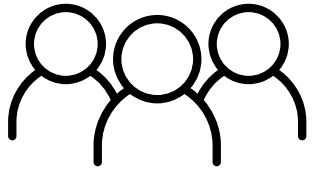
GROWTH

HISTORIC VALUE

KNOWLEDGE AND COMMUNITY HUB - Water Knowledge Hub

Community Hub

ART



FACILITIES

HEALTH

Impact

Global

CLIMATE CHANGE

San Francisco Bay

INTERACTION

Hunters Point

GROWTH

Hunters Point Shipyard

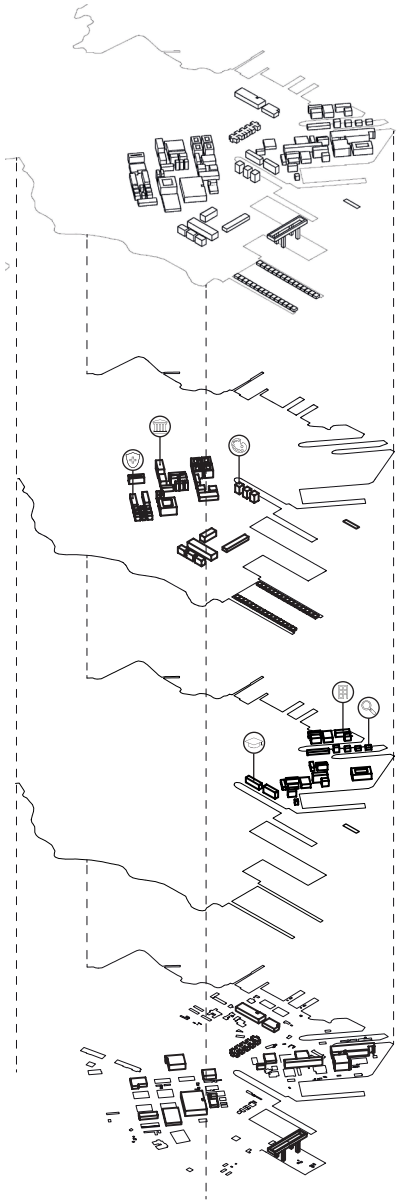
HISTORIC VALUE

WATER KNOWLEDGE
AND CULTURE HUB

CULTURE

KNOWLEDGE

HUNTERS POINT

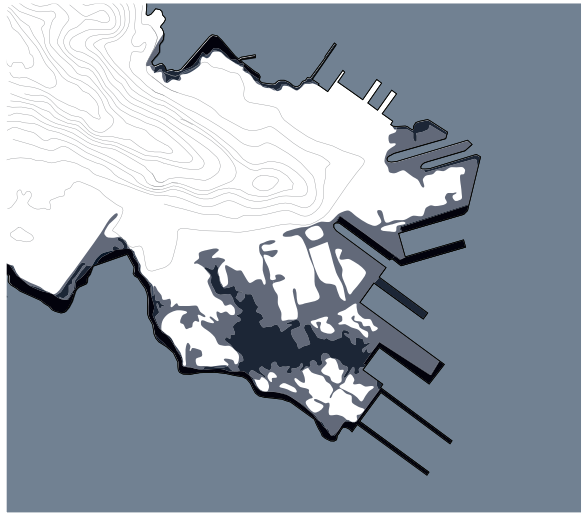


APPROACH
- Zoning by Flood

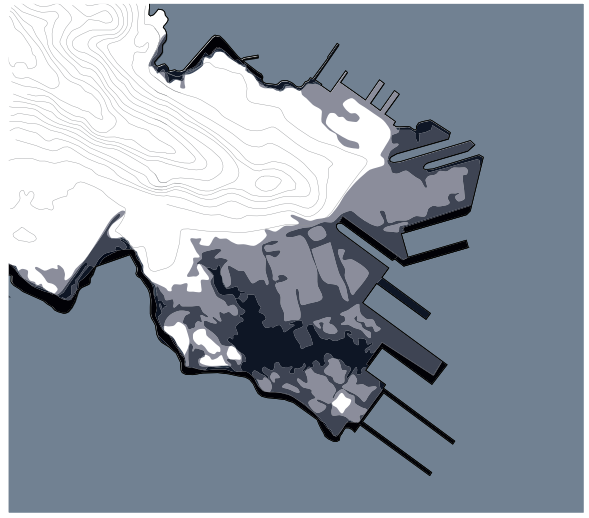
FLOODING

0.5 m

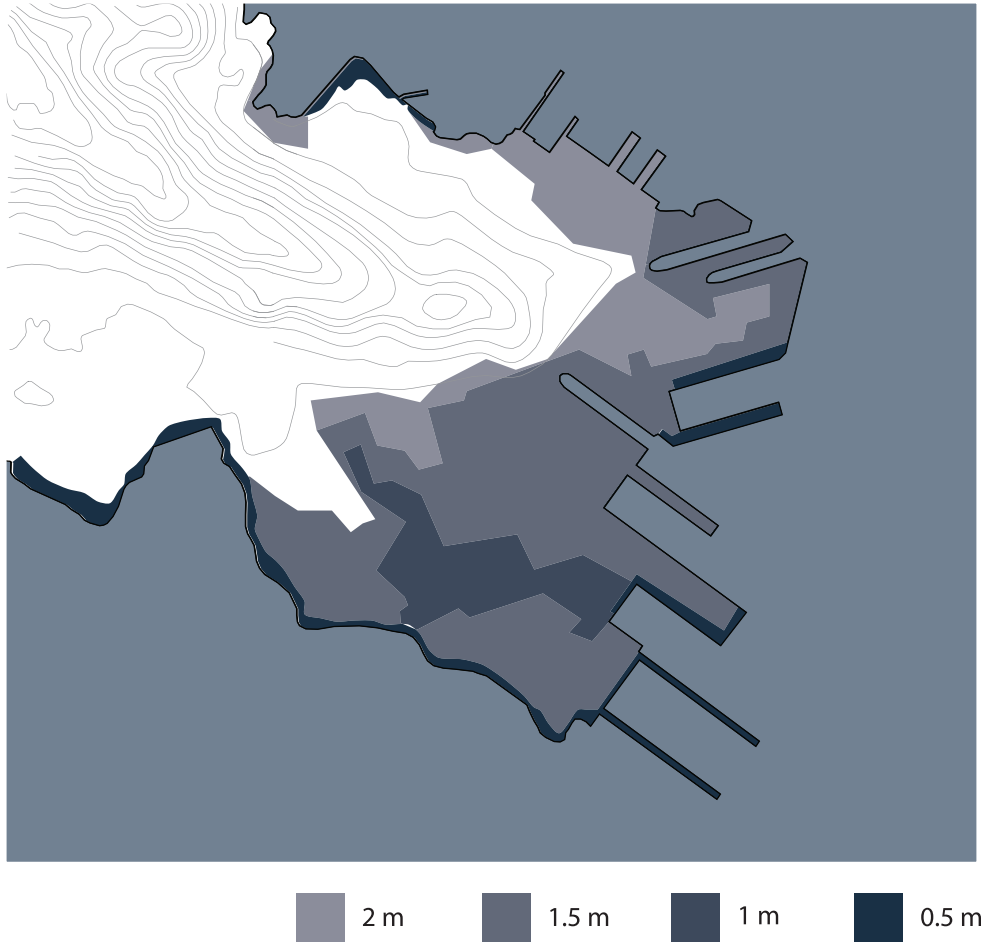
1 m 0.5 m



1.5 m 1 m 0.5 m

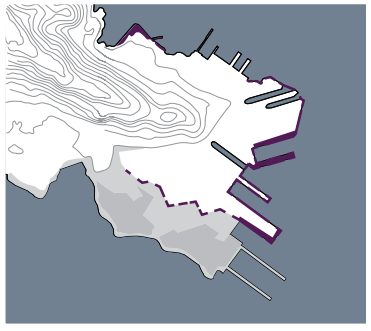


2 m 1.5 m 1 m 0.5 m



FLOODING

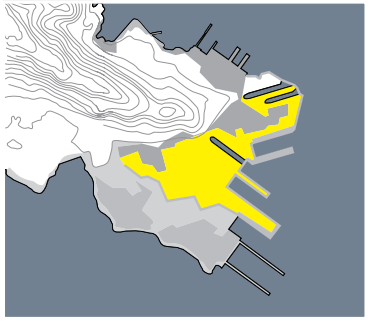
KNOWLEDGE AND COMMUNITY HUB - Function and Density



LINEAL PARK AND PUBLIC SPACE
Flooded at 0.5 m

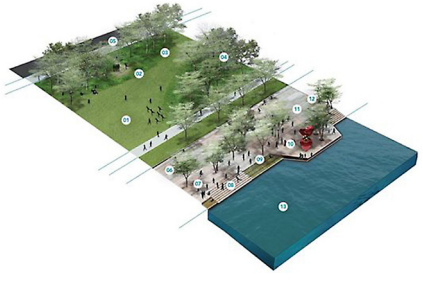
FLOODABLE PARK
Flooded at 1 m

ELEVATED RESIDENTIAL
Flooded at 1.5 m

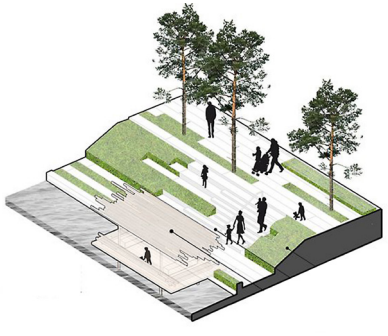


MIXED USED
Flooded at 1.5 m

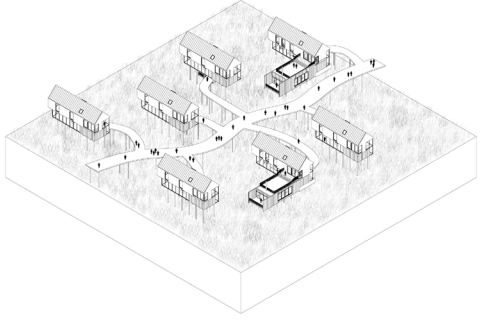
MIXED USED
Flooded at 2 m



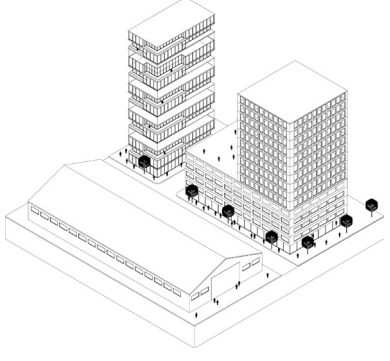
HIGH RISK - LOW DENSITY
image from http://huaban.com/boards/15858188/



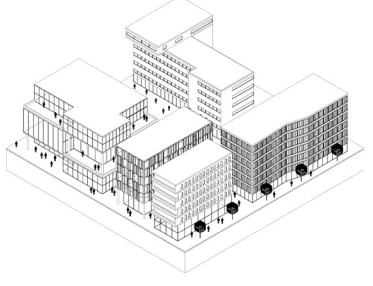
HIGH RISK - LOW DENSITY
image from www.dezeen.com



HIGH RISK - LOW DENSITY



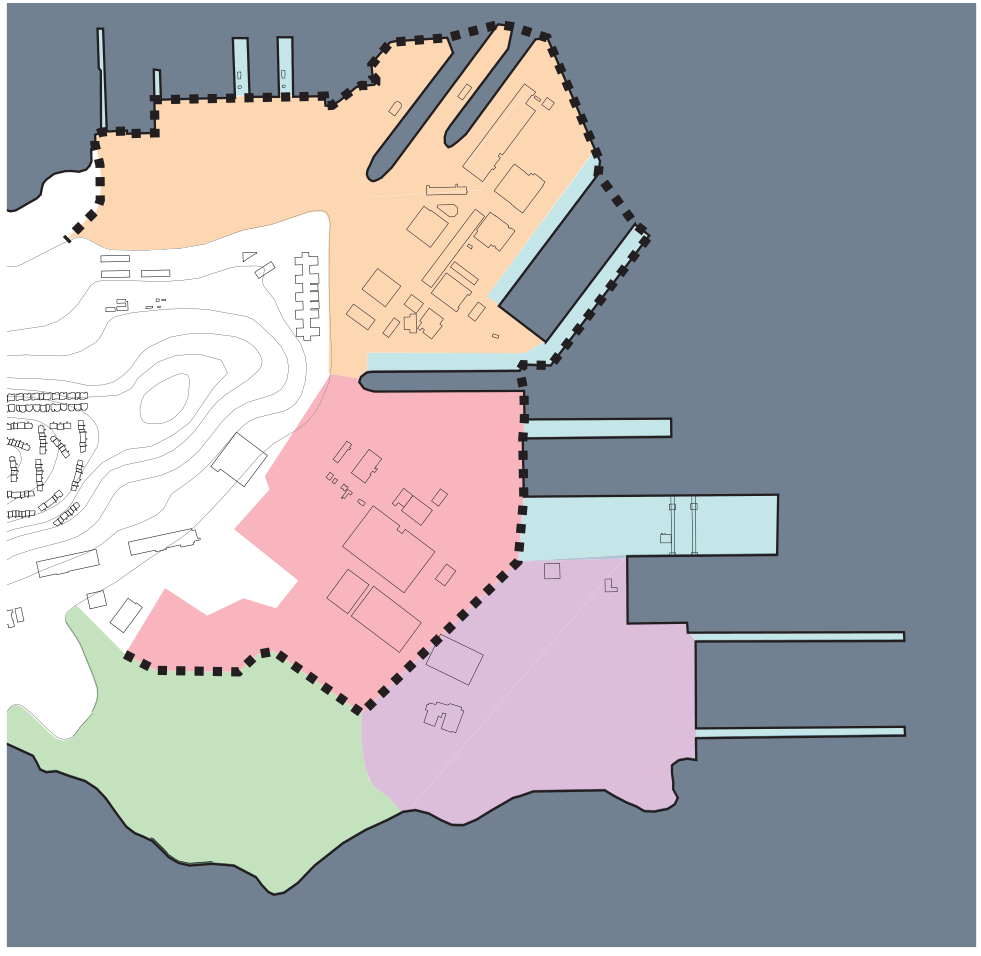
MEDIUM RISK - MEDIUM DENSITY



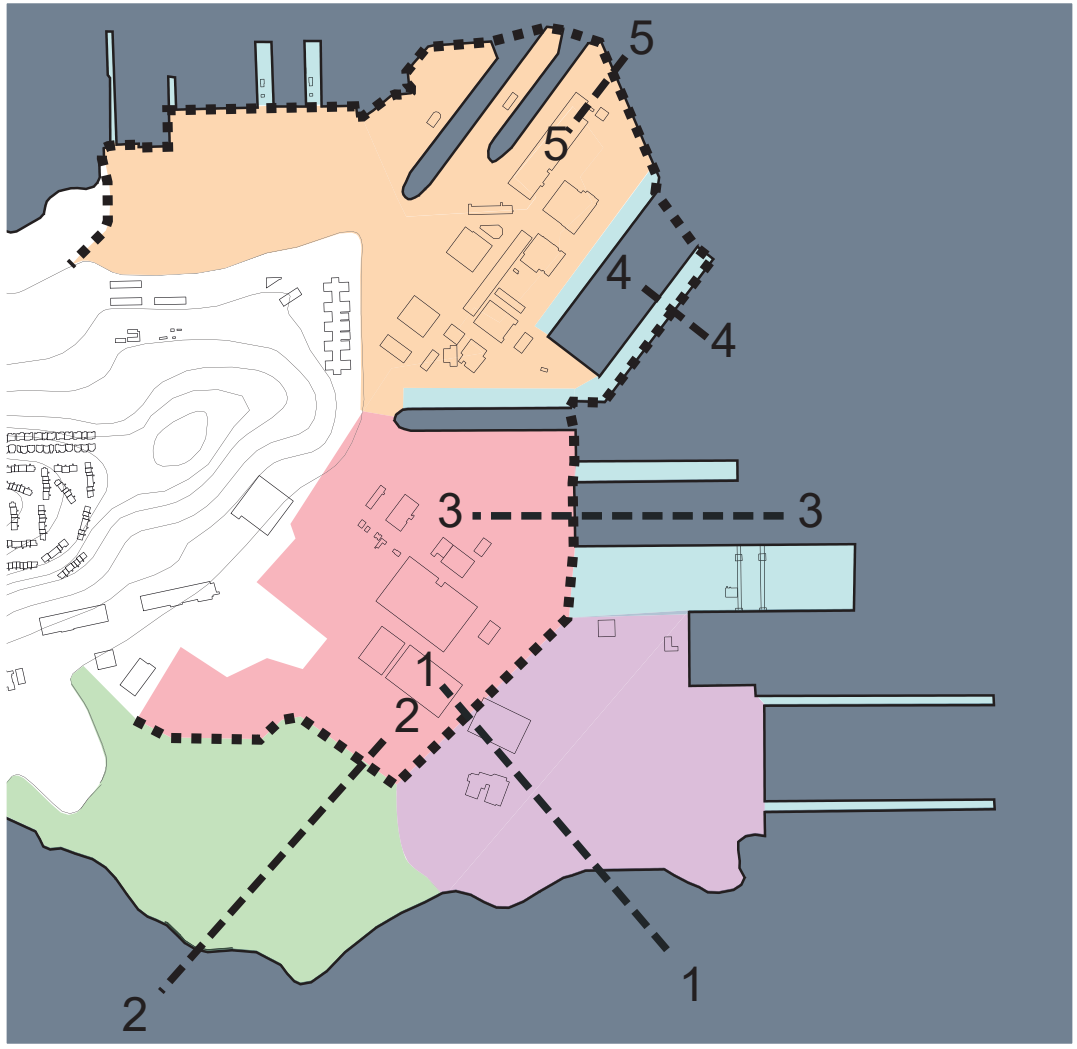
LOW RISK - HIGH DENSITY

KNOWLEDGE AND COMMUNITY HUB

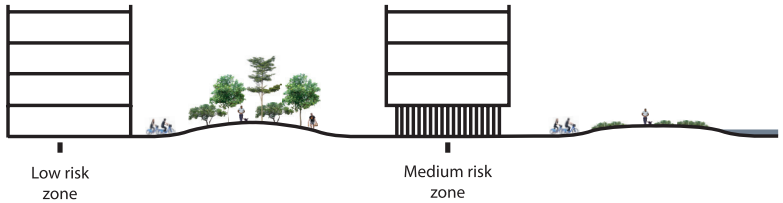
- Flood Defence



ZONING


5
5
4
4
3
3
1
2
2
1

A natural flood defence in
an urban environment.



SECTION 1 - 1

A floodpark that provides the possibility to experience nature in
combination with flood resistent houses and walking trails.

SECTION 2 - 2

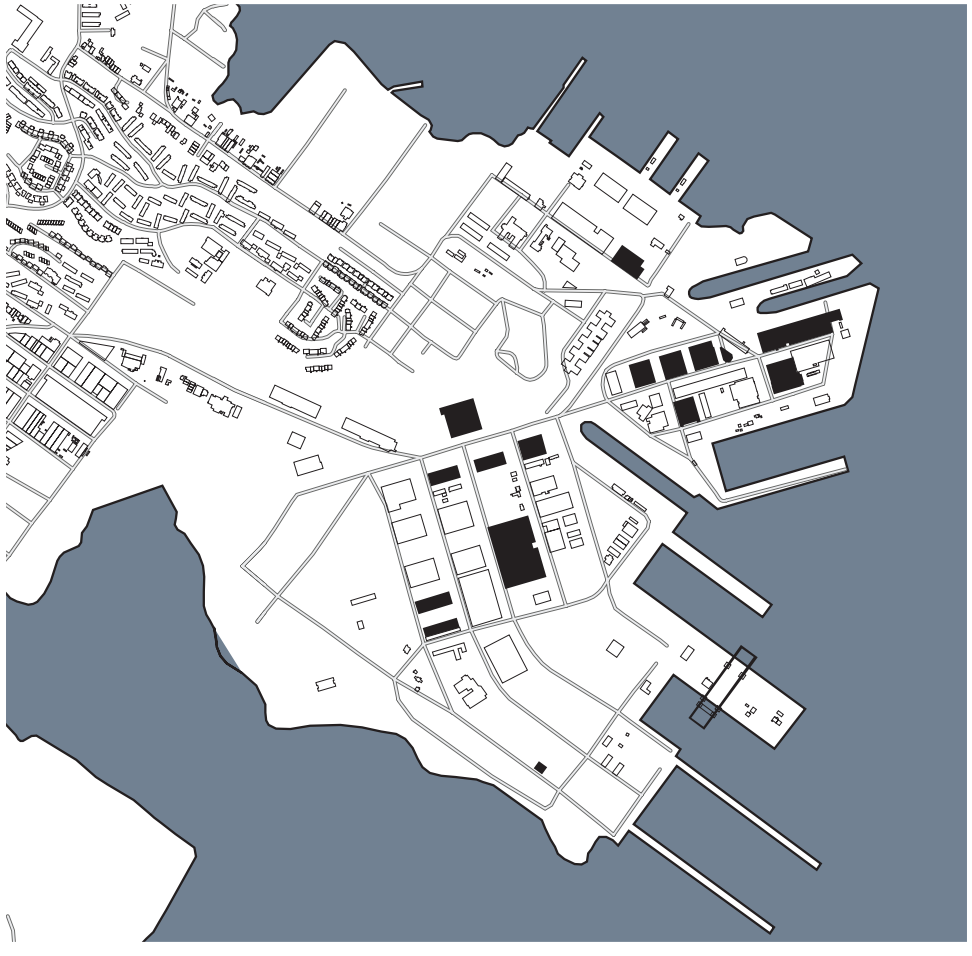
Providing protection at the open waterside and creating a
connection at the closed waterside

SECTION 4 - 4

A park for students also providing water protection

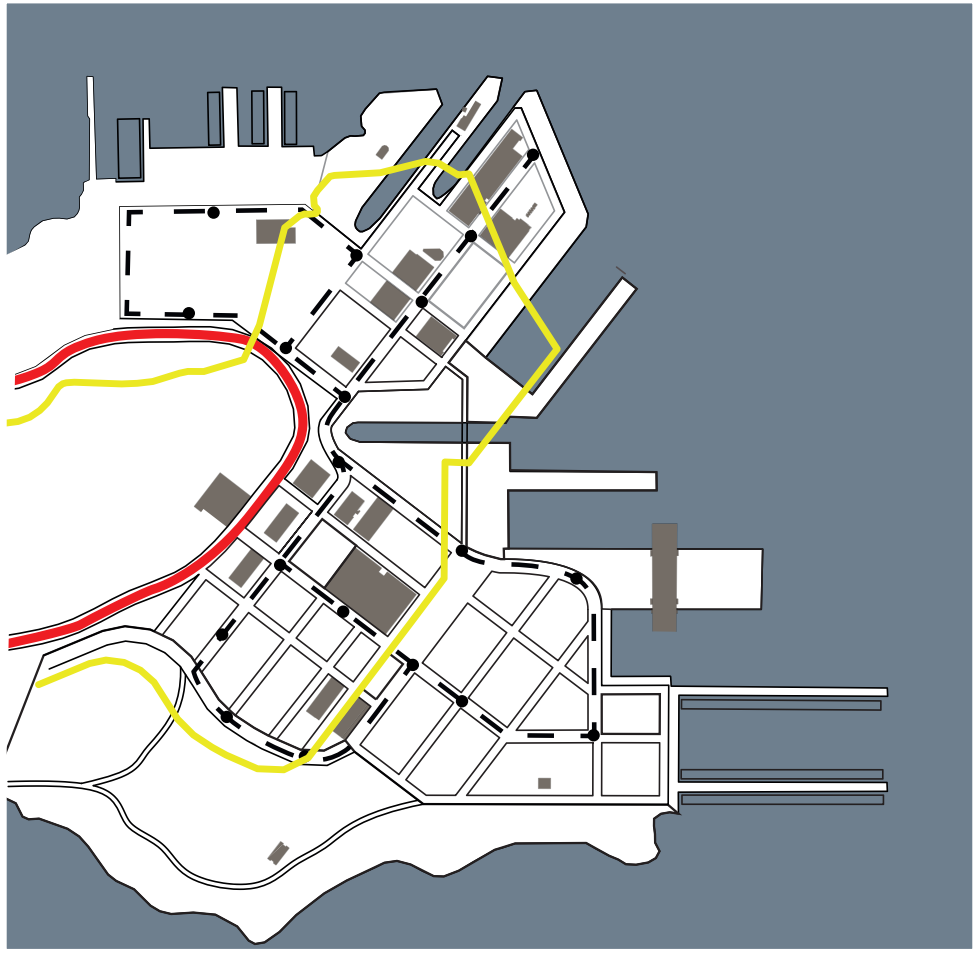
SECTION 5 - 5

ABANDONED BUILDING ANALYSIS



HUNTERS POINT

NETWORK OF TRANSPORTATION



Public transport

Water defense line

Highway

FINAL MASTERPLAN

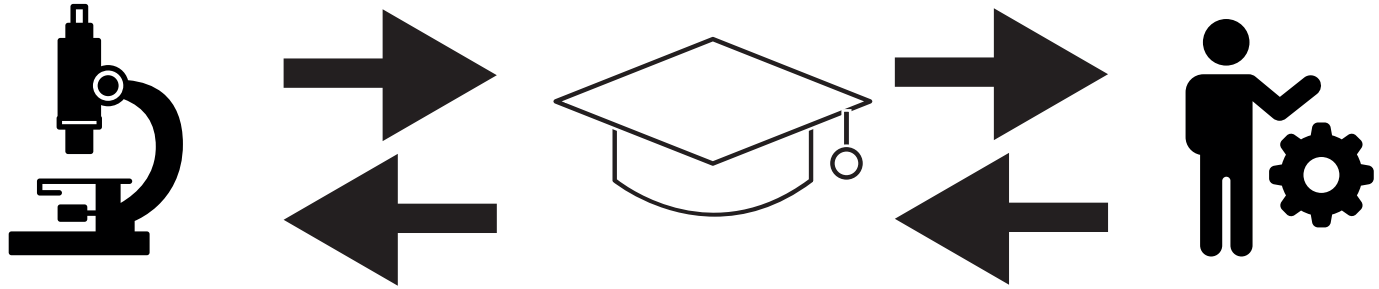
Scale - 1 : 5,000


PEPSI
GOLDEN ANCHOR
COFFEE SHOP
SPEED
LIMIT
15

THE BUILDING

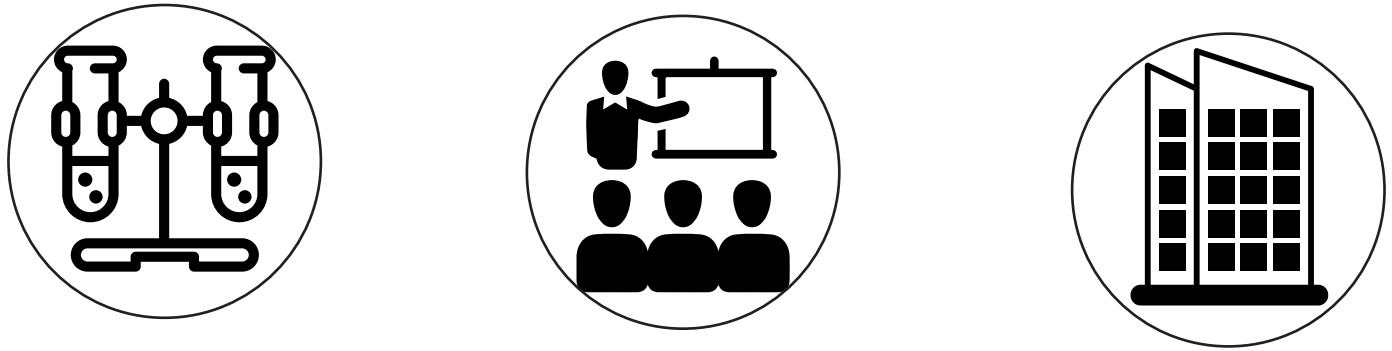
WATER EDUCATION AND RESEARCH CENTER

Create a Space of Interaction



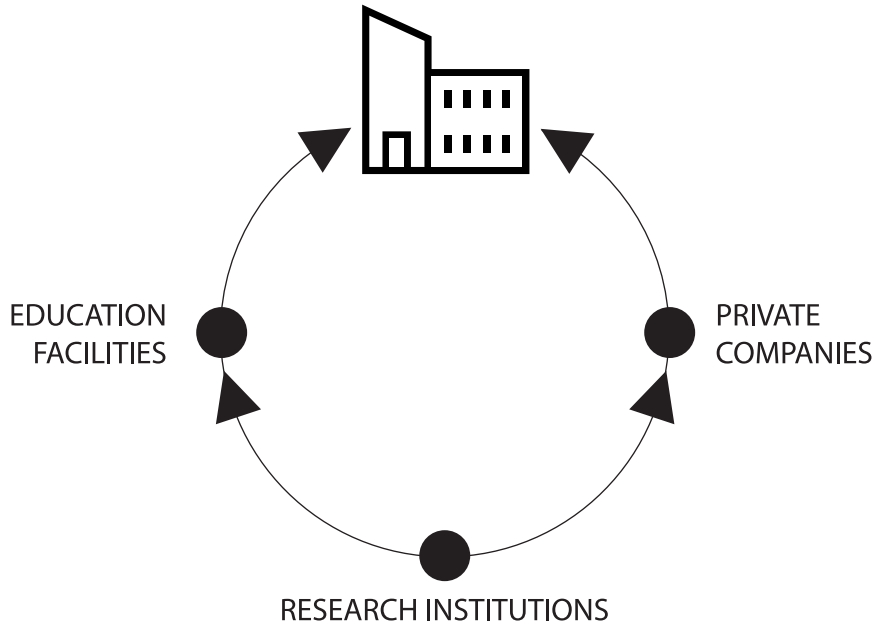
RESEARCH EDUCATION PRACTICE

Create a Spatial Connections

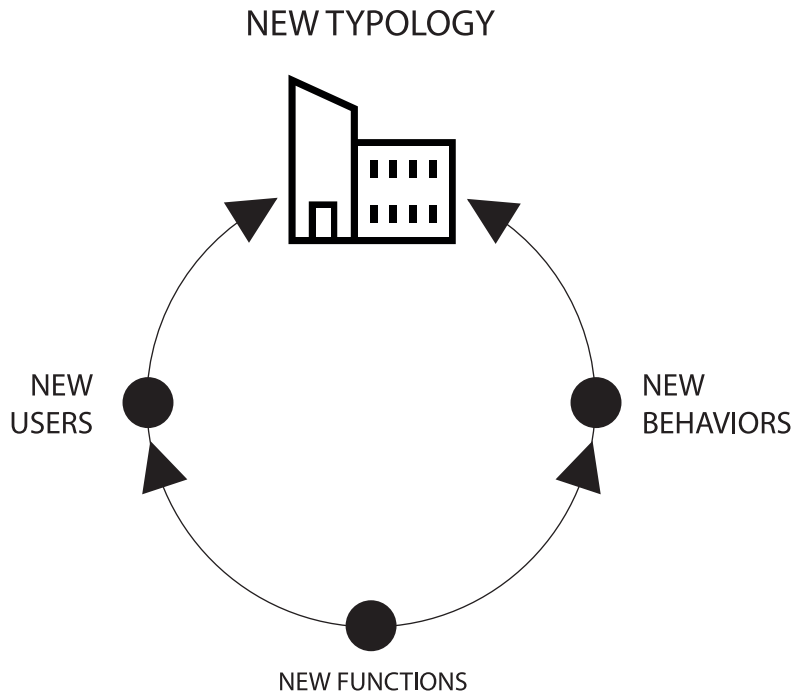


LAVORATORIES CLASSROOMS OFFICES

Create Institutional Communication

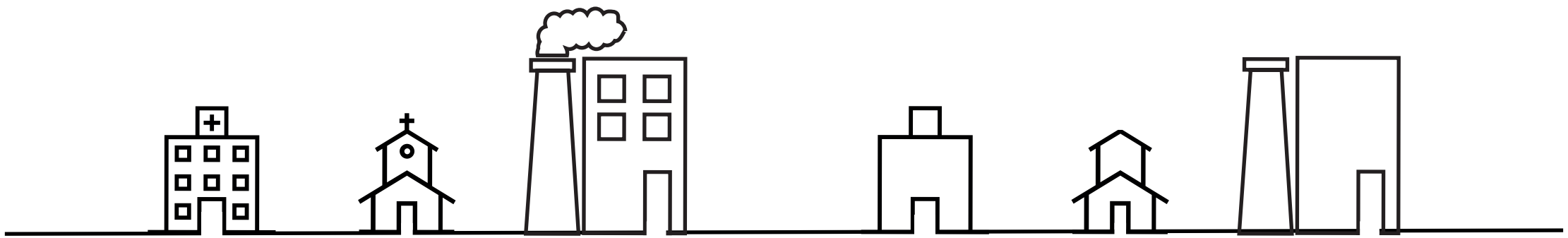


Create New Typology

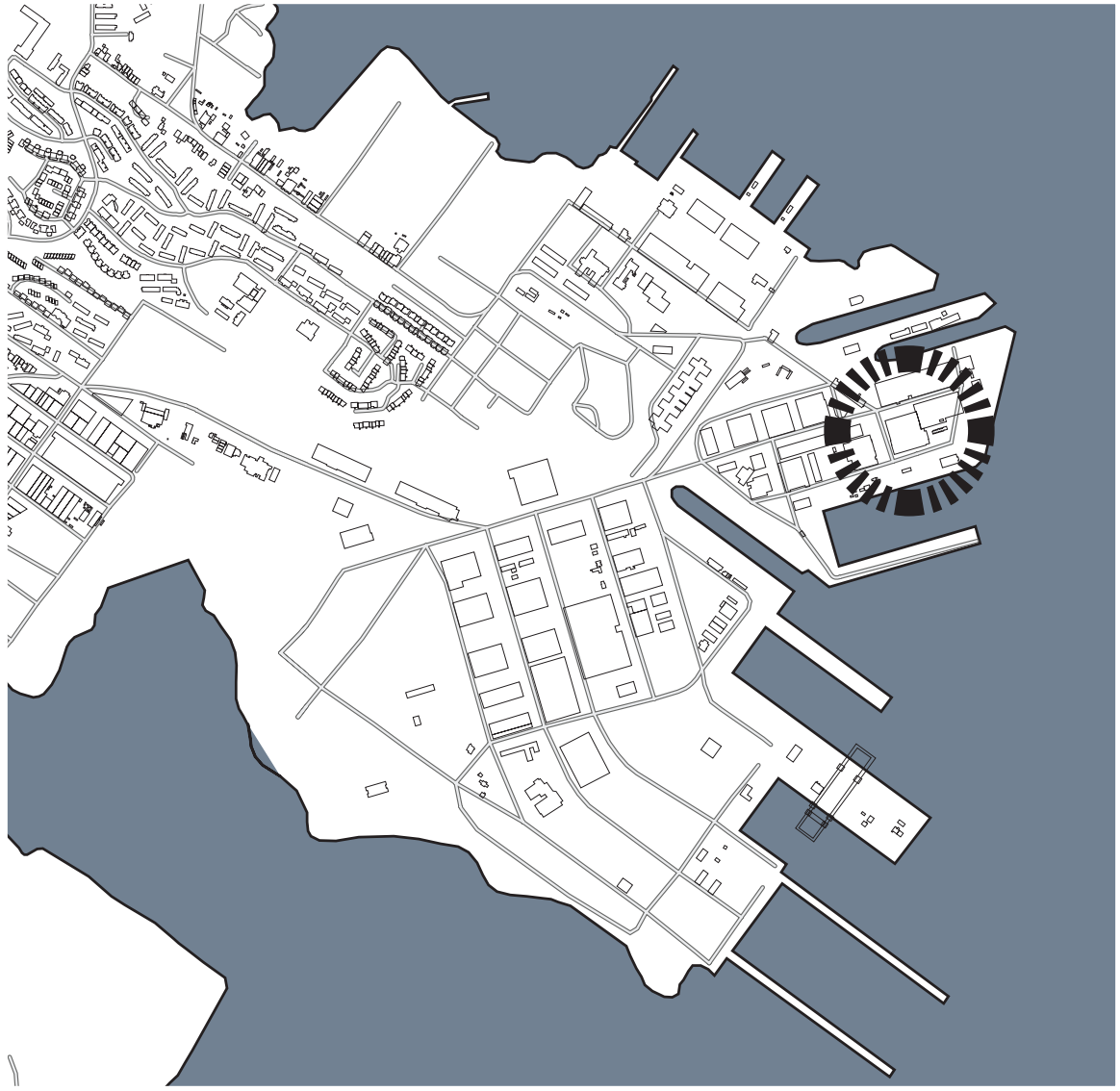


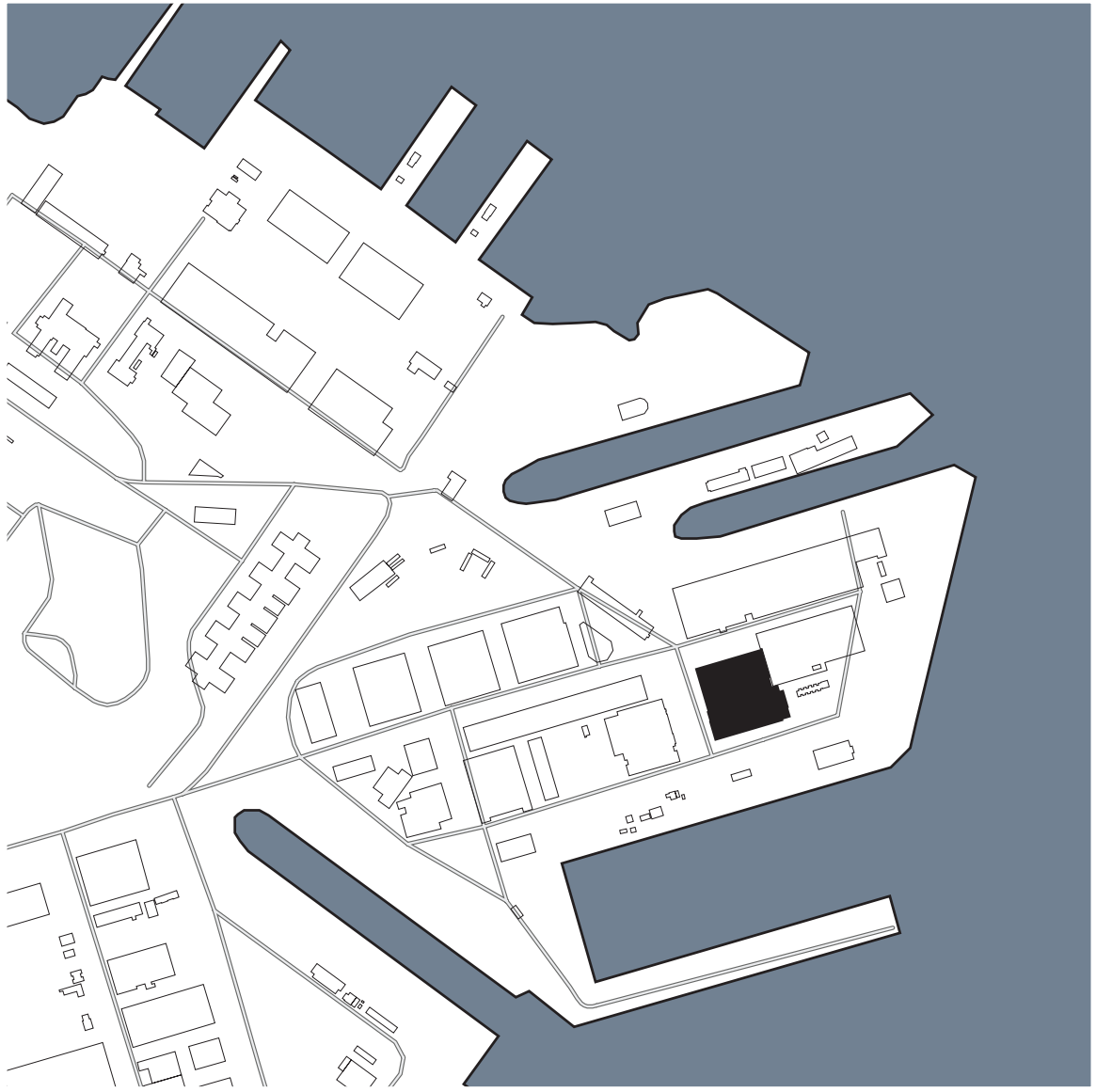
REUSE OF THE BUILDING

Break the rules governing the functions of the buildings “Inhabit the Inhabitual” -Lebvre



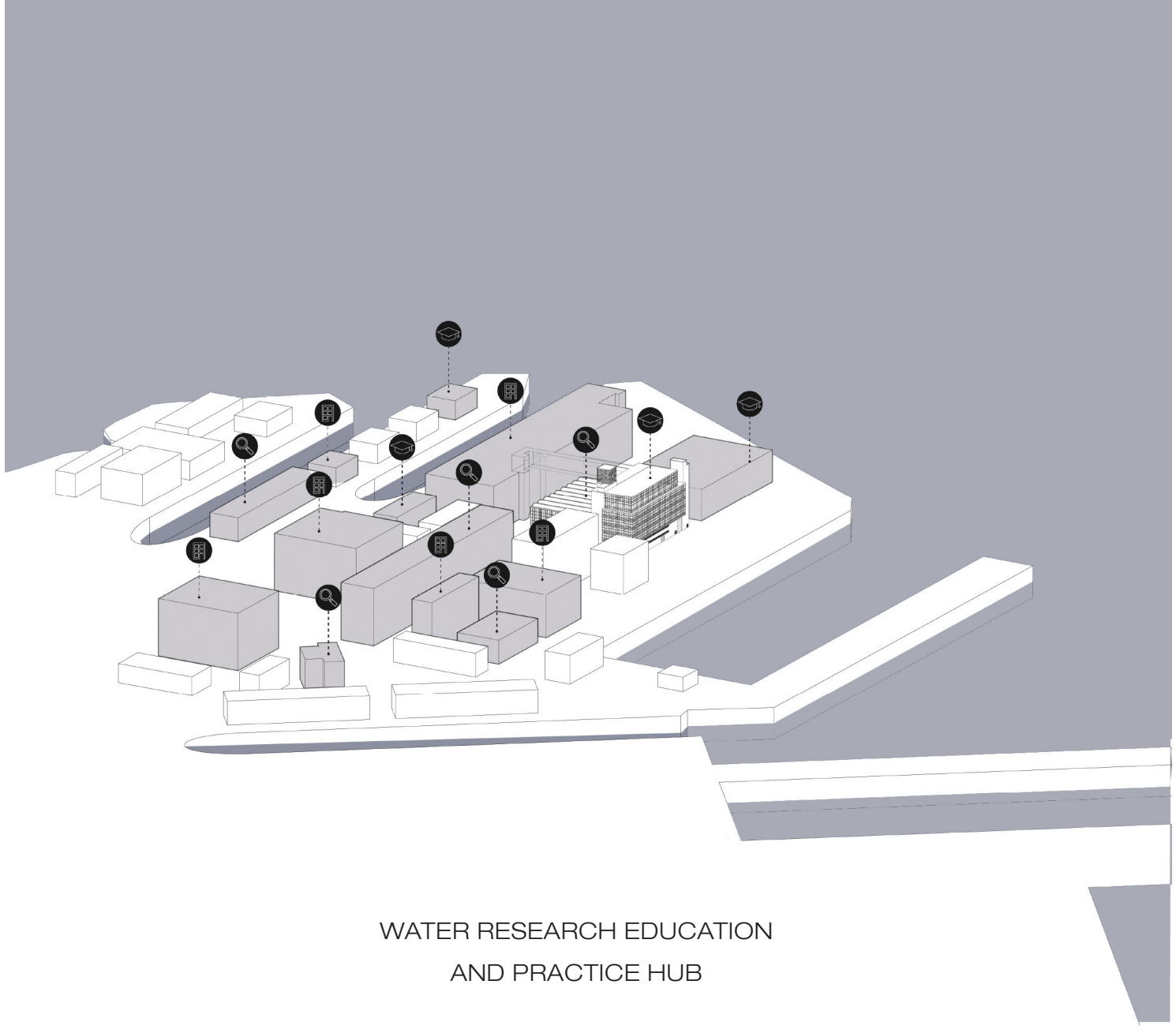
THE “OLD” BUILDING





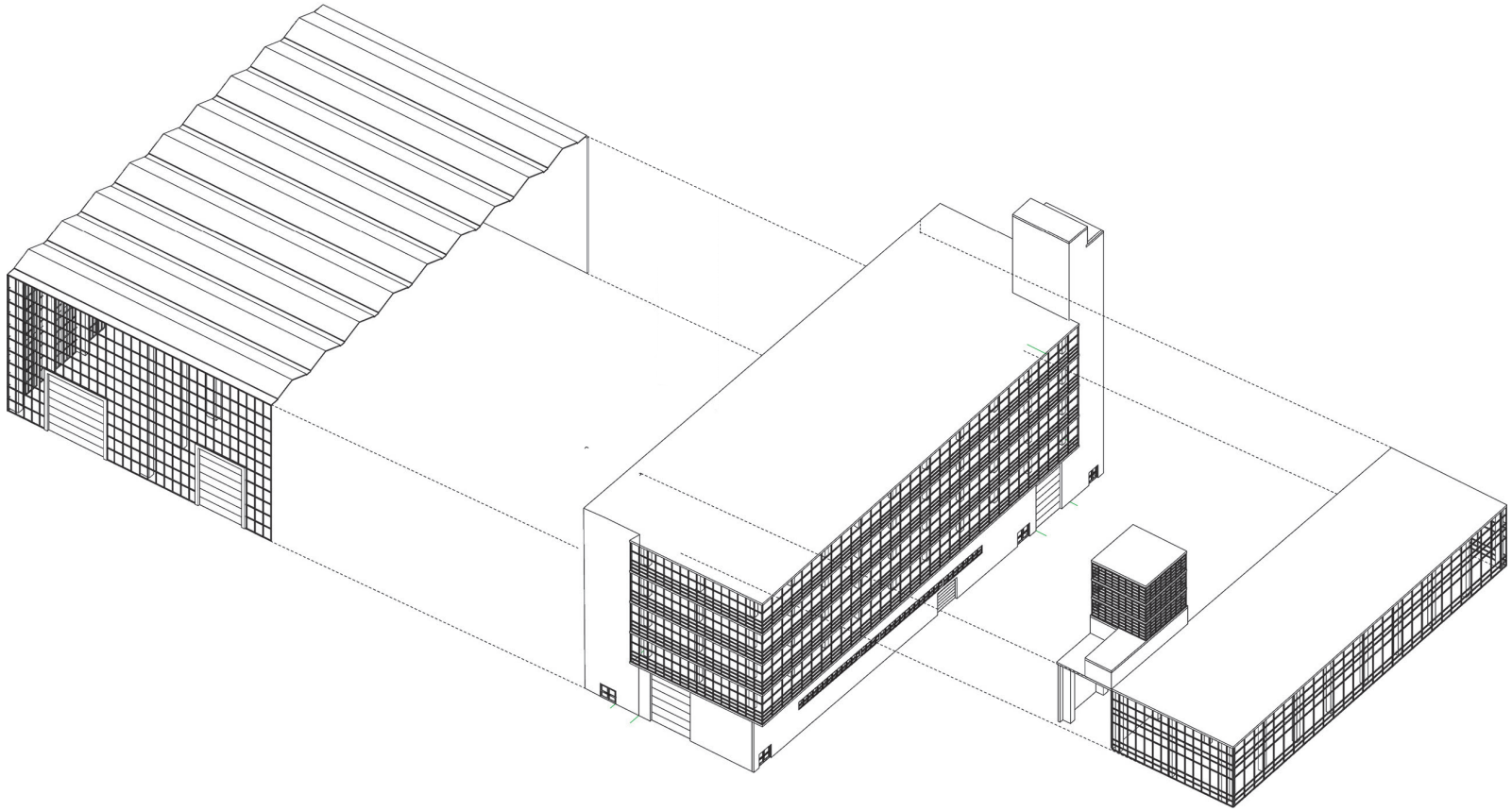

YARD
BUS

THE “NEW” BUILDING

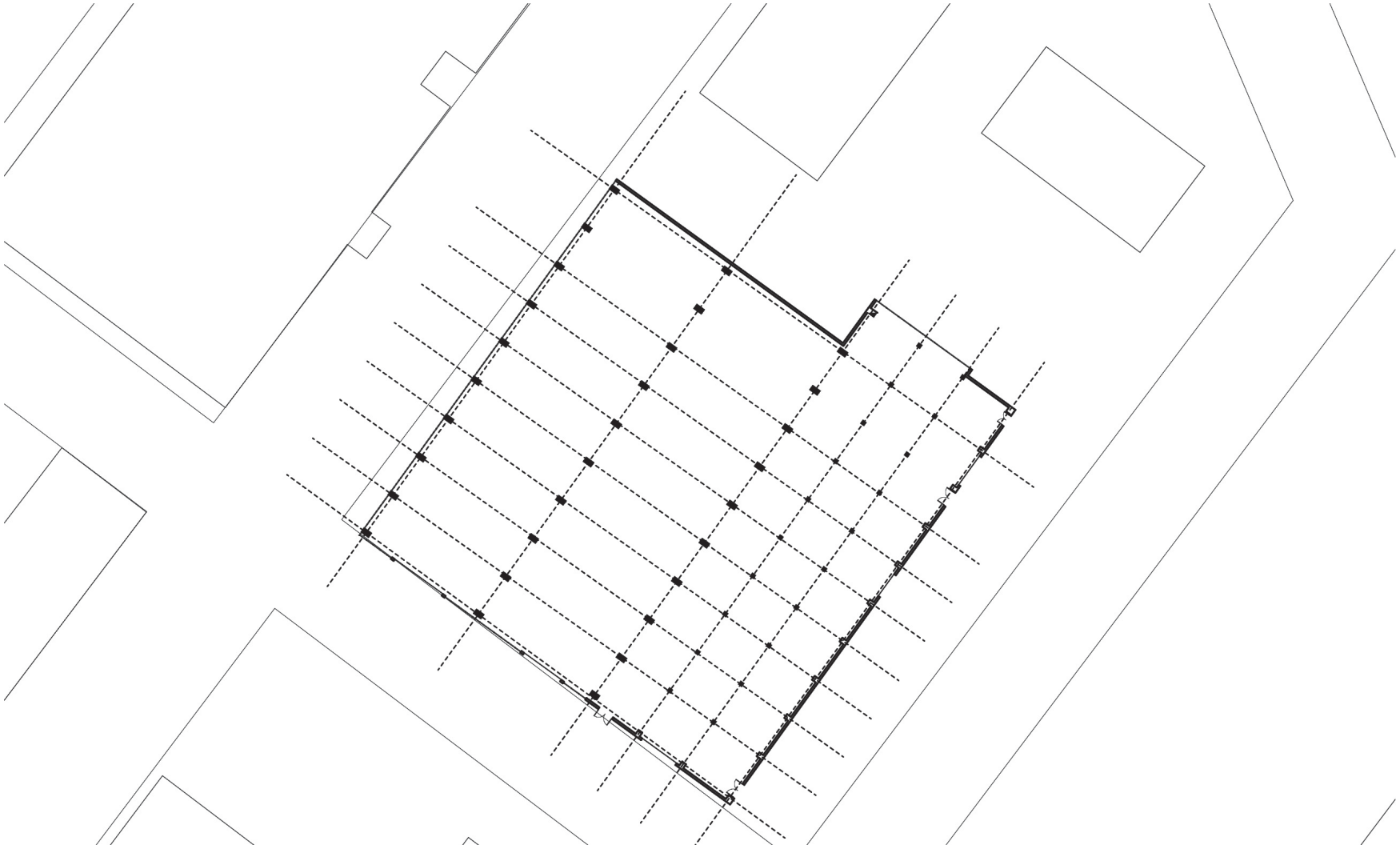


WATER RESEARCH EDUCATION
AND PRACTICE HUB

ANALYSIS OF THE OLD BUILDING

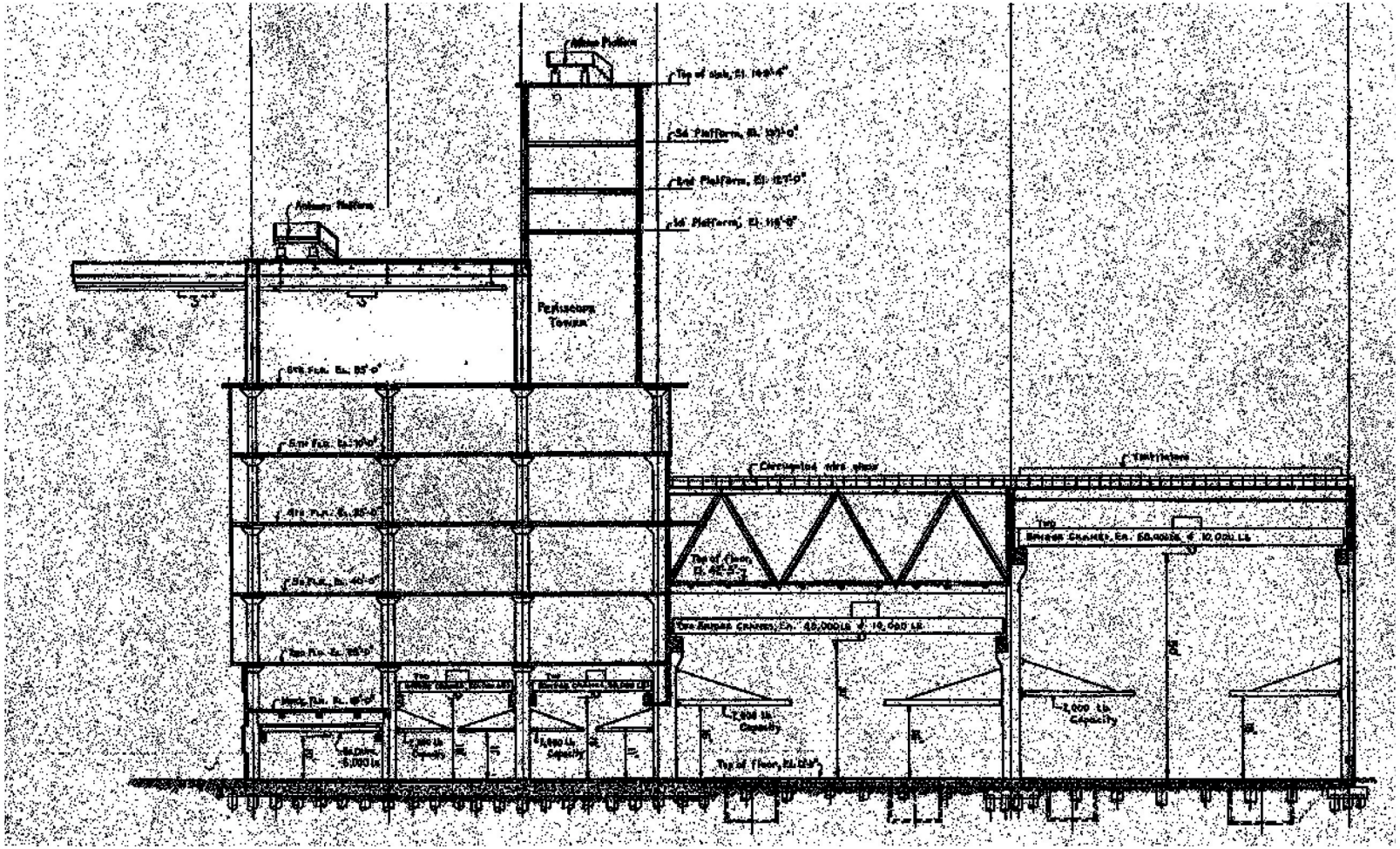


MAIN ELEMENTS OF THE BUILDING



STRUCTURAL PLAN

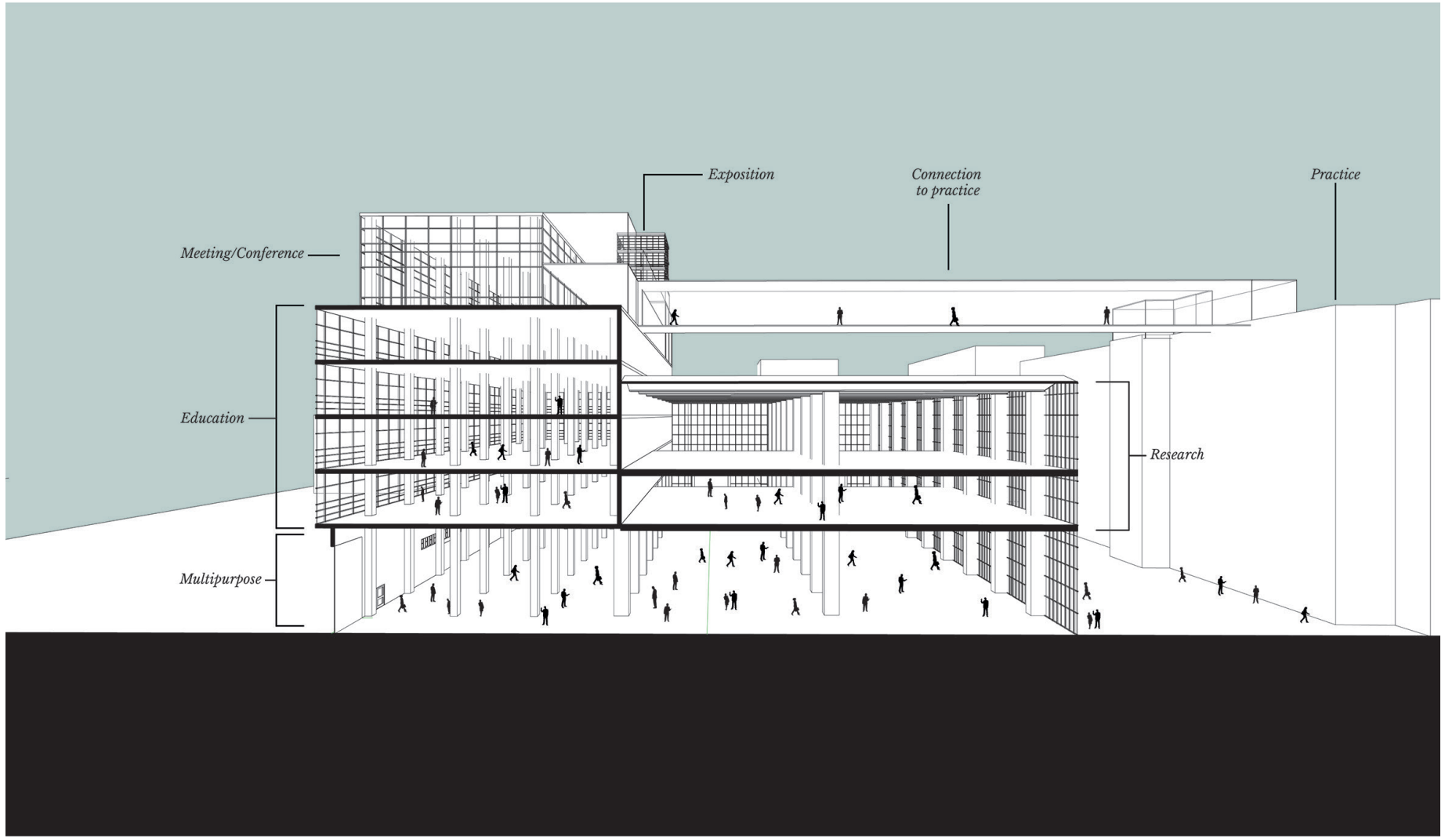
SCALE 1:500

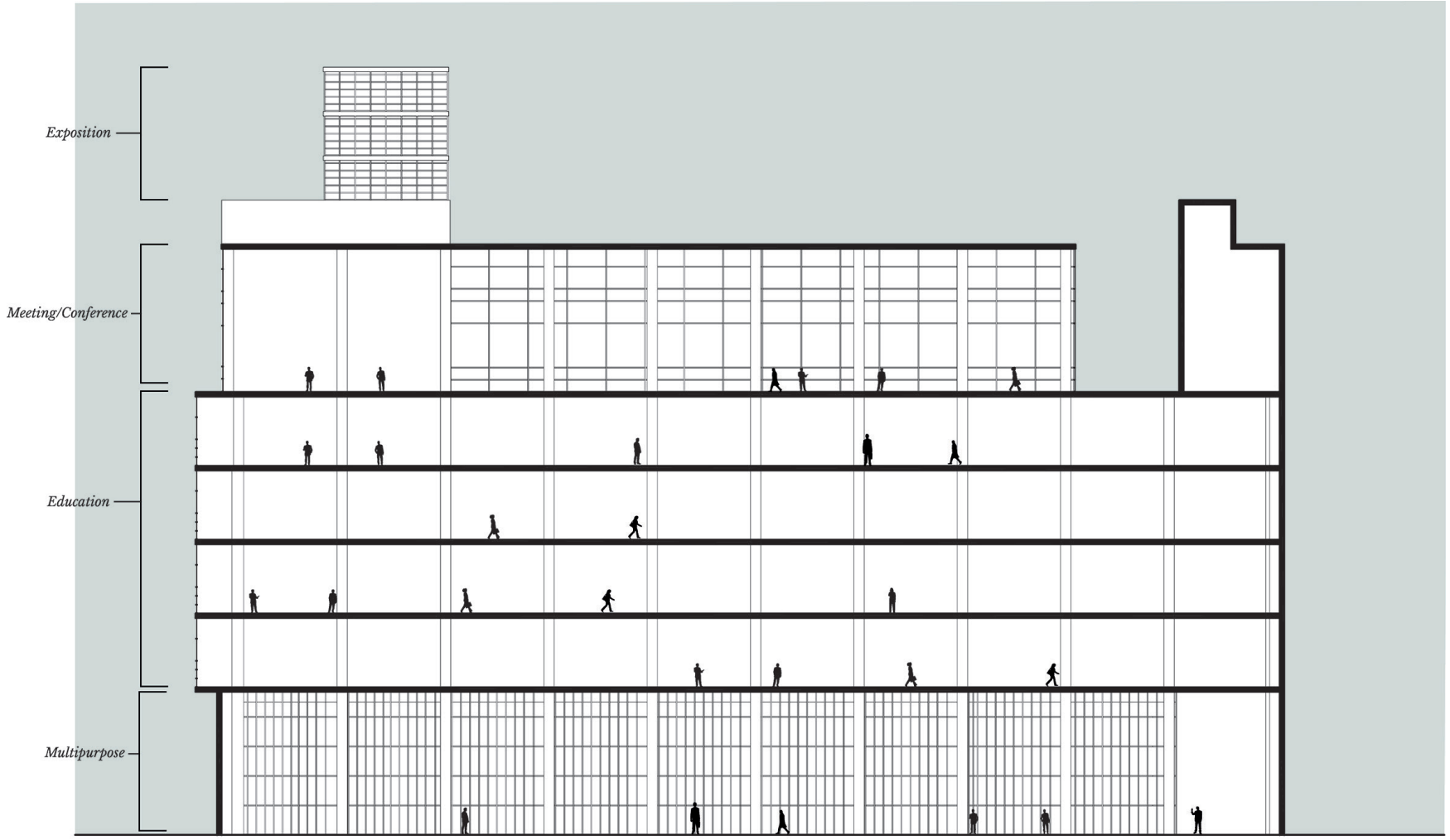


STRUCTURAL SECTION

THE NEW BUILDING

DEFINITION OF PROGRAM


Exposition
Connection to practice
Practice
Meeting/Conference
Education
Research
Multipurpose

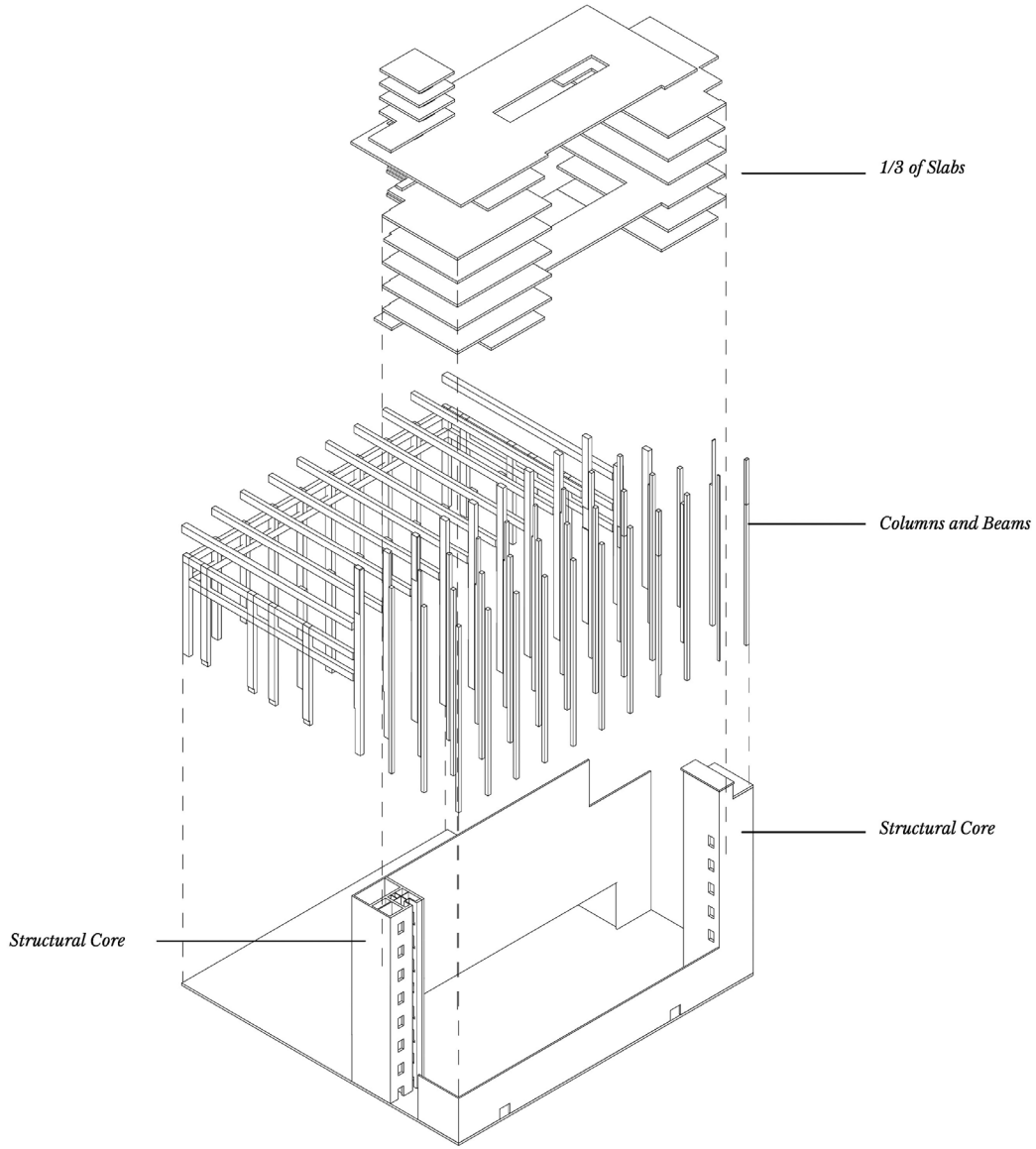


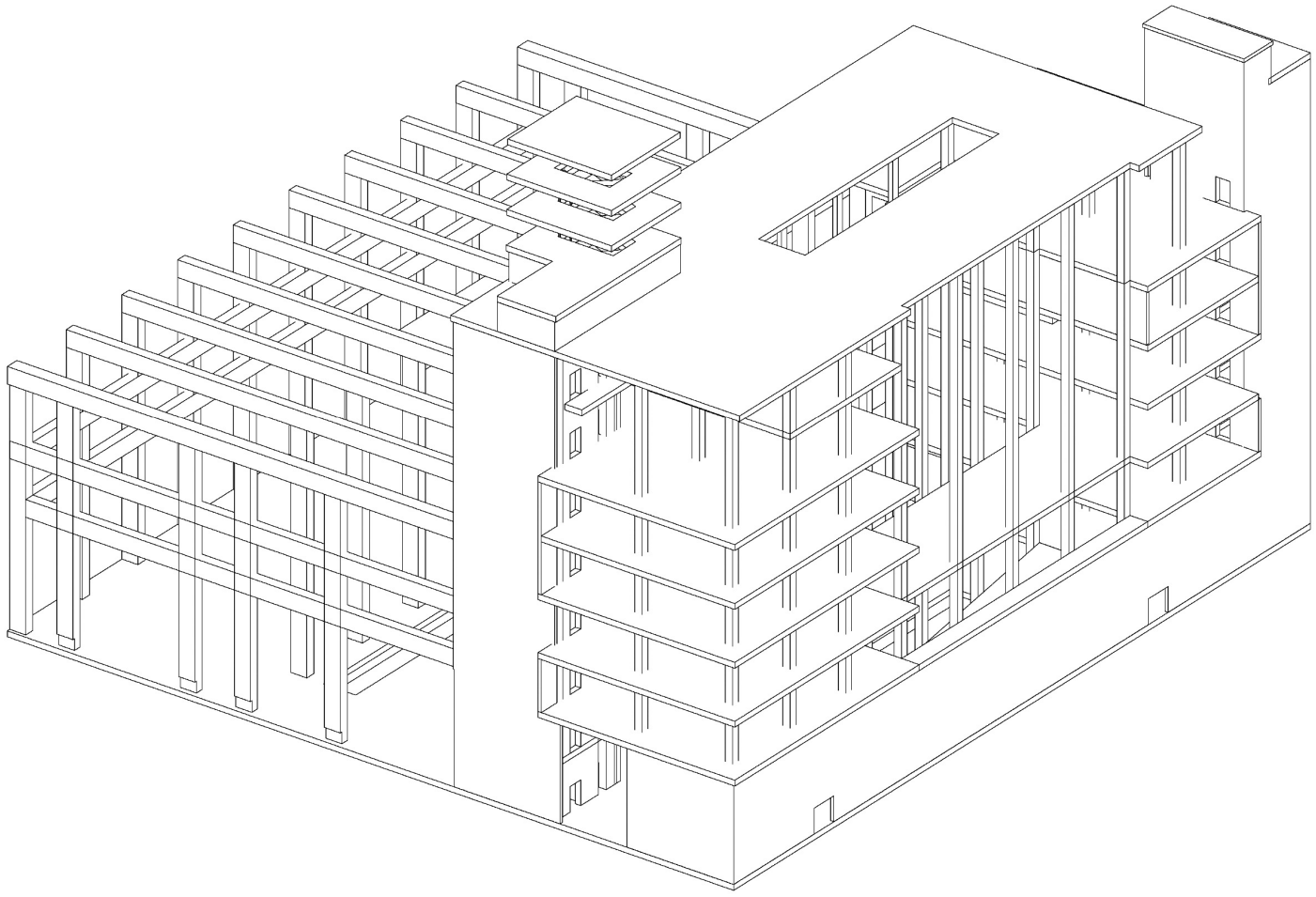
SECTION C-C

SCALE 1:250

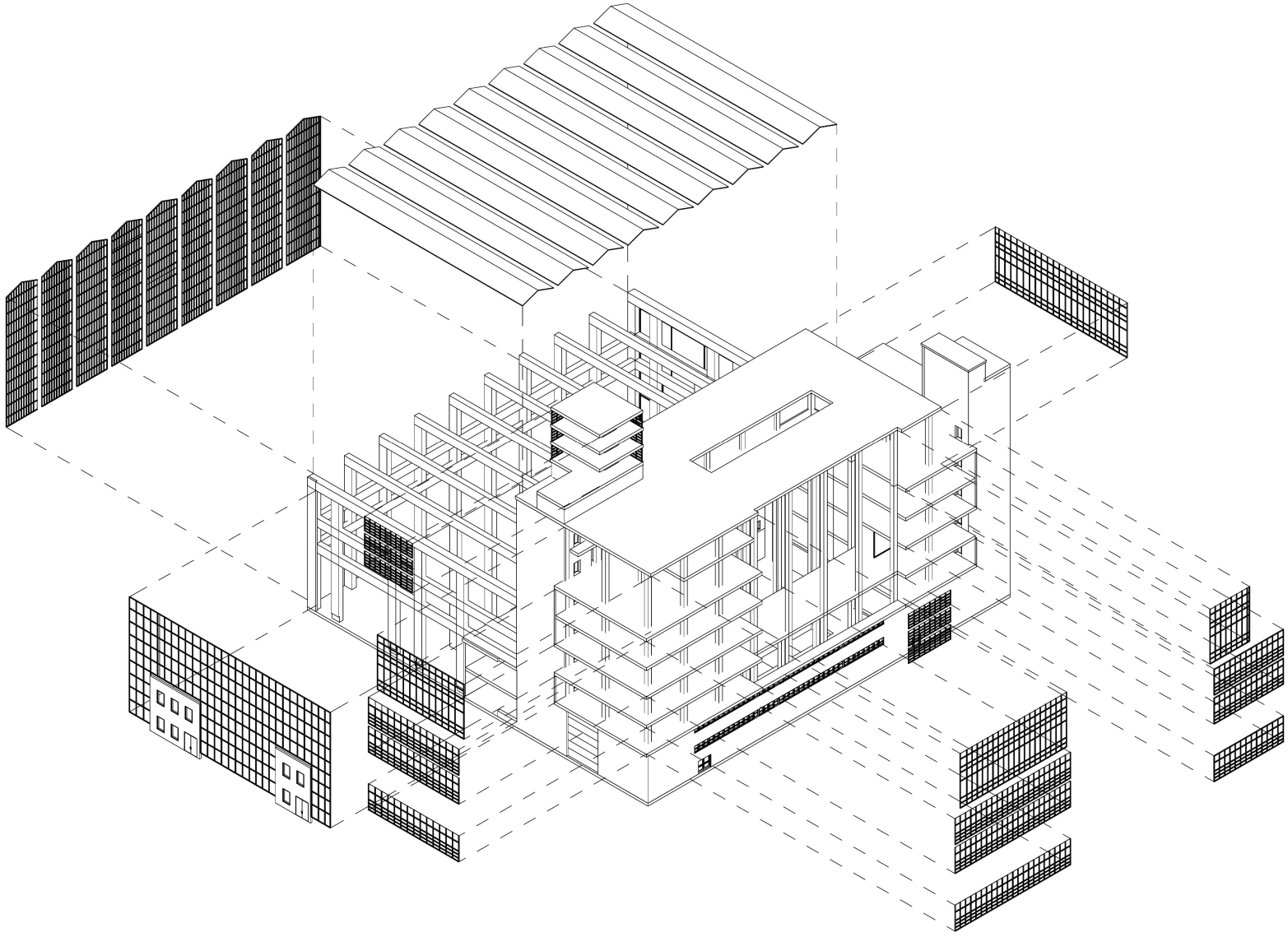
BUILDING COMPOSITION

WHAT WAS REUSED

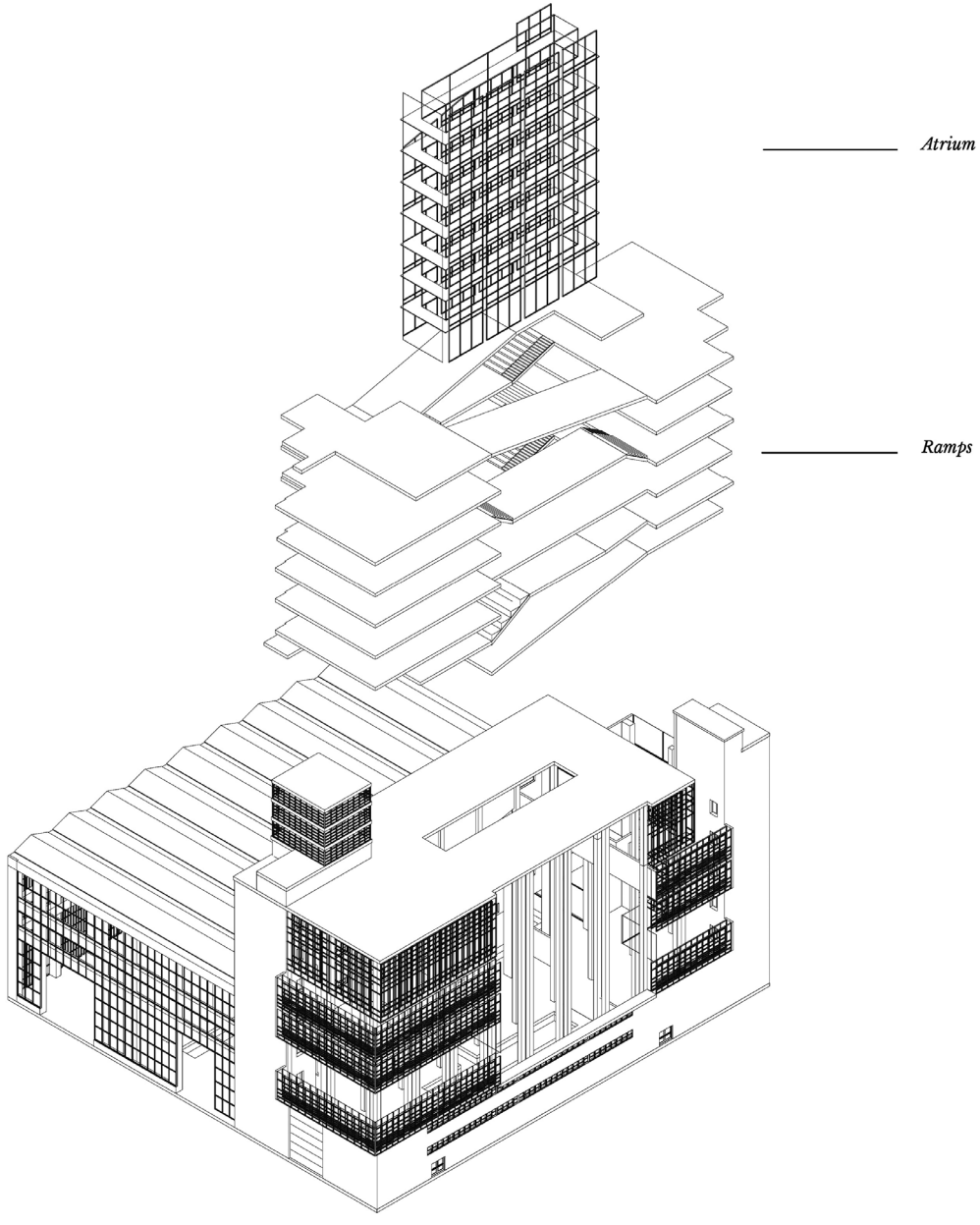

1/3 of Slabs
Columns and Beams
Structural Core
Structural Core

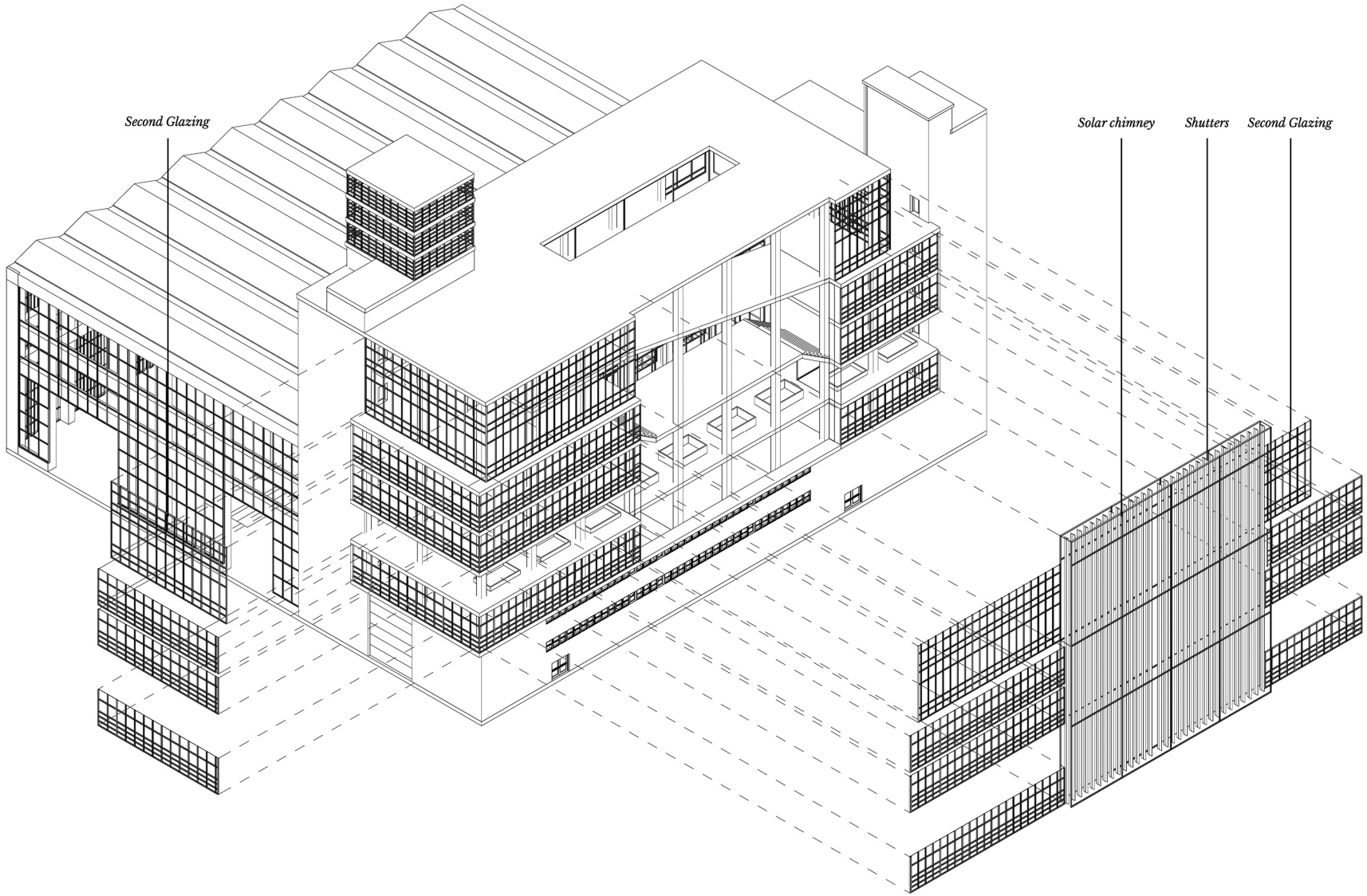


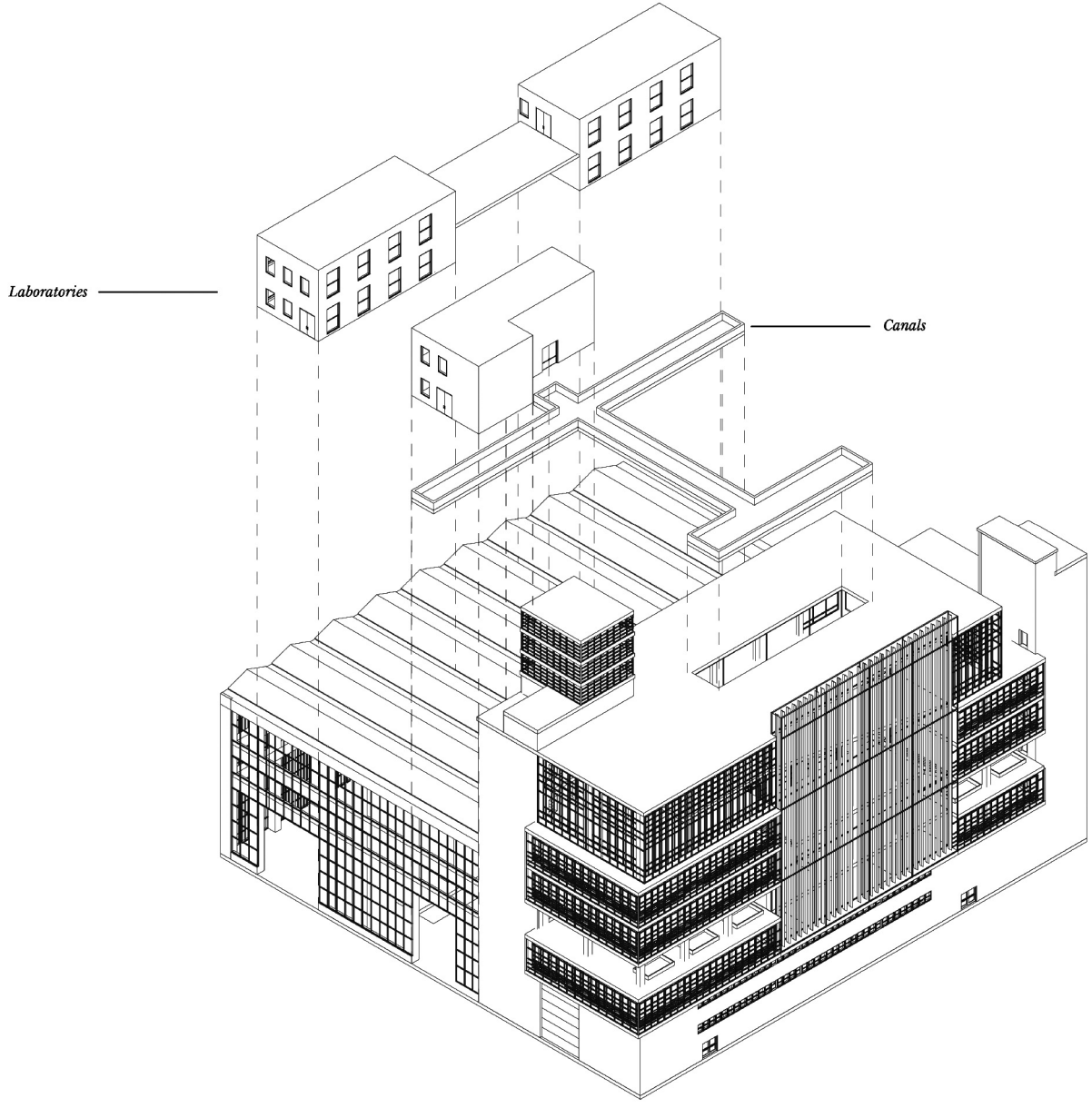
WHAT WAS RESTORED

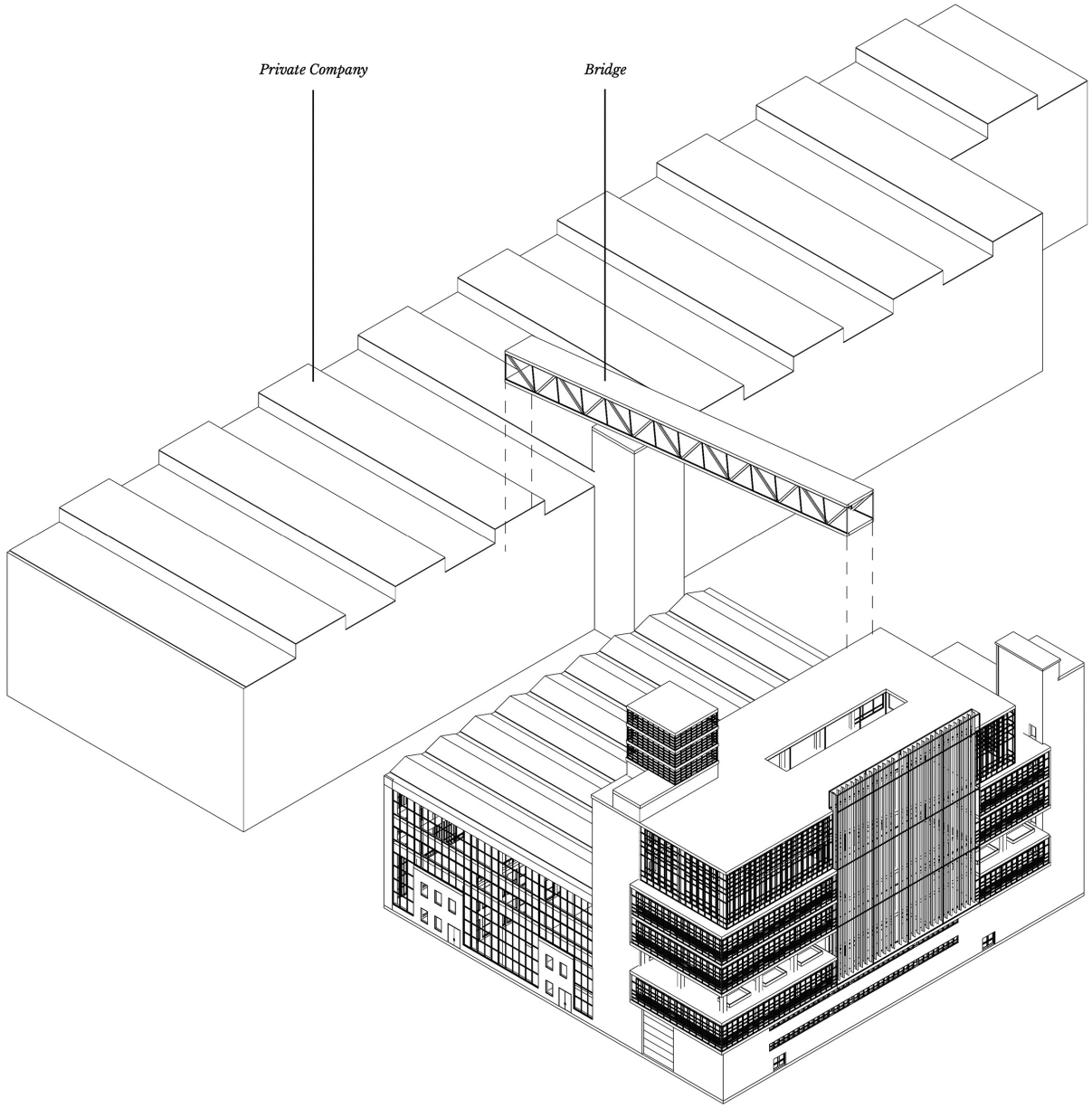


WHAT IS NEW


Atrium
Ramps

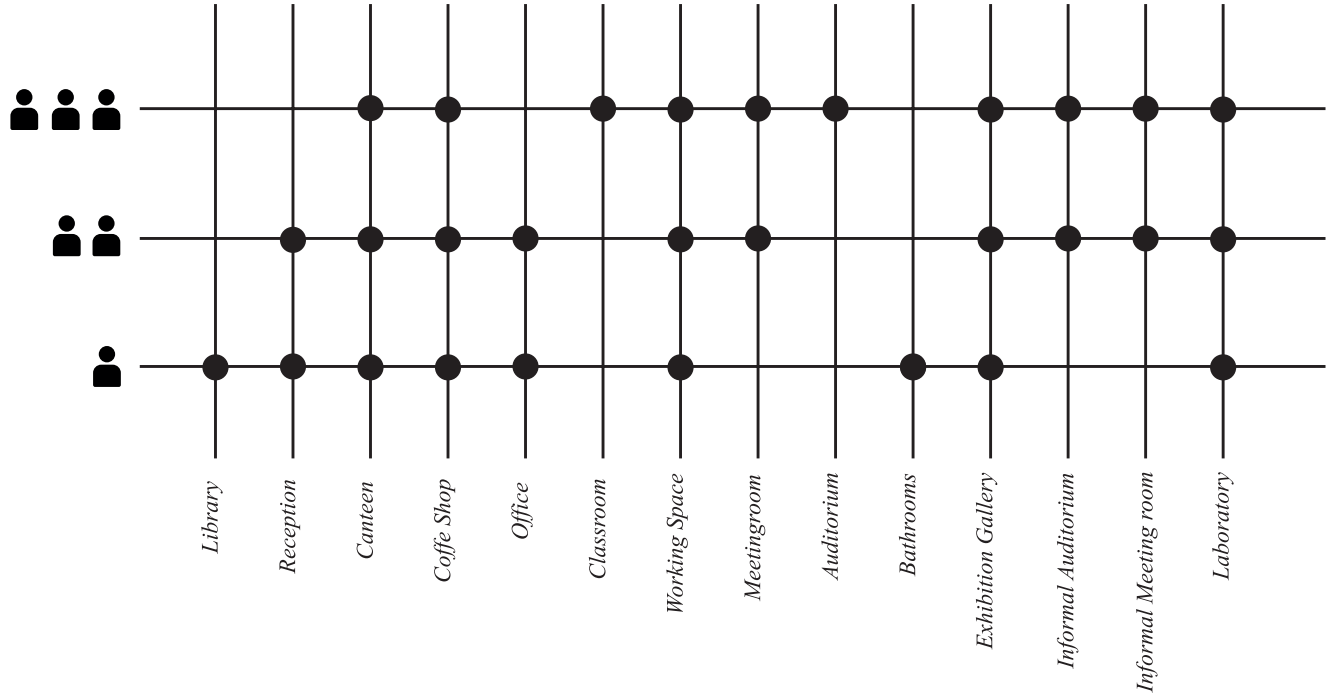

Second Glazing
Solar chimney
Shutters
Second Glazing


Laboratories
Canals

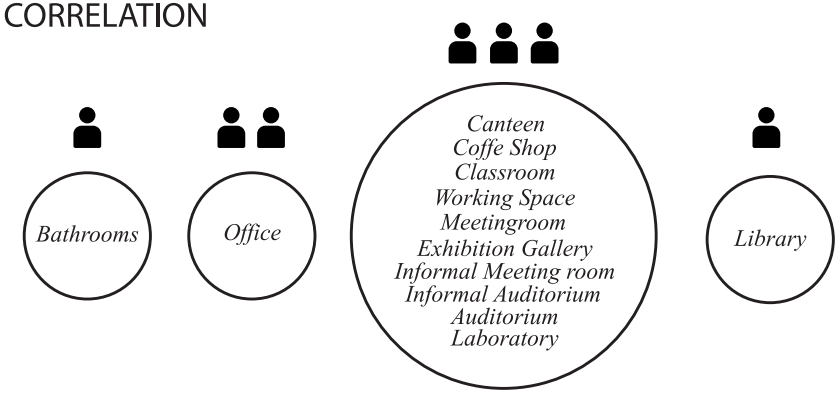

Private Company
Bridge

PROGRAM ANALYSIS

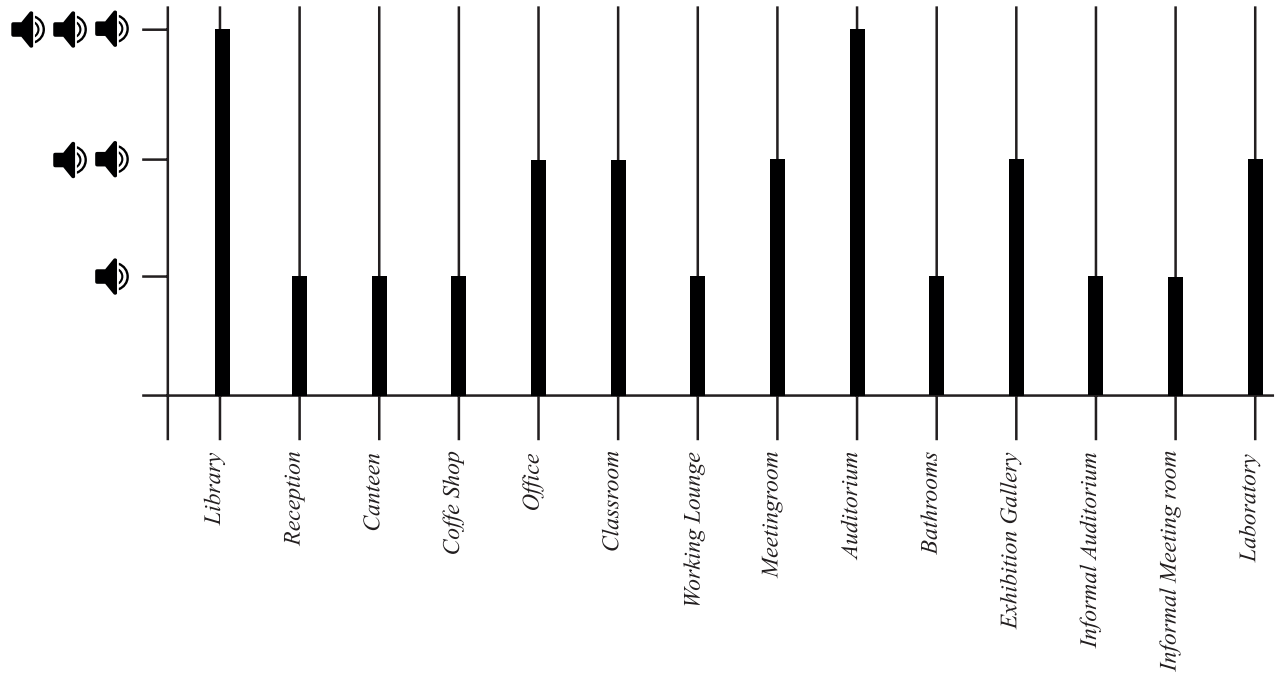
SPACES AND USERS



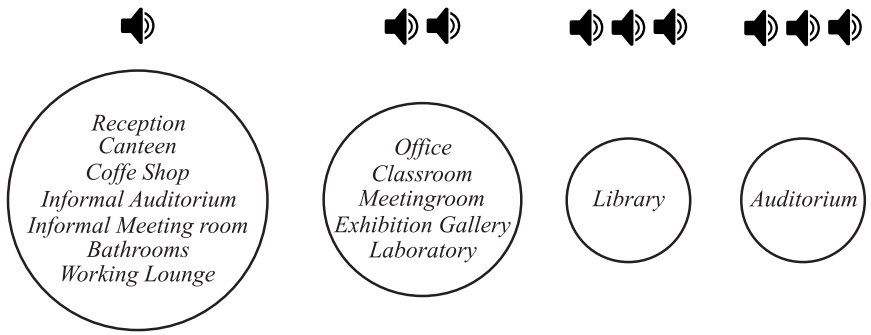
GROUPING BY USER CORRELATION



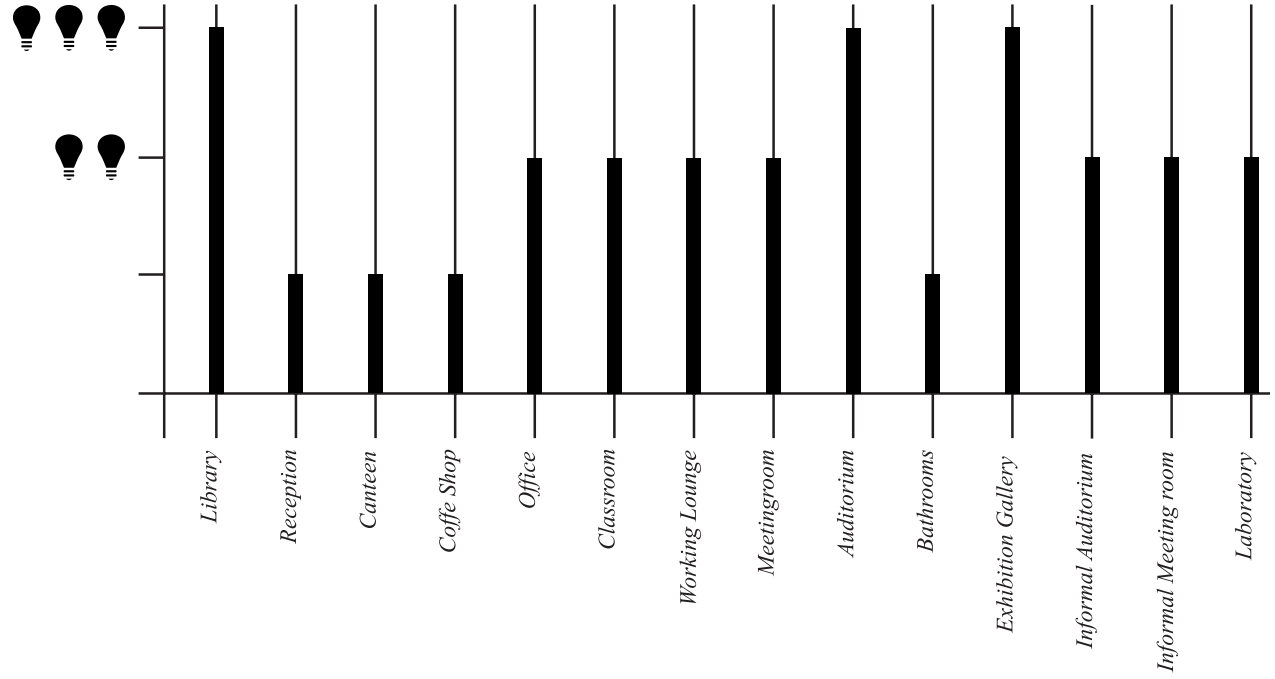
LEVEL OF SOUND CONTROL



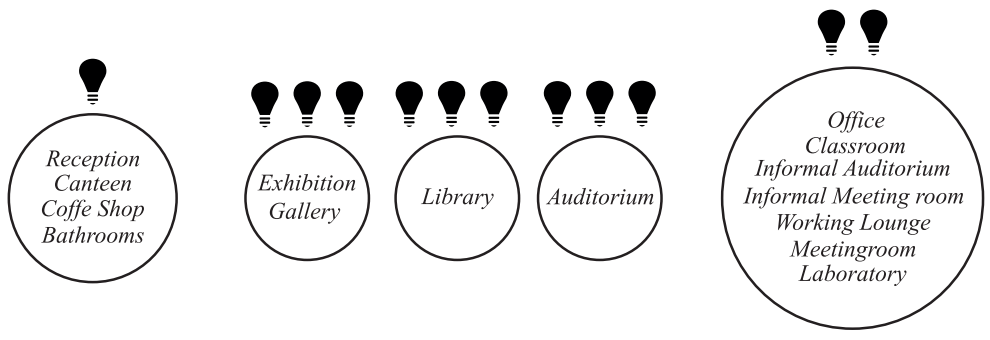
GROUPING ACCORDING TO LEVEL OF SOUND CONTROL

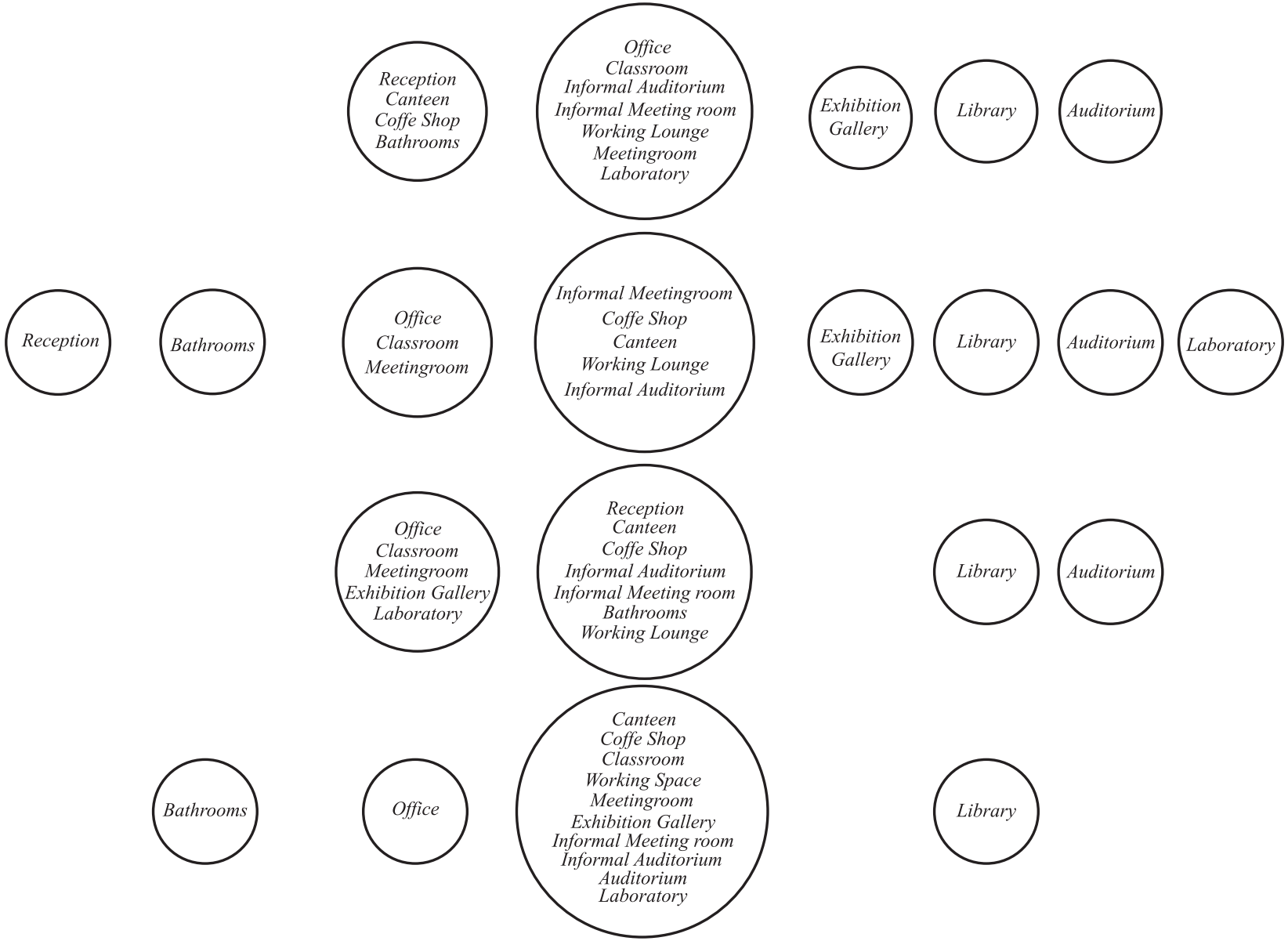


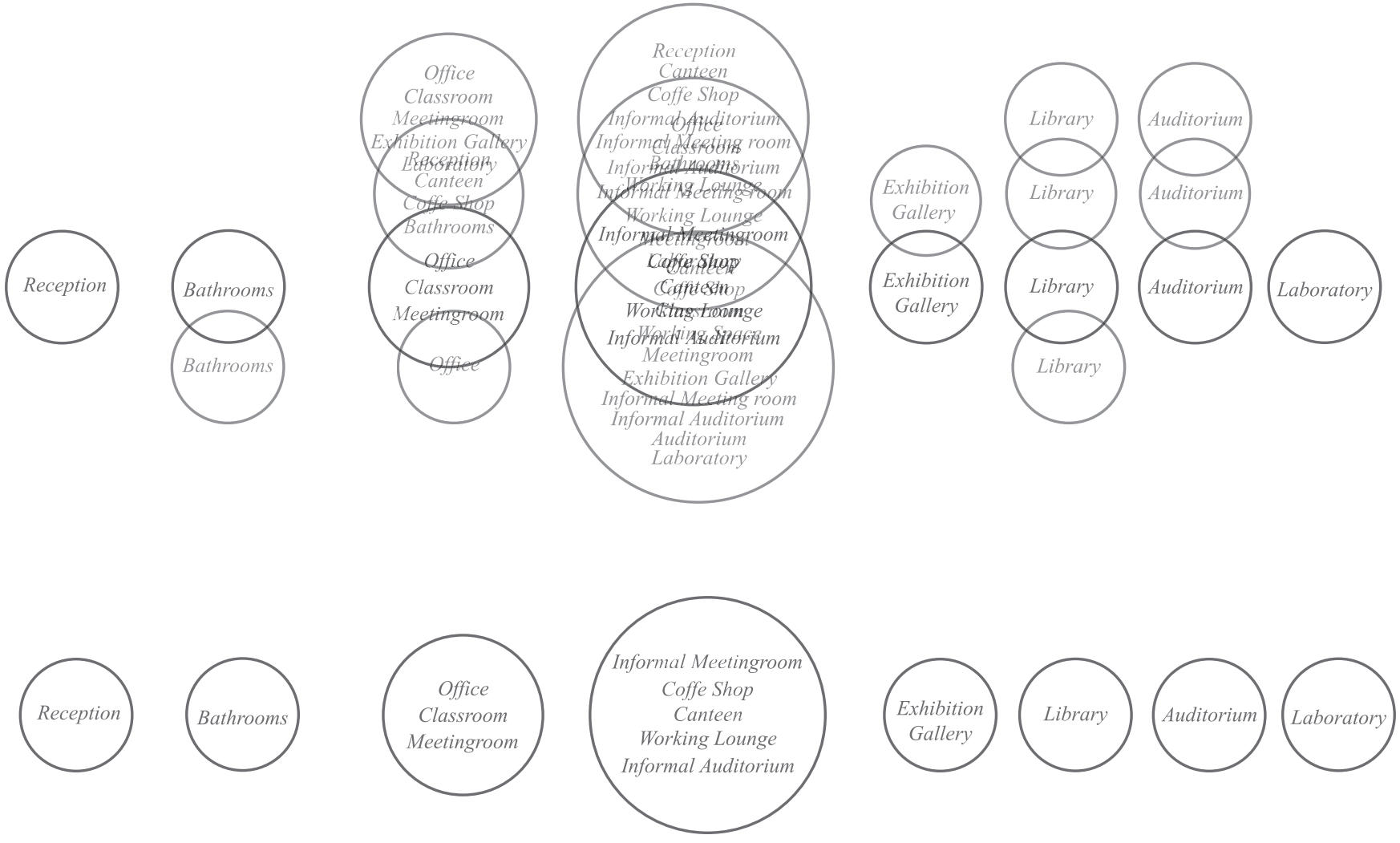
LEVEL OF LIGHT CONTROL



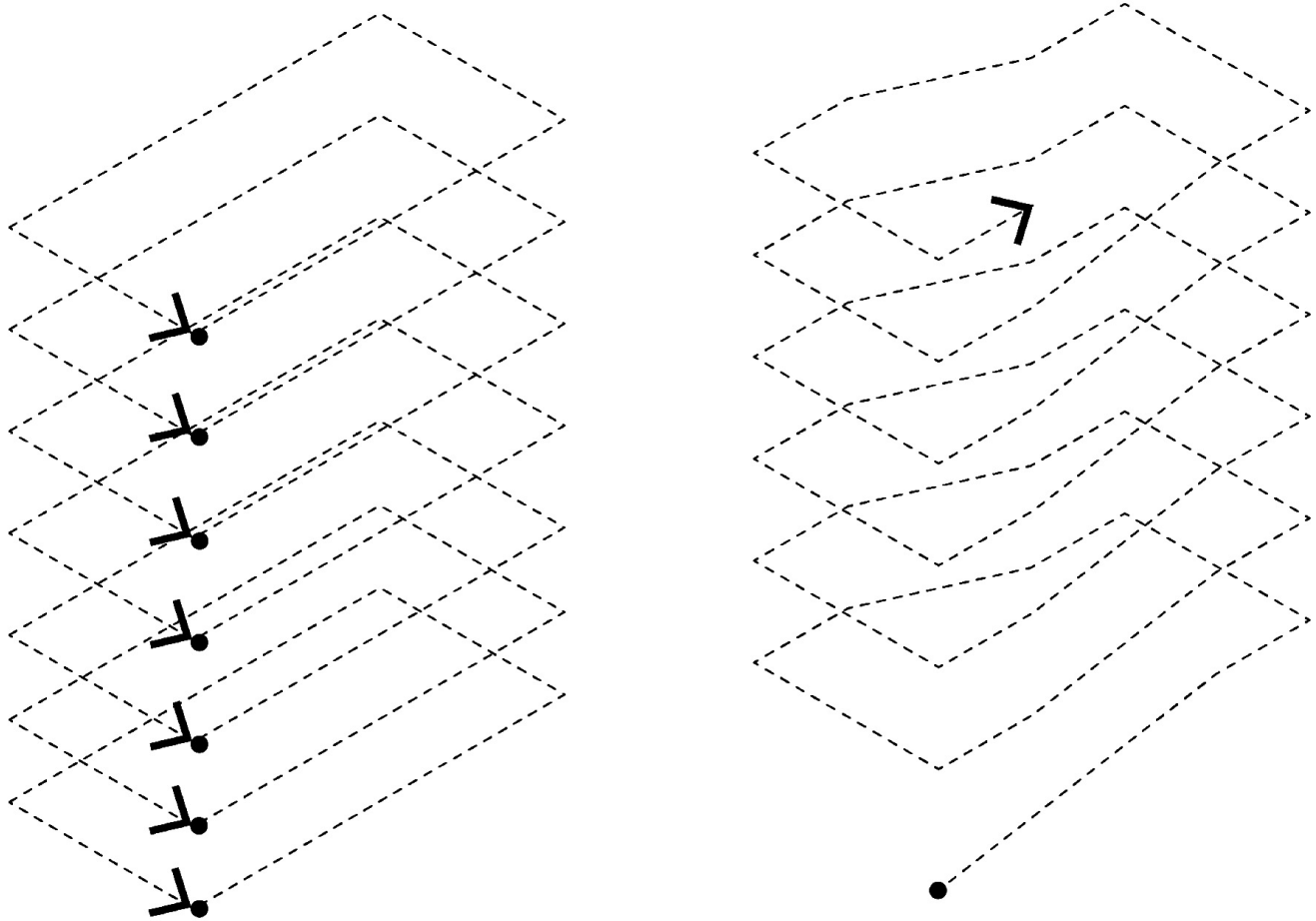
GROUPING ACCORDING TO LEVEL OF LIGHT CONTROL



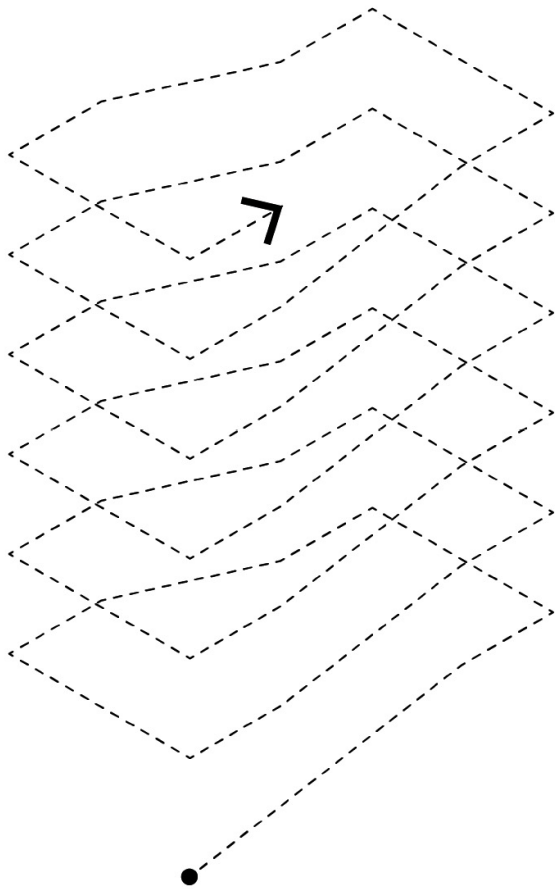

Reception
Canteen
Coffe Shop
Bathrooms
Office
Classroom
Informal Auditorium
Informal Meeting room
Working Lounge
Meetingroom
Laboratory
Exhibition Gallery
Library
Auditorium
Reception
Bathrooms
Office
Classroom
Meetingroom
Informal Meetingroom
Coffe Shop
Canteen
Working Lounge
Informal Auditorium
Exhibition Gallery
Library
Auditorium
Laboratory
Office
Classroom
Meetingroom
Exhibition Gallery
Laboratory
Reception
Canteen
Coffe Shop
Informal Auditorium
Informal Meeting room
Bathrooms
Working Lounge
Library
Auditorium
Bathrooms
Office
Canteen
Coffe Shop
Classroom
Working Space
Meetingroom
Exhibition Gallery
Informal Meeting room
Informal Auditorium
Auditorium
Laboratory
Library

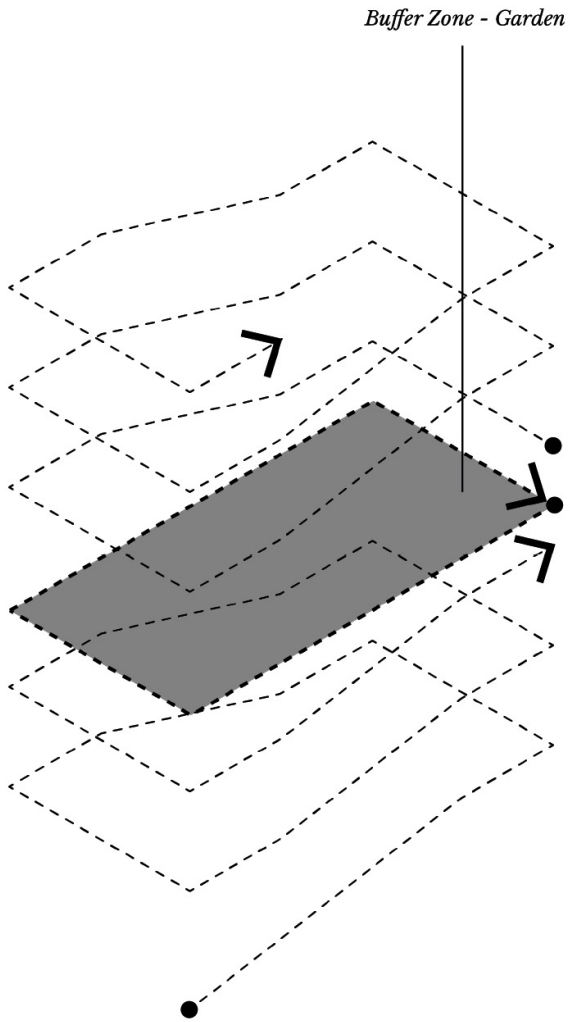

Reception
Bathrooms
Bathrooms
Office
Classroom
Meetingroom
Exhibition Gallery
Laboratory
Reception
Canteen
Coffe Shop
Bathrooms
Office
Classroom
Meetingroom
Office
Reception
Canteen
Coffe Shop
Informal Auditorium
Informal Meeting room
Office
Classroom
Bathrooms
Informal Auditorium
Working Lounge
Informal Meetingroom
Working Lounge
Informal Meetingroom
Coffe Shop
Canteen
Coffe Shop
Working Lounge
Working Space
Informal Auditorium
Meetingroom
Exhibition Gallery
Informal Meeting room
Informal Auditorium
Auditorium
Laboratory
Exhibition Gallery
Exhibition Gallery
Library
Library
Library
Library
Auditorium
Auditorium
Auditorium
Laboratory
Reception
Bathrooms
Office
Classroom
Meetingroom
Informal Meetingroom
Coffe Shop
Canteen
Working Lounge
Informal Auditorium
Exhibition Gallery
Library
Auditorium
Laboratory
Noise Control
Noise Control
Noise Control
Light Control
Light Control
Light Control
Activity
Activity
Activity
Activity

THE RAMPS
-Freedom of Space
Fluidity Interaction

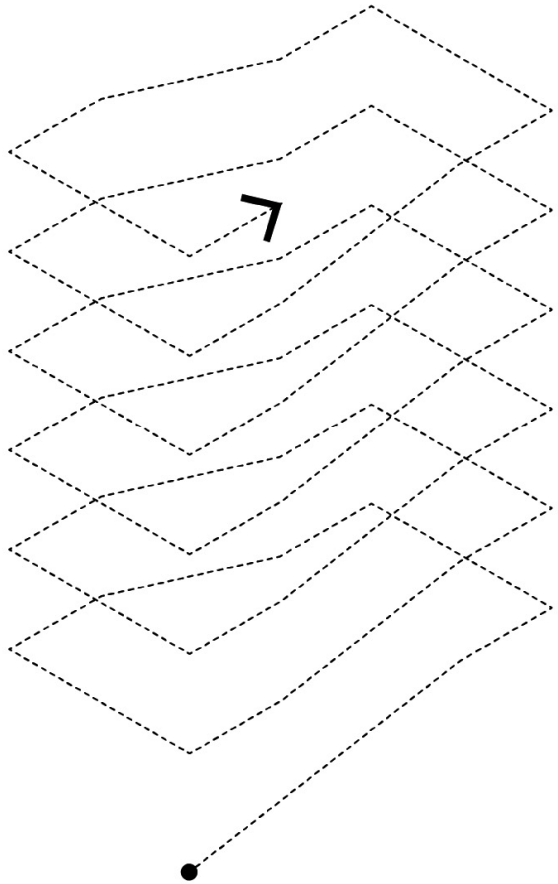


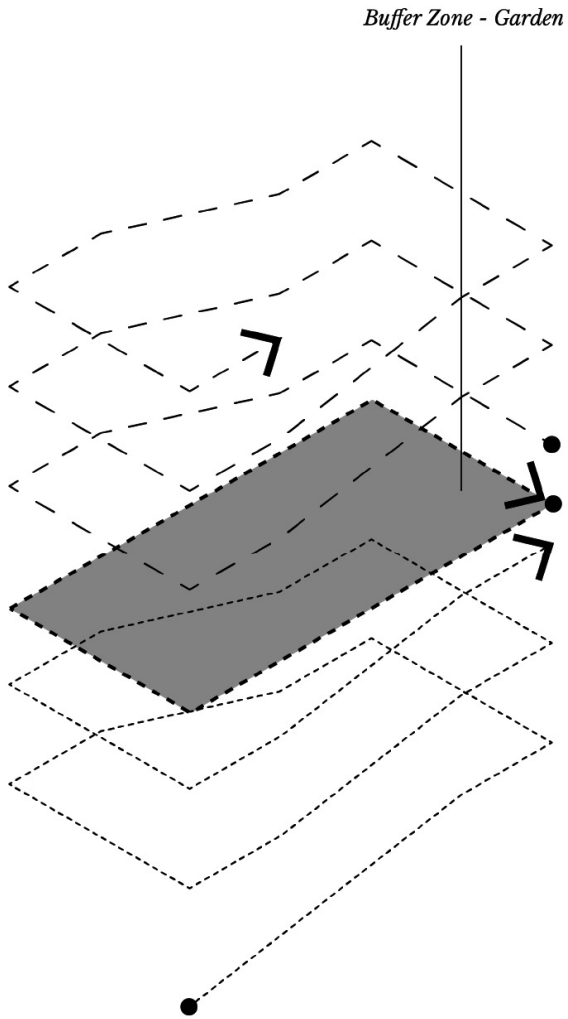
THE RAMPS
-Buffer Zone



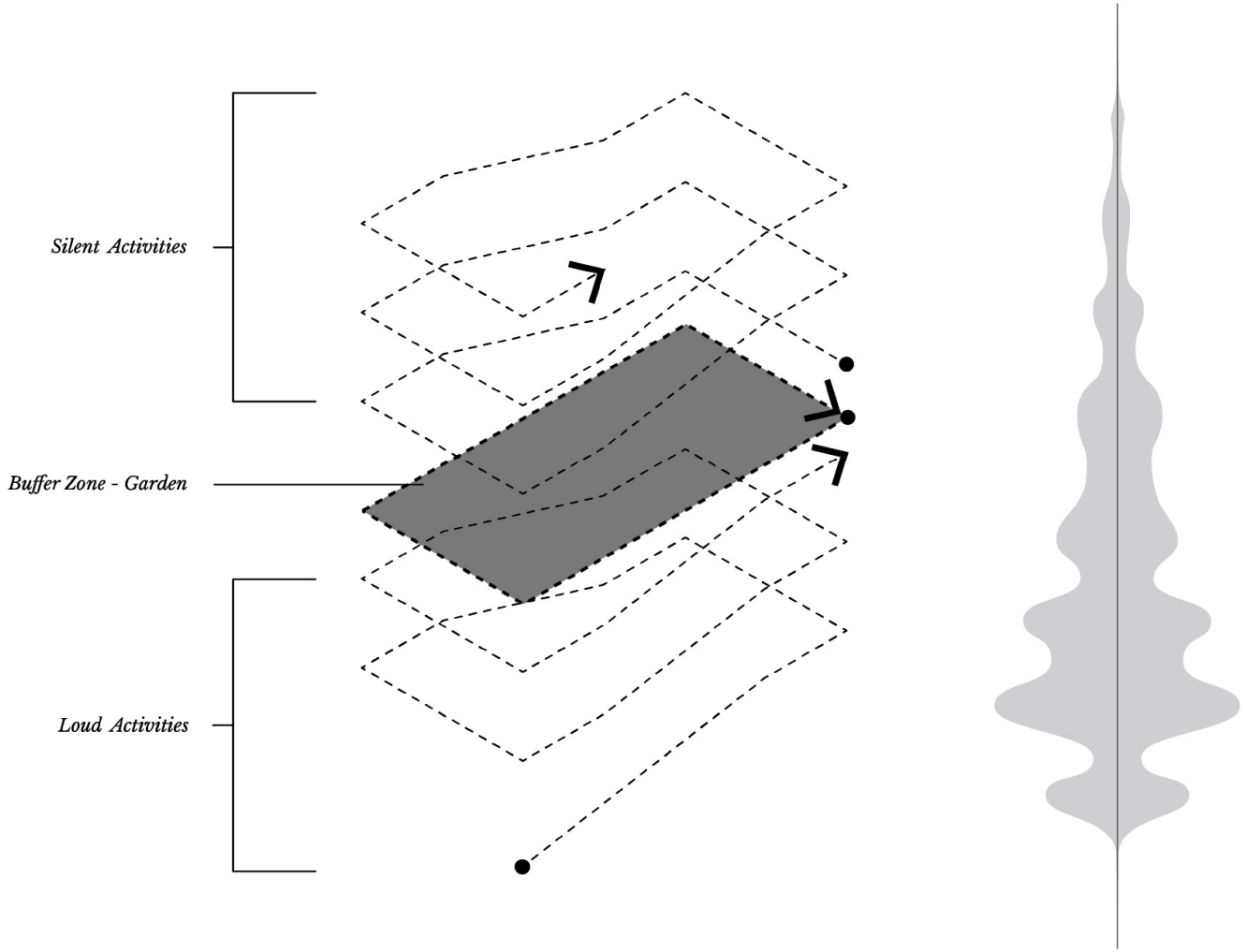

Buffer Zone - Garden

THE RAMPS
-Movement Control



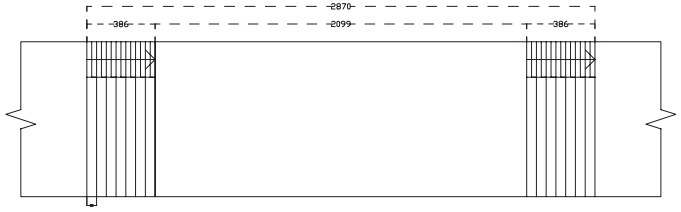

Buffer Zone - Garden

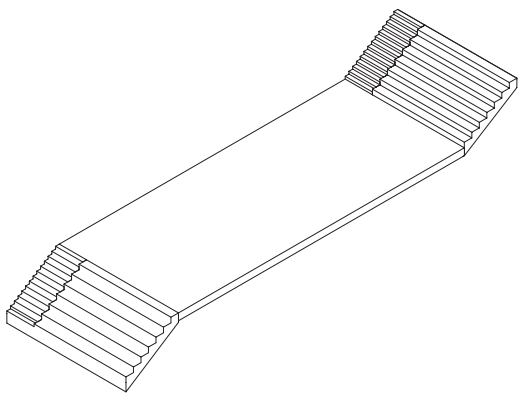
THE RAMPS
-Noise Control


Silent Activities
Buffer Zone - Garden
Loud Activities

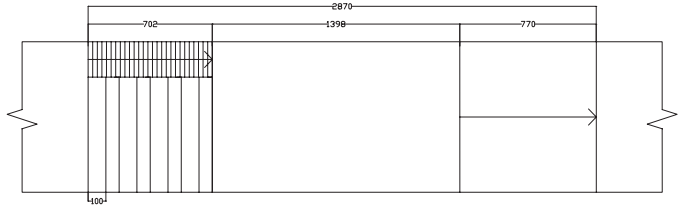
RAMPS DESIGN

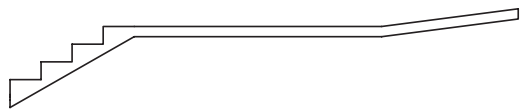
INFORMAL MEETING

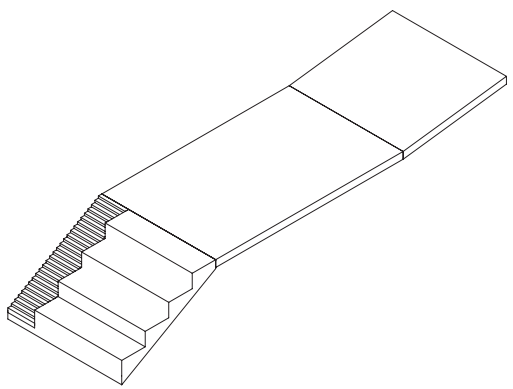




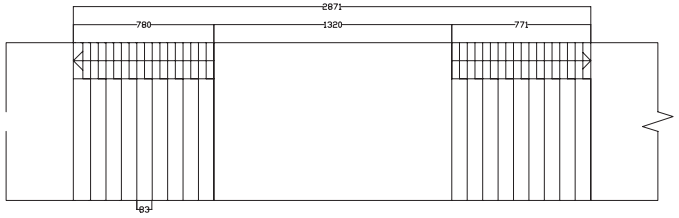
CRAFTING STORAGE AND WORKING

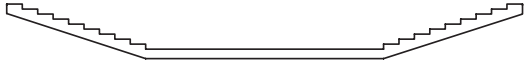


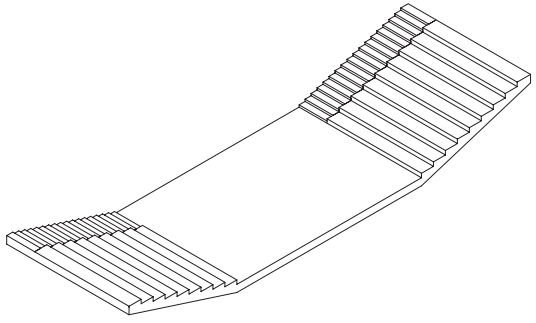




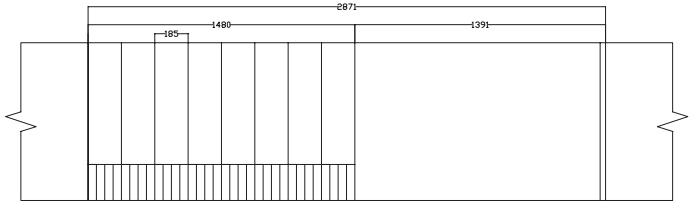
INFORMAL AUDITORIUM

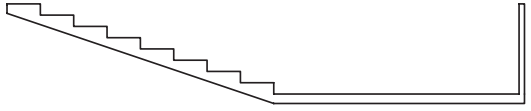


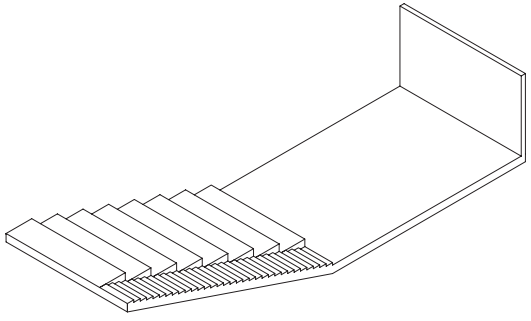




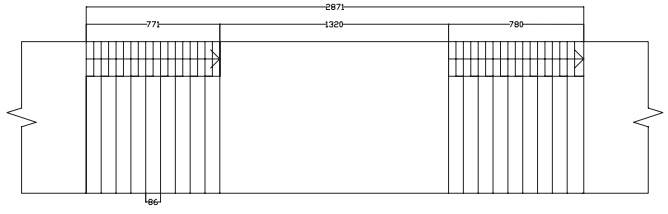
INFORMAL PROJECTION ROOM

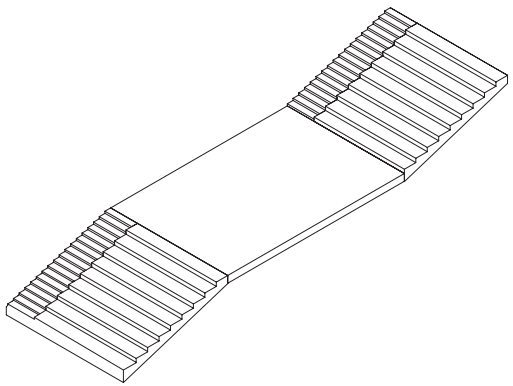




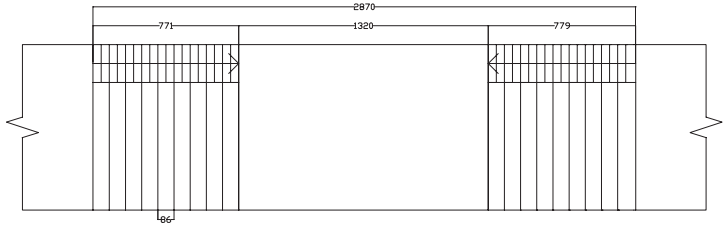


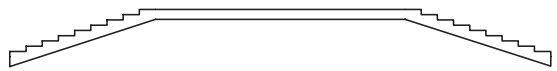
WORKING LOUNGE

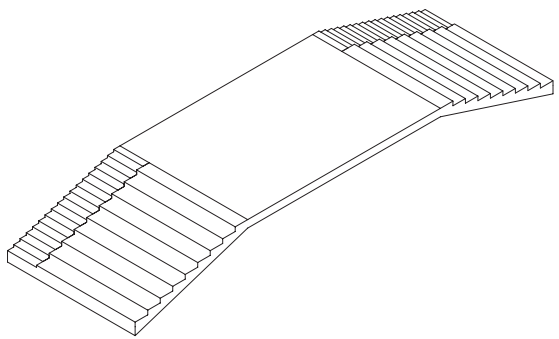




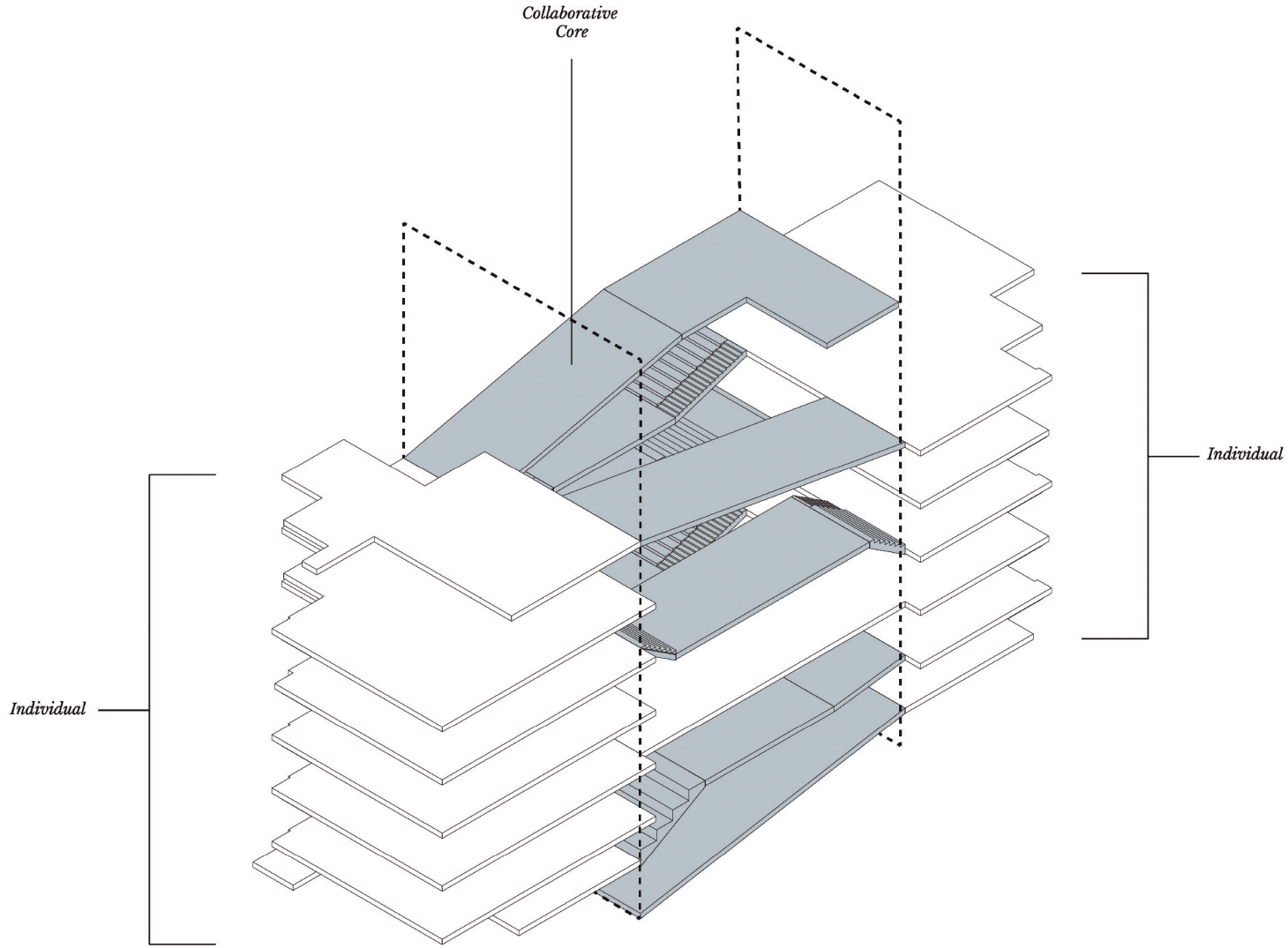
STUDING LOUNGE

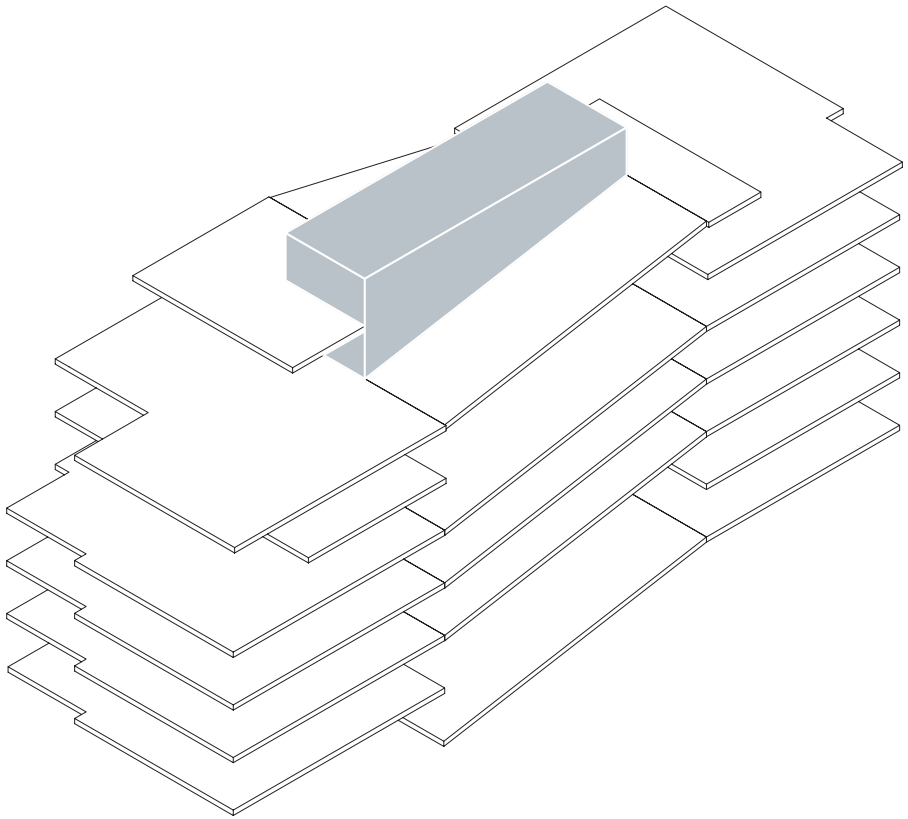




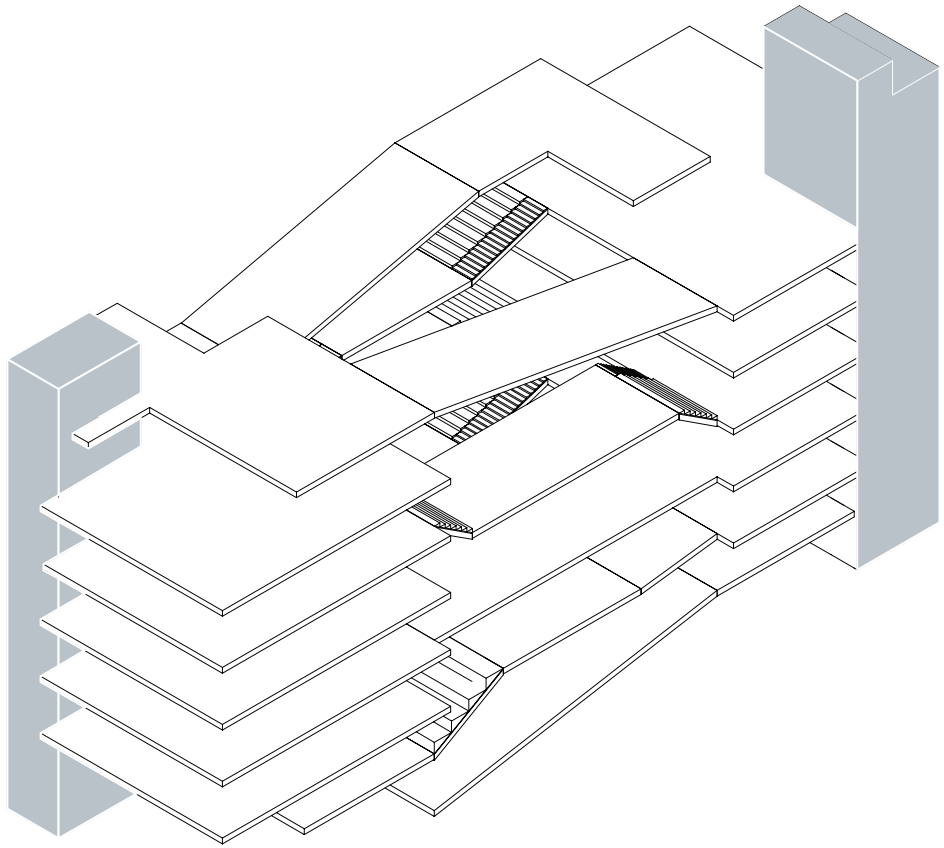


SPACE SUBDIVISION

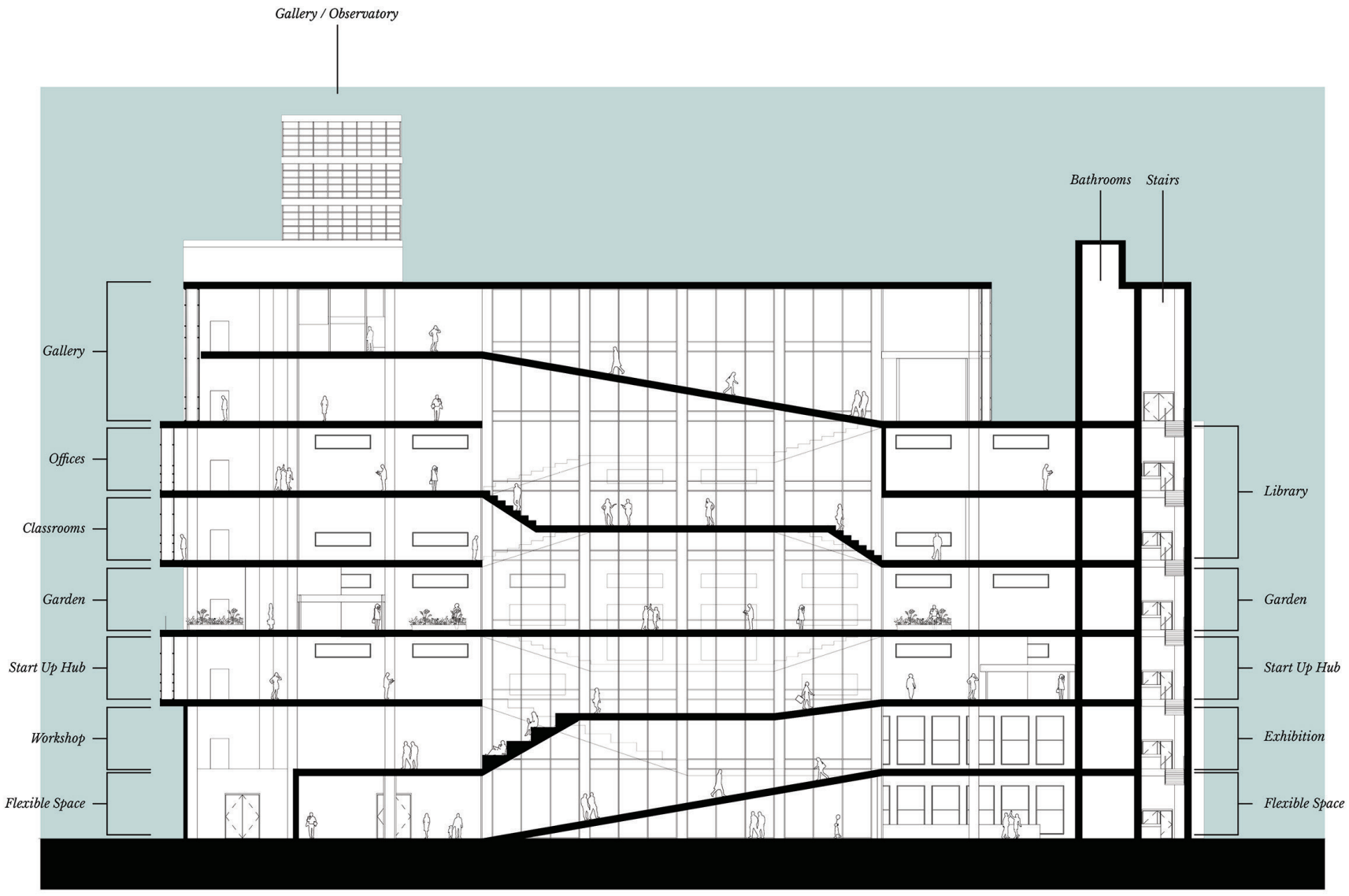

Collaborative
Core
Individual
Individual

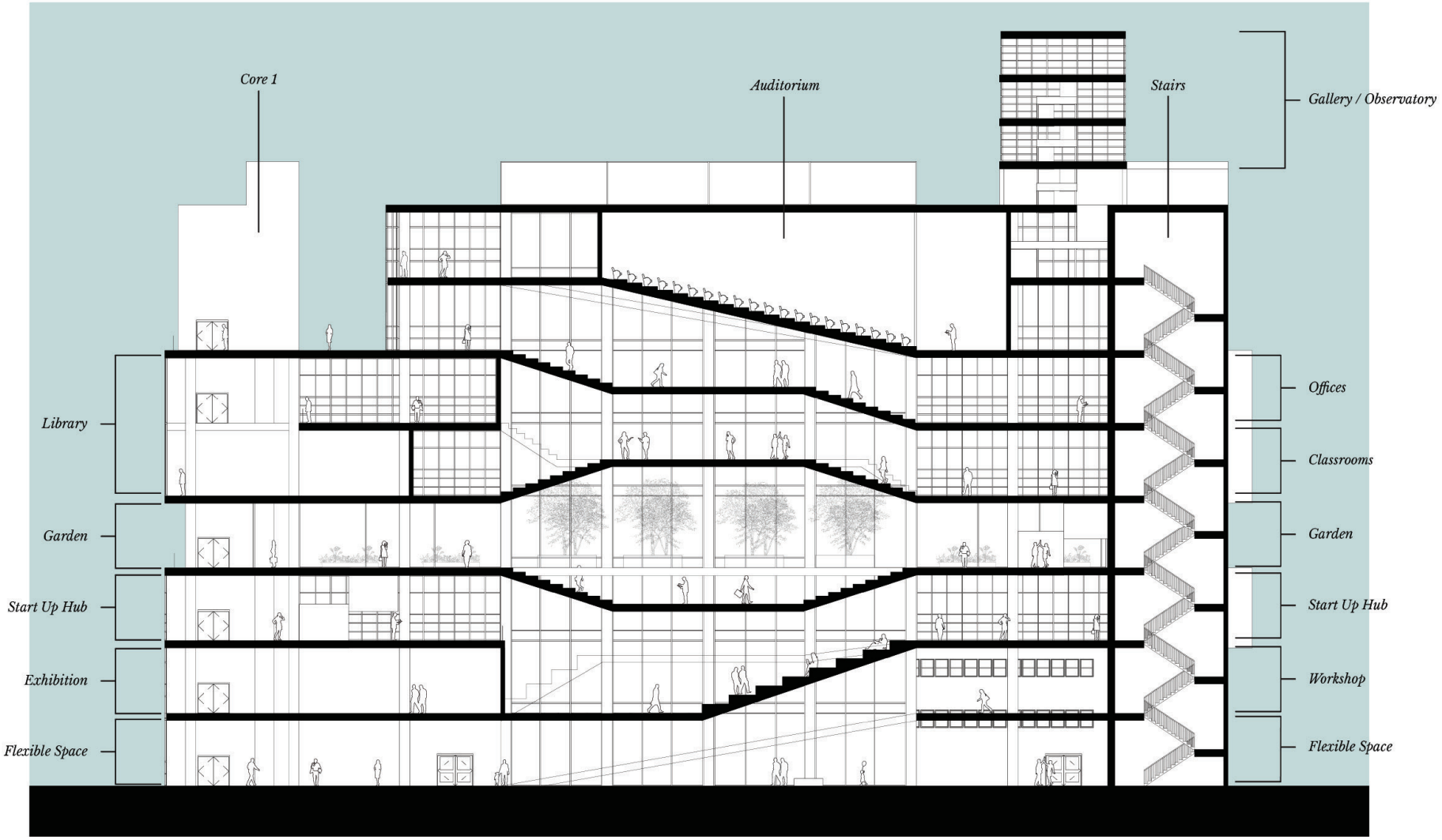


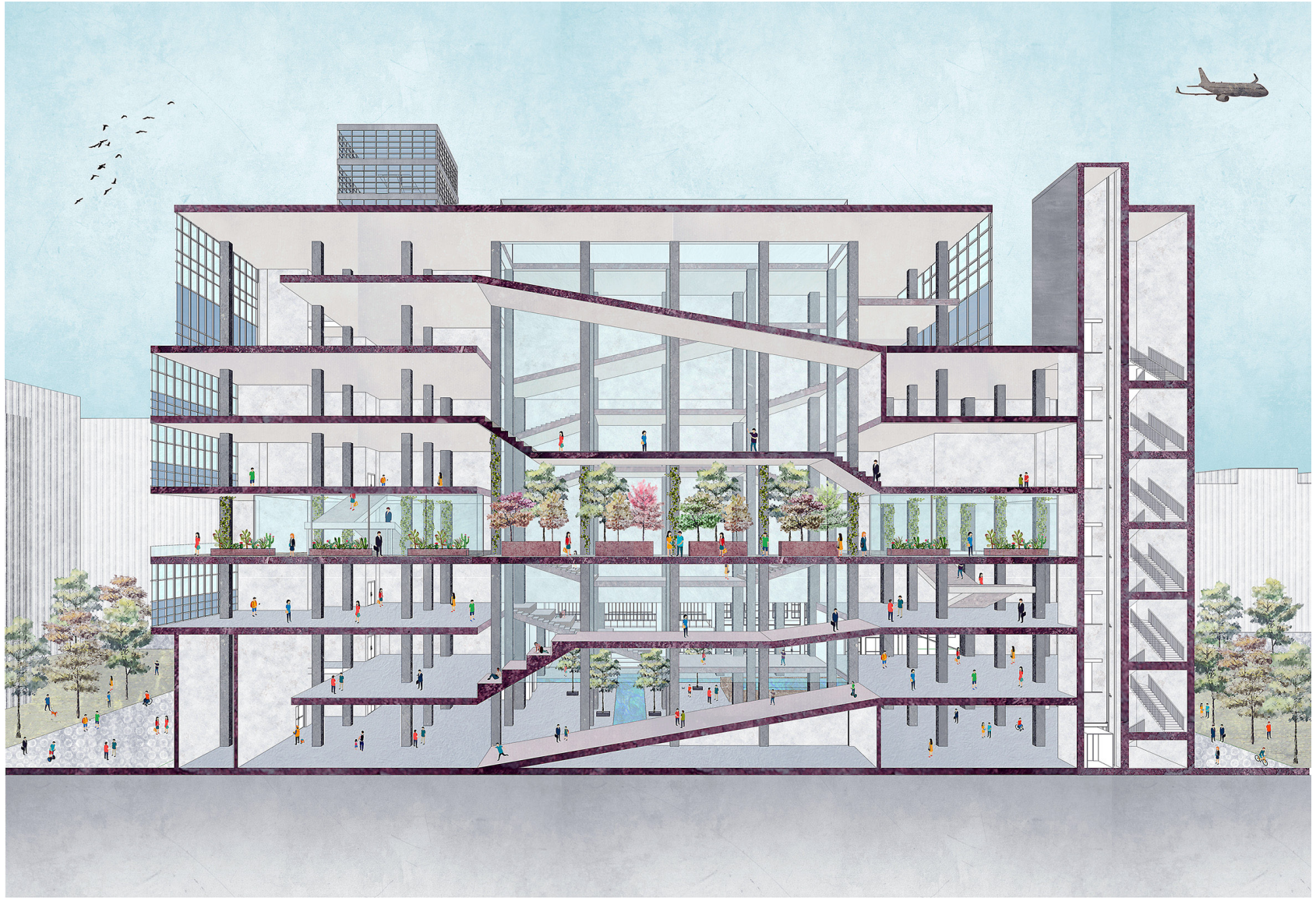
CENTRAL CORE

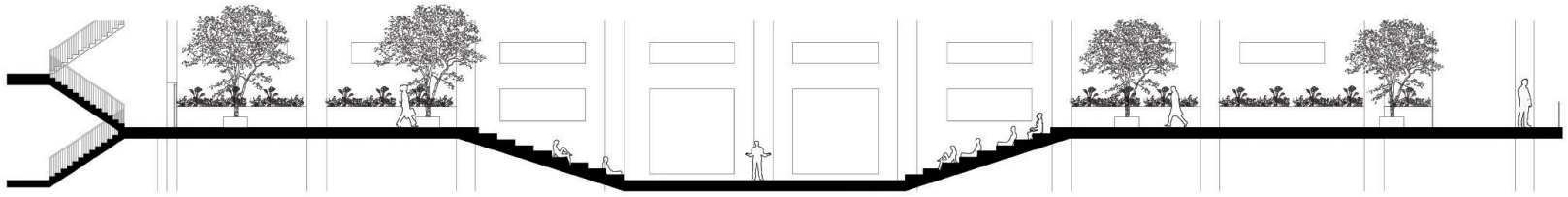


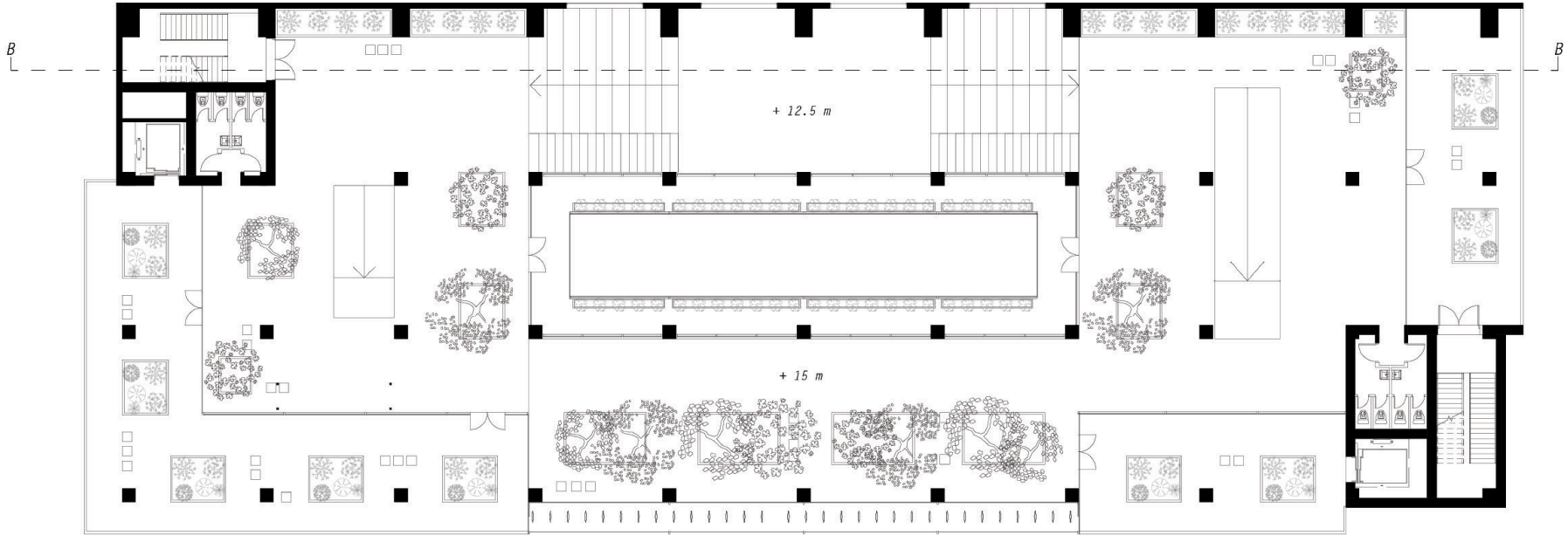
SIDE CORES - ORIGINAL FROM THE BUILDING

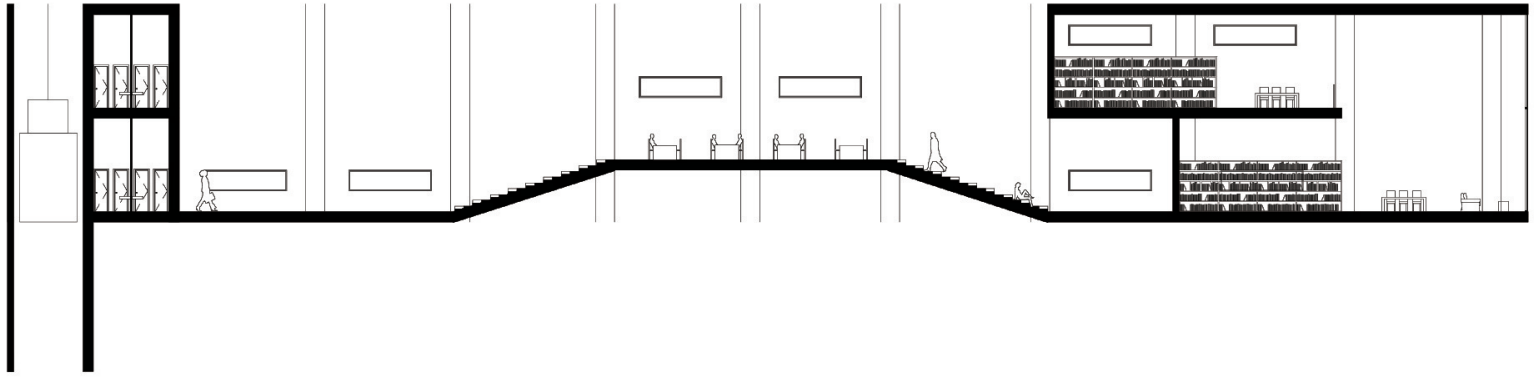

Gallery / Observatory
Bathrooms
Stairs
Gallery
Offices
Classrooms
Garden
Start Up Hub
Workshop
Flexible Space
Library
Garden
Start Up Hub
Exhibition
Flexible Space

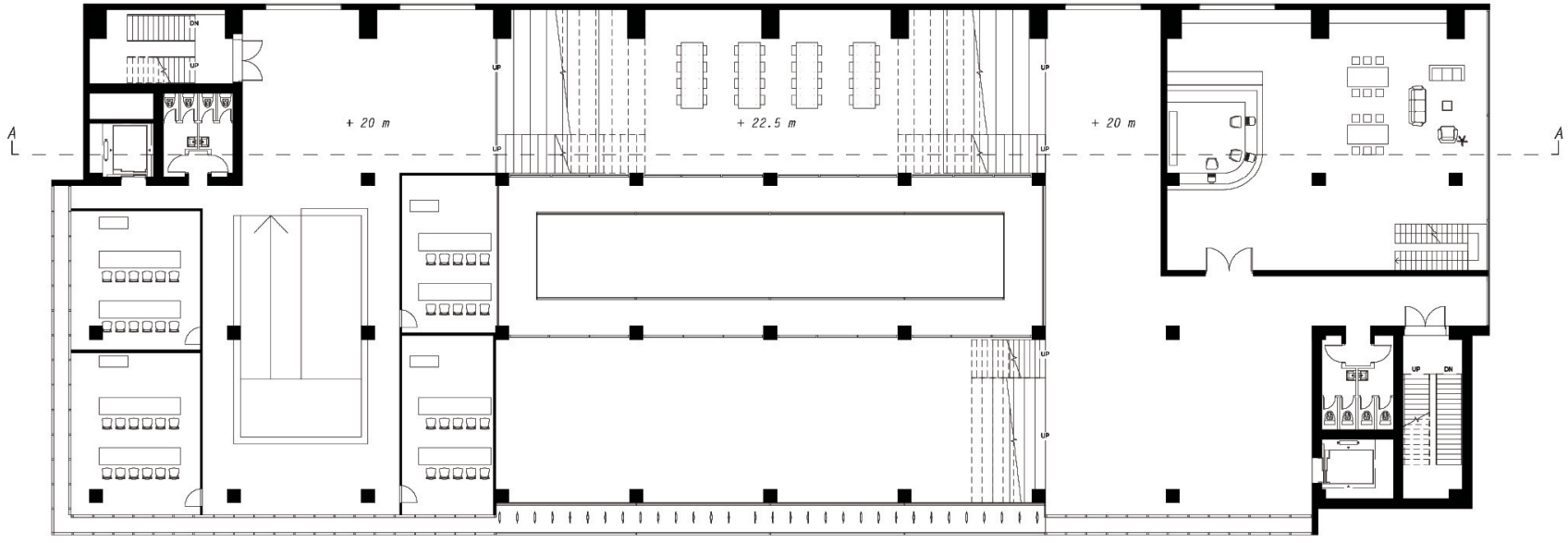

Core 1
Auditorium
Stairs
Gallery / Observatory
Library
Garden
Start Up Hub
Exhibition
Flexible Space
Offices
Classrooms
Garden
Start Up Hub
Workshop
Flexible Space



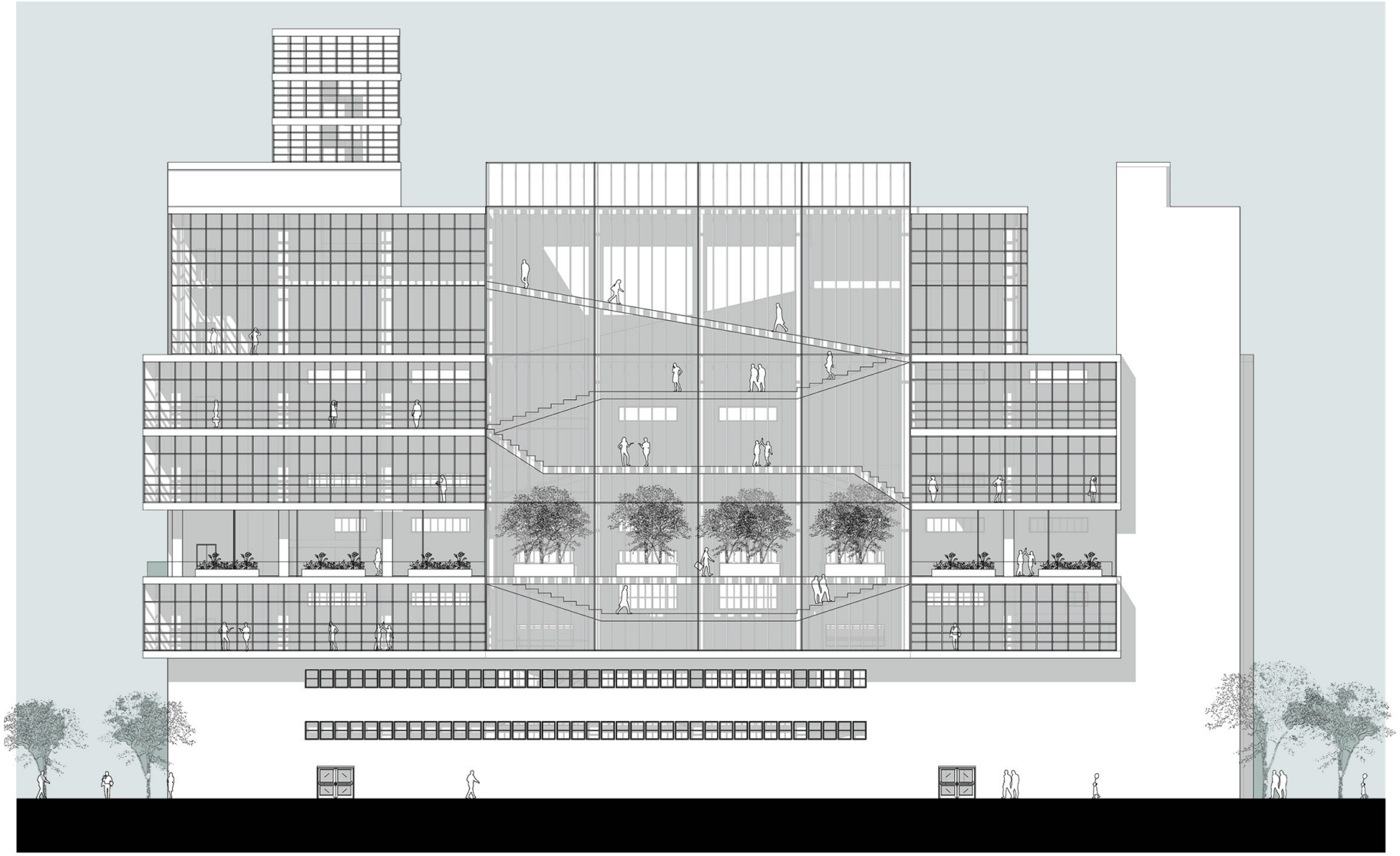


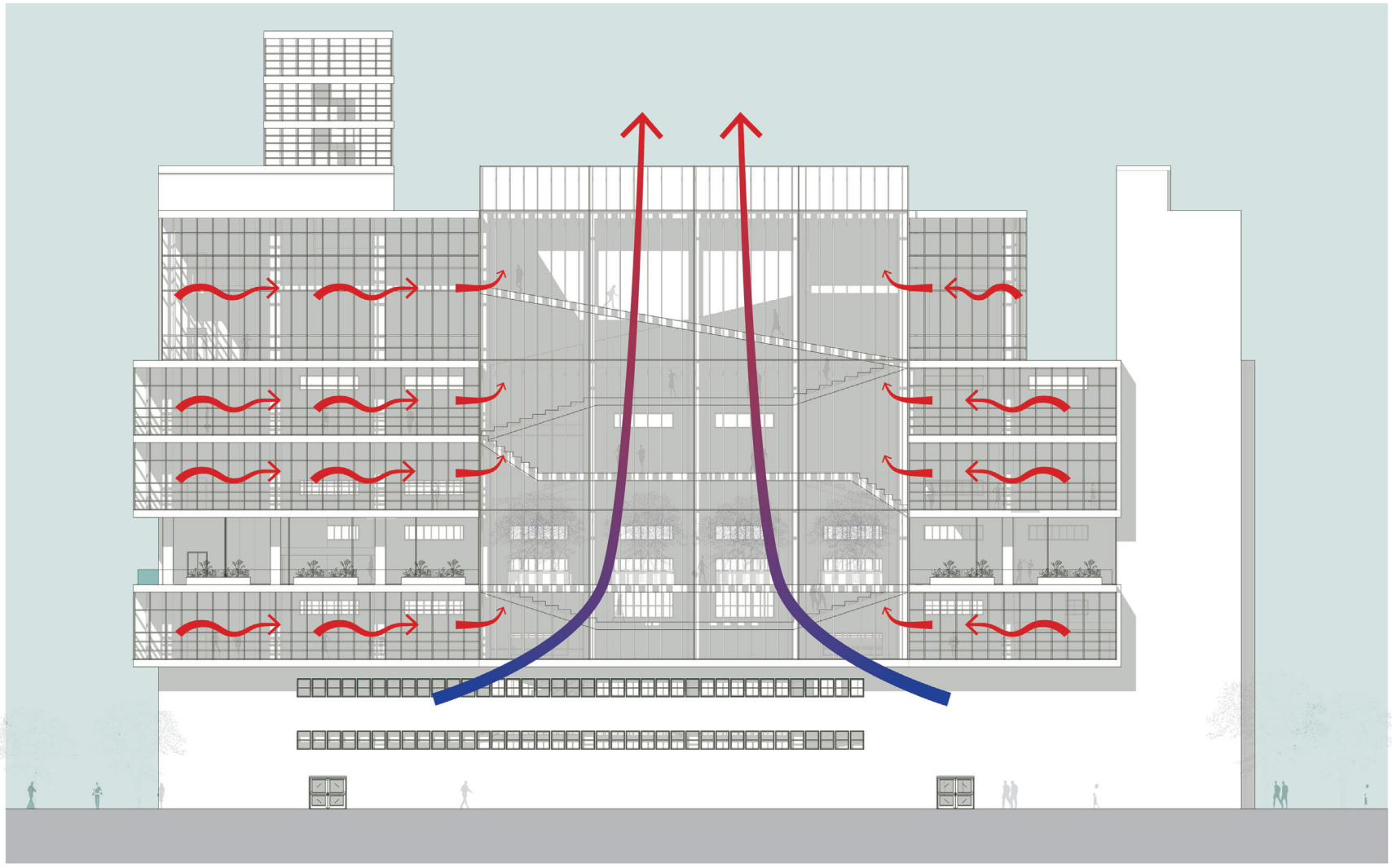

B
B
+ 12.5 m
+ 15 m

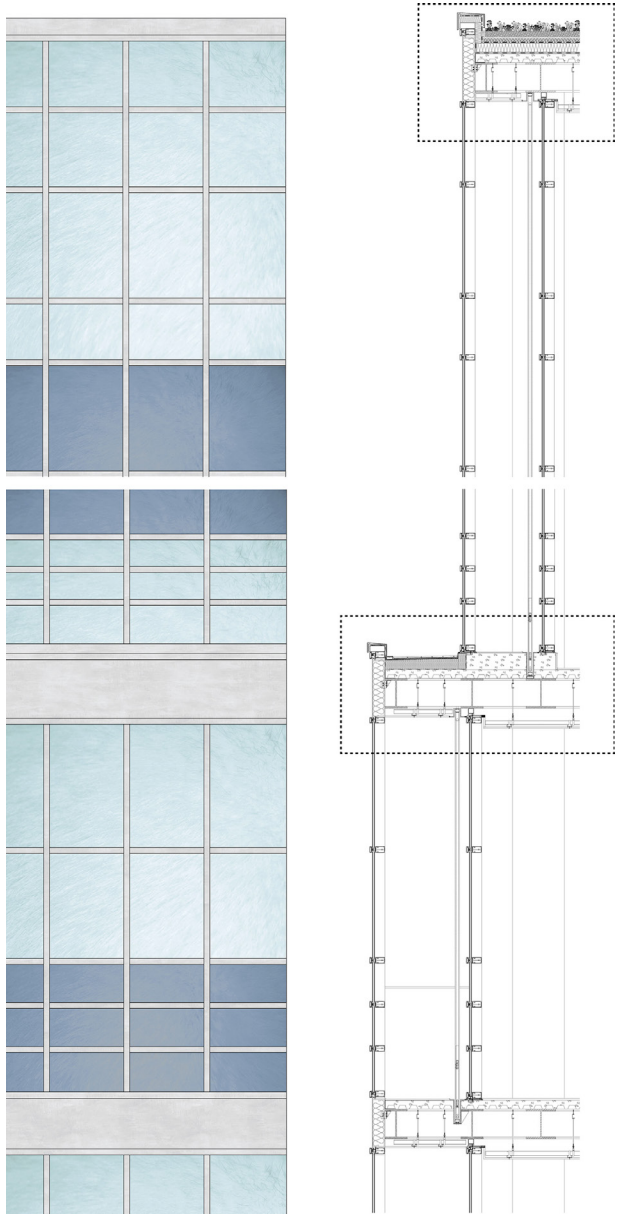



A
A
+ 20 m
+ 22.5 m
+ 20 m
UP
DN

THE SOLAR CHIMNEY







L1 - L1

Carefully selected vegetation

SDS extensive substrate

FL 150 filter layer

SediumDrain - 25 water reservoir & drainage layer

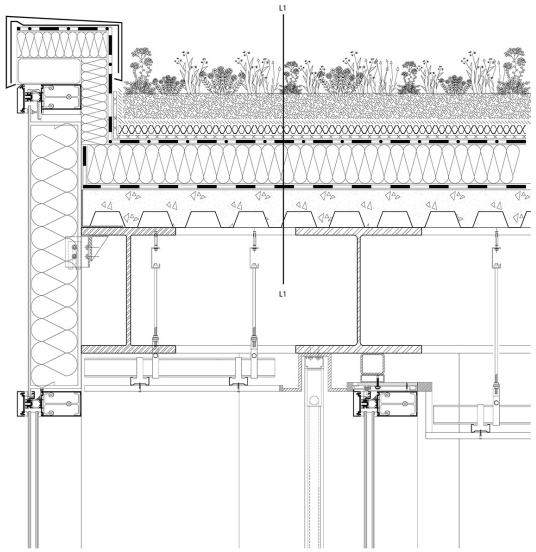
PL 300 protection layer

Root-resistant waterproofing

Insulation

Vapour control layer

Structural deck



L2 - L2

Concrete slabs

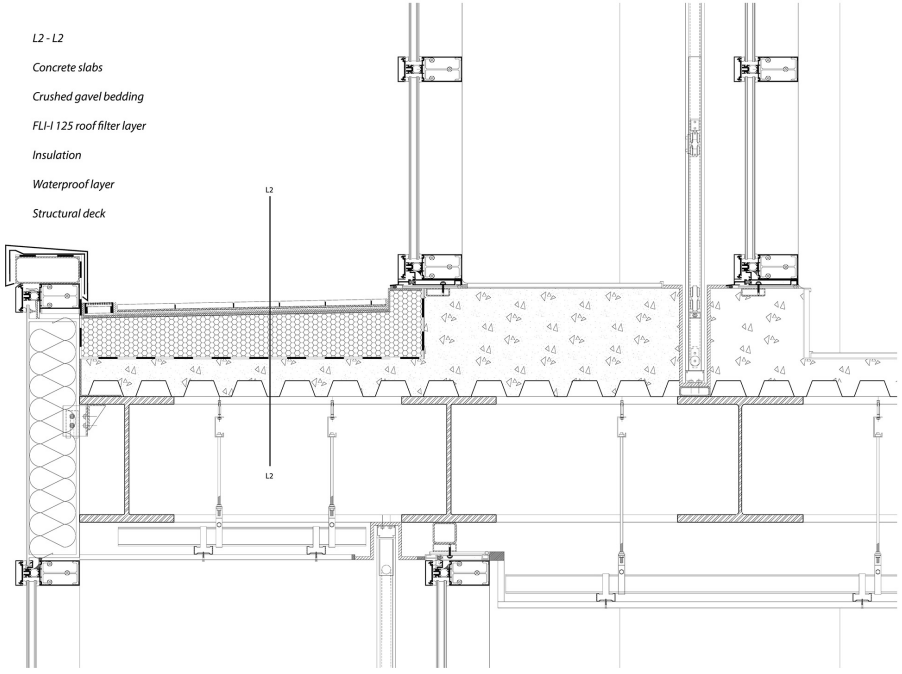
Crushed gavel bedding

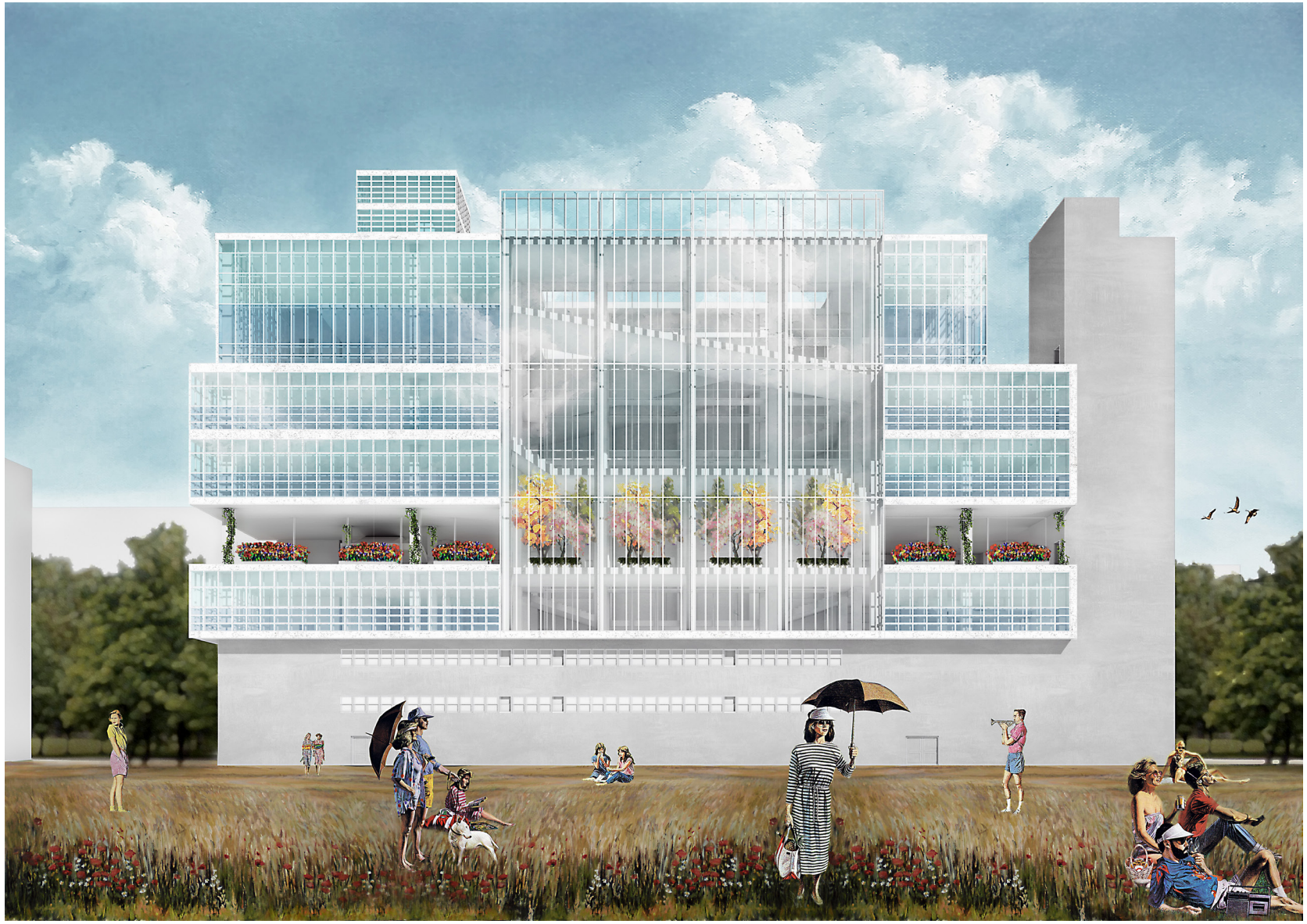
FLI-I 125 roof filter layer

Insulation

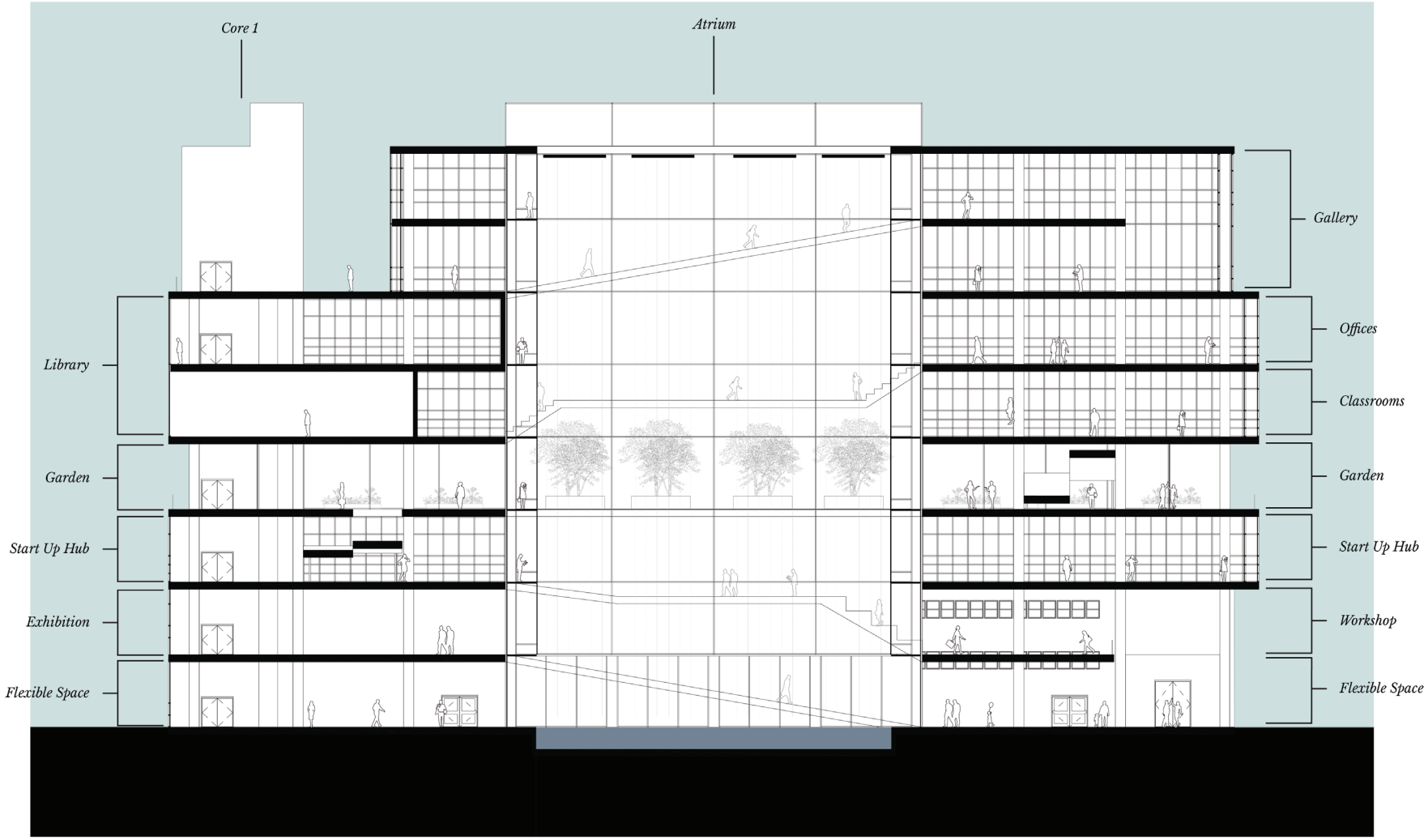
Waterproof layer

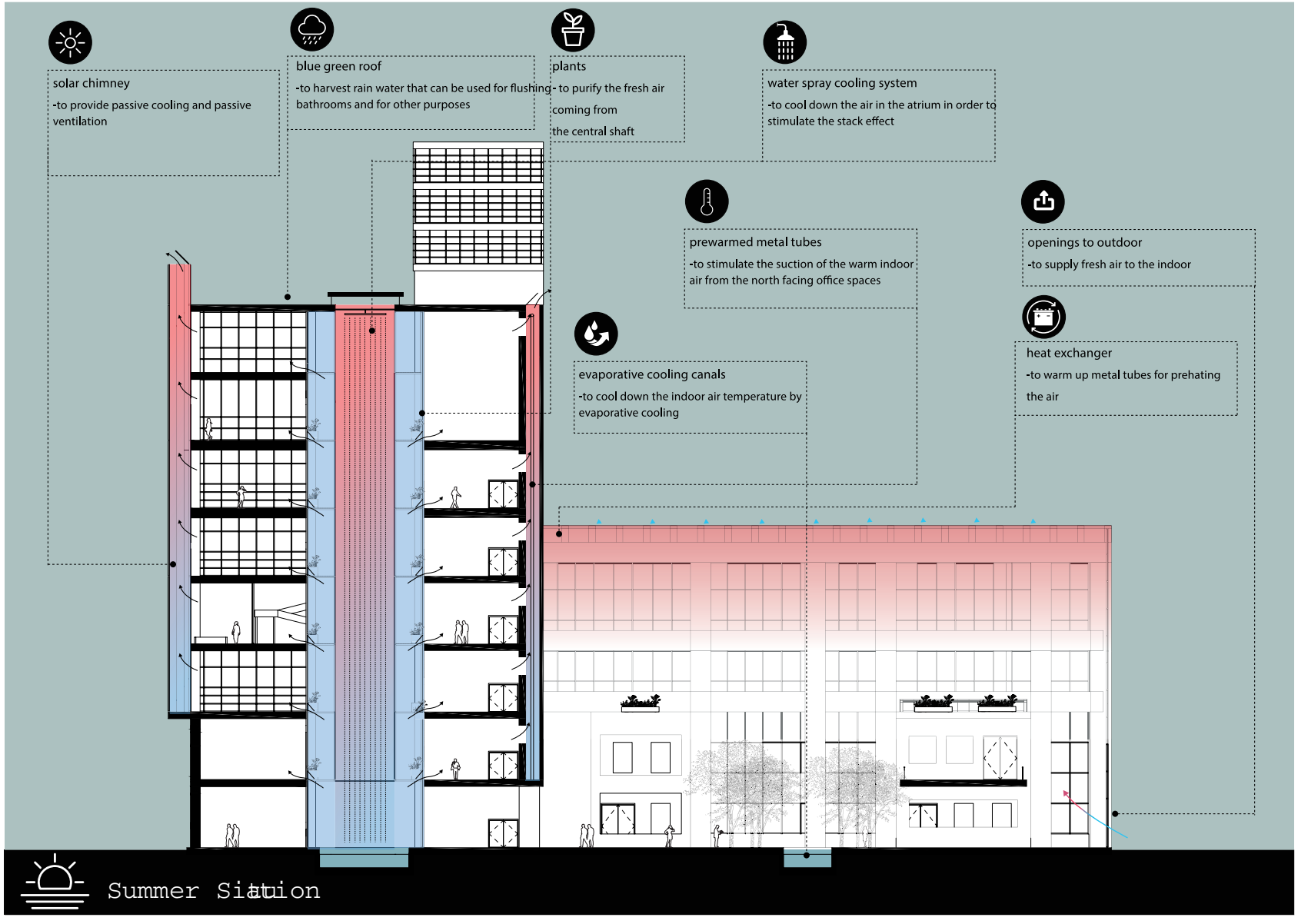
Structural deck

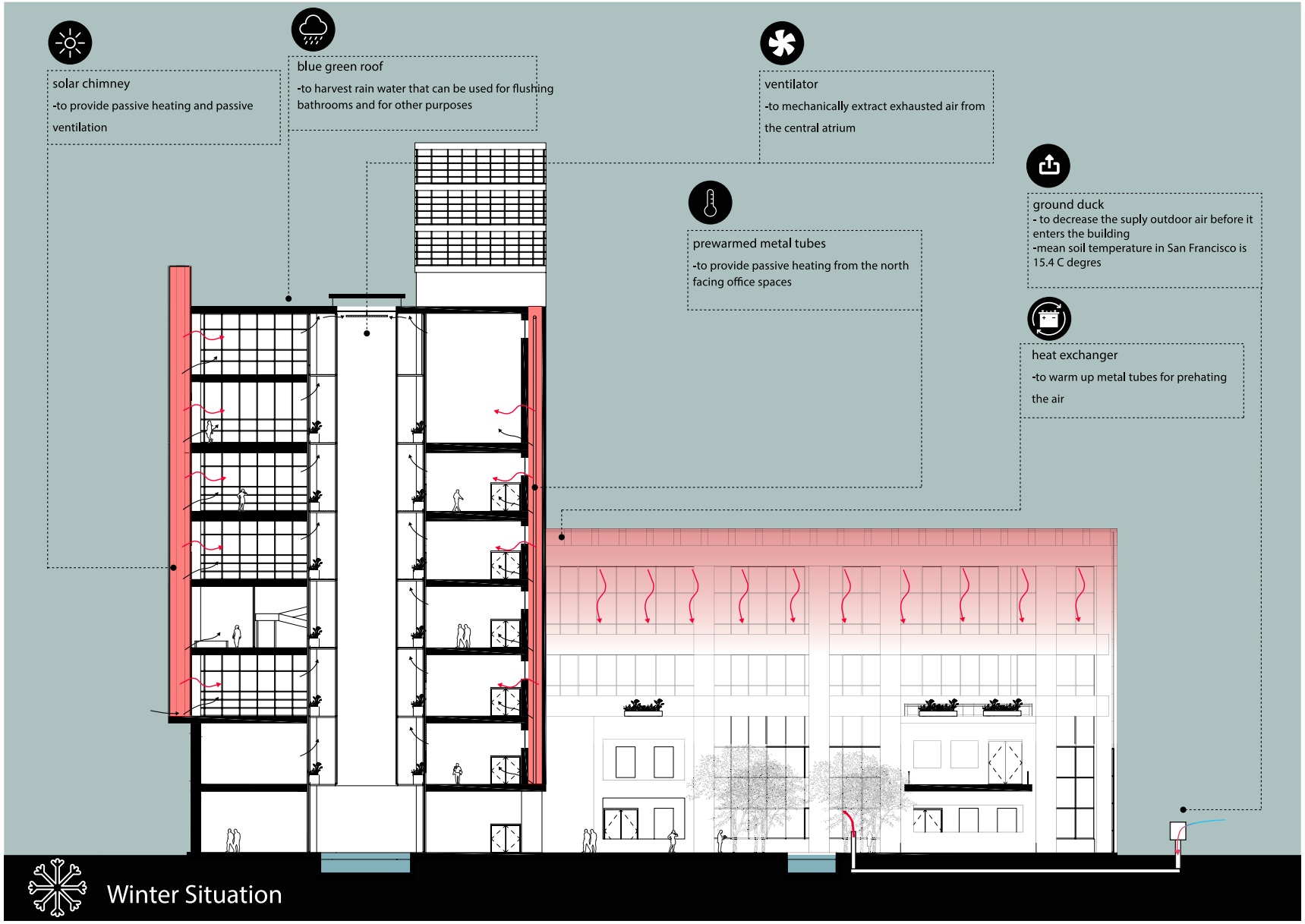




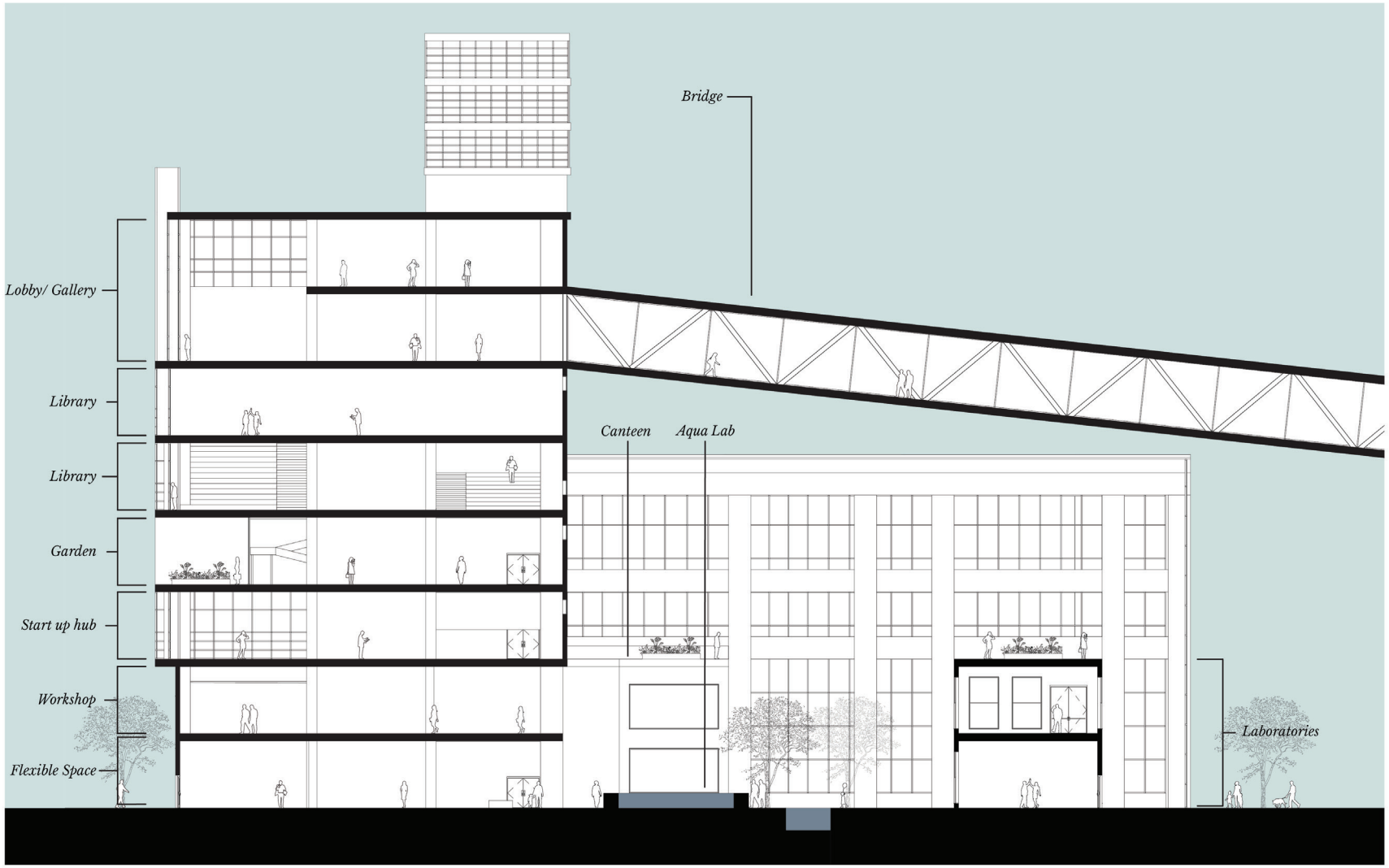
THE CENTRAL SHAFT

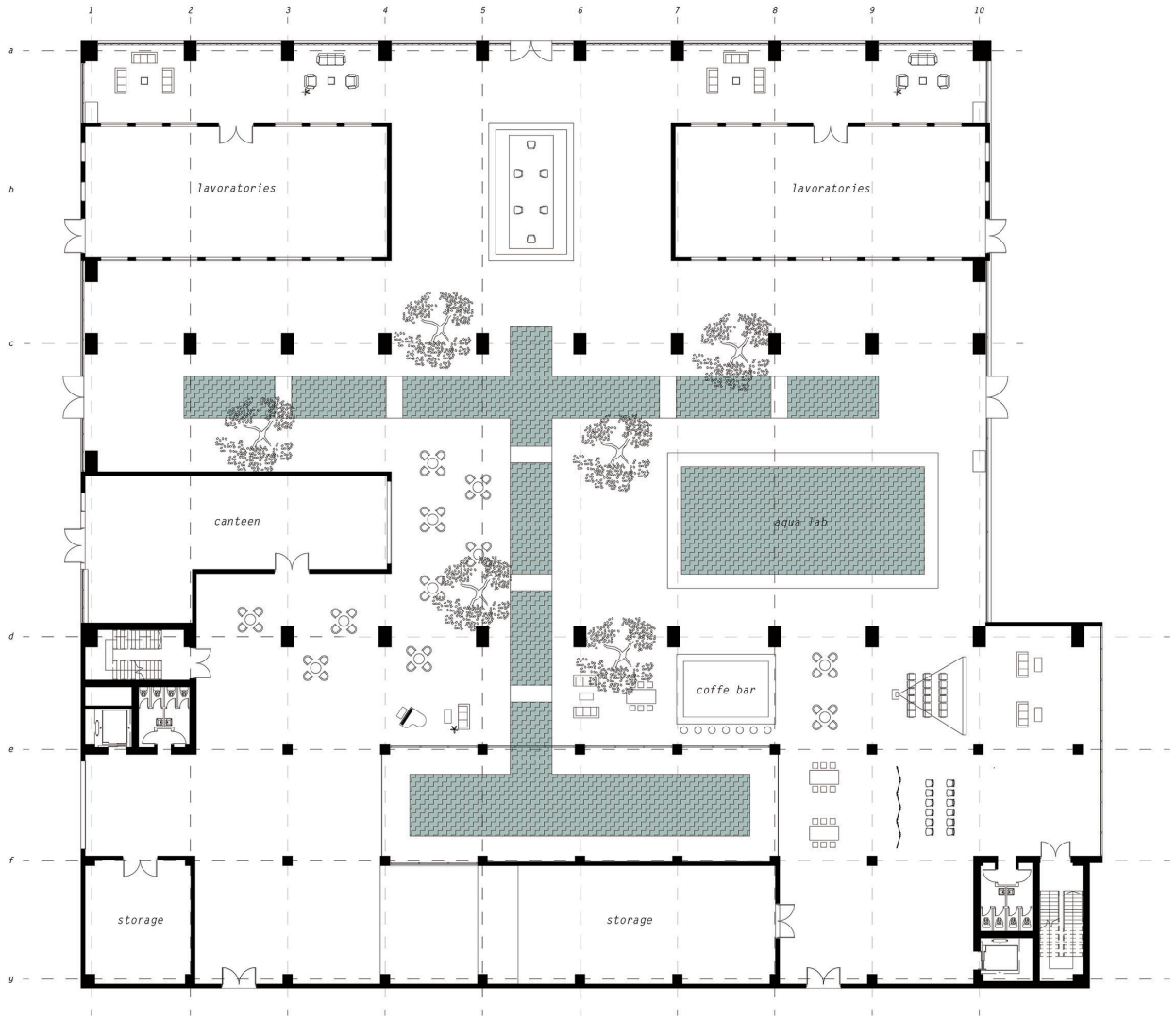

Core 1
Atrium
Gallery
Offices
Classrooms
Garden
Start Up Hub
Workshop
Flexible Space
Library
Garden
Start Up Hub
Exhibition
Flexible Space


solar chimney
-to provide passive cooling and passive ventilation
blue green roof
-to harvest rain water that can be used for flushing bathrooms and for other purposes
plants
- to purify the fresh air coming from the central shaft
water spray cooling system
-to cool down the air in the atrium in order to stimulate the stack effect
prewarmed metal tubes
-to stimulate the suction of the warm indoor air from the north facing office spaces
openings to outdoor
-to supply fresh air to the indoor
evaporative cooling canals
-to cool down the indoor air temperature by evaporative cooling
heat exchanger
-to warm up metal tubes for prehating the air
Summer Situation


solar chimney
-to provide passive heating and passive ventilation
blue green roof
-to harvest rain water that can be used for flushing bathrooms and for other purposes
ventilator
-to mechanically extract exhausted air from the central atrium
prewarmed metal tubes
-to provide passive heating from the north facing office spaces
ground duck
- to decrease the suply outdoor air before it enters the building
-mean soil temperature in San Francisco is 15.4 C degres
heat exchanger
-to warm up metal tubes for prehating the air
Winter Situation

CONNECTION TO THE GROUND
-Main Stage of Interaction


Bridge
Lobby/ Gallery
Library
Library
Garden
Start up hub
Workshop
Flexible Space
Canteen
Aqua Lab
Laboratories


1
2
3
4
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6
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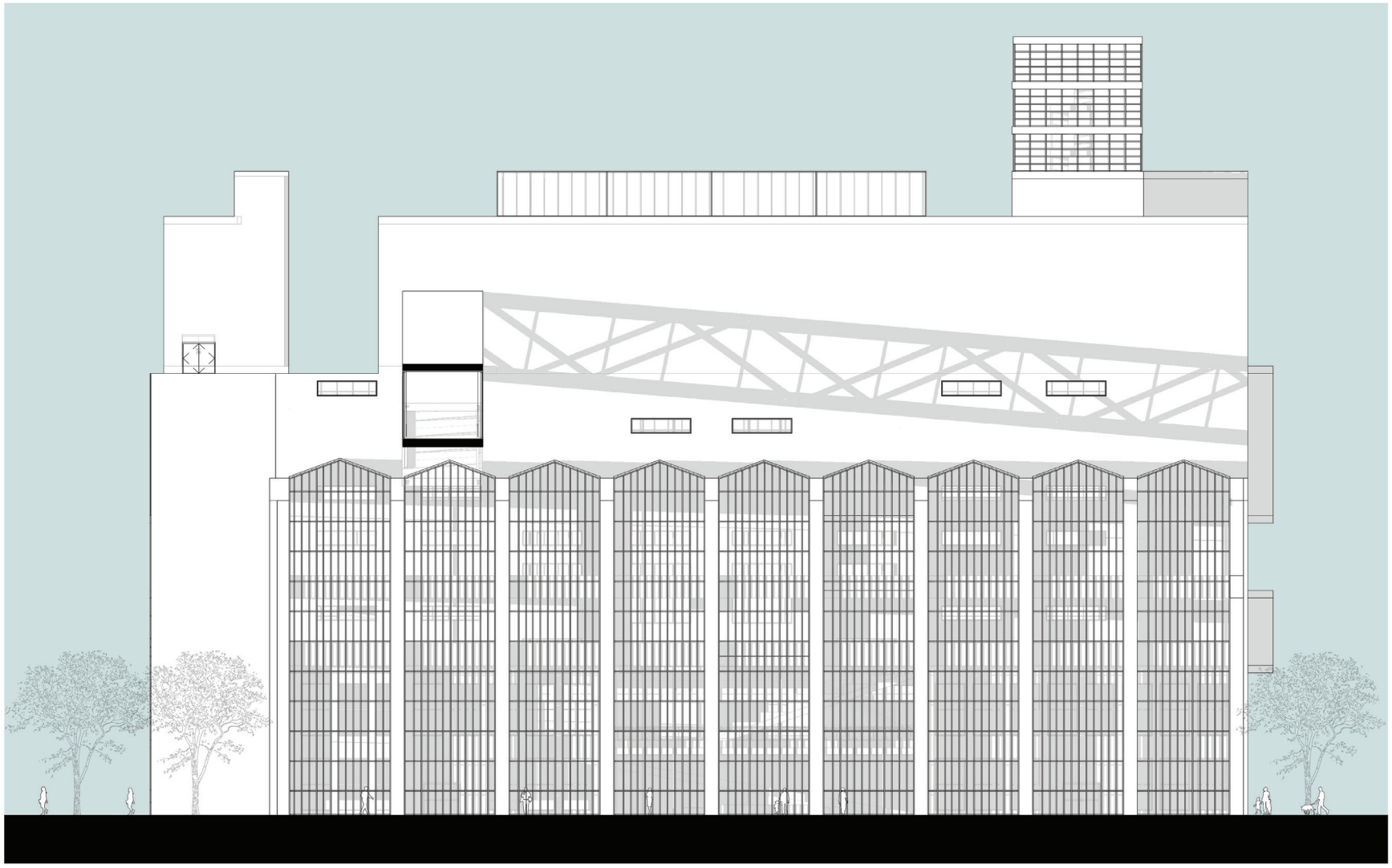
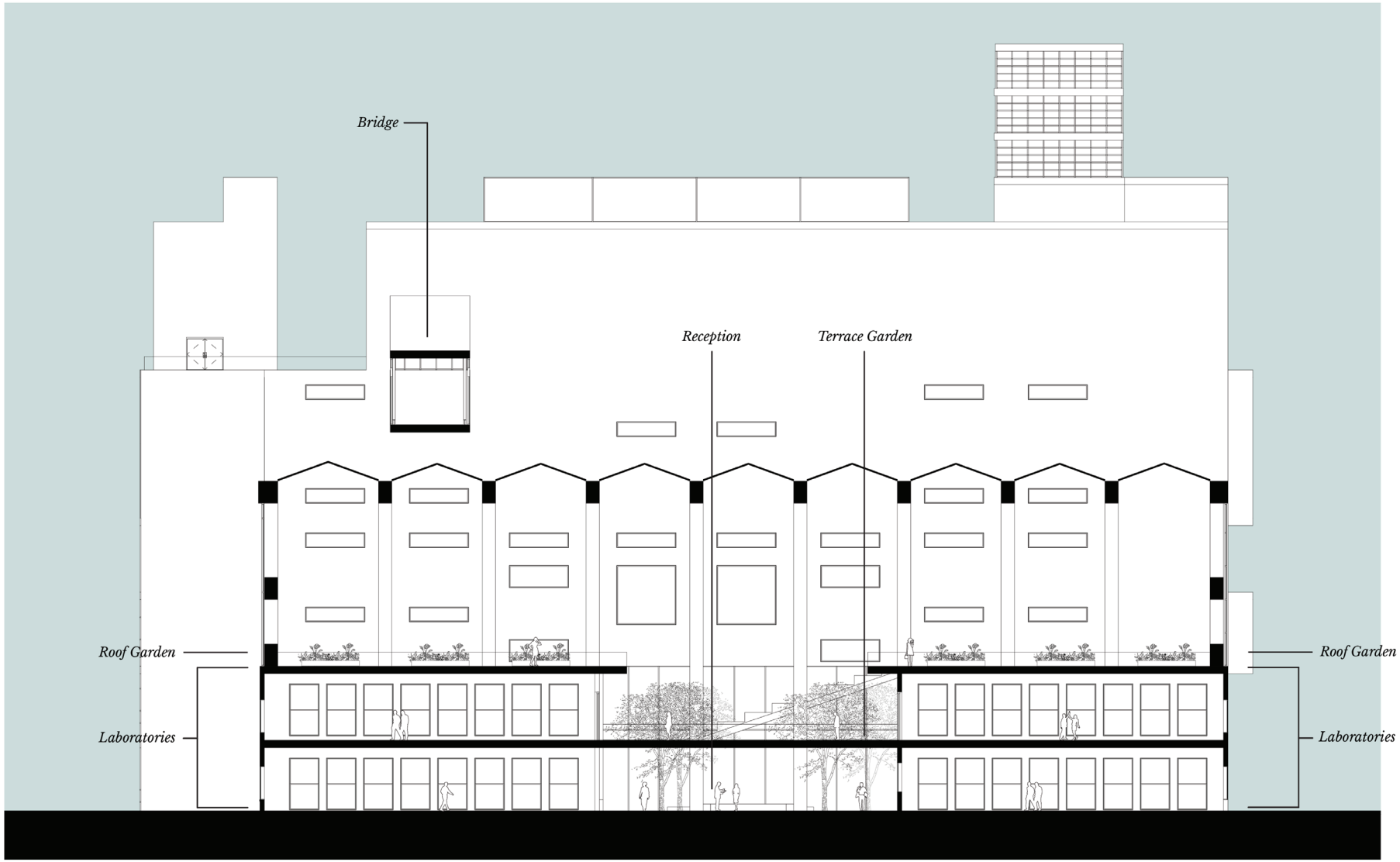
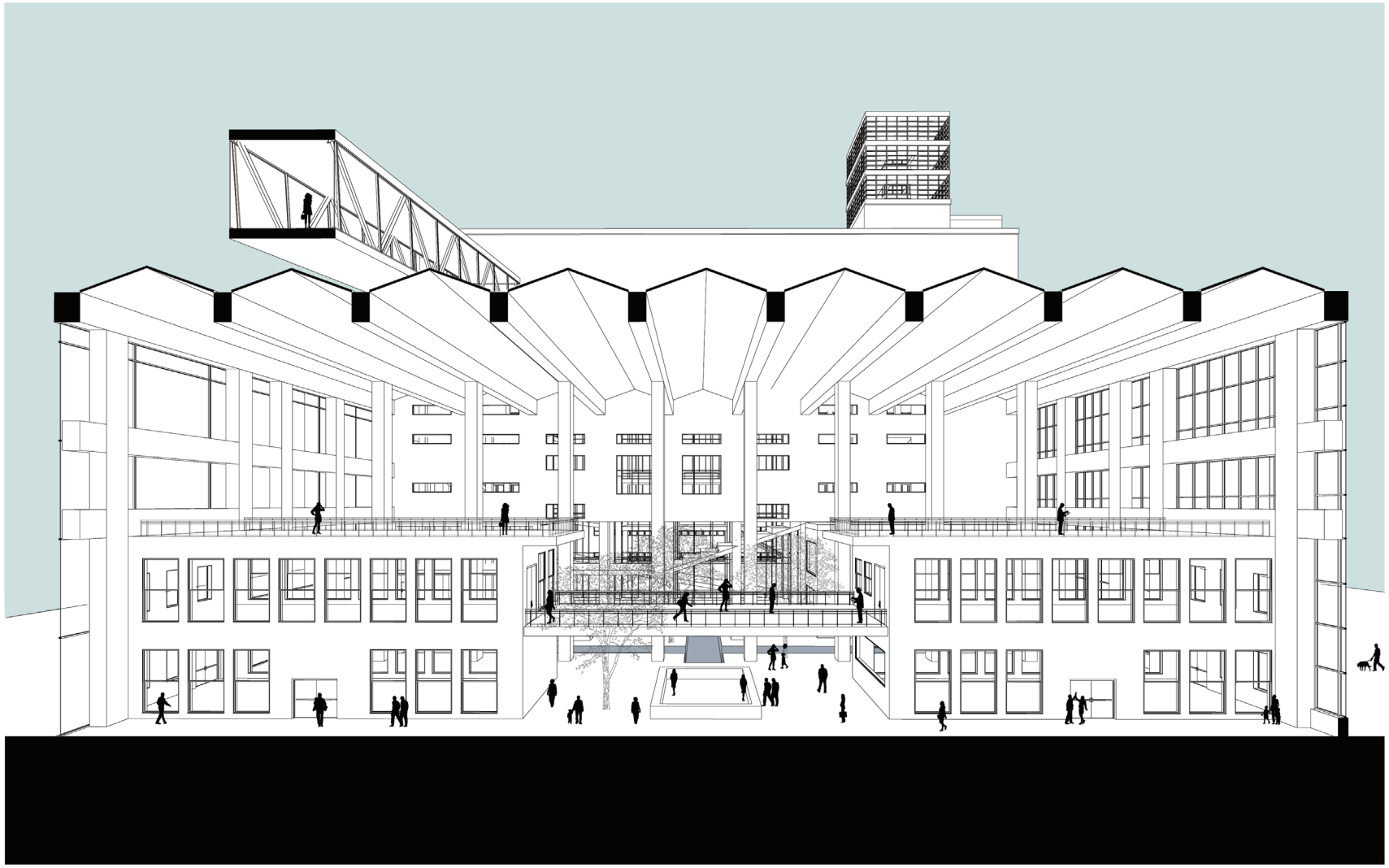
8
9
10
a
b
c
d
e
f
g
lavoratories
lavoratories
canteen
aqua lab
coffe bar
storage
storage

LABORATORIES




Bridge
Reception
Terrace Garden
Roof Garden
Laboratories
Roof Garden
Laboratories

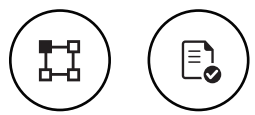


Strategies incorporated with Design

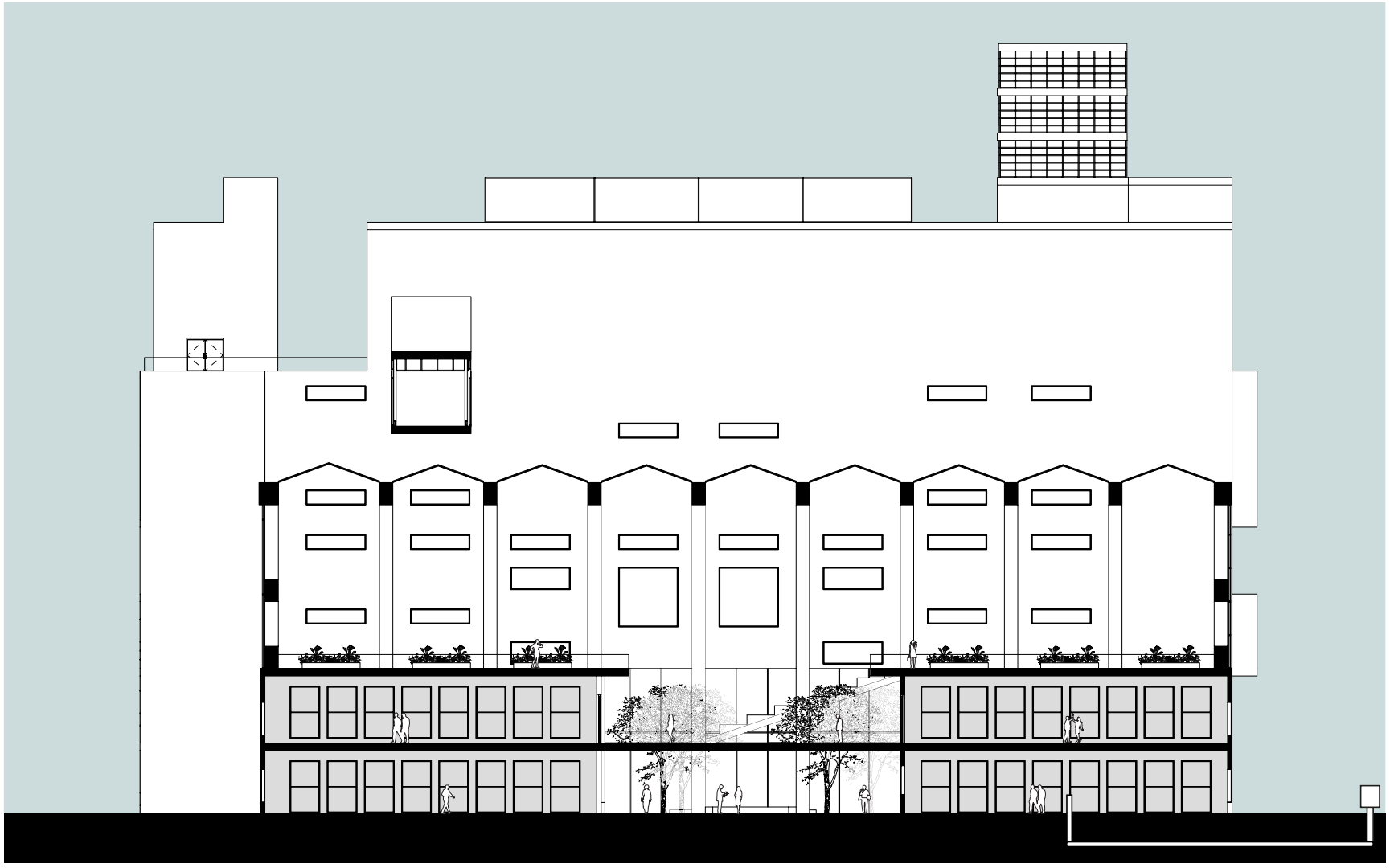
- Utilization of the ground temperature to cool down the internal air temperature

- Employment of PV cells to produce energy

- Allocation of different climatic zones according to their characteristic requirements



- Natural ventilation by utilizing stack effect

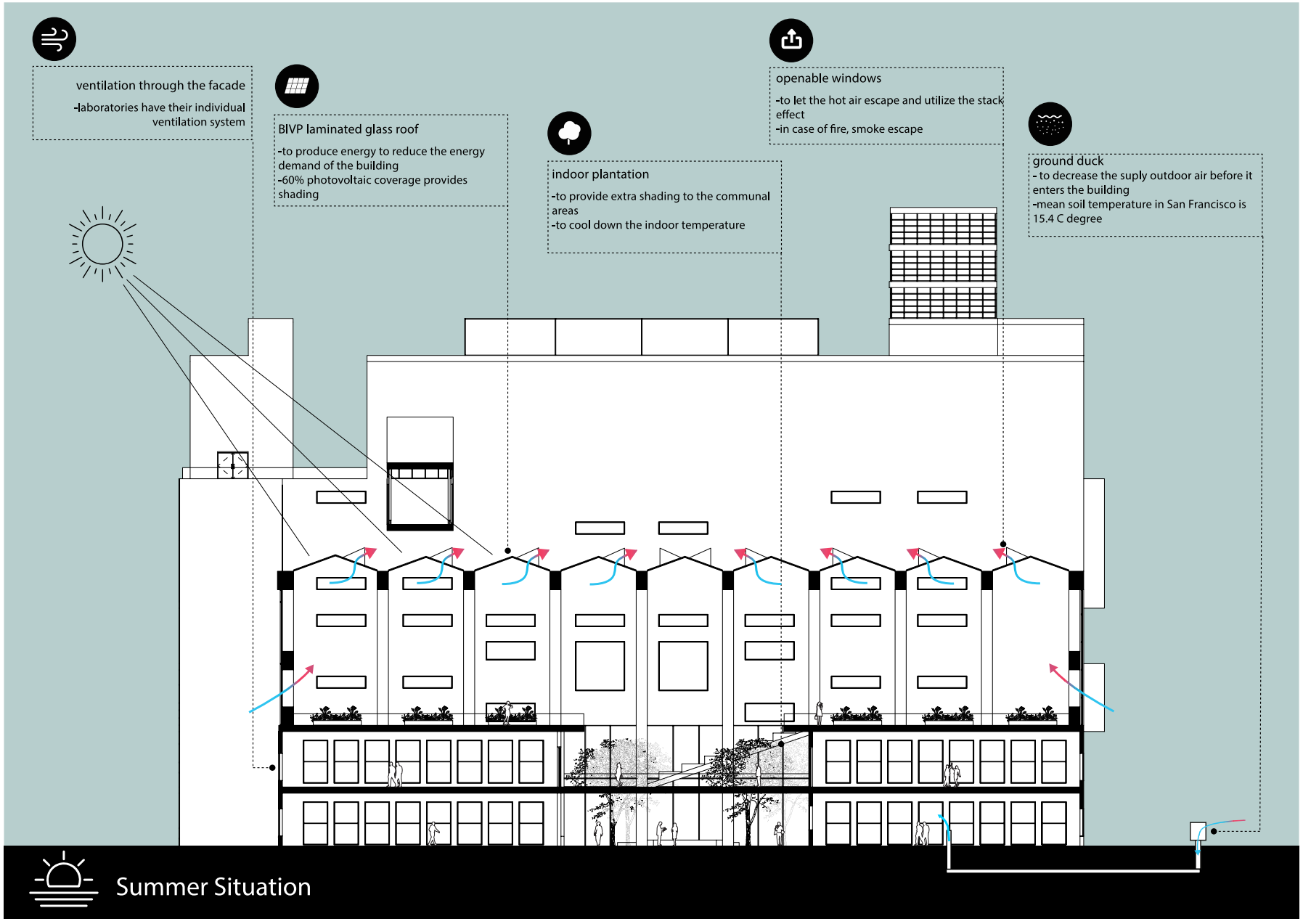


CLIMATIC ZONE 1: LABORATORIES

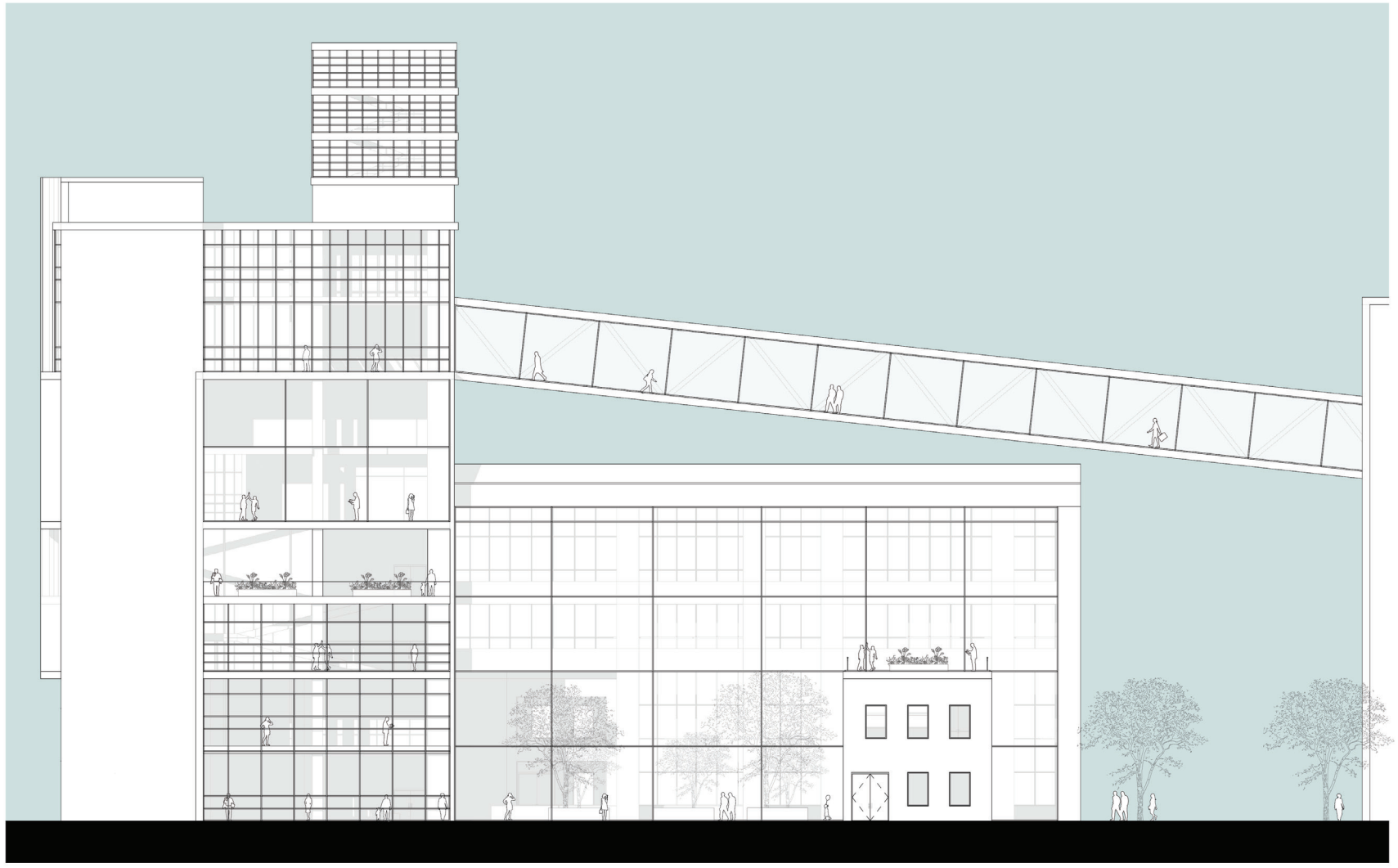
Ventilation in these areas are controlled by detectors
and mechanically regulated due to strict requirements

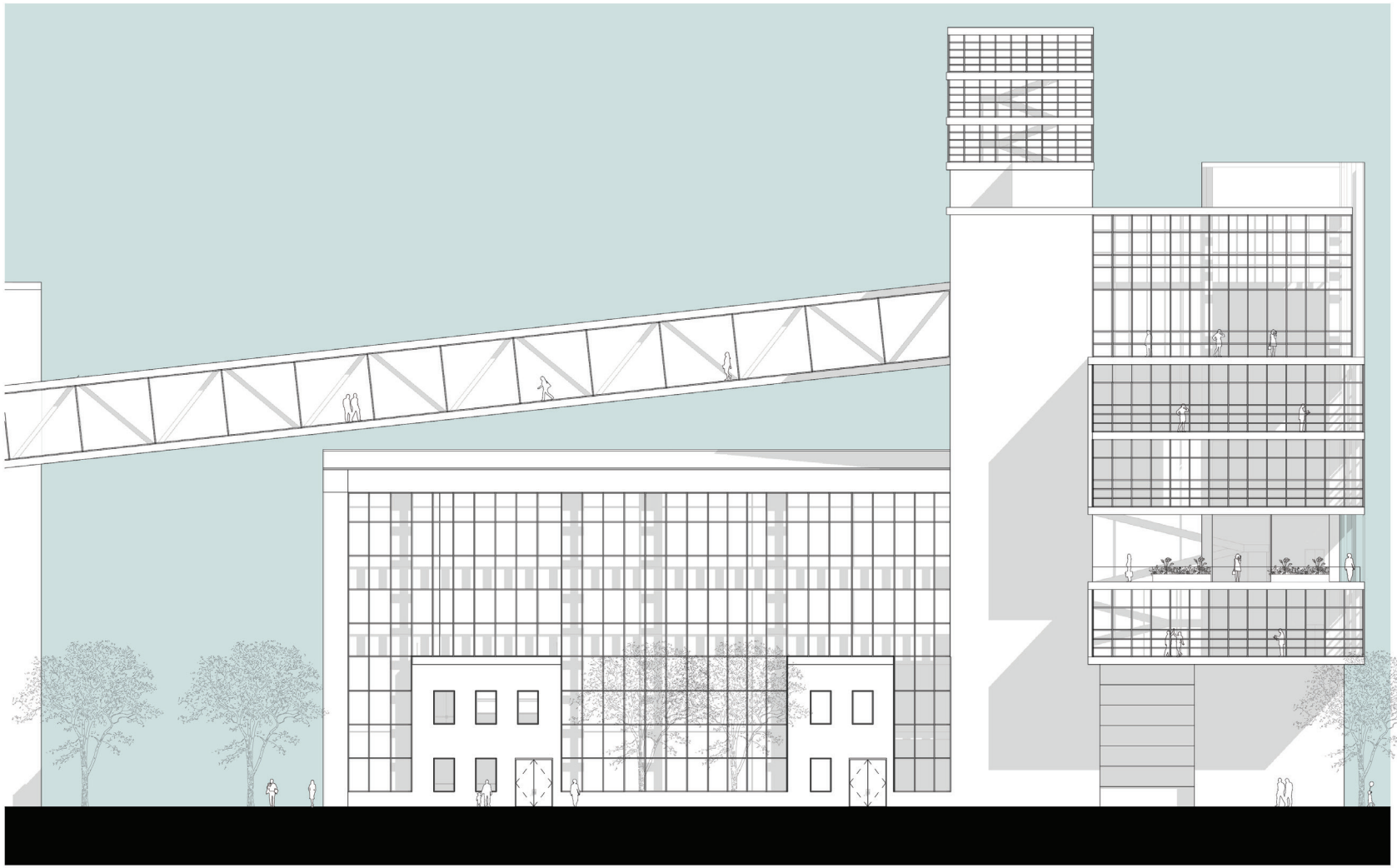
CLIMATIC ZONE 2: COMMUNAL HALL

Ventilation is provided by series of passive systems in this area and active systems are only used during the unexpected weather conditions


ventilation through the facade
-laboratories have their individual ventilation system
BIVP laminated glass roof
-to produce energy to reduce the energy demand of the building
-60% photovoltaic coverage provides shading
indoor plantation
-to provide extra shading to the communal areas
-to cool down the indoor temperature
openable windows
-to let the hot air escape and utilize the stack effect
-in case of fire, smoke escape
ground duck
- to decrease the suply outdoor air before it enters the building
-mean soil temperature in San Francisco is 15.4 C degree
Summer Situation

CONNECTION PRACTICE





CONNECTION TO URBAN SETTINGS