GREEN INTERVENTION

RENOVATION OF BEURSGEBOUW

YU CHEN

CONTENT

RESEARCH

Urban scale research
Site research
Program research

DESIGN

Culture value assessment
Context design
Space design
Facade design
Climate design

NOWADAYS



Almere structure plan 1977

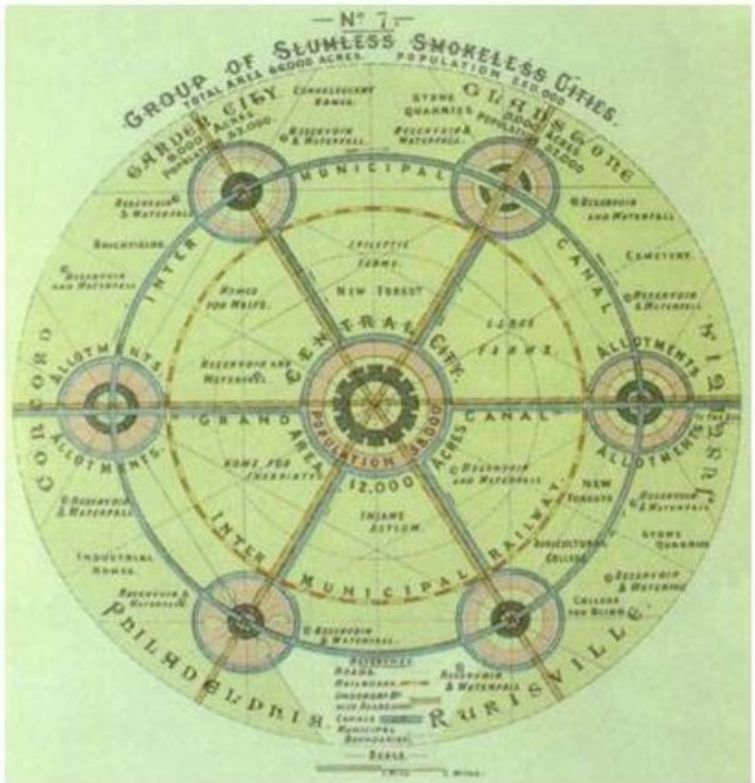


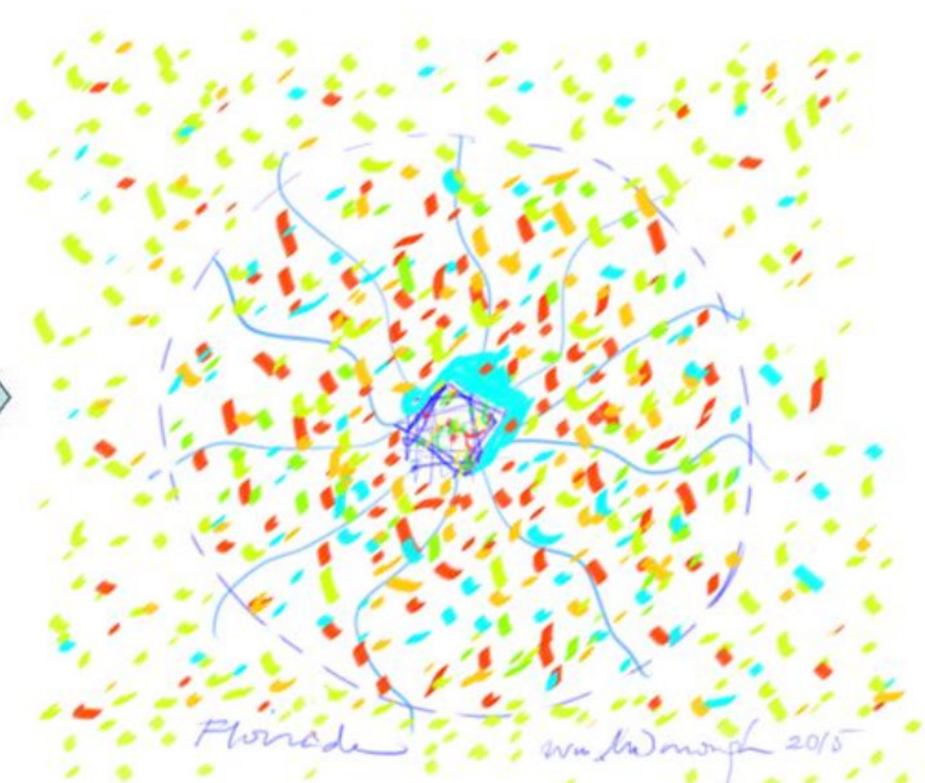
Almere structure plan 2010

FUTURE DEVELOPMENT

GREEN CITY

"The city is part of nature" --- Almere Principle





Garden city

Green city

FUTURE DEVELOPMENT



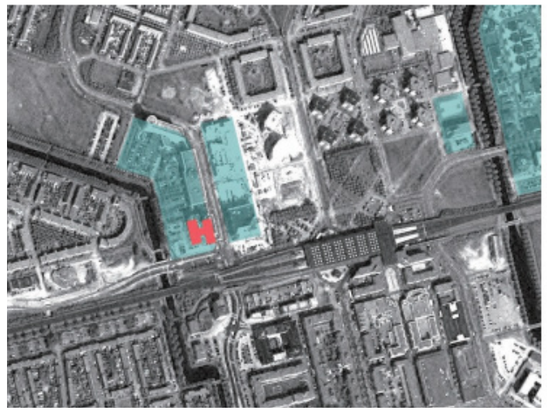
RESEARCH QUESTION

How to integrate the heritage with nature and green technology?

How to use nature and green technology to revitalize the building?

MARGINALIZATION





2000



Now

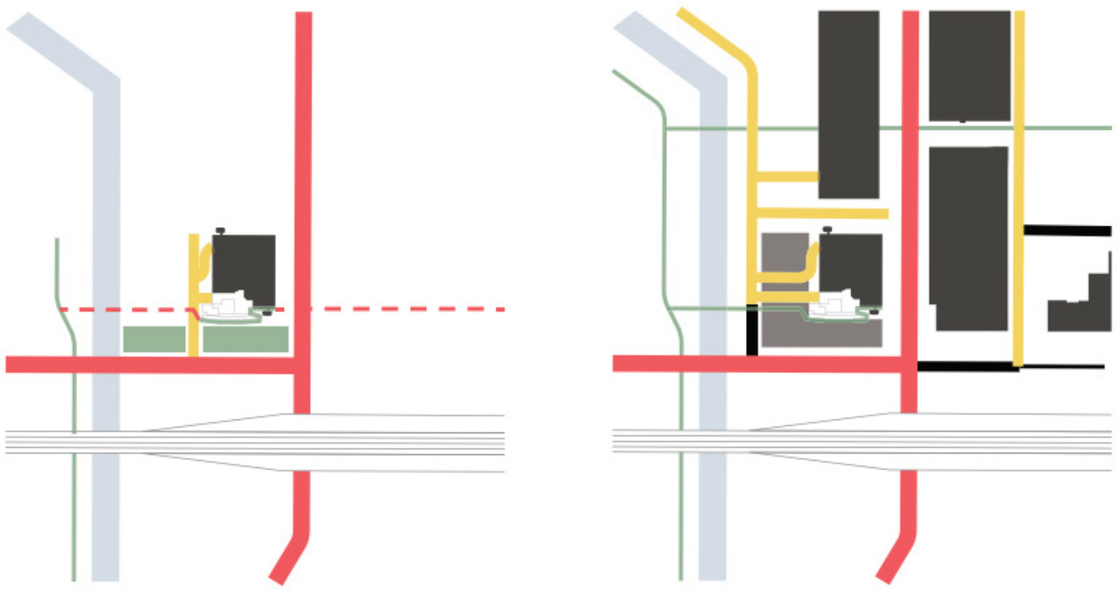


The pioneer of office building

|

The minor and substitutable

ISOLATION



Original design in 1979

Present

Ideal traffic and social hub

|

An isolated and inactive corner

RESEARCH QUESTION

How to use nature and green technology regain the identity of the building?

and to connect the building with the surrouding and even the city?



URBAN FARM

GOAL

CONNECT TO CITY

Residents

Professional and students

Food business

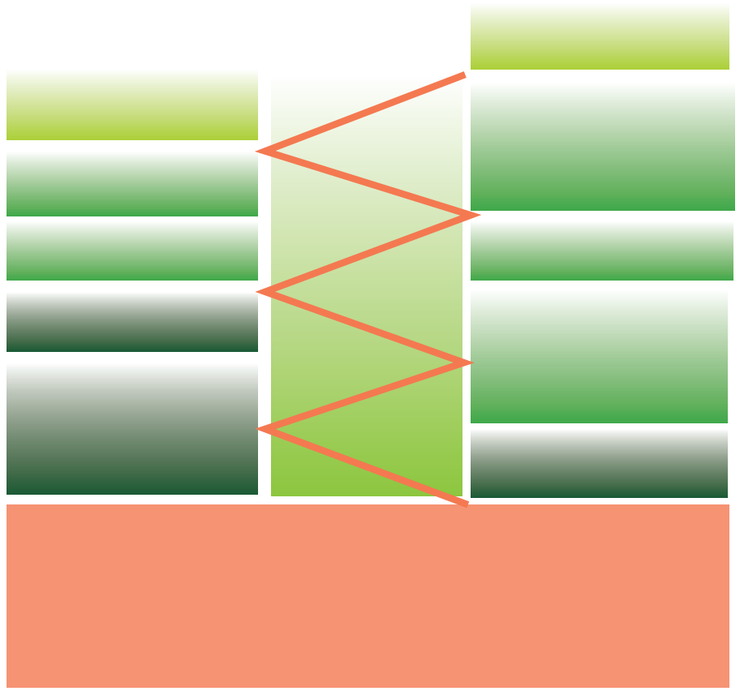
BENIFIT TO CITY

Healthy and fresh food

Sustainable and healthy life awareness

Research base for green city program

PROGRAM



URBAN FARMING RESEARCH CENTER

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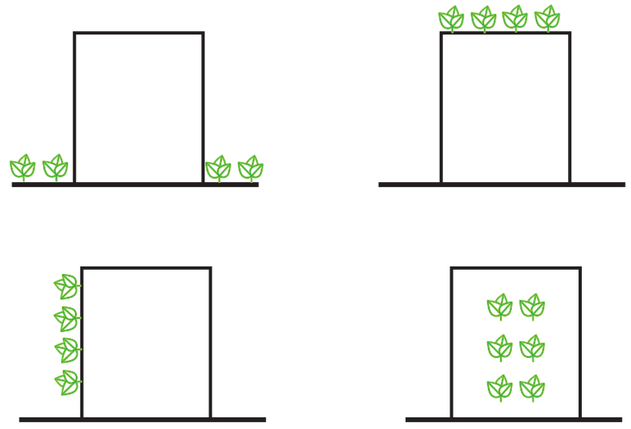
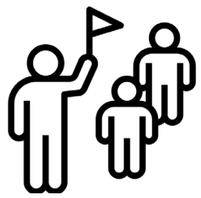
URBAN FARMING INTERPRETATION CENTER

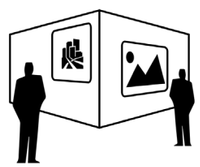
URBAN FARMING RESERCH



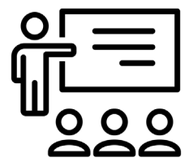
URBAN FARMING JOURNEY



Farm guide tour



Exhibition



Class and training



Healthy kitchen



Community food market

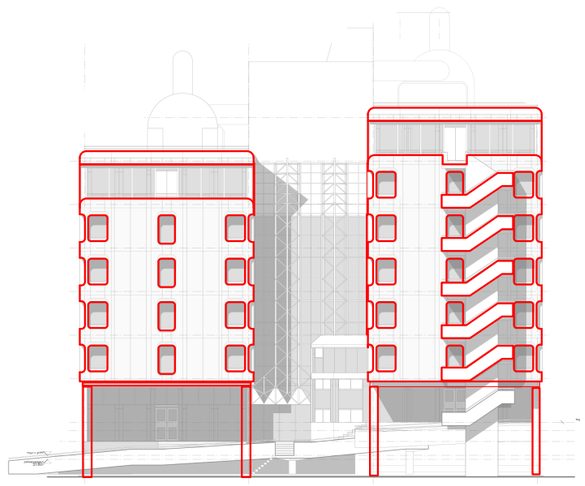


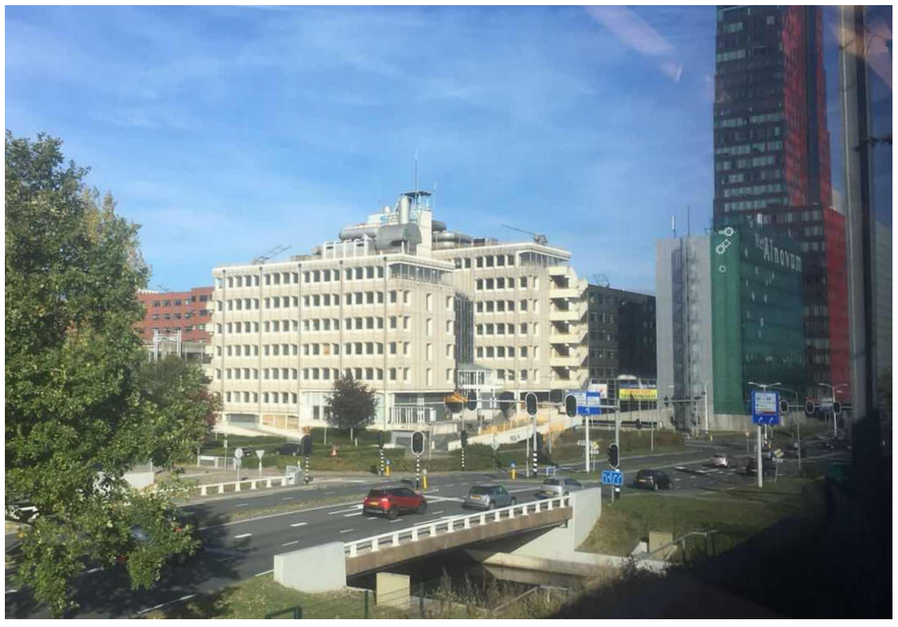
Farming activity

DESIGN

CULTURE VALUE ASSESSMENT

CONCRETE SKIN







Aesthetic value

Historical value

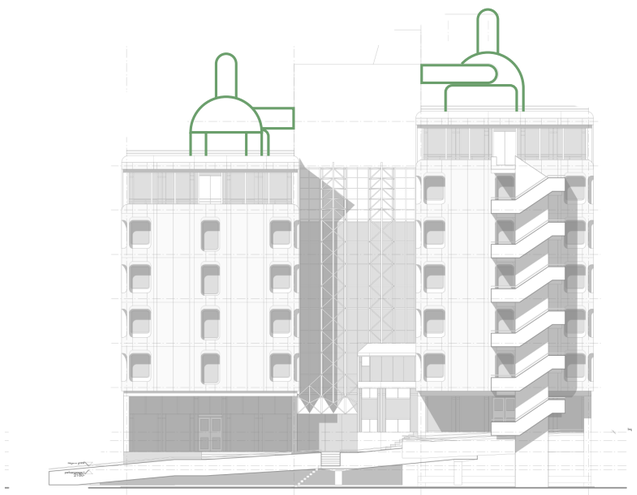
Use value

|

City image - balance between old and new

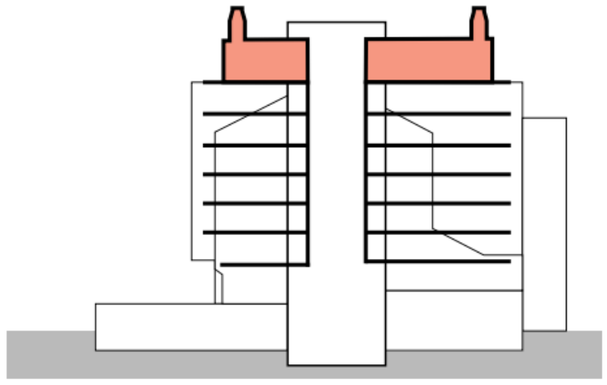
CULTURE VALUE ANALYSIS

ROOF



Recover:

400 kwh/m^2/year



Ventilation system and heat wheels (main pipe line)



Architecture value

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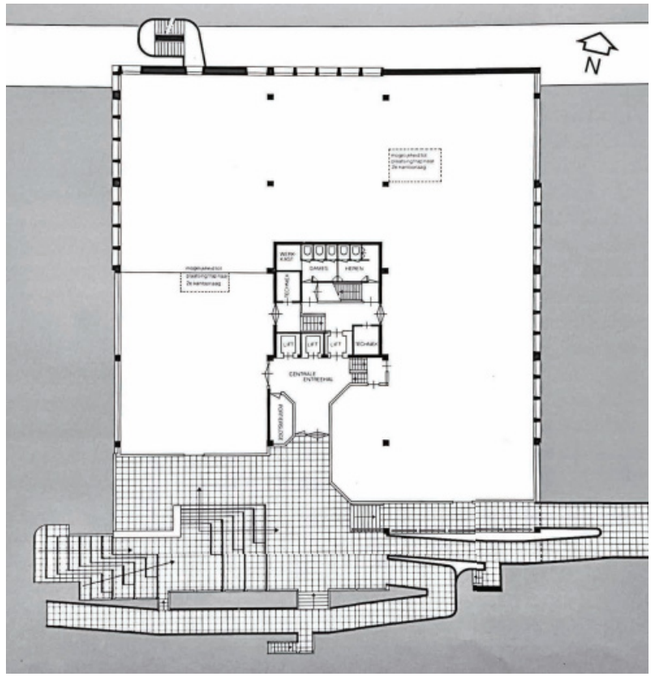
Building expression and identity - new expression and identity

CULTURE VALUE ANALYSIS

ENTRANCE SPACE







Social value

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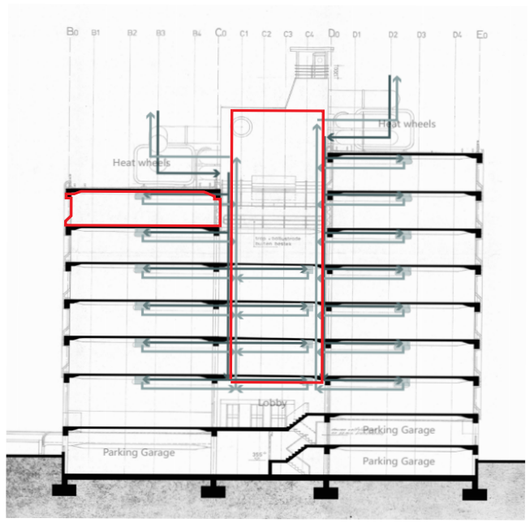
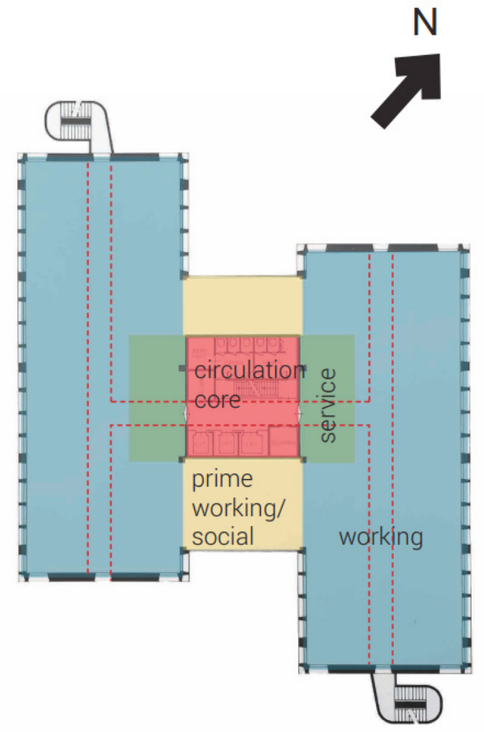
City connection - regain social value

CULTURE VALUE ANALYSIS

SPACE PLAN







Use value

Social value

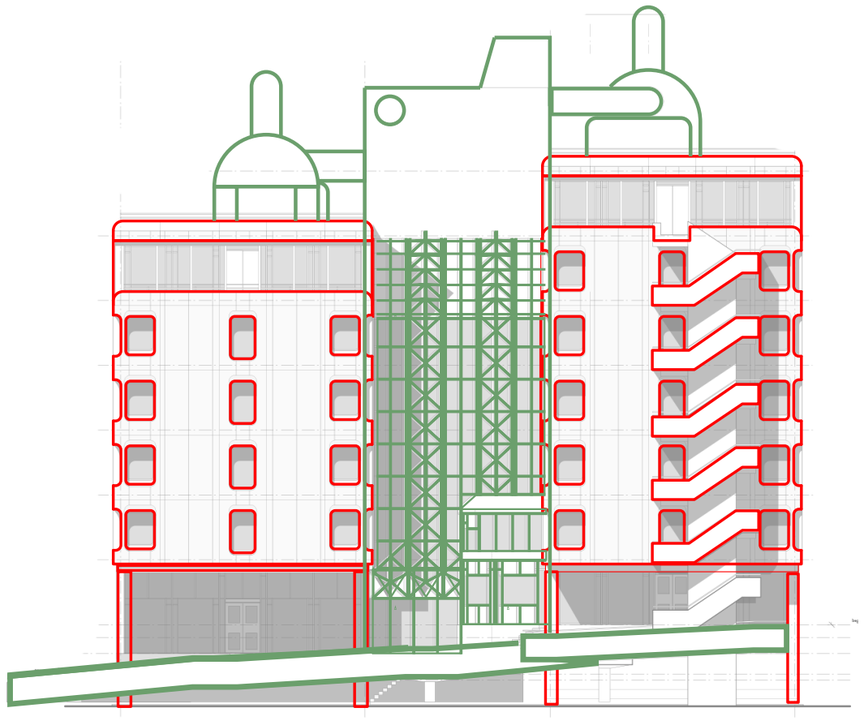
Architecture value

|

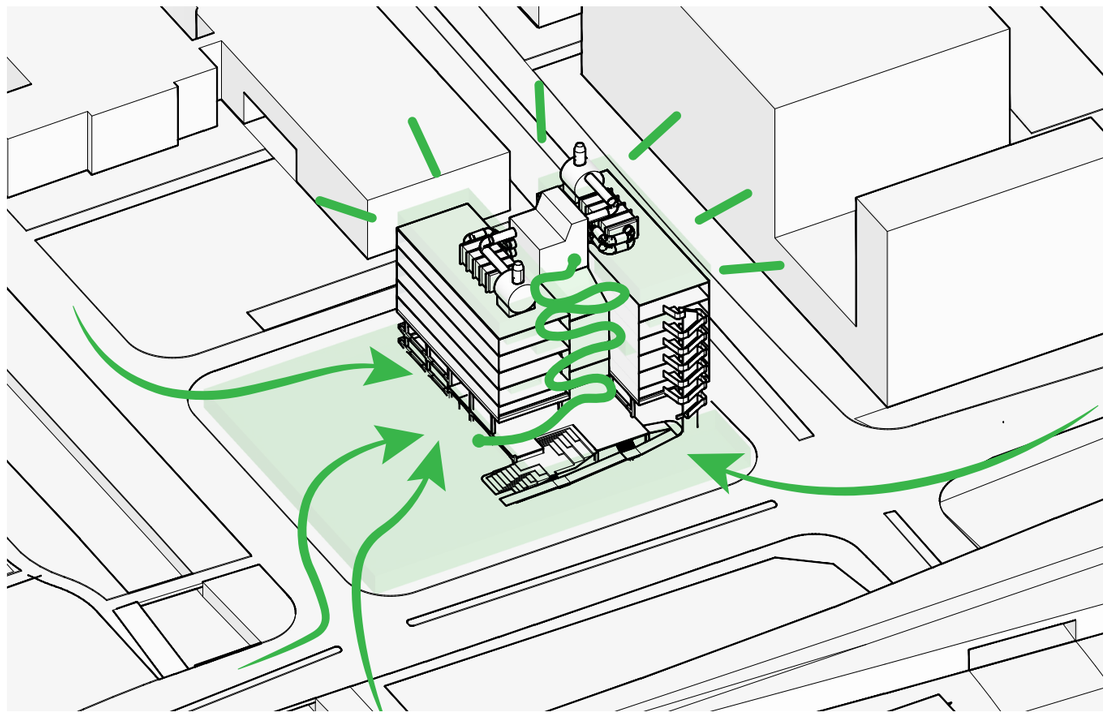
Heart of the building - new program new interpretation

GREEN INTERVENTION

VALUE ASSESSMENT



DESIGN STRATEGY



Stairs - regain social value

Space plan - original spatial quality

Skin - contrast of old and new
Roof - new building identity

Context design - connect the building to the surrouding

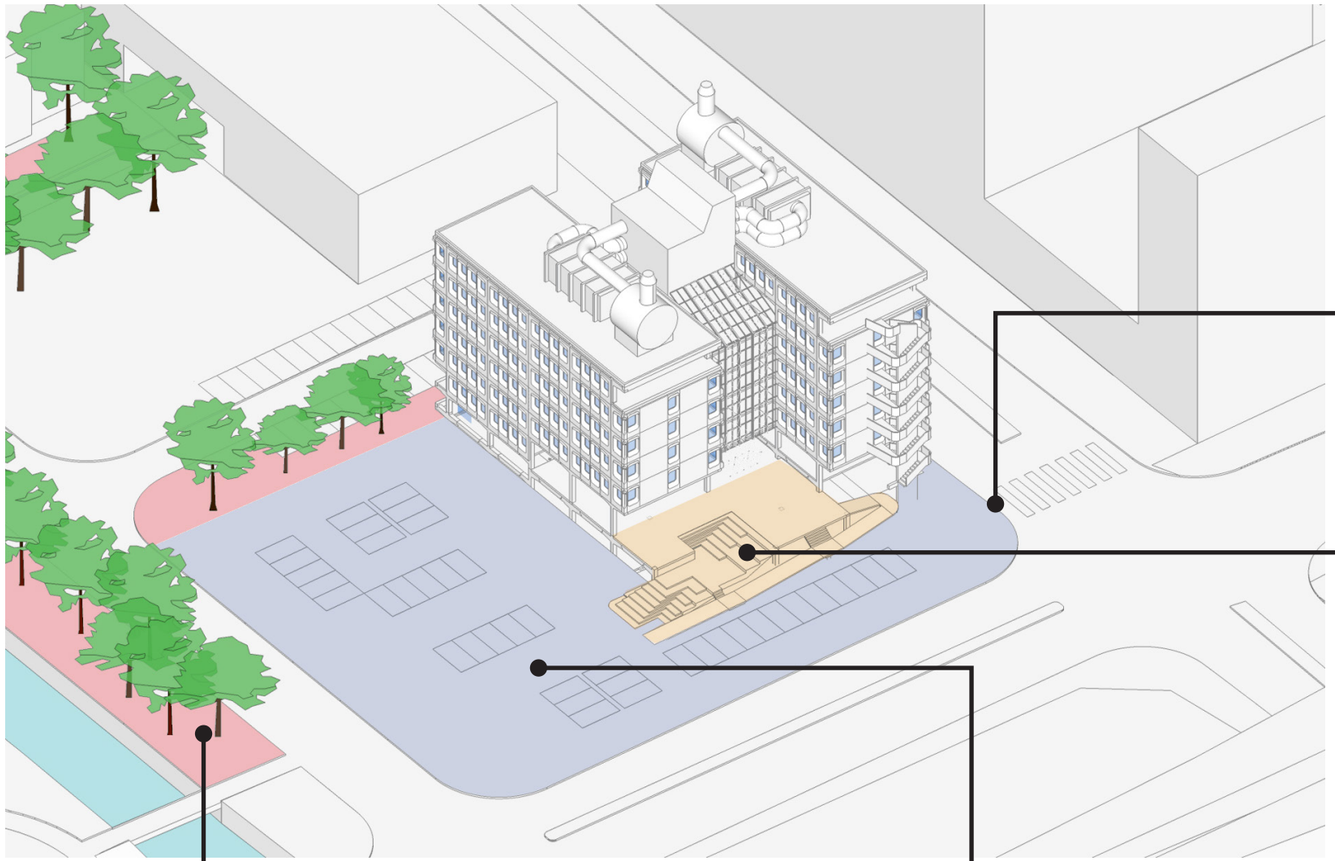
Space design - connect urban farm to people

Facade design - building image and identity

CONTEXT DESIGN

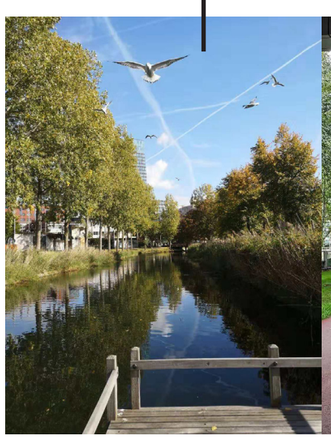
CONTEXT DESIGN

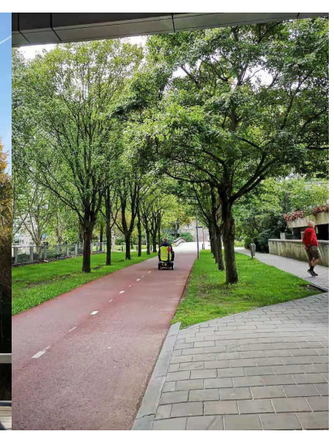
VALUE ASSESSMENT



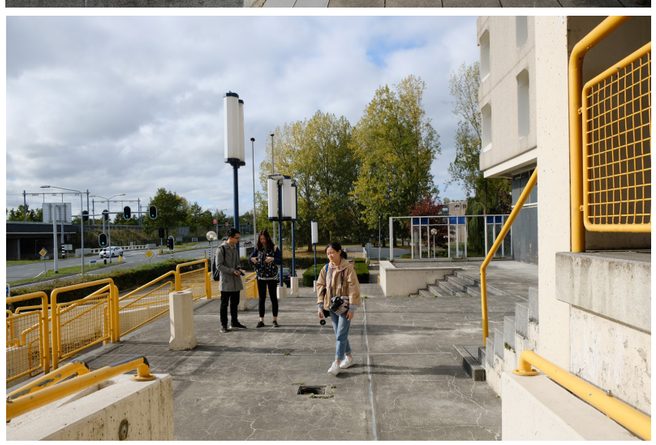








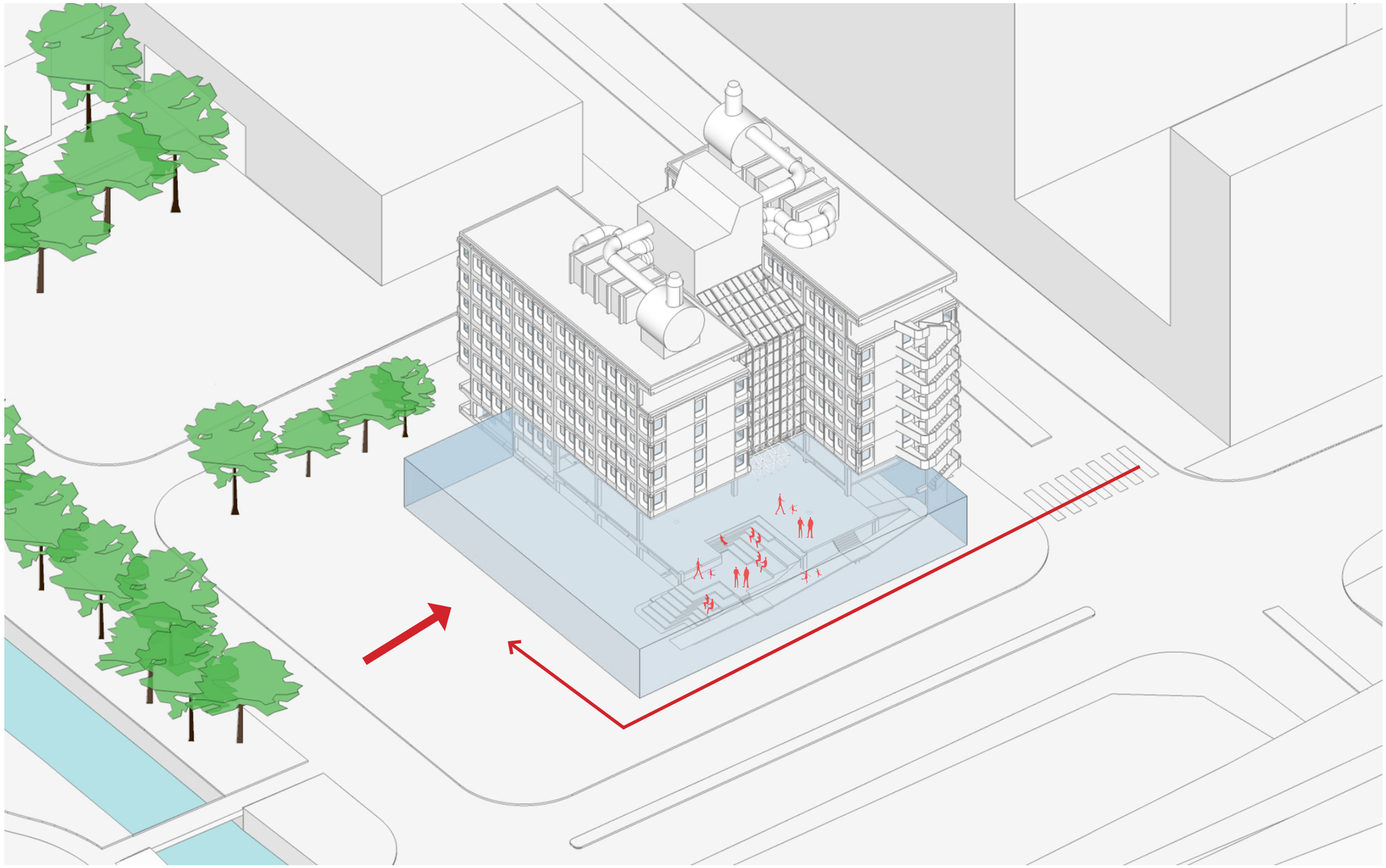




High value Positive value Low value

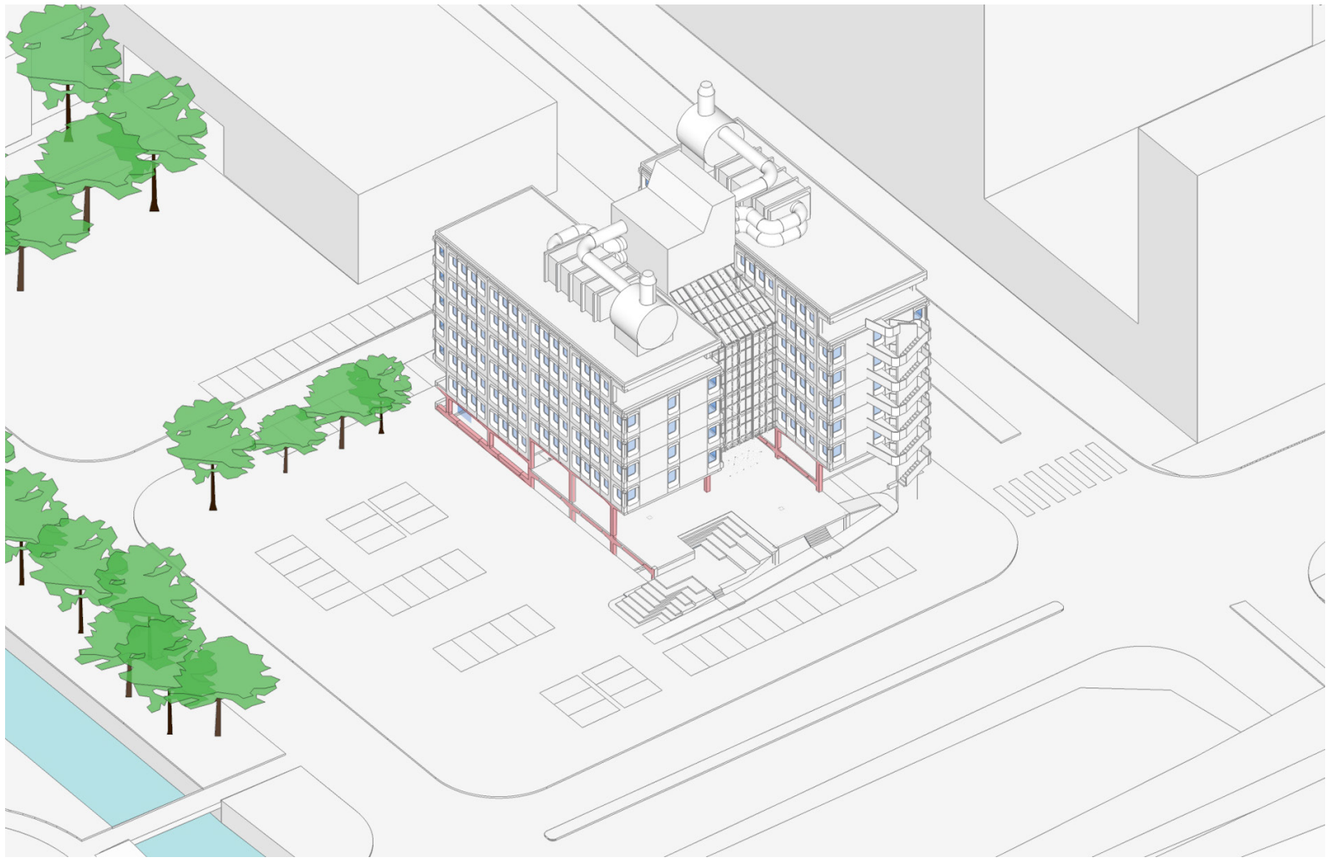
DESIGN STRATEGY

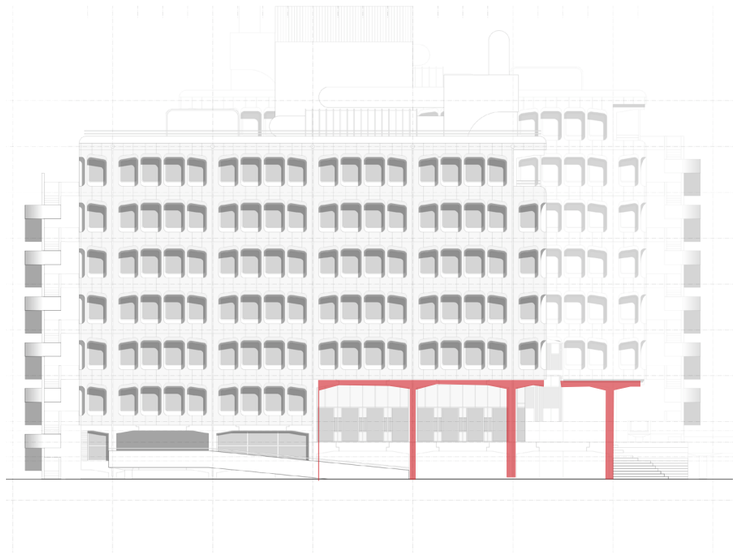
REGAIN SOCIAL VALUE



Increase social space quality

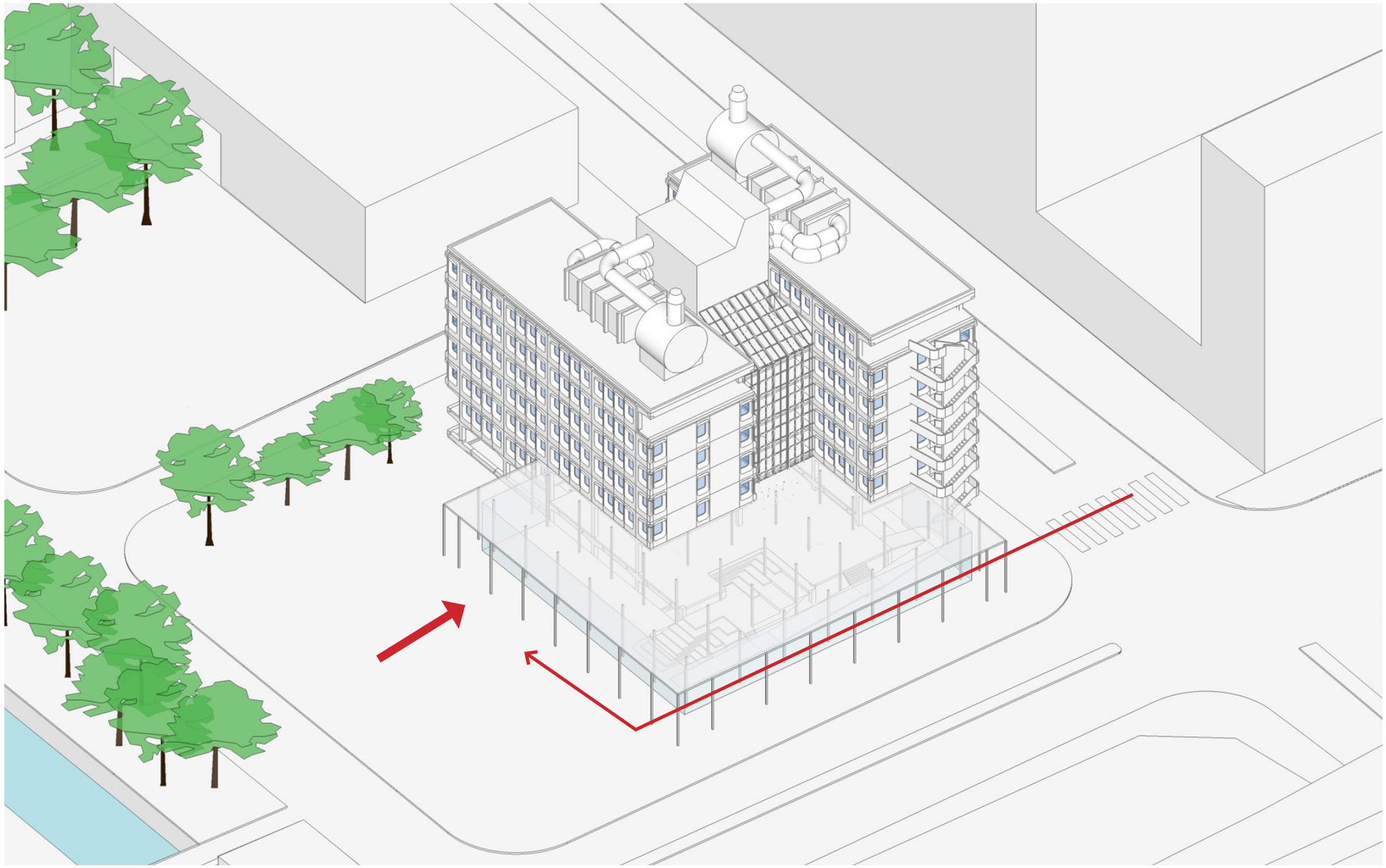
VALUE ASSESSMENT



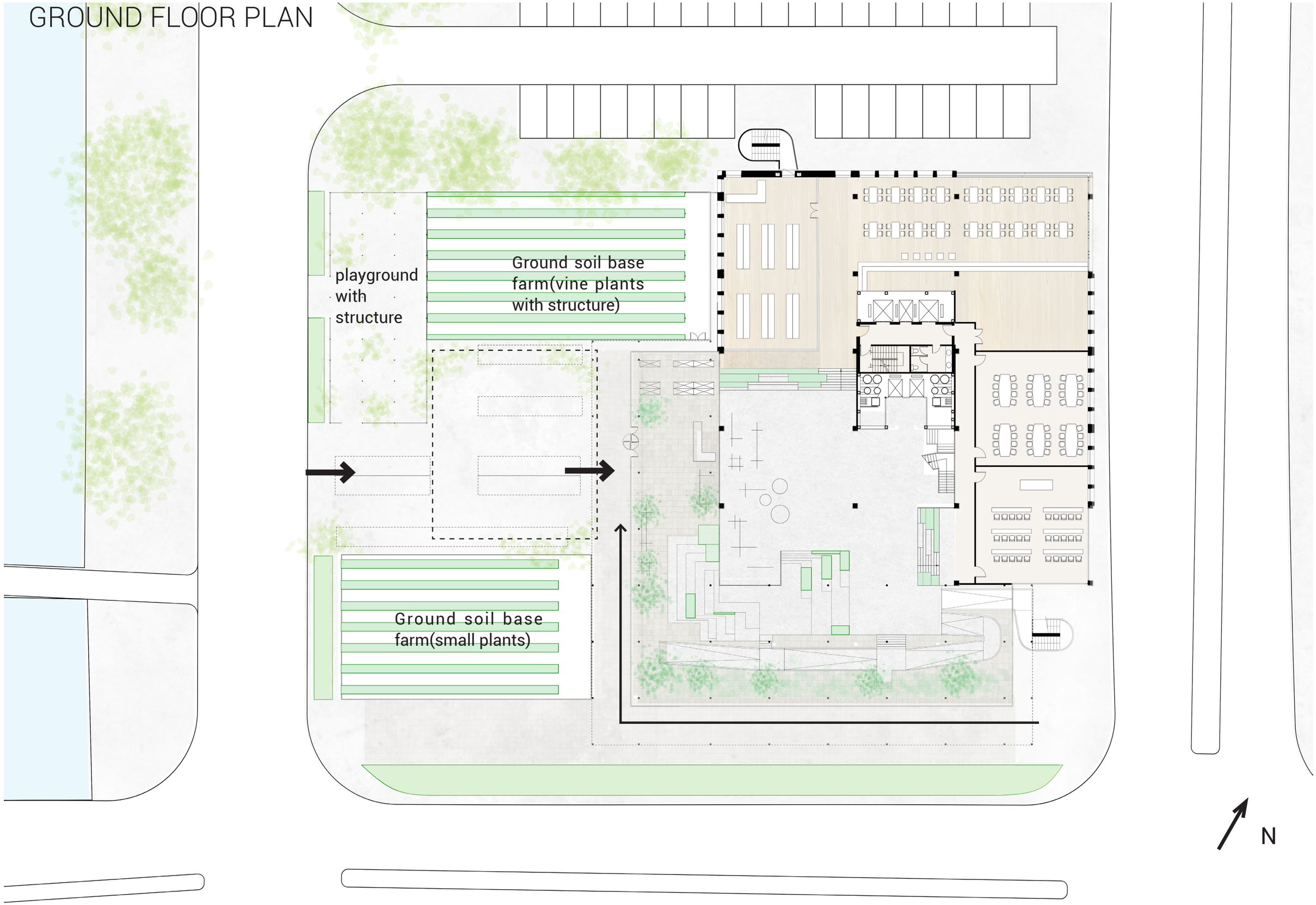


DESIGN STRATEGY

NEW RYTHNM



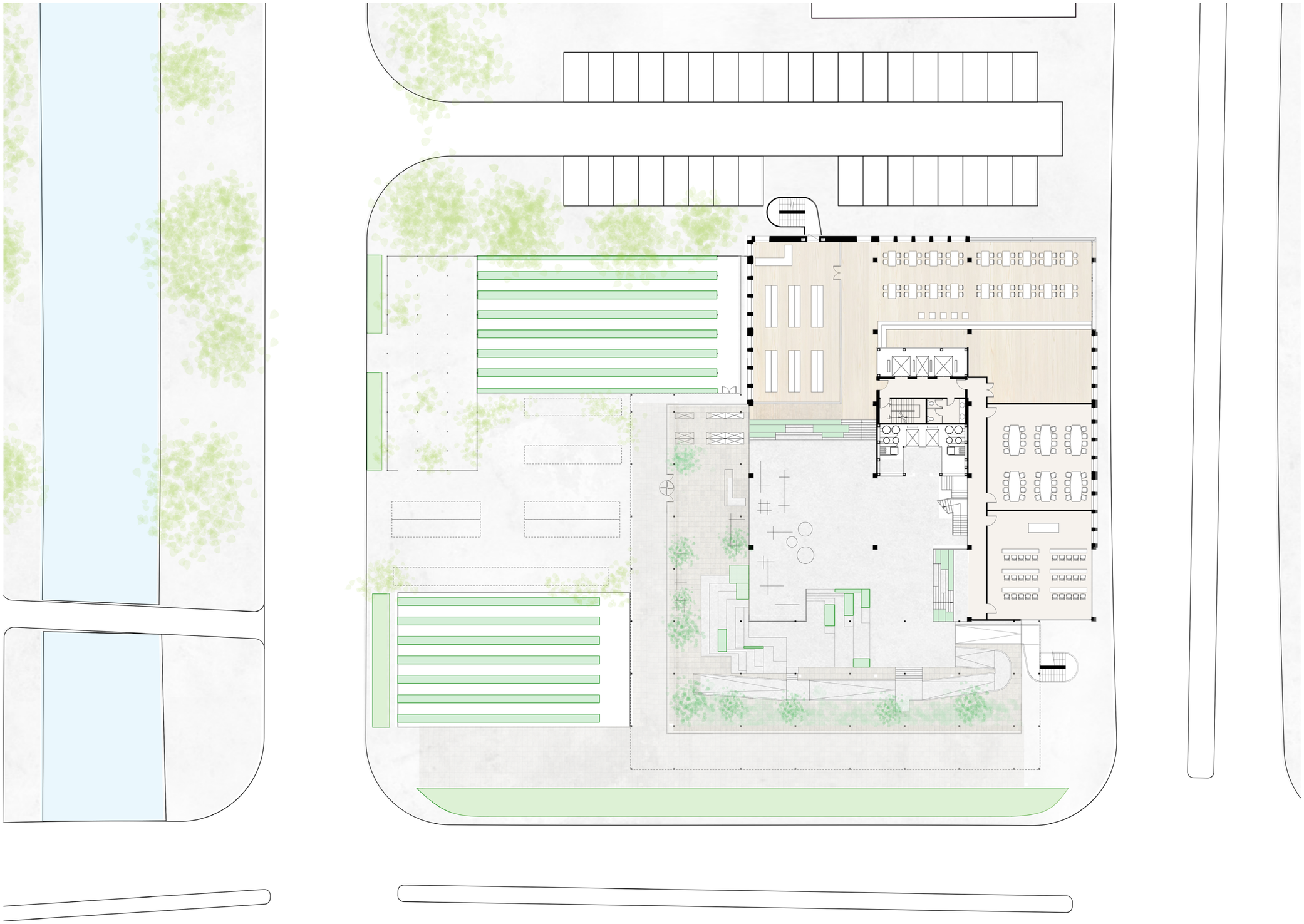
GROUND FLOOR PLAN



MAIN ENTRANCE



GROUND FLOOR PLAN



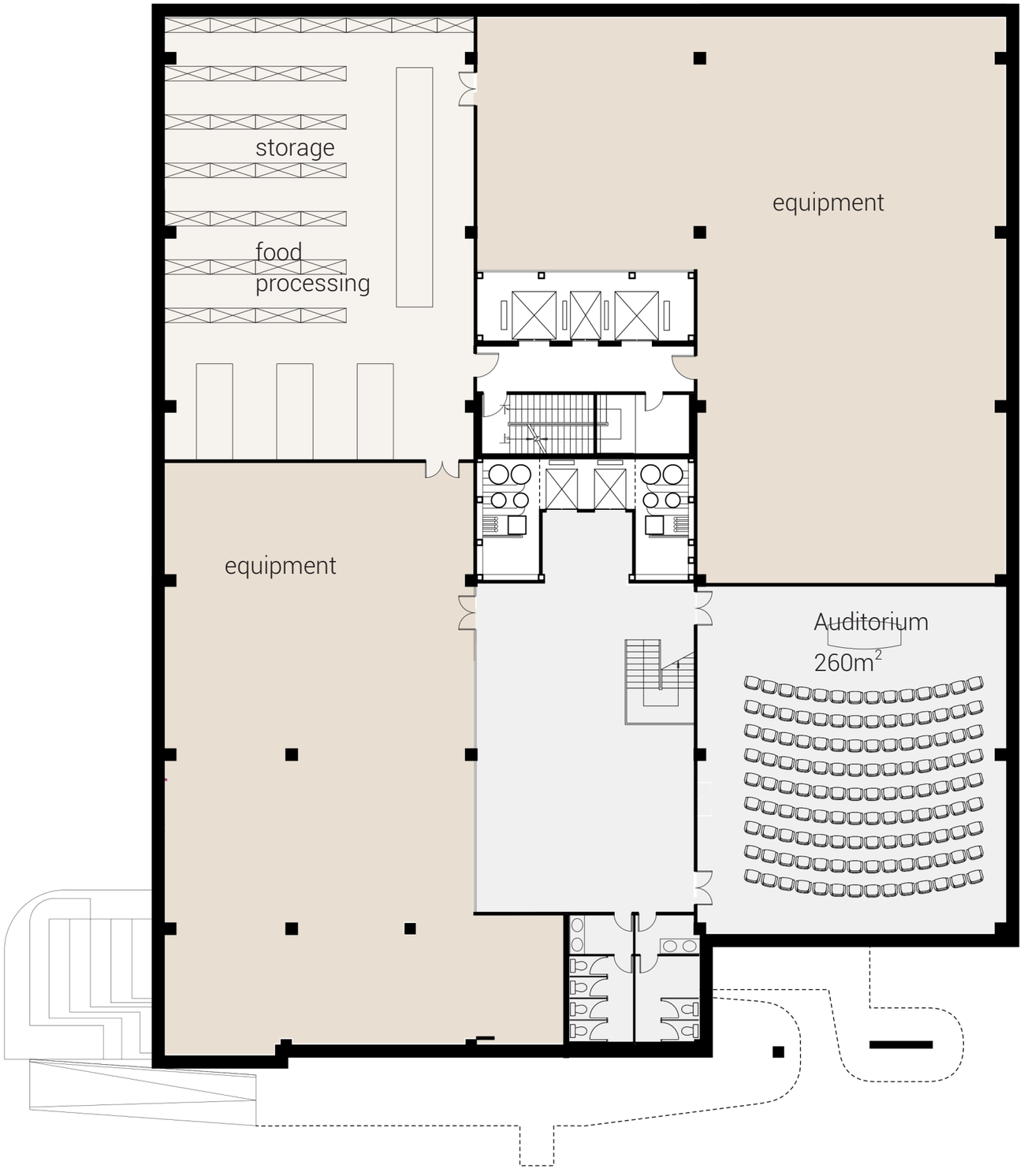


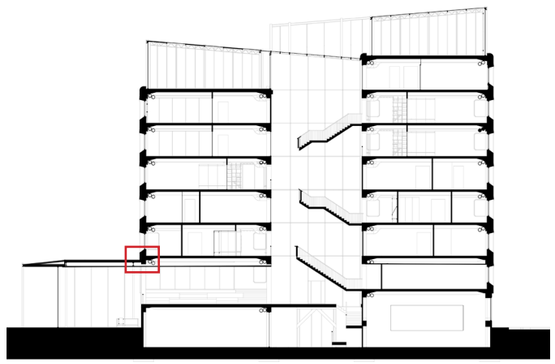
Garden entrance



different layers integrate with green

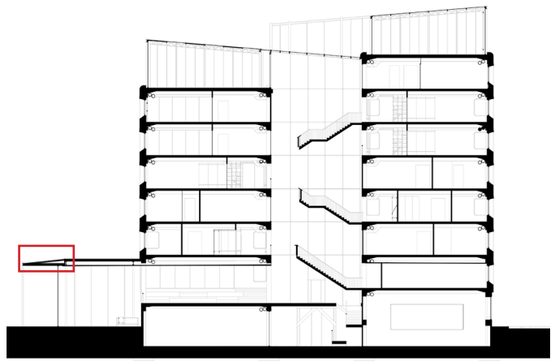
UNDERGROUND LEVEL PLAN

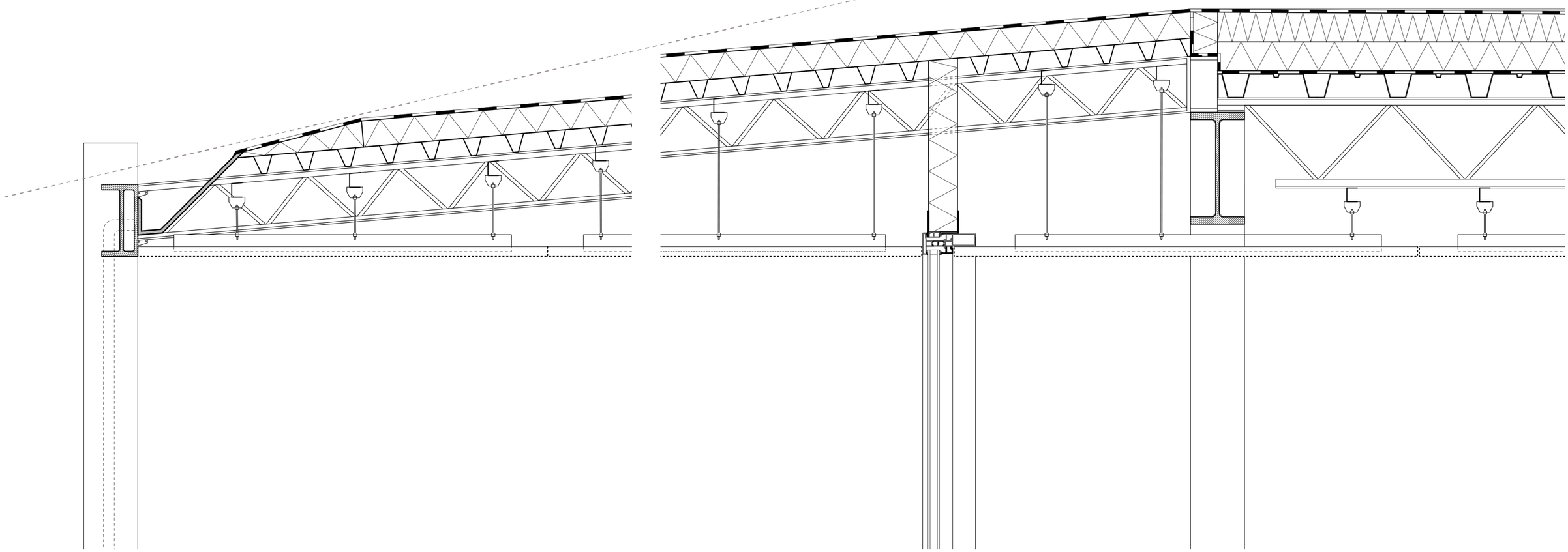




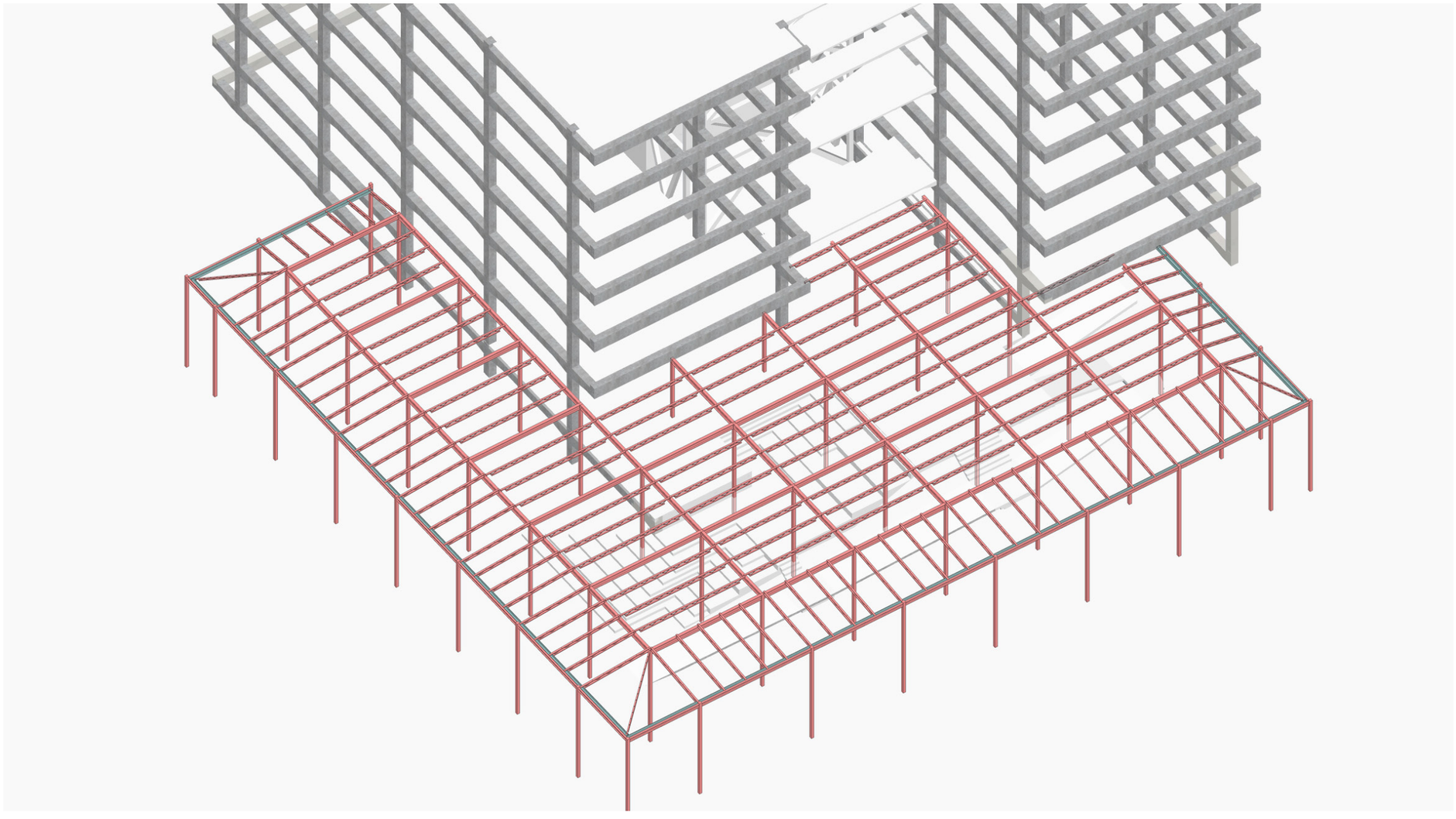
CONSTRUCTION DETAIL

CONSTRUCTION DETAIL





STRUCTURE DESIGN



URBAN FARM DESIGN

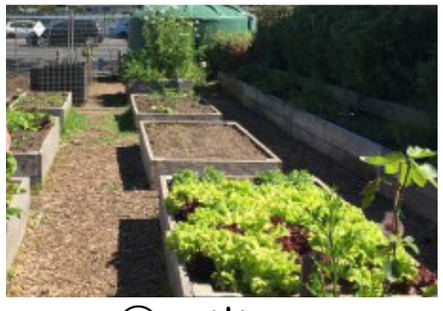
URBAN FARM TYPOLOGY CHOICE

Ground

Soil-based ground garden



Ground container garden



Soil-based green house



Roof

Open air roof garden



Open air roof container garden

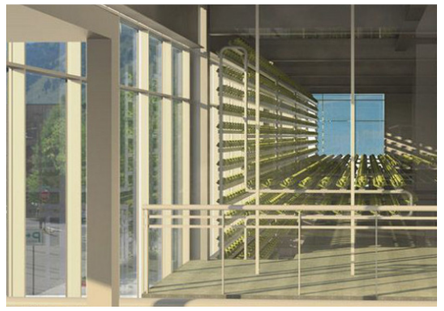


Roof green house



Indoor

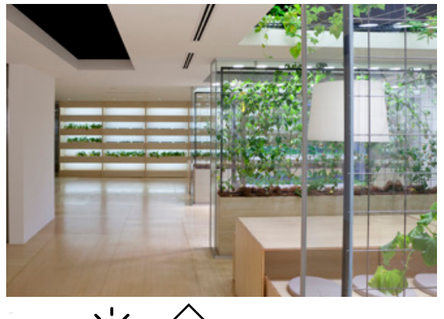
Indoor farm with sunlight



Indoor farm factory



Indoor flexible farm



Facade

Edible living wall



Double skin green house



Soil based

Hydroponic

Sun light

Rainwater irrigation

Natural ventilation

Artificial light

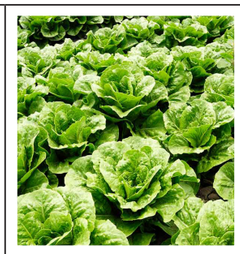
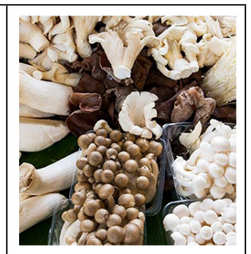
Mechanical control

CONSIDERATION

1. Ground - soiled base garden - recreation
2. Indoor - hydropnic - environment control
3. Roof and facade - same design language, energy exchange

FEATURES OF VEGETATION RESEARCH

HYDROPONIC-SYSTEMS

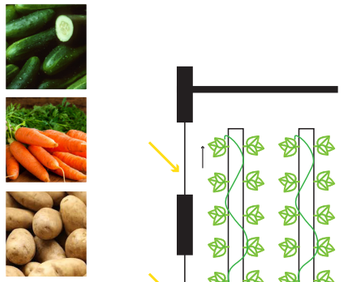
	 Tomato	 Strawberry	 Pepper	 Cucumber	 Carrot	 Potato	 Spinach	 Lettuce	 Mushroom
Light requirement	6-8 Hours/day	6-8 Hours/day	6-8 Hours/day	4-6 Hours/day	4-6 Hours/day	4-6 Hours/day	<1 Hour/day	<1 Hour/day	<1 Hour/day
Temperature	21-25 C	18-24 C	21-26.7 C	20-27 C	15.5-21C	15-20	18-25 C	18-25 C	20-25 C
Growing cycle (Days)	40-55	45-60	60-80	85	90	80	35-50	45-90	45
Yield/area (Kg/m2)	195.3	15	25-45	25-45	150	25	5	36	16
Space/plant (M2)	0.465	0.3	0.272	0.372	0.015	0.953	0.9	0.155	0.55
Vine plant	●			●					
Vertical farm Requirement	●			●		●	●		

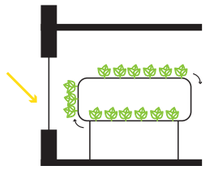
Green house system

Indoor farm with light

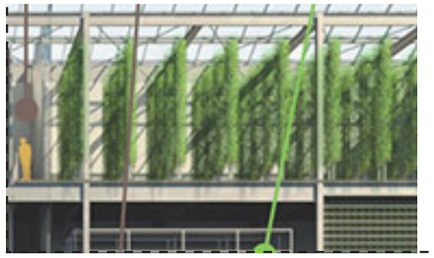
Indoor farm without light

URBAN FARM TYPOLOGY



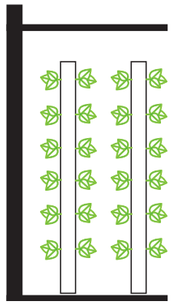


Indoor farm with sunlight









Indoor farm factory



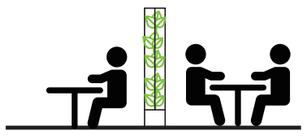


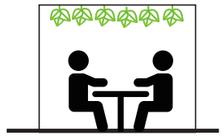


Soil-based ground garden











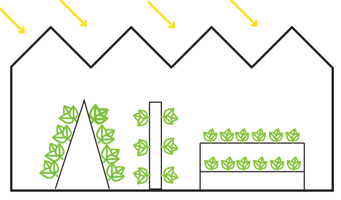
Indoor flexible farm





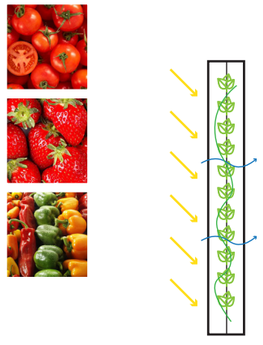






Roof green house



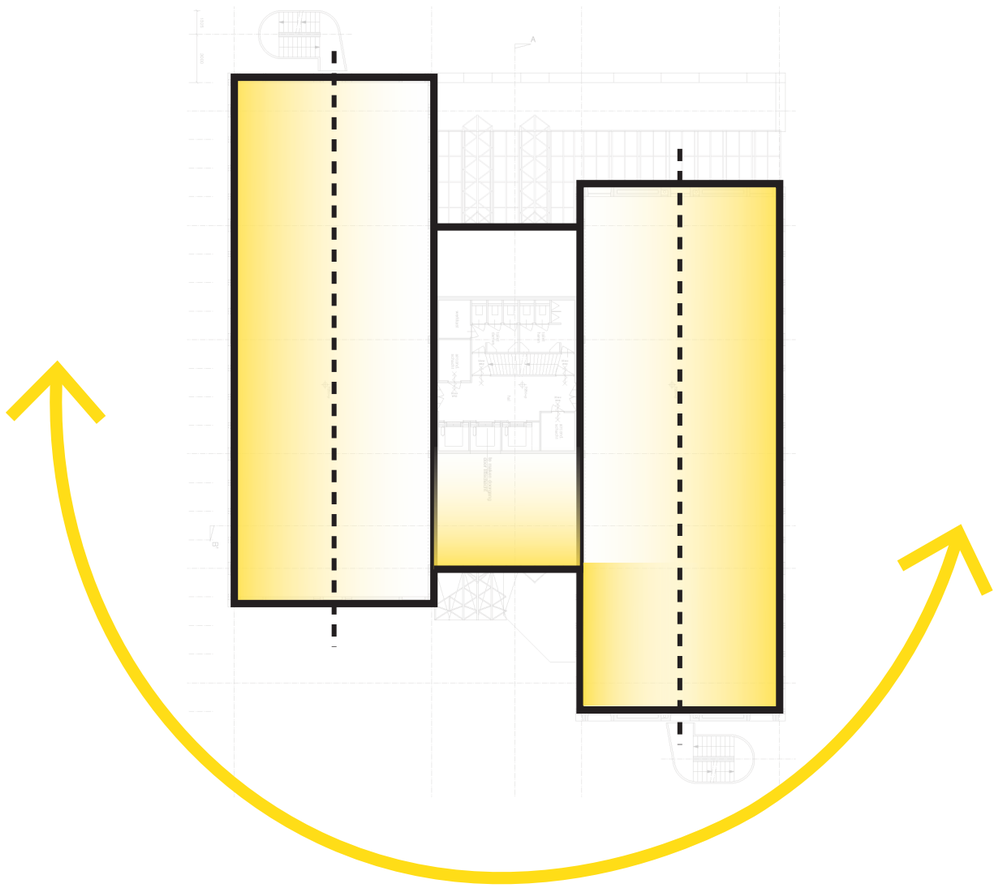


Double skin green house

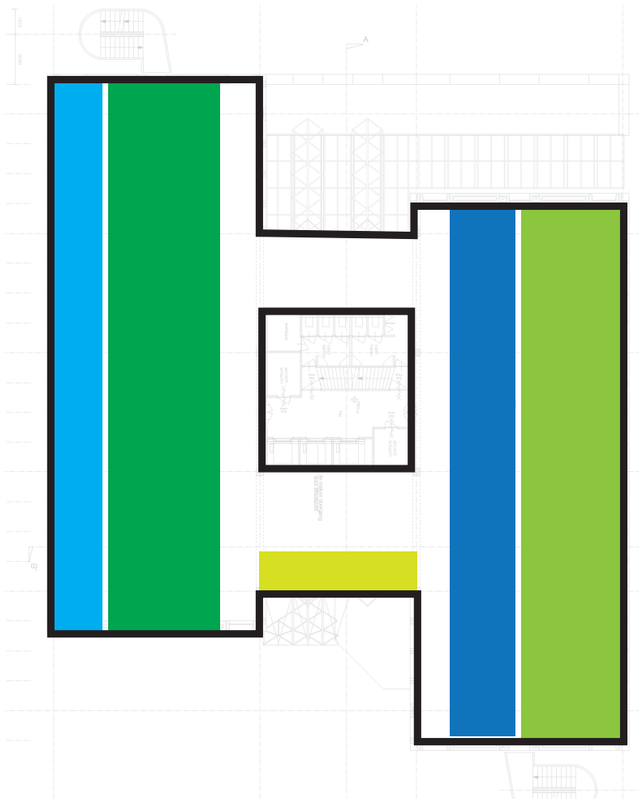


EXISITING BUILDING SPACE ANALYSIS

LIGHT ANALYSIS

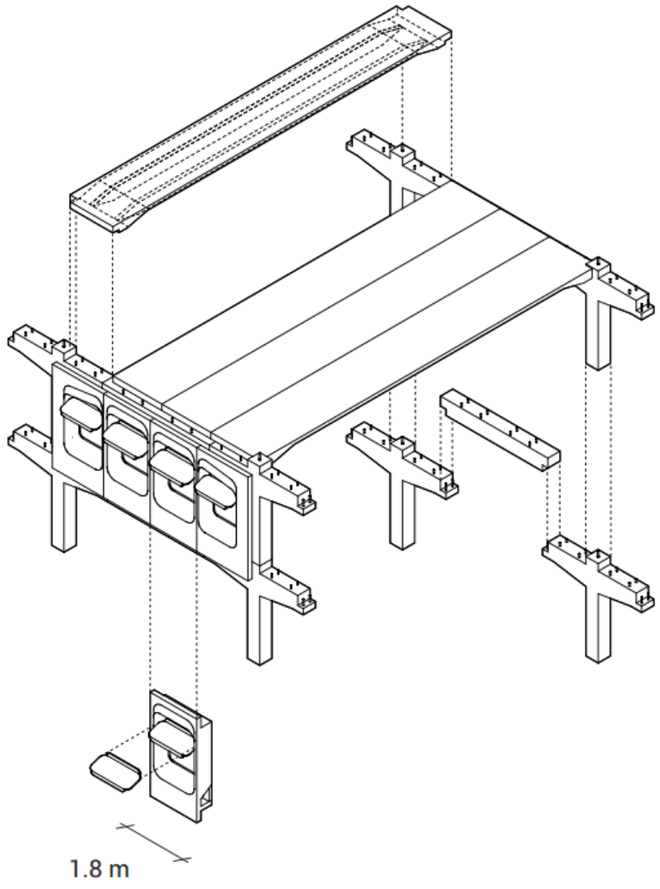


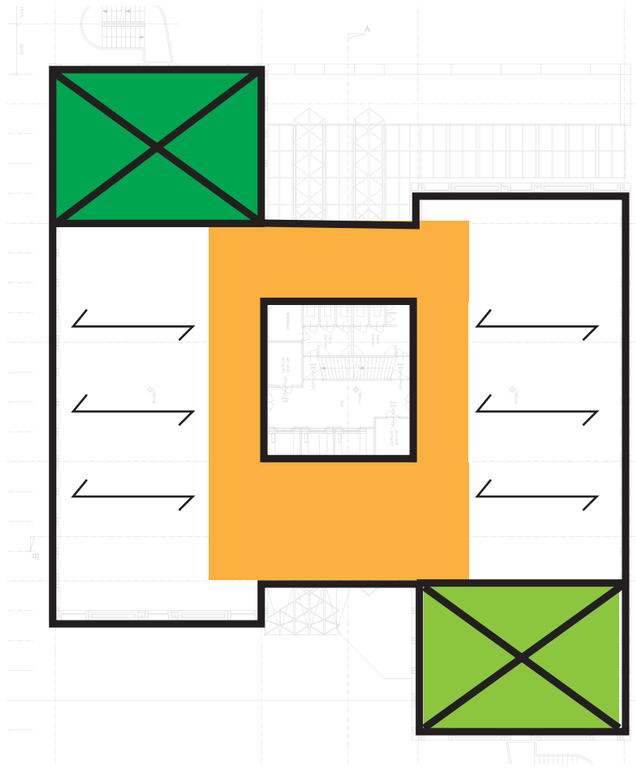
GENERAL LAYOUT



Indoor farm factory
Office
food testing lab
Indoor farm with sunlight
Double skin green house

VERTICAL FARM SPACE STRUCTURE ANALYSIS



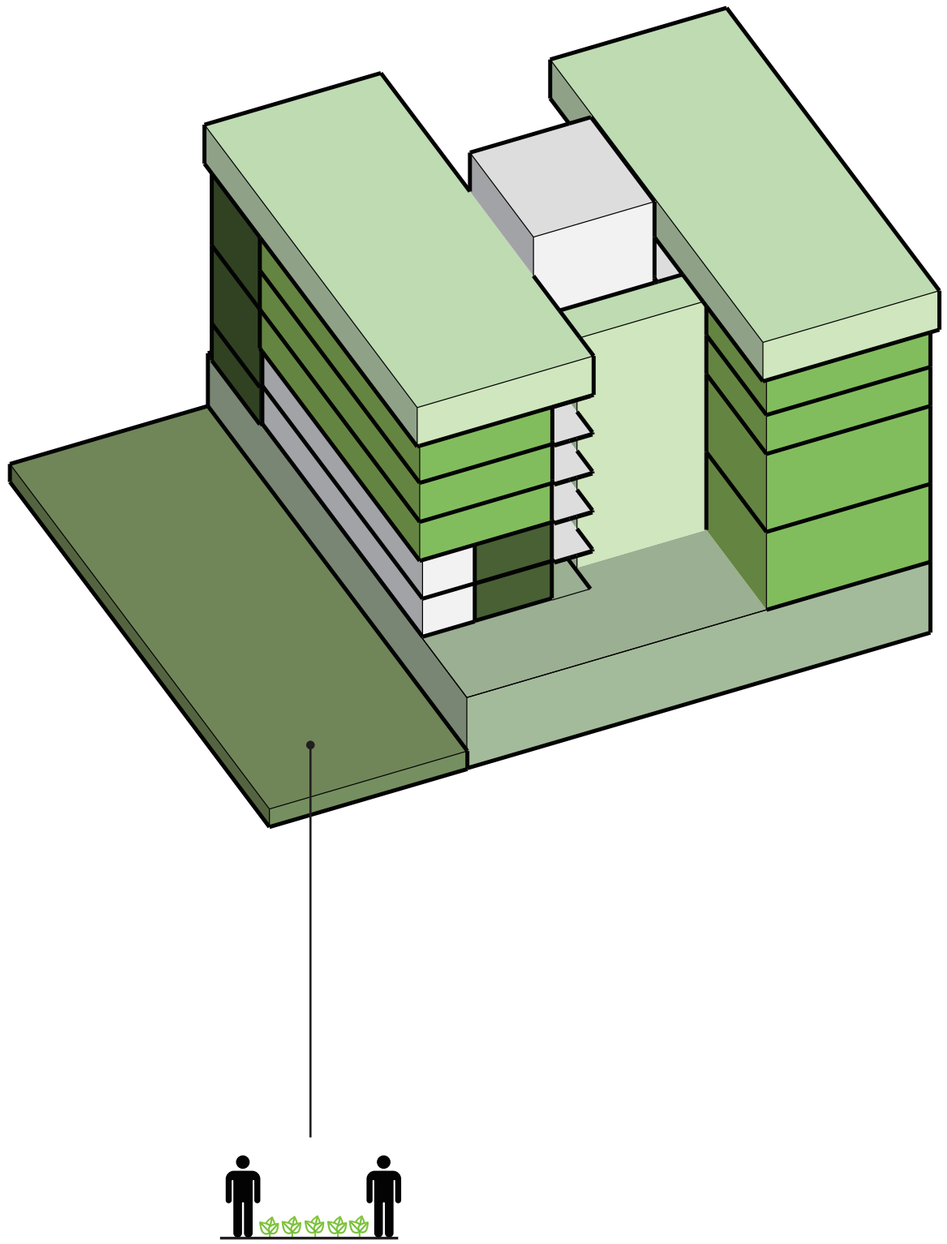


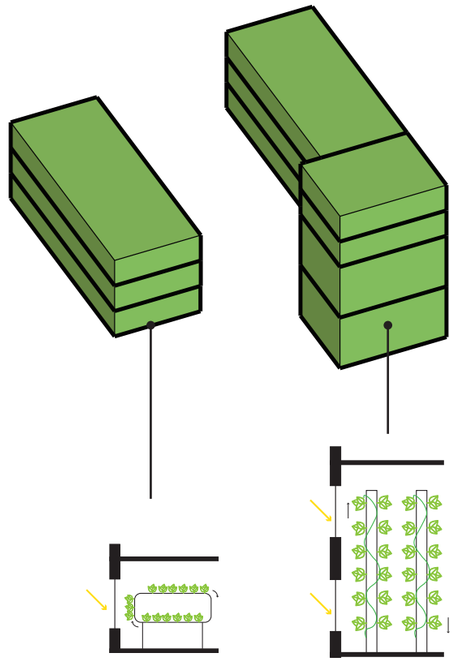
Circulation space

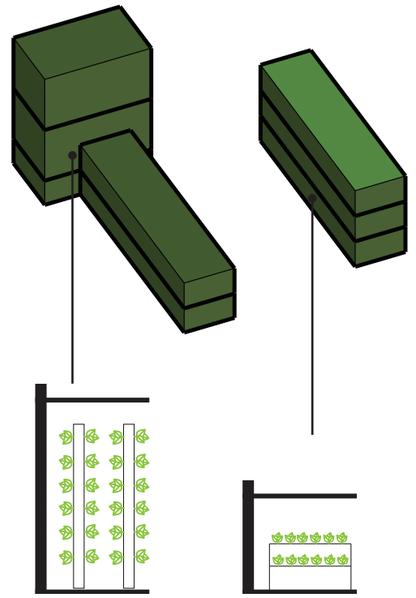
Indoor farm with sunlight

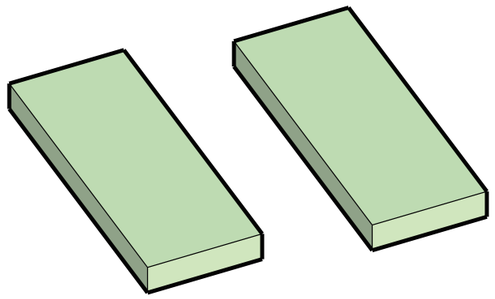
Indoor farm factory

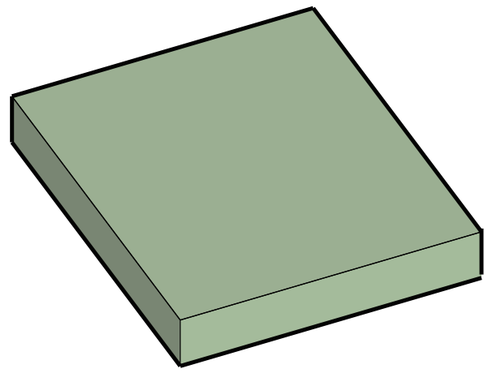
URBAN FARM LAYOUOT

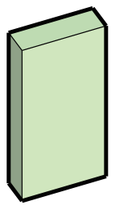


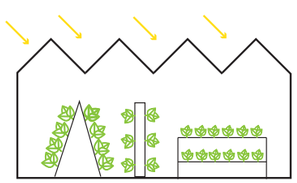


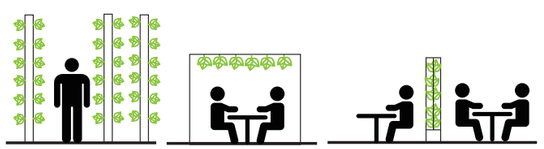


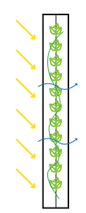






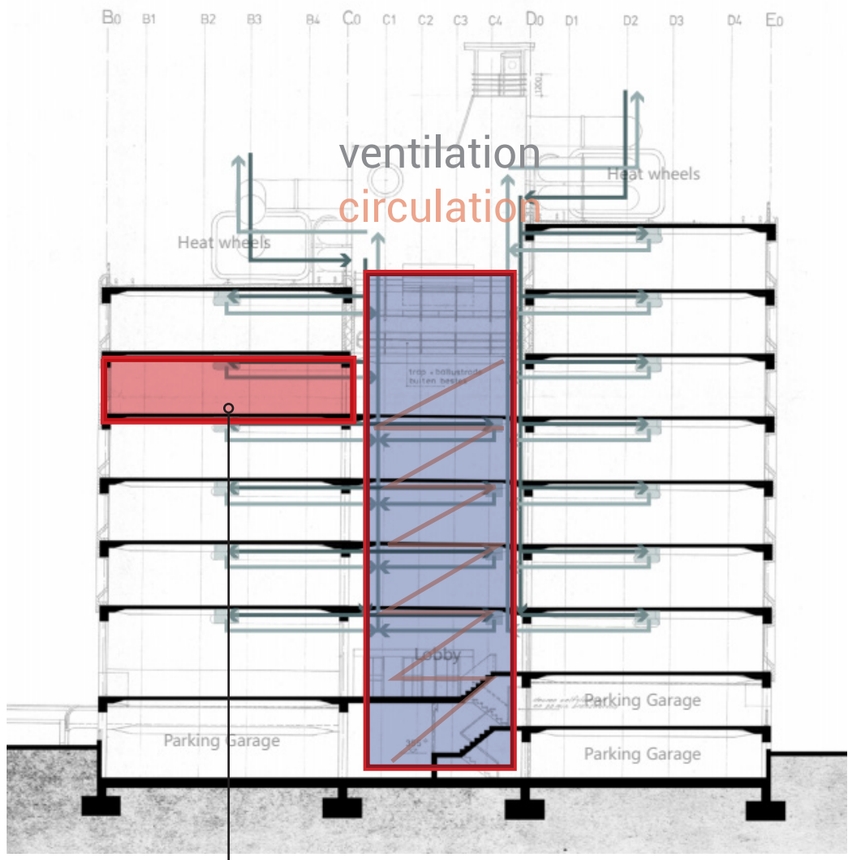


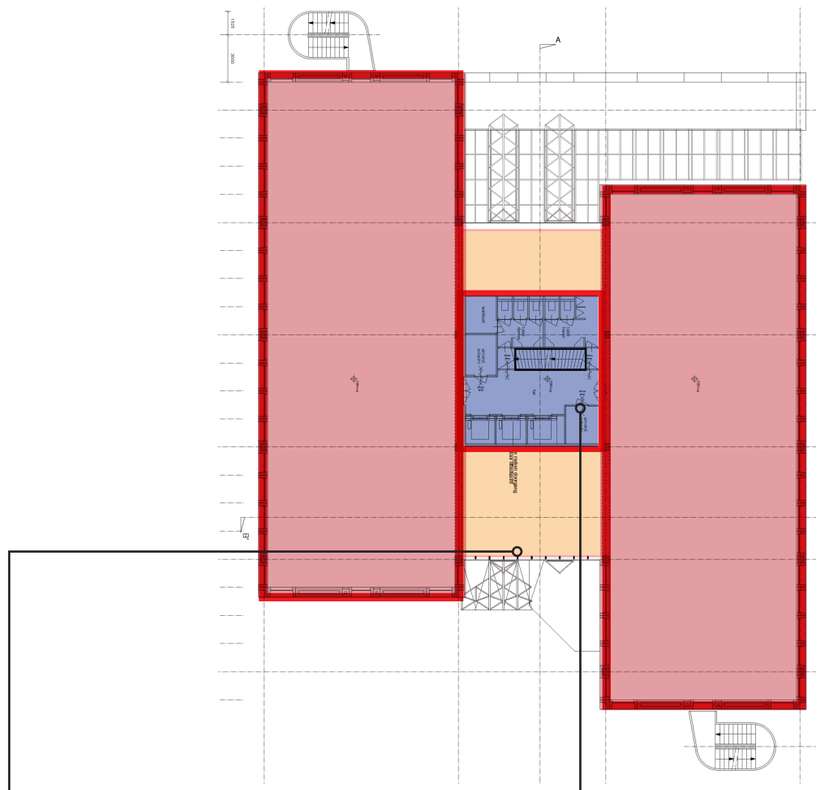


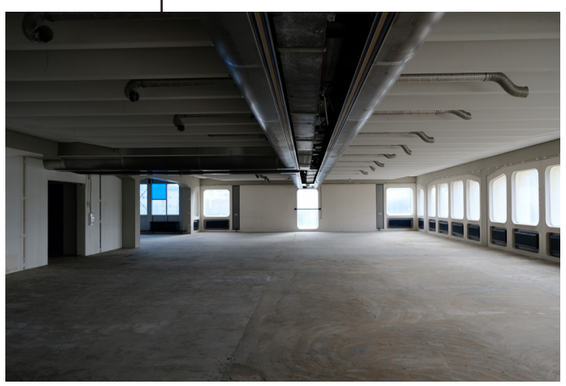


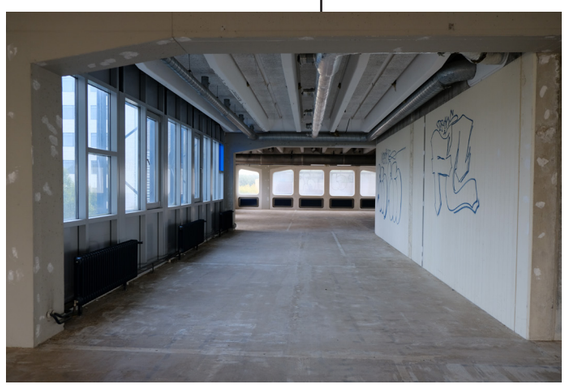
URBAN FARM TOUR DESIGN

VALUE ASSESSMENT











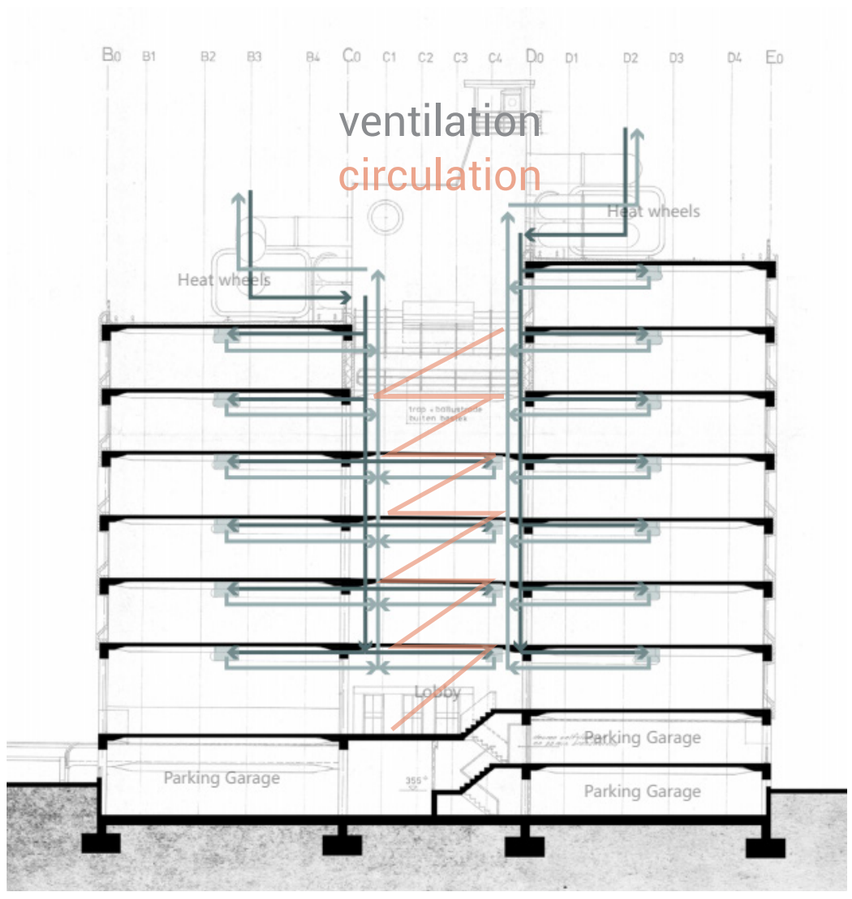
High value

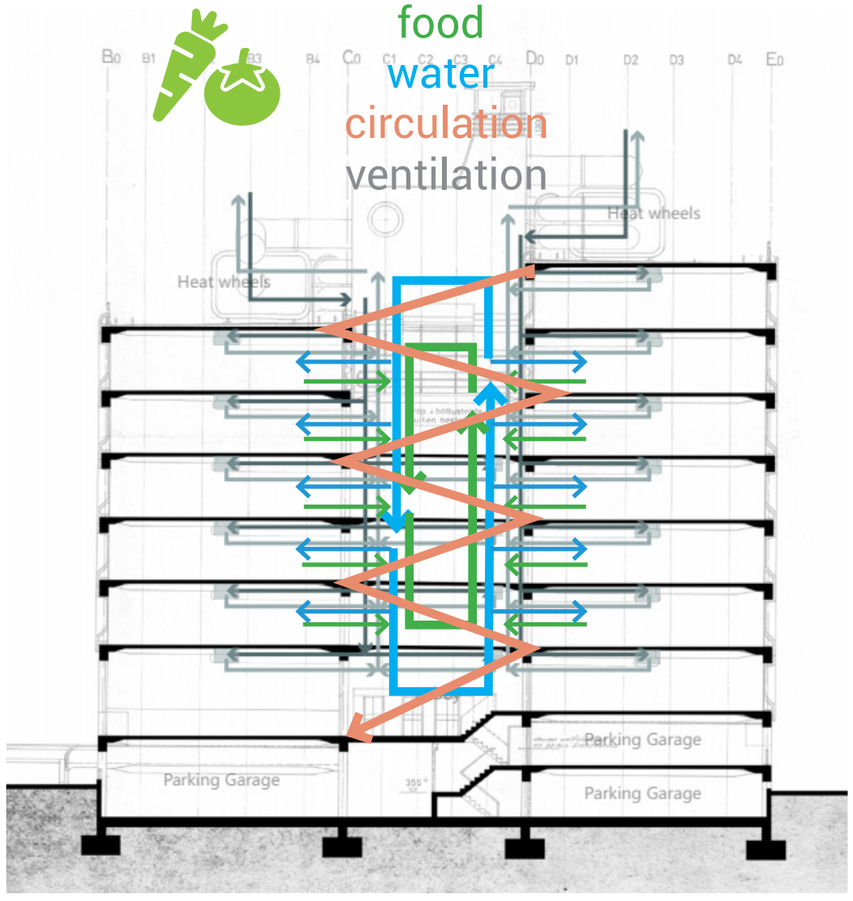
Positive value

Low value

URBAN FARM TOUR DESIGN

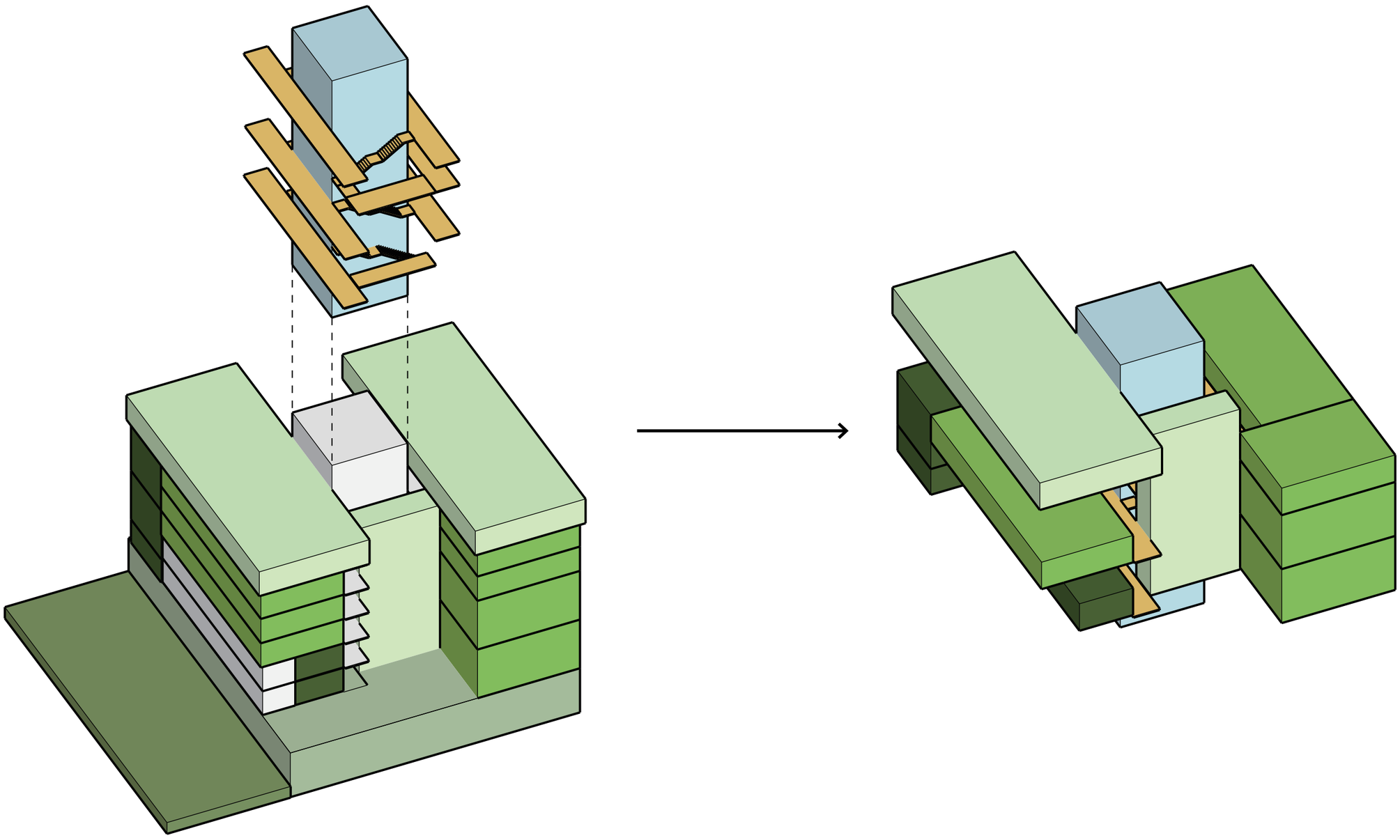
WORKING HEART



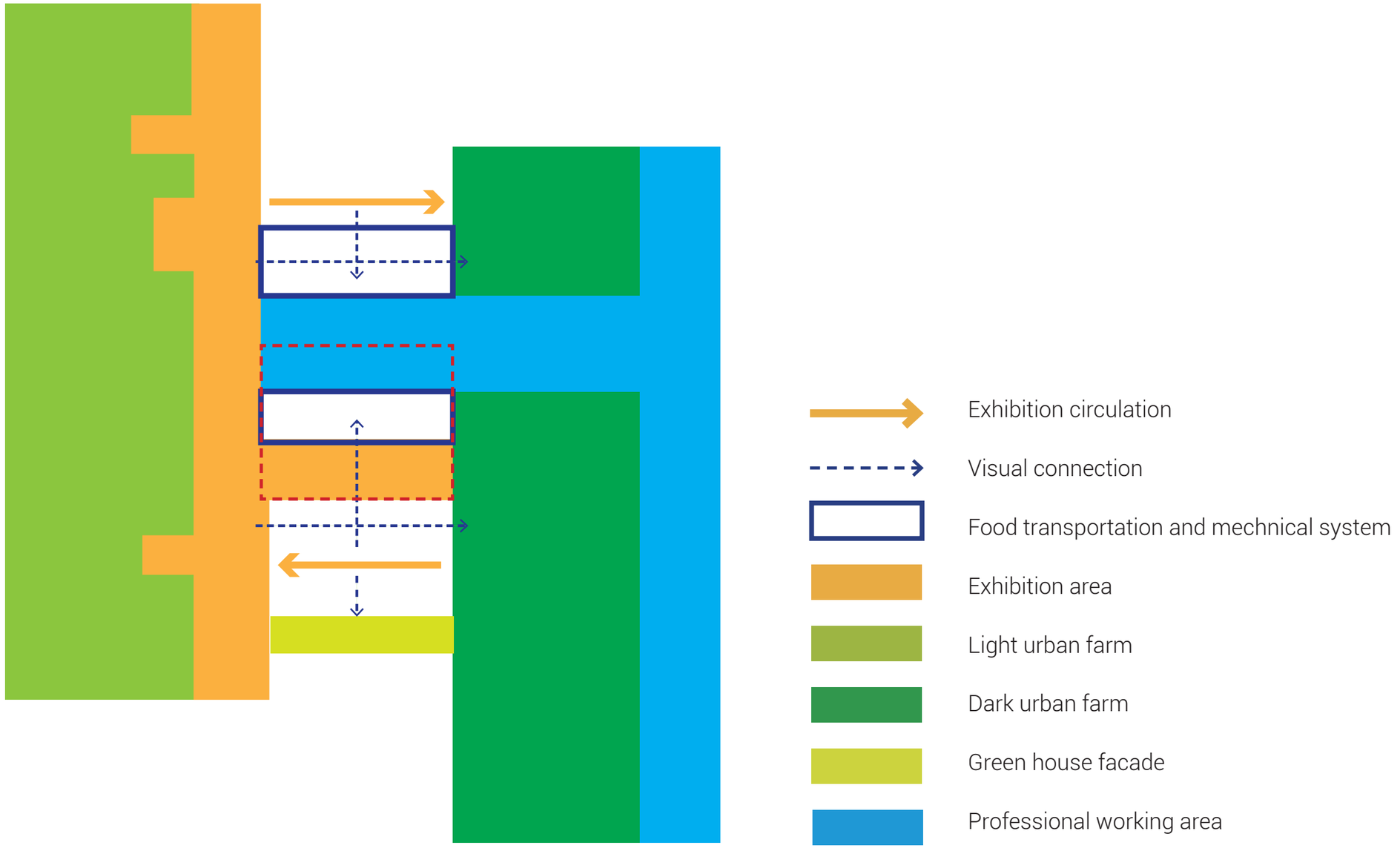


URBAN FARM TOUR

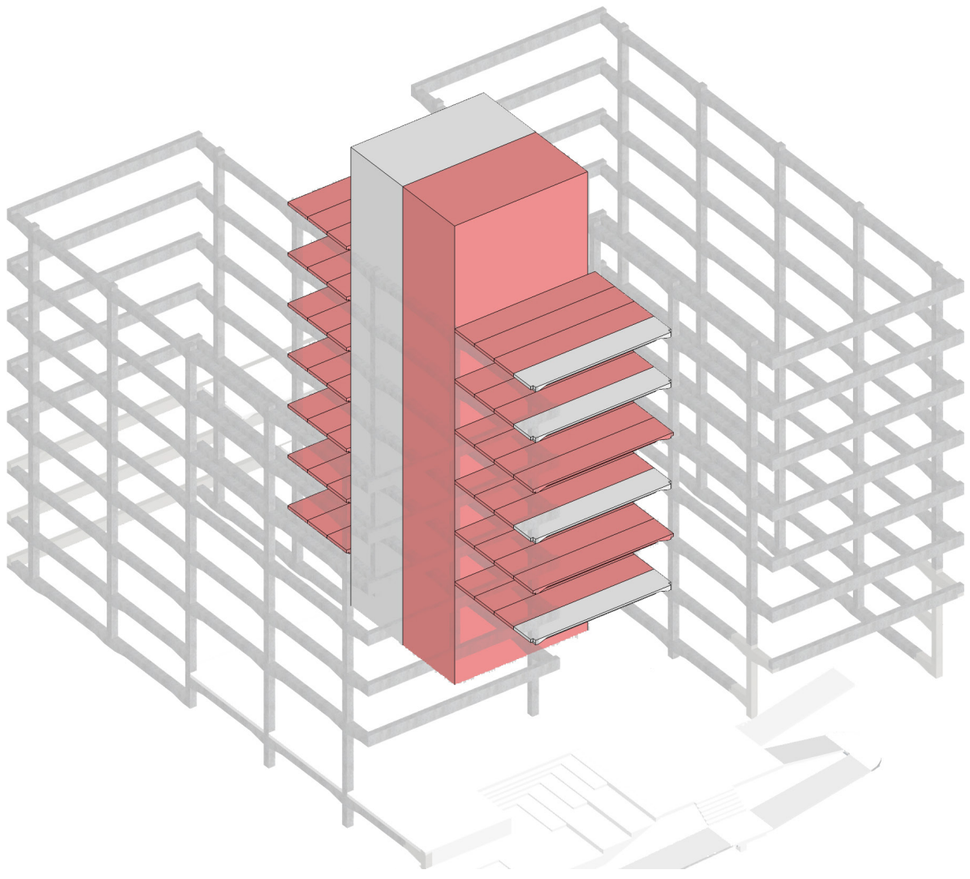
DESIGN STRATEGY

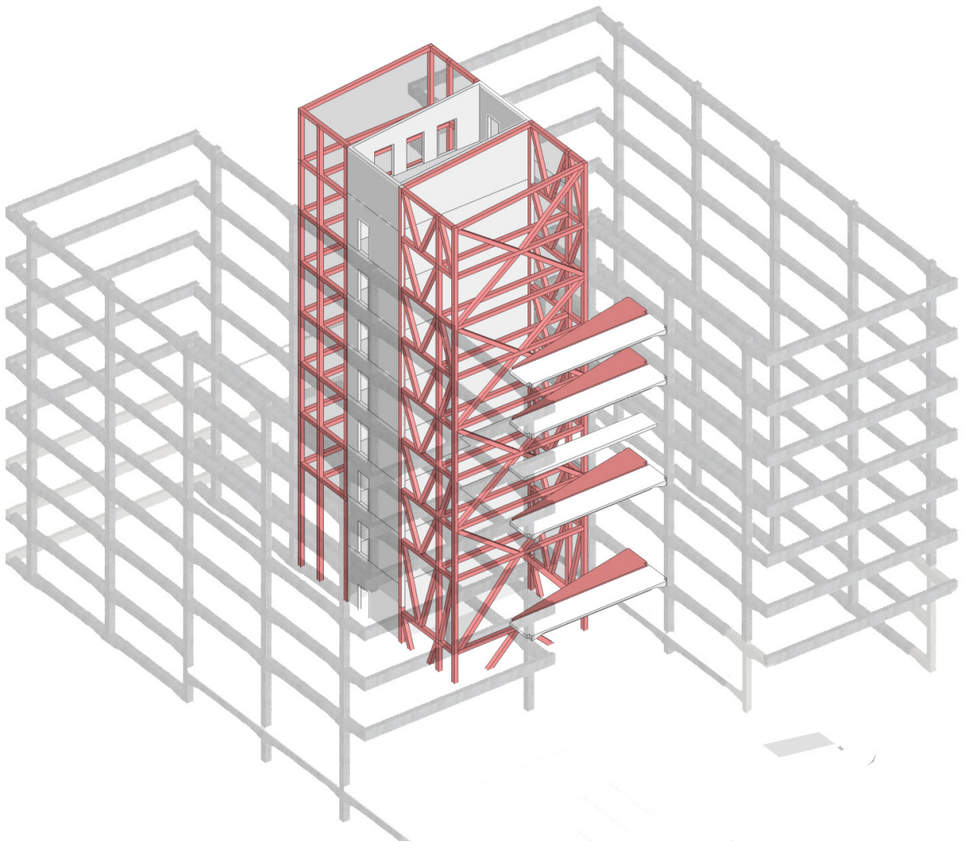


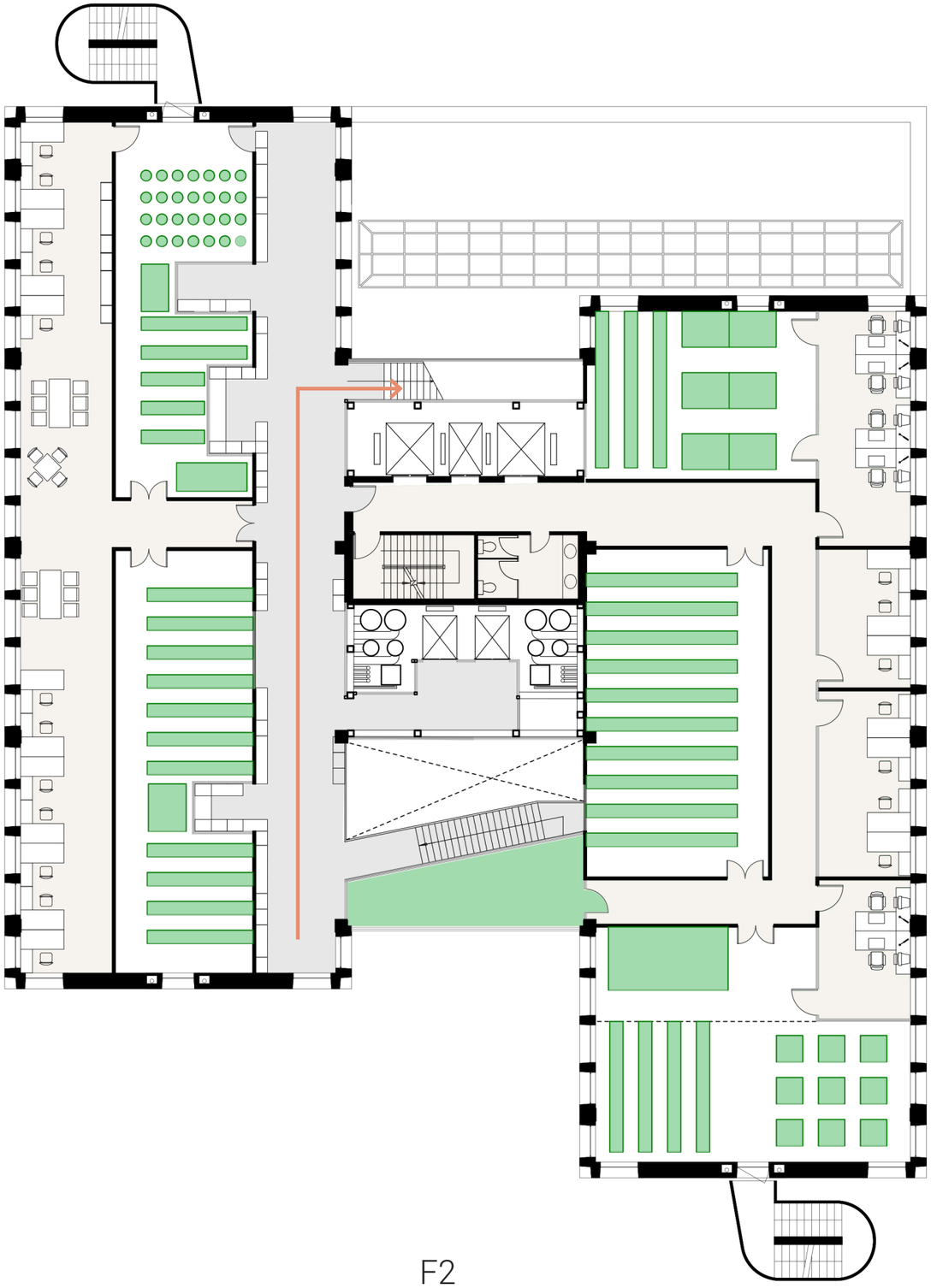
DESIGN CONCEPT



STRUCTURE DESIGN







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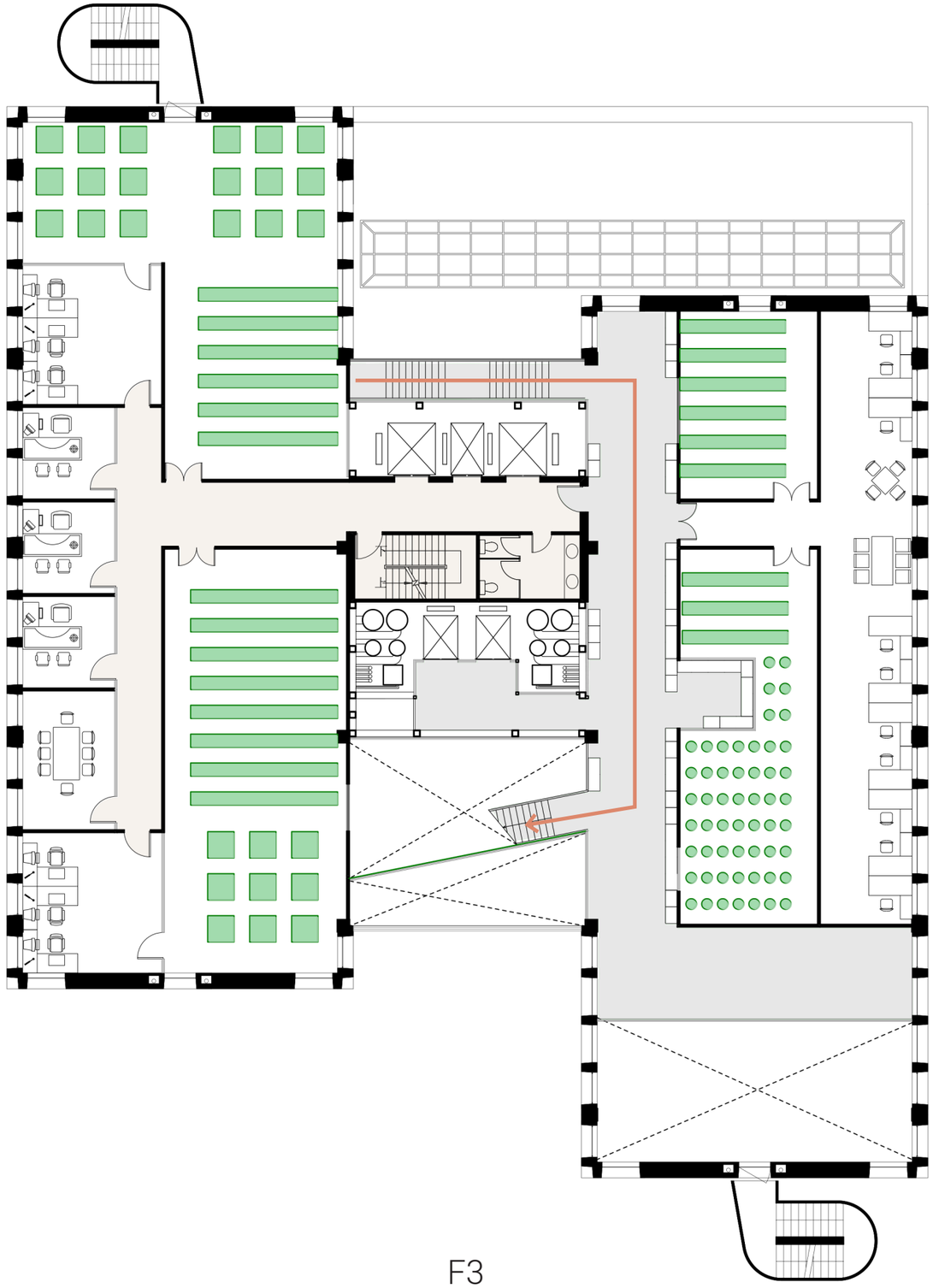

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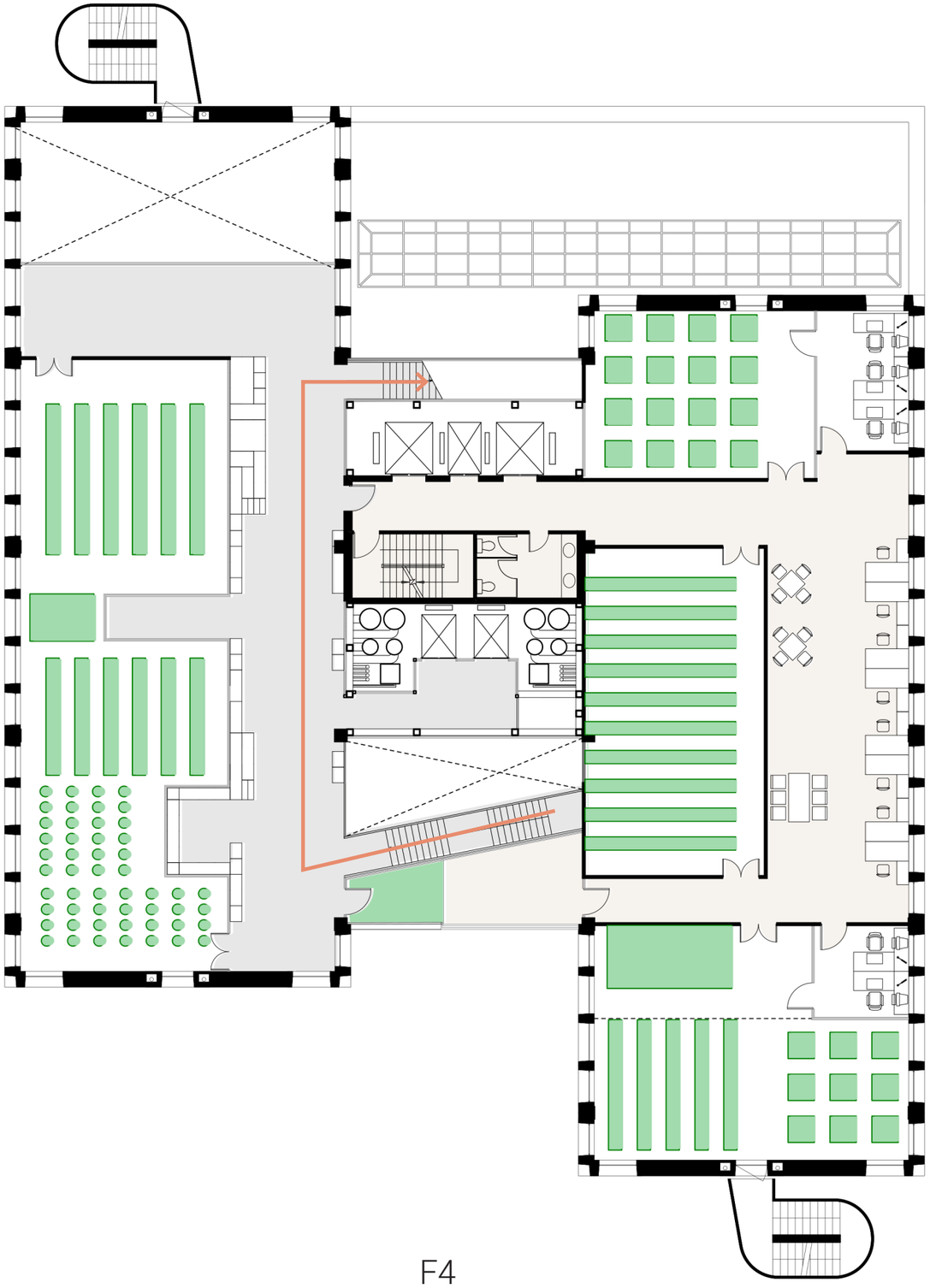

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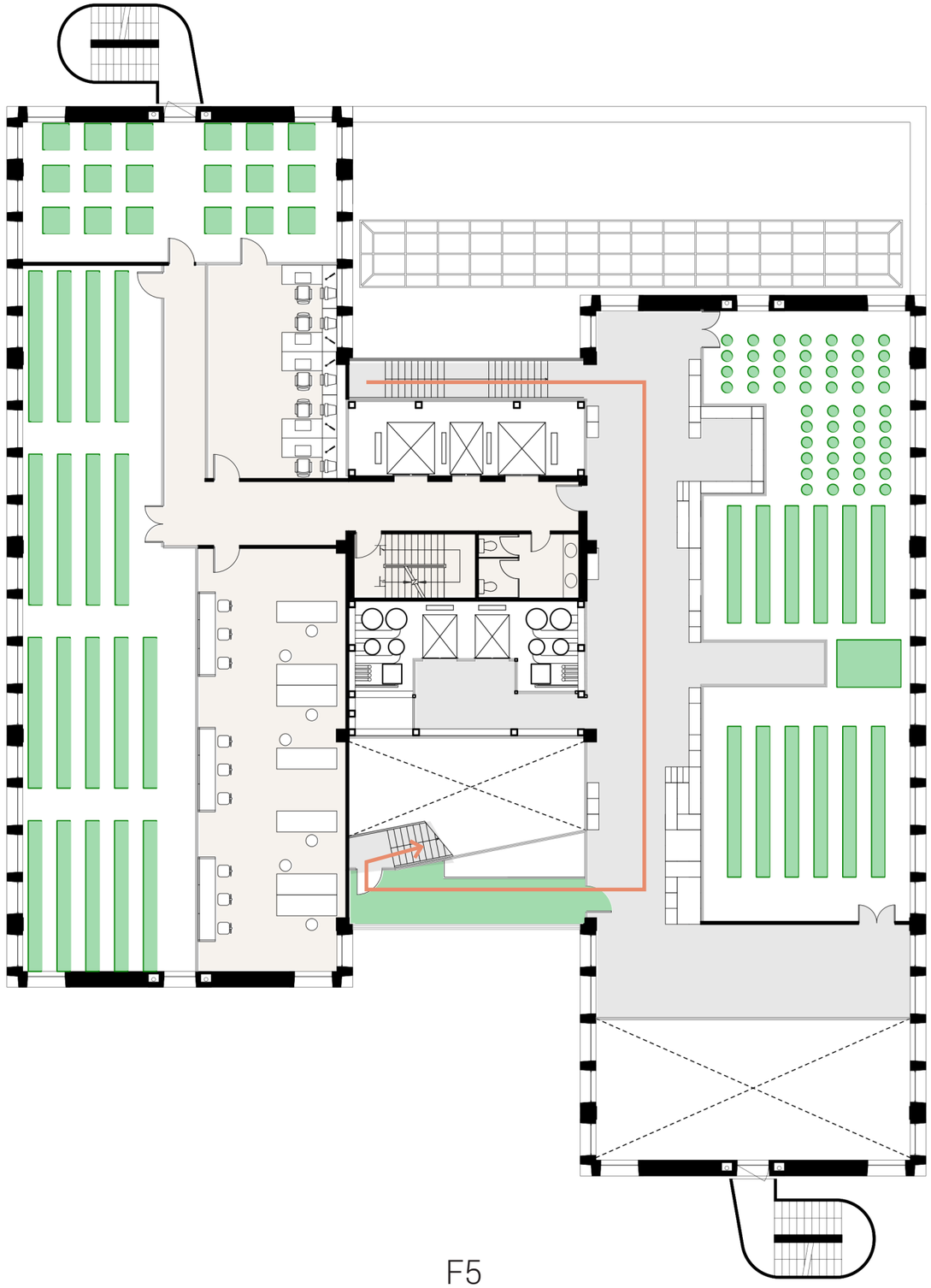

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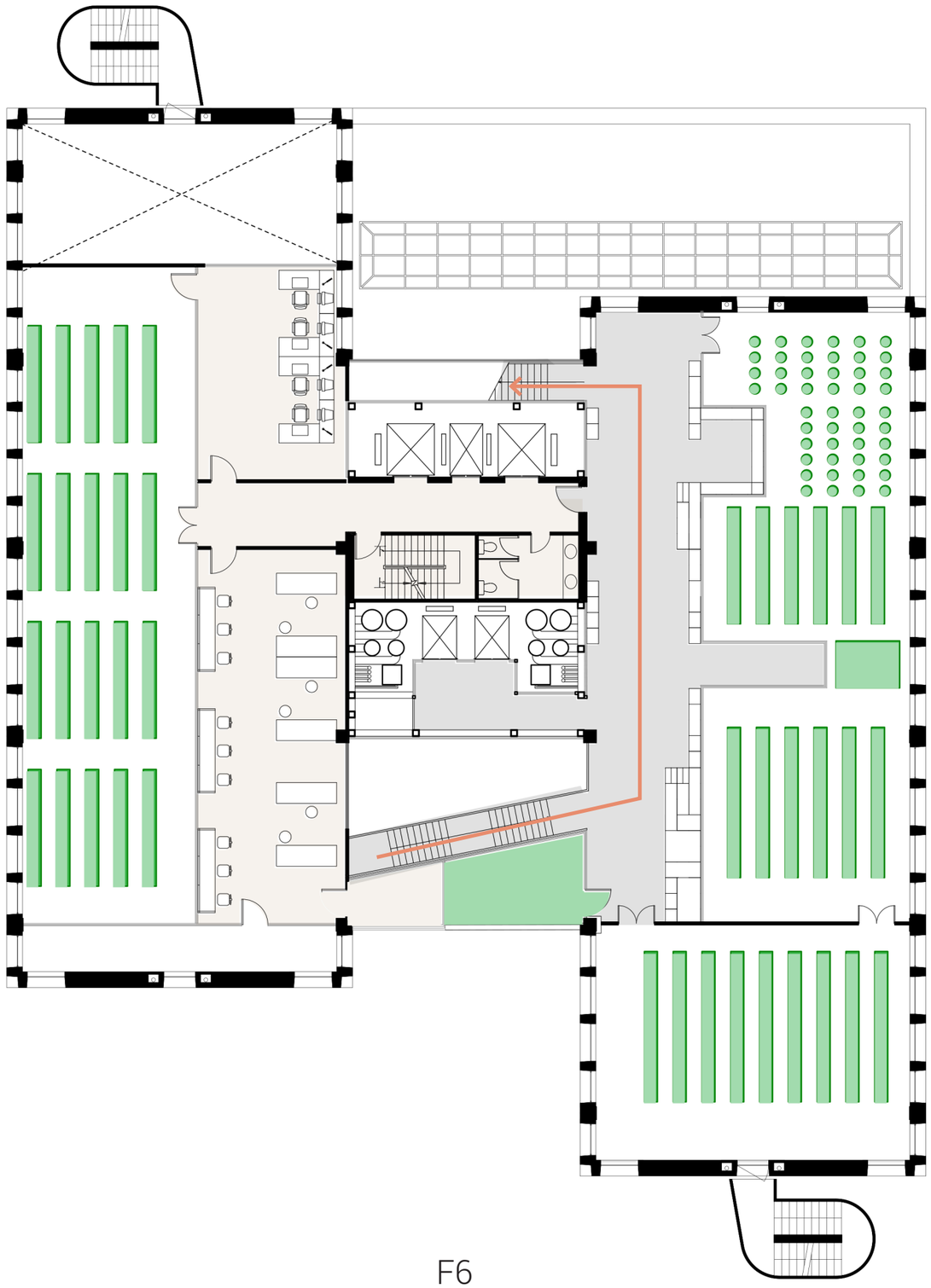

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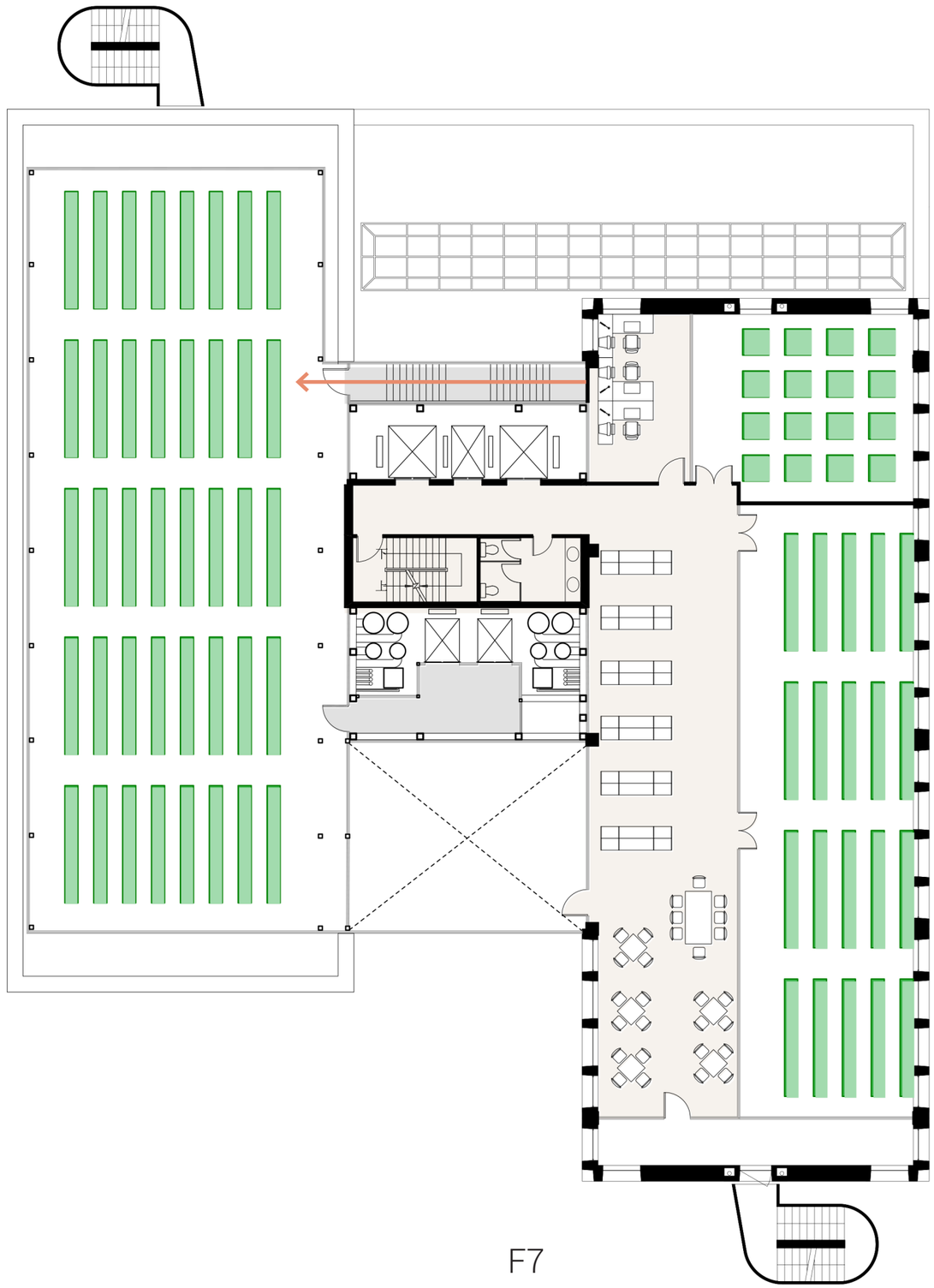

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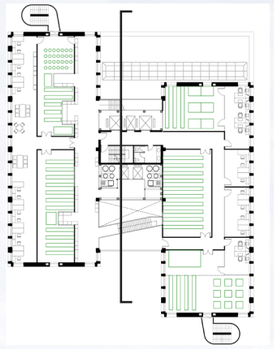
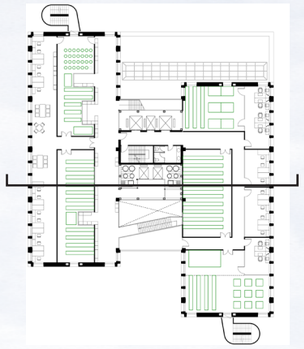
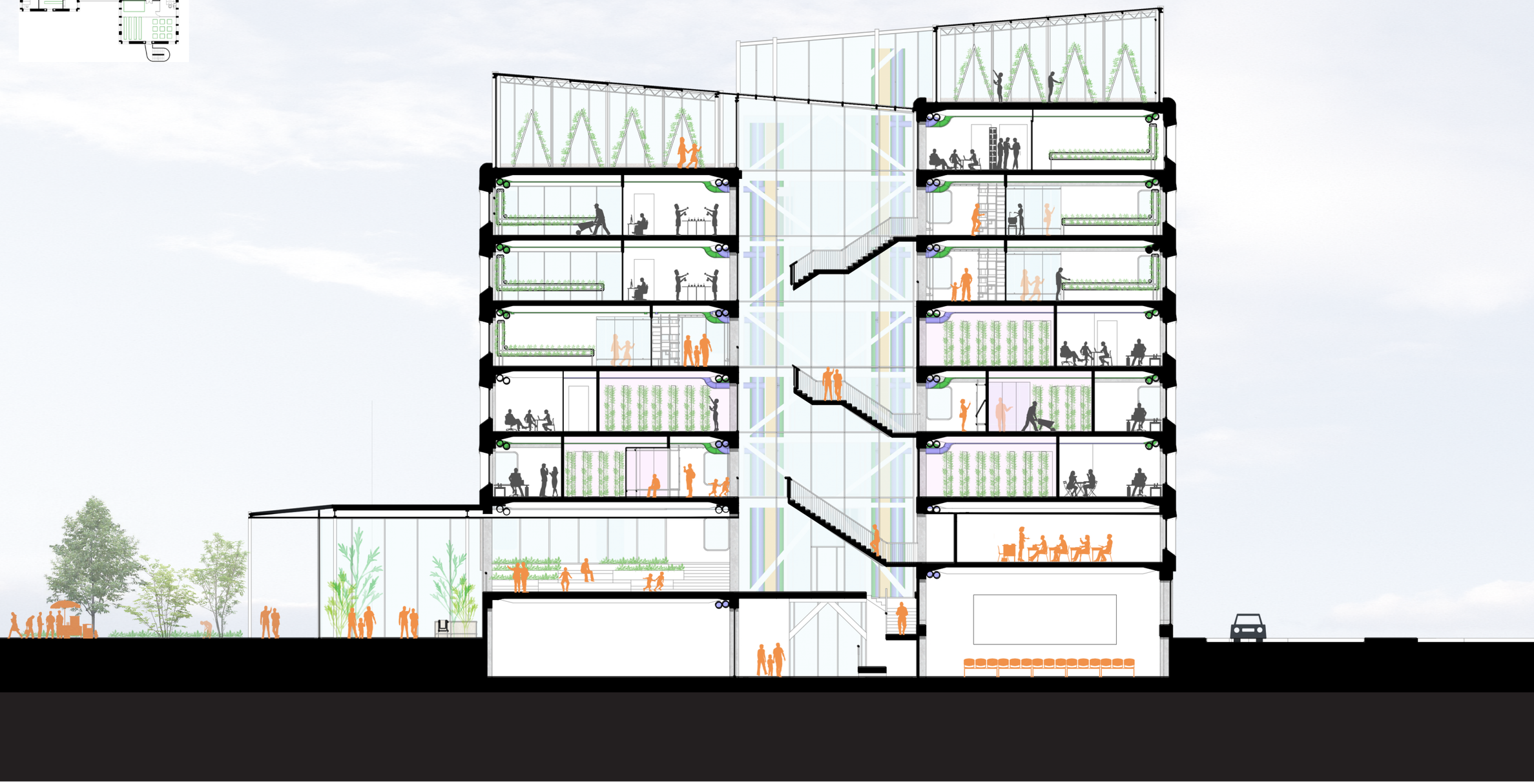


SECTION

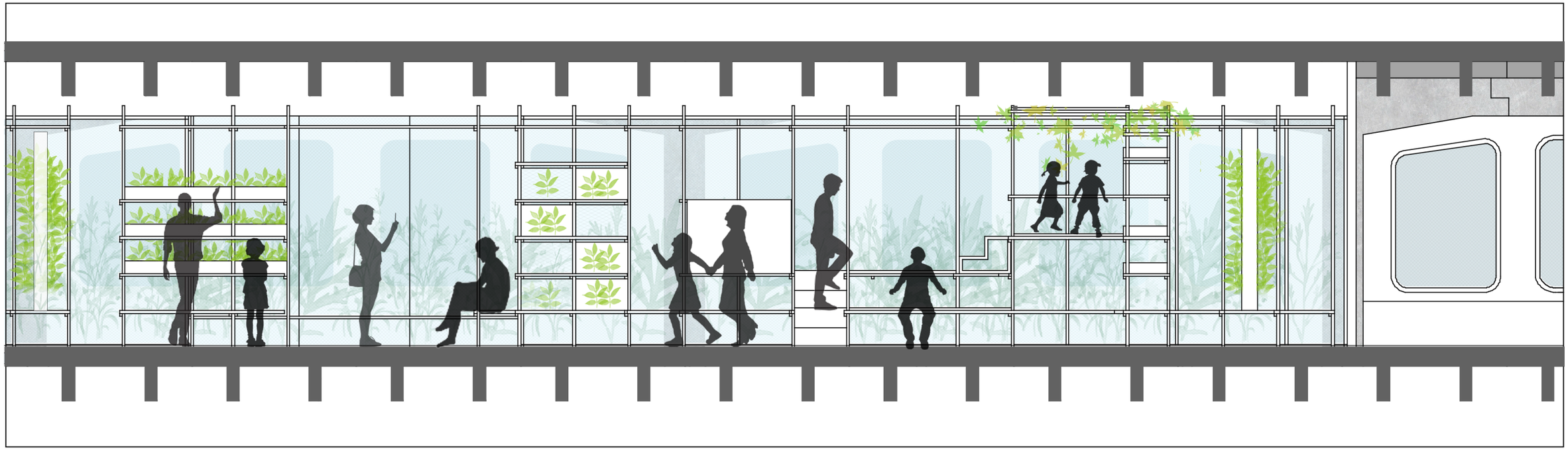
SECTION





EXHIBITION AREA DESIGN

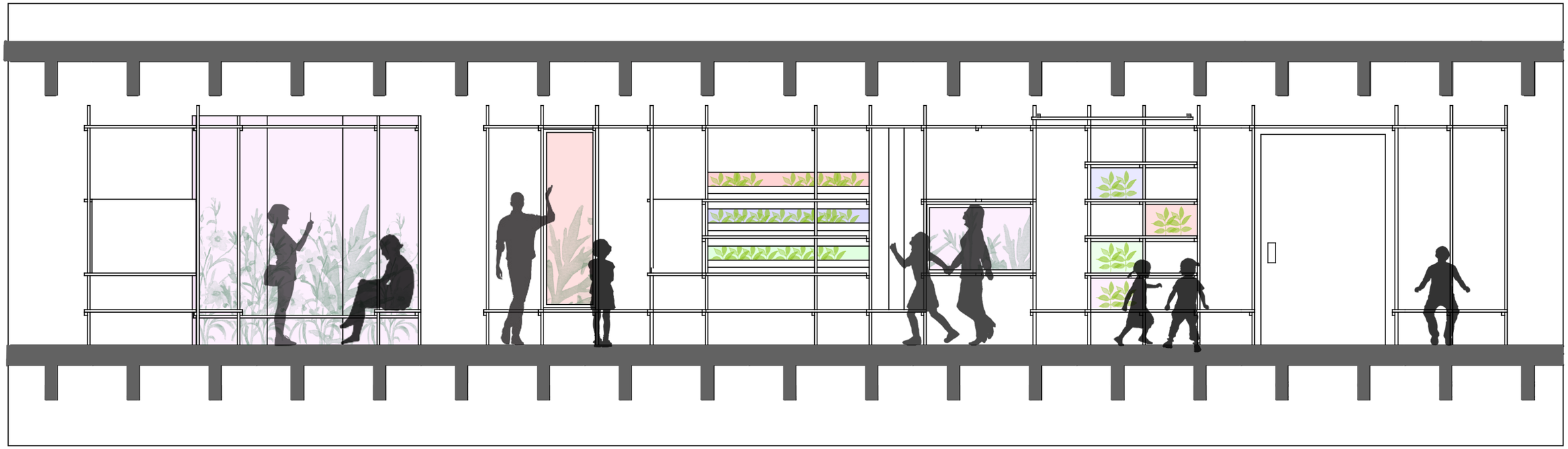
LIGHT URBAN FARM

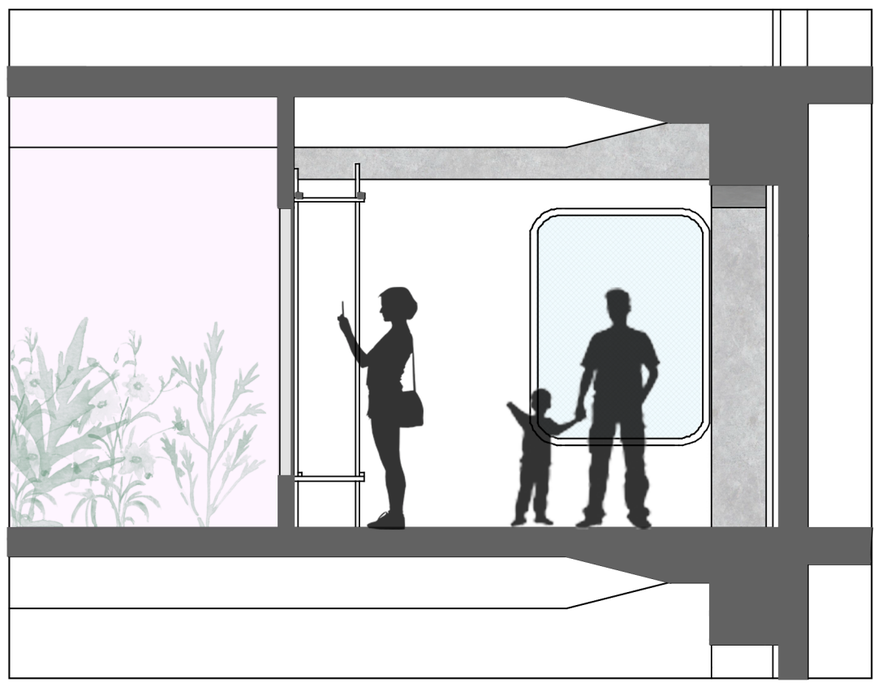




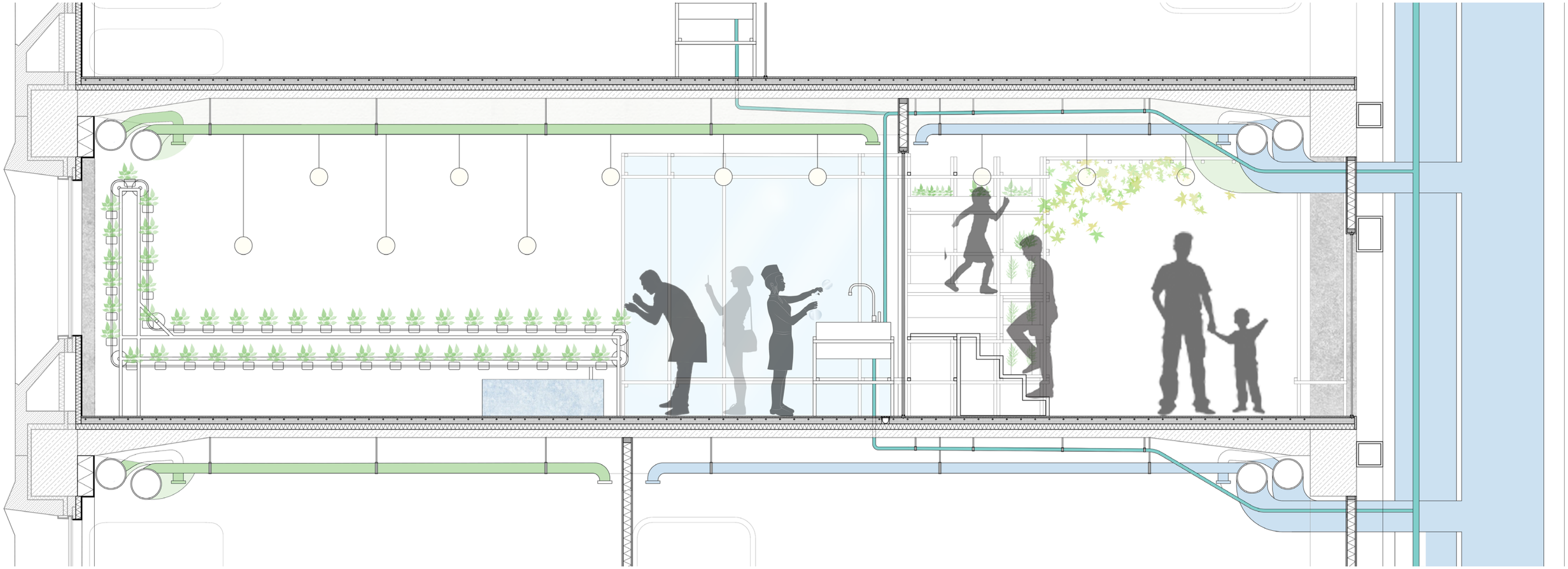
EXHIBITION AREA DESIGN

DARK URBAN FARM



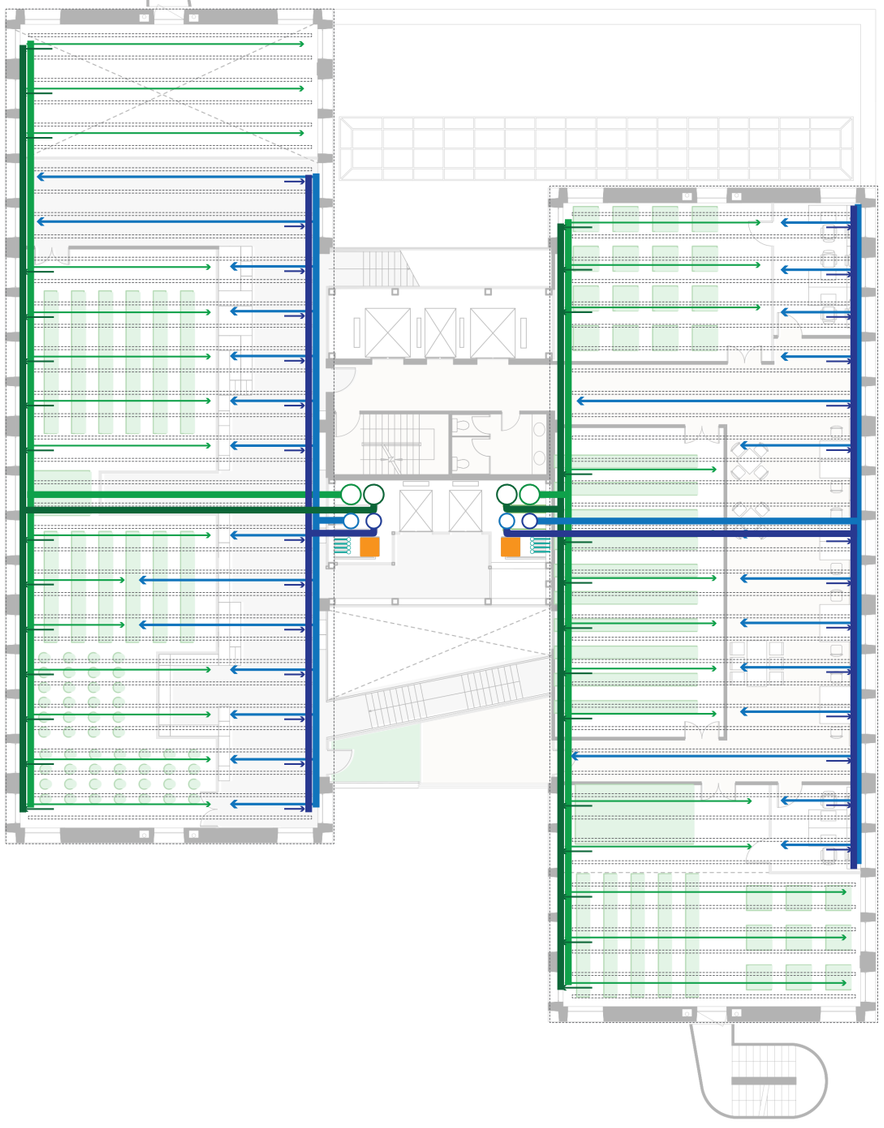


CONSTRUCTION DETAIL

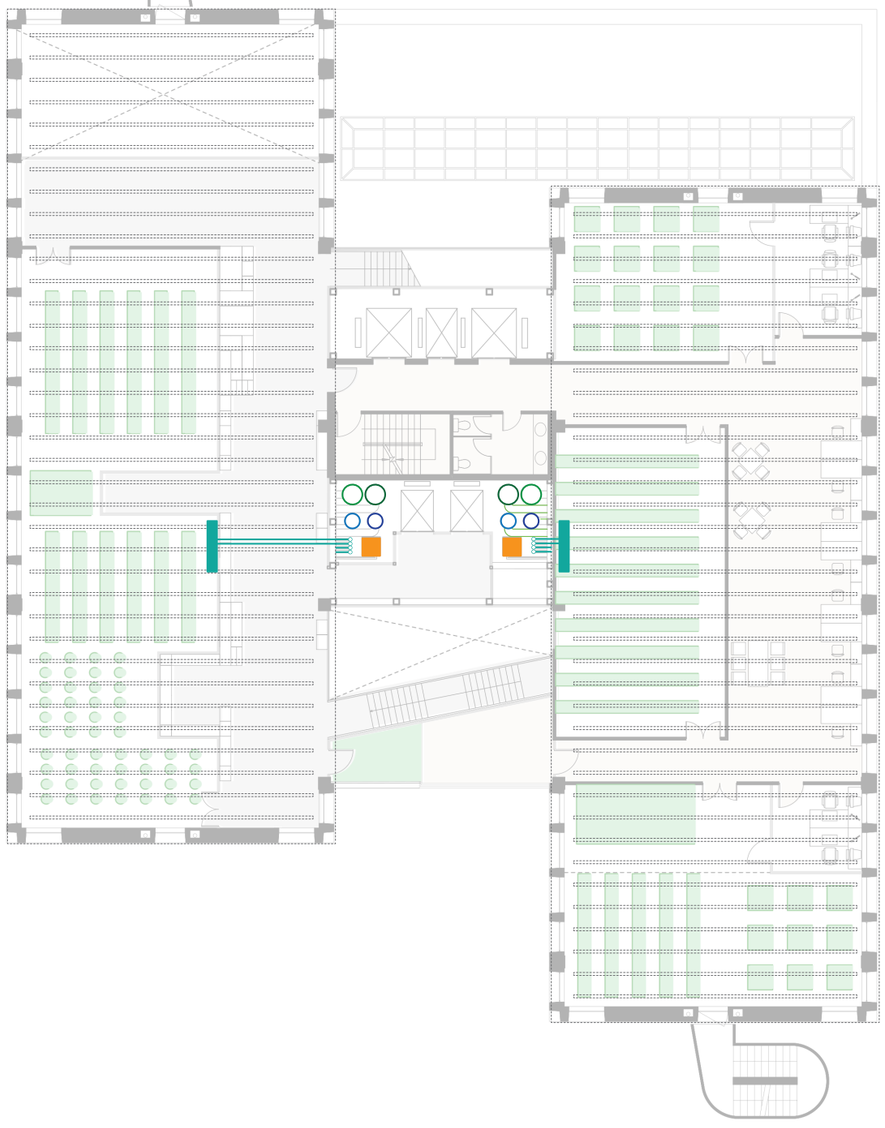


LAYOUT OF PIPE

VENTILATION



WATER PIPE



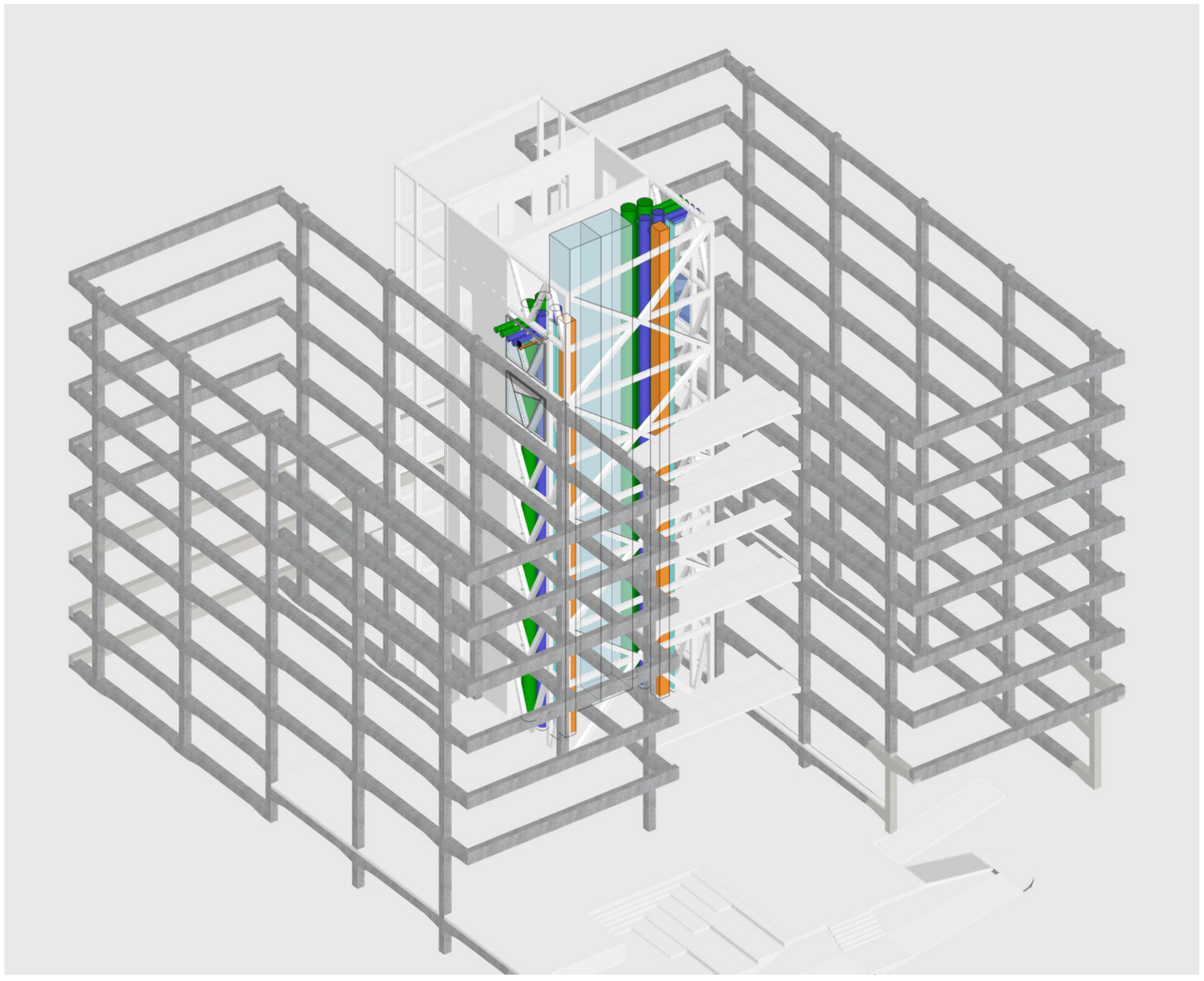
urban farm ventilation

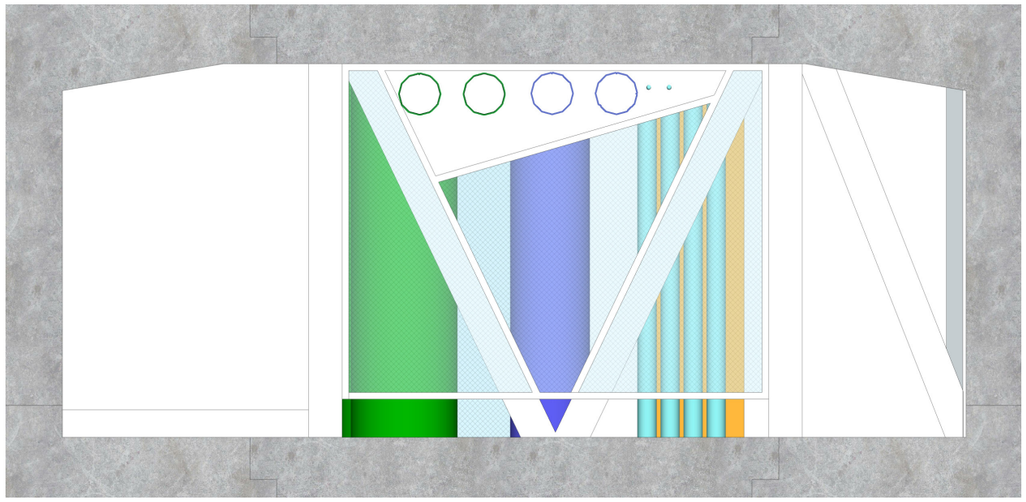
exhibition and office ventilation

water

electricity

LAYOUT OF PIPE





Size (Diameter/ mm)	Urban farm ventilation	Exhibition & Office Ventilation	Water pipe
Shaft pipe	800	600	100
Main pipe	300	300	
Secondary Pipe	100	100	30

urban farm ventilation

exhibition and office ventilation

water

electricity

LIGHT URBAN FARM



LIGHT URBAN FARM



DARK URBAN FARM



DOUBLE SKIN GREEN HOUSE



ATRIUM



FACADE DESIGN

FACADE DESIGN

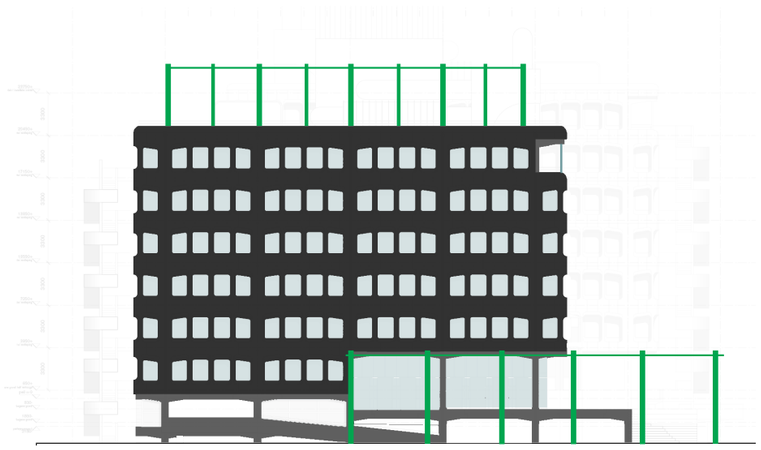
MATERIAL





FACADE DESIGN

CONCEPT







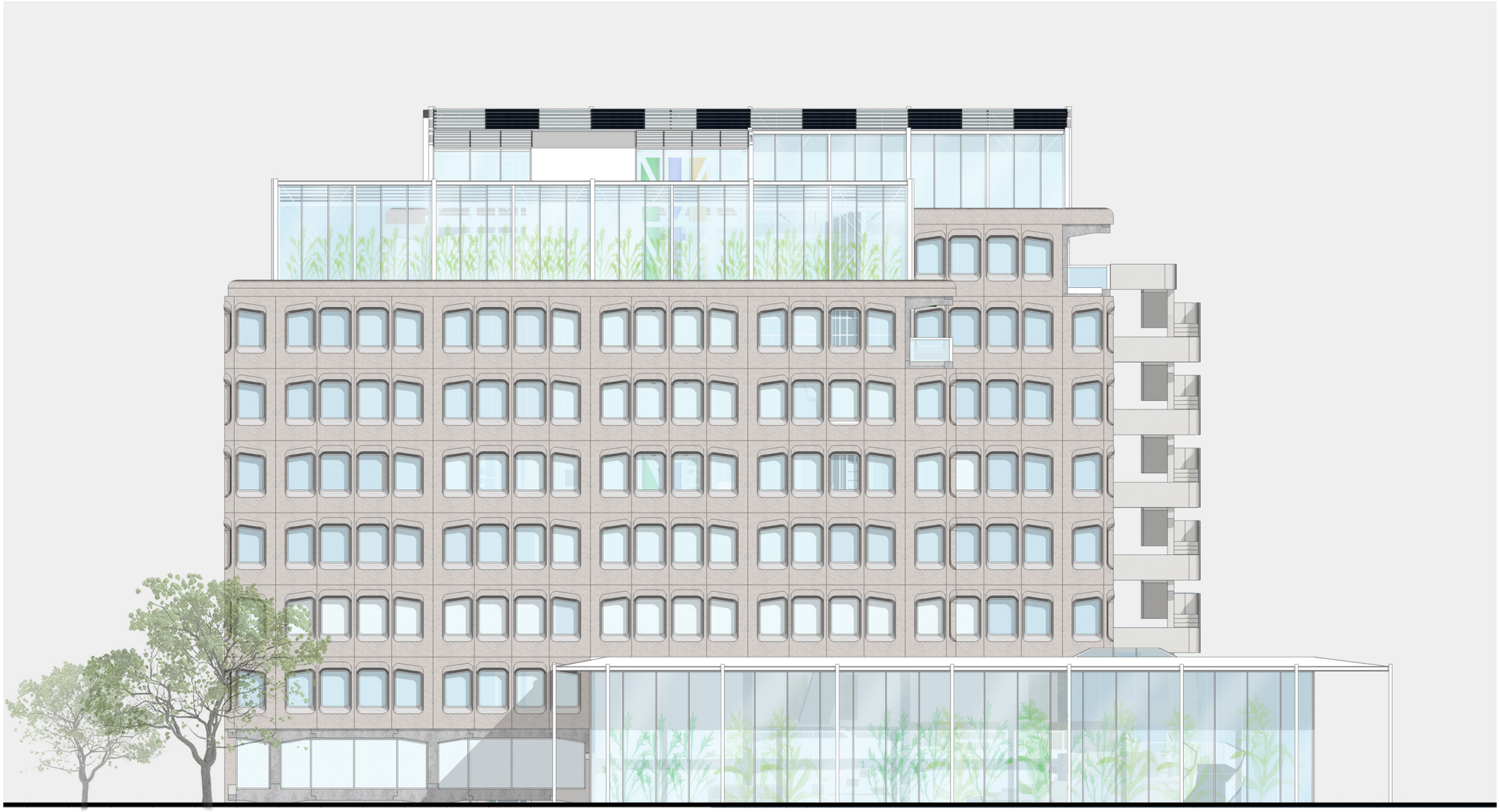
FACADE DESIGN

SOUTH ELEVATION

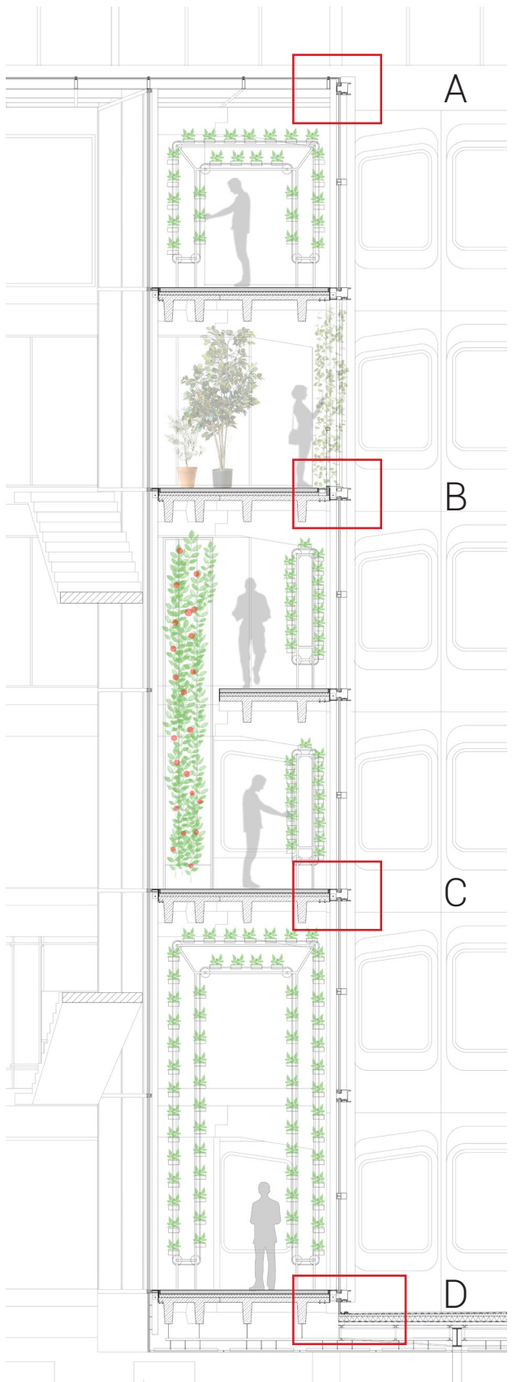


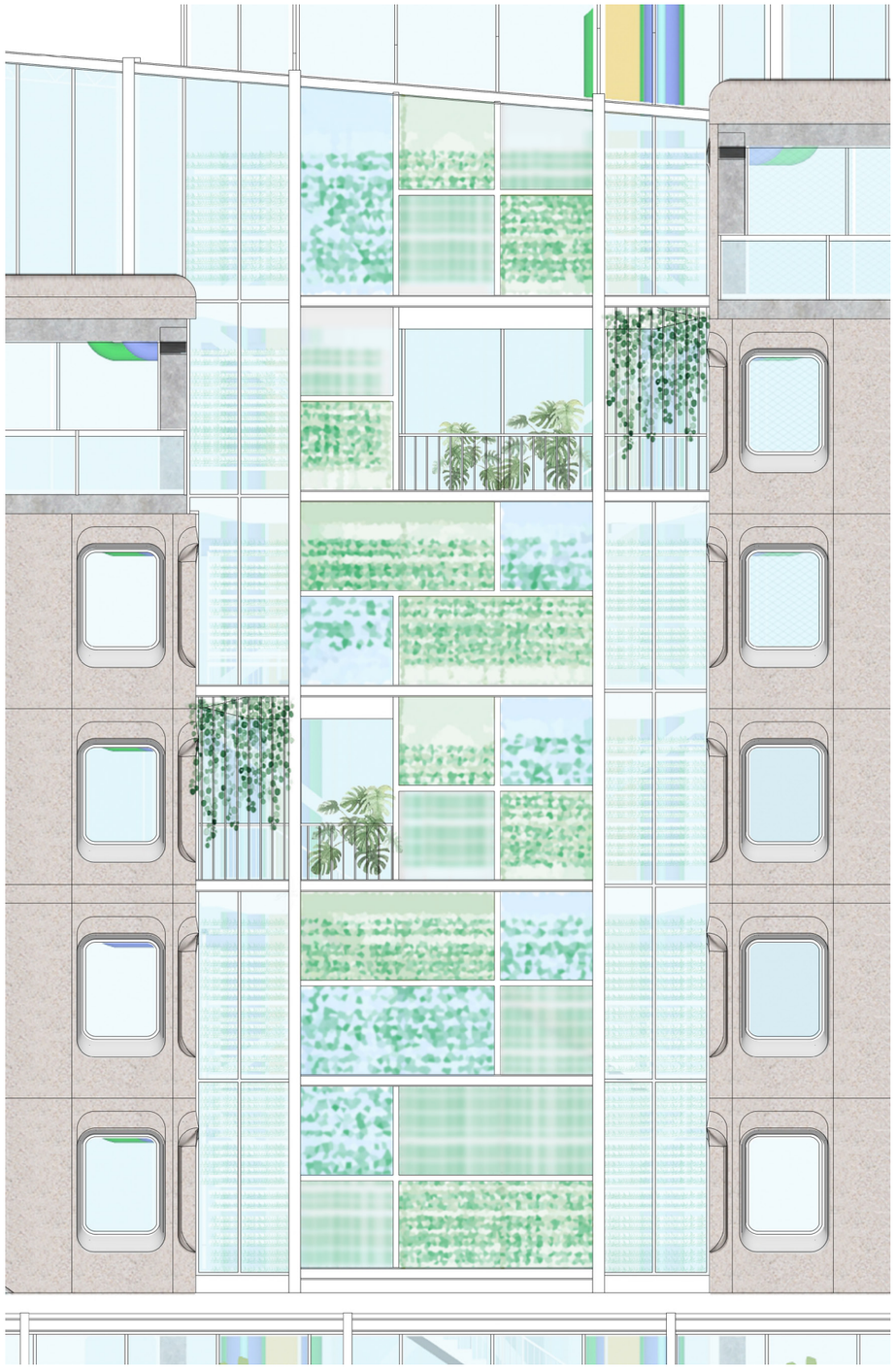
FACADE DESIGN

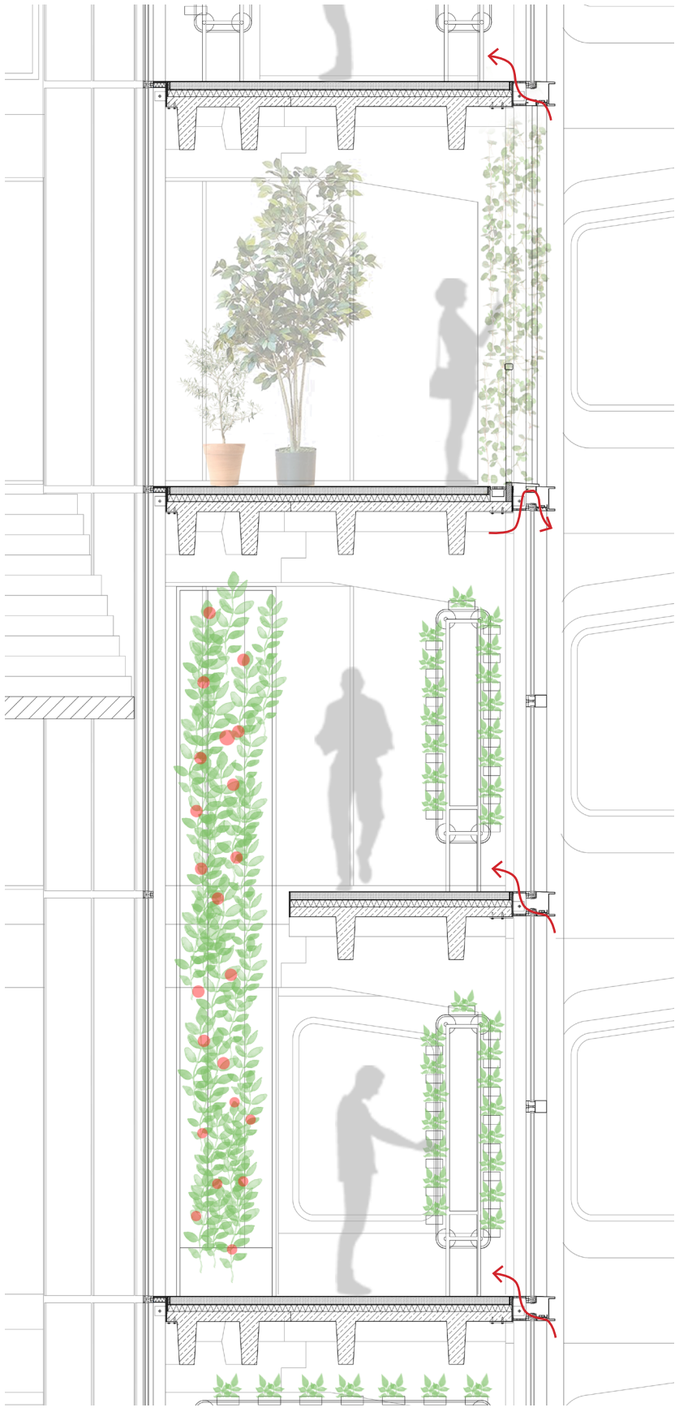
WEST ELEVATION



FACADE DATAIL



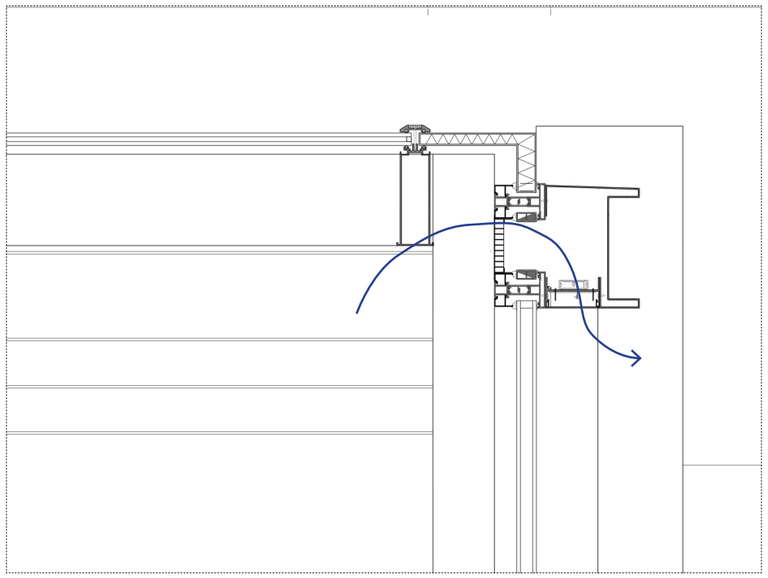






FACADE CONSTRUCTION

A



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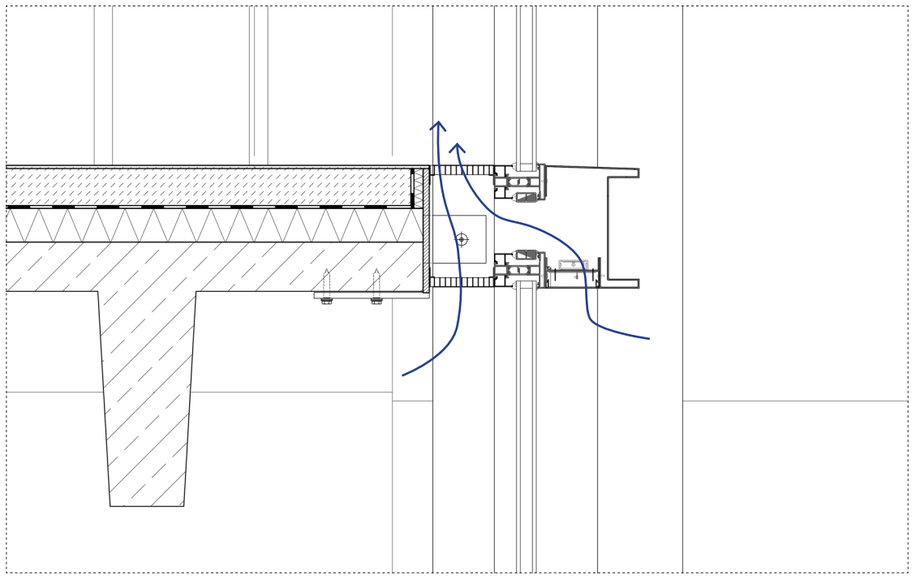
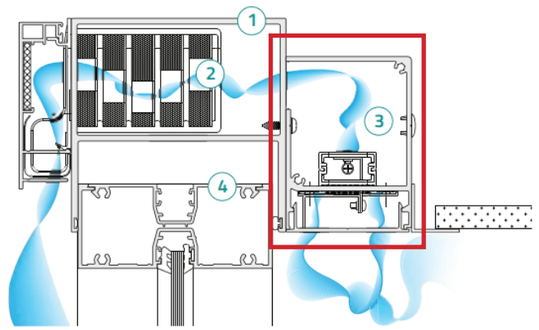


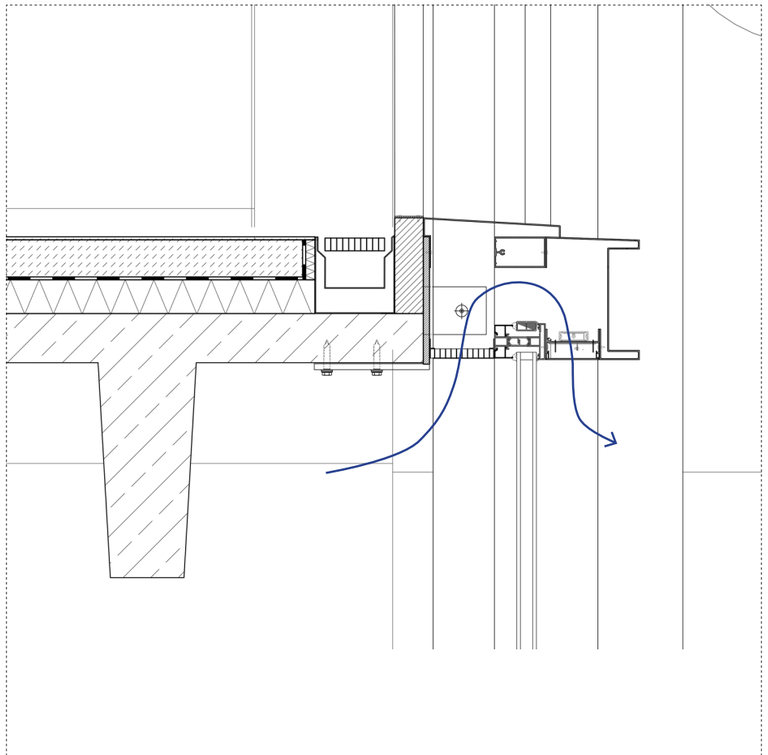


3 Trickle ventilation device incorporating bimetal shape memory alloy springs to automatically open or close the vent based on external air temperature.

AWS
ARCHITECTURAL WINDOW SYSTEMS PTY LTD

VENTIENT
Trickle ventilation system

B



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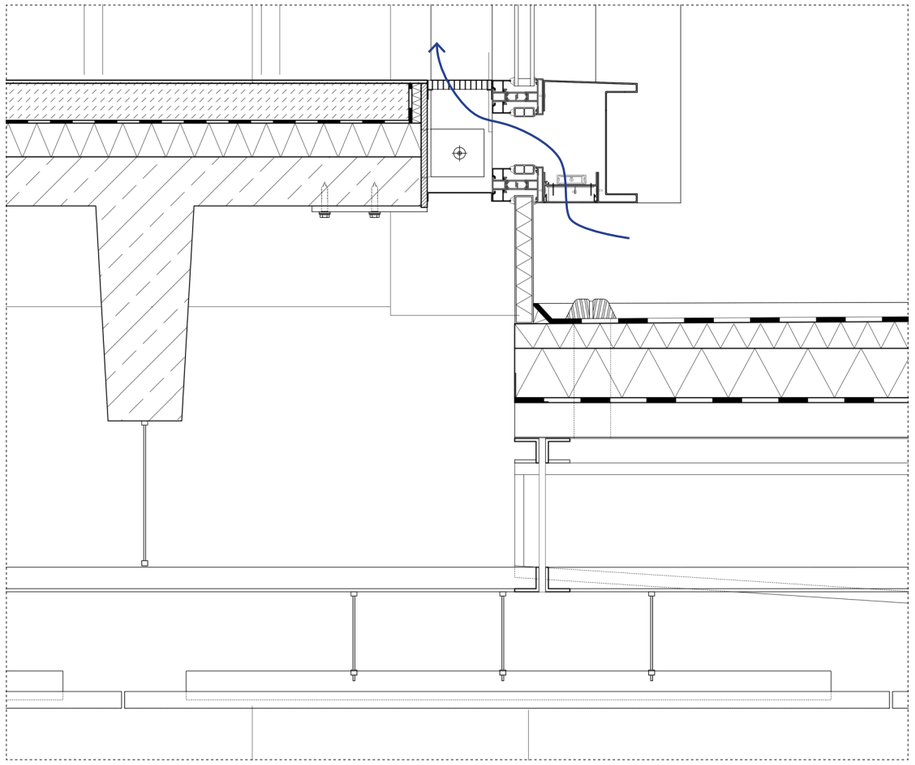
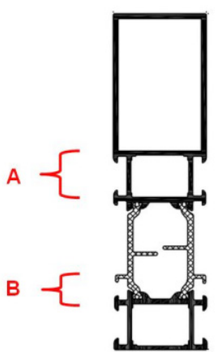
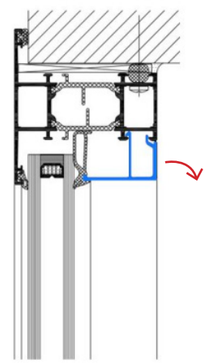
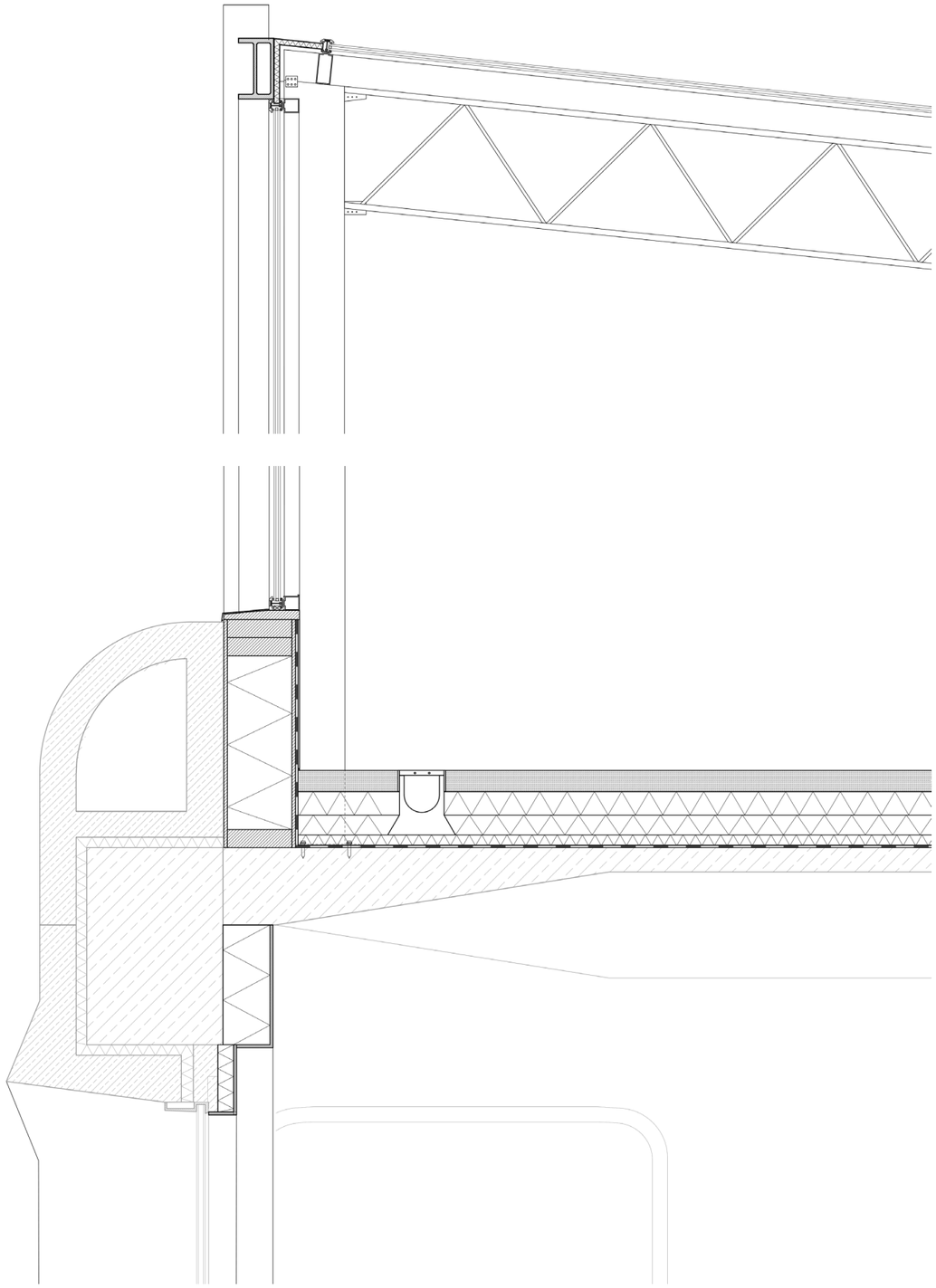
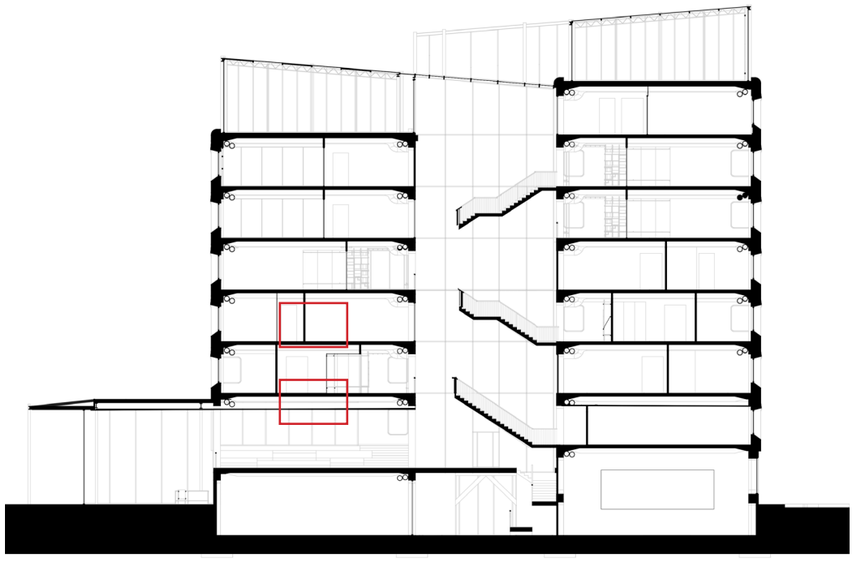


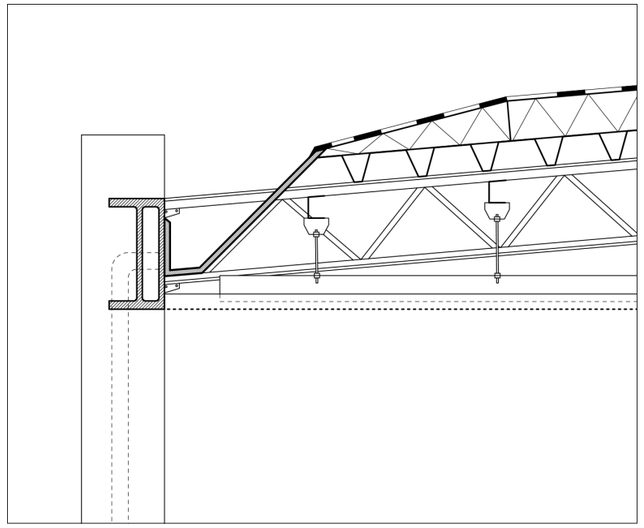


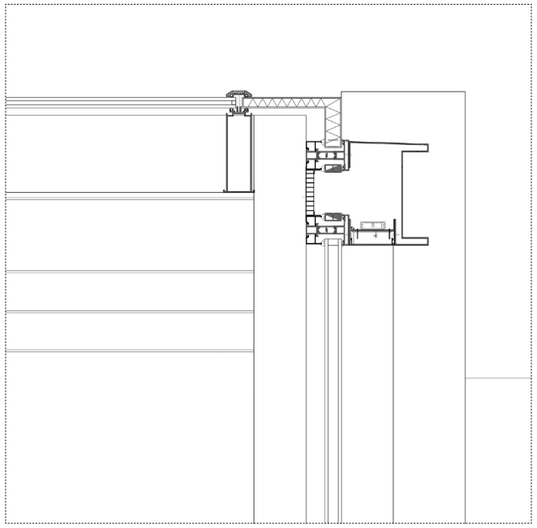


ROOF CONSTRUCTION

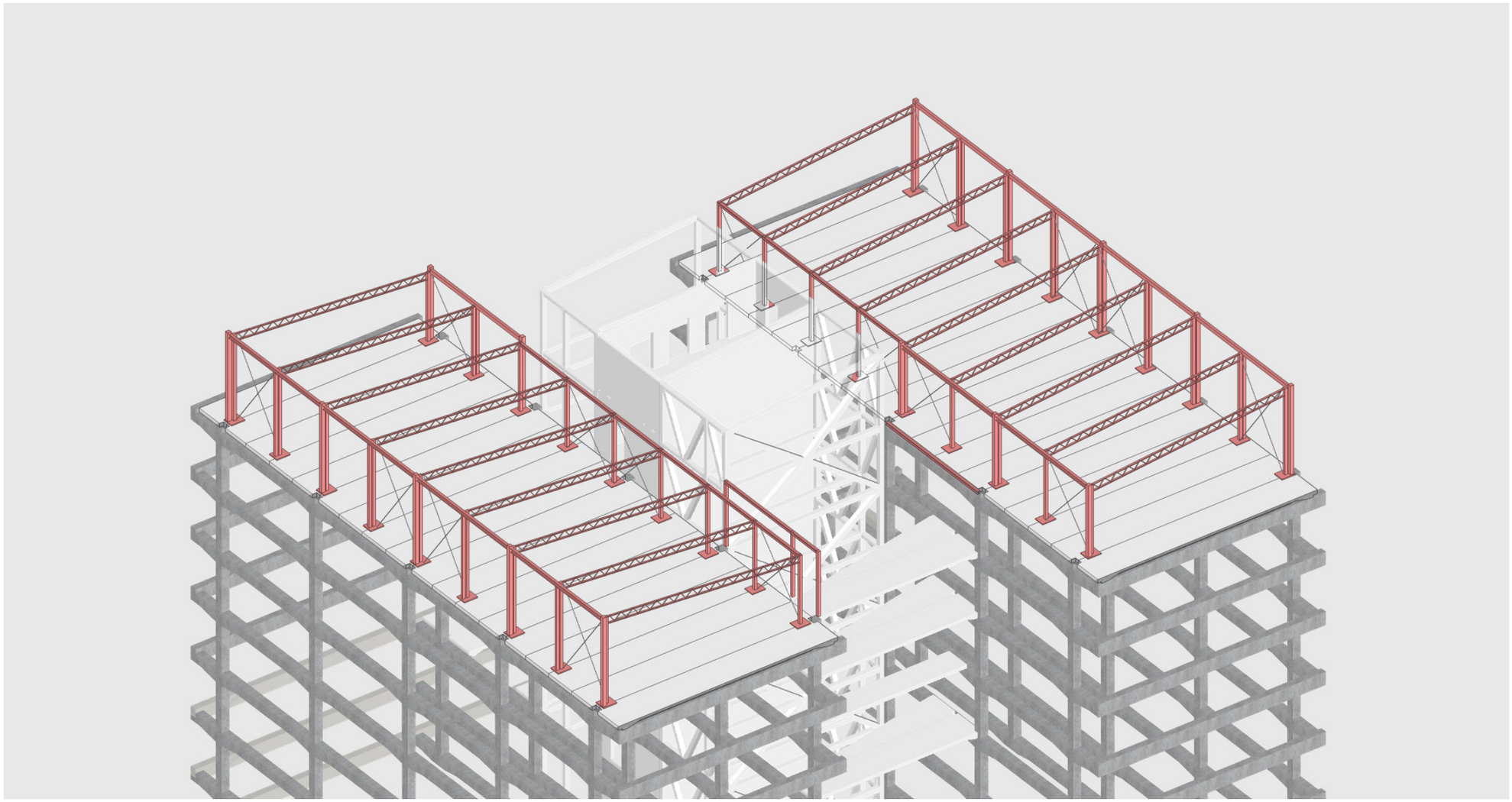






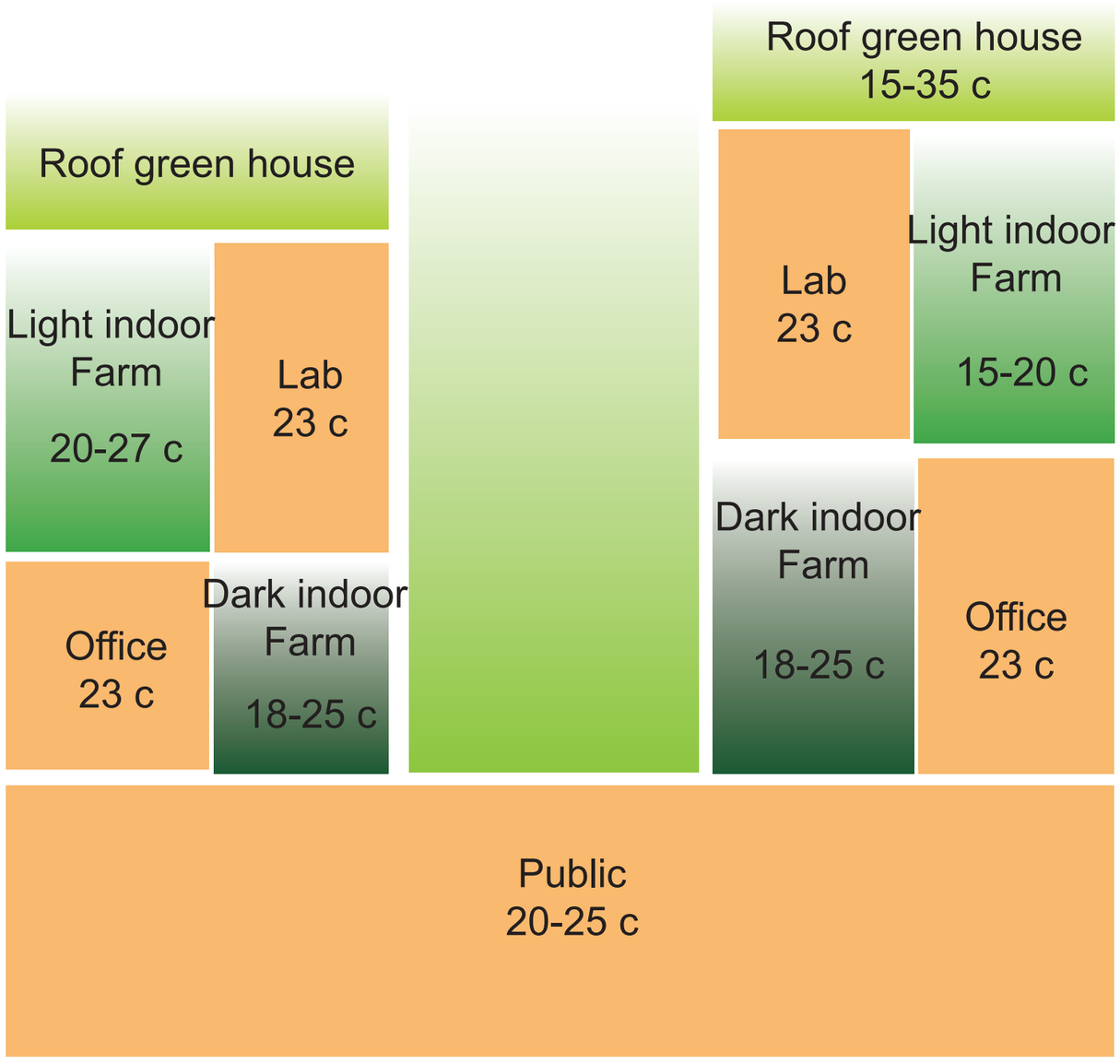


ROOF STRUCTURE



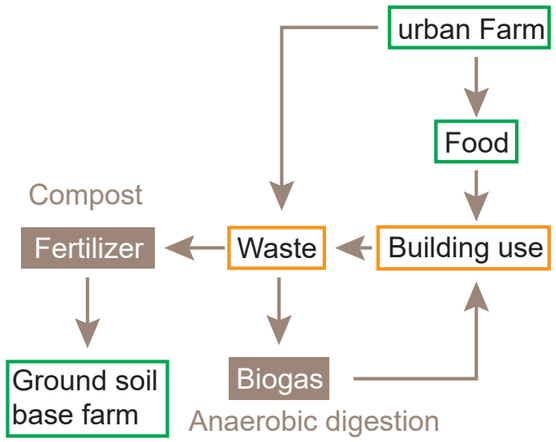
CLIAMTE DESIGN

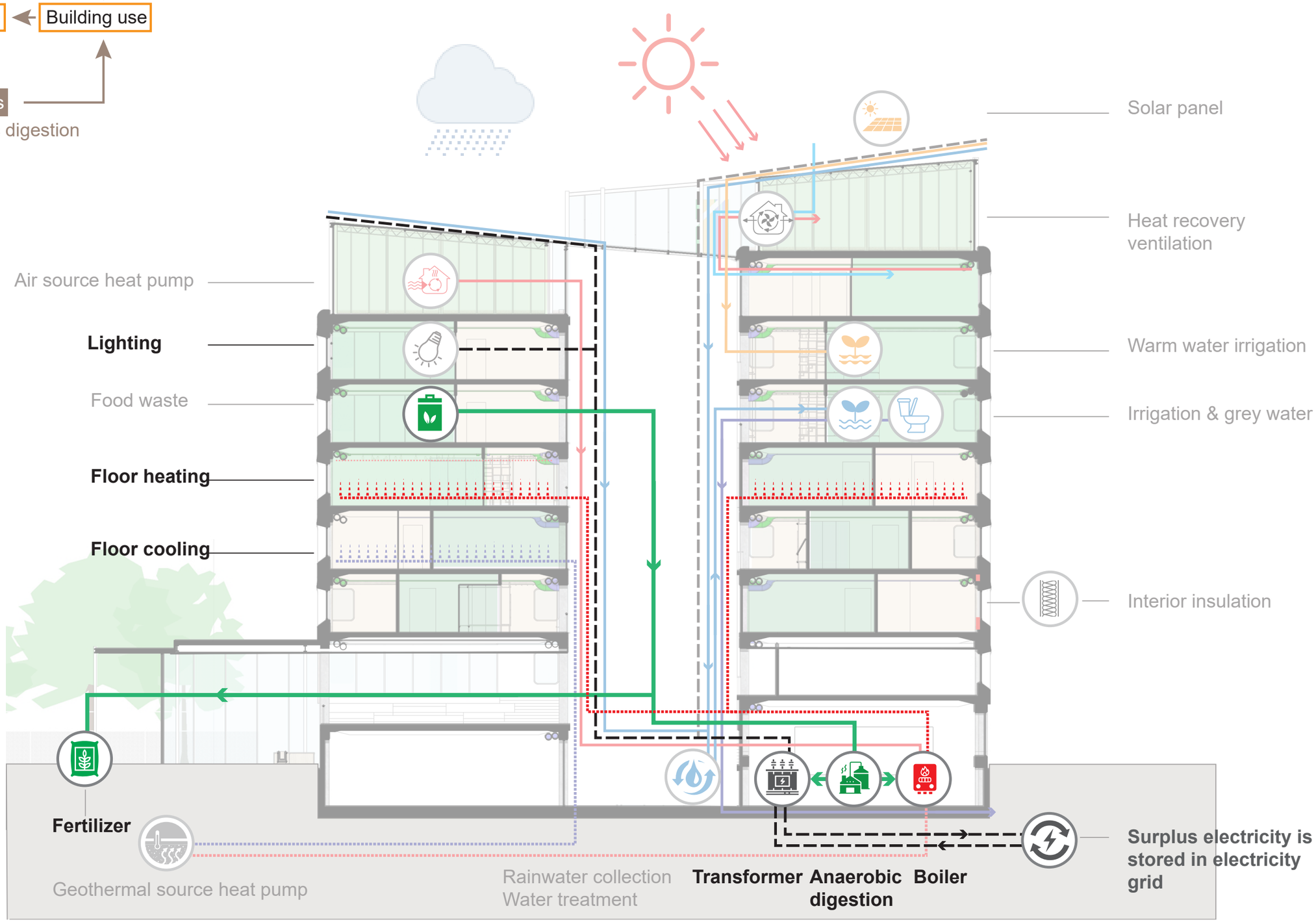
CLIMATE ZONE



CLIMATE SCHEME

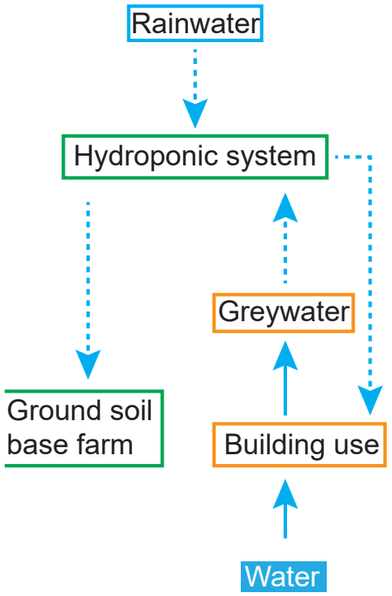
FOOD FLOW

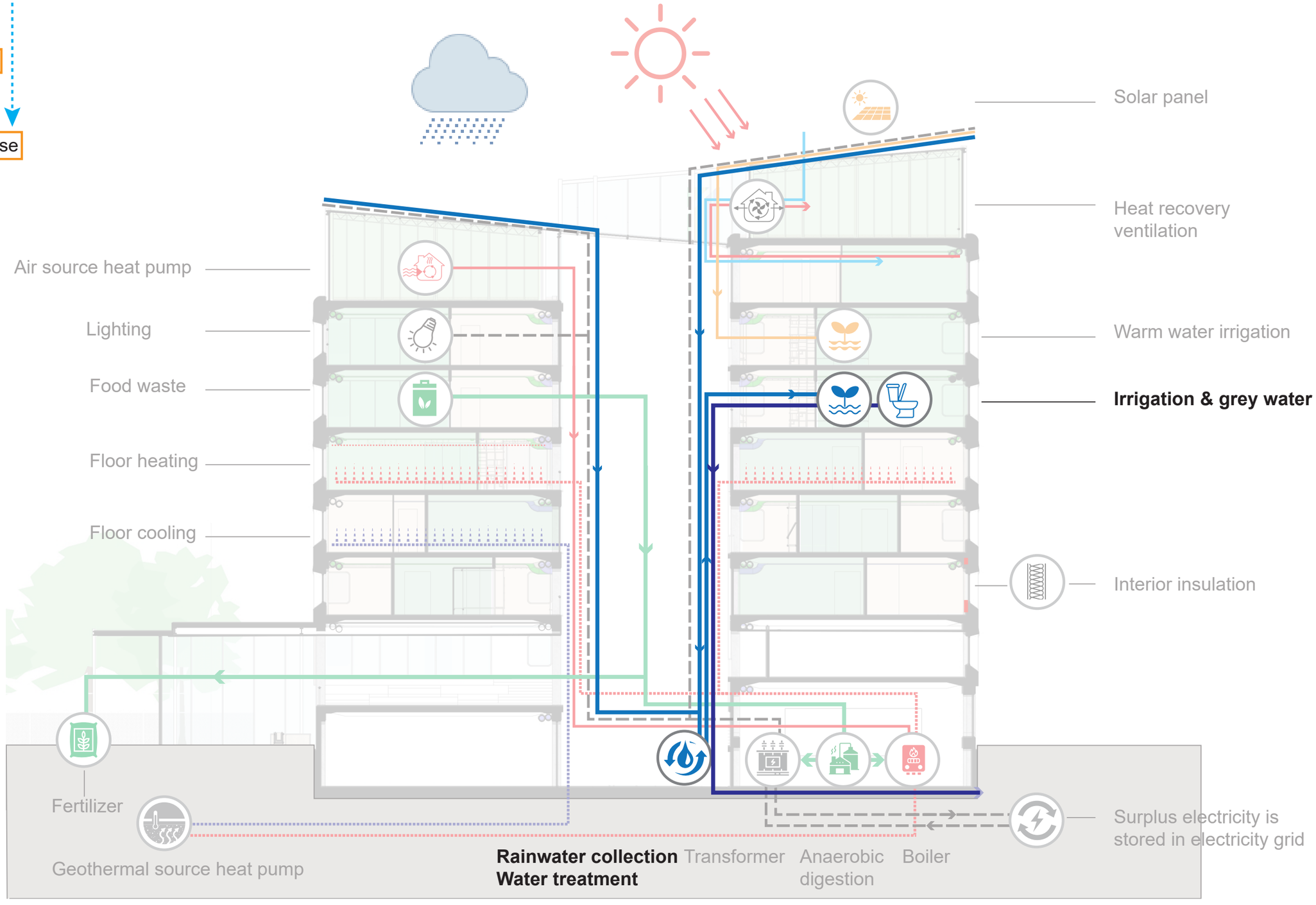




CLIMATE SCHEME

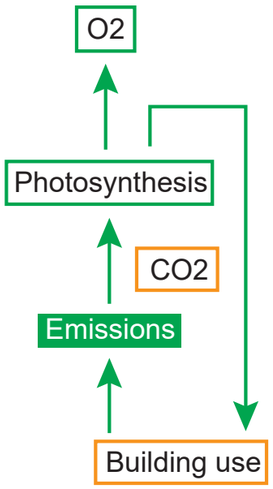
WATER RECYCLE

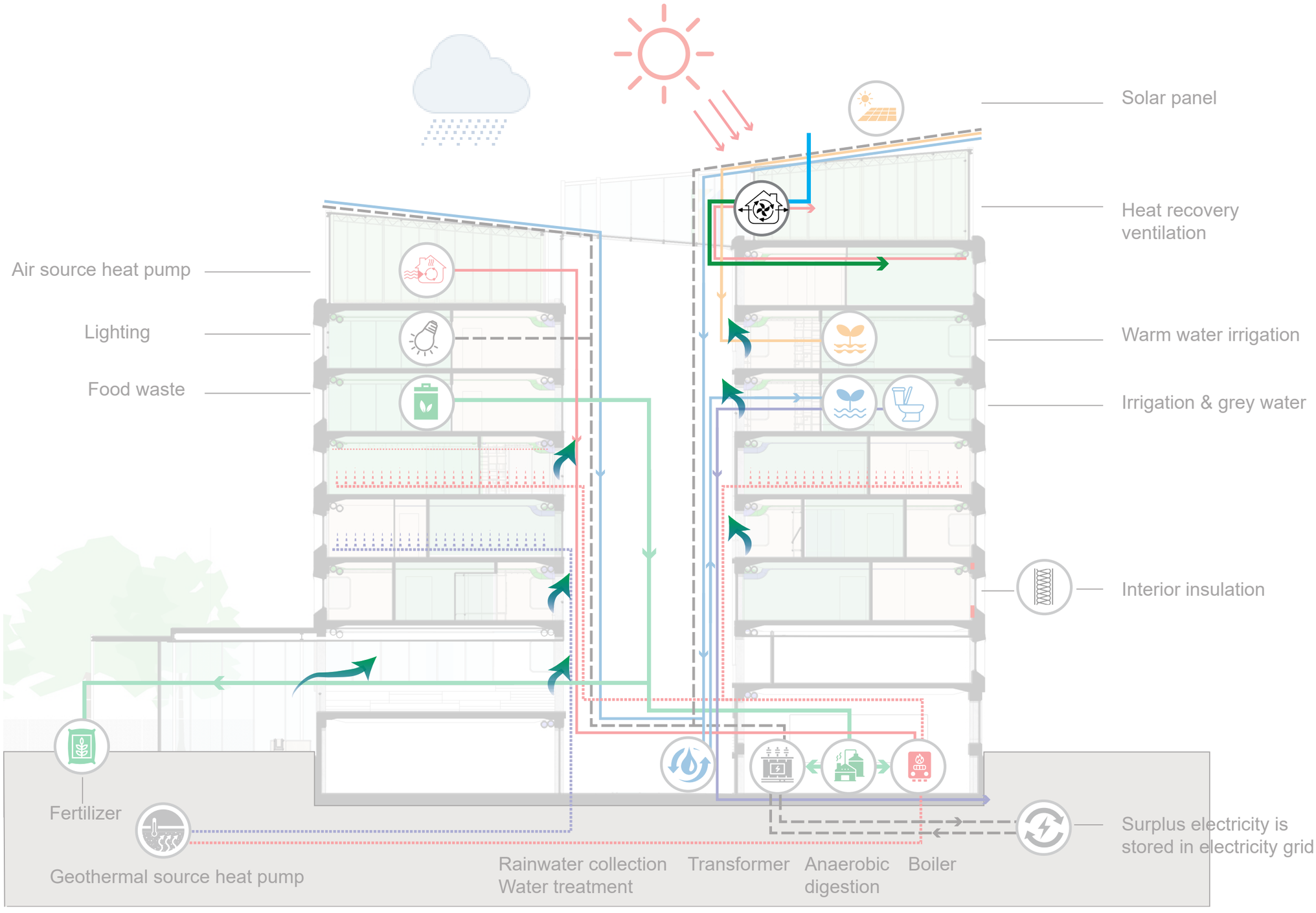




CLIMATE SCHEME

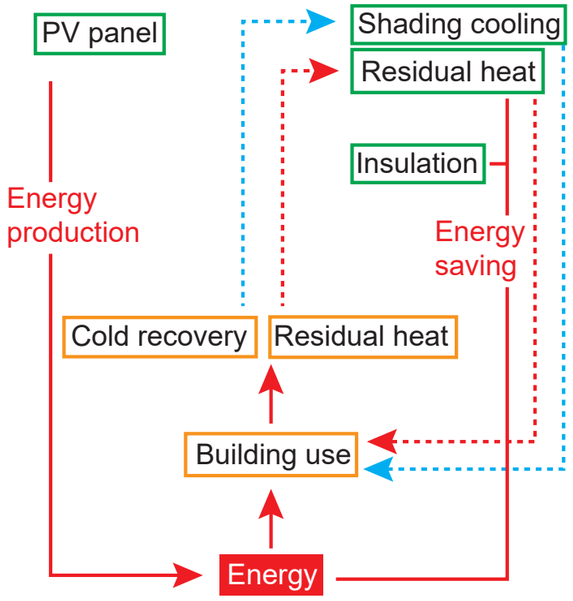
MINIMIZATION OF EMISSIONS

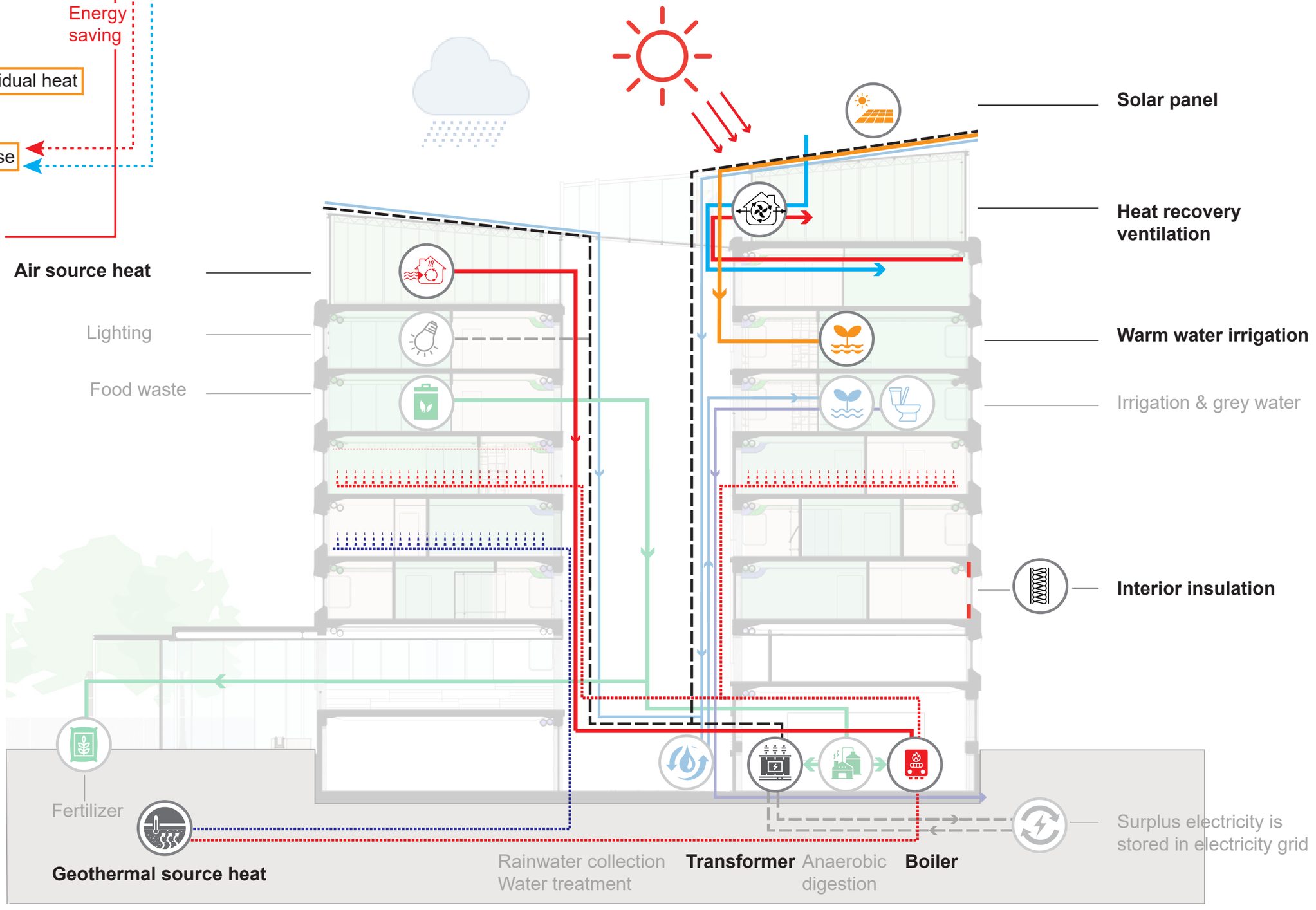




CLIMATE SCHEME

ENERGY SAVING





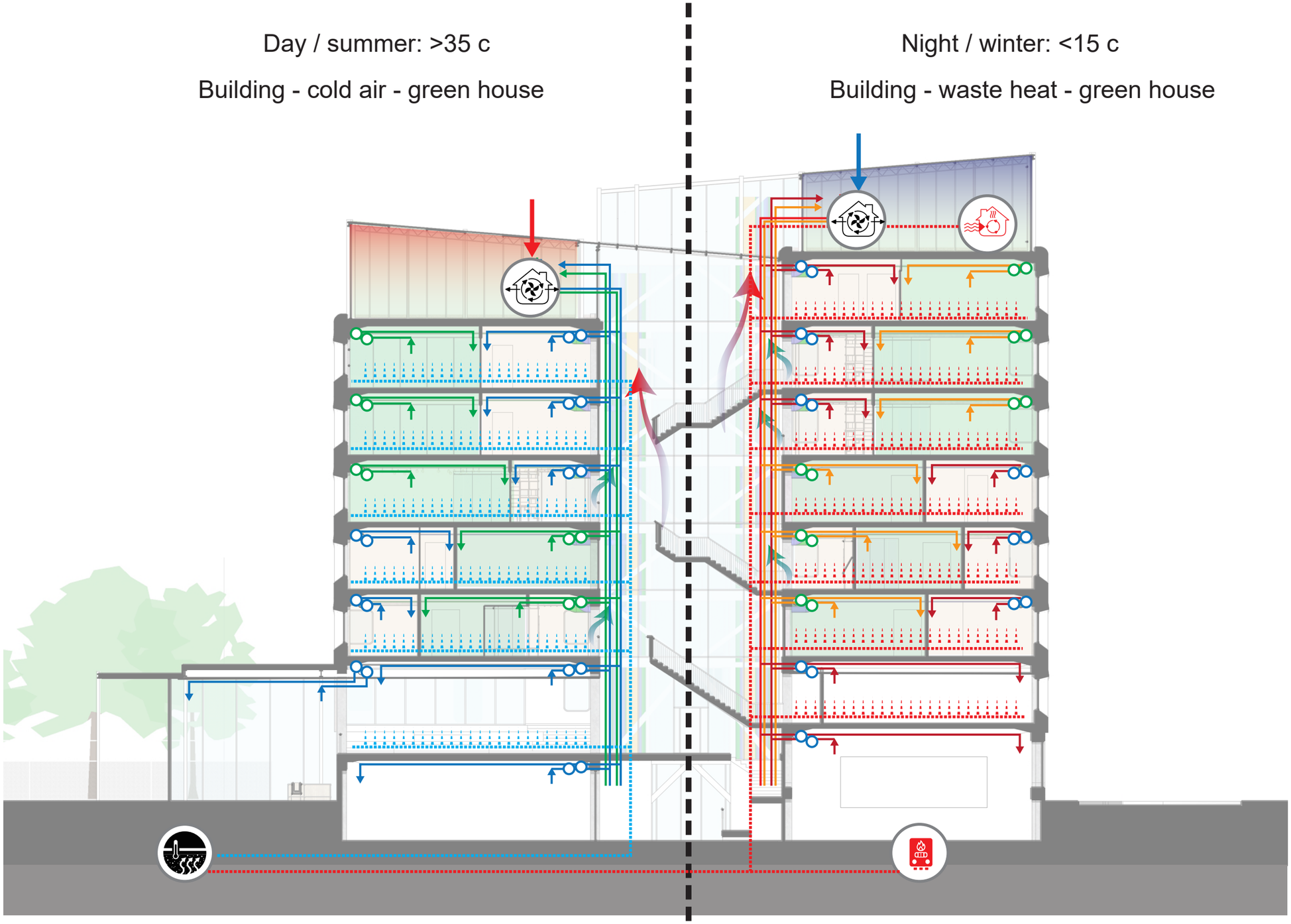
CLIMATE SCHEME

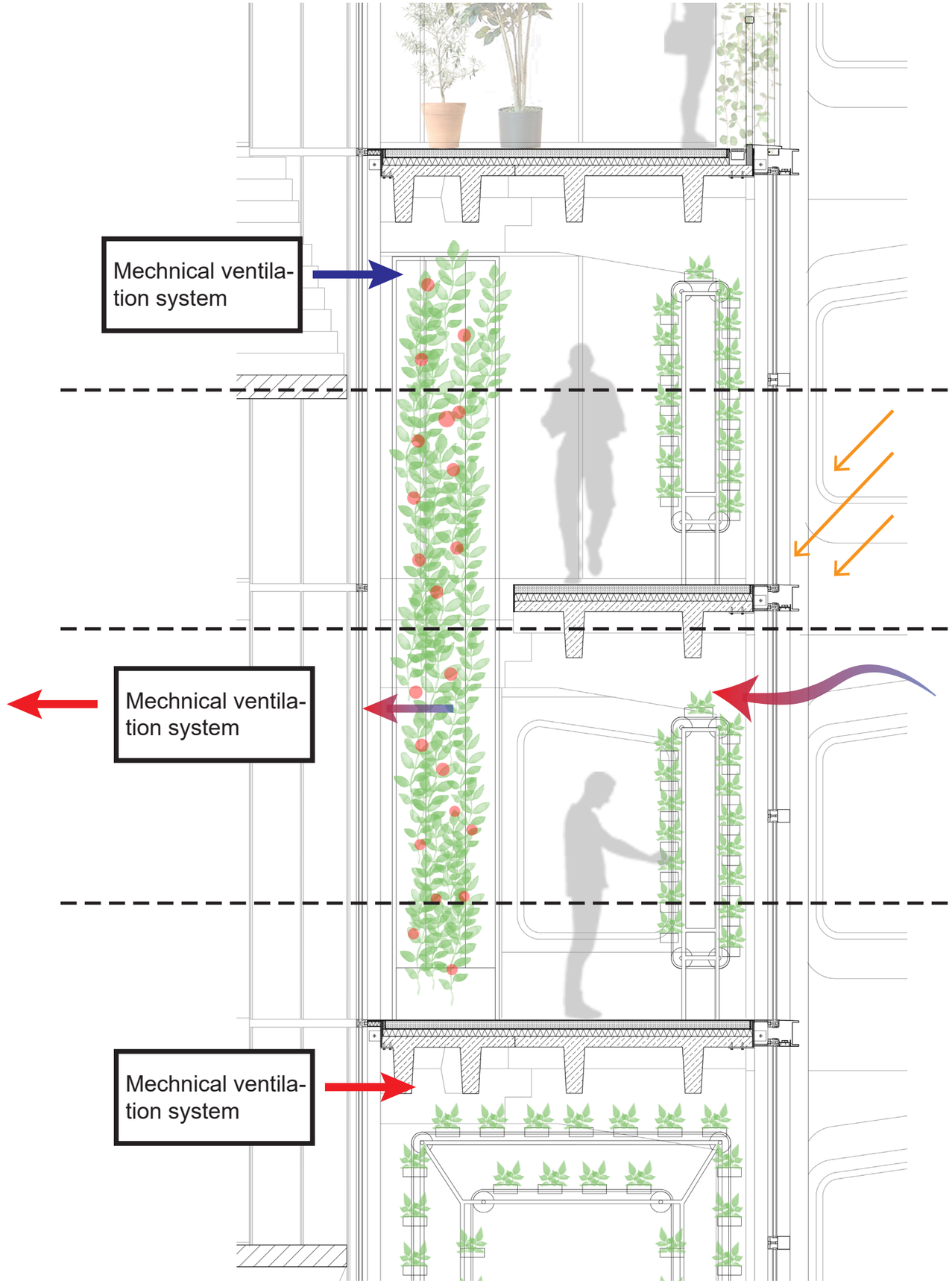
Day / summer: >35 c

Building - cold air - green house

Night / winter: <15 c

Building - waste heat - green house





Summer

Inside: cool temperature
Double skin: too high temperature
Conduct the cool air to maintain the temperature of green house

Summer

The plants as shading to reduce heat gain

Winter

Preheated / prehuminidified outside air to reduce heat demand

Winter night

Exhausted air with residual heat conduct to the double skin green house to maintain the temperature

GREEN INTERVENTION



GREEN INTERVENTION



GREEN INTERVENTION



GREEN INTERVENTION

