Advanced housing Design

Farming Condenser

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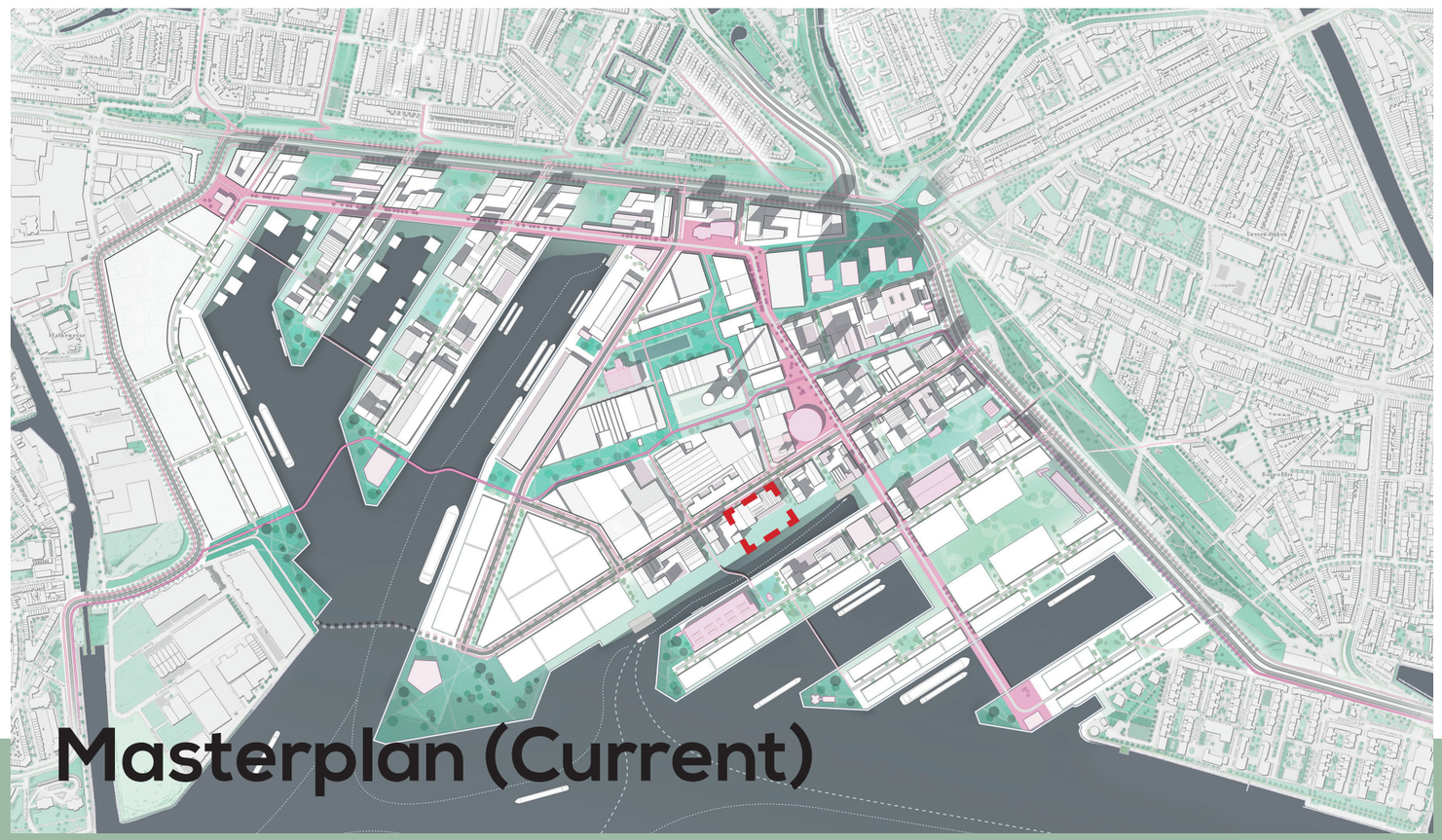
M4H - Rotterdam

Sky view



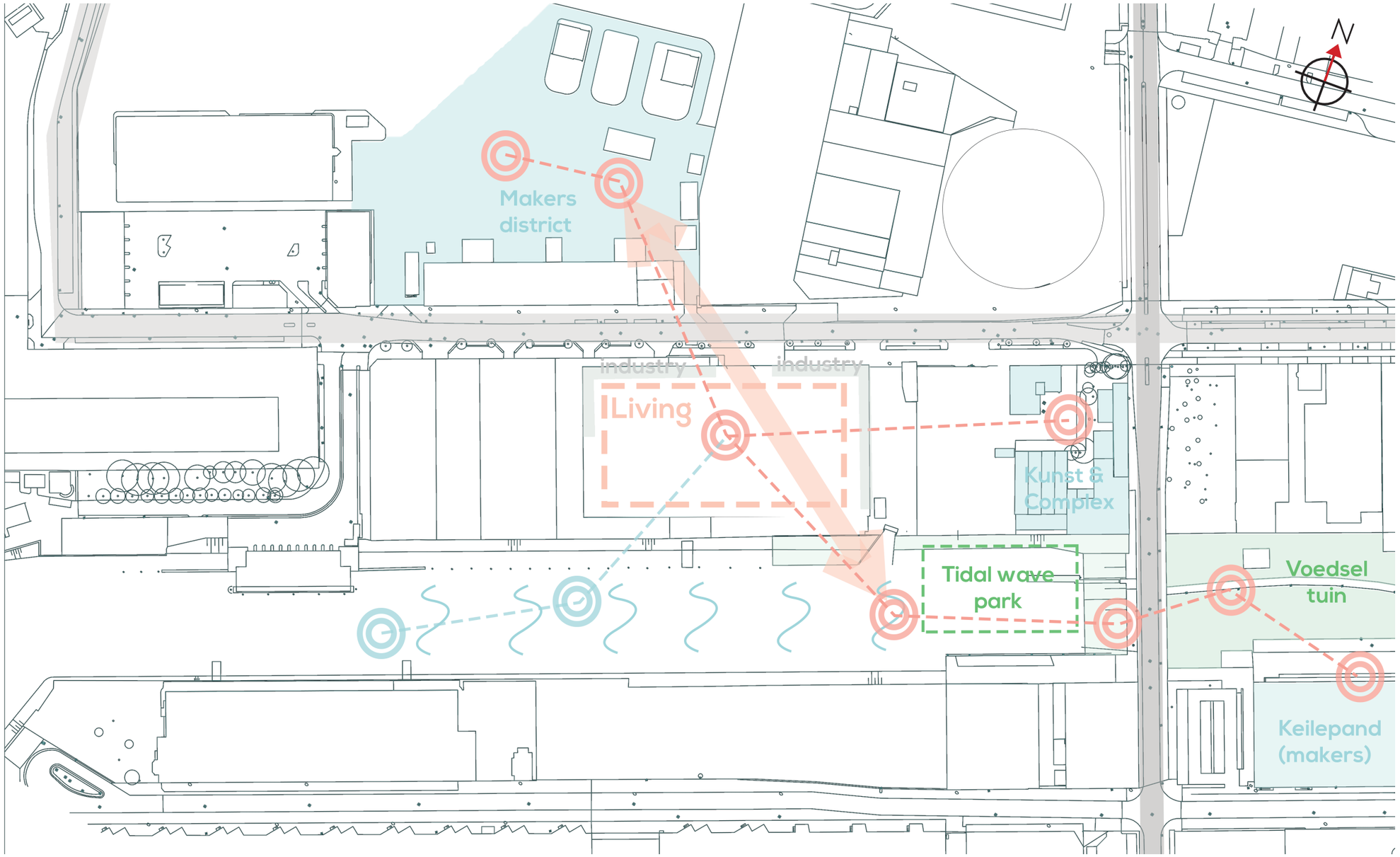
Masterplan (Current)

Location:
- old port of Rotterdam
- mainly habited by industry
- community of small makers

Important areas:
- Voedsel tuinen
- Makers district (in development)
- Tidal wave park

What Rotterdam wants:
- Maker district (development of innovative building techniques)
- Living area (providing dwellings for Rotterdam's rising population)

Opportunities & Restrains



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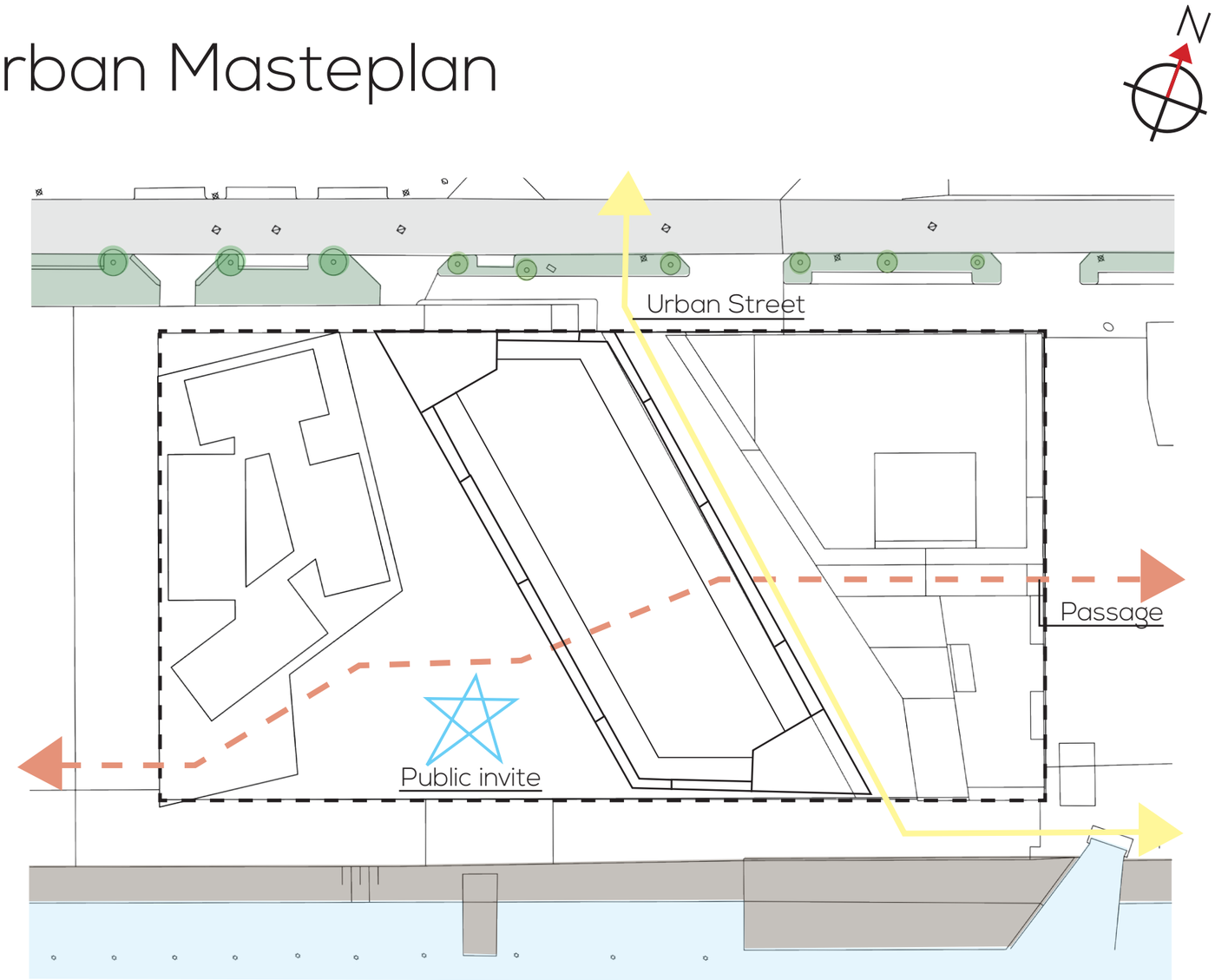
Masterplan

Urban Masteplan



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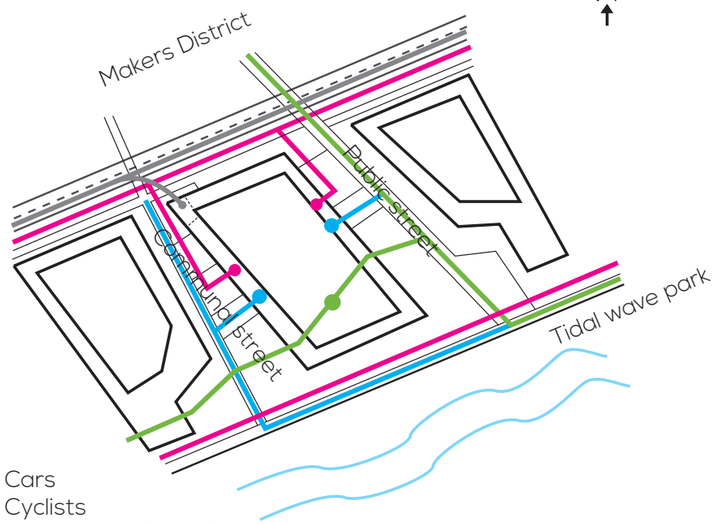
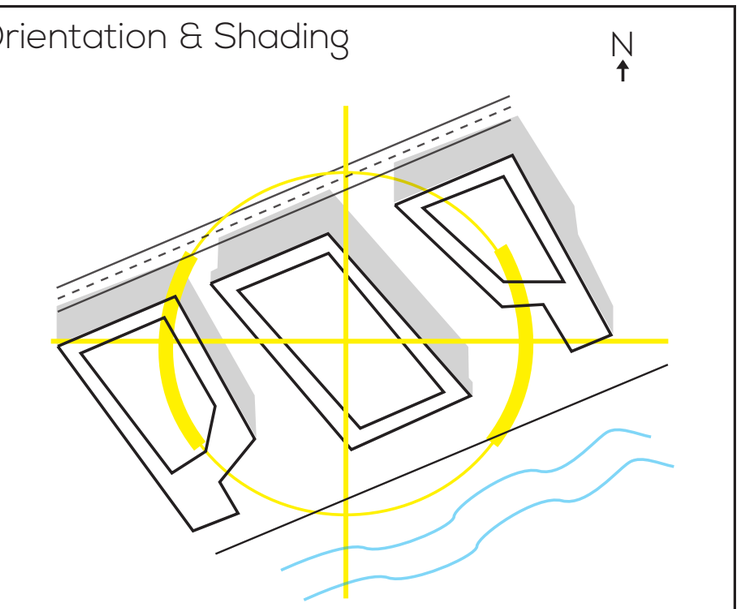
Traffic & Access



Orientation & Shading



Target Group(s)

Solo dwellers:

- Risk of loneliness and social isolation
- Financial disadvantageous (depending on one loan)

Empty nesters:

- Want to live smaller
- Miss people around them

Type of housing:

- Smaller houses suited for solo dwellers (1-2)
- Collective housing for community living (6-8)
- Moving possibilities within the building (Living career) (variation of larger dwellings)

Research Question:

"How can mix-used housing projects enhance community living for people who are socially isolated?"

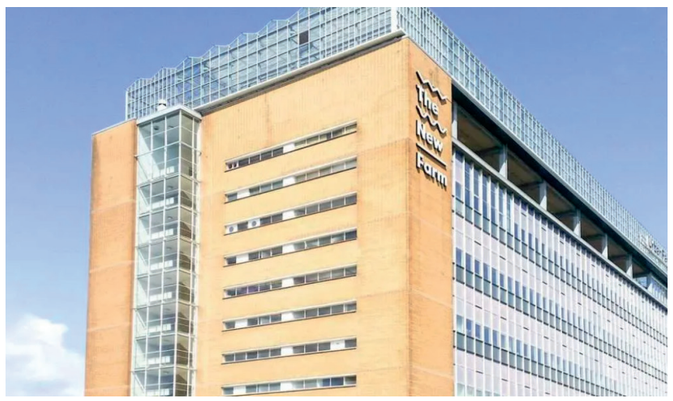
Case-studies

Afrikanerplein, Amsterdam

Study on social interaction and neighborhood participation.
Non-profit focus

The New Farm, Den Hague

Study on local food production and makers industry.
Profit focus



Community farming

What makes communal farming effective for community forming?

- Location (A Place to come together)
- Low organisational
- Consistancy of activity (weekly schedule)
- Can be done individual and in group form
- Development of different activities over time from a strong base activity

Set-up similar to a Sport Association

Activities as the core of social interaction

Benefit from this kind of interaction:

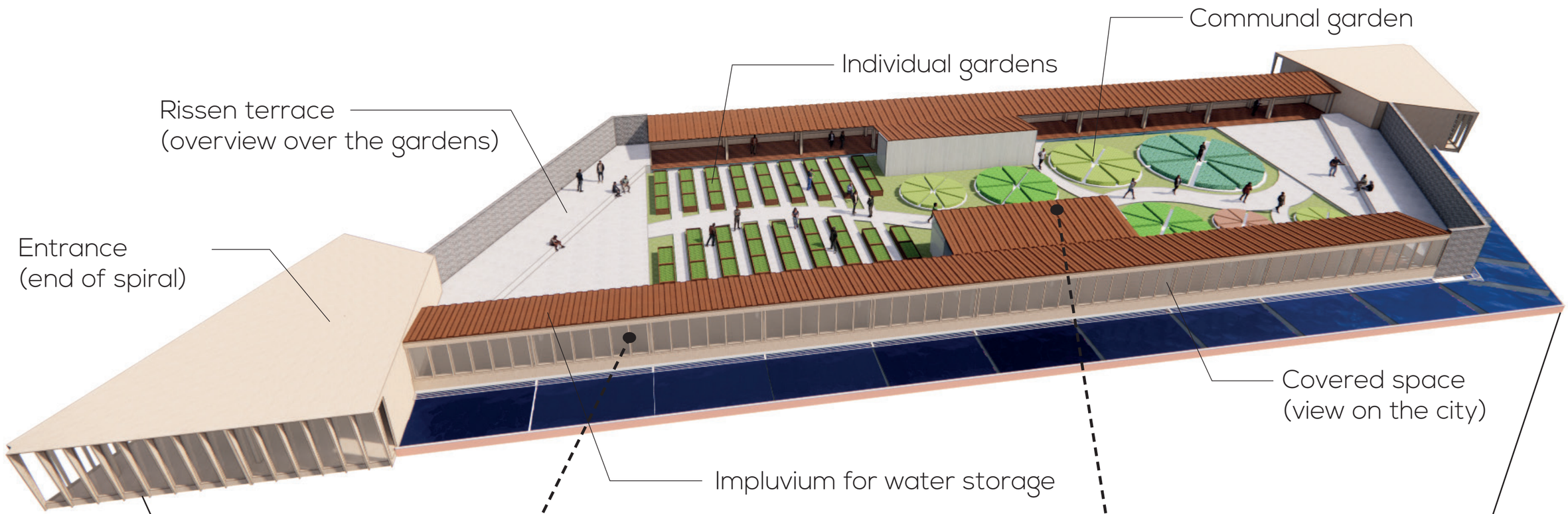
- **Activities:** Focus on something that people already enjoy
- **Clear schedule:** Promoting of taking initiative
- **Clear expectations:** Ensure comfort as best as possible

Organization:

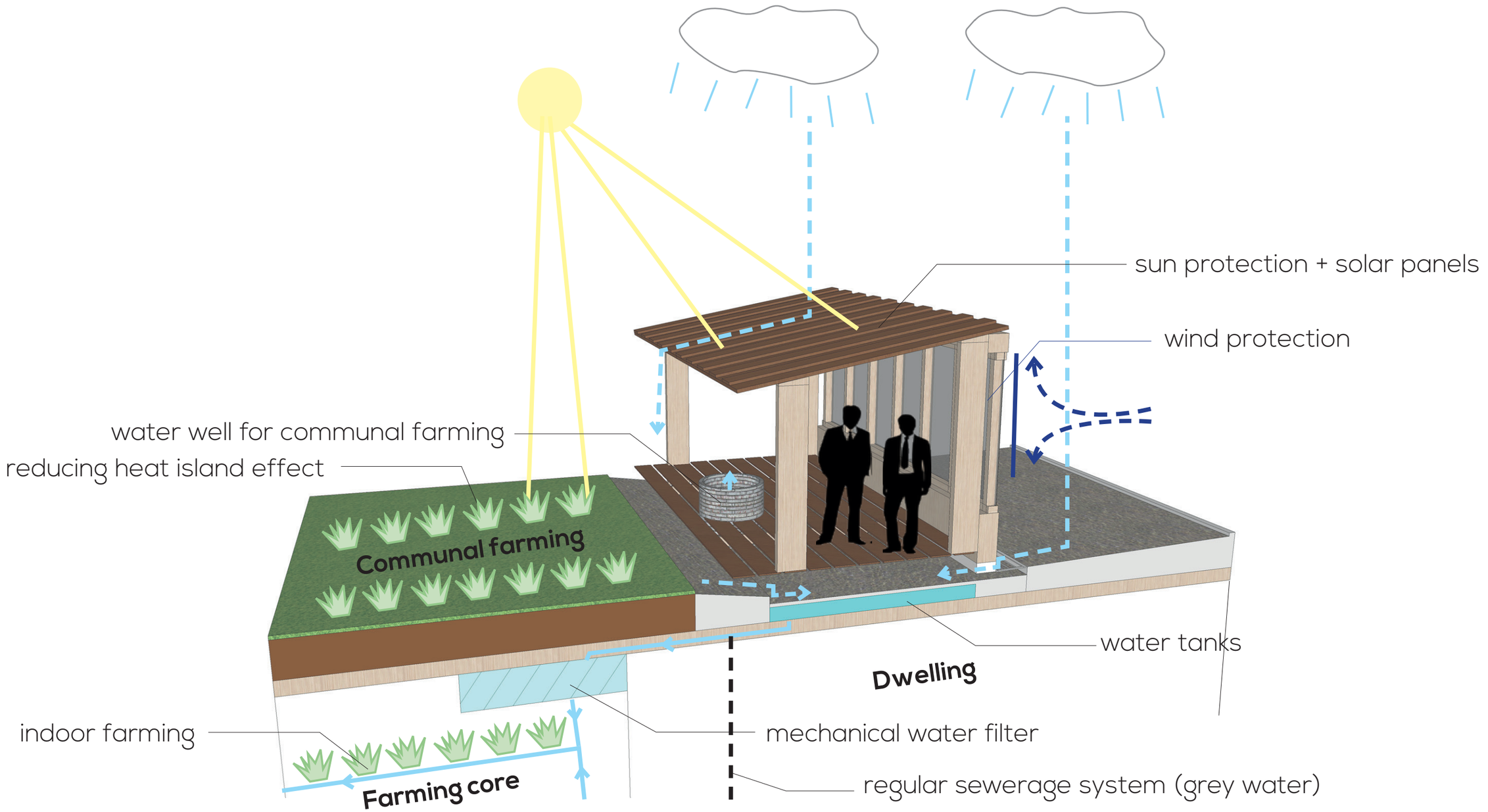
- Regular weekend events
- Big event in the weekend
- Organized by the owner association
- Irregular activities by workgroups

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Morning 7:00-9:00	**Morning fitness** to start out the week						
Throughout the day 9:00-17:00	Work	Work	Work	Work	Work	**Big events**	**Recover Day** Time to Rest and focus on individual activities
Evening 17:00-22:00		**Regular activities** in smaller (standard) groups	**Irregular activities** Organized by residents in mixed-groups	**Regular activities** in smaller (standard) groups	**After work drinks** (With your floor/cluster) (free to join)	**Big events**	

Rooftop garden



Rooftop climate concept



Local industry

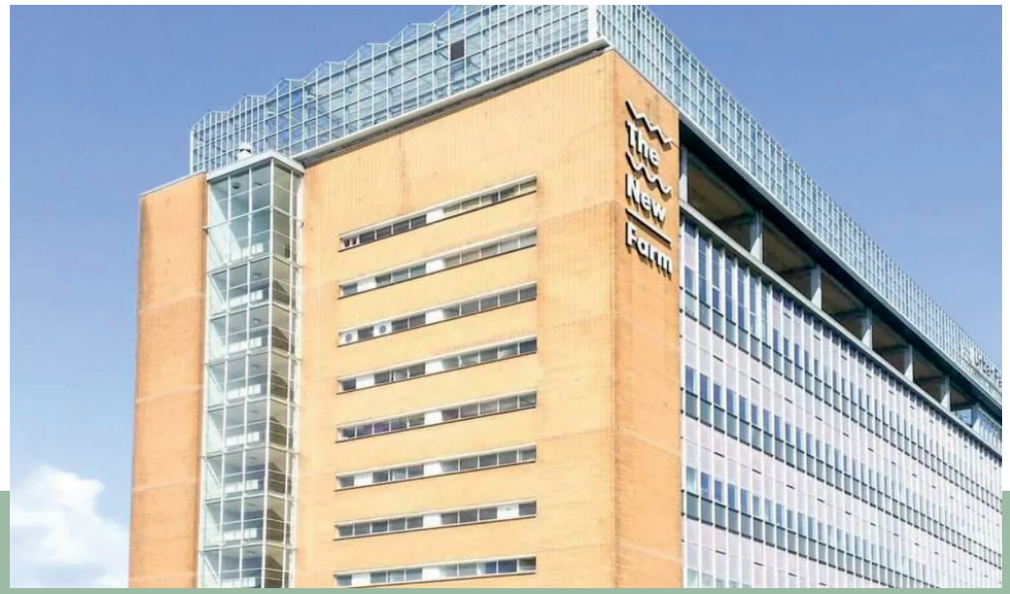
Small start-up

when production-scale increases

Providing for the entire neighborhood

Main Problem(s):

- sound disturbance (machinery and transportation)
- smell nuisance (more potent on larger scale)
- visual nuisance (perspective of residents)



Choice of industry

Urban farming

Indoor farming
(T=20-25C)

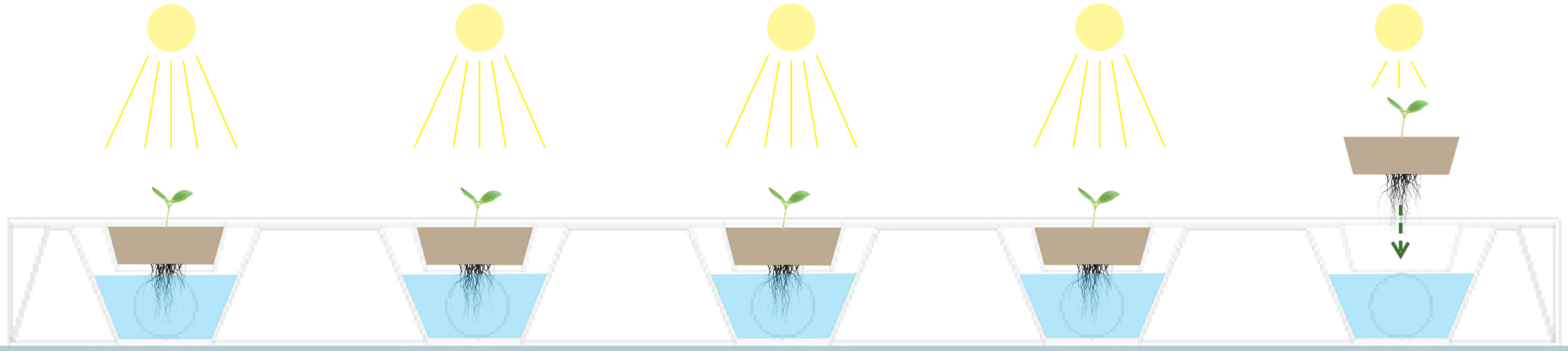
- Little to no sound disturbance
- Looking at plant creates a possitive effect on its residents
- little smell nuisance
- very light weight of the production
- Residual heat can be easily used for heating of dwellings.
- large local costumer group

Fish farming

Fish farming
(T=13-17C)

- Little to no sound disturbance
- large local costumer group
- consistent buffer of cold water to cool dwellings.

Hydroponic Farming



Farming System

- Fully controlled conditions
- High water efficiency
- Artificial lighting
- Larger diversity of products

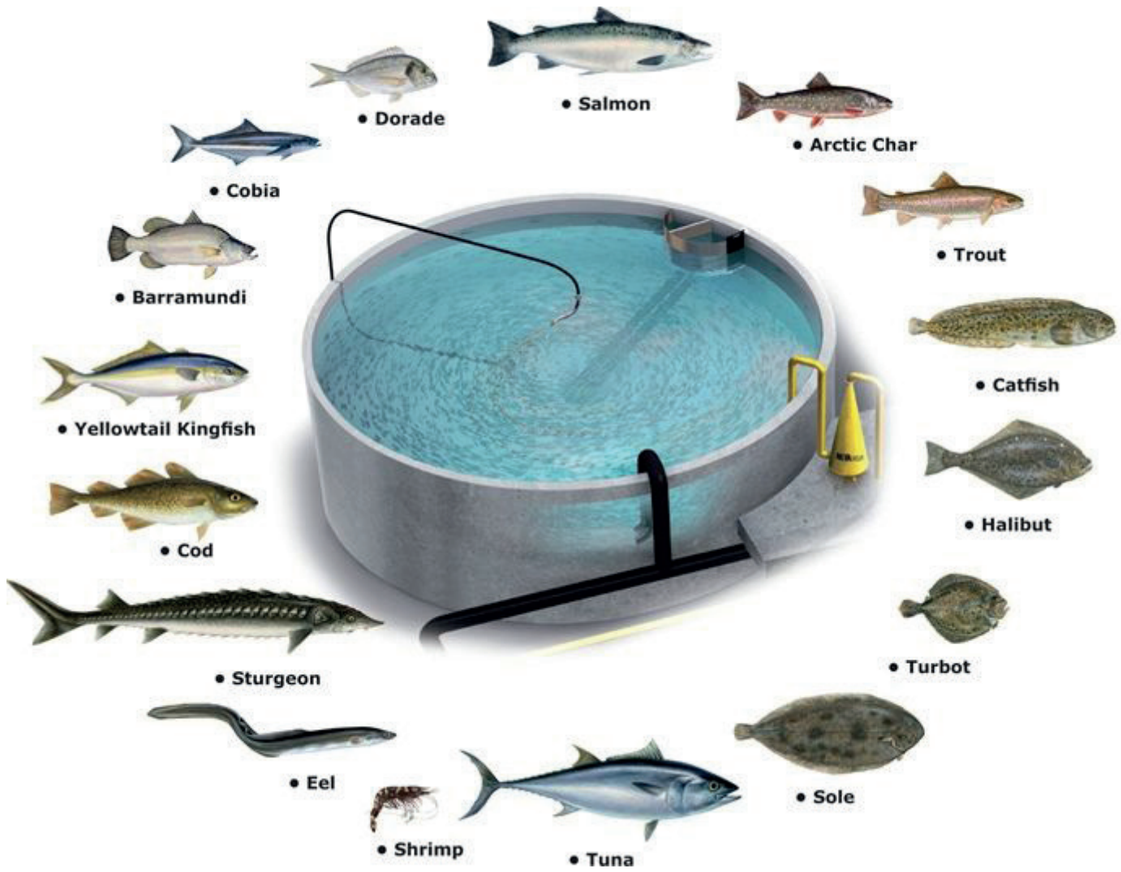
Recirculation Aquaculture System

Farming System

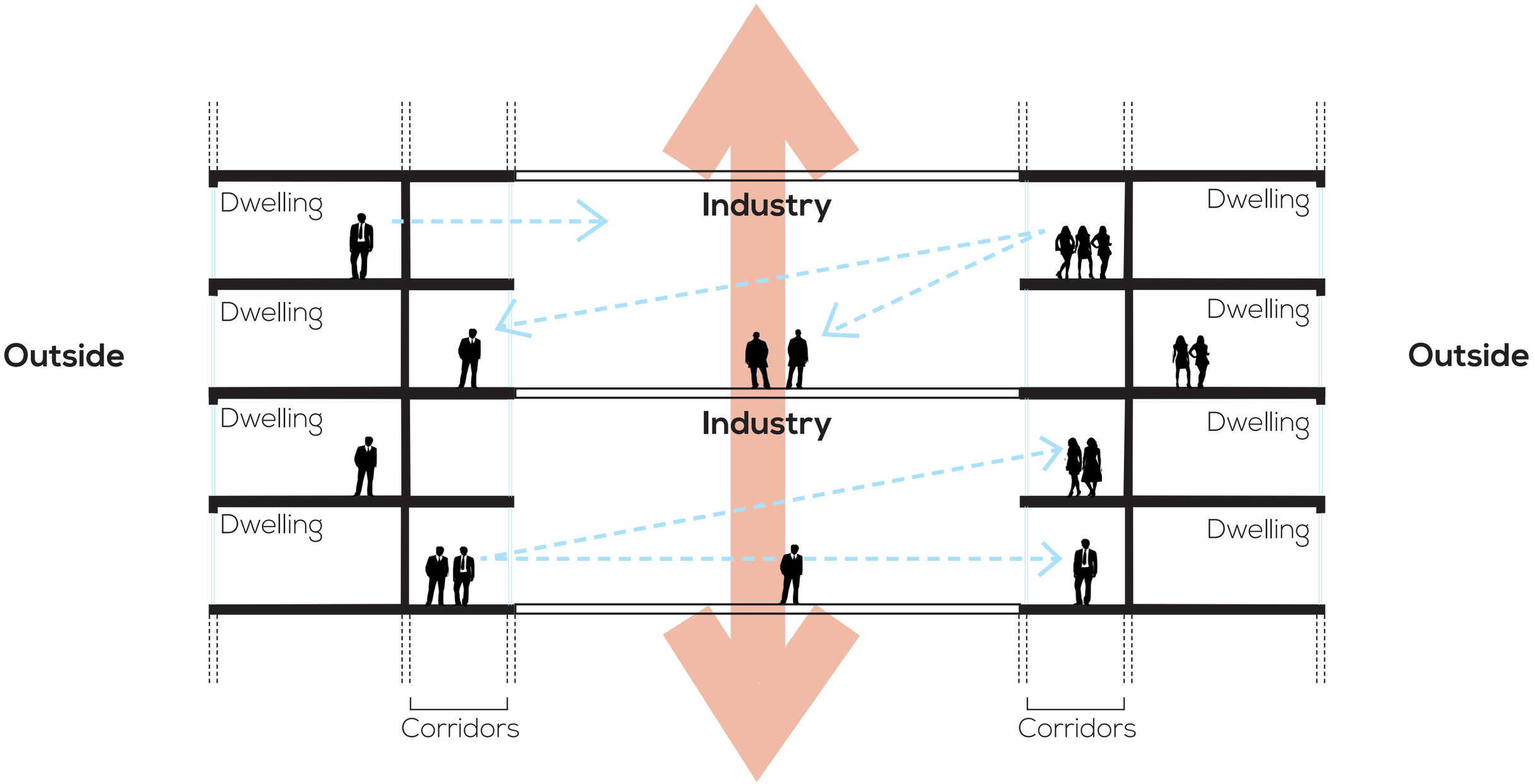
- Fully controlled conditions
- High water efficiency
- Cold water buffer

Choice in fish

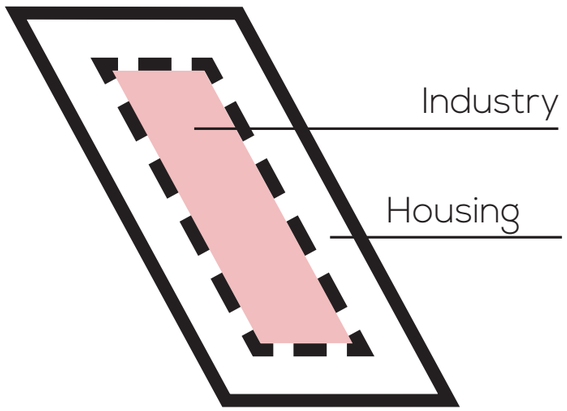
- Salmon (13-17 C)
- Rainbow Trout (12-18 C)



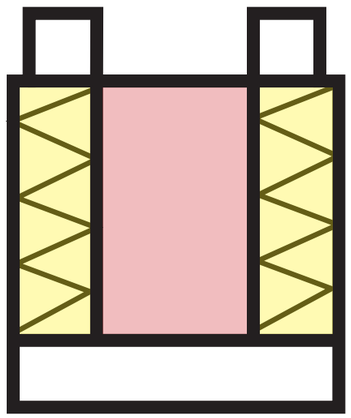
Typological Concept



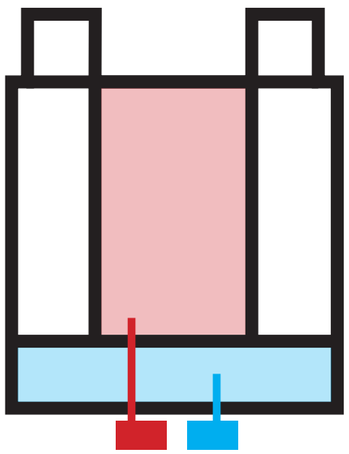
Sustainability Benefits



High Compactness



Dwellings as insulation
for the industry



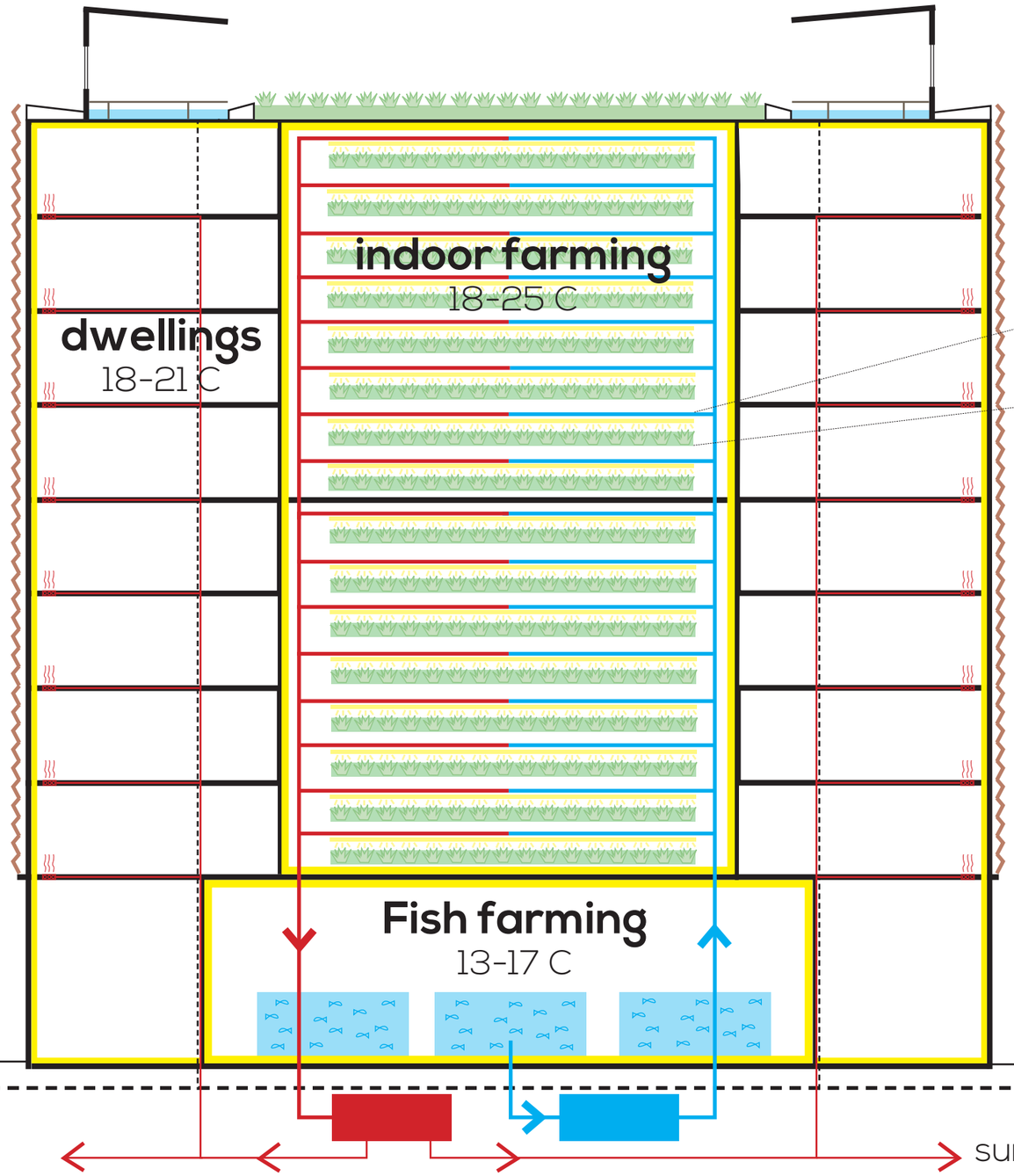
Optimal use of residual
heat and cold

Climate section (industry)

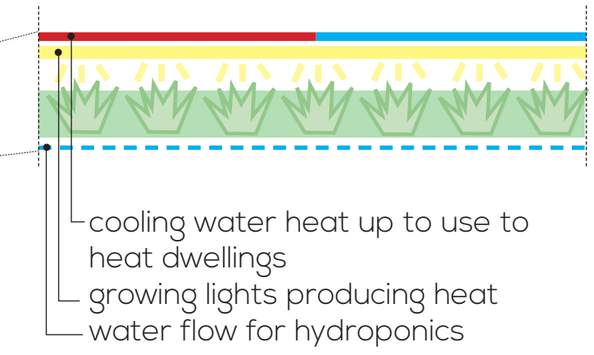
Rain water storage

max 300 mm/m²
3 kN/m² aan variable force

- water for communal garden
- filtered water for indoor farming
- used for flushing tiolets (gray water)



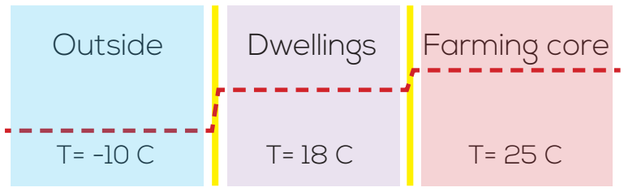
Energy flows



Legend

- Cold water
- Warm water
- Insulation layer
- Sewerage system

Double insulation layer



high thermal mass

How to make urban farming succesful

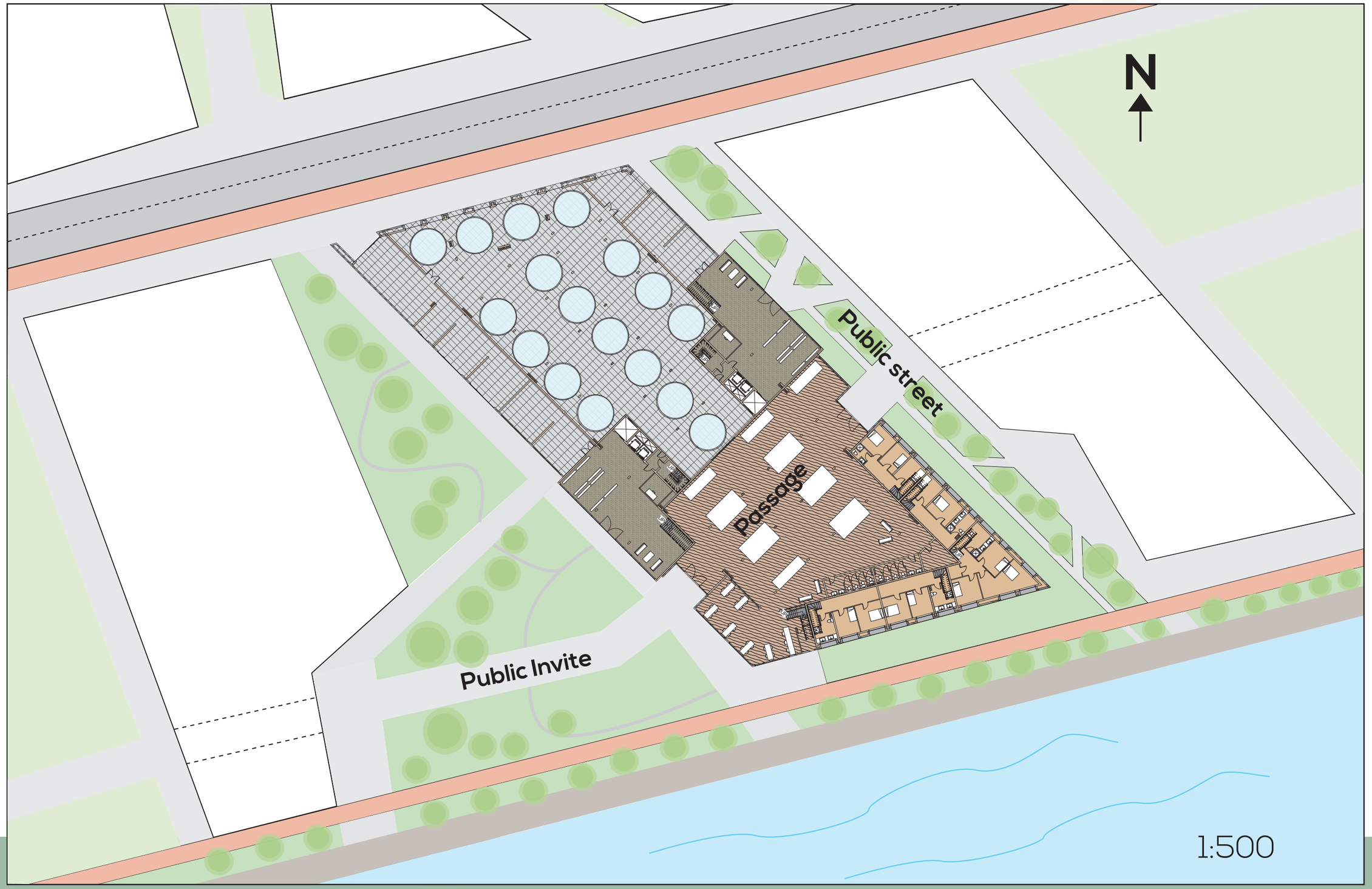
Uniqueness of the products:
(start out)

- Restaurant
- Food street
- Seasonal products

Daily grocceries:
(develop into)

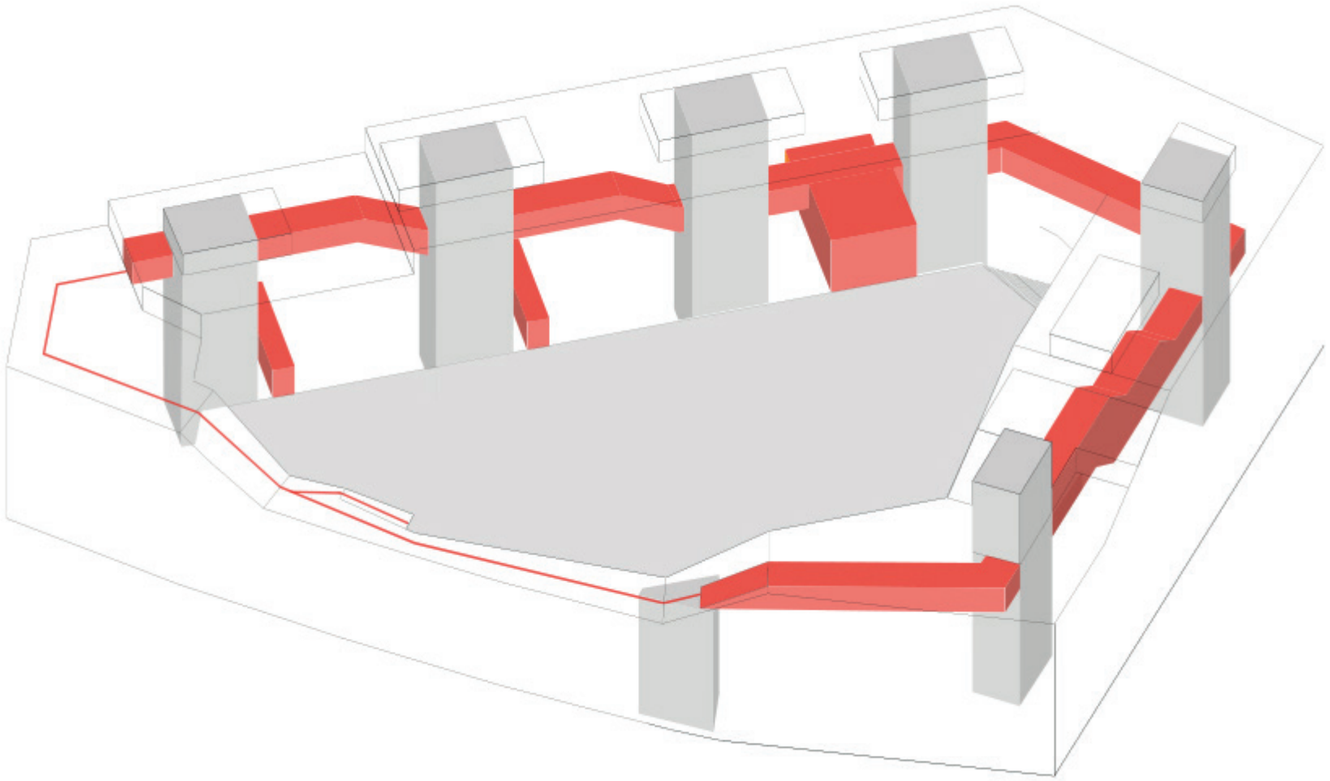
- Visual connection with the production
- Incorporated in local (super)markets

Ground floor connection

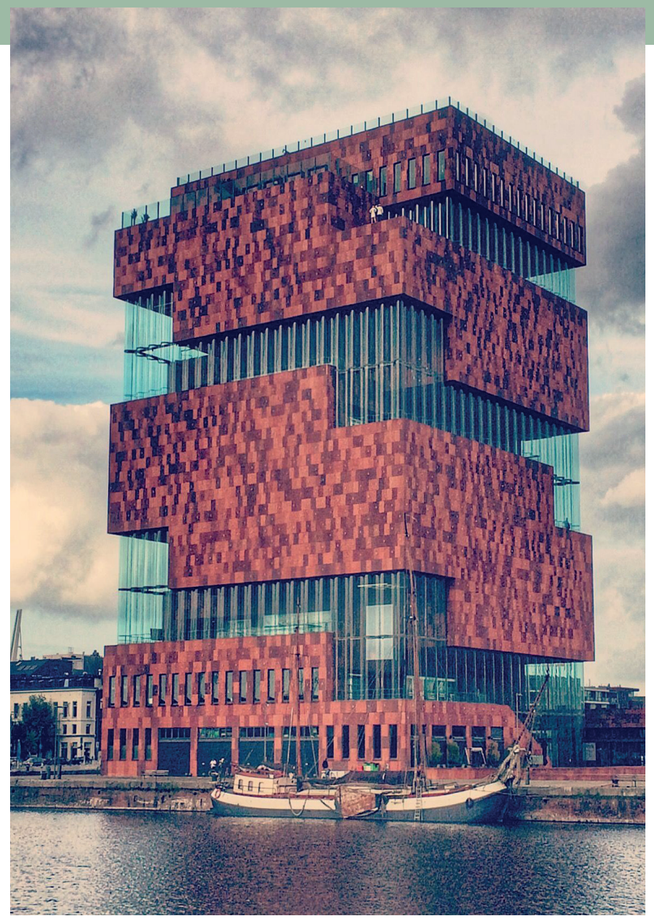


Food Street

Circulation (inspiration)



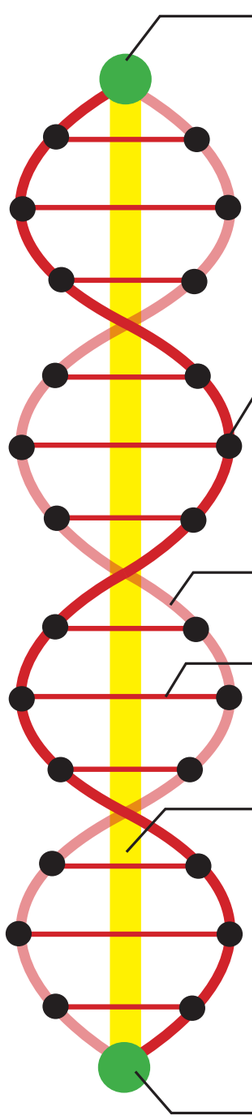
Circulation Kalkbreite



MAS, Antwerpen

Kalkbreite, Zurich

Circulation Concept



Rooftop park/
farm 'park'

Collective spaces
'squares'

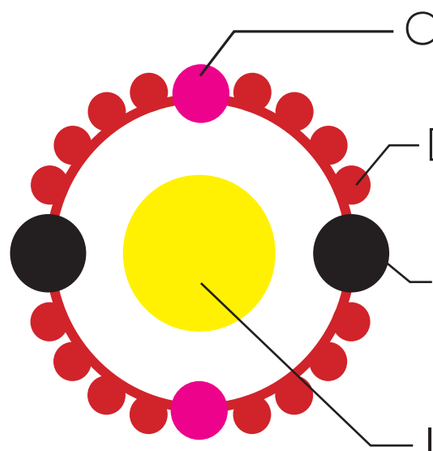
Circulation

Corridors 'streets'

Industry
'food production'

Shopping center/
public functions

3D diagram



Co-housing

Dwellings

Collective
spaces

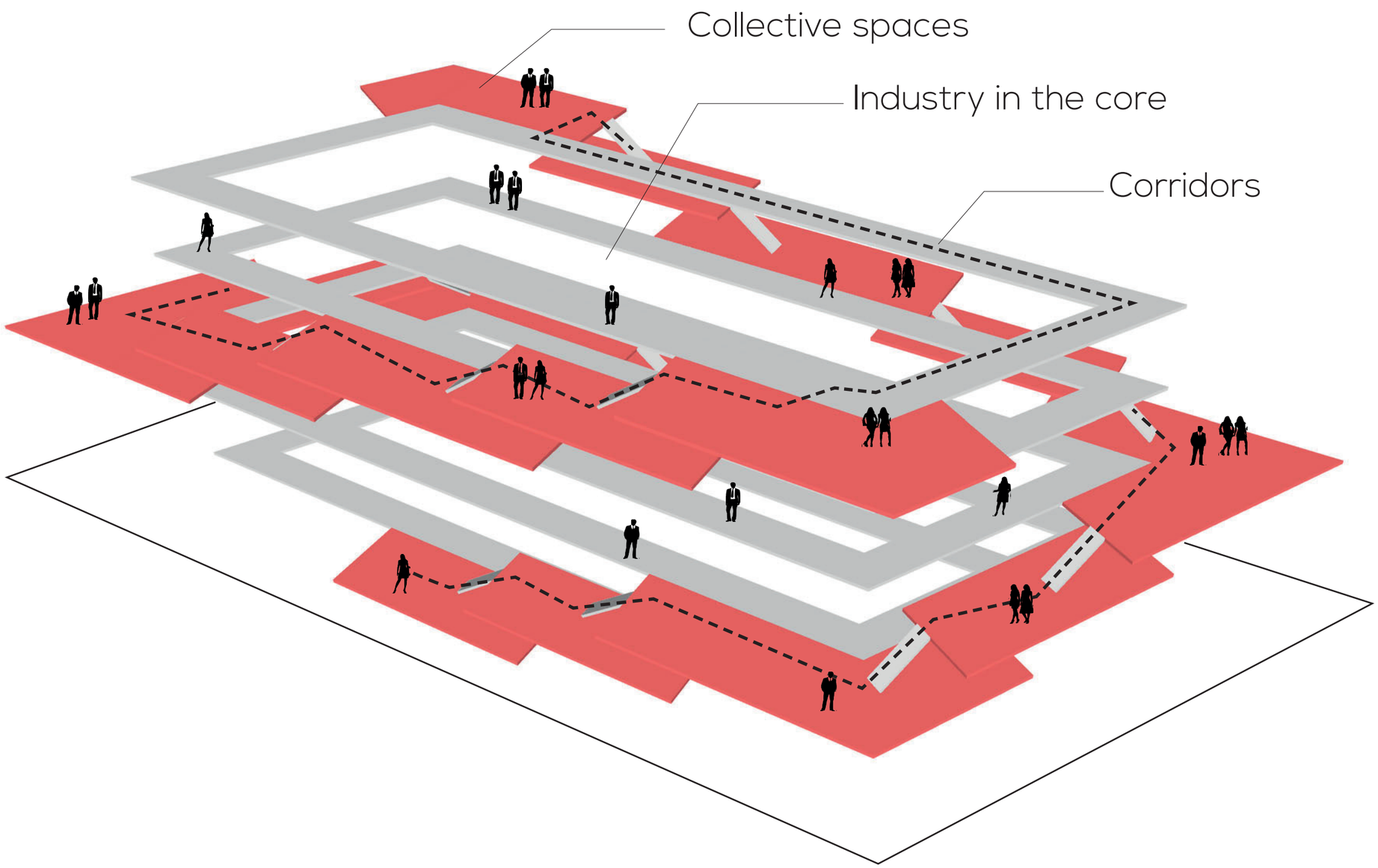
Industry

2D diagram

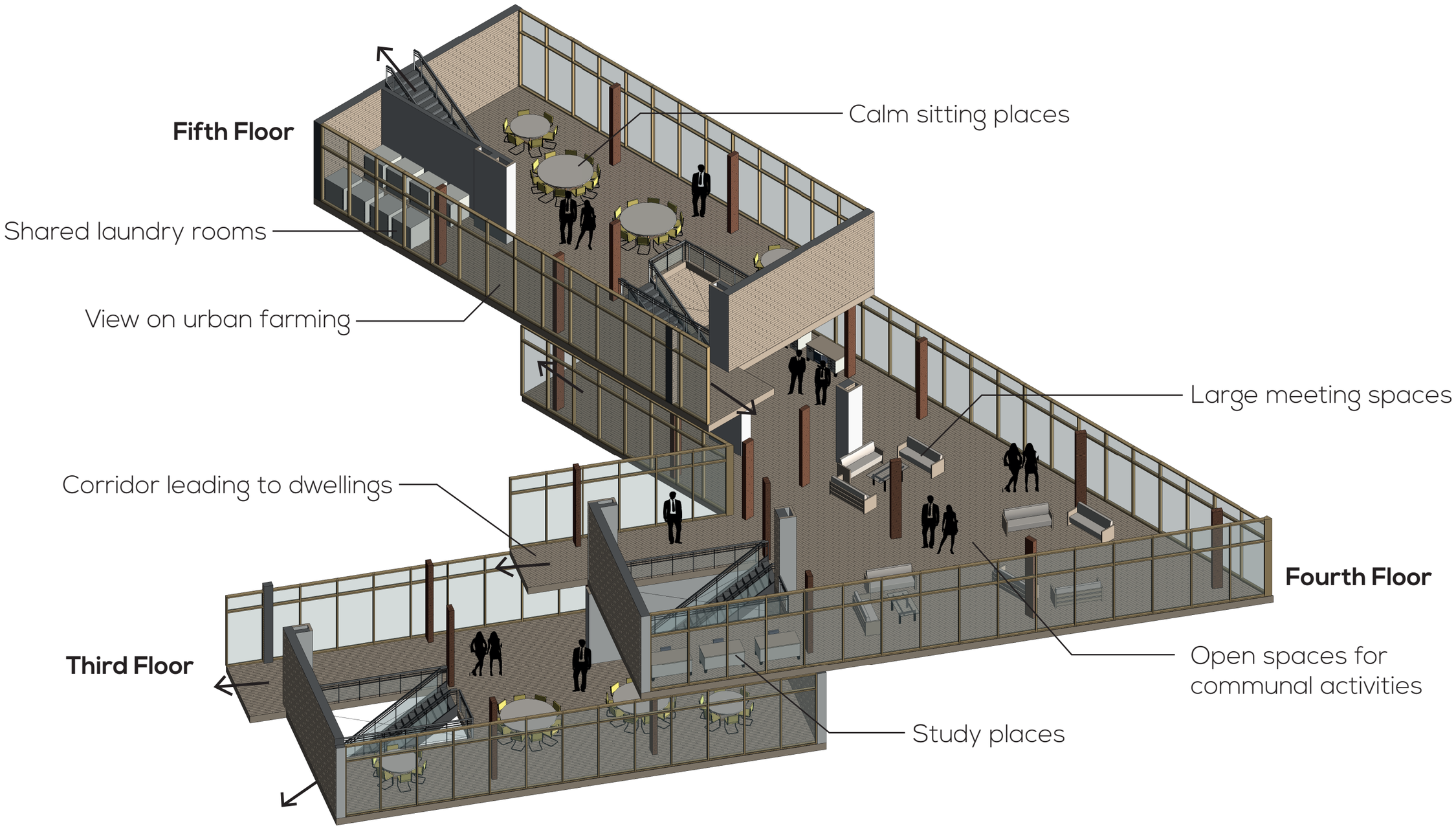
Important aspects:

- Stay-ability of the space
- Leading to a place of significance
- Able to occupy the circulation

Circulation Design

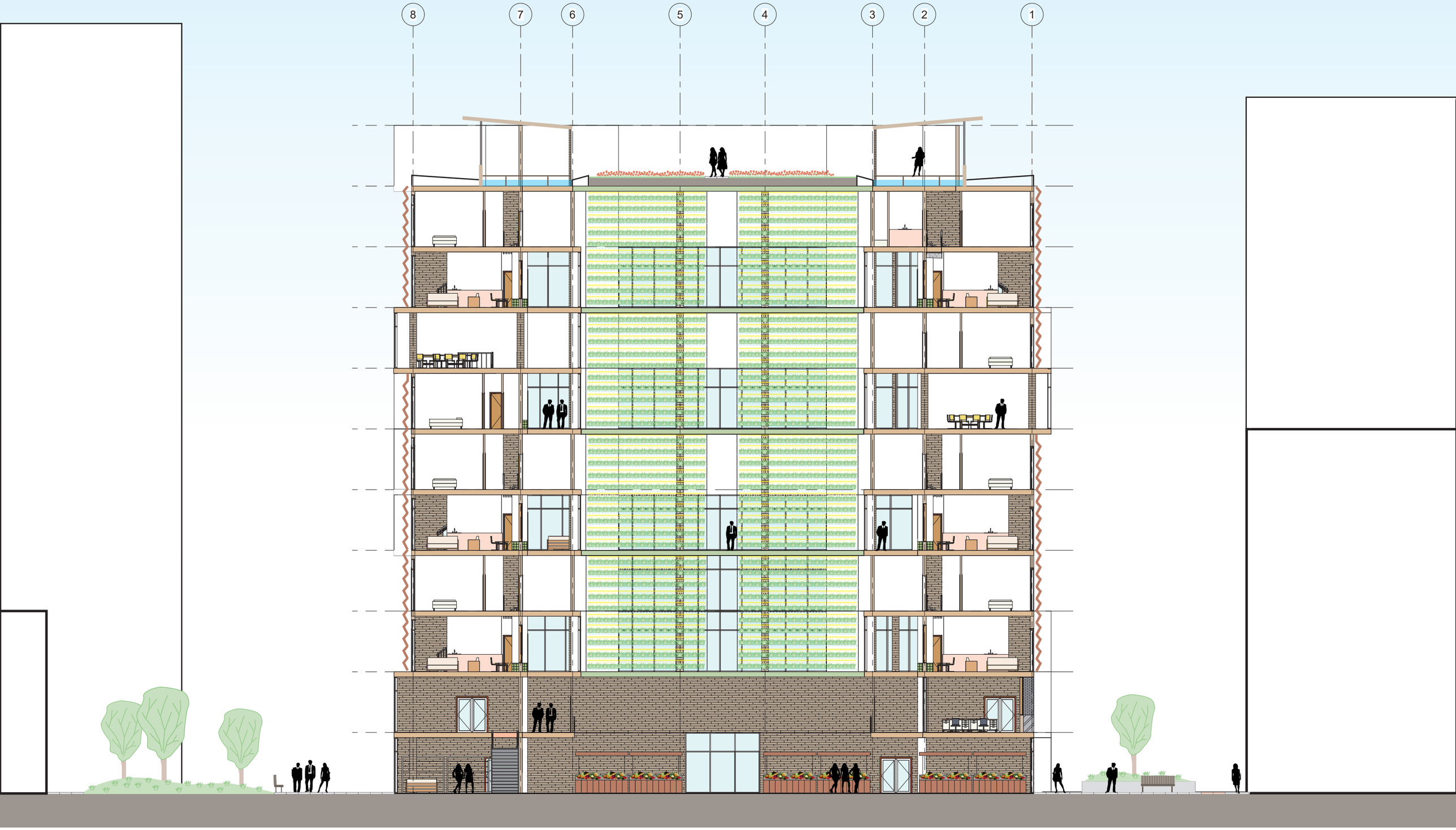


Collective spaces



Collective spaces

Section A



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Fourth Floor

1:300

Legend

- Collective spaces
- Urban farming
- Dwellings
- Collective Living

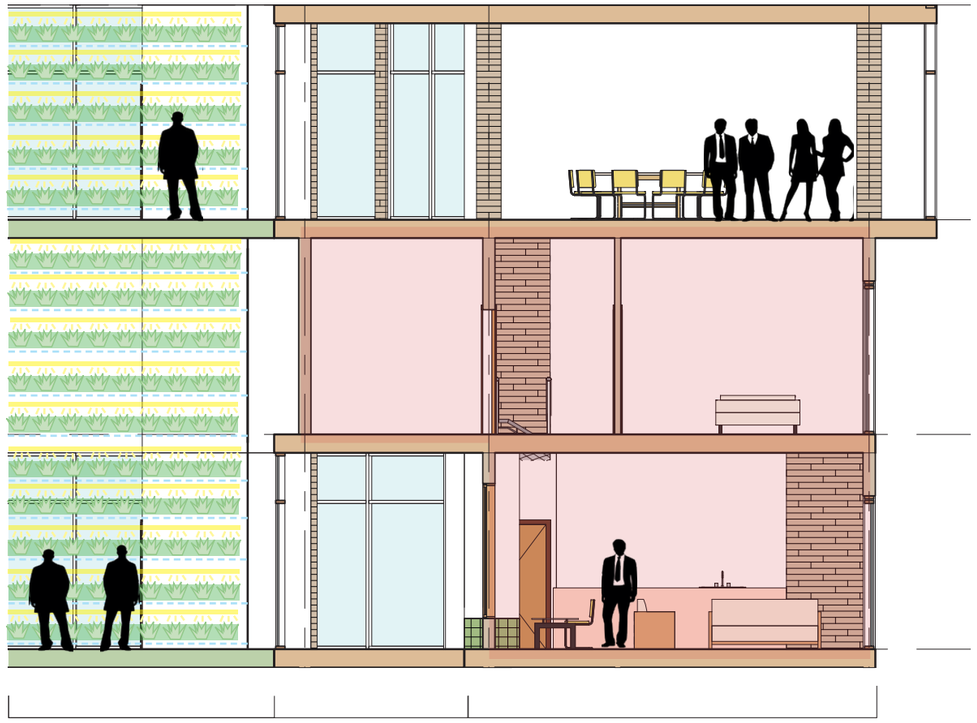
Fifth Floor

1:300

Legend

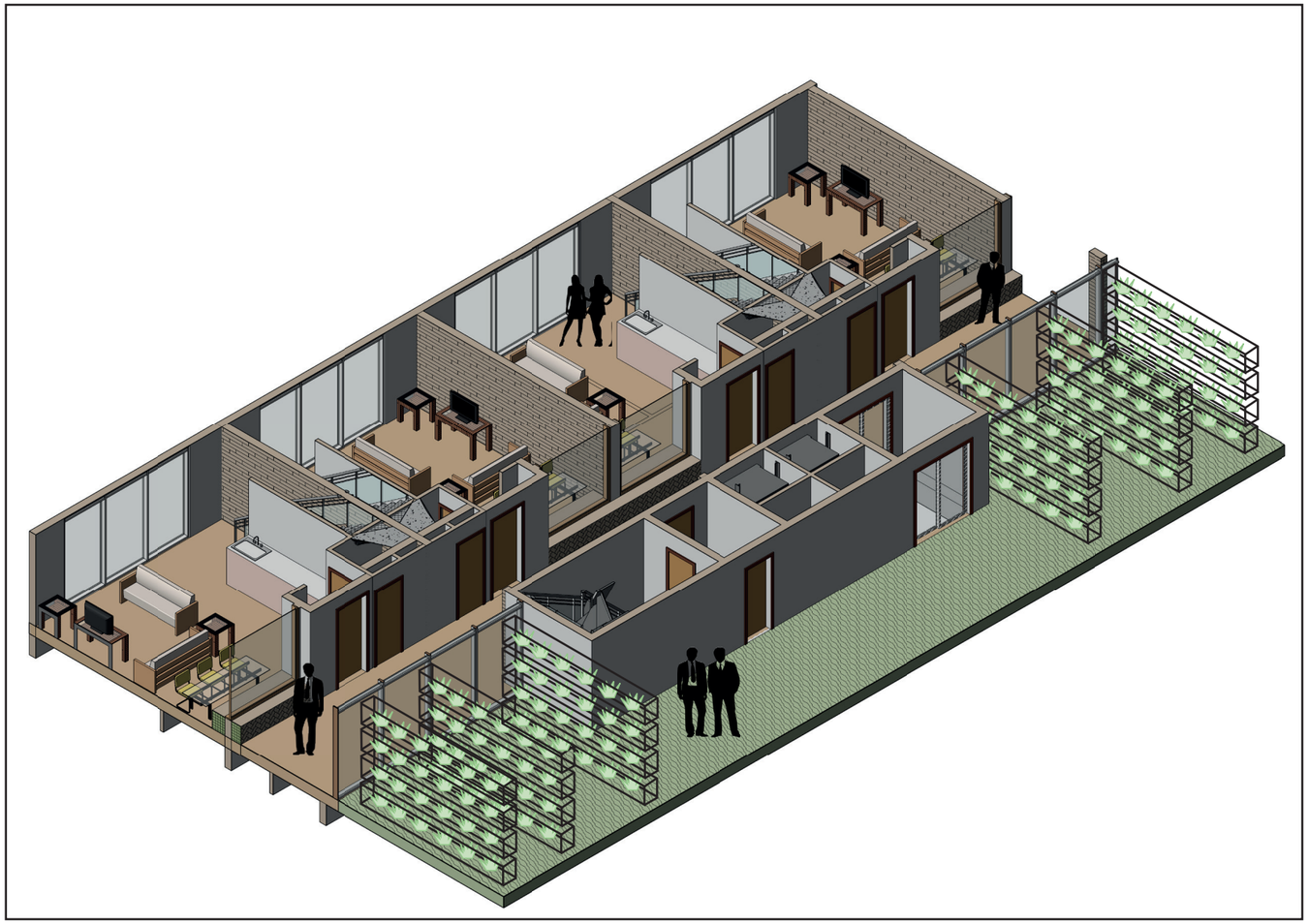
- Collective spaces
- Urban farming
- Dwellings
- Collective Living

Solo dweller apartments



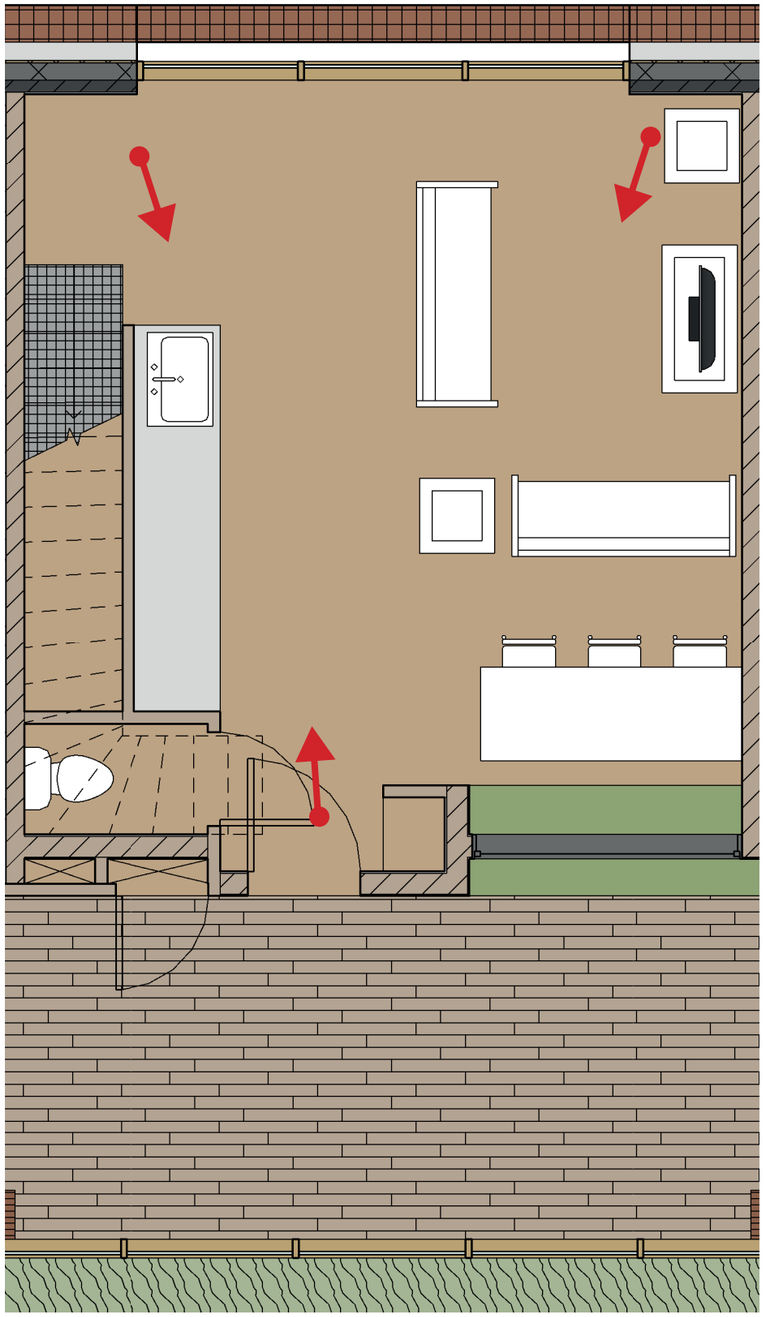
Industry 'Street' Dwelling

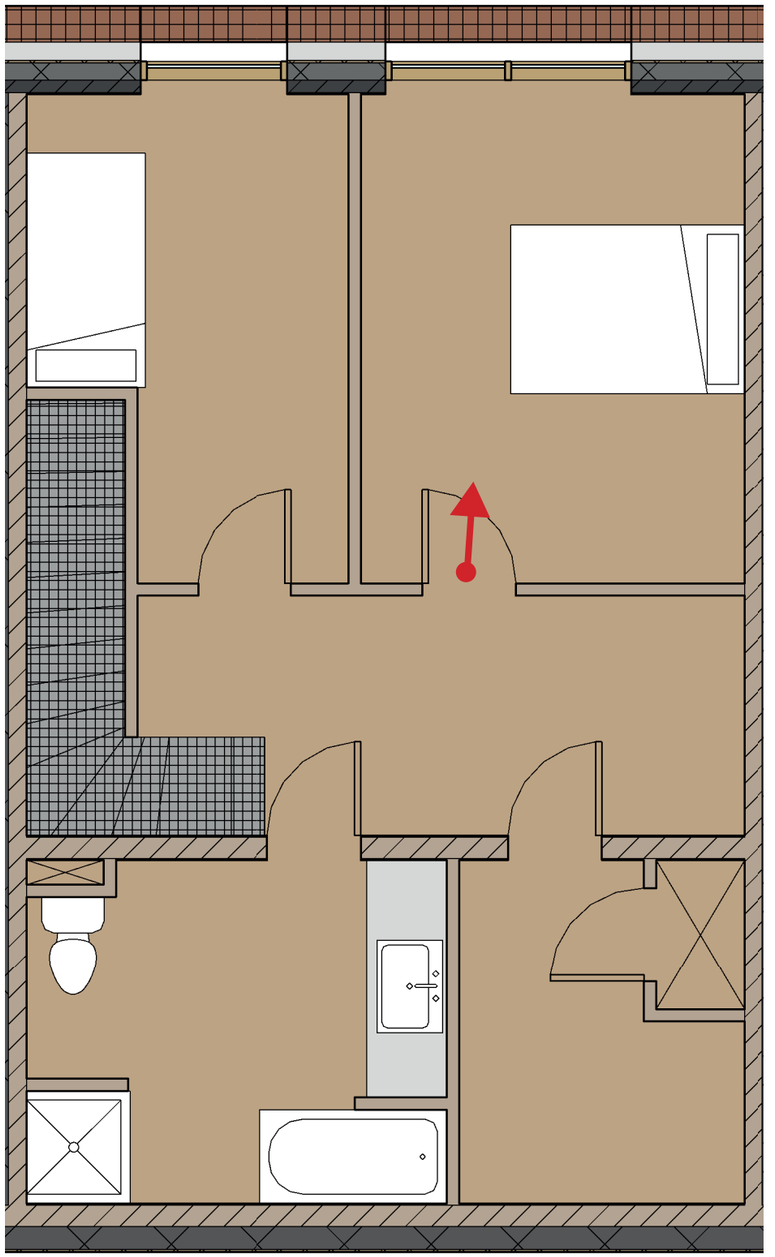
1:100



Corridors-dwelling connection

Solo dweller apartments





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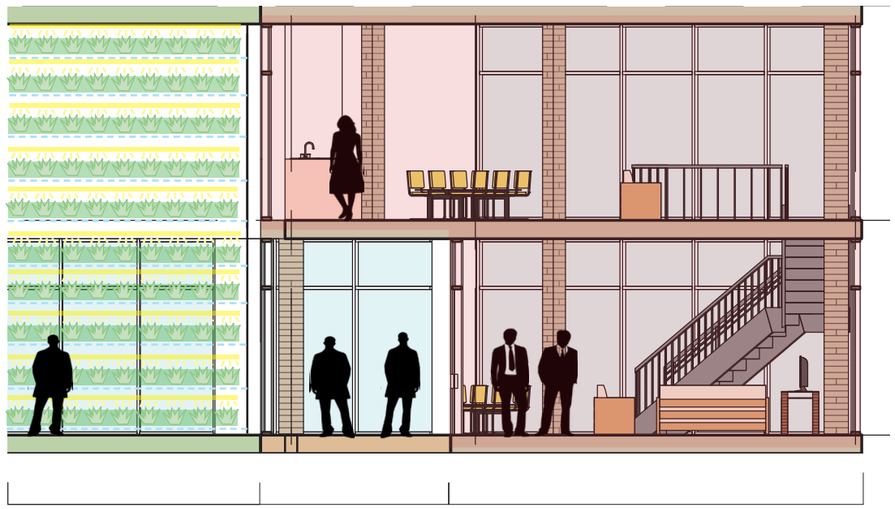
Solo dweller apartments

Co-housing units



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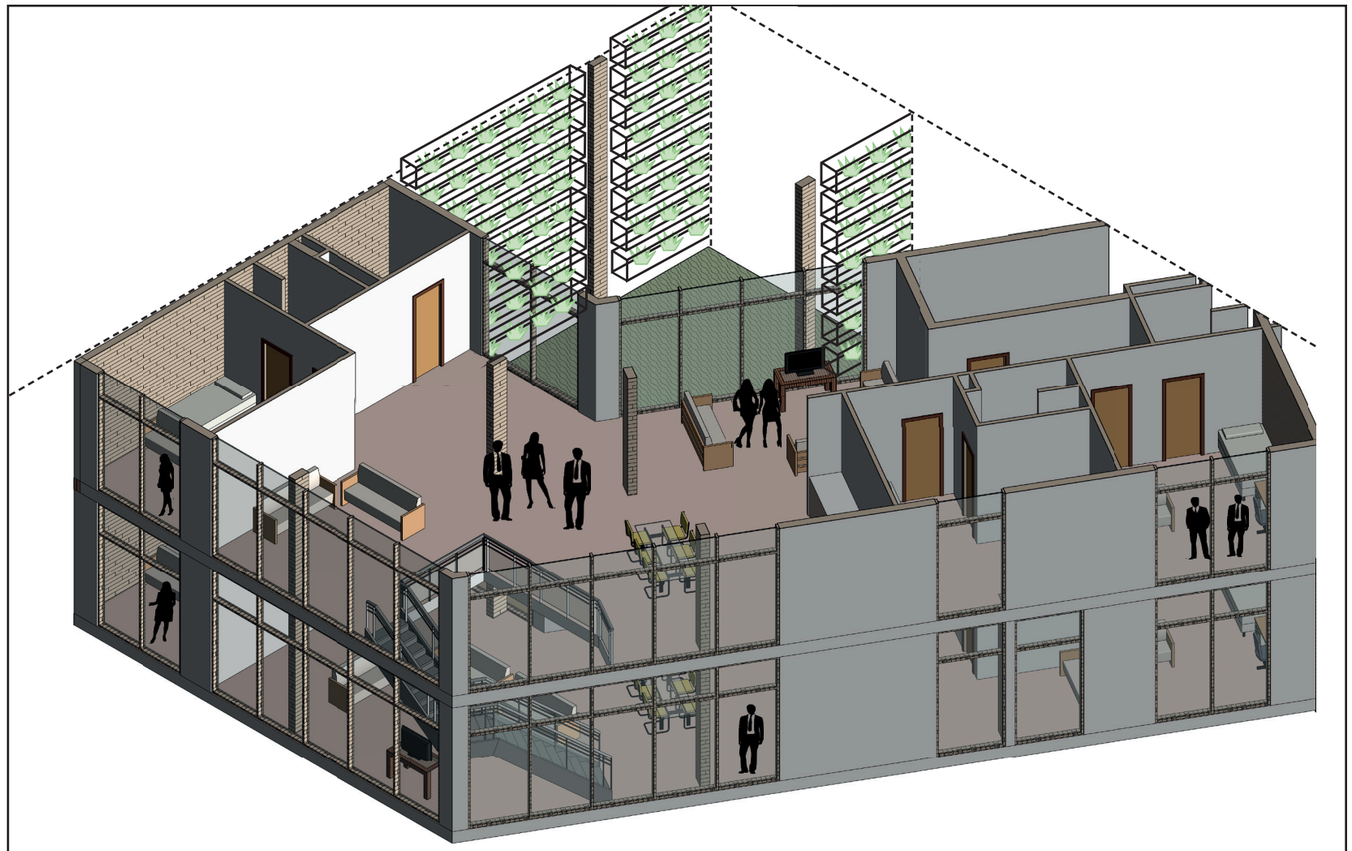
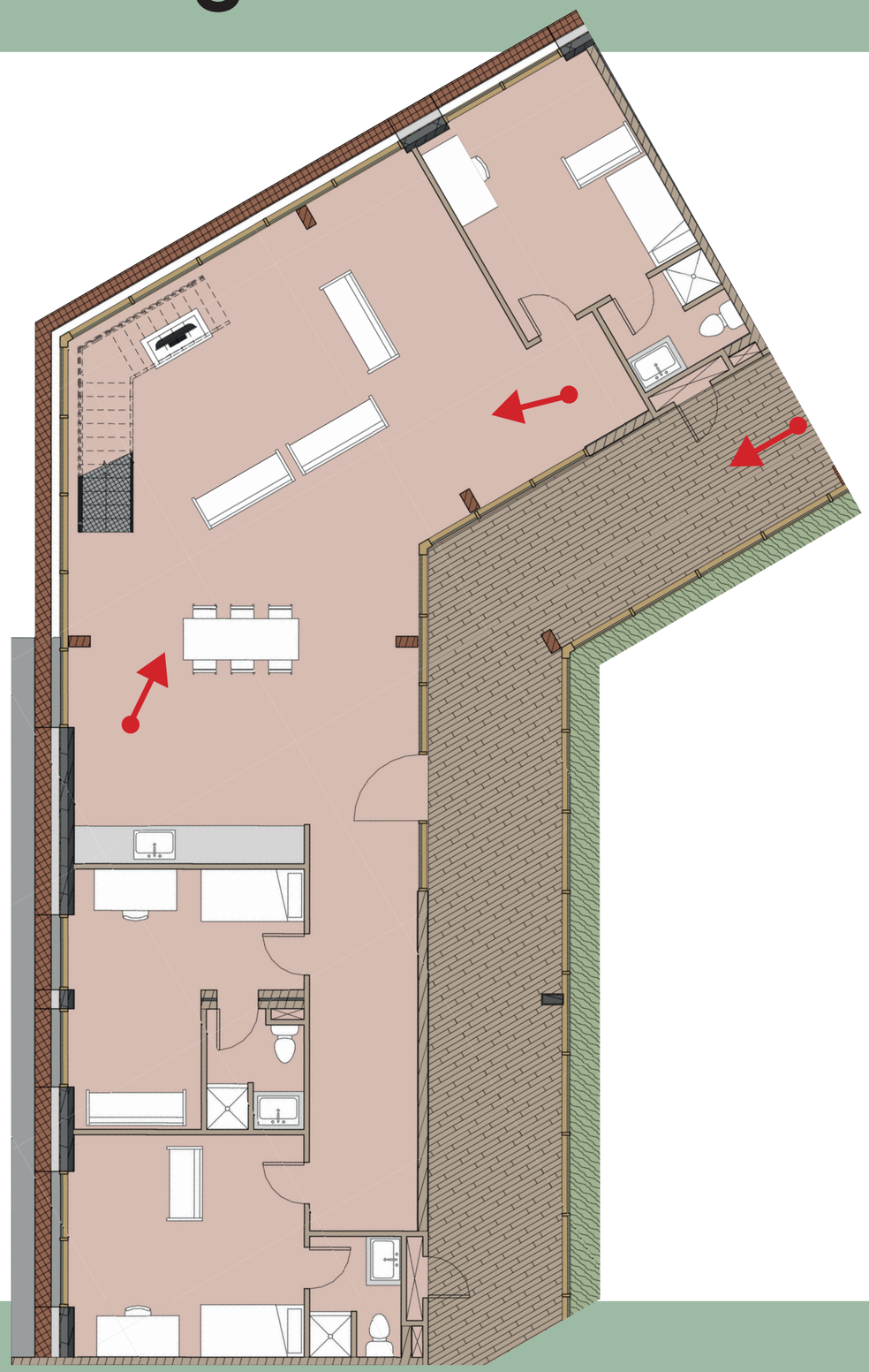
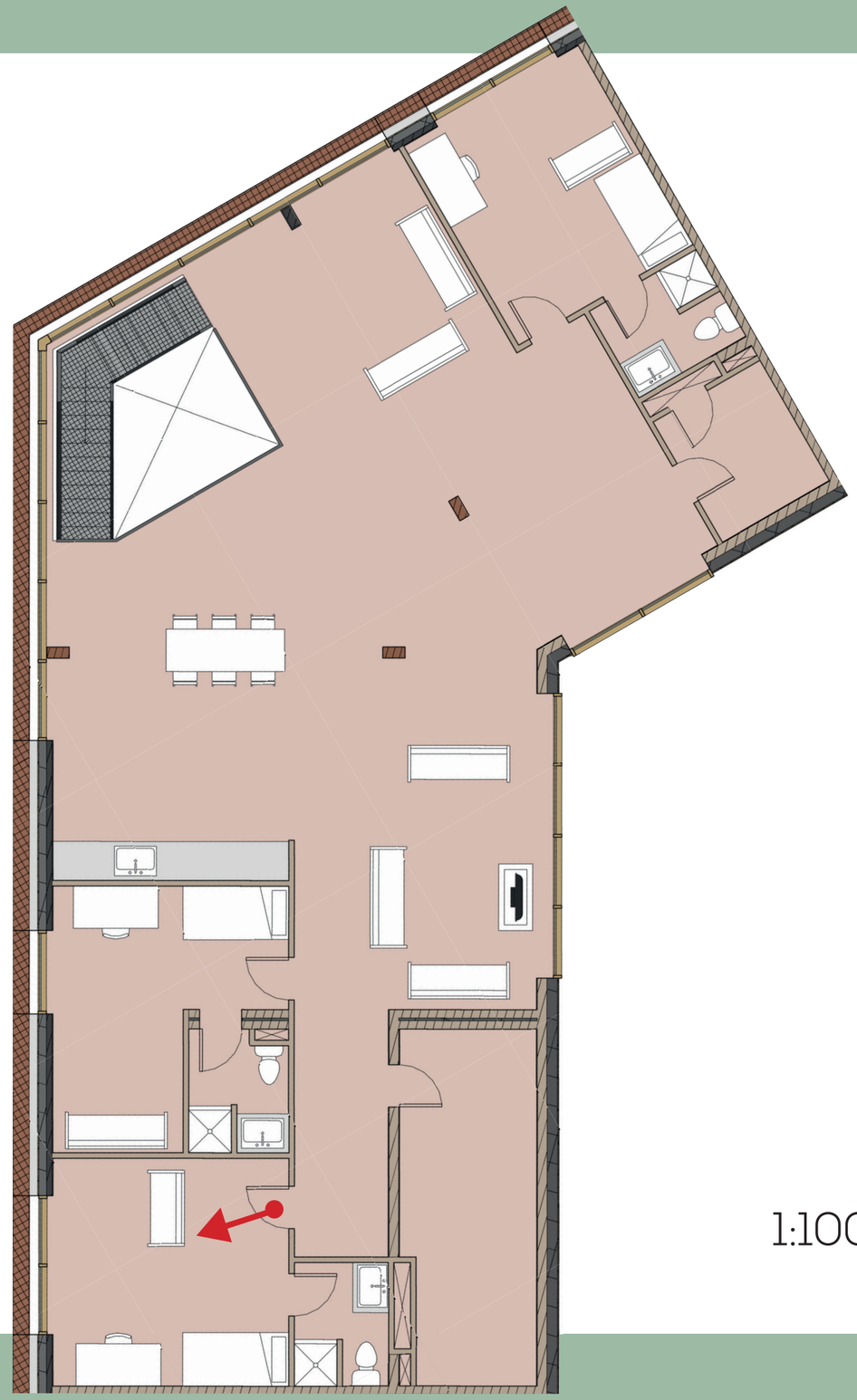


Co-housing units





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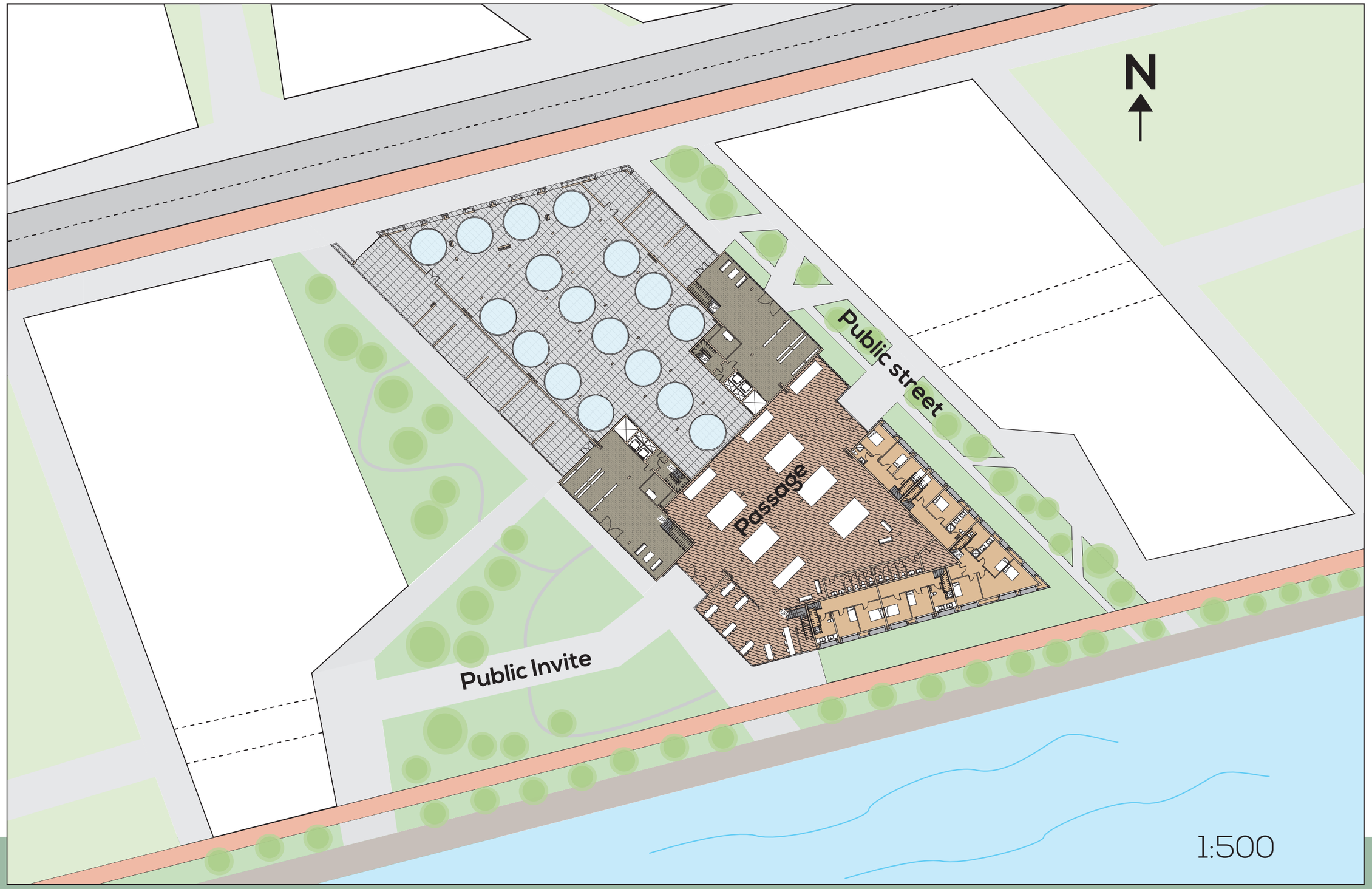
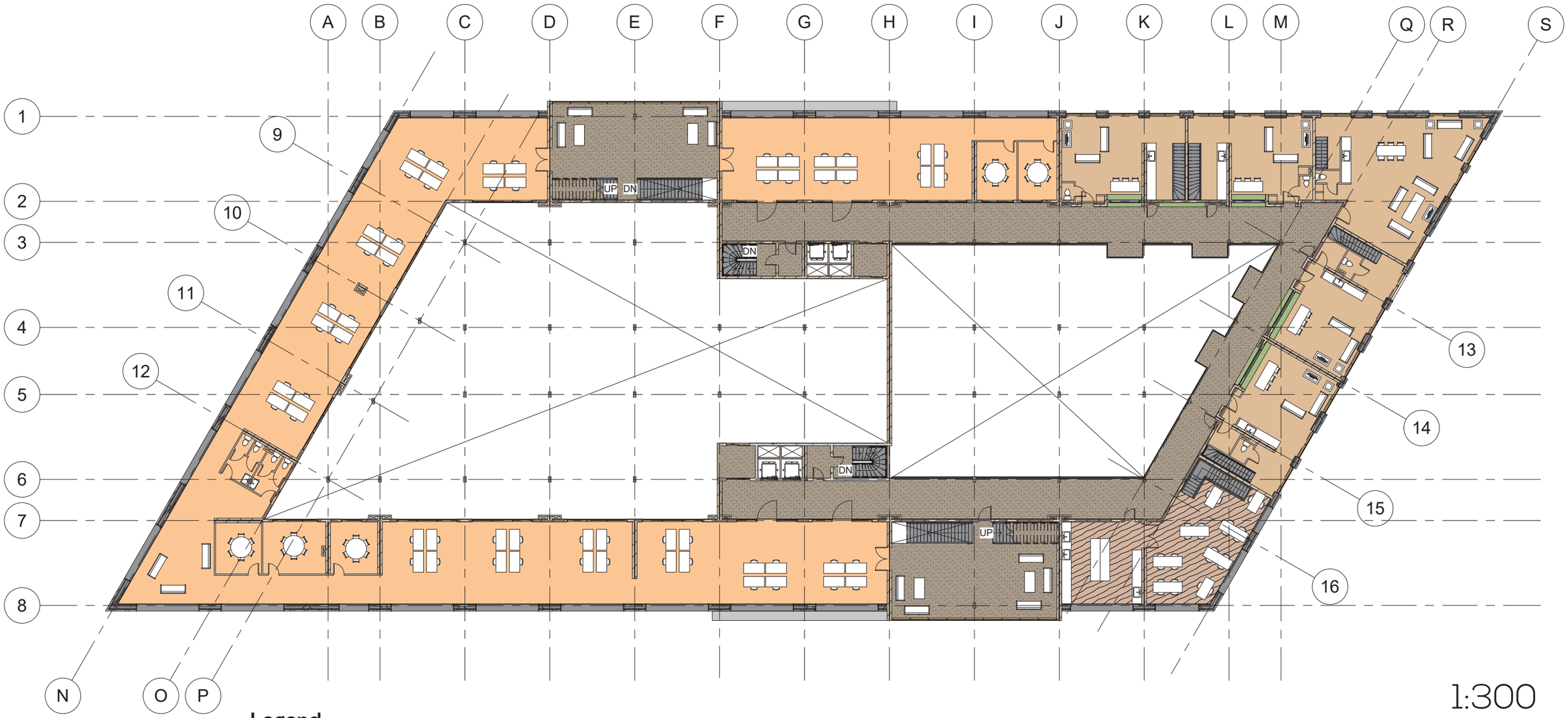
Co-housing units

Ground floor connection



First Floor



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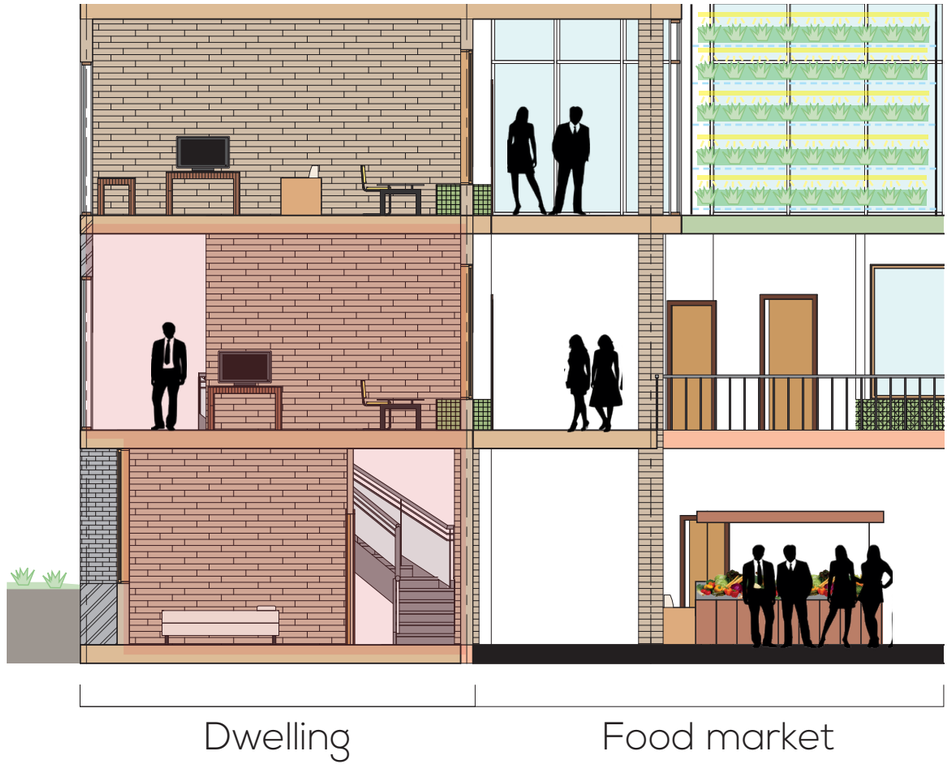
Legend

- Collective spaces
- Dwellings
- Office space
- Restaurant

Dwelling on the ground floor



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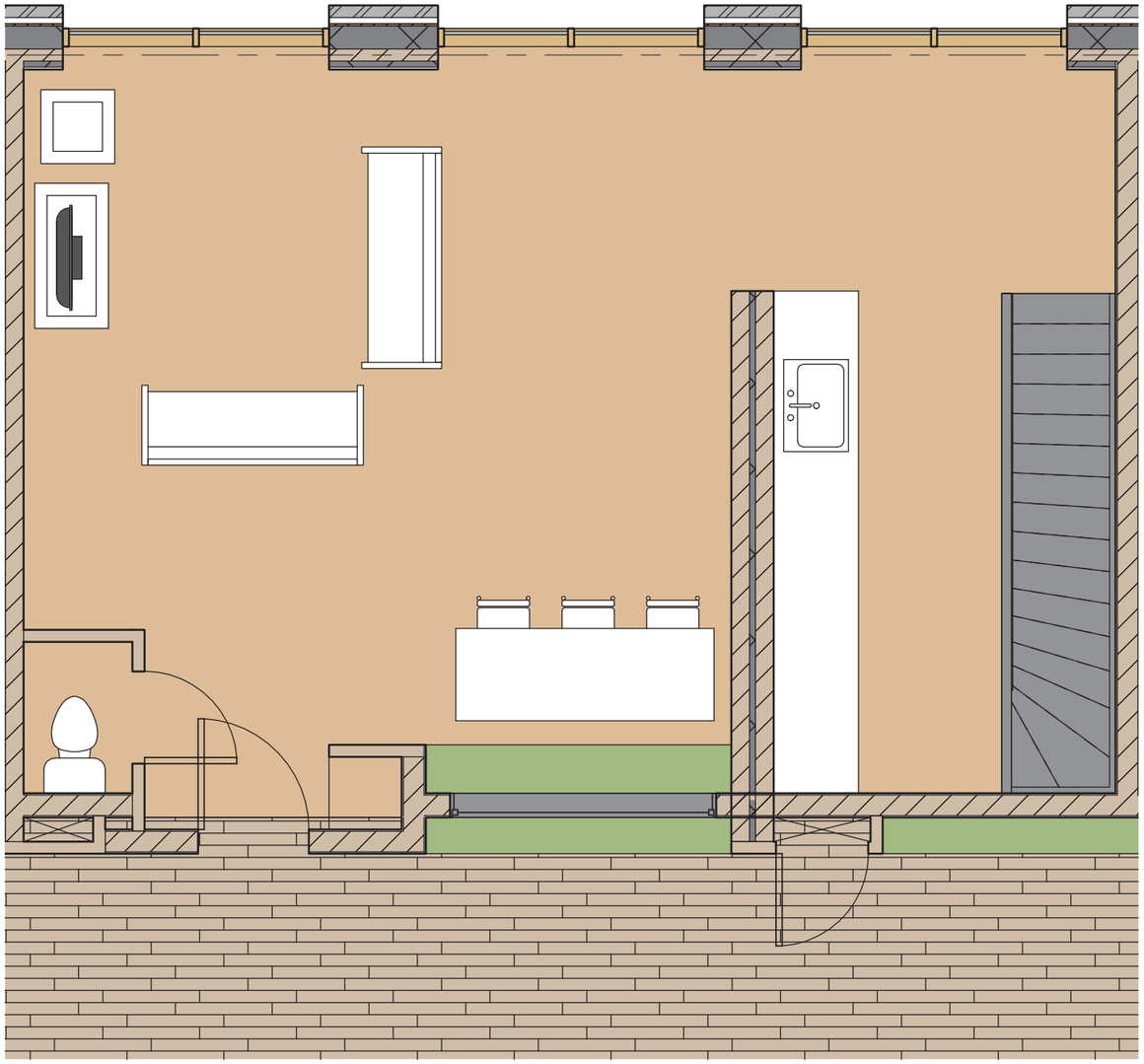
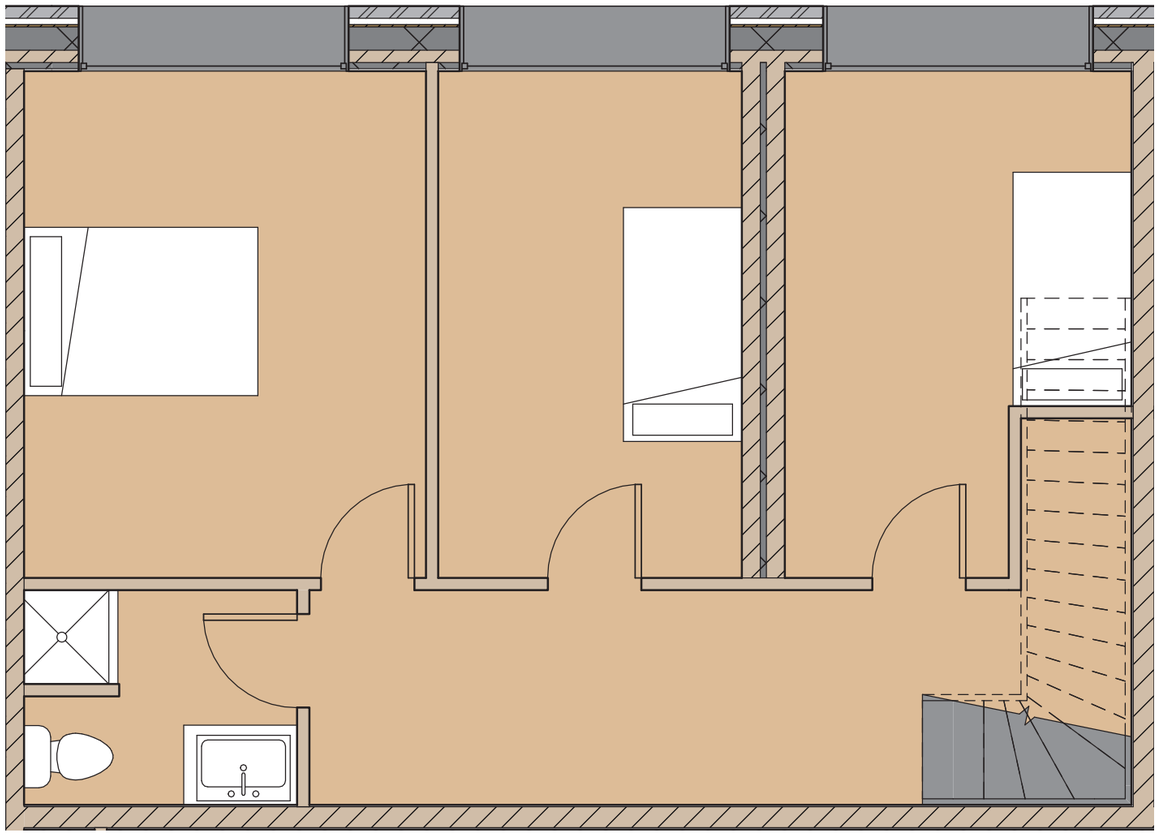
Dwelling on the ground floor





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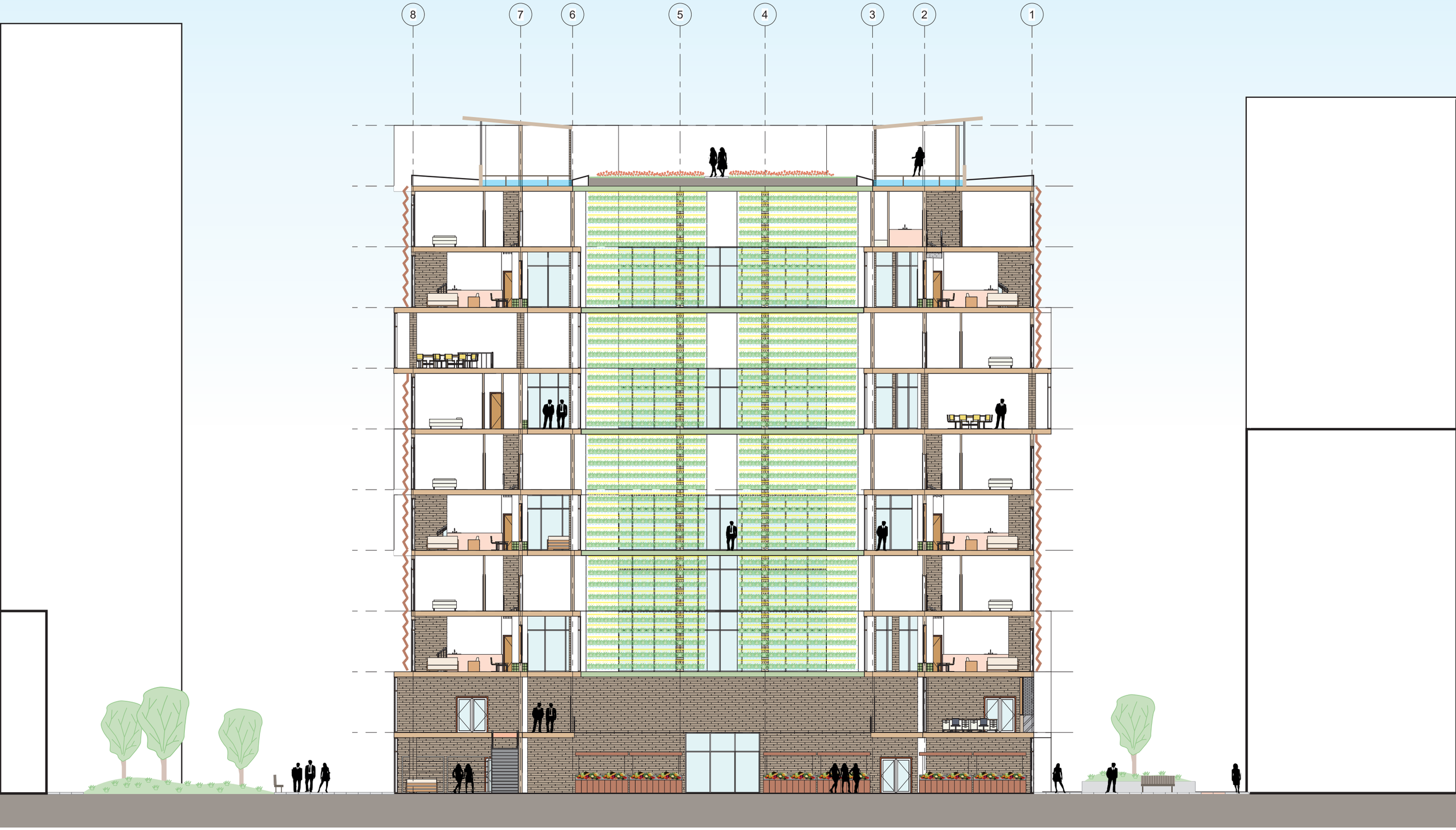
Section A



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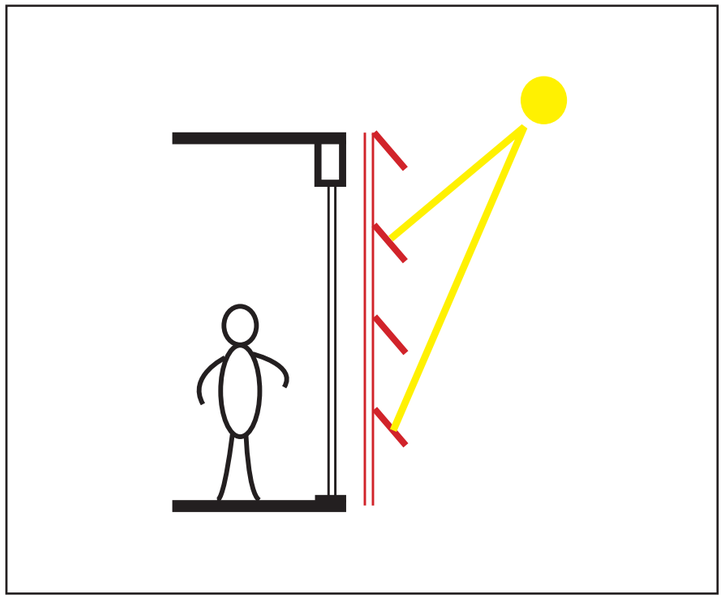
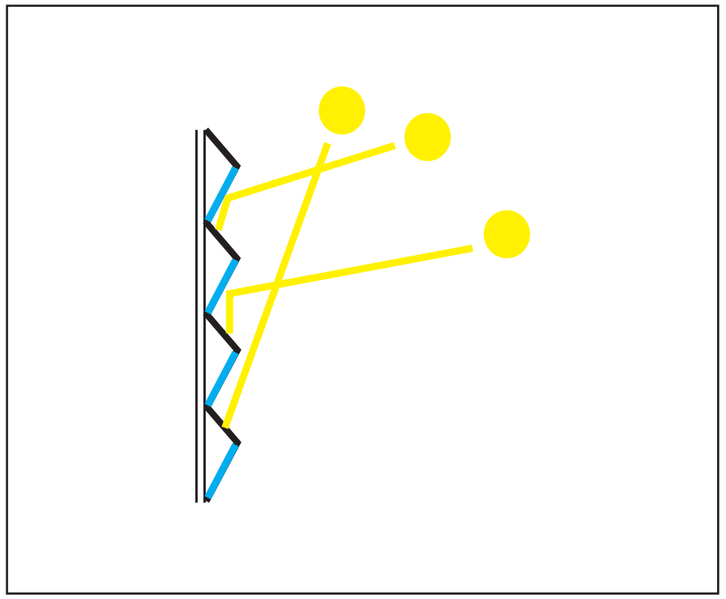
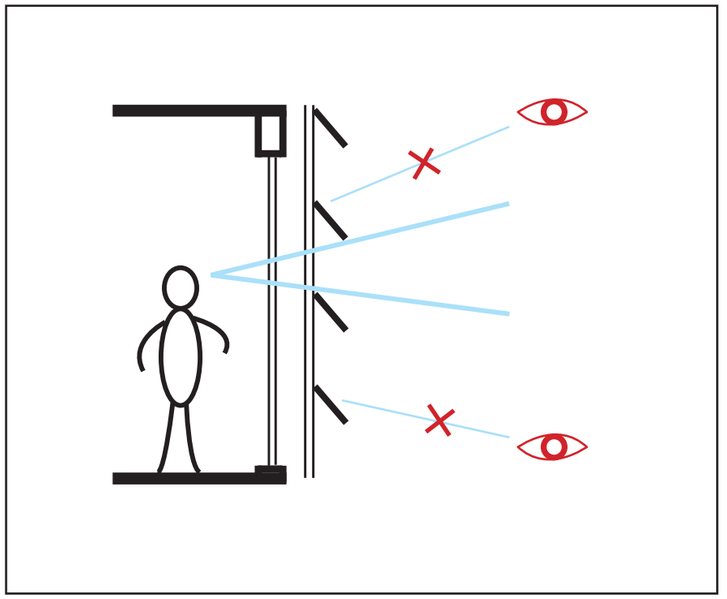
Facade Design



Overheating protection through disconnected facade



Sustainable energy generation for the industry

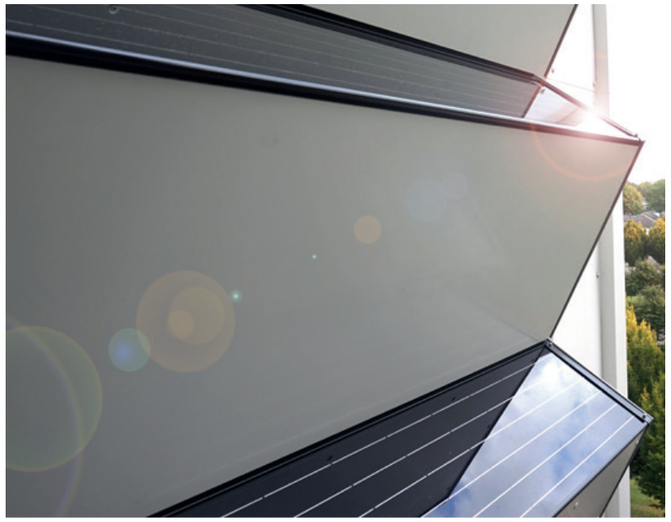


Optimizing view and privacy for the dwellings

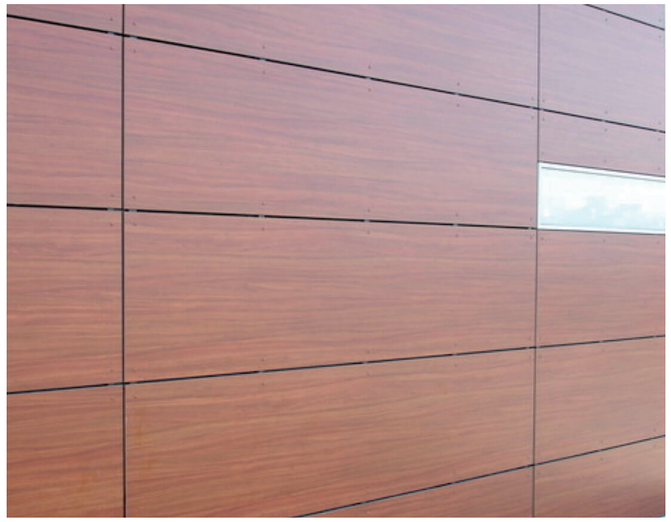
Zigzag solar

Solarpanel facade

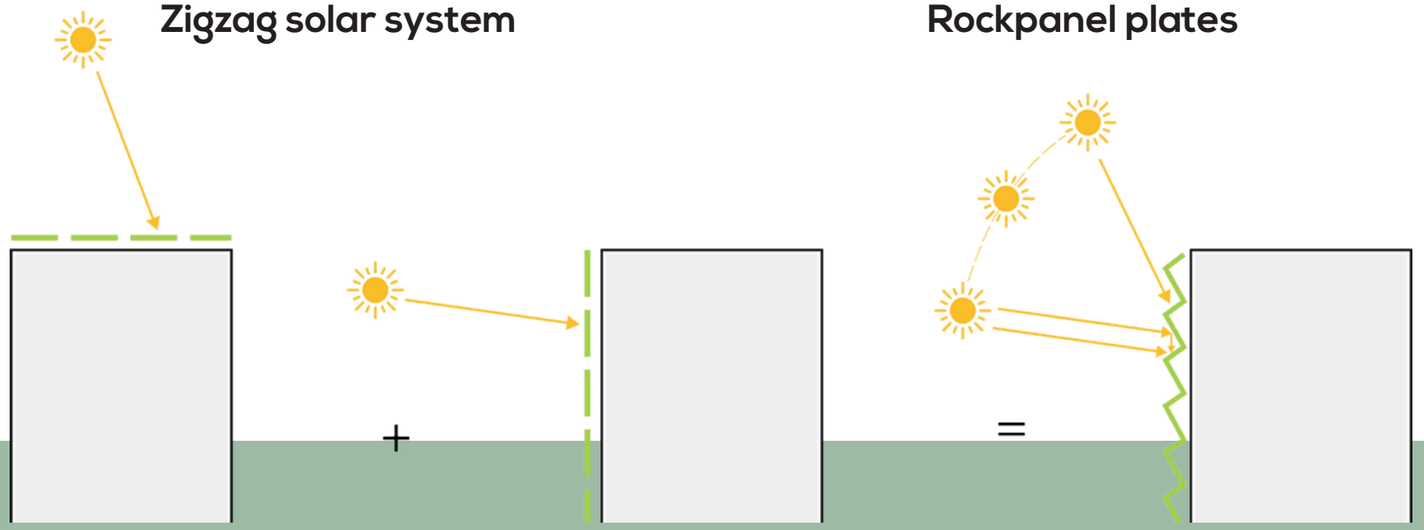
- solar heat protection
- maintain view
- high energy production with ideal angle



Zigzag solar system



Rockpanel plates



Solar benefits:

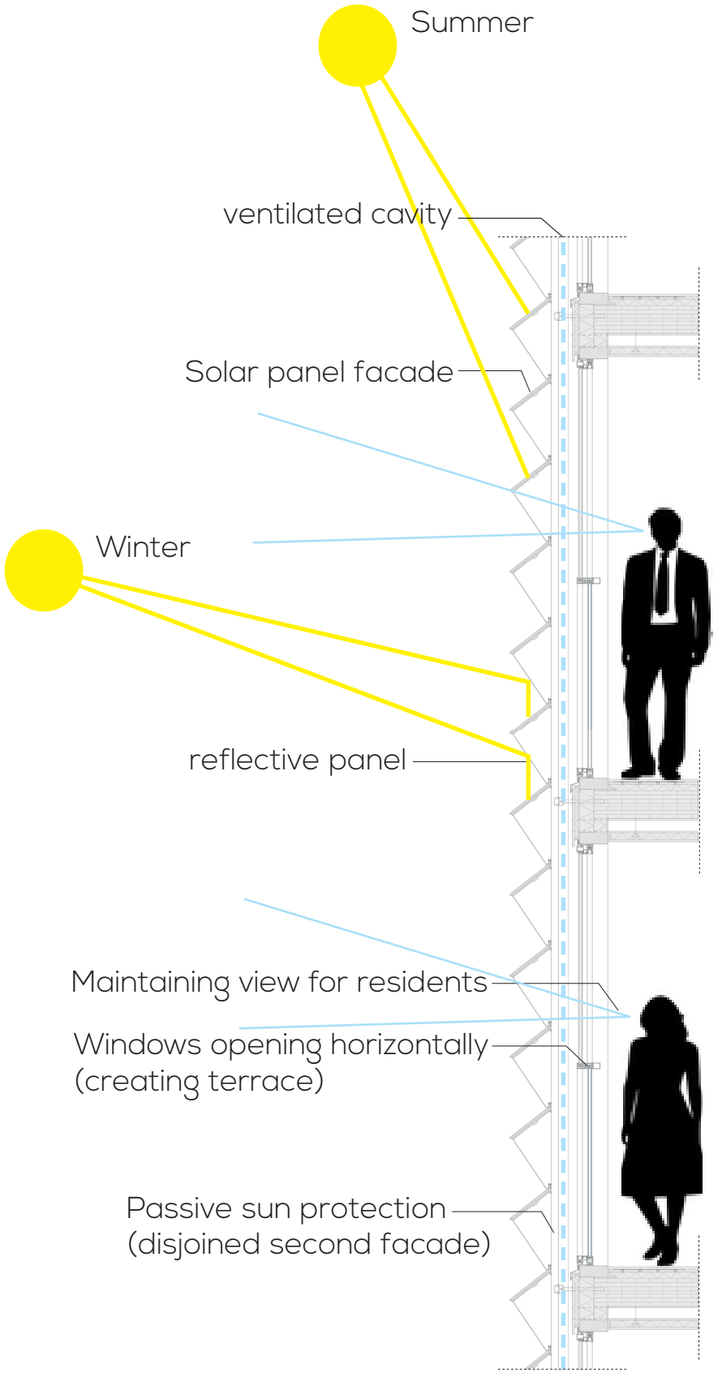
125*25,2 = 3150 kWh per (standard) dwelling

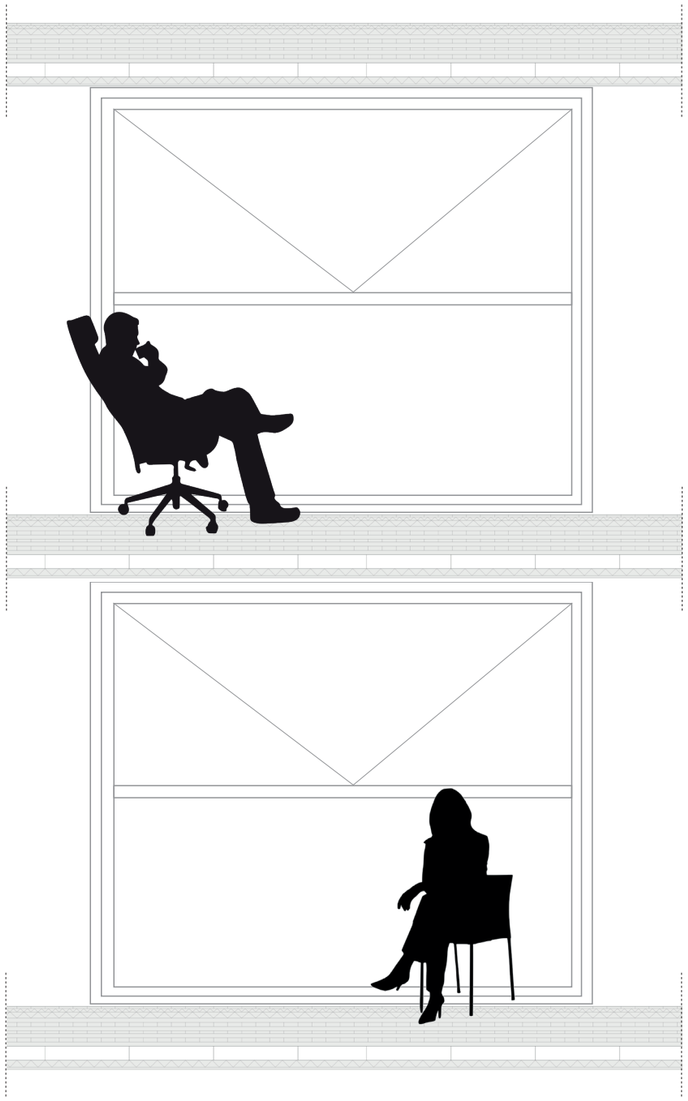
(rendement circa 90%)
3150*0,90 = 2850 kWh

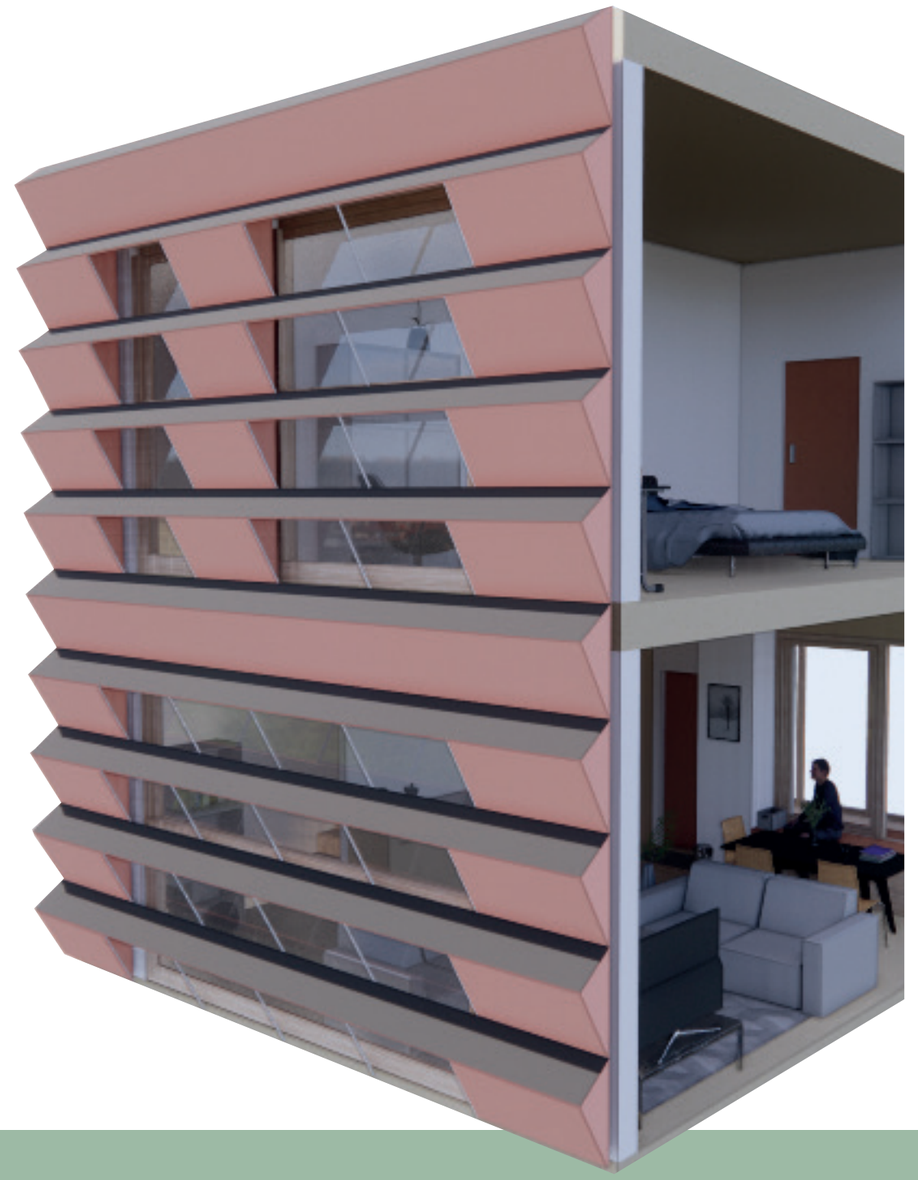
Average energy usage:
1-2 person household = 1830 - 2850 kWh

total of the building:
2850*10*4*2*1,5 = 342000 kWh

Facade Design (solar facade)







Facade design (spiral)

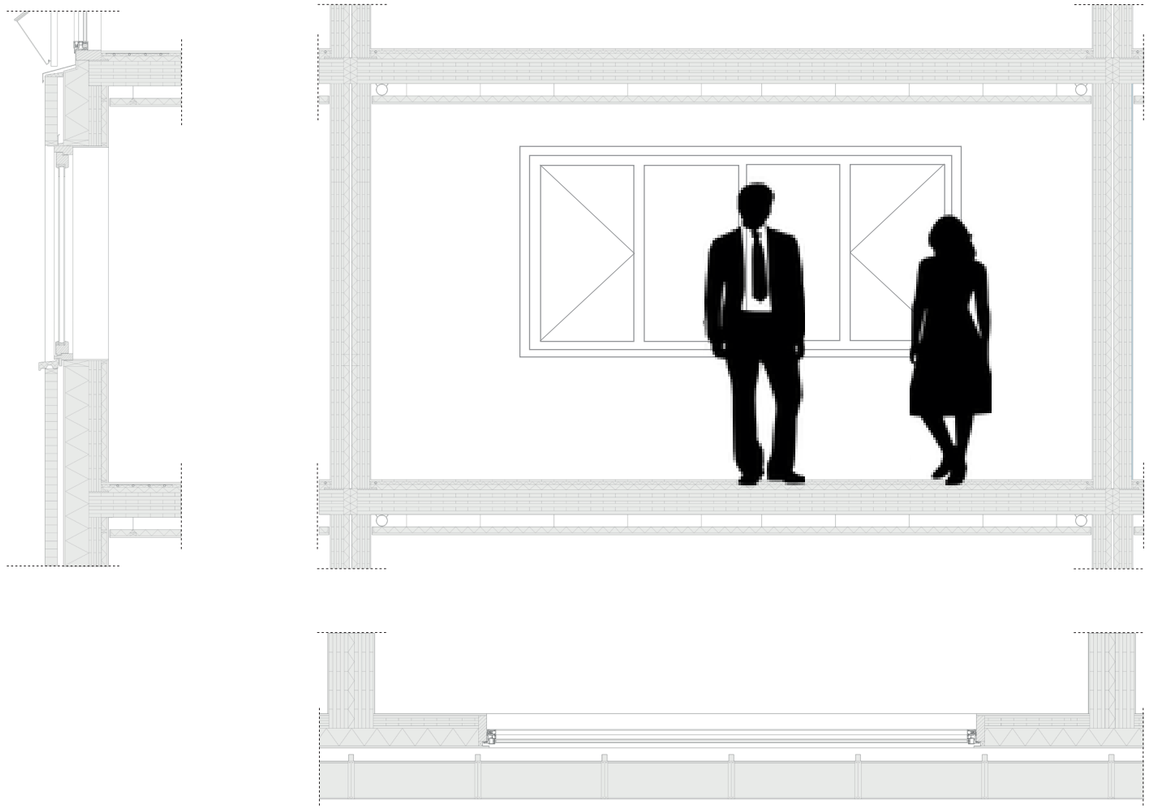
1m Overhang

Stabalux curtain wall

CLT columns

Passive sun protection
(Wooden slets)

Facade design (plinth)

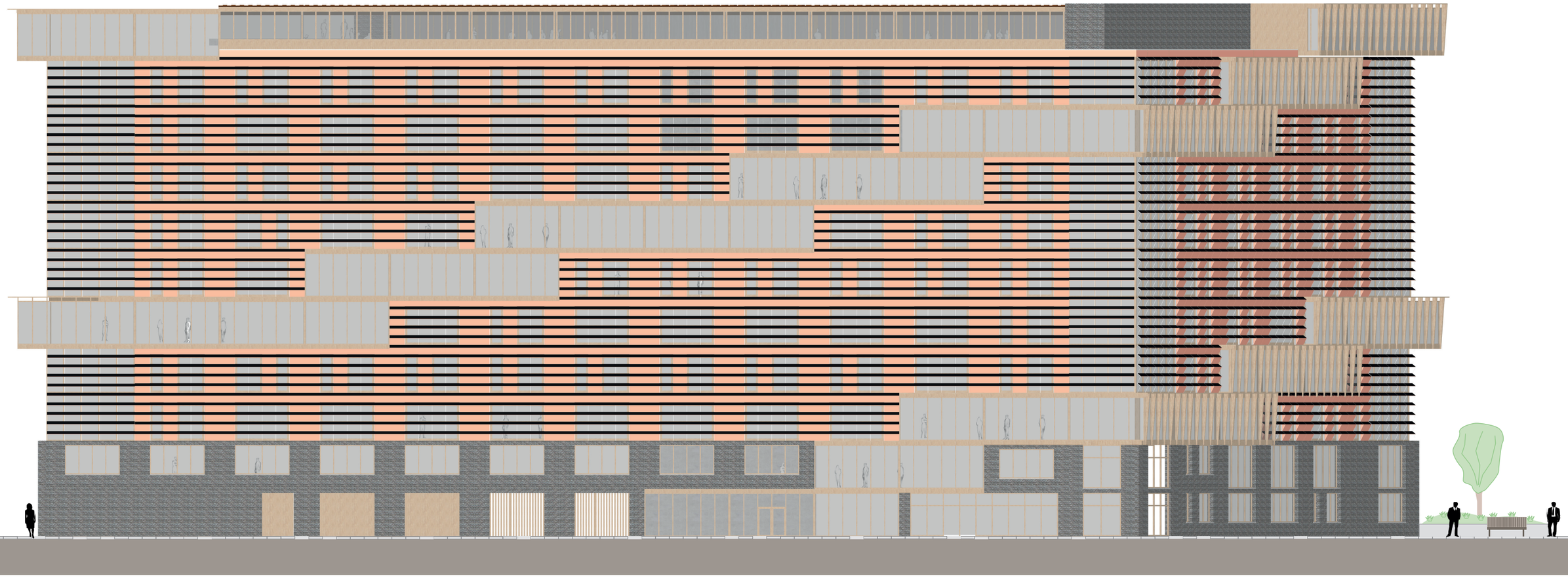


Bike storage
(Wooden slets)

Grey bricks

Facade View

South-west



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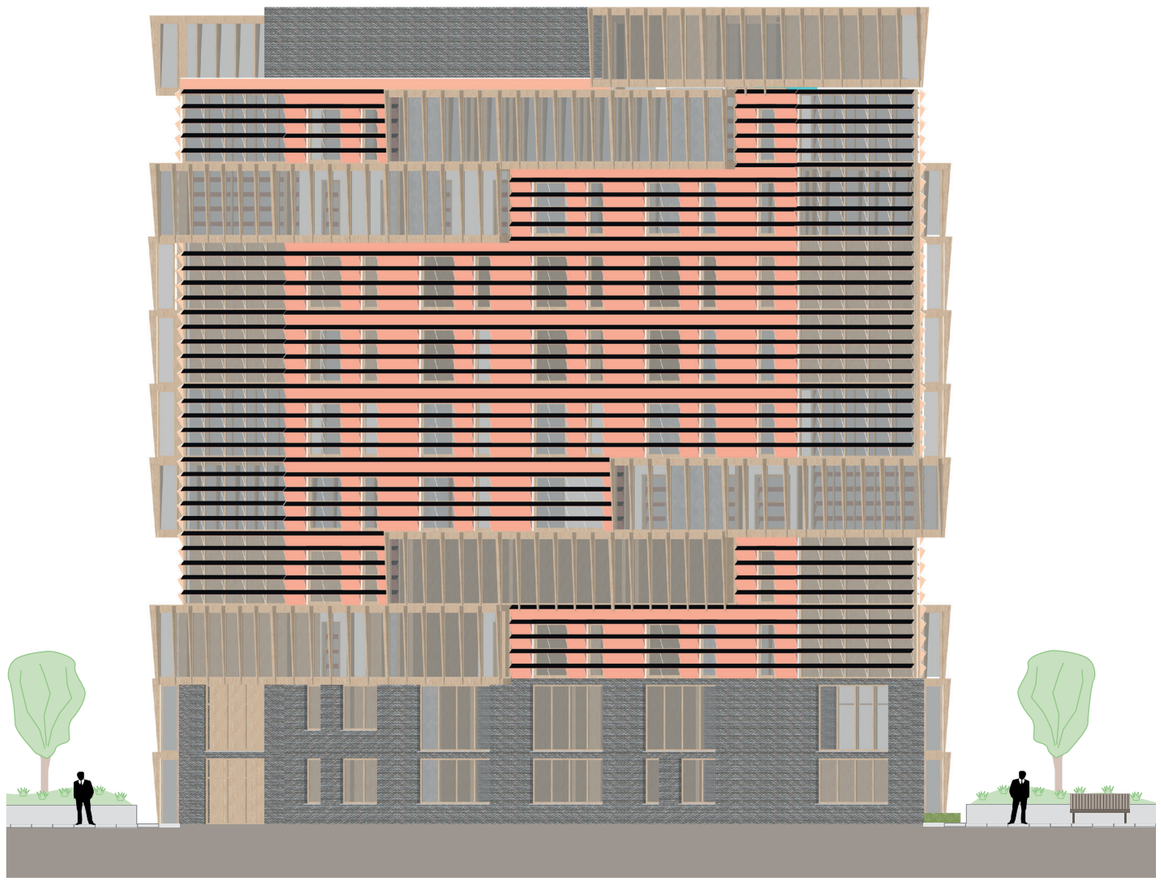
Facade View

South-east



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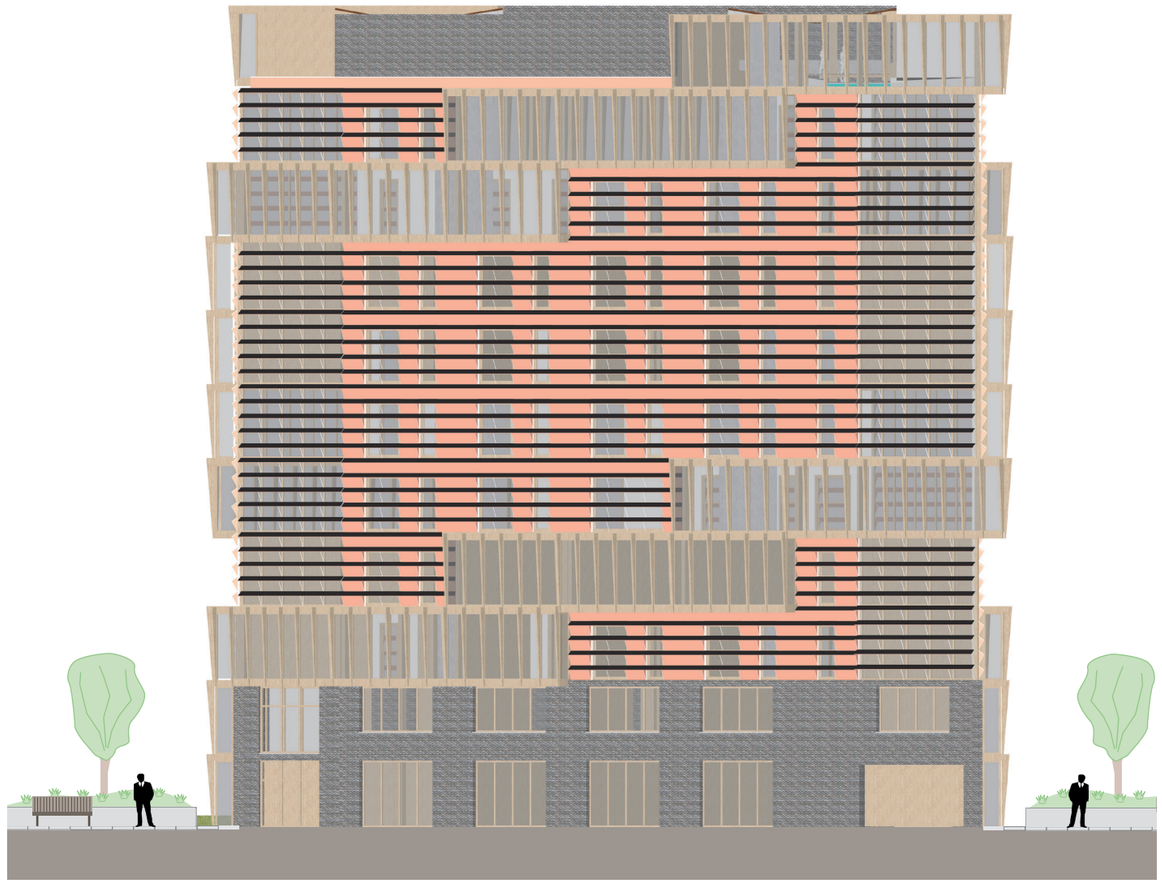
North-west



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