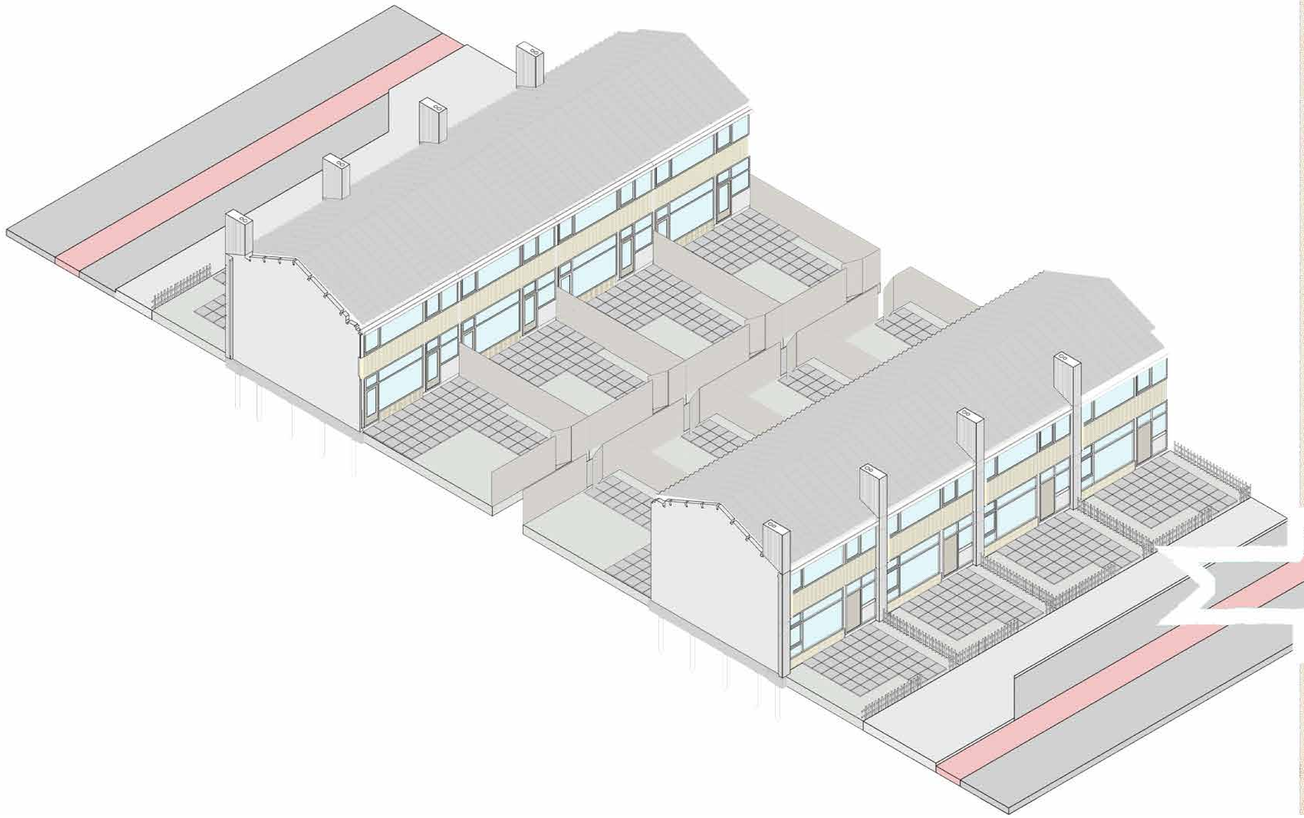
Nature-Based Renovation of East-West Oriented Row Houses



Coby Bianco 4789717

Architecture Tutor: Mo Smit
BT Tutor: Paddy Tomesen
Research: Tatijana Armijos Moya

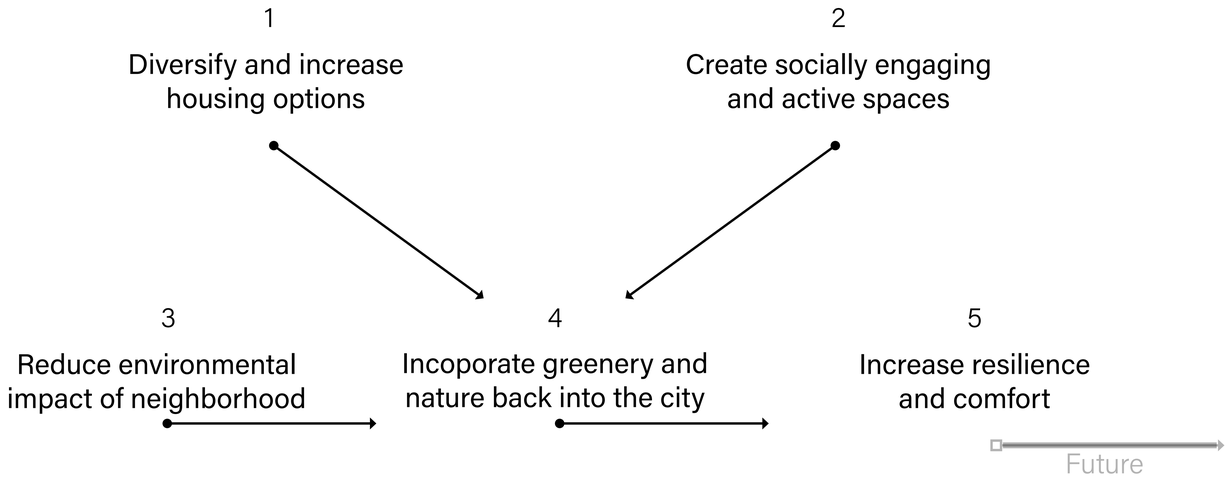
P5 Presentation
aE studio

Social Engagement

Nature inclusion and utility

Technical upgrades

Design Goals



Physical context

Climate crisis

National Challenges

Social Engagement

Nature inclusion and utility

Technical upgrades

Physical context

Climate crisis

National Challenges

Neighbourhood Conclusion

- Low technical state of the buildings
- Reduced indoor comfort and too high energy use
- Future demand for cooling
- Unprepared for future and current climate challenges
- Socially unengaging outdoor space
- Underutilized public space
- A disconnect between urban green and surrounding greenery
- Public space excessively divided into car infrastructure, pedestrian infrastructure, green patches, and public buildings squares and playgrounds.
- Excessive hardening
- Mismatch between demographic, household composition and housing supply.

Nature Preservation & Ecosystem Services

Increasing exposure to nature
Generating an appreciation for nature
Giving nature a place in and passage through the city
Bring back 'system' in the ecosystem of the city

'Future' weather & Climate Resilience

Changing climate
More extreme weather
Seperation between dry & wet periods - drought and flooding
Increased summer temperatures for longer

Energy crisis & Carbon neutrality

Reducing local energy consumption
Generating local renewable energy
Stimulating local production of goods and services
Net Zero Energy neighborhood

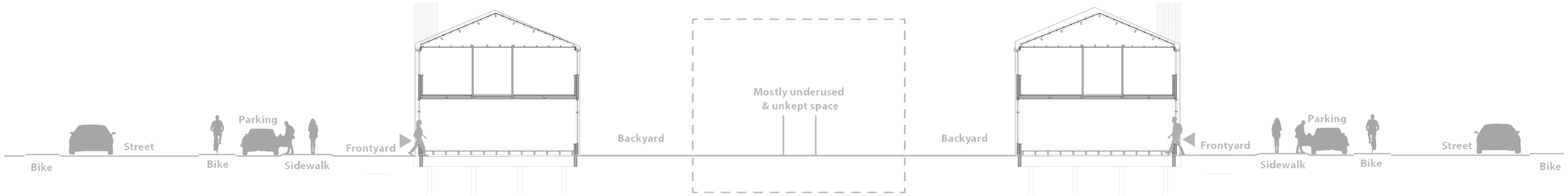
Housing crisis

Increase quantity of housing within the city
Provide more diverse housing
Give space for growth

The pieces of the Intervention

Flipping • Splitting • Garden Path • Constructed wetland

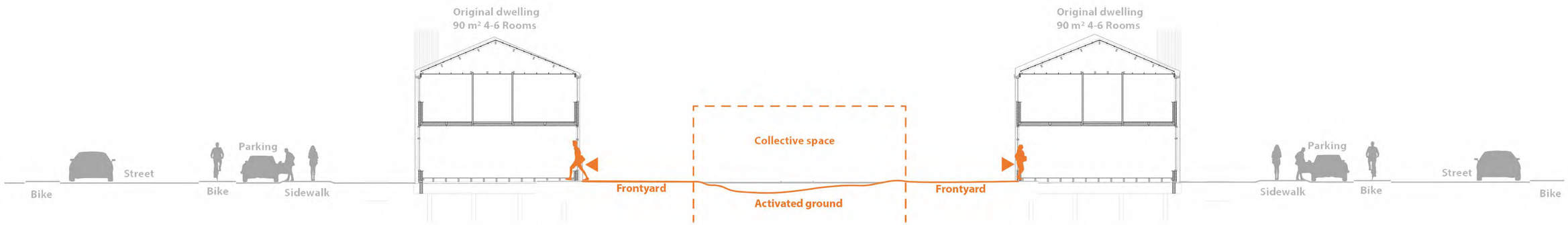
Current Situation



Communal space • Green roof • New facade envelope • Extension

The pieces of the Intervention

Flipping • Splitting • Garden Path • Constructed wetland



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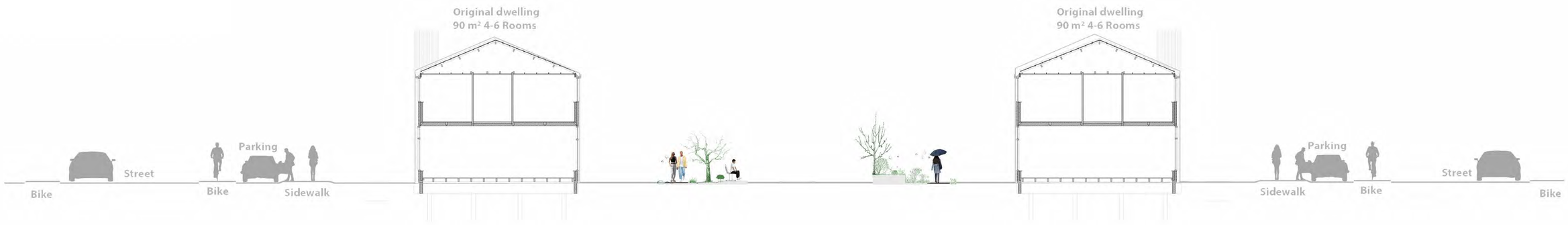
Flipping • Splitting • **Garden Path** • Constructed wetland



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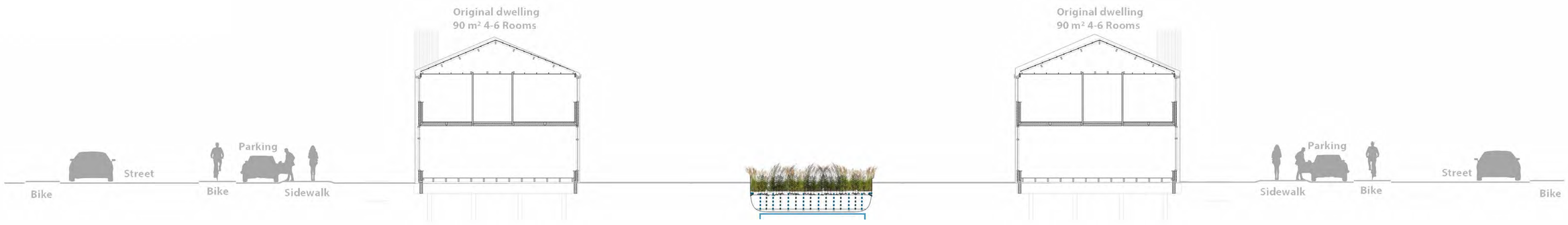

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Communal space • **Green roof** • New facade envelope • Extension

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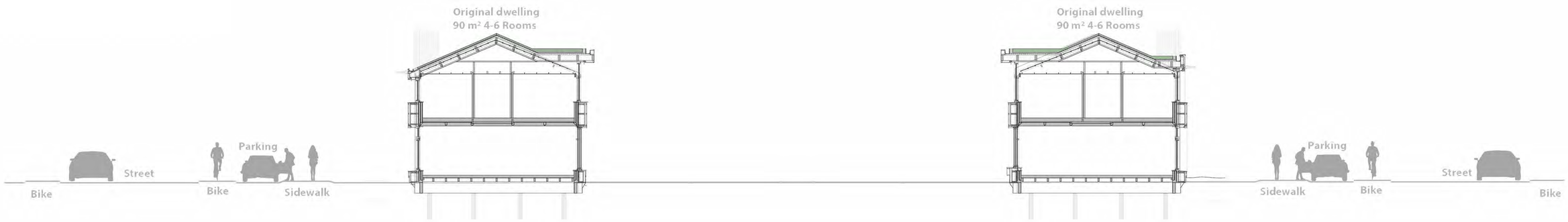
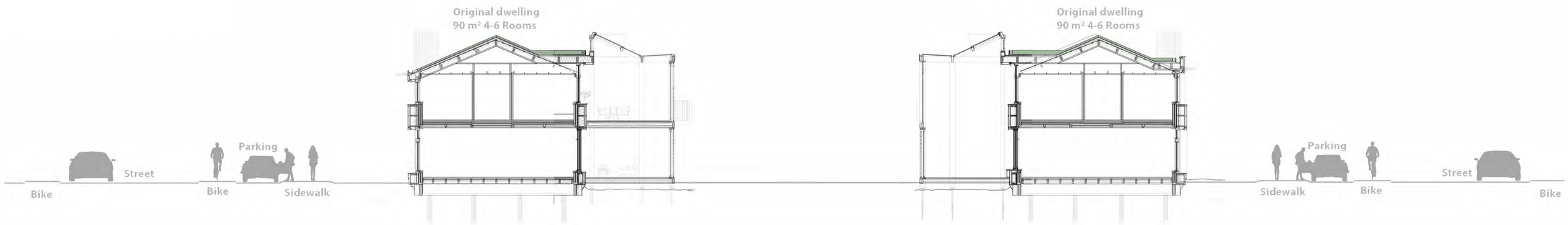
Flipping • Splitting • Garden Path • Constructed wetland



Communal space • Green roof • **New facade envelope** • Extension

The pieces of the Intervention

Flipping • Splitting • Garden Path • Constructed wetland



Communal space • Green roof • New facade envelope • **Extension**

Social Engagement (breaking out of the shell)

Flipping the houses

Splitting the houses

The Extension

The Communal space

The Shared path

Nature Inclusion and utility

The garden Path (Shared path)

The Constructed Wetland

The green roofs

Smaller green interventions

Technical upgrade

The Constructed Wetland

The green roofs

The Extension

The facade envelope

Current situation

Photos old & new

Current situation

Photos old & new

Current situation

Public space & Services

- Schools (various levels) Daycares, Child Centers etc.
- Community Center
- Lidl Grocery Store
- Burger Restaurant
- Multicultural Church
- JW Church

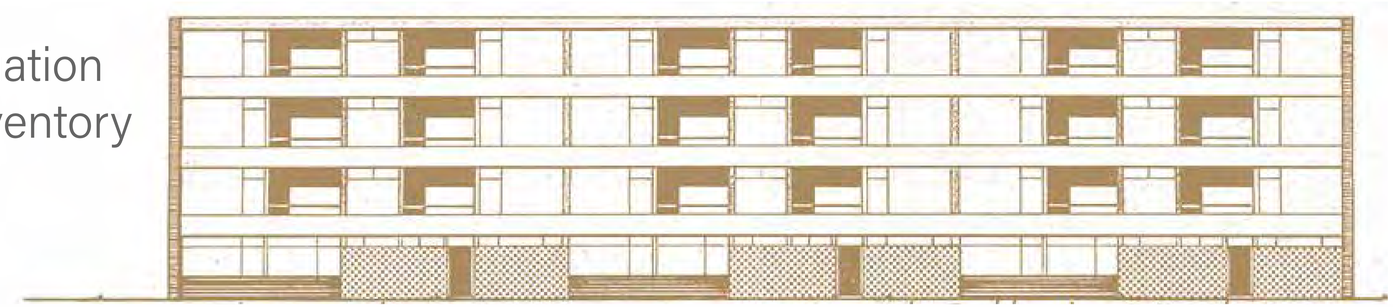
Current situation

Mobility infra &
Public buildings

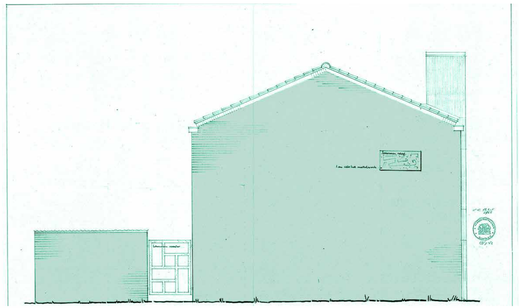
Current situation

Available public
Green surfaces

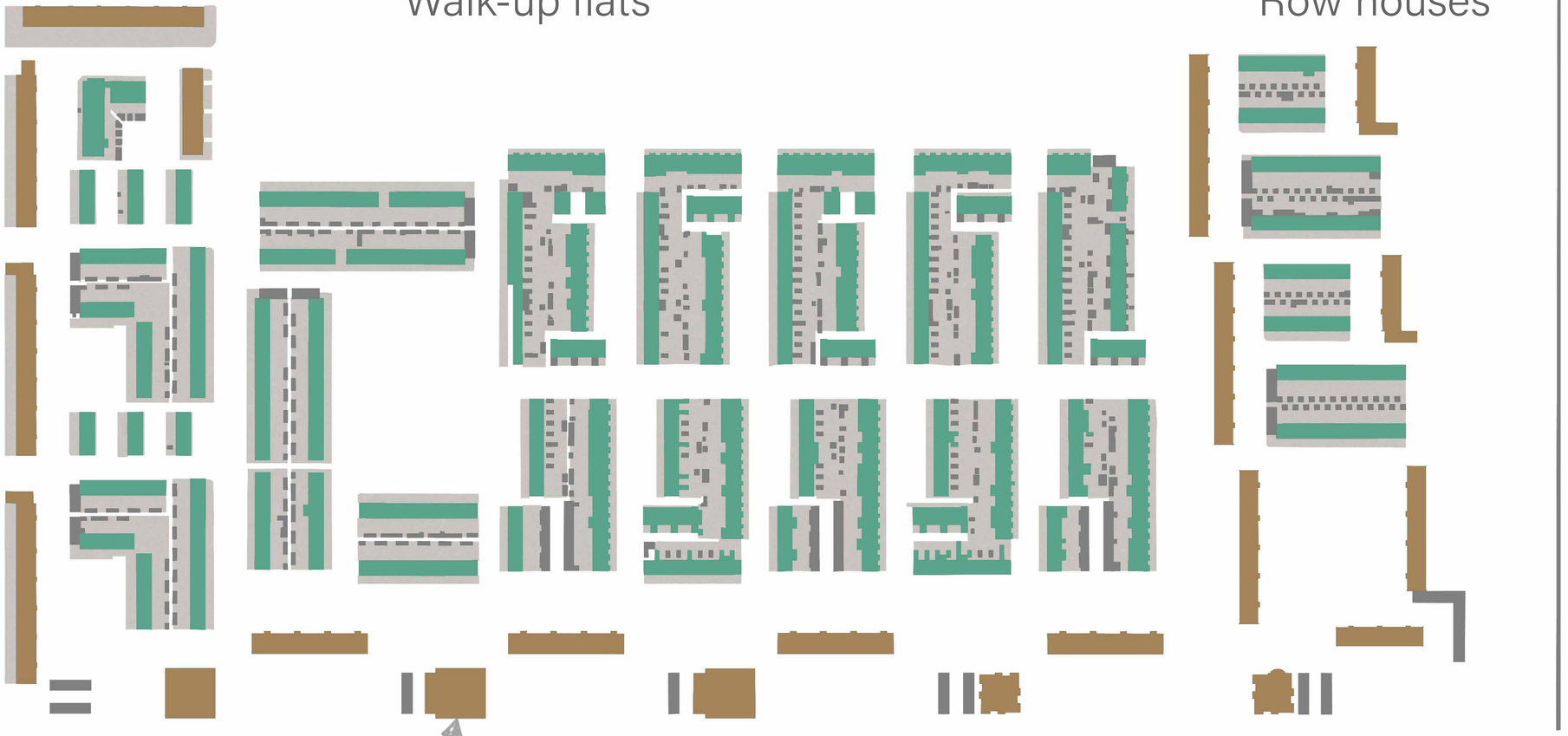
Current situation
Building inventory



Walk-up flats

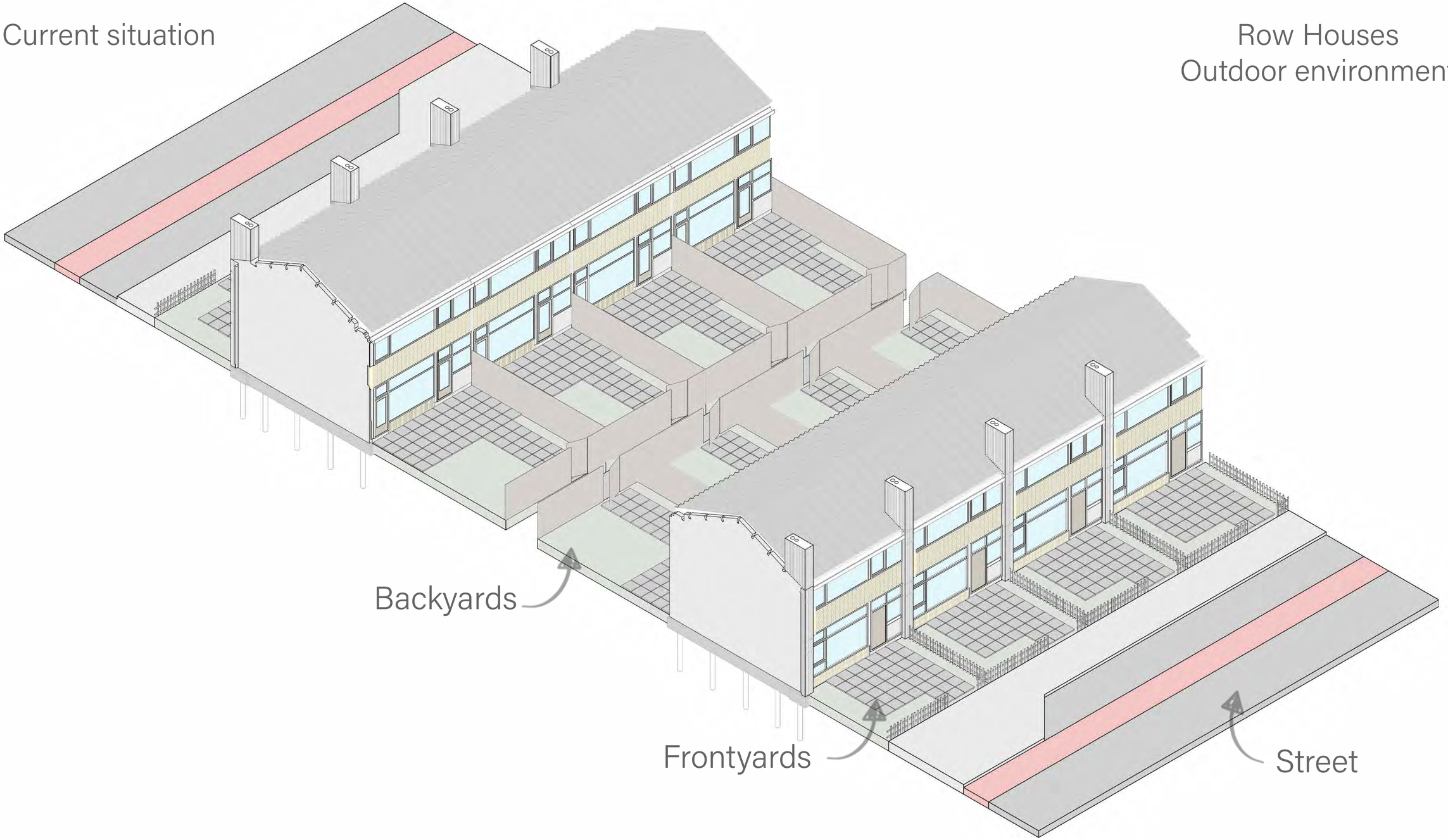


Row houses



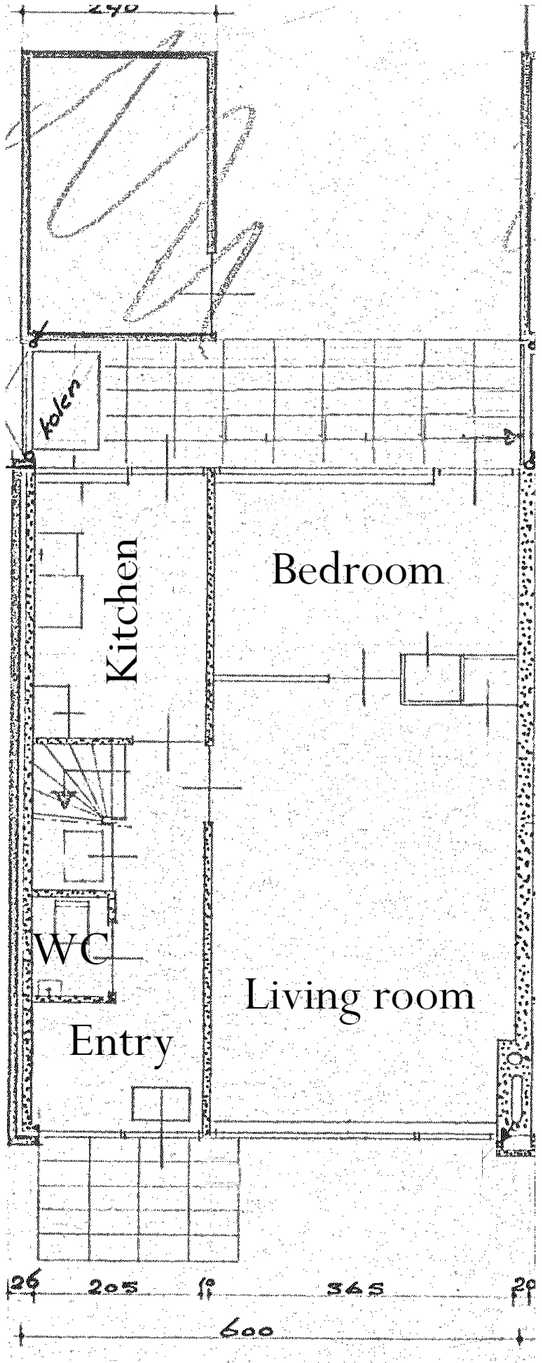
Current situation

Row Houses
Outdoor environment



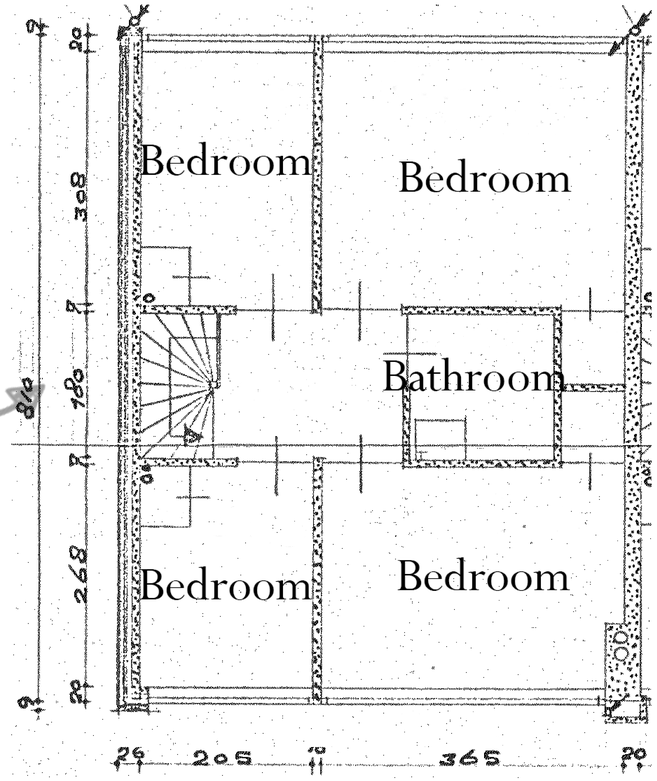
Current situation

Row Houses
Layouts



Ground floor

First floor



Ages	
00 - 15	**20%**
15 - 25	**11%**
25 - 45	**34%**
45 - 65	**22%**
65+	**13%**

Ethnicity	
Autochtoon	**45%**
Other	**55%**

Moroccan	**21.7%**
Turkish	**25.3%**
Other	**27.3%**
Western	**19%**
Suriname	**4.8%**

Ages	
00 - 15	**20%**
15 - 25	**11%**
25 - 45	**34%**
45 - 65	**22%**
65+	**13%**

Household Composition	
Single Households	**40%**
Couple Households	**22%**
Family Houdeholds	**26%**
Single Parent Households	**10%**

Current situation

Demographics &
Household Composition

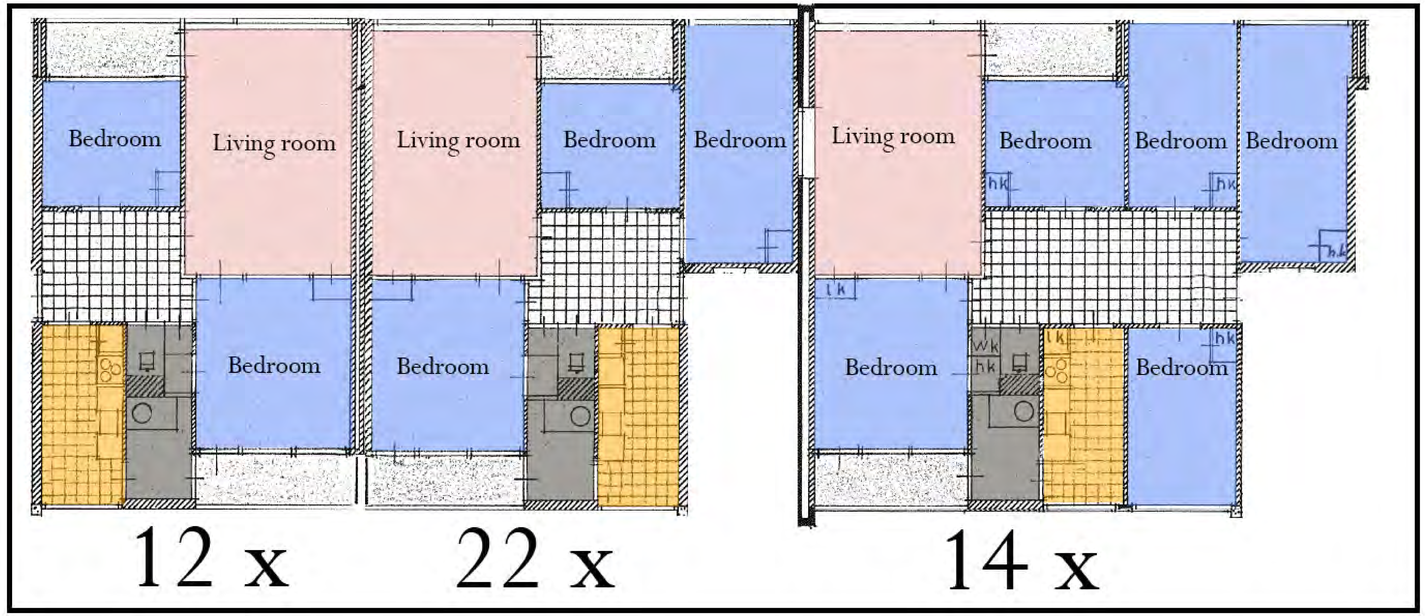
Ages	
00 - 15	**20%**
15 - 25	**11%**
25 - 45	**34%**
45 - 65	**22%**
65+	**13%**

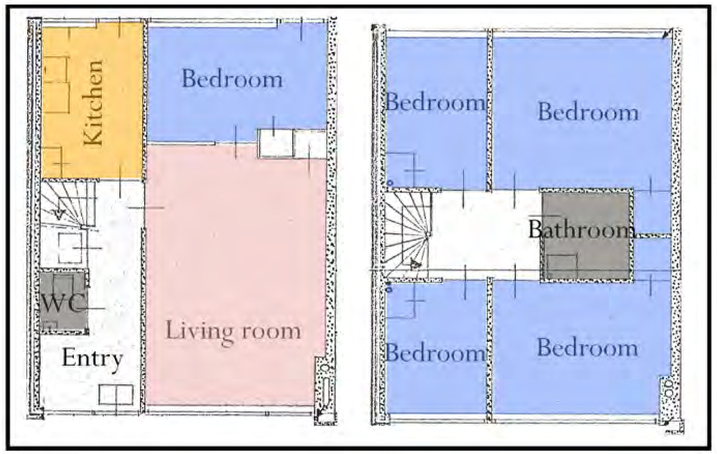
Household Composition	
Single Households	**40%**
Couple Households	**22%**
Family Houdeholds	**26%**
Single Parent Households	**10%**

Housing supply	
Single family	**45%**
Flat apartements	**55%**
5 bedroom units	**61%**
3 or less bedroom units	**39%**

55%

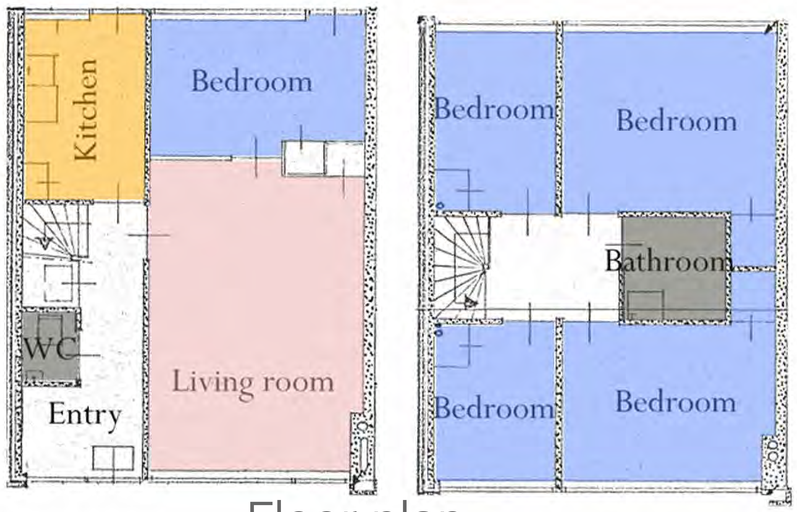
45%



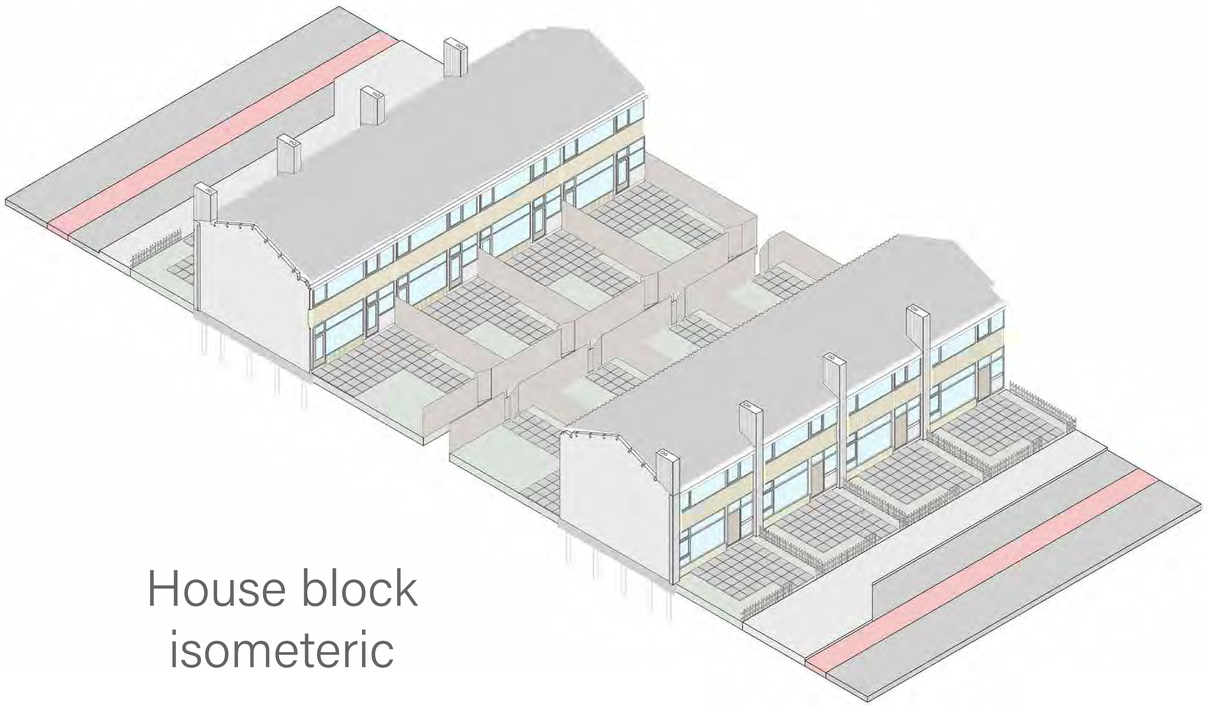


Row house

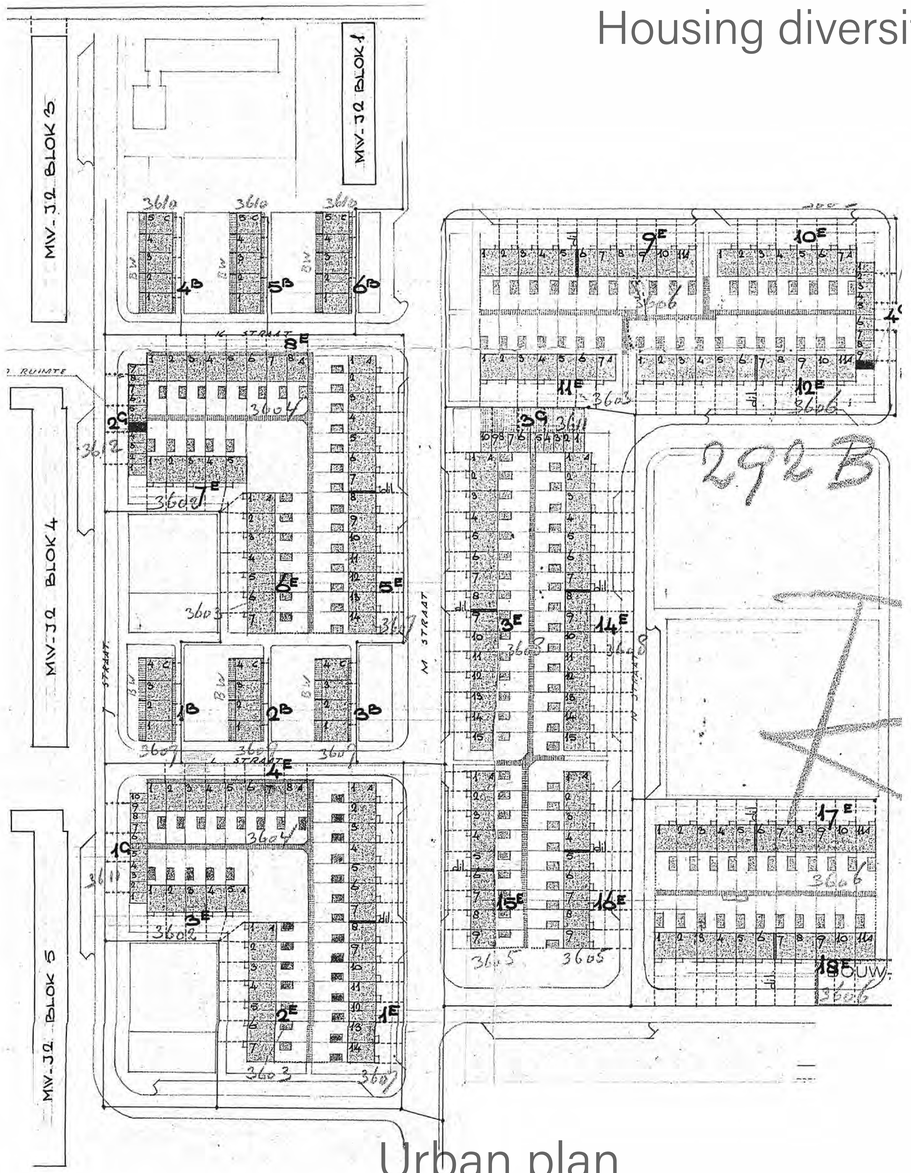
Current situation
Housing diversity



Floor plan

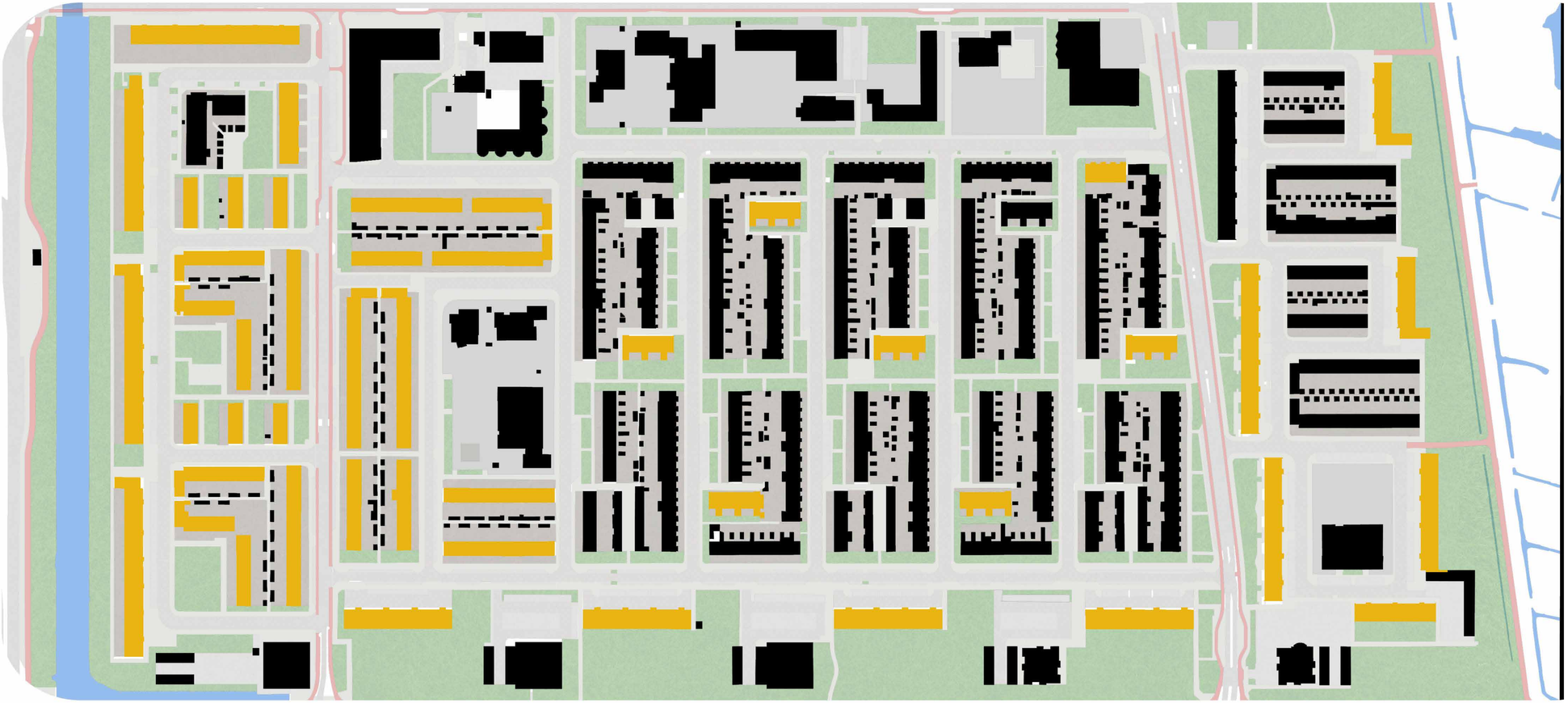


House block
isometeric



Urban plan

Corporation vs privately owned housing



How to get from Current -> Design

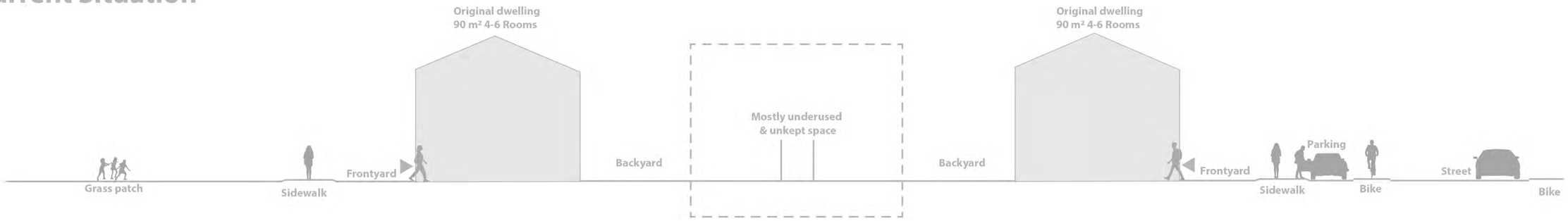
Flipping • Splitting • Garden Path • Constructed wetland

Communal space • Green roof • New facade envelope • Extension

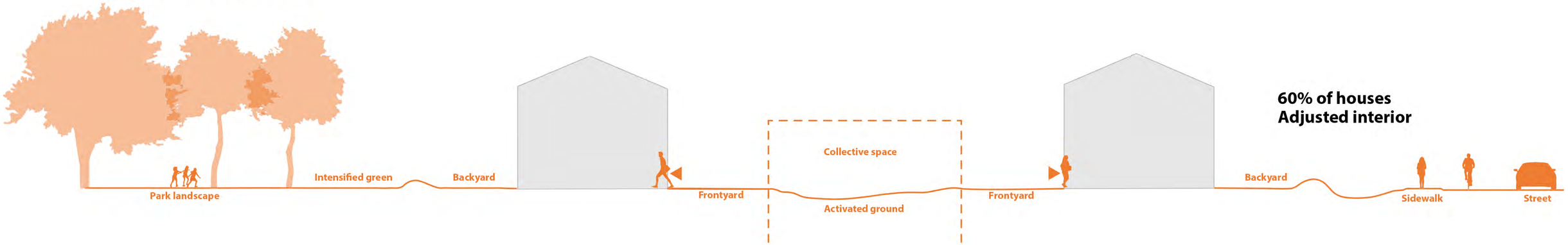
Flipping

Creating the canvas

Current Situation



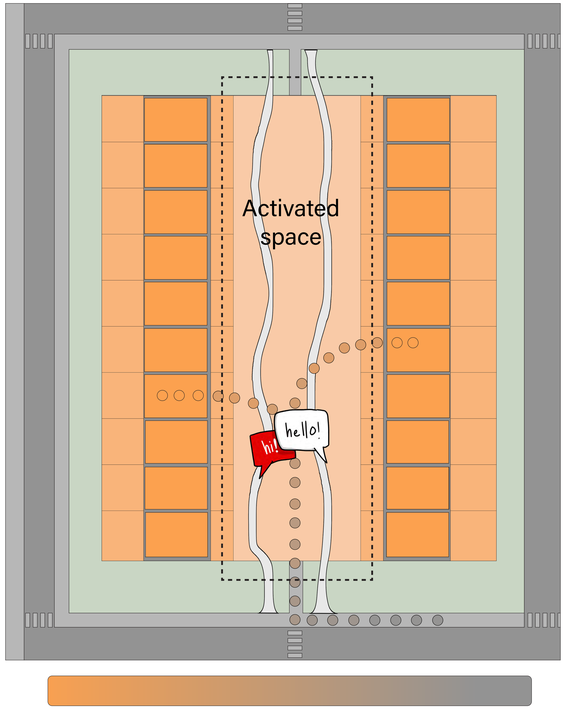
Inverted Houses



60% of houses
Adjusted interior

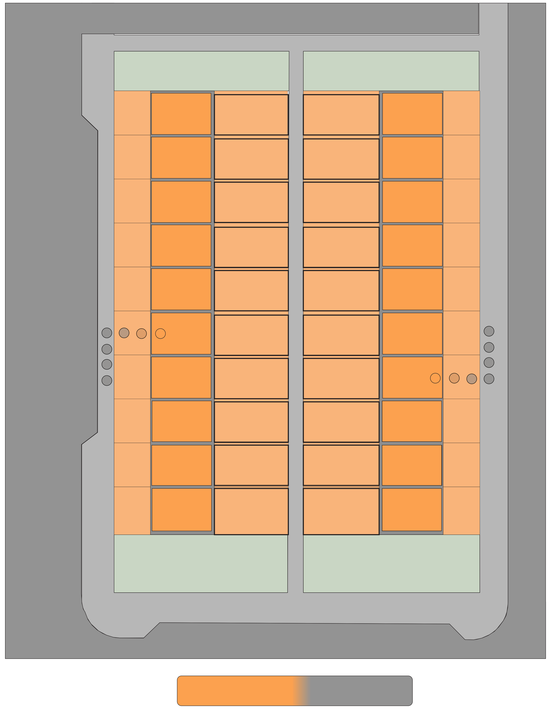
Flipping

Concentrated activity

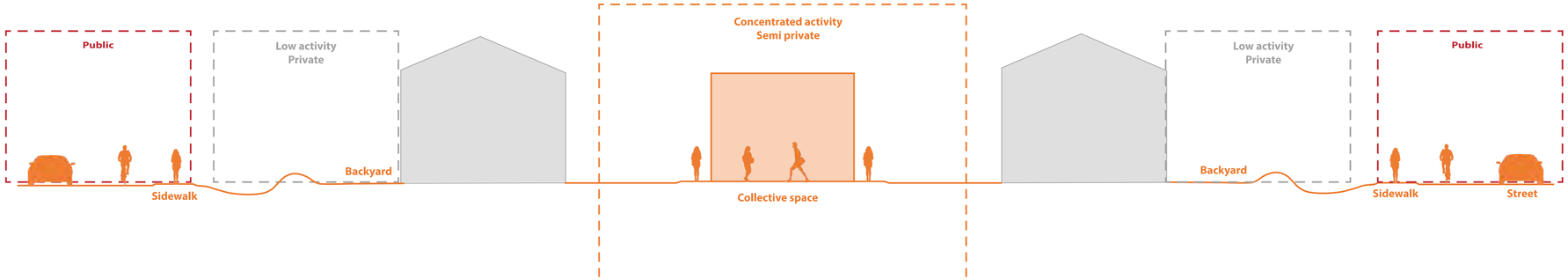


Transitional space to public

Dispersed inactivity



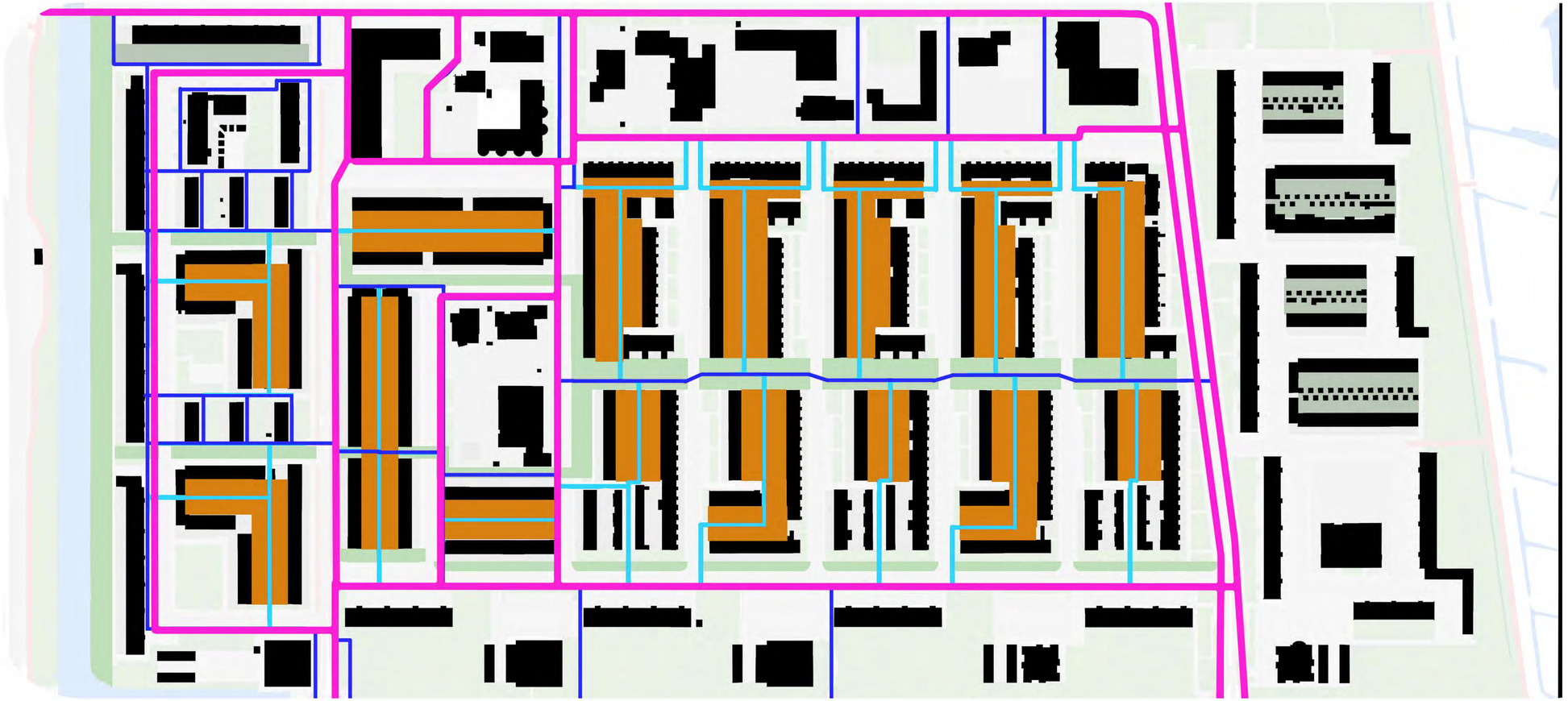
Abrupt transition



Flipping

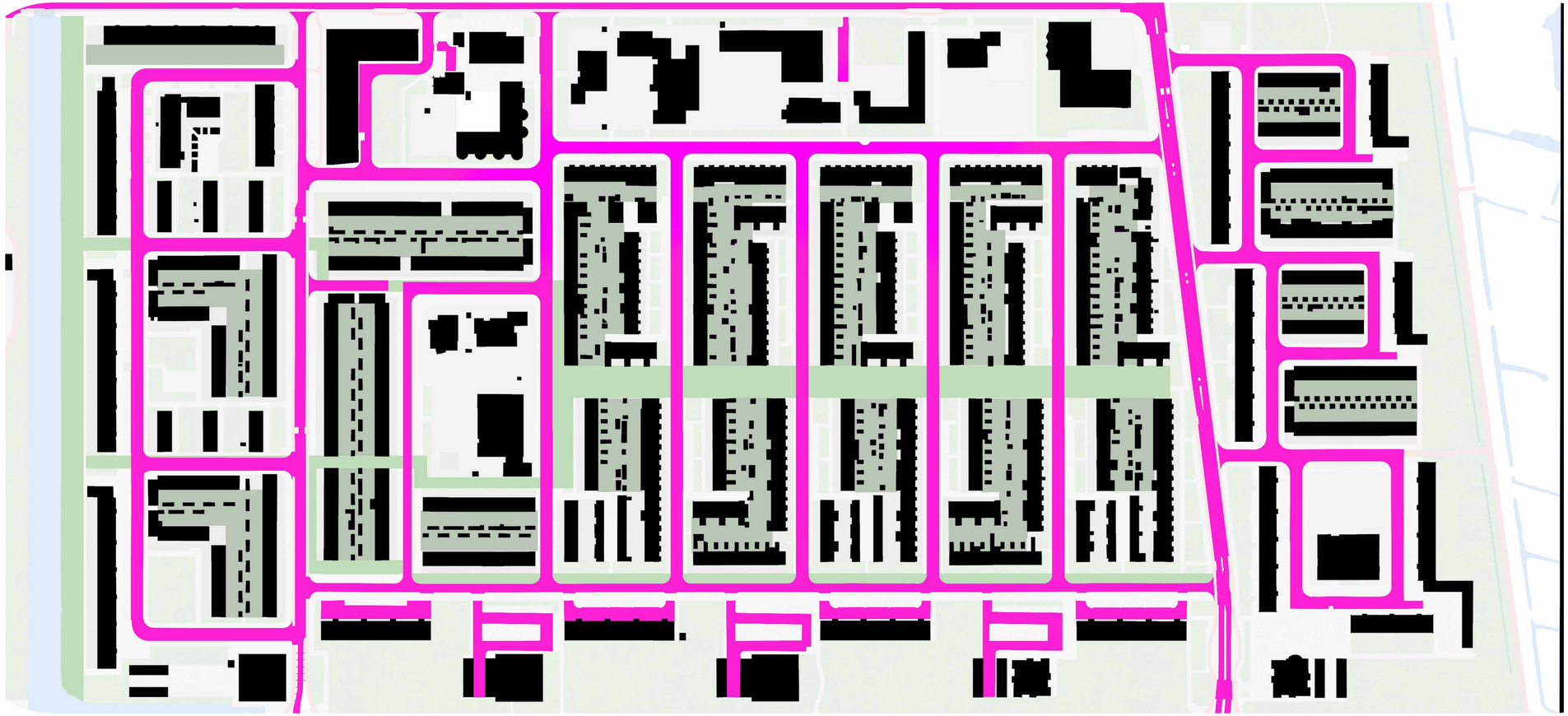
Updated Urban Network

Collective space routes
Pedestrian priority
Mixed mode mobility

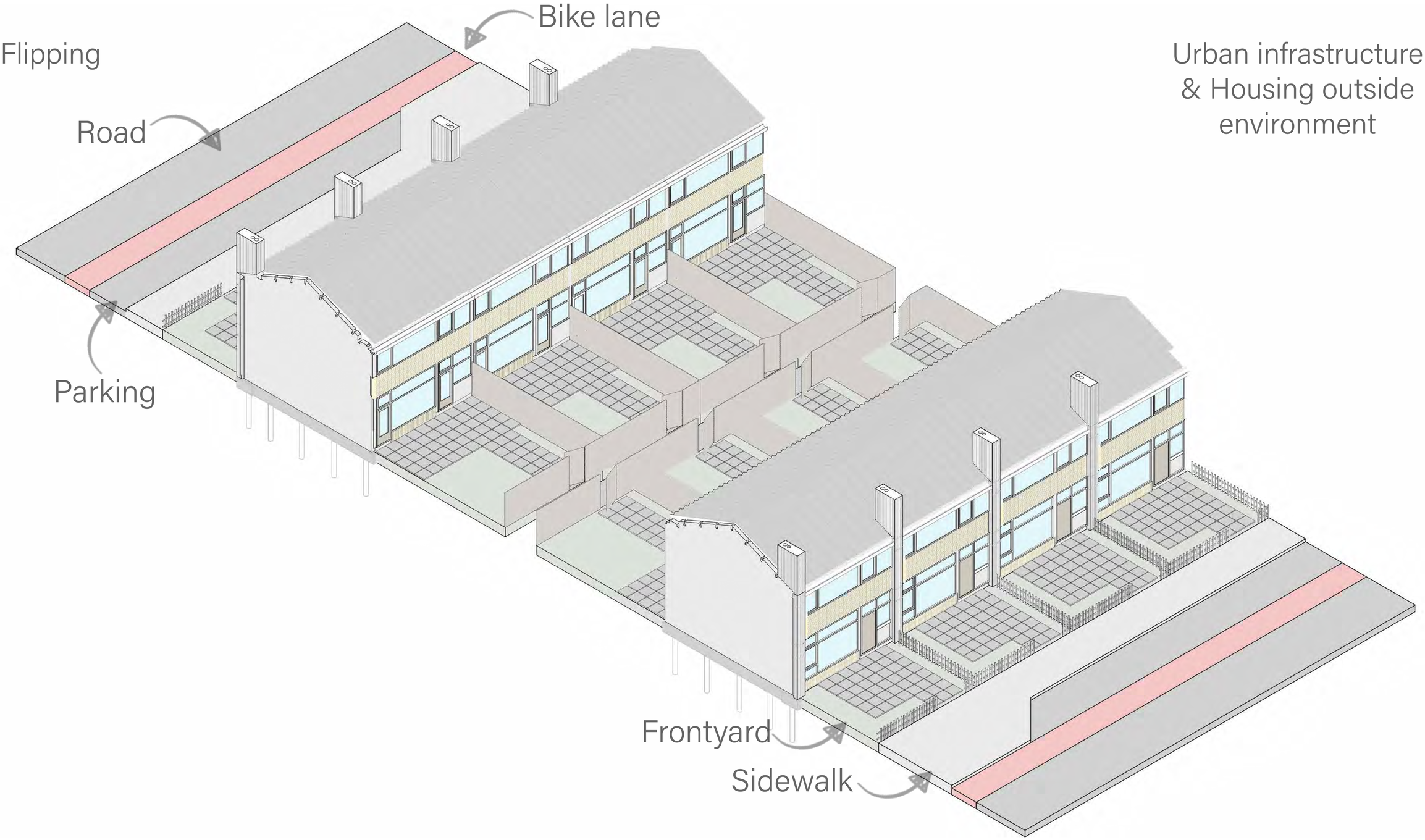


Flipping

Exiting Urban Network

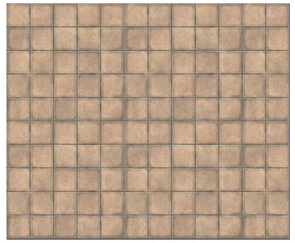


Urban infrastructure
& Housing outside
environment

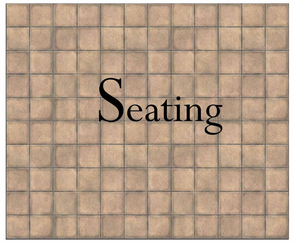


Flipping

Front garden upkeep



A 15%



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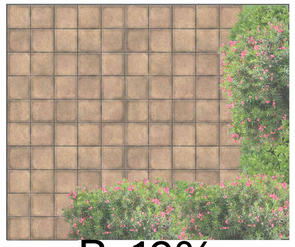
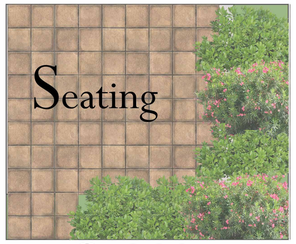
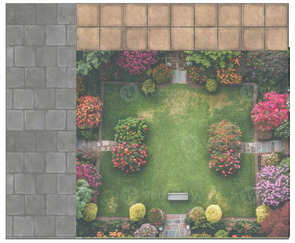


B 19%

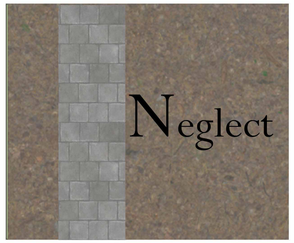


C 20%

N 10%



E 34%



G 1%

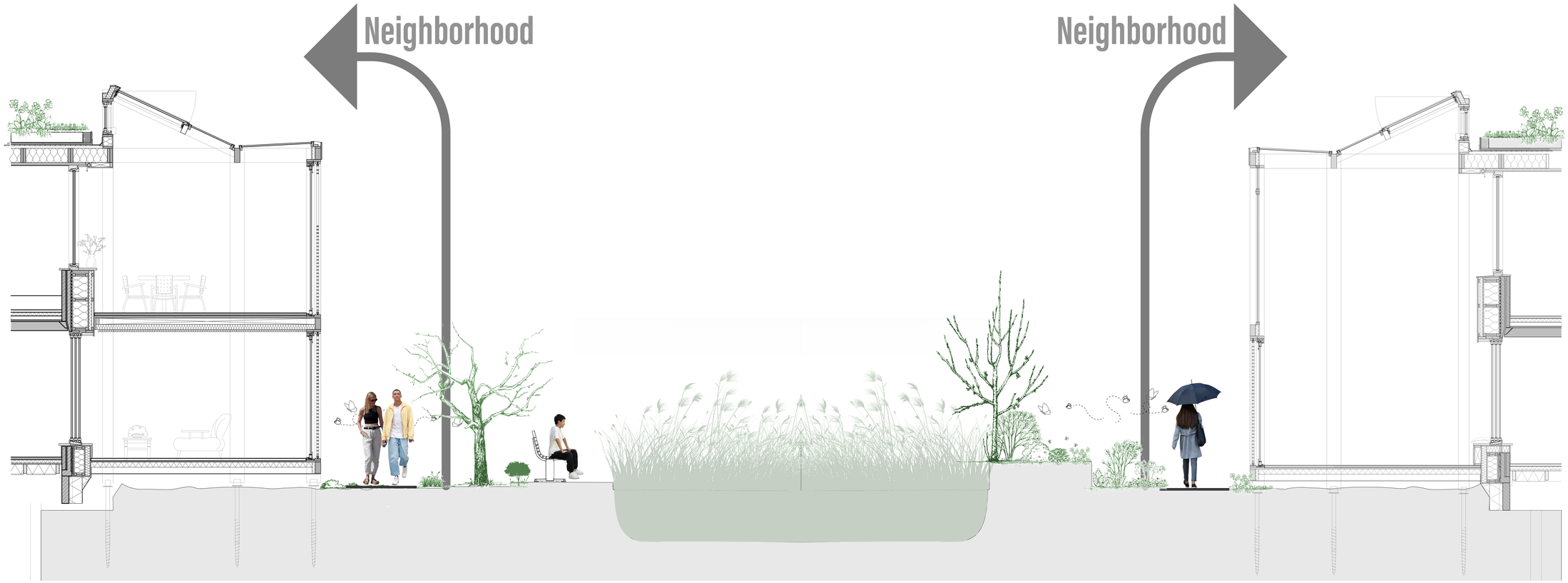
F 2%

Flipping
Extension
Shared Garden

Sheltered
outdoor space

Flipping
Extension
Shared Garden

Navigating from
private to public



Rationale of Flipping

1. Dedicated outdoor space

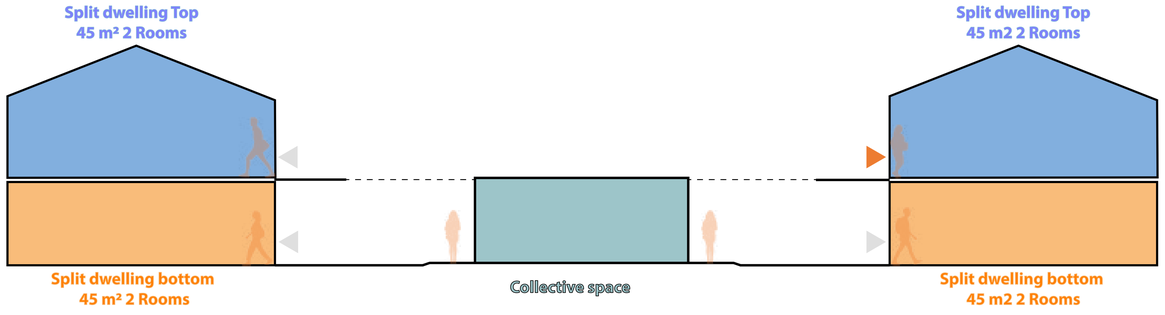
2. Breaking out the shell

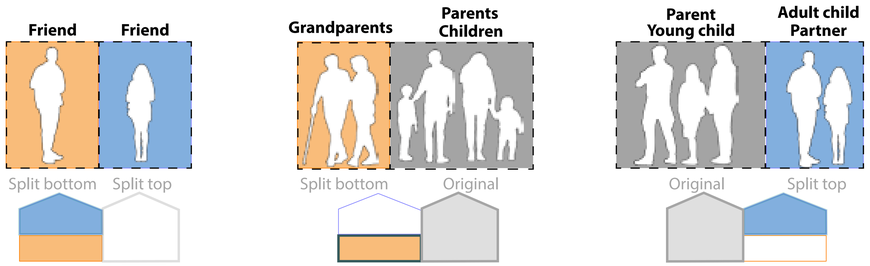
3. Connection with seasonal changes

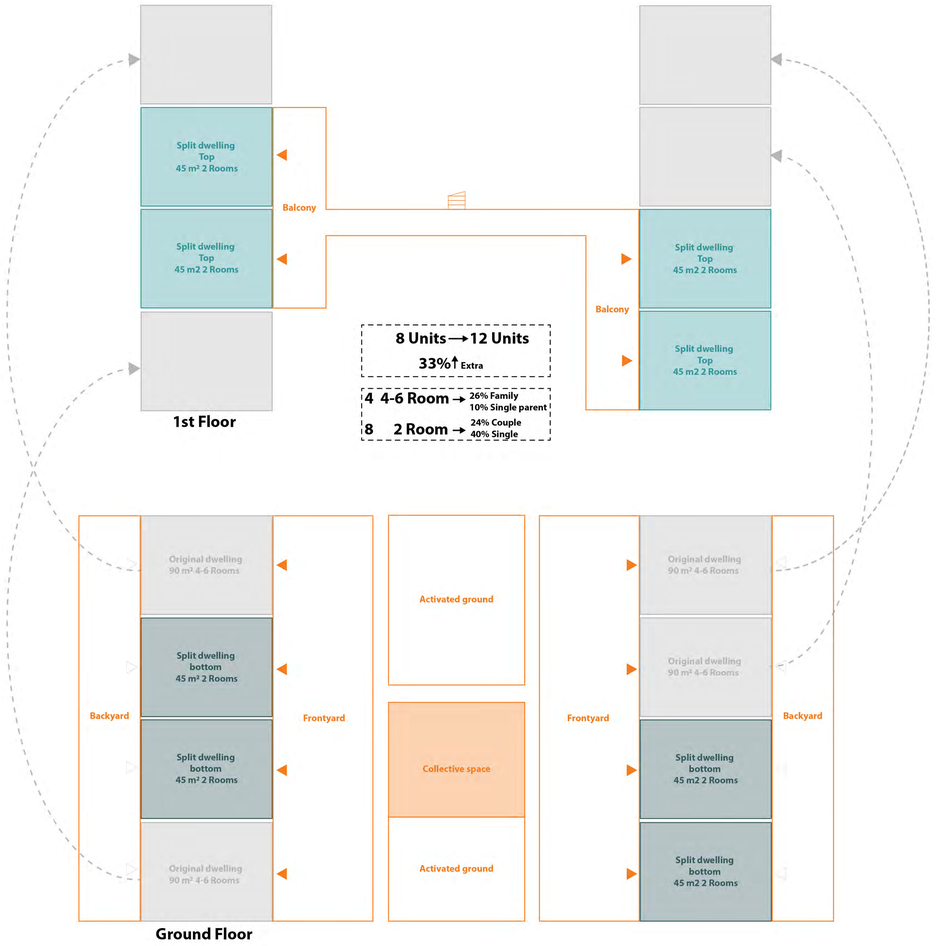
4. Green exposure

Splitting

Increasing & Diversifying Housing supply

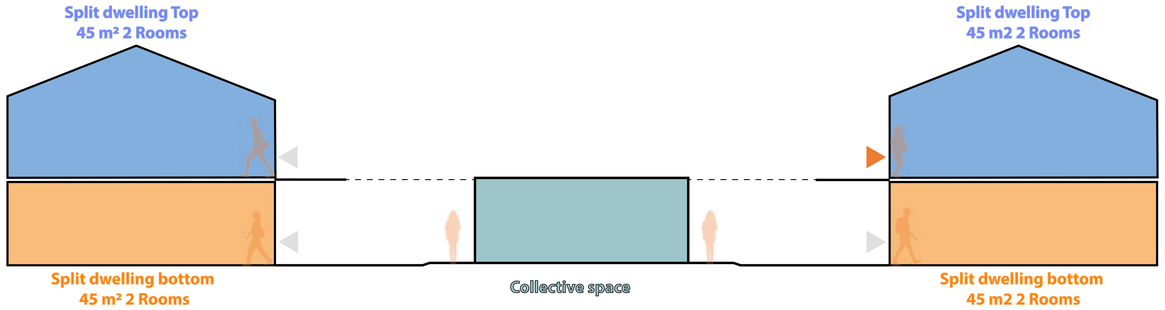


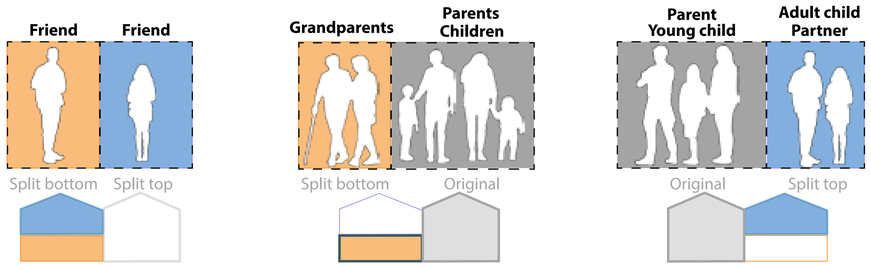


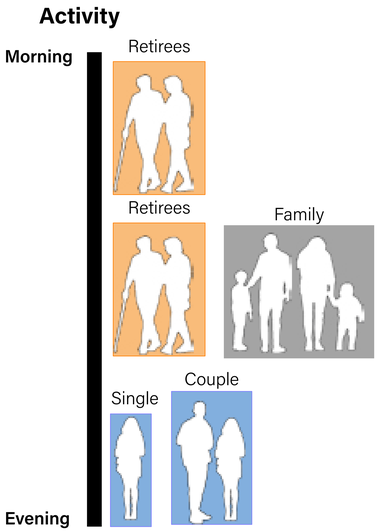


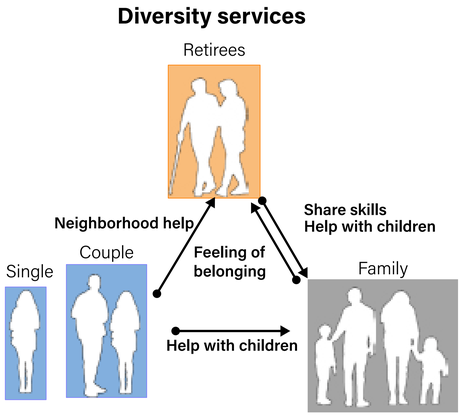
Splitting

Growing community diversity and strengths



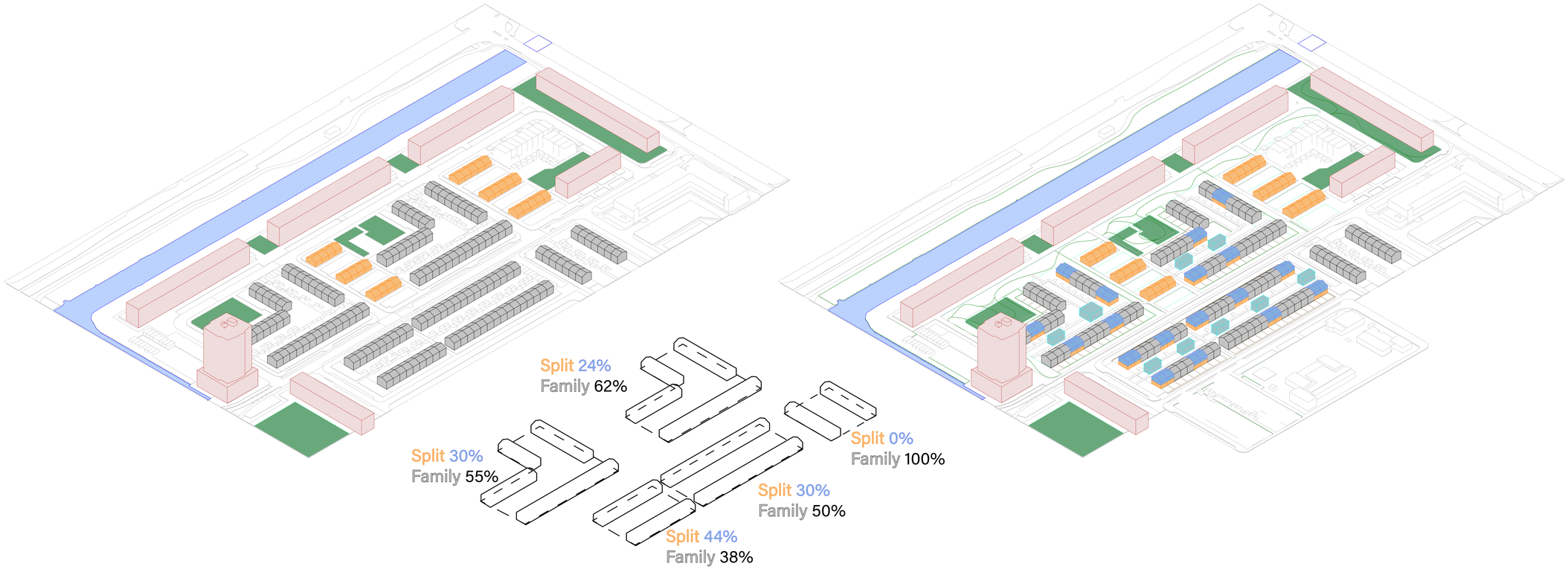






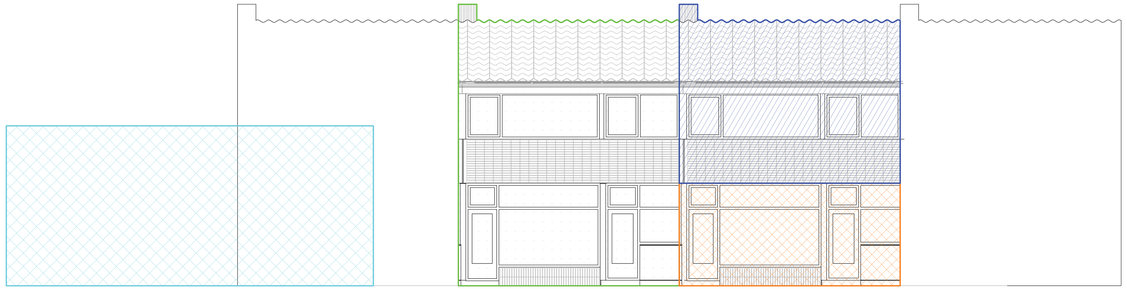
Splitting

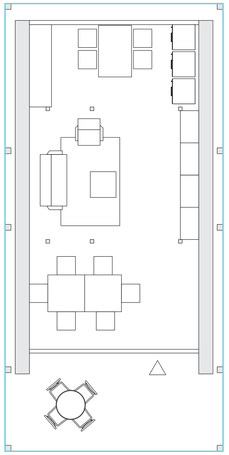
Splitting flexibility on urban scale



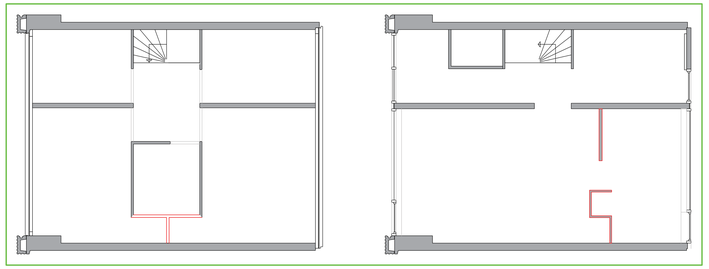
Splitting
Communal space

3 housing types
in place of 1

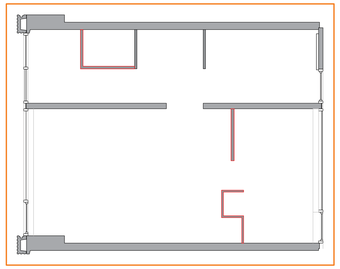




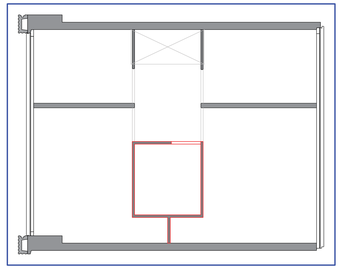
Shared space



Family unit



Retired single/Couple



Single/Couple

Shared space audience use

Morning Afternoon Evening

Communal space

Offering something to a wider demographic

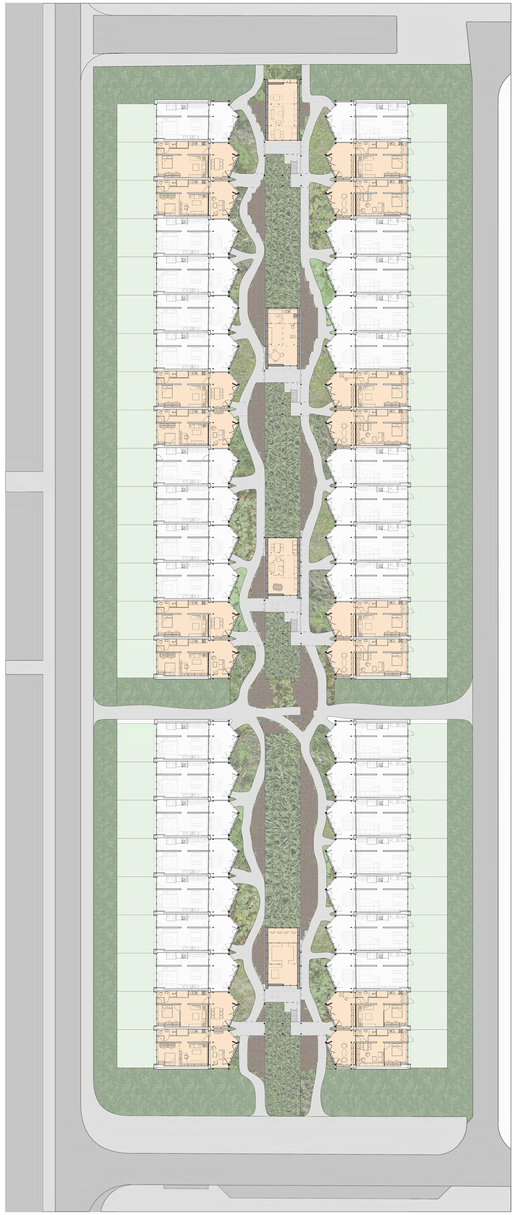
- Schools (various levels) Daycares, Child Centers etc.
- Community Center
- Lidl Grocery Store
- Burger Restaurant
- Multicultural Church
- JW Church

Ages	
00 - 15	**20%**
15 - 25	**11%**
25 - 45	**34%**
45 - 65	**22%**
65+	**13%**

Household Composition	
Single Households	**40%**
Couple Households	**22%**
Family Houdeholds	**26%**
Single Parent Households	**10%**

Communal space
Shared garden

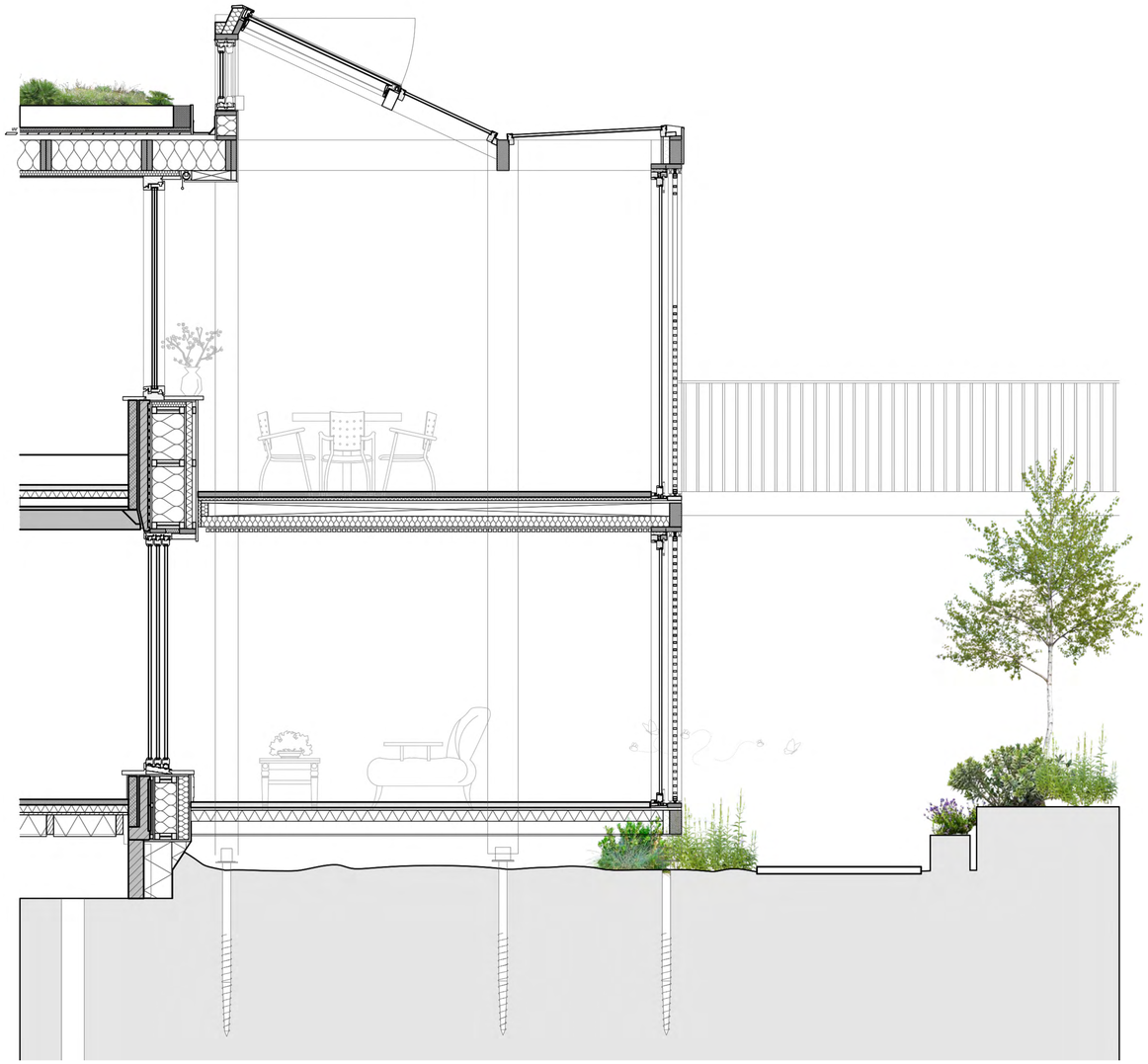
A Collective and green dimension



1:200 plan

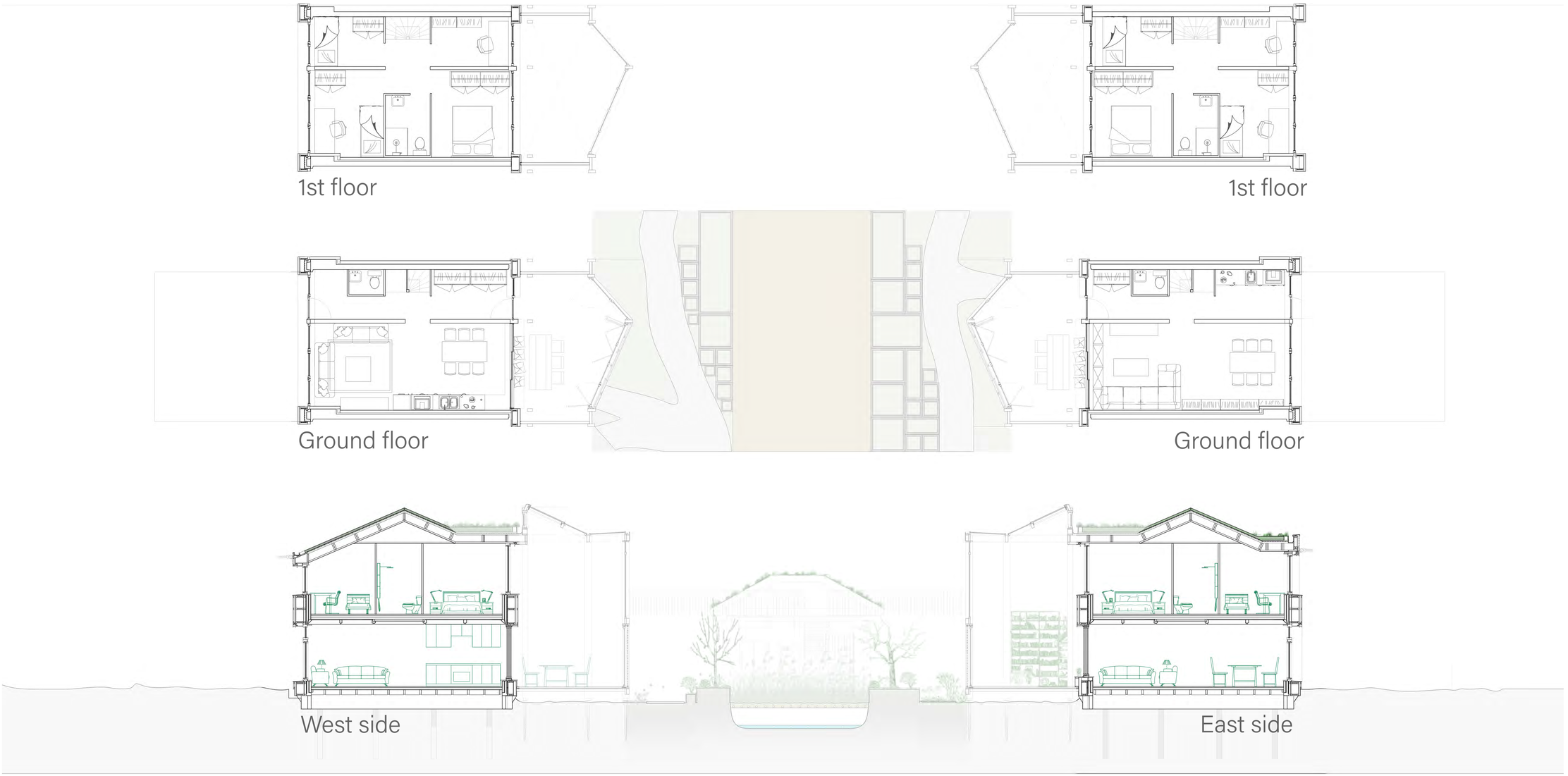
Splitting
Extension

Extension floor



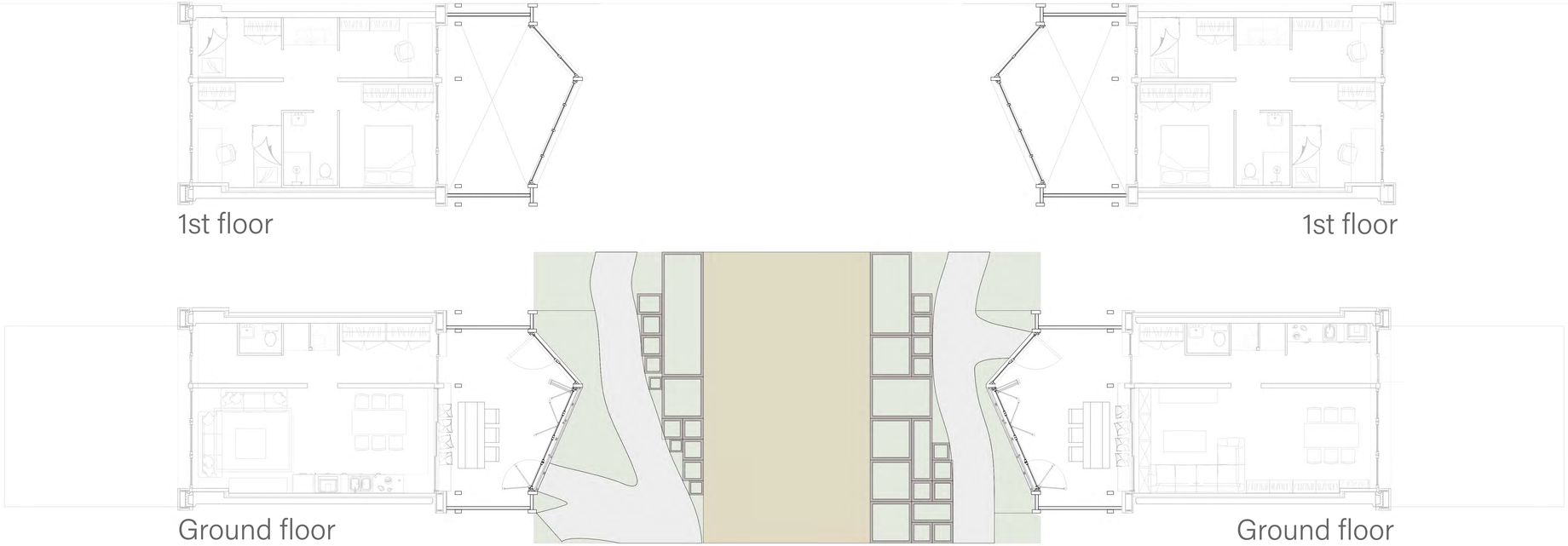
Family Unit

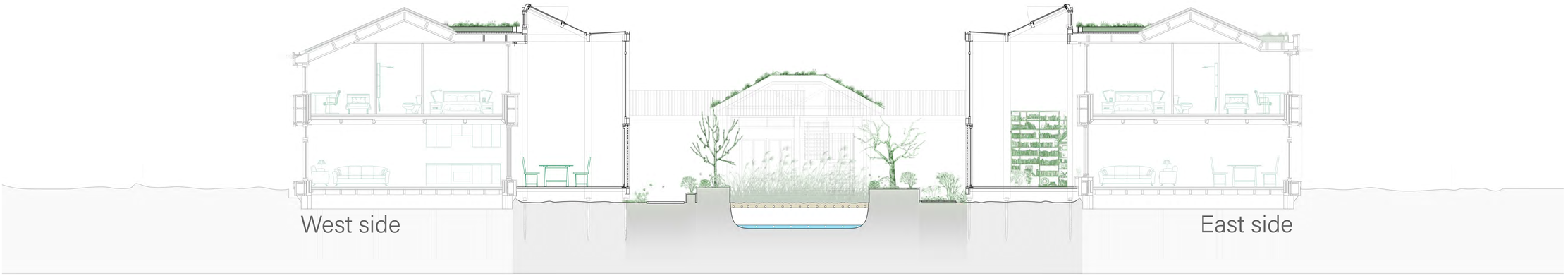
Main Interior functions remain



Family Unit

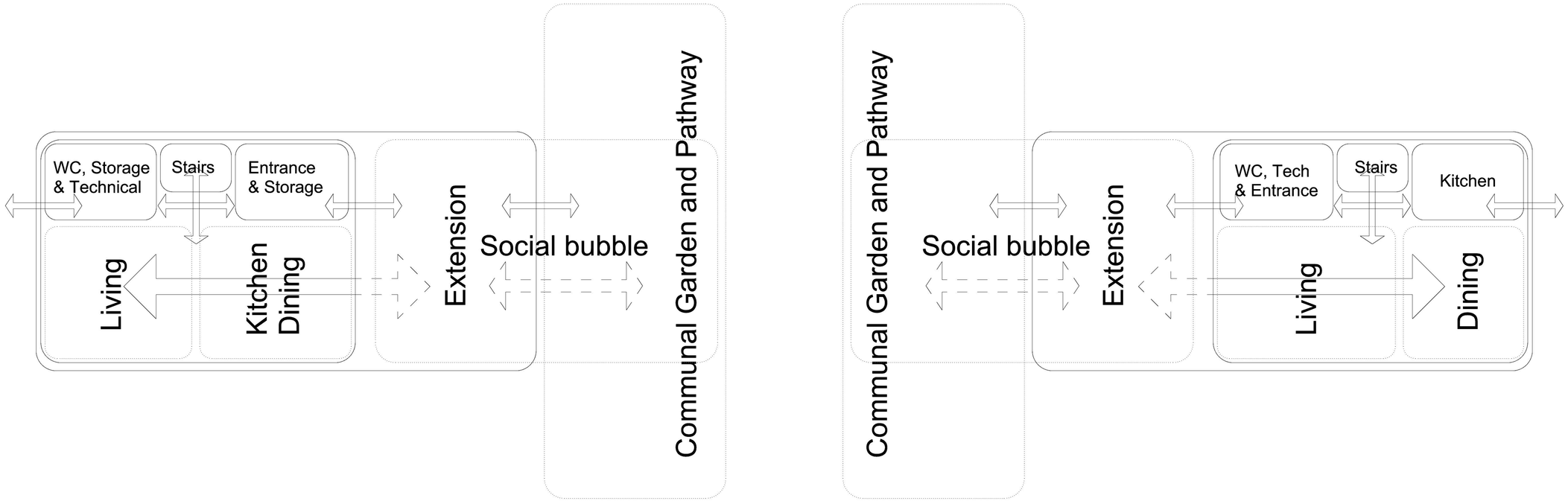
Extension &
Community garden





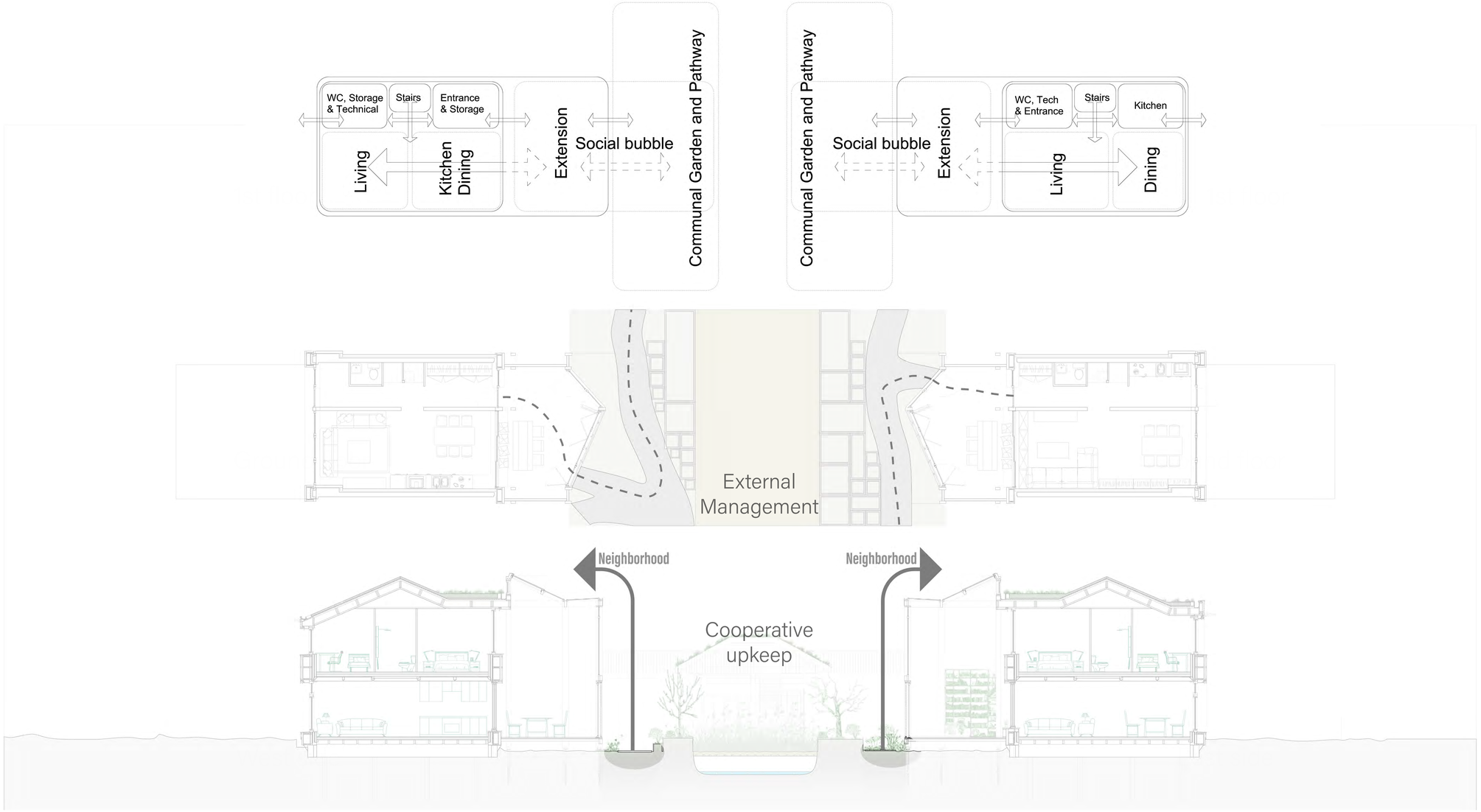
Family Unit

Layout and connectivity scheme



Family Unit

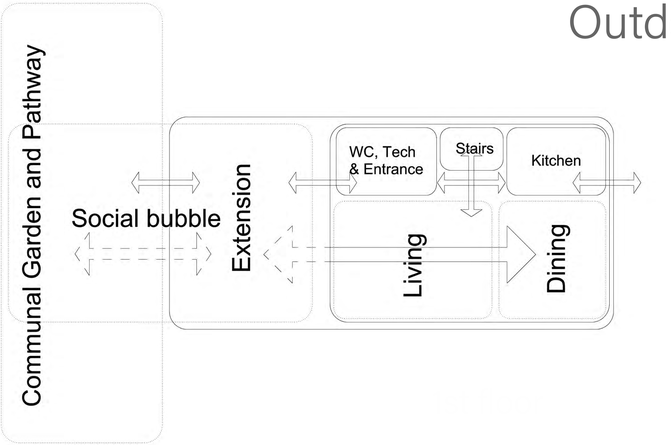
Extension & Community garden

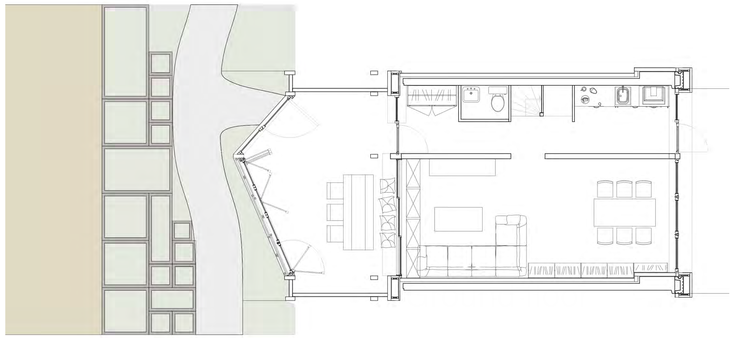


Family Unit

Sun, Weather, Neighbors, Flora

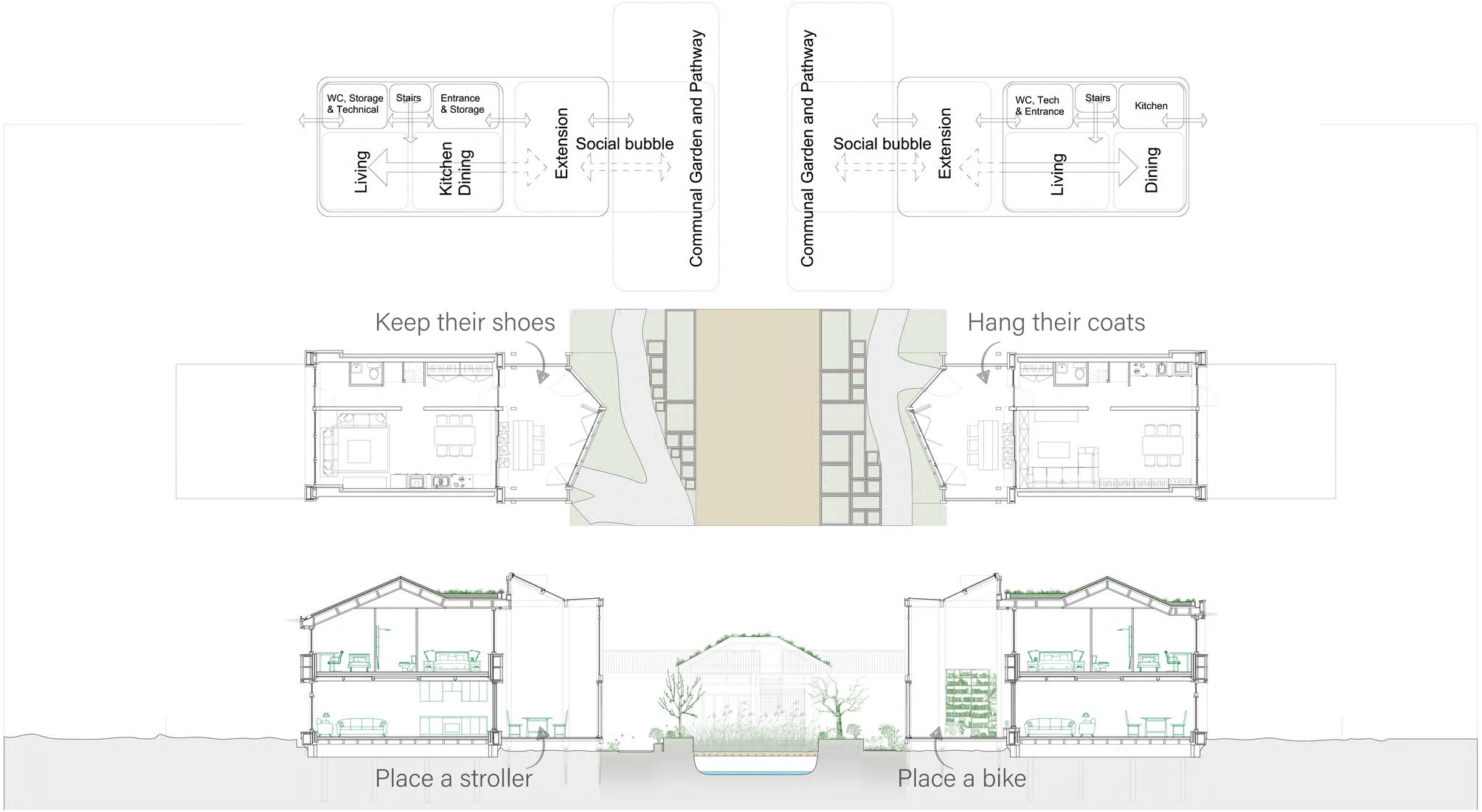
Outdoor connection





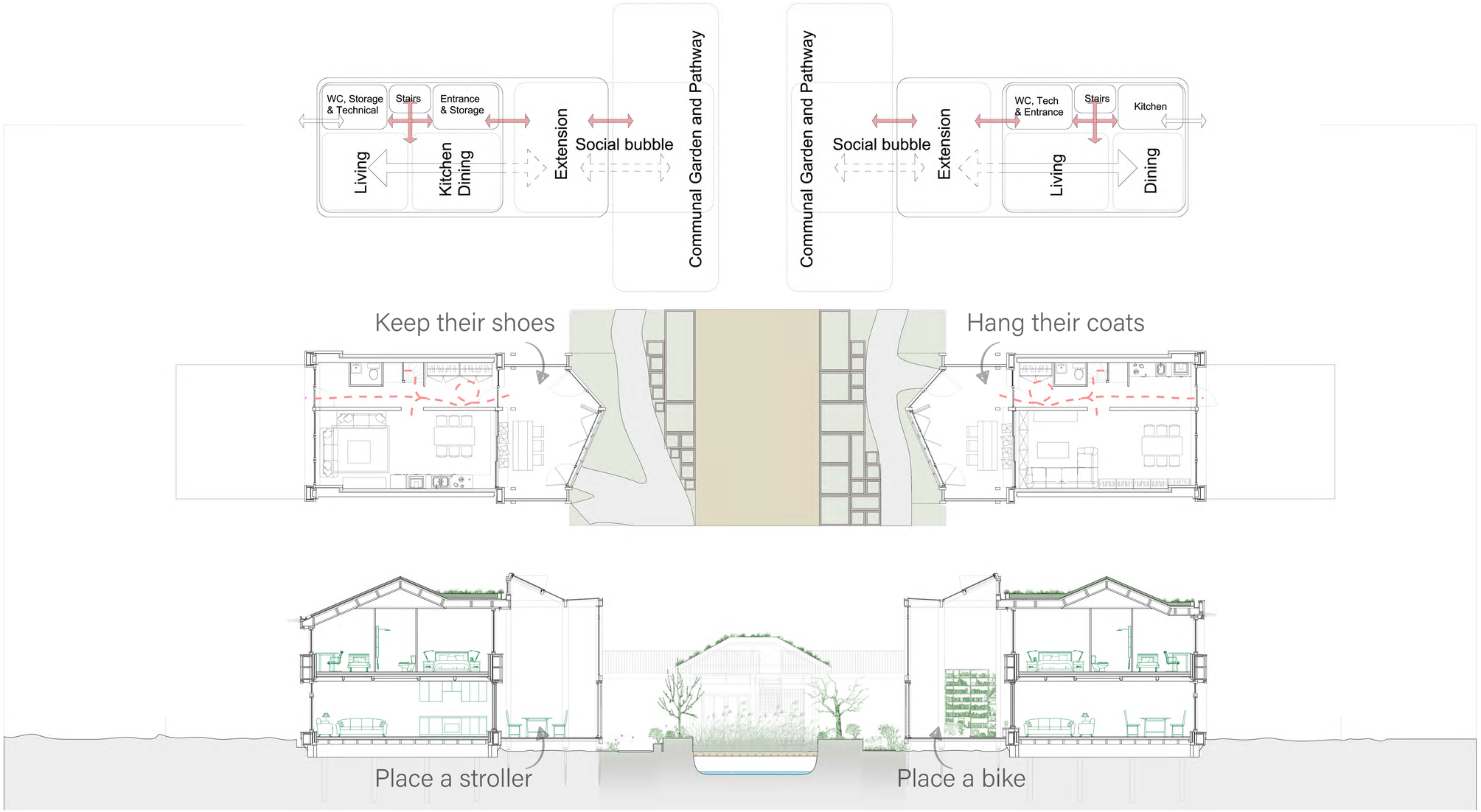
Extension & Entry

Family Unit



Extension & Entry

Family Unit

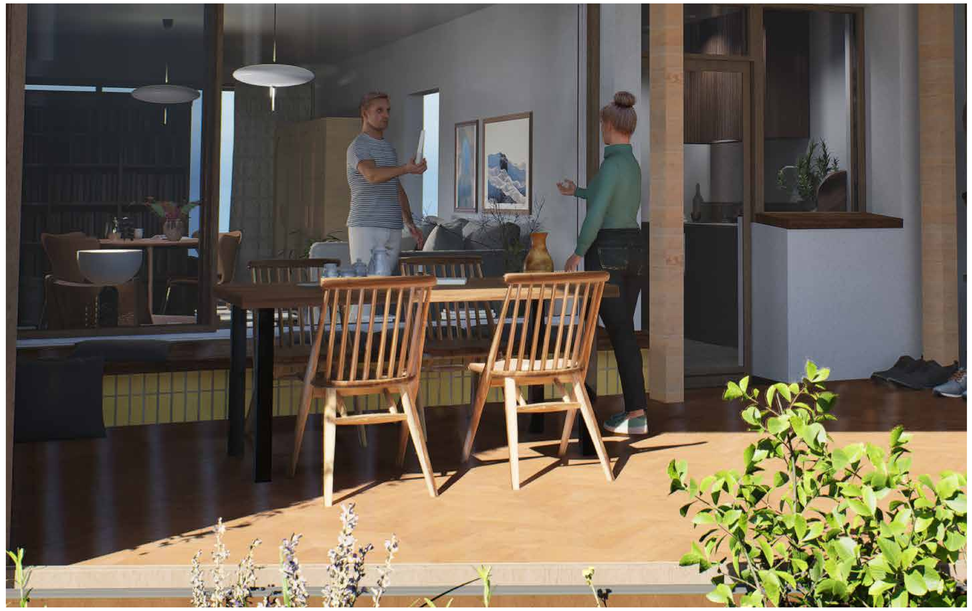


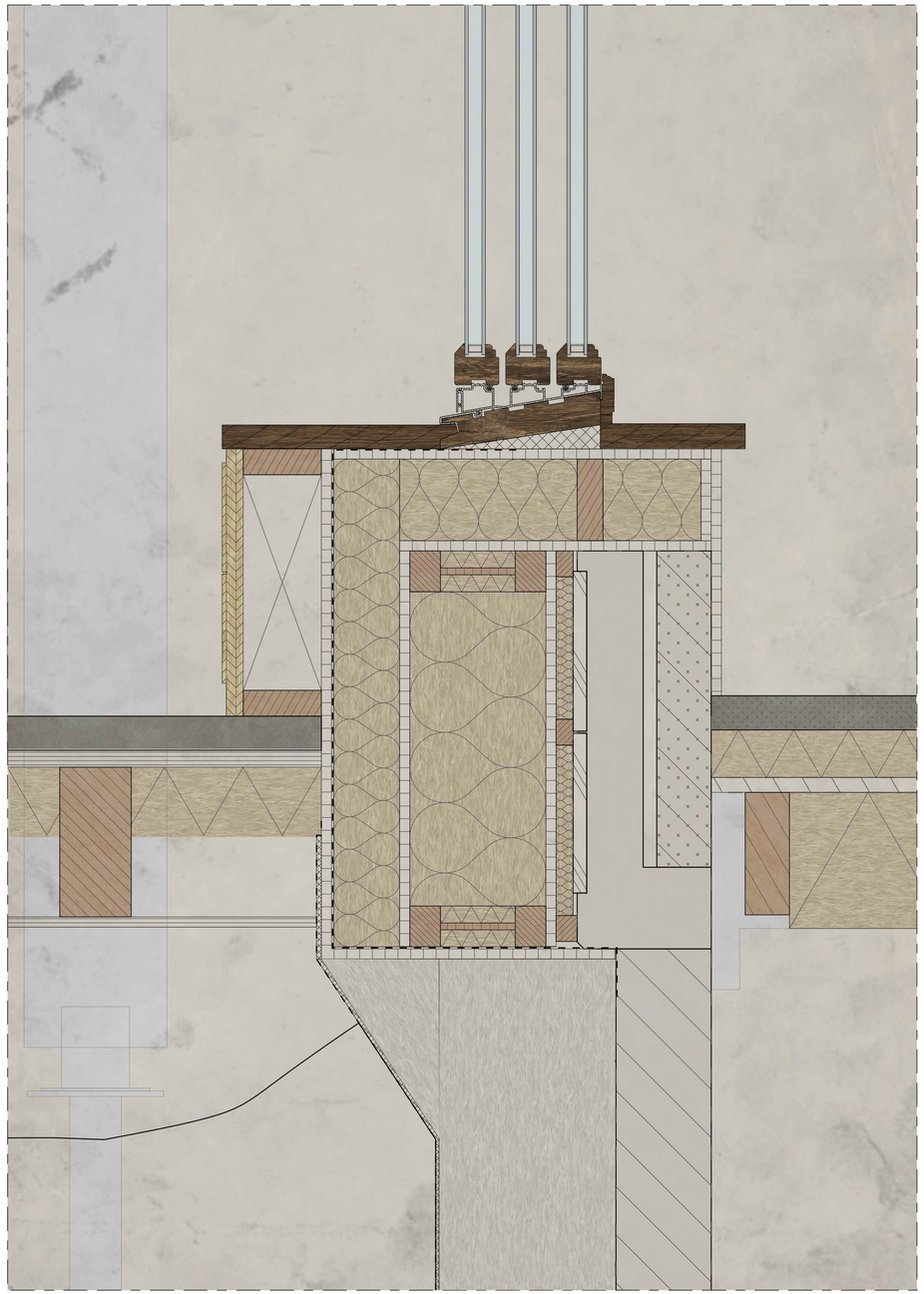
Family Unit

Extension
programable space

Family Unit
Window detail

Interactivity between interior and extension

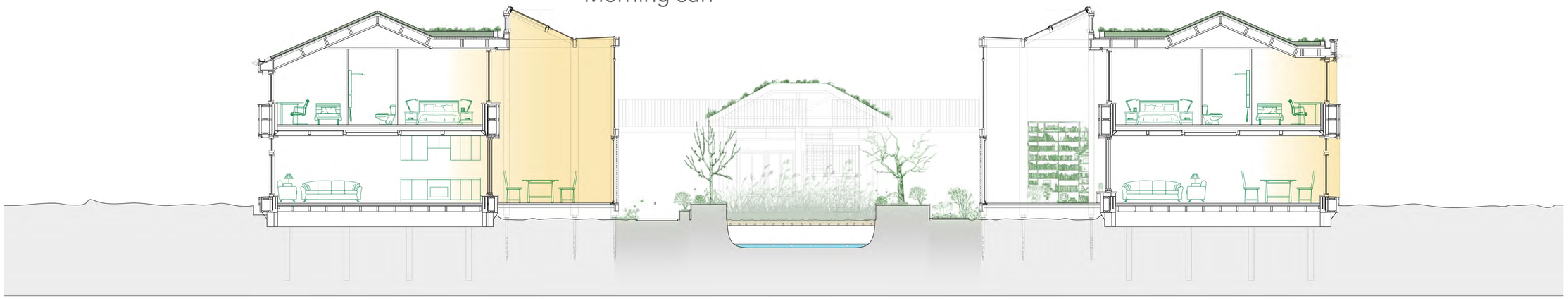




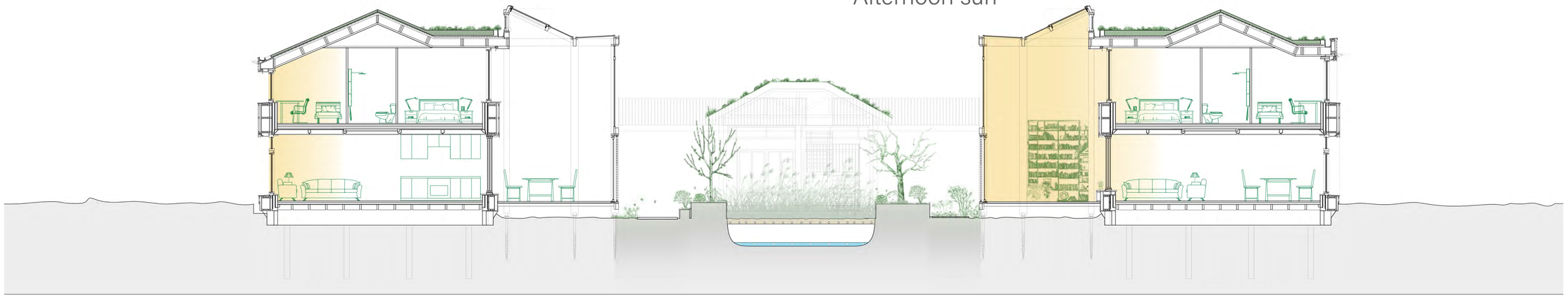
East-West assymetry

Family Unit

Morning sun

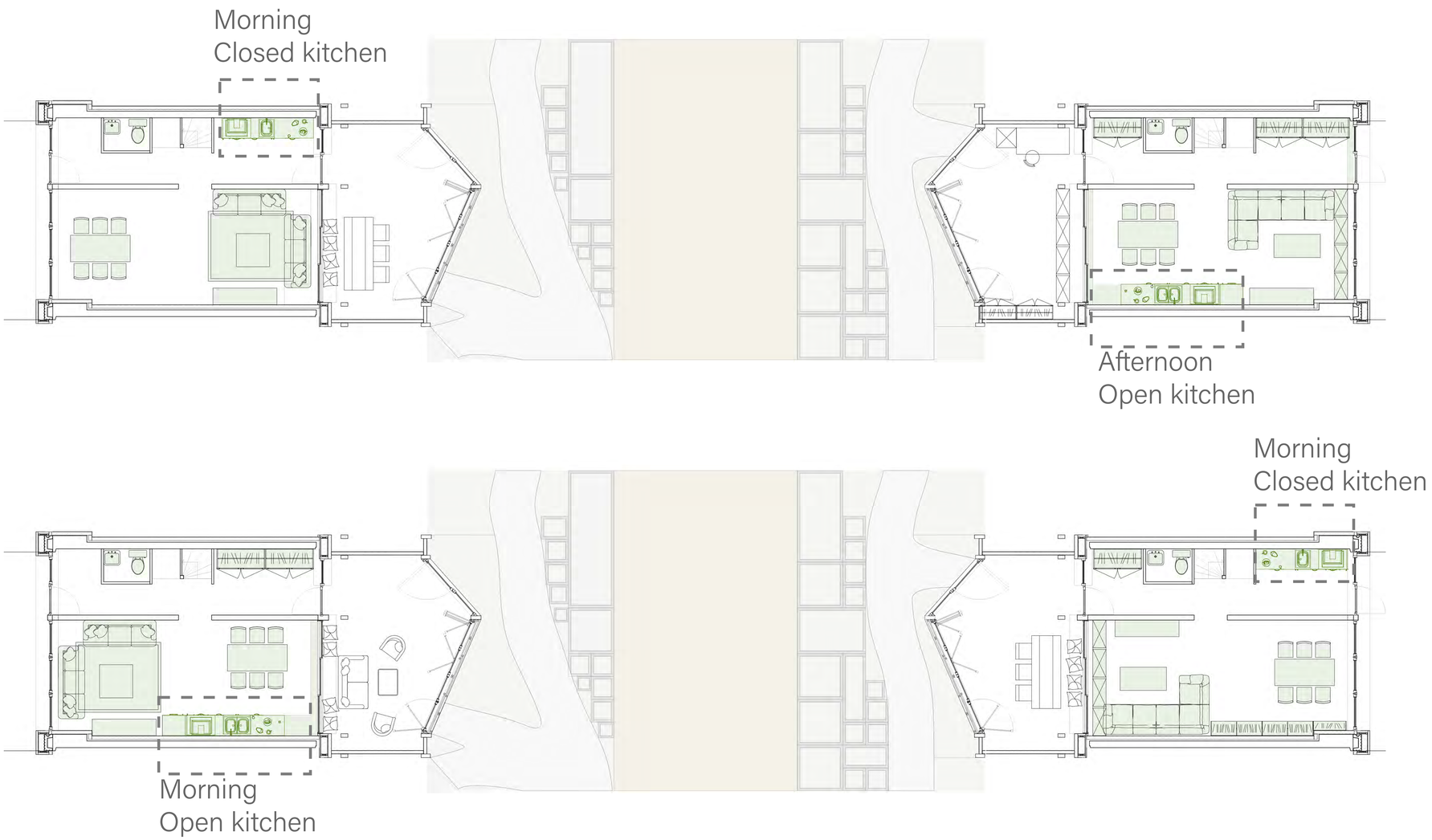


Afternoon sun



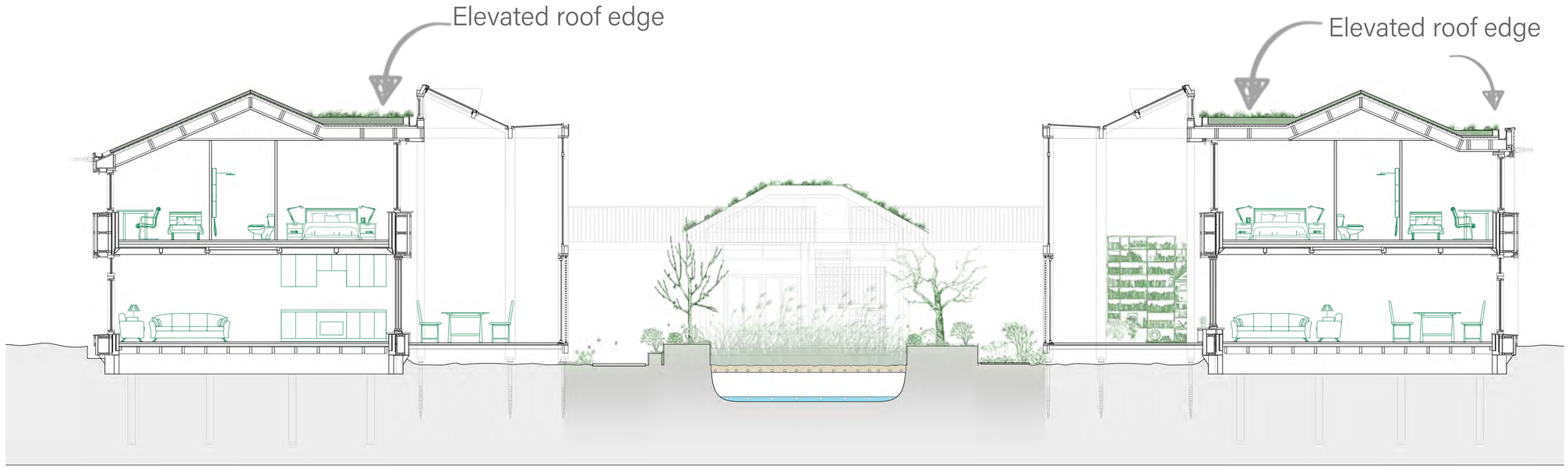
Kitchen variations

Family Unit



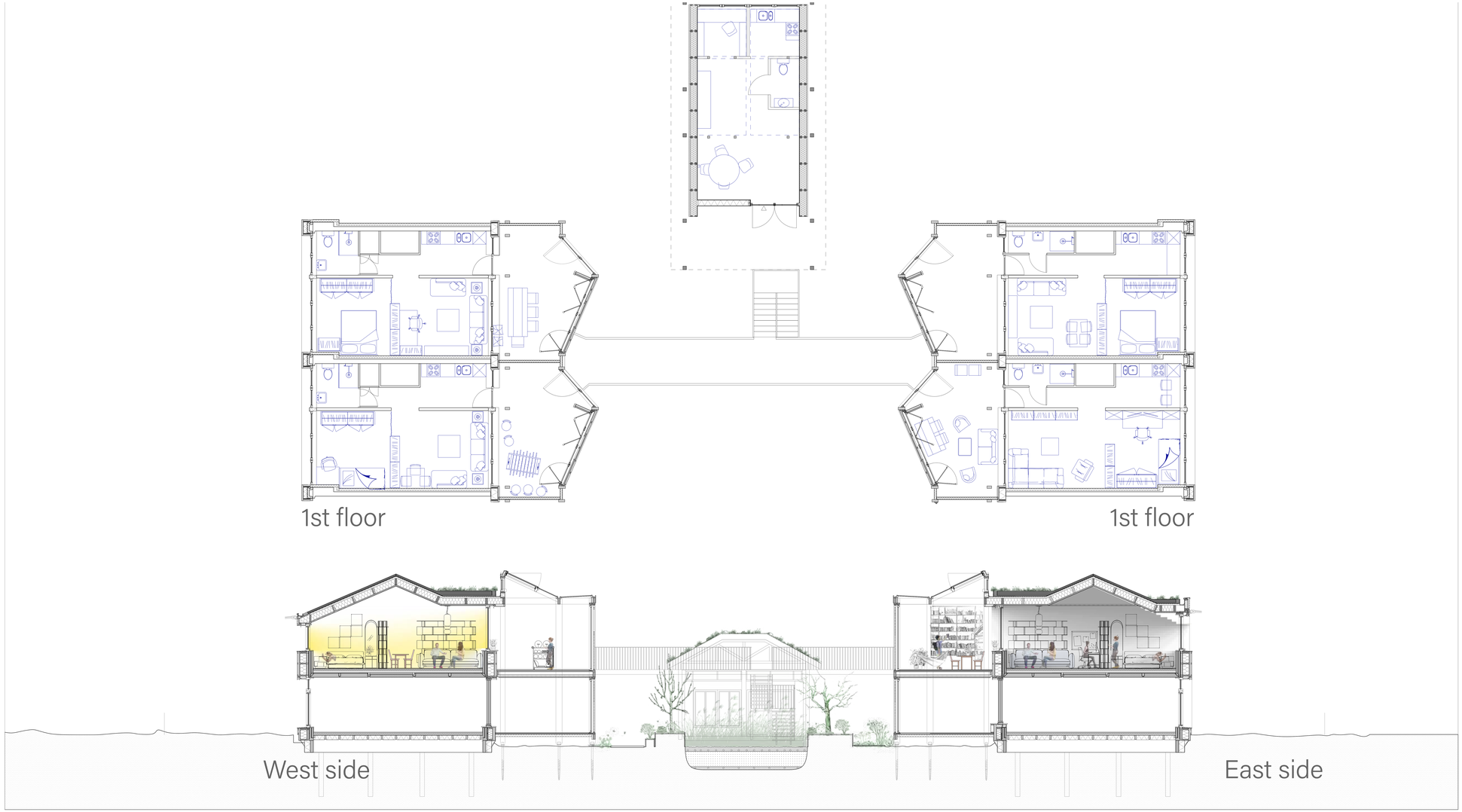
East-West Assymetry

Family Unit



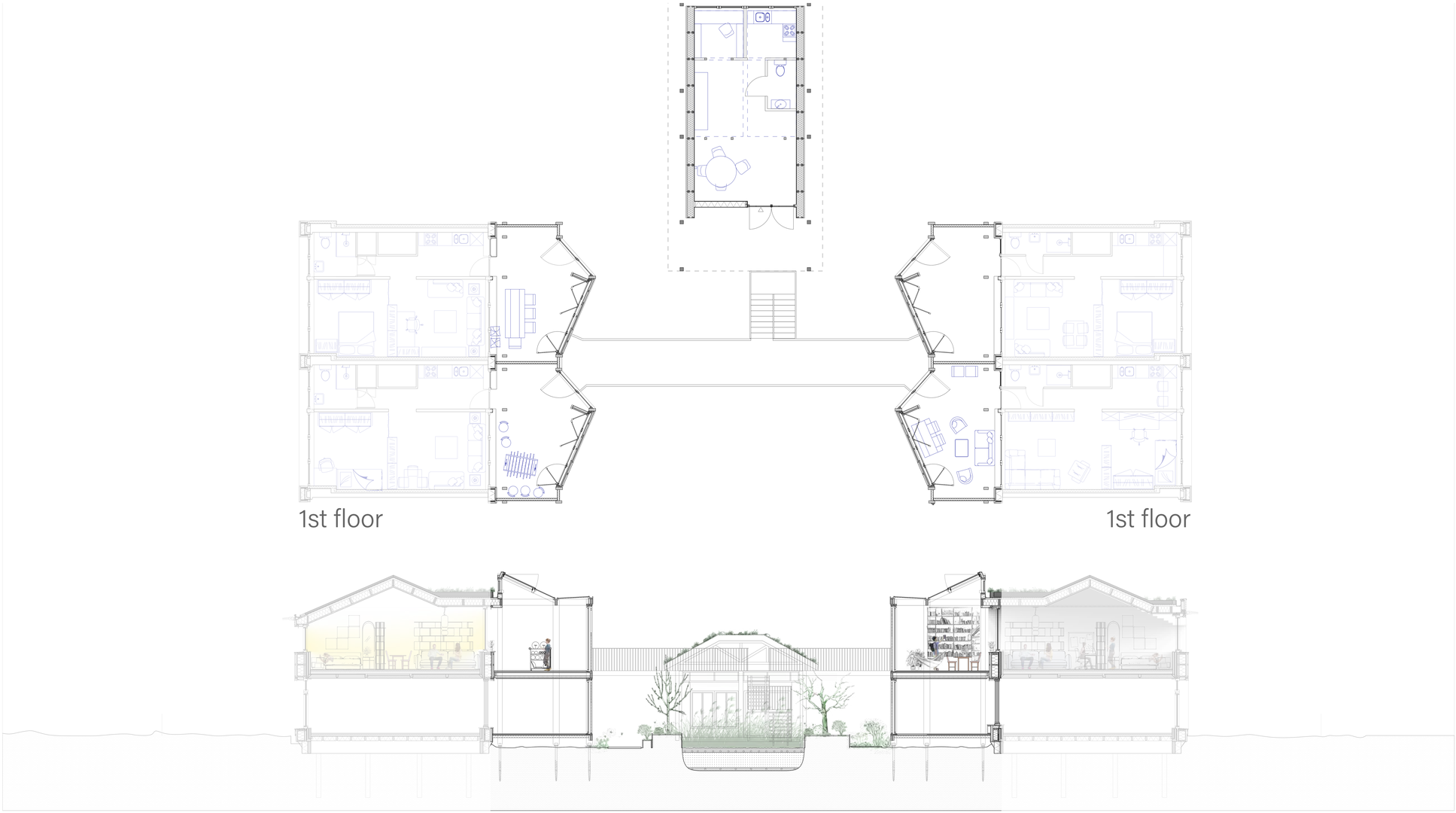
Split Unit

1st Floor Plan and Section

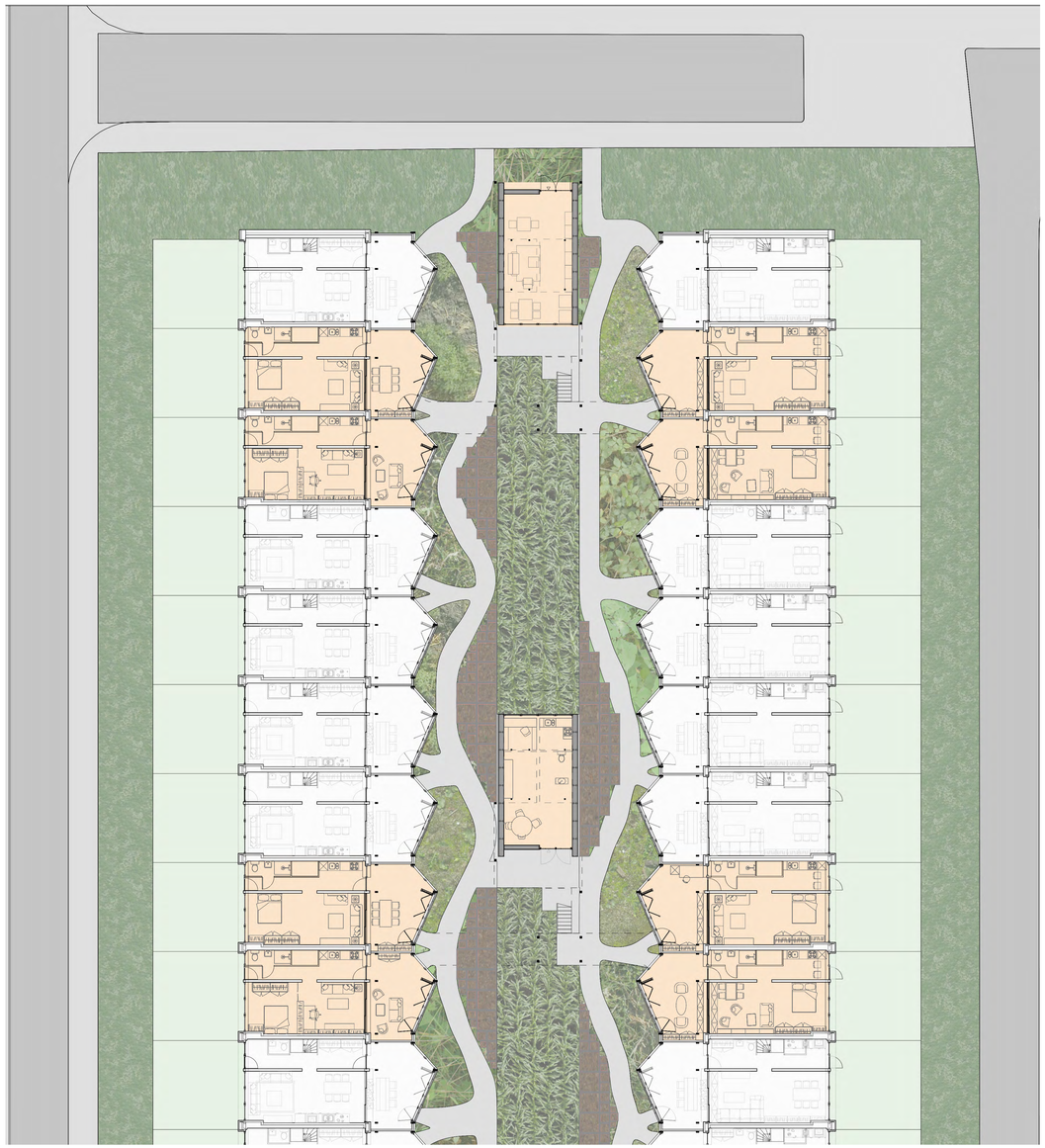


Split Unit

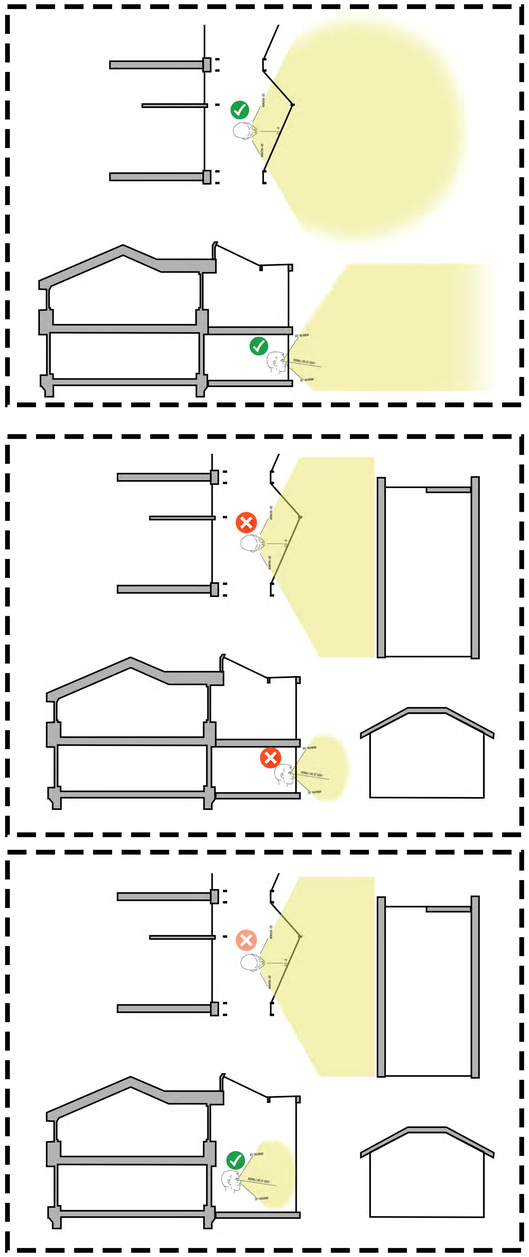
Access and Community



Split Unit

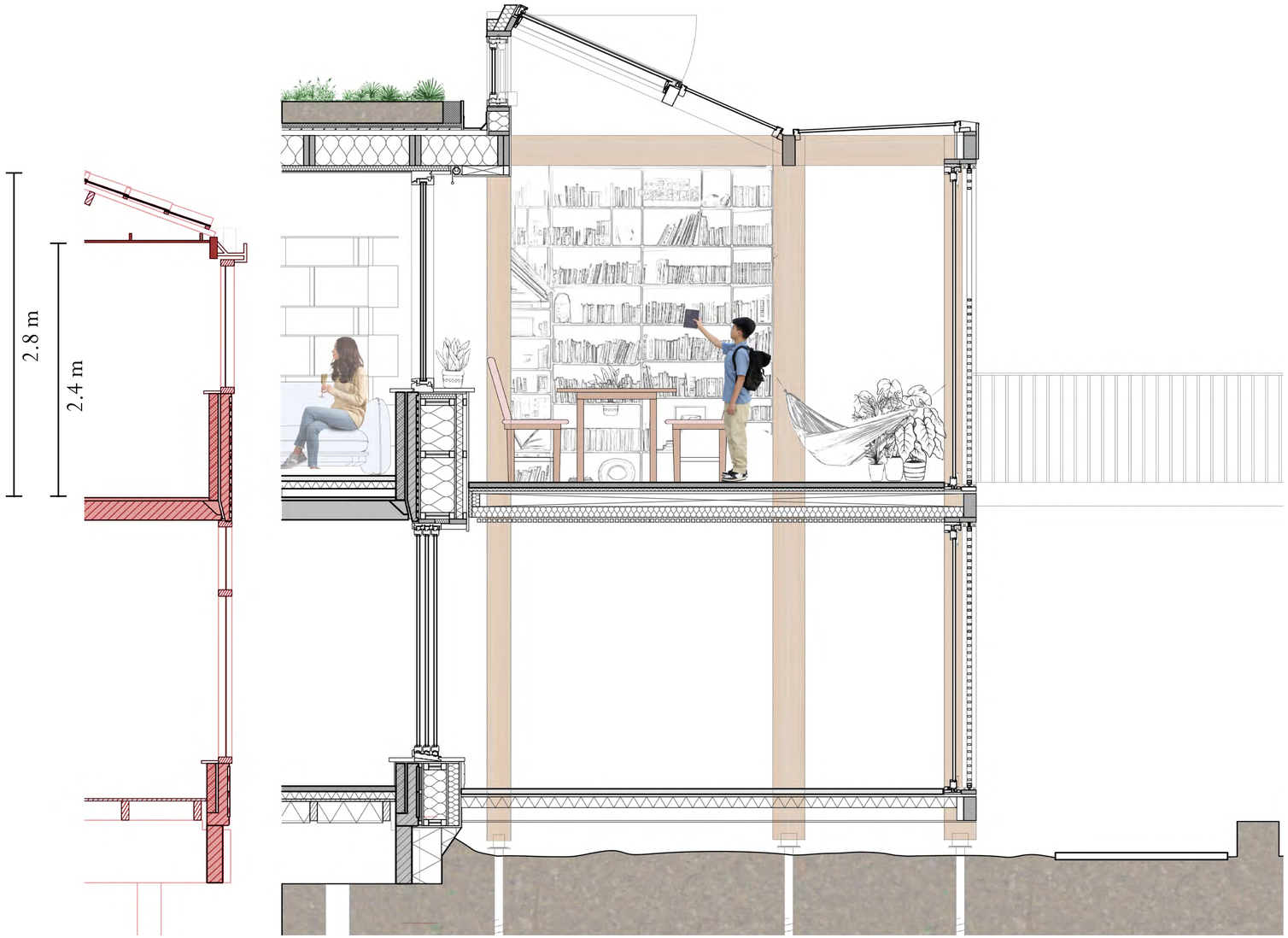


Communal space placement



Elevated roof

Split Unit



1st Floor Plan

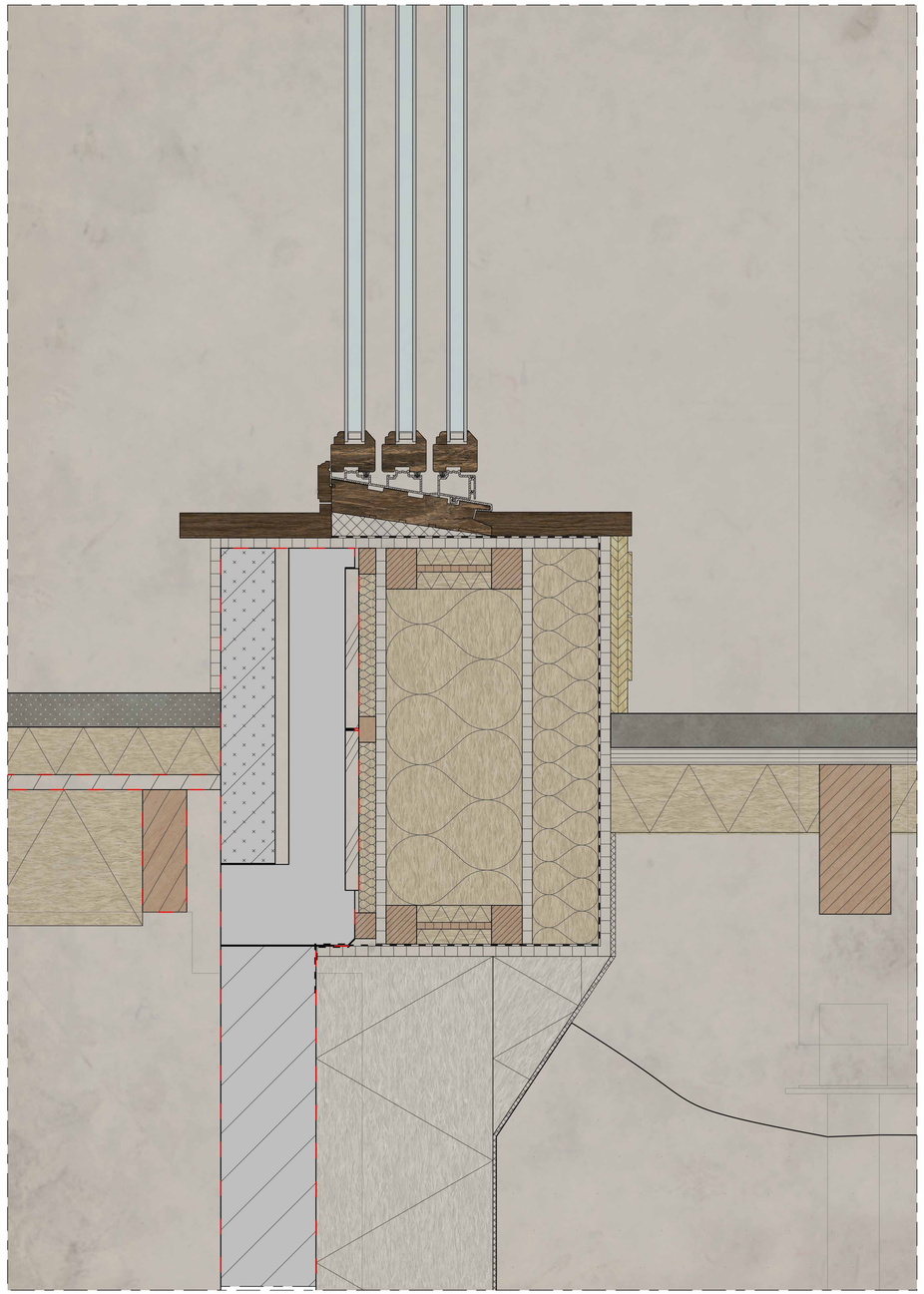
Split Unit

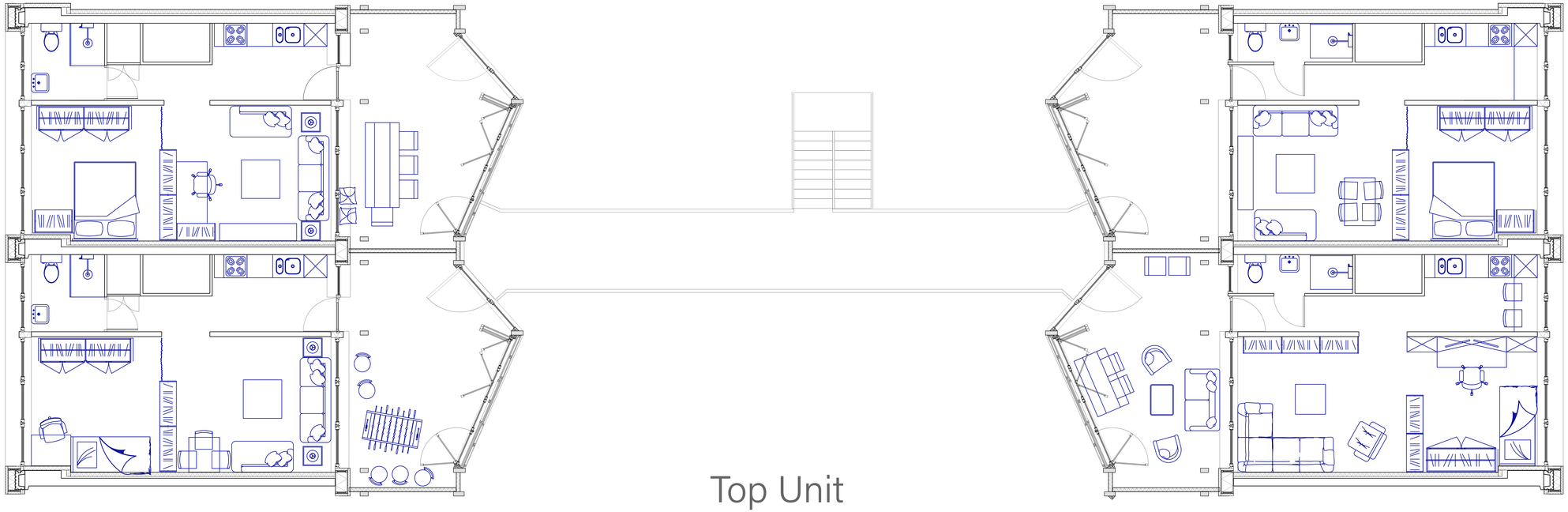
1st Floor Plan

Split Unit

Dining place • Living room • Indoor garden • Workout space • Hobby room

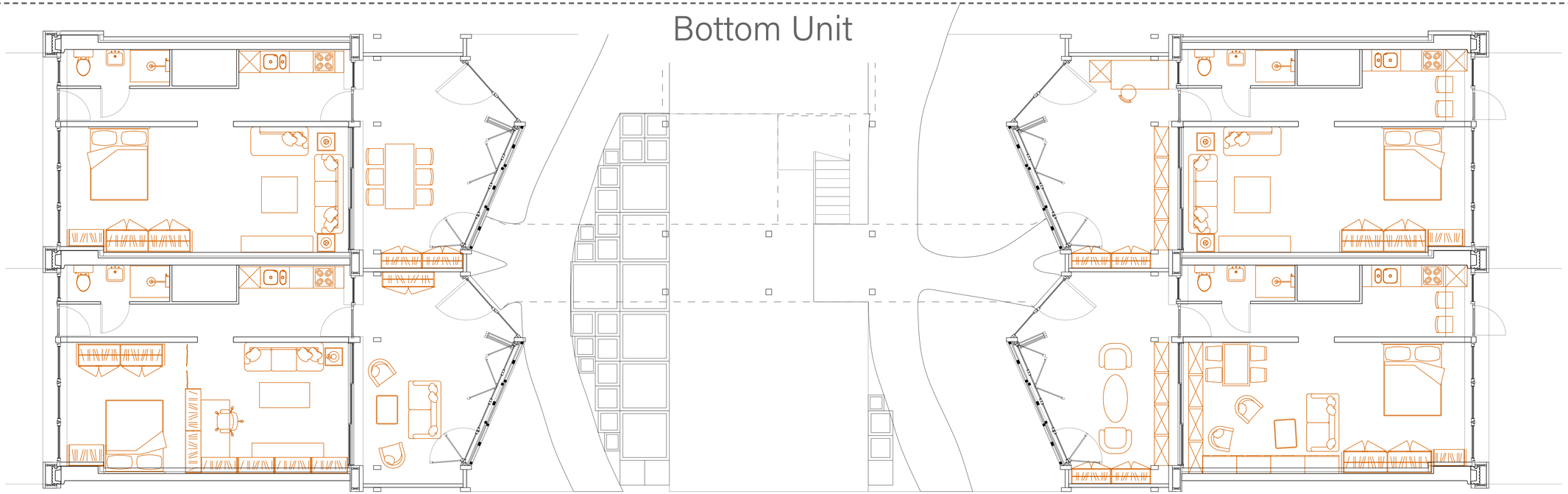
Split Unit
Window detail



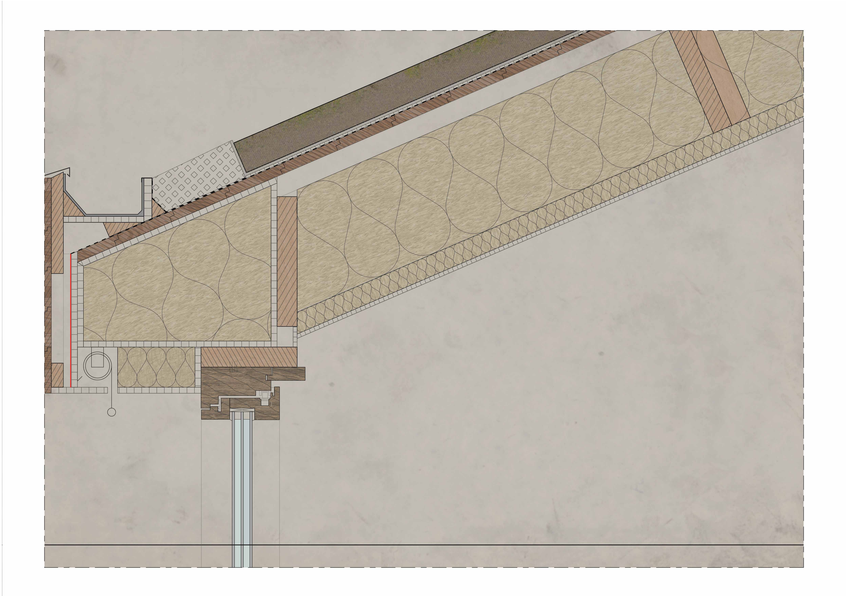


Top Unit

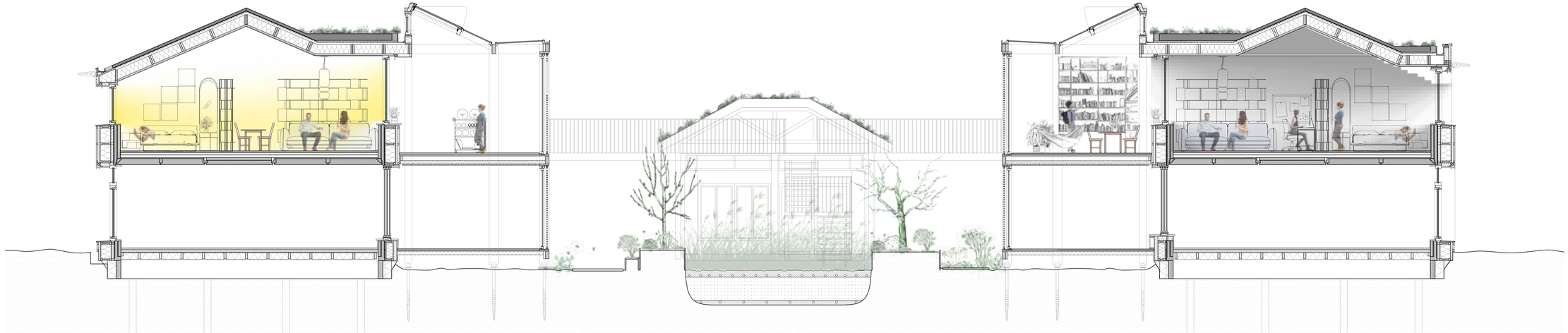
Bottom Unit



Split Unit



Elevated roofs details



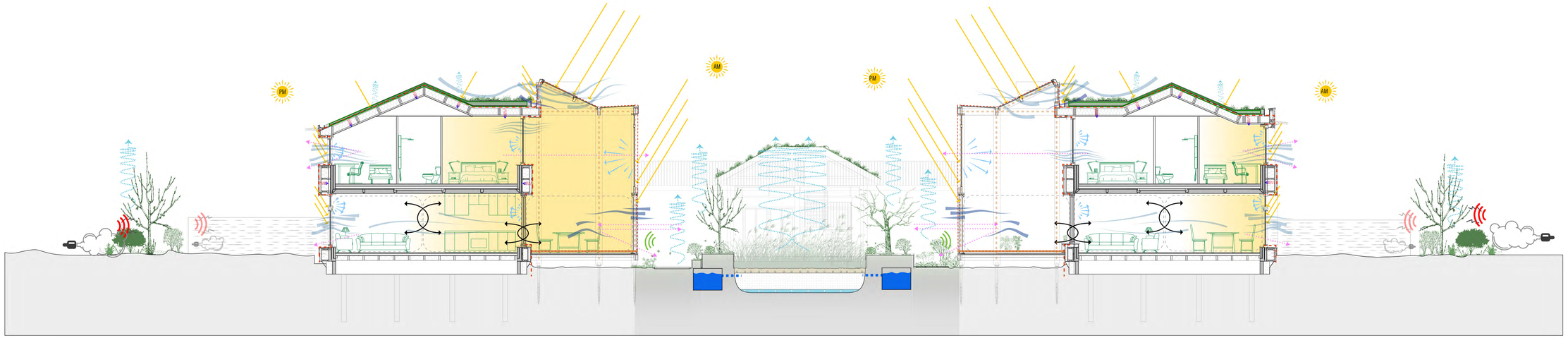
Technical and Materials Aspects

1. Nature based solutions

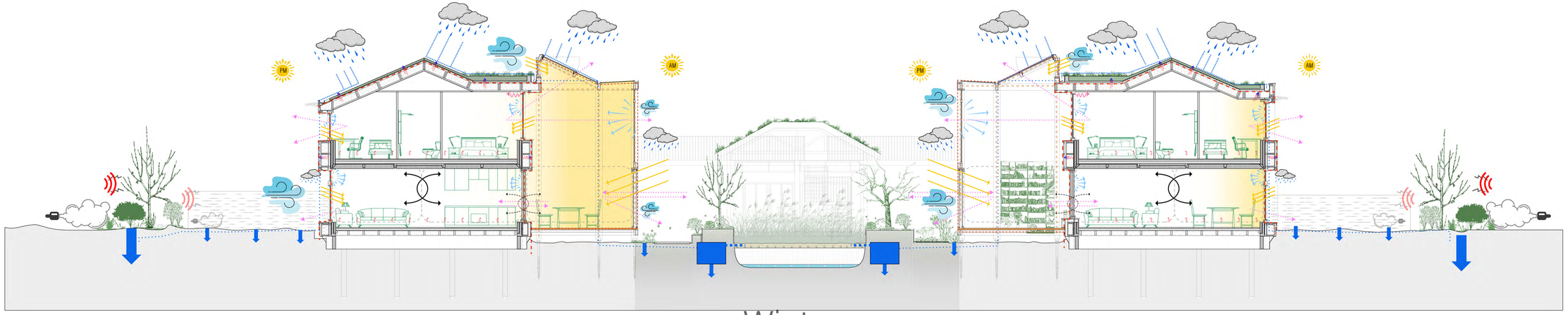
2. Extension: Wintergarden/Sunroom/Entry

3. New facade layer: insulation package

Climate interaction scheme



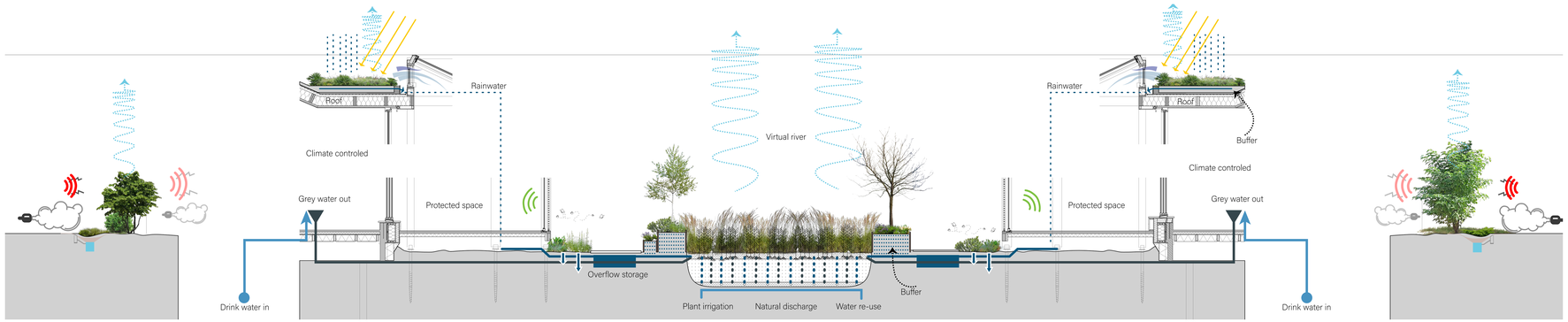
Summer

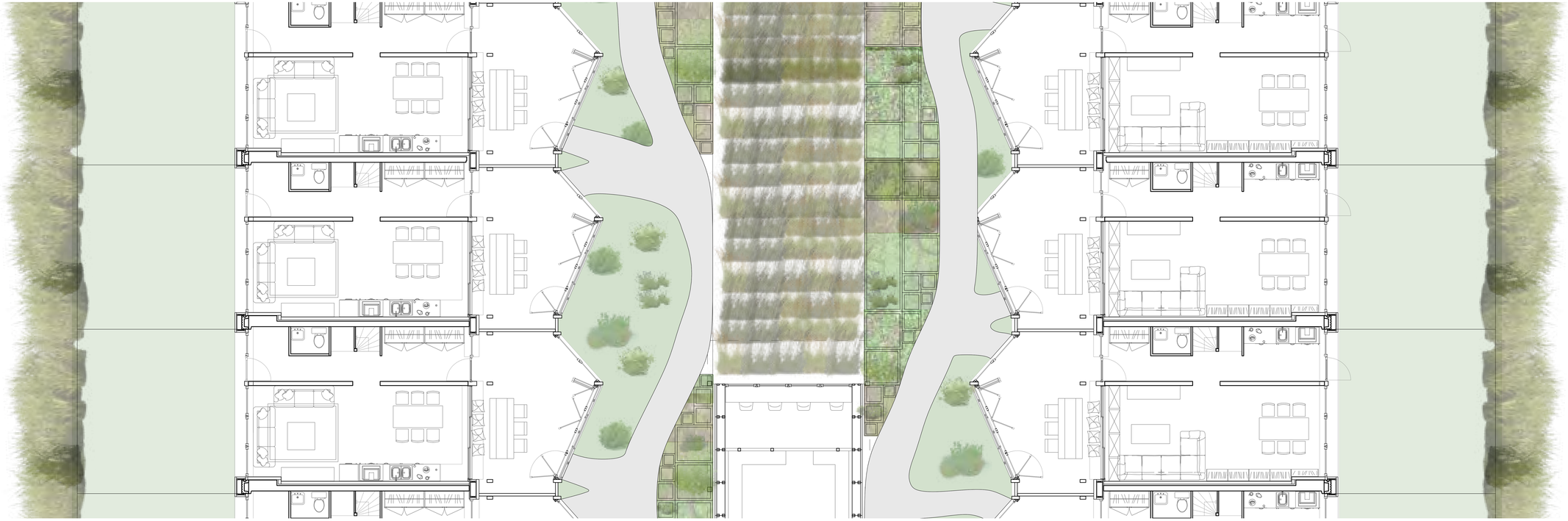


Winter

Section and plan

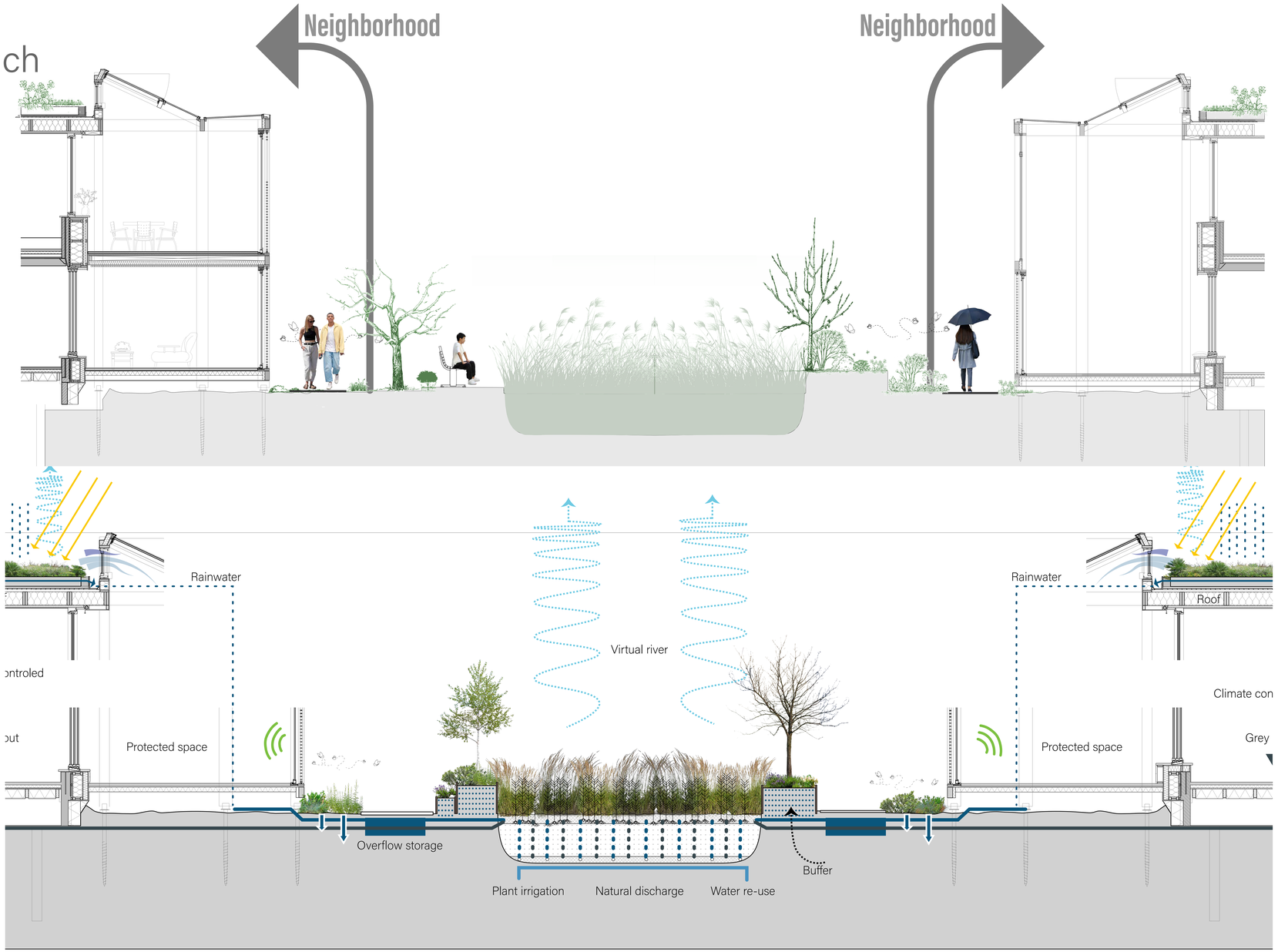
Green approach





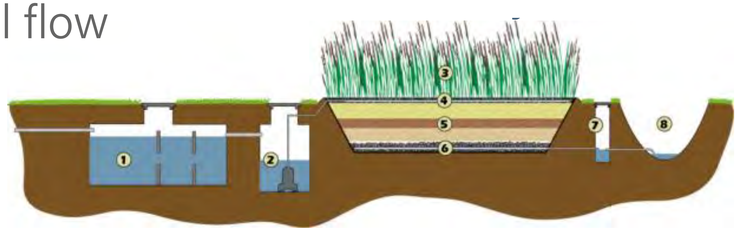
Green approach

Interactive & Functional

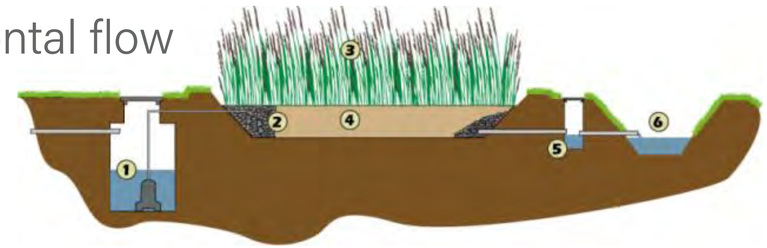


Nature Based Solutions

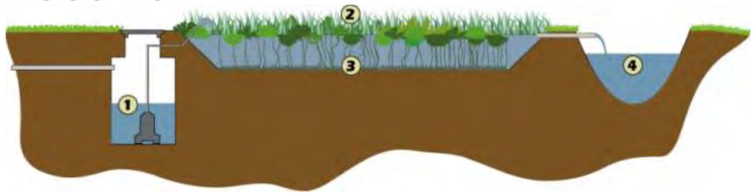
Vertical flow



Horizontal flow



Free surface flow



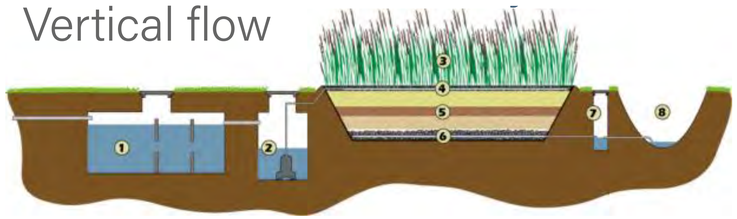
http://www.wetlantec.com/nl/helofytenfilter

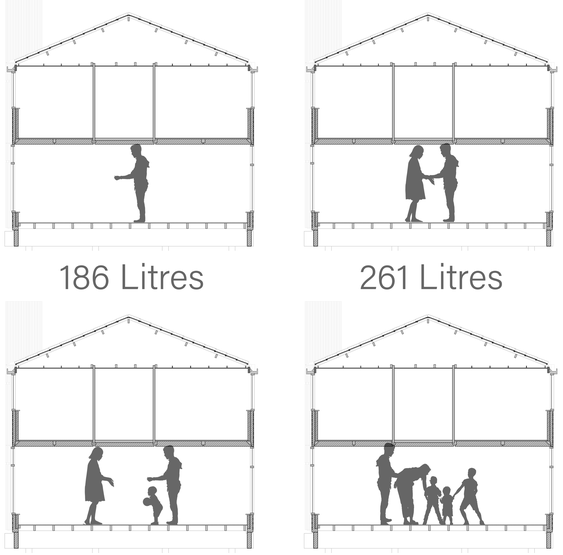
D. Tocchetto, 2010.

https://www.leachate.us/wetlands

Nature Based Solutions

Vertical flow





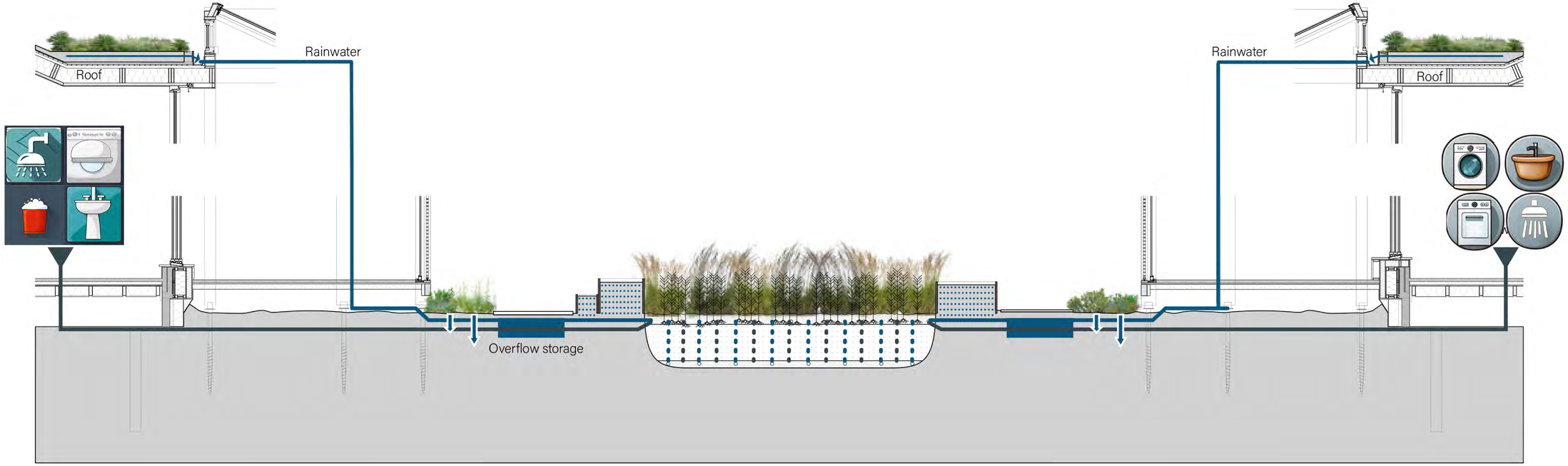
3-5 m2 per person (Ecofyt.nl)

'selected' household composition

Single Households	**13%**
Couple Households	**21%**
Small Family Households	**16%**
Large Family Households	**50%**

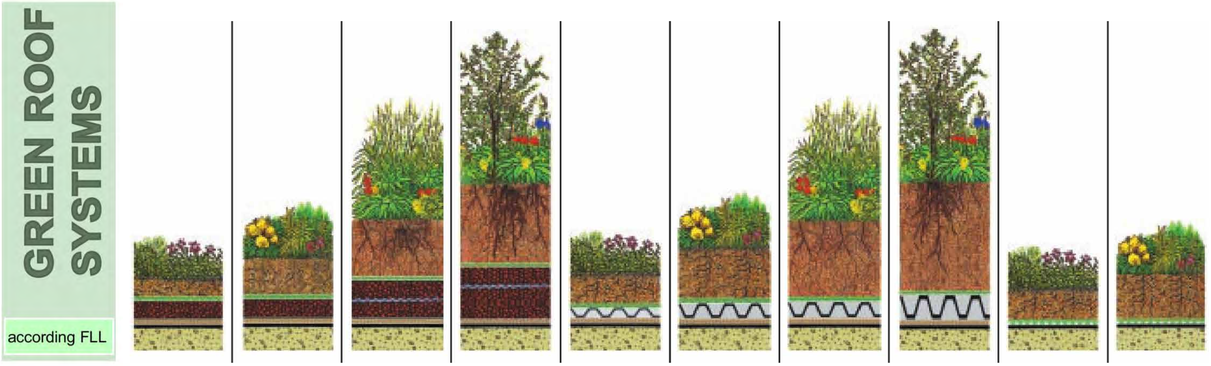
Greywater treatment

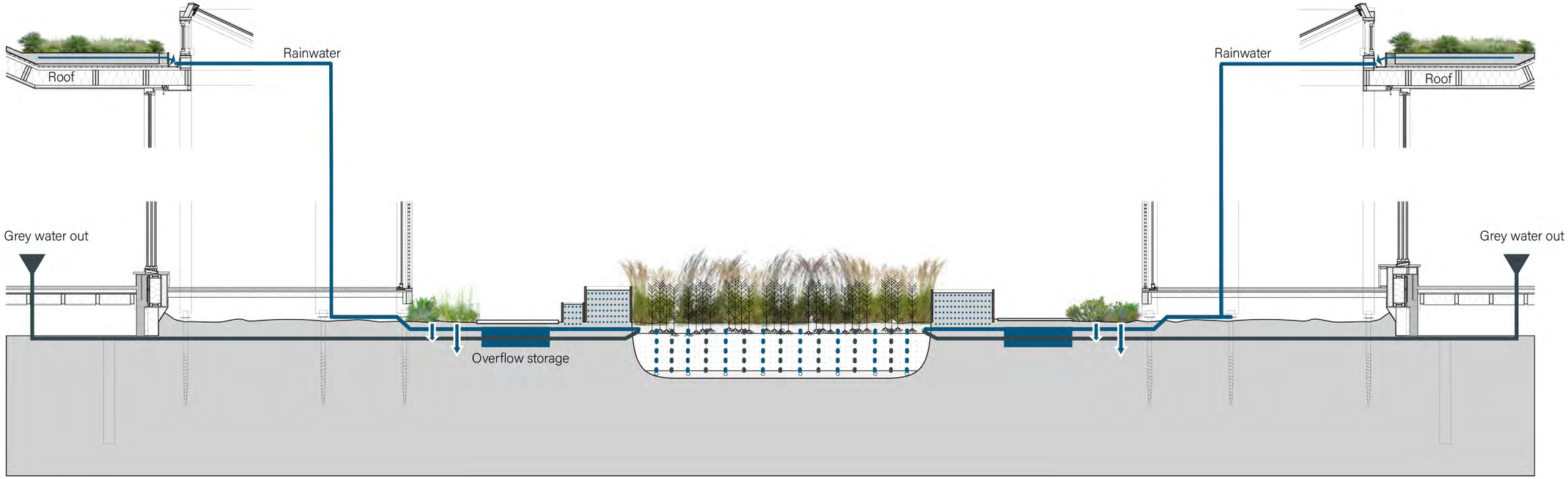
Green approach



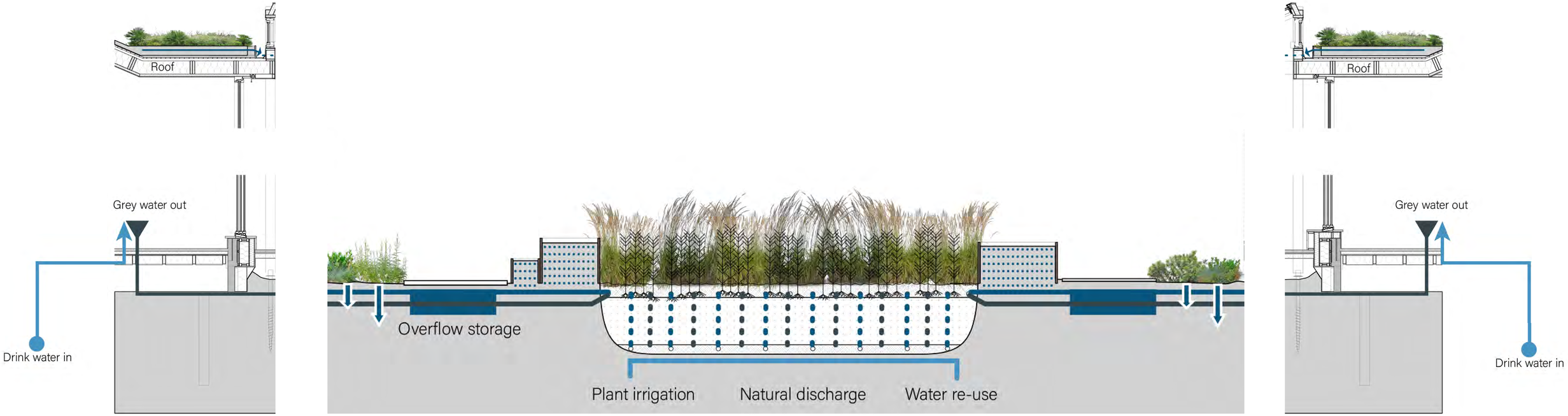
Green approach

Green roof runoff treatment



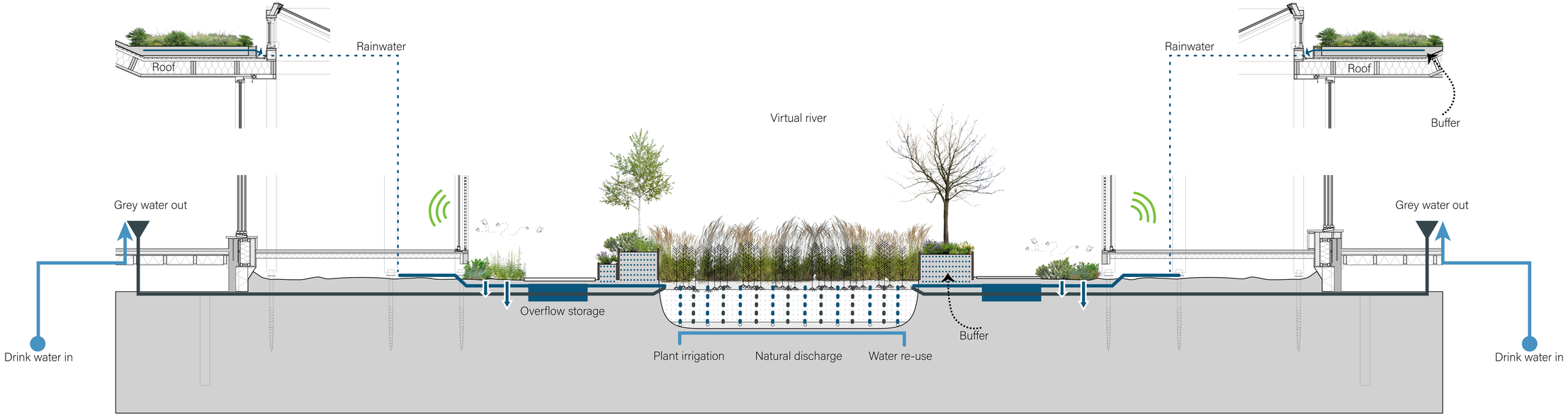


Green approach

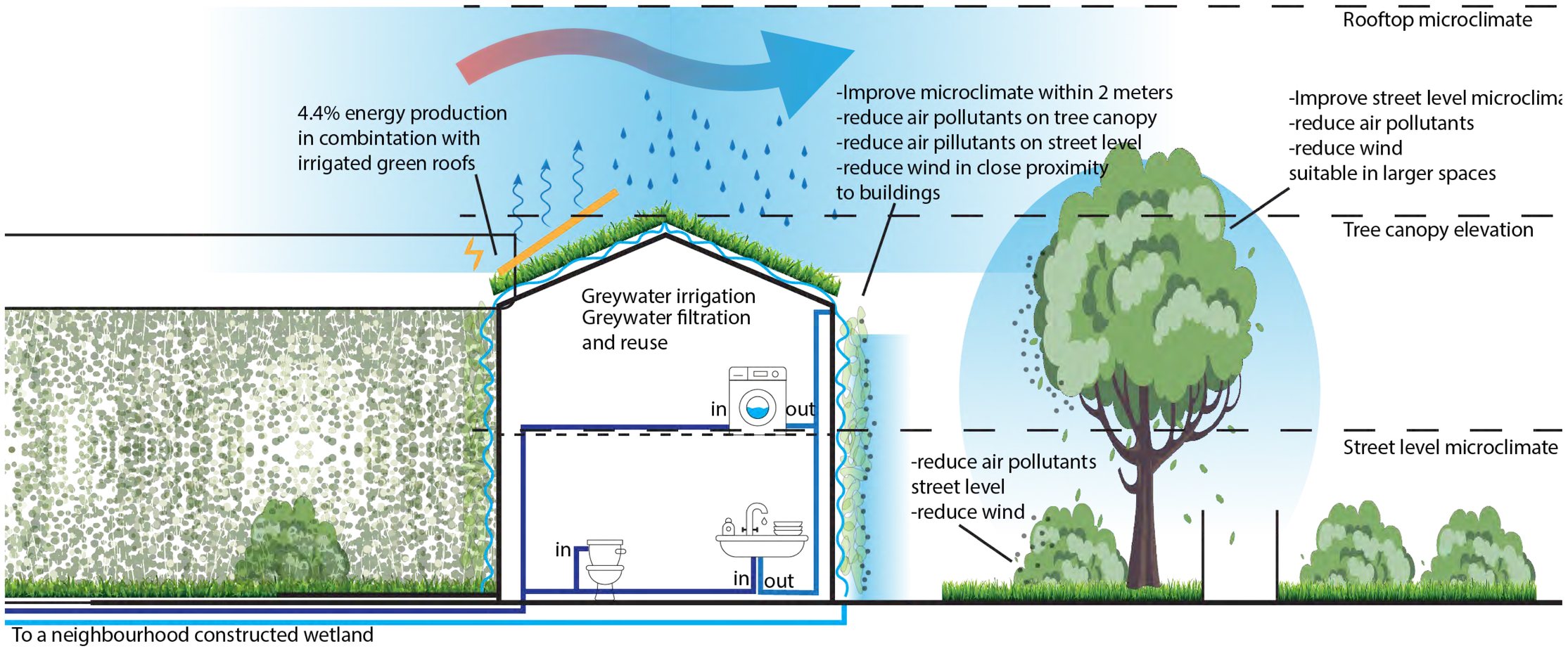


Green Utility

Green Approach

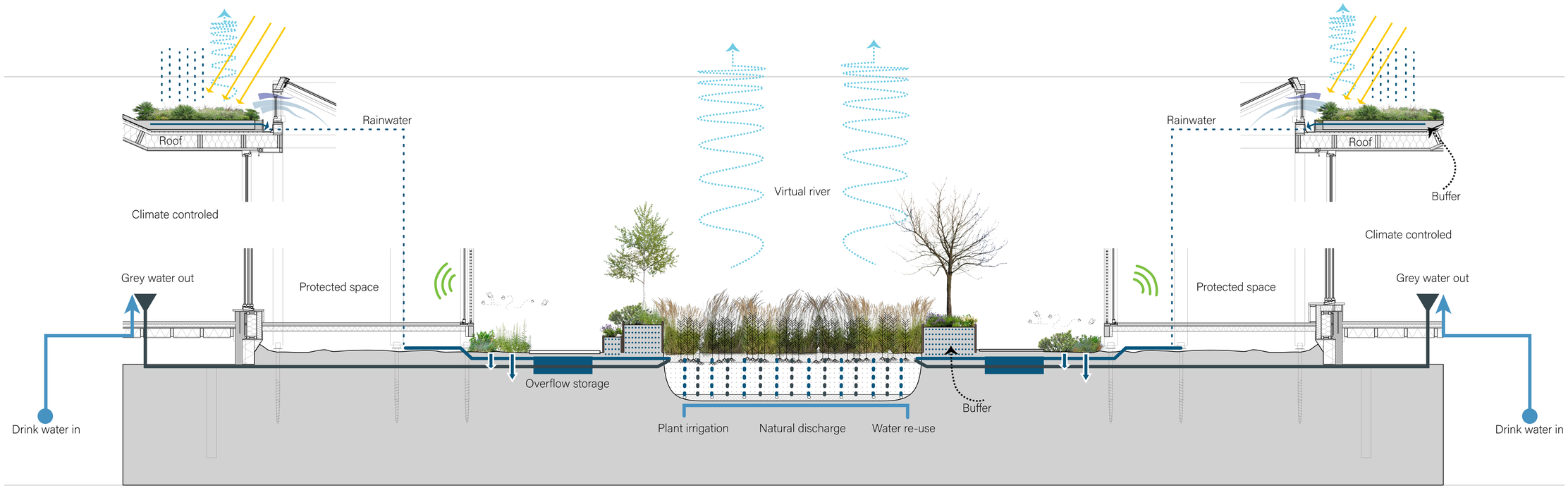


Green Approach



Green Approach

Resilient Cooling in close proximity

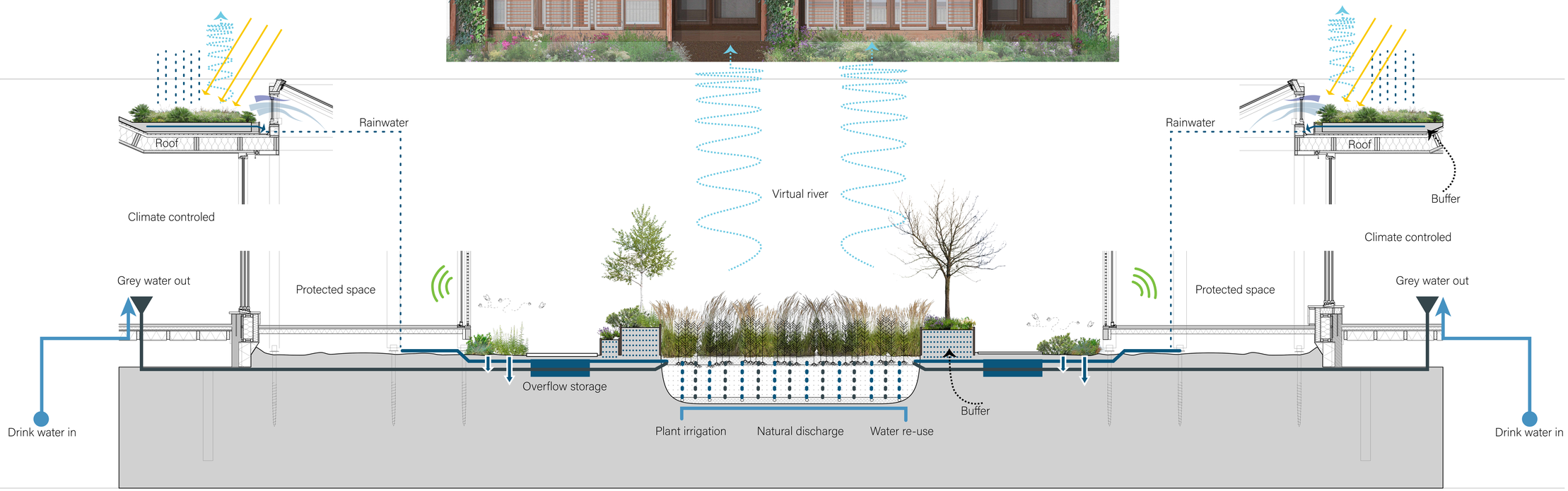


Green Approach

Resilient cooling
in close proximity

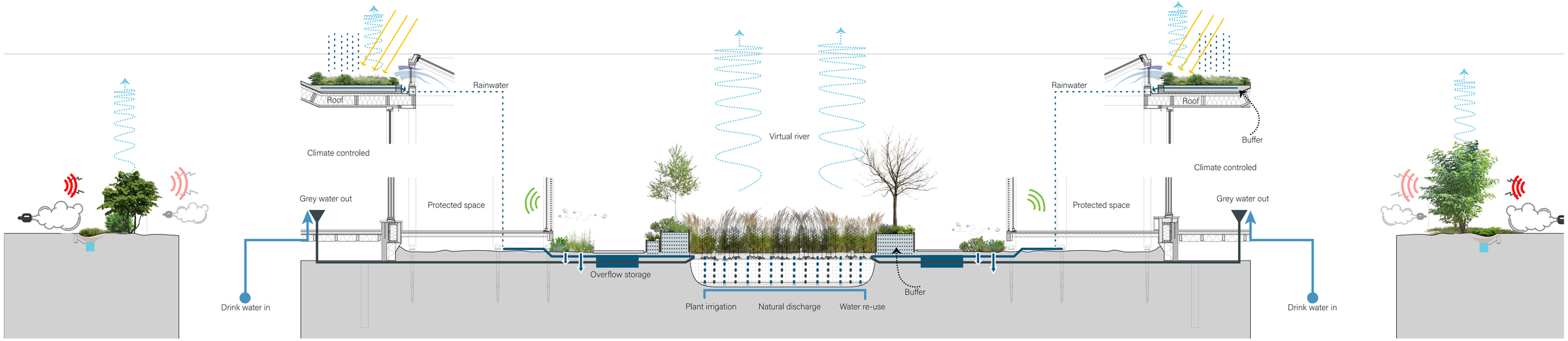
Green Approach

Resilient Cooling in close proximity



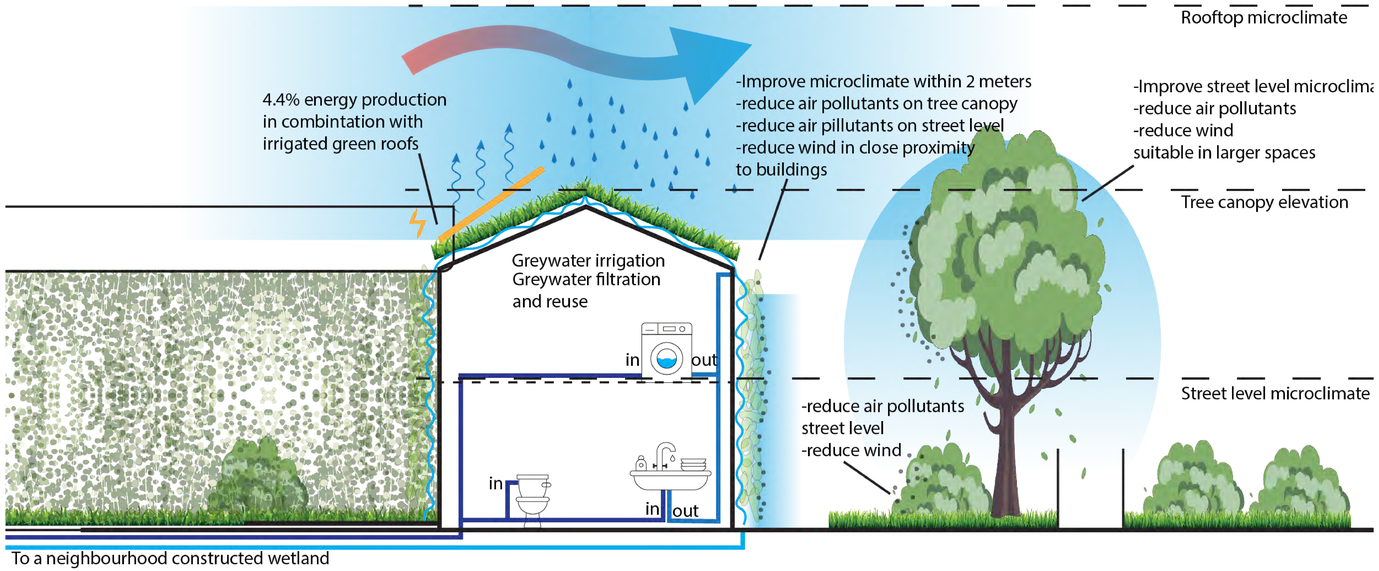
Green Approach

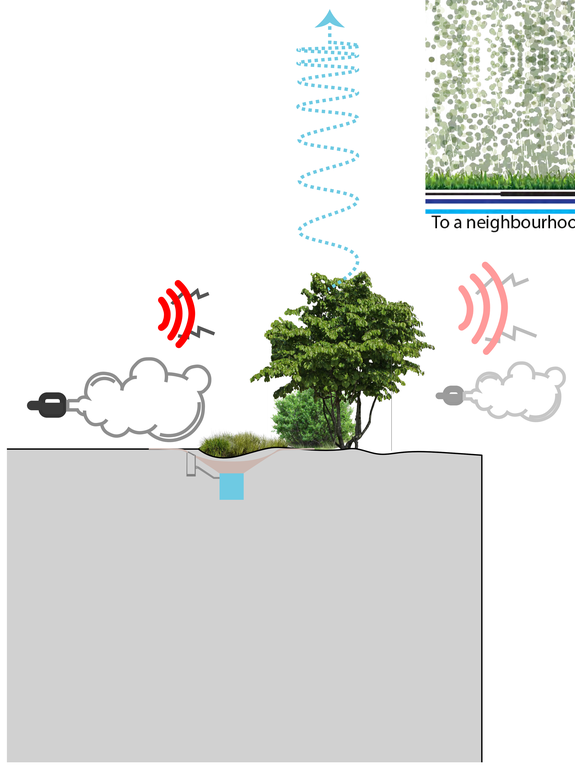
Green Utility for Sound, Noise and Air

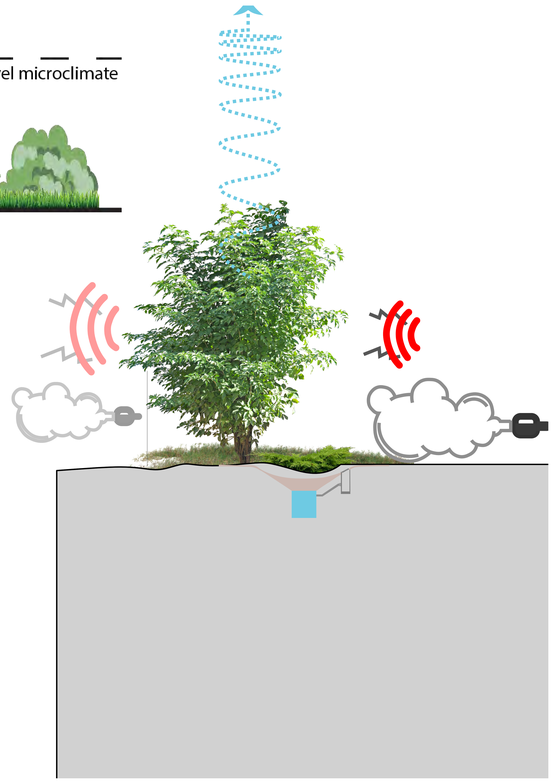


Green Approach

Green Utility for Sound, Noise, and Air

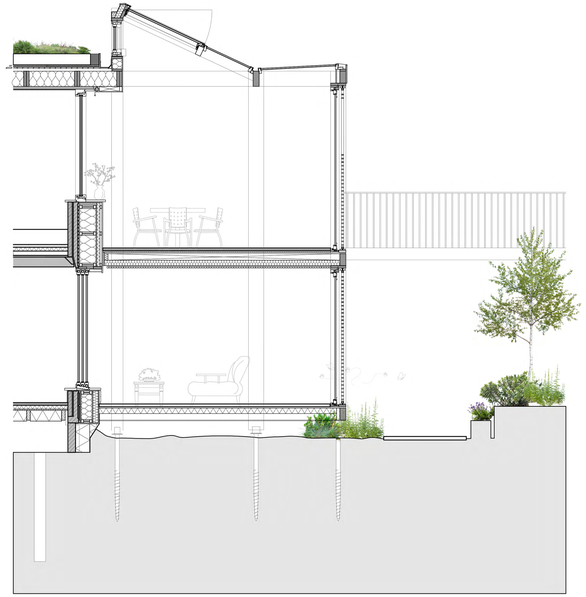


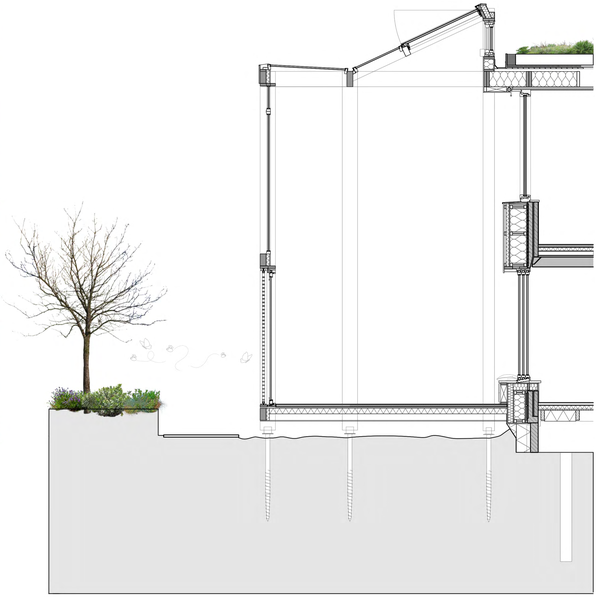


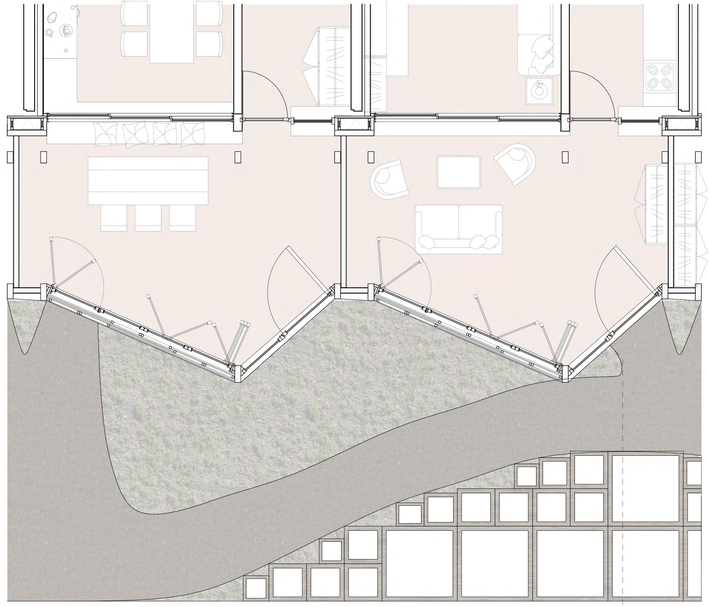


Overview

Extension







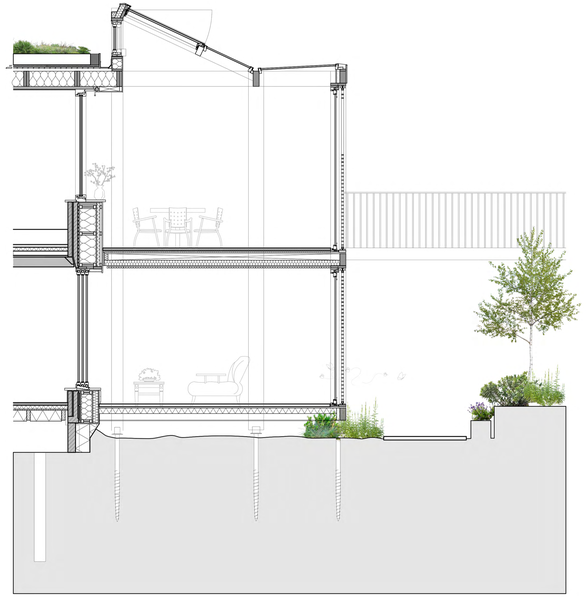
Vestibule • Wintergarden

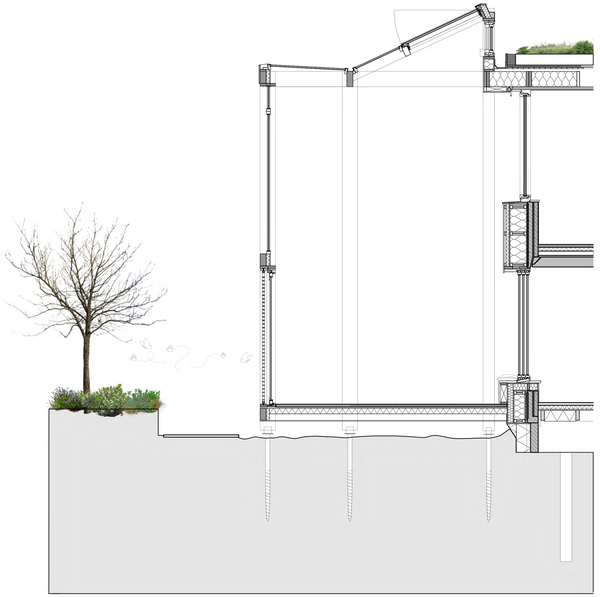
Comfortable outdoorspace • Sunroom

Extension

Overview

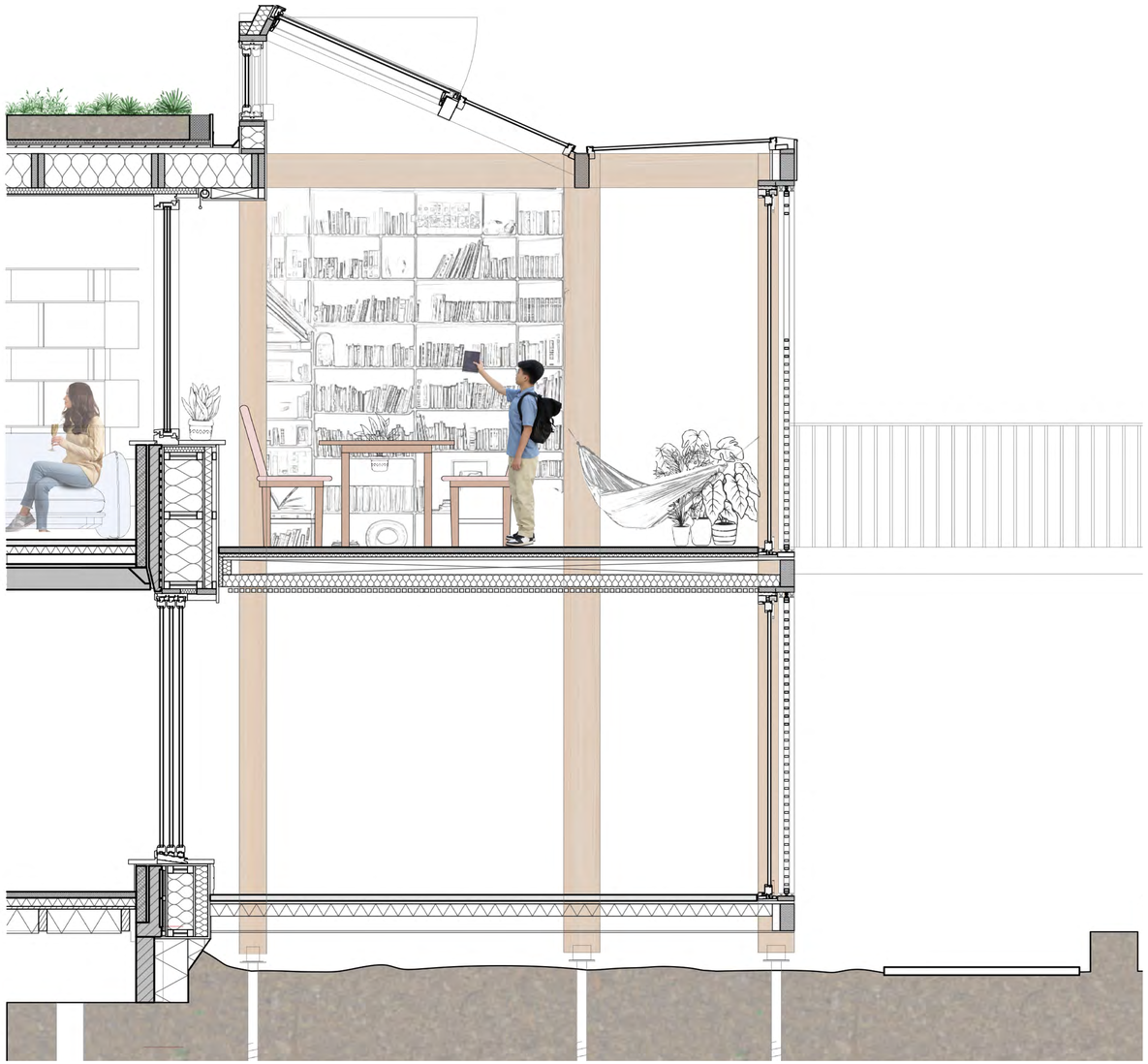
Extension





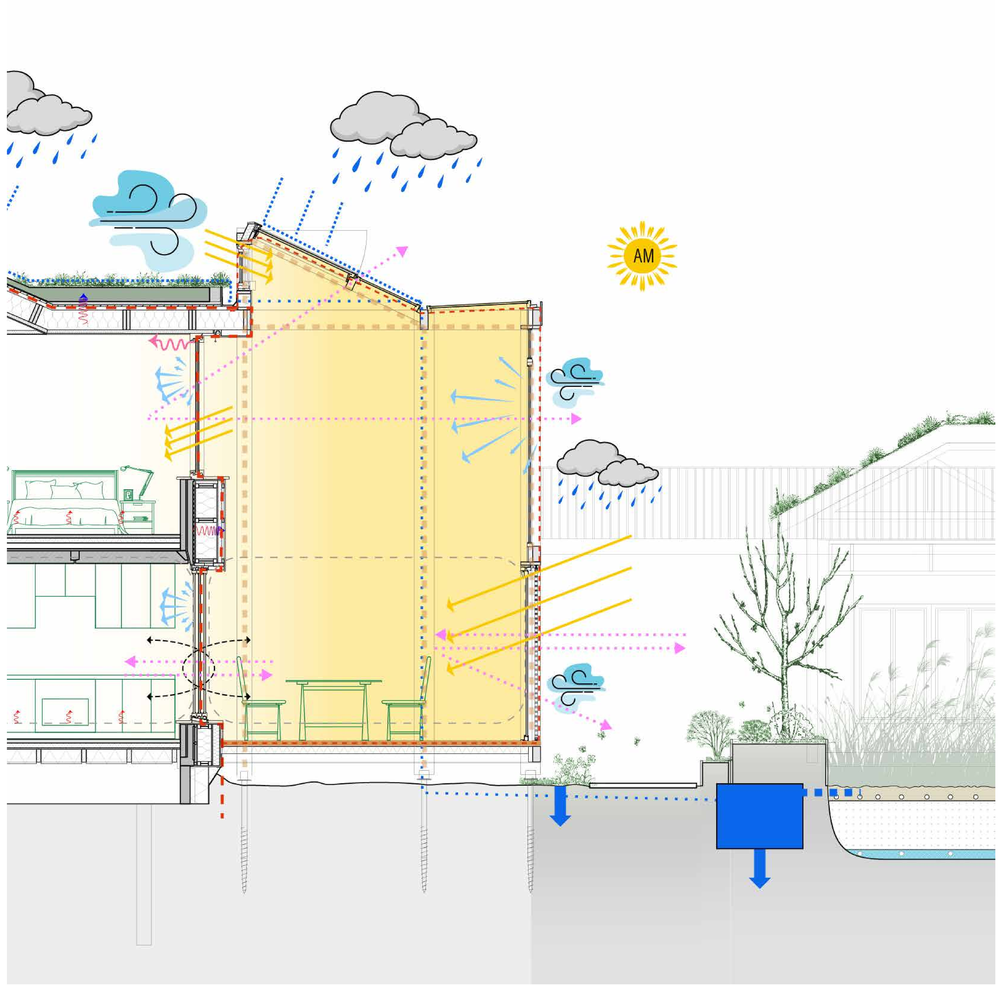
Section Overview

Extension



Extension

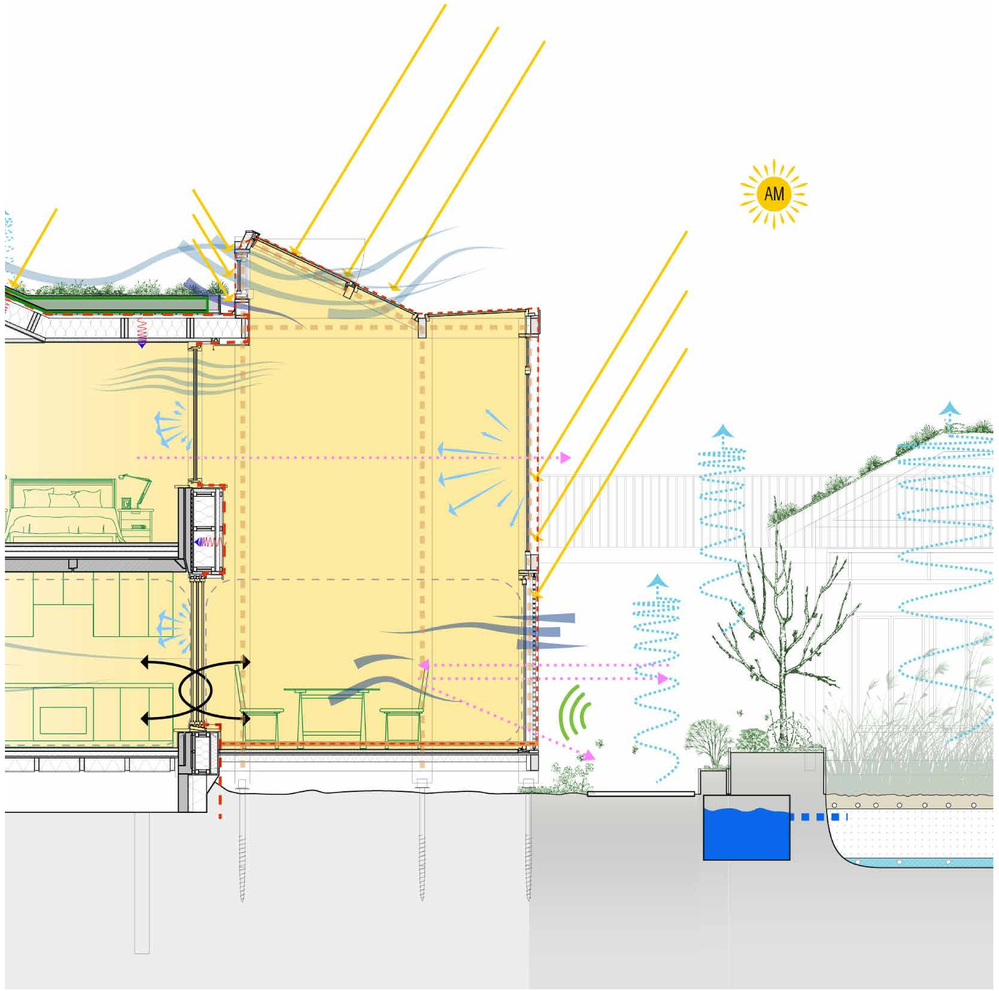
Adaptivity Goals
Winter/Cold



- Protect from wind
- Remain dry
- Capture sun heat
- Full of daylight
- Firm connection with garden

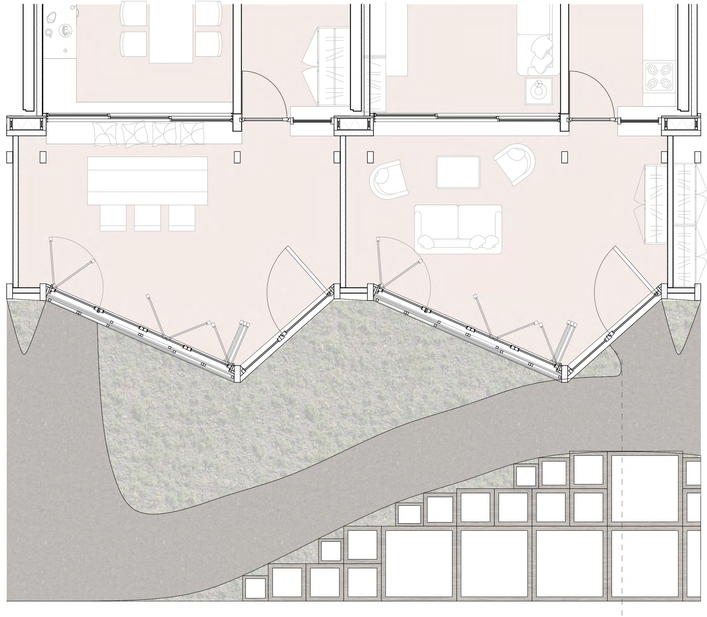
Extension

Adaptivity Goals
Summer/Dry

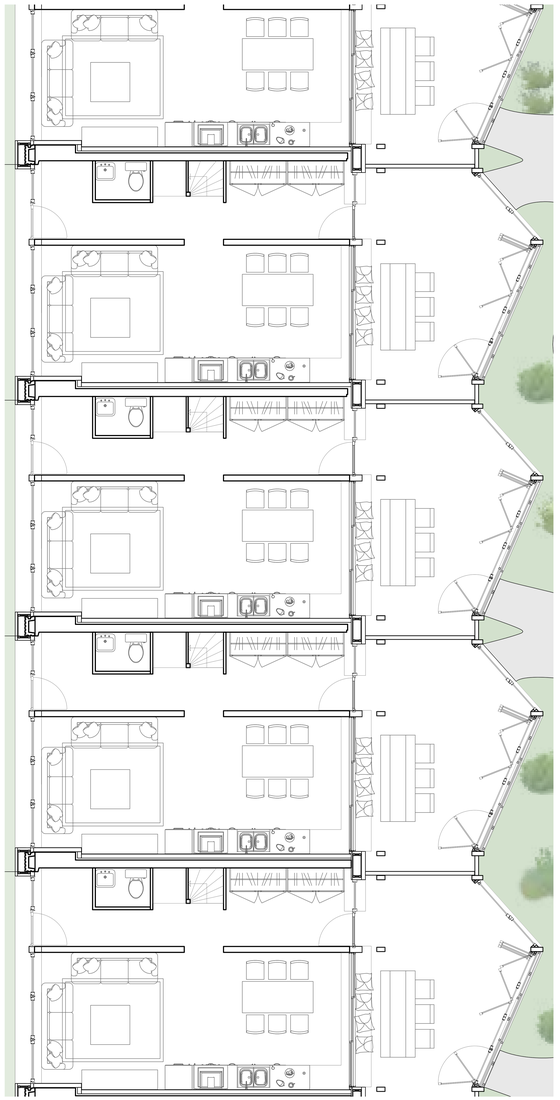


- Fully openable
- Unobstructing engagement
- Outdoor feeling
- Allow Windflow
- Protect from direct sun

Extension



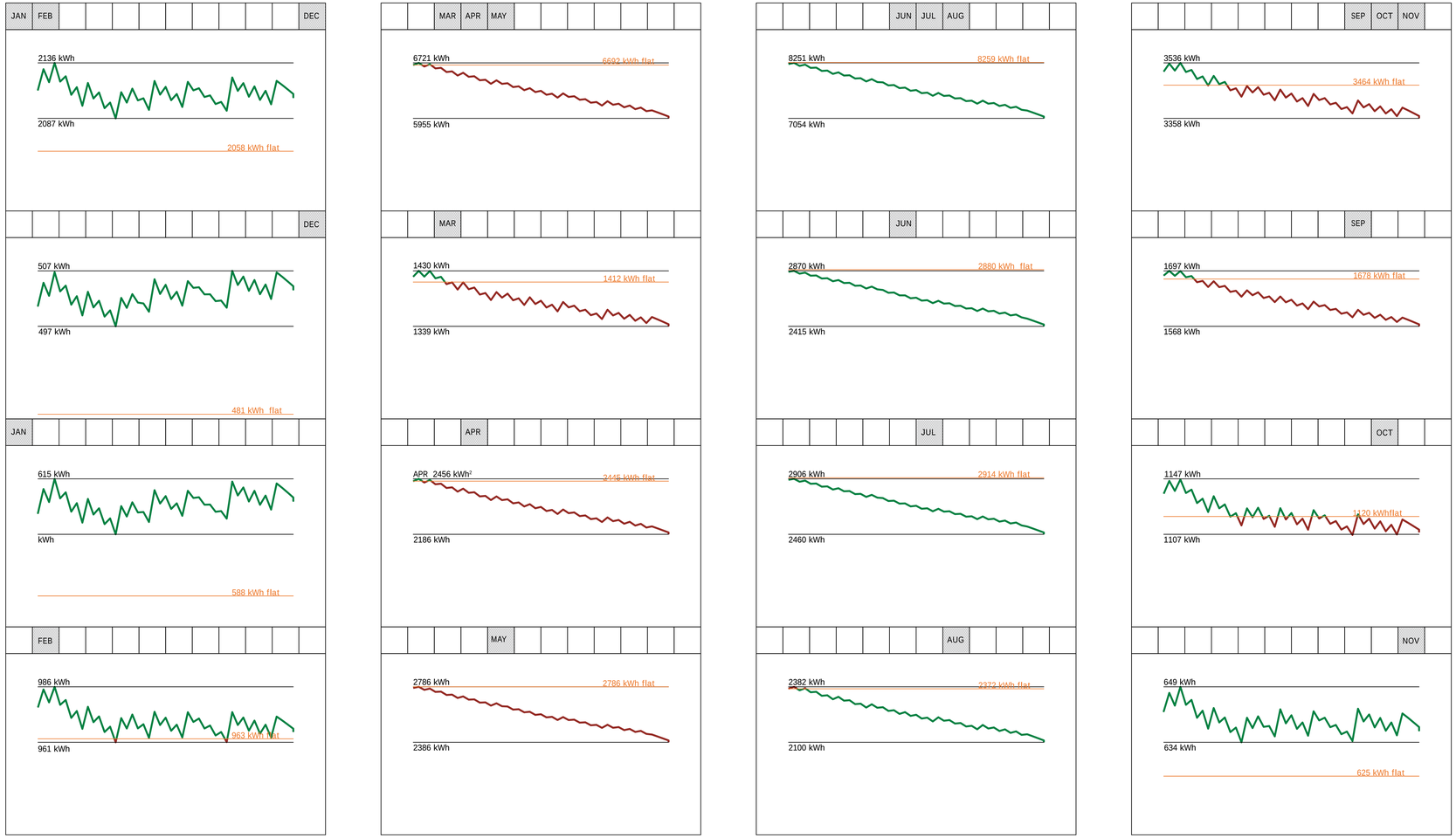
Odd shape...



Shape Optimization

Extension

WEST FACING FACADES - 4 is best



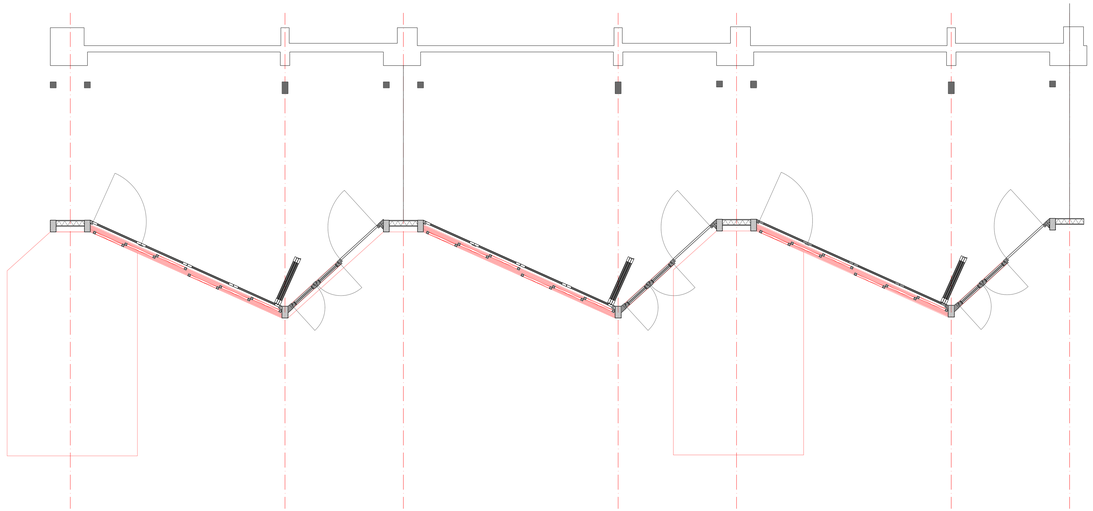
Extension

Adaptive Shading
Facade structure

Adaptive facade

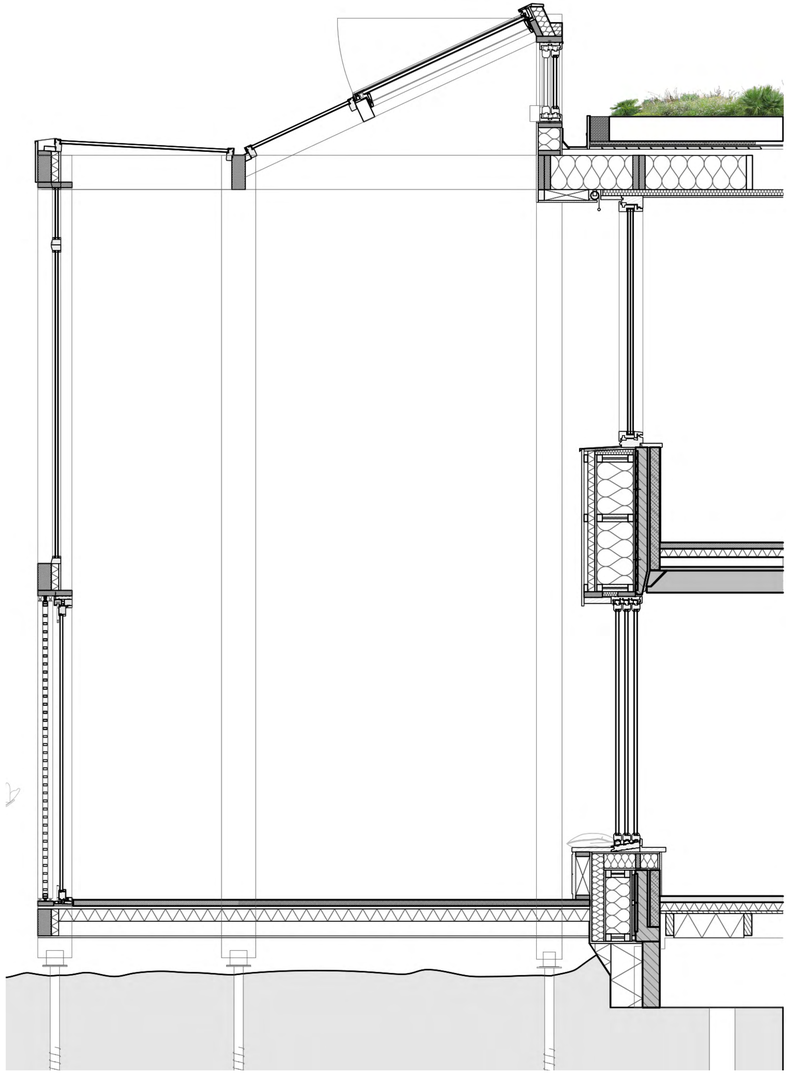
Extension

Extension

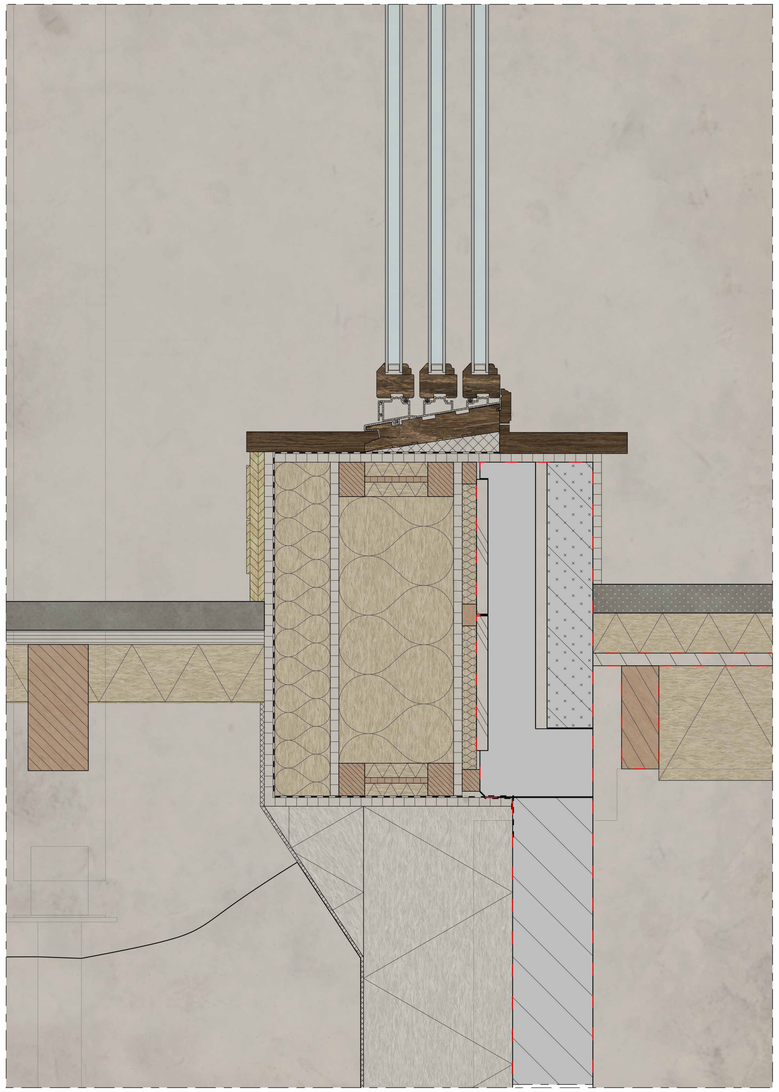


Extension Rhythm

Extension
New Facade Envelope

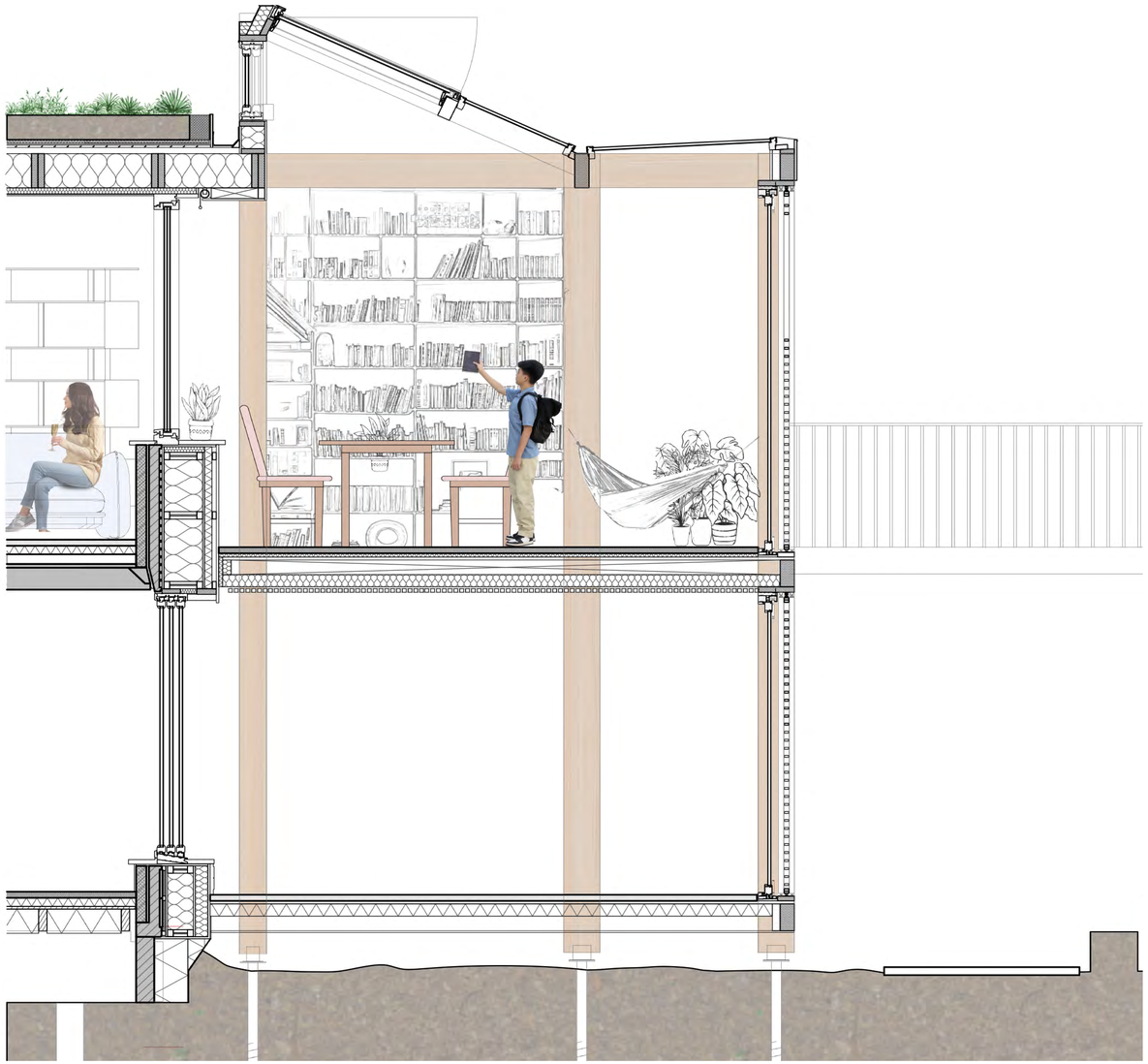


Thermal Envelope
& Window



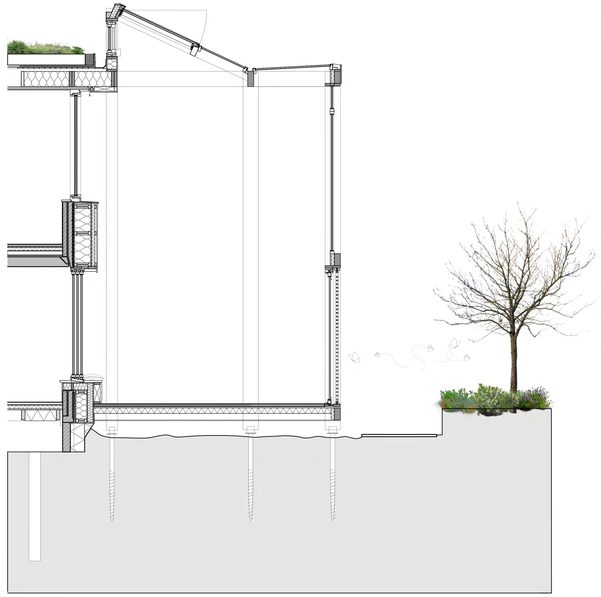
New Facade Envelope

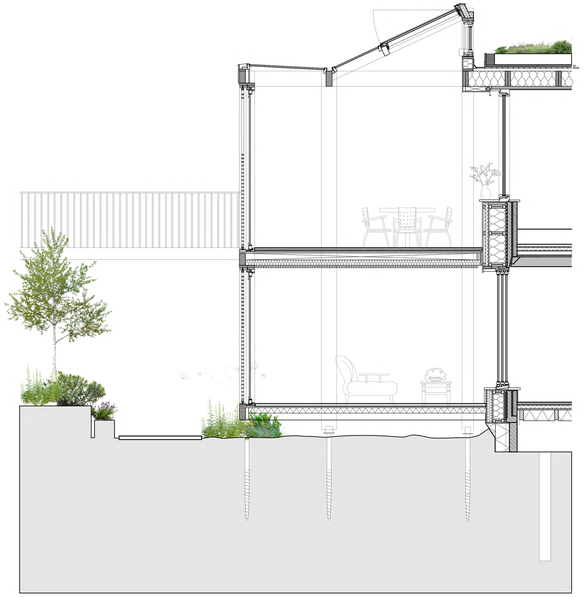
Elevated roofs details

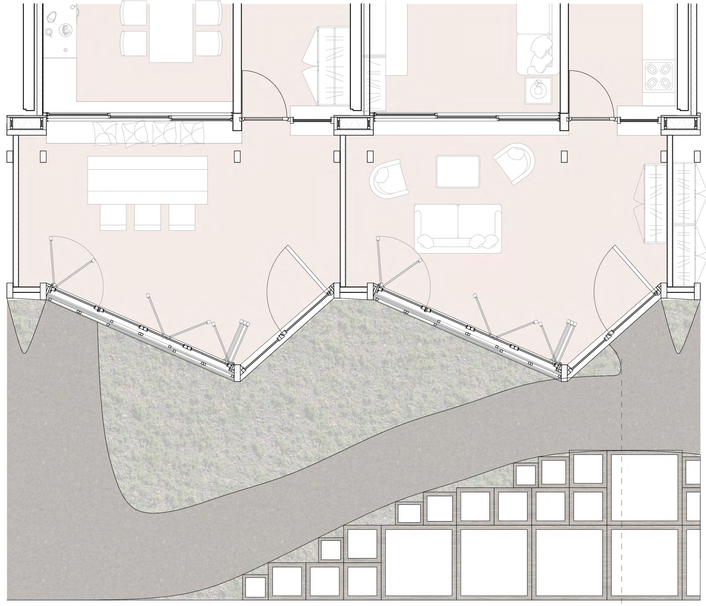


New Facade Envelope

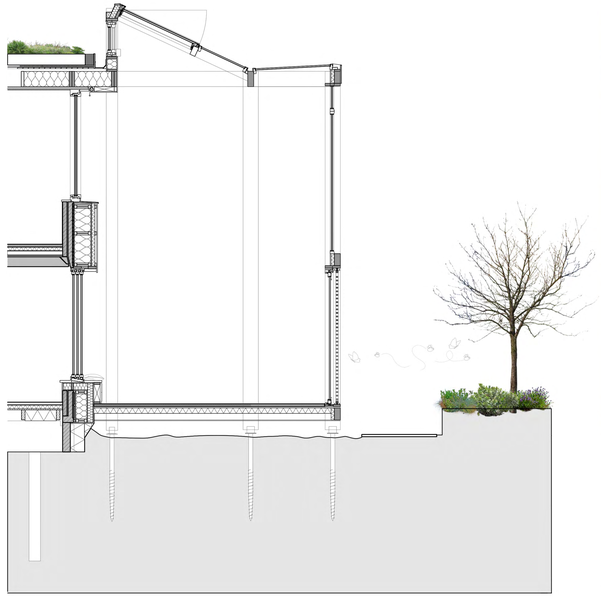
New Facade Layer

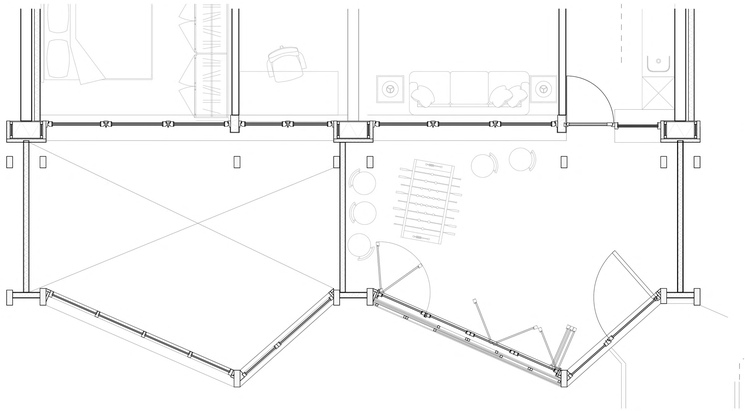




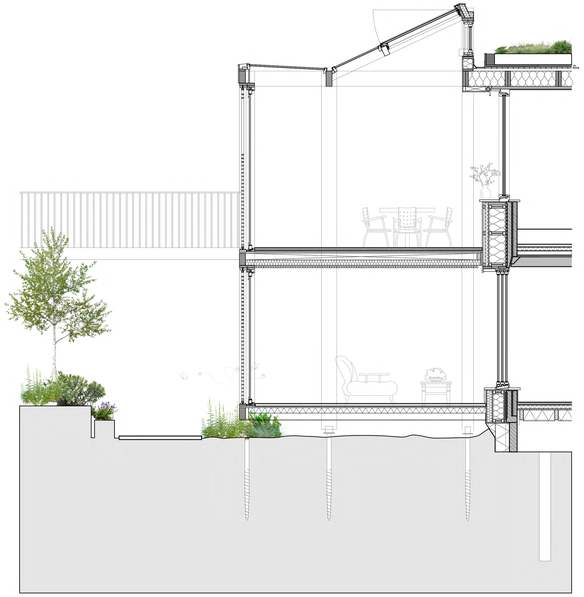


Facade Fragment





Extension Section

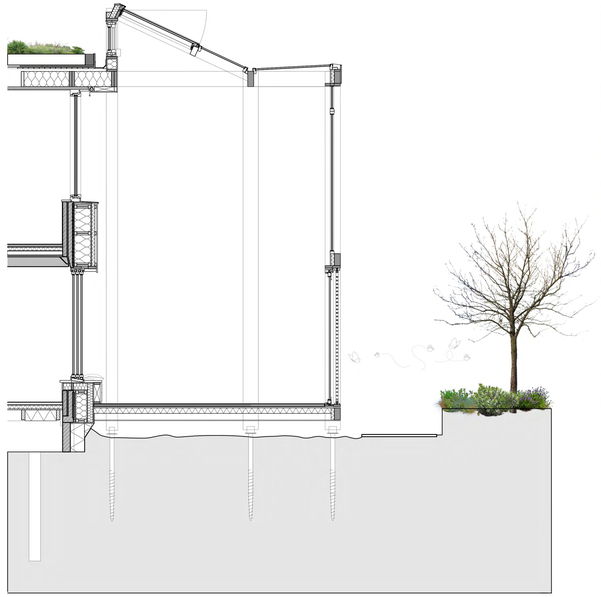


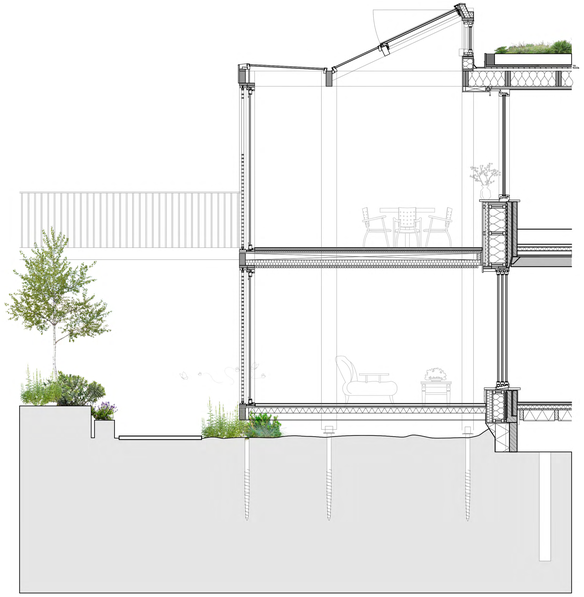
Extension Facade

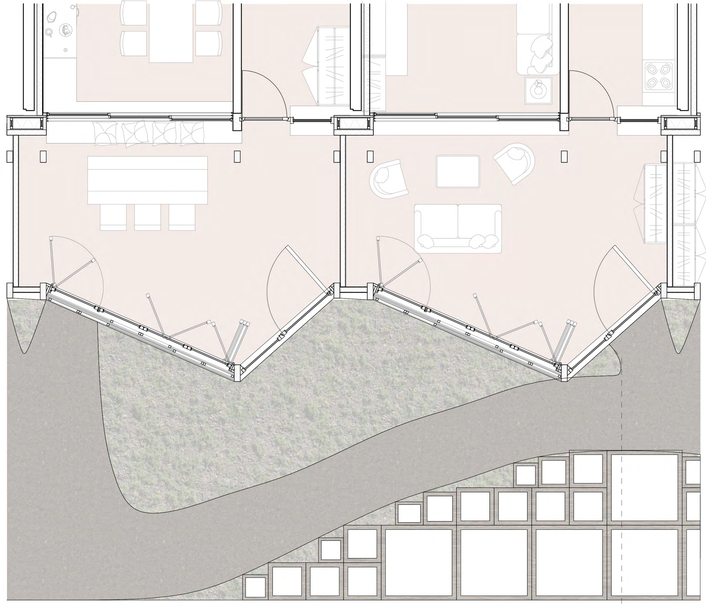
Facade Fragment

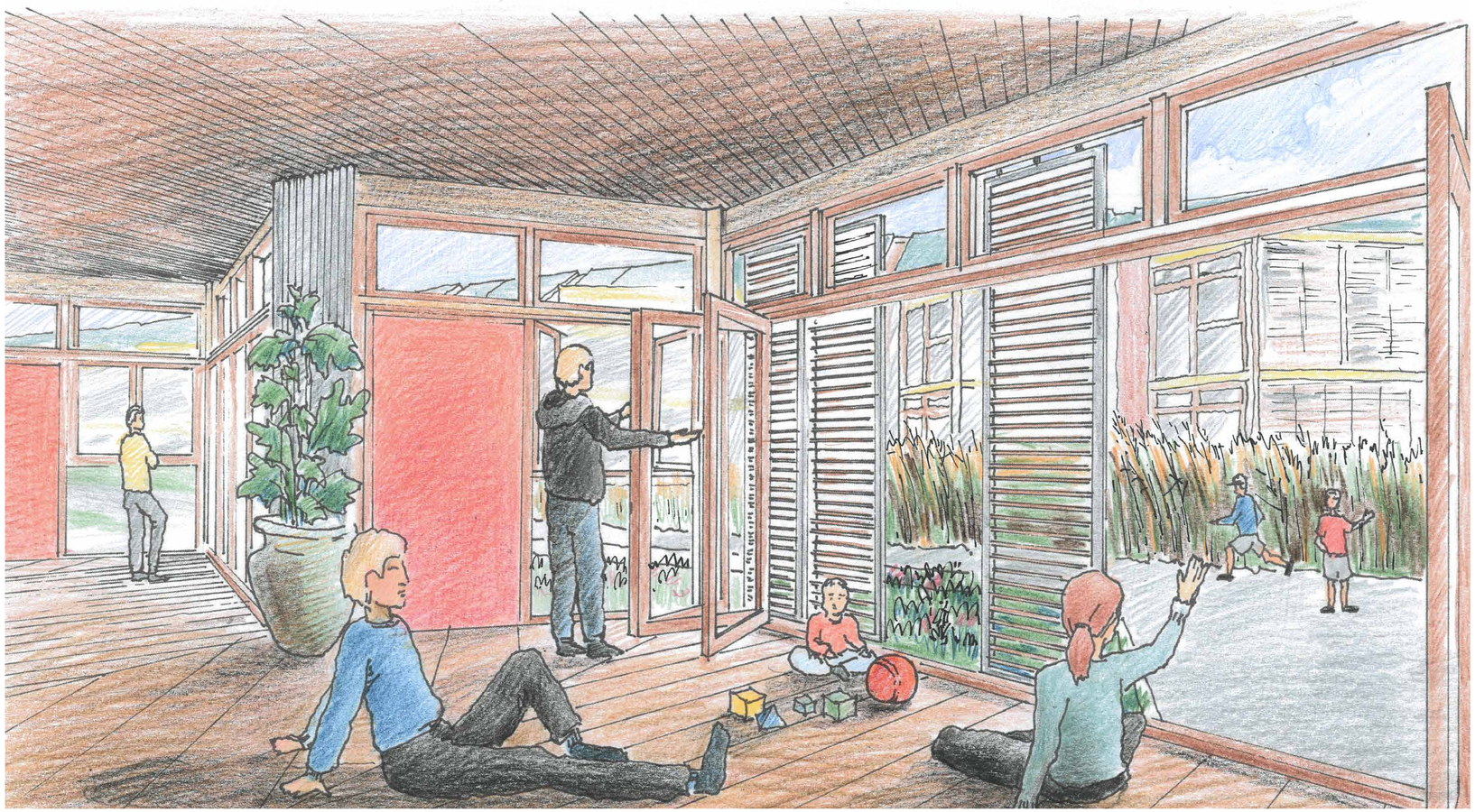
Sliding Shadings

Facade Fragment







Final look

The End! Thank you!