Transforming The Garden City

AR3AH105 Graduation Studio | Resourceful Housing: Adapting 20th Century Heritage

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Amsterdam Nieuw-West

Urban Renewal in the Context of:

- 20th Century Heritage
- Housing
- Resource Scarcity

Problem Statement

Social: Urban Inequality

Nieuw-West has seen a decrease in ratio of social housing units, from 76% in 2000, to 53% in 2016 (Nio et al., 2016, p. 19). State led gentrification has been associated with the displacement and exclusion of low-income households to the suburbs around the city (Hochstenbach & Musterd, 2021).

Ecological: Material Waste

Construction and demolition waste (CDW) is responsible for over a third of all waste generated in the EU (Bilsen et al., 2018), and the Duch building sectors material use is responsible 11% of total carbon emissions (Hekma, 2021). With the challenge of buliding 100.000 homes a year, the Dutch construction industry will exceed its carbon budget for a 1,5-degree warming scenario by 2027 (Bosch et al., 2023).

Heritage: Loss of Identity

Despite a complex and extensive system of heritage listings, most buildings outside the historic canal belt have very little concrete legal protections, and demolition and new construction remains the de facto method for urban renewal. This is leading to a loss of diversity and of unique identities of districts, causing the city to become increasingly homogenised.

Contents

Part I: Urban Renewal Case Study
What has been the social and ecological effect of urban renewal at the neighbourhood level, and what has the role of heritage been in this process?

Part II: Refurbishment Case Studies
How do different renewal strategies at the building level perform across social, ecological and heritage dimensions, and what does this reveal about the challenges of re-using postwar flats?

Part III: Values Based Redesign
How can we achieve the goals of urban renewal, like densification & diversification, without resorting to demolition and new construction?

Part I

What has been the social and ecological effect of urban renewal at the neighbourhood level, and what has the role of heritage been in this process?

Case Study: De Kolenkitbuurt

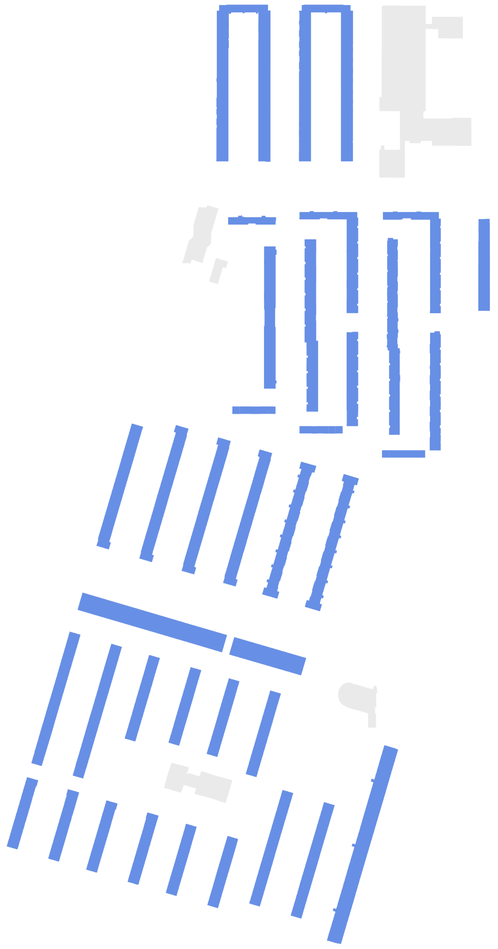
Areal photograph of the Kolenkitbuurt, Stadsarchief Amsterdam, June 17th 1983.

Areal photograph of the Kolenkitbuurt, Stadsarchief Amsterdam, July 9th 1957.

Renewal and Tenure

Source Data: Amsterdam Geo-Webservices

2005



2023

original corporation housing

converted to private rent

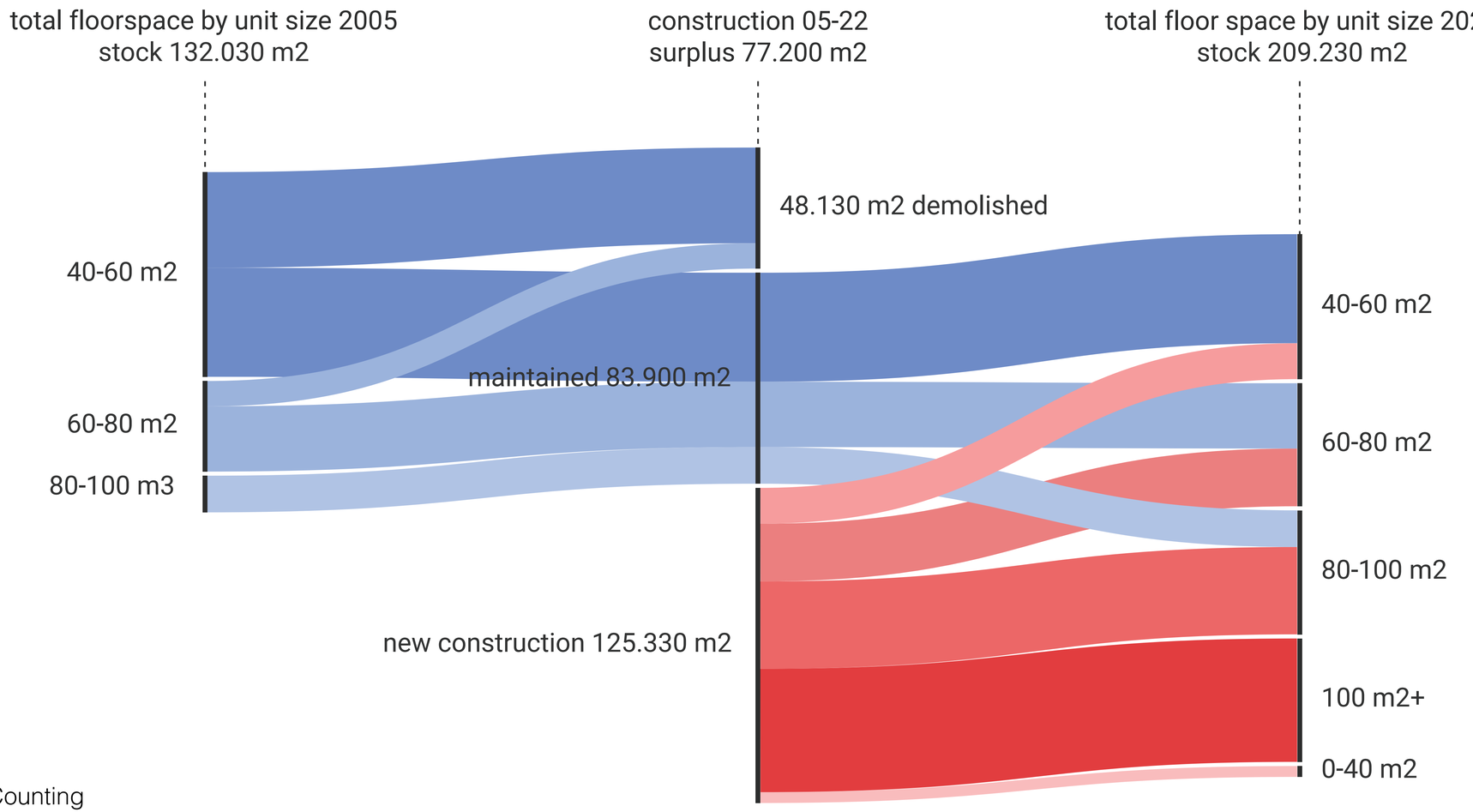
converted to owner occupied

new corporationhousing

new private rent

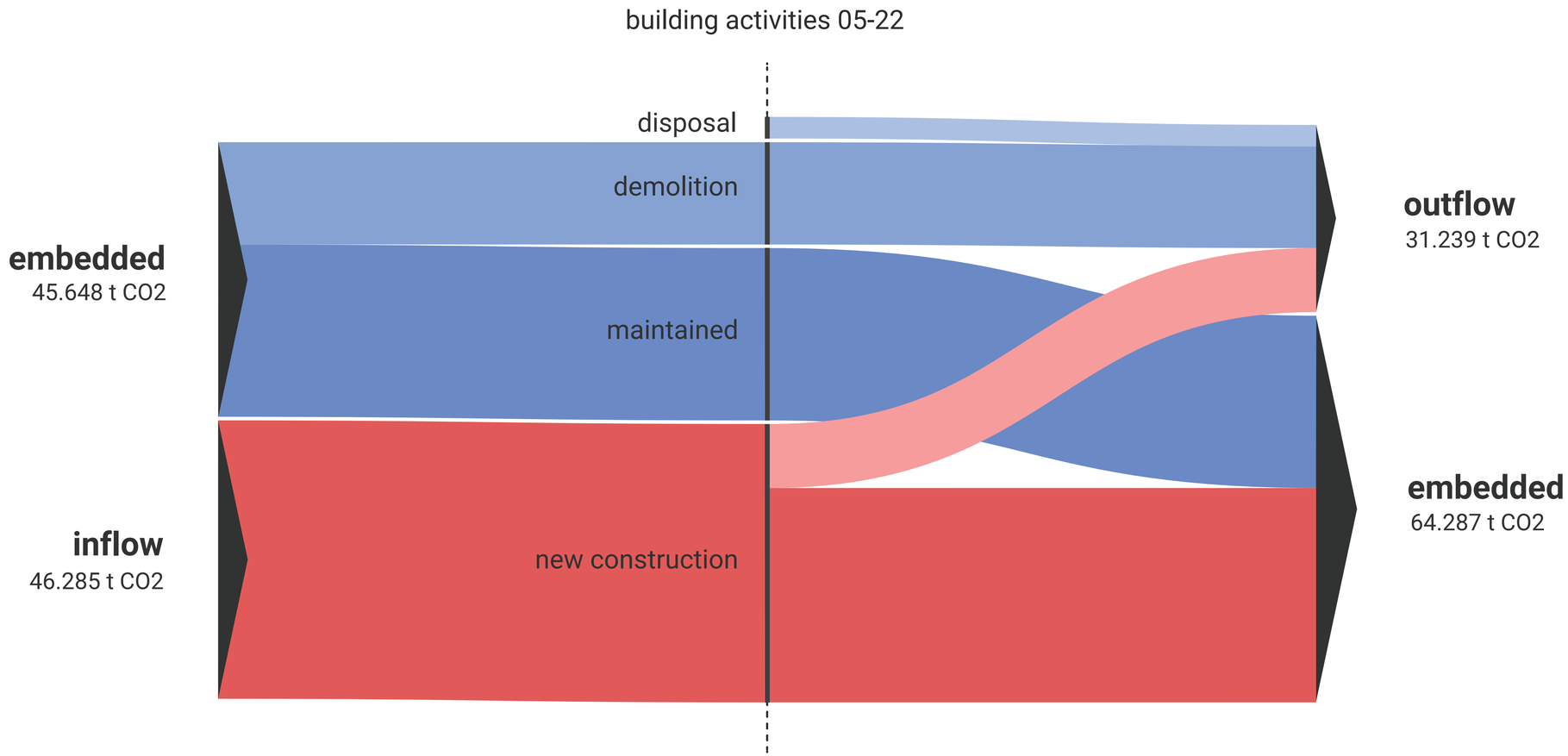
new owner occupied

Renewal and Total Floorspace by Dwelling Size



Source Data: O&S Amsterdam & Manual Counting

Embodied Carbon Flows



*Calculation based on generic figures using Granta Edupack data set

Conclusions

1. Social Outcomes

There were improvements in the average size and number of dwellings. Inconclusive evidence on efficacy of social mixing policies. Still room for more mixed uses, there is still some socio economic inequality between new and old blocks and the ratio of social housing was reduced.

2. Use of Material Resources

Extensive demolition and new construction leads to high environmental cost for relatively small expansion of housing stock. In this context re-use could have reduced material consumption by 48% and material based emissions by 67%.

3. Challenges for Re-Use

Retrofits were less effective at achieving densification and diversification of dwellings compared to new construction. Particularly the need for bigger dwellings to accommodate large families was a limitation. Likely due to inflexible construction systems and limited load bearing capacity of foundations.

Part II

How do different renewal strategies at the building level perform across social, ecological and heritage dimensions, and what does this reveal about the challenges of re-using postwar flats?

1. De Nieuwe Akbar
2. De Leeuw
3. De Verfdozen
4. Klarenstraat
5. Bakemabuurt
6. Dudok Haken
7. Seneca Flat
8. Koel Kit
9. Filosoof
10. Complex 50 en 117
11. Blomwijckerpad
12. Staalmanplein

Part II: Renovation Case Studies

1. De Nieuwe Akbar
2. De Leeuw
3. De Verfdozen
4. Klarenstraat
5. Bakemabuurt
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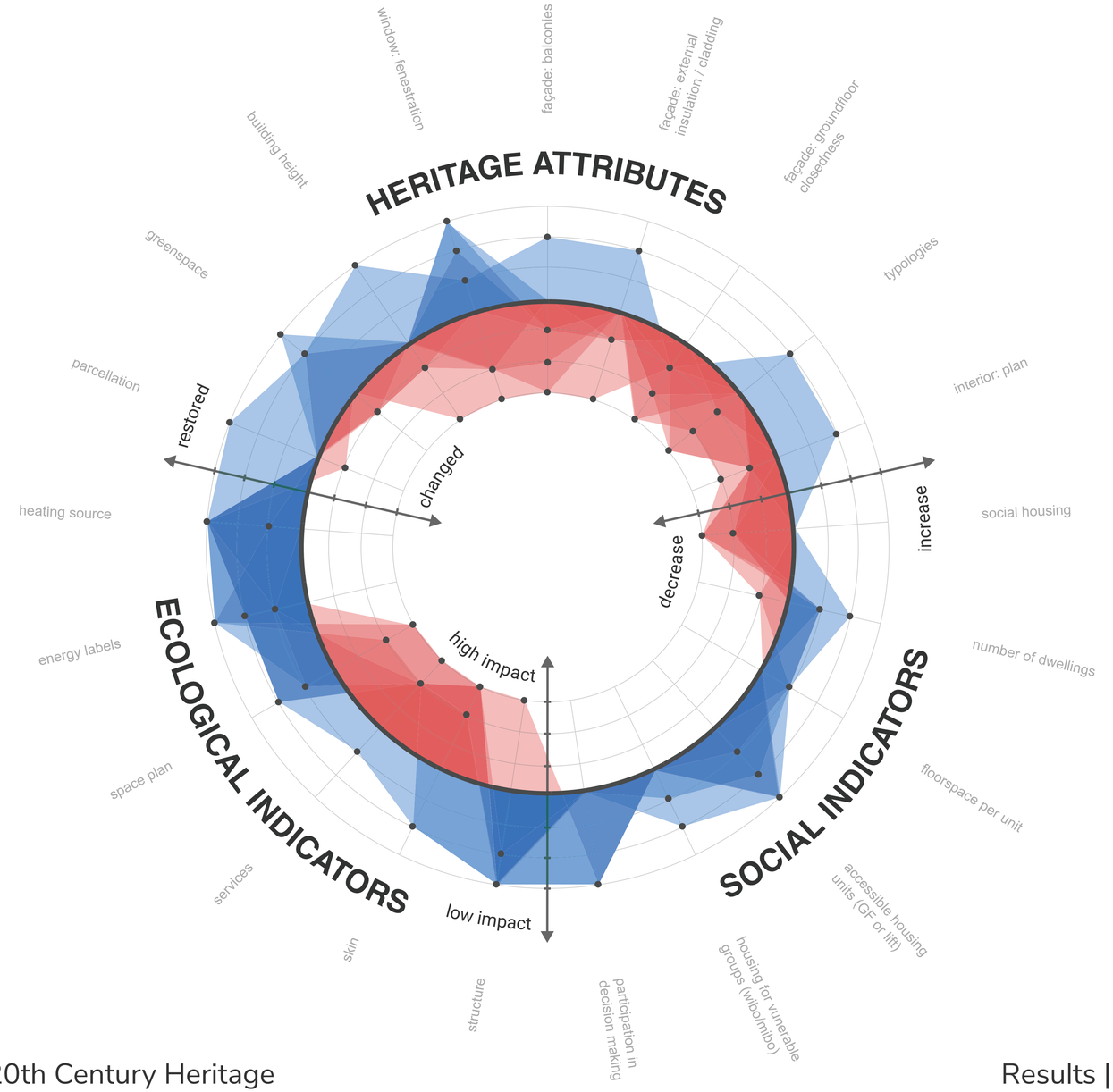
7. Seneca Flat
8. Koel Kit
9. Filosoof
10. Complex 50 en 117
11. Blomwijckerpad
12. Staalmanplein

Image source: Stadsarchief Amsterdam

Results


HERITAGE ATTRIBUTES
window: fenestration
façade: balconies
façade: external insulation / cladding
façade: groundfloor closedness
typologies
interior: plan
social housing
number of dwellings
floorspace per unit
SOCIAL INDICATORS
accessible housing units (GF or lift)
housing for vunerable groups (wlbo/mlbo)
participation in decision making
structure
skin
services
space plan
energy labels
heating source
parcellation
greenspace
building height
ECOLOGICAL INDICATORS
restored
changed
decrease
increase
high impact
low impact

1. Heritage Attributes

Limited Awareness

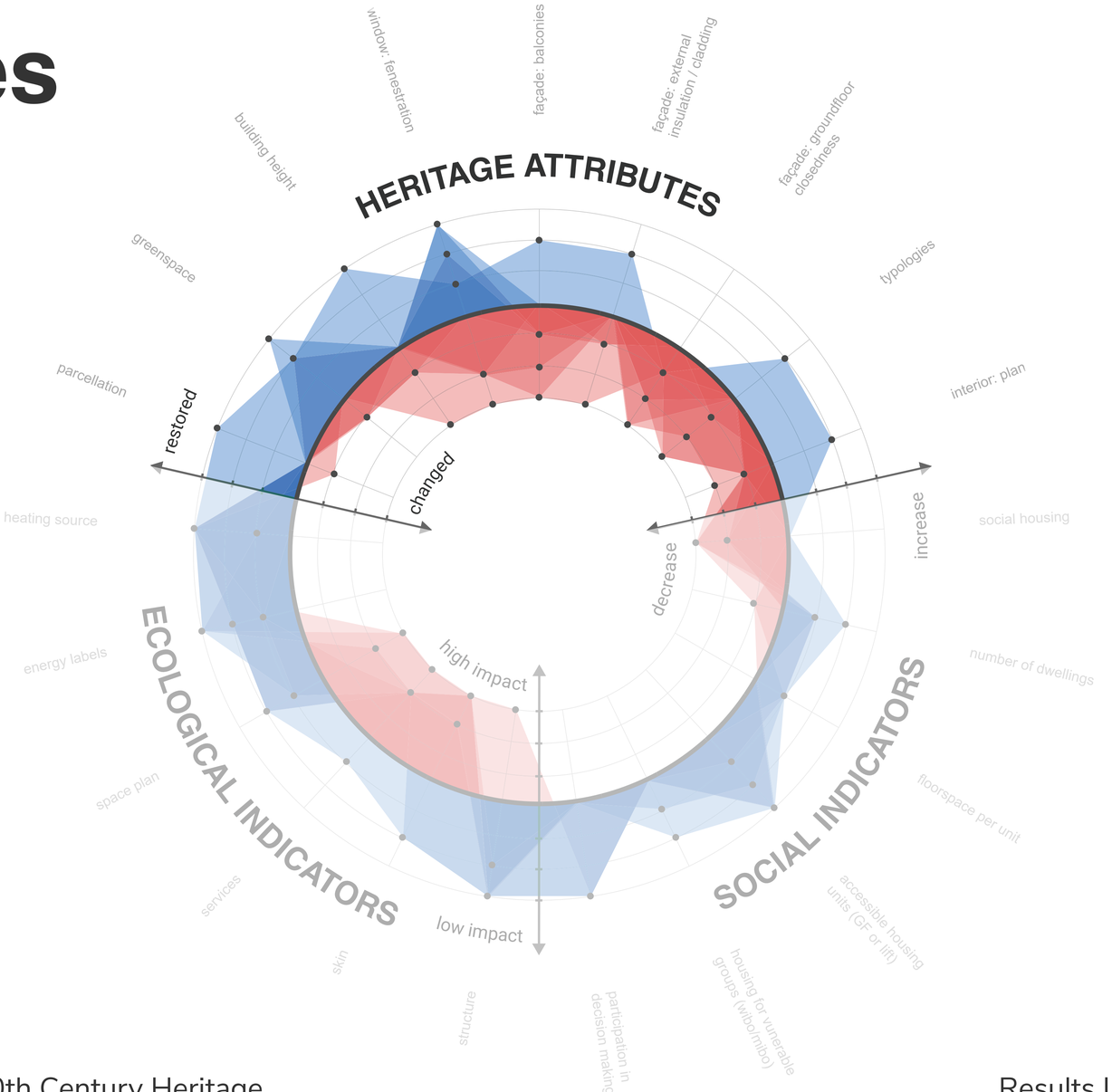
There is a general lack of awareness of heritage value at the building scale, leading to poor preservation of heritage attributes over the buildings life time.

Restoration Efforts

Some interventions make a concious effort art restoring valuable attributes to their orginal state, but there is not always room for this in the budget.

Necessary Change

‘Groundfloor facade closedness’ was rated as a negative heritage attribute by experts (Havinga et al. 2020). All most all interventions recognise this and attempt to ‘fix’ this in some way.



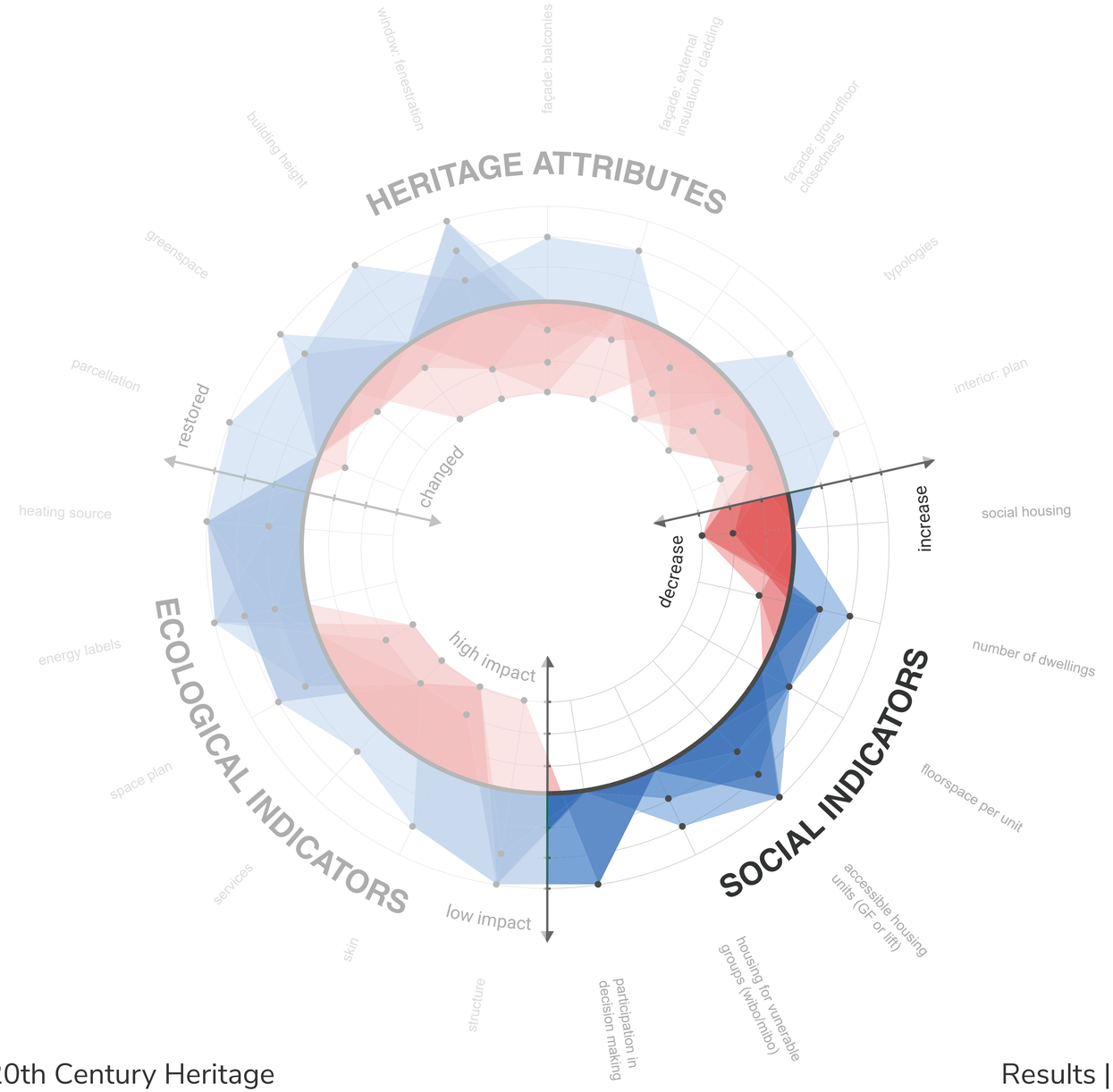
2. Social Indicators

Decrease in Social Housing

Just like in the neigbhourhood analysis, tenure conversion was common & often used as an income generation tool. The public housing sector is under a lot of pressure so further reduction in the social housing stock may not be desirable

Accessibility

Improvements to accessibility by converting to gallery (deck) access or adding ground floor dwelling was common.



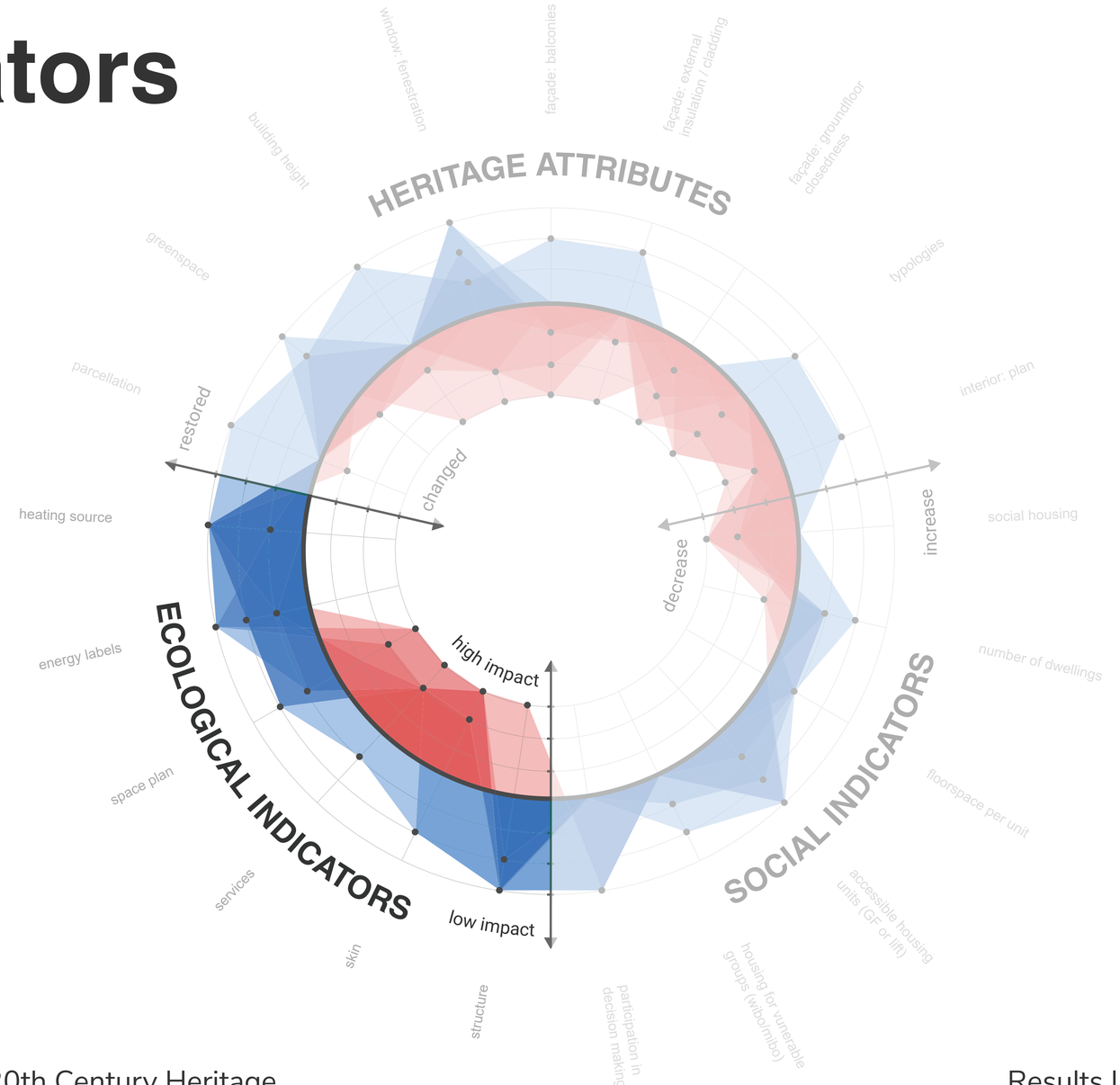
3. Ecological Indicators

Focus on Energy

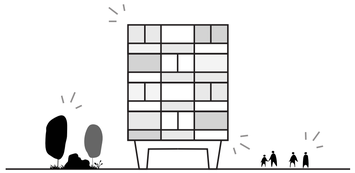
All interventions made significant improvements to the energy performance through the addition of internal or external insulation, better glazing and connections tot the heating grid.

Re-use of Structure Only

Out of the shearing layers usually only the structure was re-used, which holds the majority of the mass and environmental impact, but the impact of replacing other shearing layers can add up over the bulidings lifespan

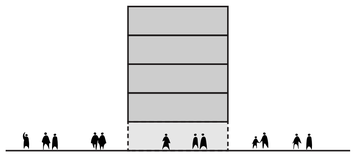


Goals for Successful Transformation



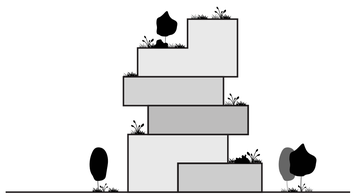
1. Use Existing Resources

Preserve and strengthen the existing heritage values present on the site. This includes not only architectural, but also the social, material and ecological values which compose the heritage environment.



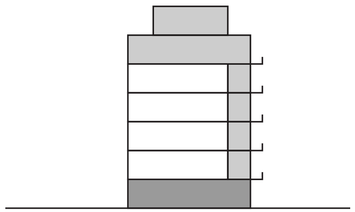
2. Activate The Plinth

Redesign the ground floor to improve the connection with the public space, consider how the public space is used and how access can change how neighbours interact.



3. Diversify Typologies

Adapt typologies to meet the needs of the new demographics in Nieuw-West; including large families, single households, students & seniors.

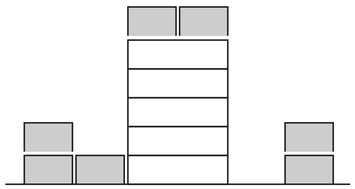


4. Mixed Use Density

Clusters of mixed use density can increase the attractiveness and use value of existing buildings and bring new life the public space.

5. Transition Spaces

Collective spaces like allotment gardens between buildings, and semi private spaces like front yards on the street create a sense of ownership in the public space while maintaining visual connections.



6. Design for Re-Use

Future proof designs by improving the adaptability of existing structures during interventions. Consider how additions can be disassembled and re-used in the future.

Part III

How can we achieve the goals of urban renewal, like densification & diversification, without resorting to demolition and new construction?

Design Case: Confuciusplein Building

Confuciusplein building, Stadsarchief Amsterdam, n.d.

Original facade of Confuciusplein building, Jan Versnel/MAI, n.d.

Designed by Architect J.P. Kloos

J.P Kloos (1970) Fotopersbureau De Boer

Bejaardencentrum ‘De Heemhaven’ (1968) J.P. Kloos, Het Nieuwe Instituut

Other Projects by Kloos

de Leeuw van Vlaanderen Straat (1960) J.P. Kloos, Stadsarchief Amsterdam

‘Hangbrug Maisonettes’ (1969), J.P. Kloos, Stadsarchief Amsterdam, n.d

Heritage: Window Fenestrations

image source: Jan Versnel/MAI

image source: Google Streetview

Social: Poor Connection Public Space

image source: Google Streetview

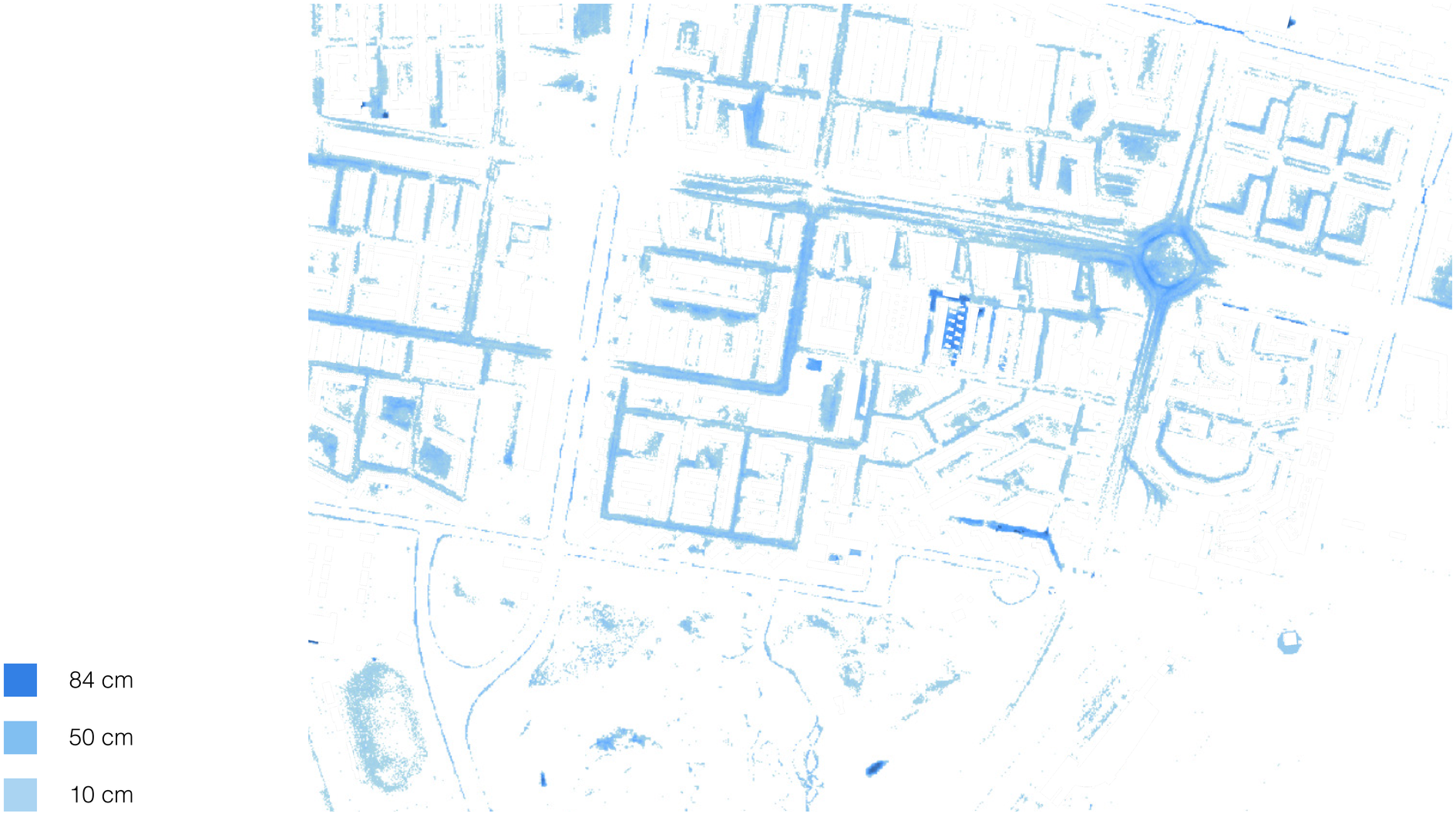
Ecological: Low Climate Adaptation

image source: Google Streetview

Urban Context

Heat Stress

perceived temeprature on hottest day, source: Maps Amsterdam



Rainwater

Rainwater depth after 120mm of rain over 2 hours, source: Maps Amsterdam

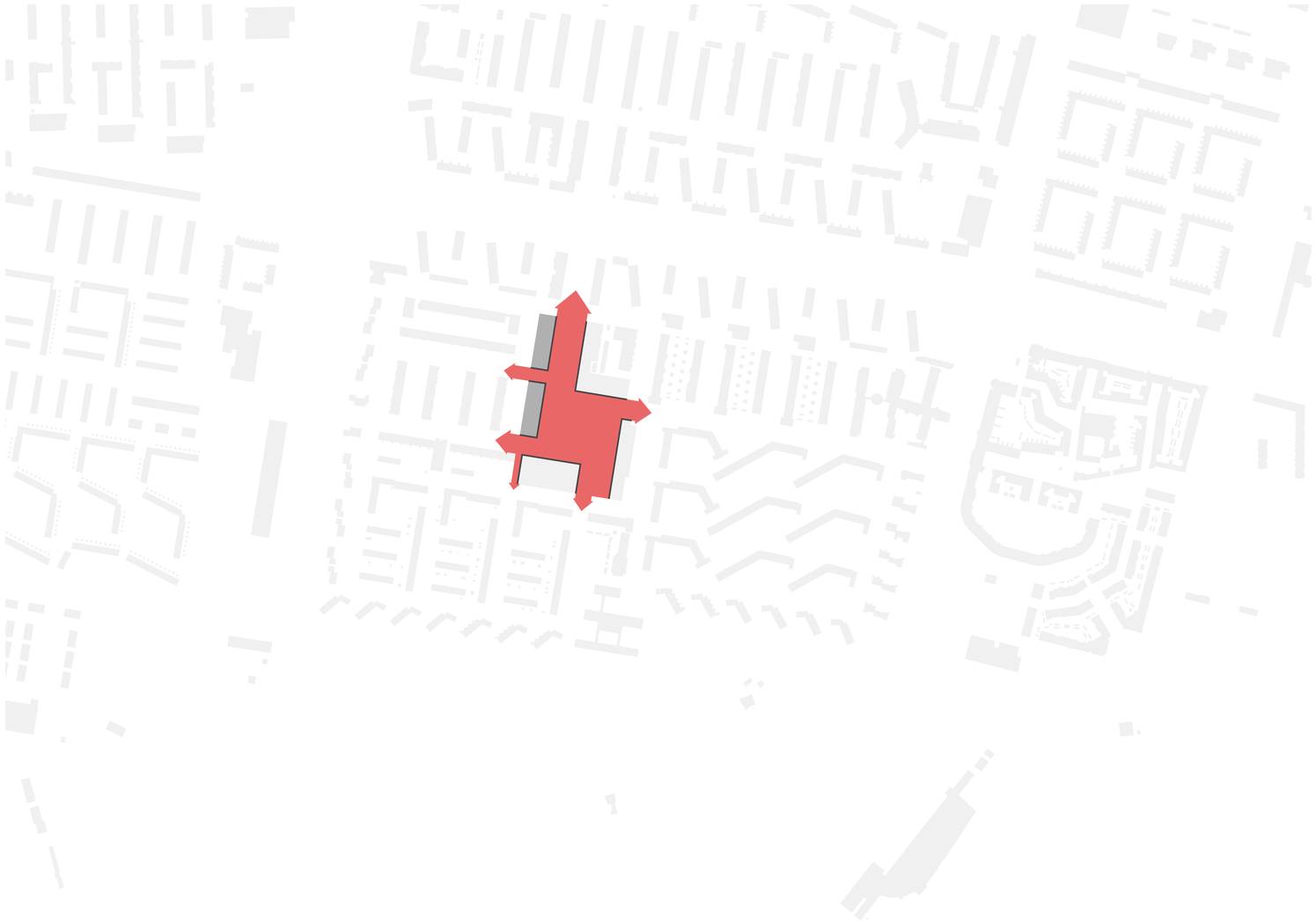
Traffic Noise

Source: Maps Amsterdam

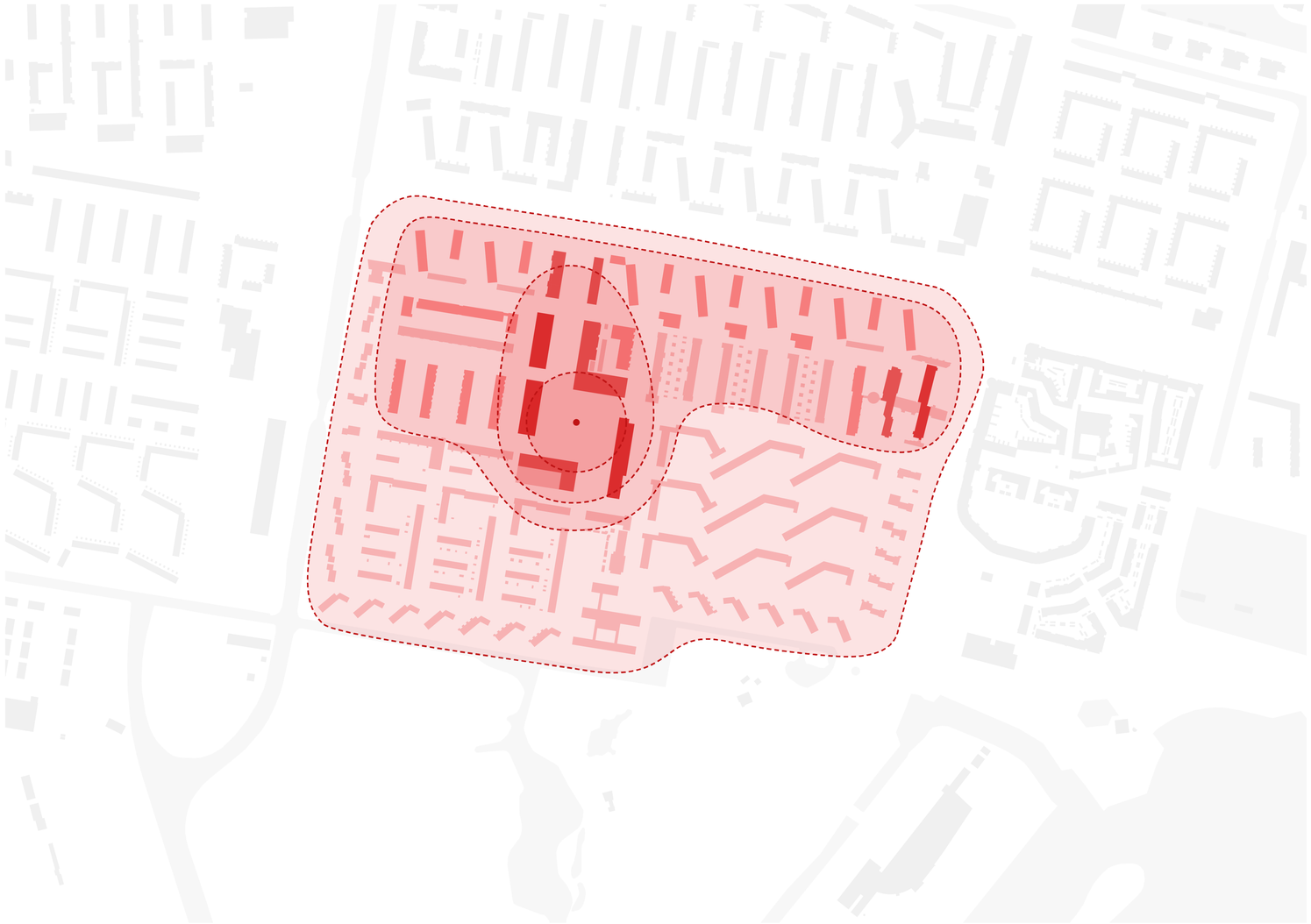
Infrastructure


Grocery
Service
Food Service
Retail
Healthcare
Education
Sport

Mixed Use

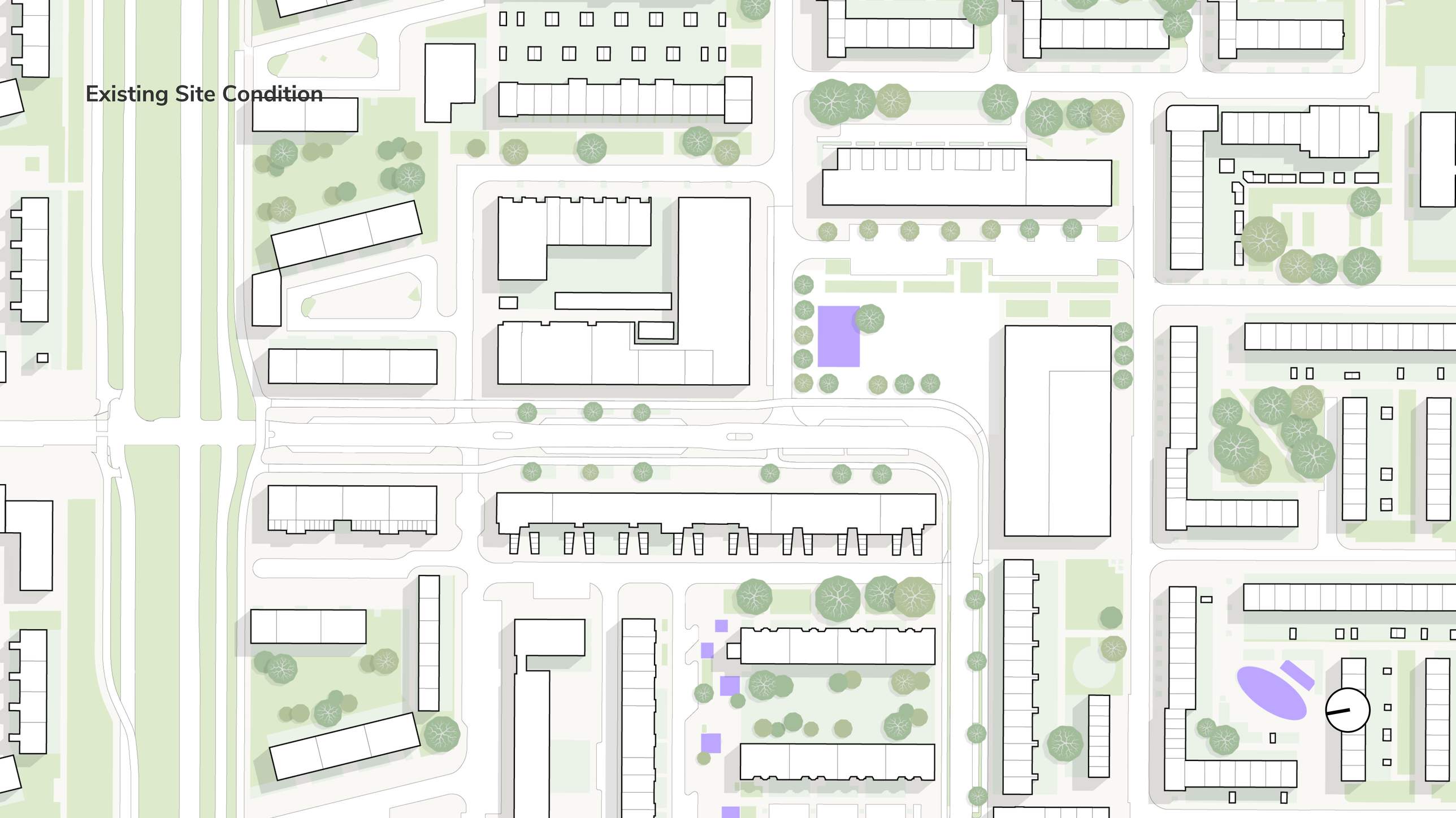


Urban Space

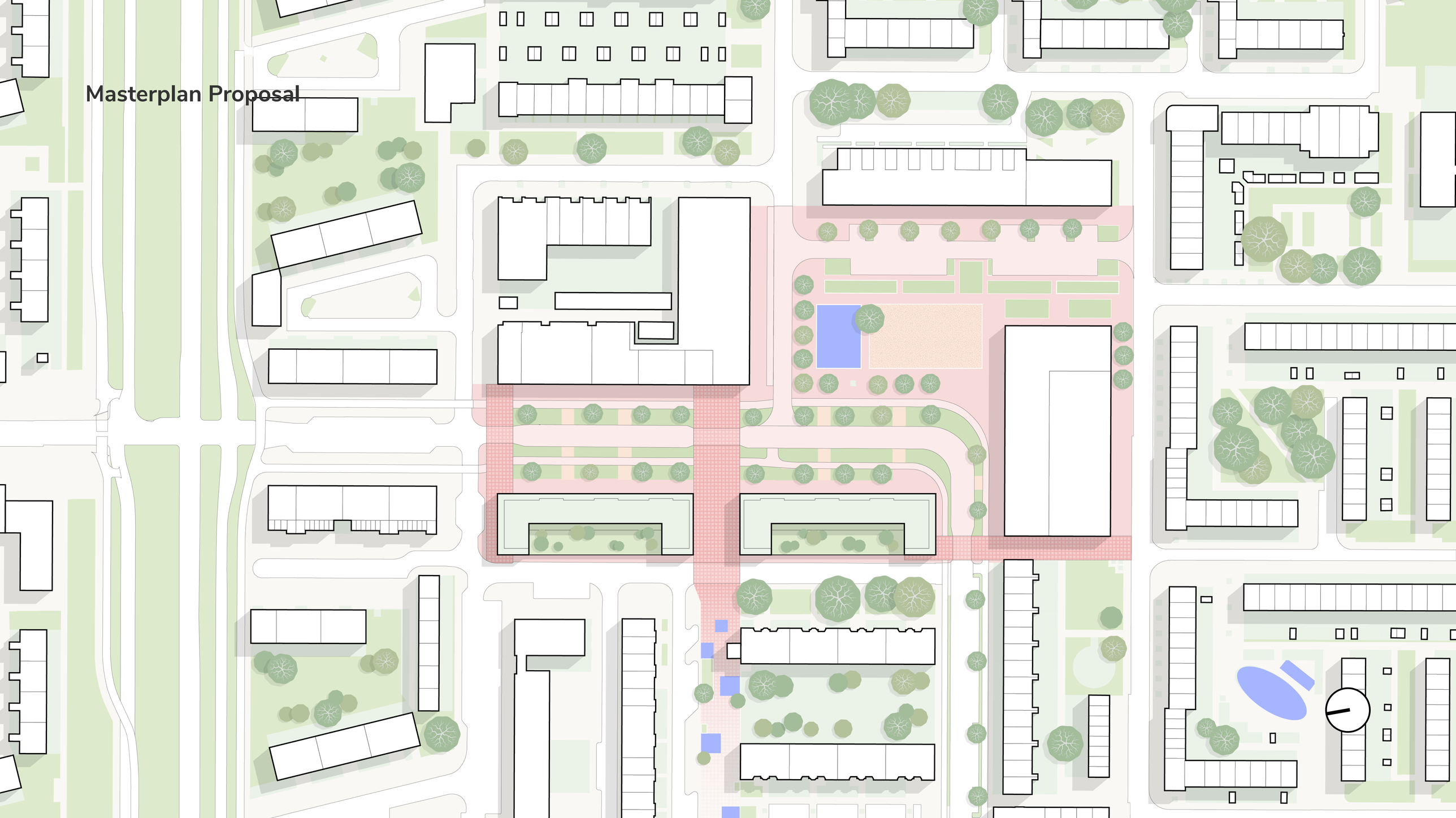


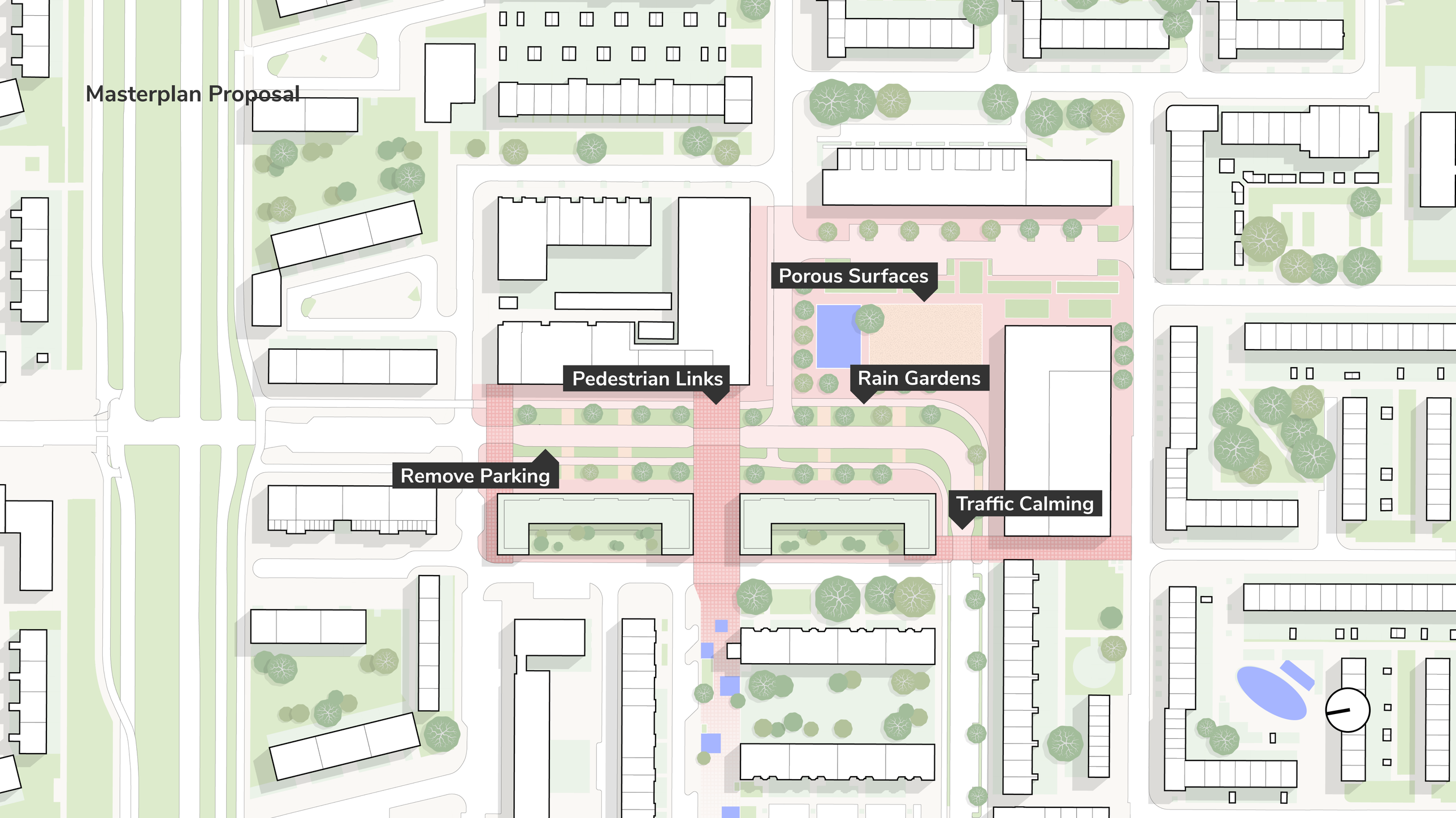
Building Heights

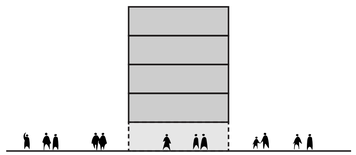
Green Corridors


Existing Site Condition

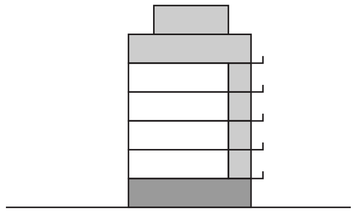
Masterplan Proposal



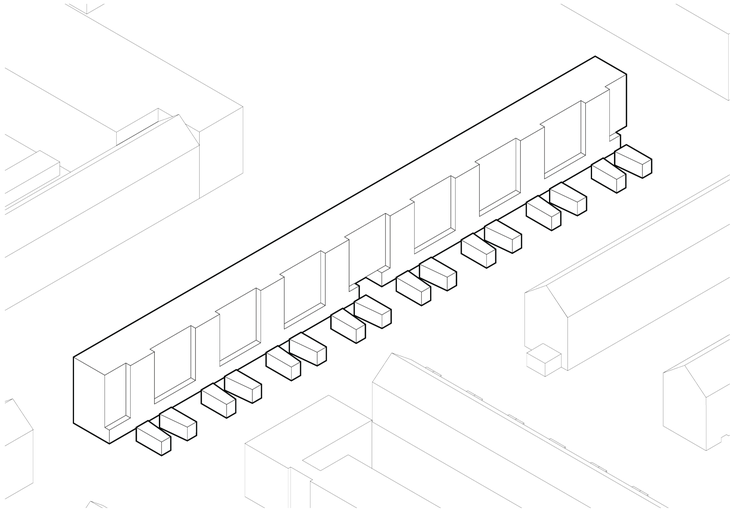

Masterplan Proposal
Porous Surfaces
Rain Gardens
Pedestrian Links
Remove Parking
Traffic Calming



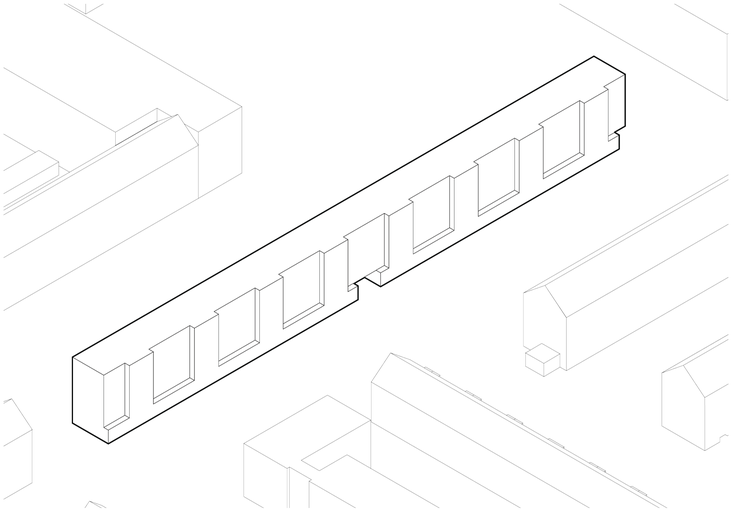
Activate The Plinth



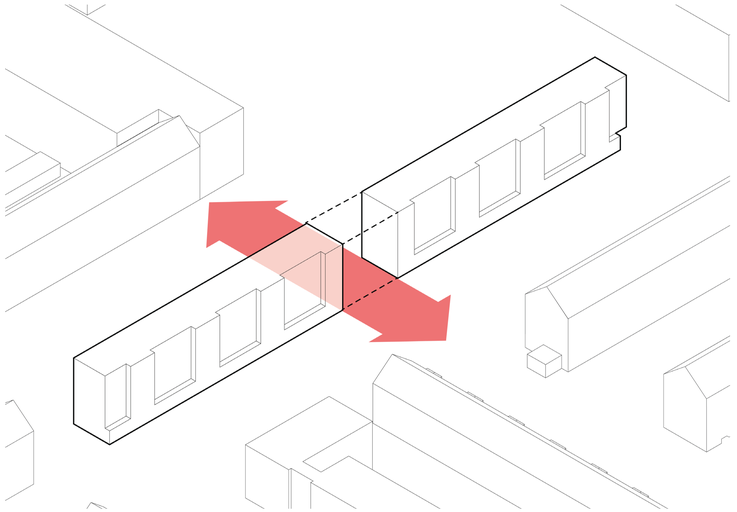
Mixed Use Density



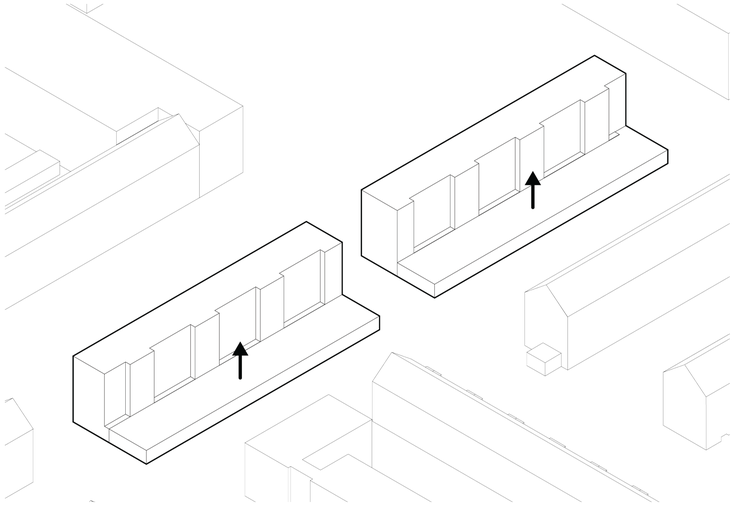
0. Existing Situation



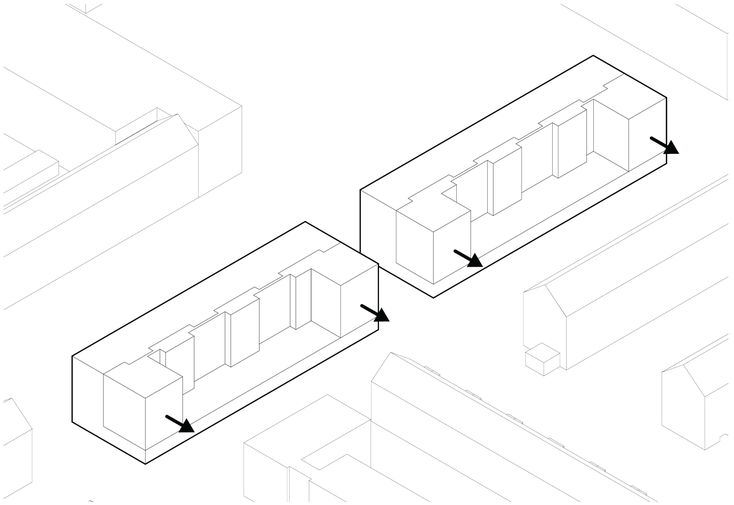
1. Removing Bike Storage



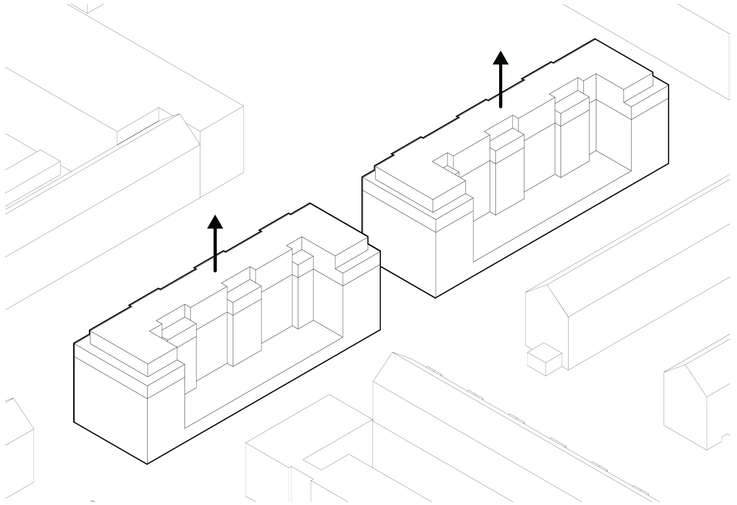
2. Enlarging The Passage



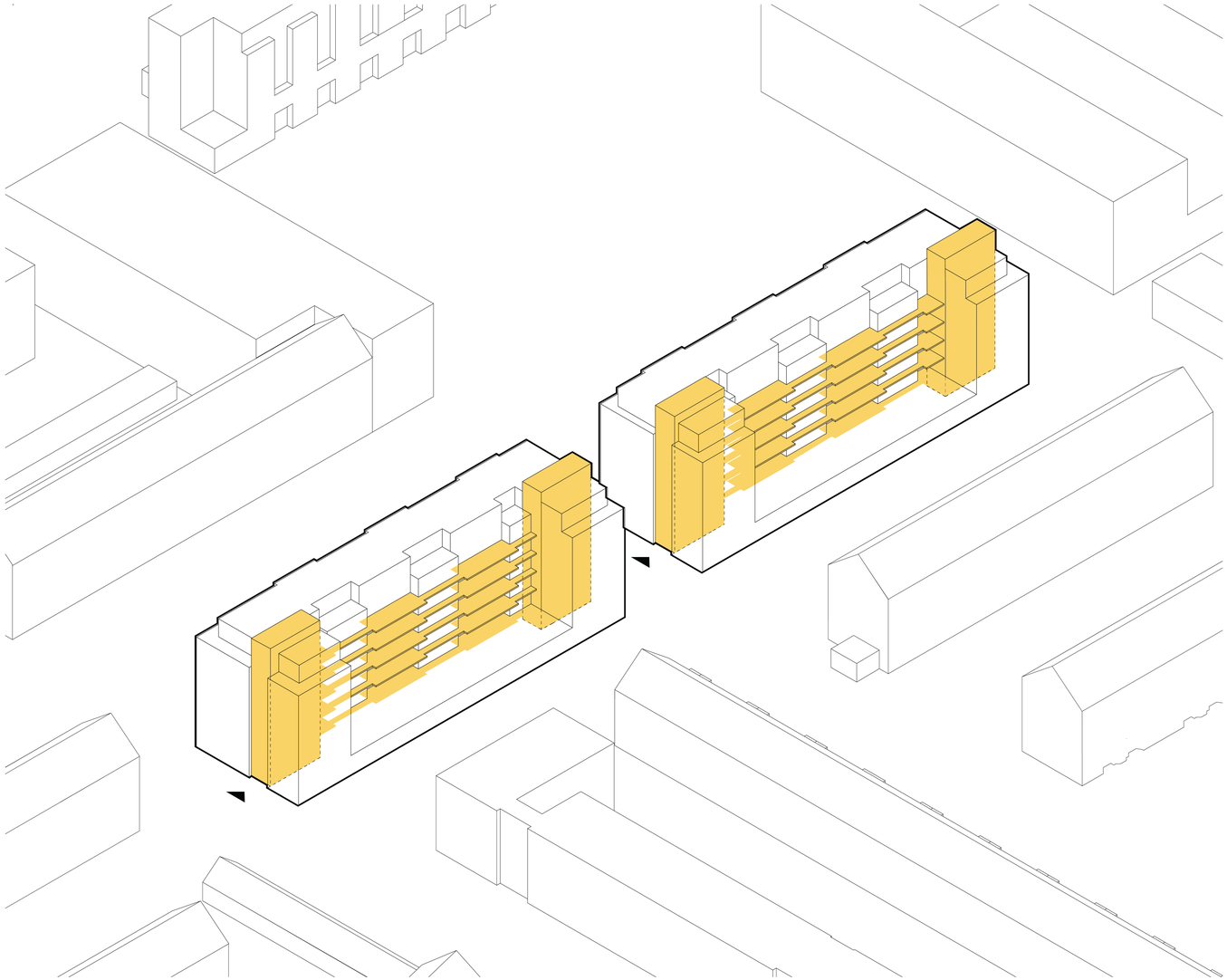
3. Expanding The Plinth



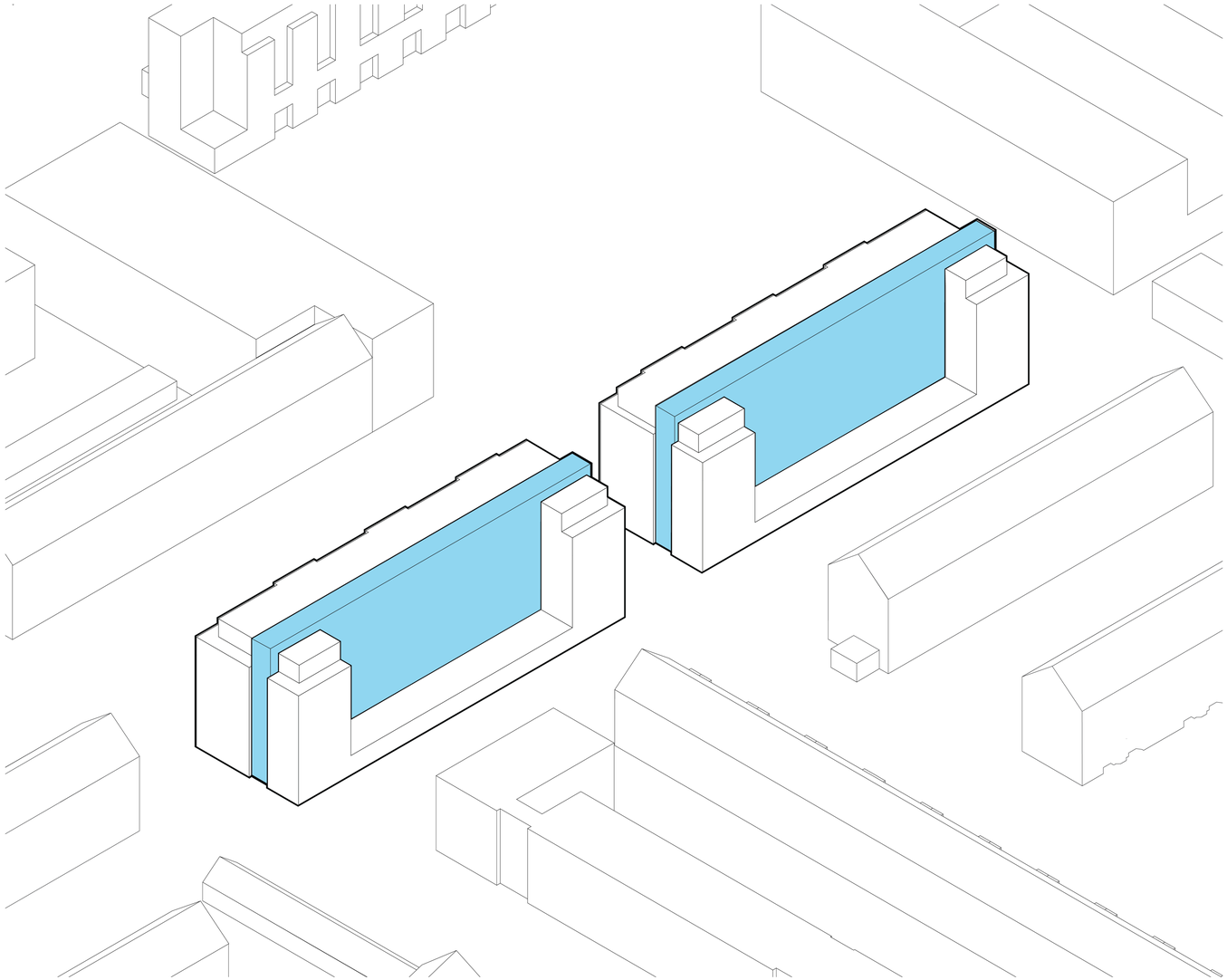
4. Creating a Corner



5. Topping Up

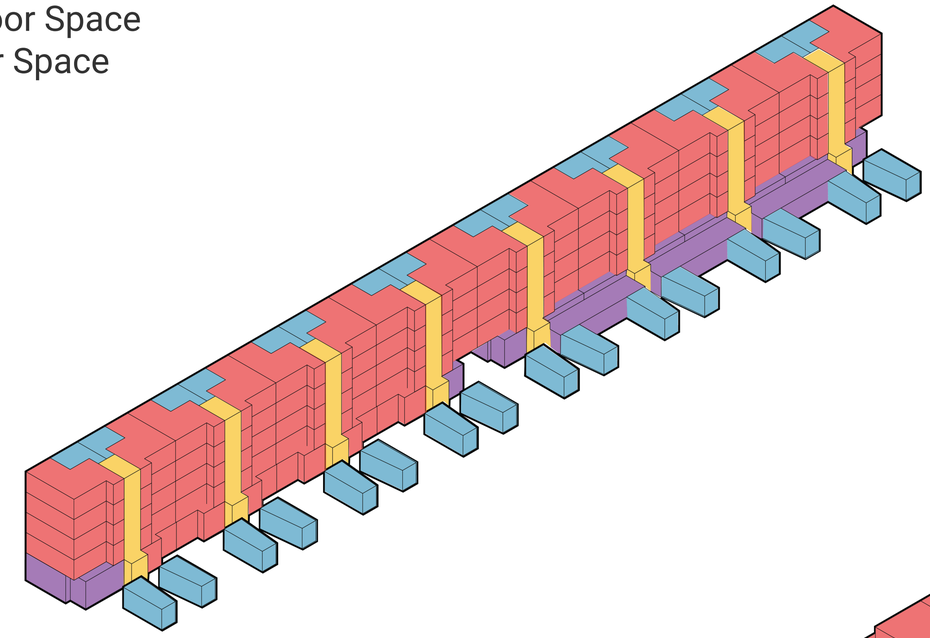


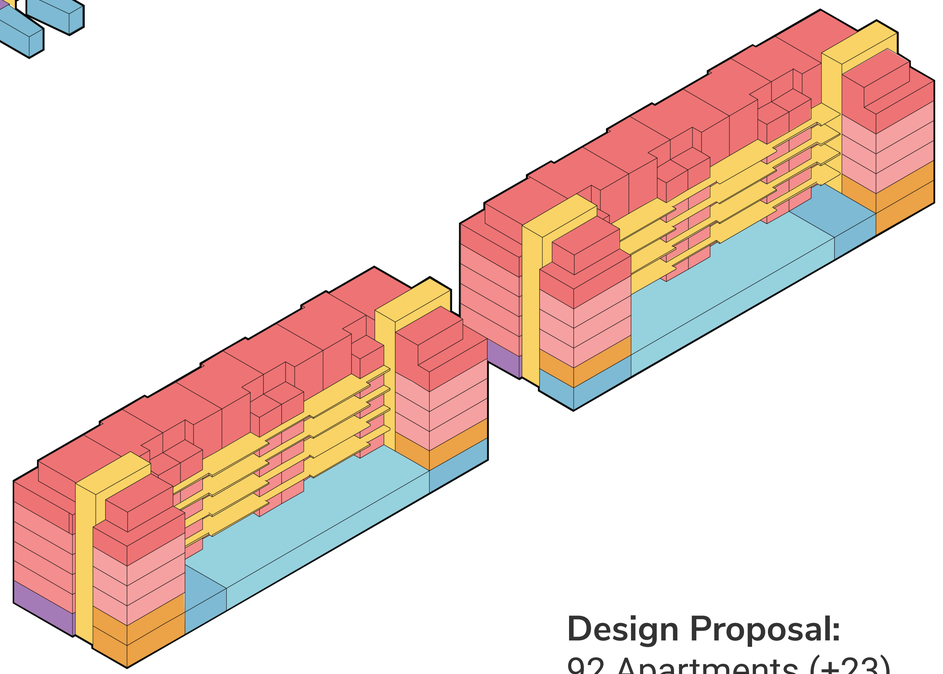
Improving Accessibility



Adding a Second Skin

Existing Situation:
69 Units
59 m^2 Average Floor Space
4139 m^2 Net Floor Space





Residential

Circulation

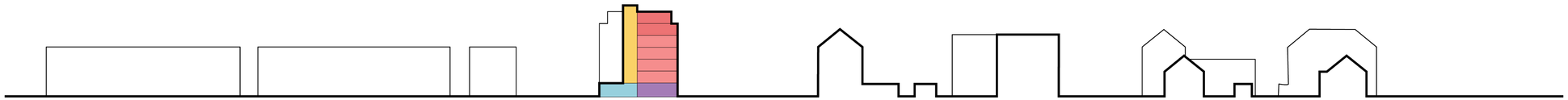
Collective/Communal

Storage/Car/Bike Parking

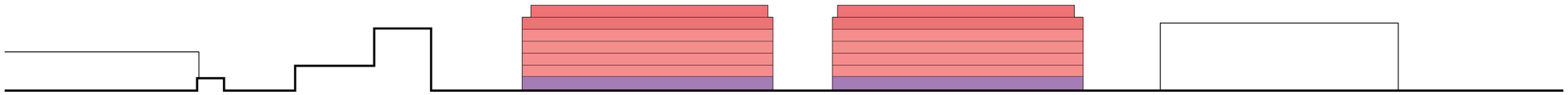
Commerical/Entrepeneurial

Design Proposal:
92 Apartments (+23)
79 m^2 Average Floor Space (+20m^2)
8968 m^2 Net Floor Space (+216%)

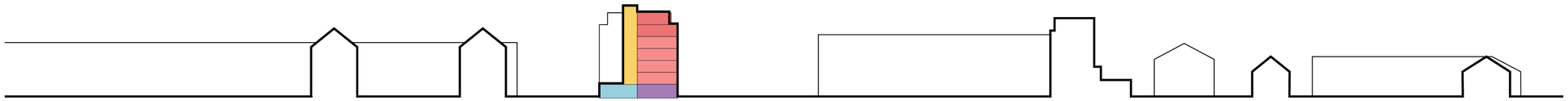
Program



Burgemeester van Leeuwenlaan



Burgemeester van Leeuwenlaan



Confuciusplein

Residential

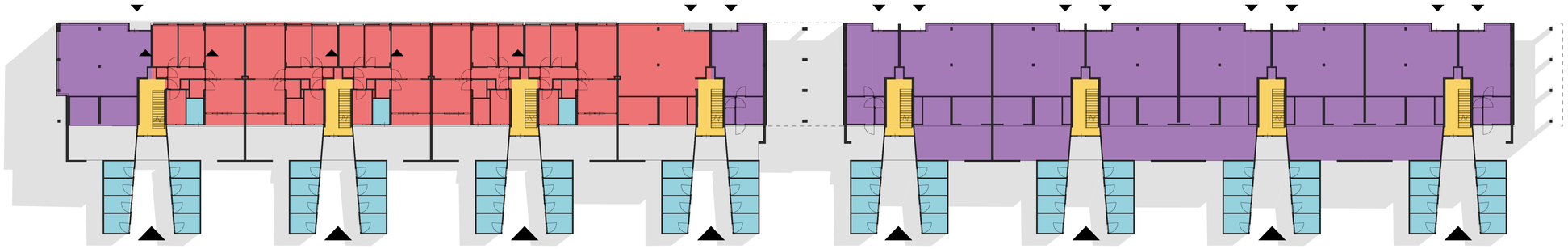
Circulation

Collective/Communal

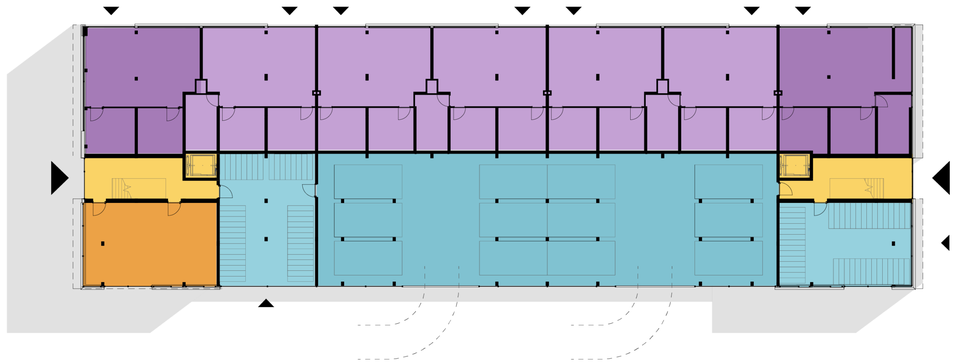
Storage/Car/Bike Parking

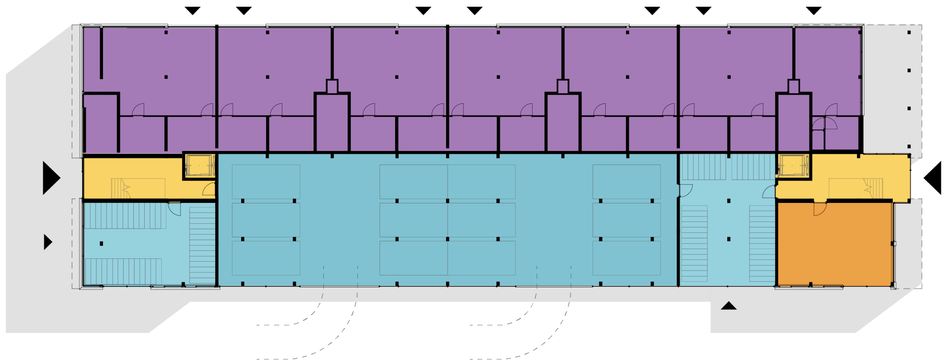
Commerical/Entrepeneurial

Program



Existing





Proposal

Residential

Circulation

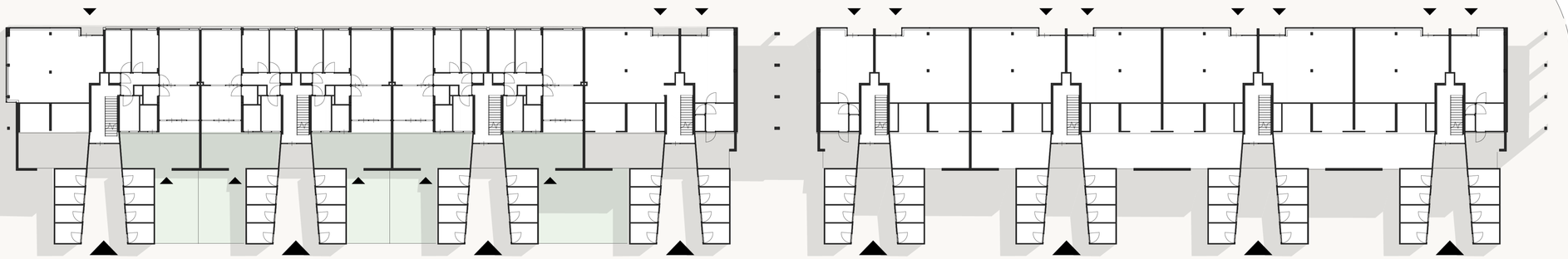
Collective/Communal

Storage/Car/Bike Parking

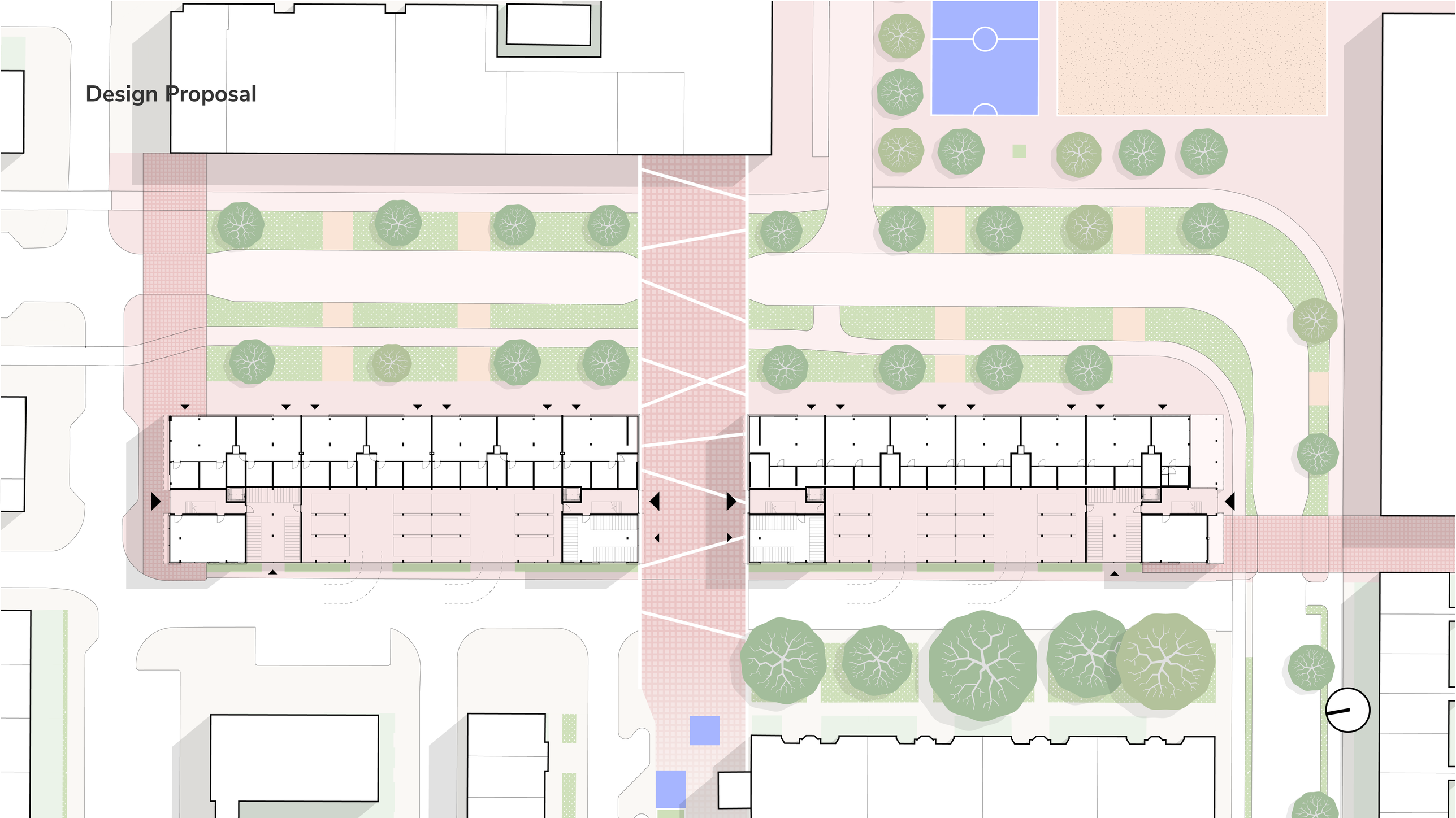
Commerical/Entrepeneurial

Program

Existing Ground Plan



Design Proposal



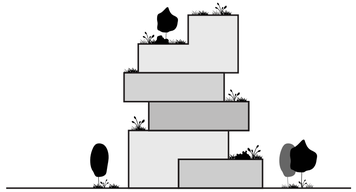

LVIV CROISSANTS

Existing East Elevation

Design Proposal

Existing West Elevation

Design Proposal

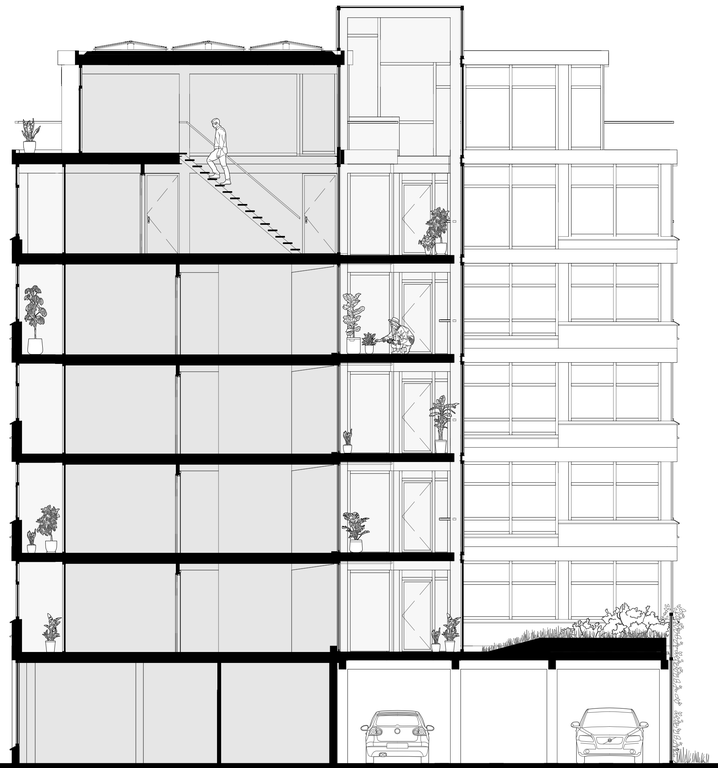


Diversify Typologies

Transition Spaces

Section BB

Existing Situation

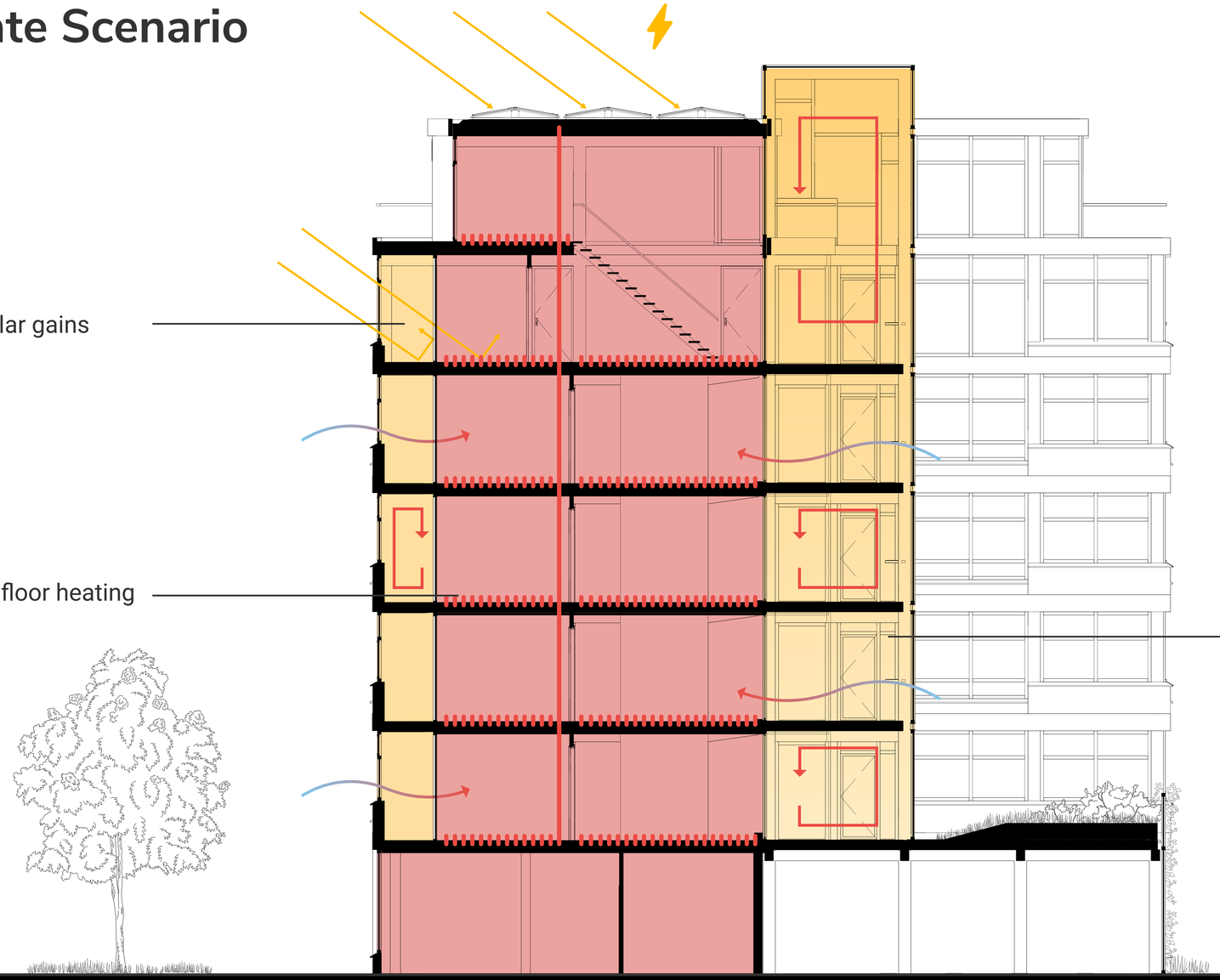


Design Proposal


Collective Living Gallery
Rooftop Maisonette
Glazed Balcony
Collective Roofgarden

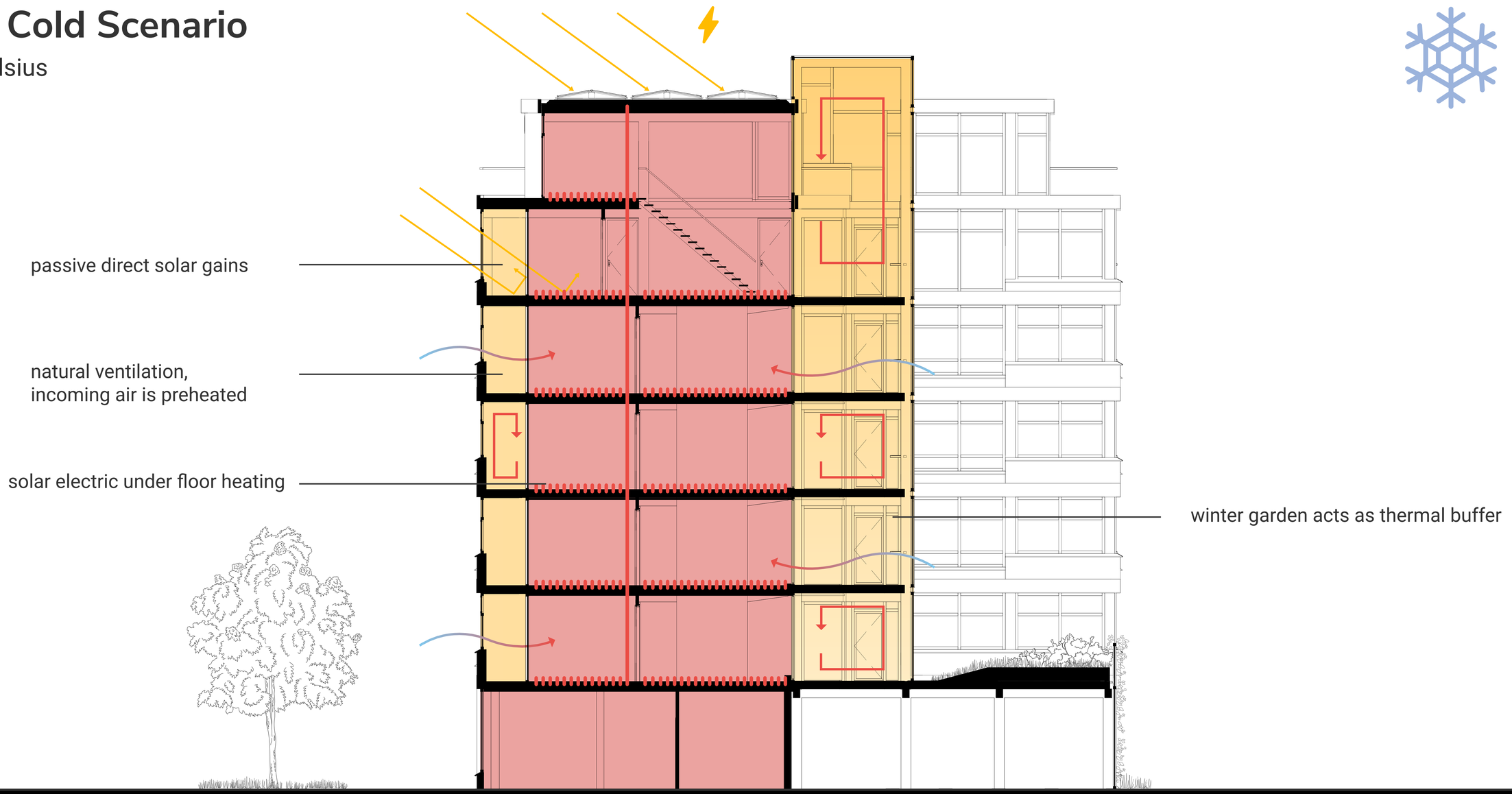
91% Temperate Scenario

0-21 Celsius



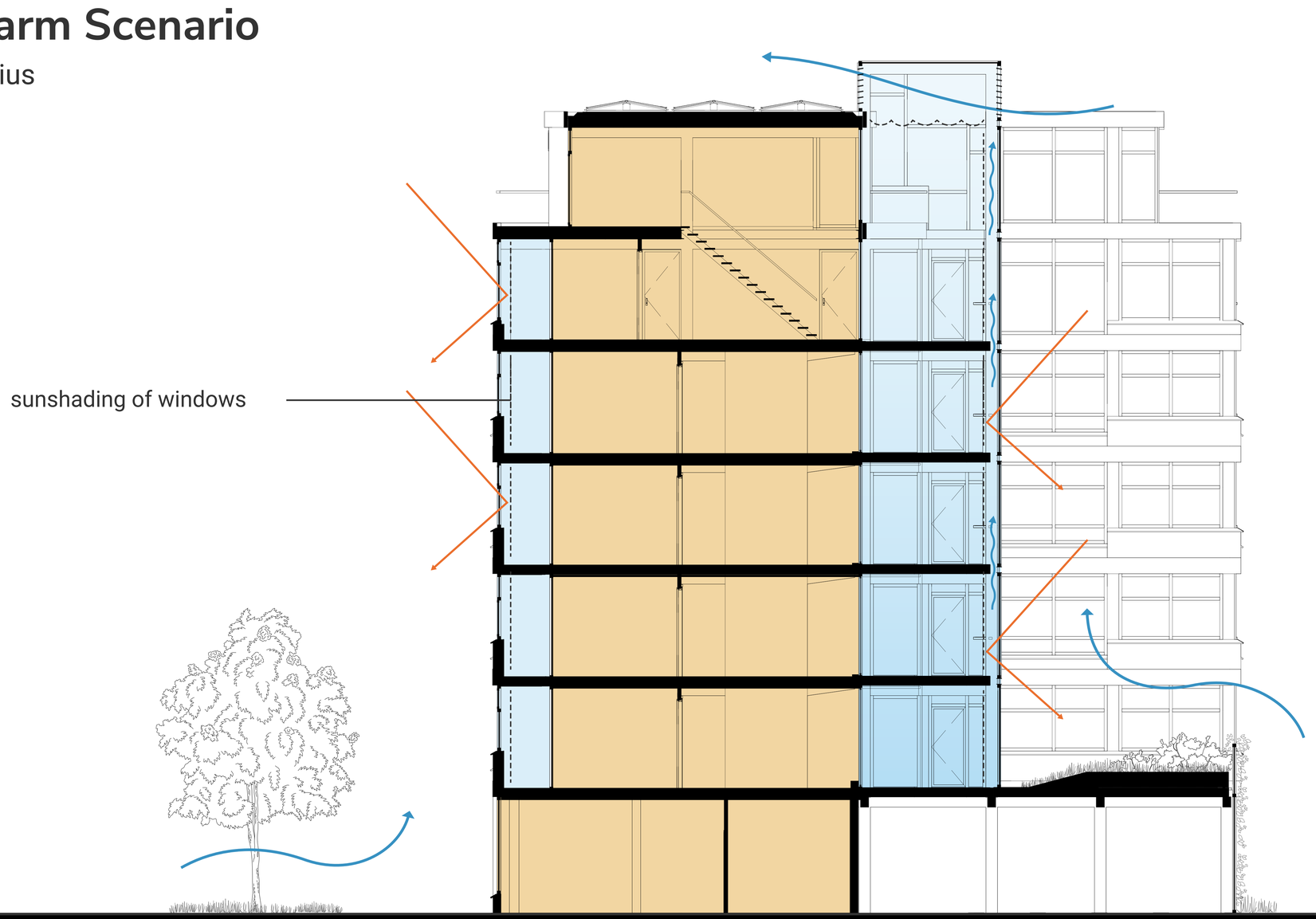
4% Cold Scenario

<0 Celsius



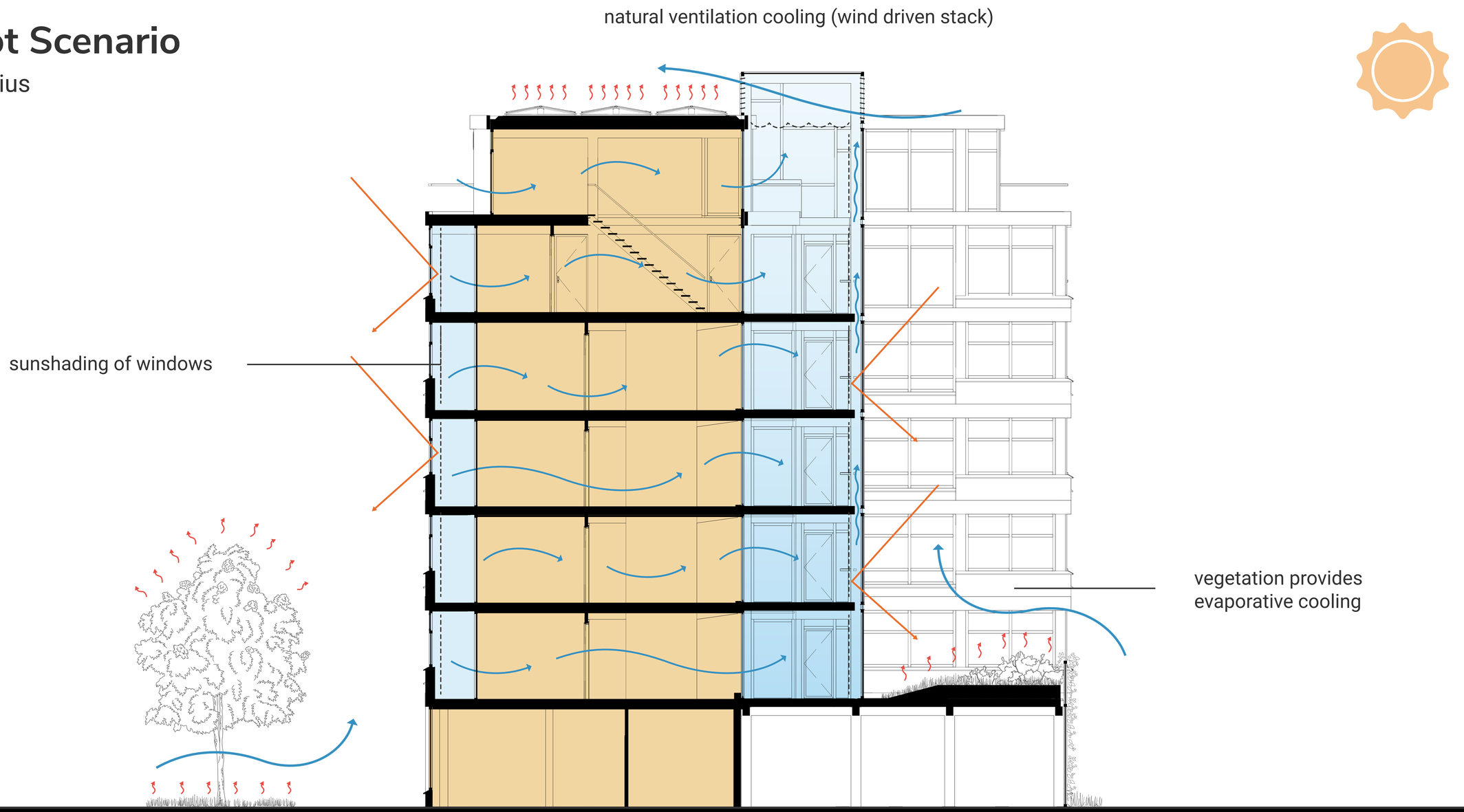
4% Warm Scenario

21-27 Celcius



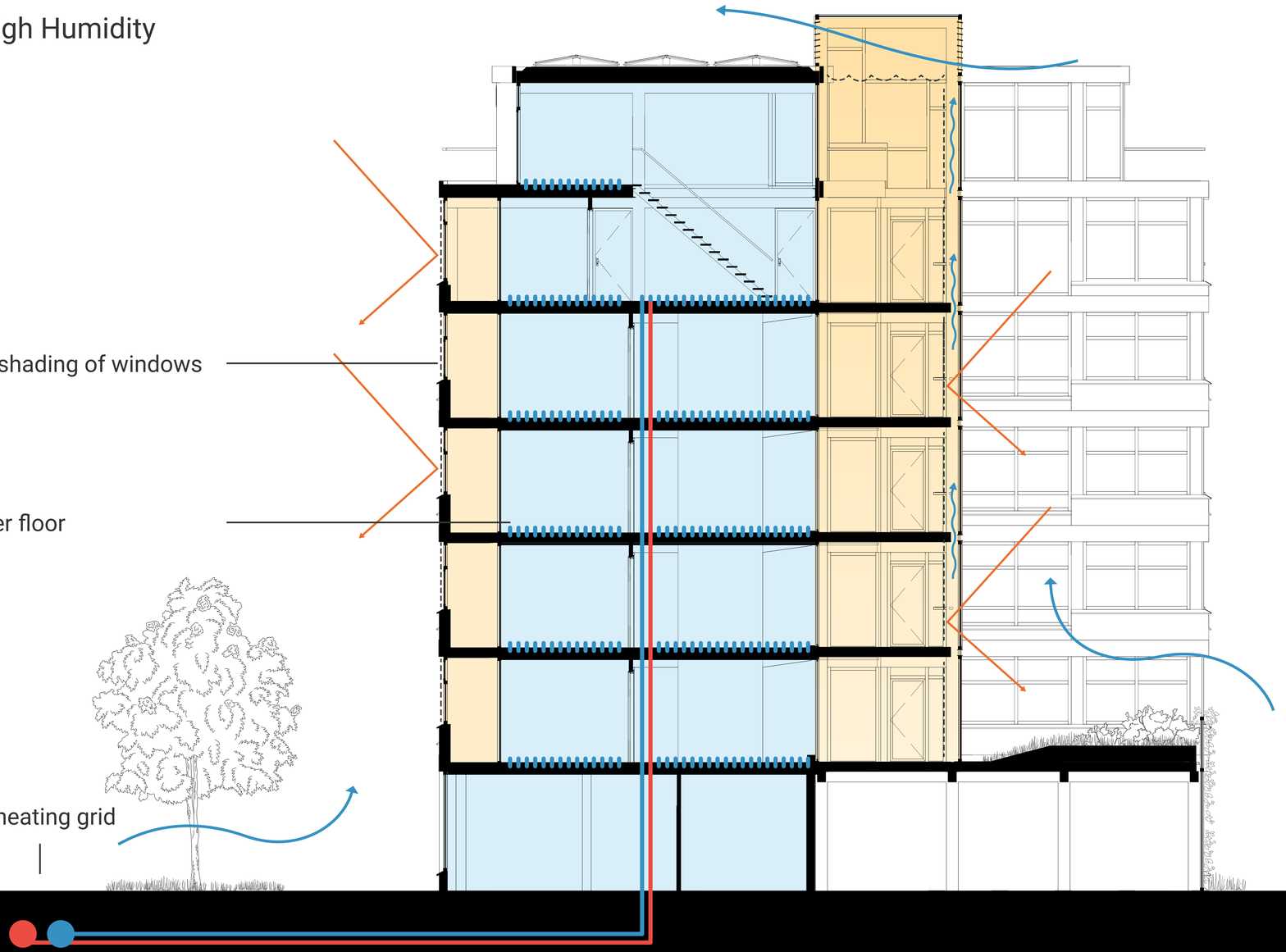
1% Hot Scenario

27-38 Celcius



Future Extreme Heat Scenario

>38 Celcius + High Humidity



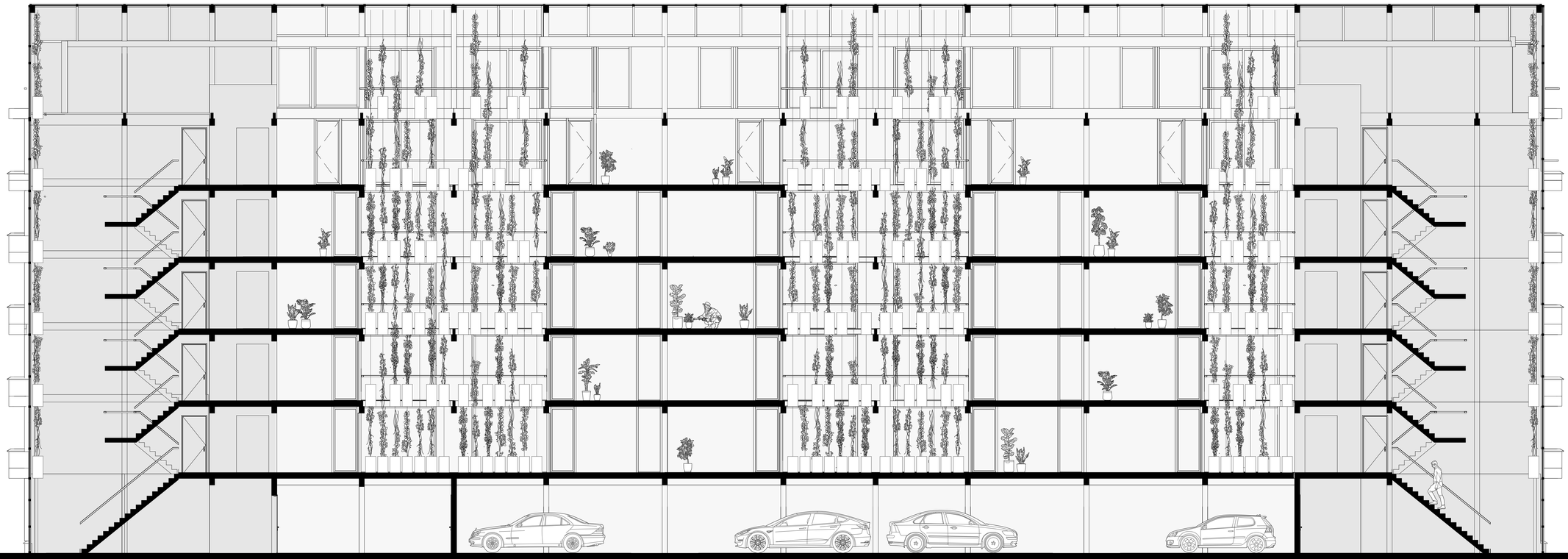
Rain & Flood Proof

20 cm depth after 120mm of rain
over 2 hours (Gemeente Amsterdam)
0,5 m flooding: 1:100.000 years (UWO)

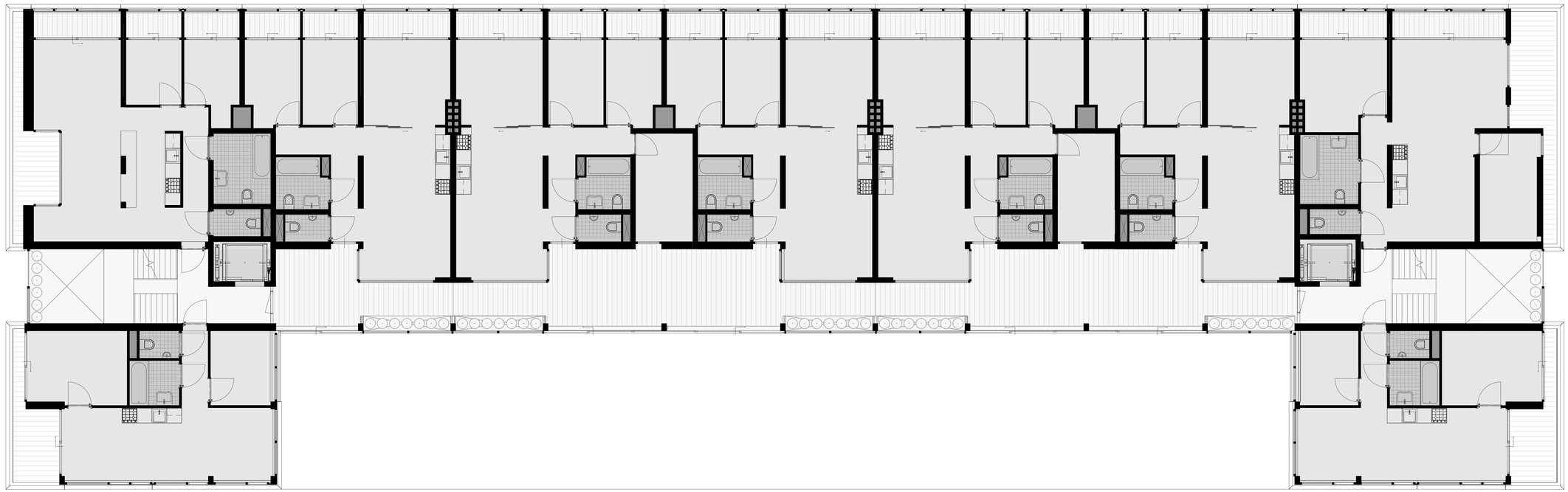
Flood Prevention

Network of greenroofs & planters
prevent excessive run-off

Section AA

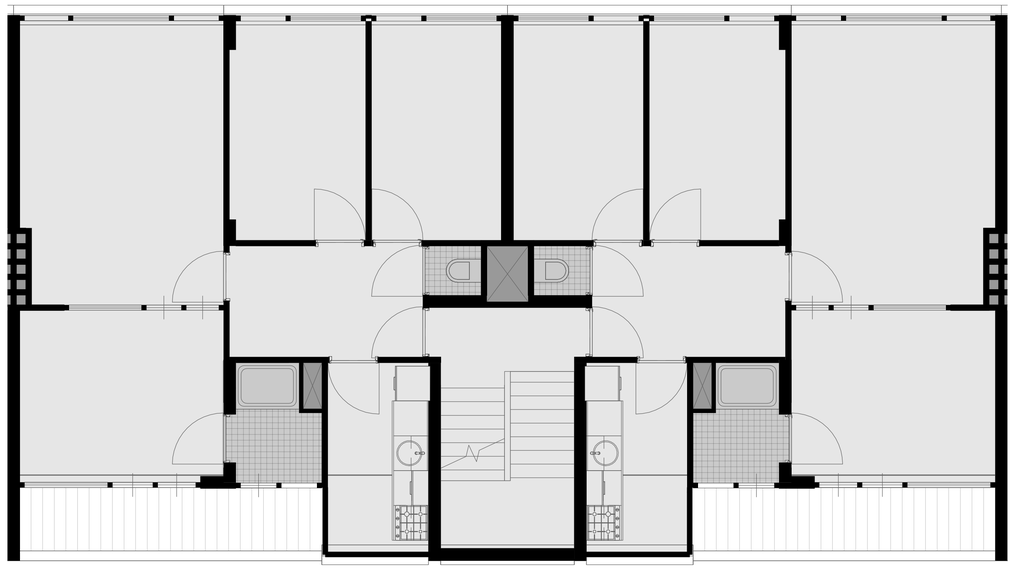


C1 A2 A1 A2 A1 A2 C2



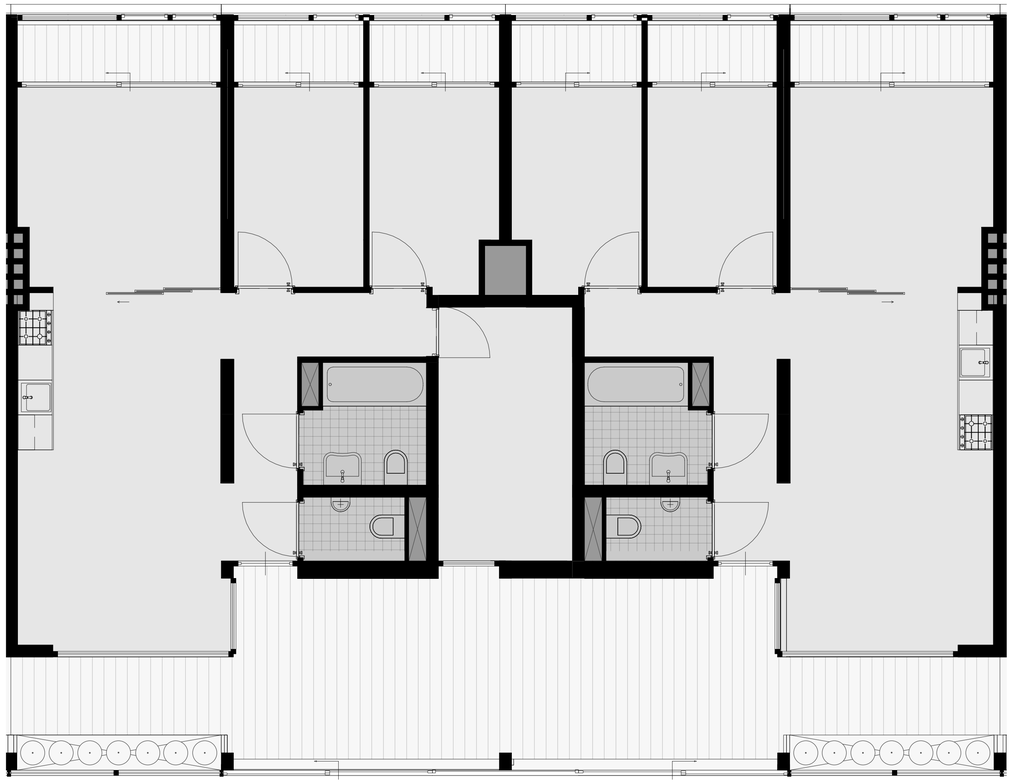
B1 B2

Floor Plan Second Floor



Floor Space: 64m^2
Outdoor Space: 5,4m^2

Existing Situation



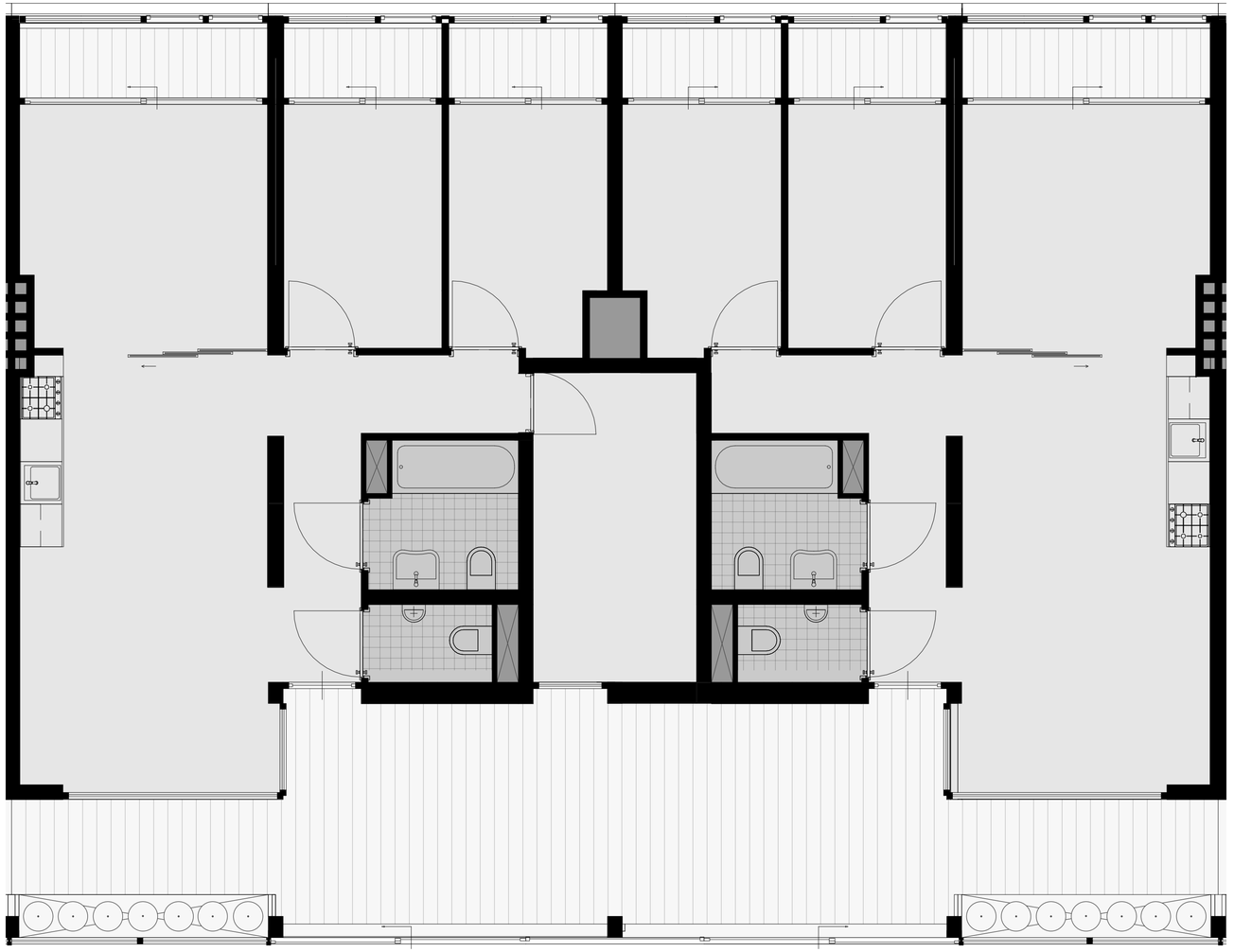
Floor Space: 67/78m^2
Winter Garden Private: 8,5m^2
Winter Garden: 17m^2

Design Proposal

Existing Situation

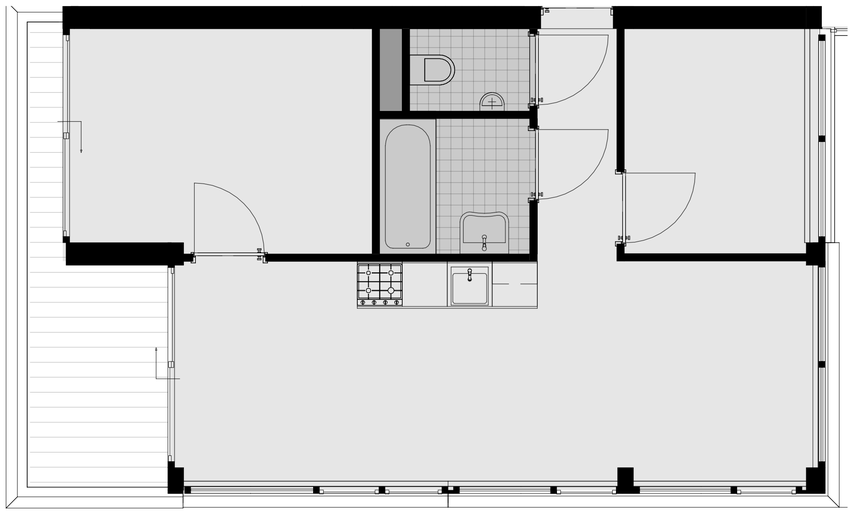
Design Proposal

Floor Space: 78m²
Winter Garden Private: 8,5m²
Winter Garden: 17m²



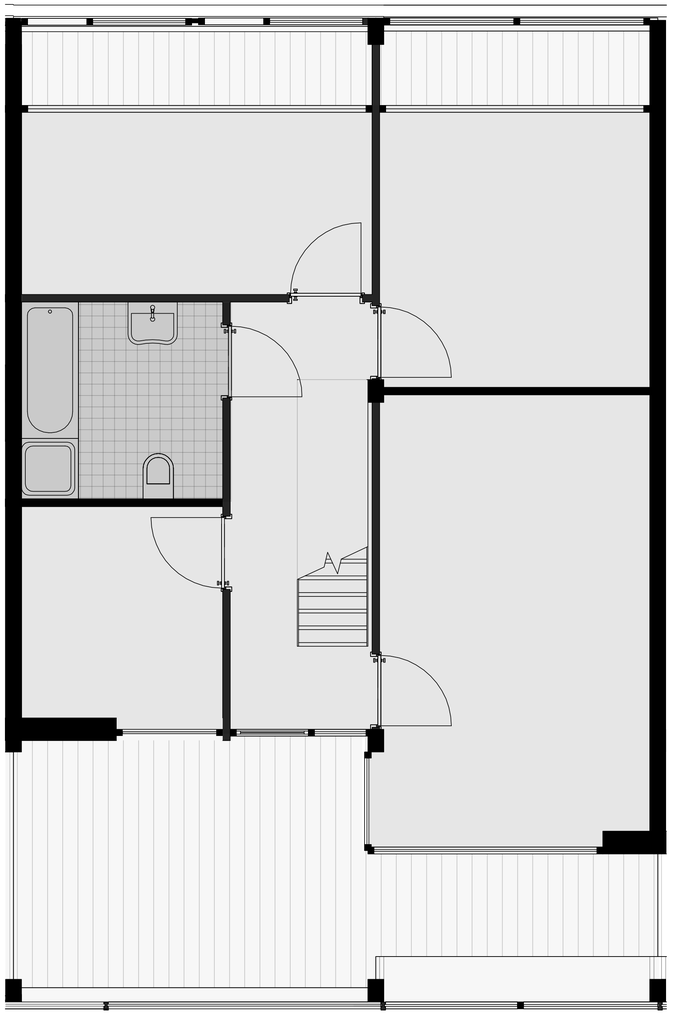
Floor Space: 67m²
Winter Garden Private: 8,5m²
Winter Garden: 17m²

Type A1 & A2

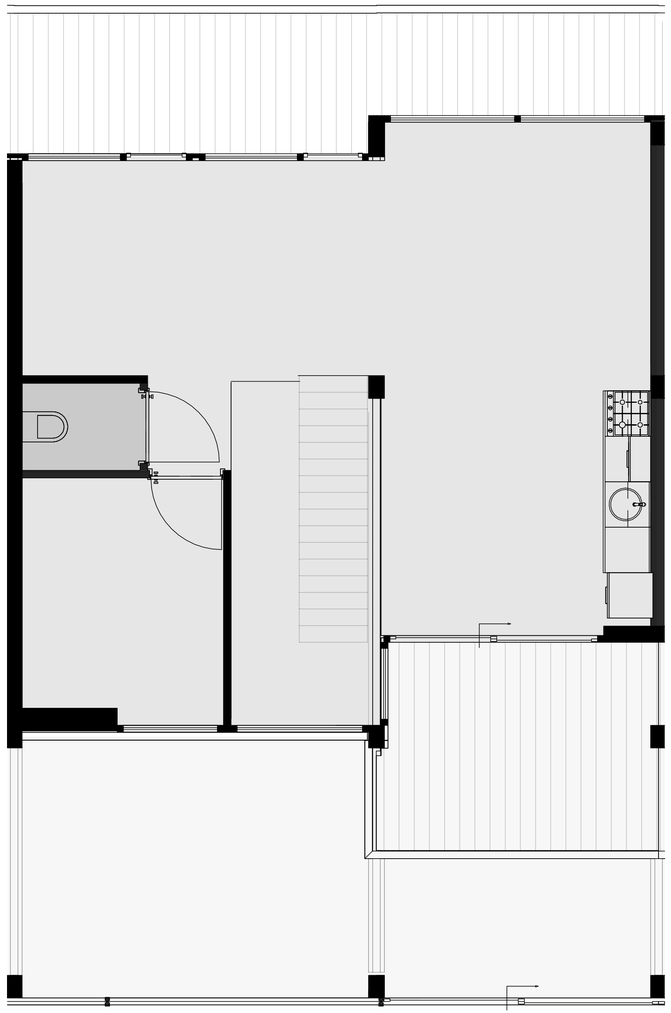


Floor Space: 57m^2
Balcony: 7m^2

Type B1



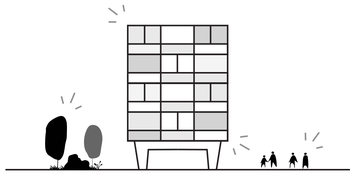
Level 01



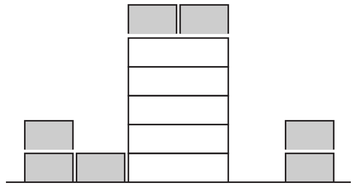
Level 02

Floor Space: 136m²
Winter Garden Private: 18,5m²
Winter Garden: 17m²
Terrace 14m²

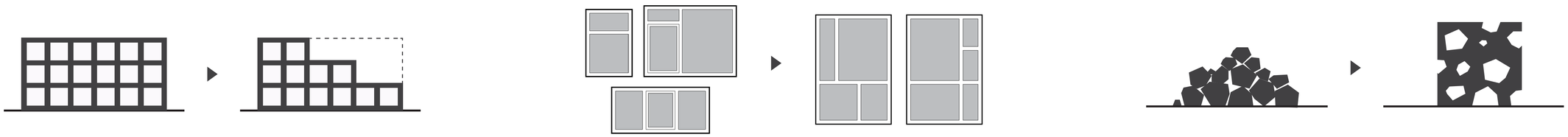
Roof Top Maisonette



Use Existing Resources



Design for Re-Use

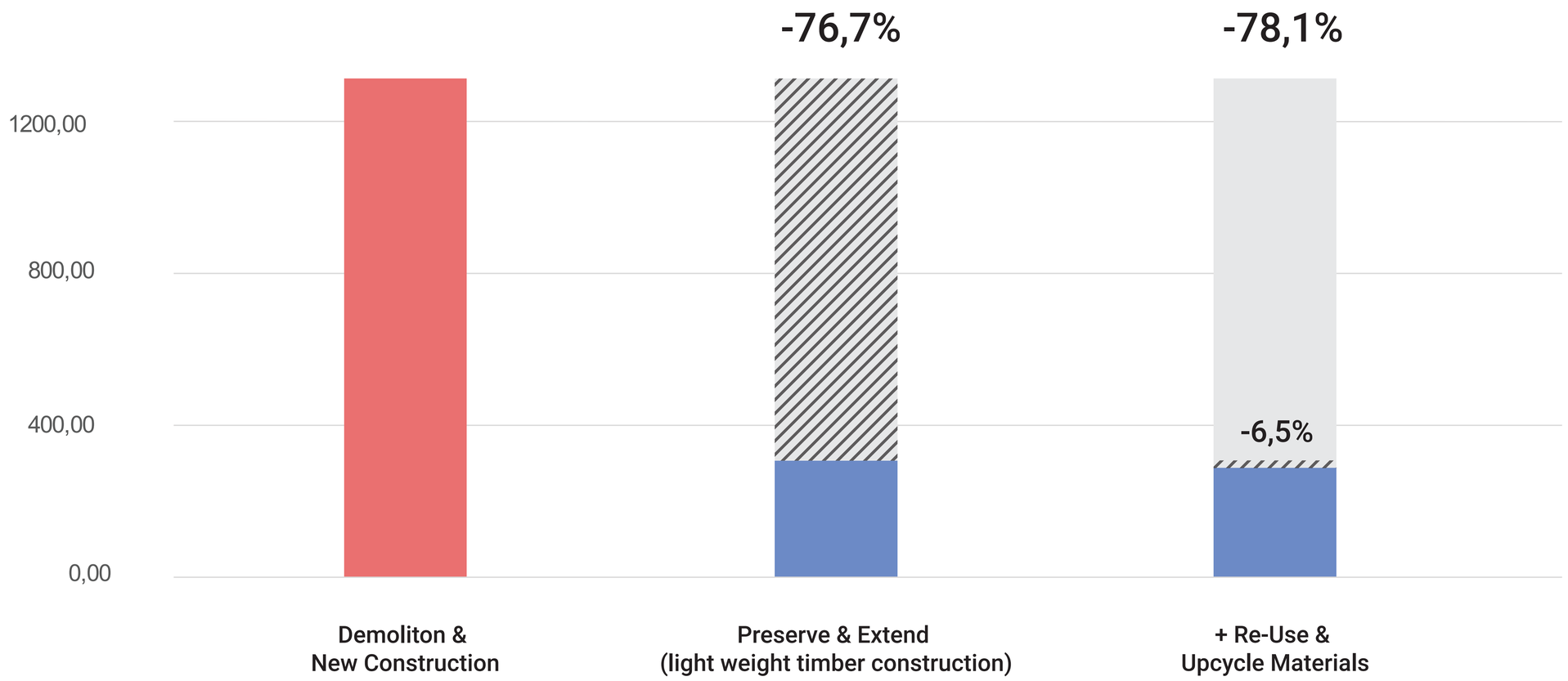


Preserve **Re-Use** **Upcycle**

High ← Potential Savings → **Low**

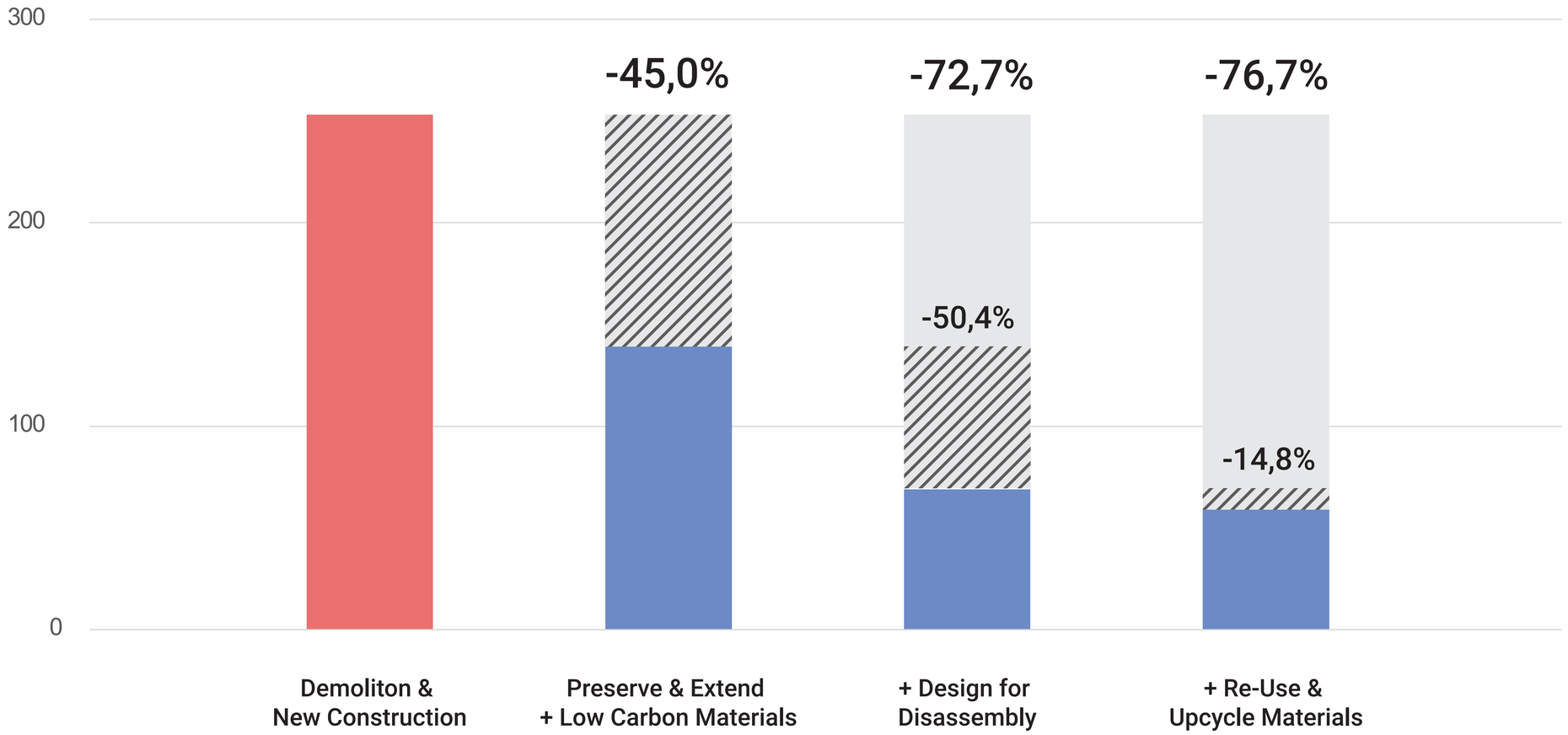
Material Consumption kg / m²

*bench mark case based on data from ‘Woningbouw binnen planetaire grenzen’ (Bosch et al. 2023)

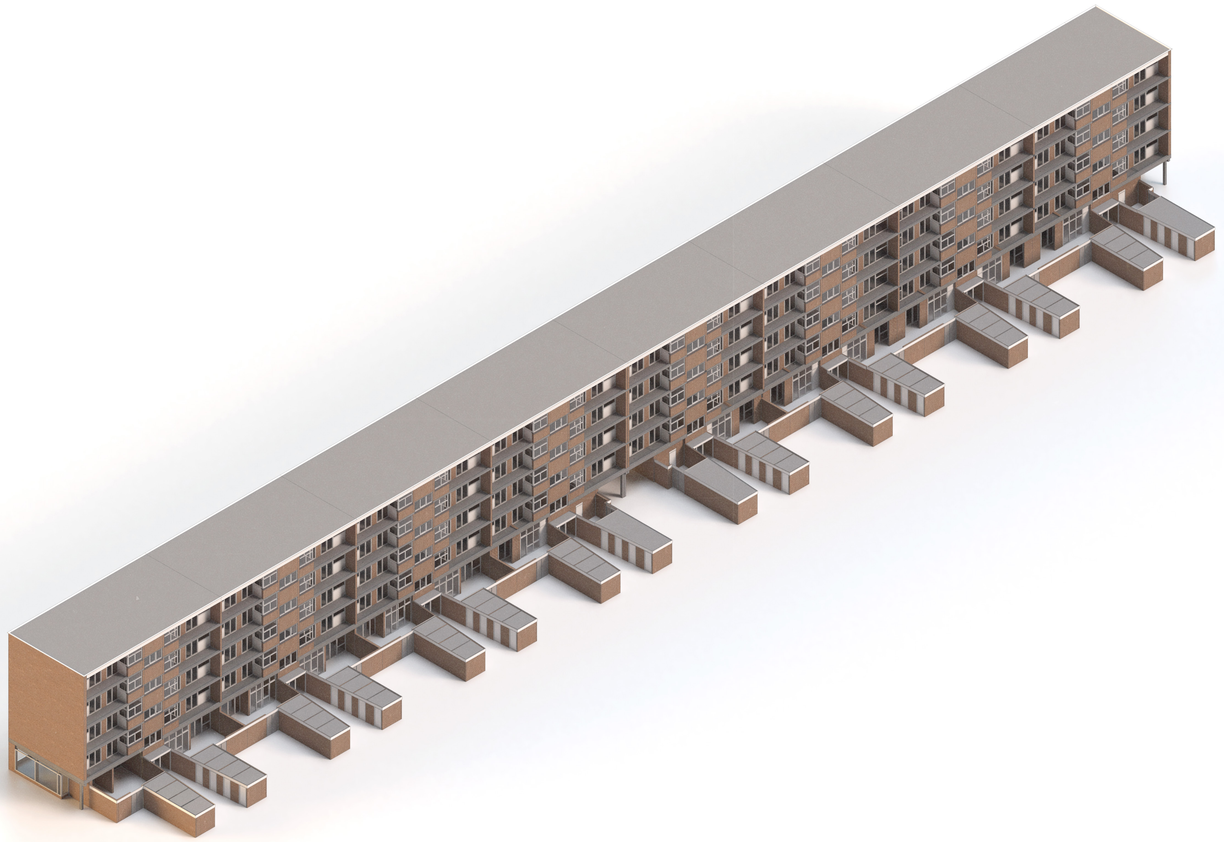


Carbon Footprint (Excluding Use Stage) kg CO_2 eq / m^2

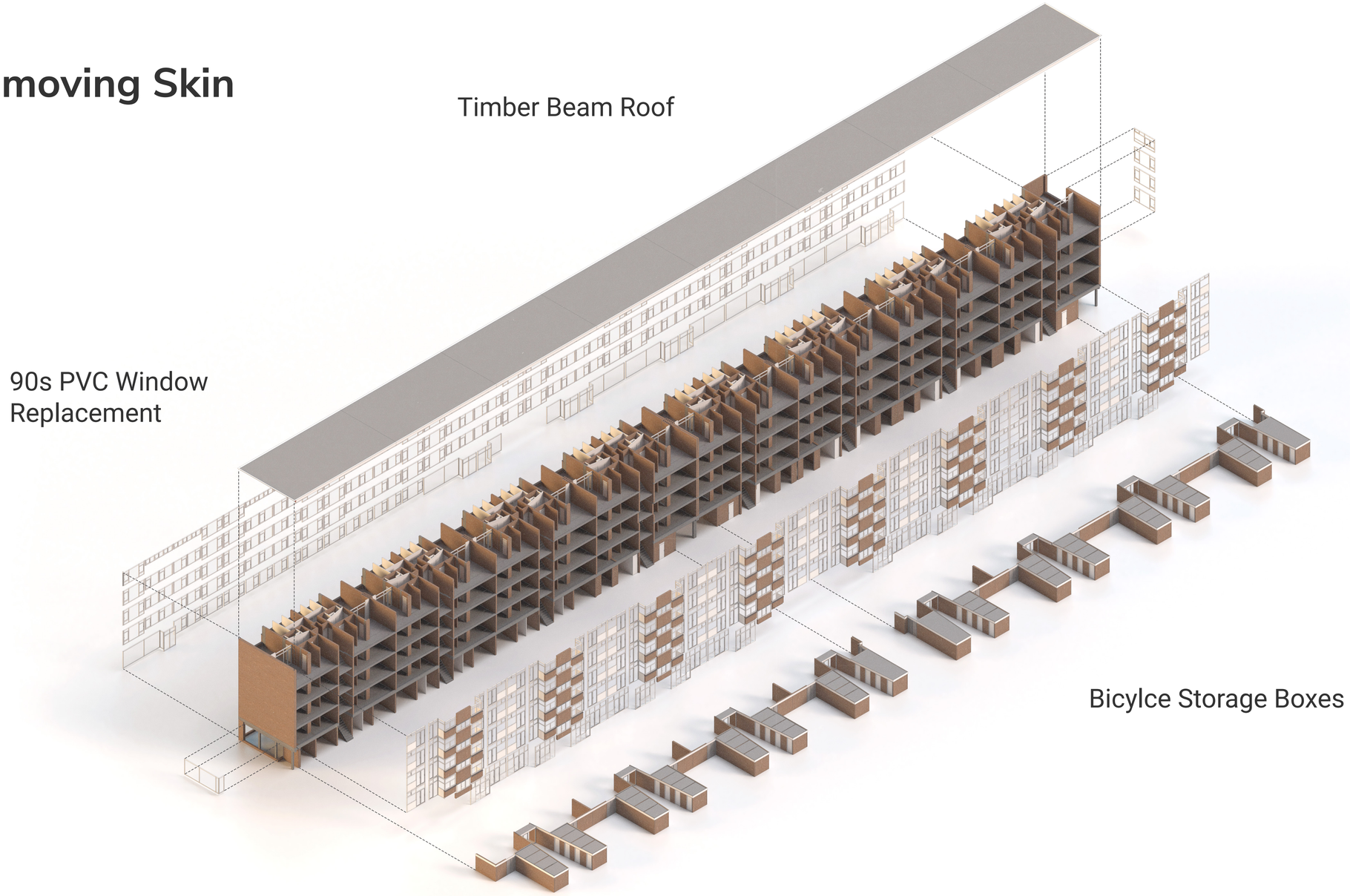
*bench mark case based on data from ‘Woningbouw binnen planetaire grenzen’ (Bosch et al. 2023)



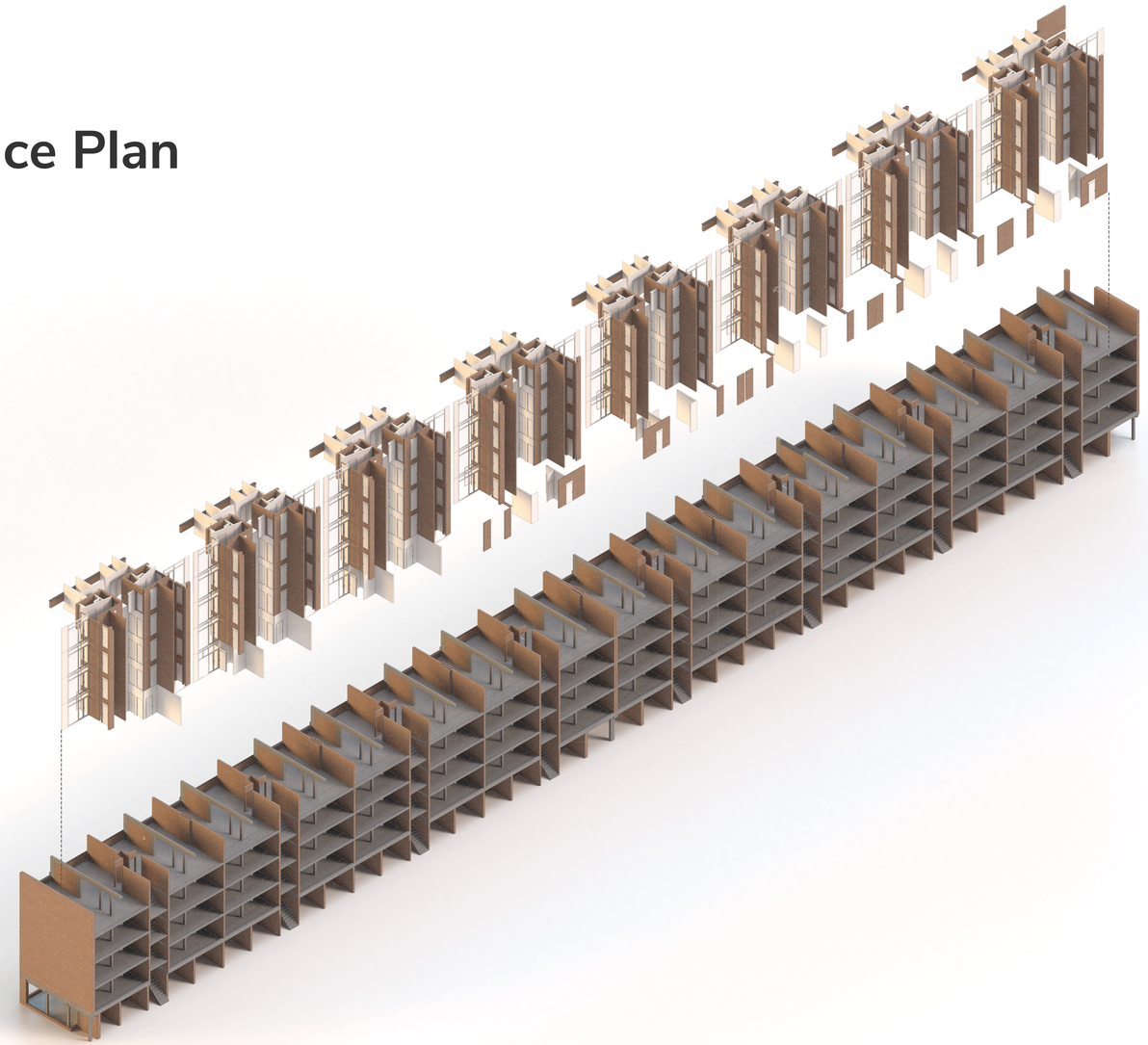
0. Existing Situation



1. Removing Skin

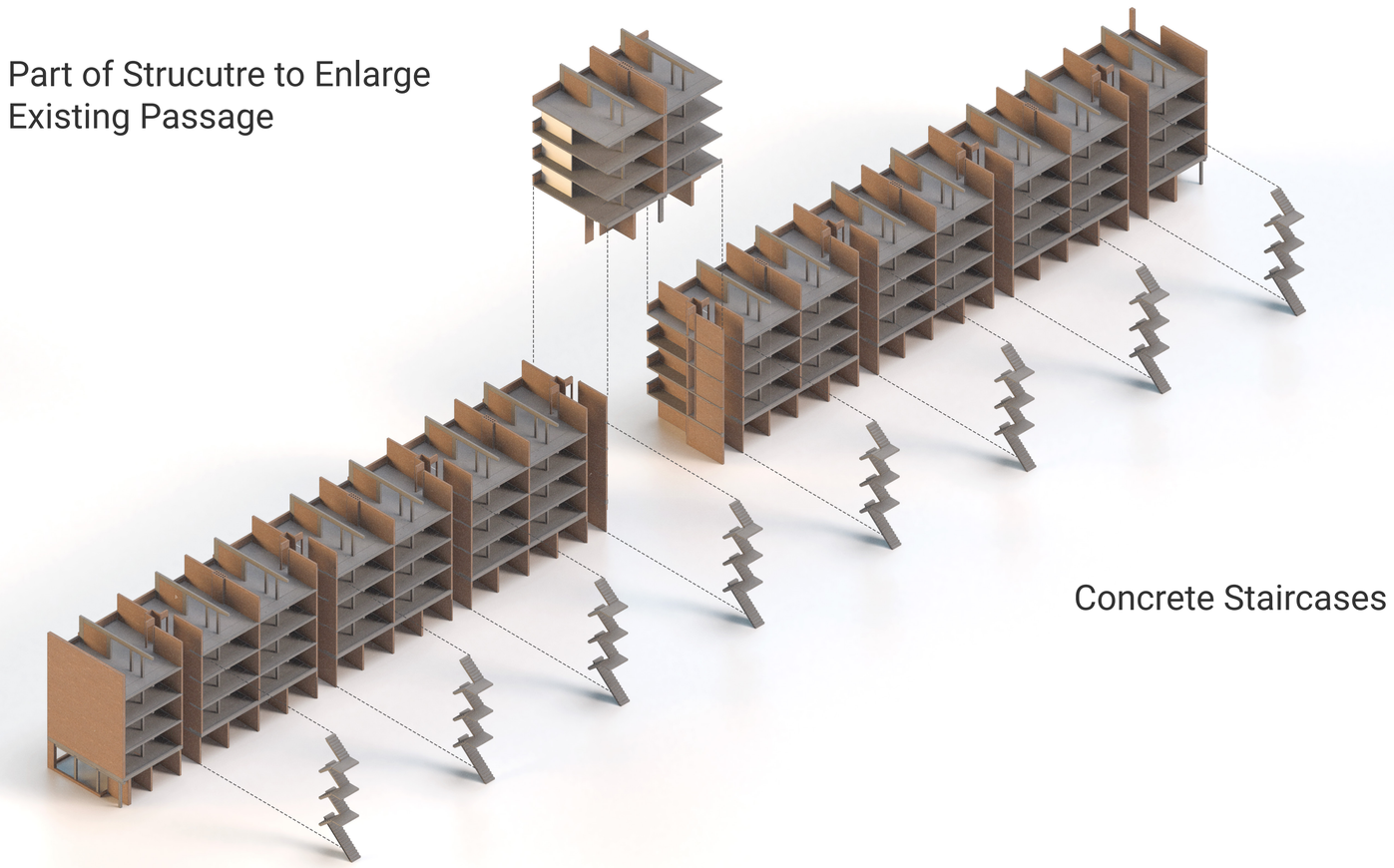


2. Removing Space Plan



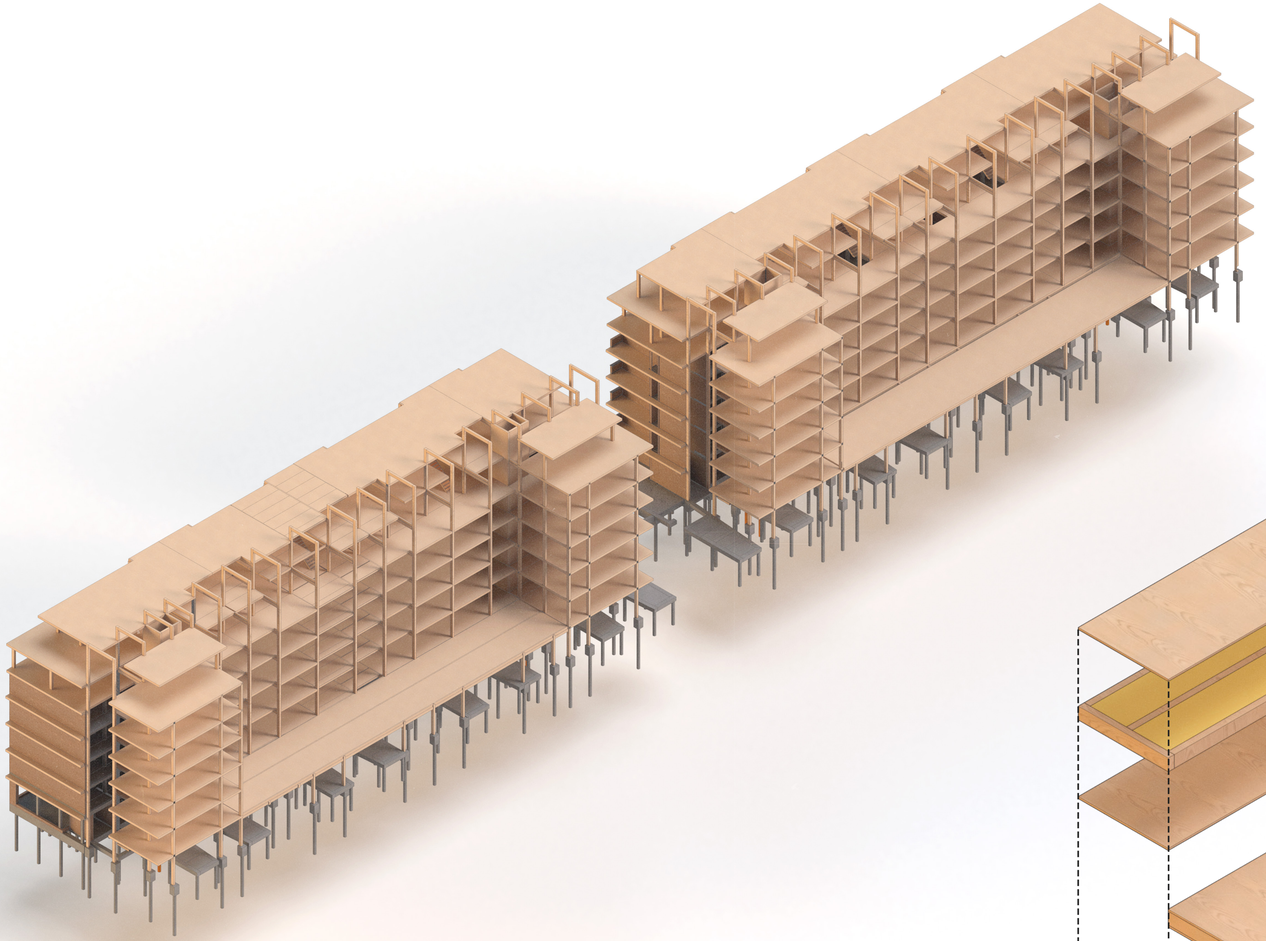
Portion of Space Plan Incl. Bathroom,
Kitchen and Attic Storage Rooms

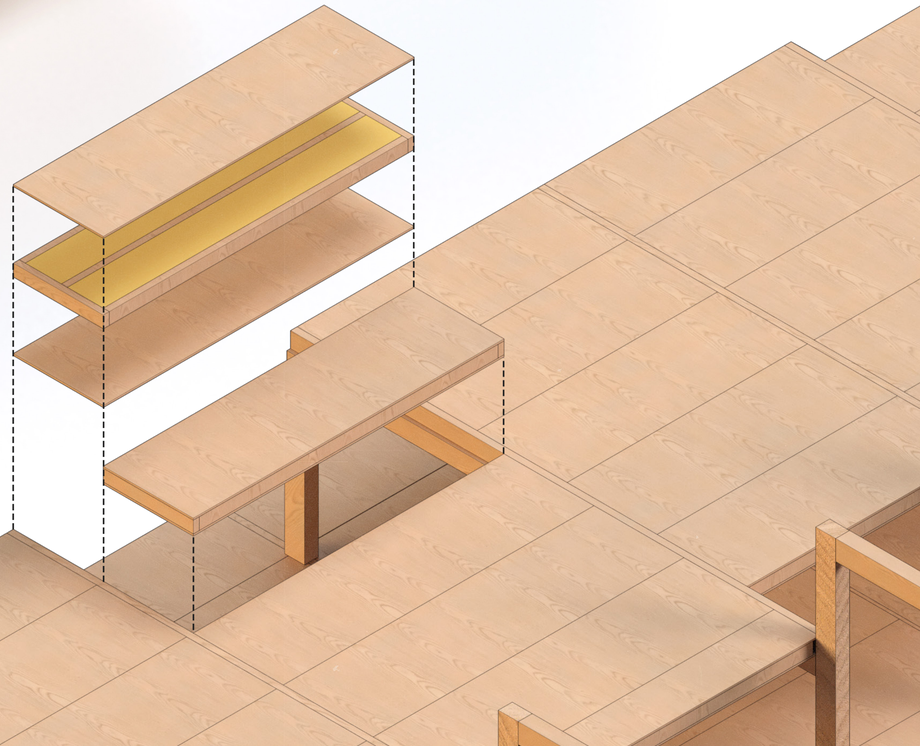
3. Removing Structure



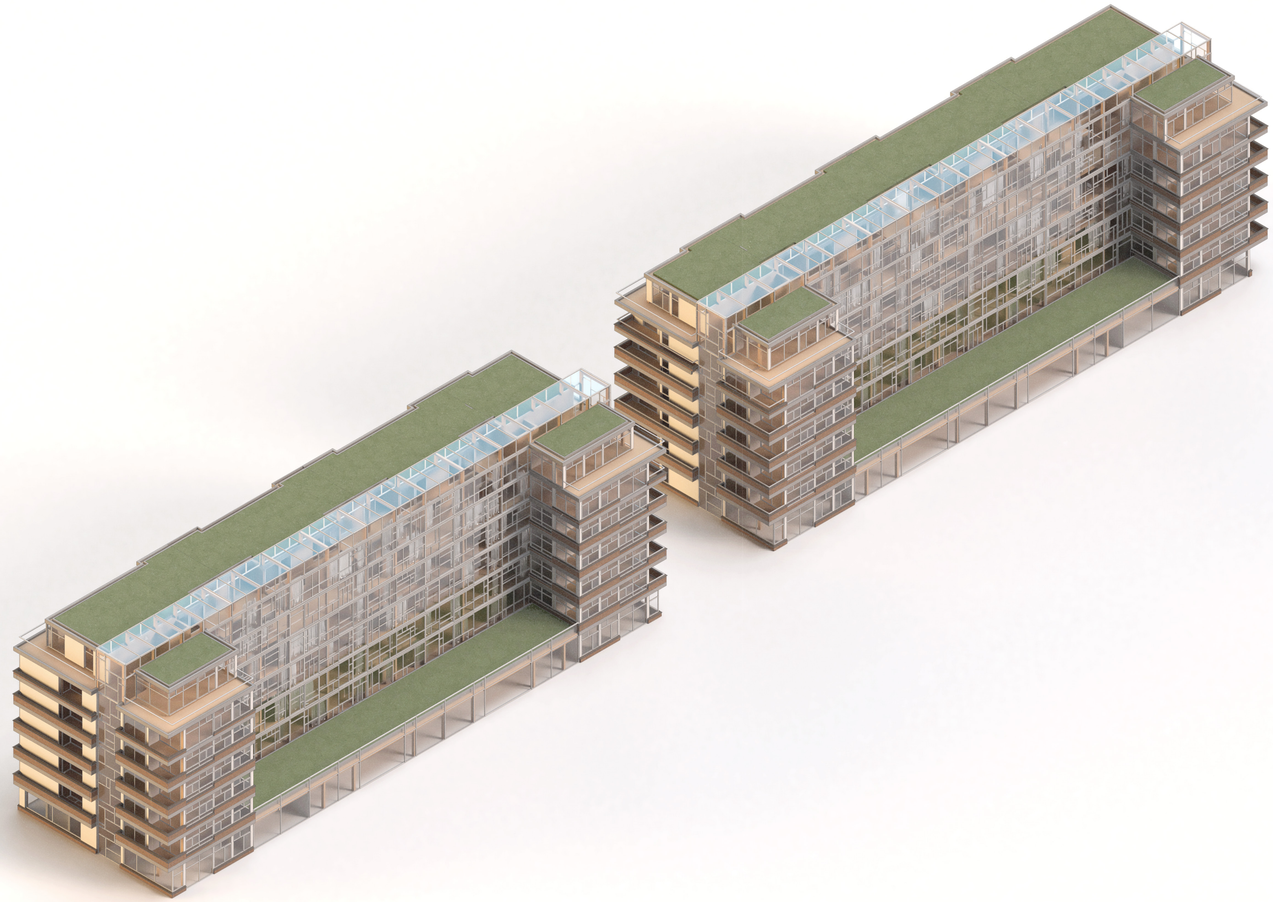
4. Adding Timber Structure

4. Adding Timber Structure

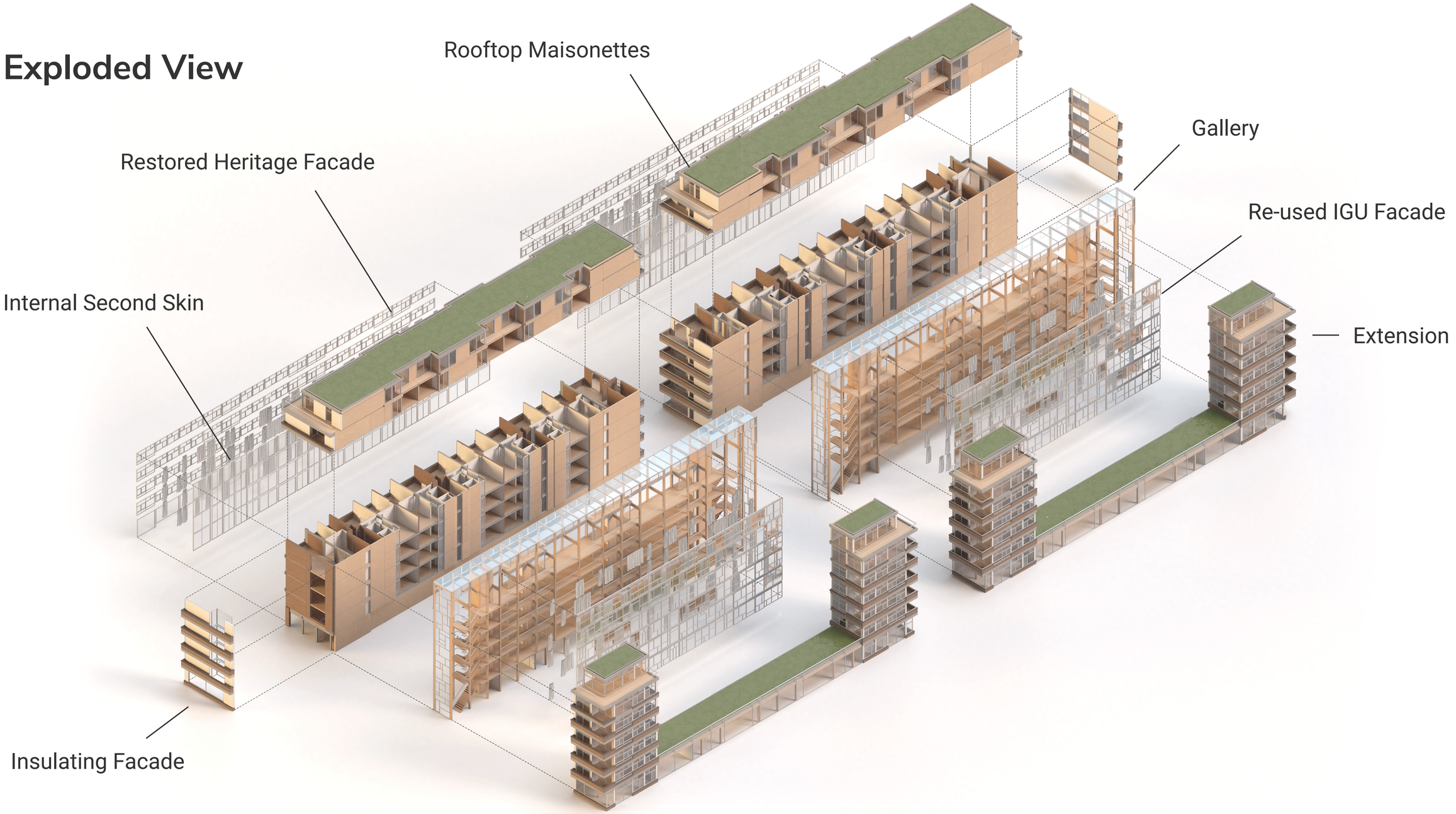




5. Adding Skin & Space Plan



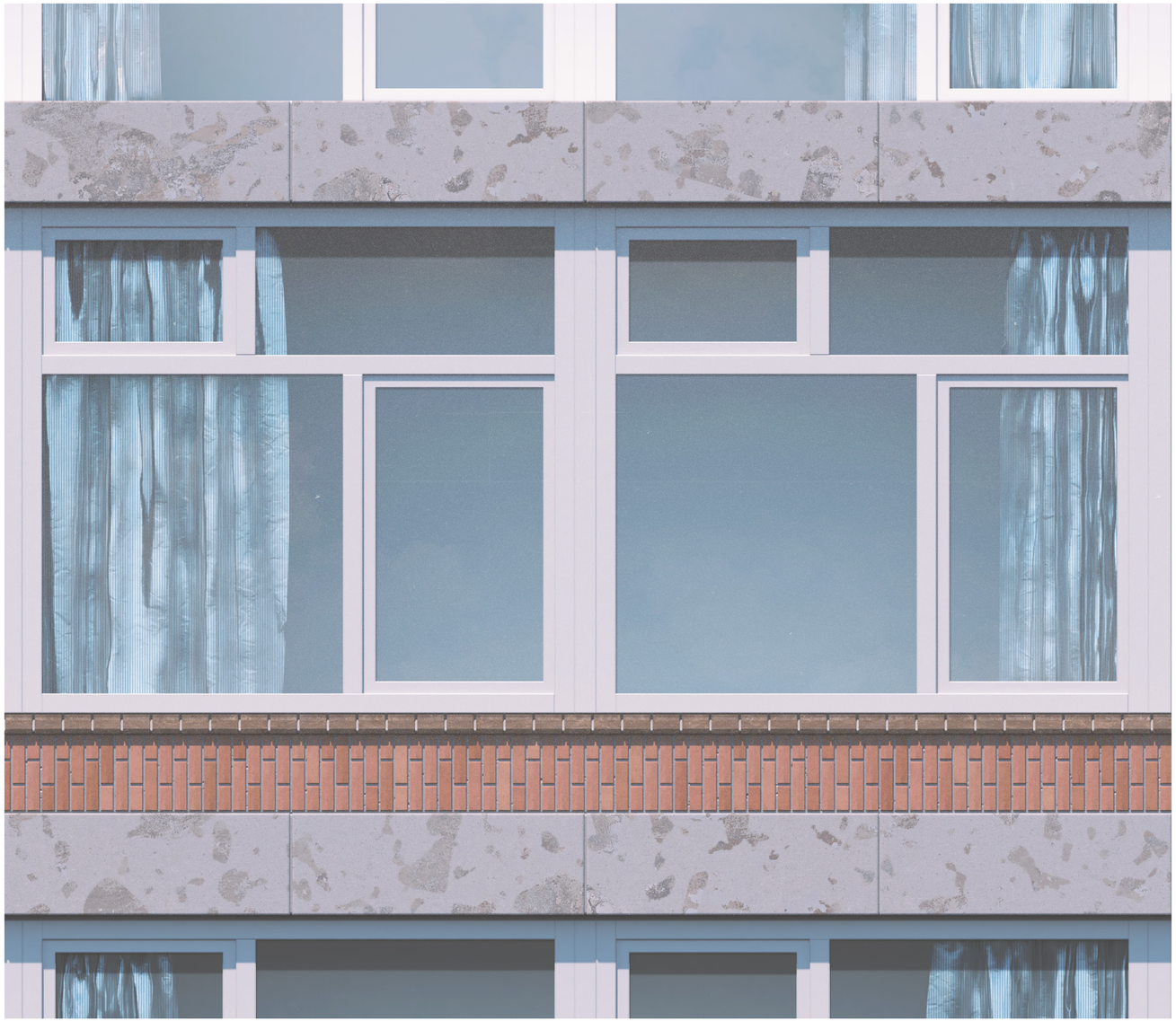
Exploded View



Fragment


Extensive Green Roof + PV panels
Restored Heritage Facade
Hanging Planters
Private Winter Gardens
Rain Gardens
Collective Winter Gardens
Re-Used IGU Facade
Shared Rooftop Garden
Green Mesh Facade +
Covered Car Parking

Details



roof construction
- 20 mm timber decking
- 70 - 50 mm tapered fibre-board insulation

structure: hollow box ceiling
- 27 mm plywood
- 180 mm laminated timer beams & natural fibre insulation fill
- 27 mm plywood

finish
- 20 mm air gap
- 10 mm fireproof ceiling

reflective shading curtain

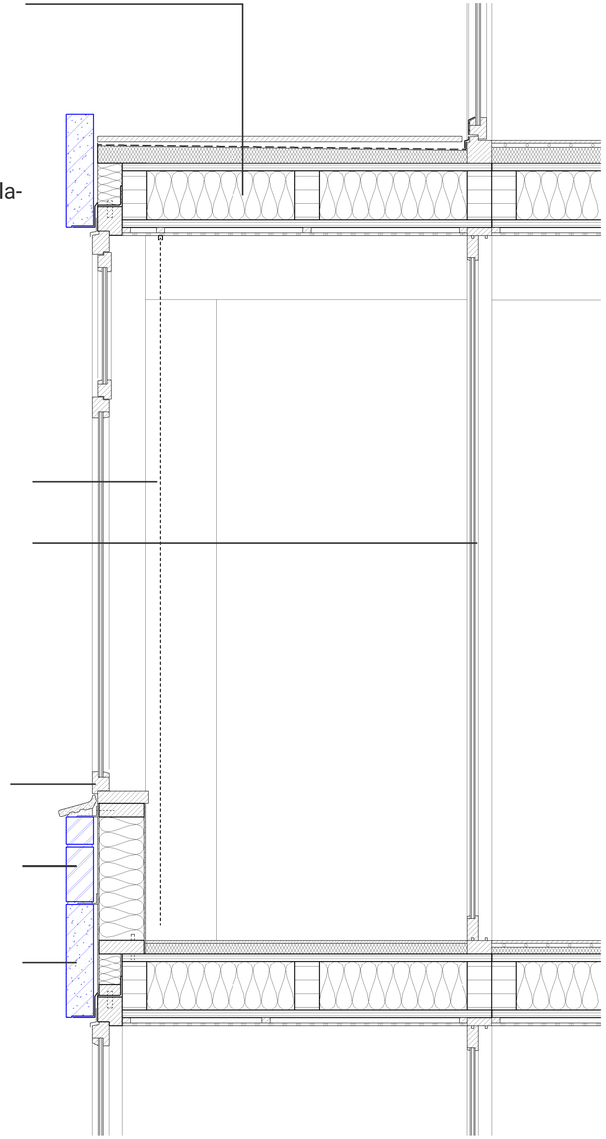
Interior glass sliding door

prefabricated re-used material facade elements

80 mm aluminium clad timber window frames

reused brick cladding rotated 90 degrees

100 mm upcycled concrete lintel



Fragment A1

Reference: Re-Used Brick Facade Cladding | Lendager Architects

Reference: Upcycling Demolition Waste | H Arquitectes

prefabricated re-used material facade elements

reused brick cladding rotated 90 degrees

100 mm upcycled concrete lintel

refurbished heritage facade

reflective shading curtain

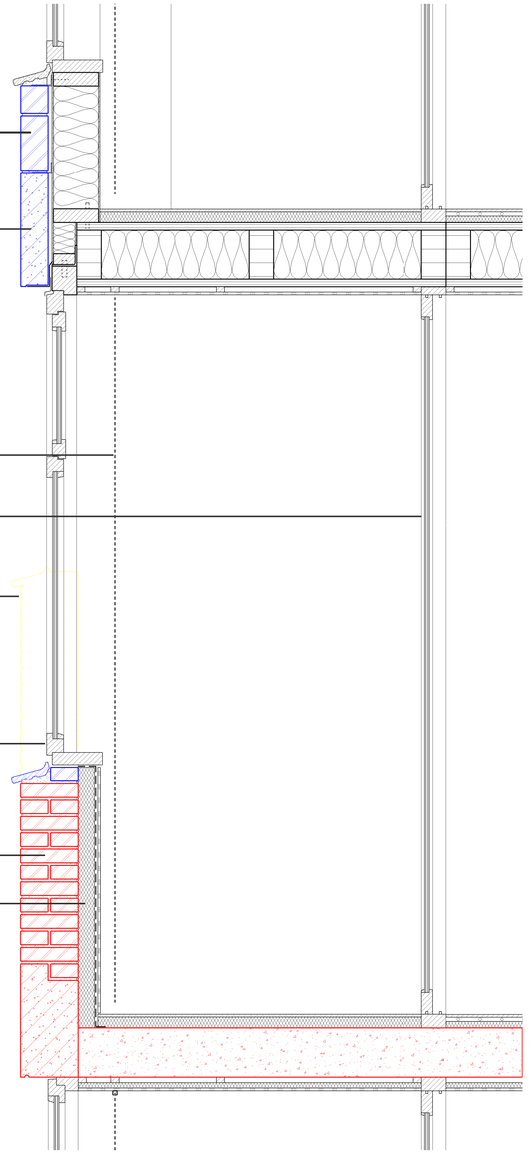
Interior glass sliding door

demolish wall segment covering former storage rooms

80 mm aluminium window fenestrations based on original design

existing brick facade

70 mm internal insulation



Fragment A2

reflective curtains

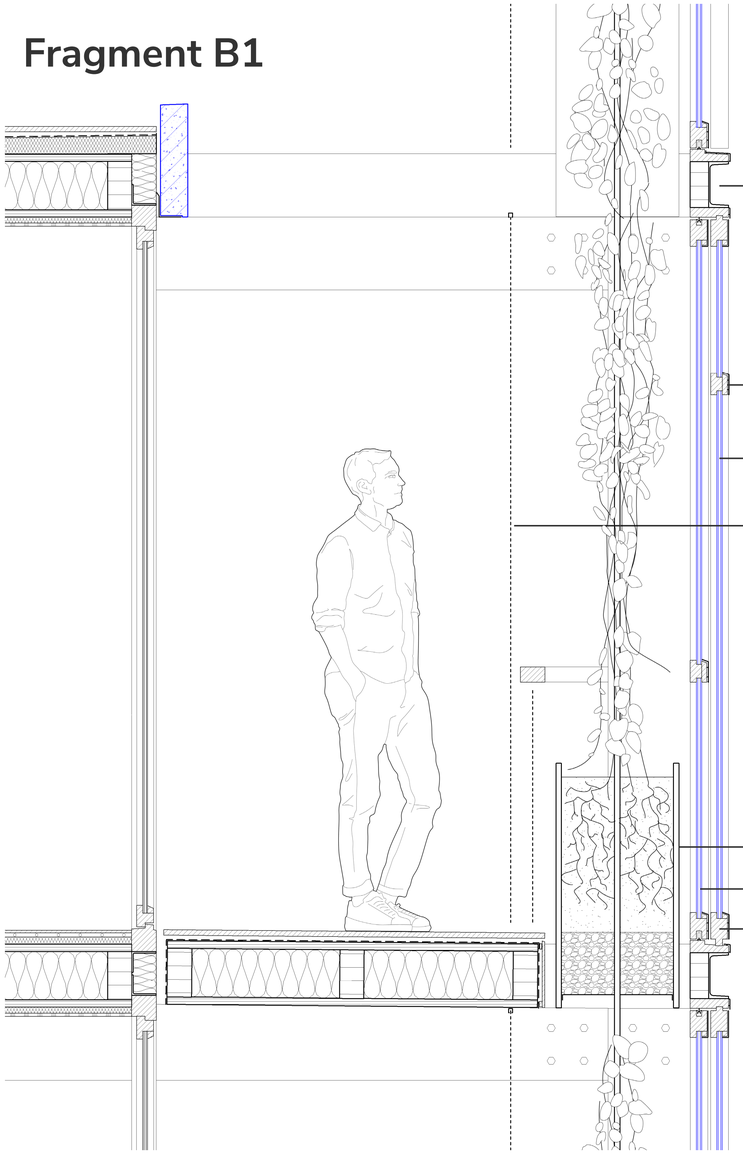
restored window fenestrations

re-used brick cladding

up-cycled concrete lintels

Elevation East Side

Fragment B1



composite beam construction: laminated timber + steel u-profile

re-used IGU facade

80 mm aluminium clad timber window frames

re-used insulated glazing units

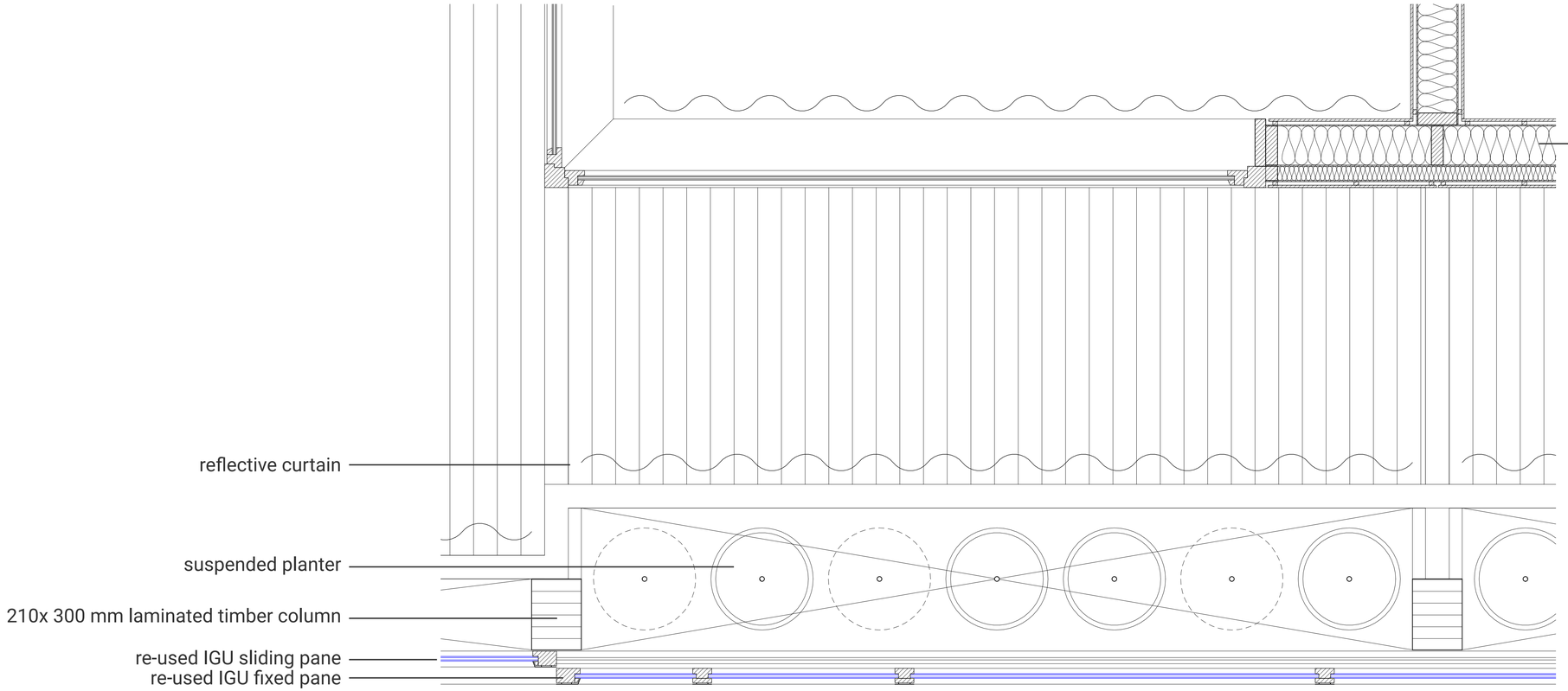
reflective shading curtain

suspended planter

sliding glazing

fixed glazing

Fragment B1: Floorplan



exterior wall construction

- 10 mm fire resistant wall panelling
- 20 mm air gap
- 60 mm fibreboard insulation
- 60x160 mm solid timber framing
- interspersed with 160 mm natural fibre insulation
- 15 mm air gap
- 10 mm timber panelling

reflective curtains

re-used IGU facade

re-used brick cladding

up-cycled concrete lintels

Elevation West Side

up-cycled concrete lintels

Elevation Passage

re-used IGU facade

re-used brick cladding

Elevation South

Reflection

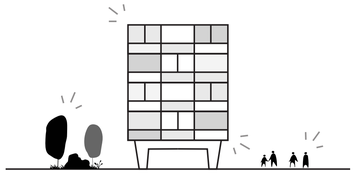
What is the relation between the research and design phases?

Part I: urban renewal case study

Part II: refurbishment case studies

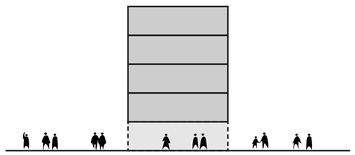
Part III: values based redesign

Goals for Successful Transformation



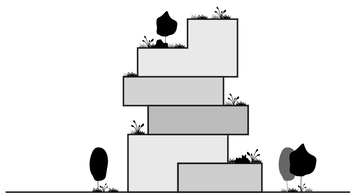
1. Use Existing Resources

Preserve and strengthen the existing heritage values present on the site. This includes not only architectural, but also the social, material and ecological values which compose the heritage environment.



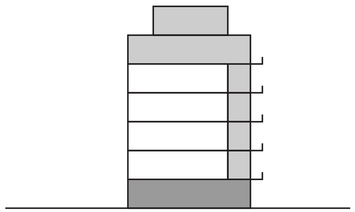
2. Activate The Plinth

Redesign the ground floor to improve the connection with the public space, consider how the public space is used and how access can change how neighbours interact.



3. Diversify Typologies

Adapt typologies to meet the needs of the new demographics in Nieuw-West; including large families, single households, students & seniors.

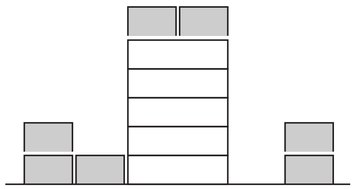


4. Mixed Use Density

Clusters of mixed use density can increase the attractiveness and use value of existing buildings and bring new life the public space.

5. Transition Spaces

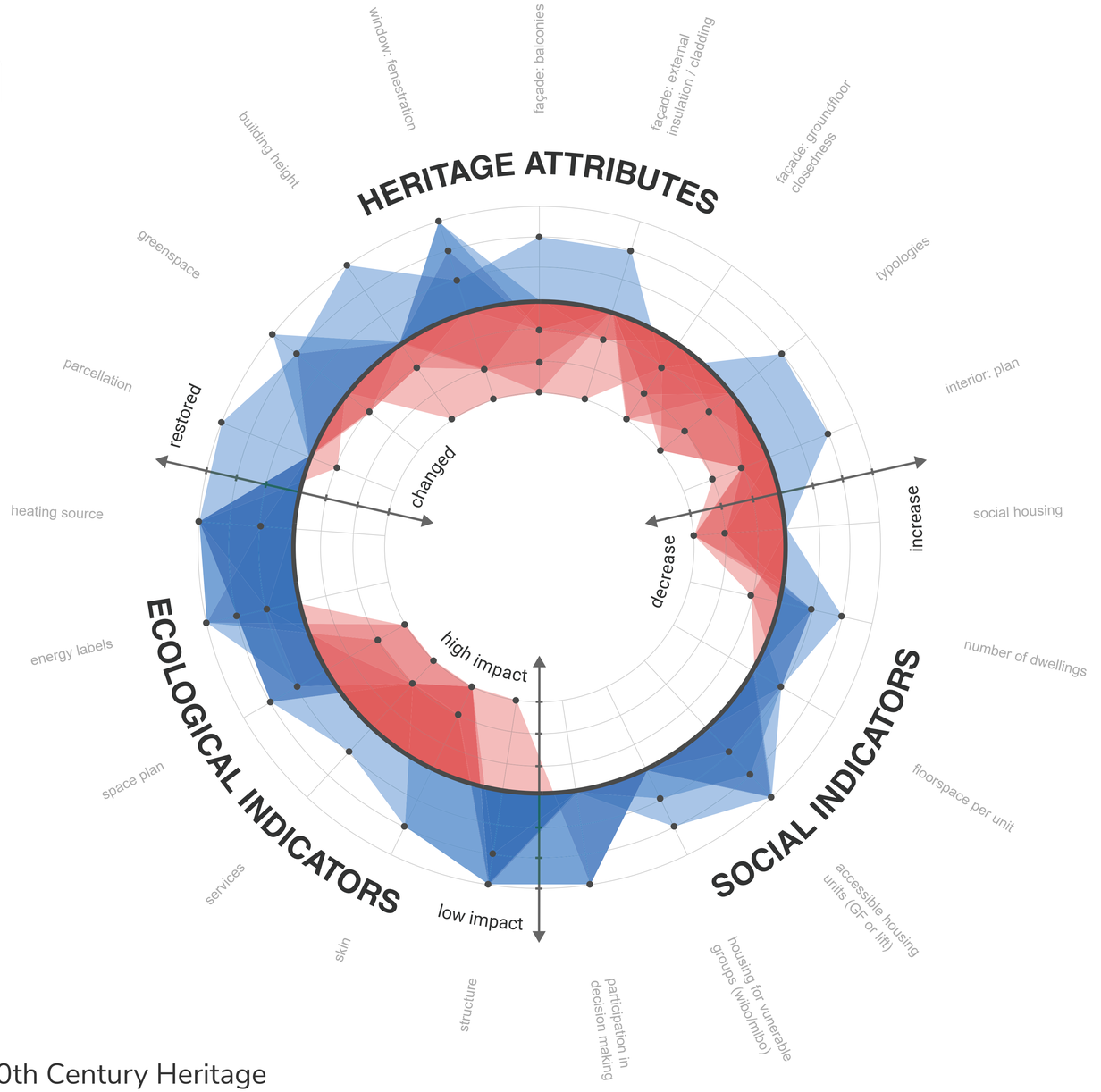
Collective spaces like allotment gardens between buildings, and semi private spaces like front yards on the street create a sense of ownership in the public space while maintaining visual connections.



6. Design for Re-Use

Future proof designs by improving the adaptability of existing structures during interventions. Consider how additions can be disassembled and re-used in the future.

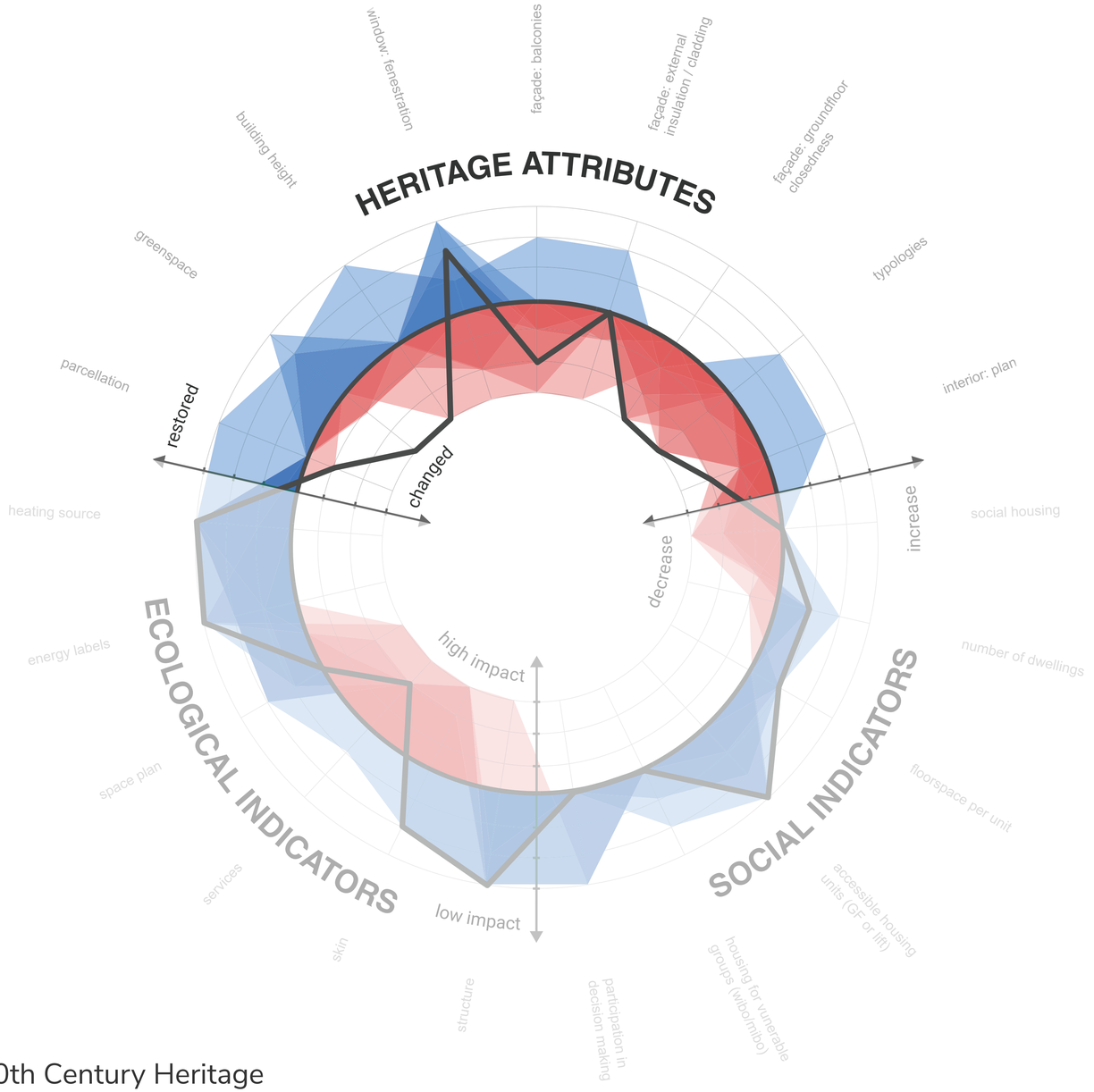
Research to Design



Research to Design

Heritage

- Transformative Approach at Urban & Unit Level
- Qualitative Improvements
- Preserving Charactaristic Attributes



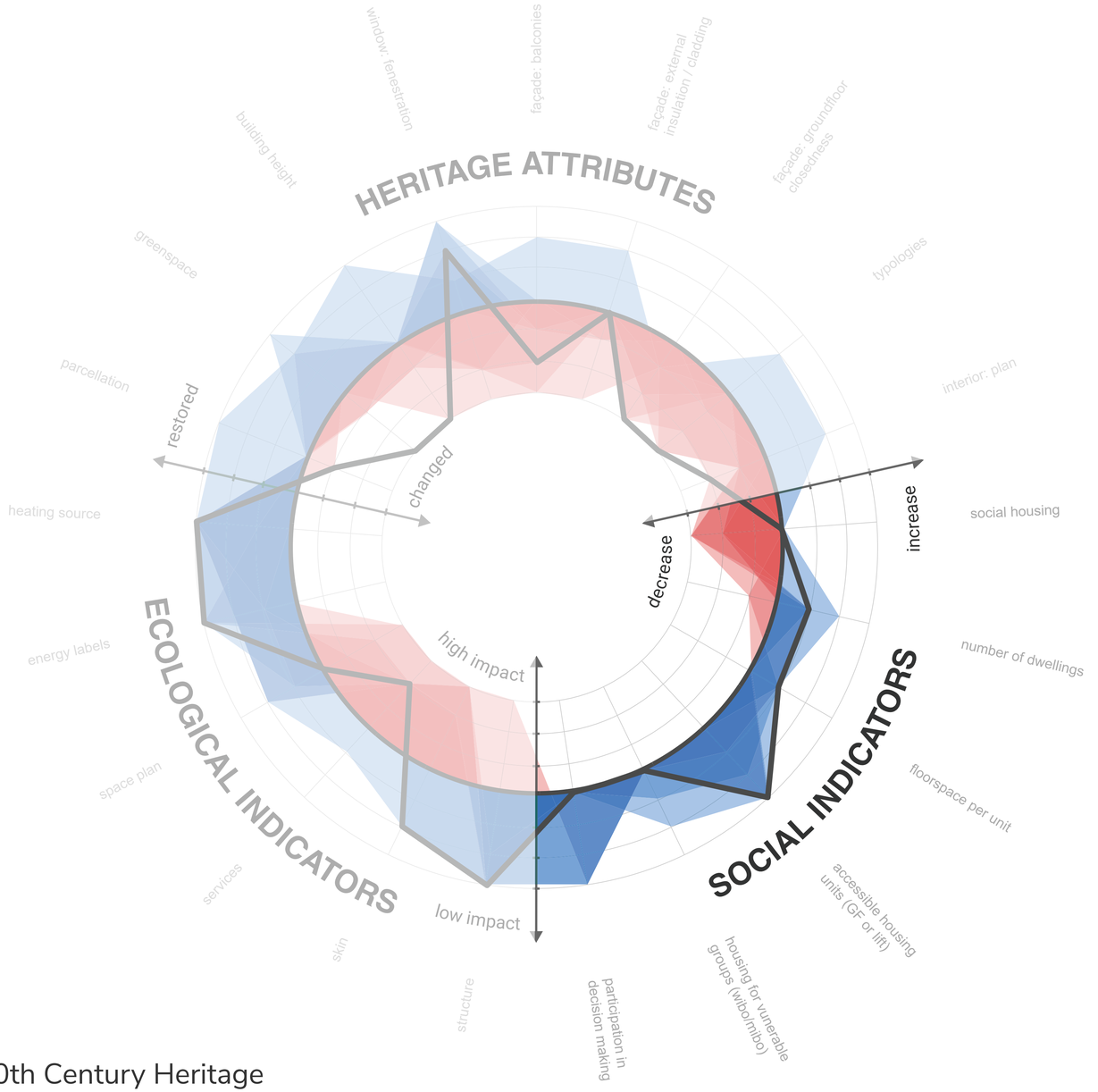
Research to Design

Heritage

- Transformative Approach at Urban & Unit Level
- Qualitative Improvements
- Preserving Charactaristic Attributes

Social

- Preservation & Improvement of Social Housing
- Densification & More Floorspace
- Improved Accesibility
- Qualitative Improvements From Collective Spaces & Mixed-Use Program



Research to Design

Heritage

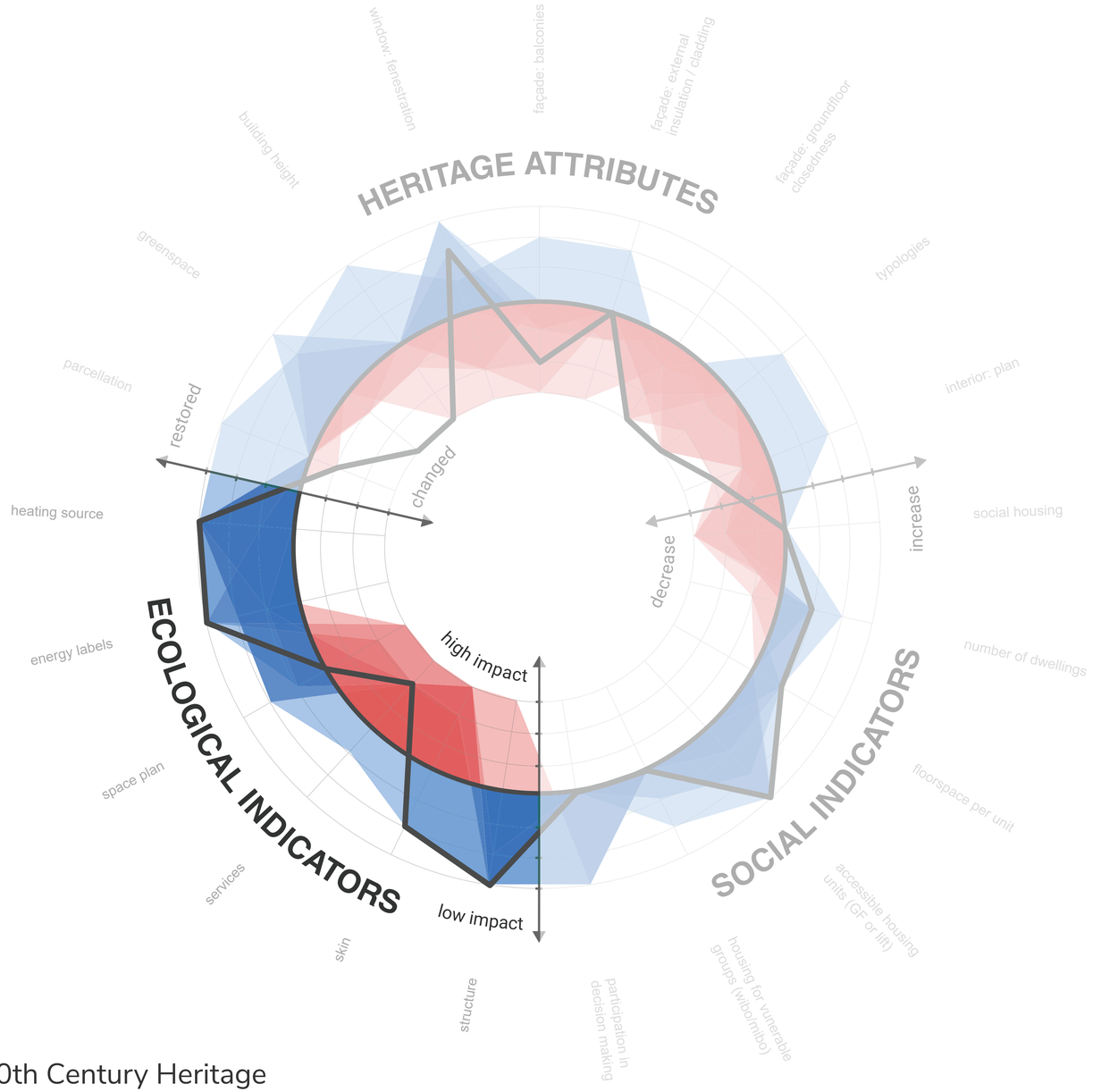
- Transformative Approach at Urban & Unit Level
- Qualitative Improvements
- Preserving Charactaristic Attributes

Social

- Preservation & Improvement of Social Housing
- Densification & More Floorspace
- Improved Accesibility
- Qualitative Improvements From Collective Spaces & Mixed-Use Program

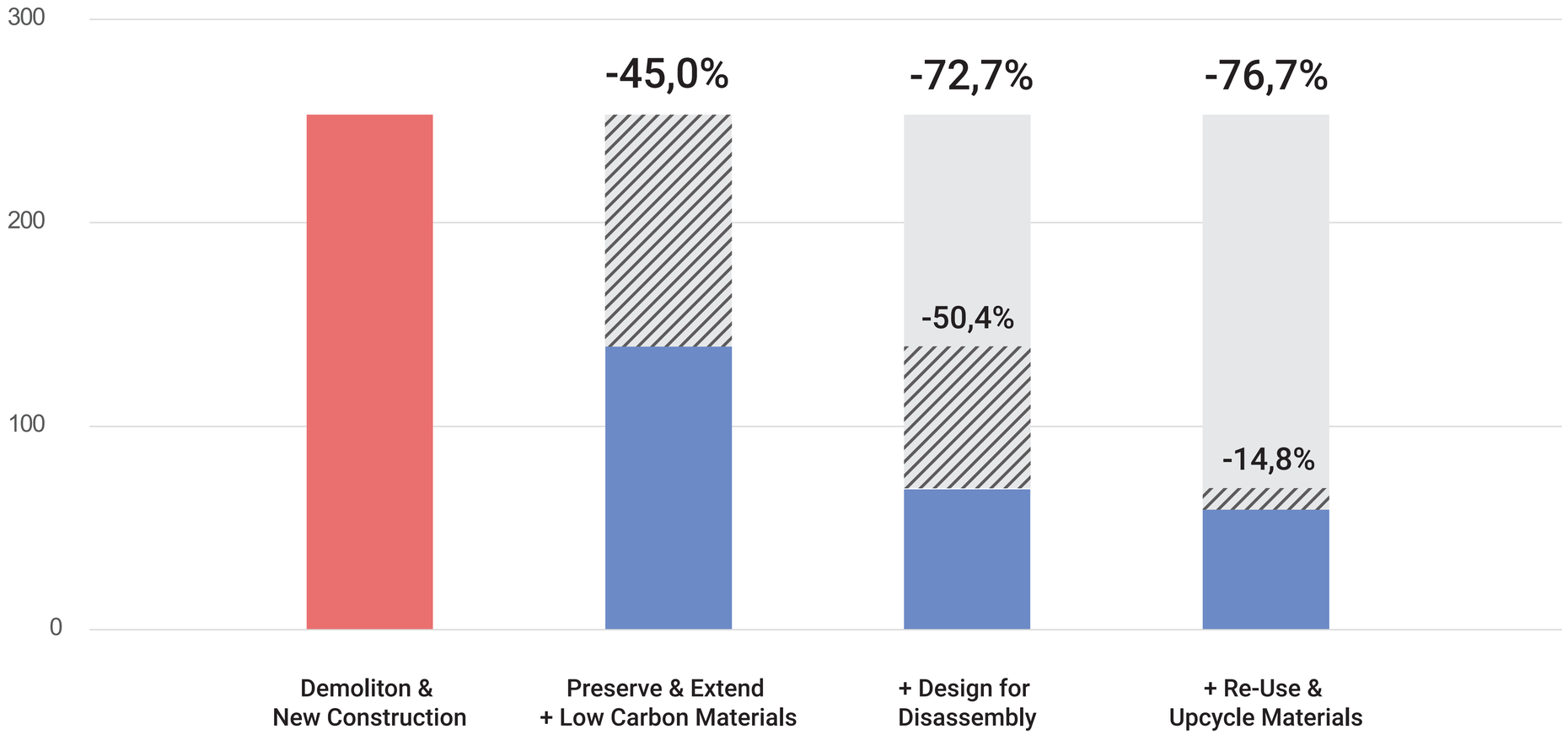
Ecological

- Shearing Layers Preserved to Greater Extent
- Use of Low Carbon Materials
- Improved Energy & Ecological Performance
- Qualitative Improvements: Noise & Thermal Comfort



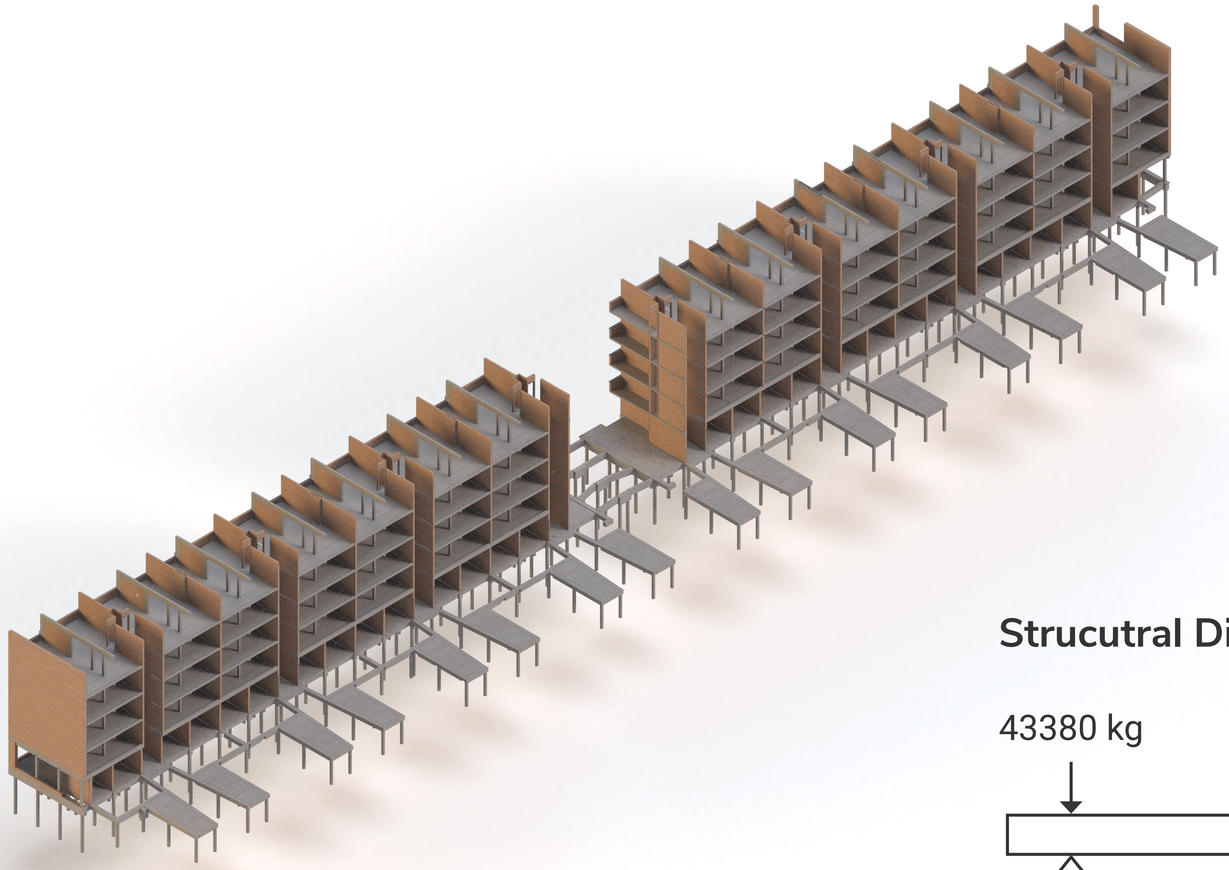
Carbon Footprint (Excluding Use Stage) kg CO_2 eq / m^2

*bench mark case based on data from ‘Woningbouw binnen planetaire grenzen’ (Bosch et al. 2023)

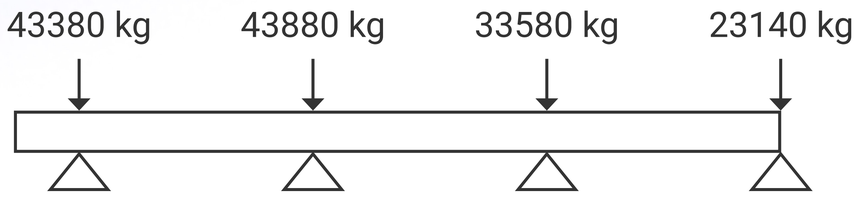



LVIV CROISSANTS

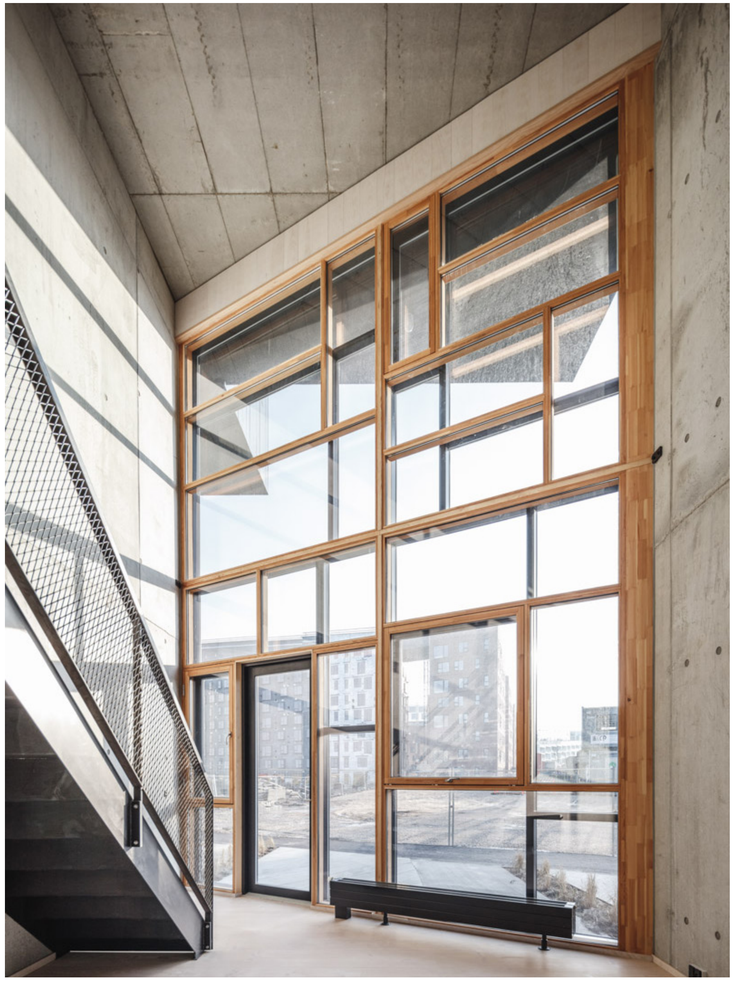
Assessing Load-Bearing Capacity

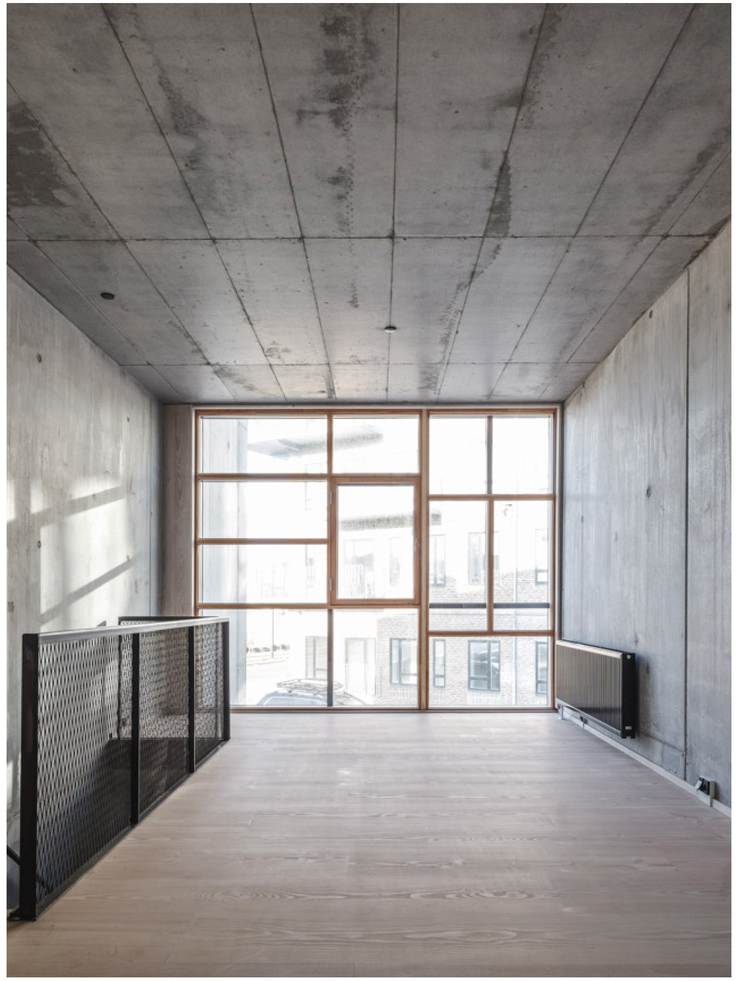


Strucutral Diagram Foundation



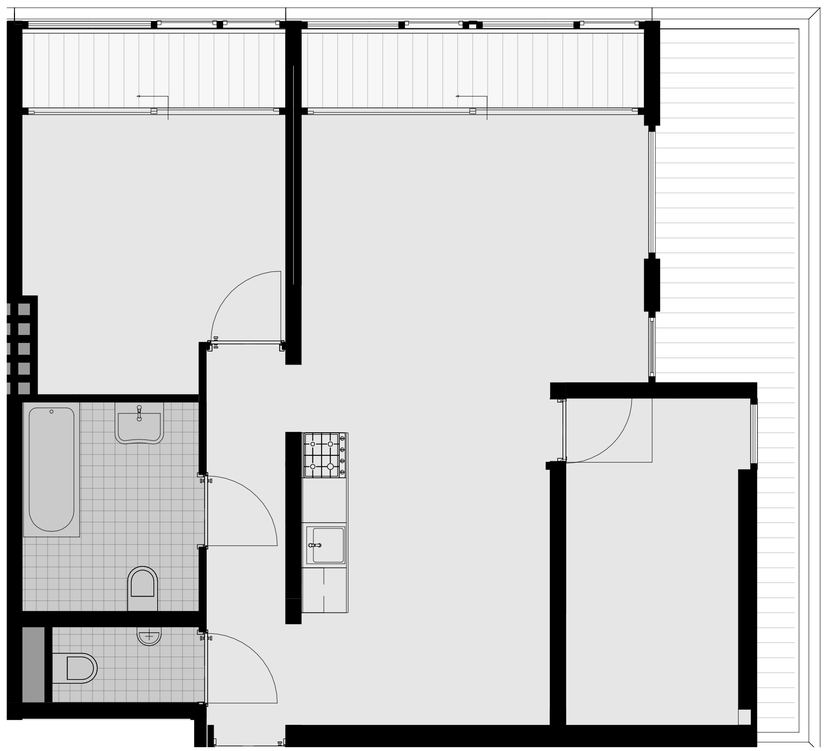
A	B	C	D
2 piles = +34000kg	2 piles = +36000kg	1 pile = +6000kg	1 pile = +16000kg





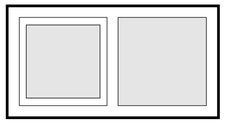
Reference: Re-Used IGU Facade | Lendager Architects

Floor Space: 69m²
Winter Garden Private: 8,5m²
Loggia: 5,8m²

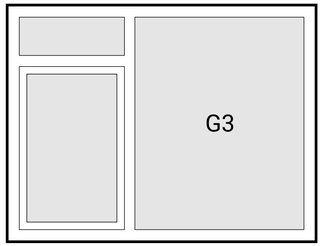


Floor Space: 74m²
Winter Garden Private: 8,5m²
Balcony: 8,6m²

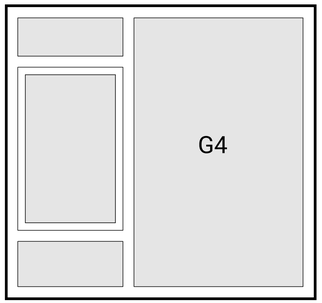
Type C1/2



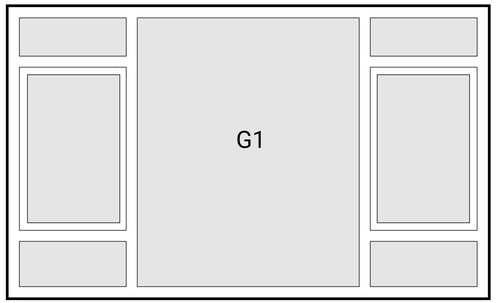
C1



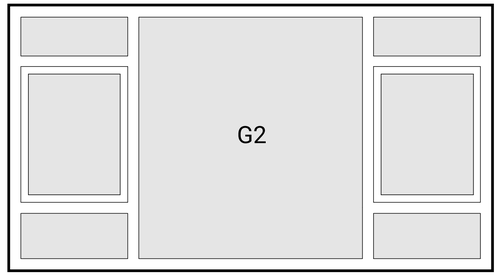
B1



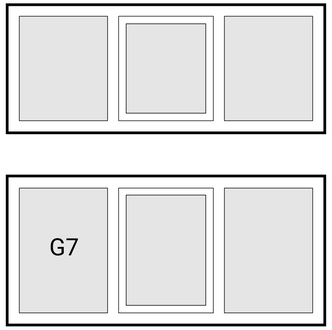
B2



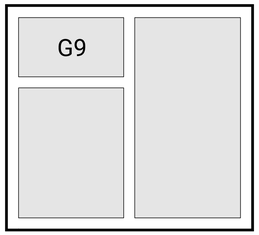
A1



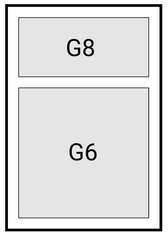
A2



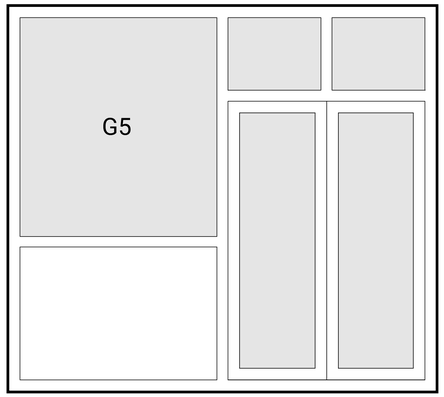
C2 / 3



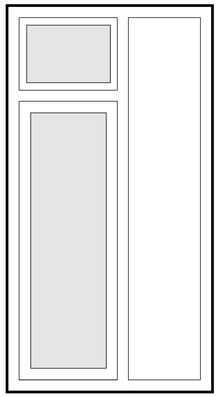
D1



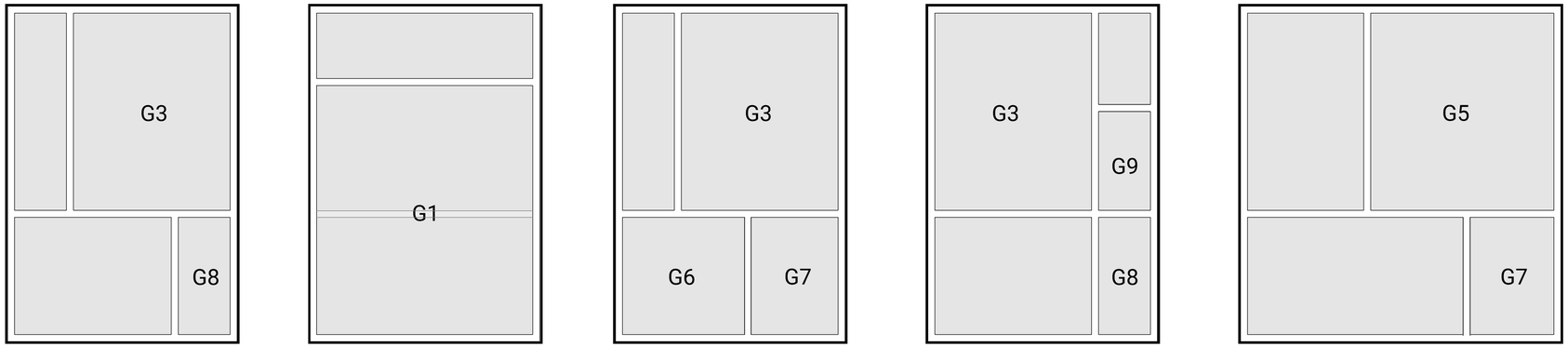
D2



D3



D4



A1 A2 A3 A4 B1