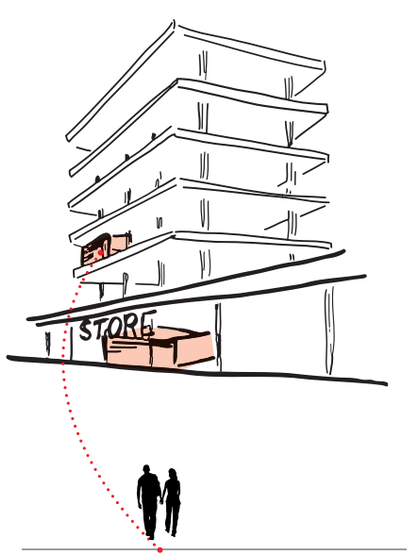
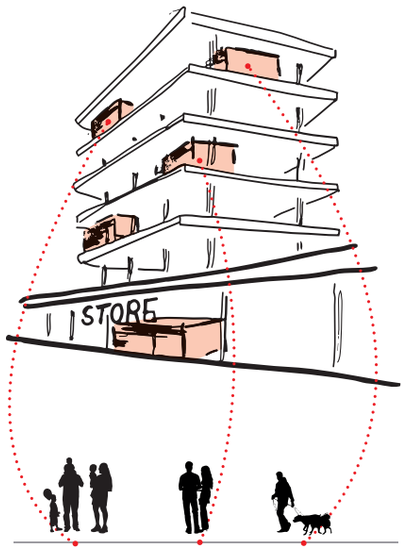
H O M E - M A D E®

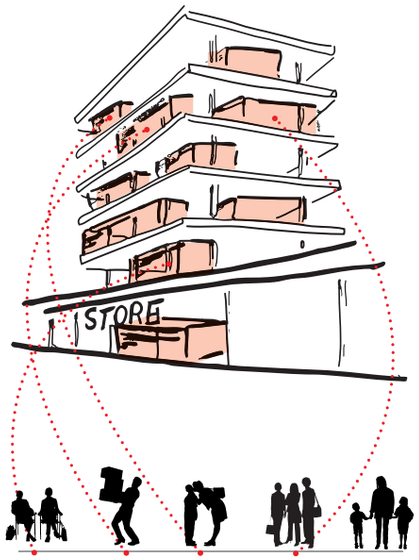
BOTTOM-UP REDEVELOPMENT OF VACANT OFFICE SPACE IN MASS-CUSTOMIZED HOUSING SOLUTIONS UTILIZING DIGITAL WOOD PROCESSING TECHNIQUES



2014



2018



2022

P5 PRESENTATION

NAME: FREEK VAN ZEIST

STUDY NR: 1517090

DATE: 17TH OF DECEMBER, 2014

1ST MENTOR: JOB SCHROËN

2ND MENTOR: PIERRE JENNEN

3RD MENTOR: PIETER STOUTJESDIJK

EXTERNAL EXAMINER: ANDRÉ OUWEHAND

TORRE DAVID

A FASCINATION FOR INFORMAL VERTICAL COMMUNITIES

KOWLOON WALLED CITY

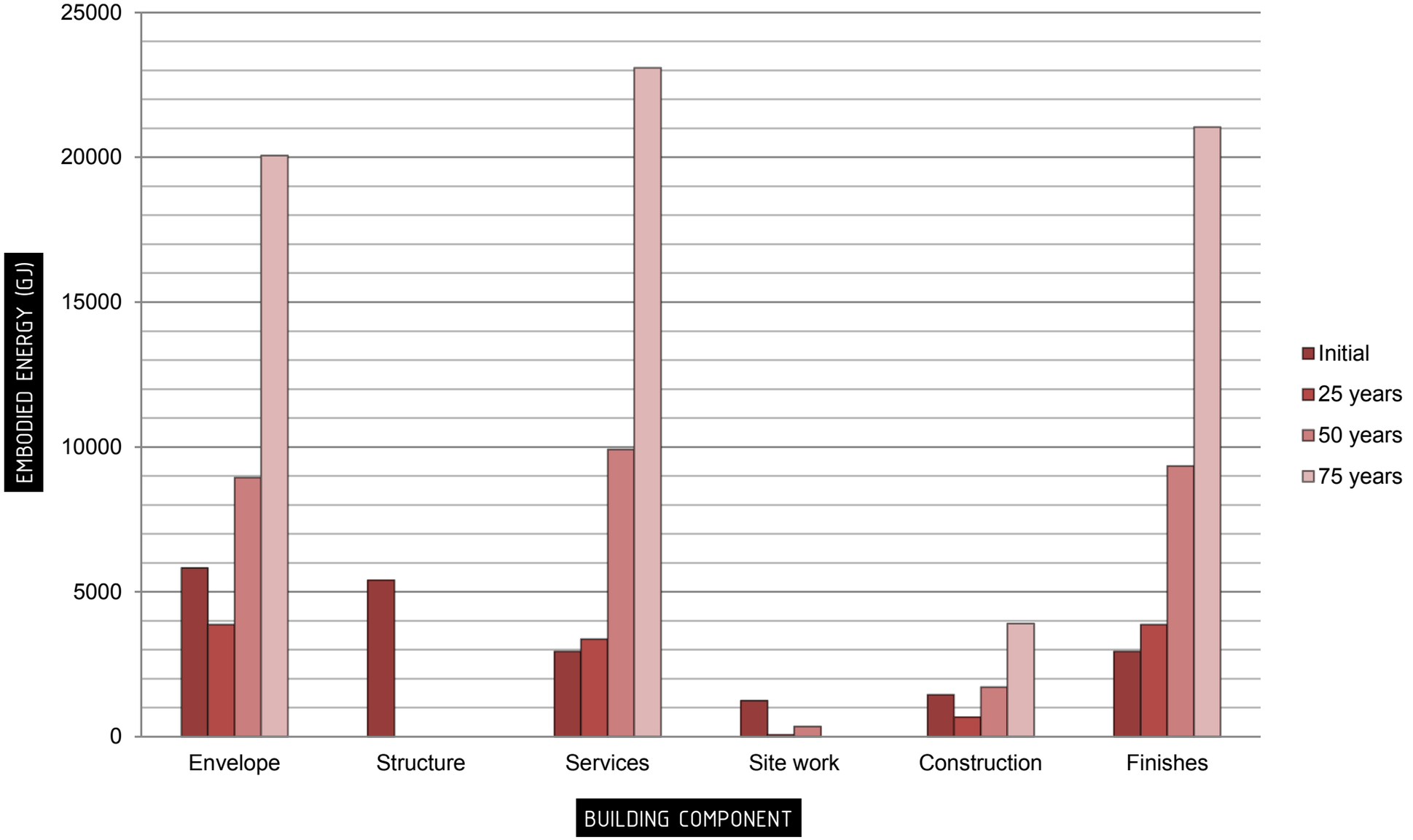
KOWLOON WALLED CITY

OFFICE VACANCY

OFFICE VACANCY

2014: 8.000.000 M²

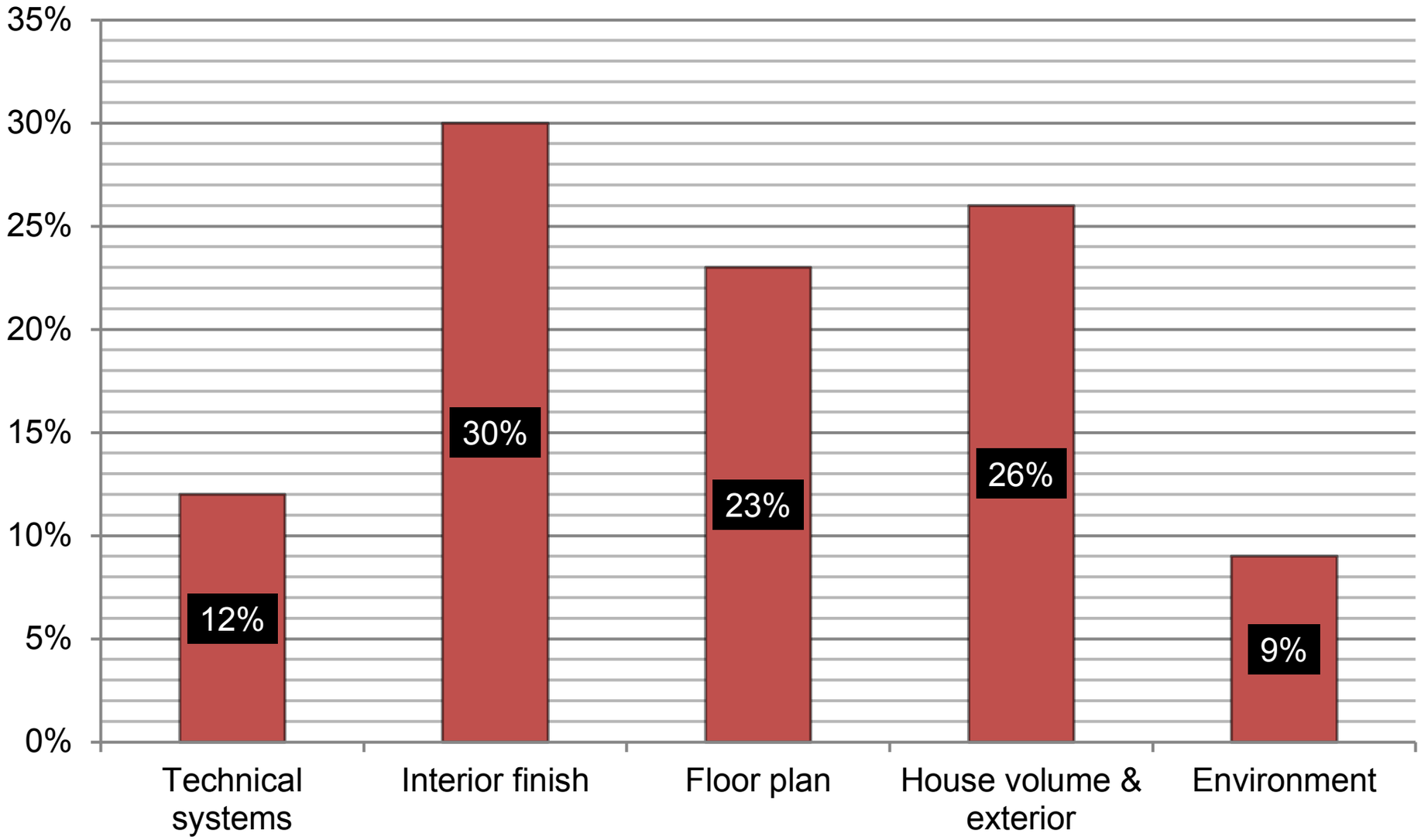
source: vastgoedmarkt.nl



source: Cole and Kernan, 1996

RECURRING EMBODIED ENERGY

HIGH RECURRING EMBODIED ENERGY FOR ENVELOPE, SERVICES AND FINISHES



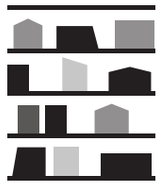
source: Hofman & Halman, 2006

THE NEED FOR SPATIAL CUSTOMIZATION AND THE PRIVATE COMMISSIONING TREND

CONCEPT

OFFICE VACANCY

PRIVATE COMMISSIONING



ORCHESTRATED PRIVATE COMMISSIONING IN A PROVIDED BASE BUILDING

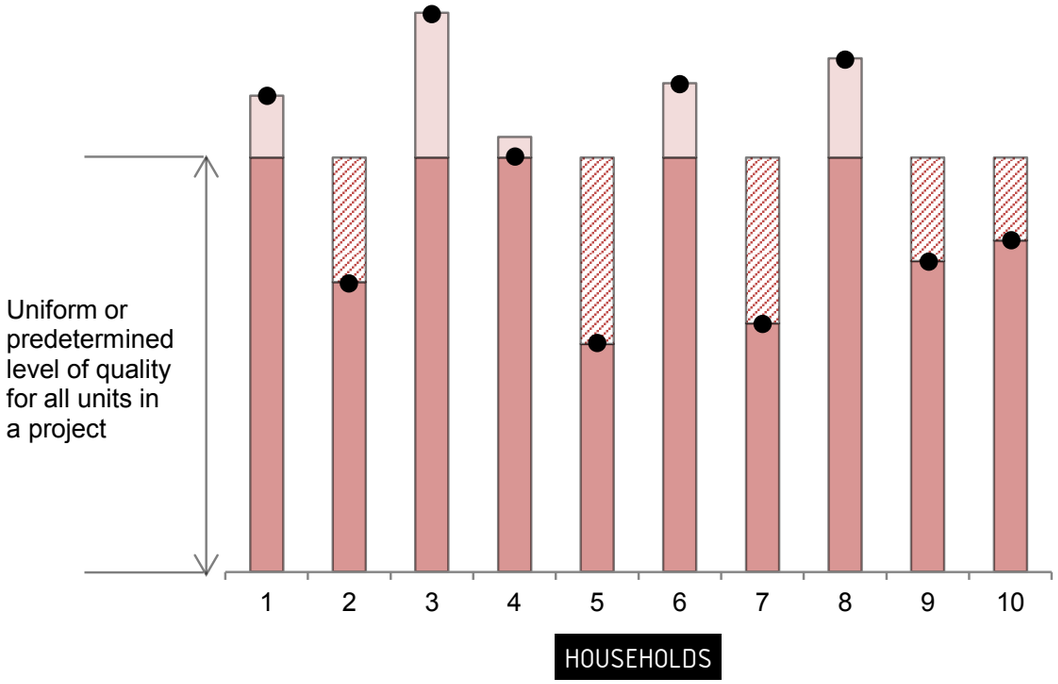
PROBLEM + TREND = CHANCE

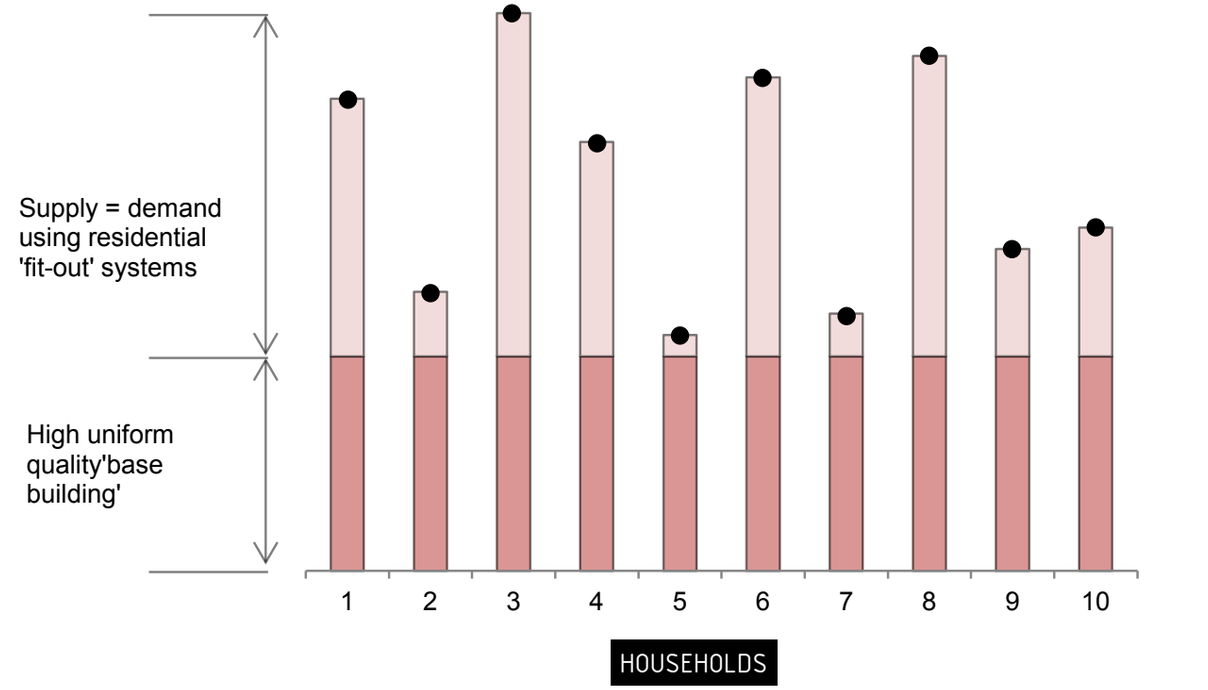
ORCHESTRATED PRIVATE COMMISSIONING IN A PROVIDED BASE BUILDING

We should not try to forecast what will happen, but try to make provision for what cannot be foreseen

Habraken in Supports (1972)

OPEN BUILDING





POST-WAR HOUSING VS. OPEN BUILDING HOUSING

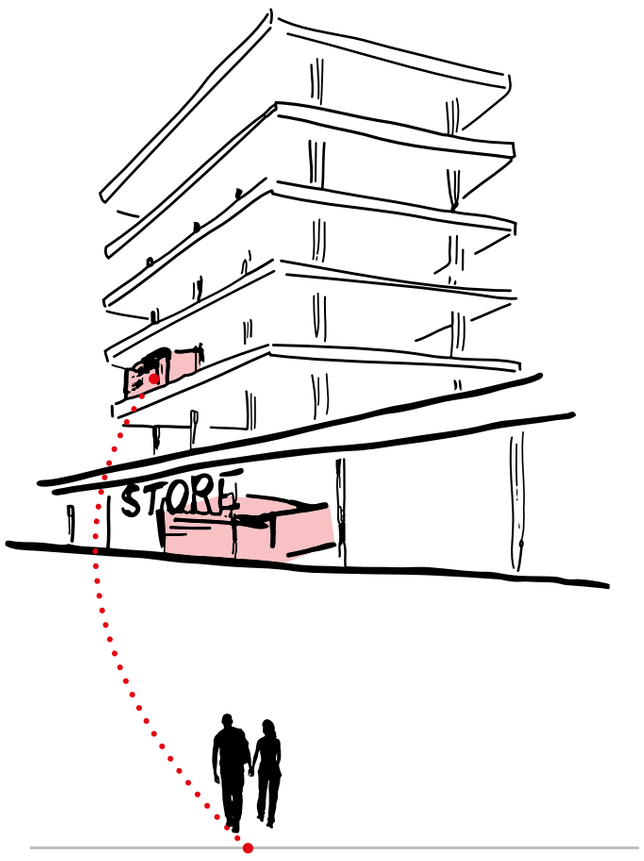
A GROWING CITY AND A LACK OF SPACE

FROM CITY EXPANSION, THEREBY USING VALUABLE SPACE

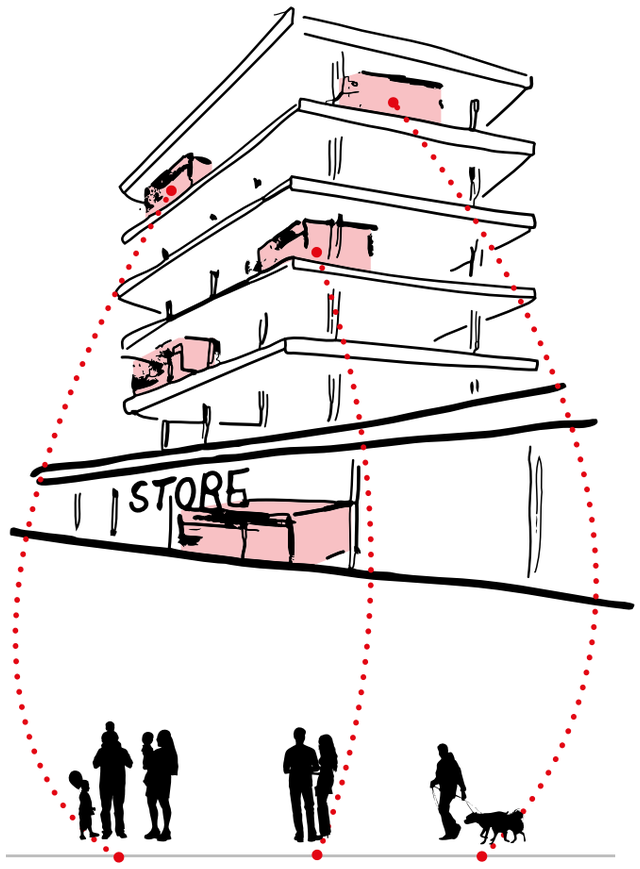
TO THE RE-USE OF EXISTING URBAN FABRIC

USING (STRUCTURALLY) VACANT OFFICE SPACE

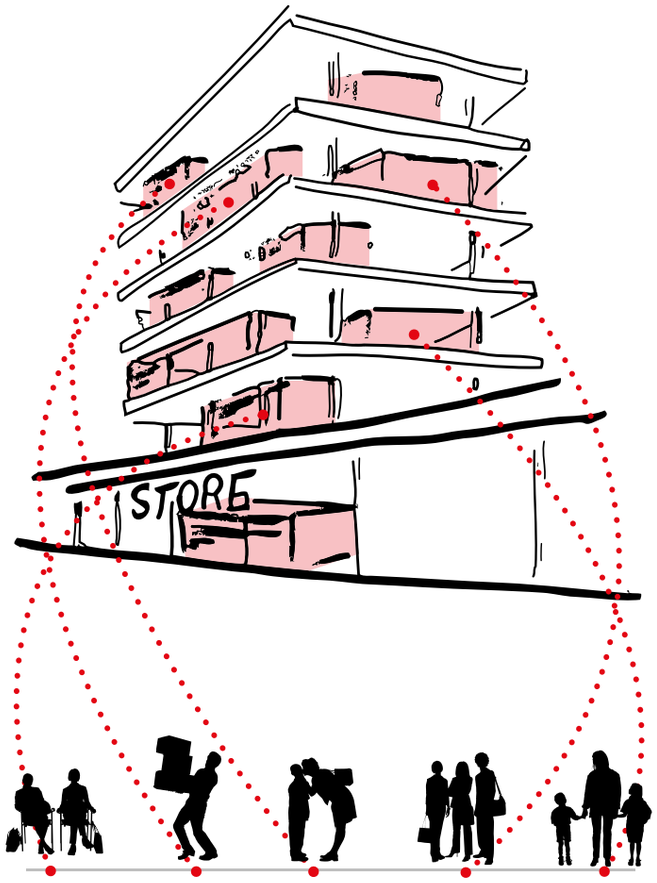
2014



2018

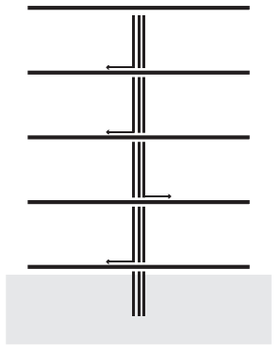


2022



A TOP-DOWN FRAMEWORK FACILITATING A
CONSUMER-DRIVEN AND BOTTOM-UP APPROACH

DESIGN PRINCIPLES



BASE BUILDING

Developer owned.

Basic facilities & utilities.

Low durable investment.

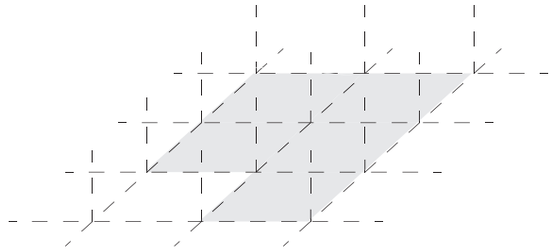
Leasehold construction.

FIT-OUT

Individualized buildings.

Spatially, functionally & aesthetically.

Privately owned.

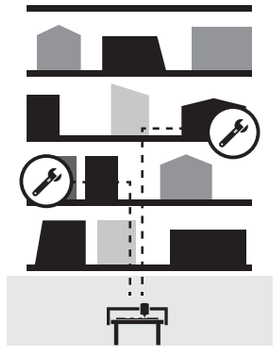


CONSTRUCTIONAL LOGIC

Unifying construction - modularity.

Lower building costs.

Speeds up building & designing process.

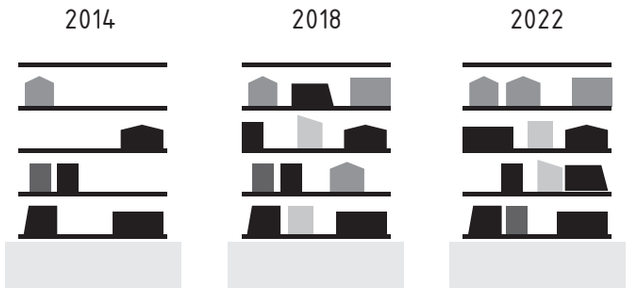


PRODUCTION & ASSEMBLY

How to build where also can be lived?

File2Factory.

Design For (Dis)Assembly.



ORGANIC GROWTH PERMANENT TRANSFORMATION

Adaptable to market conditions.

Growing project - evolution.

Blank canvas.

NETWORK OF BASE BUILDINGS

Exchangeability.

Your house moves with you.

Network of new urban typologies.

RESEARCH QUESTION

How can the mass customization potential of digital wood processing techniques be used in the bottom-up re-development of (structurally) vacant office space into custom housing solutions?


CONTEXT


PROGRAM & USE


TECHNIQUE

RESEARCH OVERVIEW

HOW CAN THE **MASS CUSTOMIZATION** POTENTIAL OF **DIGITAL WOOD PROCESSING TECHNIQUES** BE USED IN THE BOTTOM-UP REDEVELOPMENT OF (STRUCTURALLY) **VACANT OFFICE SPACE** INTO CUSTOM HOUSING SOLUTIONS?

REGENERATION OF THE VACANT OFFICE BLOCK

MASS CUSTOMIZATION IN HOUSING SOLUTIONS

DIGITAL WOOD PROCESSING TECHNIQUES AND THEIR FABRICATION AND (DIS)ASSEMBLY

TECHNICAL DESIGN OF A CONSTRUCTIONAL SYSTEM WITH IMPLEMENTED MODULARITY

GENERIC DESIGN METHODOLOGY
FOR MASS CUSTOMIZED HOUSING SOLUTIONS IN VACANT OFFICE SPACE
USING A CONSTRUCTION SYSTEM WITH IMPLEMENTED MODULARITY

CASE STUDY DESIGN

CASE STUDY DESIGN

RECOMMENDATIONS FOR FURTHER RESEARCH

TOP DOWN

INITIATIVE

PROJECT DEVELOPER AND/OR ARCHITECT

1. IDENTIFICATION OF PROJECT BUILDING
2. A. ANALYSIS OF NEIGHBOURHOOD AND VIABILITY OF TRANSFORMATION POTENTIAL
   B. ANALYSIS OF POTENTIAL TARGET GROUPS
3. BUILDING SURVEY: INSPECTION AND DETAILED STUDY OF BUILDING STRUCTURE AND ADAPTABILITY POTENTIAL

TRANSFORMATION POTENTIAL MEASUREMENT TOOL

FEASIBILITY ASSESSMENT

BUILDING DEMOLISHMENT OR OTHER PURPOSE

BUILDING APPROVED FOR SUPPORT DESIGN

SUPPORT DESIGN

PRINCIPAL ARCHITECT

* DOCUMENTATION AND STRUCTURAL AND SPATIAL INVENTARISATION OF PRESENT STATE OF BUILDING
* CIRCULATION AND ACCESSIBILITY ANALYSIS
* UTILITY ANALYSIS, POSSIBLE SERVICE CORES AND COVERAGE OF HORIZONTAL SHAFTWORK
* ZONING ANALYSIS
* PLOT DIVISION
* PLACEMENT OF PUBLIC AND COMMUNAL SPACES, IDENTIFICATION & URBAN EMBEDMENT
* DETERMINATION OF INTERNAL ZONING PLAN AND BUILDING RULES

!

NOT PER DEFINITION A LINEAR PROCESS

PHYSICAL SUPPORT DESIGN → DETAILED 3D MODEL USING TLS TECHNIQUES

INTERNAL ZONING PLAN

CIRCUMSTANCES & LIMITS

FIT-OUT DESIGN

END-USER

USER CENTERED DESIGN PROCESS

1. ACTIVITY LISTING
2. ACTIVITY DESCRIPTION
3. RELATIONAL DIAGRAMS
4. INITIAL FLOOR PLAN
5. FINAL DESIGN

USER-CENTERED DESIGN LOOP

(ARCHITECTURAL) CONSULTANT

CLIMATE DATA

DIGITAL HOUSING CONFIGURATOR

ZONING PLAN TEST

CONSTRUCTIONAL LOGIC

TRANSLATION FROM THE DIGITAL TO THE PHYSICAL WORLD

RE-USE & RECYCLING OF MATERIALS

CUSTOMIZED DWELLING

BOTTOM-UP

TOP DOWN

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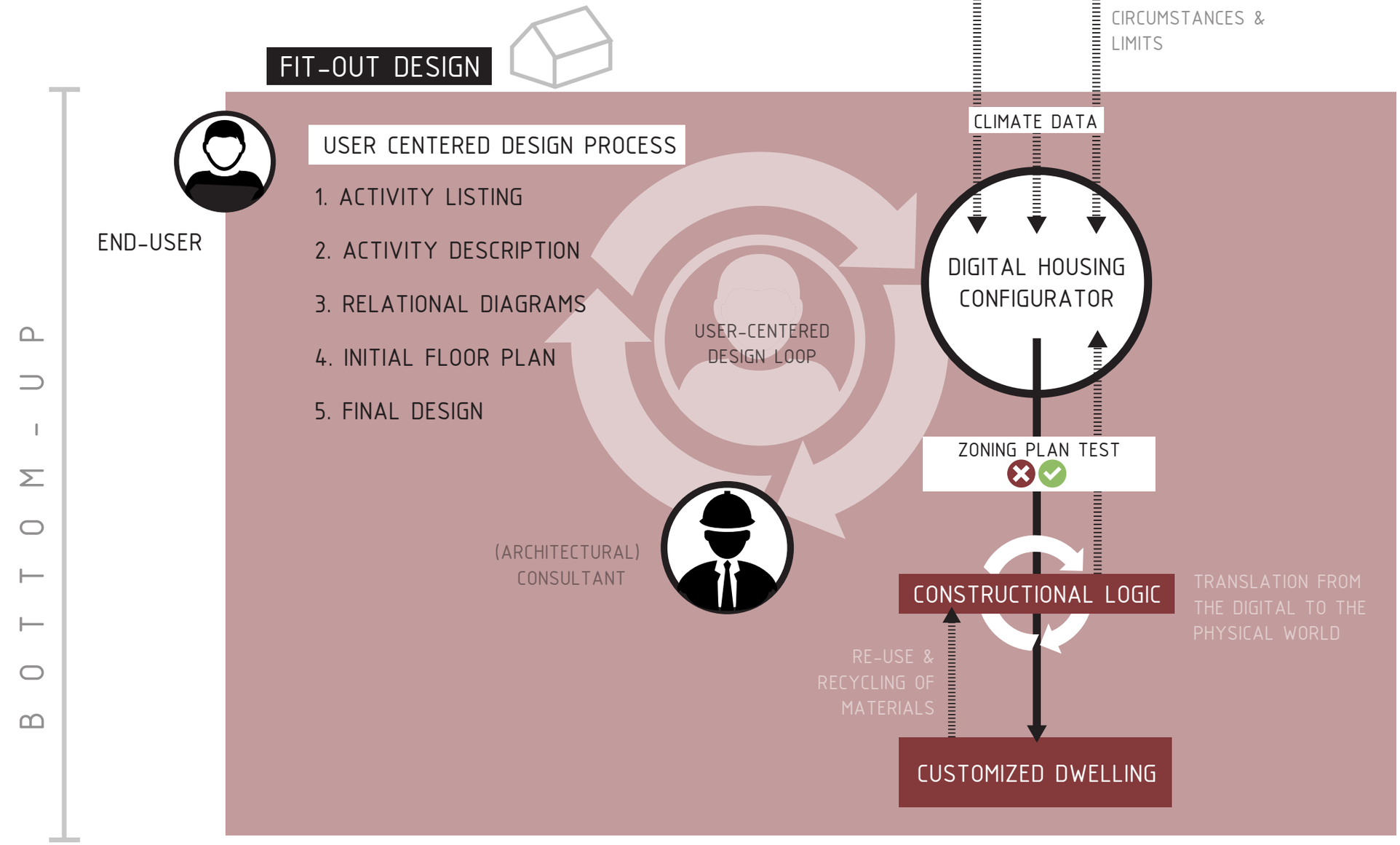
!

NOT PER DEFINITION
A LINEAR PROCESS

PHYSICAL SUPPORT DESIGN → DETAILED 3D MODEL USING TLS TECHNIQUES

INTERNAL ZONING PLAN


BOTTOM-UP
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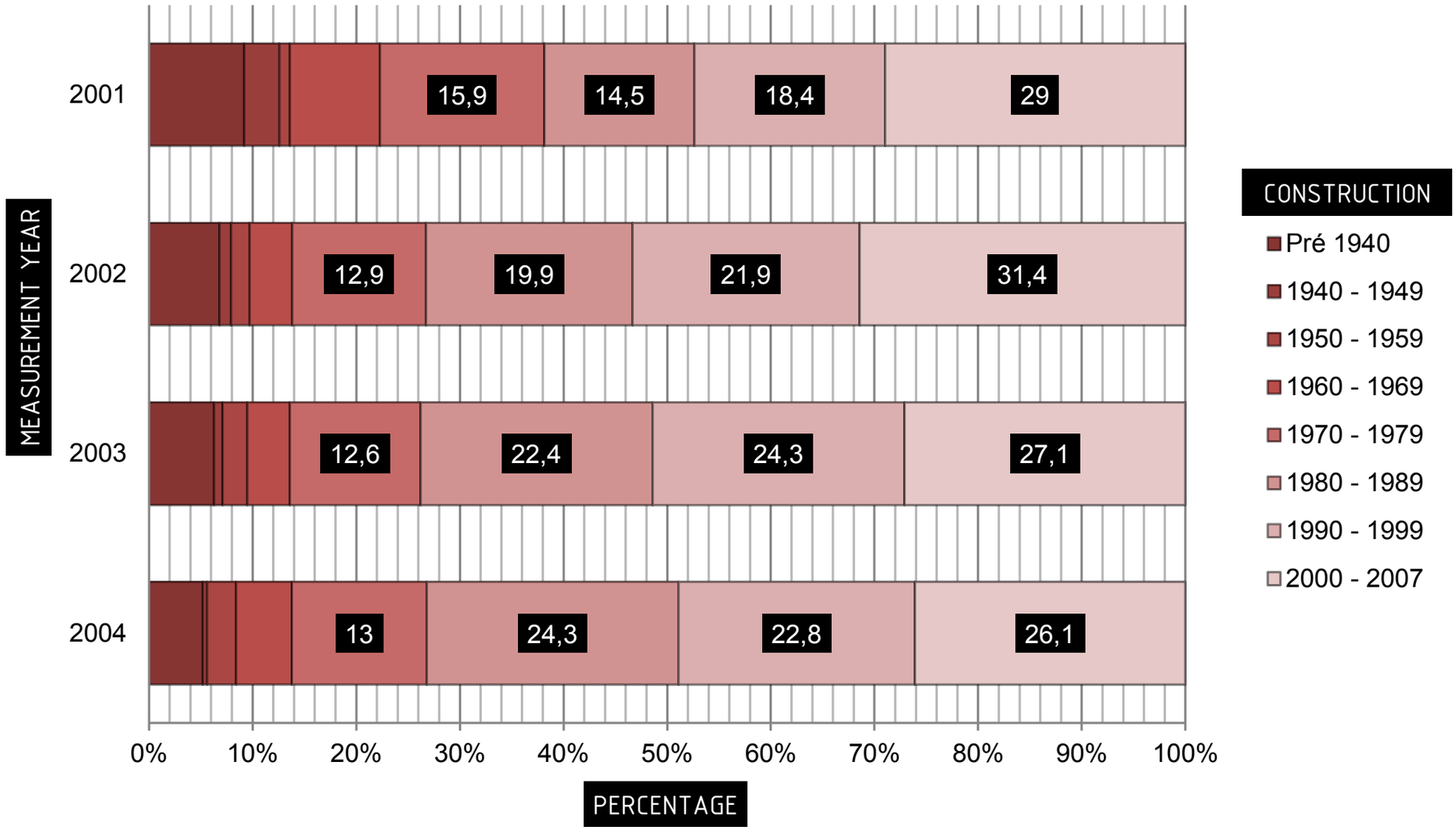
CUSTOMIZED DWELLING

CONTEXT

THE REGENERATION OF THE VACANT OFFICE BLOCK



source: Remoy, 2007

VACANCY RATES PER YEAR

ABSOLUTE AND RELATIVE GROWTH OF VACANCY IN '70's & '80's

CONSIDERATIONS

DIMENSIONS / COLUMN GRID
FREE PLAN DUE TO LOADBEARING FACADE

OR GRID DIMENSIONS

CONDITION OF FACADE
OUTDATED OR SUITABLE FOR

REFURBISHMENT

VERTICAL TRANSPORTATION
SUFFICIENT FOR NEW USE

OTHER FUNCTIONS FOR EXISTING SHAFTS

EXTRA SPACE FOR TRANSPORTATION NEEDED

EXISTING UTILITIES
SUITABLE FOR REFURBISHMENT?

ARE EXISTING SHAFTS BIG ENOUGH

DAYLIGHT ENTRANCE
HOW FAR DOES DAYLIGHT PENETRATE

ALLOWED FUNCTIONS ACCORDING TO REGULATIONS

CLIMATE
SUB-CLIMATE

CLIMATISED

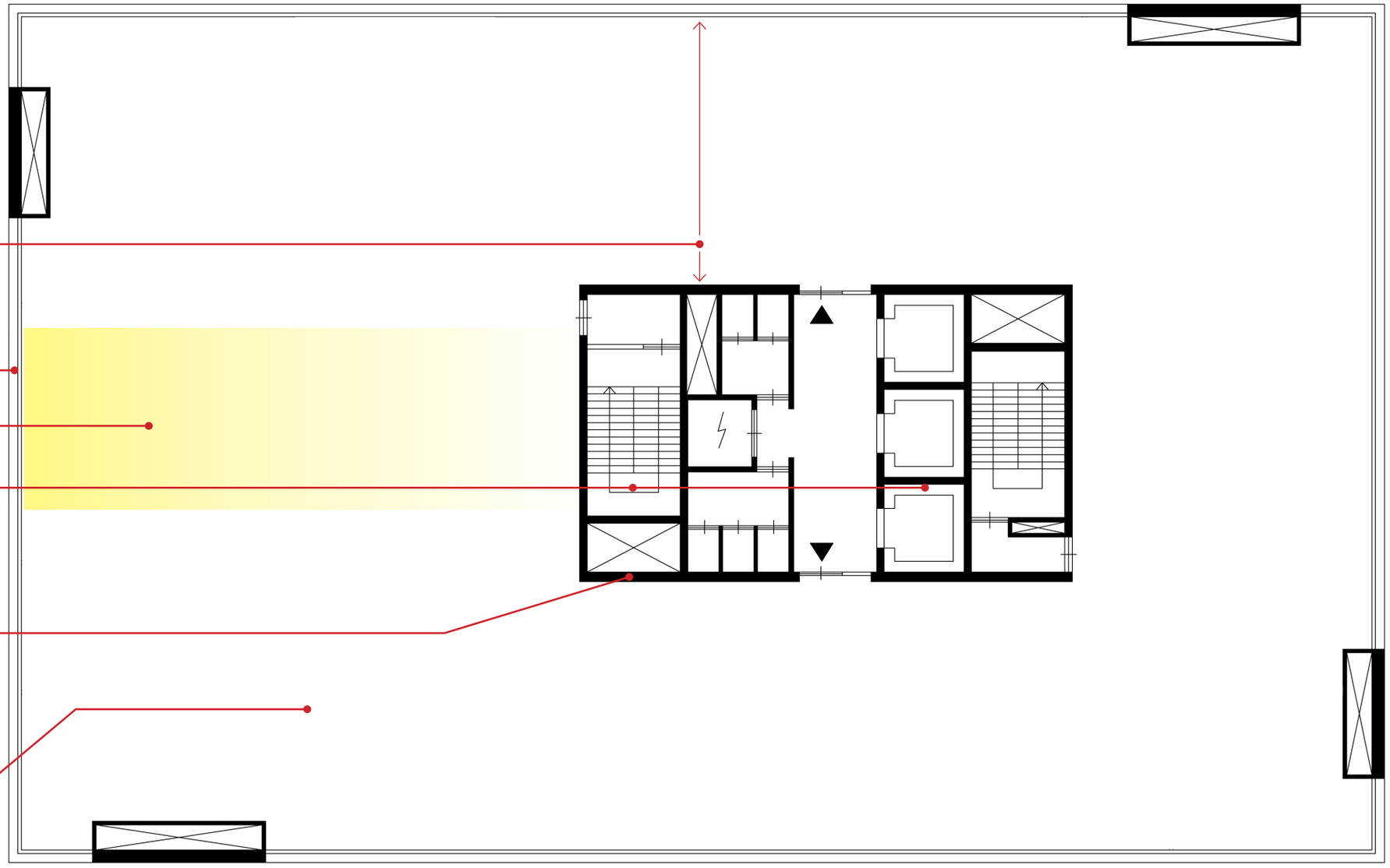
OUTSIDE CONDITIONS

FIRE SAFETY
SUFFICIENCY OF EXISTING ESCAPE ROUTES

FIRE SAFETY REGULATIONS APPLIED TO HOUSING

LOGISTICS
WASTE MANAGEMENT

EXTRA UTILITIES



modified floor plan of the Parool tower, Wibautstraat, Amsterdam

	BENEFICIAL	OBSTRUCTIVE	SOLUTIONS
CONSTRUCTION	• Modular grid sizing of 5.4 or 7.2m, applicable to housing • High ceilings, lowest net heights 2.8m • Columns, free floor fields • Appropriate depth	• Locally lowered ceilings due to beams • Grid structure • Fire safety issues • Columns oppose obstructions (acoustic, thermal and moisture)	• Separate placement of units ensures acoustical quality and fire safety standards
FLOORS	• Designed for high floor loads, 300 kg/m^2. Normative for housing is 175 kg/m^2.	• Post tension bars; often low flexibility for vertical shaftwork • Low mass. Raised floor and lowered ceiling needed to comply to building regulations. • Deflection of floors	• Use existing elevators as utility shafts • New box-in-box construction • 3D scanning to map the deflections and deviations for digital fabrication input
ENVELOPE	• Modular grid sizing of 1.8m and loadbearing walls. Good connections possible.	• Curtain walls; bad technical conditions. No connections possible for function separating walls. • Cantilevered floors; applicability of balconies is difficult. • New façade is expensive.	• A new façade is needed in order to properly redevelop into housing solutions
VERTICAL ACCESSIBILITY	• Elevators are oversized for housing purposes.	• Often not enough escape routes. • Stairs and elevators account for relatively much space.	• Possibility of adding extra stairs inside or outside the building

based on literature research

TORENHOVE, DELFT

THE BASE

SITE PLAN (1:1000)

NEIGHBOURHOOD MAPPING

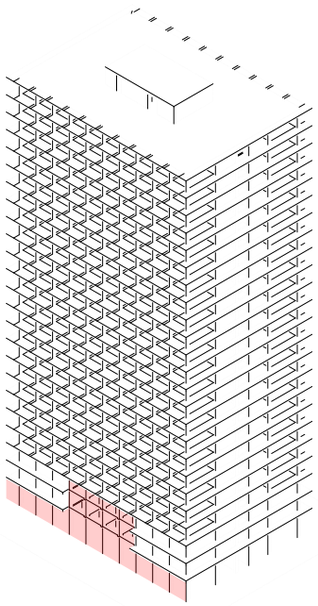
TRANSFORMATION POTENTIAL

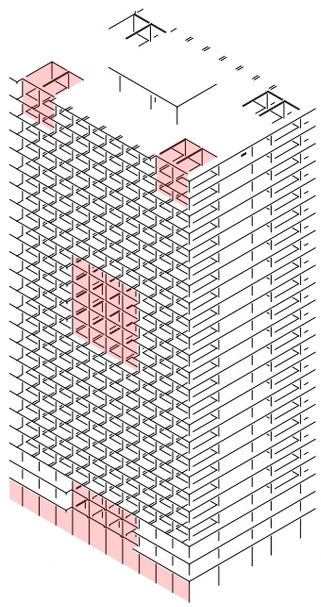
ASPECT	CRITERION	✓
LOCATION		
Urban situation	Office on remote industrial zone	
	Office in the middle of an office park	
	Office in area defined as priority area for offices	
Land property	Land rent	
Vacancy	Vacant for more than a year	
	Vacancy of surrounding buildings	
Character of urban situation	Location on or near city edge, ring roads	
	Desolated area	
	No greenery in the neighbourhood	
	Social depreciation, vandalism	✓
	Pollution; smell, noise, view	
Distance and quality of facilities	Shop for daily errands > 1km	
	Meeting place (café, snackbar, etc.) > 500m	
	Bank/post office > 2km	
	Basic medical facilities (doctor, pharmacy) > 5km	
	Sport facilities (fitness, swimming pool, sports park) > 2km	
	Educational facilities (nursery, school, university) > 2km	
Accessibility by public transport	Distance to station > 2km	
	Distance to bus, metro or tram stop > 1km	
Accessibility by car; parking	Many obstacles, limitations, poor flow	
	Distance to parking place > 250m	
	< 1 parking place / 100m^2 dwellings reasonable	
BUILDING		
Year of construction	Building was built or renovated recently (three years)	
Character of the building	Unrecognisable, non-eloquent*	
	Poor maintenance	
Extensibility	Not extensible horizontally	✓
	Not extensible vertically	✓
Structure	Structure in technically bad condition	
	Dense structural grid, < 3.6m	
Dimensions	Net story height < 2.6m	
Façade*	Façade openings not adaptable	
	Impossible to create windows which can be opened manually	
	Daylight entry < 10 percent of the living area	
Entrance (building, dwelling)	Impossible to create a socially secure entrance	
	Impossible to realise elevator in the building (if more than four floors)	
	Distance from dwelling to stairs/elevator > 50m	
	Impossible to realise escape stairs according to escape demands	
Installations*	No or insufficient conduits realisable	
Environment	Noise level at the façade > 50dB	
	Sufficient insulation between dwellings impossible	
	Sufficient insulation of façade impossible	
	Presence of dangerous materials in construction	
	No or little sunlight	

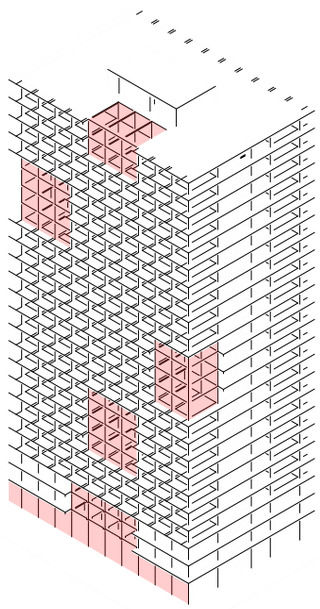
EXISTING BUILDING

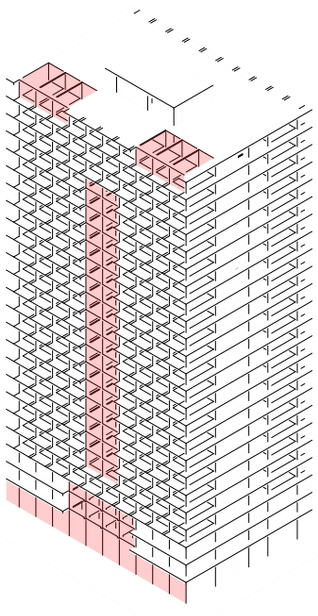
STRIPPED BUILDING

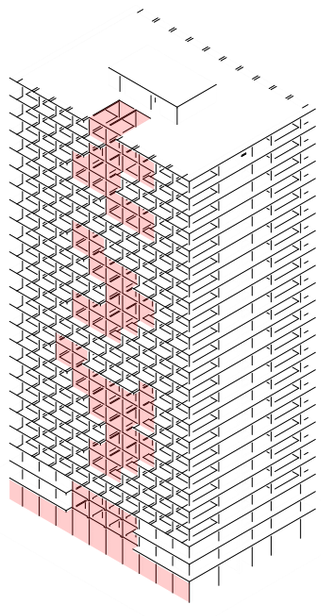
VOID OPTIONS

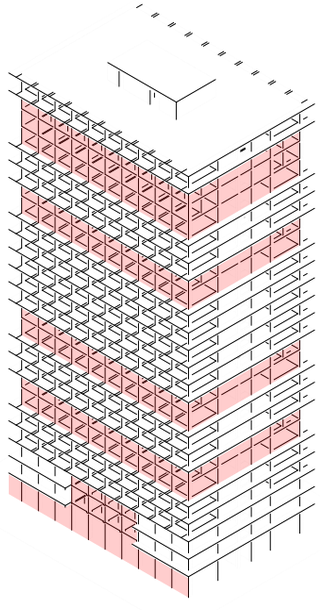




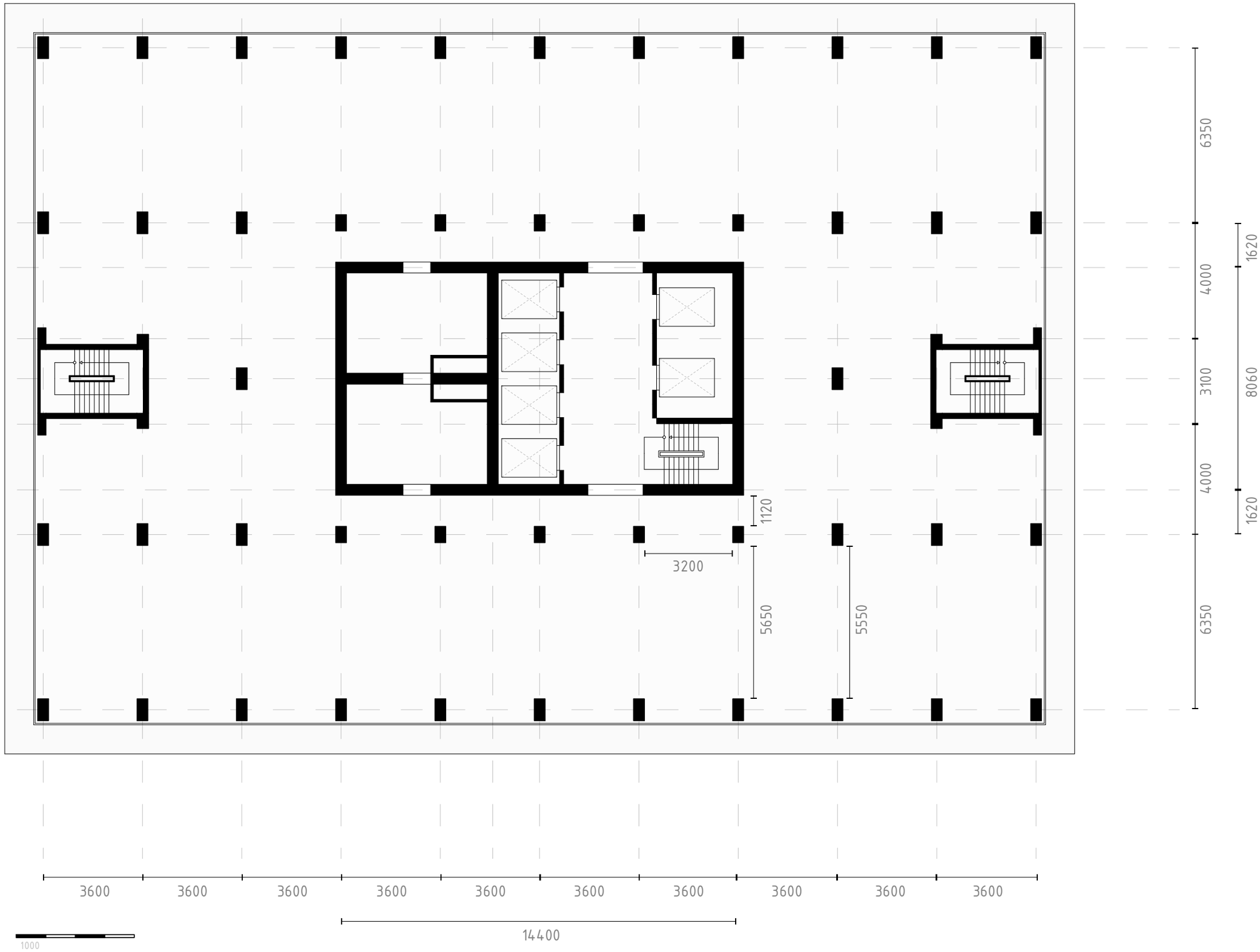




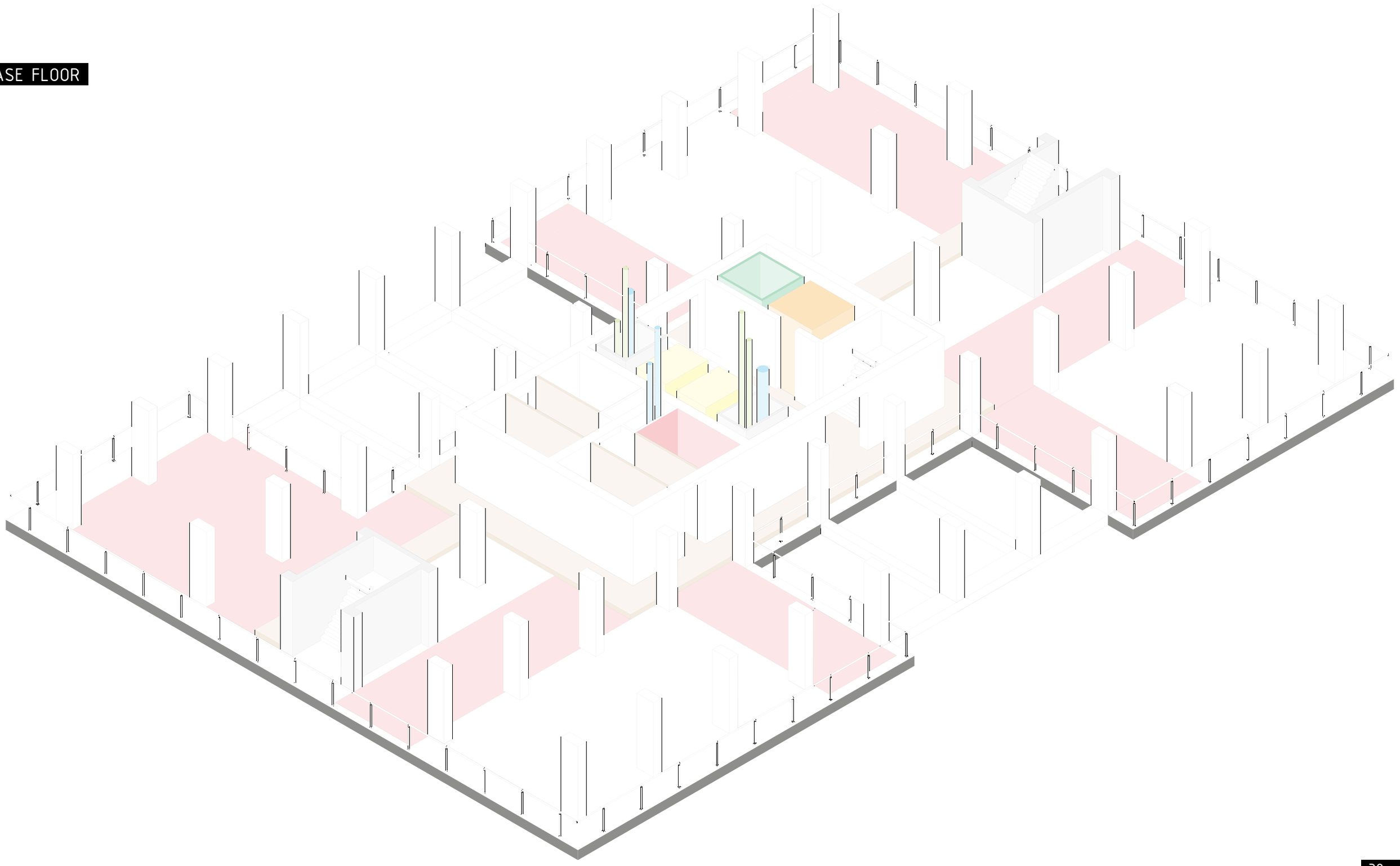




INVENTARISATION

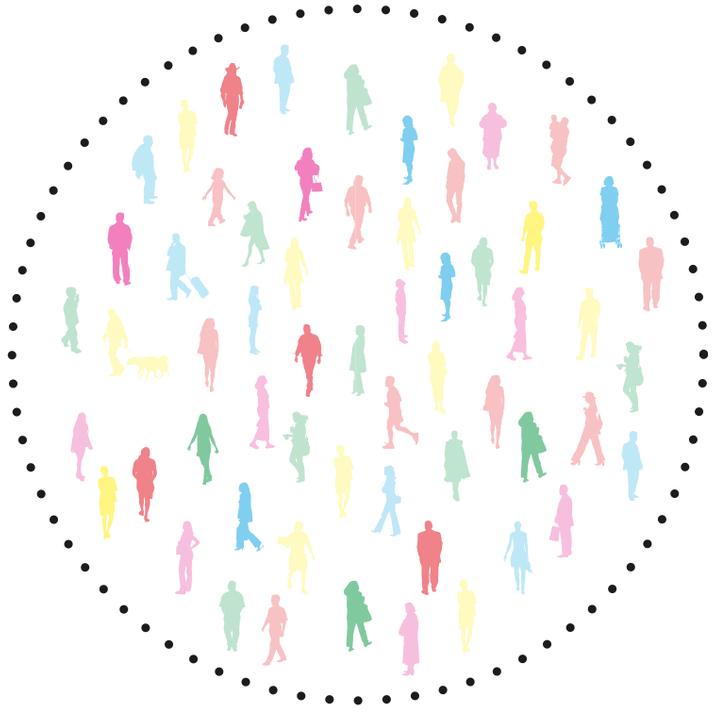


BASE FLOOR

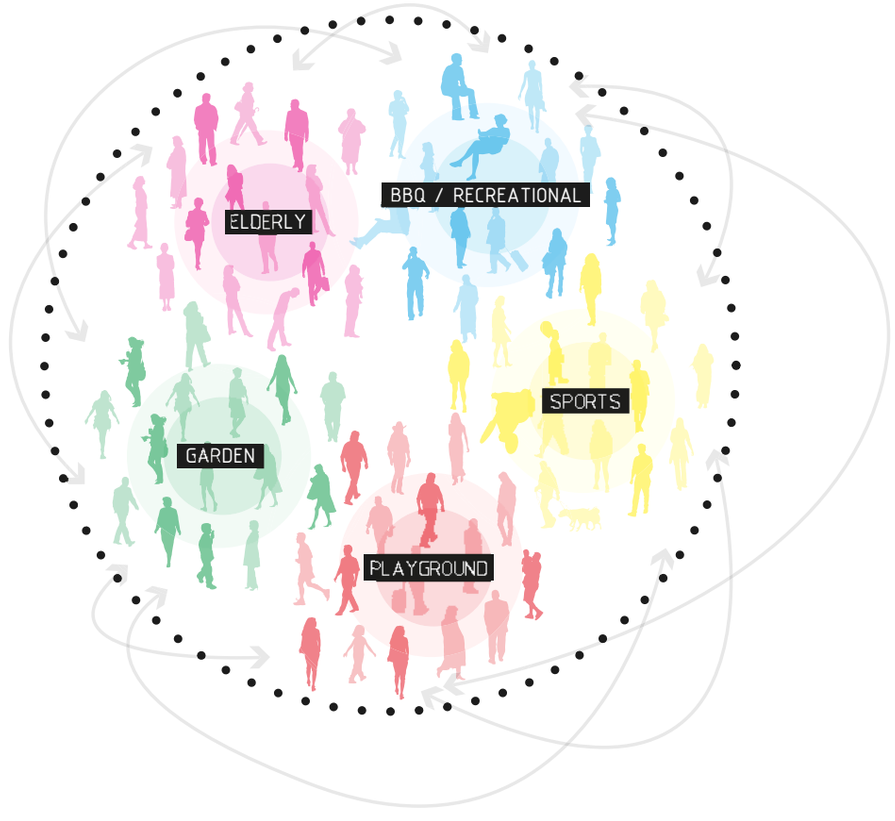


THE COLLECTIVE

HIGH-RISE | INDIVIDUALITY

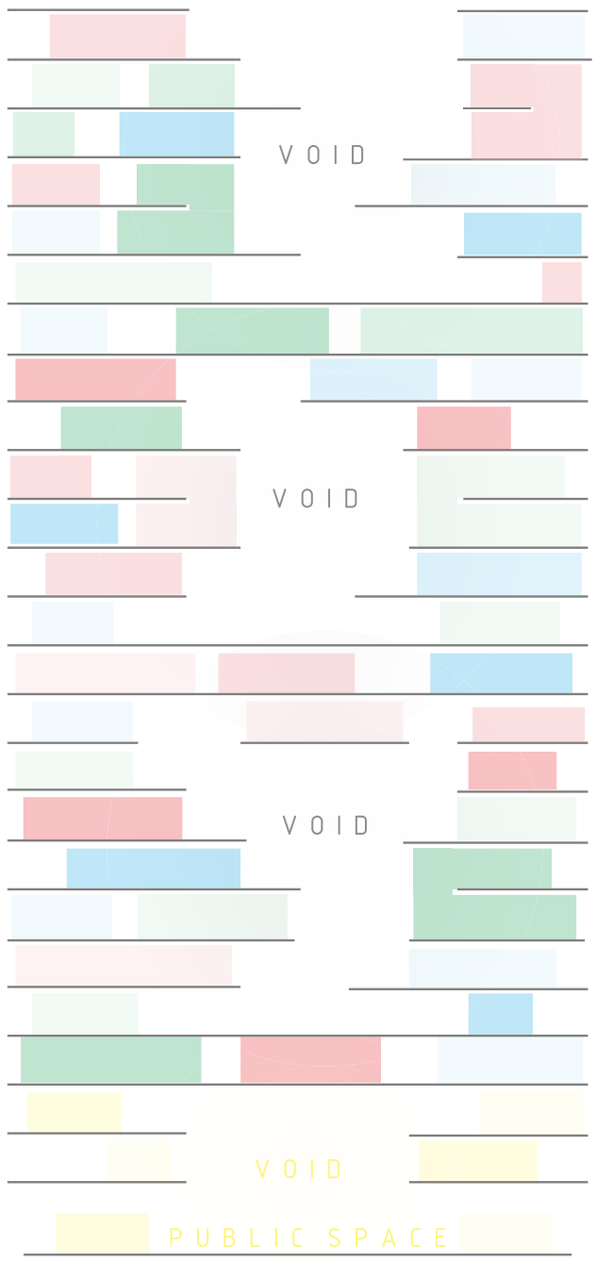


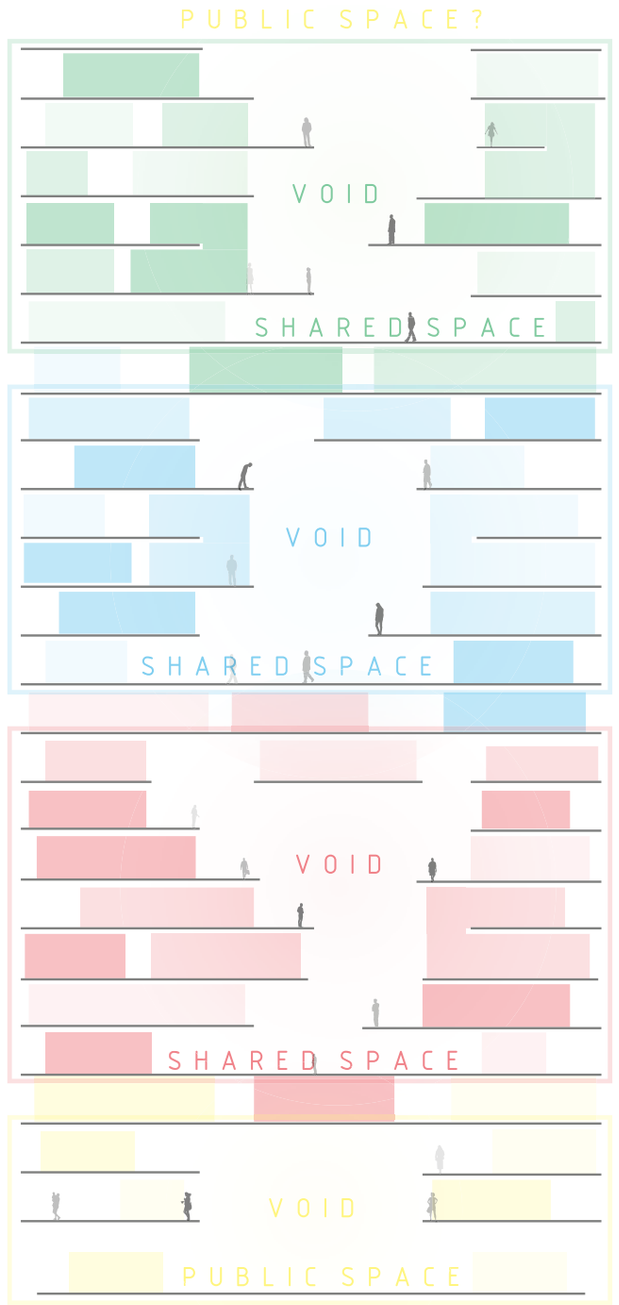
THE MERGER OF INTEREST
COLLECTIVE GROUPING



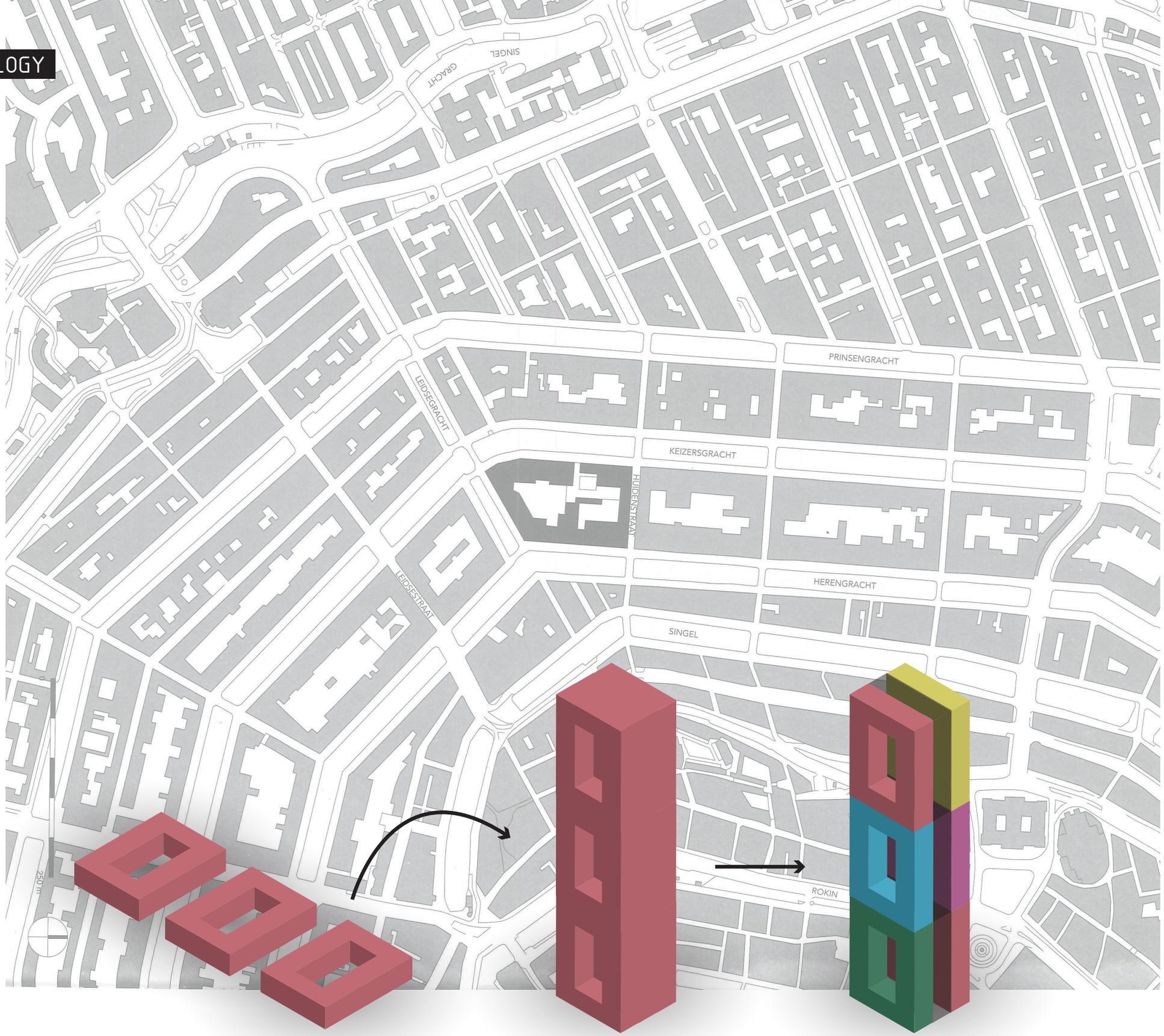
THE MERGER OF INTEREST

COLOURED ON FUNCTIONAL ORGANIZATION, NOT ON AESTHETICS





SCALE ANALOGY

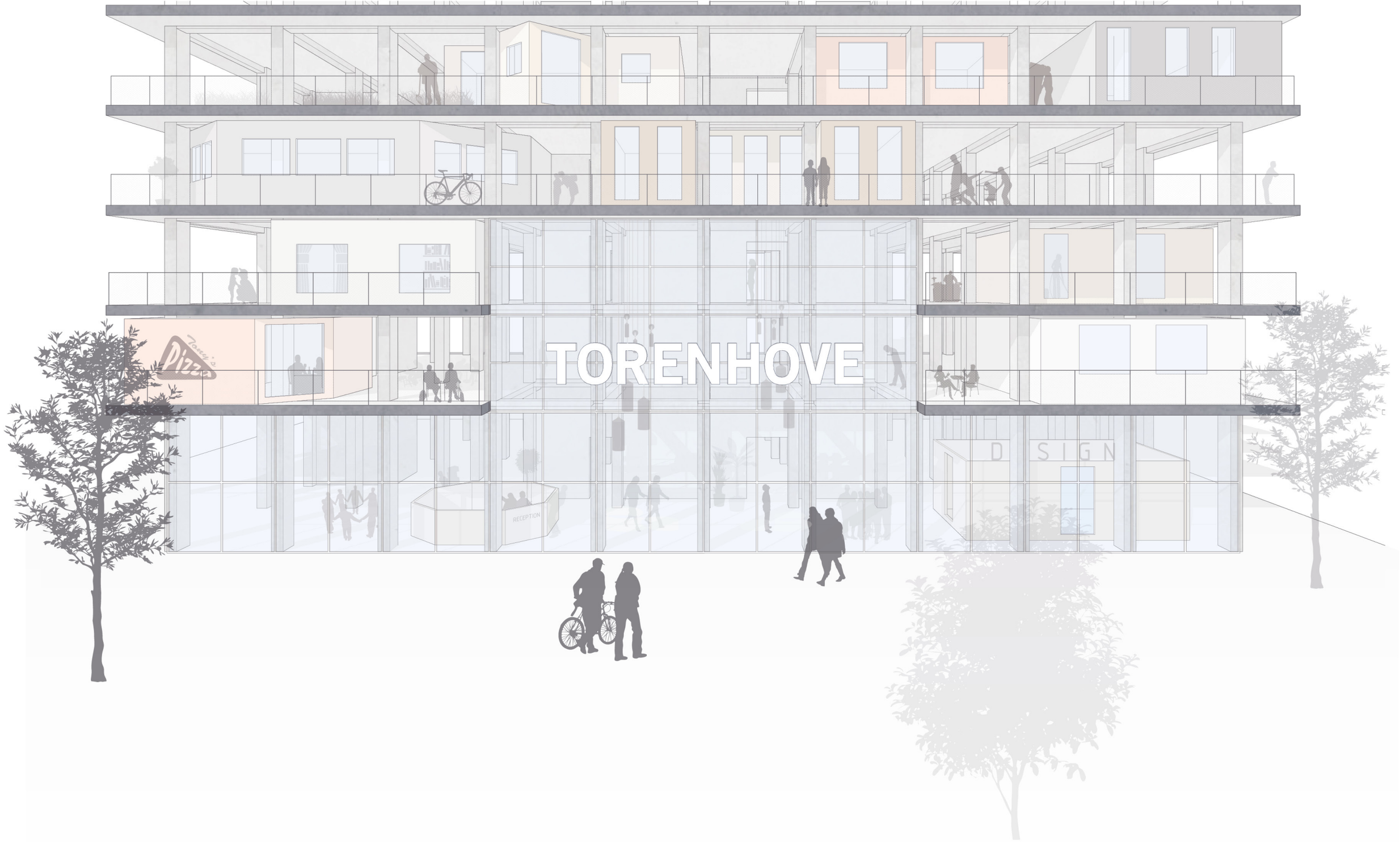


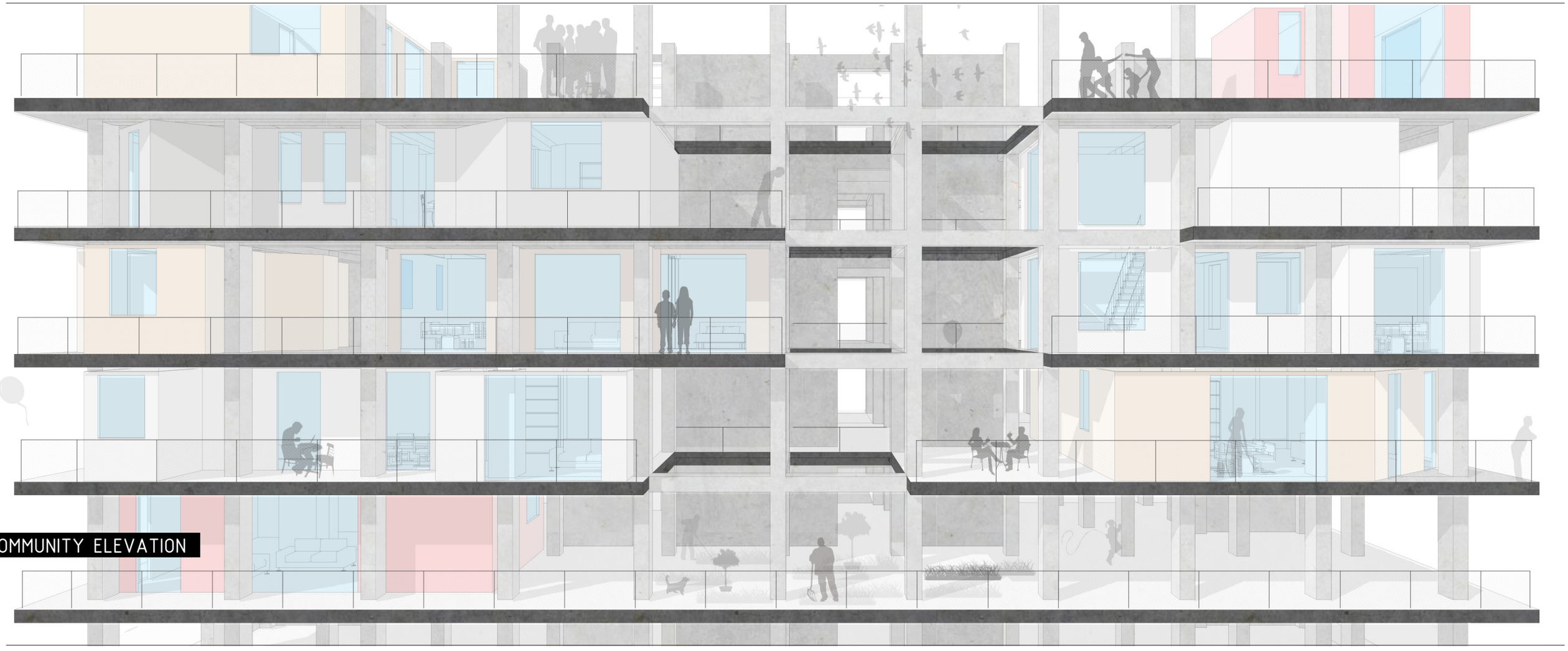
Atlas van het Nederlandse bouwblok, p. 16

HOUSING BLOCK WITH COLLECTIVE INTERIOR

HIGH RISE TOWER WITH COLLECTIVE INTERIORS

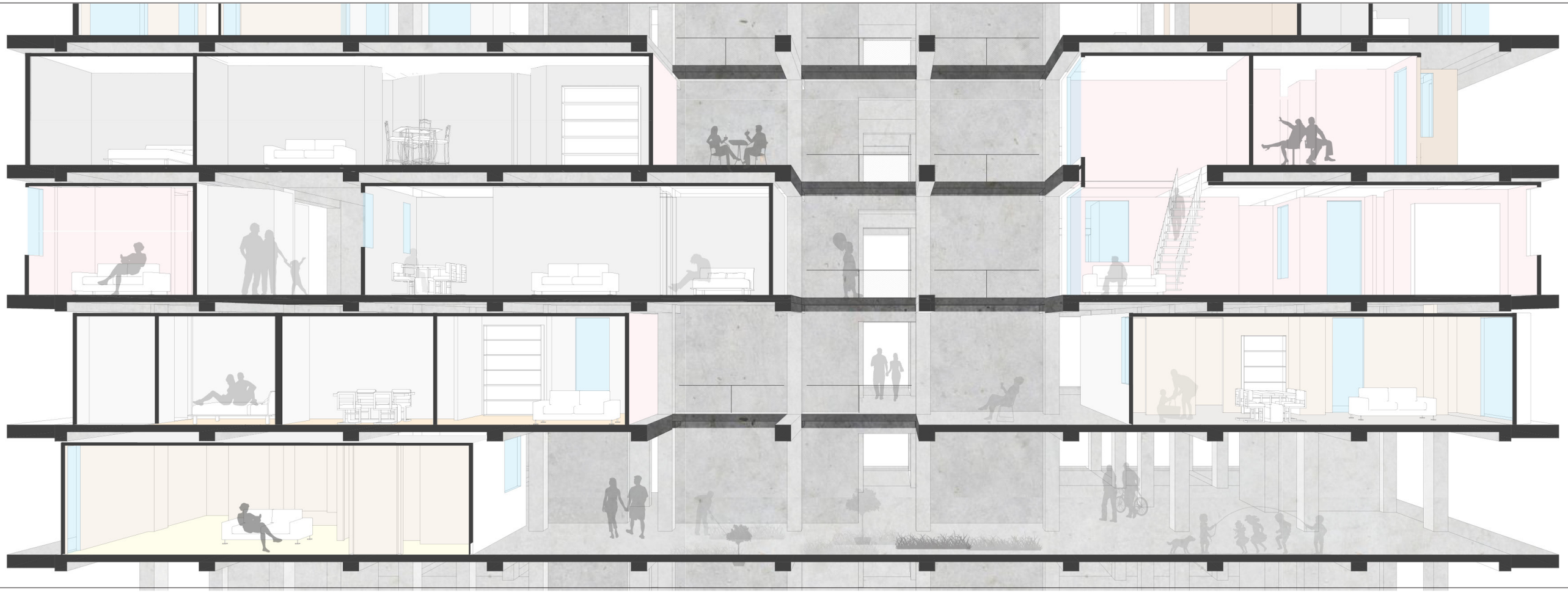
HIGH RISE TOWER WITH PROGRAMMATIC COLLECTIVE INTERIORS


TORENHOVE
RECEPTION
D SIGN

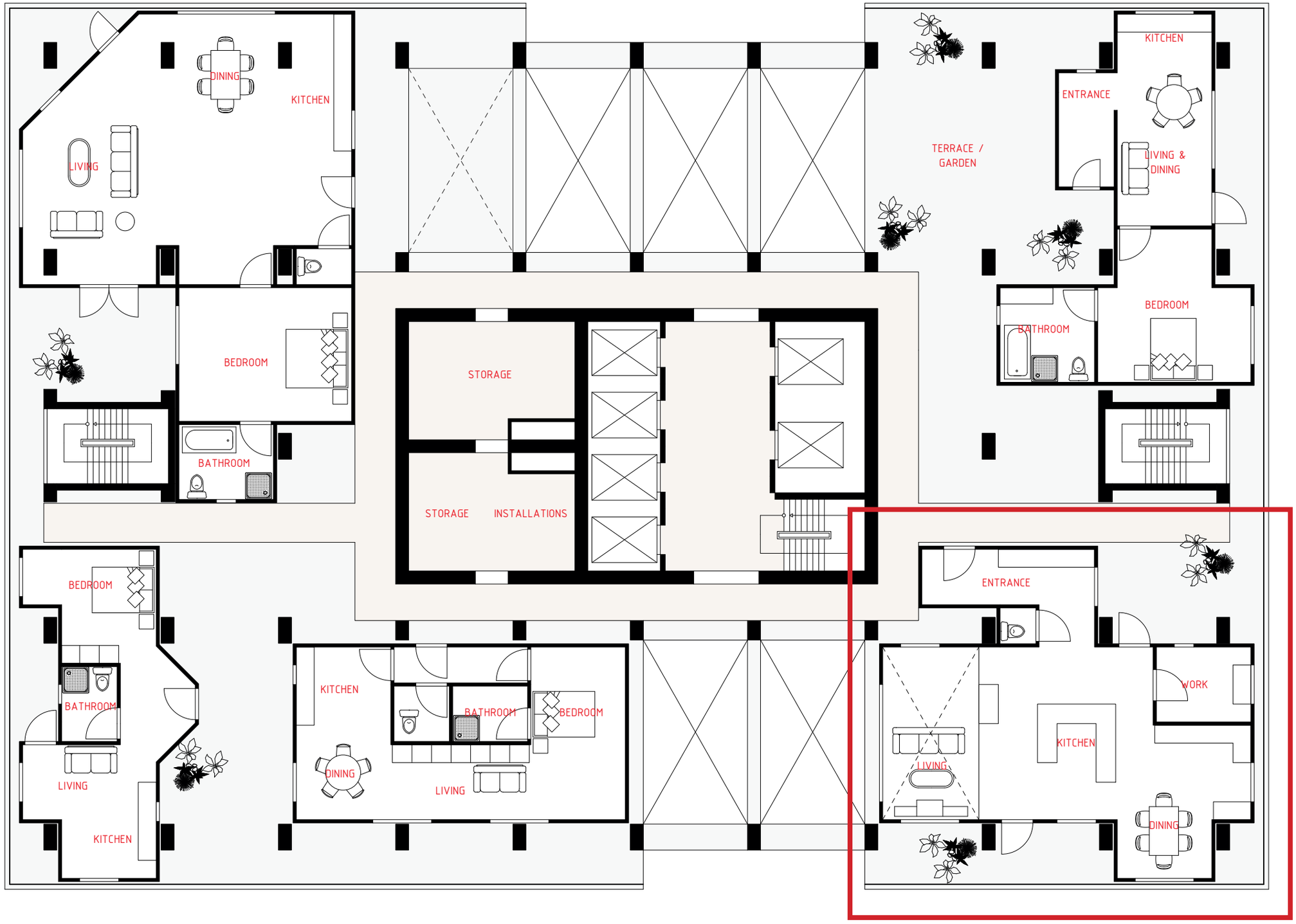


COMMUNITY ELEVATION

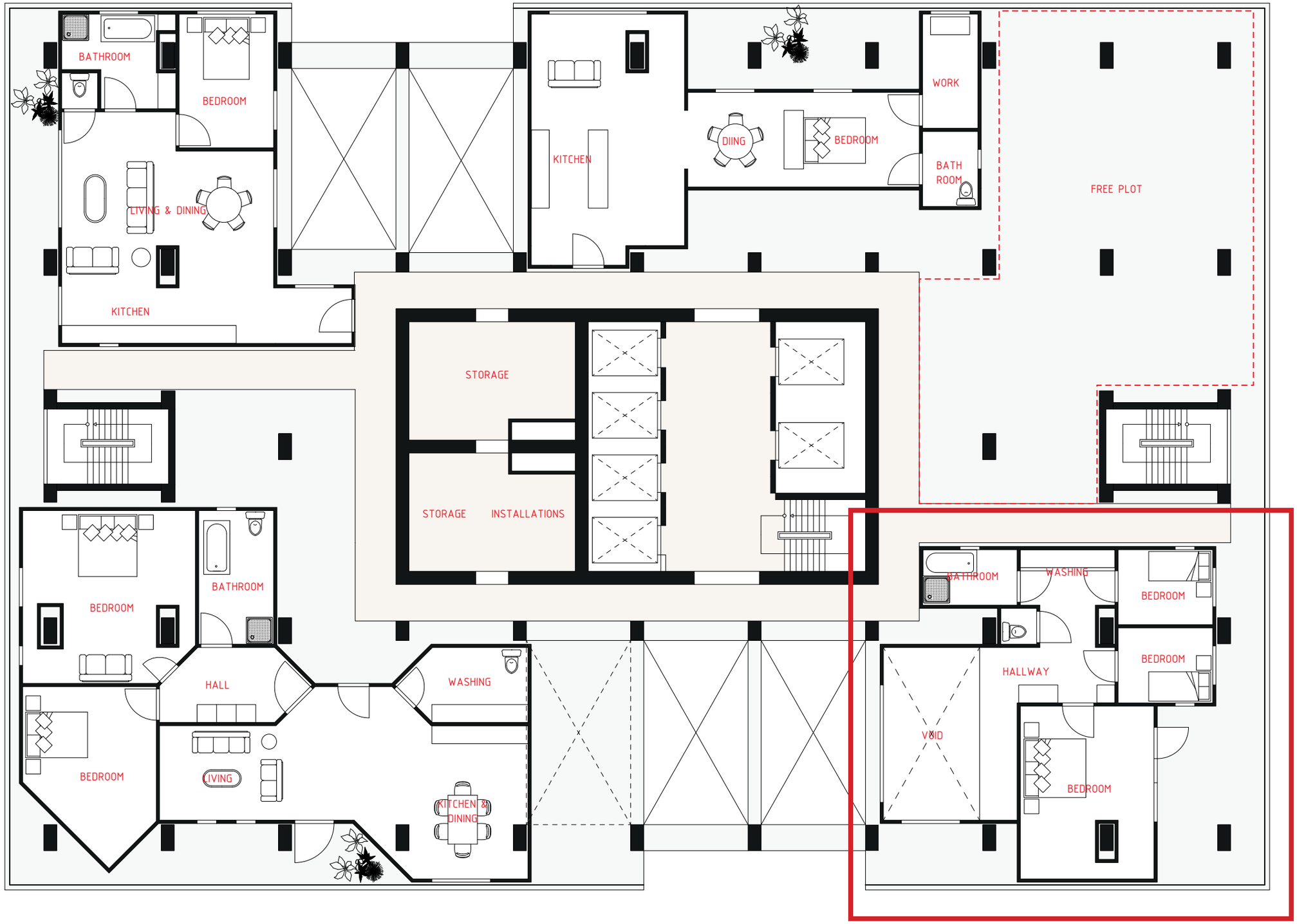
COMMUNITY SECTION



FLOOR PLAN


DINING
KITCHEN
LIVING
BEDROOM
BATHROOM
STORAGE
STORAGE
INSTALLATIONS
TERRACE /
GARDEN
KITCHEN
ENTRANCE
LIVING &
DINING
BEDROOM
BATHROOM
BEDROOM
BATHROOM
LIVING
KITCHEN
KITCHEN
BATHROOM
BEDROOM
DINING
LIVING
ENTRANCE
WORK
KITCHEN
LIVING
DINING

FLOOR PLAN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BEDROOM
LIVING & DINING
KITCHEN
KITCHEN
DIING
BEDROOM
WORK
BATH ROOM
FREE PLOT
STORAGE
STORAGE
INSTALLATIONS
BEDROOM
BATHROOM
HALL
WASHING
BEDROOM
LIVING
KITCHEN & DINING
BATHROOM
WASHING
BEDROOM
BEDROOM
HALLWAY
VOID
BEDROOM

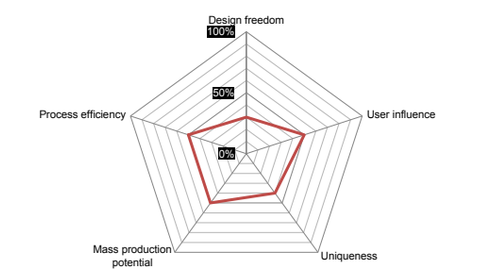
THE FIT-OUT

A CUSTOMIZED DWELLING, BASED ON GENERIC PRINCIPLES

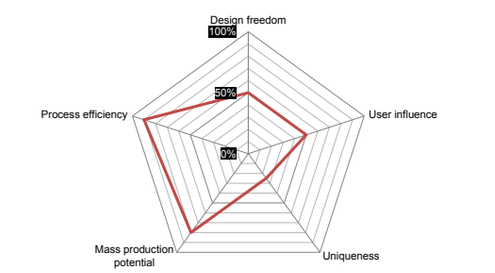
CUSTOMIZATION CATEGORISATION & ANALYSIS

CLASSIFICATION ON: DESIGN FREEDOM, USER INFLUENCE, UNIQUENESS, MASS PRODUCTION POTENTIAL AND PROCESS EFFICIENCY.

CLOSED ELEMENTAL

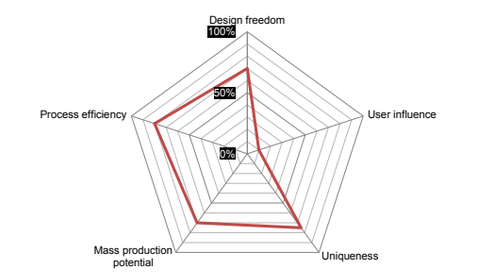


CLOSED SPATIAL

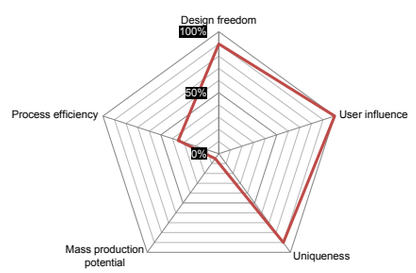


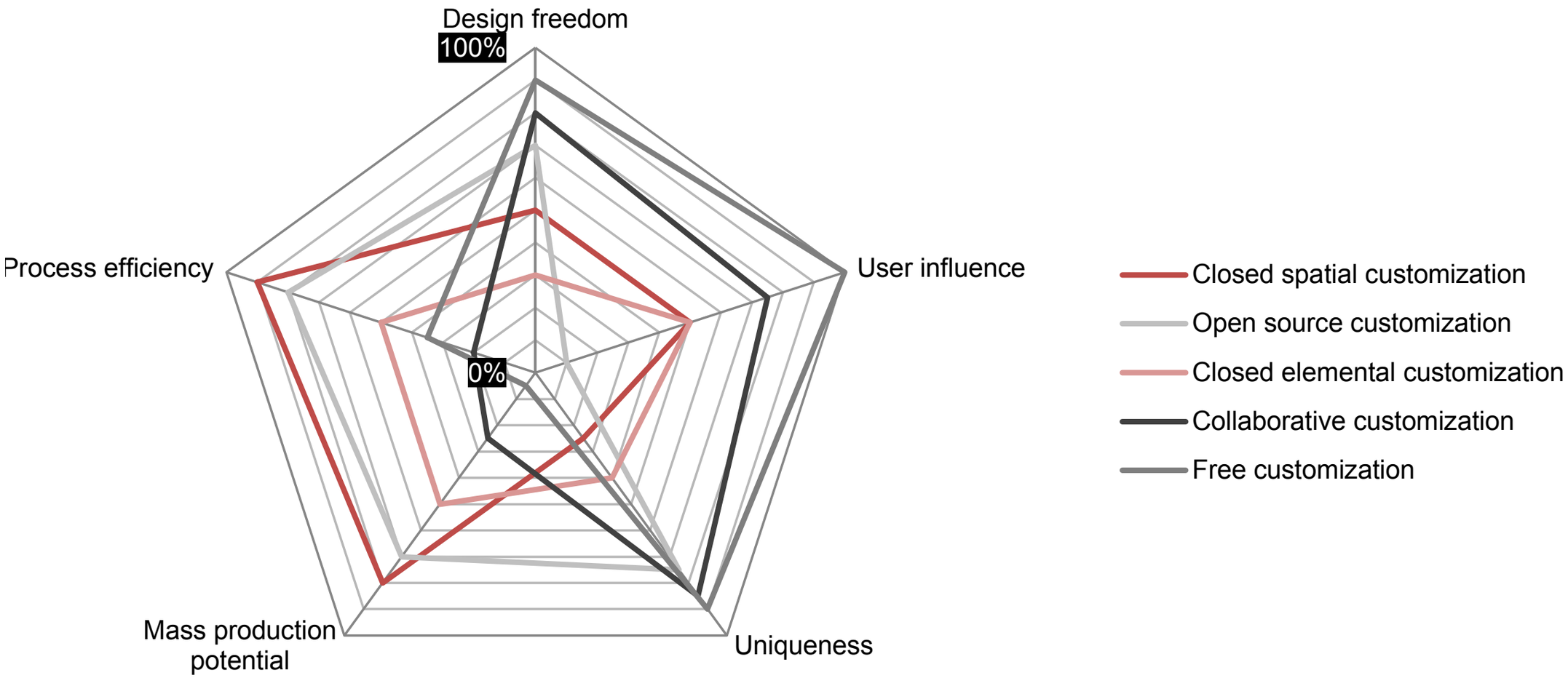
COLLABORATIVE

OPEN SOURCE



FREE





MODULAR LANGUAGE WITH FREEDOM

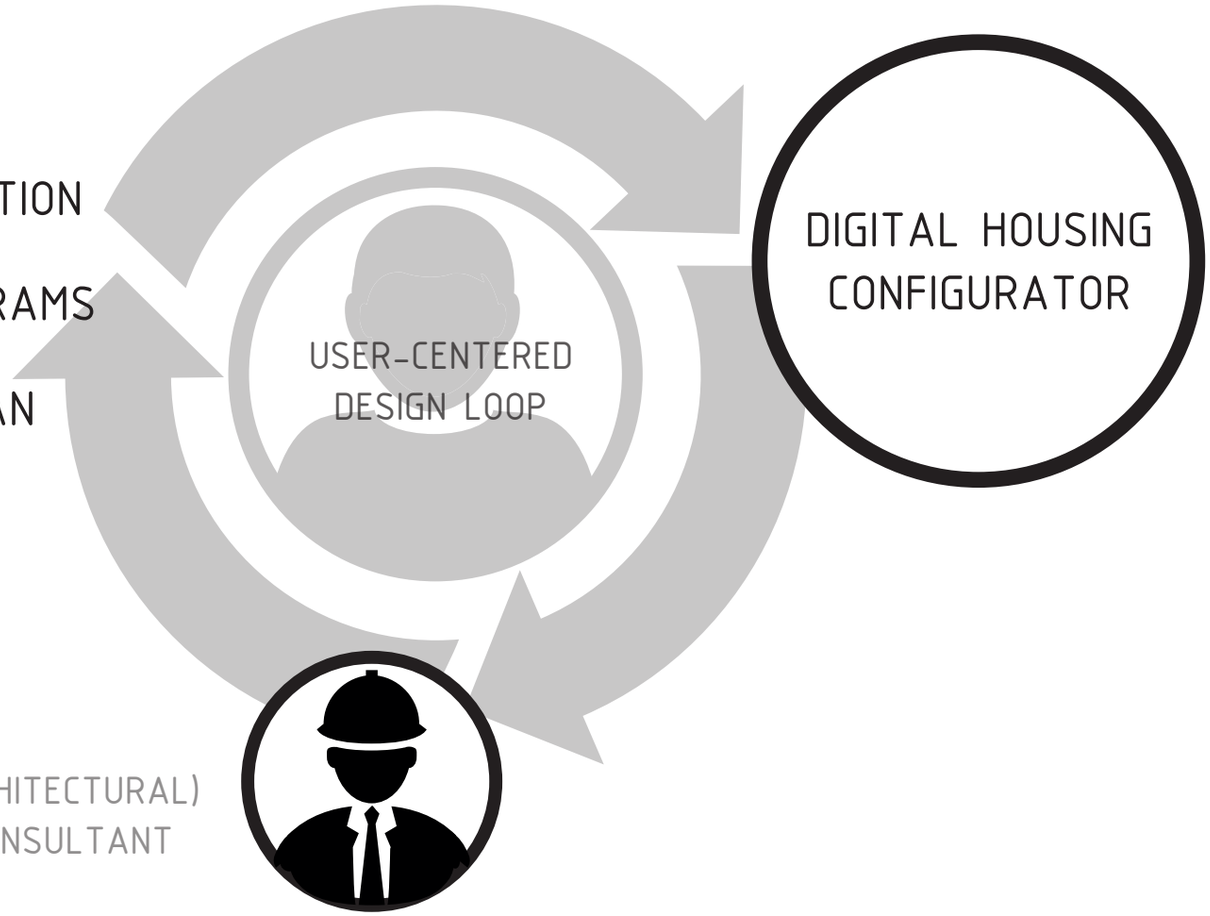
1. ACTIVITY LISTING

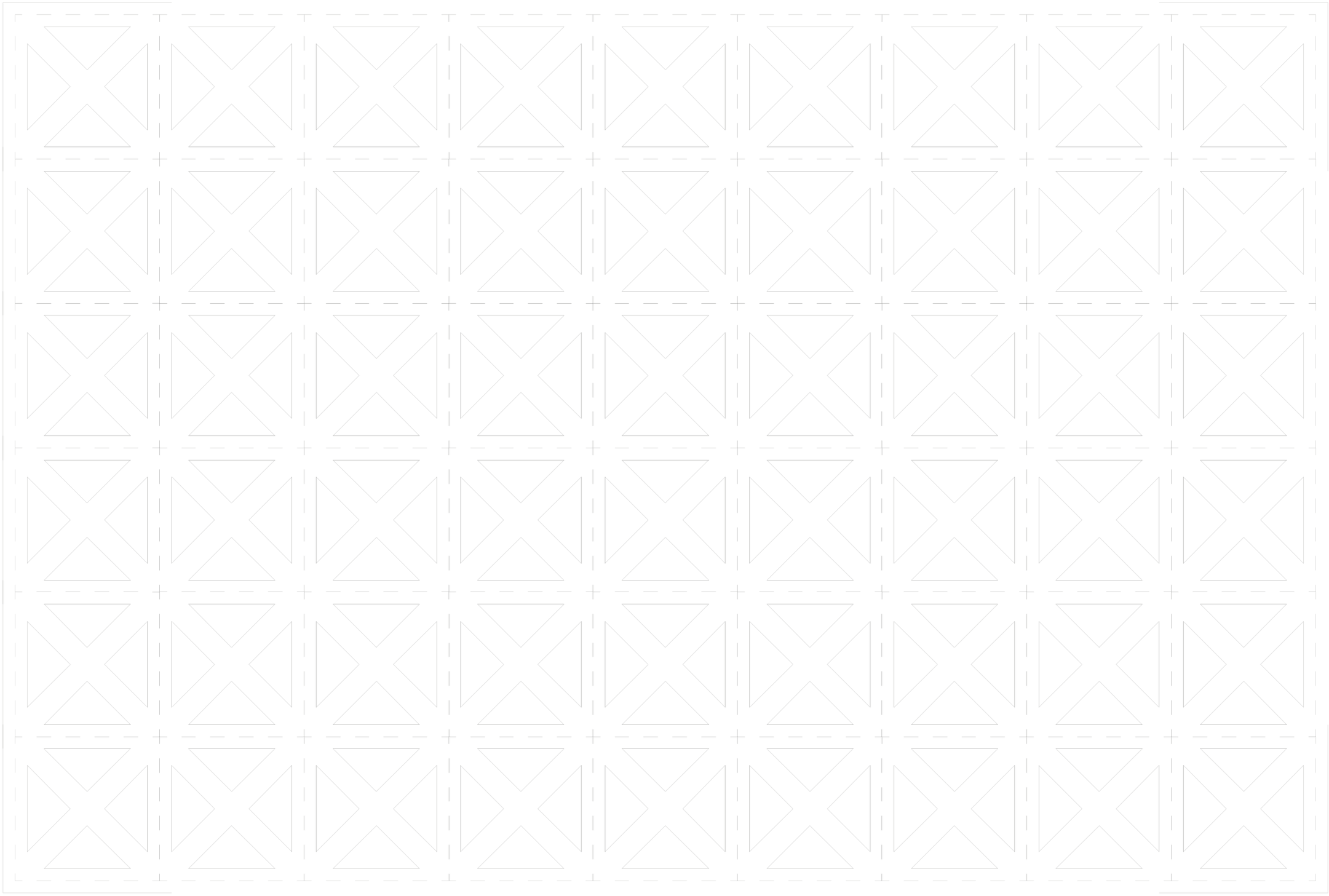
2. ACTIVITY DESCRIPTION

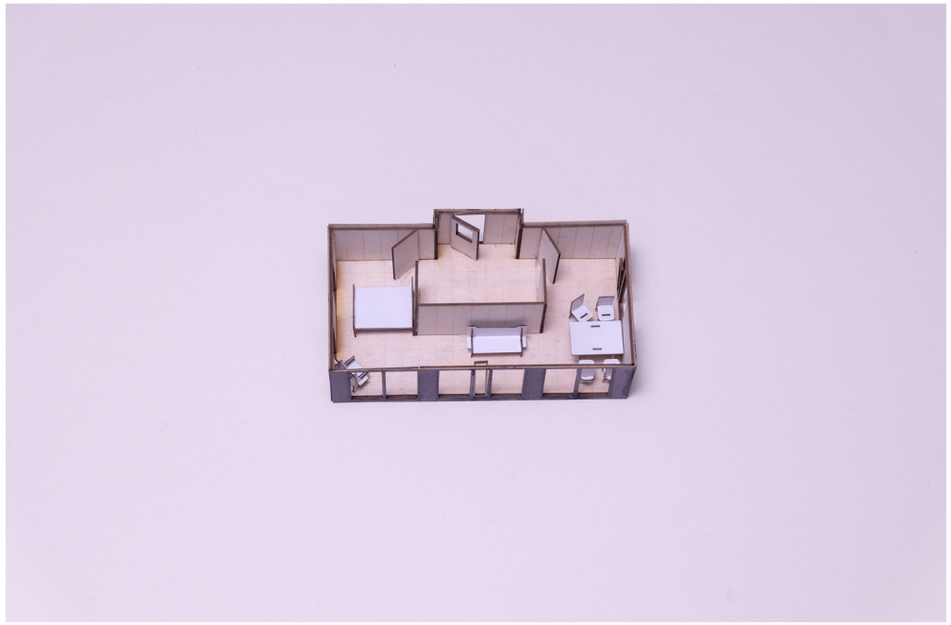
3. RELATIONAL DIAGRAMS

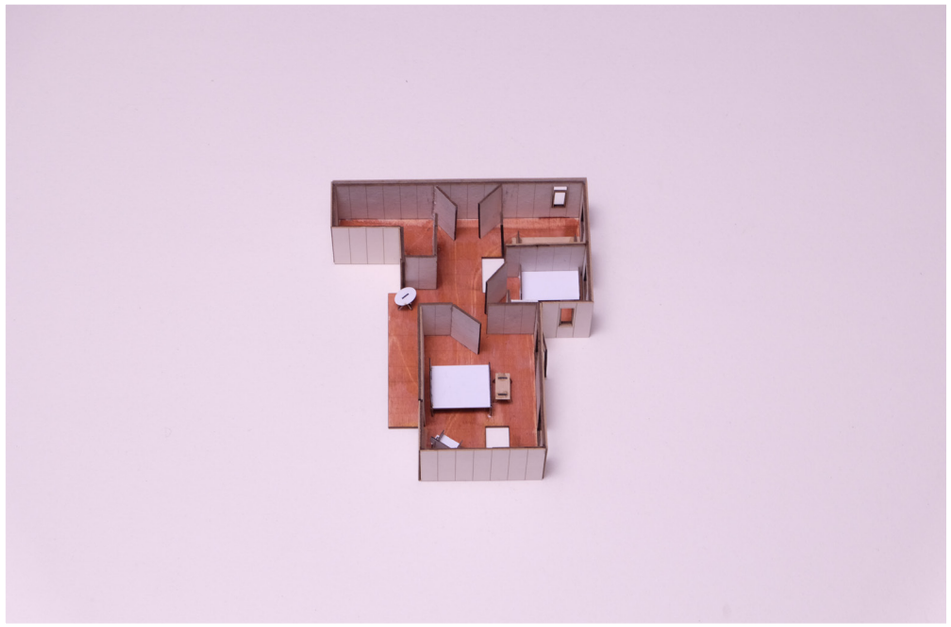
4. INITIAL FLOOR PLAN

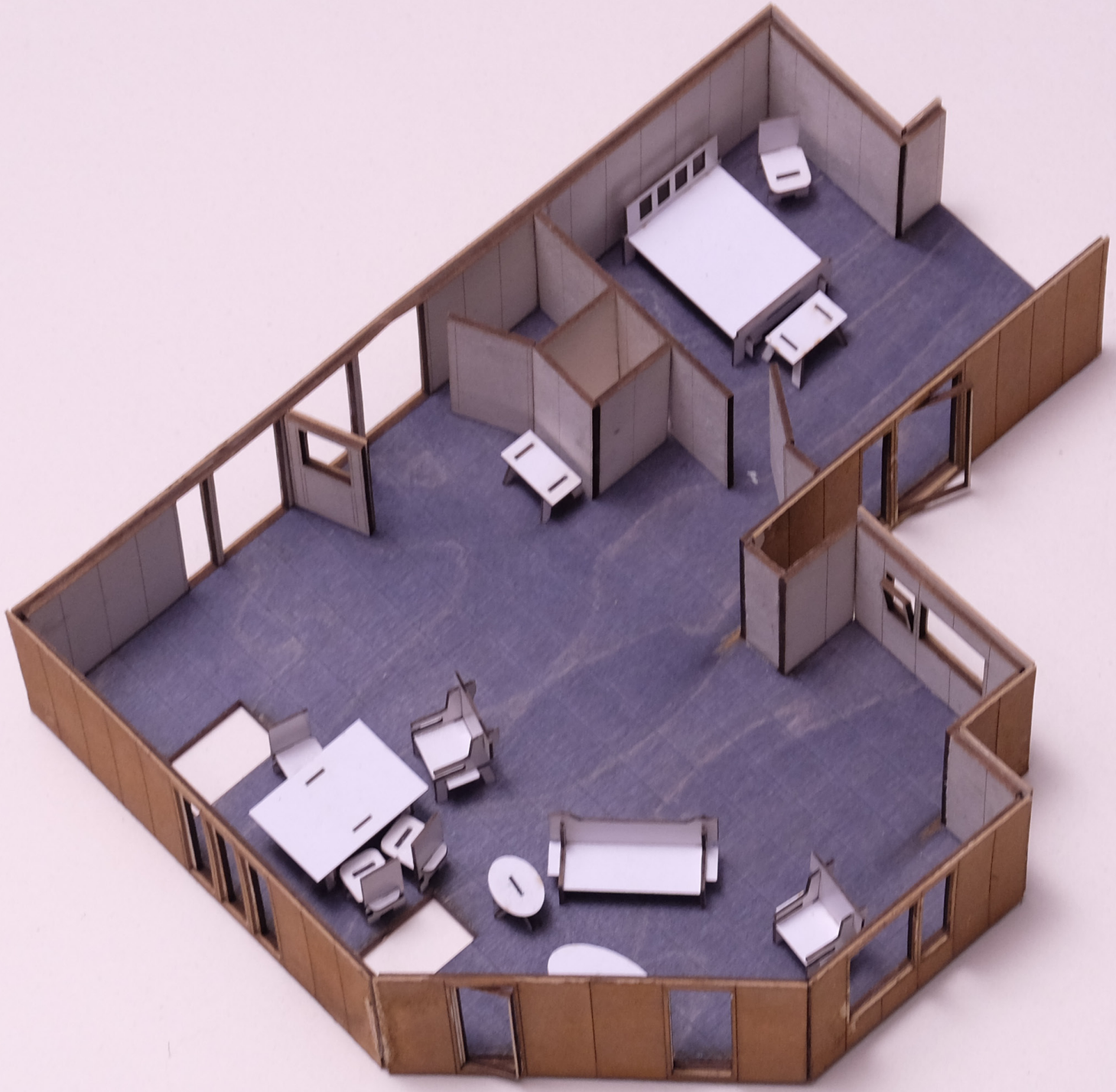
5. FINAL DESIGN

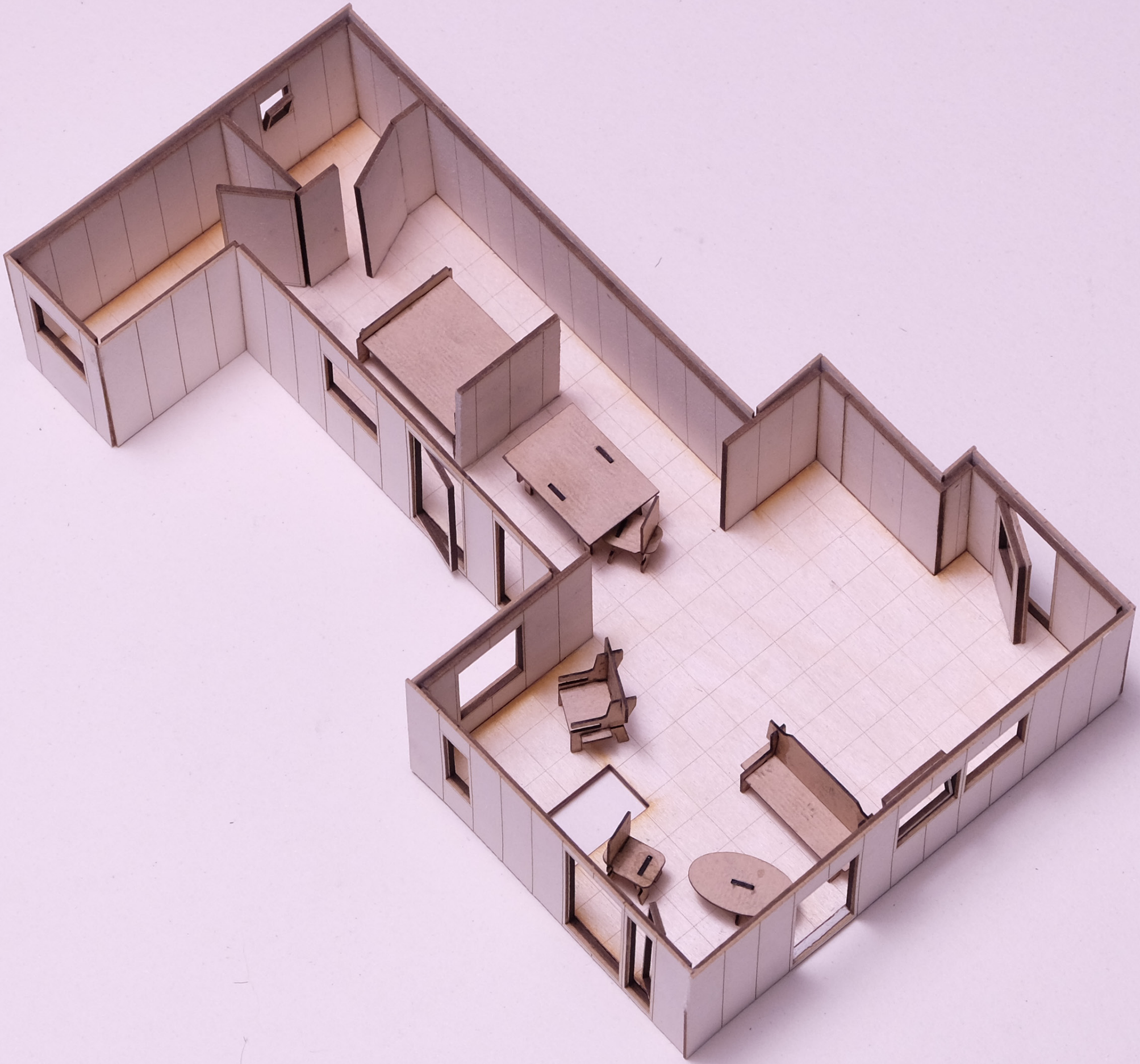


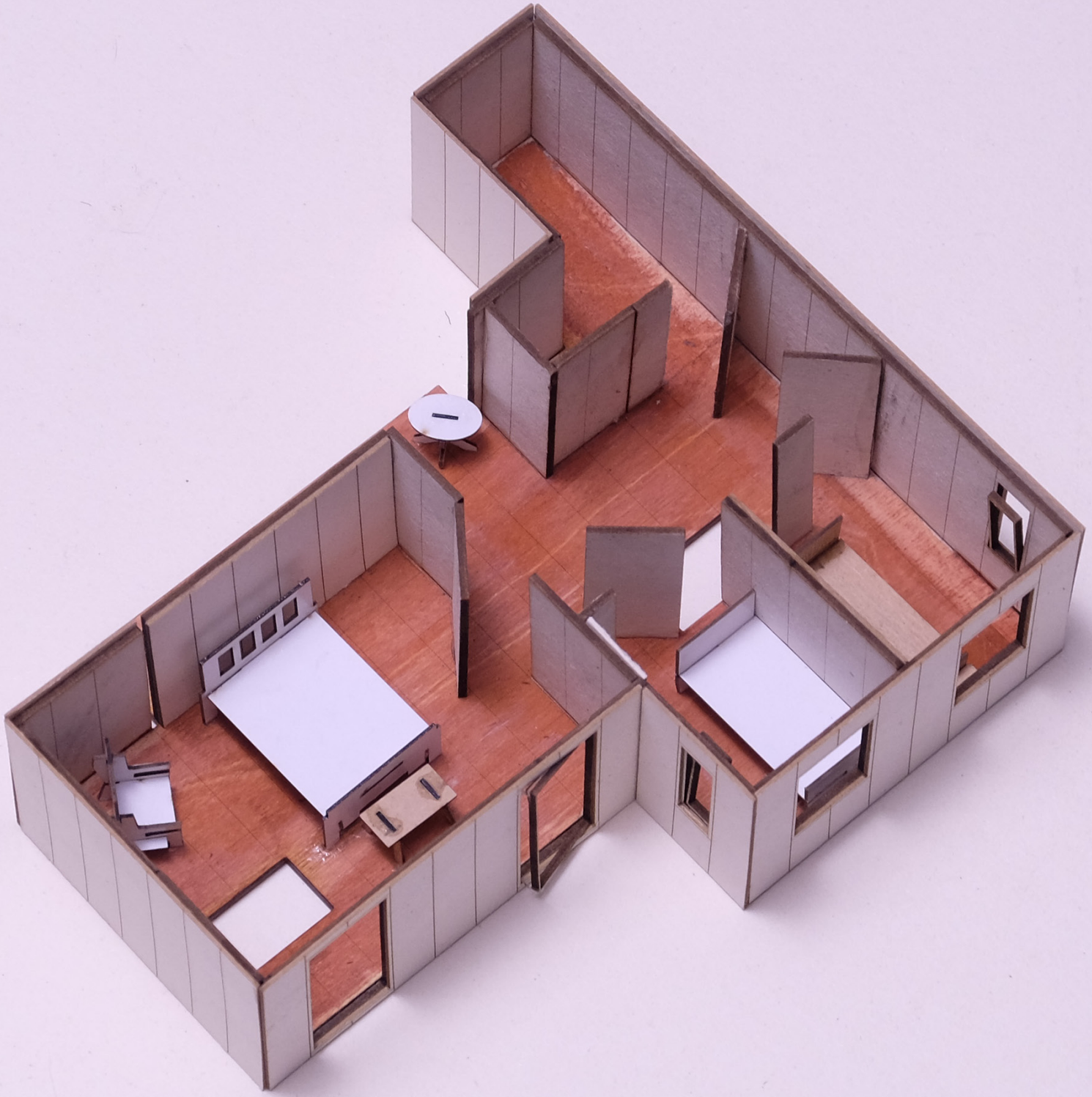




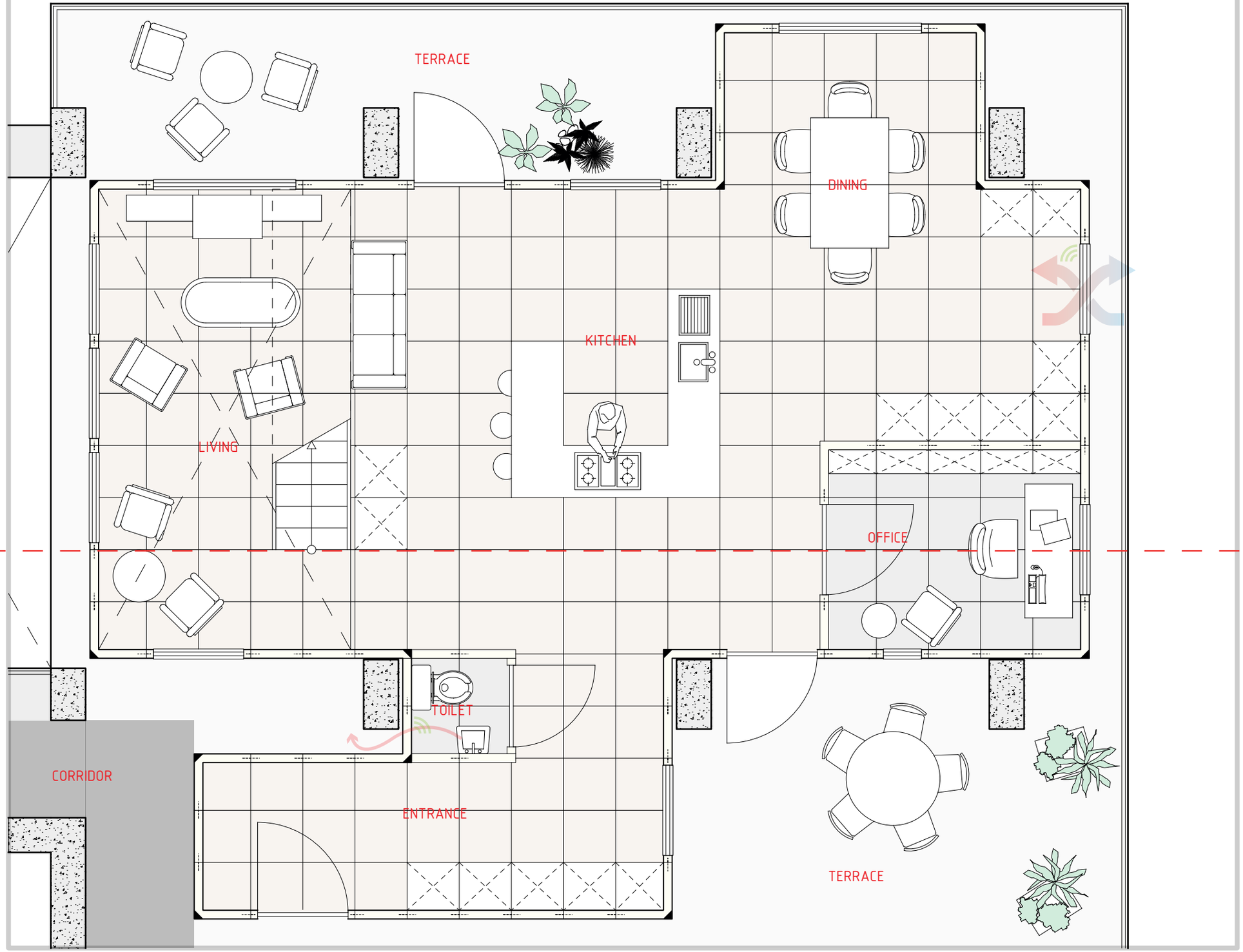






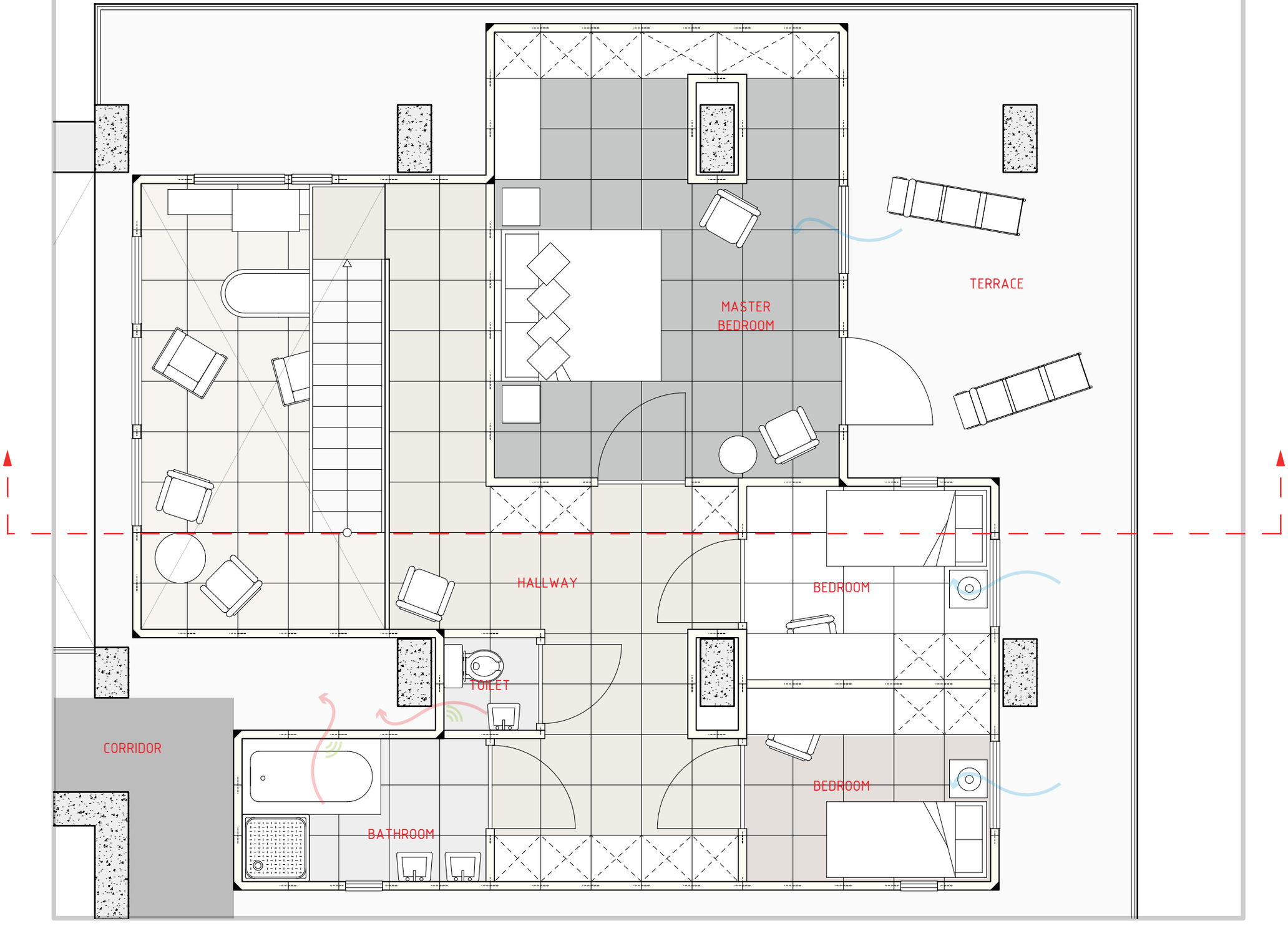


FLOOR PLAN



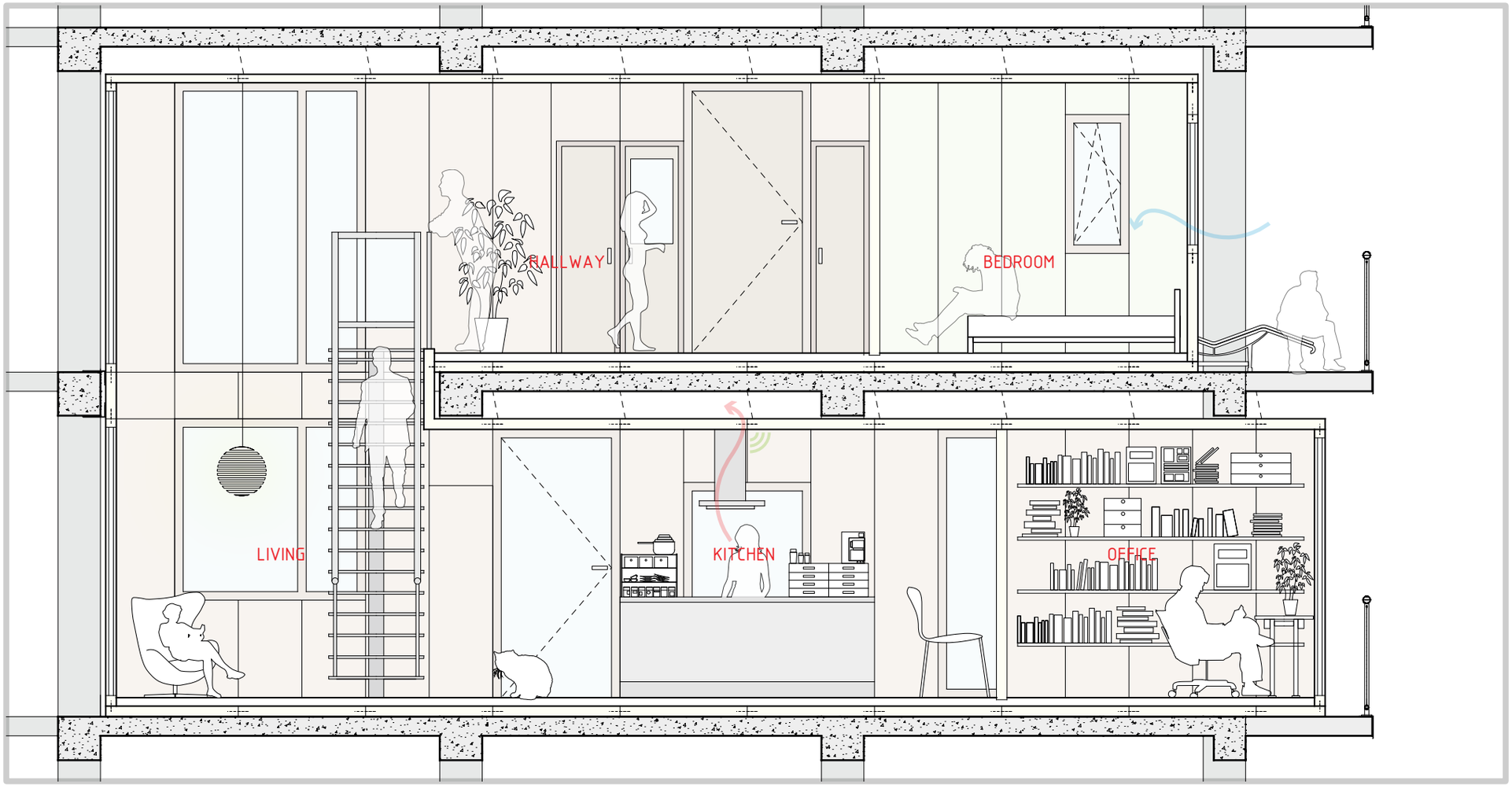
Ground floor plan, 1:50

FLOOR PLAN



First floor plan, 1:50

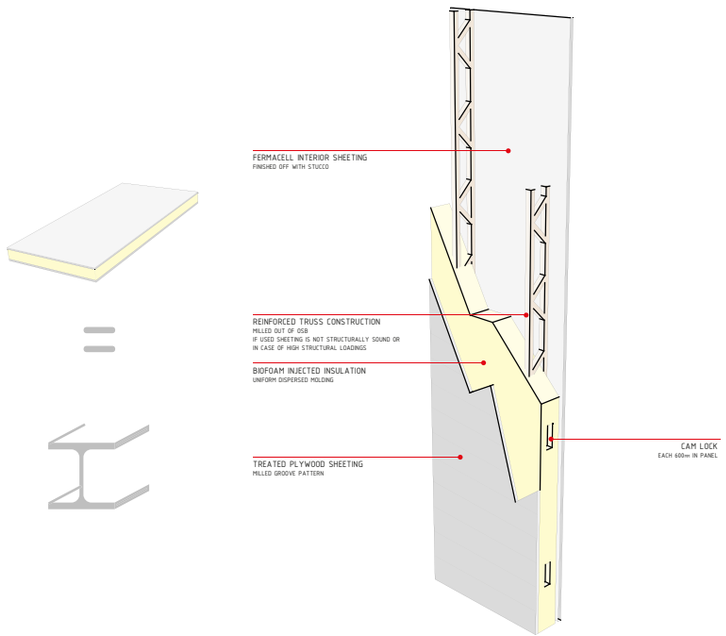
SECTION



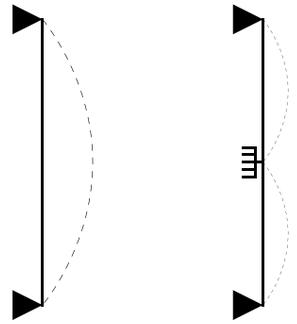
Longitudinal section, 1:50

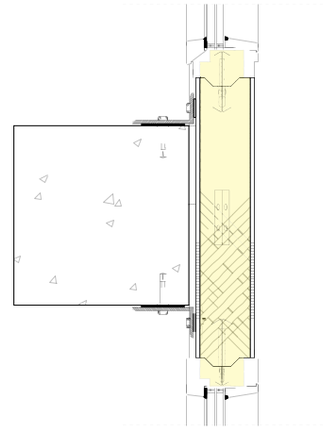
STRUCTURAL PRINCIPLES

STRUCTURAL INSULATED PANEL CONSTRUCTION A

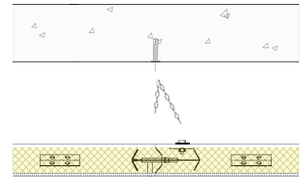


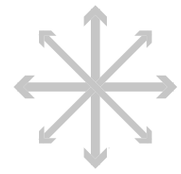
DOUBLE HEIGHT ANCHORING B



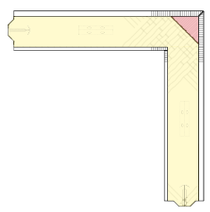


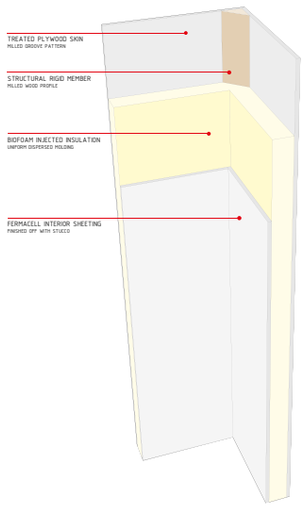
SUSPENDED INSULATED CEILING: FREE FLOOR FIELD C



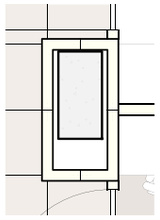


CORNER ELEMENTS: RIGID STRUCTURAL MEMBERS D

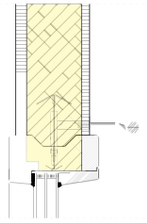




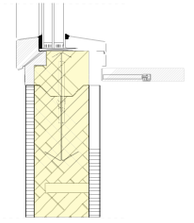
BOX-IN-BOX E



INTEGRATED ASSEMBLY F



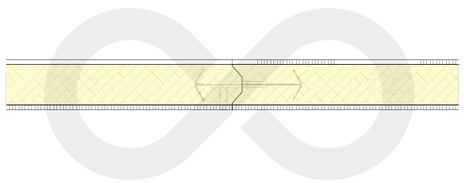
CURTAIN RAILING



WINDOWSILL / BOOKSHELF

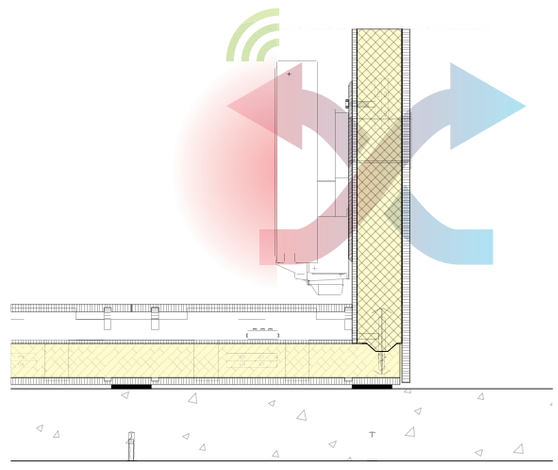
CLIMATIC PRINCIPLES

1 CONTINUOUS INSULATION

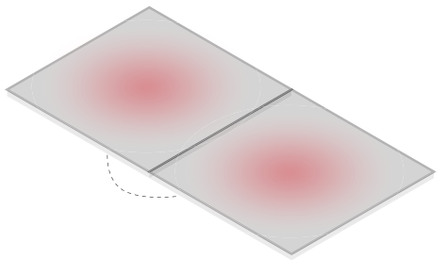


2 PLUG & PLAY, UTILITY LOOP

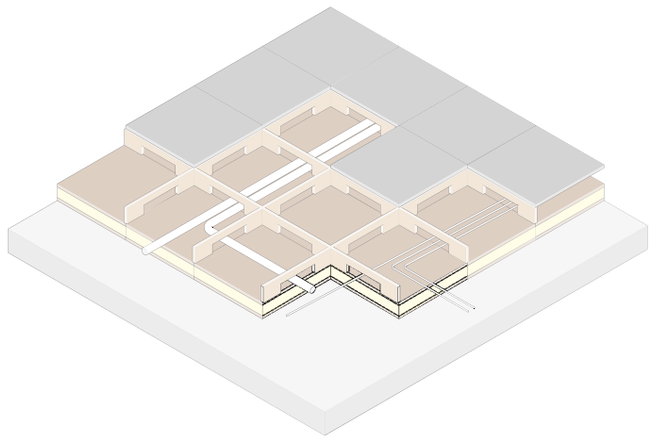
3 INTEGRATED VENTILATION & HEATING WITH HEAT RECOVERY

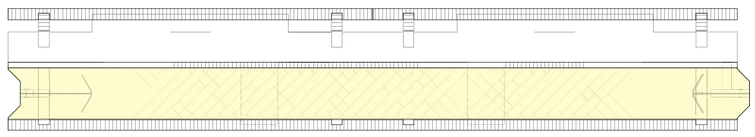


4 MODULAR ELECTRIC FLOOR HEATING



5 RAISED FLOOR



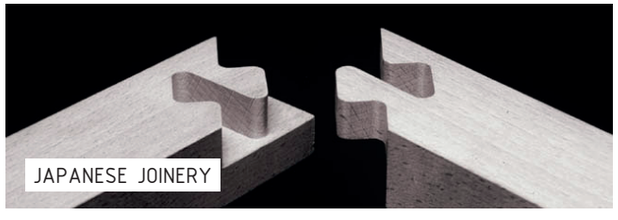


THE LOGIC

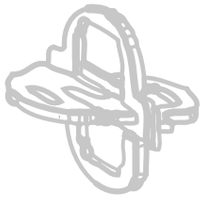
CONSTRUCTION AND CUSTOMIZATION FEATURES, IN COMBINATION WITH ASSEMBLY STRATEGIES AND A CIRCULAR BUSINESS STRATEGY

PRECEDENTS

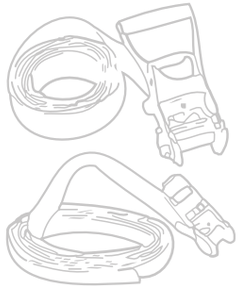
KEY DFMA PRINCIPLES

	Minimize part count	Standardized parts & materials	Modular assemblies	Efficient joining	Minimize reorientation of parts during assembly and/or machining	Simplify & reduce number of machining operations	DFMA score
 PACKAGED HOUSE SYSTEM	★★★☆☆ There are still a lot of parts present in the system, efficiency is achieved through the joining method.	★★★☆☆ Everything is factory made. Though, there are still a lot of different components present.	★★★★★ Every assembly is the same due to the fact that there is 1 joint.	★★★★★ Gropius and Wachsmann designed 1 universal connector for every joint.	★★★☆☆ Due to the fact that there are many different components, machinery and assembly is still quite labor intensive.	★★☆☆☆ The prefabrication of the parts was labour intensive.	★★★½☆
 INSTANT CABIN	★☆☆☆☆ With approximately 970 parts (including connections), there are a lot.	★★★☆☆ Parts are not standardized. The construction consists of one material, including connections.	★★★★☆ Each part has a specific structural function and is modular in use.	★★★★☆ Not the amount of connectors, but the friction-fit joining makes it efficient.	★★★☆☆ During machining no reorientation. Assembly is like a small puzzle.	★★★★★ The only machining operation is milling in 2D, so limited to 1.	★★★½☆
 LIINA TRANSITIONAL SHELTER	★★★★★ By using SIPs as a truss structure, the amount of parts is drastically minimized.	★★★★☆ The truss is modular and thereby standardized.	★★★★★ Connections are the same and occur in logical order.	★★★★☆ Just dowels, dovetails and ratchet straps act as connectors giving an airtight building.	★★★☆☆ During machining quite a lot. During assembly practically none.	★★☆☆☆ Making SIPs in the factory requires more labor.	★★★½☆
 BAMBOO MICRO HOUSING	★★☆☆☆ The bamboo and supporting structure account for a lot ofparts.	★★★☆☆ Materials are all standardized from production.	★★☆☆☆ The structures assembly can only be done as a whole.	★★★☆☆ Joining methods used are efficient but time intensive.	★☆☆☆☆ During machining, parts undergo heavy adjustments.	★★★☆☆ The bending of the bamboo straps makes the fabrication process unnecessarily complicated.	★★☆☆☆
 JAPANESE JOINERY	★★★★☆ Integrating the structural frame and joinery minimizes part count.	★★★☆☆ Standardized in production, although it needs quite some processing.	★★★★☆ The structures assembly is modular in its framework of joints.	★★★★★ The integration of structure and joinery makes for an efficient joining method, also erasing screws etc.	★★☆☆☆ The nature of the joinery requires a lot of reorientation during machinery.	★★☆☆☆ A lot of reorientation also ensures that the machining is quite time and labour intensive.	★★★☆☆

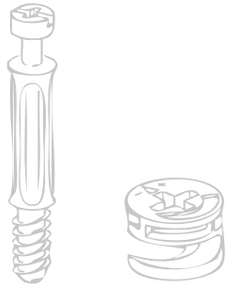
CONNECTION PRINCIPLE



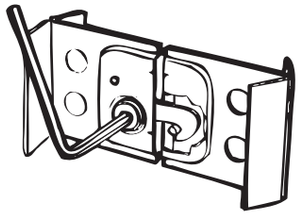
UNIVERSAL JOINT



RATCHET STRAPS

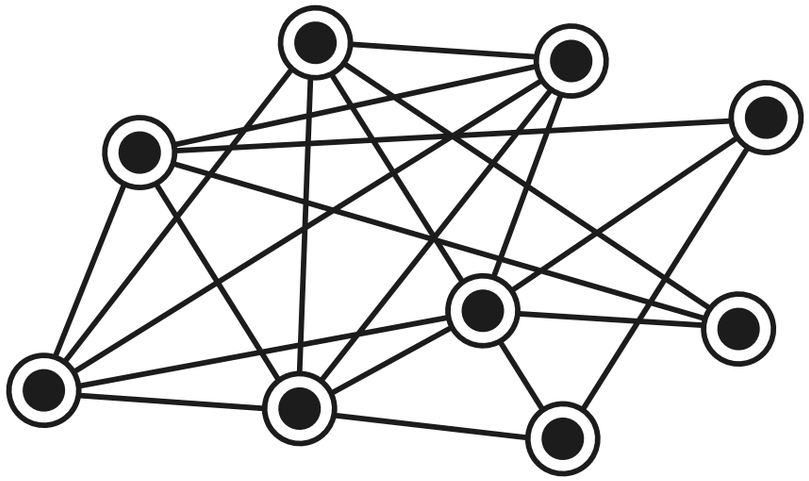


IKEA CAM-LOCKS

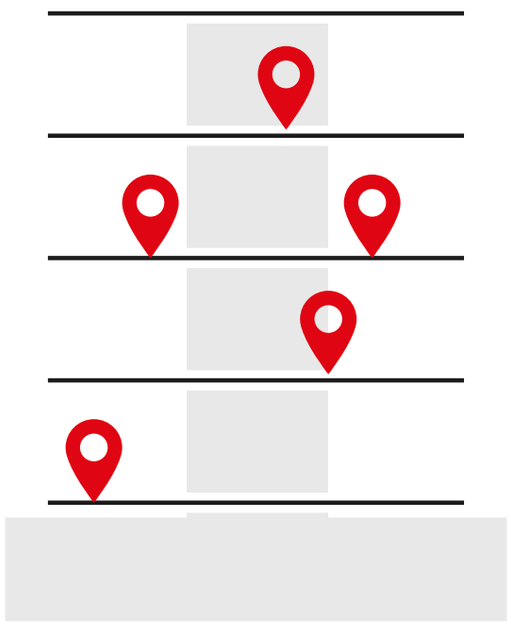


FOAMED-IN-PLACE
CAM-LOCK FASTENERS

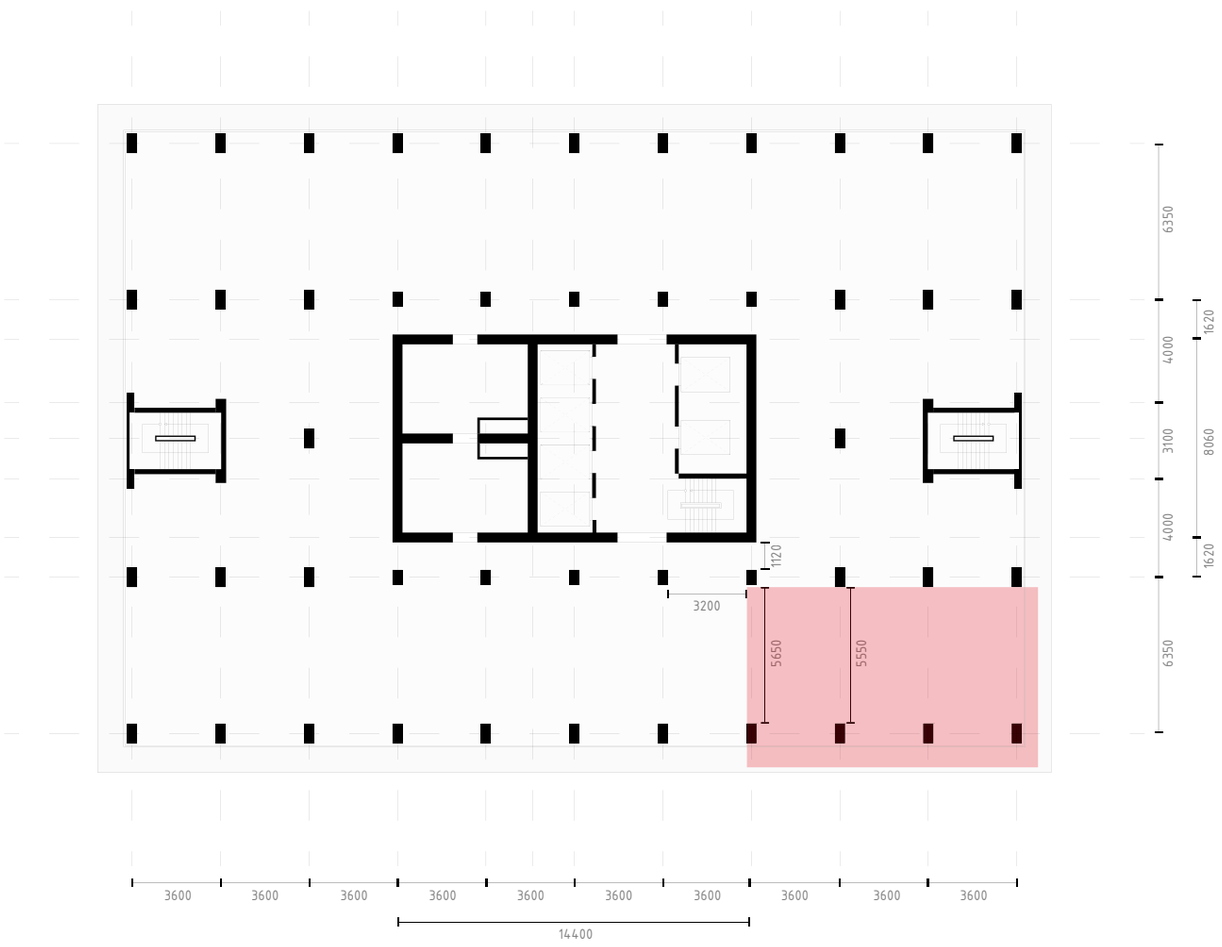
CUSTOMIZATION FEATURES



BUILDING & LOCATION



PLOT LOCATION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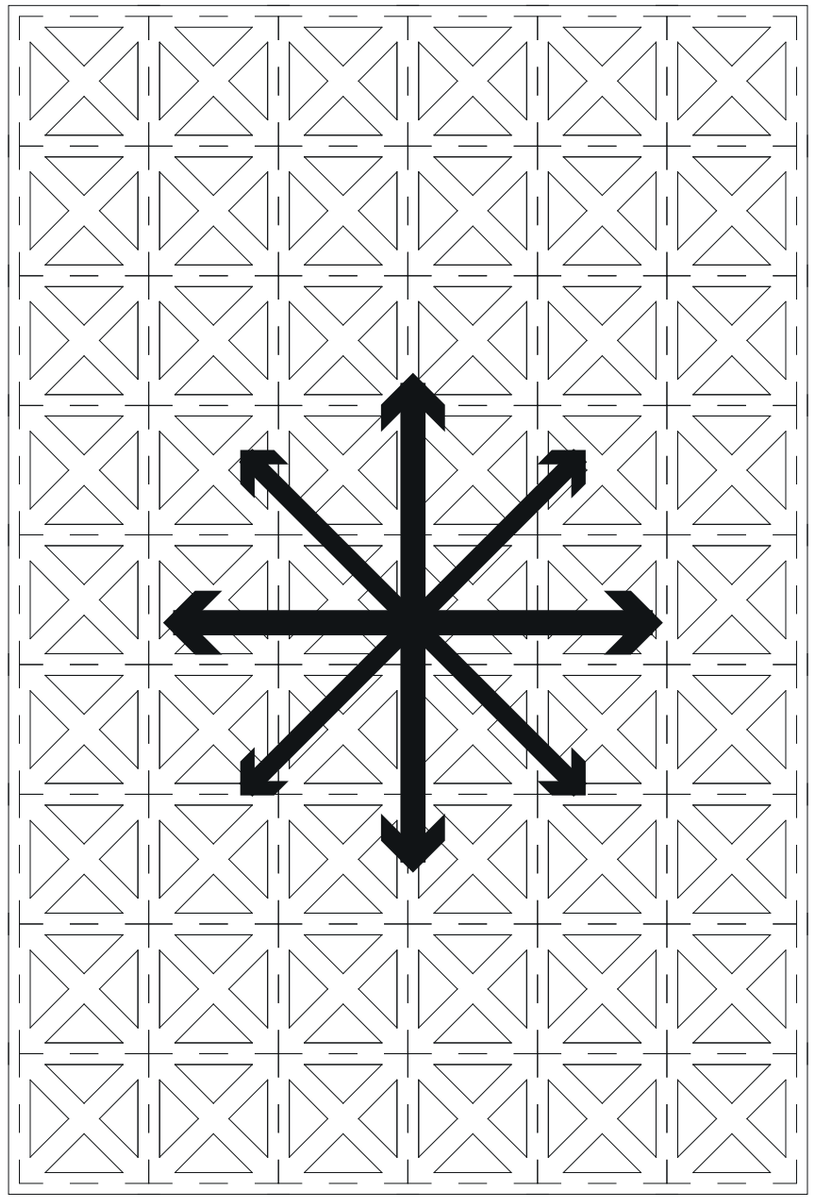
14400

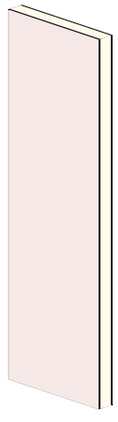
PLOT SIZE

GRID MODULE



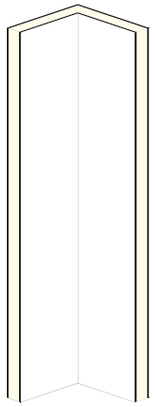
SPATIAL FREEDOM

STANDARD
SIZED

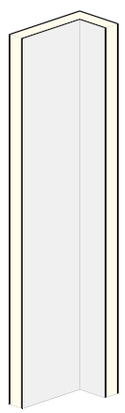


LARGE
SIZED

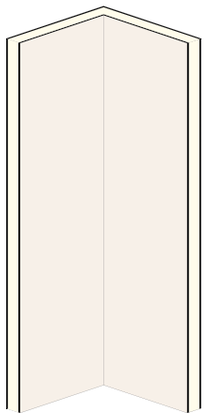
DOUBLE
STANDARD



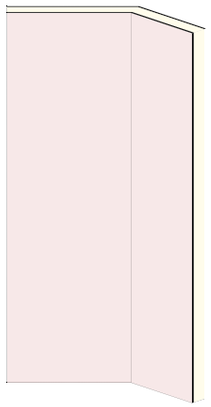
STANDARD
ANGLE (90°)



COLUMN
ENCLOSURE (90°)

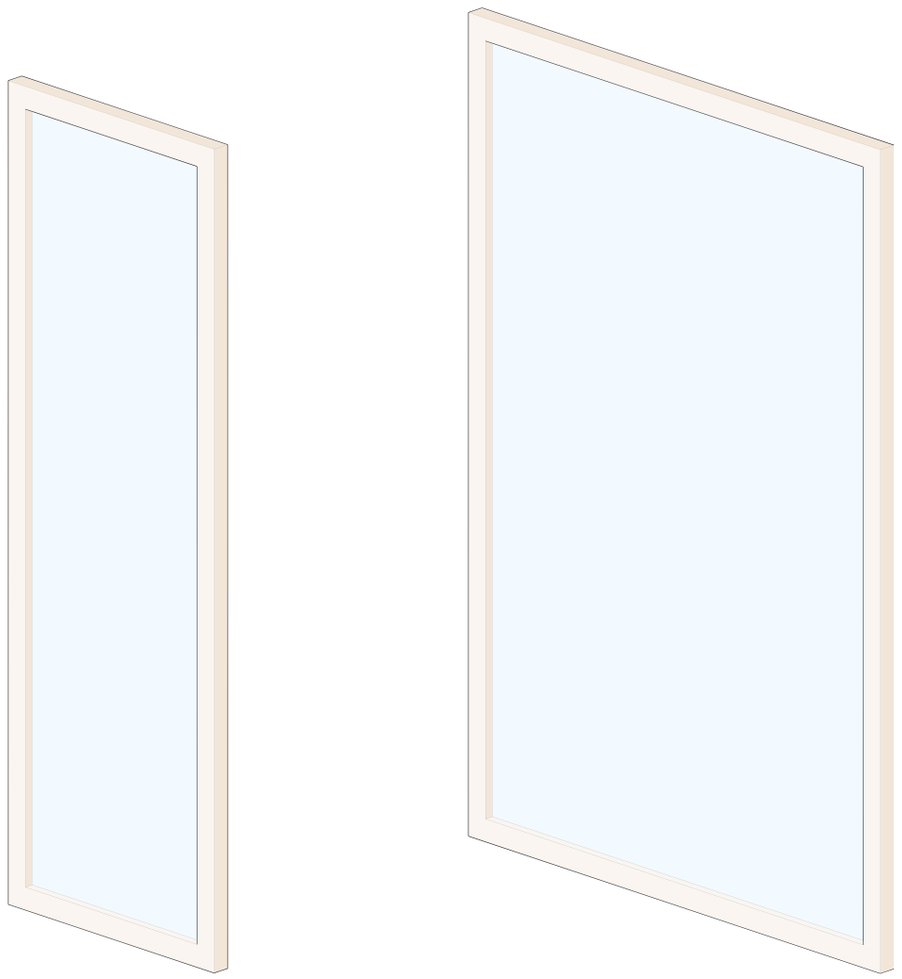


LARGE ANGLED
PANEL (90°)

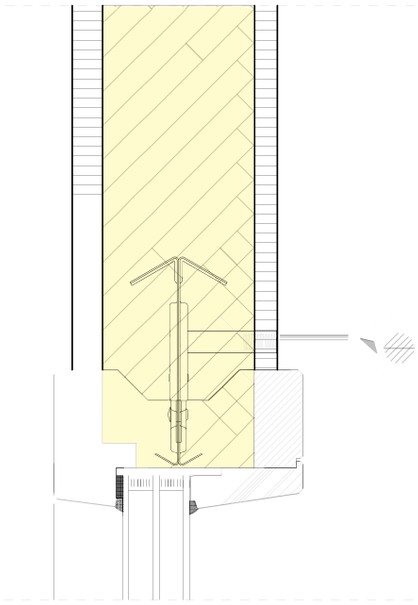


ANGLED
PANEL (135°)

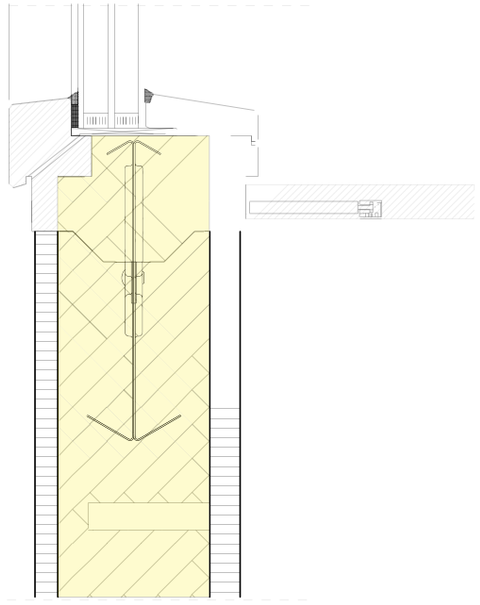
PANEL TYPES & MATERIALISATION



WINDOW OPENINGS



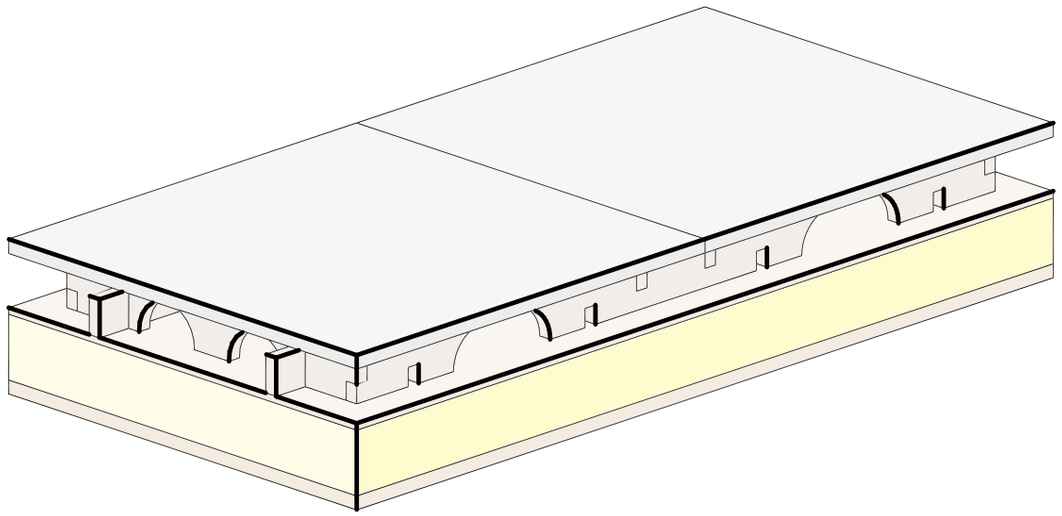
CURTAIN RAILING



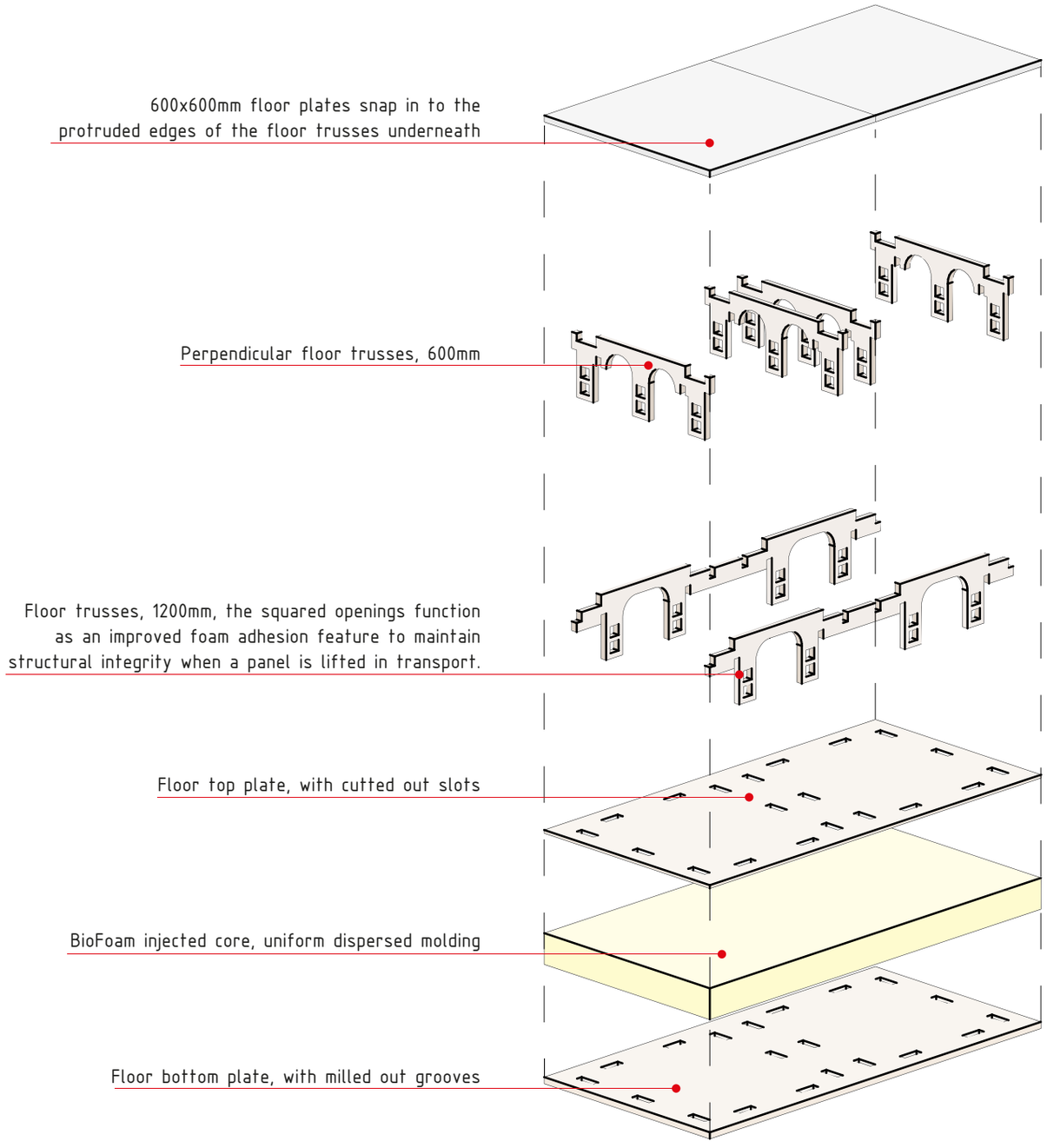
WINDOWSILL / BOOKSHELF

INTEGRATED ASSEMBLY


FLOOR ASSEMBLY

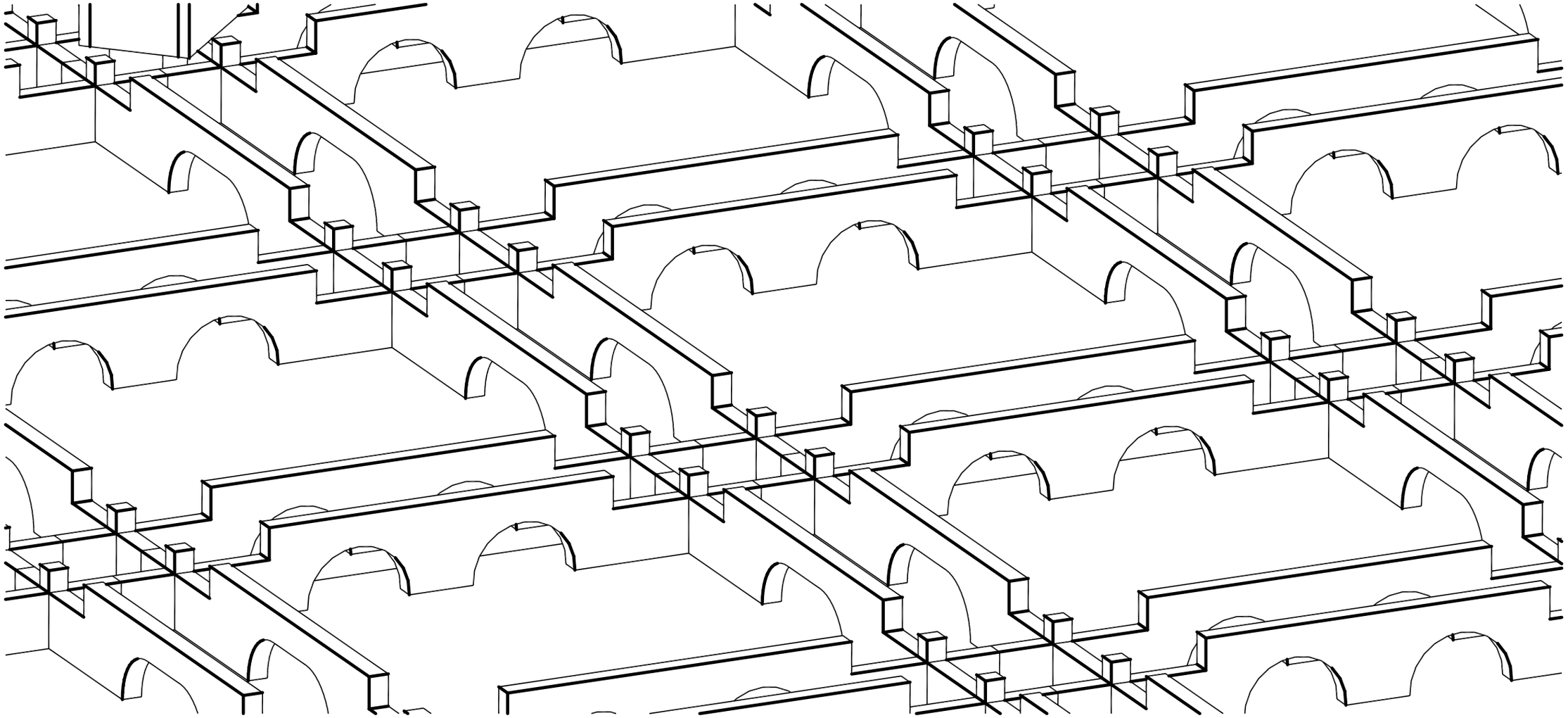


ASSEMBLED FLOOR MODULE

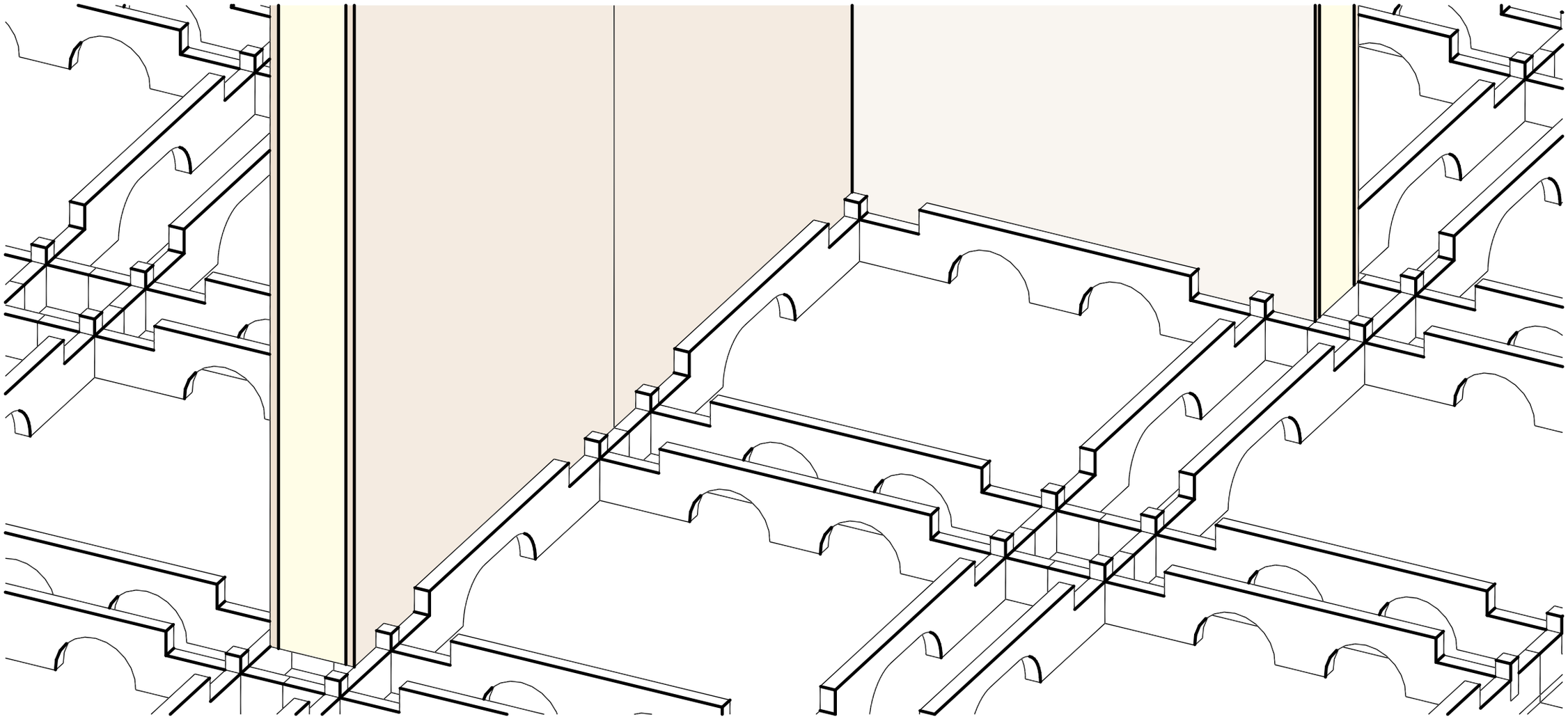


EXPLODED VIEW

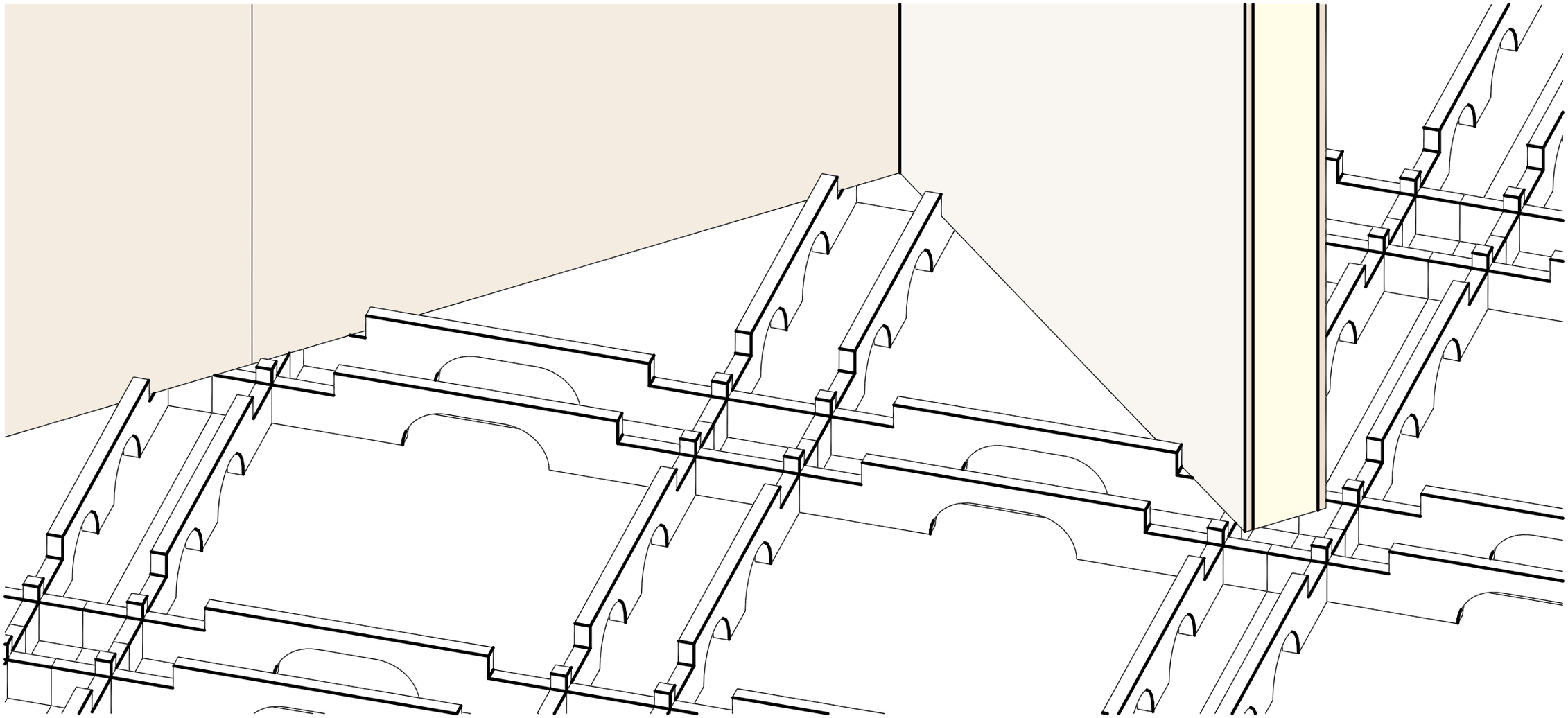
OPEN FLOOR VIEW



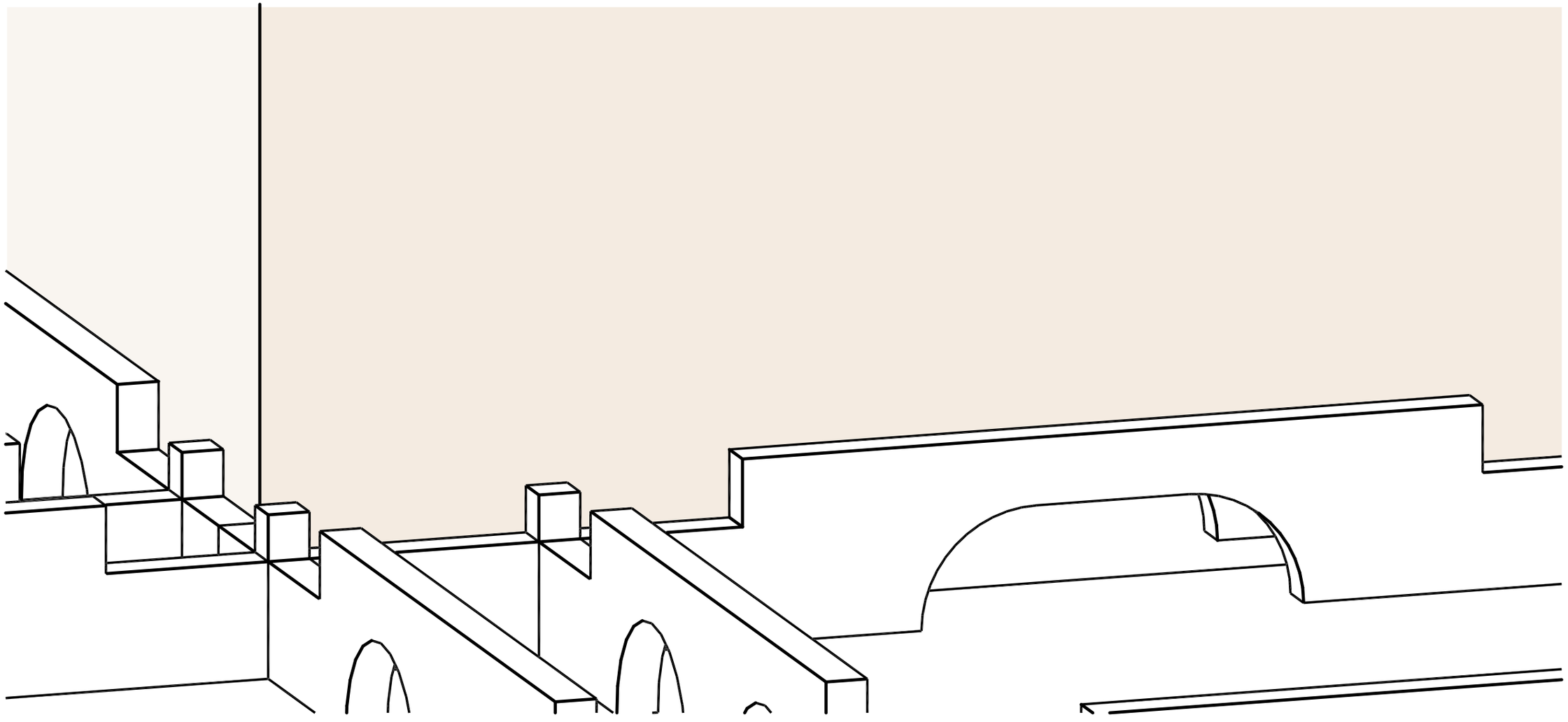
FLOOR VIEW WITH INTERIOR PARTITION



FLOOR VIEW WITH DIAGONAL PARTITIONING

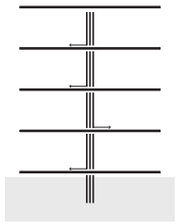


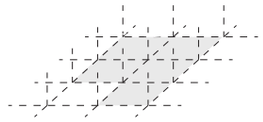
RAISED FLOOR FREEDOM



BUSINESS PERSPECTIVE

STAKEHOLDERS





ZONING PLAN REQUIREMENTS

BUILDING PLOT

RETURNING 2ND HAND COMPONENTS

RECYCLING OF FIT-OUT COMPONENTS

MUNICIPALITY

OWNER / LANDLORD

END-USER

FIT-OUT COMPANY

EXTERNAL COMPANIES

BASE BUILDING ADAPTABLE TO FUNCTIONAL CHANGE

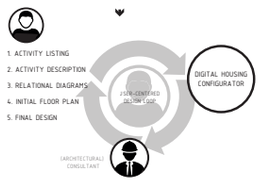
FIT-OUT CONSTRUCTION

LEASING / RENTING NEW OR 2ND HAND FIT-OUT COMPONENTS

SUPPLY OF FIT-OUT COMPONENTS AND MATERIALS

DEVELOPER

ARCHITECT



CONSULTANT

CONSORTIUM OF COMPANIES PROVIDING THE DIFFERENT FIT-OUT COMPONENTS NEEDED (SIP PANELS, PLYWOOD, PIPEWORK, KITCHEN FIT-OUTS AND OTHER WET UTILITIES)

CONVENTIONAL SUPPLY CHAIN

SUPPLY & INVERSE SUPPLY CHAIN (LEASING OR RENTING MODEL)

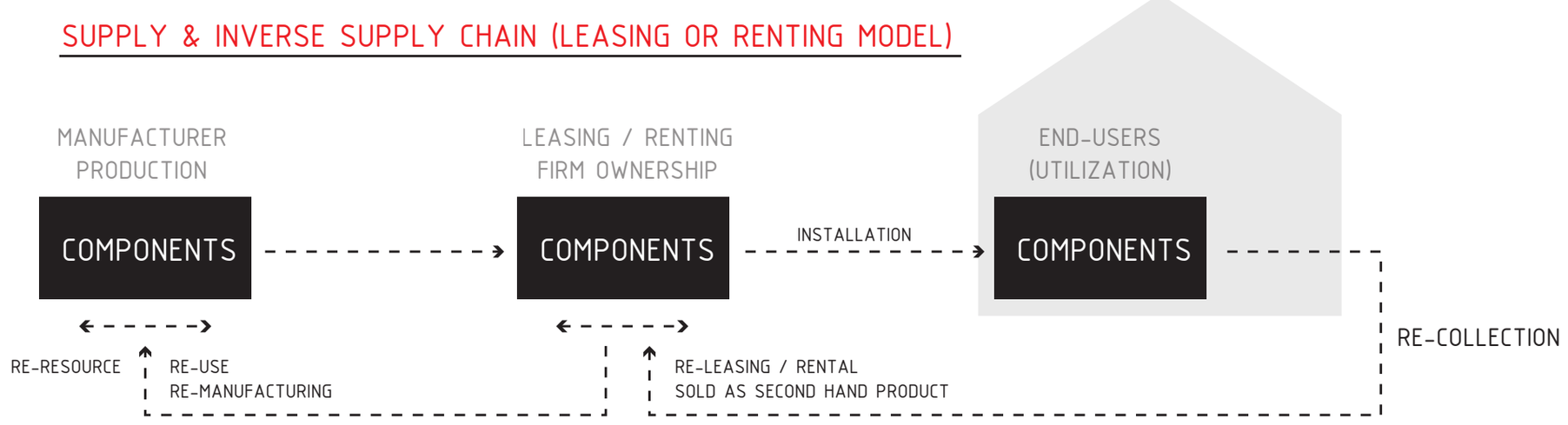


diagram adapted from Yashiro & Nishimoto (2002)

MATERIAL PERSPECTIVE

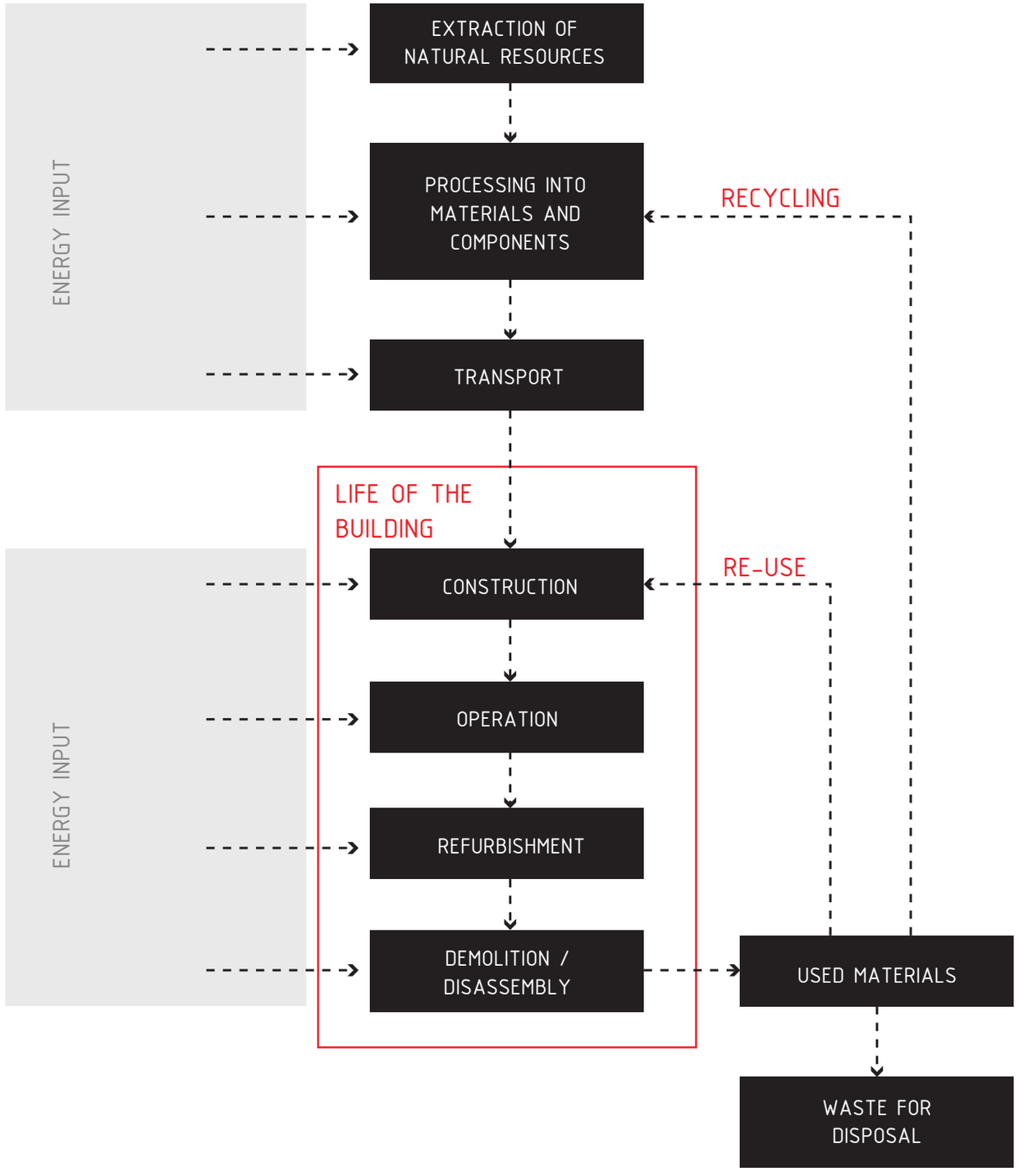


diagram adapted from Crowther (1999)

RELEVANCE

COALITION AGREEMENTS 2014

Gemeente Amsterdam

FLEXIBLE ZONING PLANS

SPACE FOR 'VRIJHAVENS', FREE ZONES FOR BOTTOM-UP EXPERIMENTATION

HIGHER PRODUCTION OF SOCIAL HOUSING

MORE OPPORTUNITIES FOR THE SMALLER HOUSING CORPORATIONS AND INITIATIVES IN REALISING SOCIAL HOUSING

GREENING OF THE CITY

source: architectenweb.nl

Gemeente Rotterdam

NEW SOLUTIONS FOR VACANCY, INCREASING POSSIBILITIES FOR NEW VACANCY APPROACHES

MORE CONTROL AND RESPONSIBILITY FOR THE CITIZEN

CONTINUATION OF THE 'KLUSWONINGEN', SELF-BUILD PROJECTS

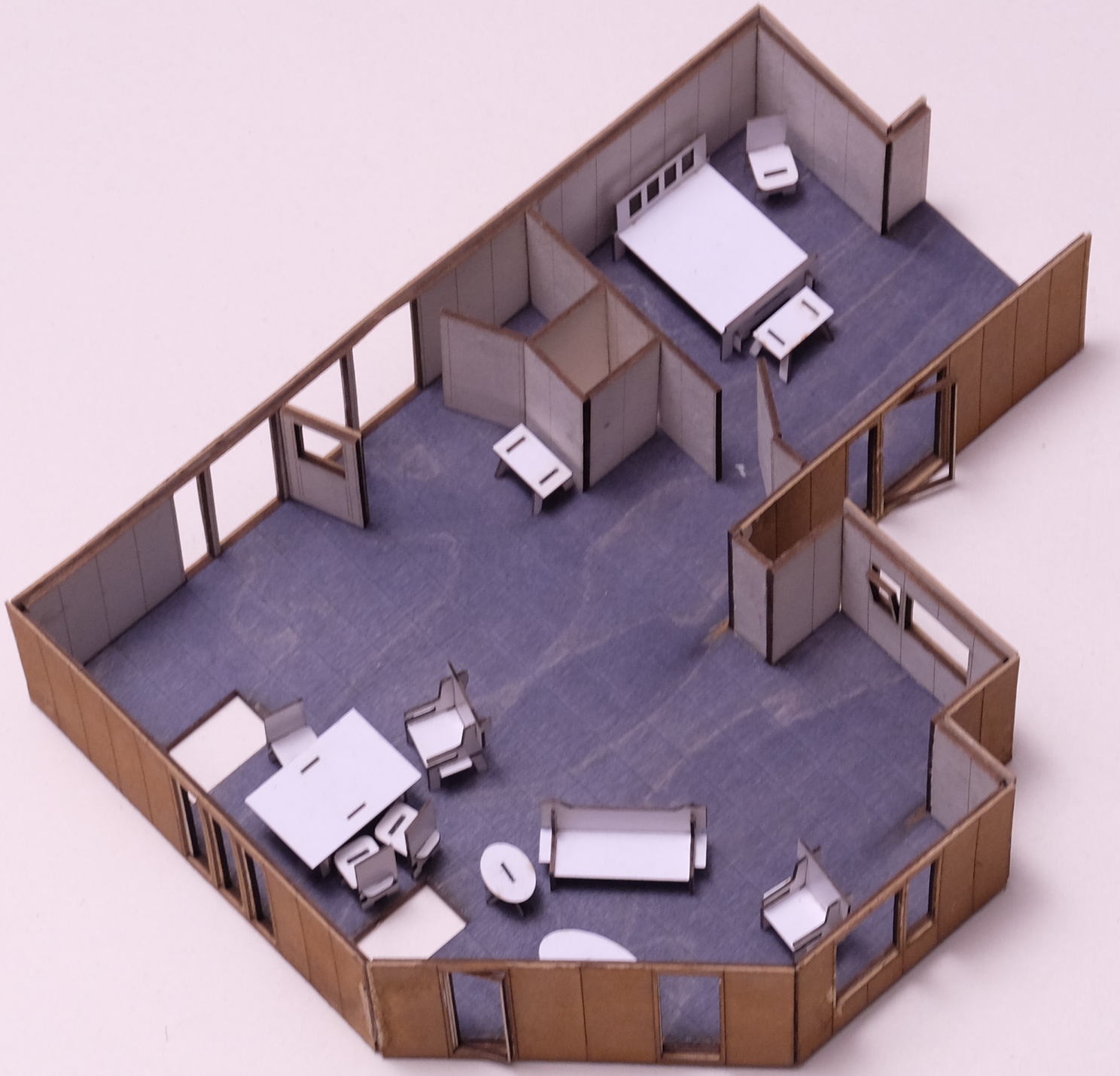
NEW DISTRICTS IN THE CITY CENTRE FOR STUDENTS AND STARTERS

GREENING OF THE CITY

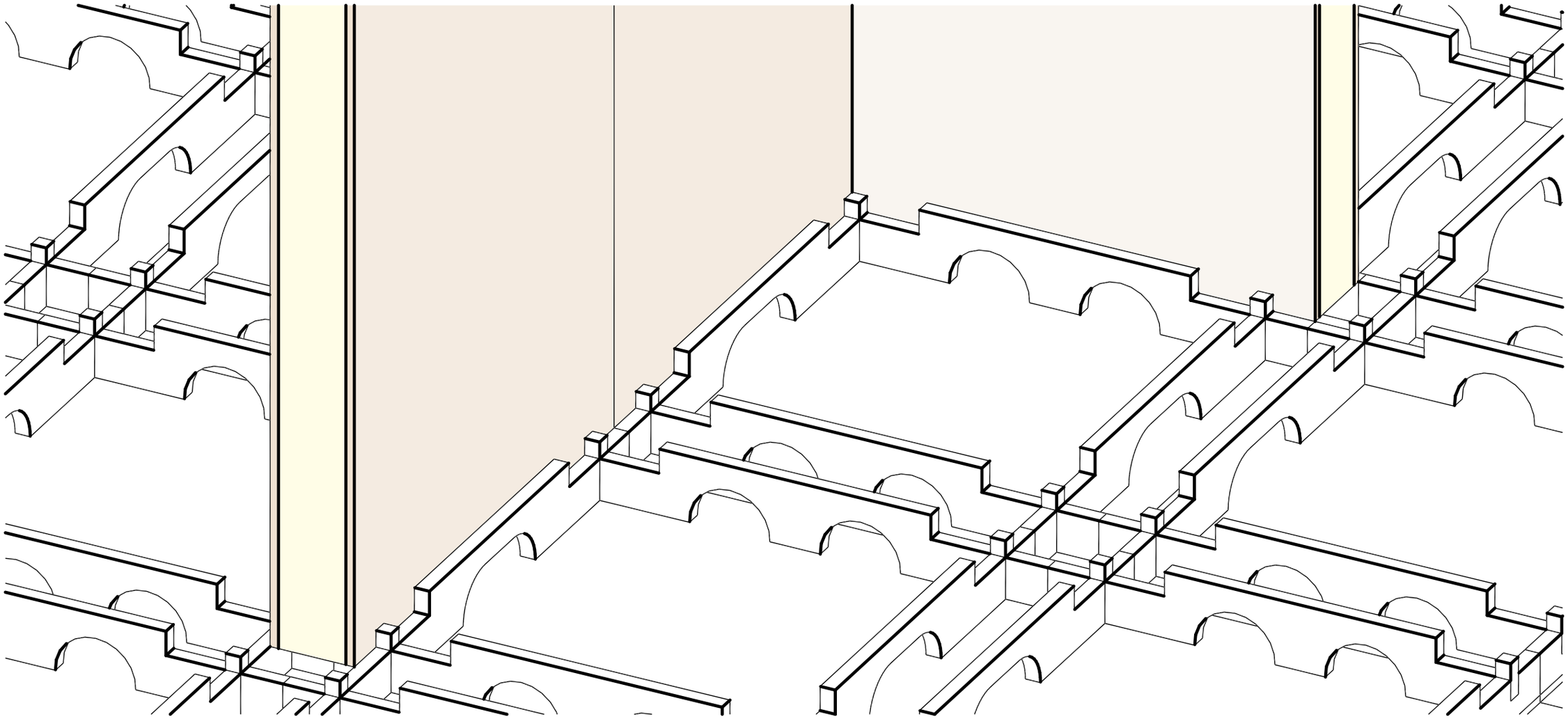
source: architectenweb.nl

THE BASE

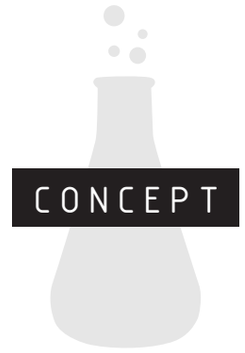
THE COLLECTIVE



THE FIT-OUT



THE LOGIC



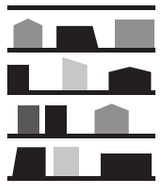
CONCEPT

OFFICE VACANCY

PROBLEM

PRIVATE COMMISSIONING

TREND



ORCHESTRATED PRIVATE COMMISSIONING IN A PROVIDED BASE BUILDING

CHANCE

A CUSTOM HOME AVAILABLE FOR EVERYONE

THANK YOU