

Harvest / P5

"Materials Bank" among the community

*Applying the concept of buildings as material banks for the
Western Garden Cities of Amsterdam*



PROBLEM STATEMENT

PROBLEM STATEMENT



■ Bijlmermeer, in 1975, before renovation



■ Bijlmermeer, now, after renovation

Amsterdam built many **social housing units** after World War II, which quickly met the city's high demand for housing in a short period with low technology. After the year 2000, this overly dense housing pattern became incompatible with **contemporary living requirements**, like the small size of housing and poor thermal insulation performance.

PROBLEM STATEMENT



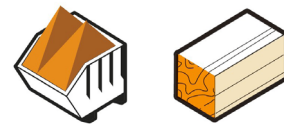
Amsterdam government released a document called "**Richting Parkstad 2015**" in 2001, which presented a plan to **renovate post-war housings**, especially in Western Garden Cities (Havinga et al., 2020).



Among the dwellings in the Western Garden Cities, 60% consist of **slab blocks with point access** (Havinga et al., 2020).

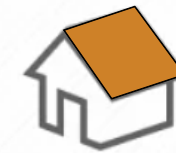
PROBLEM STATEMENT

6,480



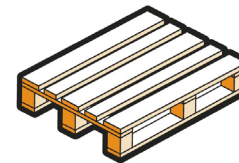
houses built between 1945 and 1970 were demolished in 2014, 58.9% of the total (EIB and Metabolic, 2020)

36,200



post-war housings in the Western Garden Cities (Havinga et al., 2020)

1941



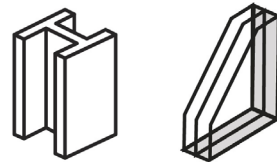
houses built between 1945 and 1970 were renovated in 2018 (City of Amsterdam, 2020)

6817kt



built environment waste was disposed of in 2018 (City of Amsterdam, 2020)

670kt



built environment materials were produced in Amsterdam in 2018 (City of Amsterdam, 2020)

40%



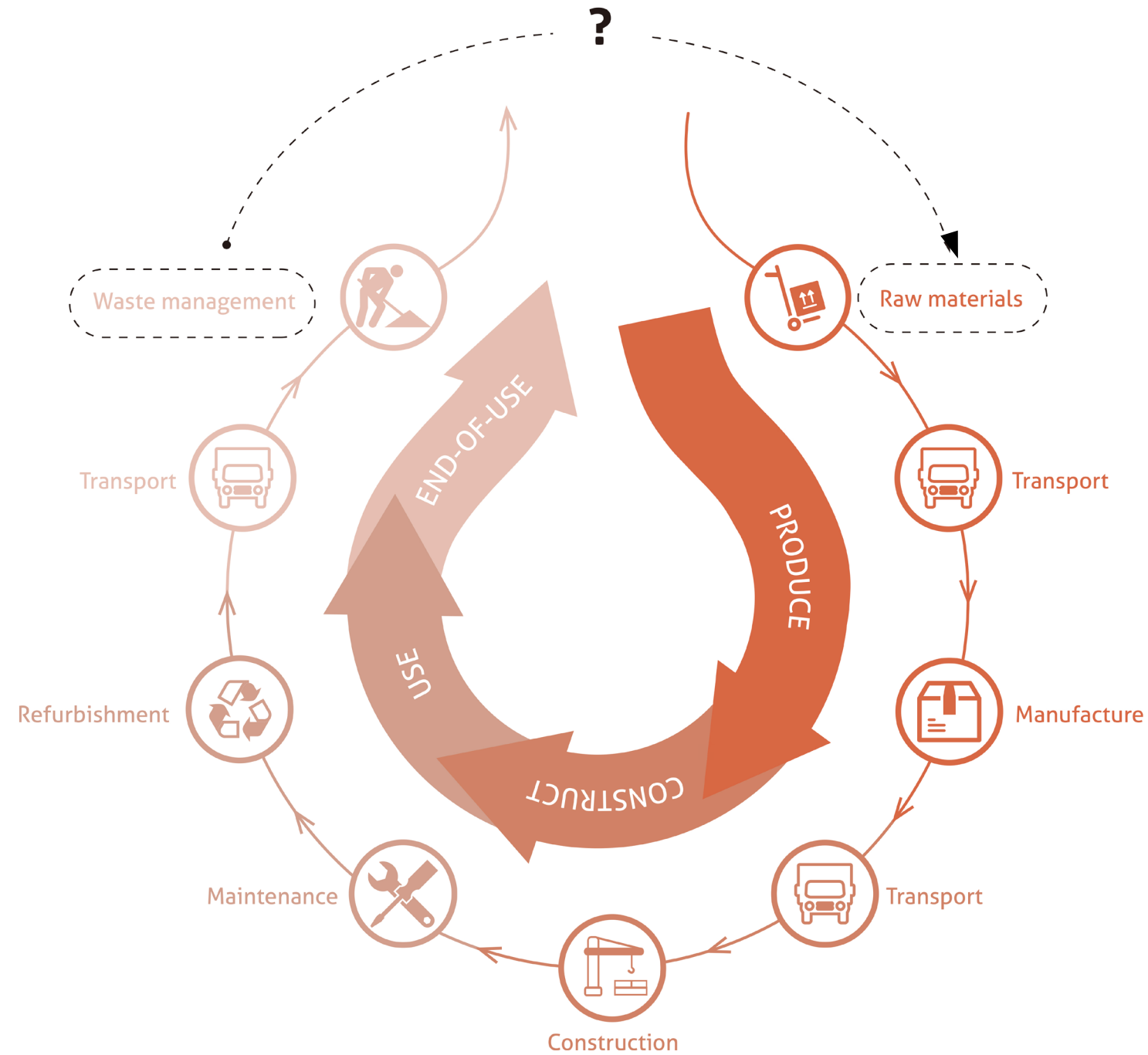
of the annual waste is generated by the demolition of buildings (Ministerie van I&M & Ministerie van EZ, 2016).



PROBLEM STATEMENT

*The widespread **post-war housing renovation projects** have posed a great **challenge** to the **management of waste** through destruction, landfill incineration.*

HYPOTHESIS



(Circular Economy for a Sustainable Built Environment, 2021)

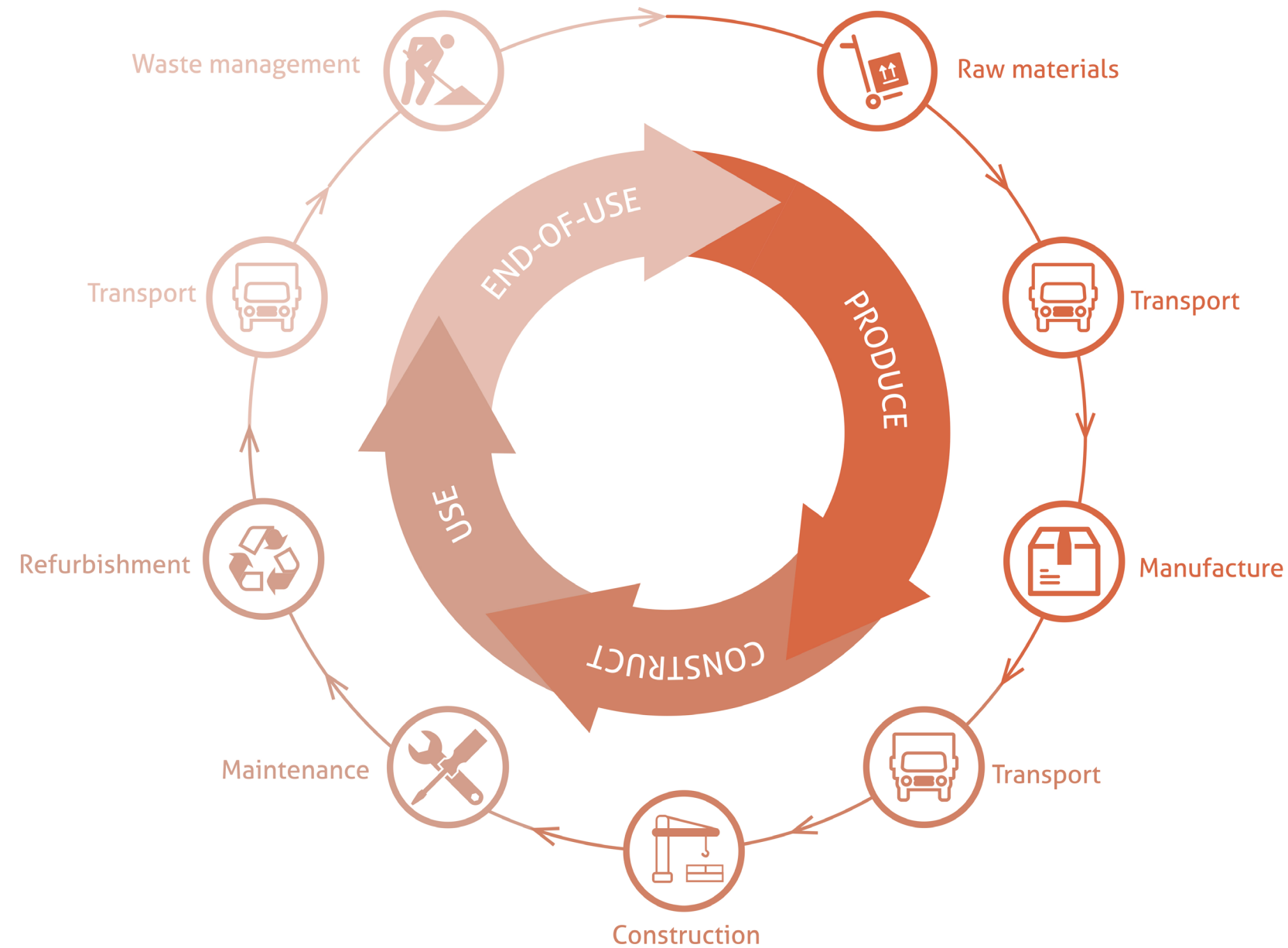
The solution to the problem of too much waste and not enough resources should start with a change in people's idea of waste. Treating waste as another form of resource can provide the waste which still have use value opportunities to use again.

TREATING WASTE AS RESOURCE

RESEARCH PART

1. Problem Statement
2. Research Part
3. BAMB Implement
4. Design Proposal

CIRCULAR ECONOMY

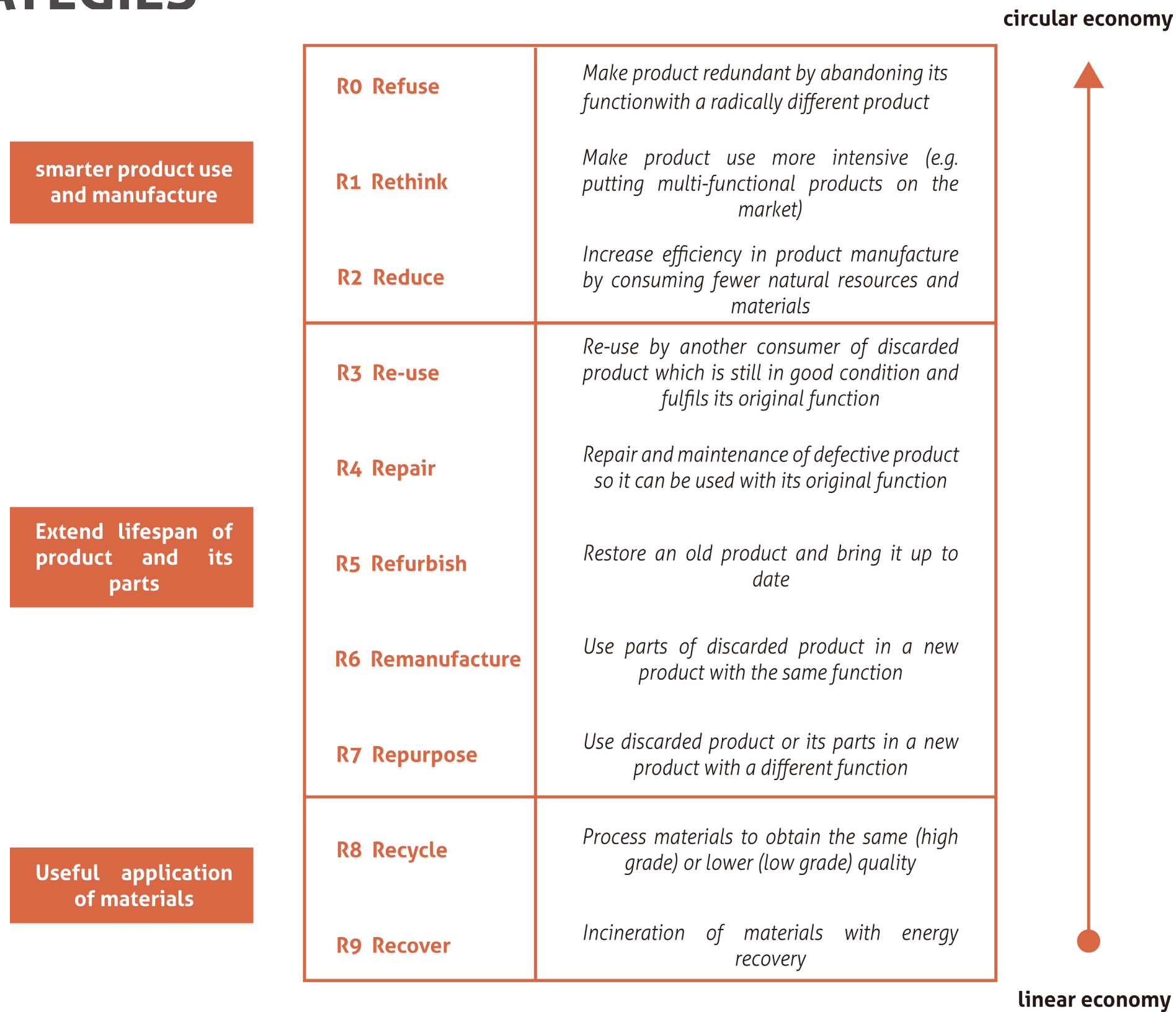


(Circular Economy for a Sustainable Built Environment, 2021)

Circular Economy decouples economic activity from the consumption of finite resources (Ellen MacArthur Foundation, 2013), and attempts to eliminate the notion of waste by maintaining the efficiency and value of products (Dokter, Thuvander and Rahe, 2020).

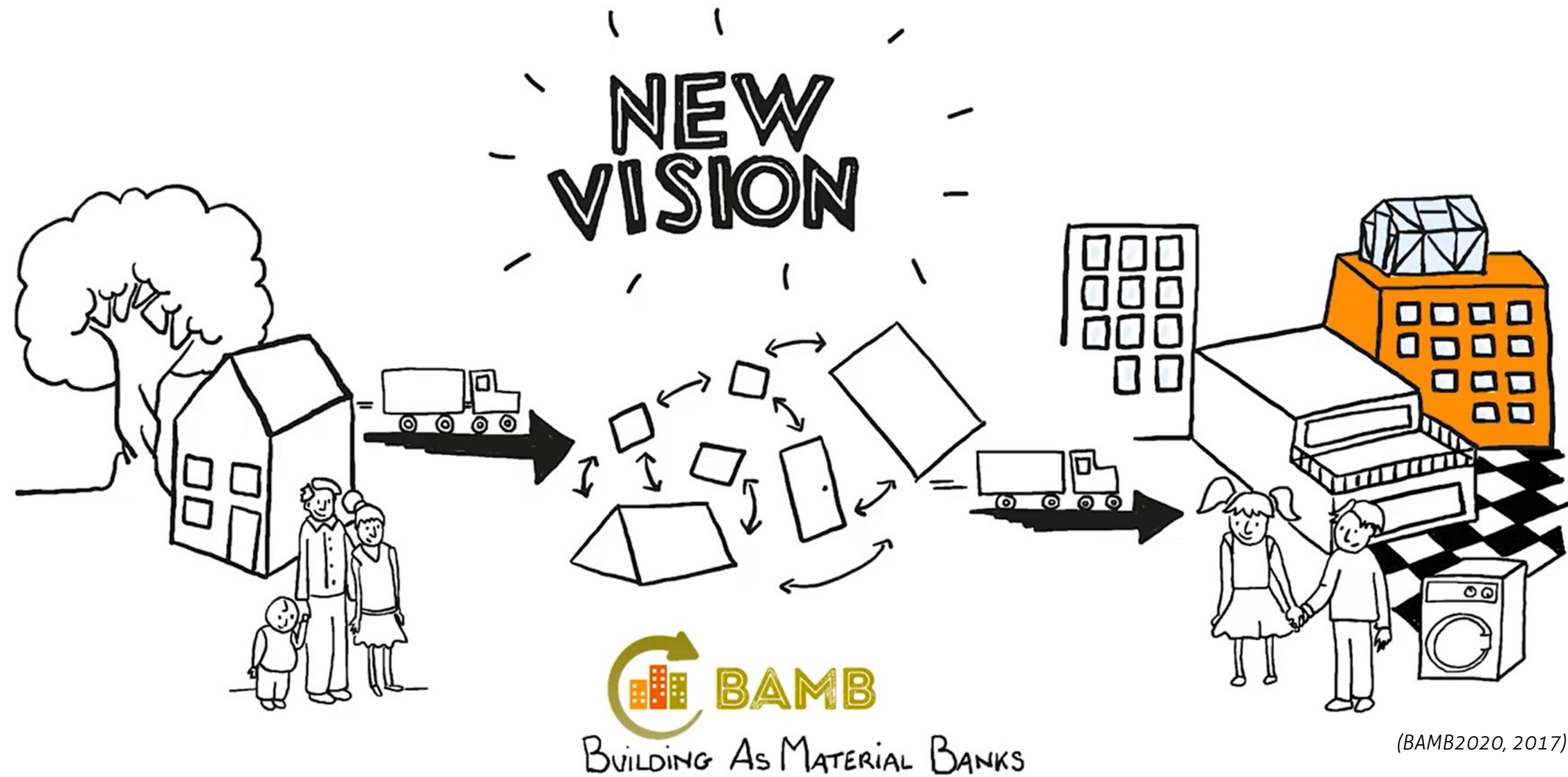
CIRCULAR ECONOMY

10R STRATEGIES



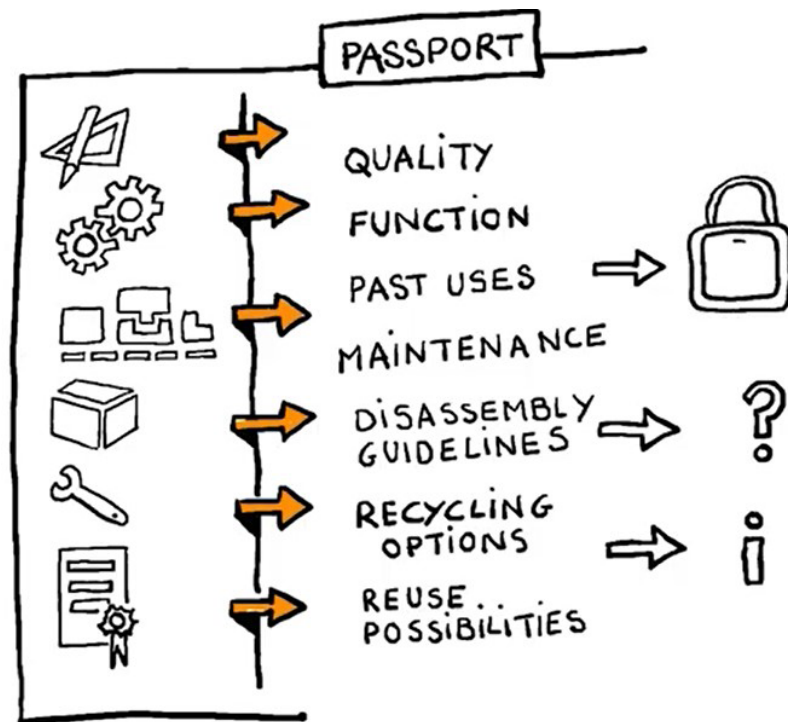
Circularity strategies towards circular economy. According to PBL Netherlands Environmental Assessment Agency

BUILDINGS AS MATERIALS BANK



Buildings as Material Banks (BAMB) can be seen as an approach to achieve a circular economy in the construction industry. According to the notion of BAMB, materials can be seen as only temporarily stored in the building and can be reused in the long term (Leising, Quist and Bocken, 2018). So, in BAMB projects, it will be reversible design, so that most of building components can maintain their value after disassembly.

MATERIALS PASSPORT



MATERIAL PASSPORT | TRAINING THE ARC

TRAINING THE ARC | GENERAL INFORMATION

PORTFOLIO NAME
Laren

PORTFOLIO OWNER
Trainer Madaster

BUILDING NAME
Training The Arc

ADDRESS DETAILS
Address: Marconibaas 12
Postal code: 3439MS Nieuwegein

CADASTRAL INFORMATION
Cadastral designation: Jutphaas
Cadastral surface area: 7100 /m²
Lot number: JPS00 - D - 2819
Restriction of public law: Geen

MADASTER INFORMATION
Classification method: NL-SfB
Most recent BIM information: 11/12/2020 3:20 PM
Building usage: Offices (Office >= 1000m2)
Gross Surface Area: 1800 /m²
Delivery date: 1/23/2019
Last renovation date: -

LABELS
BREEAM: Good
GPR-score: -
Indicative MPG score: 0.69 €/m²
LEED: -

WELL SCORE

BUILDING NAME
Training The Arc

PUBLISHER
Sander Beeks

OWNER
Trainer Madaster

PUBLISHING DATE
11/12/2020

COMPANY NAME
Madaster Training

MATERIALS PASSPORT

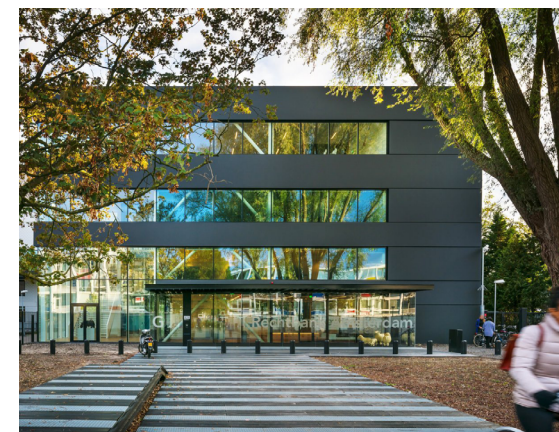
- 1. Production information (*time / manufacturer*)
- 2. Basic information (*dimension / color*)
- 3. Traits information (*waterproof / insulation rate / fireproof*)
- 4. Life expectancy and usage history
- 5. Potential performance over time

Material Passport sample on MADASTER.COM

One of the tools of the BAMB is the use of Material Passports. MPs are electronic and actionable datasets that collect material properties. All information about the material is recorded. For example. Reliable and standardized databases can help bridge information gaps and communication between relevant stakeholders in the construction industry.

CASE STUDIES

Name	Year	Architect	Area	Function	Recycle Part	Use Method	Detachable
The Resource Rows	2015	Lendager	9148 m ²	Dwelling	Facade	Cut the abandoned brick wall into larger modules for the facade	No
People's Pavilion	2017	bureau SLA + Overtreders W	250 m ²	Pavilion	All	All materials used in the project are old. The materials not only come from the suppliers but also from the garbage of the local residents.	Yes
Afvalbrengrstation	2017	SuperUse Studio	2700 m ²	Garbage transfer station	Except for the steel structure	The facade is made of an industrial remnant material. Supplemented by second-hand Azobé sheet piles	No
The Circle	2017	Cie Architect		Pavilion	Floor and roof	Discarded wooden frames are made into wooden floors, and jeans are used as insulation material	No
Tijdelijke rechtbank amsterdam	2016	cepezed	5400 m ²	law court	None	Because of special attachment system, this building can be reassembled completely in at a different location	Yes
Triodos bank Netherlands	2019	RAU Architect	12994 m ²	Bank office	None	All materials used in the building are accurately recorded, which facilitates the reuse of materials if user needs change or the house is not in use.	Yes
Villa Welpeloo	2009	Superuse	400 m ²	Housing	Load-bearing structure and façade cladding	The structure is made of steel girders from a paternoster, formerly used in the textile industry. The wooden façade cladding is made of redundant cable reels	No



TEMPORARY COURT AMSTERDAM

CEPEZED | AMSTERDAM | 2016

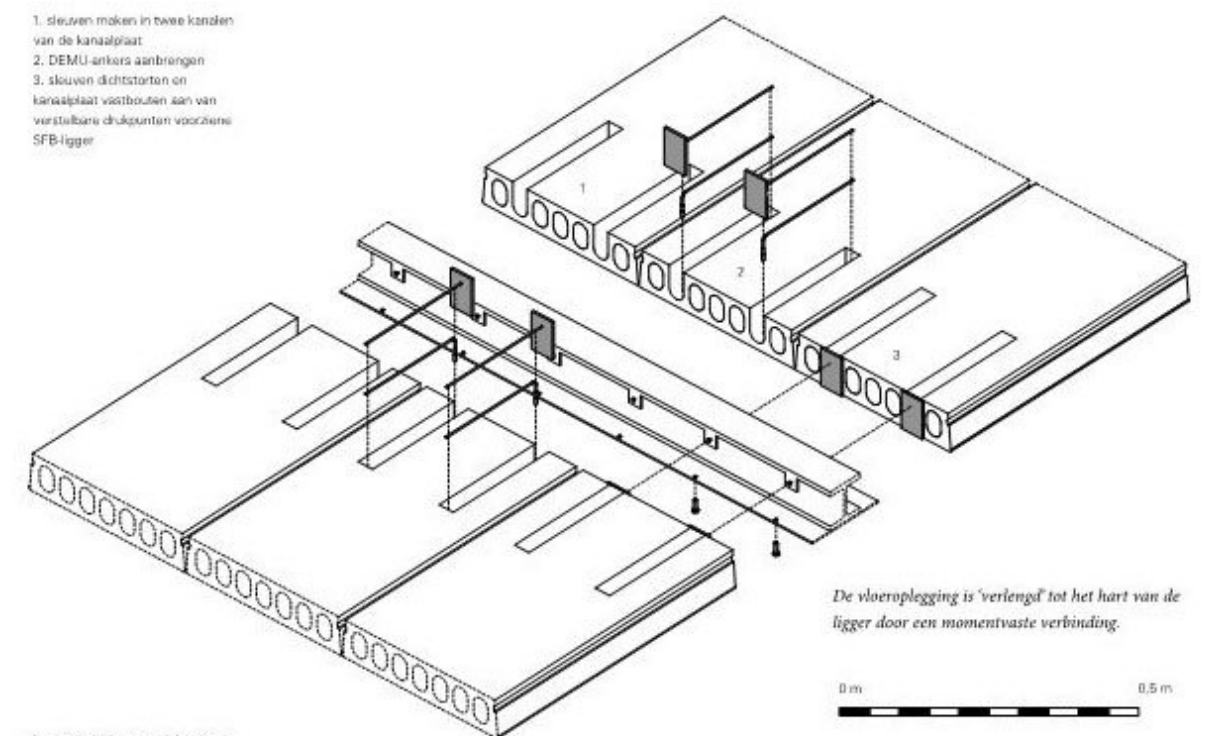
The building developed a special connection system for the hollow slab, which simplifies the disassembly of the slab as much as possible and promotes reuse. The building can be reassembled in its entirety in different locations.



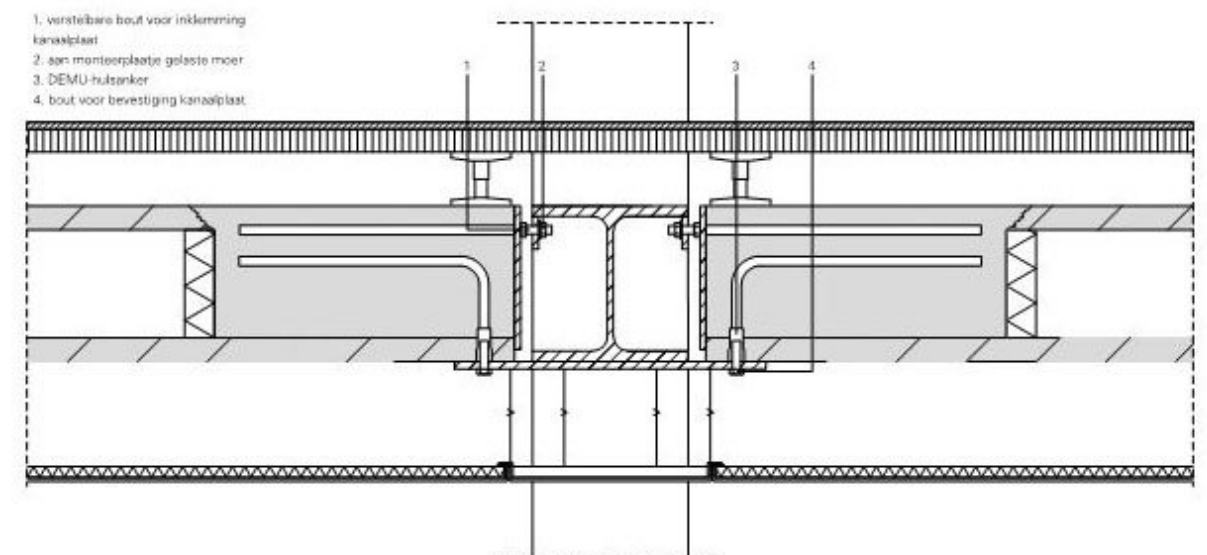
Cruciaal: demontabele verbinding vloer-ligger.



De stekken worden achteraf aangegoten met beton.



detail aansluiting kanaalplaat-ligger
1:10



BOUWEN MET STAAL 257 | JUNI 2017

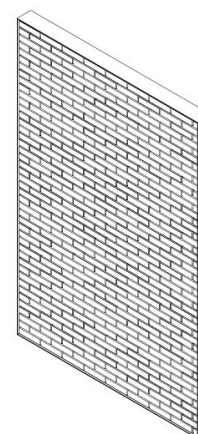
THE RESOURCE ROWS

LENDAGER GROUP | DENMARK | 2015

By cutting the bricks facades of the abandoned building and installing them in steel frames, they can be used as facade in the new building.

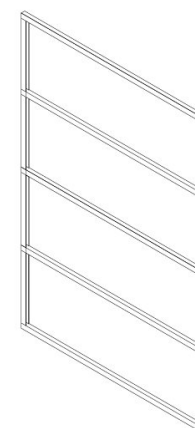


Recycled brickwork



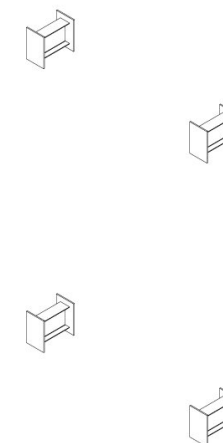
2. Panel with frame surrounding brick

Initial assembly



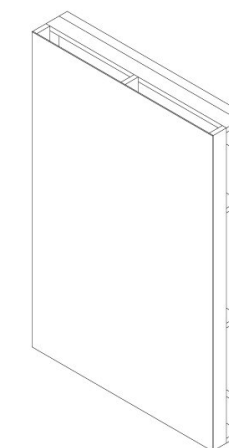
3. Mounted on welded steel frame of 'I' or 'U' profiles

Brackets



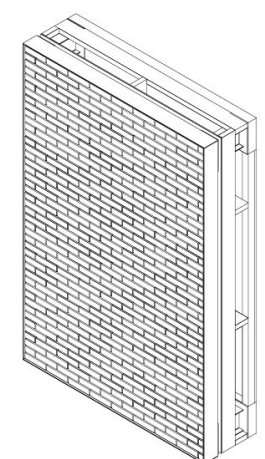
4. Panel hung from load-bearing 'I' profile brackets

Construction



5. Fitted with brackets, panel is attached to internal wall and insulation

Finished assembly



6. Masonry elements can be produced in varying sizes according to same principles

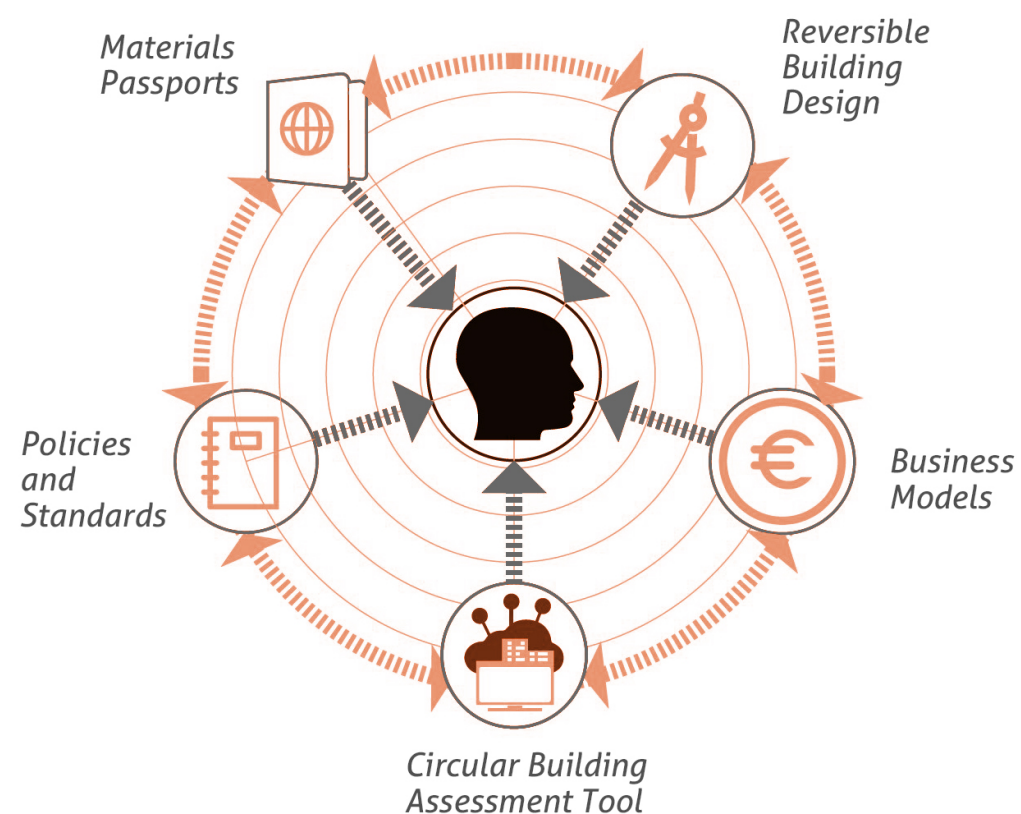


BAMB IMPLEMENT

THEORETICAL CONTEXT

BAMB PROJECT

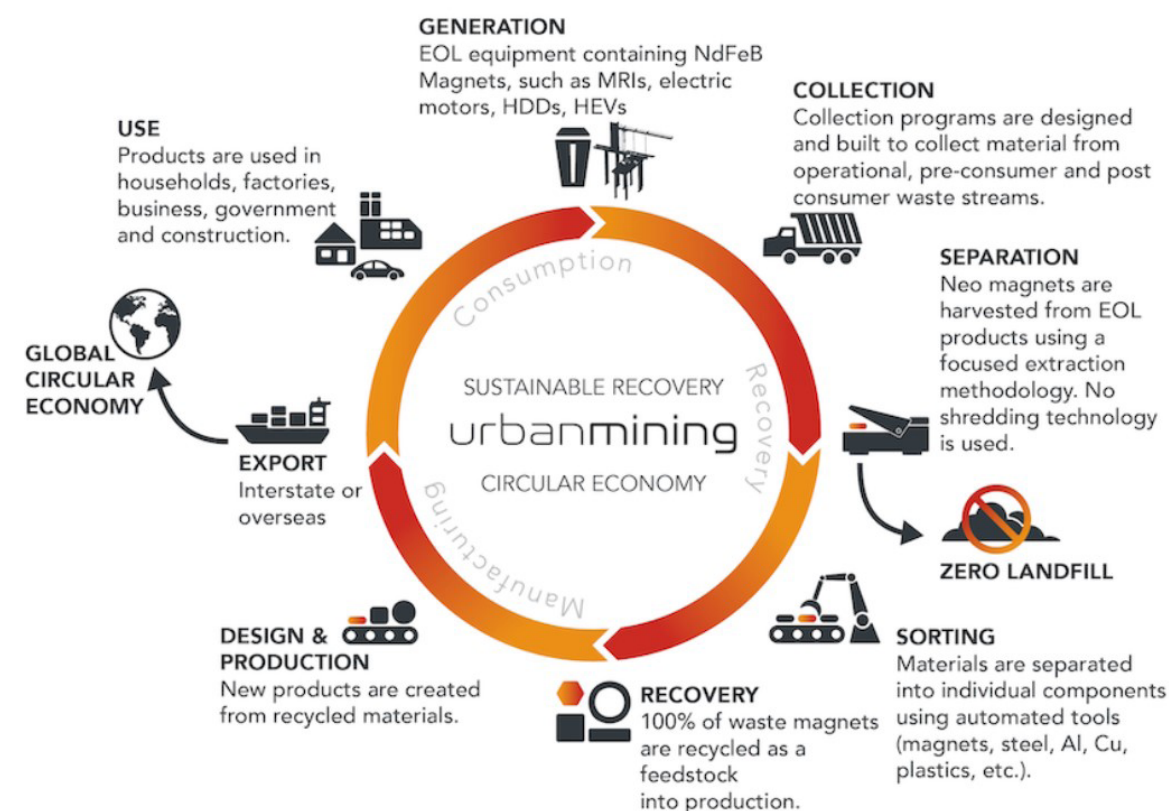
"materials can be seen as only temporarily stored in the building and can be reused in the long term (Leising, Quist and Bocken, 2018)"



(Brussels Environment, 2019)

URBAN MINING

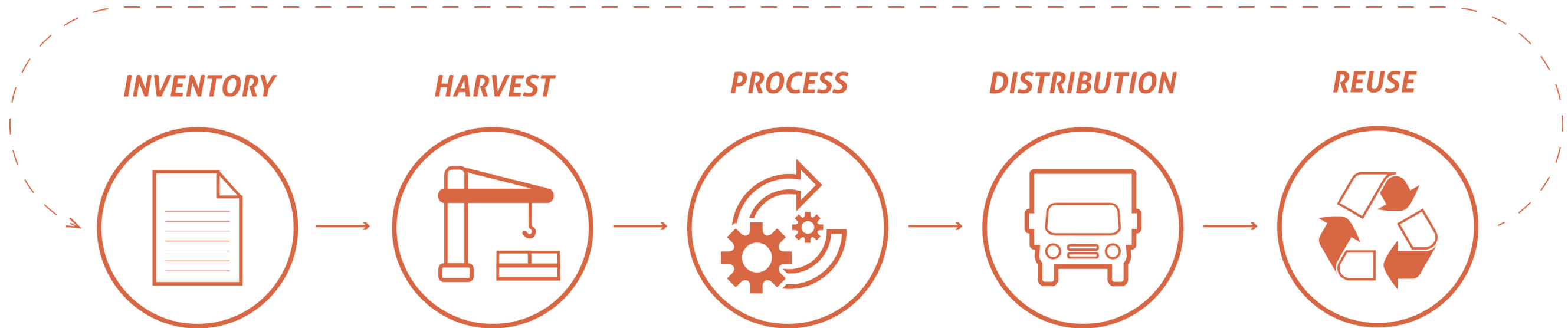
"the process of reclaiming components from any kind of anthropogenic stocks, including buildings, infrastructure, industries, and products (in and out of use) (Cossu and Williams, 2015)"



(Urbanminingco.com, 2022)

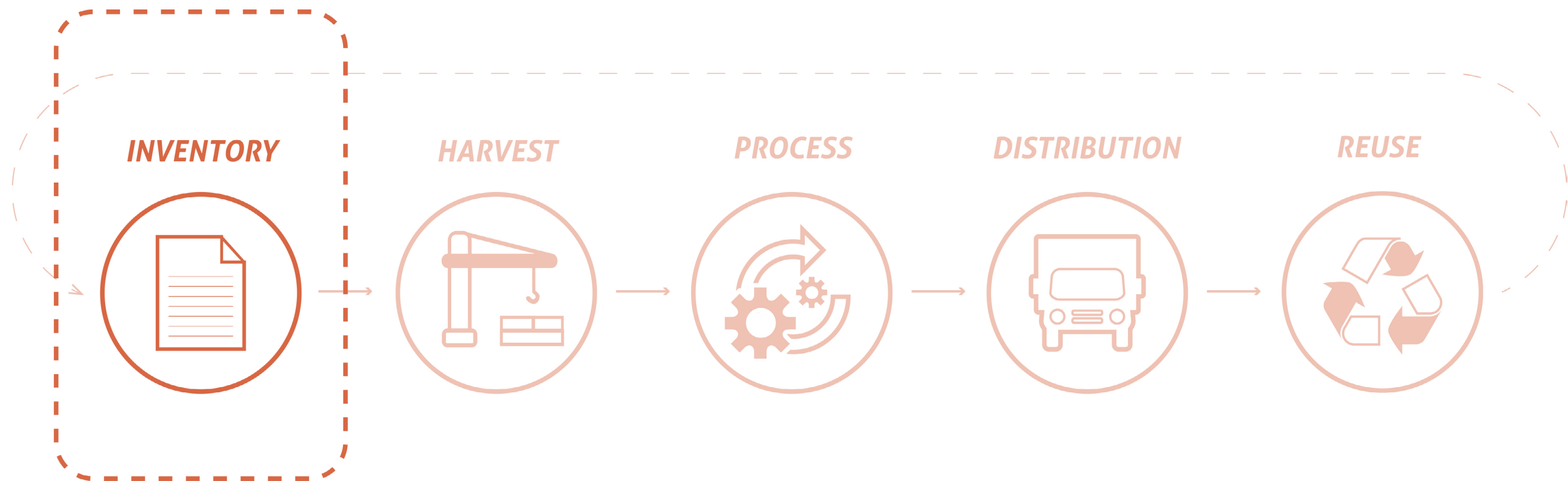
BAMB currently does not have a clear and unified implementation standard, and the only practical BAMB projects funded by the EU are only attempts based on building scale.

BAMB FLOW



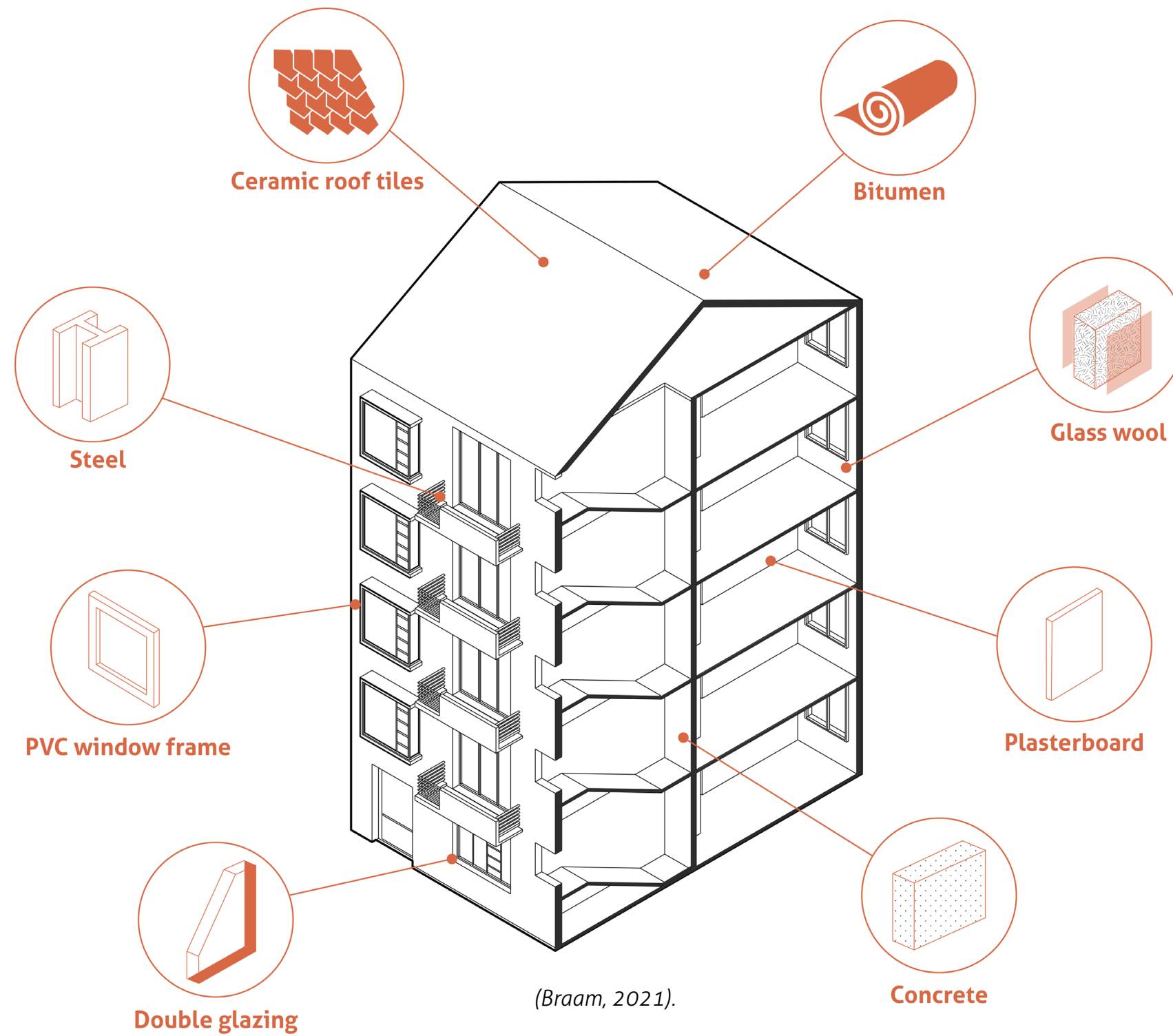
Based on the combination of the BAMB project and Urban Mining, I proposes to divide the implementation of BAMB into five phases: inventorying, harvesting, processing, distributing, and reusing.

INVENTORY



The purpose of the inventory is to clarify the reusability of components in the building

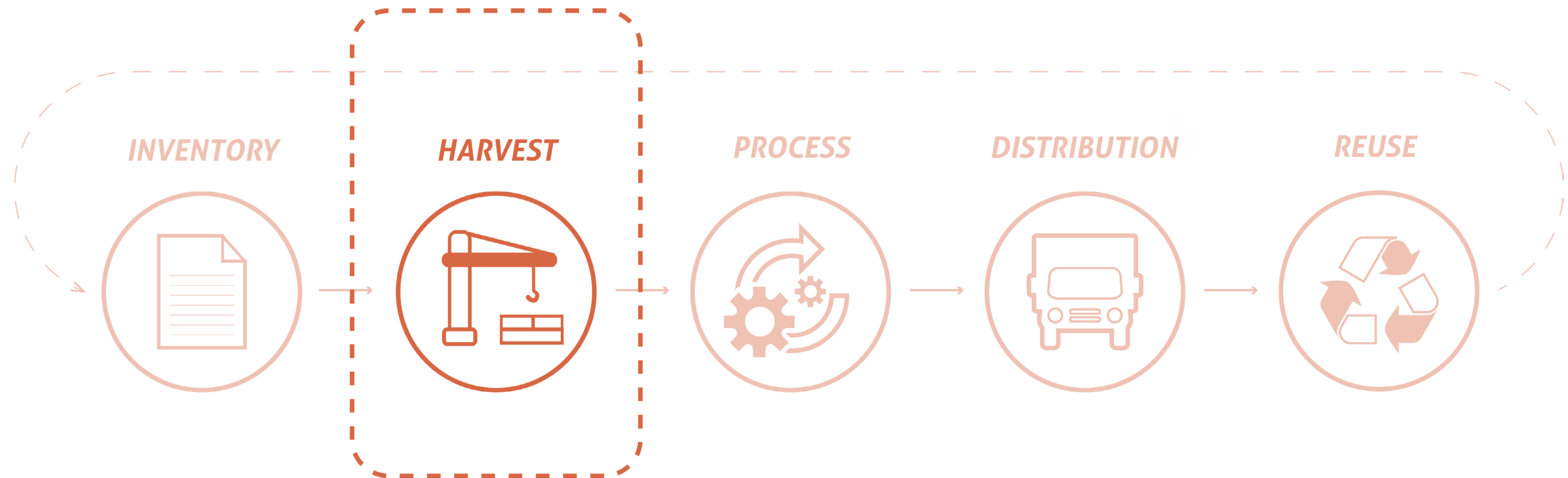
INVENTORY



The creation of the inventory requires the participation of stakeholders from different fields. The inventory will help to reduce construction waste by recycling as much usable material as possible.

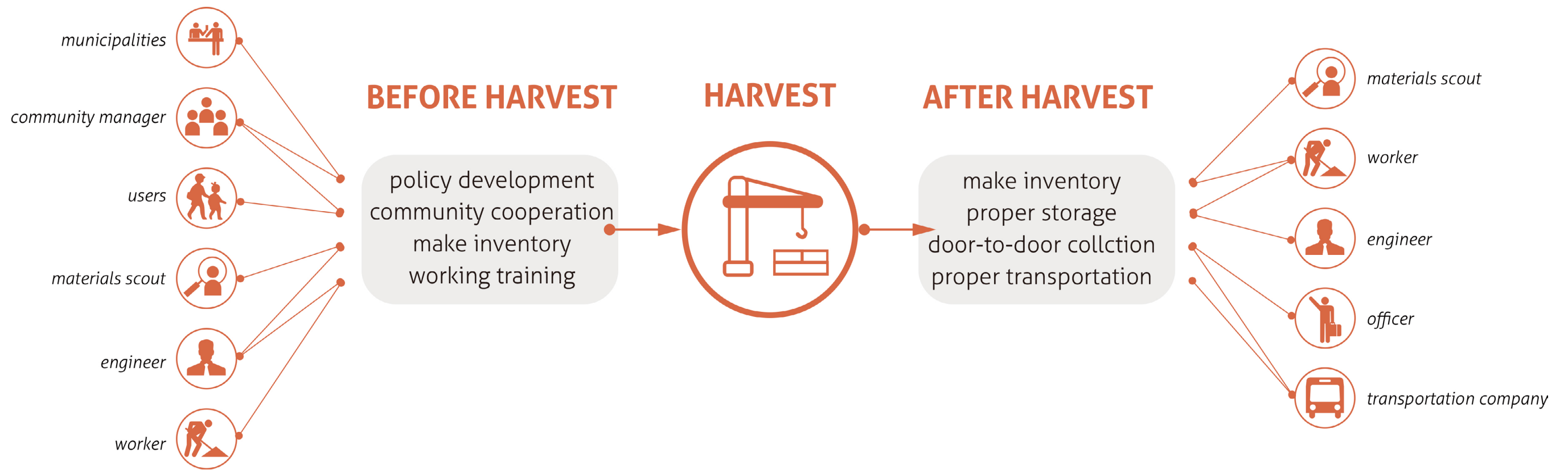
MAKING INVENTORY

HARVEST



Removing the components from the post-war housings, and also separating the parts that are still usable in a way that maintains as much value as possible.

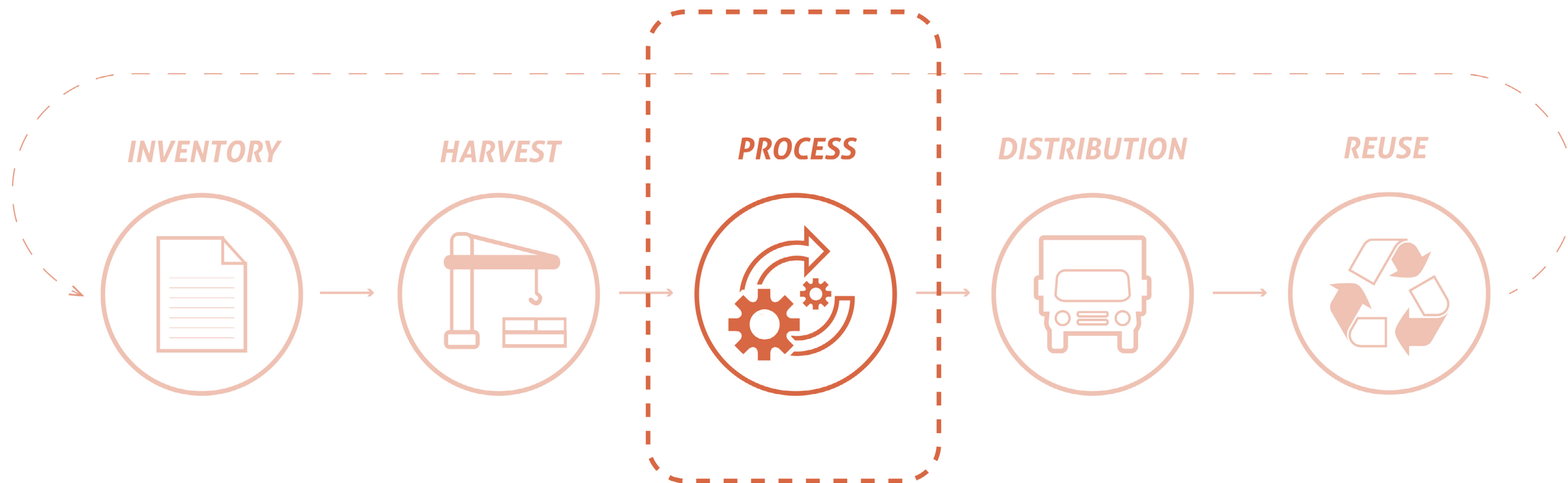
HARVEST



This requires knowledge of assembly and disassembly among the demolition workers, and perhaps even need training in advance of the formal demolition

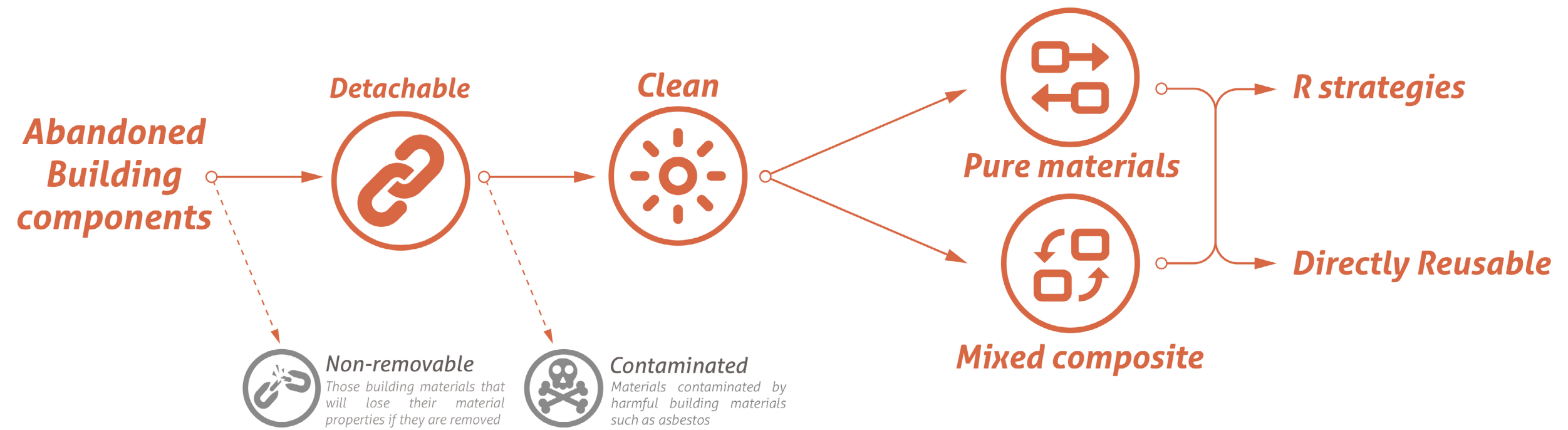
POLICY & TRAINING

PROCESS



Materials separated from the post-war buildings will be transported to a local material processing center, where they will be initially sorted, processed, documented, and stored.

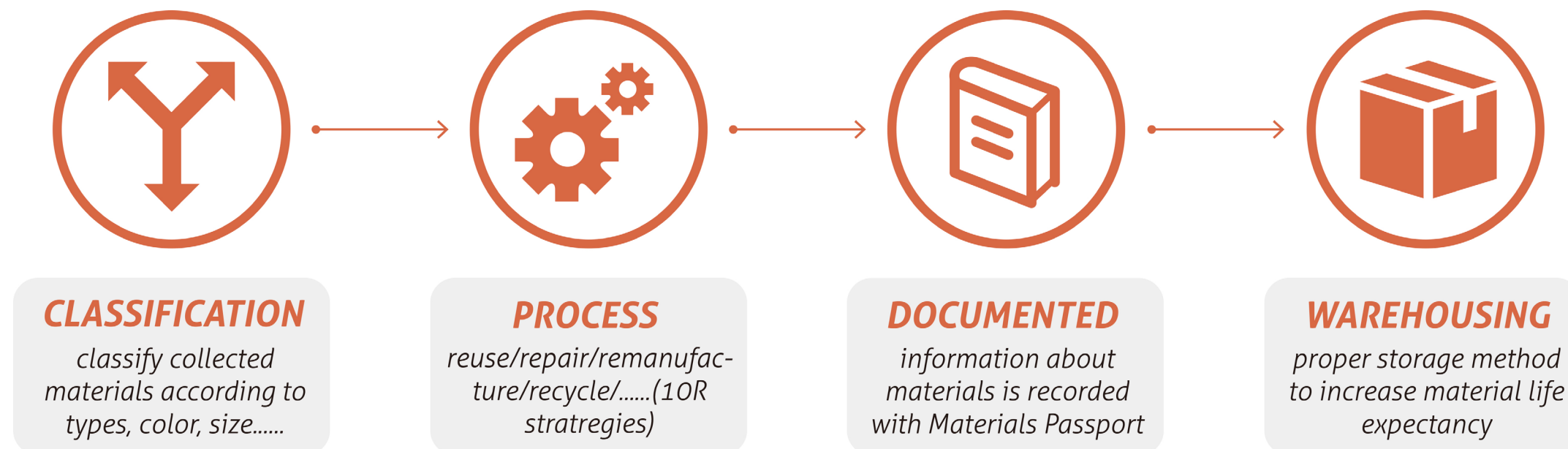
PROCESS



The collected waste materials need to be initially sorted to ensure a more targeted treatment for the following process.

CLASSIFICATION

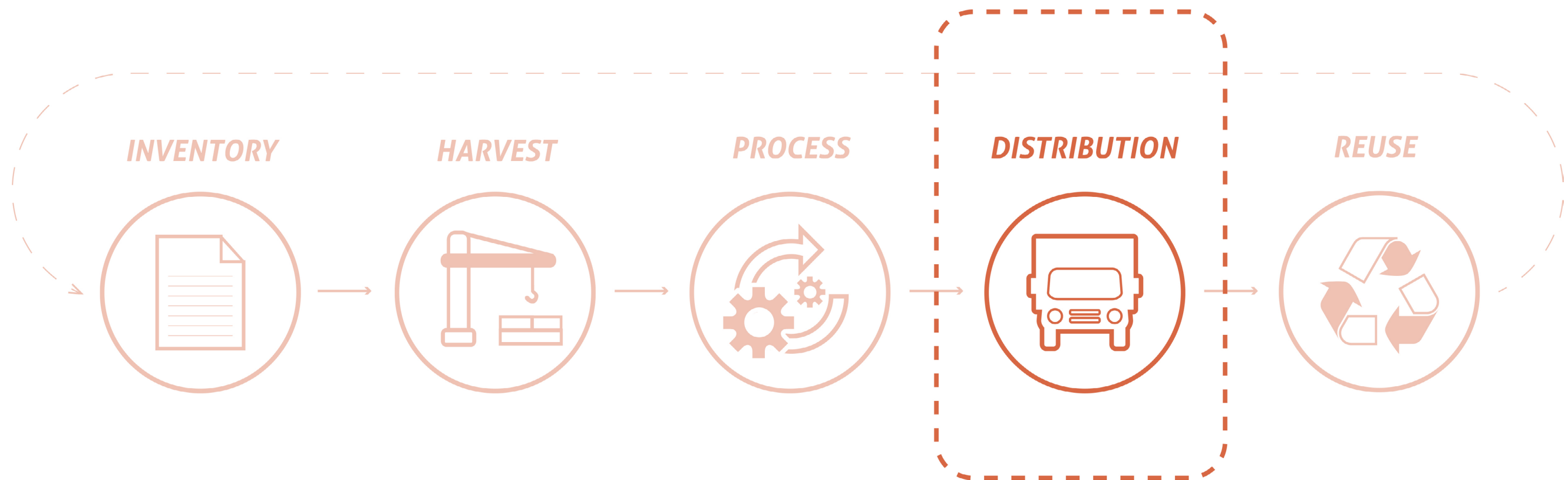
PROCESS



After sorting, the treatment is decided according to the characteristics of the material.
After that, the processed material will be recorded in the form of MP and stored.

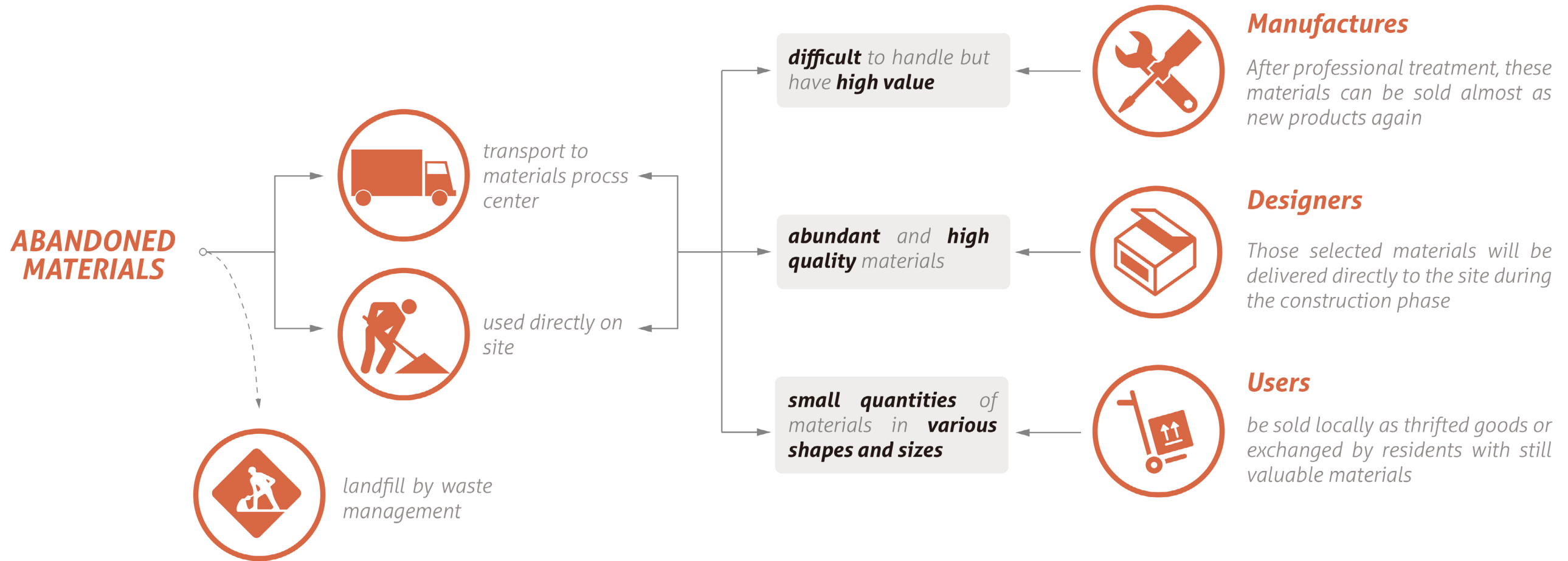
PROCESS FLOW

DISTRIBUTION



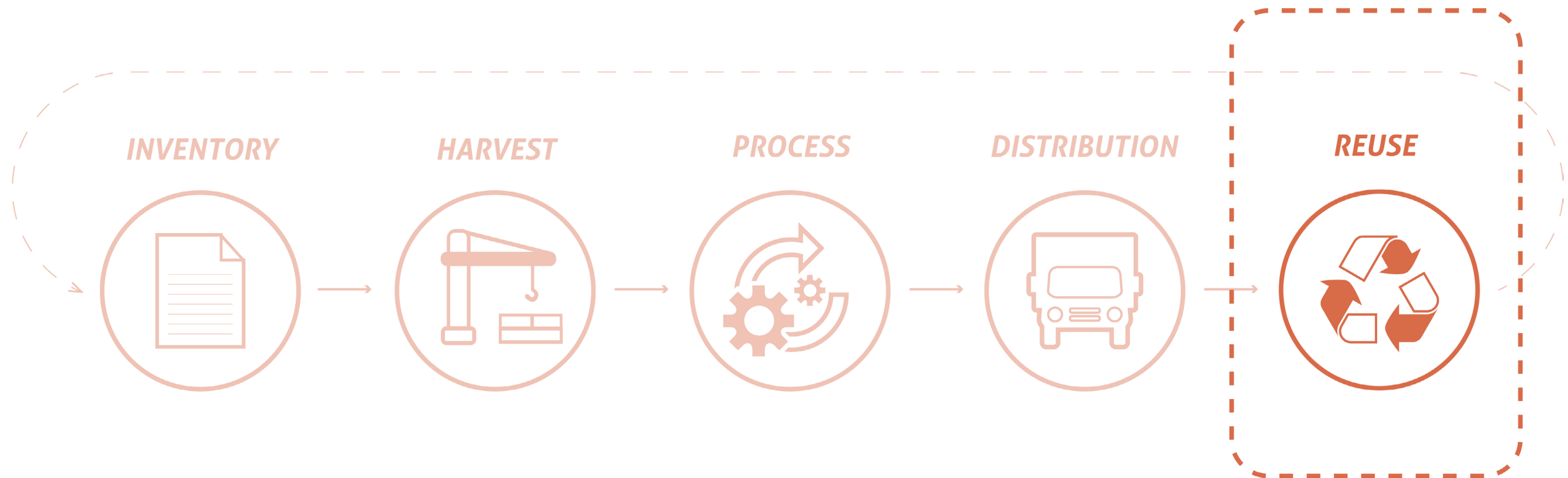
Diversified distribution channels can break down information barriers and allow all kinds of people to have access to recycled materials

DISTRIBUTION



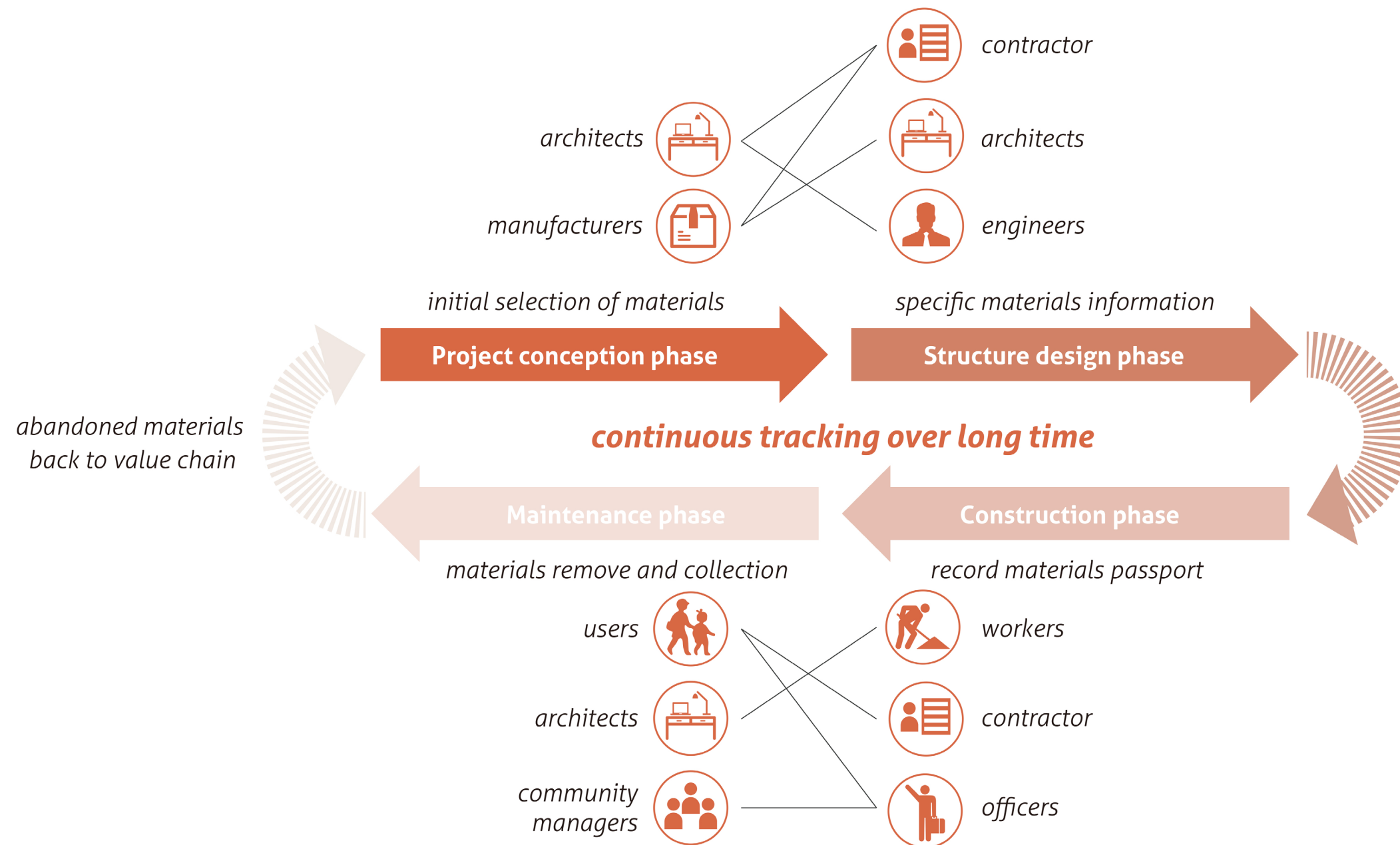
DISTRIBUTION DESTINATION

REUSE



For the realization of BAMB, it is not enough to focus only on the process from harvesting to distribution of materials.

REUSE



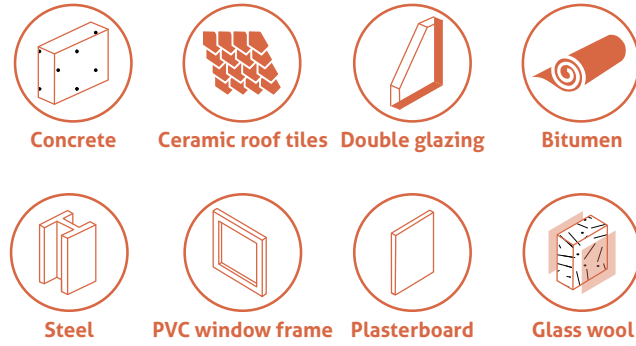
BAMB is concerned with the approach of using and maintaining the value of materials over a long time. The long-term value of materials that enter the BAMB system should be given more attention than their use in the present. To achieve it, the different stakeholders will have their responsibilities for materials at different stages of design

REUSABLE MATERIALS

BAMB FLOW

1. INVENTORY

The purpose of the inventory is to clarify the reusability of components in the building



The creation of the inventory requires the participation of stakeholders from different fields. The inventory will help to reduce construction waste by recycling as much usable material as possible.

2. HARVEST

Removing the components from the post-war housings, and also separating the parts that are still usable in a way that maintains as much value as possible.

BEFORE HARVEST

policy development
community cooperation
make inventory
working training



This requires knowledge of assembly and disassembly among the demolition workers, and perhaps even need training in advance of the formal demolition

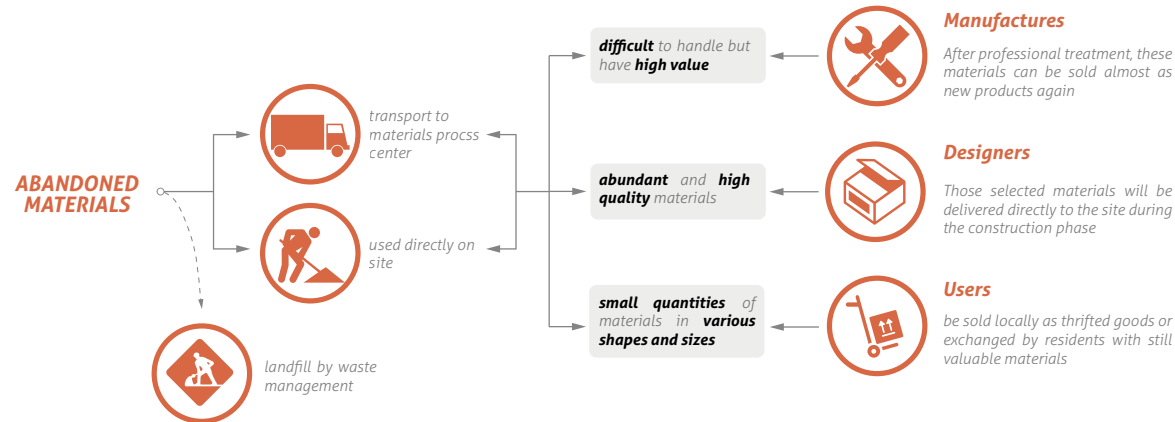
AFTER HARVEST

make inventory
proper storage
door-to-door collection
proper transportation



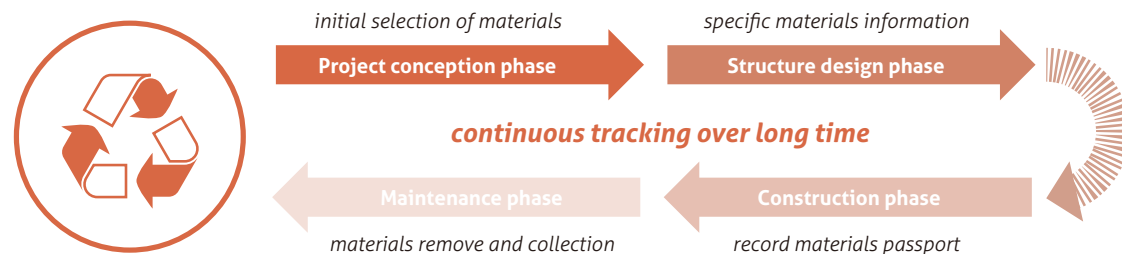
4. DISTRIBUTION

Diversified distribution channels can break down information barriers and allow all kinds of people to have access to recycled materials



5. REUSE

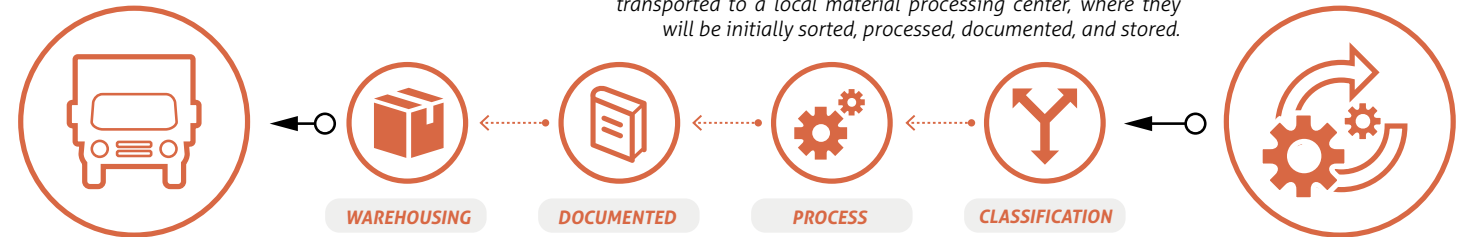
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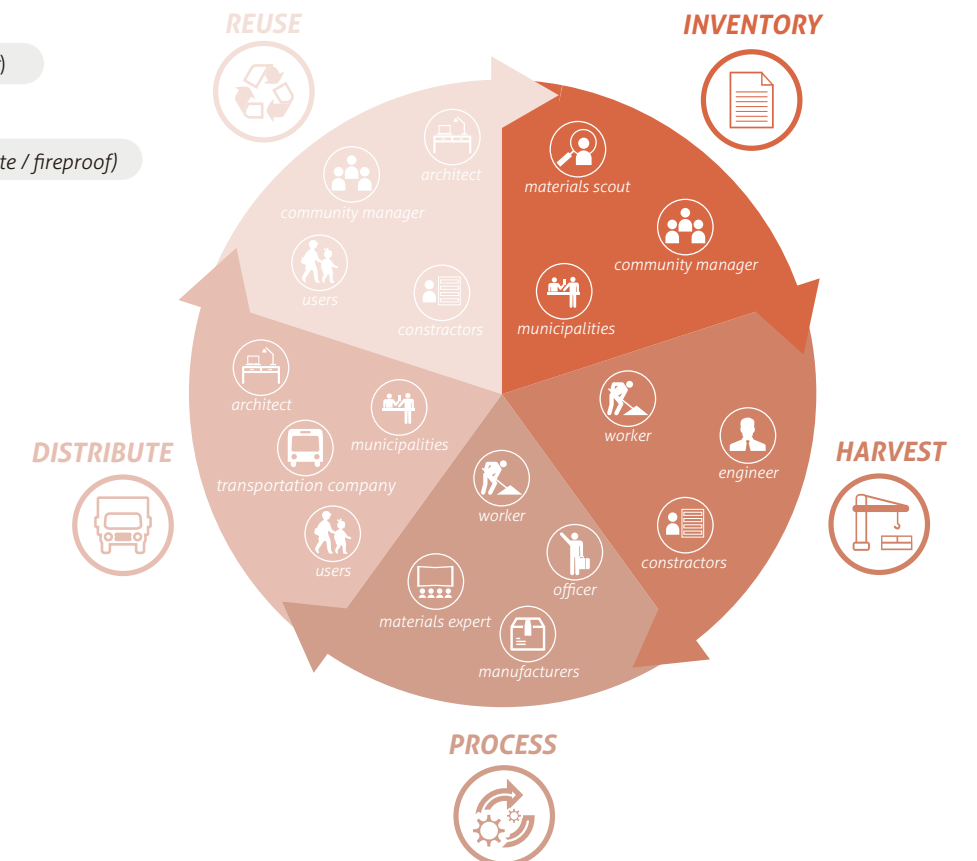
3. PROCESS

Materials separated from the post-war buildings will be transported to a local material processing center, where they will be initially sorted, processed, documented, and stored.

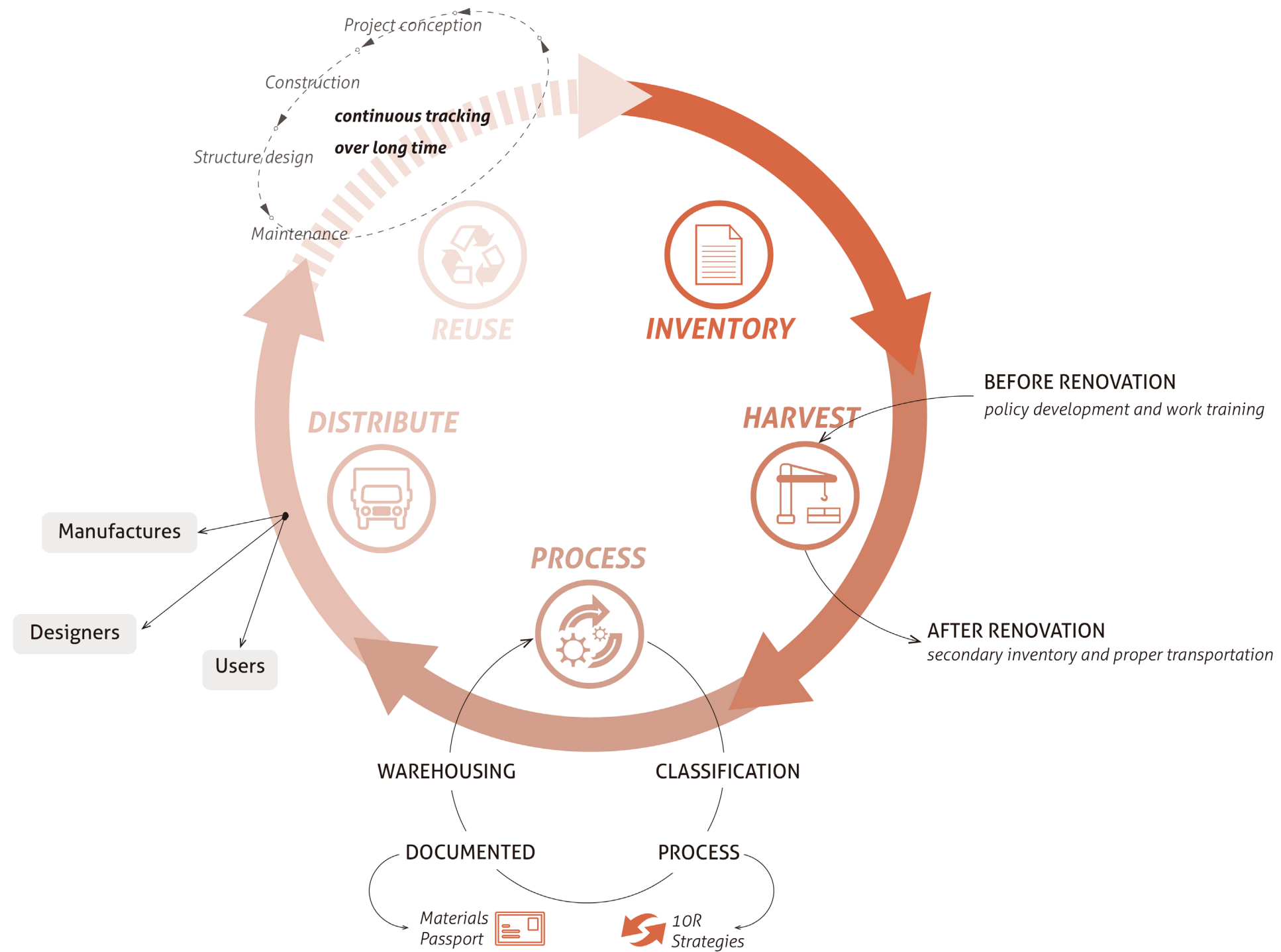


MATERIALS PASSPORT

- 1. Production information (time / manufacturer)
- 2. Basic information (dimension / color)
- 3. Traits information (waterproof / insulation rate / fireproof)
- 4. Life expectancy and usage history
- 5. Potential performance over time



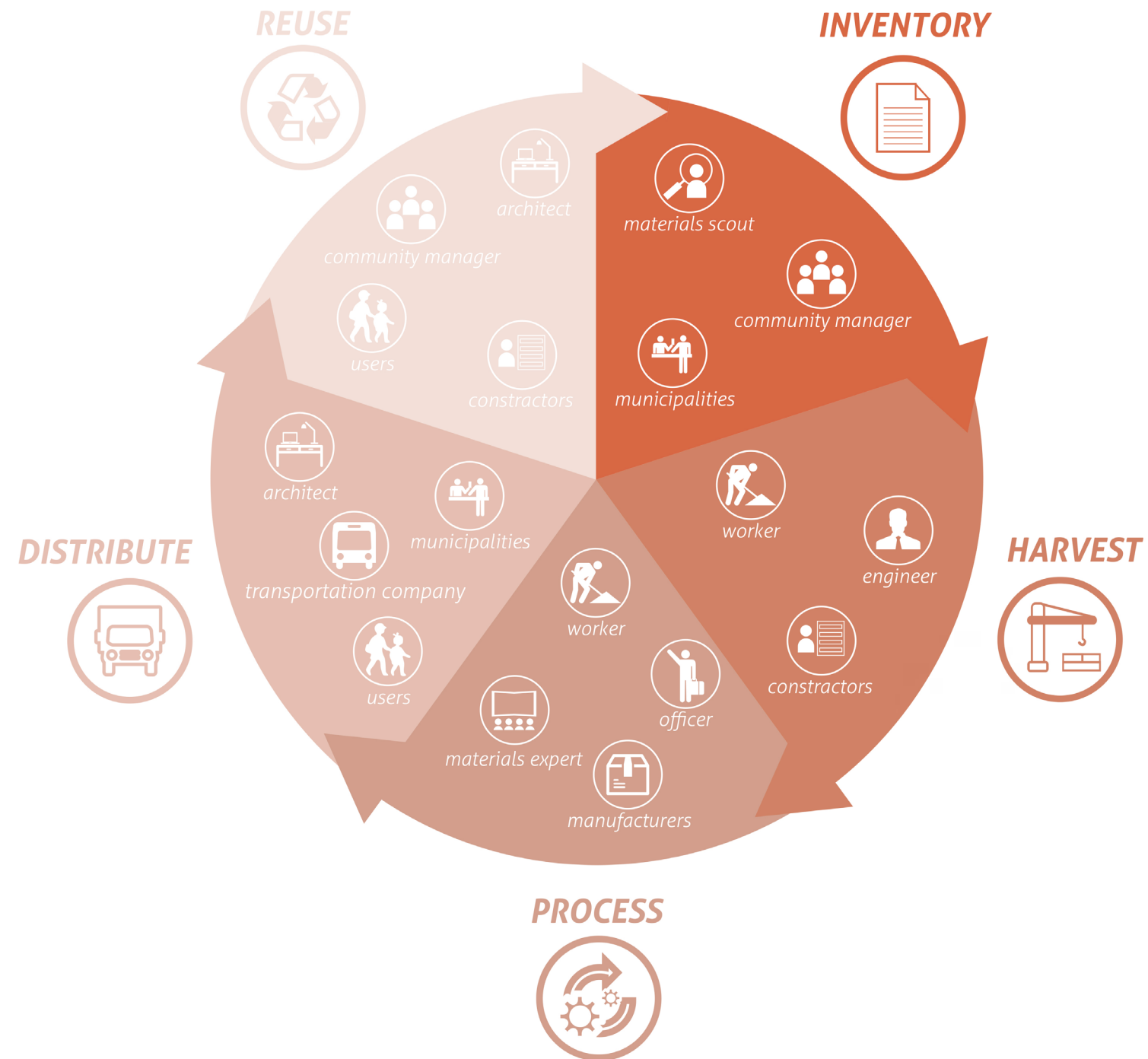
BAMB FLOW



The whole BAMB Flow. This is a complex process that has many details. We have to do many things to achieve it.

BAMB FLOW

BAMB FLOW



The implementation of BAMB requires the close cooperation of the stakeholders. There are many steps required to implement BAMB in the neighborhood, and often these steps involve stakeholders from various fields.

STAKEHOLDERS INVOLVED

CONCLUSION



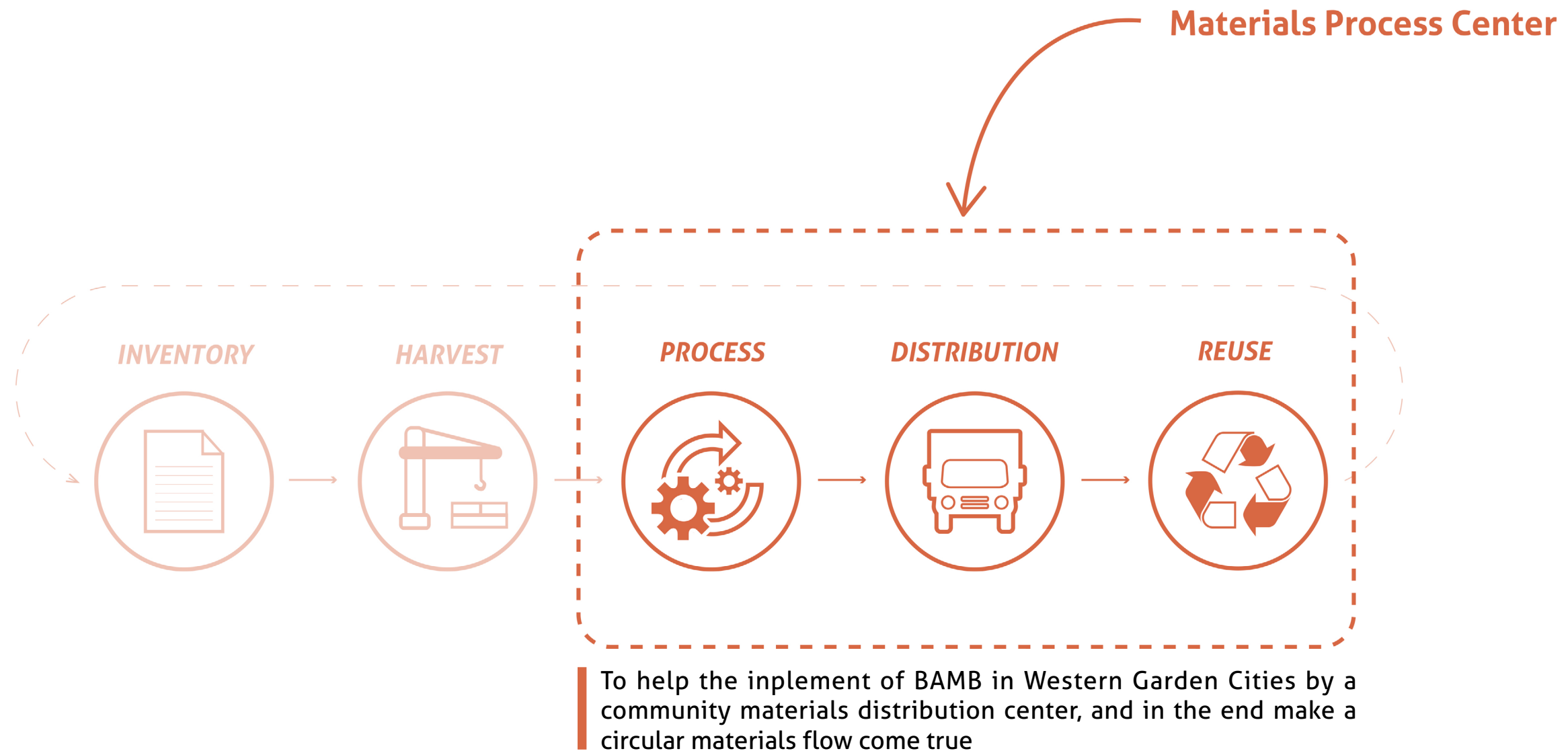
The implement of BAMB is a complex and long-term process that involves many people. Therefore, the implantation of BAMB in the community needs to be controlled by a coordinating center.

COMPLEX AND LONG TERM

DESIGN PROPOSAL

1. Problem Statement
2. Research Part
3. BAMB Implement
4. Design Proposal

DESIGN AMBITION



SITE ANALYSIS

● waste transformers center

● waste point Seineweg (New West)

Geuzenveld
built 1953-1965

Slotermeer
built 1951-1965

Amsterdam ●

Sloterplas Park

Overtoomse Veld
built 1955-1965

Osdorp
built 1957-1965

Slotervaart
built
1954-1965

Western Garden Cities: 1951 – 1965

The area Western Garden Cities is the most famous post-war community of Amsterdam. The urban development plan was developed between 1934 and 1958. Including five districts.
("Garden Cities", 2021)

SITE ANALYSIS

● waste transformers center

● waste point Seinenweg (New West)

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Sloterplas Park

Overtoomse Veld
built 1955-1965

Osdorp
built 1957-1965

Slotervaart
built
1954-1965

Select a site in the western garden city. Materials that have been discarded due to building renovation will be transported here

SITE ANALYSIS

● waste transformers center

● waste point Seinenweg (New West)

Geuzenveld
built 1953-1965

Slotermeer
built 1951-1965

Amsterdam ●

Sloterplas Park

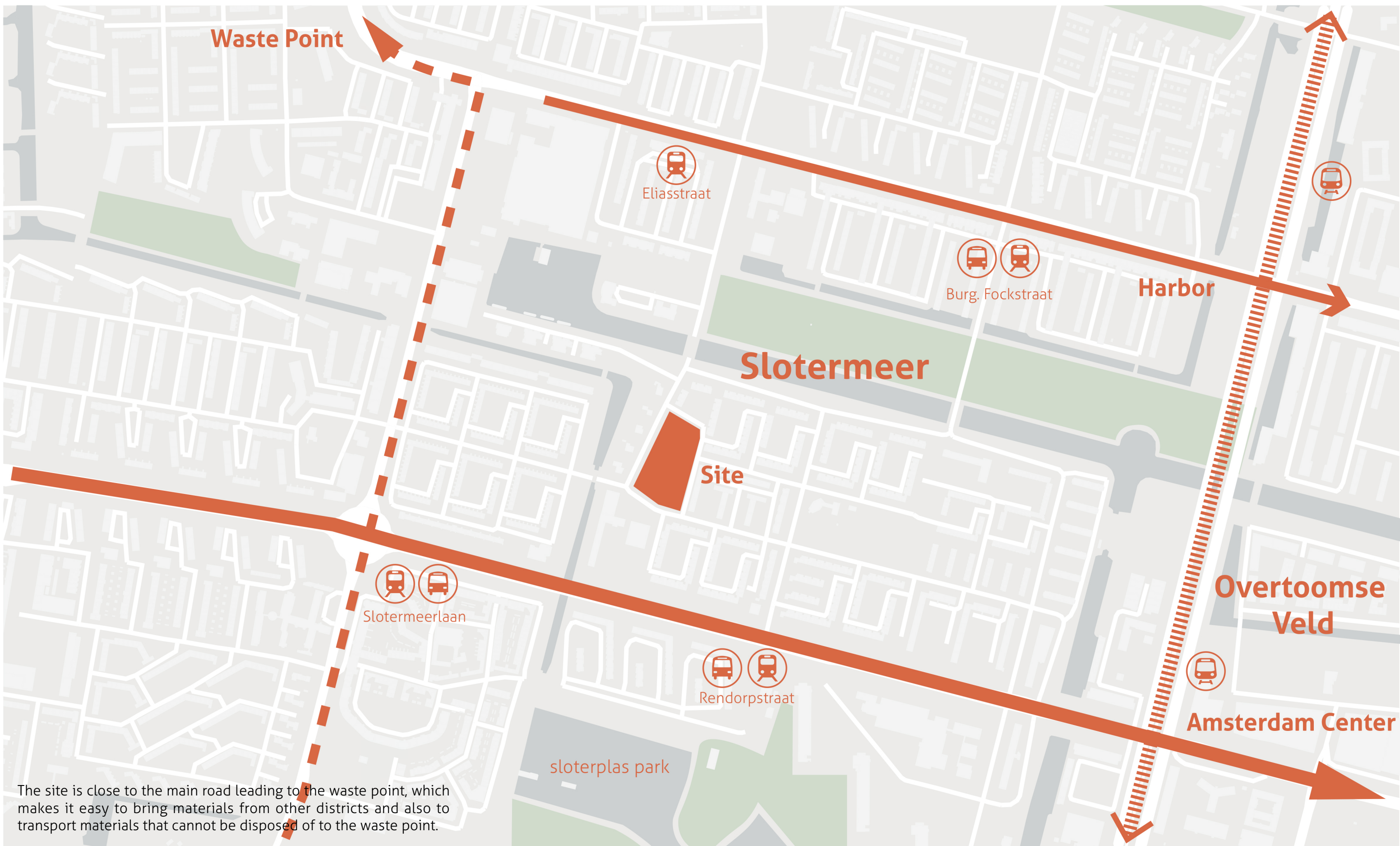
Overtoomse Veld
built 1955-1965

Osdorp
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Slotervaart
built
1954-1965

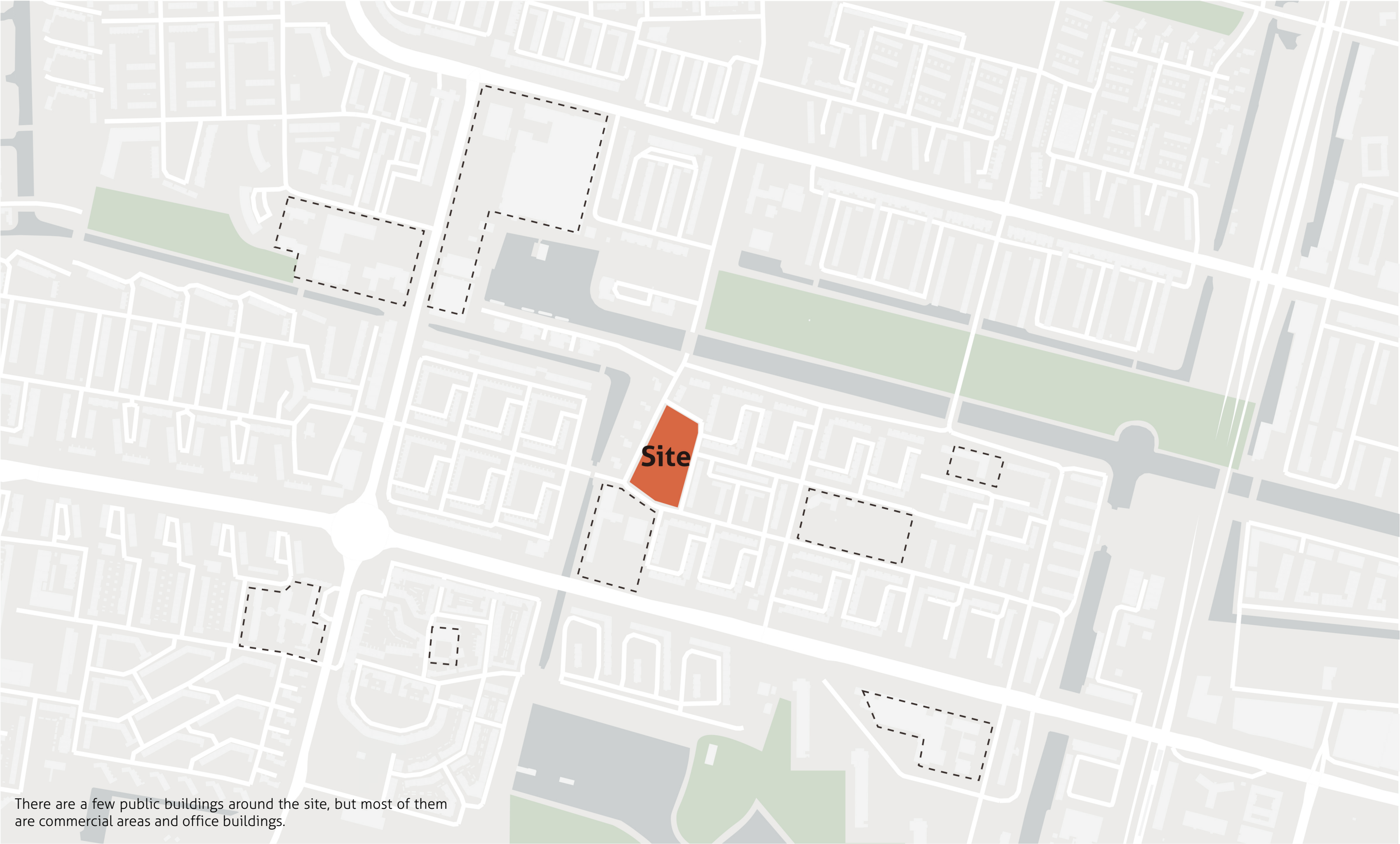
After initial sorting, those materials that are difficult or unnecessary to dispose of will be transported to a nearby waste center. And those materials that have been disposed of at the materials center will have the opportunity to be returned to the post-war housing renovation.

SITE ANALYSIS





SITE ANALYSIS



There are a few public buildings around the site, but most of them are commercial areas and office buildings.

FIELD RESEARCH



FIELD RESEARCH



PROGRAM

1 BAMB OFFICE

initial process of materials
1000m²
+
temporary storage of materials
500m²
+
warehouse office
50m²
+
administration
50m²
+
meeting room
50m²
+
document
50m²

1700 M²

+

2 ACTIVITY CENTER

thrift shop
150m²
+
repair shop
150m²
+
display hall of BAMB
300m²
+
training room for workers
200m²
+
workshop for citizens
100m²
+
café
150m²
+
activity rooms
200m²

1250 M²

USERS



WORKERS

Workers work here to process recycled materials and receive professional training.



CITIZENS

The neighborhood organizes activities and receives knowledge about reusing materials.



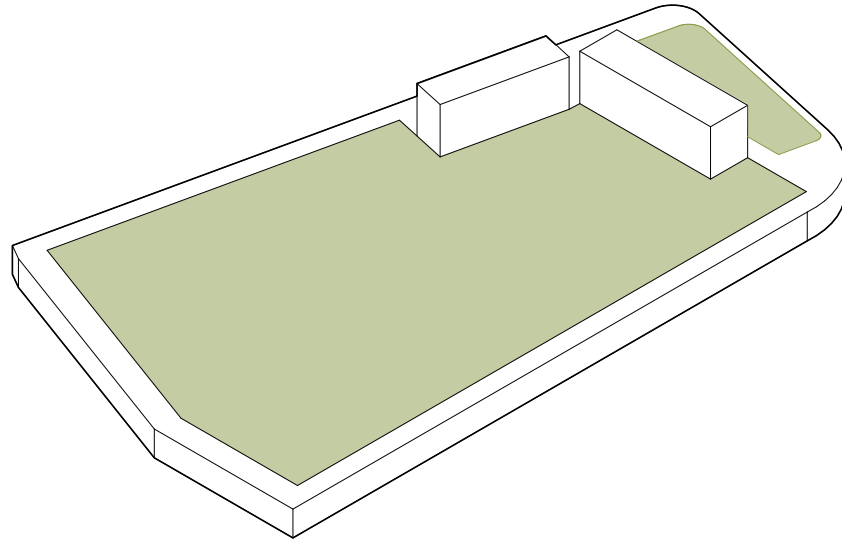
OFFICERS

BAMB staff manage the materials here and control the entire process of harvesting and reuse of materials.



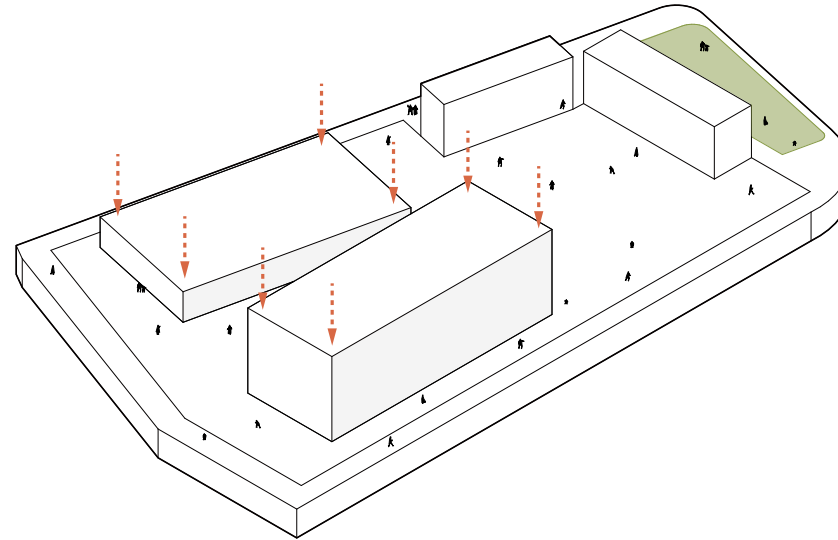
PROJECT DESIGN

MASS GENERATION



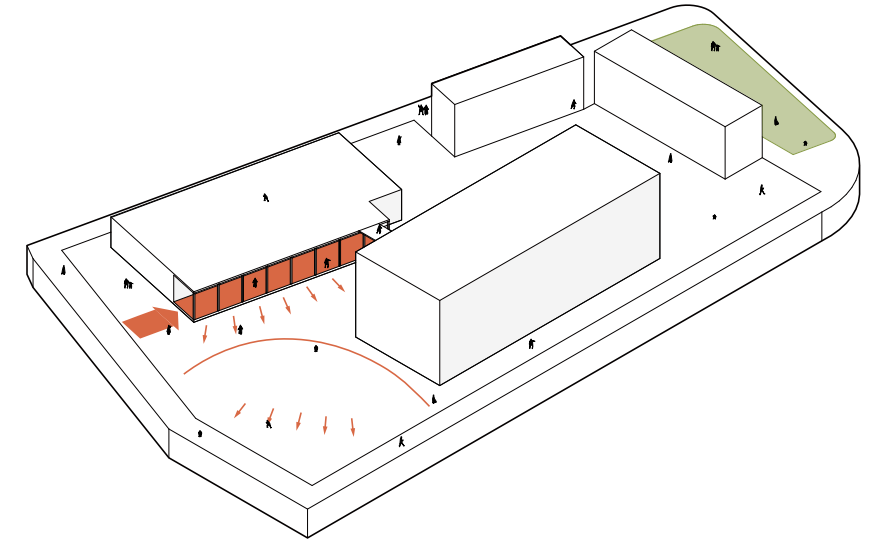
CHOOSE SITE

Choose a suitable site in the community, which is close to the citizens and also close to the garbage station in the area.



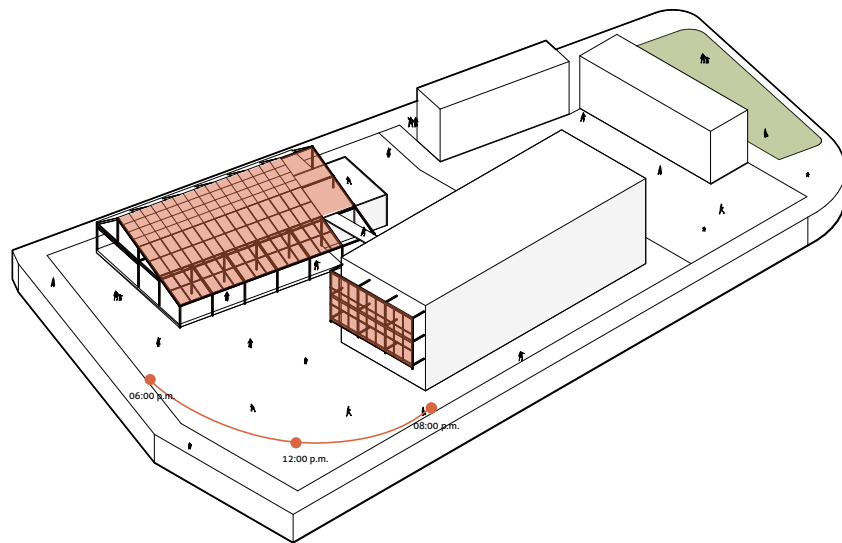
SEPARATE MASS

Since the renovation of the post-war residence will end at any time, the material recycling center and the activity center are divided into two volumes.



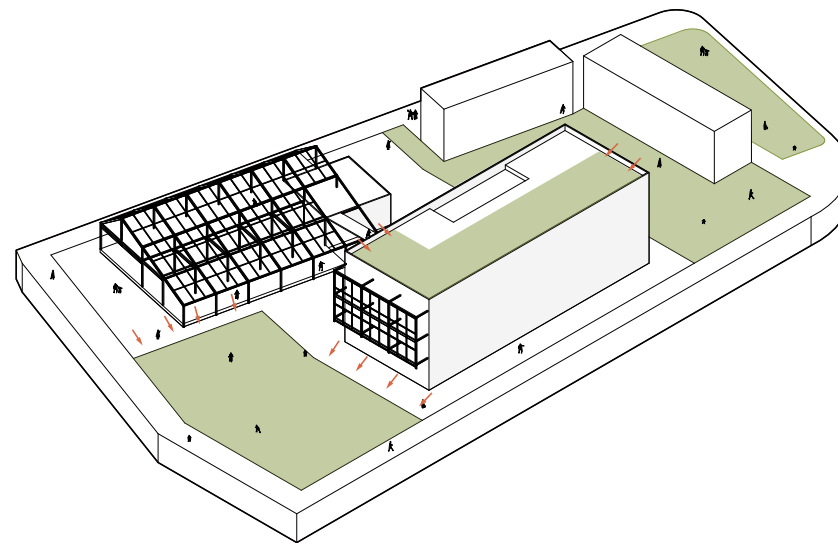
OUTSIDE SPACE

What is offered to the public should not only be a good indoor space, but also a good outdoor space. So a block is set back to form an outdoor activity space.



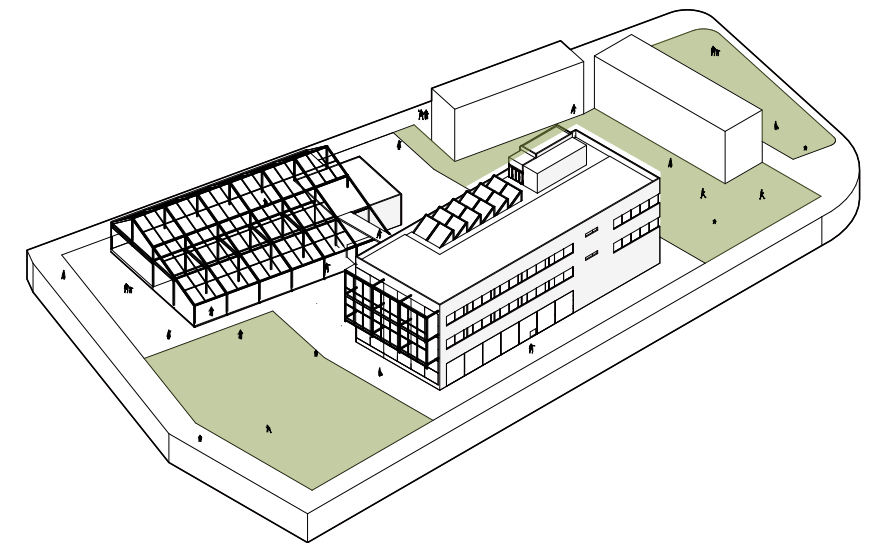
SECONDARY FACADE

A second façade is placed on the south side of the building for shading. Materials collected from the post-war buildings will be placed here for shading.



MORE GREENLAND

Green space is placed in the front plaza of the building and on the roof to maximize the greenery of the site.

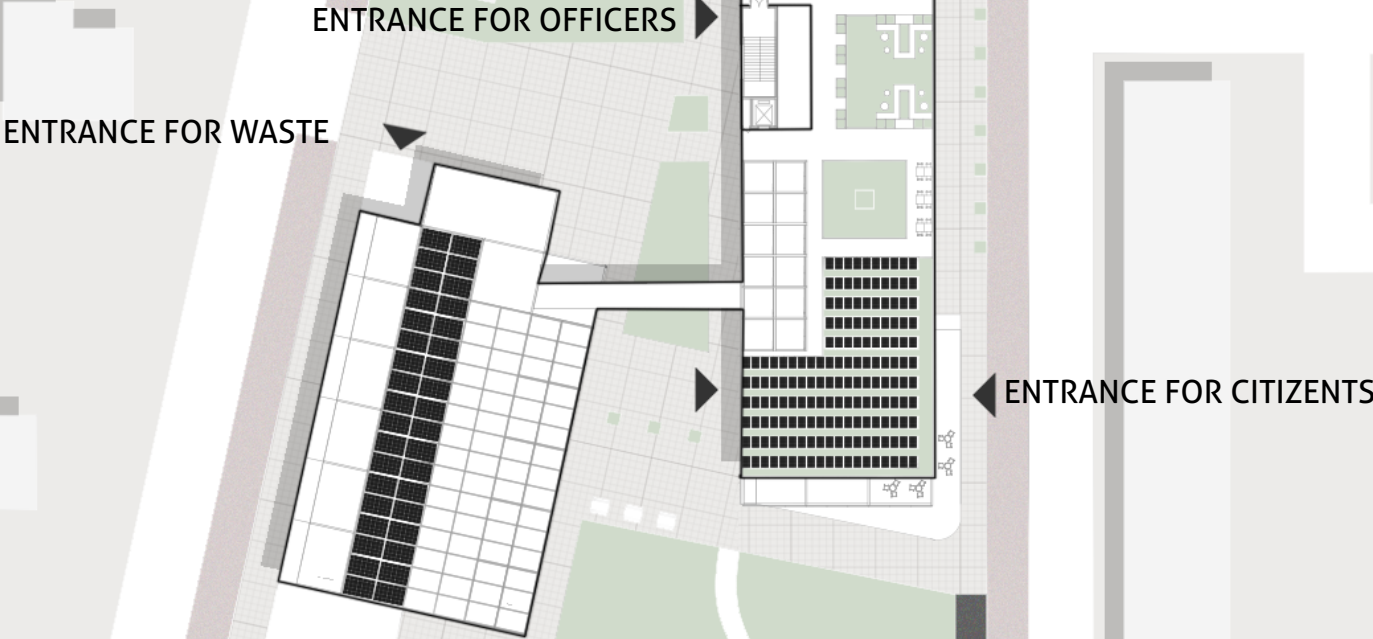


FINISHED

MASTER PLANNING



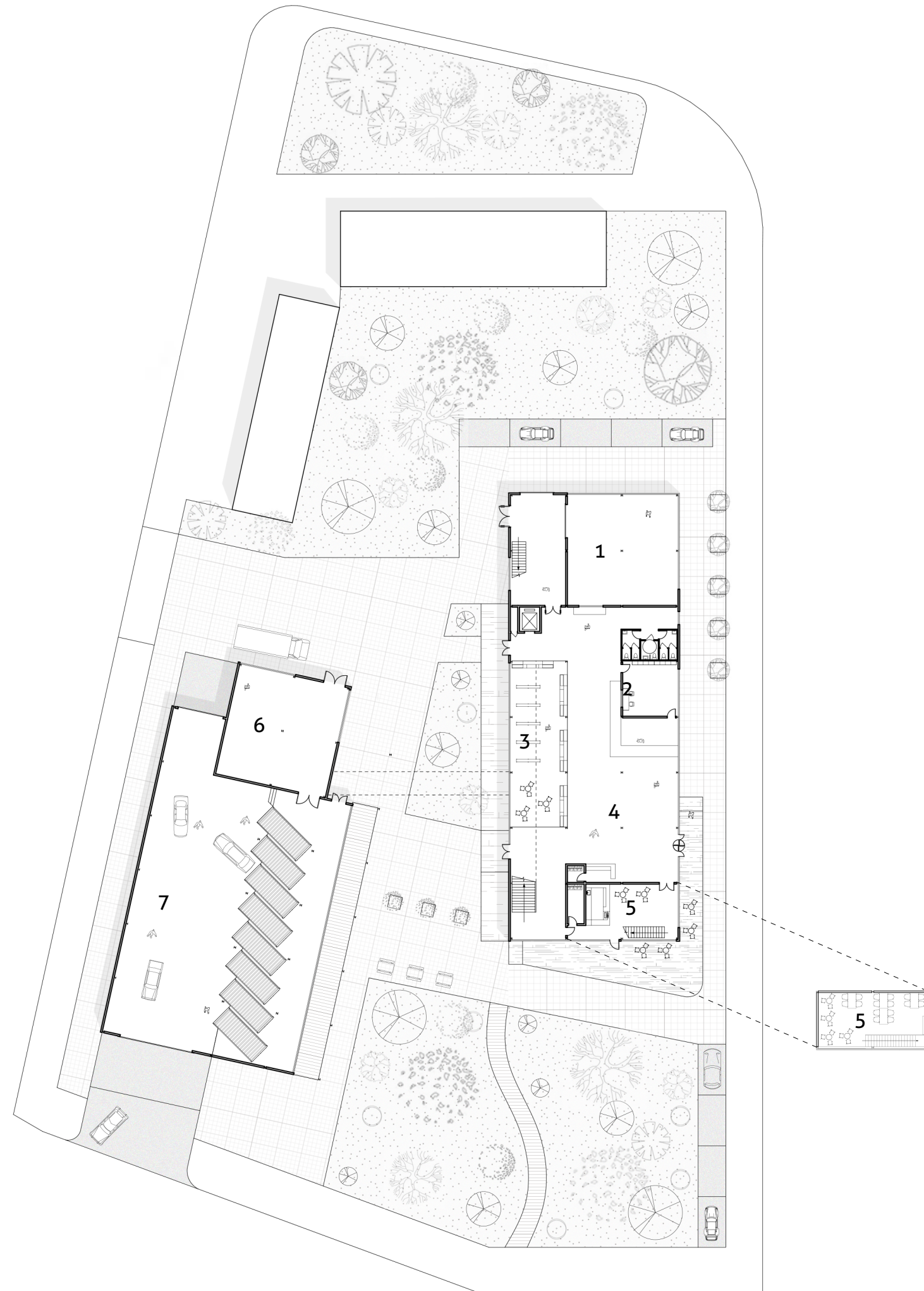
YUJIA REN 2022



PLANNING

GROUND FLOOR

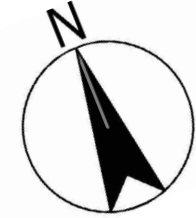
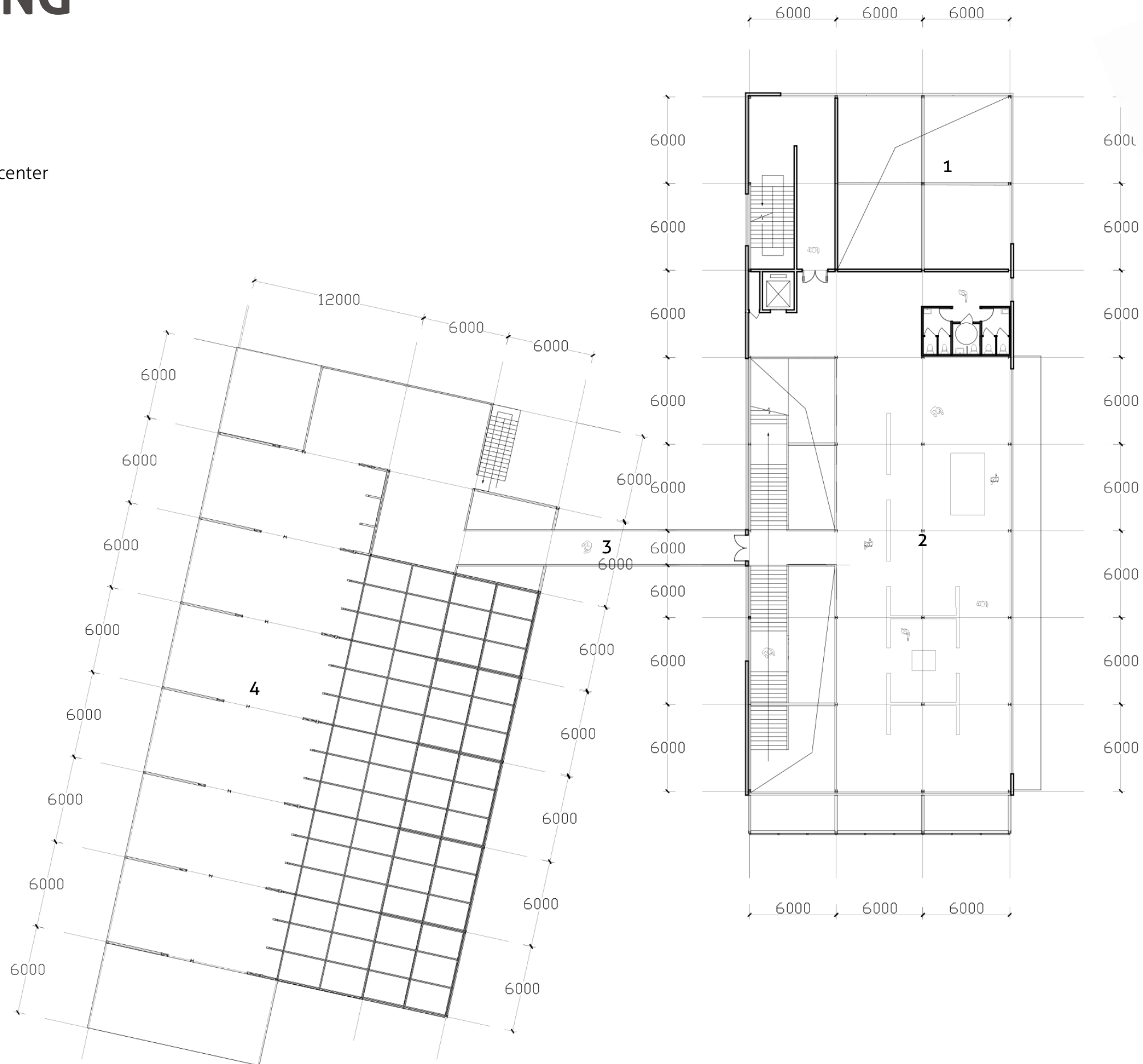
1. storage
2. repair shop
3. thrift shop
4. entrance hall
5. cafe
6. temporary storage
7. materials process center



PLANNING

FIRST FLOOR

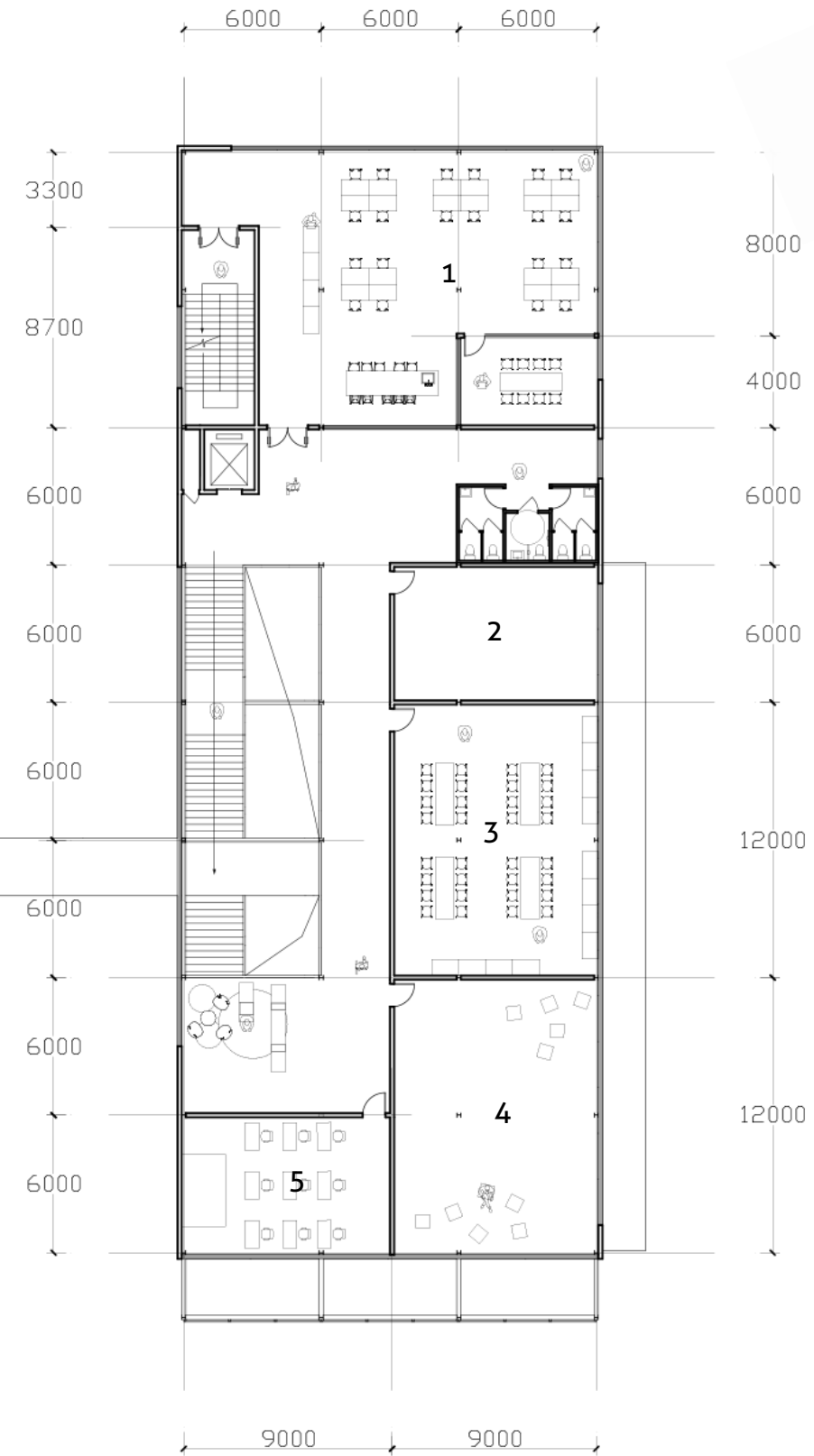
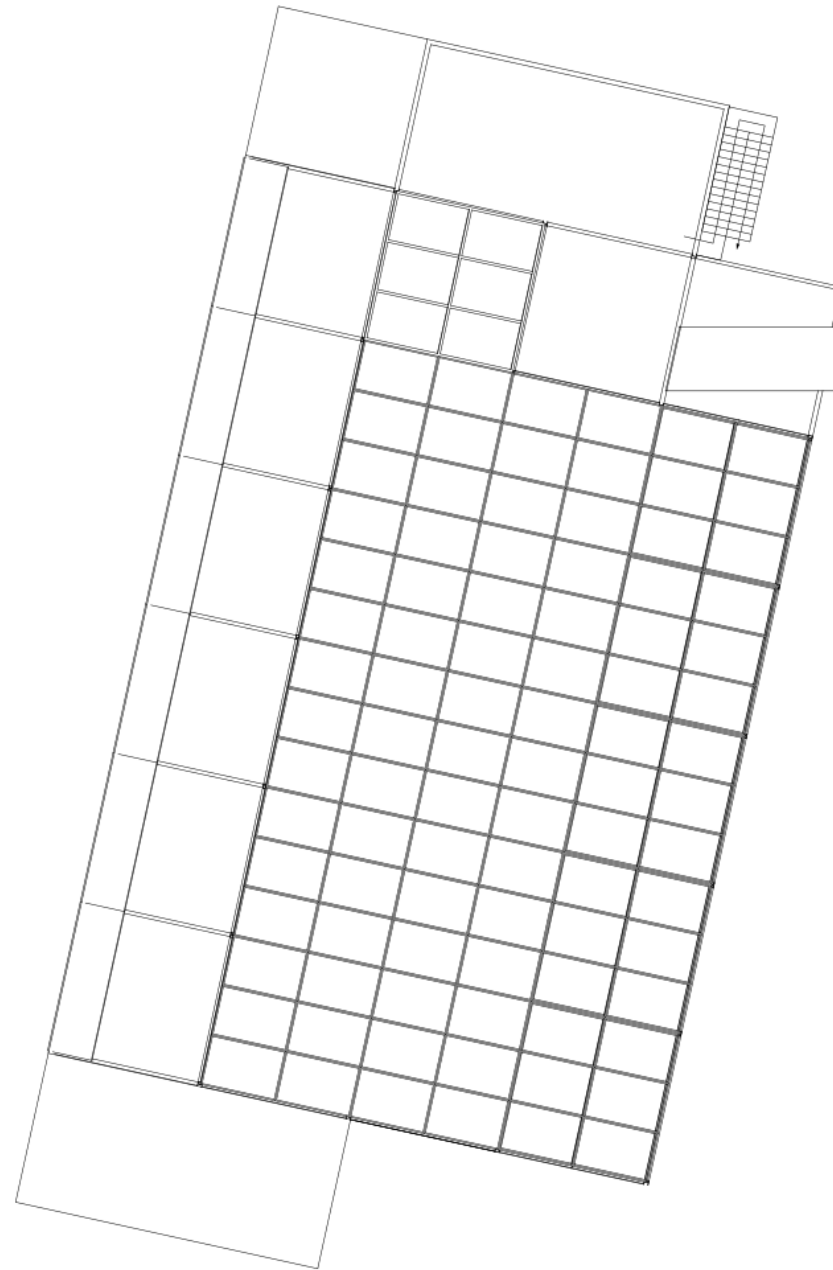
1. storage
2. BAMB display
3. bridge to materials center
4. platform



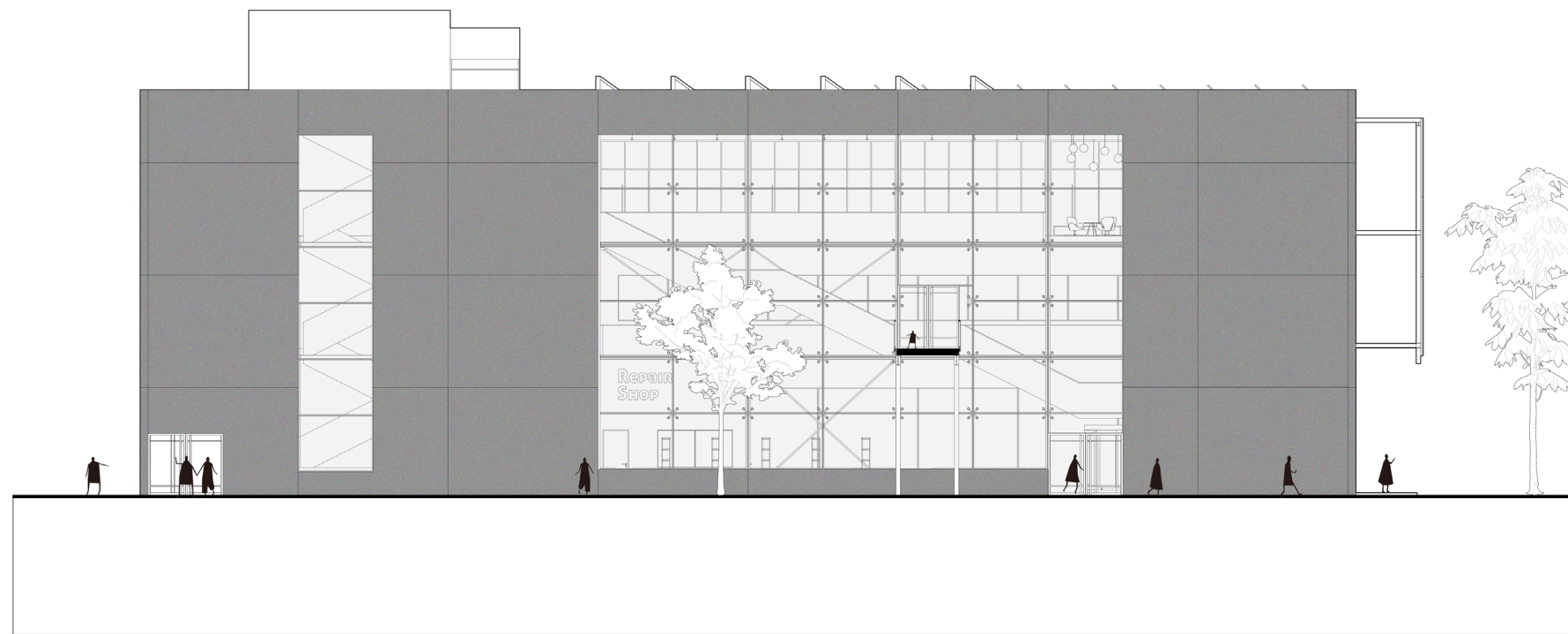
PLANNING

SECOND FLOOR

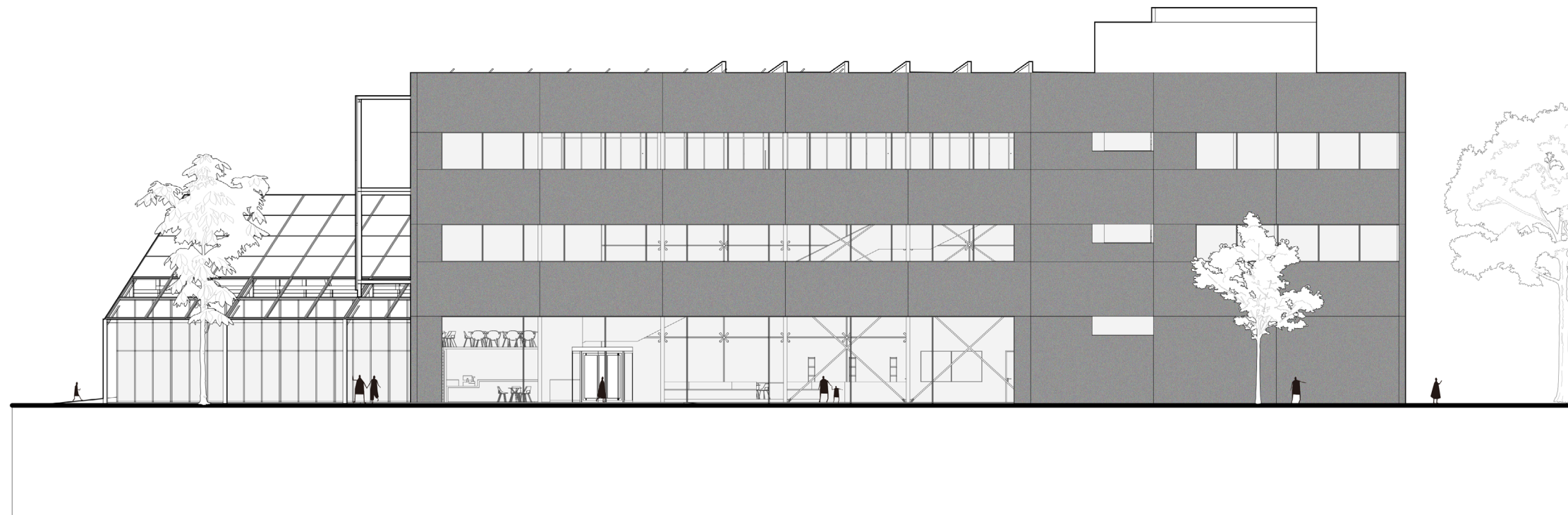
1. BAMB office
2. workshop
3. training room
4. activity room
5. workshop



FACADE

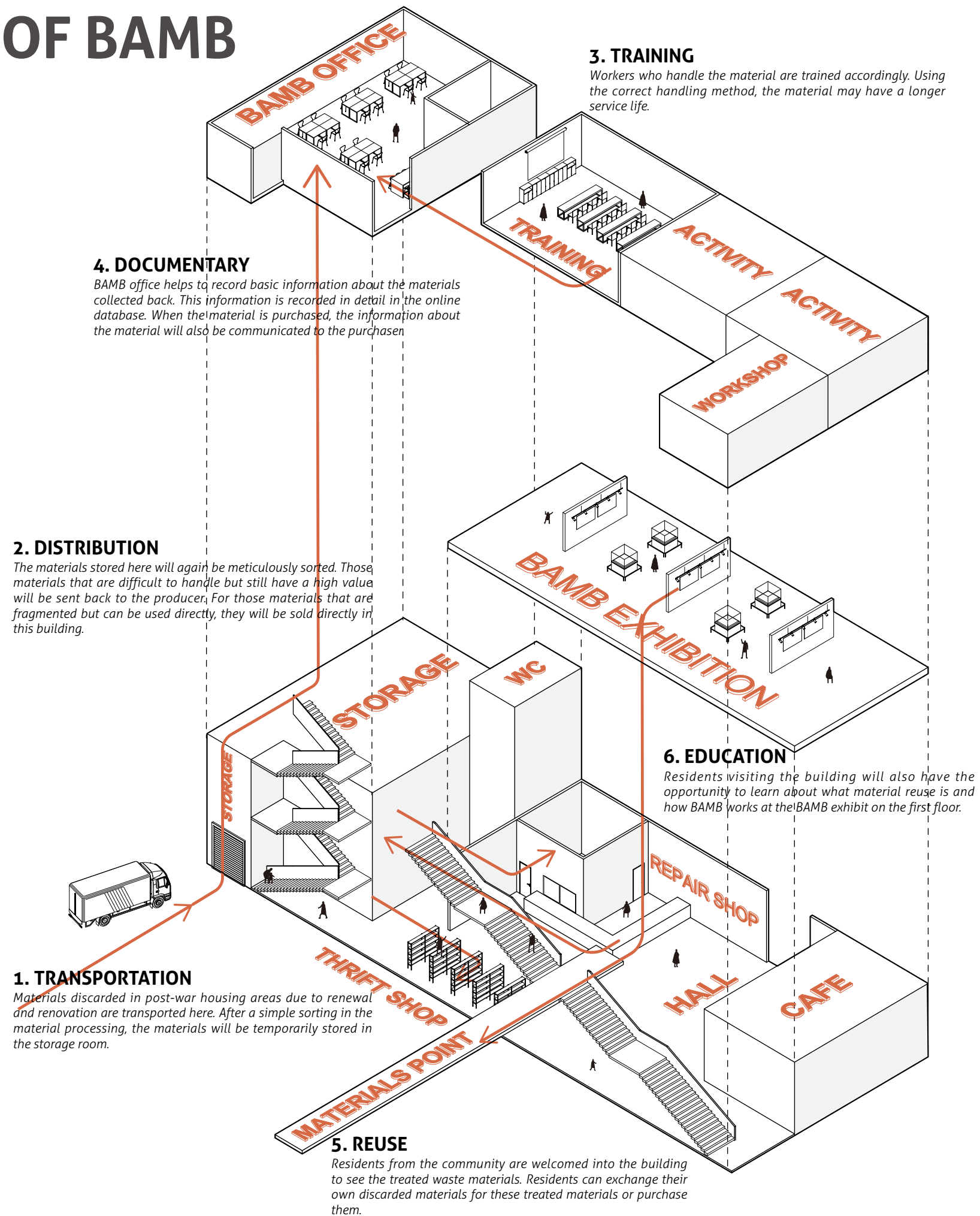


FACADE FACE TO MATERIALS CENTER (NORTHWESTERN FACADE)

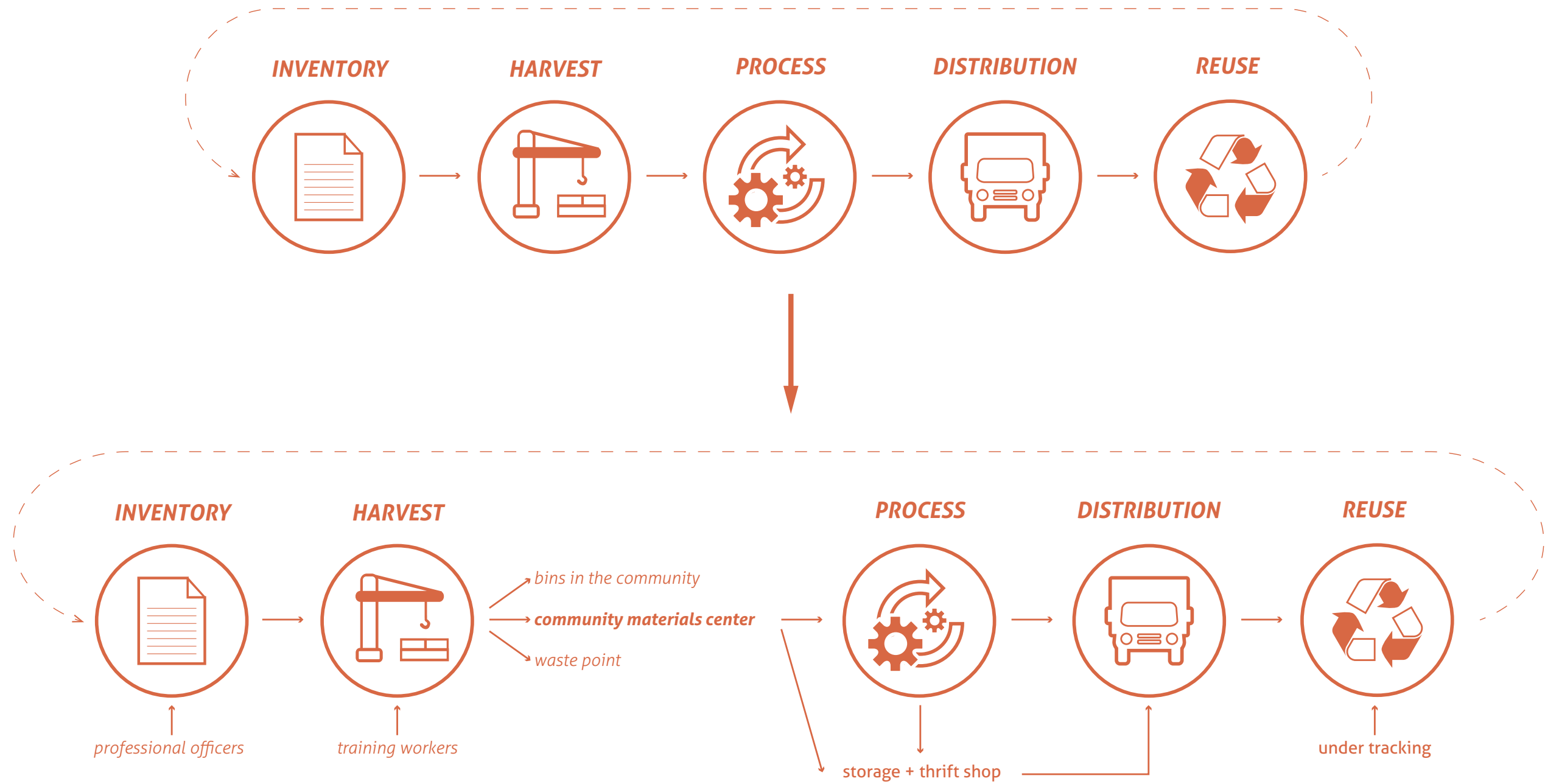


FACADE FACE TO COMMUNITY (NORTHEASTERN FACADE)

OPERATION OF BAMB



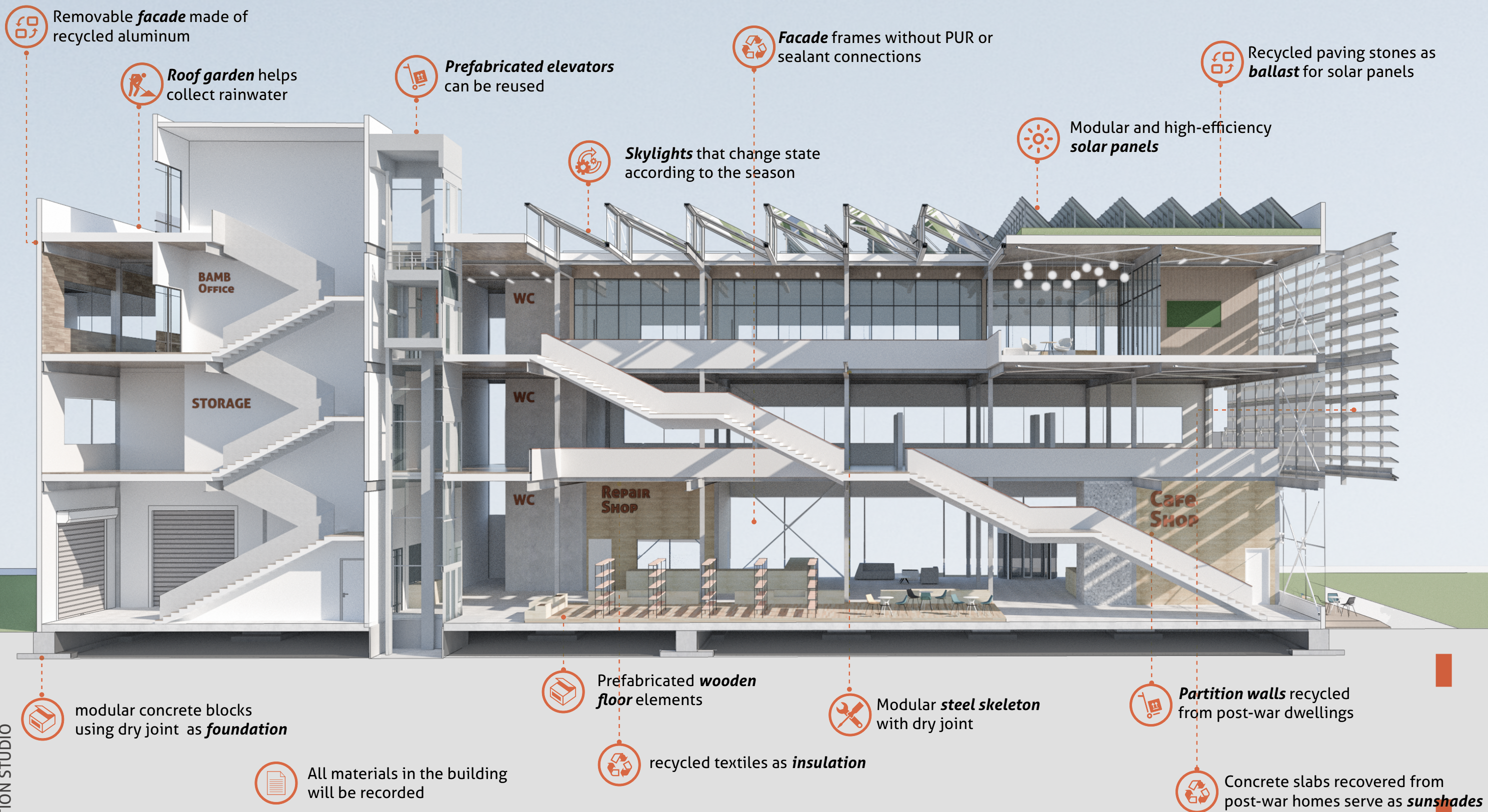
BAMB FLOW



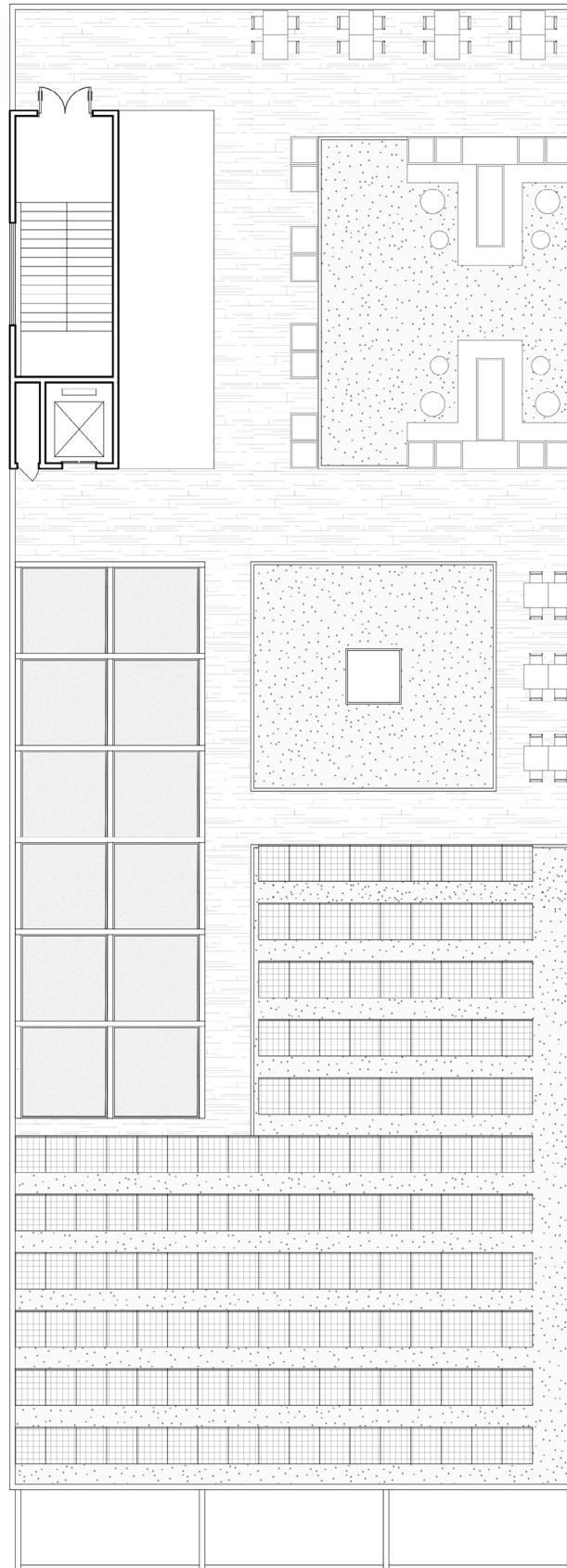


CIRCULARITY DESIGN

CIRCULARITY STRATEGY

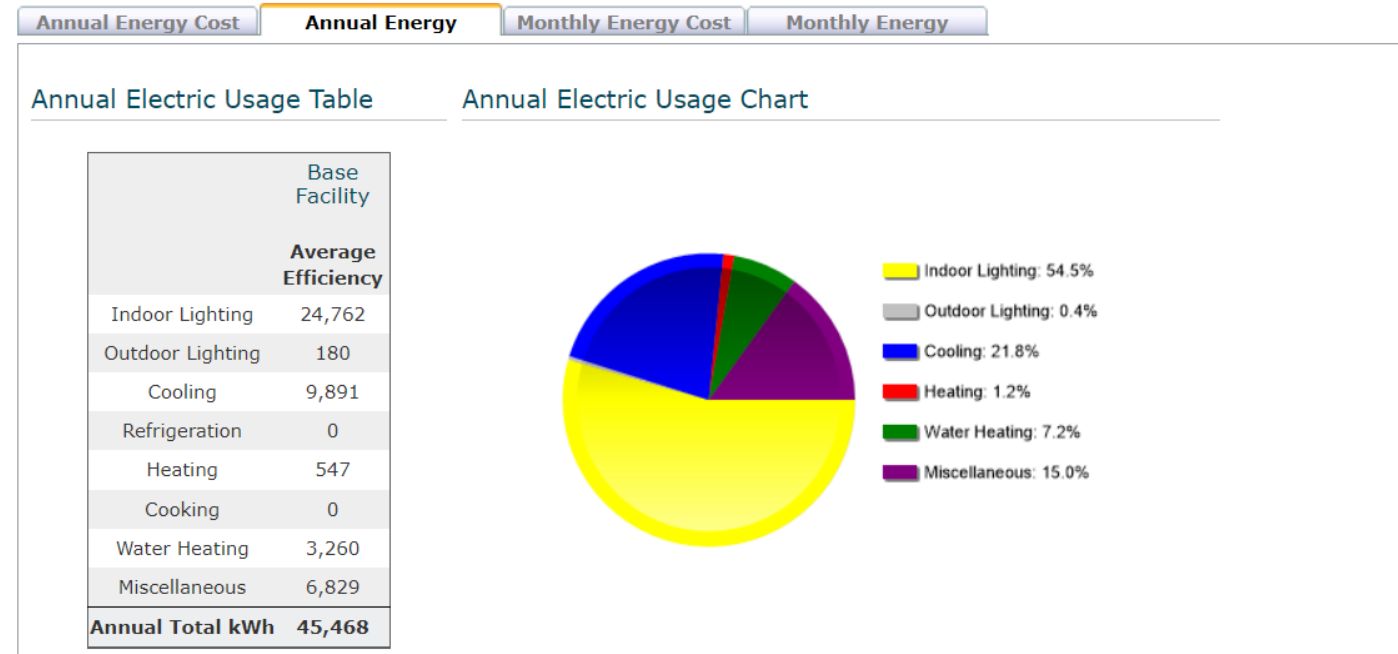


ENERGY CAUCULATION



ROOF GARDEN

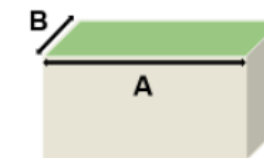
Rough calculation of the annual energy requirement of the building



Calculate the number of solar panels needed based on the annual energy requirement

You need 152 modules to provide your electricity demand! ?

Your PV system contains **152 solar panels**. This number was estimated based on your yearly electricity demand of **45468 kWh**. It is calculated that **there fit 187 solar panels** at your location.



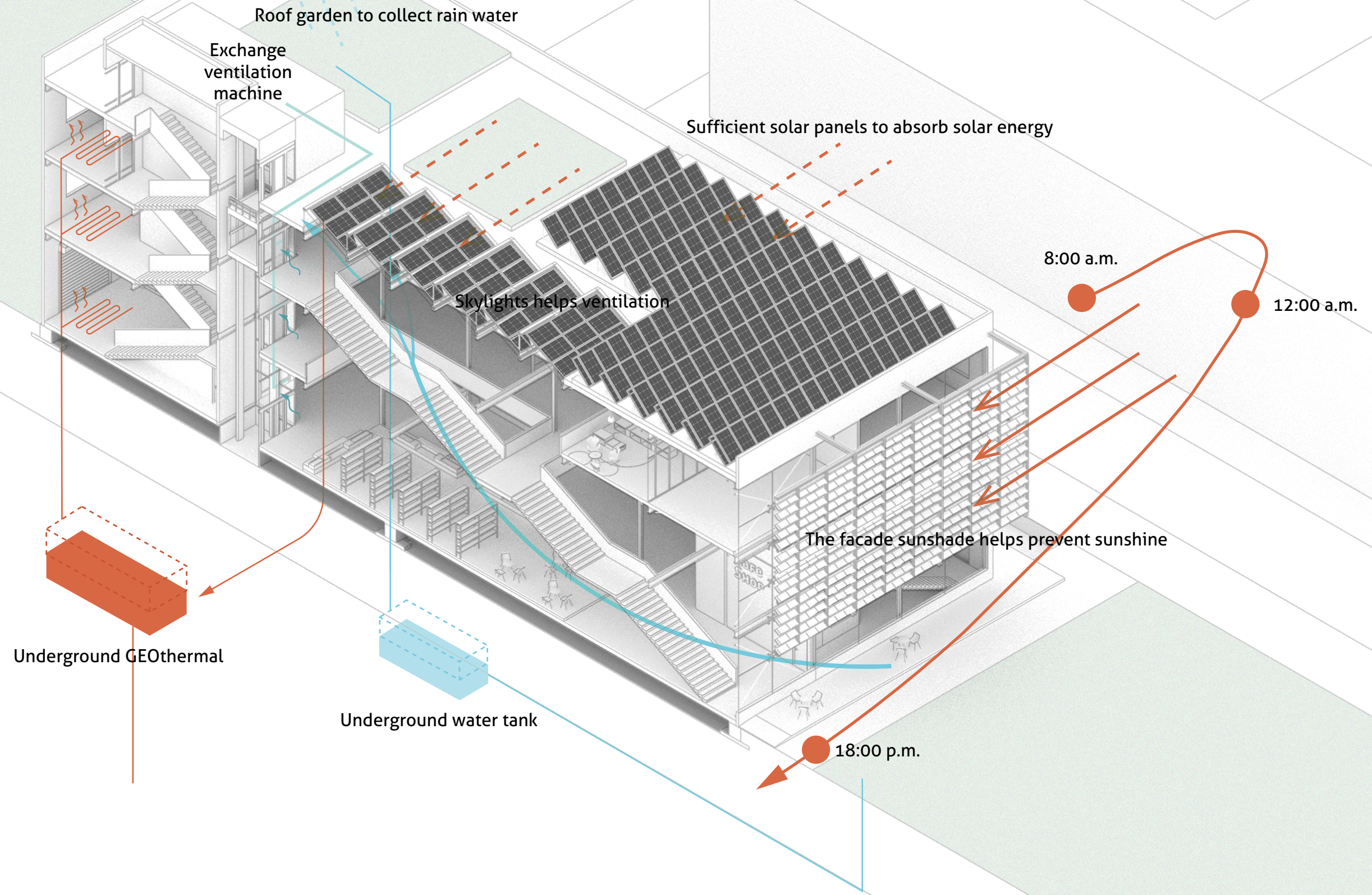
Installed capacity	45.5 kW _p		
Yearly electricity use	Not specified		
Available area	340m ²	17m x 20m	187 modules
Desired area	-	-	-
Required area (based on your electricity use)	271.52m ²	16.86m x 16.1m	152 modules

Required field area	272 m ²
Required ground area	176 m ²
Required active area	249 m ²
GCR	0.65

CLIMATE DESIGN

SUMMER

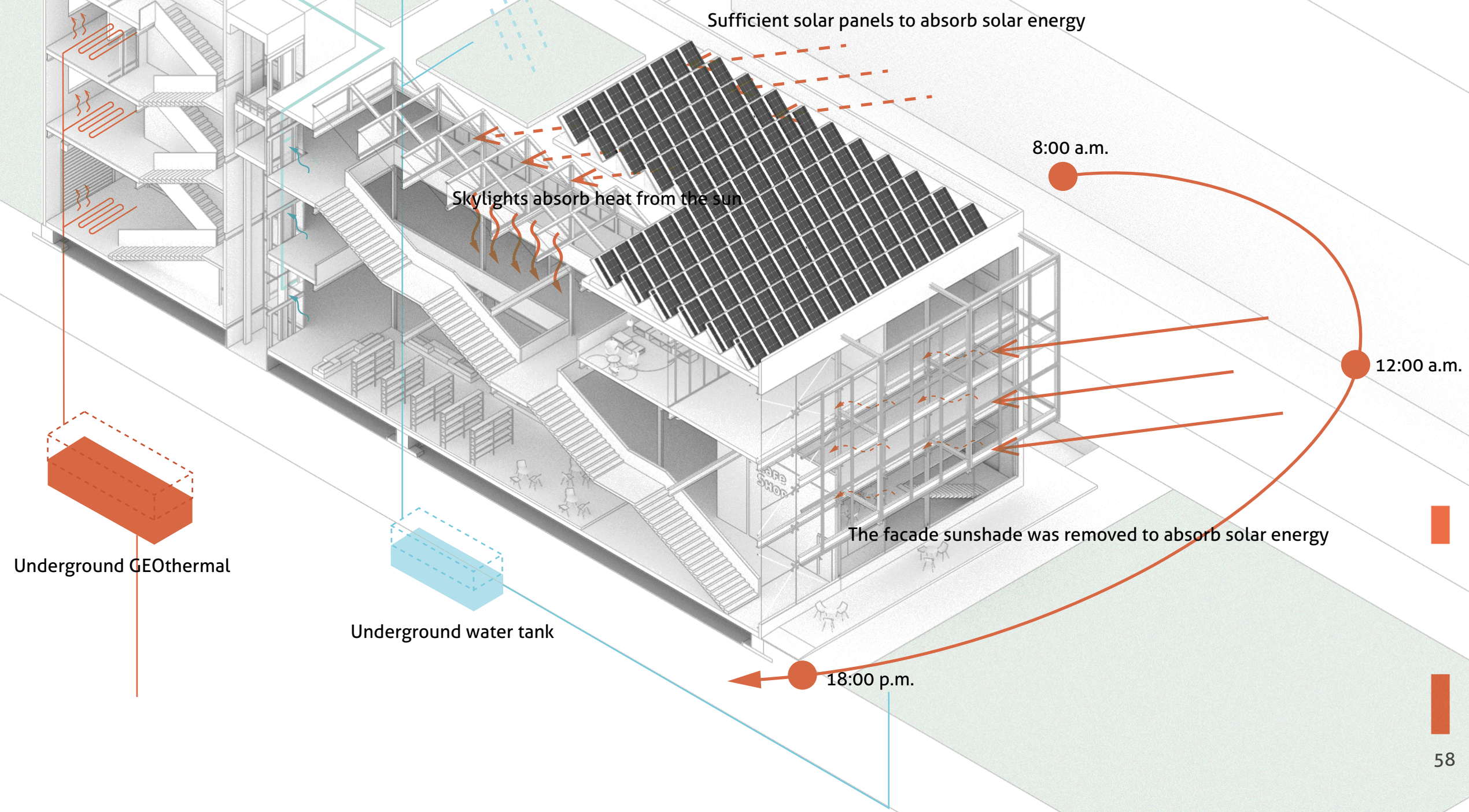
YUJIA REN 2022




CLIMATE DESIGN

WINTER

YUJIA REN 2022





STRUCTURE DESIGN

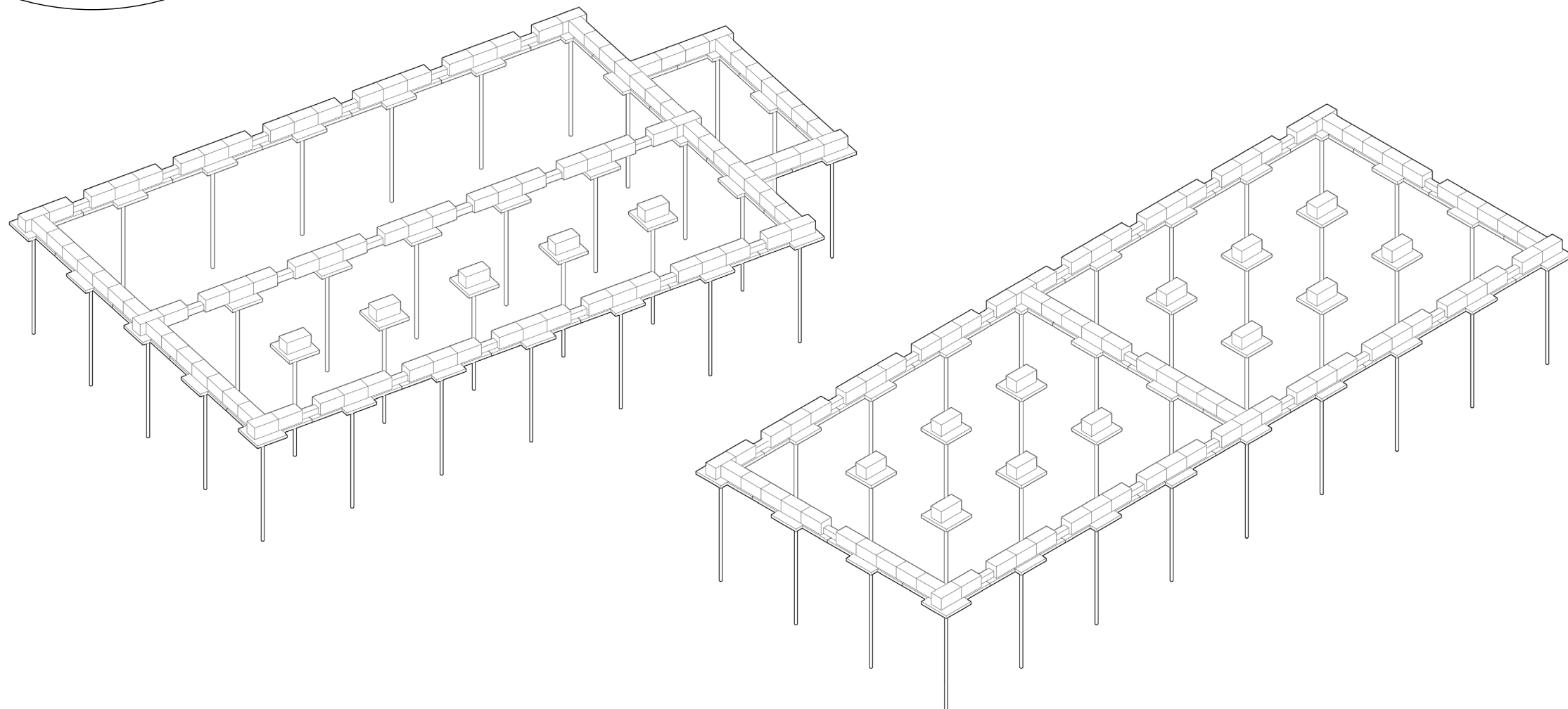
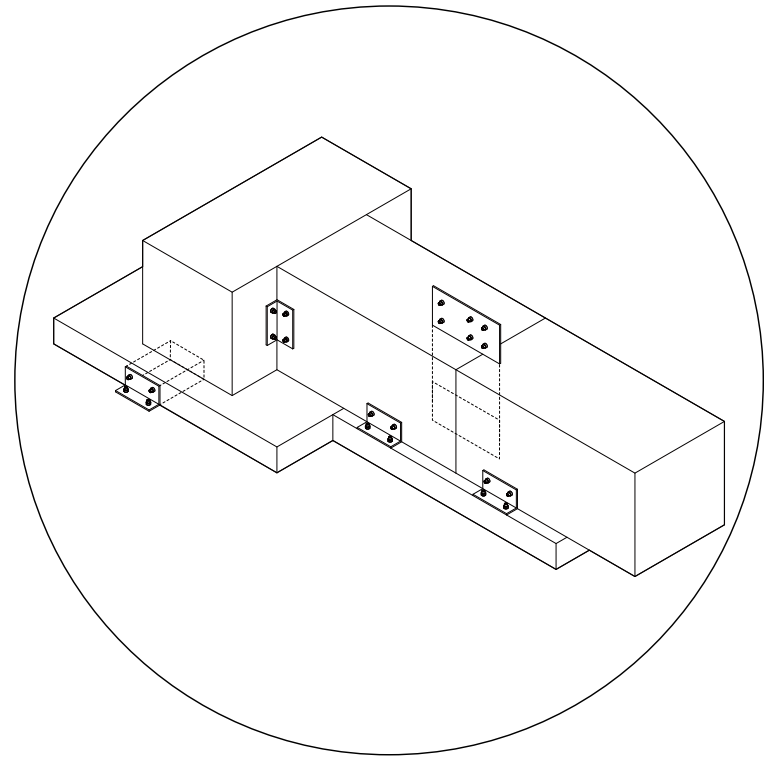
STRUCTURE GENERATION



PUT PILES UNDER FOUNDATION

Because of the soft soil in the Amsterdam area, 25 meters of piles had to be placed underground to support the building.

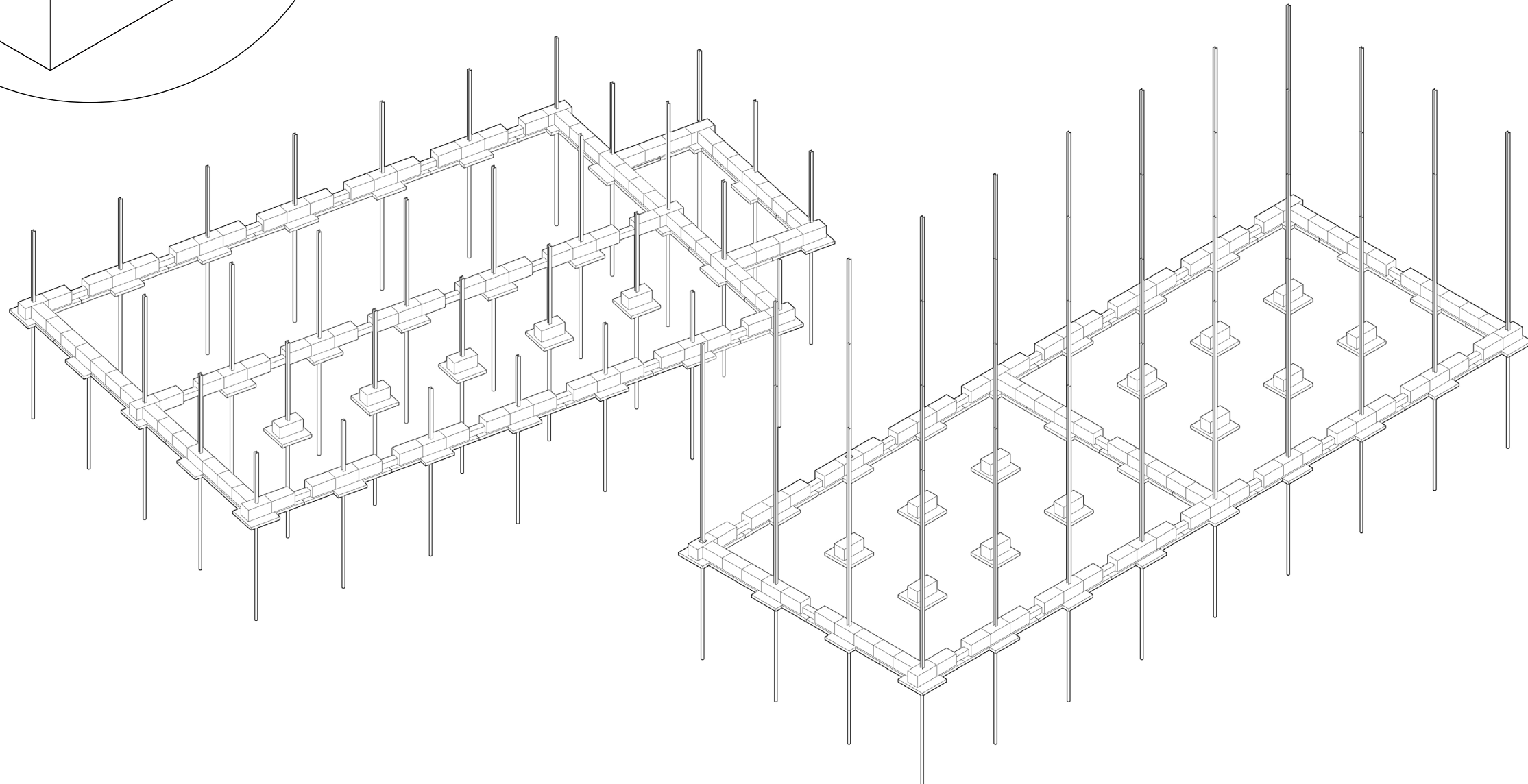
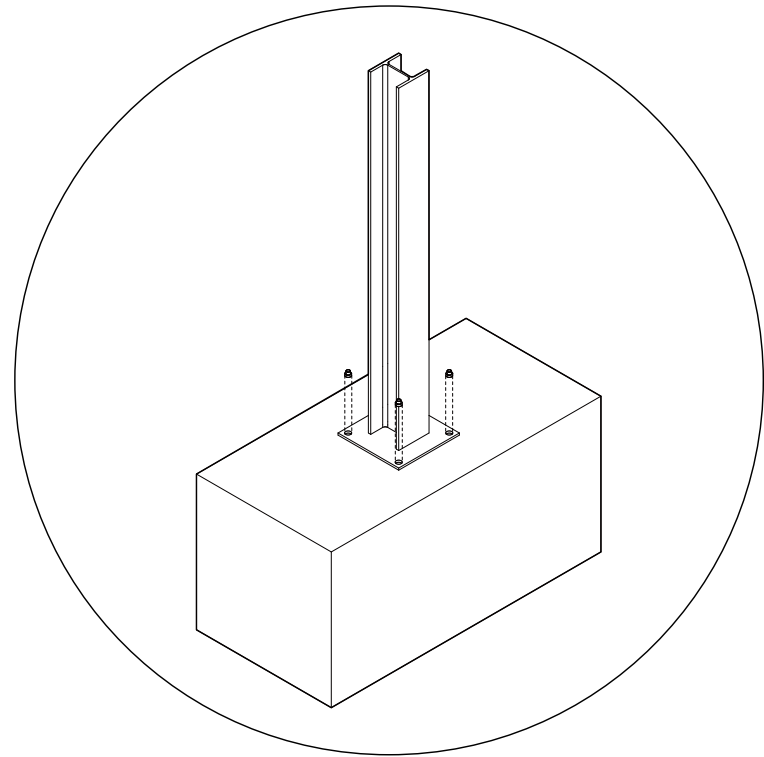
STRUCTURE GENERATION



PUT MODULAR FOUNDATION BLOCK

The foundation part of the building consists of three types of concrete blocks. Each concrete block is connected by a dry joint.

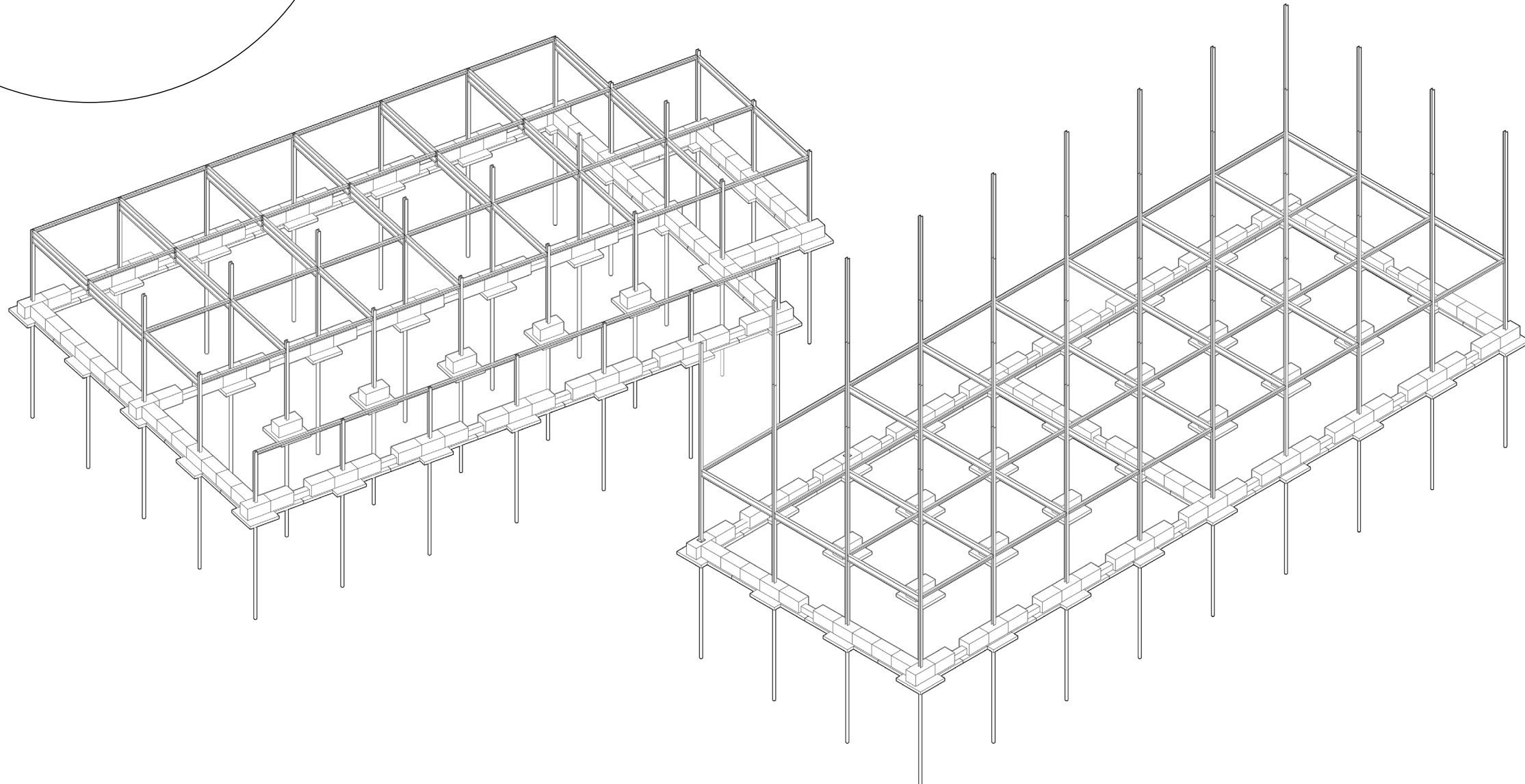
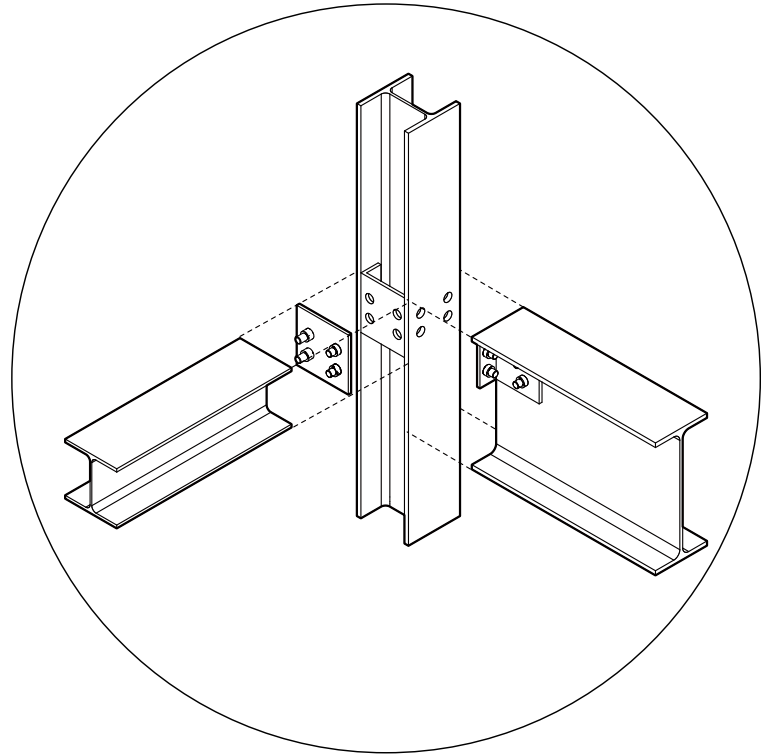
STRUCTURE GENERATION



PUT STEEL COLUMN ON THE FOUNDATION

The steel columns of size HEB180 are fixed to the concrete foundation by square steel members and screws.

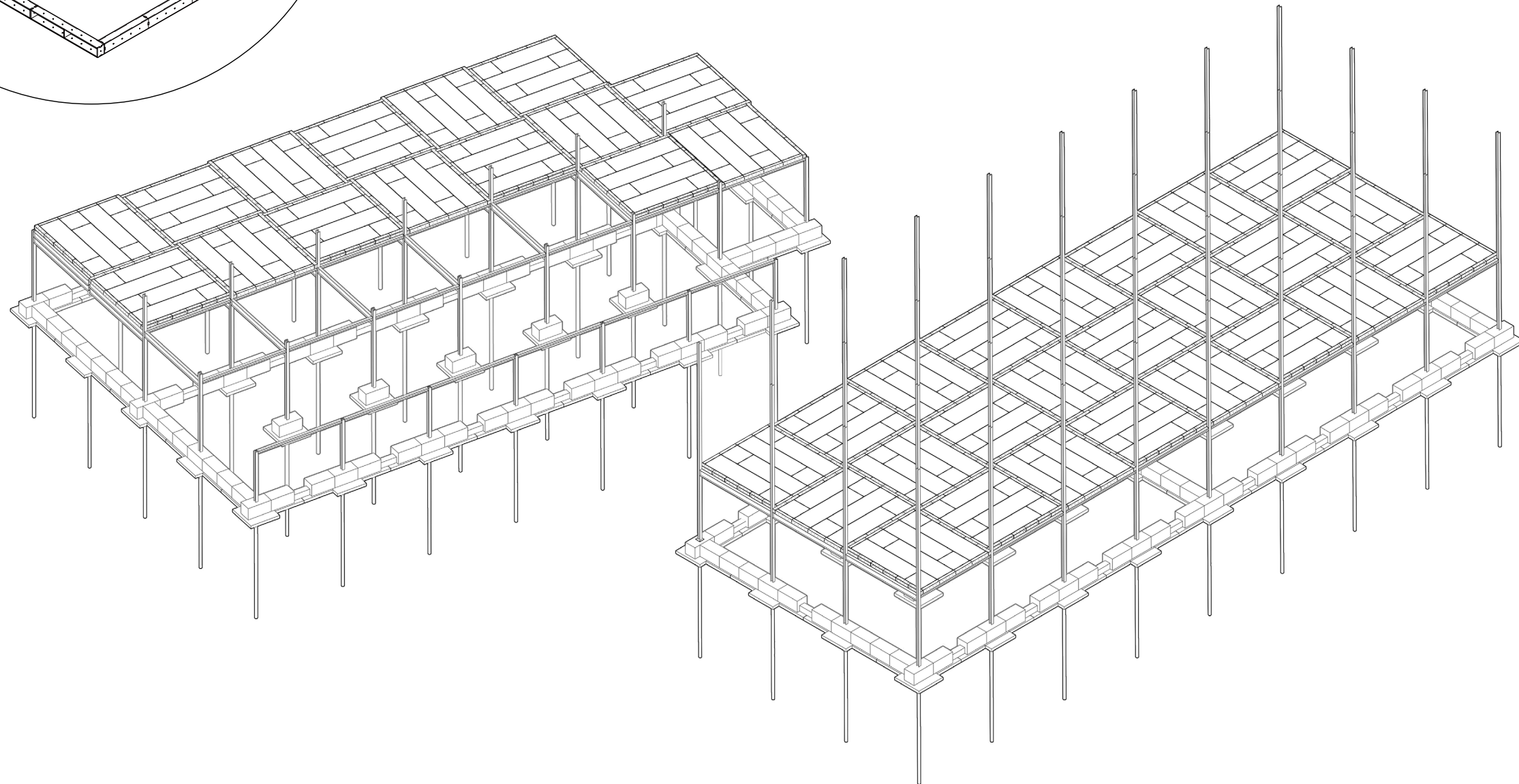
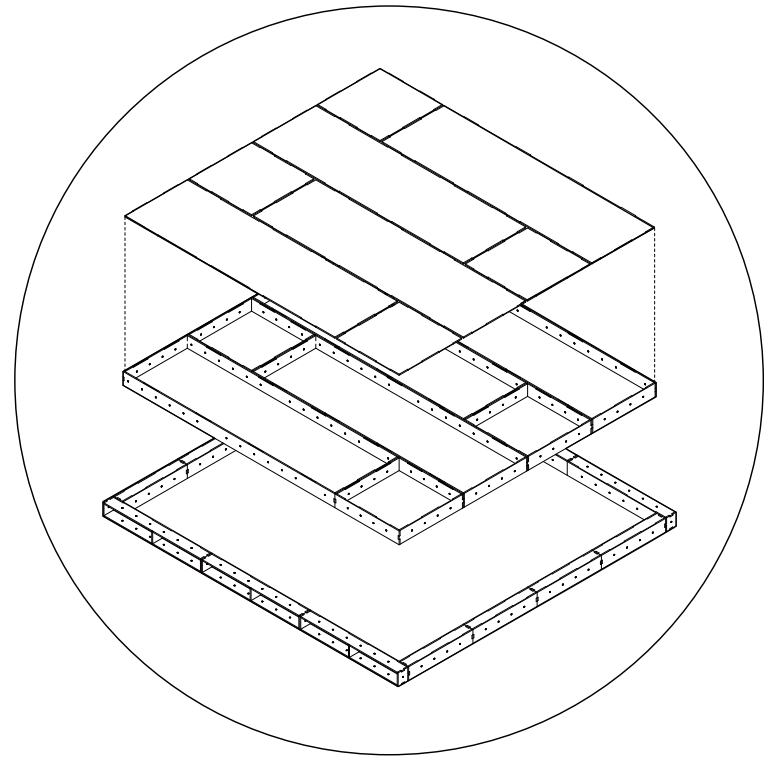
STRUCTURE GENERATION



PUT STEEL BEAM ON COLUMN

The main beam of size IPE400 and the secondary beam of HEA180 are fixed to the steel column by rigid connection.

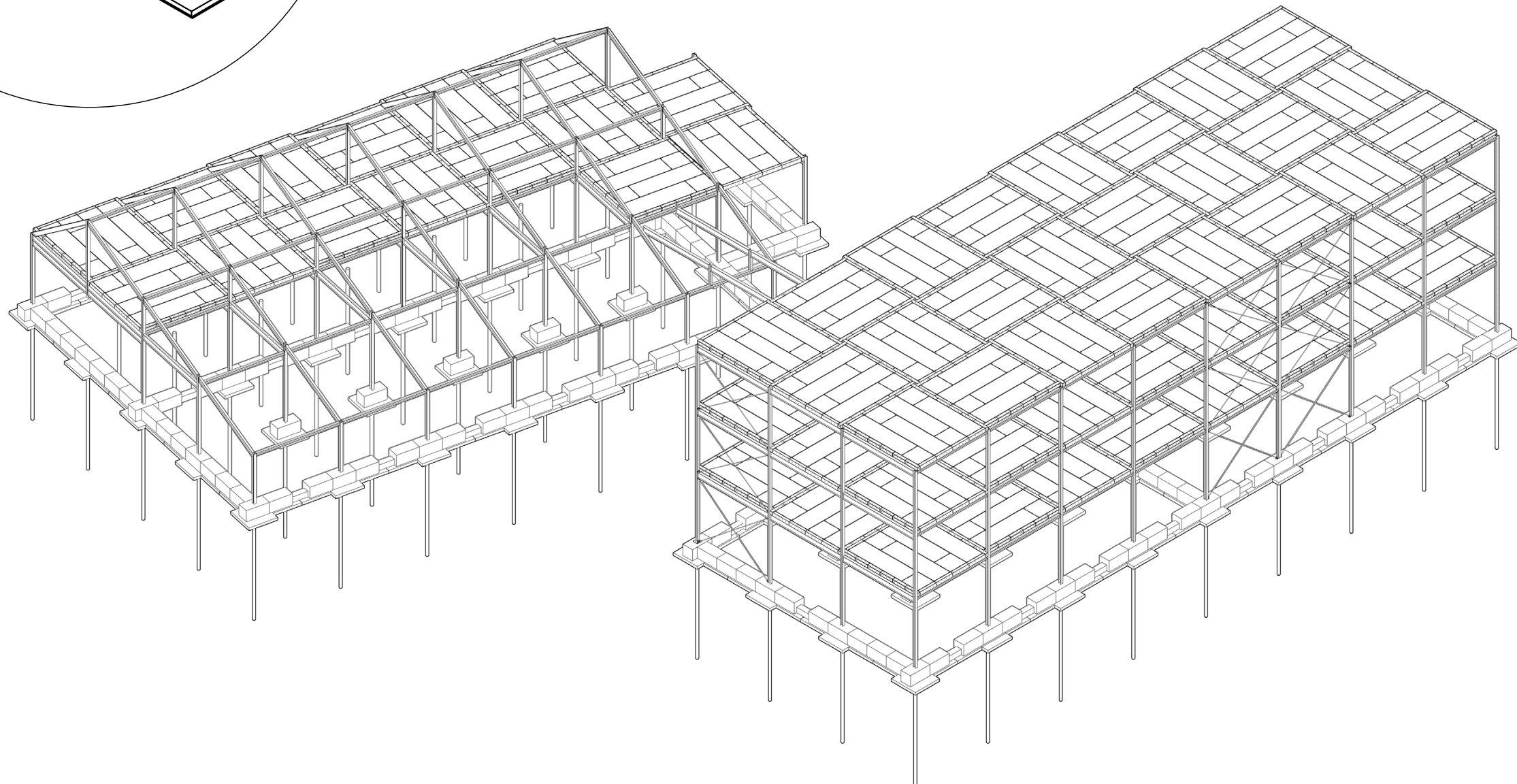
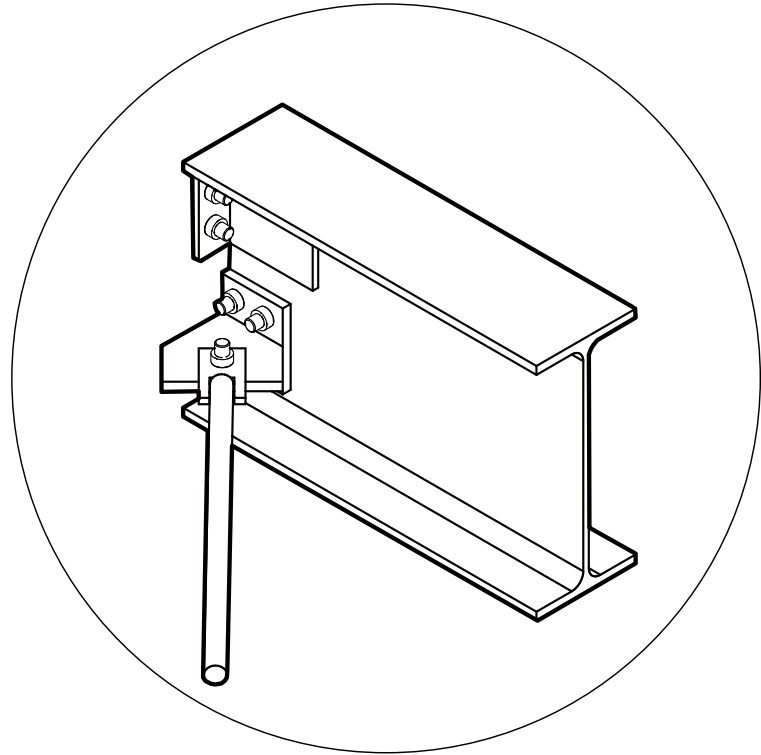
STRUCTURE GENERATION



USE U-BUILD SYSTEM FLOOR

The floor slab is made of u-build system. Each floor unit is 6m*6m. u-build consists of a number of boards laminated to each other.

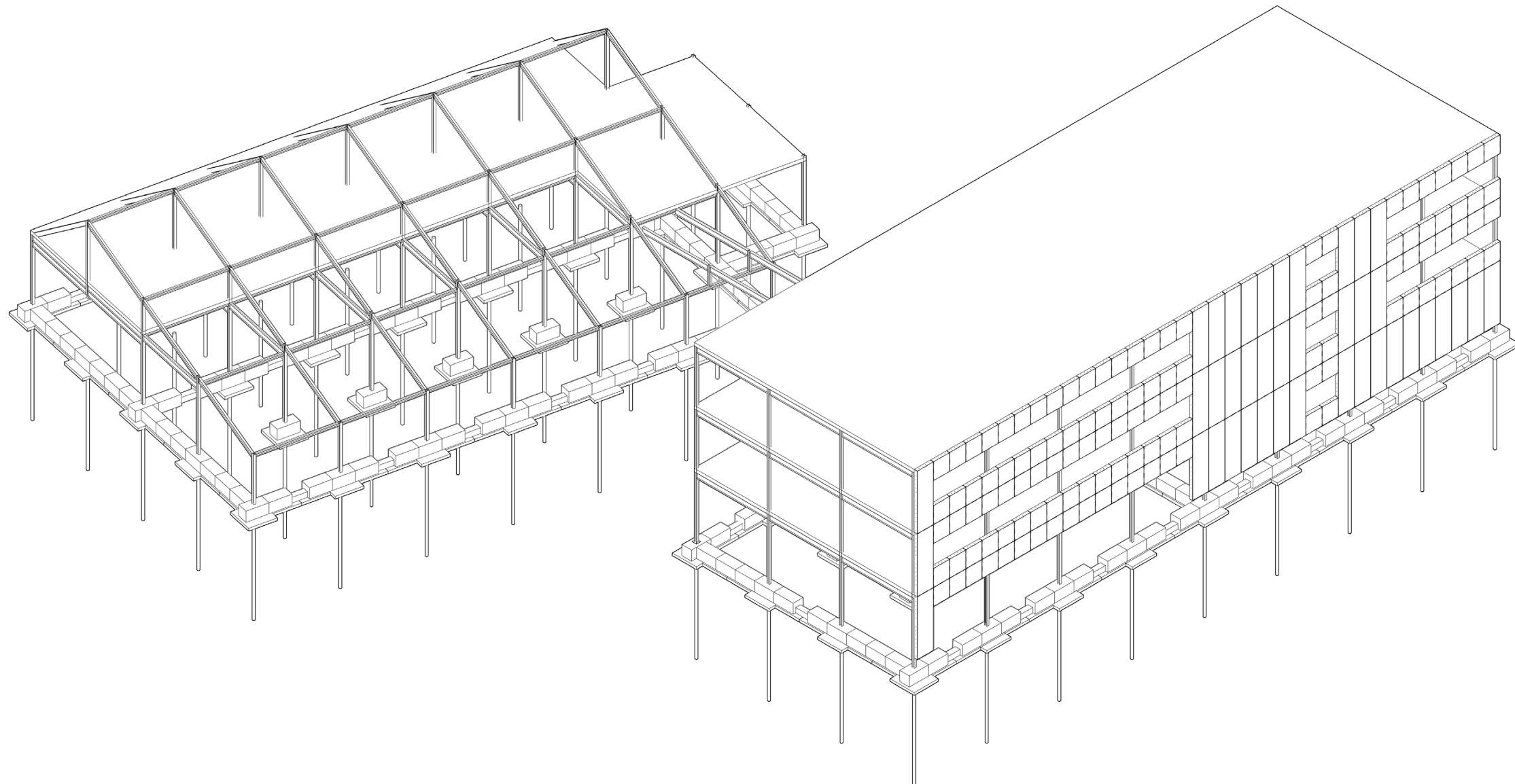
STRUCTURE GENERATION



PUT BRACING ON STEEL STRUCTURE

Add diagonal bracing reinforcement on three sides of the building.

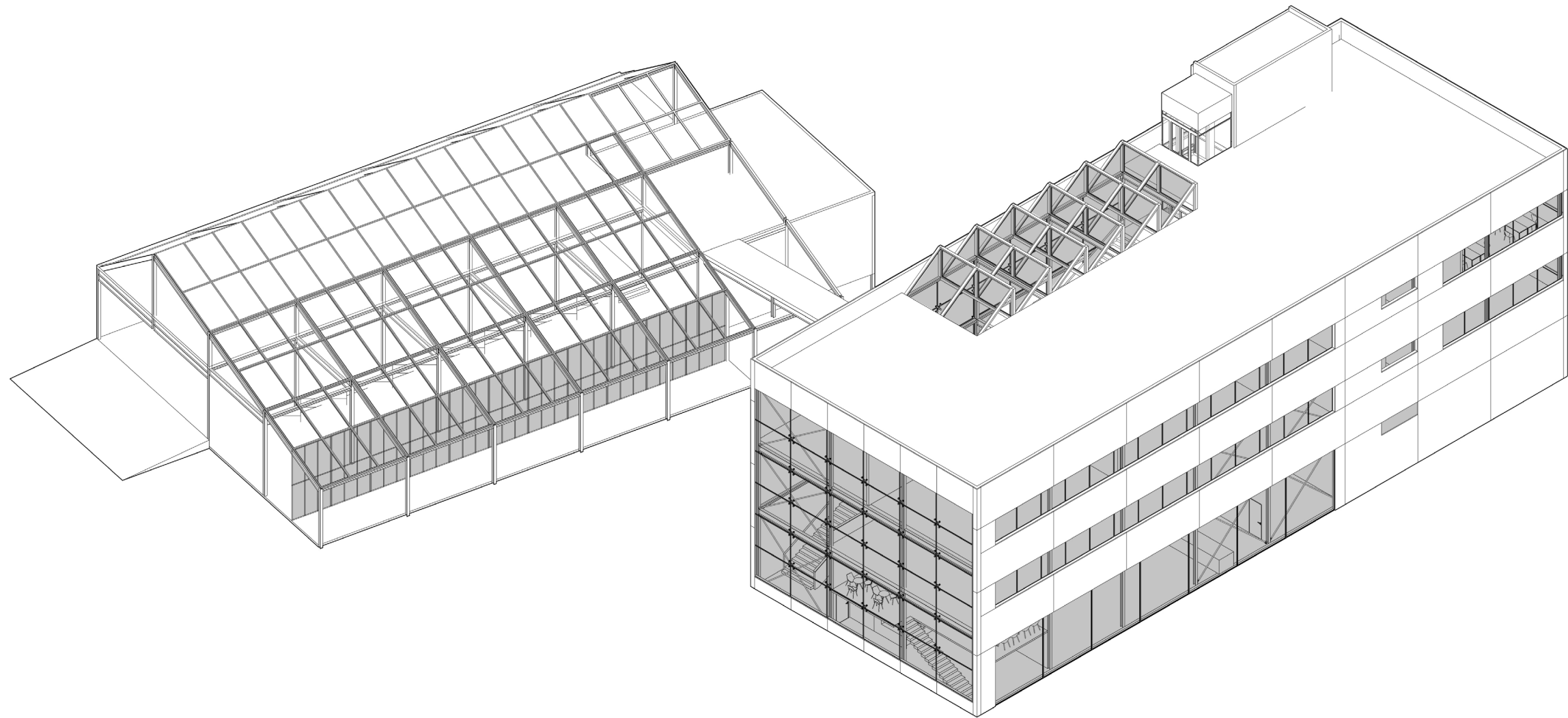
STRUCTURE GENERATION



USE U-BUILD SYSTEM ON FACADE

Similarly, u-build is also used on the façade. Each u-build panel is suspended from a steel column.

STRUCTURE GENERATION



RECYCLED ALUMINUM ON FACADE

Recycled aluminum is used as the façade of the building. The aluminum may come from all over the Netherlands, so the style of the facade may change depending on the look of the recycled material.

U-BUILD SYSTEM

Our Designs

Projects

Journal

FAQs

About Us

YUJIA REN 2022

U-Build®

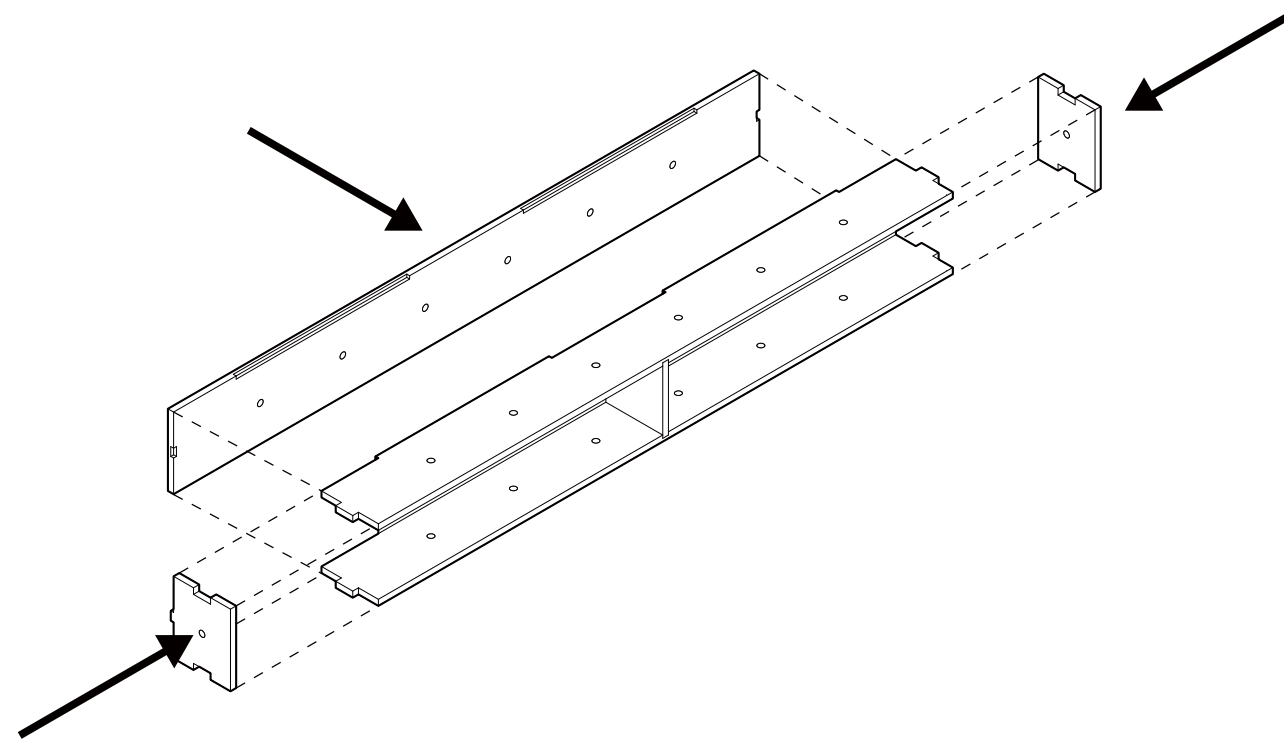
U-Build is a Revolutionary Self-build System.

[Find Out Why](#)



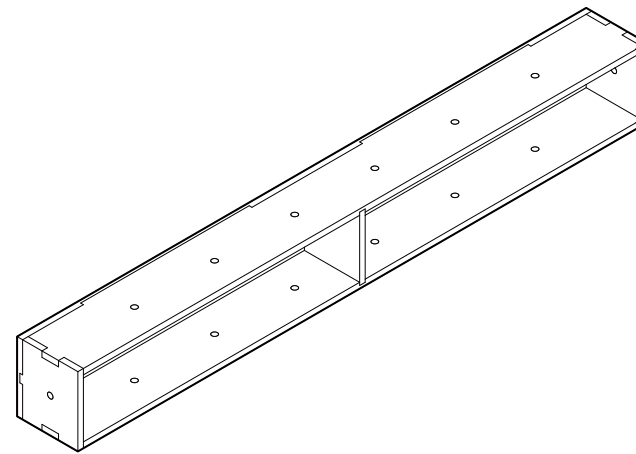
U-Build is a modular wooden construction system developed by Studio Bark to be easy to build, pleasant to inhabit, and simple to deconstruct at the end of its useful life. U-Build is essentially a system of giant building blocks. They arrive flat packed, are assembled into 'human-scale' boxes, and are stacked up to form walls, roofs and floors: the fundamental building blocks for any design project.

U-BUILD SYSTEM



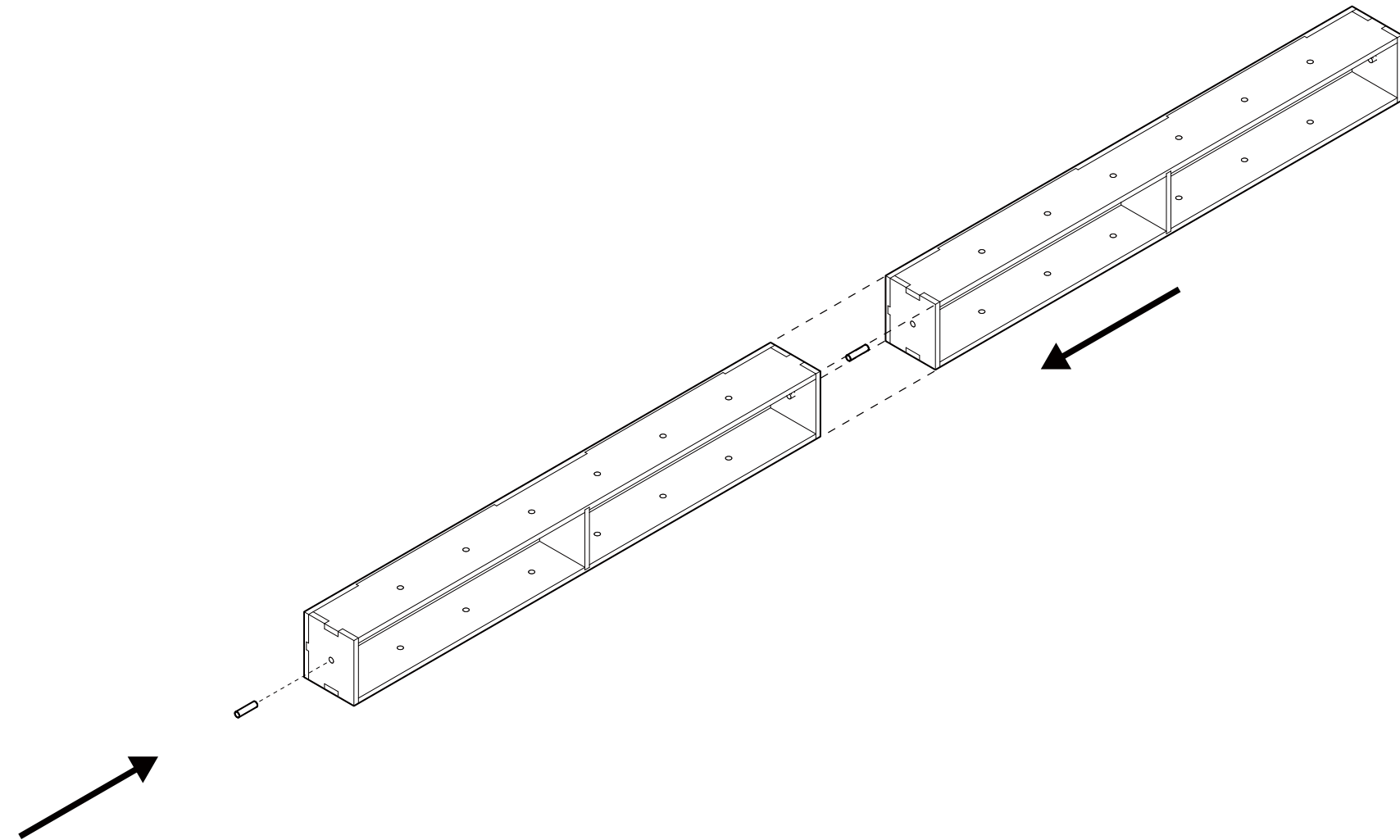
USE 6 TIMBER PANEL TO MAKE ONE TUBE

U-BUILD SYSTEM



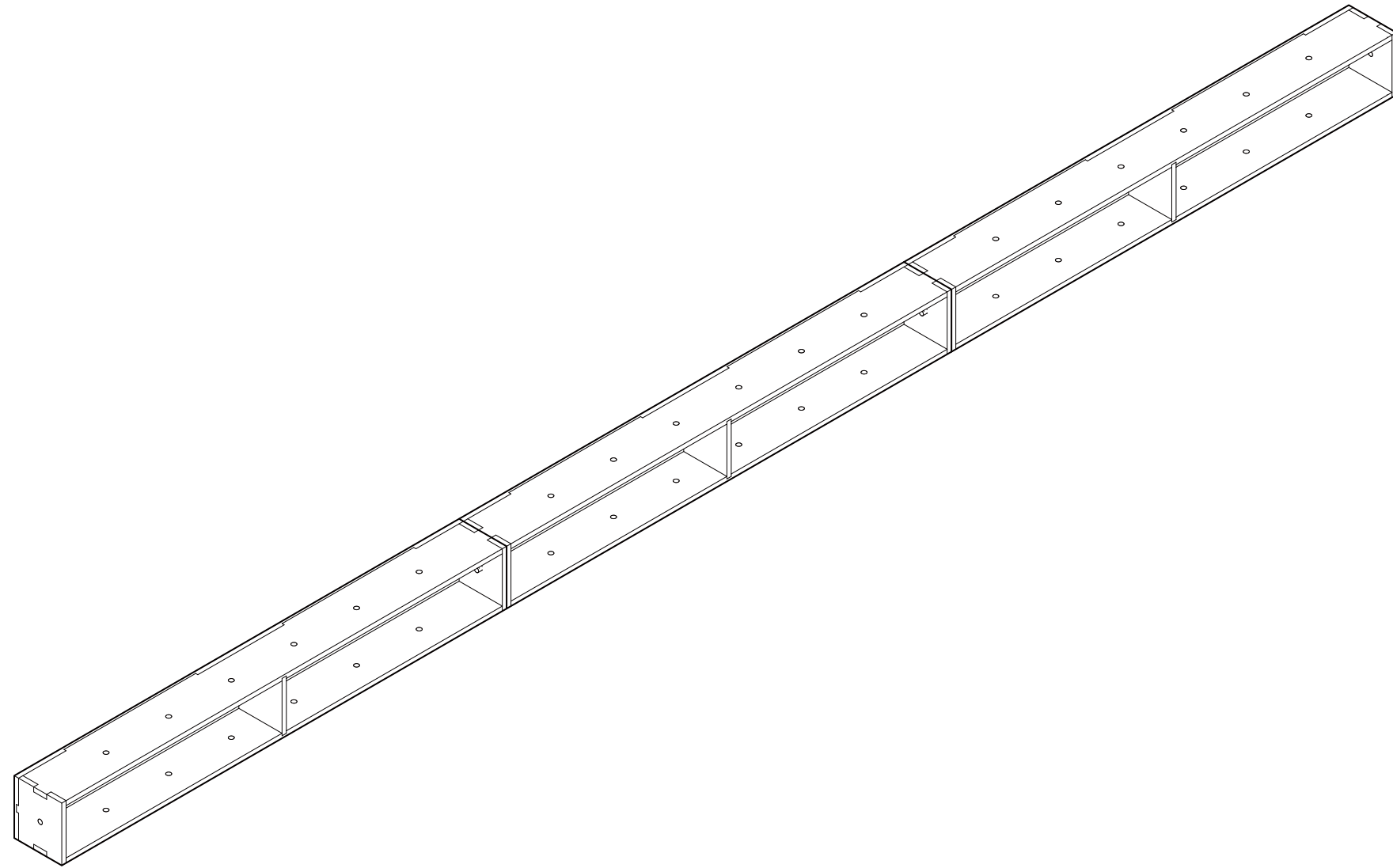
USE 6 TIMBER PANEL TO MAKE ONR TUBE

U-BUILD SYSTEM



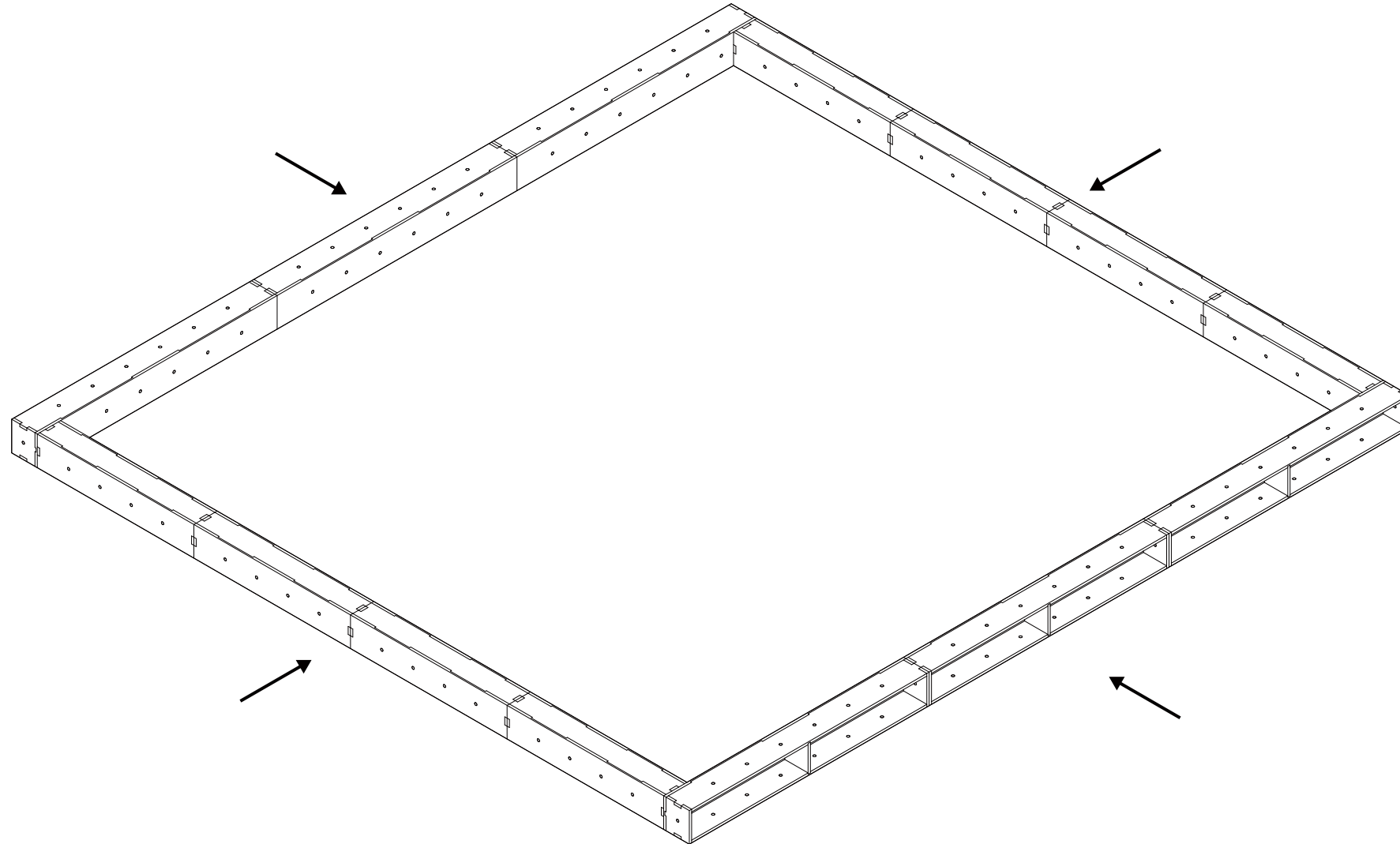
CONNECT TUBES BY A SMALL COMPONENT

U-BUILD SYSTEM



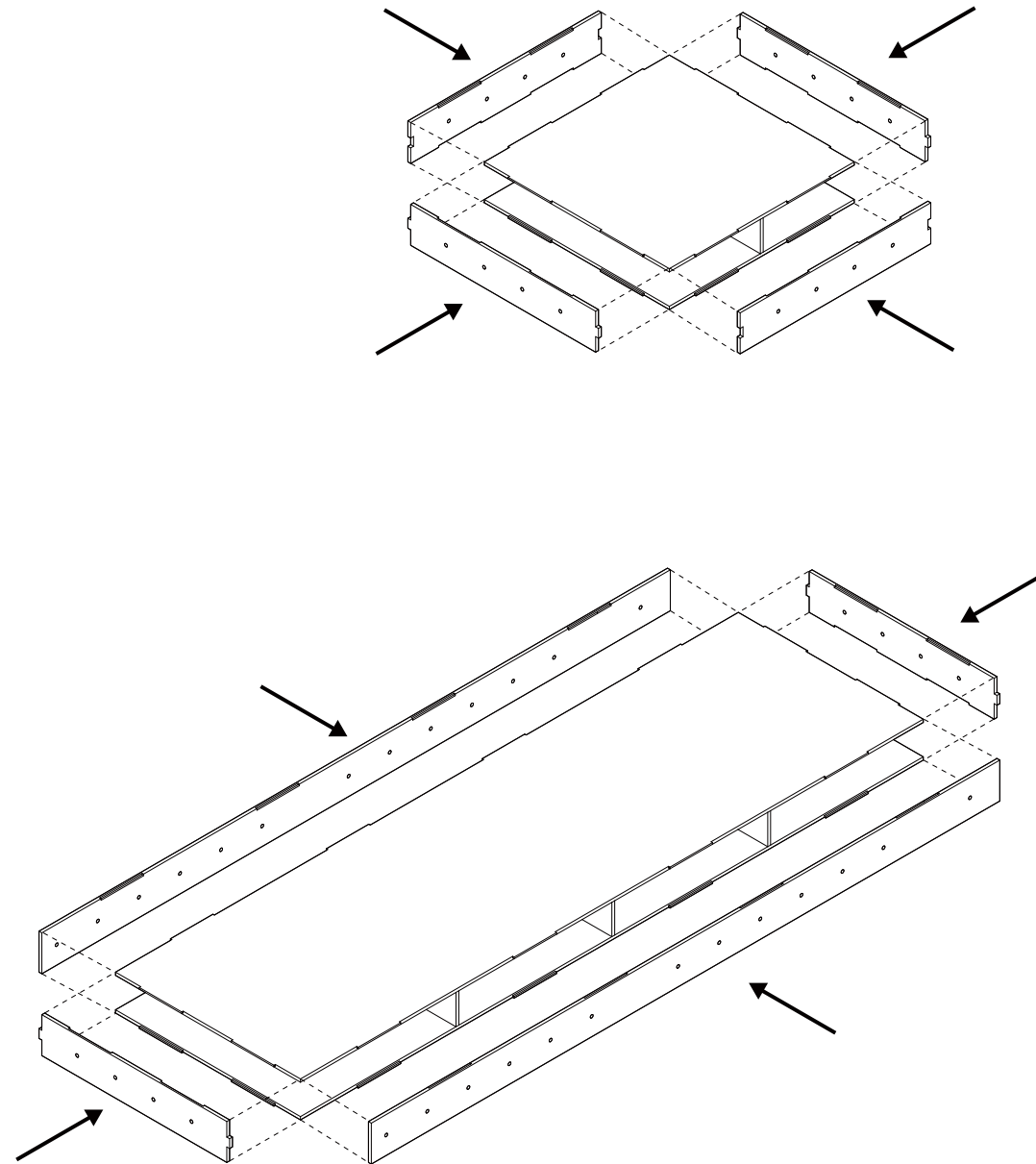
3 TUBES BECOME A SIDE OF U-BUILD PANEL

U-BUILD SYSTEM



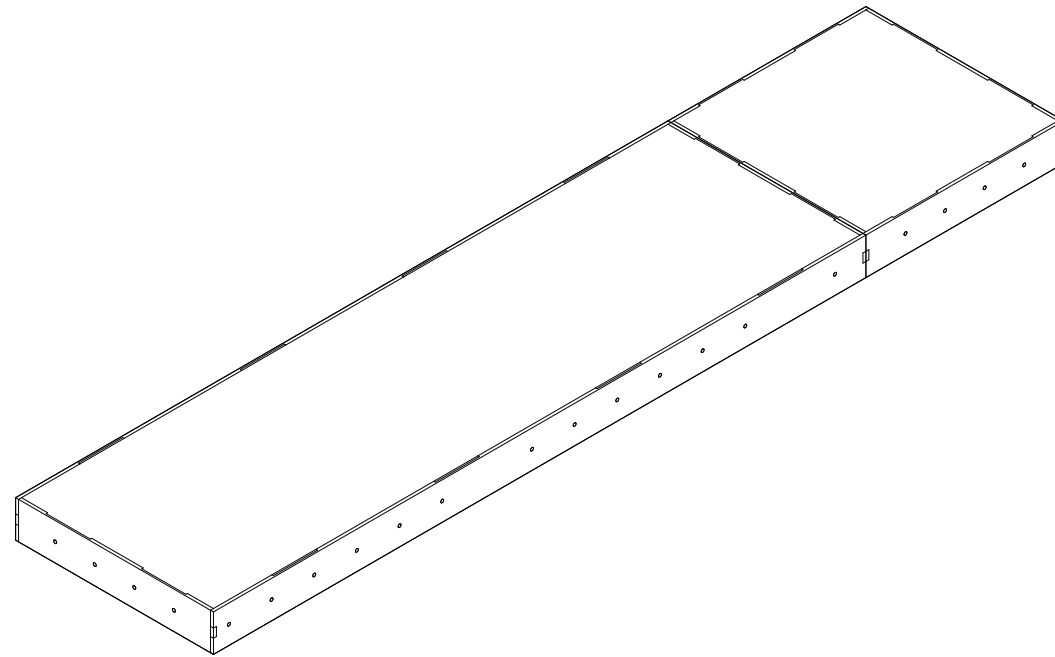
4 SIDES MAKE A FRAME

U-BUILD SYSTEM



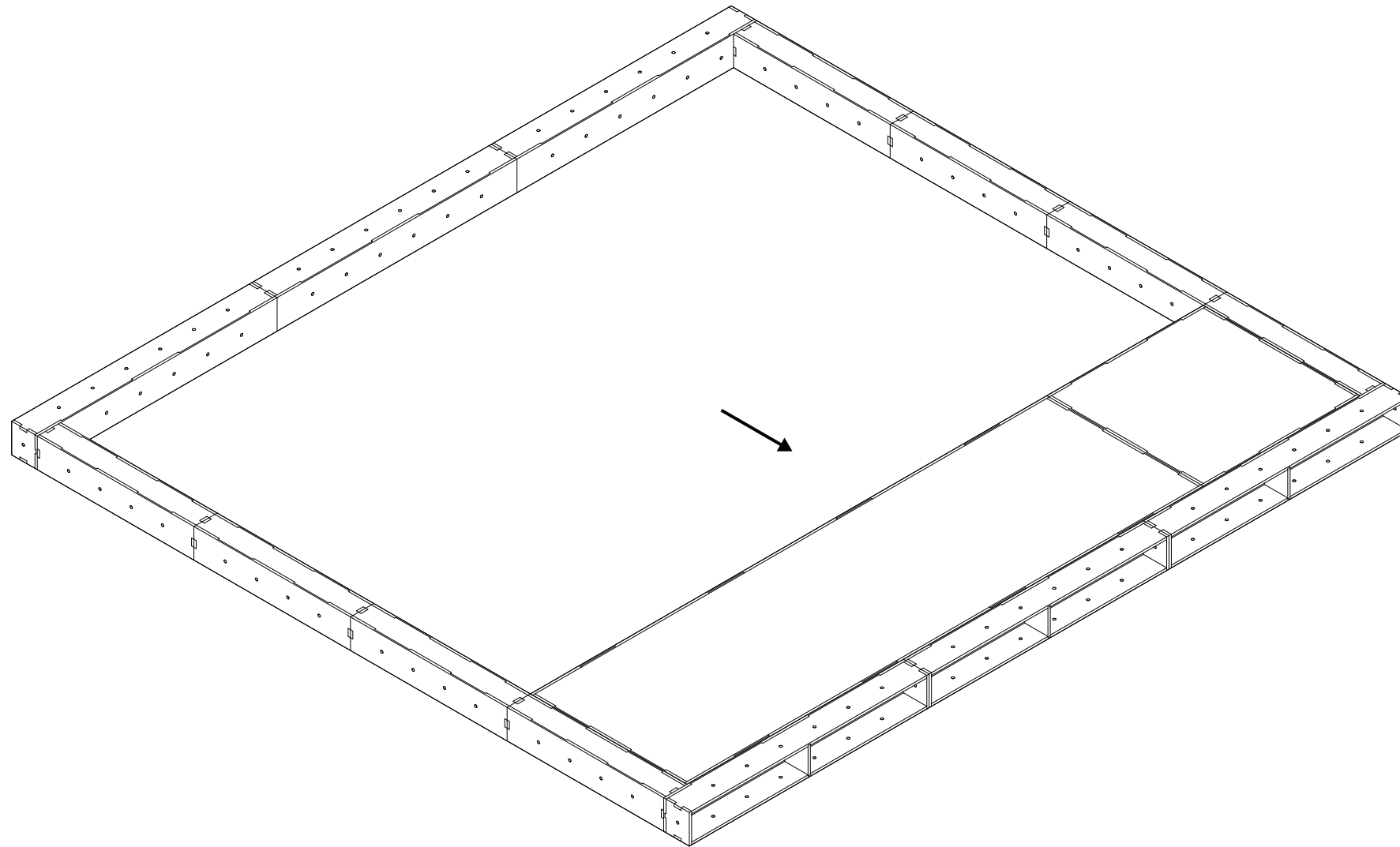
MAKE TWO SIZES OF UNIT

U-BUILD SYSTEM



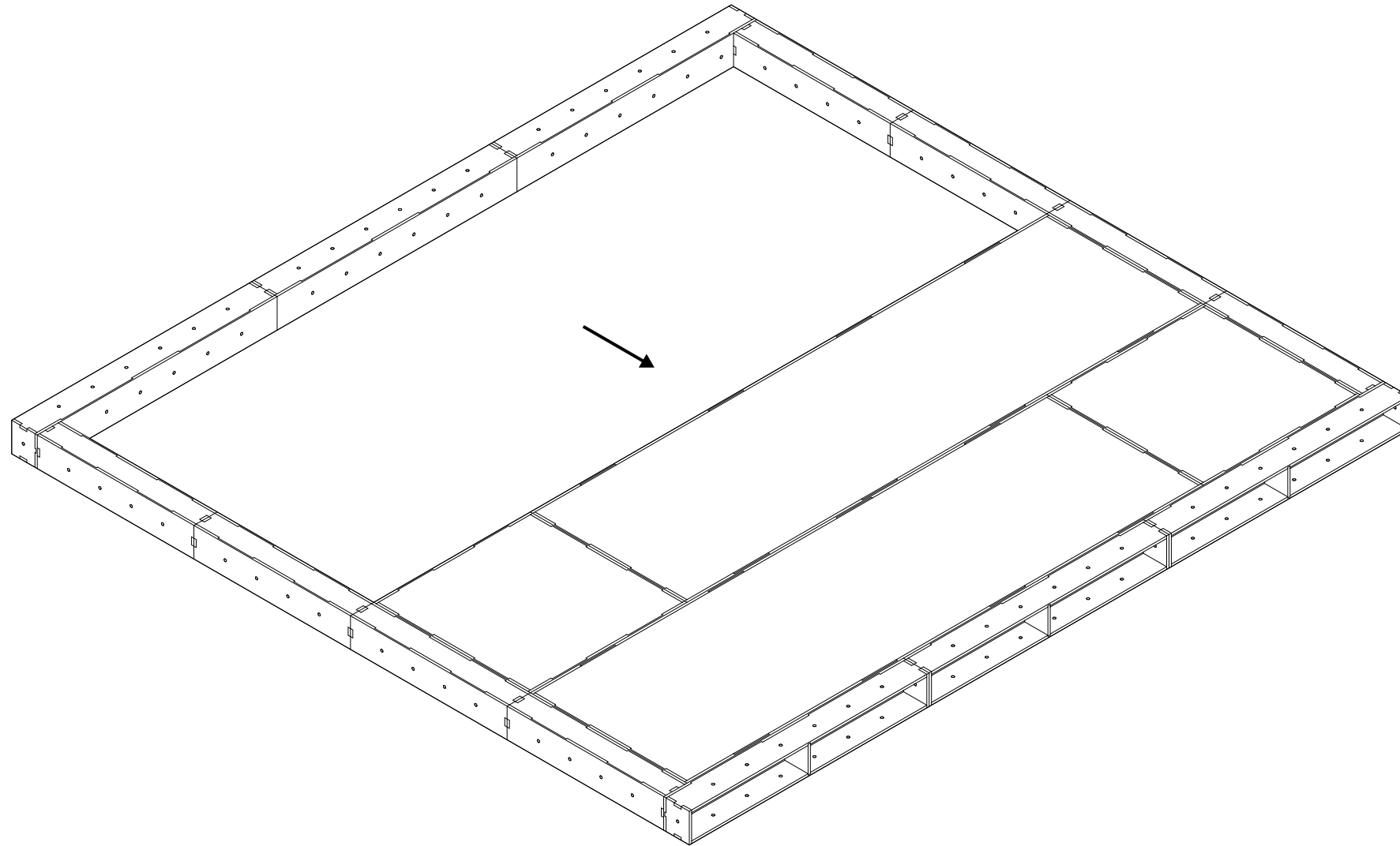
MAKE THEM TOGHTER

U-BUILD SYSTEM



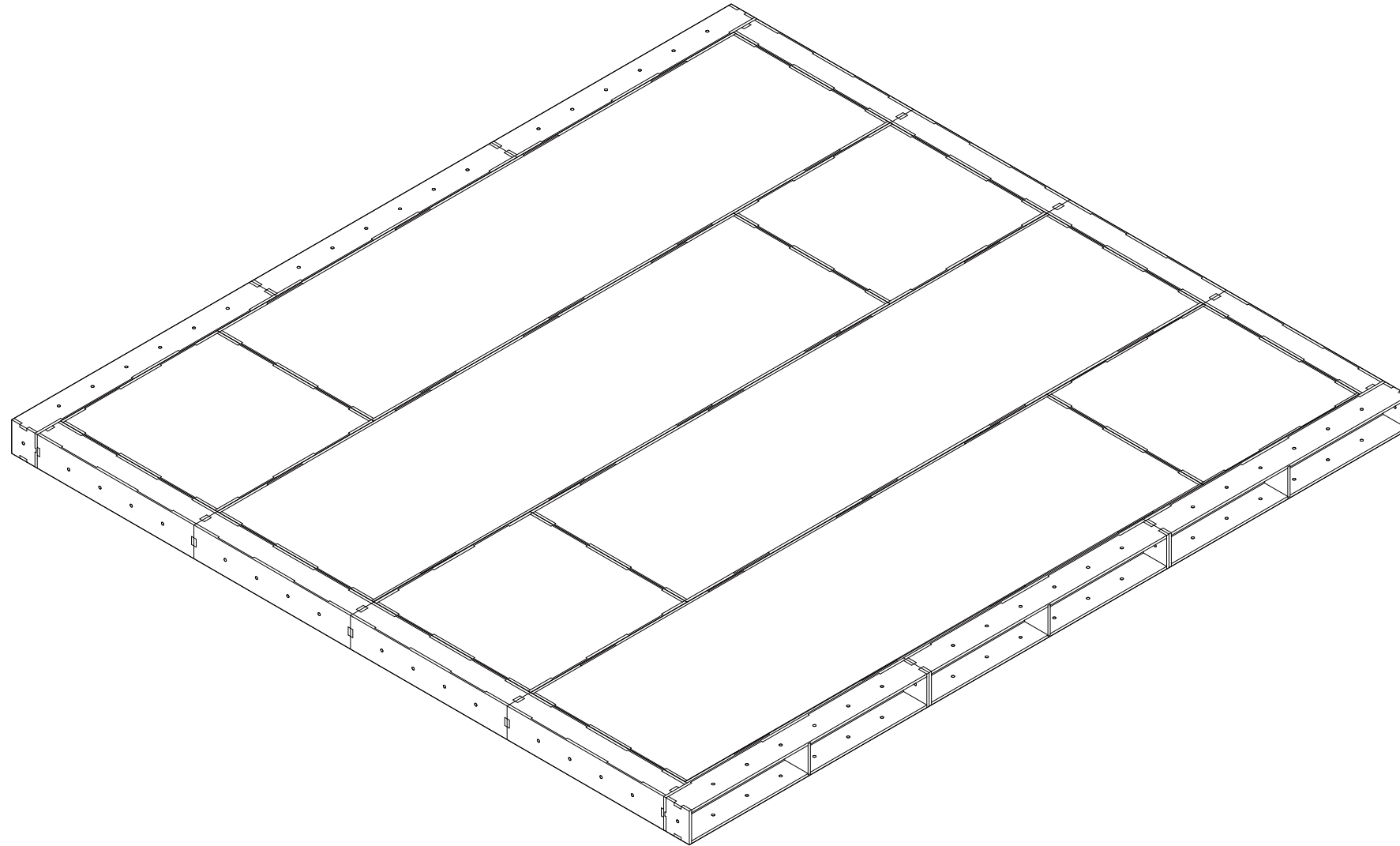
PUT THE UNIT IN THE FRAME

U-BUILD SYSTEM



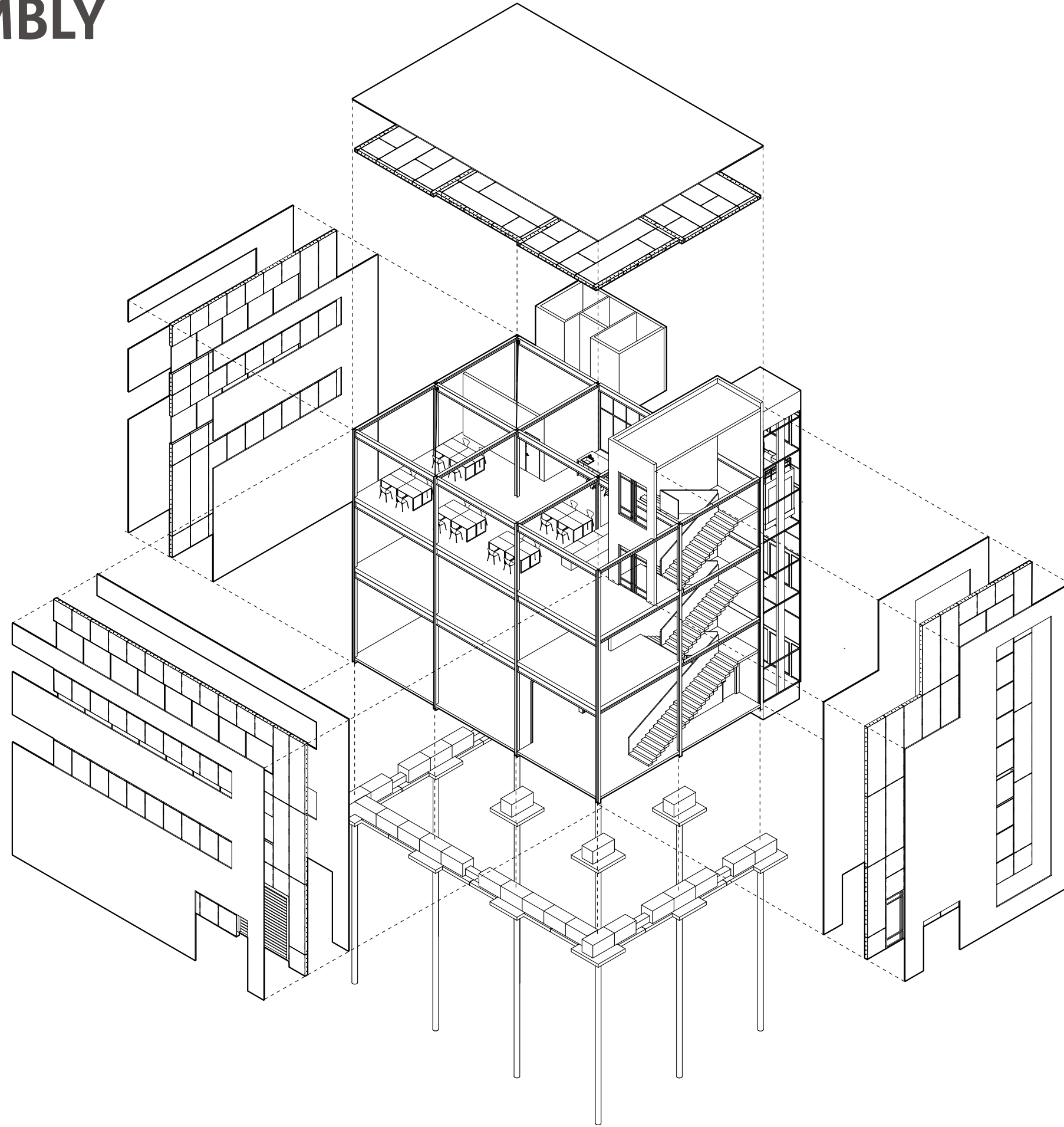
PUT THE UNIT IN THE FRAME

U-BUILD SYSTEM

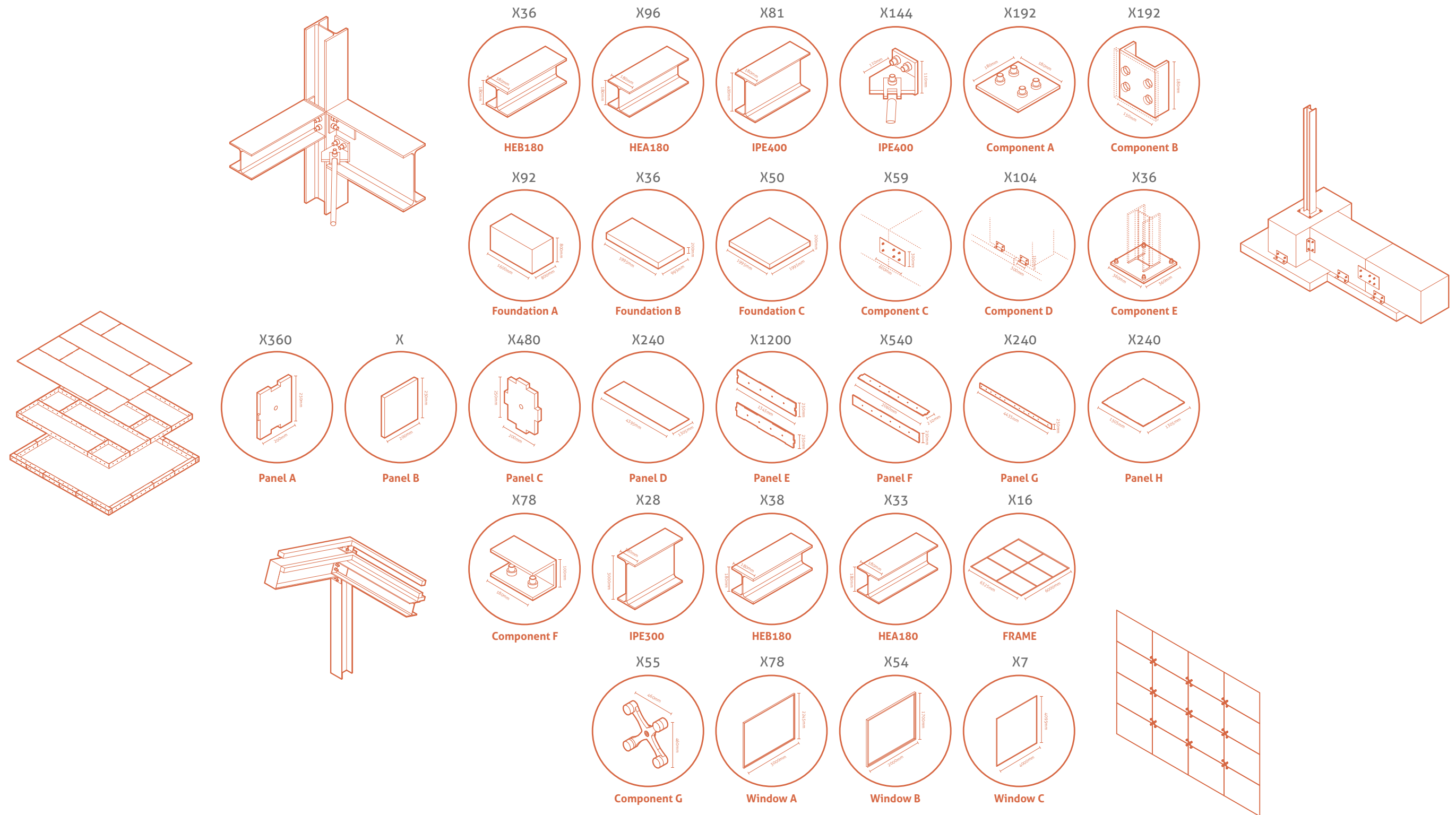


A FINISHED U-BUILD PANEL

DISASSEMBLY



MATERIALS PASSPORT

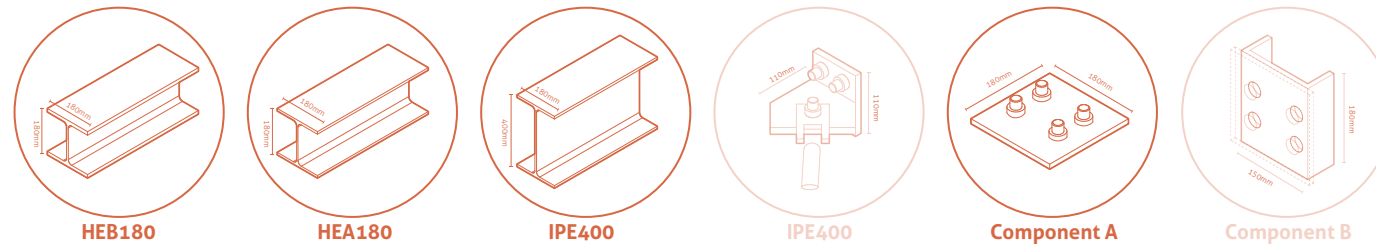


MATERIALS PASSPORT

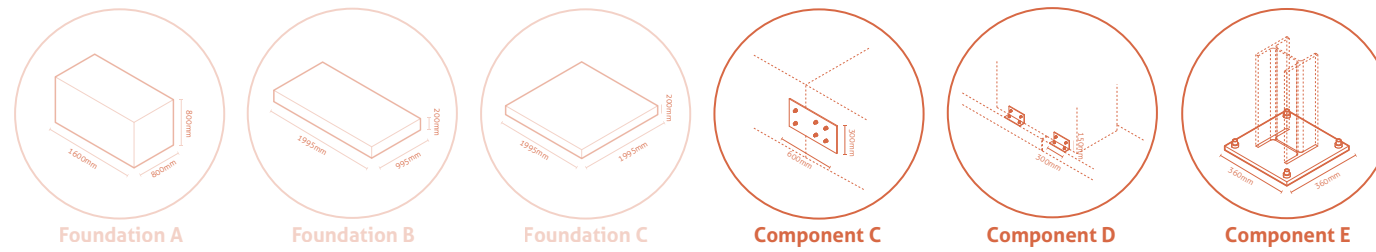
All materials used in the building are recorded in an online database. Basic information such as material size, color and manufacturer is recorded, which facilitates the reuse of materials in the future.

MATERIALS PASSPORT

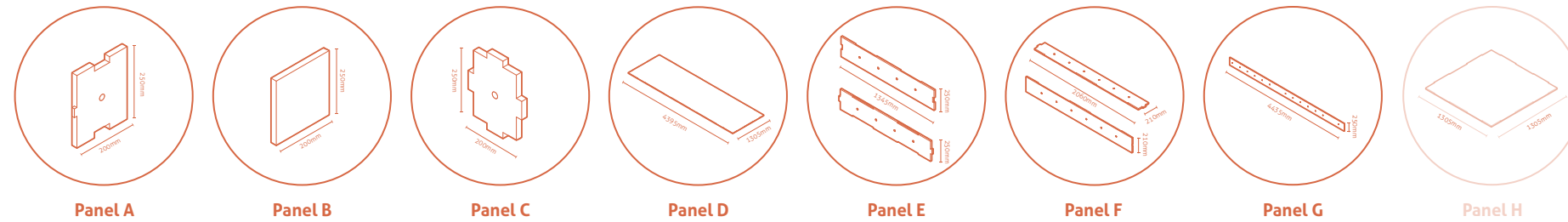
STEEL



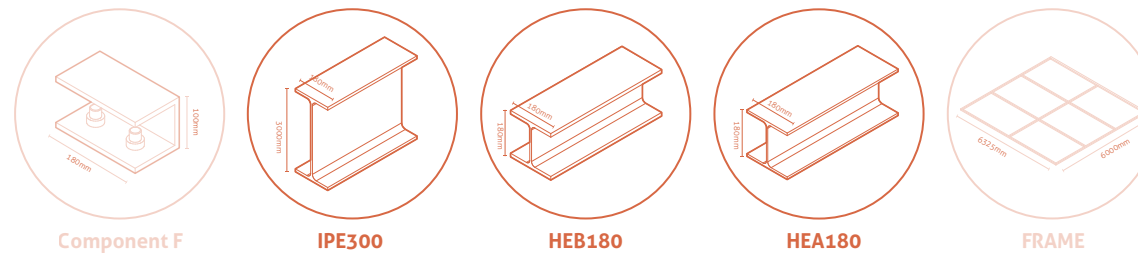
CONCRETE FOUNDATION



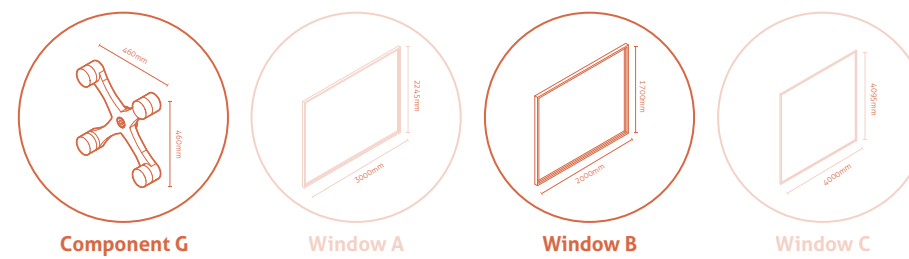
TIMBER



STEEL



WINDOWS

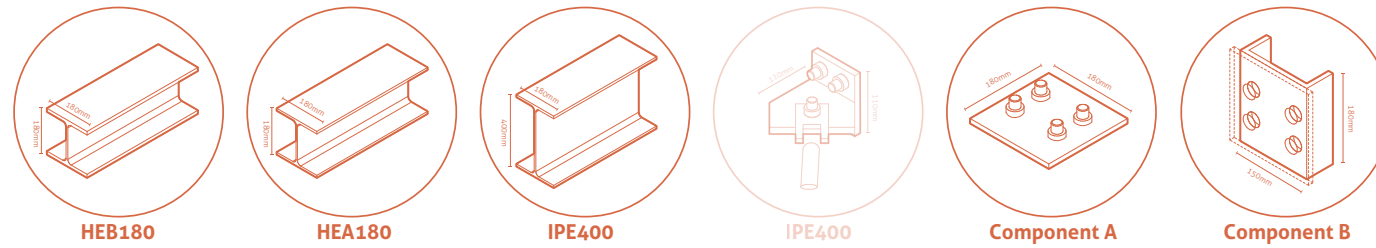


POTENTIAL TO USE OLD MATERIALS

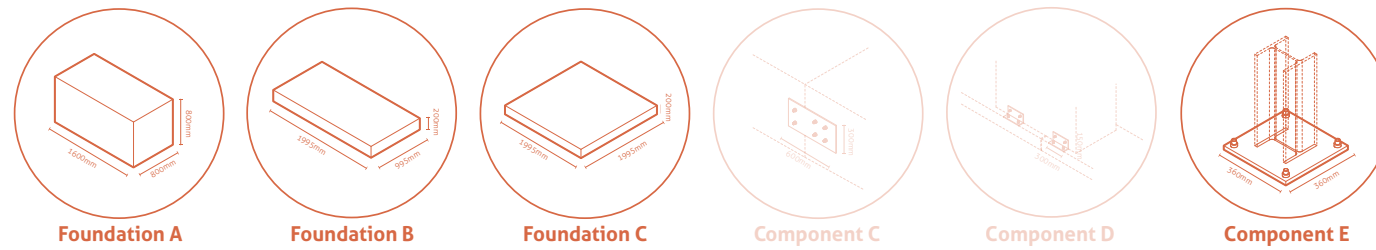
Every material used in the building is used in standard sizes as much as possible so that the ratio of old materials used for the building can be increased.

MATERIALS PASSPORT

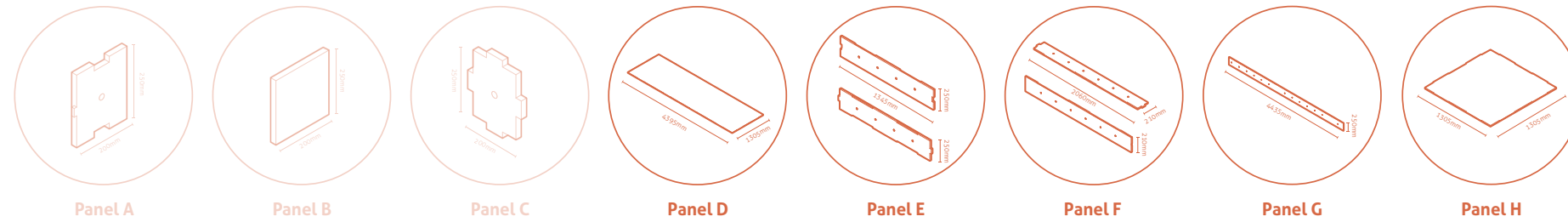
STEEL



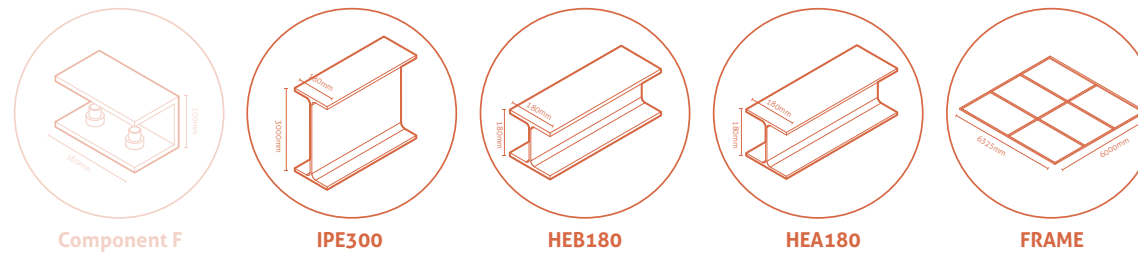
CONCRETE FOUNDATION



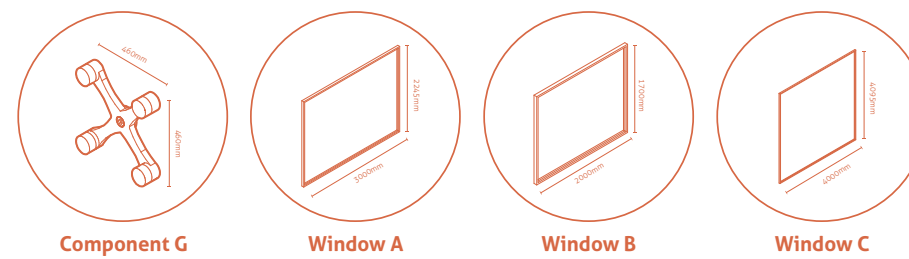
TIMBER



STEEL



WINDOWS

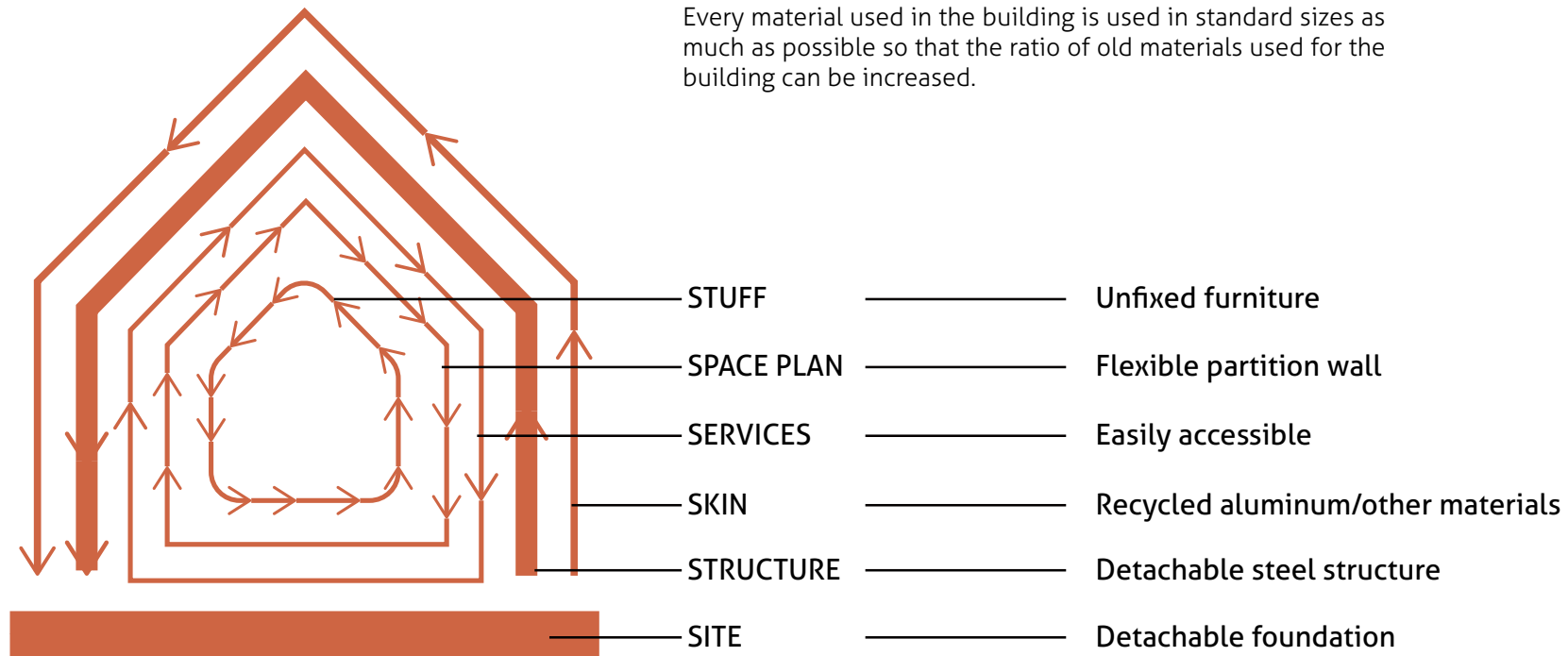


POTENTIAL TO USE IN THE FUTURE

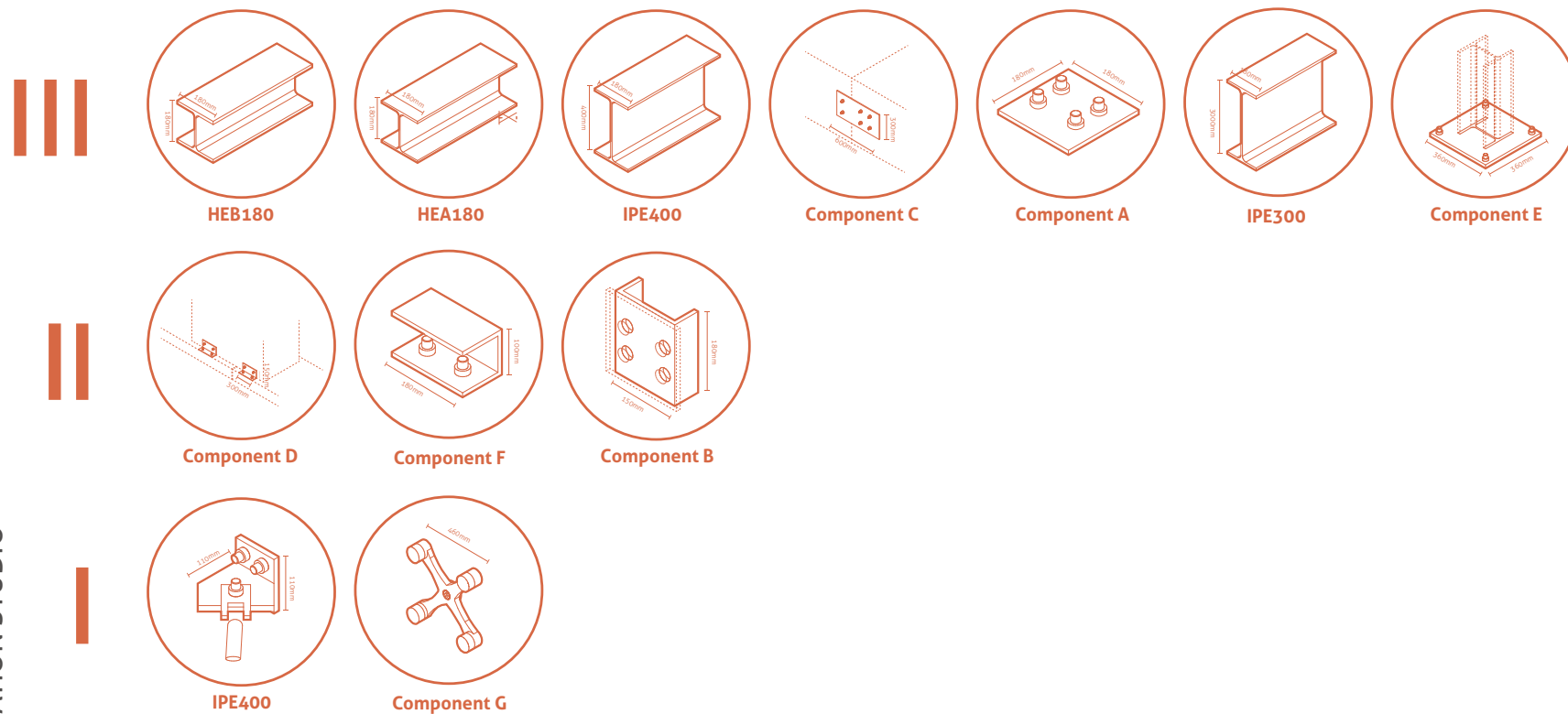
Every material used in the building is used in standard sizes as much as possible so that the ratio of reused materials for other building can be increased.

MATERIALS PASSPORT

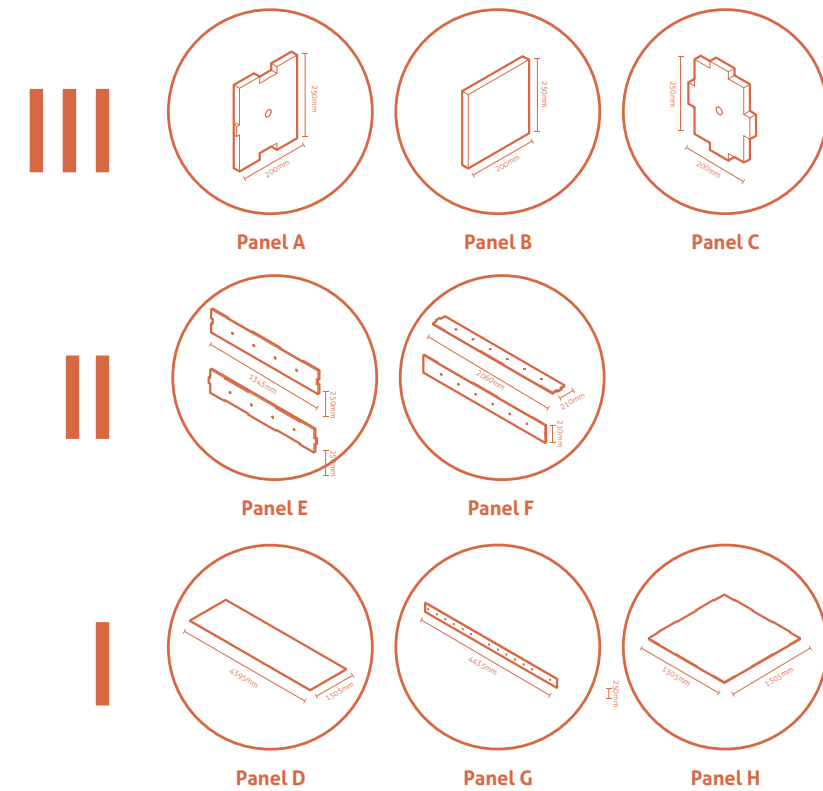
Every material used in the building is used in standard sizes as much as possible so that the ratio of old materials used for the building can be increased.



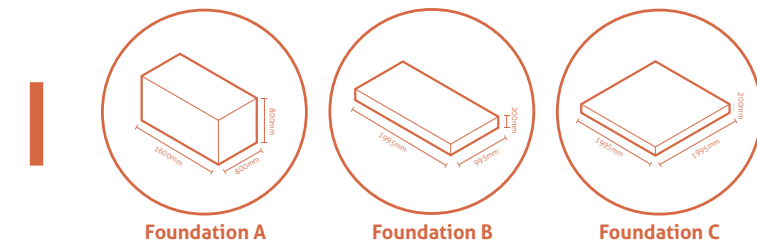
STEEL



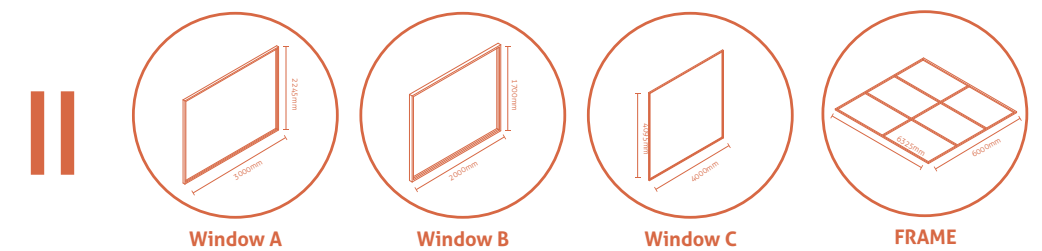
TIMBER



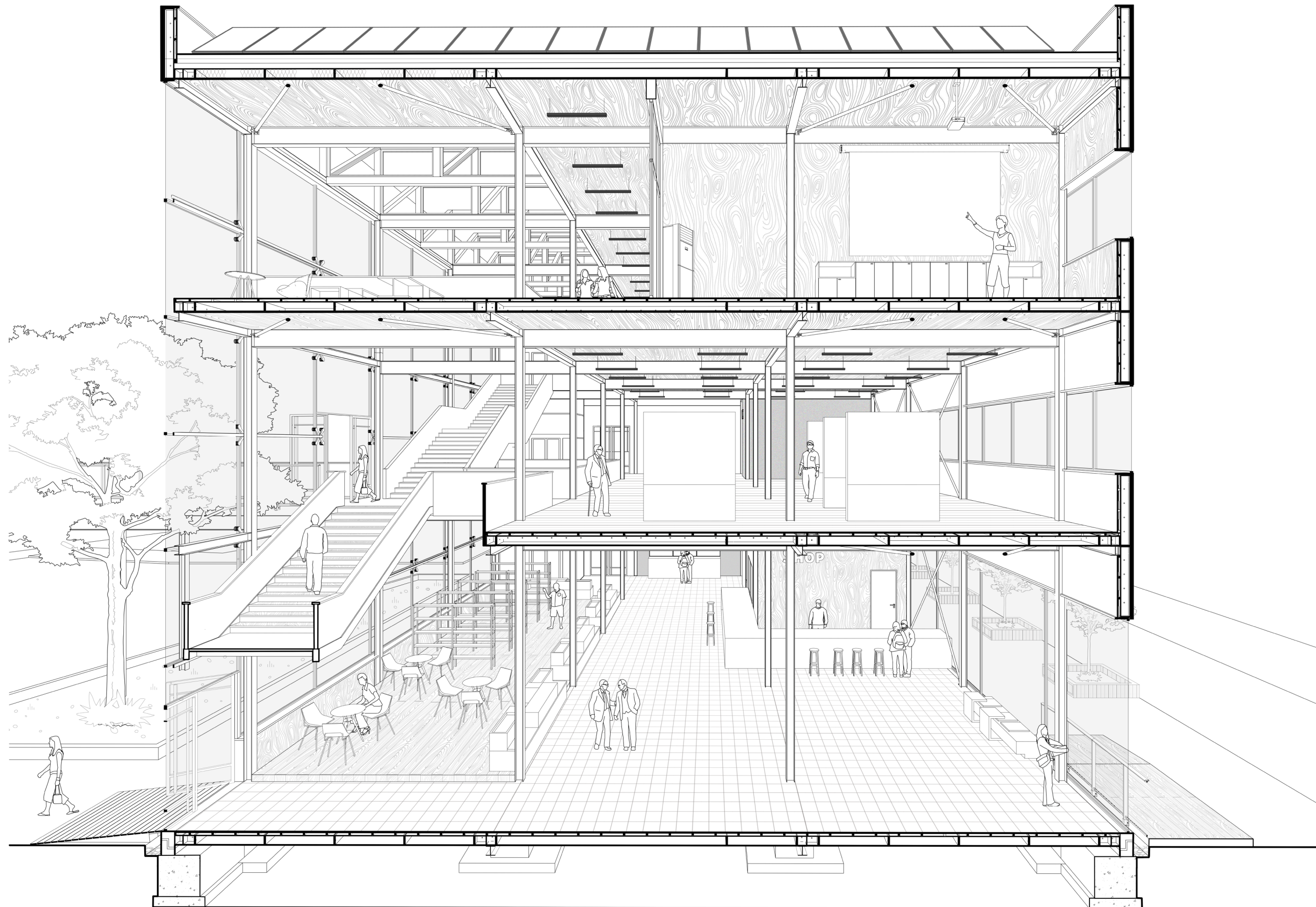
CONCRETE



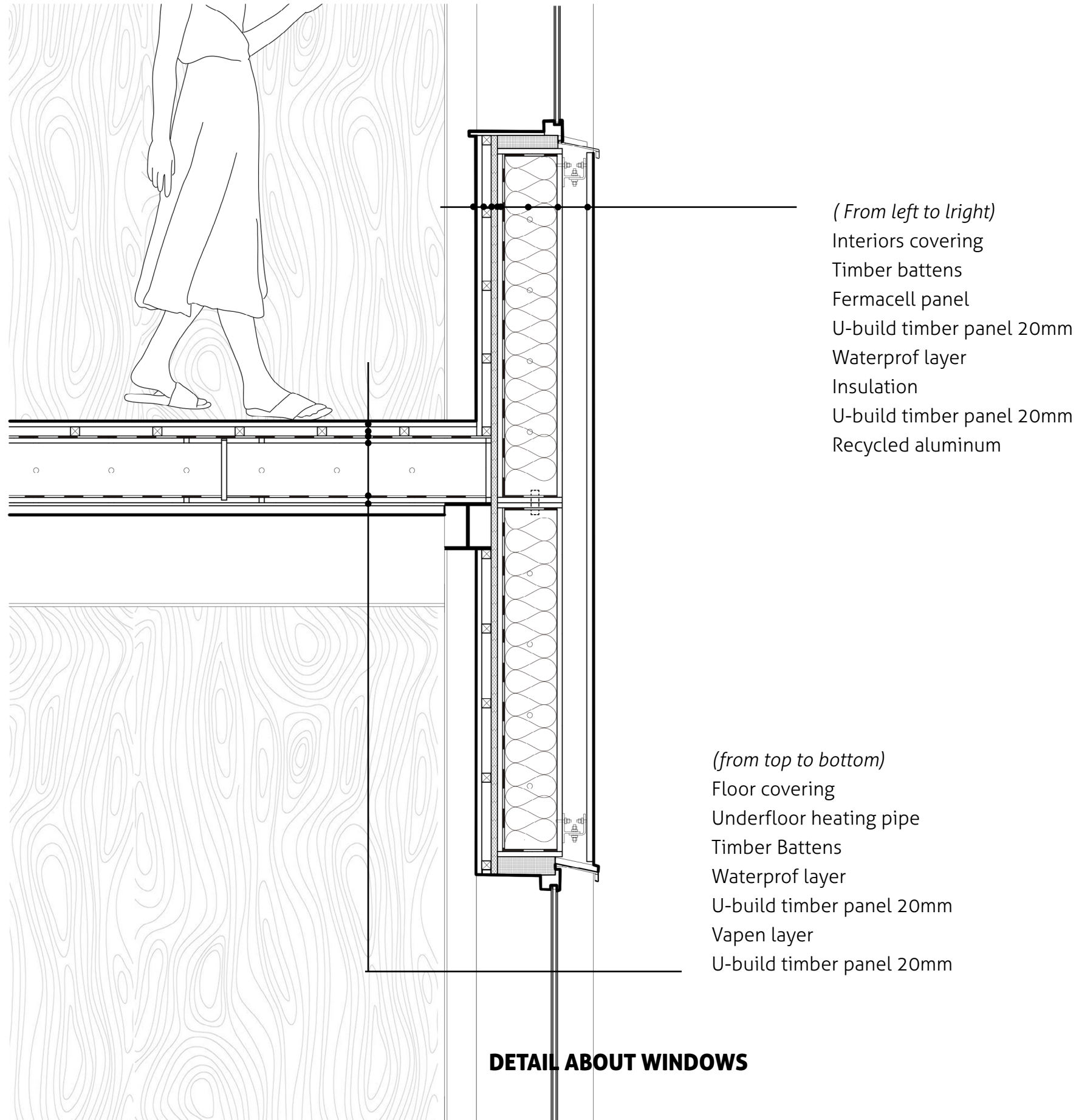
FRAME



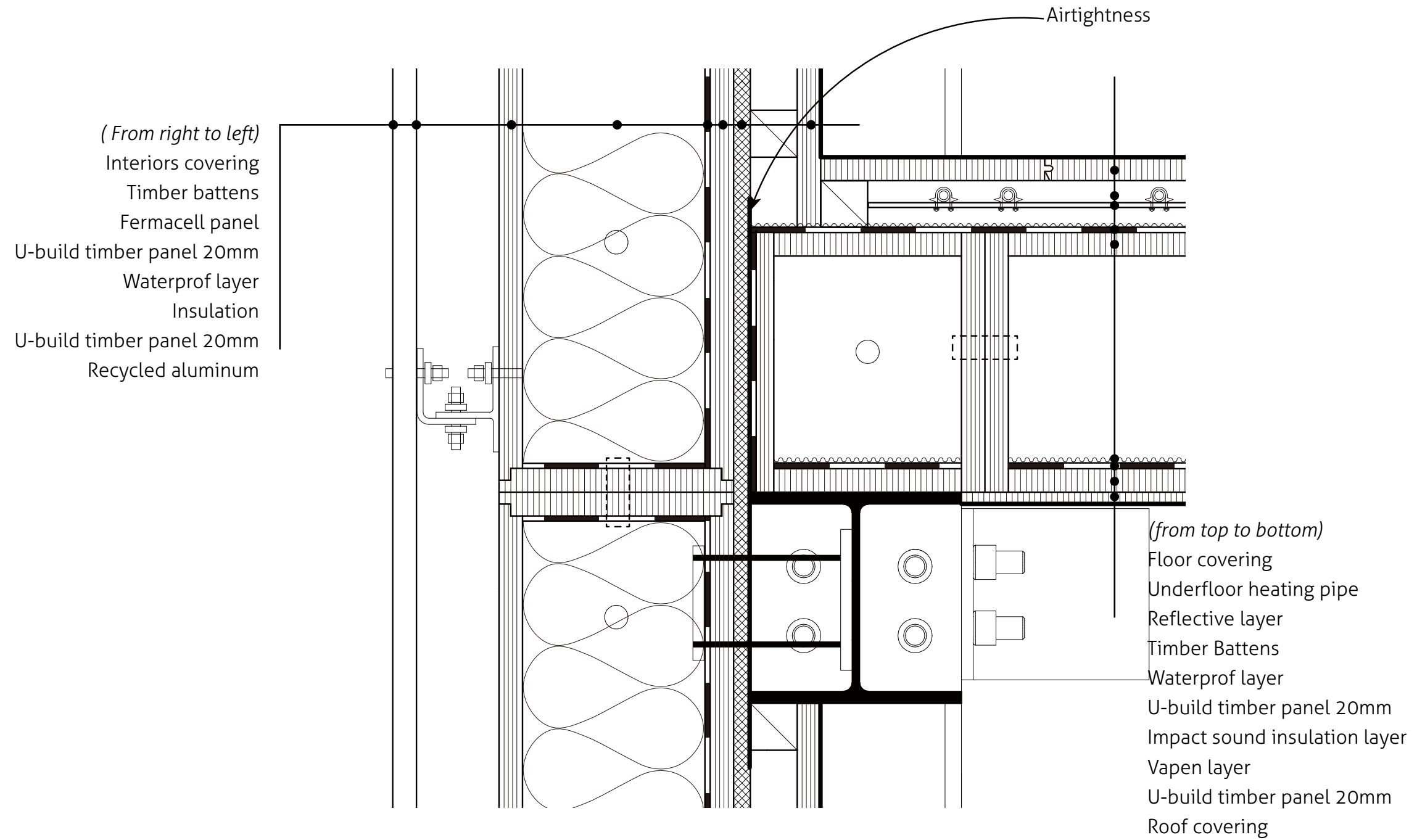
1:50 DETAILS



1:20 DETAILS

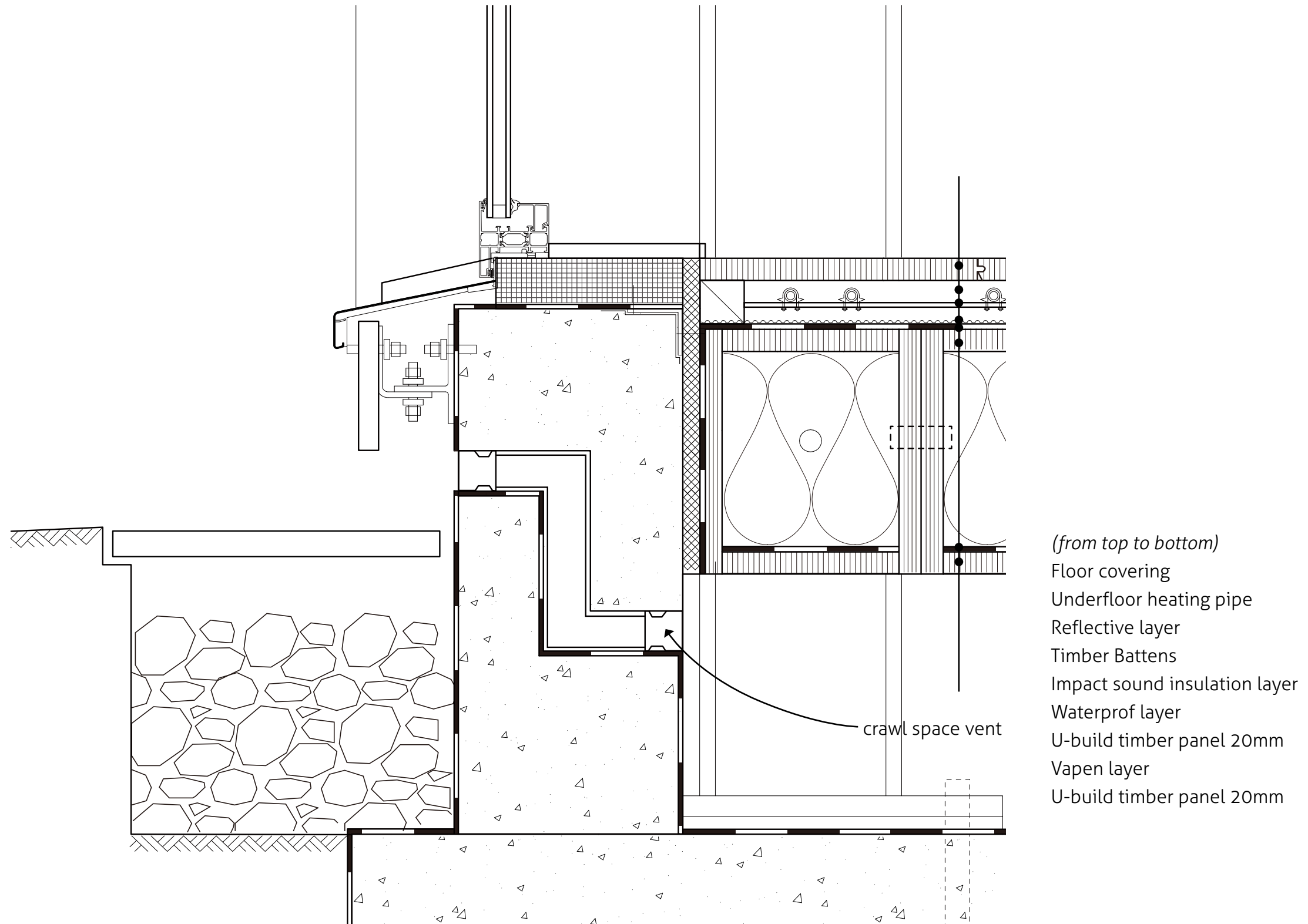


1:5 DETAILS



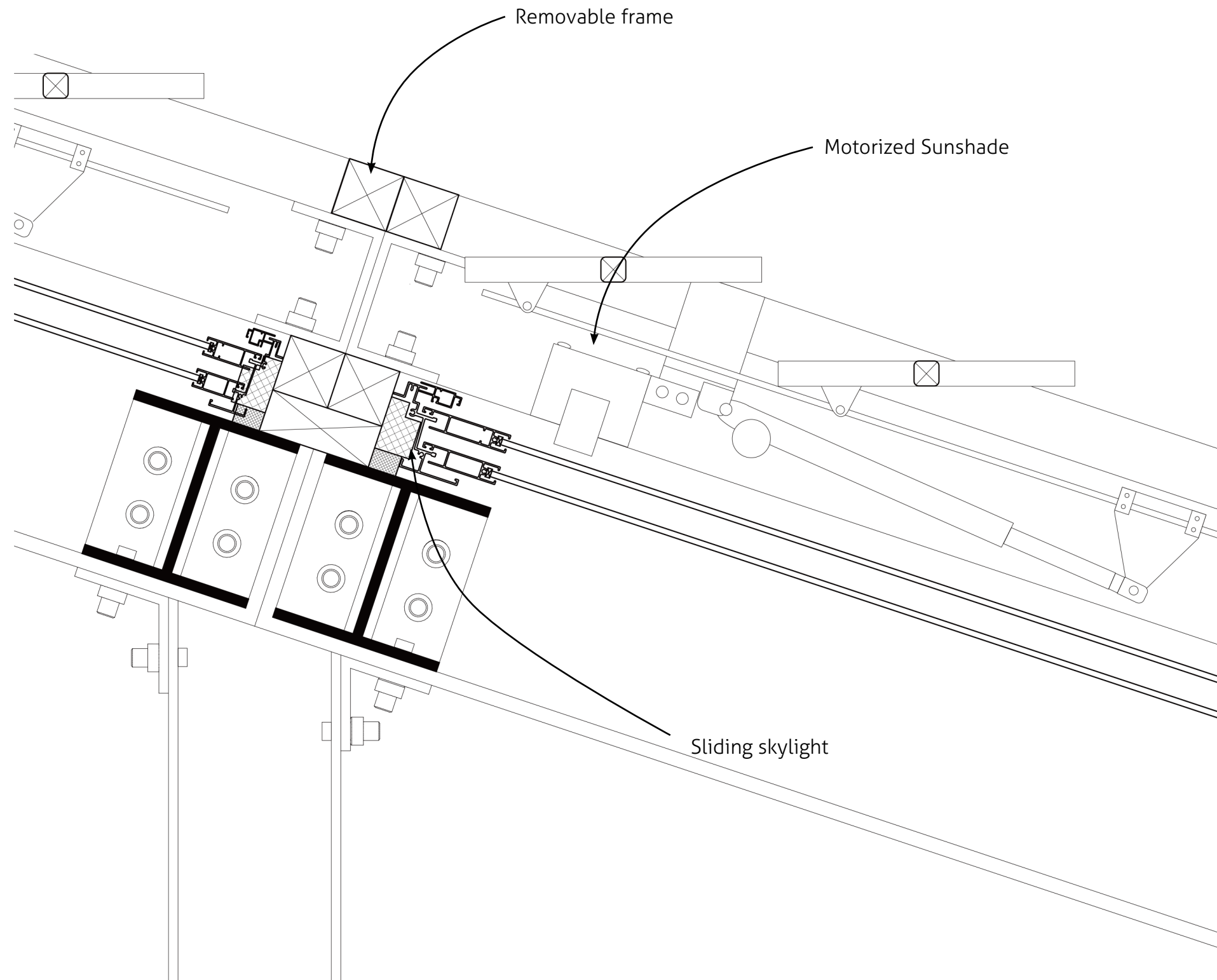
DETAIL ABOUT STEEL STRUCTURE, FLOOR AND FACADE

1:5 DETAILS



DETAIL ABOUT FOUNDATION

1:5 DETAILS



DETAIL ABOUT SECONDARY FACADE









FUTURE VISION

STRUCTURE ANALYSIS

Airey-woningen:

Common in four and below floors, especially in "slotermeer and sloterhof" districts.

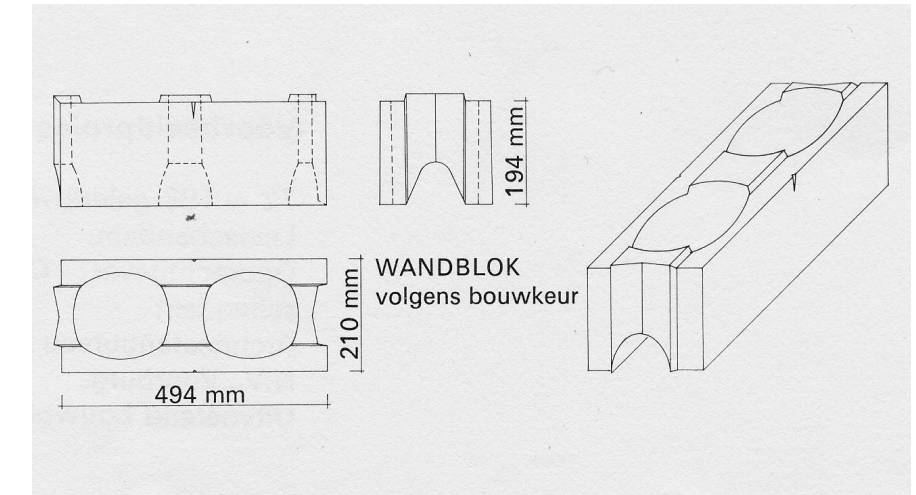
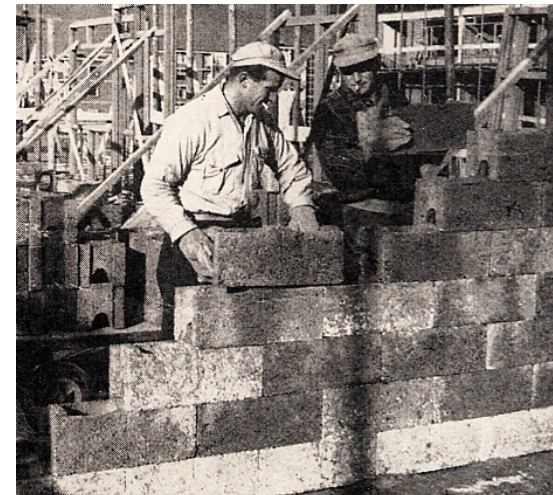
1. inner partition walls are free
2. facade is concrete panel
3. plastic window frames + double glazing
4. roof tiles



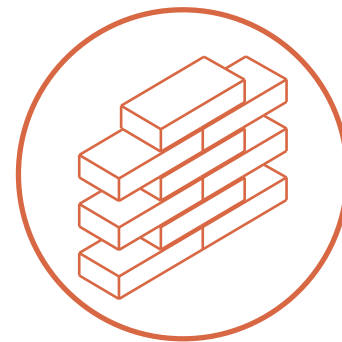
MUWI-system:

Common in Western Garden Cities.

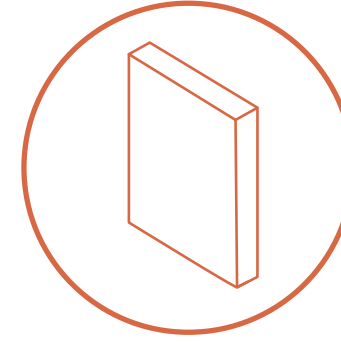
1. Walls use prefabricated hollow concrete elements
2. brick as a facade decoration
3. concrete filled with original without rebar



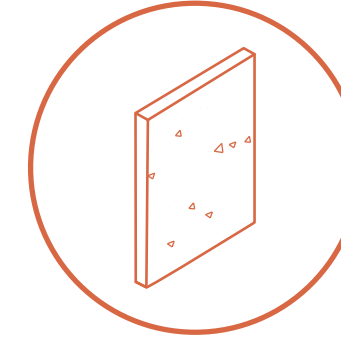
Ceramic roof tiles



Brick



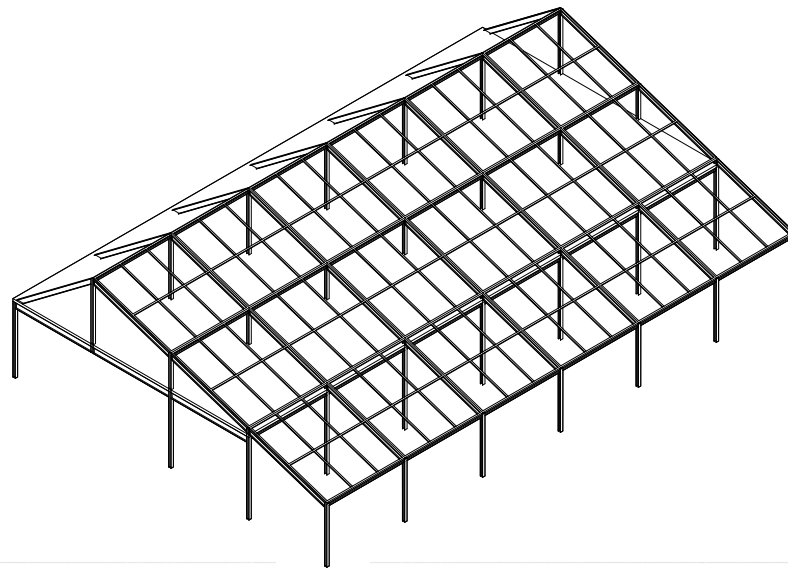
Partition wall



Concrete panel

SECONDARY FACADE

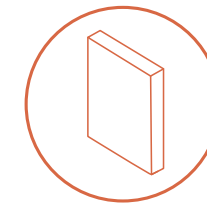
The roof of the materials processing centre will become a showcase for the potential of recycled materials for the community. Various materials collected from the post-war housing areas will be placed on top of the roof as sunshades. This façade can be changed depending on the season and the type of recyclable material. The community will be able to visualise the changes in the roof to see the potential of the materials.



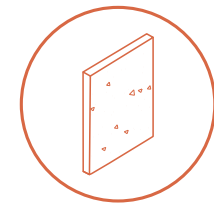
Ceramic roof tiles



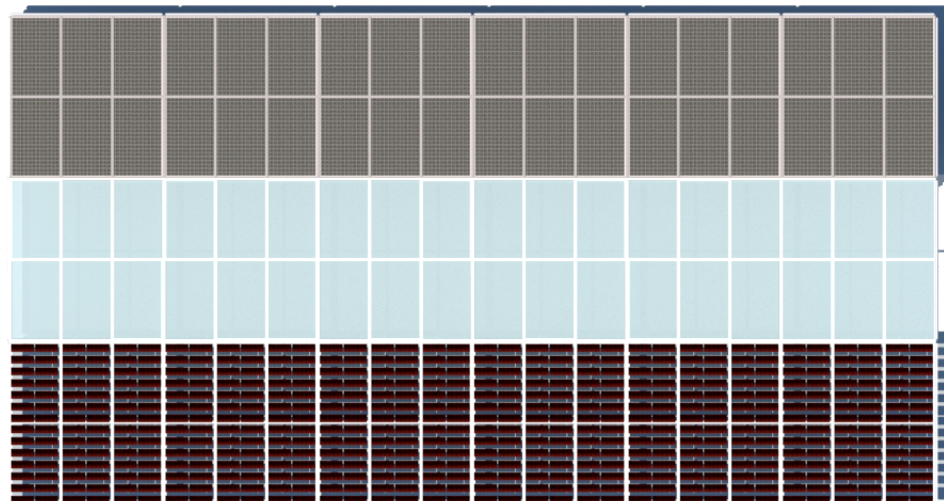
Brick



Partition wall

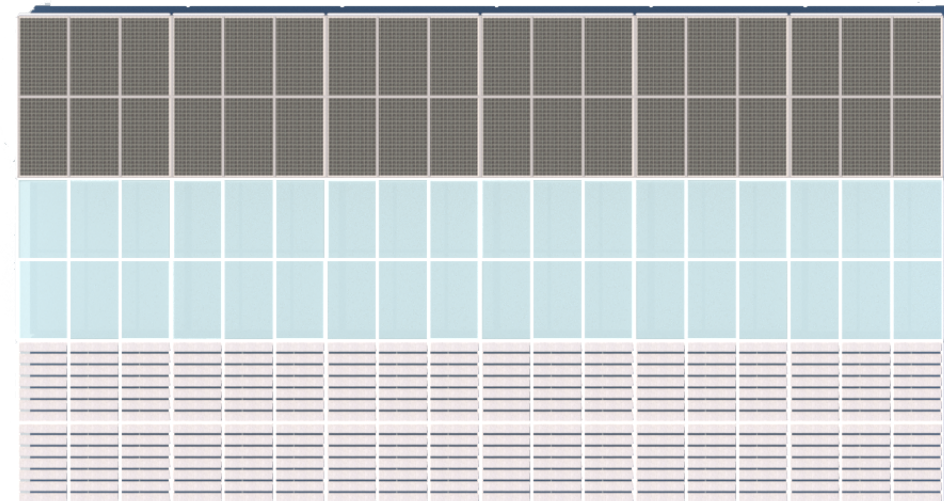


Concrete pane



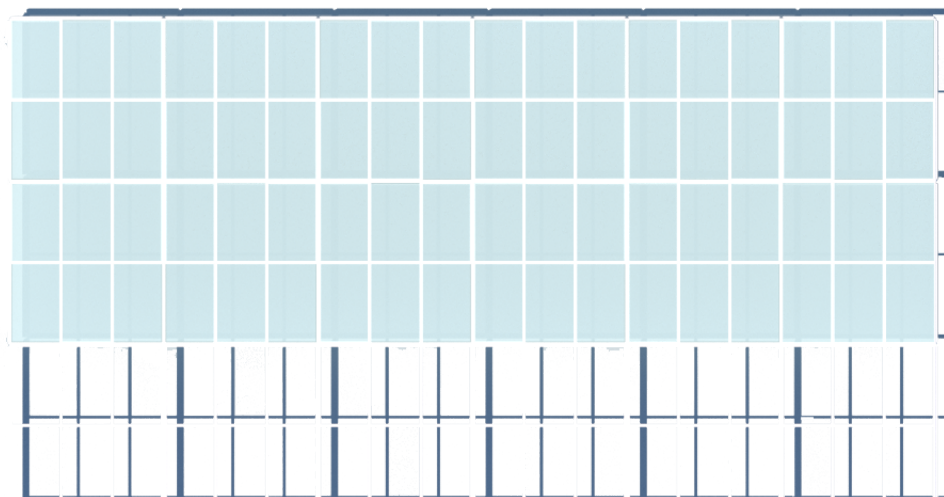
SEASON:
summer

MATERIALS:
solar panel 33%
glasss 33%
roof tiles 33%



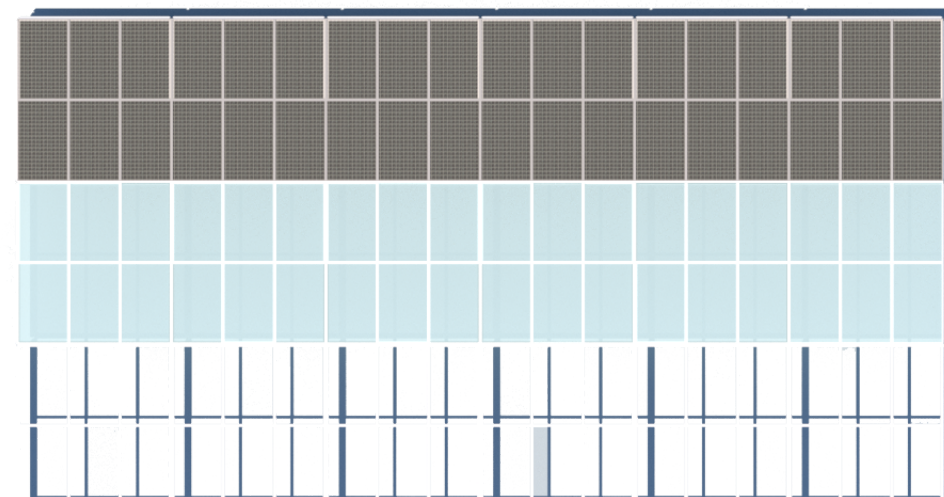
SEASON:
summer

MATERIALS:
solar panel 33%
glasss 33%
concrete panel 33%



SEASON:
winter

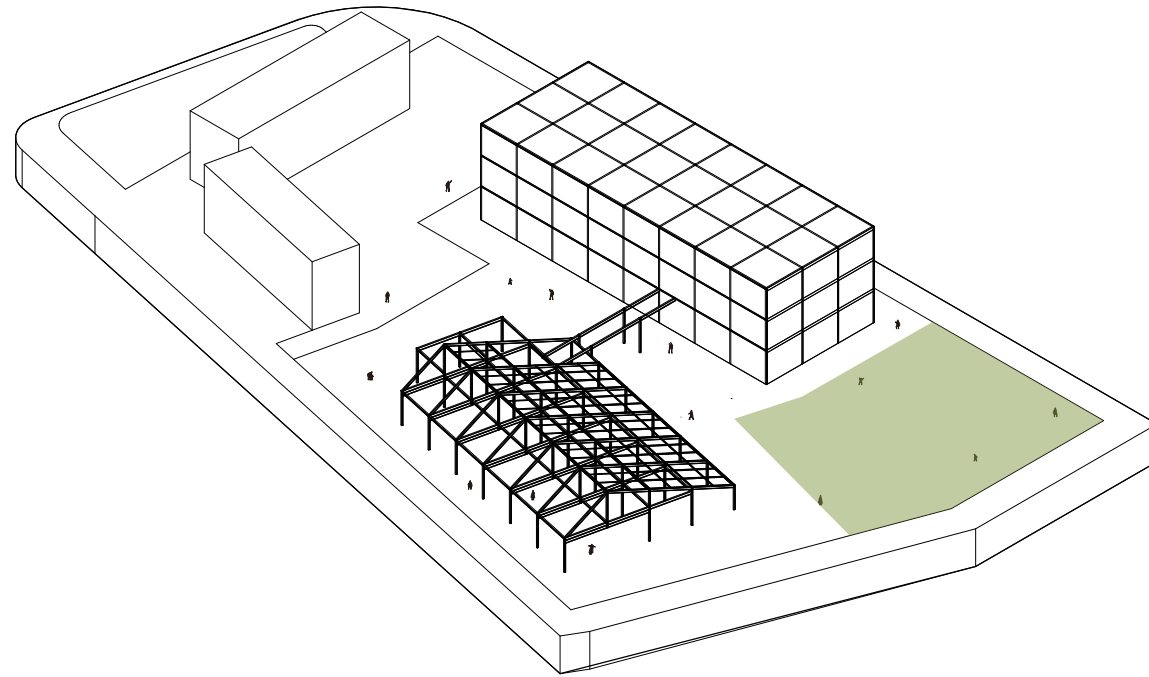
MATERIALS:
glasss 66%



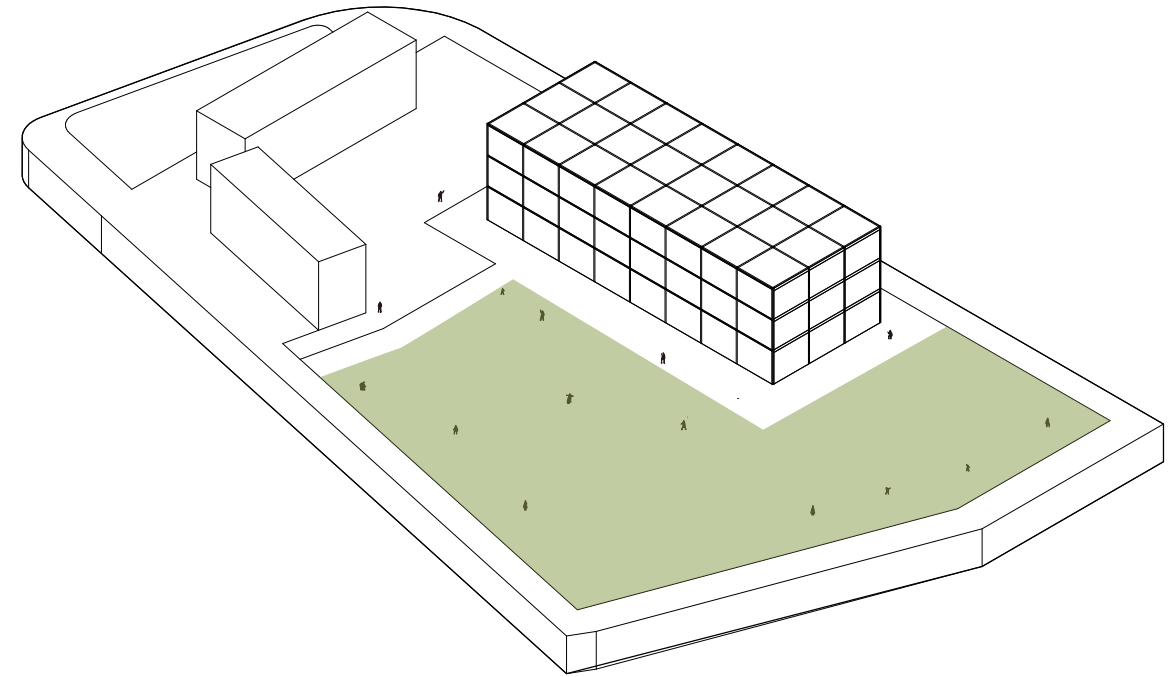
SEASON:
autumn

MATERIALS:
solar panel 33%
glasss 33%

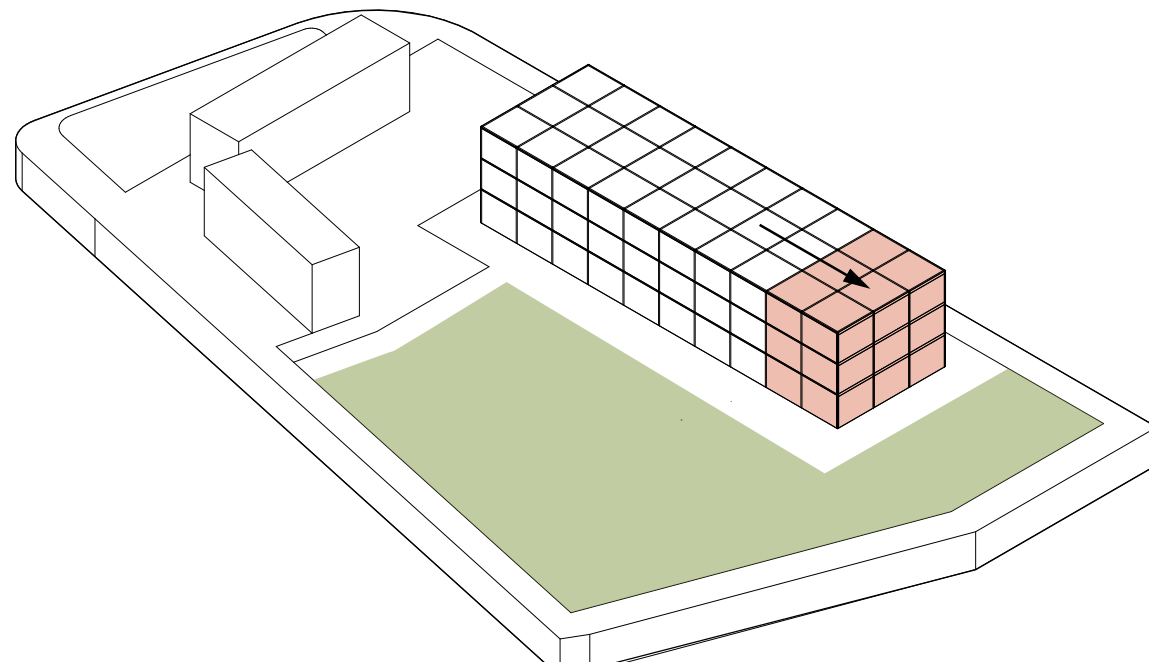
FUTURE VISION



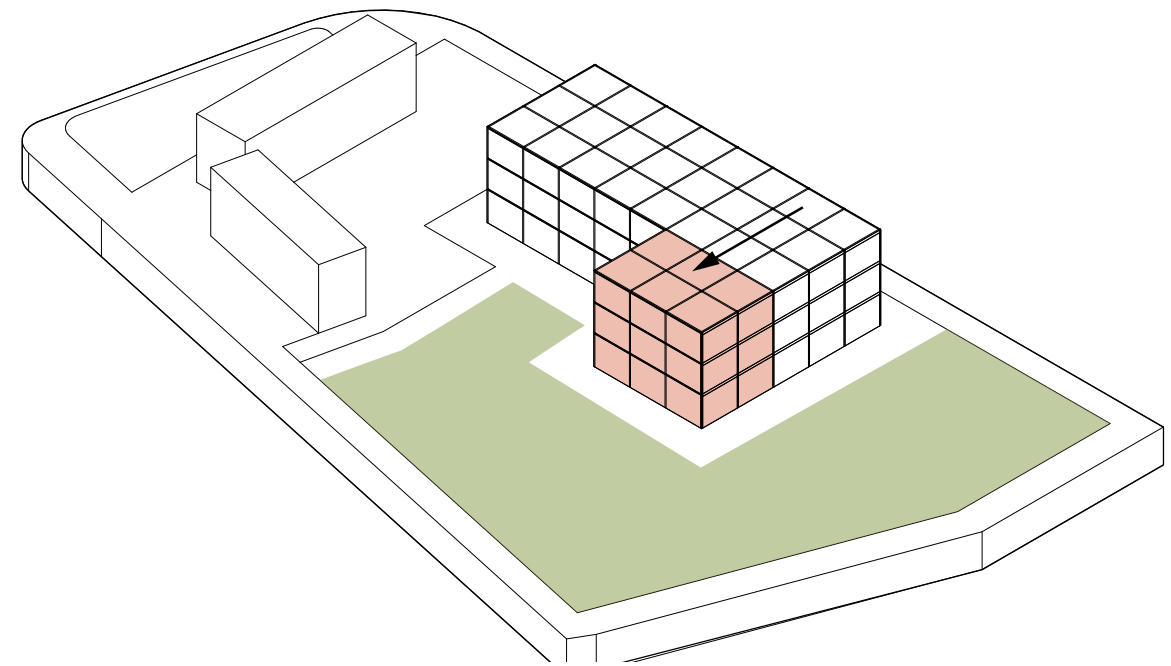
2022



2030



2050



2070

In the future, when the renewal of the western garden city is over, the material handling center can be demolished. The demolished materials will be used in the construction of other buildings. The activity center can be added in the future in the form of a 6*6 module.

FOR SURROUNDINGS



Provide Energy

The solar panels installed on the building not only provide the building's energy consumption, but the excess energy can also be used to serve the community. For example, charging electric cars and powering street lights.



Space for Activities

The project provides good indoor and outdoor space for community residents who lack activity space. People can move around here and have the opportunity to learn about recycling old materials.



Educational case

The building is not only an activity center, but also a example of circularity. As the building's façade is replaced with different recycled materials from post-war housing depending on the season, people around the building can get a more realistic sense of the potential for reuse of old materials.



Thanks

