

2022 EXTREME CARE Azraq Refugee Camp

Tianyi Gu | 5566134



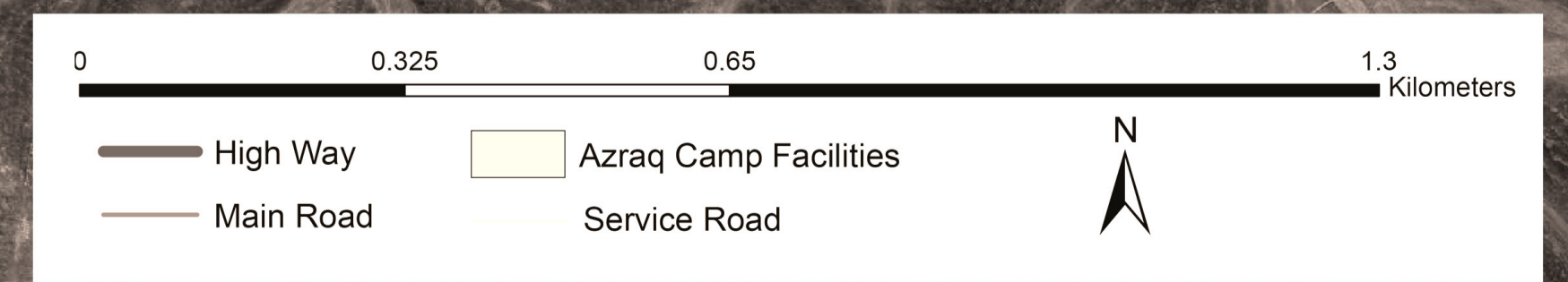
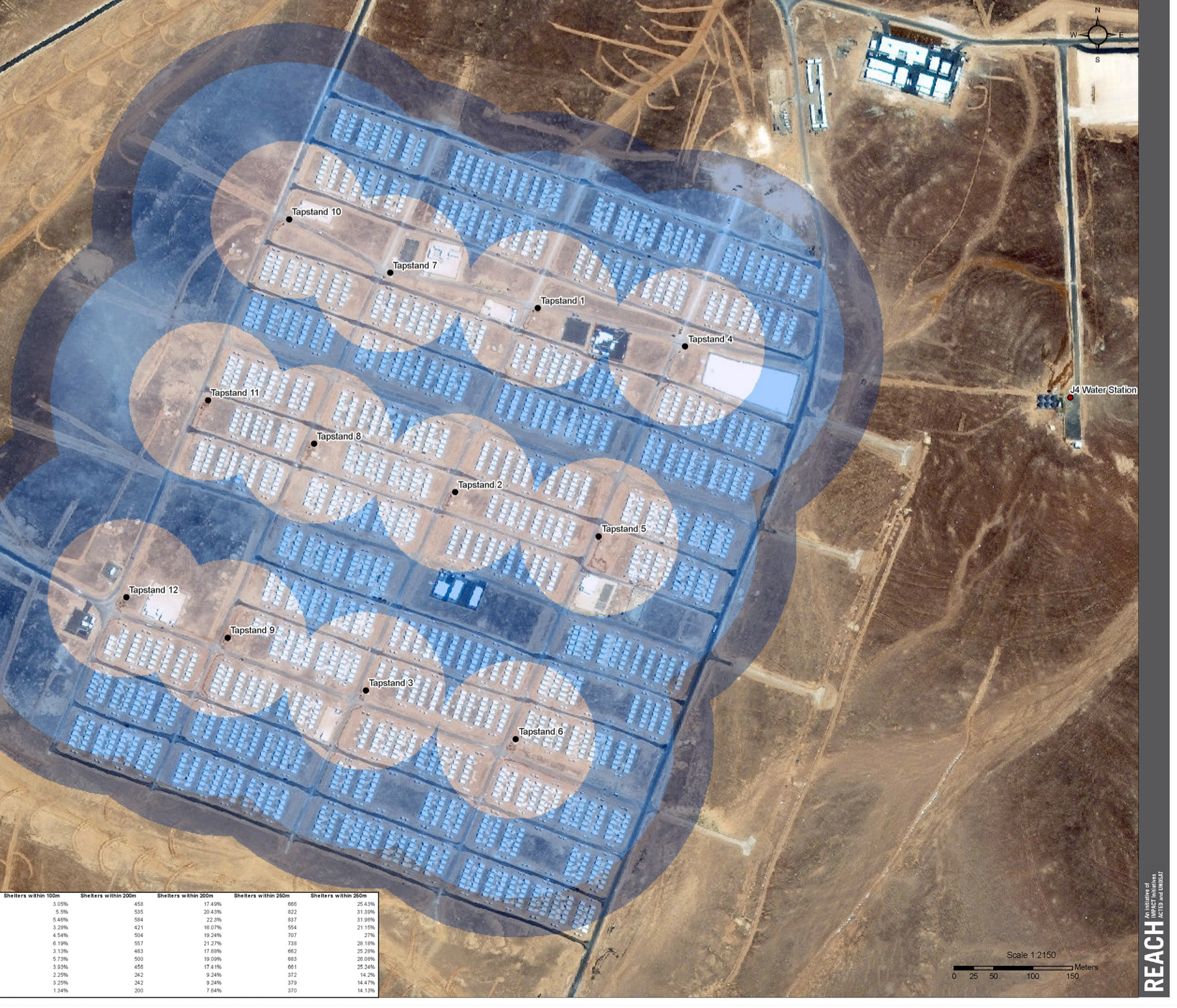
Site Analysis



Azraq Refugee Camp
Tapstands in Village 3

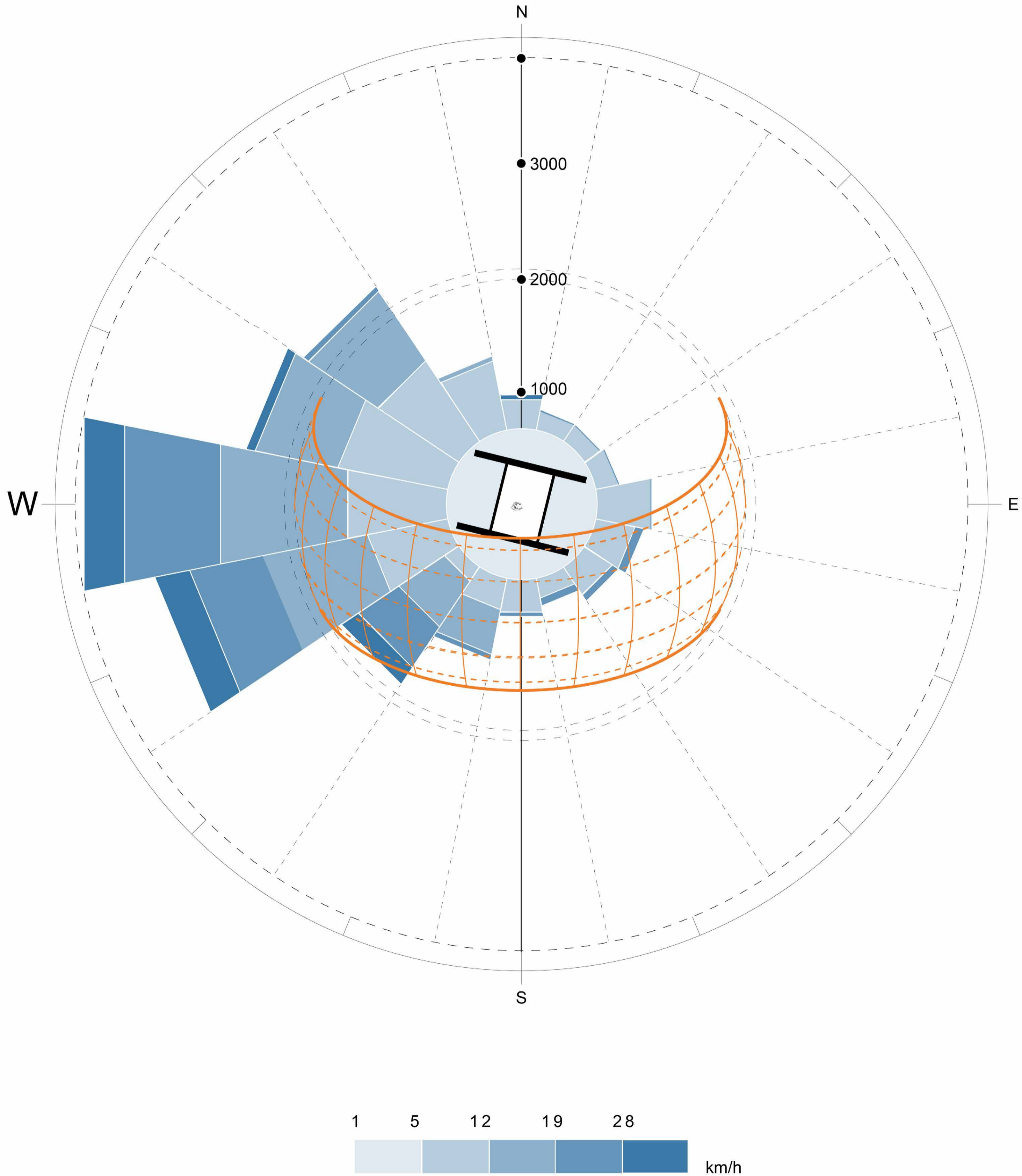
For Humanitarian Purposes Only
Production Date: 12 May 2014

For more information visit the Open Street Map Portal



Map source: UNHCR, UNOSAT

Climate Condition



Health risks

Solutions

Overheating

Natural ventilation



<https://www.infomigrants.net/en/post/14290/jordan-nrc-provides-assistance-at-azraq-refugee-camp>



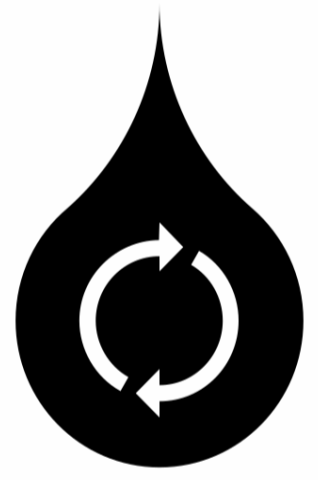
Water shortage

Grey water recycle



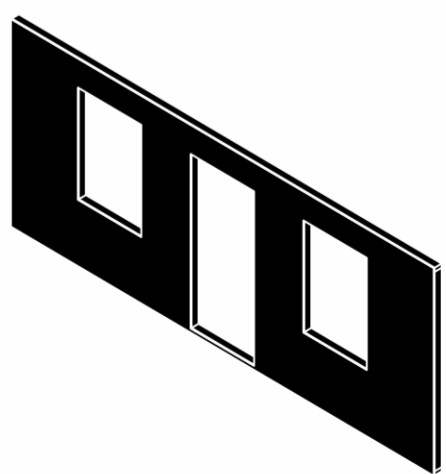
<https://thearabweekly.com/jordans-water-shortage-made-worse-refugee-crisis>

<https://www.borgenmagazine.com/water-scarcity-in-jordan-and-syrian-refugees/>

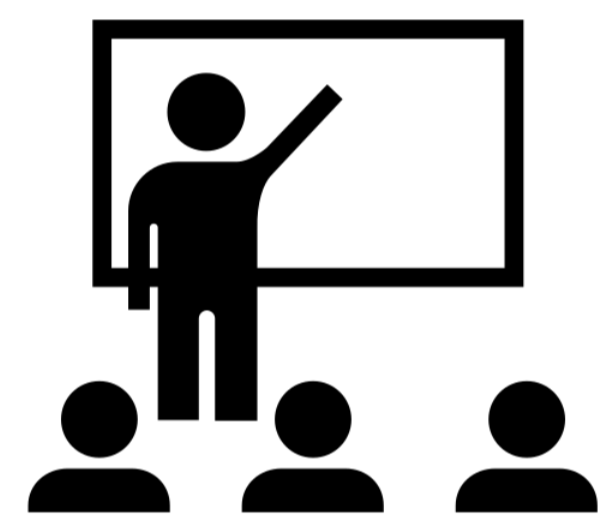


Sandstorm

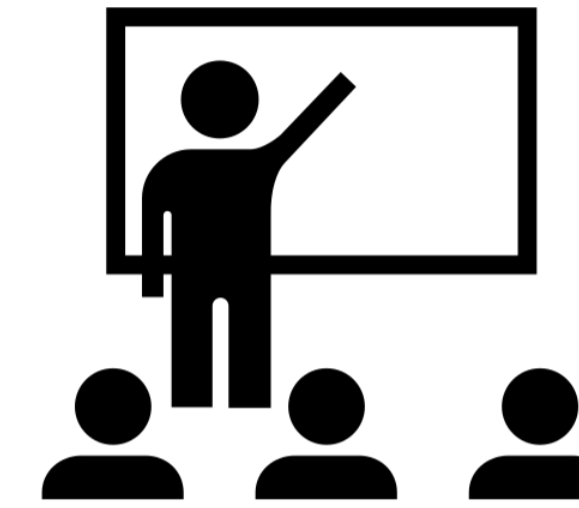
Operable openings



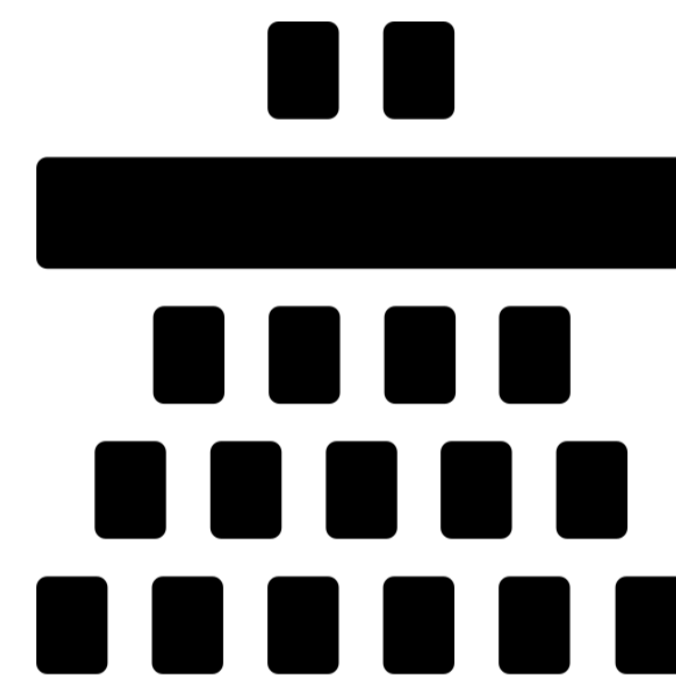
A school is not only a school



Teaching



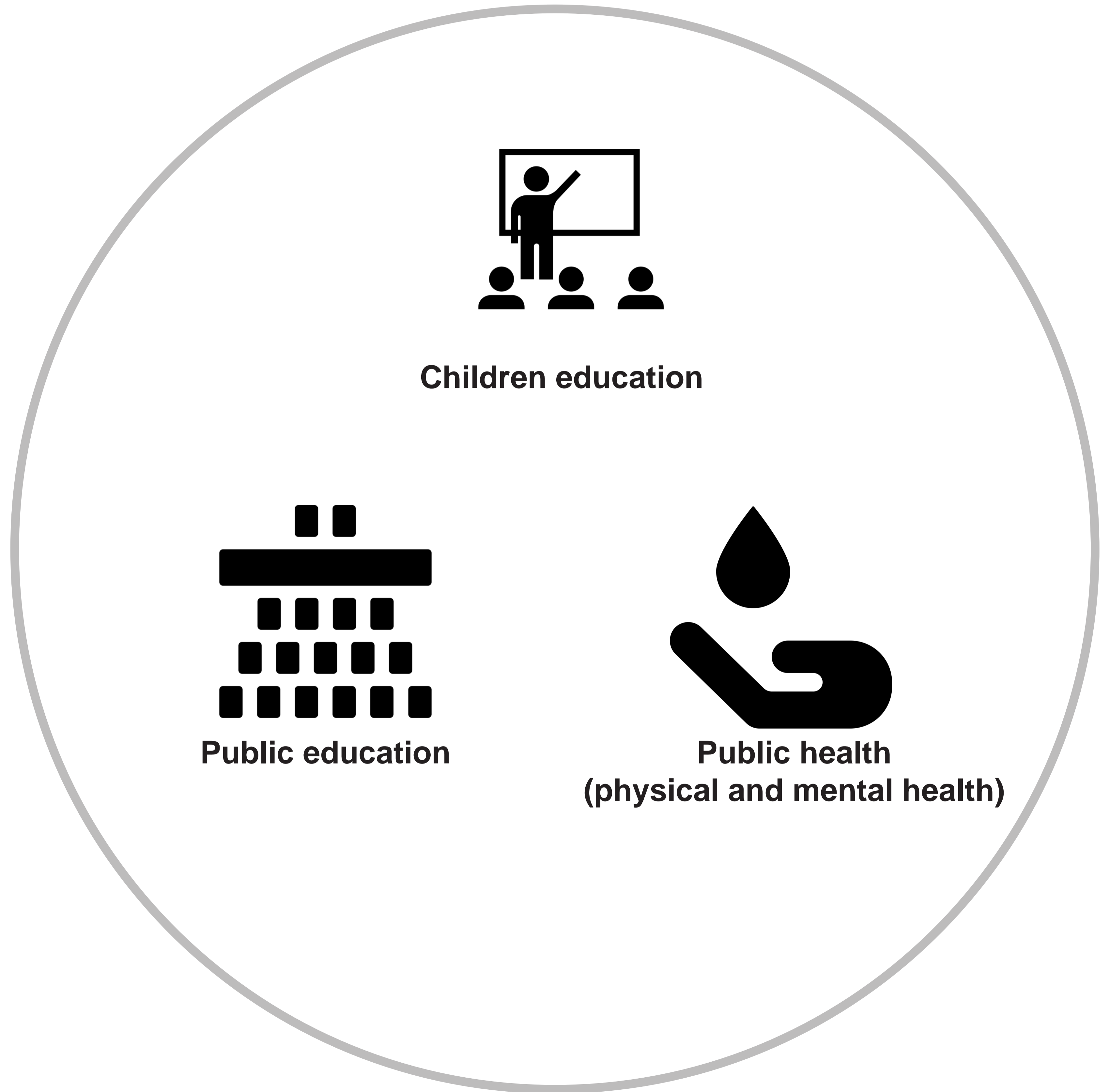
Children education



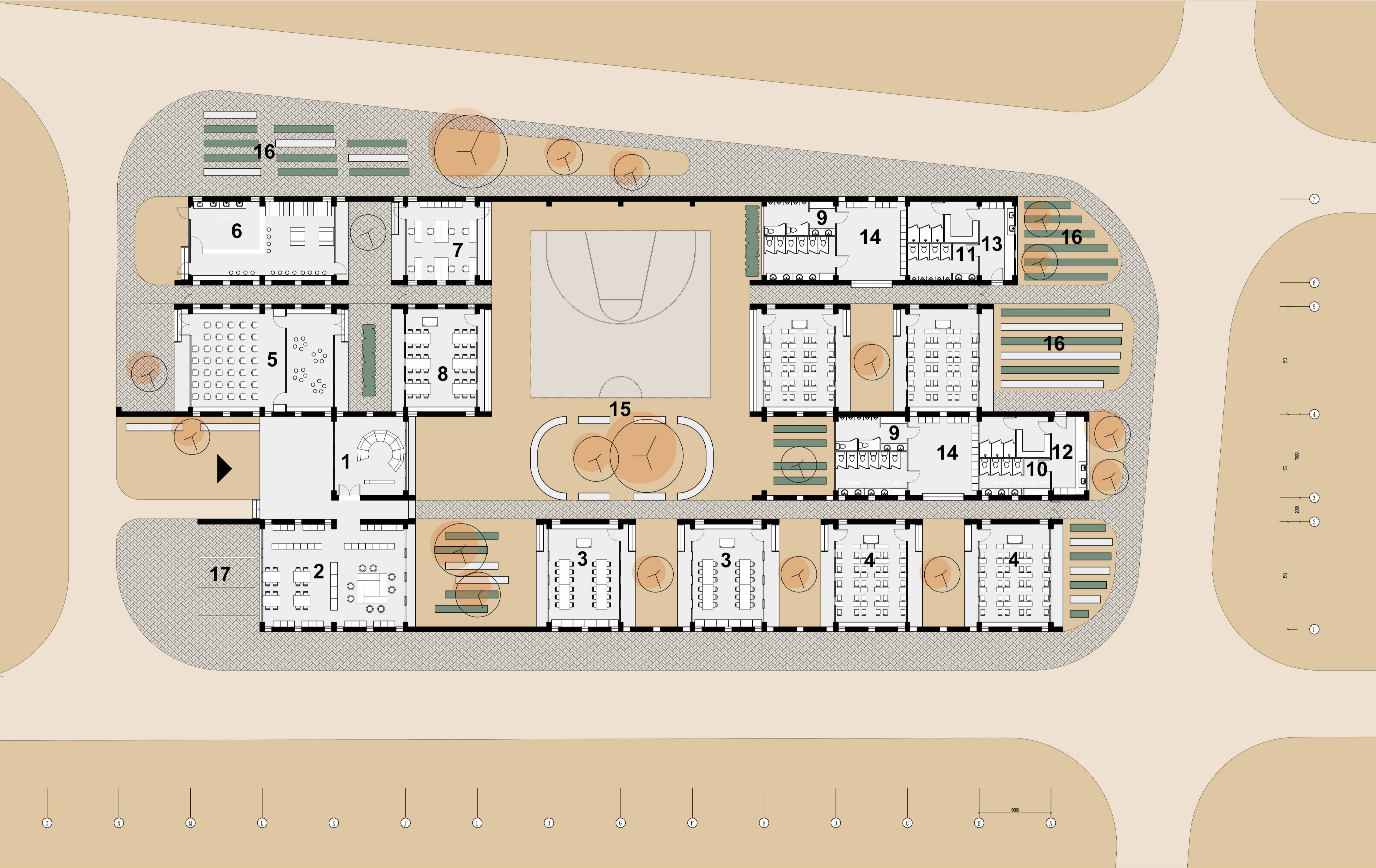
Public education



Public health
(physical and mental health)



Site plan

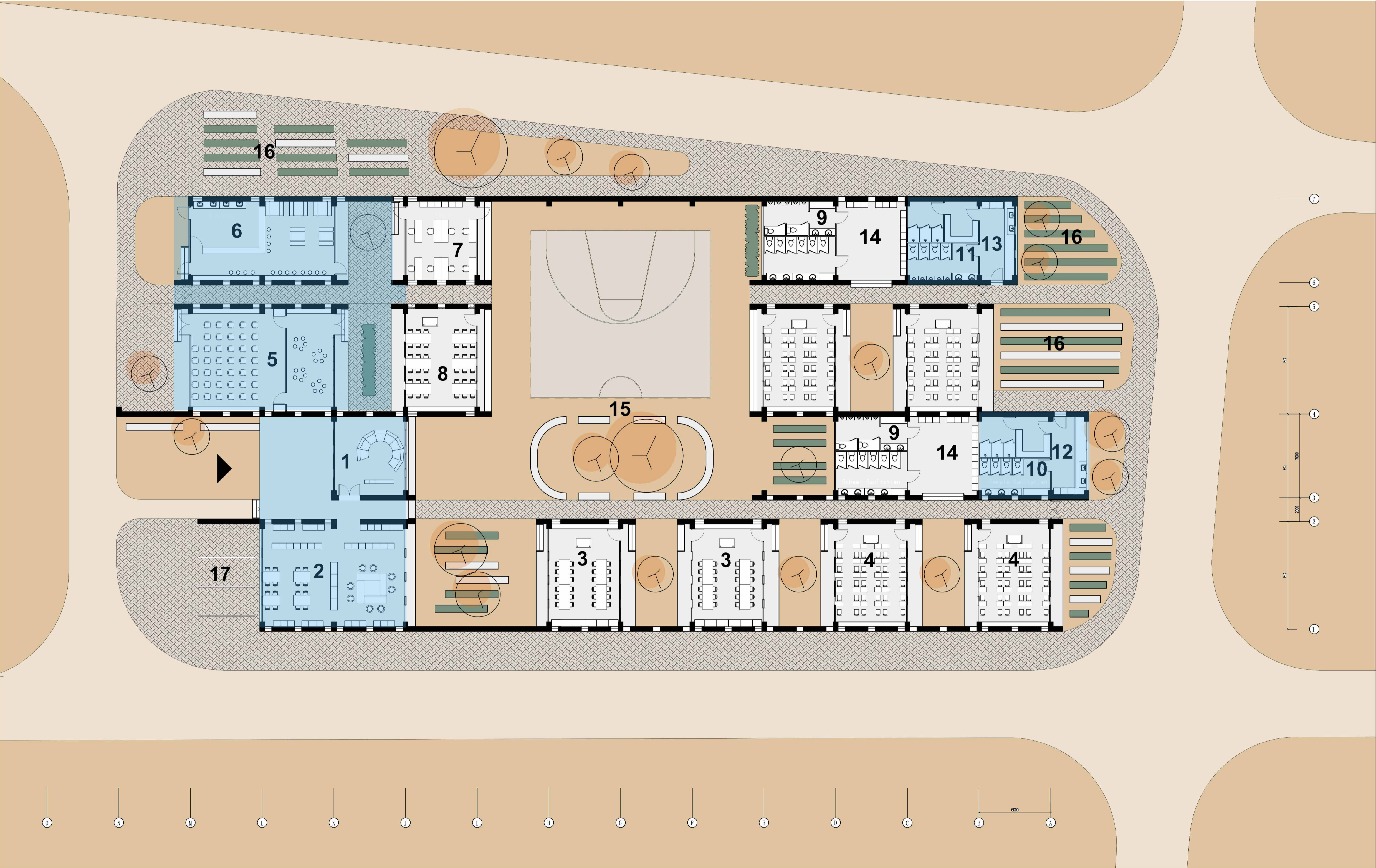


- 0 1 2 3 4 5M
- N
- 1 Reception & Exhibition
 - 2 Library
 - 3 Seminar
 - 4 Classroom
 - 5 Cultural space
 - 6 Kitchen
 - 7 Administration
 - 8 Pre-school
 - 9 Sanitation for school
 - 10 Sanitation for female
 - 11 Sanitation for male
 - 12 Laundry space for female
 - 13 Laundry space for male
 - 14 Locker
 - 15 Courtyard
 - 16 Crop field
 - 17 Parking slot

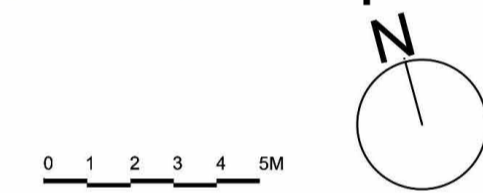
Site plan 1: 200

Site plan

During the day



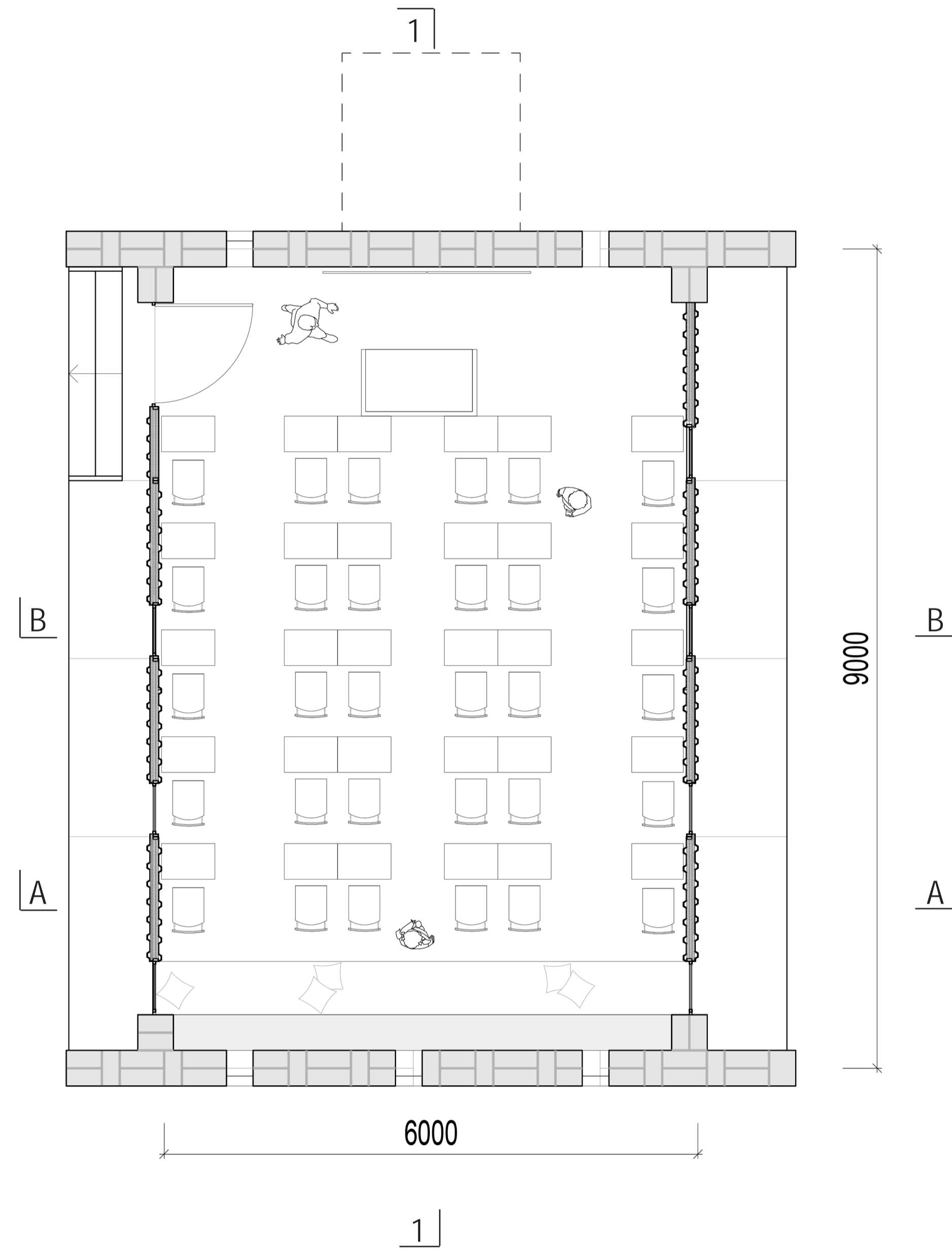
Space open to the public



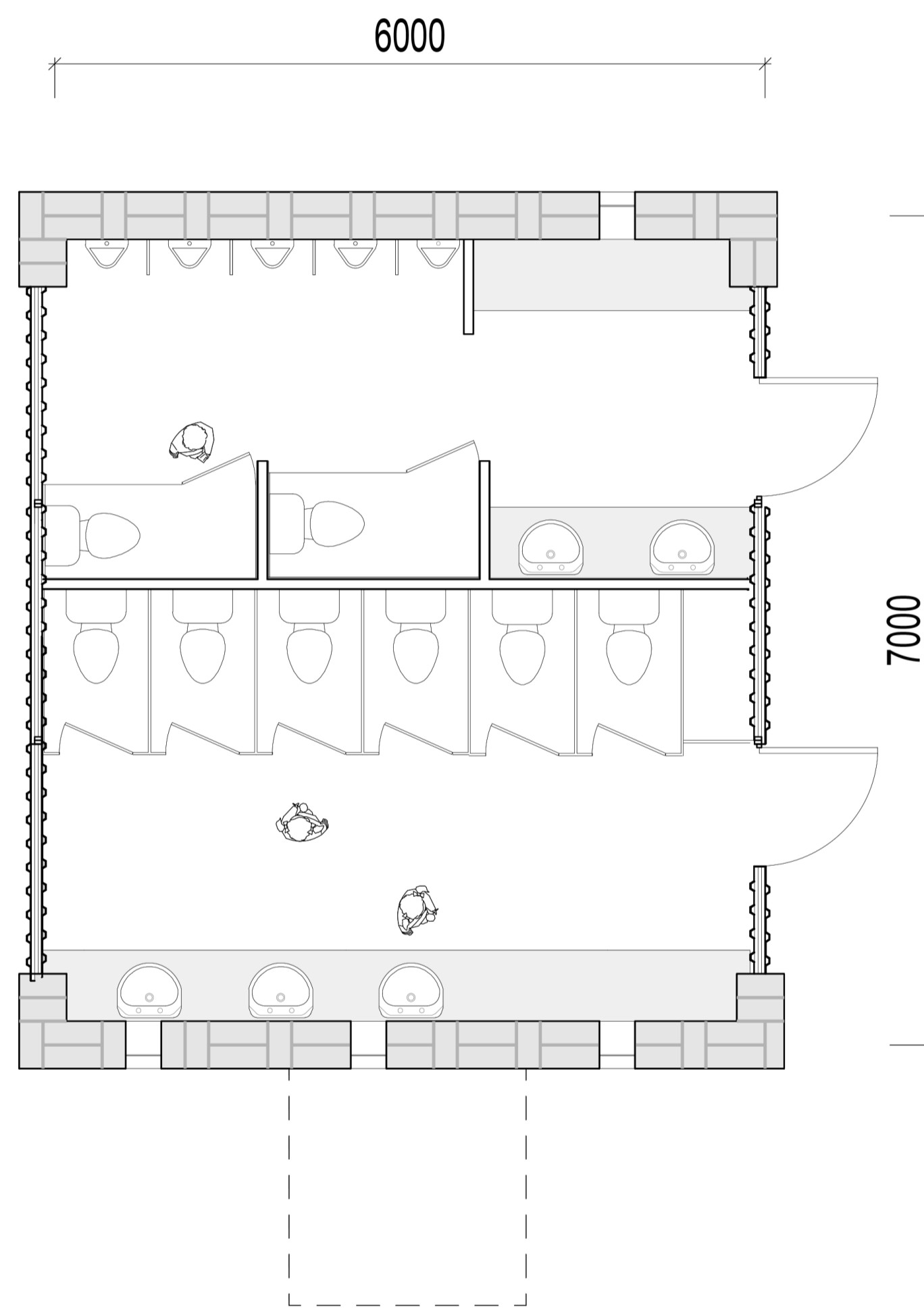
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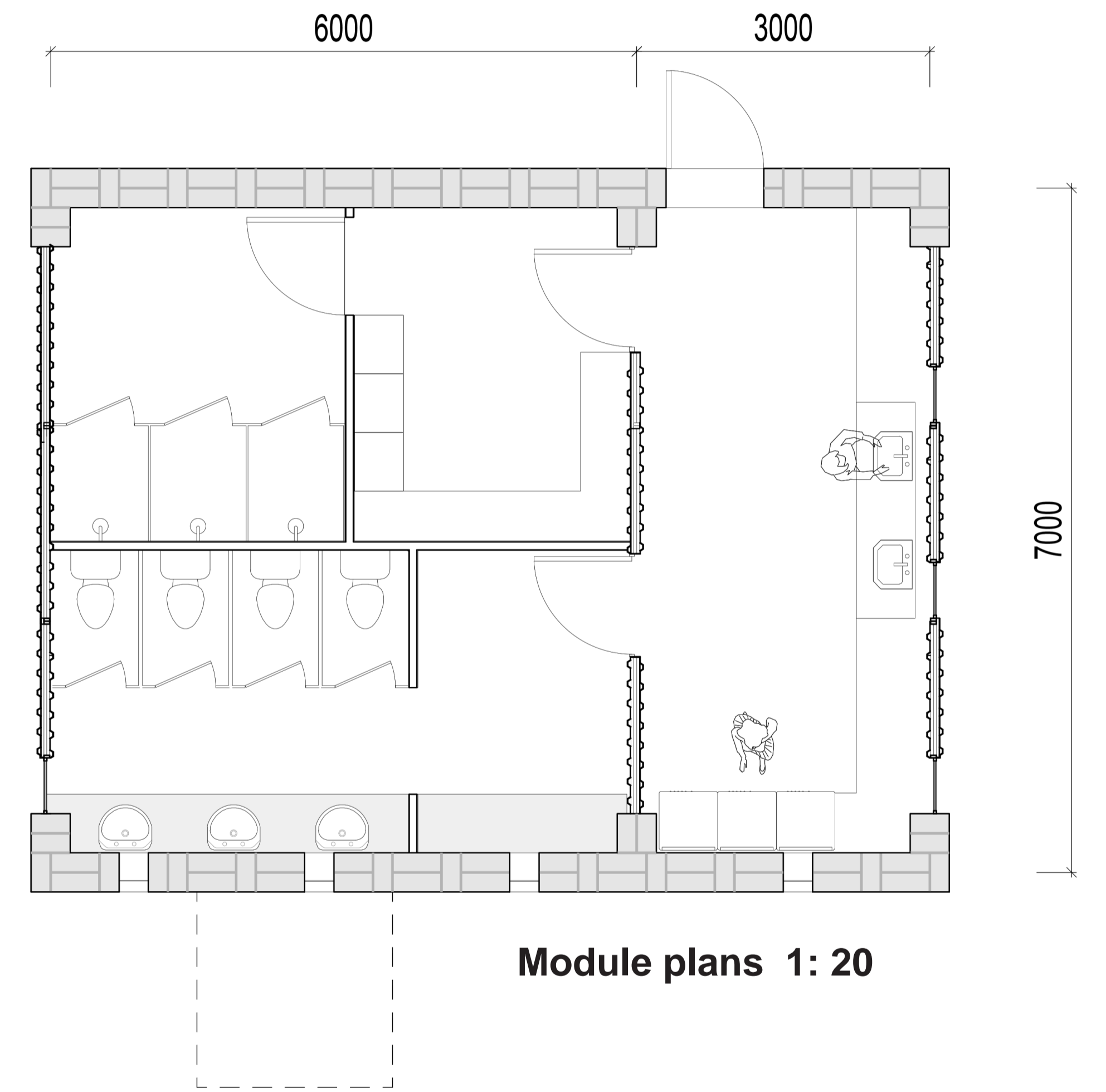
Module plans



Classroom module

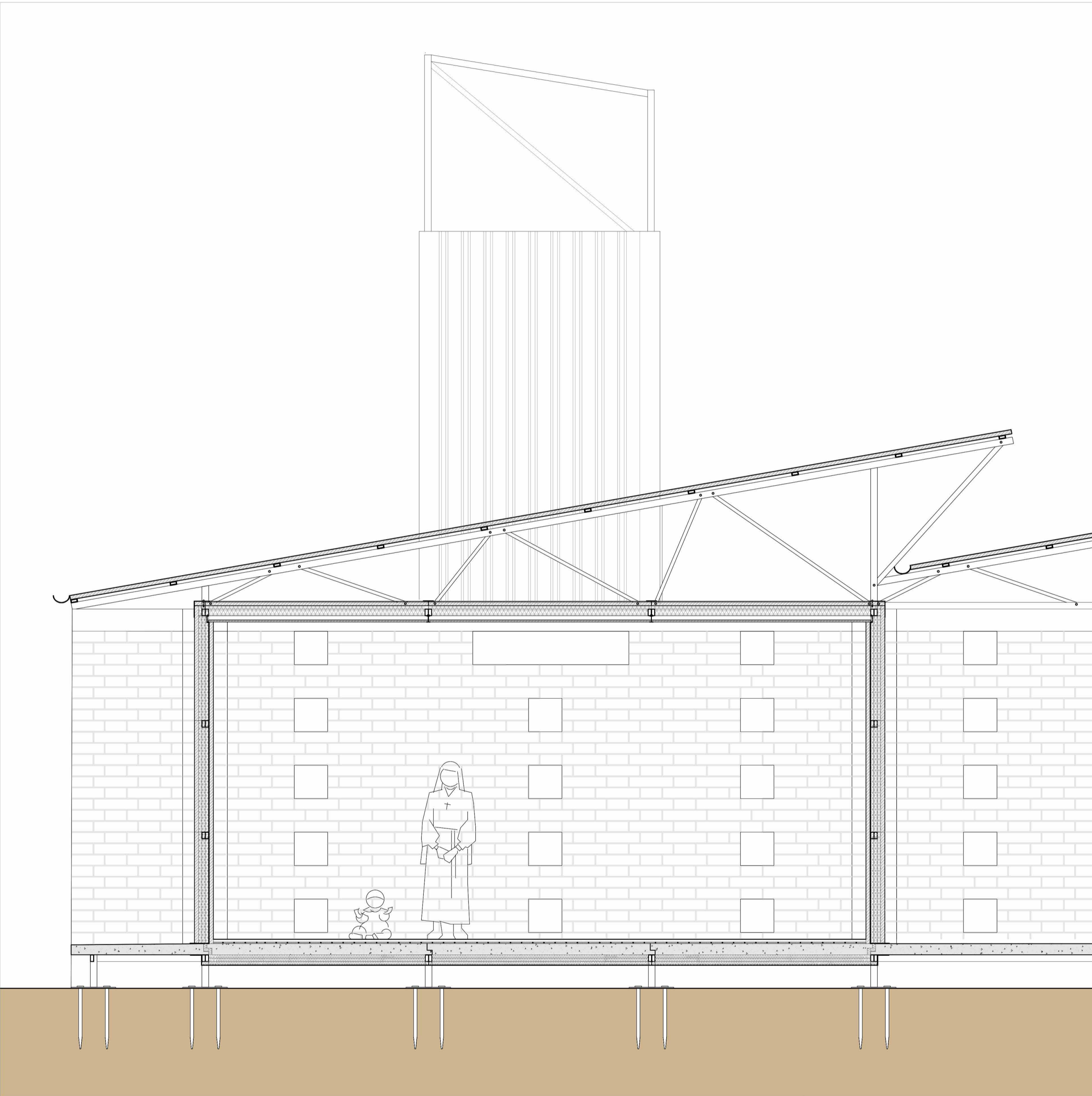


Sanitation module

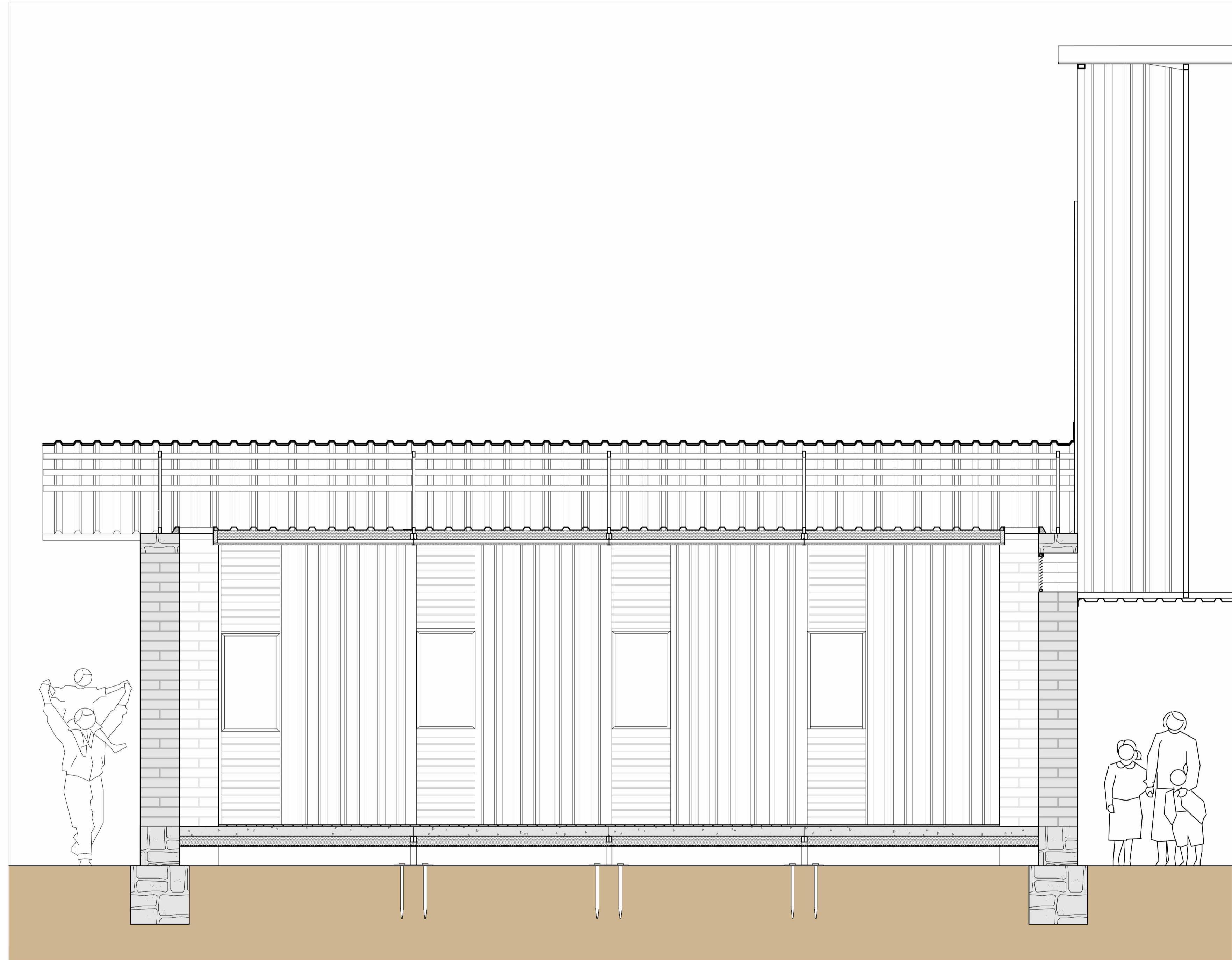


Module plans 1: 20

Module sections

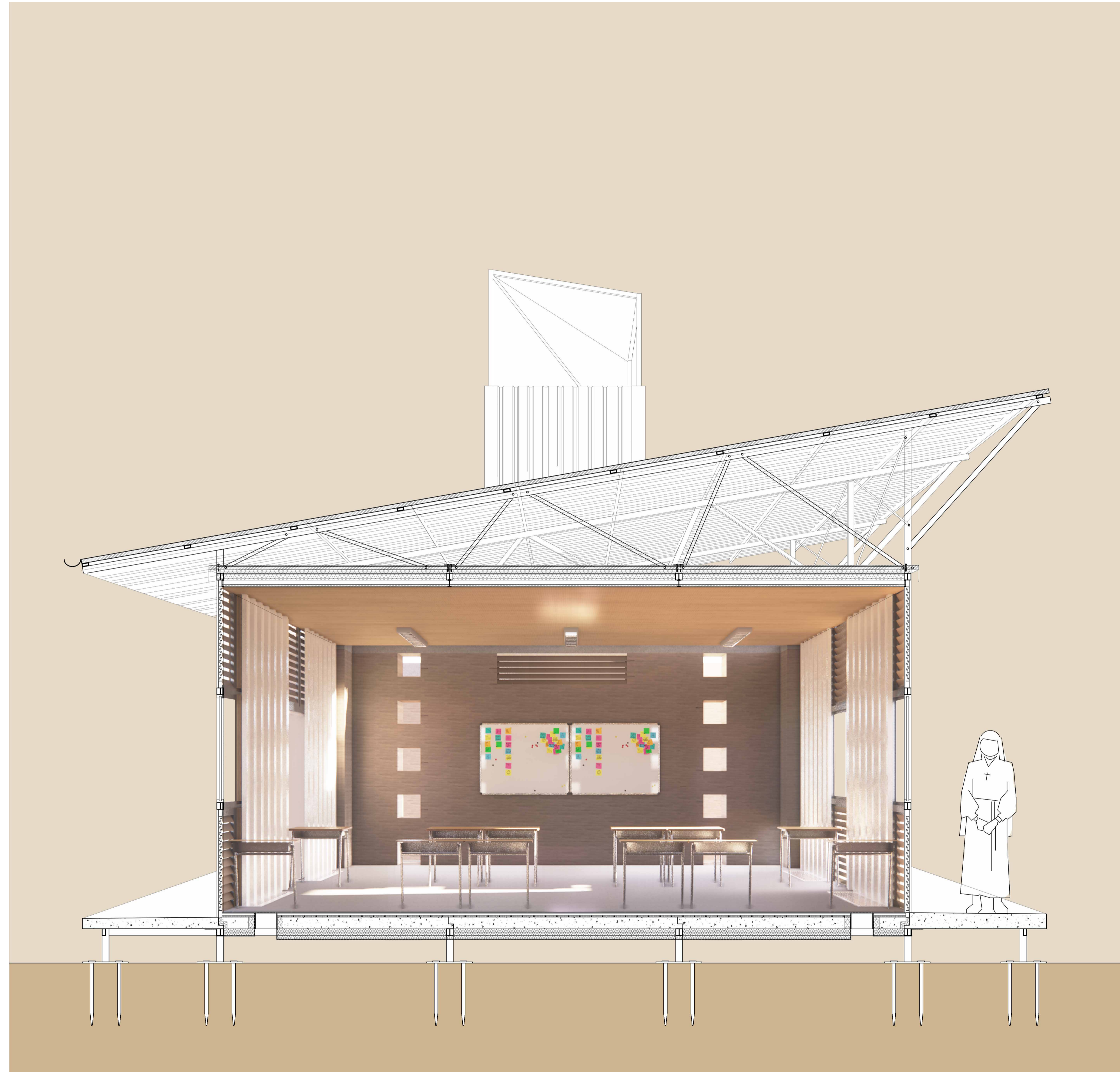


Section A 1: 20



Section 1 1: 20

Module sections

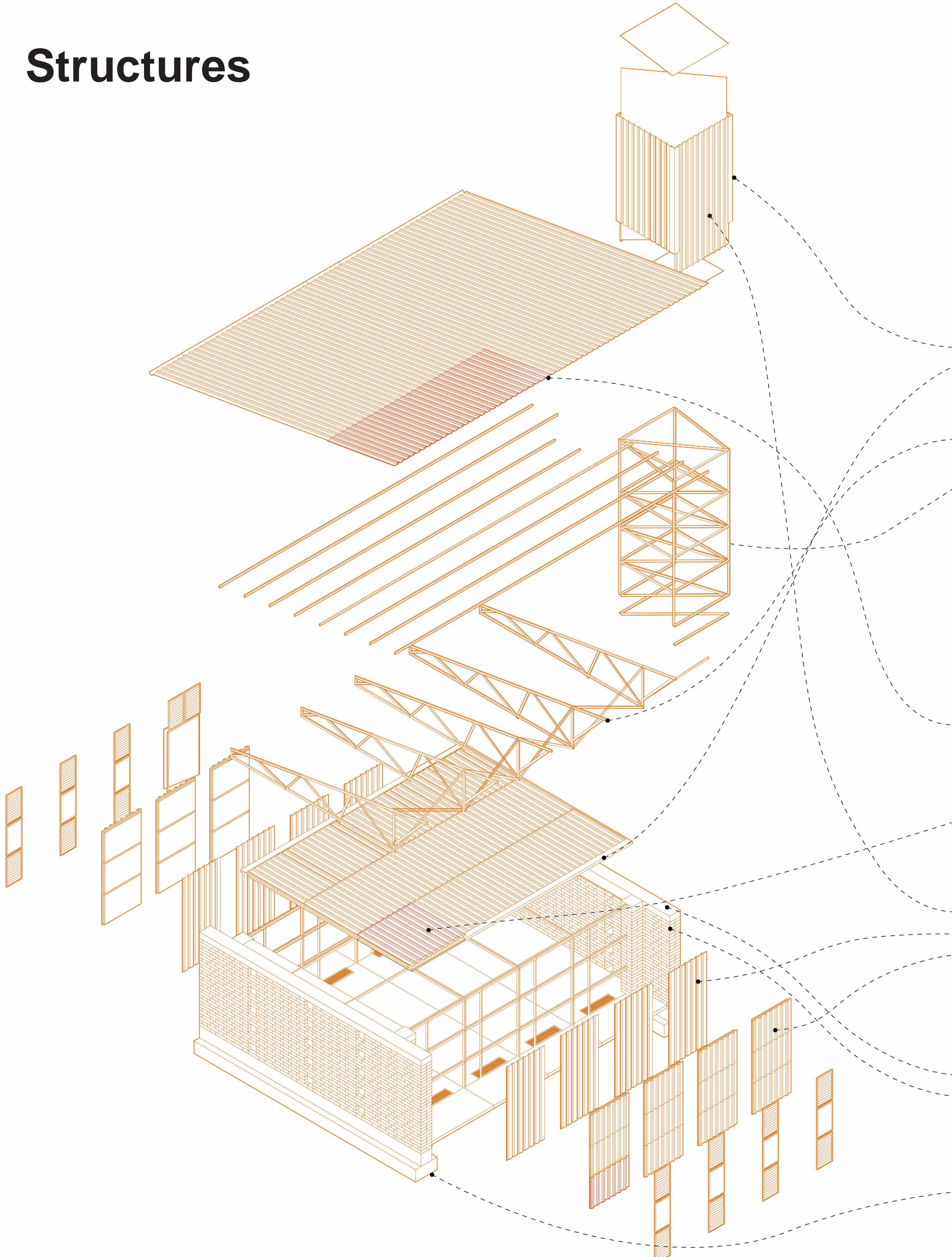


Section B 1: 20

Render



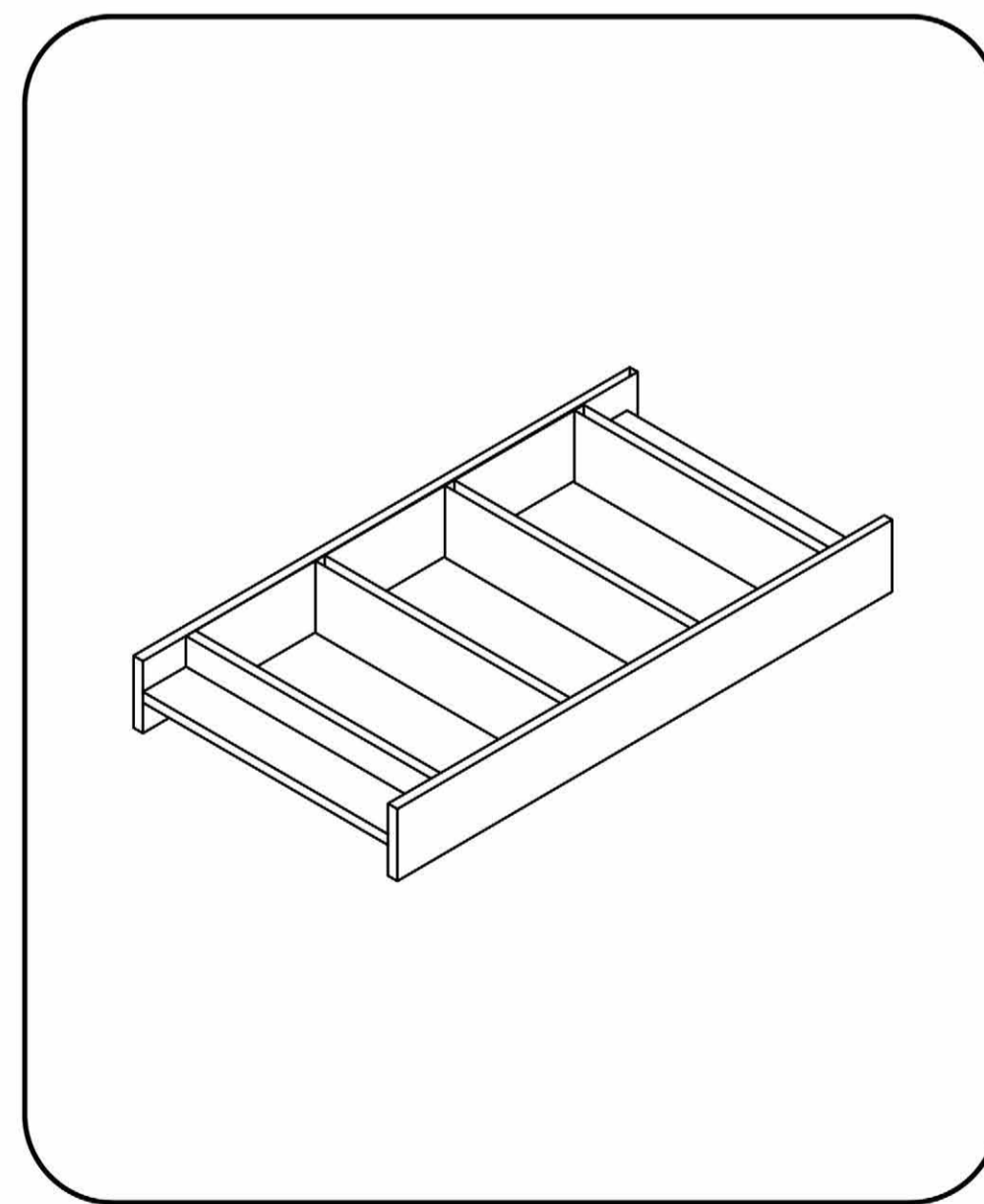
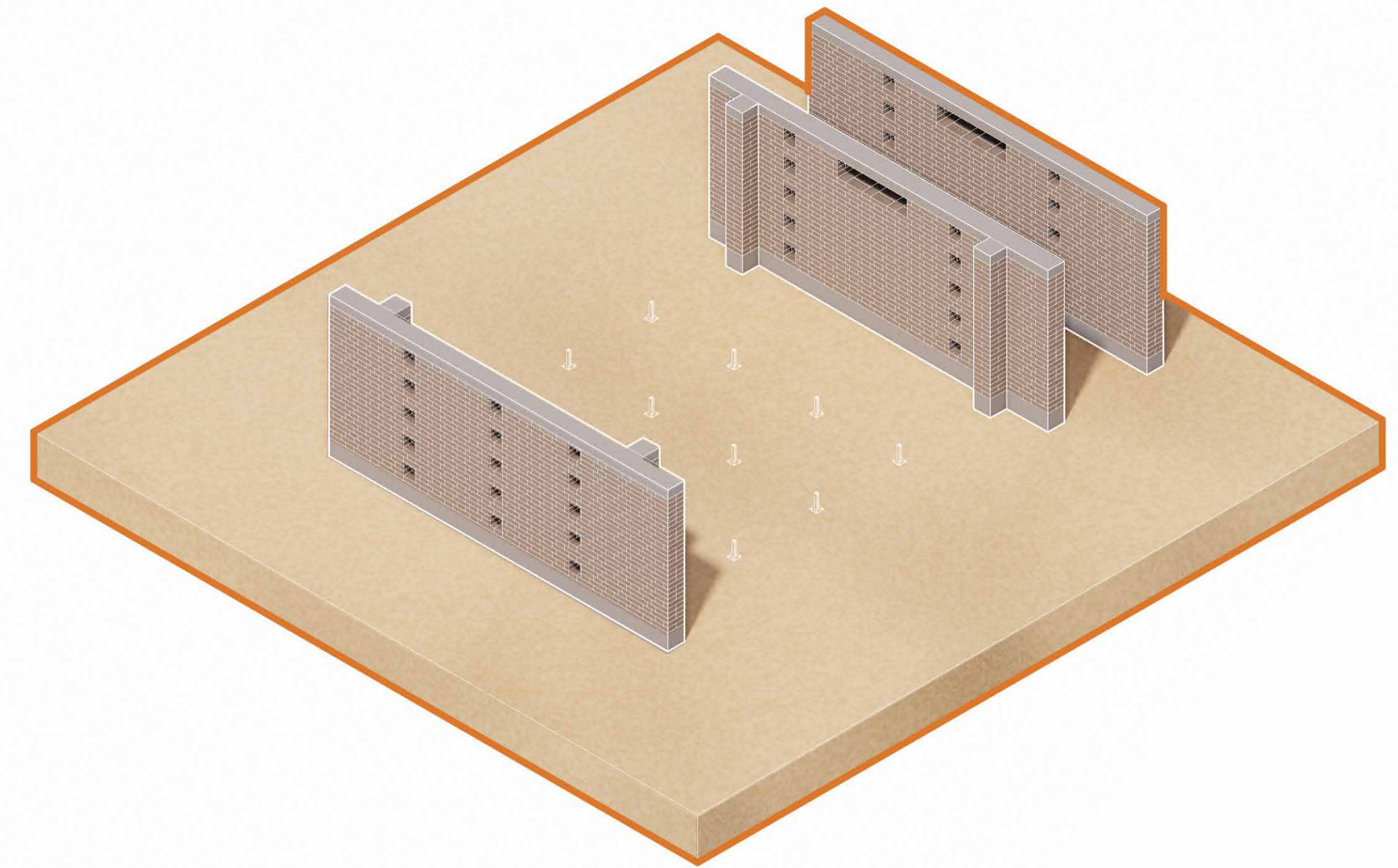
Structures



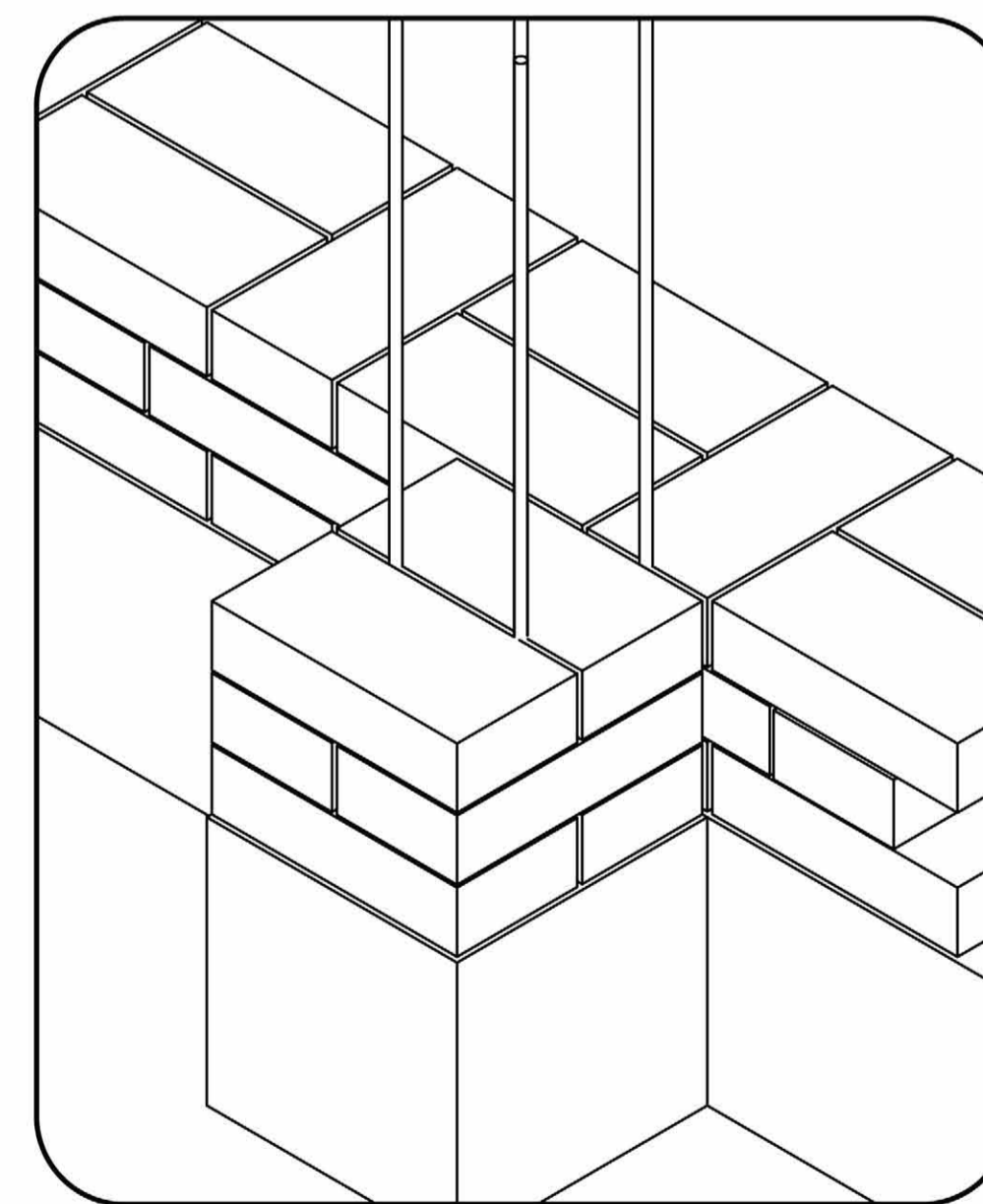
Prefabricated material	Recycled material	Material from local resources	
<p>Operable shutters (x8) (x1)</p>			Shutter
	<p>Rafter & corner flashings (x2) (x4)</p>		Flashing
<p>(x5)</p>	<p>(x1)</p>		Steel structure
	<p>Steel frame components</p>		
	<p>(x8) Shading</p>		Roof
	<p>(x12) Insulated sandwich panel</p>		
<p>(x24) Insulated sandwich panel</p>	<p>(x8) (x2) Aluminum sheets</p>		Nonbearing wall
		<p>(x2) Adobe brick Limestone lintel</p>	Loadbearing wall
	<p>(x18) Steel foundation</p>	<p>(x2) Rubble foundation</p>	Foundation

(mm)

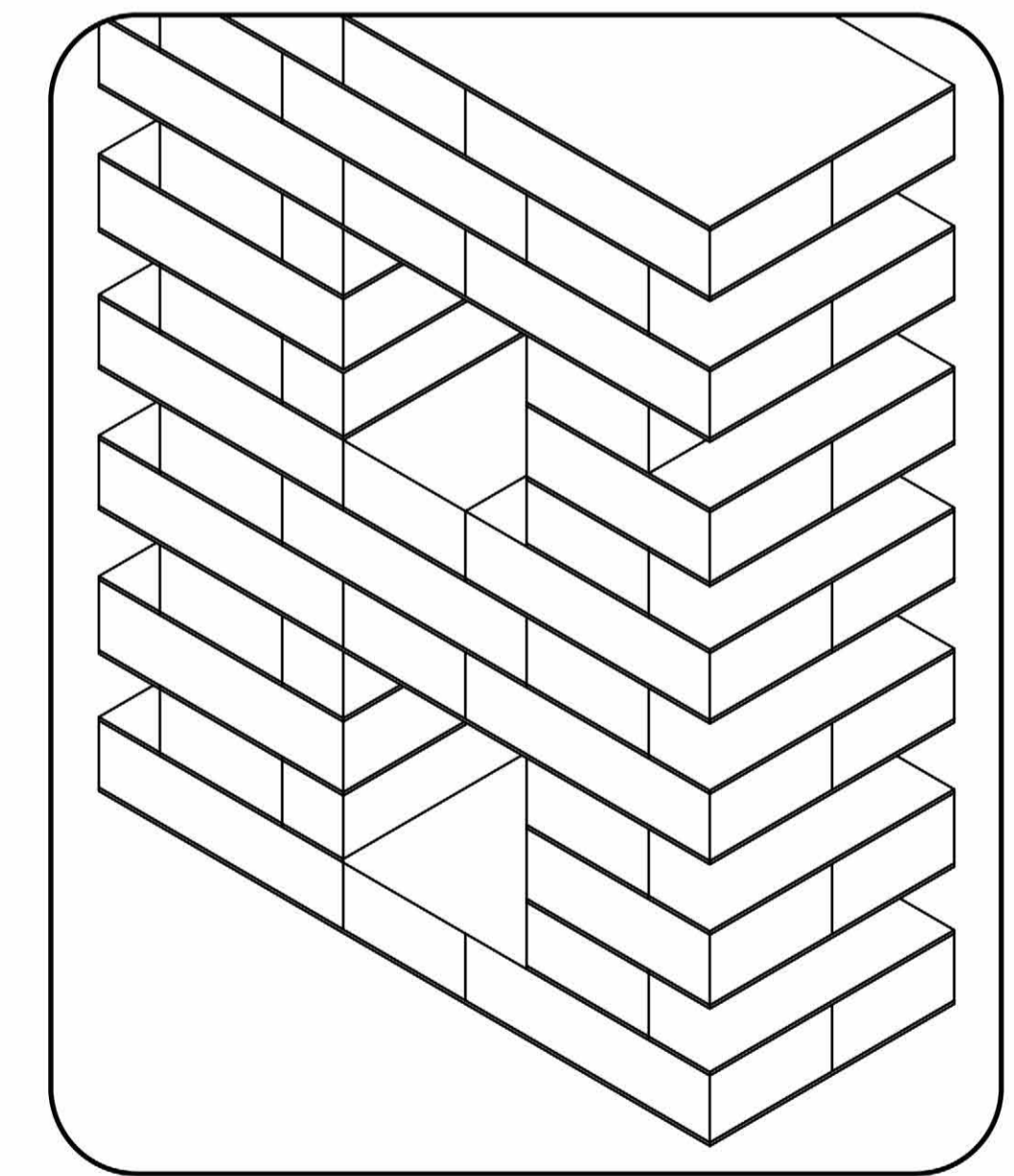
Construction process



Adobe brick making

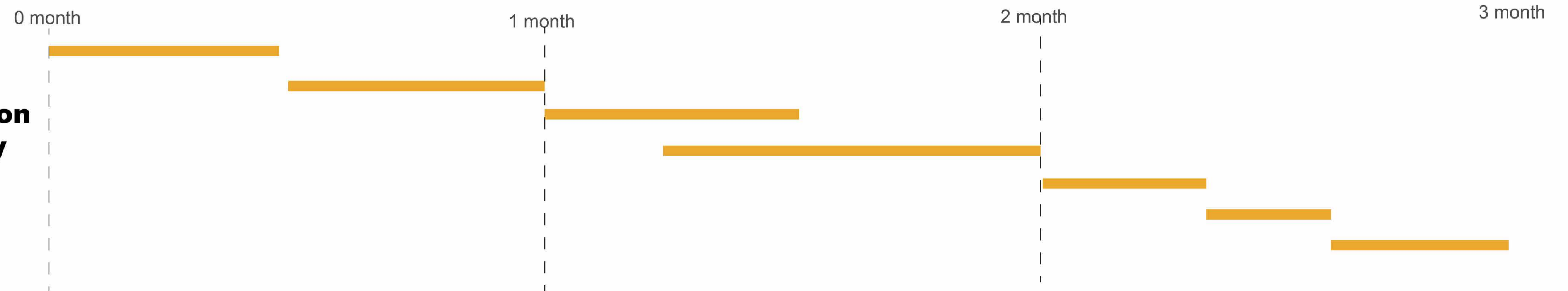


Wall construction

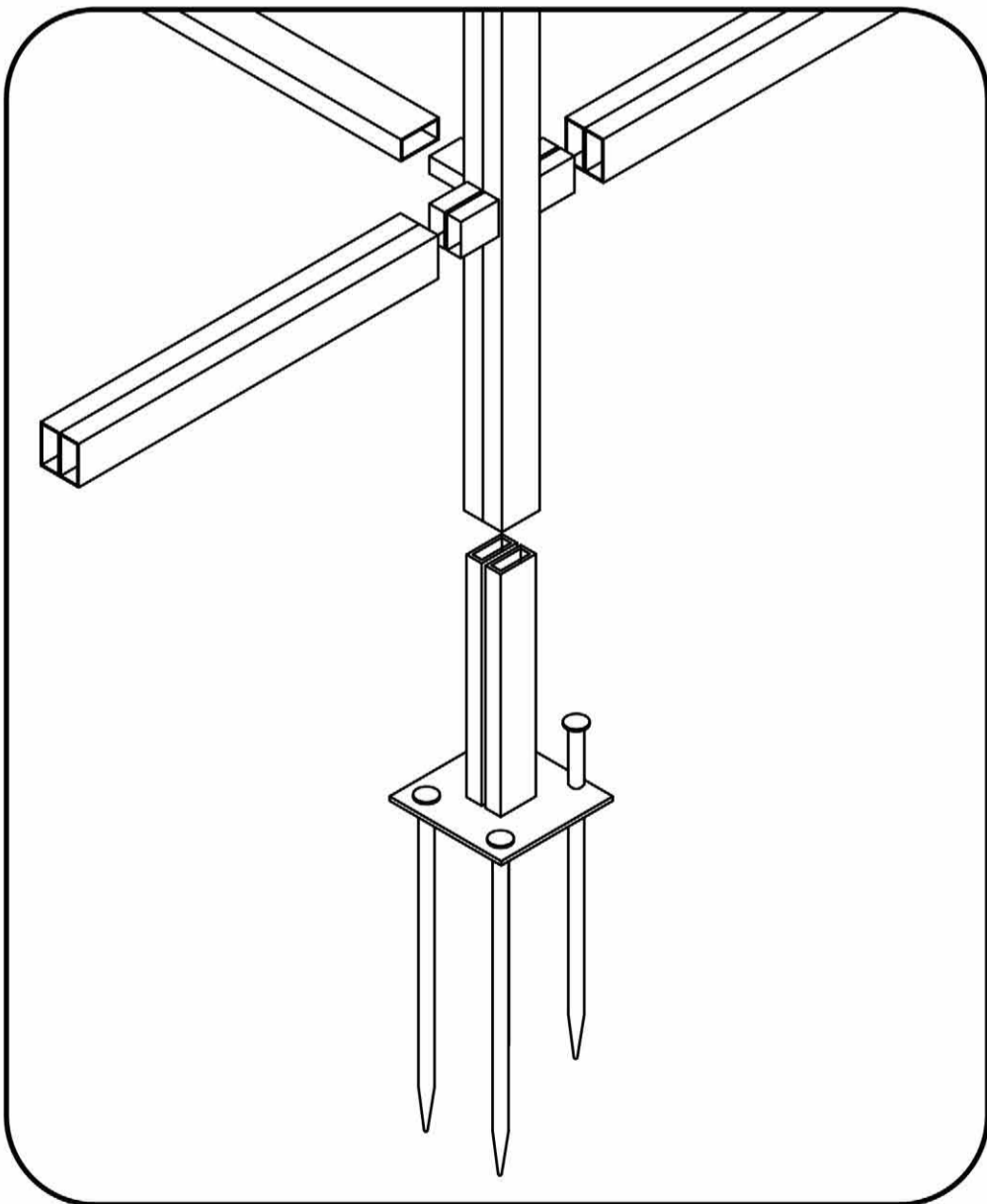
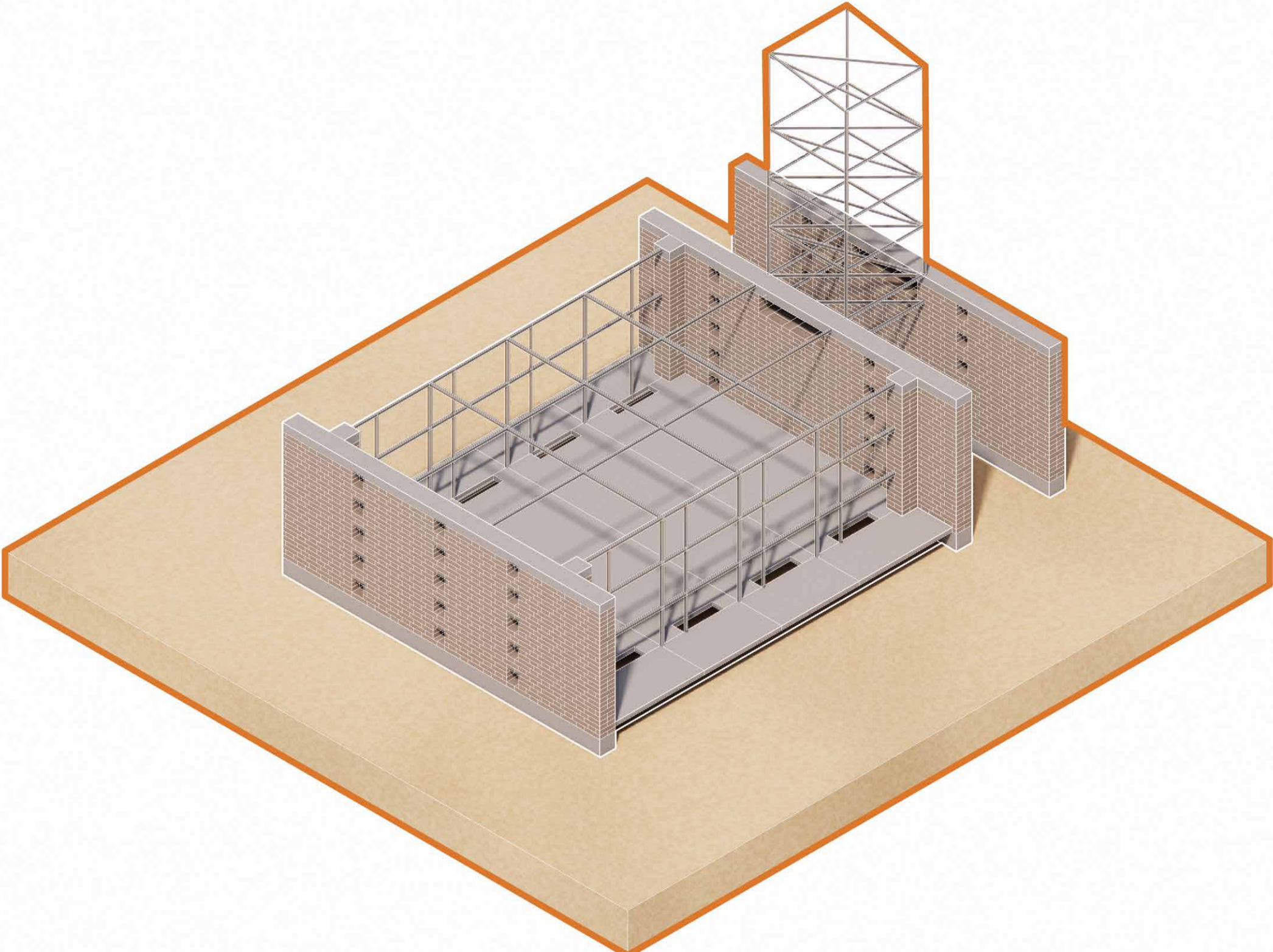
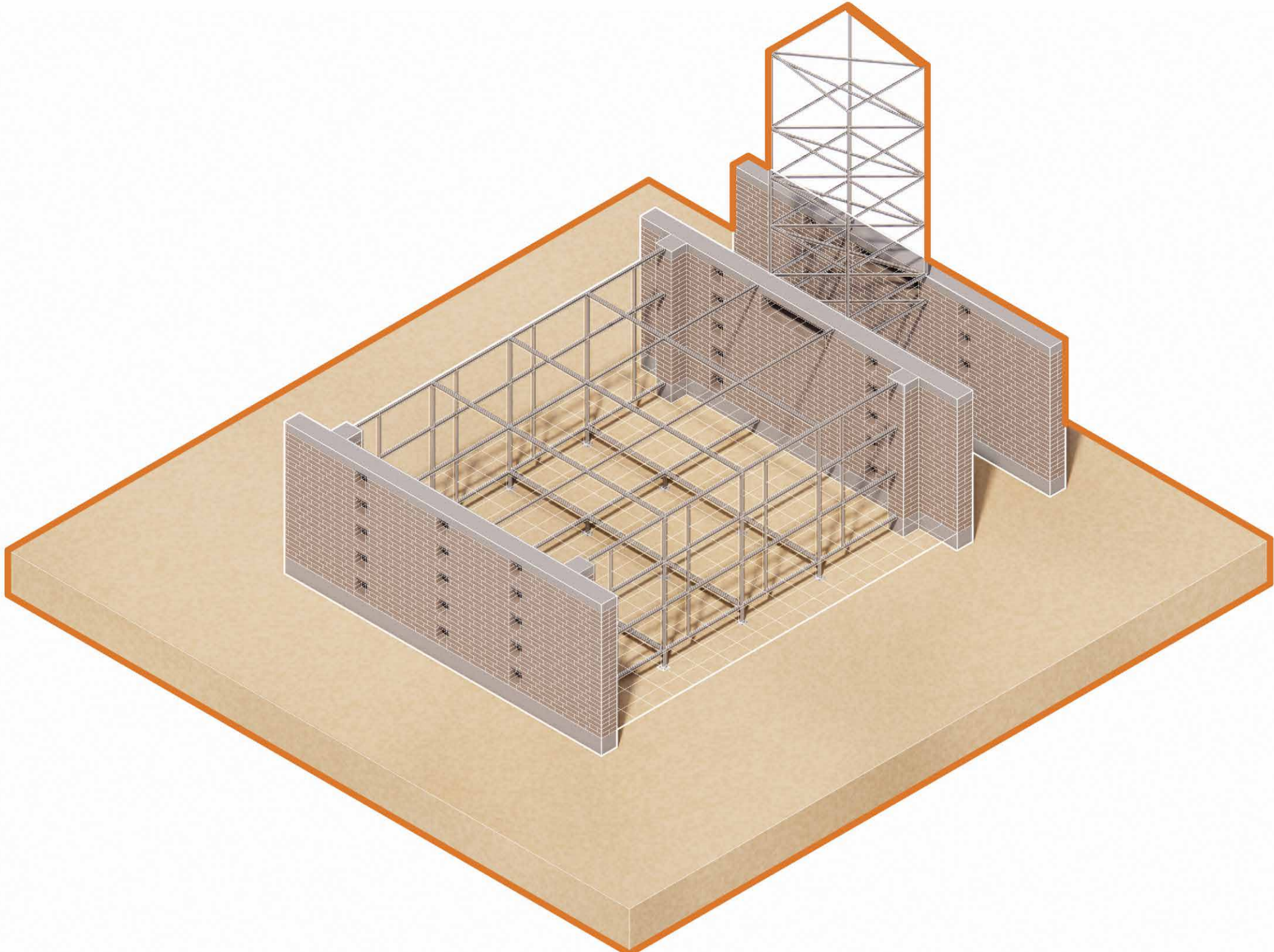


Reserving space for openings

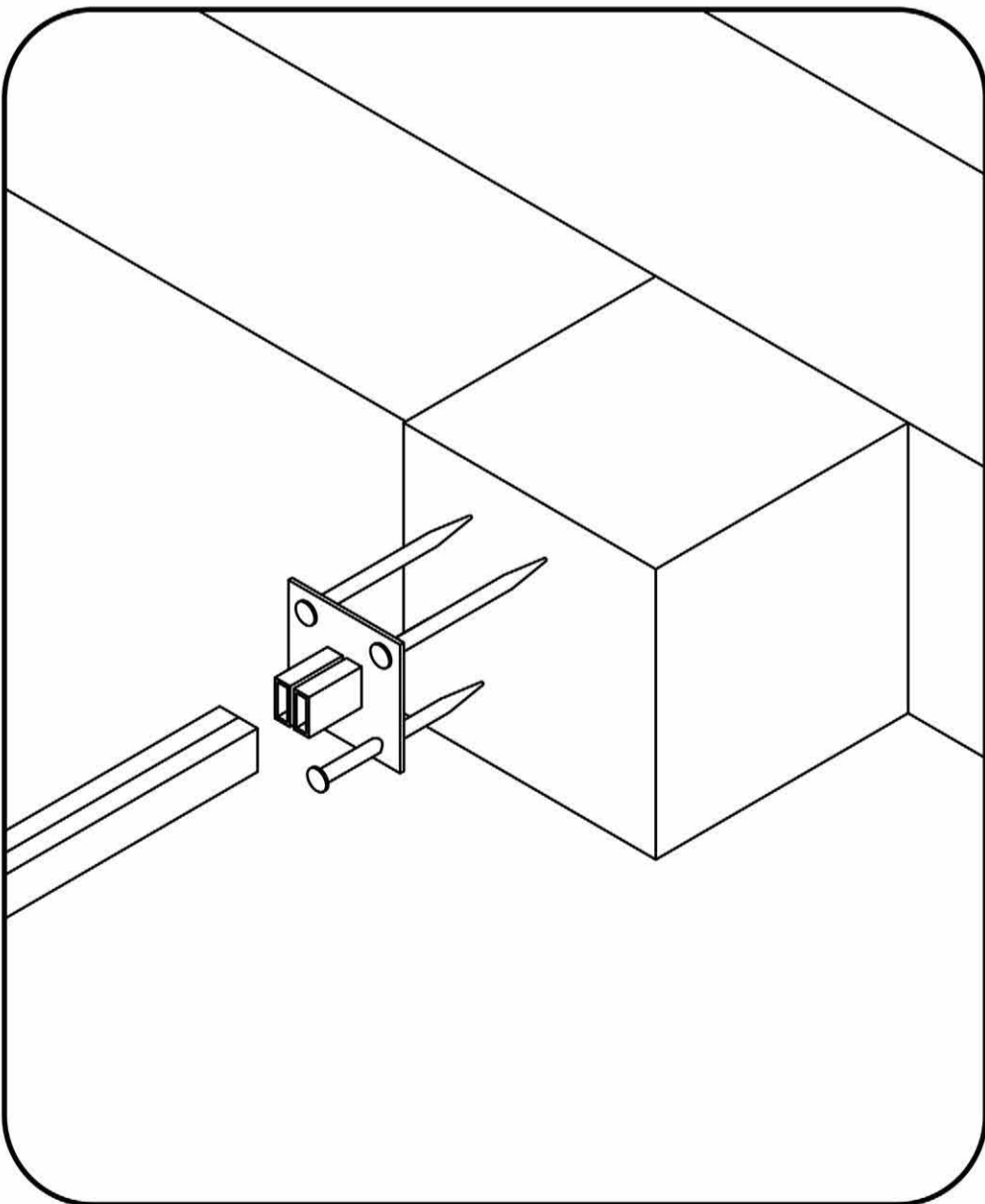
- Stage 0: Brick preparation**
- Stage 1: Foundation**
- Stage 2: Brick wall construction**
- Stage 3: Steel frame assembly**
- Stage 4: Panels**
- Stage 5: Top shading**
- Stage 6: Fitting windows**



Construction process



Joints (foundation to column; column to beams)

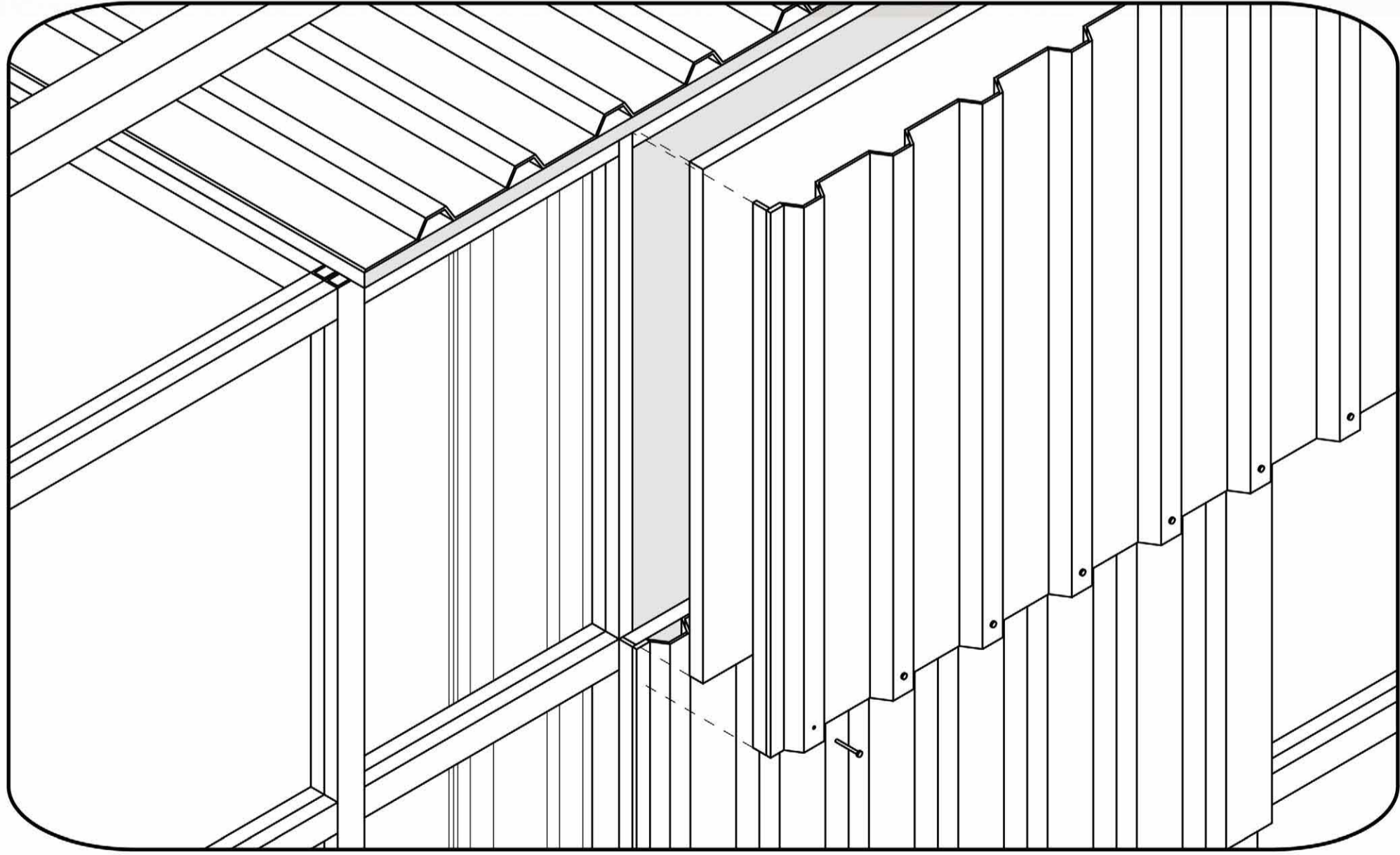
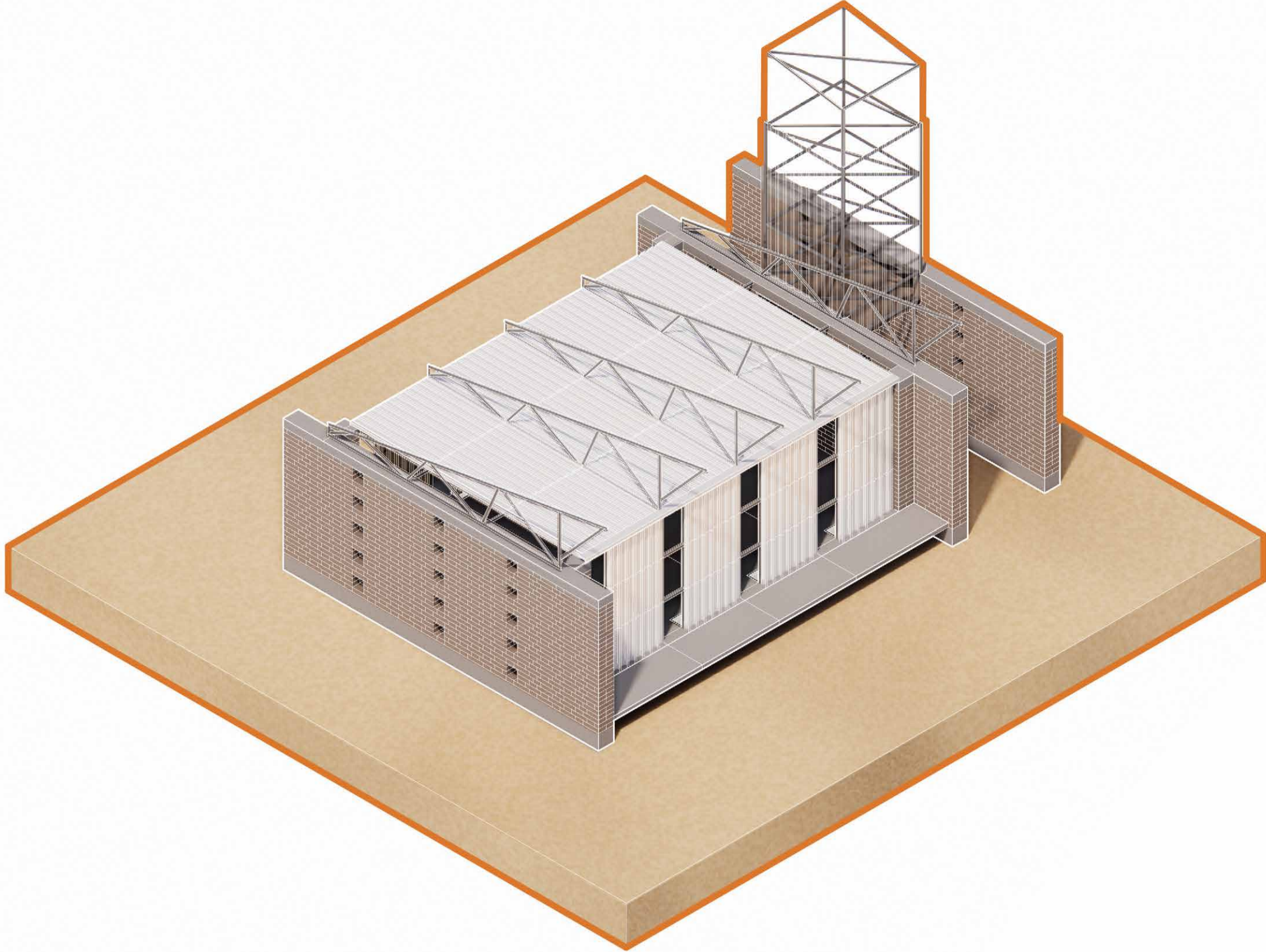
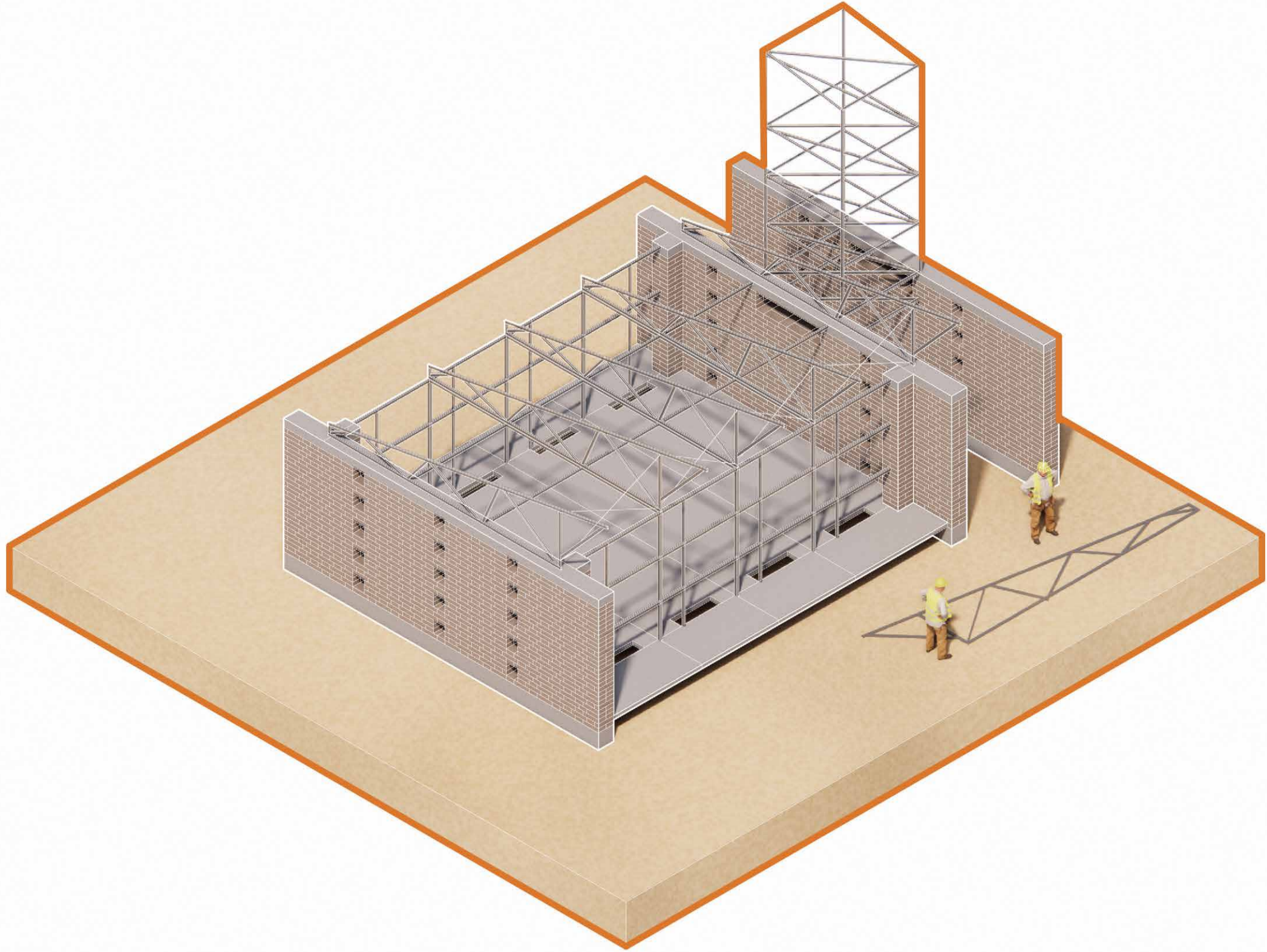


Joints (beams to loadbearing walls)

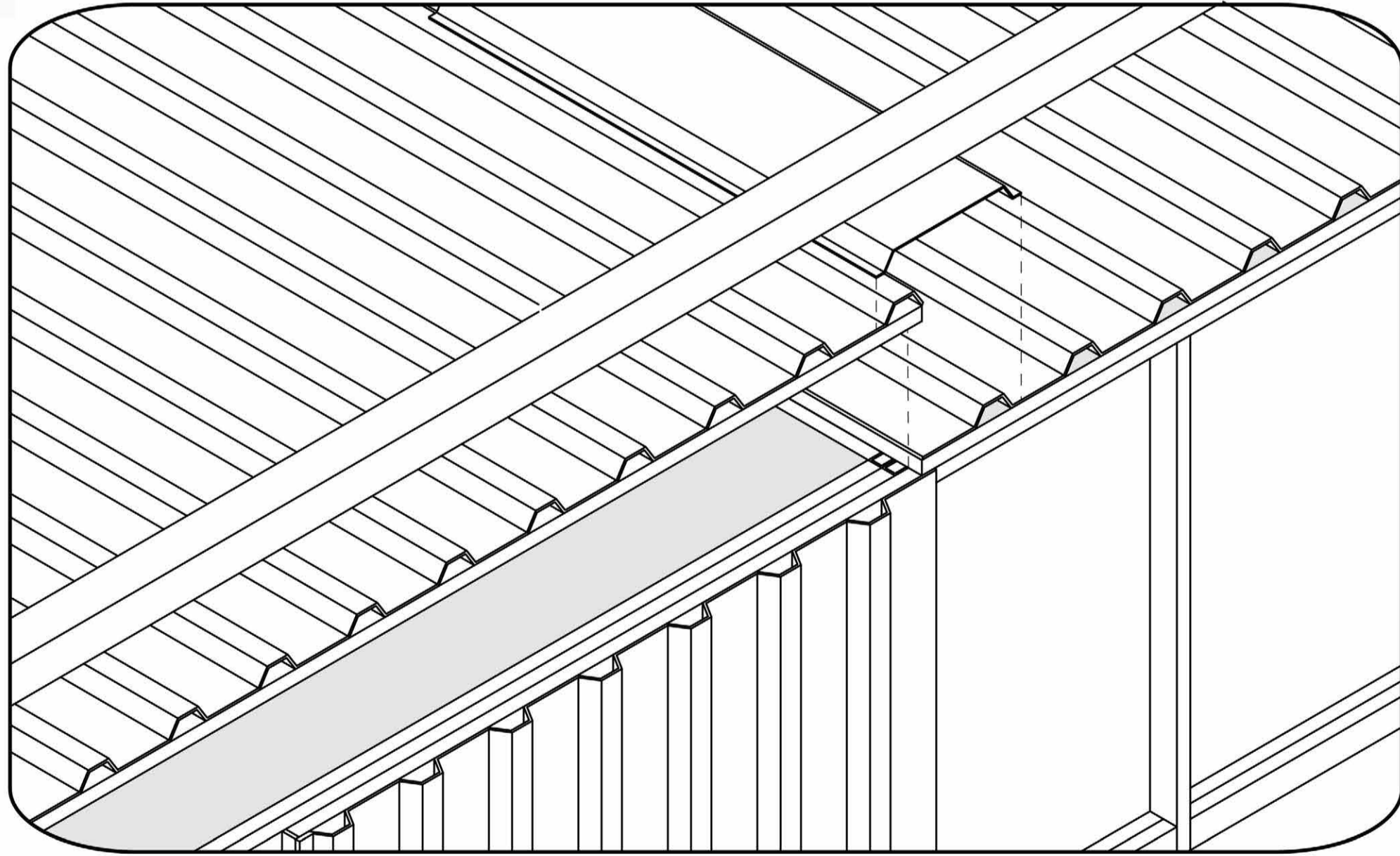
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Construction process



Assembling sandwich facade panels (continuous insulation layer)

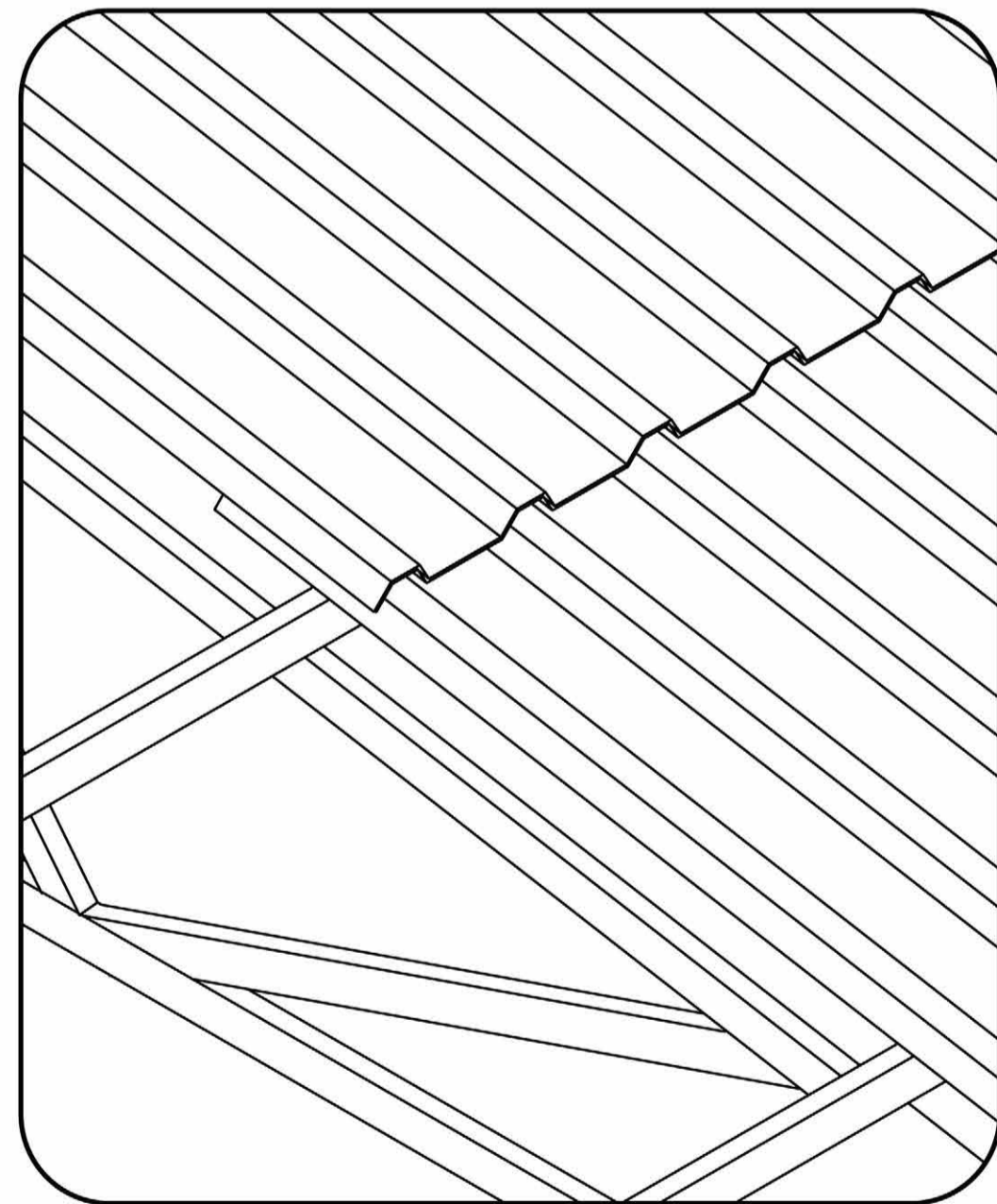
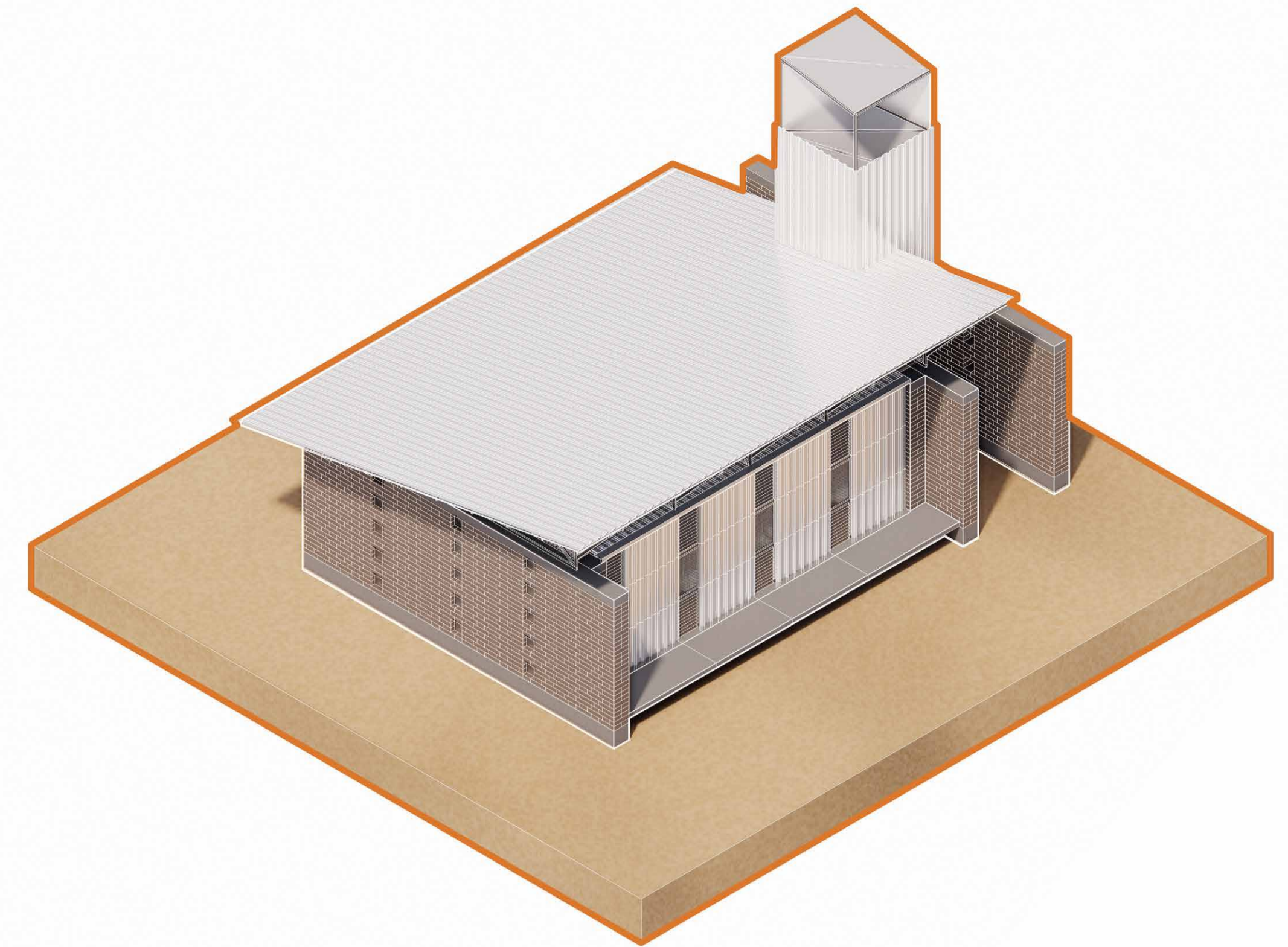
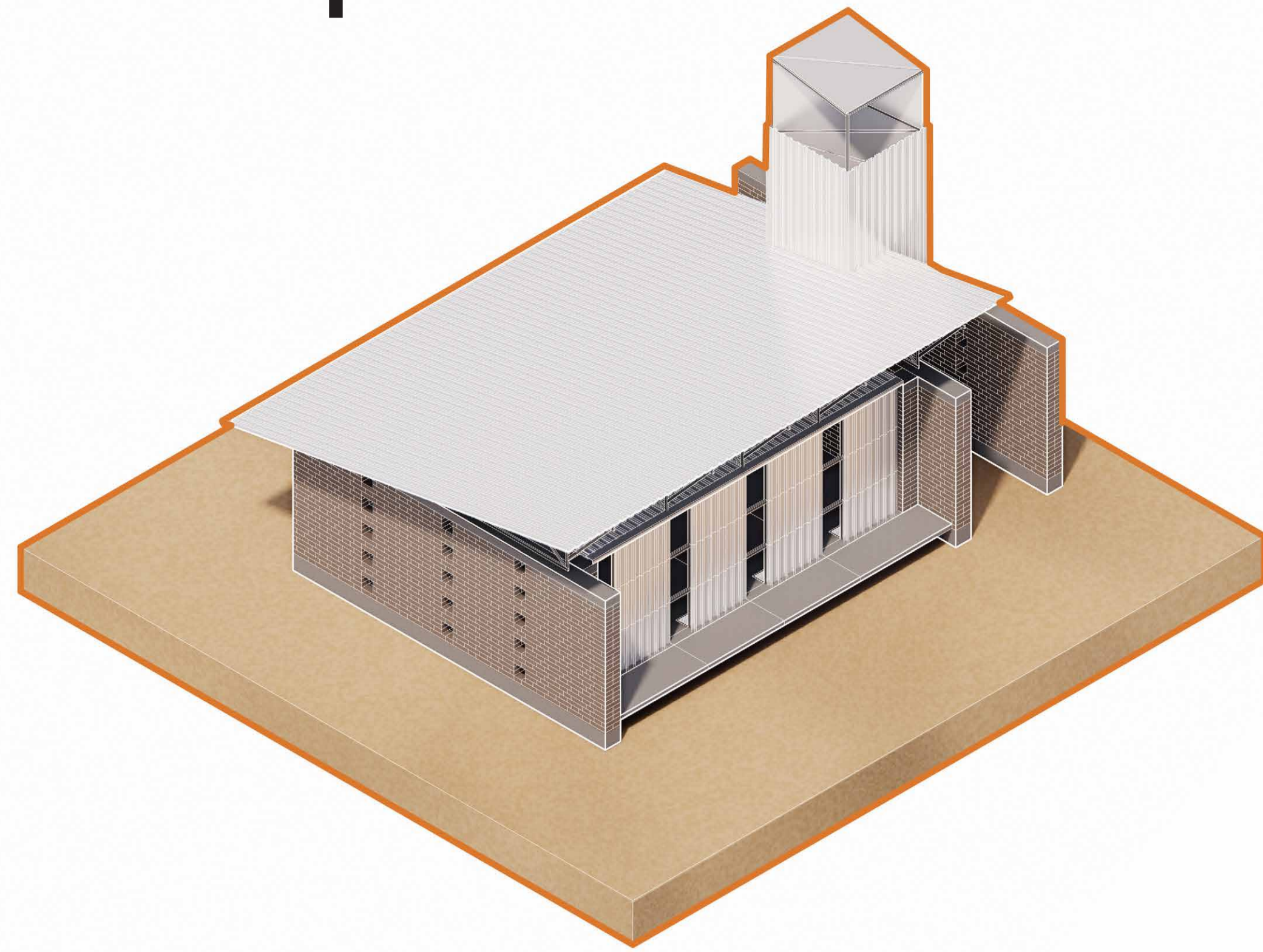


Assembling sandwich roof panels (continuous insulation layer)

- Stage 0: Brick preparation**
- Stage 1: Foundation**
- Stage 2: Brick wall construction**
- Stage 3: Steel frame assembly**
- Stage 4: Panels**
- Stage 5: Top shading**
- Stage 6: Fitting windows**



Construction process



Assembling top shading (stacked to ensure waterproof)

- Stage 0: Brick preparation**
- Stage 1: Foundation**
- Stage 2: Brick wall construction**
- Stage 3: Steel frame assembly**
- Stage 4: Panels**
- Stage 5: Top shading**
- Stage 6: Fitting windows**



Construction process

The whole construction process of the project is divided into three phases in order to put it into use as soon as possible.



0 month

3 month

5 month

8 month

Phase 1: Sanitation facilities

The first phase is constructing the sanitation facilities to respond to the urgent need of women and children for more toilets and bathrooms.

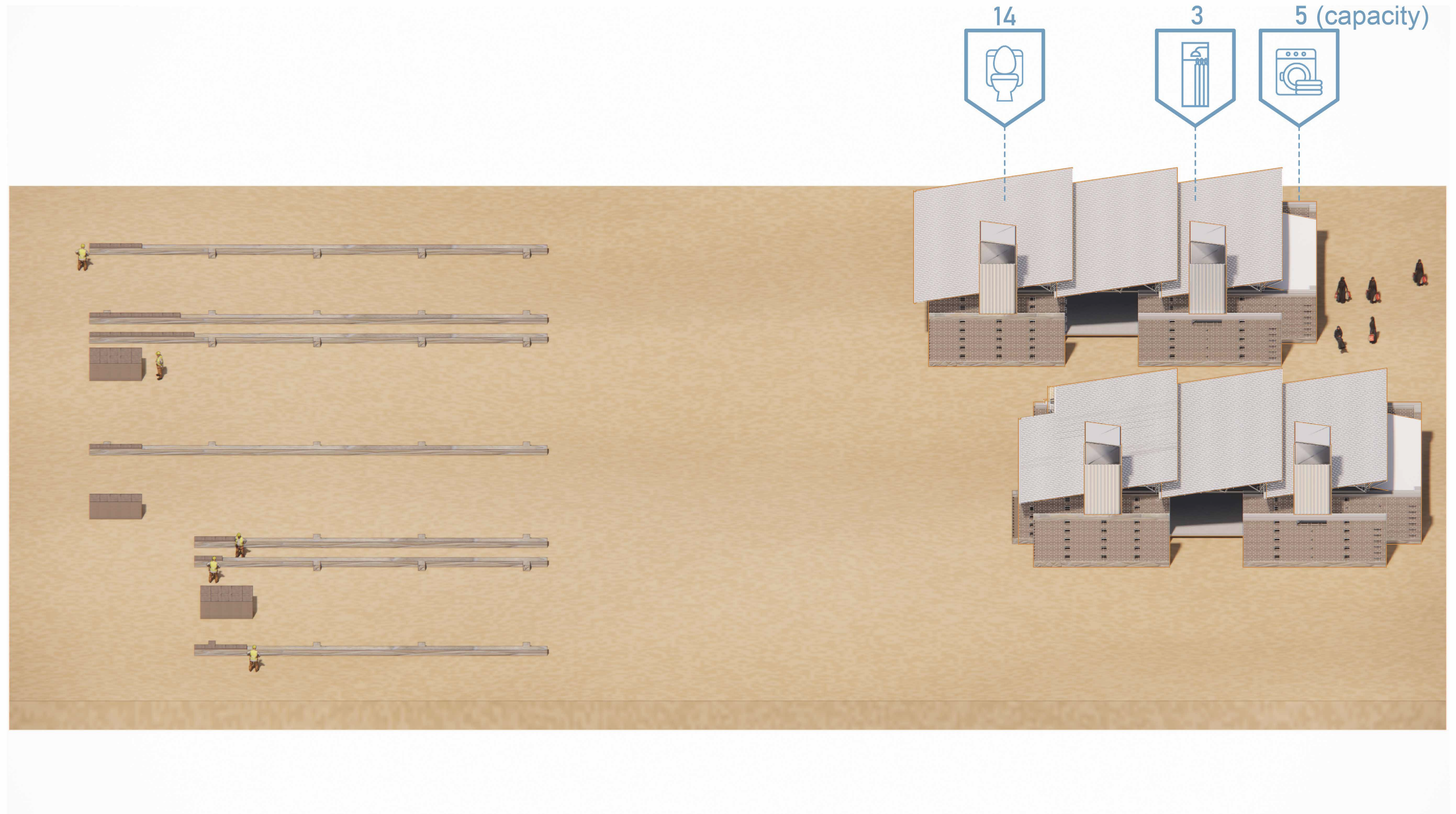
Phase 2: Cultural space

Cultural space (including one hall; one library and a canteen) is constructed during the second phase. The pre-school classroom and the office in design are used as primary school classrooms temporarily.

Phase 3: Teaching space

Teaching space is constructed during the final phase. After the complete construction, the project will be put into use as a primary school and as well as public service space.

Construction process



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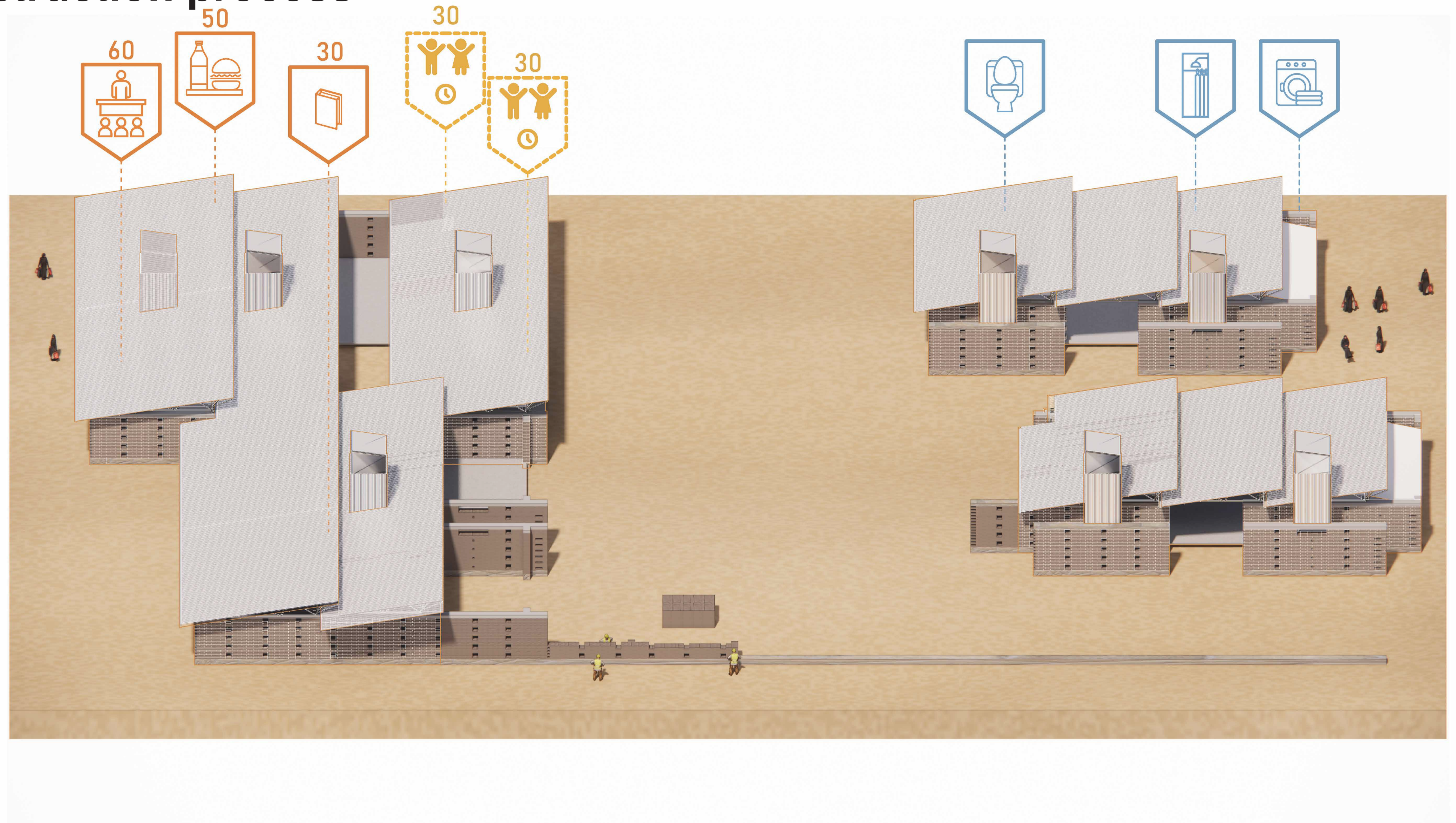
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Construction process



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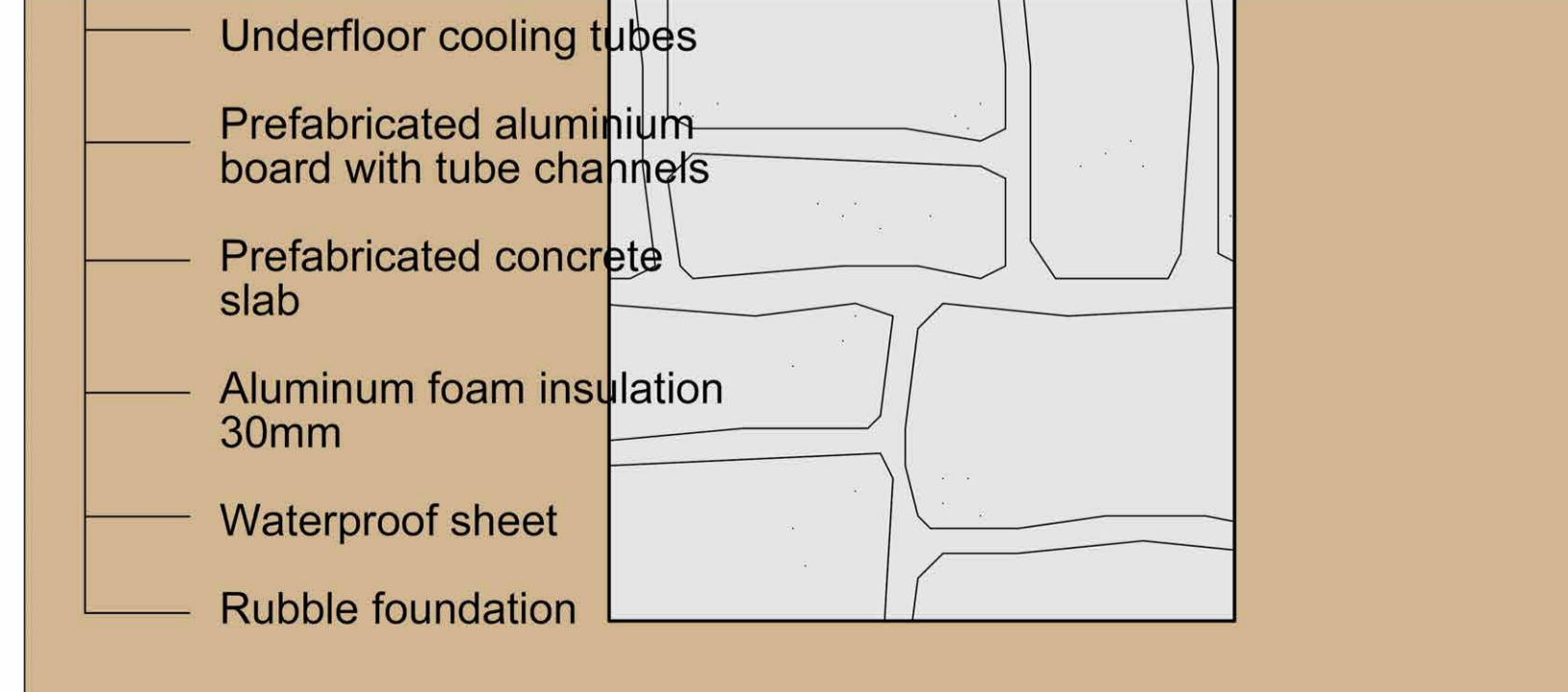
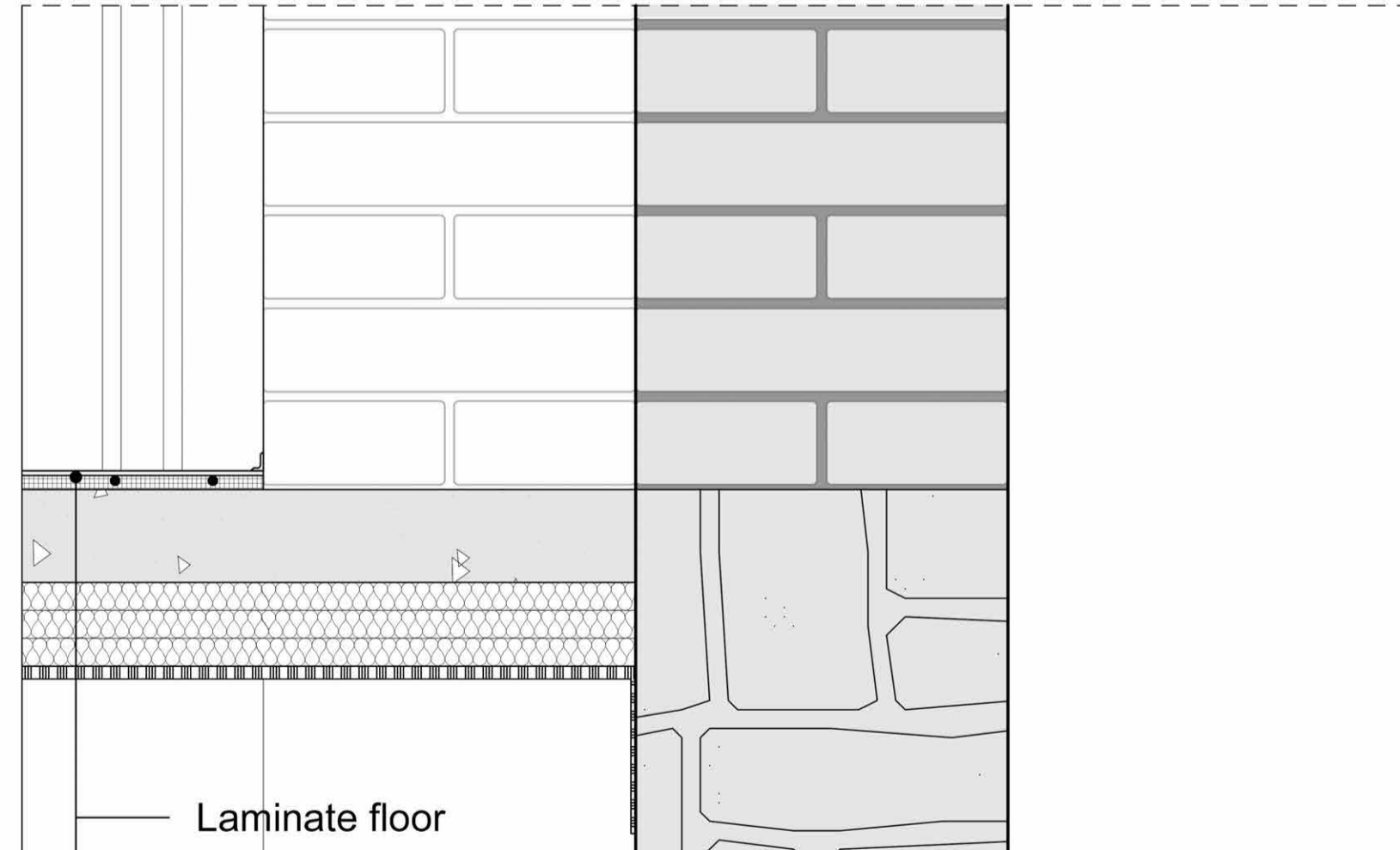
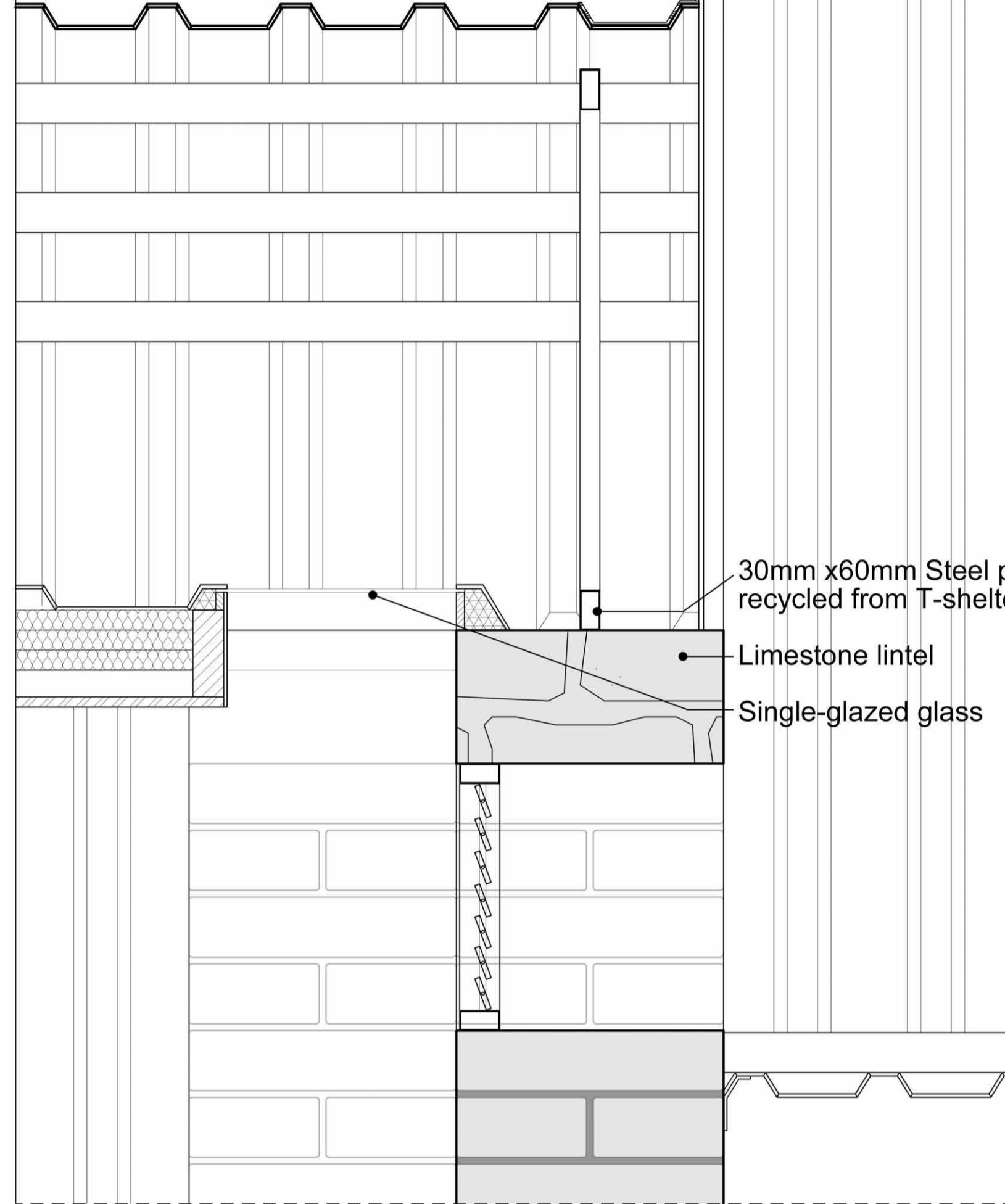
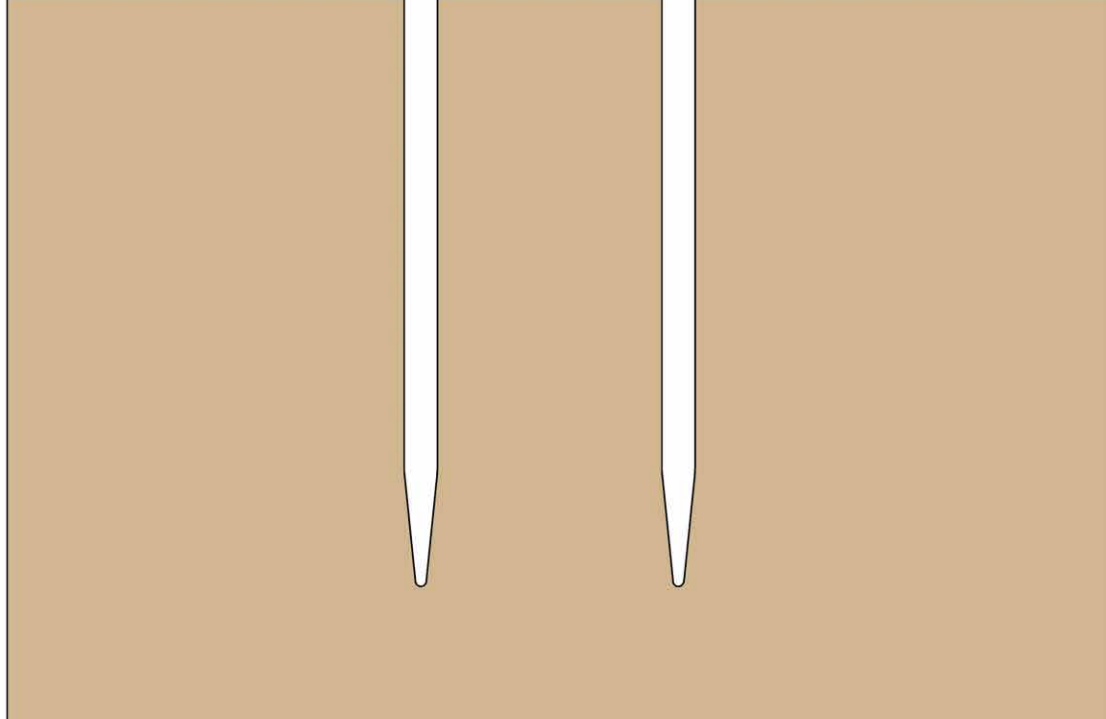
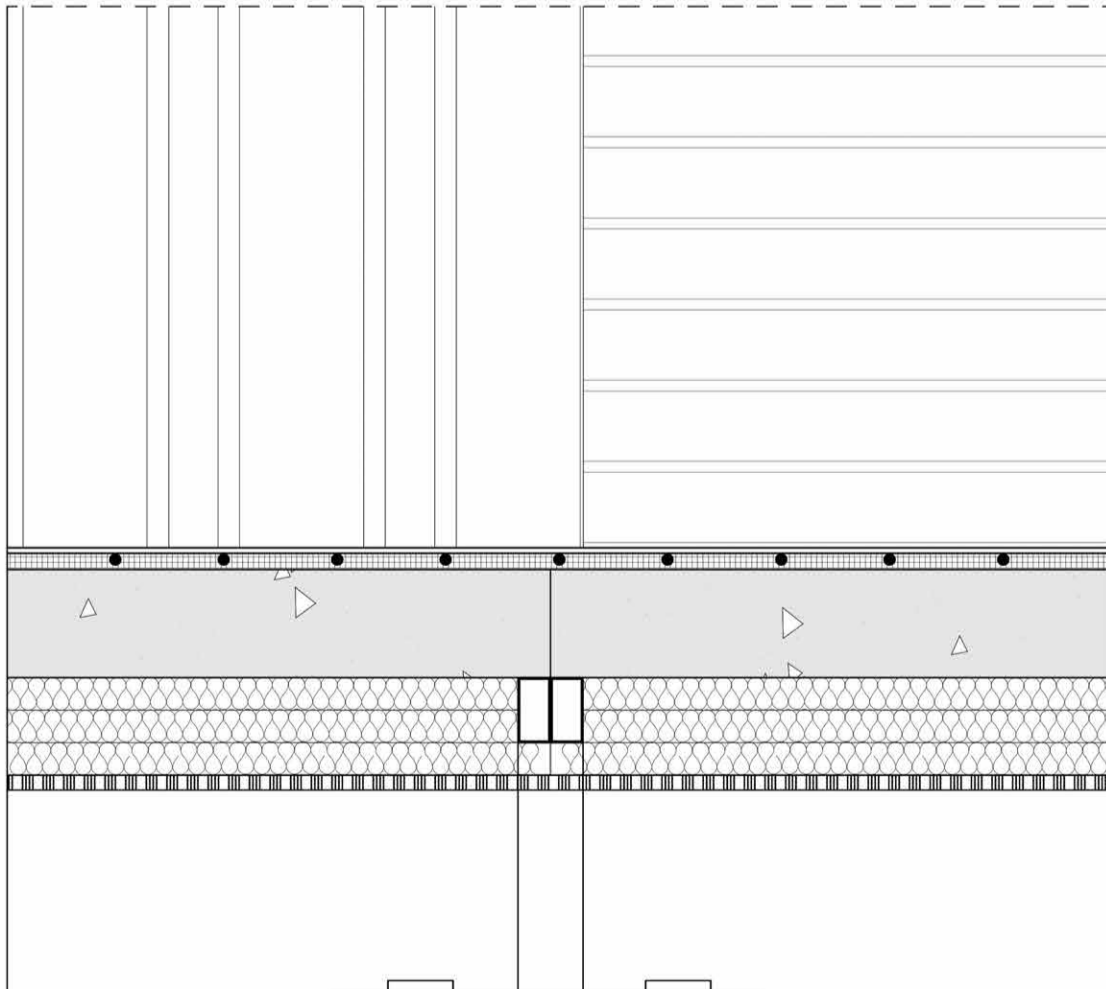
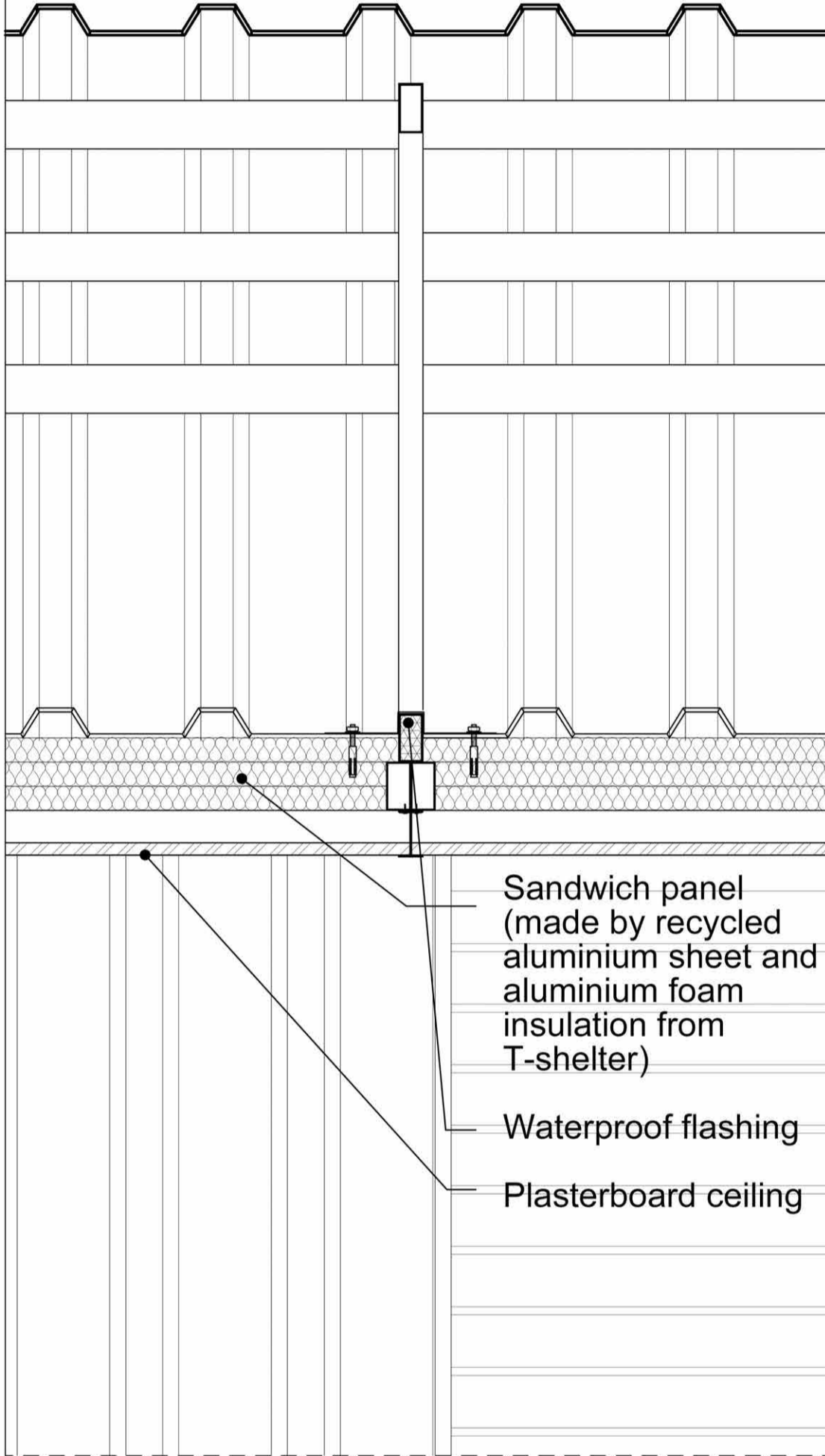
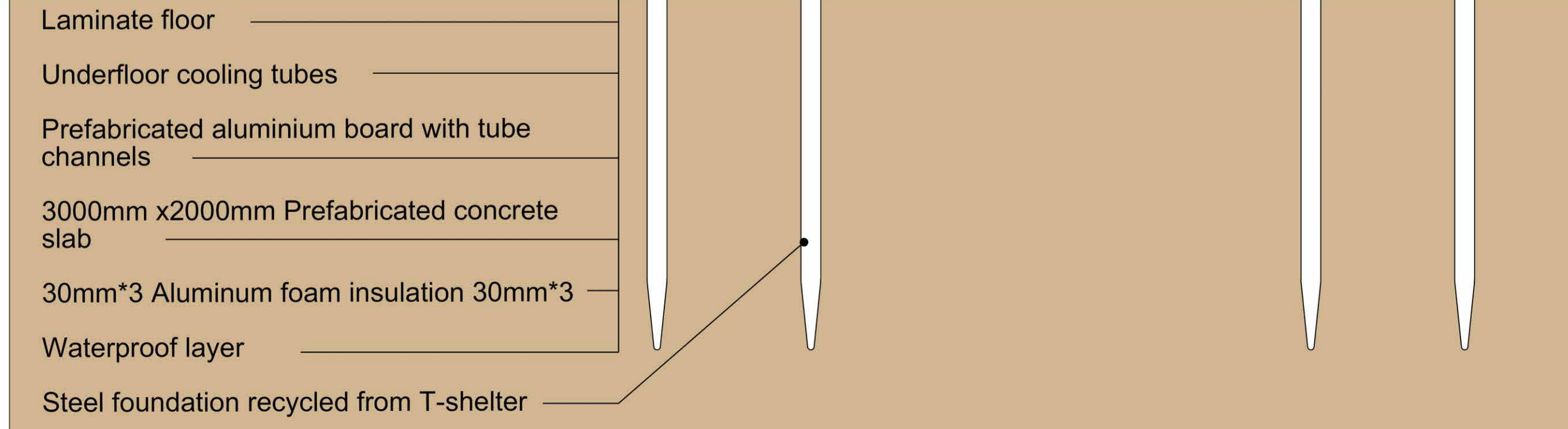
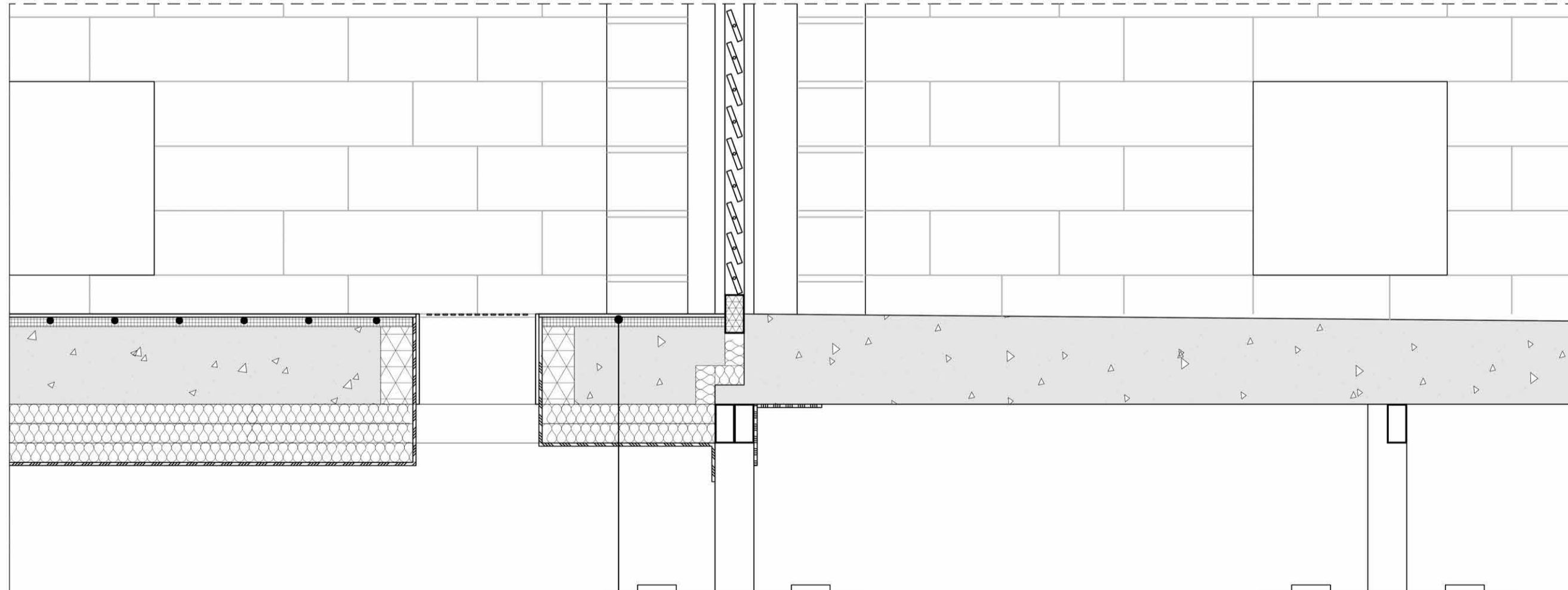
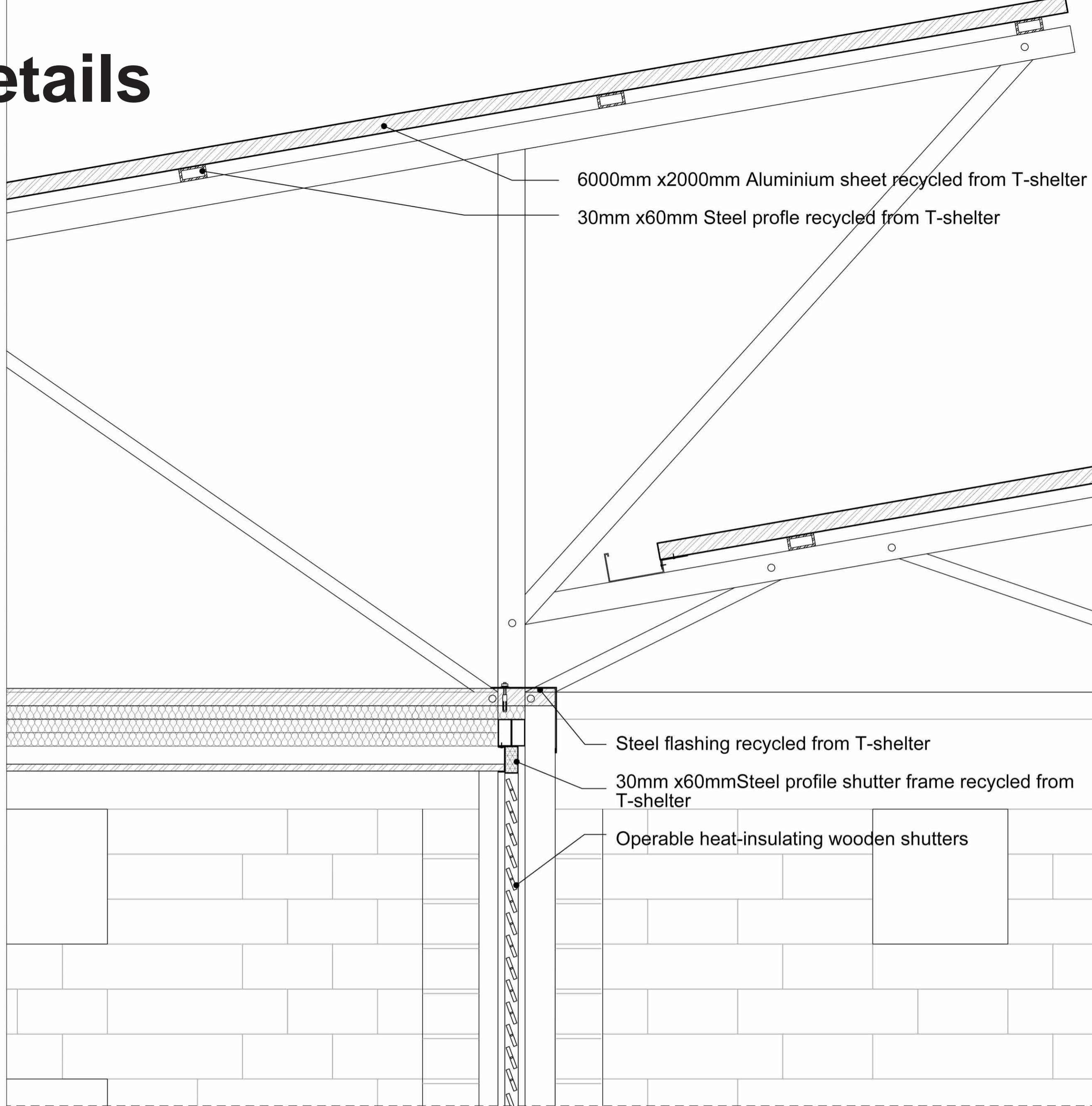
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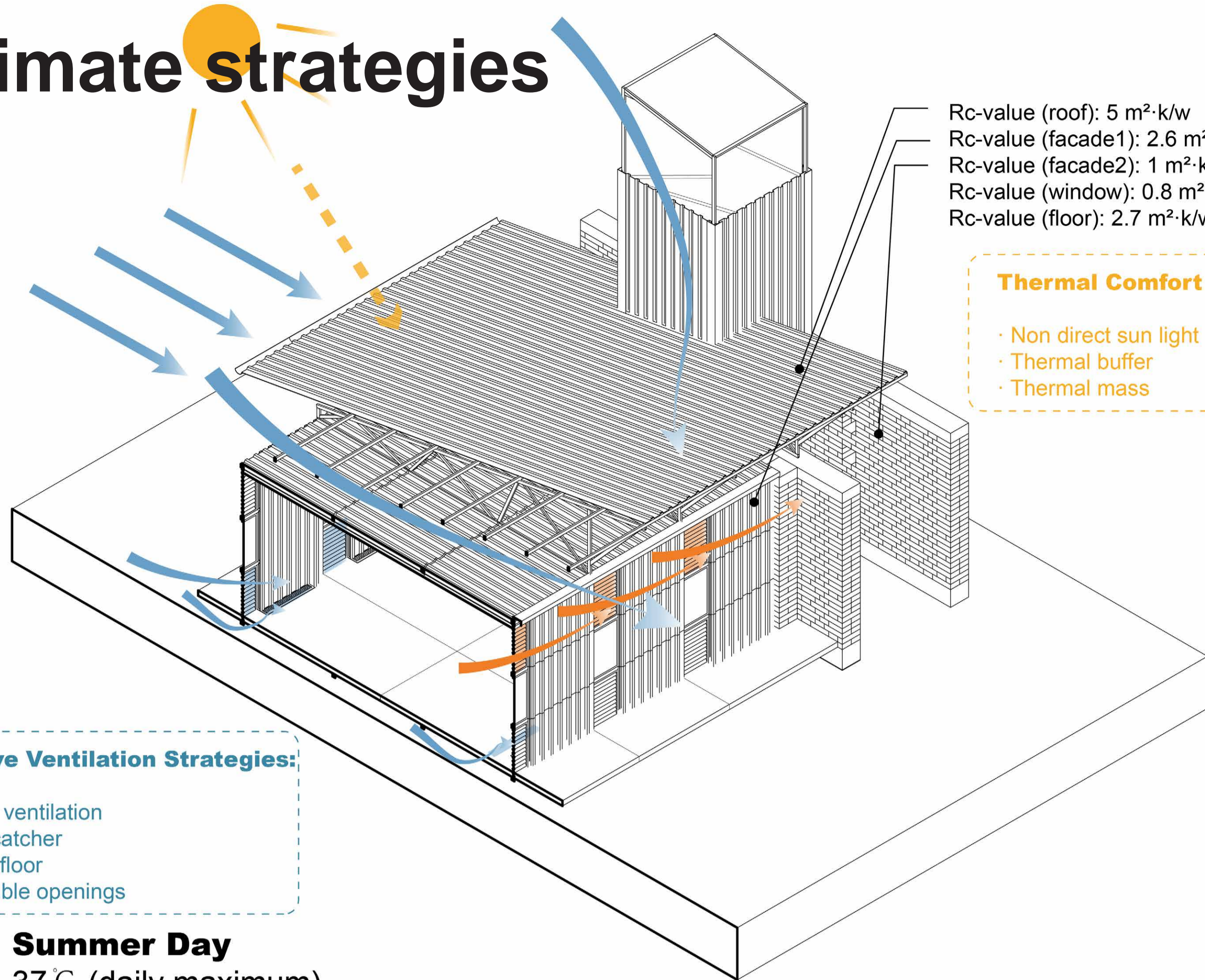
Teaching space is constructed during the final phase. After the complete construction, the project will be put into use as a primary school and as well as public service space.

Details

1:5



Climate strategies



Rc-value (roof): 5 m²·k/w
 Rc-value (facade1): 2.6 m²·k/w
 Rc-value (facade2): 1 m²·k/w
 Rc-value (window): 0.8 m²·k/w
 Rc-value (floor): 2.7 m²·k/w

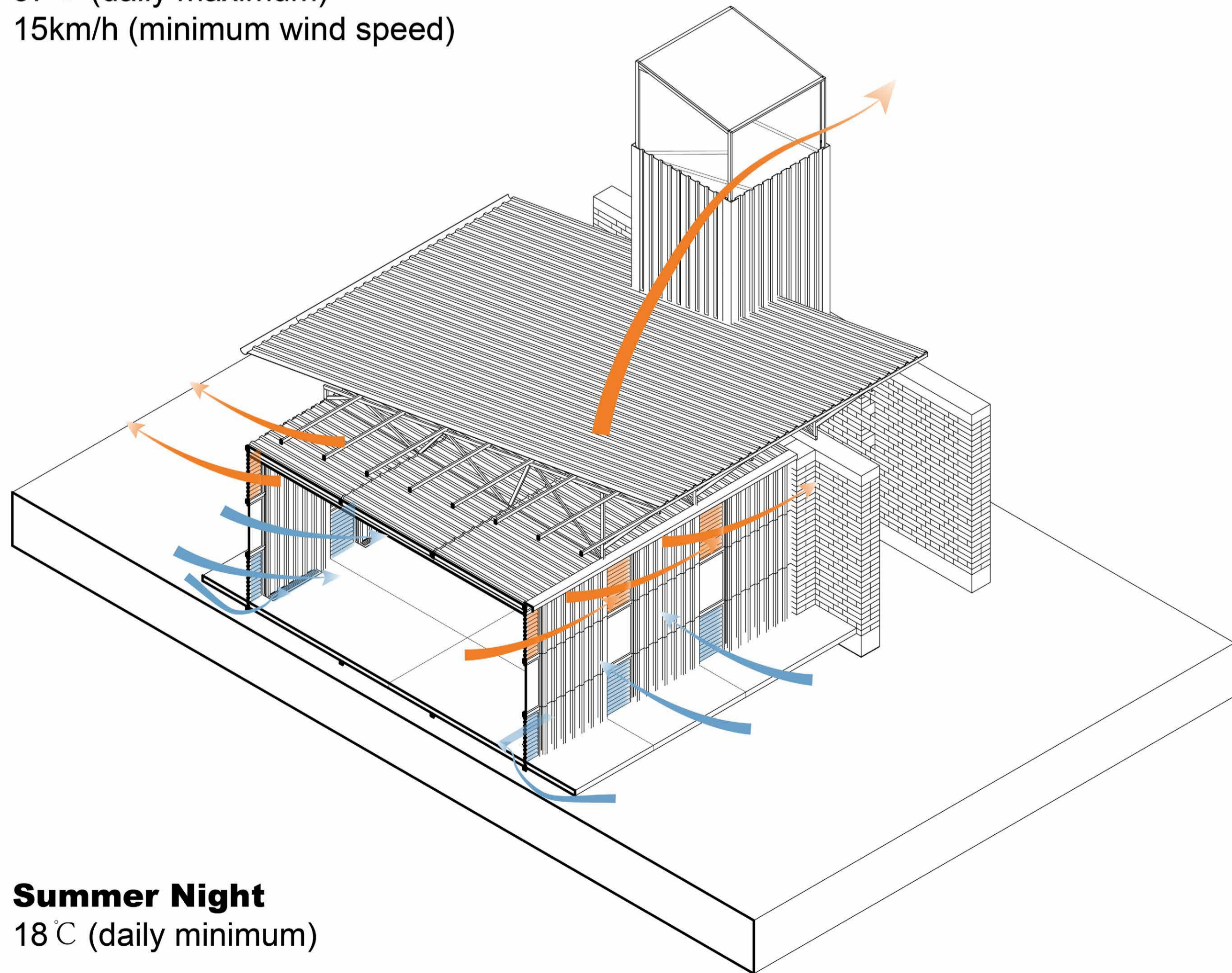
Thermal Comfort Strategies:

- Non direct sun light
- Thermal buffer
- Thermal mass

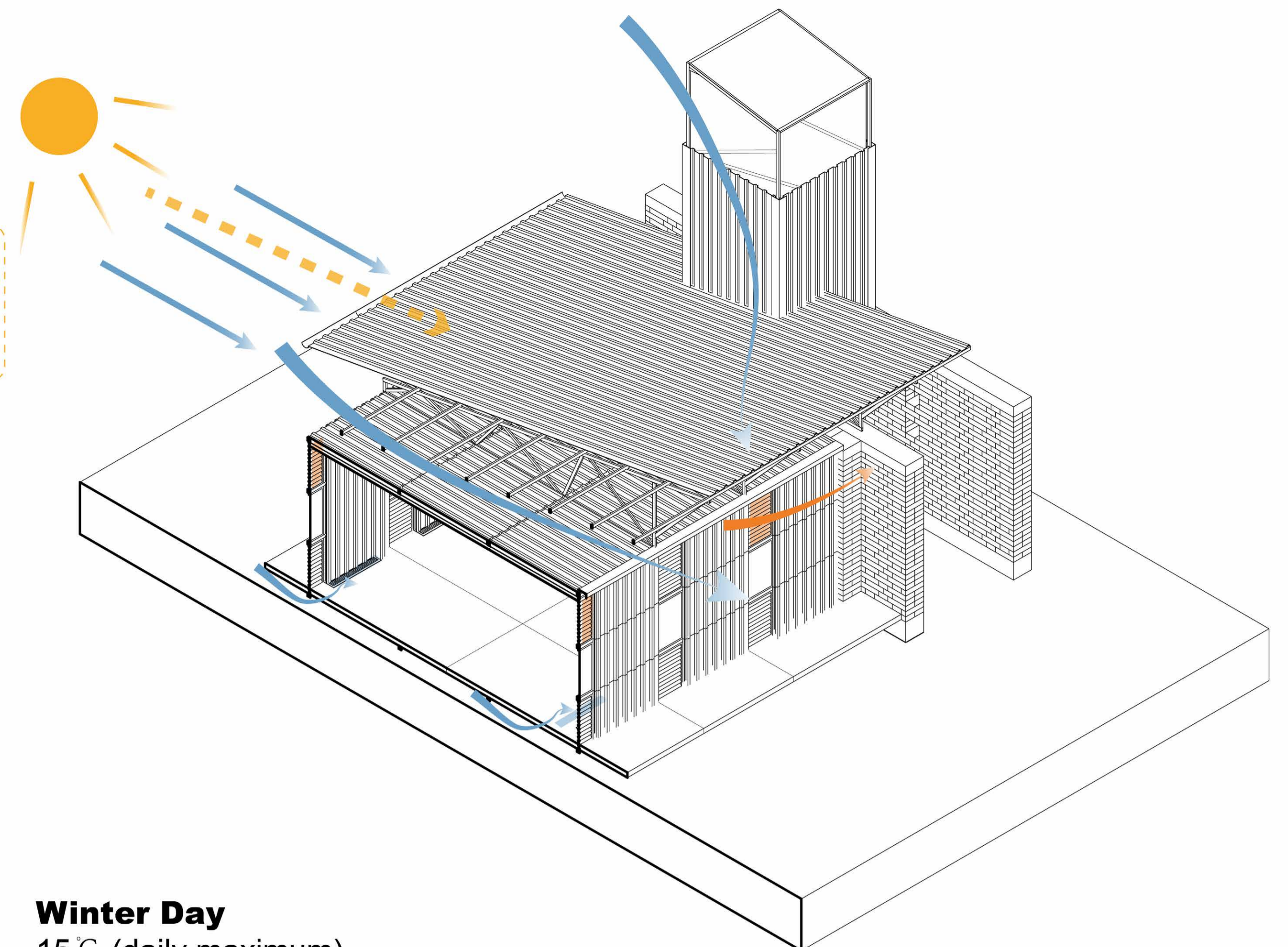
Passive Ventilation Strategies:

- Cross ventilation
- Windcatcher
- Lifted floor
- Operable openings

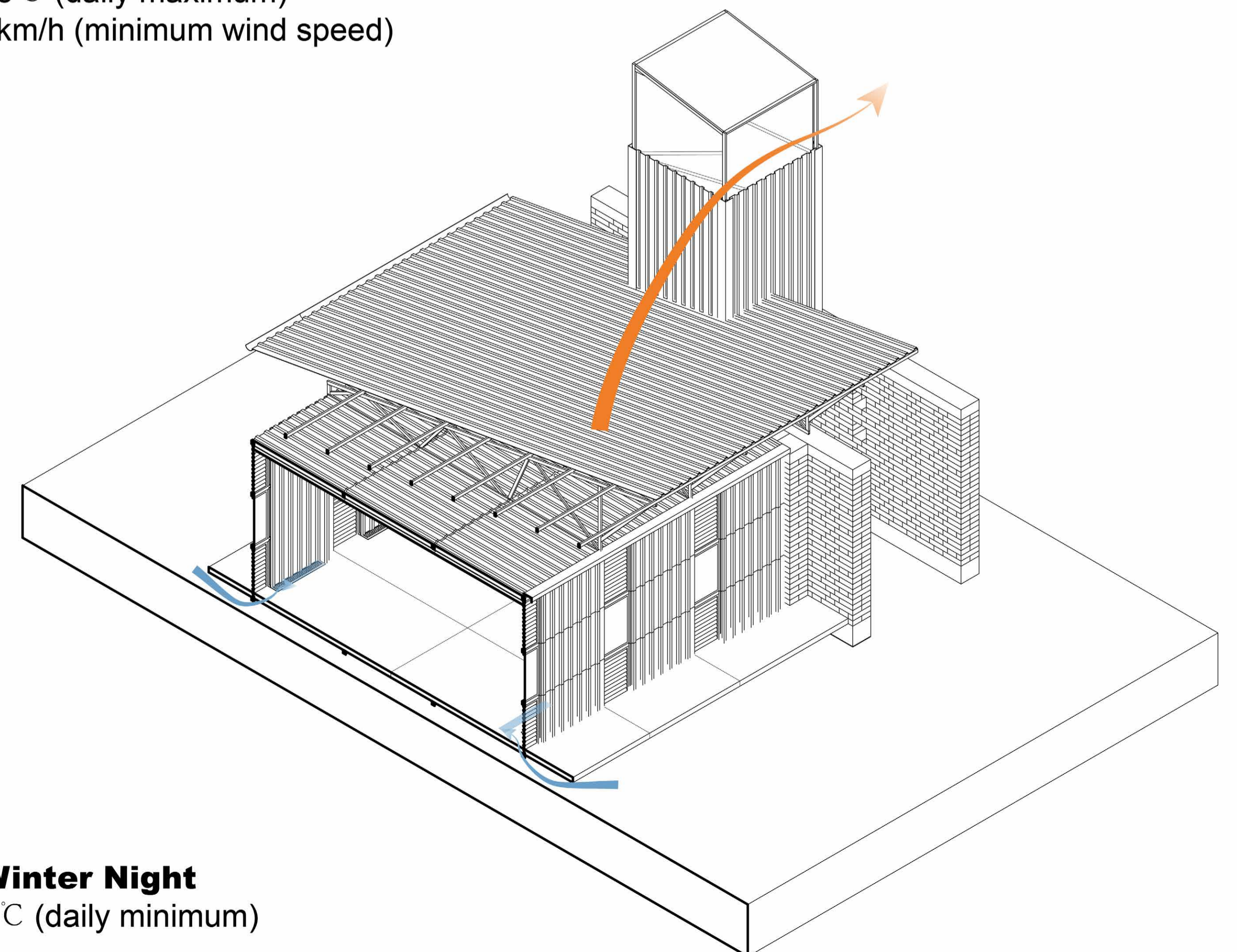
Summer Day
 37°C (daily maximum)
 15km/h (minimum wind speed)



Summer Night
 18°C (daily minimum)



Winter Day
 15°C (daily maximum)
 5km/h (minimum wind speed)

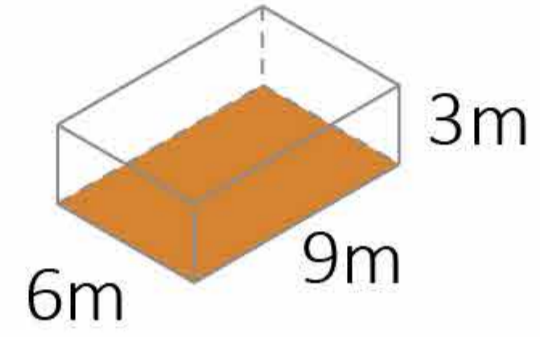
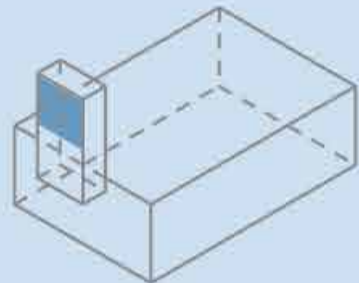
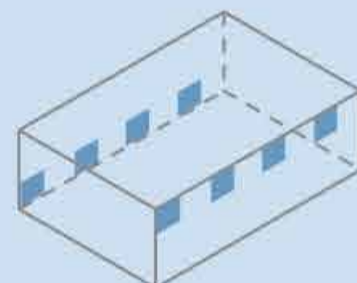
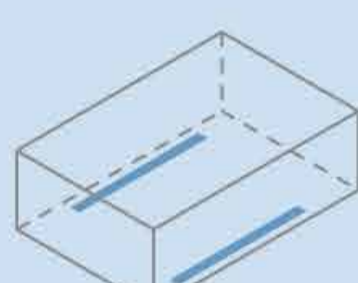
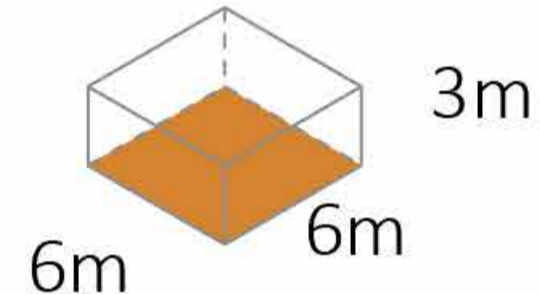
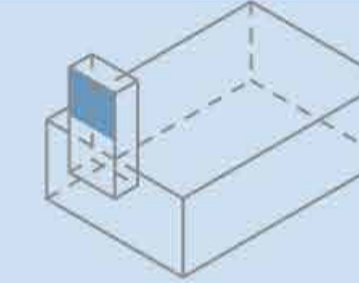
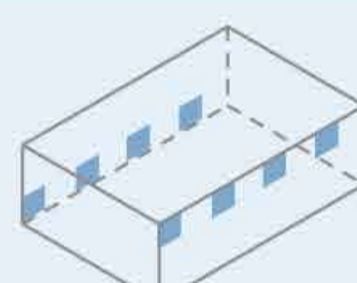
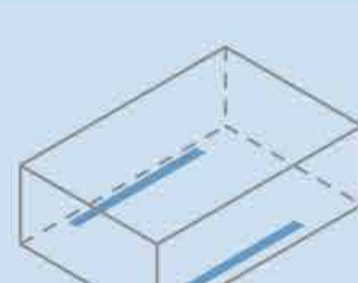
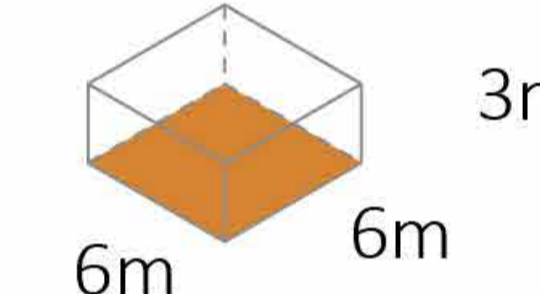
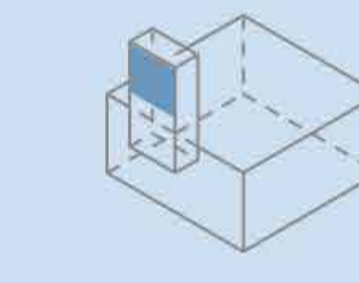
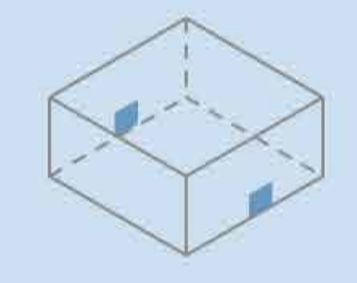
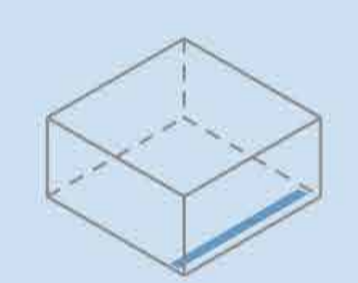
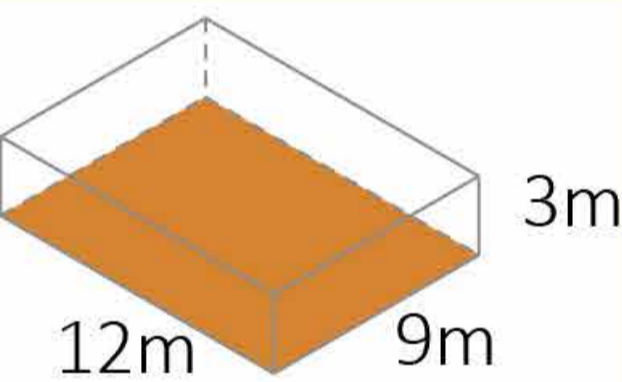
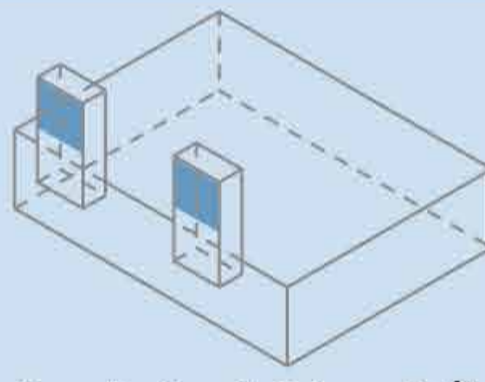
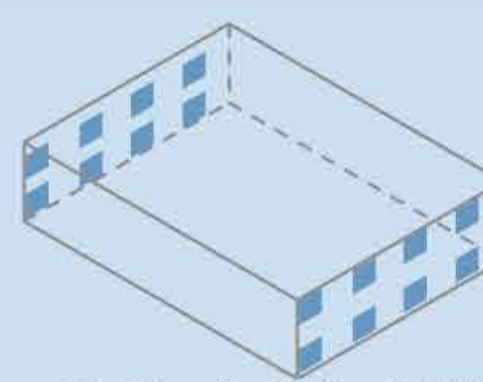
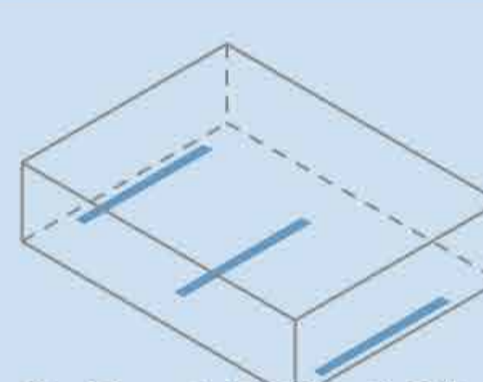
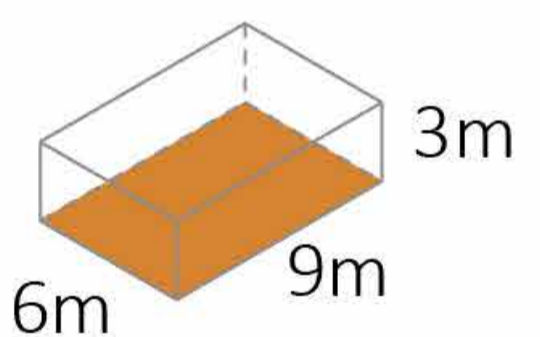
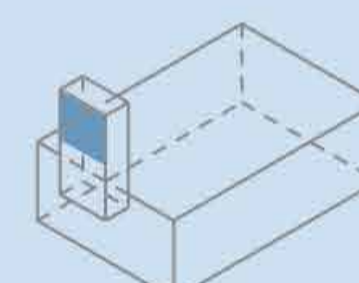
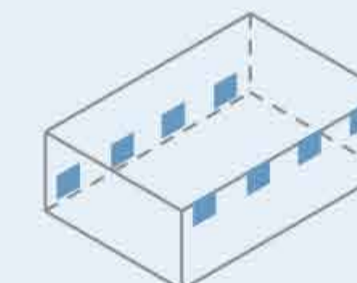
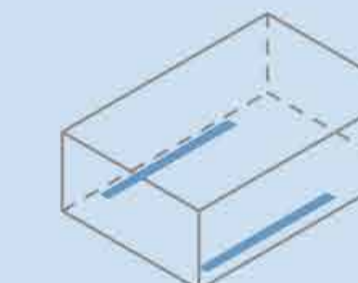
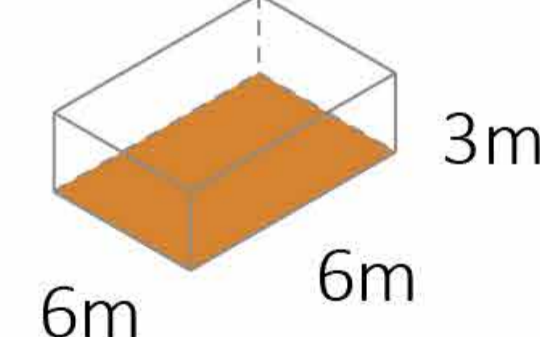
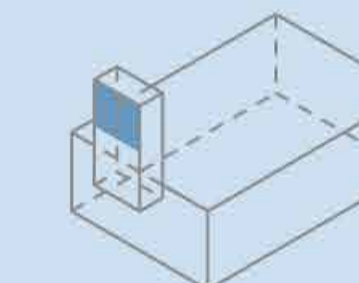
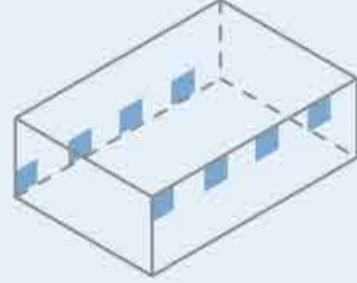
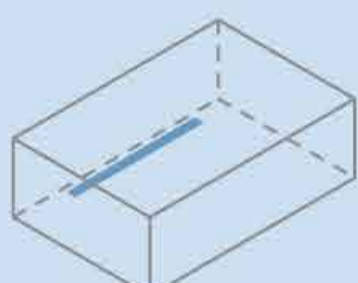
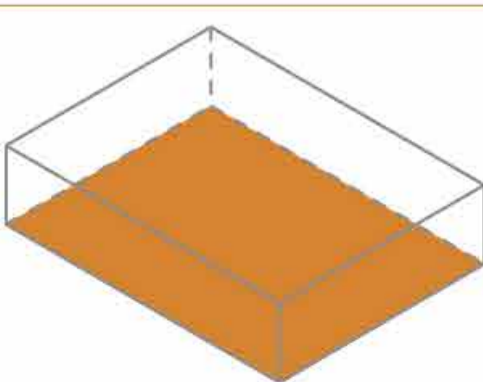
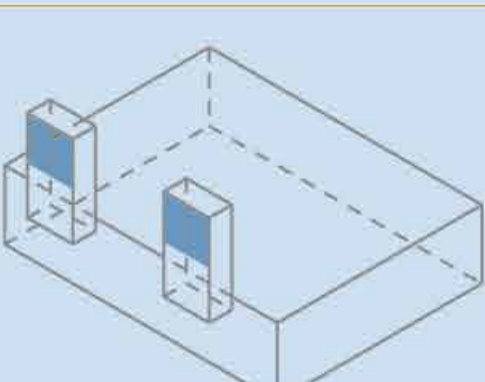
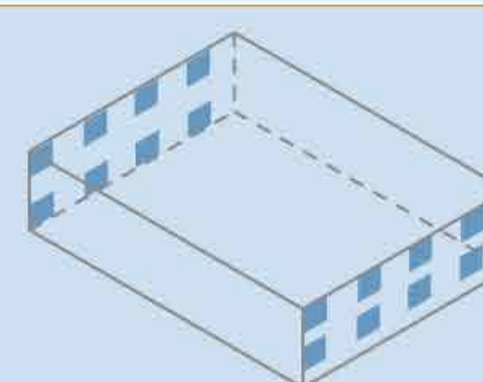
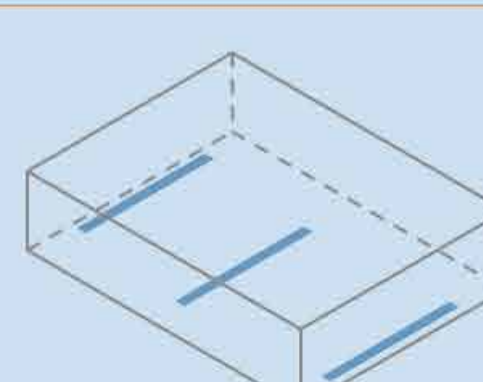


Winter Night
 5°C (daily minimum)

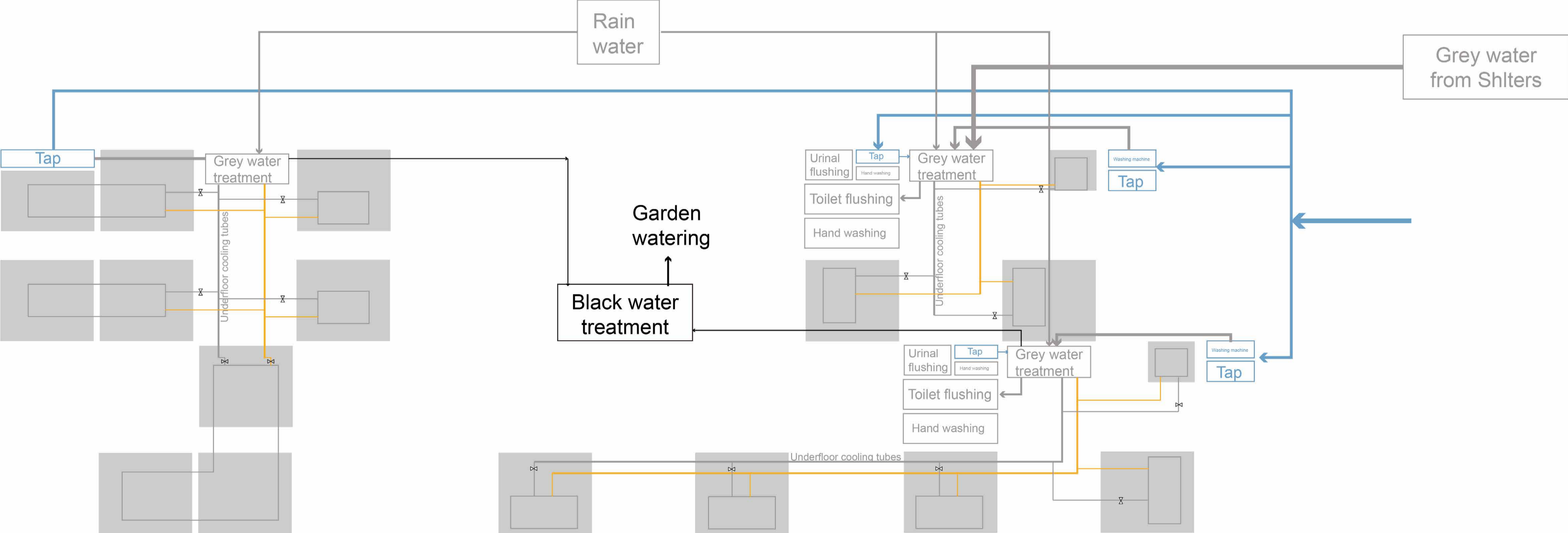
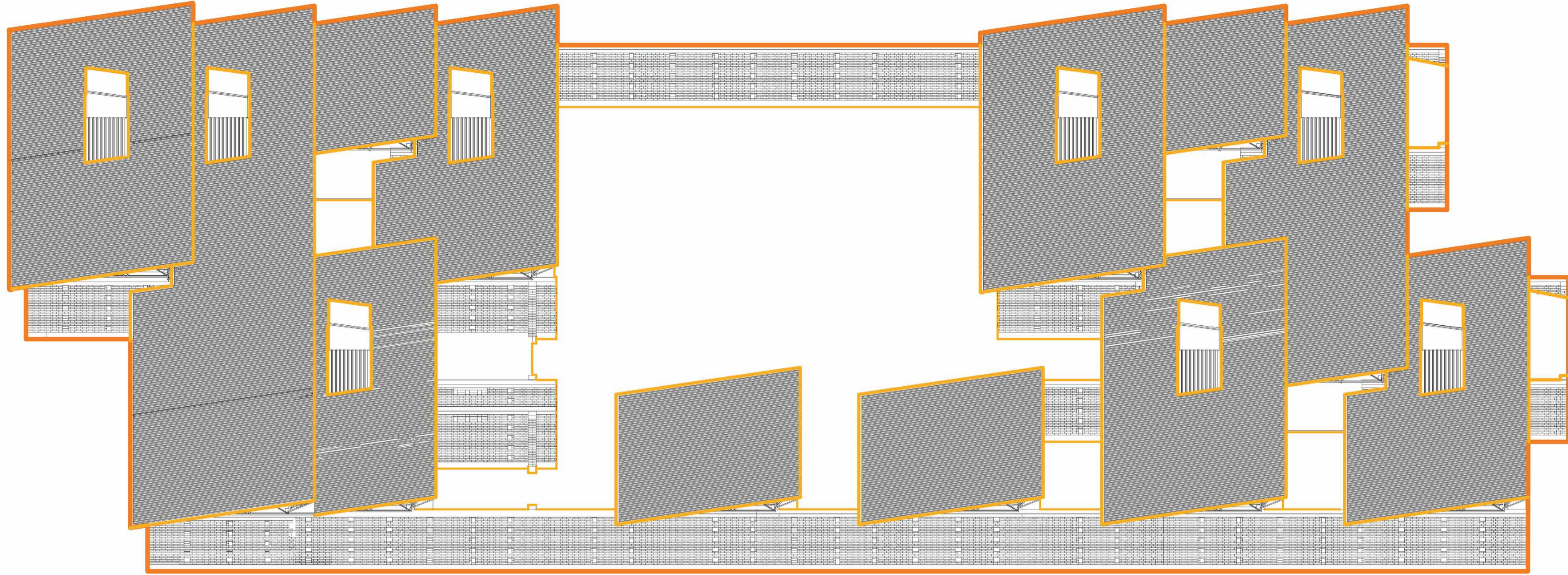
Passive ventilation strategies (Operable openings)

Winter (minimum wind speed: 5km/h)

* recommended minimum ventilation rate: 5 l/ s-person (=18 m³/h-person)

Module	Volume (/m ³)	Capacity (/person) 👤 = 10 people	Q1 (m ³ /h) (windcatchers)	Q2 (m ³ /h) (windows)	Q3 (m ³ /h) (ground ventilation)	Units of air changes per hour (ACH)
Classroom	 6m x 9m x 3m	👤👤👤	 2m ² , 5x10 ³ m ³ /h	 9.6m ² , 7x10 ³ m ³ /h	 2.4m ² , 3.5x10 ³ m ³ /h	15 m ³ /h·person
Admin	 6m x 6m x 3m	👤	 2m ² , 5x10 ³ m ³ /h	 4.8m ² , 3.5x10 ³ m ³ /h	 1.2m ² , 3.5x10 ³ m ³ /h	19 m ³ /h·person
Sanitation	 6m x 6m x 3m	👤	 2m ² , 5x10 ³ m ³ /h	 2.4m ² , 4.6x10 ³ m ³ /h	 1.2m ² , 1.7x10 ³ m ³ /h	20 m ³ /h·person
Cultural space	 12m x 9m x 3m	👤👤👤 👤👤👤	 4m ² , 1x10 ⁴ m ³ /h	 9.6m ² , 14x10 ³ m ³ /h	 3.6m ² , 5.1x10 ³ m ³ /h	5 m ³ /h·person
Seminar	 6m x 9m x 3m	👤👤	 2m ² , 5x10 ³ m ³ /h	 9.6m ² , 7x10 ³ m ³ /h	 2.4m ² , 3.5x10 ³ m ³ /h	15 m ³ /h·person
Kitchen	 6m x 6m x 3m	👤	 2m ² , 5x10 ³ m ³ /h	 4.8m ² , 7x10 ³ m ³ /h	 1.2m ² , 1.7x10 ³ m ³ /h	12 m ³ /h·person
Library		👤👤👤 👤👤	 4m ² , 1x10 ⁴ m ³ /h	 9.6m ² , 14x10 ³ m ³ /h	 3.6m ² , 5.1x10 ³ m ³ /h	5 m ³ /h·person

Grey water system



Reflection

The studio is a great chance for me to get to know more about the real life condition of Syria refugees. It is also a great challenge to design under an unfamiliar culture and climate circumstance. For me the aspects to be think about further could be the following:

Is my design easy enough to build?

Is my design conflicting with the lifestyle of Syria refugees?

What are the relations between the school and shelters?

