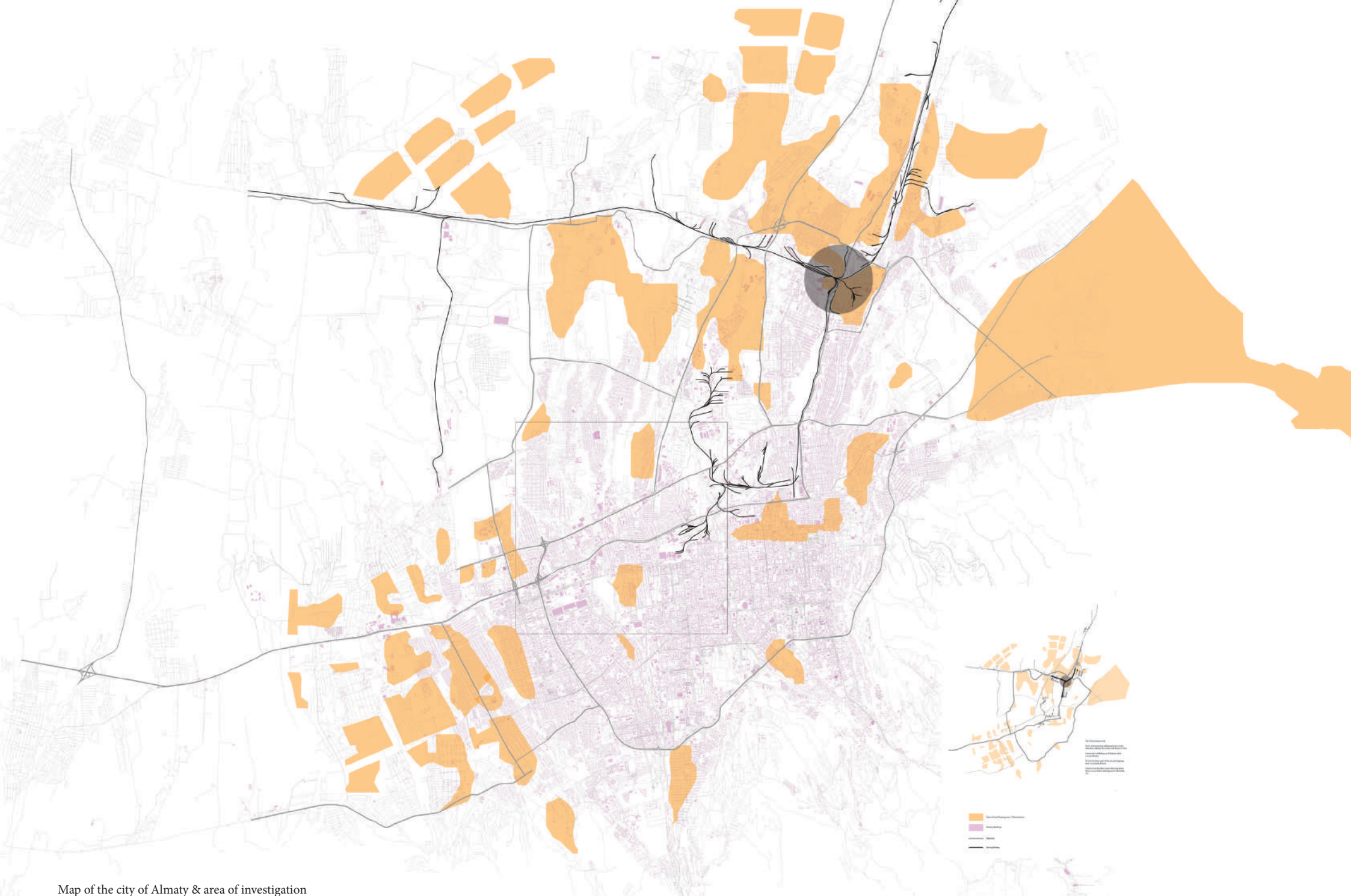
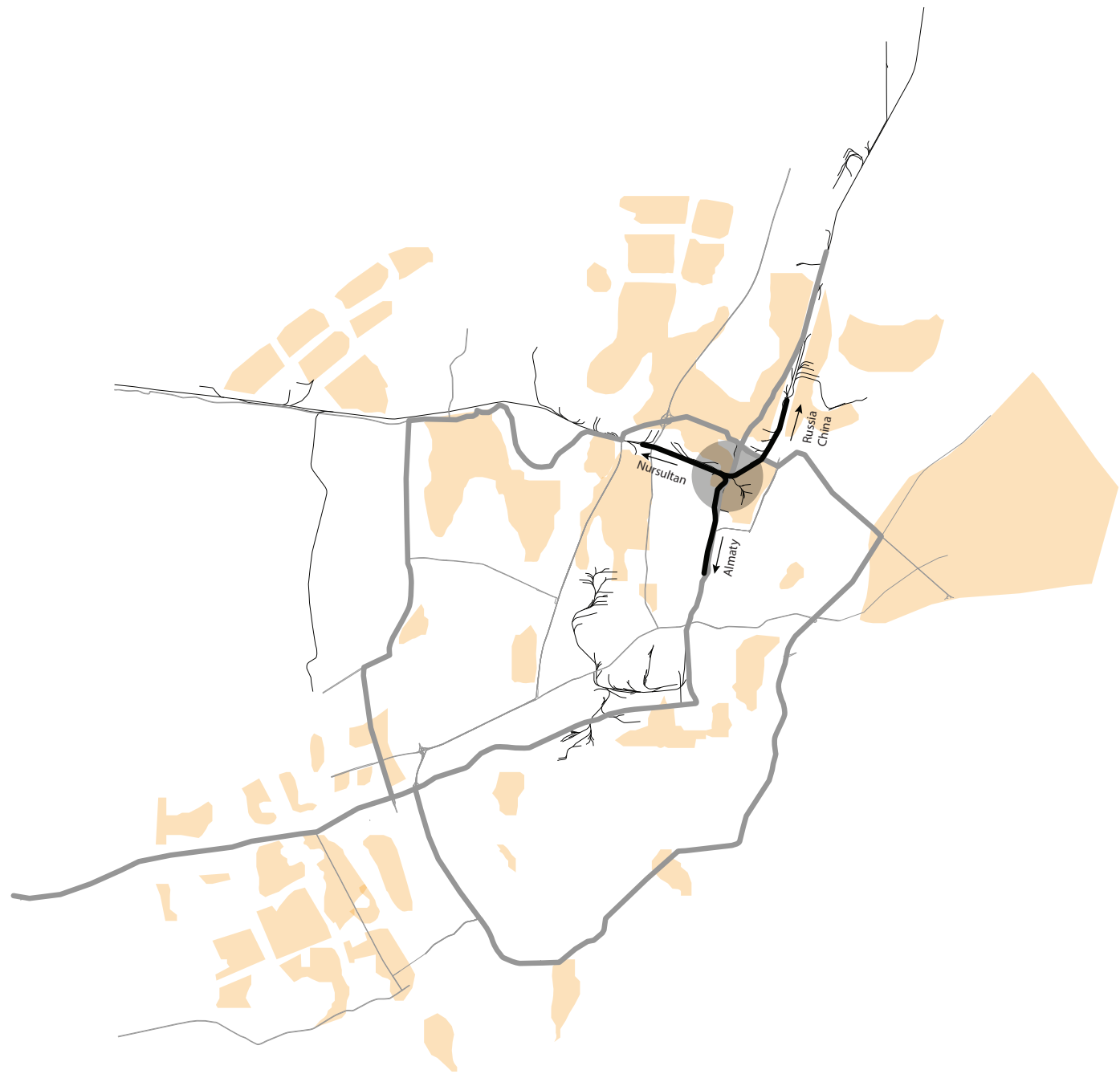
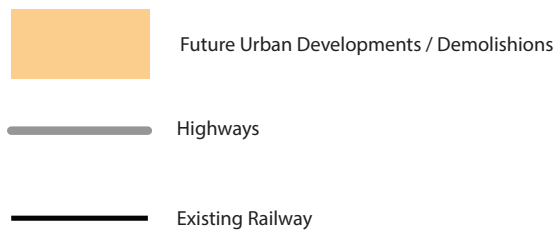
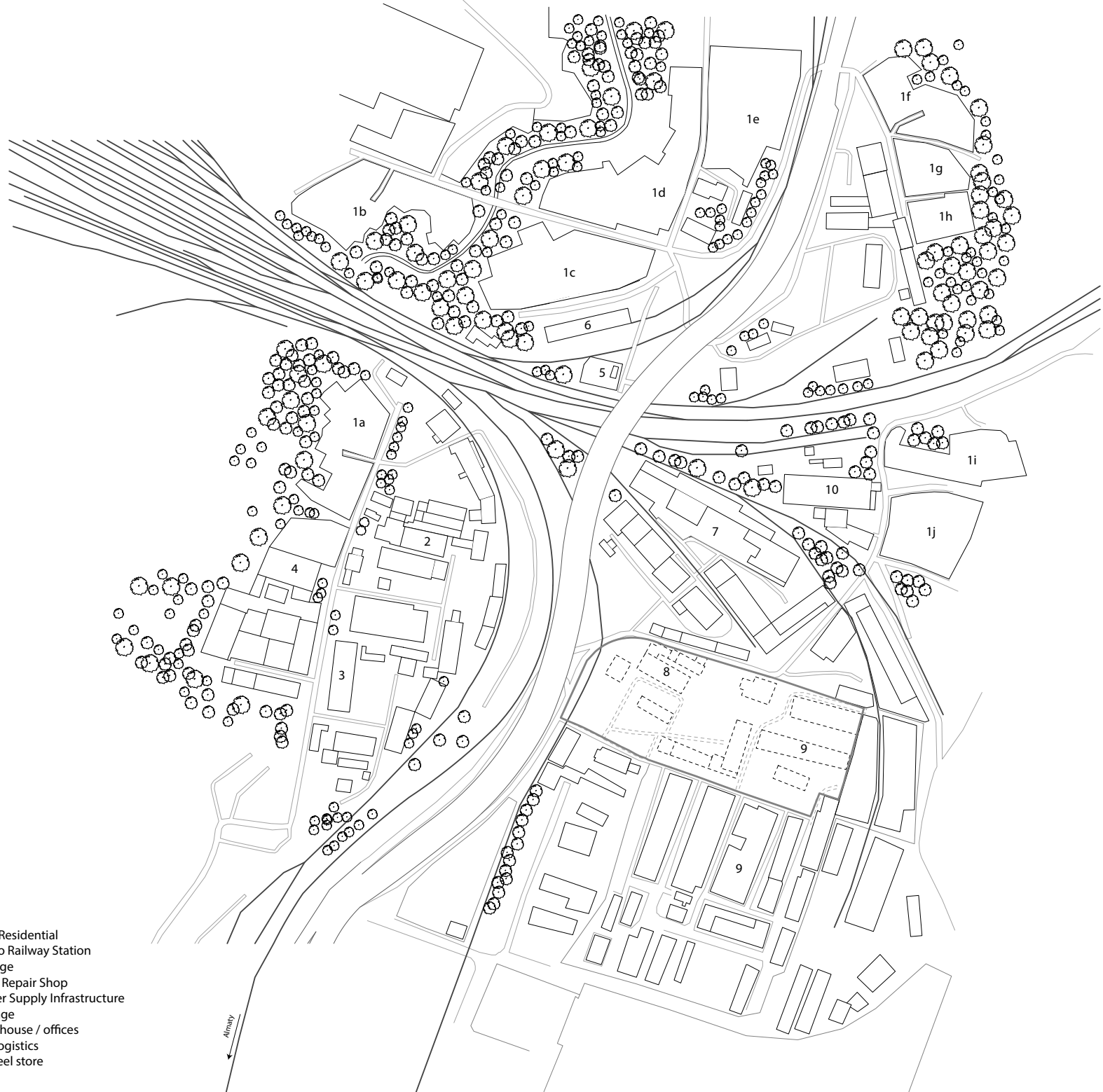




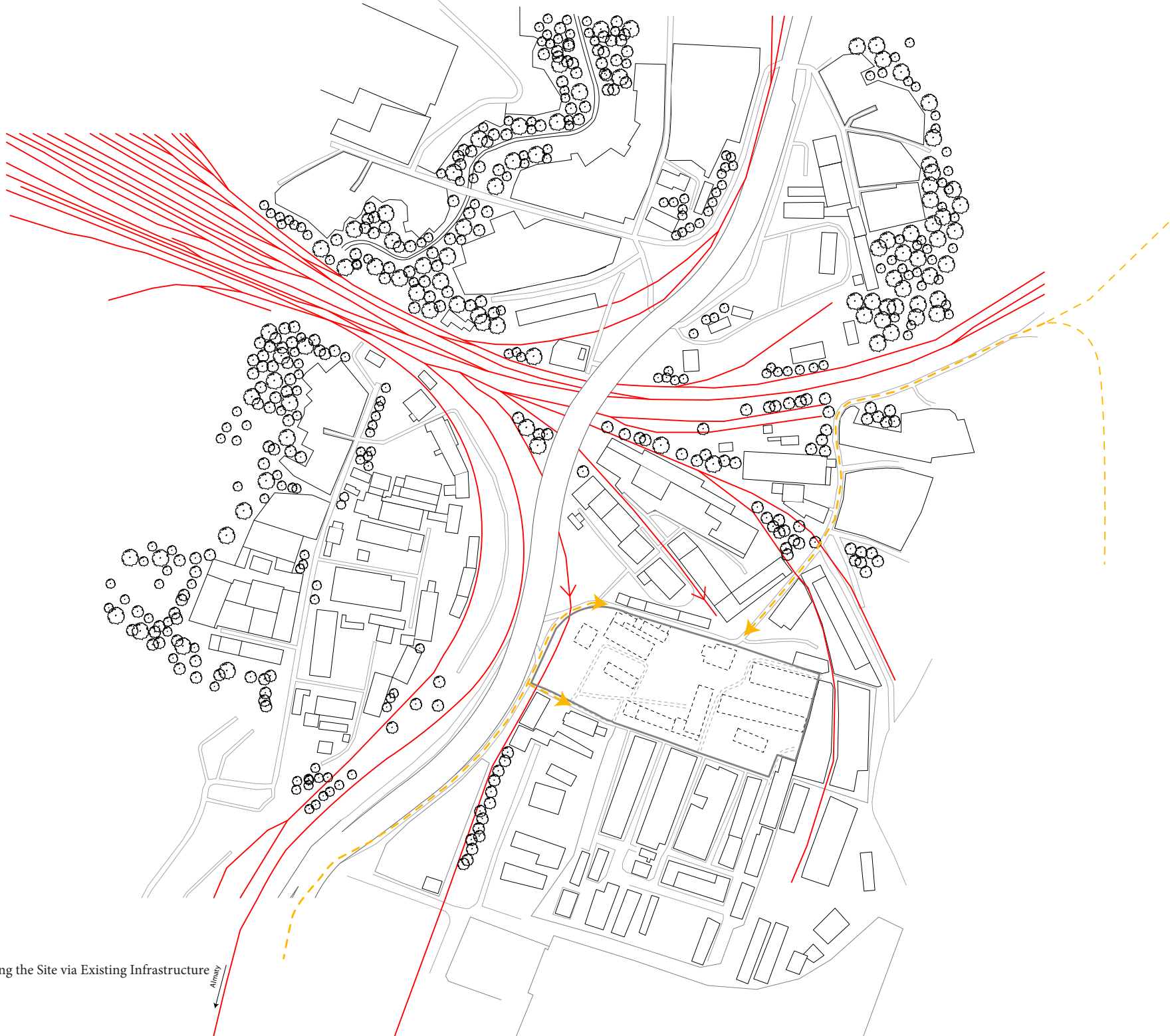
Map of the city of Almaty & area of investigation





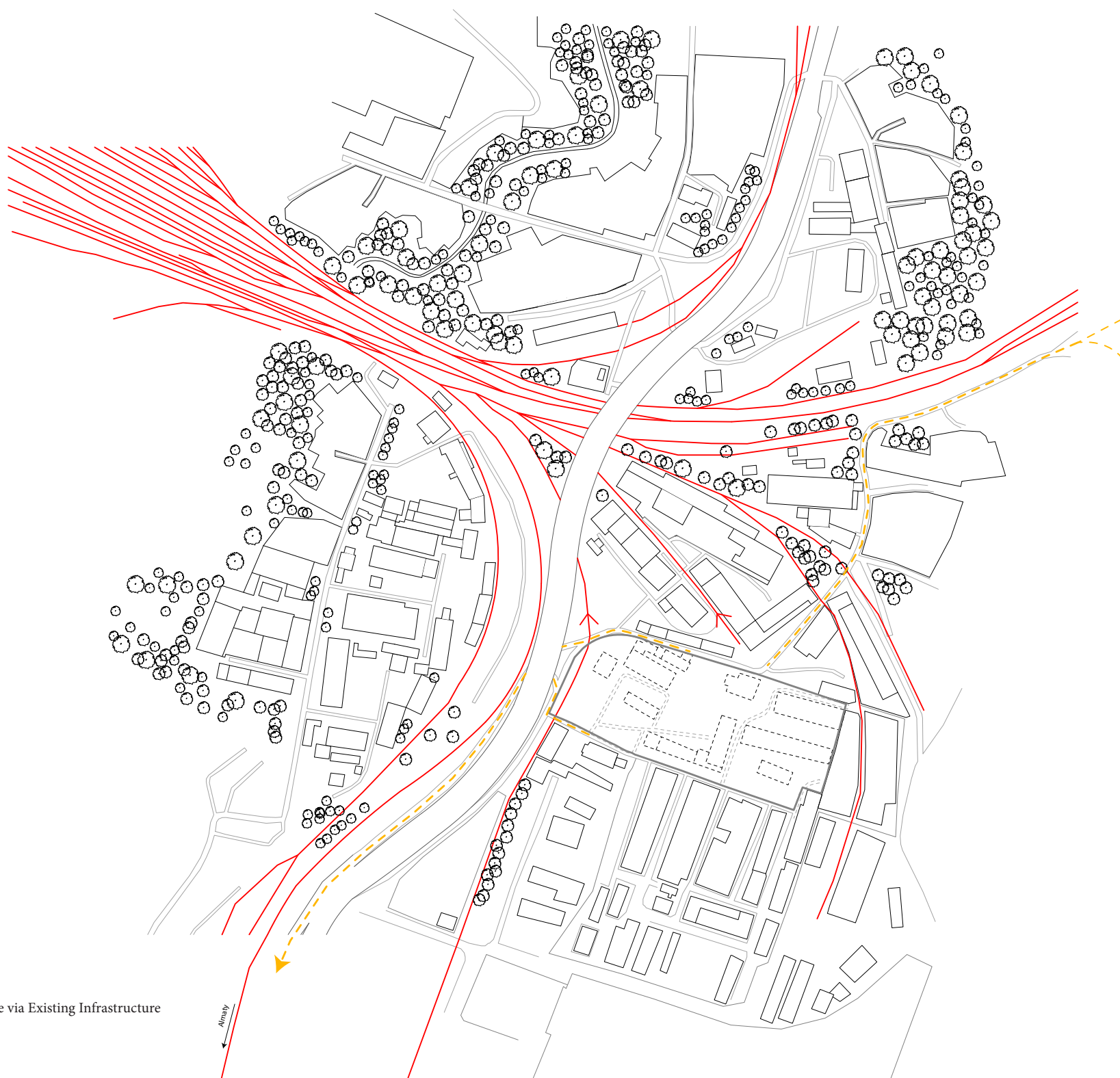
- 1a - 1j: Residential
- 2: Cargo Railway Station
- 3: College
- 4: Auto Repair Shop
- 5: Power Supply Infrastructure
- 6: Storage
- 7: Warehouse / offices
- 8 - 9 : Logistics
- 10: Wheel store

Chosen Site and
Demolition



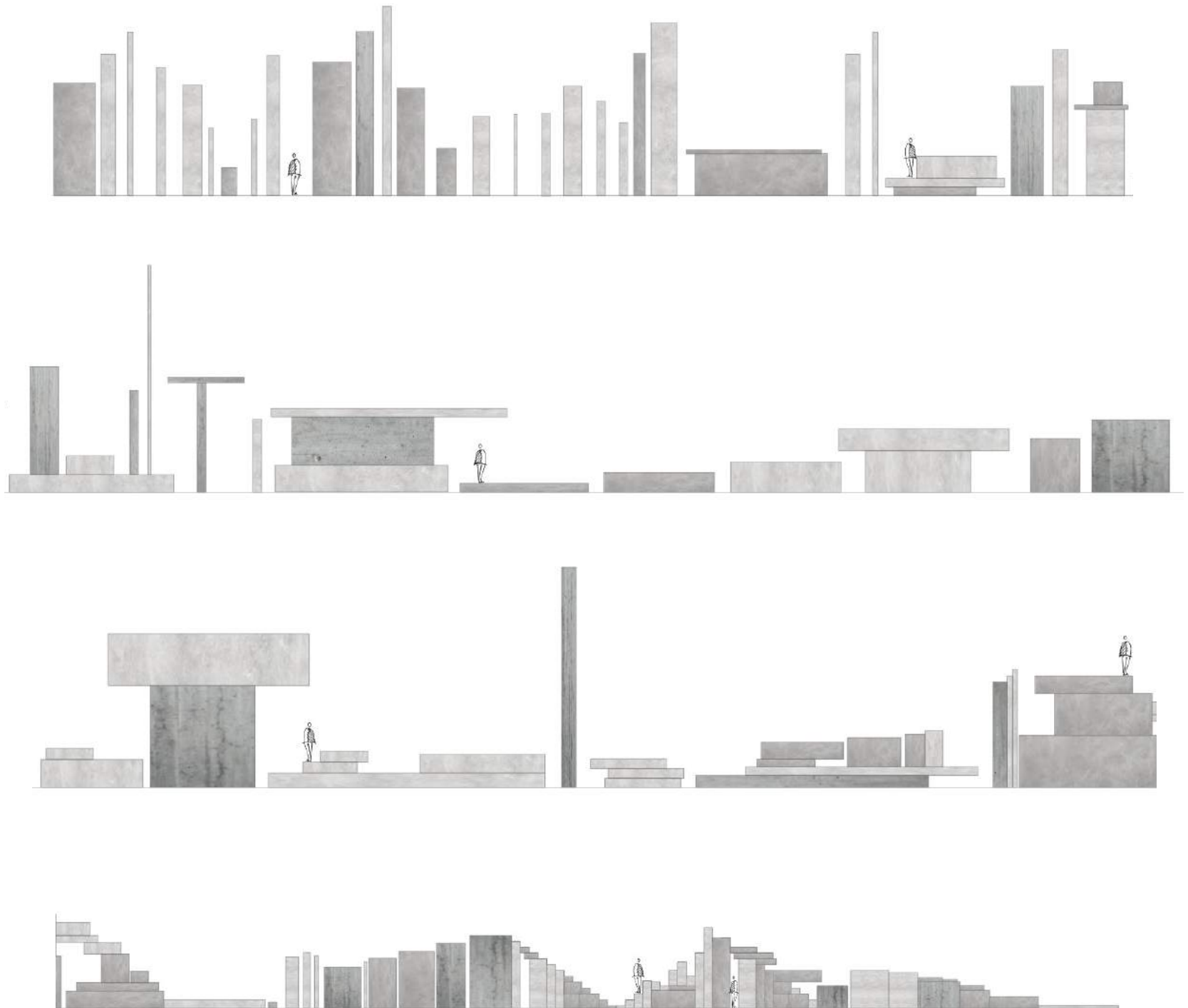
Material Entering the Site via Existing Infrastructure

Almaly



Material leaving the Site via Existing Infrastructure

Almaly

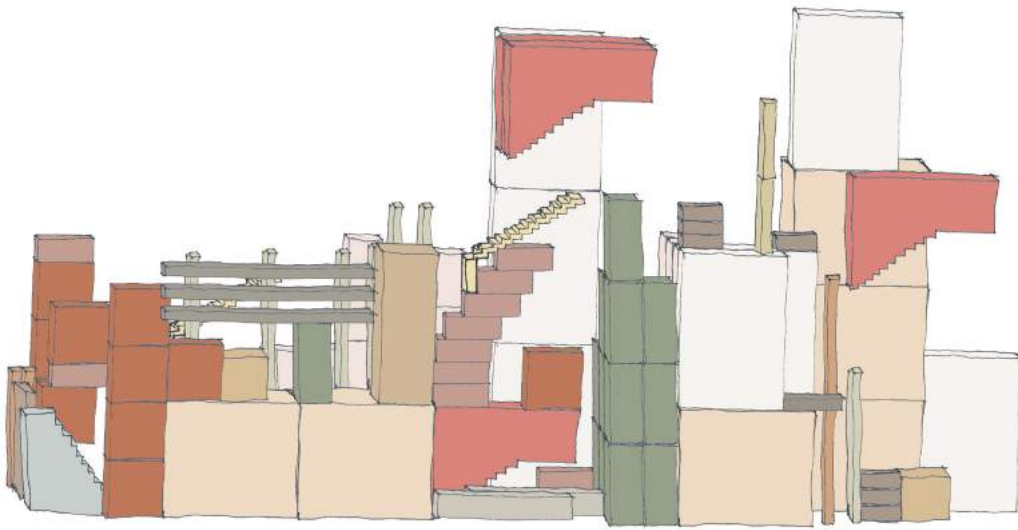


Exploring ways in which you can enter a relationship with a space. Can you read a space by counting and measuring at the same time?

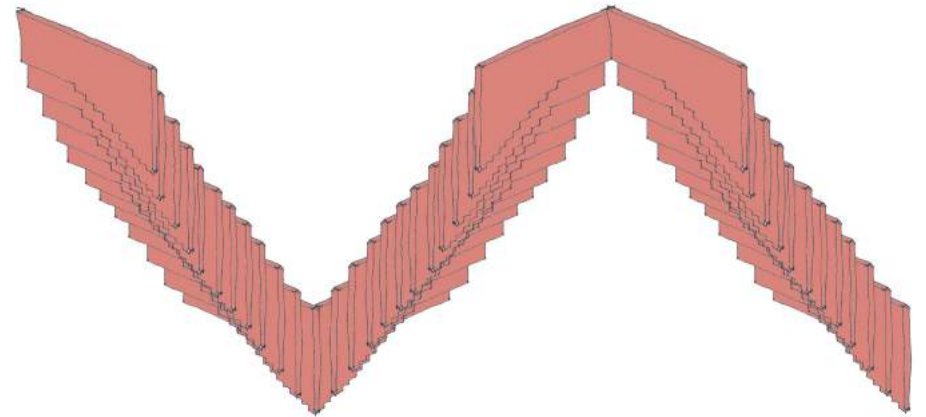
Challenging the proportions of basic building elements



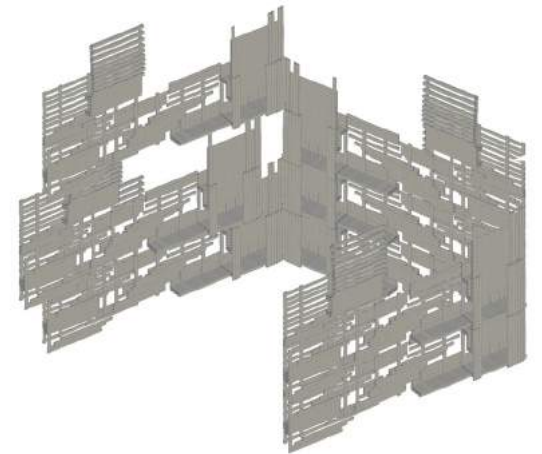
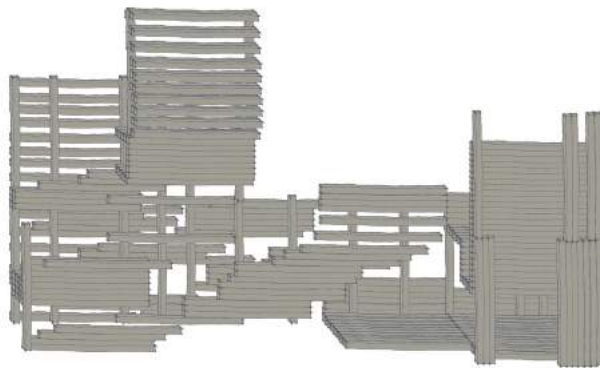
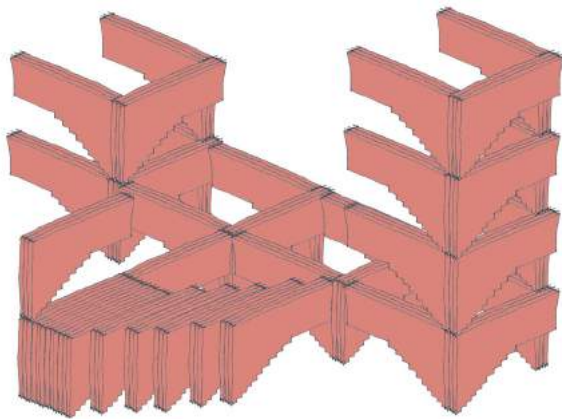
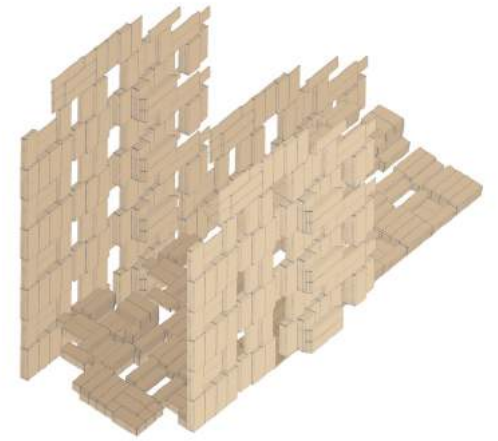
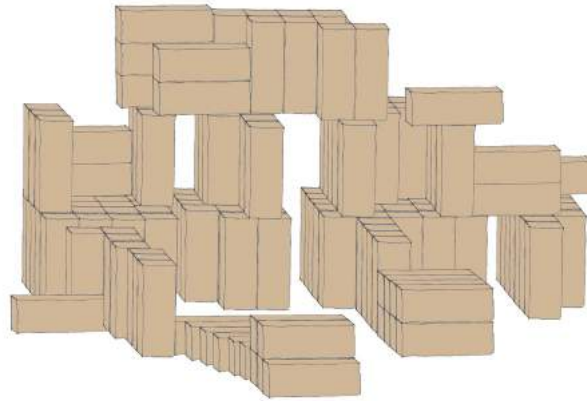
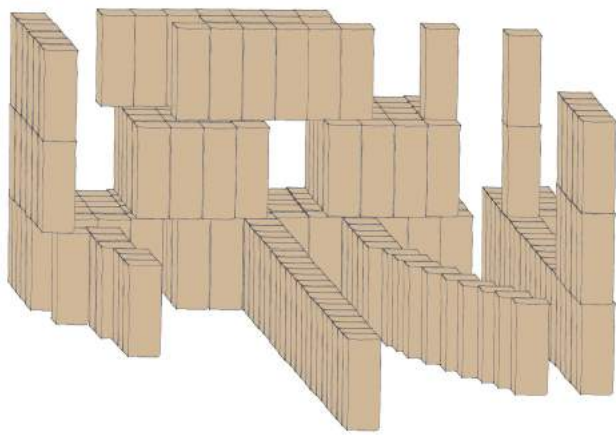


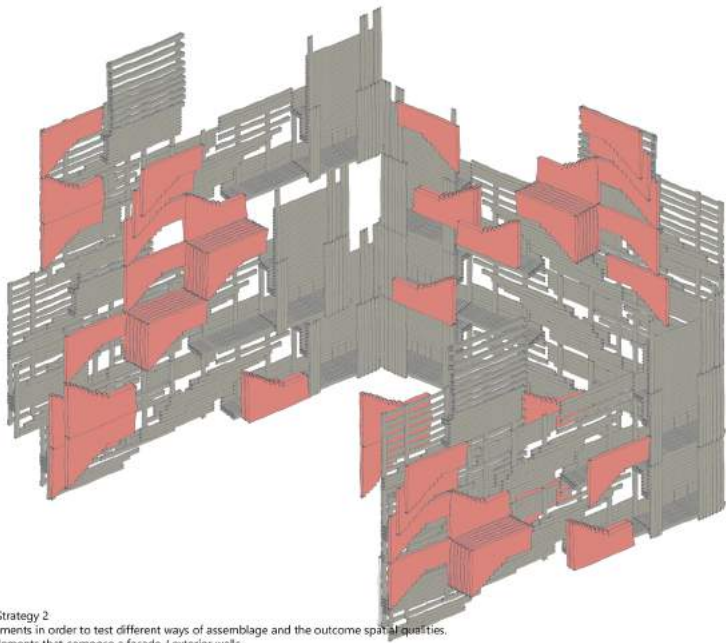


Strategy 1: Assamblage of all the concrete elements that explores the outcome spatial qualities

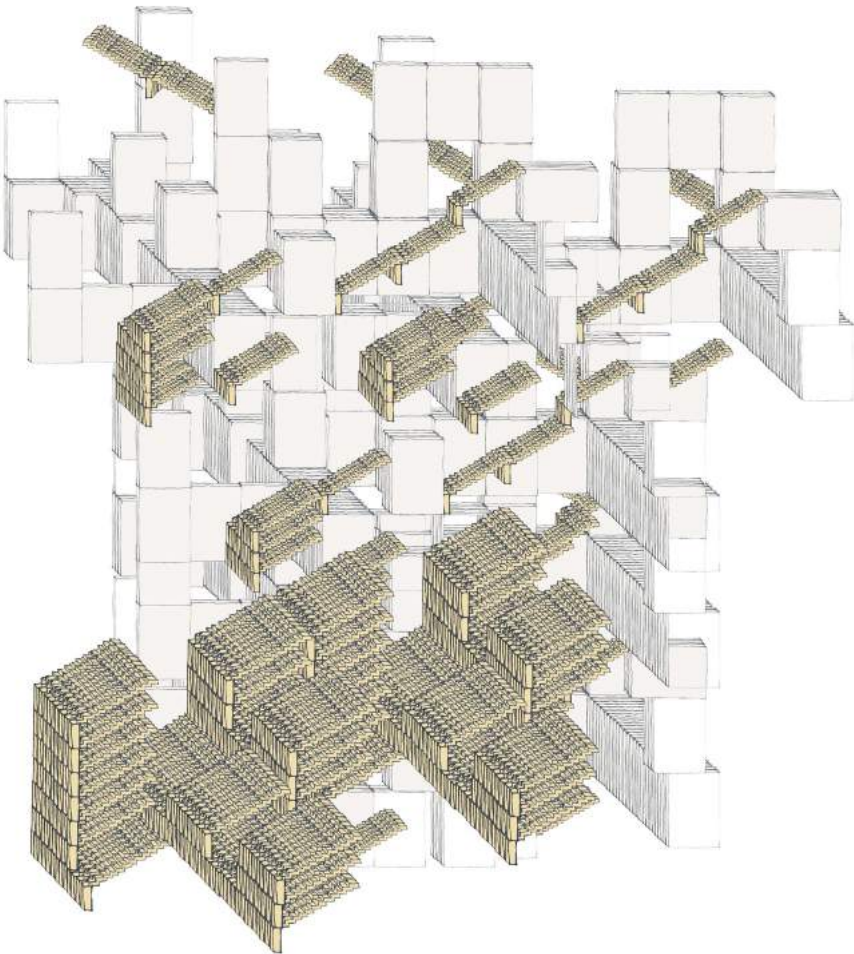
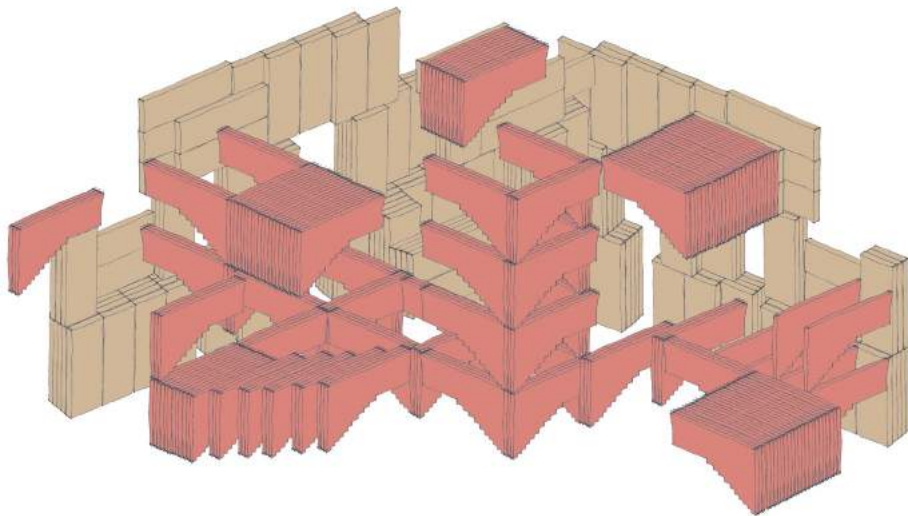


Strategy 2: Repetition of one element and different ways of assembling in order to reveal spatial qualities

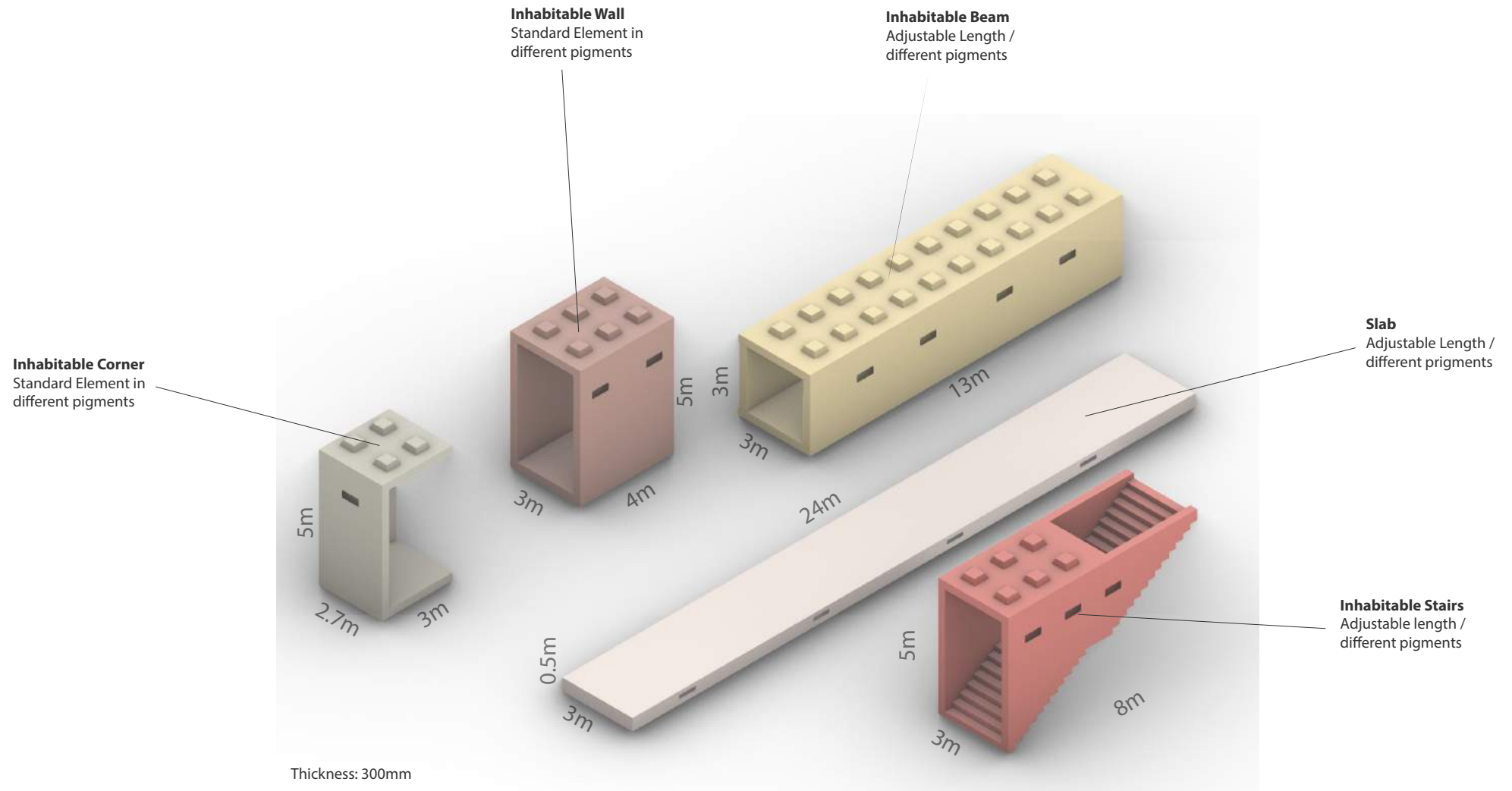




Strategy 1 + Strategy 2
Using two elements in order to test different ways of assemblage and the outcome spatial qualities.
Testing two elements that compose a facade / exterior walls

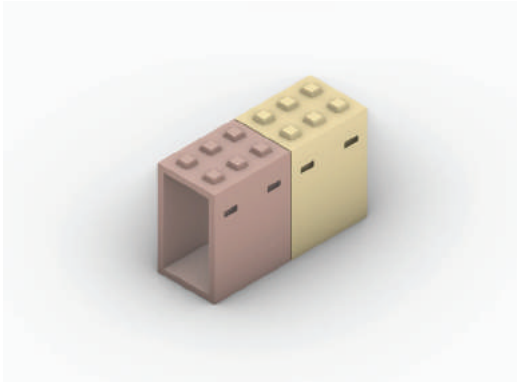


Strategy 1 + Strategy 2 / two elements

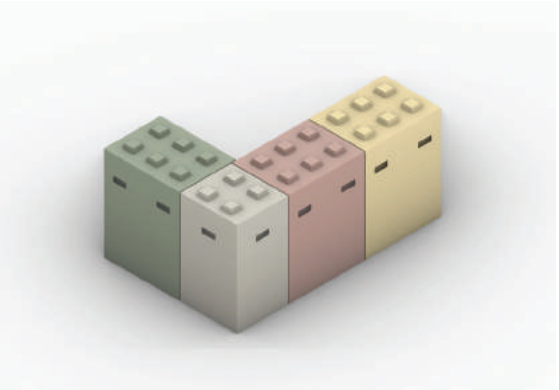


Main Principles of Assemblage:

1. Use five building elements
2. Use basic geometries and straight lines
3. Use a maximum width of 3m
4. Juxtapose / Stack the elements according to primitive architecture
5. Assemble with the use of a crane / elements arrive from above
6. Keep the dimensions of the elements constant and alter length where needed.
7. Use an Earthy colour palette / smooth colour transition - Concrete possibilities



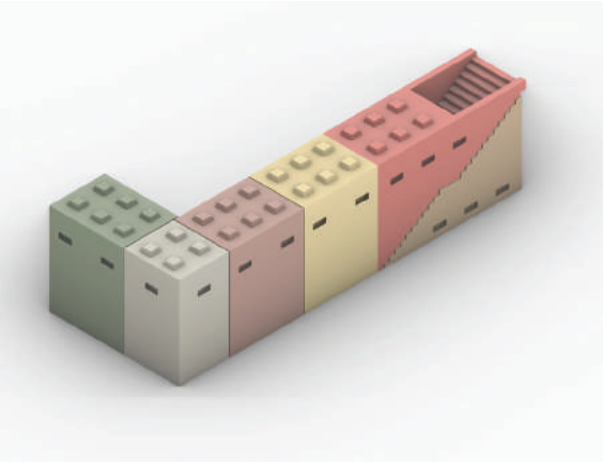
1. Placing vertical elements (inhabitable walls) one next to the other



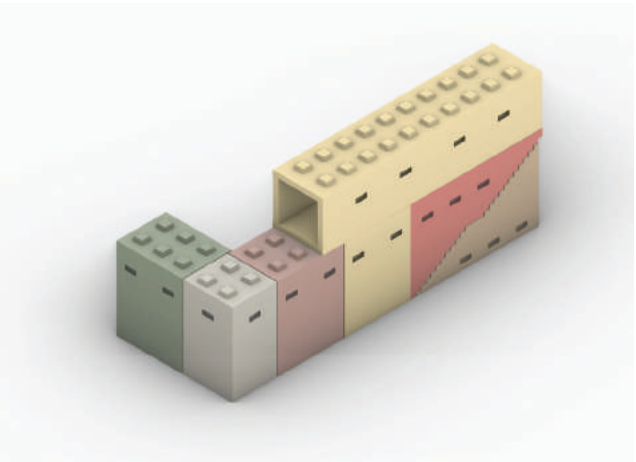
2. Form a corner by placing elements next to each other / Define void with hollow elements



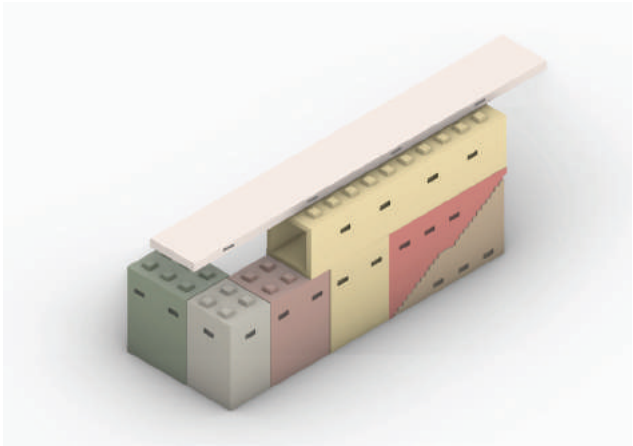
Reference:
Concrete blocks in PC Hoofstraat, Amsterdam



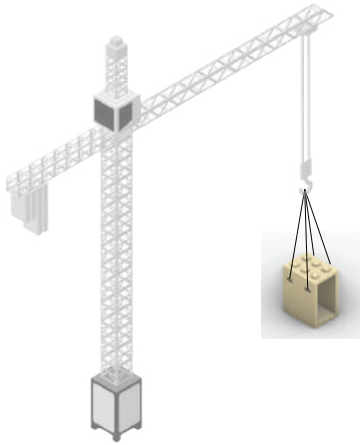
3. Place inhabitable stairs on the ground



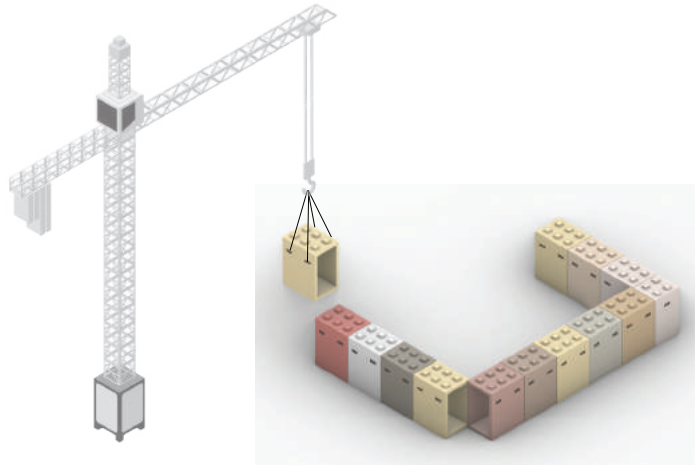
4. Juxtapose horizontal element (inhabitable beams) on top of the vertical elements and stairs



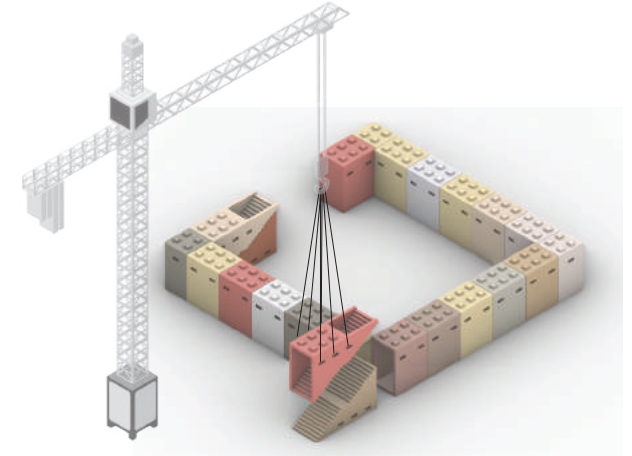
5. Stack orthogonal slab on top of the horizontal element (inhabitable beam)



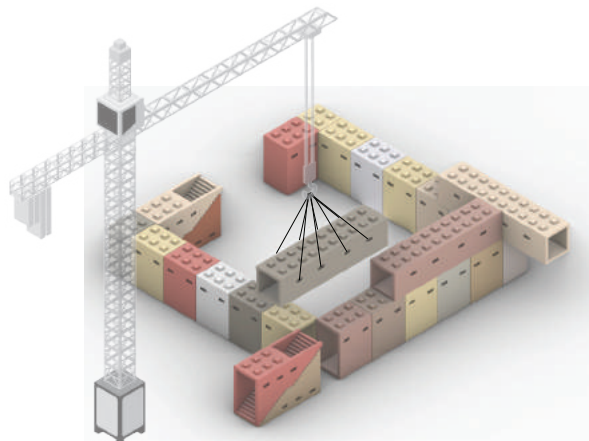
Start placing vertical hollow elements



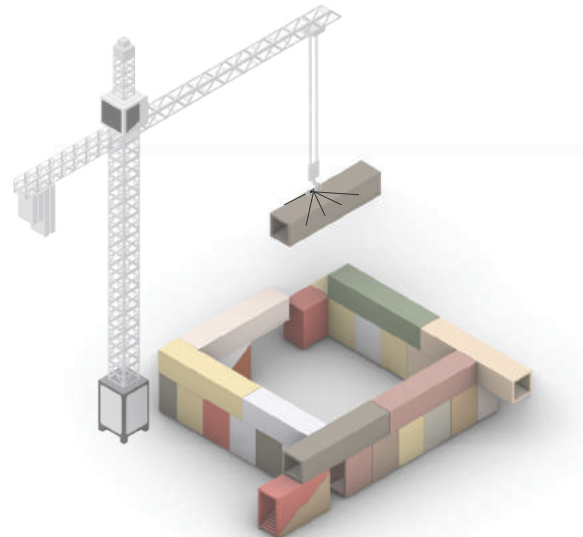
Define Void by placing vertical hollow elements next to each other
Relationship between human scale spaces and machine scale spaces emerges



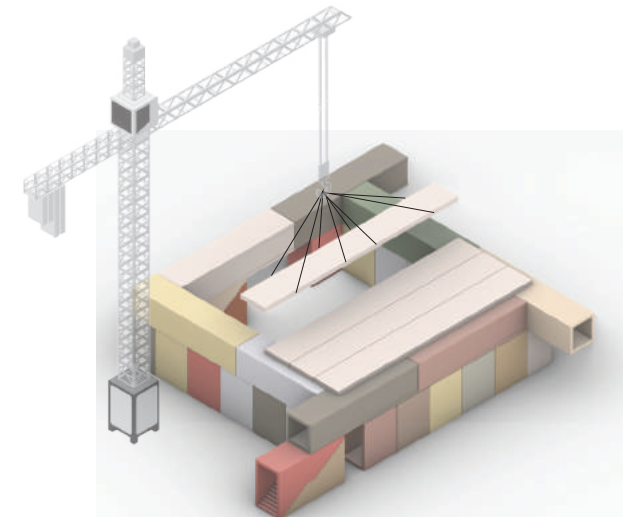
Place hollow stairs on the ground / Top part stacked on the bottom one.



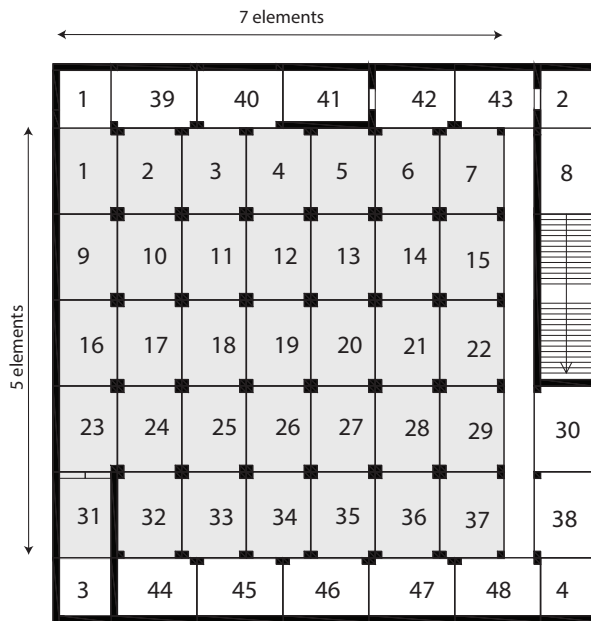
Juxtapose / Stack horizontal elements (inhabitable beams) on top of the vertical elements



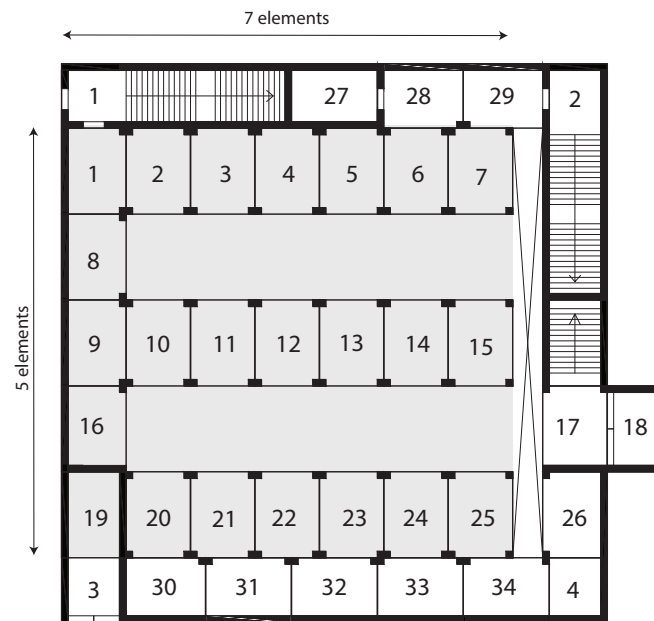
Juxtapose / Stack horizontal elements (inhabitable beams) on top of the vertical elements



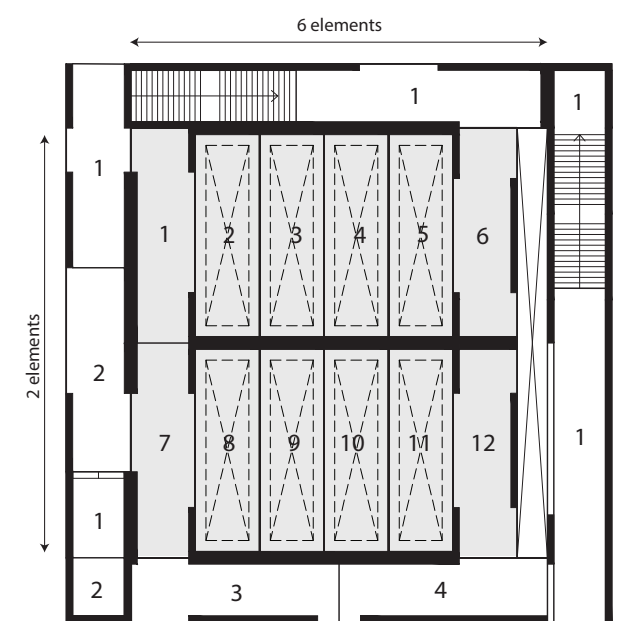
Juxtapose / Stack slabs on top of the horizontal elements to form the roof of the inner void



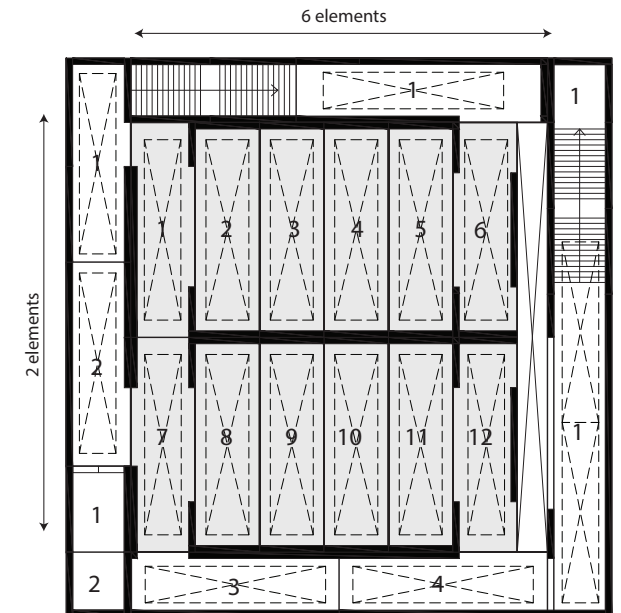
Basement Floor Plan



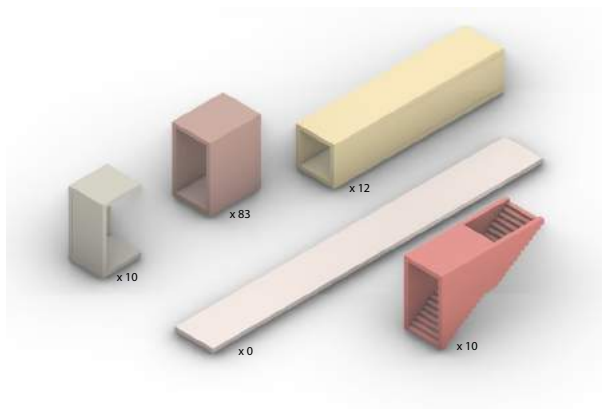
Ground Floor Plan



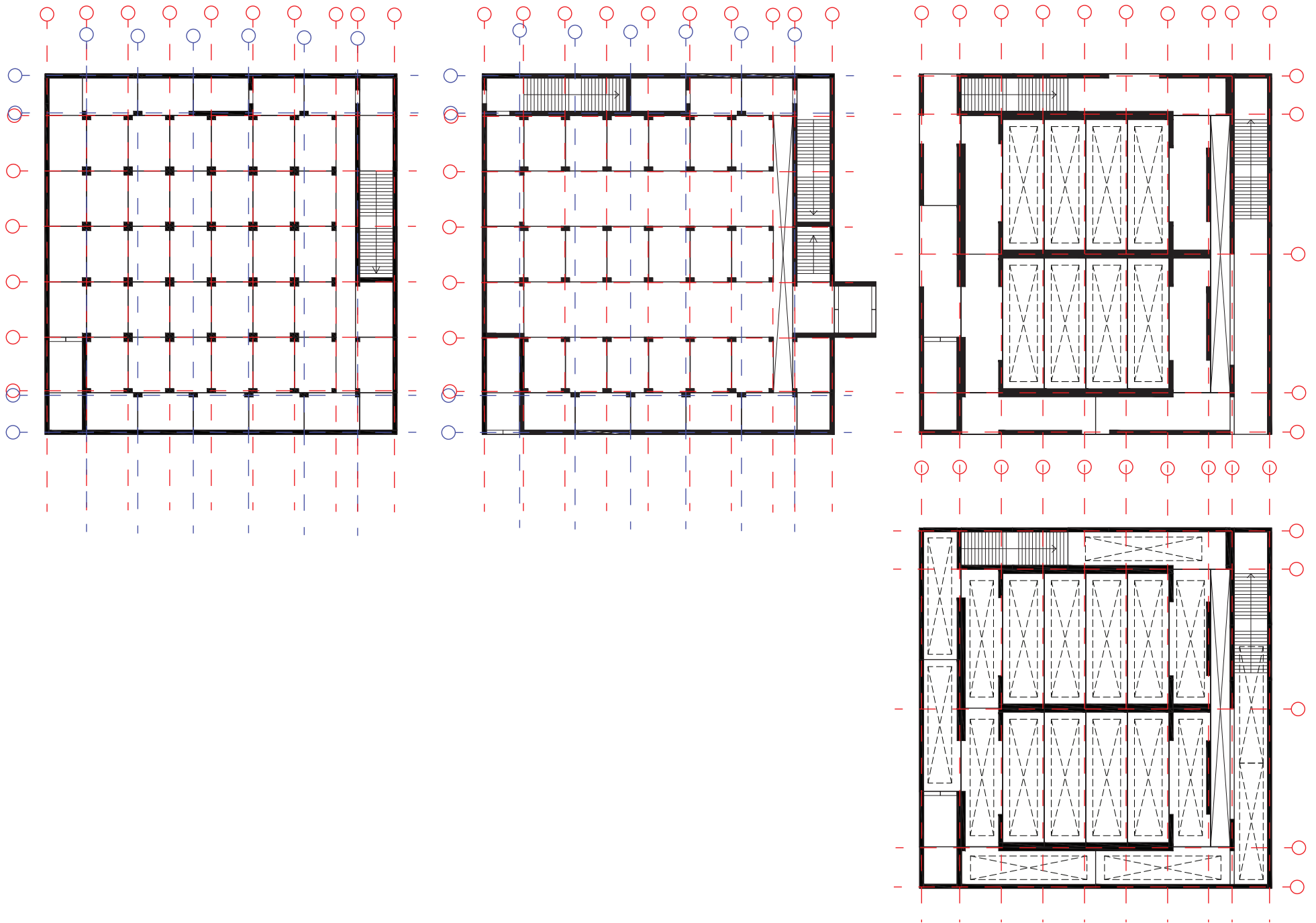
First Floor Plan #1

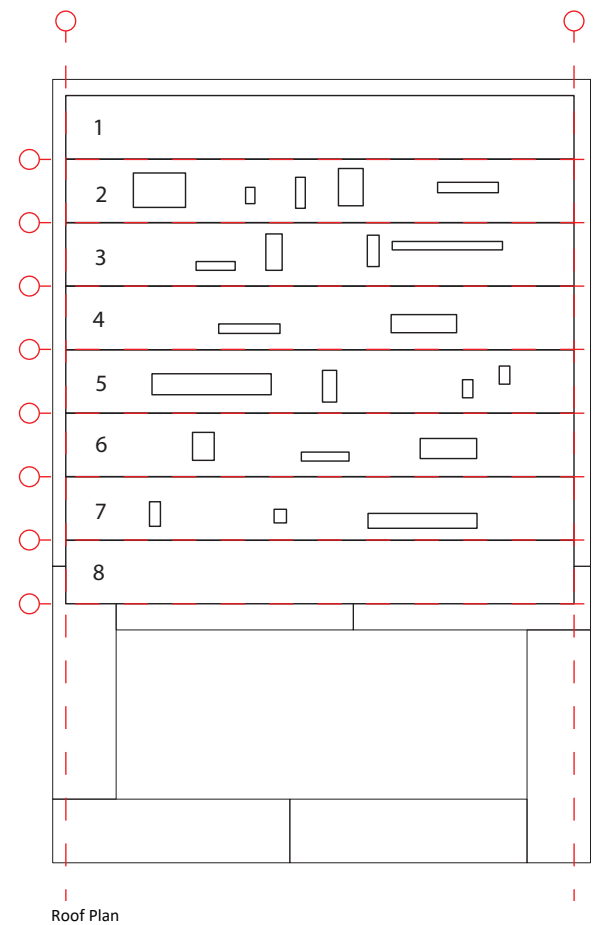
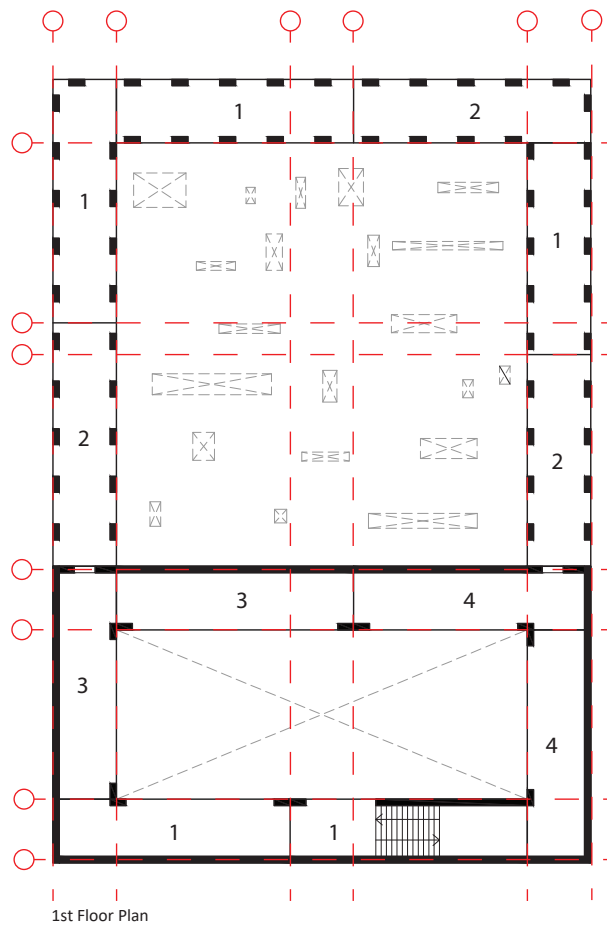
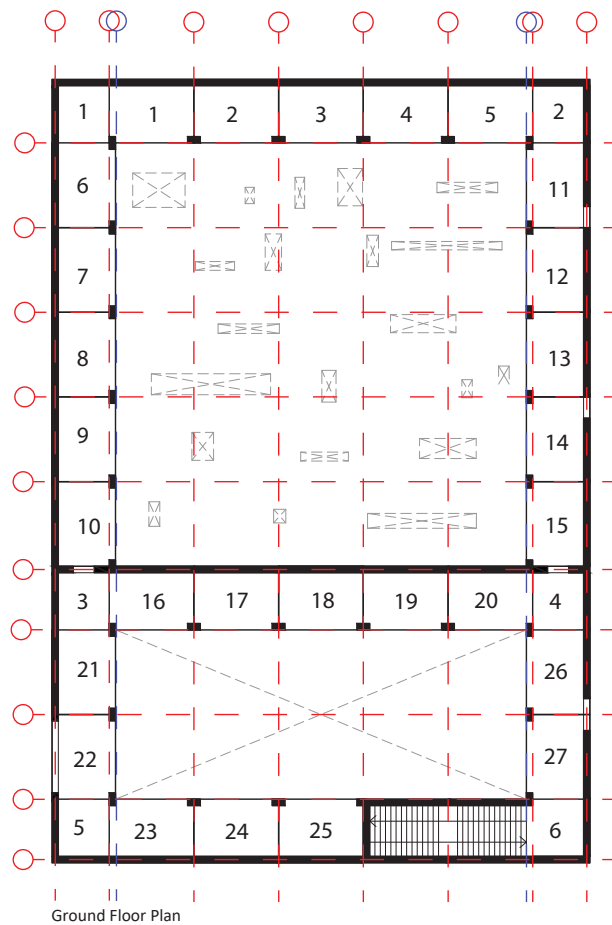


First Floor Plan #2

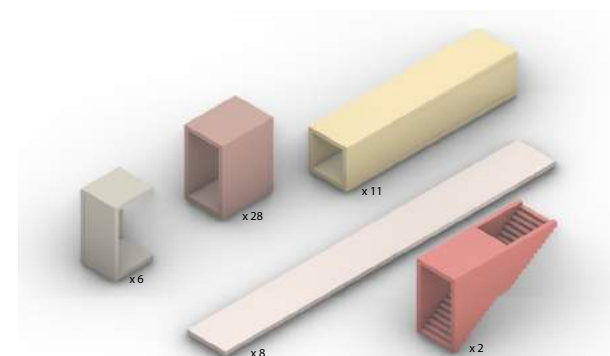


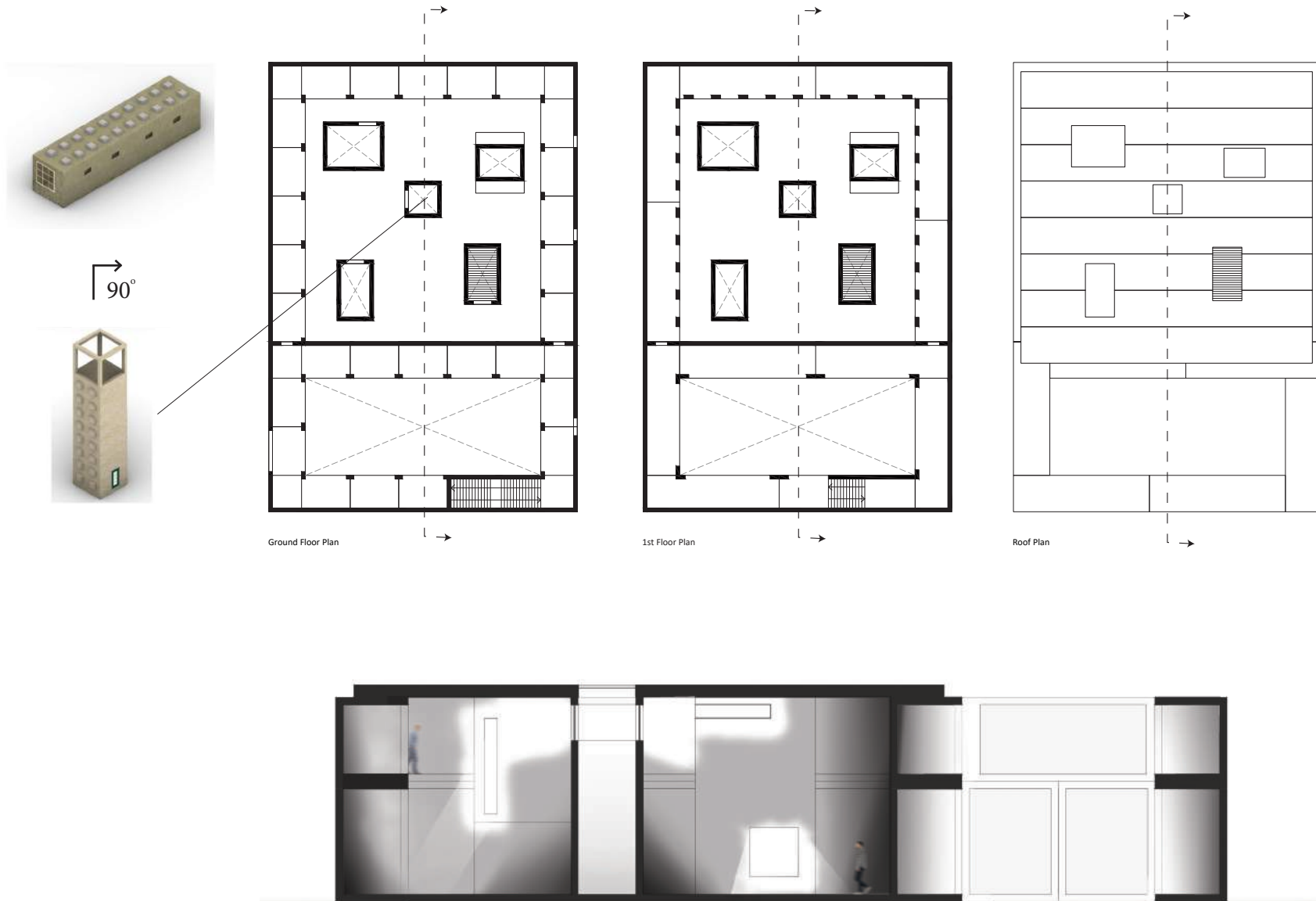
Understanding the space by counting

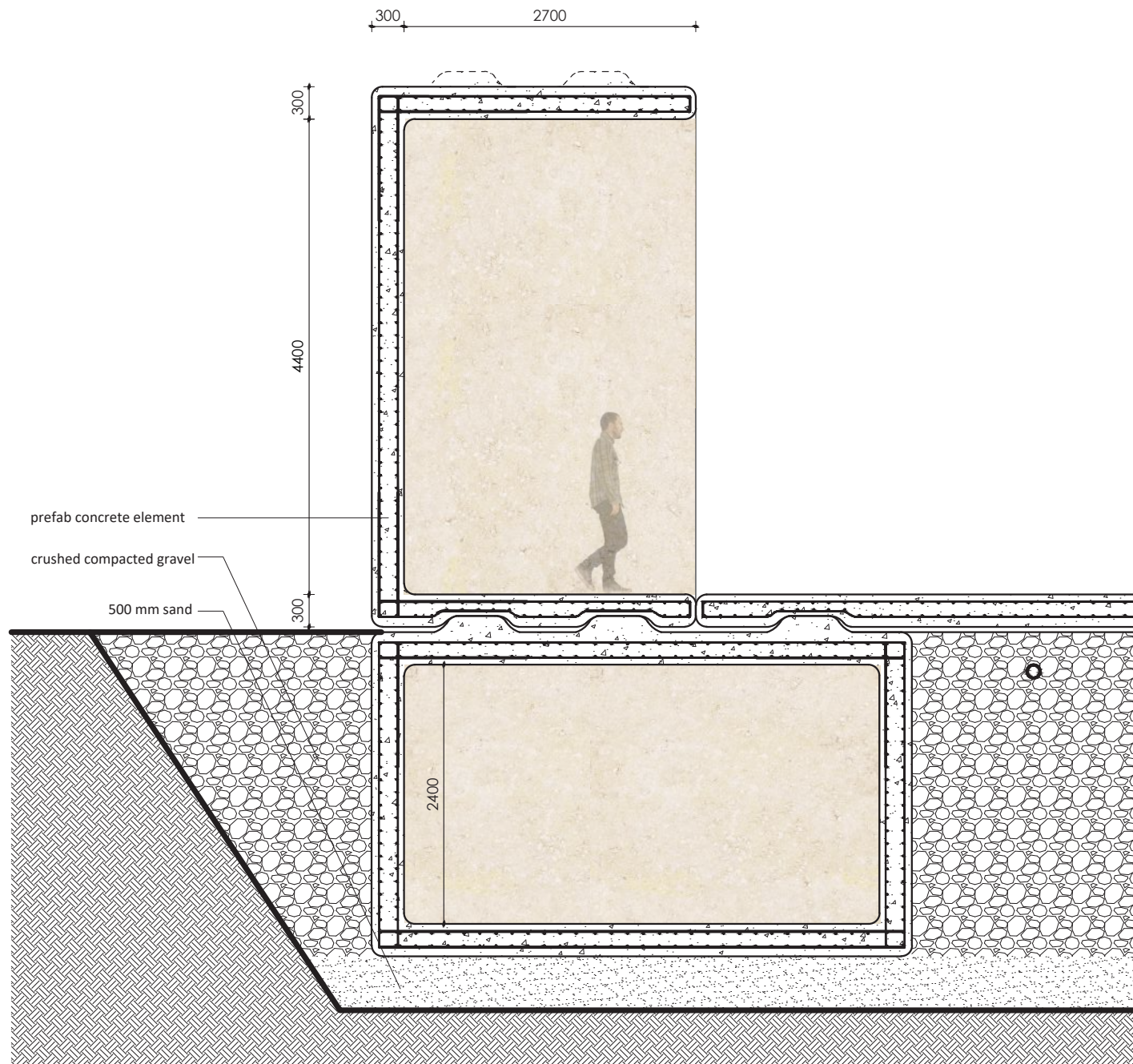




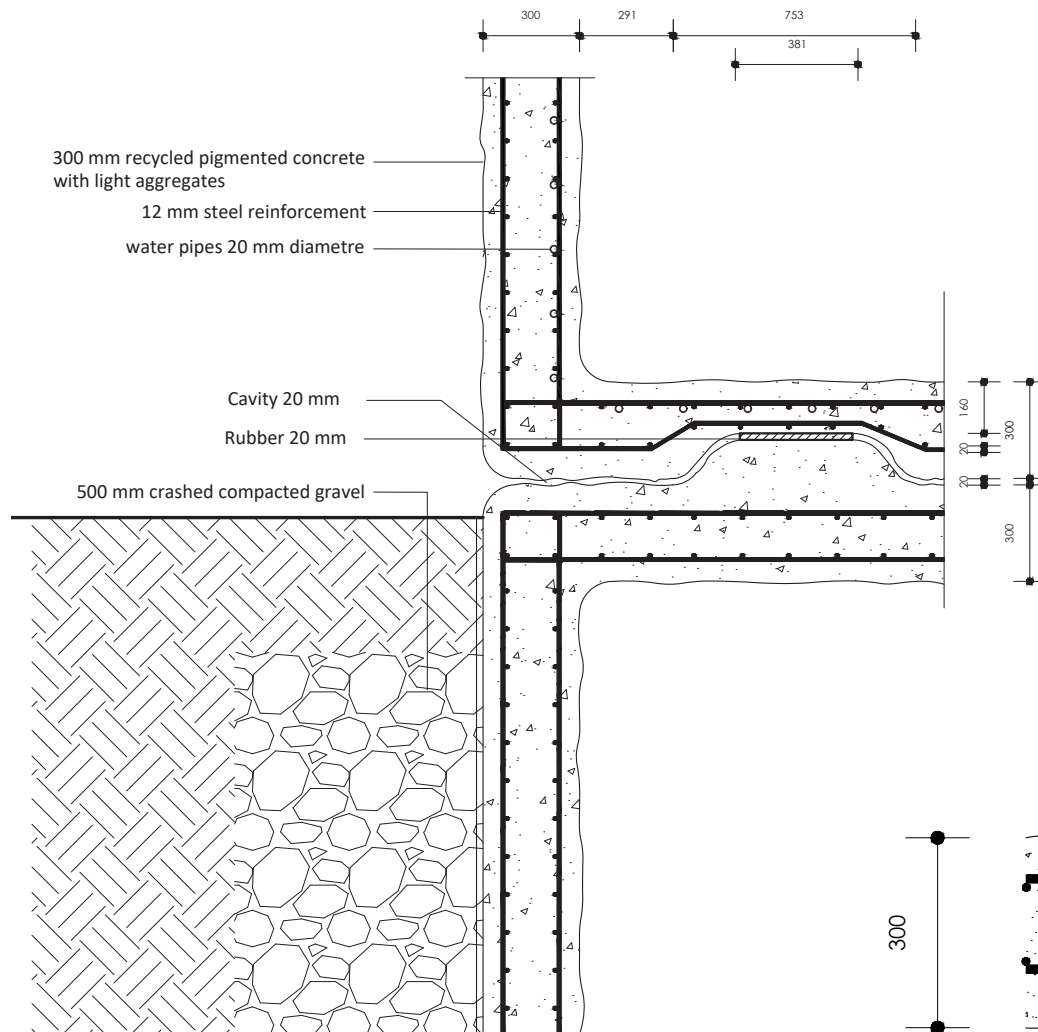
Understanding the space by counting & as a set of grids



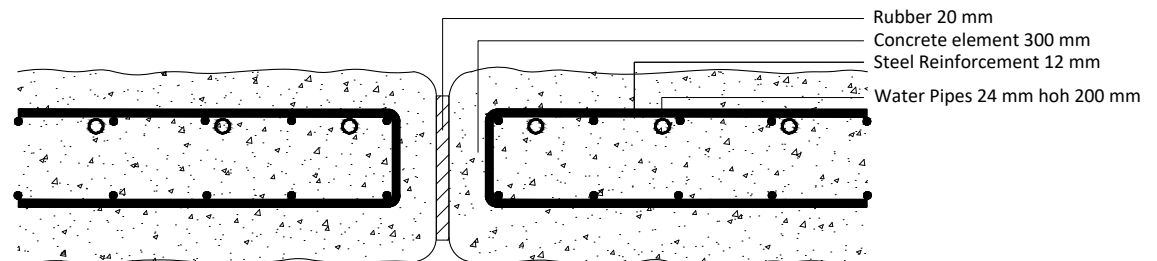




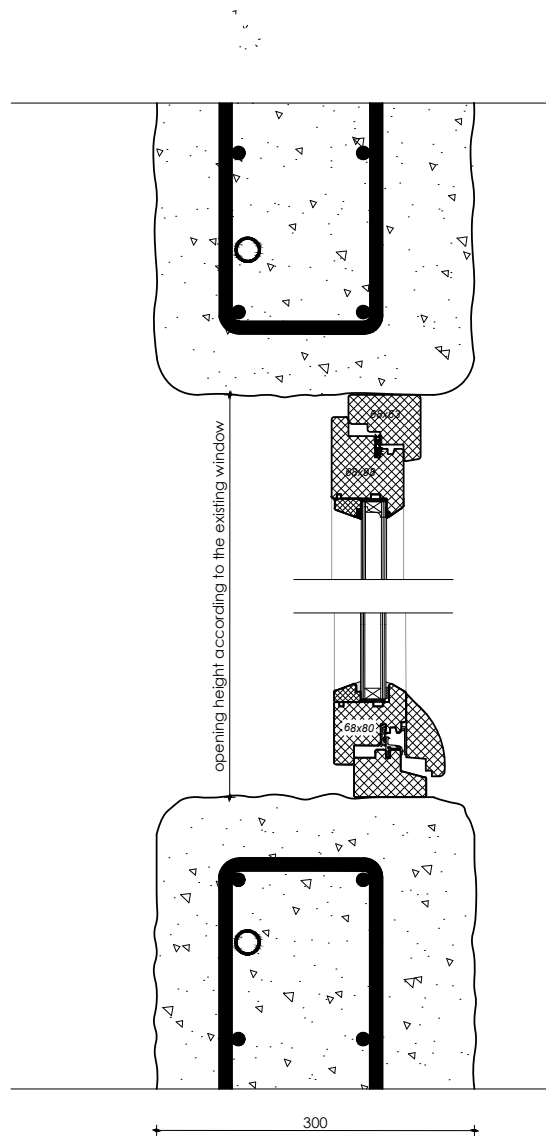
detail: Interlocking Structure
scale 1:20



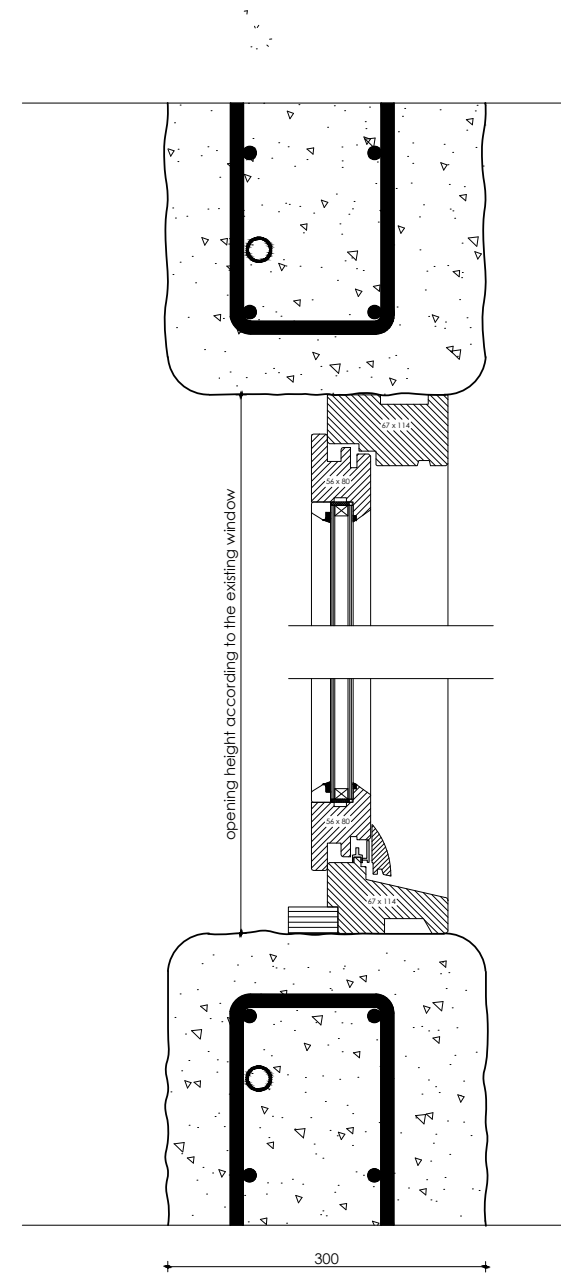
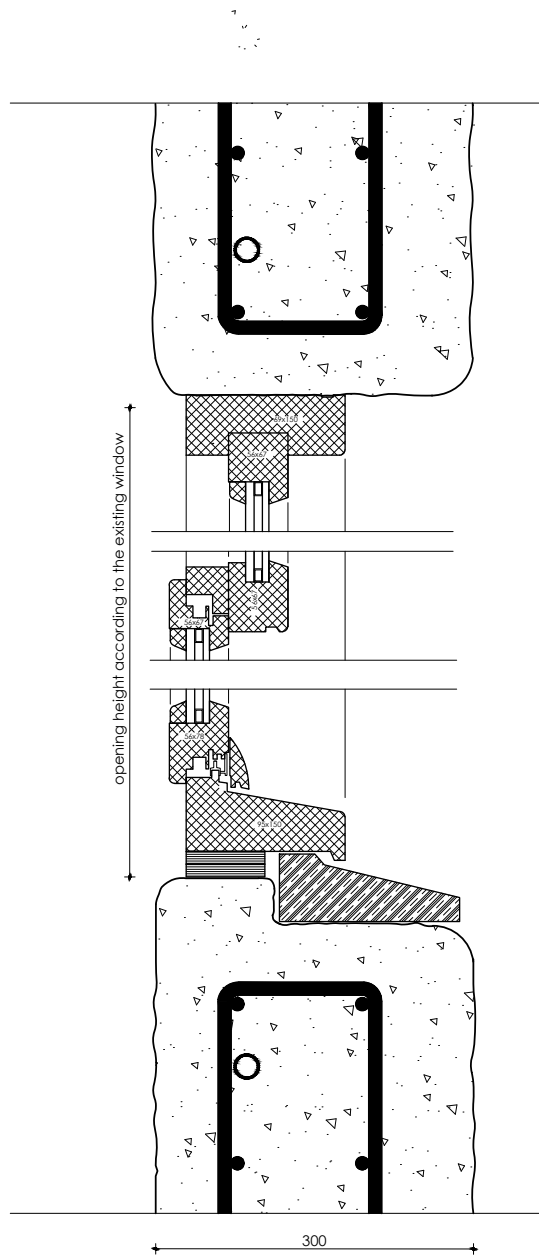
detail floor - foundation
scale 1:10

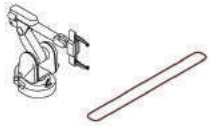


Horizontal Detail
1:5

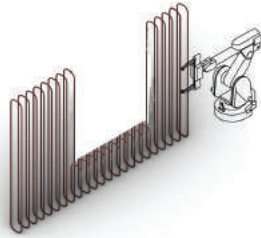


Opening Details
Scale 1:5

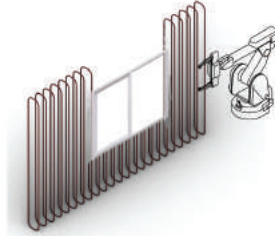




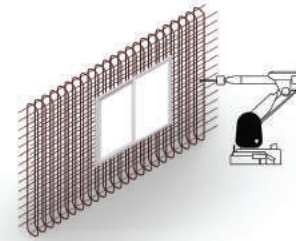
Prefabrication of vertical reinforcement



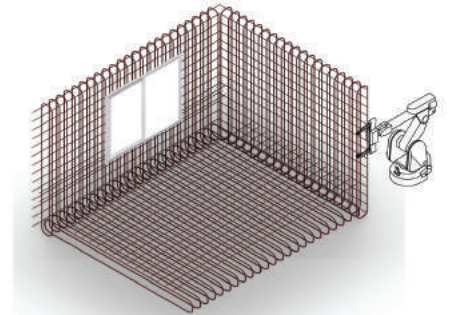
Assemblage of vertical reinforcement forming a specific size opening



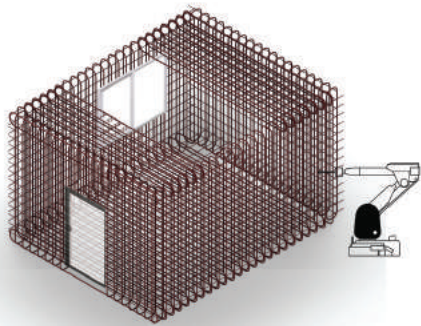
Existing window re-used and places within the fabricated opening



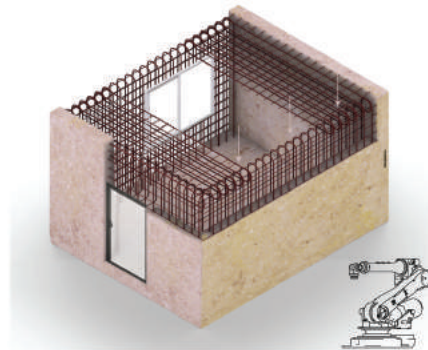
Prefabrication of horizontal reinforcement via Novel robotic wire application



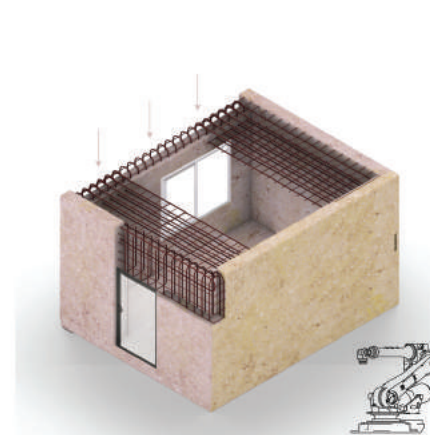
Assemblage of the different sides of the concrete element



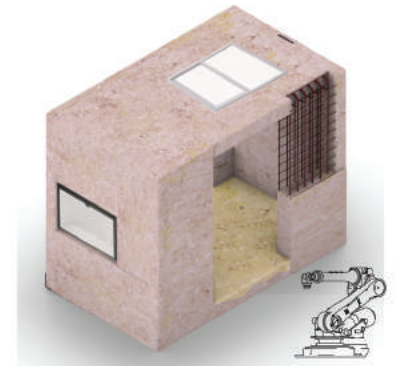
Prefabrication of the last horizontal reinforcement after door installation



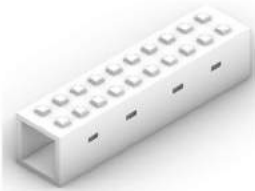
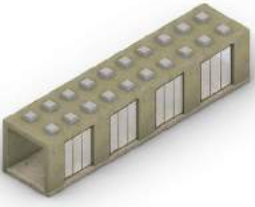
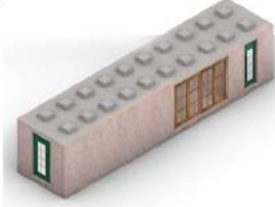
Concrete spraying using the robotic arm. The robot first applies the concrete on the inside of the element and customises each side according to a specific colour



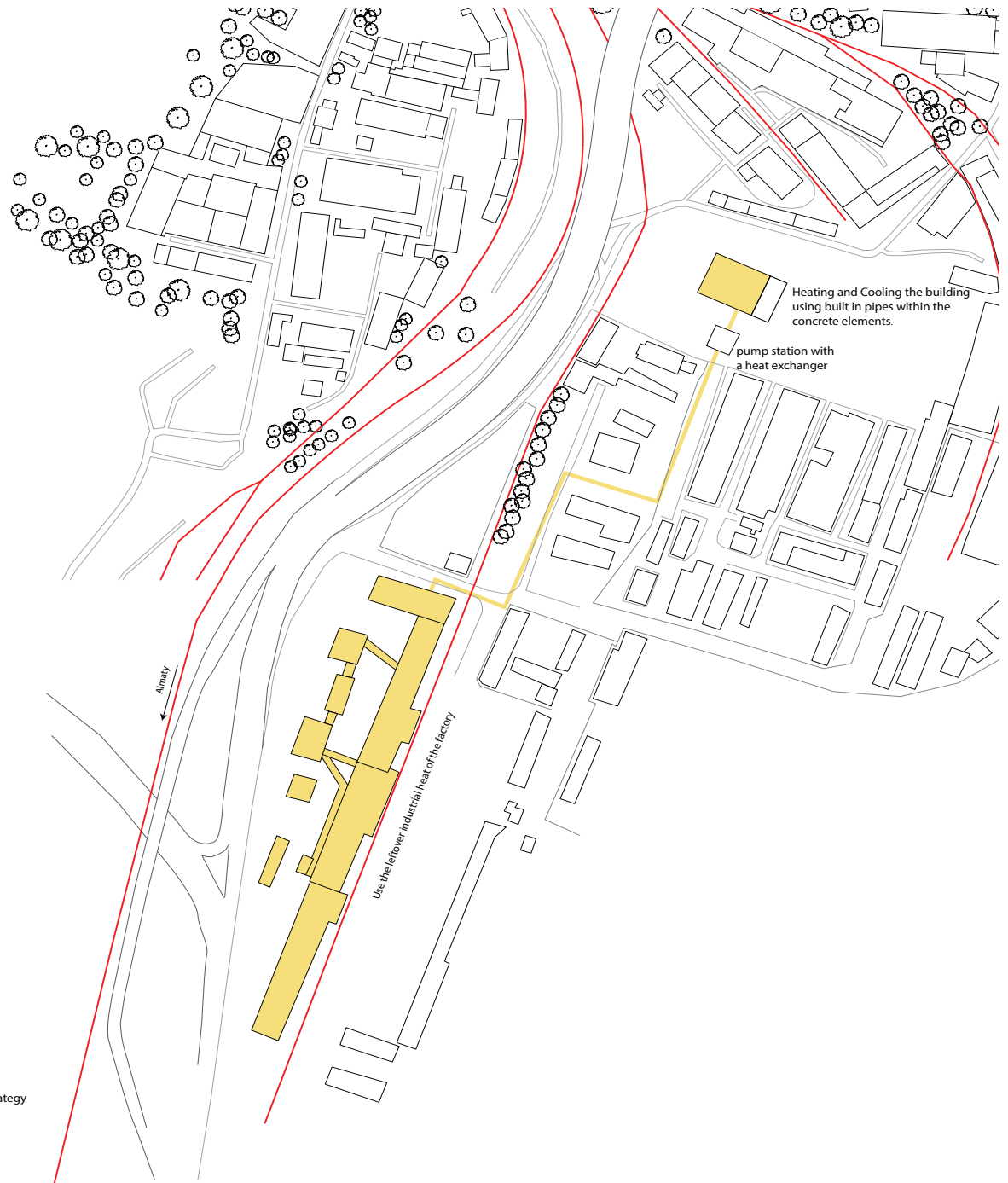
Concrete spraying using the robotic arm from the outside. The inside and outside concrete differ in their aggregates size.

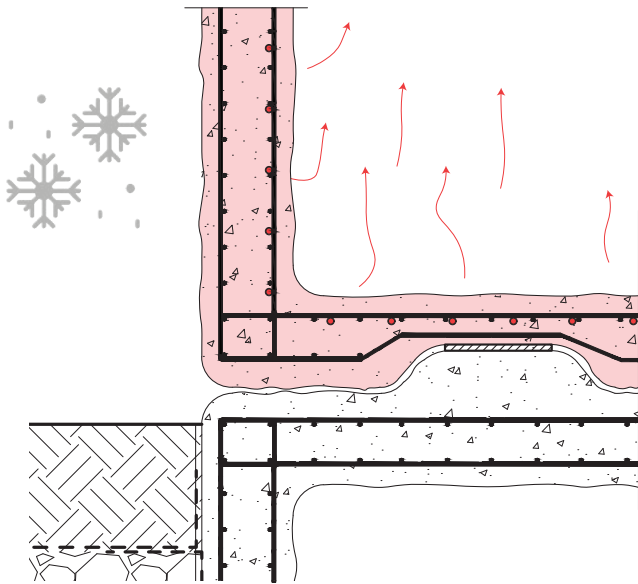


After the concrete is dried, the element is flipped 90 degrees in order to apply concrete on the roof

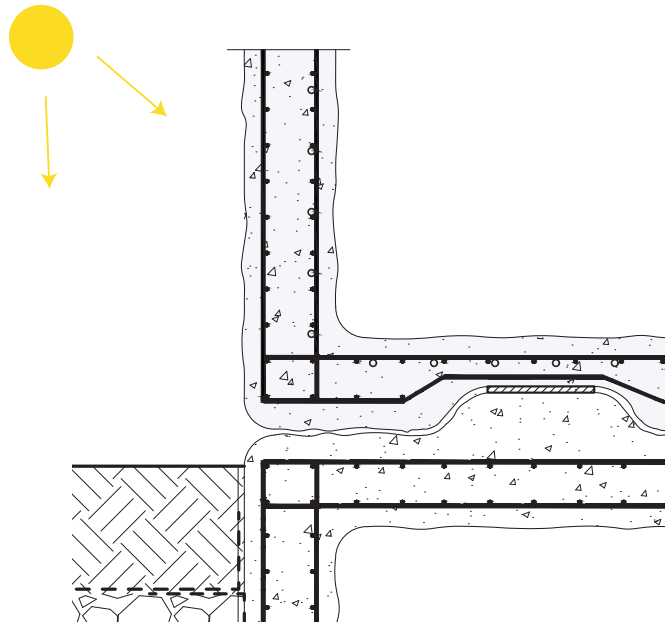
digital elements	∞ Possible Customised Outcomes / Variables: Openings, Colour of concrete, size of aggregates, rotation				
1. 	1a. 	1b. 	1c. 	1d. 	1e. 
2. 	2a. 	2b. 	2c. 	2d. 	2d. 
3. 	3a. 	3b. 	3c. 	3d. 	3d. 
4. 	4a. 	4b. 	4c. 	4d. 	4e. 
5. 	5a. 	5b. 	5c. 	5d. 	5e. 

heating / Cooling strategy

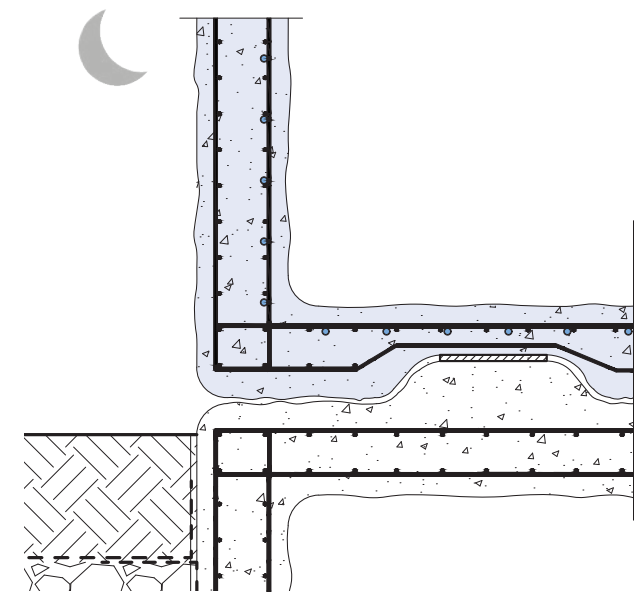




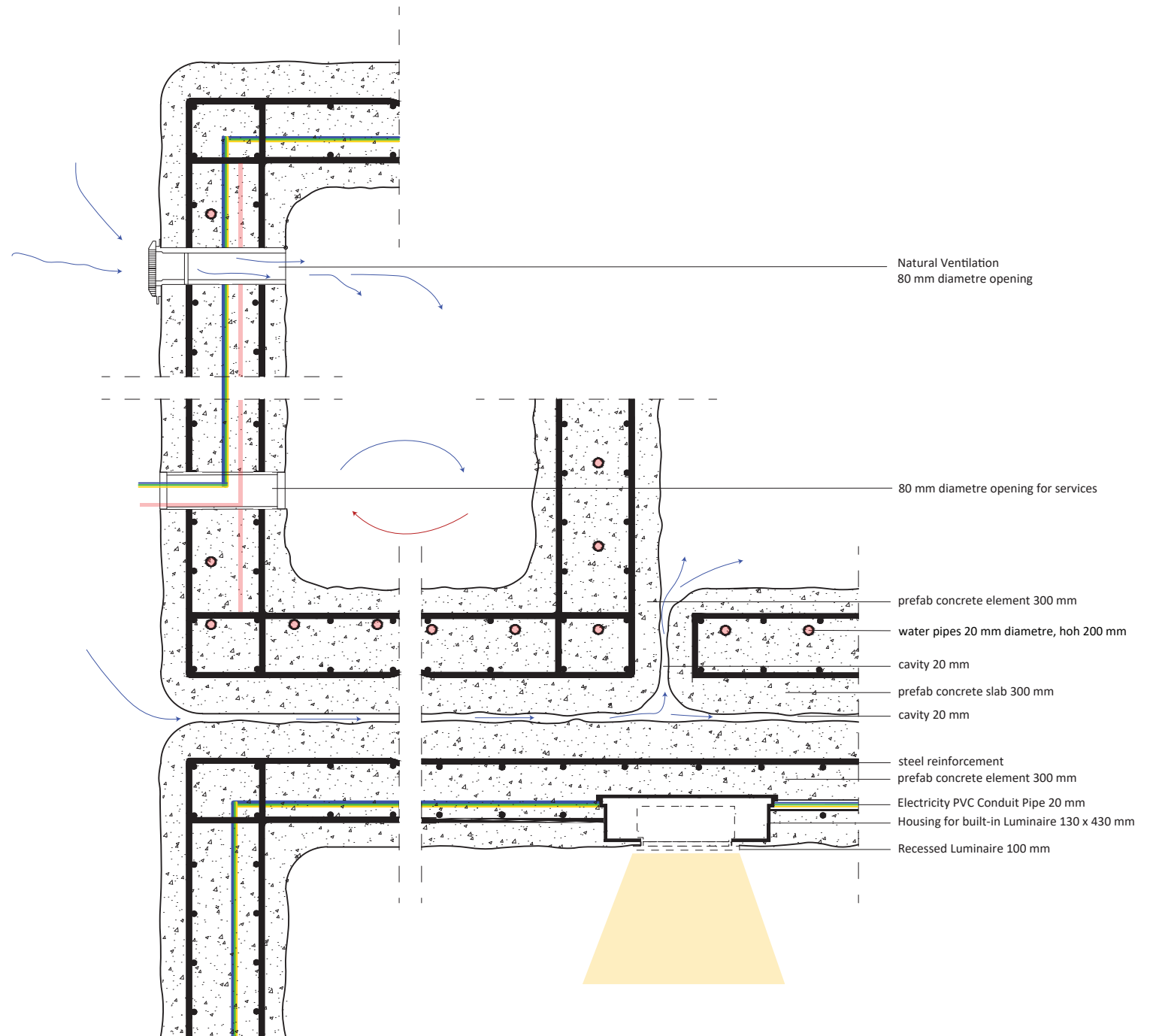
Thermal Comfort: Winter
Active Insulation / Using the mass of the concrete to heat up the space

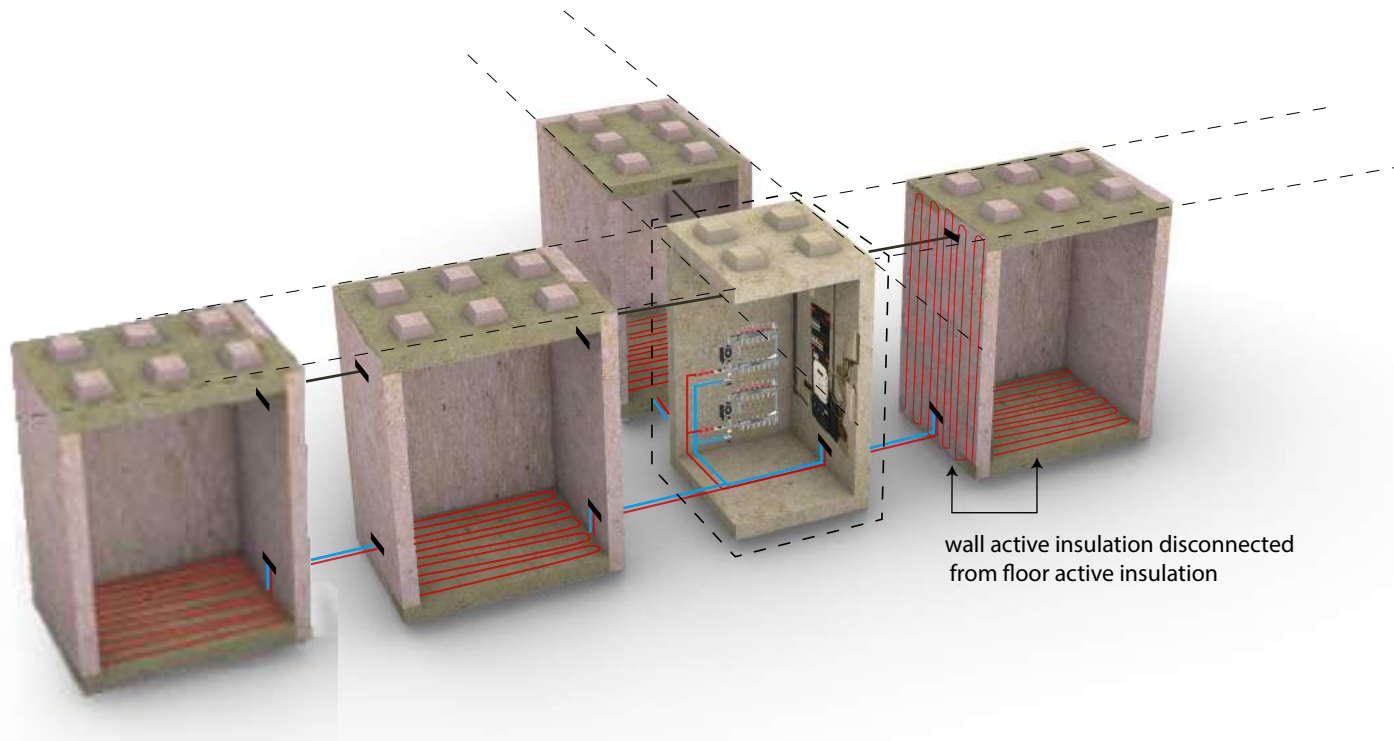


Thermal Comfort: Summer - Daytime
Active Insulation: Using the mass of the concrete to cool down the space



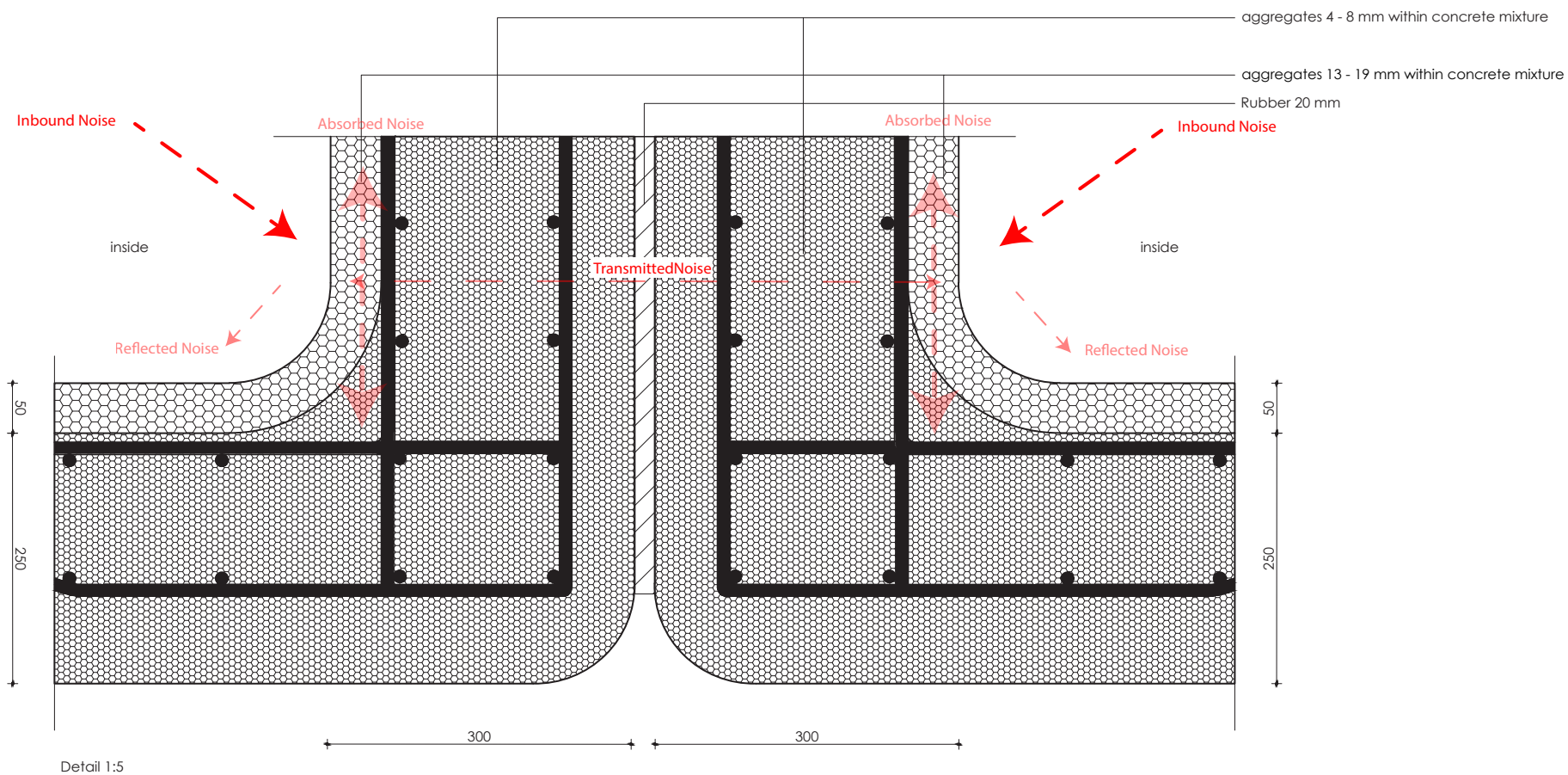
Thermal Comfort: Summer - Nighttime
Active Insulation: Using the mass of the concrete to cool down the space

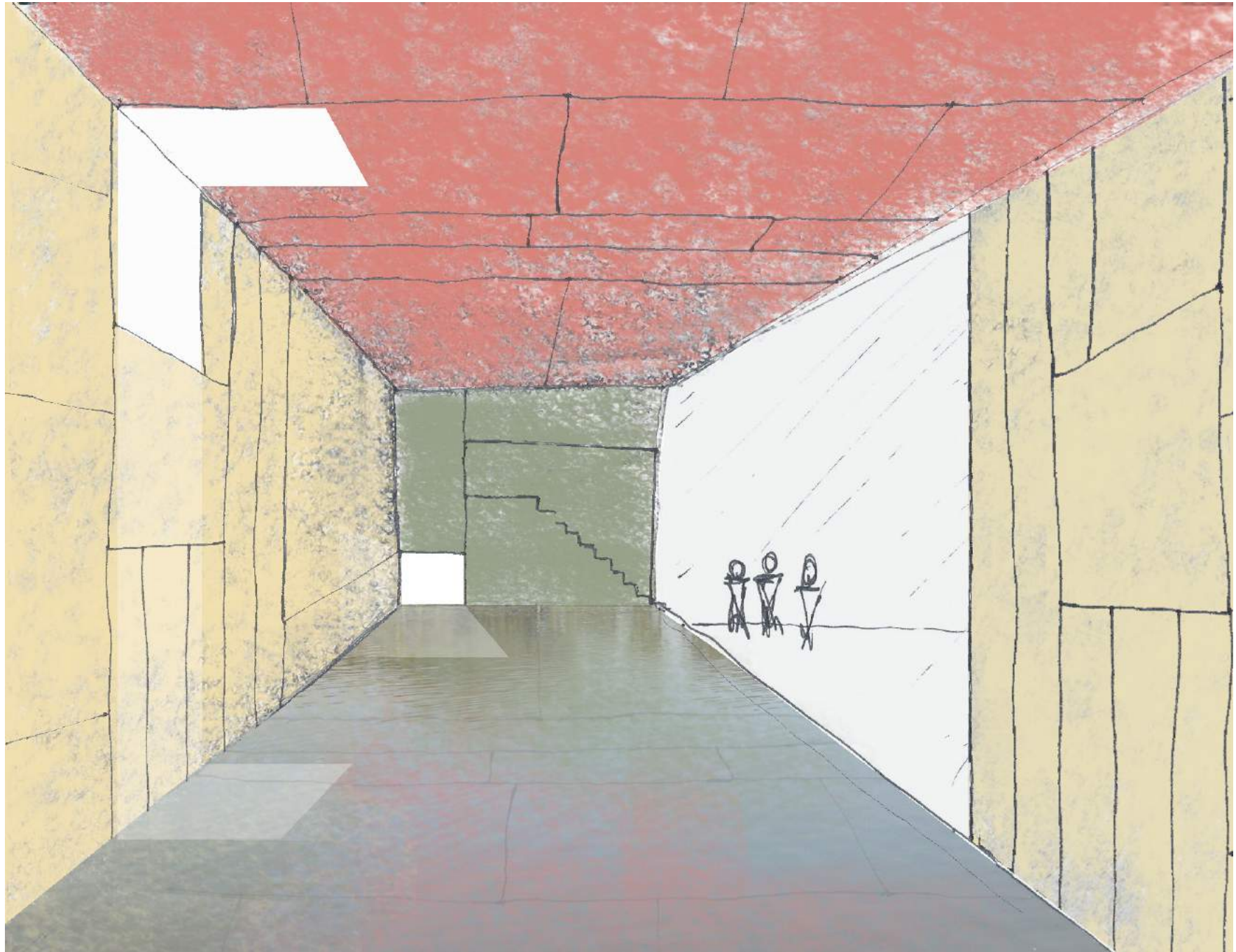


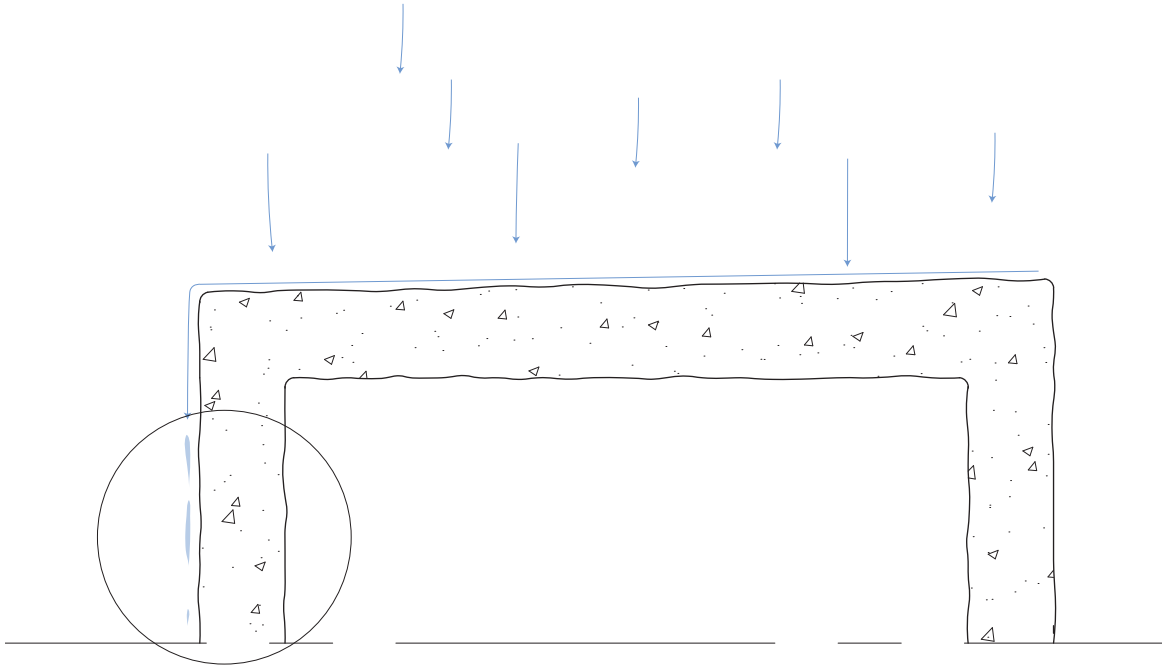


One concrete element can be used as a technical room.
 Water pipes and electricity installations are connected to the technical room via openings on the concrete
 Openings can be used for services or ventilation







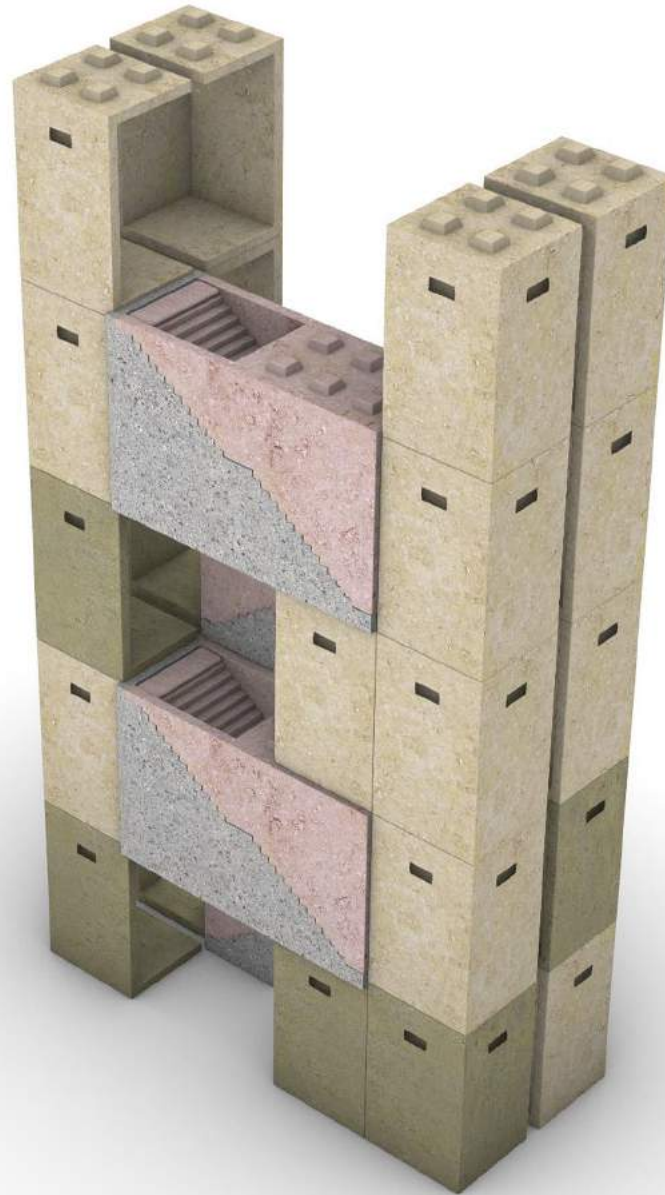


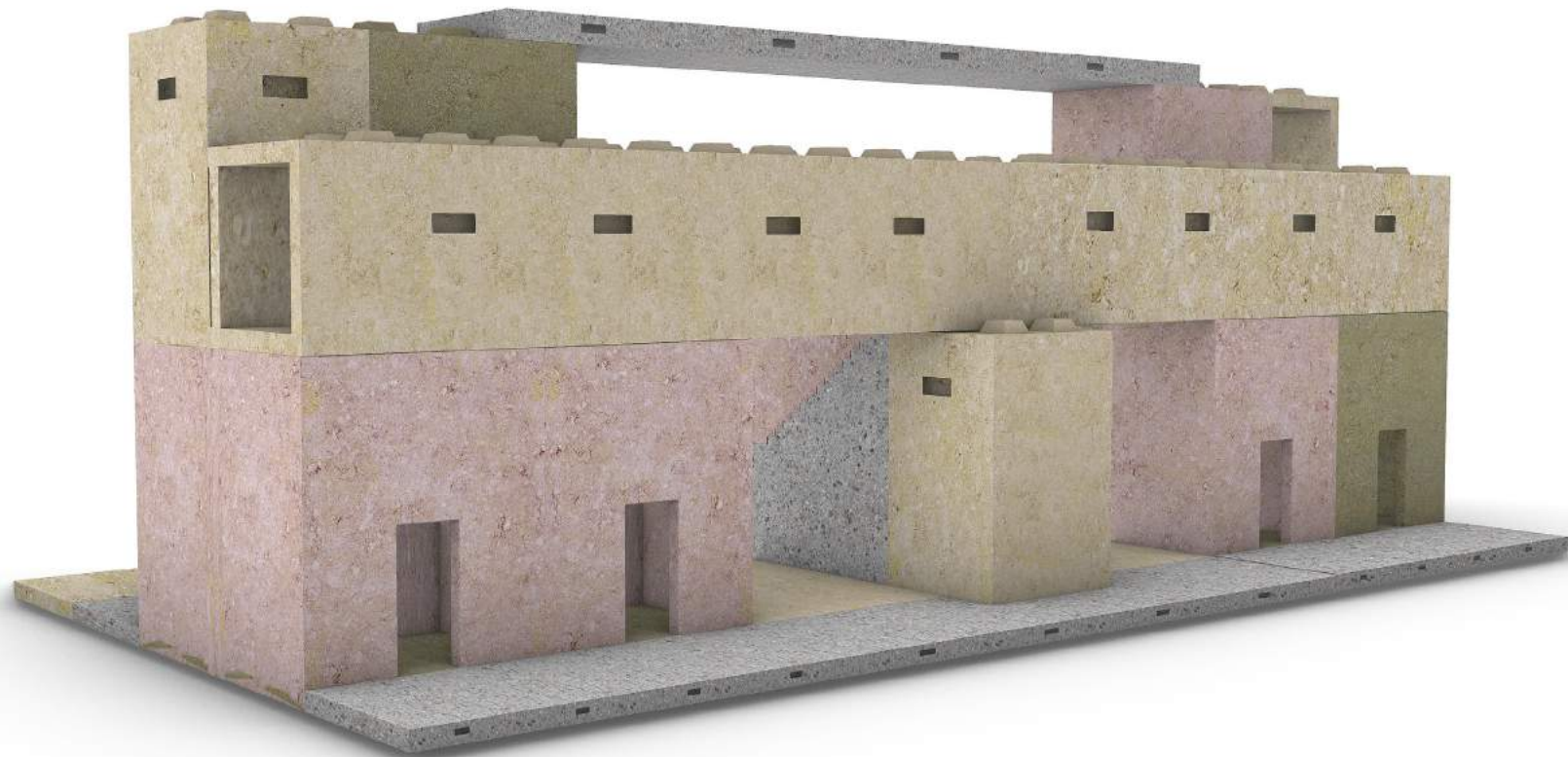
Roof has an inclination of 1 degree in order for the rain water to leave the roof of the concrete element and fall on the ground

Rain Water



Wet concrete Surface



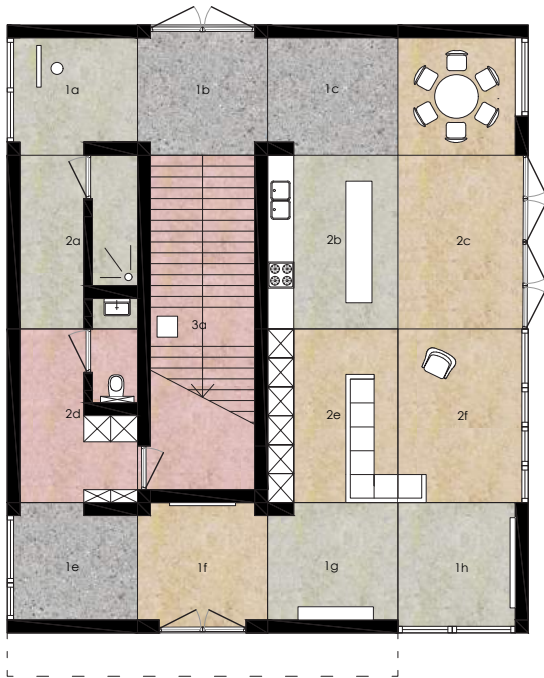




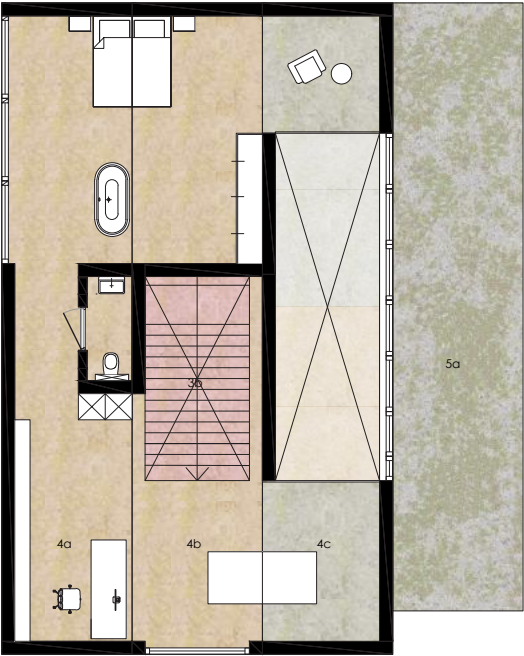


Exterior facade and vegetation

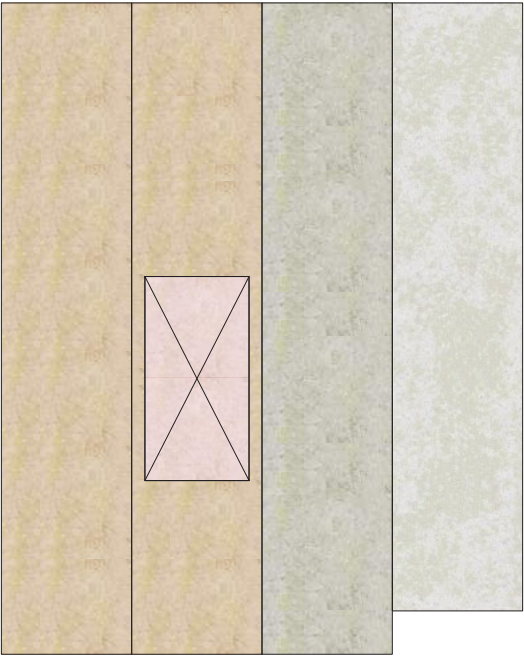




Ground Floor Plan
scale 1:100



First Floor Plan
scale 1:100



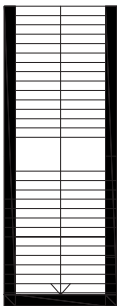
Roof Plan
scale 1:100



Element 1: 3 x 3 m
Height: 5 m



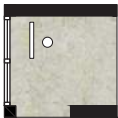
Element 2: 3 x 4 m
Height: 5 m



Element 3: 3 x 8 m
Height: 5 m



Element 4: 3 x 15 m
Height: 3.6 m



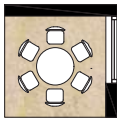
1a:
painting element



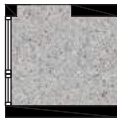
1b:
circulation element



1c:
circulation element



1d:
dining element



1e:
circulation element



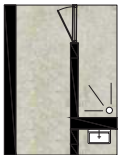
1f:
entrance element
with painting



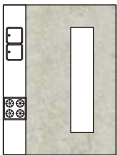
1g:
circulation element
with furniture



1h:
circulation element
with mirror



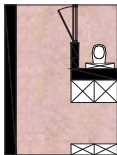
2a:
circulation / shower /
toilet element



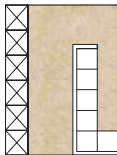
2b:
kitchen element



2c:
circulation element



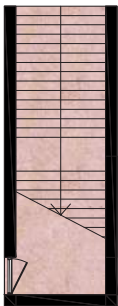
2d:
circulation / toilet /
closet element



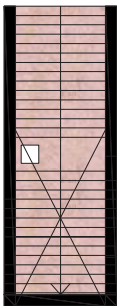
2e:
kitchen / living element



2f:
living / circulation
element



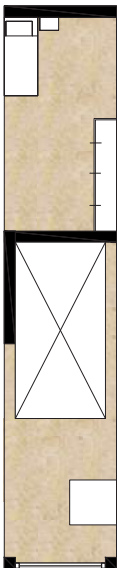
3a:
storage / stairs
element



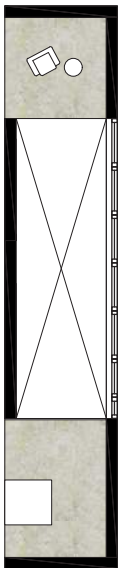
3b:
stairs element



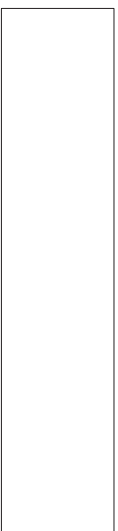
4a:
studio / toilet /
bedroom element



4b:
studio / bedroom
element



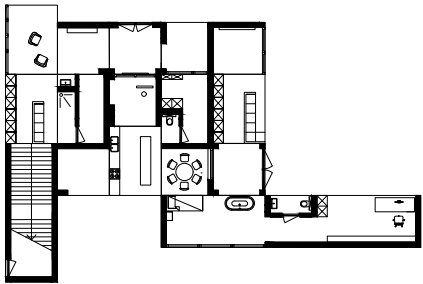
4c:
studio / bedroom
element



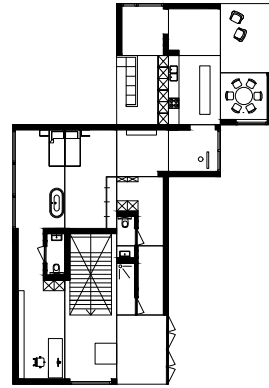
Element 5: 3 x 15 m
Thickness: 0,3 m



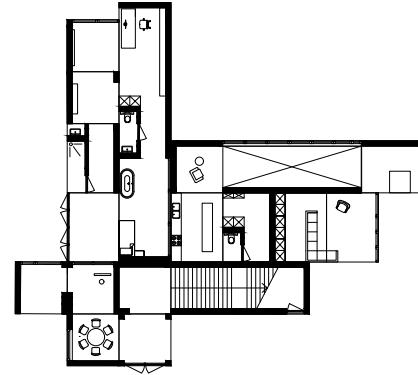
5a:
roof slab element



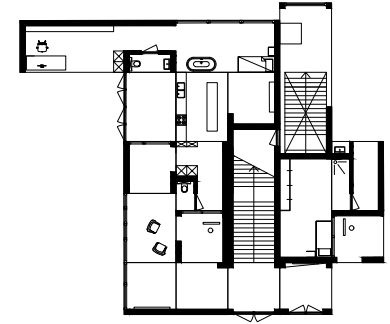
Ground Floor Plan example 1



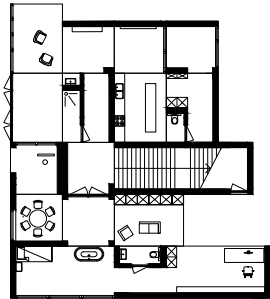
First Floor Plan example 1



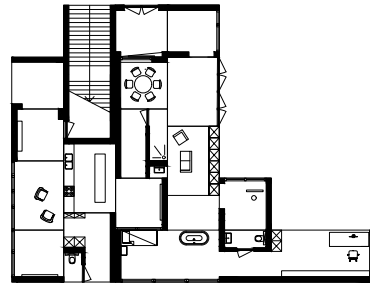
Ground Floor Plan example 4



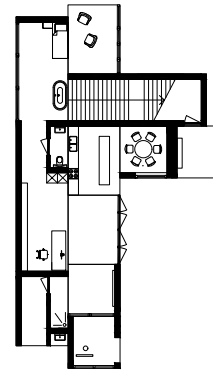
First Floor Plan example 2



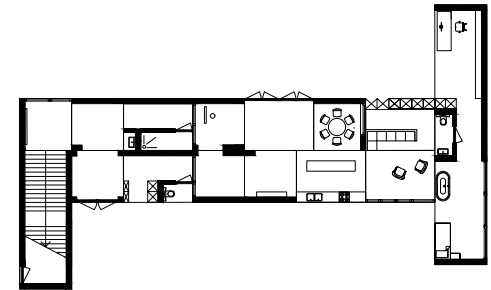
Ground Floor Plan example 2



Ground Floor Plan example 3



Ground Floor Plan example 5



Ground Floor Plan example 6







