



**Politecnico di Milano**

SCHOOL OF ARCHITECTURE URBAN PLANNING CONSTRUCTION ENGINEERING

Master of Sciences in Building and Architectural Engineering

ACADEMIC YEAR 2019-2020

## A School for All

A Renovation project of a Secondary School in a remote place in the north-east of France, towards revitalisation and sustainability

MASTER THESIS

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**Drawings of the Design**

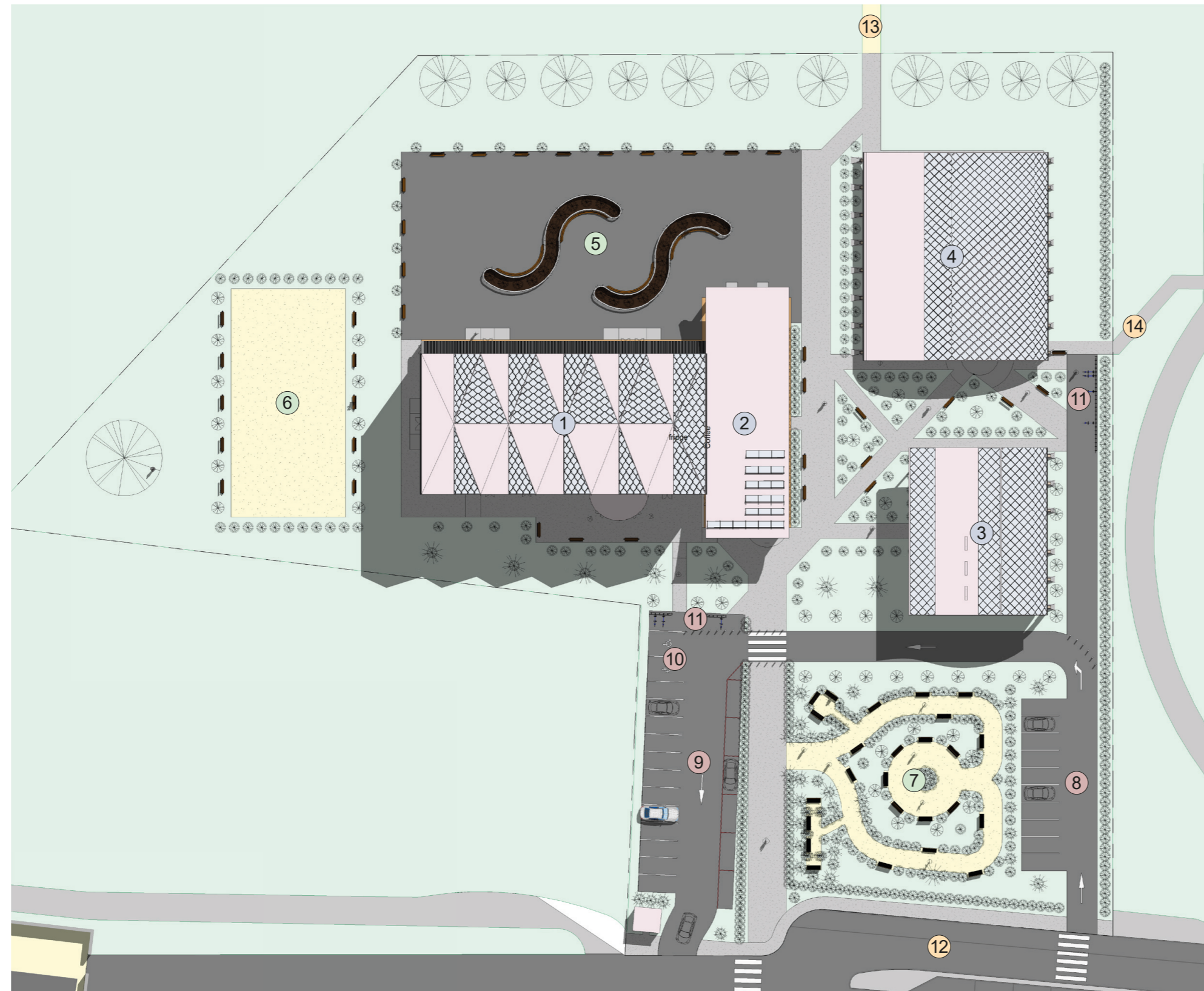
**DESIGN****Table of Contents**

<b>Pictures of the actual state</b>	<b>3</b>
<b>Plan</b>	<b>5</b>
Masterplan . . . . .	5
Main Building & Cafeteria . . . . .	6
Ground floor	
First floor	
Second floor	
Last floor	
Roof	
Fitness . . . . .	11
Ground floor	
First floor	
Roof	
Dojo . . . . .	14
Floor plan	
Roof	
Accessibility . . . . .	16
From the town	
Within the ground floors	
<b>Elevation</b>	<b>18</b>
Site . . . . .	18
South (secondary entrance) & North (main entrance)	
West & East	
Main Building & Cafeteria . . . . .	20
South	
North	
West	
East	
Fitness . . . . .	24
South & North	
West & East	
Dojo . . . . .	26
South & North	
West & East	
<b>Section</b>	<b>28</b>
Location . . . . .	28
North → South . . . . .	29
East → West . . . . .	30
<b>Isometric view</b>	<b>31</b>
North-east . . . . .	31
South-east . . . . .	32
South-west . . . . .	33
North-west . . . . .	34

<b>Render</b>	<b>35</b>
Site . . . . .	35
Car park	
Main entrance	
Secondary entrance	
Garden	
Garden, “private” part	
Main courtyard	
Playground	
Football field	
Indoor . . . . .	43
Dojo	
Fitness	
Cafeteria	
Doctor’s office	
Waiting room (doctors’ floor)	
Co-working space	
Night view . . . . .	49
<b>Additions &amp; Subtractions</b>	<b>50</b>
Main Building . . . . .	50
Ground floor	
First floor	
Second floor	
Last floor	
Fitness . . . . .	54
Ground floor	
First floor	
Dojo . . . . .	56
<b>Structure</b>	<b>57</b>
Existing state . . . . .	57
Floor plan	
Sections	
Main rough details	
Projected state . . . . .	60
Existing columns strengthening	
Last floor columns design	
Seismic . . . . .	62
Transversal loading	
Longitudinal loading	







**Legend:**

Buildings

- ① Main Building
- ② Cafeteria
- ③ Fitness
- ④ Dojo

Spaces

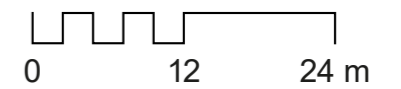
- ⑤ Private courtyard
- ⑥ Playground
- ⑦ Park

Parking spaces

- ⑧ Workers car park
- ⑨ Customers car park
- ⑩ Accessible car park
- ⑪ Bike parks

Accesses

- ⑫ Main access
- ⑬ Secondary access
- ⑭ Connection to existing sports facilities



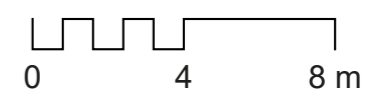
① Masterplan  
1 : 600

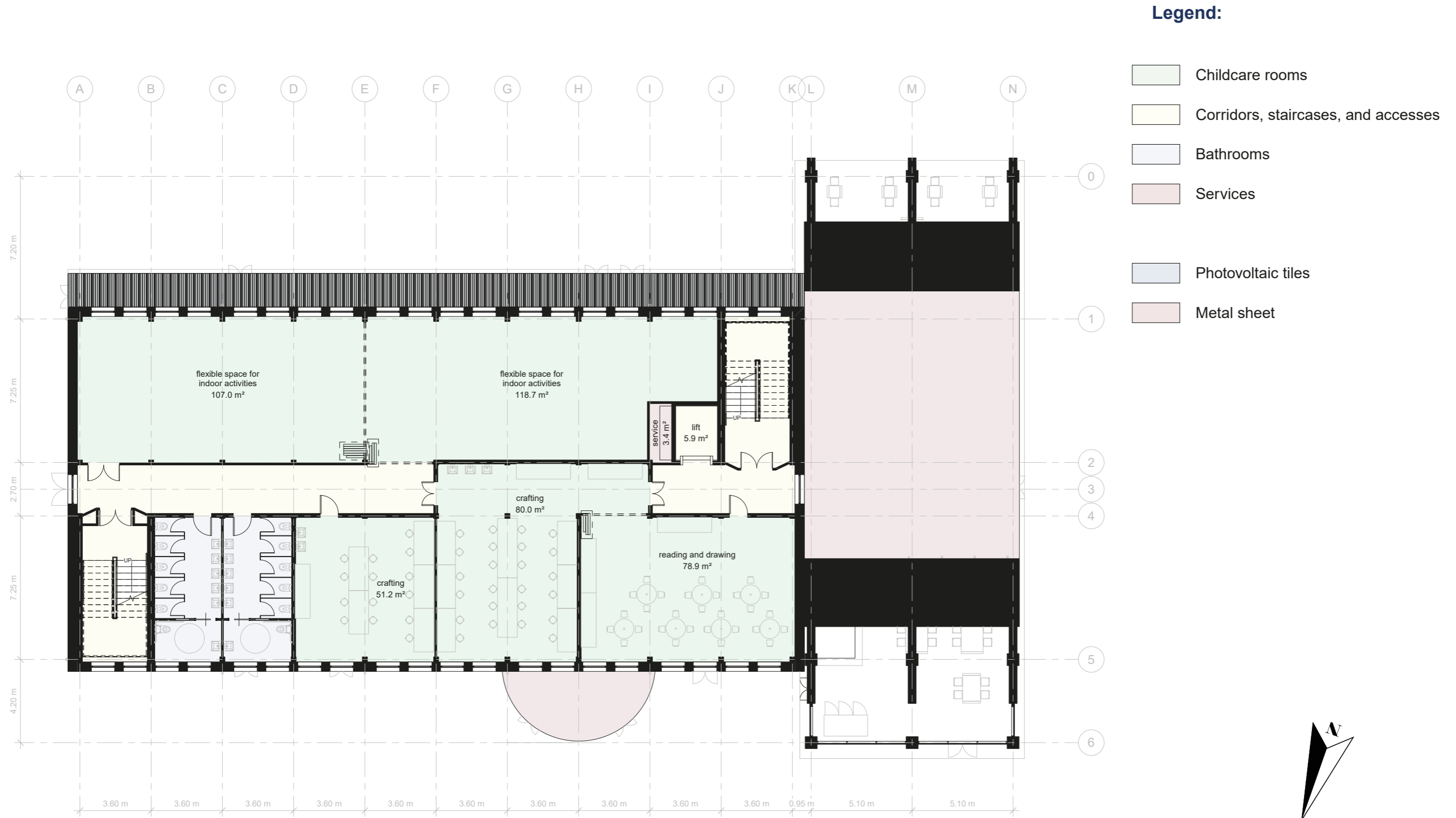
Legend:

- Offices, association rooms, kitchen
- Reception and dining room
- Corridors, staircases, and accesses
- Dressings and bathrooms
- Services
- Terrace

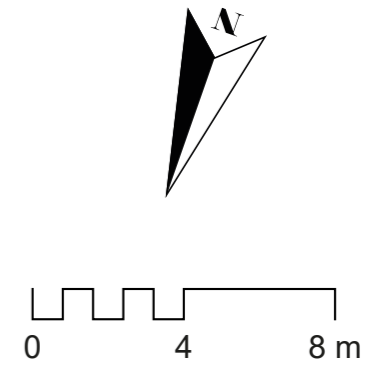


1 Ground floor  
1 : 200



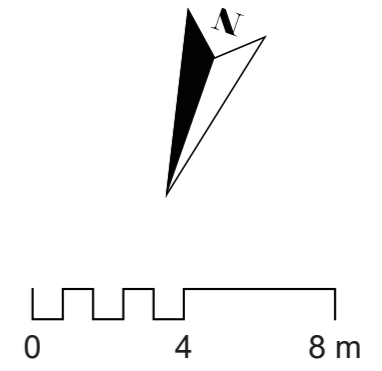


1 First floor  
1 : 200





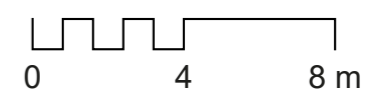
1 Second floor  
1 : 200





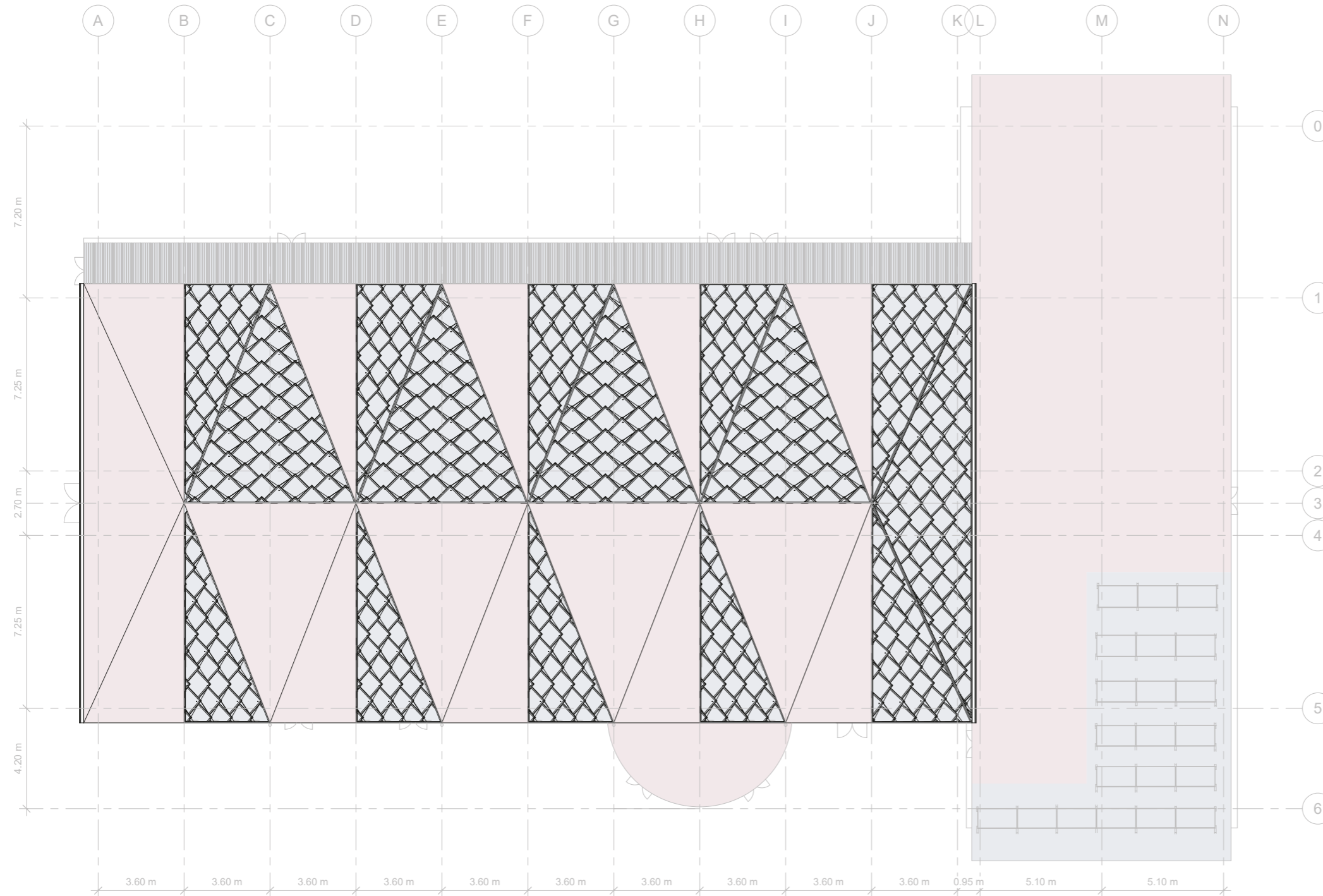


1 Last floor  
1 : 200

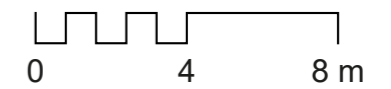


Legend:

- Photovoltaic tiles
- Metal sheet



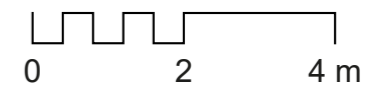
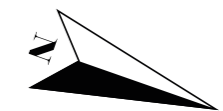
1 Roof  
1:200



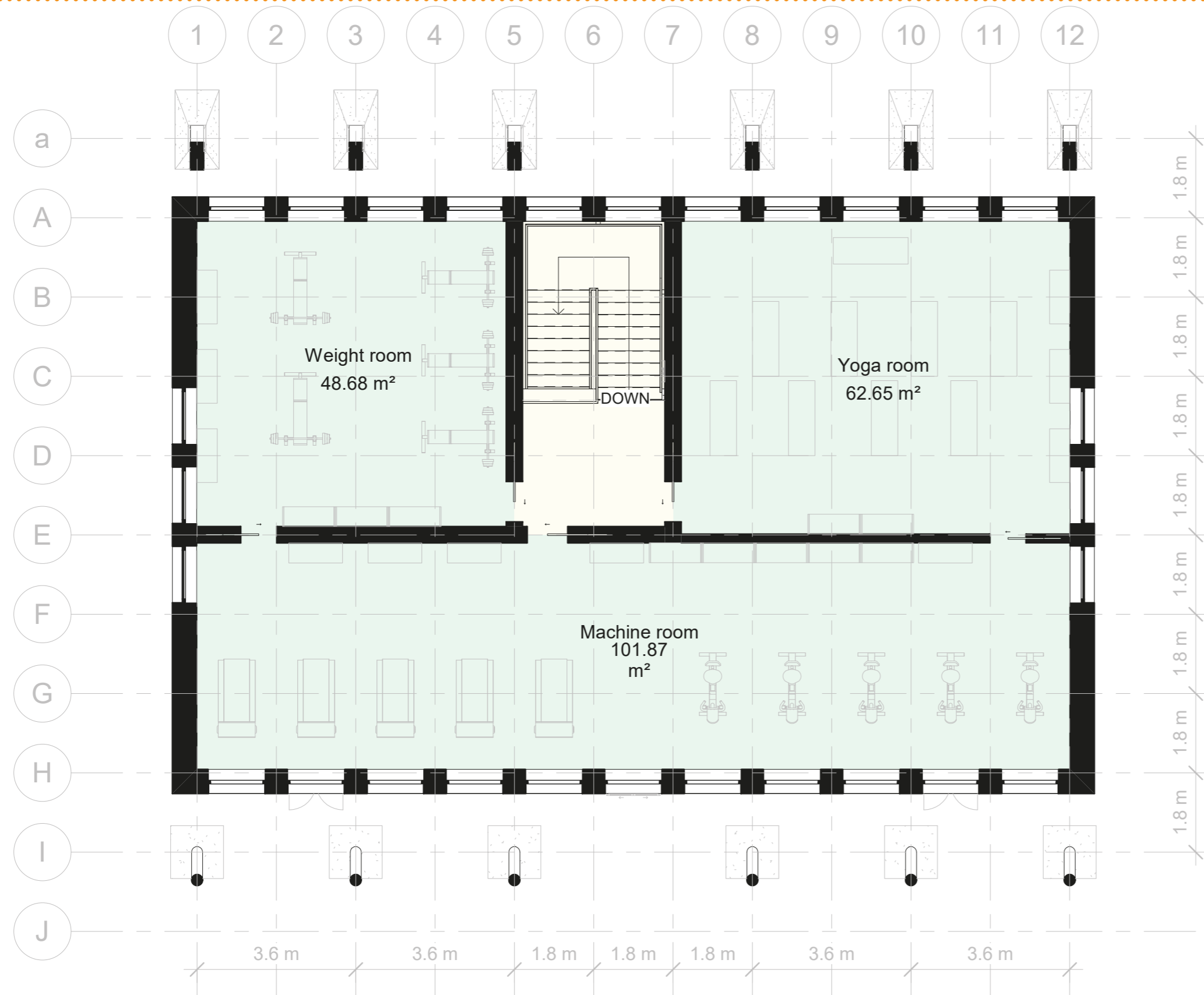


Legend:



- Medicalised fitness room
- Reception and waiting spaces
- Staircase and accesses
- Dressings and bathrooms

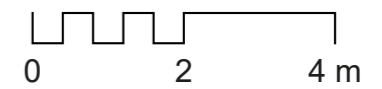
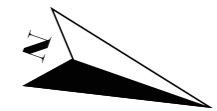


1 Ground floor  
1 : 100

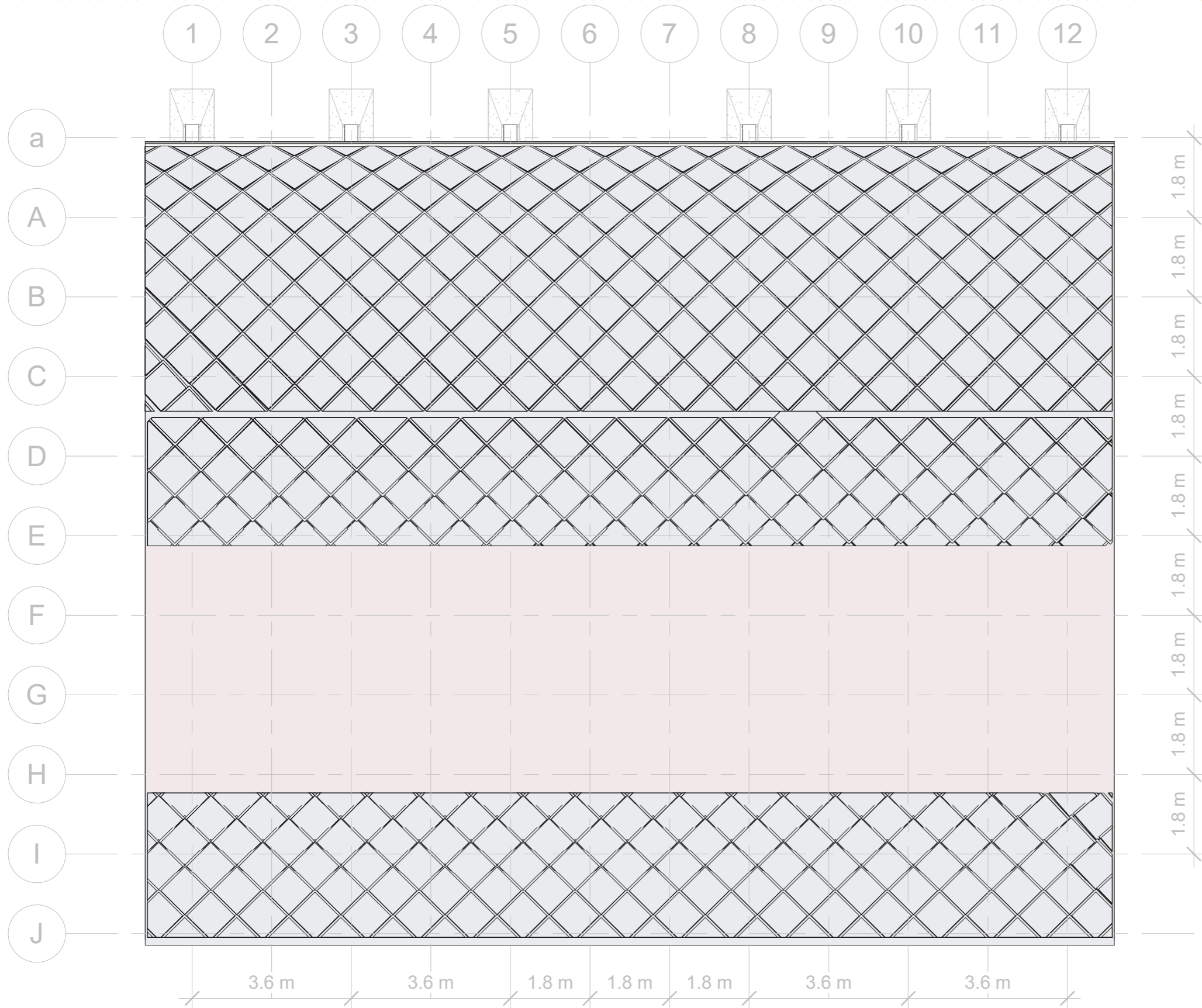


Legend:

-  Fitness rooms
-  Staircase and accesses

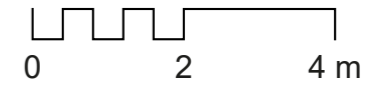
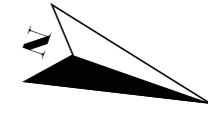


1 First floor  
1 : 100

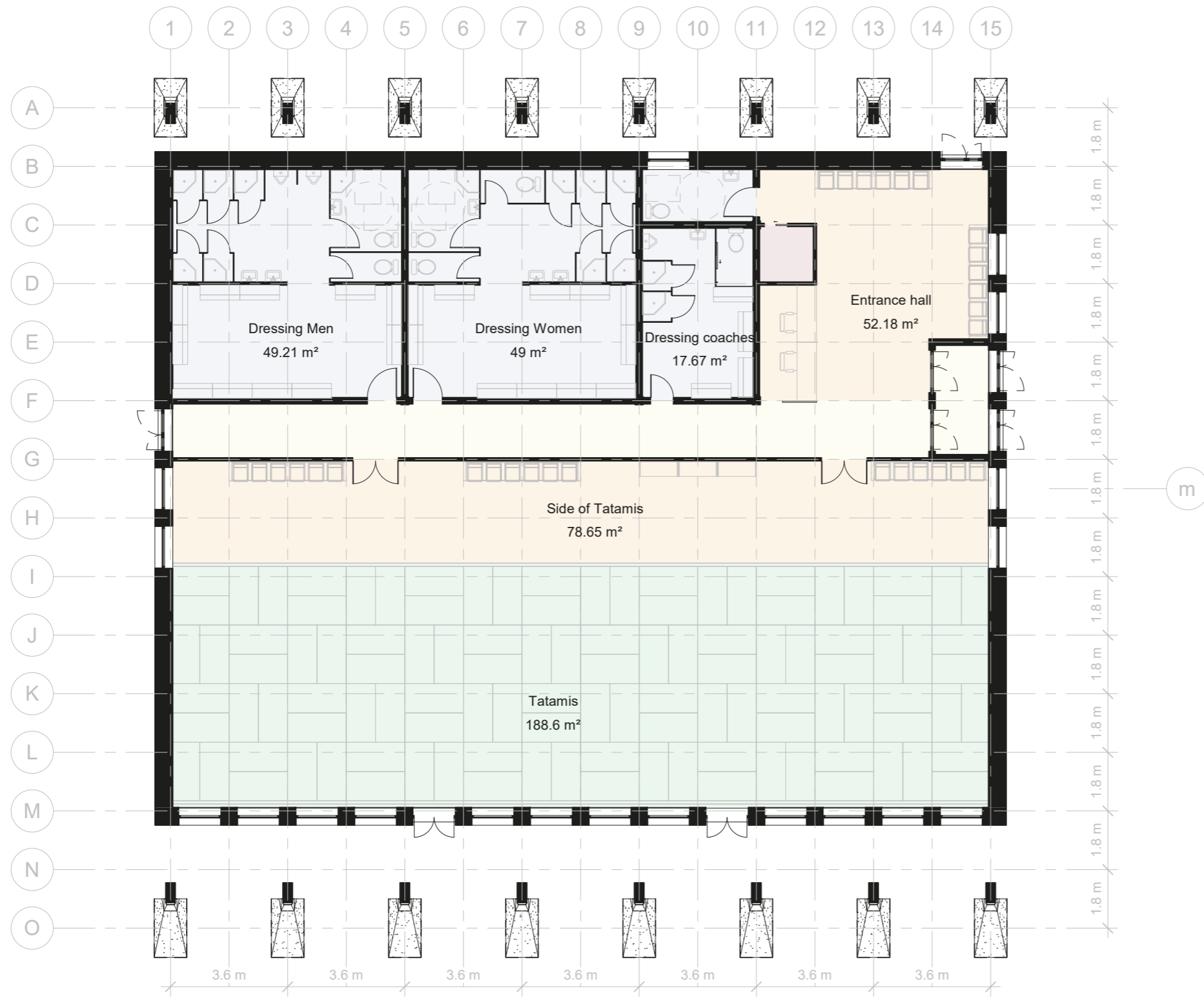


Legend:

- Photovoltaic tiles
- Metal sheet



1 Roof  
1:100



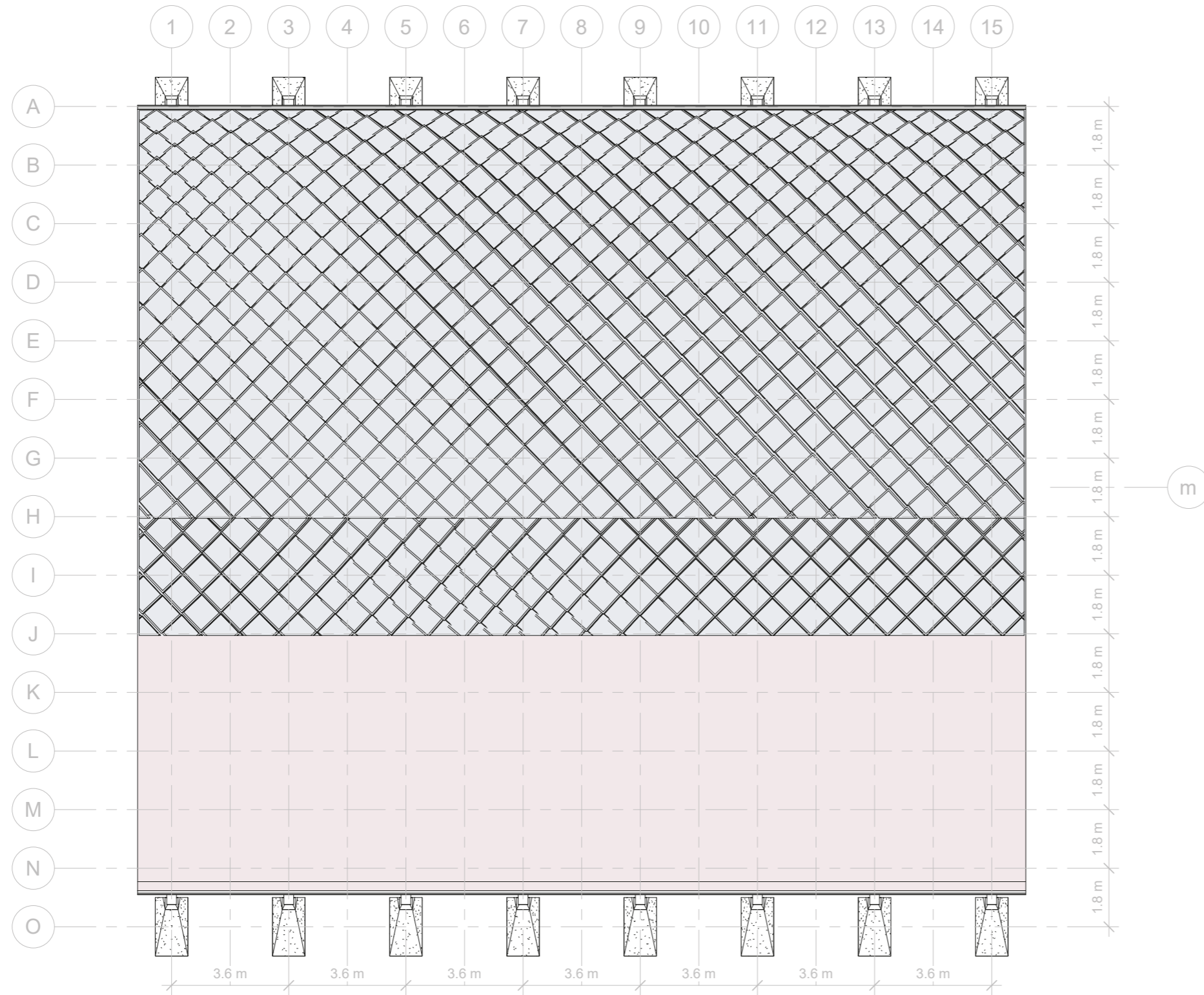
Legend:

- Dojo (Tatamis)
- Reception and waiting spaces
- Corridor and accesses
- Dressings and bathrooms
- Services

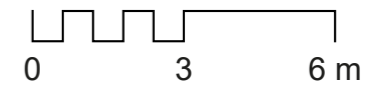
1 Floor plan  
1:150

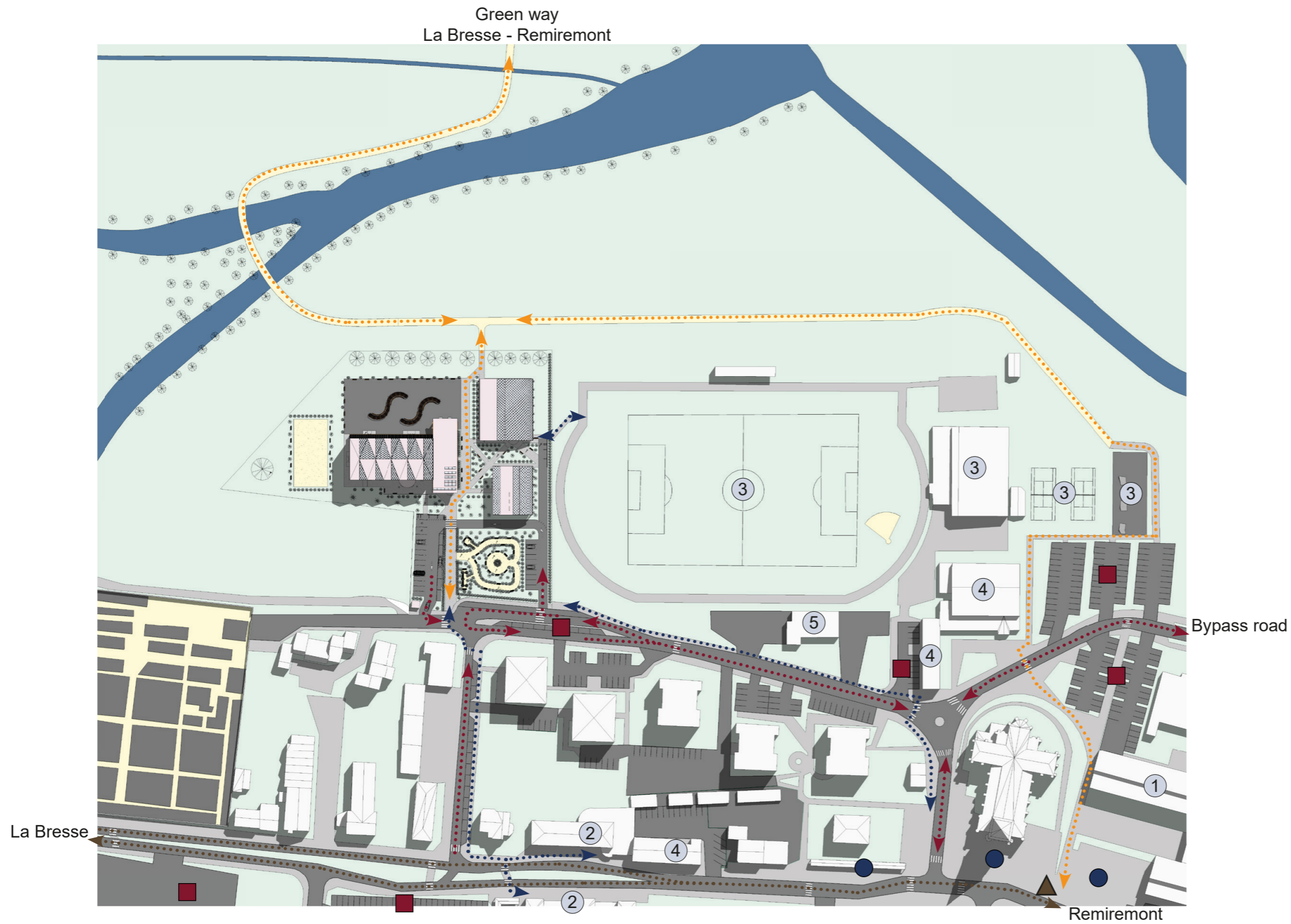
Legend:

- Photovoltaic tiles
- Metal sheet



1 Roof  
1:150





**Legend:**

Bus  
 .....> Bus line & main road

▲ Bus stop

Cars  
 .....> Driving direction

■ "Public" car parks

Bikes  
 .....> Driving direction

Pedestrian  
 .....> Main paths

● Public places

Main functions

① Retirement house

② Schools

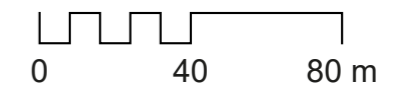
③ Sport facilities

④ Multifunctional spaces

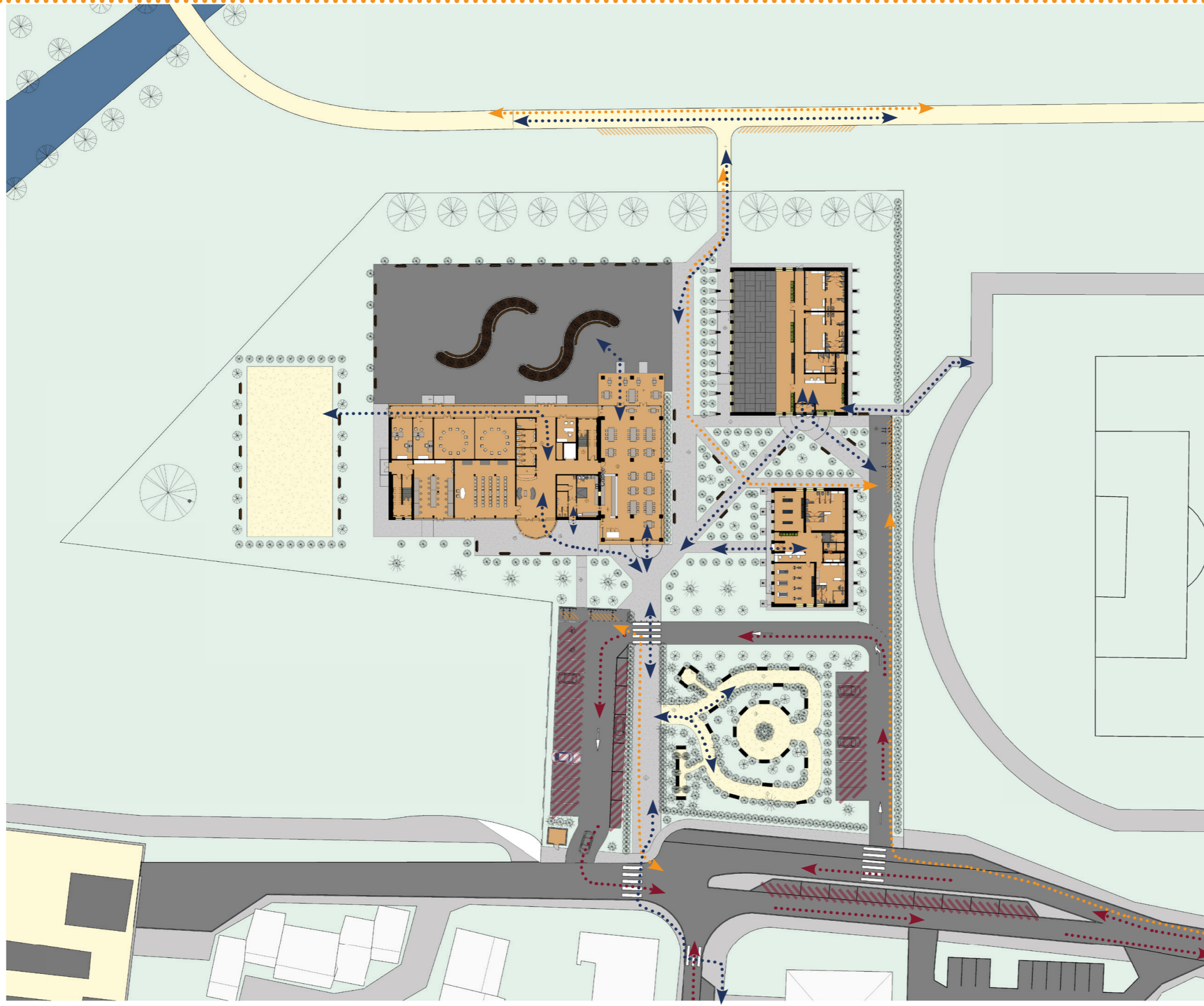
⑤ District heating system



① Masterplan & surrounding  
 1 : 2000







**Legend:**

Cars

.....➔ Driving direction

//// "Public" car parks

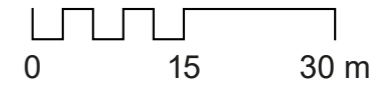
Bikes

.....➔ Driving direction

//// Bike parks

Pedestrian

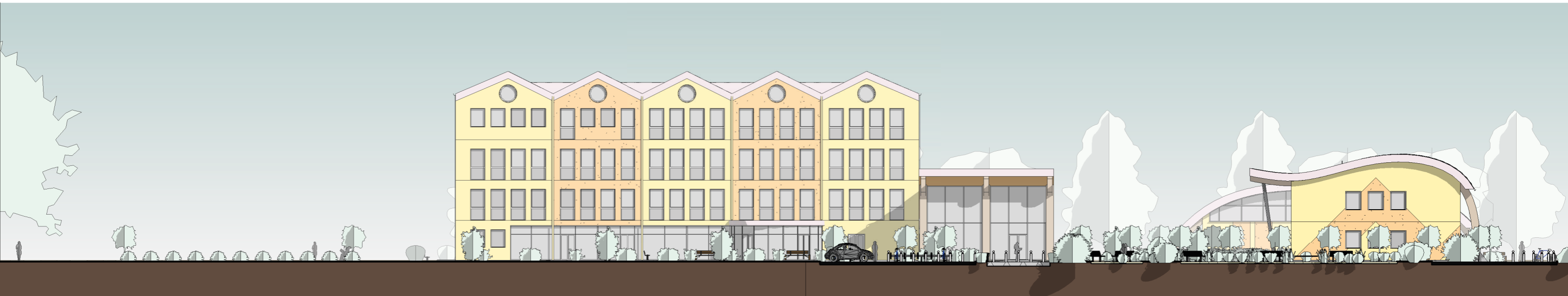
.....➔ Main paths



1 Accessibility  
1 : 750



1 South  
1 : 300



2 North  
1 : 300



① West  
1 : 200



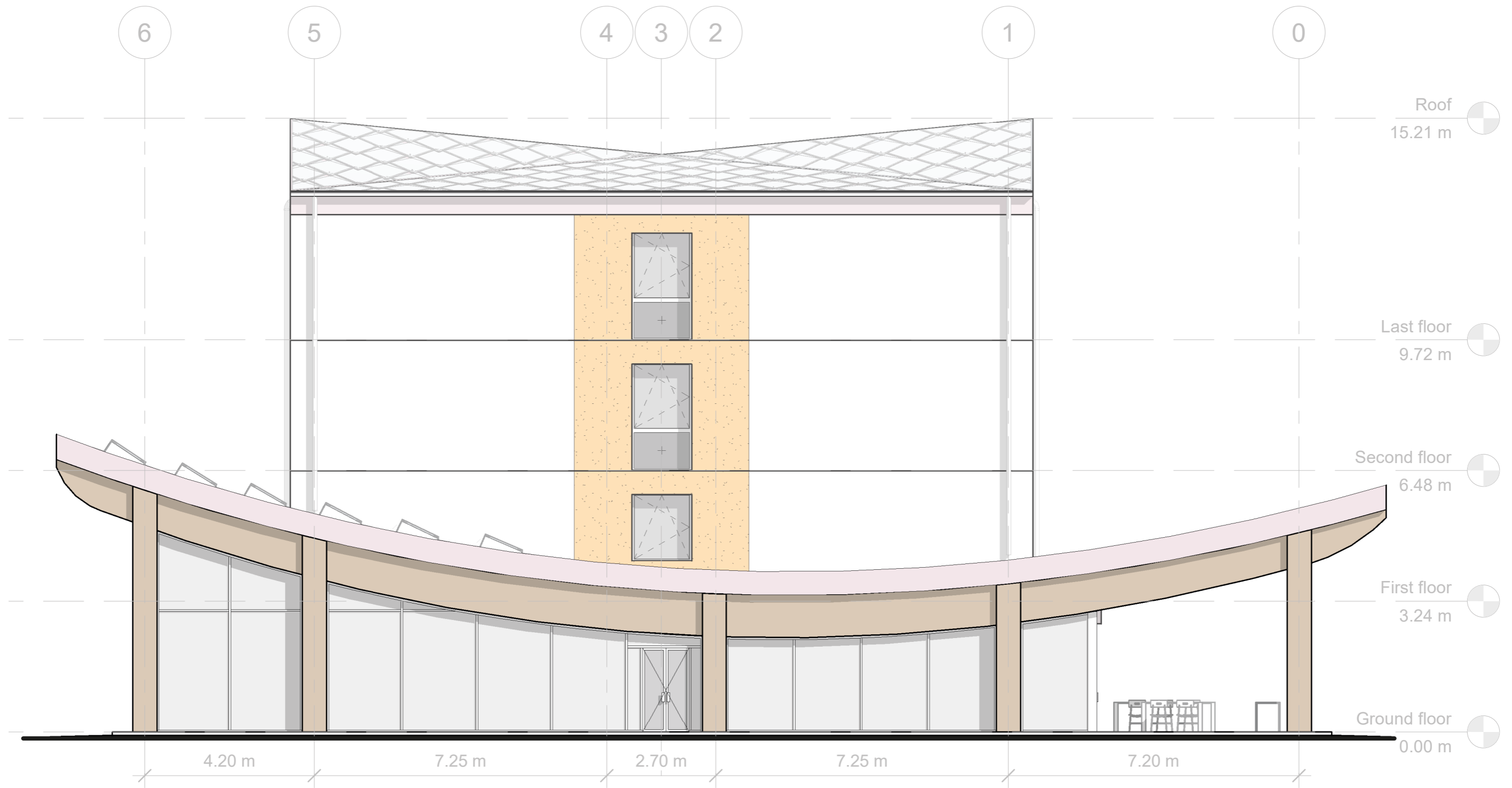
② East  
1 : 200



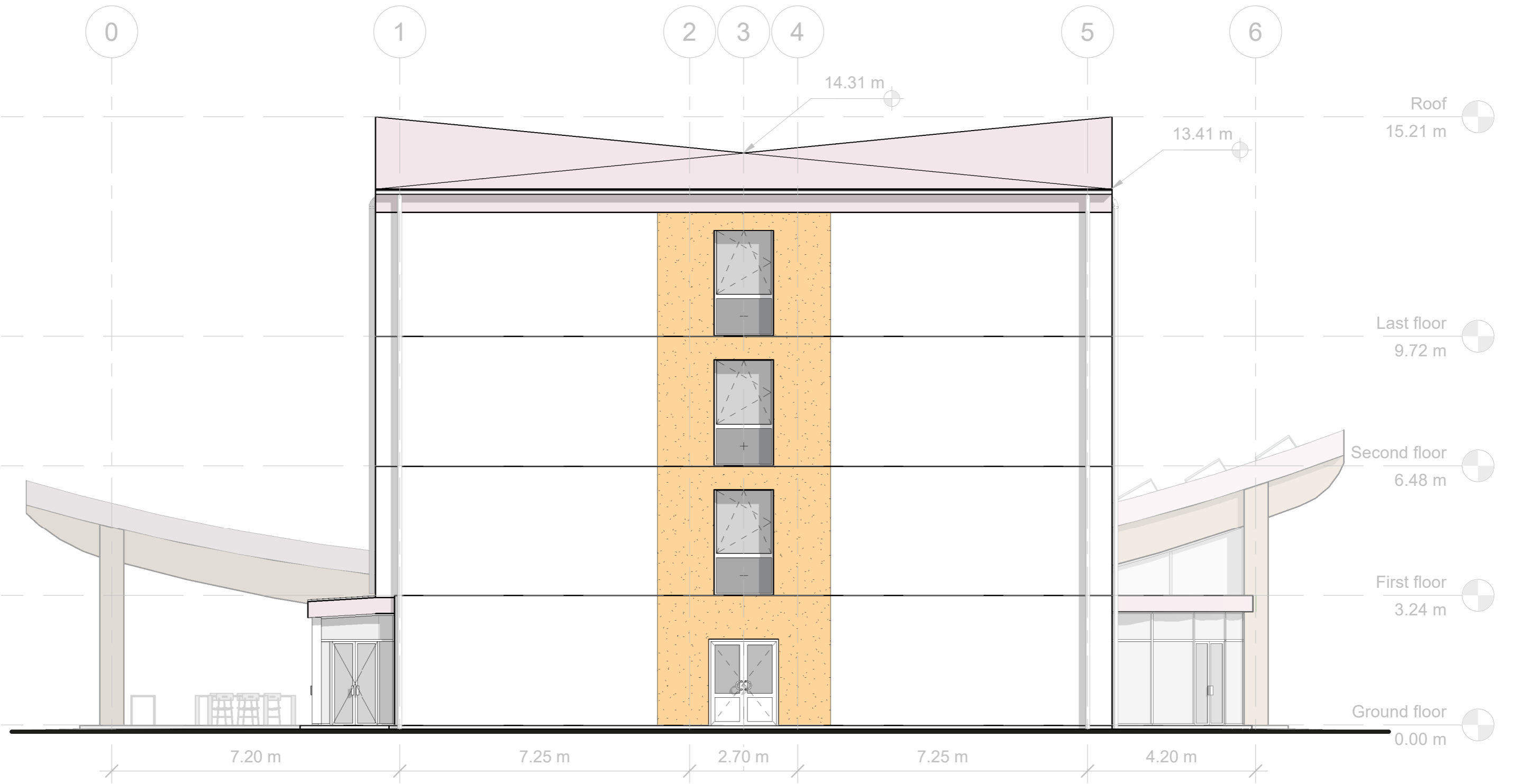
1 South  
1:150



1 North  
1:150



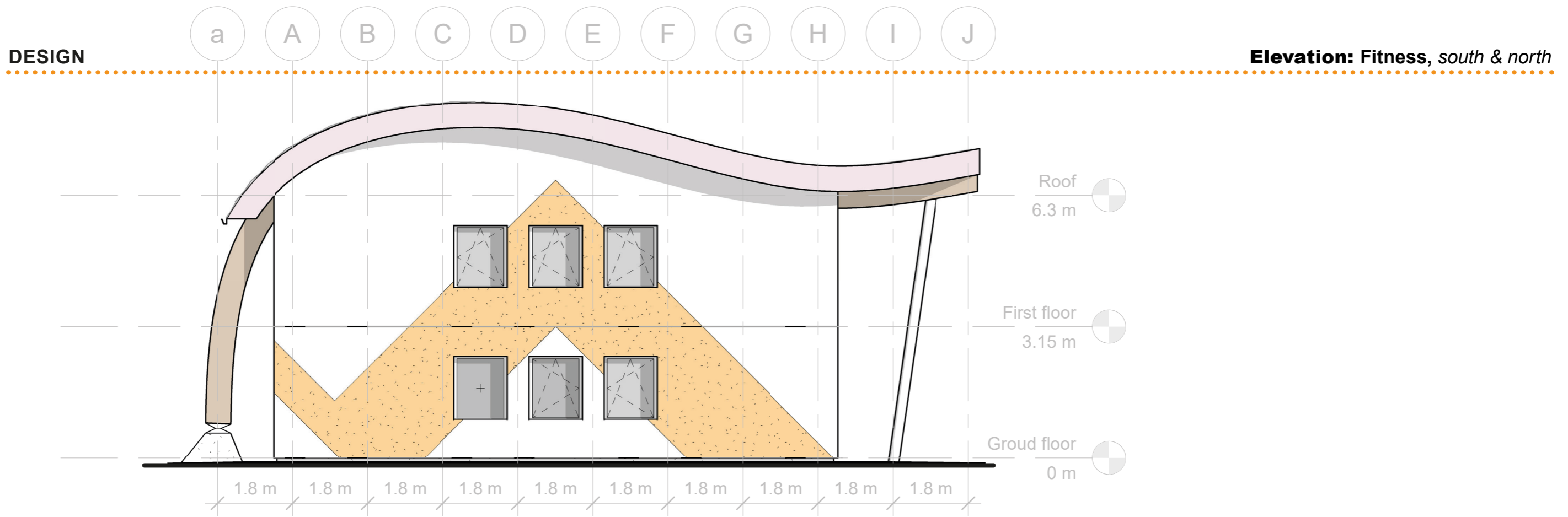
① West  
1:100



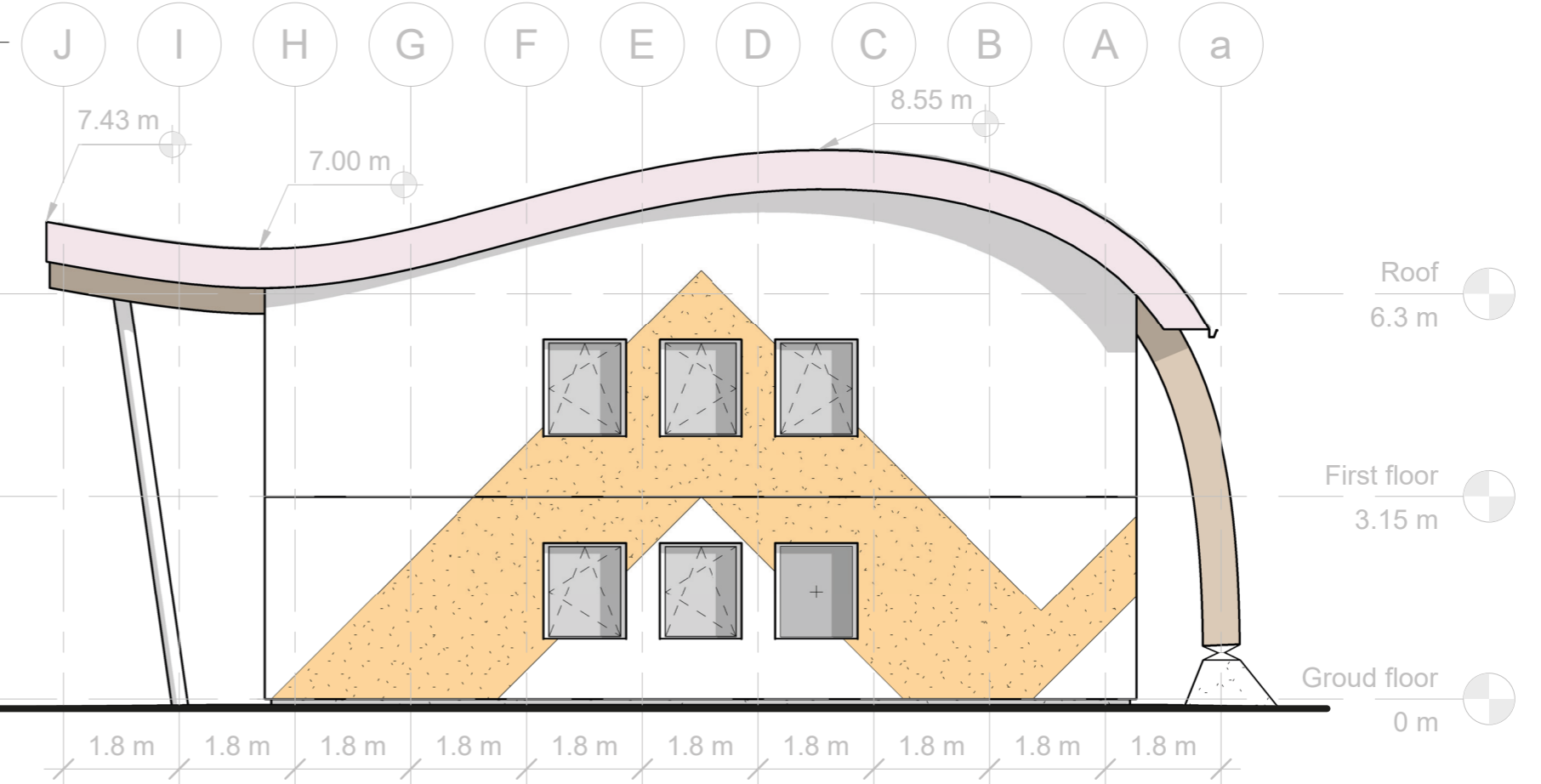
1 East  
1:100

DESIGN

Elevation: Fitness, south & north



1 South  
1:100



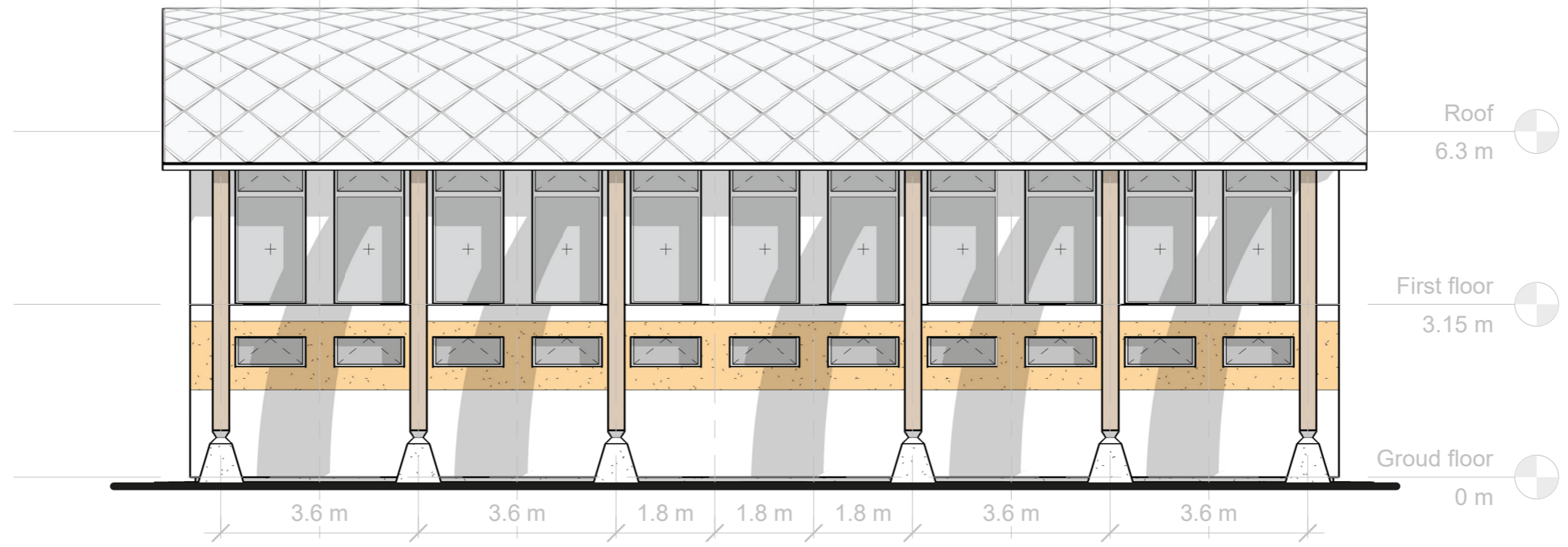
2 North  
1:100



DESIGN

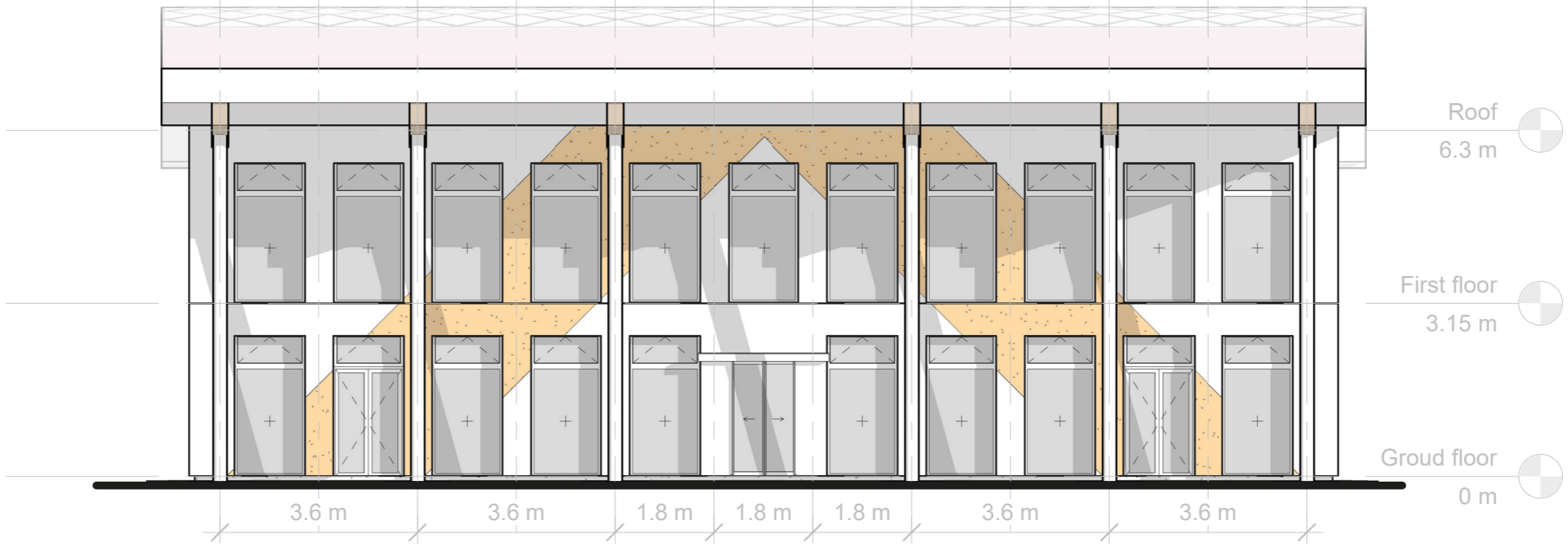
Elevation: Fitness, west & east

12 11 10 9 8 7 6 5 4 3 2 1



1 West  
1:100

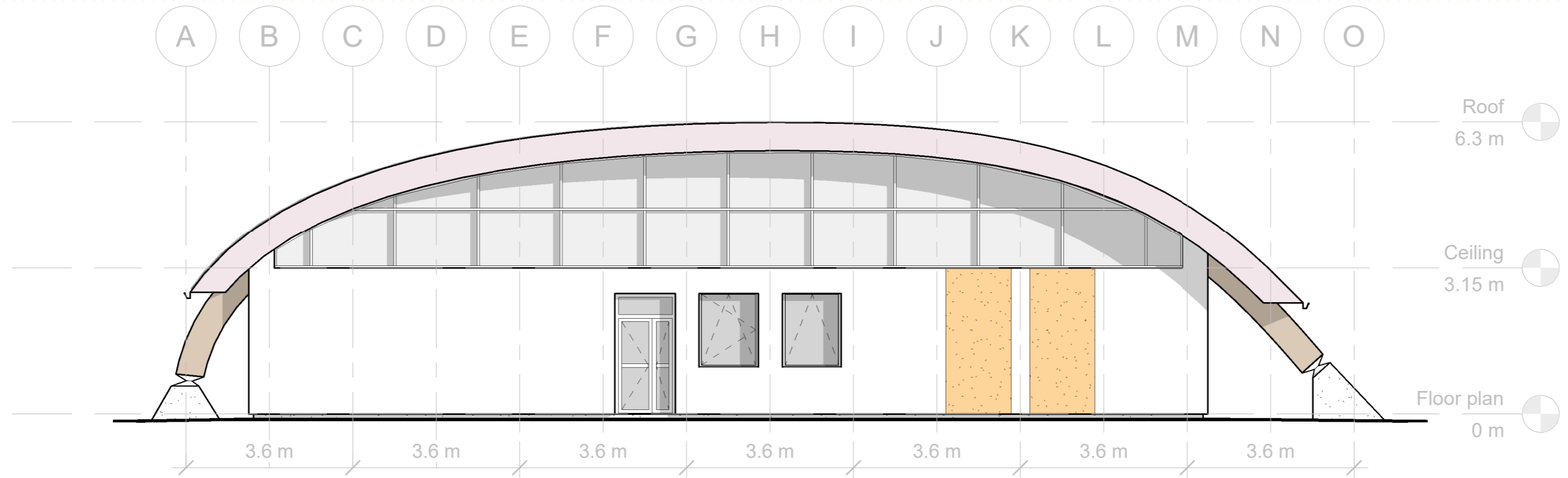
1 2 3 4 5 6 7 8 9 10 11 12



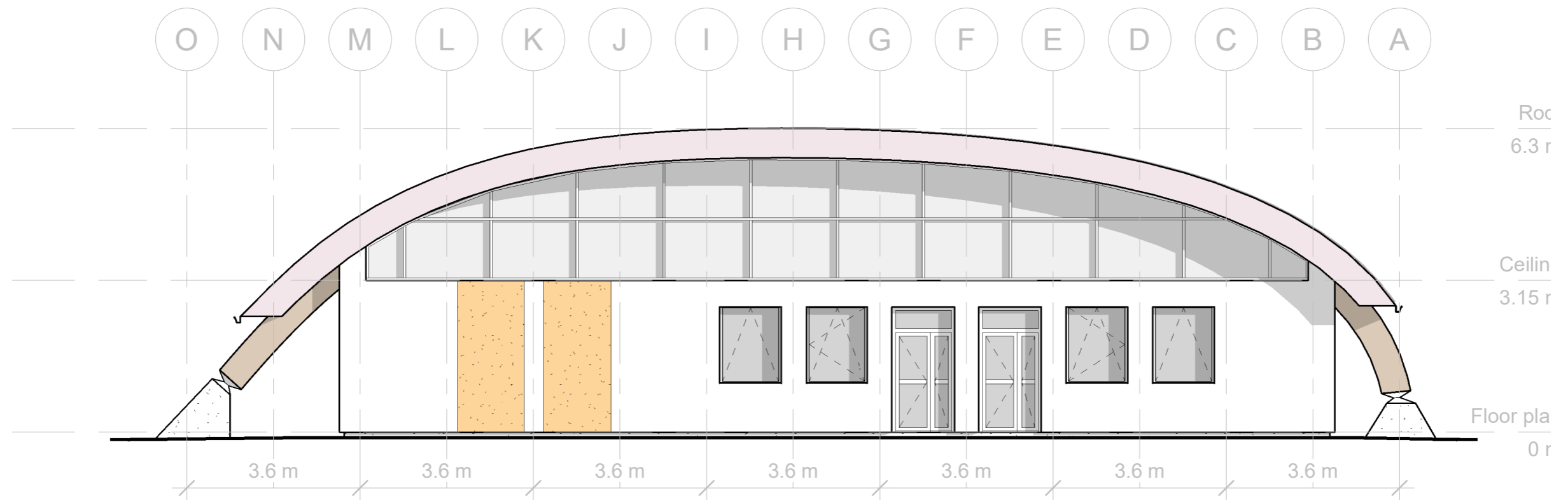
2 East  
1:100

DESIGN

Elevation: Dojo, south & north



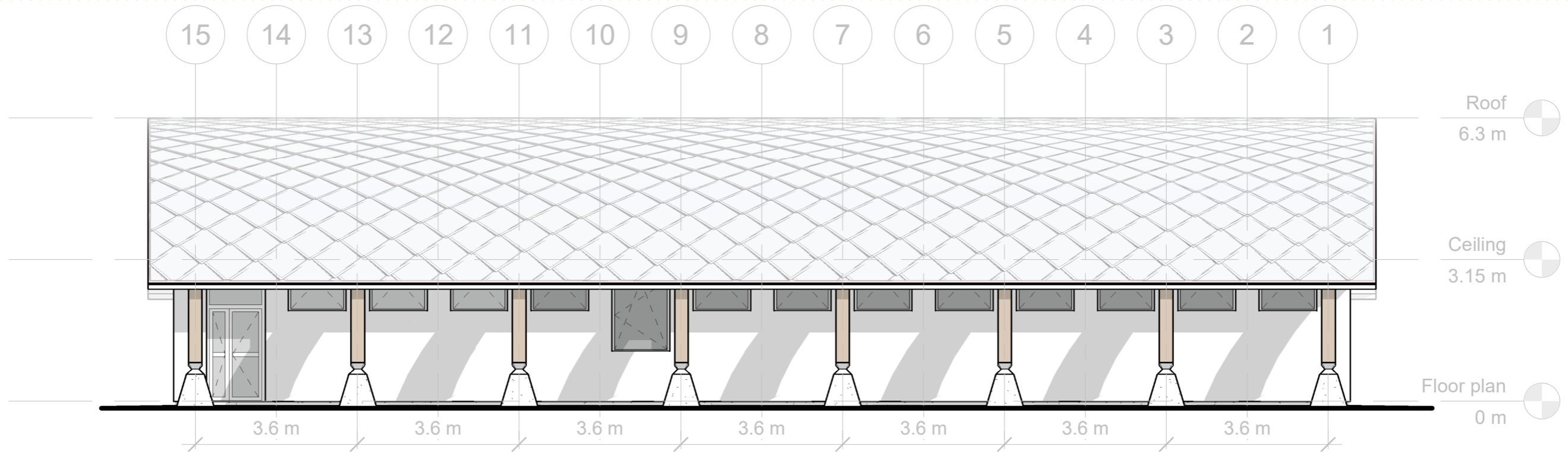
1 South  
1:100



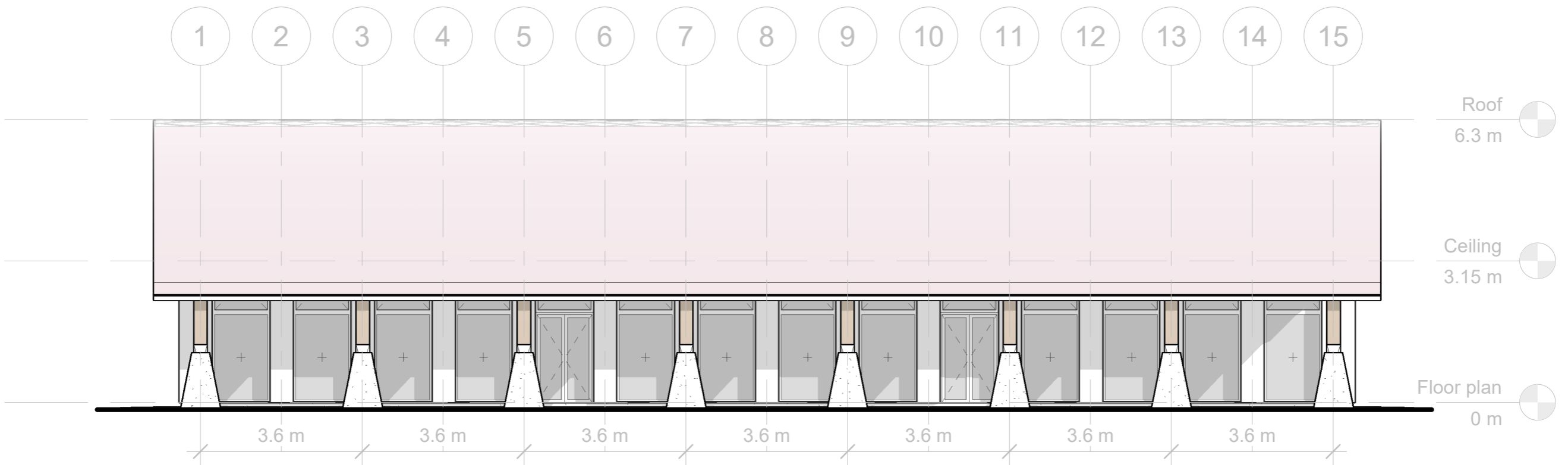
2 North  
1:100

DESIGN

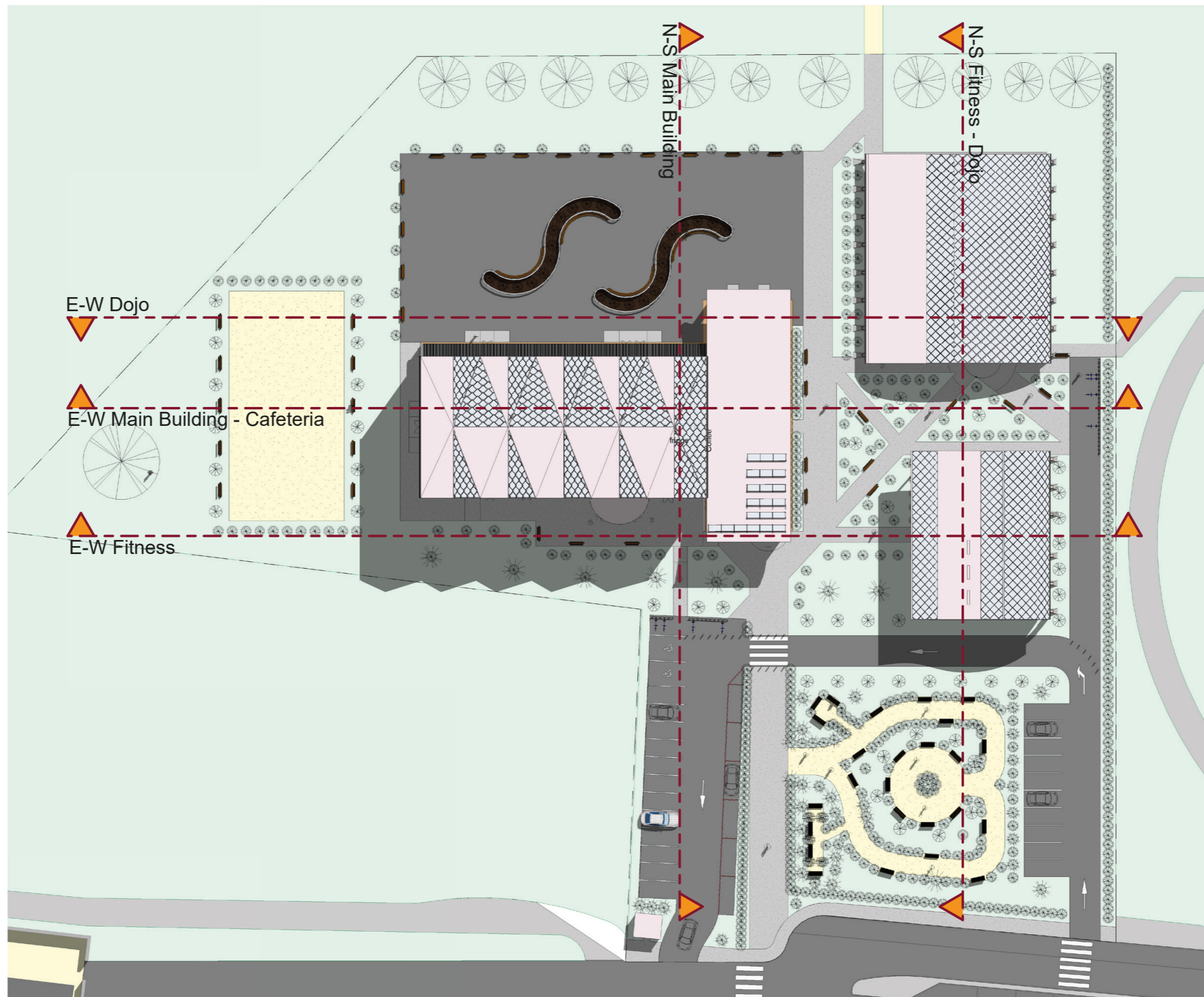
Elevation: Dojo, west & east



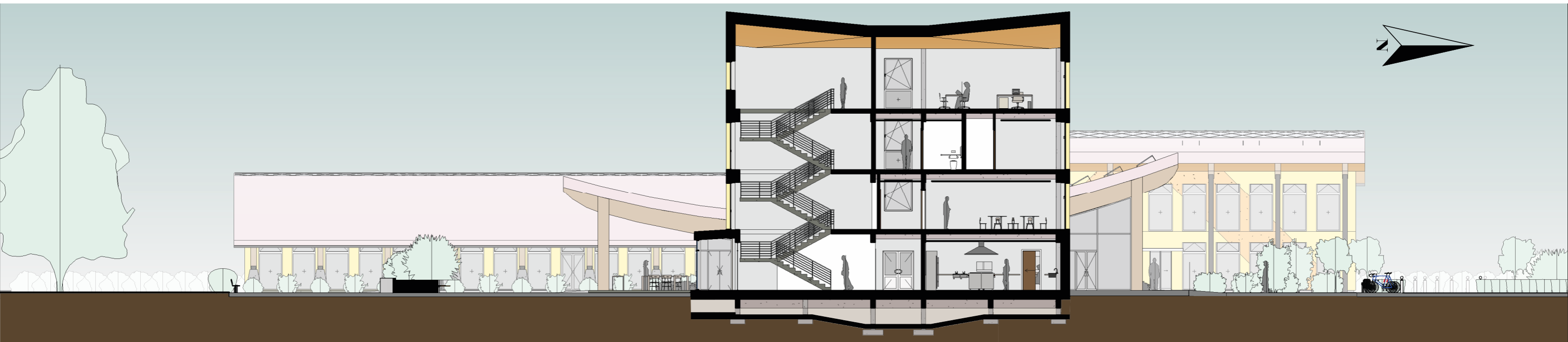
1 West  
1:100



2 East  
1:100



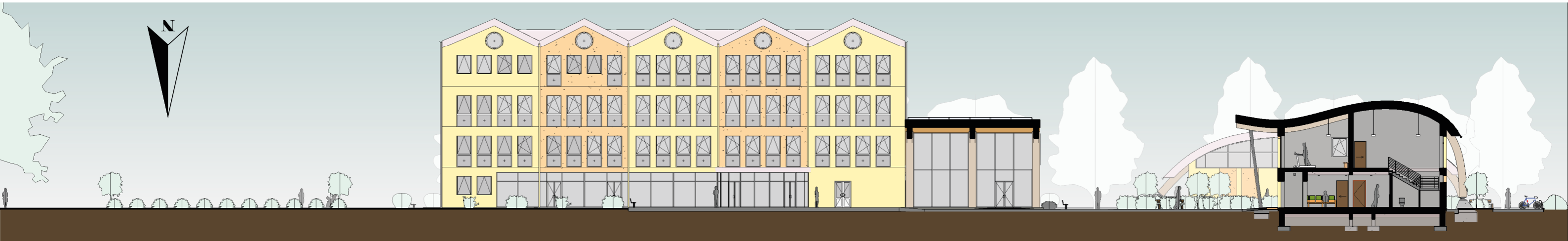
1 Sections location  
1 : 600



① Main Building  
1 : 200



② Fitness - Dojo  
1 : 200



1 Fitness  
1 : 300

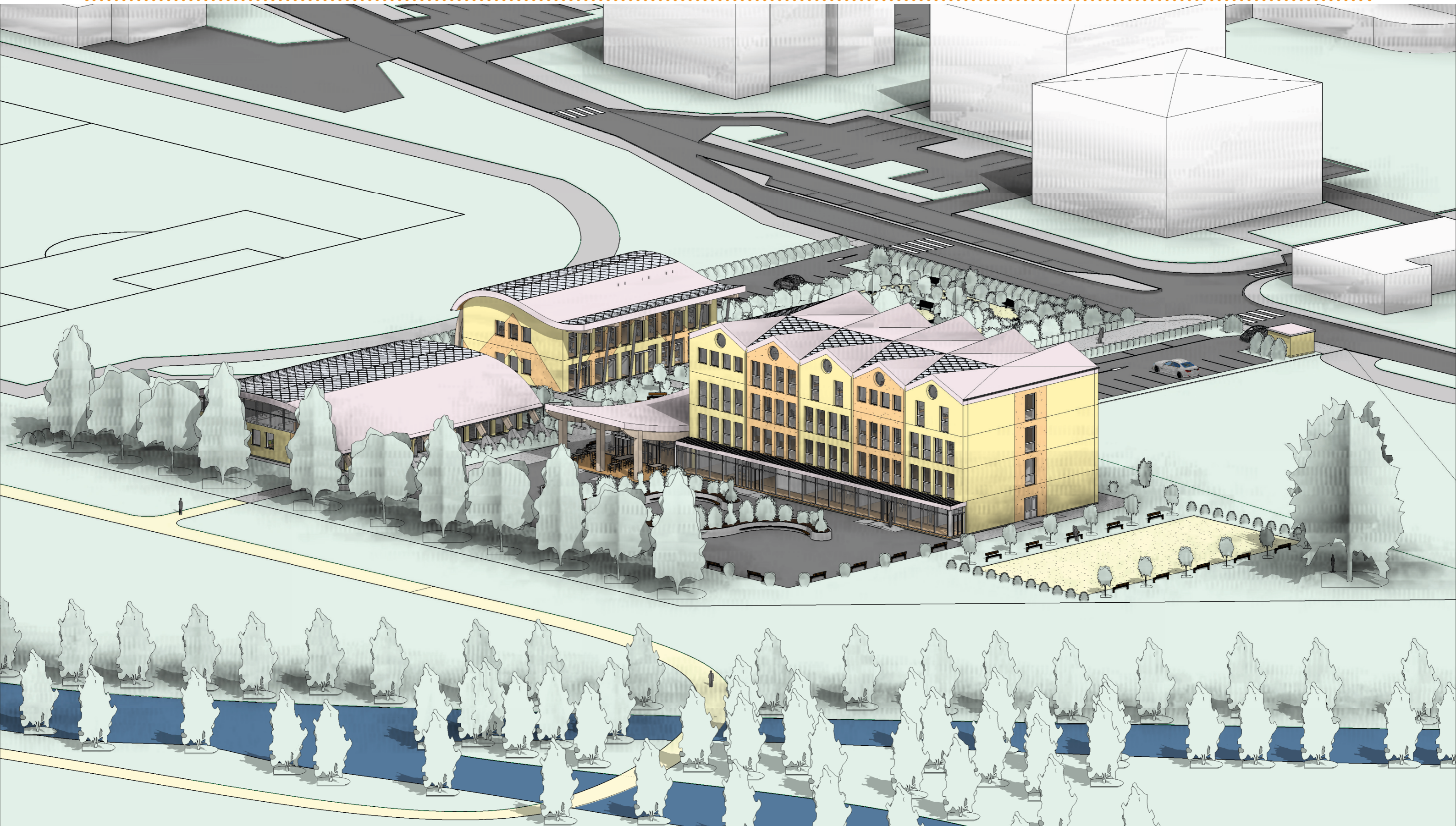


2 Main Building - Cafeteria  
1 : 300

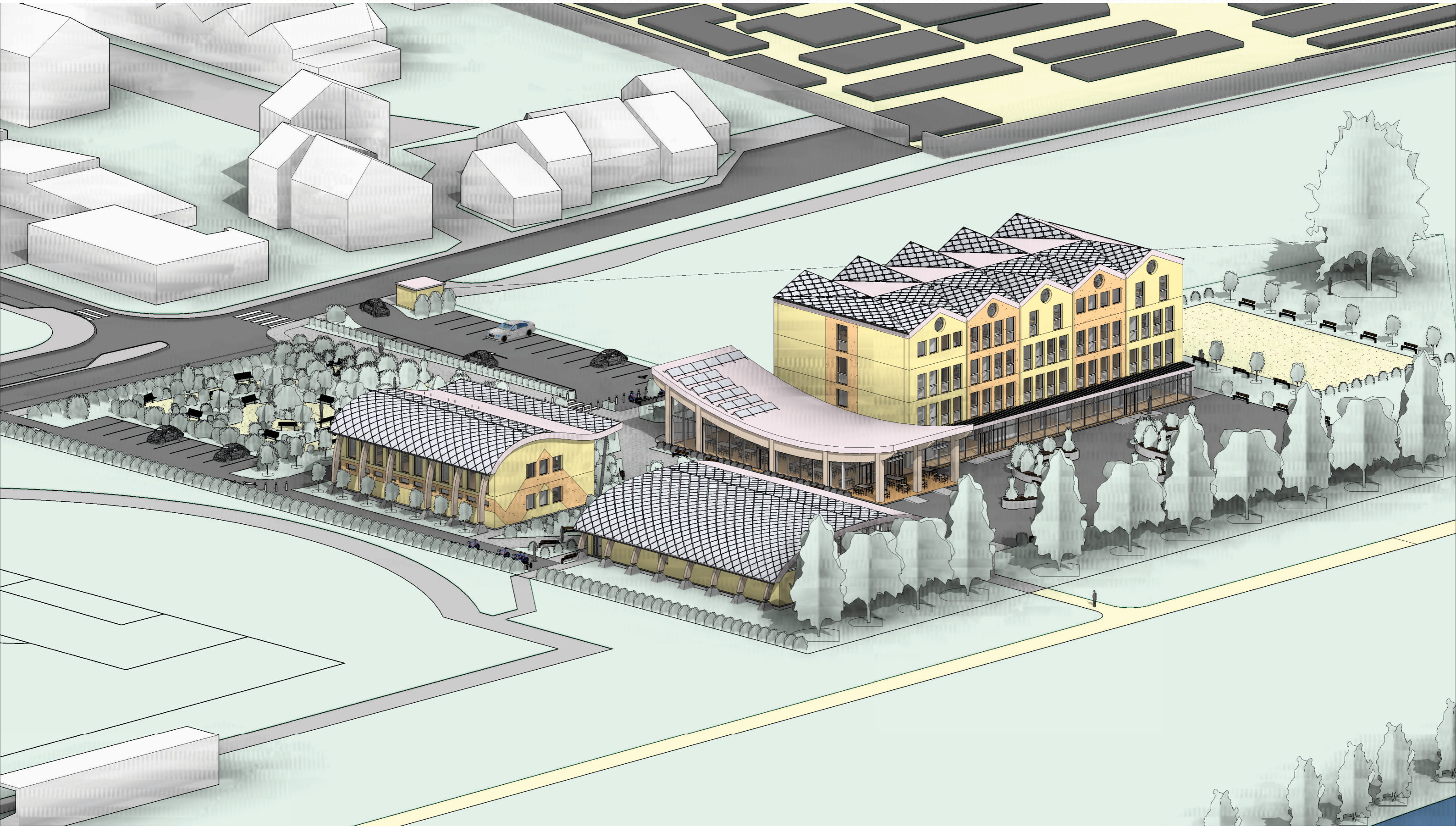


3 Dojo  
1 : 300







































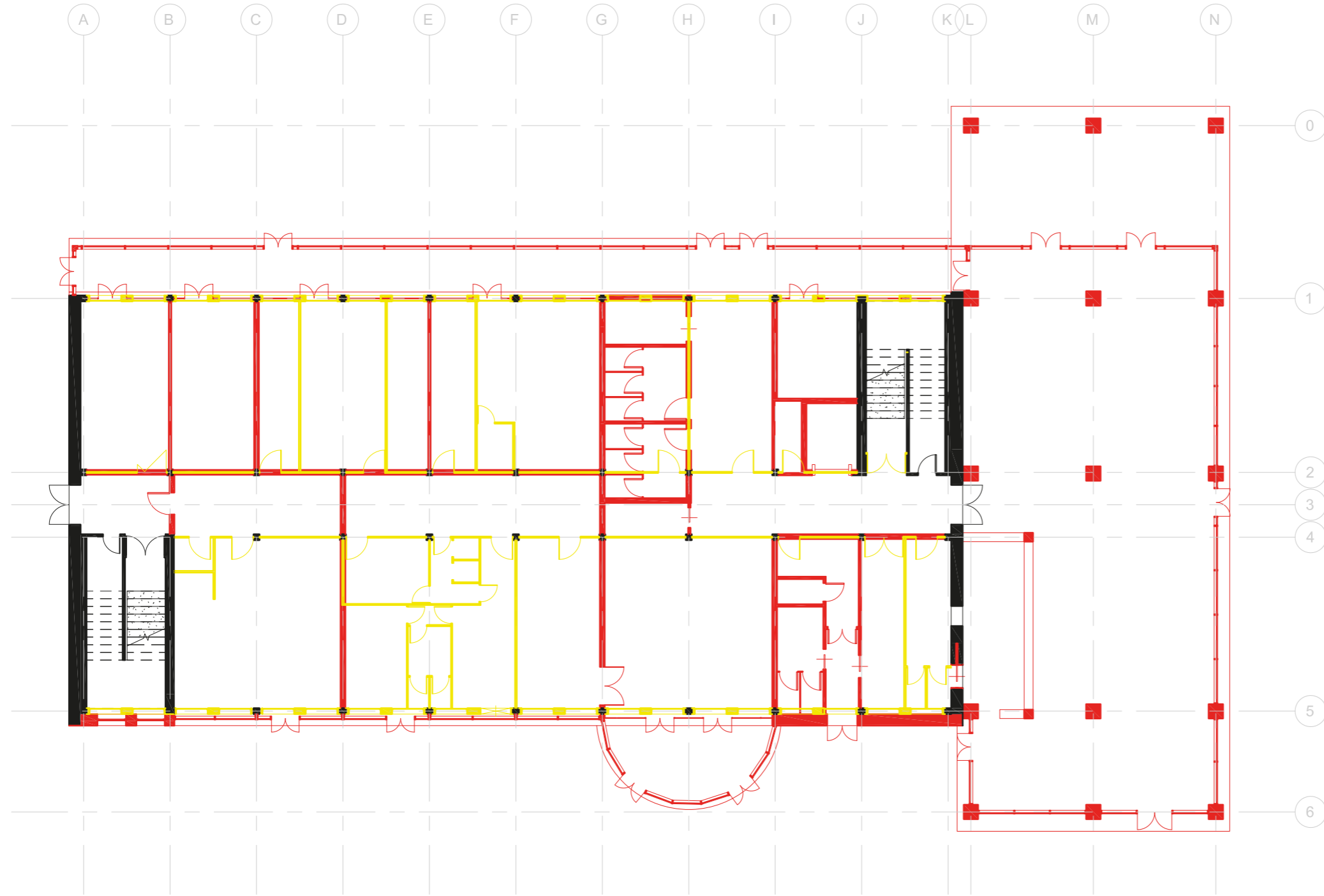




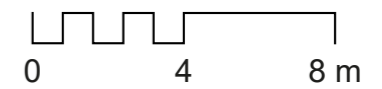


Legend:

- Existing reused
- Existing demolished
- New additions

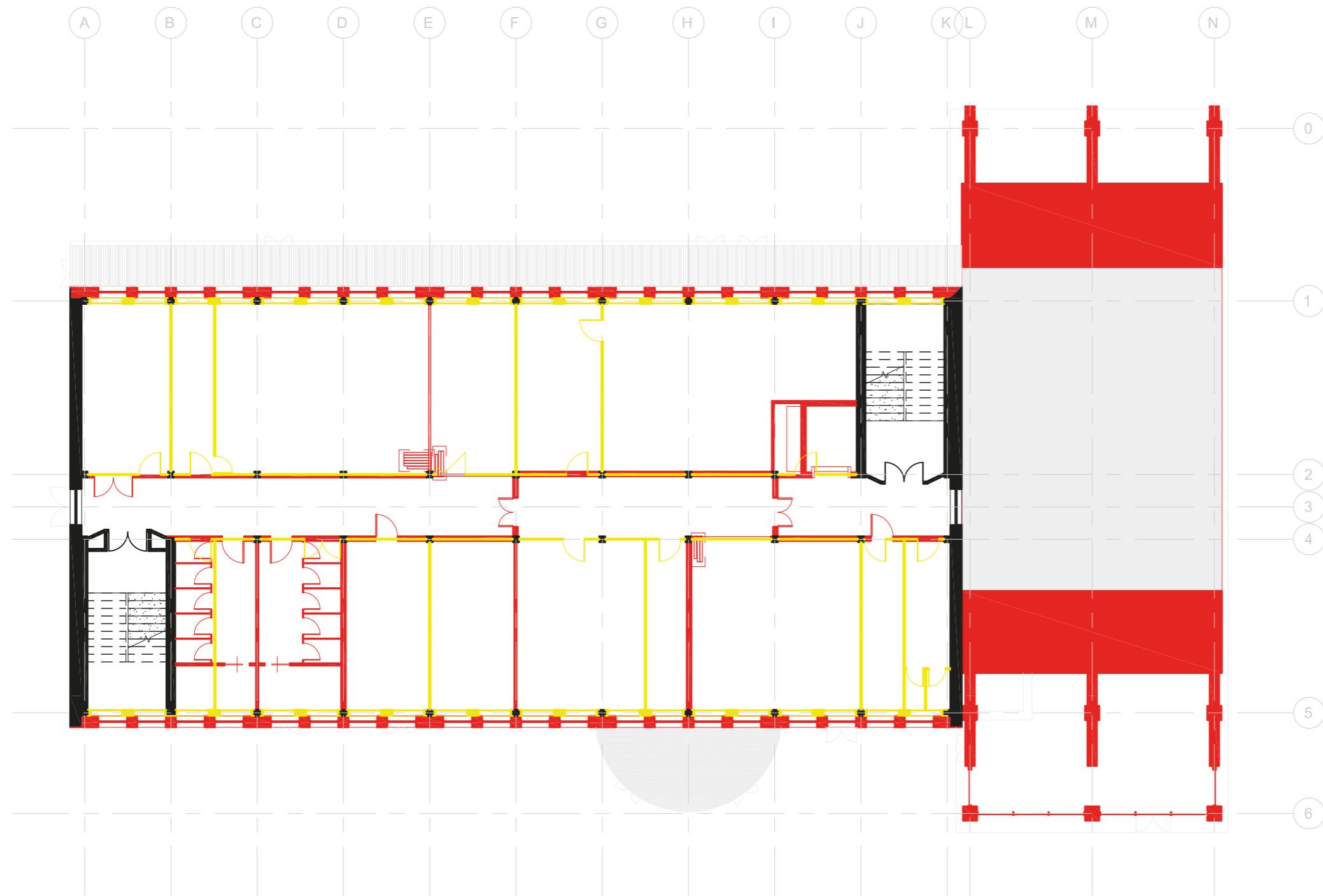


1 Ground floor  
1 : 200

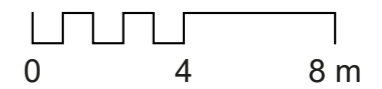


Legend:

- Existing reused
- Existing demolished
- New additions

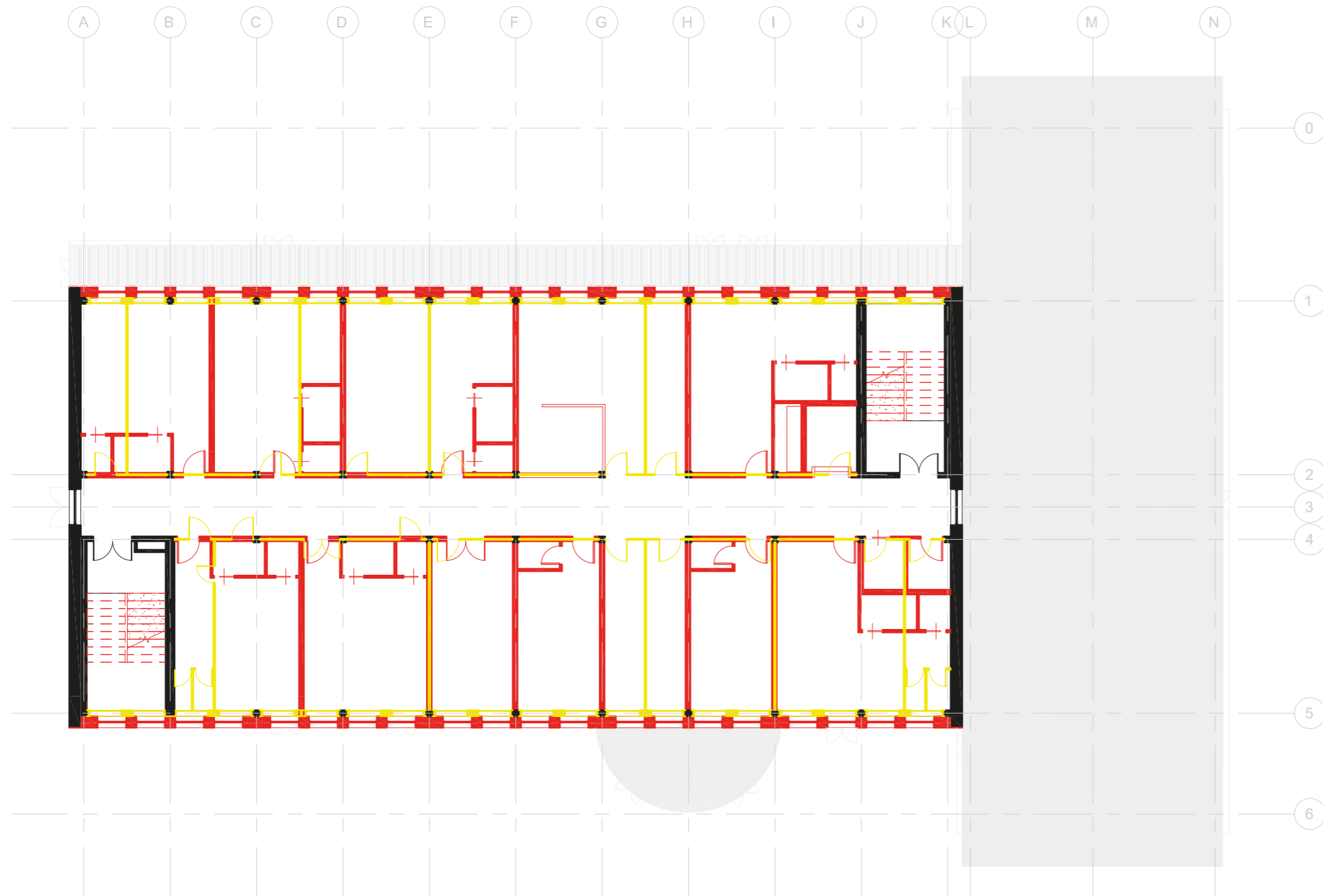


1 First floor  
1 : 200



Legend:

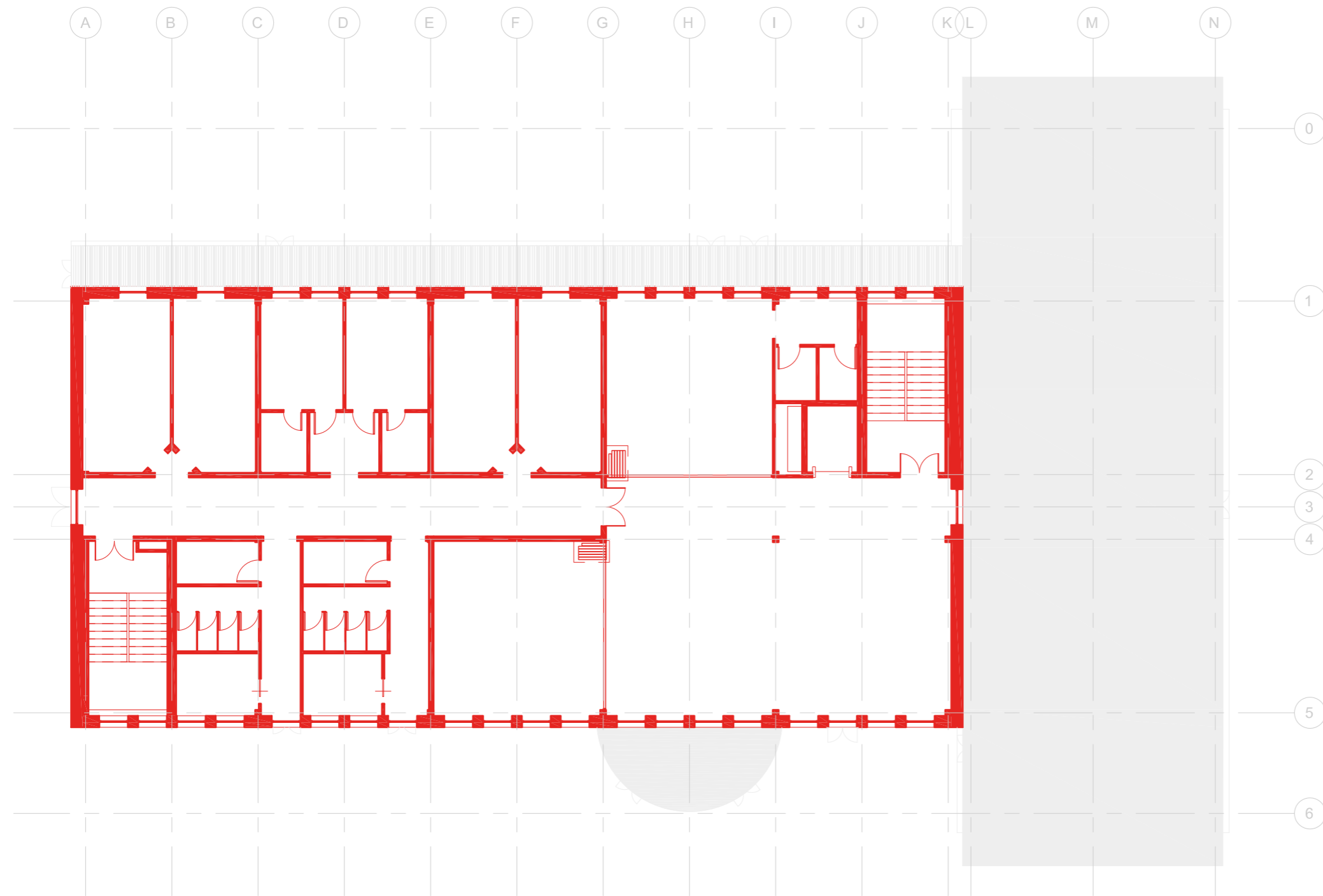
- Existing reused
- Existing demolished
- New additions



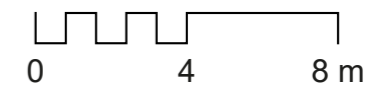
1 Second floor  
1 : 200

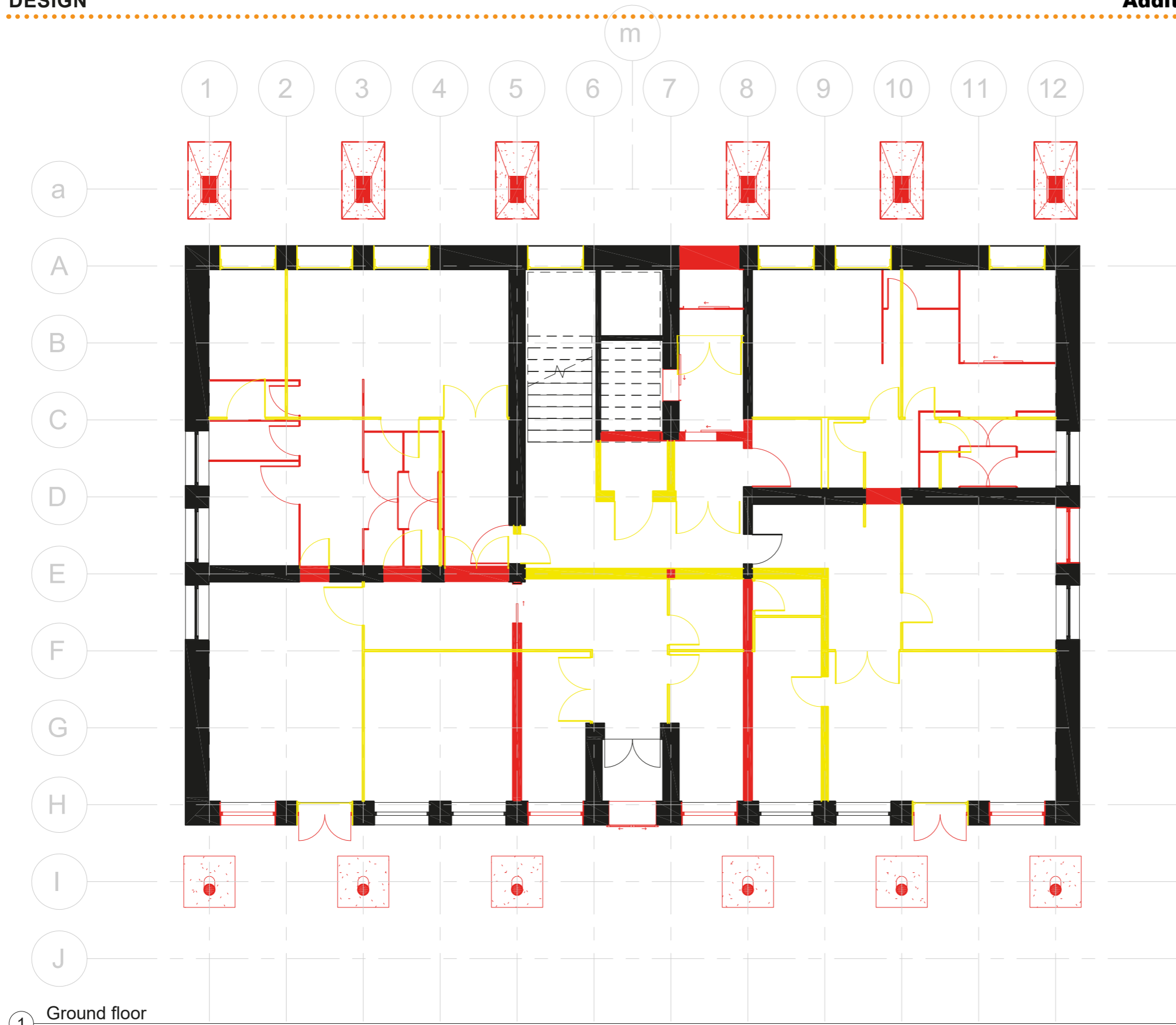
Legend:

- Existing reused
- Existing demolished
- New additions



1 Last floor  
1 : 200

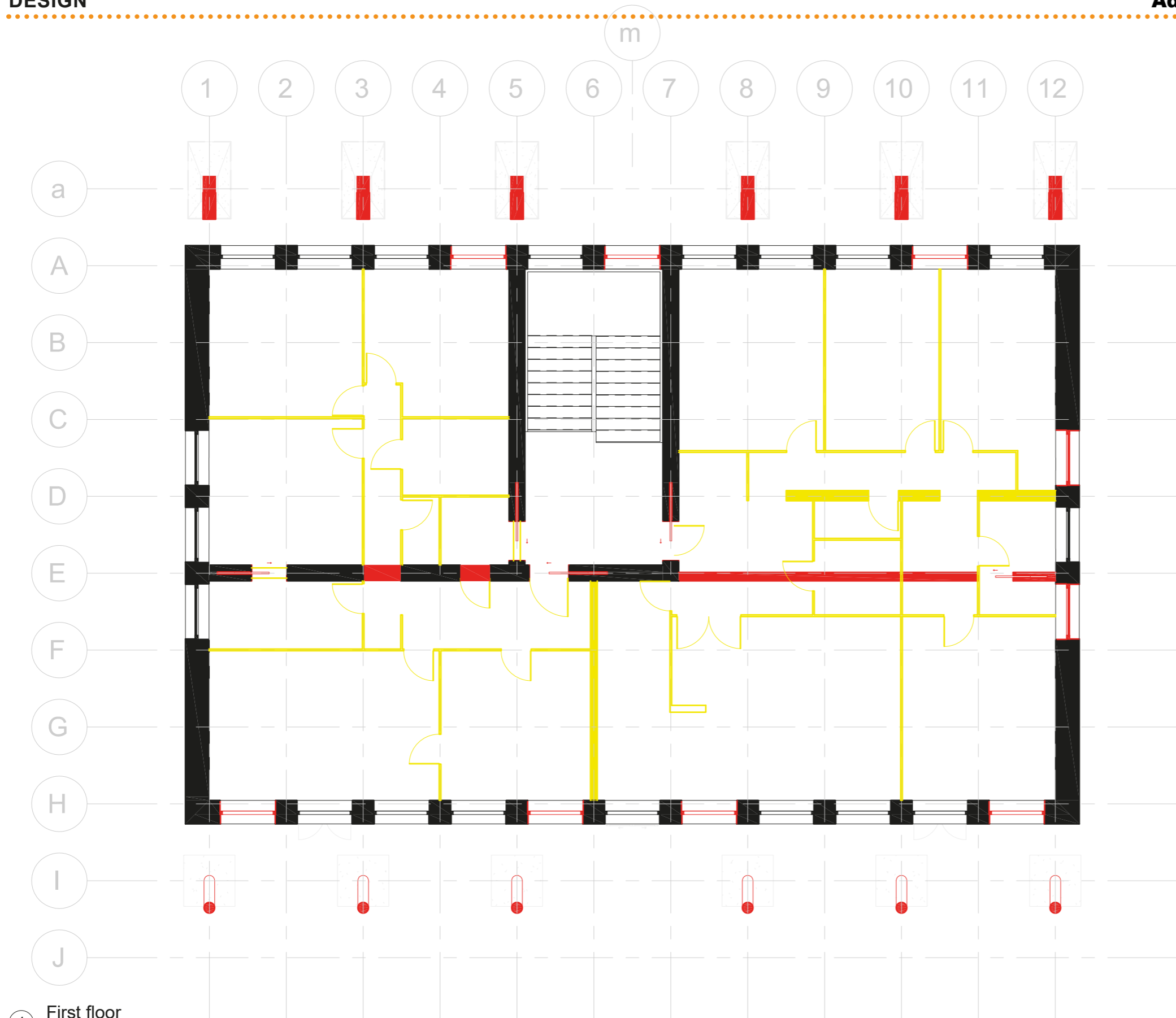




Legend:

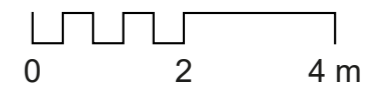
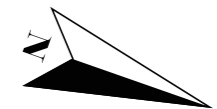
- Existing reused
- Existing demolished
- New additions

1 Ground floor  
1:100

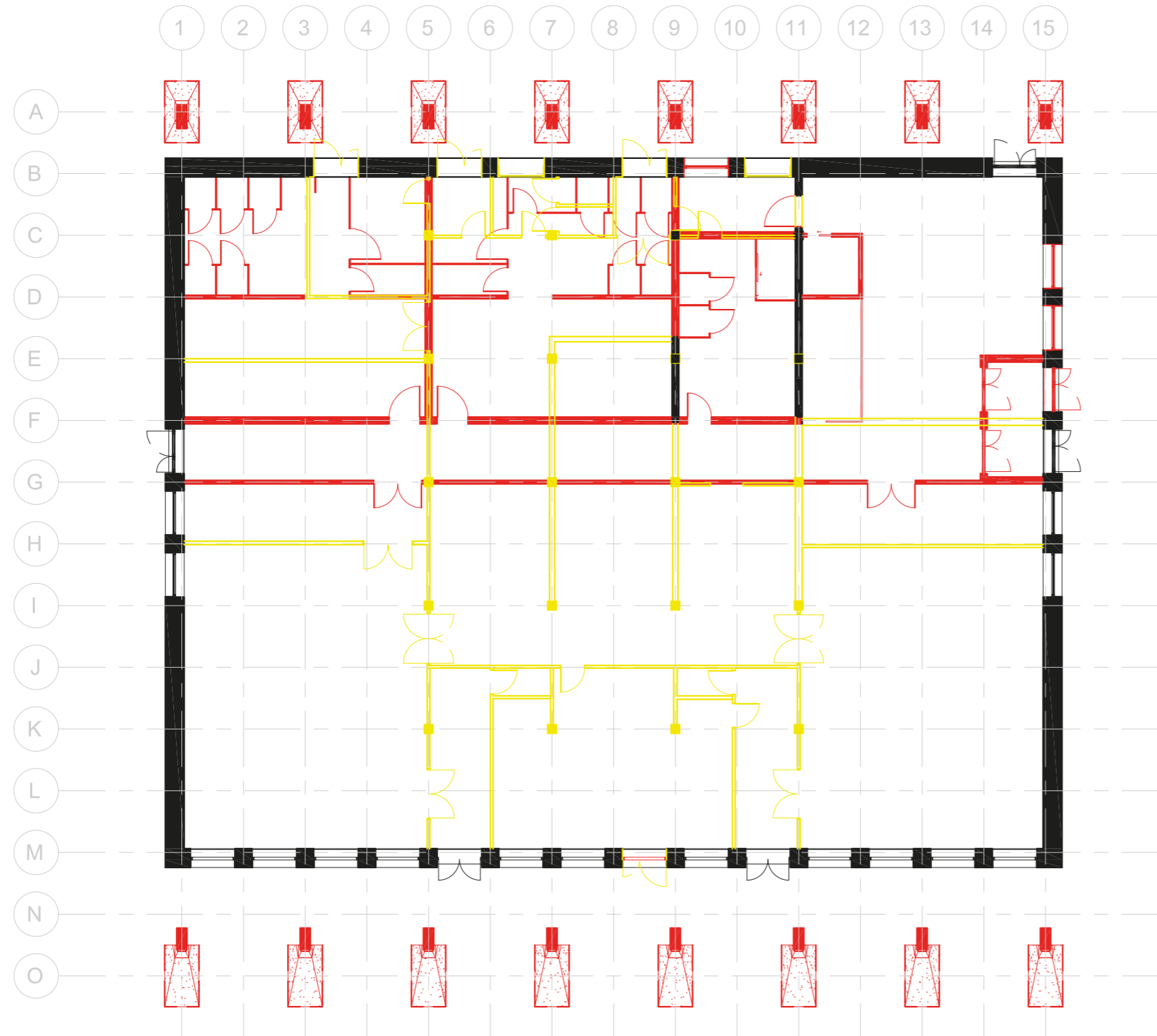


Legend:

- Existing reused
- Existing demolished
- New additions

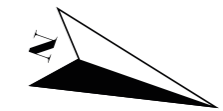


1 First floor  
1:100

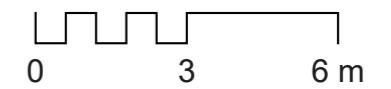


Legend:

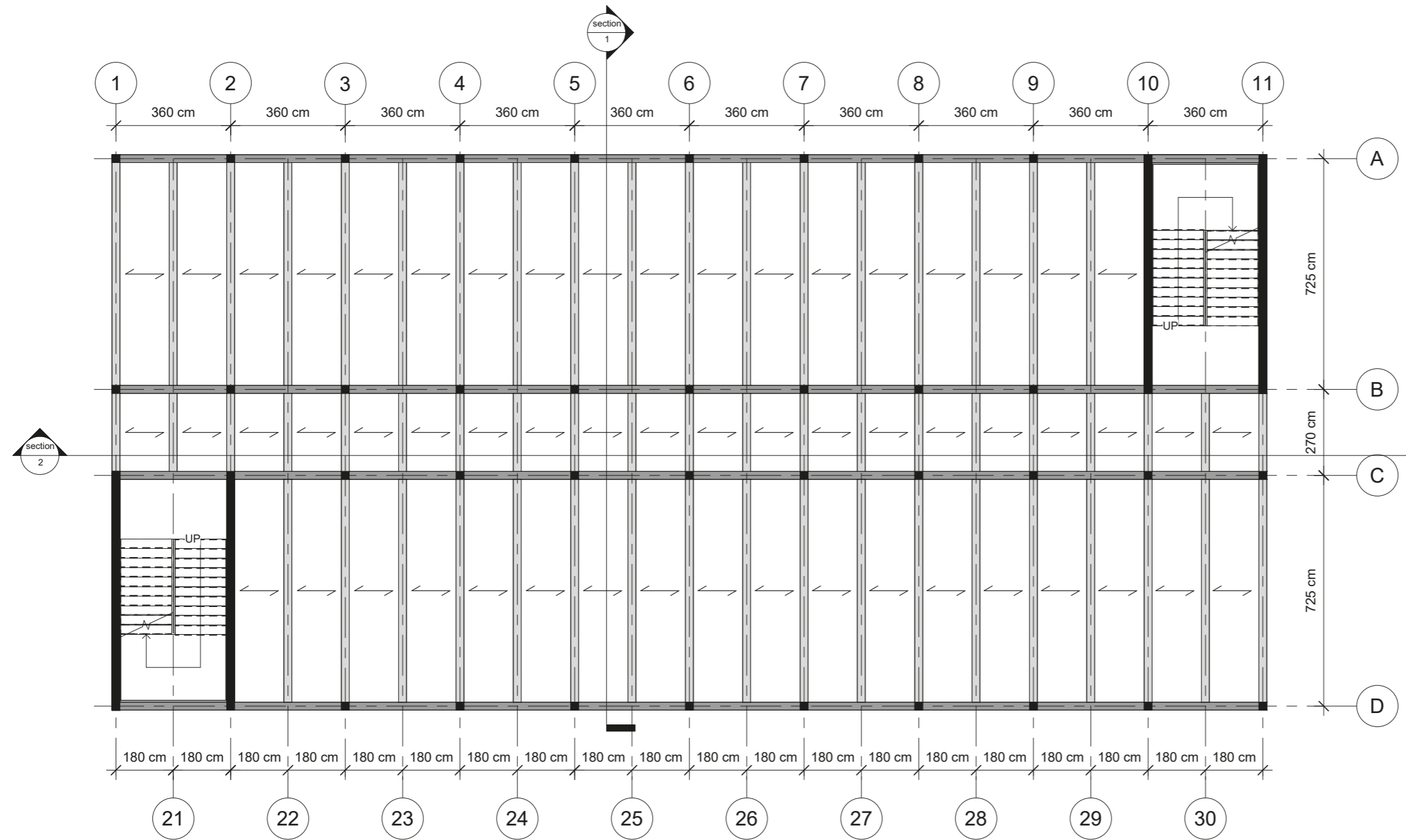
- Existing reused
- Existing demolished
- New additions



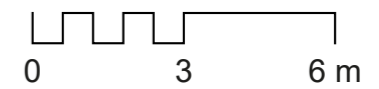
1 Floor plan  
1:150





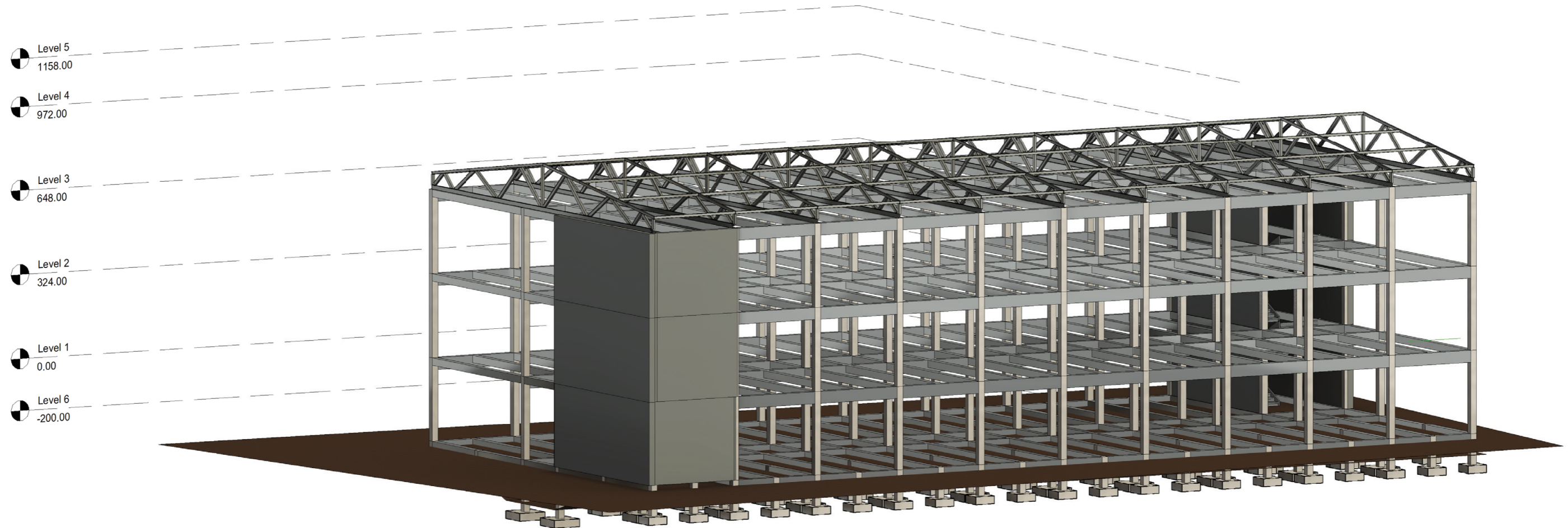


1 Typical floor  
1 : 200

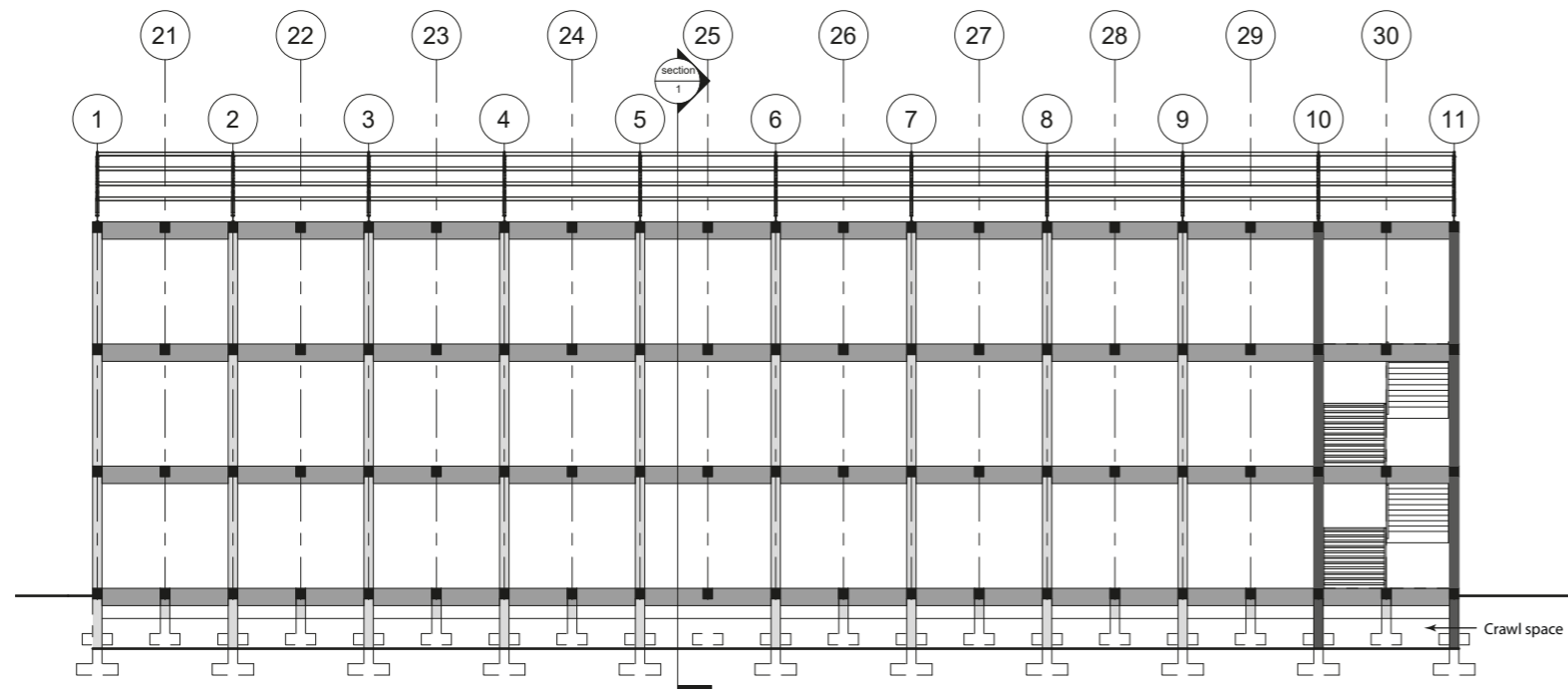


# STRUCTURE

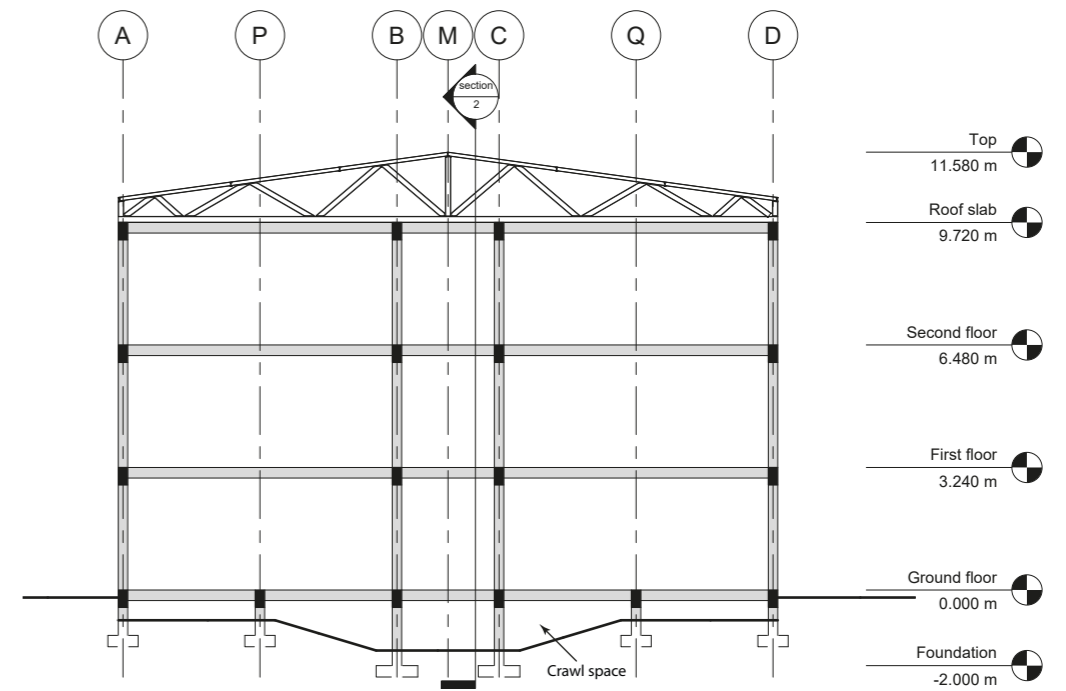
# Structure: Existing state, Sections



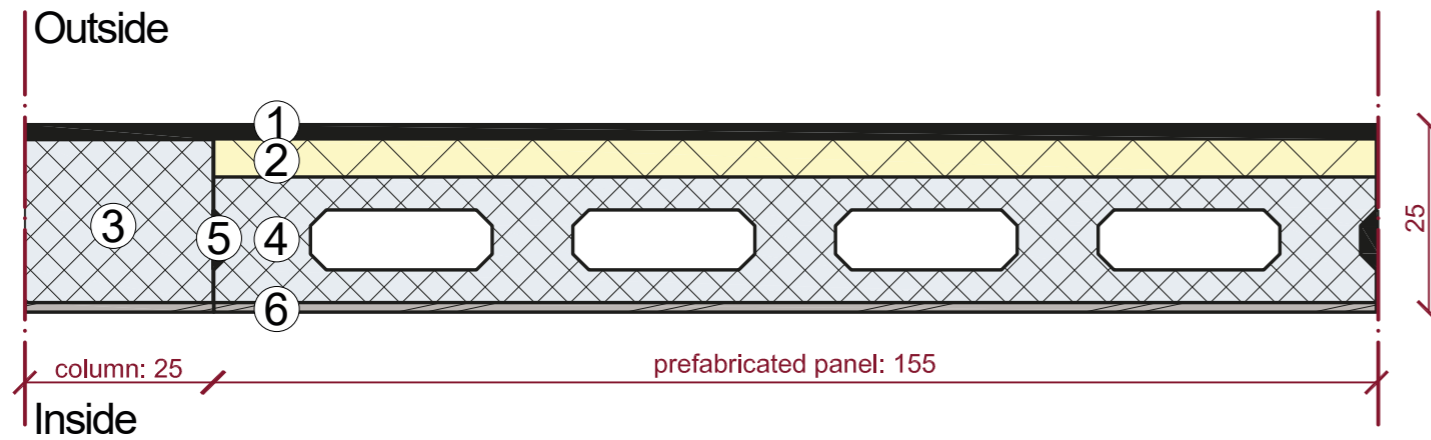
1 Isometric view



2 Longitudinal section  
1 : 200

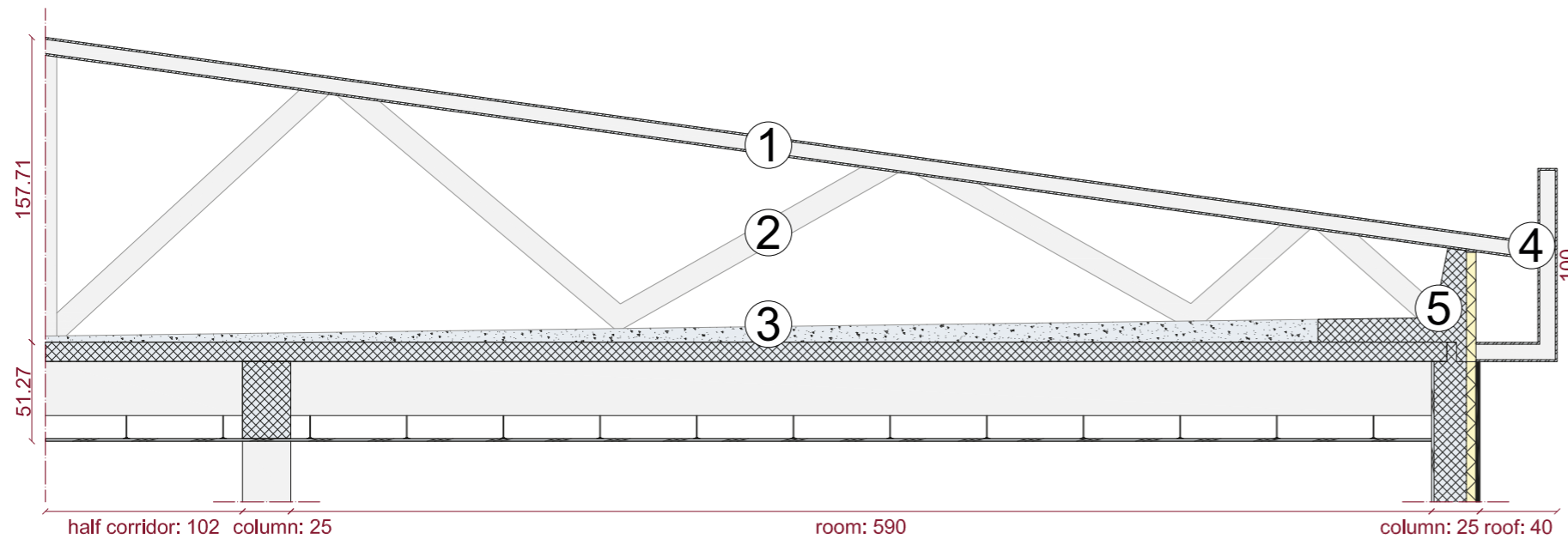


3 Transversal section  
1 : 200



Layers		s [m]
Outdoor		
①	Plaster finishing	0.020
②	Polystyrene	0.050
③	Column	0.250
④	Hollow reinforced concrete panel	0.168
⑤	Joint	-
⑥	Plasterboard	0.0127
Indoor		

① Existing prefabricated façade panel detail  
1 : 100

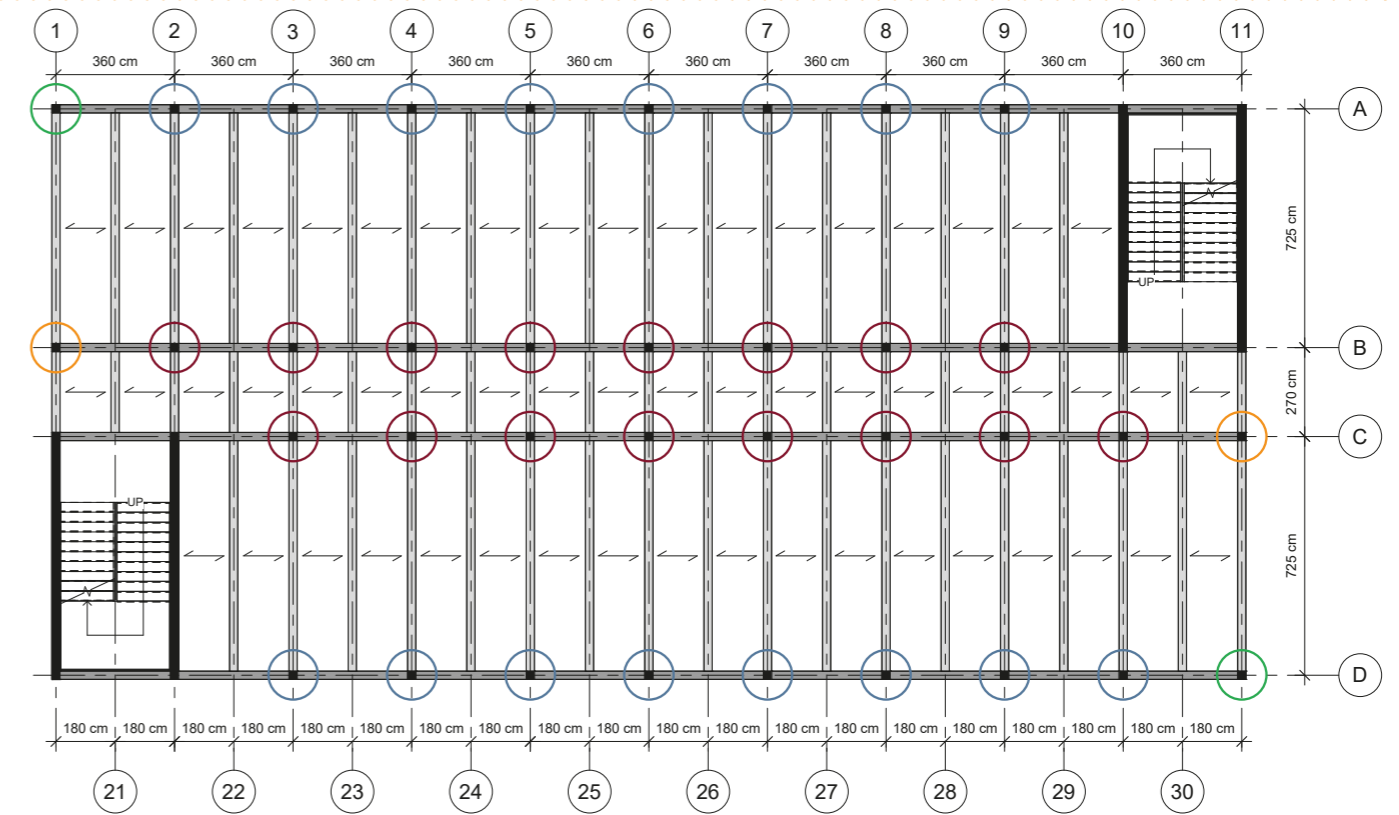
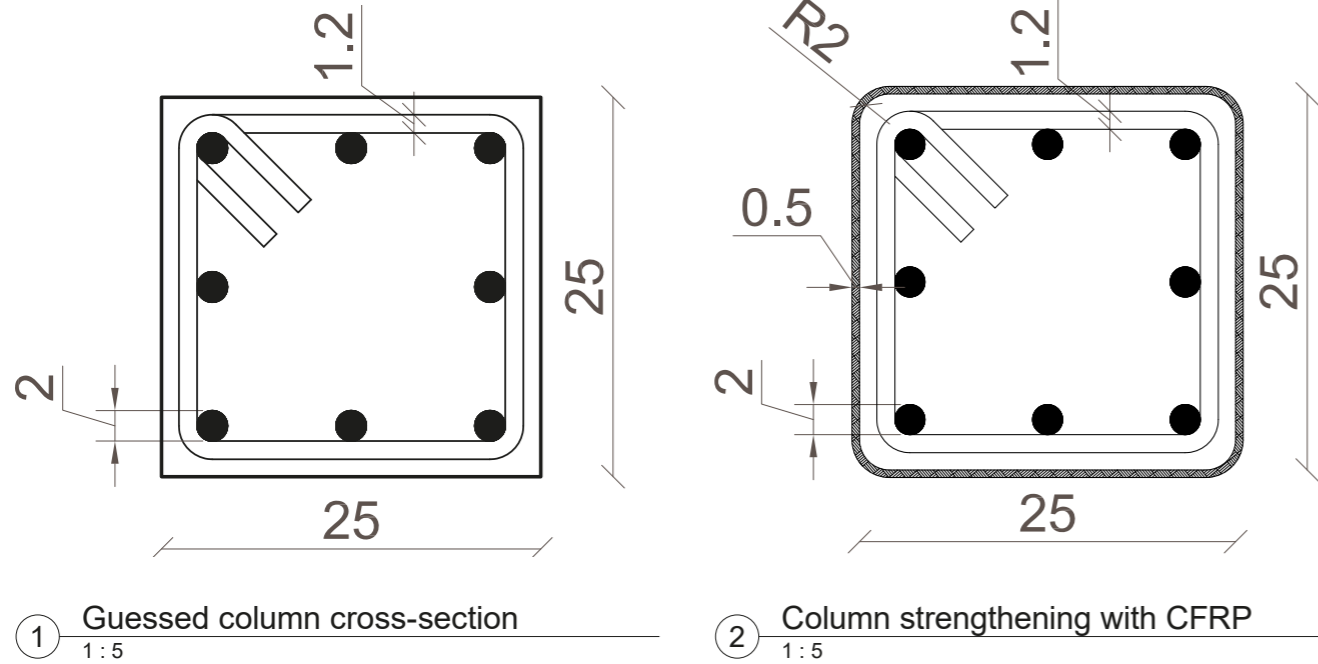


Components	
Outdoor	
①	roofing with a metal sheet
②	metal lattice for the roof structure
③	slope in concrete
④	gutter designed with the roof shape
⑤	prefabricated concrete "panel" for the roof side
Indoor	

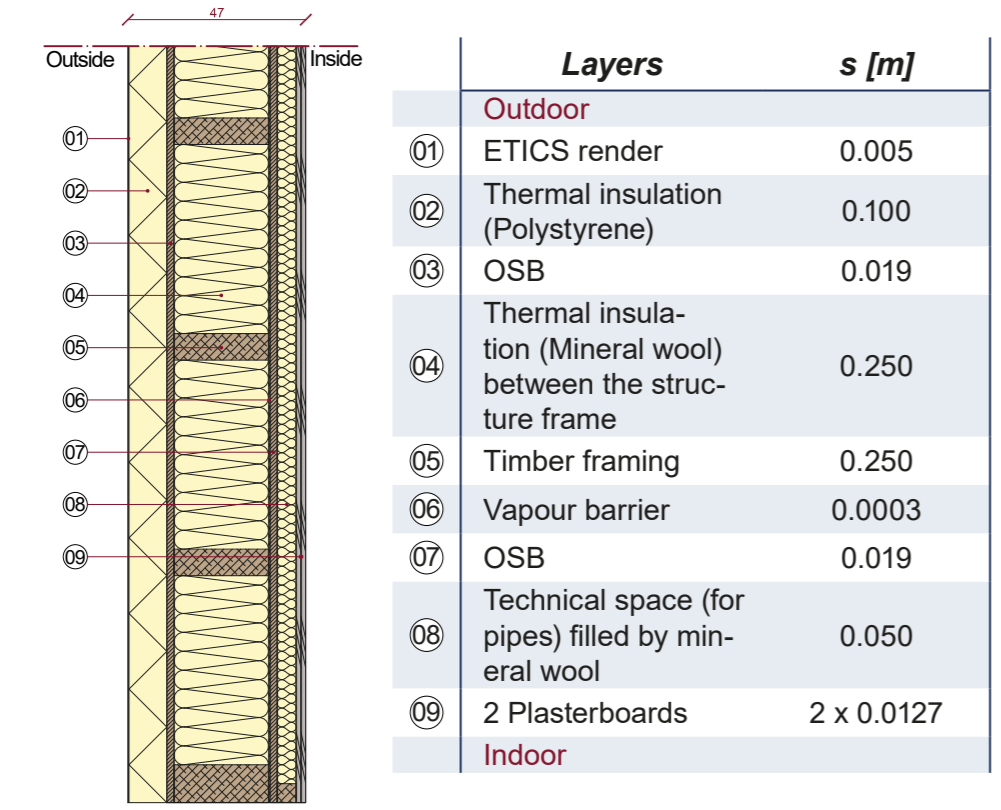
② Existing steel roof detail  
1 : 333

**STRUCTURE**

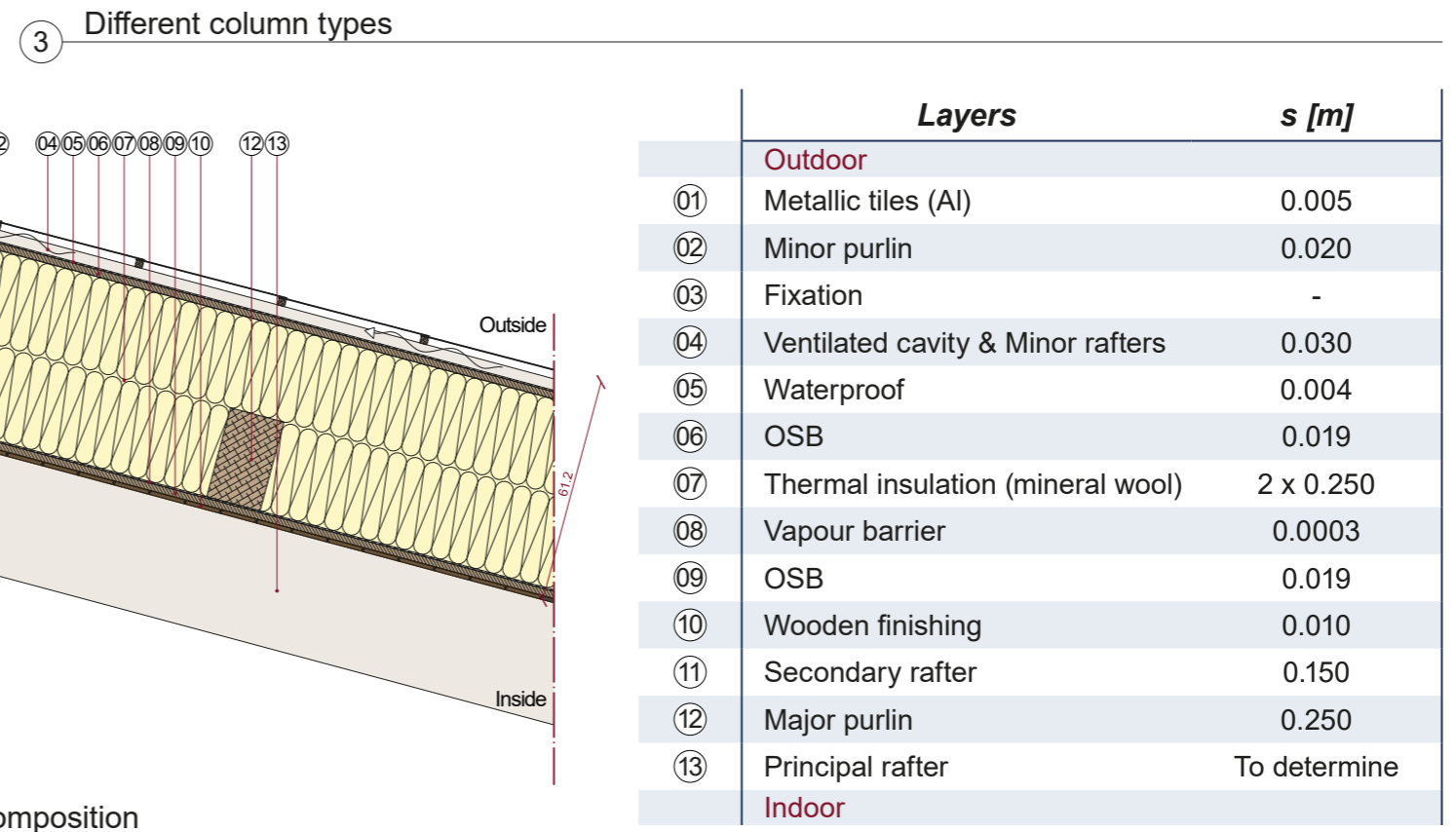
**Structure: Projected state, Existing columns strengthening**



Legend: column category ① ② ③ ④



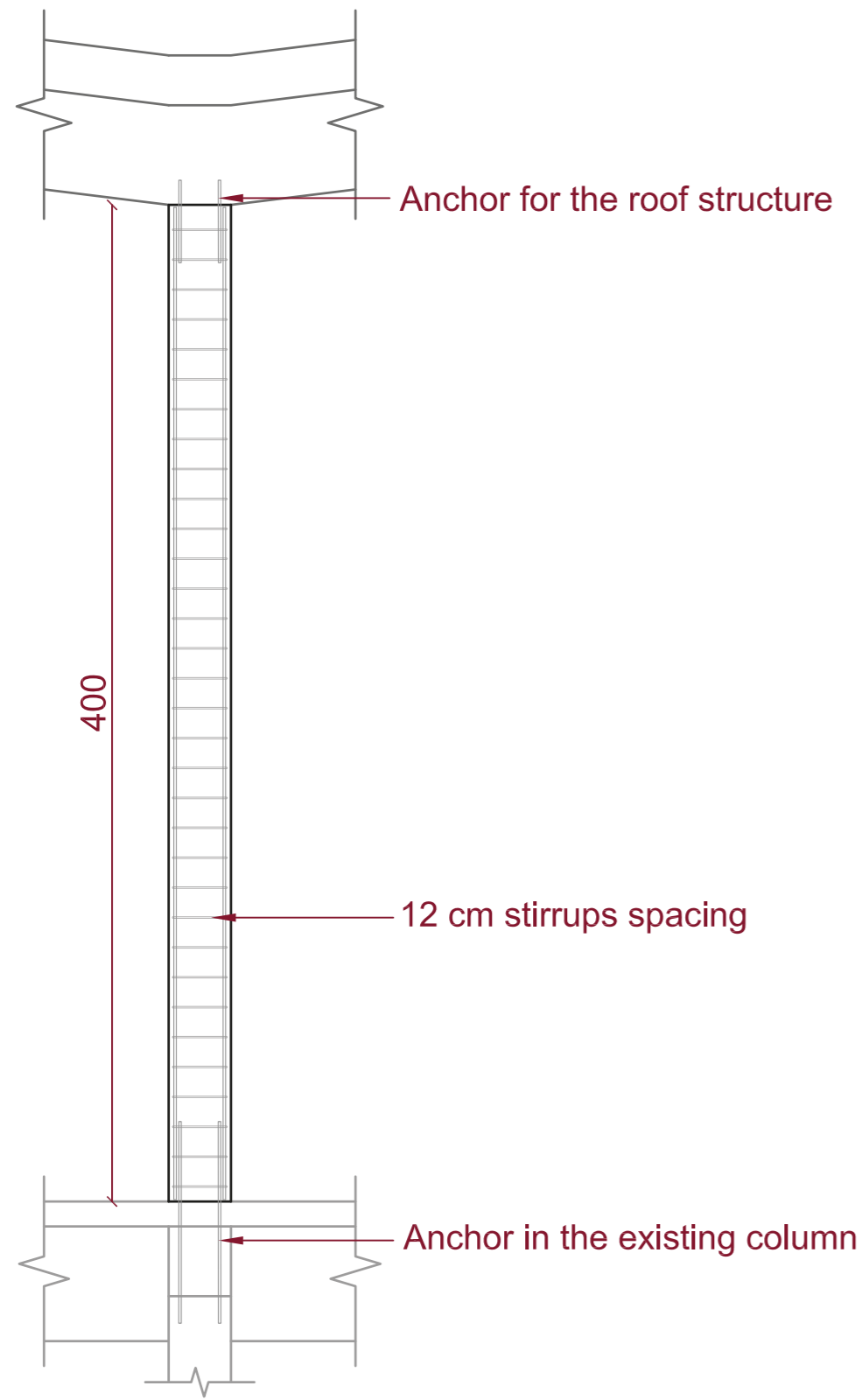
④ New façade panel  
1:20



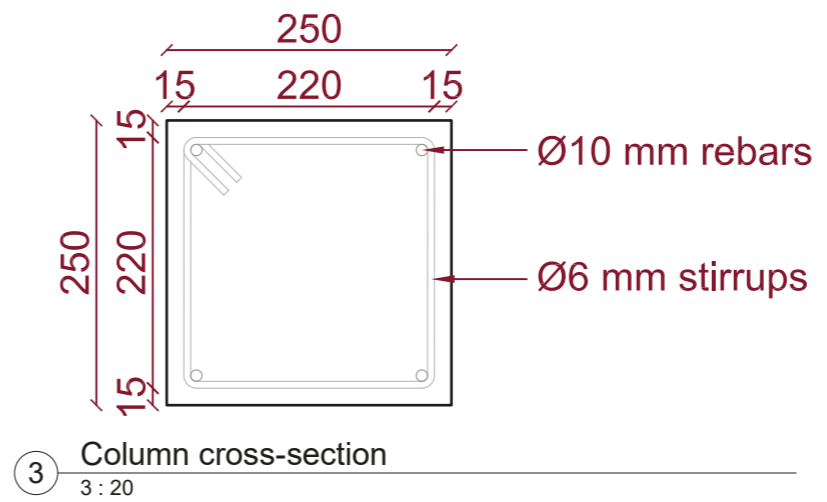
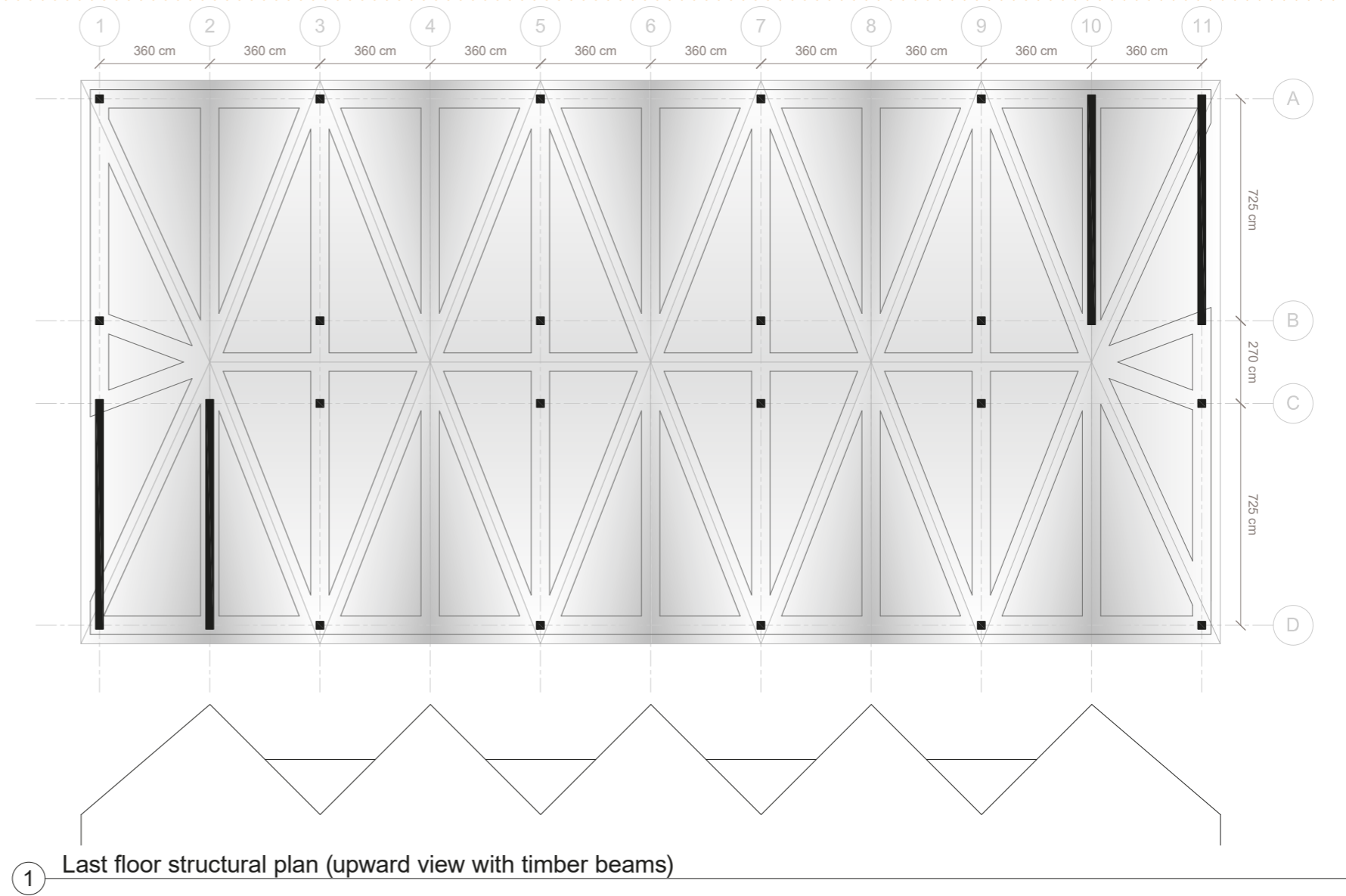
⑤ New roof composition  
1:20

**STRUCTURE**

**Structure: Projected state, Last floor columns design**

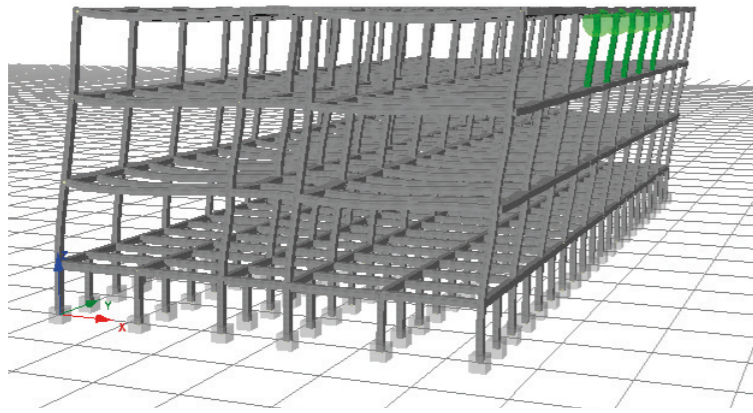


② Transversal reinforcement in the column  
3 : 80

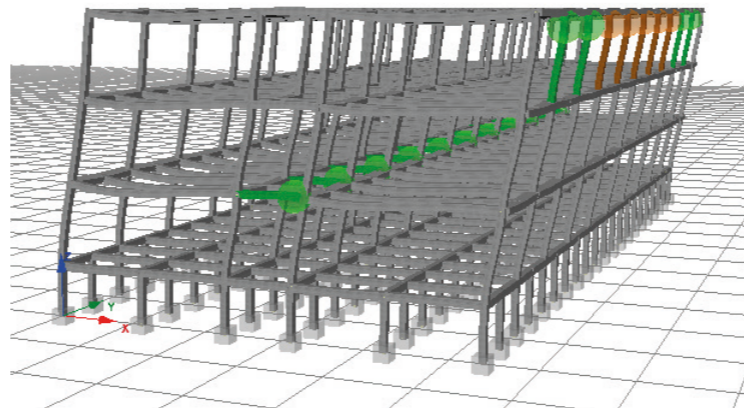


Existing state

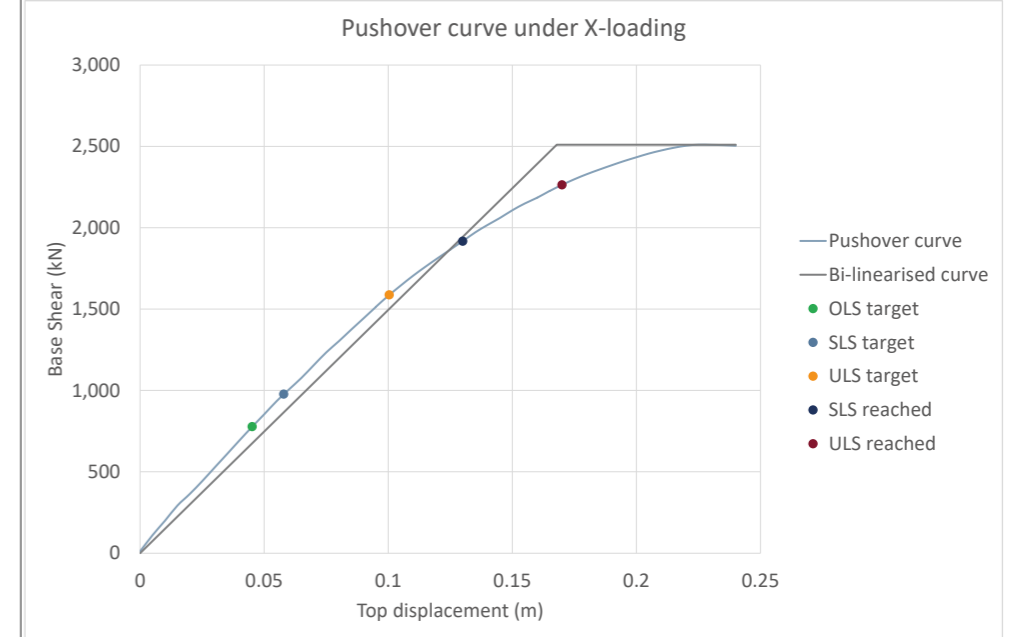
First elements reaching SLS (in green)



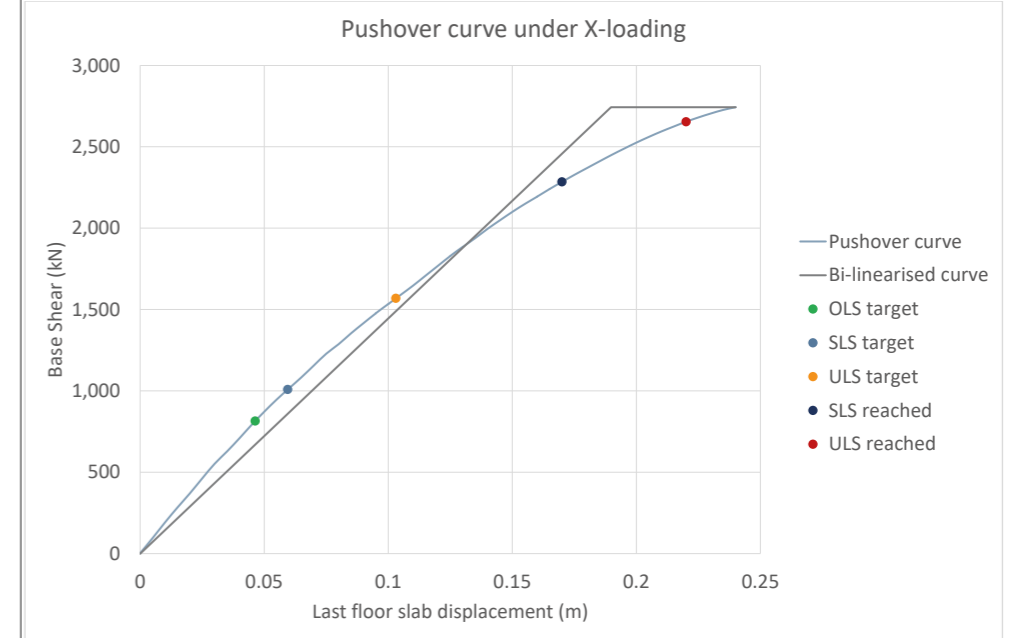
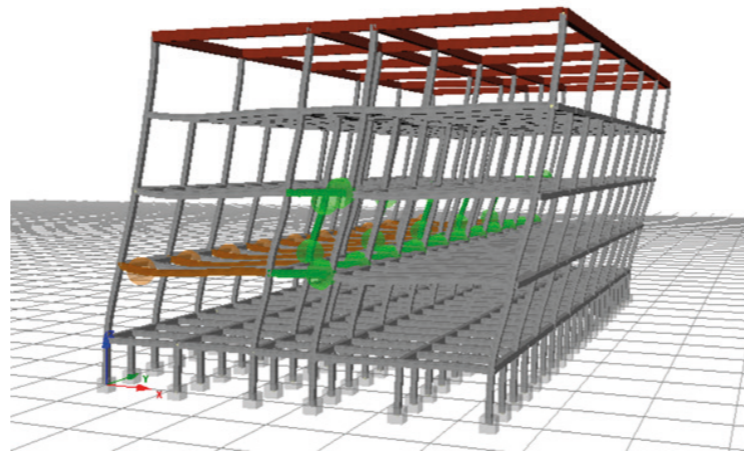
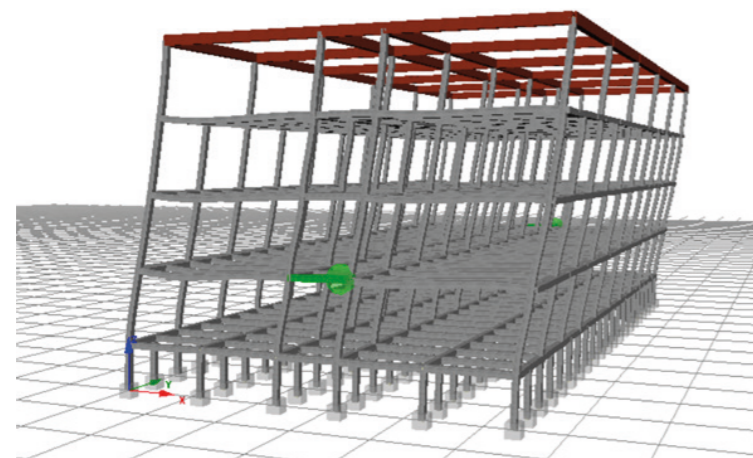
First elements reaching ULS (in orange)



Pushover curves

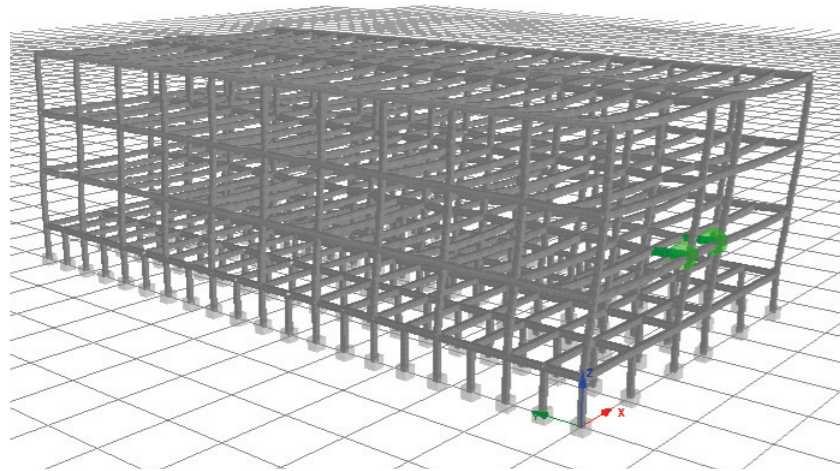


Projected state

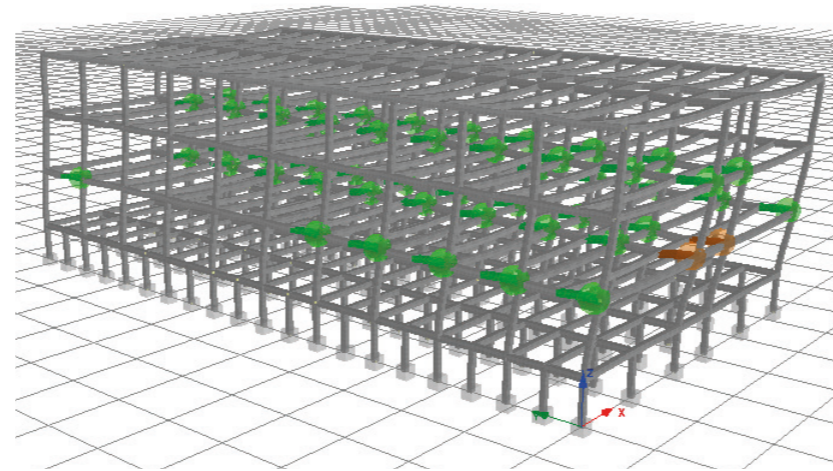


Existing state

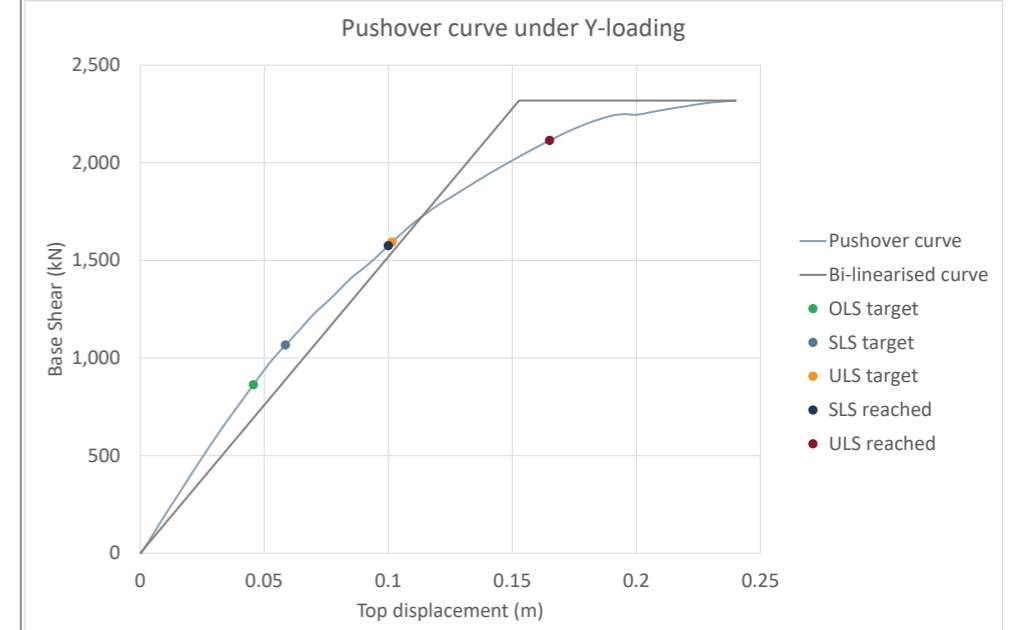
First elements reaching SLS (in green)



First elements reaching ULS (in orange)



Pushover curves



Projected state

