



# hybrid solutions

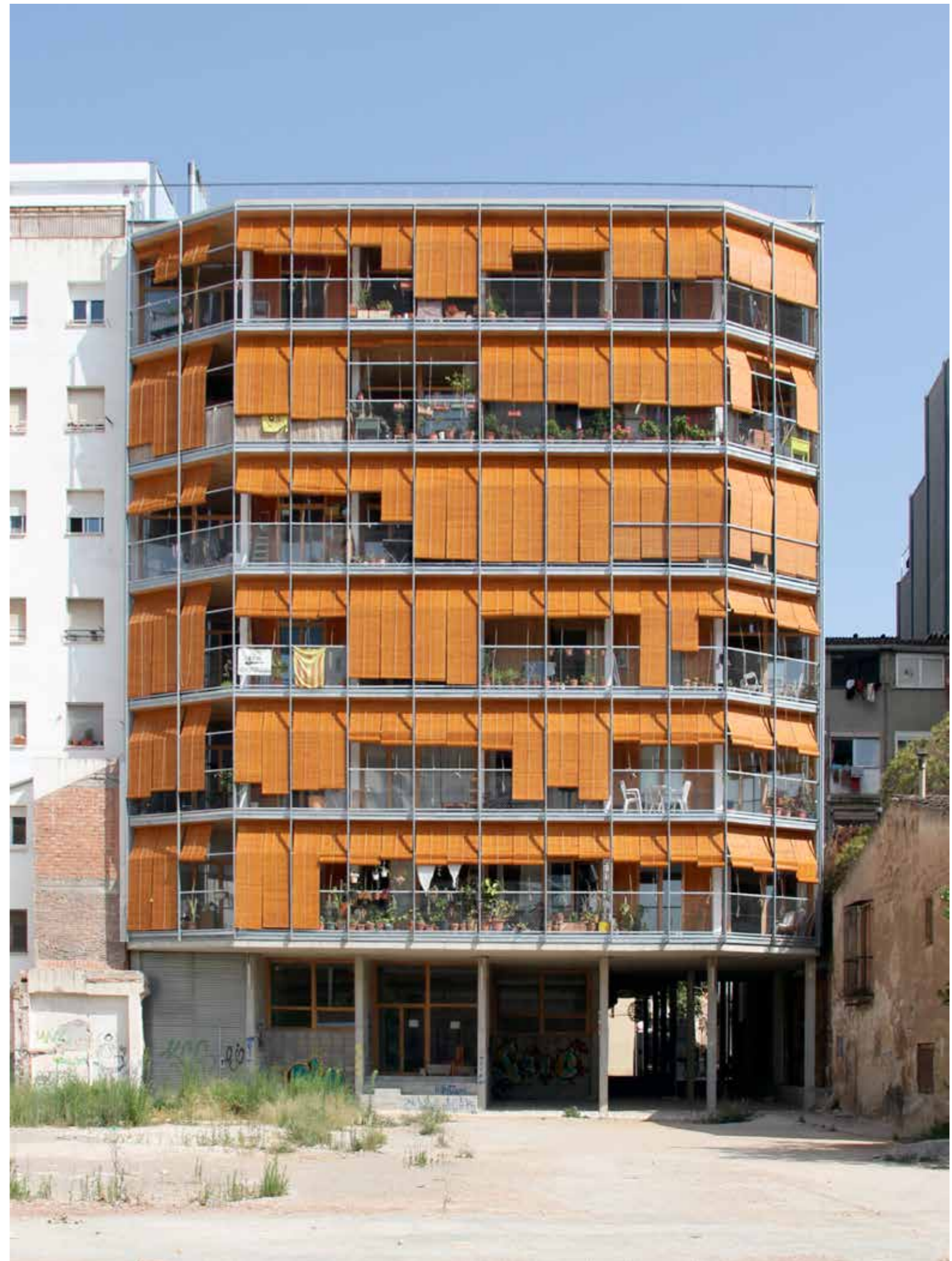
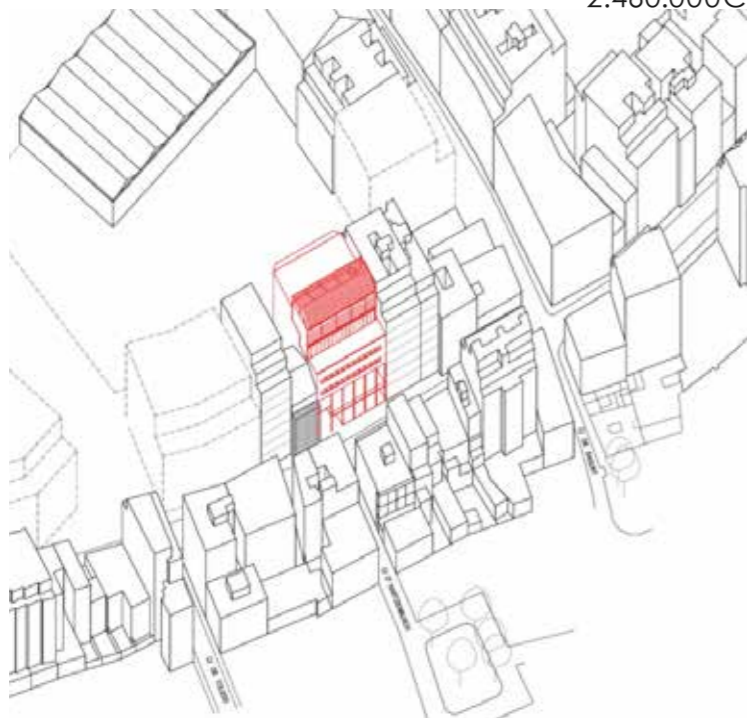
I n d u s t r i a l   W o o d   C o n s t r u c t i o n

	PROGRAMM	SOLUTION
<p><b>LA BORDA</b></p> 	<p>Shared space</p> <p>Appartments</p>	<p>Concrete columns and floors / GLT post, beam and CLT slab</p> <p>CLT walls and CLT slab with in situ concrete</p>
<p><b>SARA CULTURAL CENTER</b></p> 	<p>Cultural / Social / Theatre Library / Gallery</p> <p>Hotel / Accommodation</p>	<p>Glue laminated timber and CLT / Hybrid GLT and steel truss.</p> <p>CLT / modular unit construction</p>

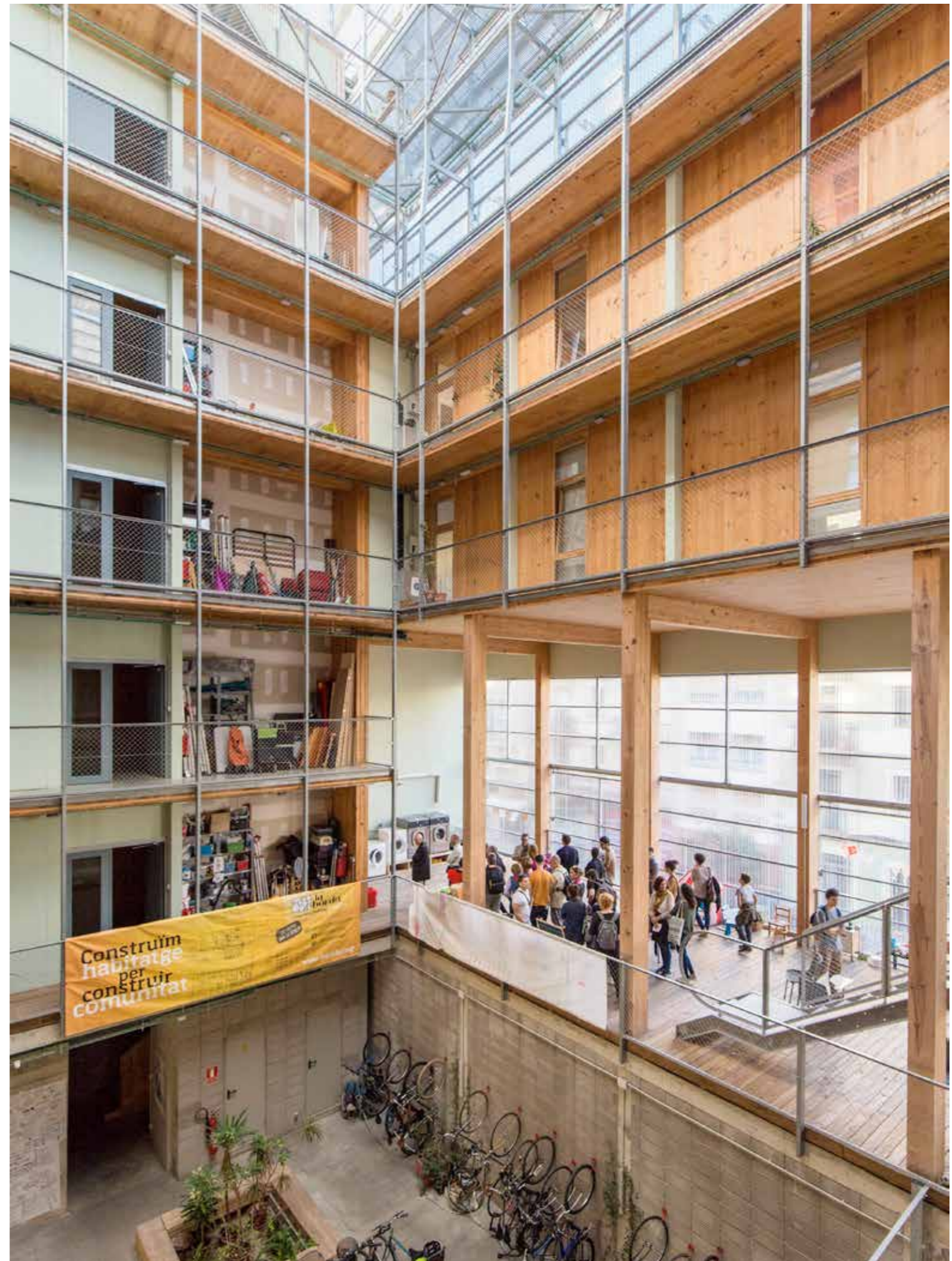
# LA BORDA

Lacol

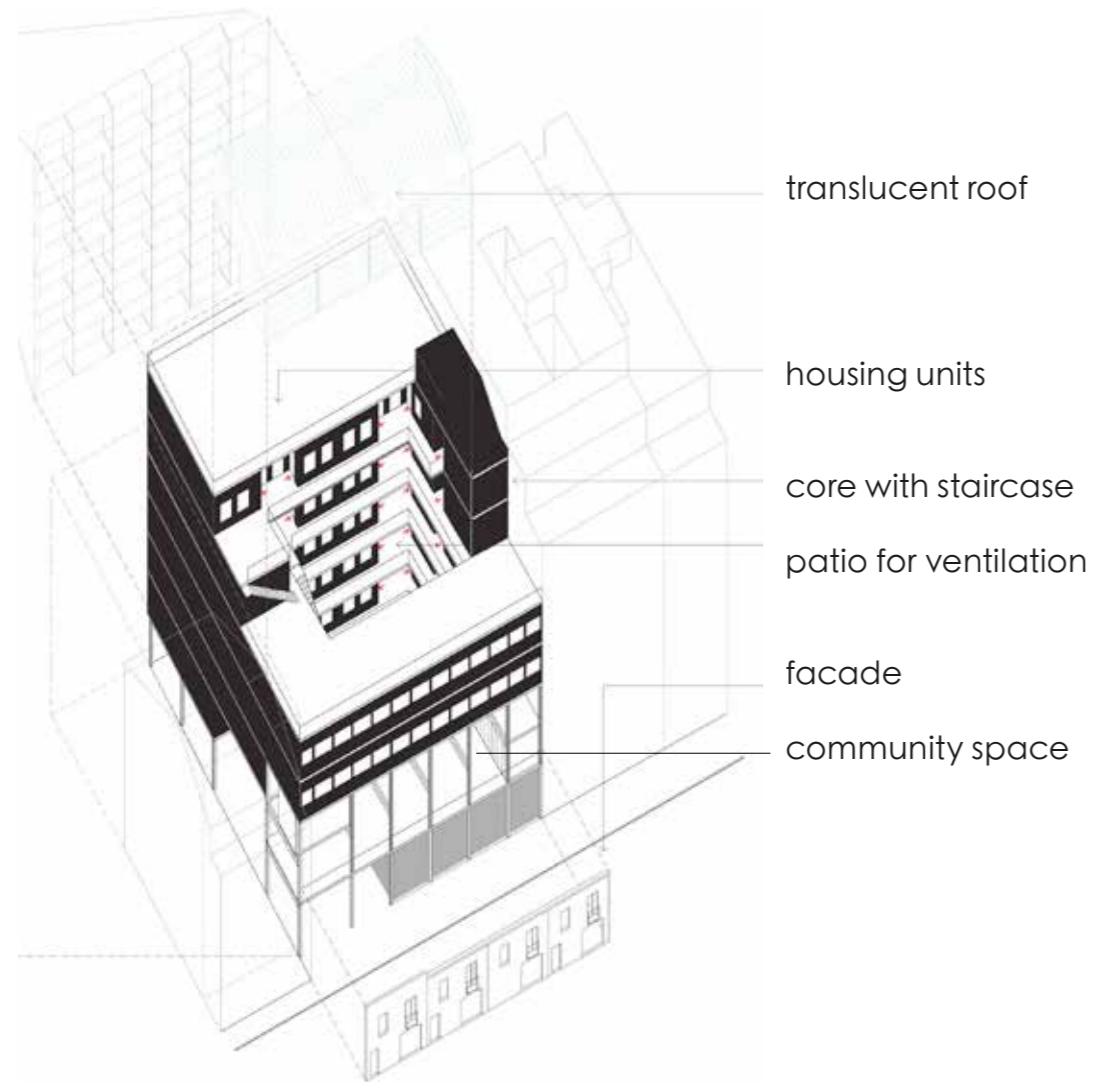
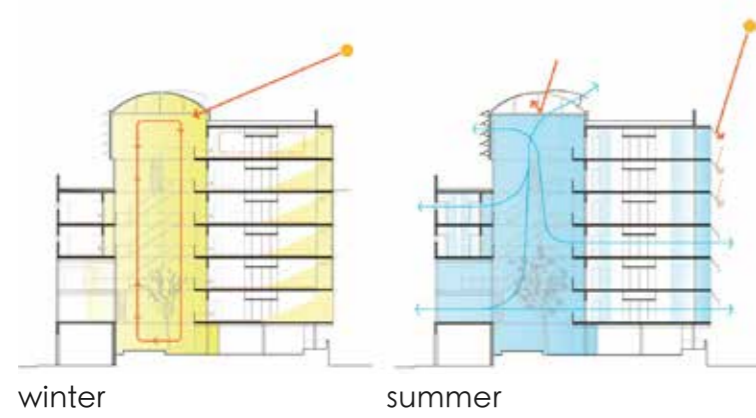
Client: Cooperativa d' habitatge La Borda  
Location: Barcelona, Spain  
Completion: 2018  
Original Use: Housing  
Storeys: 7  
Floor space: 3.071 m<sup>2</sup>  
Cost of construction: 2.460.000€



# 1 flexibility for program



adaption to climatic influences



adaption to the user



I infrastructure, II optional walls,



translucent roof

housing units

core with staircase

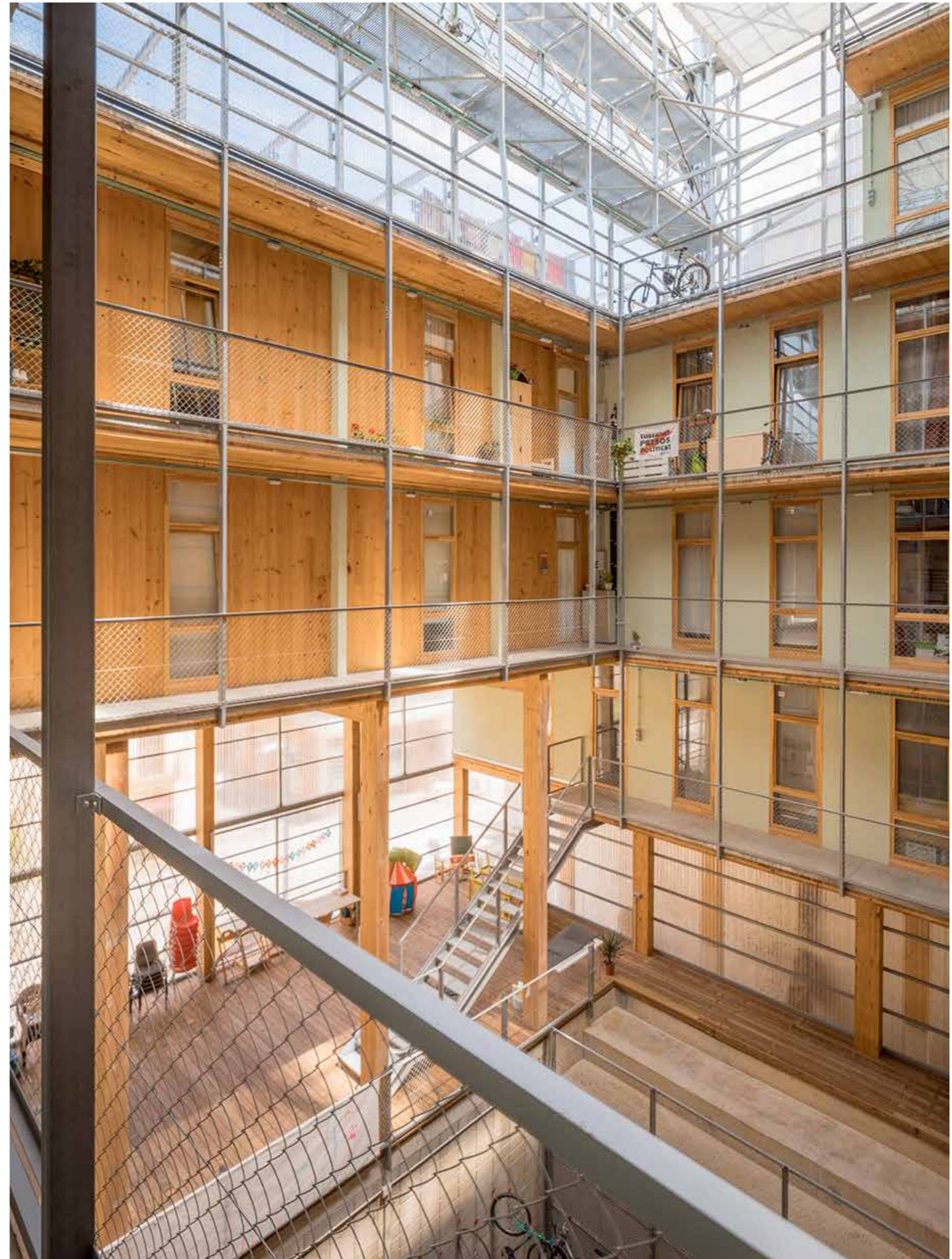
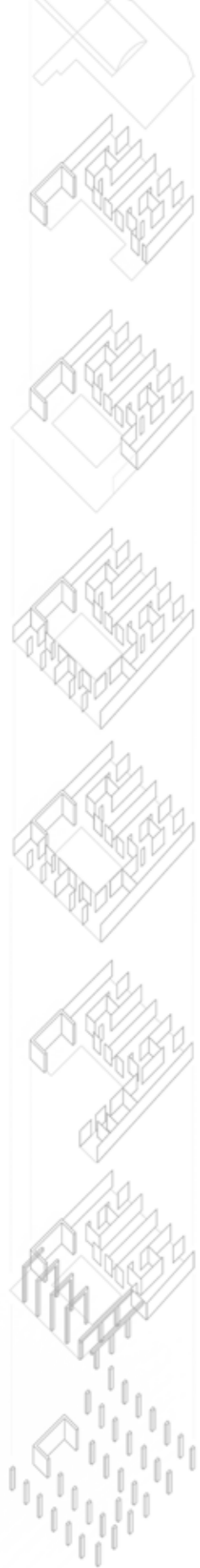
patio for ventilation

facade

community space



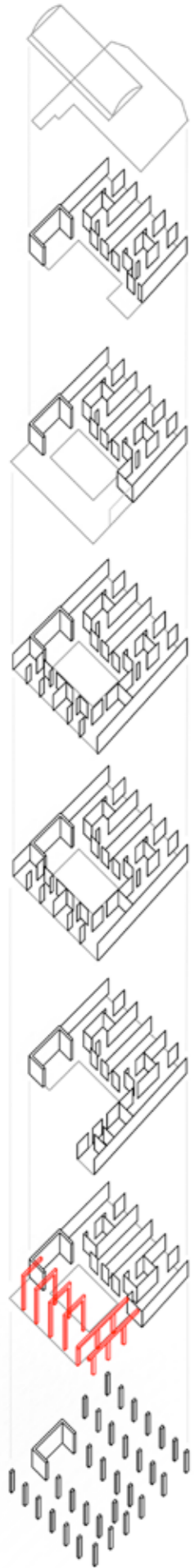
# 2 optimized material use







## wooden first floor

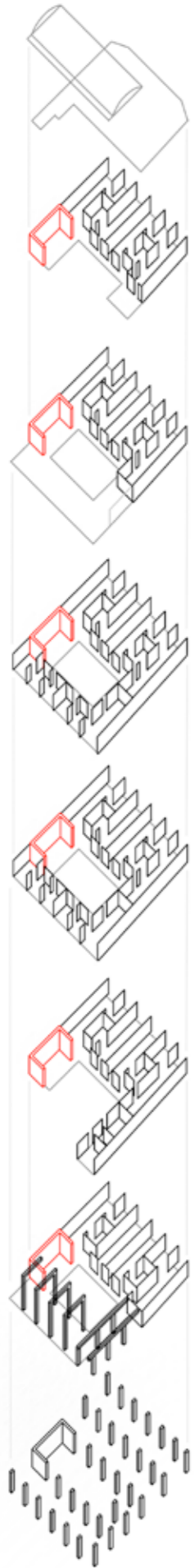


### GLT post & beam + CLT slab

- wood columns (glulam) 300mm x 500mm
- wood beam (glulam) 300mm x 500mm
- CLT slab 120 to 150mm
- in total 40 m<sup>3</sup> of glulam timber



wooden core

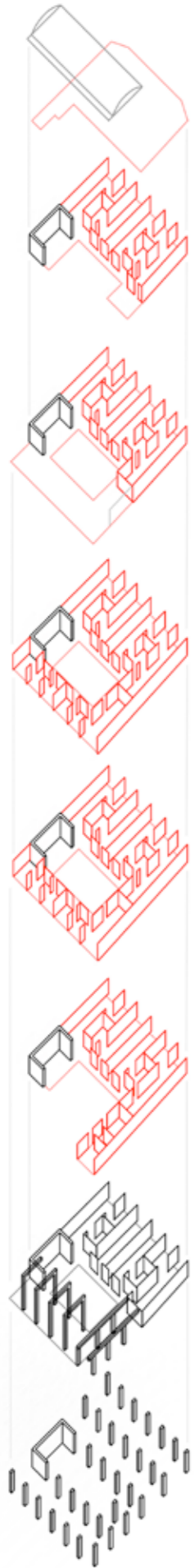


### CLT panels

- initially planned in concrete
- high costs of the joints between concrete core and CLT building
- CLT core proved competitive
- CLT sheets 300mm

- thickness necessary to limit lateral wind oscillation
- thickness allows CLT to remain exposed
- 120 minutes resistance of external fire

## wooden apartments

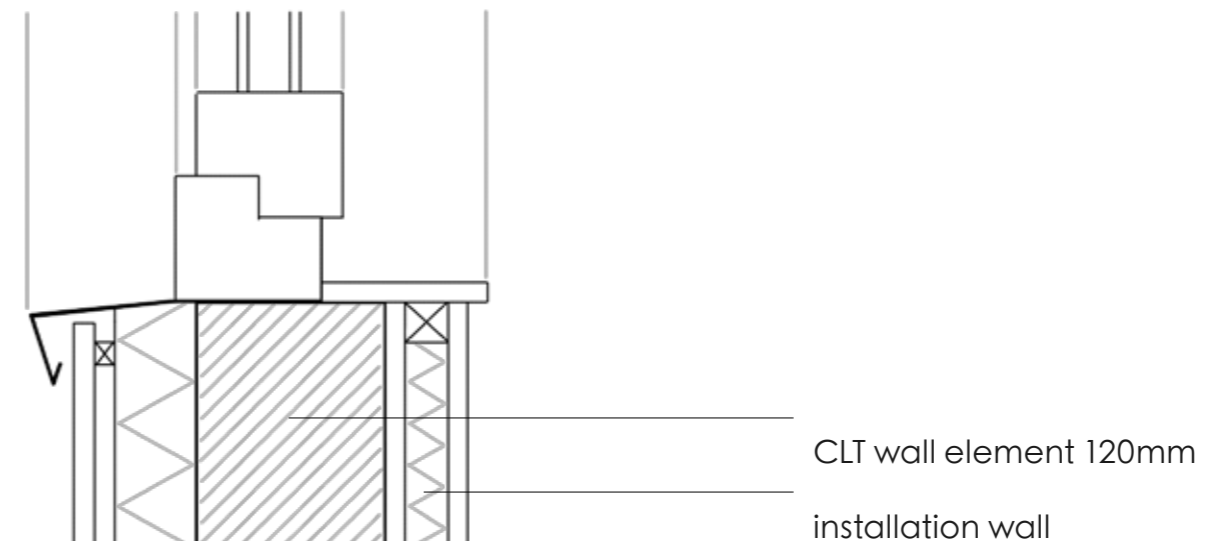
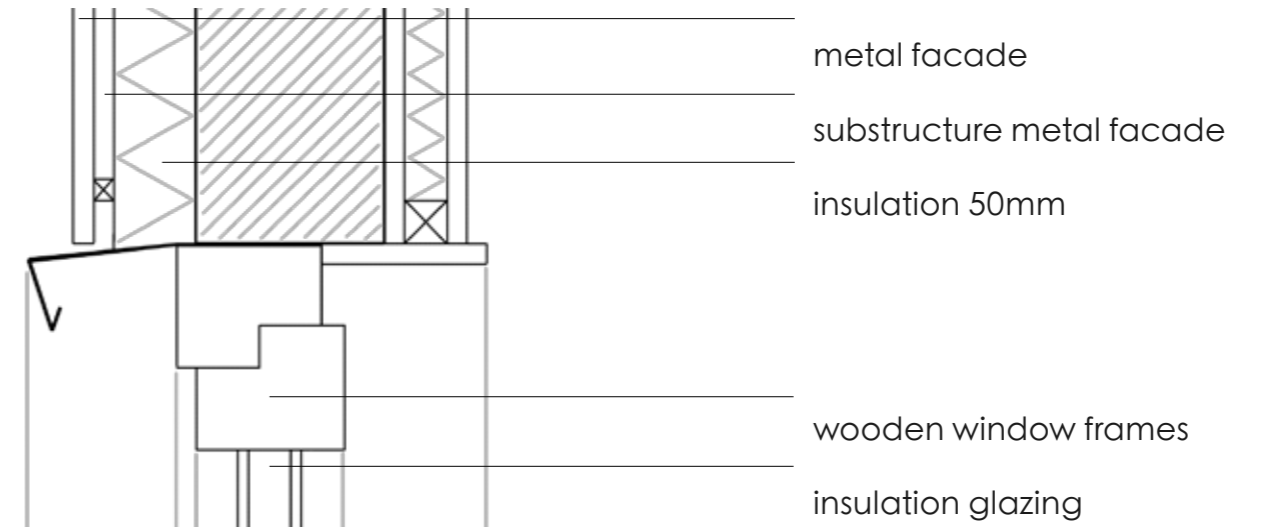
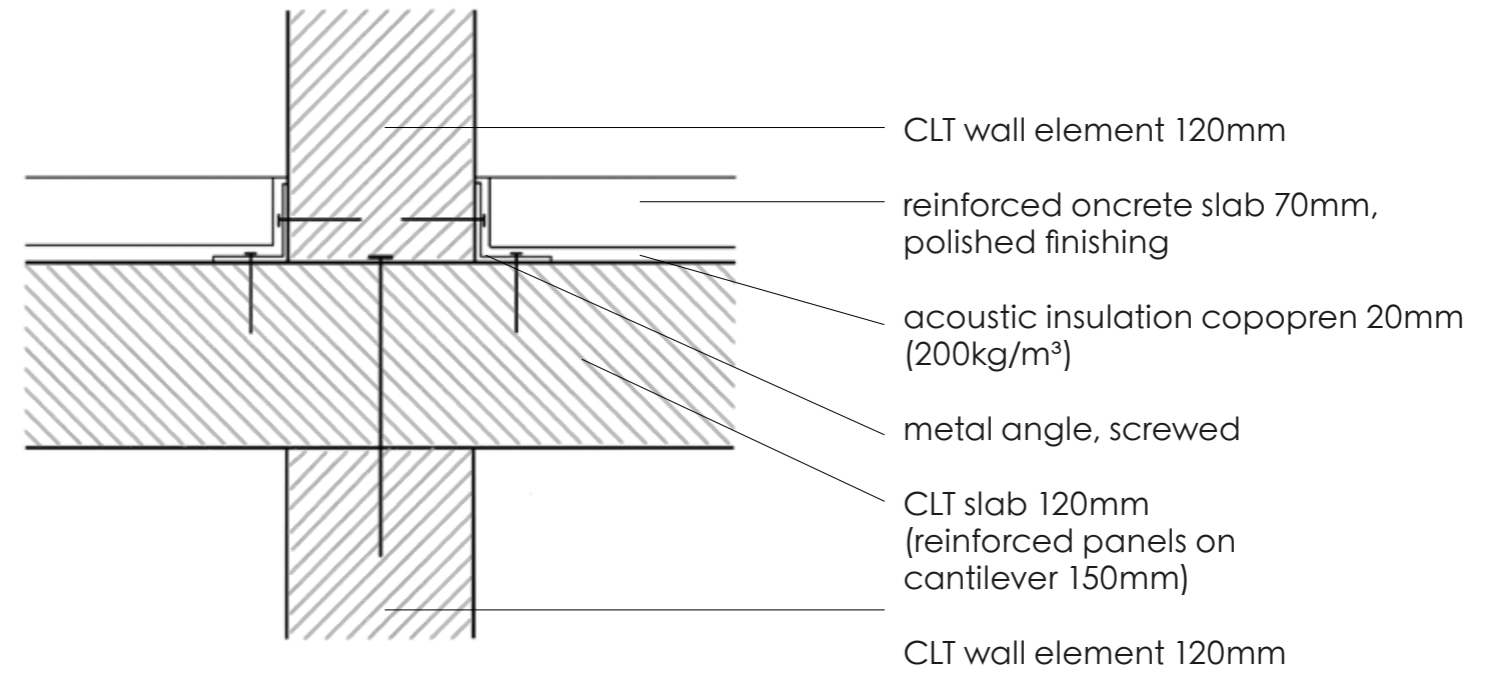
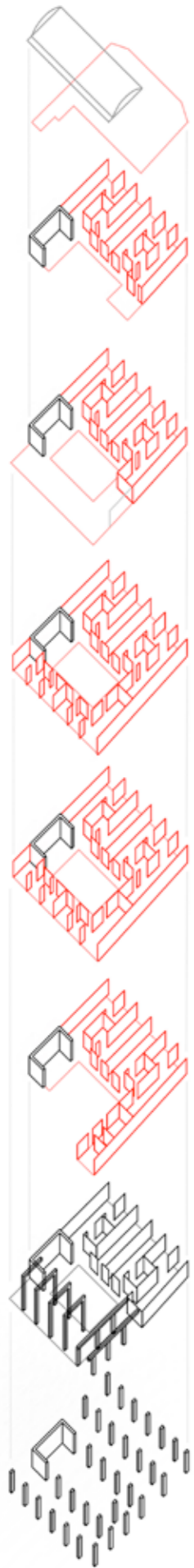


### CLT panels

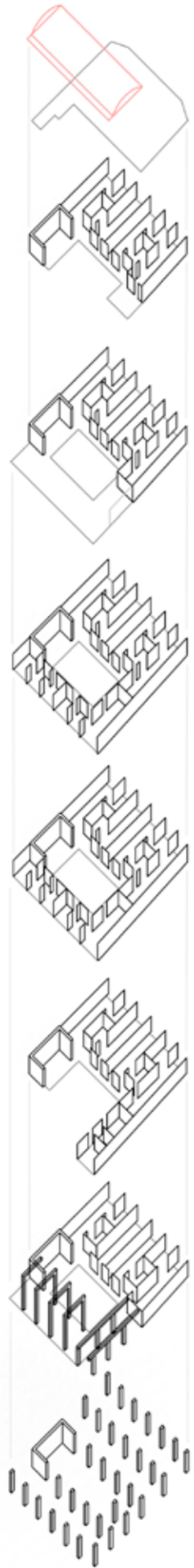
- prefabricated CLT slabs 120mm - 150mm
- wood comes from the Basque Country, 500 km from site
- 6 weeks of assembly (for the structure)
- 500 CLT panels
- 10 truckloads of wooden panels
- around 720 m<sup>3</sup> of wood
- more than 150,000 lag screws



wooden apartments

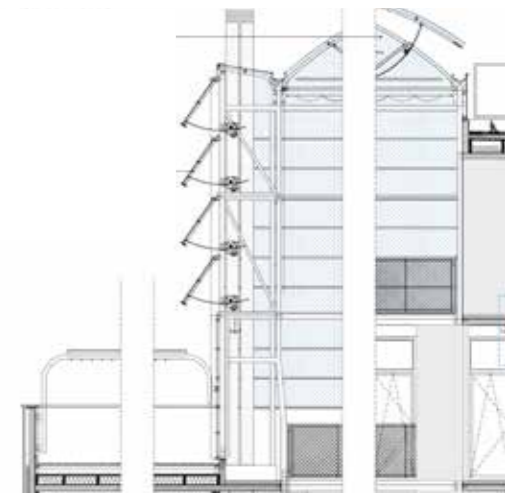


steel structure



metal and polycarbonate roof structure

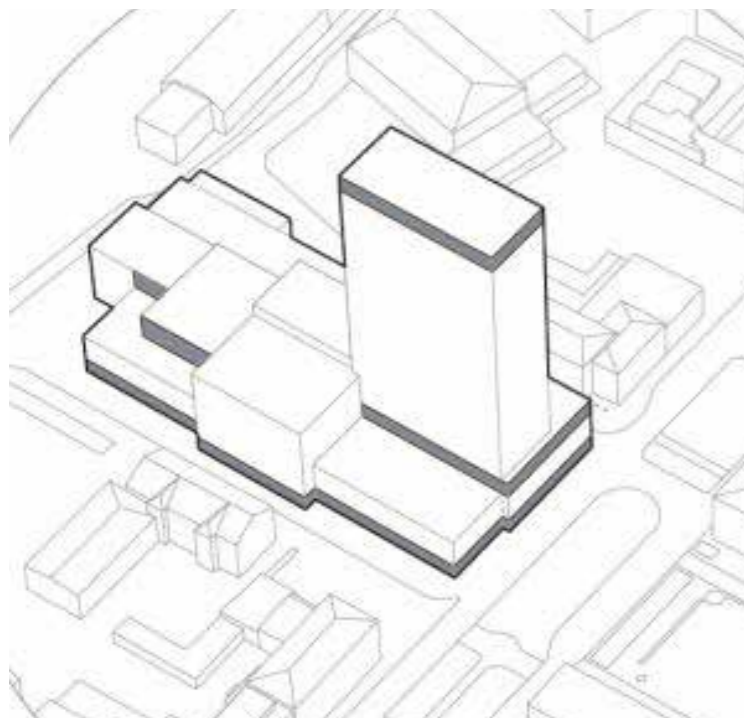
- galvanized steel roofing system with corrugated PVC coating
- corrugated polycarbonate vertical enclosure fixed to galvanized steel frame



# SARA CULTURAL CENTER

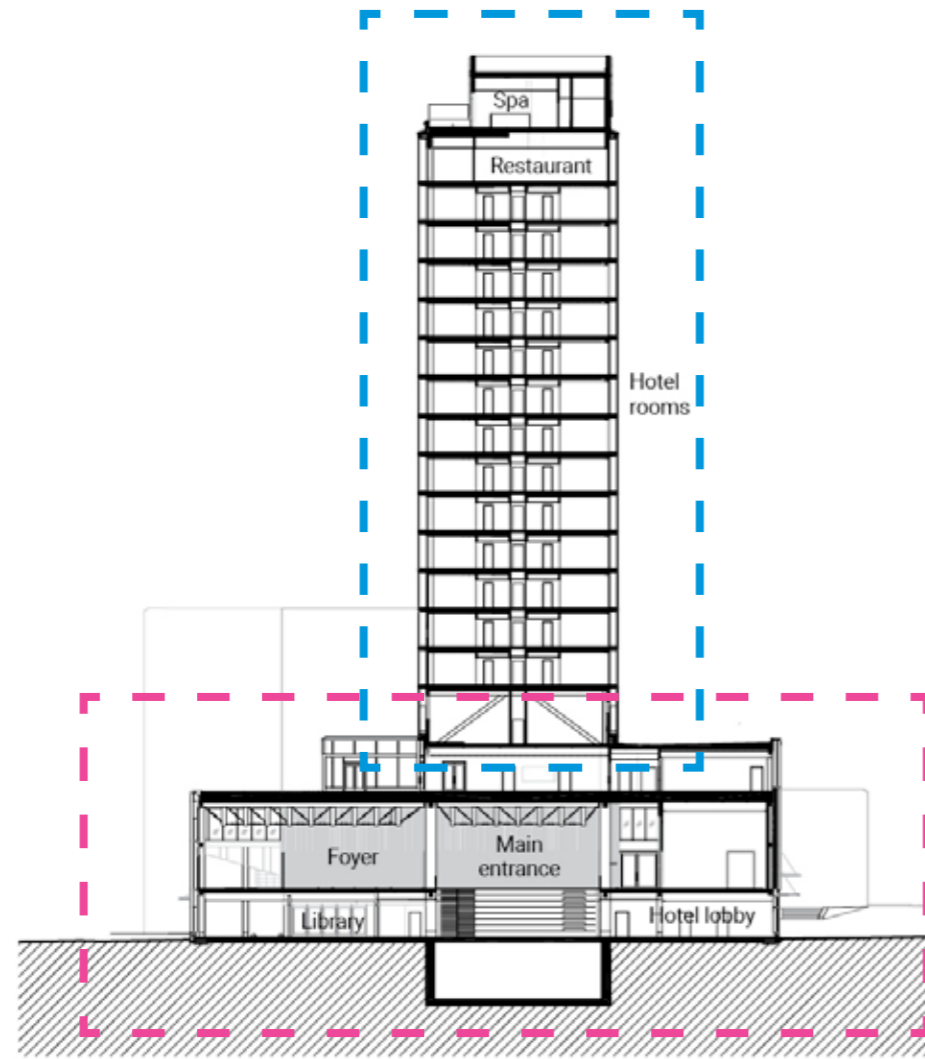
White Arkitekter

Client: Cree GmbH  
Location: Skellefteå, Sweden  
Completion: 2021  
Original Use: Hotel, cultural center  
Floor space: 300.000 m<sup>2</sup>  
Cost: 105.000.000€

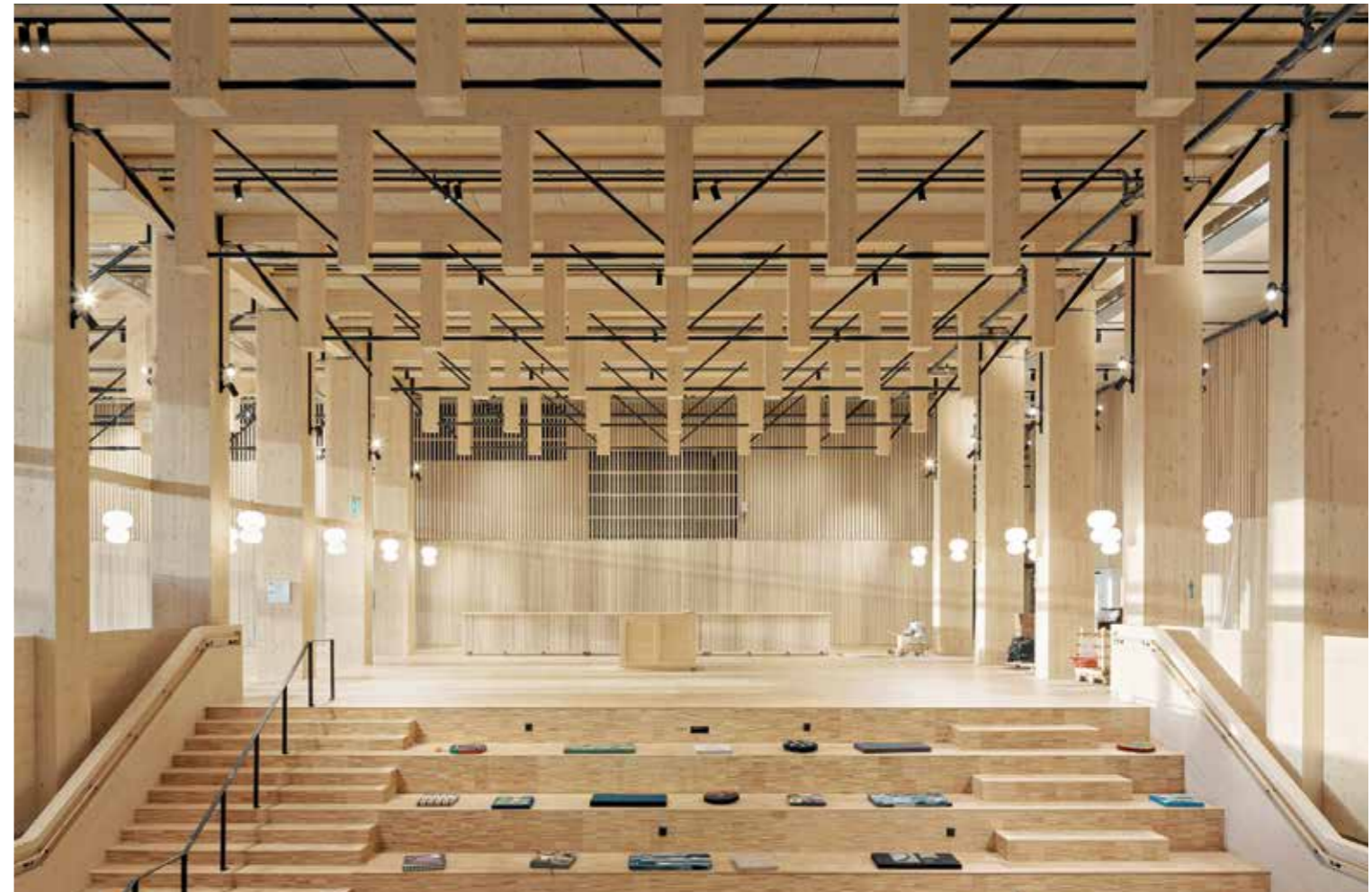


# 1. flexibility for program

modular unit hotel



hybrid truss/ post and beam

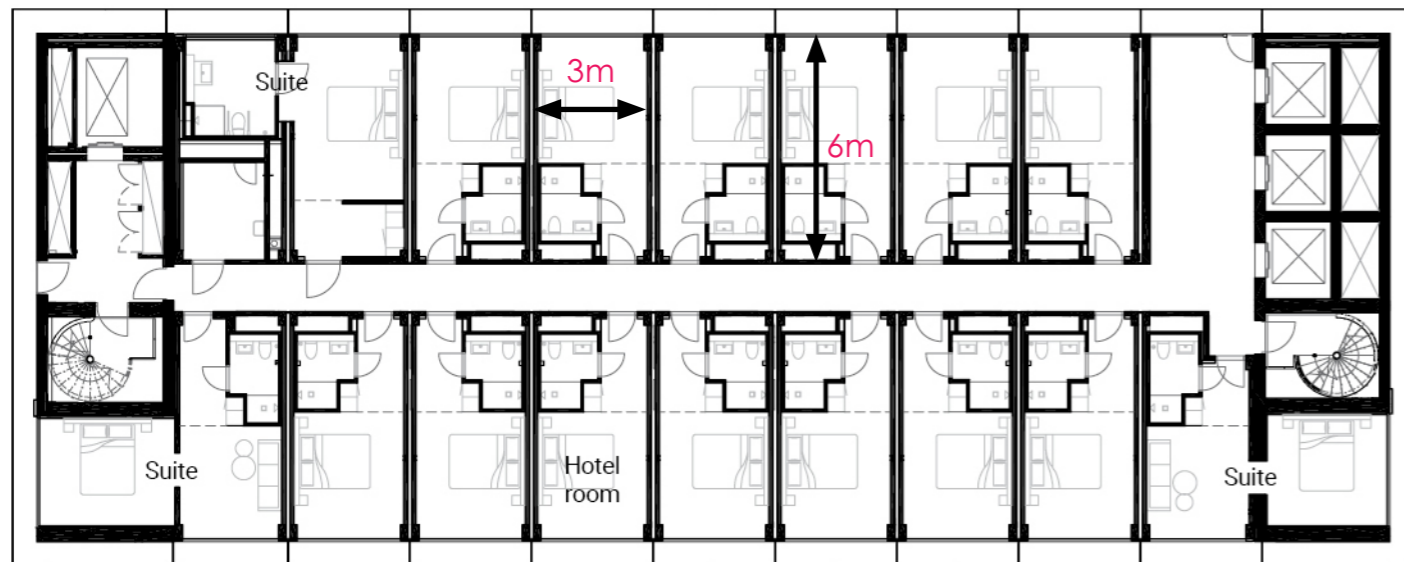


# 3. speed of construction



## Level 9 Floor plan

13 of the total 15 floors of the hotel tower comprise load bearing prefabricated room modules stacked on top of a transfer floor

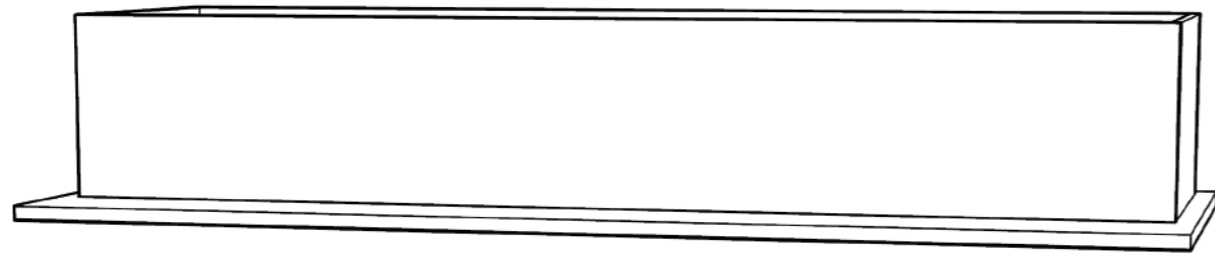


## Time saved

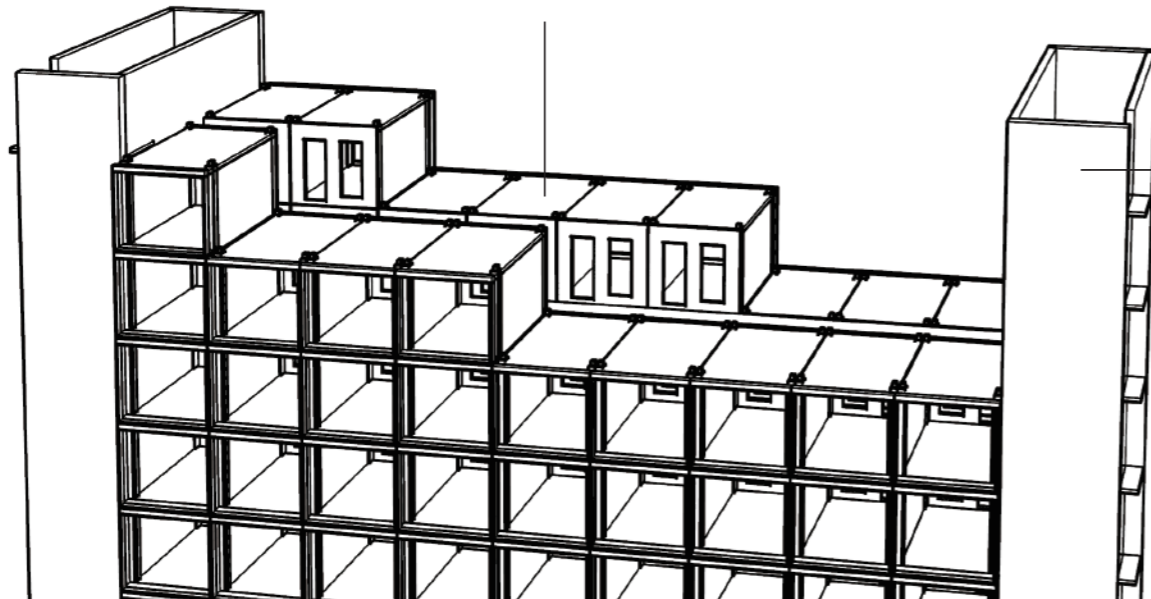
Construction method selected due to:  
-small scale (rooms)  
-serial/ repeated nature of the hotel room  
-acoustic/ soundproofing requirements placed on the partition walls and ceilings.

It is believed that the construction programme was reduced by 1 year as a result of building in wood.





prefabricated  
room modules



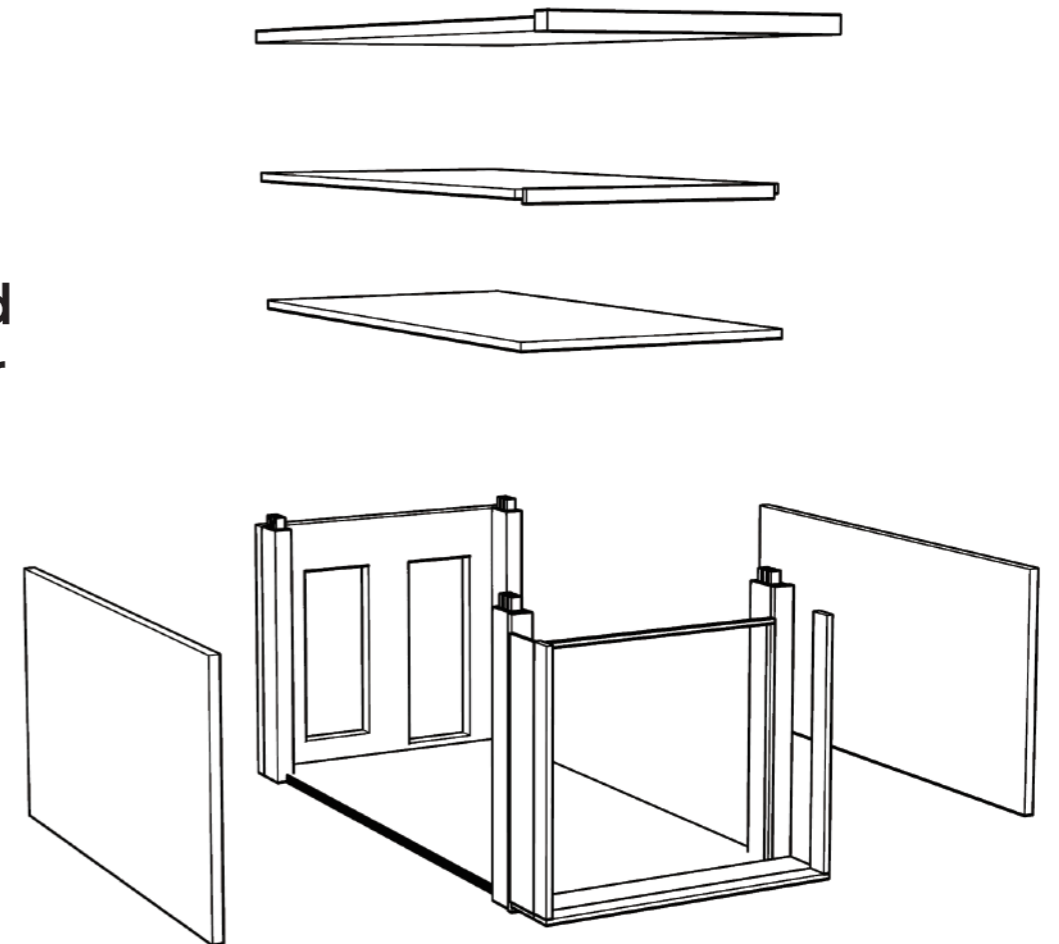
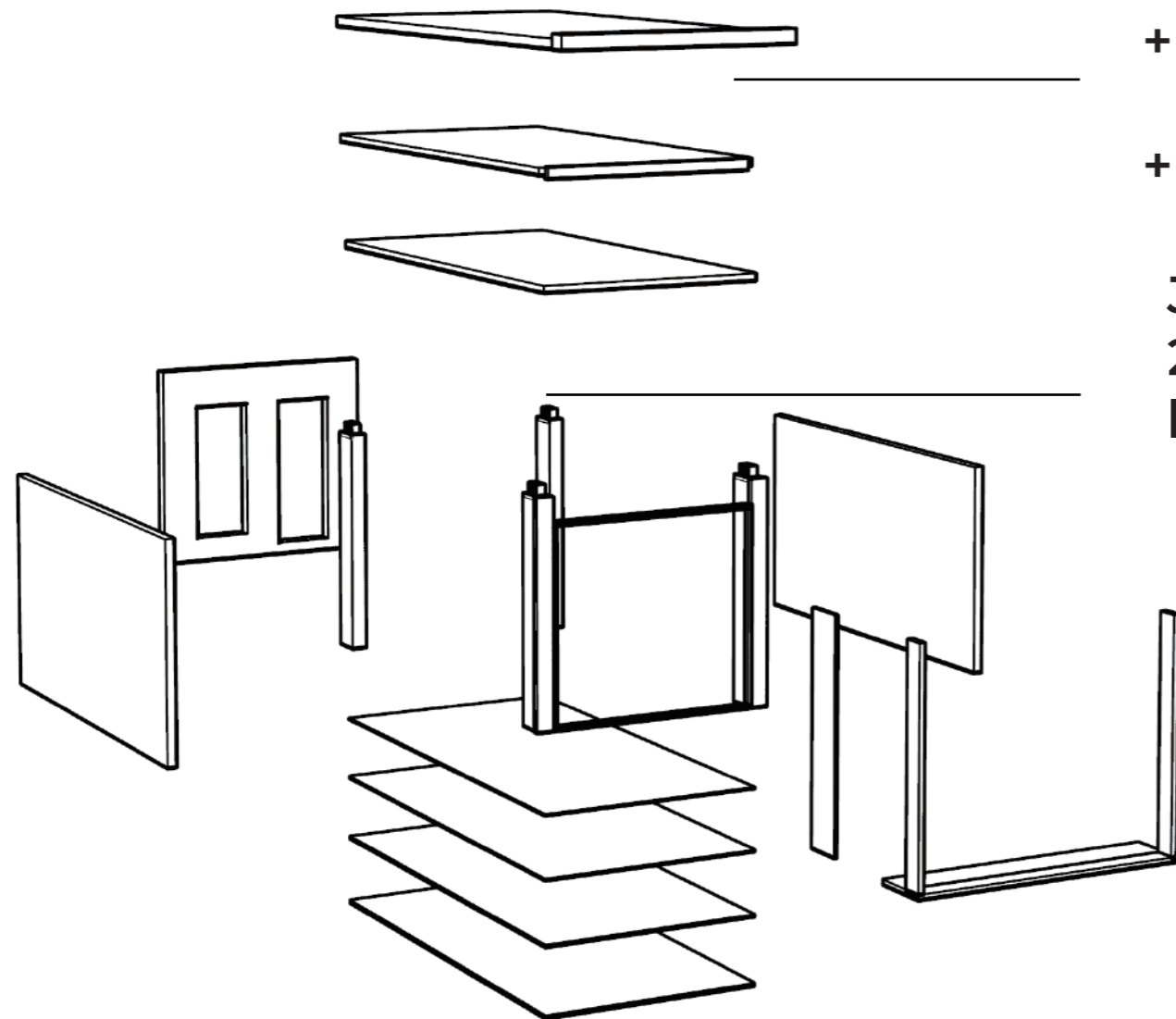
staircase cores  
- CLT panels



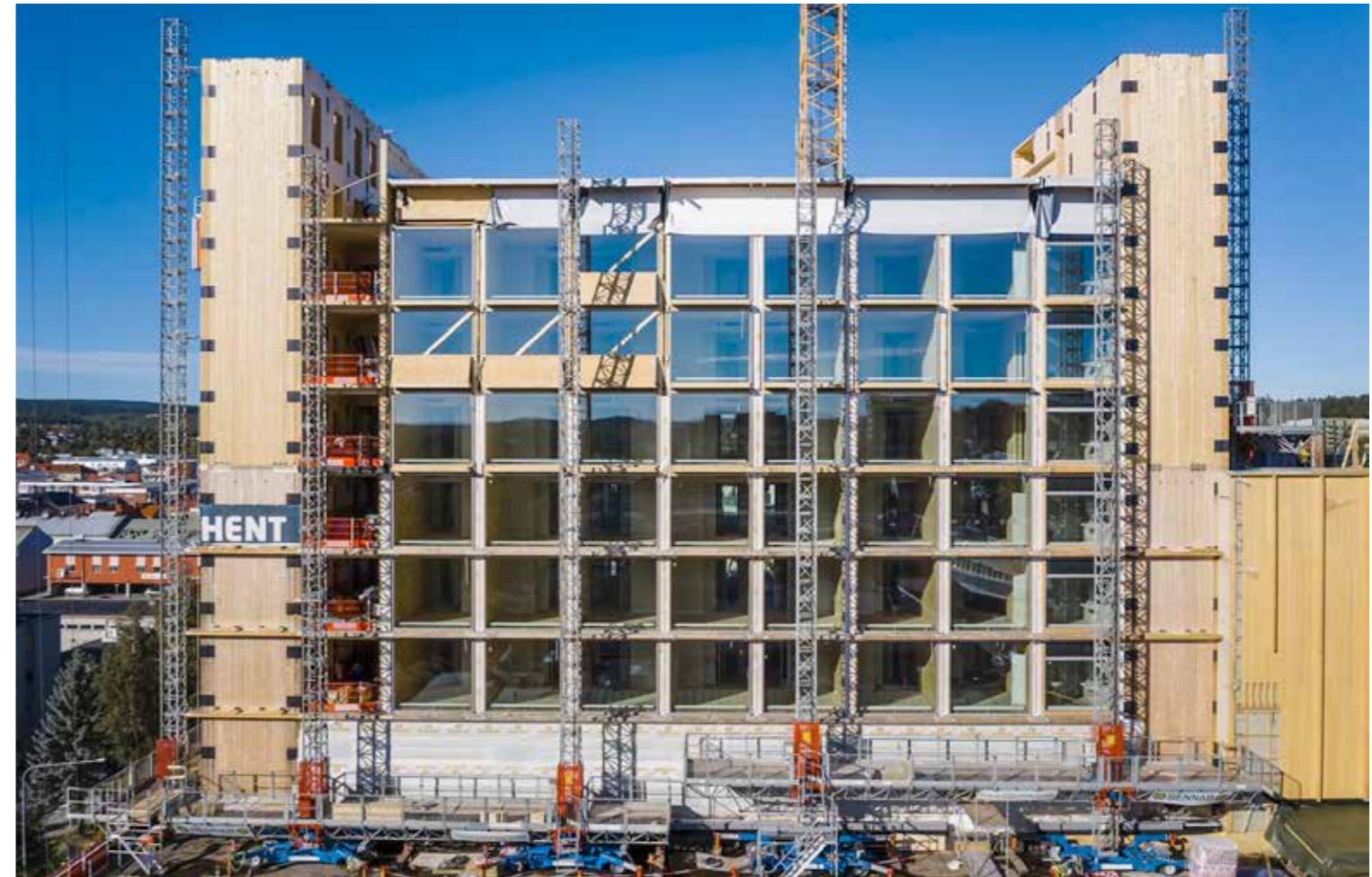
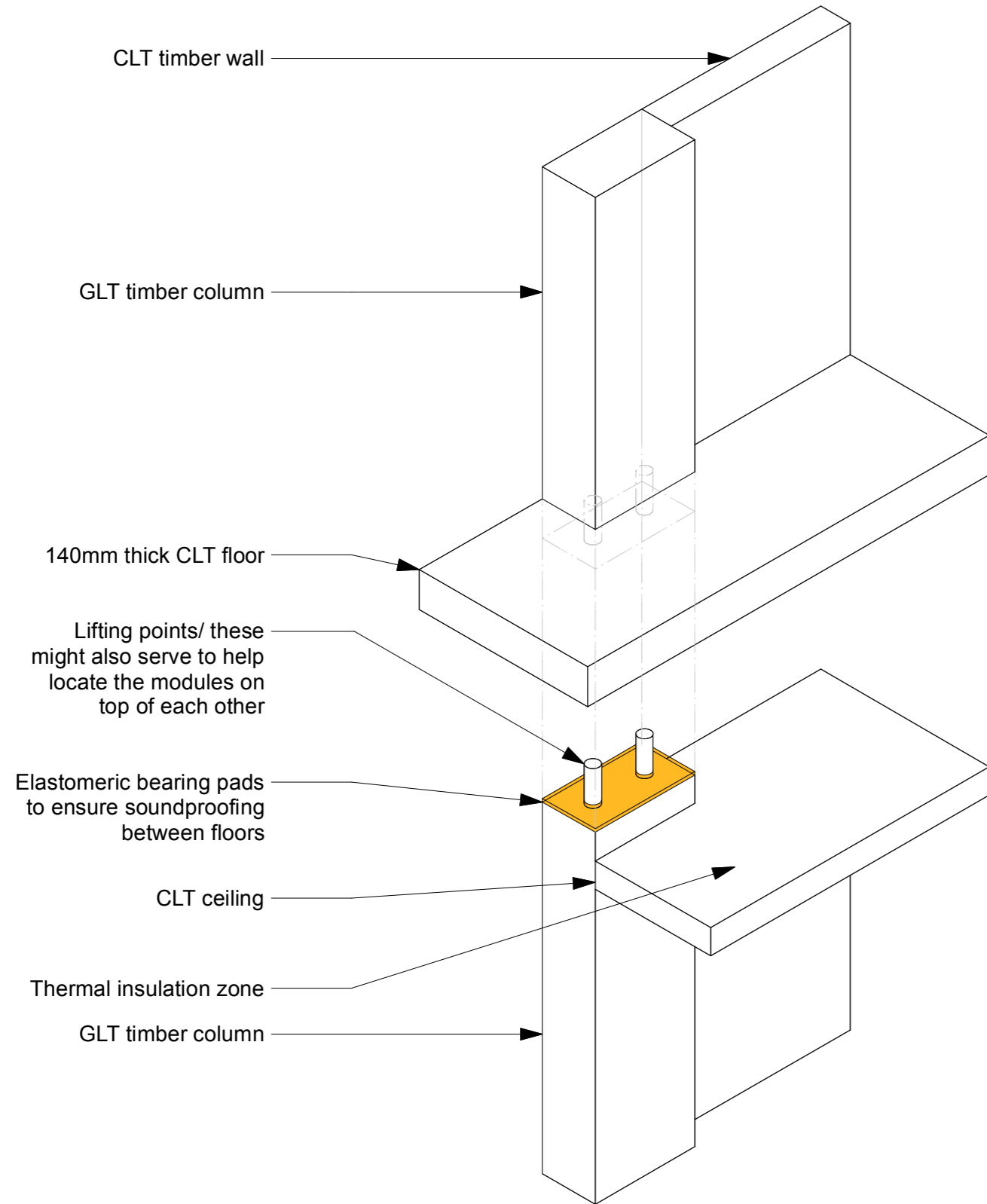


**120mm CLT  
+ 120mm thermal  
insulation  
+ 100mm CLT**

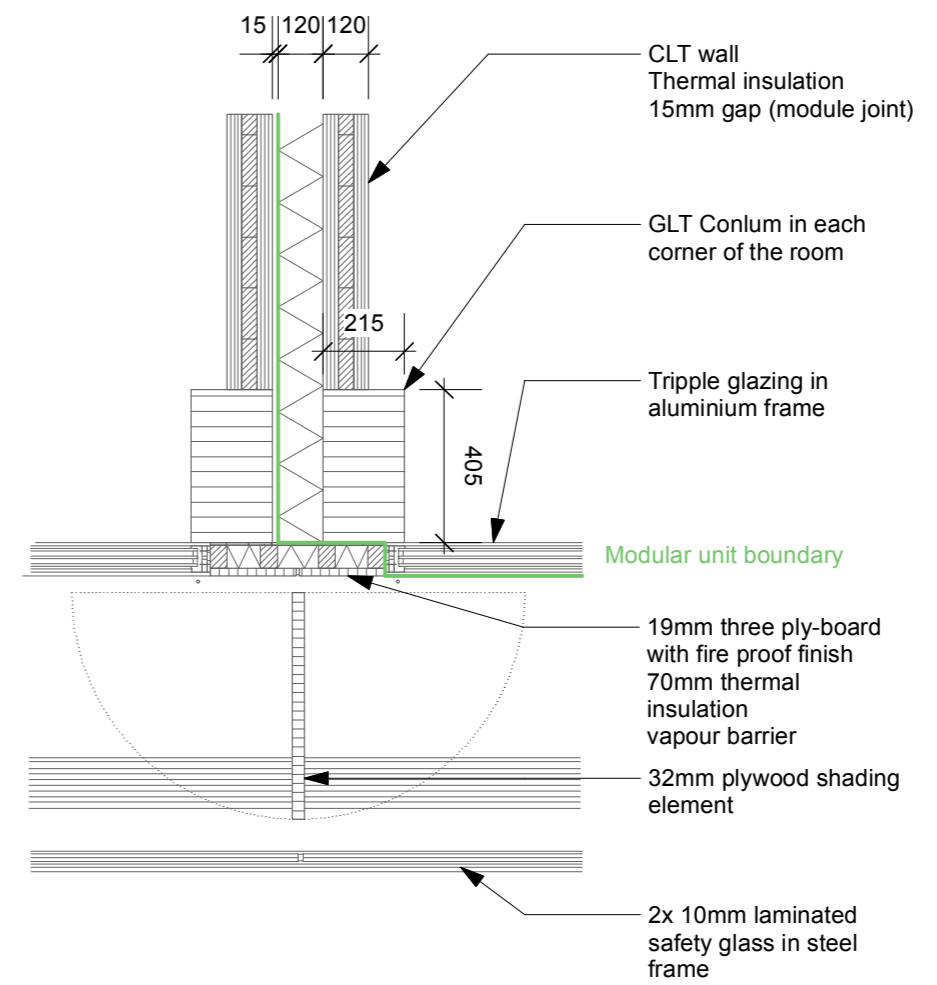
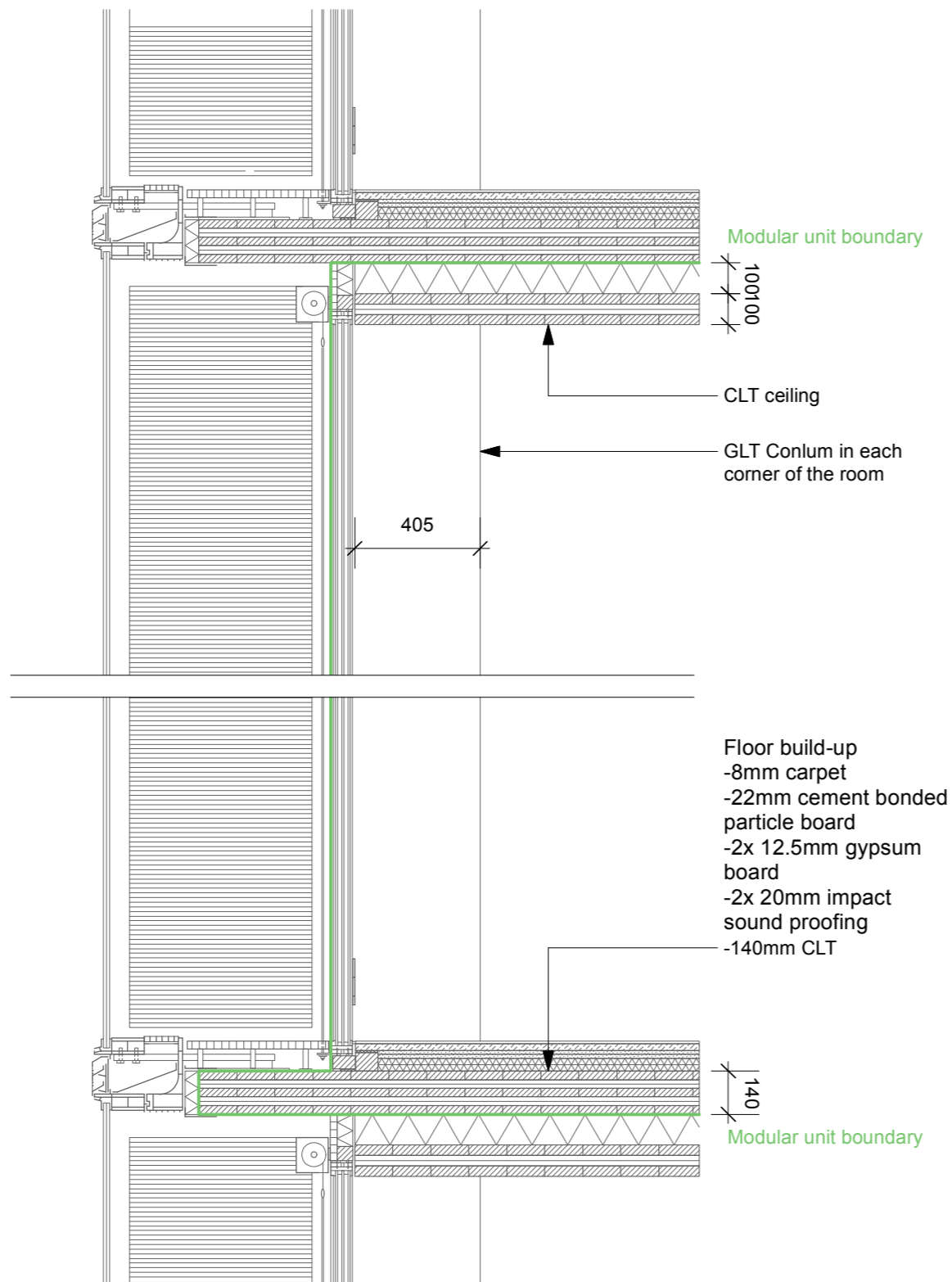
**Joint +  
215/405mm glued  
laminated timber**



butt joint between floors



key dimensions/ module overview



# 4 economic benefits



## Including

- investing in local resources
- helping to develop skills and teaching
- pioneering developments in wood construction
- providing investment in place during and after the construction phase
- making a place more desirable; Sara Cultural Centre seeks to engage in and to some extent slow or reverse the rural to urban migration seen in many small Swedish towns and cities.



# Advantages



**1.** flexibility for program



**2.** optimized material use



**3.** speed of construction



**4.** economic benefits

# Disadvantages



**1.** use of concrete



**2.** recyclability



**3.** transport distances

# References

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