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HAMK



SUSTAINABLE, HIGH-PERFORMANCE BUILDING SOLUTIONS IN WOOD

2020-1-LV01-KA203-077513

Architecture - How to think in timber?

Martin Aichholzer

2021 09 07



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MA ARCHITEKTEN GK

Arch. DI Martin Aichholzer | Arch. DI Günter Klein

www.magk.at



www.fh-campuswien.ac.at



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WHY take WOOD ?



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VALSTYBINĖ
KOLEGIJA



**Wood is the only regenerative building material
used in the load-bearing structure of multi-storey buildings.**



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WHO WOOD we take ?



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an integrated planning team



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MAGK & RUBNER





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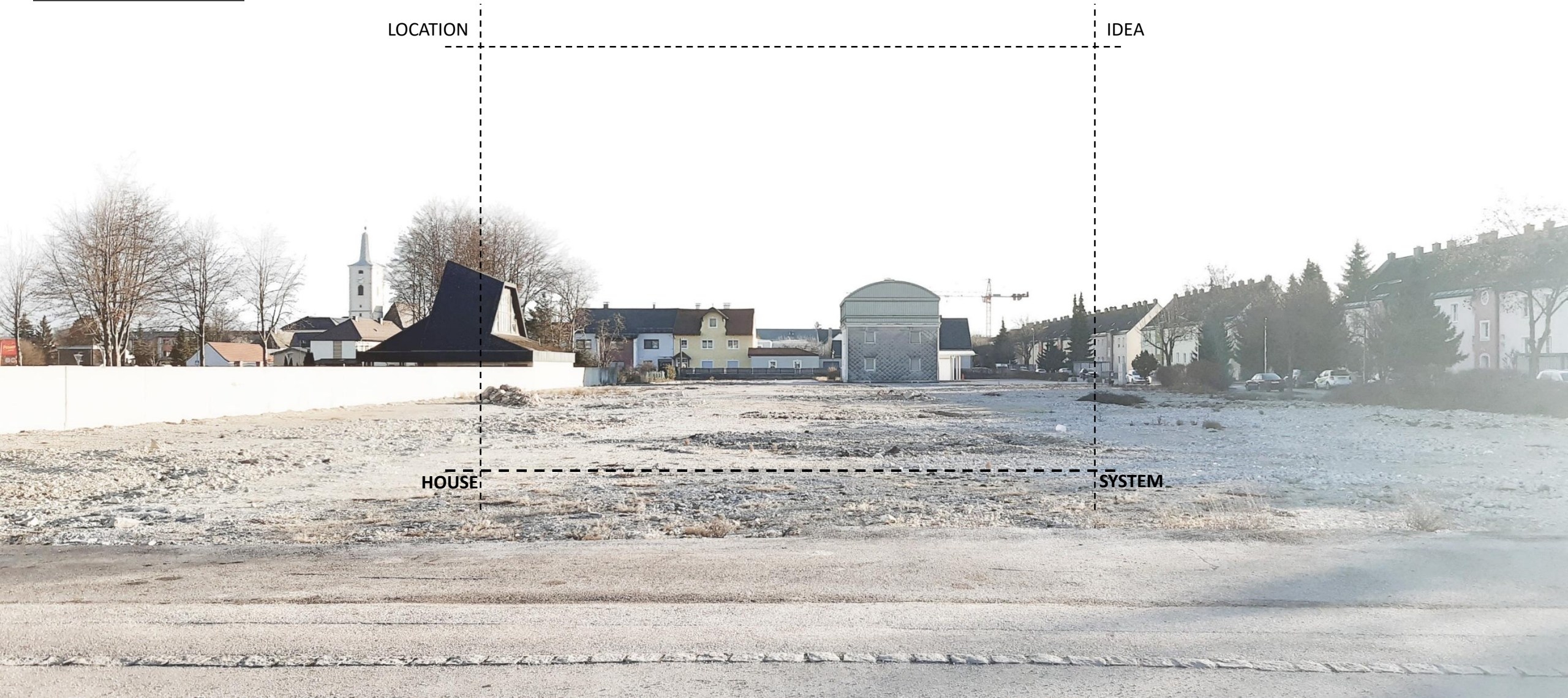
MAGK & RUBNER

LOCATION

IDEA

HOUSE

SYSTEM





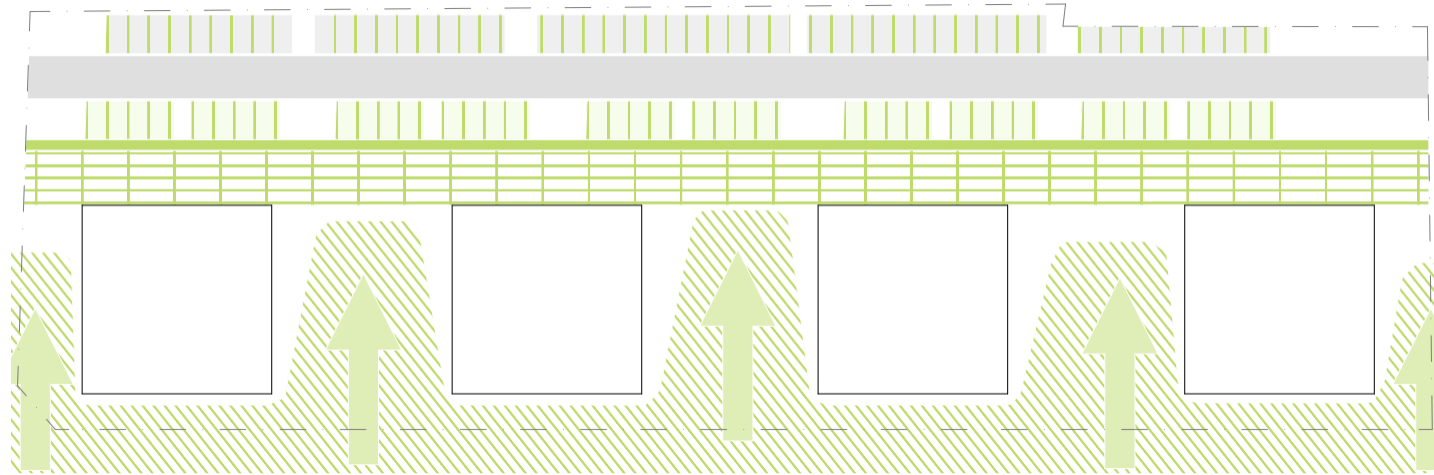
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LOCATION





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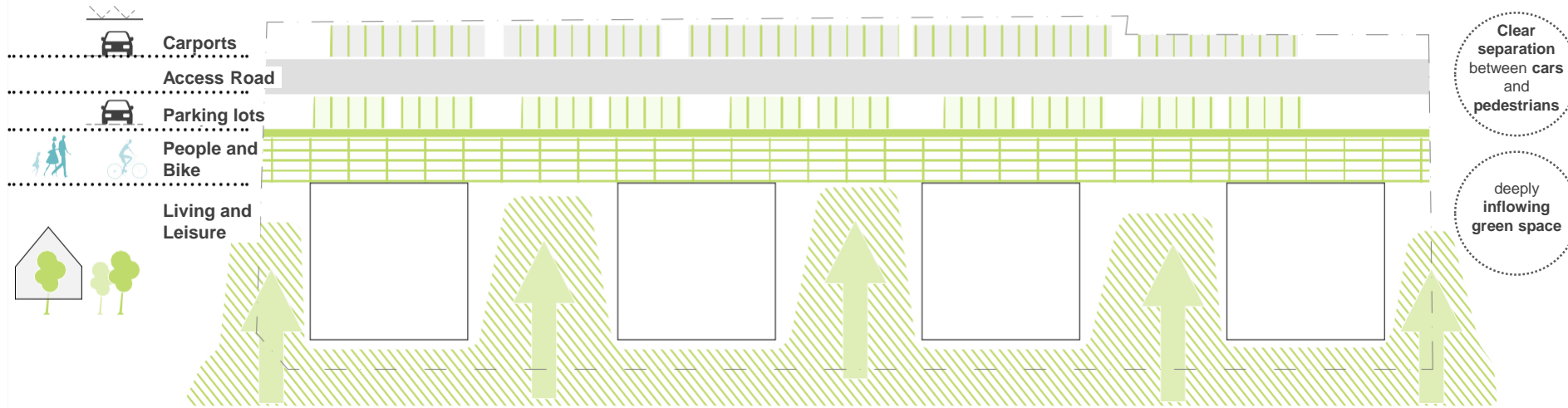


LOCATION



ZONING

deliberate – clear - differentiated





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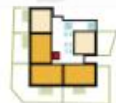
LOCATION

Semiprivate Gardens



Communal spaces Traffic, parking, access

H 1



H 2



H 3



H 4



LOCATION

Private Gardens



LOCATION



Arrangement of the buildings



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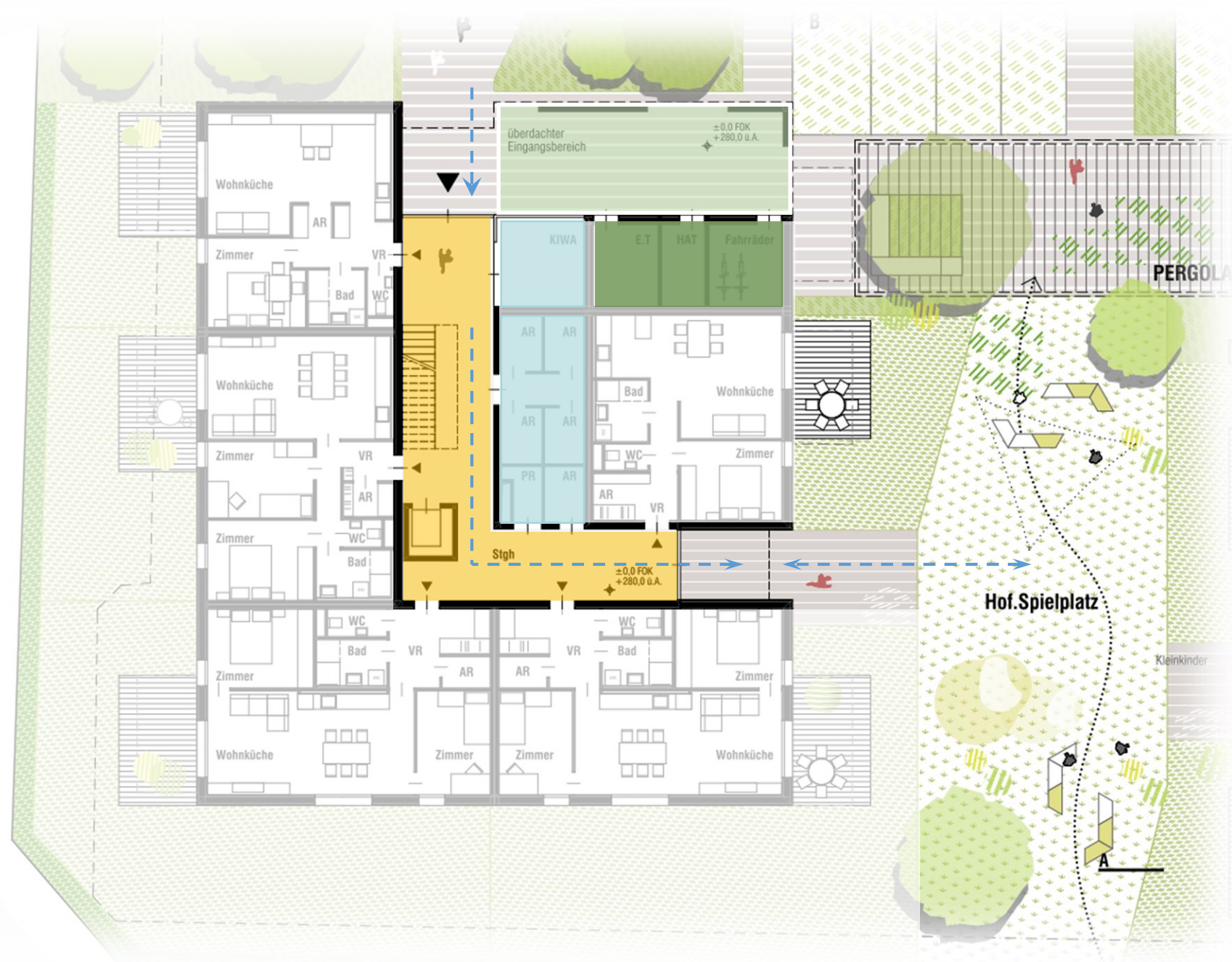


THE BUILDING



Building H1 in detail

THE BUILDING



Ground Floor

THE BUILDING

Staircase core

- Wet rooms
- Access
- Storage spaces



First and Second Floor

THE BUILDING

Types of Flats

- Flat B 
- Flat C 



First and Second Floor

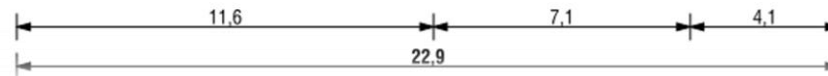
THE BUILDING

Types of Flats

- Flat B 
- Flat C 



Rooftop



THE BUILDING

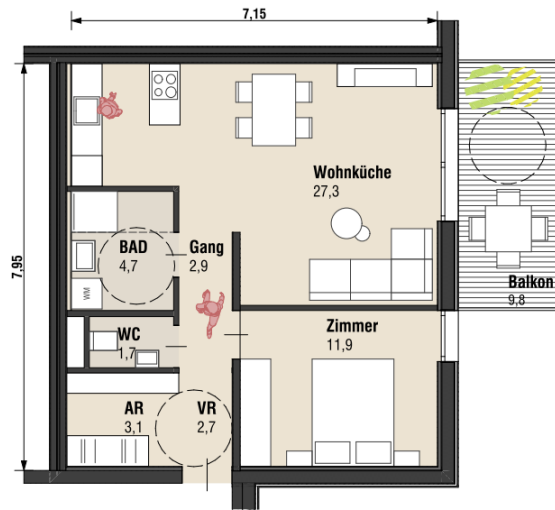
80 FLATS
54 TYPE C
26 TYPE B



TYP B^{1a}

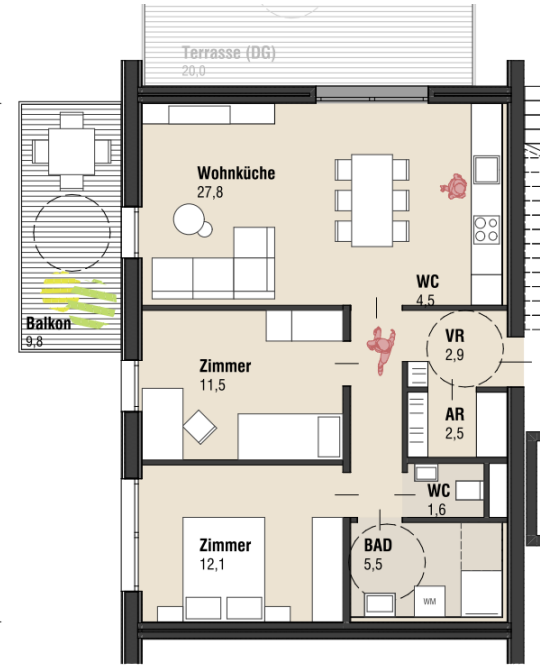


TYP B¹

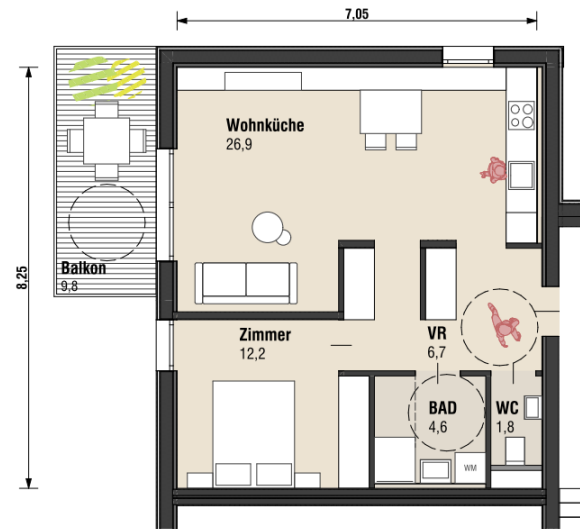


TYP C²

3



TYP B²

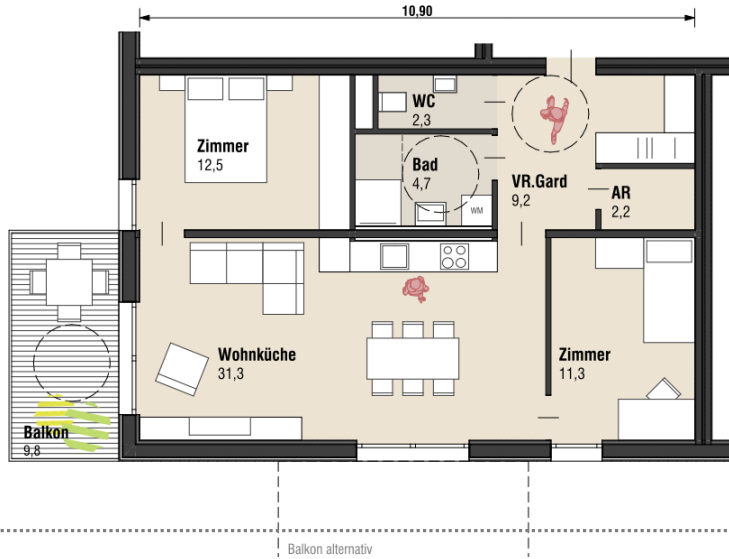


THE BUILDING

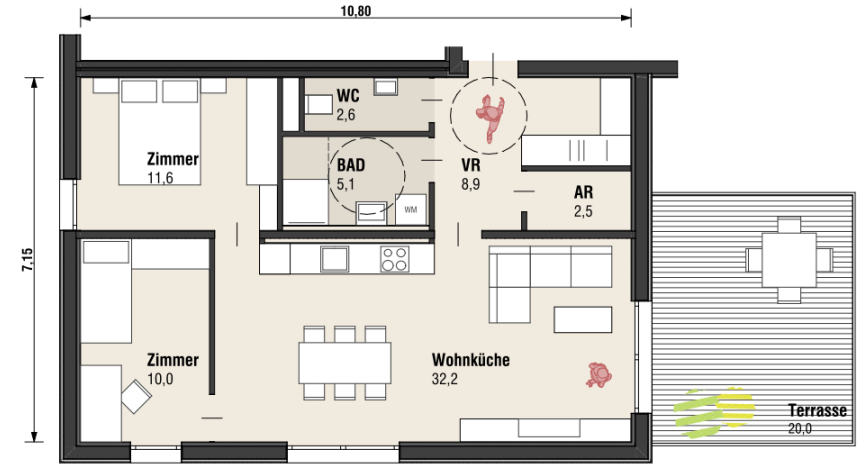
80 FLATS
54 TYPE C
26 TYPE B



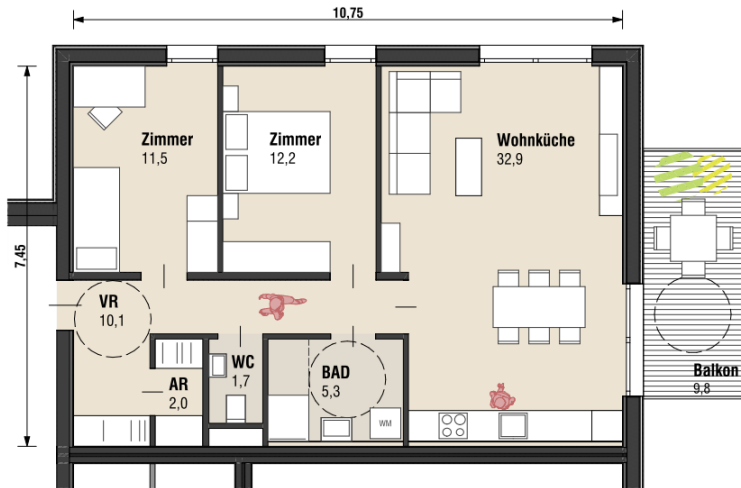
TYP C¹



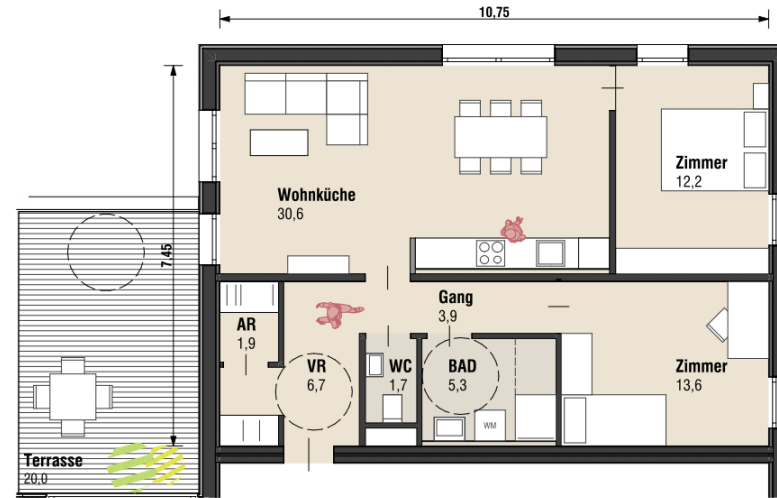
TYP C^{1a}



TYP C²



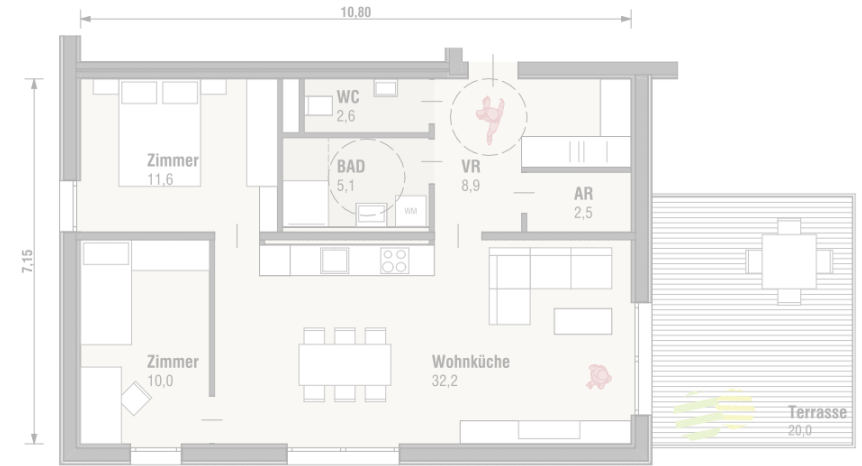
TYP C^{2a}



THE BUILDING

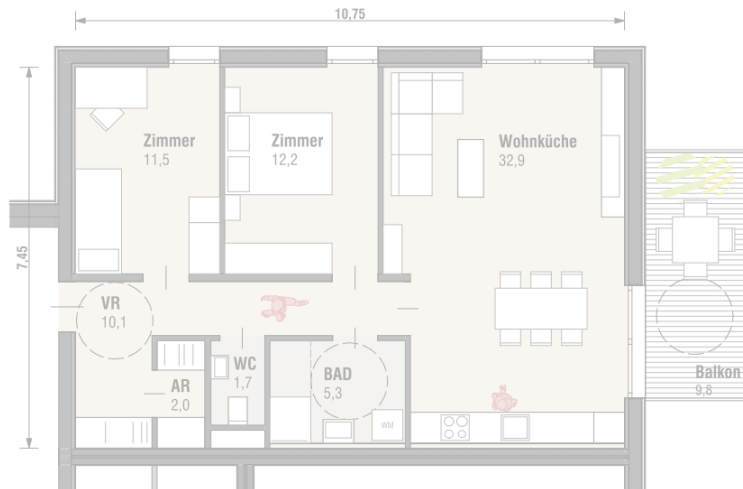


TYP C¹

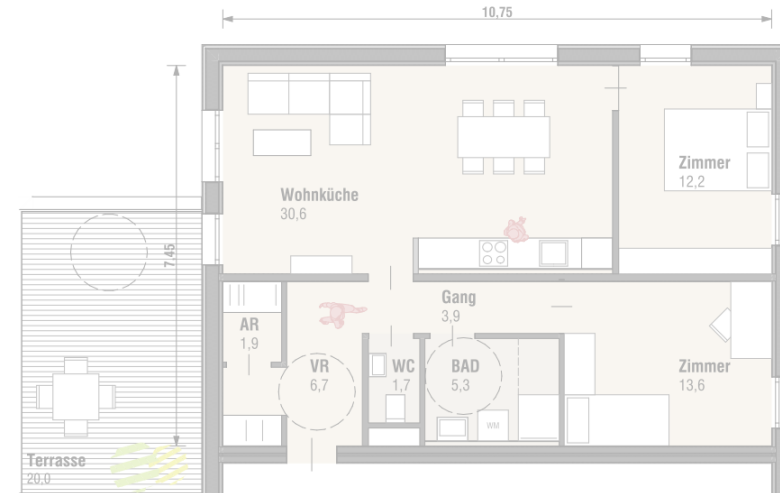


TYP C^{1a}

Concept of daylight and view



TYP C²

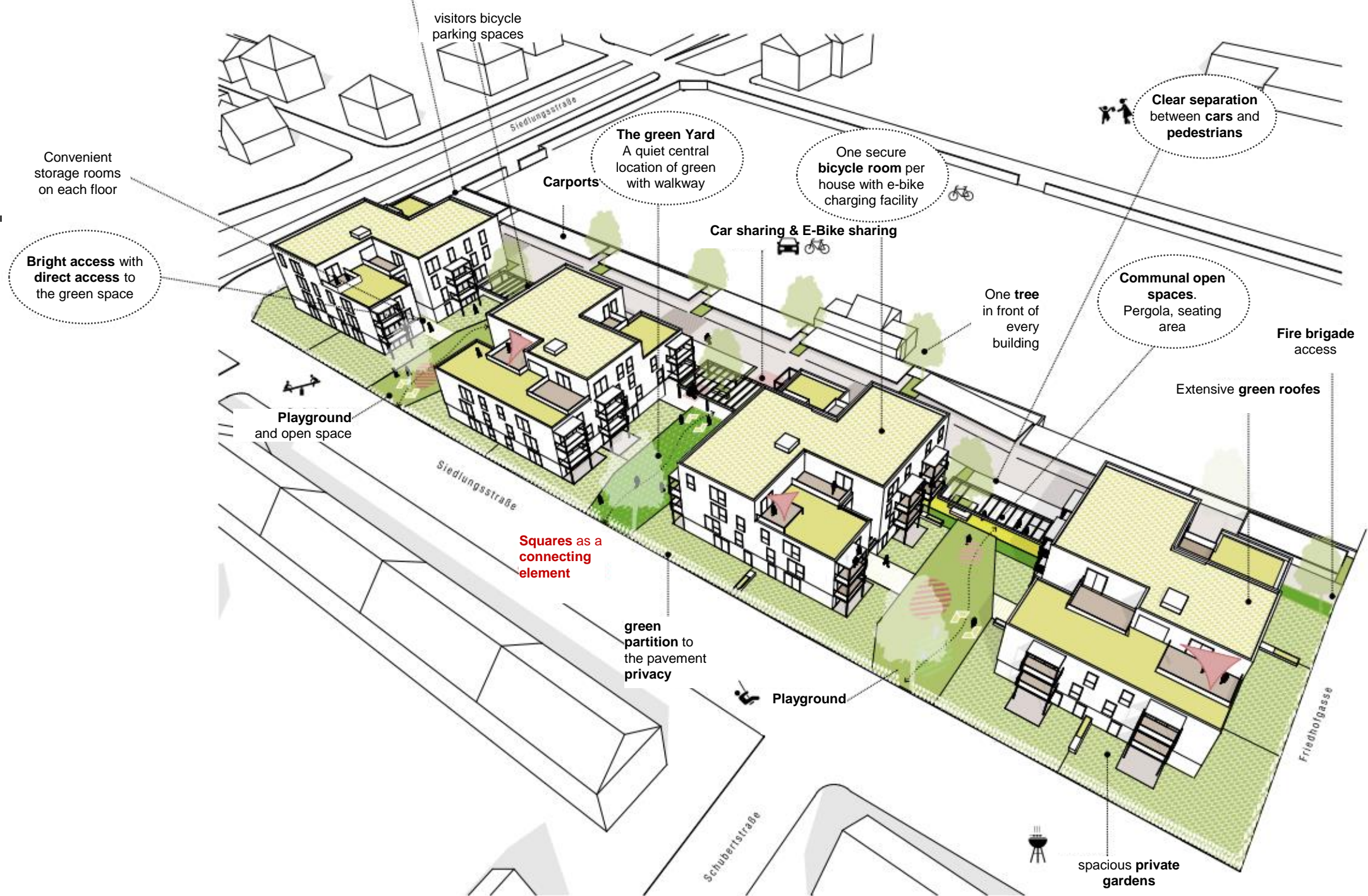


TYP C^{2a}

Rendering



**GLEICHANDERS
SAME BUT
DIFFERENT**



...lets live

GLEICHANDERS

SAME BUT DIFFERENT





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BASICS



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LOCATION



Arrangement of the buildings



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2020
BYBINE



THE BUILDING



Ground floor



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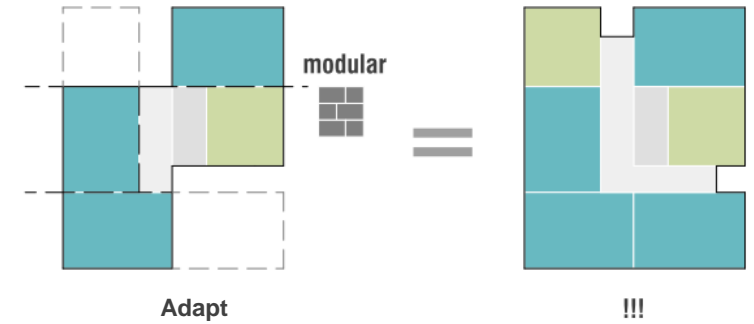
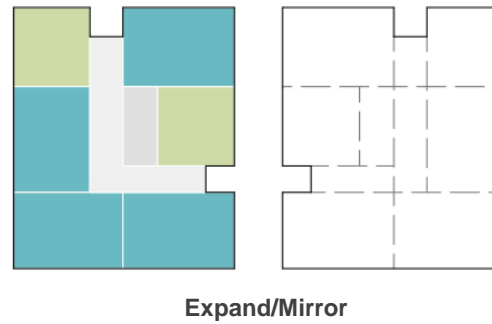
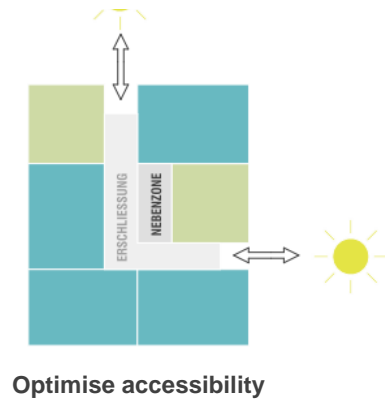
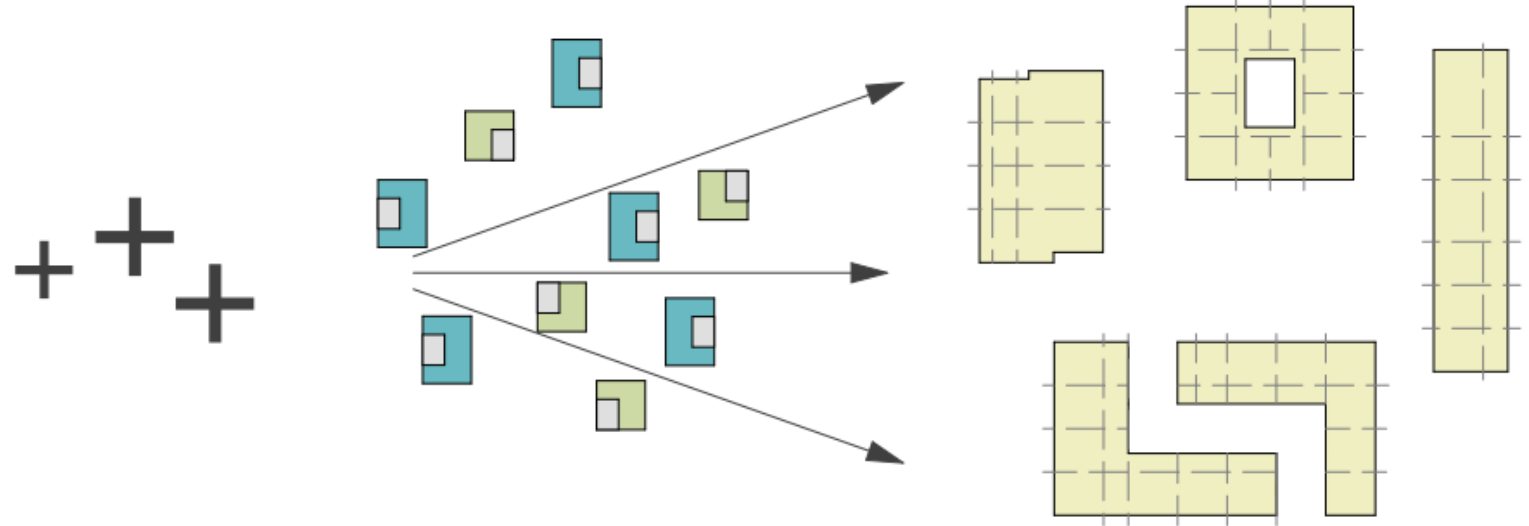
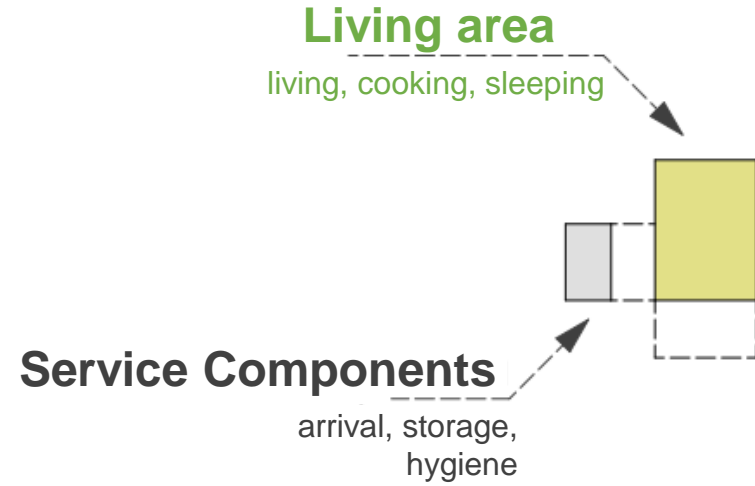


THE BUILDING



1th/2nd floor

DESIGN IDEAS



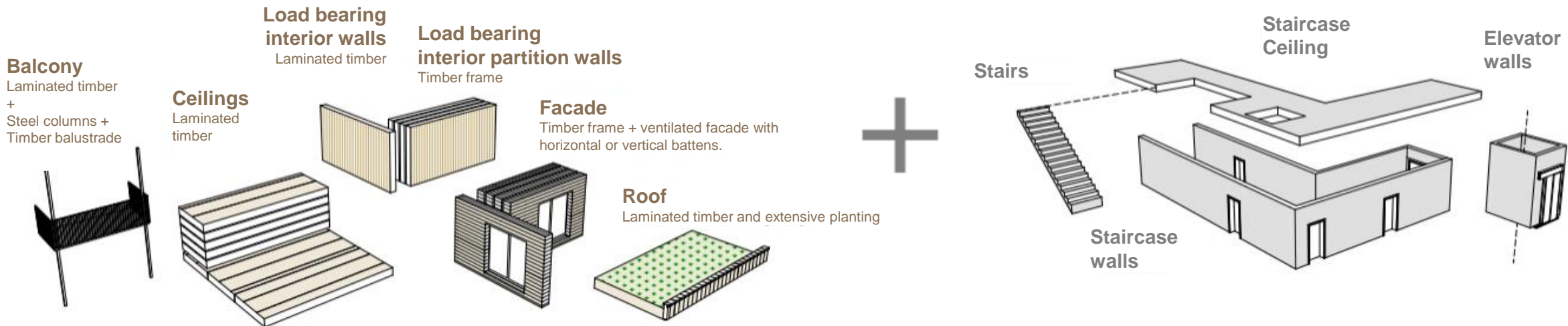
!!!

THE SYSTEM

Catalog of elements

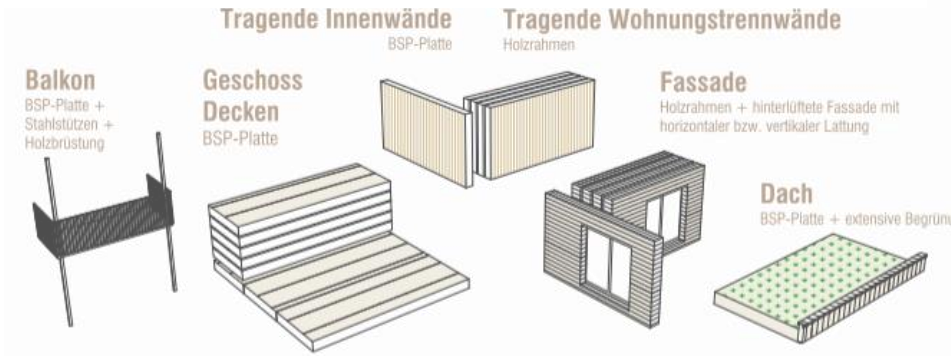
Prefabricated Timber modular construction

Prefabricated concrete construction elements

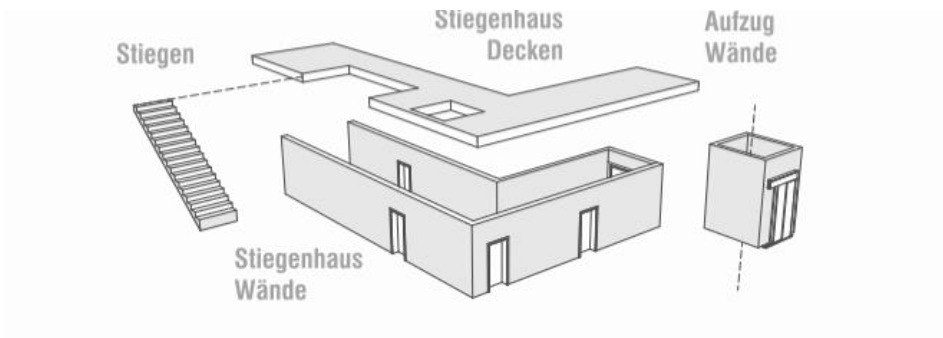


THE SYSTEM

Prefabricated Timber modular construction

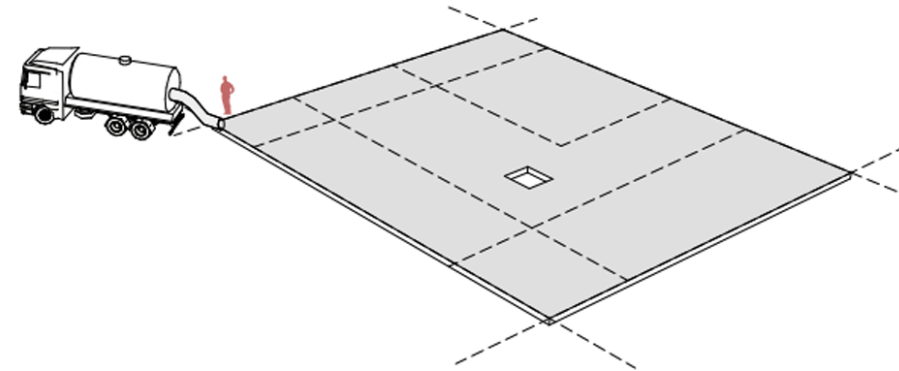


Prefabricated concrete construction elements



PREFABRICATED ELEMENTS

Foundation and base



CAST IN PLACE CONCRETE



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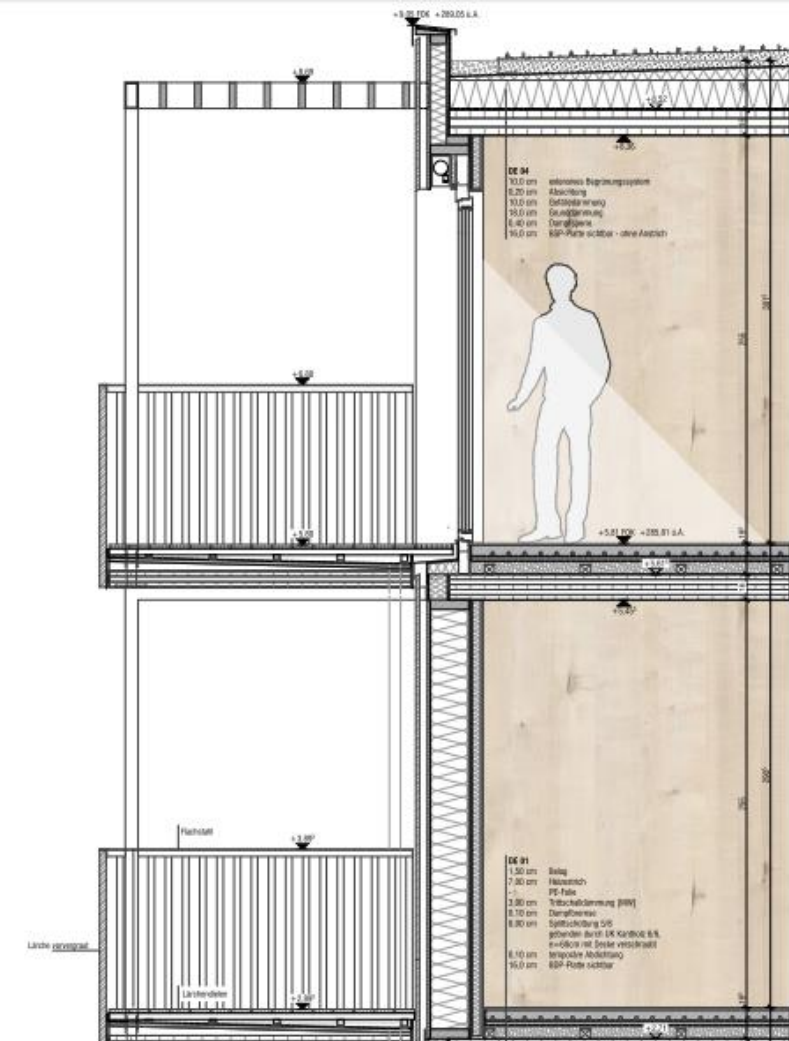
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THE SYSTEM

Facade

- High grade of prefabrication
- Element construction method
- Interplay of battens underlines the base
- Easy replacement of heavily strained parts
- Same system, different appearance





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FH CAMPUS WIEN
UNIVERSITY OF APPLIED SCIENCES



RIGA BUILDING COLLEGE



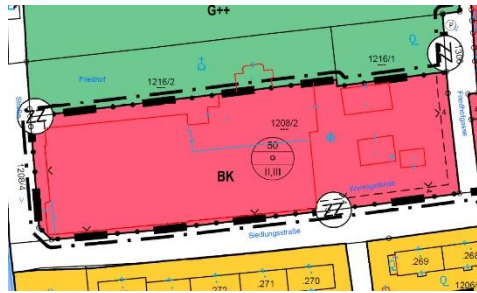
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Building regulations



Distances of the building structures to the southern property line.

Building Class II, III:
Open Construction Method
Building Heights max. 11 m

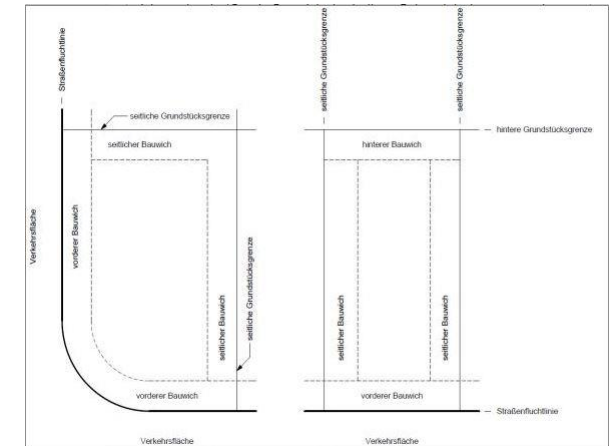
Space between street and building is usually 3m in Lower Austria. In this case it was recommended to have about 4m.

Building restriction line:
Boundaries within a property beyond which main buildings may not be erected as a matter of principle [lower Austria]

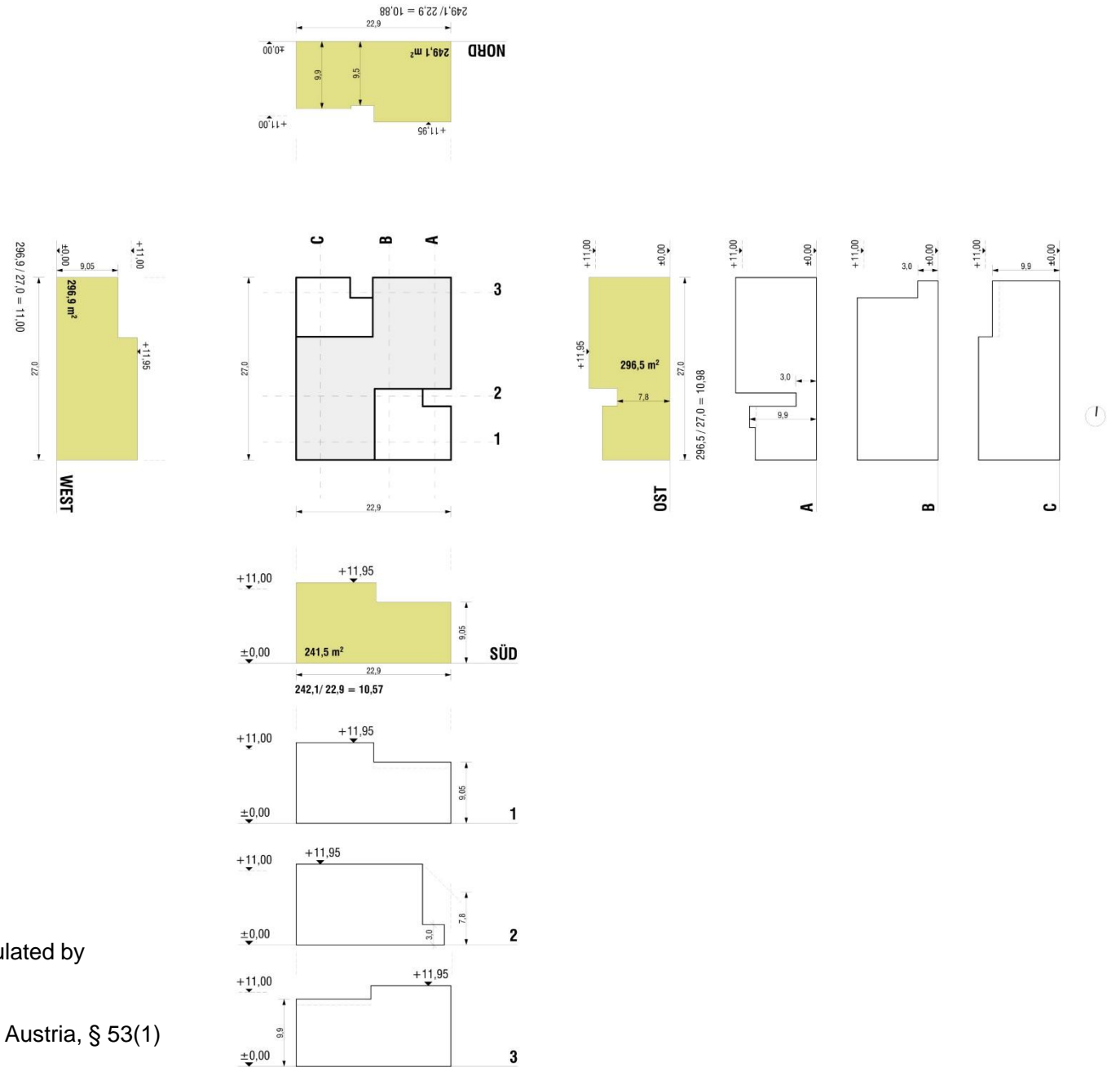


(1) Der seitliche und **hintere** Bauwisch müssen, wenn sie nicht in den nachfolgenden Bestimmungen anders geregelt sind, **der halben Gebäudehöhe (§ 53) der jeweiligen, der Grundstücksgrenze zugewandten Gebäudefronten der Hauptgebäude entsprechen.**

(2) Bei einer Gebäudehöhe von mehr als 8 m dürfen der seitliche und **hintere Bauwisch** nur für Gebäudefronten mit einer Länge von insgesamt nicht mehr als 15 m je Bauwisch der halben Gebäudehöhe entsprechen. Bei allen anderen Gebäudefronten muss der Bauwisch der vollen Gebäudehöhe entsprechen.



BUILDING REGULATIONS



The building height is the average height of the building front and it is calculated by dividing the area of the building front by its greatest width.

Building regulations of lower Austria, § 53(1)



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Building Industry 4.0 - How to reach “Low Impact” standard?

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“low impact” (definition)

- locally adapted, diverse and unique
- based on renewable resources
- of an appropriate scale
- designed in a high quality standard
- enhances biodiversity
- increases public access to open space
- generates little traffic
- linked to sustainable livelihoods
- coordinated by a management plan



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„IT'S ALWAYS A QUESTION OF RESOURCES“

Hermann Scheer 1944-2010





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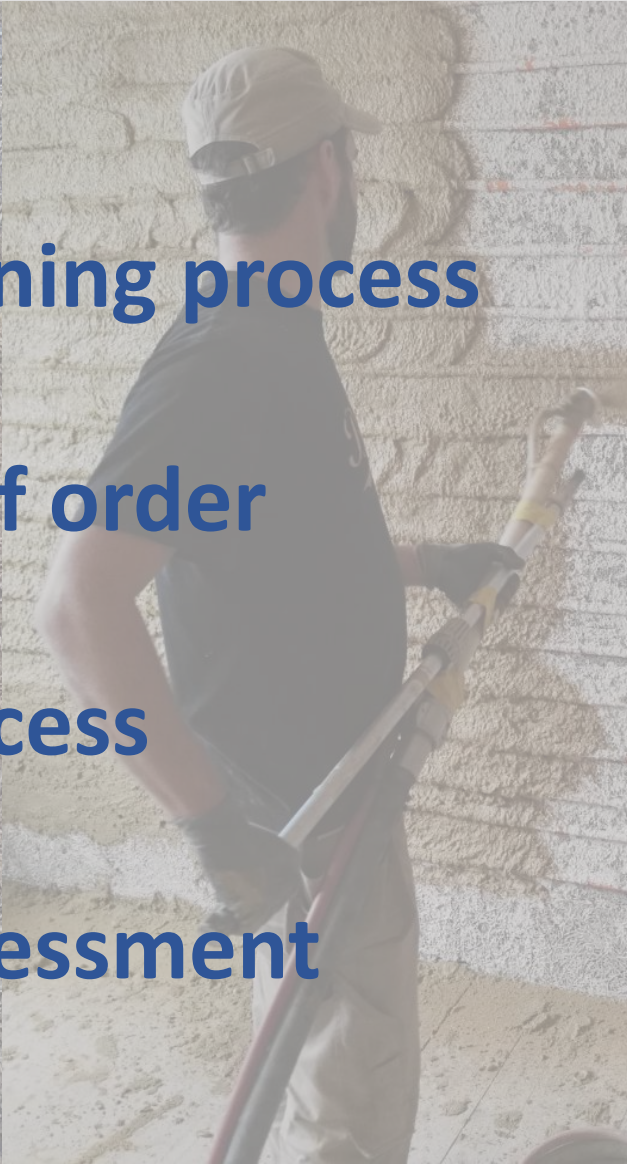
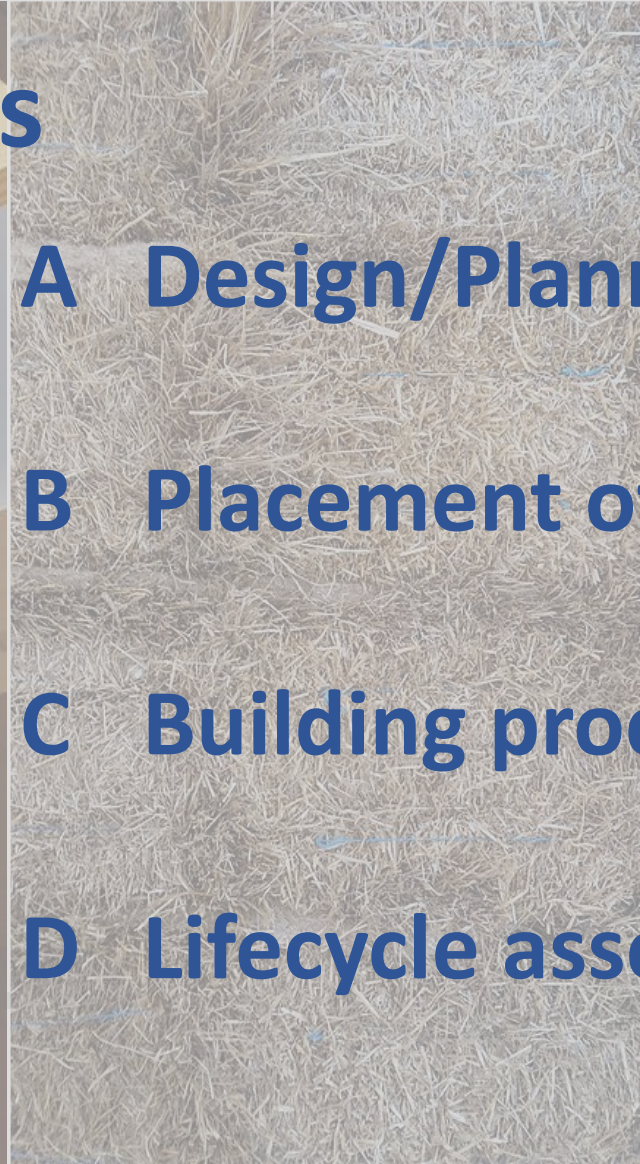
Strategies

A Design/Planning process

B Placement of order

C Building process

D Lifecycle assessment





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A Design Process

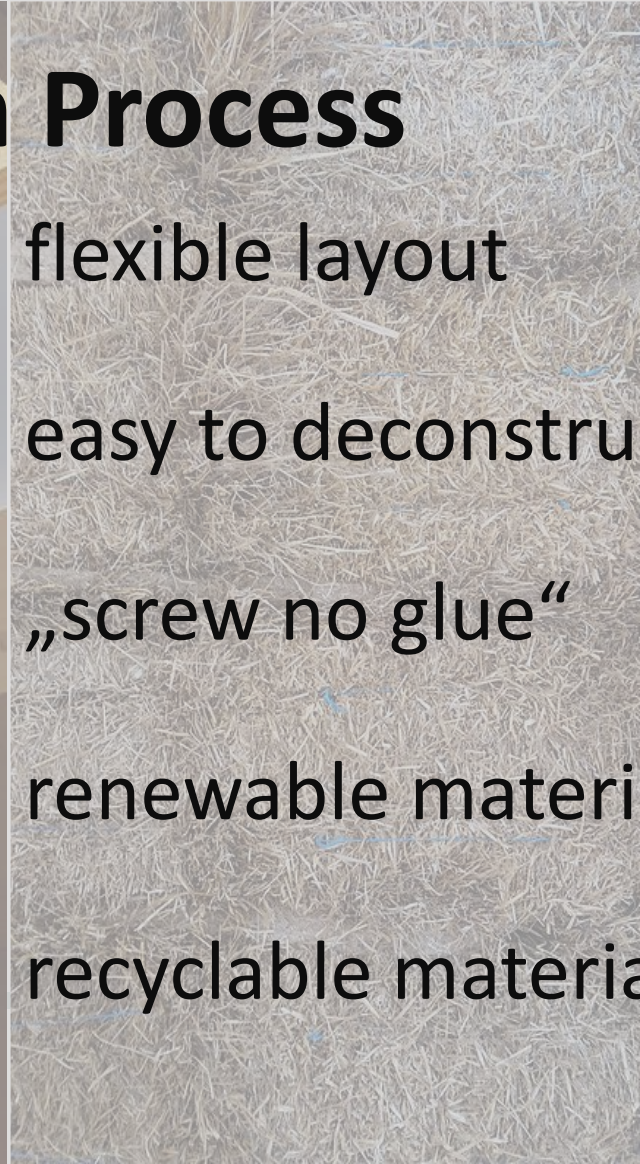
flexible layout

easy to deconstruct

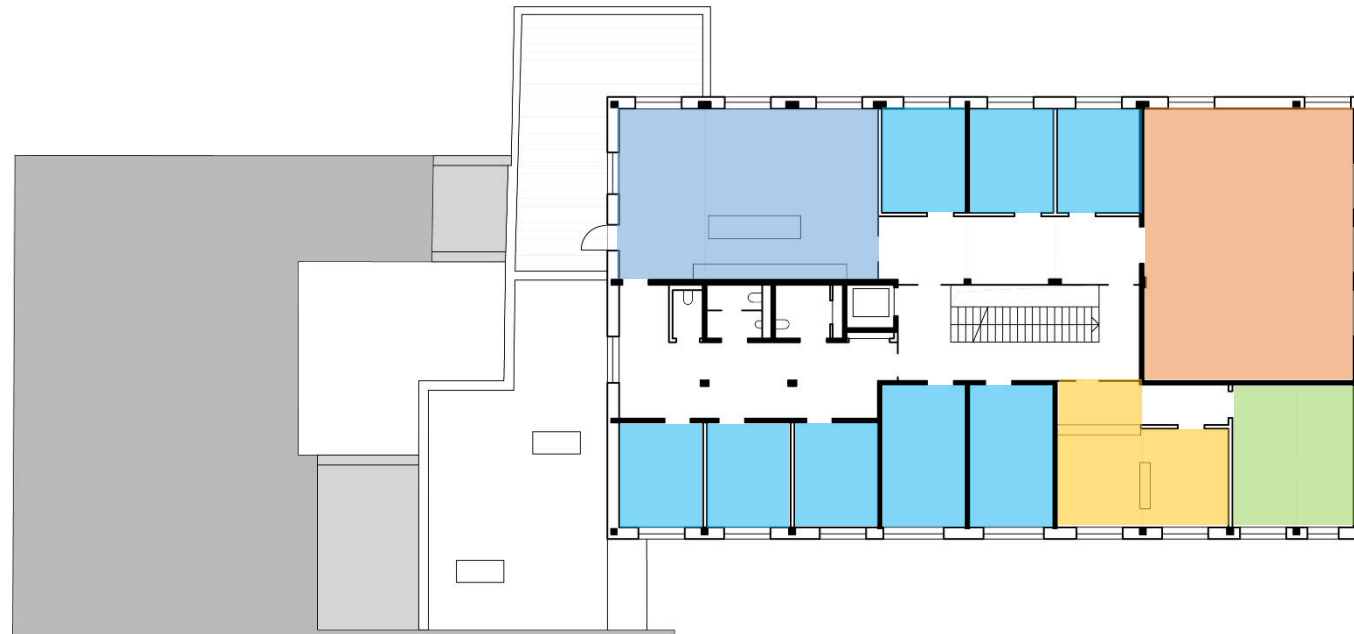
„screw no glue“

renewable materials

recyclable materials



functions – 1st floor



- Existing building
- Training room
- Administration
- Consulting
- Office
- Social space

flexible layout



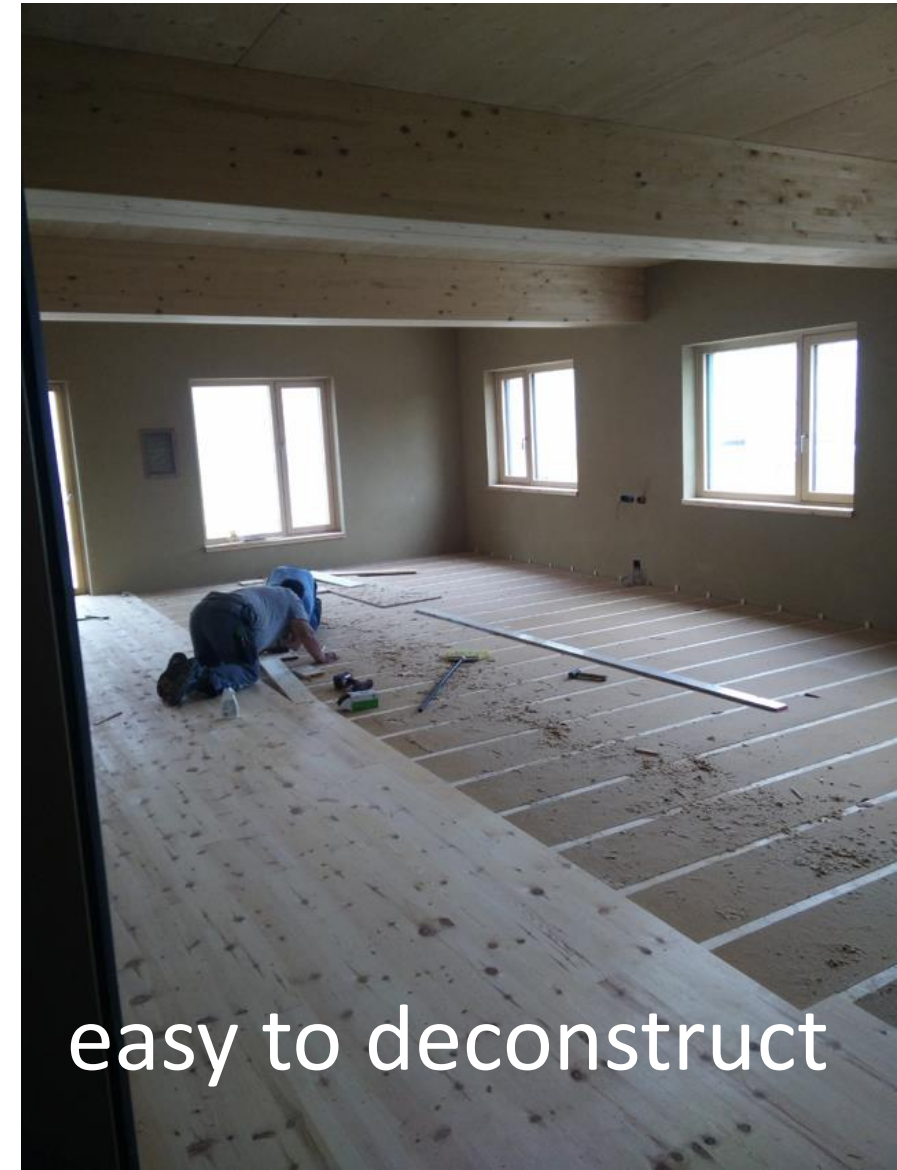
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easy to deconstruct



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A Design Process

passive house standard

passive cooling

„Klima Aktiv“ (1000/1000) certificate

qualification of clients

representative participation

URKUNDE

Das Gebäude

Haus des Lernens

Daniel-Gran-Straße 36, 3100 St. Pölten

geplant von

MAGK aichholzer/klein ZT OG, GESA

errichtet von

GESA Gemeinnützige Sanierungs- und Beschäftigungs GmbH

hat 1000 von 1000 möglichen klimaaktiv Gebäudestandard-Punkten erreicht.

Dieses Gebäude entspricht damit

klimaaktiv Gold

Inge Peter-Höck

Programmanagement klimaaktiv baum und wasser

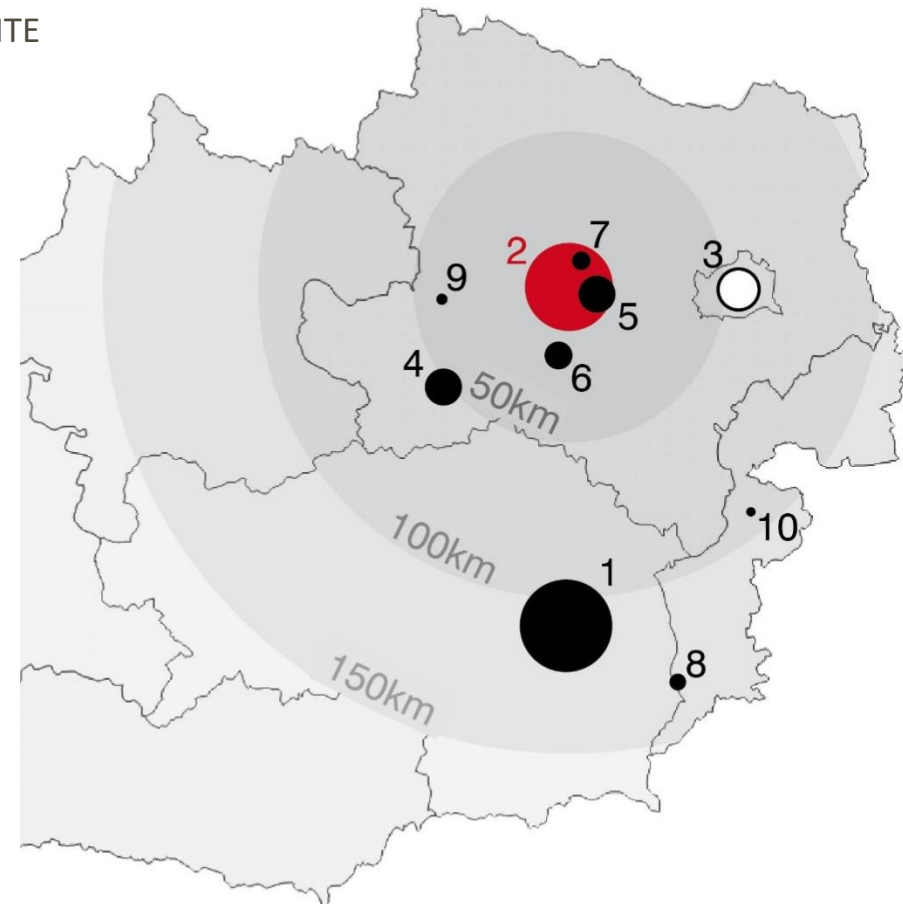
27.11.2018



B placement of order

PORTION OF COSTS CRAFT DISTANCE TO SITE

	PORTION OF COSTS	CRAFT	DISTANCE TO SITE
1	25,0%	carpenter	110km
2	23,3%	gesa/miscellaneous	0km
3	11,8%	general planners	55km
4	9,4%	glazier, portals	52km
5	9,8%	builder	10km
6	5,9%	plumber	21km
7	5,2%	electrician	10km
8	4,4%	windows manufacturer	133km
9	3,0%	floor tiler	40km
10	1,1%	elevator manufacturer	95km





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C Building Process

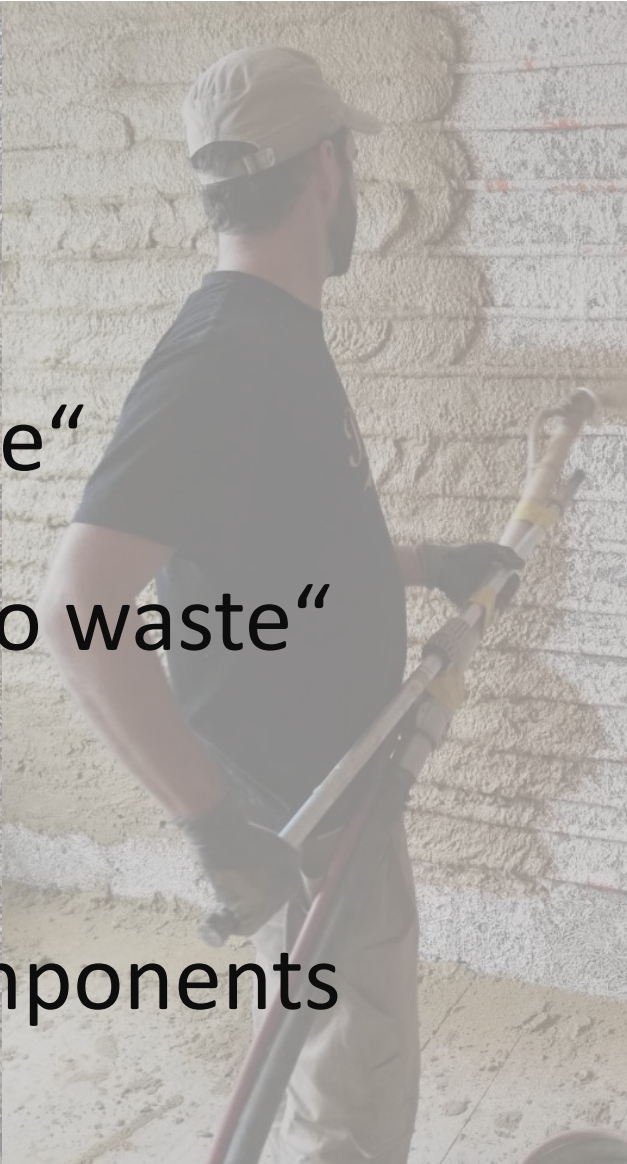
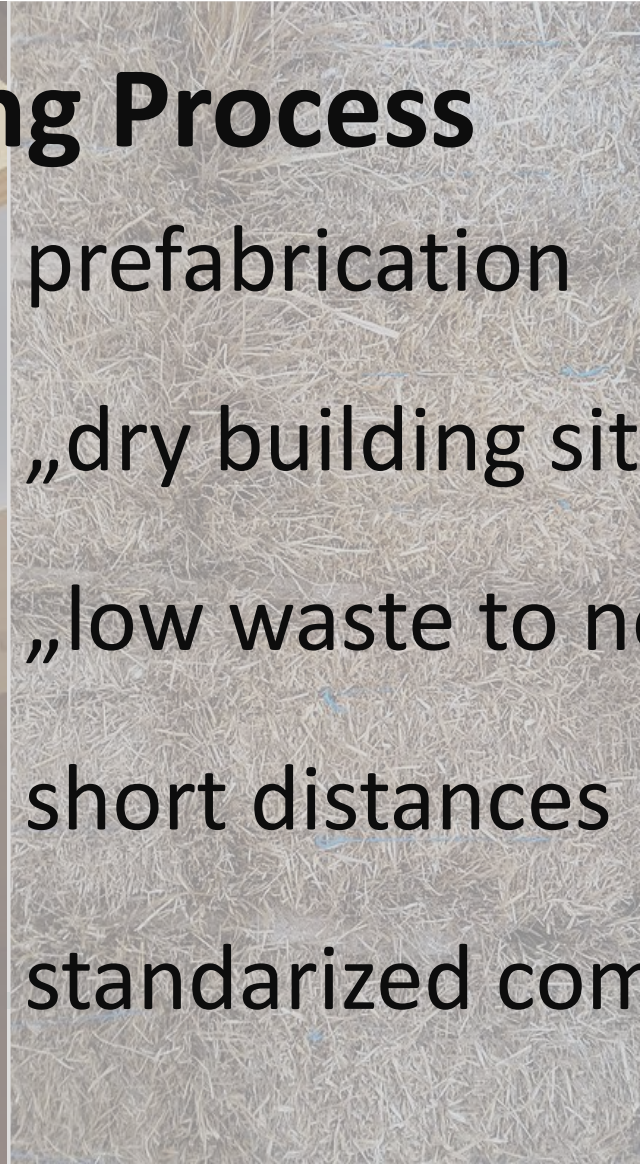
prefabrication

„dry building site“

„low waste to no waste“

short distances

standardized components





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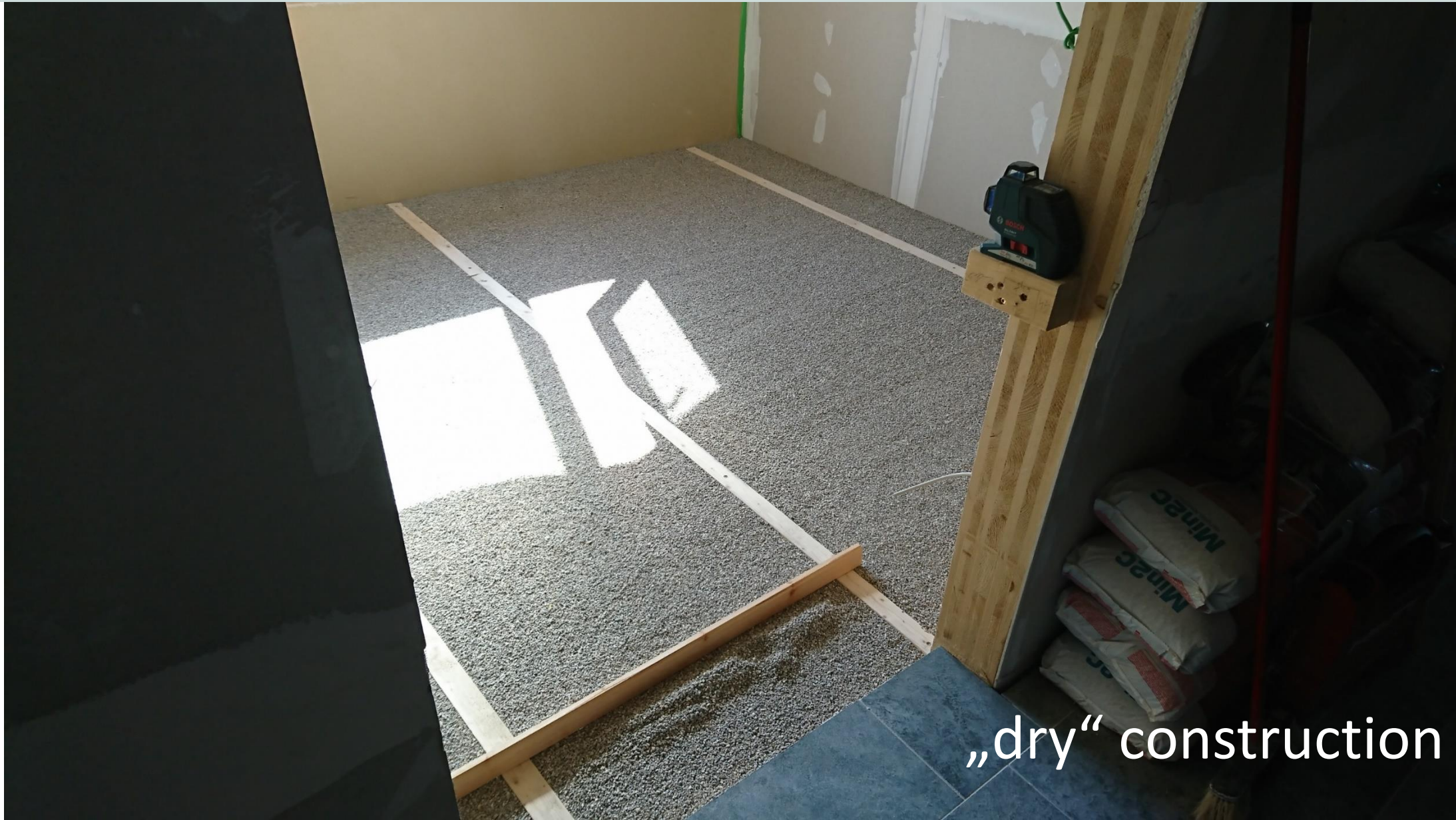
prefabrication



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„dry“ construction



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D Lifecycle Assessment

low energy consumption ph-standard

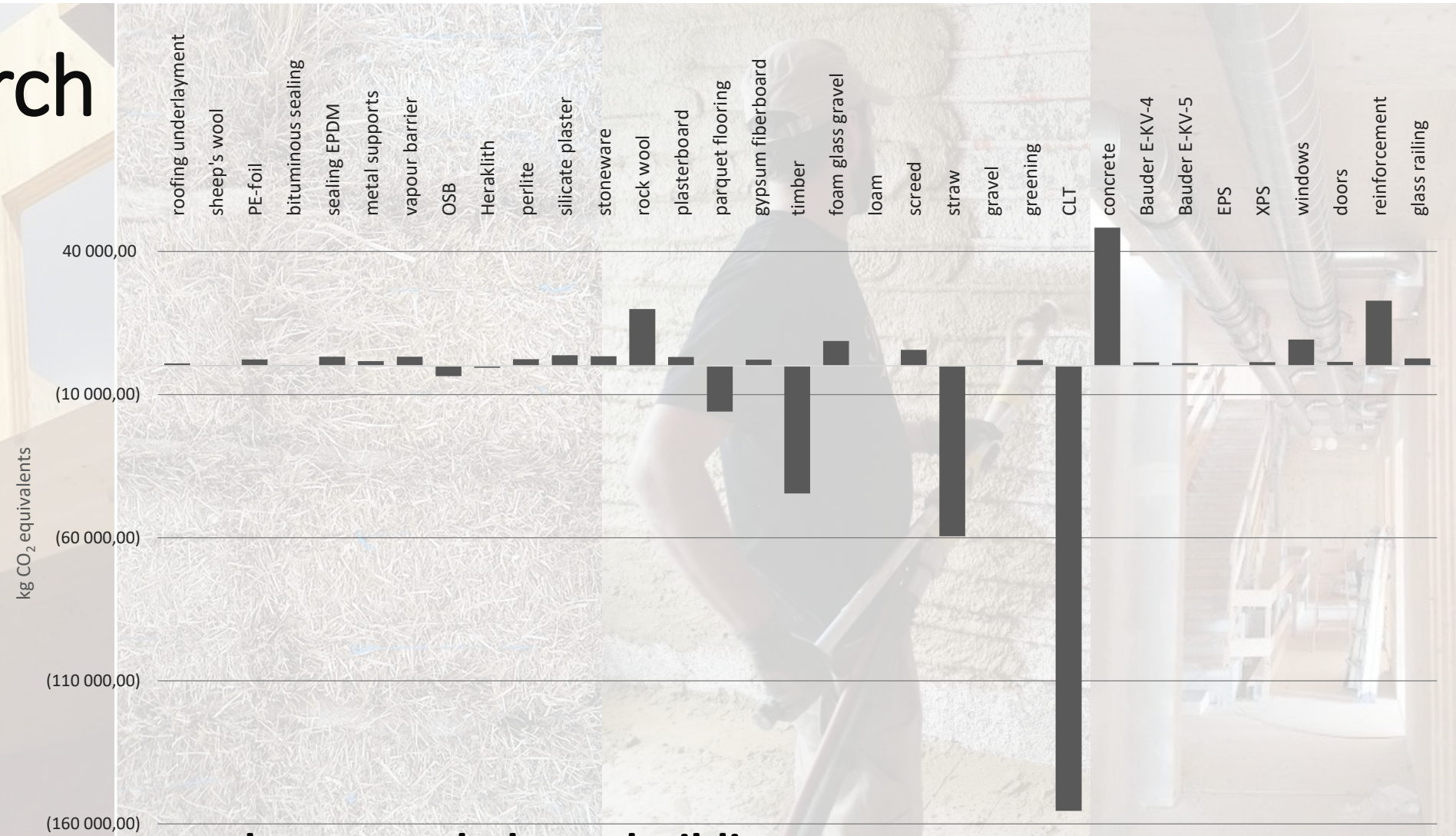
easy to rebuild

low maintenance costs -low tech solutions

short distances

water saving and retention

Research



greenhouse gas balance building components



Research

standardisation of renewable materials
certification of constructions and materials
building 4.0 new building processes
use of regional potentials
further digitalisation



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„Lessons Learned“

renewals – building physics

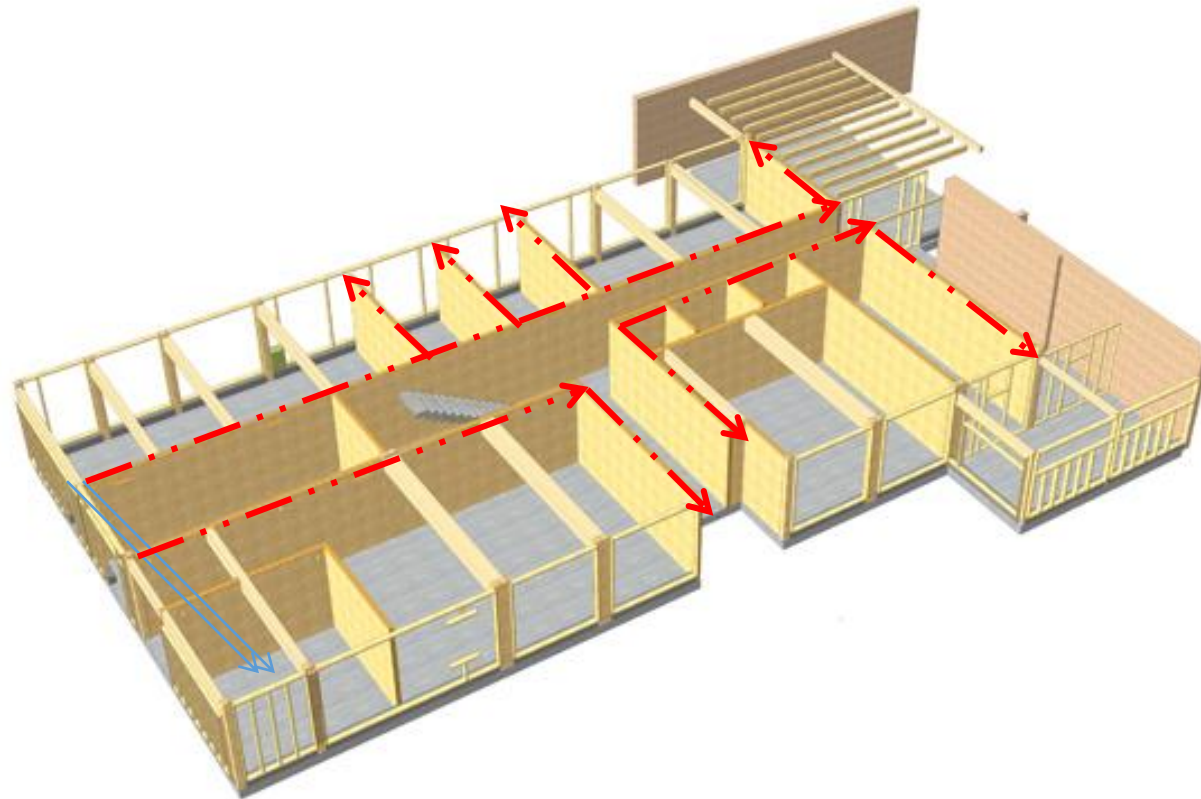
craftsmen has few experience

„building 4.0“ needs new structures

qualification needs time

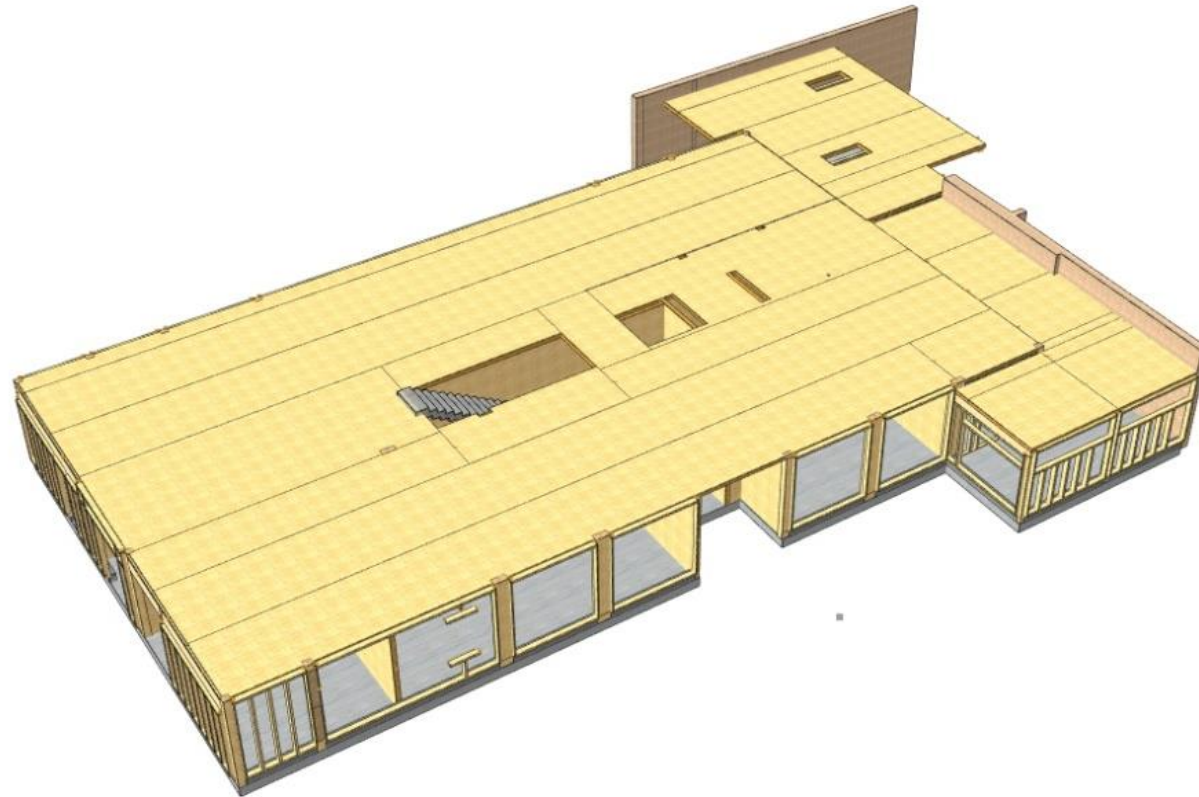
crowd funding is still hard

HOUSE OF LEARNING
construction

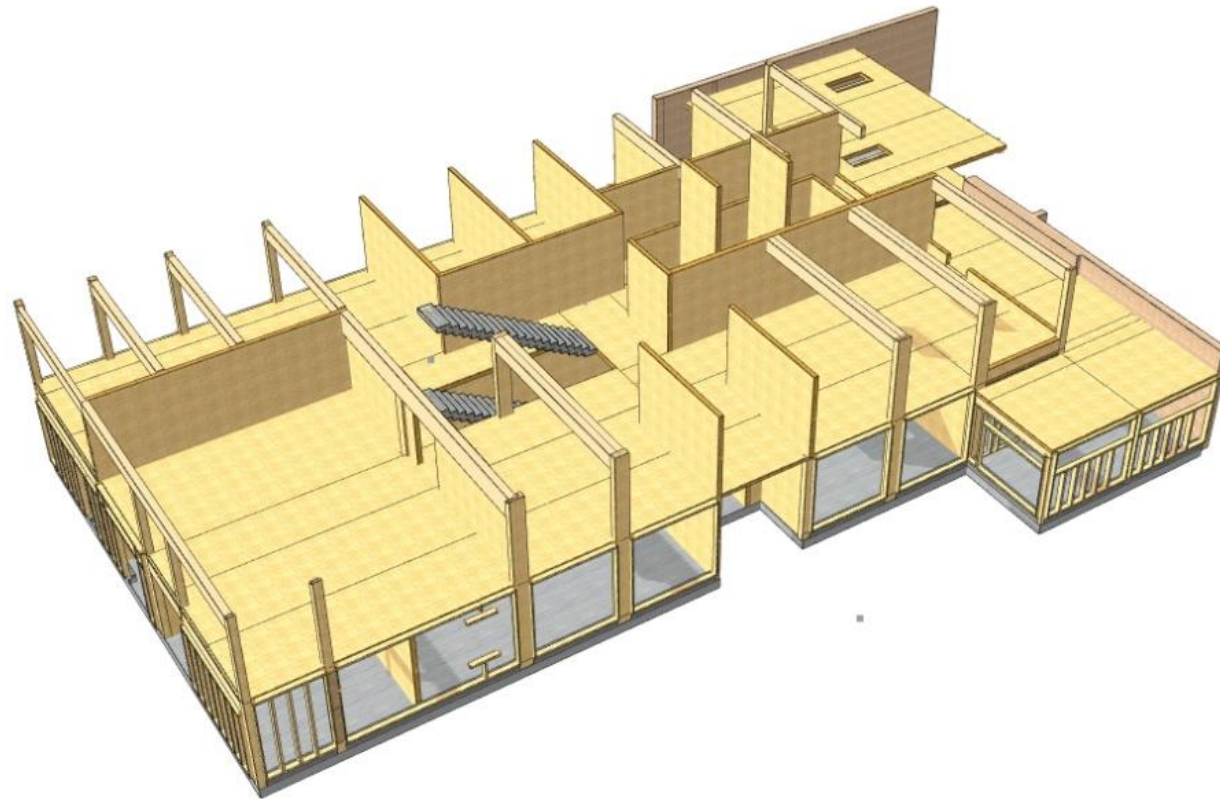


HOUSE OF LEARNING

construction

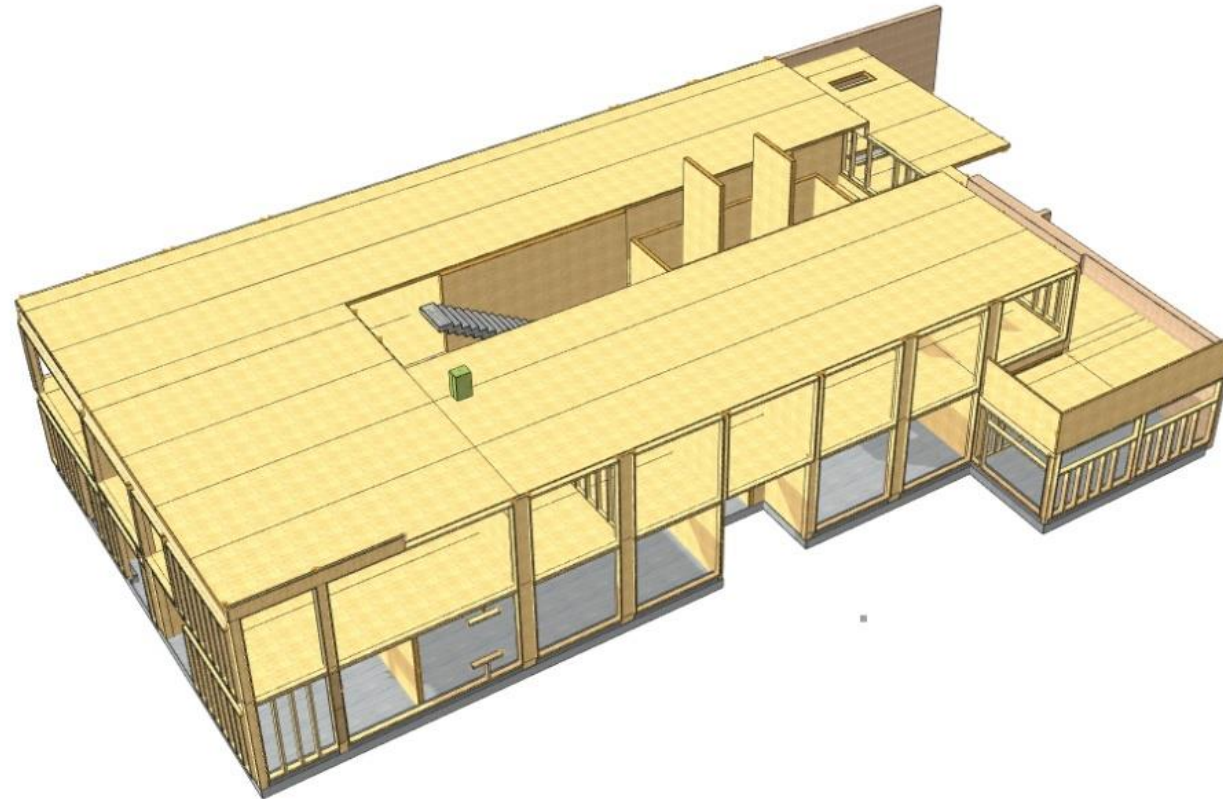


HOUSE OF LEARNING
construction



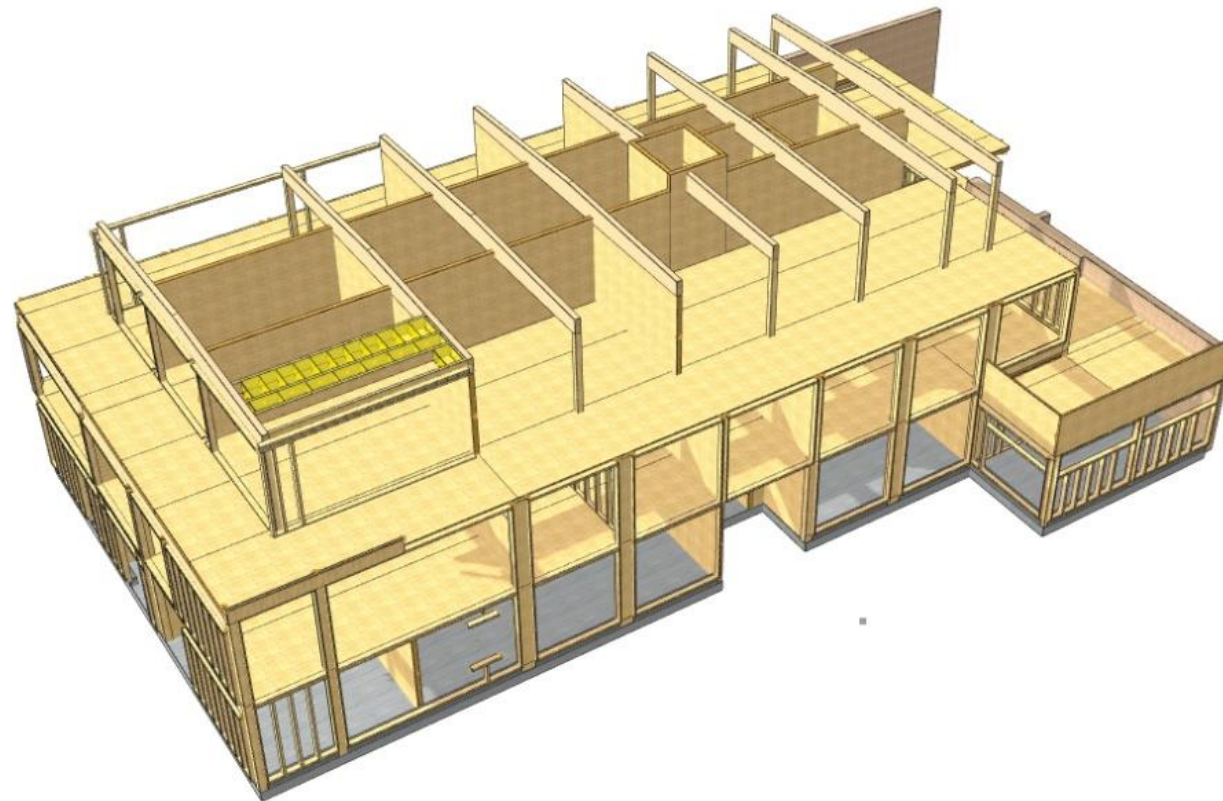
HOUSE OF LEARNING

construction



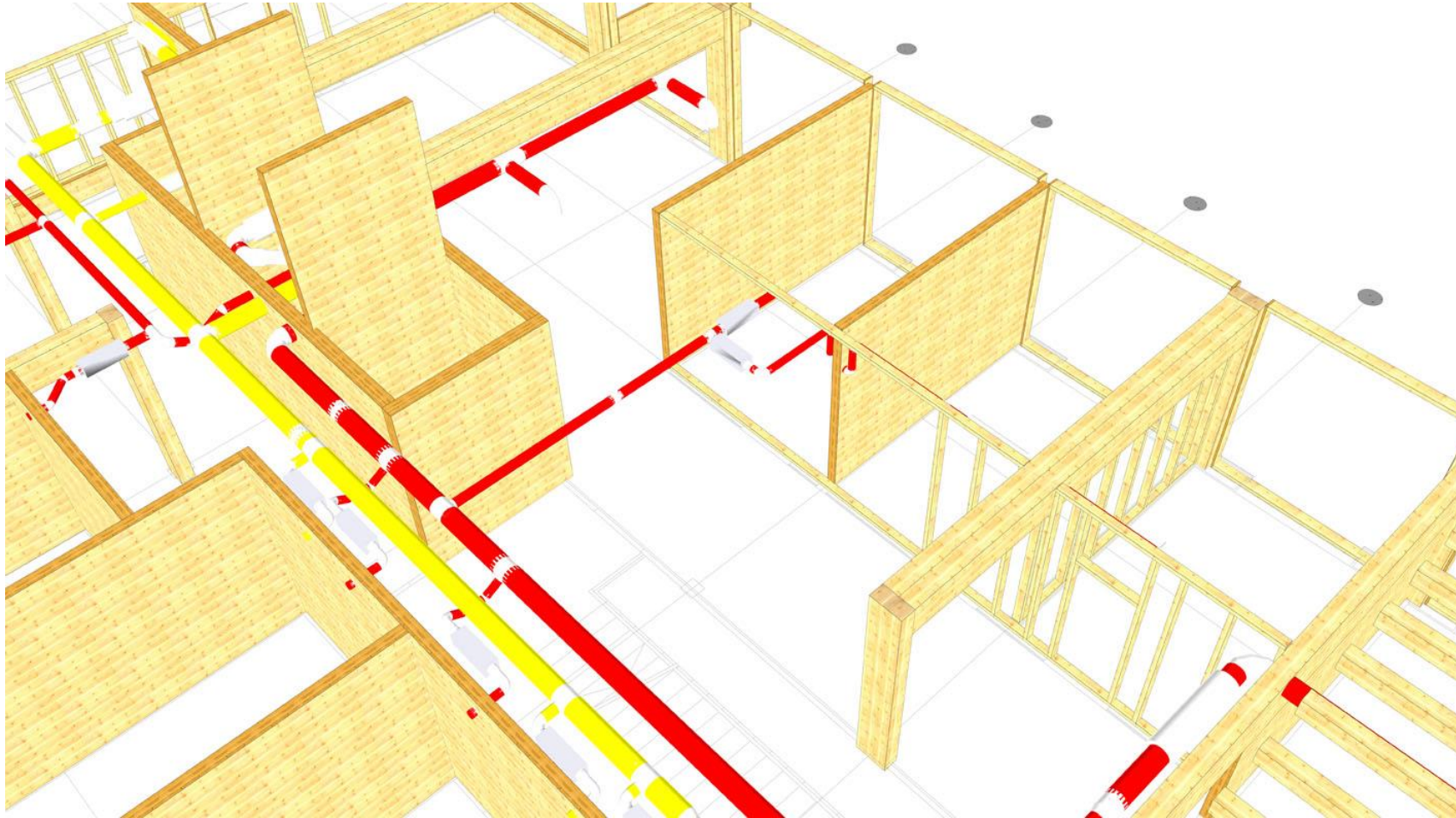
HOUSE OF LEARNING

construction

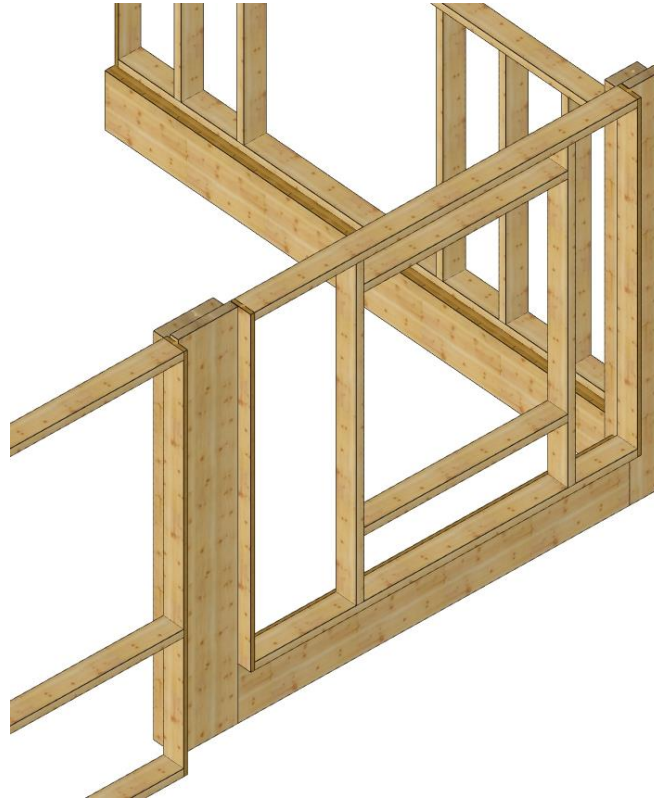


HOUSE OF LEARNING

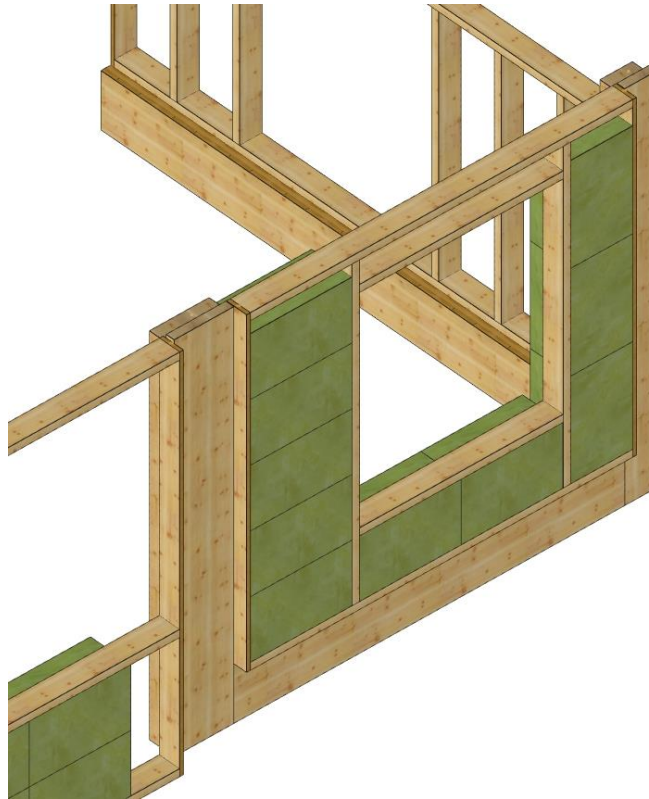
construction



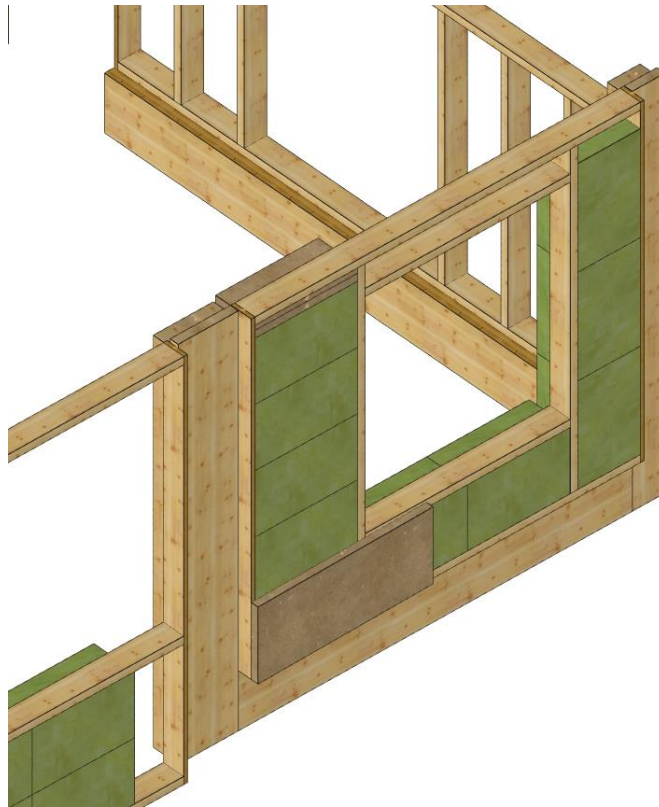
HOUSE OF LEARNING
construction



HOUSE OF LEARNING
construction



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construction





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Hi Bi
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HOUSE OF LEARNING

construction

Fasadenschnitt
M 1:75

1 Dachaufbau 2OG

- 5,0cm Substrat
- Vlies
- Abdichtung EPDM 1,5mm
- 2,5cm rauhe Schalung
- 8,0cm Hinterlüftung mit Lattung
- Unterspannbahn diff. offen - 2. wasserf. Schicht
- 2,0cm rauhe Schalung
- 32-73,0cm Dachstuhl / Strohdämmung / Sparren
- Dampfbremse
- 2,5cm rauhe Schalung
- 4,0cm Lattung gehobelt
- 1,25cm GKF
- Sichtbarer Dachträger

2 Wandaufbau 2OG

- 3,0cm Lehmputz
- 16,0cm Strohämmung
- 1,6cm DWD-Platte
- 4,0cm Stehende Lattung
- 1,2cm OSB Platte
- 2,5cm Lattung
- 2,0cm Spanschalung

3 Fußbodenaufbau 2OG

- 2,5cm Bretterboden geölt
- 2,5cm Tigidur
- 3,0cm Trittschalldämmung
- ungebundener Kies
- 7,0cm Trittschalldämmung
- 2,0cm CLT-Decke

4 Dachaufbau 1OG

- 5,0cm Substrat
- Vlies
- Abdichtung EPDM 1,5mm
- 2,5cm rauhe Schalung
- 6,0cm Hinterlüftung
- Unterspannbahn diff. offen - 2. wasserf. Schicht
- 2,5cm rauhe Schalung
- 40-52,0cm Strohdämmung
- Dampfsperre
- 12,0cm CLT-Decke

5 Wandaufbau EG/1OG

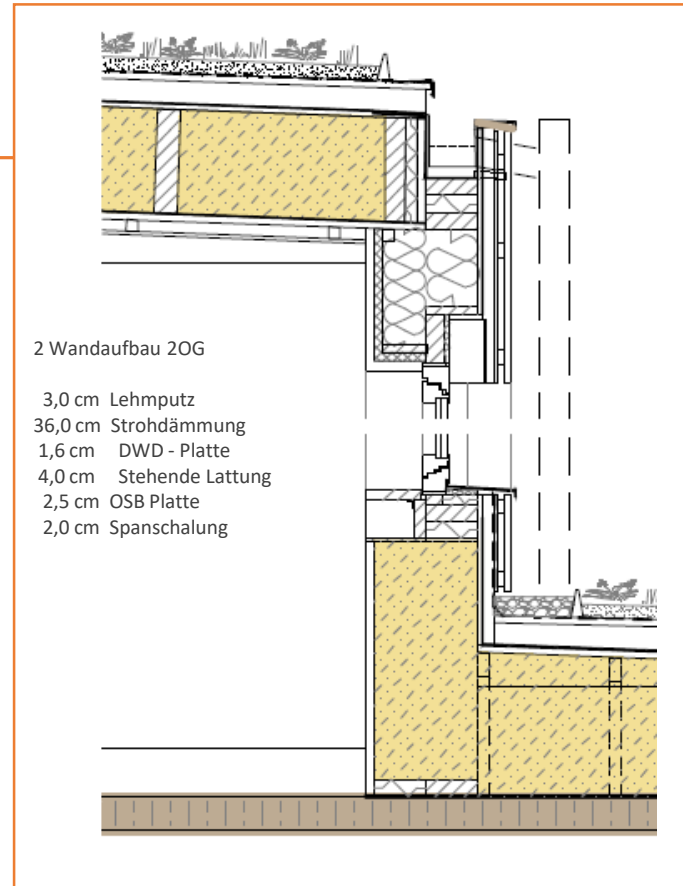
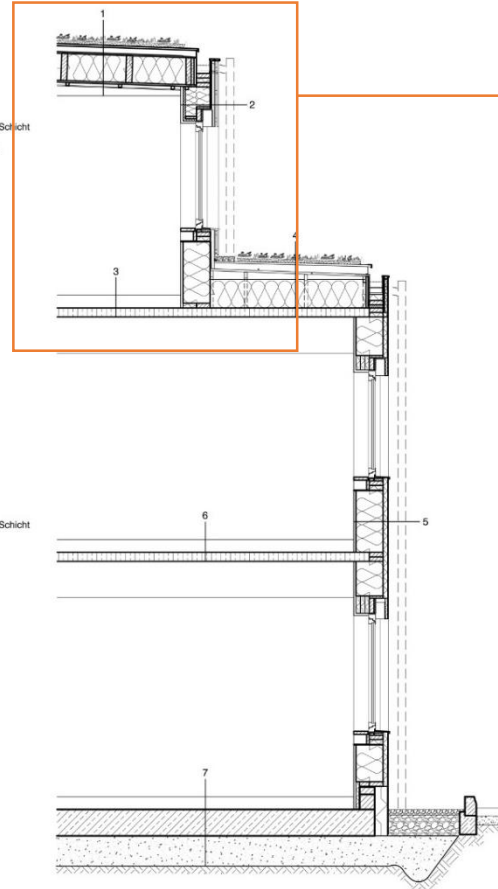
- 3,0cm Lehmputz
- 36,0cm Strohdämmung
- 6,0cm Holzweichfaserplatte
- 1,0cm Außenputz

6 Fußbodenaufbau 1OG

- 2,5cm Bretterboden geölt
- 2,5cm Rigidur
- 3,0cm Trittschalldämmung
- ungebundener Kies
- 7,0cm Trittschalldämmung
- 2,0cm CLT-Decke

7 Fußbodenaufbau EG

- 2,5cm Bretterboden geölt
- 2,5cm Rigidur
- 2,0cm Trittschalldämmung
- 9,5cm Perimeterdämmung
- 0,5cm Isolierung
- 35,0cm STB-Betonplatte
- 40,0cm Glasschaumschotter



2 Wandaufbau 2OG

- 3,0 cm Lehmputz
- 36,0 cm Strohdämmung
- 1,6 cm DWD - Platte
- 4,0 cm Stehende Lattung
- 2,5 cm OSB Platte
- 2,0 cm Spanschalung

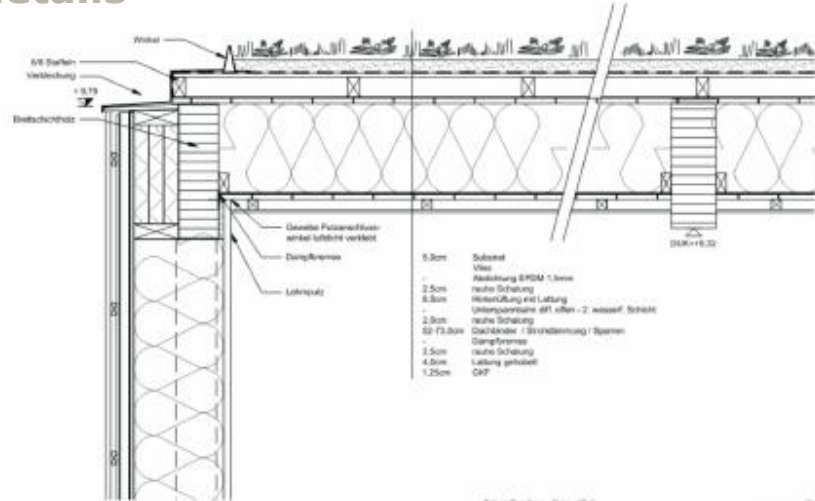


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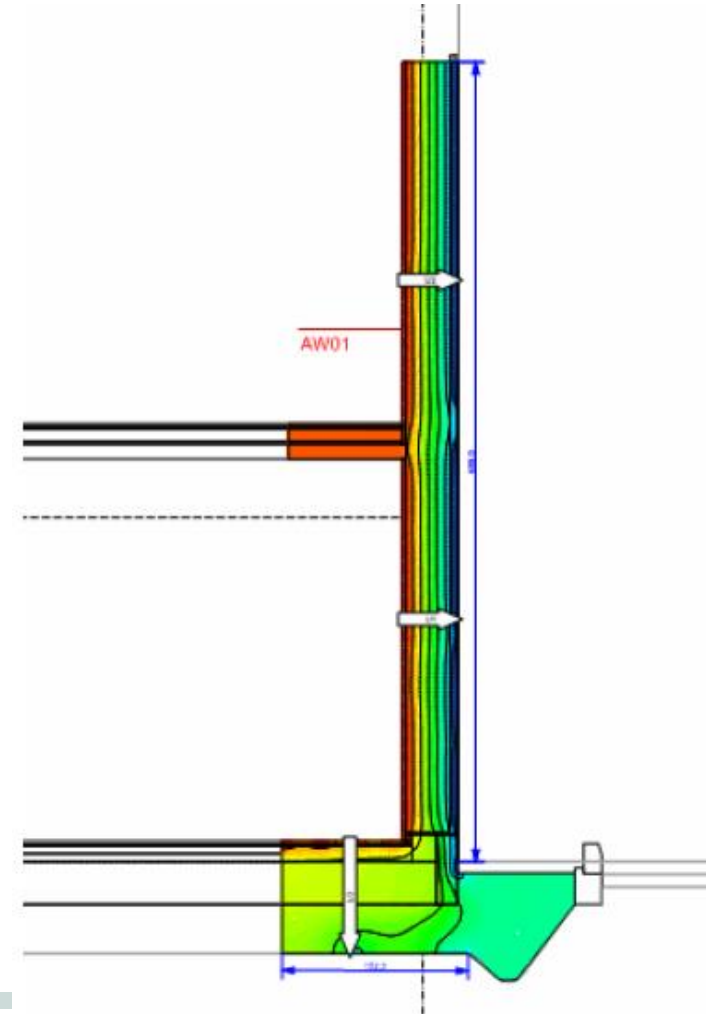
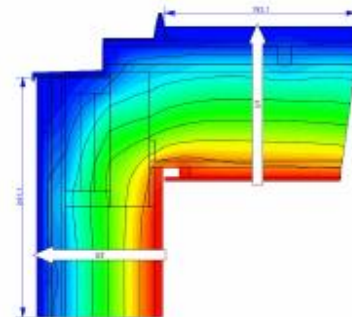


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details



LEITDETAIL		MAGK	
HDL, 1. Maßstab des Lagers		HDL, 1. Maßstab des Lagers	
Projekt:	1.00	MAGK	
Objektname:	HDL_6_019	MAGK	
Stand:	A.3	MAGK	
Datum:	24.06.2019	MAGK	
Blatt:	1/1	MAGK	





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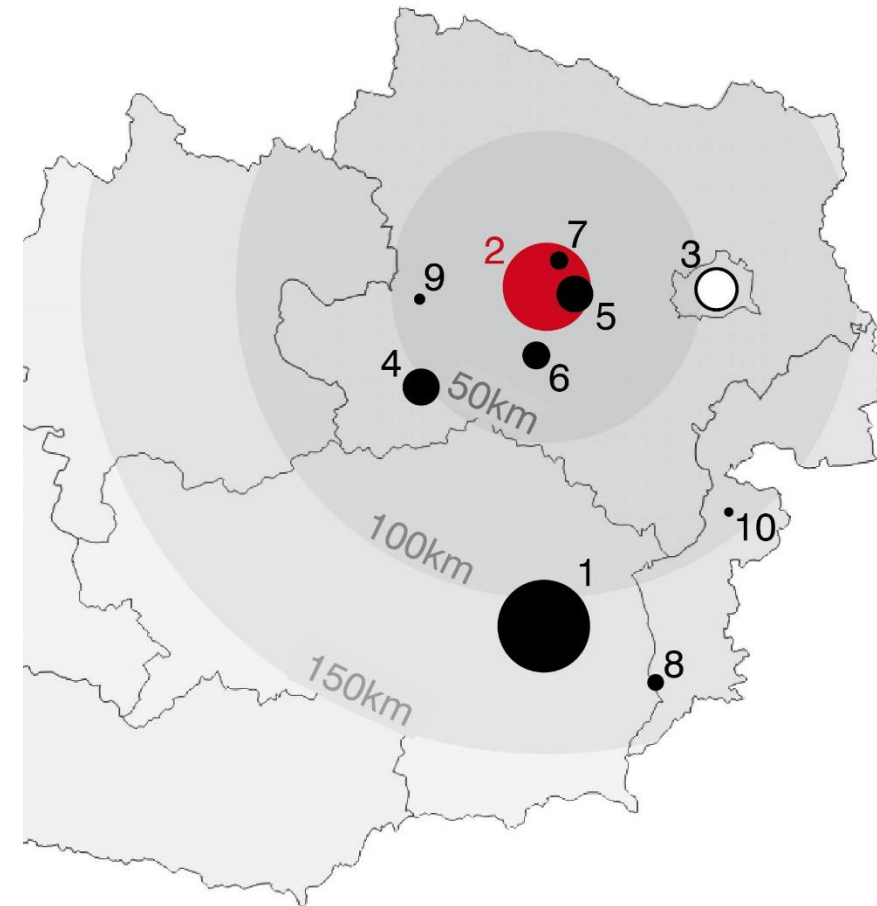
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think global act regional

	Kostenanteil	Gewerk	Entfernung
1	25,0%	Zimmerer	110km
2	23,3%	GESA/ Sonstiges	0km
3	11,8%	Generalplaner	55km
4	9,4%	Glaser/ Türen	52km
5	9,8%	Baumeister	10km
6	5,9%	Installateur	21km
7	5,2%	Elektriker	10km
8	4,4%	Fenster	133km
9	3,0%	Bodenleger	40km
10	1,1%	Lift	95km





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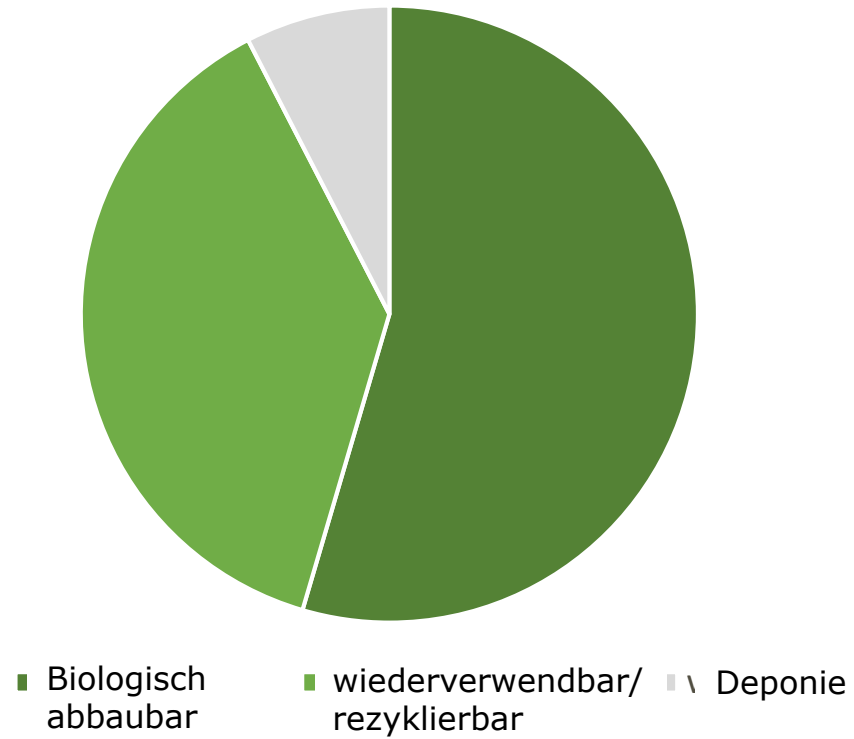
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Hi Bi
WOOD







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east elevation



ABUS 51 SLANGHEID OMNIV 1000 WIKK

































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goals

“give something back to nature”

“low impact building”

“leave without a trace”



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History

"The principle of industrialization requires the **relocation of the building production from the construction site** or the factory site **to the factory**. The demand for precision, quality and maximum performance under economic conditions leads to **prefabrication** in the sense of a complete finished production of all parts. The construction **becomes an assembly**. A process that **differs** significantly from all previously **common methods** of construction and is only caused by industrialization."

Konrad Wachsmann (1901-1980), „Wendepunkt im Bauen“ 1959



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paldies!

dziękuję!

thank you !

ačiū!

Kiitos!

Vielen Dank!