



# verplaatsbare woningen voor braakliggende terreinen

Justin van der Kooij

4616782

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# Probleemstelling

Braakliggende terreinen



# Probleemstelling

Woningtekort voor starters en studenten



# Probleemstelling

Gebrek aan aanpassingsvermogen

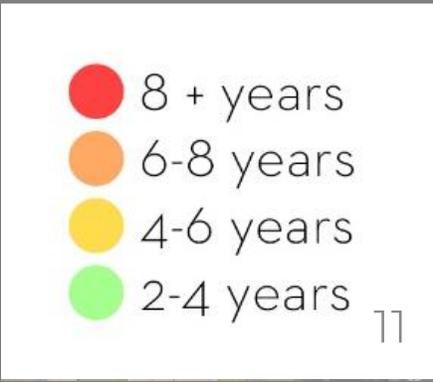


# Probleemstelling

Biologische en technische materialen worden gemengd



# Locaties Dordrecht





Colijnstraat, 8000 m<sup>2</sup>



# Generieke & specifieke kenmerken

- verloedering
- geen permanente plannen

- lokaal klimaat
- omvang
- aanwezigheid  
nutsvoorzieningen

- opnemen in basis concept

- aanpassingsvermogen  
concept

# Referenties

- Transport
- Fundering
- Nutsvoorzieningen

1. Spacebox, De Vijf
2. ONE, Heijmans
3. Cubestee, Onix architects
4. The woody, Woodyshousing
5. Wikkelhuis, Fiction Factory
6. NEZZT, de Meeuw
7. Circular building, Arup
8. Onetwo house, Vivax
9. Facit Homes



veel variatie mogelijk



geen aanpassings-  
vermogen

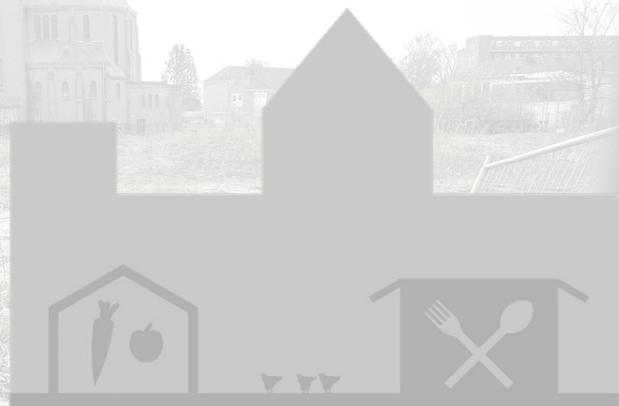
groot aanpassings-  
vermogen



one size fits all

# Doelstelling

Iets terug geven  
aan de buurt en  
geen 'molshoop'  
achterlaten



braakliggende terreinen



woningtekort

Prefab  
verplaatsbare  
woningen

Geen 'one size  
fits all' en  
aanpassen aan  
de context

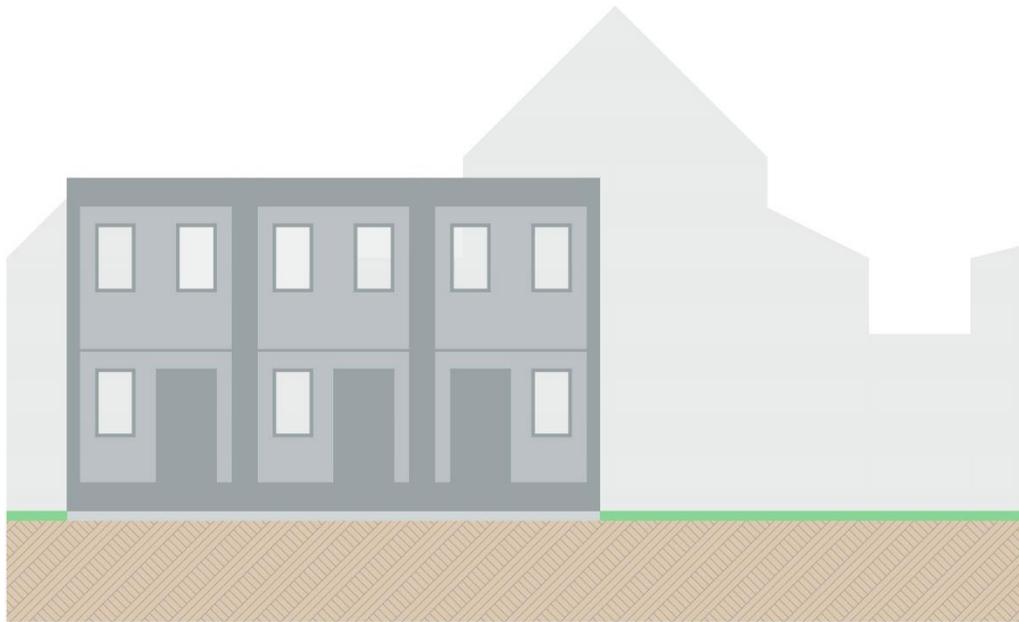


aanpassingsvermogen

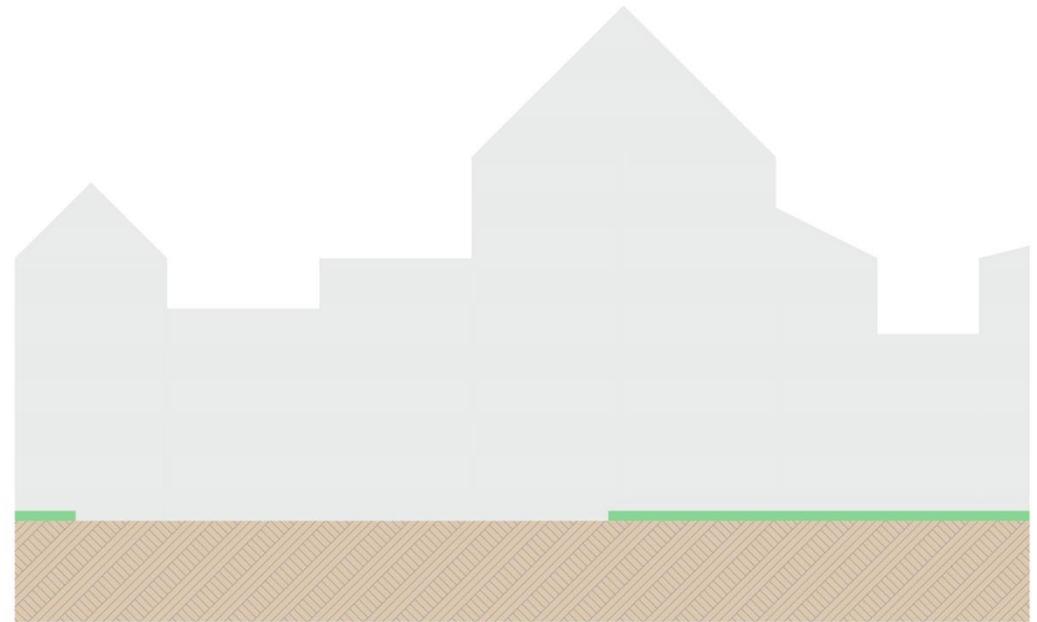


mengen materialen

Remontabel  
bouwen



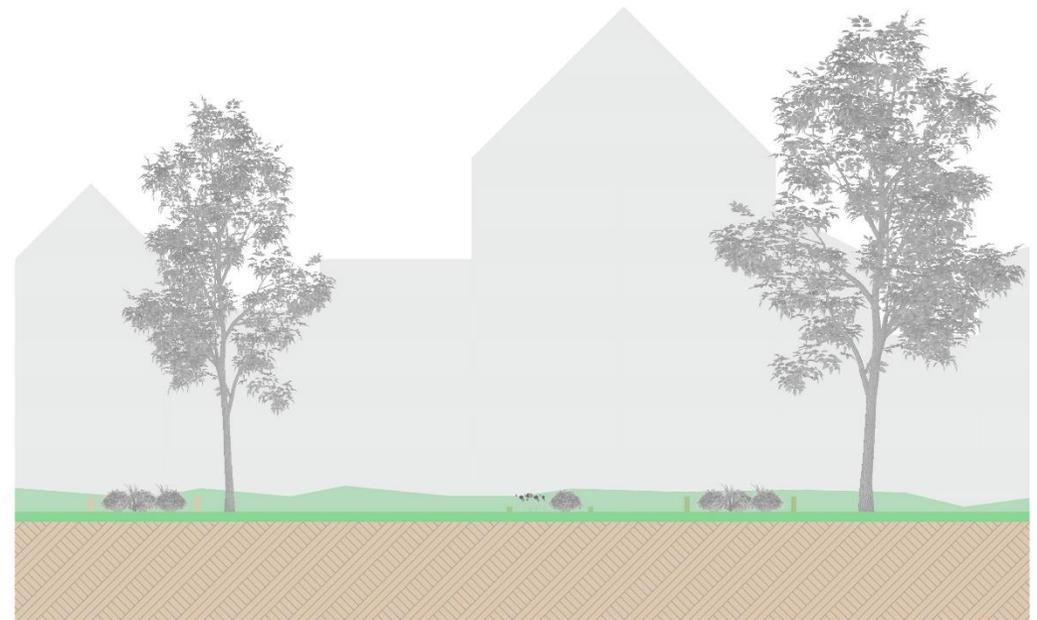
standaard container woningen (voor)



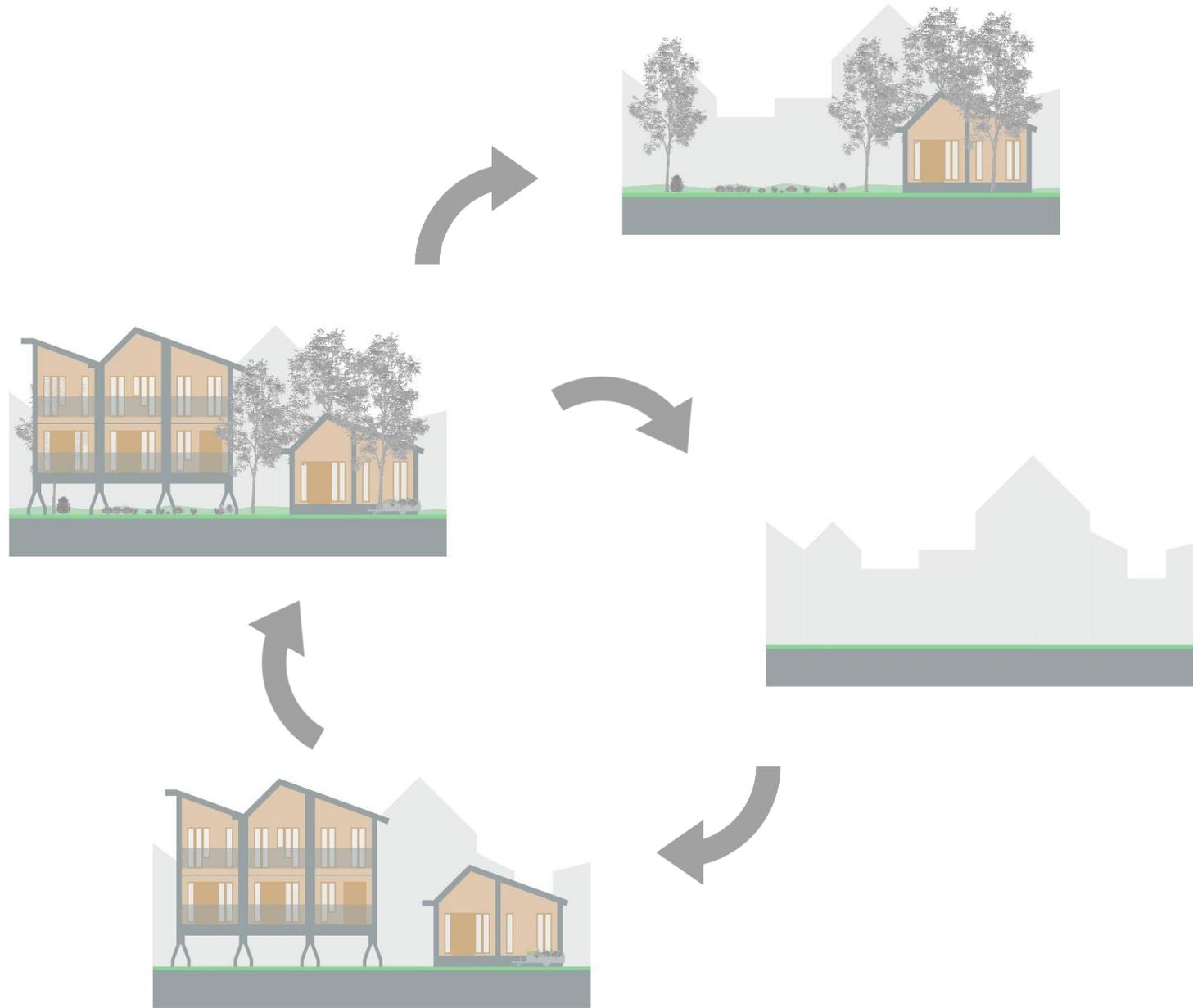
standaard container woningen (na)

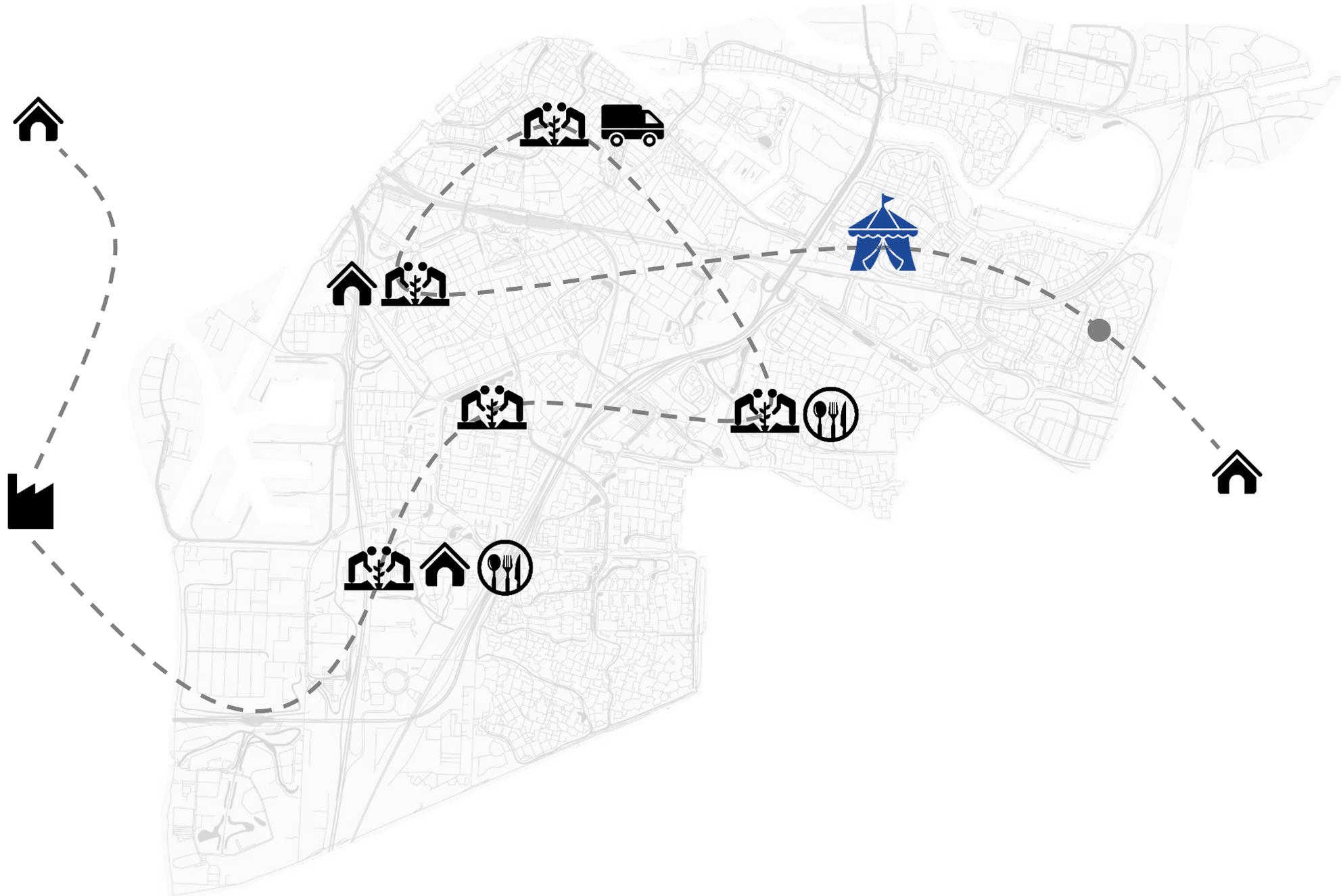


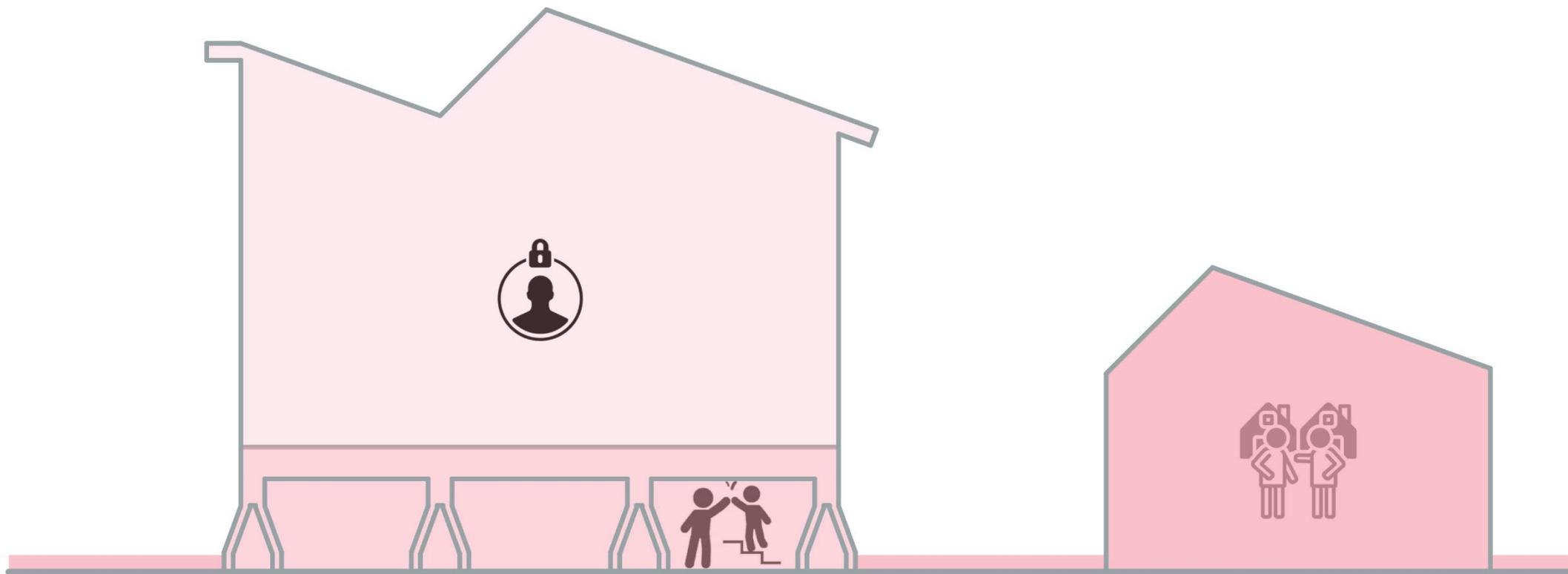
opgetilde woningen (voor)

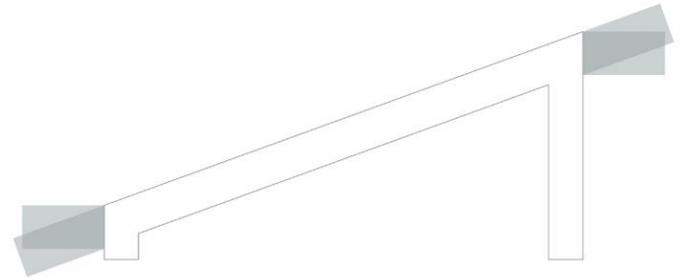
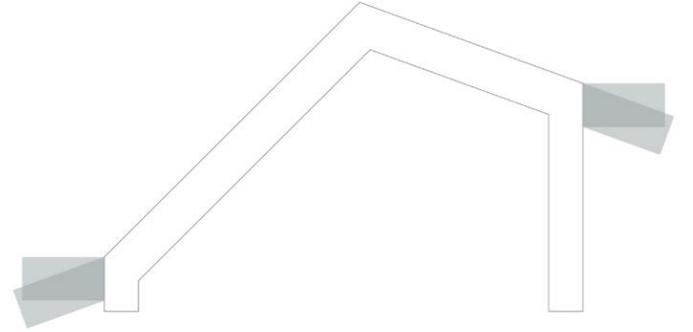
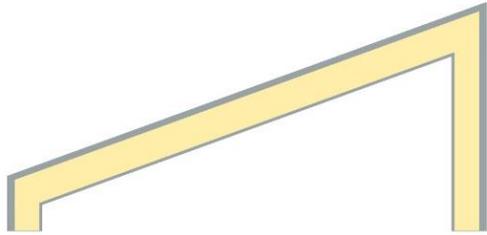
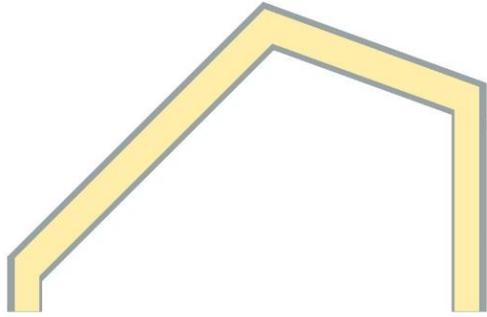
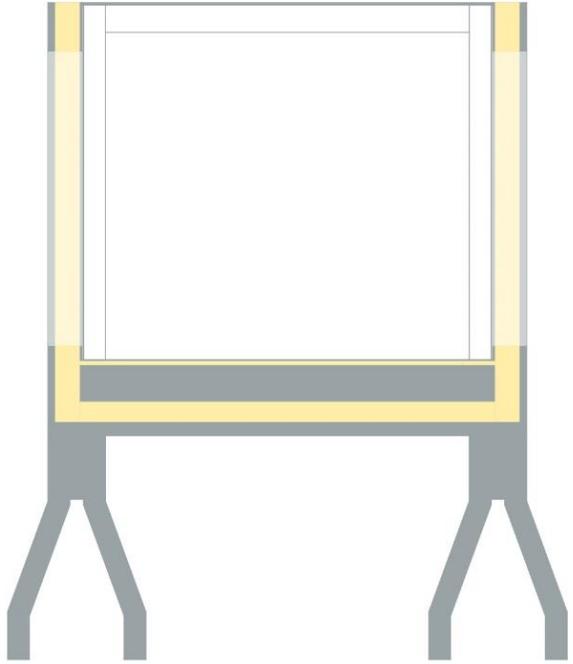


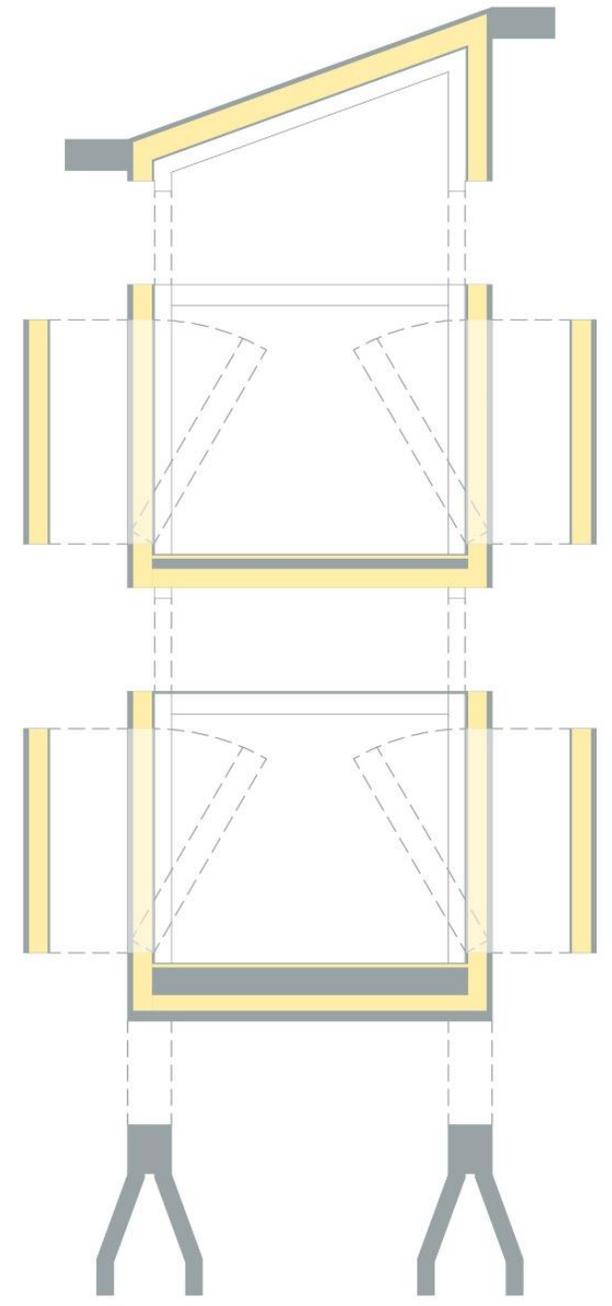
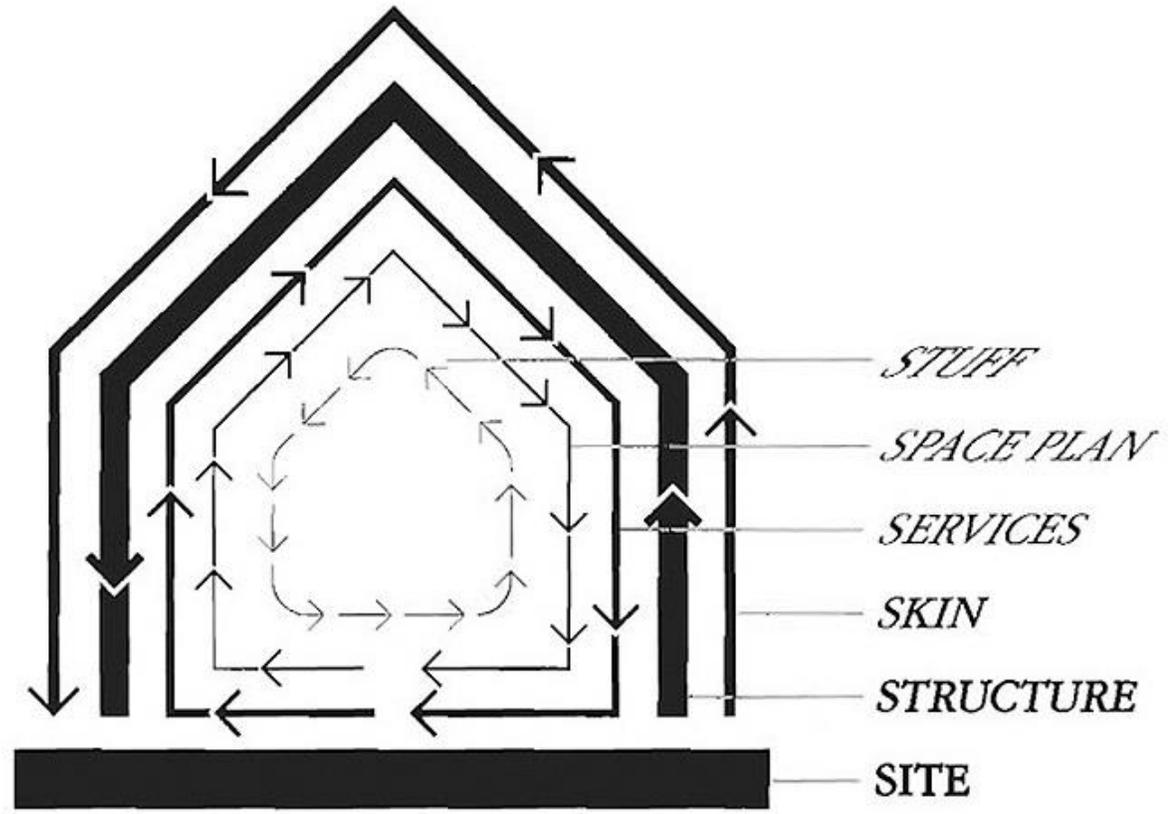
opgetilde woningen (na)











# Verdiepend onderzoek - Remontabiliteit

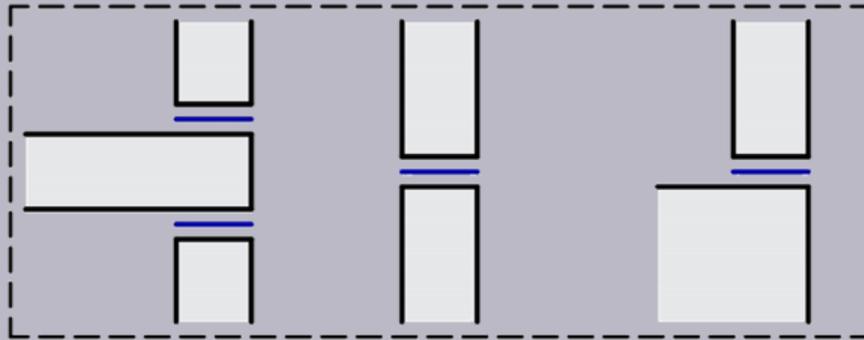
- Samenwerking met drie medestudenten
- Individuele toepassing - naaddichtingen

*“Welk type naaddichtingen zijn geschikt om een remontabele en verplaatsbare woning te realiseren die op zijn minst twintig keer herplaatst kan worden?”*

# Verdiepend onderzoek - Resultaten

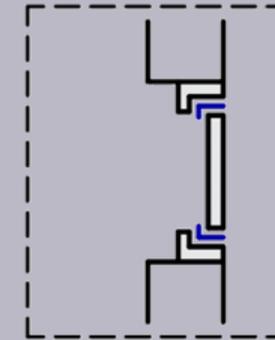
1. Mechanische bevestiging 2. Hoge slijtvastheid 3. Geen schade

Structural



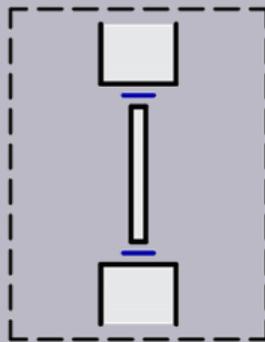
floor, wall, foundation (1)

Movement

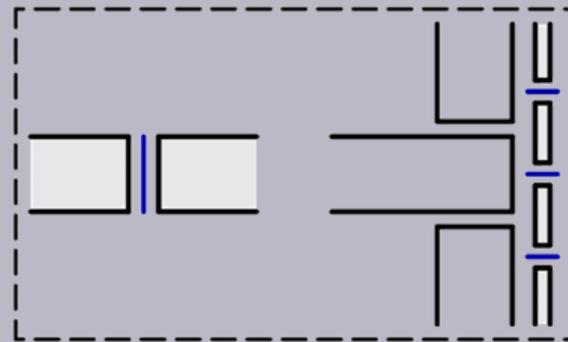


Door/window (4)

Expansion

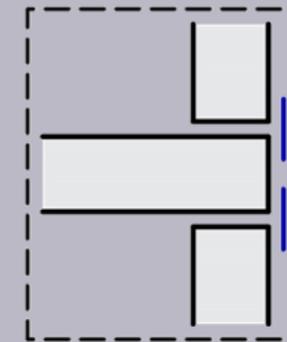
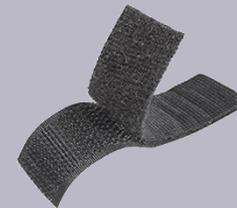


5 - 10 mm (2)

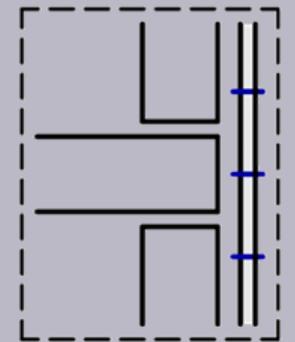


10 - 40 mm (3)

Plane /  
Overlapping



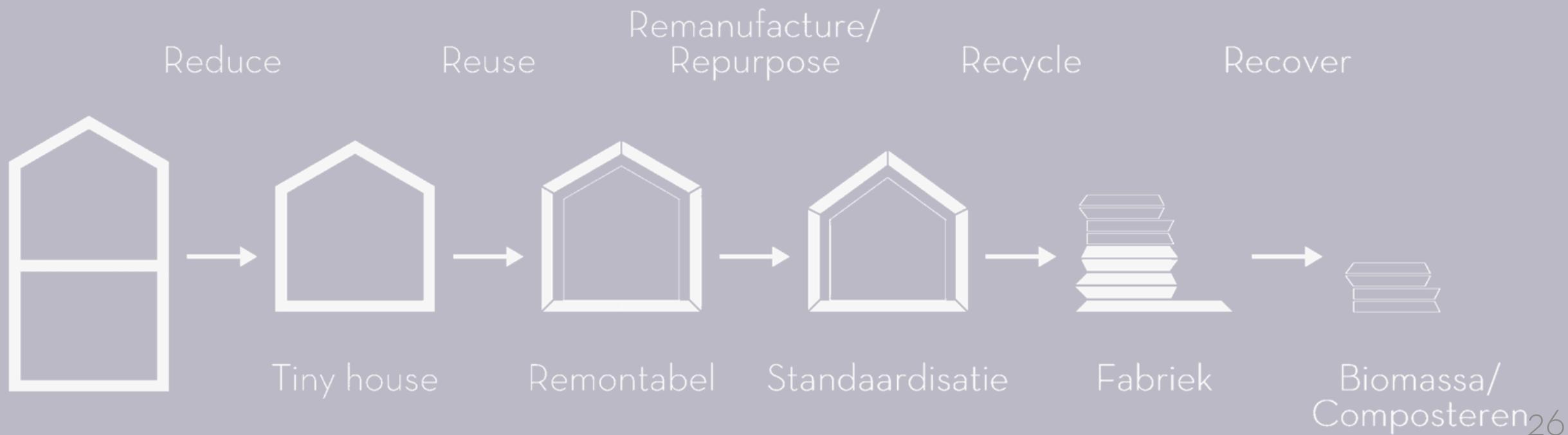
Foil (5)

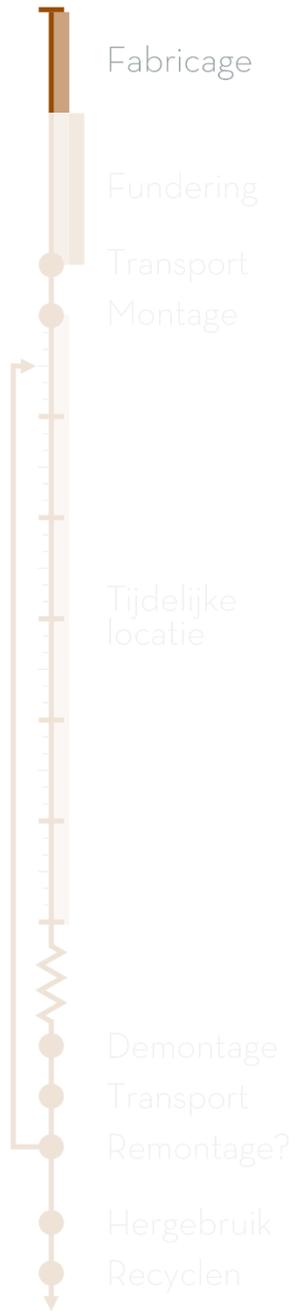


Cladding (6)

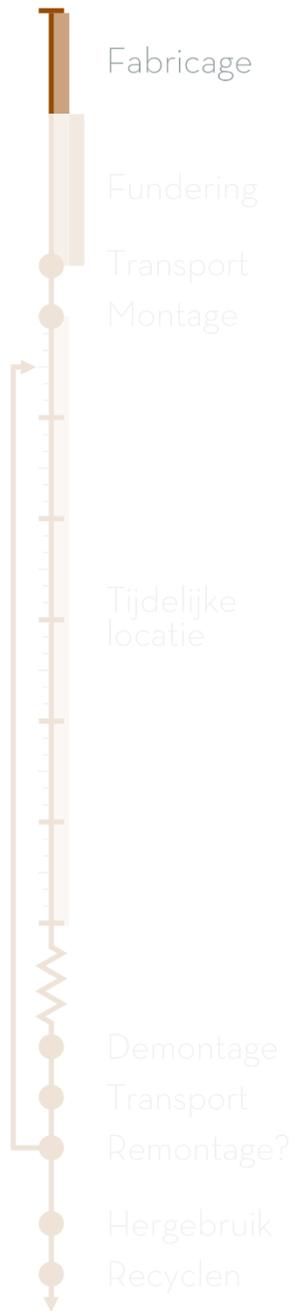
# Sleutelfactoren

- Beperken aantal (de)montage stappen
- Aanpassingsvermogen
- Bruikbaarheid na gebruik vergroten
- Scheiden materialen

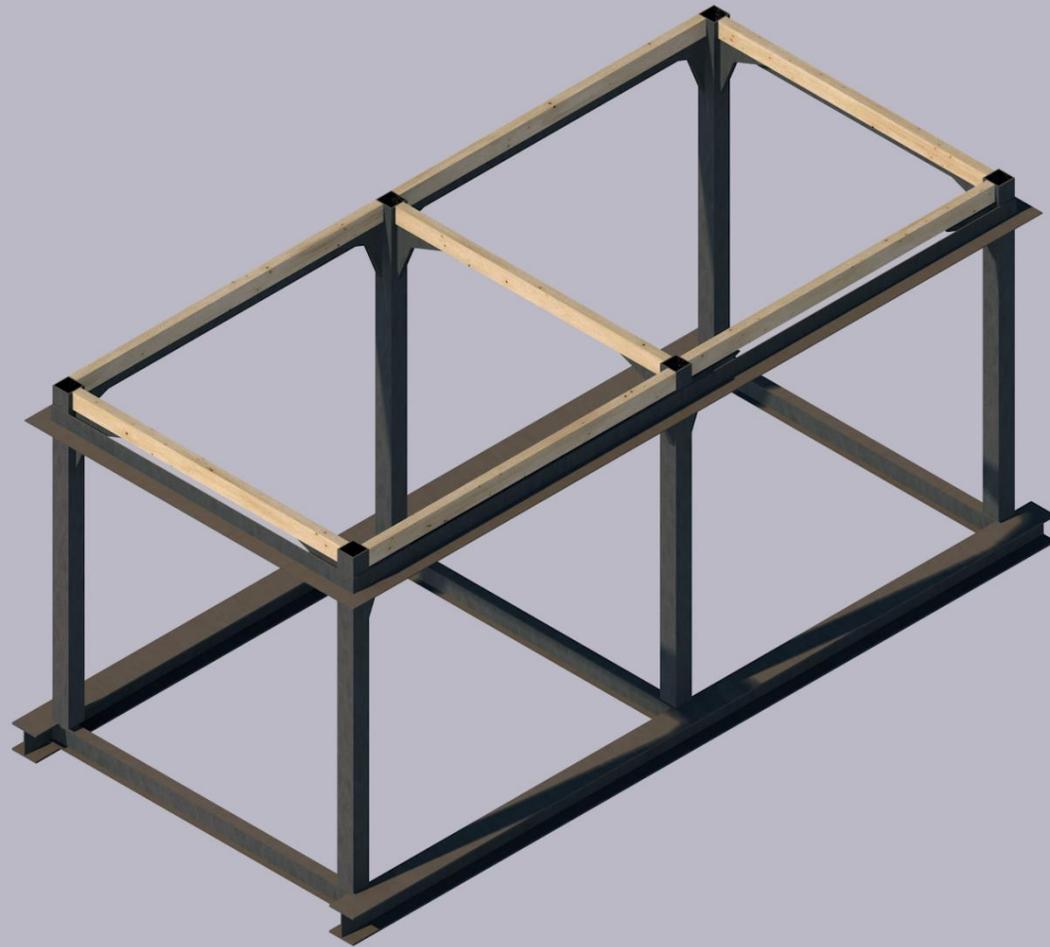
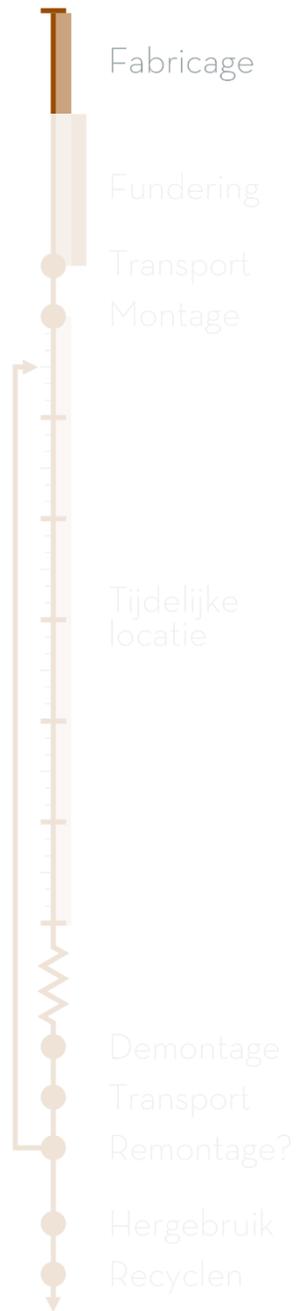


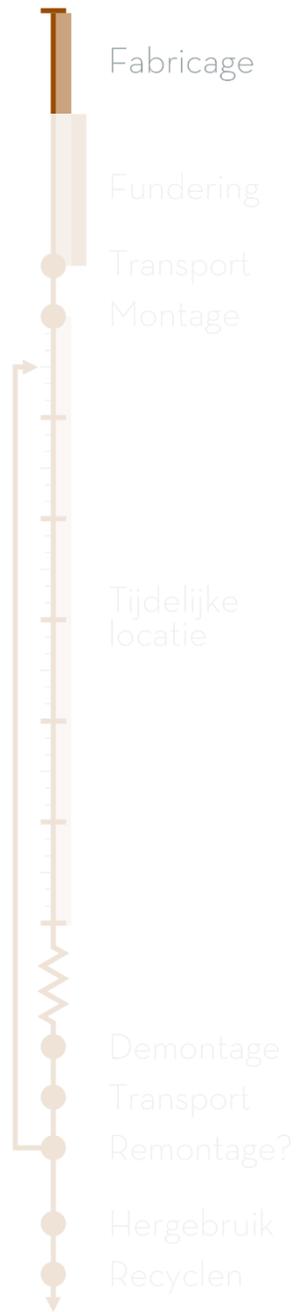


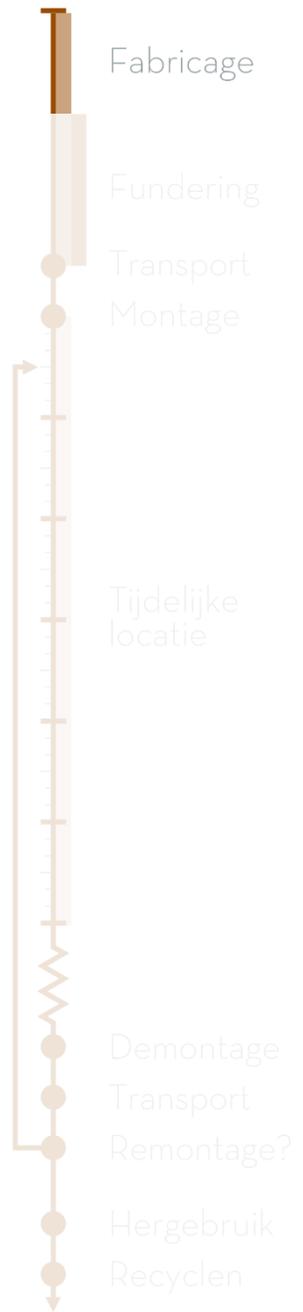
# Colijnstraat, Dordrecht

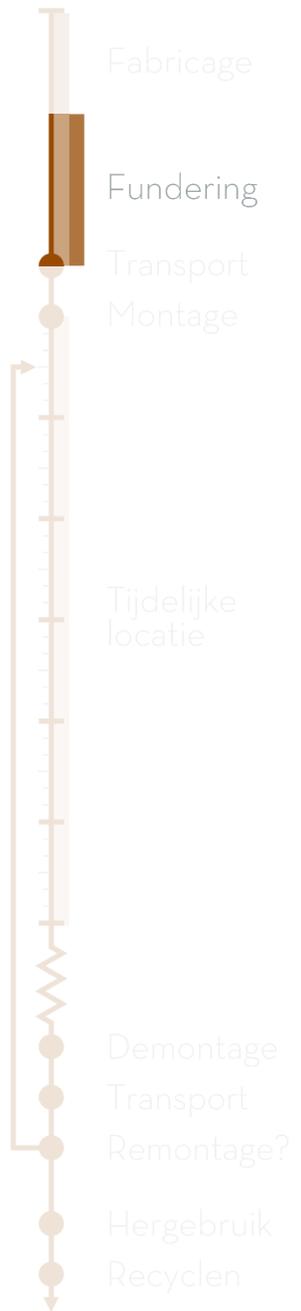


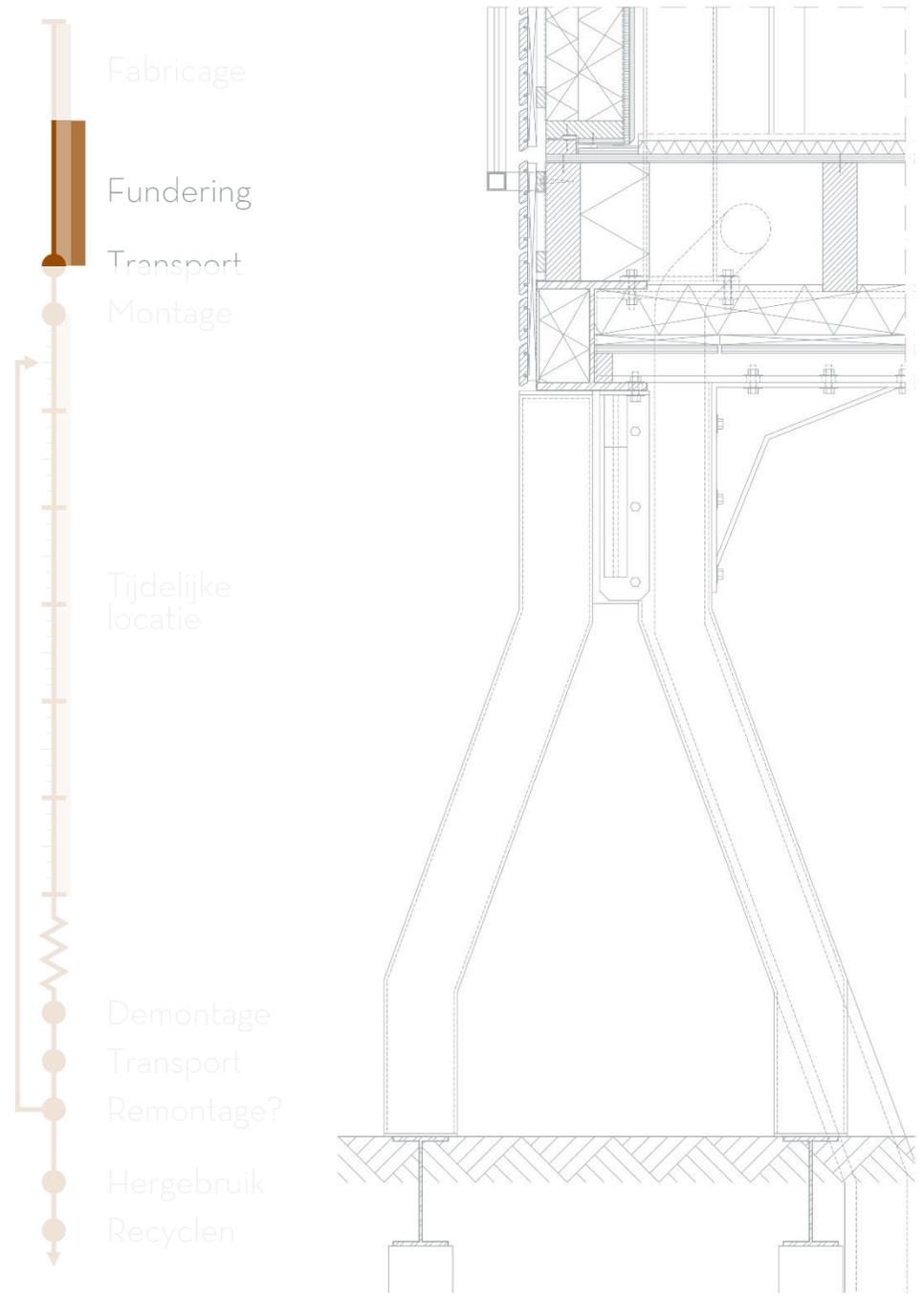
Colijnstraat, Dordrecht

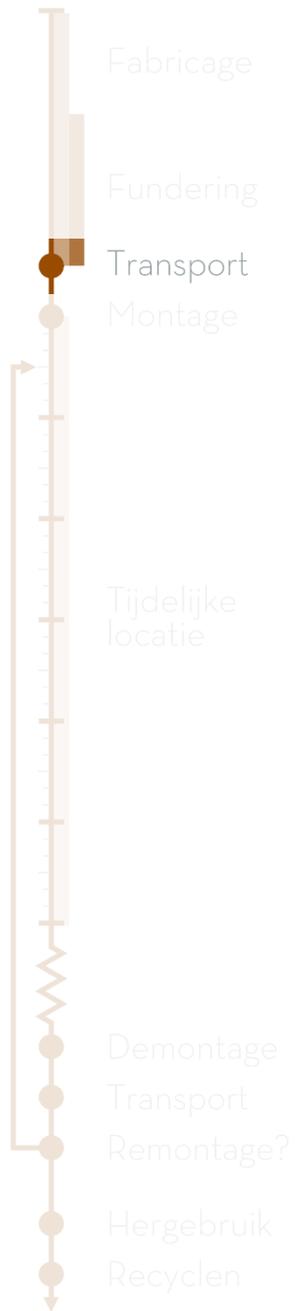






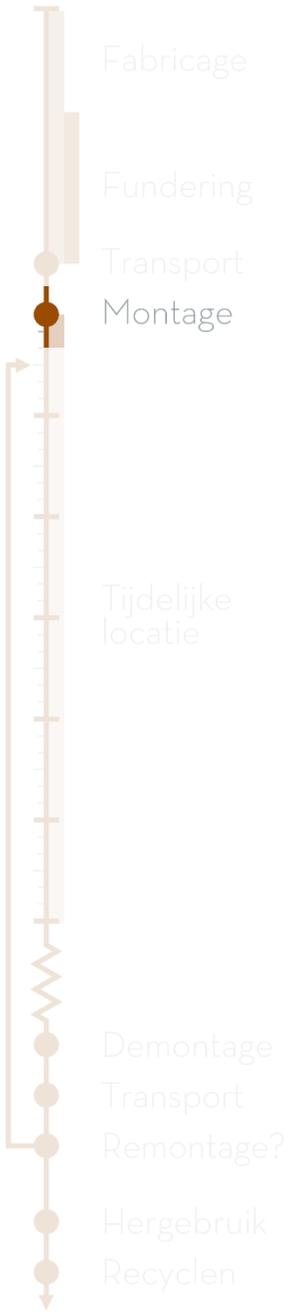


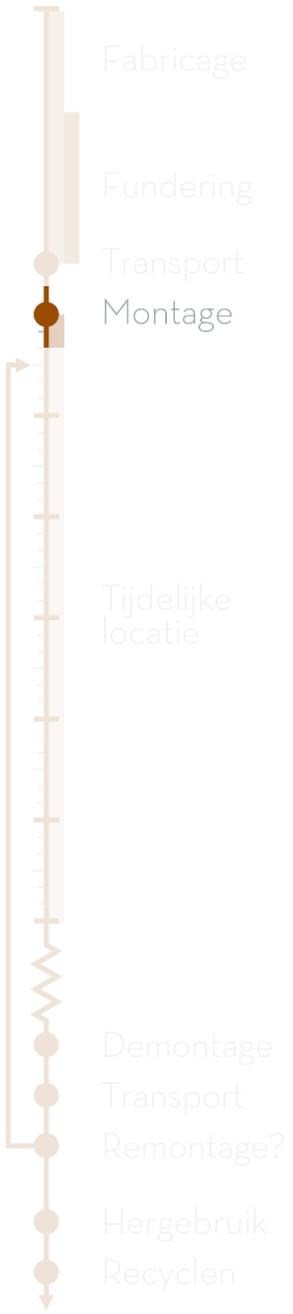


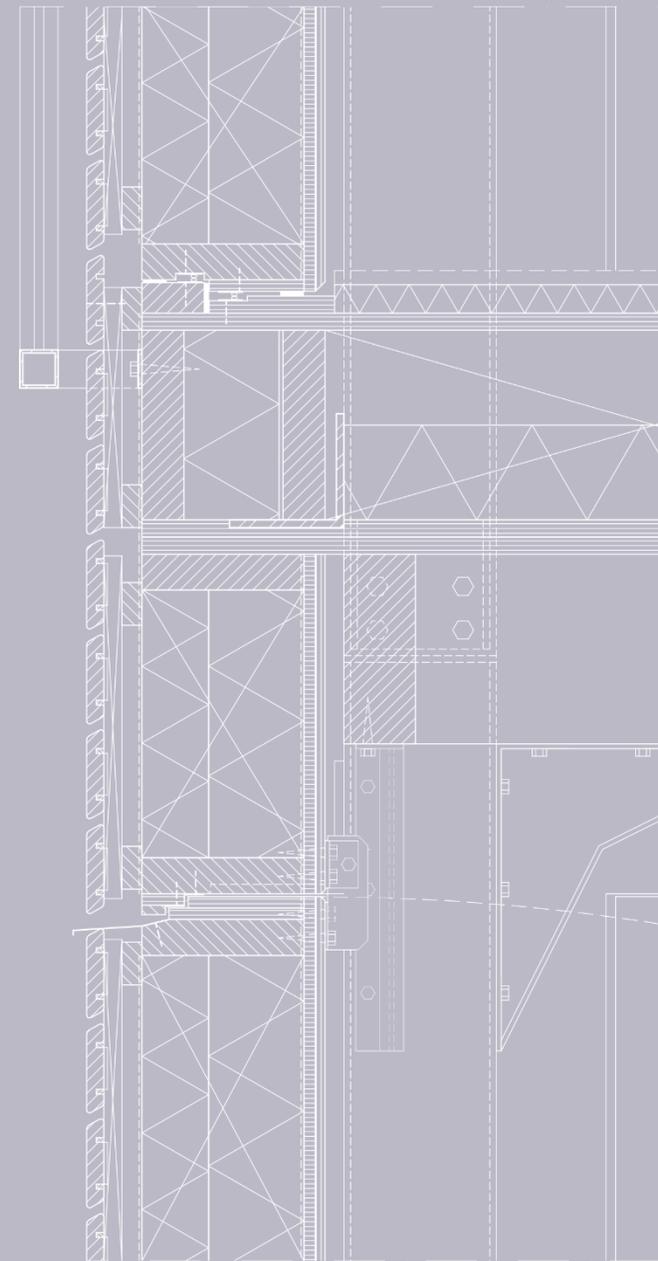
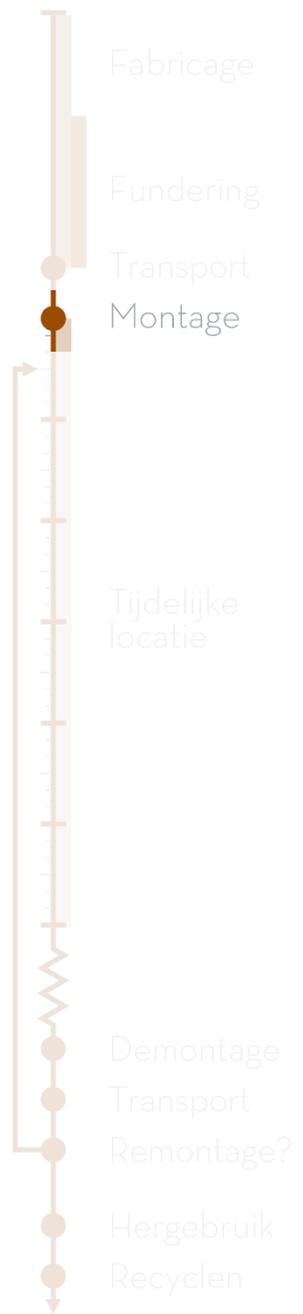


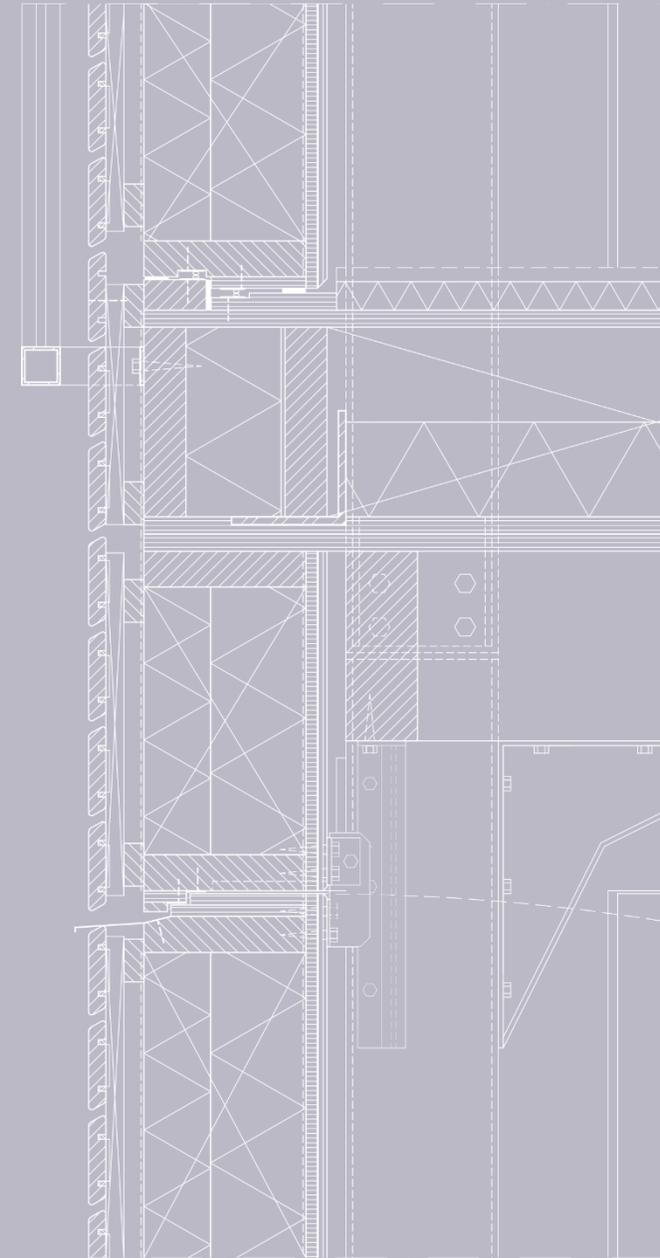
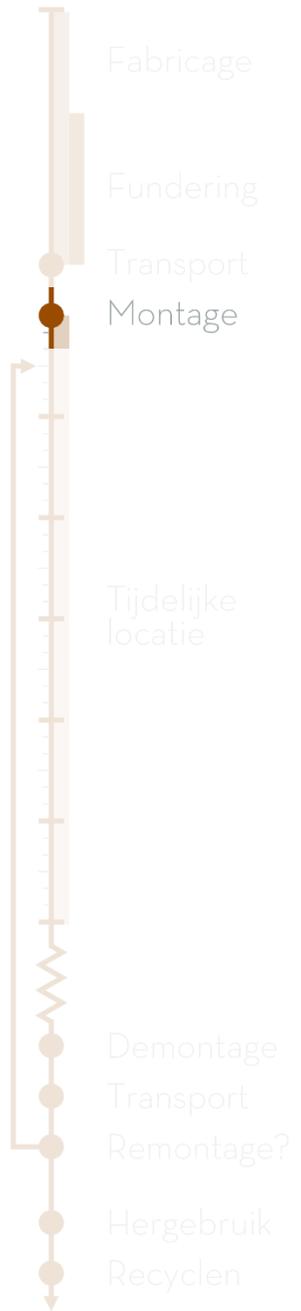
- Euro dieplader (met doorlopende ontheffing)
- 15 m lang
- 3,5 m breed
- 3,5 m hoog

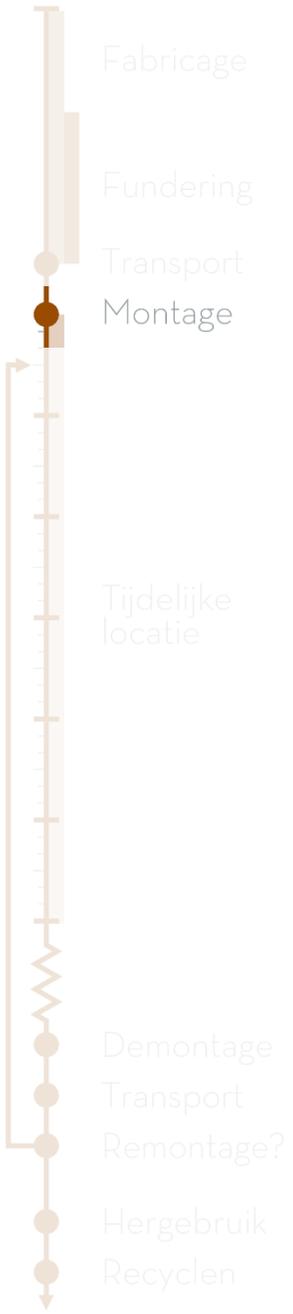




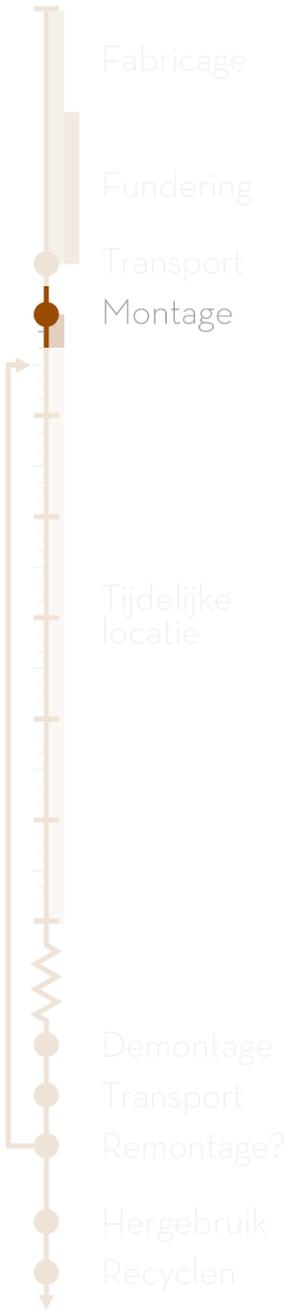


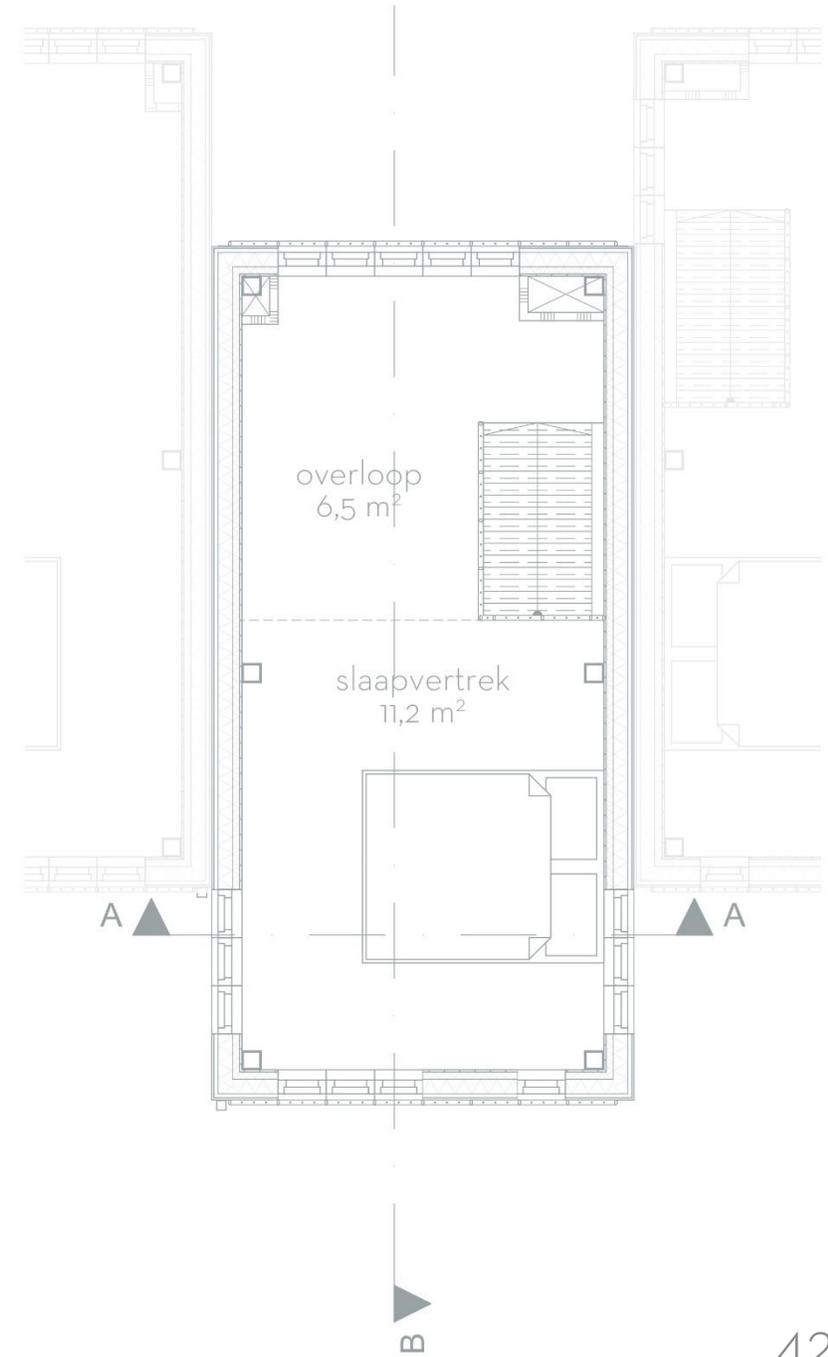
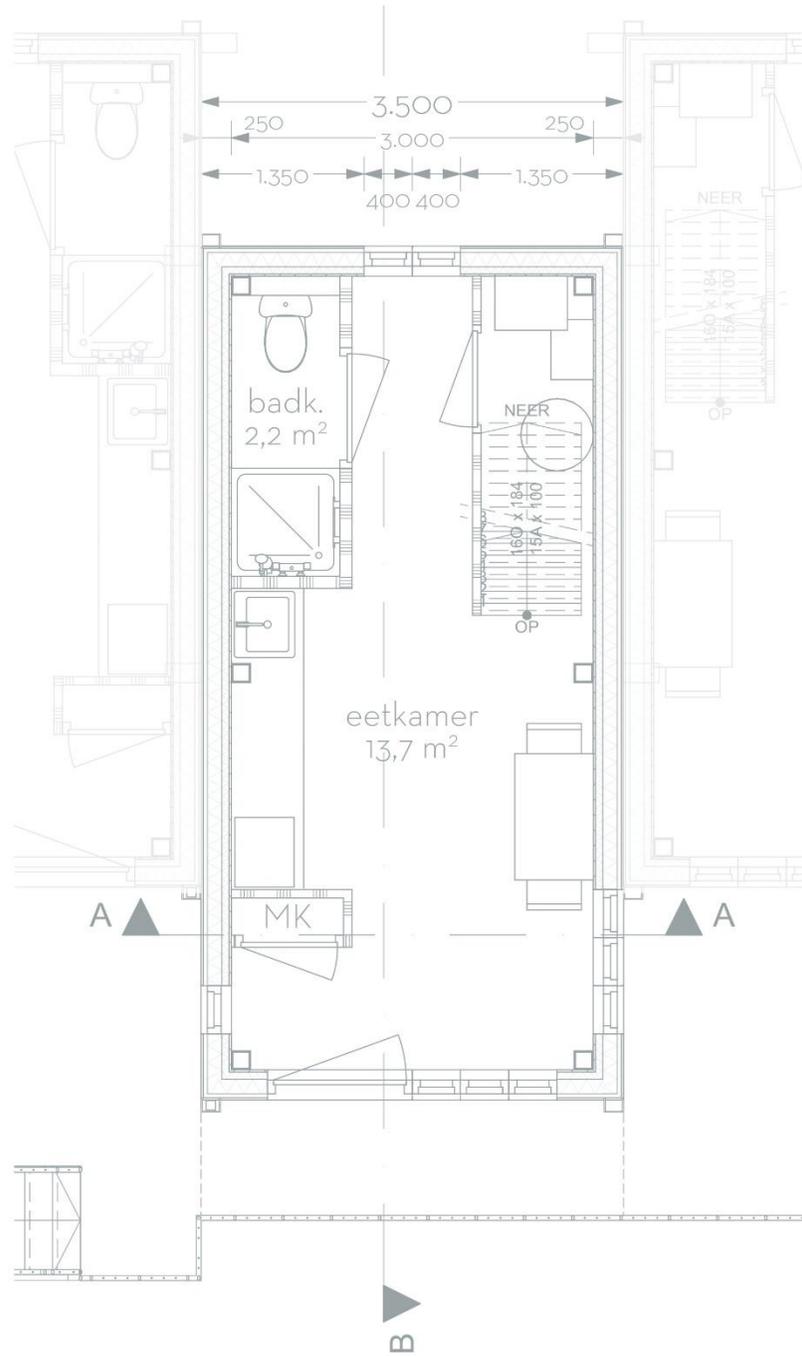
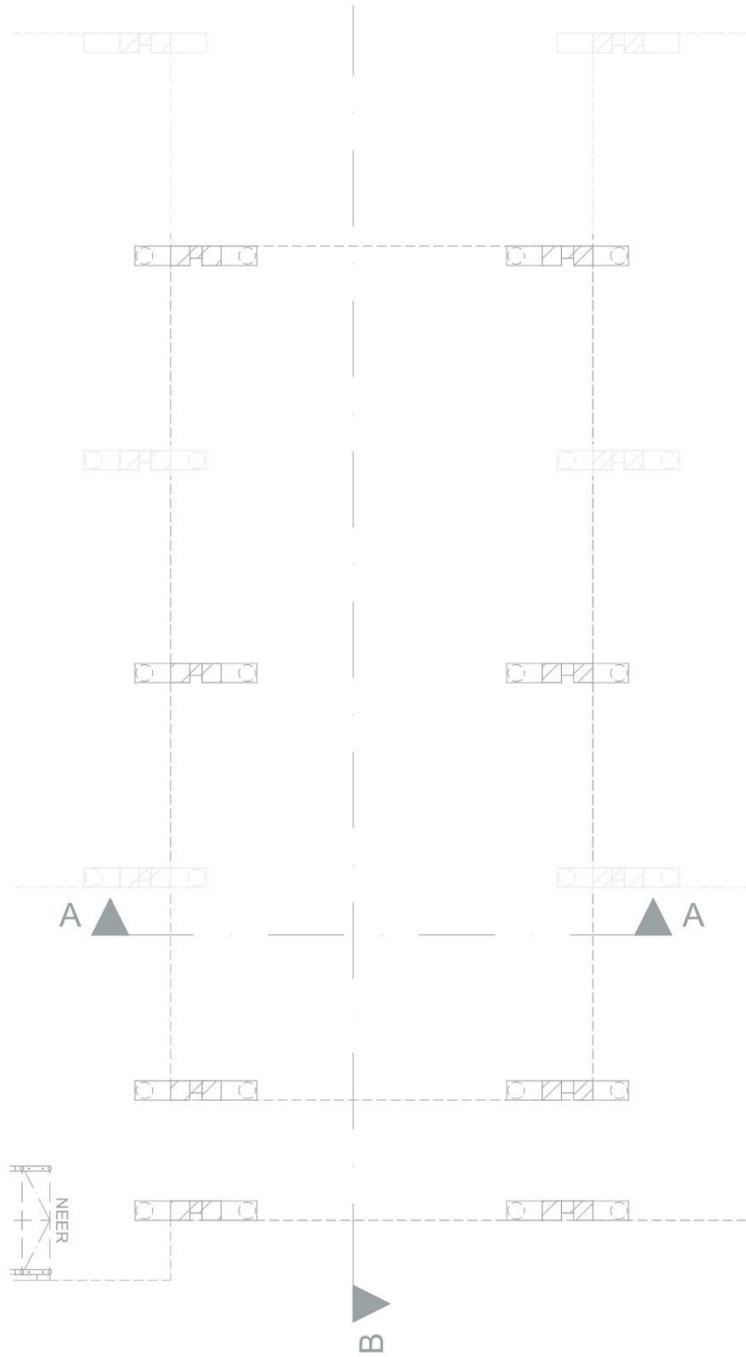










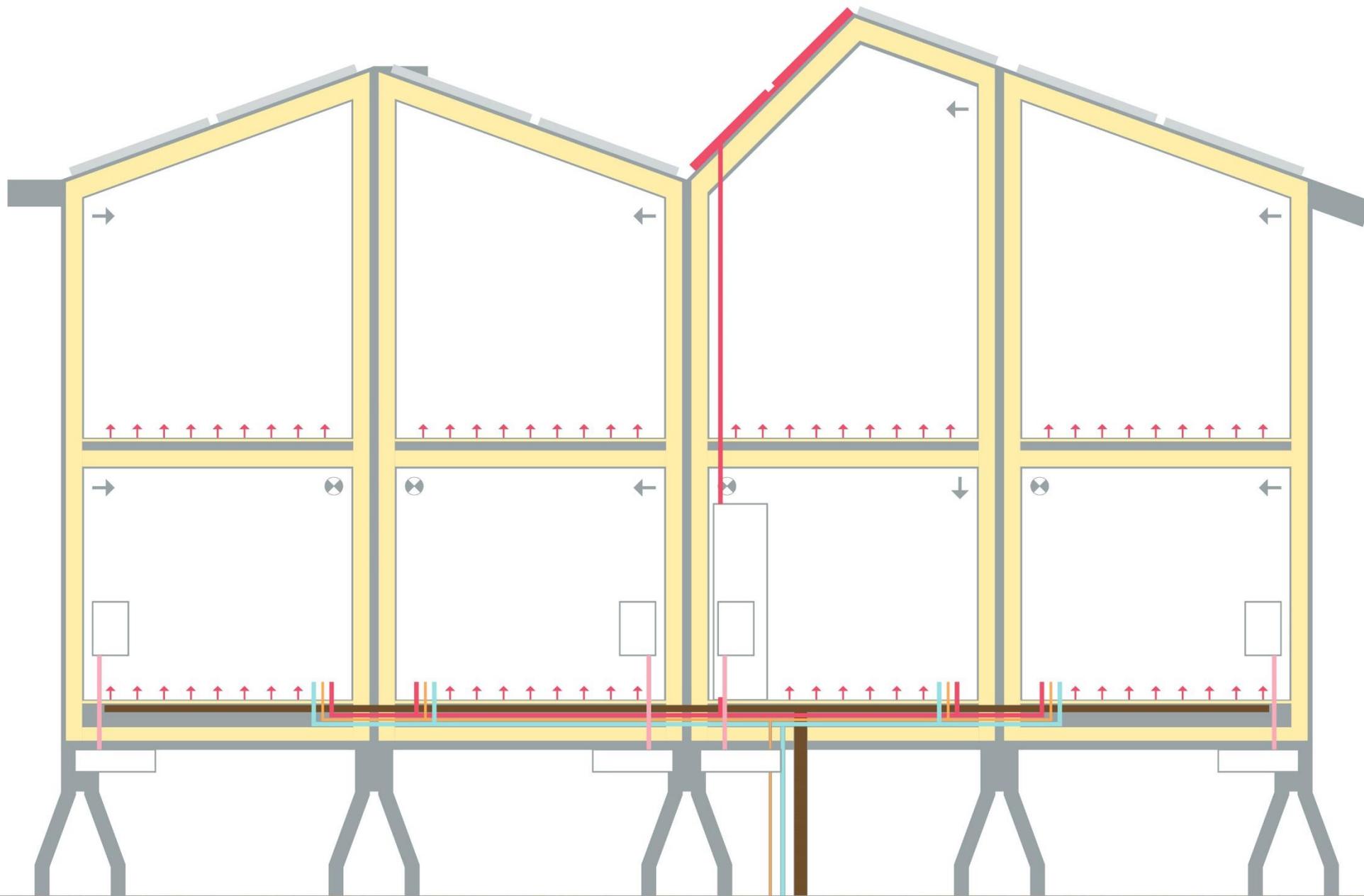




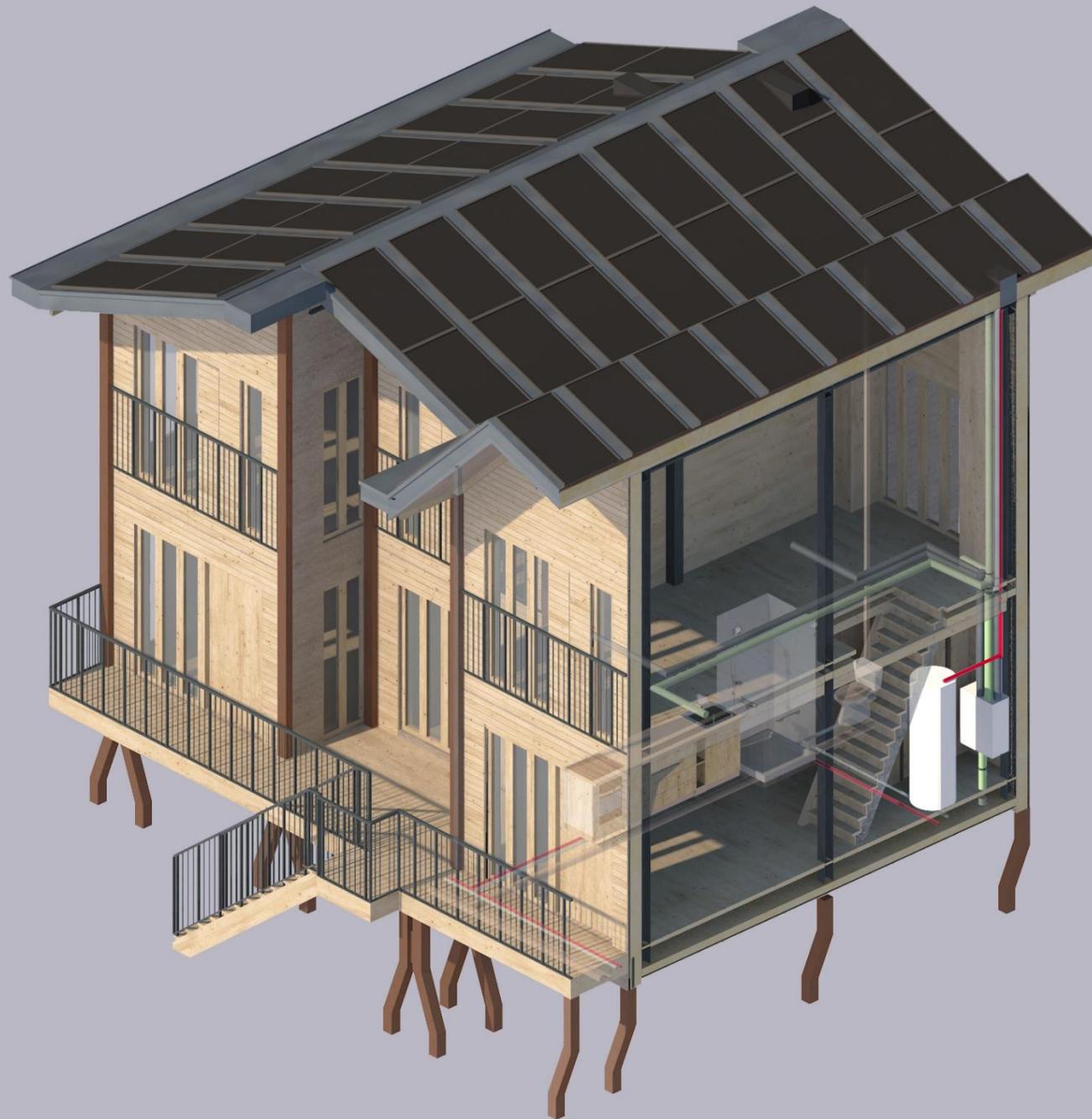








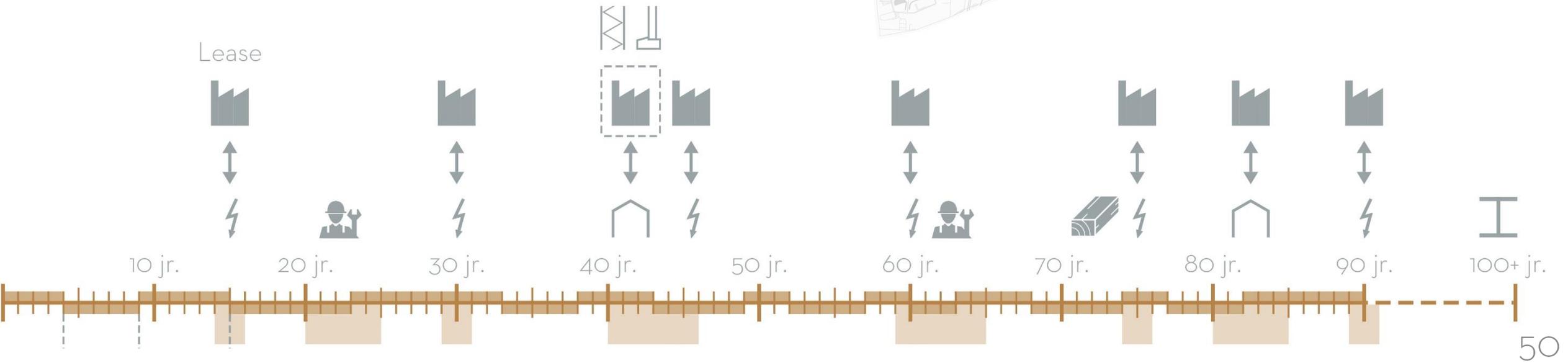
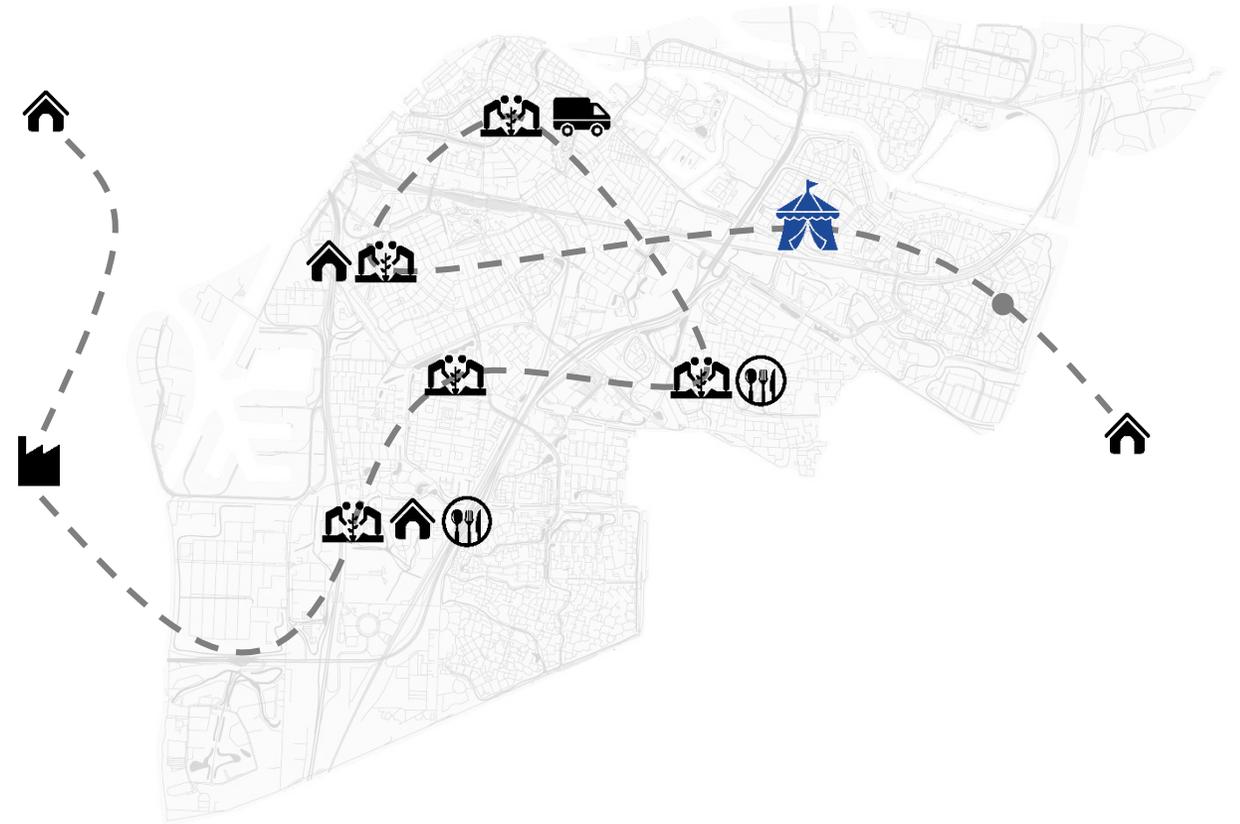
- ⊗ mechanisch afzuigpunt
- mechanisch ventilatiepunt
- lucht/water warmtepomp
- ↑ LTV vloerverwarming
- warm tapwater (zonneboiler)
- pv-paneel (all black)
- waterleiding
- elektra
- riolering





# Aanpassingsvermogen

- Gevelindeling - 6 maanden
- Samenstelling units - 3-10 jr.
- Installaties - 15 jr.
- Gevelsysteem 20-40 jr.



Gemeente Dordrecht  
(eigenaar)



- Kozijn/gevel fabrikant
- Installatie leverancier
- Isolatie fabrikant
- Staal fabrikant

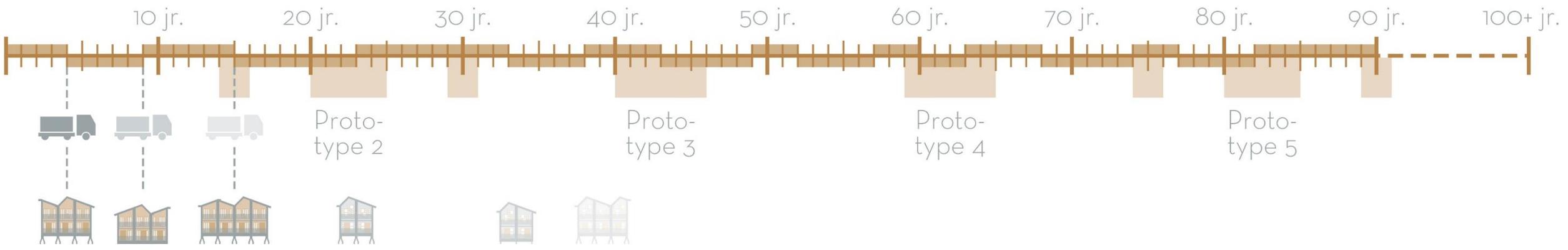
huurcontract  
voor tijdelijke  
locatie



Huurder(s)



Team van professionals

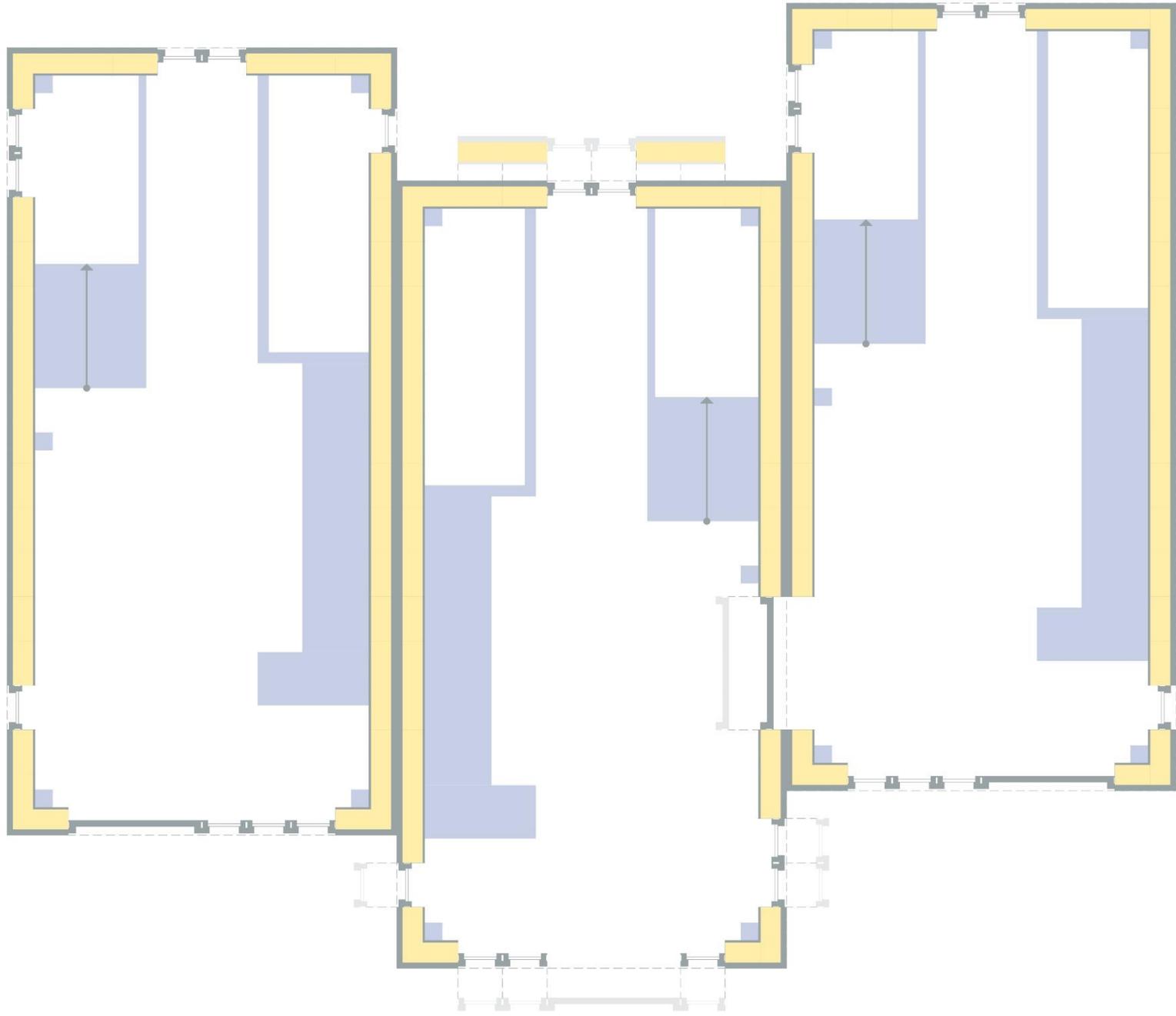


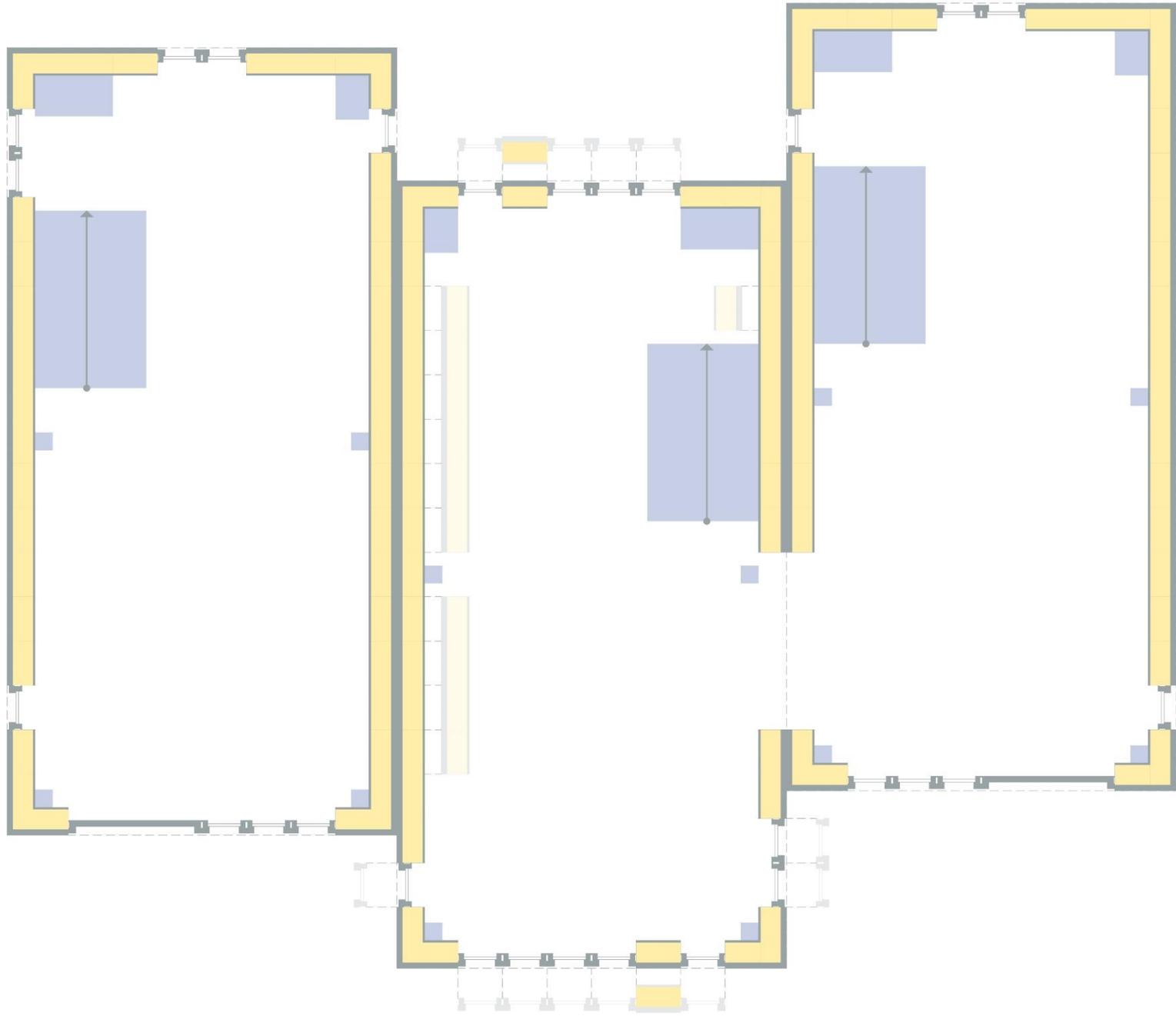
# Aanpassingsvermogen - Gevel

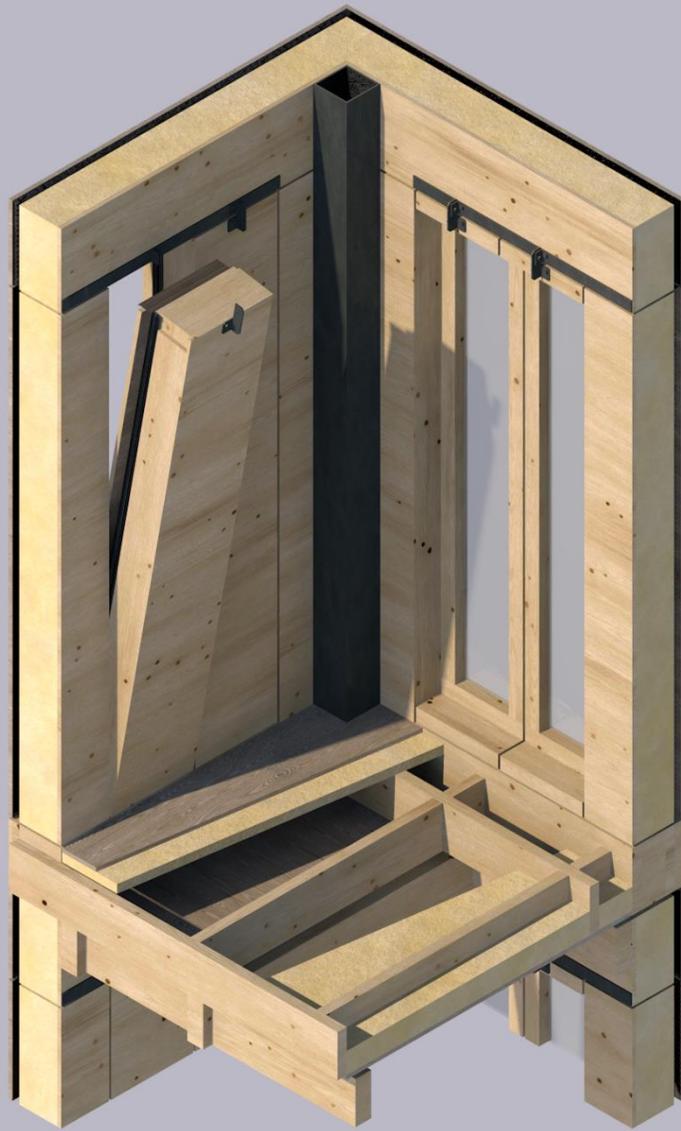


# Aanpassingsvermogen - Gevel



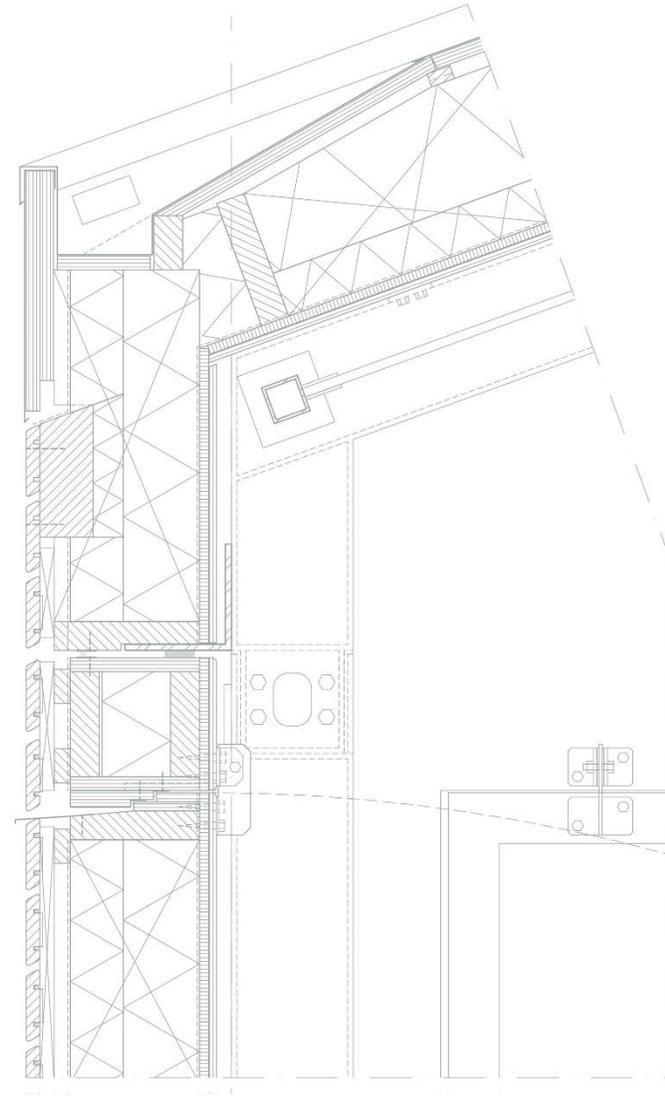




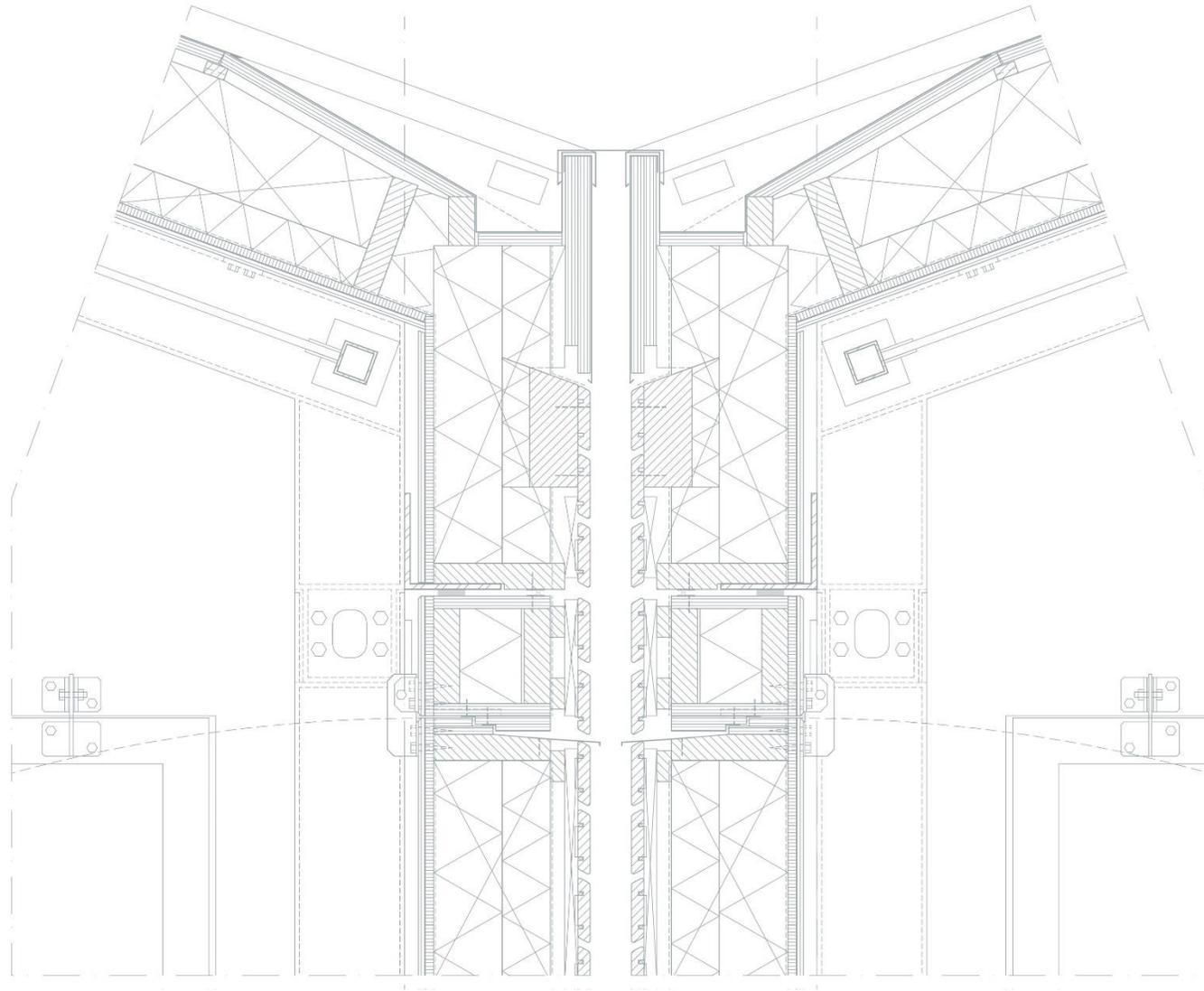




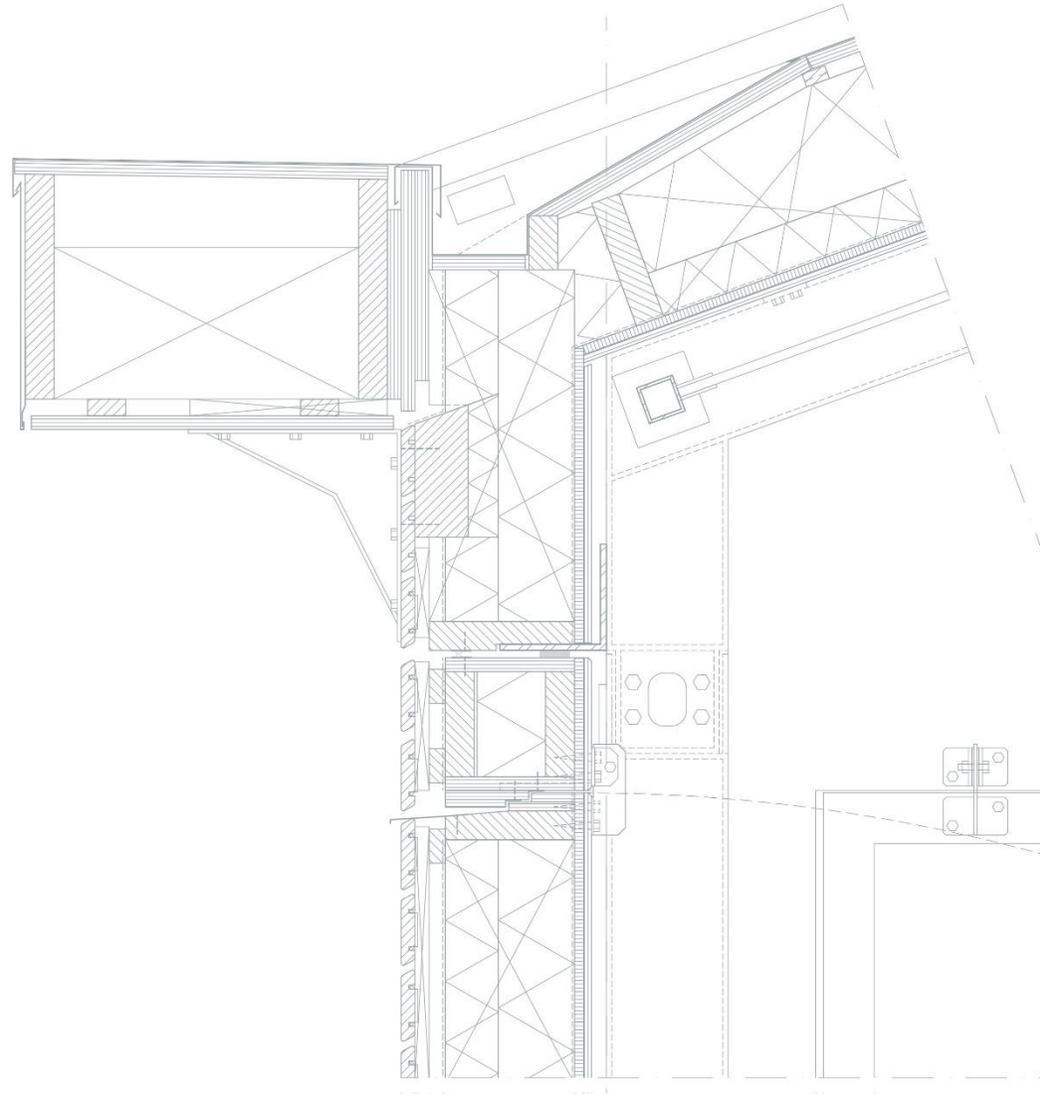
# Aanpassingsvermogen - Samenstelling units



# Aanpassingsvermogen - Samenstelling units



# Aanpassingsvermogen - Samenstelling units







432

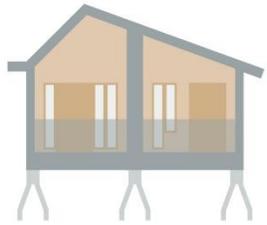
433







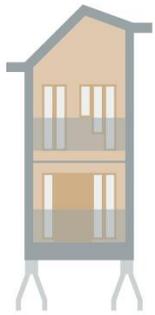




Optopping



Reageren op  
lokaal klimaat

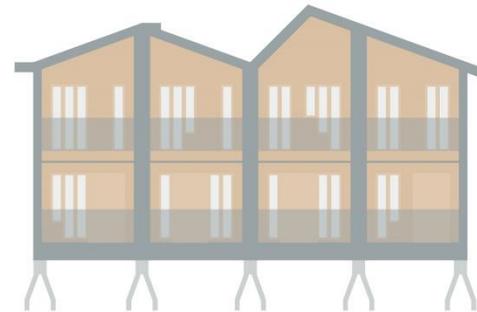


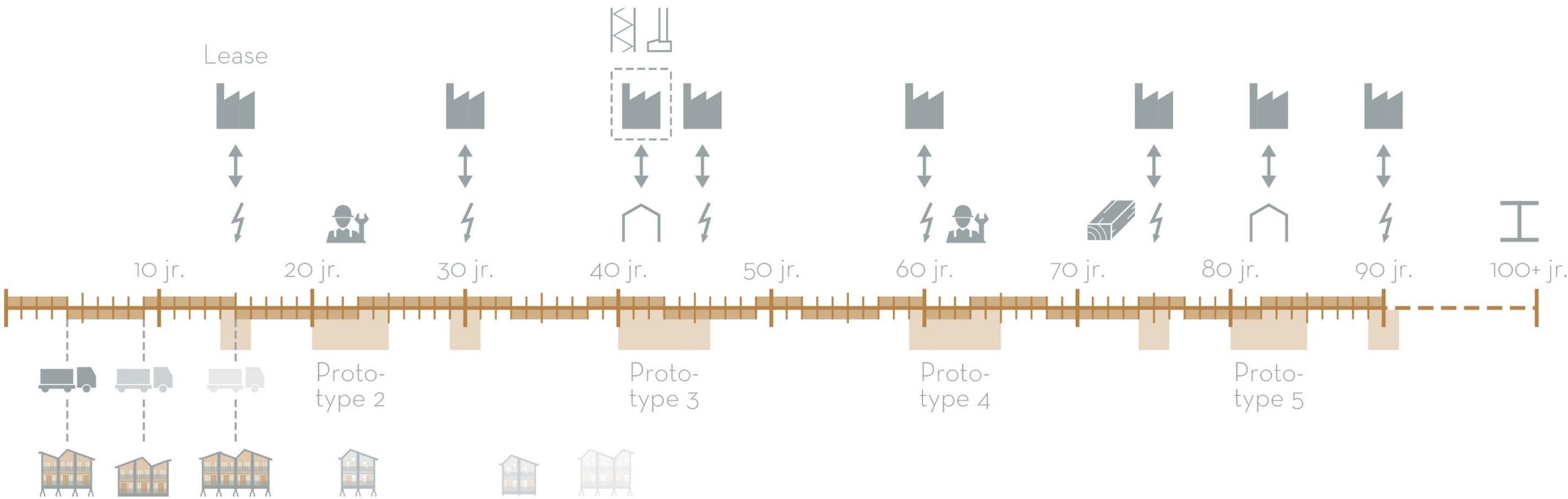
Braakliggend  
terrein

2<sup>e</sup>, 3<sup>e</sup> prototype



Vaste  
ondergrond





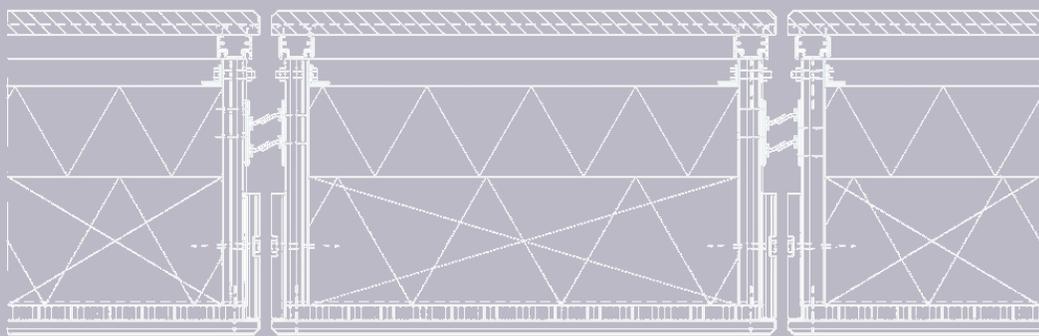




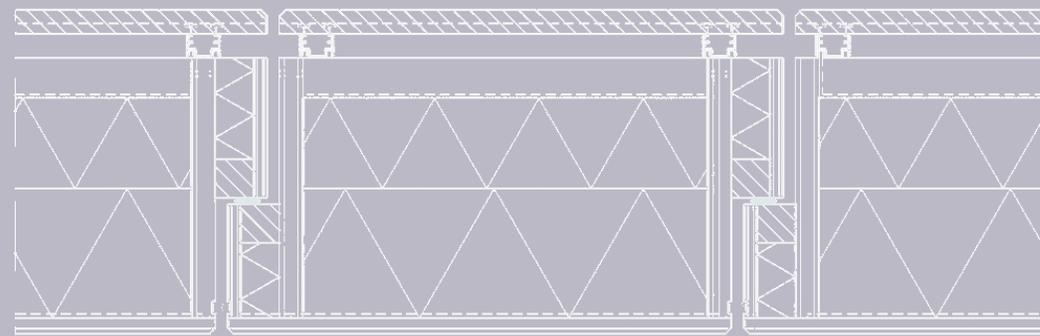


# Reflectie – Bouw Technologie

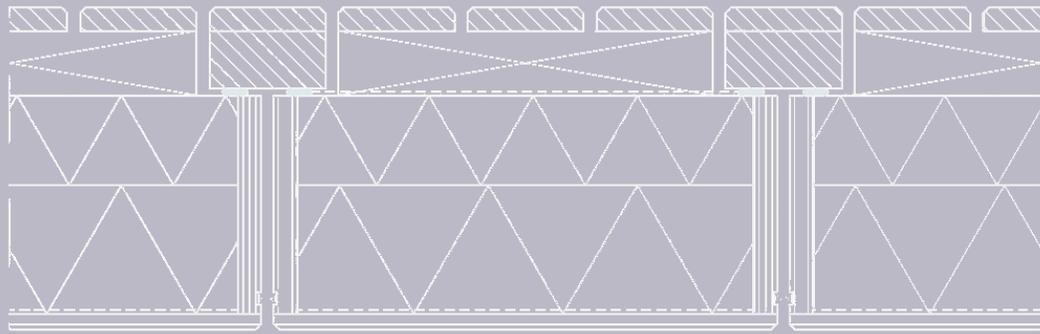
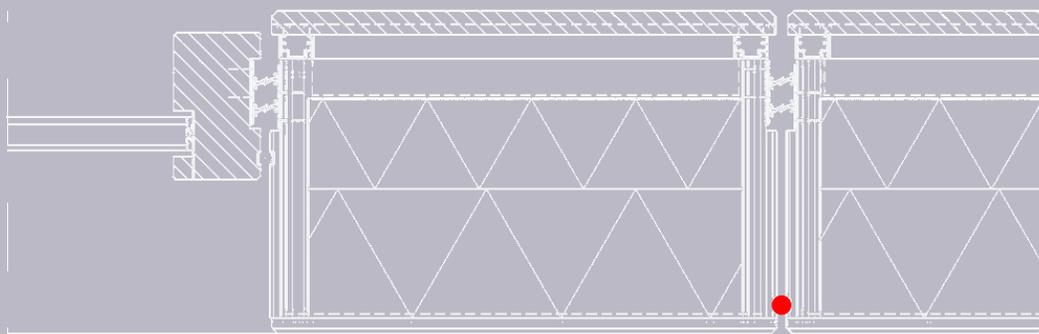
- Koudebrug (gevel < 250 mm) / Alternatieve gevel opbouw (complexiteit)



- + geen volgorde + meer daglichtopp.
- koudebrug + brede opening mogelijk



- specifiek volgorde - minder daglichtopp.
- + beperkte koudebrug + brede opening mogelijk

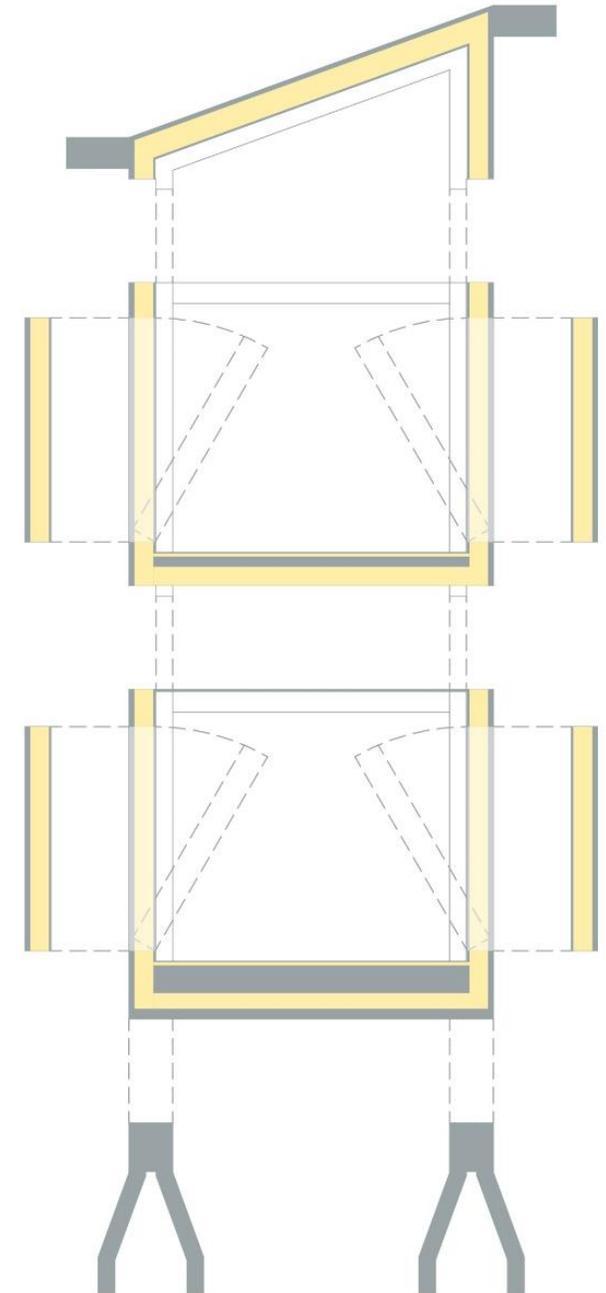


- geen volgorde - minder daglichtopp.
- + beperkte koudebrug + brede opening niet mogelijk

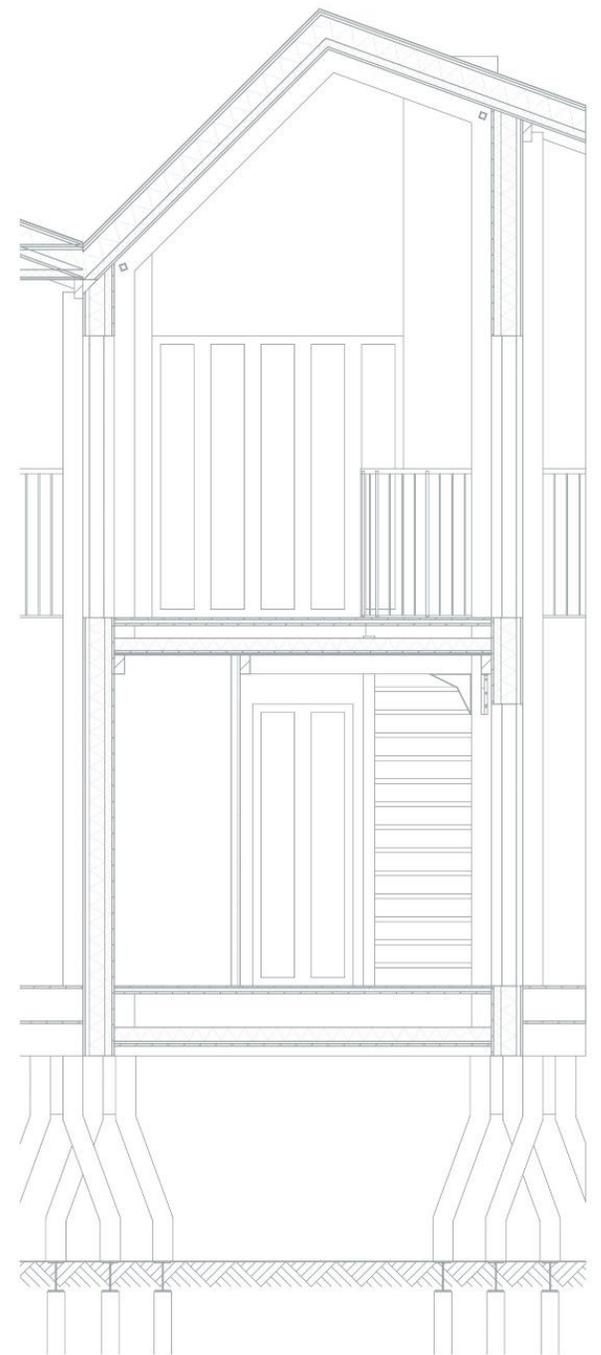
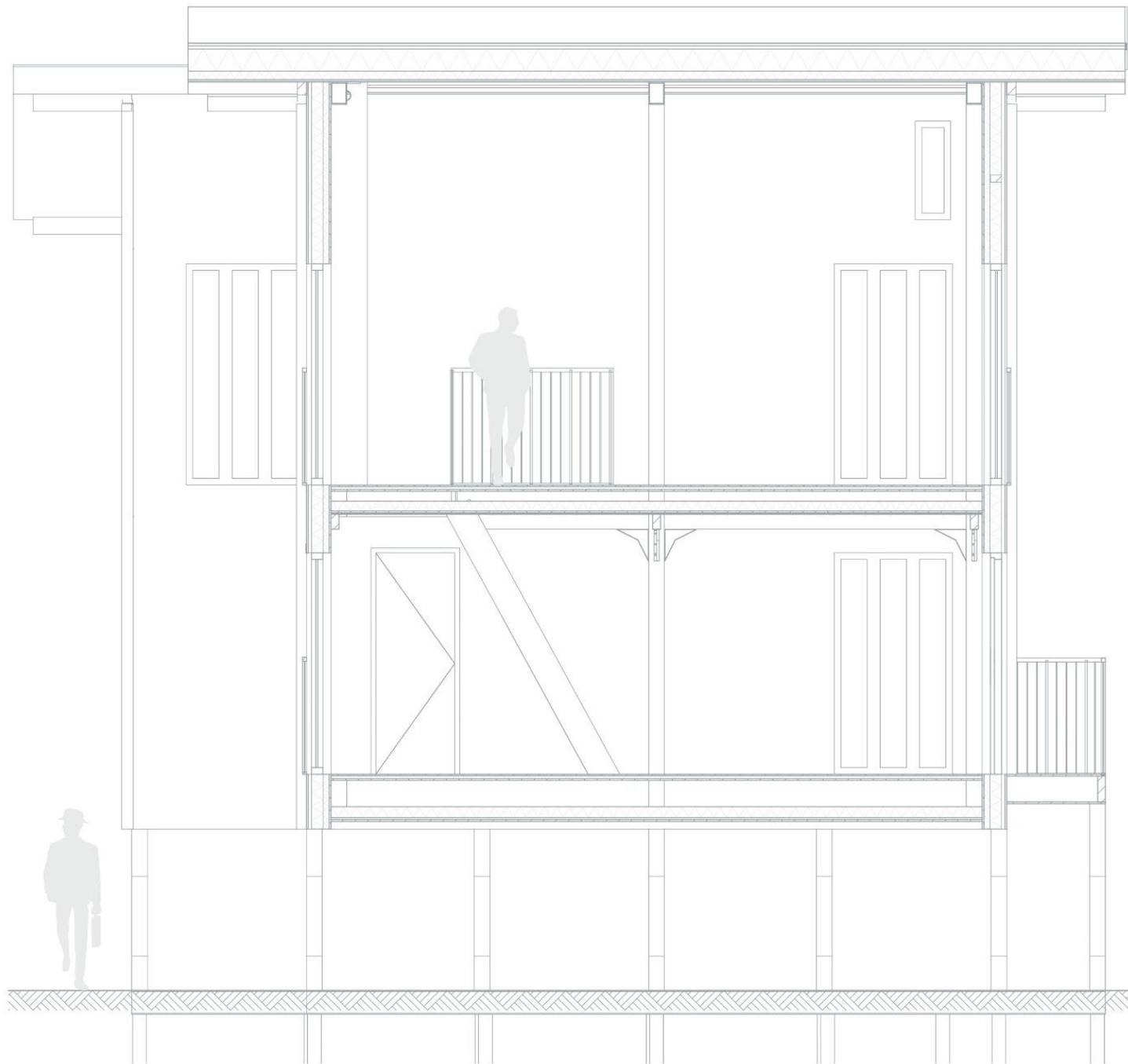
*“Hoe kunnen remontabele en verplaatsbare woningen worden gebouwd en geplaatst die zich kunnen aanpassen aan de context, zonder biologische en technische materialen te mengen?”*

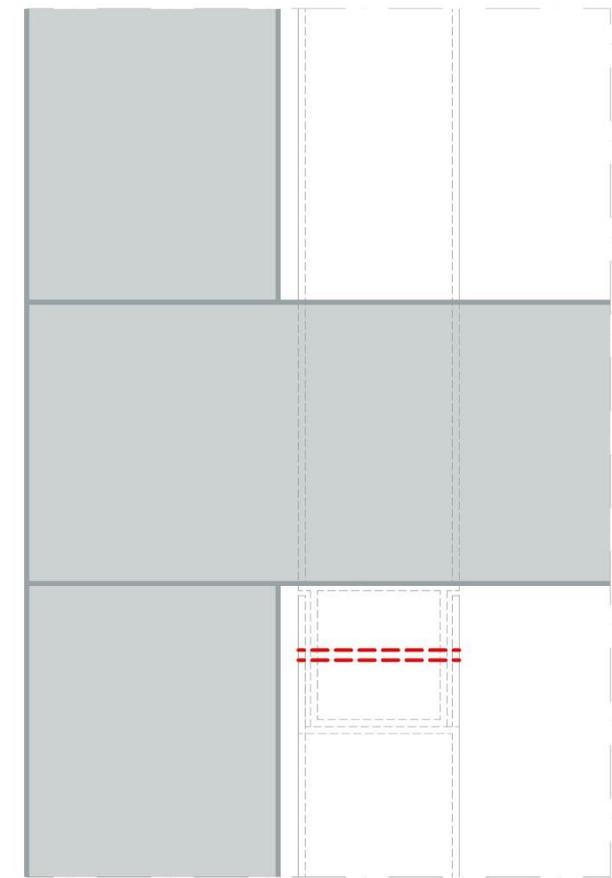
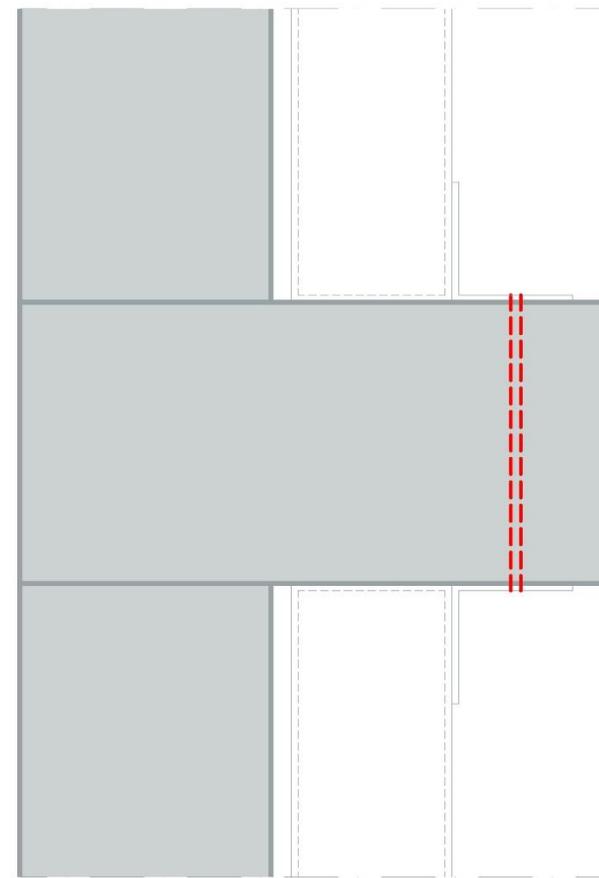
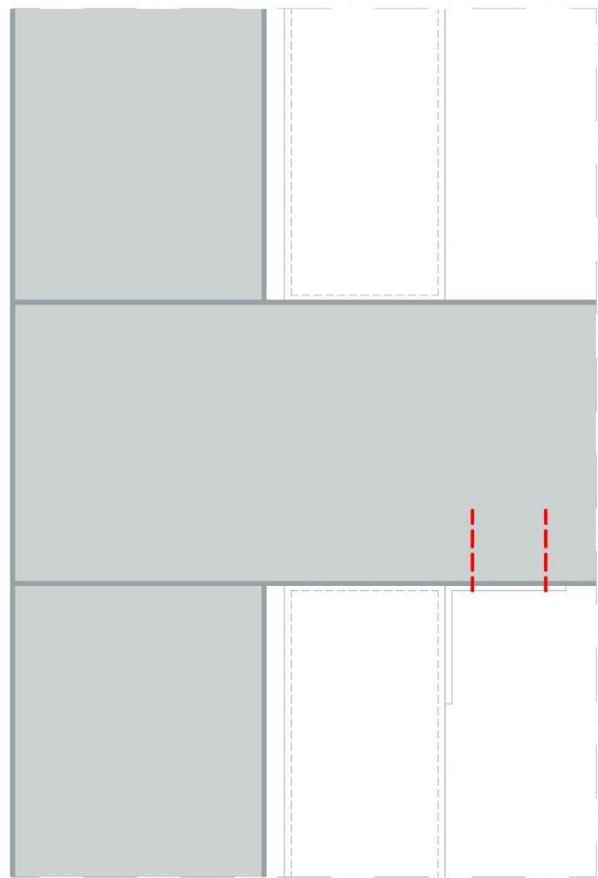
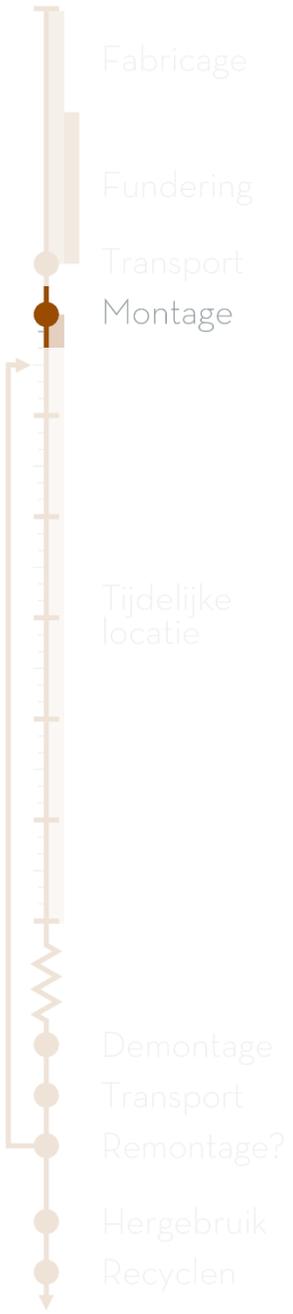
## Conclusie

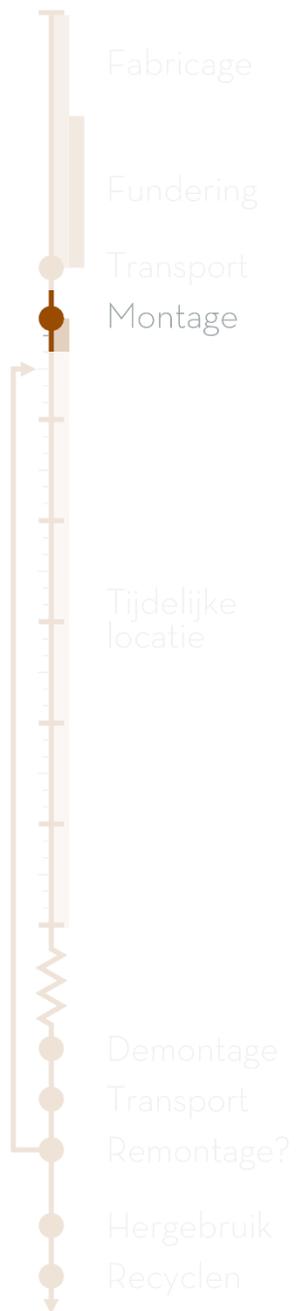
- Beperken (de)montage stappen
- Aanpassingsvermogen vergroten
  - Lokale klimaat
  - Omvang wijzigen
- Scheiden materialen











- Ruimte bij de verbinding
- Hermontage verbinding
- Hergebruik zonder schade

de(montage)

hergebruik

Kosten

\* vermoedelijke

	Factor	Schroef fixering		Boutverbinding		Geïntegreerd	
		R	S	R	S	R	S
Hoeveelheid connectors	22,2	7	155	7	155	7	155
Complexiteit tool	9,0	7	63	7	63	7	63
Connector type	45,3	5	227	7	317	7	317
Vereiste toegankelijkheid	28,4	7	199	6	171	7	199
Arbeidsintensiteit	2,5	9	22	5	12	9	22
Demontage graad	35,3	7	247	7	247	8	282
Subtotaal		27,9		29,5		31,8	
Potentie na gebruik	47,8	9	431	9	431	9	431
Levensduur*	50,8	8	407	8	407	8	407
Standaardisatie	22,5	9	202	9	202	9	202
Vervangbaarheid	30,2	9	272	7	211	9	272
Functionele schade	52,2	7	365	8	418	9	470
Subtotaal		51,2		51,0		54,4	
Transport optimalisatie	12,7	9	114	9	114	9	114
Kosten*	4,7	6	28	4	19	4	19
Subtotaal		4,4		4,1		4,1	
Totale score		83,5		84,5		90,2	

# Verdiepend onderzoek - Meetmethode

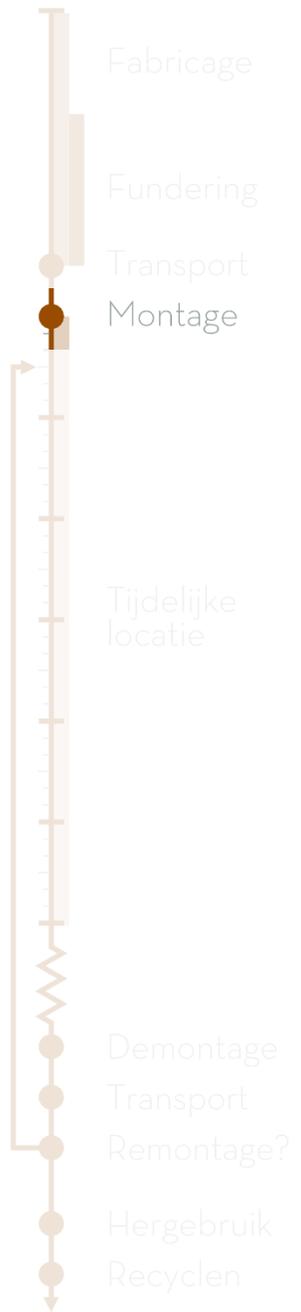
1. Waardebepaling criteria	Schade bij (de)montage	-	14,4%
	Levensduur	-	14,0%
2. Beoordeling lijsten	Potentie na gebruik	-	13,2%
(van 1 (worst case scenario)	...		
tot 9 (best case scenario)	...		
	...		
3. Vergelijking van de	...		
eindscores	...		

# Verdiepend onderzoek - Meetmethode

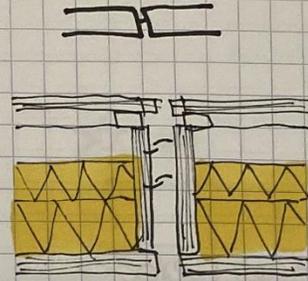
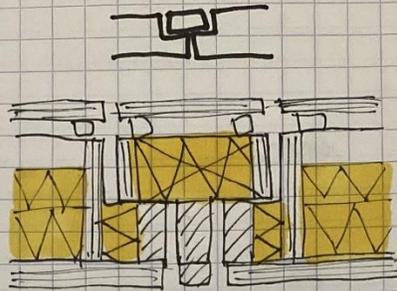
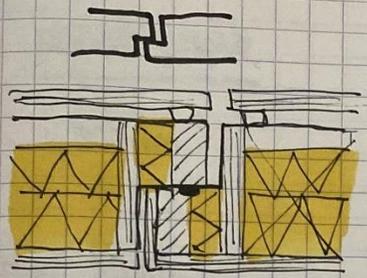
1. Waardebepaling criteria	Geen schade zichtbaar	9
	Kleine krassen, nauwelijks impact op prestatie	8
	...	
	...	
	...	
2. Beoordeling lijsten (van 1 (worst case scenario) tot 9 (best case scenario))		
3. Vergelijking van de eindscores	Vervangen na gebruik	1

# Verdiepend onderzoek - Meetmethode

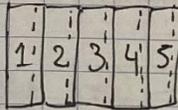
1. Waardebepaling criteria	Variant 1	78
	Variant 2	82
2. Beoordeling lijsten (van 1 (worst case scenario) tot 9 (best case scenario))	Variant 3	62
3. Vergelijking van de eindscores	Welke naaddichting heeft voorkeur qua tochtdichting, waterdichting?	







(planken)



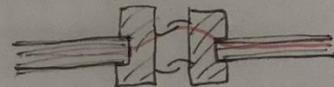
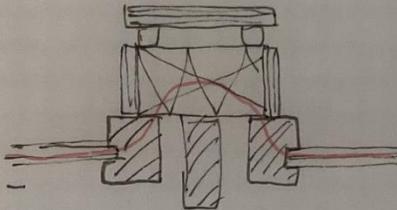
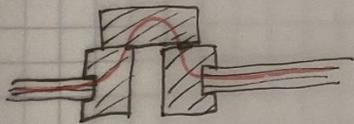
- specifieke volgare
- minder daglicht opp.
- + beperkte koudbrug
- + ~~geen~~ brede opening mogelijk



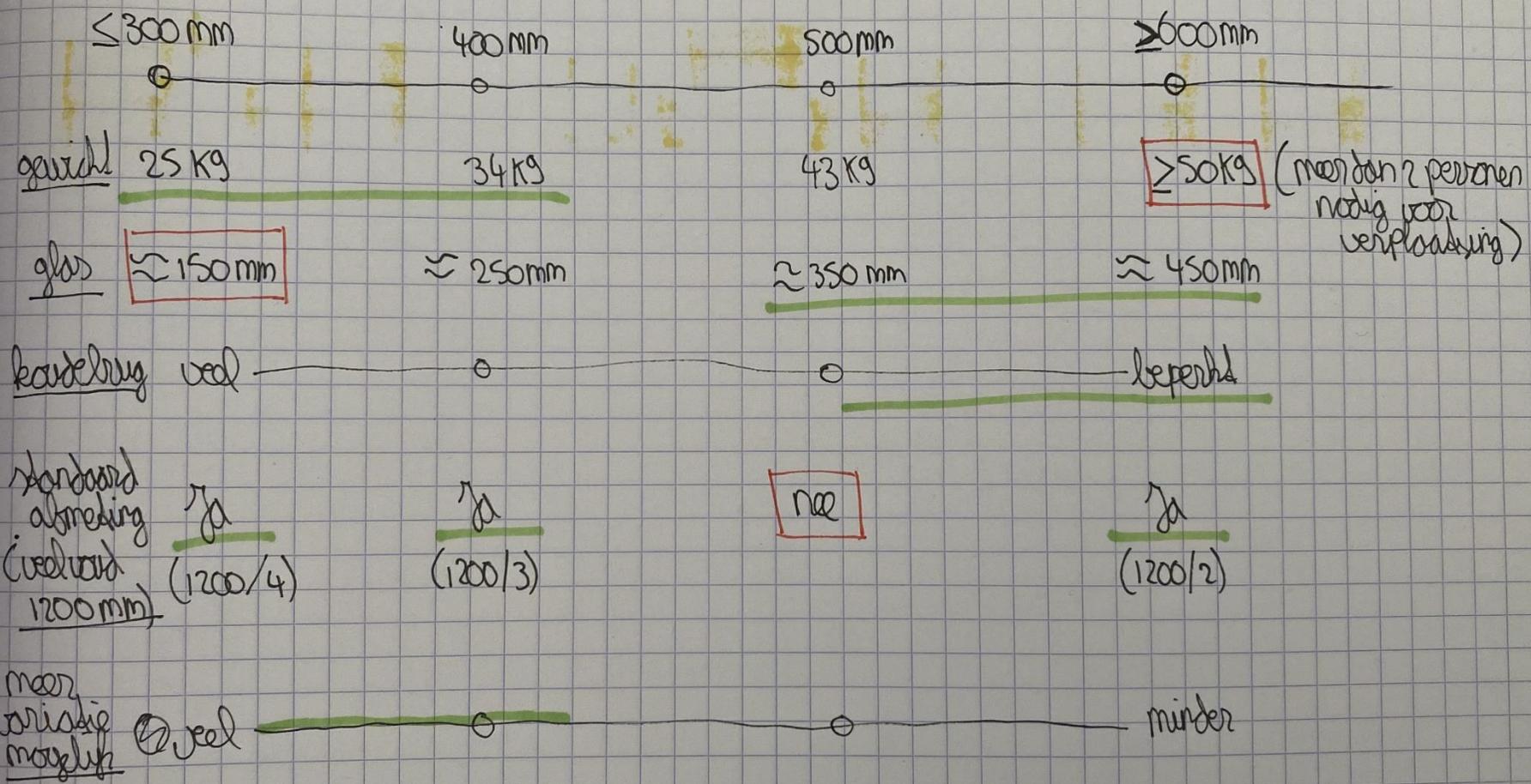
- + geen volgare
  - minder daglicht opp.
  - + beperkte koudbrug
  - brede opening niet mogelijk
- demonabel maken ←

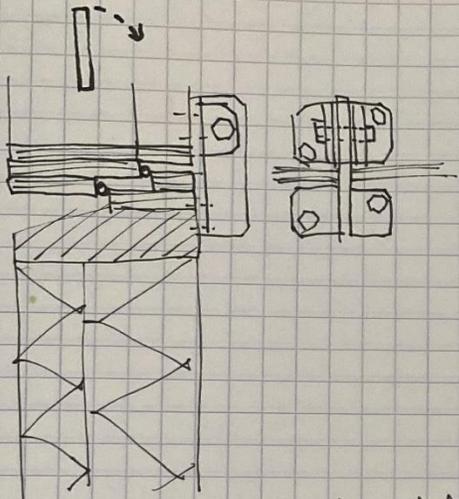


- + geen volgare
- + meer daglicht opp.
- koudbrug
- + brede opening mogelijk

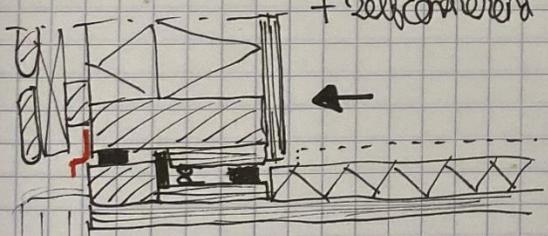


# paneel breedte

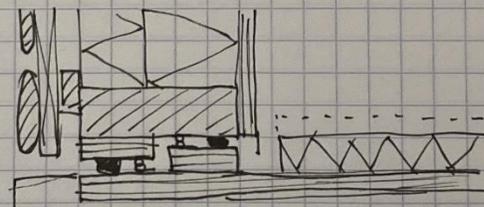




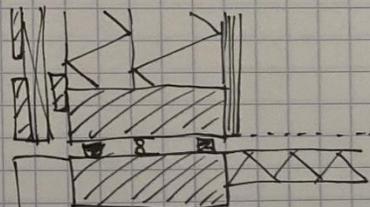
+ oorslog profiel =  
 verankering  
 + zelfconterend



- geen oorslog  
 - precisie vereist



- geen oorslog  
 + minder materiaal



+ verankering  
 + oorslog  
 - precisie vereist

