

# Identity and earthquakes

## Repair with gold

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P5 presentation	aE studio
Design	Mo Smit
Building technology	Engbert van der Zaag
Research	Koen Mulder



# Probleemstelling



Schade



Oplissing



Italië



Groningen



Sloop



Tijdelijke oplossing

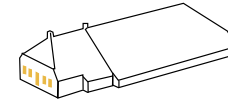
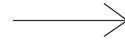


# Onderzoeksvraag

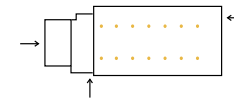
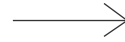
Hoe kan een ontwerp aardbevingsbestendig zijn en tegelijkertijd de identiteit van Groningen behouden?

# Identiteit

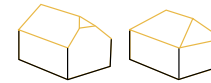
- Type boerderij



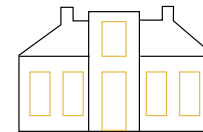
- Vormgeving



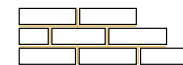
- Daken



- Symmetrie



- Metselwerk



- Mosterd geel



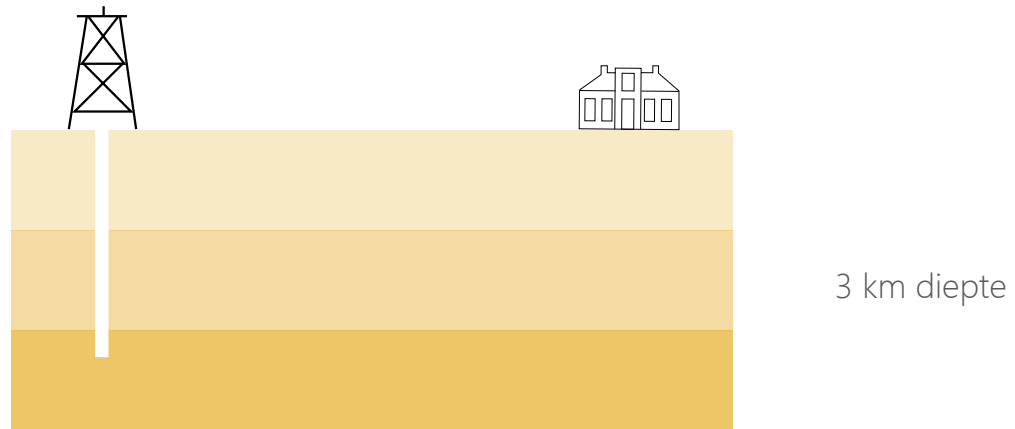


# Identiteit



# Aardbevingen

Ontstaan:



# Aardbevingen

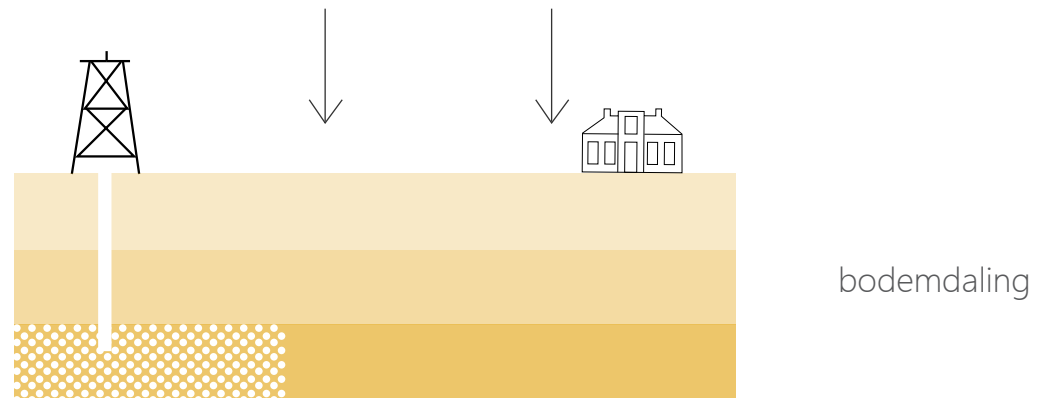
Ontstaan:



druk neemt af

# Aardbevingen

Ontstaan:



# Aardbevingen

Ontstaan:



lagen in elkaar gedrukt

# Aardbevingen

Ontstaan:



wanneer schoksgewijs: aarbeving ontstaan

# Aardbevingen

Verwachtingen:

- zelfs bij stoppen gaswinning, zullen aardbevingen nog tientallen jaren aanhouden

# Aardbevingen

Huidige gebouwen:

- niet bestand tegen aardbevingen
- bestand tegen eigen gewicht en windbelasting
- gestapelde constructie: onversterkt metselwerk



# Aardbevingen

oplossing voor nieuwbouw:

- verschillende principes om aarbevingsbestendig te bouwen

# Aardbevingen

oplossing voor nieuwbouw:

- verschillende principes om aarbevingsbestendig te bouwen

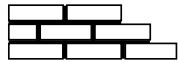


# Boerderij Alma

# Traditie

metselwerk

scheurvorming



landbouw

kleinschalige boerenbedrijven  
verminderen

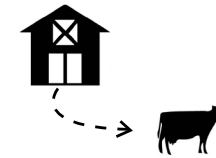


leegloop provincie



&

fosfaatreductieregeling



# Samenvatting

traditionele materialen



&

landbouw



FOCUS

boomgaard



&

café/restaurant



FUNCTIES

respecteren



&

verbeteren



KEUZE BEPALING

spanten



&

gesloten volume



VORMGEVING

ervaring



&

uitzicht



GELAAGDHEID

introdactie

probleemstelling

onderzoek

ontwerp

conclusie





introdactie

probleemstelling

onderzoek

ontwerp

conclusie

23/92



introdactie

probleemstelling

onderzoek

ontwerp

conclusie





introdactie

probleemstelling

onderzoek

ontwerp

conclusie



introdactie

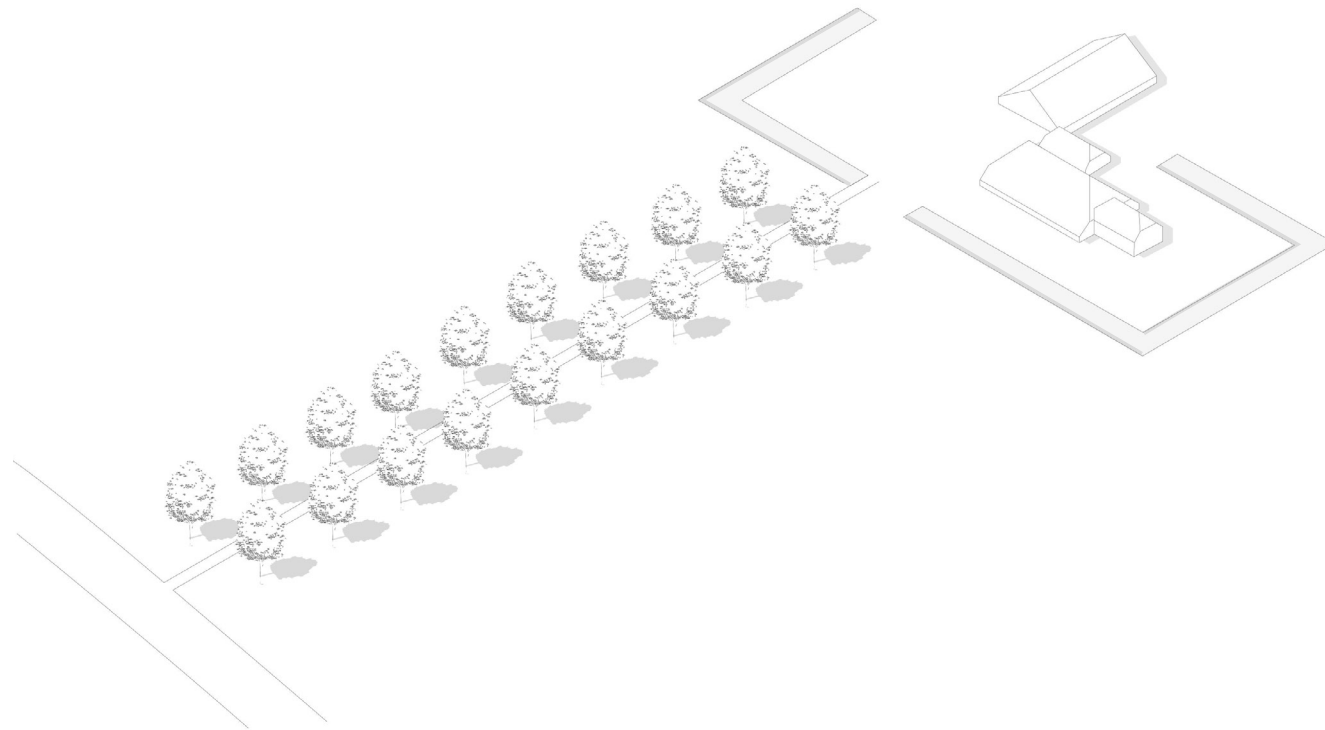
probleemstelling

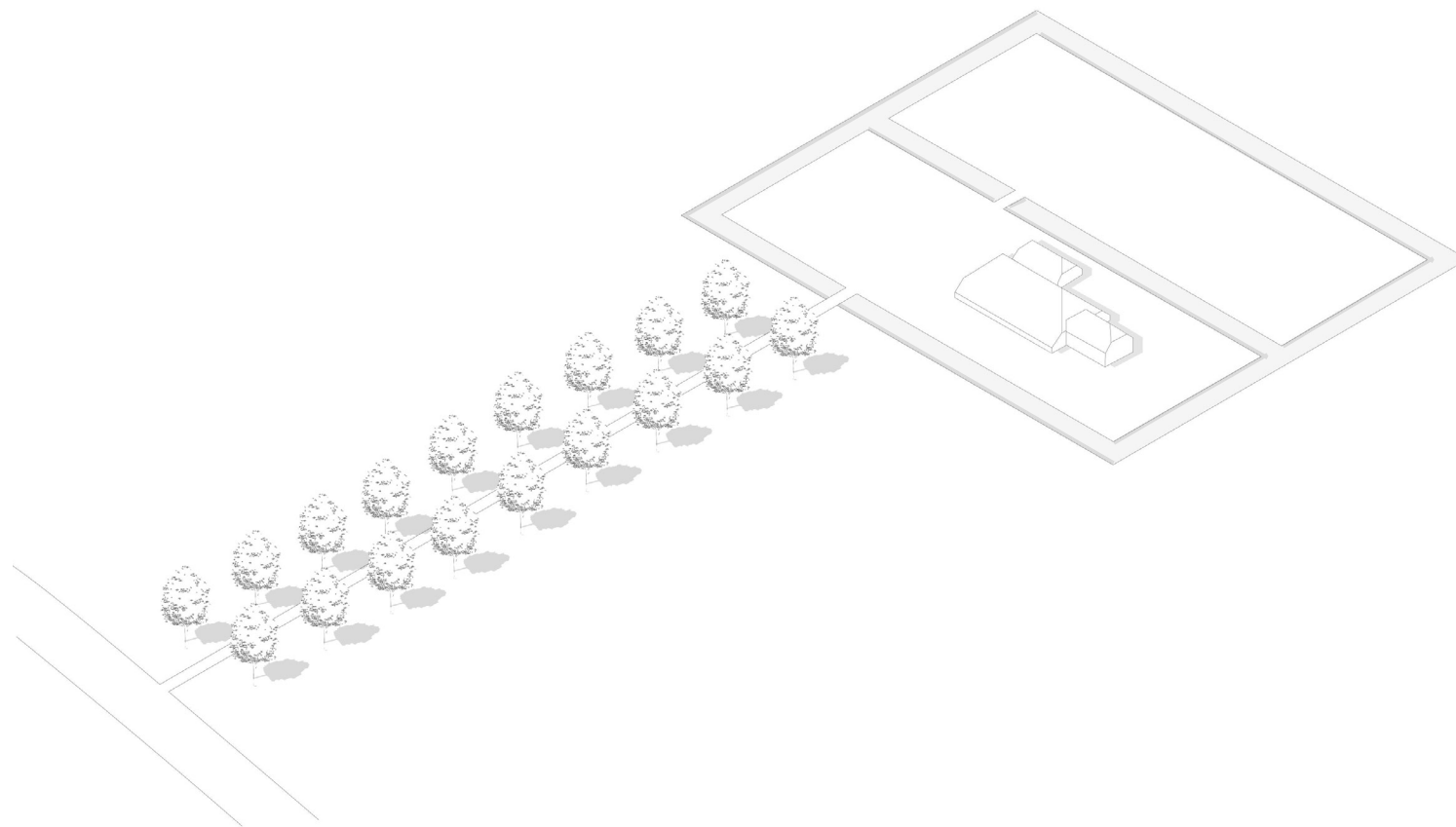
onderzoek

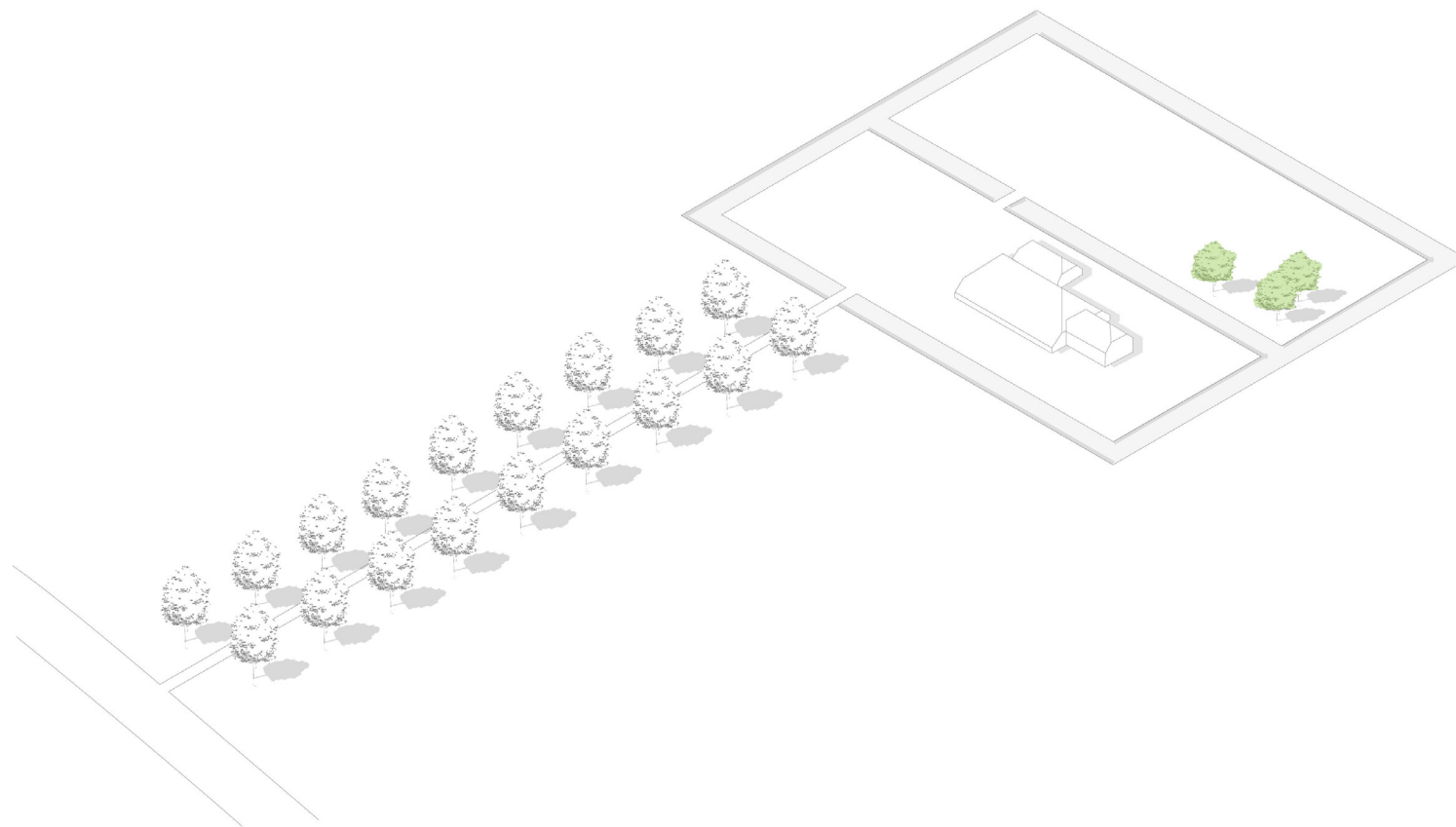
ontwerp

conclusie

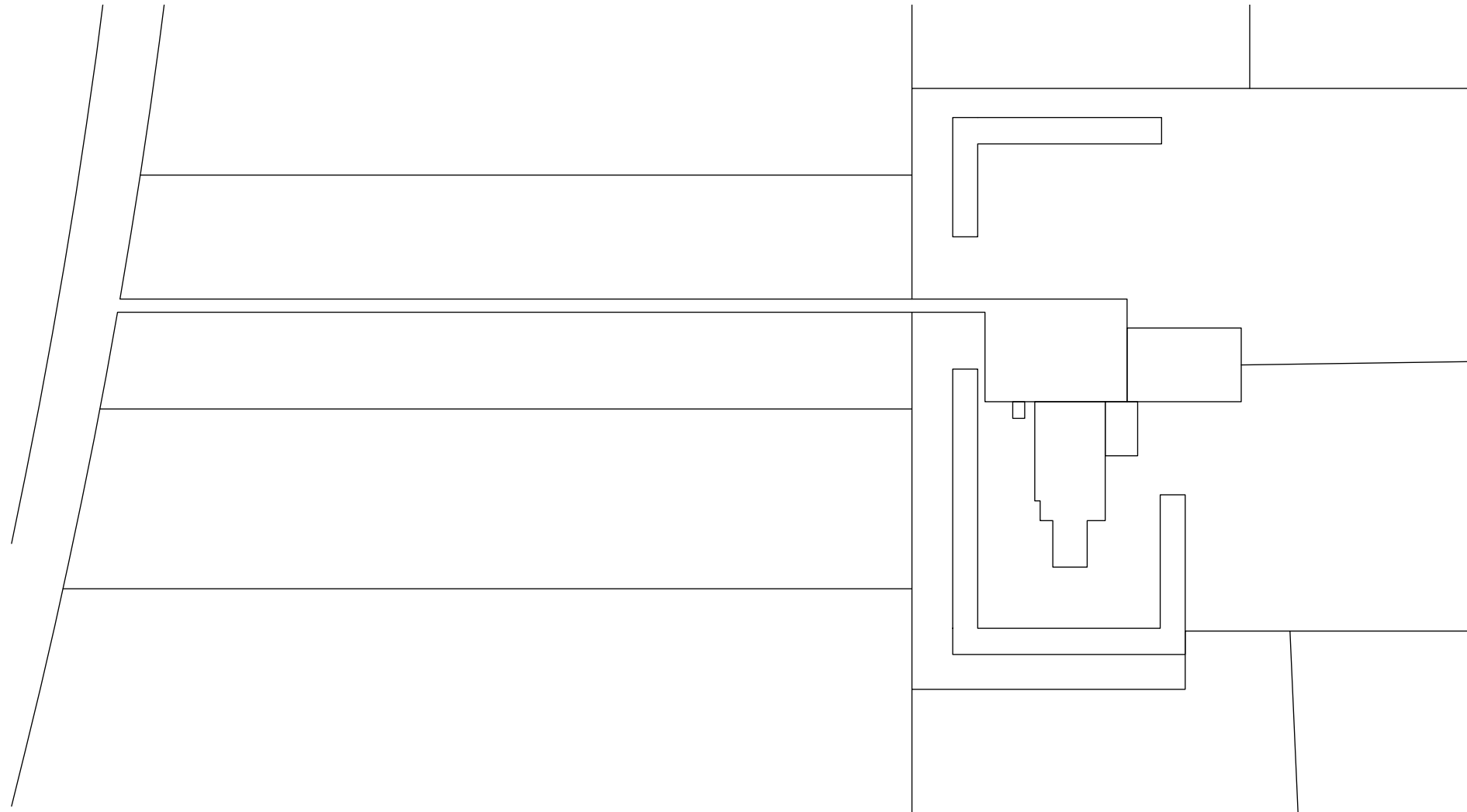
# Huidige situatie







# Situatie oud



introductie

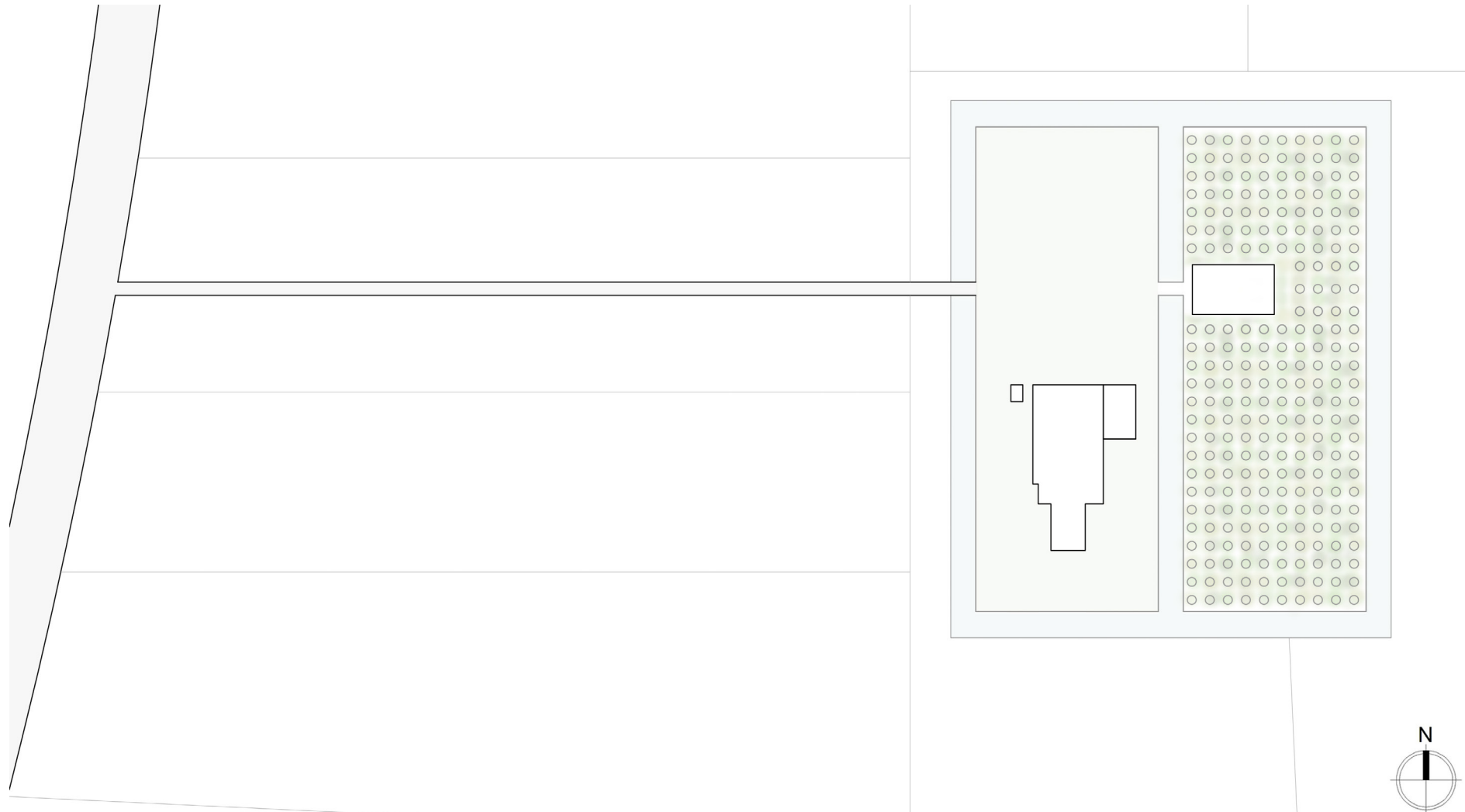
probleemstelling

onderzoek

ontwerp

conclusie

# Situatie nieuw



introdactie

probleemstelling

onderzoek

ontwerp

conclusie

# Appelboomgaard



introdactie

probleemstelling

onderzoek

ontwerp

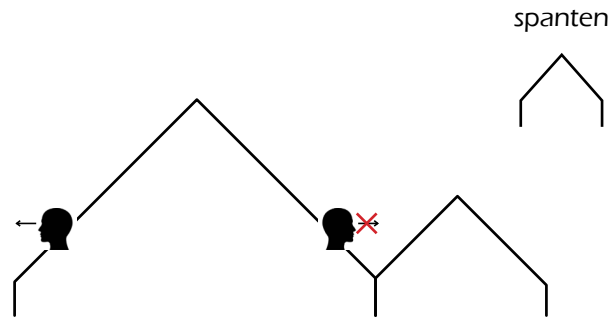
conclusie



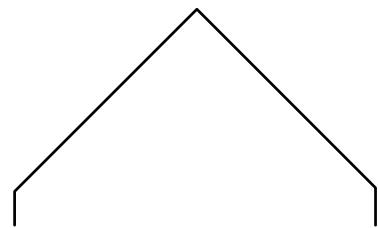
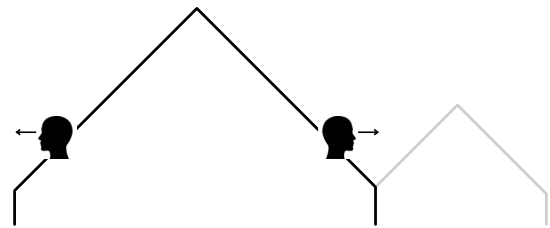
# Programma

Opslag en verwerking appels	150 m <sup>2</sup>
Restaurant en cafe	180 m <sup>2</sup>
Keuken (restaurant)	40 m <sup>2</sup>
Toiletten	35 m <sup>2</sup>
Winkel	20 m <sup>2</sup>

# Vormgeving

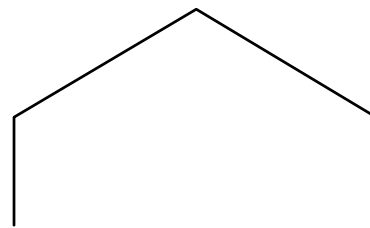
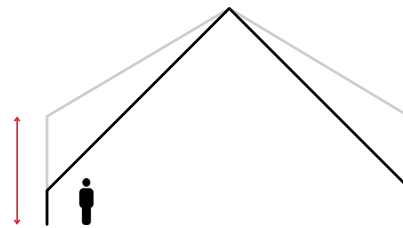
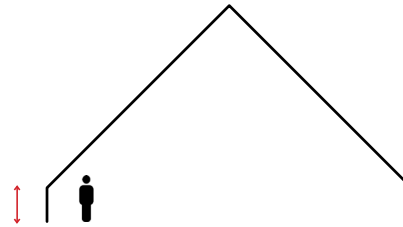


spanten



Traditionele spanten,  
maar geen tweekaps schuur

introductie



muren hoger om meer ruimte en zicht te creëren

probleemstelling

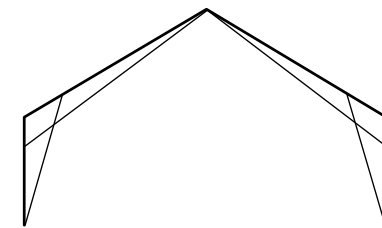
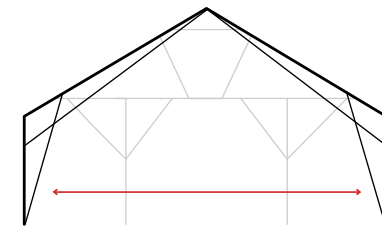
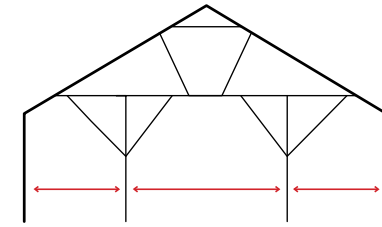
onderzoek

spanten



&

gesloten volume



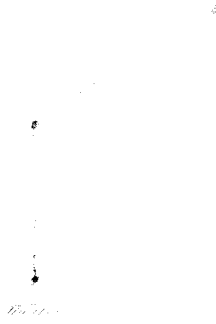
open ruimte door in een keer te overspannen, driespant blijft

ontwerp

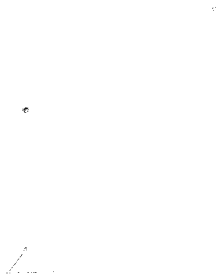
conclusie

# Spanten

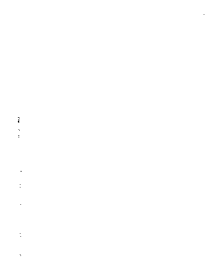
Driescharnierspant

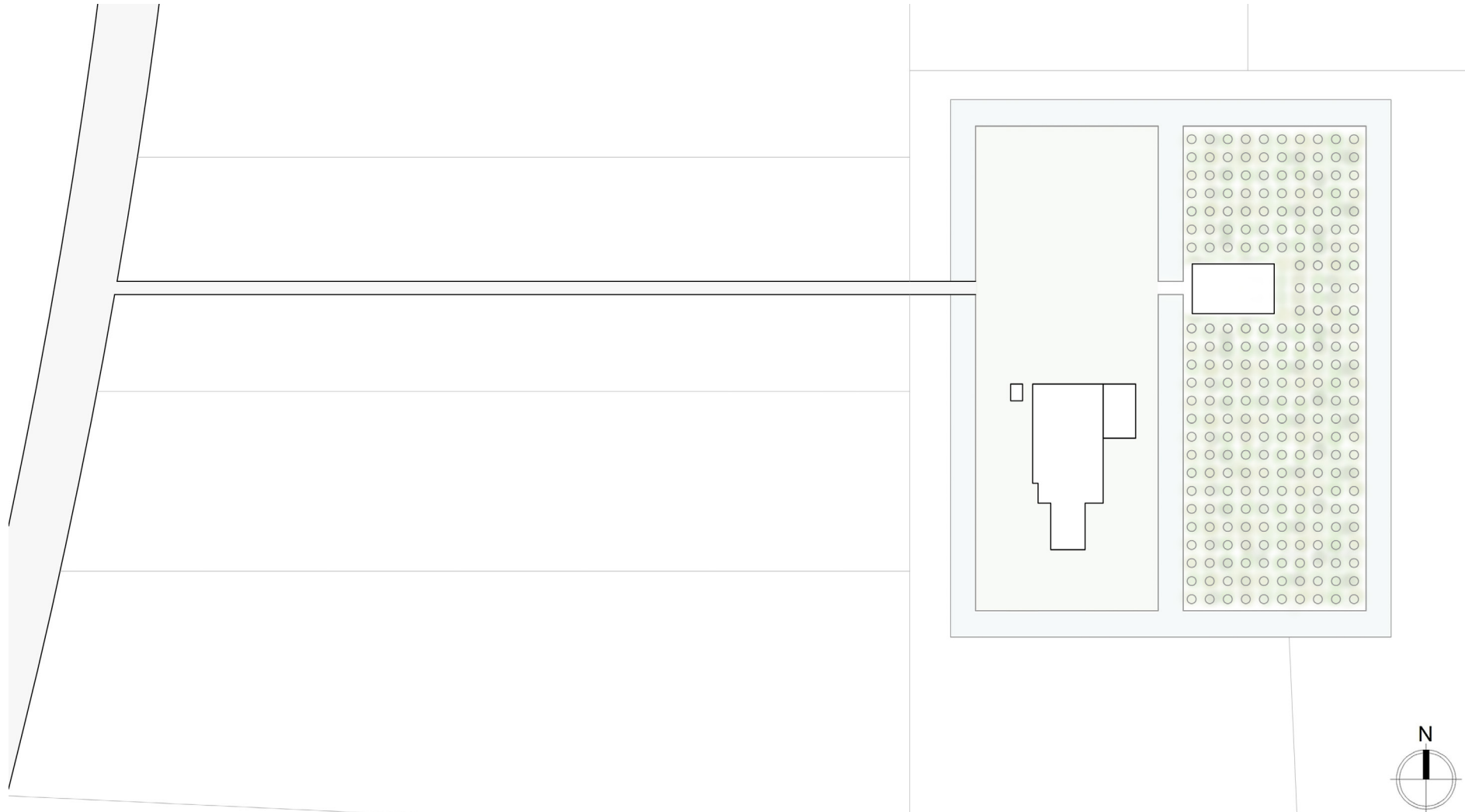


Scharnierend



Versterking





introdactie

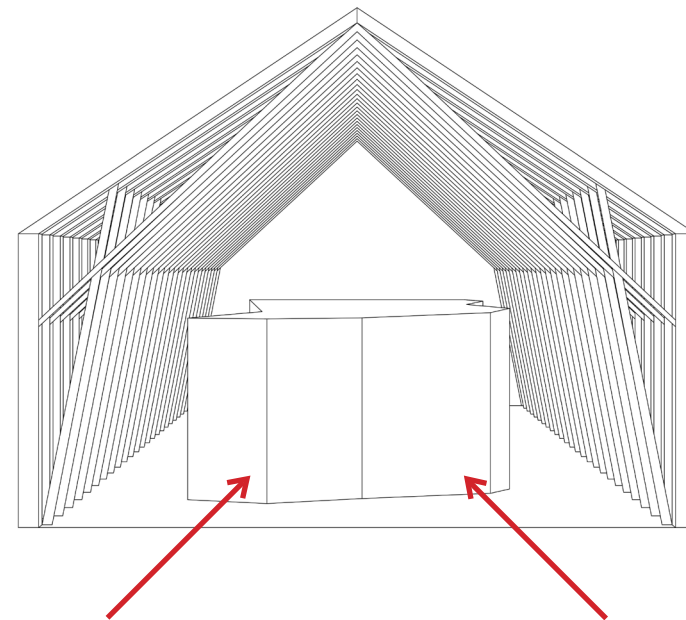
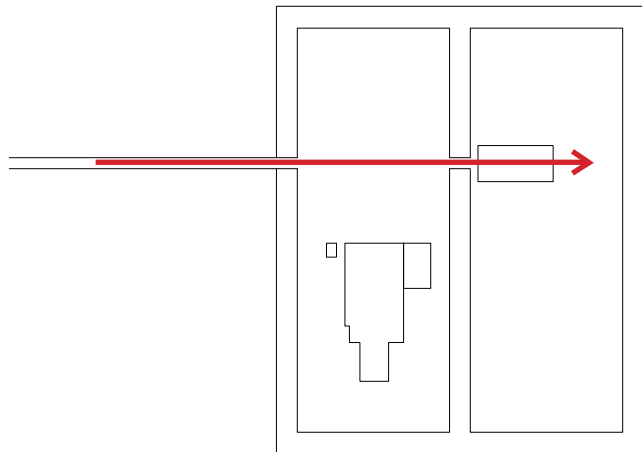
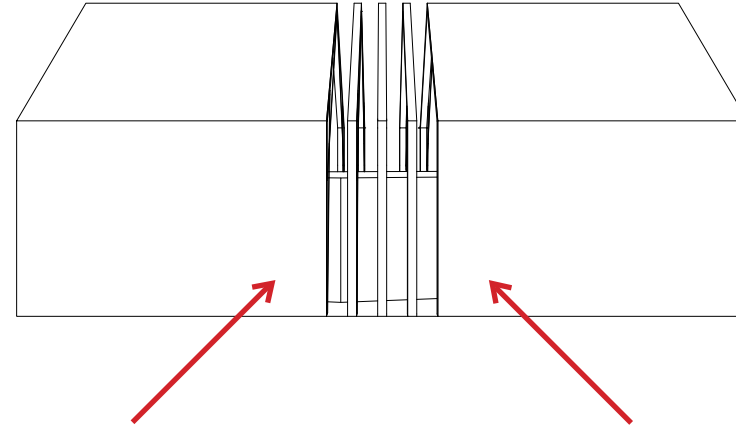
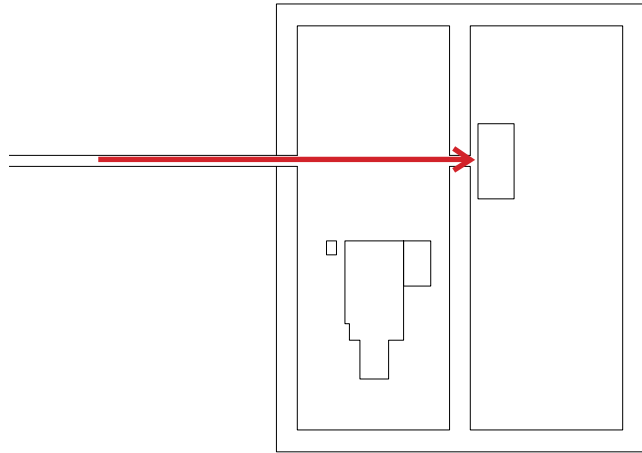
probleemstelling

onderzoek

ontwerp

conclusie

# Orientatie



introdactie

probleemstelling

onderzoek

ontwerp

conclusie

# Vormgeving

spanten

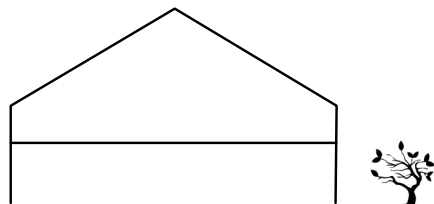
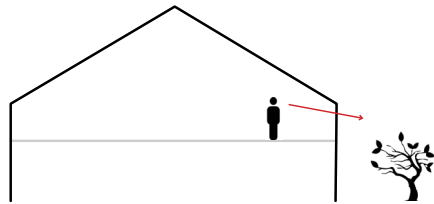
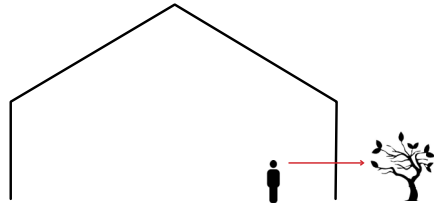


&

gesloten volume



gesloten volume



verhoogd niveau voor zichtlijn over bomen  
heen

introdactie

probleemstelling

onderzoek

ontwerp

conclusie

# Vormgeving

spanten

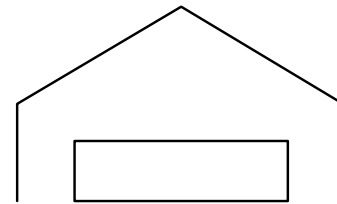
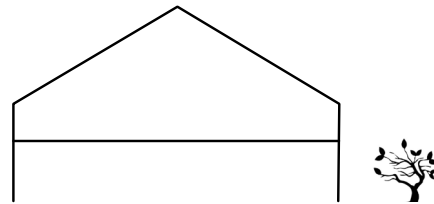
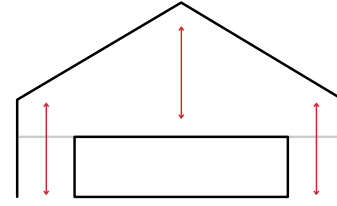
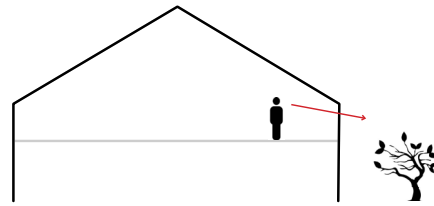
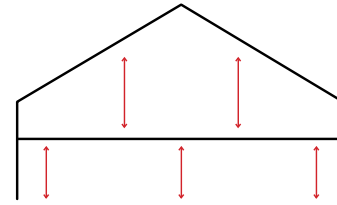
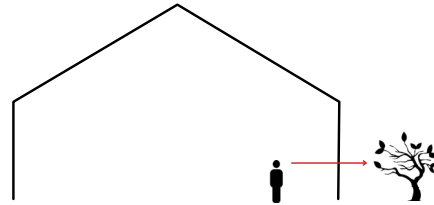


&

gesloten volume



gesloten volume



verhoogd niveau voor zichtlijn over bomen heen

losstaand volume voor behoud ruimtelijkheid spanten

introductie

probleemstelling

onderzoek



introdactie

probleemstelling

onderzoek

ontwerp

conclusie

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# Vormgeving

spanten

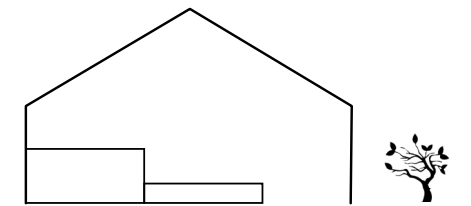
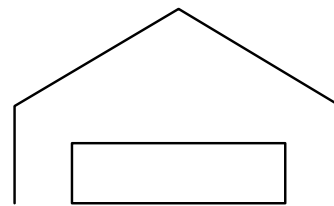
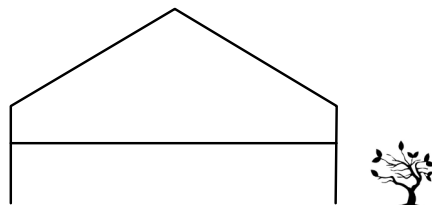
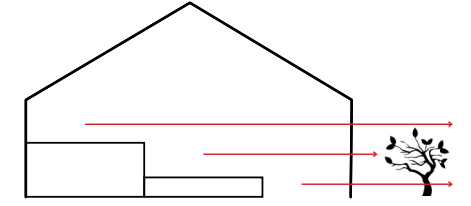
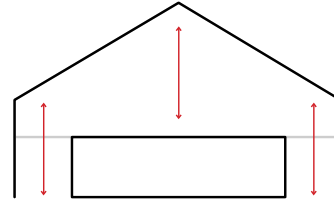
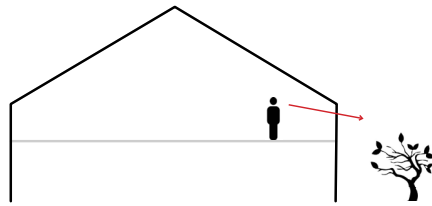
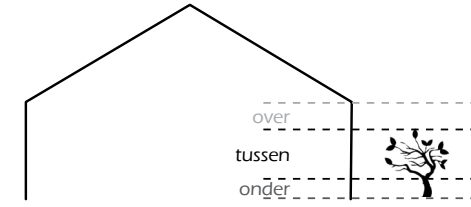
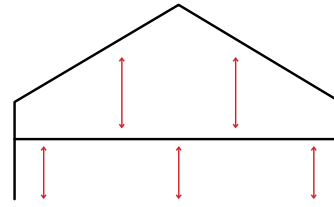
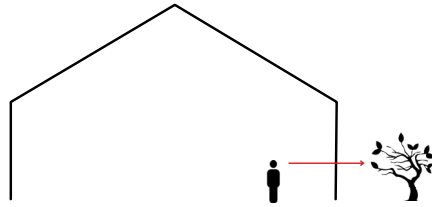


&

gesloten volume



gesloten volume



verhoogd niveau voor zichtlijn over bomen heen

losstaand volume voor behoud ruimtelijkheid spanten

introductie

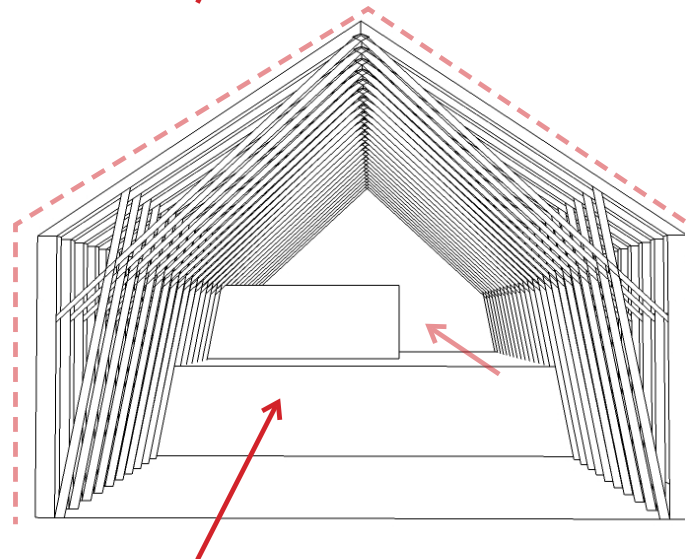
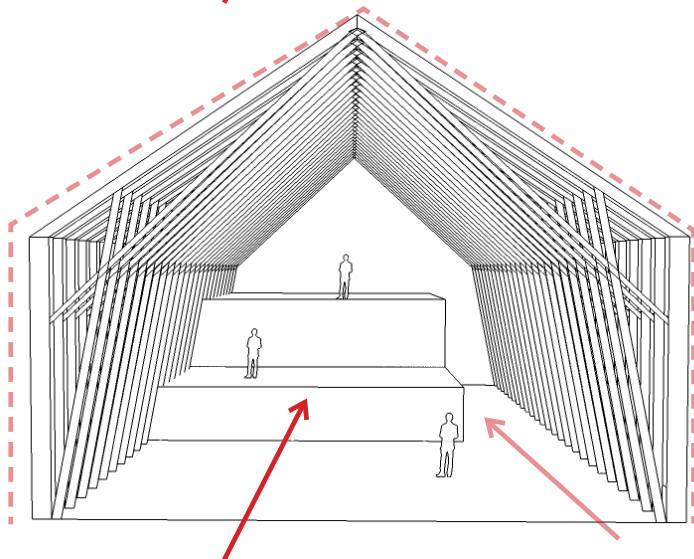
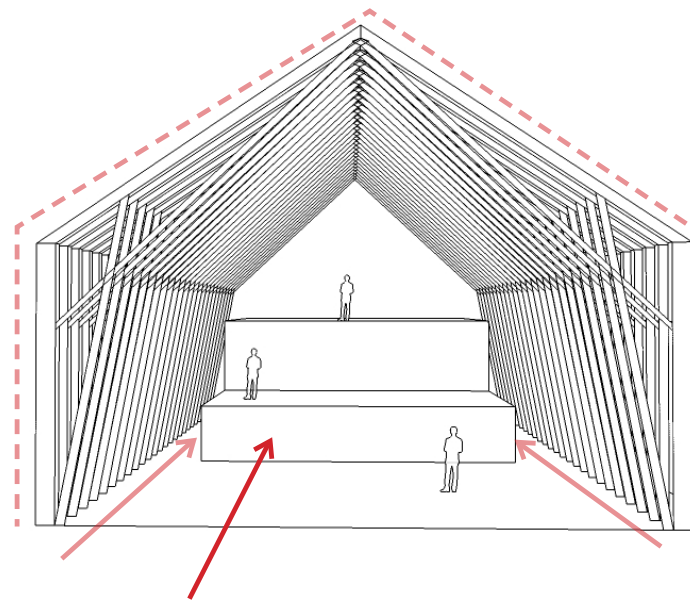
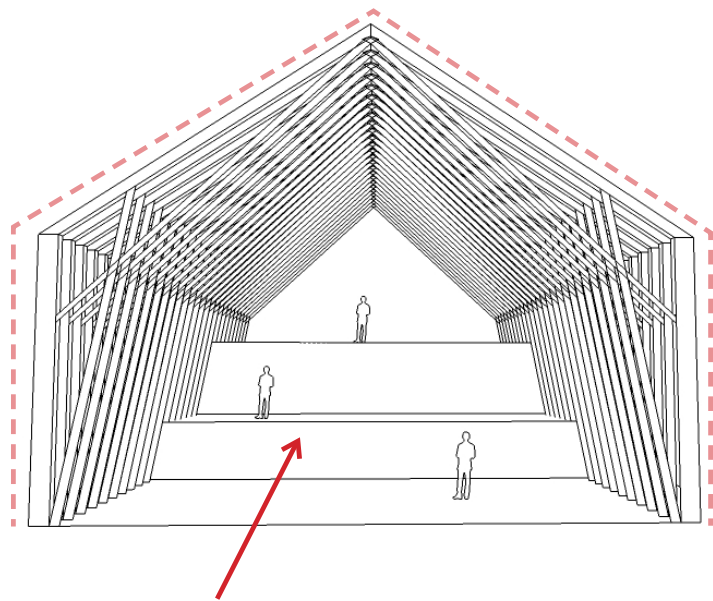
probleemstelling

onderzoek

ontwerp

conclusie

# Volume bepaling



introdactie

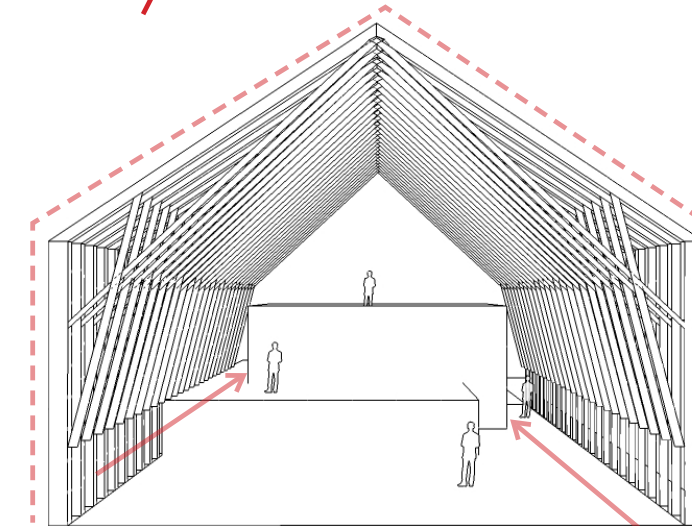
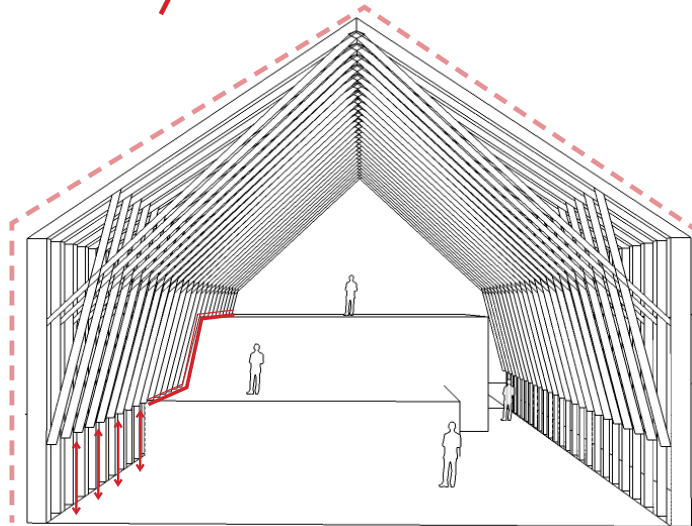
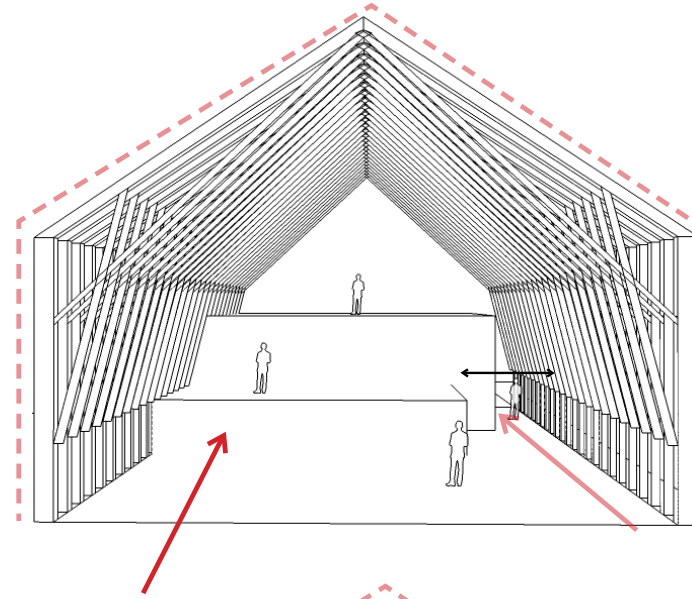
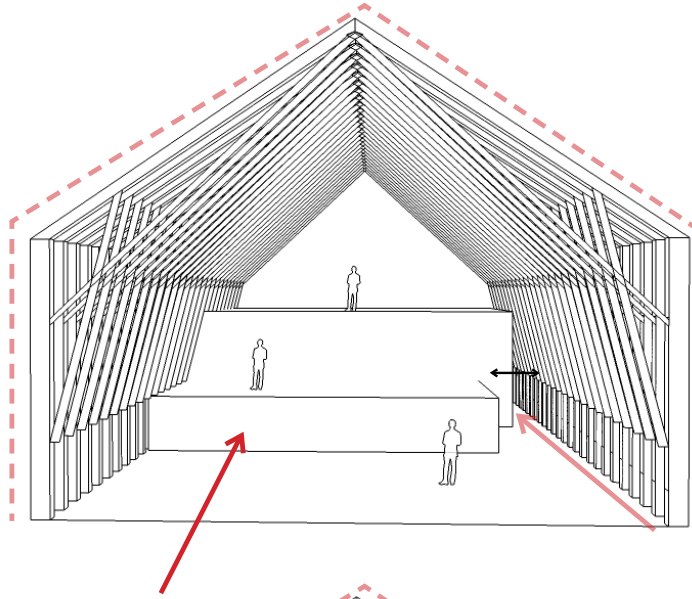
probleemstelling

onderzoek

ontwerp

conclusie

# Volume bepaling



introdactie

probleemstelling

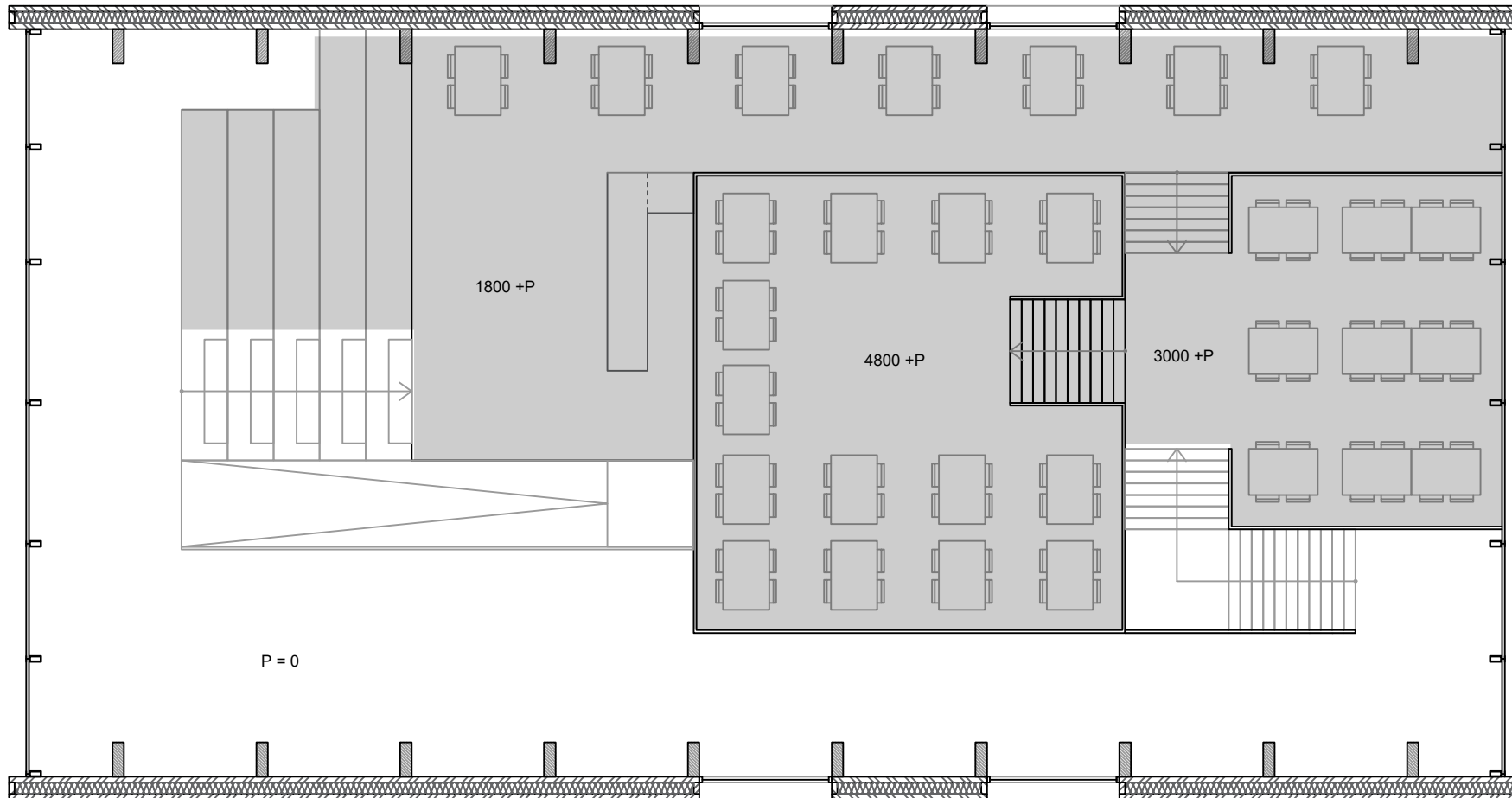
onderzoek

ontwerp

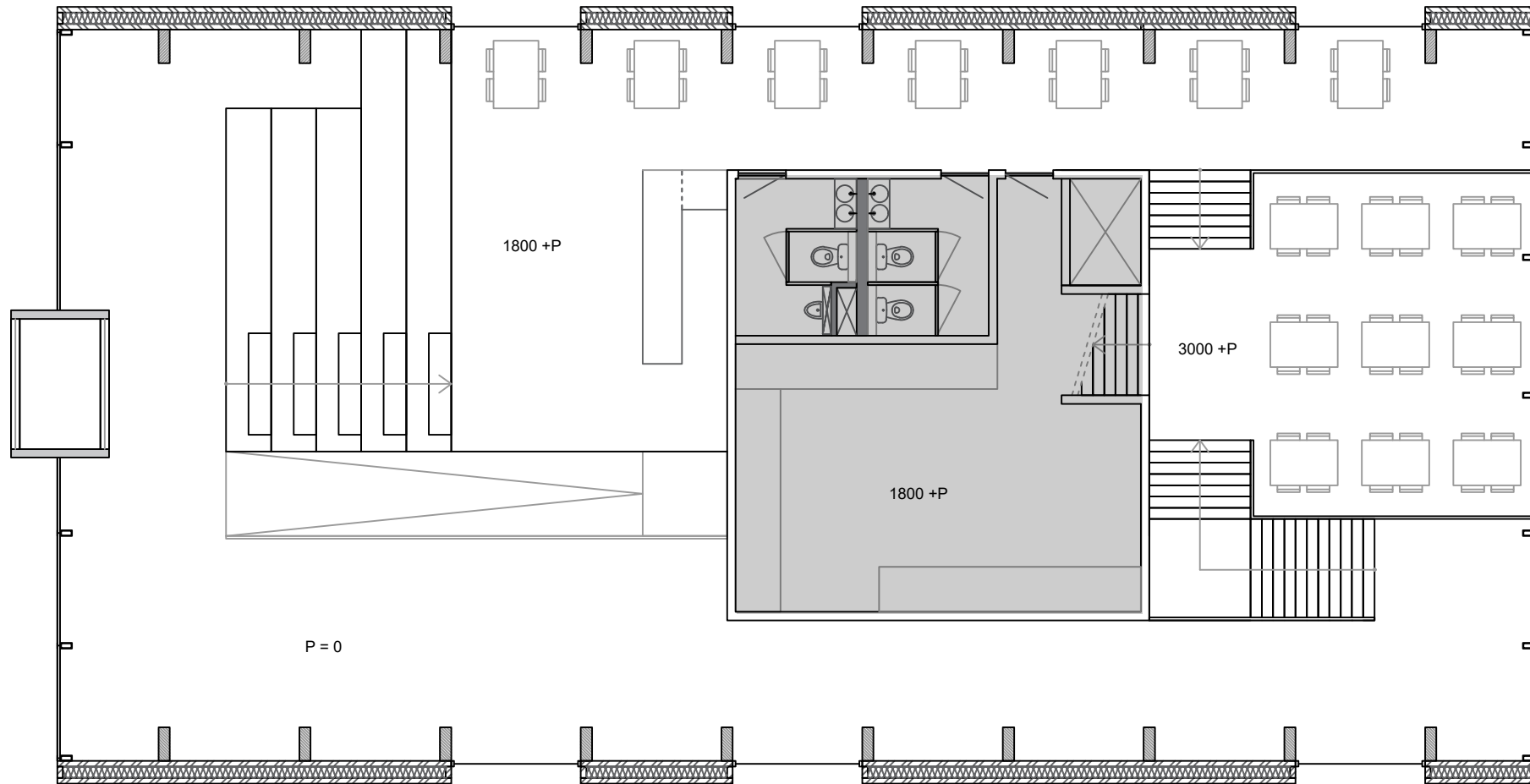
conclusie

# Programma

Opslag en verwerking appels	150 m <sup>2</sup>
Restaurant en cafe	180 m <sup>2</sup>
Keuken (restaurant)	40 m <sup>2</sup>
Toiletten	35 m <sup>2</sup>
Winkel	20 m <sup>2</sup>

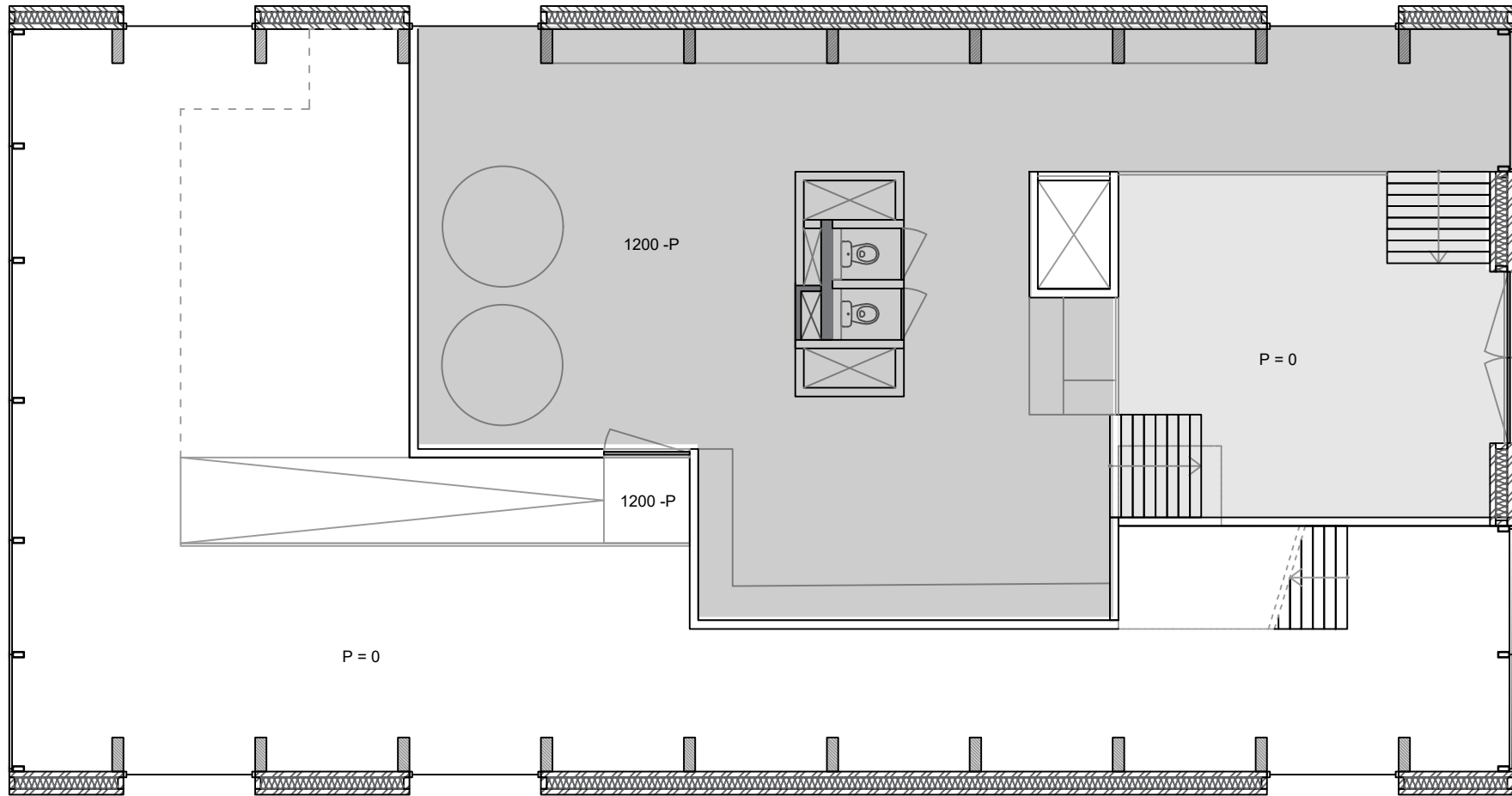


Restaurant en cafe 180 m<sup>2</sup>



Keuken en Toiletten

75 m<sup>2</sup>



Opslag en verwerking appels en winkel 170 m<sup>2</sup>

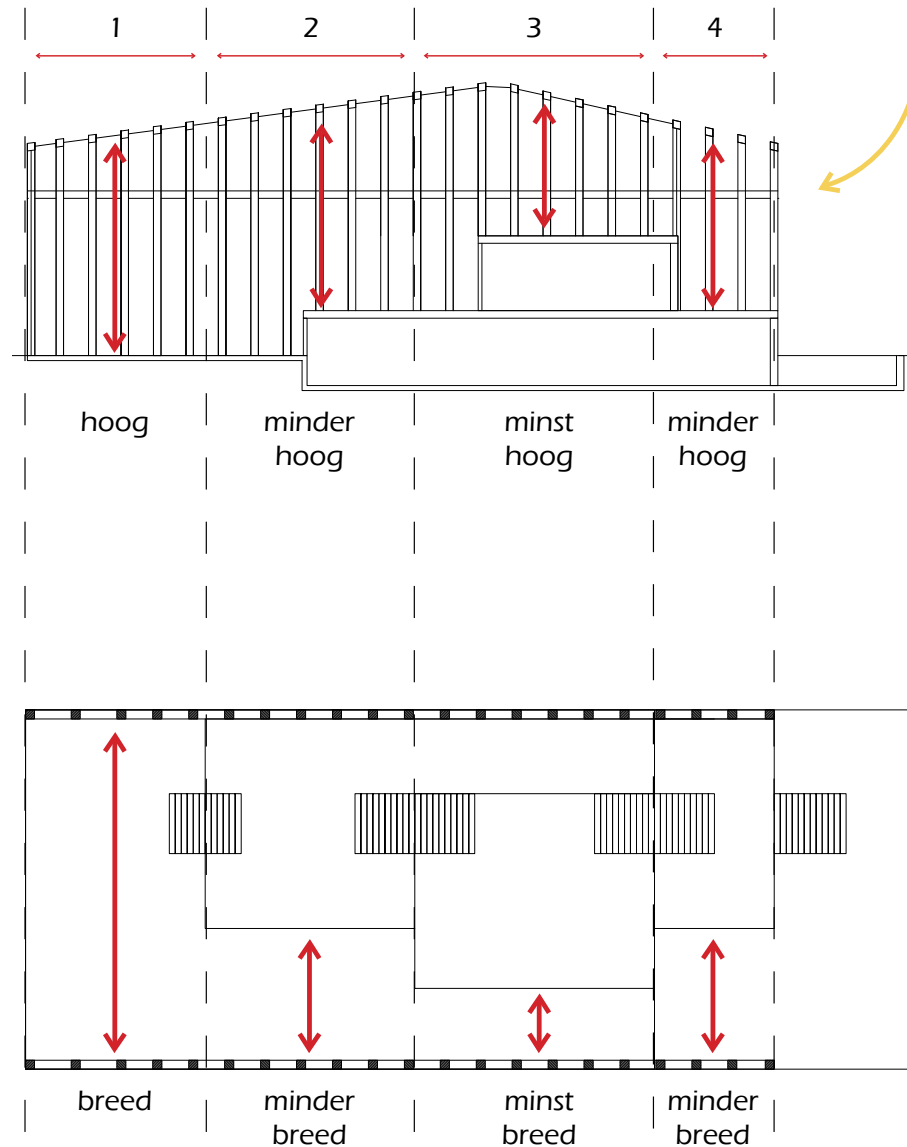
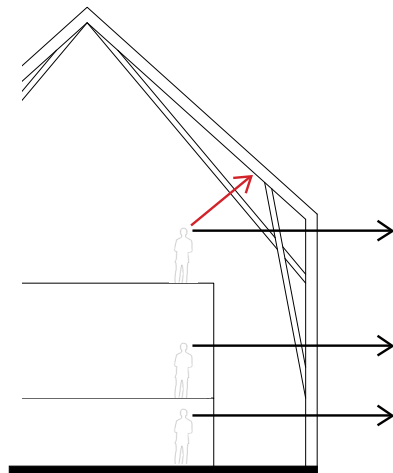
# Licht

Dak gesloten:

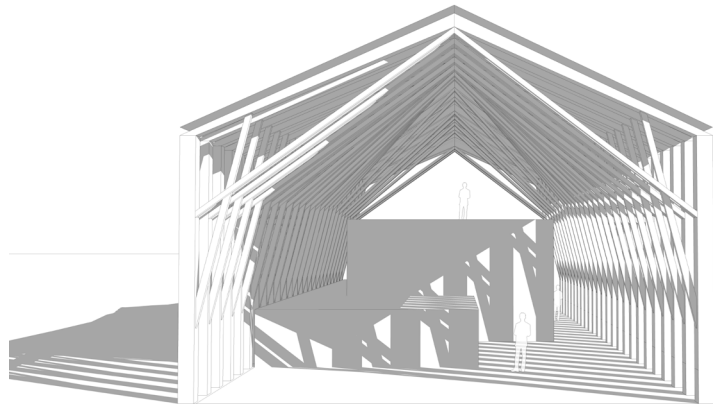
- muur en dak hebben andere taal
- uitzicht enkel nodig over boomgaard, niet omhoog

Openingen:

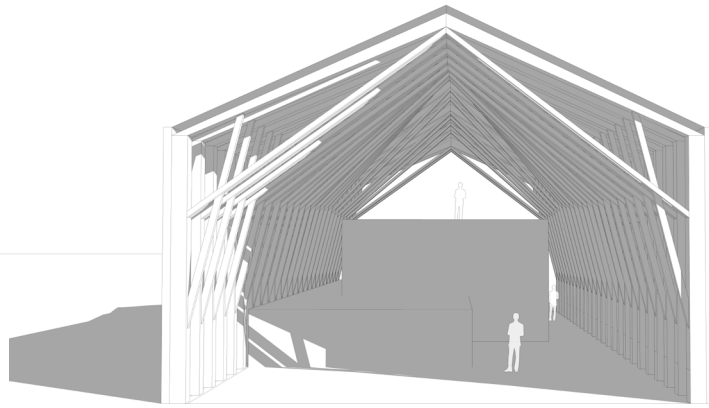
- achterin meer open, oog trekt naar licht toe, verder gebouw in



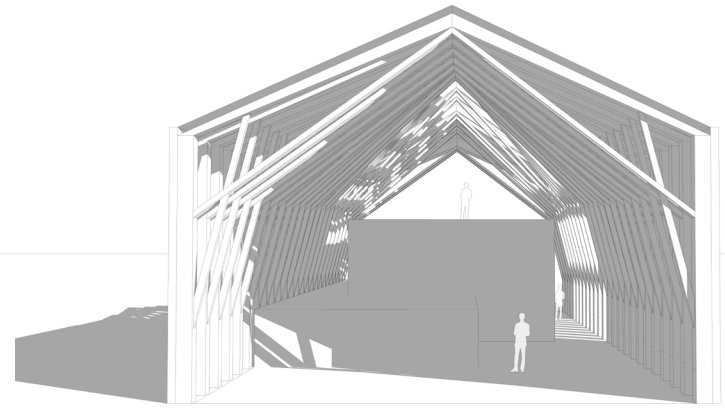




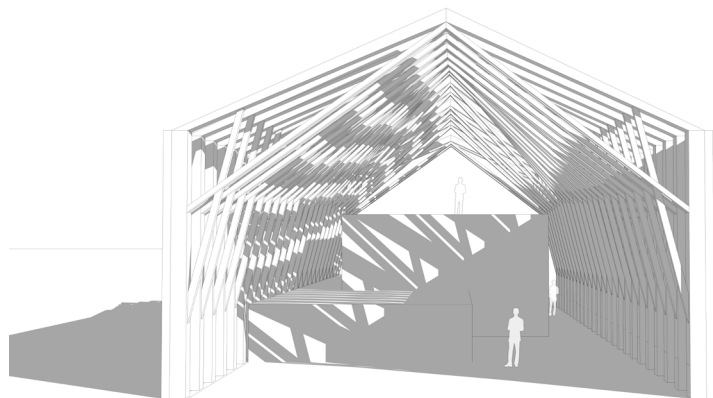
gesloten dak



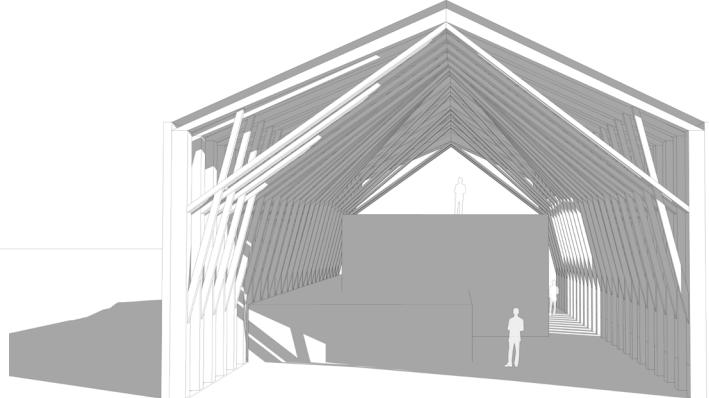
gesloten dak en muur



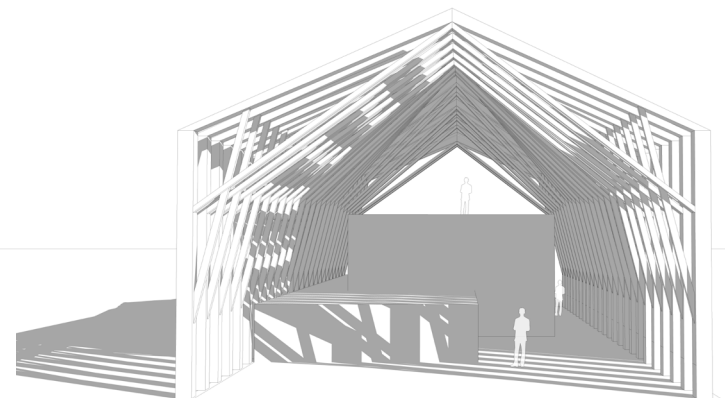
voor gesloten



gesloten muur



deels gesloten muur



achter gesloten

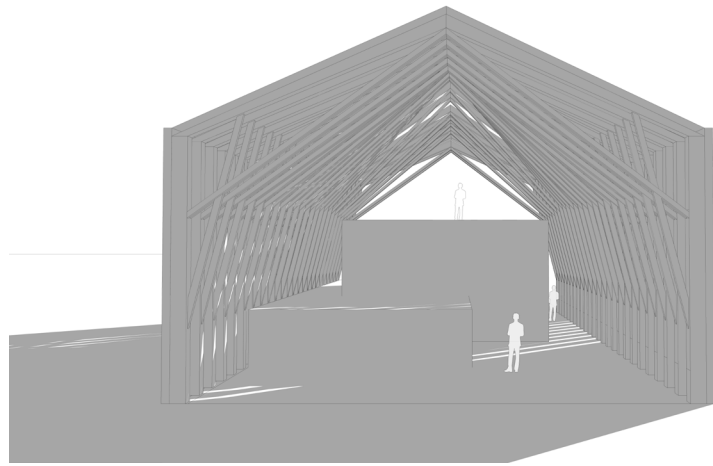
introdactie

probleemstelling

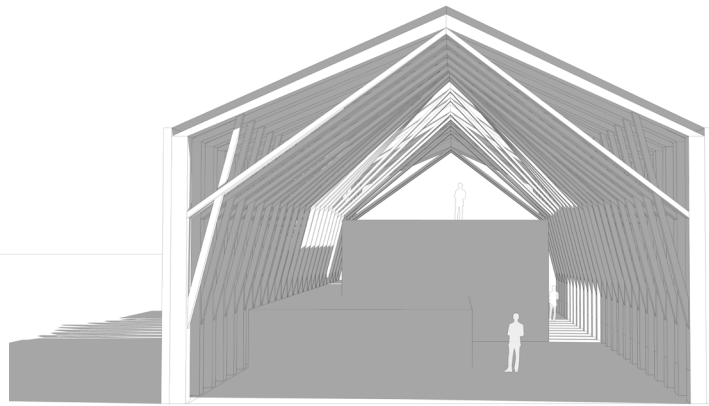
onderzoek

ontwerp

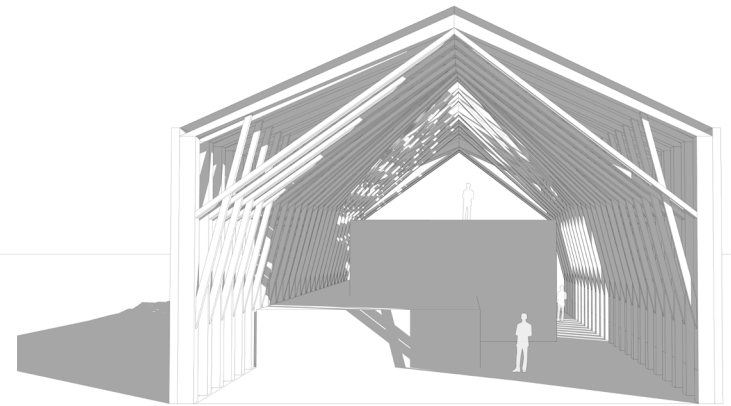
conclusie



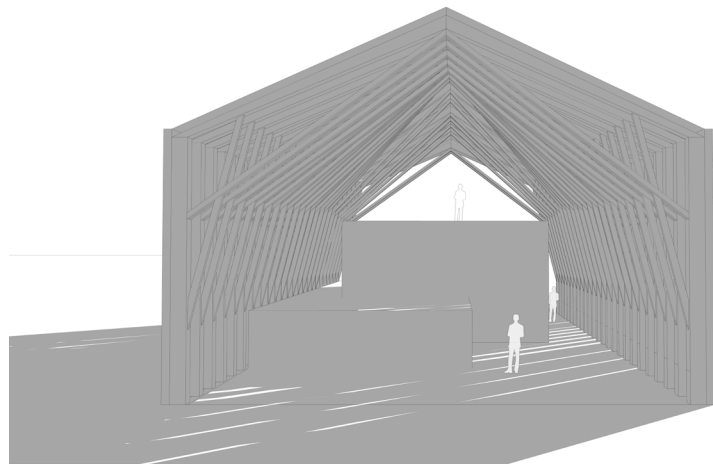
09:00  
muur en dak open



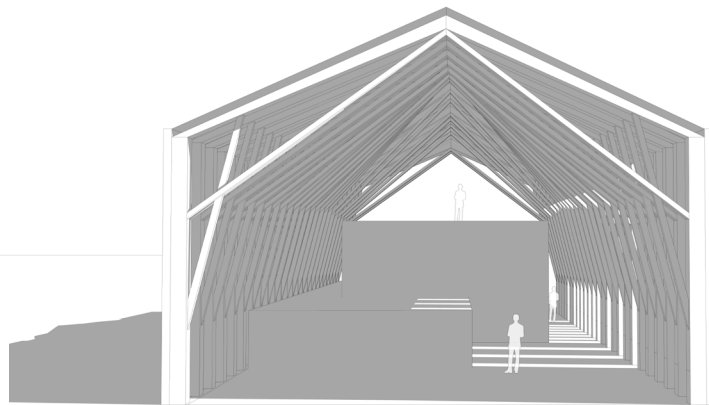
12:00  
muur en dak open



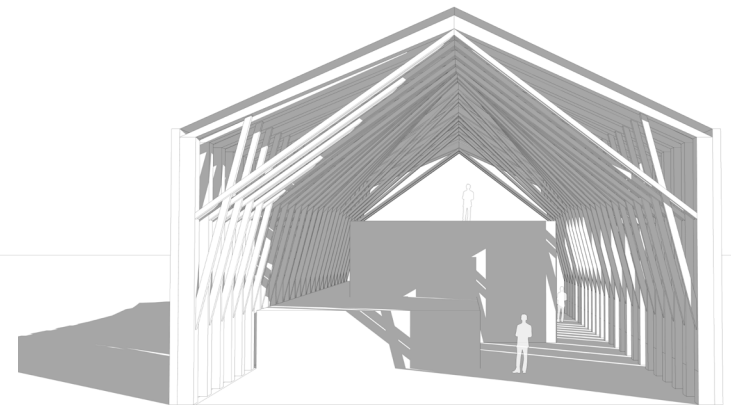
20:00  
muur en dak open



09:00  
muur open  
introductie



12:00  
muur open  
onderzoek

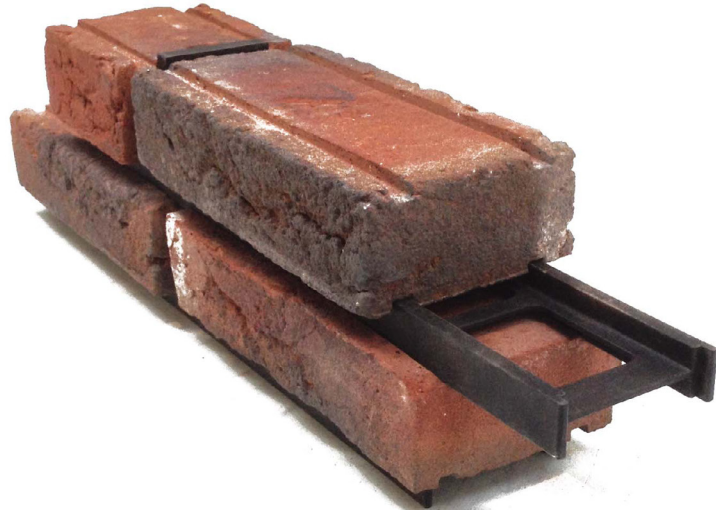


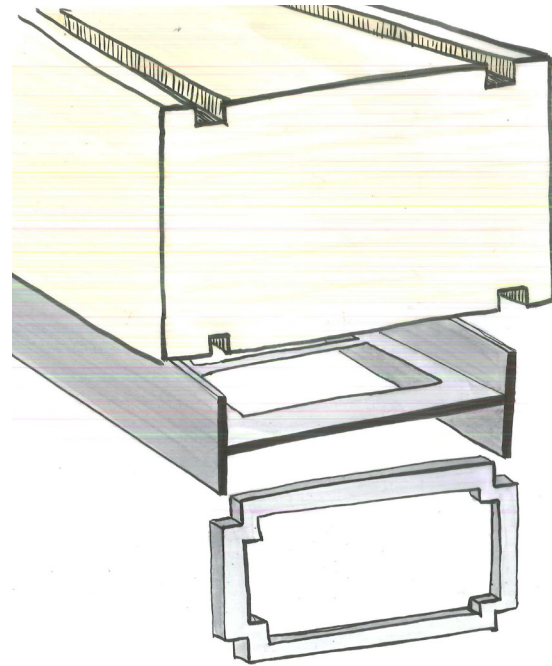
20:00  
muur open  
conclusie

probleemstelling

ontwerp

# Gevelontwerp

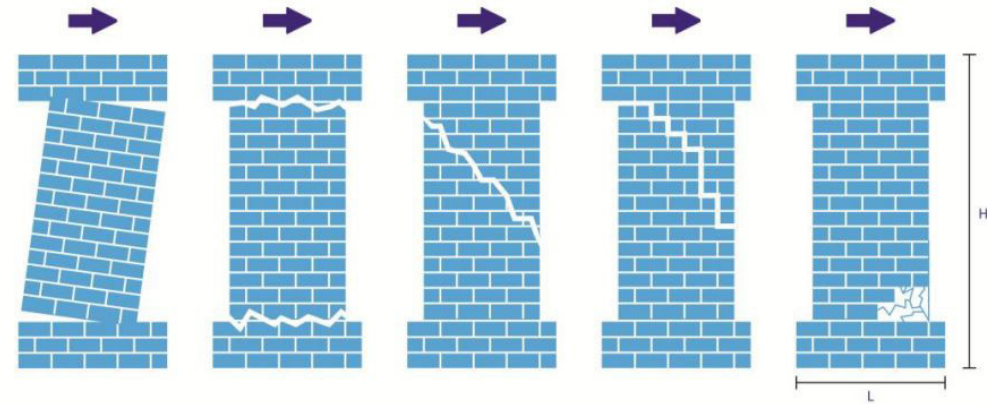




① Brick

② Rails

③ Element



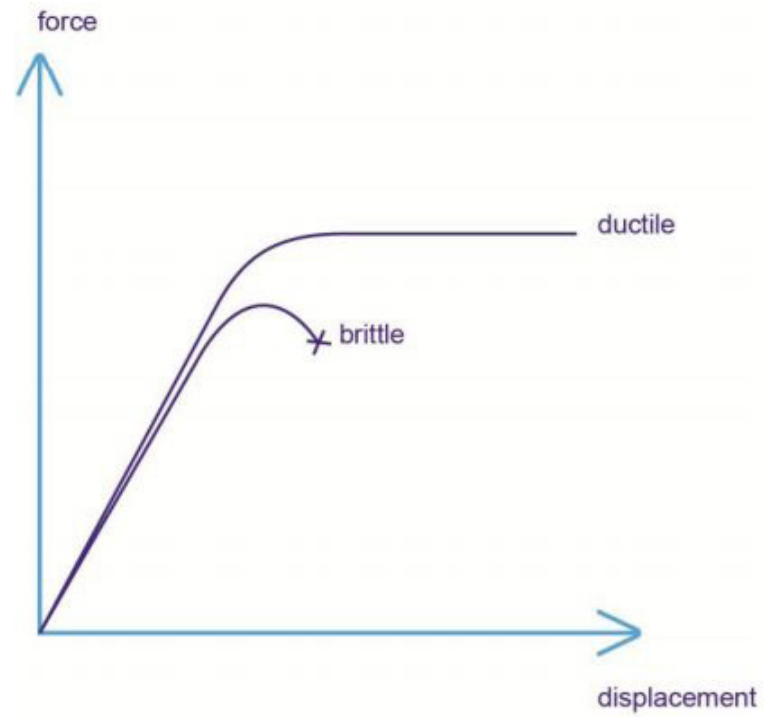
(a) rocking

(b) sliding

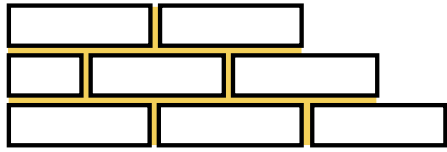
(c) diagonal tension

(c) diagonal tension

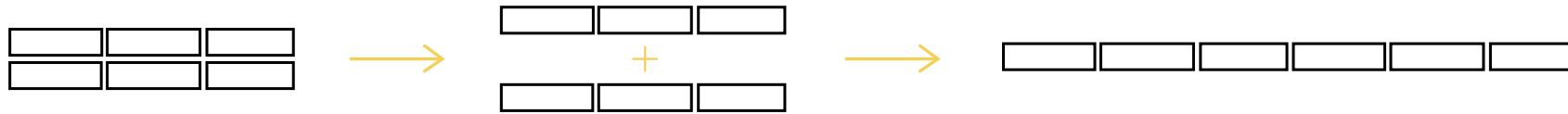
(d) toe crushing



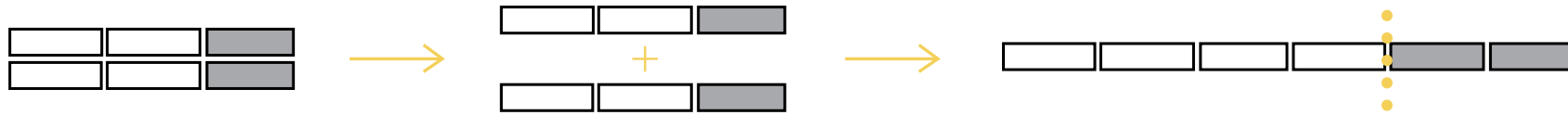
# HERGEBRUIK BAKSTEEN:



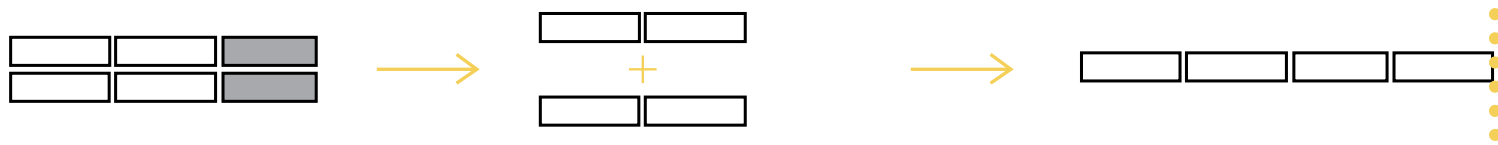
STEENS MUUR:

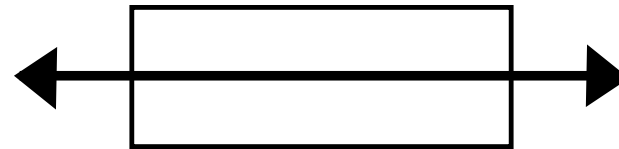


MAAR:

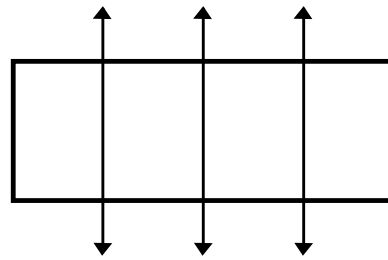


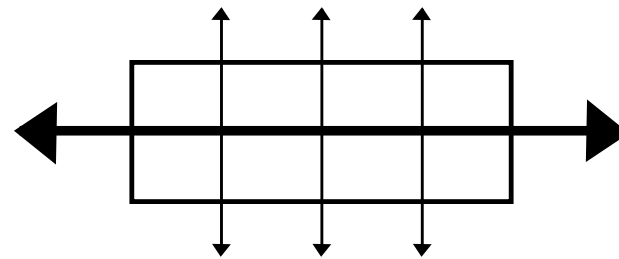
DUS:













introdunctie

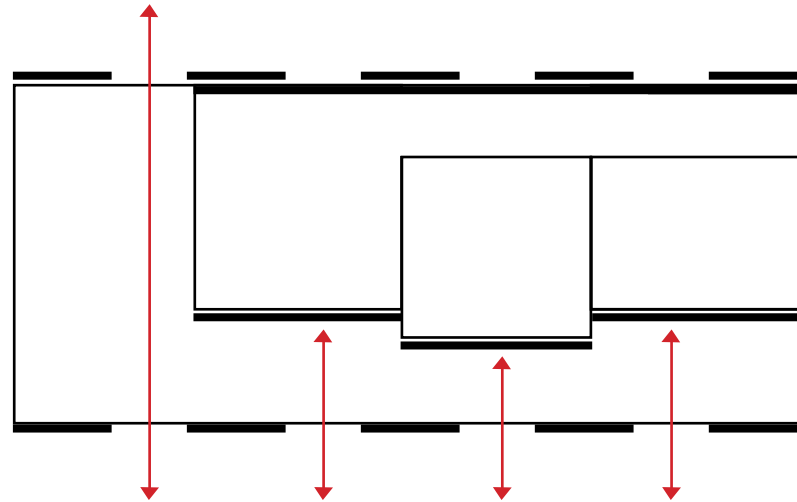
probleemstelling

onderzoek

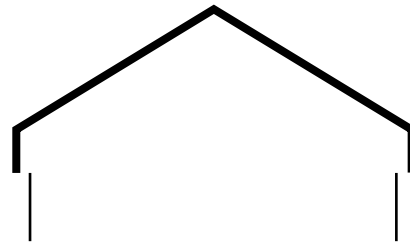
ontwerp

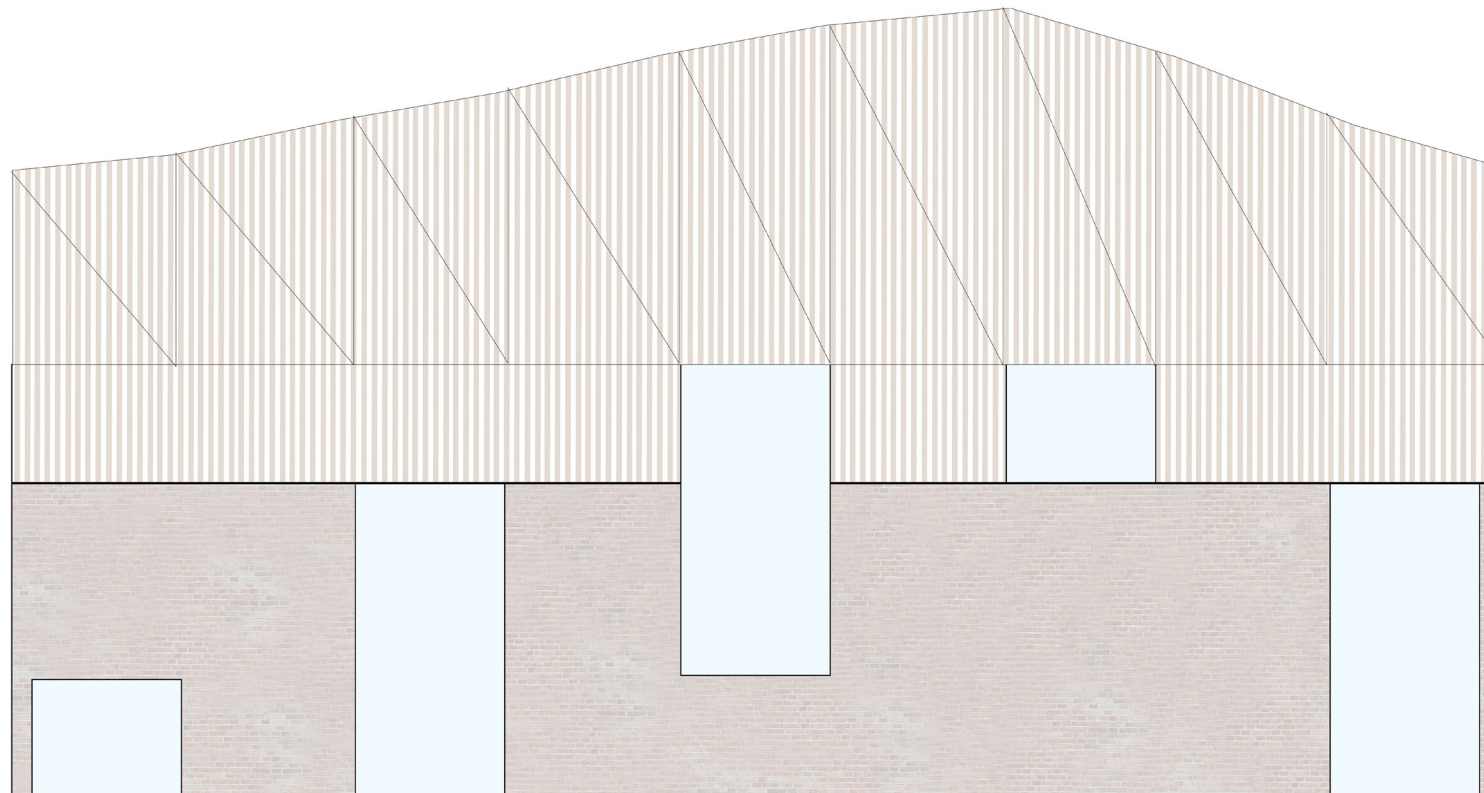
conclusie

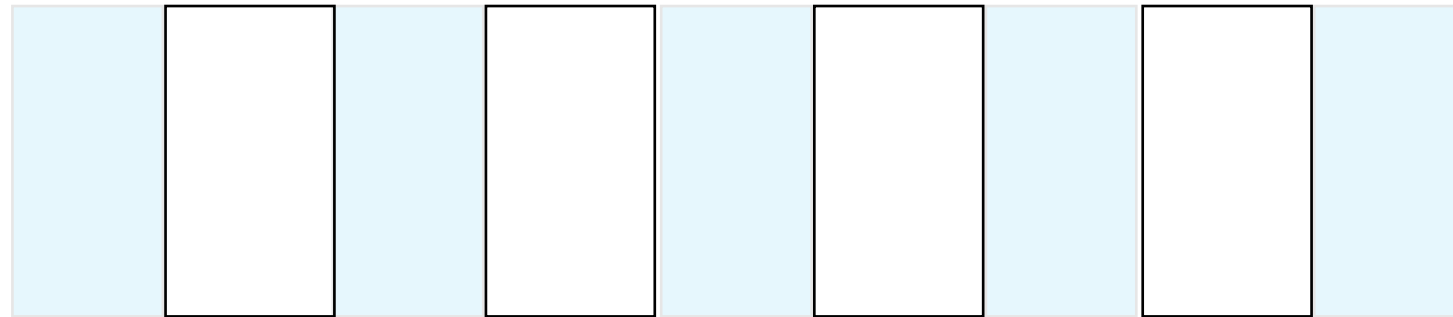
# Coulisse



## sokkel en massa







introdactie

probleemstelling

onderzoek

ontwerp

conclusie

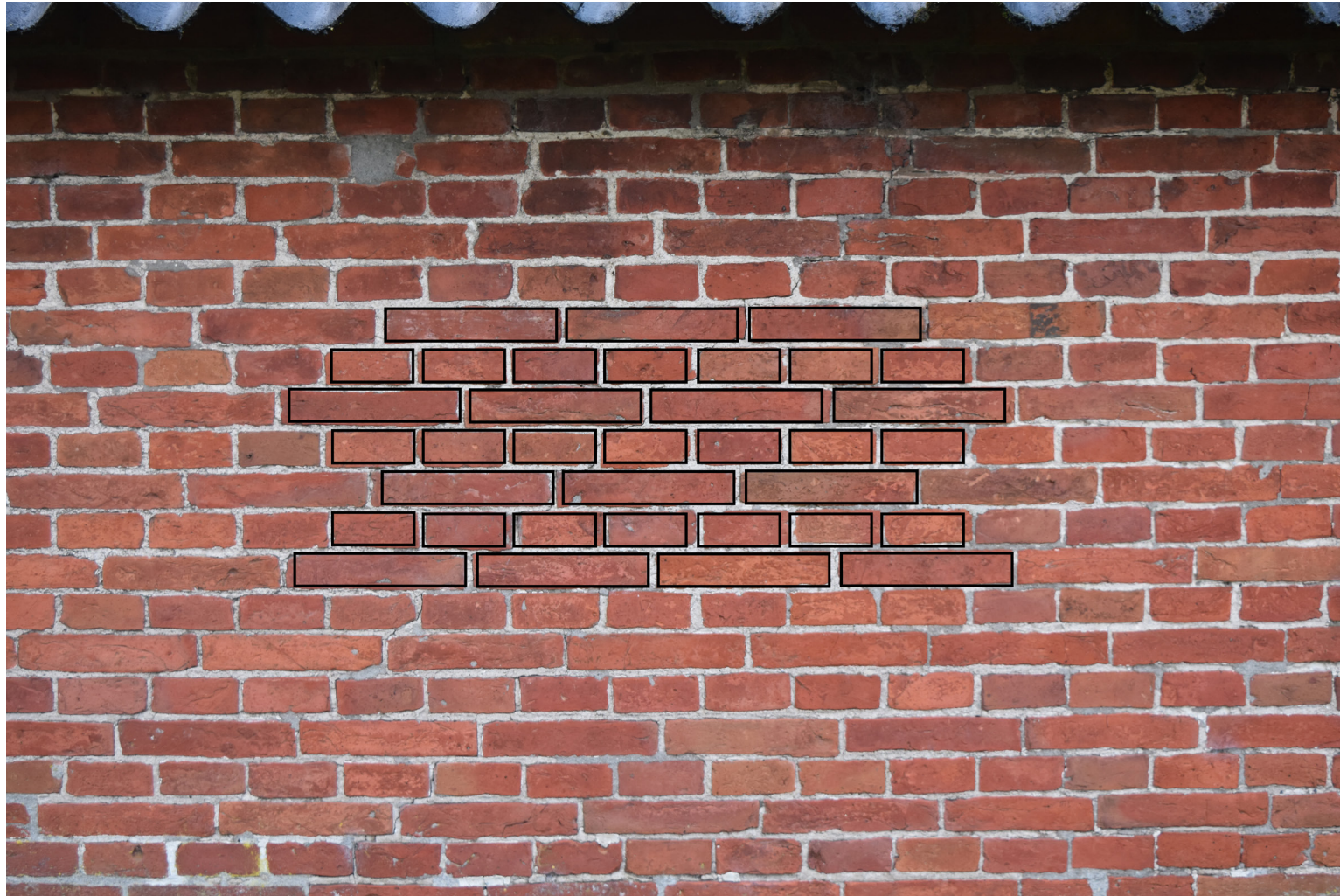


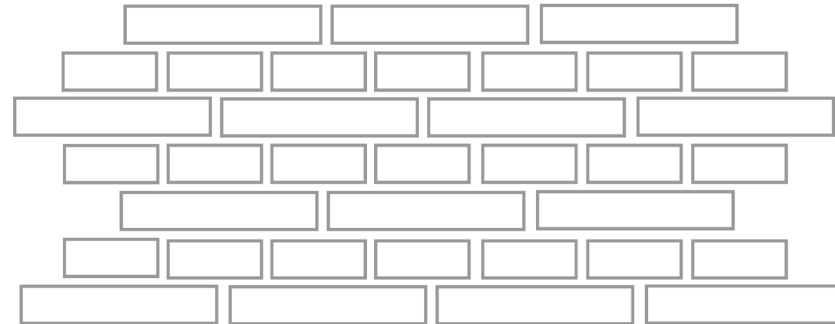
1. open

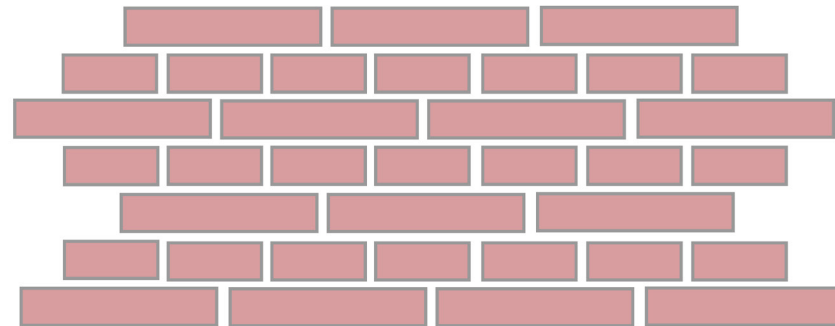
2. gesloten

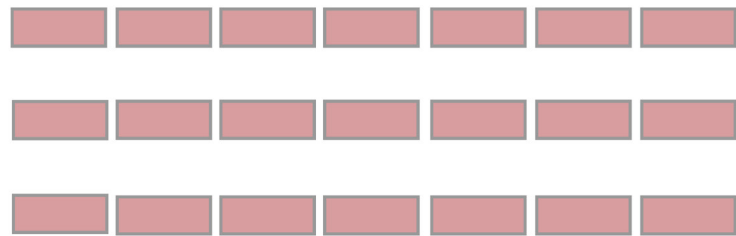
3. semi-open

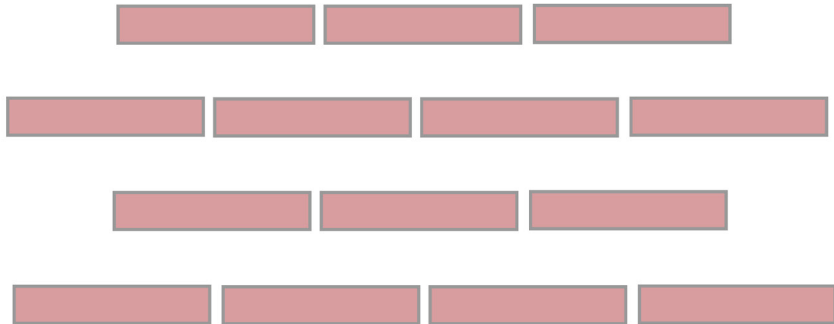


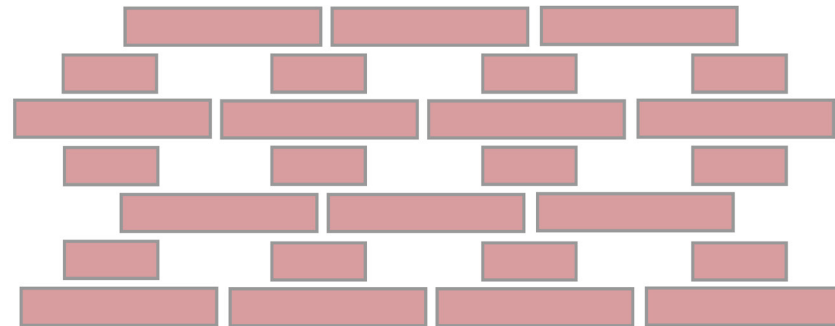


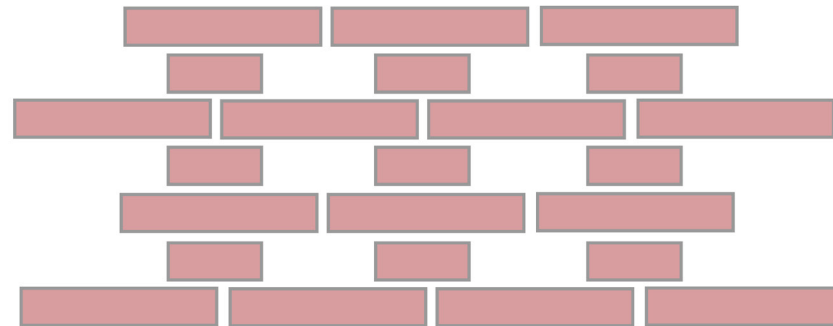


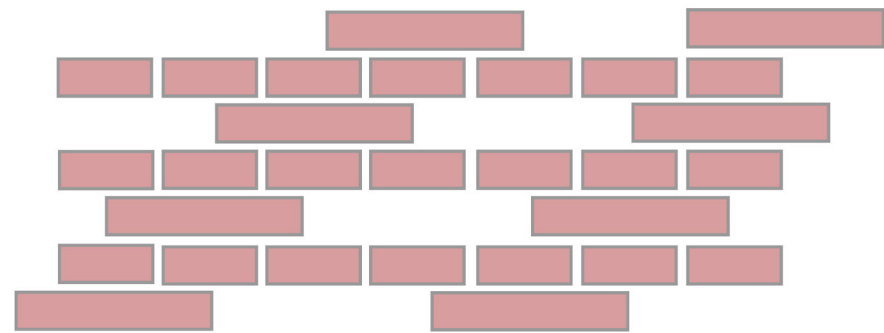
















introdactie

probleemstelling

onderzoek

ontwerp

conclusie

73/92



introdactie

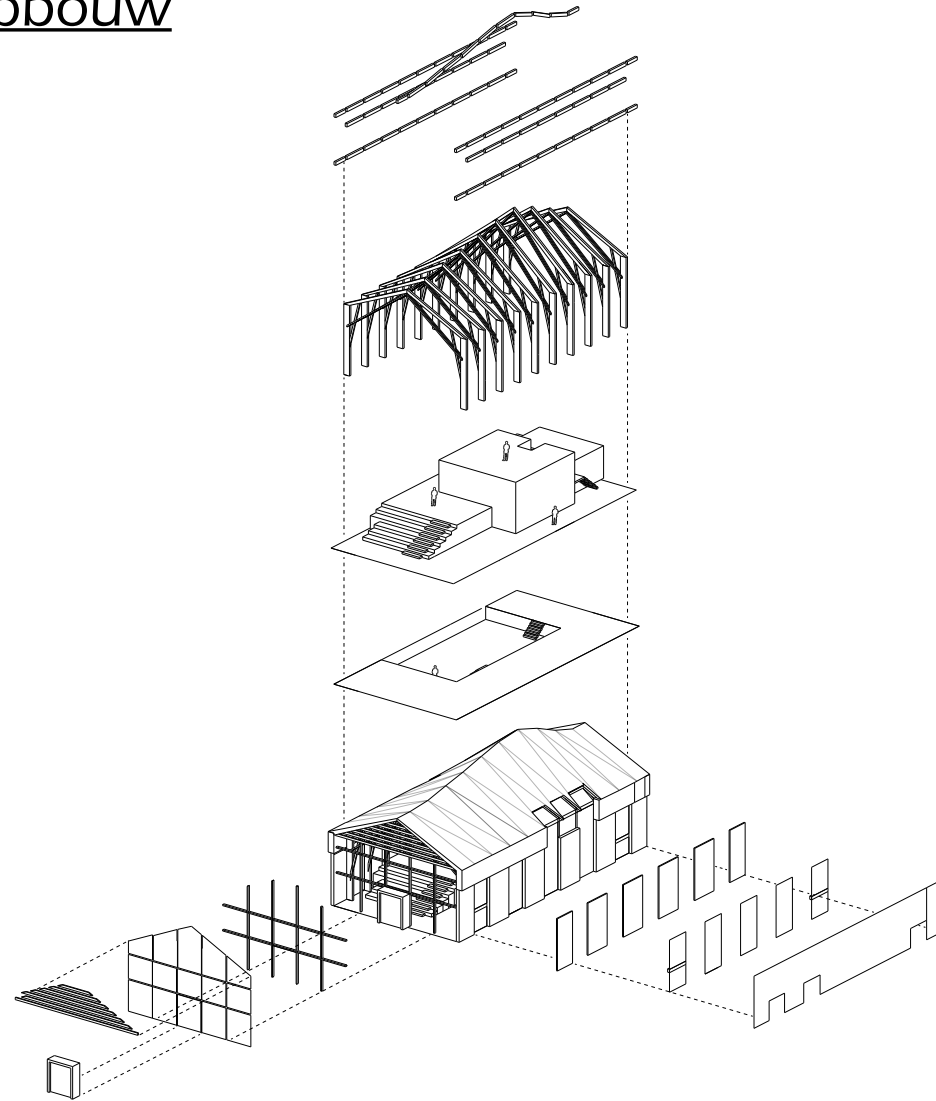
probleemstelling

onderzoek

ontwerp

conclusie

# Opbouw



introductie

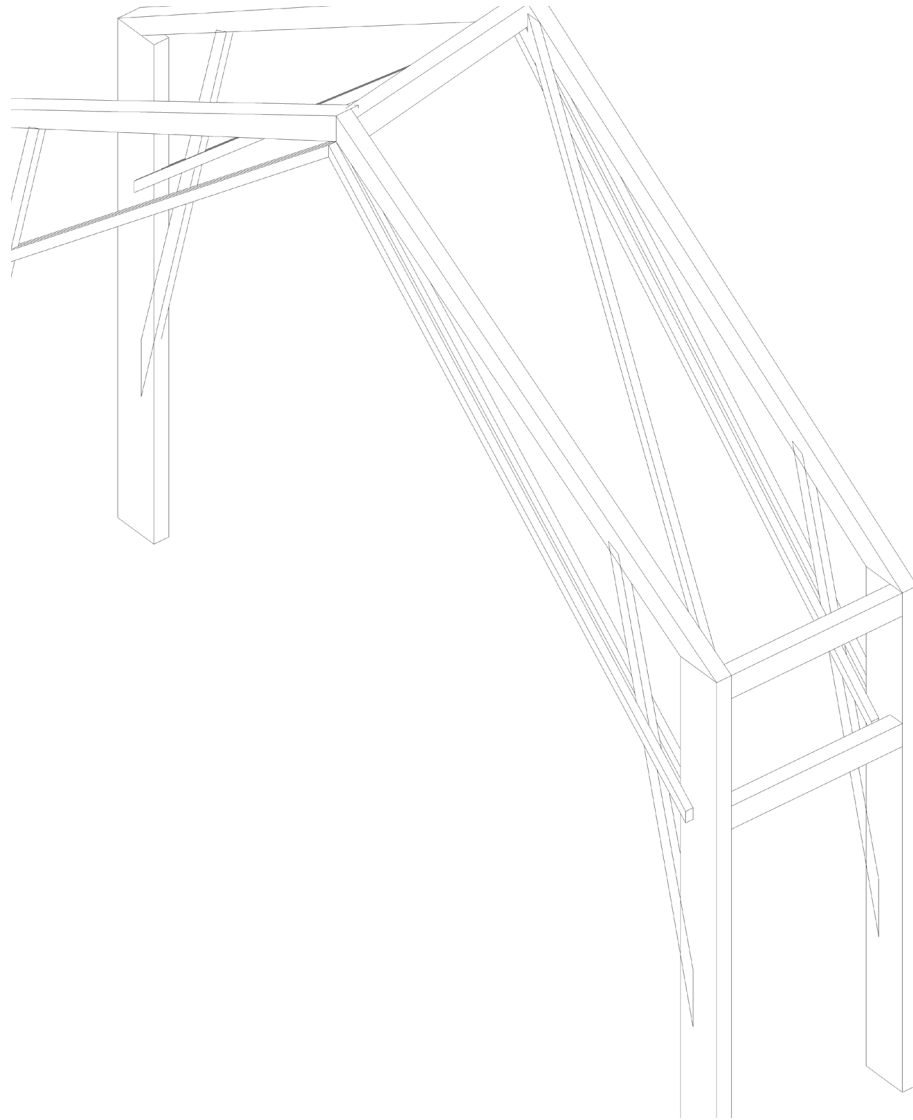
probleemstelling

onderzoek

ontwerp

conclusie

# Opbouw dak



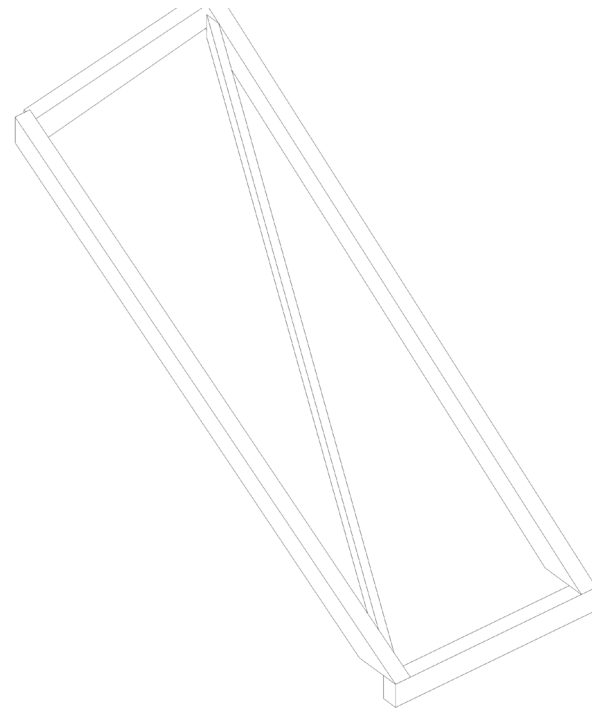
introdactie

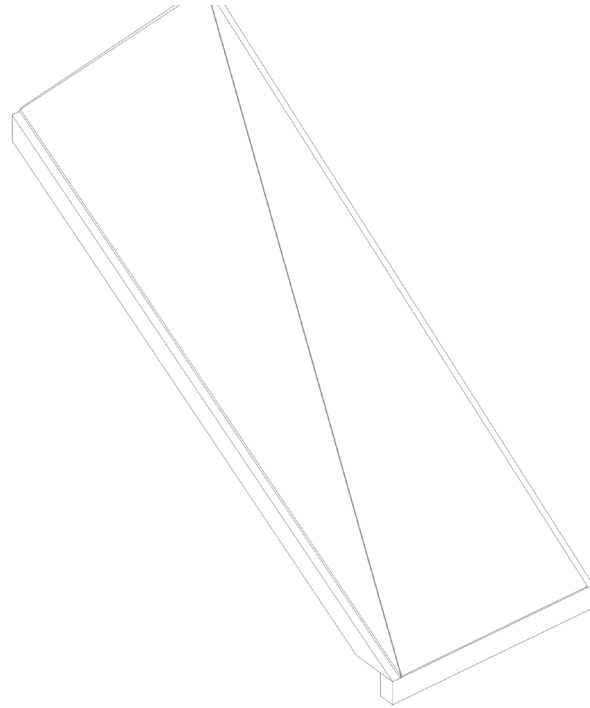
probleemstelling

onderzoek

ontwerp

conclusie





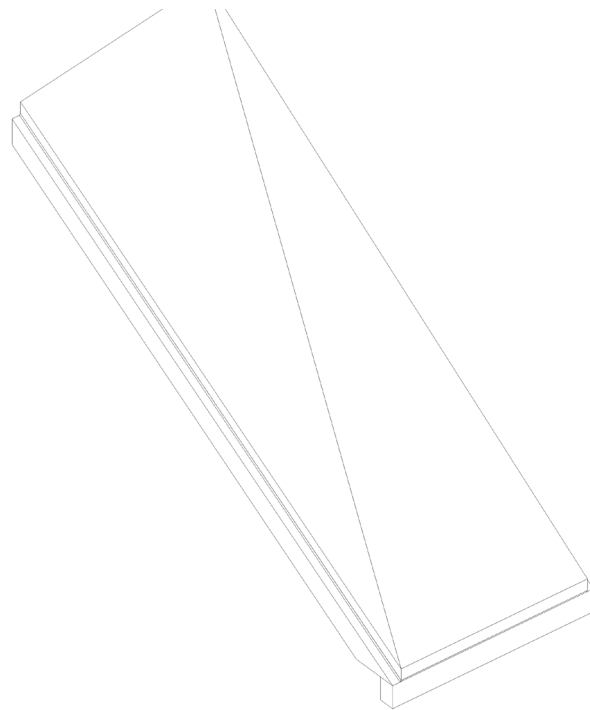
introdactie

probleemstelling

onderzoek

ontwerp

conclusie



introdactie

probleemstelling

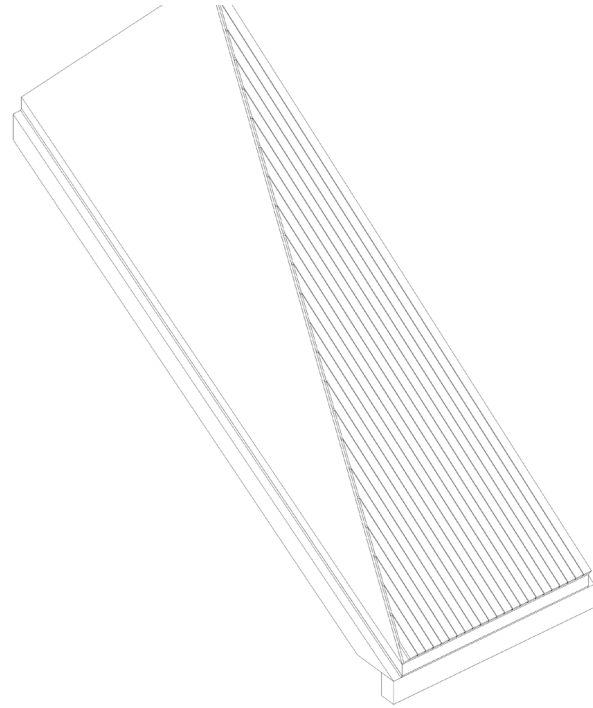
onderzoek

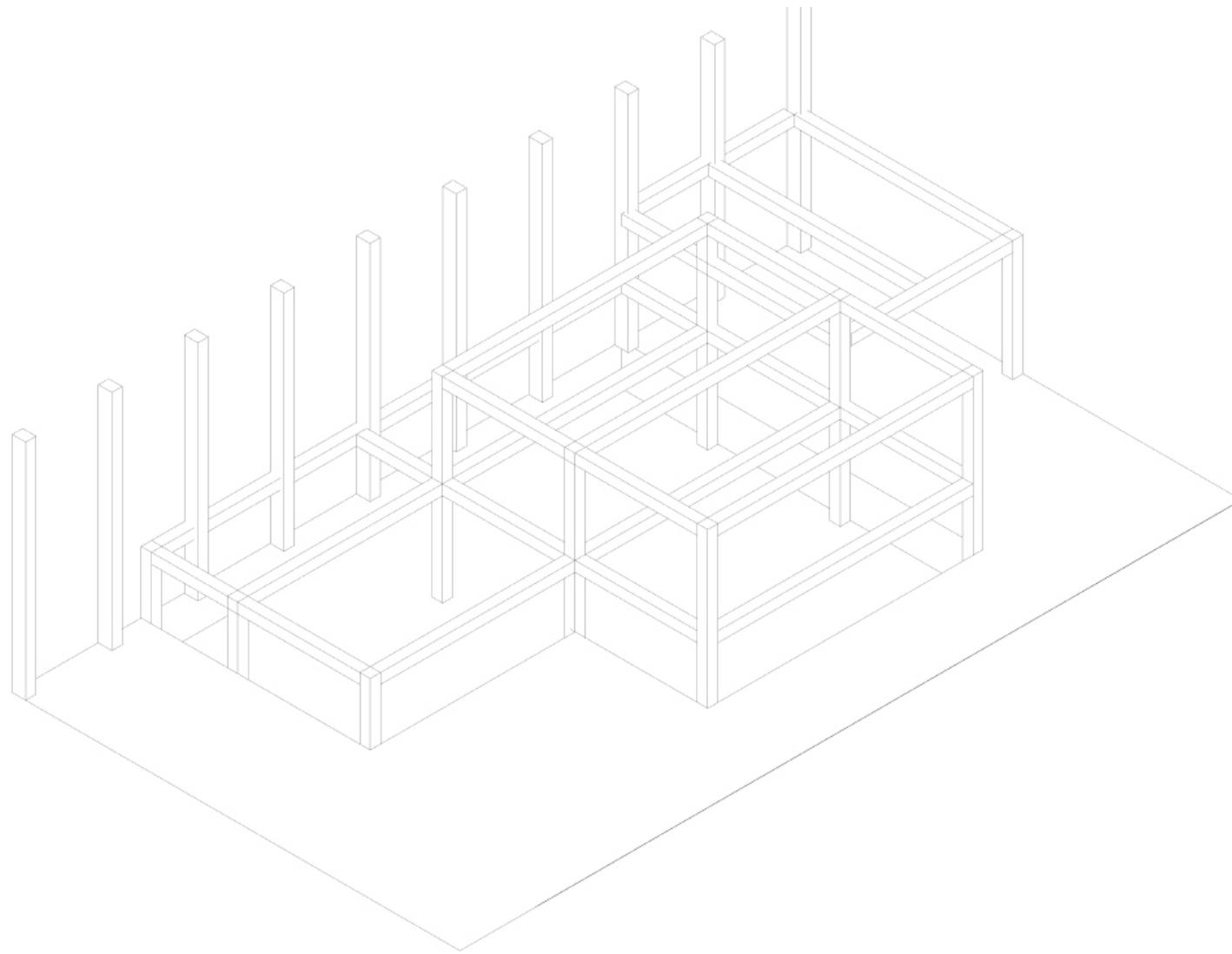
ontwerp

conclusie









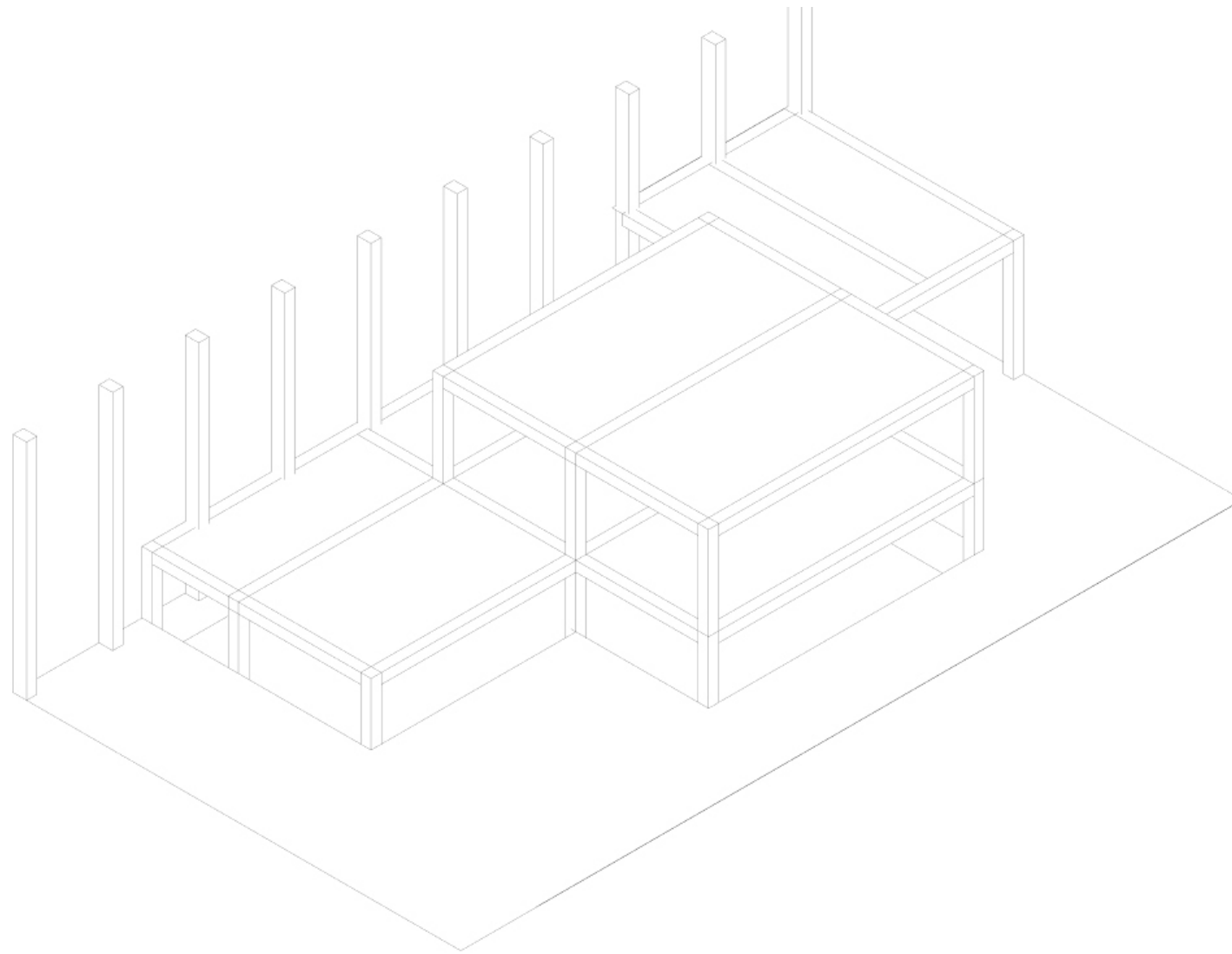
introdactie

probleemstelling

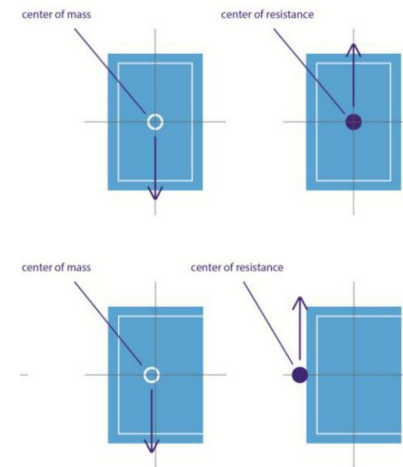
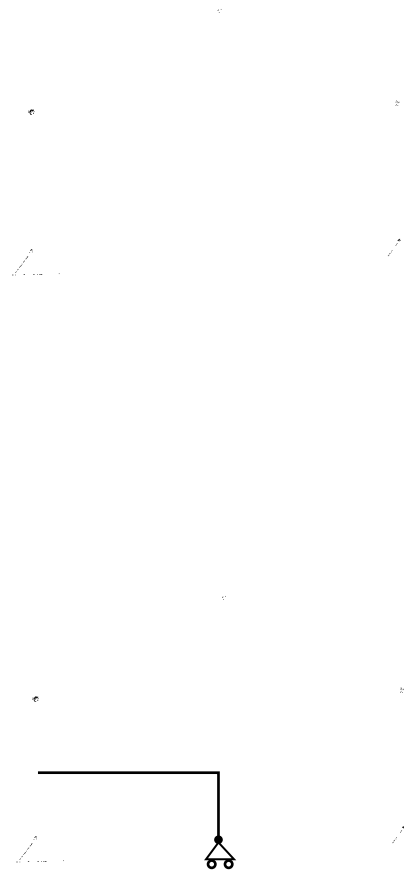
onderzoek

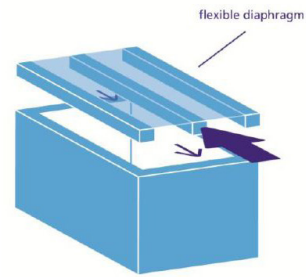
ontwerp

conclusie



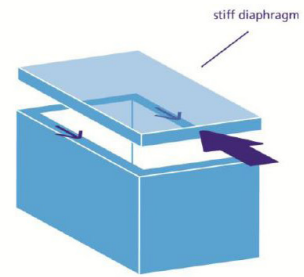
# Torsie





flexible diaphragm

flexible diaphragms result in unfavourable out-of-plane resistance

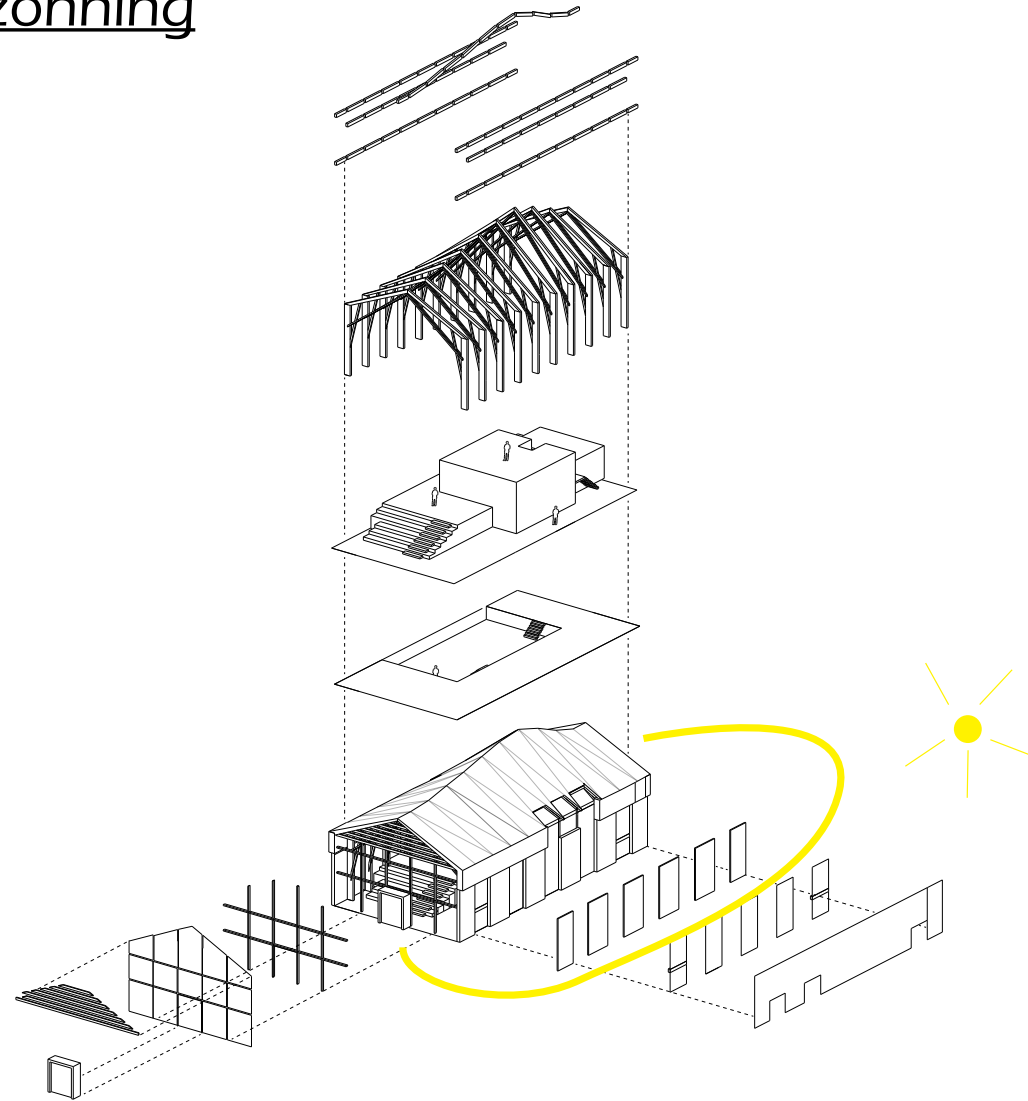


stiff diaphragm

stiff diaphragms result in favourable in-plane resistance

keuze voor betonvloer

# Bezinning



introdactie

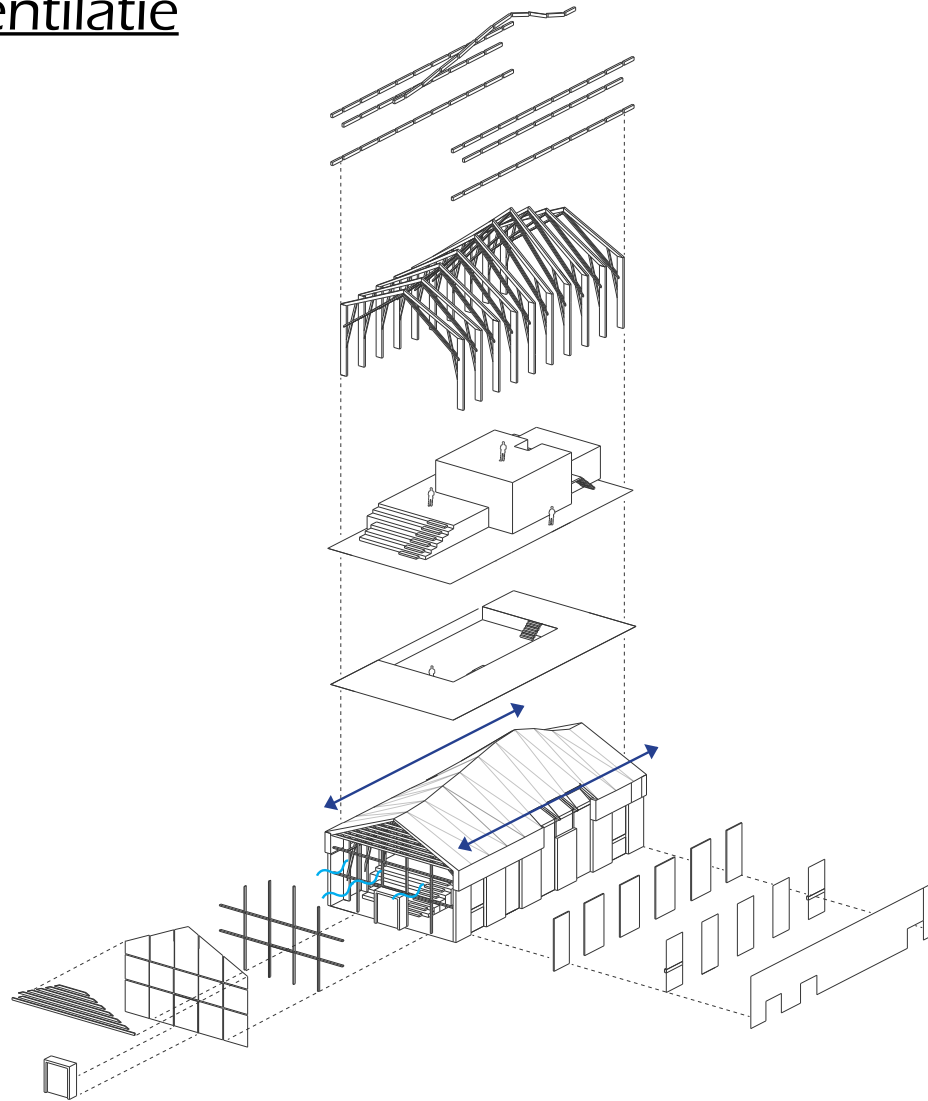
probleemstelling

onderzoek

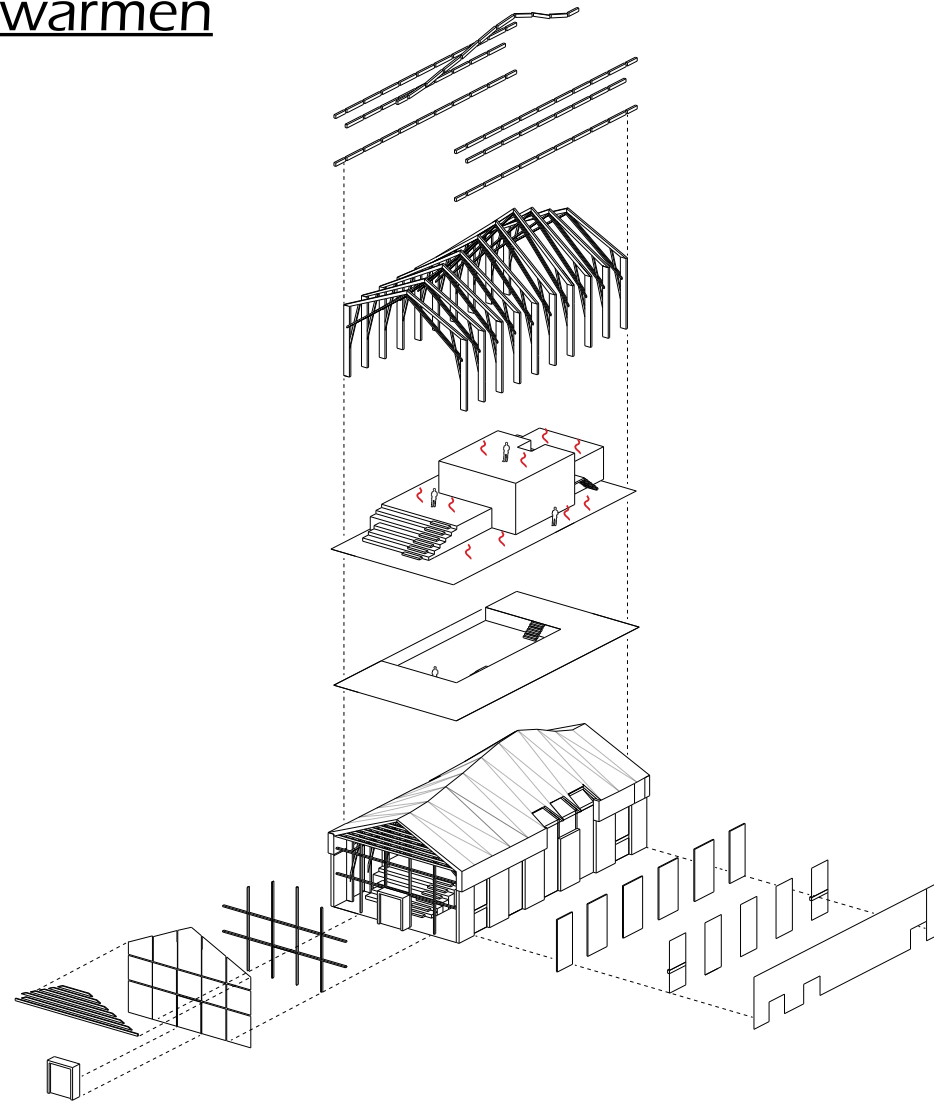
ontwerp

conclusie

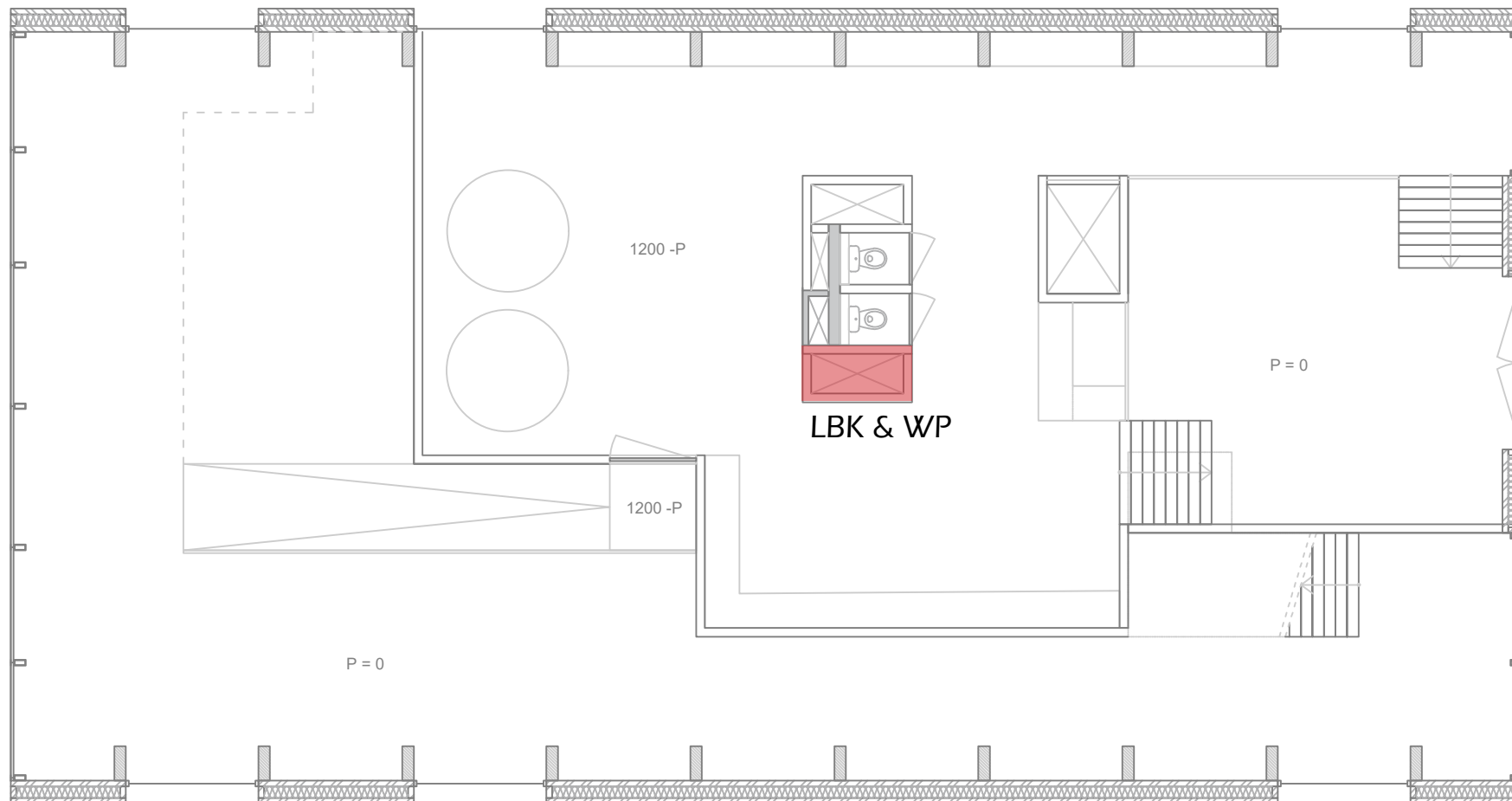
# Ventilatie

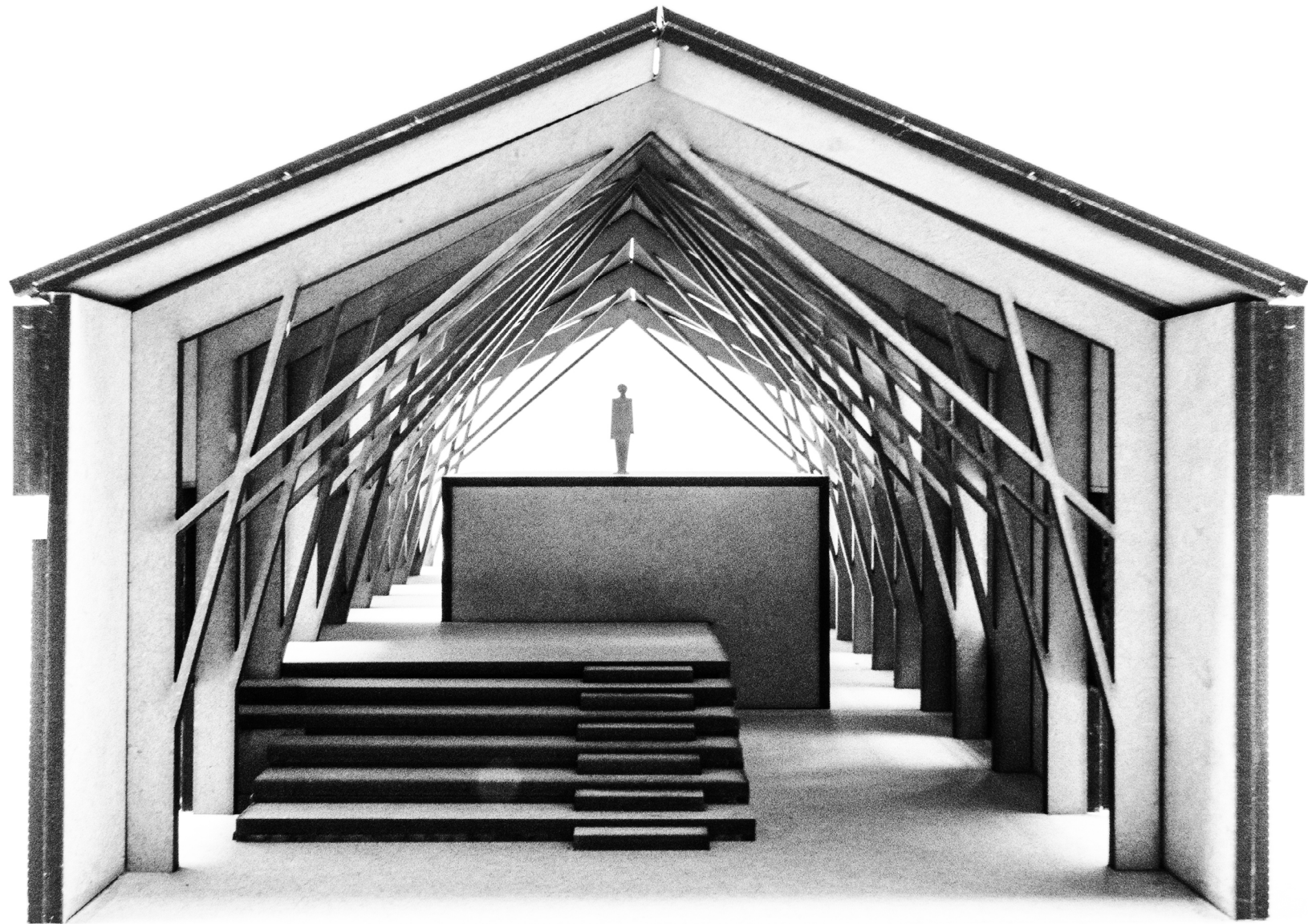


# Verwarmen















Bedankt !

