



Sheltering shelters

A transformation toolbox for HAS at Soesterberg airbase

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STRUCTURE

Overview of chapters

Why?

- Problem statement
- Potential

Methodology

- Method
- Research questions
- Scope

SQ I

- Values
- Spatial qualities

SQ II

- Criteria
- Evaluation
- Strategies

SQ III

- Ensemble scenarios
- Shelter scenarios

SQ IV

- Evaluation & impact

SQ V

- Final design

Conclusion

- Main takeaways
- Future directions

FIRST IMPRESSION

Hidden in nature



FIRST IMPRESSION

Impressive structure



FIRST IMPRESSION

Overgrown and aging



FIRST IMPRESSION

Interior



FIRST IMPRESSION

Opening doors



FIRST IMPRESSION

View from a shelter



PROBLEM STATEMENT

Relevance & potential

Goedemorgen Nederland | Nederland

Voorzitter Bouwend Nederland: wooncrisis kan zeker nog twintig tot dertig jaar duren

Rick Hartkamp · 19 mei 2026 12:05

Home > Onderwerpen > Energietransitie van gebieden

Erfgoed als blauwdruk voor de circulaire economie

rose morrison

Adaptive Reuse of Industrial Buildings Saves 65 Years of Carbon: Why Historic Renovation Outperforms New Green Construction

Home > Onderwerpen > Militair erfgoed > Erfgoed van de Koude Oorlog

Onderzoek naar monumenten van de Koude Oorlog

Why European Militaries Collectively Downsized After the Cold War

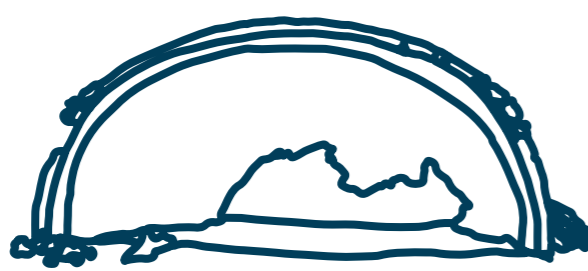
What happened to European militaries at the end of the Cold War?

op cultureel erfgoed worden steeds ering van erfgoed kan bijdragen t laat zien hoe in het verleden werd uitdagingen en hoe den. Hierin liggen lessen en van de leefomgeving

emptiness. But these structures hold hidden ial relics into modern, functional spaces down and building new, cities and developers n, preserves cultural heritage and revitalizes

In de Kamerbrief van 28 april 2020 heeft de minister van Onderwijs Cultuur en Wetenschap Ingrid van Engelshoven, aang erfgoed van de Koude Oorlog niet of nauwelijks ons rijksmonumentenbestand. De Rijksdie heeft de opdracht om de kennis over deze p verhalen te vertellen en vervolgens een bep te starten. Om zo bij te dragen aan behoud va voor volgende generaties.

Articles derived from: The Collector, RCE, Renewable Energy Magazine & WNL



Abandoned Shelters



Tension between ecology and cultural heritage



Lack of precedents and information

PROBLEM STATEMENT

Relevance & potential



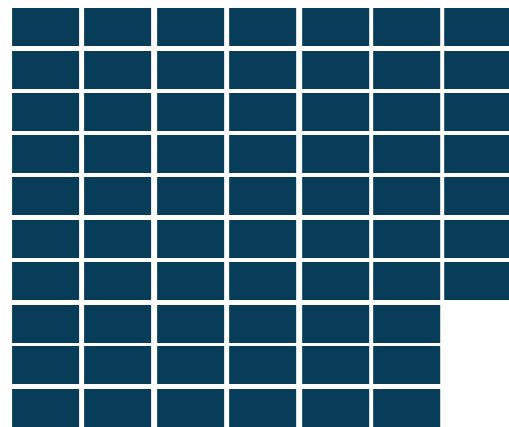
One shelter equals
1400m²



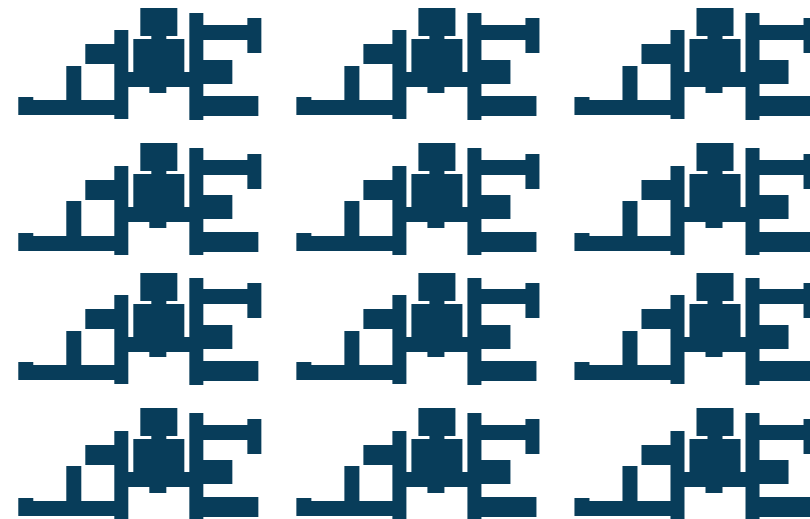
Combining all the
shelters this would be
23.800m²



Which totals to 288
houses of 85m²



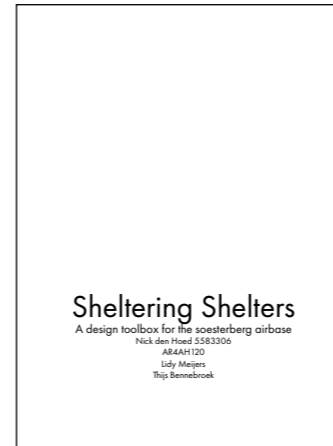
420 shelters combin-
ed results in 67 soccer
fields (8701m²)



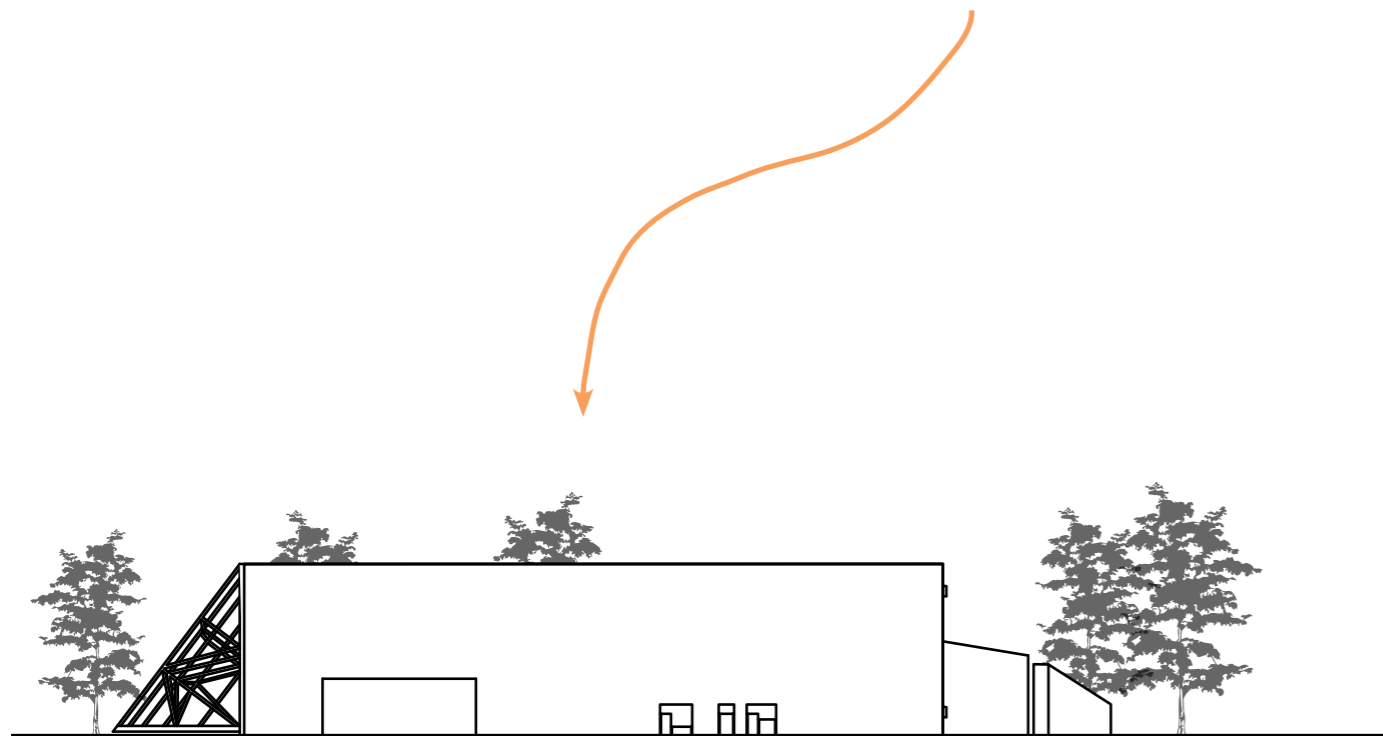
Which equals roughly
16 times the Architec-
ture faculty of TU Delft
(3600m²)

RESEARCH QUESTIONS

Main research question



To what extent can a design-based *toolbox* guide the possibilities of transforming *HAS* (Hardened aircraft shelters) at *Soesterberg Airbase*?



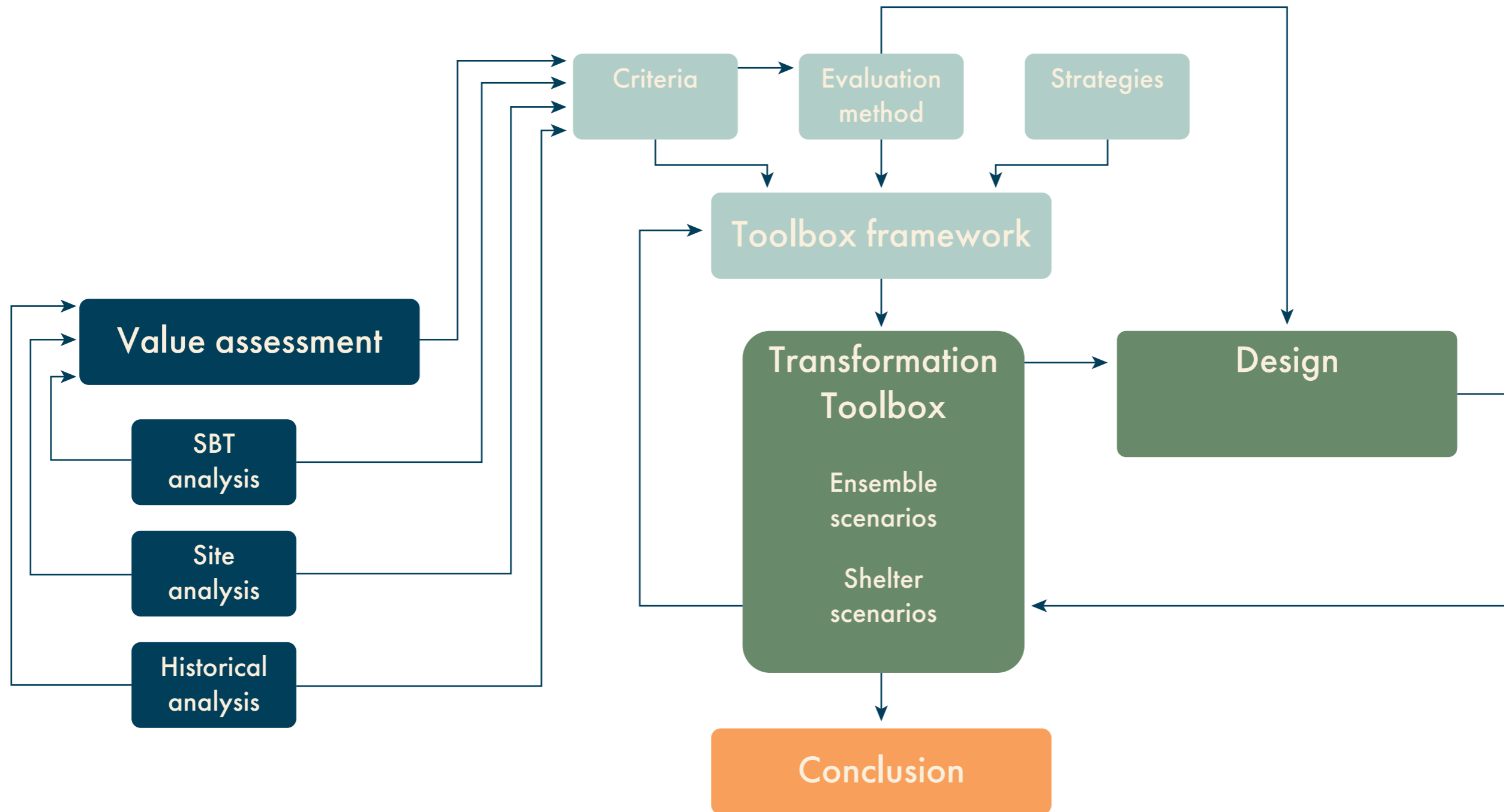
RESEARCH QUESTIONS

Sub-questions

- SQ I** Which heritage values, spatial qualities, and architectural characteristics define the HAS at Soesterberg airbase?
- SQ II** Which criteria, strategies and evaluation methods can form the basis of a design-based toolbox for the HAS?
- SQ III** Which transformation scenarios and future functions are compatible within the context?
- SQ IV** How do the proposed interventions and design scenarios affect the heritage values and transformation potential of the HAS?
- SQ V** How can a selected transformation scenario be developed into an architectural design?

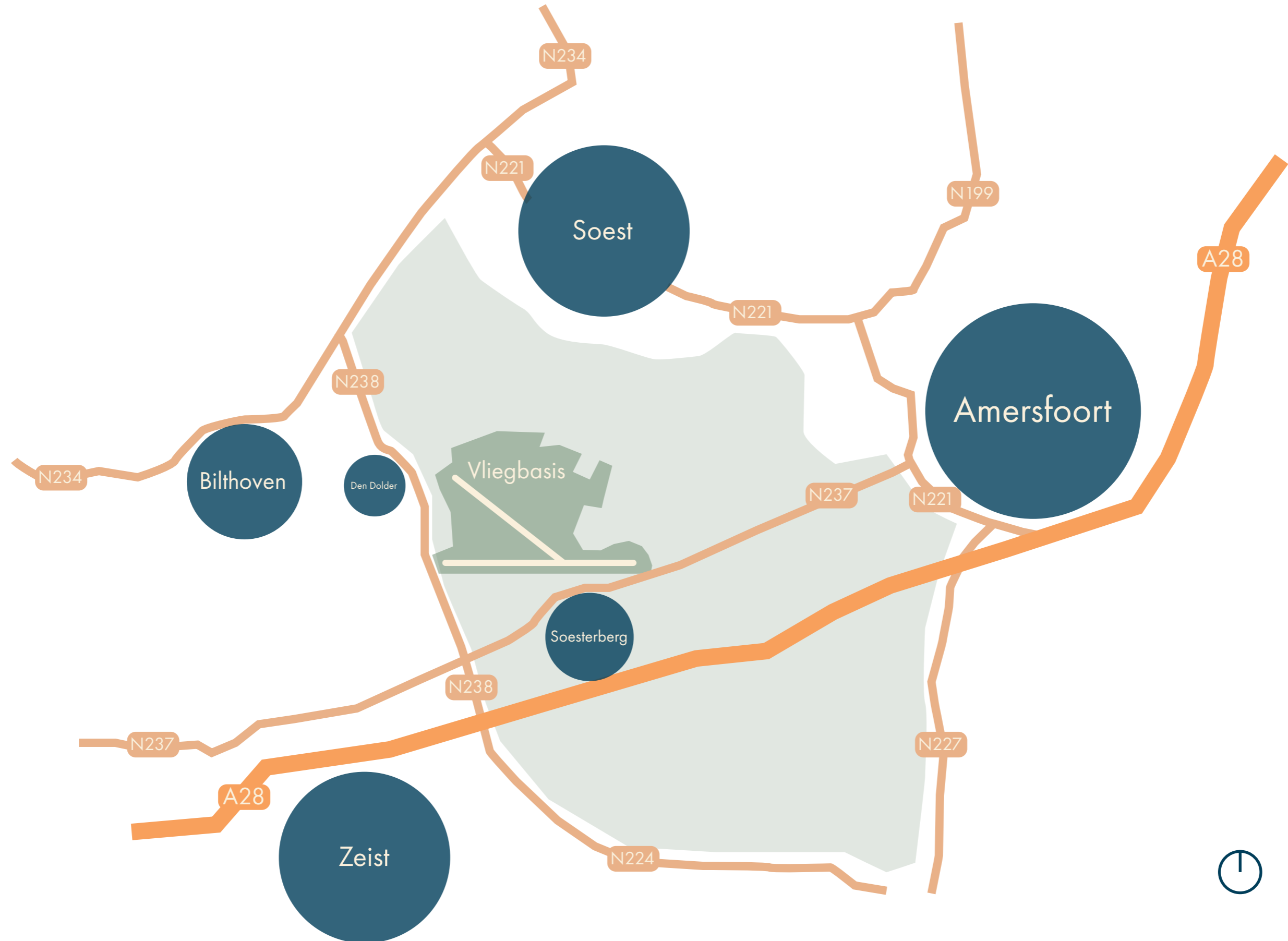
RESEARCH SCHEME

From framework to design



SCOPE

Location & connection



SCOPE

Site & impression

Why?

Methodology

SQ I

SQ II

SQ III

SQ IV

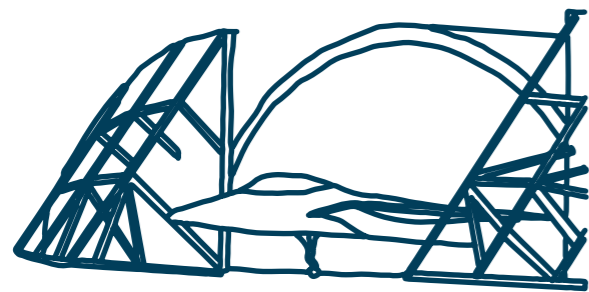
SQ V

Conclusion

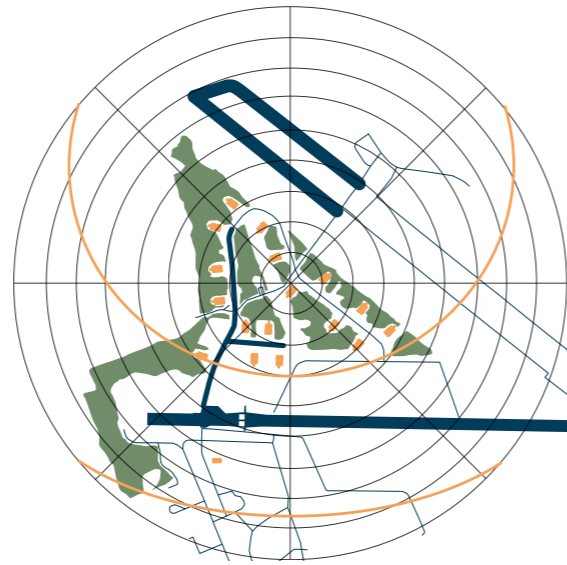


ANALYSIS

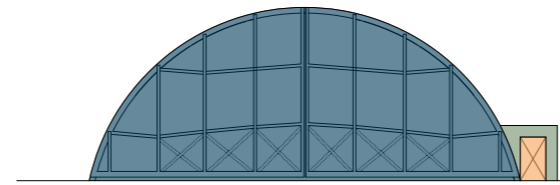
Used methods



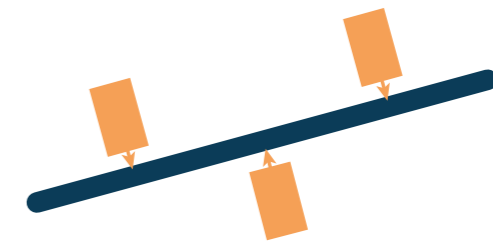
Historical research



Site analysis



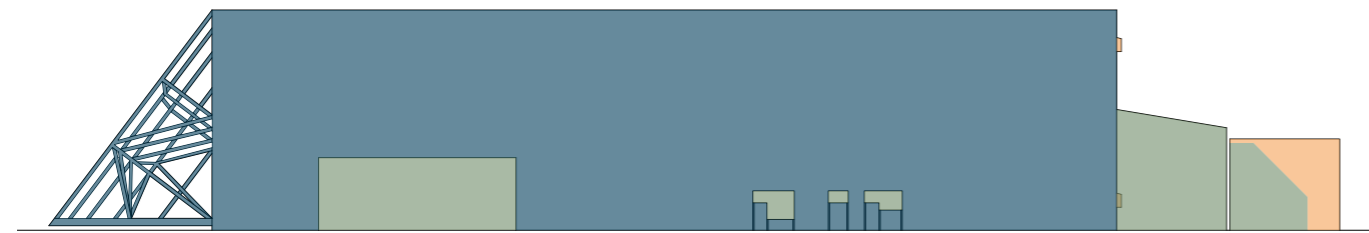
Value assessment



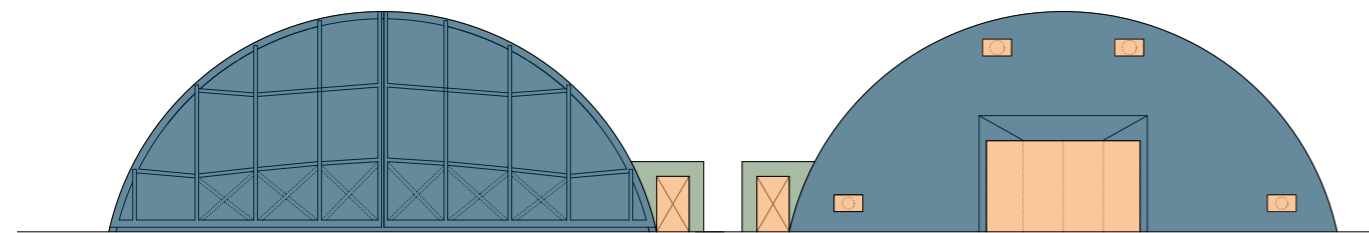
Spatial building Typology

VALUE ASSESSMENT

ERM & value matrix

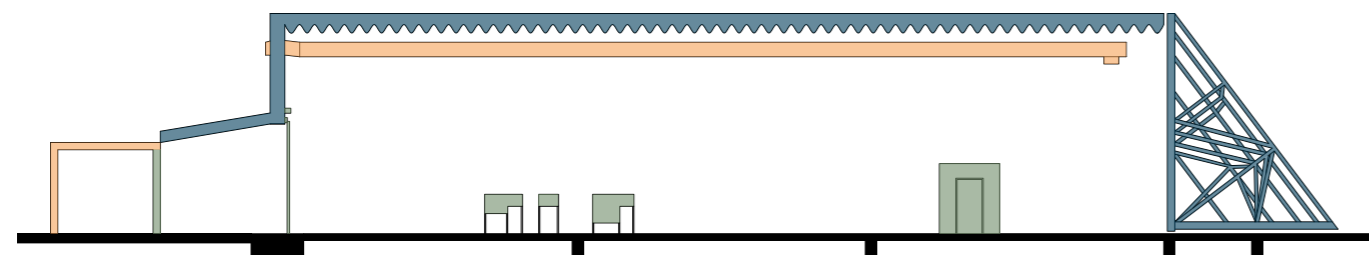


Sites containing HAS

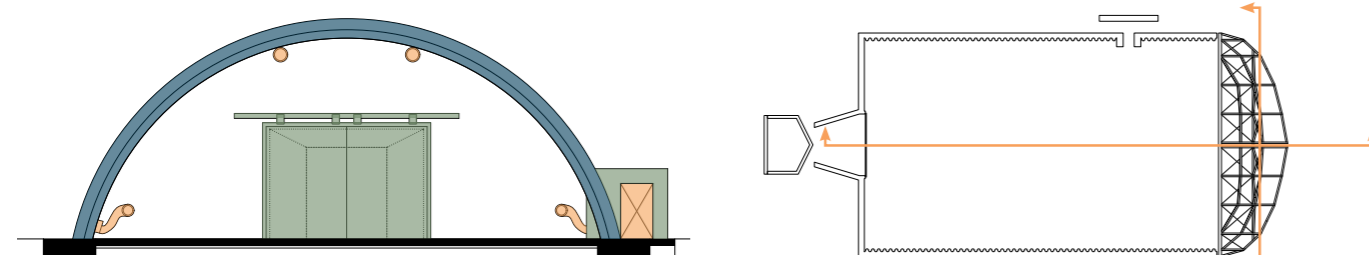


Sites containing HAS

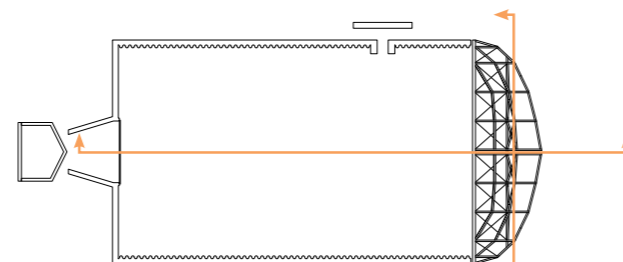
Sites containing HAS



Sites containing HAS



Sites containing HAS



Value assesment Airshelter area Soesterberg Airbase

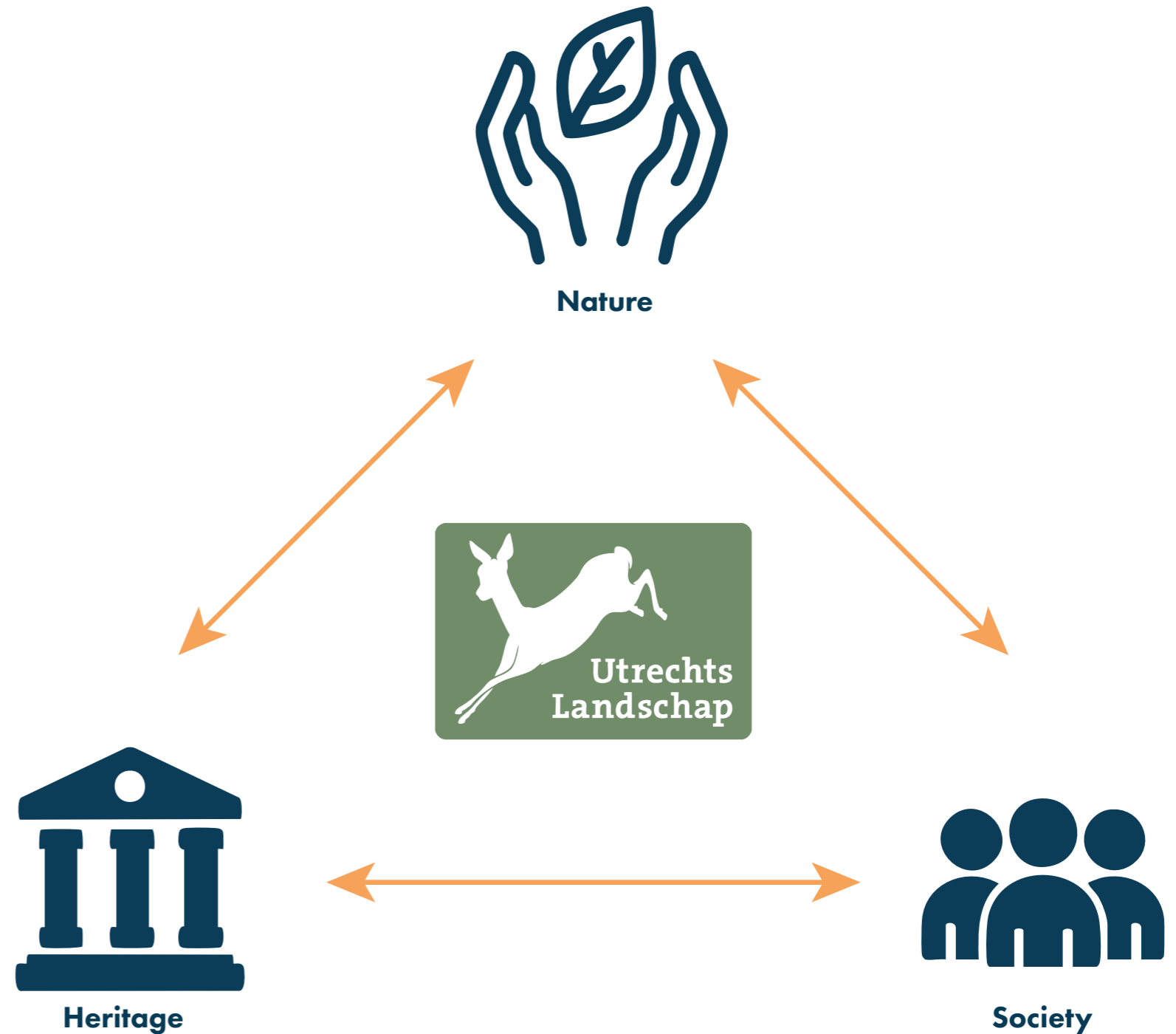
What are the possibilities with the heritage?

	Age	Historical	Artistic	Commemorative	Rarity	Nostaltic	Use	Conflict /Dilemma	
Surroundings	 Layers of Moraine and plain landscape, traces of war and human intervention	 Layered history from Napoleon to 'Vliegerheide'	 Paintable nature due to depth and perspectives.	 Intended commemorative value through the museum and memorials.	 Its the first military aviation site in the Netherlands and NATO airbase	 Public airshows and the first McDrive for American soldiers	 From closed off military airbase to public nature park	What is the hierarchy between the different time periods/layers?	
Site	 Mature trees, remains of airfield infrastructure and old tracks visible in the vegetation					 American influence and soldiers, restricted access to the airbase	 High diversity of ecology, well maintained infrastructure. Utrechtlandschap	What is the hierarchy between the ecology and cultural heritage?	
Sub-cluster		 Randomness in orientation of shelters			 Use of planted trees to camouflage the shelters and overall ensemble		 Clusters of buildings, easy accessibility		
Structure	 Aging of the steel structure, water damage	 Use of the Wondr building steel structure					 Self-supporting dome structure	The idea is valuable but it is not rare in the world.	
Space plan	 Directional paint stripes	 Third generation TAB-VEE shelter					 Open floorplan and three different sized entrances	Do you preserve or restore the spaceplan?	
Skin	 Weathering of the concrete skin and overgrown moss						 Overdimensioned structure, thick skin	How much can you alter the skin so the appearance of the whole doesn't change?	
Service	 Original machinery and systems	 Implementation of exhaust opening and old doors					 Sense of past function through service systems	Old services are still mostly usable	
Stuff								Most stuff is in the museum or taken away by the previous users. So the original stuff is not present at the site	
Spirit of place	 The combination of nature, materials, buildings, stories and spatial qualities create a feeling of the past					 USAF under direct command of the Dutch military	 For the community feelings of secrecy, safety, danger and mystery.	 Opportunity for story telling, using the mystery and revealing the secrecy	What story do you tell and how do you tell it? How can you tell a story of secrecy?
Conflict /Dilemma	Is the age value lost when you restore materials? And if so, how do you preserve it?		Airshelters are not meant to be artistic, but looking at it now people could see it as art	Airshelters is uncommemorative- it was meant to be functional and quick built	Airshelters are not rare in the world but in the context of the Netherlands, Soesterberg and landscape it is.	Personal and conflicting memories, everything together creates sense of past, how much can you take away?	Value difficult to determine Do you look at the past present or future?	<ul style="list-style-type: none"> High Value Positive Value Indifferent Value 	

VALUE ASSESSMENT

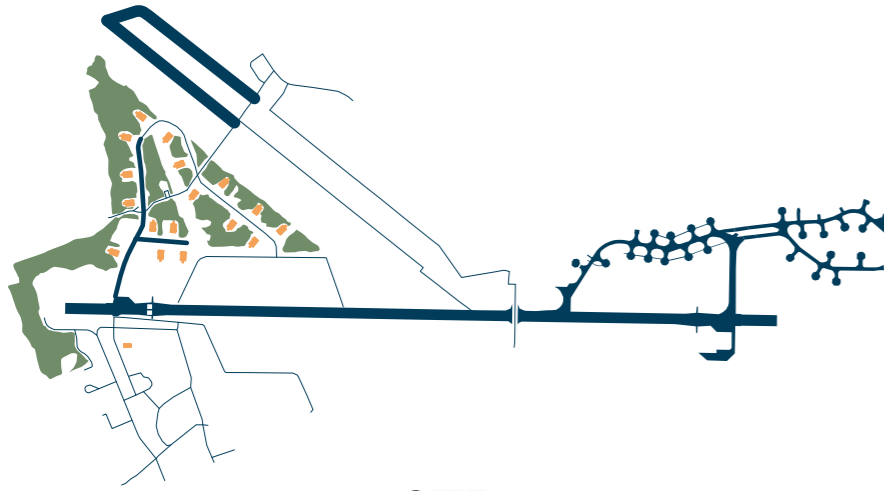
Main values & Utrechts Landschap

1. Ecological significance
2. Rarity of ensemble
3. Hidden in nature
4. Collective memory
5. Perception of cold war



SPATIAL BUILDING TYPOLOGY

Six scales of qualities



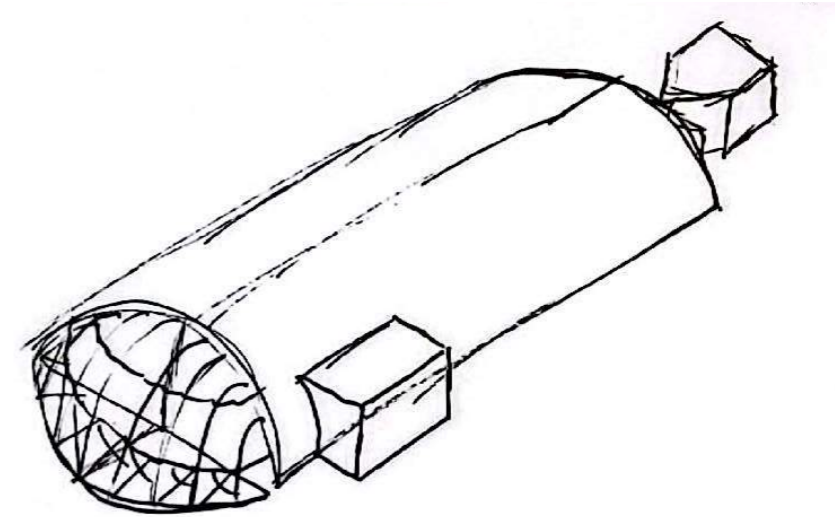
SITE

Location & cammouflage with trees



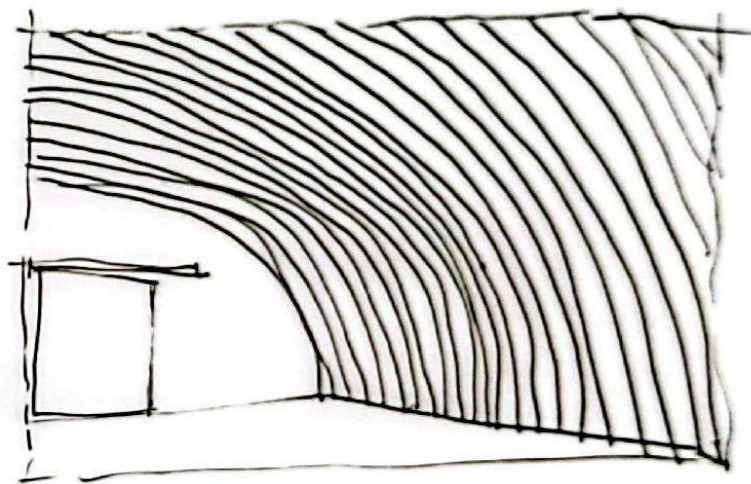
ENSEMBLE

Organic composition



BUILDING

Low extended tubular shape



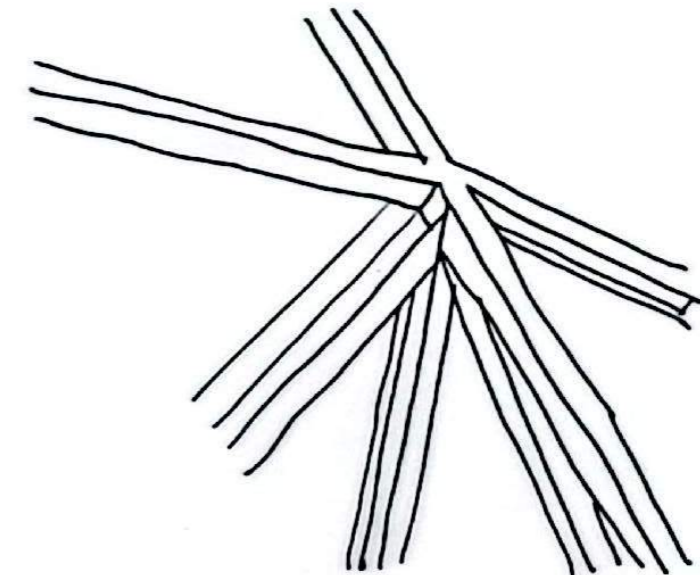
SPACES

Ribbed dome interior



ELEMENTS

Wonder building construction



COMPONENTS

Harsh materiality

CRITERIA

Defining the parameters



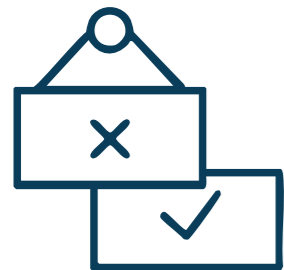
INTERVENTION

Level and method of intervention



CULTURAL HERITAGE

Guiding values



PUBLIC/PRIVATE

Public or private use



UTRECHTS LANDSCHAP

Three main principles



OCCUPANCY

Opening hours & daily use

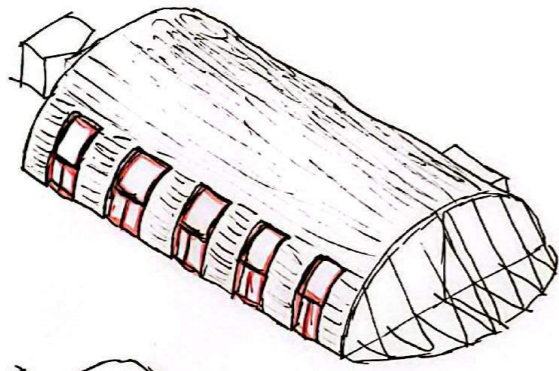


SUSTAINABILITY

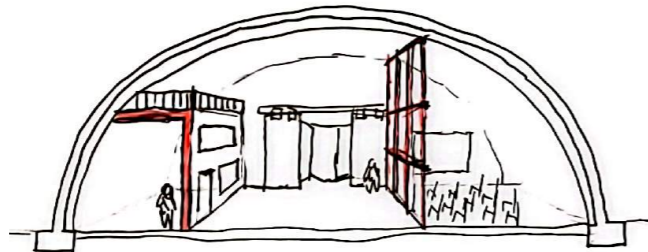
Wilderness-bases checklist

EVALUATION

Methods of intervention



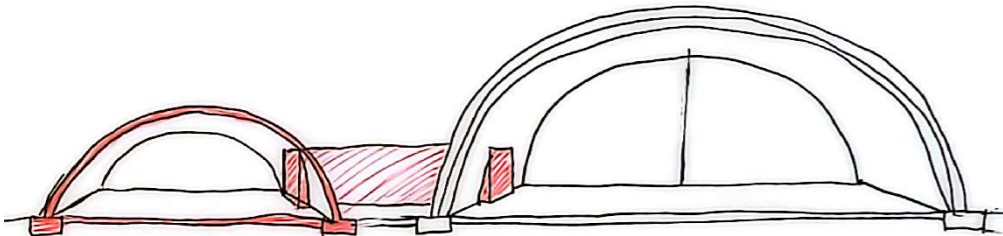
I OPEN UP



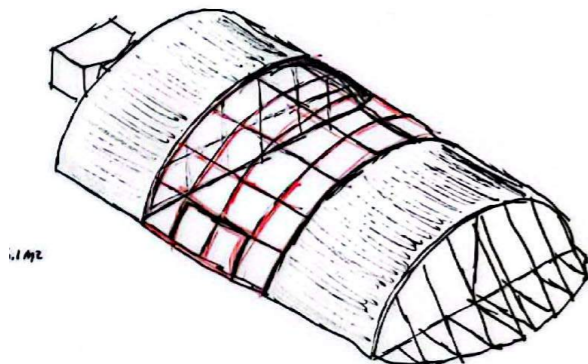
II DIVIDE



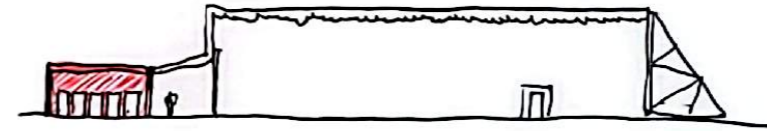
III ISOLATE



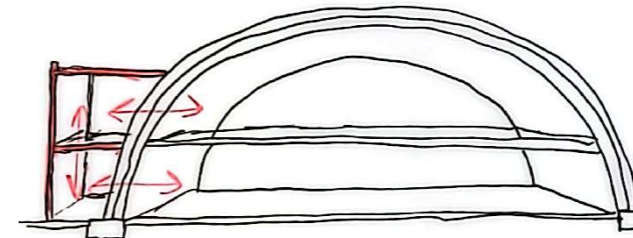
IV ADD



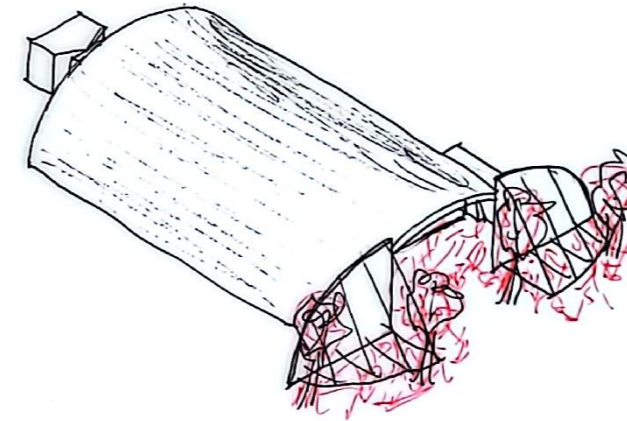
V REMOVE



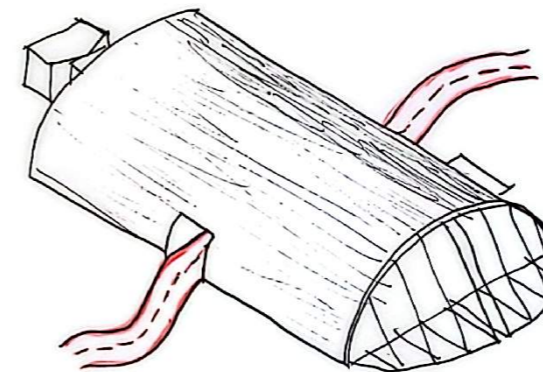
VII FACILITATE



VIII ACCES



IX ACTIVATE



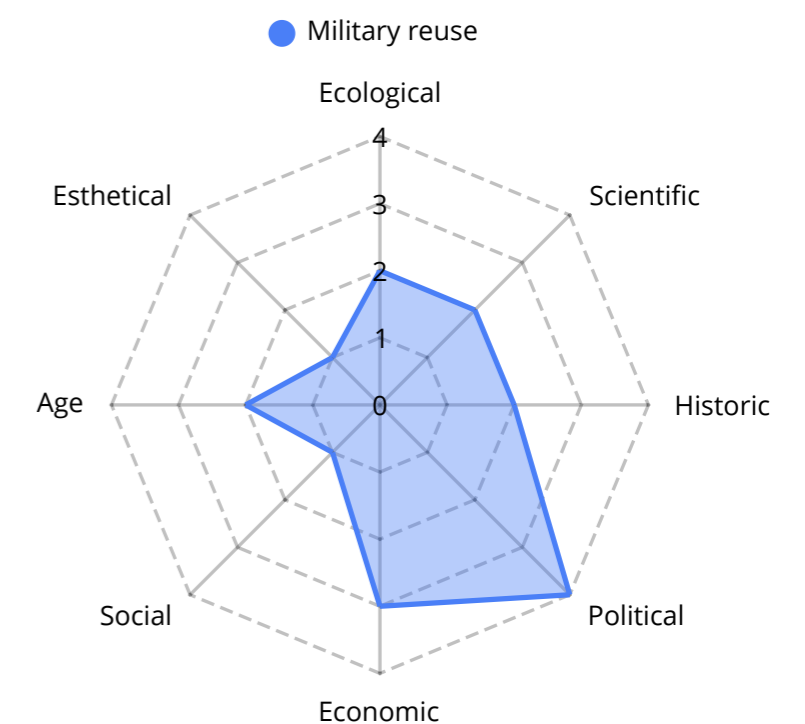
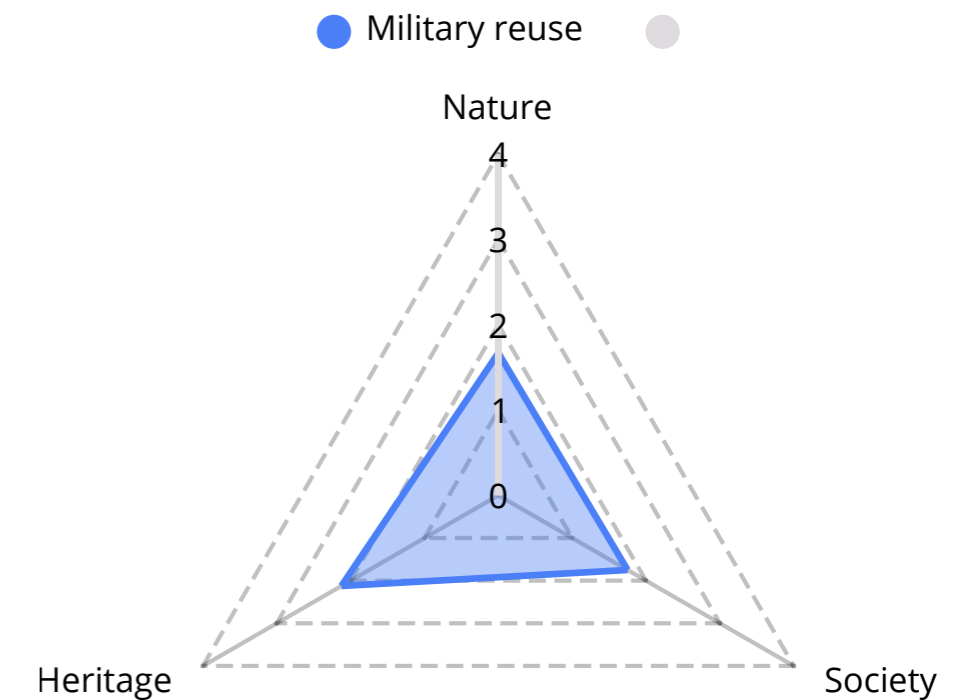
X CONNECT

EVALUATION

Cultural heritage values & Utrechts landschap

Values:

Nature:	
1.	Animals (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
2.	Plants (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
3.	Attention (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
Society:	
1.	Quality of life (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
2.	Densification (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
3.	Social and active (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
4.	Climate & energy (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
Heritage:	
1.	Average of Heritage (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
2.	Scientific (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
3.	Historic (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
4.	Political (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
5.	Economic (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
6.	Social (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
7.	Age (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)
8.	Aesthetical (1 = decrease; 2 = no change; 3 = small increase; 4 = large increase)



STRATEGIES

Curated decay & Gestalt recycling

REDUCE

Perception

Maintenance

Behavior

REUSE

Renovation

Conversion

Infill

Redesign

Subtraction

Additions

RECYCLE

Material recycling

Gestalt recycling

ENSEMBLE SCENARIOS

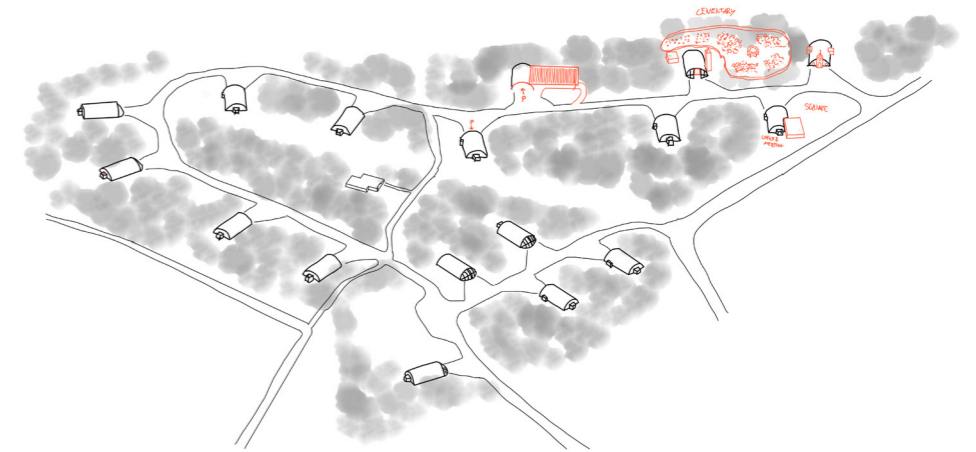
Six possible scenarios for the whole site



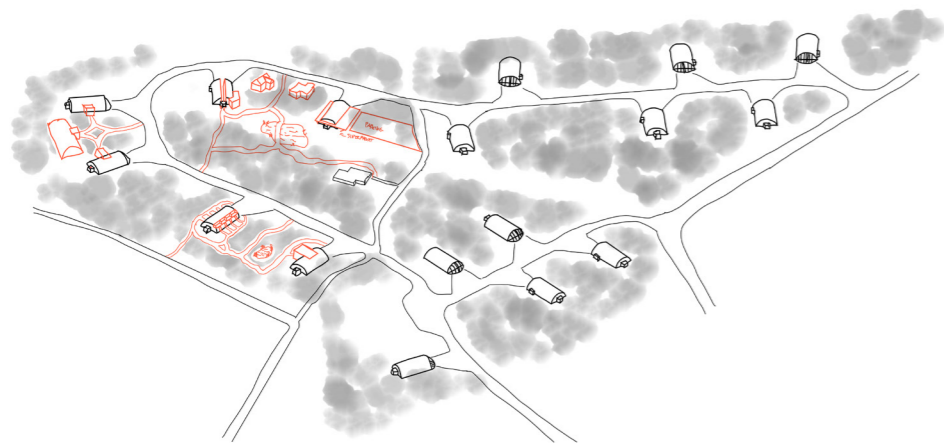
RUINS PARK



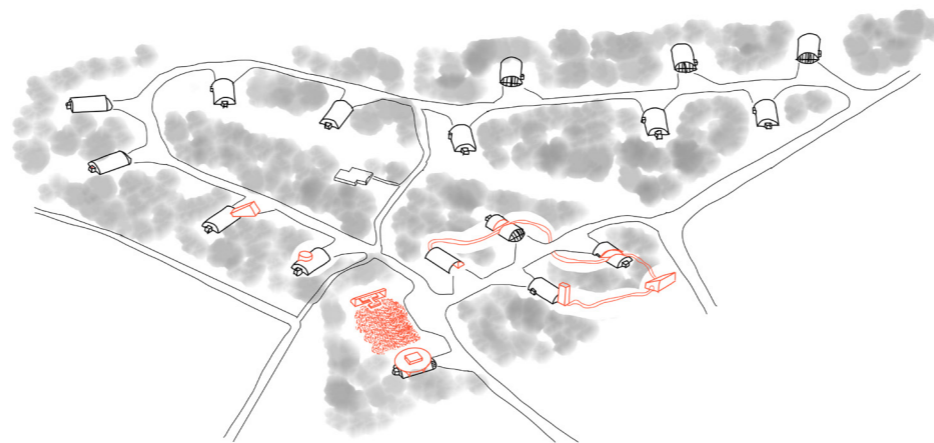
MILITARY REUSE



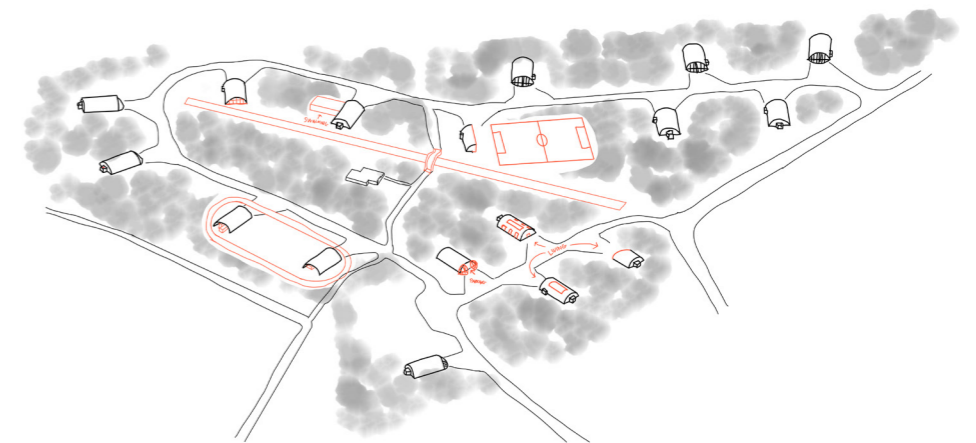
NATURAL CEMETERY



RESIDENTIAL DISTRICT



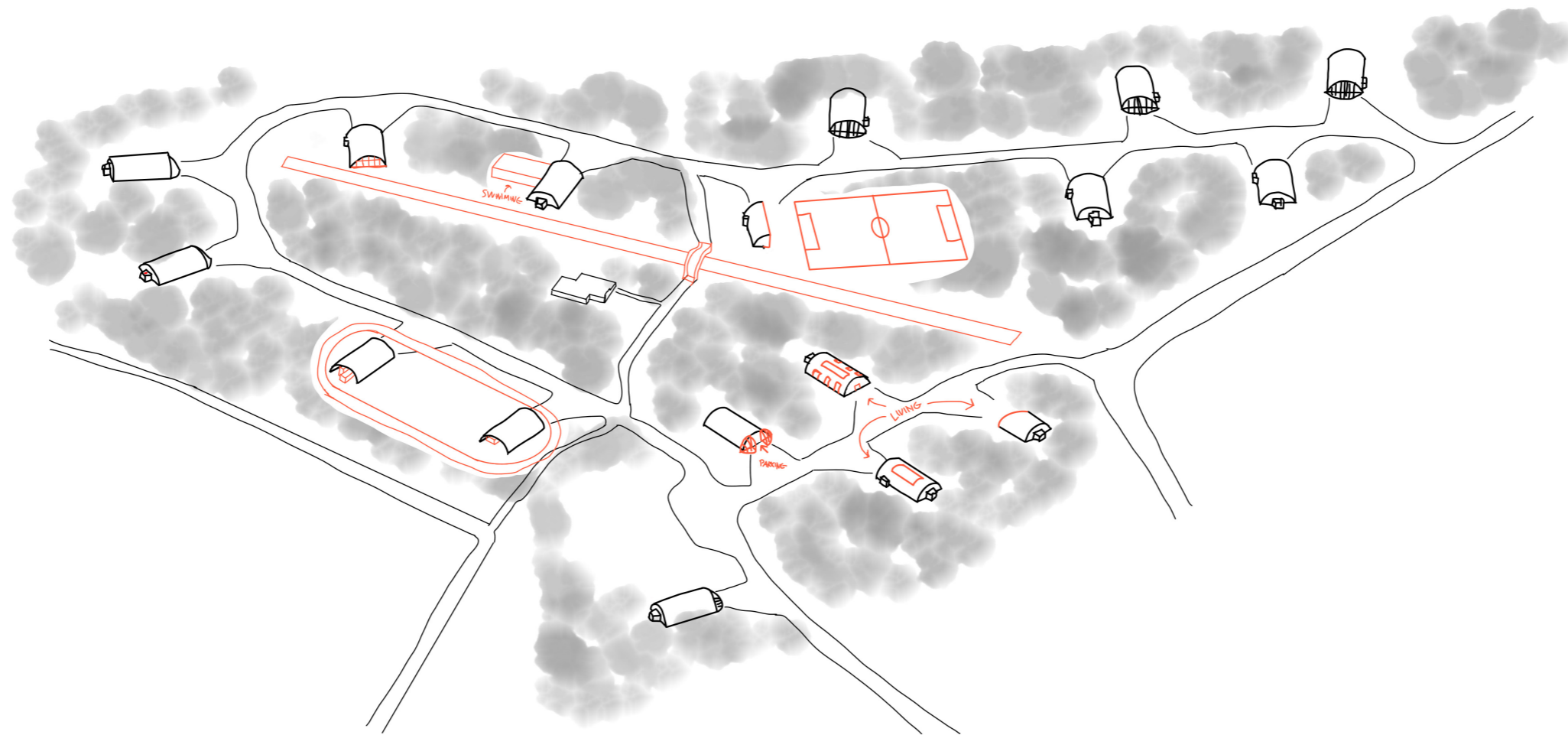
CULTURAL AREA



OLYMPIC VILLAGE

ENSEMBLE SCENARIOS

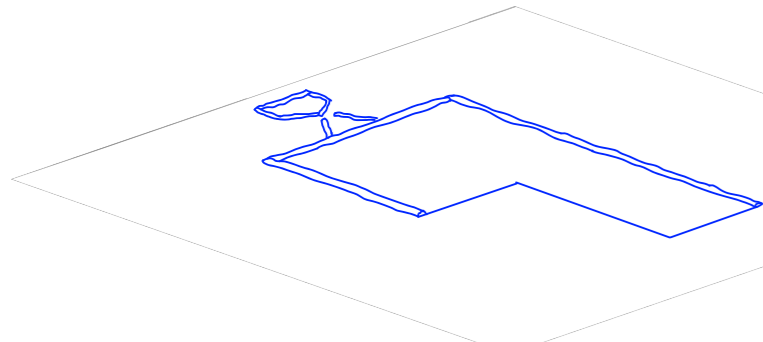
Six possible scenarios for the whole site



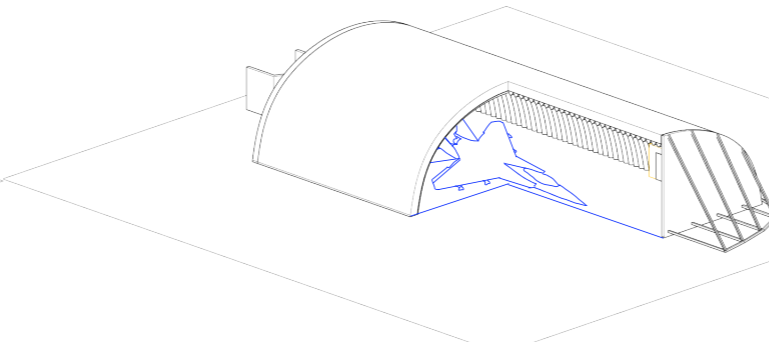
OLYMPIC VILLAGE

SHELTER SCENARIOS

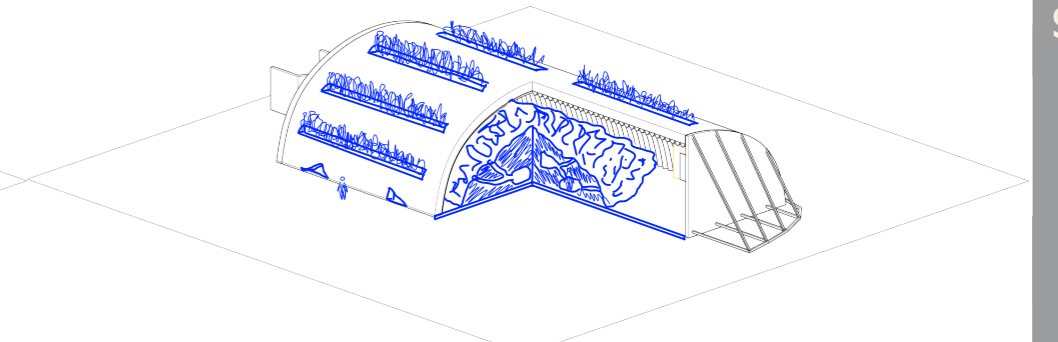
Twelve scenarios on shelter level



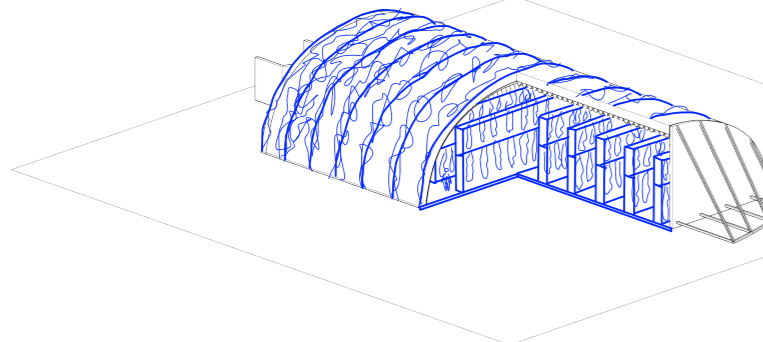
MEMORIAL



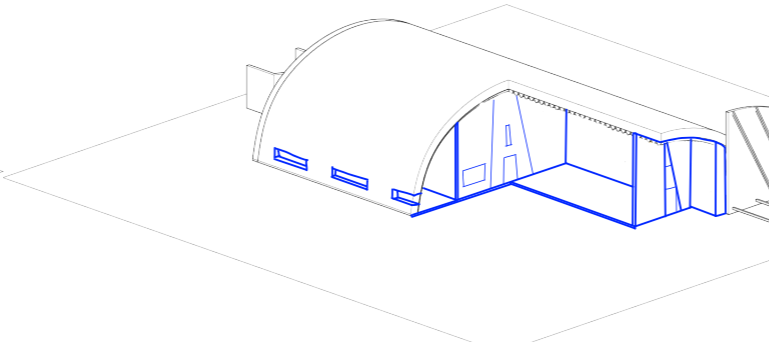
MILITARY



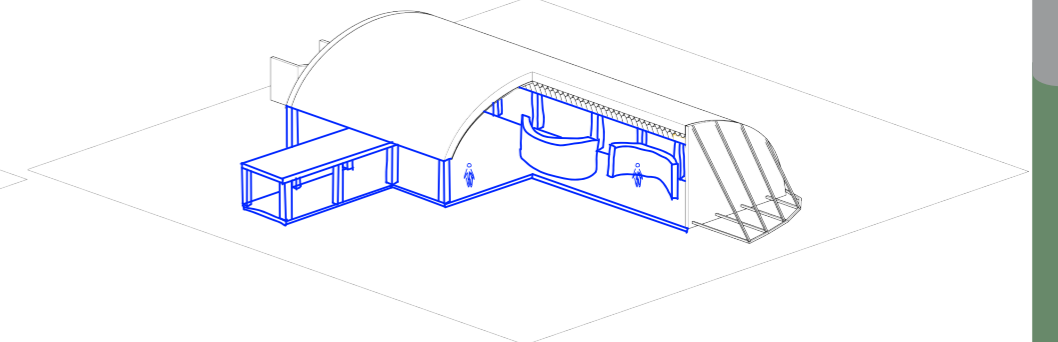
ANIMAL SHELTER



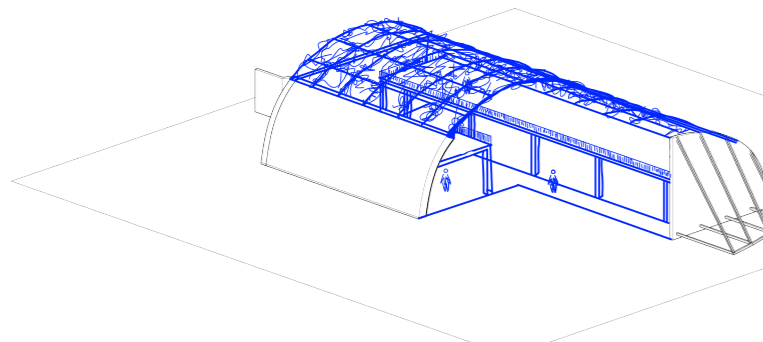
SHROOM FARM



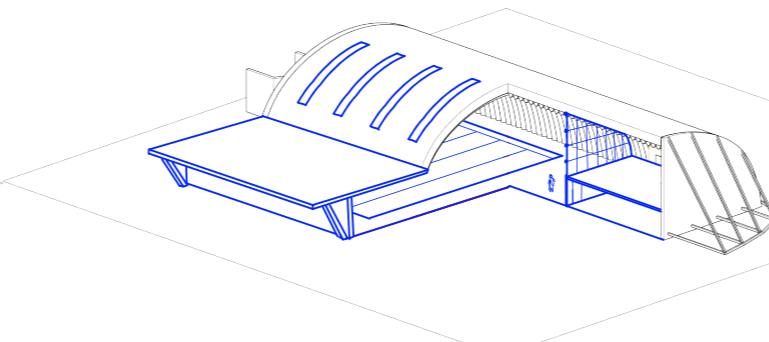
CHAPEL



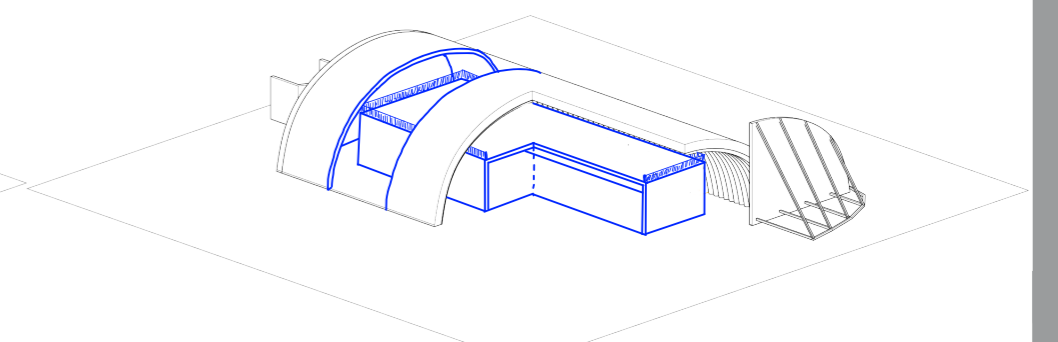
COLUMBARIUM



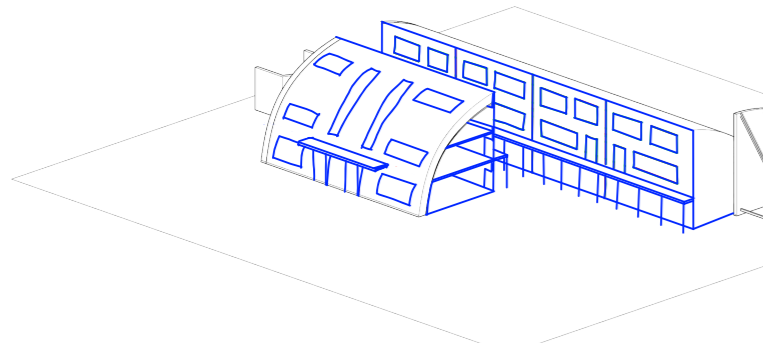
FOODHALL



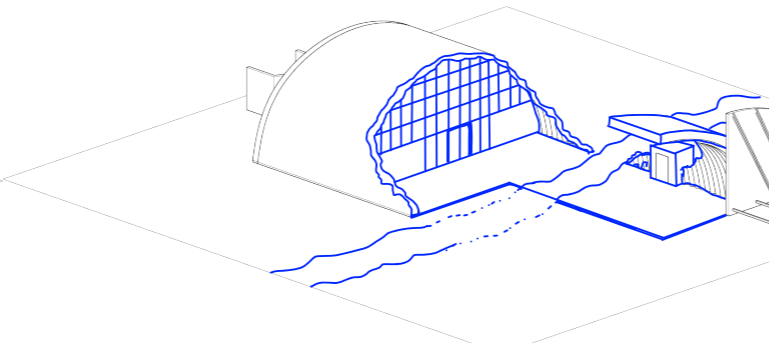
SWIMMING POOL



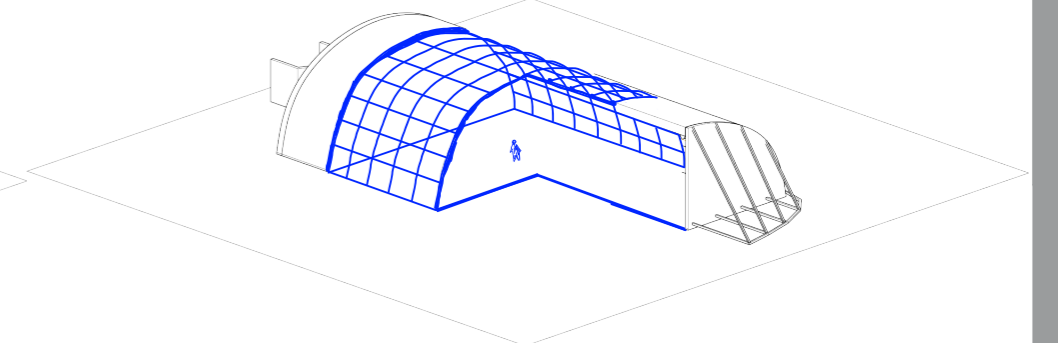
SCHOOL



HOUSING



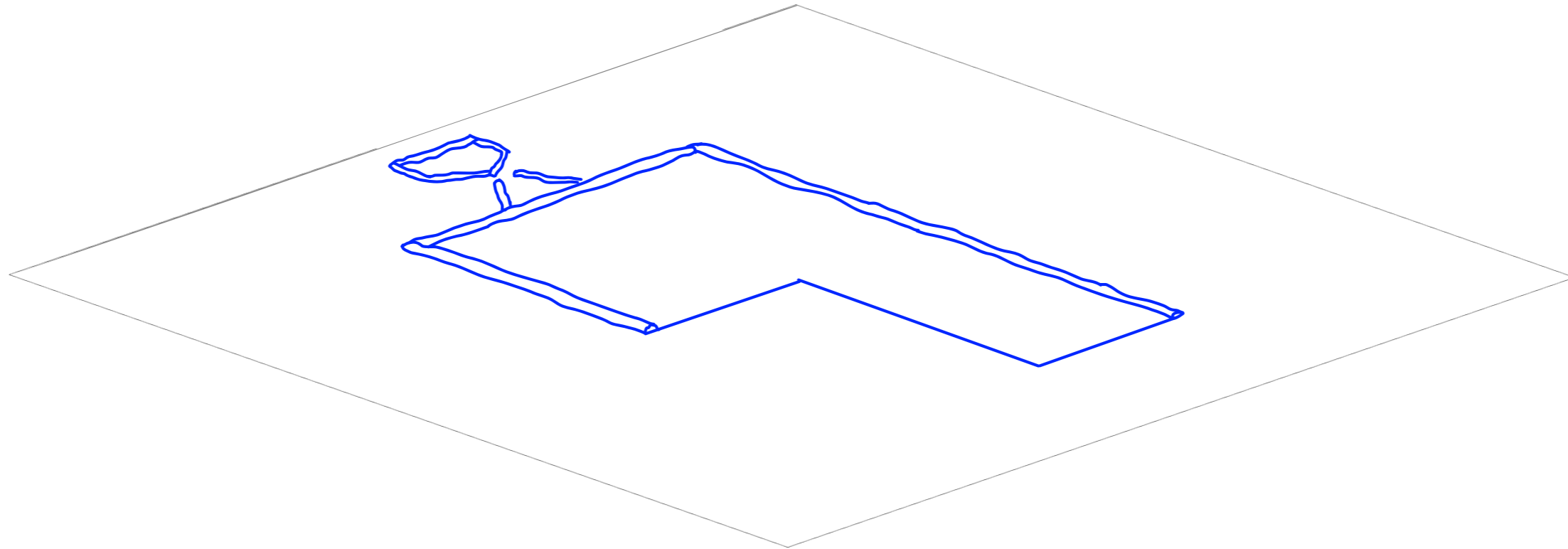
EVENT RUIN



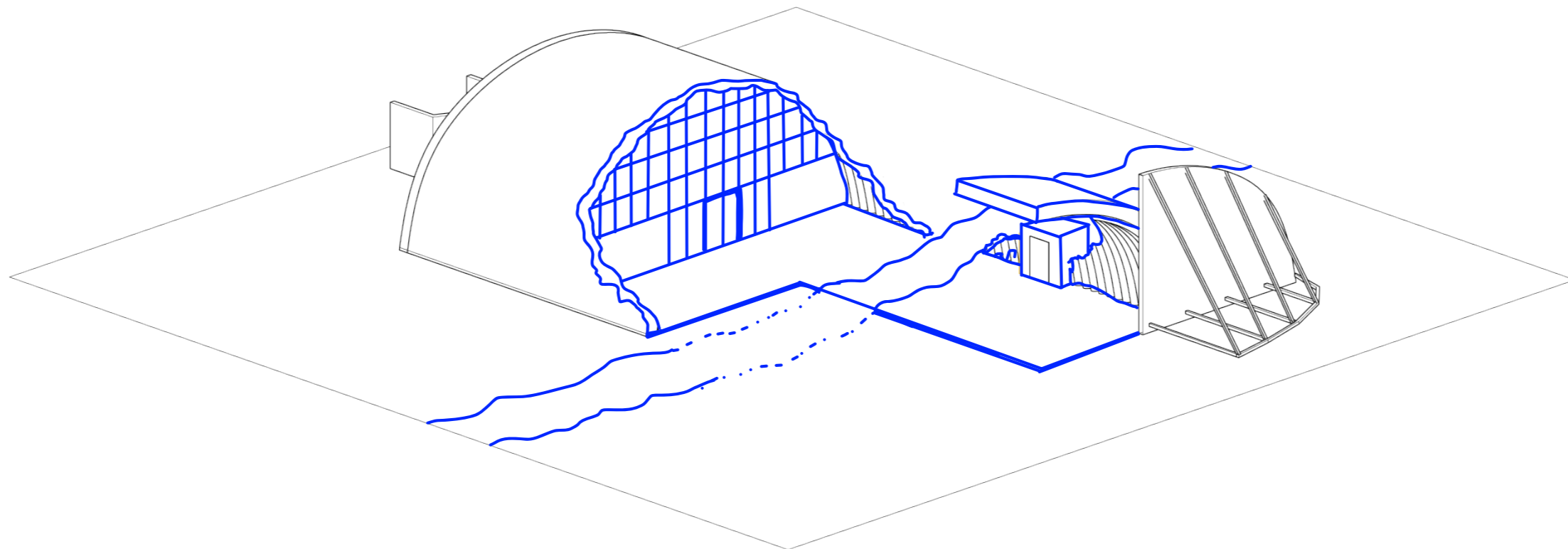
RESTAURANT

SHELTER SCENARIOS

Twelve scenarios on shelter level



MEMORIAL



EVENT RUIN

EVALUATION

Conflicts & impact

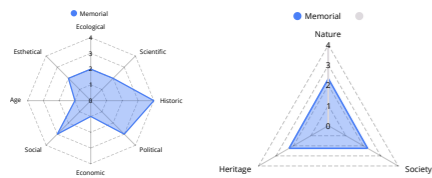
Evaluation Memorial

- Intervention:
- 95% Removed & 0% Added
 - Method V

- Public/Private
- Public

- Occupation:
- Once a year a large ceremony
 - 09:00-22:00

Heritage & Utrechts Landschap



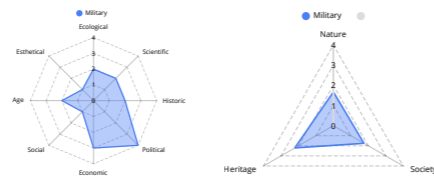
Evaluation Military

- Intervention:
- 0% Removed & 0% Added
 - Method IX

- Public/Private
- Private

- Occupation:
- Whole year round
 - 00:00-24:00

Heritage & Utrechts Landschap



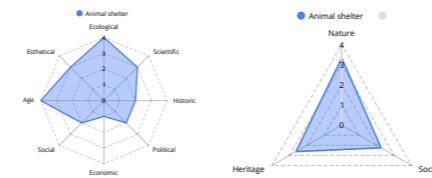
Evaluation Animal shelter

- Intervention:
- 15% Removed & 0% Added
 - Method I

- Public/Private
- Private

- Occupation:
- closed all year
 - closed

Heritage & Utrechts Landschap



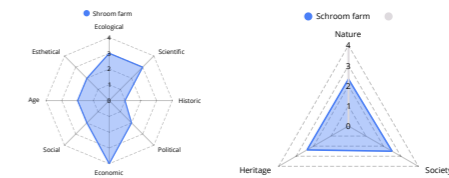
Evaluation Shroom farm

- Intervention:
- 0% Removed & 20% Added
 - Method III

- Public/Private
- Private

- Occupation:
- Mon-Sat
 - 09:00-17:00

Heritage & Utrechts Landschap



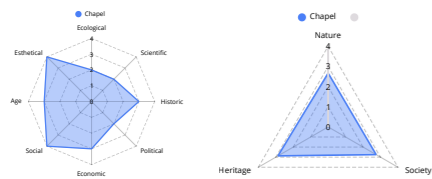
Evaluation Chapel

- Intervention:
- 10% Removed & 50% Added
 - Method I, II, IX & X

- Public/Private
- Semi Public

- Occupation:
- Few times a week
 - 09:00-14:00 & 17:00-22:00

Heritage & Utrechts Landschap



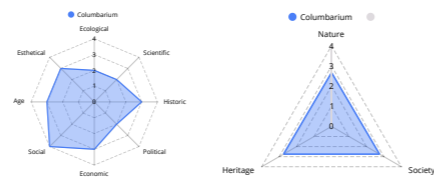
Evaluation Columbarium

- Intervention:
- 50% Removed & 30% Added
 - Method IV, V & IX

- Public/Private
- Public

- Occupation:
- Whole year round
 - 08:00-22:00

Heritage & Utrechts Landschap



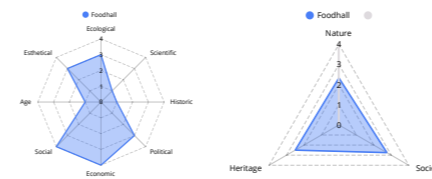
Evaluation Foodhall

- Intervention:
- 45% Removed & 50% Added
 - Method II, V & VII

- Public/Private
- Semi-Public

- Occupation:
- From spring till autumn
 - 11:00-01:00

Heritage & Utrechts Landschap



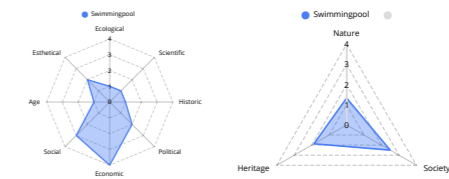
Evaluation Swimming pool

- Intervention:
- 30% Removed & 60% Added
 - Method I,II,IV,V

- Public/Private
- Semi-Public

- Occupation:
- Whole year round
 - 07:00-21:00

Heritage & Utrechts Landschap



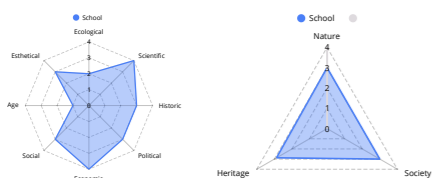
Evaluation School

- Intervention:
- 35% Removed & 60% Added
 - Method III & V

- Public/Private
- Semi Public

- Occupation:
- Mon-Fri
 - 08:00-16:00

Heritage & Utrechts Landschap



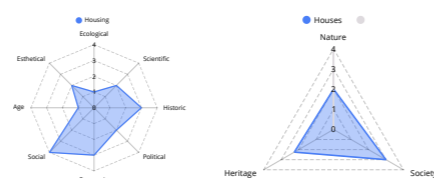
Evaluation Housing

- Intervention:
- 35% Removed & 60% Added
 - Method III & V

- Public/Private
- Semi Public

- Occupation:
- Mon-Fri
 - 08:00-16:00

Heritage & Utrechts Landschap



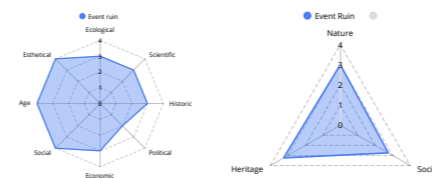
Evaluation Event ruin

- Intervention:
- 75% Removed & 40% Added
 - Method IV,V, IX & X

- Public/Private
- Semi Public

- Occupation:
- Wed-Sun
 - 12:00-02:00

Heritage & Utrechts Landschap



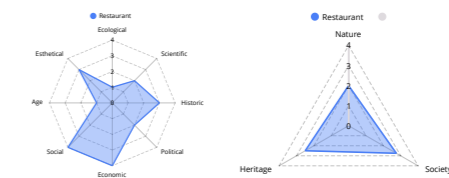
Evaluation Restaurant

- Intervention:
- 80% Removed & 80% Added
 - Method IV,V

- Public/Private
- Semi-Public

- Occupation:
- Wed-Sun
 - 14:00-24:00

Heritage & Utrechts Landschap



EVALUATION

Selection & conclusion

Evaluation Event ruin

Intervention:

- 75% Removed & 40% Added
- Method IV,V, IX & X

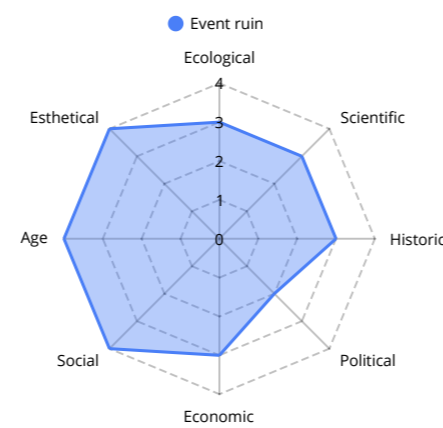
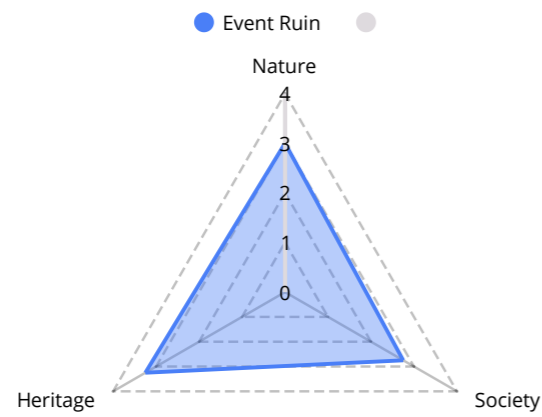
Public/Private

- Semi Public

Occupation:

- Wed-Sun
- 12:00-02:00

Heritage & Utrechts Landscha



Evaluation Cemetery

Intervention



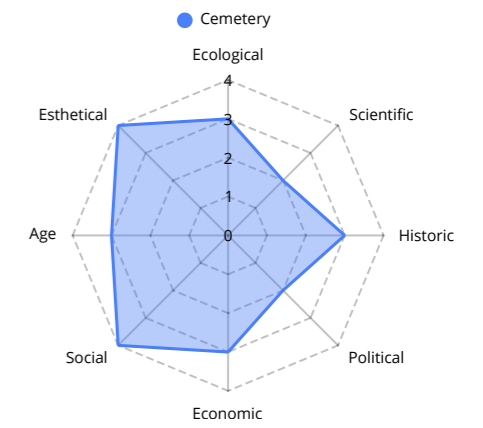
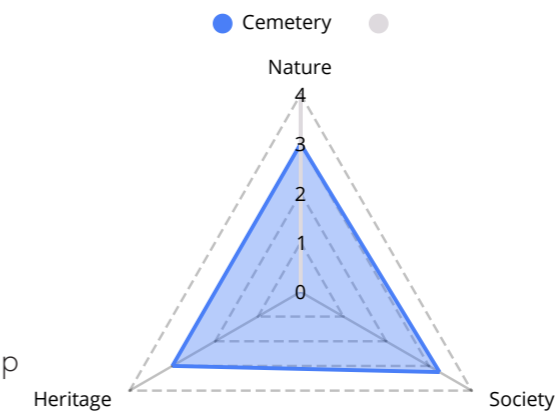
Public/Private



Occupation



Heritage & Utrechts Landschap



Evaluation School

Intervention:

- 35% Removed & 60% Added
- Method III & V

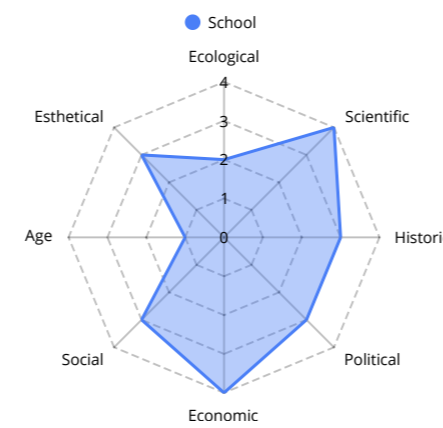
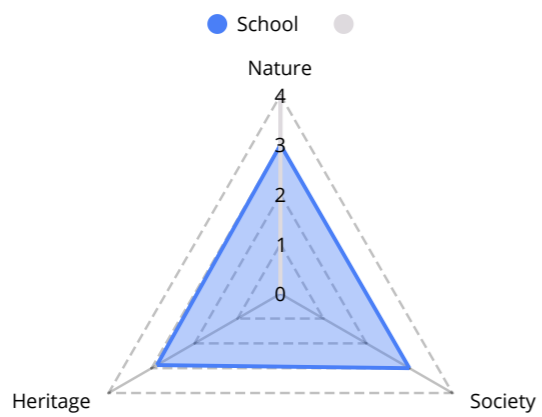
Public/Private

- Semi Public

Occupation:

- Mon-Fri
- 08:00-16:00

Heritage & Utrechts Landscha



Evaluation Cultural area

Intervention



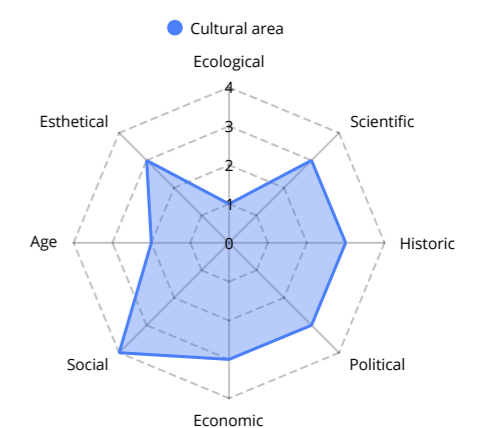
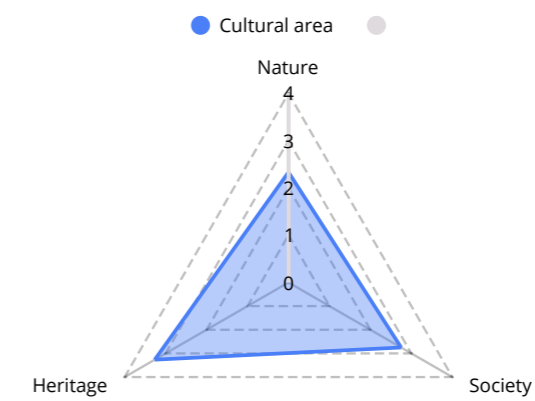
Public/Private



Occupation



Heritage & Utrechts Landschap



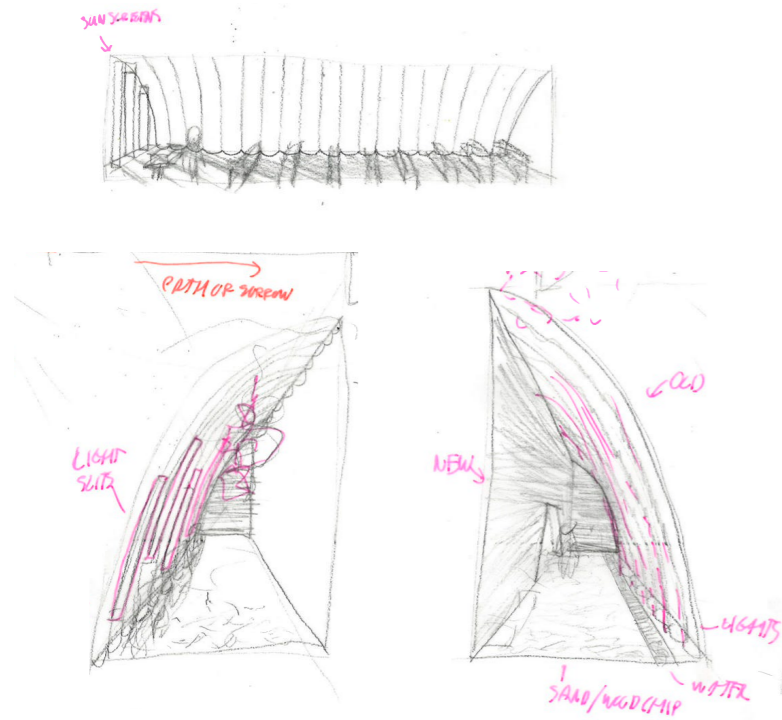
CHOSEN SCENARIO

Natural cemetery



DESIGN RESEARCH

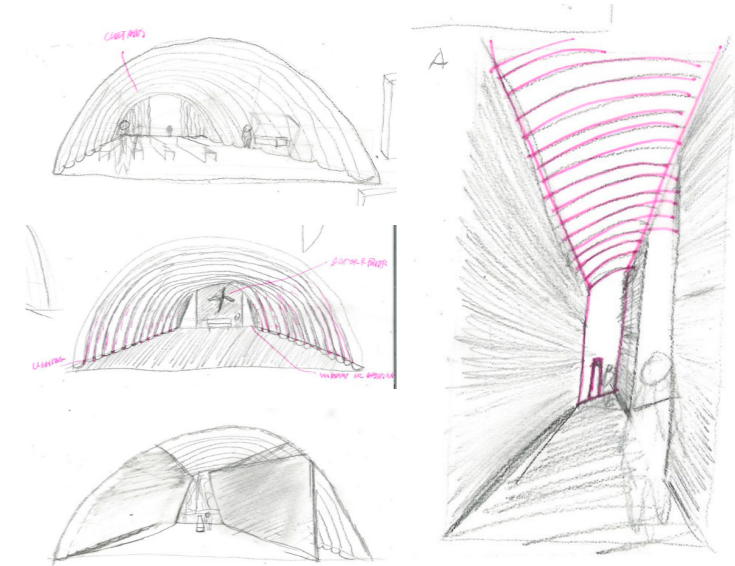
Daylight, routing, atmosphere & architectural concept



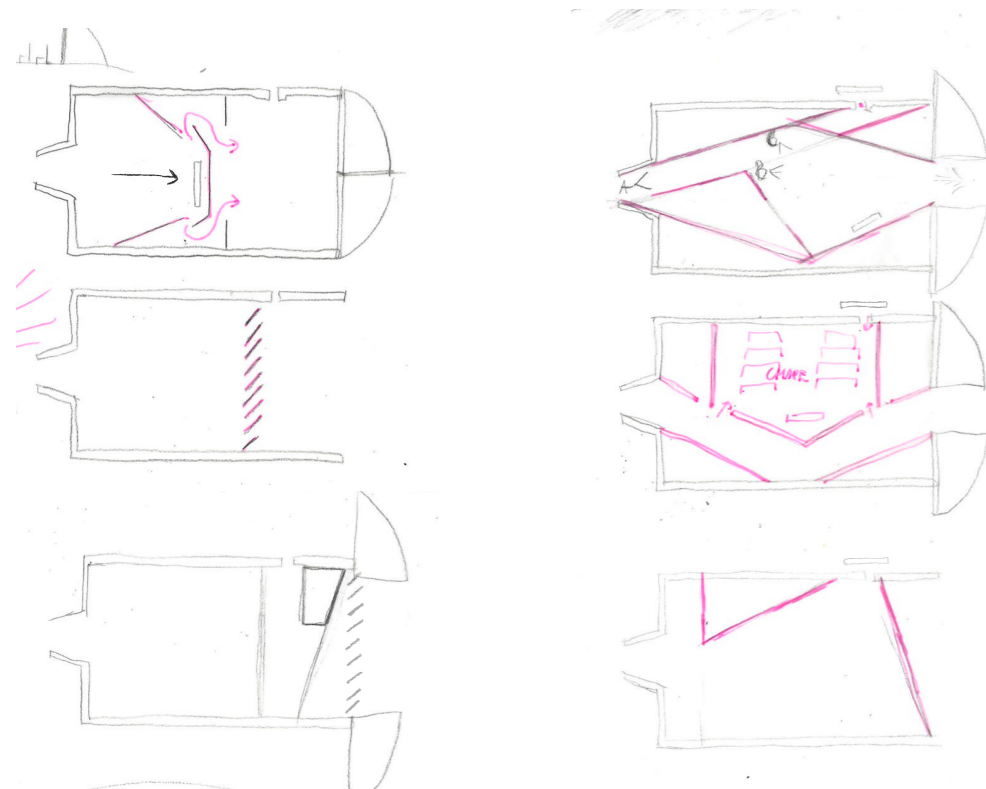
LIGHT STUDIES



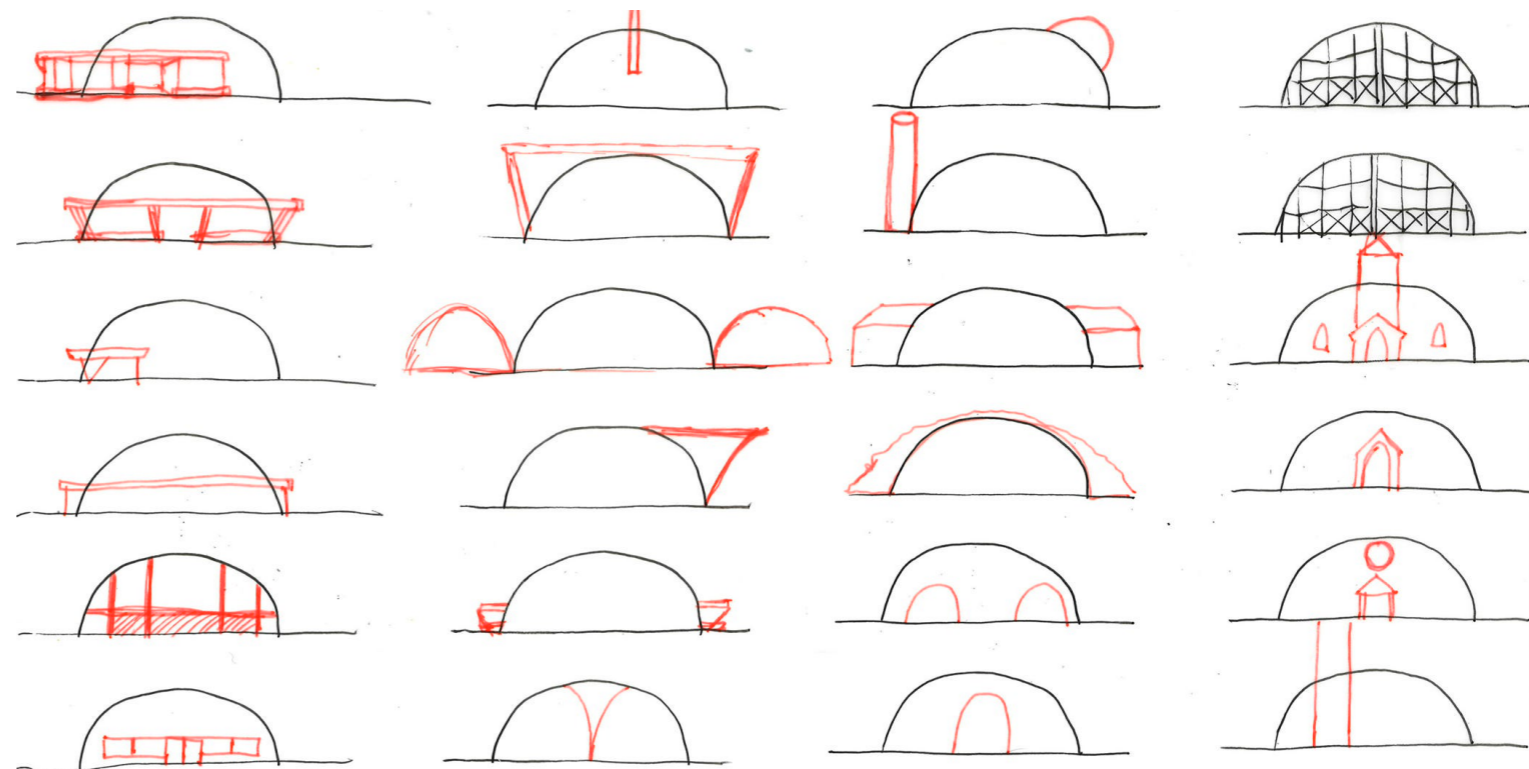
ROUTING



ATMOSPHERE



ARCHITECTURAL CONCEPT

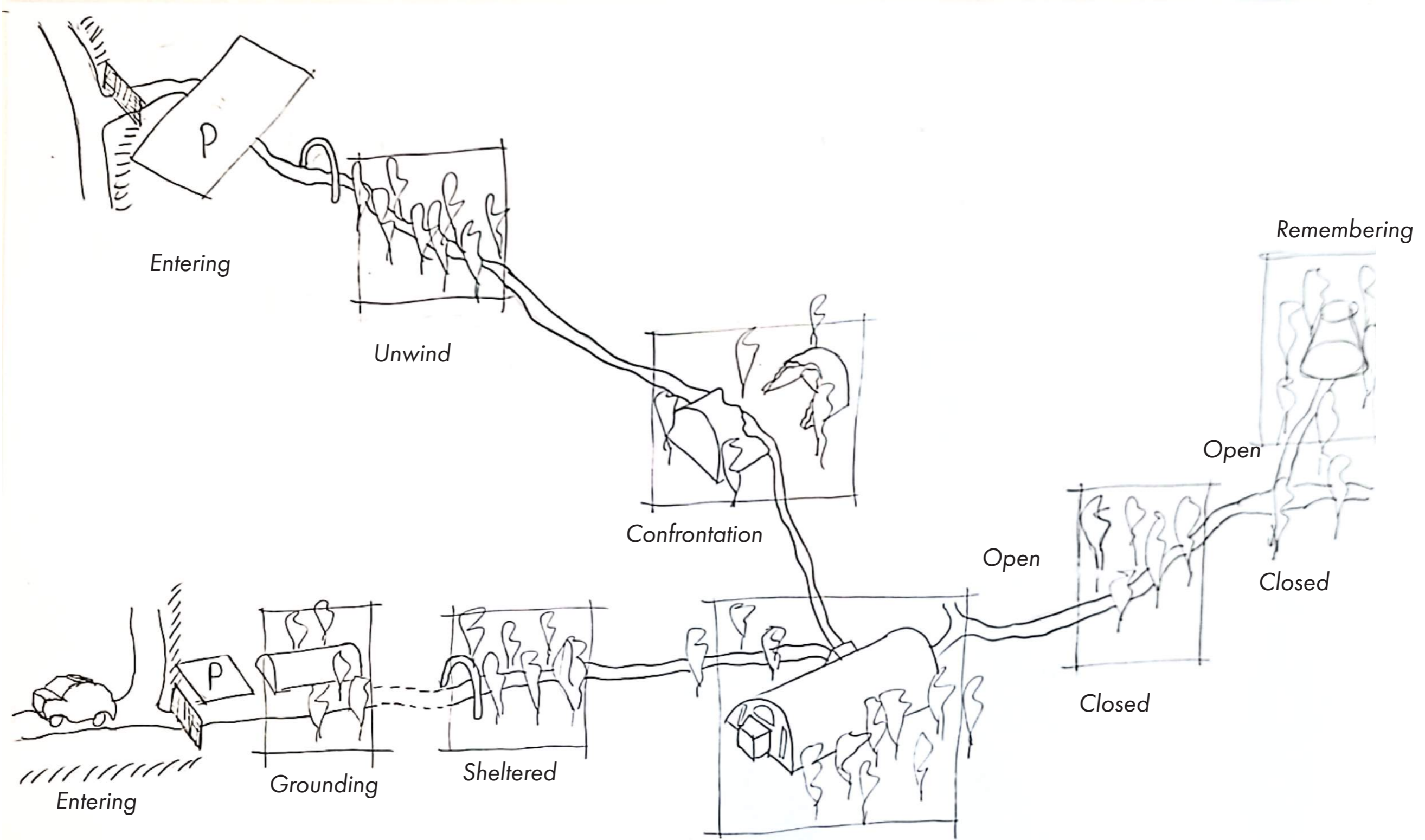


ROUTING

Guiding visitors in their loss

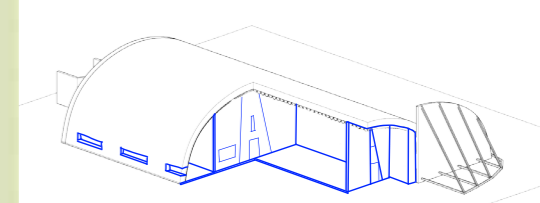
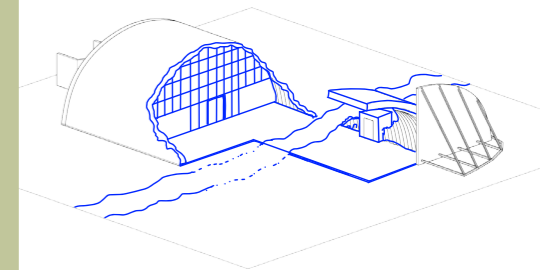
The path of loss

Every day life  Last rites

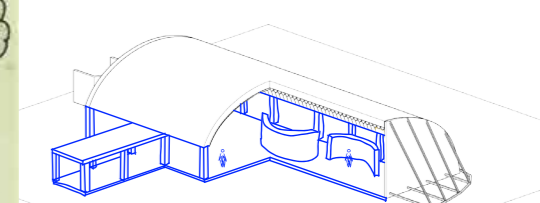


SITE PLAN

Reused shelters & paths



CHAPEL



COLUMBARIUM

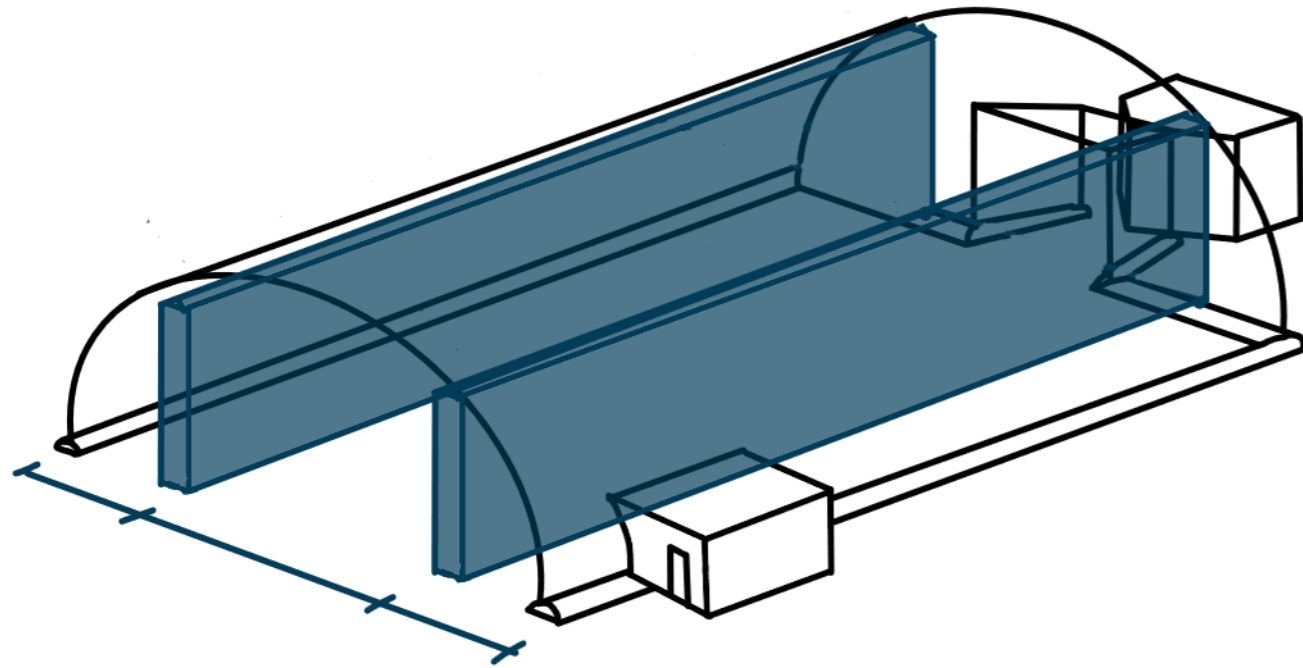
SITE ATMOSPHERE

Sandbags & memorance

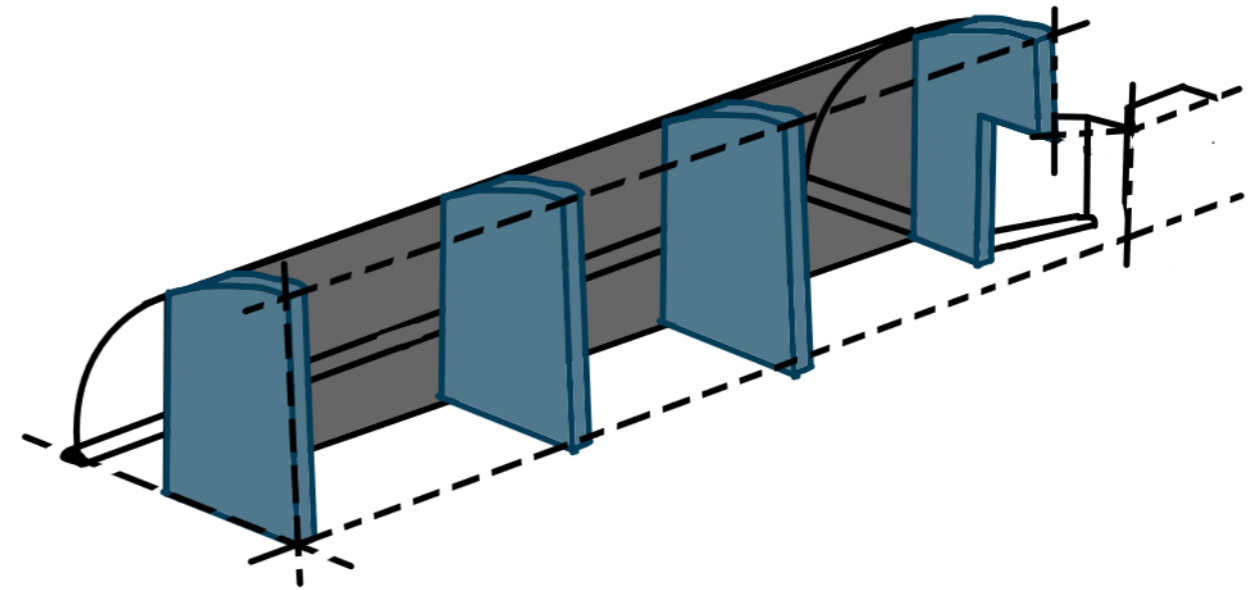


DESIGN CONCEPT

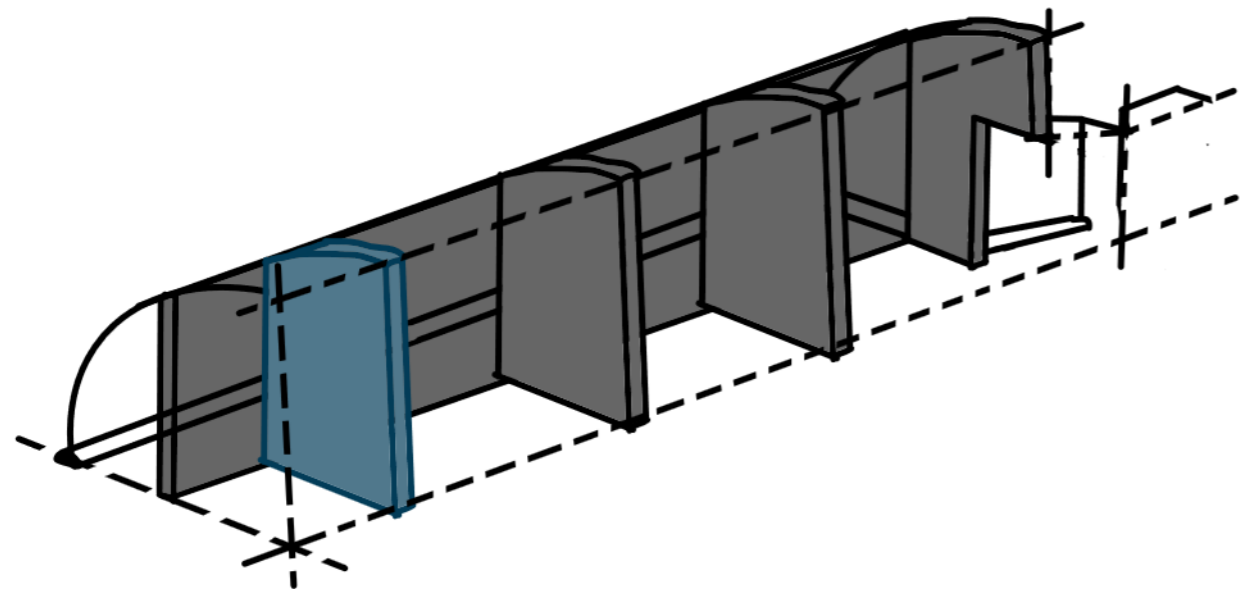
Interventions & Additions



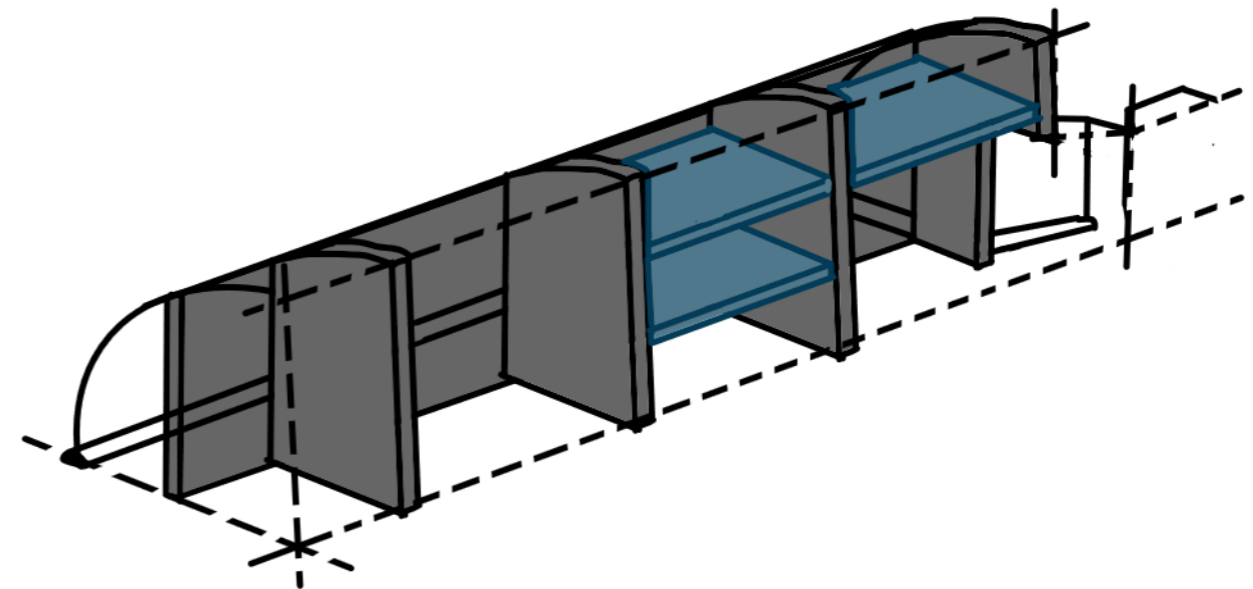
SHELTER SPLIT INTO THREE VOLUMES



MAIN VOLUME DIVIDED INTO THREE



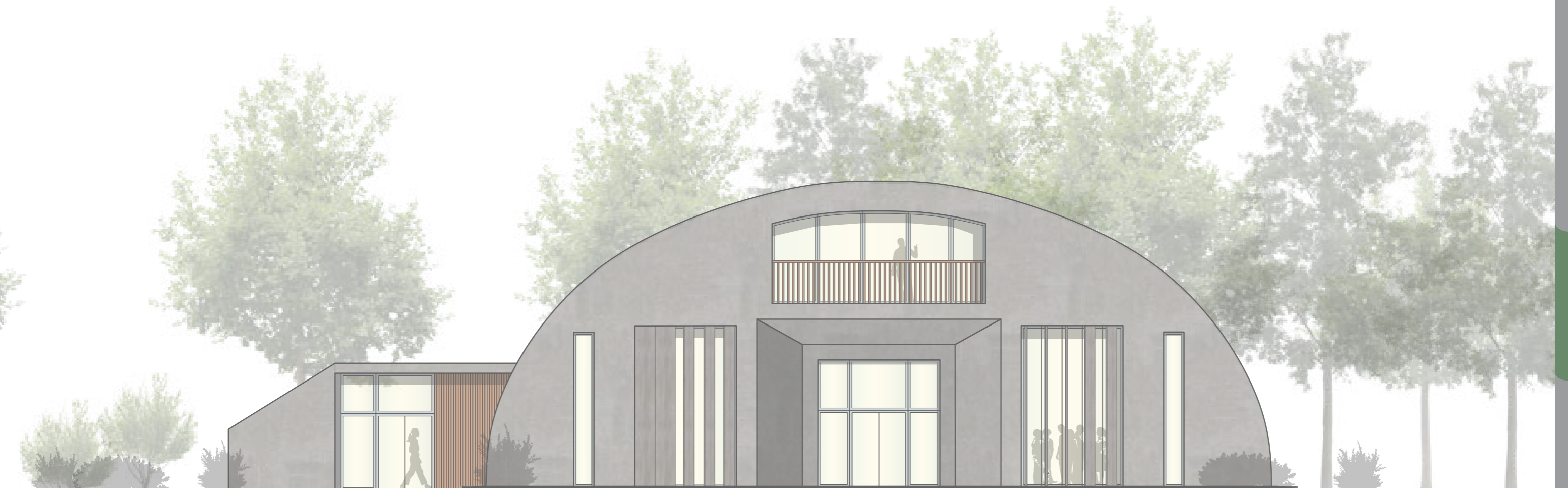
SEMI OUTSIDE SPACE CREATED



FLOORS CREATING DIFFERENT SPACES

FACADES

Back facade



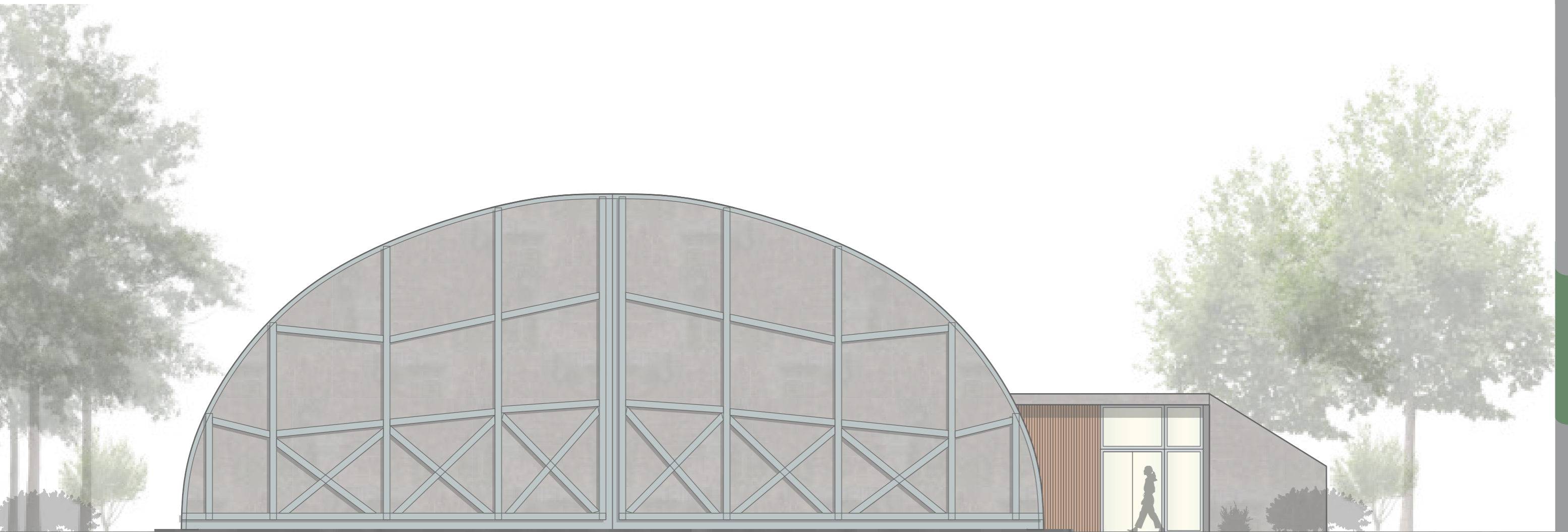
FACADE

Side facade



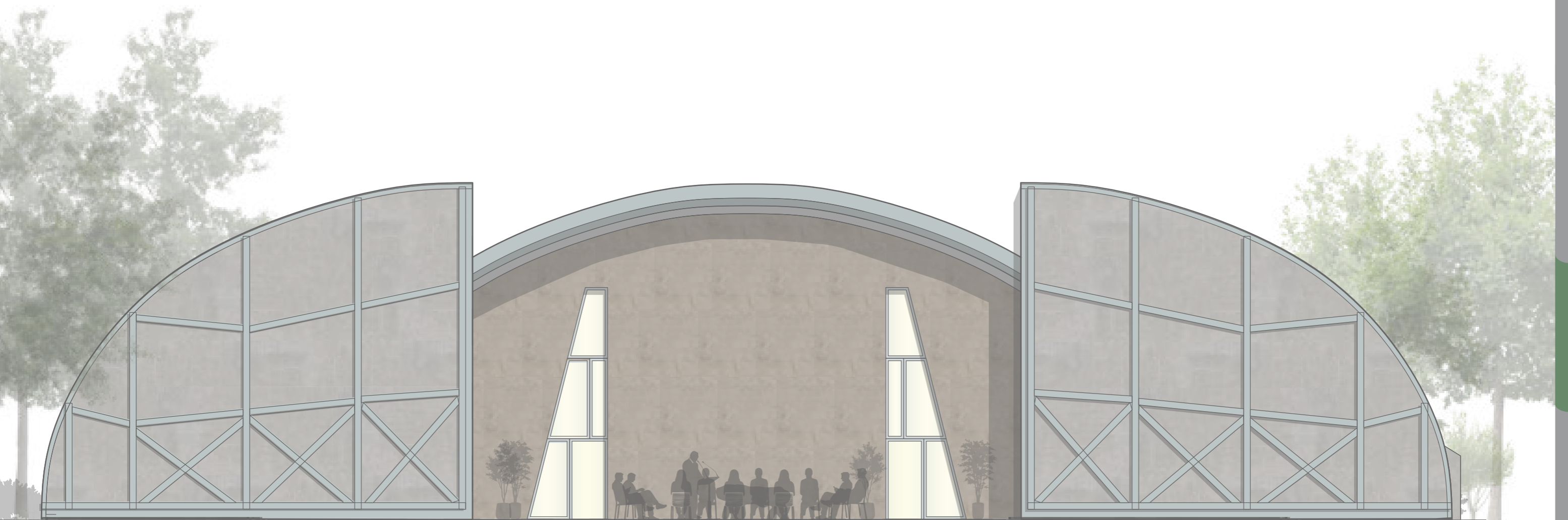
FACADES

Front facade closed



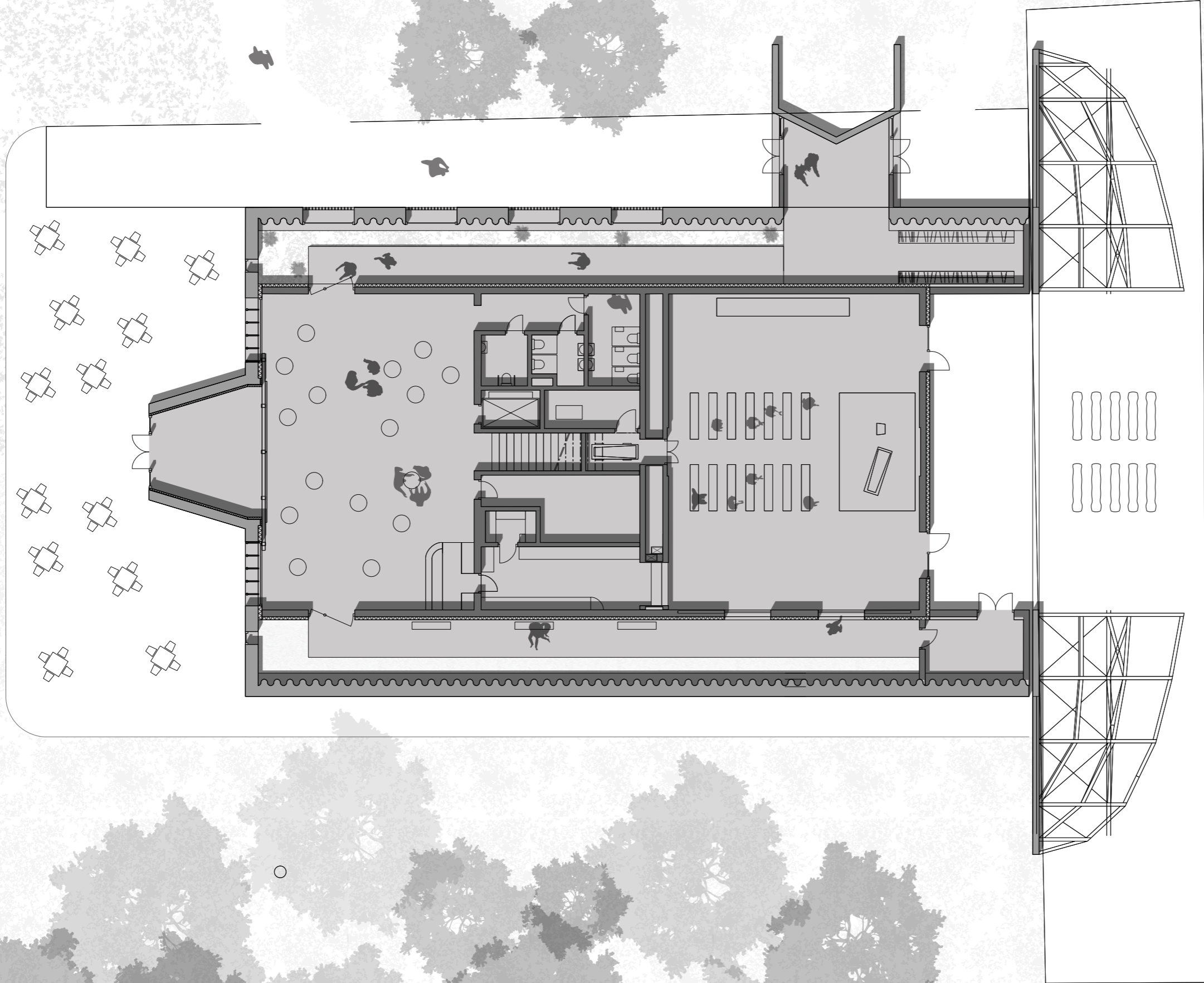
FACADES

Front facade open



FLOORPLAN

Ground floor

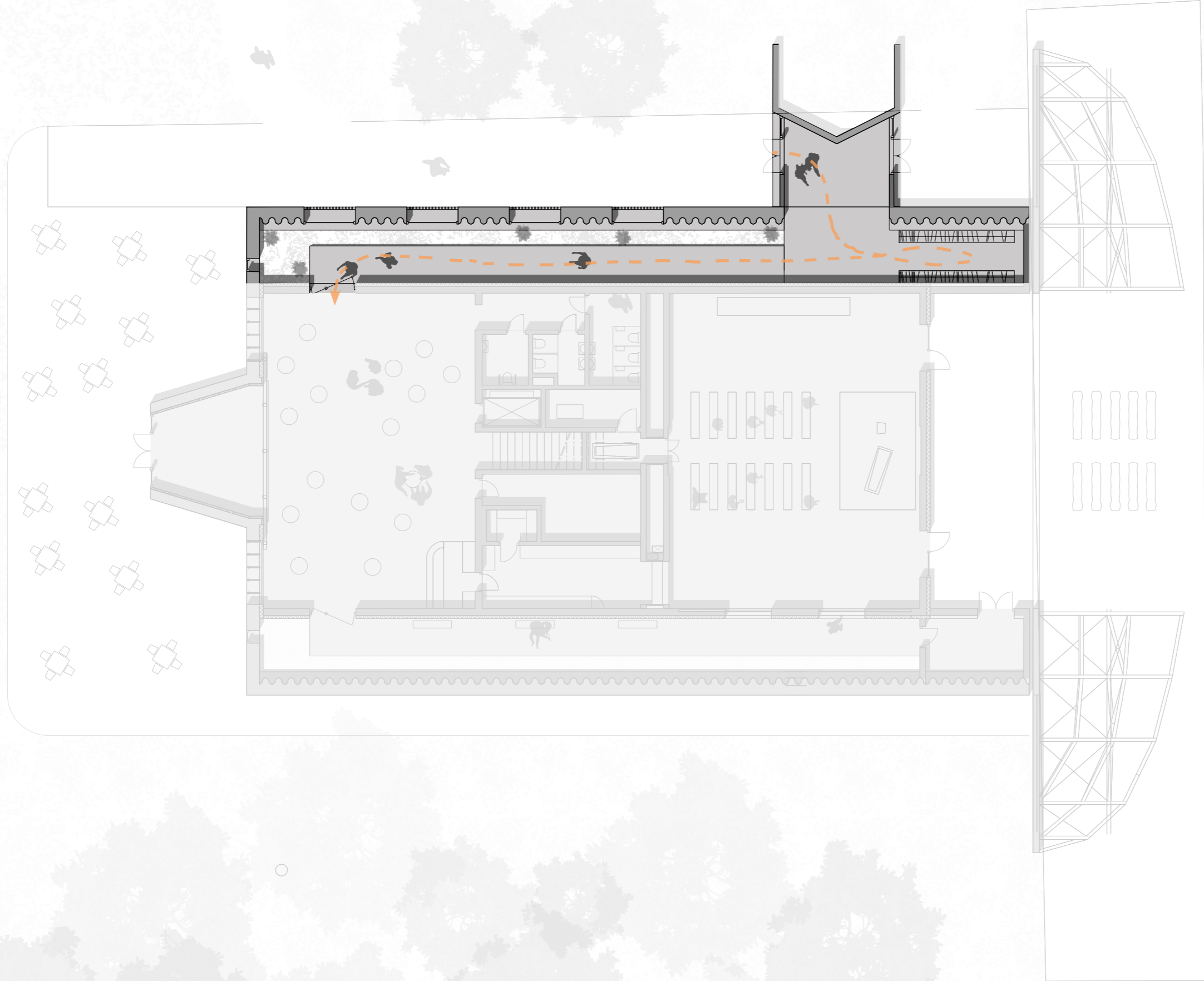


0 2 4 6 8 10m



FLOORPLAN

Ground floor

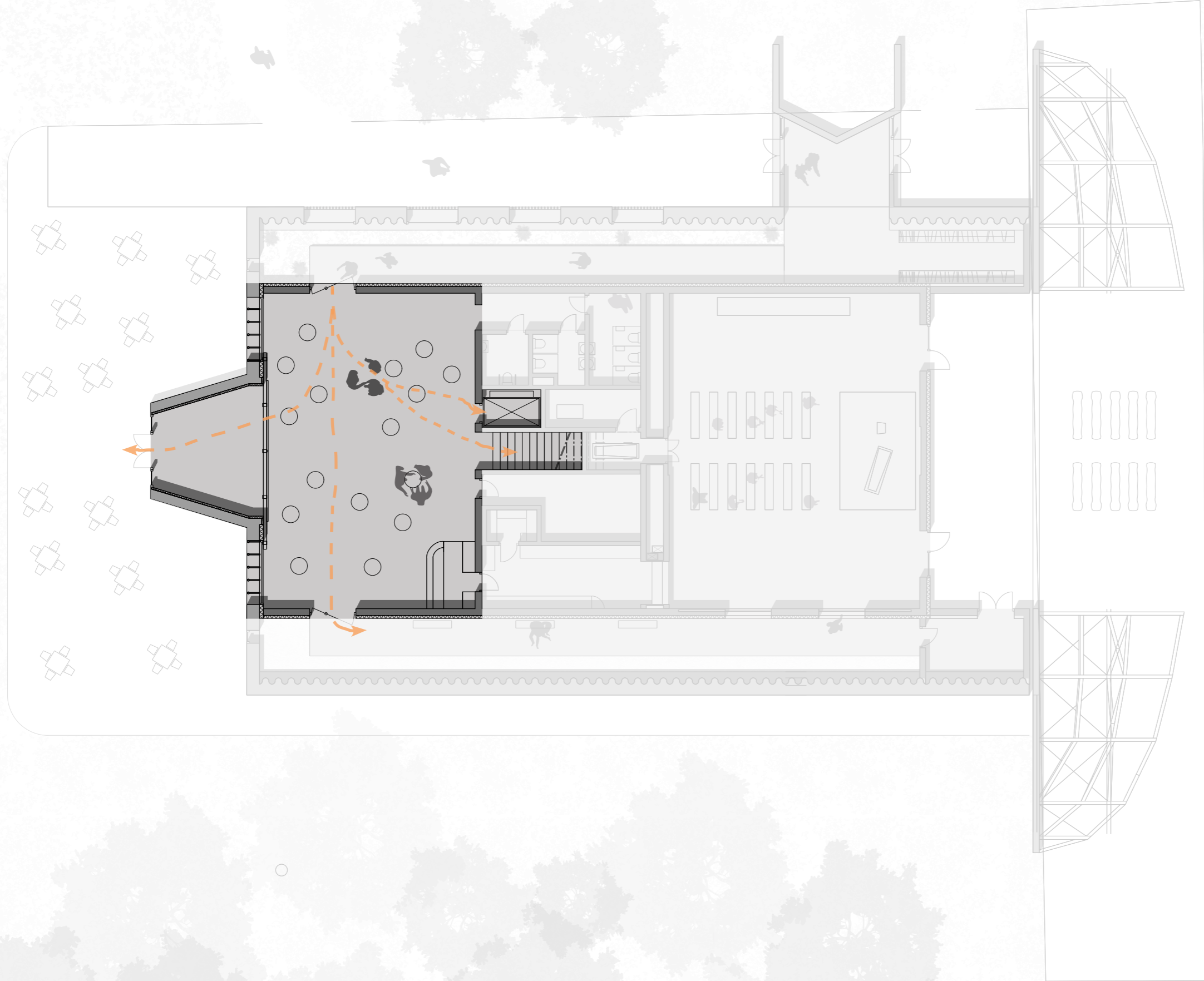


0 2 4 6 8 10m



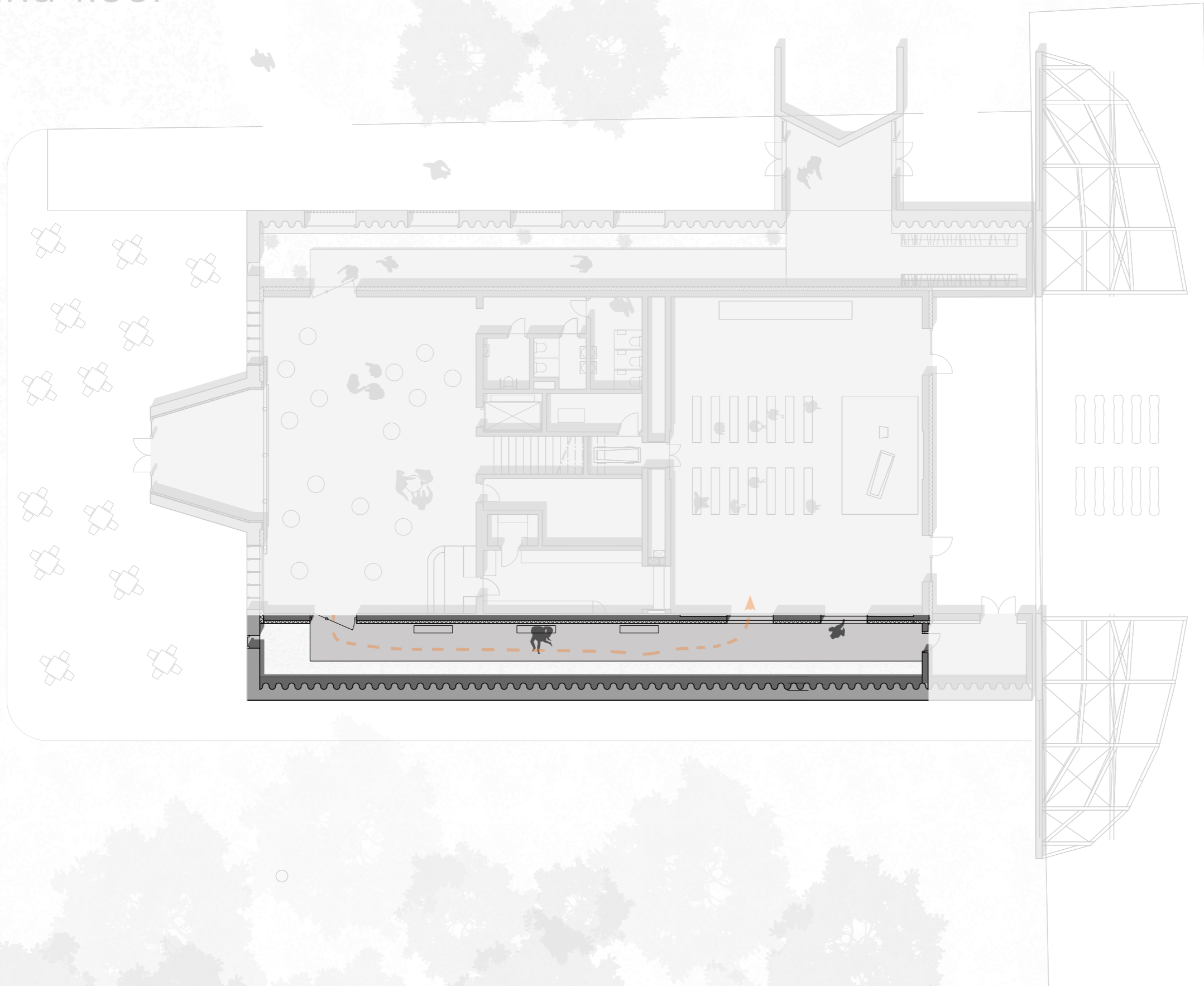
FLOORPLAN

Ground floor



FLOORPLAN

Ground floor

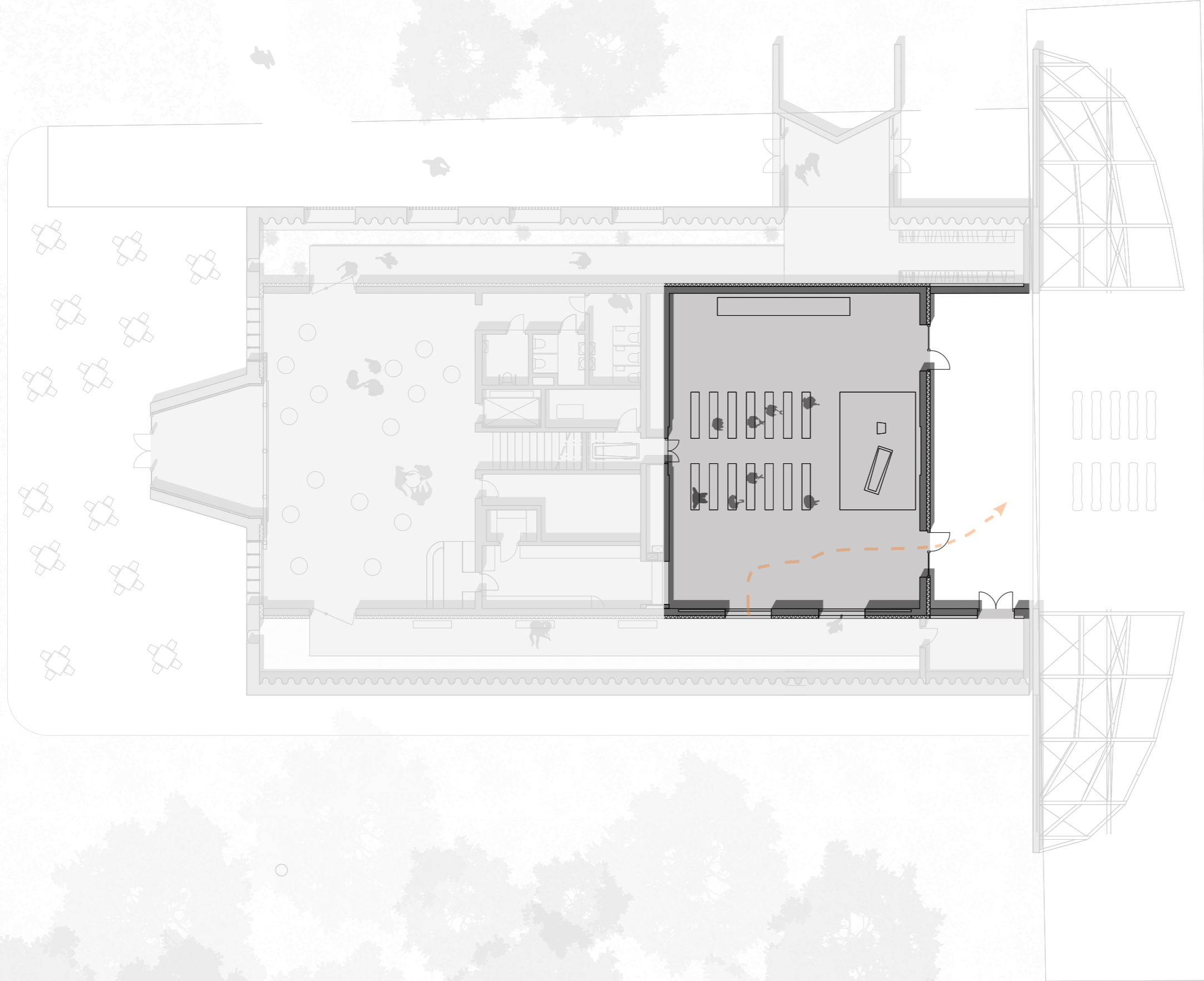


0 2 4 6 8 10m



FLOORPLAN

Ground floor

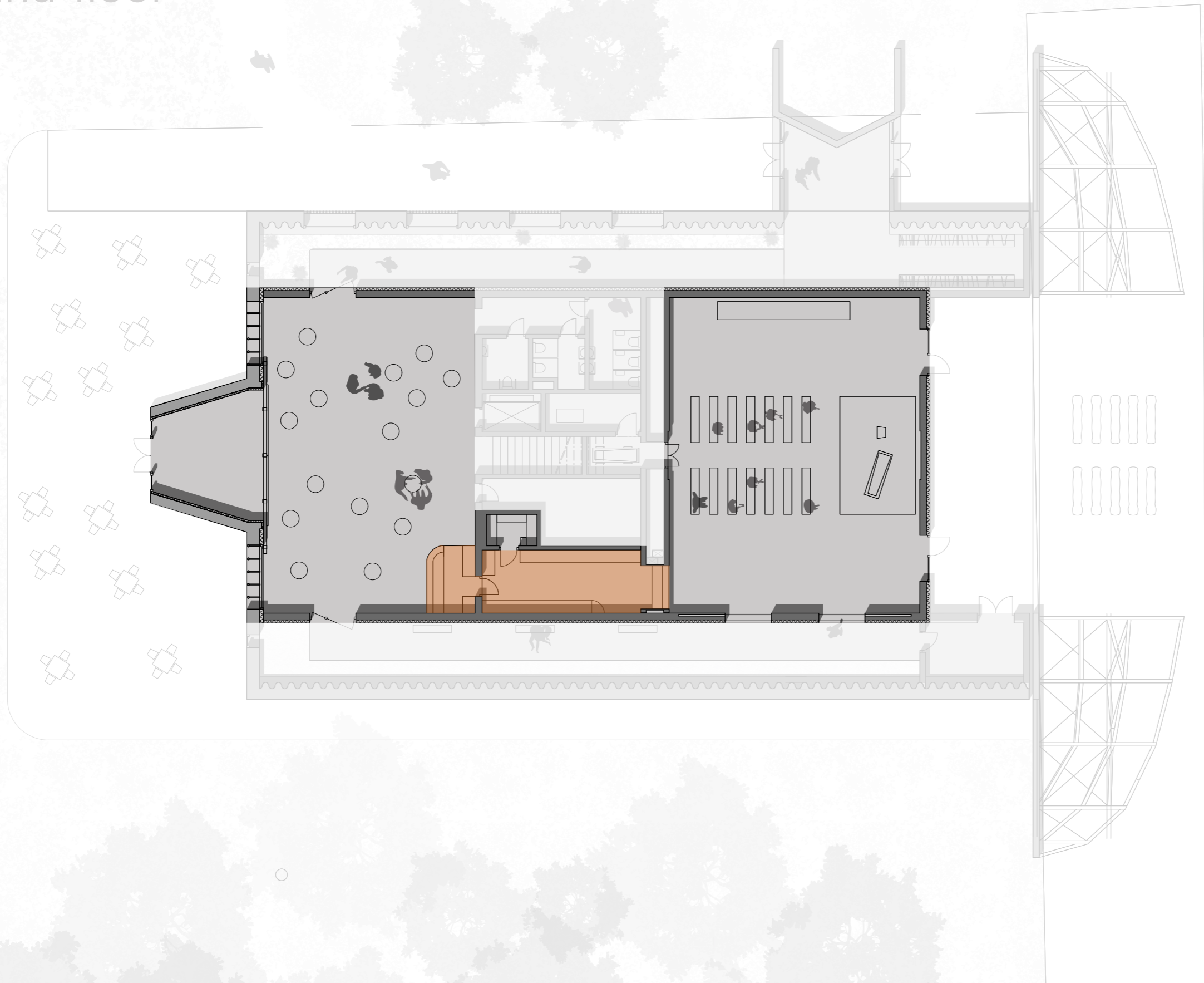


0 2 4 6 8 10m



FLOORPLAN

Ground floor

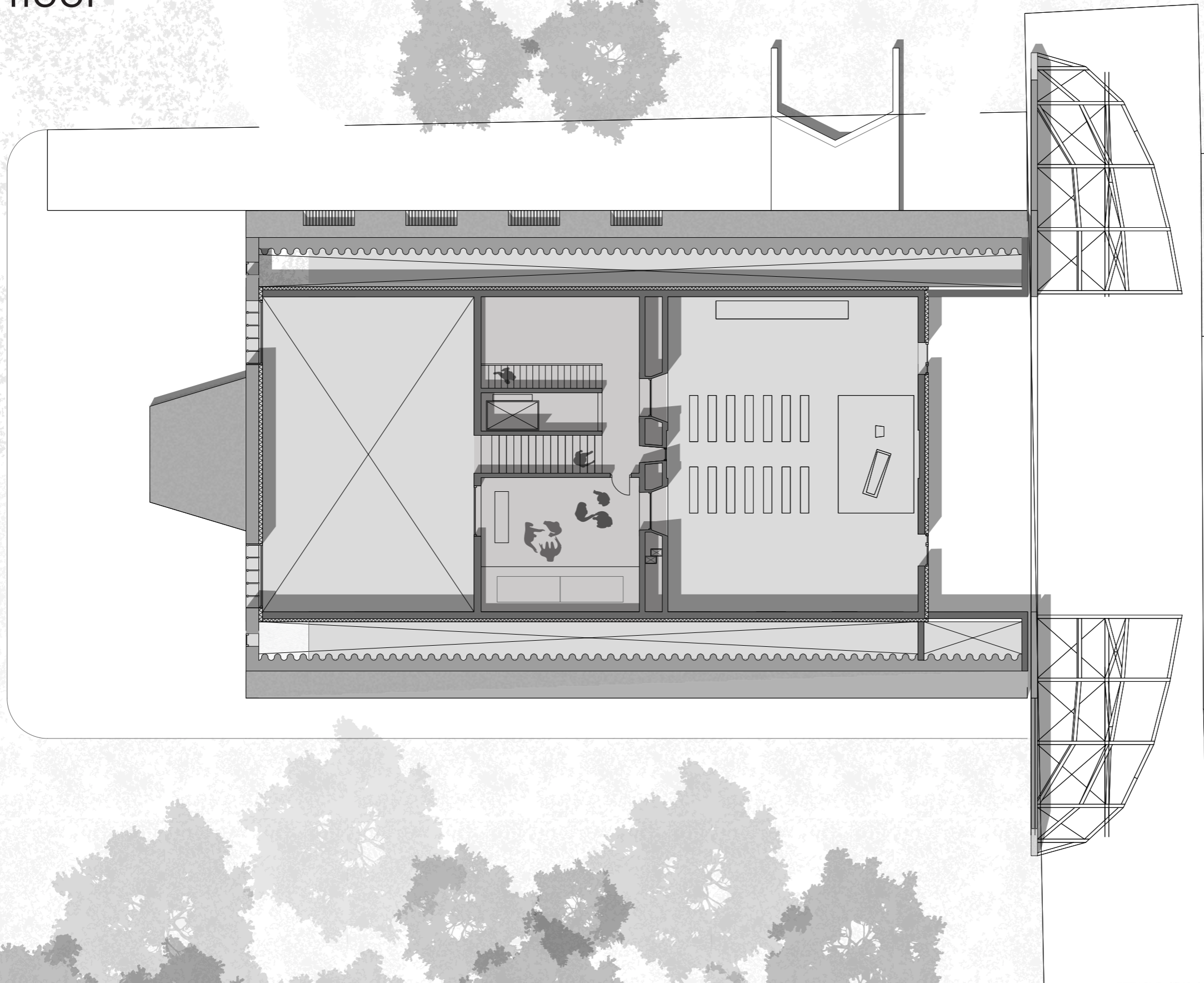


0 2 4 6 8 10m



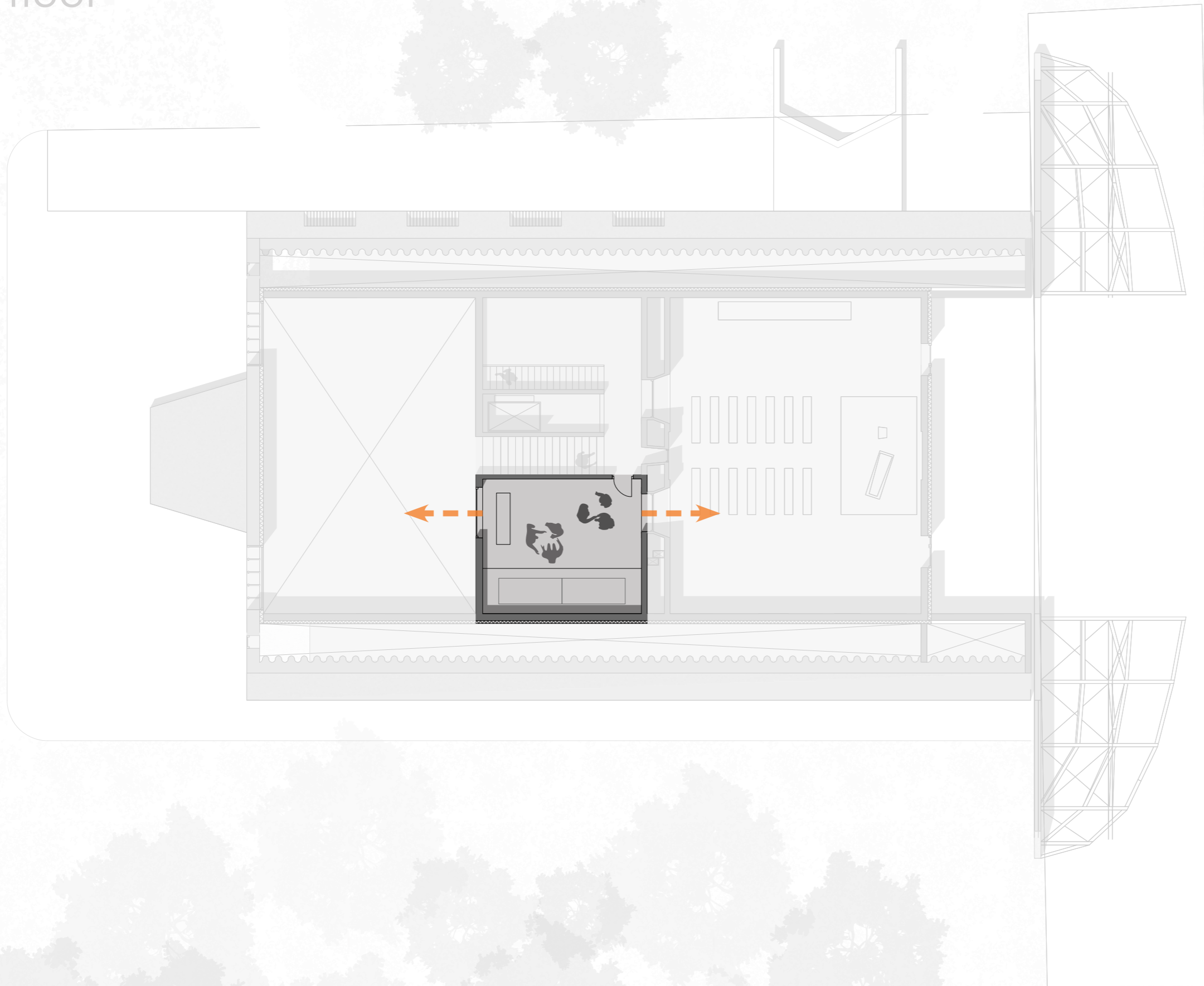
FLOORPLAN

First floor



FLOORPLAN

First floor

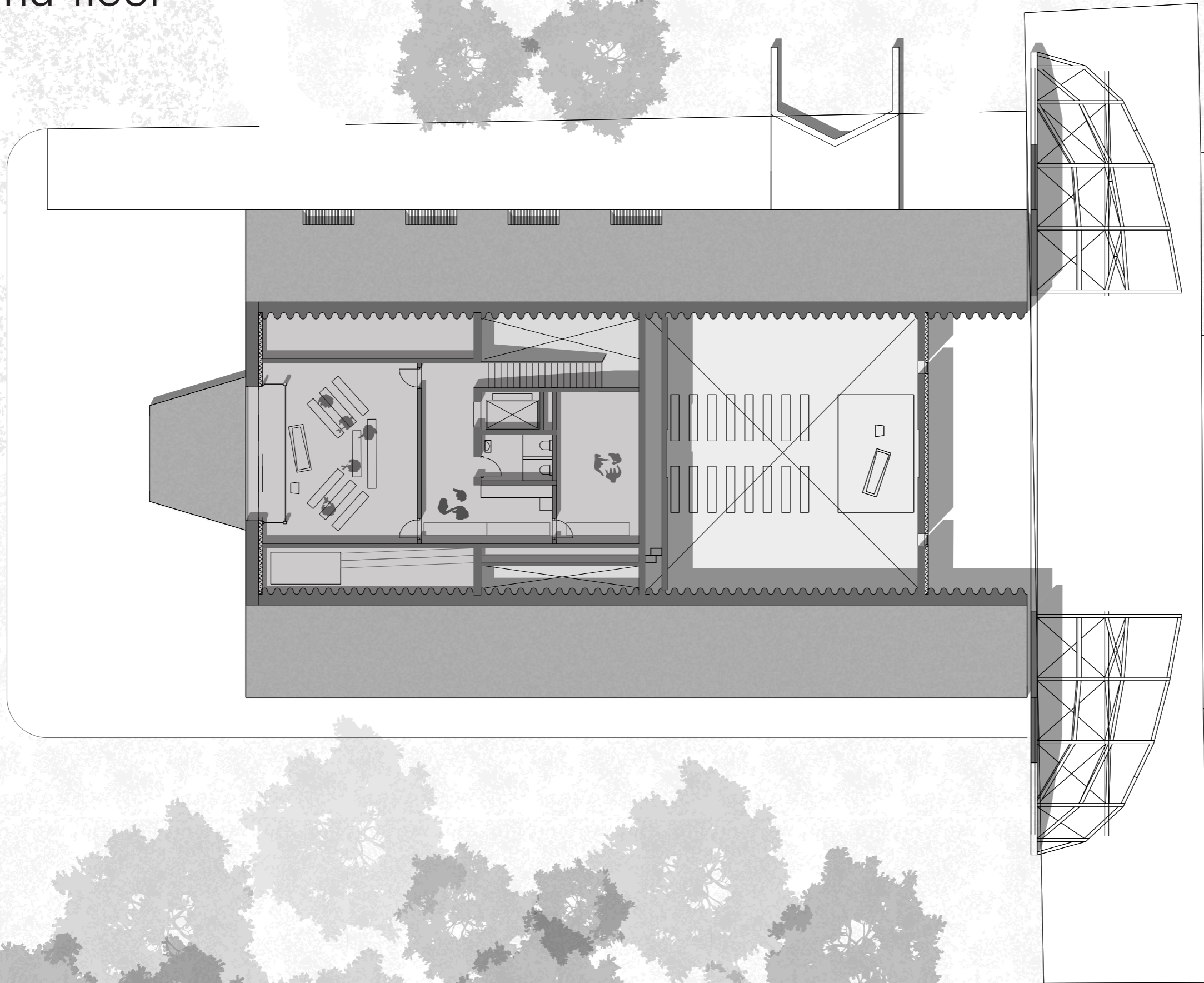


0 2 4 6 8 10m



FLOORPLAN

Second floor

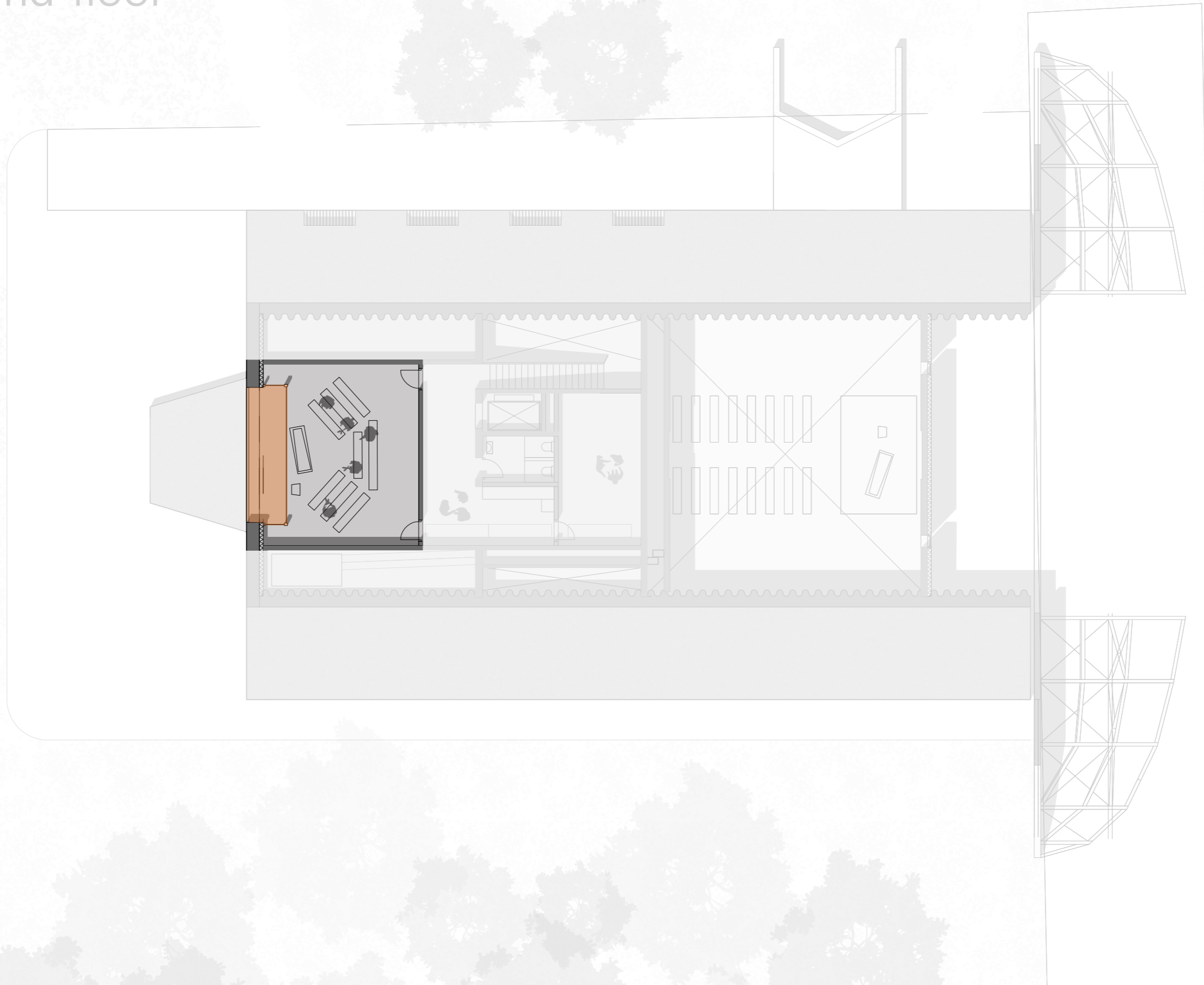


0 2 4 6 8 10m



FLOORPLAN

Second floor

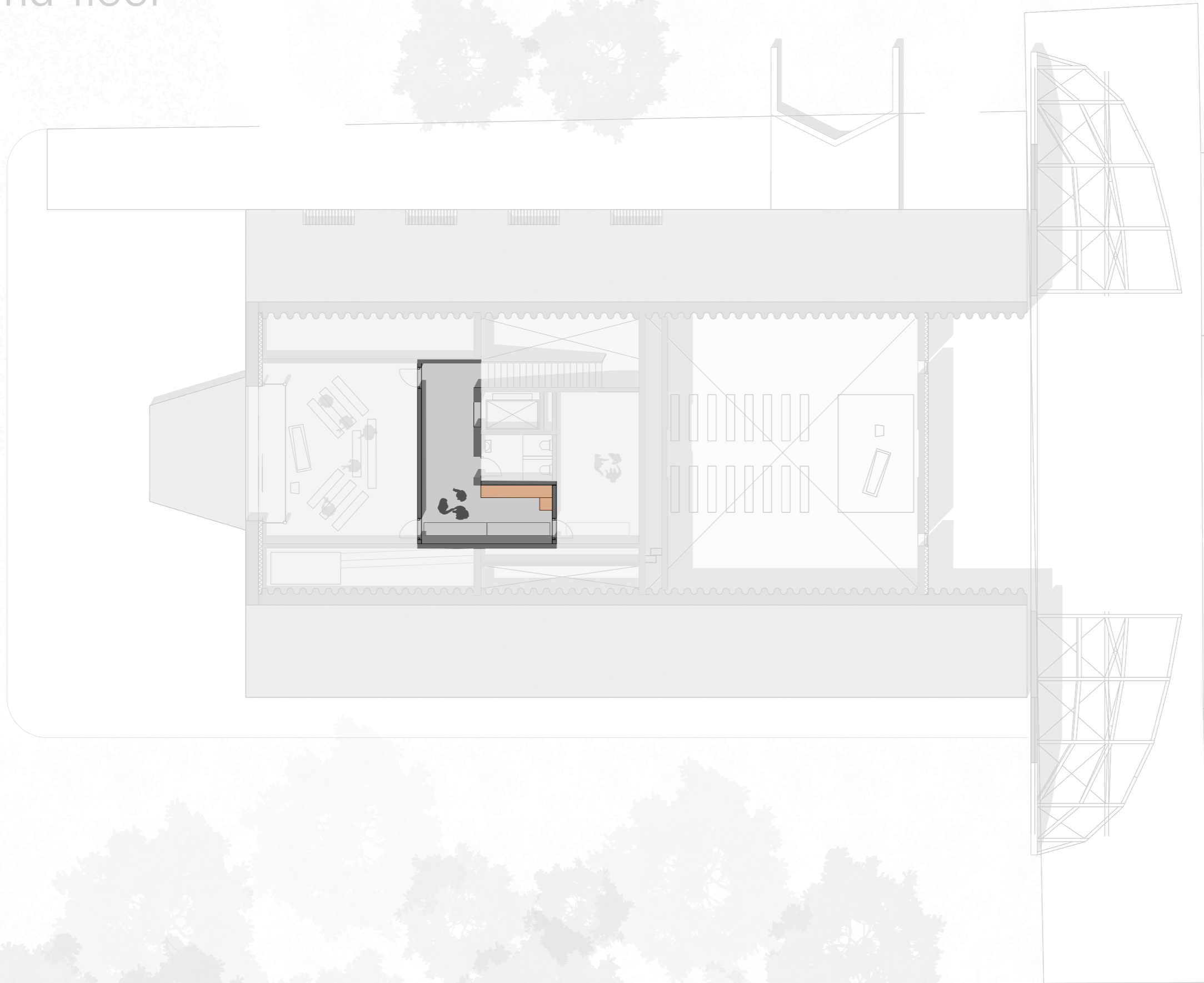


0 2 4 6 8 10m



FLOORPLAN

Second floor

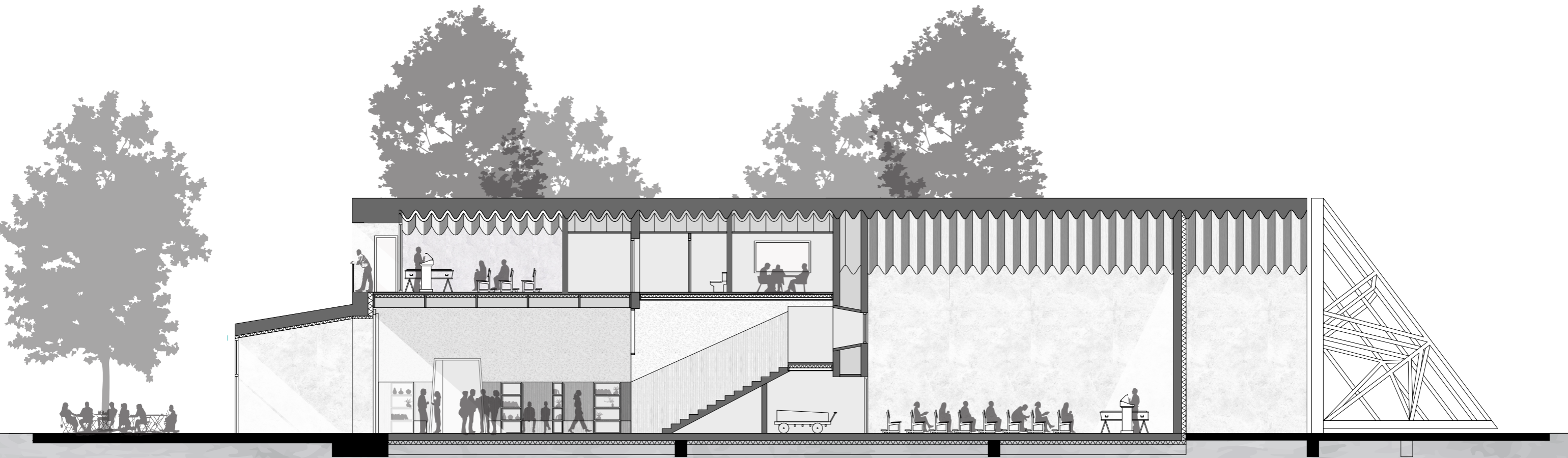
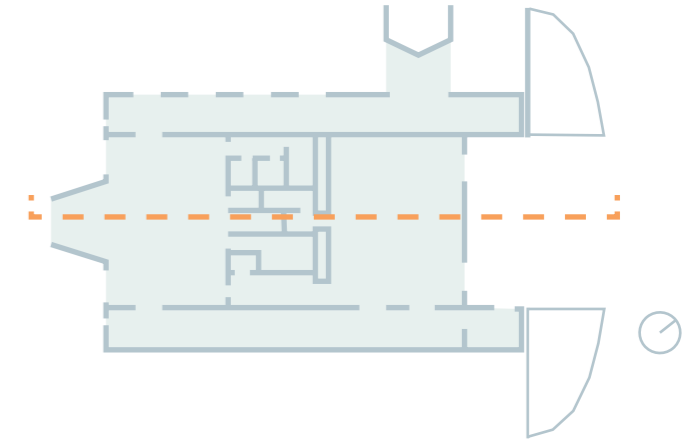


0 2 4 6 8 10m



SECTIONS

Sequence of spaces



Why?

Methodology

SQ I

SQ II

SQ III

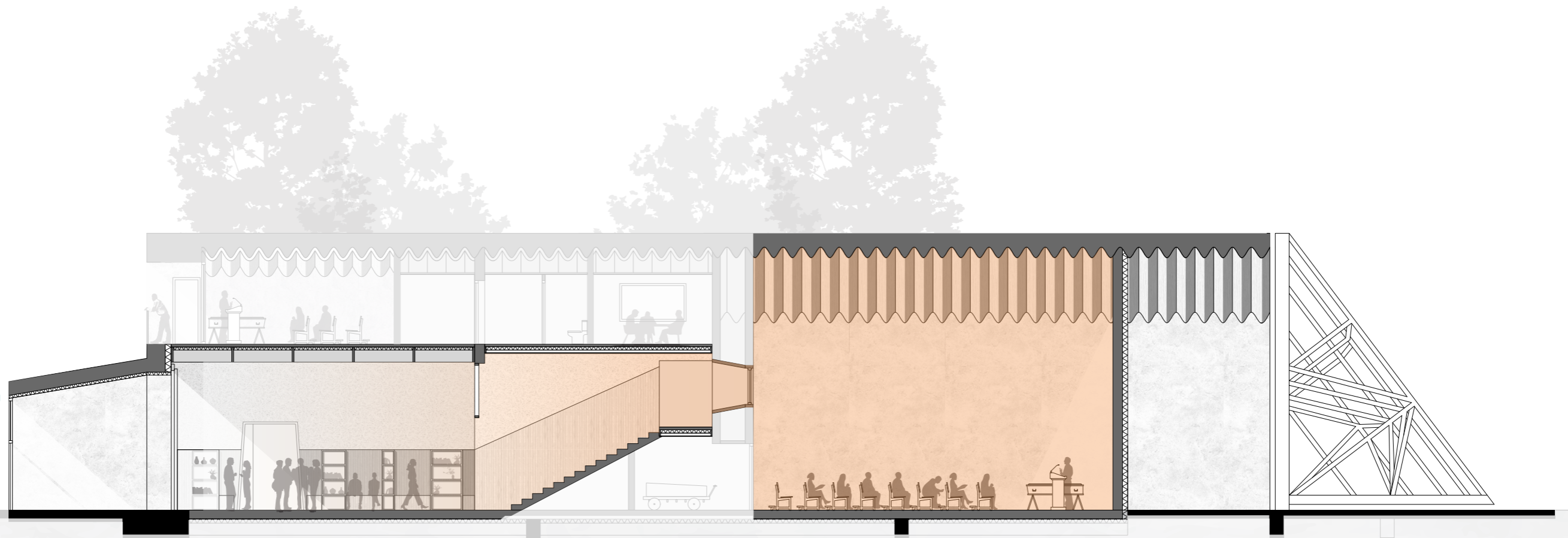
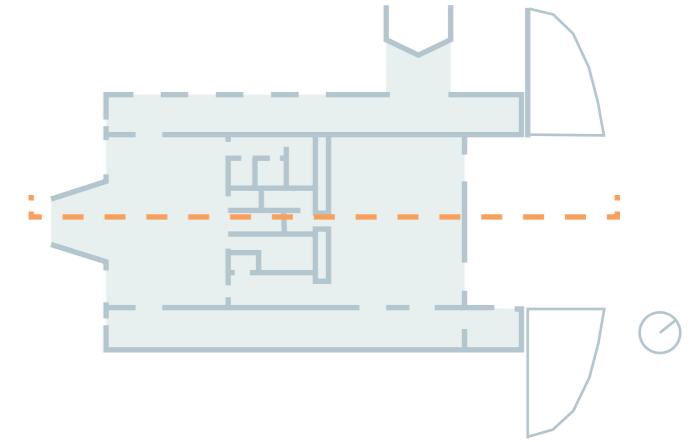
SQ IV

SQ V

Conclusion

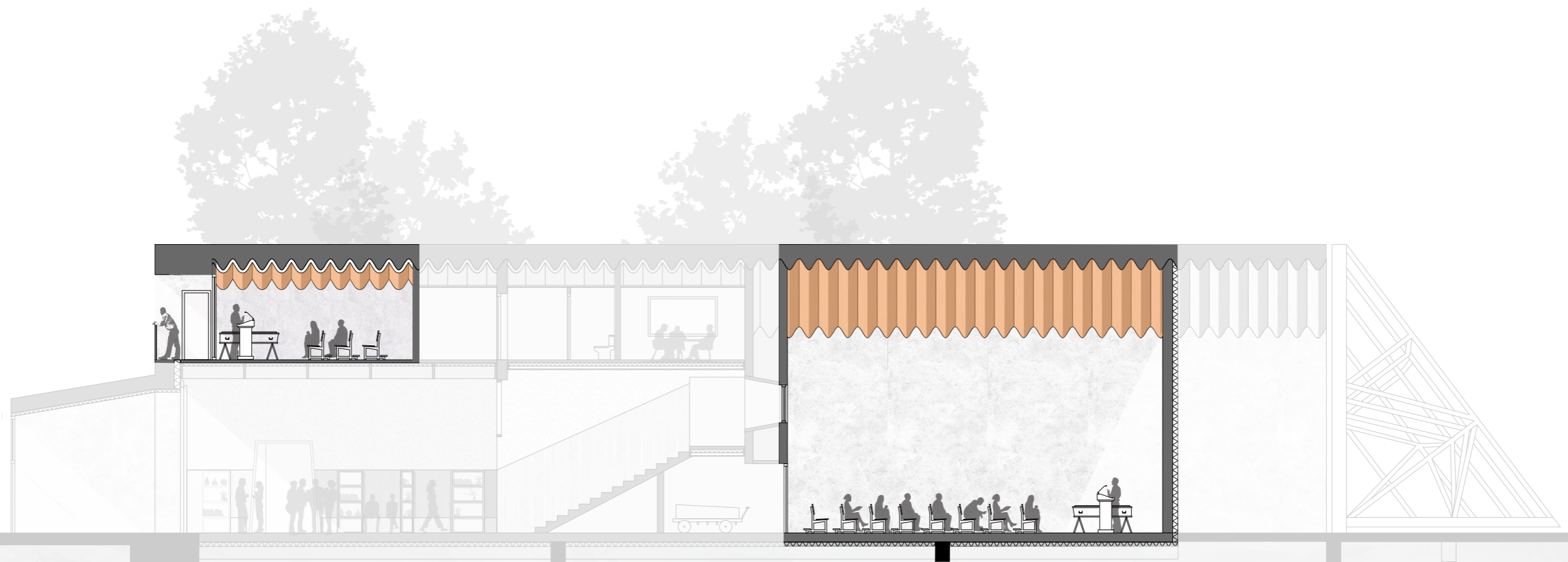
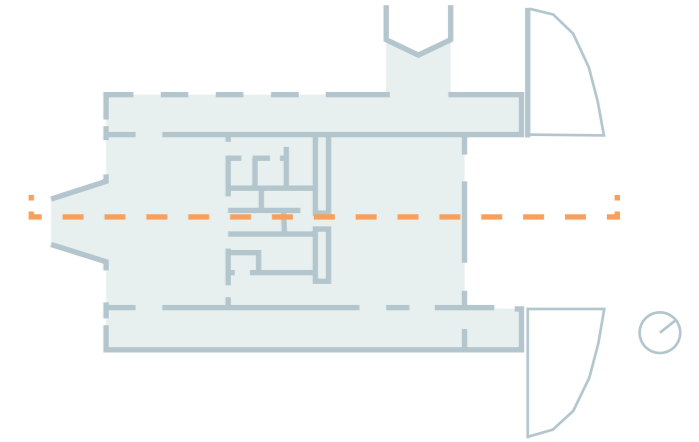
SECTIONS

Sequence of spaces



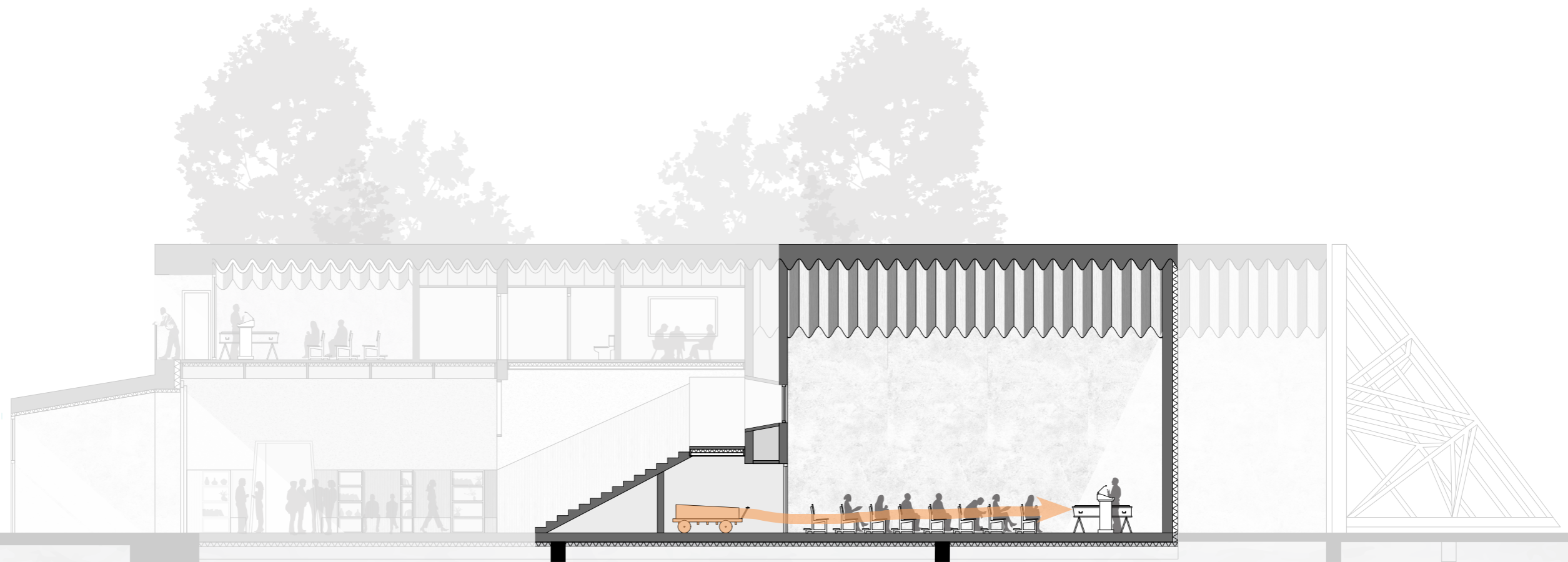
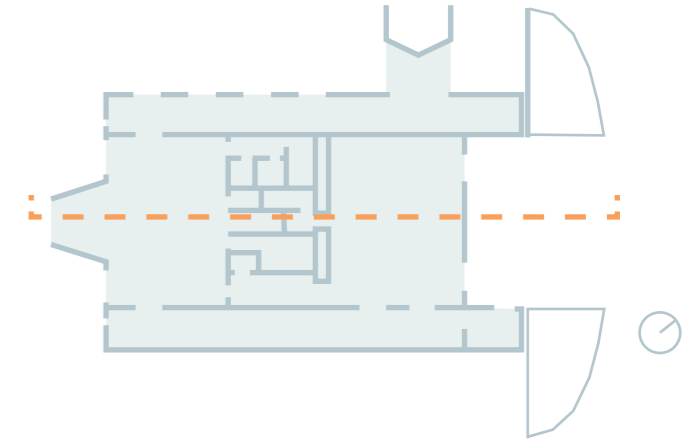
SECTIONS

Sequence of spaces



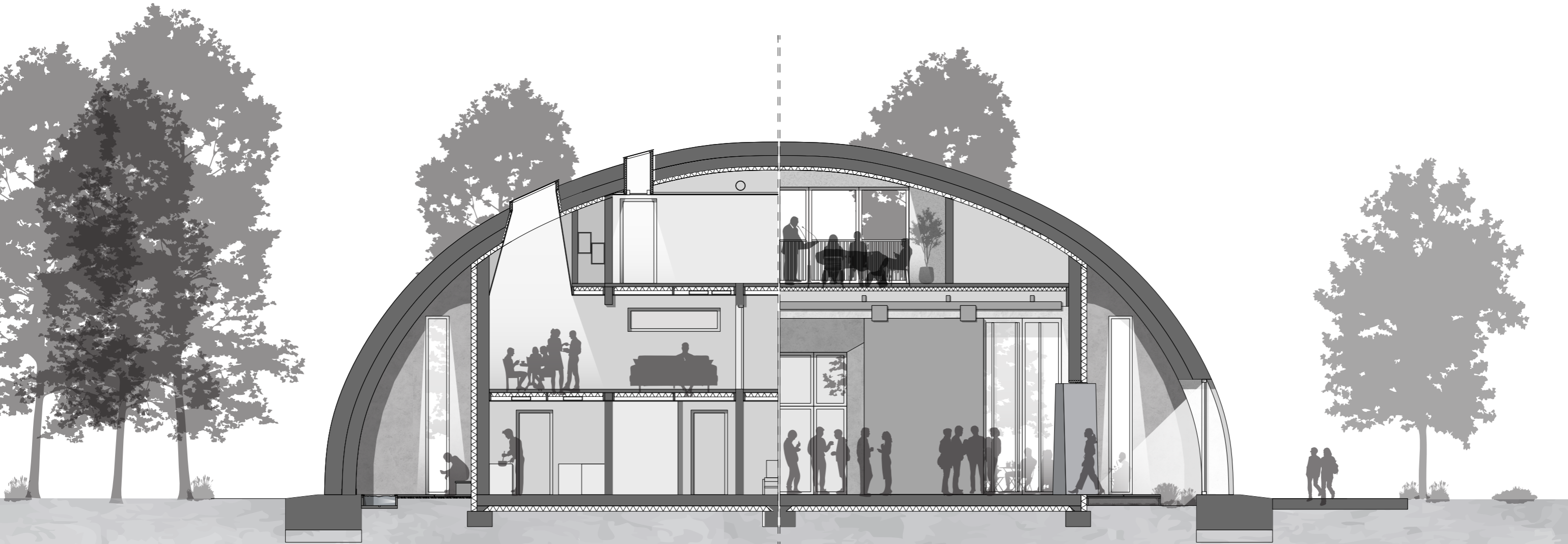
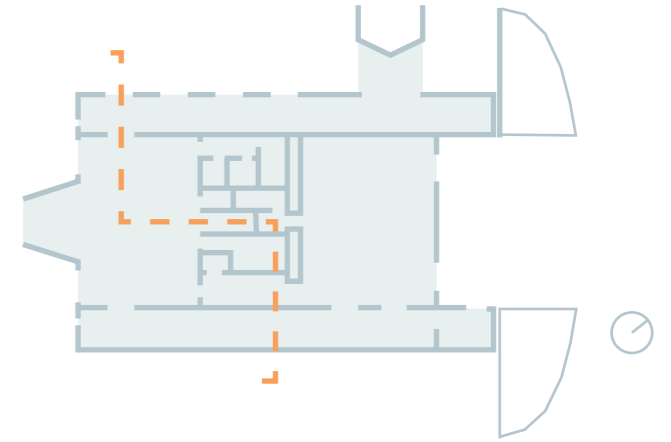
SECTIONS

Sequence of spaces



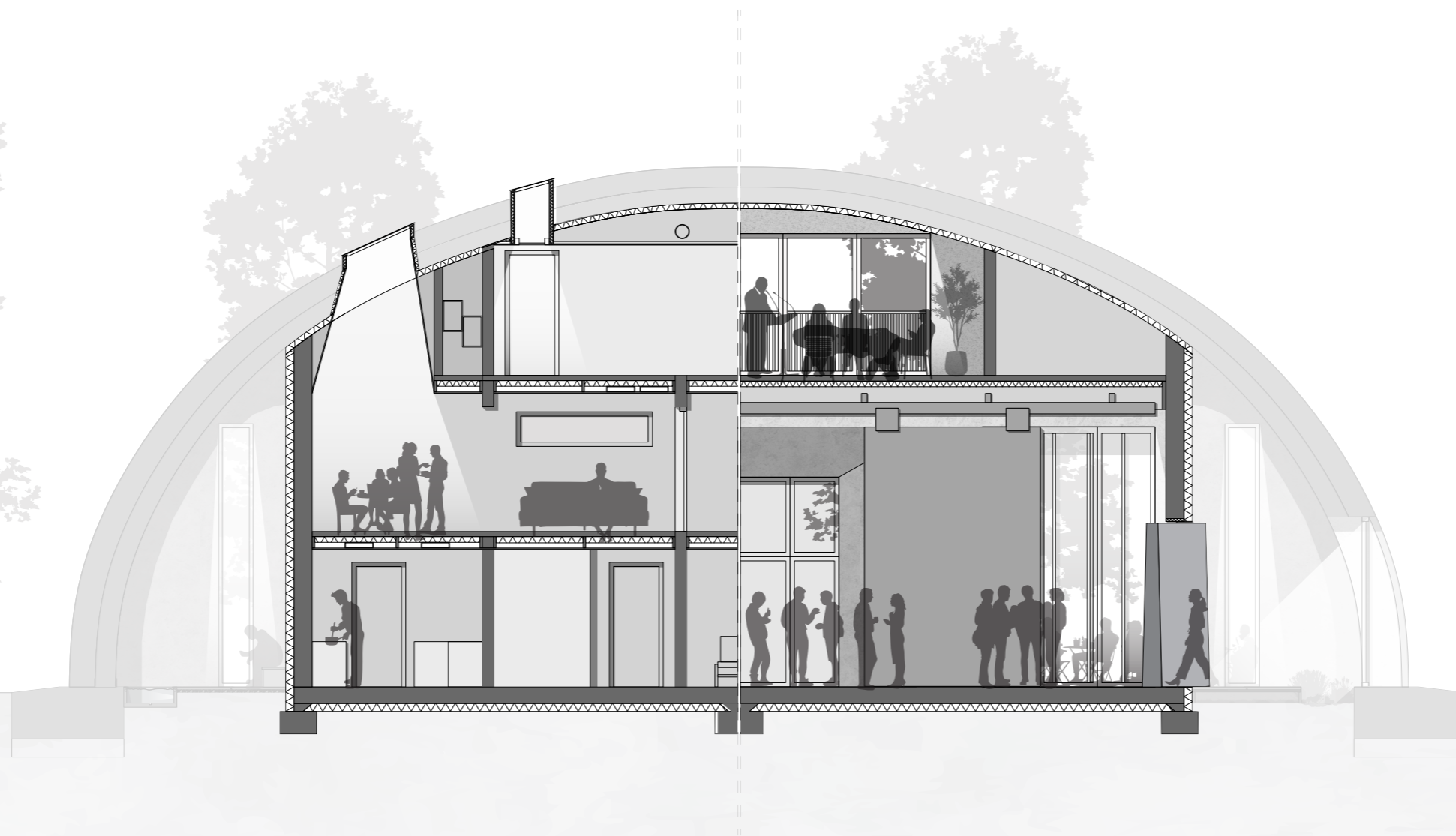
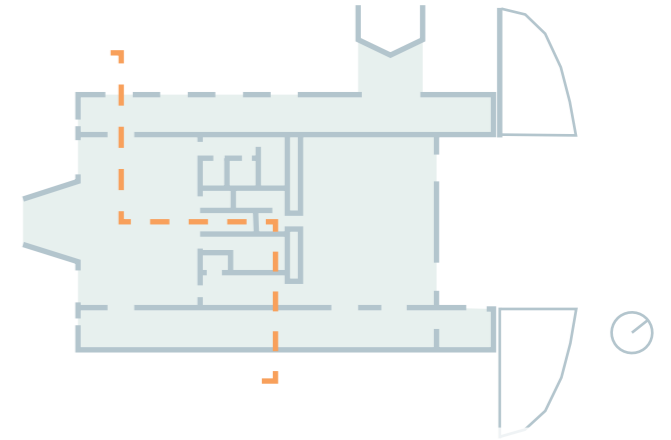
SECTIONS

Entering of light



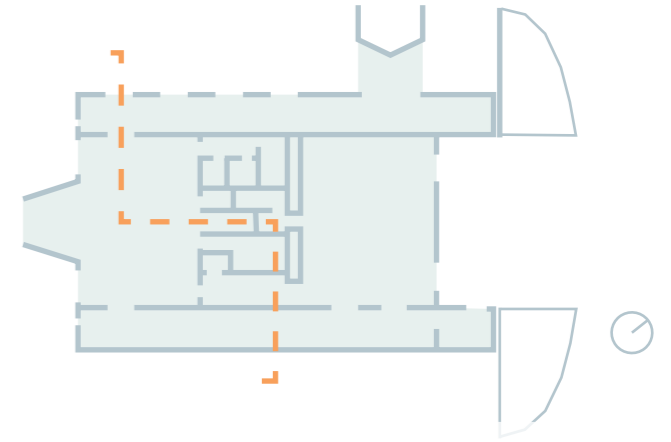
SECTIONS

Entering of light



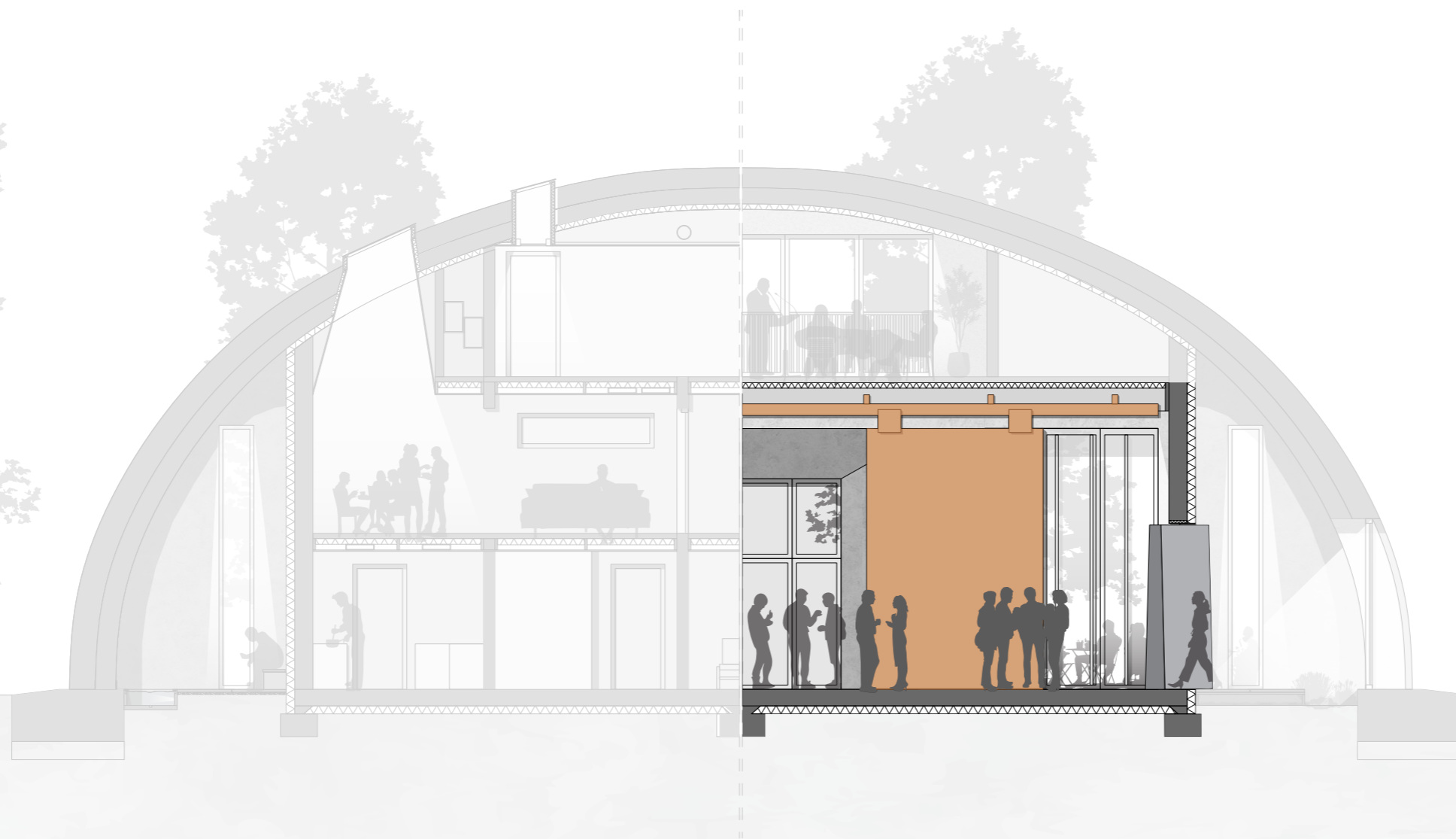
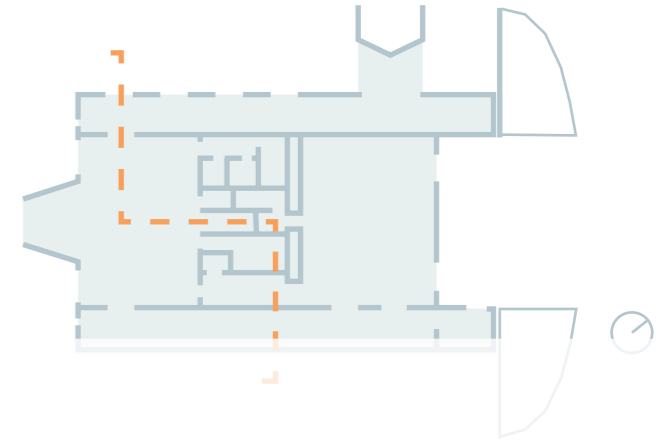
SECTIONS

Entering of light



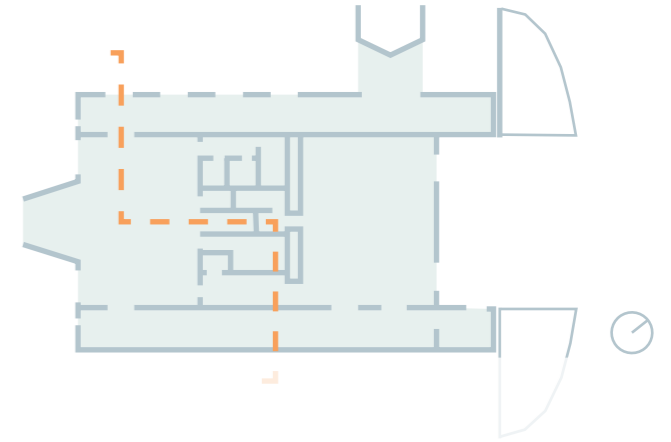
SECTIONS

Entering of light



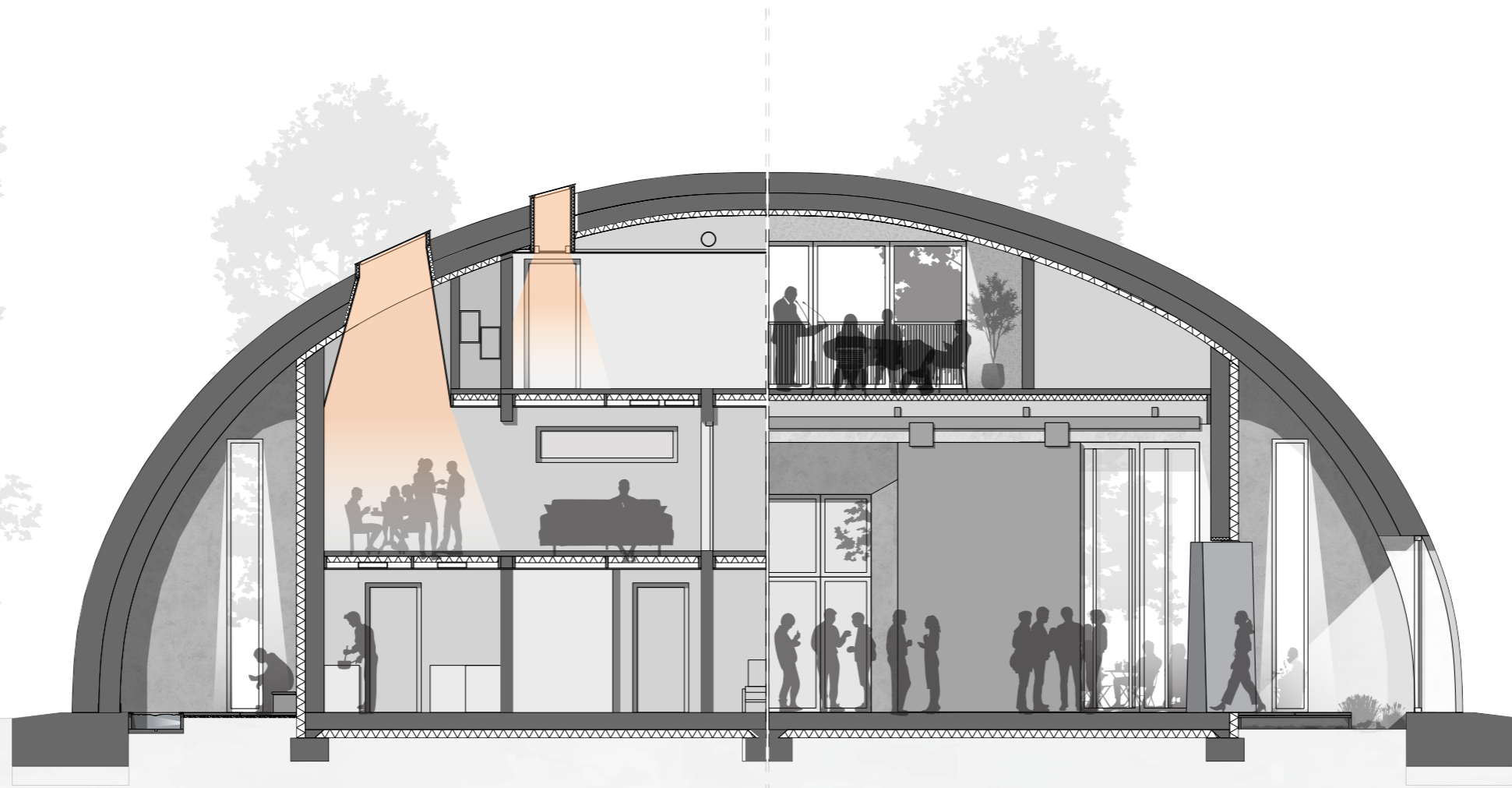
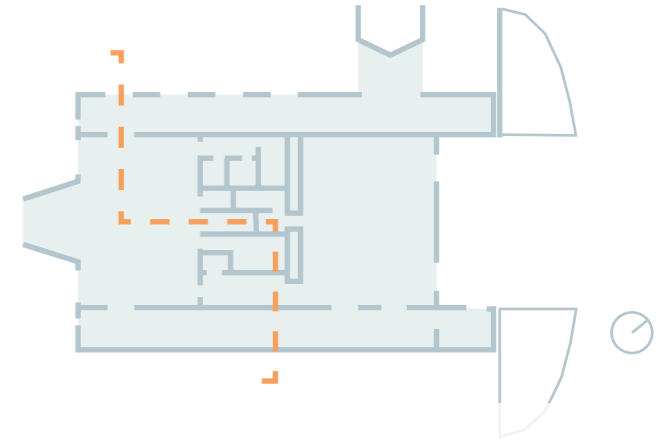
SECTIONS

Entering of light



SECTIONS

Entering of light



Why?

Methodology

SQ I

SQ II

SQ III

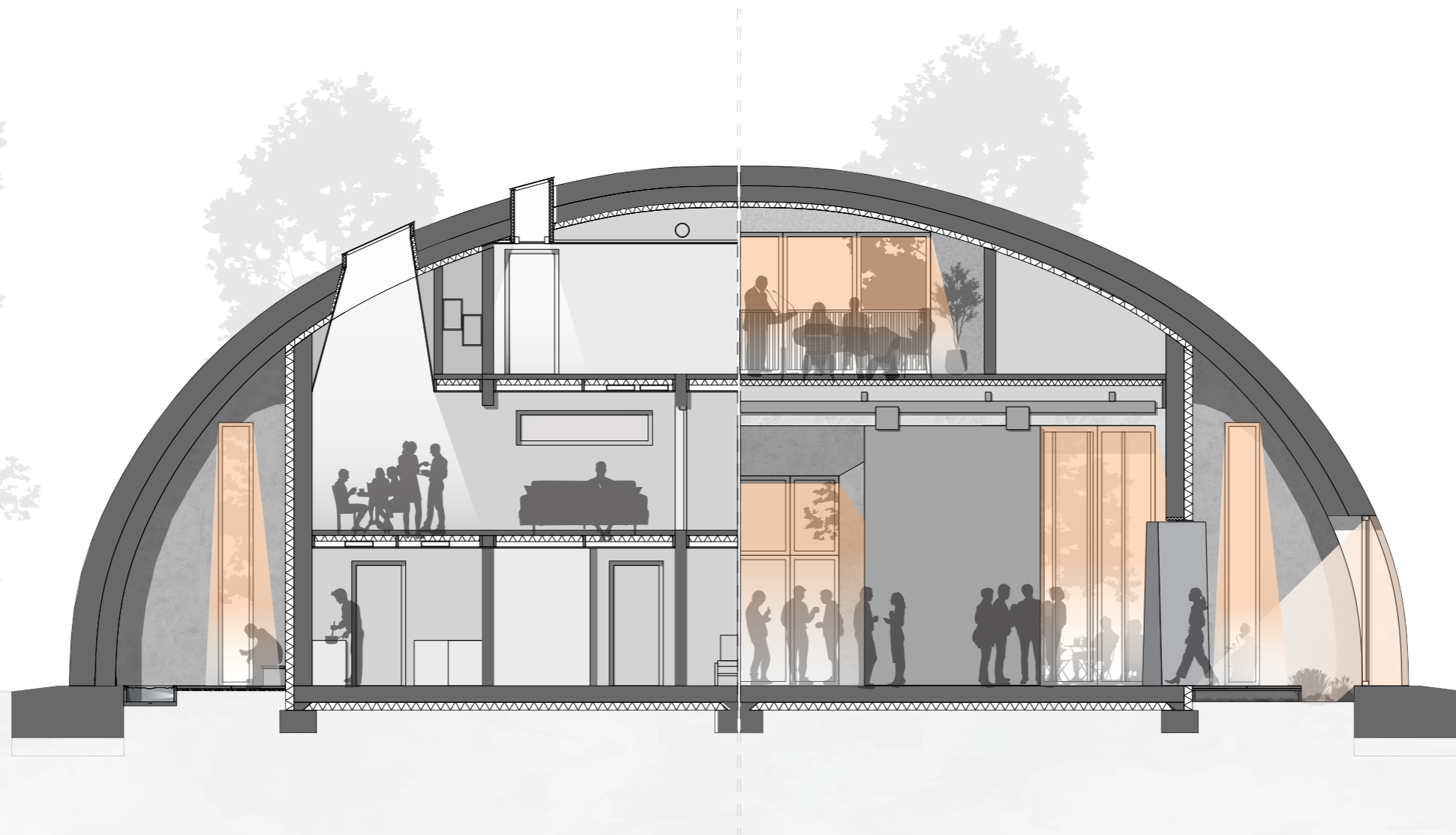
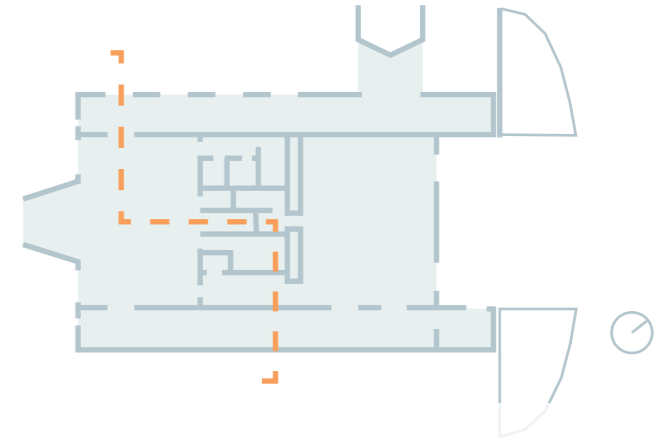
SQ IV

SQ V

Conclusion

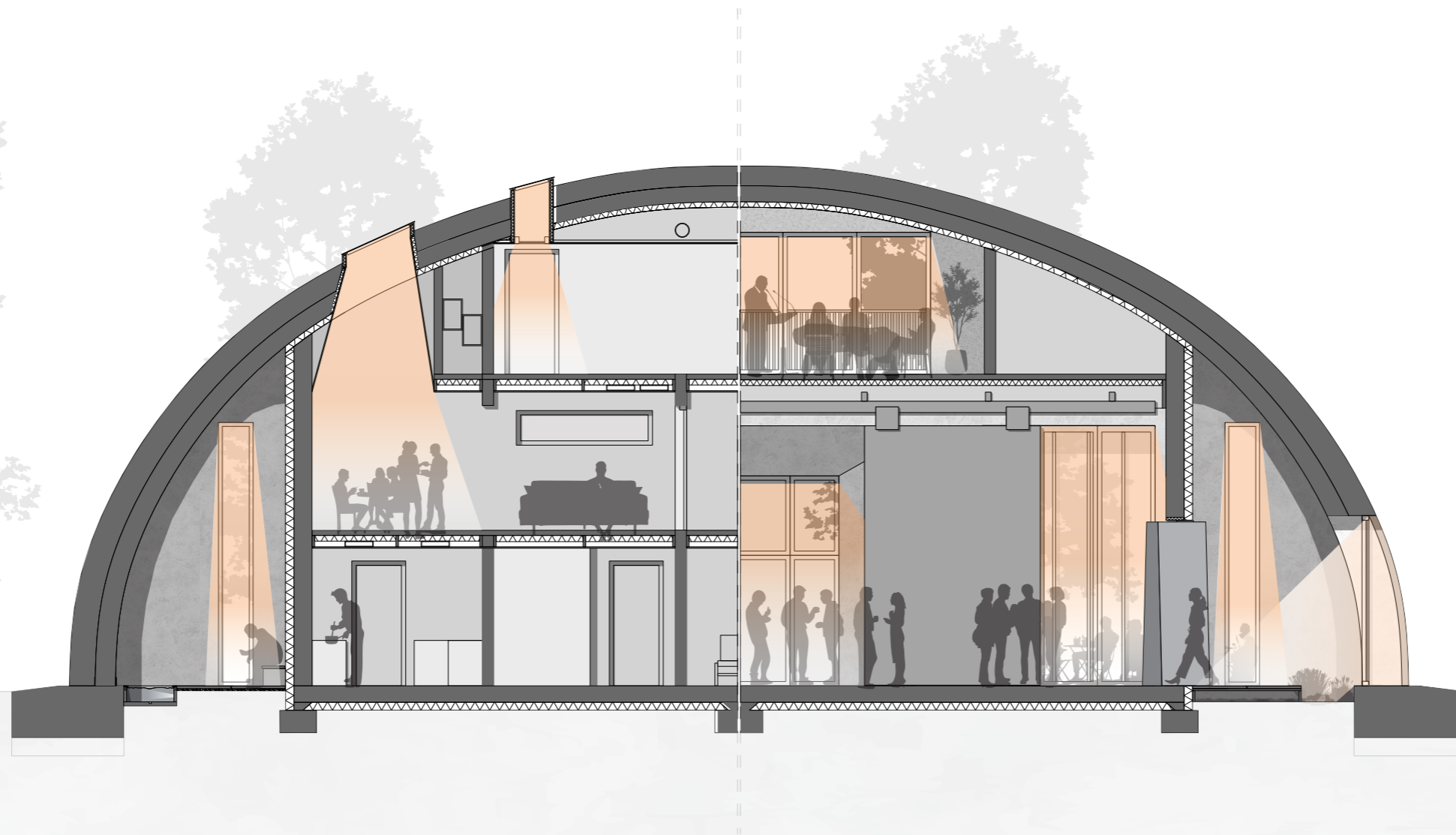
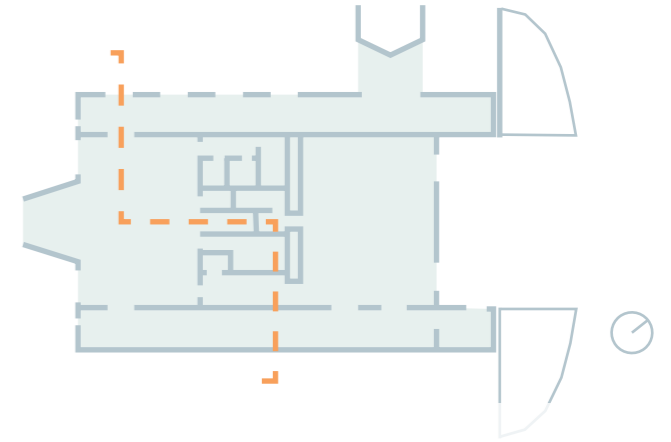
SECTIONS

Entering of light



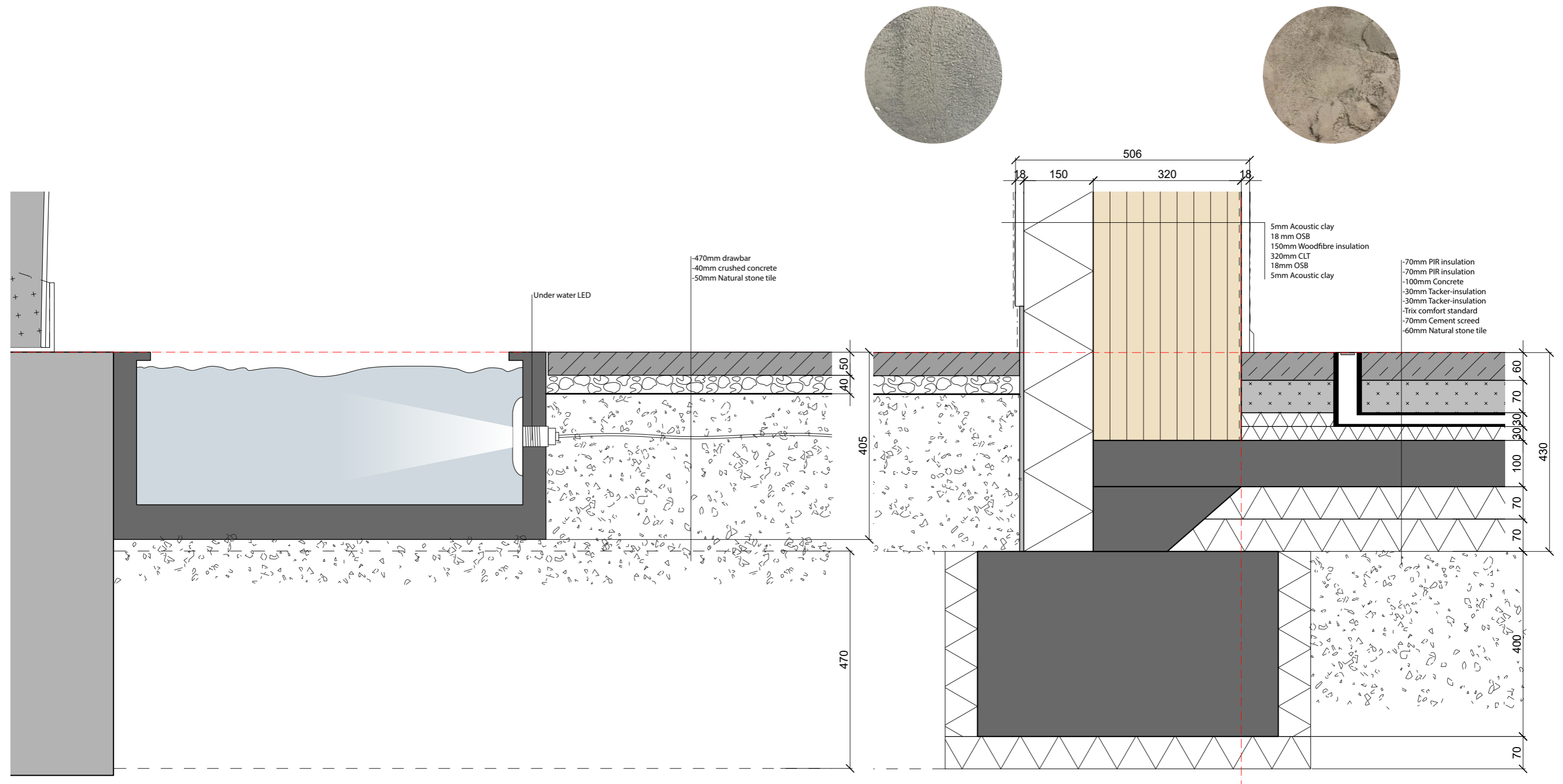
SECTIONS

Entering of light



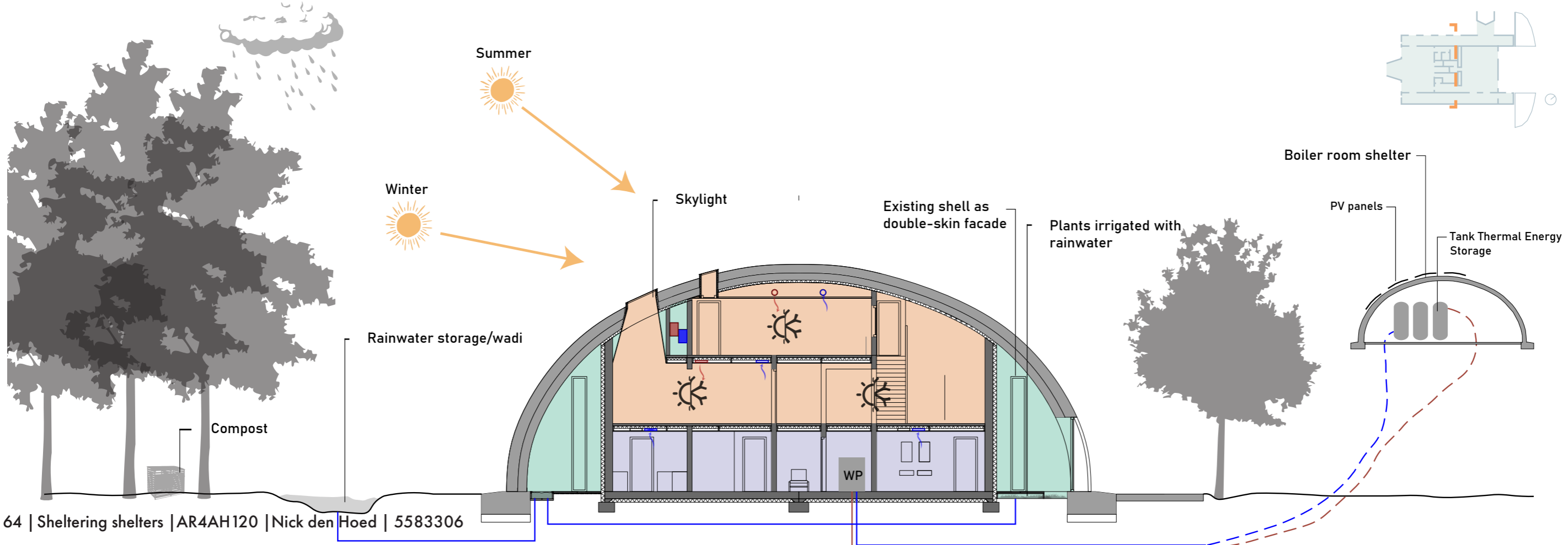
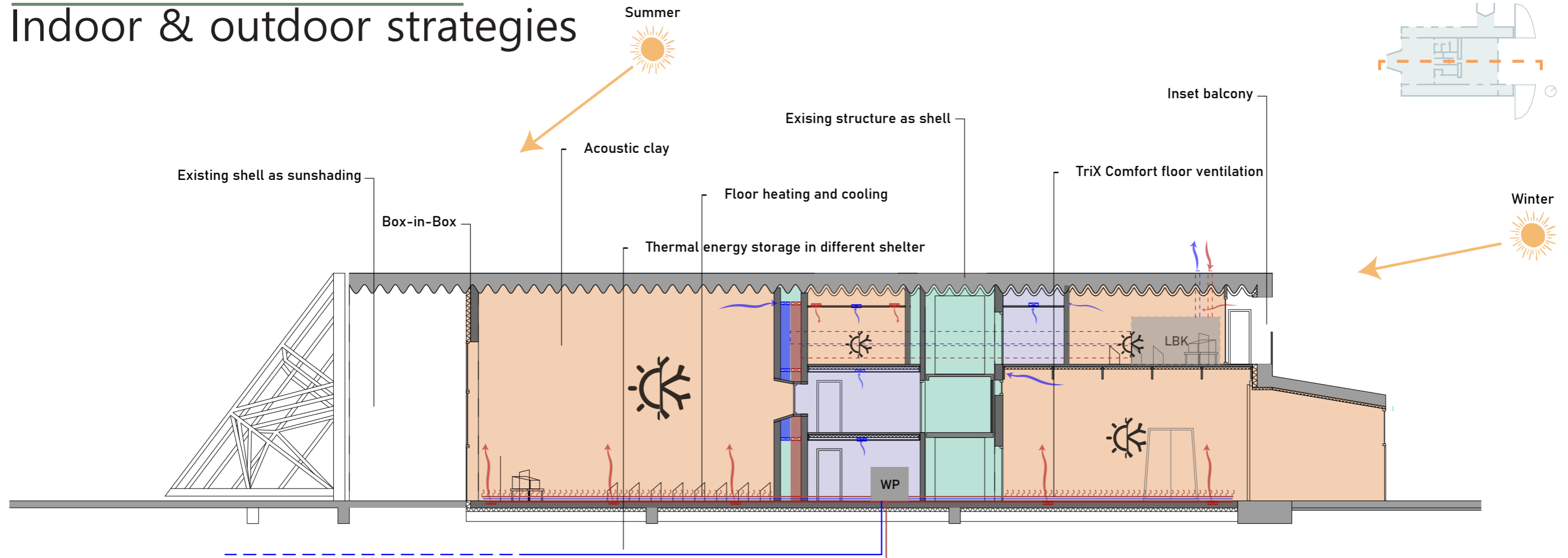
CONSTRUCTION DETAILS

Floor ventilation & water stream lighting



CLIMATE CONCEPT

Indoor & outdoor strategies



IMPRESSIONS

Hallway of life



Why?

Methodology

SQ I

SQ II

SQ III

SQ IV

SQ V

Conclusion

IMPRESSIONS

Foyer closed-off



Why?

Methodology

SQ I

SQ II

SQ III

SQ IV

SQ V

Conclusion

IMPRESSIONS

Foyer opened



Why?

Methodology

SQ I

SQ II

SQ III

SQ IV

SQ V

Conclusion

IMPRESSIONS

Foyer opened



Why?

Methodology

SQ I

SQ II

SQ III

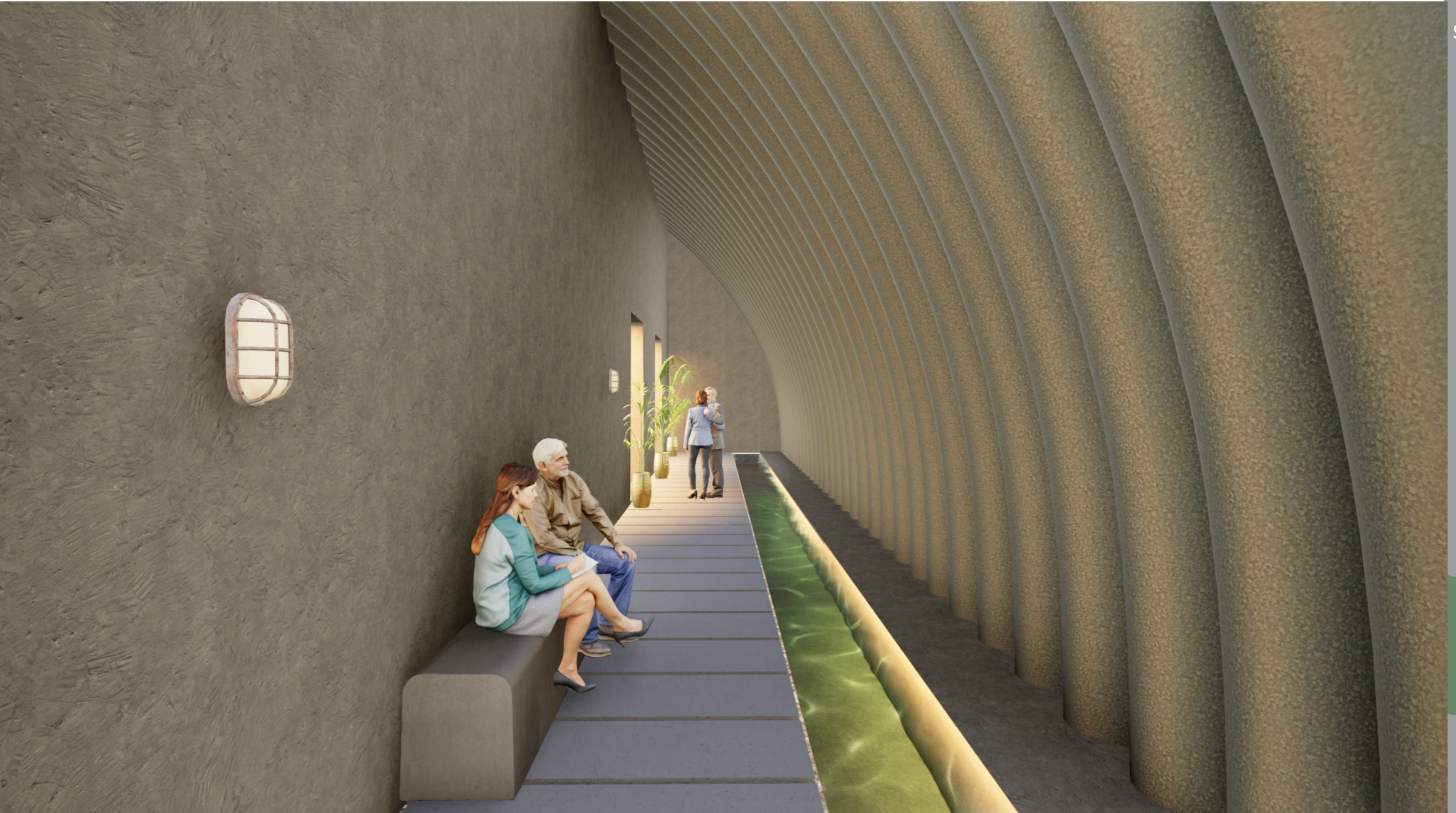
SQ IV

SQ V

Conclusion

IMPRESSIONS

Hallway of loss



IMPRESSIONS

Ceremonial room



Why?

Methodology

SQ I

SQ II

SQ III

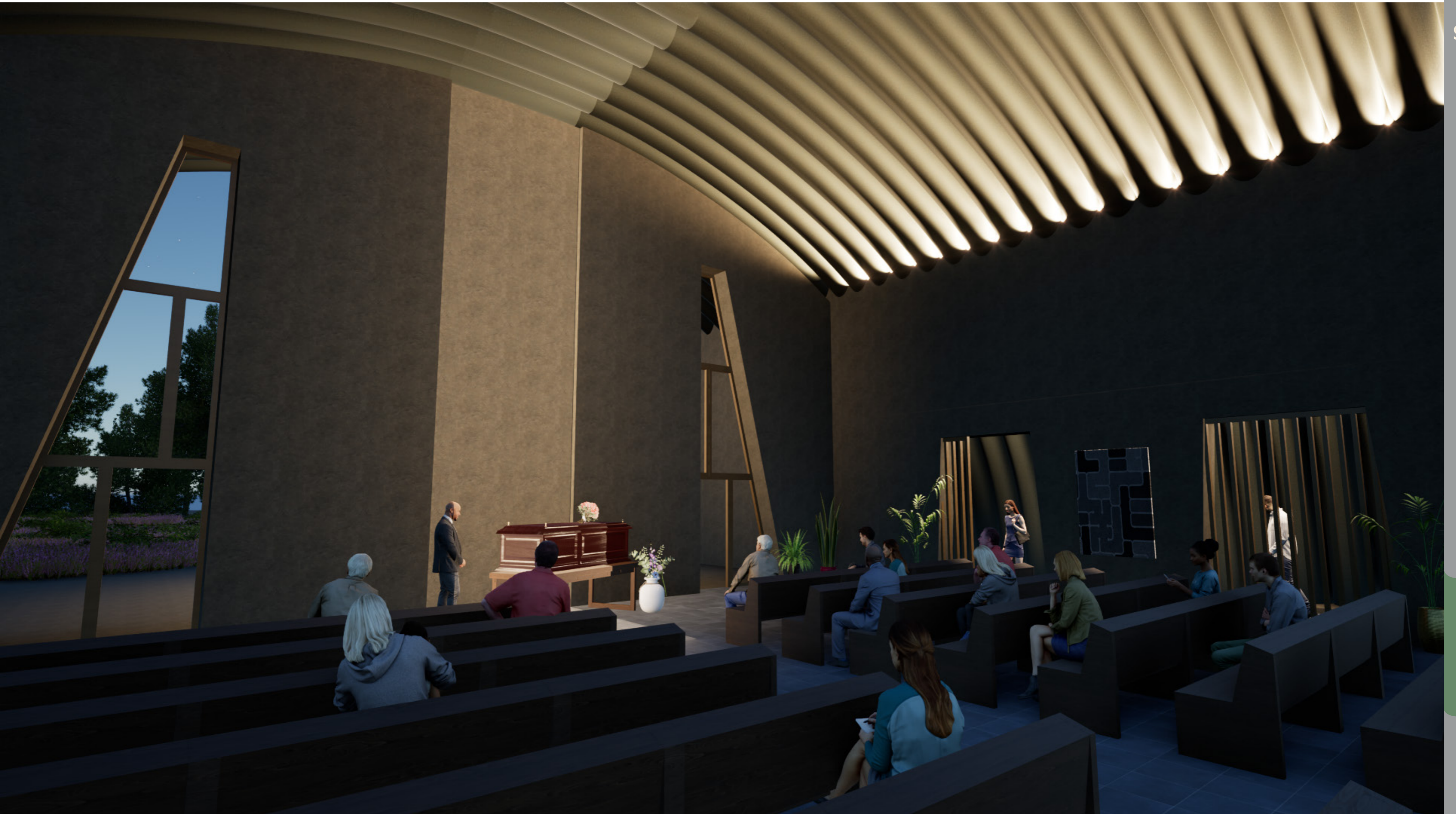
SQ IV

SQ V

Conclusion

IMPRESSIONS

Ceremonial room



Why?

Methodology

SQ I

SQ II

SQ III

SQ IV

SQ V

Conclusion

CONCLUSION

Inspiration, conversation & position

