

ARC310
Sensory Architecture

Maya Angelus





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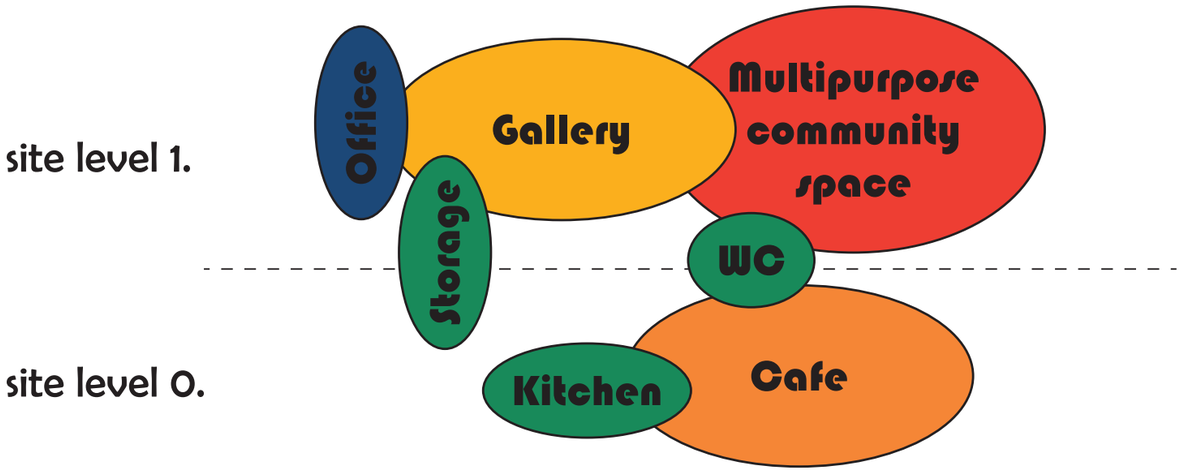
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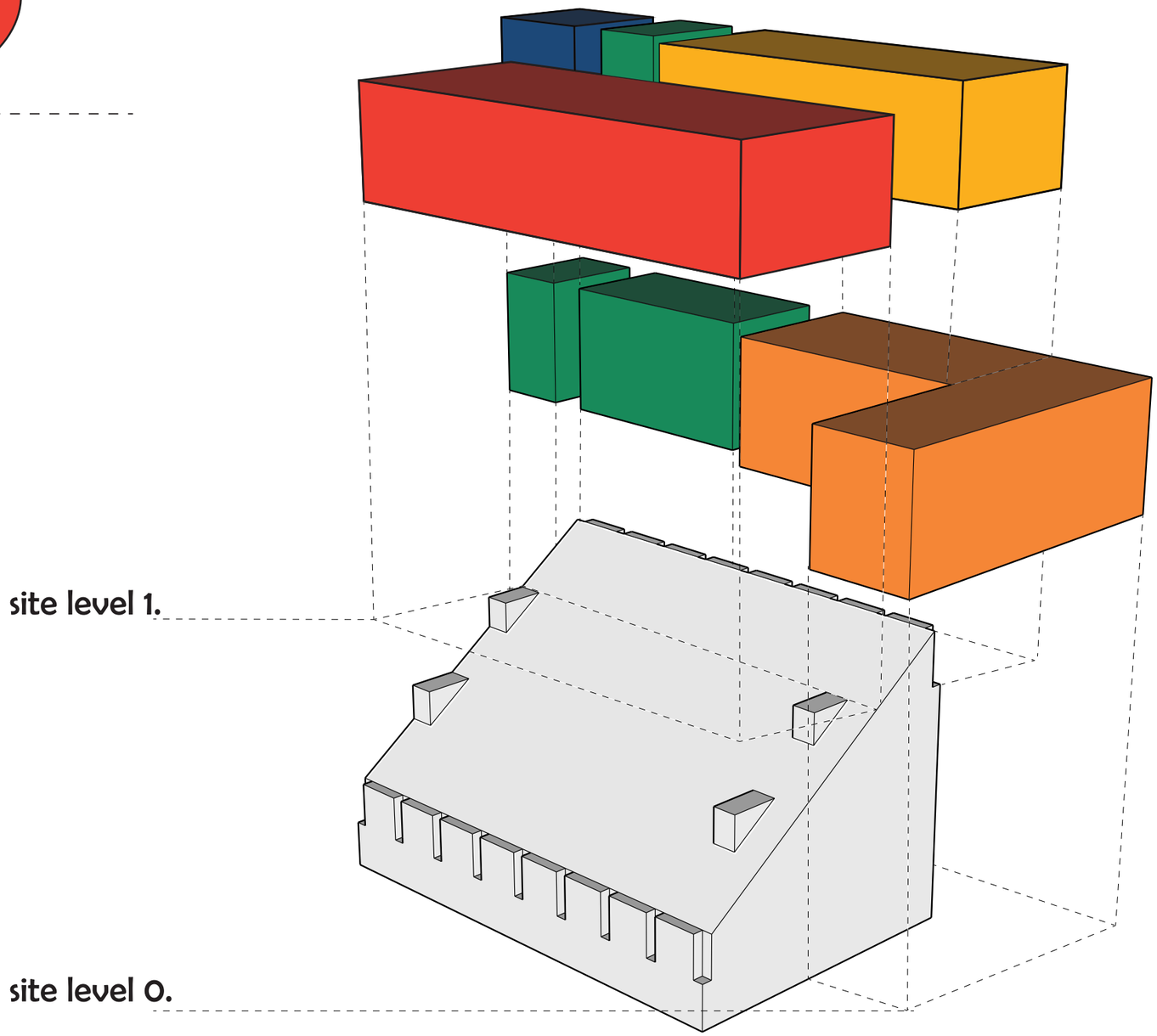
My brief was to connect people to an abandoned quarry. To offer a multi-purpose community space for the locals to practice their cultural heritage. Taking into account that the South West Coast Path crossing through the site. This offered a great opportunity to create a meeting point. A meeting place encourages connection between a remote community and the wider public.

My leading ideas were:

Cornish cultural heritage
Language and identity. Rebellions. Strong sense of place.

Community
Creating stronger bonds inside the surrounding communities.

Connection
Connecting people to place with a closer look to the site. Sharpen senses for the things that we forget to notice.



Initial adjacency diagram

Site - Dean Point

Dean Quarry, St Kevern, Cornwall

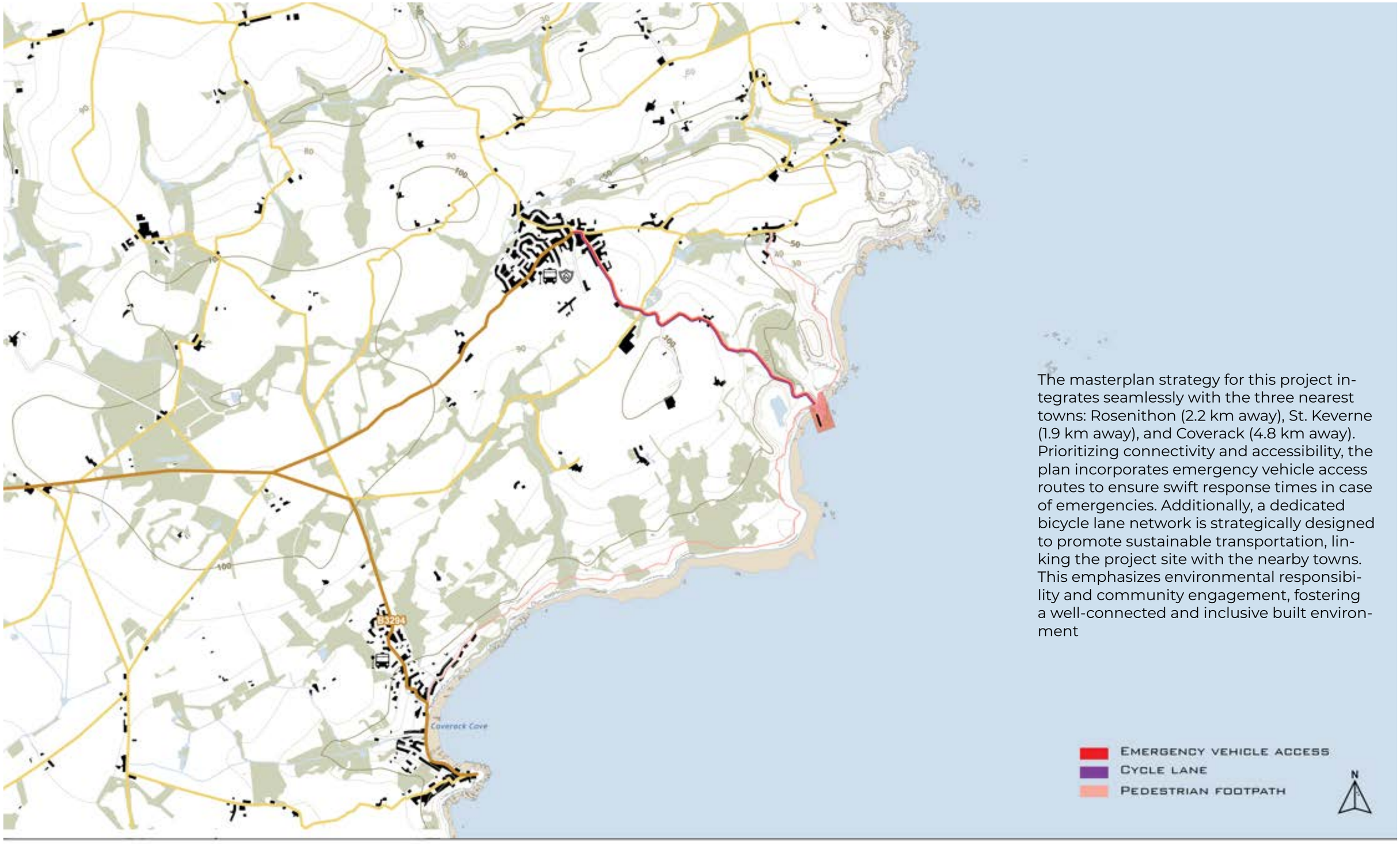
- on the east coast of the Lizard Peninsula
- large intrusion of gabbro from Coverack to St Keverne
- the quarry closed in 2005
- The Manacles Marine Conservation Zone (MCZ)
- Hundreds of shipwrecks in the area









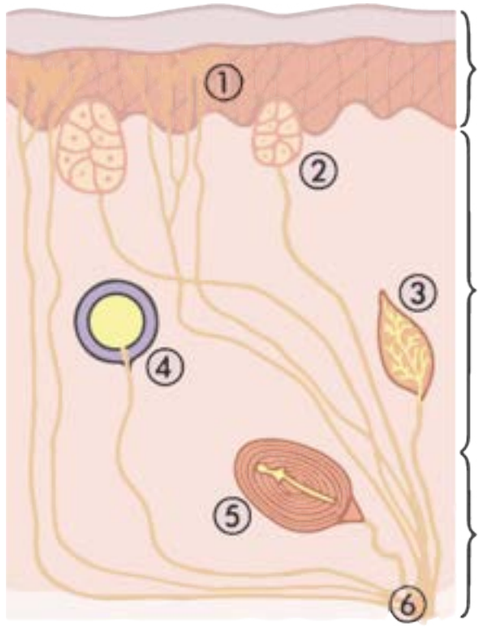


The masterplan strategy for this project integrates seamlessly with the three nearest towns: Rosenithon (2.2 km away), St. Keverne (1.9 km away), and Coverack (4.8 km away). Prioritizing connectivity and accessibility, the plan incorporates emergency vehicle access routes to ensure swift response times in case of emergencies. Additionally, a dedicated bicycle lane network is strategically designed to promote sustainable transportation, linking the project site with the nearby towns. This emphasizes environmental responsibility and community engagement, fostering a well-connected and inclusive built environment


MUSIC

Thermoception

There are about 3000 nerve endings on a human fingertip. One of the most receptive part of the body.



Epidermis	Pain receptor (free nerve endings) Meissner's corpuscle (tactile corpuscle)
Dermis	Heat receptor Cold receptor
Subcutis	Vibration receptor Sensory nerve fibres

Heat Capacity

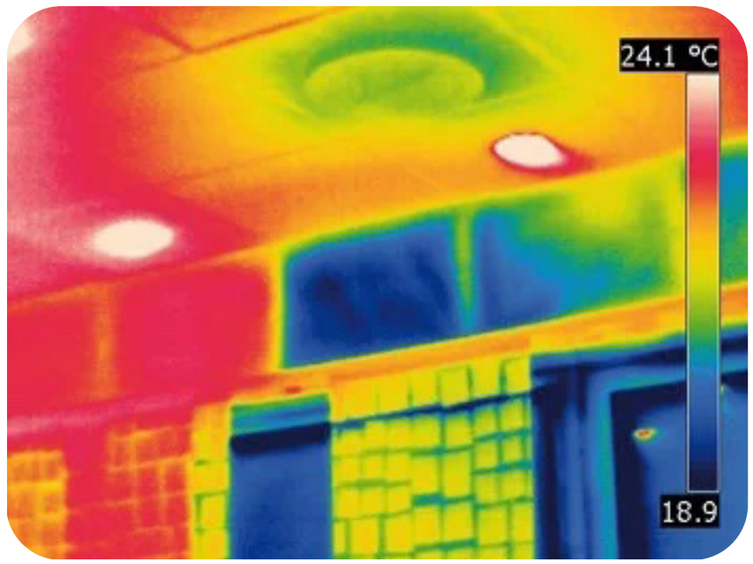


Bigger temperature Increase

Smaller temperature Increase

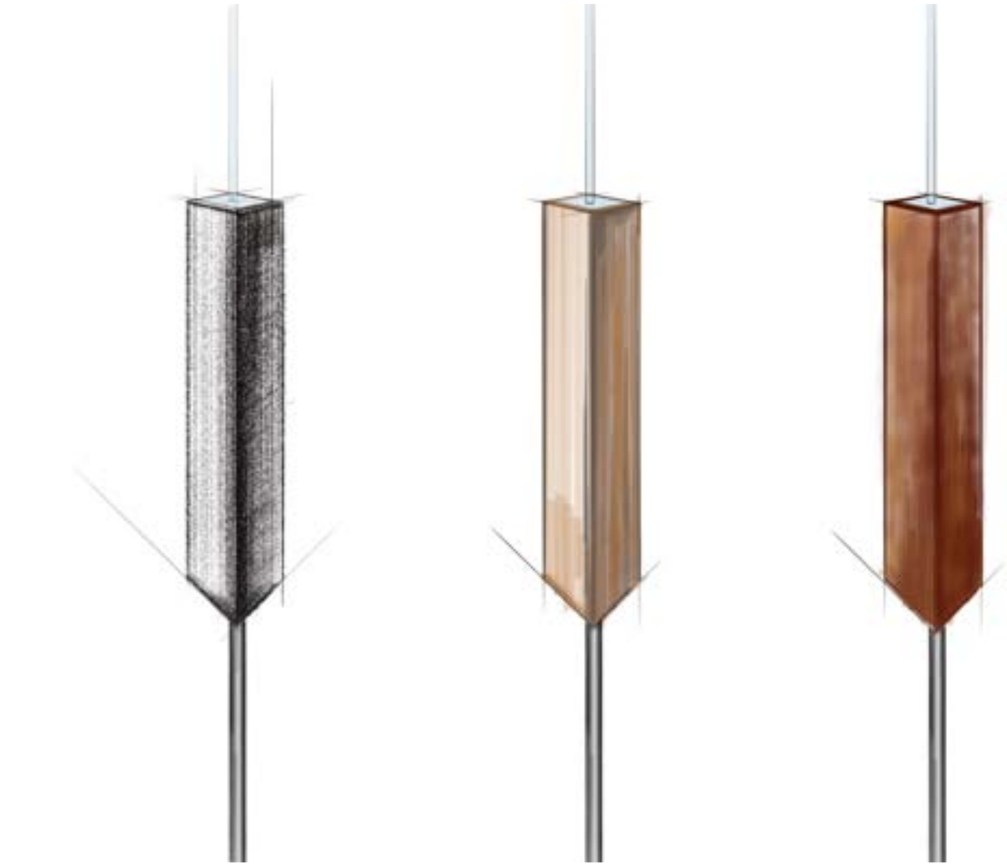
Same amount of heat applied



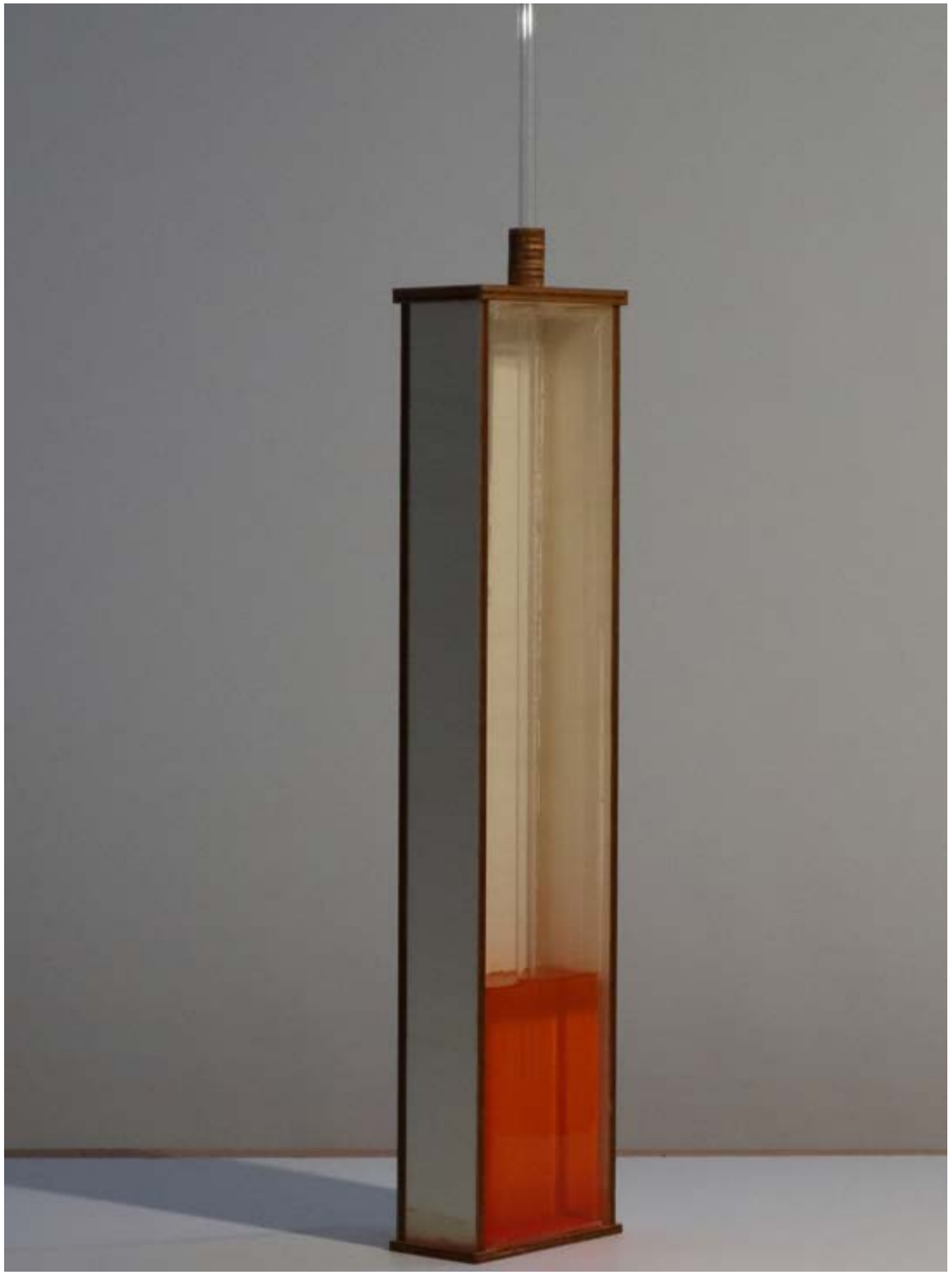




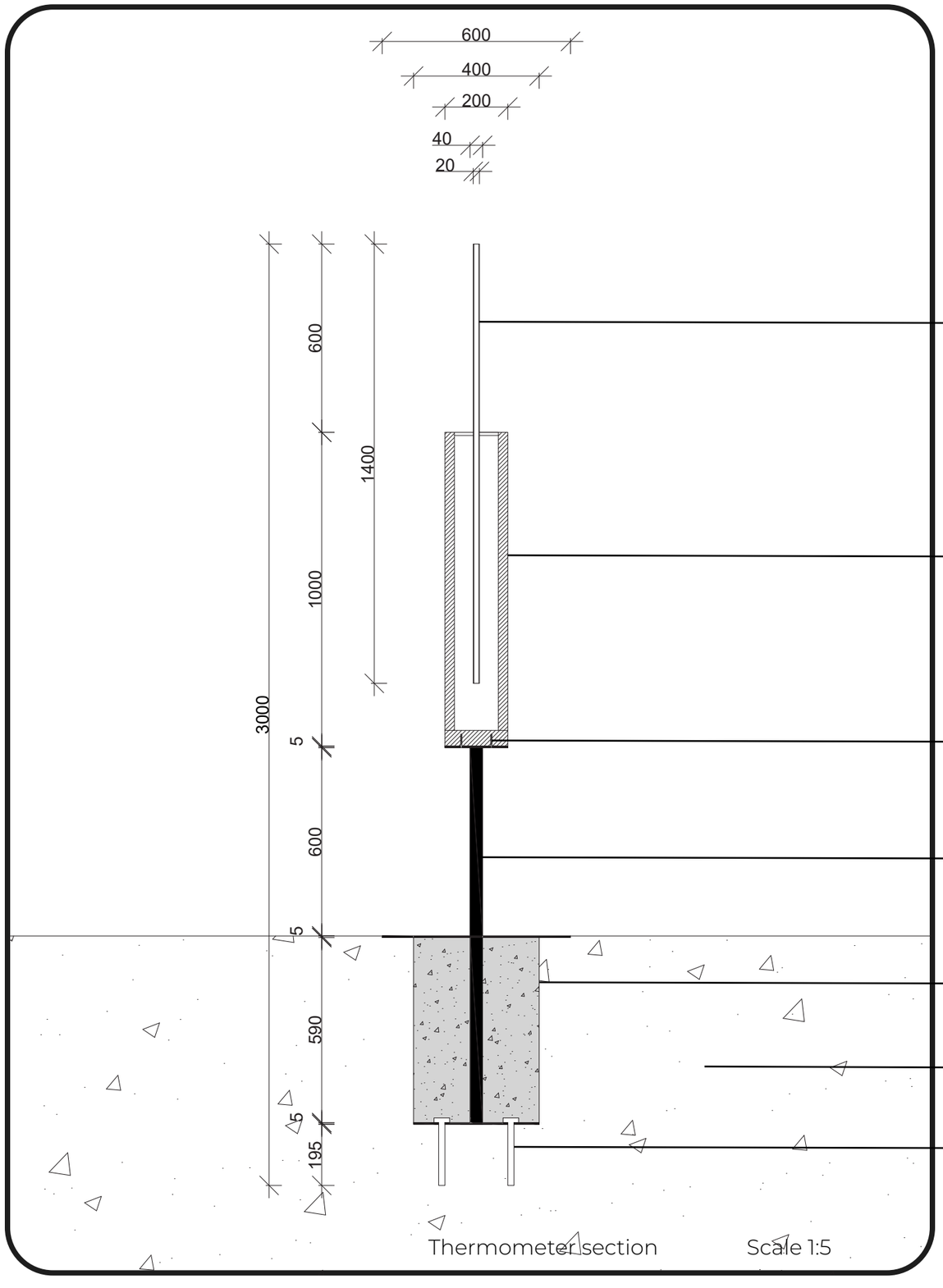
Designed sensory device to draw attention to materials that surrounds us.







Device - Thermometer section



Thermometer section Scale 1:5

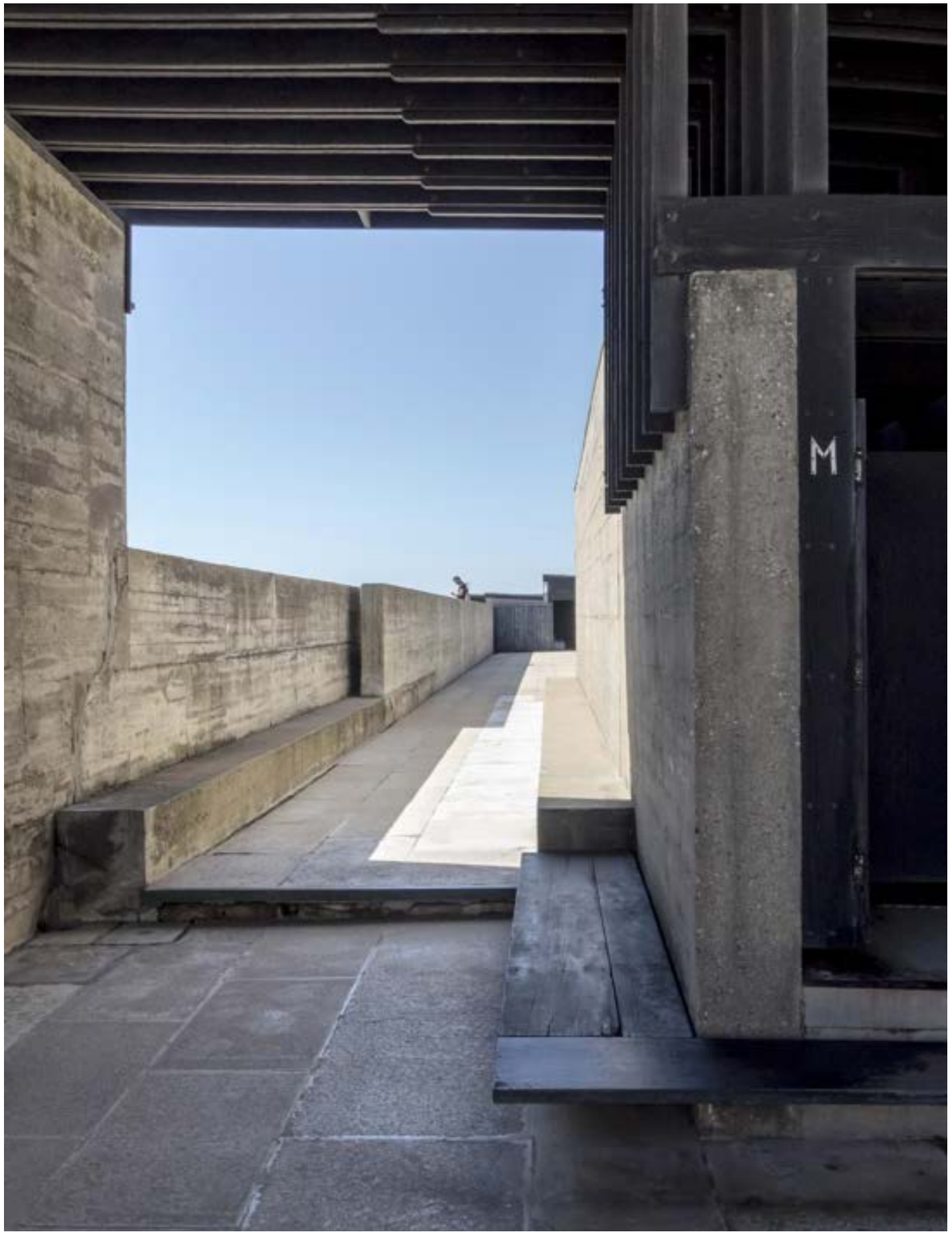
Visualization of the placement on site



Leça Swimming Pool by Álvarao Siza Viera







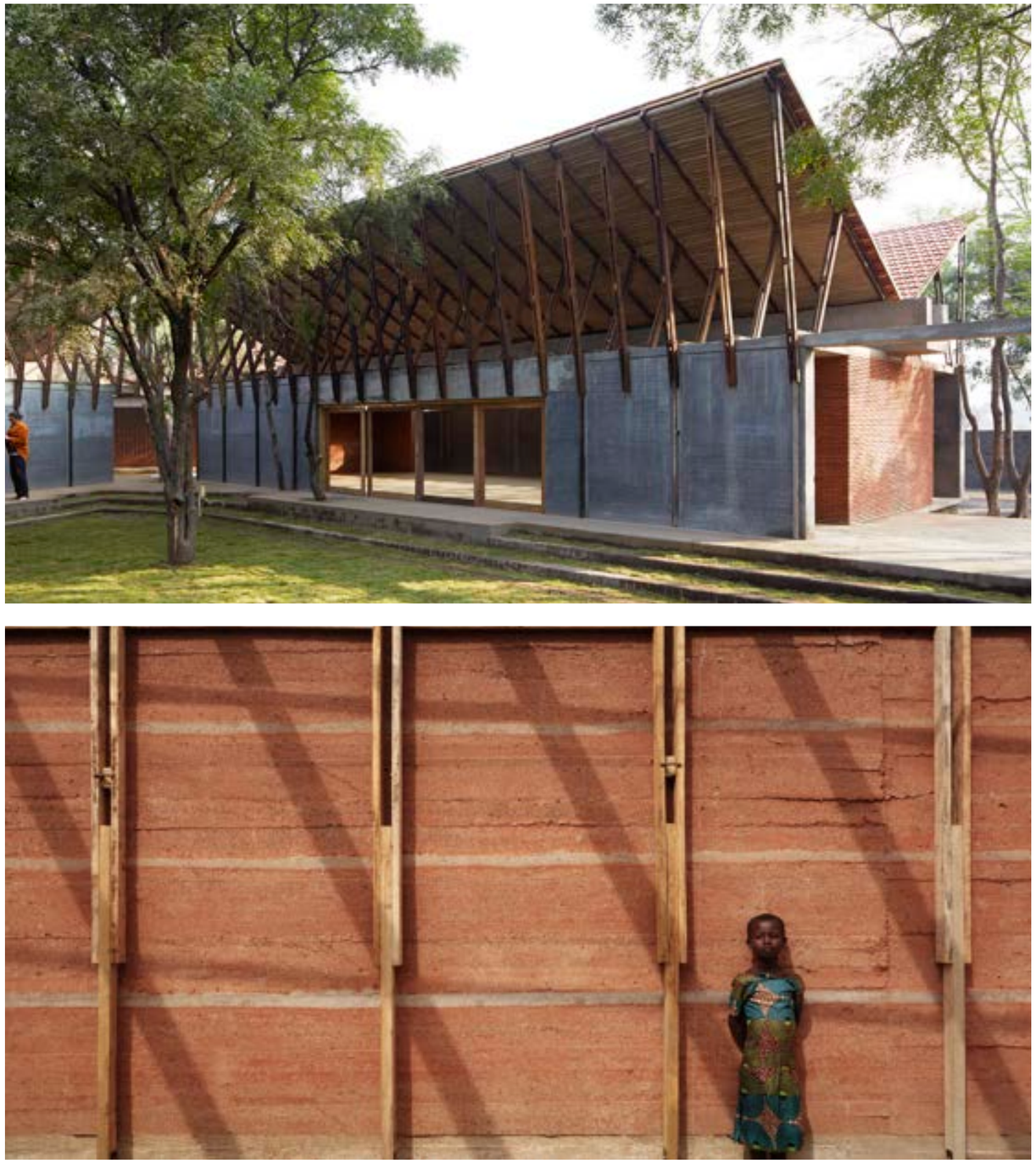
Jorba castle retrofit by Carles Enrich





InsideOut School by Andrea Tabocchini and Francesca Vittorini

Jetavan Spiritual Centre by Sameep Padora and Associates

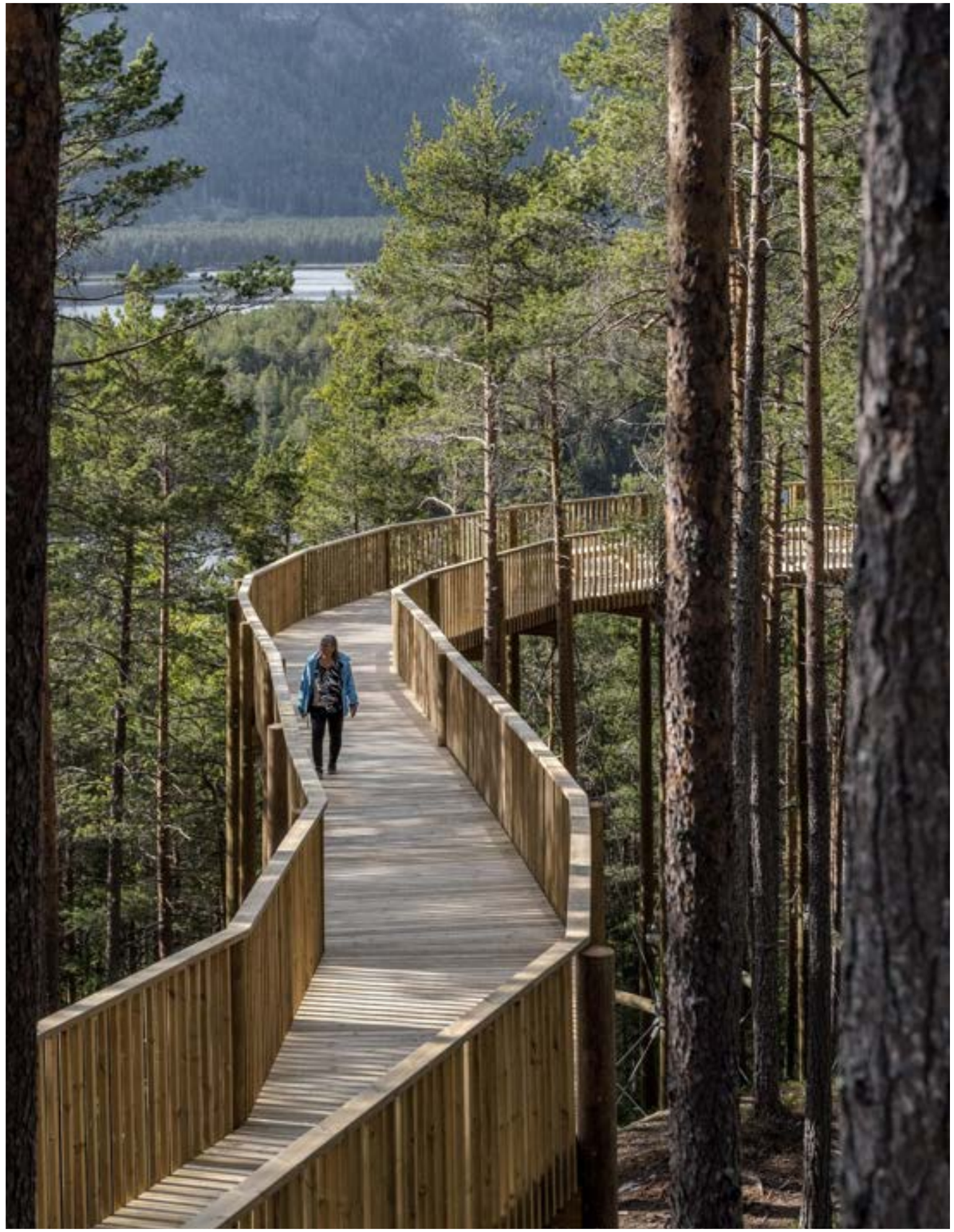




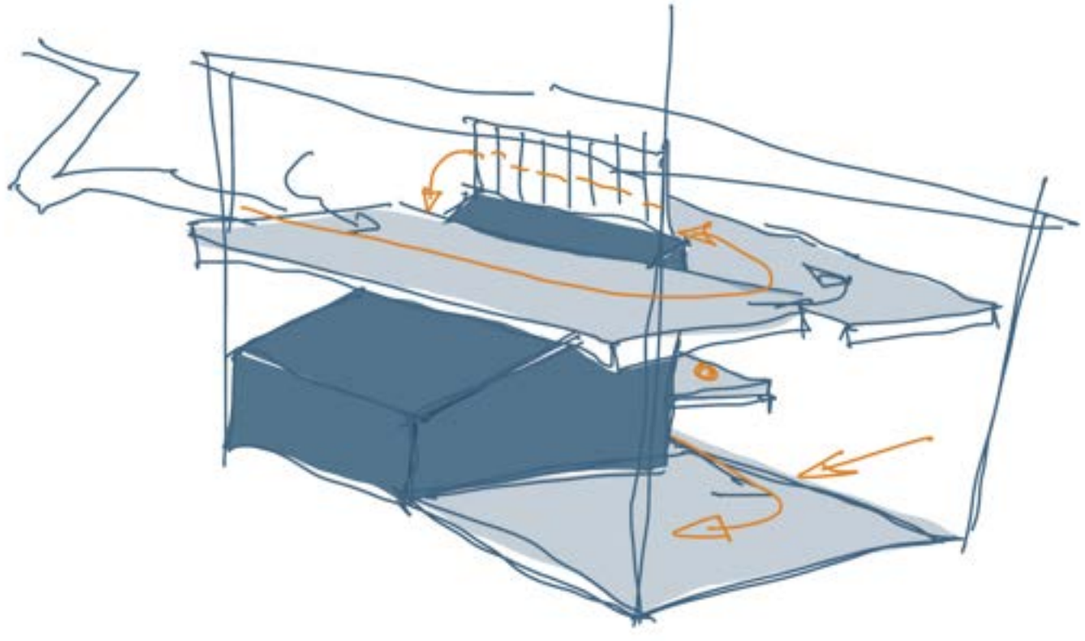
Hamaren Acticity Park in Fyresdal by EFFEKT studio

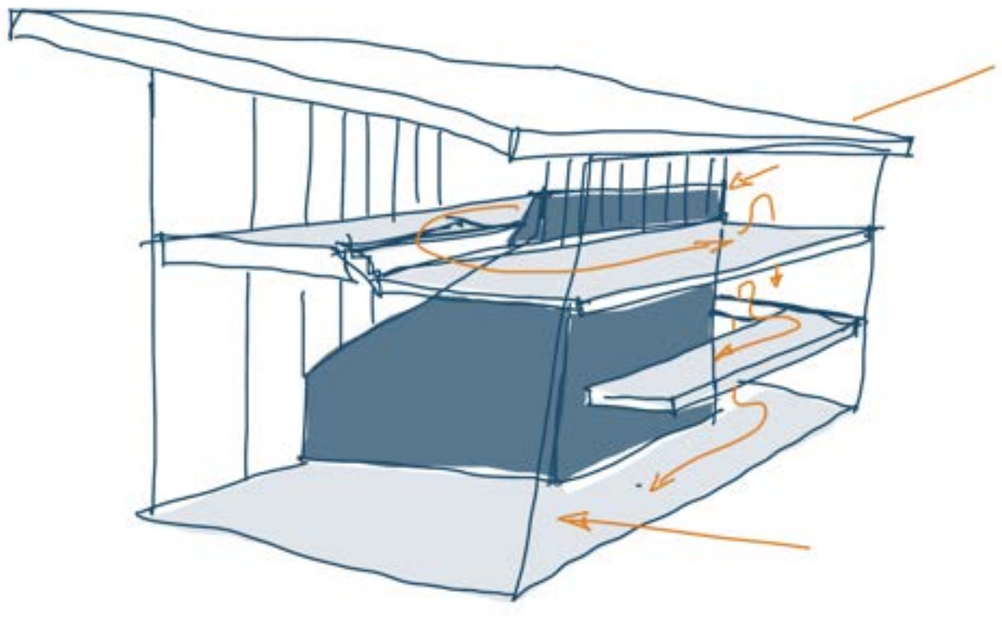






It’s a development of 565 m2. There is a wheelchair accessible sloping high level walkway leading to the top-level entrance. To get to the GF entrance a pathway is marked by wooden railing branching from the South West Coast Pathway. The building serves two purposes. One is offering a “recharging” place for tourists and hikers with a grand café and an exhibition area. The other part of the scheme is for locals to practice their Cornish cultural heritage and make stronger connections within the community. To serve this goal a multipurpose hall, an exhibition place and a community office are at their disposal. The multipurpose hall is perpect for gatherings, lectures or talks in the same time offers a intimet, spititual space for yoga or dancing. For physical movment classes there are changing rooms with showers. The builing has multiple storages for foldable tables and chairs for hosting craft workshops. The exhibition space offers a good opportunity for local artist to connect with a wider audiance through the passerbyer hikers and turists. The tall cielinged cafe permits the relaxing public to feel connected to the site, bring them closer to existing structures thoes carry their history within. Leading people to use their sensen. To touch the concrete wall, feel the texture and the warmth of the material. It offers a unblocked view to the sea from a shelterd indoor space where tourists and hikers can recharge in the middle of a hike.



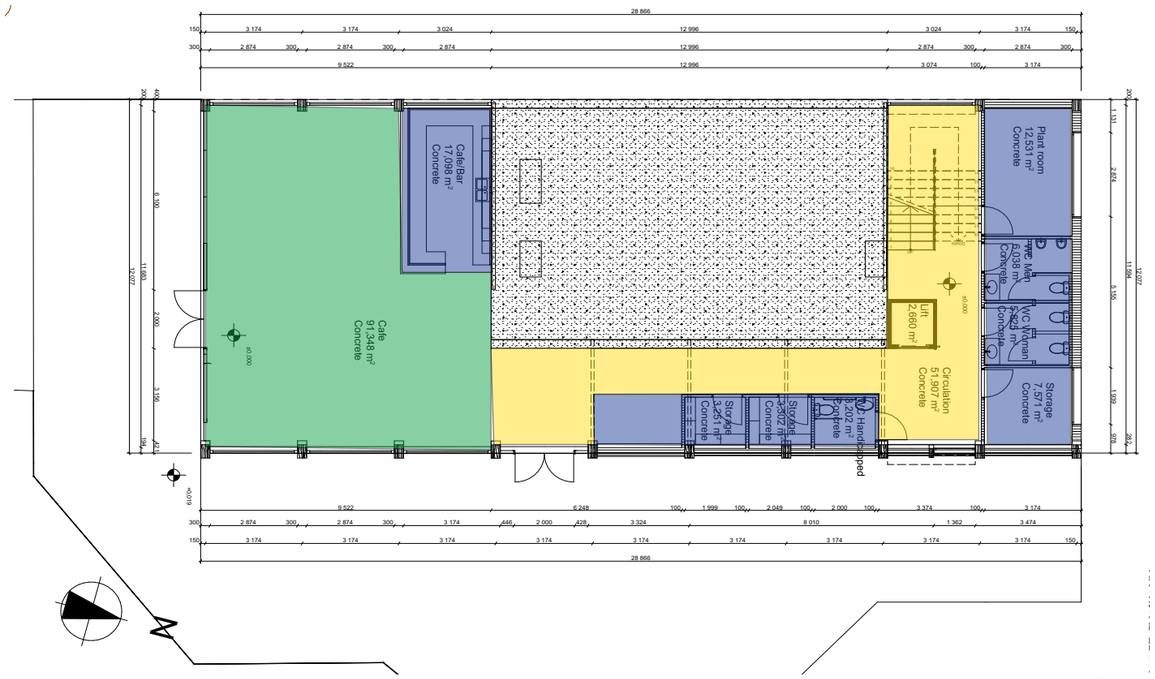


Function Scheme

1. Active spaces - 369 m^2

2. Circulation - 104 m^2

3. Services/ back of house - 92 m^2



Ground floor

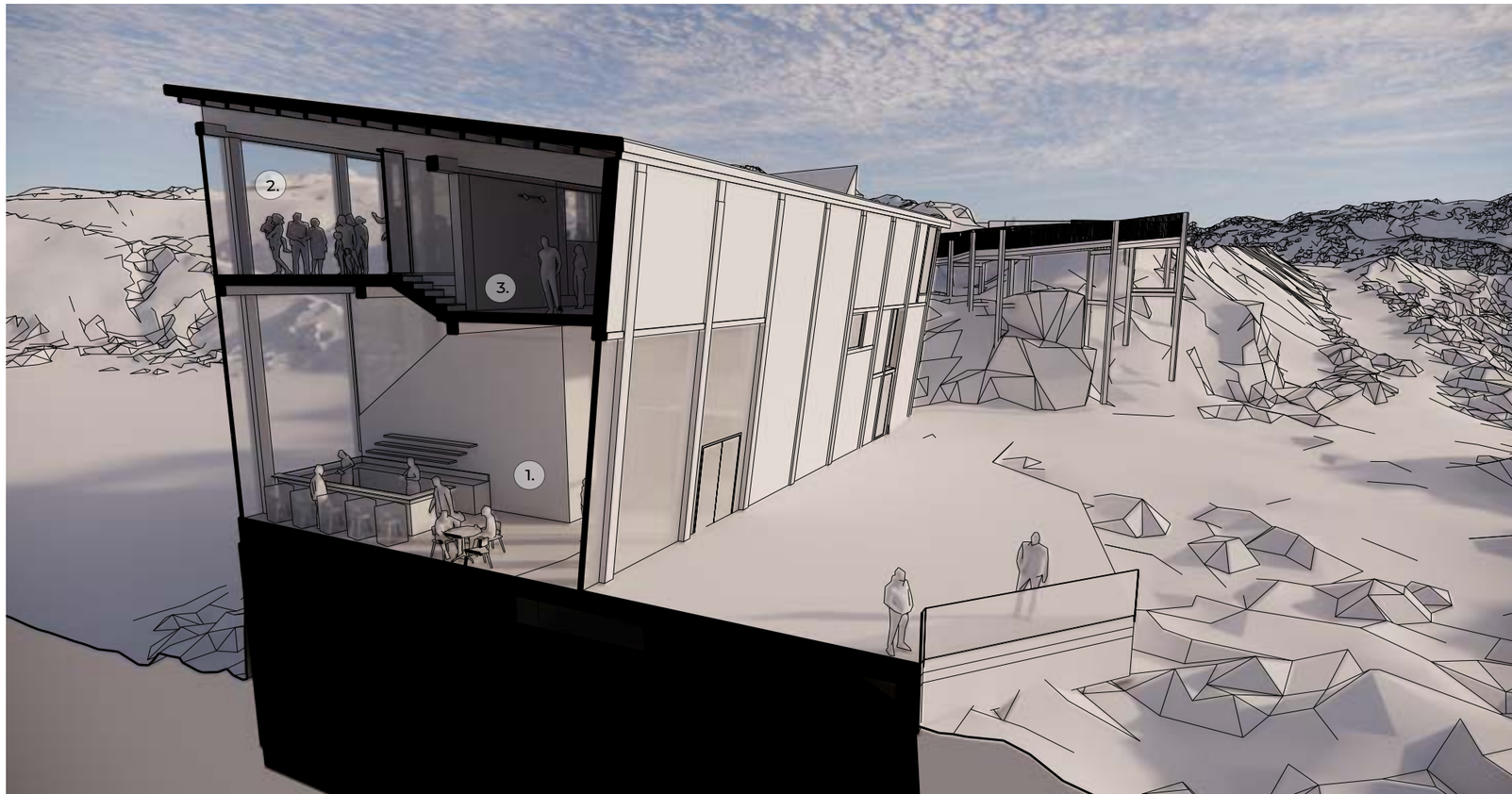
1. Foayer and cafe - 91 m^2

2. Multipurpose community space - 146 m^2

3. Exhibition space - 115 m^2

4. Relax zone - 17 m^2

5. Up stairs entrance - 28 m^2

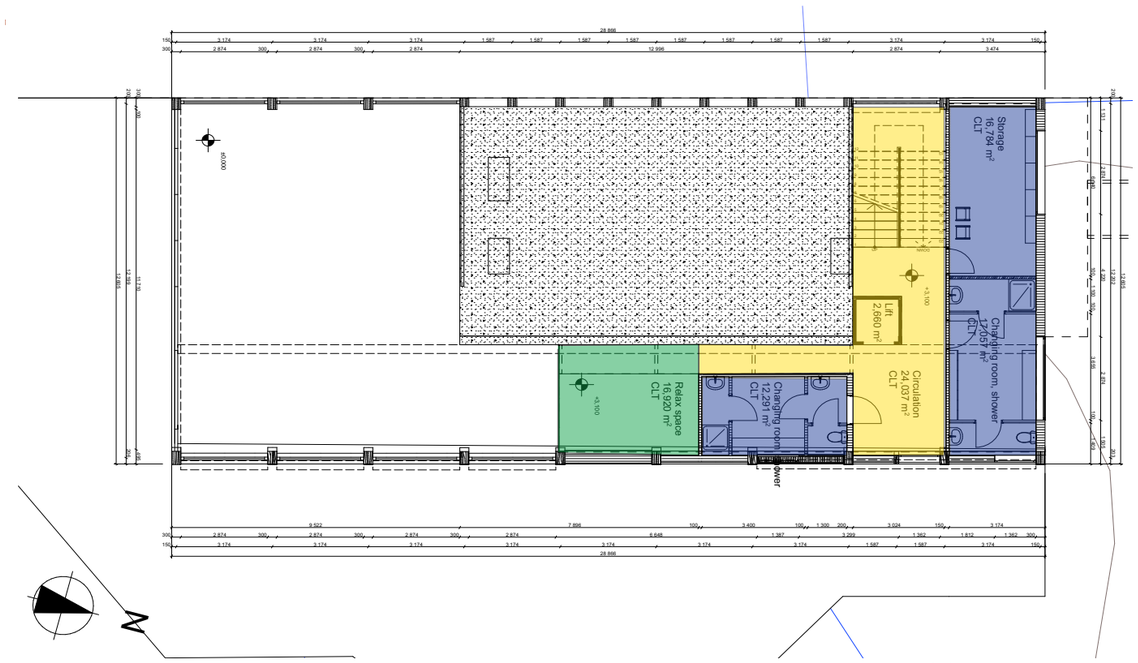


Function Scheme

1. Active spaces - 369 m^2

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Mezzanine level

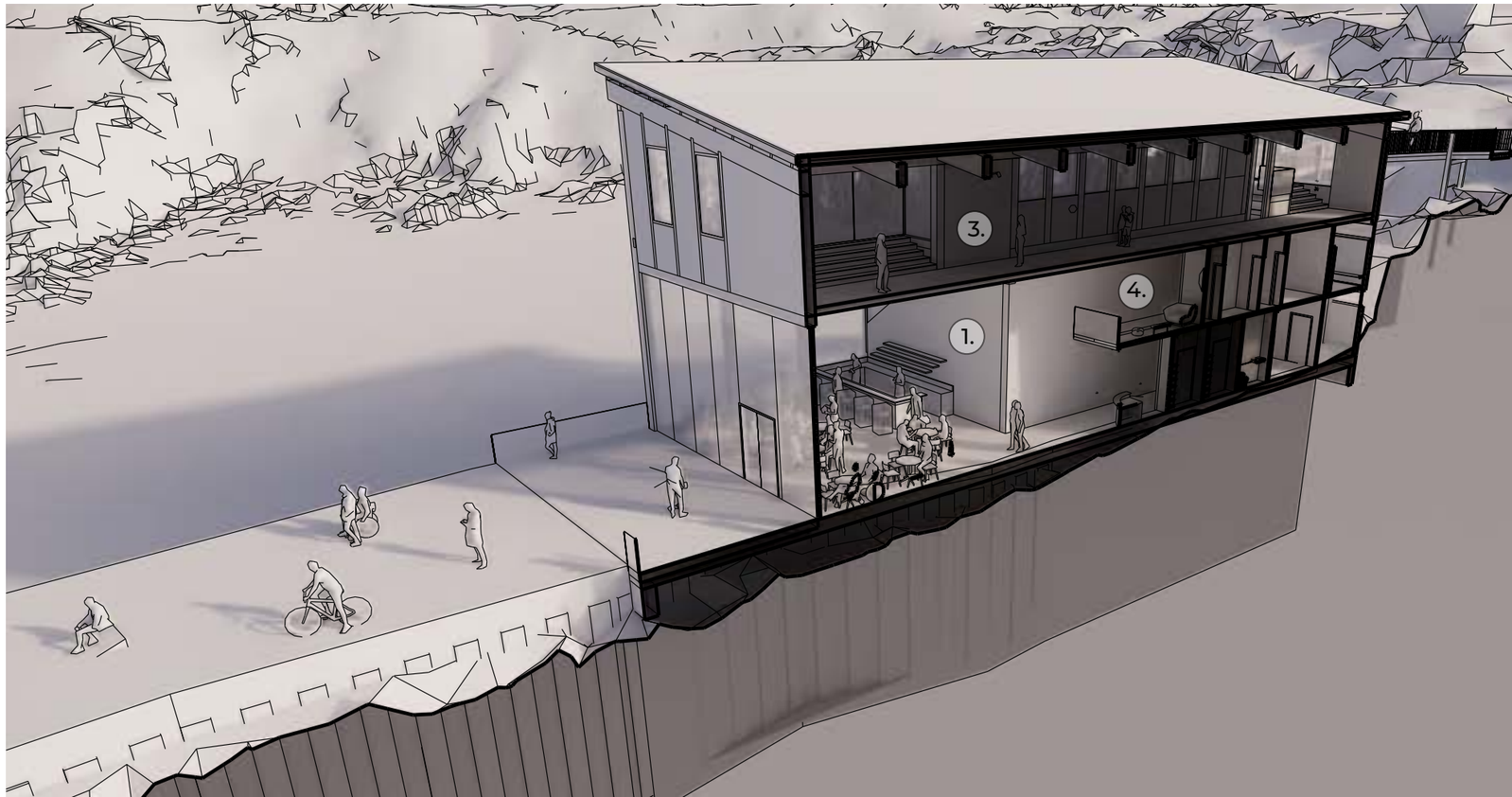
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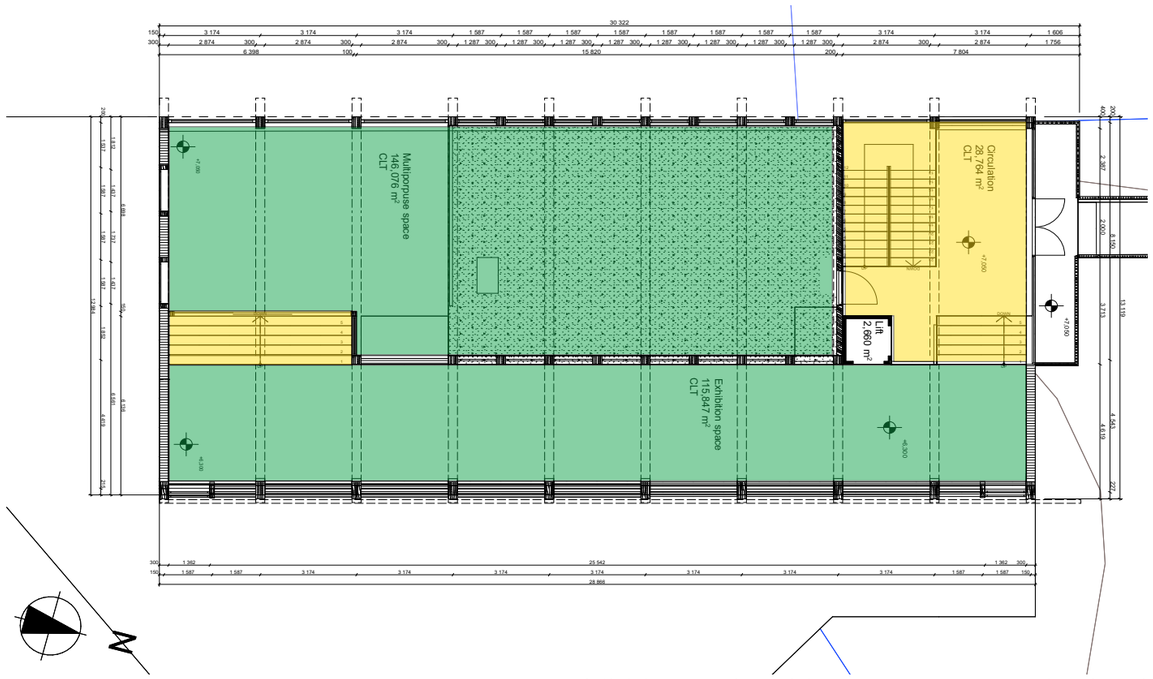


Function Scheme

1. Active spaces - 369 m^2

2. Circulation - 104 m^2

3. Services/ back of house - 92 m^2



Exhibition and Multipurpose community level

1. Foayer and cafe - 91 m^2

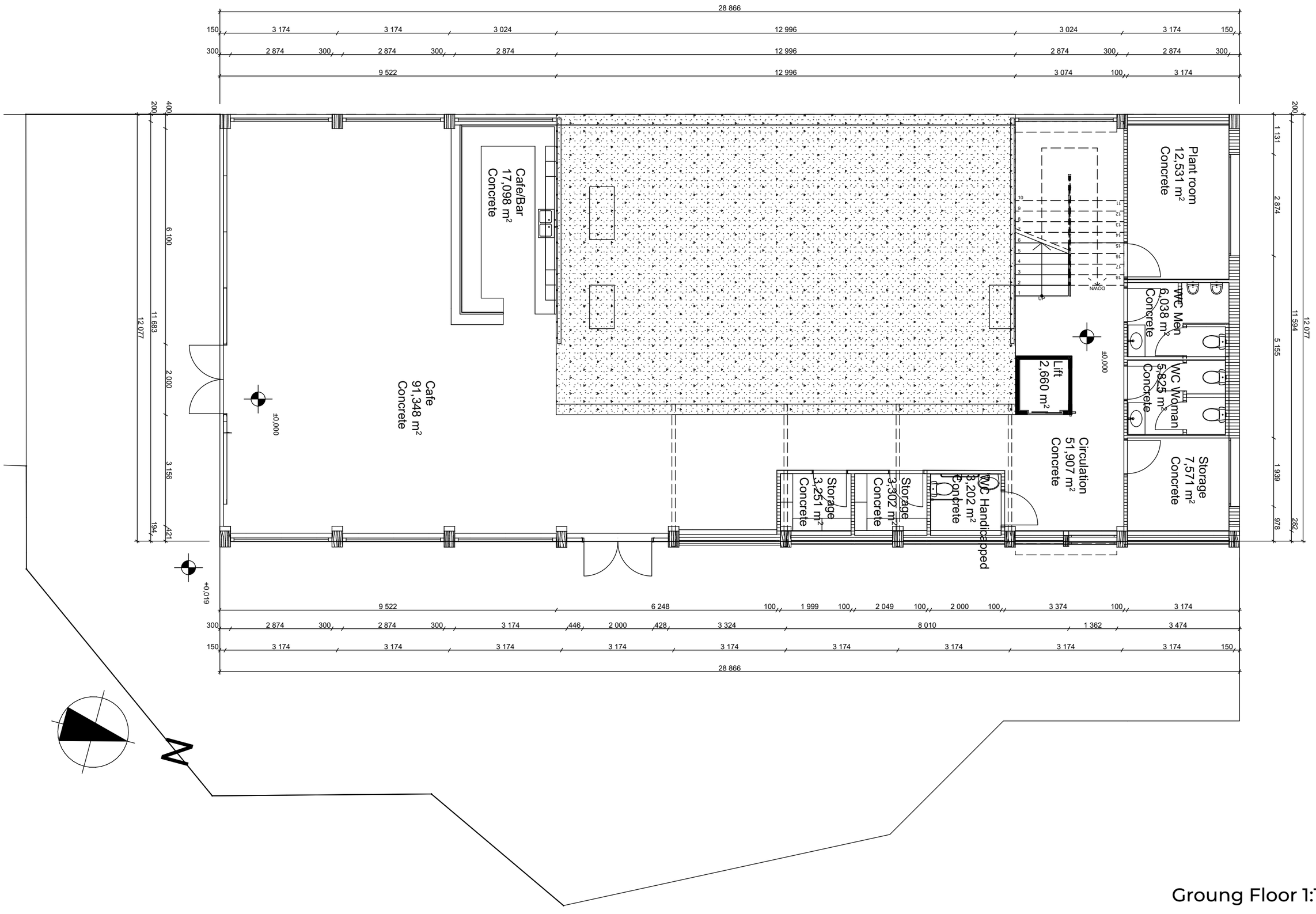
2. Multipurpose community space - 146 m^2

3. Exhibition space - 115 m^2

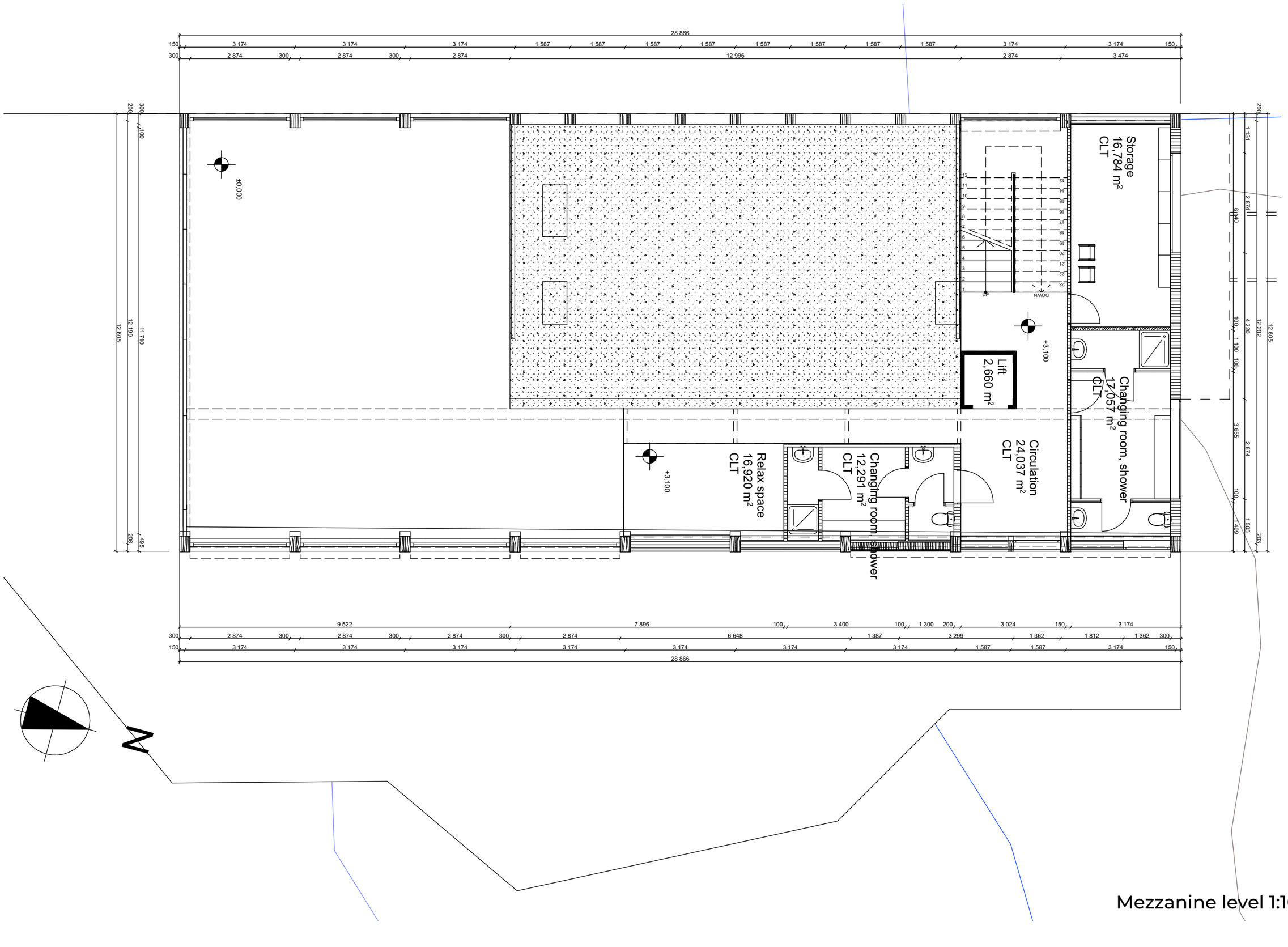
4. Relax zone - 17 m^2

5. Up stairs entrance - 28 m^2

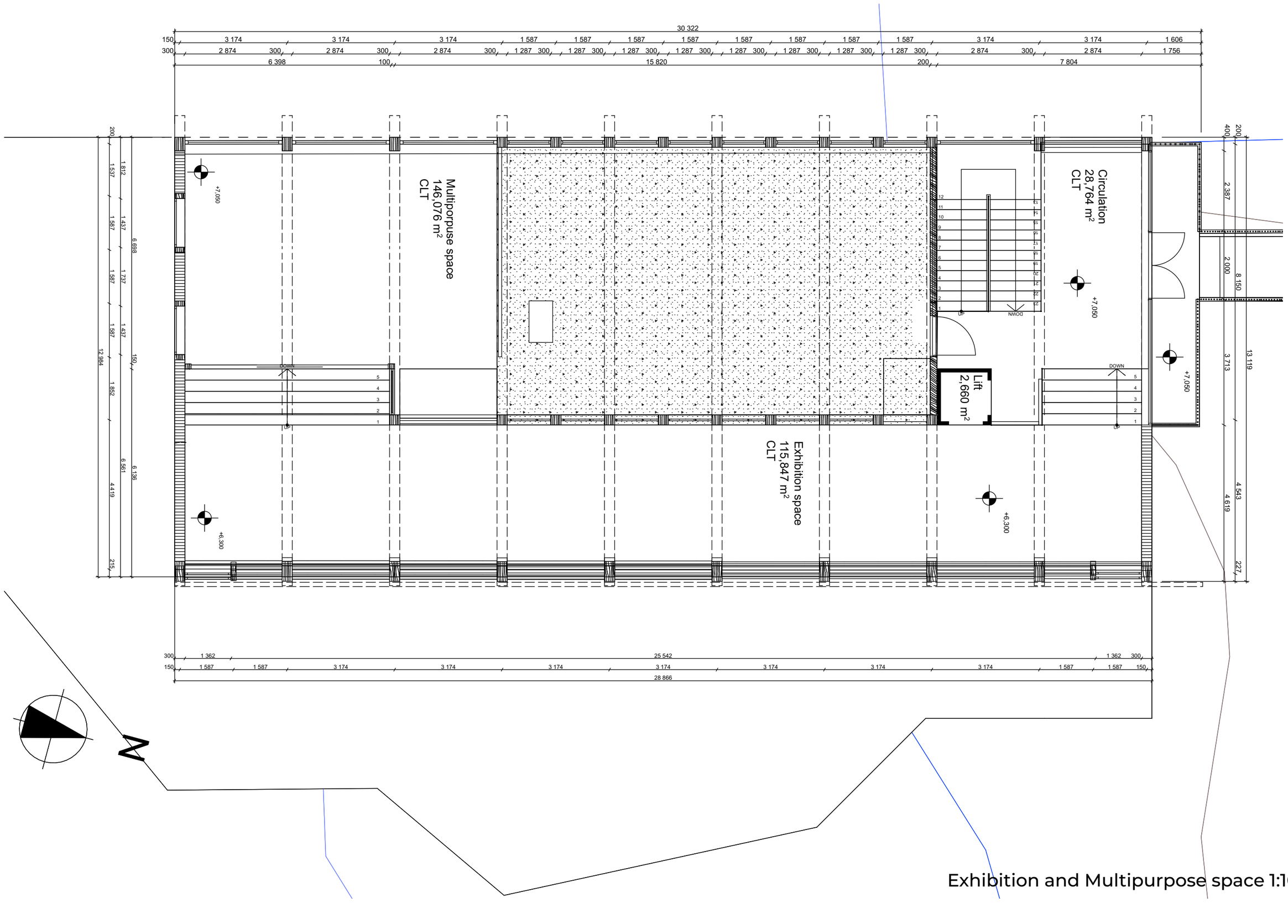




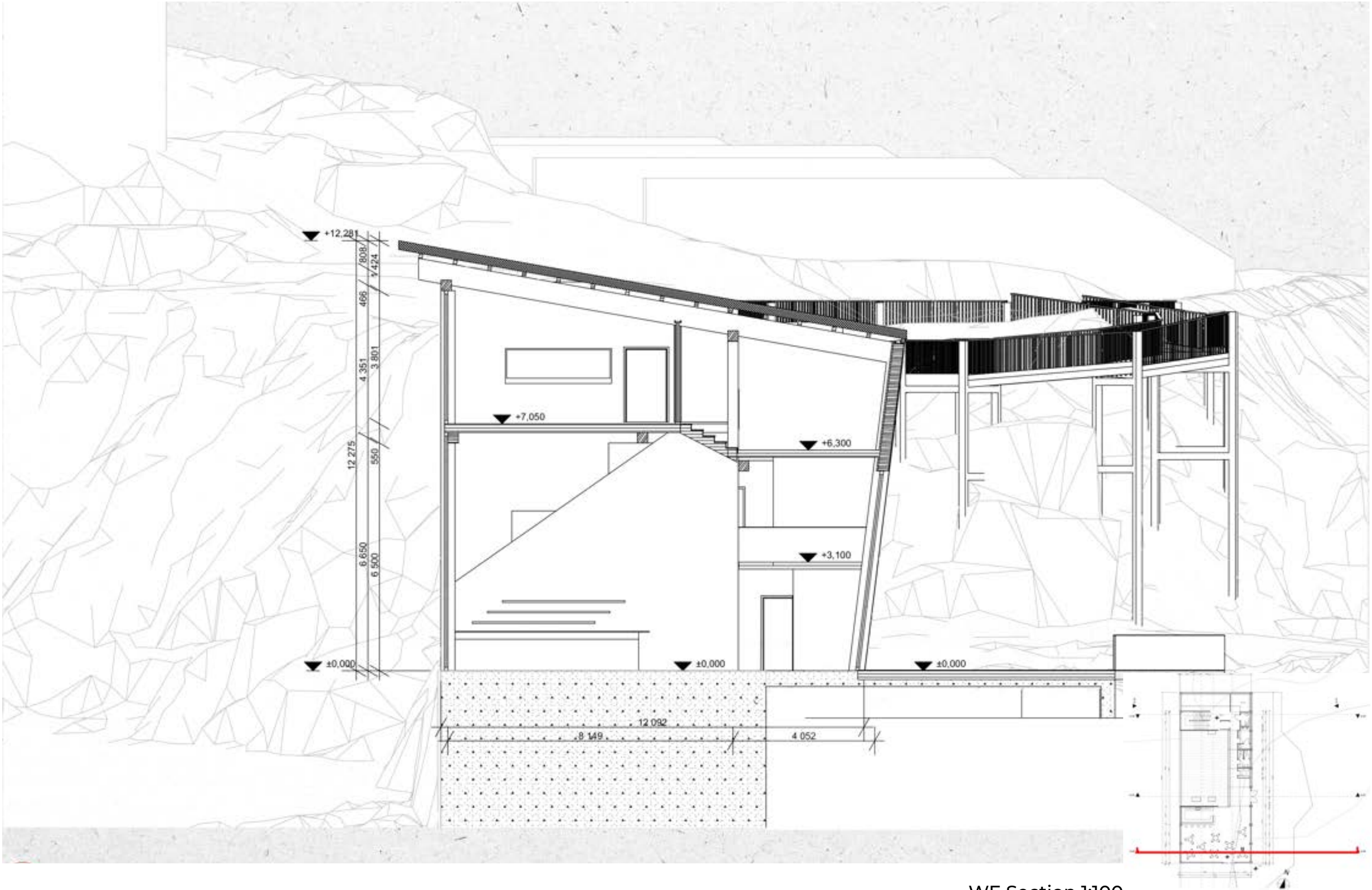
Groung Floor 1:100



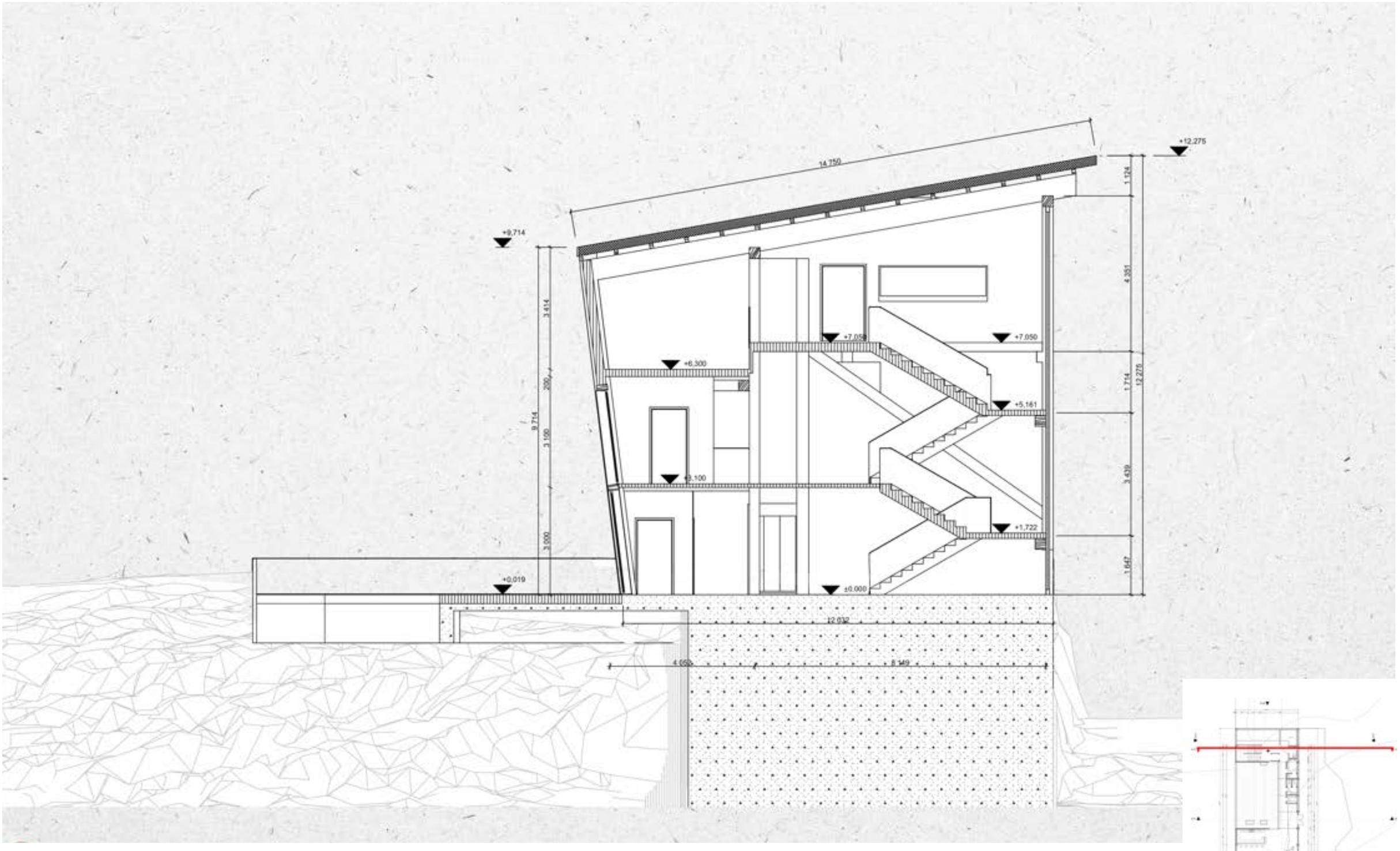
Mezzanine level 1:100



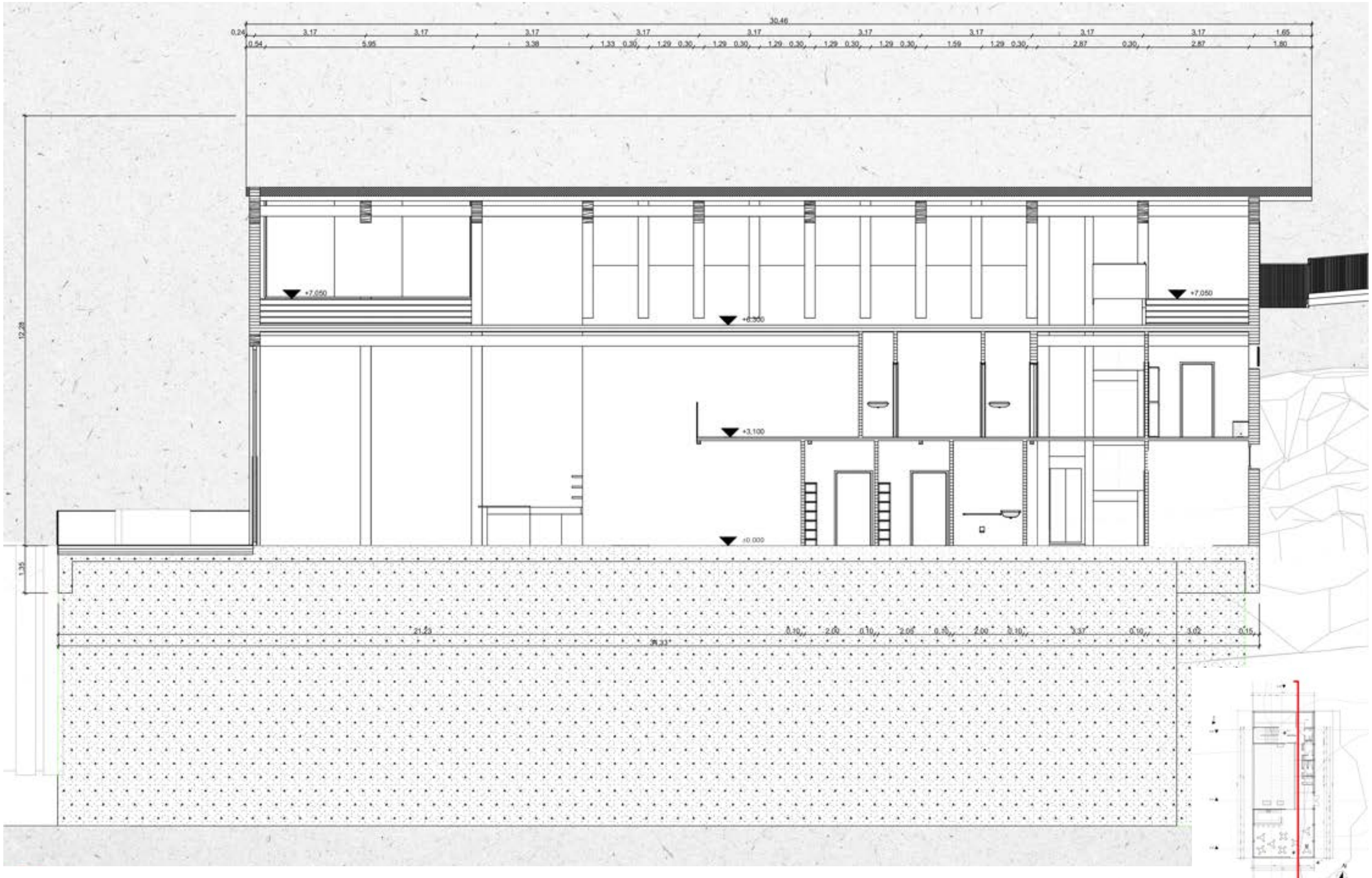
Exhibition and Multipurpose space 1:100



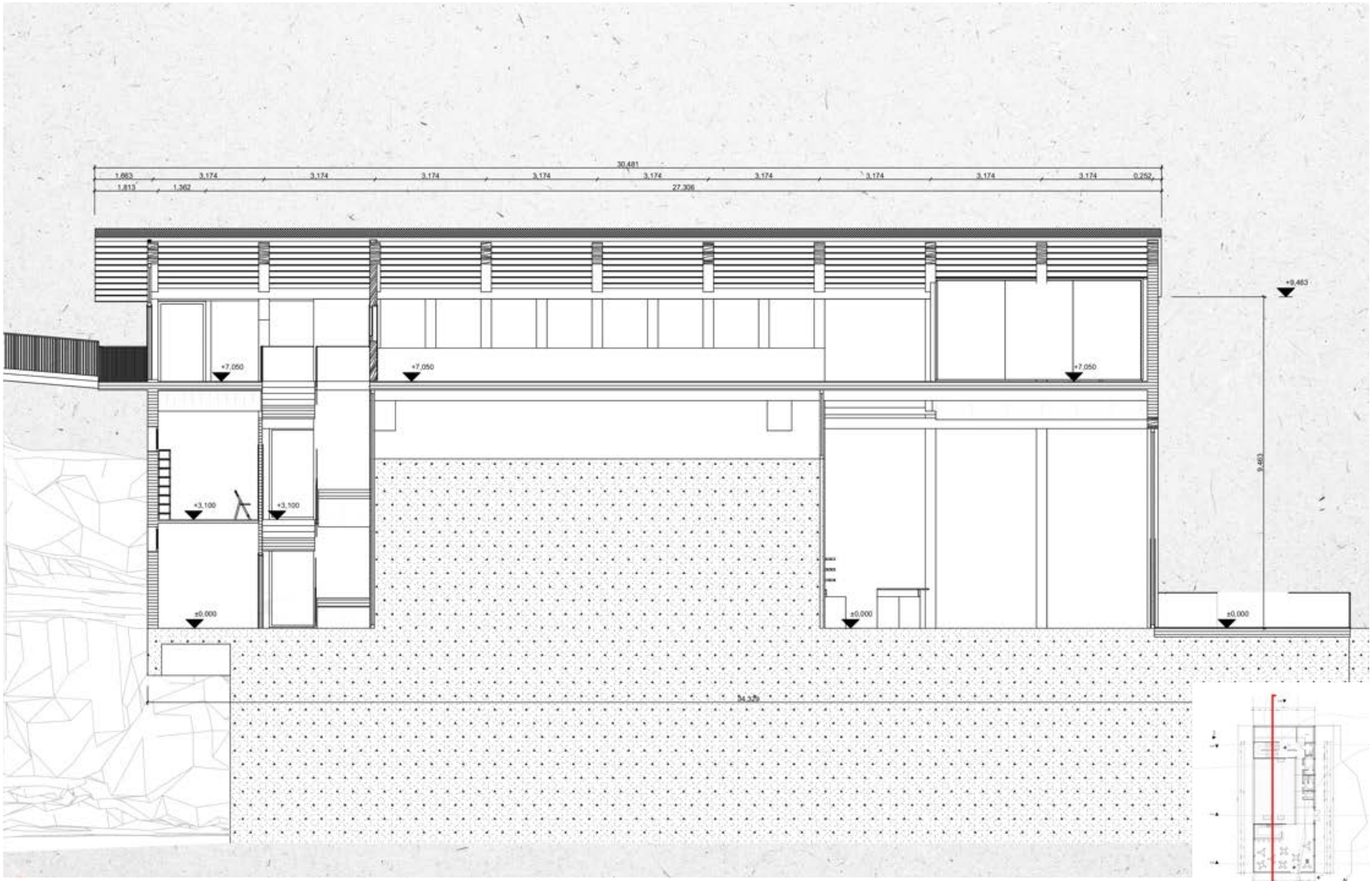
WE Section 1:100



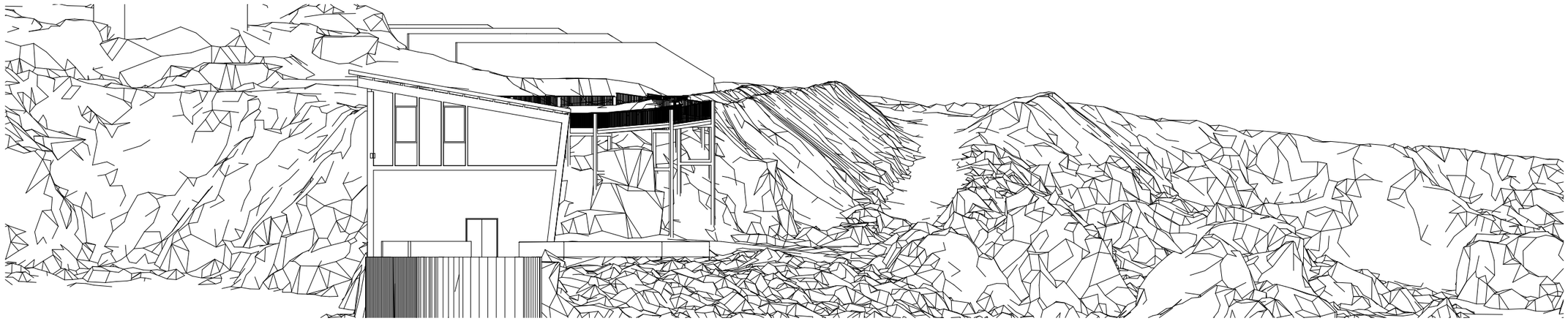
EW Section 1:100



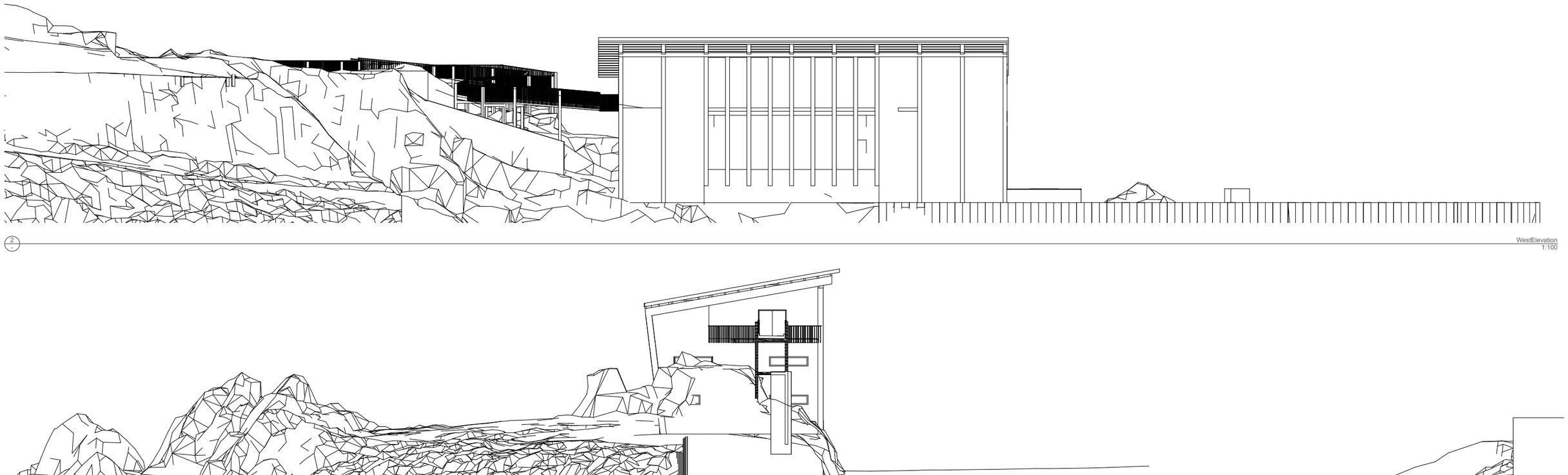
SN Section 1:100



NS Section 1:100



1 - South Elevation
1:100



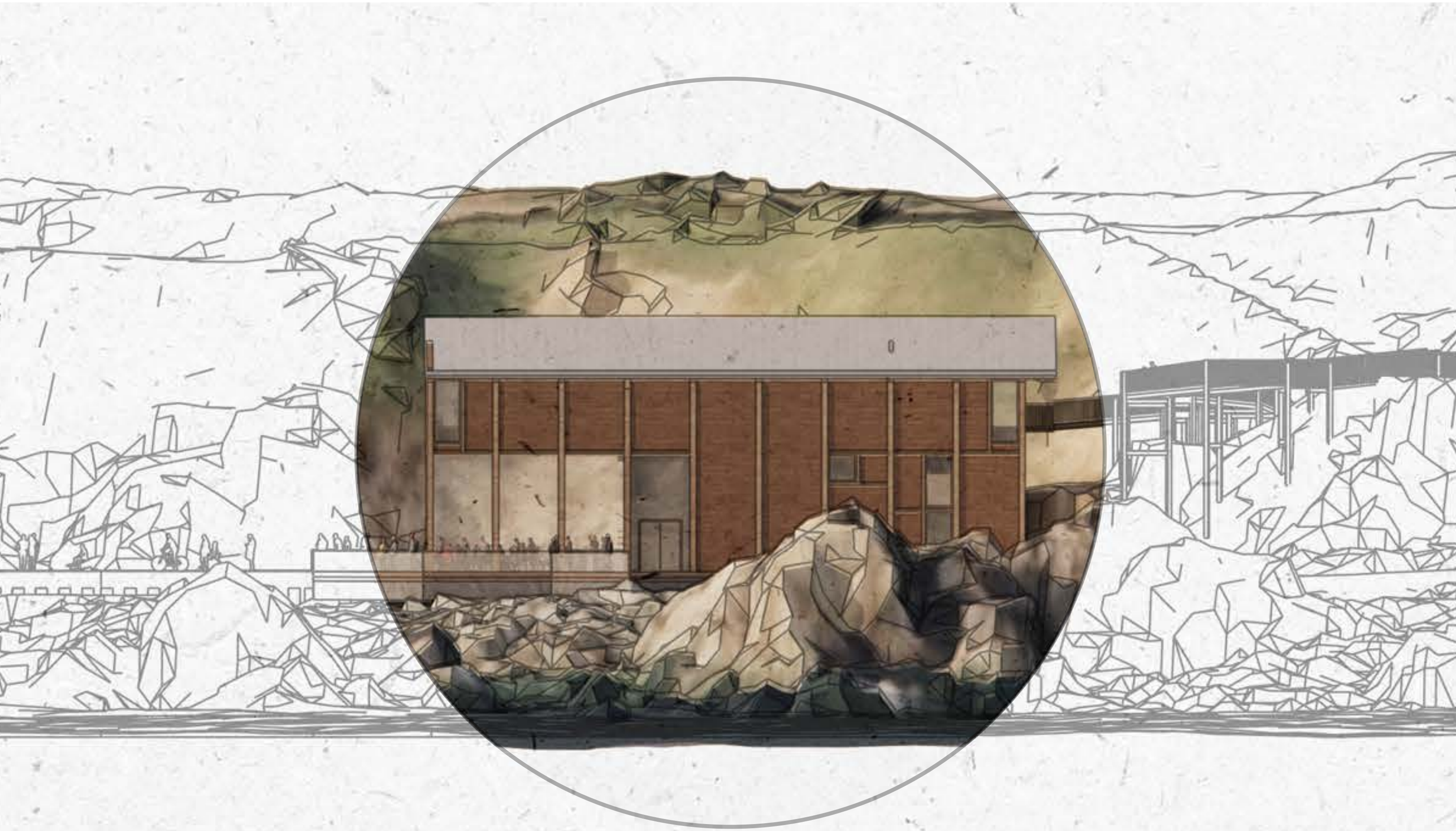
2 - WestElevation
1:100



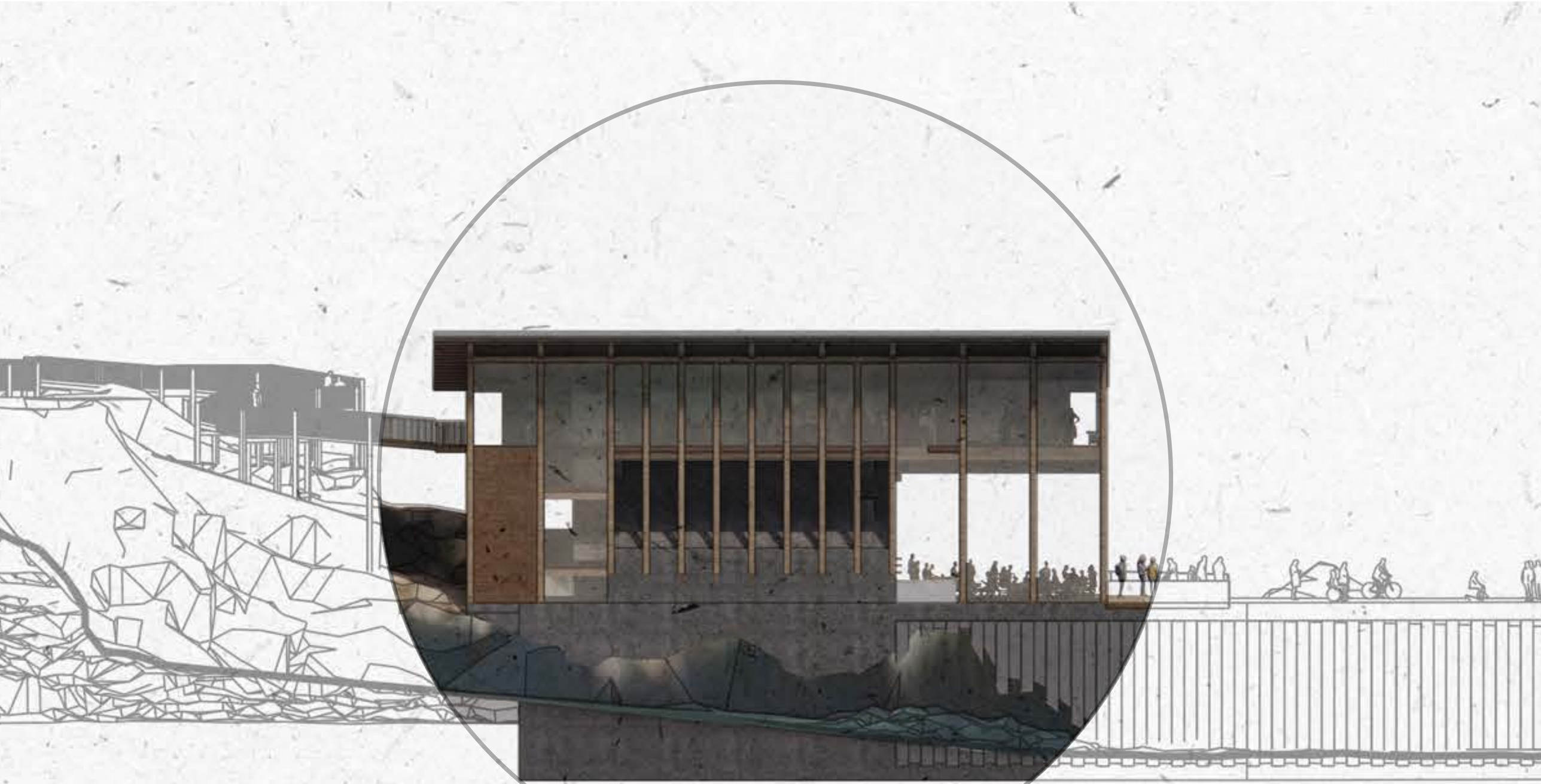
4 - North Elevation
1:100

not in scale, on A1 - 1:100

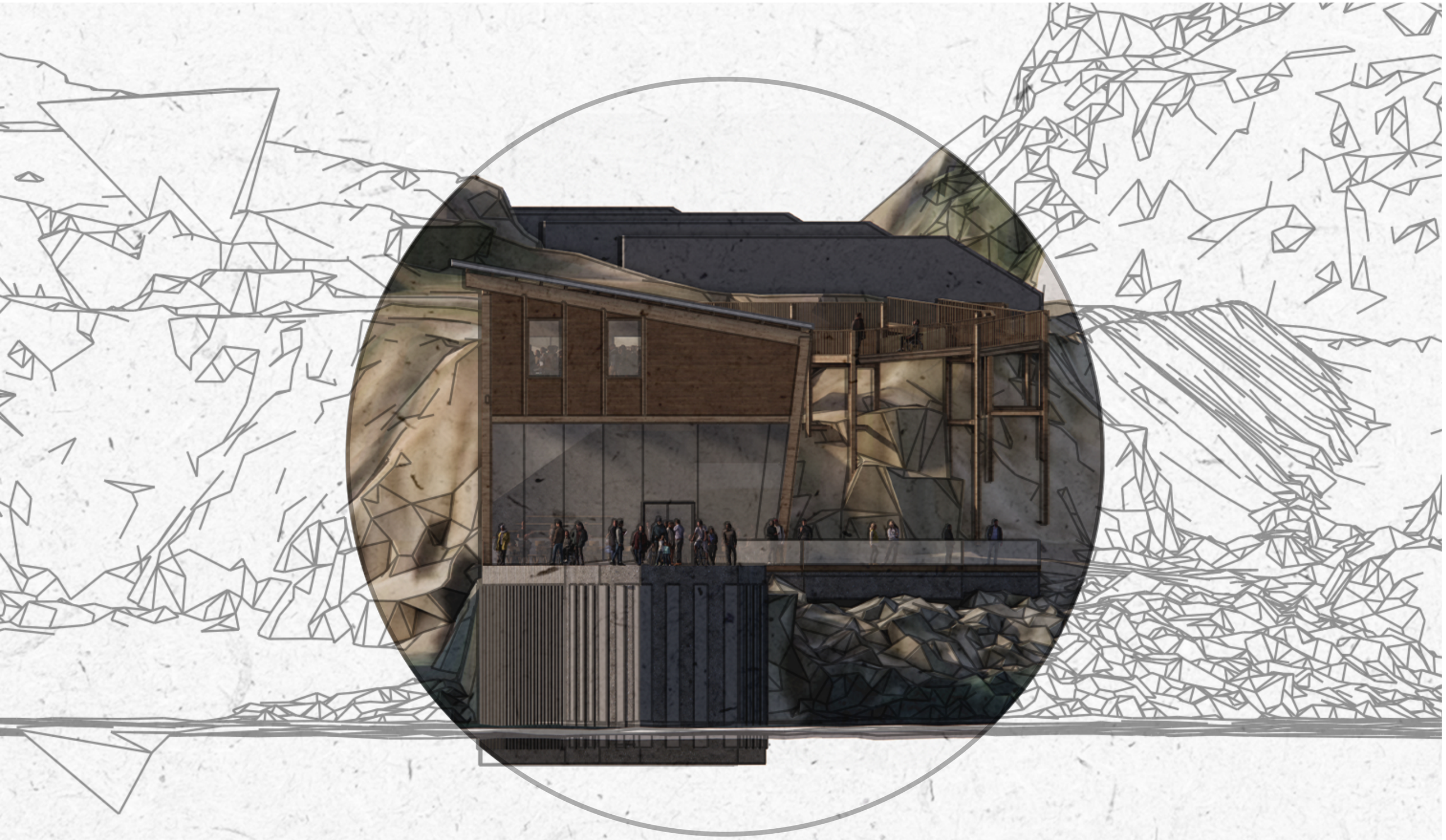
East Elevation



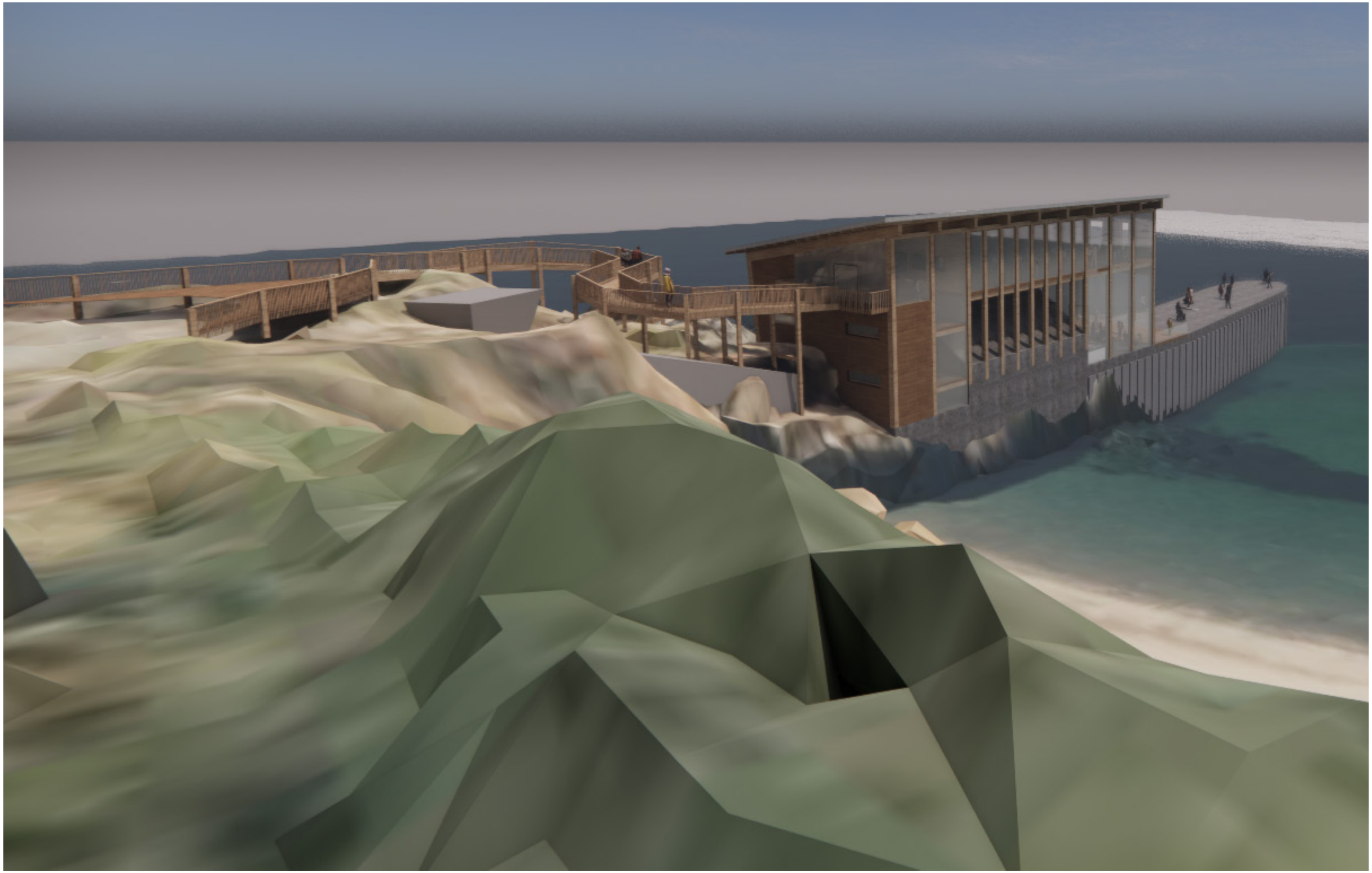
West Elevation



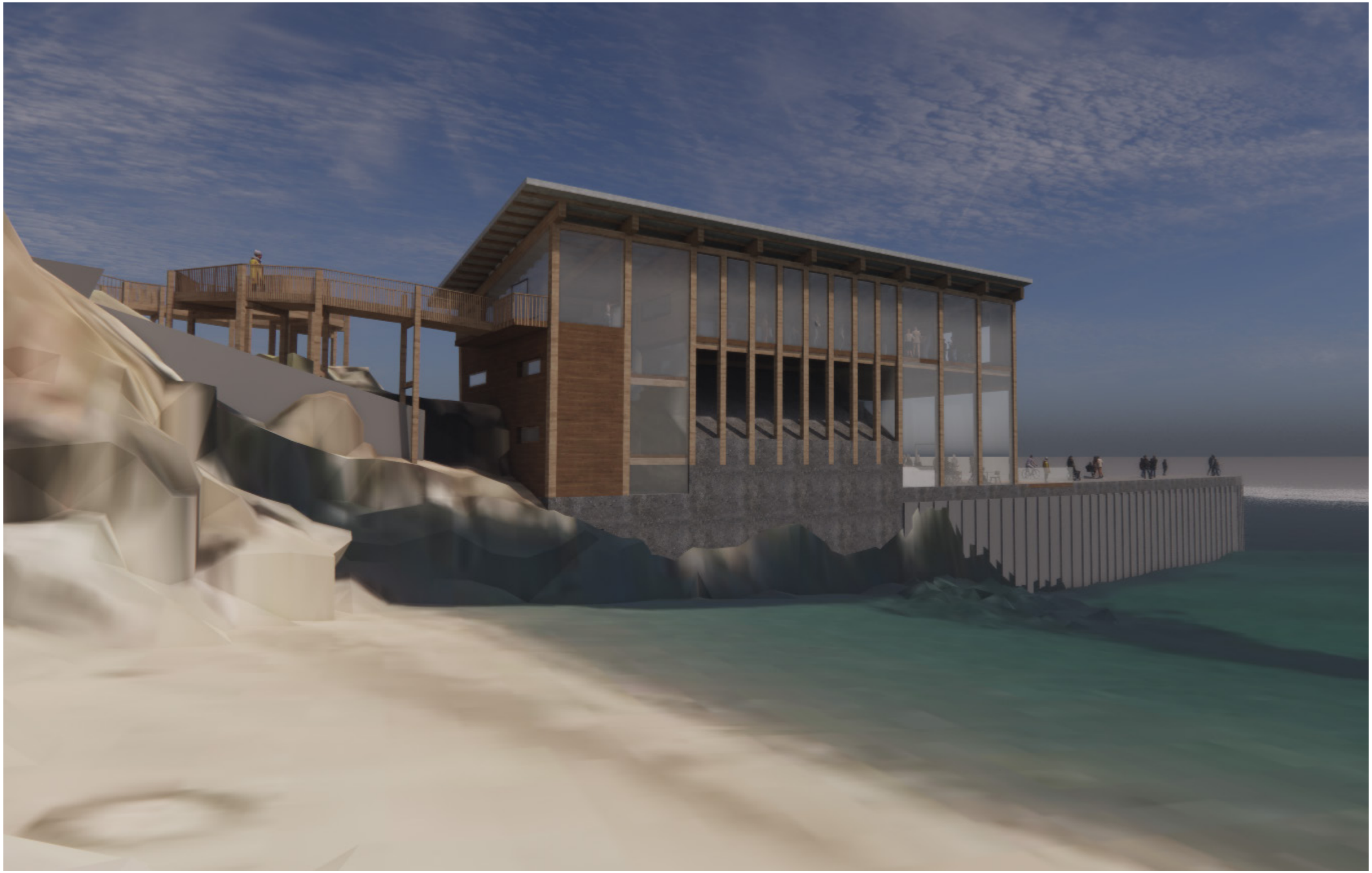
South Elevation



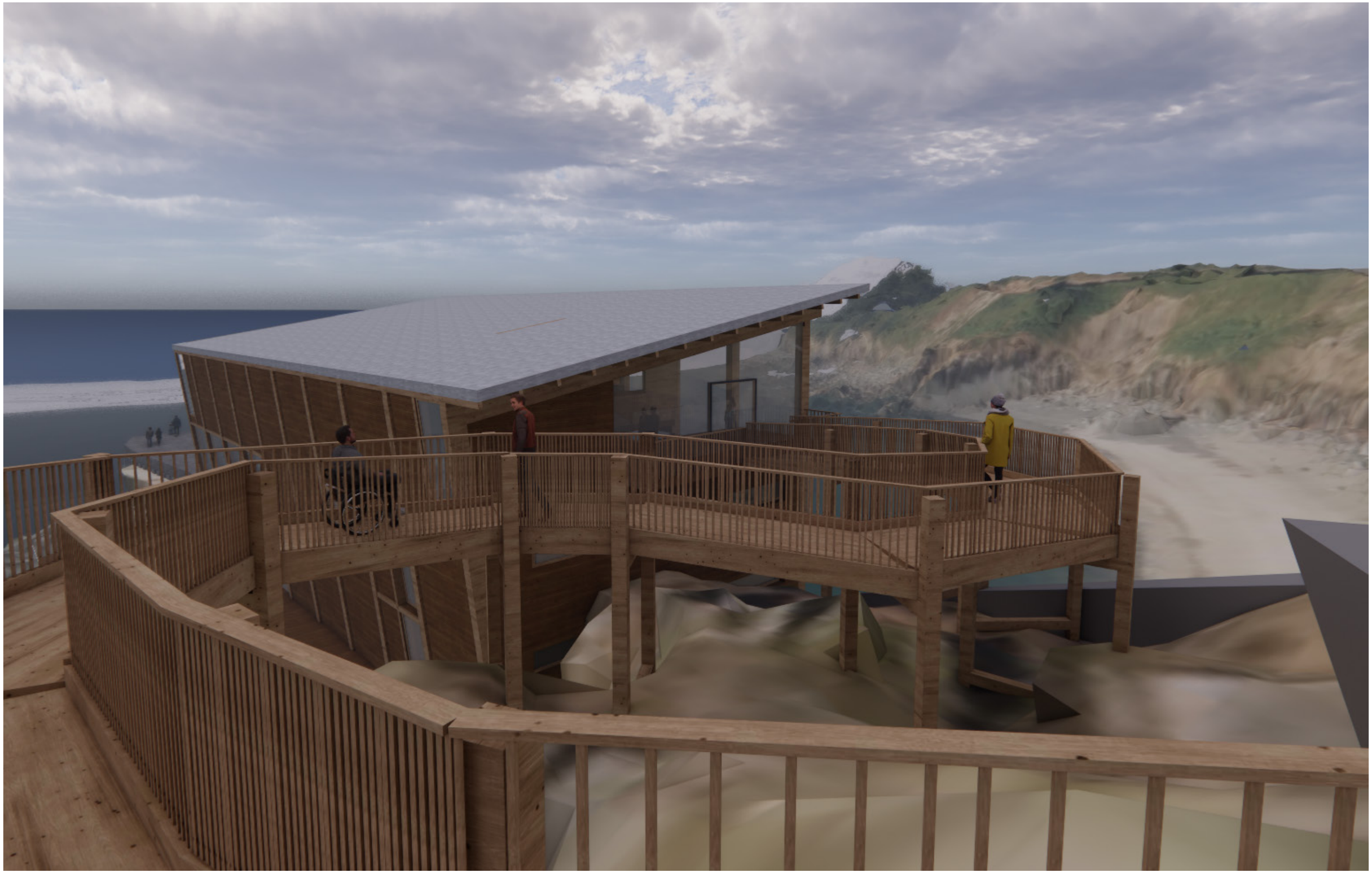
Approaching the site from the SW Coast Path



View from the beach



View from the top of the ramp



Approaching GF entrance



Cafe



Looking down from the mezzanine to the cafe and the Jetty



Mezzanine, chill out area



Up stairs entrance, circulation



Multipurpose community space, variation of use - gathering, concert



Multipurpose community space, variation of use - gathering, concert



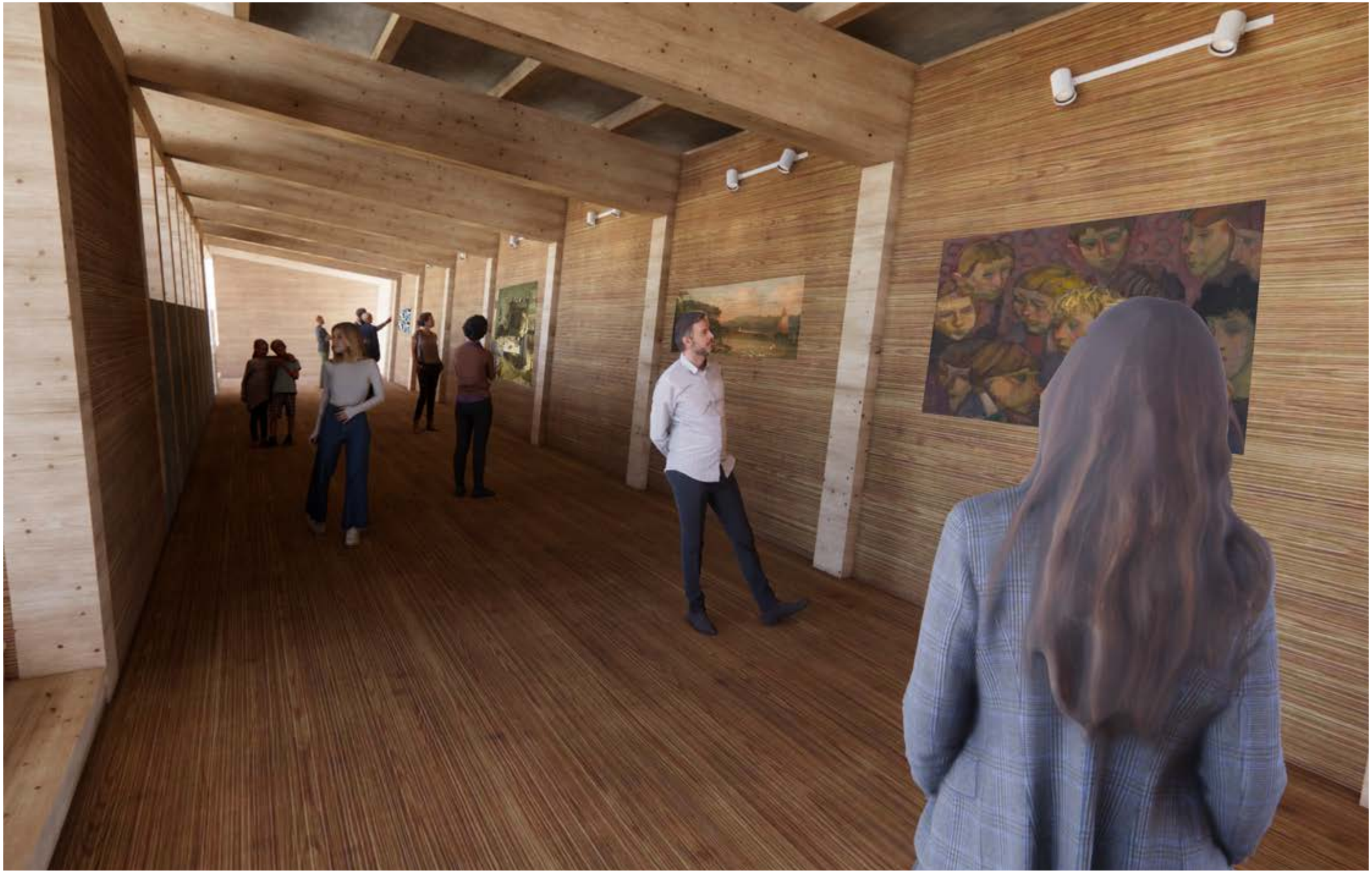
Multipurpose community space, variation of use - yoga class



Multipurpose community space, variation of use - start up meeting supporting young entrepeneurs



Exhibition space



This sustainability strategy adopts a holistic approach that values existing resources, promotes biodiversity, and incorporates Cross-Laminated Timber (CLT) to minimize environmental impact.

Using what is already there:

The strategy prioritizes adaptive reuse, recognizing the value of existing structures and materials. Using what is already there, is to repurpose buildings or elements of buildings rather than demolishing and rebuilding, thereby reducing construction waste and conserving embodied energy. Adaptive reuse helps to preserves the cultural and historical significance of the site.

Material Efficiency and Lifecycle Considerations:

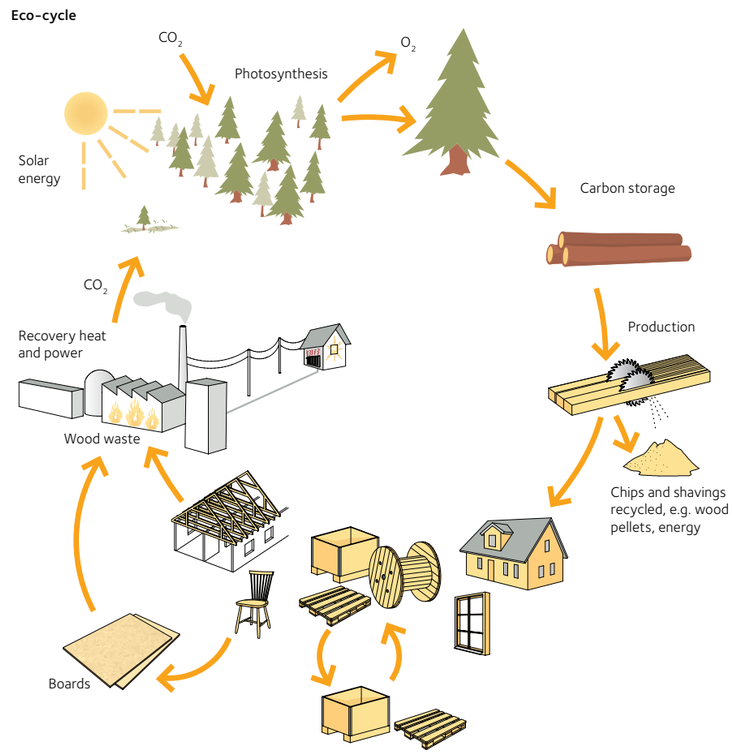
Emphasis will be placed on selecting materials with a minimal environmental impact, considering factors such as recyclability and durability. Additionally, a life-cycle assessment informed material choices, ensuring that the environmental footprint is minimized throughout the building's lifespan.

Biodiversity restoration:

Dean Quarry's biodiversity restoration plan focuses on native vegetation reintroduction, habitat creation, and soil restoration. This phased strategy emphasizes community engagement and education, involving locals in planting events and monitoring efforts. By integrating these elements, the strategy seeks to create a resilient ecosystem, fostering the return of native species and promoting sustainability at the quarry site.



Eco-cycle of wood production



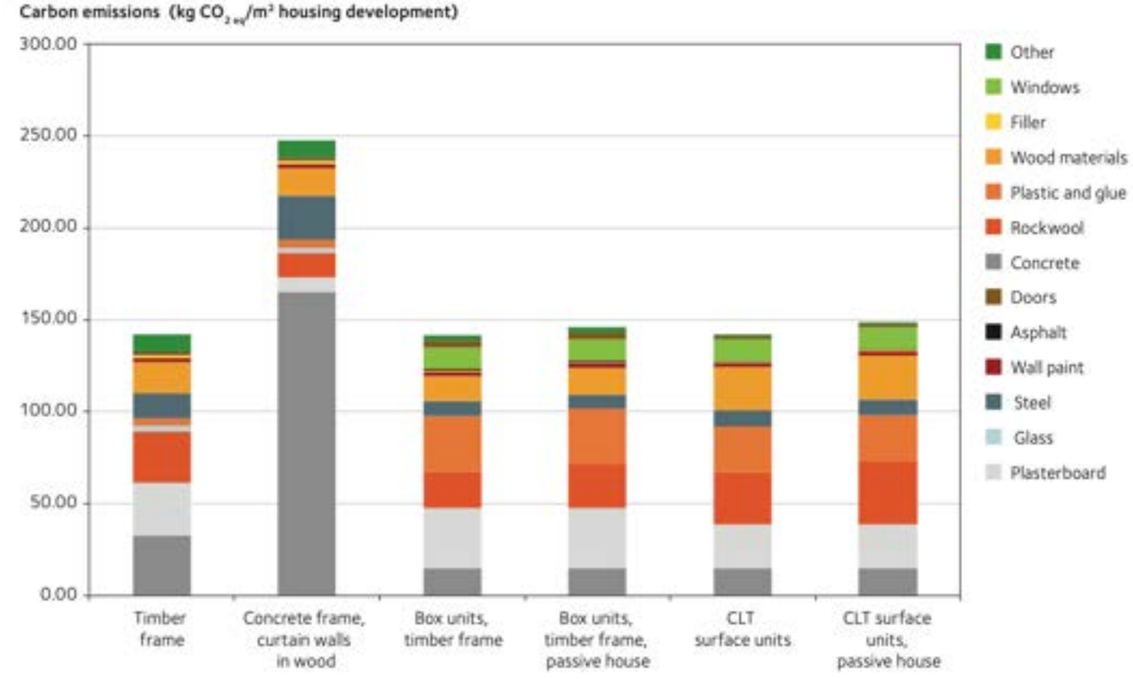
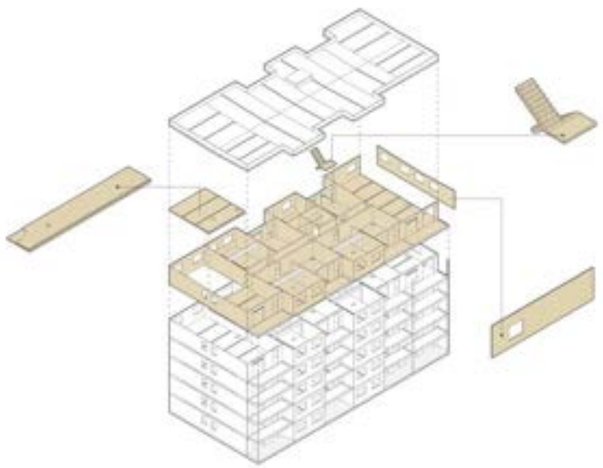


Figure 1.3 Greenhouse gas emissions (carbon dioxide equivalents, $CO_{2\,eq}$) from the production phase for six different designs of a four-storey building. Standard means a building insulated to Boverket's Building Regulations (BBR) 2012 and passive house means a building insulated according to the passive house standard issued by the Forum for Energy-efficient Buildings (FEBY).

Cross-Laminated Timber (CLT) Floors and Walls with Glue-Laminated Timber (Glulam)

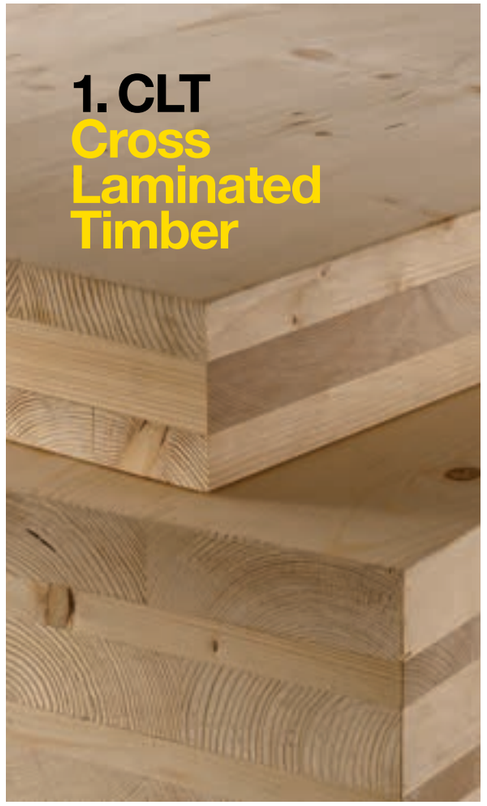
The architectural strategy for this project emphasizes sustainability, efficiency, and aesthetic appeal through the use of innovative building materials. The primary focus is on incorporating Cross-Laminated Timber (CLT) for floors and walls, complemented by Glue-Laminated Timber (Glulam) structural elements. This strategy aims to achieve a harmonious blend of environmental responsibility, structural integrity, and visual warmth in the site's hars climat
CLT will also be employed for exterior and interior walls, complemented by Glulam beams and columns will be strategically integrated to enhance the overall structural strength and visual appeal of the building.











Key data

Application	Structural elements for walls, floors and roofs
Maximum element dimensions	Length: 16 m / Width: 3.45 m / Thickness: 0.35 m
Invoiced widths	2.25 m / 2.45 m / 2.75 m / 2.95 m / 3.25 m / 3.45 m 3.25 m and 3.45 m only available from Gruvön mill on request
Panel lay-up	3, 5, 7 or more layers depending on structural design requirements
Wood species	Spruce (pine, fir, stone pine/larch and other wood types on request)
Strength class	C24 according to EN 338, maximum 10% C16 permitted (other strength class compare with ETA 14/0349)
Moisture of wood according to EN 13183-2	6% to 15% Within one member of CLT the moisture content shall not differ by more than 5%
Adhesive	Formaldehyde-free PUR adhesive for finger jointing and surface bonding, approved for load-bearing and non-load-bearing components indoors and outdoors according to EN 15425; Formaldehyde-free EPI adhesive for narrow side bonding
Surface quality	Non-visual quality (NVI), Industrial visual quality (IVI) and Visual quality (VI); the surfaces are always sanded on both faces
Weight	5.0 kN/m³ according to DIN 1055-2002 for structural analysis 490 kg/m³ for determination of transport weight
Fire rating	In accordance with Commission Decision 2003/43/EC: • Timber components (apart from floors) ➲ Euroclass D-s2, d0 • Floors ➲ Euroclass Dfl-s1
Thermal conductivity	0.12 W/(mK)
Air tightness	CLT panels are made up of at least three layers of single-layer panels and are therefore extremely air-tight. The air-tightness of a 3-layer CLT panel was tested according to EN 12 114
Service class	Service class 1 and 2 according to EN 1995-1-1

CLT as a moisture variable vapour barrier

With 3 layers and more, CLT elements are “air-tight” but not vapour-proof. CLT is permeable and the adhesive bonds form vapour barriers for the insulation plane.
Thus, CLT reacts like a variable vapour barrier. During the heating season, when the relative humidity inside the building decreases, CLT loses its ability to transport moisture and becomes more diffusion-resistant. On the other hand, during the summer, when the level of humidity inside the building increases again, CLT becomes more open to diffusion. This natural property of wood is an advantage in the construction industry as it enables structures to be designed and built which remain sustainably operational and take into account the building physics construction principle of permeability needing to increase from inside to outside.
Thus, CLT also helps to regulate the ambient air. When there is higher ambient humidity, CLT absorbs the moisture and releases it again when the level of humidity decreases.

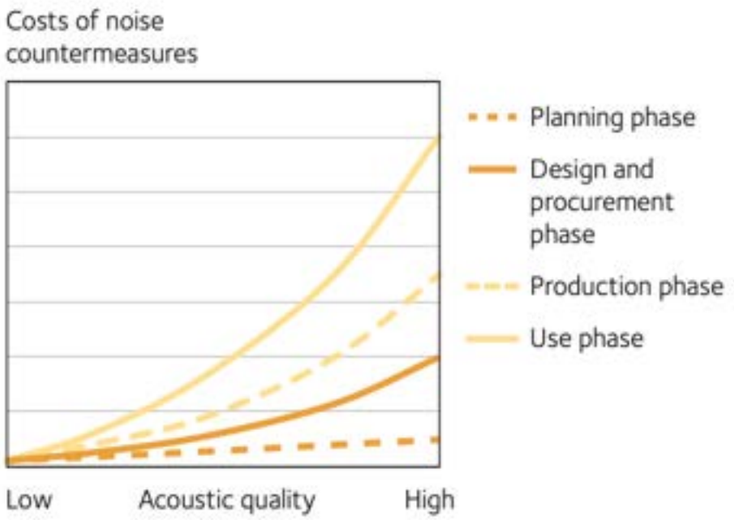
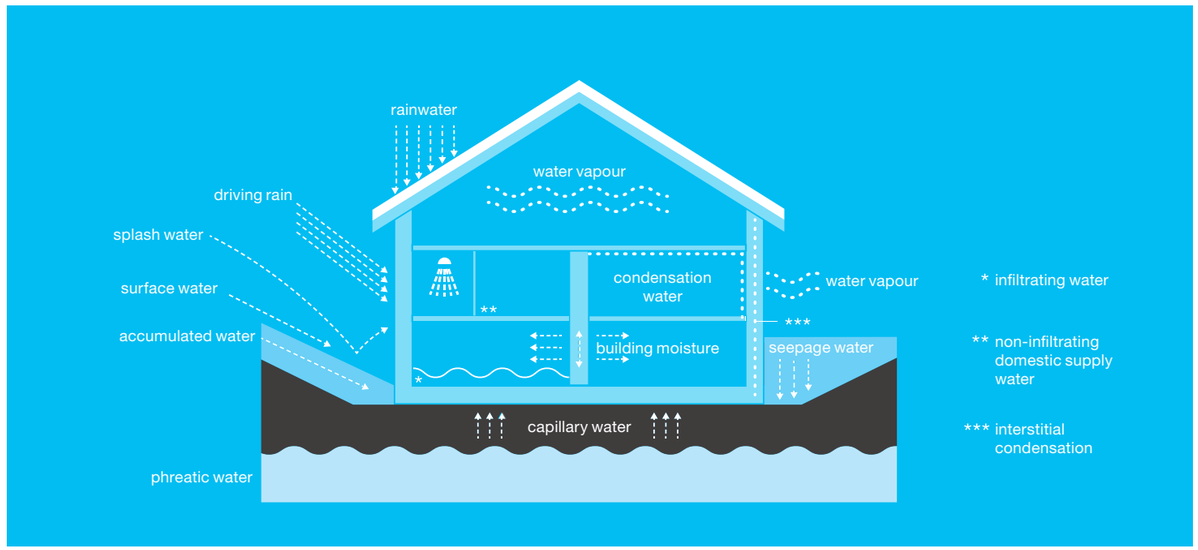
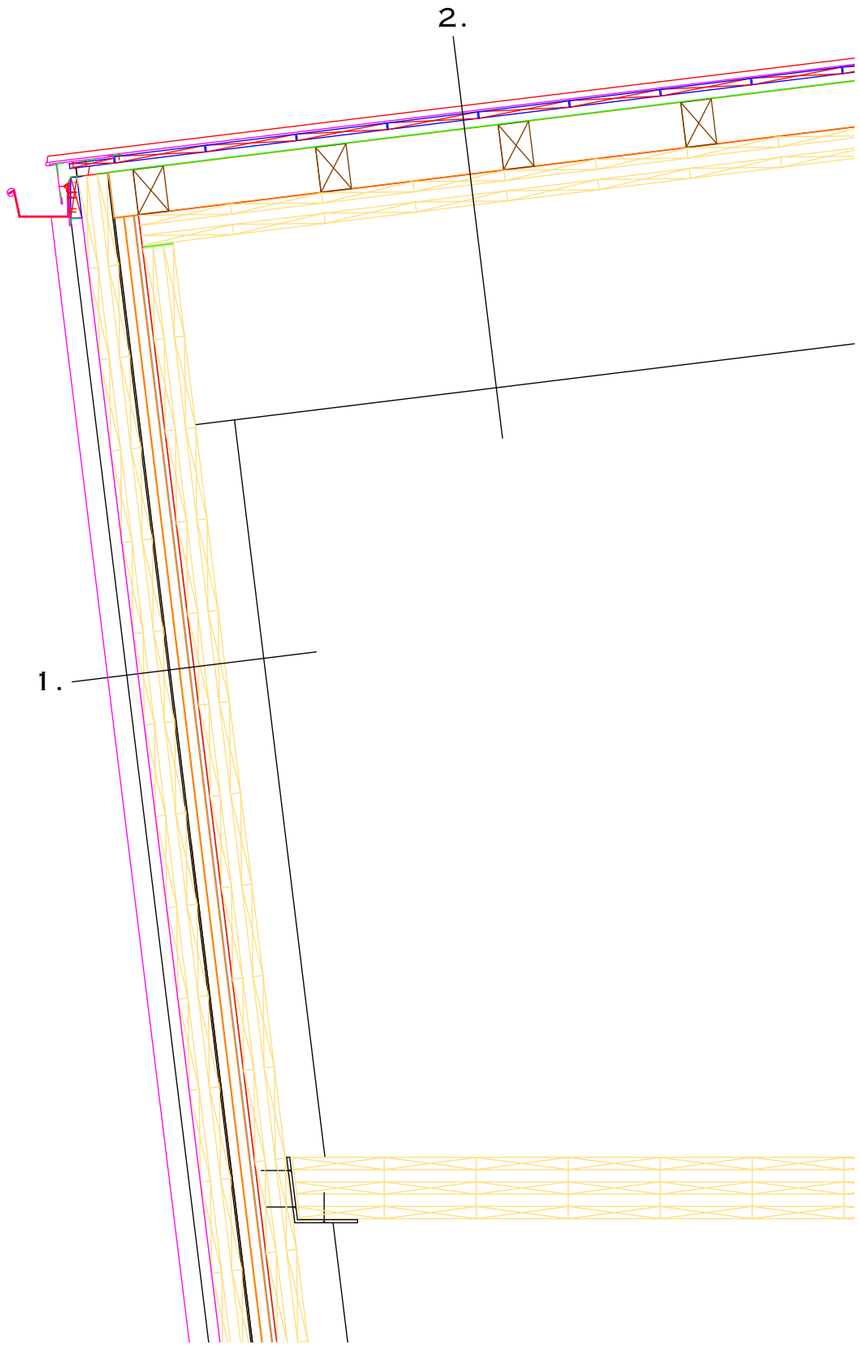


Figure 8.1 Costs of noise countermeasures in different phases.

Acoustic Properties: The mass and density of CLT panels provide effective sound insulation, ensuring a comfortable and quiet indoor environment.



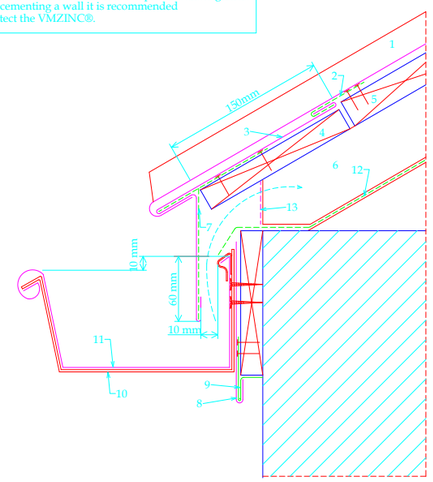


1.: Double-layer visible CLT panel
-100 mm Stora Enso CLT
-5 mm air gap
-2x 30 mm miner wool
-12,5 mm plaster board
-100 mm Stora Enso CLT

2.: Zink standin seam roofing
-VMZ Sanding Seam
-continous eaves apron strip in VMZINC, with sheet clip in VMZINC, th=0.8 mm, w=80 mm, 2 per m
-roofing boarding
-battens, ventilated cavity
-100mm DCT VulcanWool insulation with rafters
-ProctorPassive Wraptite SA
-CLT

JUNCTION VMZ GUTTER

- In some cases it is recommended to provide snow guards
- When cementing a wall it is recommended to protect the VMZINC®.



1. VMZ Standing Seam
2. sheet clip in VMZINC®, th=0.8 mm, w=80 mm, 2 per m
3. continuous eaves apron strip in VMZINC®
4. eaves boards, 5 mm thinner than adjacent boards
5. roof boarding
6. ventilated space
7. folded clip in VMZINC®, th=1 mm, w=250 mm, 2 per m
8. flashing in VMZINC®
9. continuous sheet strip in VMZINC®, th=0.8 mm
10. VMZ Gutter bracket
11. VMZ Gutter
12. VMZINC® Membrane
13. insect mesh

VMZINC

STANDARD DETAIL

Ref : VMZ-SN-SN-GO-b1 Date : 2022

VM Building Solutions Ltd, Cutler House, Mead Lane, Hertford, SG13 7AX Tel: 020 8453648

VMBUILDINGSOLUTIONS

$D_{nT,w}$ ($C;C_{tr}$): 61 (–3;–10) dB

Double-layer visible CLT panel



100 mm	Stora Enso CLT
12.5 mm	plasterboard
30 mm	mineral wool
30 mm	mineral wool
5 mm	layer of air
100 mm	Stora Enso CLT

1. Statutory Framework and Legislation

Building regulation has a set requirement for specific aspect of building designe and consruftion. A series of approved documents provide general guidance to each part of Building Regs.

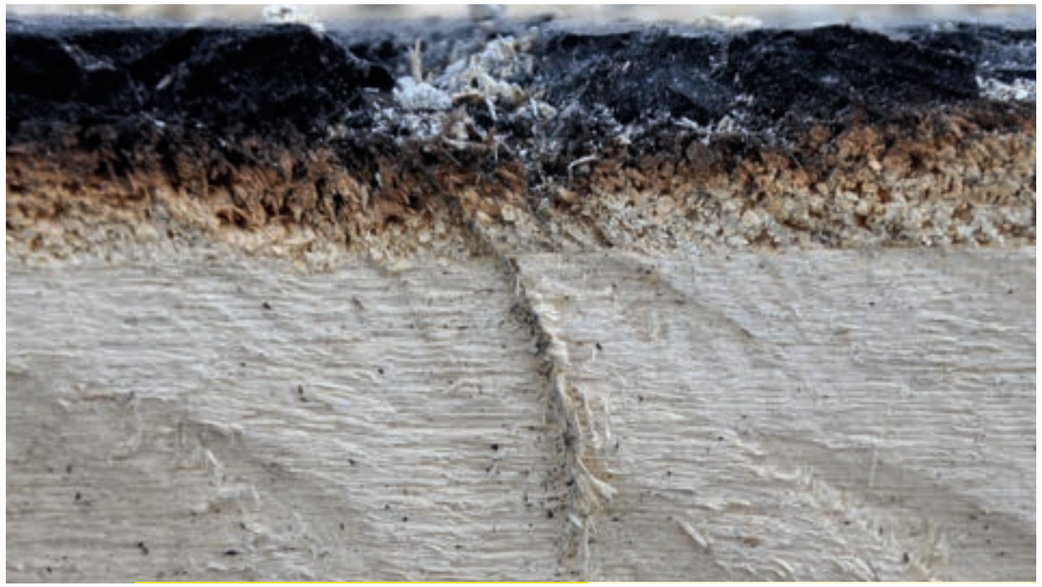
A: Structure
B: Fire safety
C: Site preparation and resistance to contaminants and moisture
D: Toxic substances
E: Resistance to the passage of sound
F: Ventilation
G: Sanitation, hot water safety and water efficiency
H: Drainage and waste disposal
J: Heat-producing appliances and Fuel storage system
K: Protection from falling, collision and impact
L: Conservation of fuel and power
M: Access to and use of buildings
N: Glazing - Safety in relation to impact, opening and cleaning (withdrawn, patly included in part K)
O: Overheating
P: Electrical safety
Q: Security - Dwellings
R: Physical infrastructure for high-speed electronic communication networks
S: Infrastructure for the charging of electric vehicles

The architect should carefully consider each part to achieve safe built environment.

In my design I paid special attention to parts of:

B: Fire safety
C: Site preparation and resistance to contaminants and moisture
M: Access to and use of building
O: Overheating

Part B:
CLT and structures made from CLT have good, predictable properties when it comes to fire. CLT is a flammable material, but in combination with other materials, the required load-bearing capacity can be maintained during the fire. Wood is slow to catch fire and it burns slowly. The way the heat develops during a fire is often crucial in determining whether the fire will spread or burn out. The charcoal layer that forms on the surface of CLT in a fire protects the inner parts, and the penetration rate for wood is generally around 0.6 – 1.1 mm per minuteence in delivering innovative and sustainable solutions.



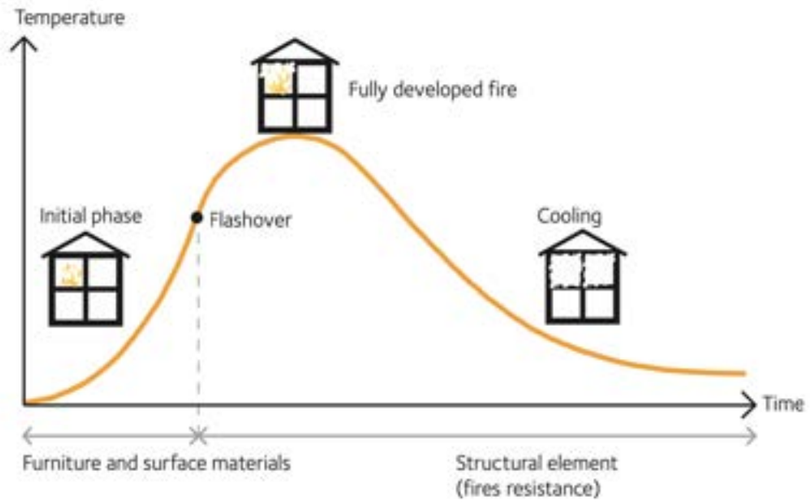
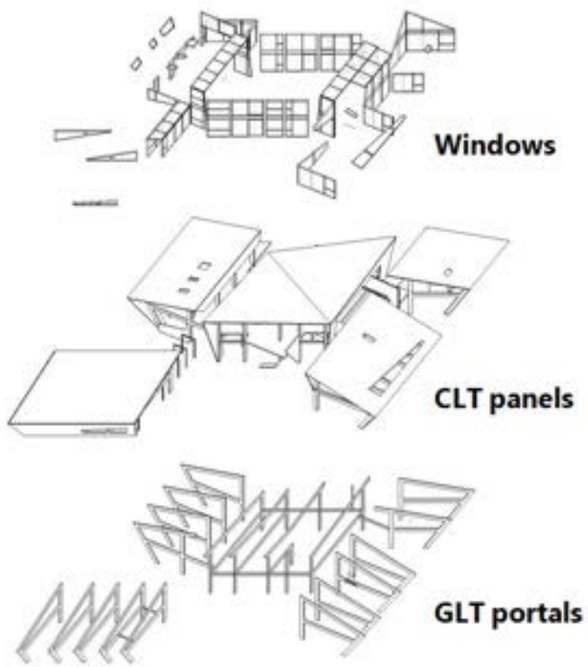


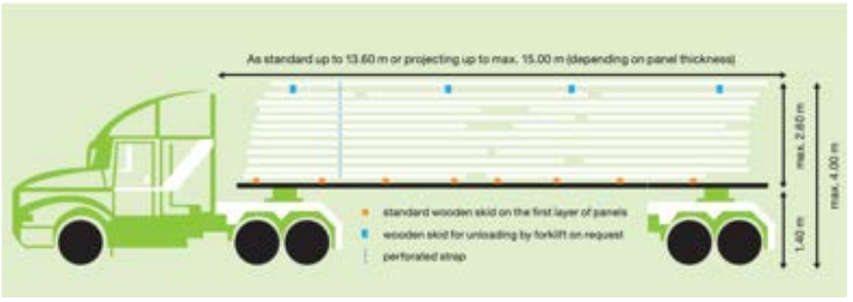
Figure 7.2 Fire development in buildings includes two main phases, the initial fire with its requirements concerning the fire safety properties of surface materials, and the fully developed fire, with its related requirements concerning the fire resistance of structural elements.



The procurement strategy prioritizes efficiency by incorporating prefabricated building elements, minimizing on-site crane time, and streamlining transportation logistics. Prefabrication accelerates construction timelines and reduces waste, while meticulous planning ensures seamless transportation of modular components. The strategy focuses on minimizing crane time during on-site assembly, optimizing efficiency and reducing environmental impact. Temporary weather protection should be conciderd for the protection of prefabricated elements. Through this comprehensive approach, the procurement strategy aims to enhance construction speed and decrease environmental footprint.



Possible risks during construction		
Access including Emergency service access	The master planning ensures emergency vehicle access to the site.	The closest fire station is in St Keverne, 1,2 km from the site. The Nearest hospital is in Helston, 19 km from the site.
Buildability Constraints	The main structure is a hybrid of CLT and Gluebeam which is prefabricated. The difficulty is that the west side of the building is closed off by the sea.	The assembly has to be precisely planned and prepared on site. It might need additional temporary structures. A specialist should be assigned for the task.
Ground hazards	There could be ground hazards as it is an abandoned gabbro quarry.	To determine the mitigations against ground hazard risks a ground composition survey would be required. It also has to be surveyed for loos soils to avoid unexpected landslides also. The working area should be checked regularly and demarked all the time to avoid falls.
Site conditions/ falls	The site includes high peaks and low hollows. The ground is rocky and can be slippery. The weather is harsh and the site is by the sea.	Because of the weather conditions and the closeness of the sea, high cliffs have to be cordoned or if that's not possible other kind of protection has to be insured. Protective clothes and special equipment are required.

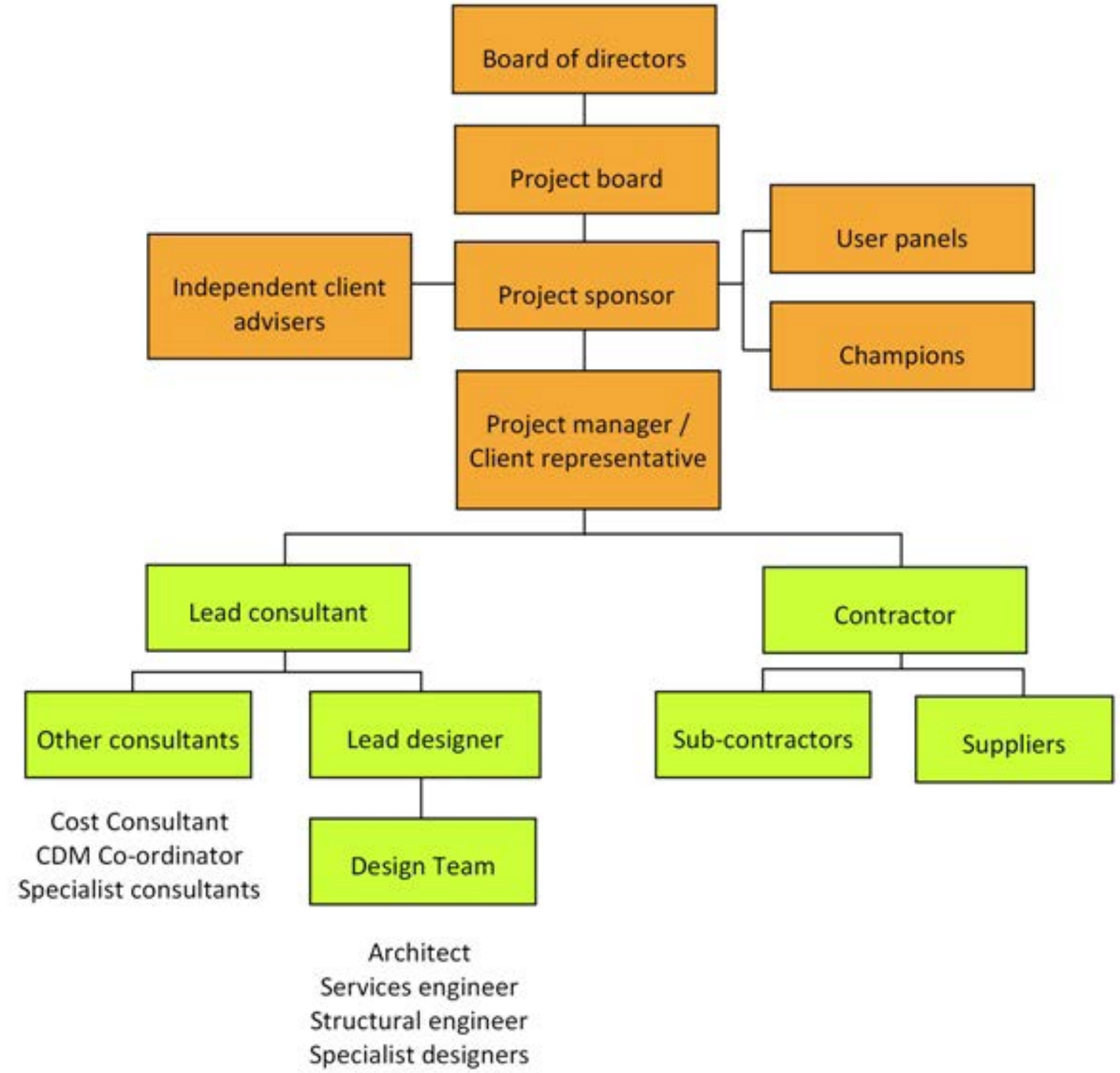


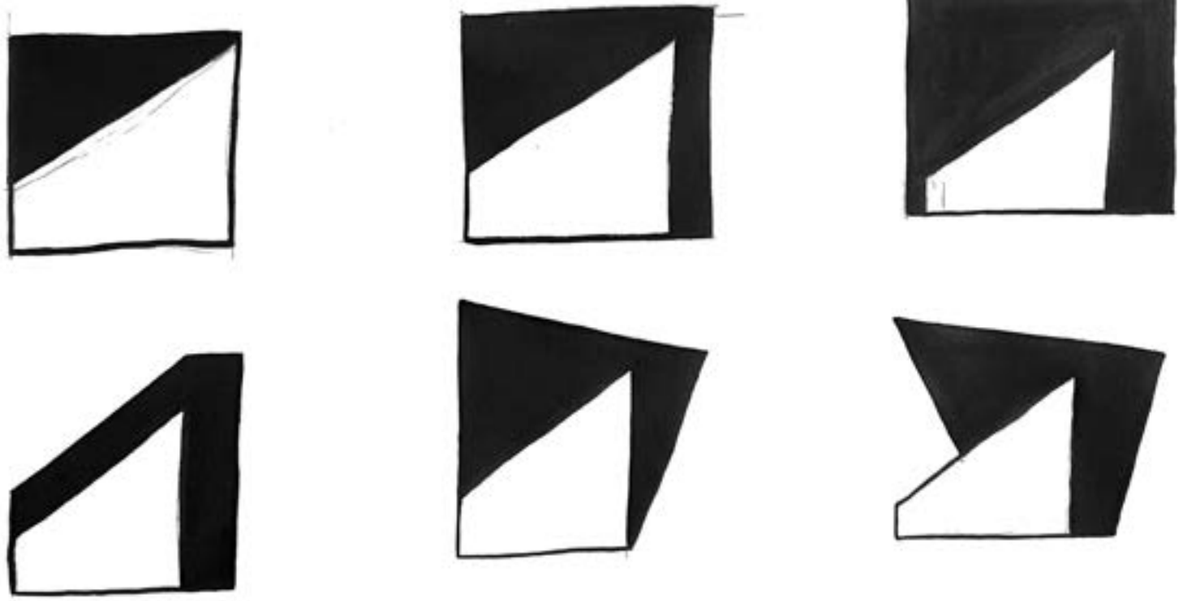
The design team comprises specialists vital for the project's success: a conservation and biodiversity expert, an environmental strategist, a crane specialist, and a Cross-Laminated Timber (CLT) structural engineer. Architectural technologists, structural engineers, services engineers, and landscape designers complement the team.

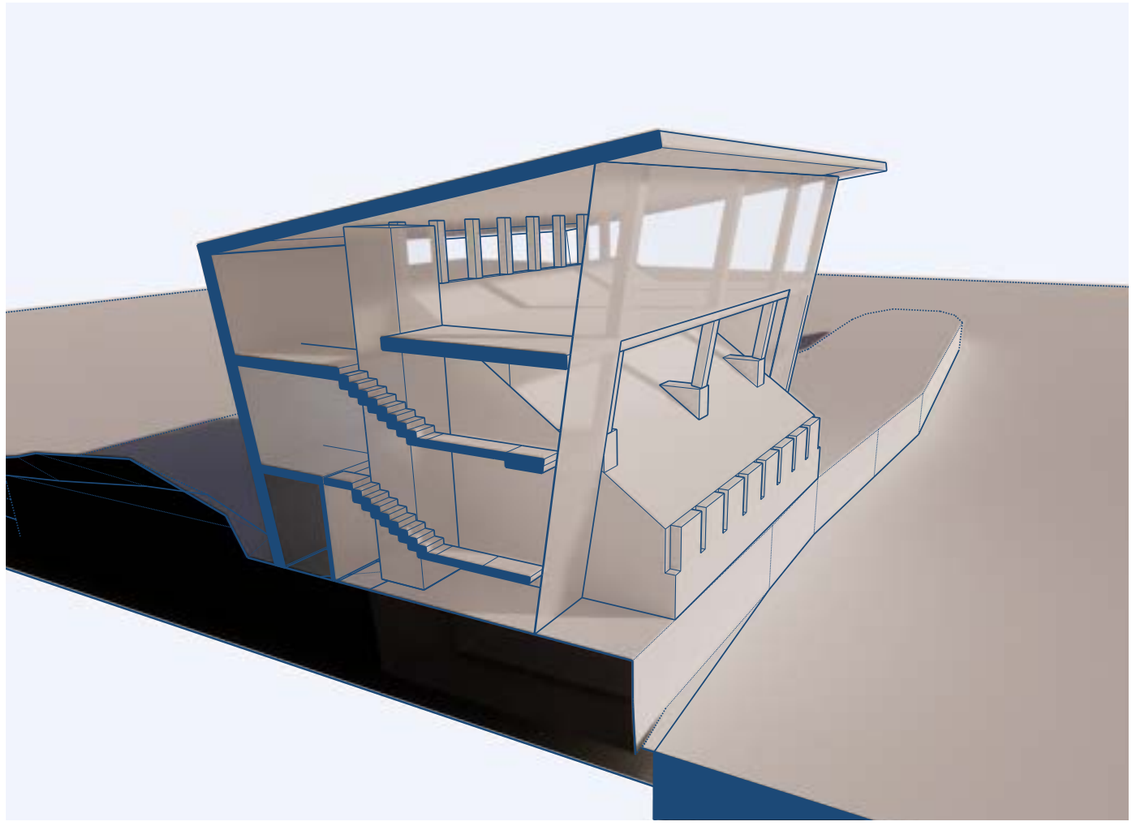
The design team operates within established codes of conduct and assumes a collective responsibility for their actions. Adhering to a structured system and hierarchy, each team member contributes to the overall success of the project. Competence stands as a paramount factor, ensuring that each individual possesses the requisite skills and knowledge to fulfill their role effectively. This emphasis on competency not only elevates the quality of design but also fosters a collaborative and accountable working environment

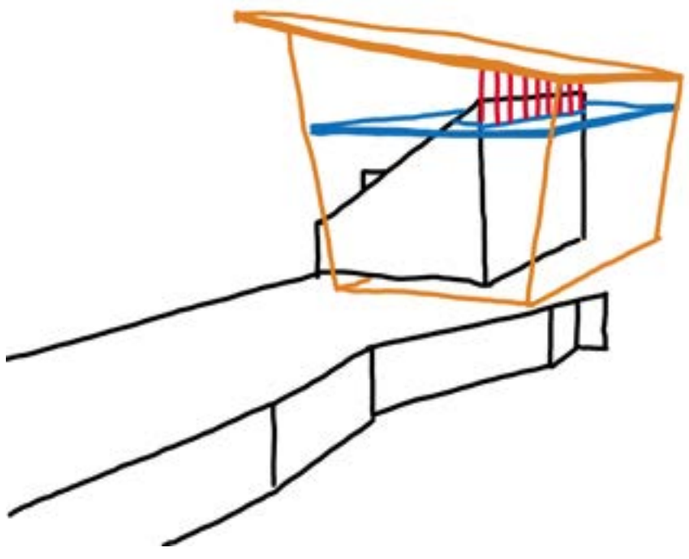
The Architects Code:
Standards of Professional
Conduct and Practice

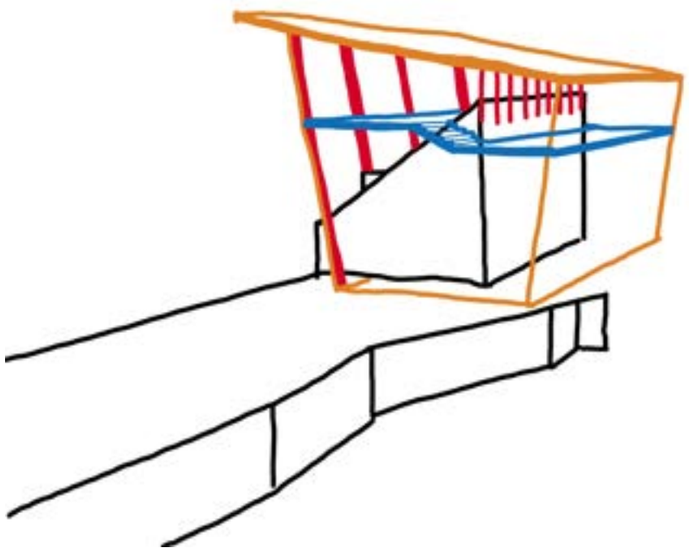
As an architect you are expected to:
1. Be honest and act with integrity
2. Be competent
3. Promote your services honestly and responsibly
4. Manage your business competently
5. Consider the wider impact of your work
6. Carry out your work faithfully and conscientiously
7. Be trustworthy and look after your clients' money properly
8. Have appropriate insurance arrangements
9. Maintain the reputation of architects
10. Deal with disputes or complaints appropriately
11. Co-operate with regulatory requirements and investigations
12. Have respect for others

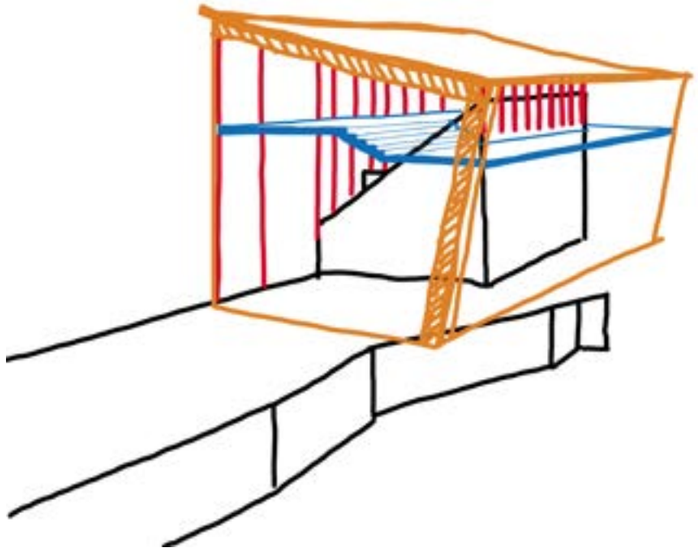




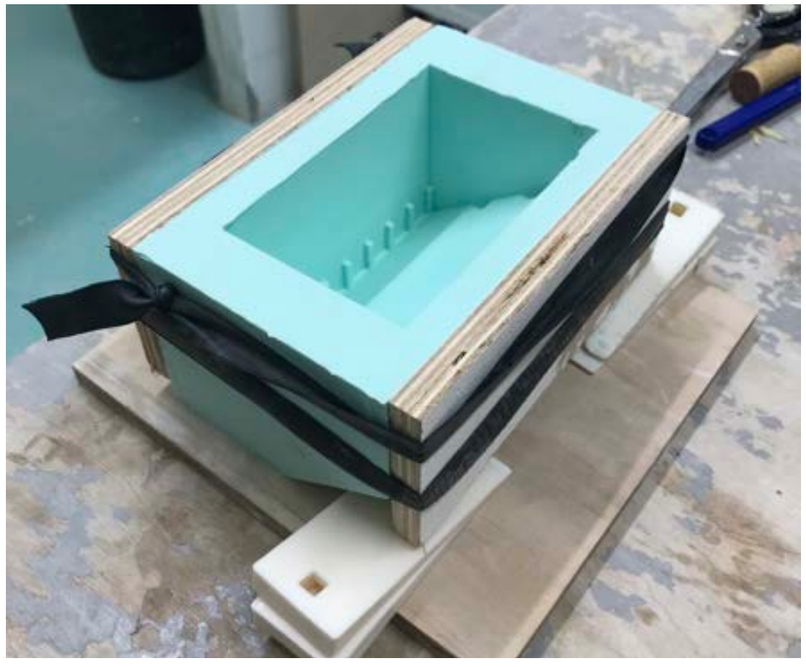








Development model











The project process taught me a lot about developing strategies and understanding the importance of details. I enjoyed the architectural drawing process very much, but I realized how much time it really takes to pay attention to details. I used ArchiCAD, which I had to learn from basics. It was hard and tedious sometimes, but worth taking time and patience with it. I think this was the first project that I experienced the joy of finessing drawings. Realizing how much I didn't know about my chosen materials and structural strategy when drawing was surprising and scary sometimes. For the future, I know I have to do a more thorough research and really work out the connections of materials and the environmental strategy. I learned a lot in this project. Worth every sleepless night.

Notes to myseft for the next module

- Paying more attention to rain water and grey water circulation
- Simple building envelop details to help buildability
- Deeper understanding of material use
- More cohesive project report layout
- Cleaner and simpler explanatory diagrams



















2023/24