The Decompression Base

- Long-term psychological resilience-

Master Thesis
Delft University of Technology
Faculty of Architecture

GRADUATION REPORT

EXTREME ARCHITECTURE
- LITHUANIA

Silje Kouwenhoven
5263298

EXTREME supervisors
Freek Speksnijder
Ulrich Knaack

June 2026

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FOREWORD

This graduation project is developed within the Master Architecture studio Extreme, which focuses on designing within extreme environments. The studio explores how architecture can respond to some of the most urgent and challenging conditions of our time, ranging from environmental to social and psychological extremes.

Within this framework, my project investigates the military base as a contemporary extreme environment, with a focus on mental health and long-term psychological resilience. I was particularly drawn to this topic because of its urgency and complexity, and the challenge of designing within a system that is both highly controlled and highly demanding.

Throughout the studio, lectures, discussions, and field trips on human-centered architecture played an important role in shaping my understanding of how architecture can support human well-being in difficult contexts. These input helped to continuously position the project within a broader architectural and ethical perspective.

I would like to thank the tutors of the Extreme studio for their guidance and feedback throughout the process, which has been essential in developing both the concept and the architectural approach of this project.

ABSTRACT

The project explores how architectural and spatial strategies within a military base can support stress regulation and long-term mental stability for military personnel. It is developed within the Master Architecture studio Extreme, which focuses on designing for contemporary extreme environments.

The research starts from the understanding that military bases are highly controlled and demanding environments, where operational pressure and constant readiness can negatively affect mental well-being. In response, the project proposes an additional environment that supports recovery and psychological decompression.

This space acts as a stabilizing factor to the intensity of the military context, offering moments of withdrawal, reflection, and reconnection with everyday life. Nature and carefully designed spatial transitions play a key role in supporting relaxation and gradual shifts in mental state.

Rather than focusing only on operational efficiency, the project suggests a broader role for architecture in supporting mental resilience within military environments.

1. INTRODUCTION

For this design studio, we were working with extreme environments. It focuses on projects in countries affected by natural disasters and war. Several of the assignments explore what happens after such a disaster or conflict. However, this project is about preparing for war, something we have to accept more and more as part of today's reality.

The Dutch army is intensifying its preparations for a potential conflict with Russia. From within NATO, a new military base is to be established in Rudninkai, Lithuania. We have been given the task of approaching this location with a new architectural perspective. What should a military base look like in today's world?

Warfare has changed a lot in the past 20 years, with new technology forcing countries to quickly adjust their defense strategies. But while weapons and equipment keep improving, the design of military bases often falls behind. Why is this? A military base is where soldiers live, train, and recover in dangerous situations. Yet, while soldiers are trained to take care of their equipment, their own physical and mental health is often neglected. This raises important questions about how architecture can better support the people who serve.

Increasingly, research has highlighted that military personnel frequently face mental health challenges. "In all, an estimated 20–30% of US military personnel returning from current combat operations report significant psychological symptoms" (Warner & Castro, 2023, p. 184). Unfortunately, these problems are usually dealt with only after soldiers return from deployment. While they are on duty, there is a culture where soldiers are hesitant to admit the stress they feel. Even if they ask for help, support is limited. What if we could design environments that help soldiers' mental health in ways so subtle they benefit without even noticing it?

This leads to the central research question of this project: How can architectural and spatial strategies within a military base contribute to stress regulation and support the long-term mental stability of military personnel?

Besides improving the well-being of current soldiers, thoughtful design could also reduce future healthcare costs. Research has shown us, for example, that the demand for medical care among US veterans who served in Iraq and Afghanistan has steadily increased, leading to rising healthcare expenditures. By 2009, Veterans Affairs had treated over 510,000 veterans, with a significant portion of costs related to mental health issues such as PTSD and other multiple health conditions (Geiling & Rosen, 2012, as cited in Khanade et al., 2018). Estimated societal costs per individual, including lost earnings and suicide-related expenses, amount to roughly $16,000 over a two-year period (Kilmer et al., 2011, as cited in Khanade et al., 2018). Investing in better designed environments for soldiers can improve their health and well-being, while also reducing healthcare costs and creating economic benefits for society.

This research project focuses on exploring how architectural interventions can mitigate mental health challenges among military personnel. Personally, I have always been fascinated by the connection between design and the brain. Understanding how spatial environments influence behavior and stress responses is both fascinating and highly relevant. If research shows us that certain design strategies reduce stress, it is crucial to apply these insights to improve the built environment.

With this project, I aim to demonstrate that architecture is not just a subjective discipline, but can also play an active role in supporting people's mental health in many ways. Especially in high-stress environments such as military bases, it becomes crucial for architecture to support the people who operate within them.

Beyond the specific challenges of the military base itself, there is also a broader societal context to consider. Mental health outcomes among the local Lithuanian population, particularly in Vilnius, are relatively poor compared to many other European countries, indicating that this is not only a military issue but also a wider public health concern affecting the local community.

In this perspective, the project is not limited to its initial military use. In the long term after the military function would no longer be active the building could be adapted to serve the civilian population of Vilnius. If carefully integrated into its surroundings, it could then contribute locally to improving mental well-being.

By maintaining the spatial and ecological qualities of the design, the project has the potential to transform into a shared place of recovery and reflection for the wider public. In this way, it extends its relevance beyond its original program and becomes part of a broader urban and social support system for mental health.

Research and design questions

To answer the main question: "*How can architectural and spatial strategies within a military base contribute to stress regulation and support the long-term mental stability of military personnel?*" the project starts with an initial research phase. This phase focuses on understanding the mental health challenges military personnel face, and on exploring how architecture can contribute to their psychological well-being. The results of this form the foundation for the project.

The research is guided by the following questions:
- *What are the main mental health concerns among military personnel?*
- *How does the built environment influence stress, recovery, and mental well-being?*
- *What is already known about the spatial and architectural preferences of military personnel?*

However, this alone is not enough to fully answer the main question. To make the project more relevant and grounded in reality, a second phase of research is introduced. This phase looks more closely at the current situation of active conflict, with a focus on the war in Ukraine, and asks: *what do military personnel actually need in order to mentally recover after such experiences?*

By adding this second layer, the research moves from general knowledge to a more specific and realistic understanding of the users and their needs.

Scope

The assignment we were given was relatively abstract and left room for further interpretation: to design a military base in Lithuania. However, following my research and a deeper exploration of how to meaningfully address the core question, I concluded that an alternative approach would be more effective in supporting military personnel. Rather than focusing solely on a traditional base, the design focuses on an external location situated near an urban area, Vilnius, approximately one hour's drive from the military base in Rudninkai. While remaining accessible, the site is distanced from the routines and environment of military life. This proximity to everyday civilian contexts allows personnel to step outside their usual surroundings and find a sense of calm and recovery; this concept will be elaborated on further in the report.

The proposed external location is designed to accommodate two platoons simultaneously and includes sleeping quarters, workspaces, workshop areas, and medical facilities. In addition, it is located within a natural park, where users can also benefit from access to amenities such as hiking trails.

It is not the goal to turn the base into a hospital; rather, through subtle design interventions, the aim is to improve the well-being of soldiers. This presents a challenge, but one that requires careful research, as it could have highly beneficial effects.

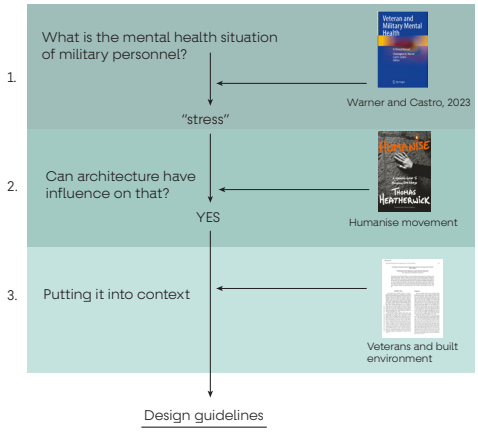


Image 1: Set-up of the research paper (own image)

Methods

To explore which architectural and spatial strategies could support the mental well-being of military personnel, the project begins with a research paper. This first phase allows for a deep dive into the subject, guided by the previously formulated research questions. The focus is on understanding mental health challenges in military contexts and how the built environment can support stress regulation and recovery. Topics studied include nature, spatial layout, sensory conditions (light, sound, scent), and formal qualities such as curved versus angular forms. Insights from this research form the foundation for later design work.

A second layer of research focuses on the current situation of active conflict, with a particular emphasis on the war in Ukraine. Through documentaries, interviews, podcasts, and other sources, the study develops a clearer understanding of the specific needs of military personnel. This phase directly addresses the question of what is required for mental recovery after exposure to active conflict. Findings from this research help translate general principles into more context-sensitive strategies.

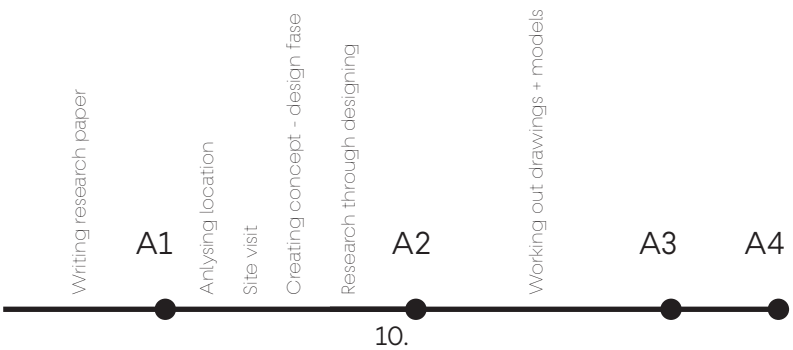
After the research paper, the design phase begins. However, the process is not strictly linear, there is a constant back-and-forth between design development and smaller, focused research activities.

For example, when new design ideas come up, small research steps are done to check if they work or to explore other options. This back-and-forth process makes sure the design is always based on what is learned.

A site visit is also conducted to gain insight into the physical conditions, landscape, and atmosphere of the potential location. Observations from the site inform the design and ensure it responds to the environment in a meaningful way.

The design process itself spans approximately 20 weeks. During this time, research findings are continuously applied, tested, and refined. The work moves across multiple scales, from the human experience to the overall spatial organization. Expert consultations, including discussions with the Ministry of Defence and TNO, provide further guidance and help validate design decisions.

Finally, all research and design insights are brought together in this graduation report. Written reflections, drawings, and visualizations collectively present the architectural strategies developed to support the mental well-being of military personnel, grounded in both research and iterative design.



Theoretical framework - Literature review

Research paper

In the military context, one of the areas that has received wide attention is PTSD among veterans. Post-traumatic stress disorder arises after experiencing life-threatening events and is often accompanied by intense fear, helplessness, and horror (American Psychiatric Association, 2013, as cited in Khanade et al., 2018). In recent years, awareness of PTSD has increased, as studies show that a significant amount of veterans are affected. In current society, mental health in general is receiving more attention.

Much of the research originates from the United States, which provides a large number of soldiers on the global stage. In addition, U.S. culture places strong emphasis on honoring veterans, which provides valuable insights that can be adapted to other Western contexts. The focus of much of this research is on understanding PTSD, its causes, signs, and impacts on veterans. Occasionally, the research that was found also highlights links between mental health and the built environment, which can be very helpful in determining architectural design strategies.

However, this research is typically retrospective, conducted years after veterans have returned from combat. What would be more valuable for the current project is research that can be applied proactively: could architectural strategies be implemented during active service to reduce the long-term psychological impact on future veterans? Psychological symptoms often develop during service, so interventions applied at this stage may help support soldiers' mental health in real time.

In addition, research on the influence of architecture on mental health will be reviewed. Movements such as Humanise have provided well-founded studies in this area. In recent years, there has been increasing research detailing precisely how our built environment affects brain activity and psychological well-being. Other relevant studies will also be considered to create a complete understanding, which will form a major part of the guiding principles for the final design.

Theoretical framework - Site review

As mentioned earlier, the location of the main military base is Rudninkai, Lithuania, where a German military base is already established. The site is strategically important, situated near Lithuania's eastern border and, consequently, close to Belarus.

Because the area has served as a military base for an extended period, not all precise information about the site is publicly available. However, it is clear that the base is located within the Rudninkai Forest, a protected woodland spanning approximately 37,500 hectares, predominantly composed of pine trees (Visuotinė lietuvių enciklopedija, z.d.). The forest features a mixture of dense woodland and open glades, offering both natural shelter and varied terrain, factors that are relevant to the functioning of the military base and to potential architectural interventions.

Within this project, the training base in Rudninkai is considered the primary base, and its location has been selected with care. Taking into account the variation in the landscape, the main base is positioned on the southern side of the training area. However, this mainbase will not be further developed within the scope of this project. Instead, the focus of the research is directed towards the external base located near Vilnius, which is explained later in the report.

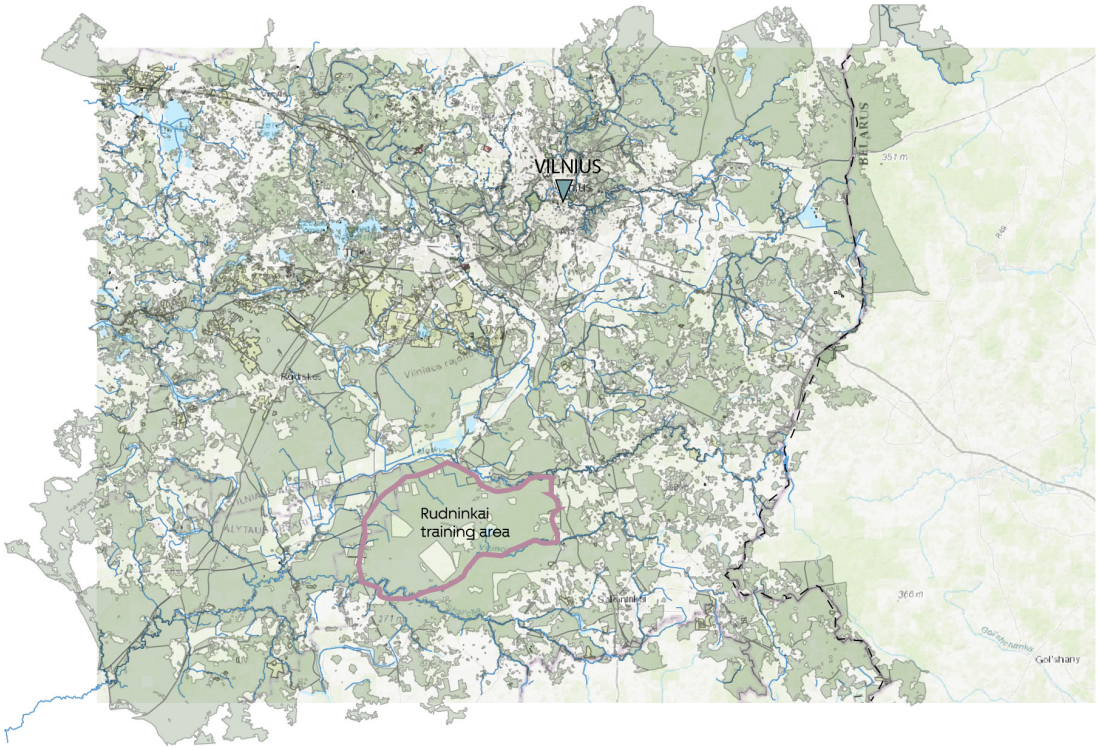


Image2: Map of Vilnius (Own image made with QGIS)

Research

The research paper (see appendix) aimed to answer the main research question by exploring several sub-questions. These focused on the most common mental health challenges among military personnel, the influence of the built environment on stress, recovery, and well-being, and the existing knowledge about the spatial and architectural preferences of soldiers.

By investigating these topics, the research provided a clearer understanding of the mental pressures soldiers experience and explored how architecture can help support them in demanding and stressful environments. Previous studies on soldiers with PTSD were also examined to better understand which environmental qualities contribute to feelings of safety, comfort, and recovery.

The diagram below illustrates the different stress factors that can cause military personnel to reach a critical threshold, where manageable stress develops into excessive mental pressure. After the research the aim of the project is to manage this critical threshold.

To answer the other sub-questions, different aspects of the built environment were analyzed to understand how they affect people mentally and how these insights can be translated into design decisions. The figure on the next page summarizes a large part of the research and highlights the spatial elements and environmental qualities that are important within military settings.

Overall, the findings suggest that architecture on military bases can play an important role in preventing stress from becoming overwhelmed. Through carefully considered design choices, military environments can become places that not only support operational needs, but also help soldiers recover mentally from daily pressures and demanding situations. In this way, architecture can contribute to reducing long-term mental health problems and reduce the need for medical or psychological support.

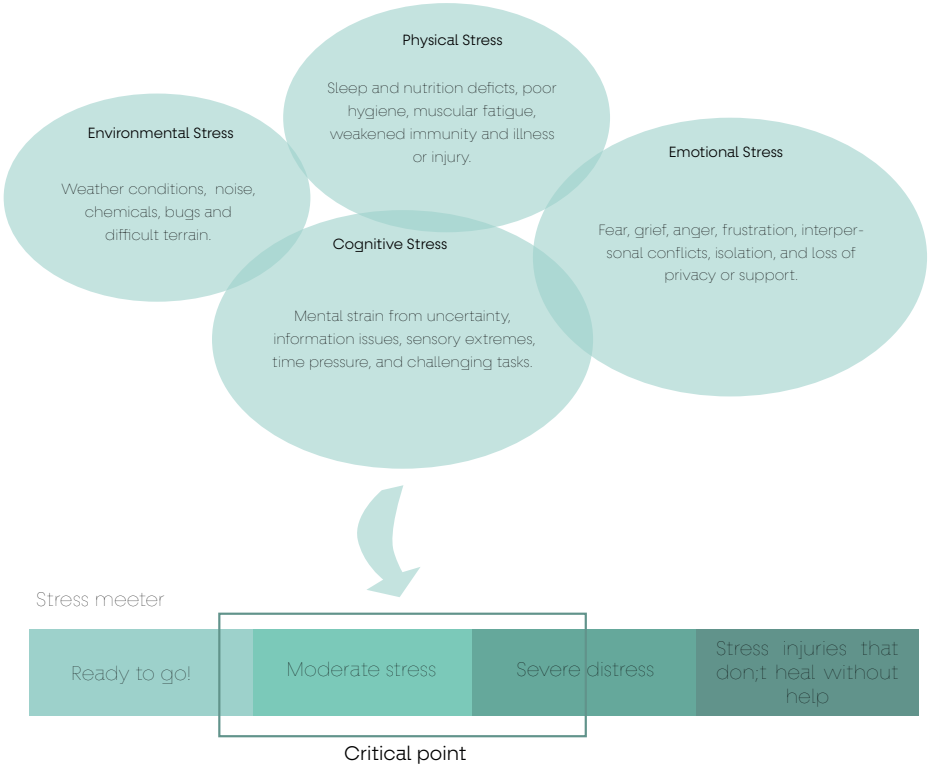


Image3: Critical point of mental stress (own image, information form Warner en Castro, 2023)

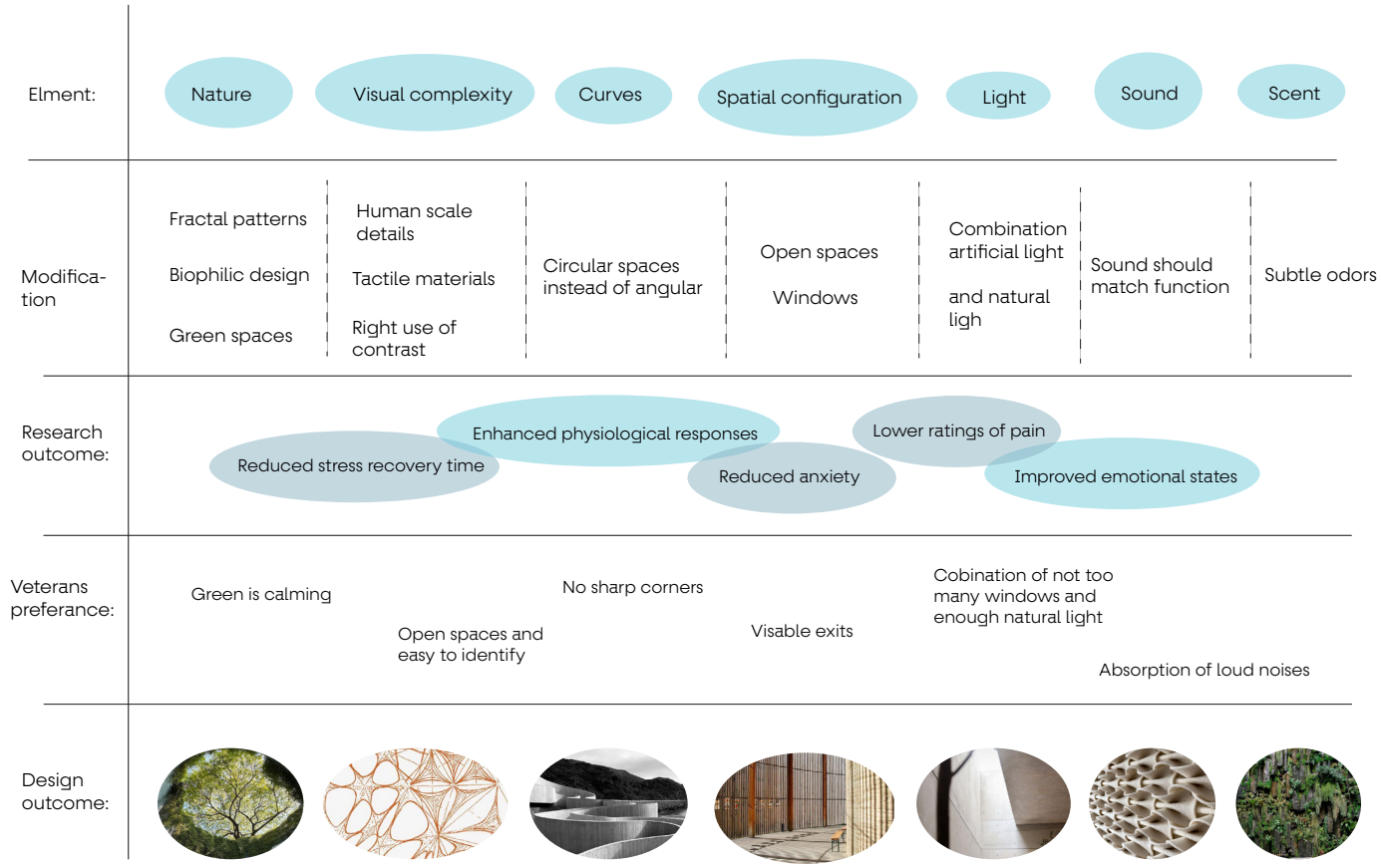


Image4: Summary research findings (own image)

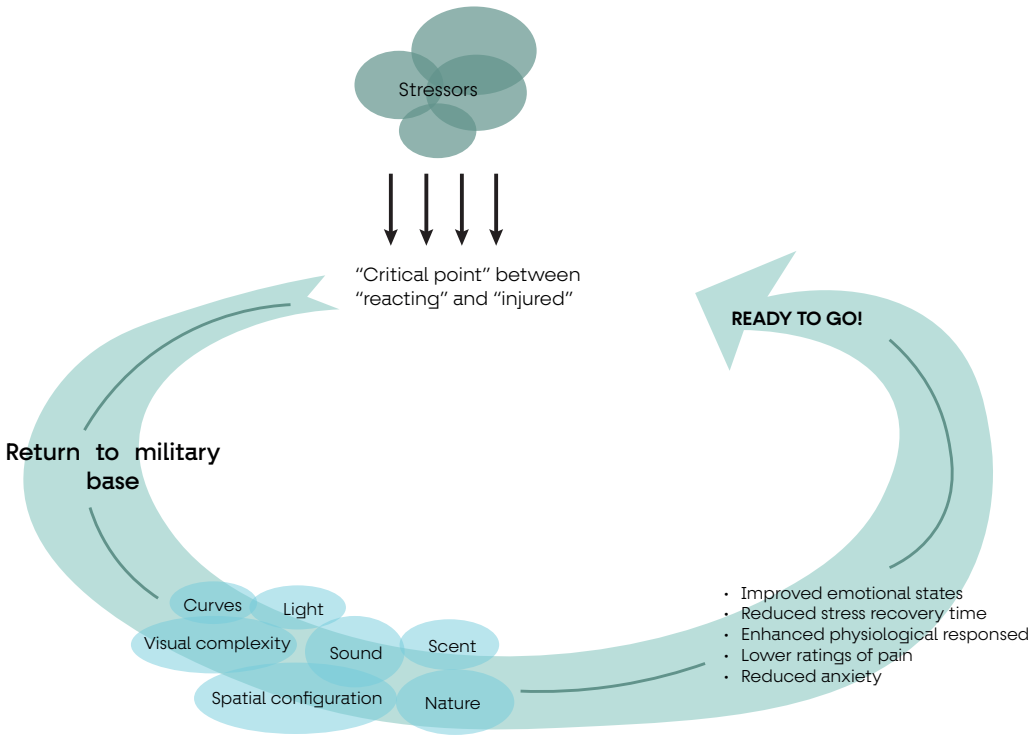


Image5: Return to military base (own image)

Ukrainian war as context- what do the military people need as base?

To answer the main research question and put the study in context, a second part of the research was conducted to better understand what military personnel may be exposed to in extreme conflict situations, such as the ongoing war in Ukraine. Although the military base is currently located in Lithuania and functions as a training facility, it is important to anticipate what soldiers might experience in future deployments. The following sources and accounts highlight the most important findings from this part of the research.

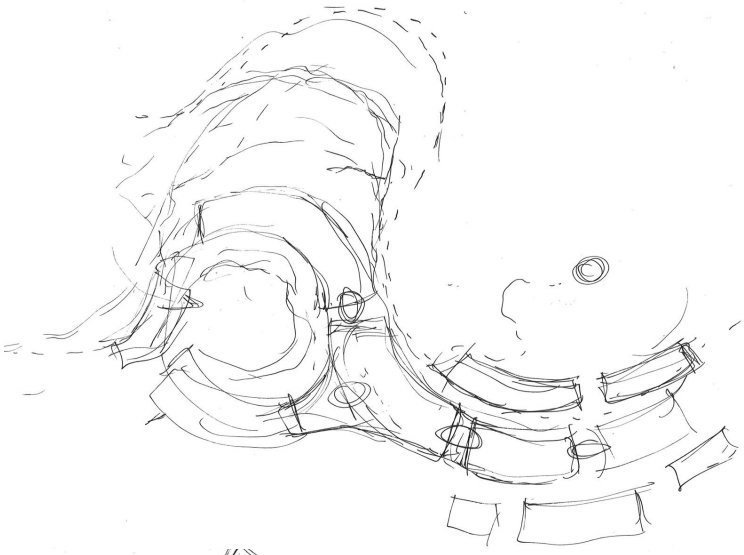
A newspaper article by Lennart van der Deure (NU.nl, 1 February 2026) describes the daily reality of both soldiers and civilians in Kyiv, highlighting the severe psychological impact of the war. The article focuses on residents Anastasiia Mykytiuk and Kseniia Sarhan. Van der Deure reports that living conditions in Kyiv are deteriorating rapidly, with destroyed infrastructure and a constant fear of drone attacks. Mykytiuk describes how prolonged exposure to danger leads to emotional numbing and survival mode, where people become detached from both positive and negative emotions as a coping mechanism. Sarhan adds that many residents suffer from panic attacks and depression, and that the psychological burden is becoming increasingly difficult to endure. Despite strong emotional ties to the city, she feels that many people are reaching their mental limits.

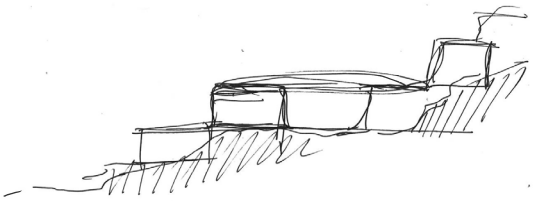
Further insights are drawn from the VPRO podcast *Dichter aan het Front*, which documents the psychological impact of prolonged warfare. Soldiers often lose connection with normal life after extended exposure to extreme conditions such as continuous shelling, drone surveillance, and physical strain.

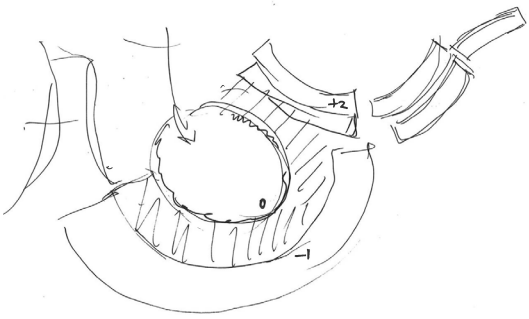
Everyday experiences become distant memories, and many describe emotional detachment. At the same time, small "normal-life moments" such as music, food, or washing provide temporary relief, though they are often not enough to restore long-term well-being.

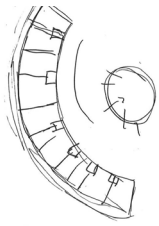
In one episode, Roman, a Ukrainian soldier and psychologist, explains how group sessions with breathing exercises and music help soldiers briefly reconnect with themselves and regain a sense of humanity. However, even these interventions have limited long-term effect after prolonged exposure to war.

Together, these accounts highlight a central issue: continuous exposure to extreme and inhumane conditions can cause soldiers to lose their sense of normal reality. Emotional suppression and chronic stress gradually disconnect them from themselves and from everyday life. This underlines the importance of environments and interventions that restore moments of normality, sensory engagement, and emotional grounding, what can be understood as a "normal-life pill", to support mental resilience and long-term psychological stability.

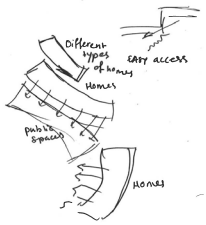


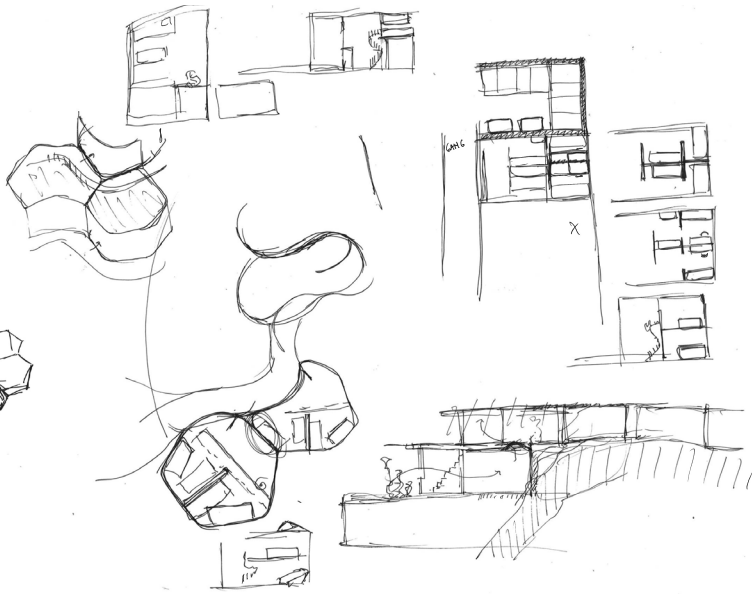


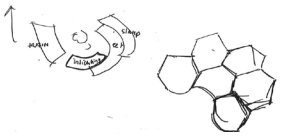




pre war → family homes
war → upscaling military people.







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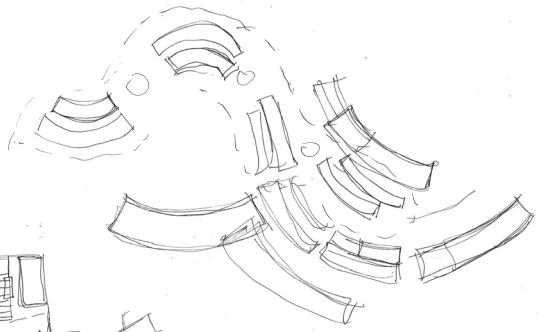

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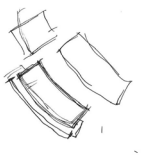

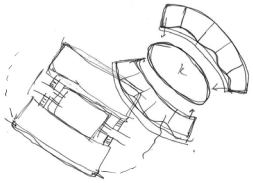

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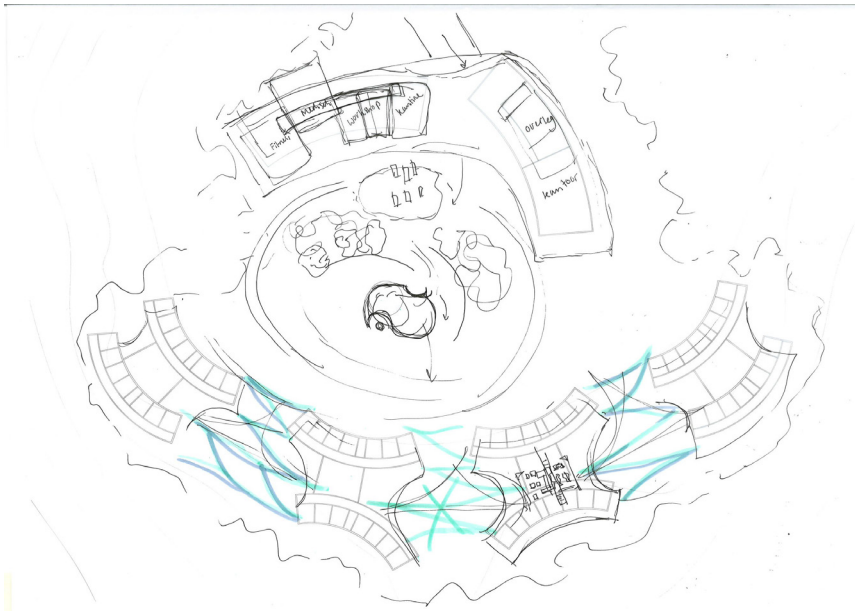
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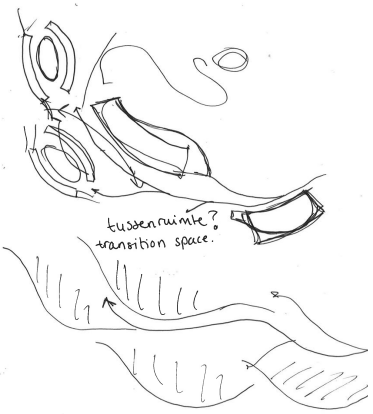
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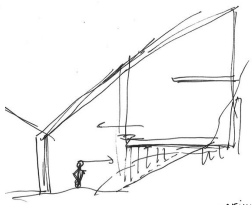
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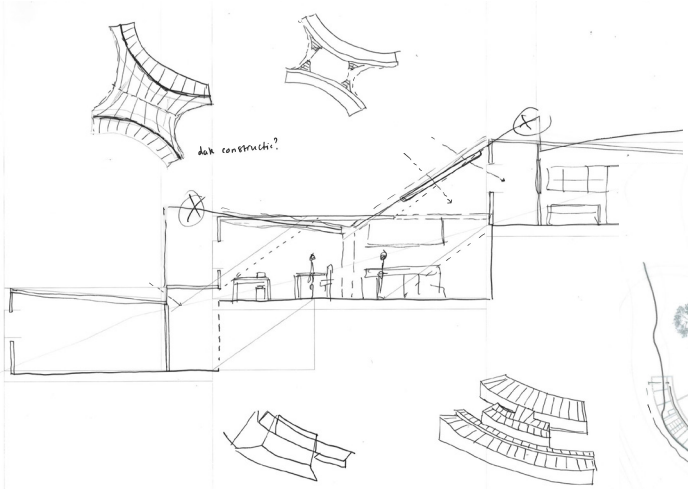
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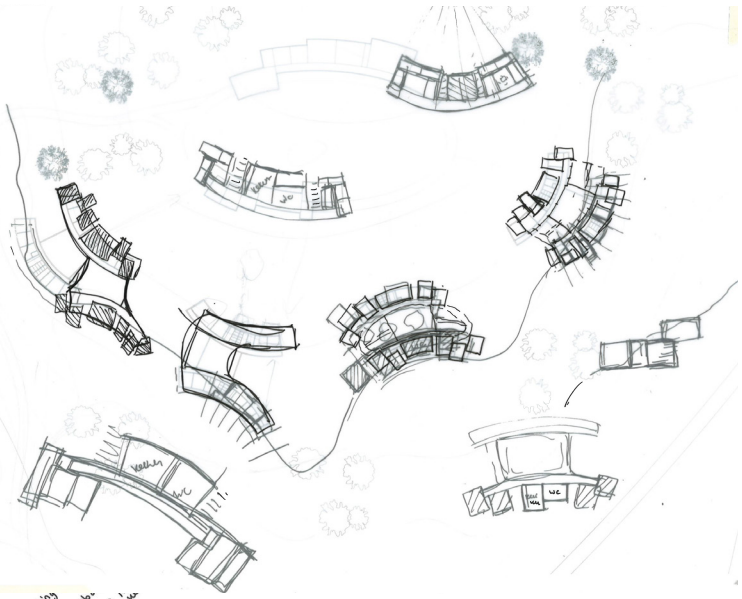

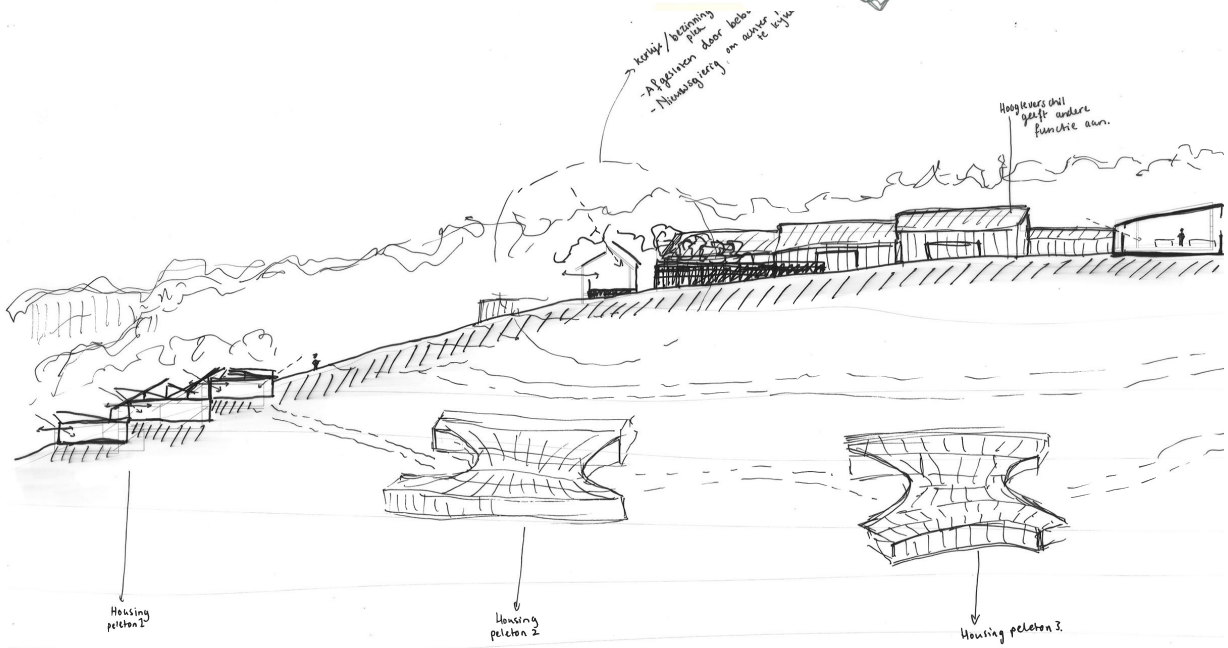
horeca / beginning plan
- Afgesloten door beton
- Nieuwsgierig om achter te kijken
Hoogteverschil creeert andere functie aan.
Housing peleton 1
Housing peleton 2
Housing peleton 3.

Location

When considering the needs of a typical military base, the required capacity is very high. The project is based on MebBrig 43, a full brigade consisting of multiple battalions, companies, and platoons, with a total size of up to 3,000 personnel. In overseas deployments, however, personnel rotate, meaning that around 1,000 soldiers are typically present at any given time.

After testing different layouts and scales, it became clear that a full-scale base is not suitable for this project. Therefore, the focus shifted to a smaller, external location dedicated to rest and recovery. This allows a more targeted approach to supporting the mental well-being of a smaller group of soldiers.

Several potential sites were considered, with key criteria being access to a "normal life" environment: close to an urban area for reconnection, but still calm enough to allow recovery. The selected location is Pavilys Regional Park, a natural area just outside the city. It is approximately 60 minutes from the main base, 10 minutes from the city center, and close to hospitals and a university for additional support if needed.

In terms of logistics, a 3-3-3 schedule is typically used (three days active duty, three days reserve tasks, and three days rest). To ensure the external site remains small and effective, only up to two platoons (around 60–80 people) can be present at the same time. This means a return cycle of approximately 15 days, making visits more meaningful and reinforcing the site's special character.

The psychological transition already begins during the journey. The one-hour drive helps soldiers decompress, while the changing landscape supports a gradual shift from a high-intensity military environment to a more relaxed state. The route moves from the base through forested areas, into open and increasingly urban zones, passing industrial and residential environments before finally entering the natural park. This gradual transition strengthens the feeling of recovery upon arrival.

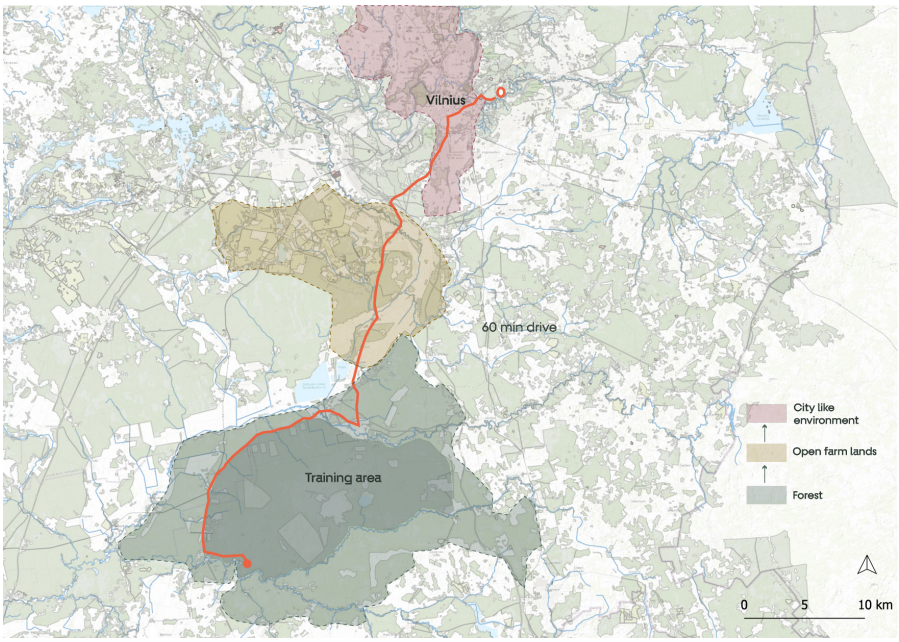

Image 6: Road to decompression base (own image, made with QGIS)

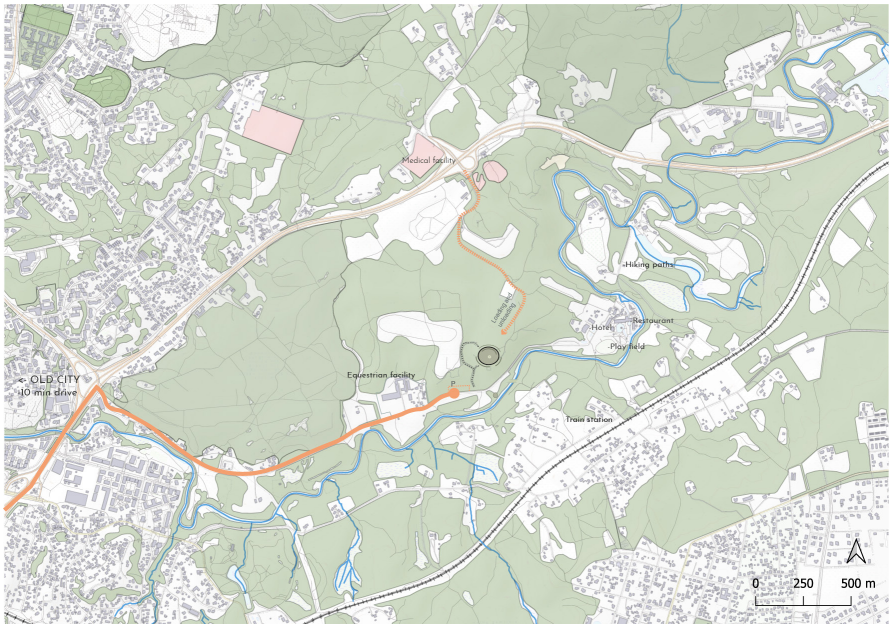

Image 7: Road to decompression base - part two (own image, made with QGIS)

Training Area Rudninkai

Road to Vilnius

Arriving Pavilys Regional Park 1.

Image 7: Road to decompression base - part two (own image, made with QGIS)

2.

3.

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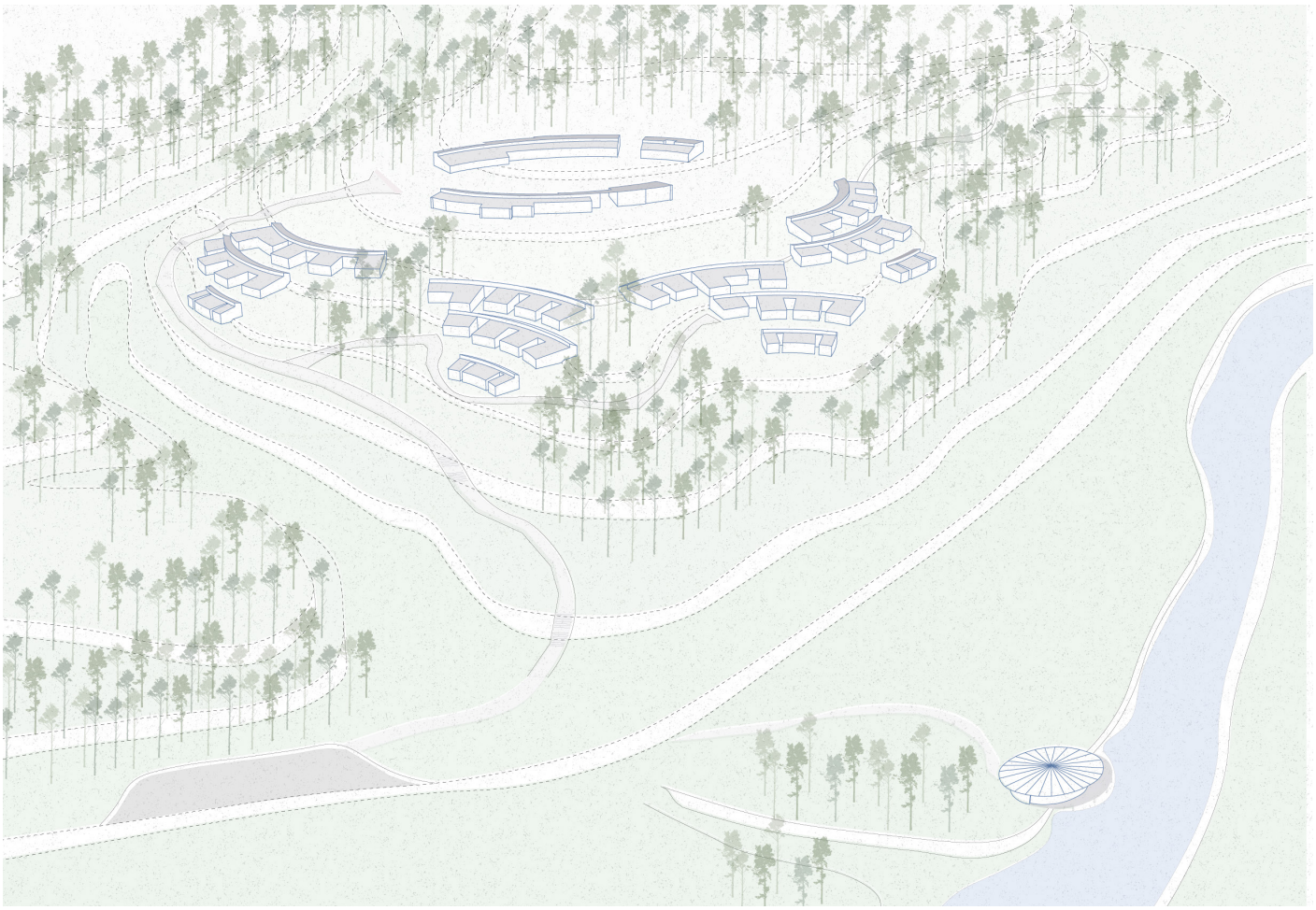


Image 8: Site (own image)

As we look further into the route toward the new location and the moment of arrival, we aim to create a specific spatial experience that sets the tone for the project. Based on studies of reference projects such as Le Corbusier's Ronchamp, the design introduces an approach from the south, where a gently rising path gradually leads toward the site. This creates a transitional phase between leaving the car and reaching the building, allowing visitors to move through nature before arrival. The subtle slope requires only minimal physical effort, yet it is sufficient to support physical and mental decompression. At the same time, the gradual ascent builds anticipation, making the approach and eventual arrival at the location more impactful and meaningful.

Design principles

Once the location was fully selected, the focus shifted to defining the exact program. The building needs to provide accommodation for 60 personnel, while also integrating elements that support a sense of "normal life."

Insights from podcasts highlighted that soldiers often use music and creative activities to feel normal or to relax. This means that the design must include workshop spaces to facilitate these activities. In addition, the building needs a variety of spaces where personnel can meet each other or their families, as well as areas where they can withdraw and rest in private.

The most important principle is that soldiers should always have a choice between social interaction and quiet rest. Research from the earlier paper also showed that personnel want to control how they move through a space, which implies the need for multiple circulation routes and flexible layouts to support both exploration and retreat.

Following the insights from the research paper, it was found that a curved building structure is most beneficial for the users. This form contributes to a sense of safety and protection, enhancing the overall experience of the space.

Another key principle is that military personnel should always feel safe in and around the building. To achieve this, the accommodations are embedded into the hillside, giving the impression that the soldiers are constantly protected by the terrain.

In addition, the buildings are slightly dispersed across the hillside rather than concentrated in a single volume. This strategy encourages military personnel to move through the natural environment as part of their daily routines, requiring them to walk outside between different functions. In this way, nature becomes part of the daily experience of the project, instead of only surrounding it.

Image 9: Site floor plan (own image)

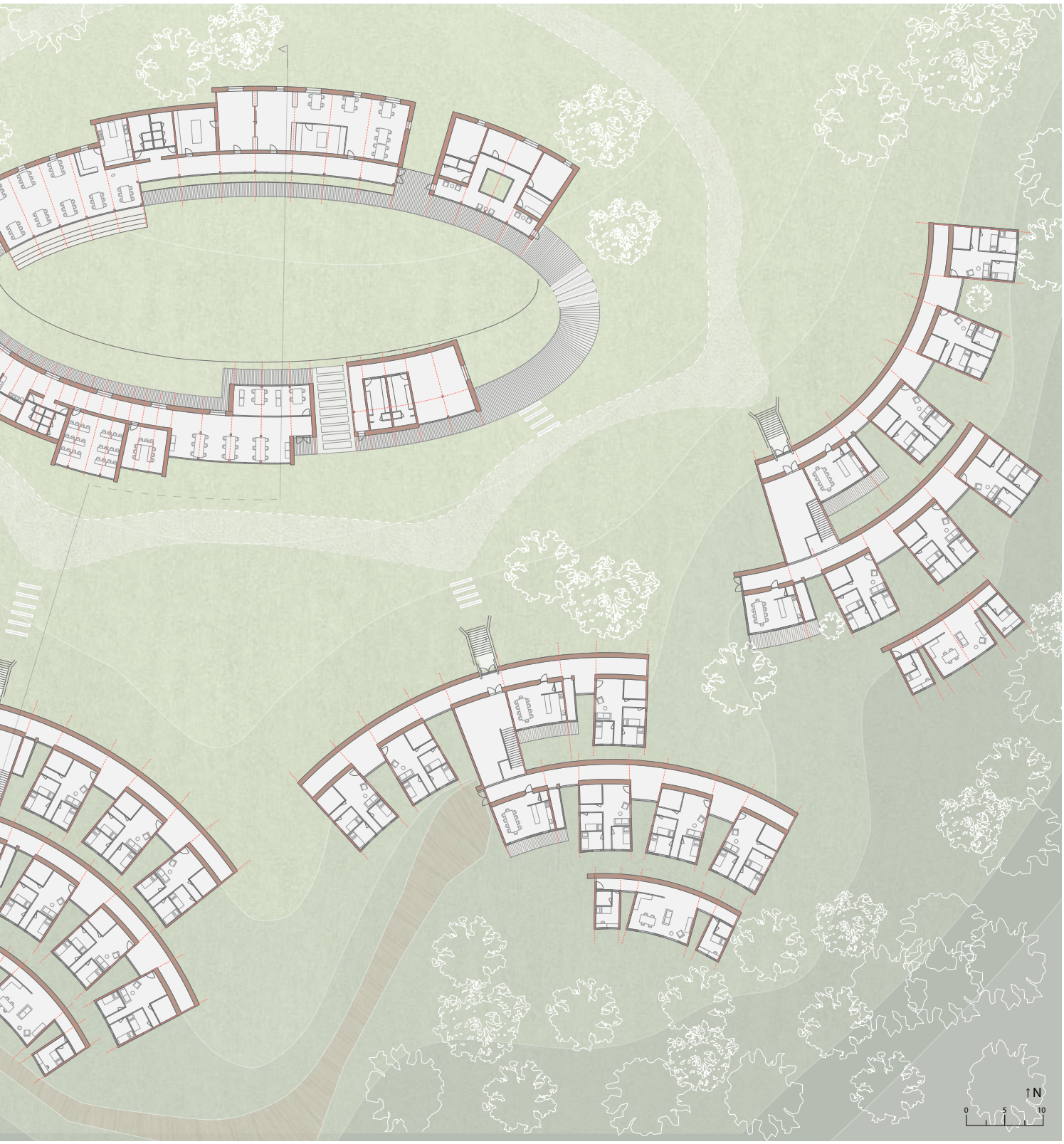

↑N
0
5
10

Image 10: Site section (own image)


+165m
+168m
0
5
10

Ecological depth

Nature integration is a guiding principle of the design. Instead of placing buildings on the landscape, the project works with the existing ecosystem.

Materials are locally sourced: on-site soil is reused for rammed earth construction and local timber is used, allowing the architecture to literally emerge from its surroundings.

The design responds to climate and seasonal change. Building orientation and form are shaped by wind, sunlight, and humidity. In winter, the buildings provide shelter and warmth, while in warmer periods they open up to the landscape, encouraging natural ventilation and interaction.

The landscape design incorporates diverse plant species that add both ecological and sensory value. Variations in vegetation, texture, color, scent, and seasonal change enhance the experience and strengthen the connection to nature, in line with research on ecological depth and sensory stimulation.

In this way, nature is embedded in every layer of the project, shaping materials, construction, and spatial experience.

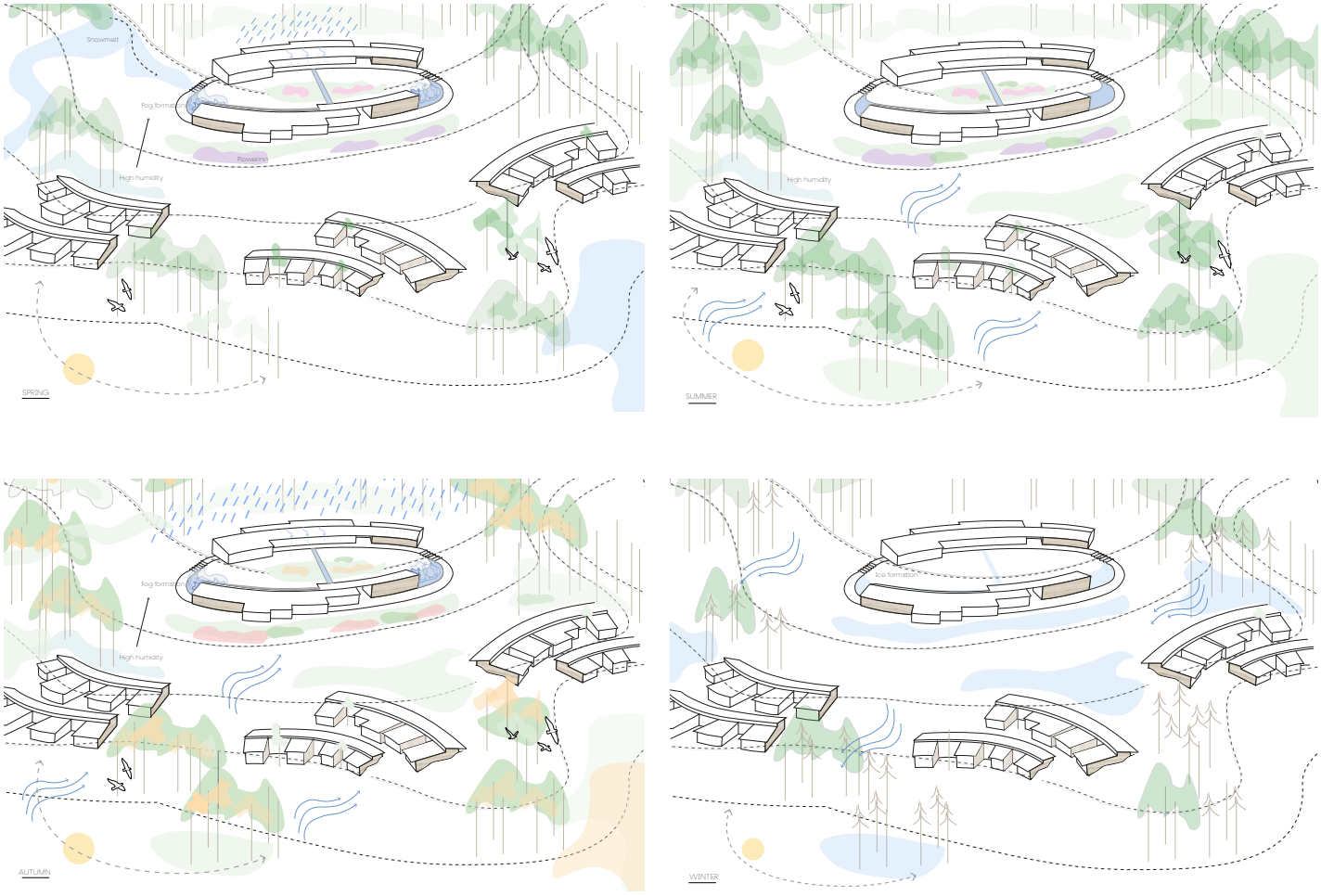


Image 11: Ecologiscal depth - 4 seasons (own image)

This ecological depth also contributes to CO2 reduction. By sourcing materials directly from the site and processing timber locally, transport needs and supply chain impacts are significantly reduced.

Rammed earth reinforces this approach through its high thermal mass, which stabilizes indoor temperatures across day and season. This reduces the need for mechanical heating and cooling, creating a more passive and energy-efficient indoor climate with fewer peak energy demands.

Together, these strategies are estimated to reduce CO2 emissions by approximately 20–30% compared to conventional local construction using concrete or brick. This demonstrates how ecological design choices improve both the relationship between building and landscape and overall environmental performance.

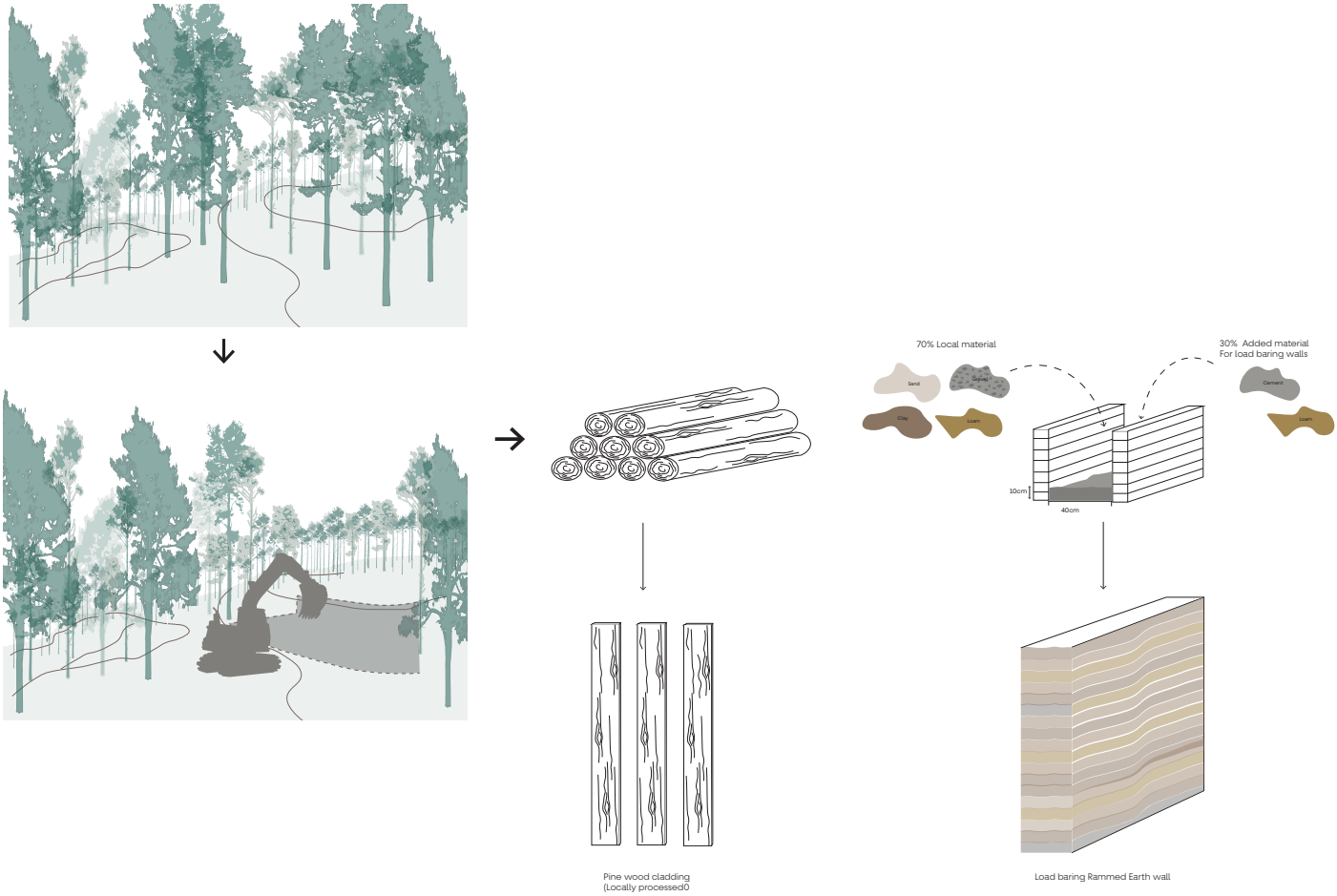


Image 12: Ecologiscal depth - materials (own image)

Main Building

This site plan shows the main building and its functional organization. The lower level is dedicated to workspaces for administrative tasks, as well as briefing rooms for operational planning and group discussions. On the right side, a fitness area supports physical training for military personnel.

Adjacent to this zone is a body of water that optimises the site's atmosphere. Due to Vilnius' high humidity in spring and autumn, it can generate mist-like conditions. Positioned behind the building, it is sheltered from prevailing winds, allowing this atmospheric effect to remain present in the outdoor space.

The upper level contains a canteen for shared meals and workshop spaces for music, creativity, and personal activities, offering opportunities for relaxation and mental recovery from operational stress.

In the far right corner is a more secluded medical center for regular check-ups and accessible psychological support, enabling early intervention when needed.

Around and between the building, varied vegetation enhances seasonal change, atmosphere, and sensory experience. Lavender on the south side releases its scent, carried by the wind to naturally guide visitors toward this main building.

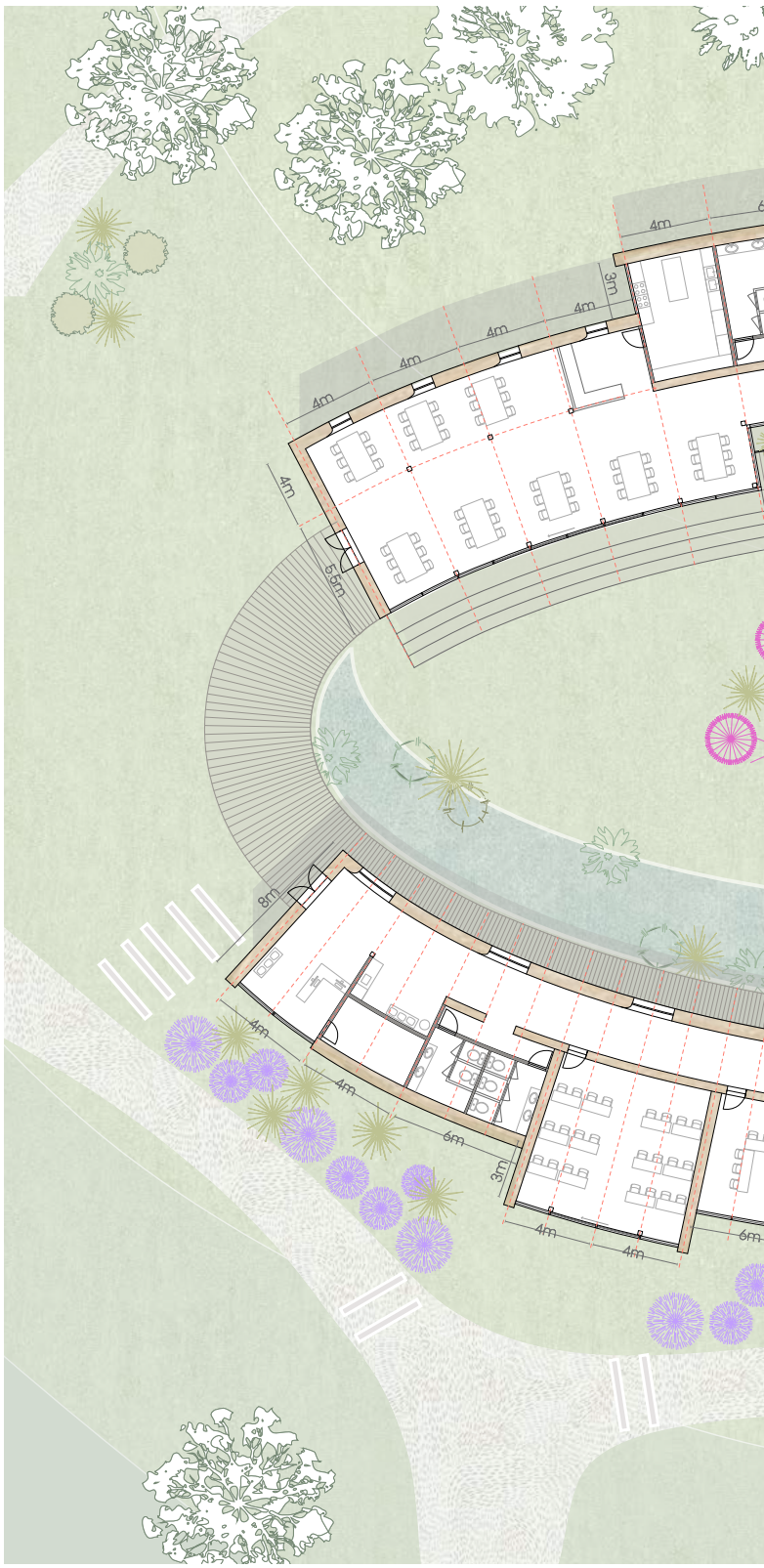


Image 13: Floor plan Main building (own image)


5m
5m
5m
5m
5m
6m
2m
5m
4m
4m
5m
9m
2.5m
6.5m
2.5m
7m
4m
4m
4m
4m
3m
2m
3m
3m
4m
4m
0
2
4
N

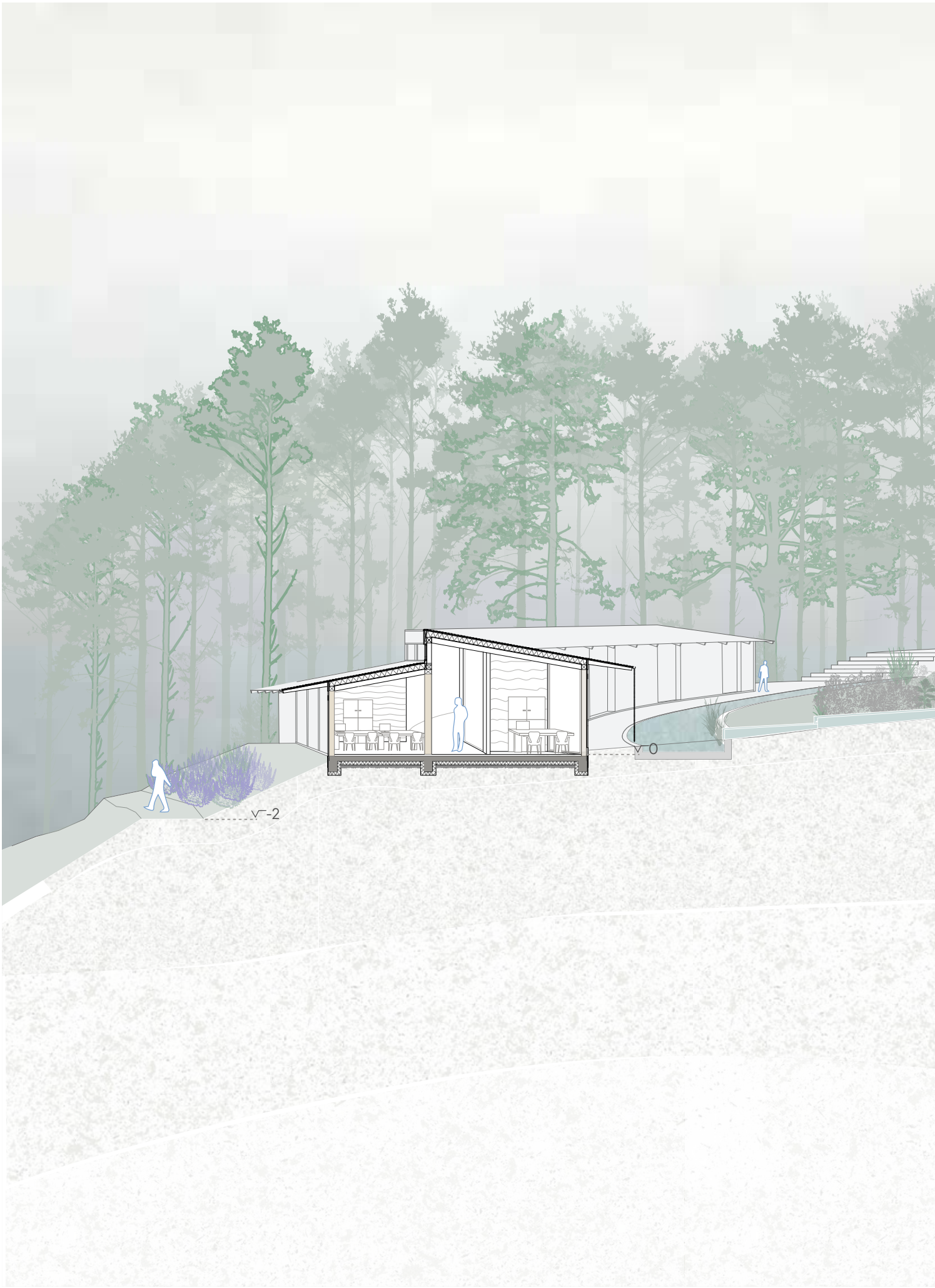


Image 14: SectionMain building (own image)

0 2 4

Central building Section

Pavillion of Contemplation

At the base of the hill, a contemplative space is created for military personnel to retreat individually for calm and reflection, away from daily and operational pressures. It can also host collective moments such as commemorations and gatherings. The flowing river enhances the atmosphere, reinforcing reflection, memory, and connection to nature.

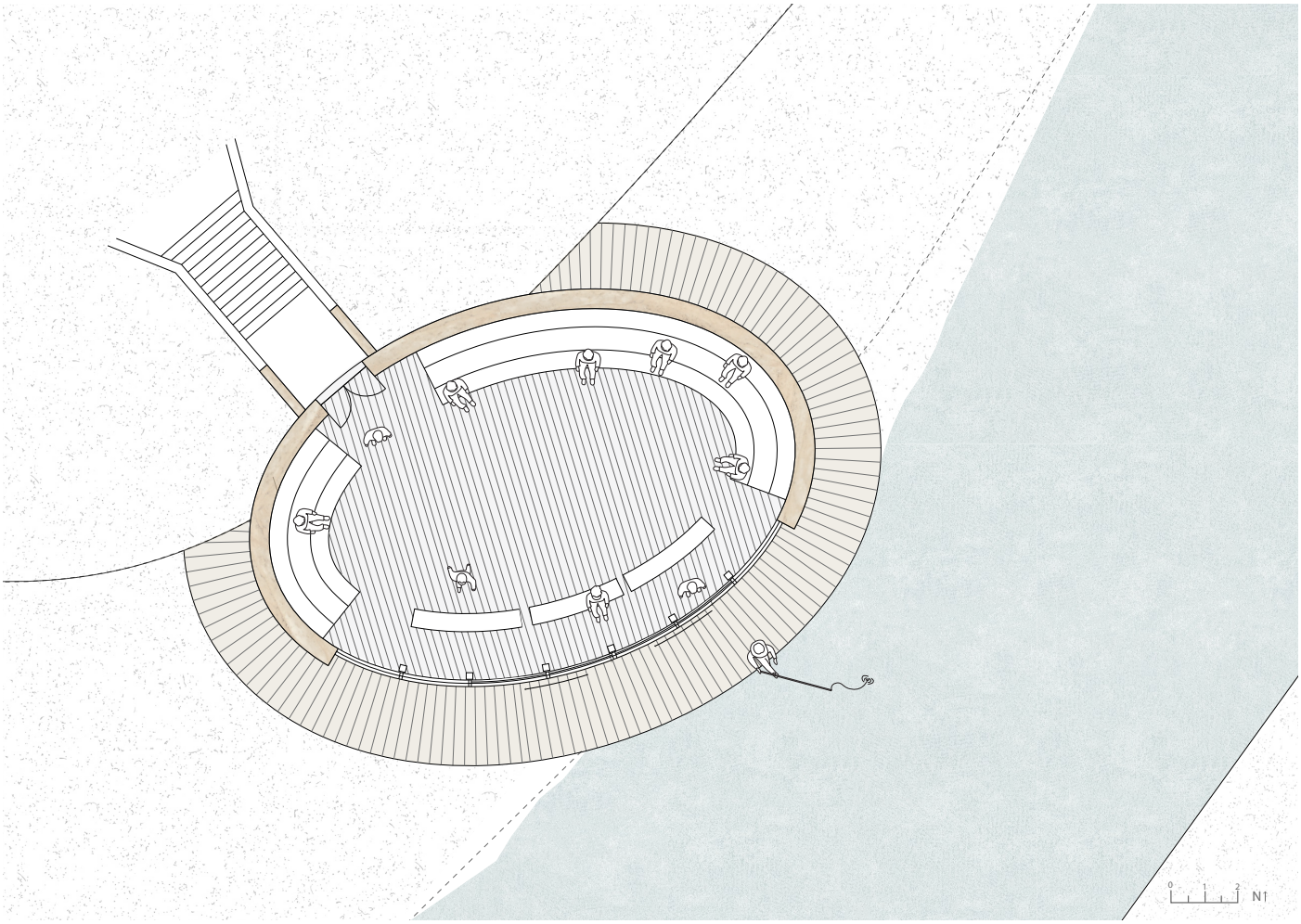


Image 15: floor plan Contemplation pavillion (own image)

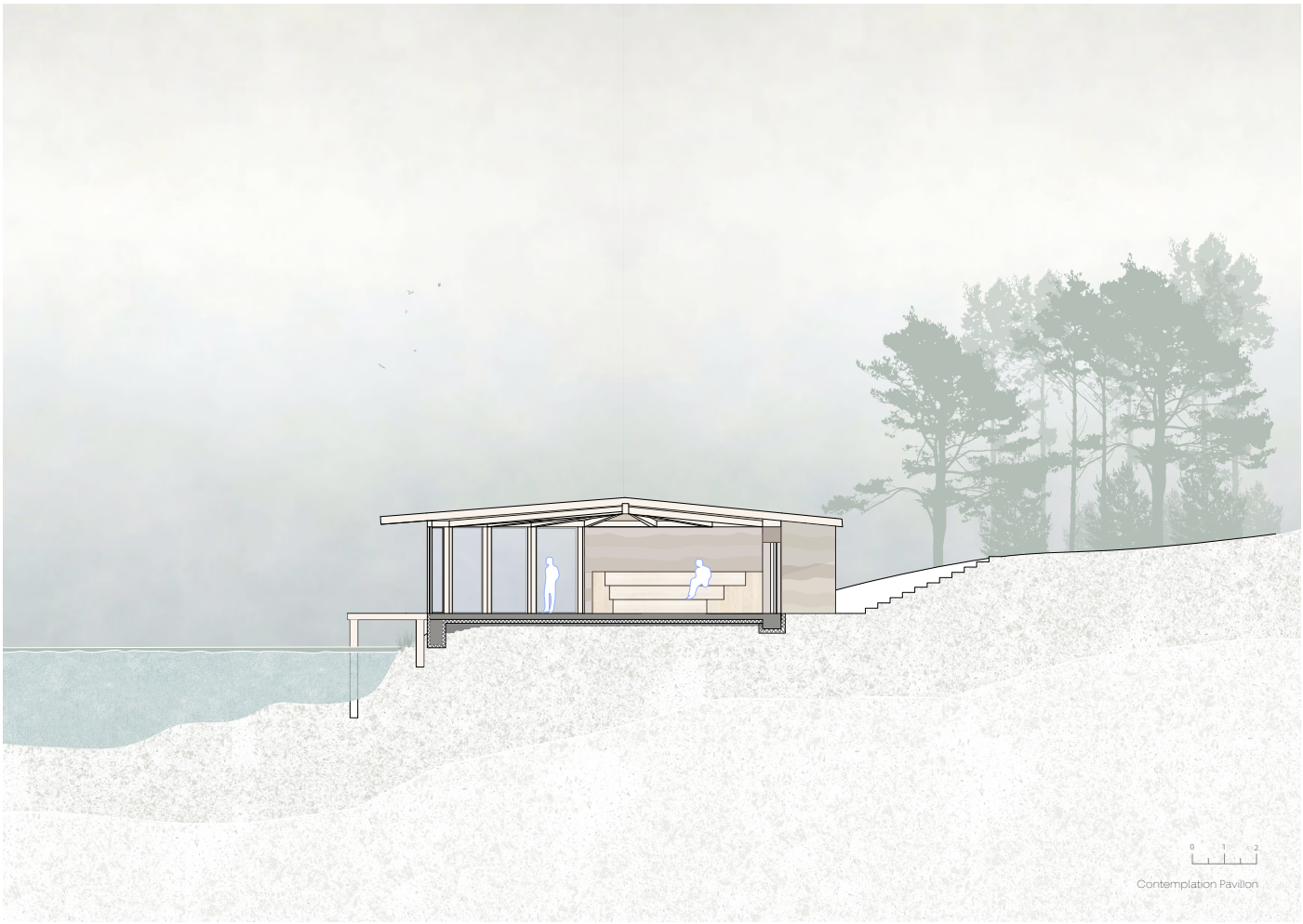


Image 16: Section Contemplation pavillion (own image)

Image 17: floor plan accomodations (own image)


155m
160m
6.5m
6.5m
6.5m
6.5m
2m
8m
0 2 4
N

Accomodations

The design is strongly guided by the human scale, which is particularly important in this building. Special attention is given to the transitions between outside and inside, from corridor to shared living space, and finally to the private room. These layered transitions shape how spaces are experienced and how people move between different levels of privacy.

Within this system, the individual is given continuous choice: to engage in social interaction or to withdraw and be alone when needed. As a result, transition spaces play a key role in mediating between collective and private life.

Research on living conditions and mental well-being supports this approach. Studies show that limited personal space can increase stress and reduce well-being due to lack of privacy and control (Wang et al., 2022), while shared bedrooms are linked to lower quality of life and more social issues compared to private rooms (Beymer et al., 2025). At the same time, small-scale shared living can be beneficial when group sizes remain limited, supporting social connection without creating overcrowding (Chen & Wang, 2021; Oh & Kim, 2021).

Based on this, the design combines private bedrooms with small living clusters of around three people, balancing privacy and social contact through carefully designed spatial transitions.

You will see these transition spaces further developed on the following pages in detailed drawings.

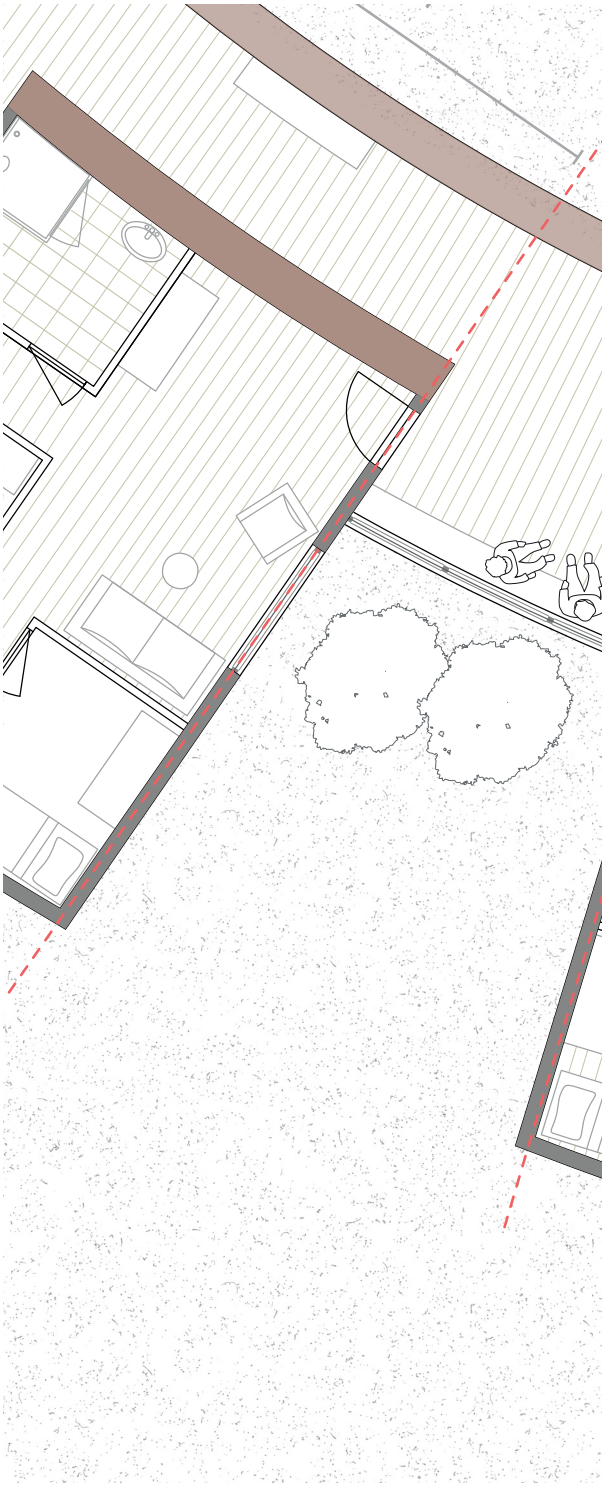


Image 18: floor plan accomodations - room (own image)

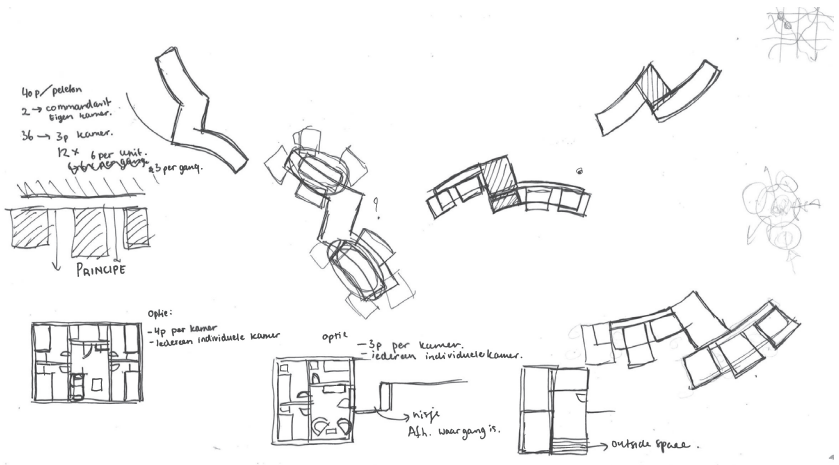


Image 19: Scetches accomodations (own image)

In the sketches on the left, different ways are explored to connect the private rooms with the shared spaces, and how this relationship extends throughout the overall design.

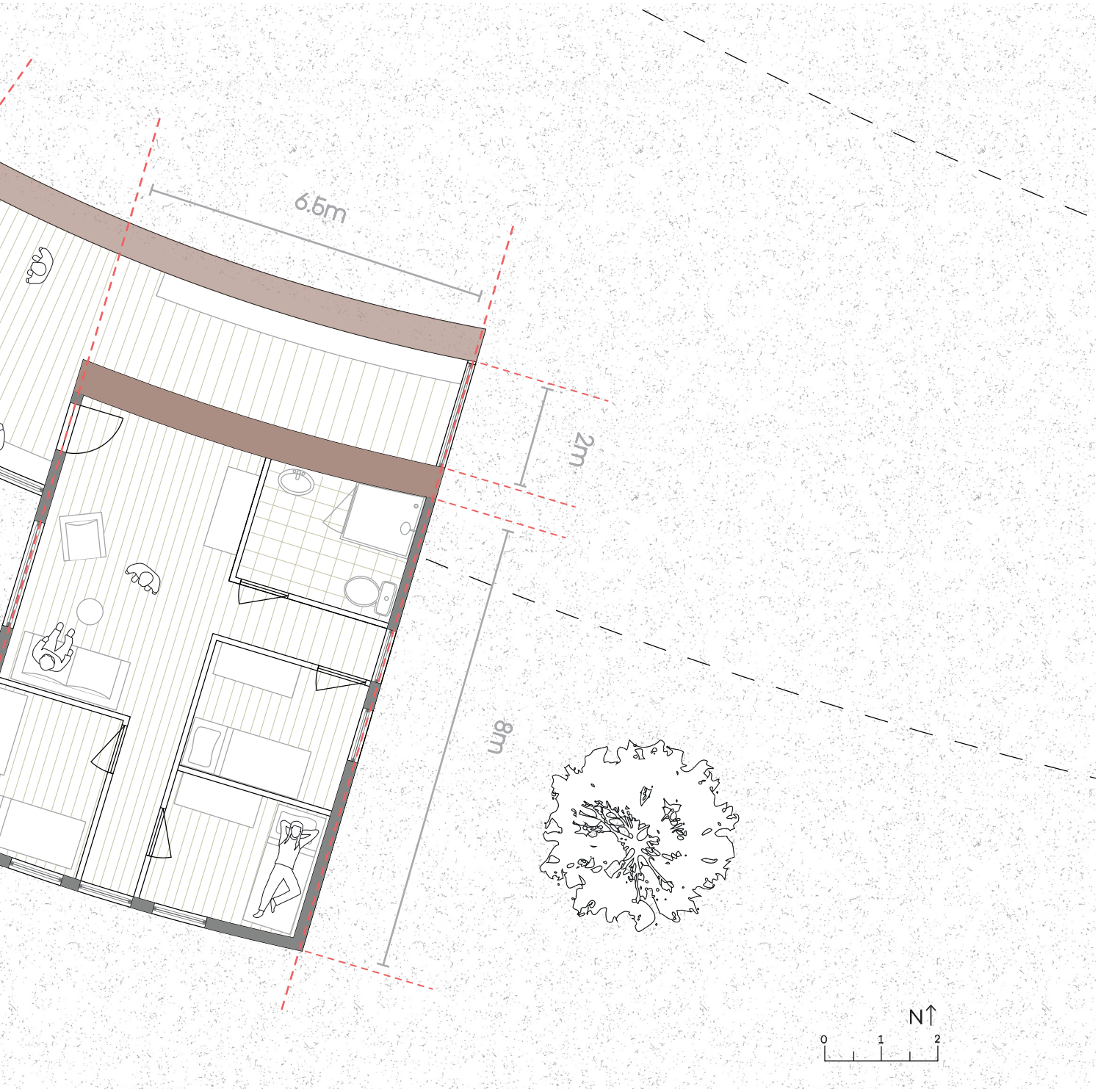
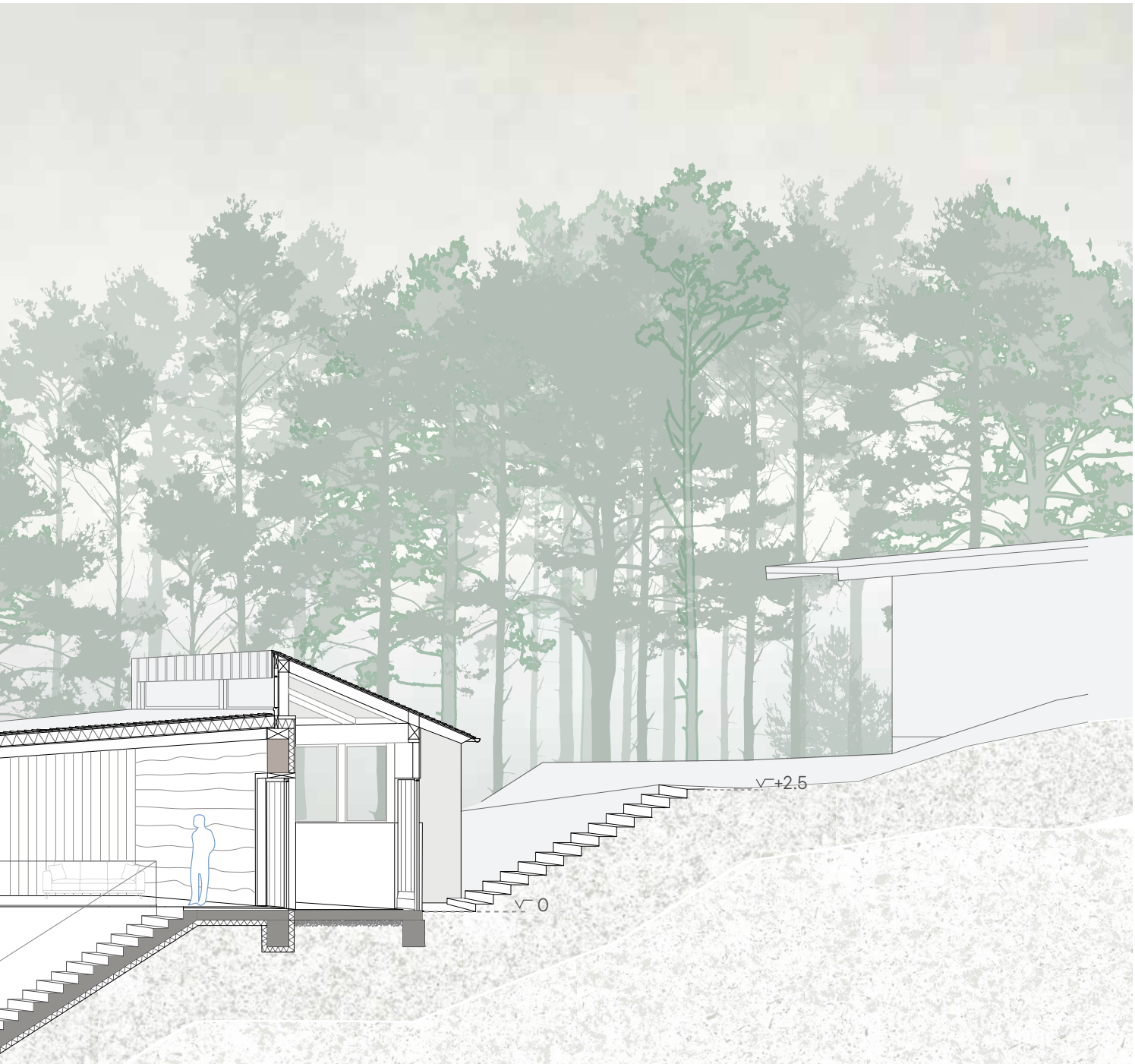
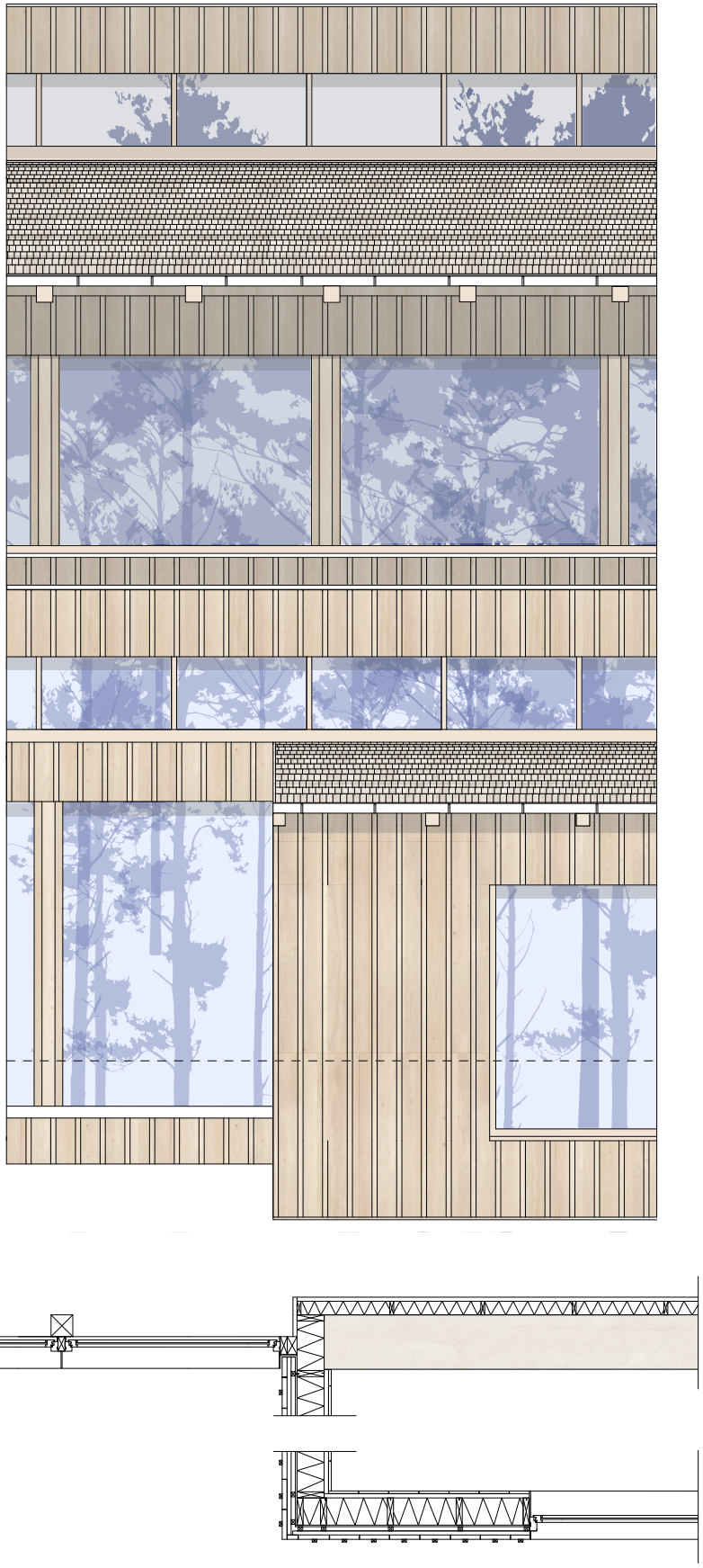

6.6m
2m
8m
N
0
1
2

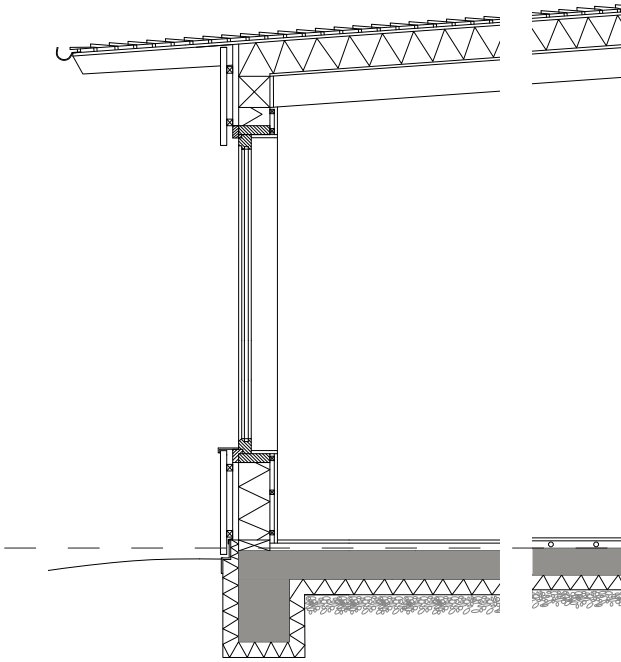
Image 20: Section accomodations (own image)



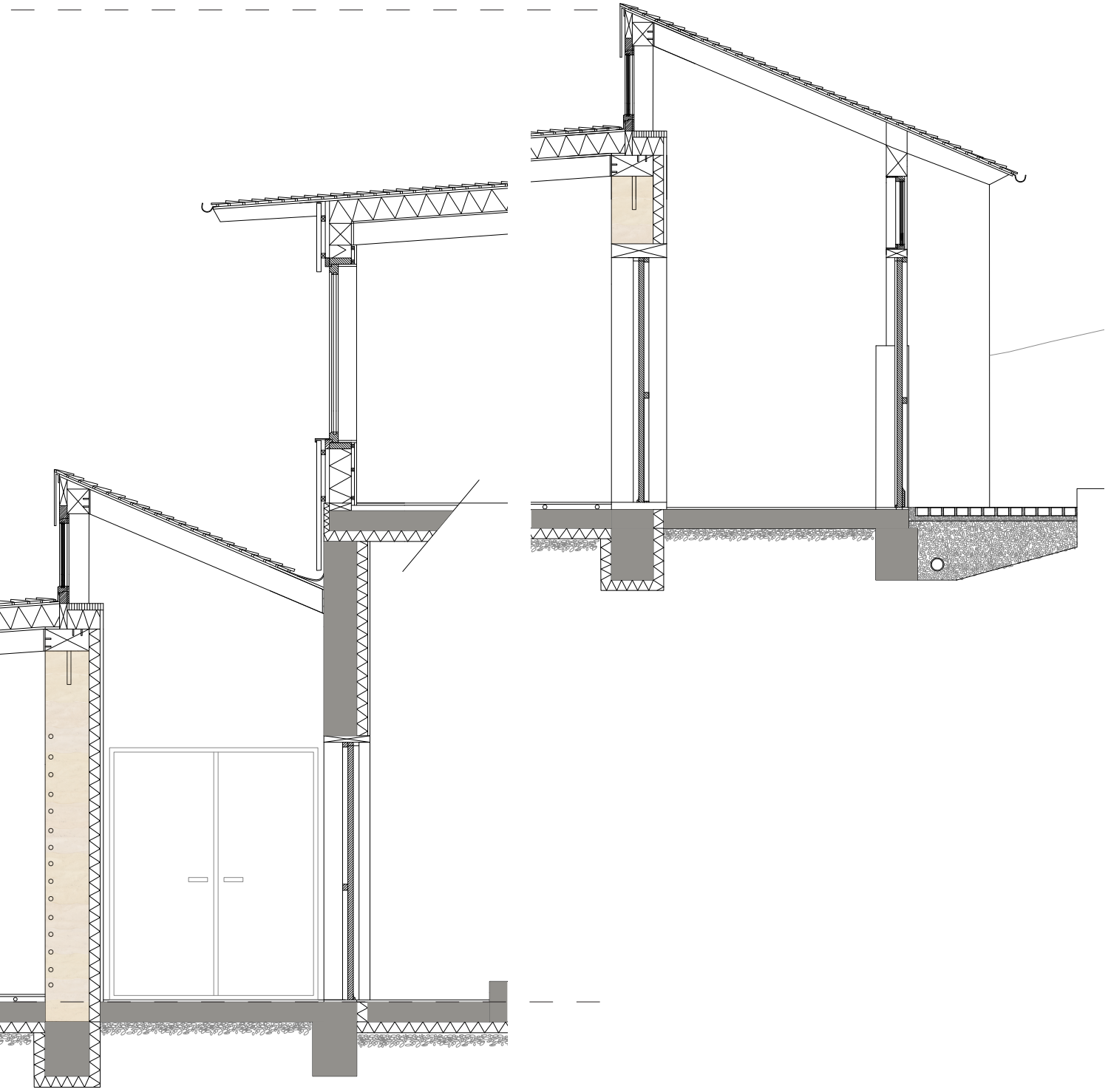
0 1 2

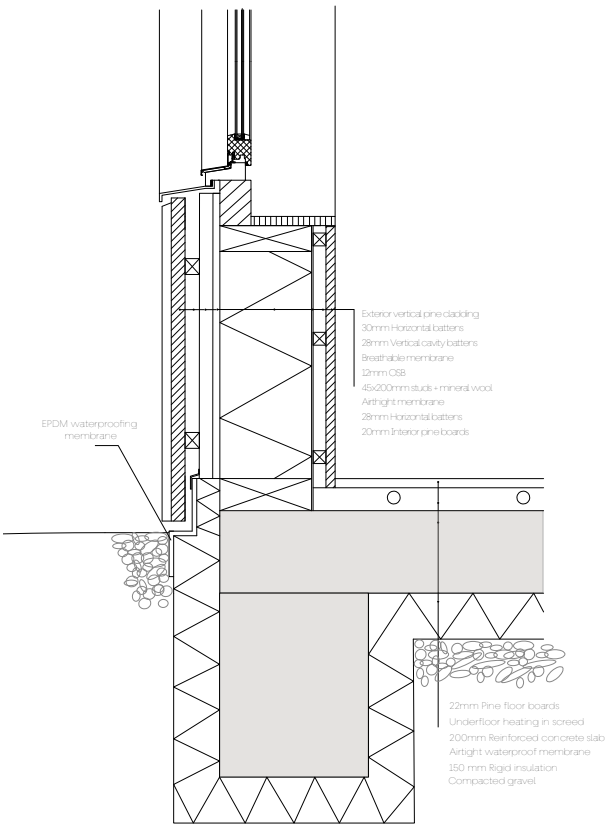
Accomodation Section

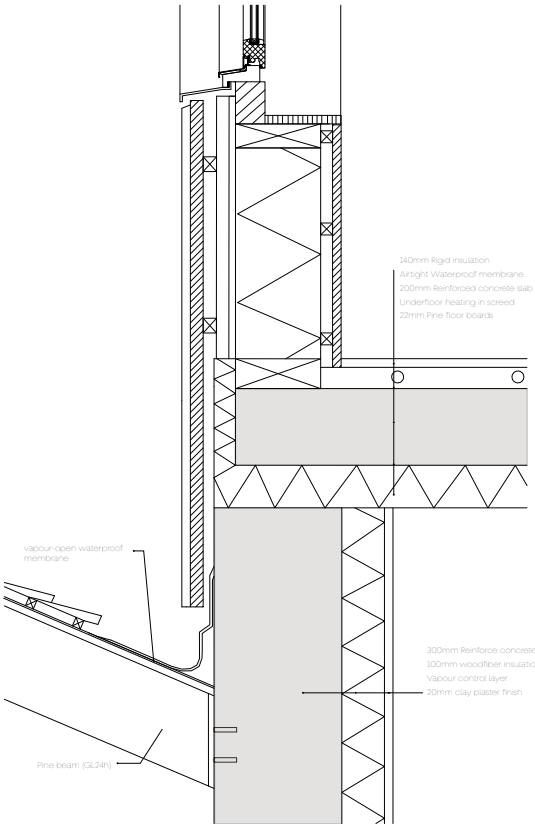


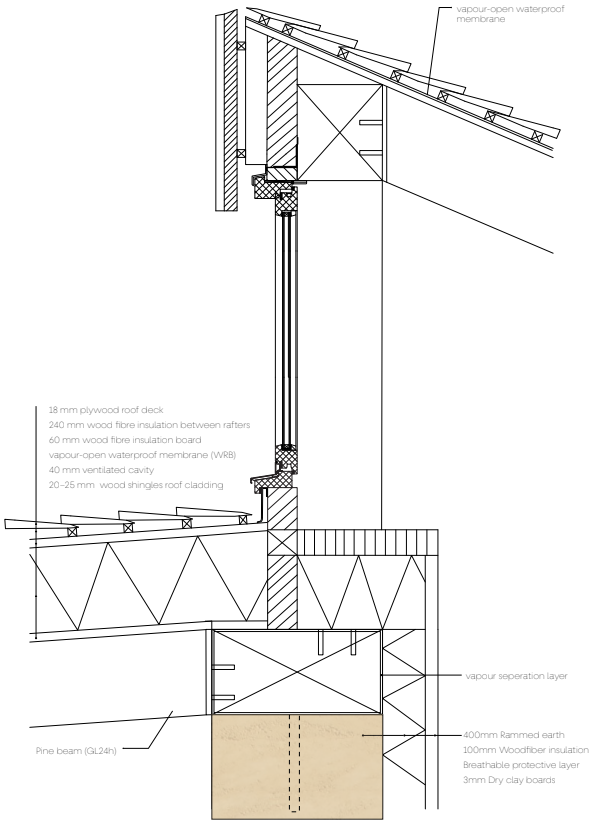


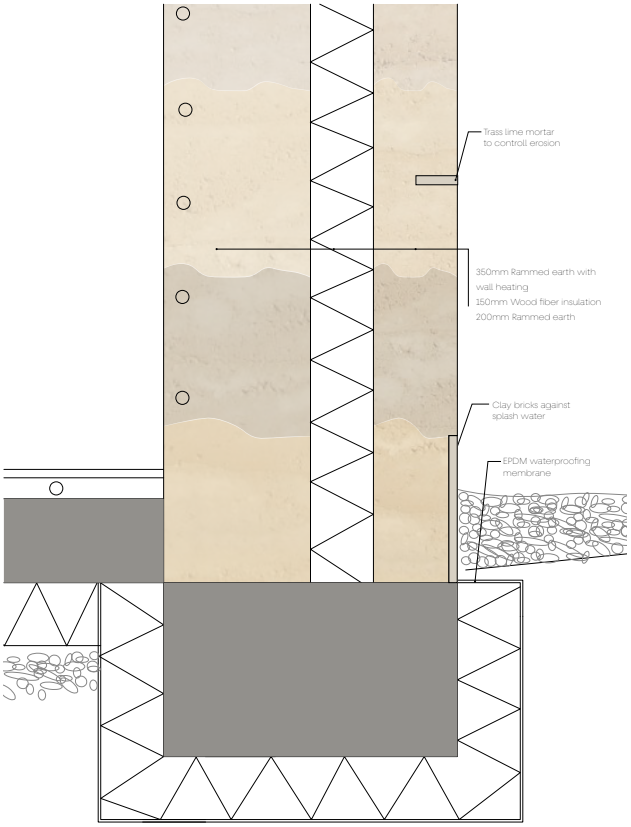
Facade with 1:20 section Accomodations Building



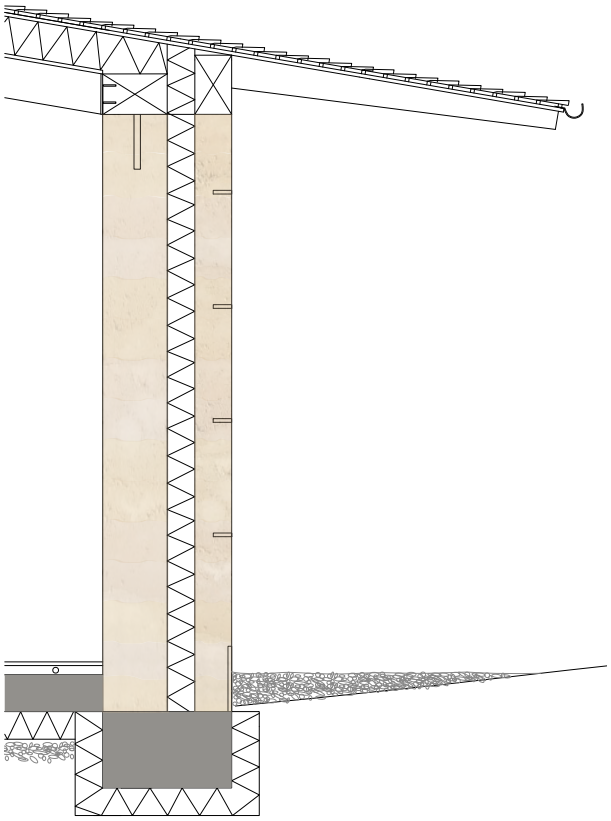

Exterior vertical pine cladding
30mm Horizontal battens
28mm Vertical cavity battens
Breathable membrane
12mm OSB
45x200mm studs + mineral wool
Airtight membrane
28mm Horizontal battens
20mm Interior pine boards
EPDM waterproofing membrane
22mm Pine floor boards
Underfloor heating in screed
200mm Reinforced concrete slab
Airtight waterproof membrane
150 mm Rigid insulation
Compacted gravel


140mm Rigid insulation
Airtight Waterproof membrane
200mm Reinforced concrete slab
Underfloor heating in screed
22mm Pine floor boards
vapour-open waterproof membrane
300mm Reinforce concrete
100mm woodfiber insulation
Vapour control layer
20mm clay plaster finish
Pine beam (GL24h)

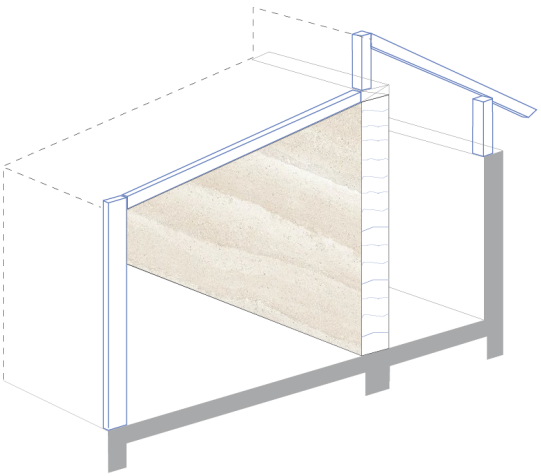

vapour-open waterproof membrane
18 mm plywood roof deck
240 mm wood fibre insulation between rafters
60 mm wood fibre insulation board
vapour-open waterproof membrane (WR8)
40 mm ventilated cavity
20-25 mm wood shingles roof cladding
vapour seperation layer
Pine beam (GL24h)
400mm Rammed earth
100mm Woodfiber insulation
Breathable protective layer
3mm Dry clay boards


Trass lime mortar to controll erosion
350mm Rammed earth with wall heating
150mm Wood fiber insulation
200mm Rammed earth
Clay bricks against splash water
EPDM waterproofing membrane

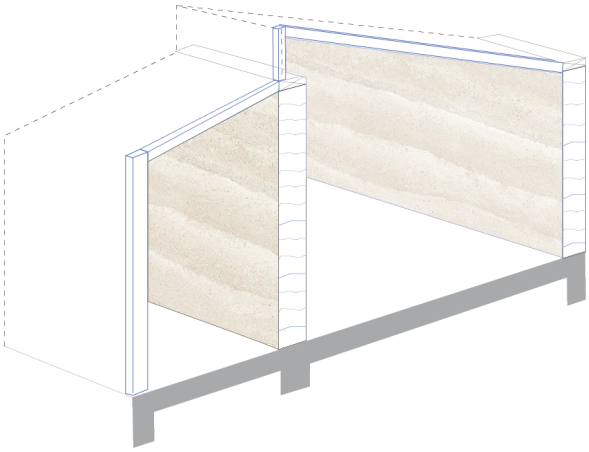
1:5 Details



Facade with 1:20 section Main Building

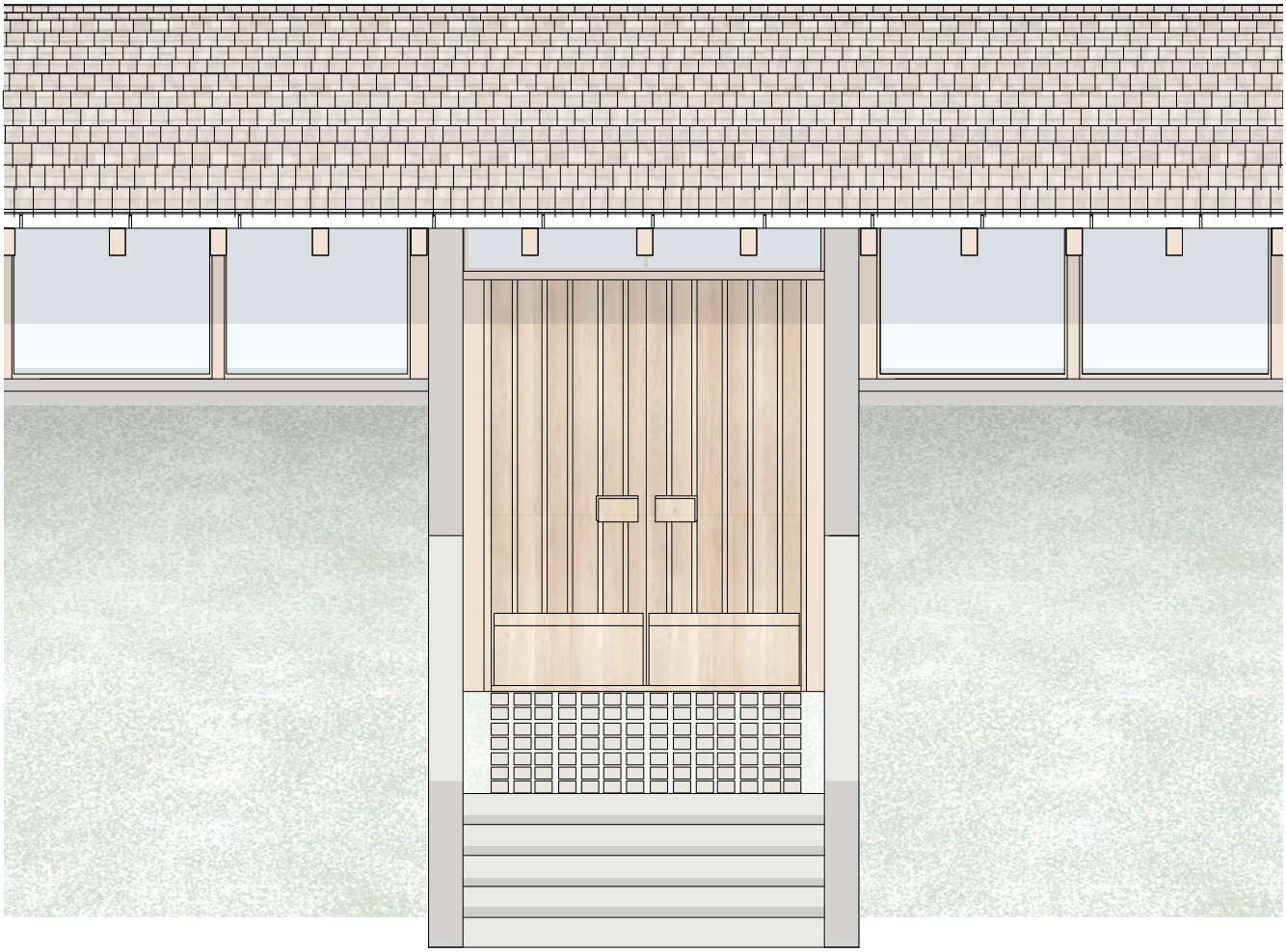


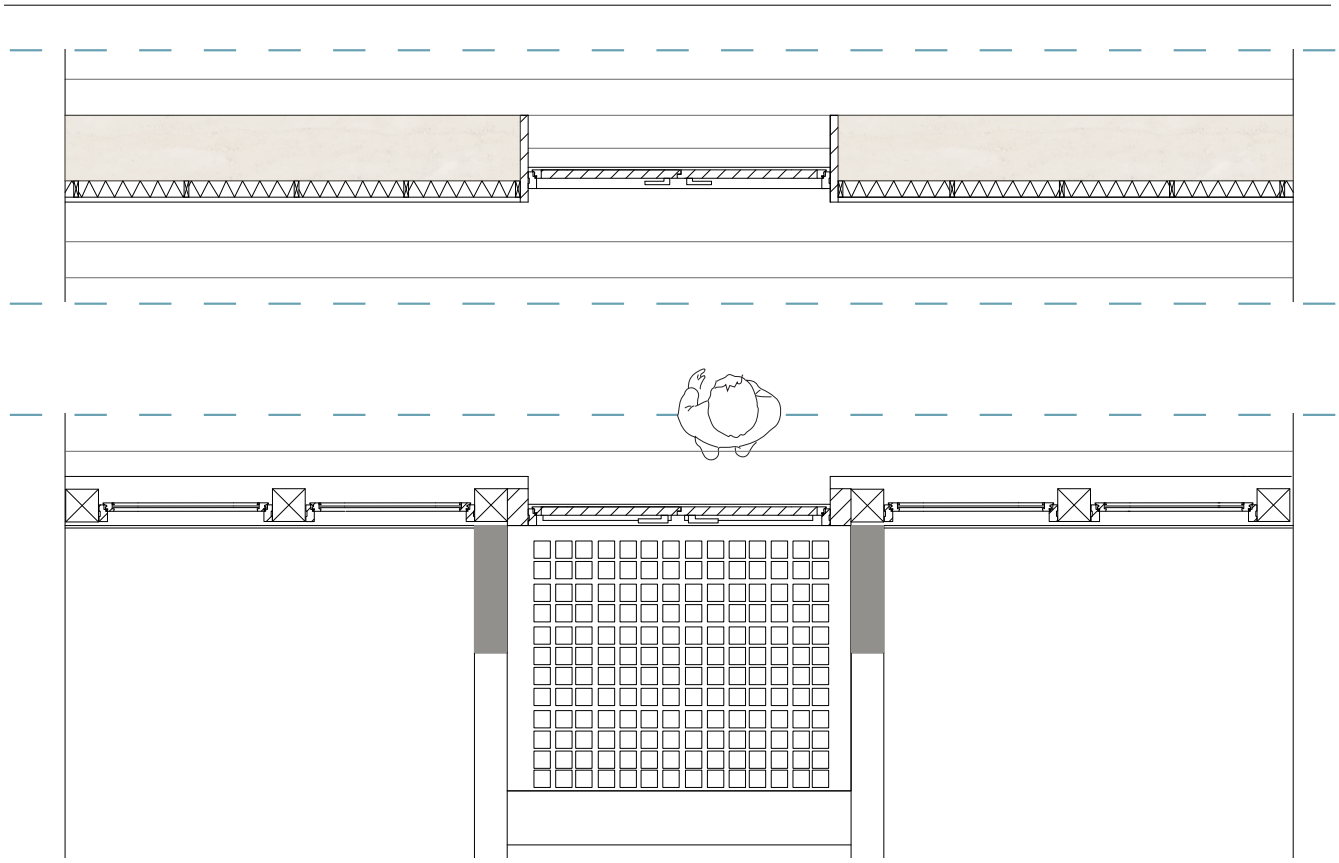
Accomodation building



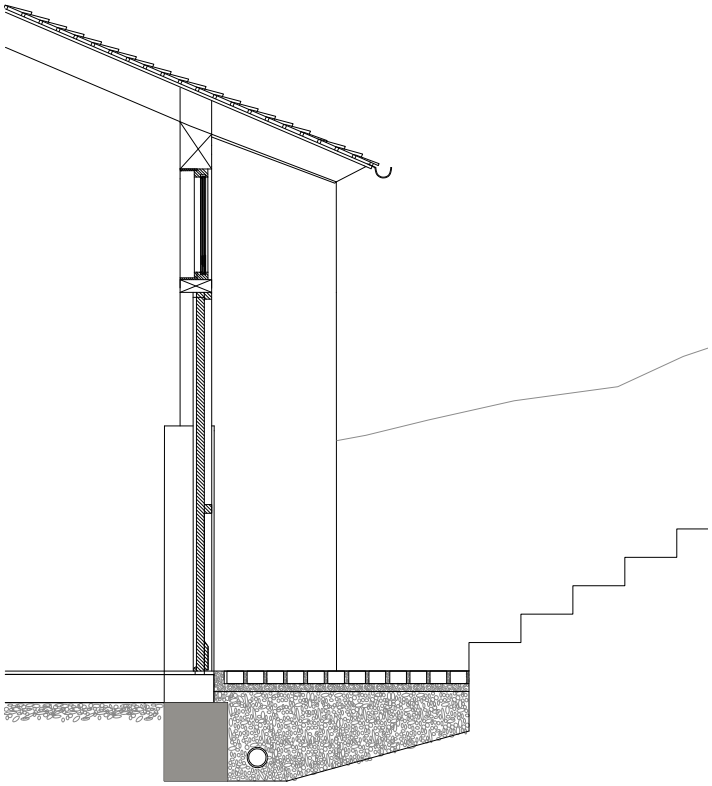
Main building

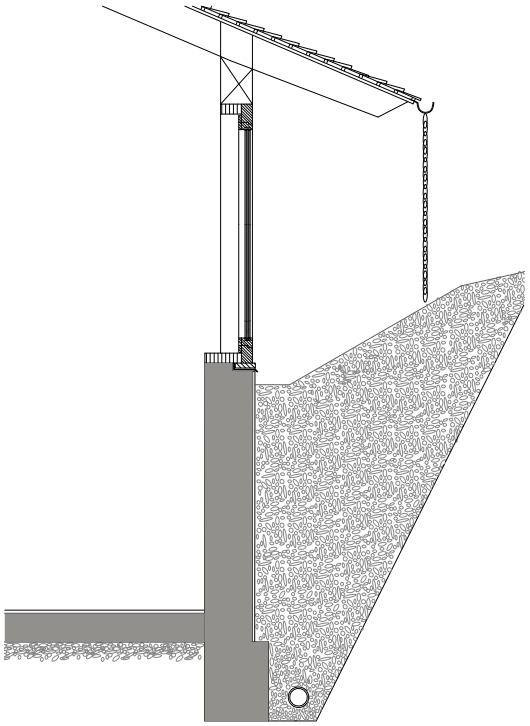
- Reinforced concrete base - ground contact, stability, foundation
- Rammed earth - constructive walls also forthermal mass, tactile quality, earth connection —
- timber structure on top lightweight, warm, open construction
  (local pine)





Entrance Accomodations Building 1:20

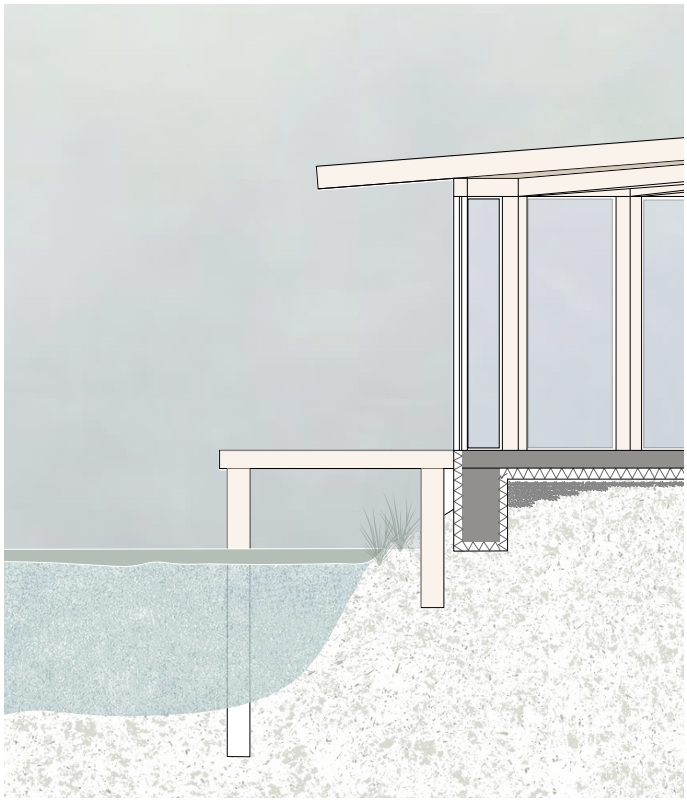




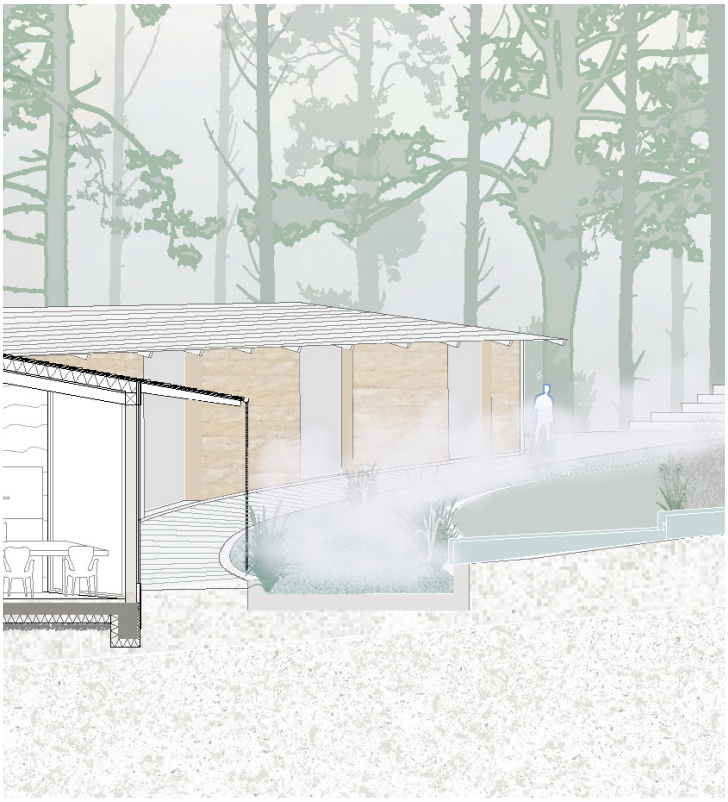
Light

Scent

Sences throughout the site



Noise



Feeling

4.1 CONCLUSION

In conclusion, this research addressed the question: How can architectural and spatial strategies within a military base contribute to stress regulation and long-term mental stability for military personnel?

The findings indicate that lasting mental support cannot be achieved solely within the conventional military base. By its nature, the base is a controlled, high-pressure environment shaped by hierarchy, operational demands, and constant readiness. While necessary for military performance, it also reinforces the stressors that affect well-being.

To support genuine recovery and resilience, an additional environment is required outside this "military bubble." This separate setting is intentionally designed for rest, reflection, and psychological decompression, acting as a stabilizing factor to operational intensity and allowing temporary withdrawal from daily pressure.

A key insight is the importance of proximity to everyday life. By locating the intervention closer to an urban context, personnel can gradually reconnect with normality, supporting reintegration beyond the military sphere. At the same time, the scale remains intentionally small and intimate, avoiding institutional character and instead prioritizing calmness, safety, and psychological comfort.

Nature is a central driver in the design. The integration of landscape and architecture creates an environment that actively supports stress reduction. Terrain, vegetation, water, and seasonal change form a dynamic system in which the building is embedded rather than imposed. This ecological depth enhances sensory experience, promotes awareness and presence, and supports recovery. Carefully designed spatial transitions between exterior and interior, and between different levels of privacy enable gradual shifts from alertness to relaxation.

Ultimately, the project proposes a rethinking of military infrastructure. Beyond efficiency and operational readiness, architecture is positioned as an active tool for mental well-being. Through withdrawal from the base, reconnection with everyday life, and deep integration with nature, the design creates conditions that support stress regulation and long-term psychological stability.

4.2 DISUSSION

This research explores an alternative way of thinking about military infrastructure by introducing a separate environment focused on recovery and psychological decompression. While the results show clear potential benefits for stress regulation and long-term mental stability, several important questions remain regarding implementation and real-world application.

A first and essential consideration is the cultural context within most military environments. Mental health is still not always openly discussed, and personnel may not easily indicate when they are struggling. The project therefore aims to be as low-threshold as possible and to fit within existing schedules, making use accessible without requiring major changes in daily routines. However, addressing long-term mental well-being in a meaningful way inevitably also requires a cultural shift—towards greater awareness of psychological health and a more active role in maintaining it.

This awareness should not only relate to the individuals, but also to the environment they inhabit. Just as personal mental health requires attention, so does the physical and spatial environment that supports it. The design assumes that both users and institutions become more conscious of how the landscape and building can actively contribute to recovery, and therefore also need to be maintained accordingly. Vegetation, water, and seasonal dynamics require continuous care, and their sensory and atmospheric qualities depend on long-term management and environmental conditions.

This leads to a broader reflection on the role of architecture in military contexts. Rather than focusing solely on functionality, efficiency, and readiness, military environments could also be designed to actively support mental resilience. This raises the question of whether well-being should become an integrated and permanent part of military spatial design, alongside operational performance, and whether even the standard typology of military bases should gradually evolve in response to this.

The research also raises questions about scale and replication. The proposal is intentionally small and context-specific, prioritizing intimacy and calmness. However, it remains open whether this model can be transferred to other military locations or larger infrastructures without losing its effectiveness. In such cases, identifying a suitable site and re-establishing the same balance between nature, scale, and spatial transitions may require time, meaning the desired impact is not automatically immediate or guaranteed.

Overall, this research shows that improving mental well-being in military contexts goes beyond spatial design alone. It requires a shift in awareness and culture, where mental health becomes a more integral part of daily military life. In this sense, the project is not a final solution, but a starting point for rethinking how military environments can better support long-term resilience.

4.3 REFLECTION

What initially drew me to this project was the relevance of the problem. Mental health within military contexts is an urgent and highly complex issue, which made the topic both compelling and challenging from the start. Because the problem is so large and intense, it often felt as if no design intervention would ever be "enough" within such a demanding context. However, over time I learned that by committing to a clear standpoint and gradually refining it, the work became more focused and meaningful. Narrowing the approach made the process not only more manageable, but also more interesting.

At the same time, working with such a heavy subject was not always easy. There were moments where it felt difficult to stay fully engaged with the emotional weight of the topic. It also took time to step outside my comfort zone and accept that the project required an extreme response to an extreme problem. In that process, I am especially grateful for the guidance from my EXTREME tutors and the visiting people from TNO and the Ministry of Defence, which helped ground the project in a more realistic understanding of the military context. The site visit was also crucial; being physically present on location gave a much clearer understanding of the scale, atmosphere, and reality of the site, which strongly influenced the design direction afterwards.

Throughout the project, I was continuously challenged to think in detail, since every spatial decision affects how the building is experienced. This made the process rich but sometimes also overwhelming, as it was easy to lose overview while working across many layers at once. Later in the process, things started to come together more clearly when I focused on the idea of ecological depth, which helped bring the different aspects of the design together into one coherent whole.

Looking back, the project taught me that clarity often develops through making and refining rather than from the beginning. Starting from a complex and almost overwhelming problem eventually led to a more focused and grounded design. It showed me that working with mental health in a strict and regulated environment requires both sensitivity and the ability to simplify without losing depth.

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Afl. 2. – Yaryna (drone piloot)
Afl. 3. – Oleksiy (Lijken ruimen)
Afl. 4. – Roman (Militair psycholoog)
- Stad in oorlog afl. 1-4 VPRO
Afl. 1. Welkom in Charkiv
Afl. 2. Helden
Afl. 3. Overleven
Afl. 4. De Voorhoede

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Images:

Data management checklist

Section A. General considerations	yes	no
1. Is the graduation project conducted as part of an internship (at a company), or as part of a research project at TU Delft? If a student's graduation project is conducted at a company or as part of a research project at the university, questions of data ownership and intellectual property rights need to be addressed in a written graduation or internship agreement before the project begins. Students and their supervisor should consult the Intellectual Property Rights of Students webpage. Additional information can also be found in the Extended Personal Research Data Workflow.		✓
2. Does the project involve conducting (part of) the research outside the Netherlands? Students who intend to travel abroad (even to other EU countries) for study, exchange, research, internship, or graduation project purposes need to follow the Travel Safety Protocol. This includes attending a mandatory Travel Safety Training Session: see the Disclaimer.		✓
3. Will the research involve processing data from humans, such as running a survey, conducting interviews or workshops, collecting data through social media or internet forums, or re-using existing datasets about humans provided by a third party? (If 'yes', see follow-up questions 4 to 13 in Checklist B.) Students who work with data from human participants must complete the next section and apply for and receive ethical approval from the Human Research Ethics Committee (HREC) before conducting the research.		✓