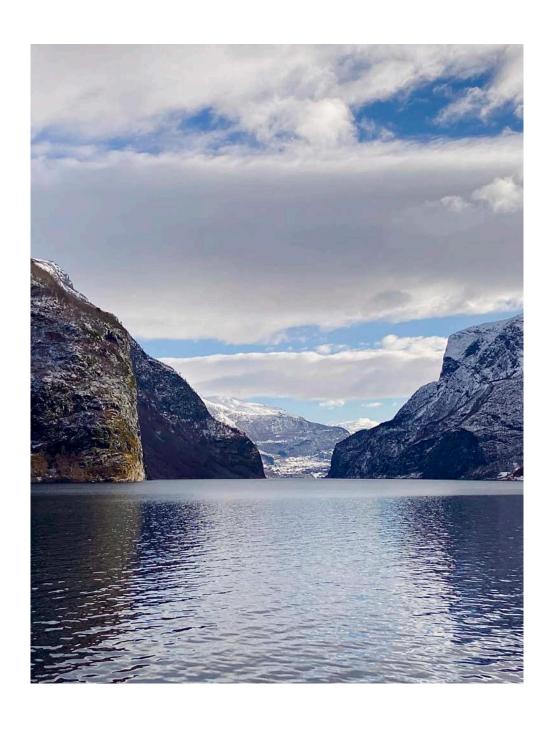


Msc04 – Architecture & Design Aalborg University Master Thesis Group 17 May, 2024



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Secondary consultant: Anna Marszal-Pomianowska

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Maher Mohammad Esam Khaddam

Trine Vig Laursen

Abstract

This paper examines the process of designing and constructing a sustainable off-grid architecctual retreat, whiten a multisensory experience as a solution to better help children facing late language development and stuttering and their parents. Through various analysis to understand and convey the site's surroundings, environment, and climate and conducted theoretical reseach insights have driven the creation of design criteria's, set up to be incorporated into the design process. Additionally, case studies have been explored to gain a deeper understanding of architectural techniques employed in similar framework. The design process evolves around the problem-solution based methodology, where as more new discovered aspects leading to a profound proposal has been investigated. In in aim for an off-grid architectural design both Passive and active design strategies, such as the incorporation of solar cells, have been employed to achieve a self-sufficient retreat. The project aims to raise awareness of some vulnerable children facing late language development and stuttering to achieve improvement through special and multisensory experiences together with gaining knowledge about the benefits of being off-grid. As a result, the research conducted in this paper, resuluted into the architectual design proposal,!: CON-TREAT

Reading Guide

This semester report consists of nine chapters: Prologue, Theory, Analysis, User group, Studies, Theory, Design process, Presentation and Epilogue. Chapters that each present the necessary steps in such a large design project. The seven first chapters present the analysis and process used to produce the final presentation outcome. In addition, appendixes are presented at the very end. The primary audience for our project includes visitors, defined as parents and children, who are the target user group for our design. The report follows the Harvard reference method for citing sources. Pictures purchased by Larsen Liverpool have been used thoughout this paper. Other illustrations and images have been approved by the author/photographer. Throughout the report, a choice has been made to use the phrase "LDD" that refer to Late Language Development, ensuring consistency and clarity. Various other shortened phrases and abbreviations are also used throughout the report in relation to other phrases that need precision. Here by presenting the word "Ribbons" which is used metaphorically to represent various conceptual threads and connections within the shape of the design. Throughout the report, a theme has been established to maintain coherence and visual harmony.

Table of content

01		03	
Prologue	Usergroup		
Introduction The framework The framework Methodology	16 18 19 20	Effect of Teqnology Interview Treatment The secodary usergroup What is a Retreat?	44 45 46 50 54
02		04	
Analysis	\	Theory	
The site Identity Moodboard Therapy Use of area Flow	24 26 31 32 34 35	What is a Kitchen garden? Off-grid architecture	55 56
Topography Microclimate	00	05	
The usergroup	42	Cases Casestudy Casestudy Vision	62 63 66
		06	
		The frame	
		Problemstatement Design Criteria Functions	66 68 70

O7 O8

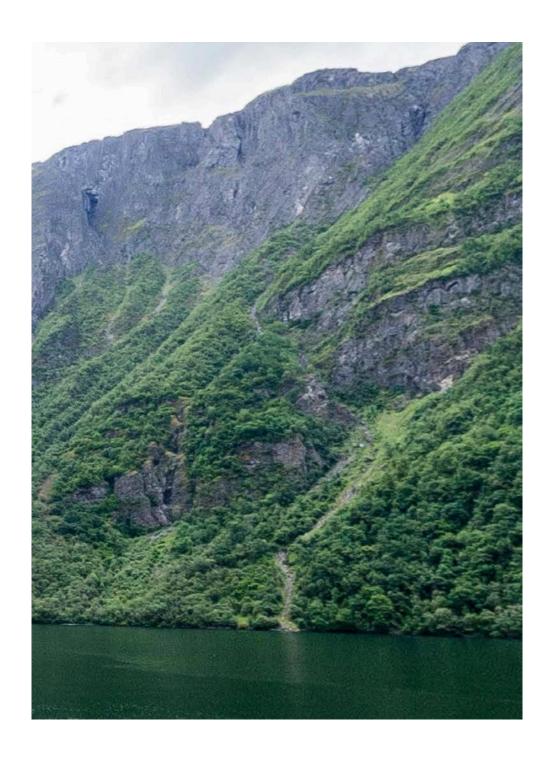
Design process Presentation

Initiative sketches	75	Concept	124
Where to build?	7	Function diagram	126
How to build?	78	function diagram	127
The overall shape	79	Room program	128
Energy consumption	80	Room program	130
Utilization	82	Plans	132
Orientation	83	Zones	142
Be18	84	Flow	143
The entrance	86	Siteplan	146
The journey	88	Sections	150
The stargazing platform	90	Section	152
Zones	92		
Workspace	94	\cap	
The units	96	U9	
The units	98	Enilogue	
The communal zone	101	Epilogue	
The Kitchen garden	102	Conclusion	154
Therapy zone	103	Reflection	156
Passive strategies	104	References	
Active strategies	112	Appendix	
RT flow	113	• •	
Wind turbines	114		
Water treatment	115		

Prologue 01

Introduction

In a world constantly pulsating with noise and speed, some of our most vulnerable citizens face a distinct challenge: Children with language delays and other difficulties such as stuttering and their affected parents as well. Confronting an overwhelming world where words can feel like rivals, there is a need for a space/place where these children can find tranquility, comfort, and a voice of their own. This master's project in civil engineering architecture strives to reach the goal of becoming a tribute to the strength found in silence. Presenting here is an innovative concept: a retreat layed out as a journey giving a multisensory experience where the children can explore, learn, and grow without the fear of being overwhelmed by other disruptions. The vision extends beyond just offering a sanctuary; The aim is to embrace the power of sustainability by designing an off-grid architecture, that not only protects its residents but also our nature. For this, different strategies have been tested to secure the best possible solution for the visitors. The design uses theories what the necessary treatment for children with late language development challenges would be and how special experience can help them to overcome their challenges and most importantly the aspects and benefits of living off-grid. This project represents not just a building, but a symbol of hope and possibilities. It is a call to action to create a world where all voices can flourish, no matter how quiet they may be.

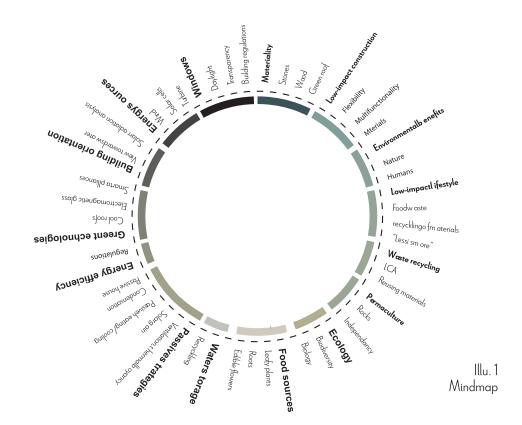


The framework

Larsen Architecture, is a dynamic ensemble of professionals, that specializes in creating international competitions and workshops aimed at challange and inspire young participants and students in the pursuit of their master thesis projects.

With Larsen Liverpools' new competition, Hidden Garden Escape, their main goal is to design a retreat with a high level of sustainability, requiring the users to be close to nature, and creating a project that is undetectable and fits seamlessly with the topography. The retreat must stand for encouraging and motivating groups of users to come over their life issues. The selection of user groups must be meticulously selected, and they must have a reflector effect on the design.

Additionally, the diagram titled "Brainstorm" delineates further considerations and inspirations vital to the projects realization, encapsulating the collective ideation process undertaken to enrich the competition brief and infuse the design with innovative solutions.



The framework Sustainability

As per the competition guidelines, there is a distinct emphasis on sustainability. Sustainability is a large subject, but to further understand the subject the three underlined pillars are described. They are intertwined categories: Environmental sustainability, economic sustainability and social sustainability. The three pillars of sustainability provide a framework for applying a solutions-oriented approach to architecture. All three pillars must be reached in an architectural design to be fully sustainable. (Treehugger, 2024)

Environmental Sustainability

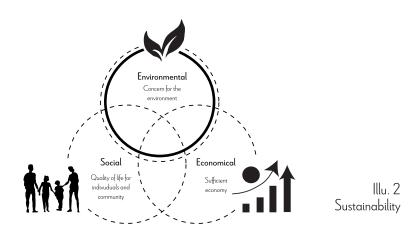
The environmental sustainability focuses on the well-being of the environment and biodiversity including natural resources where as to the nature must be preserved. Water quality, air quality, and reduction of environmental stressors, such as greenhouse gas emissions are important as it effect the health of all life.

Economic Sustainability

Economic sustainability includes job creation, profitability, and proper accounting of the ecosystem. high rates of employment benefit both the economy and the people's social well-being. Lower operating cost can for example come from being environmentally sustainable and vice versa.

Scocial Sustainability

In terms of social aspect of sustainability, the aim is to fix fixing the existing social problems we have, things like overpopulation, poverty, and social injustice, so it is the aspects of sustainability that relate to people. This pillar is more subjective. (Treehugger, 2024)



Methodology

Problem - Solution

The project will follow Bryan Lawson's method "The problem-solution space", which contains five distinct phases: problem, analysis, synthesis, evaluation and solution (Lawson, 2005). In this approach, the problem and solution serve as the starting and concluding points of the design process, while analysis, synthesis, and evaluation act as pathways leading to the solution.

Problem:

At the outset, a problem is pointed out, although it may transform and adapt as the project develops and further insights are gleaned from subsequent stages. Even new problems can come to the surface while investigating another problem. But in all these problems acts as a guiding principle for the entire project.

Analysis:

Throughout this stage, an array of thorough examinations Whitin the field of research is undertaken. These encompass analyzes of the macroclimate, contextual inquiries, user assessments, considerations of daylight, and evaluations of construction. Each examination has the potential to unveil a variety of solutions for the design.

Synthesis:

In the integration phase, various design iterations are generated based on the previously conducted examinations and relevant theories. These iterations and developments lead to the formulation of a potential design solution.

Evaluation:

In this phase, the potential design solution is assessed against design criteria. If the design aligns with the required standards. This involves testing prototypes, gathering feedback, and refining designs to identify the most promising solution.

Solution:

The concluding phase entails the presentation of the project's ultimate resolution. This is achieved through the utilization of diagrams, illustrations, renderings, 3D models, and calculations, all contributing to a comprehensive showcase of the design solution.

But Whitin all of these stages new "smaller problems" can be detected that resolute in new iterations and design ideas. But in all it must be remembered to reach a solution on activities (analysis, syntesis and evaluatuion) must be put together.

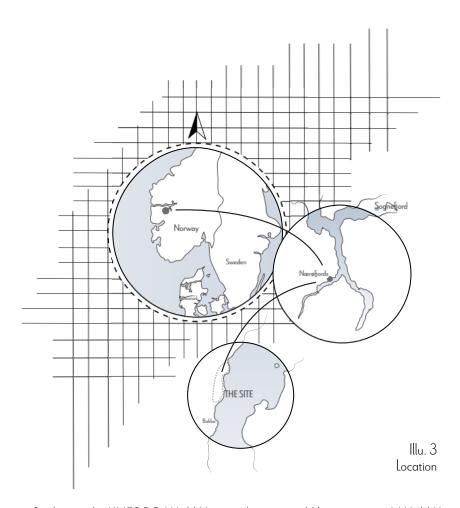




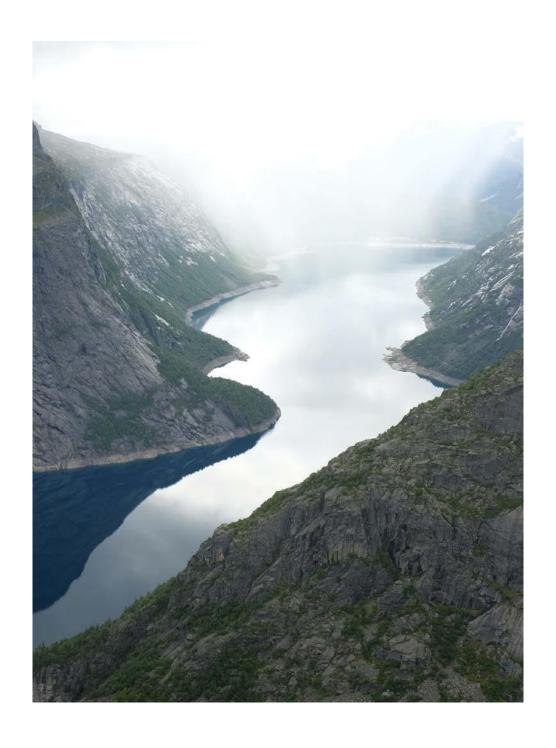
The site

Choice of site

The Scandinavian context, wild amazing nature, untouched landscape, and the new conditions to investigate in Norway, are the reasons for choosing one of the most incredible sites for our master thesis project. Nærøfjords is a fjord located in Aurland Municipality in Vestland county in Norway. Another personal reason we have toward this site is the very wide design opportunities we can make, as the terrain is very sloped. Unlike the flat terrain, which does not have these opportunities.



The nærøfjords is on the UNESCO World Heritage list as a world heritage site. A World Heritage Site is a landmark or area with legal protection by an international convention administered by the UNESCO. World Heritage Sites are designated by UNESCO for having cultural, historical, scientific or other forms of significance. (UNESCO,2024)



Identity

Nærøfjord

The Naeroyfjord is a 17-kilometer-long fjord in the Aurland Municipality of Vestland county, Norway. It is a branch of the larger Sognefjord, and is one of the narrowest fjords in the world, with a width of only 250 meters in some places. The fjord is surrounded by steep mountains that rise up to 1,800 meters above sea level. The mountains are covered in lush vegetation, including forests, waterfalls, and glaciers.

Villages

Along side the river banks of the Nærøyfjord, smaller villages are located for example Gudvangen, Styvi, Flåm and Dyrdal and closest to the site the small village Bakka. The name Bakka is derived from the Old Norse word bakki which means "(river) bank". The village, Bakka is only accessible by boat, adding to its secluded charm.



Waterfalls

Around the site several beautiful waterfalls are to be found, for example Kjelfossen Waterfall at Gudvangen and Tuftefossen Waterfall next to the Rimstigen trail just outside of Bakka. (add pictures)

Hiking trails

Further on hiking trails are to be found in the mountins and near the water, escepially the stegasteinm viewpoint is popular for its torurism. At the stegastein viewpoint one can experience the spectacular views of the fjord and mountins from its platform, located 650 meters above the water, designed by Todd Saunders and Tommie Wilhelmsen and was completed in 2006.



The flora

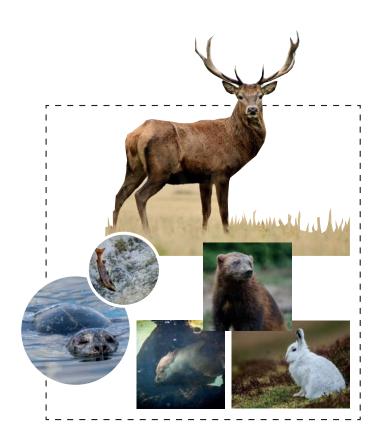
The plant life of the used area is defined by tall needle covered trees, berry bushes and flowers. This plant life is rich and colorful. The Nordic spruce is the most dominant along side the Scots pine, which both are not just sustainable timber souches but also a living insignia to the rich Nordic forest. Bilberry and juniper both displaying tiny blueish berries are also thriving in the undergrowth of the vestland forest. Furthermore, there are also fine flowers which add splashes of colors to the rocky terrain. Spotted around the nærøfjords are delicate flowers such as purple saxi fradge and the arctic star flower.



Illu. 5 The Flora

The fauna

A rich wildlife is also experienced around the nærøfjords. The majestic red deer can be seen grazing in the meadows where to their calls is a part of natures rhythm in Vestland. Smaller animals such as the mountain hare and the wolverine can be seen in nature. In the water there are otters which are playful swimmers, and seals which can be seen lounging around both in the water and nearby rocks. Norway is also known for its large shoals of salmon, where to their migrations enriches ecological system



Illu. 6 The fauna

Materiality

In the area the souroundings are imprinted by tall cliffs and cool rocks crafted by old glaciers. Old stones as gneiss and cranite can be found up there. Furthermore wood is a continues found imprinting the site.



Illu. 7 Materiality

Illu. 8

The build environment

Bakka Village is renowned for its well-preserved wooden buildings, showcasing traditional Norwegian architecture. These charming structures provide a glimpse into the region's rich history. In the village an old church is to be found. Moreover, the build environment is visible in form of historic hotels, railroads and the known ancient viking village that acts a the western gateway. Futhermore in terms of other structures is the Stagestein Viewpoint.



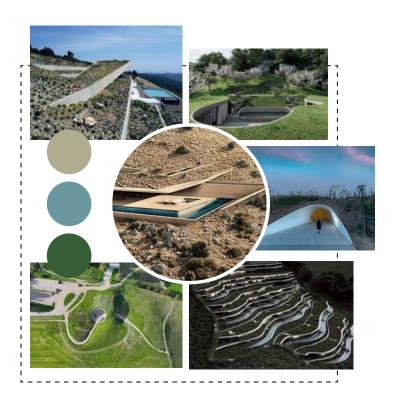
Moodboard

Undetectable architecture

The aim for the building is to be somehow undetectable in the terrain, where as to the architecture is somehow hidden in the surroundings. The goal for the retreat is to be invisible, and flattened and integrated with the terrain and the surrounding area. (see appendix -xx)

To investigate this purpose, a mood board of different projects has been made. Within this mooad board, different examples for how to flatten the building into the terrain is presented. For example, the building could be totally graved under the terrain, the building form and its main lines could be designed to follow the contour lines, or by the building materials so that it became united with the terrain.

But for us co create some kind of a landmark, the aim is to have some part of the building, for example the entrance or the internal stargazing platform being detectable. ...

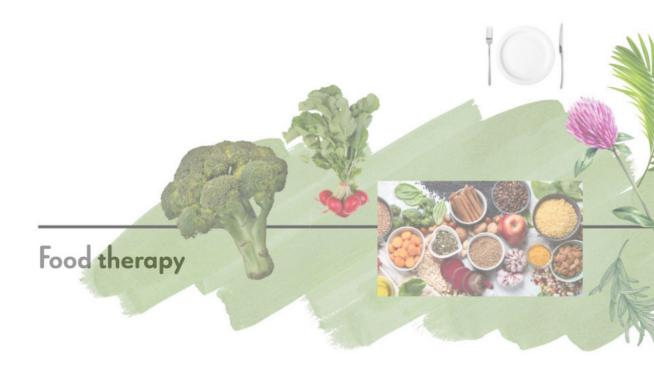


Illu. 9 Moodboard: Undetectable architecture

Therapy

How to integrate horticulture, Food and aroma Therapy

By weaving together elements of culinary artistry, therapeutic aromas, and flourishing horticulture, the retreat fosters a holistic sanctuary where nourishment for the body, mind, and soul intertwine, inviting inhabitants to embark on a journey of sensory elements. Here, amidst the nurturing environment, food becomes not just sustenance but a tool for communication and expression. Through thoughtful integration, the retreat offers a transformative space where each element serves as a vital component of holistic therapy, fostering growth, communication, and connection for children on their journey to linguistic empowerment.

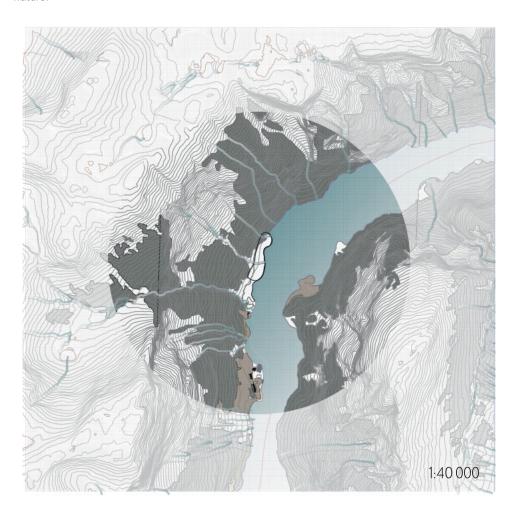




Ill. 10 Therapoy

Use of area

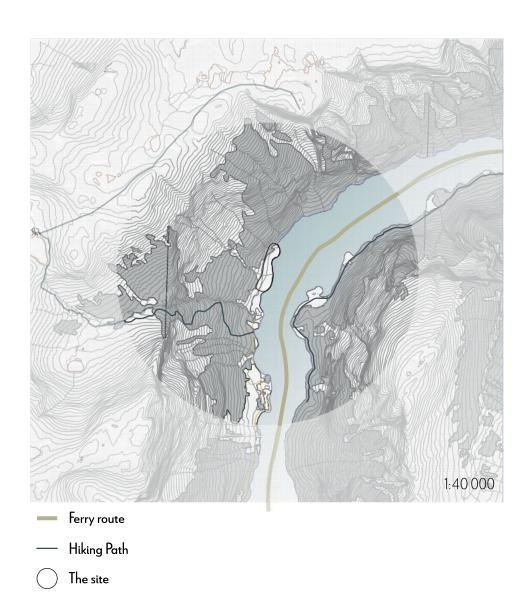
The map shows a small tourist village to the south of the site, and further on to the south there is a very small village, Called Bakka, where a few houses is located. The rest of the site is covered with protected nature.



- Forest
- Water
- Cultivated land
- Build area
- () The site

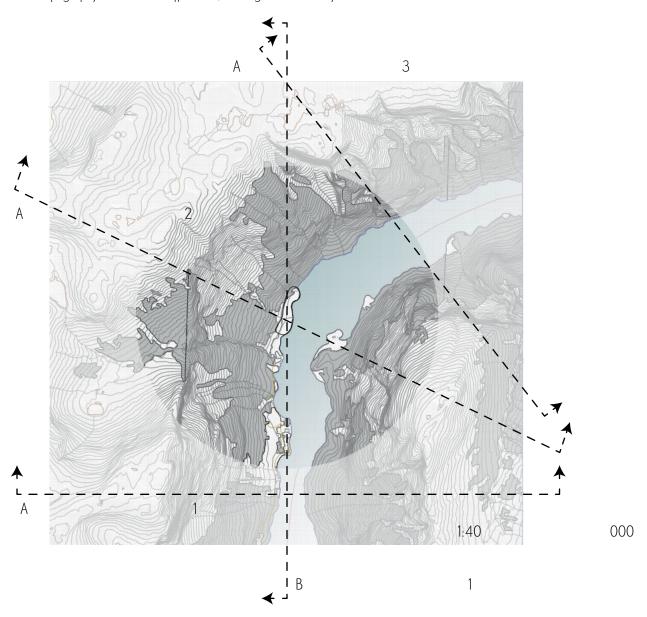
Flow

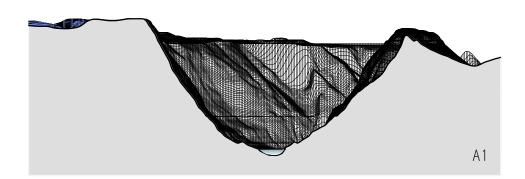
The site is only going to be accessible via a boat. Hiking is also a possibility in the surroundings of the site

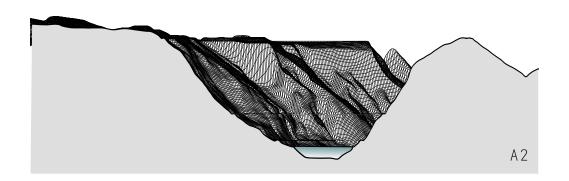


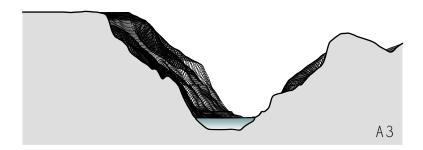
Topography

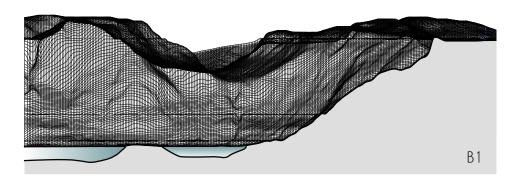
The site is located close to the Fjord, undermost some high mountains that reach 1400 m high. The topography cross the site differs a lot, which give the site a dynamic view.





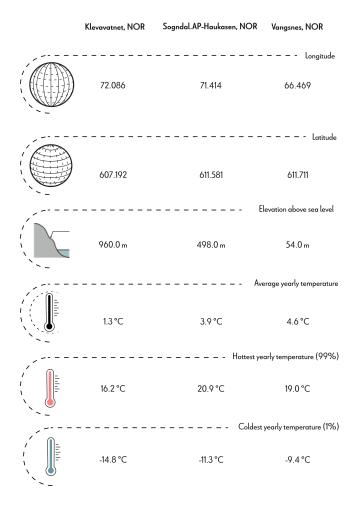


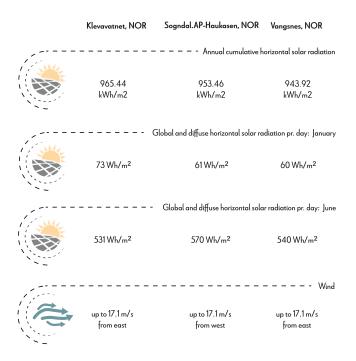




Microclimate

Due to the positioning of the longitude far north, the climate exhibits distinct characteristics. During winter, sunlight is limited to only a few hours per day, resulting in decreased solar radiation available for utilization at the site, whereas wind is more present for utilization.





In conclusion, the proposed architectural design must harmoniously integrate with the resolute hilly terrain and the surrounding mountainous landscape. The rural and dominant nature of the site, characterized by its lack of prominent nearby typologies, necessitates an approach that both respects and incorporates these unique environmental features. The design should draw inspiration from the present materiality to inform the building facades, ensuring a seamless blend with the natural surroundings. To preserve the integrity of this rare, undisturbed environment and respect its flora and fauna, the architecture must strive to be undetectable, minimizing visual and physical disruption. Furthermore, the design must embrace the microclimate, aiming for an off-grid solution that leverages from natural forces for sustainable energy production. By working with the existing conditions rather than against them, the architecture can achieve a symbiotic relationship with the environment, promoting environmental sustainability.





The usergroup

Children with late language development

Even though language delays are quite common, it affects more than first assumed.... according to the University of Michigan Health System, delayed speech or language development affects 5 to 10 percent of preschool-aged children. (Healthline, 2016) A language delay can be either receptive, expressive, or a combination of both. A receptive language deficit happens when your child has difficulty understanding language. An expressive language disorder happens when your child has difficulty communicating verbally. (Healthline, 2016)

Common symtomps

- Not babbling by the age of 15 months
- Not talking by the age of 2 years
- Inability to speak in short sentences by the age of 3 years
- Difficulty following directions
- Poor pronunclation or articulation
- Difficulty putting words together in a sentence
- Leaving words out of a sentence

Childen having problems with reaching the normal milestones and developing speech and language can be caused by hearing loss, oral impairment such as a short frenulum, and or other brain related problems that causes troubles coordination the lips, tounge and jaw. Perhabs causes by being born premature. (Hartnett, 2022) Other more social factors can unfornunatly also be the cause for children to develop language later on: these are/can be:

- Large family
- Parents-diconect
- Low parental education
- Family history of diorders



Illu. 11 Usergroup

Effect of Tegnology

Smart media

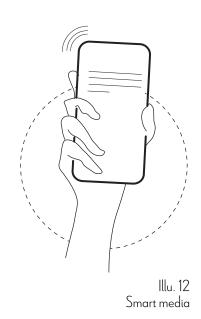
I this modern (digital) age speech delay may have a connection to electronic devices or so called "smart media". As there is a increase in smart media usage among children, concerns have been raised about its potential impact on various aspects of child development. One particular concern is speech delay, given the importance of early language acquisition for cognitive, social, and educational growth. understand the relationship between speech delay and smart media usage in children.

Extended exposure to electronic media in children has been found to be overall negatively associated with expressive vocabulary and language skills. Conversely, more educational apps and shared media engagement with parents were correlated with stronger language skills. But introducing smart devices later in development, specifically at 24 months of age and older, has been linked to a positive language development. In contrast, early introduction was associated with speech delay. Nevertheless, it is recommended by the American Academy of Pediatrics (AAP) that the used screen time is of less than 1-2 hours per day for children under two years of age.

While there is some evidence linking excessive smart media exposure to speech delay in children, the exact nature of this association is complex and not entirely understood. But Children who use smart media devices may perhabs be less inclined to participate in activities that promote speech development, such as conversing with their parents and siblings. parental use of smart devices is also linked to weaker vocabulary and reduced lexical skills in their children, because it might cause interruption of interactions between parents and their child/children. Prolonged screen time therefor might have a

negative imprach on the childrens communication skills as well as social skills later on. Language development is namely a key stage in early childhood cognitive, social, and further emotional growth. The the intricate process may as mentioned vary but in all Early positive experiences, like responsive interactions and varied language exposure, build strong language abilities. (shorten)

Children are in overall effected negatively by the usage of different electronical devices as it contributes to less time with the rest of the family, but whit a more controlled approach to smart media, that engage both parents and their children and using it for educational purposes there can be some benefits to deveopling language skills. This can in a smart and innovative manner be included in the designed of the retreat. The retreat must also cater to promote more interactions between the involved parties, children parents and families inbetween.



Interview

Hilda Sønerstrud: Professor in....

To further enrich the understanding of this usergroup, reaching out to professional about this subject of matter has been done. The interview delves into the subject of how architecture can be created to meet the needs and preferences of the usergroup: children with LDD and stuttering. The physical space, is as mentioned important for a good treatment to evolve. Recognizing the difference between working with children aged 6 and over versus younger, and the implications this has for our design considerations and therapeutic approach. Needed for the retreat is spaces that caters to both individual and group-based session with a professional.

Keen to understand the time frame required for effective intervention, inspiration has been seeking out to similar session for this program to be successful. The timespan of a week, working with each age group at a time has been selected to determinate the size of several aspect thought out the design process. Expertise given to us has also given an insight into how parents and children with LDD and stuttering interact. Therefor a space for educational purposes for the parents only is also needed.

Additionally, knowledge about what different educational facilities and areas that promote independent growth, insights from this interview has given the design an more suitable and precise direction. (See appendix x) Architectural elements and sensory experiences that have been shown to improve communication skills and engagement among children facing these challenges, leans more so on drawing benefits of incorporating nature, outdoor activities and multi-sensory experiences. This is only being confirmed by The expert Hilda Sønderstrud. In the quest to design a retreat that truly resonates with its occupants, the importance of mood and

atmosphere has even more so sparkled interest in what is suitable. Whether it's promoting a sense of comfort and relaxation or sparking curiosity and learning, the focus is to a design that fosters growth and development. Finally, other unconventional elements such as food, horticulture and aromatherapy play in enhancing therapeutic outcomes. Each usergroup much be taken into consideration, so having facilities of a spacious character provided for the staff creates further social interactions between the colleagues in the retreat. Additionally, can elements as mirrors or one sided windows be used for students or interns to observe the children for educational purposes.

The focus of this interview, has only drawn more attention to the multisensory experience for such a treatment required in this retreat. Therefor an investigation has been carried out to learn more about with spaces can be created out from the focus of having kinesthetic, auditory, visual and tactile element as a part of the treatment managed in the building.

Treatment

The typical course of treatment often entails speech and language therapy, overseen by a licensed speech-language pathologist who conducts an assessment to identify the specific challenges your child is encountering. This evaluation serves as a foundation for devising and implementing a tailored treatment plan. In cases where underlying health conditions are present, additional treatments may be recommended by a medical professional. (Healtline, 2016)

Studies have been carried out to investigate the architectural approaches aimed at facilitating

Spacial Experience

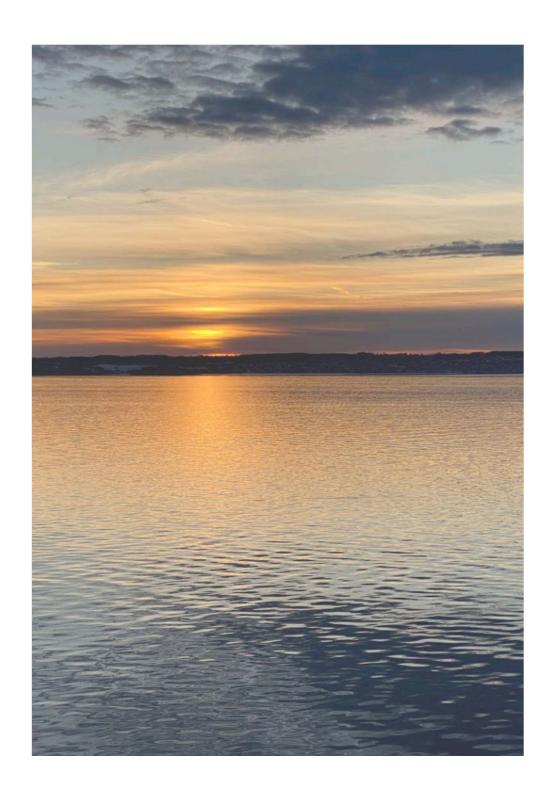
interactive spatial experiences forchildren, fostering a sense of positive energy that contributes to their healing process. in other words Architecture thus holds potential for promoting sustainable childhood development.

Historically, spatial experience has been a central consideration in architectural design, with ancient architects deliberating over the atmospheric qualities of spaces to align with their intended functions.

One example of such architectural design is the creation of meditation zones, intended to help children alleviate fears and worries. These spaces utilize natural materials like wood flooring and clay walls, along with organic screens for soft lighting, fostering a spiritual connection with nature in a gradual and gentle manner. Through strategically positioned openings in these screens, children within the meditation zones can gaze upon the calming surface of nearby ponds. (case study??)

In contrast, the active therapy zones serve as the primary treatment areas, accommodating various therapeutic sensory system such as art therapy, family therapy, and group therapy. Each of these spaces is designed to create a certain atmosphere that helps with therapy.

Designing spaces conducive to the recovery and healing of children with late language development necessitates characteristics that are both enjoyable and stimulating, fostering an environment conducive to therapeutic engagement



Multisensory methods

Another aspect of treatment that can be incorporated also, is multisensory learning, which involves engaging multiple senses to enhance learning outcomes. Multisensory stimulation refers to the simultaneous activation of two or more sensory receptors, such as visual, auditory, kinesthetic, and tactile inputs, VAKT (visual, audible, kinetic, and tactile stimuli), which converge in the brain for efficient perception and integration of information. This approach can play a significant role in facilitating the acquisition of new skills, including literacy and language development.

Research namely suggests that in early childhood, the sensory systems are particularly receptive to multisensory experiences, presents an opportune time for leveraging such methods to bolster literacy and language skills. Active learning, which encourages children to connect new information with existing memory through multisensory experiences, has been shown to be more effective than passive memorization techniques.

By having multisensory integration which occurs rapidly in the brain, is essential for efficient perception of the environment. Multisensory instruction methods, characterized by systematic, sequential, explicit, and direct instruction utilizing various sensory stimuli, are instrumental in promoting early literacy skill acquisition.

Catering to the multisensory aspect of VAKT is therefor important, when considering the usergroup. The VAKT system intriques for how this can be done, suggestions for how The VAKT system can be incorporated is as follows:

The kinesthetic Zone:

The kinesthetic zone focuses on movement and bodily interaction. It involves creating spaces that encourage physical activity, exploration and interaction. It can be done with the inclusion of open spaces for example dance or gymnastics, and the use of stairs or ramps.

The auditory zone:

This zone focuses on the sound experience in the room. It involves music and elements generating sound. This may include the use of soundproofing to minimize noise pollution, such as acoustic materials to improve sound quality.

The visual Zone:

Focusing on visual experience involves creating visual conditions that promote clear and pleasant visual communication and perception of space. This can be done with the presense of a projector showcasing different interesting light shows, it may also include the use of lighting to highlight architectural details or create mood. Choice of colors and materials to create visual contrast and variety may also be of importance when designing for the eyes.

The tactile Zone:

This zone focuses on the tactile experience in the room involving perhabs creating physical surfaces and materials that invite touch and sensory interaction. This can include the use of textures and patterns in materials such as wood, stone or fabric, and designing tactile elements for children to interact with.

Further elements to create a multisensory experience both indoor and outdoor, can be:

Indoor:



Activity in the form of a **Joungle gym**



Sound





Auditorium to chowcase the childrens development



Small spaces to give more attention to each child

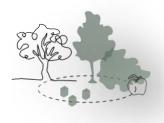


Up-high windows to avoid distractions

Outdoor:



 ${\sf Playground}$



Garden

Illu. 13 Multisensory

The secodary usergroup

The effect on the parrents

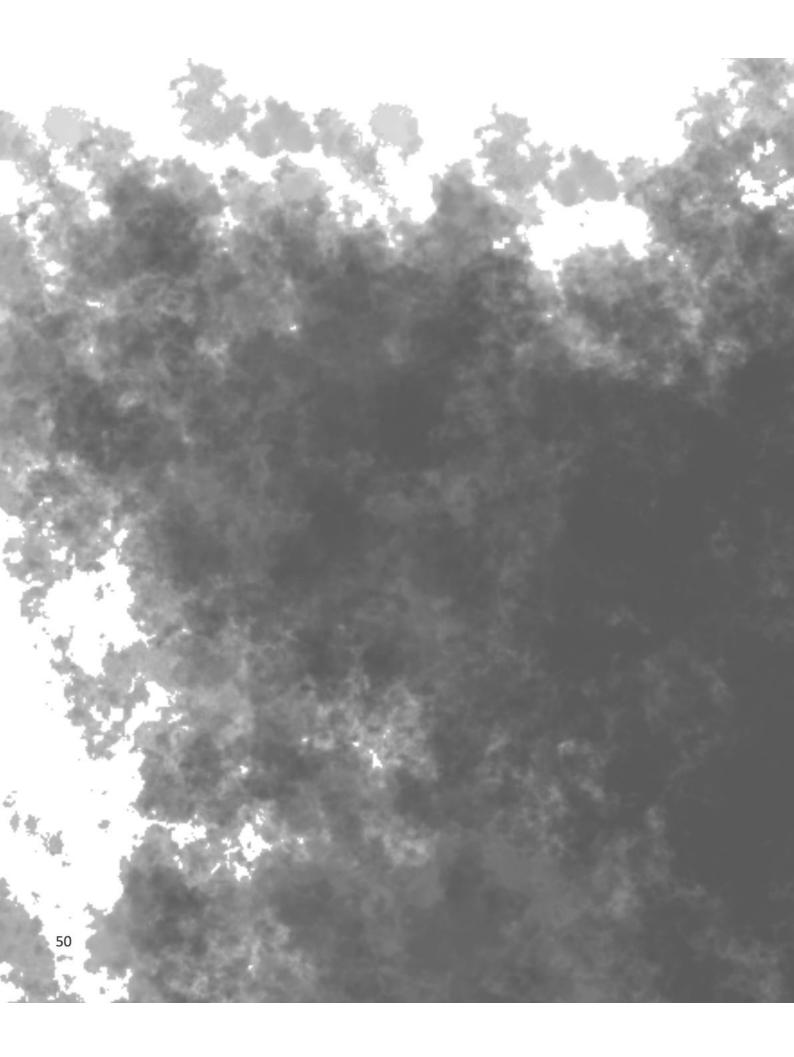
The main user group are the children who face late language development and stuttering in tge age group and 2-13 years old. But as advised their must be a separation when treated (HILDA), so the suggestin is for the retreat to cater to children at the age of 2-6 years in one period and the children from the age og 6-13 in another period. Suggesting treatment for children during one week can improve the challenges they are facing.

The secondary user group is the main defined user group parents. The parents are going to be a part of the retreat as well as children in this user group might relay a big deal on their parents. The parents.....

The tertiary user group is the employees at the retreat. The employed therapists aim to provide effective treatment in the form of therapy and ensure a good experience, while the other employees, such as receptionists, chefs and janitors, aim to ensure the operational maintenance of the building.

Cconclusion

In conclusion, addressing the issue of late language development and stuttering in children within the context of the modern digital age necessitates a multifaceted approach, as early language acquisition is critical for cognitive, social, and educational growth, making it essential to understand the relationship between smart media usage and speech delays in children. Insights from an interview with Hilda Sønderstrud, a professor specializing in child development also underscore the importance of the of tailored therapy for children. One effective approach is the use of multisensory treatment techniques, such as the VAKT (Visual, Auditory, Kinesthetic, Tactile) system, which engages multiple senses to enhance learning and language development, which can be done with a variety of different architectural elements. Architectural features could include areas or a treatment zone designed for multisensory activities, incorporating elements that stimulate visual, auditory, kinesthetic, and tactile experiences. Additionally, spaces for social interaction and play would be essential, promoting communication and language use in a natural setting. Integrating these insights into an architectural retreat has the potential to create an environment conducive to addressing speech delays in children. Such a retreat would prioritize natural, technology-free spaces that encourage direct human interaction and engagement with the natural world.



Theory 04 51

What is a Retreat?

As mentioned in the framework, a retreat must be build, for the competition "Hidden Garden Escape". The term "retreat" refers to a space within the facility that offers a sense of privacy and relaxation for the residents while still being part of a community. It is also a space where, visitors can benefit from areas where they can withdraw from the everyday life and in a way offers for a new perspective on it. Retreats provide an opportunity for restoration, transformation and personal development. Most retreats have a theme, as well as a series of presentations or activities to help you interact with each other and engage with the theme. (Peerspace, 2020)

The benefits of going to a retreat...

Going to a retreat must offer a multitude of benefits for the children as well as their parents. A retreat usually offers benefits in terms of personal growth, relaxation, and overall well being. Retreats provide an ideal environment for self-reflection and introspection, offering a unique opportunity to deepen ones self-awareness and foster personal growth. This retreat must through diffent activity zones/spaces provide a safe space for such positive developments. The change in scenery, combined with exposure to different teachings and experiences, opens our minds to new ideas and possibilities.

The children must whitin this retreat be able to develop their communication skills wheather they suffer from late language development or stuttering. The parent must also benefit from this retreat getting educated in how to help their children and get an overall wider understanding of the issue. While retreats often focus on

individual growth, the retreat must also create opportunities for building connections and fostering a sense of community. Retreats gather like-minded individuals who are on a similar journey or/and face similar issues regarding their child late language development.

The Benefits of Going on a Retreat: Transforming Your Well-being - Wellness Tour Center This retreat "The Hidden Garden Escape" must so within the location, nature, architectural elements and overall atmosphere provide comfort and uplifting environment for Children with late language development and their parents. As they come here to learn cominications skills spaces must be created to uplift these activities. The children as well as their parent must whitin this environment feel the emphasis there is on being at a retreat. The retreat must cater to the humans but also the environment and here creates a symbiosis.

What is a Kitchen garden?

The typical vegetable garden is a small garden designed for food production and harvesting of herbs. One may picture row after row of corn, dozens of tomato plants, and probably associate it with a lot of work. But a kitchen garden can consist of just one or a few beds with just the crops you want. The small kitchen garden aims to provide food but can also be used for discovering and relaxation. (Gardenary, 2024) The kitchen garden that is presented in this design is somewhat larger and should probably be referred to more as a "grove" as it consists of a wide assortment in that it must be self-sufficient and consists of several rows of different vegtables and additionally fruit trees.

In terms of defining the size of the self-sufficient garden, calculations have been made out of what an average person + child consume in a year. (see appendix) The total area for the kitchen garden should be around 1800 square meters.



Ill. 14 Moodboad: Kitchen garden

Off-grid architecture

Energy in its various forms is essential for all human activities. Having access to energy, particularly electricity, is closely linked to human development. Throughout history, global per capita energy consumption has consistently increased. Access to electricity plays a significant role in determining per person energy consumption. There are two main approaches to providing electricity access: on-grid and off-grid.

On-grid electrification involves supplying electricity through a connection to a large centralized grid. In many countries, this grid is known as the "national grid." Extending the grid to rural areas often requires building infrastructure like power lines, transformers, and substations. In urban areas, connecting to the grid only require simpel infrastructure upgrades.

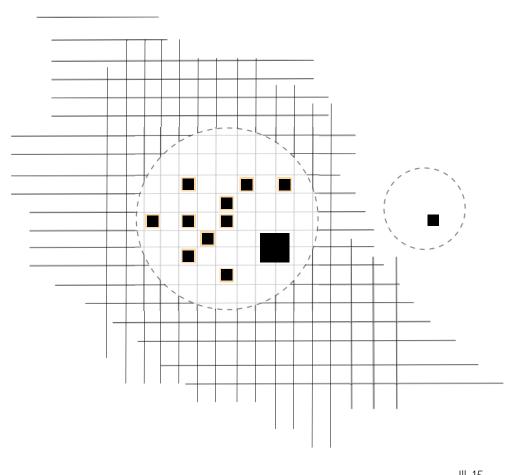
Off-grid electricity access can be achieved through various means. The terminology used can be flexible, and characteristics may not always be clearly defined. Off-grid electrification is typically associated with rural areas, as connecting remote and sparsely populated areas to the grid is often economically challenging, even in developed countries. Offgrid electricity can be provided through methods such as diesel generators or solar-powered systems, with various design options available, such as DC/AC systems. There is yet to be a universally accepted set of terminology when describing offgrid systems. For example, there is no precise boundary between mini-grids and micro-grids. Under this category hybrid-grids are also important to mention. Hybrid systems are off-grid systems that uses two or more types of energy conversion technologies to preduce electricity, it can be both conventional power generation and reneable power generation.

Nowadays, there's a wide array of renewable energy sources (RES) available, including sunlight, water, wind, and biomass. However, the most prevalent technology utilized in buildings and remote regions is solar photovoltaic (PV). These systems can be categorized into three types. Monocrystalline solar cells, polycrystalline solar cells and thin-foil solar cell also called amorphous solar cells. Amorphous solar cells distinguish as they are more translucent and more flexible in terms of assembly compared to the others that are in the form of individual panels. In terms of efficiency, they don't perform as well as the panels, but they work more efficiently in terms of shade or grey weather. So suitable to this location in Norway in a temperate climate these are the one to go with. Aesteticly they can also be considered to be more undetectable. (Solcellerpriser.dk, 2020)

Nowadays, there's a wide array of renewable energy sources (RES) available, including sunlight, water, wind, and biomass. However, the most prevalent technology utilized in buildings and remote regions is solar photovoltaic (PV). These systems can be categorized into three types.

Batteries

Batteries play a crucial role in storing energy, enabling its utilization for example on cloudy days and during the night. This function is essential as it serves as a "buffer", ensuring reliable power supply for off-grid systems during periods when for example solar energy is not accessible. There are various types of batteries suitable for solar systems, with the most common types being as follows: Lead acid, Lithium and Nickel cadmium. Unfortunatly, All of these rise a concern for the



environment in some way do to their content of acids and heavy metals. There is not yet any proper and manageable way to dispose of these. Escpecially the lead acid betteri is a problem.

But yet there are some advantegous for using these batteris for off-grid systems. Lead-acid batteries enable the generation of more current within a shorter operating time compared to other batteries. The cost of delivering electricity to the consumer is lower with lead-acid batteries Lead-acid batteries contribute to reduced fuel consumption, which is particularly important for limiting health problems in rural areas.

In between there is a solar charger/load controller that serves as a bridge between the solar PV modules and the batteries. Its primary roles include regulating the rate of battery charging and discharging. Furthermore it is preventing overcharging or overdischarging of the batteries.

Selecting an appropriate storage solution for off-grid systems lacking access to the national electricity grid is critically important, particularly when depending on unpredictable energy sources like PV panels.

The Personal Wellbeing of Off-Grid Dwellers:

Living 'off-grid' typically refers to being disconnected from the national electricity grid, gas supply and water supply. Off-grid homes often rely on sustainable food sources and renewable energy. Examples of off-grid lifestyles range from single households to smaller communities. Living off-grid often involves a lifestyle with less reliance on modern technology,

medicine and mass-produced goods. However, architecturally this simply means using renewable energy on site, without necessarily requiring a specific lifestyle.

Being of-grid have both its benefits and challenges. But, being of-grid in the terms of also taking some distance to the modern technologies and being more in touch with nature, have a powerful impact on peoples well-being and the local environment plays a particularly crucial role in our physical and mental health, social and community life, and in relation to this project worh mentioning is it that it also effects the development of children. Social bonds are also important, and being in nature can encourage people to engage in social interaction when outdoors.

There is not a direct link between off-grid living and well-being, but the independent approach can potentially contribute to better health. However, the physical environment also affects one's well-being. Being remote, which is often associated with off-grid living, can have a significant impact on well-being, aware of this still being very much subjective.

Cconclusion

In conclusion, retreating to an off-grid lifestyle, which typically involves disconnecting from national electricity, gas, and water supplies, offers numerous benefits that extend to various aspects of well-being, encompassing both mental and physical health. The environment plays a significant role in well-being, and living off-grid and distancing oneself from modern technologies while being more in touch with nature can very much have a potentially profoundly impact well-being. Social bonds, which are important for well-being, can be strengthened through increased social interaction when people engage in outdoor activities. Additionally, the inclusion of a kitchen garden in an off-grid lifestyle brings numerous benefits. Growing ones own food enhances self-sufficiency and ensures a fresh, nutritious supply of product. Engaging in gardening can also have therapeutic effects, reducing stress and improving mental health. Although its impact can be subjective, the combination of a sustainable lifestyle, closer connection to nature, and a supportive community can contribute to the overall benefits by going to a retreat. Therefor potential of being off-grid must be promonante in the design, along side exposing the kitchen garden to set the mood. Morover, the theme of the retreat must be sublime showcased throughout the overall architectural expression.

Cases 05

Casestudy

The Bill Fisch Forest Stewardship and Education Center

Location : Ontarion, Canada

Architects: DIALOG Area: 362 m² Year: 2016

The Bill Fisch Forest Stewardship and Education Center (BFFSEC) stands as an integral component of one of the world's most successful forest regeneration projects. The building has been developed to educate residents of York Region and the wider community about the significance of natural resources and forest ecosystems, and with this focus it makes sense that the Bill Fisch Forest Stewardship and Education Center is built on previously developed land surrounded by an approximately 100-yearold forest. This forest thus supports the site's ecological education client in both a direct and demonstrative way - The site's space is designed precisely to support interaction, collaboration and learning in natural outdoor surroundings. For further connection between the exterior and interior, an outdoor classroom has been built, which has been planted with a completely natural palette of plant materials. These species complement and enhance the surrounding forest landscape. Grading and stormwater management promote natural infiltration and minimize soil erosion, mimicking the natural state of the site. An integration that creates a fluid transition. This case therefore supports spaces and environments that summon people while exemplifying performance and environmental sensitivity. The center is located in an area abundant with local resources, including water. The natural aquifers on site are capable of providing ample water supply for the facility, by being connected to two wells, one existing and one new, to meet the demand for potable water. Additionally, non-potable water is sourced from on-site groundwater and rainwater collected on the building's roof, which is directed into an underground cistern. This collected water is used for plumbing purposes inside the building. The project is actually described as 'net-positive water' meaning All water used within the building is returned to nature, either as clean as or cleaner than it was initially. Rainwater, greywater, and blackwater from plumbing is sent to a biofiltration device and eventually infiltrated back into soils on site. The Bill Fisch Forest Stewardship and Education Building is designed to function as a net positive energy building - generating more clean energy on the project site than is used in a year under design conditions. And achieving Net Positive requires ultra-high levels of energy efficiency inside the building and renewable energy systems that are efficiently dimensioned, designed and commissioned on site. Most rooms in the building are equipped with an air source heat pump for heating when the outside temperature is above the unit's minimum operating temperature; cooling for this room is also provided by the unit's split system. The building's cooling is relying on strategically placed operable windows to maintain occupant comfort. Furthermore, fossil solar cells are used on site, either on the building or on the ground around the building. Lighting is controlled so that the focus is on lighting during the night hours. What also helps to achieve net zero energy are the various high-performance building components in the building: roofs and walls, windows and floors.

Casestudy University childcare center

Location : Burnaby, British Columbia, Canada Architects : Hughes Condon Marler Architects

Area: 550 m2 Year: 2012

The University Childcare Center is designed to accommodate 50 children aged 3 to 5, but what makes this case remarkable is that it has achieved Water Petal certification through a series of systems designed to capture water on site. In addition, excess water is infiltrated on site. Similarly, black water and gray water are treated on site, and the treated waste water is infiltrated on site.

WATER COLLECTION

All collected rainwater from the main building is stored in an underground rainwater tank. This tank then supplies water for toilet flushing and washing machine use. However, water supplied for drinking purposes comes from a municipal water supply system, as there are legal requirements to comply with.

BLACK WATER TREATMENT

Once all the water received from the underground tank is used, all building sanitary drains lead to a custom treatment system that complies with local wastewater treatment standards. As part of this system, all sanitary drainage flows into an underground bioreactor tank in a safe and proper manner. The black water treatment method used is known as Upflow Sludge Blanket Filtration (USBF®), a specific self-regulating wastewater treatment process.

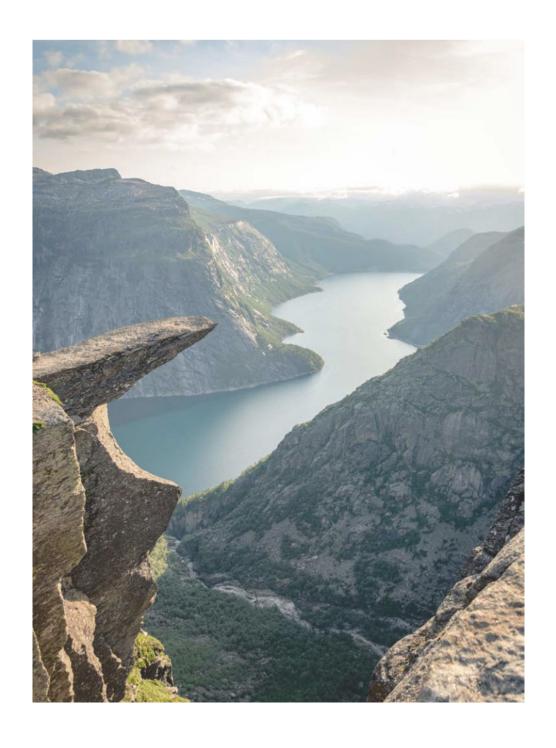


Vision

This project envisions the creation of a retreat with a supportive and promotive atmosphere where the visitors can retract themselves from their daily routines. The primary goal is to cultivate an environment conductive to supporting children's language development through an immersive multisensory experience. The retreat is therefore envisioned to offer a stimulating and engaging atmosphere, guiding visitors on a journey as they navigate through its spaces. Further on, the aim is to explore and investigate an exemplary design approach to living off-grid, and as the project is located in such an amazing nature, the aim is to whit in this aspect to search for undetectable architecture. Also Emphasizing on sustainability and independence by being off-grid, the retreat will educate visitors on the benefits of a minimalistic lifestyle. Through this paradigm shift, the design seeks to redefine conventional notions of education and development, harnessing the transformative potential of sustainable living as a catalyst for personal and societal change. Looking ahead, the vision extends beyond the confines of the retreat itself. The aim is to aspire to a more sustainable and equitable future for generations to come.

Problemstatement

How can off-grid architecture be utilized to design an undetectable retreat that embraces families with children who have challenges with language and speech, throughout a multisensory experience?



Design Criteria

Architecture and off-grid principles

Goals set to be achieved within this project, are very broad and need to be broken down into more specific criteria in order to evaluate their implementation into the project. First, the aim is to implement architectural criteria mostly presented by the competition brief, Other criteria are generated from previous analyses, theories and cases, which cover the off-grid principles and the needs of the usergroup.

The overall design must include spaces and materials to promote a multisensory experiences.



Whitin a multisensory treatment zone the architecture must create a safe and promoting environment for children, to build up confidence to overcome their challanges.

Social activities must be implemented throughout the design to enhance the interaction between visitors.

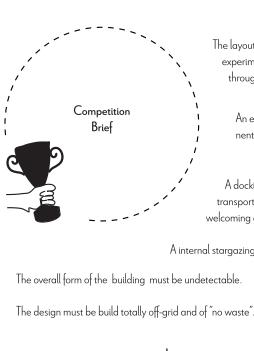
A hierarchy between private and public facilities must be determined for the visitors to be able to retract themselves .

The architecture must be respectfull to the sorrounding environemt an the identity if the site.

The placement of the building should be towards the entrance of the fjord to ensure a wider view.

The design must be resilient to the surrounding microclimate including sun, wind and precipitation.





The layout must provide and reflect the sense of α experimental journey for the visitors as they move through the building.

An external terrace for relaxation must be prominent in the design connecting to the surroundings.

A docking platform must be available for boat transportation and placed whitin a calm and welcoming area.

A internal stargazing platform, must be included into the design.

Relying on limited nourishment resources and consideration of "no waste" must within the architecture create encouragement to a minimalist lifestyle

A Totally off-grid system must be drawn to ensure self-sufficientcy.

Consideration must be made for sustainable and renewable technologies.

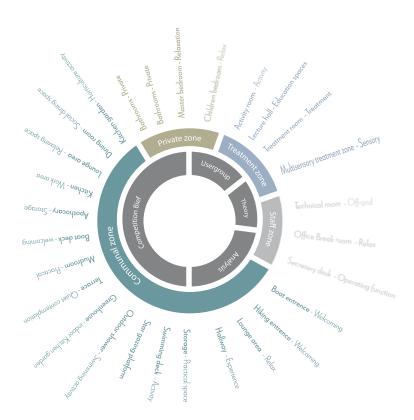
Encorangment to use off-grid principles whitin the multisensory treatment activities should be formed.



III. 16 Design criteria

Functions

In envisioning the creation of a functional space, careful consideration has been given to identifying essential functions integral to the design. This process involved thorough analysis of the project brief, theoretical frameworks, and most significantly, the needs of the user group. Each function contributes to an overall ambiance that delineates distinct zones within the space, facilitating the layout of various functions. The zones created include communal areas, treatment spaces, private quarters, and dedicated staff areas.



Ill. 17 Functions - Zones

Design Process 07

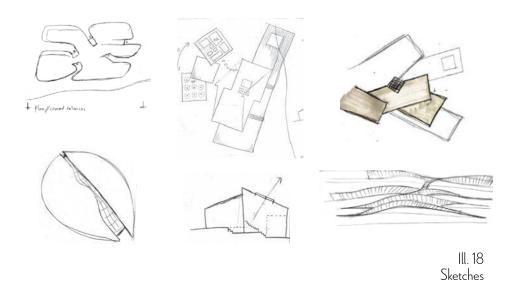
How to Design?

Decision making

Within architectural design, the overriding consideration lies in the harmonization of various factors: In this project, as mentioned, the goal is to create an exciting and interesting experience for the user group, within the architecture being undetectable and sustainable by being off-grid. The needs and preferences of the user group, the need to create a seamless aesthetic to ensure a sense of understated elegance, and the commitment to sustainability by being off-grid, thereby promoting environments that not only meet functional requirements, but also nurture ecological balance in generations to come. However, it is imperative to recognize the nuanced interplay between these factors and recognize that prioritizing one in certain contexts may necessitate compromises in another. Therefore, while the ideal architectural endeavor strives to balance all of this, it is often dictated that not all of these factors can be equally present in every architectural manifestation. For clarification, descriptions are given to showcase the weight of each aspect in each design iteration.

Initiative sketches

This early design phase is marked by iterative rounds of sketching associated with collaborative feedback, with each iteration acting as a stepping stone towards new refinements. Sketches in hand has therefore also been formed to test out more initiative and more intuitive ideas, that also resonate with the previous analysis. When entering a competition Understanding the task, and how the required functions can be formed around thesthe purpose of creating a HIDDEN GARDEN ESCAPE, and to form a suitable atmosphere between the build and the context.

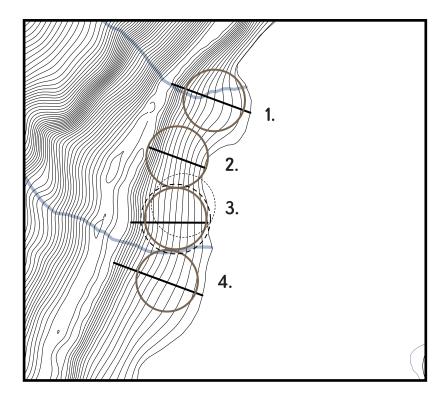


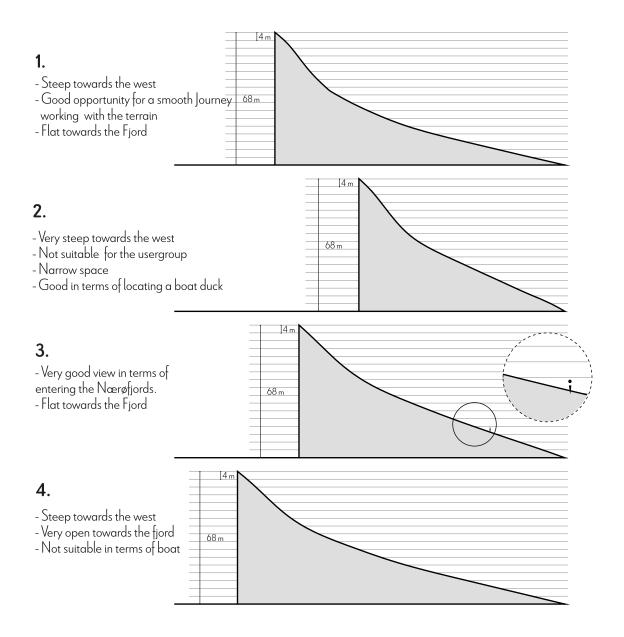
Armed with insights collected from analysis the sketches and various proposals remain adaptive and responsive, reshaping the architectural narrative to align with changing needs and aspirations throughout the design process. For this phase the aesthetics have still very much been of a weighing factor.

Where to build?

Choice of exact site

Working with such a large site for a more suttle retreat, an exact building area must be chosen. For this the terrain has been investigated. The terrain can play a crutial role for the form of the building, and when integrateing the building into the terrain a smooth surfave to work with is perhabs to prefer. For an more exact location view towards the building, orientation towards the kitchen garden and the placement of the boating docvk has also been debtalble when choosing the exact building area.

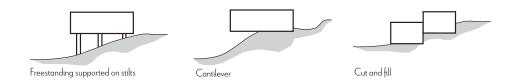




How to build?

Choice of construction

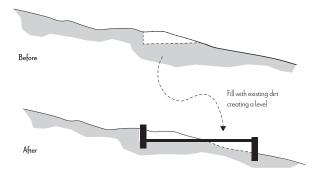
Designing buildings on hilly or sloping terrain involves special considerations to ensure structural safety and harmony with the environment. To do so effective design strategies include integrating the building with the landscape by for example using cantililever, split levels, and stilt structures.



For further understand these principles in relation to the specific site, design studies have been conducted to showcase the opportunities to create undetectable architecture whitin these principles

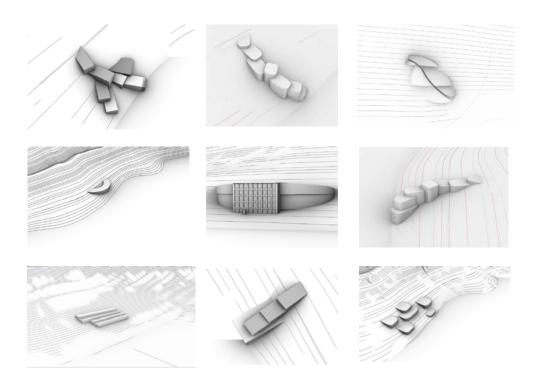


The least distributive to the terrain is the stilt structure, which creates a volume that is not undetectable. The principle with the cantilever creates a similar detectable structure. Both of them can be formed in a compact manner, but they are more exposed to outdoor conditions compared to the cut and fill. Cutting and filling into the terrain, to fit the building on several levels creates a building that follows the slope, so it becomes the most undetectable. From this this study the conclusion is to reach undetectable architecture and somehow hidden from the backdrop of the mountain, as stated in the competition brief, the cut and fill strategy is the approach to go with. Explained below is the principle of cutt and fill.



The overall shape

When further embarking on the journey of architectural design, we are confronted with the central task of defining the spatial volume that will encapsulate our aspirations and demands. Foremost the goal is to sculpt a volume or shape that not only meets functional requirements, but also resonates harmoniously with its surroundings. As the explorations into the realm of form begins, an investigation has been made through a spectrum that moves between the rigidity of cubic forms and more curved based sahpes. Te study has been caried out to see which form creates and Integrated volume vs. contradicting the terrains. These explorations are guided by an innate desire to strike a balance between functional efficiency and aesthetic appeal. Moreover, all these forms are created to get a further understanding af the brief.



Energy consumption

Initial building volumes

When going a step further an iteration of some different overall volumes was tested out in terms of energy concumption in the Excel tool: MontAverage. This program does calculations based of ventilation, internal heat loads and building caracteristics such as for example walls, orientation, vindows, and heat capacity. The heat capacity is set to 80 as the aim is to build a medium light building construction and other parameters are set to be equal as well for example all of these have a net area of 800 m2. These volumes are demonstrating simplified volumes that are taking the view towards the fjord into consideration.

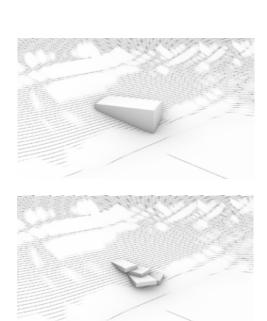
The volumes that are being tested out are seen below. (se illu x).

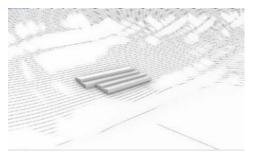
Building 1: 33,1 kWh/m2/yr. Building 2: 38,6 kWh/m2/yr. Building 3: 33,5 kWh/m2/yr.

The energy consumption of the different building iterations is compared to identify trends and patterns. For example, Building 3.1, with adjustments to its facade orientation and integration with the terrain, shows a decrease in energy consumption compared to the original Building 3.

For further investigation on how walls digged into the terrain effect the energy consumption of the building an further iteration of building #3 was made. This building has the same overall shape but has mainly only one facade: The facade towards the east, where as the other ones are almost fully covered by the ground.

Building 3,1: 30,5 kWh/m2/yr.







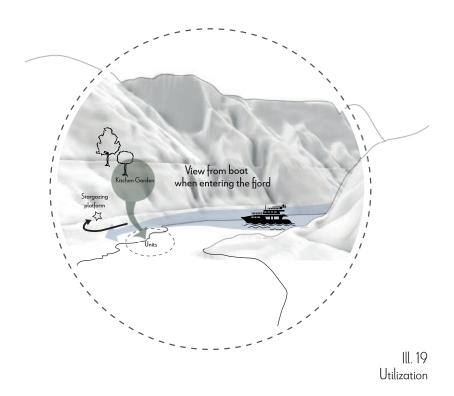
Even though the four stripes are not as compact but when utilizing the terrain it sums up to almost the same. Using one big compact volume and push it back to the terrain as done with the four strips is maybe not the best possible turn to make as it will cause other challenges is term daylight and natual ventilation. This further iteration showcased that having building towards the backwall of the mountin only is more beneficial.

The findings (mentioned above) from the comparisons are used to establish optimization principles for future designs of the overall form and placement within the typography. For instance, it is noted that having buildings primarily towards the back wall of the mountain is more beneficial in terms of energy consumption. However, it should be noted that the approach to these results is quite primitive and just an oversimplification. Furthermore, it is also acknowledged that this configuration may pose challenges in terms of daylight and natural ventilation.

Utilization

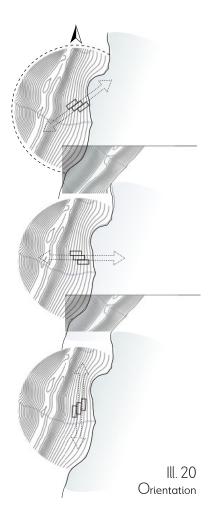
Thing to utelize from the sourronding landscape

Working with such an amazing nature sourronding the site, inclusion of this must be incorporated. Expecially the entrance to the fjord has become the view driver to the design. Both the views experienced when entering the fjord via boat and the view from the site towards the water. The colors from nature, such as blue, white, grey and green can also be considered in a way, so the building becomes an integration to the mountains. So things to especially utilize from the site is the rich natual colors and the view that is created towards the site when entering the fjord.



Orientation

In the architectural creation, a building's orientation in relation to the surrounding landscape plays a central element that dictates not only functional efficiency, but also affects flow, connections to the surroundings and the view. Deciding on the orientation of the building volume it requires an in-depth exploration of the terrain. (p, x) However, this are also connected with the desire to harmonize built form with natural context and potentials on site, which is to get the sun to the south and in this case also the view created towards the site when you sail into the fjord.



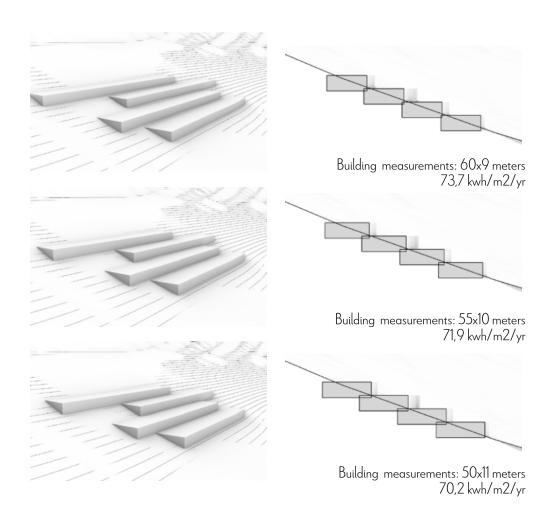
- Open towards the view
- Half crossing the terrain
- Seperated volumes
- Detectable
- Half open towards the view
- Crossing the terrain
- Seperated volumes
- Detectable
- Open towards the view
- Intragrated with the terrain
- United volumes
- Undetectable

Guided by the contours of the terrain, the work continues with an orientation that creates a volume that follows these contours. This can be a useable catalyst to creating undetectable architecture on a sloped hillside.

Be18

Energy consumption

This involves balancing energy efficiency with other factors such as daylighting, natural ventilation, and overall architectural aesthetics. Our findings about having a compact volume form being beneficial to the building's energy consumption let to the testing out of the different dimensions building 3,1 could pose as. Similar to the previous testing, tree types of shapes or "ribbons" are tested out in the Danish program; BE18.



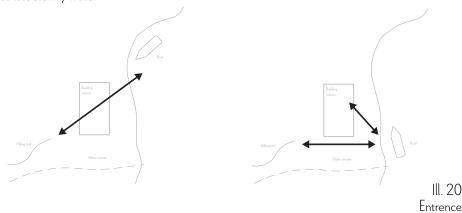
Initially, three almost similar volumes are sketched, each differing in length and width, facilitating a comparative analysis of their compactness and subsequent impact on energy usage. Through the utilization of BE18, calculations are performed to assess the anticipated energy consumption for each design variation. It becomes evident that the longer and narrower form exhibits a less favorable compactness, leading to higher energy consumption compared to the shorter and wider alternative. The importance of understanding how the shape and compactness of building volumes affect energy consumption, knowing the shorter and wider form emerges as more compact and thus more energy-efficient is an important factor in further dessicion making.

By systematically testing and comparing different design variations, it is possible to make informed decisions to better create more sustainable and energy-efficient architectural volumes. Recognizing the significant influence of shape and compactness on a building's energy efficiency this is used into further design evaluations and sketching rounds. As further aspects needs to be considered further on in creating a well functioning retreat for children with late language development.

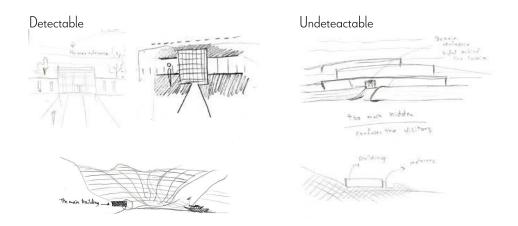
The entrance

Welcoming the visitors

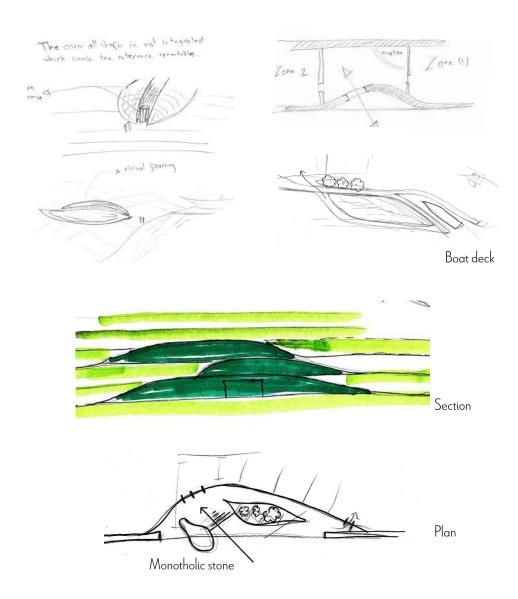
The entrance as well as the boat deck is the welcoming part of the total design. In designing an entrance, the process starts with a thorough site and flow analysis to identify potential entry points. The boat deck is to be considered as a part of the urban planning as the site is only accessible by boat. And wise about the flow towards the hiking trail a connection between these must be formed, and to ensure that the building becomes a part of the created flow easy access must be made through the building. Further reasoning for the urban layout is that having the boat located within a small bay creates less stormy water.



For a detectable entrance, the usage of visual cues, welcoming elements, and distinctive materials can be used to draw attention to this part of the building, but for a more hidden entrance the shape must be blending in seamlessly with the environment, to correlate with the theme of a HIDDEN GARDEN ASCAPE. Furtheron usage of subtle indicators, integrated materials and elements are ways to create a more subtle entrance.

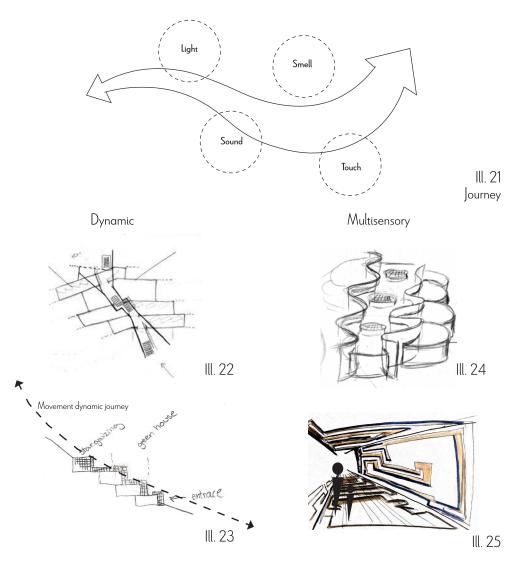


When detailing this entrance thoughts have circulated around creating a hidden entrance yet with some detectable elements to indicate the entry to the building. Therefor patterns of shapes has been detected from the surrounding to create a sublime entrance that somehow melts into the building.

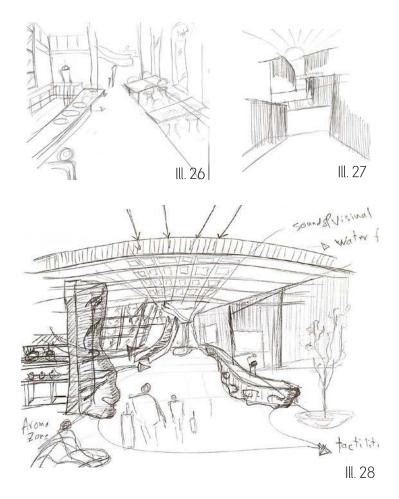


The journey

The journey is continuing inside and must be sensory in nature, correlating with the therapeutic principles employed within the building. This study envestigate on how to incorporate the multisensory aspect into this part of the building. The multisensory experience of this journey can happen through the use of different shapes and elevations. Furthermore, smell from the food in the kitchen and harvested herb, shapes and surfaces that cast light and sound around in the space to create curiosity for the users as they move along this pathway. The Journey must be laid on in both ways both horizontally and vertically, so the journey is happening through the building up the mountain, so a wholesome



experience is created encompassing the entire building. This must be done in a dynamic manner. The vision for creating a both dynamic and therapeutic multisensory journey through a building involves interesting pathways that guide users through varied spatial experiences, incorporating interactive elements, dynamic lighting, and acoustics to maintain engagement. This holistic approach harmonizes all sensory inputs, creating a functional, accessible, and captivating environment that fully engages visitors on every level.



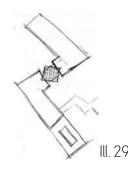
This study show through sketches how multisensory element, such as touch, movement, smell and sound can be incorporated into flow areas. These elements determinate the hallway to make it an journey full of experiences. Focusing on the terrain as well, this main hallway must include dynamic flow as well.

The stargazing platform

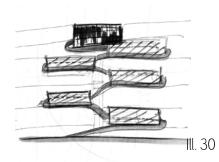
An aweamazing experience

Designing around a stargazing platform can be done in a literal manner where the building has this element as a centralized function in the middle of the building. Having an internal stargazing platform gives the visitors a place for meditation and looking at the skies at night in a sheltered way. This gives them the opportunity to get more relaxed as the rest of the building is very active. However, after extensive sketches and discussions, several arguments emerged favoring an alternative approach: where the stargazing platform is more hidden and placed towards the back of the building. In this way the stargazing platform becomes more of a significant element of the journey through the building. Compared to having the stargazing in the middle, where the space is more disturbed, the space become more suitable for meditation having it at the back. Having a detectable stargazing platform draws just the right attention to the exsistence of the building.

Stagazing platform in the center

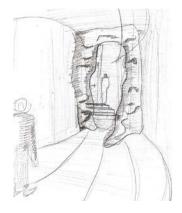


Stagazing platform at the back



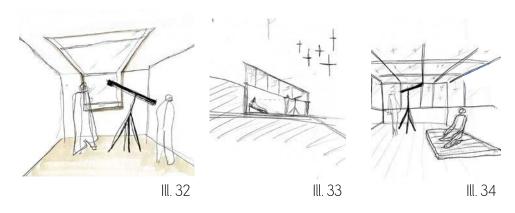
Having the stargazing element be at the outer corner of the design also gives the opportunity to create a stargazing platform that has it own volume, so the space only needs heating when in use, enhancing the buildings off-grid efficiency.

The entrance up towards the stargazing platform must be somehow hidden to create curiosity, natual stone elements can be emplementet.

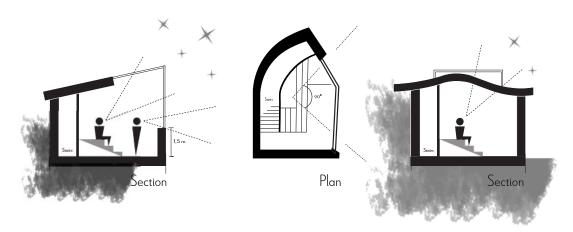


III. 31

When embarking on site the stargazing platform becomes a little detectable at the far back, a distrinquish form that only enhances the visitor's curiosity for taking part in such an awe aspiring activity: Looking at the stars and Northen lights. This can be through a large window roof, or smaller framed glass areas where to one can look out at the stars. Encapsulating the sky, gives more attention to the observed which is the focus here. Furthermore, functionalities such as seating can be implemented in different ways. Having seating raised above each other generates maximize viewing opportunities within a compact space.



The stargazing platform becomes with this back placement and entrence an endeavor to investigate, but has changed its form to be more undetectable, by for example lowering the roof. The stargazing with its secluded location has its own shape. The shape and space are inspired by a jouney happening inside the building. There to curves emerged. Futheron the glass roof of the stargazing platform has undestrubted view towards the sky as there is a viewport from the seating with a 90 degree open angle, but in terms of understanding the volume this became to detectable. Therefor a only skylight



Zones

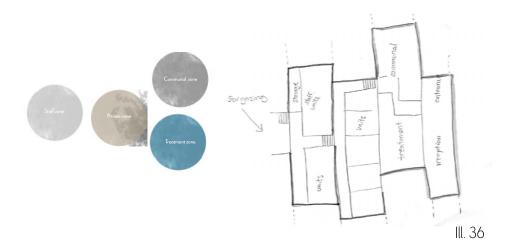
Zoning of the building

In architectural design, zoning plays a central role in orchestrating the flow and functionality of a building, ensuring that each space is purposefully allocated and connected. Clear zoning promotes effective communication by providing intuitive navigation and demarcation of spaces, making it easy for users to understand and navigate the built environment, even if a maze-like journey is the theme of the retreat. Zoning promotes spatial hierarchy and organization while maintaining a sense of coherence and order. First and foremost, the focus has been on creating a divide between the public and private zone in order to ensure comfort for the visitors.

For a building directly facing the view towards the fjord, the zones can be laid out like a string of perals, with a zone division that creates hieachy as you walk more and more in to the building having the public zones placed near the entrance and the most private at the back, for this configuration a lot of disturbtion may be present as you have to wealk through a zone to get to another.



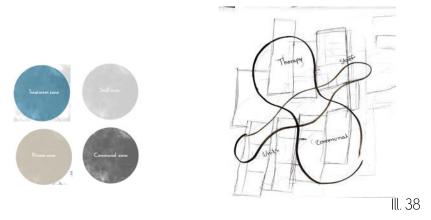
Creating a more flatten out zone division where the treatment zone and communal space becomes of same priority still does not better the flow.



The journey can also be used as a devider having the more public zones towards the north and private zones towards the south. Thus this layout has staff and visitors units beside each other the hieachy becomes very present between public and private becomes very present.



Having a similar configuration with the treatment more to the back, creates good work flow, creates more hierarchy between the private units and the staff area, ensuring comfort and privacy for the visitors.



So to cater to hierarchy, flow, view and privacy this last configuration has been worked with still catering to division between public and private.

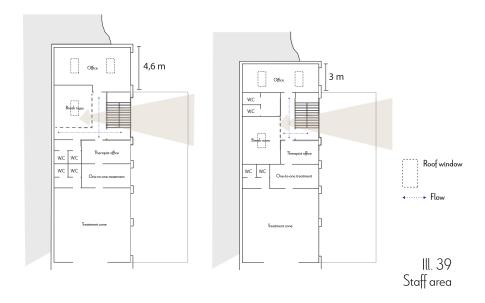
Workspace

The staff zone

Designing a retreat for treatment requires help from authorized personal and other occupational positions. This tertiary user group, comprising staff members, must be considered with regard to creating a pleasant and efficient work environment. This group consist of:

- Therapist
- laniter/cleaner
- Gartner
- Cheff
- Secretary

For this space to function all needed ameneties much be whin near location to each other. This includes offices, tequical rooms, working rooms such an landry room and storage. Furtheron, a breakroom is provided for the staff, allowing them to enjoy lunch and take breaks in a secluded space, free from disturbances. This space is configured to ensure adequate natural light and work lighting, optimizing comfort while maintaining minimal energy consumption. The breakroom, along with other staff areas, is designed to create a balance between efficiency and comfort, supporting the well-being of the staff while adhering to the retreat's off-grid principles.



Minimizing the overall space and walking paths within the staff zone contributes to reduced energy consumption for heating and cooling. By designing a smaller, more efficient staff zone, the retreat can effectively lower its energy demands. Not having corridoes minimize the space, and as there is only staff member per session working with the children not walking though the office will be a problem.

The staff zone in all is strategically located near the entrance to facilitate the welcoming of parents and children to the retreat. This placement ensures that staff can provide immediate assistance and support upon arrival. Additionally, offices are provided within this zone, enabling staff to perform their administrative and treatment-related duties efficiently. Each office is designed to maintain a balance between privacy and accessibility, enhancing the staff's ability to focus on their work while managing the building's operations and offering treatment.

Individual units are also available for staff to retreat to during their off-hours. These units are designed with minimalistic principles to support the off-grid nature of the retreat, focusing on minimizing energy demands. The compact design of these units not only reduces the energy required for heating and cooling but also supports the overall sustainability goals of the retreat.

The units

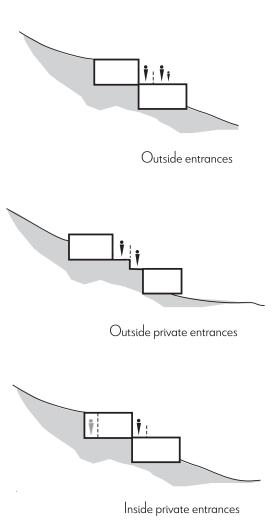
The personal spaces

Designing the more private and more secluded functions of the building are the units. Here the family, meaning the parent or parents with their child are to retract themselves. The primary aim for these units is to create functional spaces that cater to the basic needs of sleeping arrangements for both the child and the parent(s), along with essential amenities for a comfortable stay. Moreover, it is imperative to design a calming and soothing environment that harmonizes with the overall exterior volume of the building. Reflecting on this aspect reveals an intriguing challenge in balancing privacy with minimal disruption from other occupants.

From an architectural standpoint, the concept of entering the units from outside suggests the possibility of scattered units. However, this approach conflicts with the goal of maintaining a compact volume, which is crucial for energy efficiency. Additionally, placing entrances along the volume's facade, especially when integrated into the terrain, results in the windows of these units becoming part of the pathway, thereby compromising privacy and the intended tranquility.

To address these concerns, an alternative design solution involves creating pathways where facades or terraces are covered. This requires adequate space between the cut and fill volumes, leading to a more cohesive overall shape with facades oriented towards the outdoors alongside interior staircases. However, this approach is less desirable due to the potential negative impact on privacy and exterior views.

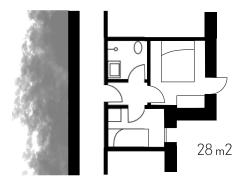
An optimized design involves positioning entrances within the building volume itself. While this creates some dead space, placing entryways on the opposite facade of the windows and terraces the enhancement of privacy by reducing external disturbances and preserving unobstructed views is of a more weighing factor as this is the indication of the private zone. This design strategy ensures that upon entering, the units provide a more secluded experience along side utilizing the roof.



For the programming of each unit several layouts have been tested out to get an efficient, effortless and respectful flow throughout the space. Layouts that all included a private entrance to enhance the indication of the private space that it is, a bathroom, bedroom for both the child and the parent/parents, a small kitchenette and a private outdoor terrace for quit contemplation. The space must be of a compact manner just as the overall volume, in terms of being off-grid, but also be of a smaller character because the focus throughout the visitors stay is the treatment for the children with late language development and stuttering and their parents. A sublime effort is therefore to be made to encourage the visitors to spend more time within the more public spaces fostering social interactions.



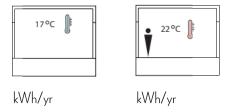
To further encouragement of social interactions to promote language development within other spaces of the building, the size of the units is designed in an even mot minimalistic manner to support an offgrid lifestyle. Initially, these units included a lounge area and kitchenette, but the design evolved to focus solely on separate sleeping areas, a bathroom, and an entrance. This layout ensures that the width of the volume aligns with the terrain while prioritizing natural light and views towards the water.



The units

Optamizing the personal spaces

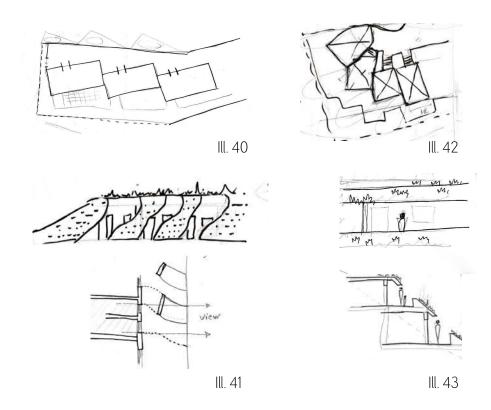
Nudging the occupants towards one preferred area over another, effect The energy demand which can be reduced op to 35 % as the need for heating is less when the units are not occupied. (See Appendix x). Even though there are some potential draw backs to this, the main focus is to create a solution that is both beneficial to the energy consumption and the social aspects of what is the strategy for this retreat. Looking at this principles even though that with the intermittent heating the preheating time is being increases to more than double that of continuous heating, which of corse is a negative factor it does not effect the energy demand that much. (ResearchGate, Study on the heating modes in the hot summer and cold ... 2023)



Nonetheless having this intermittent heating principal compared to constant heating is the most profitable, still aware of the fact that it might move the problem to another zone. When adding this principal to the units the overall energy consumption is improved, but the numbers can not be translated directly to the overall calculation to the entire building, but having this knowledge only benefits the aspect of being energy efficient.

Minimizing the units

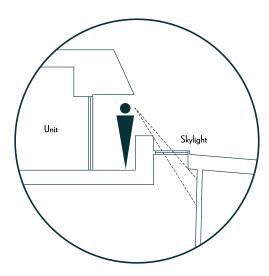
The placement of the units in relation to each other plays a crucial role in fostering social interaction between parents and children. Centralizing the units around each other can encourage family members to spend more time together outside their individual family units, as these communal spaces are intuitively laid out to promote interaction. Consequently, the placement of the entrances to the units has been carefully considered to balance user privacy and energy efficiency.



Conversely, a more decentralized placement of the units, adhering to uniform "ribbons" shapes, offers an alternative design approach. This configuration emphasizes privacy and individualized space, aligning with the desire for more secluded living arrangements. Decentralization can also contribute to distinct visual and spatial experiences, potentially enhancing the sense of personal retreat within each unit. Moreover, such a layout may yield unique energy efficiency benefits by allowing for localized heating and cooling solutions tailored to each unit's specific needs. For the bigger units the design has centered around four "ribbons", but minimizing the size gives the opputunity to make the overall volume even more compact, by creating only three "ribbons" still maintaining the concept.

Detailing

For quiet contemplation whit in this HIDDEN GARDEN ESCAPE The units include a small terrace. The terrace is designed as a part of the unit by having a small niche for relaxation. Focusing on privacy to ensure well-being, security, and overall quality of life, the terrace is to be whit in no disturbance from others. This is secured by railing and an overhang covered by vegetation. By merging the railing and overhang in to the buildings fifth facade: The roof is upholding the aim to be undetectable, only have small openings in front of the units.



Ill. 44 Detail: Terraces

Detailing this has been a process in itself, through expected as when designing under the problem-solution methodology, there are new problems to be solves whitin larger problem solutions stages. As there is a need for skylight at the back of the building this interfere with the terrace. Moving the "ribbon" with the units back requires another build structure, so the terraces must be placed on top of the roof. To make room for both design elements. To achieve a smooth transition across different sections of the building, the roof is designed with a continuous slope. This design choice harmonizes the structural form and aesthetic flow, ensuring that the building's silhouette remains cohesive.

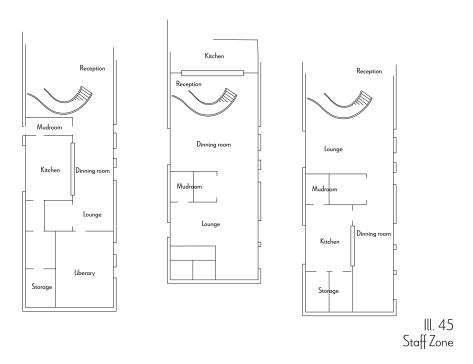
The roof, designated near the private zone, is covered with sedum plants, where no walking is advice, to create a tranquil and secluded outdoor space. This green roof not only enhances the aesthetic quality but also contributes to the building's sustainability by improving insulation and reducing rainwater runoff. There for the Kitchen garden is only placed on the first "ribbon". This "ribbon" over the communal zone and the private staff zone are demonstrating how an additional journey can be experience outside as the Kitchen garden exstends further on around the building.

The communal zone

The public spaces

The communal space is the place where the visitors can gather to eat, relax and enjoy some free time apart for the treatment. Therefor the location of it is apart from the therapy zone. Nudging the occupants towards the communal areas have affected this space in a way that it became larger. Further on, detailing the larger parts of the building, the communal zones have been meticulously crafted to cater to the diverse needs of all user segments.

Configurating of this space has been done through several iterations first creating a large dining room towards the view to cater to an drawing experience while culinary food is enjoyed. But having no lounge area within the private units have forced the design to redefine the space. Creating a larger lounge area, with spaces for reading, play and relaxation has been defined in a way where view towards both the greenhouse and waterfront are utilized, giving the communal space a sublime connection to the outdoors. An iteration where the kitchen is closer to the staff zone has also been investigated, but overruled by the fact that the kitchen location must be within near proximity to the greenhouse or Kitchen garden to collect food. Having the practical parts, such as storage and toilet towards the back drop have also determined the space in all iterations.

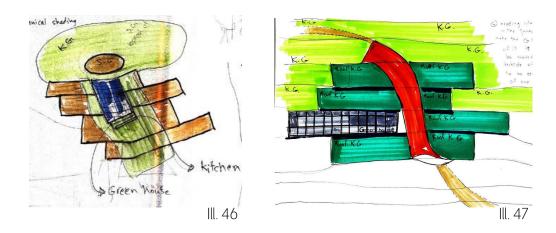


In essence, the communal space must stand as an active zone yet with place for contemplation and with a direct access from the communal zone to the terrace, extending as an open invitation to immerse and connect with the outdoors it becomes a tranquil external retreat for contemplation and rejuvenation.

The Kitchen garden

Self sustainable garden

Implementing food, aroma and horticulture therapy ideas on how to integrate the kitchen garden started circulating. Placement of this large area circulated around how to create a smooth transition from the inside towards this space, therefor iterations on having the kitchen garden towards the south, to also utilize the sparce sun as this is very much needed when growing plants, where investigated. Futher adaptation towards the inside programming is to place the kitchen garden near the communal zone wherein the kitchen lies.



Suggestions on designing around the kitchengarden has also been a topic, to where as view towards this can be drawn from almost every where inside the building, making in an including part of the journey. To even futher integrate the garden into the design having smaller part of the kitchen garden on the roof, where thought into the design. In this way the building becomes of green cover and the journey continues up on the roof.

Greenhouse

To make a smooth transition from the indoor to the outdoor kitchen garden a mediation zone is created: The greenhouse. The green house functions as an indoor kitchengarden where plants in need of covering can be plantet and harvested here. The size of the green house is around xx square meters (see appendix x) and has been drawn out as a integrate part of the building leading out to the kitchen garden. The challenges with the green house has been to work with the height differences and create a proper view to this green area so a connection to the nature is designed. For this flower beds are designed on different levels.

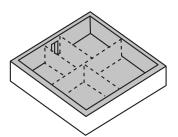
Therapy zone

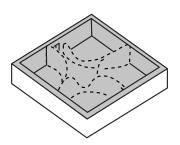
How to create a multisensory experience

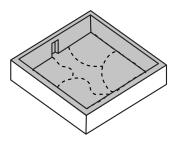
Having the therapy zone be of intricate matter in this retreat, this zone has been especially laid out to cater to the symbiotic relationship between the staff and the children under their care, therefore a close connection has been made trhout this floor, integrating the view to the green house all the way towards the staff zone creating hierarchy to also determine the educational activities that are laid out here. Furthermore this zone has been divided into the four zones; kinesthetic, auditory, visual and tactile witch in each manner include different activities such as a Sound/audio-video room, tactile elements, element encouraging movement and rooms with views. The zoning can be done in a literal manner where the therapy zone is divided by walls as barriers or i can be designed as an open space. But doing a sublime inbetween zoning can create the safe spaces for the indiviual child that there is the need still having an open area available for social interaction improving the childrens understanding. This creates a more relaxed mood whitin the space of education.

Overall, the therapeutic zone within this retreat is more than a physical space: It is a testament to the transformative power of architectural spaces and the mood that it creates, which can promote healing, growth, and resilience in children with unique therapeutic needs. By seamlessly integrating sensory experiences, educational activities, and natural elements, this zone serves as a beacon of hope and possibility, inspiring both staff and children to embark on a journey of self-discovery, empowerment, and holistic well-being.

This study list the effect of division but to set the mood more underlayed division is futher implemented into the design.







Ill. 48 Therapy zoning

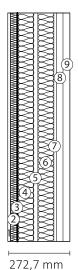
Passive strategies

Building envelope

Passive strategies in architecture are the design techniques that leverage natural environmental conditions to enhance the energy efficiency and comfort of buildings. These strategies focus on reducing reliance on mechanical systems such as heating, cooling, and artificial lighting, instead utilizing the building's design, orientation, materials, and surrounding environment. The included passive strategies in this design are:

- Improving the building evelope
- Compacting the volume
- Putting the volume in the terrain
- Daylight
- Natual ventilation

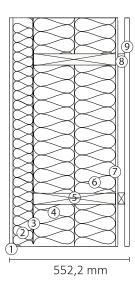
Ensuring better operation of the building, designing a good building envelope can have a great impact. For this an investigation has been made to construct proper, wall, roof and floors where to different insulation types have been analyzed. They have been analyzed in relation to a similar wall assembly. This method of trial has given the opportunity for more variety in the construction and leaves a more segmented design process rather than a continuous design process. The selection has been based out of the sustainable design criteria, focusing on the best possible u-value and thickness calculated on the website Ubakus for the constructions.



- 1. Gypsum board (12,5)
- 2. Aerogel with sprouce (30 mm)
- 3. Foil, PE (0,2 mm)
- 4. Aerogel (70 mm)
- 5. MDF (20 mm)
- 6. Aerogel (70 mm)
- 7. MDF (10 mm)
- 8. Rear ventilated airgab (30mm)
- 9. Wood cladding (30 mm)

The very interesting material called aerogel which consist of 99,8 % air, and low density makes it a great suggestion for thermal insulation. It is a nono pore silicone-based solid and its usual properties, include low thermal conductivity makes it possible to create light and thin walls assemplies compared to others. (Designboom. com, 2024) With this type of insulation material, very thin walls can be created to reach an appropriate u-value. An assembly of a wall with aerogel with a u-value at 1.0 is suggested. but for a more environmentally friendly bio-based insulation materials such as wood fiber and cellulose have been investigated.

Wood-fiber insulation and cellulose insulation are made from the same raw material. Cellulose is made out of newspaper, whereas wood fiber comes from softwood chips. Regarding wood fiber insulation, it can be performed as batches or as a blow-in insulation. (Use of wood - regjeringen.no. 2024) Wood fiber insulation, in contrast, is renewable, recyclable, safe to handle and nontoxic. Most importantly, because it sequesters carbon, with the potential to actually capture and store more carbon than is emitted in its production—wood fiber insulation can play a key role in improving building sustainability by reducing both operational carbon emissions and embodied carbon. Cellulose shares many of wood fiber's advantages, but due to declining demand for print media, its availability has become irregular. Moreover, wood and timber can be found locally.



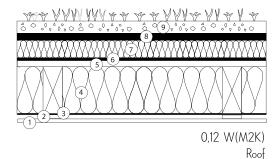
- 1. Gypsum board (12,5)
- 2. Woodfiber (90 mm)
- 3. Foil, PE (0,2 mm)
- 4. Wood fiber insulation with sprouce cc 60 (180 mm)
- 5. MDF (20 mm)
- 6. Woodfiber insulation with sprouce cc 60 (180 mm)
- 7. MDF (10 mm)
- 8. Rear ventilated airgab (30mm)
- 9. Wood cladding (30 mm)

Using wood fiber insulation in the walls leaves the design with a 52 centimeters thick wall for remarkable changes to bee seen within its energy consumption. Reaching for a u-value at 0.09 kwh/m2 lovers the need for heating compared to a wall with a u-value at 1.0.

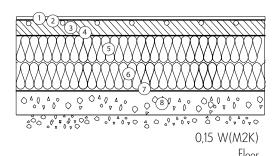
Passive strategies

Building envelope

Conducted are also assembly for the Roof and the floor. The roof has a basic assemblage of a green roof, as integrating the nature on to the building is an appeal. For a closed envelope a drainage matte is needed. Detailing will follow. Both the floor and roof are 418 mm in thickness.



- 1. Gypsum board (12,5)
- 2. Stationary air (24 mm)
- 3. Pro climate intello (0,25 mm)
- 4. Wood fiber insulation with sprouce cc 60 (200 mm)
- 6. Membrane (5 mm)
- 7. Polystyrene (XPS 035) (80 mm)
- 8. Matte for drainage (20mm)
- 9. Soil (Sedum roof) (30 mm)



- 1. Floring (10 mm)
- 2. Aluminium foil (0,2 mm)
- 3. Cement screed (60 mm)
- 4. Foil, PE (0,2 mm)
- 5. Woodfiber insulation (120 mm)
- 6. Woodfiber insulation (120 mm)
- 7. Water proofing membrane (5 mm)
- 7. Gravel (100 mm)

Conducted are also assembly for the Roof and the floor. The roof has a basic assemblage of a green roof, as integrating the nature on to the building is an appeal. For a closed envelope a drainage matte is needed. Detailing will follow.

Passive strategies

Natual Ventilation

Ventilation is needed in building to ensure a good indoor climate in terms of good air quality. For the building to use less energy the building is relaying on natural ventilation, with the purpose to provide indoor conditions conducive to occupant health along with low energy use. Natural ventilation is the most simple form of ventilation, where as the natural forces are wind and buoyancy. There are generally tree different types of natural ventilation: Single-sided -, cross - and stack ventilation. There principles are as are showcased below.







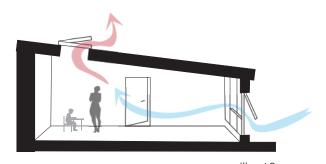
Single-sided ventilation

Cross ventilation

Stack ventilation

With a building with mainly one facade single-sided ventilation is tested out to simplify the design, but for single-sided ventilation to be effective, the room depth should not be more than about 2 times the floor to ceiling height. For facades with double openings, ventilation is effective to a depth about 2,5 times the floor to ceiling height. The ceiling height in this design is 2,5 meters, and with a room deeper than 6,25 meters having single sided ventilation is not effective enough.

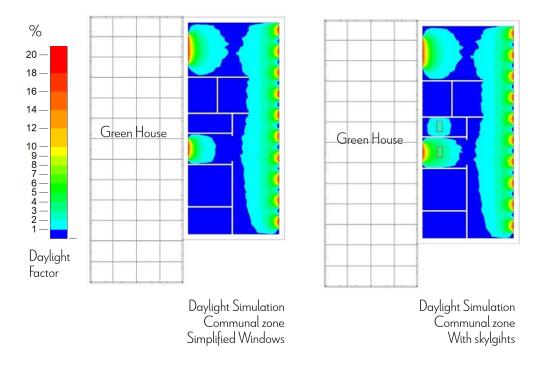
There by investigating the possibility of stack ventilation as cross ventilation is not an option. The stack effect requires window openings in the ceiling for buoyancy to work. Buoyancy ventilation means that warm indoor air rises upwards in the flue ducts, thus removing air from the building space. Moreover the stack outlets provides light into the building. The effect of the ventilation is the building is illustrated in section:



Illu. 49 Treatment zone Natual ventilation

Passive strategies Daylight

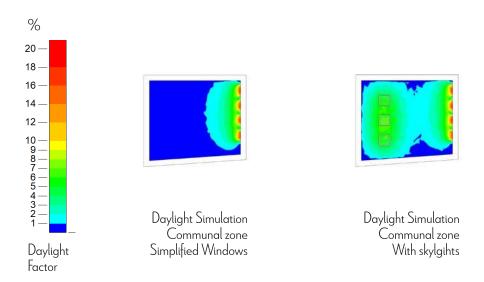
Daylight in architecture is a multifaceted and critical aspect that influences various dimensions of the design, such as aesthetics, and functionality. It is especially important because of its profound impact on human health and well-being. The daylight can set the mood. The daylight must very much be considered where there is a working space as it effects productivity. Placing the windows that provide light into the building has carefully been considered also thinking about the expression of the façade design. To not make the expression of the building to detectable big glass facades are to be avoided and also to not overheat the rooms inside. But still whitin the aim to reduce the need for artificial heating, to save energy. Further on especially in the multisensory treatment zone the aim is to create comfortable visual environment for the children, to cater to the VAKT sprinciples.



The first simulations conducted, seen above, are the communal zone with simplified windows in the facade towards the east. The light from east is especially present in the morning but the diffuse light can be utilized throughout the day. The simulations are made precise to the climate on site. This indicate that there is too little light inside the building, especially to the back as more than 50 % is needed. Optimizing this is done with having skylights in this area. The skylight provides natural light minimizing the need for artificial light optimizing the energy needed in the building.

Passive strategies Daylight

In the treatment zone, where the depth of the room also presents challenges for natural lighting, the integration of skylights is a strategic design decision. Adding skylights significantly improves the quality and quantity of daylight within this space, creating a brighter, more welcoming environment conducive to the work that is happening with children. This approach not only enhances the visual and psychological comfort of the space but as mentioned also aligns with sustainable design principles by reducing the need for artificial lighting during daylight hours.

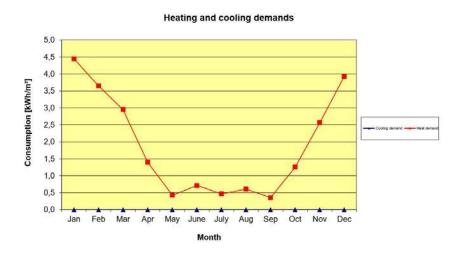




Passive strategies

MonthAverage Excel

Continuing with the energy consumption in the Excel tool: MontAverage, the detailed building is calculated for. Changes made are the dimensions in terms of cross area, because of the concept with only tree "ribbons". Ventilation and heat capacity are equal to as before, whereas the internal Heat loads are different as the area has changed. Compacting the design in terms of off-grid has only improved the results as cooling is no longer needed.



Energy consumption for heating pr. m² floor area Energy consumption for cooling pr. m² floor area 22,8 kWh/m² yr 0,0 kWh/m² yr

Total energy consumption pr m² floor area

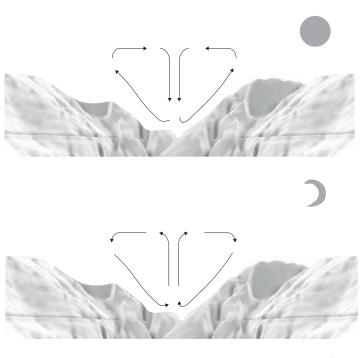
 $22.8 \, \text{kWh/m}^2 \, \text{yr}$

These calculations guided the project to a more specific window area, going from having 50% windows in the facade to 30%. Lowering the energy demand for the building. Futheron Improving the U-values as mentioned created the right envelope. Further on lowering the height of the building from 3,5 meter to 3 meters improved the energy consumption.

The results in terms of Heating and cooling are important components of the architectural design, directly impacting the comfort, energy efficiency, and environmental footprint of buildings. This result in significant improvements in indoor climate control and overall sustainability.

Active strategies

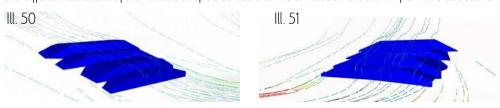
The wind or the breeze on the site are very much determinate by the mountain and sea relation. A breeze is a light wind which appears due to temperature differences affected by the warm land doing the day and the cold land doing the night together with the cold air right above sea level. During the day the wind blows from the sea to the shore and up the mounting, called the anabatic effect and in opposite direction duing the night, as warmer air is ligher that cold air. So contrasting is the katabatic effect when the cold mountins slopes pres the heavier cold air down the mouintin. This is together what causes the Mountin-valley circulation. (Windy. App, 2024) The wind velocity around the site is around 17 m/s at its maximum. (See appendix x) Even though this calls for some challenges to build near the sea, as it is somehow an aggressive environment, this can be utilized as it is an optimal place for different wind technologies, such as wind turbines.



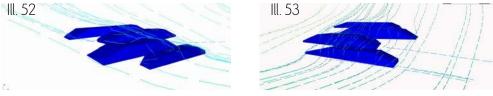
III. 49 Mountain - Sea wind

RT flow Wind simulation

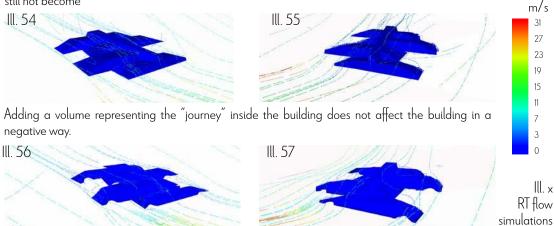
When designing with the wind in mind simulation have been conducted in the Rhino plug-in: Flow RT. This program brings out real-time CFD simulation to the Rhino design and its surrounding environment based of on data from Climate studio, where the average wind velocity is about 10 m/s. Tested out are different iterations of the volume shaped as ribbons. The simulation are shown from two directions.



The iteration where "ribbons" are placed directly behind each other up the mountain the overall wind and its parameters such as direction, speed and turbulence. The wind comes primarily from the east and west. (see appendix x) Near the sea the wind speed is higher than on land around the building, where it goes over the building volume witout that much turbulence.



Placing the "Ribbons" more shifted to each other, to fashion a more dynamic volume, effects it in such a way that more turbulence is created, but with a wind speed at only at approximately 4 m/s it does still not become



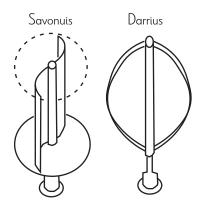
Creaking some brackets on the sides of the building affects the wind as more turbulence is created near these points. This makes this ittereation suitable for having some of the wind turbines as a part of the building.

Wind turbines

Wind turbines

As wind power is an emerging as a promising energy source, an investigation has been made to see what kind of turbines fits the design best, both in term of efficiency and design. When it comes to harvesting wind, there are primarily to types of turbines that can be used. Horizontal-axis wind turbines (HAWT) and Vertical-axis wind turbines (VAWT). Horizontal turbines are generally rigidness for their higher efficiency but in contrast are the vertical turbines more suitable for area where there is more turbulent wind and changing wind patterns, as these are less affected by the wind direction. Furthermore, does the VAWT require less space and maintenance when it comes to installation. Woth mentioning is it also that the VAWT create less noise compared to the HAWT. (Invertor.dk, 2023)

VAWT features vertically oriented rotor shafts, with blades that rotate around a central axis perpendicular to the ground is more compact and more simplified in terms of design that HAWT. VAWT can be designed in two ways: with Darrius blades a lift like design and Savonuis blades with a drag-like design. The Darrius one is suitable for small spaces where as the other ones are more suitable for remote locations. (Duval G, 2024)



Ill. 58 Vertical windturbines

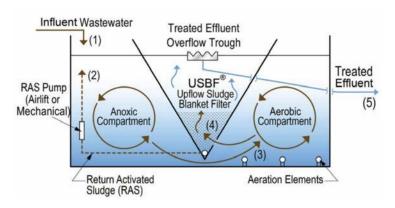
The most suitable option for this chosen site is the VAWT with Savonuis blades as the wind differs a lot in direction duing the day and nigh as the site is in a Mountin and valley location because here the wind is directly connected to the shape of the typography causing the so called Mountin-Valley circulation effect. The size of the wind turbines are $H2.7 \times W1.5$ and the amount is calculated to be 10 small ones integrated to the building and 10 larger ones in the nearby sourroundings.

Water treatment

Water treatment

Worldwide, buildings are acknowledged as major consumers of freshwater resources, necessitating significant energy usage. (Al-Ggamdi, 2020) Often this concerns conventional water treatments that are causing degradation, so for this project the intension is to use a more sustainable water treatment system enabling the building to operate off-grid with an innovative approach so the water collection systems are integrated into the building's design. (see sketch) Water serves numerous purposes both inside and outside buildings. These include washing, cooking, flushing the toilet, cleaning and watering plants, and for maintains of a building living up to modernstandards the collection of water is needed for the building to be off-grid. (Nallaperuma, B, 2024)

For water collection purposes, both green roofs and walls can serve as effective tools for sustainable drainage. They achieve this by reducing and retaining runoff, thereby delaying its peak flow. A green roof typically consists of a top layer of soil and vegetation designed to capture rainwater, thus reducing the volume of water that flows onto streets and into stormwater systems. Additionally, it may include additional layers for waterproofing, root aeration, and irrigation to support the growth and health of the vegetation. (Nola, 2024)



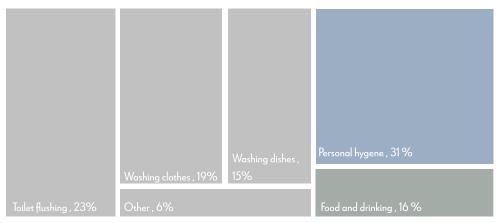
Ill. 59 Filtrations system in tank

The two main sources for Gathering water is to have a well drilled deep in to the ground to have a water resource and green roof for collecting rain water. Well water serves as a cleaner alternative for drinking and cooking, sourced from groundwater in aquifers deep underground. Wells, typically drilled between 10 and 250 meters deep depending on the water table's depth, extract water from these aquifers. Several essential components of the well system collaborate to transport groundwater from the well to the building. Well water is cleaner tain rainwater that is being collected. (Drinking-Water, 2019)

Water

Water consumption

The average water consumption per person per day in Norway is approcemetly 160 liters which is a bit higher thanm in the neighboring countries. (Peak demand factors for residential water, 2024) The table shows the percentage distribution of the water used. This one part for the purpose of using it for drinking and cooking. This water supply is from a well. The second part comes from collecting water from the green vegetation technologies, as this is only to be used for tasks that do not require as clean water.



III. 60 Water consumption

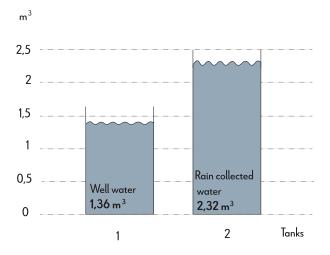
For non-rainy days, the necessity of an additional storage tank becomes apparent. Anticipating a period of five uninterrupted days without rain, it becomes essential for the retreat to have adequate water reserves to sustain operations during this time. Thus, the implementation of a storage tank system ensures that water is available for consumption and other essential needs even in the absence of rainfall. This proactive approach to water management enhances the resilience of the retreat's water supply system, mitigating the impact of intermittent weather patterns and ensuring consistent access to water resources.

The reliability of the assumption that it will not rain for five consecutive days is certainly questionable due to the variation in rainfall patterns throughout the year. Especially in the summer months there can be periods of less rainfall, while in other seasons there can be more rainfall. This variation highlights the importance of adopting a more nuanced approach to water management, one that takes into account seasonal fluctuations in rainfall and adjusts storage and conservation strategies accordingly. Green roofs and walls, also known as vegetated surfaces, serve a several purpose as natural filters and aesthetic enhancements in the surroundings. These structures leverage the natural proficiencies of plants to absorb and purify rainfall and surface water through their roots and the soil layer.

Water collection

To ensure that harvested rainwater is suitable for drinking and cooking purposes, filtration is essential. One natural method involves the use of plant xylem, a porous material responsible for transporting fluids within plants. By harnessing gravitational pressure, rainwater can be effectively filtered as it passes through the xylem. In plants, the xylem, referred to as sapwood in woody plants and vessels in floral plants, acts as a highly efficient filtration system. Utilizing this natural process, xylem effectively filters out nanoparticles and bacteria, thereby improving water quality by removing pollutants from runoff. (PDF)

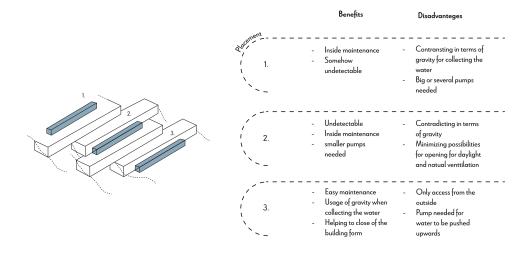
When designing and selecting plants for green roofs, it is important to prioritize native species. These plants are adapted to the local climate and soil conditions, enhancing their resilience and overall performance. Native species may include a variety of herbaceous flowers and grasses that thrive in the given environment. In addition to native species, plants with specific traits such as good thermal capacity are also beneficial choices for green roofs. For example, Sedum sediforme, a succulent plant known for its ability to retain moisture and withstand harsh conditions, is an excellent option. Similarly, plants like Delosperma, which can tolerate intense radiation and drought, are suitable choices for green roofs and walls. (Leotta, L., Toscano, S. and Romano, D, 2023) Other benefit from green roof are, that it creates habitat, as thay offer a place for plants and insects and birds to florish, so the biodiversity is preserved.. The lifespan of the roof is also being increased as it can cut down the maintenance level and replacement cost by protecting the innter roofs exposure to climate. The green roof can also help to a greater insulation offered which can reduce the amount of energy needed to moderate the temperature of a building. (Greenroofs, 2024)



For harvesting rain water for usage and in drougt or non-rainy days collection points such as tanks or reservoirs are needed. The water in the tanks can then be used for numerous purposes such as irrigation of plants in the kitchen garden, toilet flushing, or other non-potable water uses in the building.

Placement of the tank

Choosing the most suitable place for the water tank involves a thorough valuation of several different factors, namely the location must be able to accommodate the required size of tank, so that there is plenty of space for necessary maintenance tasks. In addition to this, the weight of the tank must also be taken into account. It can also be advantageous to pave the tank near the building's plumbing. Ideally, the tank is placed near the areas, where the water is to be used, to minimize the pipe distance, reduce costs and potential water losses from leaks. The surrounding landscape also has an influence on the location of the tank. A tank located at a higher elevation than the actual system that will use the water can benefit from gravity fed water systems, reducing the reliance on pumps. Also consider sun and wind exposure, as prolonged exposure can lead to deterioration over time. (smart Water, 2024)

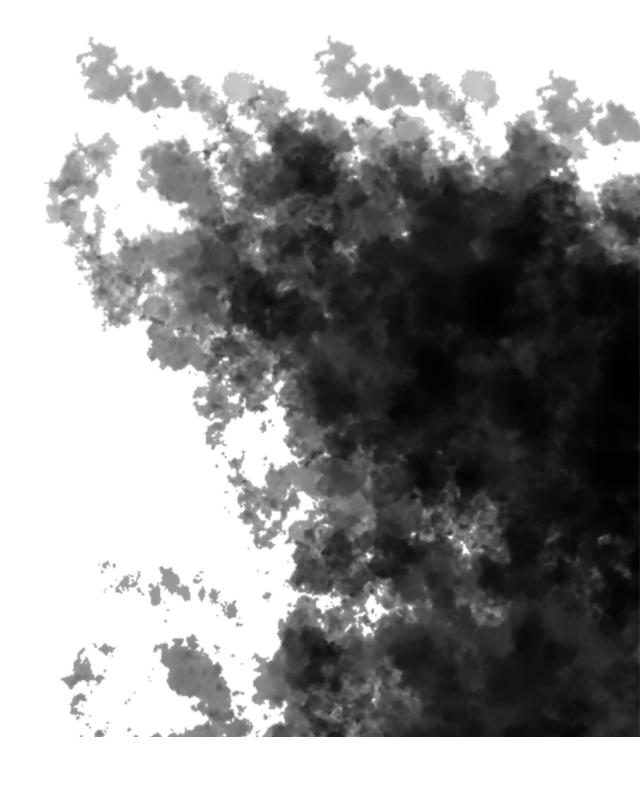


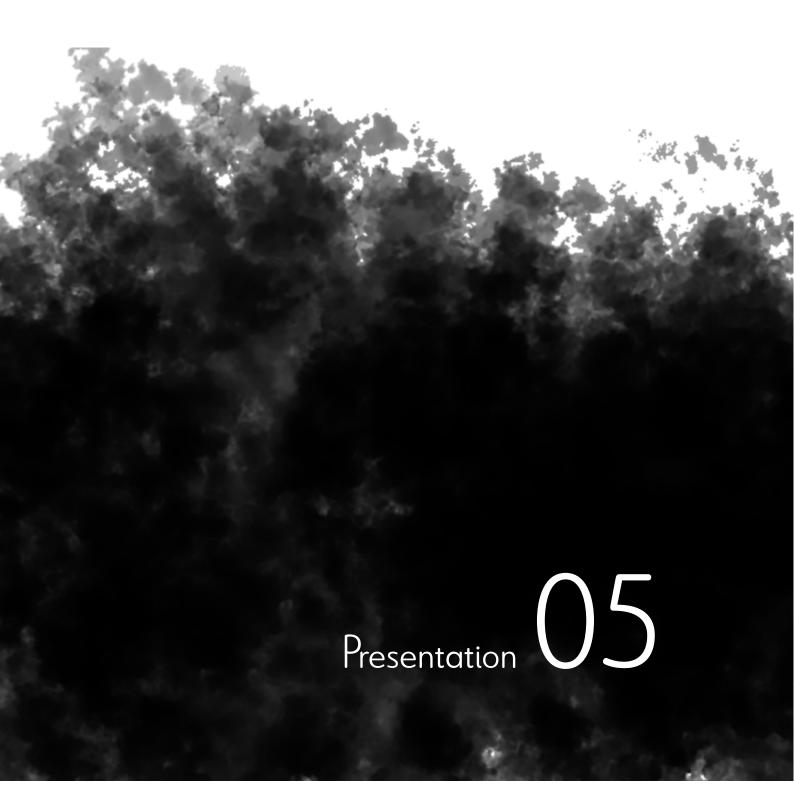
Placement of the PV - panels

Another element that on the other hand need a lot of sun exposure are the PV-panels. PV- panels generate electricyty from the sun to the battery ensuring electricity in the building. Ensuring of a suitable place for the PV-panels the roof of the greenhouse that is tilting towards the south is a profitable solution, as the souther sun is to be utilized.

Conclusion

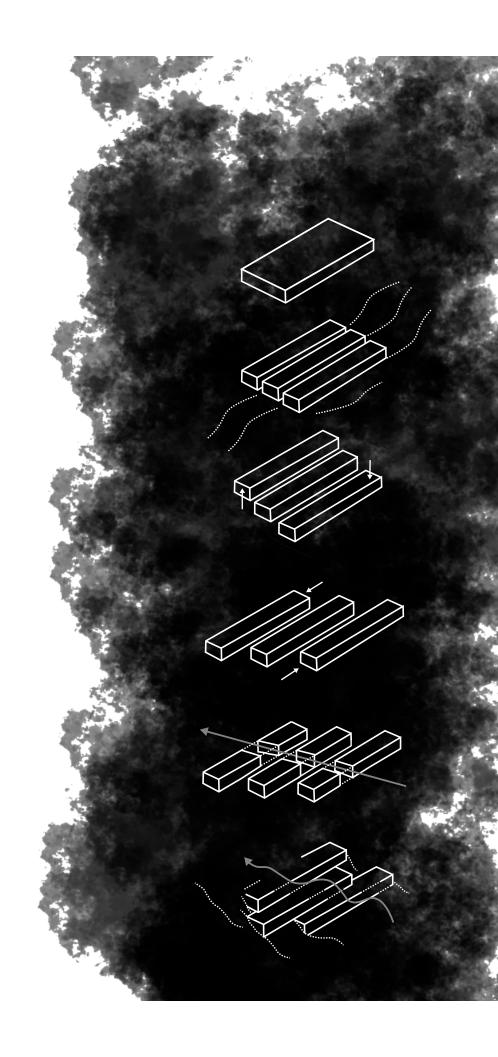
As introduced whitin architectural design, the objective is to create a harmonious intersection of all relevant requirements, particularly for this project is the contour lines, the user group, and the goal of pioneering new methods of off-grid living. However, not every requirement can be equally fulfilled in every detail. Recognizing this, certain aspects of the design prioritize for some aspects the needs of the user group, while others address the technical challenges inherent in off-grid living. Throughout the design process, each component was meticulously examined as the room program evolved, aiming to blend these findings into a cohesive proposal. With the used methodology new discoveries and problems emerged, to whereas changed in one space might affected others but also resolving in new ideas and solutions. The HIDDEN GARDEN ESCAPE embodies this approach, aligning all studies showcased throughout the design process with the theme of creating a secluded retreat where individuals can withdraw from their everyday life facing problems with children having difficulties learning how to speak. The overall zoning prioritizes communal and treatment areas as dividers between staff and visitors, establishing a secure and tranquil space for both usergroups. This approach has driven the design, flow, organization, and integrated elements within each zone. Integrating water harvesting strategies with green roof and wall concepts allows the building to adopt a comprehensive approach to water management, significantly reducing dependence on external sources. So, to become sustainable whitin being off-grid all presented aspects are to be included in the design

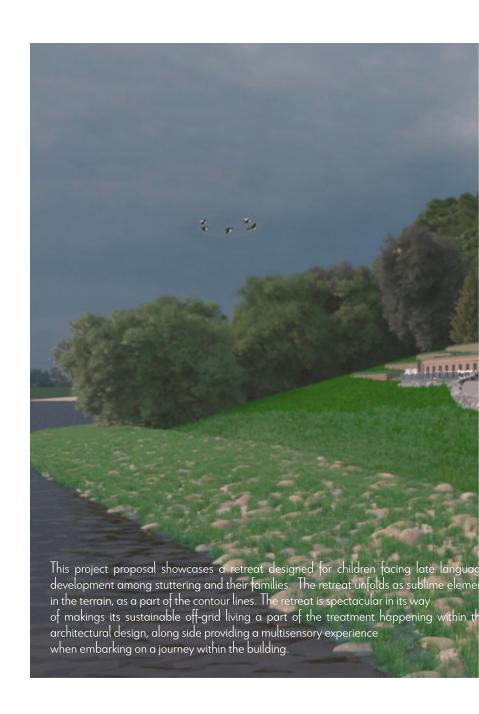




Concept Inspired by contours

The architectural concept of integrated fragmented volumes revolves around the idea of decomposing a building into smaller, interconnected segments that rise from the landscape. These volumes are meticulously designed to follow the contour lines of the terrain, creating a seamless transition that embodies a harmonious blend between architecture and nature. The integration with the terrain is achieved through several design studies of topographical mapping to ensuree that the building complements the natural slopes, ridges, and valleys, minimizing the need for extensive excavation and retaining the site's ecological balance. These shapes create a dynamic interplay of levels and perspectives, offering to the site a unique spatial experiences and visual connections to the surrounding water and mountains. The smaller volumes further contribute to a compact volume making the building perform better in terms of energy.









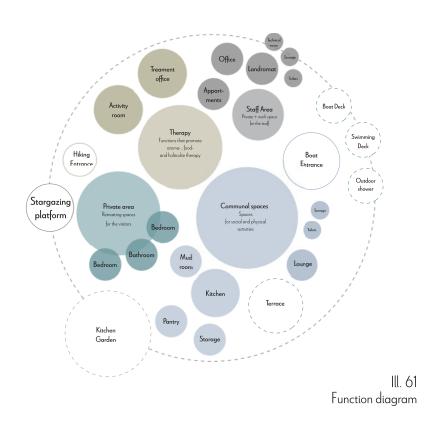
Upon arrival to the retreat, children and their parents are beginning upon a new journey, starting out at the entrance. A monotholic stone structure hold up the roof making the entrance door hidden. Natual element are in all implemented.



Function diagram

Functions

The layout of the building and room configuration is shown in this diagram, simplifying the connection there is between the four zones: Communal, staff, treatment and private. The sizes are somehow relative to each other but on a conceptual level as well as the orientation. The indoor/outdoor spaces are also shown whinin the craftsmen of each circle.





Looking at the building from the south the relationship between these "ribbons" is showcasaed and how these follow the terrain.

Room program

	1	1				
Sources	s Definition		Quanitity	Total	Free room hight	
		(m2)		(m2)	(m)	
	Communal spcaces					
Brief	Dining room	50	1	50	2,5	
Usergroup	Main lounge area	50	1	50	2,5	
Brief	Lounge area for Stargazing platform	30	1	30	2,5	
Brief	Lounge area	15	1	15	2,5	
Usergroup	Lecture hall for parents	30	1	30	2,5	
				191		
	Children therapy zone					
Theory	Auditory treatment zone	20	1	20	2,5	
Theory	Visual treatment zone	20	1	20	2,5	
Theory	Tactile treatment zone	20	1	20	2,5	
Theory	Kinesthetic, treatment zone	20	1	20	2,5	
Own annalysis	Toilets	4	2	8	2,5	
				92		
	Kitchen (related to the garden)					
Brief	Kitchen (driven by the staff for all people):	24	1	24	2,5	
Brief	-Storage (divided into 2 zones/frozen&fresh)	14	1	14	2,5	
Brief	-Storage Pantry (can food)	8	1	8	2,5	
Brief	Apothecary (Farmacy for herbs)	10	1	10	2,5	
Brief	Muddroom	5	2	10	2,5	
				66		
	Entry					
Own annalysis		20	1	20	2,5	
•	Hiking entrance	10	1	10	2,5	
	Hallway (main hallway + corridors)	230	1	230	2,5	
•	Secretary desk /intergrated with the hallway/	15	1	15	2,5	
Own annalysis	lollets	4	4	16	2,5	
				291		

Оссиј	pancy	Acitvity (M		Access	Ambiance	Daylight lux	Temp e	e ratu r	Ventilation I/s (m2)
Adult	Children	Adult	Children				Winter	Summer	
12	6	1,8	1,6	Public	Social space, calm	300	20-25	23-26	1,3
14	6	1,5	1,6	Public	Quiet	500	20-25	23-26	1,3
12	6	1,5	1,6	Public	Amazing	200	20-25	23-26	1,3
4	2	1,5	1,5	Public	Warm and calming	200	20-25	23-26	1,3
13	-	1,5	0	Public	Ispiering	300	20-25	23-26	1,3
1	6	1,8	1,6	Public	Tretment	300	20-24	23-20	6 1,0
1	6	1,8	1,6	Public	Tretment	300	20-24	23-20	5 1,0
1	6	1,8	1,6	Public	Tretment	300	20-24	23-20	6 1,0
1	6	1,8	1,6	Public	Tretment	300	20-24	23-20	
1	1	1,5	1,2	Private	Clean and practical	200	16-25	-	1,0
		,	,		•				, ,
2	-	2	-	Public	Social workarea	500	20-25	23-26	,
2	-	2	-	Public	Walk in fridg	300	16-25	-	2,2
2	-	2	-	Private/public	Storage	300	16-25	-	3,9
5	-	2	-	•	Clinical cs. Therapution		16-25	-	3,1
3	1	2	-	Public	Practical	300	16-25	-	3,1
5	6	2	1,8	Public	Safe and welcoming	300	20-25	23-26	5 1,6
7	6	2	1,8	Public	Welcoming	300	20-25	23-26	
20	6	2,3	2	Public	Journey/Flow	300	20-25	23-26	· ·
1	-	1,8	0	Private	Office work area	300	20-25	23-26	
1	-	1,5	1,2	Private	Clean and practical	200	16-25	-	1,5

Room program

Sources	Definition	Size (m2)	Quanitity	Total (m2)	Free room hight	Total zone
	Visitors units					
Brief	Master bedrooms	13	6	78	2,5	
Usergroup	Children bedrooms	9	6	76 54	2,5 2,5	
Brief	Bathromms	4	6	24	2,5 2,5	
Brief	Bathioninis		Ü		2,3	
				156		
	Staff/working zone					
Usergroup	Therapist office	15	1	15	2,5	
Usergroup	Treatment room (one to one treatment)	20	1	20	2,5	
Own annalysis	Workers office: Janitor/cleaner & chef & gartner	30	1	30	2,5	
Own annalysis	Break room /with Staff Kitchenette	30	1	30	2,5	
Brief	Toilets	4	2	8	2,5	
Brief	Bedrooms	16	5	80	2,5	
Brief	Bathroom	4	5	20	2,5	
				203		
	Practical zones					
Brief	Technical room zone					
	-Tank> drink water	10	1	10	2,3	
	-Tank> rain water	10	1	10	2,3	
	-Tank> reuse water	10	1	10	2,3	
	-Tank> waste food	10	1	10	2,3	
	-Tank> black waste	10	1	10	2,3	
	-Log burner_wood	10	1	10	2,3	
	-Energy _ battery	10	1	10	2,3	
	-Heatpump	10	1	10	2,3	
	Technical room/total			80	2,3	
Brief	Cleaning room zone:					
-Brief	-Laundry room	10	1	10	2,3	
-Brief	-Storage	6	2	12	2,3	
	Cleaning room/total			22	2,3	
Own annalysis	Gardening storage for tools	12	1	12	2,3	
				114		

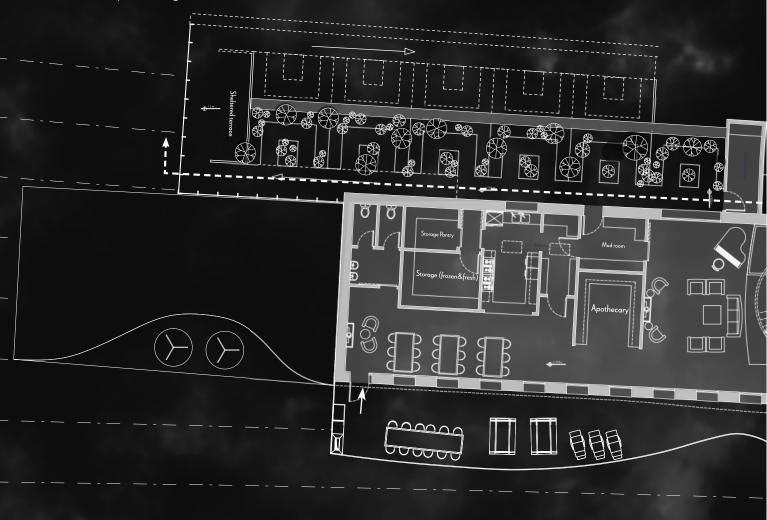
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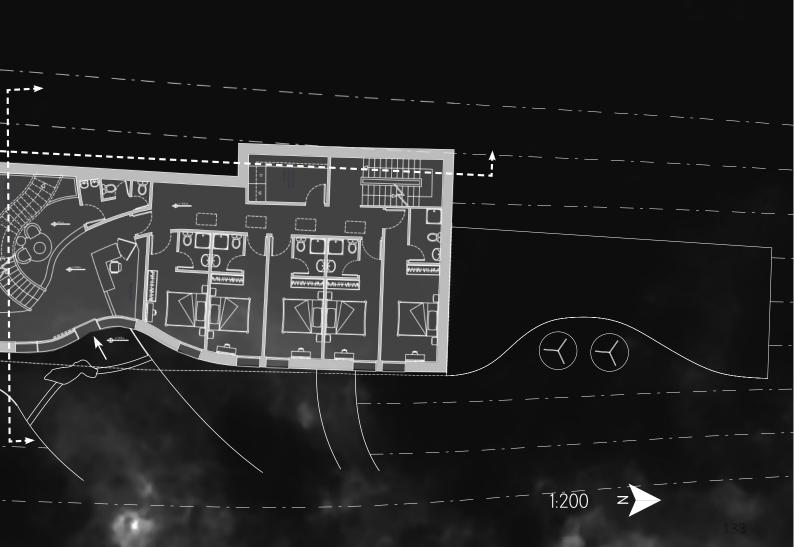
es Occ	Occupancy		Acitvity level (MET)		Access Ambiance		Temperatur		Ventilation
						lux	C		l/s (m2)
12 - 6	- 6 3	0,9 1 1,5	- 0,9 1,2	Private Private Private	Comforting comforting Coxy and clean	300 300 200	20-25 20-25 16-25	23-26 23-26 -	1,1 0,8 4,1
1 1 3 8 2 5 5	- 1 - - -	1,8 1,8 1,8 1,8 1,5 0,9 1,5	1,6 1,6 - - - - -	Semi private Semi private Private Semi private Private Private Private Private	Office work area Therapeutic Office work area Relaxing Hygenic Relaxing Hygenic	500 300 500 500 200 300 200	20-24 20-24 20-24 20-24 16-25 20-25 16-25	23-26 23-26 23-26 23-26 - 23-26	0,9 1,3 1,4 3,8 3,0 0,4 3,0
2	2	2,3		Private	Practical		16-25		
2	-	2,3	-	Private Private	Practical Practical		16-25 16-25 16-25 16-25 16-25 16-25 16-25 16-25 16-25 16-25		
2		2,3	-	Private Private	Practical Practical	-	16-25 16-25 16-25	-	

Plan

First floor

This plan drawing is illustrating the buildings design and layout of its spaces. On the first floor when entering the building, is a welcoming foyer where view to wards the rest of the spaces are visible. Here lies a reception for staff to quickly cater to the visitors. Furthermore sanitary rooms are available to the right upon arrival. Laid out on this floor is also staff units and most importantly the communal zone. Holding dining room and lounge area in near connection to each other, this becomes a space for social interactions. In the middle of the space is designed an apothecary that enrichens the space both visually and with its aromas. The spaces are centered around a view towards the water and the implemented green house.

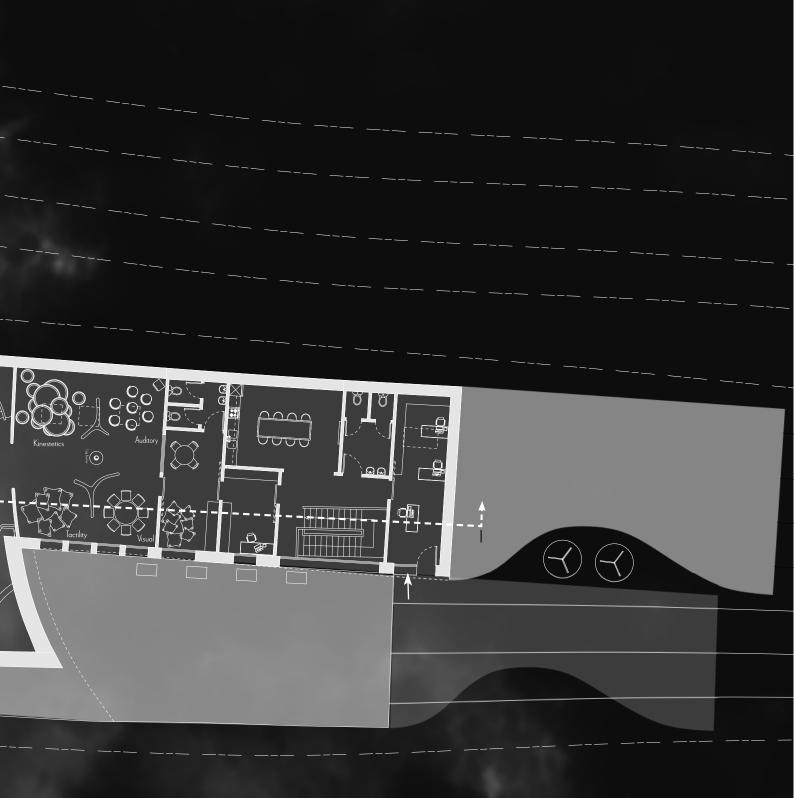






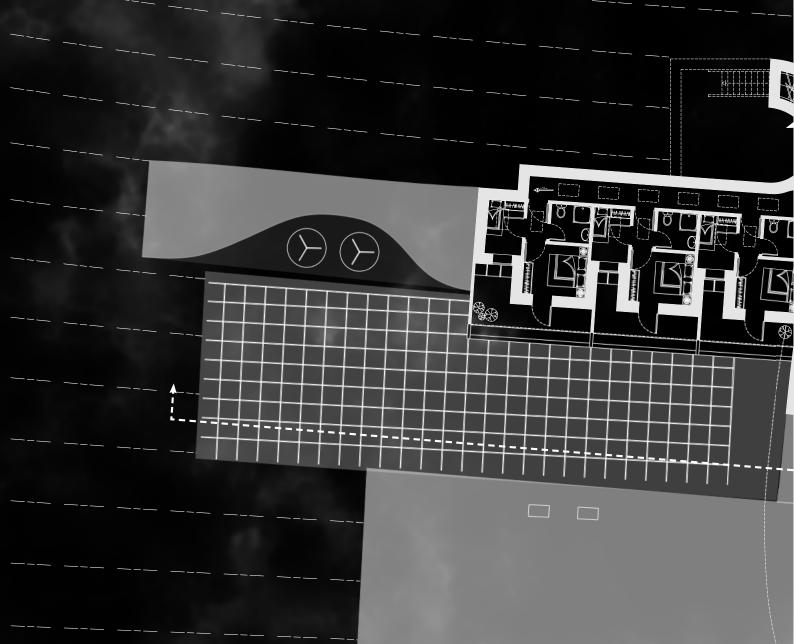
The second floor holds the treatment zone with both spaces for children and the parents. A lecture hall is implemented in the main transition zone to centralize this space. Further on the treatment zone holds an activity room where children can explore with their senses. A sublime division is made whitin this space, to cater to each child as well. Furtheron, on this floor is the staff working zone.







The third "ribbon" whitin the building volumes holds the private-room. They are laid out to become a unit where bold child and parent/parents can retract themselves. Furtheron, connected to the units—are a smaller terrace with a seating nook. View to wards the water is equally distributed on this floor.





Plan

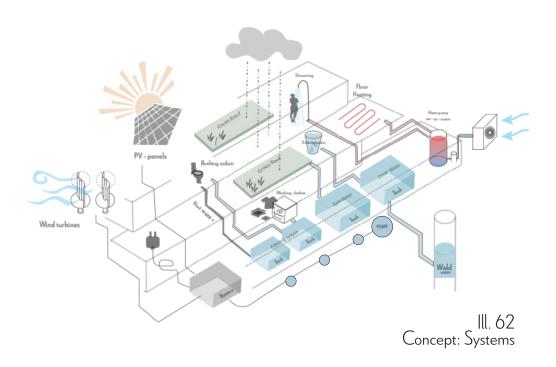
The stargazig platform

When-embarking on the journey of going through this building, up the stairs and through the different lies at the end a stone structure. Special to this stone structure is that hidden whit in is an entrance up to a star gazing platform. The stargazing platform is a cave like space, where there is no disturbance from sound and light, making it an optimal space for relaxation, and with a large skylight shooting stars and the beautiful Norther light can be experiences from here.

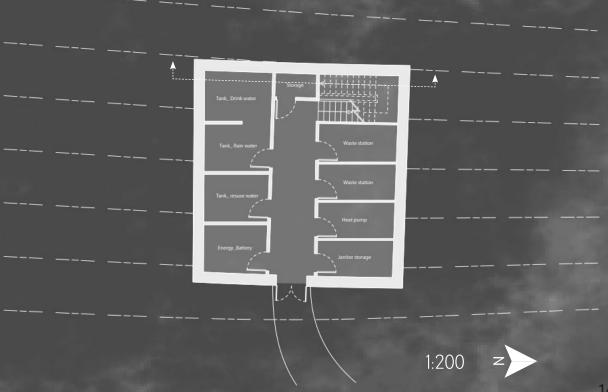


Systems Off-grid

Lastly, a basement is integrated into the design. The basement are placed in the staff zone with stairs leading down to it. Here there is room for the cleaner/janitor to store work equipment among other tings and most importantly the right calculated spaced for the systems in the building is laid out. This off-grid sustainable building systems that are aimed to be contribute to an eco-friendly construction is integrating an air-to-water heat pump, water treatment such as black water reuse, green roof technologies, along side PV panels and vertical wind turbines. This is illustration shows on a principle level the integration of the different systems and the relation to each other.



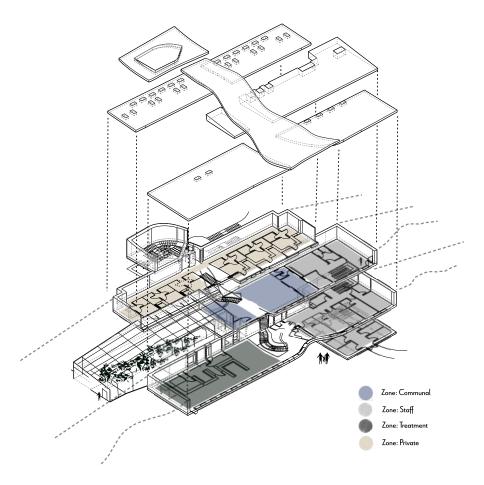
Plan Basement



Zones

Building concept

Based on the functions needed in the building are the four main zones: Communal spaces, treatment zone, private units, and staff area: Theese zones help organize the spaces to enhance functionality, improve user experience, and optimize the overall efficiency of the structure. Placed in the middle of the building close to the journey happening inside with a close connection to the green house leading outside it the Treatment zone, where the treatment with children facing challenges with LDD and stuttering is being done.

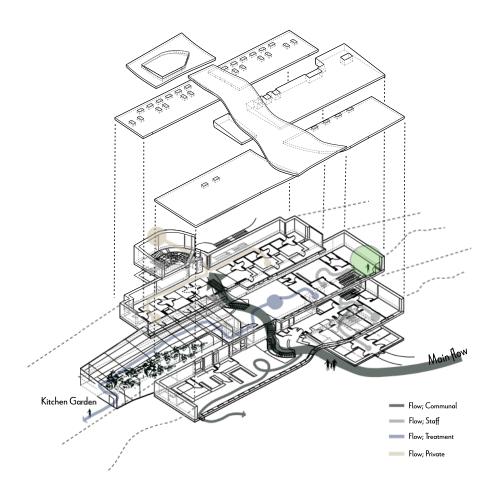


Ill. 63 Zones diagram

Flow

Movement in the building

To showcase the circulation of people happening inside the building, including hallways, corridors and stairs. Good circulation design ensures smooth, unobstructed movement. Dividing the flow on several levels create spatial hierarchy. The most up speed flow is happening inside the middle of the building in the treatment zone intersection the main flow. More calm flow is predicted to happen at be back of the building. In terms of accessible and visually linked connection flow is broken down to a calmer pace, promoting the experience and integration of the multisensory treatment.

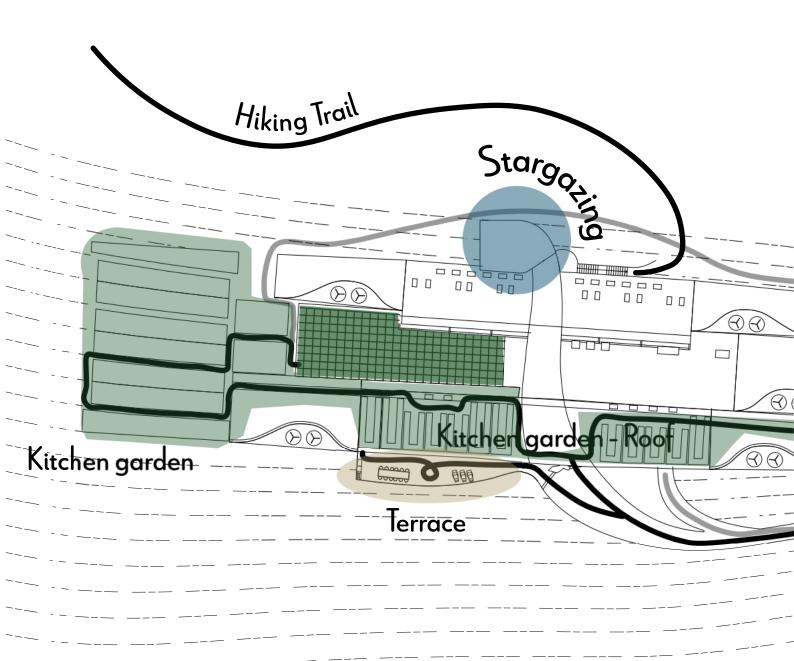


Ill. 64 Flow diagram



The site plan showcasing the proportions of the building in relation to the terrain. The building is not the most prominent from this view as the construction of the green covered roof is put to the terrain. Countour lines indicates the slope happening on the site. Further on, this drawing is showcasing the relation between the building and the kitchen garden. Urban planning in form of a pathway to the boat has also been layout as a continuous journey happening inside the building.





- Flow; Communal
- Flow; Staff



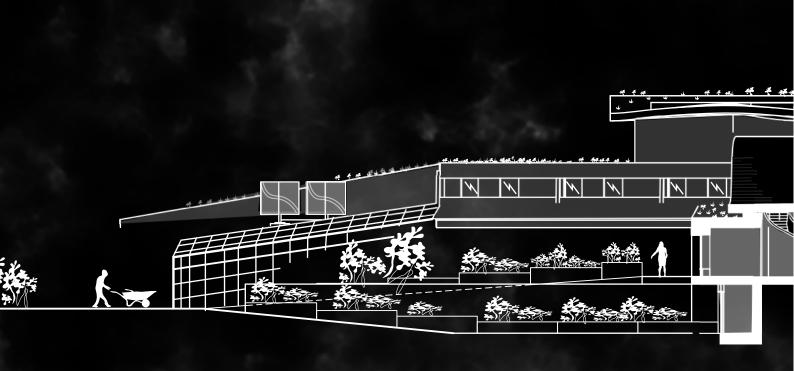
Kitchen garden Swimming deck Entrance

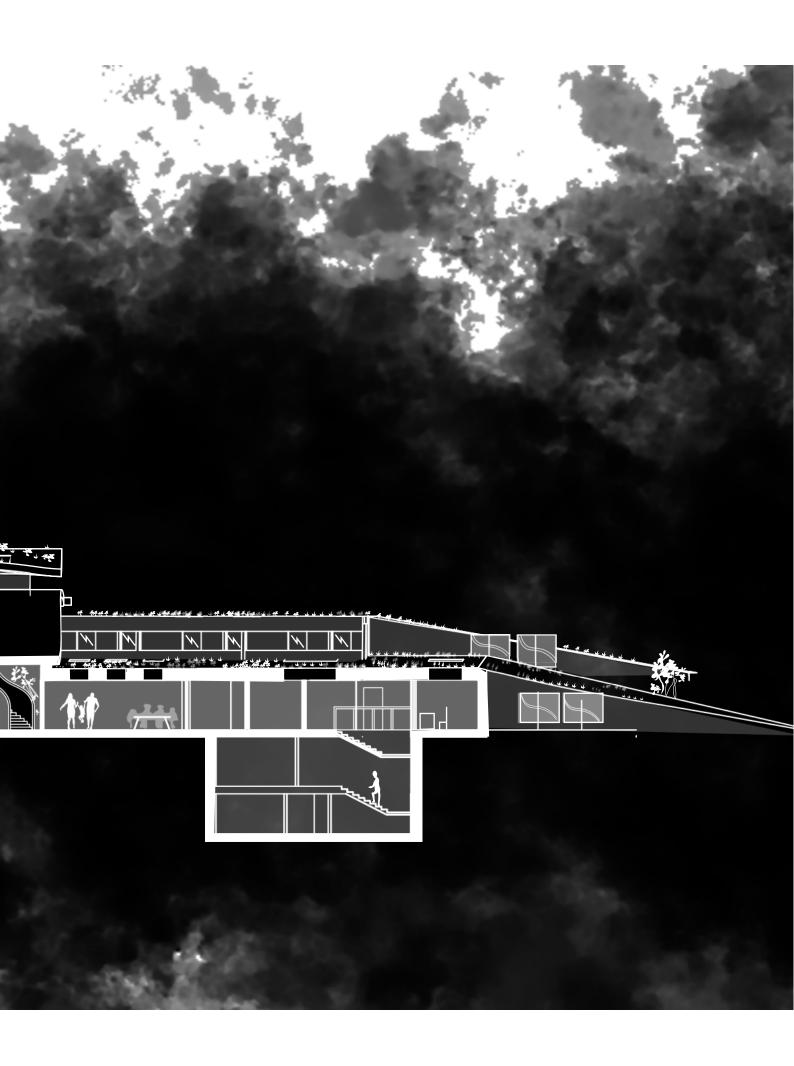


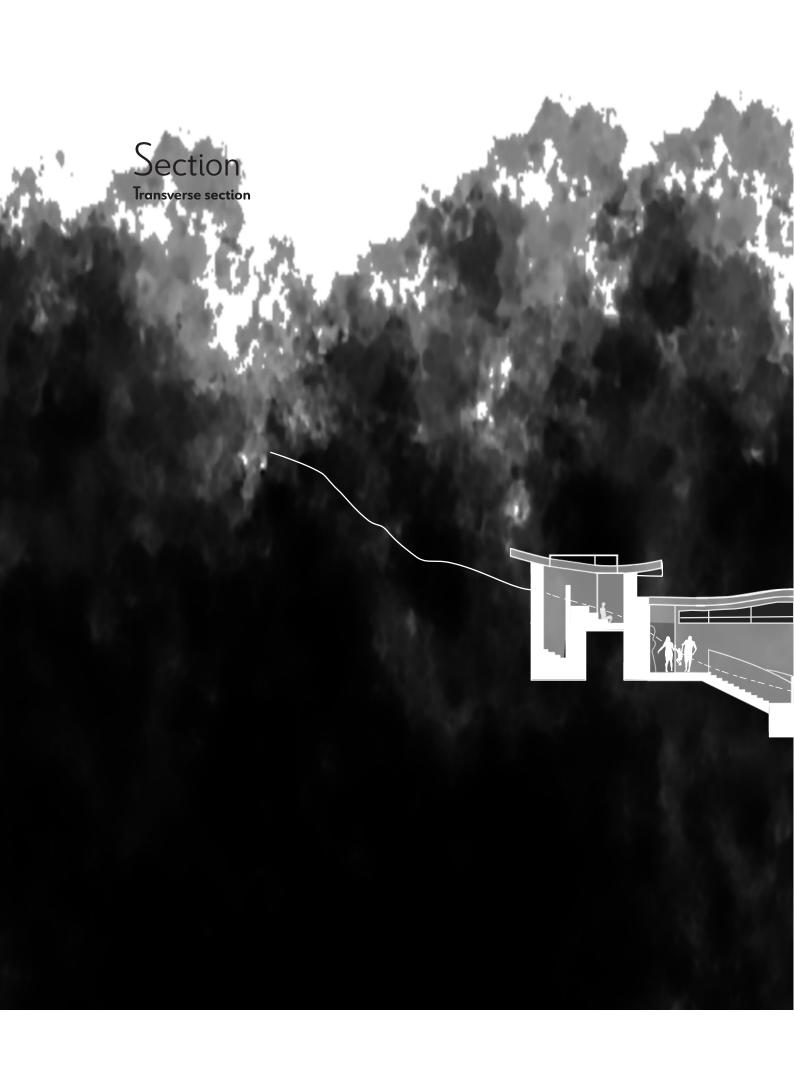


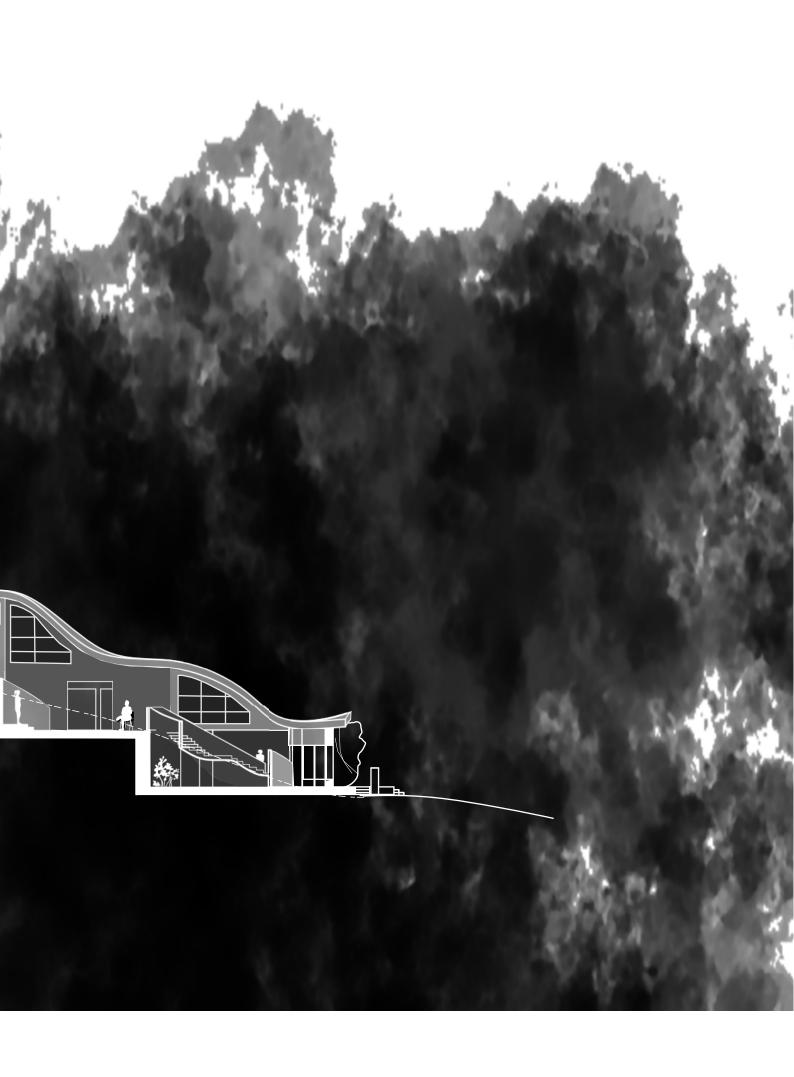
Section Longitudinal section

The following illustrations showcase the longitudinal and transverse sections of the building. These architectural sections aim to provide a detailed view of the relation between the inside and outside, where the building is cut to the terrain. Furthermore, the section along the length of the building highlights the spatial arrangement and the interaction between different floors and systems, such the relationchip between the divided staff zone. The cross-section provides an insight into the building's width, demonstrating the implementation of the dynamic journey across several levels









Conclusion

With an architectural and engineering approach the assigned task is answered with the design the CON-TREAT. This retreat will act as a treatment center for children with late language development and stuttering. The retreat includes multisensory experience to promote language and communication among the users. As the simultaneous activation of two or more sensory receptors, such as visual, auditory, kinesthetic, and tactile inputs, the so called VAKT - system which converge in the brain for efficient perception and integration of information. This is helping the children to develop new skills along side literacy and language development. The design includes spaces directed to focus on one of the human senses at a time, with proportionate zoning to also make an interplay between the VAKT. These zones include elements casting shadows, generating acoustic and encouraging movement. Features such as herbs implemented in a showcasing apothecary in the communal zone alongside the use of smart technology, becomes a part of the treatment, as both engaged children and parents takes part in it. Furtheron, as children are all effected negatively by the usage of different electronical devices as it contributes to less time with the rest of the family, this retreat provides other activities, that engage both parents and their children that supports the treatment. There for with the use of technologies that stimulate other senses can lead to an elevated future. Also included in the design is a platform that acts as a stage for children to perform their development and build confidence even more so. Laid out are also small personal unit for both the visitors and the employees. All of these spaces are created to minimize the building envelope even more still having a spacious layout with still functional bathrooms and bedrooms. The private units for the visitors are scattered in a manor to continue the volume with the presented "ribbons" allowing for a clear flow thought out the space. Additionally these unit have a small terrace for quiet contemplation and where view towards the water can be enjoyed. Parameters such as view towards the floor below is done with an unobstructed view towards the greenhouse and the roof but no direct view into the skylight placed down below. To cater to the secondary and tertiary usergroup spaces just for the staff and parents are designed. These staff spaces are to be more private for them to retract when off from work, whereas the designed spaces for the parents are to be more envisioned for more less occupied time as the aim is to foster social interaction throughout the rest of the building. In all the units are built to make sure of a secure and relaxing space for the families during this endeavor as a lot of stimuli is provoked embarking on the multisensory journey.

The stargazing platform is designed in detail to form a space that is suitable meditation and relaxation when enjoying the view to the night sky. Most dramatically about the space its that it unfold to a calm space after experiencing the journey that is happening inside the rest of the building leading up to this room. The entrance is hidden creating curiosity for reaching this level. The room is designed to be placed at the back of the building away from artificial light and other disturbances and function and operate as its own envelope. Back at the building is also a door to the outside hiking trail found around the site.

From the outside the building is set to be undetectable and a part of nature, especially the contour lines, there by the name of this retreat. The building is undetectable mainly cause the prominent areas with covered greenery, but also in its shape. The overall volumes cater to a simple formulation of undetectable and easygoing architecture. This is marked by the slopes on the roof and on the sides of the building. Here this

design becomes a solid proposition in future architecture that is build in remote places

The Concept where to the building more or less are shaped as a result of the contours on the site and volumes unfolds into "ribbons" the build is within its fragmentation becoming undetectable and integrated into the terrain. This goal has been reach, with only few other added elements so also prominent architecture is being suggested. The aim has always been to showcase individual thematic architecture that within teamwork is being improved, and within this group the differences in approached have been smoothen together beautifully. The concept is clear in its form of these "ribbons" and with the tilting roof on the side of the building the architecture smooths into the surrounding landscape. Furthermore the concept of a journey is showcased with a rise roof across these "ribbons" to in a more literal manner highlight that there a journey is happening.

In terms of creating harmonizing architecture whitin various factors: In this project, as mentioned, the goal is to create an exciting and interesting experience for the user group, within being undetectable and sustainable by being off-grid. Reaching a sense of elegance a sublime effort has been made to make a smooth transition from the inside to the outside connecting the kitchen garden to the green house and further into the communal zone, making flow for both the staff and the visitors functional. Recognizing the nuanced interplay that is laid out between all important factors within a design process, a balance is reach where to all requirements are set up to bee important when needed in the detailing of different architectural spaces.

With a distinct emphasis on sustainability this proposal provides various suggestions that cater to all tree pillars of sustainability. In example catering to the environment using local materials is of prominence to cater to the planet. Further on catering to human well-being, both psychically and mentally by dominant promoting to social interaction the aimed vision is reached. Furthermore, this design proposes ways to design off-grid architecture where less energy is needed. Here case studies have generated inspiration designing the off-grid system. The water treatment. Ultimately, the incorporation of both passive and active strategies reflects a holistic approach to sustainable development, ensuring a balanced and resilient design for the HIDDEN GARDEN ESCAPE. The integration of green roofs and walls, along with strategic water tank placement, is vital for the sustainable off-grid design. By leveraging natural filtration processes and optimizing resource usage, these systems exemplify innovative approaches to addressing environmental challenges. The water tank placement utilizing gravity, maximizes the utility of the water system. PV-panels and wind turbines are contributers to generating energy in terms of electricity and these elements are integrated into the the architectural design in a way that the building now showcases and resonate within the theme of being off-grid. Together, these integrated strategies contribute significantly to the sustainability and functionality of off-grid living environments.

With implementation of the multisensory and purpose to create interesting spaces for the children this retreat become one of a kind. Participating in such a specialized retreat targeting these issues can be very advantageous, as it allows for a more concentrated focus on a particular area. Futher on The objective of attending such a retreat is to engage both children and their parents in further understanding the nuances of speech and language development, a pivotal skillset for ongoing intellectual growth benefiting communities and the society later on.

Reflection

The primary focus of CON-TREAT is its commitment to creating an environment that stimulates multiple senses simultaneously, fostering an effective and integrative learning experience. By incorporating spaces designed to target individual senses while promoting interplay among them, the retreat facilitates an immersive environment that is both engaging and therapeutic. The inclusion of design elements like shadow casting, acoustic features, and herbal displays in communal zones not only enriches the sensory experience but also creates a dynamic learning atmosphere, but reflecting on detailing of such incorporated element could have been shown more. But in all The controlled use of smart technology within CON-TREAT and the related concern of the effects of excessive screen time considereing children. Elements are designed to acts as a tool for enhancement rather than distraction, promoting a healthier, more interactive learning environment.

One of the standout features of the CONTREAT retreat is its seamless integration with the natural environment. The design prioritizes sustainability and minimal ecological footprint, employing local materials and incorporating green roofs and walls. The building's undetectable presence, blending with contour lines and natural surroundings, reflects a commitment to creating architecture that harmonizes with its environment. This approach not only enhances the aesthetic appeal but also promotes ecological sustainability,

Sustainability is a core principle in the retreat's design. The use of local materials, passive and active environmental strategies, and innovative water treatment systems underscores a holistic approach to sustainable development. Further investigation on how systems can be optimized

when off-grid and more specific in use could have been driven out, but for this project the aim is to make a cohesive design between the architectural design and the systems, integrating its elements such as wind turbines and pv-panels.

When designing the "lourney" inside the building, volumes, shapes and different elements have been used to spark interest when walking though the building to cater to the usergroup. This journey is whit in the design expressed in very promonante volumes both inside and outside which can be considered to take the request of a jouney to leterel. Taking everything in a literal manner when designing architecture can namely have its implications on the creative process and the overall aesthetic of a project. Literal interpretations can constrain innovative thinking and limit the exploration of abstract concepts or unconventional ideas that might lead to other unique and inspiring designs. Such design might lack the symbolic depth or layered meanings that more abstract or conceptual approaches can provide. This can result in buildings that are less engaging or thought-provoking. Even though, going with this literal approach can ensure that the design meets the exact specifications and requirements laid out by clients or regulatory bodies, reducing the risk of misinterpretation. But as Architecture has the power to convey messages and tell stories through its forms and spaces, a literal approach might miss opportunities to use metaphor and symbolism.

Lastly when completing a master's thesis in architecture which has been a multifaceted journey, which is requiring not only deep research and creative design but also meticulous attention to detail in documentation and communication. With an aim to Deliver a thoroughly proofread paper, despite smaller typographical errors,

grammatical mistakes sentences have been constructed to create a cohensy in the written text along side reputedly create curiosity for the reader whitin an academic language. Here the text becomes consistent which creates a proficient paper. This effective communication, both whin the written text and visual presentation, is basis of a successful thesis, this could have been improved. Especially some illustration could have been conveided more professionally, but further works continues with even more aspiration to create good communication. Aware of some of these issues, there has Throughout the process, been sought out feedback from supervisiors and other interested partners, which have led to a helpful process striving to better both the written and visual presentation.

Illustration list

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Illustration list
Ill. 1: Mindmap
Ill. 2: Sustainability Ill. 3: Location
III. 4: The site
Ill. 5: The site
Ill. 6: The flora
Ill. 7: The fauna
Ill. 8 : Materiality
Ill. 9: Build environment
Ill. 10: Moodboard: Undetectable architecture
Pictures used: https://www.theplan.it/award-2023-villa/my-little-big-world-a-villa-based-on-a-
fluid-inward-oriented-atrium-superform, photographer: www.superform.si: Approved
https://www.archdaily.com/903759/issa-megaron-proarh/5bbf78e7f197cc3c6a00039e-
issa-megaron-proarh-photo?next_project=no
                                                                   https://www.facebook.com/
bernfestarchitecturalphotography/about_contact_and_basic_info
photographer: Miljenko Bernfest: approved
https://www.facebook.com/profile.php?id=100064028321767
photographer: Damir Fabijanić: Approved
https://www.archdaily.com/967872/encaved-stone-villa-tsolakis-architects,
photographer: George Messaritakis: Approved
https://314architecturestudio.com/mob.php?cat=003-epidav,
photographer: https://314architecturestudio.com/mob.php#: Approved
https://www.designboom.com/architecture/konstantinos-stathopoulos-krak-architects-engraves-
photographer: KRAK. architects , https://krak.gr/konstantinos-stathopoulos-krak-architects-8/:
Approved
III. 11: Usergroup
Ill. 12: Smart Media
Ill. 13: Multisensory
Ill. 14: Kitchen Garden – Pictures Used
https://garrybelinsky.com/Overview/26, Gary Belinsky: approved
https://www.byggeplads.dk/byggeri/ungdomsbolig/basecamp-koebenhavn-lyngby,
                                                                                           Peter
jørgensen: approved
https://www.contemporist.com/mad-architects-living-garden/Tian Fangfang
studio@tianfangfang.cn: Approved
Ill. 15: Off-grid
Ill. 16: Design criteria
Ill. 17: Functions – zones
III. 18 Sketches
III. 19 Utilization
Ill. 20: orientation
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- Ill. 21: Entrence
- III. 21. Entitle Ce
 III. 22-28: Journey
 III. 29-35: Star gazing
 III. 36-38: Zones
 III. 39: Staff area

- III. 40-43: units
- III. 44: Detail Terrace
- III. 45: Staff zone
- Ill. 46-47: Kitchen garden
- Ill. 48 -Therapy zoning
- Ill. 49: Mountin, sea-wind
- Ill. 50-57: RT Flow Simulations
- Ill. 58: Vertical windturbines
- Ill. 59: Filtration system in tank https://ecofluid.com/treatment-processes/upflow-sludge-blanketfiltration-usbf/
- Ill. 60: Water consumption

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The Competition Bundle

Explain the competition bundle and a brief summary of the site

- Secret Garden Escape Scandinavian Fjords: Design a hidden, off-grid escape and wellness retreat
 along the sloped bank of the Nærøyfjord UNESCO World Heritage Site, centred around a bountiful kitchen
 garden.
- Floating Sauna Scandinavian Fjords: Design a unique underwater sauna experience beneath the frozen UNESCO Nærøyfjord.
- Site Analysis: This package is a tool to influence and guide your design, if you want it to. It is designed to
 give you a general overview on the area, similar to a site analysis.

General Requirements

All participants must consider and acknowledge the following in their designs, regardless of the competition the design is for:

Materiality
Windows - light and sun exposure
Building orientation
Energy sources
Green technologies

Energy efficiency Passive technologies Water storage and recycling Food sources Ecology Permaculture
Waste recycling
Low-impact lifestyle
Benefit to the environment
Low-impact construction



Design Guidance Checklist:

ı	Desi	gn		\Box	Stargazing area indoor or outdoor if
		Unique and innovative design			stars are visible - will not be raining
		Invisible			Some connection with ancient
		Off grid/sustainable design			Norwegian buildings
		Garden/growing area Communal spaces		Sust	ainability Impact on wildlife - can this project
		Staff kitchen		П	benefit local wildlife?
		External diving deck and comfortable seating			Materiality
		Connection to surroundings throughout External shower			Thermal insulation Heat source
		Private bedrooms with private bathrooms			Water recycling Potable water source
		User experience/journey Suitable for 12 people and 6 staff			Growing area for microhabitat/edible plants on board
		Log burner/heat source			Energy storage - must be non polluting, renewable energy
		Sensory experience Texture/lighting	П	Aron	natherapy
		Natural materials	_		Soft fabrics
		Carefully considered colour palette, needs to reflect the site			Natural stones and wood Stimulate senses
		Monolithic stone feature Area for quiet contemplation			Tactile environment Light

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	Dried herbs Storage jars/bottles and apothecary	_	How do visitors get on and off, and where? Docking station
	Yoga space		No set size but must be appropriate for the use/site
☐ Food	Indoor water source d therapy		The use/site Show option for early morning and late evening skies/atmospheres (dawn and dusk)
	Natural foods Growing area indoor/outdoor Communal dining experience - can be single table for 12 people Views Fire/barbeque Lounge seating for after meal		ose: choose your own subject topic Consideration to the type of users - why are they "escaping" to the retreat? Research and statistics Length of stay
	Interactive experience - gather food themselves Storage of dried herbs, teas, vegetables etc	Subm (ission and drawing list Main images must show proposal in winter with icy water Show external and internal of
☐ Hori	Growing areas and layout Harmonious planting Native, seasonal planting and harvesting time consideration Kitchen and preparation (staff only) Gardening storage Mud room/boot room Greenhouse) ((building Full view of architecture within context Architectural perspective section drawing - feature wall, internal/external growing wall, recycled glass bottles. Axonometric showing zoning and journey through proposal Drawing outlining sustainability and resource conservation strategies to
Othe	Energy and resource conservation - water recycling, composting, etc er Consider wild swimming and what might be needed to ensure safety	(resource conservation strategies to support a completely off-grid proposal Drawing demonstrating wildlife preservation strategies

Garden Escape criteria:

- Your visuals must reflect the site and the landscape of the fjords.
- We are looking for a unique and 'out of the box' design style, always with the user experience in mind. The
 architecture must be functional, user driven and locally responsive using natural resources, suitable for this
 unique location.
- The Escape should provide a sensory experience with a focus on tactile materials, lighting and relate to the garden and associated therapies. It should be almost hidden against the backdrop of the Fjords and create a safe and comforting environment for the user.
- The building should be suitable for 12 people or 6 couples at any one time with a minimum of 6 staff for
 your chosen period of time, based on research. You may add more guests depending on your research and
 project proposal but this must be reflected in the size, scale and accommodation of the building. Reasons
 for this must be included.
- Your design must be of minimal environmental impact with minimal habitat destruction. Consideration for
 wildlife while creating architecture that benefits natural flora and fauna of the area is essential with natural
 by-products being reused, e.g. compost and fertiliser, creating a 'no waste' proposal.
- Growing areas should consider native, seasonal produce, including during harsh winter months, with an
 emphasis on harmonious planting. This indoor/outdoor garden should provide enough food to sustain the
 visitors while producing sufficient harvest to store for less fruitful times.
- The architecture can be on one level or split across multiple levels providing a clear journey for visitors as
 they move through the building. The building should feature communal loungin, dining and outdoor areas
 with private areas for quiet contemplation and each guest and staff member should have a private double
 room with a private bathroom.
- A kitchen area for staff use only must be drawn and detailed this will use produce from the growing areas so should be located nearby.
- An external terrace should feature seating and dining areas and an area to relax before/after wild swimming
 in the fjords.
- The escape will be accessed by boat only, and a docking platform should be considered. If you are taking
 part in the Floating Sauna Competition, this can be featured in your design and located at this dock for the
 quests to use.
- A stargazing platform should be available for guests this can be internal or external. If external, the area
 does not need to be covered if stars are visible there will be no clouds/rain.
- · A monolithic stone structure should be featured within your design this is a chance to get creative.

Appendix 2

Interview

Hello Hilda Sønsterud

As mentioned, we are conducting a master thesis in architecture and design, where we are to compete in an inspirational architecture competition for master student at Larsen Liverpool in October. The competition involves building a retreat in Norway at the Nærøfjords in Aurland Municipality. The retreat is from our own choosing targeting children with late language development and/or stuttering with their parents. And for this reason, we are interested in leaning from your knowledge about people who face languages difficulties and stuttering.

Which age group do you consider to be the most in need of such a retreat? Working with children who stutter from the age of 6 and above are within her expertise, as children under the age of 6 requires some other treatment as well. When designed for children and older kids there are some contrasting points to consider.

...and for which period of time is needed for them to get the proper help?

1 week is enough, some treatments lasting one intense week have been shown to be very beneficial What are the most common characteristics for people/patients with late language development if there are any.

Children are in all more able to stand on their own without their parents present, so for them not to overprotect their kids, spaces for educational purposes for the parent only are needed. Here the parents can share their experiences with having children who suffer from LDD and stuttering. A part of the treatment is also for them to be prepared for the real world where they must be able to stand on their own.

Which kind of rooms and spaces is needed for a language teacher to help the child and/or groups of children?

Big group rooms where you can work with groups of the zise of 6-8 children is a proper distribution. But not to big groups. Groop rooms with space where you a able to gather the children in a circle.

What sensory experiences is shown to be most effective to help children to better communicate and/or what architectural elements do you suggest as a language professor to be helpful for this usergroup? Play and high level of activities are beneficial for the children to be more engaged in the treatment. Going outside is also beneficial for group to have a change of sensory.

ls a connection to the nature and outdoors in some way beneficial to children late language development?

Are there any other hindering for these children and their parents that we need to take in consideration when designing a building for children with late language development? They are being challenges even further when standing in front of an audience, so for them not to get

frighten, to draw to focus on a screen or some pictures are very beneficial to them. An auditorium like space can be used.

In the mean time we have done some analysis of our own focusing on a special experience for an increase interest in the matter. In this relation we are talking about the "mood" of the space. What mood or different mood is there to prefer when working with children who face these issues? When talking a bout mood it could be a meditation zone for creating the feeling of comfort and relaxation or another learning environment that is fun and creates some kind of curiosity.

Both is important. But having a space for mind-fullness can be very beneficial, but have only conducted research about adolescence and adult to receive this kind of treatment.

Furthermore we are suggesting a multisensory experience as we have done a research about how activating other senses might help the children's curiosity and learning curve and language development.... What do you think about that?

Having auditory, tactile, visual and auditory senses activated is very important for children to be more engaged. Everything M.T. is important.

Can food, horticulture and aroma therapy be useful tool/element that might help children with late language development.

Don't know.

Can Calm soothing activities be good for stutters while harvesting activities migh be benefitial to children.?

Don't know.

Do you usually use some specific elements or tools in your treatments sessions, do you need a precise space for something related to treatments course? Some element children might benefit from in their therapy sessions? Are there some activities/elements that are beneficial for children's play when tackling this issue.

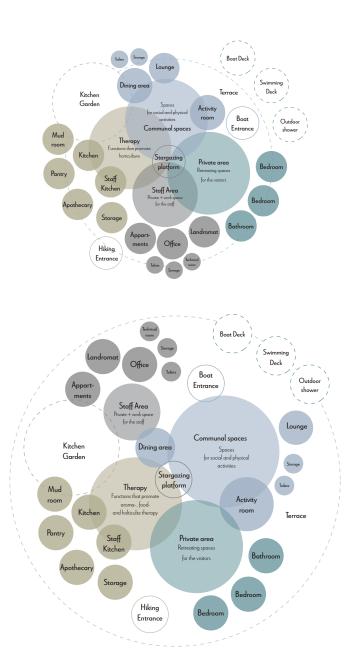
For a therapist a desk and a chair is needed, and space for colleagues to gather would also be nice. Do you think such a stay/retreat have a beneficial effect on children with LLD and stutters?

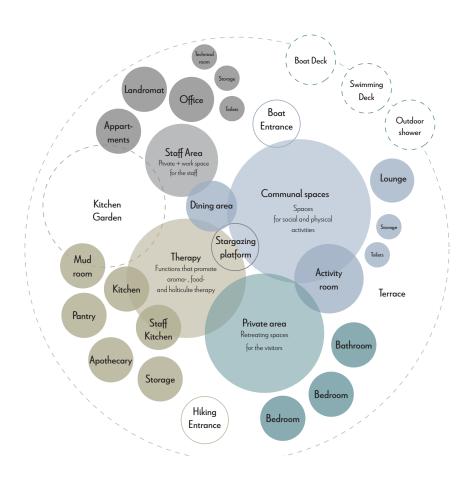
Very much. And it would be nice to see such a place be realized.

Furthermore, is there anything else you value as important in relation to our design process whitin this field of topic?

Having a place for student to be able to watch the children interact and how treatment sessions are done would be nice. Having a sort of mirrored glass window for them to watch without the kids been aware of being watched. Using these glass windows are have been tried out and well received by student studying children with LDD and stuttering.

Appendix 3 Initial functions diagrams

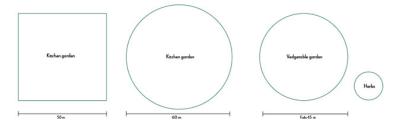




Appendix 4

In terms of defining the size of the self sufficient garden, calculations have been made out of what an average person + child consume in a year (see appendix)

The size of the garden should be approximately 1500 square meters. This could for example be presented in a garden at the size of around 50x50 meters. It could also be presented whitin a circular garden represented by a circle with a radius of around 30 meters. For a more organized garden a proposal of two smaller gardens is to be preferred: one for Vedgetables and fruit and one for Herbs.



How many square meters is required for a Kitchen garden to be self-sustainable? In terms of defining the size of the self sufficient Garden, calculations have been made out from what an average person + child consume in a day/year. The average person needs about 400 grams of fruits and vegetables in a day meaning 146 Kg pr year. For a garden to produce enough food deepens on various things such as amount of cultivation, climate, soil, humus, timely and water etc. The self-suffienct kitchen garden produce can vary from one to four kilograms per squarre meters depending on the choice of vegetable there is planted. For example, carrots, kale and potatoes are very productive vedgetable regarding to the size they need. The harvesting of carrots can be up to 10 kg. per m2. And a hectare of potatoes can yield more than sixty tons of potatoes, meaning for one person you need approxamatly 15 squarre meters of garden space, or in a garden with the size of 50x50 meters, four rows of potato to last one year for approxametly 18 people.

Potato plants	
Potato plants	
Potato plants	
Potato plants	
50 m	

If one person requires 146 Kg pr. Year and a child requires about two thirds of that and the retreat can occupied by 8 adult staff, six of whom work per shift, which means there would be five staff every day, in addition to 12 parents, in total there would be 17 adults and 6 children there needs to be cultivated 2336 Kilograms yearly for the designed Kitchen garden to be self-sufficient.

Furton if the ground in the kitchen garden is of well soil, the kitchen garden should at least be able to produce 2 Kilograms of fruits and vedgetable per squarre meter a garden at the size of 1533 m2 is needed to feed the visitors of the retreat.

$$3066 \, \text{Kg} / 2 \, \text{Kg per m2} = 1533 \, \text{m2}$$

In addition to this fruit trees should be planted near or in the garden for additional food. The wish is here to plant apple, pear and trees of plum of three trees of each. These should be plantet with a distance of each other of a maximum of δ mesters if they are about to become very big. So in addition to the 1533 m2 kitchen garden a plot of land for trees of a bout the sixe of 18x18 meters.

$$18*18 = 324 \text{ m2}$$
 Total
$$324 + 1533 = 1857 \text{ m2}$$

Apple Tree FAQs – Irish Seed Savers Association

How many m2 4 self-sustainable? (cultu.be)

Appendix 5 Kitchen Garden

In terms of Energy Demand for the building, included in the calculations are:

- Energy demand: Heating
- Machine/system
- Electrical appliences
- Pumps

Energy	demand	Demand p	er m2 m	ı	Units	Floor	area	Units		•
Heating	Critical cold day		4,5	LAA/I	n/m2month	97		m2		
пеасіп	Critical hot day		0,0	KVVI	i/mzmontn	97	4	m2		
		1							•	•
			and per	tota	Units	Mon	th	Total demand	per day	Units
			4383,0	00	 	Januar	31		141,39	LANGE / el e
			0,00)	kWh/month	June	30		0,00	kWh/day

REference: Month Average Excel.

When finding a pump the energy demand pr. day must be known: 146,67 kWh/day To gey it to hours:

$$141.39 / 24 \text{ hours} = 5.89 \text{ kWh}$$

To get the energy the pump is in need of: Divide with COP from the heat pump that is found: The COP is a measurement of the energy efficiency of the unit's heating performance.

There are generellay four types of heatpumps: Air souce, Ground source, water souce and Air-to-air souce:

Writer, J.J.L. and Manager, M.S.C. (2023) A guide to the 4 types of heat pumps: Pros & Cons, The Eco Experts. Available at: https://www.theecoexperts.co.uk/heat-pumps/types (Accessed: 25 May 2024).

First it was estimated to include a boiler, but as a heat pumps uses less energy aso this is preferred.

https://www.sinclair-solutions.com/en/products/heat-pumps/s-therm-yukon-twin-fan-monoblock-units/11519-smhm-180b-3-053122000005180.html

$$COP = 4.7$$

 $5,89 \, \text{kWh} / 4,7 = 1,25 \, \text{kWh}$

	Machine/system	Demand	Units	nated use hours pe	erlemand per da	Units
tama	Mechanical ventilation	4,4	LAM	24	105,6	kWh/day
Systems	Heat pump	1,25	kW	24	30,1	KWII/uay
	$Total_1$				135,7	kWh/day

Electric appliances		Demand	Units	Occupancy		Units	Per day	Units
		Per one family		around 8 families	machine * occupants		Demand: Electric appliances / 365 day	
Refridgerator		288		8	2304,0		6,31	
Freezer		409		2	818,0		2,24	
Dishwasher		289		1	289,0		0,79	
Washer		243		2	486,0		1,33	
Dryer		368	kWh/ year	1	368,0	kWh/ year	1,01	
Audio visual appliances		330		0	0,0		0,00	kWh/day
Computer		226		0	0,0		0,00	
Standby power		482		8	3856,0		10,56	
							Demand per total lighting / 182.5 day	
P. L.C.	winter	552	LIME C	8	4416,0	tred (24,2	
lighting	summer	300	kWh/ season	8	2400,0	kWh/ season	13,2	
Total ₂	winter						46,45	Land All
	summer						35,40	kWh/day

For the electrical appliances estimations recording to a households are found at this source:

Olivier Sidler, Jérome Lemoine, ENERTECH Benoit Lebot, International Energy Agency Electricity Demand in European Households: Major Findings from an Extensive End-Use Metering Project in Four Individual Countries By: Olivier Sidler, Jérome Lemoine, ENERTECH Benoit Lebot, International Energy Agency Lorenzo Pagliano, Politechnicum Milano Available at: https://www.aceee.org/files/proceedings/2002/data/papers/SS02_Panel8_Paper23.pdf acessed at: (25-05-2024)

	Machine/system	Demand	Units	Estimated use hours per day	Demand per day	Units
	Filtered black water> toilets	2,00		3	6	
numana	Filtered rainwater> cleaning/showering	2,00	kW	3	6	kWh/day
pumps	Well drink water> tank	2,00	KVV	3	6	KWII/uay
	Drink water> foset	2,00		3	6	
	$Total_3$				24	kWh/day

Admin (2024) Water pump electricity usage: Capacity and factors, FAMCO. Available at: https://famcocorp.ae/blog/water-pump-electricity-usage-capacity-and-factors/ (Accessed: 25 May 2024).

Energy dema	Energy demand (DK)					
$Total_{all}$	$Total_1 + Total_2 + Total_3$	winter	206,129	kWh/day		
Totalall	100001. 100002. 100003	summer	195,08	kwn/day		

Calculation is made for a winter day, as it would be the more critical period. January

Estimated energy needed to be produced for each system

Energy is covered by:

from CBE: Center for the Built Vnvironment In average the global and Diffuse Horizontal Solar Radiation per day / January 65 Wh/m²

 $W\,to\,kW$

$$65/1000 = 0.065 \, \text{kWh/m}^2$$

So they produce

$$0.065 \, \text{kW} \, * \, 24 \, \text{h} = \text{kWh/m}^2/\text{day}$$

The PV system's capacity should be:

Total energy consumption / Average Solar insulation
$$20,61 \, kWh/day / 1,56 \, kWh/m2/day = 13,21 \, kW$$

But with an efficienty at 18%

$$13.21 \, \text{kW} / 0.18 = 73.41 \, \text{kW}$$

each panel has power rating 400 W or 0,4 kW The number of PV-panels should be

$$73.41 \, \text{kW} / 0.4 \, \text{kW} = 183.5 \, (184 \, \text{PV-Panels})$$

one PV-panels has the area of 1,7 m2 so the total are needed is

$$184 * 1.7 = 108 \text{ m}2$$

For the rest to be covered the 85% Vertical wind turbines should produce 185,34 kWgh/day. For this it is chosen for some of it to be integrated into the building and the rest integrated into the urban landscape. To get the estimate of performane of a particular wind turbine this formula is used:

$$AEO = 1.64 * D^2 * D^3$$

AEO = Anual energy output (kWh/day)

D = rotor diameter, m (here 2,25 m)

V = Annual wind speed (here 8 m/s)

$$AEO = 1,64 * 2,25^2 * 8^3 = 1889,28 \, kWh/year$$

Per day

$$1889,28 \, \text{kWh/year} / 365 = 5,2 \, \text{kWh/day}$$

Estimated energy needed to be produced from wind turbine integrated in the building design

$$218,05\,kWh/year$$
 * 18% * $27\,\%=50\,kWh$ Number of turbines needed

$$50 \text{ kWh} / 5.2 \text{ kWh/day} = 10 \text{ wind turbines}$$

Integrated into the building design is 10 vertical wind turbines, they are placed inside the sloped part of the building where its becoming a part of the terrain. 2 in each placement. (see master plan) In the urban design plan there is needed bigger turbines. Same presidure.

To get the estimate of performane of a particular wind turbine this formula is used:

$$AEO = 1,64 * D^2 * D^3$$

AEO = Anual energy output (kWh/day)

D = rotor diameter, m (here 6,25 m)

V = Annual wind speed (here 8 m/s)

$$AEO = 1,64 * 6,25^2 * 8^3 = 5248 \text{ kWh/year}$$

Per day

$$5248 \, \text{kWh/year} / 365 = 14.4 \, \text{kWh/day}$$

Estimated energy needed to be produced from wind turbine integrated in the building design

$$kWh/year * 18\% * 73\% = 135 kWh$$

Number of turbines needed

$$135 \, \text{kWh} / 14,4 \, \text{kWh} / \text{day} = 9,4 \, (10 \, \text{big wind turbines})$$

Integrated into urban design plan is 10 bigger vertical wind turbines, they are placed on the slope up the mountin.

Battery size:

in this webpage a semple metho to calculate the batter size is described

https://www.awelectrics.co.uk/finding-your-perfect-solar-battery-size-a-step-by-step-guide/

Energy Consumption: The total daily energy demand required in the building.

Autonomy Days: The number of days that a renewable system can provide energy in case the external energy sources like sun or wind are not provided

Depth of Discharge (DoD): The percentage of the total battery capacity that can be used, before recharging is regiuered

In this linkit is found that a Lithium-ion battery's DoD is about 90%, it has higher energy density compared to the lead acid battery which means it can store more power in relation to the battery dimension size, require less maintenance and it has a relatively high life span

 $https://www.epowertechnologies.co.za/news/lithium-ion-batteries/\#: \sim : text=What\%20 is\%20 the\%20DoD\%20of, to\%20charge\%20it\%20as\%20often.$

Formula: Battery Size = $(total\ energy\ consumption\ in\ kWh\ x\ Autonomy\ Days)\ /\ 0.95 = battery\ size\ in\ kWh.$

Considering other factors likewise; the system efficiency and temperature 80%

The final formula: Battery Size = (total energy consumption in kWh x Autonomy Days) / 0.95*0.8 = battery size in kWh.

Energy Consumption: 218,05 kWh
Autonomy Days 5days
Depth of Discharge (DoD) 0,95
Other factors 0,8

Battery size:

 $218,05*5) / (0,95*0,8) = 1434,5 \, kWh$

From this link, a battery unit that can be installed in a module system is found.

https://www.improvecn.com/articles/application-of-lithium-battery-in-household-energy-storage-system

The specific chose battery can be found at this link:

https://www.improvecn.com/products/10-30kwh-stackable-power-storage-brick?tab=tech_specs

The chose unit has a capacity of 30 kWh The battery has these dimensions:

Lenght: 0,6 m With: 0,5 m Height: 1,285 m Volume: 0,3855 m^3

Total:

$$1434.5 \, \text{kWh} / 30 \, \text{kWh} = 47.8 \, \text{kWh}$$

Total volume

$$0.385 \, \text{m}^3 \, *47.8 \, \text{kWh} = 18.4 \, \text{m}^3$$

With a storage room hight at 2,3 m the need area to fit the battery is: $8\,\text{m}^2$

$$18.4 \,\mathrm{m}^3 / 2.3 \,\mathrm{m} = 8.01 \,\mathrm{m}^2$$



31/05/2024, 02:26 Mail - mkhadd18@student.aau.dk

RE: Use of pictures

Maher Mohammad Esam Khaddam

Fri 12/04/2024 11:18

To:Katerina Tsili <tsili.314studio@gmail.com>;

Hey Katerina

Thank you very much for your help and your approvment. I assure you that we will refer to the Pictures owner in our final report.

Here is our initial introduction and framework that will draw some outlines about our project.

Introduction:

In a world constantly pulsating with noise and speed, some of our most vulnerable citizens face a distinct challenge: Children with language delays and other difficulties such as stuttering and their affected parents as well. Confronting an overwhelming world where words can feel like rivals, there is an urgent need for a space/place where these children can find tranquility, comfort, and a voice of their own. This master's project in civil engineering architecture strives to reach the goal of becoming a tribute to the strength found in silence. Presenting here is an innovative concept: a retreat tailored specifically to these exceptional children, a multisensory experience where the children can explore, learn, and grow without the fear of being overwhelmed by other disrupts/distractions.

The framework:

https://www.larsenarchitecture.com/company

Larsen Architecture is a dynamic team of professionals, who design international competitions and workshops to challenge and inspire young participants, and students to make their master thesis projects.

With Larsen Liverpool's new competition, Hidden Garden Escape, their main goal is to design a retreat with a high level of sustainability, requiring the users to be close to nature, and creating a project that is undetectable and fits smoothly with the topography.

Our main goal of using your pictures is to use them as inspiration for undetectable architecture.

Med venlig hilsen Maher 42332409 Mkhadd18@student.aau.dk https://www.linkedin.com/in/maherkhaddam/

From: Katerina Tsili

Sent: Friday, 12 April 2024 10.44 To: Maher Mohammad Esam Khaddam

Subject: Re: Use of pictures

Good morning! Of course, you can use these photos for your thesis, provided that the source from which you obtained the photos is shown, as is usual in any research. Also, we would be interested in hearing a few words about your thesis and the reason why you want to use these photos.

Maher Mohammad Esam Khaddam

Tue 16/04/2024 10:00

Sent Items

To:Brad Feinknopf < bfeinknopf@feinknopf.com >;

Hey Brad

Thank you for permitting us to use your pictures. I will assure you that we will cite you in our thesis.

Med venlig hilsen Maher 42332409 Mkhadd18@student.aau.dk https://www.linkedin.com/in/maherkhaddam/

From: Brad Feinknopf

Sent: Friday, 12 April 2024 13.14

To: Maher Mohammad Esam Khaddam

Cc: info@ottoarchive.com Subject: Re: Use of pictures

Maher

I thought I had replied. That's fine. Please credit the image in your thesis as " Photography ©Brad Feinknopf"

Thank you for asking first.

All the Best,

Brad Feinknopf

Please excuse any typos!!!

104 N. 3rd St. Columbus, Ohio 43215 (614) 225-0414

Recently selected by ArchDaily as one of the Top Photographers in the World to Follow

http://www.archdaily.com/417291/world-photo-day-the-13-architecture-photographers-to-follow-now/section and the section of t

Please check out my new website at:

http://www.feinknopf.com

On Apr 12, 2024, at 5:41 AM, Maher Mohammad Esam Khaddam <mkhadd18@student.aau.dk> wrote:

info <info@superform.si>

Fri 12/04/2024 11:29

To:Maher Mohammad Esam Khaddam <mkhadd18@student.aau.dk>;

Hi there.

It's alright with us. I'm glad that our projects inspire others.

Best wishes, Marjan

marjan poboljšaj, u.d.i.a.. | +386 40 561 077 | marjan@superform.si

superform, d. o. o. | nazorjeva 6a, 1000 ljubljana, slovenia | http://www.superform.si

From: Maher Mohammad Esam Khaddam <mkhadd18@student.aau.dk>

Sent: Friday, April 12, 2024 10:33 AM

To: info@superform.si Subject: Use of pictures

To whoever has the right.

Hey

I am trying again here, with the hope off getting your answer.

Concerning publishing an architectural master thesis, I need your approval to use the following images, which can be found in this link.

https://www.theplan.it/award-2023-villa/my-little-big-world-a-villa-based-on-a-fluid-inward-oriented-atrium-superform

Med venlig hilsen Maher 42332409 Mkhadd18@student.aau.dk https://www.linkedin.com/in/maherkhaddam/

Maher Mohammad Esam Khaddam

Fri 12/04/2024 11:47

To:KRAK. architects < krakarchitects@gmail.com>;

Hey Konstantinos

Sent Items

Thank you for your reply, and I assure you that we will cite the author in our final report.

Med venlig hilsen Maher 42332409 Mkhadd18@student.aau.dk https://www.linkedin.com/in/maherkhaddam/

From: KRAK. architects

Sent: Friday, 12 April 2024 11.42 To: Maher Mohammad Esam Khaddam

Subject: Re: Use of pictures

The images are subject to intellectual rights , you can use them for scientific purposes by adding citation and with the author mentioned clearly ©konstantinos stathopoulos|KRAK. architects

Konstantinos Stathopoulos

architect & founder of konstantinos stathopoulos | KRAK. architects

On Fri, Apr 12, 2024 at 11:07 AM Maher Mohammad Esam Khaddam < mkhadd18@student.aau.dk > wrote:

To whoever has the right.

Hey

Concerning publishing an architectural master thesis, I need your approval to use the following images, that can be found in these two links.

 $\underline{https://www.designboom.com/architecture/konstantinos-stathopoulos-krak-architects-engraves-crooked-residence-like and the properties of the properties o$ cretan-landscape-10-08-2021/#

Maher Mohammad Esam Khaddam

Thu 21/03/2024 10:15

To:George Messaritakis < g@gmessaritakis.com > ;

Hi George

Thank you a lot for giving permission. I will assure to hold the conditions as you wish. And I will already ensure you that the picture will only be used for academic purposes.

Thank you very much, wish you all the best.

Med venlig hilsen Maher 42332409 Mkhadd18@student.aau.dk https://www.linkedin.com/in/maherkhaddam/

From: George Messaritakis

Sent: Wednesday, 20 March 2024 20.06 To: Maher Mohammad Esam Khaddam Subject: Re: Use of pictures

Dear Maher,

Thanks for getting in contact. I hold the copyright on the images and I can give you permission to use them on your

The conditions are that the architects name and my name must be mentioned with the images, and also the images can only be used non-commercially in the academic context of your thesis.

I hope this helps and good luck with your studies!

Kind regards

George



George Messaritakis photographer

architecture + landscape



Athens +30 6977 618916 g@gmessaritakis.com

Use of picturs

Martin Møller Vilhelmsen <mam@cebraarchitecture.dk>

Fri 26/04/2024 13:09

To:Maher Mohammad Esam Khaddam <mkhadd18@student.aau.dk>;

Hi Maher,

Thank you for reaching out and for your interest in CEBRA's work.

Please, follow this link to see the photos (expires on May 12): https://collab.cebraarchitecture.dk/s/NDpFSSidGeSZBj2

Terms and conditions of educational use

The materials available via the link in this email must only be used for educational purposes. The content must remain unchanged and cannot be edited without further agreement with CEBRA. Moreover, you are not allowed to use, share, or edit the content for commercial purposes or share it with third parties without permission from CEBRA.

Feel free to reach out if you have any questions. Good luck with your thesis. Have a nice weekend!

Speak soon,

Med venlig hilsen | Best regards

Martin Møller Vilhelmsen Kommunikationsansvarlig | Communications Manager

office +45 8730 3439 | direct +45 3161 9671 email mam@cebraarchitecture.dk









aarhus | Vesterbro Torv 3, 2. sal | 8000 Aarhus C copenhagen | Vesterbrogade 124B, 3. sal th. | 1620 København V

Web | Facebook | LinkedIn | Instagram | YouTube

From: Maher Mohammad Esam Khaddam <mkhadd18@student.aau.dk>

Sent: Tuesday, April 16, 2024 8:55 AM

To: Cebra main email <cebra@cebraarchitecture.dk>

Subject: Use of picturs

You don't often get email from mkhadd18@student.aau.dk. Learn why this is important

Hey

Maher	Mohammad	Fsam	Khaddam
IVIAIICI	Wildingillinga	LJUIII	KIIAUUUIII

Thu 21/03/2024 10:11

Sent Items

To:info@fabijanic.com <info@fabijanic.com>;

Hi Damir

Thanks for your approvment.

Med venlig hilsen Maher 42332409 Mkhadd18@student.aau.dk

https://www.linkedin.com/in/maherkhaddam/

From: info@fabijanic.com

Sent: Monday, 18 March 2024 17.31 To: Maher Mohammad Esam Khaddam

Subject: RE: Use of pictures

It's okay to use photos for that purpose.

Damir Fabijanic

From: Maher Mohammad Esam Khaddam <mkhadd18@student.aau.dk>

Sent: Monday, March 18, 2024 11:00 AM

To: info@fabijanic.com Subject: Use of pictures

To whoever has the right.

Hey

Concerning publishing an architectural master thesis, I need your approval to use the following images, which can be found in this link.

https://www.archdaily.com/903759/issa-megaron-proarh?ad_source=search&ad_medium=search_result_all

Med venlig hilsen

Karel Galland <kgalland@ecofluid.com></kgalland@ecofluid.com>
on 15-05-2024 18:19
Til:Trine Vig Laursen <tvla18@student.aau.dk>;</tvla18@student.aau.dk>
Hi Ventig, Feel free to use the illustration in the proposed context. Karel V Galland, PEng ECOfluid Systems Inc 1900-200 Granville Street Vancouver, BC, V6C 1S4 T: 604 662-4544, Direct: 604 696-6947
From: Trine Vig Laursen <tvla18@student.aau.dk> Sent: Monday, May 13, 2024 10:59 PM To: info <info@ecofluid.com> Subject: Use of pictures</info@ecofluid.com></tvla18@student.aau.dk>
CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.
ні
ECOfluid
I am reaching out to you to get your authorization to use some illustrations on your website in relation to publishing a master thesis about off-grid architecture where the plan is to use some of your techonologies. IT is about this illustration
https://ecofluid.com/treatment-processes/upflow-sludge-blanket-filtration-usbf/
tank you in advance
Venlig Hilsen
Trine Vig Laursen
Aalborg Universitet
ARK/URB

Peter Jørgensen <pjfoto@mail.dk>

ma 11-03-2024 10:44

Til:Trine Vig Laursen <tvla18@student.aau.dk>;

Hej Trine,

det er du velkommen til

Venlig hilsen Fotograf Peter Jørgensen Biskop Svanes Vej 8 3460 Birkerød Tlf.: 45 4045 4171 Mobil: 4045 4171 www.pjfotograf.dk

Den 11. mar. 2024 kl. 10.37 skrev Trine Vig Laursen < tvla18@student.aau.dk>:

Hej Peter

I forbindelse med at jeg udgiver mit Master projekt, vdr. Arkitektur og design fra Aalborg universitet ønsker jeg tilladelse til at bruge de billeder du har fotograferet af Skovbrynet i Lyngby. Det drejer sig om dette foto.

<pastedImage.png>

Håber jeg har fået kontakt til rette vedkommende.

Venlig Hilsen
Trine Vig Laursen
Aalborg Universitet
ARK/URB

答复: Use of Pictures

方方的田 STUDIO FANG <studio@tianfangfang.cn>

ma 11-03-2024 10:04

Til:Trine Vig Laursen <tvla18@student.aau.dk>;

Hi Laursen

Thanks for informing me. Yes, you are allowed to use the pictures. If you need any other help, let me know.

Best regards

Tian Fangfang

方方的田 STUDIO FANG

地址: 上海市徐汇区襄阳北路131弄3号楼

邮箱: studio@tianfangfang.cn

发件人: Trine Vig Laursen <tvla18@student.aau.dk>

日期: 星期一, 2024年3月11日 16:47

收件人: 方方的田 STUDIO FANG <studio@tianfangfang.cn>

主题: Use of Pictures

Hello Tian

I am writing and about to publish an Architectual Master thesis project for a competition in Norway. A Master thesis from Denmark that is going to be publish on June 2024. For safety reasons I need to ask for your permission to use and refer to one of your photographs. The images I am interest in using is from this article published in 2018. https://www.contemporist.com/mad-architects-living-garden/

Best Regards

Trine Vig Laursen

Aalborg Universitet

ARK/URB

Sv: Contact Form Submitted

Trine Vig Laursen

on 13-03-2024 09:28

Sent Items

Til:Garry Belinsky <gb@garrybelinsky.com>;

Hi Gary

Thank you for letting us showcase your images when we refer to: The Bay Welcome center

We are writing a Master thesis about how to go beyond sustainability with regenerative design strategies, such as green tecnologies. We are designing a retreat in Norway in relation to a Competition by Larsen Liverpool. A retreat for late language development among children aged 2 to 4. A retreat that when build gives back and include nature.

We will of cause give cititation to you in relation to use your pictures.

Best regards
Trine Vig Laursen
Aalborg Universitet
ARK/URB

Fra: Garry Belinsky <gb@garrybelinsky.com>

Sendt: 12. marts 2024 18:43:09

Til: Trine Vig Laursen

Emne: Re: Contact Form Submitted

Hi Trine,

Thanks for reaching out! I don't see any issue with you publishing some of my images in your thesis, as long as you include a photo credit. Can you please tell me a little more about your thesis project and which images you are interested in? I may have some more shots of the welcome center which do not appear on my website.

Best, Garry

GARRY BELINSKY PHOTOGRAPHY (510) 825-6998 garrybelinsky.com

On Mar 11, 2024, at 2:52 AM, Trine Vig Laursen <postmaster@mg.photofolio.com> wrote:

A contact form was submitted:

title: Contact

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