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◂ Ill. 1 - Pathway through the wooded area towards the site.

Abstract

The purpose of the thesis is to create a psychiatric facility located in Aalborg, Denmark.
The project will focus on the notion of deinstitutionalizing the architectural space; creating an environment that seeks to promote healing and lower the hospitalization duration.

In terms of utilizing the notion of deinstitutionalized space, the project will seek to understand its opposite, the institution, and how its counterpart - a non-hierarchical, humanized environment, can be created in a design proposal.

The project will integrate elements of evidence based design into the final proposal, thus seeking to integrate scientifically proven methods into the proposal. The project will also seek to combine functional, aesthetic and technical aspects through an integrated design process.

Reader's guide

The thesis communicates the process and development of a psychiatric youth facility located in Aalborg, Denmark.

The report is divided into six parts; *motivation* (**I**); analysis - which contains *thematic analyses* (**II**) and *architectural approach* (**III**) - *design process* (**IV**); *presentation* (**V**) and *epilogue* (**VI**).

This structure reflects the integrated design process, working through thematic analyses in order to understand the problem of the project and the method of solving it through a design proposal. The sketching and synthesis phases are then introduced, communicating the outcome and integration of technical, aesthetical and functional elements. The final section explains and presents the design.

Reflections and conclusions, as well as all references and illustrations, are organized in the epilogue section.

CONTENTS

Ill. 1 - Beech forest with pathway.

INTRODUCTION

The following thesis project represents a product of work conducted to elaborate on the development of an architectural master thesis at Aalborg University.

The thesis focuses on the establishing of a youth psychiatry facility, which must implement user needs, context, as well as functional and technical demands; all contributing in creating an architectural environment which supports the notion of *healing architecture*.

The initial analysis chapter will seek to clarify existing conditions in the chosen field of youth psychiatry and the prevailing contextual conditions at the site, located at Skovdalen in Aalborg.

◂ Ill.2 - Photograph from surrounding area. Taken from the hill top west to the site.

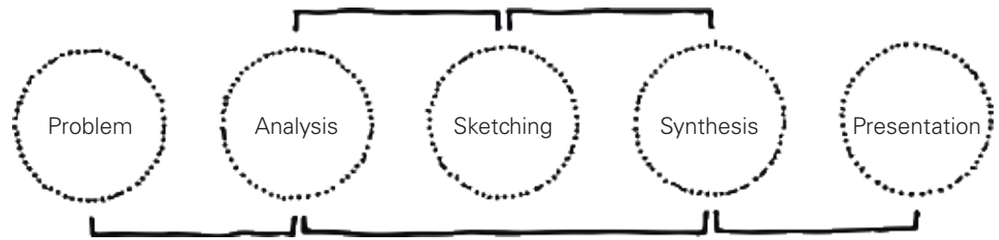
I

MOTIVATION

In the following segment, the initial phase of the project will be described, concerning the problem of the thesis – regarding the increased number of young people who have gotten in contact with the psychiatry. This will be followed by the used method of the Integrated Design Process, as well as evidence-based design. At last the implemented theories will be described.

PROBLEM

As previously mentioned, the thesis will focus on the designing of a youth psychiatric facility to be located in Aalborg. The main motivation for this is to accommodate the rising numbers in both outpatient stays and hospitalizations of youth in relation to psychiatry (elaborated further upon in Diagnoses in Youth Psychiatry, page 17).
Furthermore, the environments of the psychiatric facilities are to be explored in relation to healing architecture; how the designing of spaces can have a positive, supporting effect on the improvement of health of the patients.



Methodology

Integrated Design Process

The integrated design process combines five different phases in creating a design proposal, ensuring that an iterative process is achieved. The five phases of the integrated design process are defined as 1) problem statement, 2) analysis, 3) sketching, 4) synthesis and 5) presentation. By following and iterating upon these five points, an approximation towards the final design is achieved, continuously revising and optimizing the project as knowledge is obtained [Knudstrup, 2005].

In the problem phase, the goals and motivation for the project are presented. In the analysis and sketching phases, the basis for the designing is developed; thematic and context analyses are incorporated, creating the frame for the design parameters, which will steer the project along. The sketching phase develops different architectural proposals from these parameters, into which technical aspects, functionality and aesthetics are integrated. In the synthesis phase, all aspects from the previous phases are combined into a final proposal. By following the integrated design process, it is ensured that iterations and revisions are made accordingly before a final proposal, fulfilling design parameters and goals, can be presented in the presentation phase.

◂ Ill.3 - Photograph of pathway through beech forest.

▴ Ill.4 - Diagram of the Integrated Design Process

Evidence-Based Design

The notion of evidence-based design describes the process of basing decisions about the built environment on credible, scientific research in order to improve the design for the user. Evidence-based design can be traced to environmental psychologist Roger S. Ulrich's observations in 1984; that hospitalized patients with a view of greenery from their beds had shorter convalescences, fewer complications and would have a lower need for medication [Ulrich, 1984].

The thesis will seek to explore some of the methods in healing architecture that have a proven scientific effect on a patient's health. Some of these methods include; the patient's access to natural environments; the effect of daylight and room orientation towards east and south; [Frandsen, A.K. et.al, 2009, p.26] the usage of sound as a calming factor; and the establishing of both private and social spaces as a means of healing [Frandsen, A.K. et al, 2009, p.154].

Implemented theory

Zumthor // Böhme: Atmospheres

The thesis seeks to explore the notion of healing architecture and how an architectural environment can include elements from this, supporting a psychiatric patient's healing. In relation to this, it is relevant to include the subject of architectural atmosphere, which is a term that influences how a user perceives a certain space. In his work, "*Atmospheres*" [Zumthor, 2006], architect Peter Zumthor seeks to explain how atmosphere can be implemented as design elements in architecture [see page x], arguing that architecture can be perceived as the human body; consisting of structure and skin which can be touched by the human. By implementing elements such as light, materiality, sound and differences in scale, a certain atmosphere can be created by the architect – which can then be understood by the user as a certain harmony, mood or feeling of presence [Zumthor, 2006, p. 13].

In his essay, "Atmosphere as the Subject Matter of Architecture" [Böhme, 2005], German philosopher Gernot Böhme also touches upon the subject of atmosphere in architecture. Böhme also investigates the relation between the inhabitor (user) and space; how space is initially a void or empty structure, which is then given atmospheric meaning by the user through memory, perception and emotion.

Using these the works of these two theorists, mainly Zumthor, the thesis will seek to explore how atmosphere can be implemented in a healing environment.

Goffman: Front stage + back stage

The thesis will seek to explore the relevance of public-social and private spaces in psychiatry; how both are achieved in order for the patient's needs to be covered. Also, the relation between the users of the psychiatric facility - primarily between the patient and the staff/caregiver - is to be included in this analysis; to which degree the patient is visibly seen by the caregiver; what the patient's needs are in relation to this; and how the presence of the staff is perceived by the patient.

Sociologist Erving Goffman (1922-1982) explores in his microsociological work "The Presentation of Self in Everyday Life" [Goffman, 1956] how the human being presents himself and is perceived by his surrounding environment and peers. This perception is controlled, Goffman argues, by the "front stage" and "back stage" presence of the human – front stage; how the human interacts socially, here applying to himself certain roles in each social environment; and back stage, the setting of the private human being, an environment which symbolizes the "real" self; the role one always returns to when alone [see analysis, page 22].

Through the analysis of this theory, the thesis will seek to implement architectural spaces that support these two different types of interaction; the private space and the social-public space.

Semper: Tectonics + Stereotomics

In terms of constructing and detailing the architectural space, the thesis will seek to explore the different elements of the building and how they can influence the human perception of space. German architect Gottfried Semper (1803-1879) theorized in "The Four Elements of Architecture" [Semper, 1851] that architecture consists generally of two elements; the tectonic and the stereotomic – opposites in the process of constructing and perceiving architecture, able to create a dynamic and a dialogue between the different elements. The tectonic, Semper argues, refers to the lightweight frame of the architecture – such as a wooden frame construction – whereas stereotomics refers to the heavy earthwork or the mass of the architecture, such as stone work [see full analysis, page 26], thus creating opposing expressions.

The thesis will seek to implement these elements of architecture in the final proposal, implementing each of their qualities in order for them to match each individual space and the qualities that are to be achieved in them.

▸ Ill.5 - Photograph of Aalborgtårnet seen from below.

II

THEMATIC ANALYSES

Through the following section of the thesis, all background analyses will be described, giving a better understanding for chosen focus areas and general choices. In the thematic analysis, the overall history of the different hospital systems of Denmark will be described – also in relation to the youth psychiatry. This leads to the choice of focus area of the thesis concerning the youth psychiatry and its relation to a possible pathologization in the health care system - a deinstitutionalization of a youth psychiatry facility is therefore being presented as a solution to the problem.

Looking at the factors above, a description of architecture and nature as well as their possibilities of being healing elements, has been made. From this, a site and case studies have been chosen to work with, and to implement elements of value from the different parts.

Finishing the thematic analysis, various design parameters have been stated, followed by a vision of the thesis as well as problems to be solved.

YOUTH PSYCHIATRY

The evolution of health care

The Danish health care sector in general has undergone several paradigm shifts since the mid-1700s. Early hospitals were focused on the aesthetical and holistic aspect of treating patients and less aware of the contamination risks and the scientific aspect of the treatment. These institutions focused on promoting inner healing, partly due to lack of knowledge, rather than applying a scientific treatment [Heslet, Dirckinck-Holmfeld 2007].

Due to the new awareness of contamination risk in the 1800s and 1900s, hospitals in Europe were being designed as pavillon hospitals. In these hospitals, the scientification of the medical profession led to a subdivided hospital with specialised, separate departments, minimizing contamination and promoting patient health. This humanization of the hospital and awareness of the human condition spread to the psychiatric field around Europe around the early-1800s [Petersen, 2006].

In Denmark, the psychiatric institution in Risskov near Aarhus was one of the first to implement the new approach; recognizing the mentally ill patients as treatable. The asylum in Risskov was inaugurated in 1861 and marked the beginning of modern psychiatry in Denmark [Petersen, 2006].
During the 1960s, the hospitals had to accommodate to a new paradigm with increased scientific knowhow and a more democratic society. This lead to the large technological hospitals that have prevailed until recently. This type of hospital is primarily an institution meant to cure as many as possible by standardizing treatment and architecture. In this new paradigm, the psychiatric hospital is primarily located near the somatic part of the hospital to increase interdisciplinary efficiency [Petersen, 2006].
Today, the awareness of the holistic approach is returning, resulting in a new paradigm promoting the interpretation of the patient as a resource instead of a problem [Heslet, Dirckinck-Holmfeld, 2007].

The modern youth psychiatric institution

The number of young people visiting the ambulatory and being hospitalized in the psychiatric sector is generally rising. This is especially true for young women at the age of 16 – 24 years of age [Christensen, Davidsen, et.al 2010]. This could be a result of an increased number of people being diagnosed with mental illness and the increased demands and expectations in society - see page 17 [Christensen, Davidsen, et.al, 2010].
Among the mental illnesses treated in the youth psychiatry is:

- Behaviour - and emotional disturbance (ADHD)
- Anxiety
- Depression
- Eating disorder
- Obsessive-compulsive disorder (OCD)

[Region Northern Denmark, 2011].
The average age of a patient in the youth psychiatric institution differs regionally in Denmark. At the current institution in Aalborg, the patients are treated up until the age of 18 [Region Northern Denmark, 2011].

Hospitalization
The general procedure when a patient is hospitalised starts with a conversation where the patient is assessed and the further treatment is determined. The conclusion on the initial meeting determines if the patient should be hospitalised in the day-section or 24-hour-section. A normal hospitalization period is 2 – 8 weeks [Region Northern Denmark, 2011]. The patient is encouraged to participate in "normal" activities such as school, sports etc. while in treatment [Region Northern Denmark 2011].

Conclusion

The current conditions of Danish youth psychiatry represent a set of problems considering the environment for treatment (visit to a ward). The lack of focus on the psychosomatic effect of the institutionalized environment in the large block hospital type is resulting in higher stress levels and therefore increasing hospitalization time and increasing consumption of medication [Heslet, Dirckinck-Holmfeld, 2007]. The desire to normalize the hospitalization is prevailing at Aalborg youth psychiatry and the aim is to deinstitutionalize experience as much as possible [Region Northern Denmark 2011].

◂ III.6 - The area of Skovdalen

Diagnoses in youth psychiatry

As mentioned previously, the Danish youth psychiatry has experienced a general increase in the amount of hospitalizations in recent years [from 2009-2015; Sundhedsdatastyrelsen, 2016], as well as the amount of outpatient visits to the psychiatric health care facilities. For instance, the amount of hospitalizations has seen an increase of 47.2 % from 2009-2015, while the amount of outpatient visits to psychiatric facilities has increased with 75.4% in the same period [Sundhedsdatastyrelsen, 2016 - for data, see scheme in appendix 1.8].
There has been a general increase in diagnoses and treatment of conditions such as ADHD (10 times the amount of medicalization as 10 years ago; [Due, 2014, p.107]), stress, depression and anxiety among the Danish youth [Jakobsen, 2016].
It is, perhaps, interesting to explore some of the potential reasons for this increase in diagnoses. One such reason could be the social constructions regarding psychiatric conditions; that new psychiatric diagnoses are being created and based upon side effects that were not previously connected with psychological conditions. Another could be the general change in culture; a performance culture, which highly has its focus on personal achievement, demands and pressure from external social forces [Felholt, 2014], which, in turn, has an effect on the individual's internal perception of self.

Conclusion

The increase in number of hospitalizations demands a new focus on the way psychiatric hospitals are constructed and designed. By considering this change and the factors behind it, such as high performance demands and social pressure, the architecture of psychiatric institutions could facilitate shorter hospitalizations.

Focus group

The focus group for the thesis project will be youth patients from the age of 19 and below. The diagnoses of the focus group will be mainly *ADHD, anxiety, bipolarity, depression, stress*, and *eating disorders*. Characteristics of the different diseases are:

ADHD
ADHD is a neuropsychiatric disorder, which causes disturbance in different parts of the brain, among others the part responsible for thinking. Some of the common characteristics are a tendency to become distracted by external stimuli such as sensory perceptions. The patient can experience difficulty filtrating irrelevant information and perception. Some patients have a superficial processing of information and have a tendency to miss details, while details obsess others. [ADHD Union, 2016]

Anxiety
Anxiety is a feeling signaling that something dangerous is about to happen without it necessarily being true. Anxiety can be a part of other mental illnesses, e.g. depression and schizophrenia. The receptivity to anxiety is, in part, innate, but is to a high degree affected by the feeling of comfort and security in the surroundings, growing up. Anxiety is most often diagnosed in women - twice as many women as men are diagnosed. The only exception is social anxiety, which is diagnosed equally between the sexes [Breds Geoffroy, 2010].

Bipolarity manic and depression
Bipolarity, also called manic depression, is a disease where the human mind is forced to the outer edges of the emotional spectrum. Manic, being the overly happy state, and depression being the lowest disillusioned state. In a state of severe depression, some patients experience symptoms such as irritation, suicidal thoughts, difficult concentrating, hallucination and delusions (Region Hovedstaden, 2014).

Stress
More and more children and young people are being diagnosed with stress and are unable to thrive. This has led to an increase in the number of young people being hospitalized with sign of severe stress. Children are in a larger degree receptive to stress and new research has shown that long-term influence by stress causes physiologically, psychologically, cognitive and social problems. According to the children asked, the primary stressor is in the close relations and family [Stressforeningen 2011].

Eating disorders
An eating disorder is a mental illness characterized by unhealthy habits and a neurotic relation to food. The relation between the body and food has been disrupted resulting in forced vomiting (bulimia), excessive exercise or a reluctance to eat (anorexia). The restoration of the relation to food and the making of food is therefore vital [Psykiatrifonden, 2016].

Common needs to the physical environment for all diagnoses are a calm environment with close relation to nature and a good overview that facilitates a gradual exposure to stimulation and social interaction, corresponding to the individual patient. All patients prefer a safe, structured and recognizable environment with the possibility of being shielded [Arch+Med, 2013].

Conclusion

Generally speaking, there is a slightly higher occurrence of girls being hospitalized in youth psychiatry [see appendix 1.1]. The ability to affect a large number of young people and their families in a positive way, by means of architecture, could potentially facilitate functioning adults and valuable contributors to society. By prioritizing this group of people architecturally, the patient could experience an increase in self-worth and sense of self, which could ensure a larger degree of life quality among these individuals.
The focus of the design proposal will mainly lie in the detailing of treatment facilities, hospitalization facilities and outpatient facilities according to the needs of the young patient and the personnel.
By dividing the different users of the psychiatry facility, a user diagram (ill. 7) has been made to get a better overview of who and when the different users are in or at the facility. The diagram have the possibility of being used in the design process of placing the different rooms and functions according to the use of the day.

Outpatient

Patients participating in outpatient treatment will be active in the facilities during the working hours of the day. The activity is rather short and spread out during those hours. The activity is primarily in the outpatient and arrival part of the complex.

Parents

Parent activity is joint-hospitalization, with the parents contributing in a supportive role. The parents will be active during all hours of the day and in all parts of the facilities.

Visitors

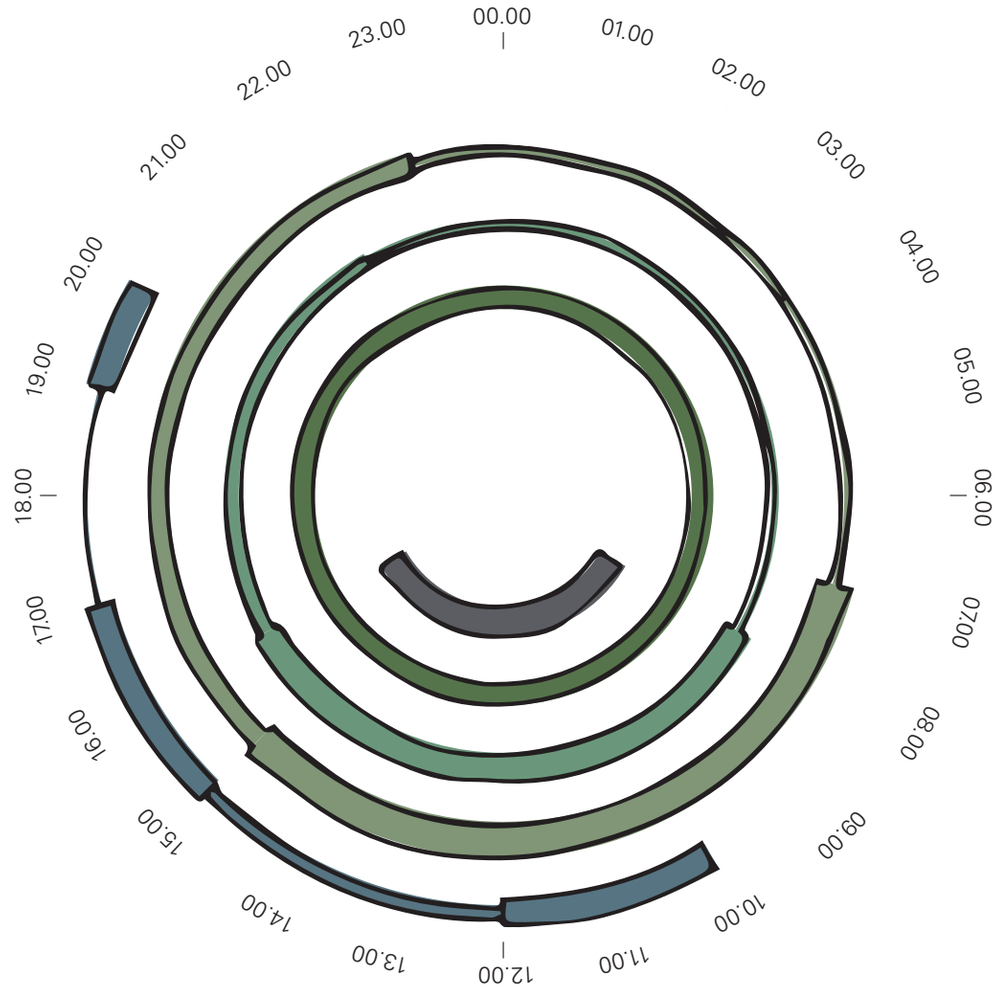
The visiting hours will be spread out during the day in compressed parts to minimize the flow of people who are not in treatment.

Hospitalized

The hospitalized patient is using the facilities during all hours of the day. The activity is primarily in the hospitalization part of the complex.

Personnel

The personnel will be active in the treatment part of the facilities during the working hours of the day and in the hospitalization part during all hours.



▲ III.7 - Diagram of the use of the building during a ususal day by different groups.

Pathologization in health care environments

The notion of pathologization in health care organizations is a complex one, comprised of several actors who influence each other in terms of perception and how certain human conditions are treated in a health care perspective. Pathologization in general describes how e.g. a patient is viewed or characterized as medically or psychologically abnormal [Merriam-Webster, 2017].

Pathologization has, perhaps, its origins in the classical structure and hierarchy of hospitalization and its culture; and has to do with how the patient's role or condition is treated and perceived by professionals and society; as well as how the patient perceives himself as a consequence of this.

Generally, the hierarchy of health care organizations has its roots in the natural relationship between the sick (the patient) and the treatment giver (usually the doctor). This relationship is, of course, characterized by a disproportion between the two actors in relation to health care knowledge; the patient is dependent on the doctor and his skillset. Thereby, the hospital environment itself also becomes an actor in this hierarchy; the space which represents the doctor and the health care knowledge [Dirckinck-Holmfeld, 2007].

Although this hierarchy is naturally present, it is of course a desire to 'even out' its occurrence, and to make the patient feel welcome and equal in the environment – this, however, is not necessarily an easy task.

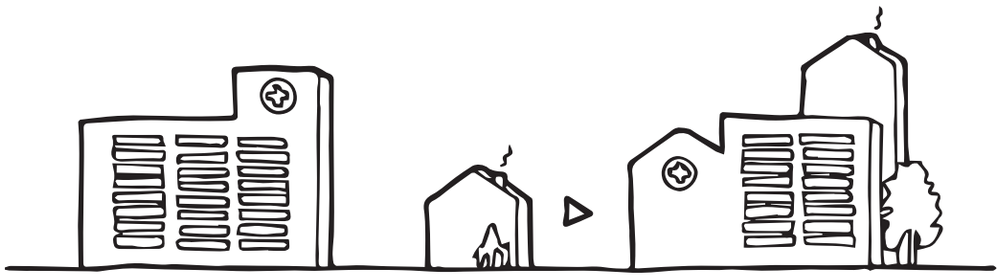
Pathologization can occur in both positive and negative ways; naturally, a serious medical condition or disease should be treated accordingly - however, when the diagnosis is given as a consequence of natural conditions, or when a screening is administered to a group of healthy individuals with the purpose of finding abnormal conditions, a negative pathologization can occur. In this case, normal conditions can be pathologized [Simonsen, 2010, p.125].

Conclusion

Breaking down the role of "patient" in society and the relation to professionals could be done spatially by considering the interaction and setting for the interaction. By creating a new setting and prioritizing the psychiatric hospital as an important architectural element of society the hierarchy of the psychiatric institution could be changed.

▸ Ill.8 - Pathway next to the site.

▸▸ Ill.9 - The idea of deinstitutionalization by combining hospital and home.



The notion of deinstitutionalization

In the following, the term deinstitutionalization is defined in relation to the thesis project. It should be noted that the term can be defined and interpreted differently in other contexts.
To understand the notion of deinstitutionalization, one must perhaps first understand its opposite; the idea of institutionalization. This term describes the process of incorporating something into a structured and often quite formalized system [Merriam Webster, 2017] – for instance within educational systems or health care systems. It also describes the active process or transition of being committed into the care of an existing institution. To de-institutionalize is thus here defined as the partial removal– either physically or psychologically – from this type of environment. The idea is not to completely distance oneself from the institutionalization – perhaps just to redefine it, and to change it from being a boundary-driven environment to an environment which reinforces the patient's interpretation of himself from "part of an institution" into a holistic individual.
The goal of deinstitutionalization in this project is thus to humanize the psychiatric facility without compromising security and a functional, health-based environment.

▸ Ill. 10 - Diagram of the front stage and back stage.

▸▸ Ill. 11 - Photograph of moss between cobblestones.

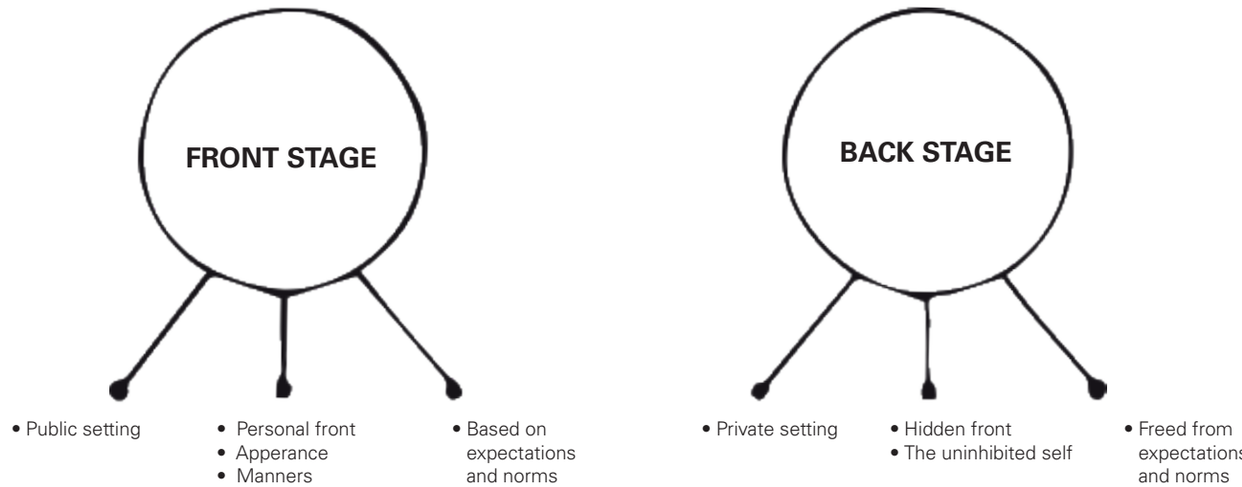
Goffman's Front- and Backstage

As previously mentioned, the theory of Erving Goffman's front stage and back stage principles are to be implemented in the design proposal. The theory establishes how the human being is perceived and wants to be perceived by the surrounding social environment, and puts into focus the idea of staging; how the human seeks to present a certain reality to an audience, changing accordingly to which social setting he is put into. On the other hand, when in a private setting, the human retracts from the performance given in the social environment [Goffman, 1959].

In terms of these concepts, the traditional psychiatric facility can be perceived as a closed-off, institutionalized setting with its own norms and rules. This creates an internal society that very much differs from the "outside" society, creating a hierarchy between the user (the patient) and this dominant setting (the psychiatric facility). The thesis will seek to explore this setting; how it can be intertwined with the outside, "normalized" setting, in order to reinforce the patient's own identity.

In relation to this, the thesis will also explore how the role as "patient" to some extent can be dissolved – thereby supporting the idea of deinstitutionalization.

Furthermore, the thesis will explore the relation between private and social spaces within the psychiatric facility; how the patient's back stage role can be supported, while also being able to create a social setting that stimulates efficient interaction between the participants.



HEALING ARCHITECTURE

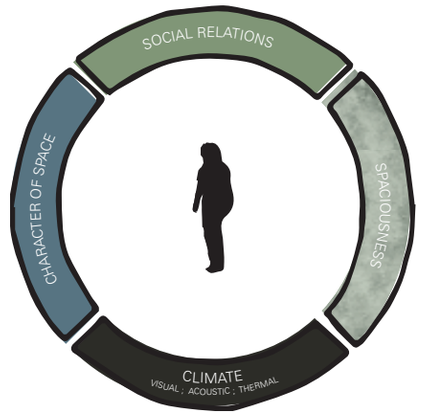
On healing architecture and its relation to psychiatry

The notion of healing architecture describes how architectural environments and spaces can enforce the process of healing or improving certain human conditions, both physical and psychological. Healing architecture must not be seen as the healer itself; but as a supporter of healing, creating the basis of a healthy environment.

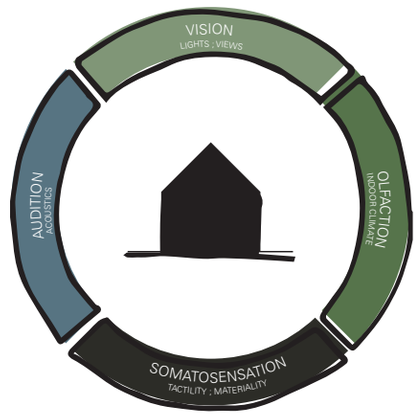
In general, healing architecture has to do with how human senses are stimulated by their surroundings through architecture itself; thus, it has to do with the four senses (taste not included); touch (materiality); hearing (acoustics); sight (visuals and light); and smell (indoor climate). In this way, architecture has the possibility of being shaped in relation to what the human can perceive through the senses [Dirckinck-Holmfeld, 2007]. This positive way of experiencing surroundings can then have a beneficial effect in terms of reducing stress, strengthening the immune defense.

From a health care perspective, healing architecture has been used, perhaps more or less intentional, through the years in different types of institutions [Dirckinck-Holmfeld, 2007]. In early Danish hospitals in the 19th century, visuals and aesthetics were focal points; underlining the patient access and view to green outdoor environments. Later, however, in modernistic hospital environments, this notion was replaced by health environments as highly functional, empirically-based machines; the patient secondary in the hierarchy [Dirckinck-Holmfeld, 2007]. Thus, healing architecture would fall into the background in the second half of the 20th century, before being revitalized yet again in recent years.

Influences on stress level



Aspects of healing architecture



◂ Ill. 12 - Diagrams
Diagram (top) of a patient and the influences on its stress level.
Diagram (buttom) of aspects of healing architecture.

Stress

Stress is commonly referred to as a disease, but is in fact a normal and natural response. People affected by stress during longer periods risk developing or worsening mental illness. The psychophysiological reaction is a primal reaction designed to promote survival during short periods by inducing adrenaline and noradrenaline. A person is likely to develop stress if there is an imbalance between demands, expectations and strains [Stressforeningen, 2014].

Stress in relation to health care

Studies have shown that if a patient is psychologically balanced and stress is reduced, the physiological healing is promoted. If the patient is stressed, the immune system is weakened, resulting in a longer hospitalization period because of the diminished inner recovery [Heslet, Dirckinck-Holmfeld, 2007]. Both internal and external stressors affect patients in a psychiatric institution. The internal stressors are related to the patient's own universe, e.g. the loss of control by being hospitalized, the uncertainty of the future, economy and prior experiences with psychiatric institutions. The external stressors are related to the surroundings and the sensory response of e.g. [Heslet, Dirckinck-Holmfeld, 2007]:

- Social relations
- Spaciousness
- Character of space
- Climate - visual, acoustic, thermal

An appropriate consideration regarding the sensory aspects can contribute to a lowering of hospitalization time, lowering of pain killer consumption, etc. [Heslet, Dirckinck-Holmfeld, 2007]

TECTONICS

On tectonics and its relation to healing environments

Tectonics generally describes the relation between architectural elements; how they are assembled, how they meet, and how they are constructed [Dirckinck-Holmfeld, 2007]. In terms of healing architecture, this assembly of elements can be related to how the human being perceives a certain space; how he experiences it, moves through it, and uses it. In this way, the tectonics can become a structural guidance to how the space should be experienced; or it can simply create a structured space that can be perceived individually by the patient/user himself.

In terms of constructing and detailing the architectural space, the different elements influence the human perception of space. German architect Gottfried Semper (1803-1879) theorized in "The Four Elements of Architecture [1851]" that architecture consists generally of two elements; the tectonic and the stereotomic – opposites in the process of constructing and perceiving architecture, able to create a dynamic and a dialogue between the different elements [Ballantyne, 2002, p. 142]. The tectonic, Semper argues, refers to the lightweight frame of the architecture – such as a wooden frame construction – whereas stereotomics refers to the heavy earthwork or the mass of the architecture, such as stonework, thus creating opposing expressions.

According to Louis Kahn, the tectonics should be structured in accordance to space and how the space, itself, desires to be portrayed - respecting the innate characteristics of construction materials and the load bearing system [Chih, Johanson et al. 2010].This approach is evident in Kahn's Exeter Library in both the concrete core and the outer walls where the size of the columns in the facade decrees with altitude, demonstrating a solid foundation or stereotomic according to Semper, and more slender, tectonic, columns at the top depicting the load bearing characteristics. Kahn describes it, as "form emerges from the structural elements inherent in the form. [Chih, Johanson et al 2010, pp. 31-36].

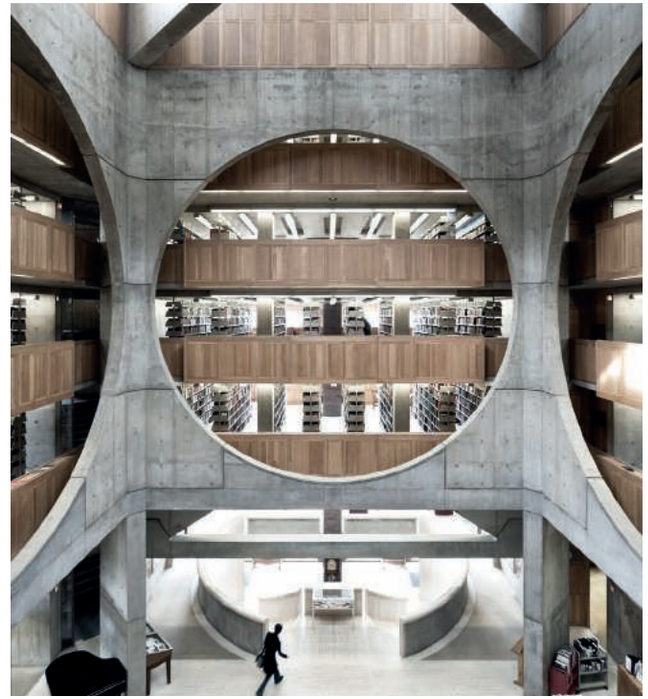
As with the brick facade at Exeter Library, Kahn believed that the physical properties and nature of materials should be applied at the location within the building structure that utilizes the inner structural properties optimally. In addition to the respect for the material nature and the structural rationality, Kahn argues for the tectonic approach with a clear relation between the structure and the space and sensory experience created [Chih, Johanson et al. 2010]. As mentioned, a tectonic approach involves respecting the material characteristic and, according to Kahn, the joining, separation and arrangement cannot be concealed or the elemental decorative nature of the material would be violated [Chih, Johanson et al. 2010].

Conclusion

Implementing a tectonic approach from the perspective of Semper and Kahn could ensure a well-structured space portrayed by the characteristics of the load bearing structure and the innate nature of the materials, thereby creating an embodied relation between architecture and patient. As a tangible perspective, the load bearing structure and material nature could act as guiders and an asserting element for patients.

▸ Ill. 13 - *Aalborgtårnet*.

Ill. 14 - *Urbans kælder*



Ill. 15 - Exeter Library, New Hampshire - Louis Kahn

Urbans Kælder *("Urban's Basement")*

The basement cave is dug into the stereotomic hillside area close to the site. In this way, the landscape functions as a protective frame, hiding the space within.

Aalborgtårnet *("The Aalborg Tower")*

The Aalborg Tower presents a clear, visible tectonic structural system, carrying the upper panoramic platform. The tower underlines the verticality which is already present in the surrounding forest area.

Exeter Library

The Exeter Library in New Hampshire clearly seperates bearing elements from aesthetical and functional elements, showing a clear contrast in materiality and geometry. The functions of the building are clearly shown through the geometry, creating overview for the user.

ATMOSPHERES

Intro: As an exploration of how architecture can become the frame of a certain perceived atmosphere, Peter Zumthor's work *Atmospheres* [Zumthor, 2006] is utilized. Atmospheres is based on a lecture from 2003, presenting nine key elements in understanding how atmosphere can be implemented in the design of an architectural work.

01 The Body of Architecture: In this first key point, Zumthor compares the overall, physical architecture to the human body, consisting of several, combined parts that create a whole. Such parts can consist of the different materials, or the structure of building; and how these materials are able to cover the interior bearing parts, creating a skin, palpable to the user.

"*It's like our own bodies with their anatomy and things we can't see and skin covering us* [Zumthor, 2006, p. 23]."

02 Material Compatibility: The second point focuses on material composition and how each material is capable of reacting with another to a larger or lesser degree. It also focuses on how each material has a variety of different characteristics, depending on how the material is treated and processed.
Zumthor argues that certain materials have a more appropriate relation to each other than to other materials; thereby being able to reinforce or weaken their reaction to each other, depending on which ones are put together.

"*You can combine different materials in a building, and there's a certain point where you'll find they're too far away from each other to react, and there's a point too where they're too close together, and that kills them* [Zumthor, 2006, p. 27]."

03 The Sound of a Space: In this key point, Zumthor argues that each building has a specific way of sounding, depending on the shaping of space, the materials and the surfaces – a sounding which can create a certain sense of belonging or association to the user. Zumthor also argues that the sound of the architectural work can create an identity to a space.

"*I think each one [the building, ed.] emits a kind of tone. They have sounds that aren't caused by friction* [Zumthor, 2006, p. 31]."

04 The Temperature of a Space: The temperature of a building has to do with how the human body responds to especially the materials of the architecture, and how certain materials have effect on how temperature is perceived; warm or cold; and thus, how the human body thermally perceives the architectural body.

"*It is well-known that materials more or less extract the warmth from our bodies. Steel, for instance, is cold and drags the temperature down* [Zumthor, 2006, p. 33]."

05 Surrounding Objects: Zumthor argues that the human personalizes the architectural space with elements, or objects, that have a nostalgic or personal value to him. This point has to do with how architecture is actually taken into use - and turned into a home by the use of personal objects.

"And sometimes (...) you find things come together in a very caring, loving way, and that there's this deep relationship [Zumthor, 2006, p. 35]."

Ill. 16 - 01 - Body.
Ill. 17 - 02 - Material compability.
Ill. 18 - 03 - The sound of a space.
Ill. 19 - 04 - The temperature of a space.
Ill. 20 - 05 - Surroundering objects.

06 Between Composure and Seduction: This point involves how the user is guided by the architecture; not, as Zumthor argues, by following a strict direction, but by creating the freedom of exploration. The key point generally has to do with how architecture involves its user by infusing movement; exploring the manner of which the user moves around in his surroundings.

"*Hospital corridors are all about directing people, for example, but there is also the gentler art of seduction, of getting people to let go, to saunter* [Zumthor, 2006, p. 43]."

"*There are practical situations where it is more sensible and far cleverer to induce a calming effect, to introduce a certain composure rather than having people running around and looking for the right door. (..) Guidance, preparation, stimulation, the pleasant surprise, relaxation* [Zumthor, pp. 43-45]."

07 Tension between Interior and Exterior: This point involves the transition between inside and outside and how the user switches between the feeling of being enveloped and being on the outside of the enclosed wall. It also focuses on private and public; on what is shown and what is hidden, and which statement the building wants to give to its surroundings.

"And whenever I'm doing a building I always imagine those terms: what do I want to see – me or someone else using the building later – when I am inside? And what do I want other people to see of me? [Zumthor, 2006, p. 49]"

08 Levels of Intimacy: The penultimate key point focuses on proximity, distance and overall scale between the human body and the architectural body. This scale, can, in turn, create a relation or sensory experience for the user; for instance in how a large building can affect the mood of a much smaller human; how intimacy is sometimes achieved in spite of a great difference in scale; or how two different masses in the architecture can create a tension.

"*It's [Palladio's Villa Rotunda, ed.] huge, monumental, but when I get inside it I don't feel intimidated at all (...) Instead of intimidating me, these are surroundings that somehow make me feel larger, allow me to breathe more freely* [Zumthor, 2006, p.53]."

09 The Light on Things: The final point has to do with how the setting of light is created in the architectural environment. Zumthor argues that natural light can have a spiritual, inexplicable quality, which, for instance, can be achieved by looking at the building as a mass of shadow, which is then hollowed out, allowing the light to enter and illuminating important parts of the building. The light is thus both functional and has a visual effect, creating depth and atmosphere.

"(…) the light on things is so moving to me that I feel it almost as a spiritual quality. (…) For an architect, that light [natural light, ed.] is a thousand times better than artificial light [Zumthor, 2006, p. 61]."

Conclusion and application of the key points

The purpose of the nine design points is to develop an architectural environment which primarily takes into account the user and his relation to the building, while, at the same time, making sure that a certain atmosphere is achieved within the architecture.

This project seeks to implement most of these key points into the final design and to combine them with the concepts of healing architecture; however, the points that are to be focused mainly upon are;
the body of architecture - perceiving the architecture as an element that can interact and have a relation to the patient; **between composure and seduction** - the manner in which the architecture is designed so that it accommodates the patient's way of moving through it in a non-clinical way, while still providing the necessary functionality;
tension between interior and exterior - how the boundary between inside and outside is designed, implementing the healing effects of nature;
and **levels of intimacy** - how the dilemma between creating intimate spaces, and, simultaneously, creating a spacious environment in which the patient can obtain a level of freedom, is resolved.

Ill. 21 - 06 - Between composure and seduction.

Ill. 22 - 07 - Tension between interior and exterior.

Ill. 23 - 08 - Levels of intimacy.

Ill. 24 - 09 - The lights on things.

NATURE

Nature as a healing element

The ability to interact or connect with nature visually seems to have a positive impact on physical and psychological health. A number of studies conducted by, among others, Roger S. Ulrich, has shown a positive response in patients and personnel in the health care sector. Visual contact or images of natural environments can reduce stress and decrease the need for medication [Frandsen, Ryhl, 2011].

> *According to the Bible, humankind's biggest mistake was punished – not by death or torture, but by separation from nature, the mother of all gardens, the Garden of Eden. Apparently, the worst thing that can surpass us is apparently the sign "please keep off the grass"* [Berlingske, 2013].

A century ago, before the paradigm shift towards the technological, as mentioned previously, the hospital had a more holistic view of the patient. A part of the treatment was e.g. optional garden chores, which was a way to solve bad nutrition and economy while giving patients access to nature [Berlingske, 2013].

The strain on the Danish health care system in the last 10-20 years has revitalised the garden as a means of reducing stress and promoting a higher level of comfort. Regular garden work can treat mental disorders such as PTSD and depression.
In Scandinavia, Sweden has been a pioneer regarding implementation of garden therapy as a way of reducing stress and other mental disorders. In Denmark it has only recently been implemented at Nacadia at Hørsholm, inaugurated in 2011 [Berlingske, 2013]. Locally, a therapy garden has been opened in Nørholm, which is elaborated upon in the Case Studies chapter.

The qualities of nature, which are hypothesized to have a supportive influence on mental recovery, are [Grahn, 1991]:

- *Serene - Peaceful, silent, safe, secure.*
- *Nature - Fascination with wild nature.*
- *Rich in species – Variety of species of flora and fauna.*
- *Space - Like entering another world.*
- *Prospect – open space vistas.*
- *Refuge - A sanctuary, secluded space*
- *Social – a social area*
- *Culture – Signs of human labour and human values throughout history*

The perception of the garden or nature has shifted from being a necessity in everyday life into becoming a recreational perception element on the same level as anti-depressive medicine.

Conclusion

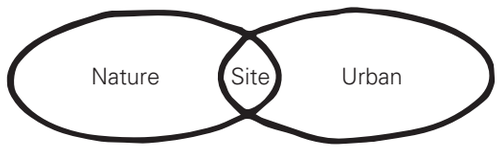
The implementation of nature is to be clear in the final proposal, utilizing its healing abilities and beneficial effect on patients. The proposal should implement qualities of therapy gardens, as elaborated upon in the Case Study chapter.

▸ Ill. 25 - Picture taken at the site.

PLACE

Aalborg has during the last couple of decades transformed the city from being an industrial seaport to an education-based city with a focus on the youth and their needs.

The site has been chosen for several reasons. A part of that is having the young/patients know that they are not far away from the society that they have been used to being a part of – that they don't feel like being put away. Placing the psychiatry centre close to the core of a city like Aalborg means that it is easy to access. Still, the young need a more quiet and relaxing environment, where the usual noise from the city won't affect their stay negatively.
The surrounding environment and nature has also been considered. Taking inspiration in the earlier ways of building hospitals, where the nature and the recreational aspects were more dominating than the late 1900's technological hospitals, the placement of the site at Skovdalen includes the nature, making the site seem protected and therefore more calm.
In addition, Skovdalen also contains the possiblities of being physically active, e.g. in terms of walks in the wooded area or activity at the Athletic Stadium of Skovdalen.



▸ Ill. 28 - *Skovdalen* Athletics .Stadium

▸▸ Ill. 29 - KUNSTEN - Museum of Modern Art Aalborg. Built in 1972 by Elissa and Alvar Aalto.

▸ Ill. 30 - *Sygehus Syd* (Hospital). The first part of the hospital at Hobrovej was built in 1911. Latest (2005), Medicinerhuset has been added to the area.

▸▸ Ill. 31 - *Aalborgtårnet*. The 54,9 m iron steel tower was built in 1933. Placed on the hill of Skovdalen, it reaches a total height of 105m above sea level.

◂ Ill. 27 - Map of Aalborg - 1:20,000. The map shows the placement of Skovdalen in relation to other areas in the city.

◂◂ Ill. 26 - Conceptual idea of the site in between the surrounding nature and urban environment.

Context

The site of the project lies in the area of Skovdalen, which is in southern part of the centre of Aalborg. Skovdalen is a respite area, placed closely to the rather more hectic and noisy part of the city. The area has its edges defined by Kong Christians Allé and Hobrovej towards north and east; the area of Sygehus Syd towards south; and the conurbation of Hasseris towards west.

Skovdalen consists of an undulated wooded terrain with paths wriggling through the forest environment. Skovdalen also contains *Aalborgtårnet*, Restaurant *Skydepavillionen*, KUNSTEN Museum, the athletics stadium and *Skovdalen* music scene.

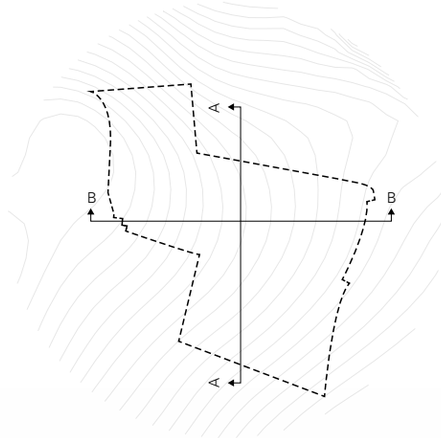
The site lies just next to *Aalborgtårnet*, *Skydepavillionen* and the eastern edge of Hasseris. Otherwise, it is surrounded by a wooded area. The main access road to the site is Søndre Skovvej, which lies between Skovdalen and the hospital area. The site is fairly undulated, reaching its highest point at the western edge. The southern part of the site is a wooded area of mostly beech, while the rest of the site is mostly lawn area. The site subdues to two district plans. The part of the site west of Skovbakkevej is subdued to district plan 05-080 from 2006 [Aalborg Kommune]. The part of the site east of Skovbakkevej is not subdued to any district plan, though it is subdued to the overall municipality plan.

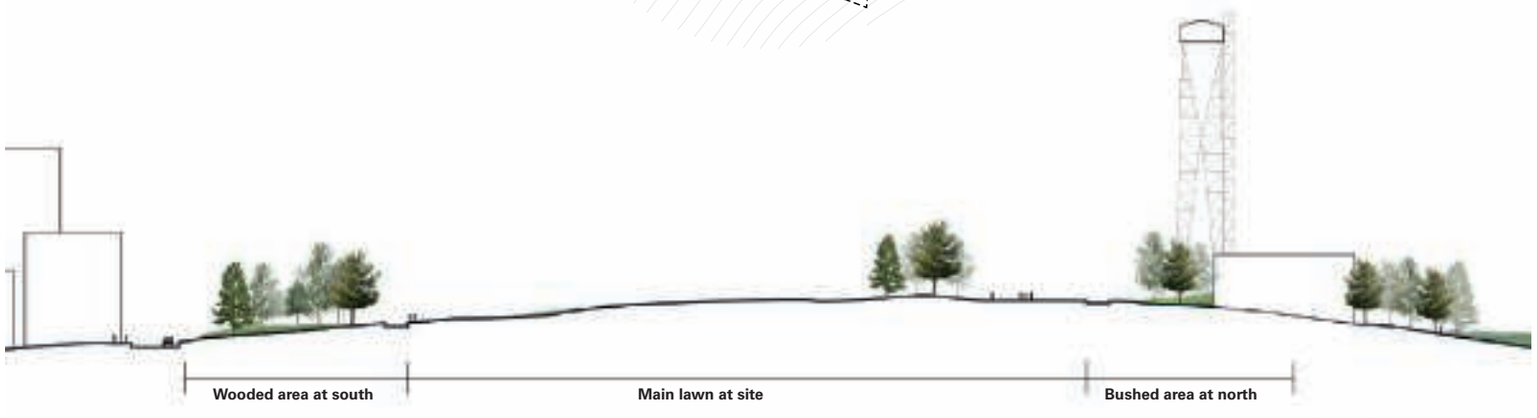
Conclusion

The site is situated in a picturesque landscape, which encourages and architectural integration of contextual elements such as *Aalborgtårnet* and forest areas.

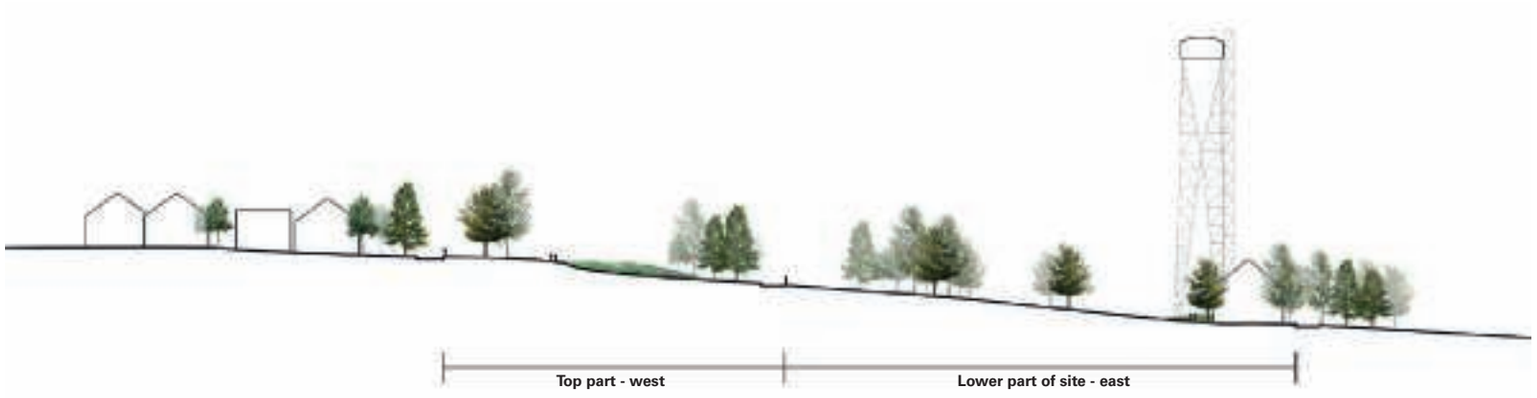
◂ Ill. 32 - Context of site - 1:1000

▸ Ill. 33 - Explanatory site plan.
Site plan showing the placement of section AA and BB

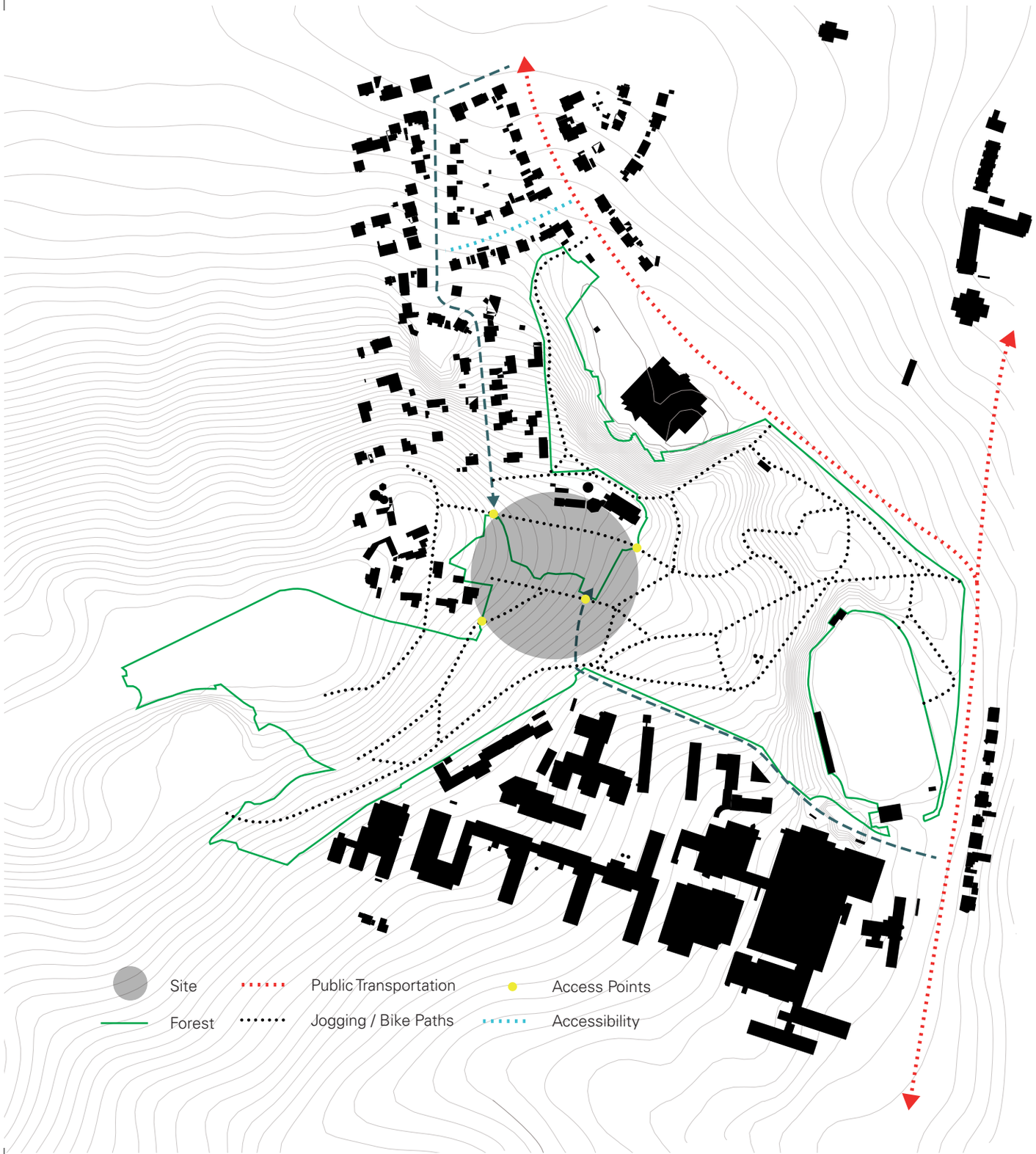




Ill. 34 - Section AA - 1:1500.
Section seen from south through site and a bit of the context area.



Ill. 35 - Section BB - 1:1500.
Section seen from east through site and a bit of the context area.



◂◂ Ill. 36 - Photograph towards the site.
Pathway in the forest, Skovdalen, towards the site.
Aalborgtårnet is visible in the distance.

◂ Ill.37 - Mapping of the surrounding area of the site.

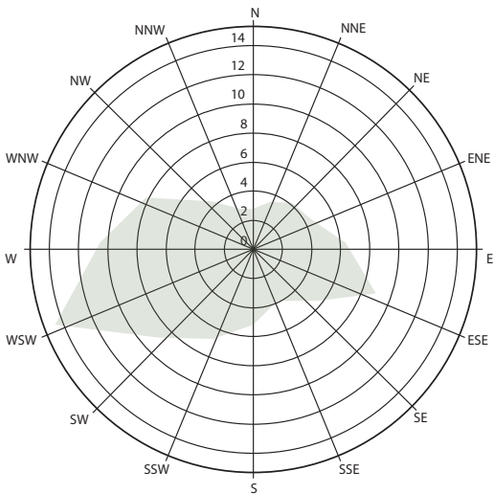
Mapping

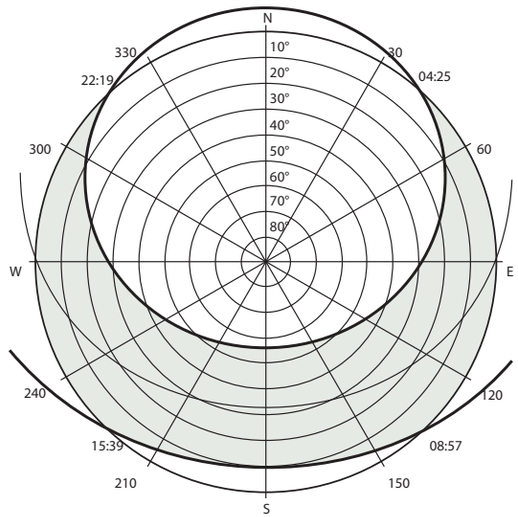
The mapping diagram shows the site, the terrain and forest area, and the buildings in its proximity.
It maps out the primary accessibility paths, one from the main road of Hobrovej, and the other more secluded to the north, through the residential neighbourhood. The access points are marked in yellow - the most public access point to the south-east, and the rest being more introvert paths.
Finally, it maps out the many jogging and bike paths around the forested area.

◂◂ Ill. 38 - Photograph of the site.
The lawn on the site taken from the entrance area towards south east. The picture shows the wooded environment at the south (left) and the open lawn with groups of birch trees in each corner.

◂ Ill.39 - Wind rose of Aalborg measured at Aalborg Airport.
The wind rose shows the average wind distribution in percentage in Aalborg during a year.

▾ Ill.40 - Sunpath diagram of the site in Skovdalen.
The diagram shows the path of the sun on the longest day and shortest day of the year - the 21st of June and the 21st of December. The equinox is shown as well as the line in between winter and summer.





Climate

Wind conditions in Aalborg are measured at the airport – an area of open land with only few obstructions of the wind. Using and comparing the wind direction distribution at the airport can therefore seem somewhat misleading in terms of the site of the project. Still, the wind diagram has been included.
The diagram shows that most of the wind during a whole year comes from west/south-west, while a smaller amount from east/south-east is represented as well. Because of the site and its surrounding wooded area, it will stay covered most of the year, only leaving it more exposed during the winter where the trees are bare.

Because of the surrounding trees, the site is exposed fairly little to the sun. Trees towards south, east and west will shadow on the site, while the open view towards north will let in diffuse light. During the winter when the trees lose their leaves, it will let more of the sunlight to enter the site. This gives the opportunity of having larger window areas compared to usual problems with overheating. At least it is something that needs to be thought less of in terms of the climate.

◗ Ill. 41 - Photograph of the residential area of Hasseris.

◗◗ Ill. 42 - Cadastral plan of the area of Skovdalen.

District plans

The main part of the site – the lawn towards east, does not subjugate to any district plans. The lawn, the adjacent wooded area and the rest of *Skovdalen* lie within the cadastral of 80auh.
Towards west, the cadastral areas, 80an and 96 lie in the area of *Hasseris Villaby*. The area is subjugated to the district plan, *05-080 - Skovbakkevej m.fl., Hasseris*. It requires certain things like high preservation of wooded area and focus on the architectural qualities of *Hasseris Villaby*. The houses stem from different time periods, which can be seen when walking in the area. There is no specific style to build in different parts of Hasseris, but the quality of architectural understanding and the use of materials must be taken into account.
Otherwise, there is a maximum building height between 8.5 m and 12.5 m in the area depending on the style. Along all public roads there is a building line of 5 meters, and all fencing along roads and paths must be hedgerows [Aalborg Kommune, 2015].

Aside from that, Aalborg Historical Museum informs that there has been found a burial mound on cadastral 96. On cadastral 80an and 96 there is also three bunkers from the World War II to be found – only one of them visible.

For a more detailed cadastral map, see appendix 1.9.


96
80aci
80an
80auh
80auh
Site

CASE STUDIES

In the following part, four case studies have been chosen to guide the thesis and to receive more knowledge about the youth psychiatry – this through meetings with the people working in the youth psychiatry on a daily basis.

Esbjerg Youth Psychiatry center was chosen because of its way of working with a fine balance between 'home' and 'institution'. Still, because some parts of the facility are not up to date, the center knows its capabilities and limits.

Secondly, the youth psychiatry center in Roskilde from 2012 is among the newest finished youth psychiatry facilities in Denmark. Visiting the center gave an insight of the thoughts of the whole process of the project, from the first drawings to the building as it stands today.

Thirdly, the sensory garden, Aurora, was chosen as a case study because of its way of looking at alternative ways of rehabilitating people through nature and activity.

Finally, *Kannikegården* in Ribe is an adjacent building to Ribe Cathedral. It has been chosen as a case study because of its simplicity – especially in the way of working with the materials and the way that there has been paid respect to Ribe, its context and the surrounding buildings.

◂ Ill. 43 - The area of Skovdalen

Youth Psychiatry Center Esbjerg

The youth psychiatry facilities in Esbjerg were established in 2003 and consist of a day section and a 24-hour section. The 24-hour day section consists of an open and a screened department with 7 beds, while the day section has 8 beds. Every patient has his or her own bedroom, whereas common rooms are placed centrally. Also, smaller recreational spaces, such as fitness rooms, sensory therapy spaces and wellness areas are spread throughout the facilities.

Esbjerg Youth Psychiatry works with the overall concept of environmental therapy, meaning that the staff creates the frame around the patient's everyday life, reinforcing a stable and positive environment.

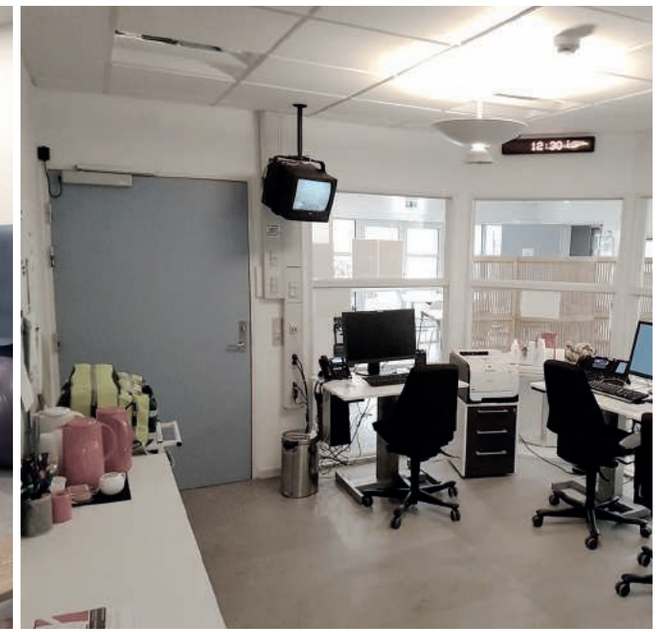
The staff of Esbjerg Youth Psychiatry seeks to be as visible to the patients as possible, making sure that patients are always able to come into contact and receive support if necessary. This is, for instance, implemented in the main office, which is connected visually to the main common room, *Torvet*.

Aside from the youth psychiatry, a new facility for adult psychiatry is built adjacent to these facilities, creating possibilities for easier collaboration and teamwork.

Through interviewing, [for transcript, see appendix 1.1] some of the challenges, upsides and downsides regarding the working environment and architecture at Esbjerg Youth Psychiatry are highlighted. Some of these are used further on as part of the design parameters.

◗ Ill.45 - Private patient room.
In the youth psychiatry facilities in Esbjerg, the rooms have been furnished with box mattresses during the last decade, although they need to be changed with regular patient beds because of work injuries.

◗◗ Ill.46 - Part of an outdoor courtyard.
Transparency and openness have been the keywords for the new adult psychiatry facility in Esbjerg. According to the employees it is too open and transparent, due to lack of privacy.



◗ Ill.47 - Fitness room.
Room for the patient to be active in. Getting the patients to be more active in all sorts of ways is also a part of the rehabilitation.

◗◗ Ill.48 - Office for the employees.
The placement of the office means that the employees have a good overview of the facility.

◖ Ill.44 - Outdoor grass field for activities.

Youth Psychiatry Center Roskilde

The youth psychiatry facilities in Roskilde were established in 2012. It is a part of Region Sjælland and consists of a 24-hour day section only – there is no outpatient facility. The focus of the new facilities has been put into common areas – there are very few corridors because of the common areas leading to every patient's private room. From every private room there is a good view over Roskilde and Roskilde Fjord. The center has the possibility of screening parts of the rooms and common areas, if e.g. a patient needs to be more looked after. The patients have access to either the outdoor area surrounding the facility, or to outdoor courtyards, which are shaped by the building.

During a stay, the patients have the possibilities of continuing their schooling in the teaching rooms, while rooms for being creative, such as painting or colouring, are also available. This means that a stay can be customized for every patient, helping the young in a more personal way, getting back to his or her daily life.

Small changes in the placement of rooms have been made since the opening of the facility. The medicine room has been decreased in size, creating space for a sensory room, where the patient has the possibility of having either different or no senses stimulated.

The center takes in all patients unless a patient is admitted to a psychiatry center because of a verdict.
Through interviewing, [for transcript, see appendix 1.2] some of the challenges, upsides and downsides regarding the working environment and architecture at Roskilde Youth Psychiatry are highlighted. Some of these are used further on as part of the design parameters.

▸ Ill.50 - Common room.
The common room also functions as the corridor to the private rooms.

▸▸ Ill.51 - Outdoor recreational area with playground.

▸ Ill.52 - Outdoor courtyard.
The courtyard is placed between the facilities of the employees and the common room of the patients. Hereby there is no loss in the privacy.

▸▸ Ill.53 - Study room.
Teaching room for the young, for when they cannot attend school.

◂ Ill.49 - Youth Psychiatry Center of Roskilde.

Aurora - a sensory garden

The sensory garden, Aurora, is run and established by psychotherapist, Annette Wibæk. The sensory garden lies about 10 km from Aalborg towards Nibe. The garden was expanded in 2012 with 25.000 m^2, giving the sensory garden the needed area with a variety of different areas, containing different elements for stimulating the senses. The sensory garden has been approved by the University of Copenhagen.

The principles of the garden is to work with the stimulation of the senses and then gardening, encouraging the people affected by stress to relax, e.g. by doing gardening. Wibæk looks after them, analyzing their behavior and supporting them in how to get back to their daily life routine.

Wibæk is working on getting more people diagnosed with stress to come to the sensory garden as a part of their healing phase. Wibæk would like to get a deeper and more permanent working relationship with the job center of Aalborg and Aalborg Municipality in general.

As a user of the sensory garden, Aurora is only a day offer; there is no possibility of staying at the facility overnight. This also limits the user group of the garden down to people with stress and anxiety. Still the users cannot be too ill – without any agreements with the municipality or any psychiatry facilities, the users still have to be able to go there by themselves, which easily can be too large of a thing to overcome.
Through interviewing, [for transcript, see appendix 1.3] some of the qualities of the garden are analyzed. Some of these are used further on as part of the design parameters.

▸ Ill.55 - Bonfire with a variety of seatings.

▸▸ Ill.56 - Fascine fence.
This type of fencing works with the privacy in a natural and relaxing way.

▸ Ill.57 - Broken tree.
The broken tree is kept in the sensory garden, because of its natural contribution to the the place.

▸▸ Ill.58 - Entrance fencing.
The fence is made half transparent and halfway open to both invite and to keep a feeling for the users, that they can escape if needed.

◂ Ill.54 - Broken tree with moss.
The natural parts of the area is kept.

Kannikegården, Ribe

Kannikegården is a building for the parochial church council of the Danish city of Ribe. It is built across from the Ribe Cathedral and consists of a rectangular volume with a pitched roof, erected on several beams, towering over an archaeological excavation site.
The upper part of the building is covered in red-brown façade tiles which mimics the material of its surroundings, whereas the lower part of the building consists of beams and glass facades, protecting the archaeological ruins.
The secondary function of the building consists of an office environment. In here, user needs are greatly implemented in terms of light intake and the working positions of the staff, with windows mirroring sitting and standing positions.

Tectonics and sensory experience

The building has a distinct visual appearance, both from an exterior and interior perspective. Specifically, its interior is saturated with a certain atmosphere, which, in part, is achieved by the structure of the building. Through the glass facades, wooden and concrete beams stand visible to the spectator visiting the ground floor and excavation site, while wooden beams are also visible as one travels up and down the staircases. The visitor is able to physically touch and change the visual of the exterior by turning the beams; further creating a connection between user and architecture.
Another element which contributes to the atmosphere of *Kannikegården* is the setting of light and use of color within the building. By working with the partial dimming of light, the hue of the walls becomes a frame for the intimacy that is felt throughout the interior.

▸ Ill.60 - Interior flooring with the detail of continuity.

▸▸ Ill.61 - Meetings between different materials.
The simple meetings between the different materials create calmness.

▸ Ill.62 - Entrance area of Kannikegården.

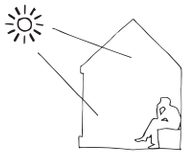
▸▸ Ill.63 - Corridor between the office rooms.

◂ Ill.59 - Facade of *Kannikegården* facing Ribe Cathedral.

DESIGN PARAMETERS

The following design parameters are based on the conducted interviews with psychiatric facility staff in Esbjerg and Roskilde (see appendix for transcripts), as well as the results from contextual and thematic analyses. From the interviews, the design parameters are deduced by analyzing needs and challenges in the existing psychiatric facilities; from the contextual and thematic analyses, design parameters are found by determining which of the existing site qualities should be implemented; and by understanding which elements of healing architecture have relevance to the further designing.

▸ Ill. 64 - Vignettes to underline the design parametres.

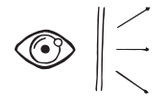


SPACE // INTIMACY
Establish a spacious environment, which, simultaneously, supports an intimate atmosphere

ATMOSPHERES
Create differentiated atmospheres as a result of the different functions of the psychiatric facility

FUNCTIONAL PLAN
Create a functional plan, providing overview for staff and patients, and establishing visibility between patient and staff in order for easy contact to be achieved and blind angles avoided

RELATION TO PUBLIC
Establish both private and public outer spaces, which should not be perceived as being confining; and create a closeness to the public, while at the same time emphasizing natural barriers and shading

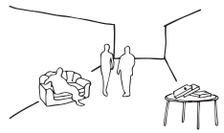


VIEWS AND INTIMACY
Ensure sufficient views that take into account the indoor environment; incorporating matting and shading, which, at the same time, ensures privacy and an intimate environment for the patients

HEALING SPACES
Establishing a supportive healing environment, e.g. by creating recreational, sensory and nature-based functions

PERSONAL SPACE
Creating privacy and an anti-clinical environment in the patient rooms

SPACE FOR RELATIVES
Making sure that relatives are involved in the process of the patient, making sure that room and space is made for them in the physical settings



HALLWAY USAGE
Revise the traditional, narrow hallway principle in order for these spaces to become recreational and leisure spaces for the patients

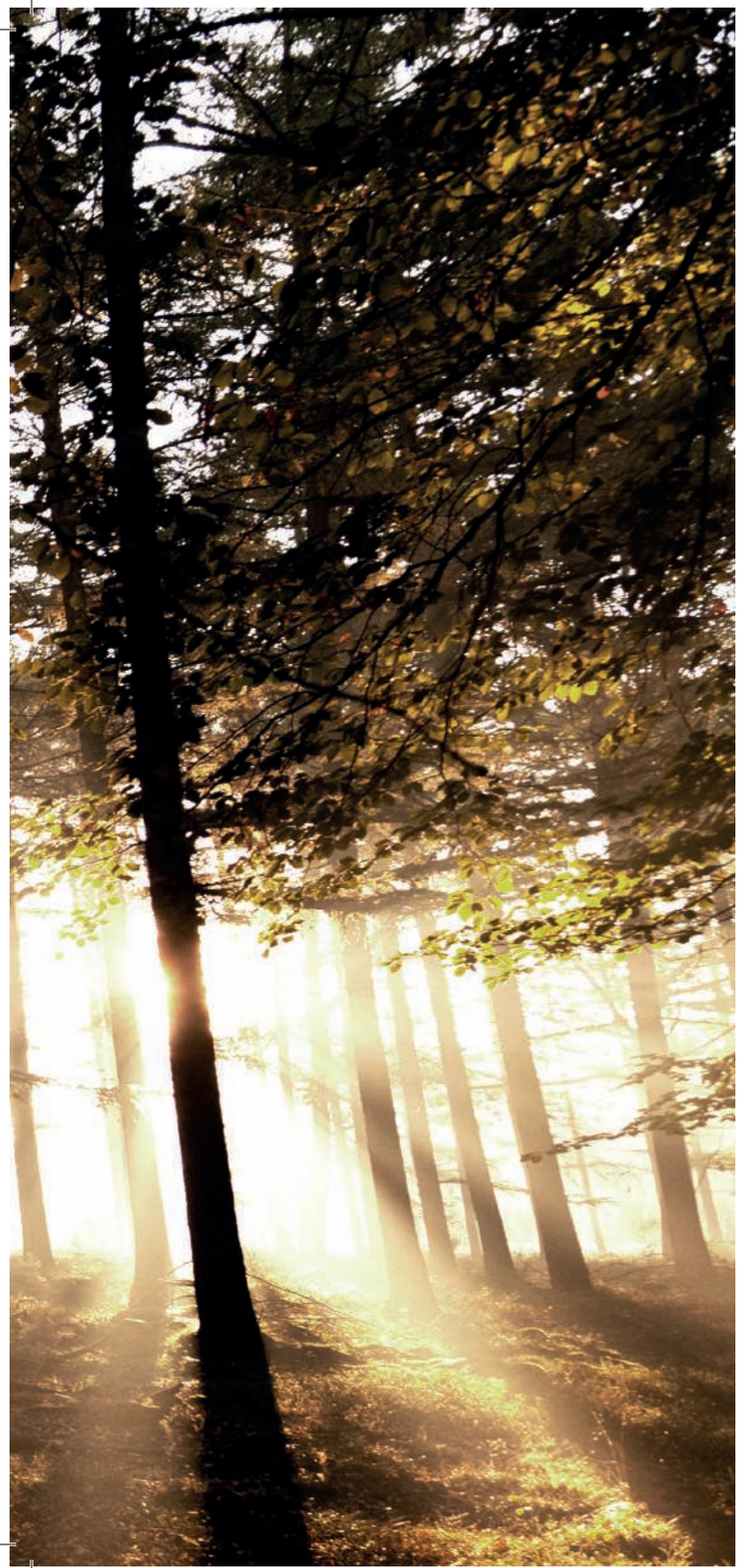
LOWERING STRESS
Implementing elements in the architecture with the purpose of lowering the stress levels in patients by using principles from the concept of healing architecture

TECTONICS + USER
Establishing a relation between user and architecture through tectonics, tactility and sensory experience of spaces

UTILIZING CONTEXT
Incorporating the context, e.g. in terms of the surrounding nature, and let the building respond to local climatic conditions

VISION

The vision for the project is to examine how a higher degree of deinstitutionalization in psychiatric care facilities is achieved in terms of centering human needs and conditions in the architecture. Also, the thesis will explore how healing environments are created in order to enforce higher life quality for the patients as well as a decreased period of hospitalization.
The project will seek to implement and understand its context; joining together architecture and nature, thereby utilizing the beneficial qualities of the latter.
Finally, relevant subjects in relation to the thesis topic; functionality in terms of accessibility, wayfinding; security for both employees and patients; and the interrelation between spaces; are to be included.



Problems

- How is a higher degree of deinstitutionalization in psychiatric care facilities achieved in terms of centering human needs and conditions in the architecture?

- How can we change the focus from a Danish health care environment that, generally, is largely based on functionality and efficiency, into an environment that equally focuses on beneficiary conditions for the human being; e.g. in terms of sensory experience?

- How are healing environments created in order to enforce higher life quality for the patients as well as a decreased period of hospitalization?

◂ Ill. 65 - Sunrise through forest

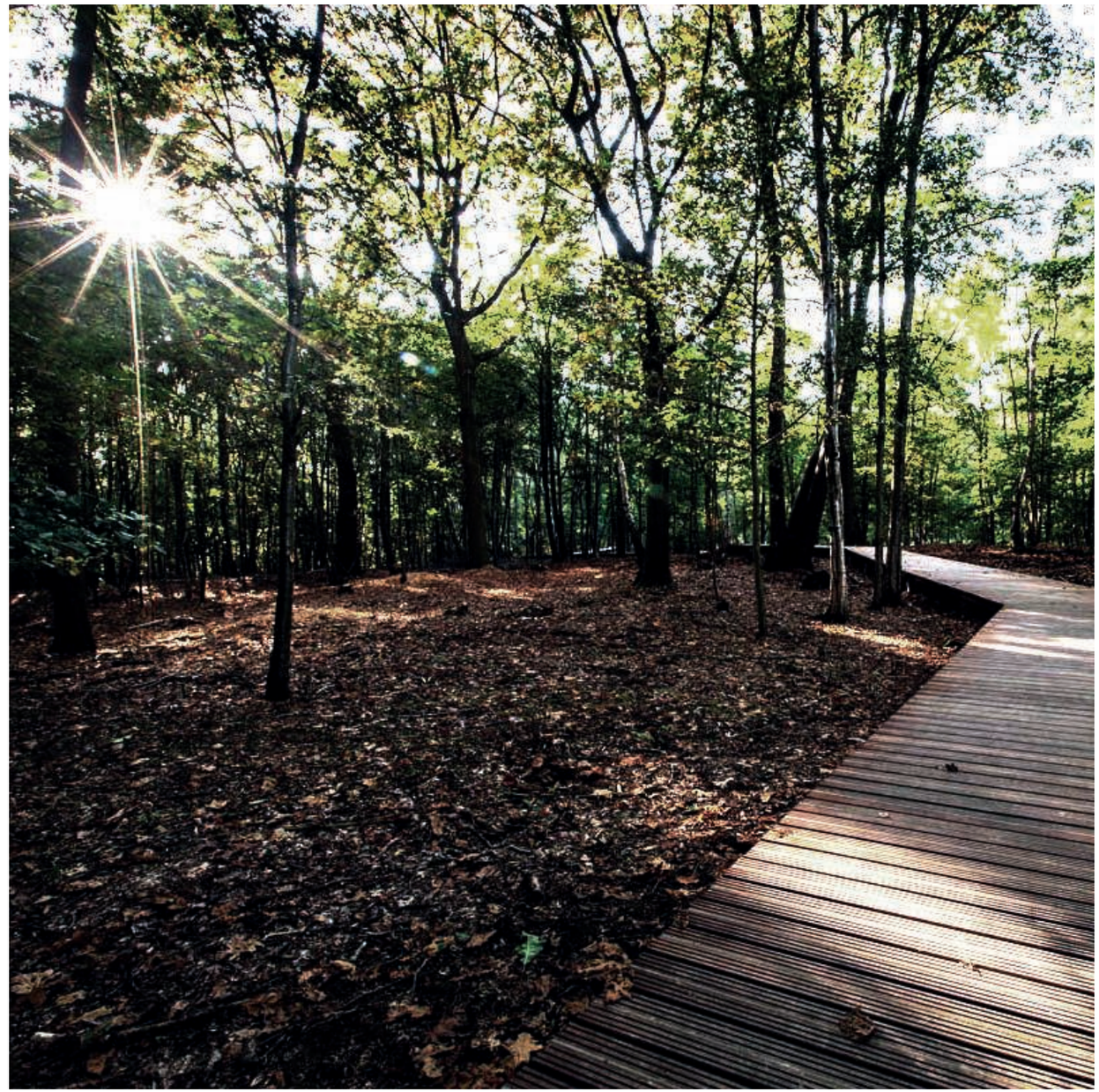
III

ARCHITECTURAL APPROACH

In the following section, the different choices of the working field of the thesis are being described. From the thematic analyses, approaches have been taken so that the implemented parts of architecture, nature, tectonics and technical aspects are described, resulting in a room program and concepts of the project.

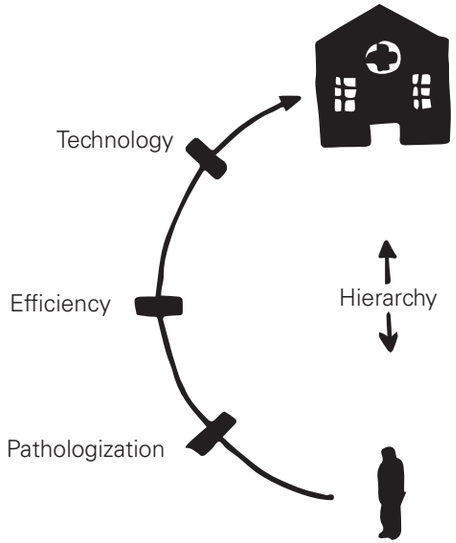
▸ Ill.66 - Forest with wooden pathway.

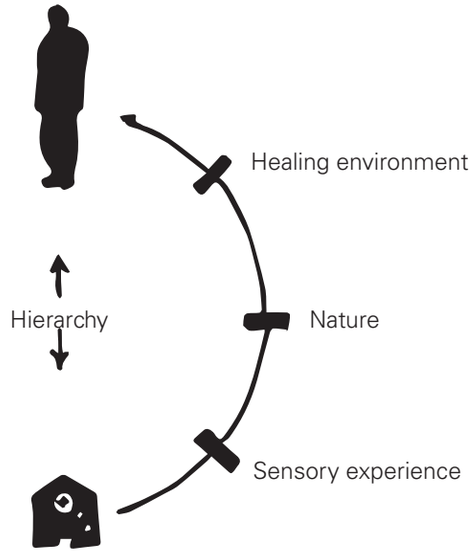
▸▸ Ill.67 - Diagrams of the existing and wanted structure of the healthcare system between the patient and the staff.

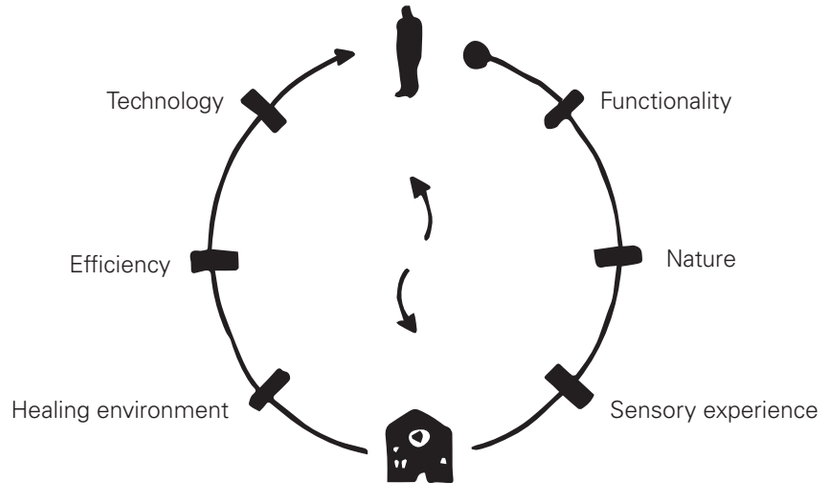


Healing architecture - Implemented

In the thesis project, the architectural design will conform to the notions of the healing environment principles described earlier. The most important factors here are the sensory experiences found through vision, audition, olfaction and somatosensation. Specifically, these sensory experiences will be found through aspects such as; choice of material; tactility; reverberation time; light in terms of window area and placement; how spaces are ventilated, etc.
The thesis will seek to develop an environment in which the patient is stimulated positively through the detailing of these aforementioned aspects.
Also, the design proposal will seek to lower the amount of external stressors; instead focusing on the combination of a secure, health-based environment and a hierarchy-free, unintimidating space, focusing on the tectonic and sensory experience.







Dissolving hierarchy

Technology driven hospital structure

The first diagram shows the patient being secondary to the hospital. The patient serves the hospital. The hospital is driven by qualities such as efficiency and pathologization of the patient.

The aesthetic hospital structure

The second diagram shows the patient as the sole focus of the hospitalization. The hospital functions only as a supportive frame for the patient's healing. The hospital serves the patient.

Hospital structure to be achieved

The third diagram shows how a middle ground is to be achieved. The patient should be the focus of the hospitalization, but the beneficial qualities of the hospital are to be utilized, such as technology and efficiency.

Ill.68 - Juvet Landscape Hotel by JSA

Nature and architecture - implemented

The fact that exposure to nature has a positive effect during stress situations – such as a hospitalization – is something that is to be implemented in the design of the psychiatric facility. The beneficial effects are to be achieved by, for instance, providing patients with access and views to outdoor environments; implementing nature in the architecture; and to utilize natural materials within the design.

Technical aspects

The project should fulfil requirements set by the Danish building regulations (BR15) and should therefore accommodate for energy, accessibility, light, acoustic, thermal and local conditional requirements. The role of the technical in the project should be outspoken and the architectural expression, clearly integrated. Structurally the project should express, in a tectonic way, the force flow of the building structure by communicating material properties in both the overall structure and in the detailing. This will be achieved by investigating structural forces and general stability.

The focus of the project will primarily be on structural investigation and calculations. Others will play a vital role, but will be addressed conceptually.

Specific points of departure for technical considerations:

Acoustic 6.4.3
Between rooms of different functions in institutions, the sound coming from adjacent rooms should not exceed 60dB, and the reverberation time should be regulated according to the use of the building / room. The requirements is considered fulfilled when the Reverberation time T is, >0.4 s in living rooms, for rooms with a room height greater than 4 meters and a room volume greater than 300 m3 should be > 1.2 x the floor area (SBI 218). (Bygningsreglement 2015)
Energy 7.2.1
Buildings such as schools, offices, institutions etc. should be designed to ensure that the total energy need should not be higher than:

$$41.0\ \text{kWh/m}^2 + \frac{1{,}000\ \text{kWh}}{\text{heated floor area}}$$

When calculating the energy need, passive elements such as climate screen, building placement, orientation, daylight, outdoor climate, heat source, thermal mass effect, ventilation, cooling, passive heat gain, solar shading and requirements to indoor climate must be taken into account. Active initiatives could be considered as well, e.g. solar cells, heat pumps etc. [Bygningsreglement, 2015].

Daylight 6.5.2
In working rooms, kitchens and living rooms the daylight is considered sufficient if the glass area is a minimum of 10% of the floor area, or, if skylights are used, a minimum of 7% of the floor area. Alternatively, the daylight could be consider sufficient in living rooms and kitchens if the daylight factor is 2% in 50% of the room. In working rooms, the daylight is considered sufficient if a daylight factor of at least 2% in the work zone is documented by computational calculation [Bygningsreglement 2015].

Thermal 7.2.1
The thermal indoor climate should be documented for dwellings, institutions, offices etc.
The thermal indoor climate should not exceed 26°C except for a few hours compared to the normal year. For other building than dwellings, the building owner will determine the hours where the indoor temperature can exceed 26°C. For dwellings, the temperature must not exceed 26°C for more than 100 hours pr. year and cannot exceed 27°C for more than 25 hours pr. year. Buildings must be airtight in order to be able to conserve heat and avoid draft. Therefore, the requirements for airtightness is 1.0 l/s pr. m2 [Bygningsreglement 2015].

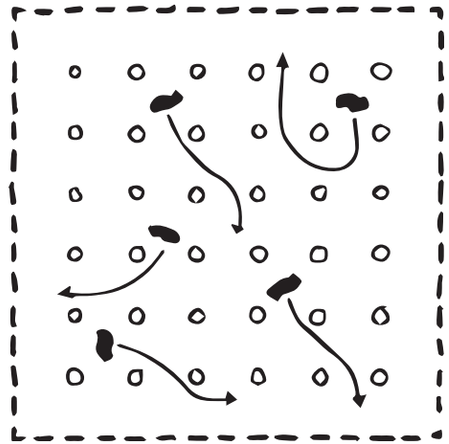
Atmospheric 7.2.1
The perception of atmospheric indoor climate or air quality is dependant on factors such as smell, dust, fumes and humidity. To maintain a satisfactory atmospheric climate, it is necessary to supply fresh outside air and remove polluted indoor air. The criteria for indoor atmospheric comfort has been set by the Danish building regulations or DS/CEN/CR 1752 and is divided into 3 categories; A, B and C [Bygningsreglement 2015].

◗ ◗ III.73 - Wooden cabins in Minnesota by HGA Architects.

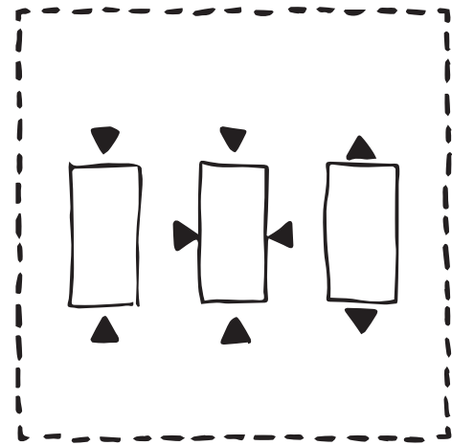
Tectonics applied

The tectonic approach will be implemented on multiple levels, e.g. the relationship with the ground expressing the transition between stereotomic and tectonic. Structurally, the shape and expression of the structural detail should express the innate nature of the materials, as argued by Zumthor. The attention to the relation between space, material and structure and should guide the overall architectural vision for the project.
The structure of the project should facilitate interaction with the load bearing elements and organize space in a predictable manner.

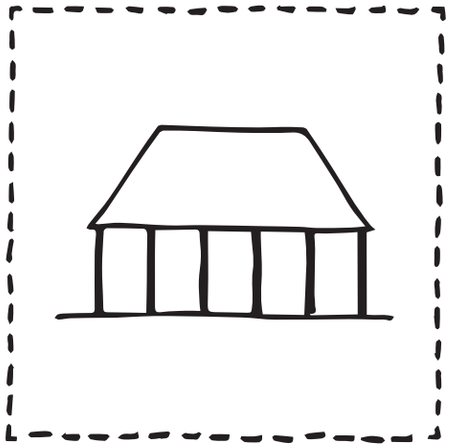
The materiality or tactility and attention to detail should be guided by the specific innate material- and structural properties.
The building or buildings should communicate an assertion of stability and calming atmosphere.
The relation between building or buildings, the earthwork/ stereotomic and the filigree tectonic structure should be clearly defined.



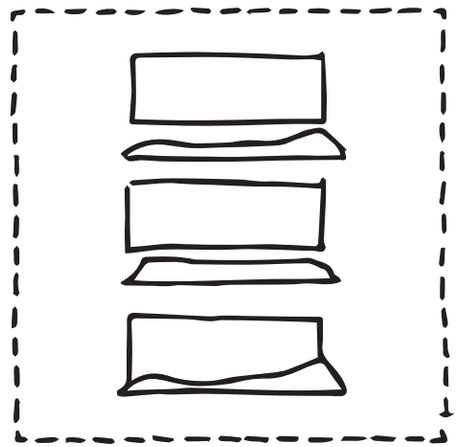
III. 69 - **01:** The relation between the human and its interaction with a building and its construction.



III. 70 - **02:** The understanding of different materials and their static capabilities.
From left:
Wood - Its capability of obtaining compressive forces along one axis.
Comcrete - Its capability of obtaining compressive forces along all three axes.
Metal - Its capability of abtaining tensite forces along one axis



Ill. 71 - **03:** The building and its simple stability and calming atmosphere.



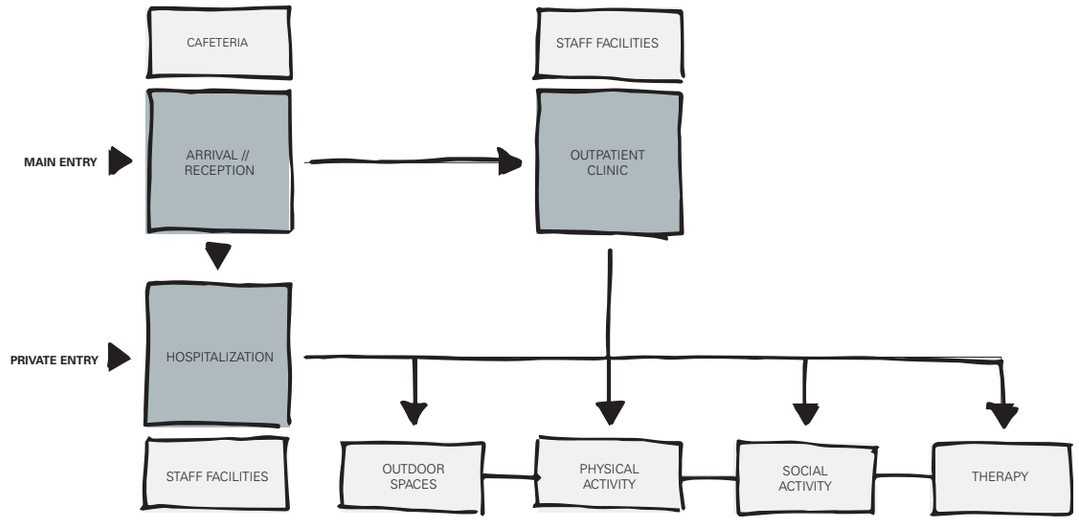
Ill. 72 - **04:** The relation between the site and the building mass.

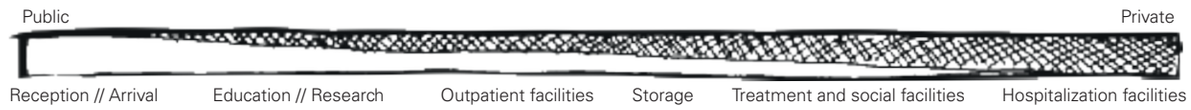
Preliminary room program

The room program has been made from needed assumptions to a new youth psychiatry facility in Aalborg, based on gained knowledge from visiting the youth psychiatry facilities in Esbjerg and Roskilde, and from the competition programs of the psychiatry in Ballerup, Sct. Hans in Roskilde and Odense (for a link to these programs, see appendix 1.7).
In an ongoing process, the room program has been changed multiple times due to more knowledge on the field, or because of the case studies.

The aim is to facilitate a youth psychiatry center for both long-term and short-term patient – a 24-hour section and a day section. The focus will be on the deinstitutionalization of the facility with the architecture and surrounding area as a healing factor for the young. The main goal is to ensure overview and calmness in the design, lowering stressors.

The placement of the facility takes part in the deinstitutionalization, because of its close distance to the city center of Aalborg. The young might come to the facility from the whole North Denmark Region, but easy accessibility is an important factor of the healing process.

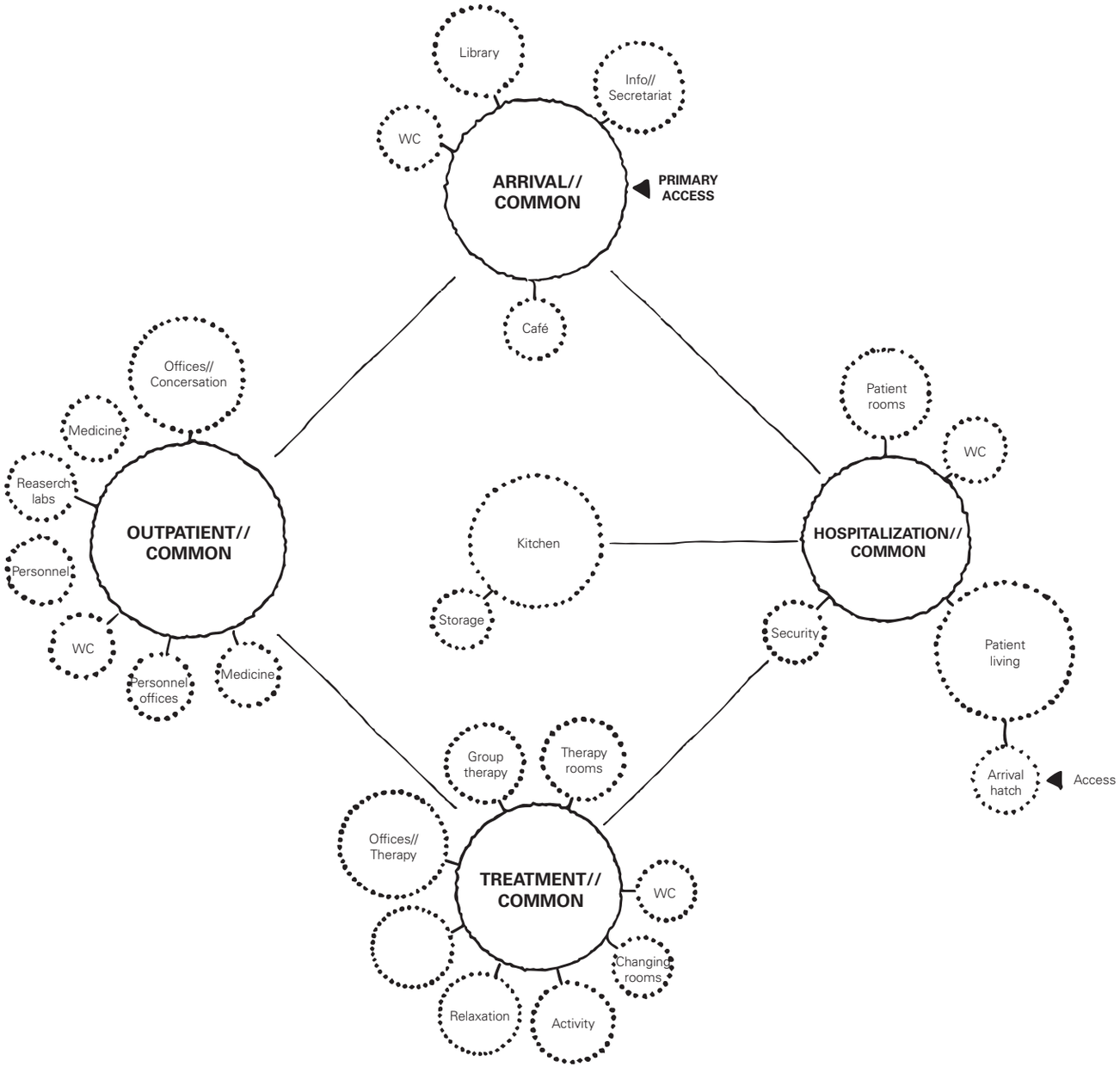




▲ ▲ III.74 - Distribution of room program.
Distribution and connection between the different functions

▲ III.75 - Public vs. private.
Diagram showing the distrubution of
functions in terms of publec and private aspects.

▶ III. 76 - Diagram of the connections
between the different functions in the psychiatry center



Function diagram

The function diagram is created on the basis of the four main areas of a regular psychiatric facility: The arrival; the hospitalization; the outpatient clinic; and the treatment spaces.

The arrival space should contain the secretariat and information area, and should mainly be of public character.

The hospitalization area contains both day section and 24-hour-section and houses the private living quarters of the patients. It should have easy access to staff, e.g. by a security overview room.

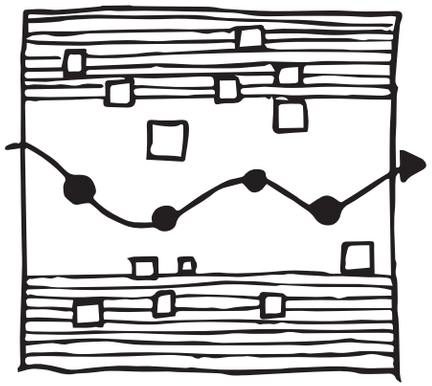
The treatment spaces should contain therapy and activity areas, having easy access to the patient's private quarters.

Finally, the outpatient area should be closely related to the arrival section in order for consultations to be easily performed. A way of connecting these four spaces could be to place a relevant central function, such as a kitchen, in close proximity to all of them.

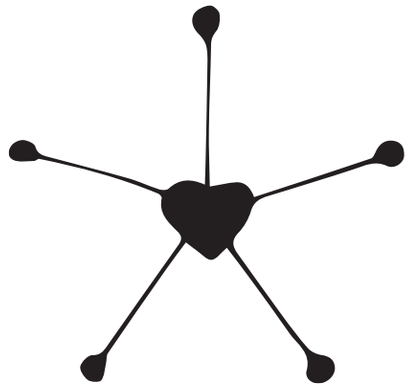
▸ Ill. 77 - Diagram of the four preliminary concepts

SUMMARY: 4 CONCEPTS

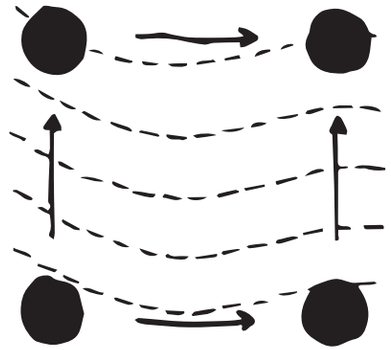
The first part of the thesis sums up the focus of the project and the relevant problems related to this. Through an overall problem that focuses on the increasing amount of young individuals being diagnosed and treated for psychiatrical conditions, as well as how the psychiatrical facilities institutionalize individuals, the thesis will seek to explore how architecture can function as a relevant and supporting actor in the healing of patients.
The analysis phase is summed up via the developing of four concepts. All of them relate to the centralizing of the patient and his needs and focus on: 1) the need for overview, 2) the implementation of human scale and nature, 3) the creation of a central hearth, and 4) the paraphrasing of the patient's process from suffering a psychological disorder to being healthy. The four concepts are elaborated upon in the following chapter.



Concept 01.



Concept 02.



Concept 03.

Concept 04.

IV

DESIGN PROCESS

The following section presents the iterative process of developing a design for the psychiatric facility.
The section narrows down the concepts from four to one - and investigates how functional, aesthetical and techical aspects are merged into it.

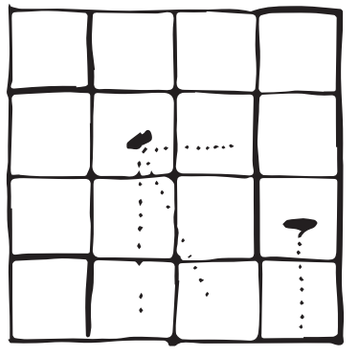
▸ Ill- 78 - Photograph of the surrounding area of Skovdalen.

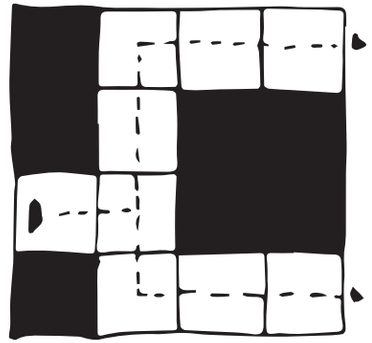
▸▸ Ill- 79 - Diagram of the the good general overview and the strict plan.

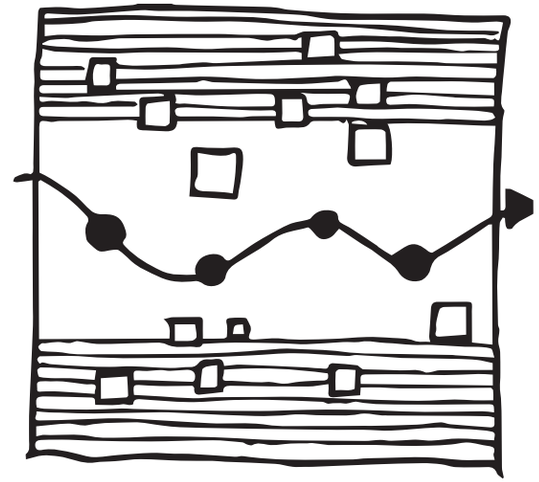
Designing for psychiatry

The following section deals with both conceptualization and concretization of the ideation phase, taking its beginning with the four concepts from the previous chapter, turning into one concept which is to be detailed.

In designing for psychiatry, one must be aware of the user's needs, as previously analyzed - overview, structure, and creating an architectural framework that has the ability to protect and surround, becoming a safeguarding perimeter without turning into a controlling entity.



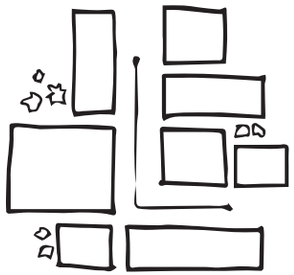


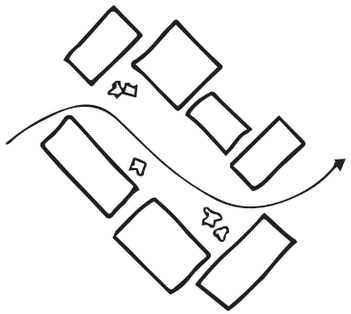


Concept 01:
Man and machine / compactness

Through previous analyses, it has been relevant to investigate the hierarchy between patient and hospital, which, for instance, can be found in how the architecture is planned. The project seeks to partially dissolve this hierarchy between the young and the staff, while maintaining the qualities of the classical institute, e.g. functionality and efficiency. The first concept has its basis in this idea; how the notion of deinstitutionalization is introduced, creating an environment of *front stage* interaction between "patient" and "hospital", and a private, *back stage* area for contemplation and private work. Physically, this would mean that a compact area containing both of these functions would be designed (see illustrations), providing a strict plan, easy to read for the user - the general overview of the building will seem more easy to understand.
Although the compactness contributes to a more energy-efficient building, problems may occur in terms of natural light intake.

▲ Ill. 80 - Diagram of the first cencept.
◀ Ill. 81 - Colonnades in Barcelona.
◀◀ Ill. 82 - Sverre Fehn, Nordic Pavillion.





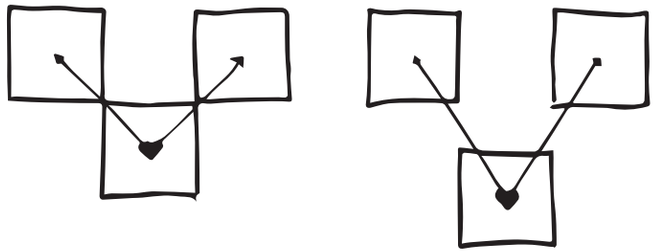
Concept 02:
Interaction between architecture and nature

The second concept investigates the merging of nature and architecture; how the context, both in terms of nature and the nearness to the suburban neighbourhood, is merged into the architectural proposal.
This has the purpose of creating closeness to nature and a homeliness based on recognizability in shapes and scale, both of which are relevant when creating a healing environment to a psychiatric patient.
The fragmentation will result in large amount of natural daylight intake, and will have the notion of including the surrounding context into the site. However, it will also be less efficient in terms of wayfinding, and the larger surface area will make it less energy efficient.

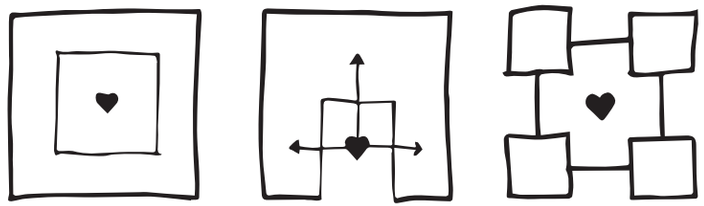
▲ Ill. 83 - Diagrams of the second cencept.

▶ Ill. 84 - *The Batin House* by Estudio Galera Arquitectura.

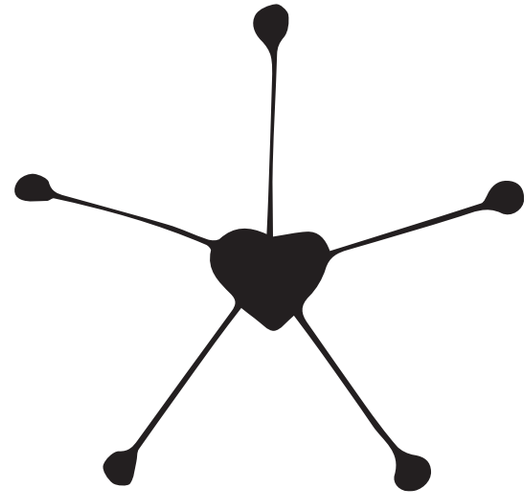
▶▶ Ill. 85 - *Quingpu houses* by William O-Brien Jr. Architects.



Ill. x.x - x.x. Distributional centers.



Ill. x.x - x.x. Circulating around centers.

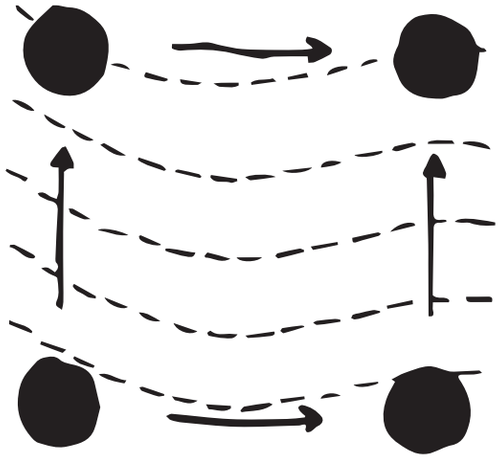


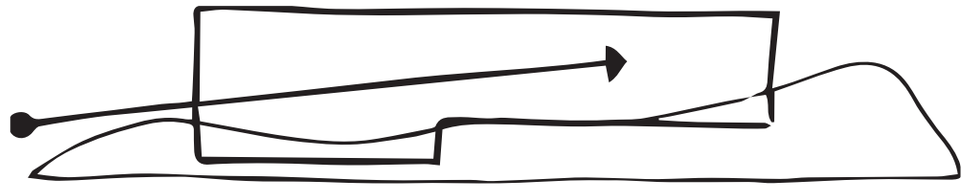
Concept 03: The distributional hearth

The third concept introduces a central space that provides the architecture with a distributional quality. From this central space, the hearth, all other functions can be easily reached.
This has the purpose of creating structure and easy wayfinding for a psychiatric patient, and can also introduce a central social element, such as a kitchen, mirroring a hearth.
Although the concept reaches for the better overview, a focus needs to be kept on the central area, making sure that it will not become a transit space.

▲ Ill. 86 - Diagram of the third concept.

◀ Ill. 87 - Two diagrams top: Distributional centers
Three diagrams bottom: Circulating around centers.

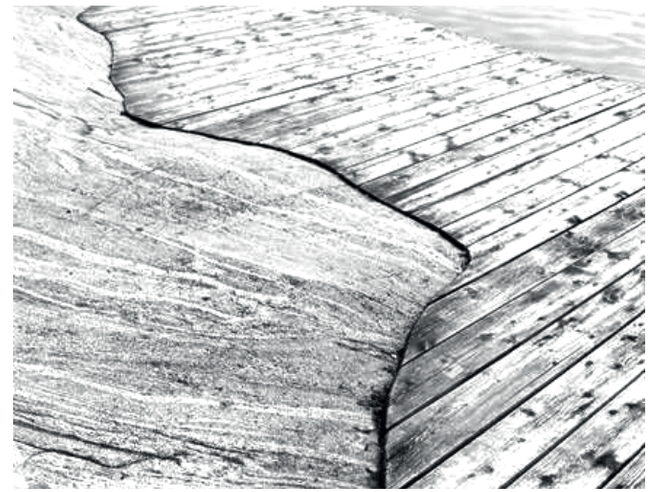




Concept 04: Terrain and flow

The fourth concept investigates how the terrain is utilized and works as an underliner for the qualities of the psychiatry functions; the most public functions are placed low in the terrain; the most private are placed high in the terrain. Hereby the site and context set guidelines for the design and the development of it.

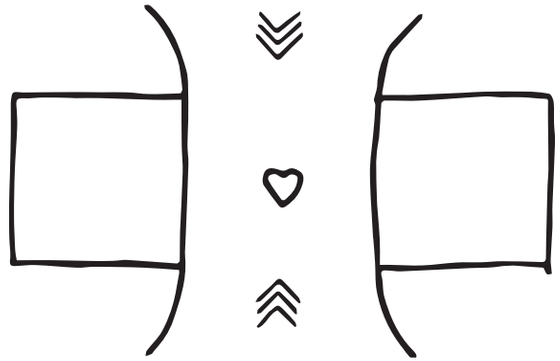
The placement of the public and private naturally creates a front stage and a back stage, taking into account the patient's condition and process towards becoming well, and examines how a relevant and easy access/flow can be achieved between functions.

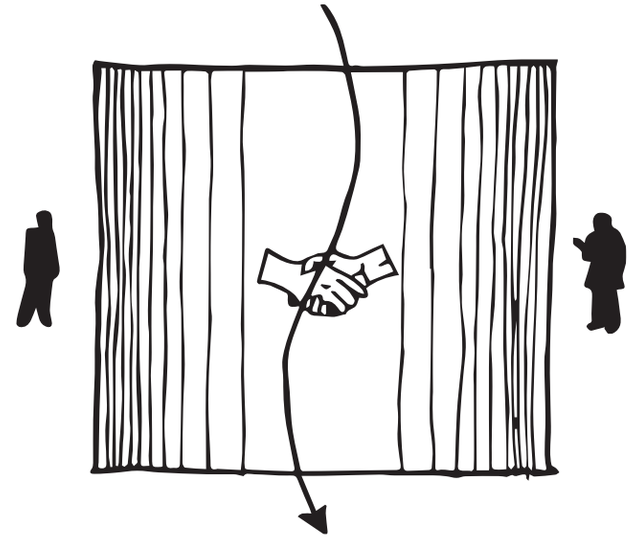


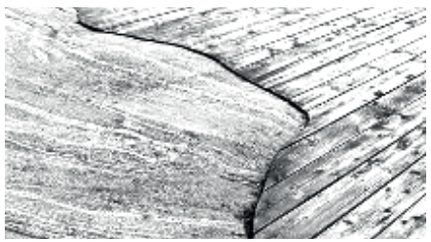
▲ Ill. 88 - Diagrams of the fourth cencept.

▶ Ill. 89 - *Le Cols extension* by RCR Arquitectes.

▶▶ Ill. 90 - Detail of *Wigert Summerhouse in Brekkestø, Norway* by Wenche Selmer







The merging of concepts

From the four concepts, different qualities of each have been investigated, thus creating a basis for the developing of a single concept. This final concept has the purpose of thoroughly implementing the psychiatric patient's needs.

The final concept is based on the idea of dissolving the hierarchy between patient and health care staff - creating a non-hierarchical space of interaction; the deinstitutionalized *front stage* - the hearth, which houses a social kitchen.

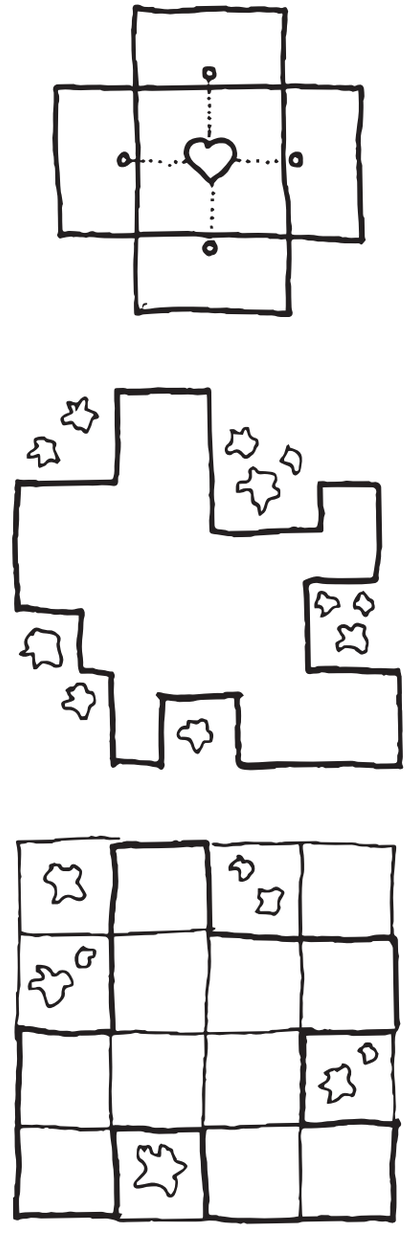
Two *back stages* are maintained in order to underline the need for privacy - a work space for staff, and a hospitalization area for the patient.

The final concept will seek to implement human scale and homeliness - the opposite of a classic institution. It will also seek to implement evidence-based design in terms of especially light and access to nature; integrating the surrounding forest and terrain.

▲ Ill. 91 - Diagrams of the four cencepts merged.

◀ Ill. 92 - Reference pictures - A sum up from the last four pages.

▸ Ill. 93 - Development of the concept.



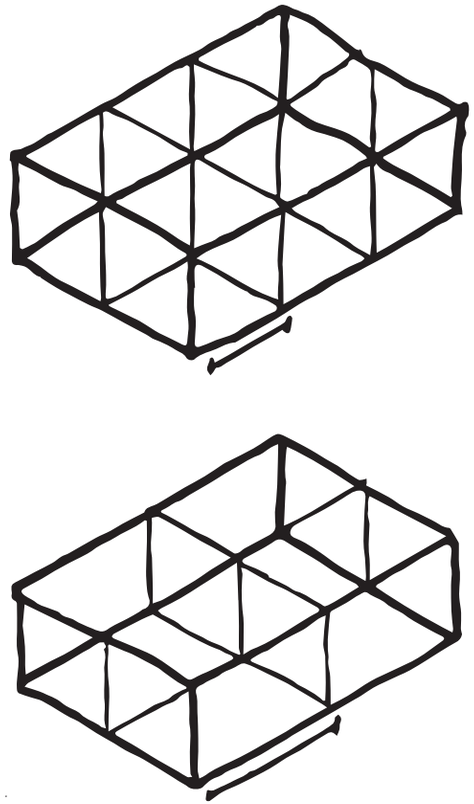
Developing the concept

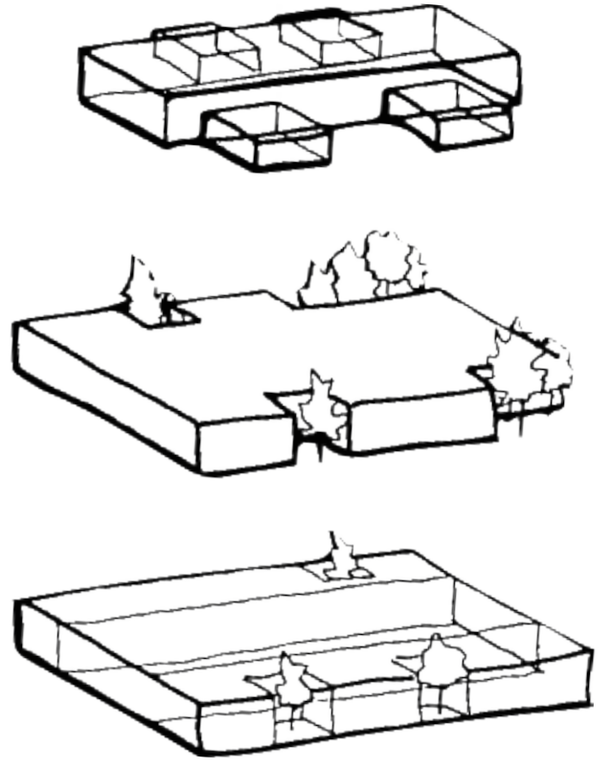
Most importantly for developing the concept is implementing user needs, understood through the analysis of design parameters in chapter 1. From these, it was understood that, specifically, overview and structure were important factors for the psychiatric patients. Thus, the idea of an overall, structural and overview-creating grid would be implemented into the concept from an early stage.

Also, in terms of evidence-based design and the notion of beneficial effects from access to nature - both visual and direct - an initial goal of creating a close relation to the surrounding forest area was sought, creating cuts into the building, shaped from the placement of the natural environment (see illustrations 93).

◂ Ill. 94 - The main iterations of the overall building shape.

◂◂ Ill. 95 - Iterations of the grid dimensioning.





01. Separate volumes representing common space and private spaces, respectively.
02. A single, irregular volume shaped after the existing trees.
03. A volume with a completely rectangular perimeter, cutting niches within it. The common space is still central, with the two back stage areas surrounding it.

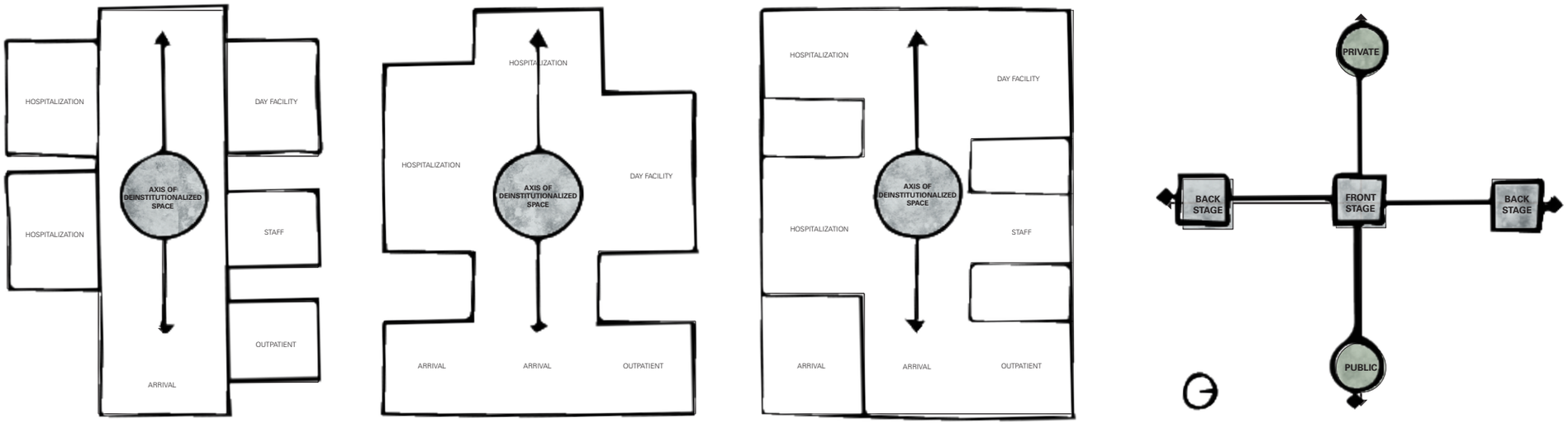
Overall shape

The design process of the complex would thus have its beginning with a structural grid; several dimensions of this grid were tested; 5 x 5 m to 4 x 4 m, decreasing it to make the relation to human scale clearer. To emphasize the overview and direction in the building, a rectangular grid of 4 x 6 m was tested in order for the grid itself to be directional (see illustration 95).

The perimeter of the building was to be strict and enveloping; thus keeping it orthogonal.
Through cutouts in this strict envelope, a relation to the nature was achieved; bringing it physically into the building.

Finally, the overall concept needed to be visible; an area representing the deinstitutionalized, non-hierarchical space, and surrounding spaces for patients and staff, were to be clearly visible in the layout.

Initially, the overall layout was fragmented, with a volume representing the deinstitutionalized space, and several smaller volumes representing the staff and hospitalization areas (see illustration 01). Although clear in its concept, a clearer understanding of the complex as a whole was sought for. This would also be done to present the building as a single, secure perimeter with a clear, deinstitutionalized space within, focusing on a healing environment. This was achieved with the third concept. (See illustration 03).



Overall shape

Placing the functions

The main goal for placing the functions was to create a border between the public space and the private health care space - intertwining these with a central axis that should represent a deinstitutionalized space.

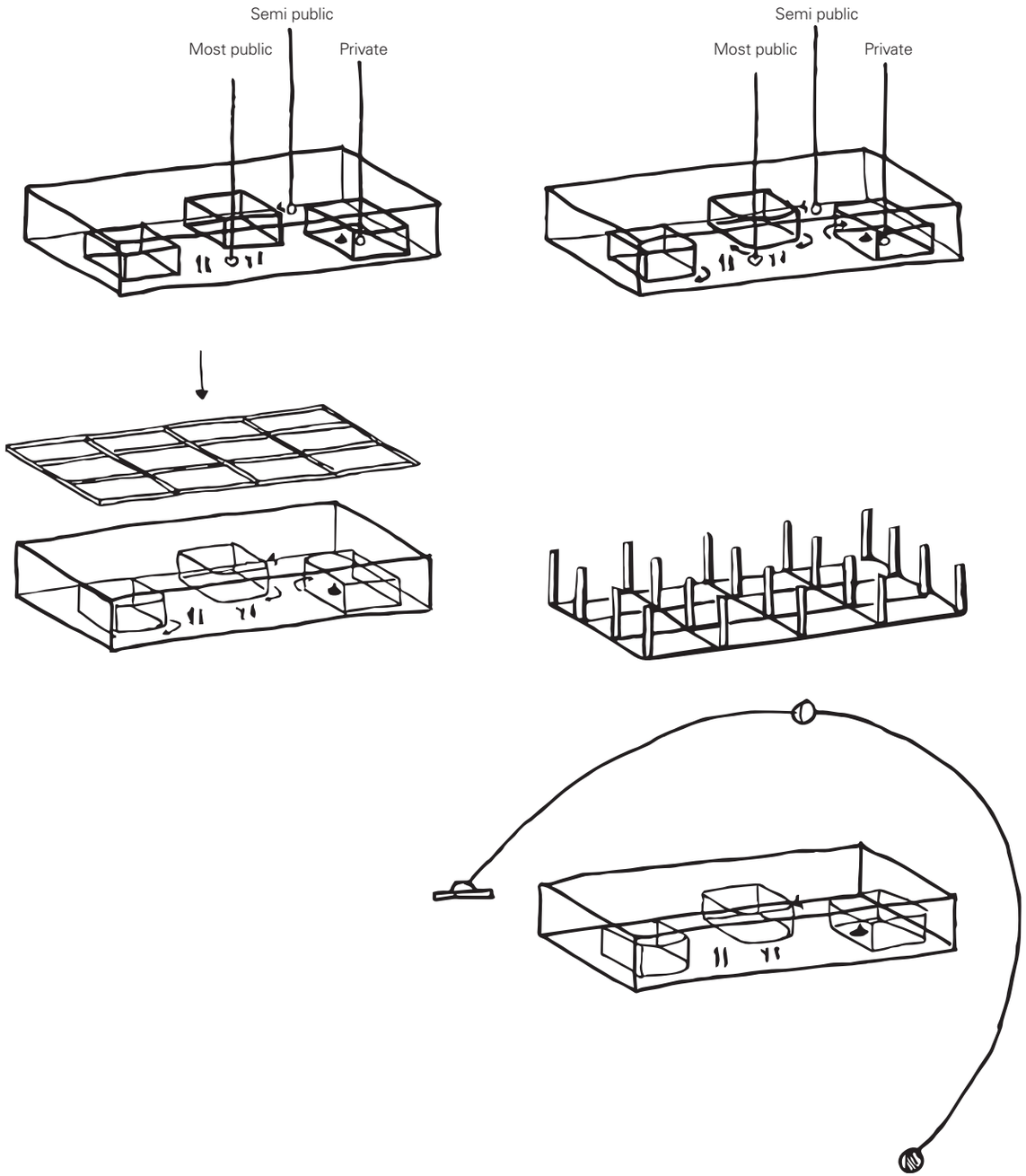
Overall, four sections were to be placed: Arrival; outpatient facility; hospitalization; and treatment. Because the axis of deinstitutionalization could be viewed as a place of healing, both in relation with others and alone, the treatment would be placed within this axis.

Arrival would be the most public space; thus being related to the parking space and main entry to the site, towards east.

The outpatient facility should also be easily reached, but needed some level of privacy; therefore, the idea of utilizing the terrain and adding another level to the building was merged into the plan. This second level could both be private and close to the entryway.

Finally, hospitalization should be placed at the most private part of the site, meaning the western part. It should also be in close relation to the deinstitutionalized axis.
The hospitalization would also need to be split into two: day-section and 24-hour-section. The 24-hour-section would need to be the most secluded; therefore it would be an idea to utilize the safe border of the forest to the south, and place it alongside this area.

▲ Ill. 96 - Major parts of the iterations on the overall shape of the building.



◂ Ill. 97 - Diagram of the considerations on the common room in terms of:
01 - The graduation of the public/private atmosphere with the interior rooms having sharp edges/corners.
02 - The graduation of the public/private atmosphere with the interior rooms having rounded edges/corners.
03 - The structural cassette system of beams in the ceiling/roof as a guiding element in terms of its direction of span.
04 - The columns as the carrying elements of the roof as well as a guiding element.
05 - The daylight intake in the different rooms in the common room, deending on their use.

The deinstitutionalized spaces

Front stage

The goal for the deinstitutionalized space in the complex is to create a common, neutral ground for the patients and the staff to meet, while at the same time creating the main social space for the patients to interact.
Also, there should be a gradient of this common area; areas for interaction and areas for more secluded recreation (see ill. 97-01).

While the whole complex should reflect deinstitutionalization, the focus is here to create a large, central space that represents this concept.

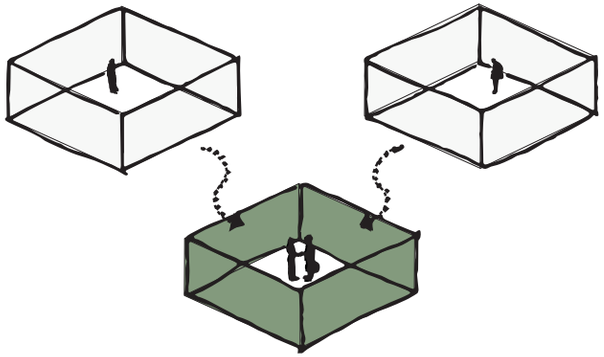
The common space should, as the rest of the complex, be easy to read for the user; providing overview and direction (see ill. 97-03 and 97-04). This was iterated upon by introducing rhythmical, structural elements in the shape of both a beam cassette system and columns, following the grid. The detailing of these elements is elaborated upon in the next section. For dimensioning of the cassette system, see appendix.

The deinstitutionalized space should in general reflect the opposite of an institution, and instead be an organic, humanized space - thus already early on introducing the idea of using mainly wood as a material - see section on Material Composition, page 82. Also, organic shaping of the walls was created (see ill. 97-02) also to create an easier view around corners.

Also, the light should, according to evidence based design, accomodate direction and the circadian rhythm, which will provide overview and counter delusions for the patients. The detailing of windows and light is elaborated on in the next section.

▸ Ill. 98 - Design parameters; work place situations.

▾ Ill. 99 - The professional meeting between staff and patient takes place on a middle ground.



The working environment

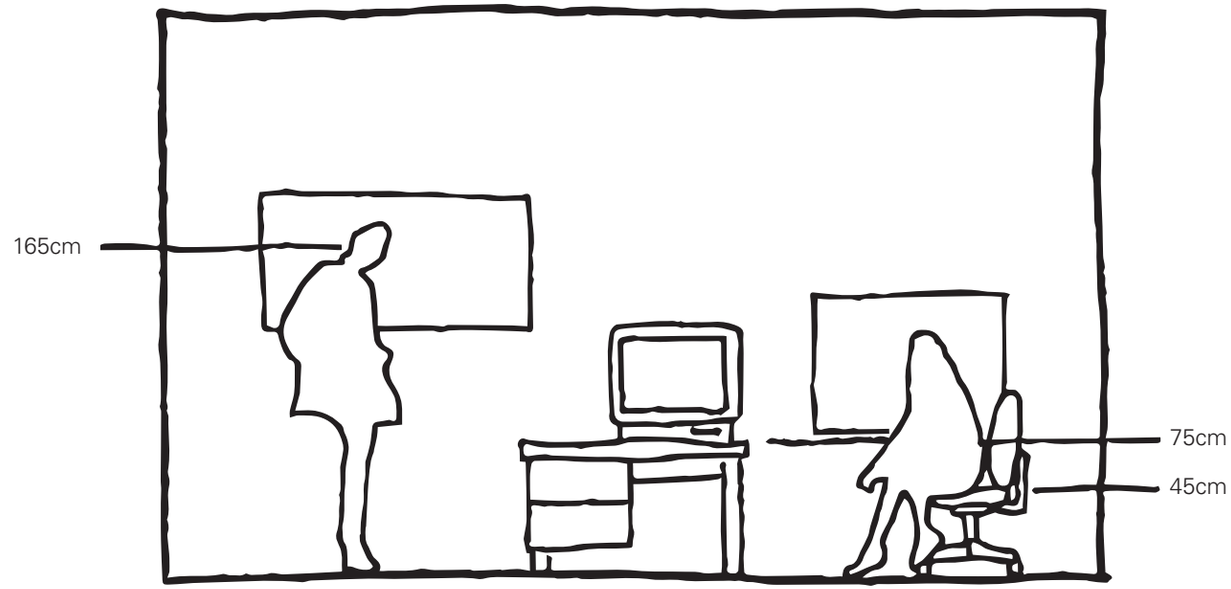
Back stage

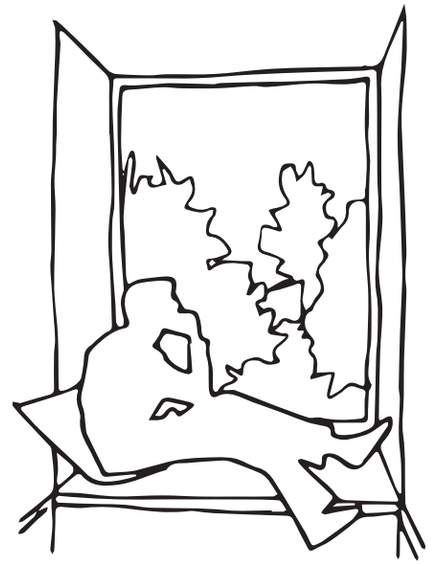
The working environments, here specifically offices, would mainly be iterated upon on the basis of one of the case studies, *Kannikegården* (see page 50)*;* here, it was relevant to look at light and visual properties, as well as creating a non-hierarchical environment for the patients and staff to meet in examination situations.

In terms of light and visual properties, the windows were examined in relation to three parameters; a staff member's sitting position; a staff member's standing position; and the height of the desk. The windows would thus have to accommodate these three situations.

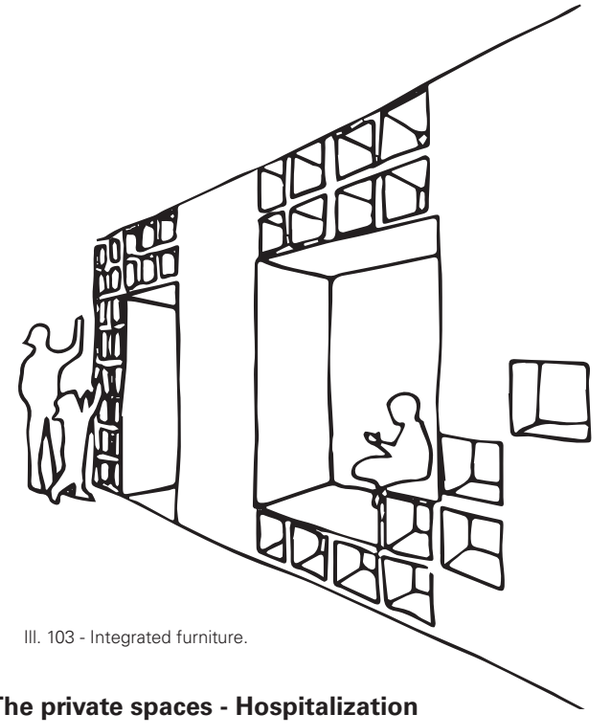
A non-hierarchic environment could be created by implementing a larger office typology, specifically designed for the meeting between patient and staff. Here, terms as sociopetal design could be implemented.

In order to also accommodate a more *back stage* office environment, a smaller and more private office typology would also be designed.

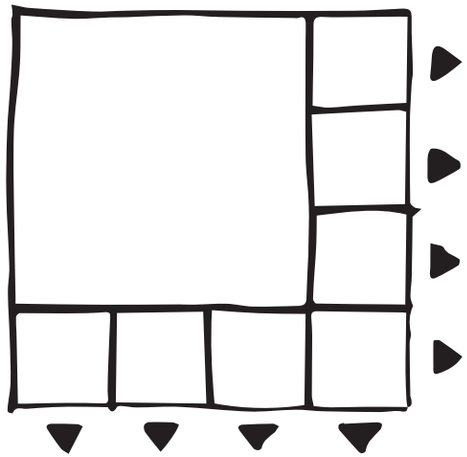




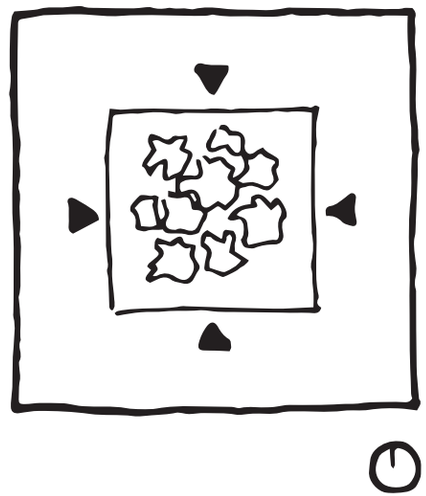
Ill. 101 - Window seat.



Ill. 103 - Integrated furniture.



Ill. 100 - Orientation of the rooms towards east and south.



Ill. 102 - Access to nature from both the children and youth section - physical and visual.

The private spaces - Hospitalization

Back stage

The idea of the hospitalization areas is to create a withdrawn space with access - visual and physical - to natural environments. Initially, the hospitalization area was a large, uniform area for all patients; this would later be separated into children and youth (teenagers) in order for them to be separated according to each of their needs.

The hospitalization area implements evidence-based design in terms of room orientation towards east and south (see illustration 100), thus potentially lowering the time of hospitalization.

In order to create a homely atmosphere of the hospitalization room, there is to be implemented recognizable and interactive elements, e.g. furniture integrated in the architecture and the ability to customize and adjust objects in terms of using modularity.

Finally, there is an idea of placing the hospitalization area in the most private area of the site in order to underline its seclusion and to ensure views into the natural surroundings.

Material and space

On material composition

The choice of material is based on the goal of an organically-appearing interior space. For this reason, locally-growing oak wood was chosen as the main material for both construction parts and most interior elements.

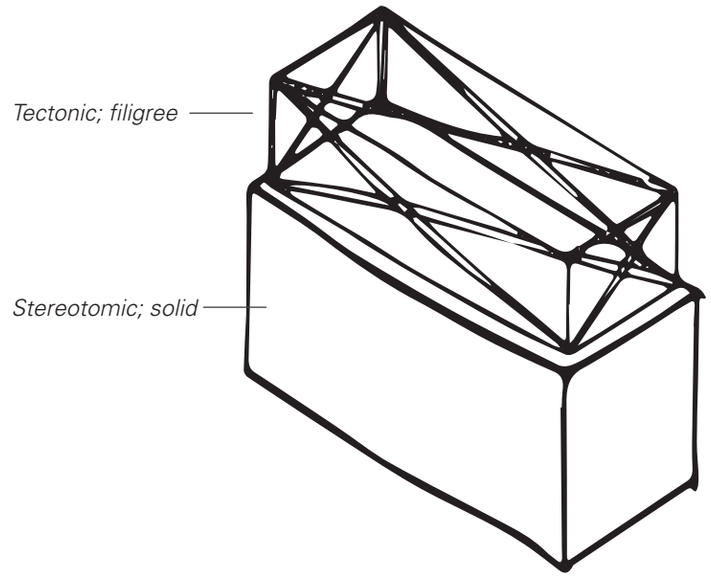
Secondly, the notion of the tectonic opposing the stereotomic was to be implemented, mainly to clearly separate architectural compositions, but also to reference the context in which such contrast already exists (see photos, page 83).

The tectonic reference in the proposal would be the light structure of wood, while the stereotomic would be a stone base - here, a red-brown brick is chosen because of its relation to existing contextual buildings.

◂ Ill. 104 - Layering in the context; boulder base with the light structure and the trees above

▸ Ill. 106 - Heavy rocks at the buttum carrying the top.

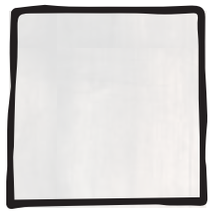
▾ Ill. 105 - Example of tectonic/stereotomic layering.



Structure, light and space

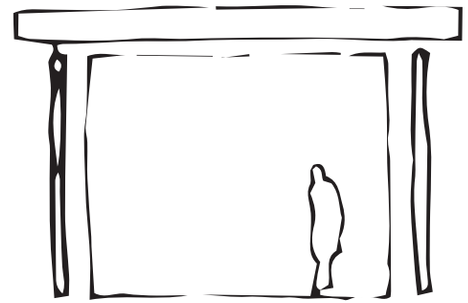
The following section describes the integration of structure, light and space in the complex, specifically considering the common space area, but also touching upon the general structural principles, lighting design and spatial design of the building.

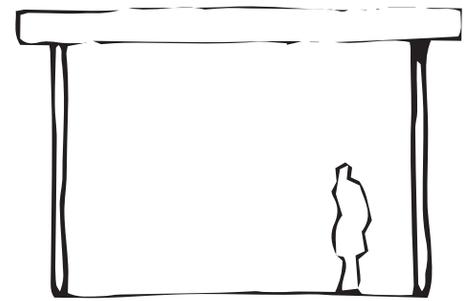
The section will seek to explore how structural elements create different spatial perceptions; how they work together with light, and how the user needs are implemented into all these aspects.

Section properties	Structual properties	Spatial qualities
 ROUND SECTION	The most stable section of the ones presented; better for transfering loads to foundation in relation to material usage; more resistant to buckling than e.g. rectangular sections. No weak axes because of uniformity.	Playful; organic
 SQUARE SECTION	Practical - easy to construct; easy to relate to/interact with orthogonal walls.	Somewhat directional; strict
 RECTANGULAR SECTION	Practical - easy to construct; easy to relate to orthogonal walls. Weak around one axis	Largely directional; strict
 FLAT OVAL SECTION	Easer to implement in orthogonal than circular section	Largely directional: Playful

◂ Ill. 107 - Iterations of the plan section of the columns.

▾ Ill. 108 - Diagram of the interaction and scale of the common room with and without and interior room.





01 • The column and the space

The first part of this chapter analyses the properties of different section types of the column, specifically in relation to how the space is perceived in accordance to a psychiatric patient. As the goal is to create a contrast to the institutional environment, a section is sought that is perceived as soft and organic. Also, the column should represent direction in order to create overview for the patient.

The sections' influence on space are further discussed on the following pages.

Section's influence on space and direction

02 • Structure and direction

The spatial properties of the section

The process describes the direction of the column through different section types and how it should fulfil the user's need for overview and understanding the direction of the space.

For the investigations, a rectangular space, mirroring the common space, is set up with the 6x4 m cassette system grid. Within the space, two random spatial elements are placed; a room and a screen, to create the idea of flow through this common area.

Through the following investigations, it is clear that a rectangular column section is wanted in order to create direction. However, as the column should also be an interactive, organically-appearing element, the flat oval section is chosen.

COLUMN: CIRCULAR SECTION

- The column is not directional.
- The column greatly invites to interaction.
- The column does not work well together with orthogonal walls.

COLUMN: SQUARED SECTION

- The column is somewhat directional.
- The column does not intuitively invite to interaction.
- The column works together with orthogonal walls.

◂◂ Ill. 109 - Iterations of the Shape of the plan section of the columns.

◂ Ill. 110 - Iterations of the Shape of the plan section of the columns.

COLUMN: RECTANGULAR SECTION

- The column is greatly directional and can work together with th ceiling direction.
- The column does not intuitively invite to interaction.
- The column works together with orthogonal walls.

COLUMN: FLAT OVAL SECTION

- The column is greatly directional and can work together with the ceiling direction.
- The column invites to interaction.
- The column, in part, works well together with orthogonal walls.

COLUMN: DOUBLE CIRCULAR

- The columns are directional.
- The columns are perceived as slimmer.
- The columns function more as an aesthetical element than an interactive element.

◗ Ill. 111 - Shape of the column and the different interaction possibilities.

◗◗ Ill. 112 - Iterations of the connection between the column and the beams

03 • Connections of the column

The column & the ground

In this first part, it is investigated how the column's meeting with the ground can be articulated, for instance by creating an integrated furniture in the column structure, or by creating a base, shaft and capital as in the classical column orders.
However, this presents the column with an extra element or volume in the space, which potentially also has the ability of fragmenting the space instead of calming it.

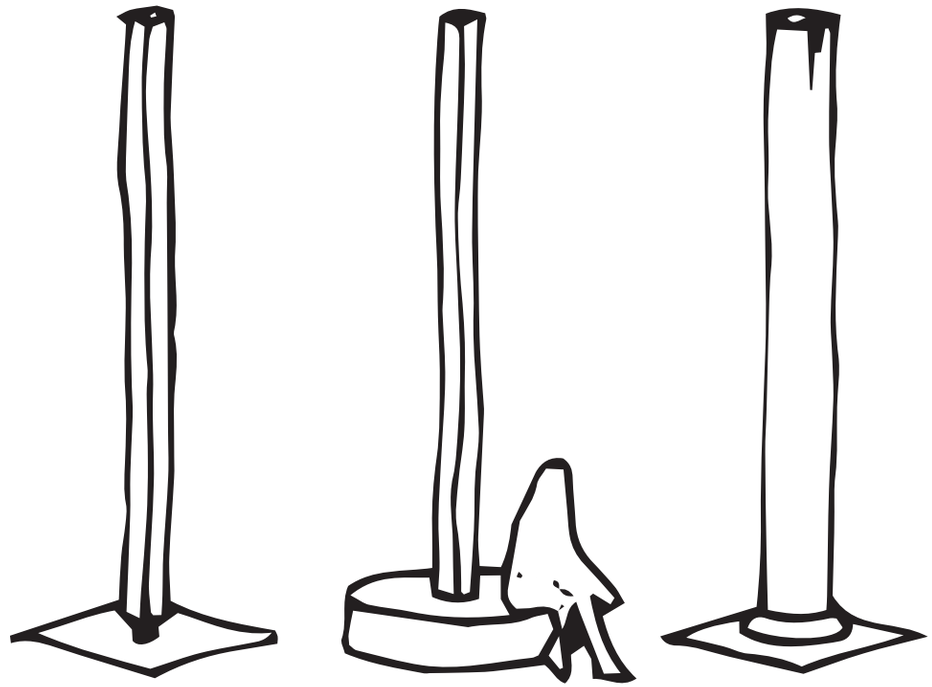
The column & the beam

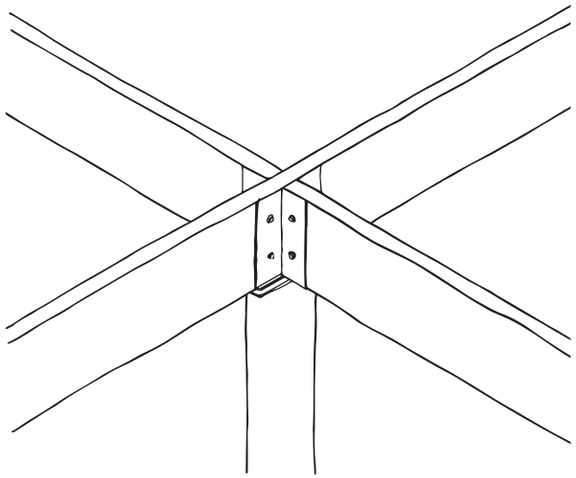
Secondly, the column's relation to the upper beam cassettes is investigated. The articulation of the joint can have different influences on the perception of space:

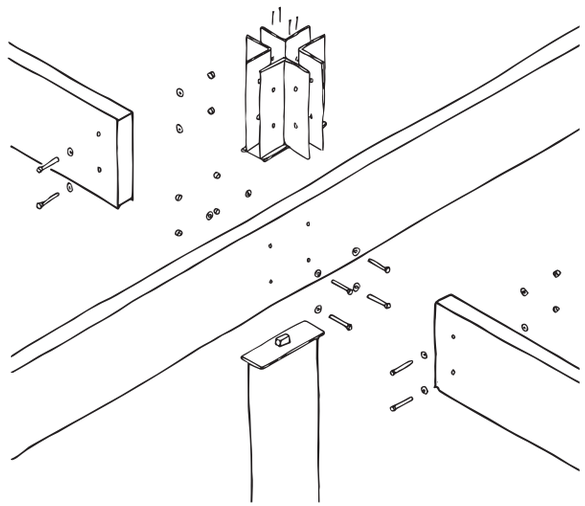
The hidden joint
The hidden joint has the ability to create a seamless, uniform visual appearance. It does not demand visual attention and can create calmness in the space.

The articulated joint
The visible joint makes the structural system a visual focus point of the space. It clearly separates beam from column and articulates the column's bearing function.

The following presents different types of joints, both hidden and articulated.

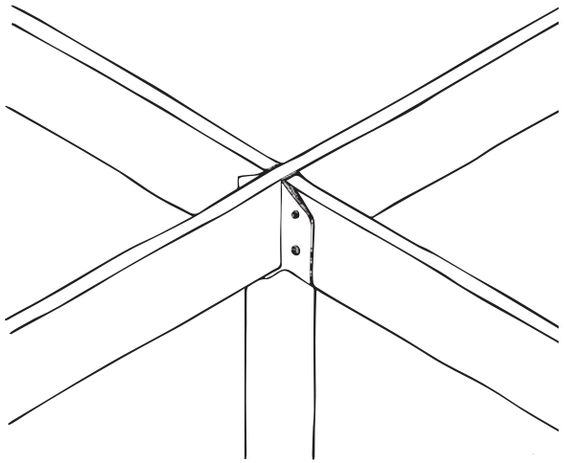


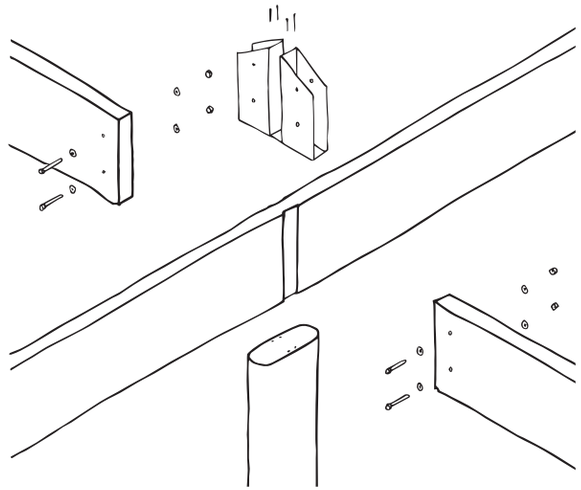




03A • Connections of the column

The visual articulation of the joint between the column and beam is made clear by implementing steel hangers, interacting with all elements of the roof structure. This solution is seen as a rather conventional solution in contemporary construction and is regarded as being strong. This option does not comply with the needs of the user due to the joint becoming a central disturbing visual element in the room.

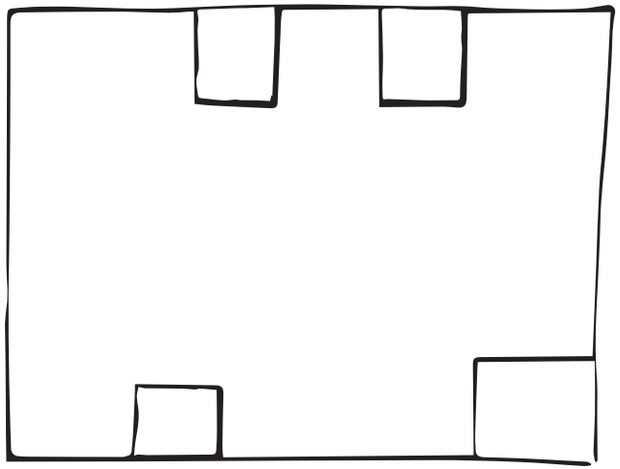




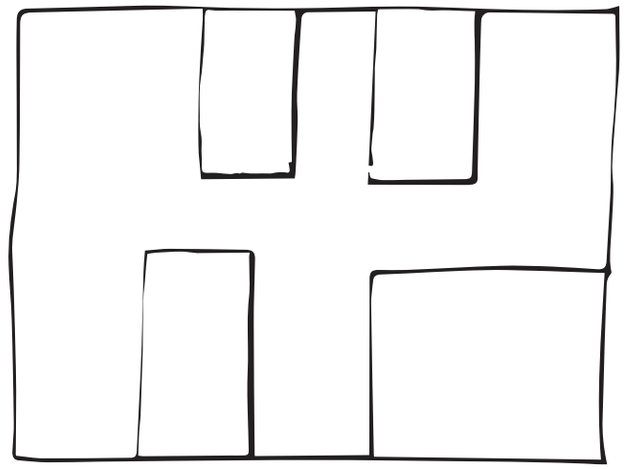
03B • Connections of the column

A simplification of the hanger joint is tested. This result is a less expressive joint than the previous iteration. The hangers are mounted on the sides of the continuous beam. This solution is considered calmer and more in tune with user needs. It is, however, still questionable when considered in relation to Louis Kahn's theory of expressing the characteristics of space in the detailing of joining and materiality.

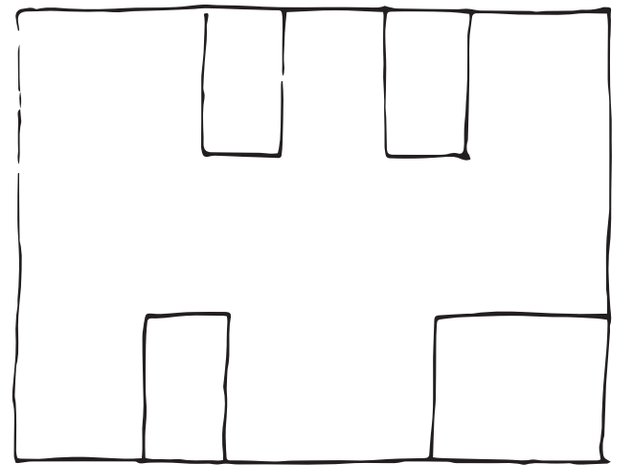
The final joint will seem completely calm and hidden, visually almost merging together beam and column to make the space appear serene.



Ill. 113 - is favourable regarding energy consumption but performs poorly regarding daylight.



Ill. 114 - performs well in terms of daylight, but the energy consumption is above the permitted level for 2015. The concept exposes too much of the façade to the climate and to the public concerning user privacy and overheating

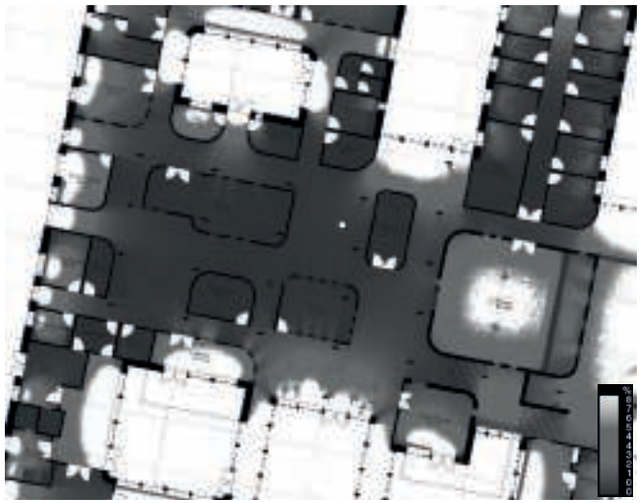


Ill. 115 - is a compromise between the daylight factor levels and the energy consumption of the building. Still the central common room is too dark. This leads to the iterations on the following pages.

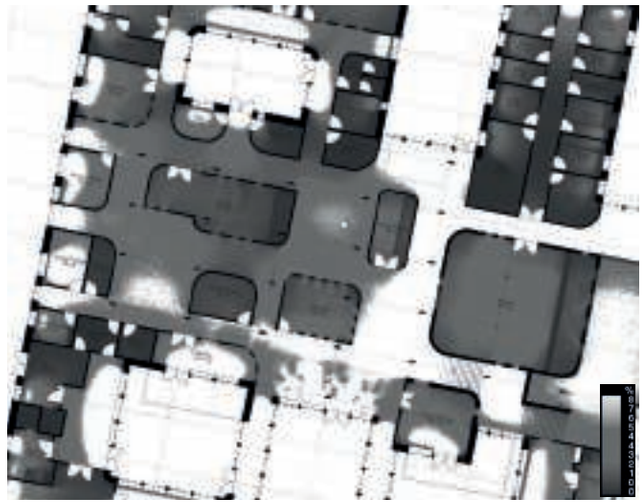
04 • Energy consumption

Testing window area/light the final iteration

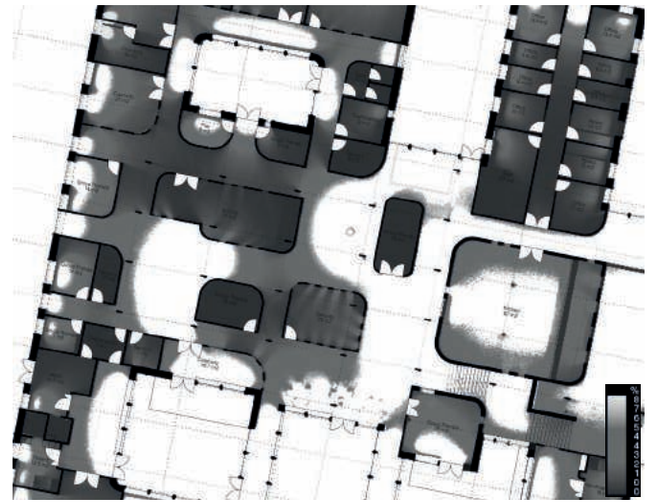
The overall energy consumption of the building is considered during the process of developing the overall compactness of the building. The size of the site and the user needs dictate a high level of compactness. This level of compactness is considered in relation to the overall energy consumption and the daylight factor levels in the building. The outer wall of the building is dimensioned to have a U-value that is sufficient to minimize the energy loss. This can also facilitate a use of the envelope as furniture. For detailed results on developing the complex through energy consumption, see appendix 1.6.



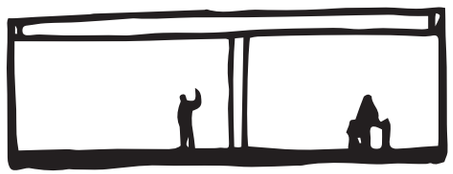
CONCEPT: NO SKYLIGHTS CENTRAL
Ill. 116 - This first iteration sought to improve the amount of light in the building without increasing the energy consumption above the limit of 2015. This was done by increasing window sizes all around and rearranging the rooms.

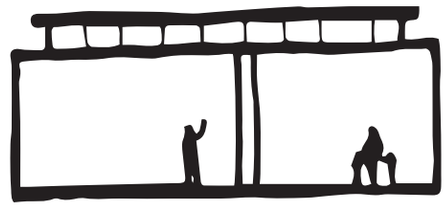


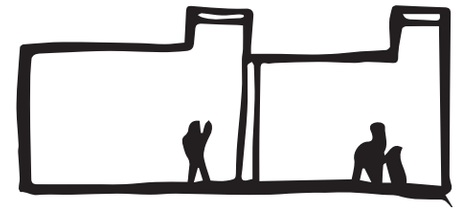
CONCEPT - CENTRAL PART RAISED
Ill. 117 - The next iteration was to improve the amount of light in the central room without exposing the patient to the public. This was done by implementing a partial raise of the building roof to create a peripheral skylight.



CONCEPT - SKYLIGHTS
Ill. 118 - The next iteration was to improve the amount of light in the central room further and creating intimate common spaces. This was done by implementing a skylights placed on top of the building.







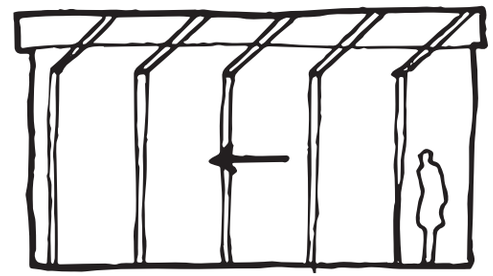
05A • Structure and light

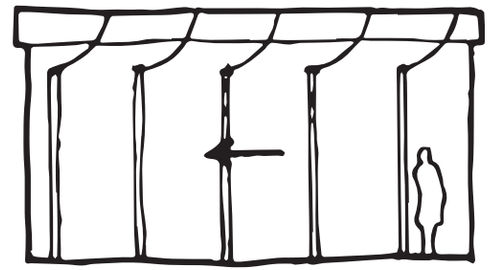
Testing window area/light the final iteration
By implementing a skylight in the common area, the exposure to the public is minimized. By testing the effect of different skylight models, the singular skylight is chosen because the focus of the light can be concentrated around activity areas in the central rooms, thereby creating a play of light and shadow, emphasizing the possibility of introvert occupation of the common room.

▲ Ill. 119 - Section of the iterations of the skylights in the common room.

Ill. 120 - Directional, following the strictness of the grid.

Ill. 121 - Directional, but softening the interior, opposing the strictness.



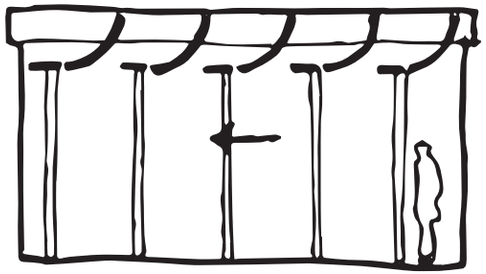


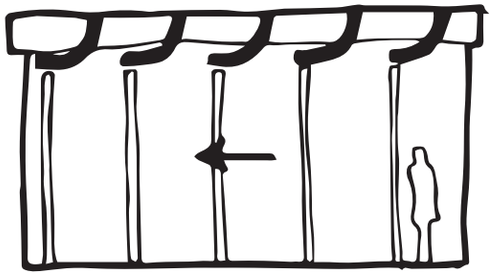
06A • Detailing the ceiling

The purpose of the detailing of the ceiling is to ensure that rhythm, pattern and direction is visible. A primary rhythm already exists in shape of the cassette grid; the ceiling investigated here is the space between this grid.
Furthermore, the ceiling also needs to work together with skylight (see above section "Structure & light").

Through these investigations, it is found that in order to oppose the strictness of the grid and create a visually softened interior, a curved shape of the ceiling can be implemented. The curvature does not necessarily need to be placed everywhere within; but can be used to underline or emphasize certain areas.

▲ Ill. 122 - Drawings of iterations of the lamellae built up.





06B • Detailed shaping of the ceiling

This further detailing of the ceiling introduces a lowering of the ceiling in order to achieve more calmness in the space.
Secondary, a flattened area is introduced before the curvation begins. In this way, the beginning of the curve follows and emphasizes the orthogonal cassette grid before turning into a curvature, even though the transverse beams are now hidden.

▲ Ill. 123 - Drawings of iterations of the lamellae built up.

Ill. 124 - The curvature is above the grid.

Ill. 125 - The curvature is lowered so the transverse beams are hidden; creating calmness.

Ill. 126 - A flattened area is introduced, "folding around" the transverse beams to underline them, even though they are now hidden.

WIDTH 100 MM
Width of lamellas: 100 mm
Width of middle partition: 100 mm
Distance between lamellas: 50 mm

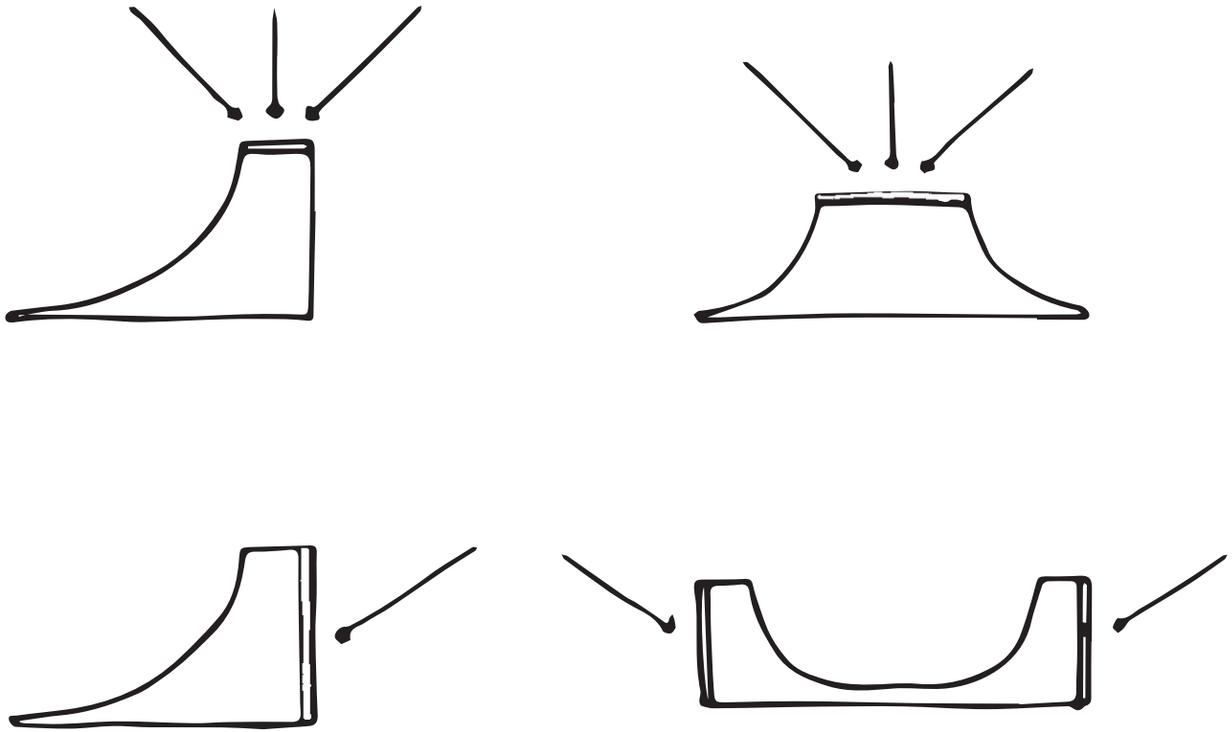
WIDTH 150 MM
Width of lamellas: 150 mm
Width of middle partition: 150 mm
Distance between lamellas: 50 mm

WIDTH 70 MM
Width of lamellas: 70 mm
Width of middle partition: 70 mm
Distance between lamellas: 10 mm

06C • Detailing the lamellas

Dimensioning
In this section, the appearance of the ceiling structure is investigated through lamella detailing.
In overall, 3 instances of lamellas have been tested; width 70 mm, width 100 mm and width 150 mm. Furthermore, the width of the middle wooden partition has been tested, as well as the distance between each lamella.
The goal is to achieve a uniformity in the appearance, thus choosing the final iteration.

▲ Ill. 127 - Iterations on the dimensioning of the lamellas.



▲ Ill. 128 - Light ducts, side view

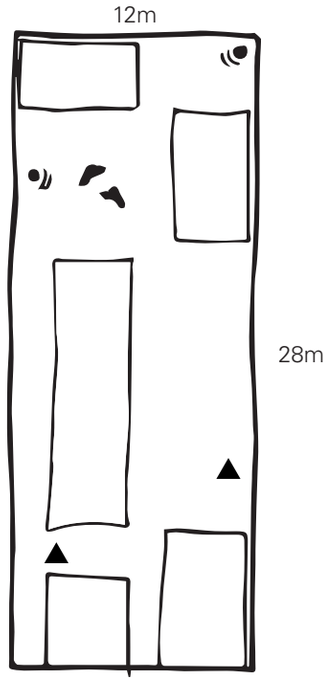
05B • Structure and light
Testing different types of skylight intake in the common space

The purpose of the light intake was to create a perceivable circadian rhythm in order to minimize delusions for the patients. It would also be appropriate to try and work mostly with indirect lighting for the same reason.

In general, two different types of light intakes were tested: skylight coming from above, and skylight coming from each of the cardinal directions.

It became clear that light intake from east and/or west would be quite day-specific; either providing light at dawn or dusk. Thus, it would seem more appropriate to either use north/south lighting or skylights.
Both of these would be able to show the circadian rhythm; but the skylight, in collaboration with a curved light duct (see illustrations), would also provide the indirect lighting that was wanted.

Common room



Acoustics

Testing of the common room and the children section

In the following section, acoustic process studies are performed through Pachyderm for Rhinoceros.

The section will investigate a common space and a hospitalization area in terms of obtaining a slight difference in reverberation time; slightly longer in the common spaces and somewhat lower in the hospitalization area, signaling the differences in their functions.

A reverberation time of approximately 0.5 seconds is sought in the common space; 0.3 seconds or lower in the hospitalization area.

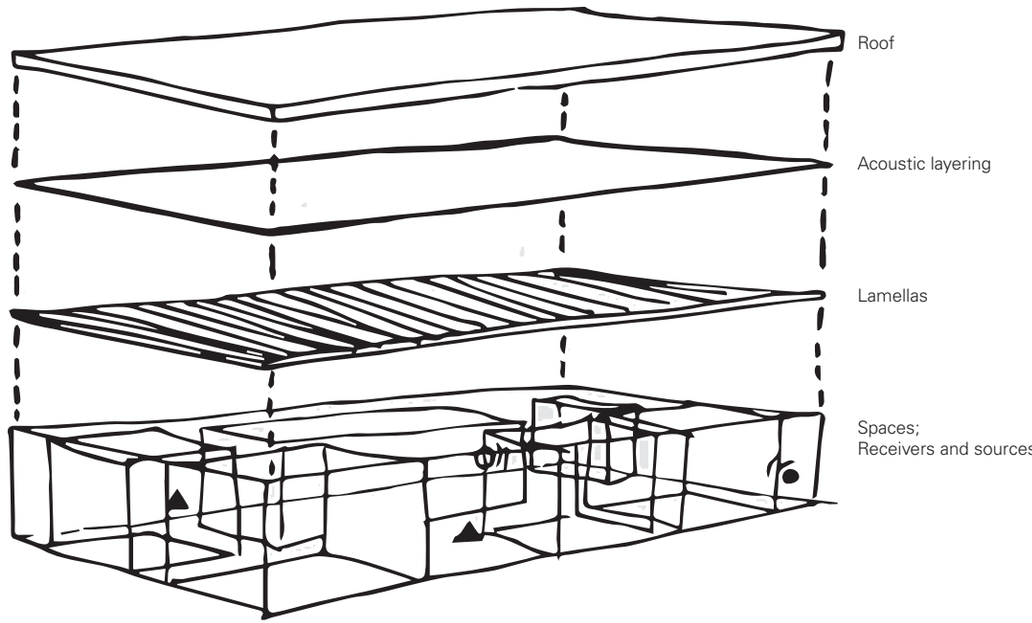
Preliminary data: Common room section, 28 x 12 m, 3.5 m height.
Wood: Sound-absorbing paneling.
Audience: "students informally dressed, seated".

TEST A-01: Wooden walls, wooden floor, wooden lamellas and acoustic layering behind lamellas.
1 source. 1 receiver.

RESULTS OF TEST A-01:
T30: 0,28 s (1000 hz); 0,16 s (500 hz).
D50: 59,48% (1000 hz); 91,37% (500 hz)

TEST A-02: Wooden walls, wooden floor, no lamellas and wooden ceiling.
1 source. 1 receiver.

RESULTS OF TEST A-02:
T30: 0,39 s (1000 hz); 0,42 s (500 hz).
D50: 70,59% (1000 hz); 66,93% (500 hz)



TEST A-03: Wooden walls, wooden floor, wooden lamellas and acoustic layering behind lamellas.
2 sources. 2 receivers.

RESULTS OF TEST A-03:
T30: 0,62 s (1000 hz); 0,54 s (500 hz).
D50: 98,35% (1000 hz); 99,81% (500 hz)

TEST A-04: Wooden walls, wooden floor, no lamellas and wooden ceiling.
2 sources. 2 receivers.

RESULTS OF TEST A-04:
T30: 1,14 s (1000 hz); 0,62 s (500 hz).
D50: 97,84% (1000 hz); 99,73% (500 hz)

TEST A-05: Wooden walls, wooden floor, gypsum ceiling. (No lamellas).
1 source. 1 receiver.

RESULTS OF TEST A-03:
T30: 0,59 s (1000 hz); 0,34 s (500 hz).
D50: 57,67% (1000 hz); 61,5% (500 hz)

TEST A-06: Wooden walls, wooden floor, gypsum ceiling. (No lamellas).
2 sources. 2 receivers.

RESULTS OF TEST A-04:
T30: 0,74 s (1000 hz); 0,5 s (500 hz).
D50: 95,64% (1000 hz); 99,8% (500 hz)

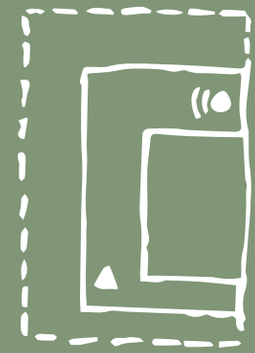
◂◂ Ill. 129 - Plan of the acoustically tested common room.

◂ Ill. 130 - Built up of the common room and the acoustic ceiling.

▲ Ill. 131 - Plan of the acoustically tested children section.

▸ Ill. 132 - Placement of the sound source and sound receiver.

Hospitalization area - hallway area



TEST B-01: Gypsum ceiling and wooden walls+floor
1 source. 1 receiver.

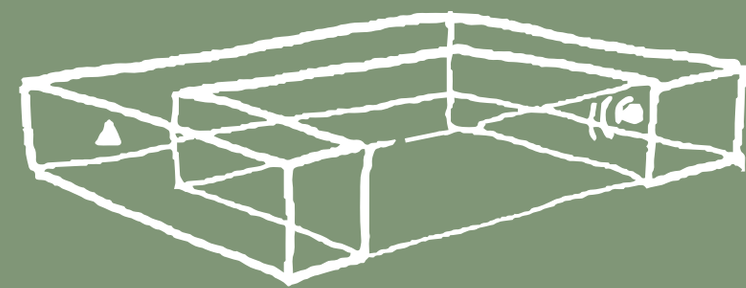
RESULTS OF TEST B-04:
T30: 0,3 s (1000 hz); 0,18 s (500 hz).
D50: 75,19% (1000 hz); 97,79% (500 hz)

TEST B-02: Gypsum walls and wooden ceiling+floor
1 source. 1 receiver.

RESULTS OF TEST B-02:
T30: 3,33 s (1000 hz); 2,81 s (500 hz).
D50: 24,22% (1000 hz); 23,79% (500 hz)

TEST B-03: Wood walls and wooden ceiling+floor (everything wood)
1 source. 1 receiver.

RESULTS OF TEST B-03:
T30: 0,28 s (1000 hz); 0,1 s (500 hz).
D50: 83,1% (1000 hz); 98,24% (500 hz)



Facade studies

The initial façade iterations are centered around the conversation between the stereotomic and the filigree tectonic. The façade is iterated upon by expressing an innate materiality and the relation to context and the human scale.

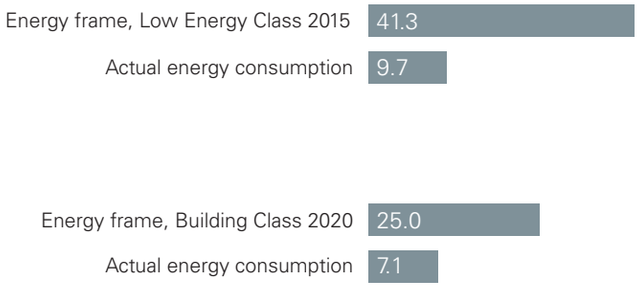
Ill. 133 - The initial iteration is focused on the placement of windows, considering the distribution of interior rooms, furniture and level of outlook. The conversation between base and top is rather blunt and they appear as two separate elements.

Ill. 134 - The second iteration illustrates a closer relation between the top and base by moving the top over the base. Therefore, the depth of the façade is expressed in general and also in windows in the base, emphasizing the weight of the brick.

Ill. 135 - In the third iteration, the façade elements are enhanced to reinforce the structural effect of the façade in general. This results in a biased expression where the materials are mimicking the weight of one another. This is contradictory to the theory of Louis Kahn, considering the innate characteristics of the materials.

Ill. 136 - The final iteration illustrates the intricate conversation between wood and stone, expressing the characteristics of the brick by supporting the façade columns with a series of stones put in rowlock position. The horizontal direction of the base emphasizes the loadbearing properties of the brick, and the vertical orientation of the top wooden façade expresses the filigree lightness of the wood.

Energy frame, kWh/m²/year



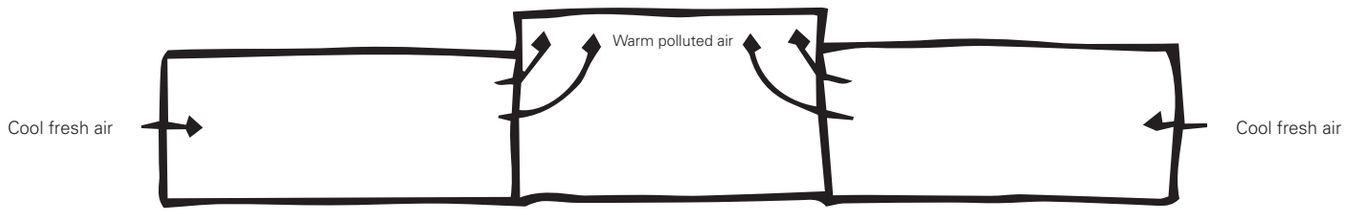
Indoor climate

The overall shape of the building is compact, thus lowering the total surface area and thereby the energy consumption.
In order to underline the central part of the building, it is extruded upward, thus also allowing for thermal buoyancy and natural ventilation (see ill. 138).
In terms of storing heat energy, the concrete slab in the flooring can be utilized by its thermal mass.

LIGHT INTAKE AND HEATING

The window area in the building is optimized according to the overall energy consumption (see page 90), making sure that sufficient lighting is achieved and that the energy consumption complies with the demands of low energy class 2015 and building class 2020.

▲ Ill. 137 - Energy frame for final iteration. (For extended results, see appendix 1.6.)



▶ Ill. 138 - Principle for thermal buoyancy.

◂ Ill. 139 - Photograph of context model used in the design process.

Summary of design process and its relation to design parametres and concept

The design process has merged together four concepts based on the initial analyses, creating a singular concept based on creating a non-hierarchical, deinstitutionalized space within the psychiatric complex; a *front stage* environment in which the interaction between people associated with the building can happen.

The design process has integrated the context in terms of nature and the implementation of several levels within, mirroring the terraced landscape. The building itself reflects, from the outside, a protective, strict frame, which, as one enters, changes into a warm, organically-inspired environment. A strong, stereotomic base opposes a light, wooden tectonic upper part of the building facades.

The light setting allows the patient to follow the circadian rhythm from skylights, and the direction and overview is achieved through structural elements; columns, beams, and ceiling.

V

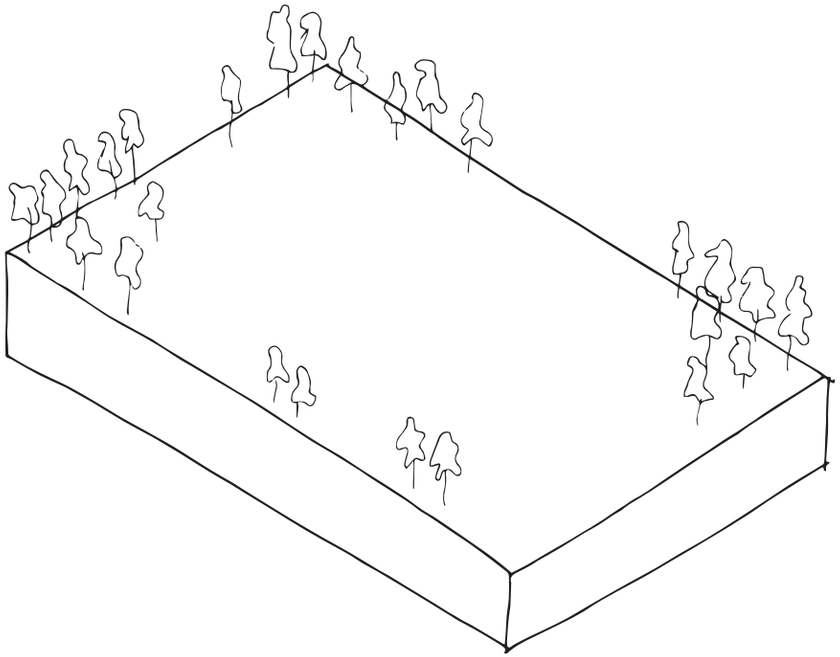
PRESENTATION

The following section presents the final project, merging together all relevant aspects from the design process and the initial analyses.

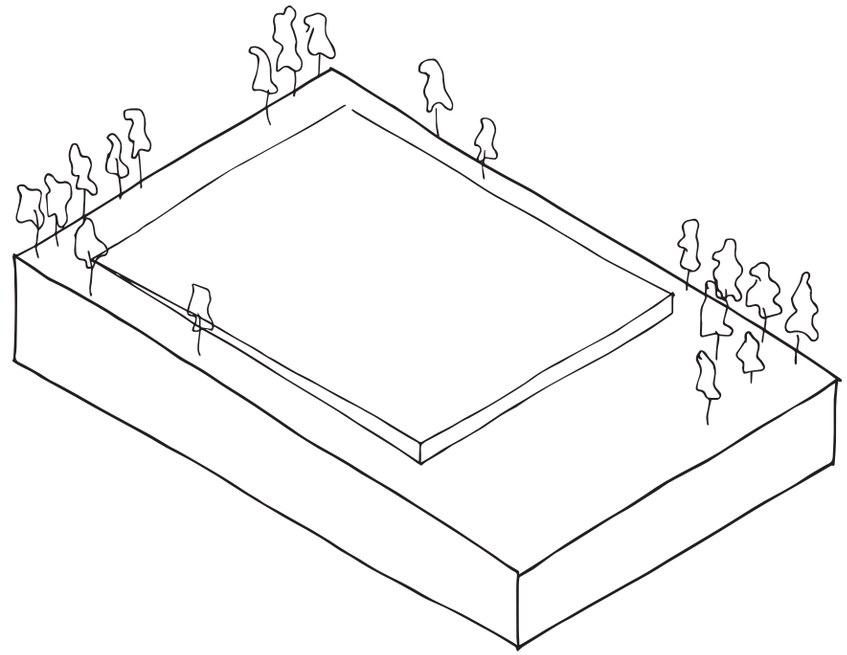
The concept of the psychiatric facility
The psychiatric facility clearly reflects the concept of a deinstitutionalized space within a protective frame.
The design is patient-centered; meaning that his or her needs are taken greatly into account, providing space for both contemplation and healing, but also creativity and interaction, depending on the pathological state of the patient.

There is a constant possibility of getting into contact with the health care staff, providing security for all parts involved. This way of being able to meet and interact as equals is one of the most important qualities of the deinstitutionalized space.

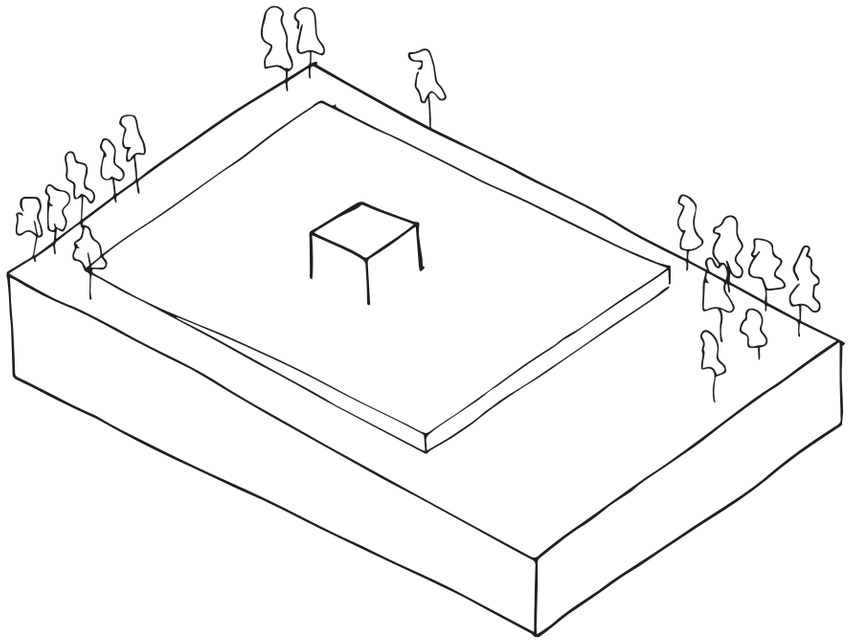
▸ Ill. 140 - Render of Aalborg Youth Psychiatry seen from the south eastern corner of the site. When arriving to the site by the main access way, this is the view to the building.



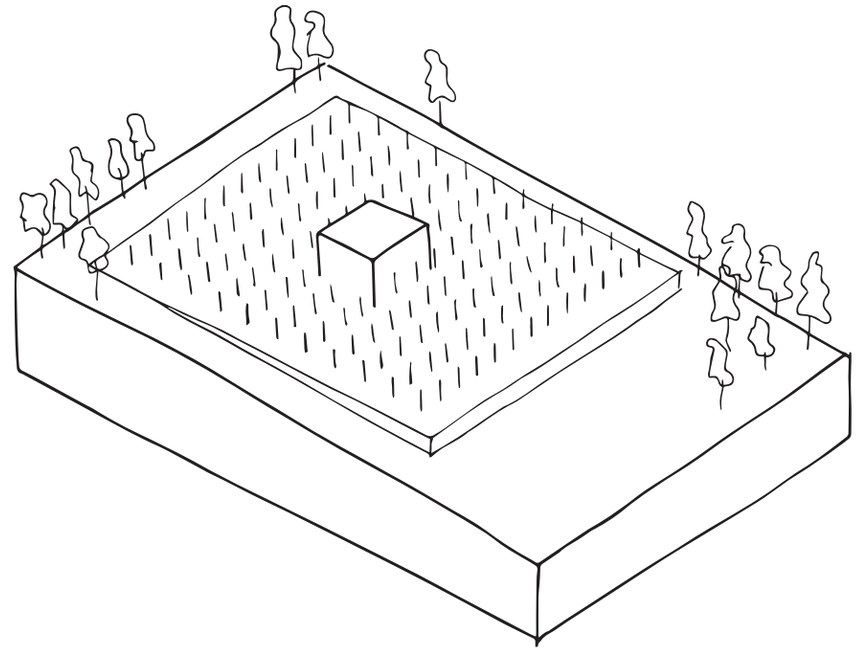
Ill. 141 - **00** - The site is located in between the wooded area of *Skovdalen*, and the older residential area of *Hasseris*. The site contains only a smaller amount of trees along the edge.



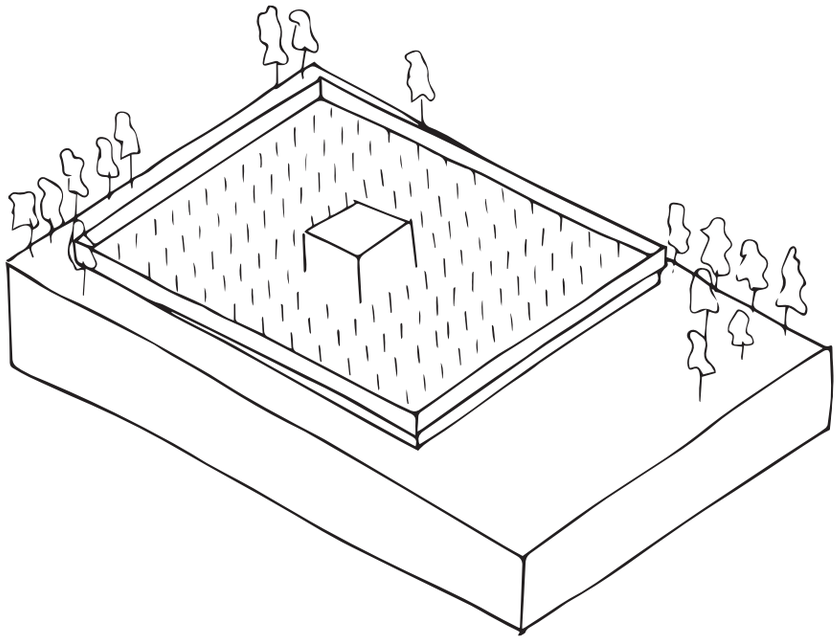
Ill. 142 - **01** - Visually, the bottom half of the building will arise from the ground, standing as a heavy foundation in a red/brown masonry brick



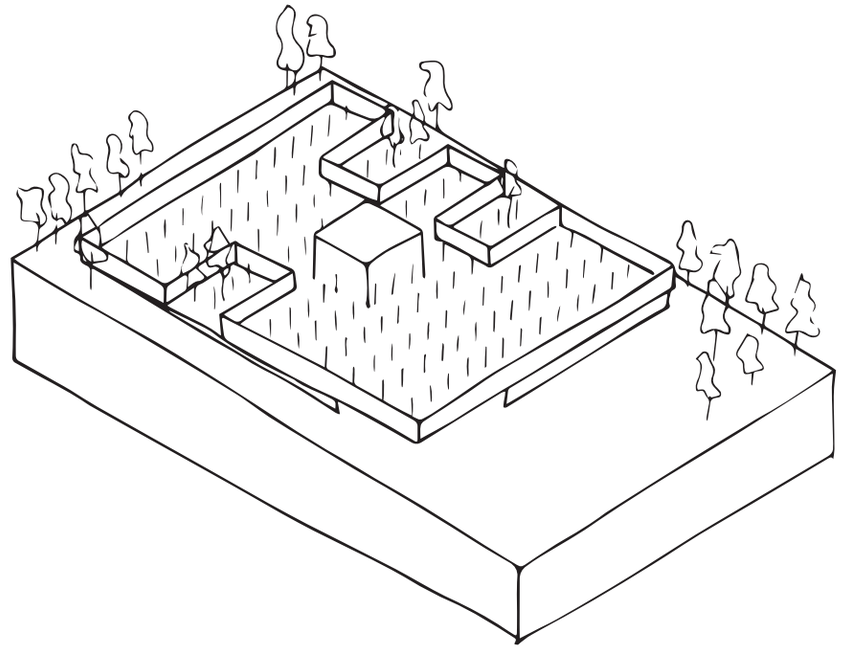
Ill. 143 - **02** - From the centre, a box of bricks will arise, creating a central focal point to the building. The Box will function as a kitchen - the heart of the building.



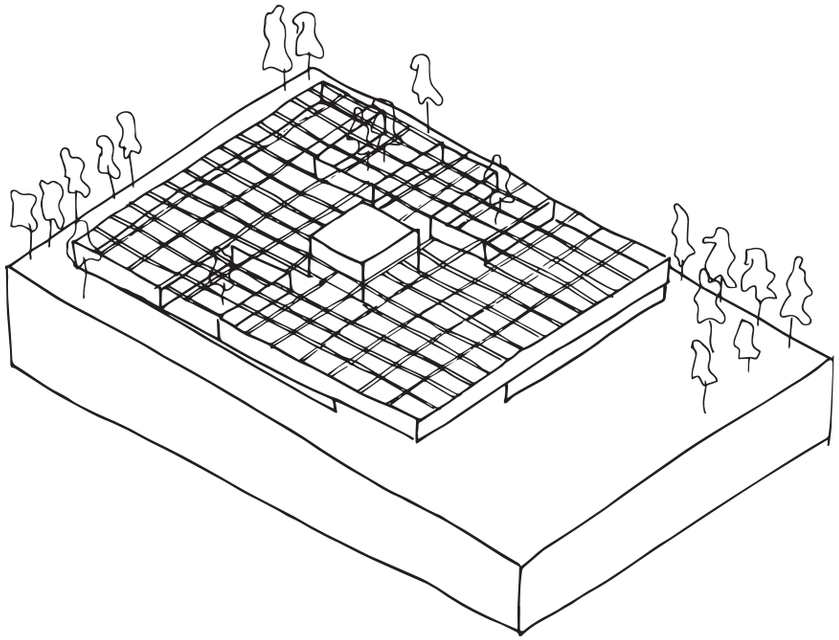
Ill. 144 - **03** - On top of the heavy bottom, wooden columns will stand in grid lines of 4x6m, following the shape and ratio of the whole building shape. The columns will function as the lighter structure for the top of the building, as well as creating an interior direction, guiding the users through the building.



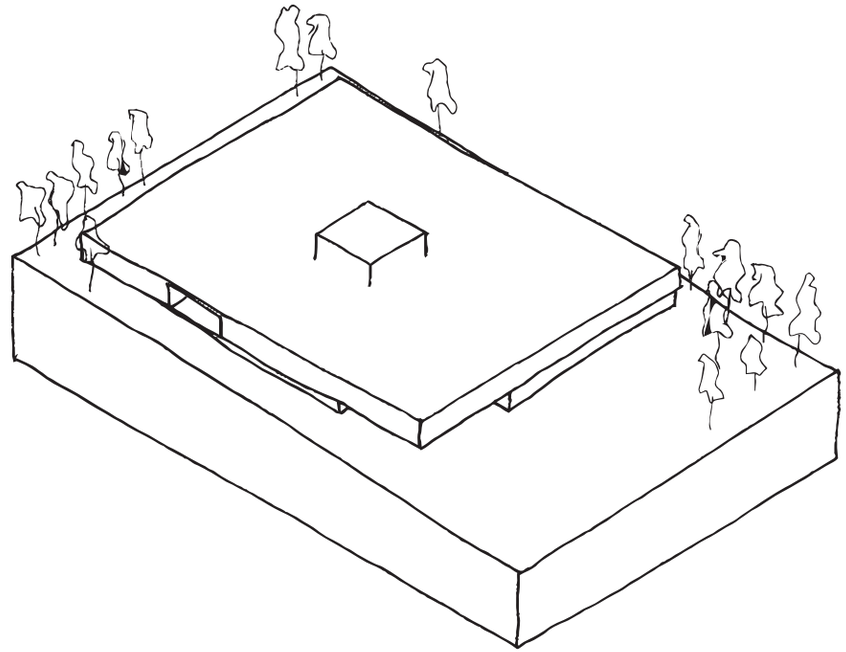
Ill. 145 - **04** - The top of the building will have a wooden plastered facade. The wooden panels will stand as a light top to the building on top of the heavy brick bottom.



Ill. 146 - **05** - The wooded context is integrated, letting in more light into the building.



Ill. 147 - **06** - As a part of the guiding part of the structure, a cassette system of wooden beams is put on top of the rounded column, emphasizing the direction in the building.



Ill. 148 - **07** - The building top is finished with a roof. Visually the roof is thin, because of the 'hidden' roof deck in between the wooden cassette system.

◂ Ill. 149 - 1:1000 masterplan.

Building and site

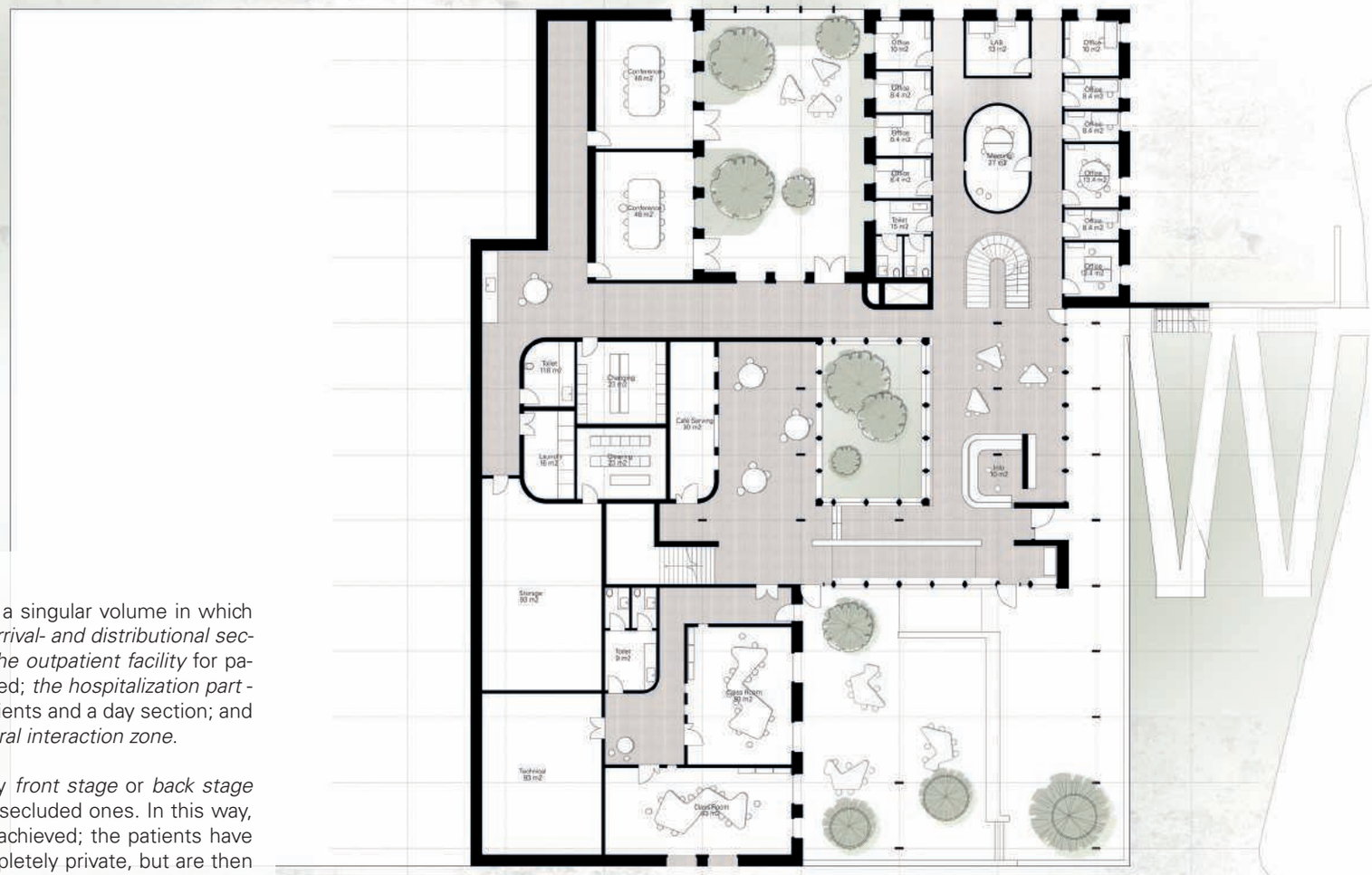
The building is located within the forested area of the site, placed as a horisontal element that opposes the verticality of the Aalborg Tower and the surrounding trees.
The building shape follows the terrain, creating the levels within in order for the visitor to gradually ascend alongside the natural environment.

Aalborg new psychiatry

The psychiatric facility consists of a singular volume in which four subsections are placed; the *arrival- and distributional section*, in which one is welcomed; t*he outpatient facility* for patients who are not to be hospitalized; *the hospitalization part* - both for long-term hospitalized patients and a day section; and finally, the *deinstitutionalized, central interaction zone*.

These four zones all reflect mainly *front stage* or *back stage* - interactive zones versus private, secluded ones. In this way, a transition between functions is achieved; the patients have a space in which they can be completely private, but are then able to transition into a more interactive space as they become ready for it in their healing process.

The following describes each of the sections in the building and their respective qualities and purposes.

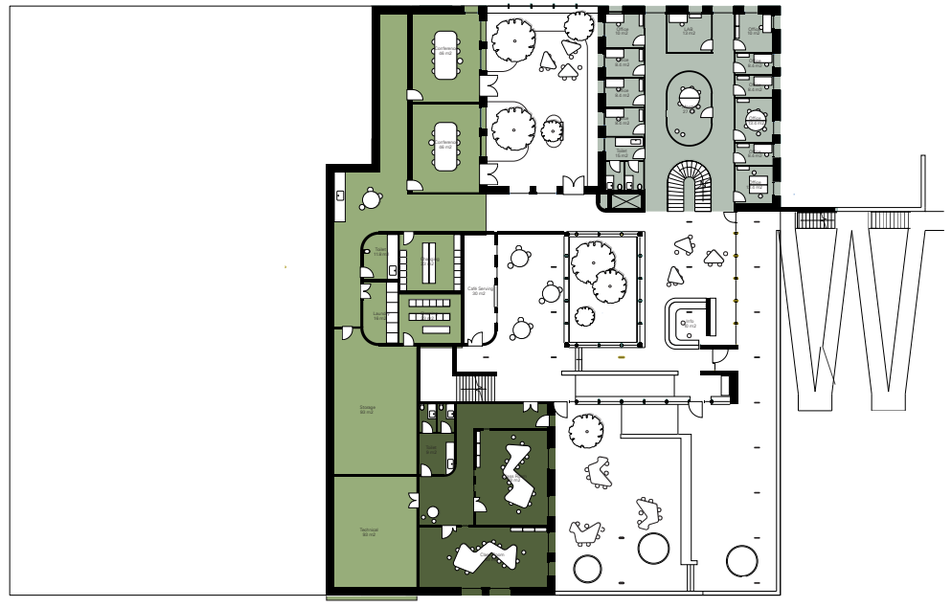


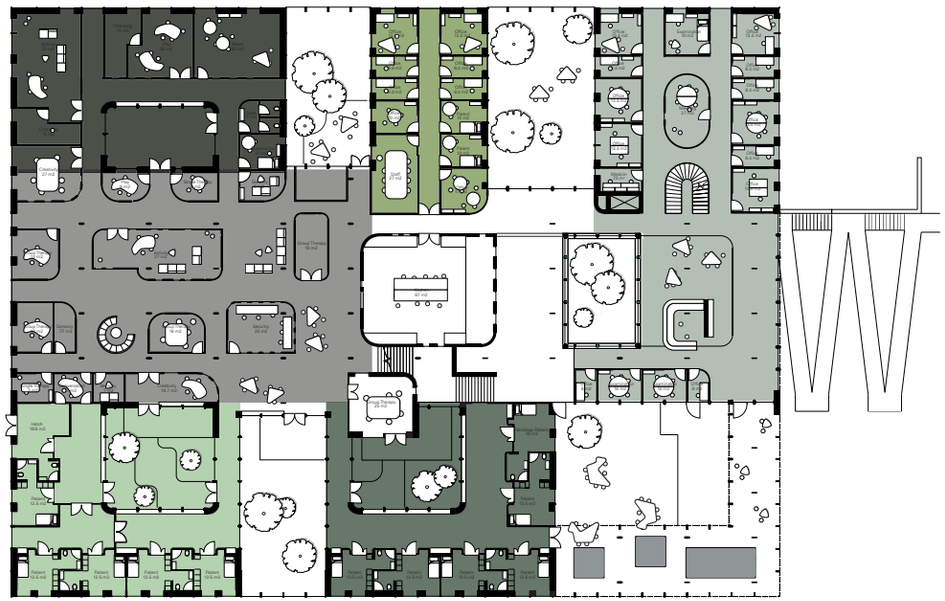
Ill. 150 - Parterre level - 1:400

Ill. 151 - 1st floor - 1:400

▸ Ill. 152 - Functions plan - Parterre

▾ Ill. 152 - Functions plan - 1st floor





Function areas

Parterre level

- Ambulatory
- Staff area
- School
- Common room
- Hospitalization - Children
- Hospitalization - Youth
- Day time area

◂ Ill. 153 - Plan for scenario - First time patient - Parterre

▾ Ill. 154 - Plan for scenario - First time patient - 1st floor

Flow scenarios - First time patient

Parterre level

1. The patient stands in front of the building, ready to walk the stairs and enter the complex (ill. 166).

2. Entry happens in the east facade, facing the main arrival area. The first view when entering is a long view towards the hospitalization area (ill. 167). The patient will be guided by staff by the information desk.

3. The patient is guided to an outpatient facility for examination (ill. 163).

1st floor

4. In the event of a hospitalization, the patient will be guided from the outpatient facility to the hospitalization area through the indirect route, being able to quietly pass the public space below (ill. 185).

5. Staff members of the hospitalization area will then welcome the new patient. (ill. 170)

6. The patient is led to his/her private room - either in the children section or the youth section (ill. 177), depending on the age of the patient (ill. 178)

Flow scenarios - Urgent patient

1. The urgent patient is brought to the building, most often by the police. This happens at the back of the building.

2. The urgent patient will enter the building through the ‘hatch’, to his/her room.

▸ Ill. 155 - Plan for scenario - Regular patient - Parterre

▾ Ill. 156 - Plan for scenario - Regular patient - 1st floor

Flow scenarios - Regular/daytime patient

Parterre level

1 The regular patient/daytime patient takes the direct route from the parking lot via the stairs.

2 The daytime patient takes either the open/direct route or the more hidden/indirect route to the hospitalization/ daytime section, depending on his/her mood.

1st floor

3 Choosing the direct route, the patient arrives to the common room via the brighter south side of the kitchen (ill. 167).
Choosing the indirect route, the patient arrives to the common room at the darker north side of the kitchen (ill. 185).

4 The daytime patient goes to the security room to check in, so that the staff members know he/she has arrived.

◂ Ill. 157 - Plan for scenario - Staff - Parterre

▾ Ill. 158 - Plan for scenario - Staff - 1st floor

Flow scenarios - Staff

Parterre level

1 The staff member arrives at the parking lot, taking the direct entryway into the building.

2 The staff member, depending on where she/he works, goes to either outpatient facility, takes the stair further up, or goes to a conference meeting.

1st floor

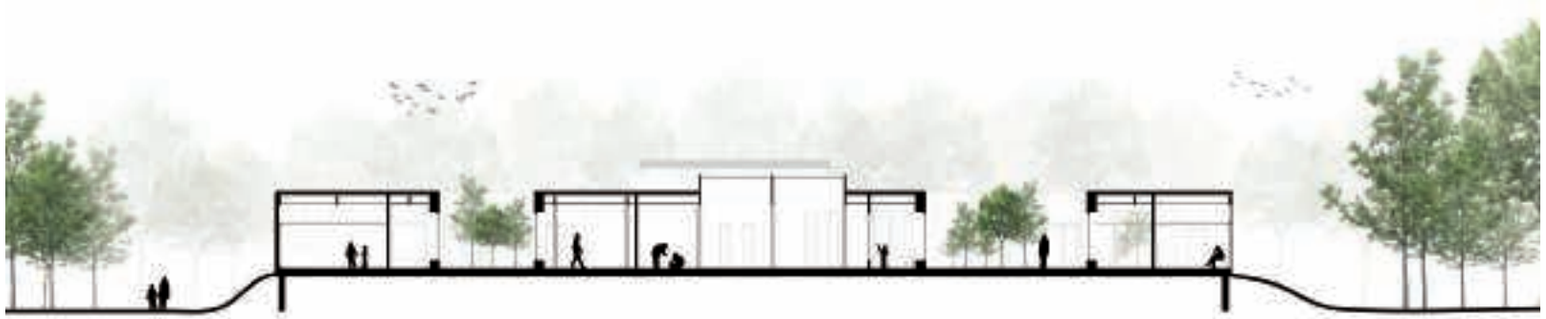
3 The staff member arrives on the hospitalization level by stairs.

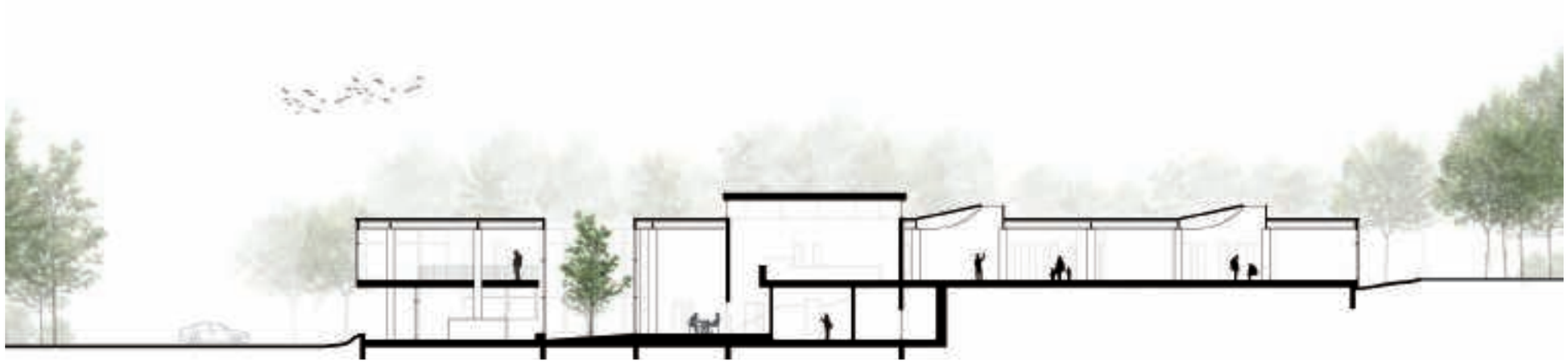
4 The staff member can go to his/her office, located close-by, depending on where they work - outpatient facility, day facility or hospitalization.

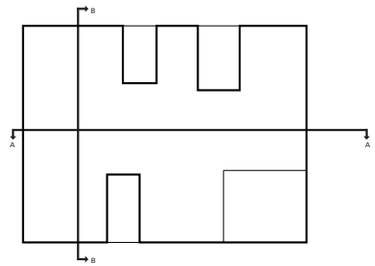
▲▲ Ill. 159 - Elevation - South - 1:400
▲ Ill. 160 - Elevation - North - 1:400

▲▲ Ill. 161 - Elevation - East - 1:400

▲ Ill. 162 - Elevation - West - 1:400







▲▲ Ill. 164 - Section BB - 1:400

▲ Ill. 165 - Section AA - 1:400

◀ Ill. 163 - Render of reception area. View towards north.

The entryways

The main entry to the building happens from the southeastern, open corner, in which the visitor discovers the facility through exposed columns, presenting the grid structure already before one enters the building.

From this main entryway, all facilities can easily be reached, whether one needs to visit the outpatient facility or the hospitalization unit - also, a ramp for visitors with disabilities is located in this front area.

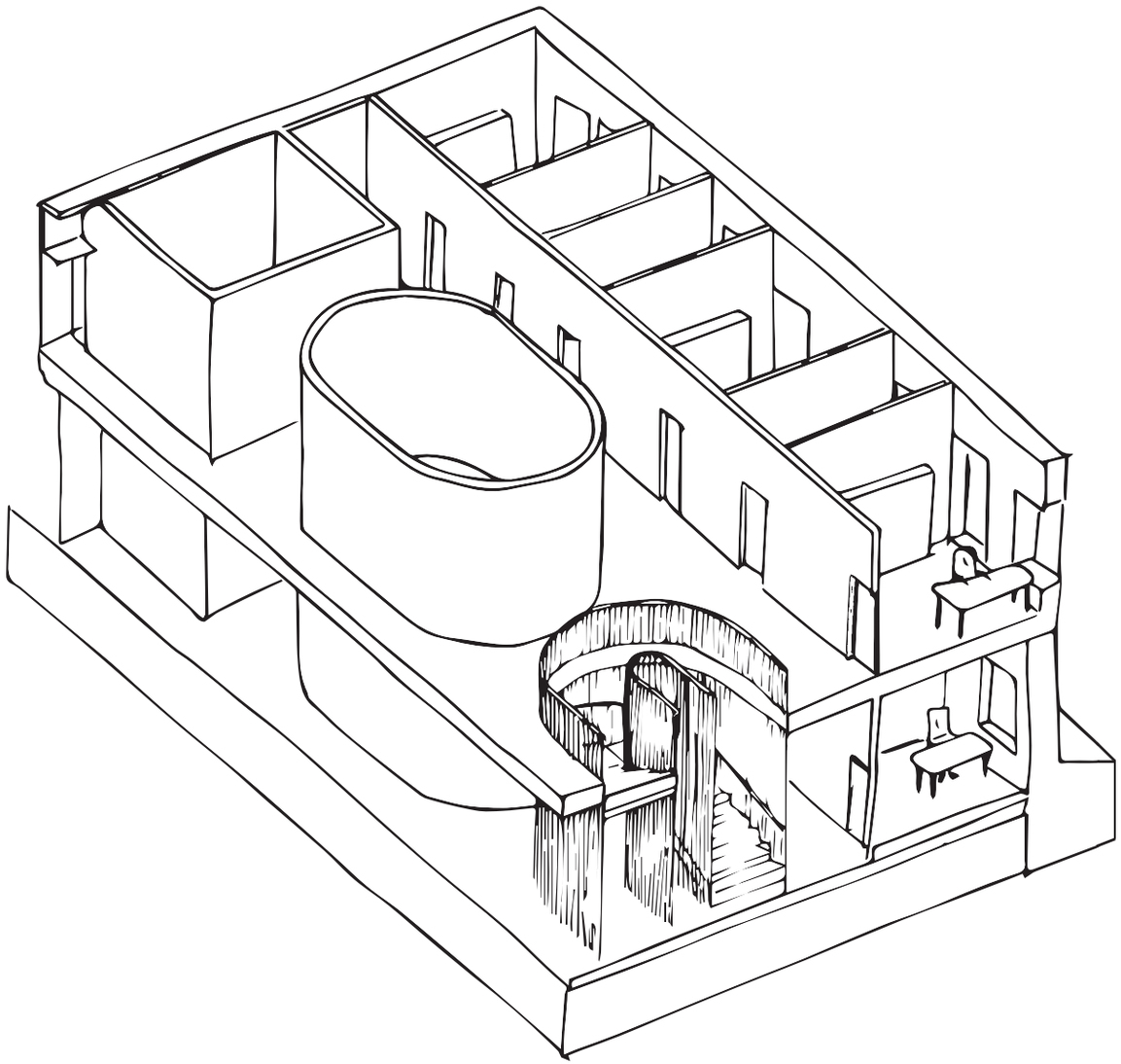
The secondary, private entryway happens from the western edge of the building; from here, emergency patients with the need for immediate help can be received through the hatch system.

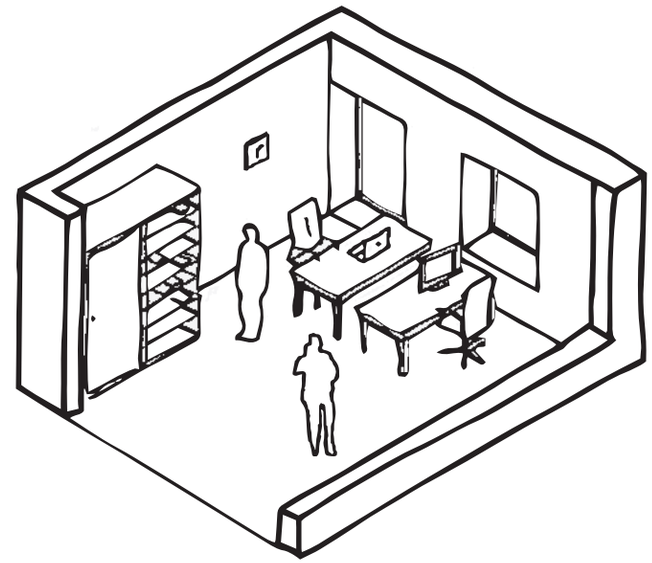
▸ Ill. 166 - Render of building seen from east.

◗ Ill. 167 - Render from the reception area towards the common room (west). The structural elements and the walls provide direction in the space, while the surfaces make room for a tactile experience.

◂ Ill. 168 - Vignette of the outpatient area of offices.

▾ Ill. 169 - View of a two-employee office.





The working environment

The working environment - mainly the staff areas - consists of offices, meeting rooms and examination rooms, the latter in which the main interaction with patients - in a pathological context - happens.

The offices consist of a small, single typology and a larger type with room for two employees to be working. Especially the light setting is elaborated upon in these spaces; how the work positions of the employees reflect the window placement - seated and standing up.

The examination rooms have the purpose of eliminating the classical hierarchy by becoming a neutral base in which both parties must leave their own quarters to get to. In this way, the parties meet on equal terms.

◗ Ill. 170 - Render of common room. View towards west.

◗◗ Ill. 171 - Vignette of the common room.

The deinstitutionalized spaces

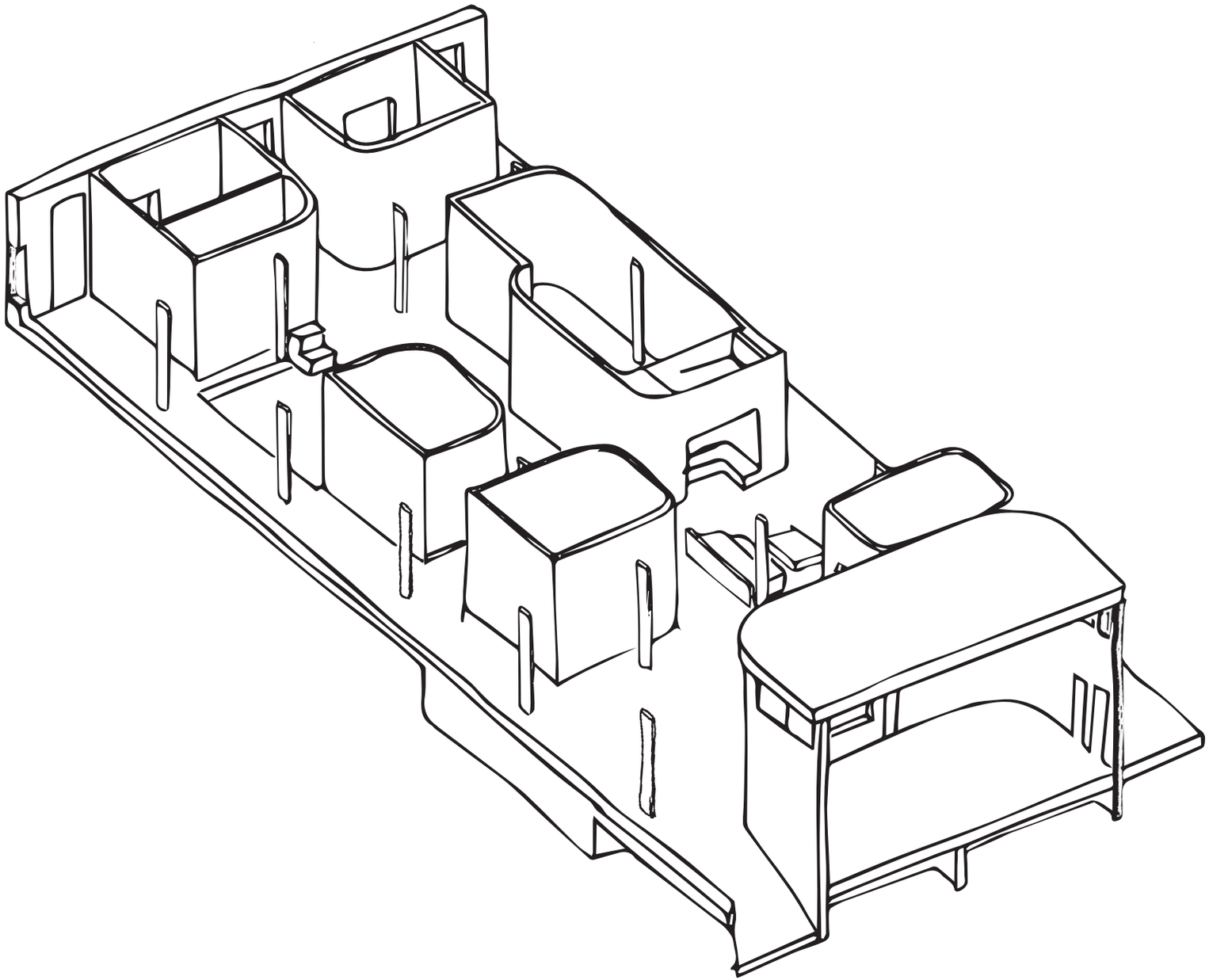
The main deinstitutionalized space is found in the heart of the psychiatric facility, stemming from the central, common kitchen. Around this space, the main interaction between patients and staff happens - the front stage of the complex. Here, hierarchy is dissolved in a warm, organic space with room for recreation and reflection.

The focal point is, as mentioned, the kitchen, which has the function of being a gathering point - a place in which the patients can help each other with social tasks, cooking, interacting; establishing a normal everyday in spite of the new setting they find themselves in.

The structure helps to create an overview for the patients; a natural flow through this central deinstitutionalized space. It leads them through it in order to discover niches for relaxation, or helps to point them in the direction of therapy and sensory rooms located within.

Through the light, which comes delving through the softened ceiling structure, the patients can orient them in regards to the time of day via the skylights directly above them.

Organic materials and rounded corners create a visually soft space with a focus on tactility and interaction with the interior elements.



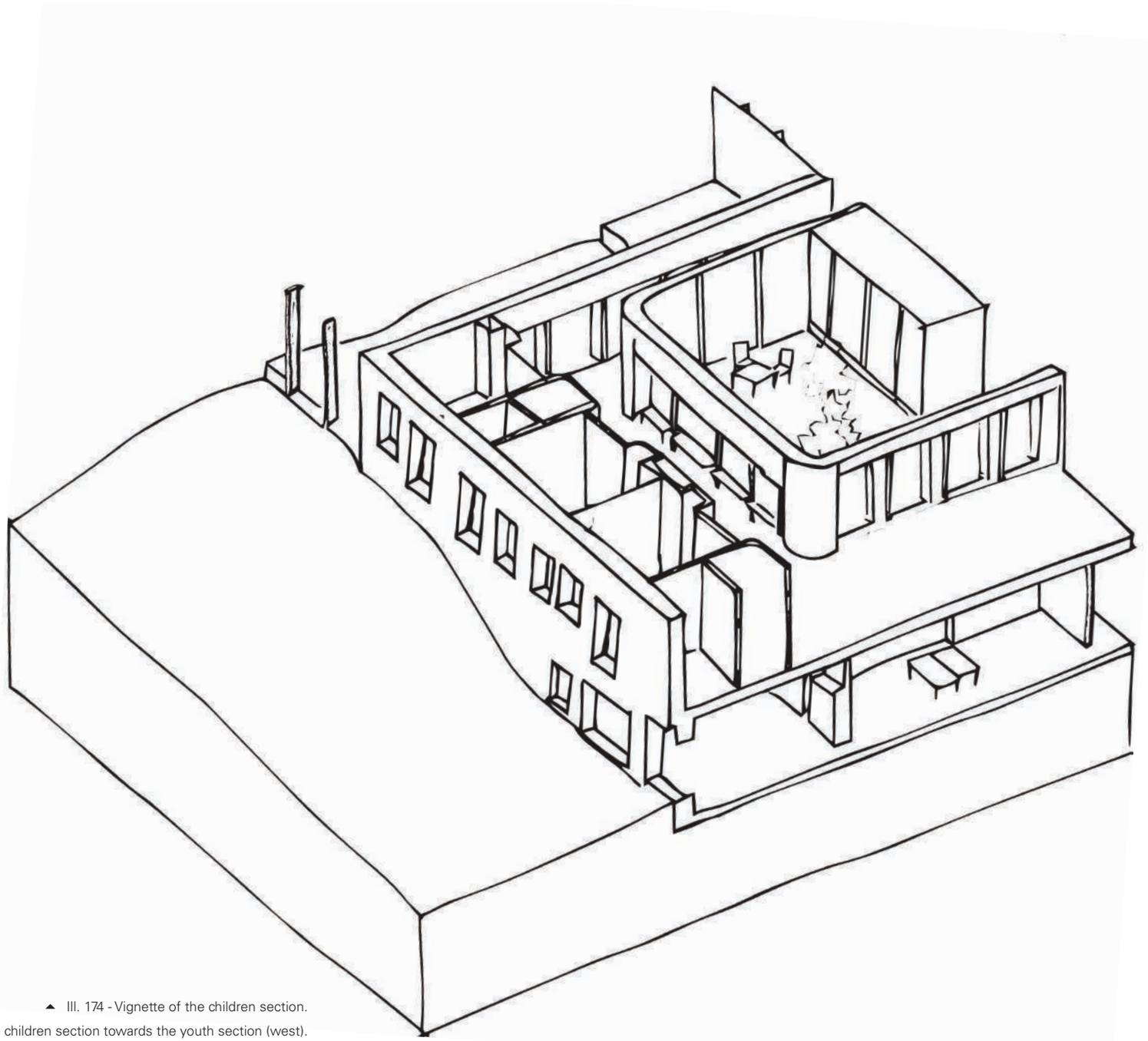
◂◂ Ill. 172 - Render of the common room. View towards north.

◂ Ill. 173 - Render of the hallway towards the youth section (south).

The private spaces

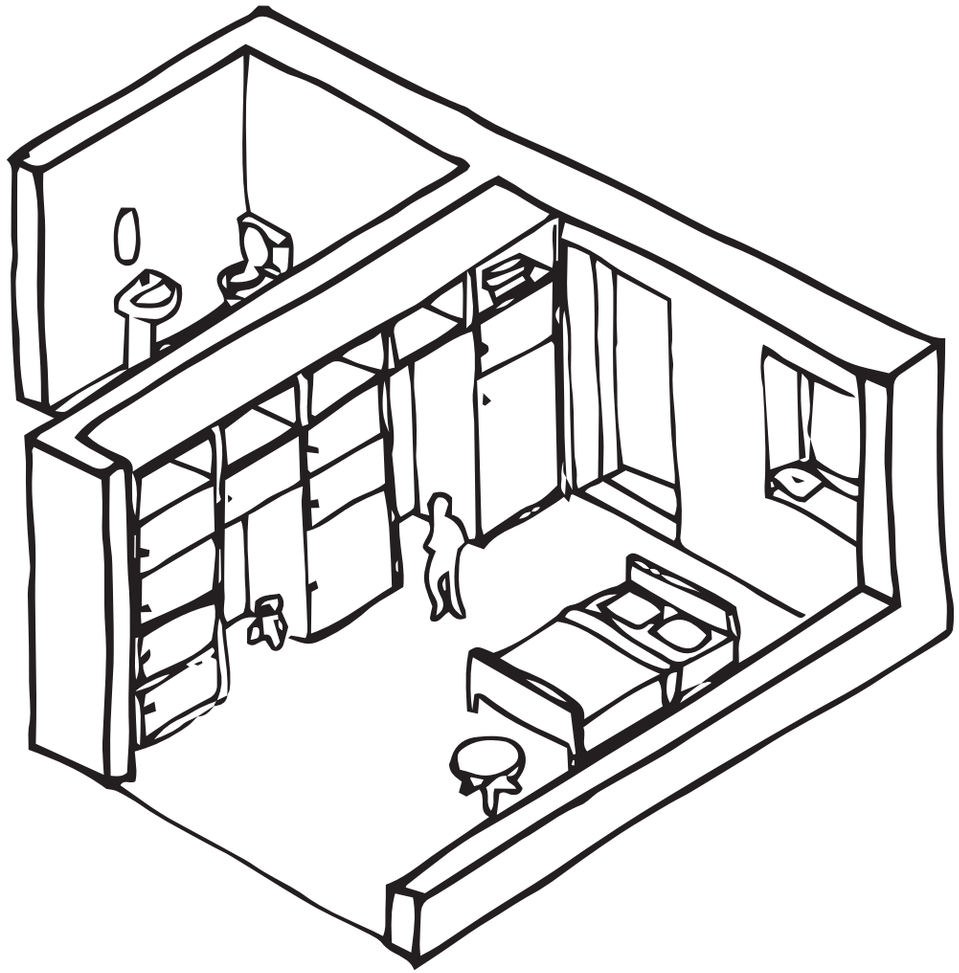
The hospitalization area is split into a children's section and a teen/youth section, providing the needed privacy and environment for both of these groups.
There is a total of 11 hospitalization rooms, including one for a special needs user. Most of the rooms are oriented towards east and south, which, in evidence based design results, is shown to lower hospitalization time [source].

The hospitalization area is placed in the most secluded area of the site, providing privacy and views into the largest part of the forest to the south.
The interior of the rooms is warm, light and homely; integrating wood as a material, access to play spaces and private toilet facilities.
As one enters the room, an overview of the entire space is achieved, creating security for the staff.



▲ Ill. 174 - Vignette of the children section.

◀ Ill. 175 - Render of the children section towards the youth section (west).



◂ Ill. 176 - Vignette of a private room
either in the children section or in the youth section.

▸ Ill. 177 - Render of a private room of a child.

◂ Ill. 178 - Render of a private room in the youth section.

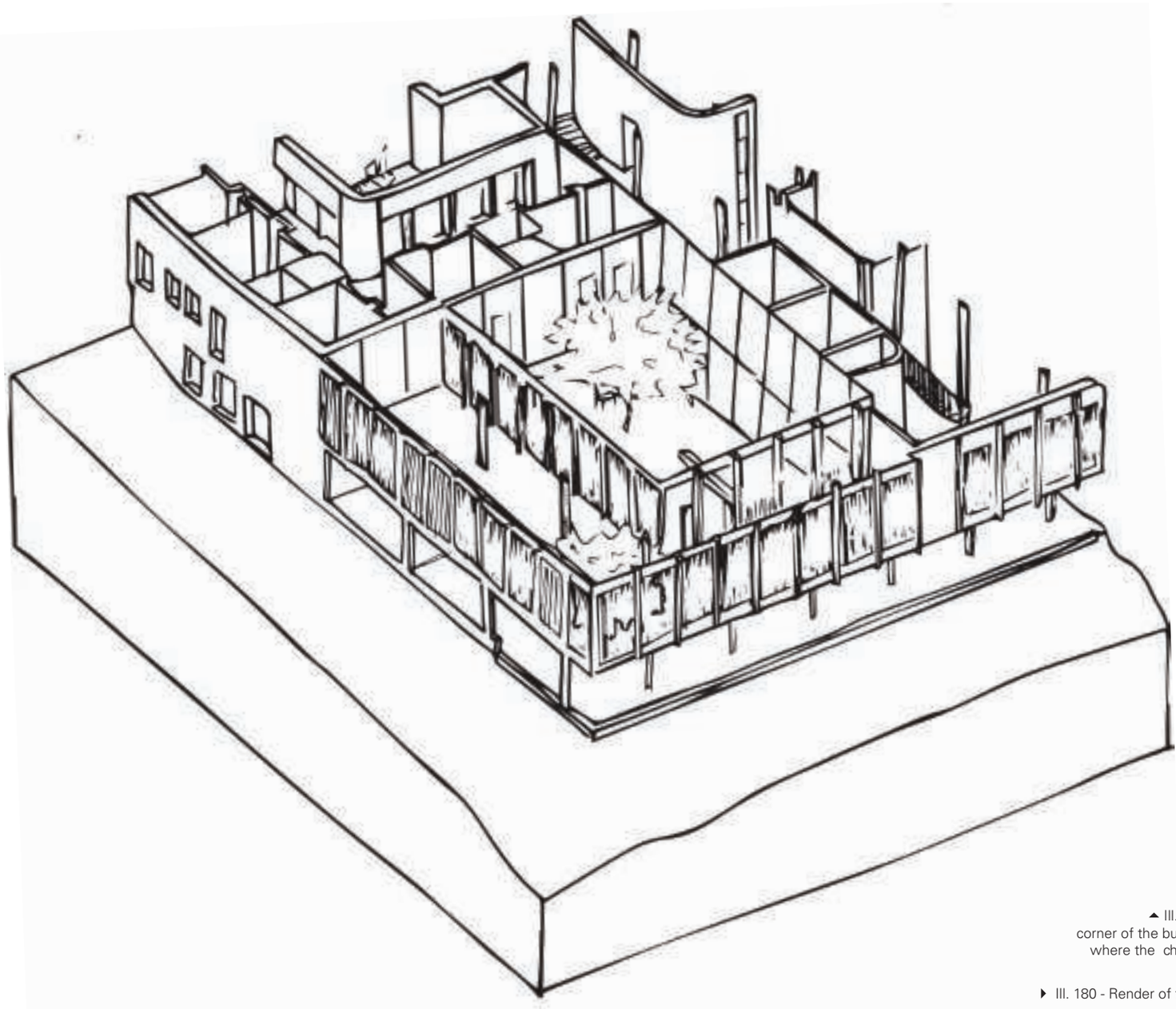
Atmosphere

The youth psychiatric facility has sought to achieve an atmosphere of calmness and a to create a place that supports healing.
Relating to Zumthor's nine points of achieving architectural atmosphere (see pages 28-29), the four main points that were utilized were 1) the body of architecture; 2) between composure and seduction; and 3) levels of intimacy and 4) tension between interior and exterior.
The body of architecture is clear through especially materiality and detailing of interior elements and structural elements. These elements, mostly consisting of wood, create organic spaces that embrace the user and invite them to interact and play; the sense of the building becoming a body itself.

Between composure and seduction tells of the patient's way of moving through the building. In the facility, the user is gently guided by the architecture, providing the needed overview for orienting oneself. In this way, the patient's way of moving is not completely controlled; but merely supported by the ways of light and structure.

The levels of intimacy tells of the relation between intimate, private domains and spacious areas. In the building, the private patient rooms create the complete seclusion; whereas the deinstitutionalized space offers both larger, light interaction areas, and introvert, dimly lit spaces of relaxation.

The *tension between interior and exterior* can be measured in the interaction points with the nature; courtyards, the treehouse area, and the cuts into the building. Here, a dissolving between in and out is created, creating a close relation to the surrounding area.



▲ Ill. 179 - Vignette of south eastern corner of the building showing the ‘tree house’, where the children can play partially outdoor.

▶ Ill. 180 - Render of the ‘interior’ of the ‘tree house’.

◂ Ill. 181 - Render of the outdoor area by the south eastern corner of the building. The area is partially placed beneath the 'tree house', creating a barrier between the public and semi public space.

The interaction with nature

The psychiatric facility is embraced by a natural forest environment, creating privacy and space for reflection and healing in spite of the closeness to the city center.

The building implements the surrounding natural environment, utilizing it to reinforce healing of the patients, potentially lowering stress levels and hospitalization time.
By cutting niches into the rigidity of the building, courtyards are established into which views and interaction can take place.

The tree house facility also lets trees grow into its middle, creating a playful and interactive space for children and youth.

▸ Ill. 182 - One of the courtyards. Even though the patient cannot leave the facility, they always have the possibility of going outside in the courtyards.

▸▸ Ill. 183 - Parents room. Some parents might arrive with their child late at night. If they want to, they have the possibility of staying the night at the facility. An extra bed can also be placed in the room of their child.

Healing environments

The psychiatric facility utilizes evidence based design, especially in relation to light and connections to the natural environment.

The private spaces are mainly oriented towards east and south, which are light properties that are proven to lower hospitalization times. In the common space, it has been sought to implement circadian lighting, which can lower delusions. In this way, the lighting has a reviving and motivating effect.

Nature is implemented by the means of views, courtyards and implementing the surrounding forest directly into the design. This relation also has an effect of lowering hospitalization and stress levels.
The healing environments are also reinforced by, in part, opposing the classical institutional design. While the exterior is still strict and orthogonal, the interior is softened - certain corners and ceiling areas are curved; the material is organic, and the patient is capable of meeting the staff on a neutral ground on which they are equal. Also, the private spaces are designed to appear home-like and recognizable. These factors in the environment all contribute to the reinvigoration of the patients.

Finally, sensory experiences are also present. Vision and somatosensation have already been elaborated upon in terms of light and tactility, respectively; but also, audition, in terms of acoustics, is differentiated according to which area one is located in, changing to a lower reverberation time in the private areas.


ykke-bjørn

Room program

The room program details the different sections of the building, stating their approximate size and quantity, and explains which qualities are wanted for each space.

Reception // Arrival	QTY	UNIT AREA	TOTAL AREA	NATURAL LIGHT	VIEW	OUTDOOR CONNECTION	ATMOSPHERE	RELATION
Information / Secretariat	01	75	75	■	□	■	Functional	Public
Waiting Room / Lounge	01	150	150	■	■	■	Domestic	Semi-public
Cafeteria	01	50	50	■	■	■	Domestic	Semi-public
Toilet Facilities	02	07	14	□	□	□	Clinical	Public
Library	01	35	35	■	■	□	Domestic / Functional	Semi-public
		Total	324 m^2					

Outpatient facilities	QTY	UNIT AREA	TOTAL AREA	NATURAL LIGHT	VIEW	OUTDOOR CONNECTION	ATMOSPHERE	RELATION
Conversation / Offices	20	8.4 -14	205	■	■	□	Domestic	Private
Examination	03	10 - 16	36	■	■	□	Domestic	Private
Waiting / Lounge	01	150	150	■	□	■	Domestic	Semi-public
Meeting	02	27	54	□	□	□	Clinical	Semi-public
Toilet Facilities	02	07	14	□	□	□	Clinical	Semi-public
		Total	405 m^2					

Staff facilities	QTY	UNIT AREA	TOTAL AREA	NATURAL LIGHT	VIEW	OUTDOOR CONNECTION	ATMOSPHERE	RELATION
Conversation / Offices	08	8.4 -17	100	■	■	□	Clinical	Private
Conference	02	46	92	■	□	□	Clinical	Semi-public
Changing	01	23	23	□	□	□	Clinical	Semi-public
Laundry	01	16	16	□	□	□	Clinical	Semi-public
Cleaning	01	23	23	□	□	□	Clinical	Semi-public
Common	01	27	27	■	□	■	Clinical	Semi-public
		Total	281 m^2					

Hospitalization facilities	QTY	UNIT AREA	TOTAL AREA	NATURAL LIGHT	VIEW	OUTDOOR CONNECTION	ATMOSPHERE	RELATION
Patient	11	12.5	137,5	■	■	□	Domestic	Private
Examination	01	10	10	■	■	□	Domestic	Private
Waiting / Lounge	01	100	100	■	■	■	Domestic	Semi-public
Toilet Facilities / Showers	03	07	21	□	□	□	Clinical	Private
Security	01	25	25	■	□	□	Functional	Private
Technical	03	07	21	□	□	□	Functional	Private
Parent	02	10	20	■	■	□	Functional	Private
Conversation	01	07	07	■	■	□	Functional	Private
Hatch	01	19.6	19.6	□	□	■	Functional	Private
		Total	361 m^2					

Education // Research facilities	QTY	UNIT AREA	TOTAL AREA	NATURAL LIGHT	VIEW	OUTDOOR CONNECTION	ATMOSPHERE	RELATION
Offices / Labs	1	13	13	■	■	□	Functional	Private
		Total	13m^2					Private

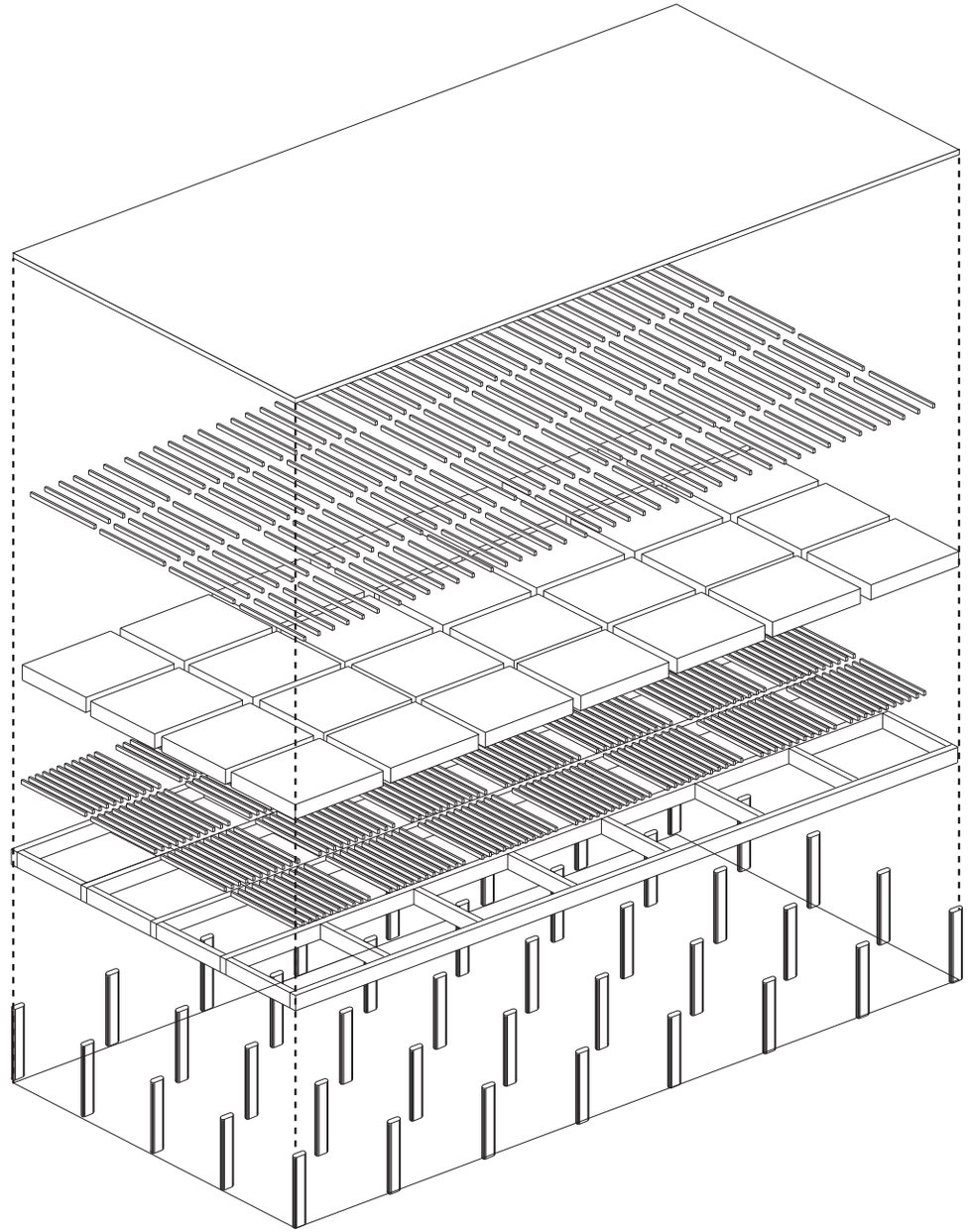
Storage	QTY	UNIT AREA	TOTAL AREA	NATURAL LIGHT	VIEW	OUTDOOR CONNECTION	ATMOSPHERE	RELATION
Food	1	25	25	□	□	□	Functional	Private
Medicine	1	25	25	□	□	■	Functional	Private
		Total	50m^2					

Treatment- & Social Facilities	QTY	UNIT AREA	TOTAL AREA	NATURAL LIGHT	VIEW	OUTDOOR CONNECTION	ATMOSPHERE	RELATION
Therapy (Single) / Offices	02	09	18	■	■	□	Domestic	Private
Therapy Group (Common)	05	14 - 25	89	■	■	□	Domestic	Semi-public
Toilet Facilities / Showers	03	07	21	■	□	□	Clinical	Semi-public
Changing	02	13	26	■	□	□	Functional	Private
Technical	03	07	21	□	□	□	Functional	Private
Sensory	03	07	21	■	□	□	Domestic	Semi-public
Activity / Play	04	09 - 52	118	■	□	□	Functional	Semi-public
Patient Café	01	100	100	■	■	■	Domestic	Semi-public
School	02	93	186	■	■	■	Functional	Semi-public
Music	01	43	43	■	□	□	Domestic	Semi-public
Kitchen / Treatment	01	80	80	□	□	□	Functional	Semi-public
		Total	723 m^2					

Total Net Area

2157 m^2

▸ Ill. 184 - Exploded isometric drawing of the built up of the roof and the carrying columns.



Technical principles & detailing

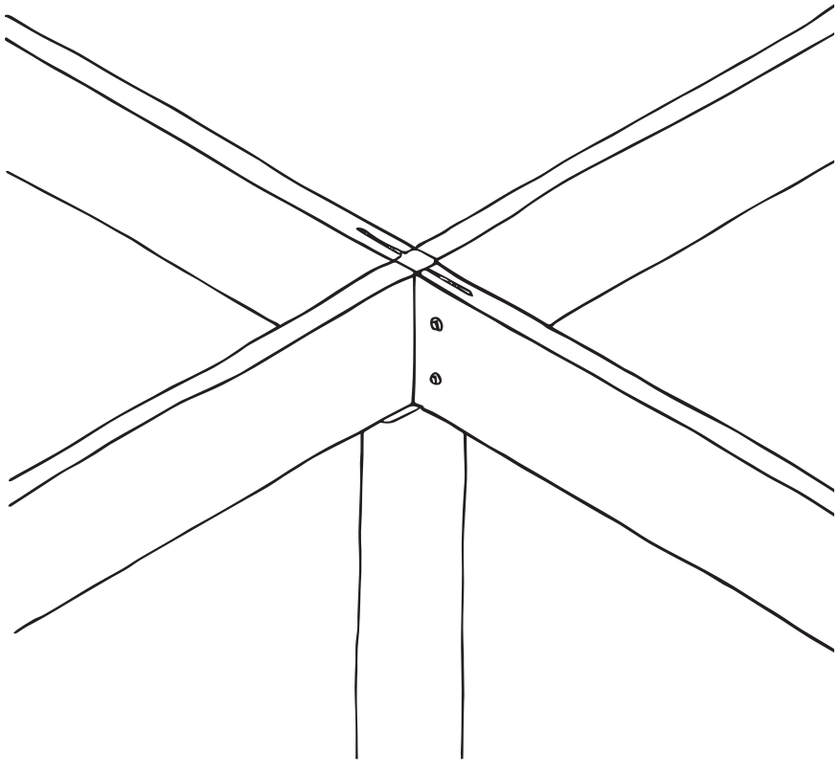
The structural system is based on a uniform cassette system of glued laminated timber which carries the roof and the potential snow load. The cassette system follows the overall grid pattern and thereby helps in creating the rhythm wanted for the patients. The cassette system beams are uniformly dimensioned, 500 x 140 mm (see appendix for calculations).
Below the cassette system, a carrying system of wooden columns further creates overview and direction. Their section is flat oval with the dimensions of app. 400 x 140 mm, creating direction and at the same time an invitation for interaction via the softened corners.

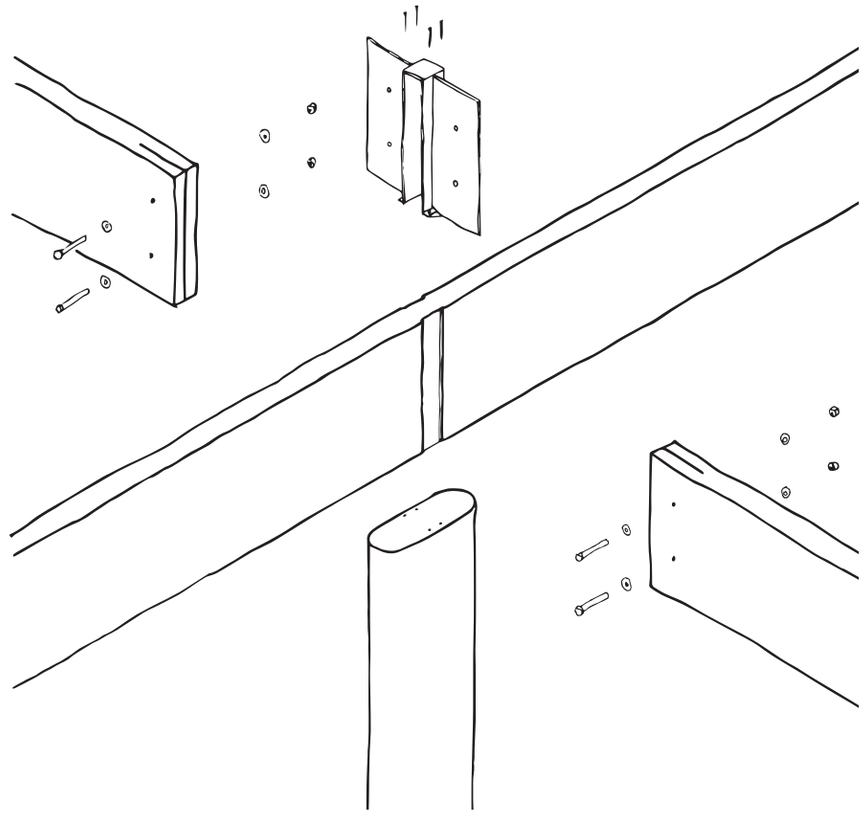
◂ Ill. 185 - Render of the more indirect and hidden access way from the reception area to the common room. This can be used if the patient is more insecure.

Fire safety

The building is placed within a site that has easy access to public roads. Also, the northern road above the site is a designated fire lane.
The building itself has several entry/exit points, making quick escape to outside terrain possible from most areas in the building. Also, the centrally placed courtyards provide temporary safety zones with automatic doors, opening in case of fire.

The wood of the columns will also have a protective quality towards the steel joints.





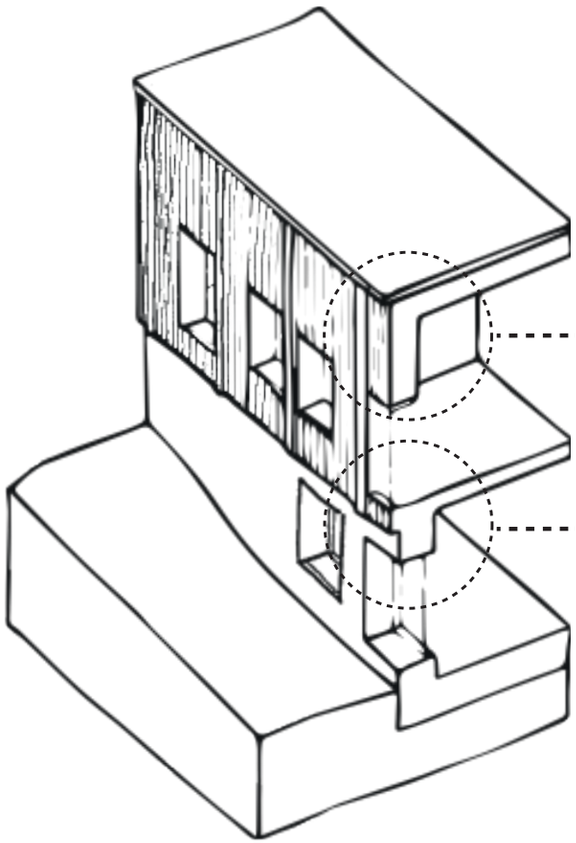
Technical principles & detailing

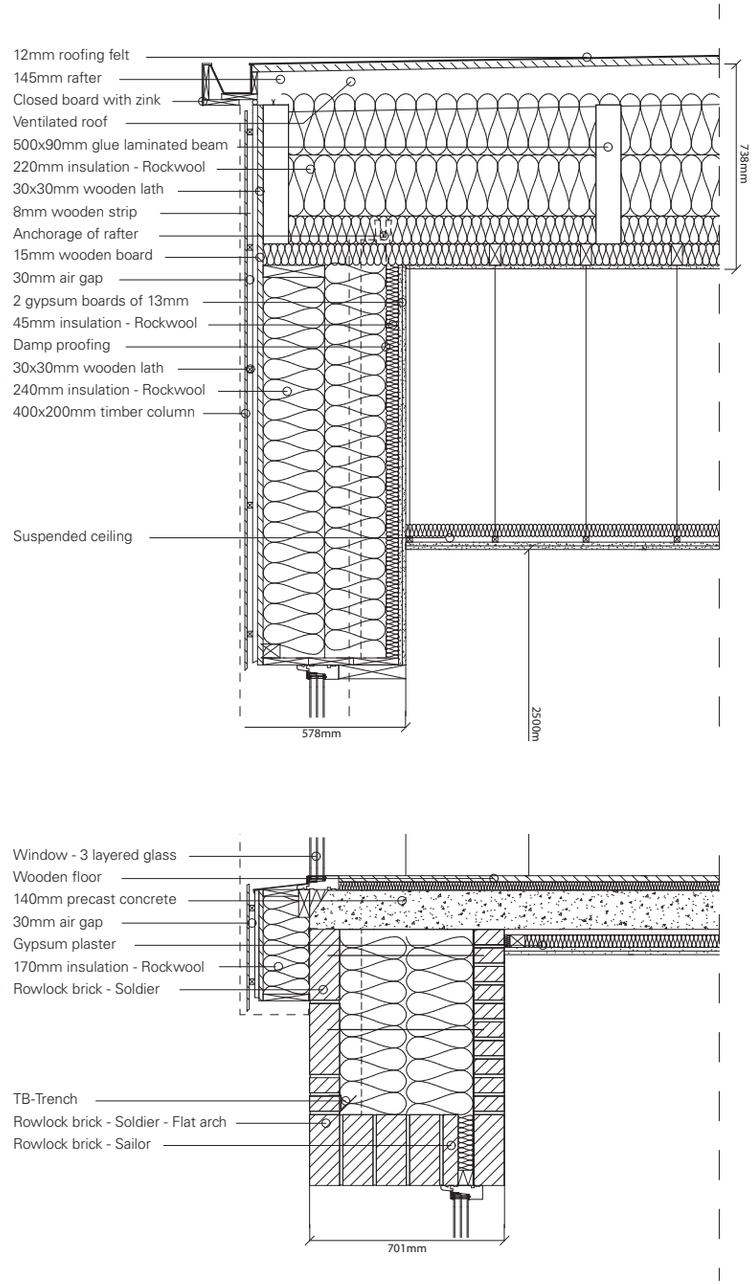
The meeting between the column and the beam is made as a calm simplistic joining of the elements as one integrated connection. The steel bracket is carved into the contentious beam to minimize the visual impact of the joint. The connection between the elements is expressed in a clam subtle manner, communicating the atmosphere of the building and translating the structural forces from roof to ground.

◂ Ill. 186 - Joint between the column and beams.

▲ Ill. 187 - Exploded isometric drawing of the joint between the column and beams.

▸ Ill. 188 - Render of the joint between the column and the beams.





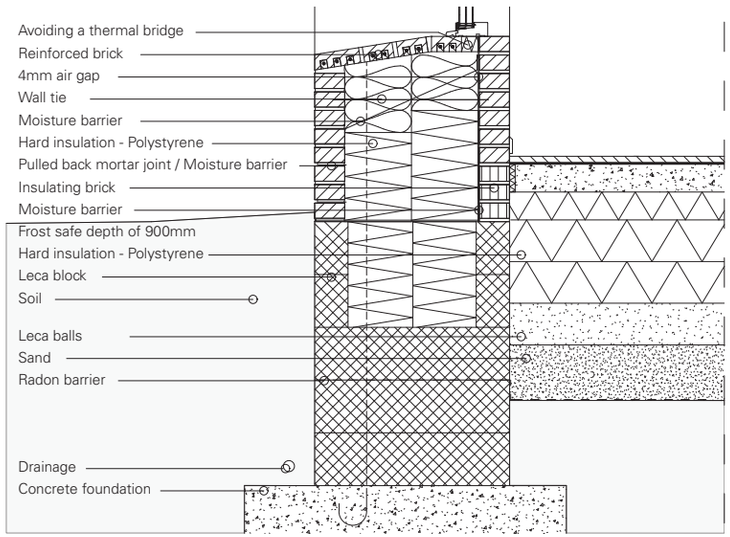
Technical principles & detailing

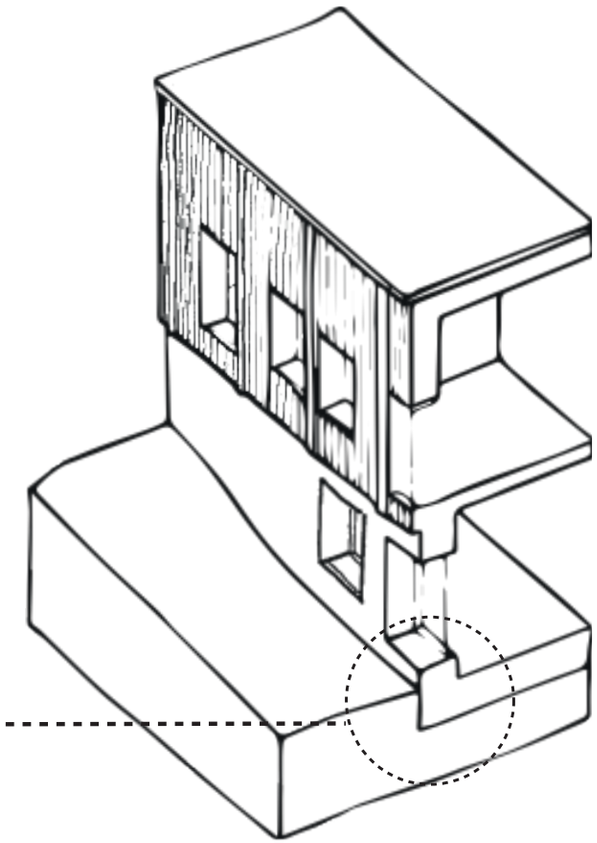
The overall concepts of tectonic and stereotomic is expressed in the detailing. The articulation of the innate material characteristics is made clear in the meeting between the brick base and the ground in a seamless transition, blurring the border between the mound and the building. The communication between the wooden filigree elements and the load-transferring base is separated as two elements respecting each other.

▲ Ill. 189 - Vignette of the structure of the exterior walls.

Ill. 190 - 1:25 detailed section drawing
▶ The heavy bottom of bricks meets the lighter top of wood.

◂ Ill. 191 - 1:25 detailed section drawing
Meeting between the wooden wall and the roof.





▲ Ill. 189 - Vignette of the structure of the exterior walls.

◂ Ill. 192 - 1:25 detailed section drawing
Meeting between the brick wall and the ground.

▲ Ill. 193 - Render along the southern facade of the building.

VI

EPILOGUE

The following section concludes the project and reflects upon certain chosen subjects of the thesis.

▸ Ill. 194. Photograph taken from Hasseris towards the site and Aalborg Tower.

Conclusion

First and foremost, the thesis has investigated the challenges of designing for psychiatric patients, discovering the needs of a mind with a psychological dysfunction, whether temporary or permanent.

The thesis has developed a complex that accommodates these needs - easy overview and a calming of the mind. The complex is easy to read from its exterior, in which one can orient himself via the central kitchen, the hearth, which is placed in the middle of the complex. The interior is based on the concept of deinstitutionalization, creating an axis of interaction - the front stage - and the private quarters for both patients and staff - the back stage.

The thesis has utilized the method of the integrated design process, iterating during every phase in order to solve aspects in plan, structure, light, facade etc., in order for them to match the user needs. The final proposal combines these iterations and develops a complex that implements principles of evidence based design and healing architecture.

Reflection

Differentiating between user needs
Through analyses, the thesis has given a general summary on the needs of the psychiatric patient, which have been used as parameters for designing the facility. However, the different psychiatric diagnoses are of course very complex, and the needs of a patient will differ depending on which diagnosis is investigated. The thesis thus presents a proposal based on general observations of the patient needs, but could also have elaborated further upon them, using them to differentiate the design even more according to specific user needs.

Further research in the field of evidence based design
The thesis has mainly used already existing research relating to evidence based design. As the existing evidence based design mainly relates to the beneficial effect of nature and light setting, it would have been rewarding to also be able to investigate the proven effects of, for instance, different materials or plan solutions, and their impact on the health of the patients. This, however, has not been possible, given that the research in the field is still being developed.

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Illustration references

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Ill. 86 - 88	Own illustration
Ill. 89	http://68.media.tumblr.com/1929f7599654e680622a97ae0917b70e/tumblr_n2atttngOd1s5qhggo5_500.jpg
Ill. 90	https://s-media-cache-ak0.pinimg.com/564x/f8/79/d5/f879d521ded34a0346176781419a5504.jpg
Ill. 91	Own illustration
Ill. 92	Sum up of ill. 81, 82, 84, 85, 89 and 90.
Ill. 93 - 103	Own illustration
Ill. 104	http://www.cadnav.com/textures/16004.html
Ill. 105	petersentegl.dk
Ill. 106	Own photo
Ill. 107 - 138	Own illustrations
Ill. 139	Own photo
Ill. 140 - 193	Own illustrations
Ill. 194	Own Photo

APPENDIX

Appendix 1.1: Uddrag af interview, oversygeplejerske Dorthe Christensen, Esbjerg Børne-Ungepsykiatri.

01: Om kompromiset mellem meget plads og intimitet. Integreret kunst.

" [..] vores skærm, som vi også kommer ned og ser om lidt, den var bare ikke stor nok ift. hvis man går lidt rundt som løve i et bur, og hvis man har det rigtig skidt, så er det godt med plads. Og det vil I se, når vi kommer over i voksenafdelingen, at nybyggeriet dérovre – uanset om man kan lide den stil eller ej udefra set, sådan med fladt tag og lidt mere moderne – så har de sådan, lavet store skærme, altså skærmede områder, for jo mere plads du har, jo mindre klaustrofobi får du. Og så har de derovre fx sådan indbygget kunsten i væggene, så du kan ikke kaste med noget, så de har sådan tænkt meget forebyggelse af de her situationer. Og meget lys. Problemet med de her store vinduer er at man bliver varmet godt op om sommeren. Arkitekter kan godt lide store vinduer, men det er en bageovn. Men de har meget gode oplevelser, og vi har nogen mål for reducering af tvang i år 2020; vi har allerede nået det her i 2017, og de mener også, at deres bygninger faktisk har betydet noget for det. Førhen har man i mange år haft her, i voksenpsykiatrien, en lukket afdeling, man kom ind på. Blev man for dårlig på de åbne afsnit, så blev man overflyttet til nyt personale. Nu har man sagt, at det er ikke godt for patienterne, det dér med at flytte miljø."

02: Om transparens i facader

Q: "Transparens i facader - var det dét der havde bidraget til lavere tvang? Fungerer det?"

"Det synes de i hvert fald, personalet. Jeg ved så ikke, hvis du interviewer patienterne, hvordan de oplever det derovre. Det er jo interessant. Samtidig med, hvis du er meget dårlig og udadreagerende, måske personalet holder dig, eller sådan noget, så kan alle jo se det. Så jeg håber da man kan trække ned eller sådan noget. Så hvordan vil det være, hvis du har det dårligt. Og det kan måske også gøre de andre patienter utrygge, der går og kan se: "hov, der foregår noget dernede". Men det siger de så i den artikel i Fagbladet Sygeplejersken, at faktisk så mener de, det er værre at *høre* noget. Men jeg håber også ligesom, at man kan skærme lidt, for der er også noget, der hedder tavshedspligt – patientens integritet og sådan noget. Men her, fx, ved os, i børneungepsykiatrien, det her afsnit er 15 år gammelt, og det var jo moderne her for 15 år siden, som jeg snakkede mig dig om i telefonen, og allerede nu her, der kan man jo se, at der vil man nok have gjort nogle ting anderledes allerede, ikke. Nogle områder, vi ville have bygget lidt større, vil jeg tro."

03: Om behovet for større rum og bearbejdede uderum

"Så er det lidt trangt dernede, i den dér skærm, ikke også. Det er sådan dét, vi synes er en udfordring. Og lidt trist udegård har vi også, og have og sådan noget der. Rygehaven har vi ikke gjort ret meget ud af."

04: Om synlighed og sikkerhed

"Når man så får det lidt bedre, så kan man komme op i den afdeling vi sidder i nu her, og så har vi sådan noget der hedder.. man kan enten have fast vagtpersonale omkring sig hele tiden, 24 timer i døgnet; man må ikke engang lukke døren, når man går på WC, man er simpelthen bange for at man kan tage ens eget liv, eller man gør det for at regulere, hjælpe dem med at håndtere en psykose: hvad er virkelighed, og hvad er ikke virkelighed. Så har man en fast person på sig. Der må man simpelthen ikke slippe dem ud af syne. Det er rent juridisk, der skal man kunne se, hvad vedkommende laver. Man kan selvfølgelig godt lige sidde uden for døren, hvis der er en gæst, men der skal lige være lidt åbent, så man kan se hvordan de har det."

05: Om sikkerhed (vinduer og lås)

"Mit vindue er det eneste, der ikke kan låses. Ellers, så alle vores vinduer, der er lås på, og man siger simpelthen, vi skal kunne bruge hele afdelingen. Så kan man godt låse en patients vindue op, hernede i den del her, og lufte ud, og sådan noget, men ellers så er vinduerne faktisk låst, sådan at man ikke bare lige smutter ud på parkeringspladsen uden at personalet opdager det."

06: Om patienten som partner og (kreativ) medinddragelse tidligt i forløbet

"Og hér, der er det mere med, at når de kommer ind, så får de kontaktpersoner, de bliver medinddraget, de kan læse deres journal, hvis de kan klare det, ikke også. Vi har—de laver de der forhåndstilkendegivelser, så vi kan cirka vide hvordan—hvilken hjælp har de brug for, hvis de får det dårligt. Og så har vi – det kommer I til at se – vi har nogle hobbyrum, nogle sanserum og wellnessrum, og alt muligt der gør, at de kan få det bedre og kan føle, at de bliver taget alvorligt og at deres behov kan dækkes herude. Så skal de pårørende inddrages rigtig meget i hele forløbet. Det er nogle gange lykkedes rigtig godt, og nogle gange kunne vi godt have gjort – været mere på forkant med det. Så det er hele tiden patientinddragelse, så meget de kan klare det."

07: Om plads til pårørende

Q: Den pårørende inde på sengeafdelingen – har de mulighed for at gå ind og sætte sig i fællesrummet?

"Ja, det har de. Og ellers nede på deres barns stuer. Men der kunne vi godt have lidt flere nicher. Og det har man ovre i voksenafdelingen. Der er vores lidt lille. Men stuerne er okay, og du kan godt sidde derinde. Men selvfølgelig, er der mange pårørende, er det lidt tæt oppe i vores fællesrum, ikke også."

08: Om lydisolerede døre. Om hospitalssenge, miljø på stuen og sikkerhed.

"Vi har lydisolerede døre på den måde, at de kan ikke høre, hvad vi sidder og snakker om. Og det har vi også på stuerne, og brandsikrede døre, så de klapper i, hvis det er. Og så i det her afsnit har vi så prøvet at vi havde sådan nogle boksmadrasser, så de ikke skulle være så hospitalsagtige. Det er vi så ved at lave om på nu, desværre, fordi personalet simpelthen-- nogen har fået arbejdsskader i de dér voldsomme situationer. Så står man nede ved sådan en boksmadras. Så der er vi nødt til at få hospitalssenge. Det er en skam, for når man lige kommer ind på en stue, der ligner sådan en hospitalsstue lidt mere, ikke også."

[...]

"...der er mange ting i sådan en seng. Der må ikke være nogen skruer, man kan sluge, og sådan noget. Men der arver vi så – der får vi voksenpsykiatriens tidligere senge, og de får de smarte nye. Og de er vist rigtig gode, dem vi får. Men det er fint, så får vi hospitalssenge, og så skal vi ud og købe nogen tæpper, noget der kan vaskes, så vi får nogle farver ind på stuerne. "

09: Om fitnessrum og kontakt til omverdenen

"Det er så ikke lige så smukt, vel, så der er totalt rod hernede. Men her har vi et fitnessrum. Vi har to gange om ugen, at vi tager de unge med, der kan, til fitness inde i byen. Men dem, der ikke kan dét, eller hvis vi ikke kan komme derind pga. personaleressourcer eller noget, så går vi herned.

[...]

Q: Så man opfordrer egentlig at træningen foregår ude i samfundet?

"Ja, som det er muligt, ikke også. Om det så bare er 2-3 der kan tage med. Nede fra vores daghospital, der er lukket idag, der er de mere stabile nede, de kan godt 3-4 stykker komme med derind. Det vil de gerne, ind og møde andre. Men nogen er også rigtig bange for det, og kan ikke lide at bade sammen, og så kan man være her."

10 Om stuerne og uderum

"Ja, så sådan en typisk stue ser sådan her ud. Vi havde blå stole før, nu har vi hvide møbler fra Kolding, der er lukket. Og der kommer nogen hospitalssenge ind. Idag havde vi nok bare valgt noget hvidt [gardiner]."

Q: Hvor store er de?

"Ja, det er da et godt spørgsmål. "

Q: Mellem 11 og 14 m2?

"Ja. Men dem har vi 4 af her. Så har vi et hobbyrum. Nu er der ryddet op, men her er normalt lidt kaotisk. Vi havde en ergoterapeut ansat, men hun var meget kreativ. Men der skete bare en hel masse ting, og det skal vi også til at gøre igen."

Q: Ville det være fordelagtigt at man havde adgang ud?

"Jah, det kunne man godt. Den dér terrasse, den bruger personalet. De unge har en anden terrasse. Men det kunne man jo godt have integreret lidt mere, ikke."

Skal det helst være [ud] til et område, der er lukket?

Nej, det behøver ikke. Det er et røgfrit afsnit her, så de går ud og ryger på den anden terrasse. Så det er bare–. Man kunne godt have lavet en dør, der gik ud, så den var låst i de perioder, hvor dét var nødvendigt. Men vi får aldrig sådan brugt den terrasse dér. Det var til personalet før, der gik ud og røg. Eller lige satte sig ud i deres frokostpause på en sommerdag. Så er det ligesom deres terrasse, ikke. Også lige for at få lidt ro nogen gange."

11: Om fællesrum og modtageslusen med minimal indretning

"Dét her kalder vi torvet, det er sådan vores fællesrum. Der er aktivitetsrum dér. Og har haft en kok ansat. Det er vores kontor, hvor vi lige går ind bagefter. Men indgangen til afdelingen er sådan set her. Sådan en sluse i modtagelsesrum. Den er ikke lige sådan specielt spændende, vores indgang. Så går man egentlig hérind og så bliver vurderingen sådan set foretaget herinde. Og her er ikke ret mange ting, for en meget oprevet person kan godt kaste med ting. Så her er meget kedeligt, men her kunne man godt have noget inde i væggene, som man har i voksenpsykiatrien. Men så prøver vi at minimere de ting, der er her. De stole kan hurtigt flytte ud. Vi kan ikke tage alt ud fra et rum hurtigt, hvis vi har en meget dårlig ung der kommer."

12: Om faciliteter for familien

"Vi kan også, for familier der kommer helt nede fra Sønderjylland om natten herop i vores, og skal modtages heroppe i akutmodtagelsen og bliver indlagt, så kan vi også engang imellem tilbyde forældrene en overnatning [..] Så prøver vi sådan, de skal jo ikke ud og have store hotelregninger. Så hvis vi har plads kan vi lige lave en opredning."

13: Om sanserummet

"Så har vi et sanserum som vi bruger til sådan tvangsforebyggelse, og partnerskabsaftaler, der er en del af dét, at vi har sådan et sanseintegrationsrum. Jeg er ikke så godt introduceret til det, men her kan man gå ind og sidde i sådan en kuglestol der, og ligge der, og så har vi sådan en projektor. Og så noget dejlig musik. Og så en stol, man kan hænge i dér. Så der har vi inddraget sådan en sekretær til dét. Det bliver brugt for lidt, synes jeg, men det bliver brugt. Der er nogle enkelte der bruger det. Men jeg tror vi skal være bedre til at gå med de unge herind. Så personalet skal tænke det som en del af afdelingen. Så jeg tror det kommer til at blive brugt mere hen ad vejen."

14: Om wellnessrummet

"Så er det blevet til et wellness-rum her. Her kan man så komme ind i badekar, hvis man er stabil til det. Og høre musik her, og dufte, og sådan noget, der stimulerer sanser her. Ikke et spændende rum, men der er faktisk nogen, der har gjort en stor indsats for –. Og der er faktisk nogen patienter, de synes det er ligesom at være på hotel."

15: Om vagtkontoret på hjørnet og synlighed

Q: Hvordan fungerer det kontor der på hjørnet, er det også vagtstue?

"Ja, det gør det nemlig. Der har man valgt, da man lavede afdelingen, at lægge det lige i midten. Men så har vi interviewet nogle patienter i årenes løb, og de synes faktisk det er dejligt, de kan se os."

[..]

"Og de kan se vi er der, og må gerne gå ind på kontoret. De vil aldrig blive afvist. Og vi prøver at have døren åben så meget vi nu kan. Man tænker jo, at man godt kan føle sig lidt overvåget herude."

16: Om at kunne rulle gardinet ned i mellemdørene på gangen

[På gangen]: "Hvis man ruller ned her, så bliver det et meget stimulifattigt miljø. Hvis du ikke kan filtrere hvad der sker omkring dig, så er det jo stressende at opleve. Så kan du rulle ned, og det giver bare meget ro."

17: Skal rummene være kliniske eller hjemlige?

"Det er nemlig dét. Altså det skal være .. Nu, for eksempel, i årenes løb har jeg snakket med flere patienter, der siger, at da de kom nede på det gamle Augustenborg, så siger de "det var bare så hyggeligt dernede", sagde de, ikke også. De var glade for at være heroppe, og glade for at være i Odense, og Kolding, men det var så hyggeligt dernede. Det var sådan en gammel bygning. Og nu siger nogle af dem, der har været i Aabenraa også, at det er så hyggeligt oppe i Esbjerg. Fordi det er sådan lidt mindre. Og det er sådan lidt lyst i Aabenraa, helt vildt lækkert og sådan noget, ikke, men det er nok sådan lidt mere intimt her, ikke."

18: TV-Stuen

Q: Men det kan også hjælpe til at det virker mere intimt [at TV-lokalet er lille]?

"Men det kunne godt – hvis man sidder mange her, kunne det godt have været større, ikke. Oppe på torvet, deroppe, kalder vi det, tænder vi ikke TV'et før kl 15. Der skal også være et sted, hvor det ikke bare kører hele tiden."

19: Stuerne ved skærm-afdelingen

"Stuerne ligner lidt dem, I så før. Hernede har vi så den skærm, hvis der kommer én, der har det rigtig dårligt. Så kan man komme herned og lukke, eller i værste fald låse. Og det kan I godt se, hvad det betyder når der kommer en sygehusseng ind, ikke. Og det var jo det vi i starten rigtig gerne ville undgå. Men det er vi bare nødt til at se stort på og så få nogle sengetæpper ind.

Og herude.. hvis man er meget selvskadende, så er spejlene sådan lidt underlige. Det er ikke et normalt spejl. Den er okay, den her, men nogle af de andre, der bliver man sådan helt mærkelig, når man kigger på sig selv. Der er noget underligt ved det. Sådan noget, ikke plexiglas, men noget, der ikke kan ødelægges. Det kan ødelægges, men det er sværere at ødelægge. Du skal banke noget igennem, for at knække det."

20: Om sikkerhed på badeværelserne

"Så kan man se her, at bruse– – du kan se, der er ikke noget.. på nogen af de andre stuer, der har de bruseforhæng, men hvis de så hænger sig i det, så ryger det bare ned.

Hvis der kommer en meget dårlig patient, så tager man den af [bruseslangen]."

21: Om ét af uderummene

"Og så den her indhegning i gården, hvor man jo sagtens kan springe udover, hvis man vil dét. Det har vi også haft nogen, der har gjort. Hvis der er risiko for det, så tager vi selvfølgelig [d]en stol ind, men de kan lige komme ud og ryge, eller bare lige få lidt luft."

22: Alarmer

"Jamen det er vores alarm. Der sker jo, at vi ringer alarmer indimellem. Og så kan man se hvilken stue.. Så det er sådan orienterings-ure. Så bruger vi dem bare som ur, så det ser lidt naturligt ud."

23: Om udgang for de dårligste patienter

Q: Dem der er hernede, de får ikke adgang udtil..?

"Altså mange, der ligger hernede også, de går rundt og sådan. Der er ikke nogen her, der ikke må gå rundt. Men de har udgang efter aftale. Altså også af deres forældre. Men dem der er her, de må gerne gå ud, og de må gerne bruge dét derude."

Q: "Så man kunne godt lave døre ud."

"Man kunne godt have lavet døre ud fra stuerne, så man kunne komme ud, ja. Det kunne man godt gøre, hvis det var."

Q: "Men det fungerer måske bedre, hvis de skal forbi jer?"

"Det er nemlig dét. Fordi vi har nemlig nogengange, hvis vi lige har luftet ud eller glemt at låse et vindue.. - Deroppe kan de jo bare gå ud af døren, men hernede, der er alle vinduer låst. Så vi ved, at de skal forbi os, som du siger. For vi formoder, at vi har de dårligste hernede."

24: Om funktionel planløsning

Q: Planløsningsmæssigt er det en meget funktionelt plan. Er det fordelagtigt ift. funktion, eller vil noget omvendt fungere bedre?

"Det giver os rigtig godt overblik. Hvor man kan sige, hvis vi havde nogle nicher, så ville vi ikke have det samme overblik, men det giver en meget – vi har meget god fornemmelse af, hvor patienten er henne. Men hvis man kommer over i nogen andre bygninger, så kan man simpelthen se, at det med at der er blinde vinkler, – de var fx nødt til at lave en hel fløj om, fordi man kom ind på stuen, og den vinkel, hvor patienten sidder, der ved man ikke, hvad man kommer ind til. Så der har man simpelthen revideret stuerne efter 4-5 år. Og [i] vores, der kan du se hele stuen. Men det dér med en blind vinkel, hvor man kan møde noget uforudset. Så når personalet er her, så kan du simpelthen se alle. Det er dét man har tænkt."

Q: Ville et rundt hjørne være fordelagtigt?

"Det kunne da godt være. Ja, det kunne da godt være."

25: Om skolerum

"Når man er indlagt og går i folkeskole, så har man ret til at få skoleundervisning, så vi har en lille skole hernede, de kommer ned i så meget de kan klare i løbet af dagen. Så får de nogle moduler istedet for 45 minutter, så er det måske et kvarter eller en halv time. Så det er både døgn- og dagindlagte, der går i skole hernede."

26: Om offentlighedens brug af psykiatriens udefaciliteter

"Men der kommer alligevel nogle gange nogen folk ind og bruger legepladsen. Og det er godt, og nogle gange er det også lidt træls for dem der er indlagt her. Men så går vi ud og siger hvis det er træls at blive kigget på."

[..]

"Vi vil jo gerne have, at offentligheden egentlig.. at vi skal afstigmatisere psykiatrien. Og samtidig, så er det bare heller ikke super dejligt at blive kigget på. For det er lidt spændende; "hvem er de dér ude på psykiatrisk hospital?" Spændende for andre, måske. Og de er jo fuldstændig stille og rolige, de fleste, der er indlagt, ikke."

27: Om hvem der er indlagt

"Og helt klart, så er der flest piger indlagte. Vi har størst procentandel af piger altid. Jeg tror det er 2/3 piger, der indlagte, sådan som udgangspunkt."

28: Om multifunktionelle rum, pladsproblemer og skolerumsstørrelse

Q: Mange af rummene er multifunktionelle..

"Ja, det er simpelthen pladsproblemer, allerede efter få år. Så i vores ambulatorie har vi faktisk et helt team der sidder inde i byen. Vi får flere og flere i årenes løb, apropos at vi skal udrede flere. Og det skal gå hurtigere.

Ja, det er bare et depotrum og så de her små skoleklasser. Ja, her sidder – det er en skoleklasse. Så. Et lille rum. Men de har så også kun 3-4 til undervisning ad gangen."

29: Om voksenpsykiatriens generelle arkitektur

"Men det er sådan noget her; lange gange, lange lyse gange. Ikke så højt til loft, og alligevel okay, faktisk, ikke også."

Q: Ville det være godt med højere til loftet og mere luft?

"Nah, jeg ved det ikke rigtig. Jeg tror, de synes det er fedt herovre faktisk. Personalet, de er ret glade for de her afdelinger. Og patienterne også, tror jeg. De synes det er lækkert herovre. Fordi det er okay. Det er højere derinde end lige her, hvor vi står. Hvor det er fint.

Hele tiden sigtelinjer, og der er gjort meget ud af det, ikke også."

30: Om forskellen på voksen og ungepsykiatrien og kantinen

"Det hérovre - der er lidt forskel på os og voksenpsykiatri; her går du fra afdelingen og ind i kantinen og spiser. Og kommer lidt væk fra miljøet, ikke. Og vi har jo vores miljøterapi, det er jo børn og unge, kan man sige, og de vil gerne have det er lidt mere hjemligt ovre ved os. Så de skal ikke ud af afdelingen, vel."

31: Om den store have/gården i voksenpsykiatrien

"Men det er jo en super funktionel have, og offentligheden kan faktisk komme ind. For vi vil gerne integrere psykiatrien og offentligheden her. Dem, som ikke må komme herud, har haver bagud, lukkede haver."

32: Om sportshallen i voksenpsykiatrien

"Vores sportshal, den går vi faktisk og kigger nedi her nu. Så går man rundt om sportshallen hér, ikke.. Den er integreret, og der er også mange foredrag, plads til powerpoint, og man kan lave den sådan mindre eller større. Så sådan multifunktion. Så man sidder hér. Der kunne også være en koncert. Der kunne være sport, eller foredrag. Så jeg synes faktisk det er ret godt tænkt."

33: Om voksenpsykiatriens afsnit generelt

"Men vi har jo de her haver, der er bygget ind. Det er rygegård til patienterne. Og så sengestuer sådan lidt rundt omkring. Og så har vi kontorer derovre, hvor man lige kan kigge ind, ikke også. Og igen en have derude. Og fint udsyn, synes jeg. Det er jo 20-sengs afdeling, og man kan jo fornemme det dér ift. vores lille afdeling, at det er meget mere tæt og at det er luftigt herovre. Og lys. Man kan godt se, der ikke er malerier, det hele er vægkreationer."

[..]

"Men igen, der er små nicher, og deres skærm herovre.. de kan lukke af dér. Men de kan også lukke af hérover. Og så har man måske et stort område, ikke. Så de har lidt anderledes muligheder. Og så små haver der, hvor man bare lige kan sætte sig ud."

34: Om forskellen mellem voksen- og ungepsykiatri

Q: Den her afdeling er måske en tand mere klinisk end jeres afdeling..?

"Ja det er den altså. Og det er det også i Aabenraa, hvis I kommer derned. Det er sådan lidt i samme stil. Men det er dét her meget lyse—om sommeren bliver der selvfølgelig rigtig varmt herovre. Der er ikke nogen afskærmning. Så der er vi glade ovre ved os."

35: Om multimøbler på stuerne

Q: Må vi have lov at åbne et skab?
Sygeplejerske: "Jo, du må åbne."
Dorthe: "Det er faktisk rigtig fint, ikke også. Ét møbel, ikke også. Det ser godt ud."
Q: Vil man kunne sidde her (multimøbel i vinduet)?
Dorthe: "Det er vel til at sidde, er det ikke det? Kigge ud ad vinduet, og.. Jamen det er flot."
Sygeplejerske: "Ja, det er nogen fine rum."

36: Kritisk blik på faciliteterne

Sygeplejerske 2: "[...] Det synes jeg ikke hænger sammen. Hvorfor har man ikke lavet nogen persienner inden i vinduerne? Inde i ruderne? Det kunne jeg godt tænke mig. Så kunne jeg også tænke på vores lille personalekøkken. Som er ren bageovn. Især om sommeren. Hvorfor har man ikke valgt at bytte den med teknikrummet? Så man måske kunne have noget udluftning."
[..]
"Og så vil jeg sige, at gulvene her.. Det har godt nok også meget at levne. Vi har jo fået ordnet gulv inde på kontoret, og vores konferencerum derinde. Det har ikke været specielt godt. Altså, der er jo revner i. Og det var der jo faktisk ude i det her også, allerede da vi flyttede ind. Det klager rengøringen jo også over. Der er stadigvæk spor, når de har gjort rent."
[Dorthe]: "Det er flot og blankt, men det er sart."
Sygeplejerske 2: "Ja, meget. Og så døjer vi med statisk elektricitet herovre, så det basker."
Dorthe: "På grund af de gulve her, eller hvad?"
Sygeplejerske 2: "Vi ved ikke hvad det skyldes. For vi prøver jo at skifte sko, og gøre ved. Og det er jo næsten uanset hvad vi har på.."

37: Om at afdelingerne ikke er bygget sammen

"Så vi er lidt for os selv. Der er fordele og ulemper, sikkerhedsmæssigt er vi lidt væk fra de andre. Om natten er der kun to på arbejde ovre ved os. Og så hvis de skal herover til alarm, så sidder der én alene. Det er så sjældent, men dét når man kun er to.. Når det er bygget sammen, så føler man lidt, at de andre er tættere på."

APPENDIX 1.2

Uddrag af interview, oversygeplejerske Poul Erik Ravnsmed og overlæge Bent Kawa. Roskilde Børne-Ungepsykiatri.

01: Om designprocessen for Roskilde Ungdomspsykiatri:

PER: "[..] Men mange af de ting der kom ind var, at det var vigtigt at der var mulighed for udearealer, hvor at I kan se [viser på plancher i lokalet] vi har placeret sådan nogle gårde, [lukkede gårdrum] et udeareal hér og hér. Her er der ligesom en lyskasse ned, [placeret ved køkkenet på plantegningen] så der også kommer udeareal nede fra den nye stueetage [parterre]."

02: Om karakteren af uderummet:

"Det er anderledes at komme ud i en gårdhave, der er mere naturlig, sammenlignet med en have med hegn - det har en stor betydning. Det var et stort ønske, at vi kunne etablere det."

03: Om miljøterapiens implementering:

"Altså dét med gårdhaven er én ting, og så har vi også brugt, at vi ønskede, at miljøterapien skulle være integreret i afsnittet. Miljøterapien må ikke være sådan noget med, at man går over i et miljøterapi-lokale. Det er en del af dén ramme det er at være indlagt. Så derfor er der jo ikke særlig mange aktivitetsrum. Det er dagligstuen, spisestuen; der også er rumfordeling. Det har præget det noget."

04: Om dilemmaet mellem åbenhed og intimitet:

"Så er der erfaringen for, at det er godt, at det er rummeligt. Det skulle opfylde to ting; det skulle være rummeligt, samtidig med at det skulle være hjemligt. Kender I den konflikt? Derfor skulle det være åbent og lyst og venligt og samtidig […] Grunden til, at det skulle være rummeligt, det er, at der er psykiatriske patienter, som har svært ved at være tæt i kontakt osv. så derfor skal der være plads til, at man kan bevæge sig. Vi ønskede at undgå snævre gange, så derfor er der egentlig ikke noget gangareal i dét, der egentlig er sengeafsnit. Her er det gang og opholdsrum i det samme."

05: Om opdelingen af funktioner i Roskilde Børne-Ungepsykiatri

[..] Det er jo så behandlerkontorer, som gør, at hér kan man komme over til en behandling, som ikke er en del af miljøterapien, som ligger herovre [henvisning til planche, østvendt del af bygningen]. Så kommer man ligesom over i en anden sammenhæng til samtale. Den måde, vi så gjorde det til […] selve kontorerne er gjort til samtalekontorer. Det centrale er ikke behandlerens skrivebord, det er samtalebordet inde i midten. Så det er et bevidst valg, at man ikke skal komme ind til et stort […]. Så det er også en central ting.
Så har vi køkkenfunktionen som en anden central. Der havde vi en stor udfordring og en stor drøftelse med vore egen interne ledelse i psykiatrien, omkring "hvor er madens betydning?" Der fik vi så muligheden for, at vi selv laver mad. Vi tænker at dét, at der dufter af mad, og at der er madproduktion på stedet, har en betydning for oplevelsen af at være indlagt. Så det fik vi gennemført, men der er jo så alle mulige krav til produktionskøkner, som I sikkert også ved er en udfordring. Så der har vi fået lavet sådan, at vi har et produktionskøkken herinde [henvisning til planche] i hjertet af afdelingen, som så laver mad til hele bygningen. Der er så placeret nogle tekøkkener rundt omkring, hvor maden så kan blive fordelt ud til inden servering."

06: Om opdelingen af stuer

Q: Hvordan er opdelingen ellers; hvis I ved, at I skal have nogen i længere tid, bliver de så placeret–?
PER: Nej, det er jo en del […] de 20 unge senge er hér [henvisning til plancher]. Så der er ikke et bestemt sted, som er til de mere akutte, det vil være blandet."

07: Om behovet for et sanserum

"[..] der fandt man så ud af, ud fra erfaringer om stille rum og musik, at sådan en ting måtte vi simpelthen også have. Et sted hvor der er mulighed for, at man kan komme ind. I stedet for, hvis man er i en opkørt situation, kan man lige blive dæmpet og slappe af i forhold til musik og dufte."

08: Om behovet for pårørendefaciliteter

"[..] der fandt man så ud af, ud fra erfaringer om stille rum og musik, at sådan en ting måtte vi simpelthen også have. Et sted hvor der er mulighed for, at man kan komme ind. I stedet for, hvis man er i en opkørt situation, kan man lige blive dæmpet og slappe af i forhold til musik og dufte."

09: Om størrelsen af faciliteter og hjemlighed på stuerne

Q: Hvor store er sengestuerne, altså patientstuerne?
PER: "13-14 m2, så der er plads til en seng. Der har vi så valgt, at det er standard hospitalssenge, som jo så er specialbyggede psykiatrisenge, som kan hæves op, og de ting som en hospitalsseng skal kunne. Så er det standard hele vejen igennem. Så man ikke skal sige, "den hér patient er dén her kategori, og hvis han nu flyttede i den stue.." Der har vi så valgt […] det gør så, at det bliver en smule mindre hjemligt end man kunne ønske sig. Der er et stort krav om at nedbringe tvang på afdelingerne, målet er at nedbringe det med 60% i 2020, så det har stor fokus og meget interesse. B.la. hvordan man indretter miljøer, der fordrer mindre tvang."

10: Om funktionerne i Roskilde Børne-ungepsykiatri

"Den normale indgang er heroppe, her kommer man fra psykiatriskskadestue. Vores vagthavende læge har så kontor herinde, så det er nemt at komme ind her til en samtale. Samtidig har det her rum en slusefunktion, det er muligt at komme den her vej ind i det skærmede afsnit. Hvis man er meget dårlig kan man komme direkte ind til en seng, som jeg lige viser jer. Dét, der er godt hér er, hvis politiet kommer ud. Så kan man komme ind her uforstyrret, og videre til resten af bygningen. Her kan I se den gårdhave, som er en del af den skærmede afdeling. Der er ikke det hér indtryk af et hegn, her er man inde i det hér [glas, der omslutter gårdhaven]."

11: Om uderummene, atriumgårdene og glaspartier

Bent Kawa: "Dét, der er idéen, er at lave de her atriumgårde ind i mellem alle områderne, så der er udsyn til noget grønt, og samtidig lukket lidt af."
Q: Vi var på besøg i Esbjerg i går, i deres ungdomspsykiatri og i deres nye voksenpsykiatri. Der snakkede vi om transparens, dét med, at man ligesom kan se igennem de her atriumgårde over til den anden side, selv hvis en patient løber nøgen rundt i den skærmede afdeling, kunne det ikke skabe nogle gener?
BK: Det gør det også, fordi i øjeblikket er det glas, som er løsningen på det hele. Det er jo, ja […] Slagelse er vores nyeste, og dér er jo endnu større glasområder, alt er glas, og alle kontorerne er med glas. Jeg ved de har haft meget arbejde med mattering og skærmning, for at få en vis form for privathed. Ja, det er jo dejligt åbent og luftigt, det vil I se, når vi går rundt. Dét, der er et problem, er at vores unge og især børnene opfatter det som for stort, og de får ikke den der hulefornemmelse, som giver tryghed."

12: Om ankomstrummet og kunst

Bent Kawa:" Det er jo igen lyst og dejligt. Og så med noget farve på væggene."
[..]
PER: "I kan se der er tænkt over farverne, som går fra billederne over i stolene."
[..]

Bent Kawa: "Helt klart det [kunst] har en betydning. Det er vigtigt, at det på én eller anden måde giver én eller anden form for helhed, tror jeg er vigtigt."
Q: Vi har snakket meget om sansningen af materialerne og duktiliteten i materialerne, når man går rundt. Steder hvor du kan mærke, at det er prioriteret.
Bent Kawa: "Jeg tror de her vægudsmykninger fungerer godt. Det giver én eller anden ro. Det er i hvert fald min oplevelse, fordi det bryder dét, at det kunne være meget sterilt, hvis det kun var hvide vægge og glas. Det giver én eller anden form for opblødning. Det vigtigste i den her sammenhæng, det er vægtningen mellem hvor store rum man skal lave, og hvor meget glas man skal lave i forhold til det mere huleagtige. Det synes jeg er det største problem, tendensen i dag er glas og meget store rum. Her bruger vi jo meget plads til opholdssteder, så vi sidder og slås med kontormangel. Vi sidder med masser af m2, men i vores job er kontorerne jo det vigtigste, det er dér vi behandler patienter. Så det er jo en afvejning; jeg vil sige, at man skal passe på, at det ikke bliver for store rum og for meget glas."

13: Om udformning af opholdsområder
PER: "Man har lidt forsøgt at få noget luftigt og samtidig hjemligt, med nogle små kroge. Det man ser her er, at det jo ikke er gangareal, men at det er ophold."

14: Om udgangsområder
Q: Adgangen ud, er det primært fra fællesområder? Jeg studsede over, at der ikke var udgang fra stuerne.

15: Om patientstuernes størrelse
"Det er standard størrelsen (13-15 m2), alle værelser er stort set ens."

16: Om patientfaciliteter
Q: Har patienterne i den skærmede afdeling så adgang til et gårdrum?
BK: "Ja, de har adgang til det atrium vi så, da vi kom ind på afdelingen. I den skærmede er der også lavet, så der er spisepladser, opholdsrum osv. så man kan bo der. Så man ikke bliver lukket ude, men man har sit eget."
[..]
PER: "Det, at I bemærkede, at det rungede på stuen før, tror jeg da godt kan have betydning. Her i rummet [opholdsrum] er der Troldtex, som virker lyddæmpende."
BK: "Der er jo også effekt af lys, f.eks. dagslys fremmer jo bedring på depressive patienter. Den er der jo også, temperament og farver er jo også noget man forsøger at knytte sammen. Jeg ved ikke hvor meget det har på sig, men det […] Der skal f.eks. ikke være for meget rødt i et skærmområde."
[..]
BK: "Vi har også KREA-rum, hvor man kan gå ind bag en lukket dør. Her kan I se nogle af de mulige aktiviteter som billard og bordtennis."
PER: "Her kan I se et eksempel på et lille tekøkken […] Herude har vi vores produktionskøkken, hvor de unge også kan være med."

17: Om wayfinding
"Når vi modtager nye, tager det ofte 14 dage før de kan finde rundt."

18: Om indlæggelsestid
Q: Hvad er den gennemsnitlige indlæggelsestid, i antal dage?
BK: "Fire uger i snit, men det variere fra to dage til ¾ år. Men i gennemsnit, altså fire uger, det gælder for de fleste."

19: Om skolerummets struktur
Q: Der jo også brudt med den klassiske opstilling af et klasseværelse. Hvordan fungerer det?
Skolelærer: "Det kommer lidt an på hvor mange vi har. Nogle af eleverne har brug for at sidde for sig selv, fordi de har jo deres problemer. Tit laver vi også nogle fælles, og mange kan godt lide at være fælles, så kan de sidde her og arbejde. Og så nogen gange, hvis de har brug for at sidde lidt skærmet, sidder de ovre i stolen hér. Det er meget rart at der er lidt ekstra plads, stolen er meget populær. F.eks. hvis man har en psykose eller ét eller andet. Men der er ikke noget kateter, det bruger vi ikke."

20: Om faciliteter
PER: "Legeterapirum, det er jo primært til børnepsykiatrien. Alt legetøjet er inde i skabet og bliver taget frem afhængig af de terapeutiske forhold."
BK: "Teknikrum, det er der altid brug for." [Rum med printer og el-tavler]
PER: "Så har vi 2 konferencerum til personalet, med en foldevæg i mellem."
[..]
"Herinde ved siden af har vi omklædning. [..] Det er jo sådanne rum man ønsker minimeret så meget som muligt, så der er flere m2 til patienter. Så er der masser af depotpladser til alle mulige ting. Her er der så også kontorer, det er jo samtalekontorer. Bent sagde på et tidspunkt, at der var mangel på kontorer, men her plejer vi at prale af at vi har en del kontorer. Det har vi defineret som behandlerkontorer, det er ikke behandlerens kontor, det er et kontor man behandler i. [..] Vores kontorer er jo hvor vi opererer, altså snakker med dem [patienterne]."
[..]
"Her er stillerummet, der kan sættes musik på, og hernede har vi nogle kugledyner."

21: Om afskærmning for patienterne
KJ: "Det tager jo lidt af lyset men det er jo ikke […] det er jo godt at have mulighed for, som psykisk syg, ikke at skulle gå for tæt forbi andre, men det kan også blive for åbent. Det er godt, hvis man har lidt mere mulighed for at lave lidt skærmede hjørner eller lignende, til dem der har brug for lidt færre stimuli. Selvom der jo ikke vil være en speciel lyddæmpning i sådan et glas, vil det jo alligevel have betydning. Bare den der fornemmelse af, at der ikke kommer en farende hen til dig, har betydning."

22: Om faciliteter for patienterne og behov
KJ: "Der er så de her værelser og centralt er så placeret personalerummet. Der er jo ikke sådan voldsomt mange ting. Der er så lavet stillerum herinde. Der er møbleret, så der er mulighed for fysisk udfoldelse, det er jo ellers begrænset en del her. […] Så kan man jo sige godt og skidt om tidens trend, også selvom man er barn er det eneværelser med eget toilet på værelserne. Det er godt på den ene side, men der er nogle fordele, og jo yngre de bliver eller hvis de er spiseforstyrrede, er det bedre, som i et hjem, at de skal ud i det offentlige rum for at komme på toilettet. Nogle af de her børn vil faktisk have godt af at de sov 2 på værelserne. Men det er politisk bestemt."

23: Om stillerummet og lys
PER: "Her er der jo begge muligheder i hvert fald, der kan både være lys og ikke. Hvis der er nogen der er skræmt over, at det er lukket, er det jo godt at have begge muligheder."

24: Om glasbrug og lys
PER: "Vi havde en udfordring med varme i starten, sådan noget med meget glas er altid en udfordring med varme. Også set i lyset af den begrænsede mulighed for at åbne vinduerne grundet sikkerhed."

25: Om pårørendefaciliteter
Q: Skulle det [pårørendefaciliteter] være på patienstuerne eller skulle det indrettes som et separat rum?
PER: "Alt det pladsmæssigt og normeringsmæssigt i Norge og Sverige, er noget helt andet med plads til forældrene. Om arkitekturen er der, det ved jeg så ikke. Men det at tænke det ind, når man indlægger et barn eller en ung, så der er plads til familien på den ene eller den anden måde. Og det må vores politikere så tage stilling til om de vil være enige i den faglige prioritering, det giver bedre resultater."

APPENDIX 1.3

Uddrag af interview, kropspsykoterapeut Annette Wibæk, indehaver af Terapihaven Aurora.

Parametre for Aurora

01: Om havens principper
"[..] to ting, der hjælper, det er sansning, og så er det havearbejde. Så de to ben står denne her have ligesom på. Så det, at man kan få nogle opgaver, og at man skal kunne sanse."

02 Om afskærmning
"Og vi har så lavet de her faskinehegn for ligesom at skærme af – når man er stressramt, er det vigtigt at man kan få noget ro, både for hørelsen, men også bare fornemmelsen af at være skærmet. Og der har vi så lavet det faskinehegn med noget kvas, som vi komme op i, og det gør vi sådan on-going. Og der vil fuglene og pindsvinene og dyr rigtig gerne være i. Så det er sådan win-win, samtidig med at vi lige får lukket lidt af ind til naboen. Og I kan se at vi har sat fuglekasser op, og vi fodrer hele året, for at have fugle her."

03 Om elementer i sansehaven
"[..] bål og ild er jo et at de der store elementer som folk falder til ro ved – se ilden og lugte røgen, hører knitren. Så vi har rigtig mange bålsteder."

04 Om skindets taktilitet
"Sådan noget som skind har jeg mange af, for det har en rigtig god virkning også. Det får folk til at falde til ro – lammeskind – og i det hele taget dyreskind."

05 Om naturens overførte betydning
"Noget af det man sådan gør med haveterapien, det er at man italesætter folks problemer ved hjælp af naturen. For eksempel, hvis vi nu ser på det her træ, som er knækket – så kan det jo overføres på et menneske, træet er knækket, men alligevel så er der liv her – det begynder at gro op igen. Så hvis man kommer ud for nogle ting i sit liv, så kan man måske finde en ny vej. Og i det hele taget, sådan det en haveterapeut laver, det er jo at gå rundt med de mennesker, og se hvad de laver, hvad kommer de til at interessere sig for, er der noget de nuldrer med eller andet, altså giver planten omsorg – giver du dig selv omsorg, vander du dig selv, gøder du dig selv, altså sådan at man på den måde italesætter et menneskeliv ud fra naturen, men man sådan går i den."

06 Om havens brugere
"Så det er sådan, og det, det jeg laver lige nu, så kimer jeg dem ned, og render til møder fordi - jeg havde i første omgang forestillet mig hjemvendte veteraner. Men øh, de bliver simpelthen så syge, at de faktisk – dem jeg har haft kontakt med, de er inden for dørene, og de vil nærmest ikke ud."
[..]
"Det er jo tiltænkt stressramte og angstfyldte mennesker, og det kunne nemt være nogle fra psykiatrien, men ikke de helt dårlige, for de kan jo ikke engang, altså de kan jo ikke tage transport, altså e kan jo døje med at fragte sig selv."

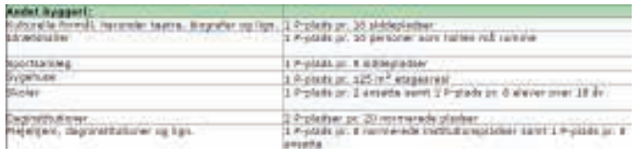
07 Om menneskets funktion i haven
"Og så bruger vi meget det med højbede, sådan for at styre – ja styre jordbærene, styre afgrøderne. Men det kunne også være sådan at hvert menneske ville få sit eget højbed at tage sig af."

08 Om at finde sin plads i haven
"Og man finder jo også altså – en af de sådan første øvelser jeg laver med folk, som er her: "Prøv at find den plads, hvor du føler dig mest hjemme". En siddeplads. Og så har vi sådan evalueret på det – og hvorfor det nu var dér. Det er også sådan en god ting – og: "hvor føler du dig mest tilpas?"

Appendix 1.4. Parking norm, Aalborg City Center.

jf. http://www.aalborgkommuneplan.dk/bilag/bilag-f0.aspx

The complex is calculated as a day institution, thus needing 2 parking spaces pr. 20 institution spots. Therefore, with 11 patient spaces in the complex, it is not needed to create more parking spaces than already exists on site.

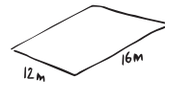


Appendix 1.5. Dimensioning of structural elements

Dimensioning of beams, cassette structure

For this dimensioning, we look at the roof as a cassette roof. The beams will thus all have the same dimensions which are calculated in the following.

We look at a section area of 12 m x 16 m. See drawing.



Information of beams:

Glulam wood, Gl32c
Utilization class: 1
Moisture class: I
Consequence class: CC2

We start off by guessing a dimension of their section, **300 x 115 mm.**

First we must calculate the load of the roof.

We calculate the load of the roof structure via the mass formula:

$m = \rho \cdot V$

in which

ρ = density of material
V = volume of element

1) Insulation:

ρ = 30 kg/m3 jf. rockwool.dk; BD60 Flexibatts.

$V = 0.5 \cdot 6 \cdot 4$

$V = 12.0$ **(1)**

$m = 30 \cdot 12$

$m = 360$ **(2)**

Which is a mass of 360 kg pr. batt.

We have a total of 8 batts.

n = 8

$M\_all\_batts = 8 \cdot 360$

$M\_all\_batts = 2880$ **(3)**

In total: 2880 kg.

2) Joists, C14:

ρ = 350kg/m3

$V = 0.2 \cdot 0.03 \cdot 12$

$V = 0.072$ **(4)**

$m = 350 \cdot 0.072$

$m = 25.200$ **(5)**

Which is a mass of 25.2 kg pr. joist.

We have a total of 53 joists.

$Mass\ total = 53 \cdot 25.2$

$Mass\ total = 1335.6$ **(6)**

In total: 1335.6 kg.

3) Zinc Cladding:

$\rho = \frac{7200\ kg}{m3}$

V= 16·12·0.0005

0.0960

$m = 7200 \cdot 0.096$

$m = 691.200$ **(8)**

In total: A mass of 691.2 kg.

4) Wooden sheet:

$\rho = \frac{600\ kg}{m3}$

$\rho = \frac{600\ kg}{m3}$

$V = 16 \cdot 12 \cdot 0.02$

$V = 3.84$

$m = 600 \cdot 3.84$

$m = 2304.00$ **(11)**

In total: A mass of 2304 kg.

$Total\ mass = 2880\ kg + 1335.6\ kg + 691.2\ kg + 2304\ kg$

$Total\ mass = 7210.8\ kg$ **(12)**

TOTAL KG OF ROOF: 7210 kg.

We calculate surface load from the mass of the roof.

$q = \frac{M}{A} \cdot g$

$q = \frac{7210}{(16 \cdot 12)} \cdot 9.82$

$q = 368.7614583$ **(13)**

Which is a surface load of 0.368 kN/m2.

We also calculate the single load of the roof.

$Q = m \cdot g$

$Q = m\ g$ **(14)**

$Q = 7210 \cdot 9.82$

$Q = 70802.20$ **(15)**

$Single\ load\ roof = 70802.2 \cdot 10^{-3}$

$Single\ load\ roof = 70.80220000$ **(16)**

Which is a single load of 70.8 kN.

Dimensioning of beams - guess: 300 x 115 mm.

We calculate the self load of this type of beam via:

$G = \frac{\rho_{wood} \cdot b \cdot h \cdot g}{l_{cc}}$

in which

G = Self load of beams, kN/m^2

ρwood = density of glulam, kg/m^3, here: 480 kg/m^3
w = width of beam, m
h = height of beam, m
g = acceleration of gravity, m/s^2
l_{cc} = center line distance between beams

$\left(\frac{480 \cdot 0.115 \cdot 0.3 \cdot 9.82}{6} \cdot 10^{-3}\right)$

0.02710320000 **(17)**

Which is a self load of 0.0271 kN/m2.

Snow load

Snow load is determined from the general form:

$s = \mu i \cdot Ce \cdot Ct \cdot s_k$

$$s = \mu i\ Ce\ Ct\ s_k \quad \textbf{(18)}$$

in which

s = snow factor
μi = form factor for snow load, kN/m^2
C_e = exposure factor
C_t = thermal factor
s_k = terrain value of snow, on site

Because the roof is flat, μi is 0.8.

Because of the secluded location of the site in a forest area, the factor of exposure is set to 1.2 (screened)
.

Because thermal conditions are assessed of not reducing the snow load, C_t is set to 1.

Terrain value is determined as:

$S_k = C_{\dot{a}rs} * S_{k\,0} = 1 \cdot 0.9\ \text{kN/m}^2 = 0.9$ jf. Danske Normregler for Snelast, DS410.

$s = 0.8 \cdot 1.2 \cdot 1 \cdot 0.9$

$$s = 0.864 \quad \textbf{(19)}$$

Which is a snow load of: **0.864 kN/m2.**

Wind load

We want to calculate the characteristic wind load for the construction parts.

The characteristic wind load, F_w, is calculated via:

$F_w = c \cdot A \cdot q_{\max}$

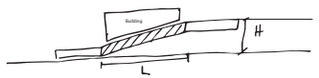
in which

c = form factor for construction parts; here outer walls and roof. c = cpe, cpi eller c=cf, which is exterior and interior values, respectively.
A = the area of the construction part we're looking at.

$q_{\max}$= characteristic maximum velocity pressure.

First, $q_{\max}$ can be calculated via:

$q_{\max} = \left(1 + 2 \cdot k_p \cdot I_v(z)\right) \cdot q_m(z)$



in which

k_p = peak factor, here 3.5
$I_v(z)$ = turbulence intensity, defined by $\frac{1}{c_t(z)} \cdot \frac{1}{\ln\left(\frac{z}{z_0}\right)}$, in which $c_t(z)$ er the topography factor. z is the height of the building above terrain. z_0 is roughness length in m; depending on which terrain category we're looking at. Here 0.3 m.
$q_m(z)$ = 10-minute medium velocity pressure, given by $c_r^2(z) \cdot c_t^2(z) \cdot q_b$, in which $c_r(z)$ er roughness factor - defined by $c_r(z) = k_t \cdot \ln\left(\frac{z}{z_0}\right)$; c_t er topography factor; and q_b er basis velocity pressure.

In order to calculate $q_{\max}$, we need to go through several subcalculations.

First we calculate $I_v(z)$, which is the turbulence intensity in a height z above terrain.
To calculate the turbulence intensity, we first need to know the topography factor, c_t. We find this by looking at the site and its sloping. (See drawing.)

$c_t(z) = 1 + 2 \cdot \left(\frac{H}{L}\right)$
H = ca. 7 m
L = ca. 90 m

$c_t(z) = 1 + 2 \cdot \left(\frac{7}{90}\right)$

$$c_t(z) = \frac{52}{45} \quad \textbf{(20)}$$

at 5 digits

$$c_t(z) = 1.1556 \quad \textbf{(21)}$$

$I_v(z) = \frac{1}{1.15} \cdot \frac{1}{\ln\left(\frac{10}{0.3}\right)}$

$$I_v(z) = 0.2479825638 \quad \textbf{(22)}$$

We can now move on and calculate the 10-minute average velocity pressure, $q_m(z)$, *given* by $c_r^2(z) \cdot c_t^2(z) \cdot q_b$.

1) To do this, the roughness factor must be calculated, $c_r(z)$.

$c_r(z) = 0.22 \cdot \ln\left(\frac{10}{0.3}\right)$

$$0.7714427373 \quad \textbf{(23)}$$

Because we're working with terrain category III.

2) Now we need to calculate q_b, the basis velocity pressure..

$q_b = \frac{1}{2} \cdot \rho_{luft} \cdot v_b^2$

ρ = air density at 10 degrees C = 1.25 kg/m^3

$v_b = c_{dir} \cdot c_{\dot{a}rs} \cdot v_{b,\,0}$

in which

c_{dir} = directional factor for wind speed. On the safe side, we use the value 1, an average of all the direction factors.
$c_{\dot{a}rs}$ = the year factor for wind speed. For permanent constructions we use the value 1.
$v_{b,\,0}$ = base value for basis wind velocity, 24 m/s.

$v_b = 1 \cdot 1 \cdot 24\ ms$

$$v_b = 24\ ms \quad \textbf{(24)}$$

3) Now the basis velocity pressure can be calculated:

$q_b = \frac{1}{2} \cdot 1.25\ kgm^3 \cdot 24^2\ ms$

$$q_b = 360.0000000\ kgm^3\ ms$$

Which is the same as: 360 N/m^2 = 0.36 *kN/m^2*

Now we have the sufficient amount of data to calculate **10-minute average velocity pressure.**

$q_m(z) = 0.771^2 \cdot 1.15^2 \cdot 0.36$

$$q_m(z) = 0.2830133601 \quad \textbf{(26)}$$

Which is an average velocity pressure of 0.28 kN/m^2.

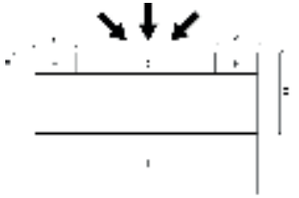
Finally, we have the sufficient amount of data to calculate $q_{\max}$, *the maximum velocity pressure.*

$q_{\max} = (1 + 2 \cdot 3.5 \cdot 0.247) \cdot 0.283$

$$q_{\max} = 0.7723070 \quad \textbf{(27)}$$

Which is a maximum velocity pressure of 0.772 kN/m^2.

Wind load, roof:



$x = \frac{e}{10}$; $y = \frac{e}{4}$; $z = \frac{e}{2}$

h = building height, here app. 10 m
z_e = h
e = the smallest value of either b or 2h. Which means we use 2h = 20 m.

Form factors for buildings with flat roofing.

We calculate with the highest, thus most critical, form factor of the roof, 0.2.

$Fw = qmax \cdot cd \cdot cf$

$$Fw = qmax\ cd\ cf \quad \textbf{(28)}$$

$Fw = 0.772 \cdot 1 \cdot 0.2$

$$Fw = 0.1544 \quad \textbf{(29)}$$

Wind load on roof = 0.1544 kN/m2.

Loads to combine:

Permanent load: 0.0271 kN/m2 (beam) + 0.368 kN/m2 (roof) = 0.3951 kN/m2
Snow load: 0.864 kN/m2
Wind load: 0.1544 kN/m2

Load combinations

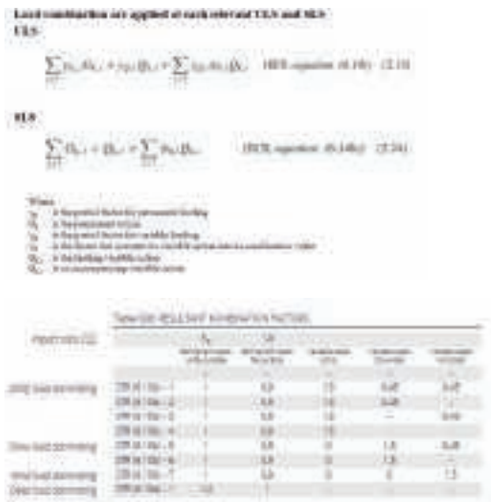
We will now make load combinations in three seperate cases to find out which one we will dimension for (the most critical one).

1) In which the permanent load is dominant.
2) In which snow load is dominant.
3) In which wind load is dominant.

We do not look at utility loads.

We look at the general load combination in ULS, given with:

$$\sum \gamma_{G,j} \cdot G_{k,j} + \gamma_{Q,1} Q_{k,1} + \sum \gamma_{Q,i} \cdot \psi_{0,i} \cdot Q_{k,i}$$



1) Permanent load is dominant.

$$(1 \cdot 1.2 \cdot 0.3951) + 0.154 + 0.864$$

$$1.49212 \qquad \textbf{(30)}$$

Which is 1.49 *kNm2.*

2) Snow is dominant.

$$(1 \cdot 0.3951) + (1.5 \cdot 0.864) + (1.5 \cdot 0.3)$$

$$2.1411 \qquad \textbf{(31)}$$

Which is 2.14 *kNm2.*

3) Wind is dominant.

$$(1 \cdot 0.3951) + (1.5 \cdot 0.154)$$

$$0.6261 \qquad \textbf{(32)}$$

Which is 0.62 *kNm2.*

From these load combinations, we can conclude that the most critical load is **snow load**. This is the one we dimension for.

Dimensioning: Examining the sufficiency of the beams - ULS. 300 x 115 mm.

Q is calculated:

$$Q = 2.1411 \cdot 6$$

$$Q = 12.8466$$

The largest moment is calculated via formula:

$$M = \frac{1}{8} q L^2$$

$$M = \frac{1}{8} \cdot 12.84 \cdot 6^2$$

$$57.78000000$$

We now calculate moment of resistance:

$$W = \frac{1}{6} b \cdot h^2$$

$$W = \frac{1}{6} b\, h^2$$

$$W = \frac{1}{6} \cdot 0.115 \cdot 0.3^2$$

$$W = 0.001725000000 \qquad \textbf{(36)}$$

We now examine the ultimate limit state, ULS.

The beam needs to satisfy:

$$f_{m,d} > \sigma_{m,d}$$

in which

$f_{m,d}$ is calculative strength, for bending, for glulam wood, Gl32c. From Teknisk Ståbi p. 305, table 7.2b.

$f_{m,d}$ =22.2 (Short-time loads, here snow, which we dimension for; K. Page 205 in Teknisk Ståbi under "GL32c, K")

$\sigma_{m,d}$ is the tension, $\frac{M}{W}$

in which

$$M = \frac{1}{8} q L^2$$

$$W = \frac{1}{6} b h^2$$

We calculate the tension.

$$\sigma_{m,d} = \frac{\frac{1}{8} \cdot 12.8466 \cdot 6^2}{\frac{1}{6} \cdot 0.115 \cdot 0.3^2} \cdot 10^{-3}$$

$$\sigma_{m,d} = 33.51286957 \qquad \textbf{(37)}$$

The tension is insufficient, because:

22.2 MPa > 33.51 **Insufficient.**

We need to try a larger section, here a 500 x 90 mm section.

Self loads are again calculated with:

$$G = \frac{\rho_{wood} \cdot b \cdot h \cdot g}{l_{cc}}$$

$$\left(\frac{480 \cdot 0.09 \cdot 0.5 \cdot 9.82}{6} \cdot 10^{-3} \right)$$

$$0.03535200000 \qquad \textbf{(38)}$$

Which is 0.0353 kN/m2.

Self load and roof load:

$0.0333 + 0.368$

$$0.4033 \quad (39)$$

Now we need to make a new load combination for snow to get the new load.

Snow dominance.

$(1 \cdot 0.4033) + (1.5 \cdot 0.864) + (1.5 \cdot 0.3)$

$$2.1493 \quad (40)$$

Which is 2.14 *kNm2.*

This is the value we dimension for.

We repeat the method.

$Q = 2.1493 \cdot 6$

$$Q = 12.8958 \quad (41)$$

We now examine the ultimate limit state.

The beam needs to satisfy:

$f_{m,d} > \sigma_{m,d}$

We calculate the tension.

$$\sigma_{m,d} = \frac{\frac{1}{8} \cdot 12.89 \cdot 6^2}{\frac{1}{6} \cdot 0.09 \cdot 0.5^2} \cdot 10^{-3}$$

$$\sigma_{m,d} = 15.46800000 \quad (42)$$

Sufficient, because:

22.2 > 15.4

Utilization degree:

$\frac{15.46}{22.2}$

$$0.6963963964 \quad (43)$$

Which is a utilization degree of 69 %.

Column dimensioning: Ø150. When beams above have the dimensions 500 x 90 mm.

We dimension the columns so that they have the same size everywhere in the building, thus working with a column length of 7600 mm, the highest point it needs to reach.
The first tests are with a circular section. The later tests are with a flat oval section; calculated as a rectangular section.

We need to show the following in order to see if the calculative column strength is larger than the load we put onto it.

$R_d \geq E_d \Rightarrow k_s \cdot A \cdot f_c \geq E_d$

$$E_d \leq R_d \Rightarrow E_d \leq k_s A f_c \quad (44)$$

$G_{selfload\_beams\_roof} = 0.4033$

$$G_{selfload\_beams\_roof} = 0.4033 \quad (45)$$

$Snowload = 0.864$

$$Snowload = 0.864 \quad (46)$$

$Area\_of\_load = 6 \cdot 4$

$$Area\_of\_load = 24 \quad (47)$$

$G\_point\ load\ self = 0.4033 \cdot 24$

$$G\_point\ load\ self = 9.6792 \quad (48)$$

$G\_point\ load\ snow = 0.864 \cdot 24$

$$G\_point\ load\ snow = 20.736 \quad (49)$$

ULS. The calculative load on column:

$E_d = 1.0 \cdot 9.6792 + 1.5 \cdot 20.736$

$$E_d = 40.78320 \quad (50)$$

Calculative column strength:

$R_d = k_s \cdot A \cdot f_c$

$$R_d = k_s A f_c \quad (51)$$

$Ø = 150\ mm$

$$Ø = 150\ mm \quad (52)$$

$A = \pi \cdot 75^2$

$$A = 5625\ \pi \quad (53)$$

at 5 digits →

$$A = 17672. \quad (54)$$

$ls = 3500\ mm$

$$ls = 3500\ mm \quad (55)$$

$I_{circular} = \frac{1}{4} \cdot \pi \cdot 75^4$

$$I_{circular} = \frac{31640625}{4}\ \pi \quad (56)$$

at 5 digits →

$$I_{circular} = 2.4851\ 10^7 \quad (57)$$

$i = \sqrt{\frac{2.4851 \cdot 10^7}{17672}}$

$$i = 37.49981137 \quad (58)$$

$\lambda = \frac{ls}{i}$

$$\lambda = \frac{ls}{i} \quad (59)$$

$\lambda = \frac{3500}{37.499}$

$$\lambda = 93.33582229 \quad (60)$$

$ks = 0.28$

$$ks = 0.23 \quad (61)$$

$R_d = 0.2 \cdot 17672 \cdot 12.0$

$$R_d = 42412.80 \quad (62)$$

Which equals 29.452 kN.

$R_d \geq E_d$ is exactly fulfilled, because 42.4 kN ≥ 40.7 kN.

COLUMN DIMENSION: Ø225 IF LENGTH OF COLUMN IS 7.6 m

We try a slight overdimensioning.
We need to show the following to see if calculative column strength is larger than the load we put onto it.

$R_d \geq E_d \Rightarrow k_s \cdot A \cdot f_c \geq E_d$

$$E_d \leq R_d \Rightarrow E_d \leq k_s A f_c \quad (63)$$

$G_{selfload\_beams\_roof} = 0.4033$

$$G_{selfload\_beams\_roof} = 0.4033 \quad (64)$$

$Snowload = 0.864$

$$Snowload = 0.864 \quad (65)$$

$Area\_of\_load = 6 \cdot 4$

$$Area\_of\_load = 24 \quad (66)$$

$G\_point\ load\ self = 0.4033 \cdot 24$

$$G\_point\ load\ self = 9.6792 \quad (67)$$

$G\_point\ load\ snow = 0.864 \cdot 24$

$$G\_point\ load\ snow = 20.736 \quad (68)$$

ULS. The calculative load on column:

$E_d = 1.0 \cdot 9.6792 + 1.5 \cdot 20.736$

$$E_d = 40.78320 \quad (69)$$

Calculative column strength:

$R_d = k_s \cdot A \cdot f_c$

$$R_d = k_s A f_c \quad (70)$$

$Ø = 225\ mm$

$$Ø = 250\ mm \quad (71)$$

$A = \pi \cdot 112.5^2$

$$A = 12656.25\ \pi \quad (72)$$

at 5 digits →

$$A = 39760. \quad (73)$$

$ls = 7600\ mm$

$$ls = 7600\ mm \quad (74)$$

$I_{circular} = \frac{1}{4} \cdot \pi \cdot 112.5^4$

$$I_{circular} = 4.004516602\ 10^7\ \pi \quad (75)$$

at 5 digits →

$$I_{circular} = 1.2581\ 10^8 \quad (76)$$

$i = \sqrt{\frac{1.2581 \cdot 10^8}{39760}}$

$$i = 56.25153697 \quad (77)$$

$\lambda = \frac{ls}{i}$

$$\lambda = \frac{ls}{i} \quad (78)$$

which equals 60.7 kN.

$R_d \geq E_d$ is fulfilled, because 61 kN ≥ 40.7 kN.

Column dimensioning, rectangular (flat oval), test dimension: 400x140 - which is the size we would like to aim for. When beams above are 500 x 90 mm.

We need to show the following to see if calculative column strength is larger than the load we put onto it.

$R_d \geq E_d \Rightarrow k_s \cdot A \cdot f_c \geq E_d$

$$E_d \leq R_d \Rightarrow E_d \leq k_s A f_c \quad (82)$$

$G_{selfload\_beams\_roof} = 0.4033$

$$G_{selfload\_beams\_roof} = 0.4033 \quad (83)$$

$Snowload = 0.864$

We need to show the following to see if calculative column strength is larger than the load we put onto it.

$R_d \geq E_d \Rightarrow k_s \cdot A \cdot f_c \geq E_d$

$$E_d \leq R_d \Rightarrow E_d \leq k_s A f_c \quad (102)$$

$G_{selfload\_beams\_roof} = 0.4033$

$$G_{selfload\_beams\_roof} = 0.4033 \quad (103)$$

$Snowload = 0.864$

$$Snowload = 0.864 \quad (104)$$

$Area\_of\_load = 6 \cdot 4$

$$Area\_of\_load = 24 \quad (105)$$

$G\_point\ load\ self = 0.4033 \cdot 24$

$$G\_point\ load\ self = 9.6792 \quad (106)$$

$G\_point\ load\ snow = 0.864 \cdot 24$

$$G\_point\ load\ snow = 20.736 \quad (107)$$

ULS. The calculative load on column:

$E_d = 1.0 \cdot 9.6792 + 1.5 \cdot 20.736$

$$E_d = 40.78320 \quad (88)$$

Calculative column strength:

$R_d = k_s \cdot A \cdot f_c$

$$R_d = k_s A f_c \quad (89)$$

$Dimensions\_400x140$

$$Dimensions\_400x140 \quad (90)$$

$A = 400 \cdot 140$

$$A = 56000 \quad (91)$$

$ls = 7600\ mm$

$$ls = 7600\ mm \quad (92)$$

$I_{rectangular} = \frac{1}{12} \cdot b \cdot h^3$

$$I_{rectangular} = \frac{1}{12}\ b\ h^3 \quad (93)$$

$I = \frac{1}{12} \cdot 140 \cdot 400^3$

$$I = \frac{2240000000}{3} \quad (94)$$

at 5 digits →

$$1.\ I = 7.4667\ 10^8 \quad (95)$$

$i = \sqrt{\frac{7.4667\ 10^8}{56000}}$

$$i = 115.4703116 \quad (96)$$

$\lambda = \frac{ls}{i}$

$$\lambda = \frac{ls}{i} \quad (97)$$

$\lambda = \frac{7600}{115.47}$

$$\lambda = 65.81796138 \quad (98)$$

$ks = 0.48$

$$ks = 0.48 \quad (99)$$

$R_d = 0.48 \cdot 56000 \cdot 12.0$

$$R_d = 3.22560000\ 10^5 \quad (100)$$

$(3.2256 \cdot 10^5) \cdot 10^{-3}$

$$322.5600000 \quad (101)$$

Which equals 322 kN.

$R_d \geq E_d$ is very much fulfilled, because 322.5 kN ≥ 40.7 kN.

As this column is overdimensioned, we would like to calculate what the actual size of the column would be. We try with a section of 233 x 90 mm.

Column dimensioning, rectangular (flat oval), test dimension: 233x90. When beams above are 500 x 90 mm.

We need to show the following to see if calculative column strength is larger than the load we put onto it.

$R_d \geq E_d \Rightarrow k_s \cdot A \cdot f_c \geq E_d$

$$E_d \leq R_d \Rightarrow E_d \leq k_s A f_c \quad (102)$$

$G_{selfload\_beams\_roof} = 0.4033$

$$G_{selfload\_beams\_roof} = 0.4033 \quad (103)$$

$Snowload = 0.864$

$$Snowload = 0.864 \quad (104)$$

$Area\_of\_load = 6 \cdot 4$

$$Area\_of\_load = 24 \quad (105)$$

$G\_point\ load\ self = 0.4033 \cdot 24$

$$G\_point\ load\ self = 9.6792 \quad (106)$$

$G\_point\ load\ snow = 0.864 \cdot 24$

$$G\_point\ load\ snow = 20.736 \quad (107)$$

ULS. The calculative load on column:

$E_d = 1.0 \cdot 9.6792 + 1.5 \cdot 20.736$

$$E_d = 40.78320 \quad (108)$$

Calculative column strength:

$R_d = k_s \cdot A \cdot f_c$

$$R_d = k_s A f_c \quad (109)$$

$Dimensions\_233x90$

$$Dimensions\_233x90 \quad (110)$$

$A = 233 \cdot 90$

$$A = 20970 \quad (111)$$

$ls = 7600\ mm$

$$ls = 7600\ mm \quad (112)$$

$I_{rectangular} = \frac{1}{12} \cdot b \cdot h^3$

$$I_{rectangular} = \frac{1}{12}\ b\ h^3 \quad (113)$$

$I = \frac{1}{12} \cdot 90 \cdot 233^3$

$$I = \frac{189740055}{2} \quad (114)$$

at 5 digits →

$$1.\ I = 9.4870\ 10^7 \quad (115)$$

$i = \sqrt{\frac{9.4870\ 10^7}{20970}}$

$$i = 67.26129661 \quad (116)$$

$\lambda = \frac{ls}{i}$

$$\lambda = \frac{ls}{i} \quad (117)$$

$\lambda = \frac{7600}{67.261}$

$$\lambda = 112.9926703 \quad (118)$$

$ks = 0.2$

$$ks = 0.2 \quad (119)$$

$R_d = 0.2 \cdot 20970 \cdot 12.0$

$$R_d = 50328.00 \quad (120)$$

Which equals 50.328 kN. This means that this column is the one that would actually be required. We, however, want it to be a bit overdimensioned. (Look at 400 x 140 test above).

$R_d \geq E_d$ is fulfilled, because 50.3 kN ≥ 40.7 kN.

Dimensioning of purlins (åse). Test with 2 x 4". Equals 50.8mm x 101.6mm.

The purlin a span of 4 m. They lie with a distance of 0.5 m. It is constructed of Glulam, gl32c.

$Self\_load\_purlin = \frac{480 \cdot 0.0508 \cdot 0.1016 \cdot 9.82}{0.5} \cdot 10^{-3}$

$$Self\_load\_purlin = 0.04865641882 \quad (121)$$

Which is 0.04865 kN/m2.

The purlin still needs to carry the roof load. The roof load is 0.368 kN/m2. We add the two together.

Self load and roof load:

$0.04865 + 0.368$

$$0.41665 \quad \textbf{(122)}$$

Now we need to make a new load combination for snow load to get the new load to dimension for.

Snow dominance.

$(1 \cdot 0.416) + (1.5 \cdot 0.864) + (1.5 \cdot 0.3)$

$$2.1620 \quad \textbf{(123)}$$

Which is 2.16 *kNm2.*

This is the value we dimension for.

We repeat the method.

$Q = 2.162 \cdot 0.5$

$$Q = 1.0810 \quad \textbf{(124)}$$

We now examine the ultimate limit state.

The beam needs to satisfy:

$f_{m,\,d} > \sigma_{m,\,d}$

We calculate the tension.

$$\sigma_{m,\,d} = \frac{\frac{1}{8} \cdot 1.081 \cdot 4^2}{\frac{1}{6} \cdot 0.0508 \cdot 0.1016^2} \cdot 10^{-3}$$

$$\sigma_{m,\,d} = 24.73750026 \quad \textbf{(125)}$$

It is exactly insufficient, because

22.2 > 24.73 FALSE.

Dimensioning of middle small beams (åse). Test with 63 mm x 100mm.

The purlin has a span of 4 m. It is constructed of Glulam.

$$Self\_load\_purlin = \frac{480 \cdot 0.063 \cdot 0.1 \cdot 9.82}{0.5} \cdot 10^{-3}$$

$$Self\_load\_purlin = 0.05939136000 \quad \textbf{(126)}$$

Which is 0.0593 kN/m2.

The purlin still needs to carry the roof load. The roof load is 0.368 kN/m2. We add the two together.

Self load and roof load:

$0.0593 + 0.368$

$$0.4273 \quad \textbf{(127)}$$

Now we need to make a new load combination for snow load to get the new load to dimension for.

Snow dominance.

$(1 \cdot 0.4273) + (1.5 \cdot 0.864) + (1.5 \cdot 0.3)$

$$2.1733 \quad \textbf{(128)}$$

Which is 2.17 *kNm2.*

This is the value we dimension for.

We repeat the method.

$Q = 2.1733 \cdot 0.5$

$$Q = 1.08665 \quad \textbf{(129)}$$

We now examine the ultimate limit state.

The beam needs to satisfy:

$f_{m,\,d} > \sigma_{m,\,d}$

We calculate the tension.

$$\sigma_{m,\,d} = \frac{\frac{1}{8} \cdot 1.086 \cdot 4^2}{\frac{1}{6} \cdot 0.063 \cdot 0.1^2} \cdot 10^{-3}$$

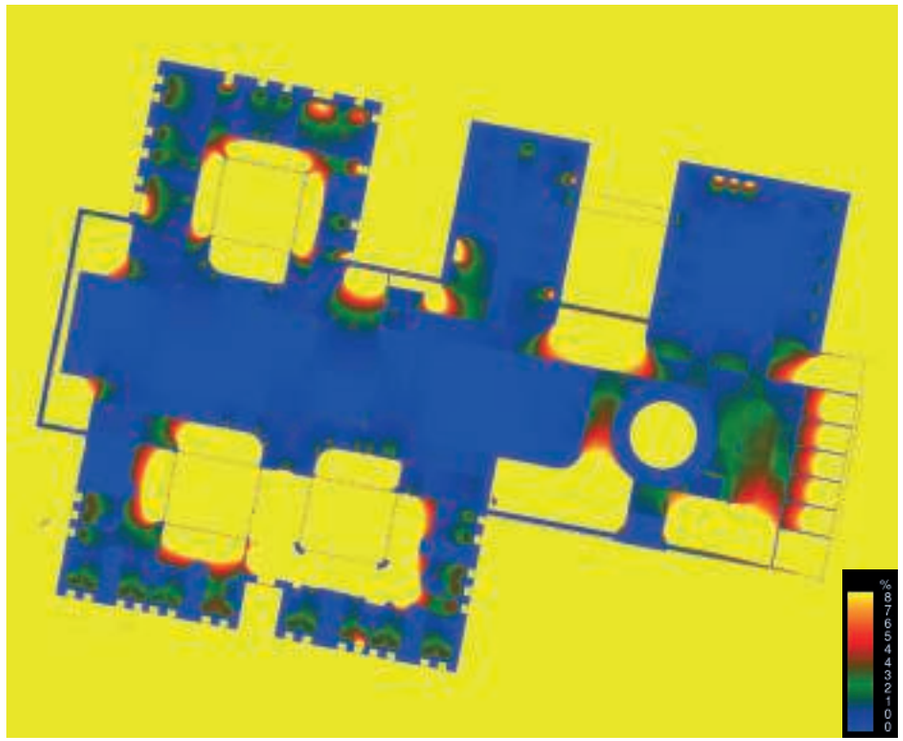
$$\sigma_{m,\,d} = 20.68571429 \quad \textbf{(130)}$$

It is exactly sufficient, because

22.2 > 20.68 TRUE.

APPENDIX 1.6.
Design process of different building shapes and their energy consumptions

Initial iteration
Hospitalization and Ambulatory Level



Energy Frame

Nøgletal, kWh/m² år

Renoveringsklasse 2

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
135,8	0,0	135,8
Samlet energibehov		7,3

Renoveringsklasse 1

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
71,7	0,0	71,7
Samlet energibehov		7,3

Energiramme BR 2015

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
41,3	0,0	41,3
Samlet energibehov		7,3

Energiramme Byggeri 2020

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
25,0	0,0	25,0
Samlet energibehov		5,3

Bidrag til energibehovet

Varme	0,0
El til bygningsdrift	2,9
Overtemp. i rum	0,0

Netto behov

Rumopvarmning	0,0
Varmt brugsvand	0,0
Køling	0,0

Udvalgte elbehov

Belysning	2,9
Opvarmning af rum	0,0
Opvarmning af vbv	0,0
Varmepumpe	0,0
Ventilatorer	0,0
Pumper	0,0
Køling	0,0
Totalt elforbrug	55,5

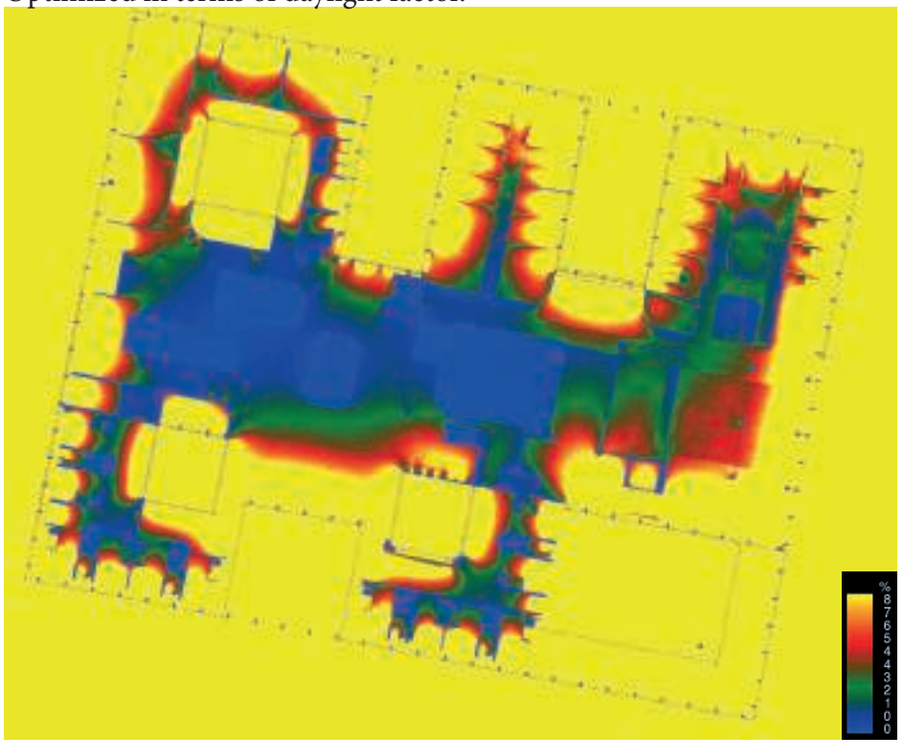
Varmetab fra installationer

Rumopvarmning	0,0
Varmt brugsvand	0,0

Ydelse fra særlige kilder

Solvarme	0,0
Varmepumpe	0,0
Solceller	0,0
Vindmøller	0,0

Second iteration
Hospitalization and Ambulatory Level
Optimized in terms of daylight factor.



Energy Frame

Nøgletal, kWh/m² år

Renoveringsklasse 2

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
135,8	0,0	135,8
Samlet energibehov		54,6

Renoveringsklasse 1

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
71,7	0,0	71,7
Samlet energibehov		54,6

Energiramme BR 2015

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
41,3	0,0	41,3
Samlet energibehov		48,6

Energiramme Byggeri 2020

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
25,0	0,0	25,0
Samlet energibehov		40,6

Bidrag til energibehovet

Varme	30,0
El til bygningsdrift	2,9
Overtemp. i rum	17,3

Netto behov

Rumopvarmning	30,0
Varmt brugsvand	0,0
Køling	0,0

Udvalgte elbehov

Belysning	2,9
Opvarmning af rum	0,0
Opvarmning af vbv	0,0
Varmepumpe	0,0
Ventilatorer	0,0
Pumper	0,0
Køling	0,0
Totalt elforbrug	55,5

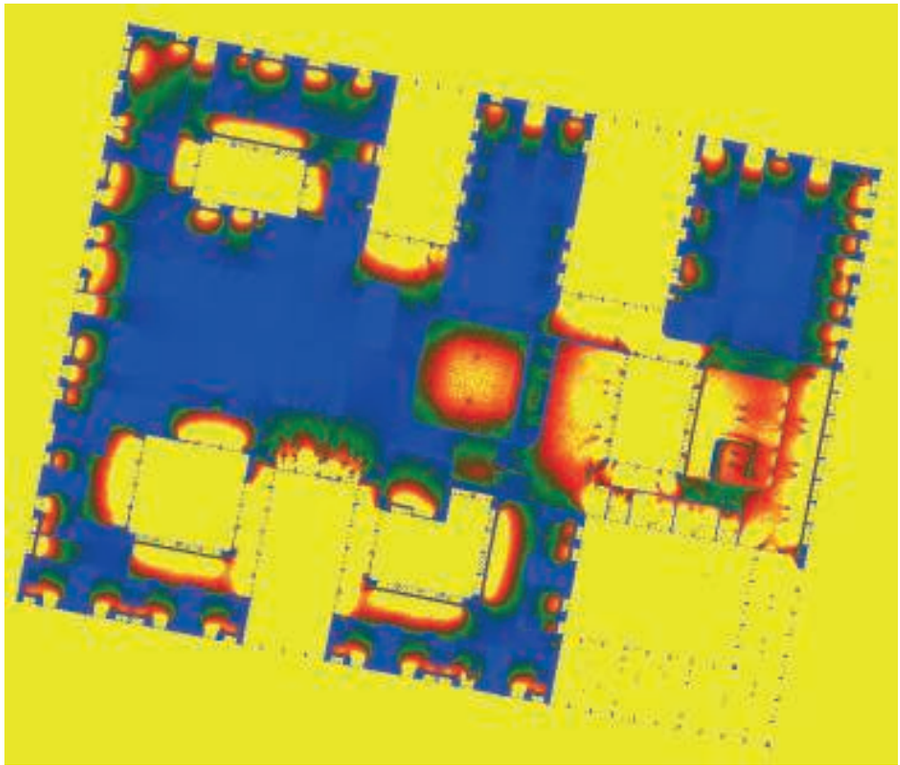
Varmetab fra installationer

Rumopvarmning	0,0
Varmt brugsvand	0,0

Ydelse fra særlige kilder

Solvarme	0,0
Varmepumpe	0,0
Solceller	0,0
Vindmøller	0,0

Final proposal.
Hospitalization and Ambulatory Level
Concept - Optimized according to Energy and light.



Energy Frame for the final proposal.

Nøgletal, kWh/m² år

Renoveringsklasse 2

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
135,8	0,0	135,8
Samlet energibehov		10,3

Renoveringsklasse 1

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
71,7	0,0	71,7
Samlet energibehov		10,3

Energiramme BR 2015

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
41,3	0,0	41,3
Samlet energibehov		9,7

Energiramme Byggeri 2020

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
25,0	0,0	25,0
Samlet energibehov		7,1

Bidrag til energibehovet

Varme	3,0
El til bygningsdrift	2,9
Overtemp. i rum	0,0

Netto behov

Rumopvarmning	3,0
Varmt brugsvand	0,0
Køling	0,0

Udvalgte elbehov

Belysning	2,9
Opvarmning af rum	0,0
Opvarmning af vbv	0,0
Varmepumpe	0,0
Ventilatorer	0,0
Pumper	0,0
Køling	0,0
Totalt elforbrug	55,5

Varmetab fra installationer

Rumopvarmning	0,0
Varmt brugsvand	0,0

Ydelse fra særlige kilder

Solvarme	0,0
Varmepumpe	0,0
Solceller	0,0
Vindmøller	0,0

APPENDIX 1.7.

Link to psychiatry competition programs, Ballerup, Odense and Sct. Hans.

https://www.dropbox.com/sh/wtrncfqlyqkerpj/AACW4ENvfO8YJngrLbKvKu9Ca?dl=0

APPENDIX 1.8.

Key numbers in Danish psychiatry, youth under 19 years of age. Number of hospitalizations and outpatient visits, from 2009-2015.

Accessed via: http://sundhedsdatastyrelsen.dk/-/media/sds/filer/find-tal-og-analyser/sundhedsvaesnet/noegletal-sundhedsvaesen/noegletal-sundhedsvaesenet.pdf?la=da

Tabel 7. Børn og unge patienter (under 19 år) og kontakter, psykiatrisk sygehusvæsen, 2009-15, hele landet

	2009	2010	2011	2012	2013	2014	2015
Indlæggelser							
Antal patienter indlagt	1.491	1.519	1.463	1.653	1.644	1.695	1.752
Antal indlæggelser	2.052	2.066	2.134	2.311	2.465	2.664	3.007
Gns. antal indlæggelser for patienter indlagt på psykiatriske afdelinger	1,4	1,4	1,5	1,4	1,5	1,6	1,7
Indlæggelser pr. 1.000 borgere	2	2	2	2	2	2	2
Ambulante besøg (inkl. skadestuebesøg og akut ambulante besøg)							
Antal patienter med ambulante besøg	20.507	23.104	25.107	26.852	28.597	31.839	33.787
Antal ambulante besøg	108.964	121.030	133.791	149.769	162.410	180.508	191.193
Gns. antal ambulante besøg for patienter med ambulante besøg i psykiatrisk sygehusvæsen	5,3	5,2	5,3	5,6	5,7	5,7	5,7
Besøg pr. 1000 borgere	85	94	104	118	129	145	154
Kontakter og patienter i psykiatrisk sygehusvæsen, i alt							
Antal patienter, i alt	**20.686**	**23.267**	**25.248**	**26.971**	**28.691**	**31.939**	**33.851**
Antal kontakter , i alt	**111.016**	**123.096**	**135.925**	**152.080**	**164.875**	**183.172**	**194.200**
Gns. antal kontakter pr. patient i kontakt med psykiatrisk sygehusvæsen	**5,4**	**5,3**	**5,4**	**5,6**	**5,7**	**5,7**	**5,7**
Kontakter pr. 1.000 borgere	**87**	**96**	**106**	**120**	**131**	**147**	**157**

Kilde: Landspatientregisteret (DRG-grupperet) og CPR-registeret, Sundhedsdatastyrelsen.
Anmærkninger:
- Tabellen omfatter kontakter for patienter behandlet på offentlige sygehuse samt offentligt betalt behandling på private sygehuse.
- En indlæggelse tælles som en patients udskrivning fra en psykiatrisk afdeling, hvor patienten optager en normeret sengeplads. Overflytninger mellem sygehusafdelinger tæller ikke med som en selvstændig indlæggelse i opgørelsen. Ved ambulant behandling er patienten indskrevet på en ambulant stamafdeling, men optager ikke en normeret sengeplads. Ambulante besøg opgøres som en ambulant patients fremmøde på den psykiatriske ambulante afdeling eller patientens møde med sundhedsfagligt personale uden for sygehuset, i et såkaldt udebesøg. Der opgøres kun ét ambulant besøg per dag per afdeling. Skadestuekontakt og akut ambulant kontakt indgår under ambulante besøg.
- Patienter er antallet af unikke patienter, som har været i kontakt med sundhedsvæsenet en eller flere gange i løbet af året. Når der tælles unikke patienter, er der tale om unikke patienter inden for de kategorier, der er opstillet i denne tabel, og tallene kan derfor ikke genfindes præcist på tværs af tabellerne.
- For yderligere forklaring vedrørende kilder, metode mv. se afsnittet "Dokumentation".
- På grund af justeret afgrænsning og/eller definition kan tallene for perioden 2009 til 2014 være ændrede i forhold til "Udvalgte nøgletal for det regionale sundhedsvæsen 2009-2014" offentliggjort i 2015. Se uddybning i afsnittet "Ændringsbilag".

APPENDIX 1.9.
Cadastral map of the site and its surroundings.
The site is marked in dark grey.