BLIND TRUST

Exploring how non-visual senses can be used in architectural design

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BLIND TRUST

EXPLORING HOW NON-VISUAL SENSES CAN BE USED IN ARCHITECTURAL DESIGN

CHALMERS

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KEY WORDS

Senses
Non-visual design
Accessibility
Haptic design

"To design for all the senses: start with a blindfold."

Bruce Mau

ABSTRACT

"*Vision separates us from the world whereas the other senses unites us with it.*"

(Juhani Pallasmaa, 2012, p.28)

The use of all five senses in architecture has been a topic discussed for some time. In the book *The Eyes of the Skin* Juhani Pallasmaa argues that vision is the dominant sense used in architectural design. Pallasmaa states that this visual domination leaves little room for our other four senses, contributing to the inhumane designs of contemporary architecture (Pallasmaa, 2012).

Similarly, Chris Downey, a blind architect, talks of how we have a tendency to design for vision, and thus, leave out those who have a visual impairment. After going blind, Downey decided to continue practicing as an architect and found that his new life state gave him knowledge about his own profession that he never would have considered otherwise (TED, 2013).

The building type which is most associated with a multi-sensory experience is the bathhouse. This space, however, which is rich in non-visual stimuli, remains largely inaccessible to people with a visual impairment. It was in this paradox that the idea for this master thesis was born: to create a bathhouse covered in complete darkness.

The aim of this master thesis was to create a bathhouse filled with experiences for the non-visual senses. The main sense investigated in this thesis has been the sense of touch, looking at how it can contribute to the architectural experience. The design of the bathhouse has been created by using an iterative loop where knowledge informs the design. Thus, the design has been continuously re-evaluated through interviews, experiments and design studies.

The result of this thesis is in part a design where the visual experience of architecture is no longer at the top of the hierarchy, and in part an experimentation of what it is like to design without focusing on the visual output. It has provided examples for how tactility can contribute to new types of spaces, where the reach of the body and the distribution of our nervous system inform the design.

RESEARCH QUESTIONS

1. What is left of architecture if we take away the visual stimulus?

Architecture is a dominantly visual experience and because of this the project Blind Trust investigated what would be left in architectural design if the sensory experience of vision was taken away. By excluding the possibility of problem solving through vision, solutions through the use of other senses were forced into the design proposal.

2. How can the non-visual senses be used in architectural design to enhance the experience of a bathhouse?

The non-visual senses have a tendency to get overlooked within architectural design as they are often not as prioritized as vision. Therefore, this thesis aimed to discover what qualities we could find within the use of the non-visual senses and how they could contribute to the bathing ritual. Furthermore, it was also investigated how architectural solutions were able to enhance or diminish these non-visual stimuli.

3. How can an architectural idea be communicated when visual input is unavailable?

The domination of the visual senses is not only visible in architecture, but communication of architectural ideas is, furthermore, mainly done through visual tools. Floor plans, sections, digital models, diagrams and renders are done for visual input and it is possible that this focus on visual communication aids in the repression of the other four senses in architectural design, but how does one communicate ideas that are based on other senses than the visual sense? Is it possible to maintain the non-visual senses in a visual representation?

4. How can the experience of a bathhouse become more accessible to the visually impaired?

The logistics of the bathhouse makes it a rather inaccessible experience for someone living with a visual impairment, but is it possible for architectural solutions to help make the bathing experience accessible?

DESIGN PROPOSAL

"Vision reveals what the touch already knows."

Juhani Pallasmaa

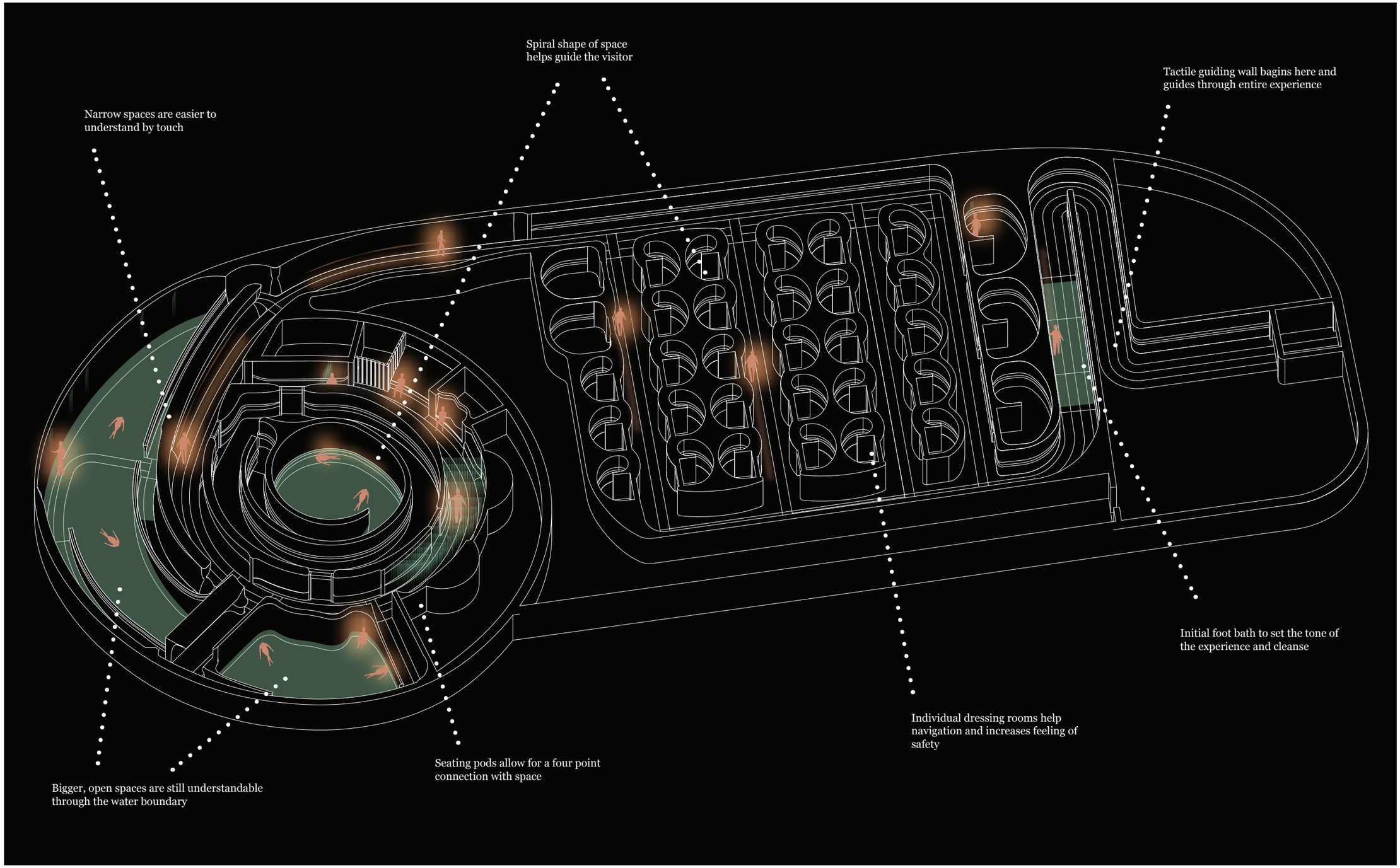


Figure 1: Axonometric drawing of building.

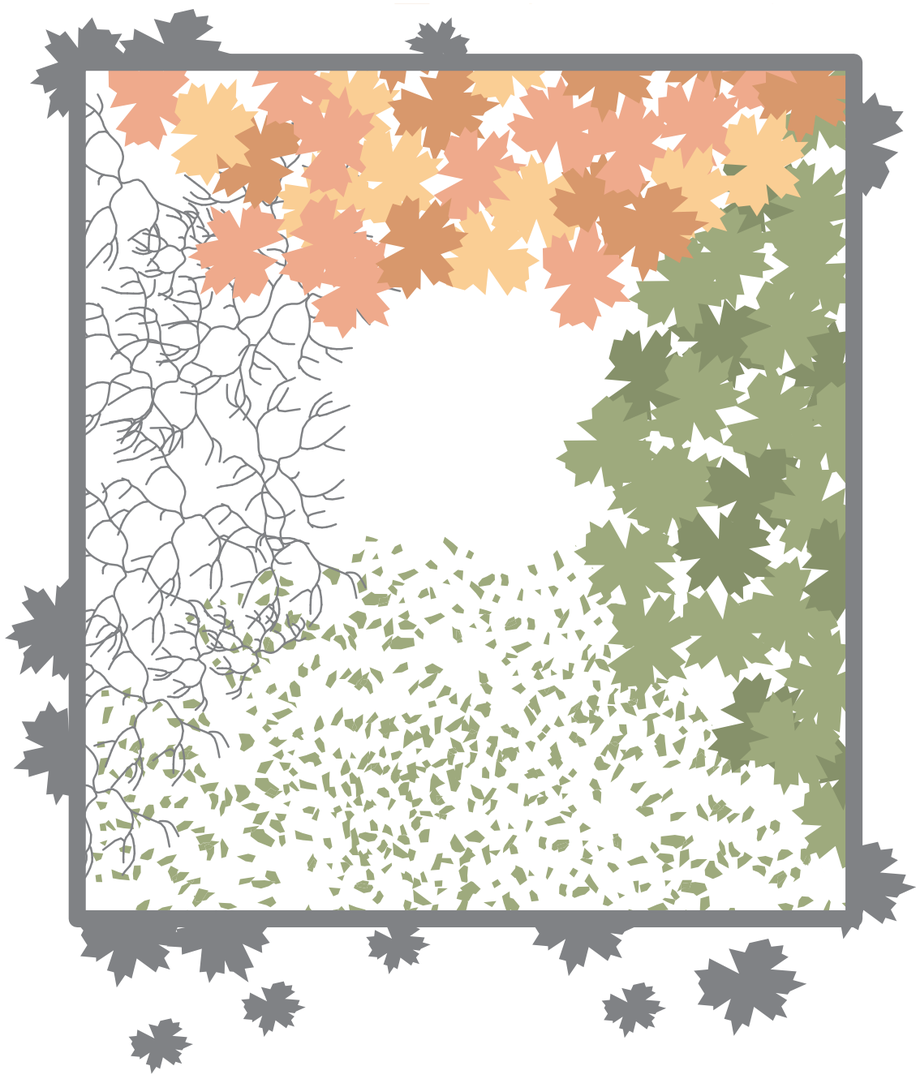


Figure 2: Diagram of the concept *A year in the forest*

A YEAR IN THE FOREST

Blind Trust proposes a space for inner reflection. The enclosed building allows the visitor to release their connection to everyday life and get encapsulated by the metaphorical forest inside. This feeling of releasing the ordinary routine is further enhanced by the complete darkness in the spaces of the bath ritual. The concept for the spa is *A Year in the Forest*, and going through the circular path of the bathing ritual, the visitor has the opportunity to experience all seasons within a year– beginning in the budding of spring and going all the way down to the chill of winter. Each season has its own tactile patterns, giving the visitor a range of haptic experiences as they pass through a year in the forest.

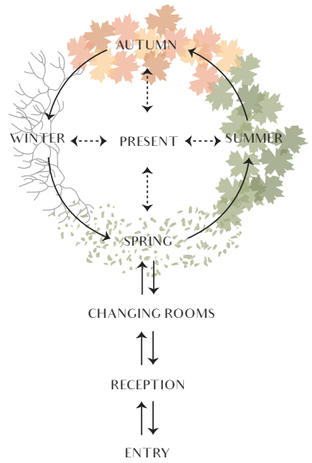


Figure 3: Diagram of circulation

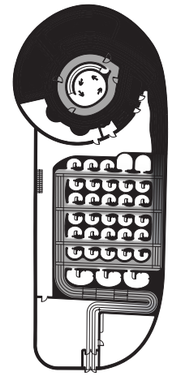


Figure 4: Light diagram

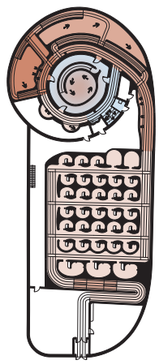


Figure 5: Temperature diagram

PARALLELL NARRATIVE

The circular motion was born in the early stages of the thesis when a desire for a clear ritual was expressed in interviews as well as found in design investigations. Thus, a safe route was created where the visitor is heavily guided throughout the experience by a tactile wall.

Since a rigorously guided path may not suit all types of visitors, the different seasons are all connected to a central pool: the pool of the present. This is an open outdoor pool, which gives a connection back to the present season. As the pool is connected to all seasonal zones of the spa, it provides the visitor with an option to leave the safe route and create their own path through the seasons.

LIGHT GRADIENTS

The darkness inside the bath greets the visitor gradually. The lobby is the brightest area, receiving daylight from highly placed windows. When entering the hallway leading to the dressing rooms the darkness gradually increases. The space outside the dressing rooms is medium dark, while the inside of each dressing room is brightly illuminated. Going from the dressing space and into the bath there is another light gradient, leading into the complete darkness of the spa experience. At the centre of the spa ritual the visitor can find an outdoor pool, which counters night vision and gives a safe space filled with light for those who discover they were not comfortable in the shadows.

VARYING TEMPERATURES

Aside from being suitable for the circular motion of the ritual, the theme of the seasons contributes to the different temperature zones needed in the spa. The concept allows for a variation in temperatures starting in the warm spring, going to the heat of summer, passing through the cool of autumn and ending in the chill of winter. Furthermore, the dressing room area is heated to be warmer than the lobby area, while still being of a lower temperature than spring. Thus, a clear distinction can be made when passing from dressing room to bath spaces.

SITE

In the middle of central Gothenburg, in close proximity to iconic public buildings such as Gothenburg Art Museum, Gothenburg Concert Hall, Gothenburg City Theatre and the Gothenburg public library, stands a parking garage of only three stories. The garage does not seem to live up to the potential of the site and the central location in question seems as if it could be optimized better for the public. Thus, the location has been chosen as a site for this thesis.

Since one of the main reasons for designing the darkness bath is to make the activity of the bathhouse available for the visually impaired, it became of high importance that the site was possible to access easily by public transport. People with visual impairment are highly dependant on public transport and this location, in the heart of the city, has several bus and tram stops in its vicinity, making it an optimal spot for the project. Furthermore, the bath suits the cultural context of Götaplatsen, where it is surrounded by the theatre, the concert hall and the art museum. In this location the bath provides a space for silence in an otherwise hectic urban environment.

The central location would also make it easier to access the bath in a more spontaneous fashion. The easy accessibility by public transport, and the central location, makes it possible to visit the bath for an hour or two, without much planning needed. This high exposure to the general public could increase the discussion about the visual dominance in our society and possibly enlighten about the difficulties that ocularcentrism creates for people with visual impairment.

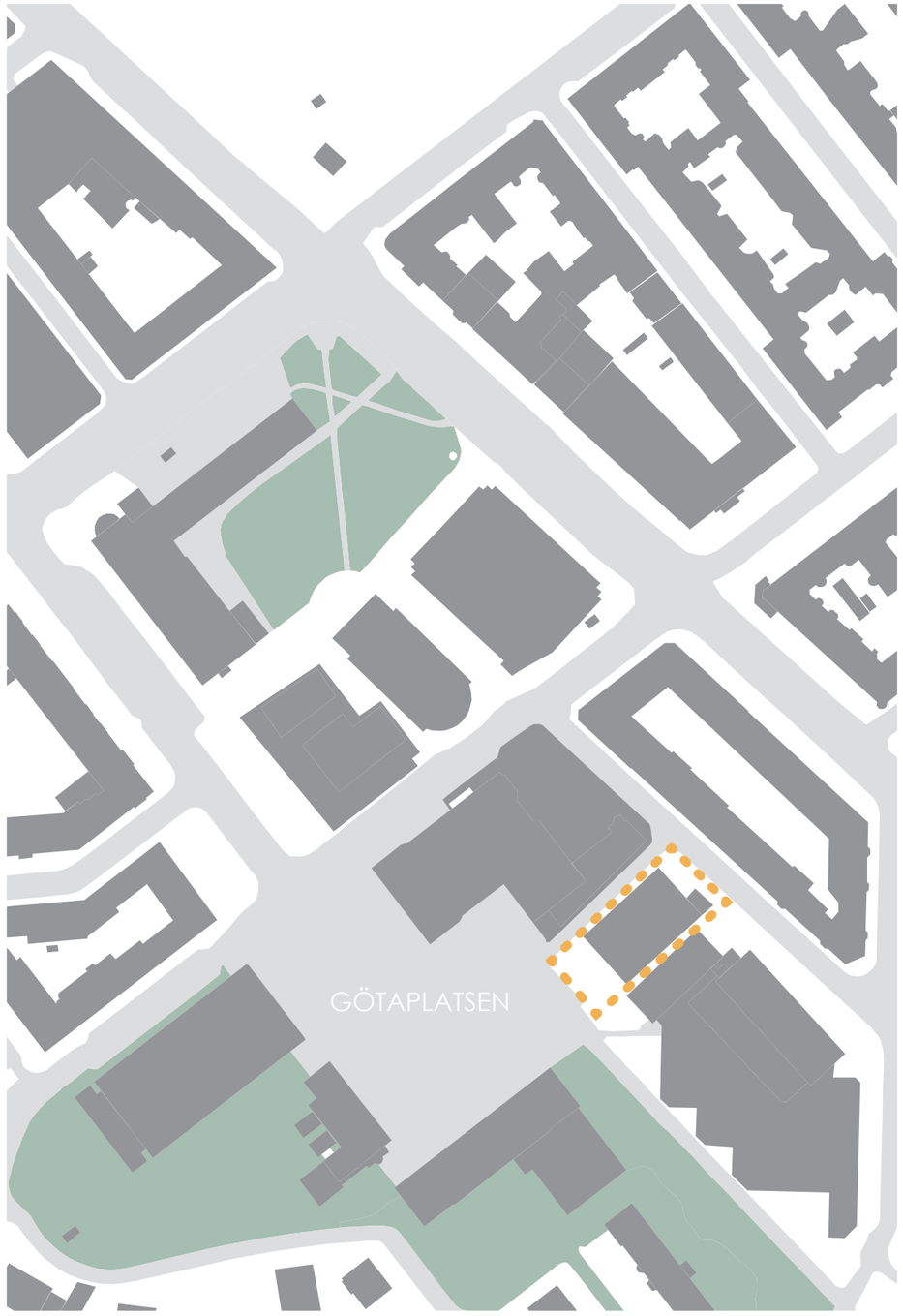


Figure 34: Site Map

Figure 6: Floor plan in scale 1:300. All seasons have different tactile patterns.

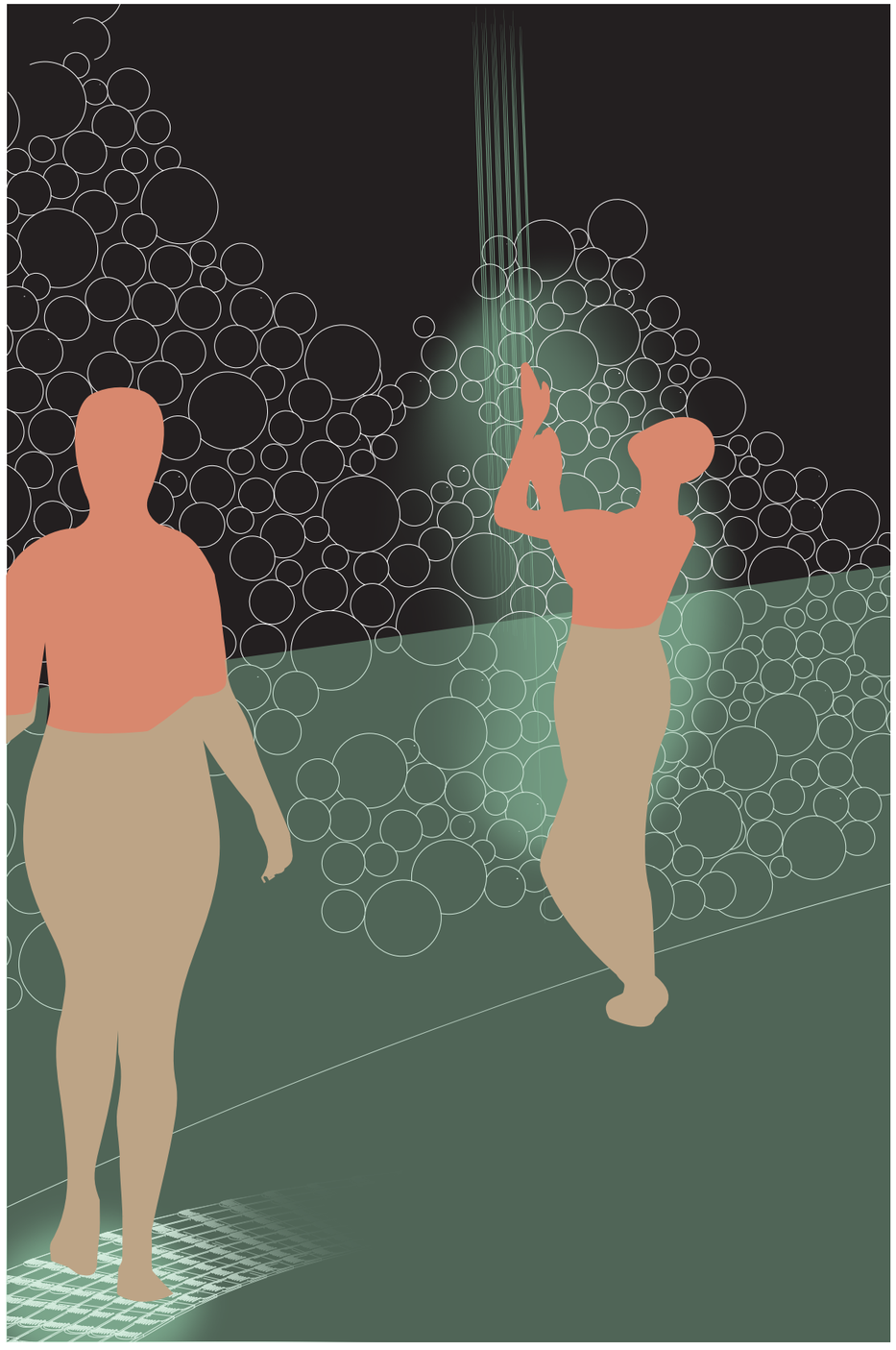


Figure 7: Perspective of spring space

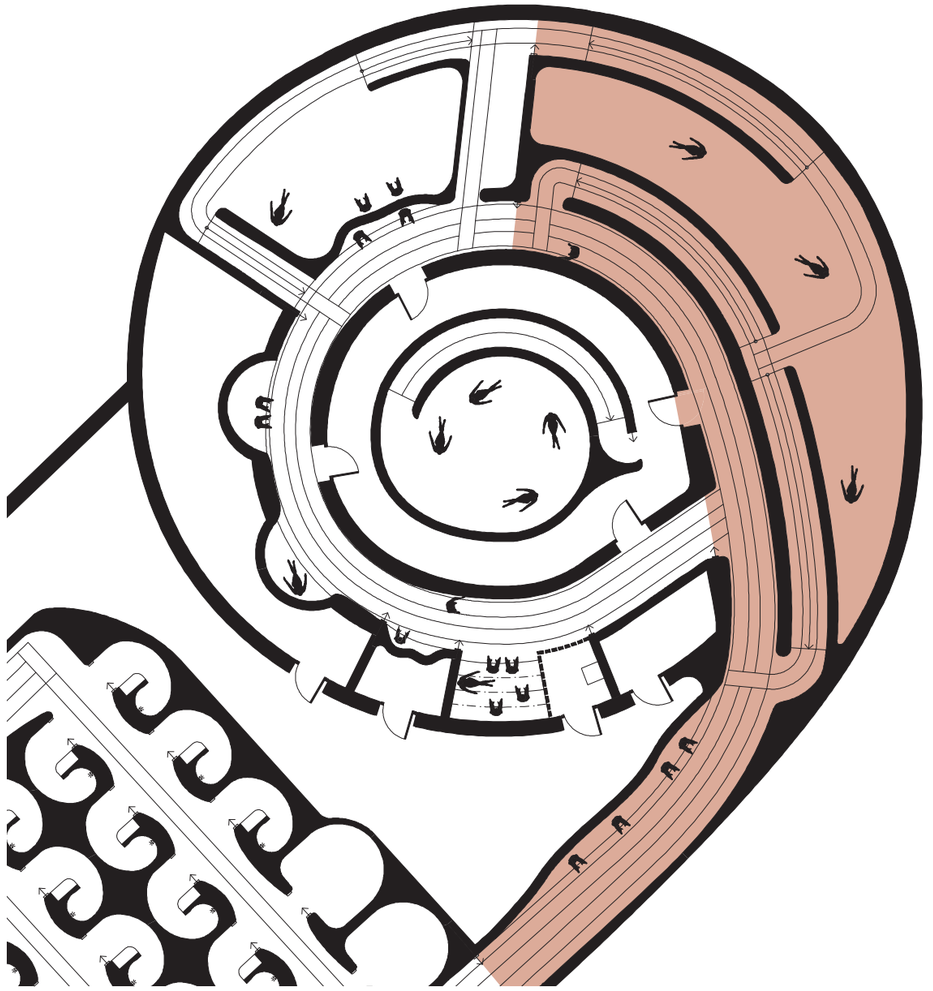


Figure 8: Diagram showing placement of spring area

SPRING

From the dressing room the visitor walks through a gradually darker corridor before entering the completely dark bath experience. Here they are greeted by the area of spring. Through the warm space there is a scent of flowers, coming from the pool which has been filled with small petals. Along one of the walls a water stream is trickling down, creating sounds as it travels along the wall.

The visitor is guided down into the pool via a ramp, gradually being immersed in the warm water, which has been heated to 30^{0} C. The space of spring is oblong, with a clear direction. This shape symbolizes the rise in temperature of the season, as it transitions from the minimum temperature of winter, to the maximum temperature of summer.

Figure 9: Tactile trail pattern spring

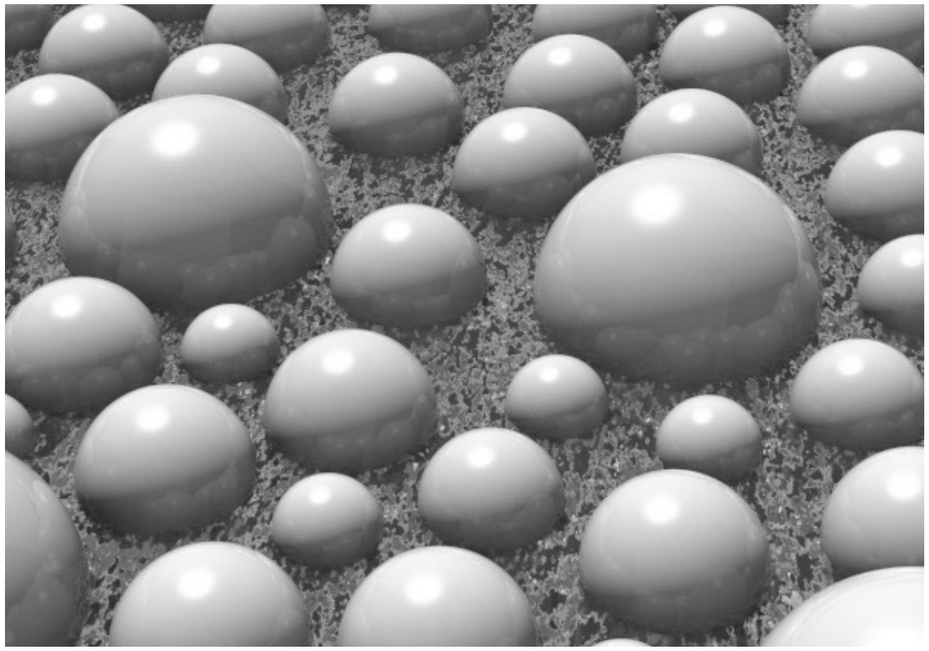


Figure 10: Wild pattern spring

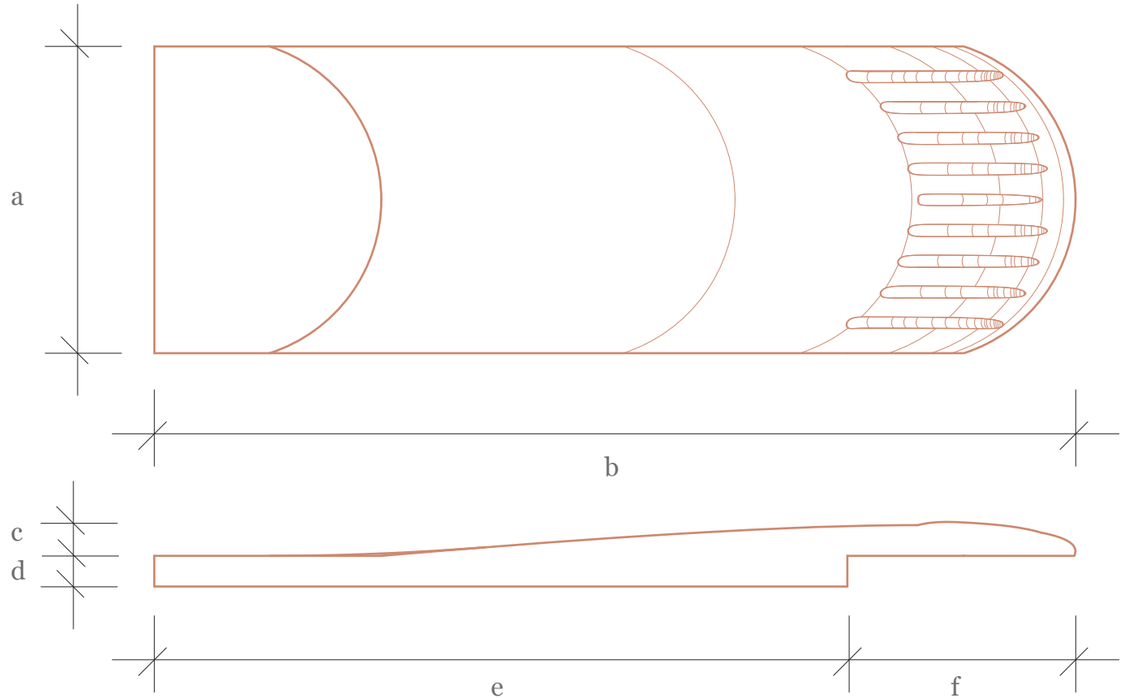


Figure 11: Plan and section for spring trail pattern tile. The size of the tile varies depending on which body part it comes in contact with and the measurements are as follows: a = 25/50 mm, b = 75/150 mm, c = 5 mm, d = 5 mm, e = 55/110 mm, f = 20/40 mm. The smaller measurement is used for the hand trail, while the larger one shows the tile size for the foot path.

TRAIL AND WILDERNESS

All seasonal spaces have two different patterns: the tactile trail pattern and the wild pattern. The tactile trail helps guide the visitor in the space, while the wild pattern contributes to the tactile experience of the space.

TACTILE TRAIL PATTERN

The tactile path of spring has been created from the inspiration of the overlapping of flower petals. Through the overlap of the tiles it is possible for the visitor to know whether they are walking forwards or backwards on the path. Similarly, the dimensions of the tiles have been created so that it is easy to differentiate length from width, making it possible to distinguish in which direction you are facing the room without using your sight. The material of the tactile path is a rough stone, to contrast the otherwise smooth ceramic of the space of spring.

WILD PATTERN

To contrast the organised path, all spaces have a wild pattern which draws characteristics from the pattern used on the path. The wild pattern of spring is inspired by the convex shapes of the tiles and similarly draws inspiration from flowers. The half-spherical tiles represent the flower buds of spring and are made from a cool ceramic material. The material choice, which both acoustically and haptically, has been described as cold, is combined with smooth curves and convex geometries, which are properties commonly associated with warmth. Thus, spring channels characteristics associated with both cold and warmth, representing the transition between the hot summer and cold winter.

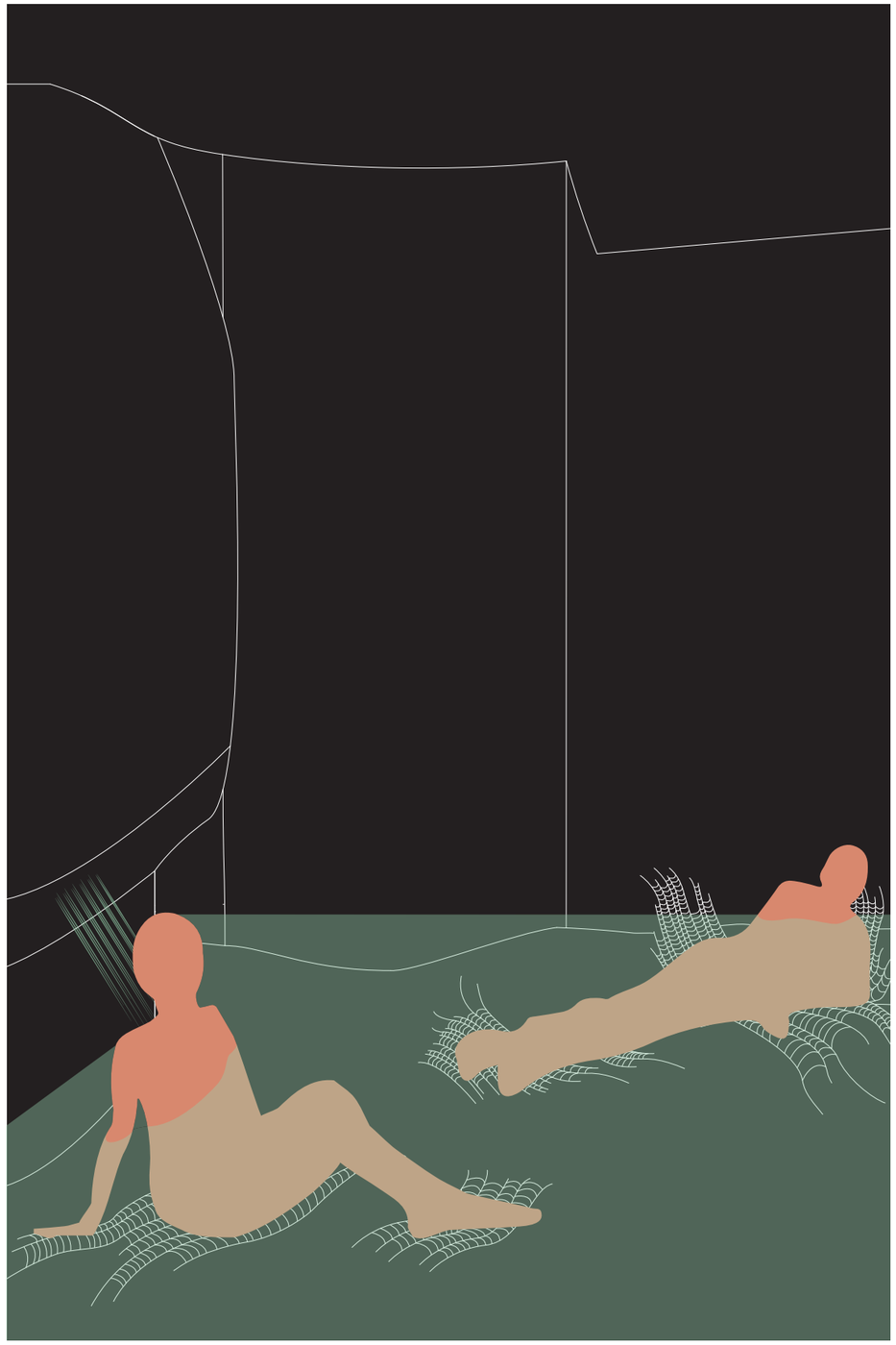


Figure 12: Perspective of summer space

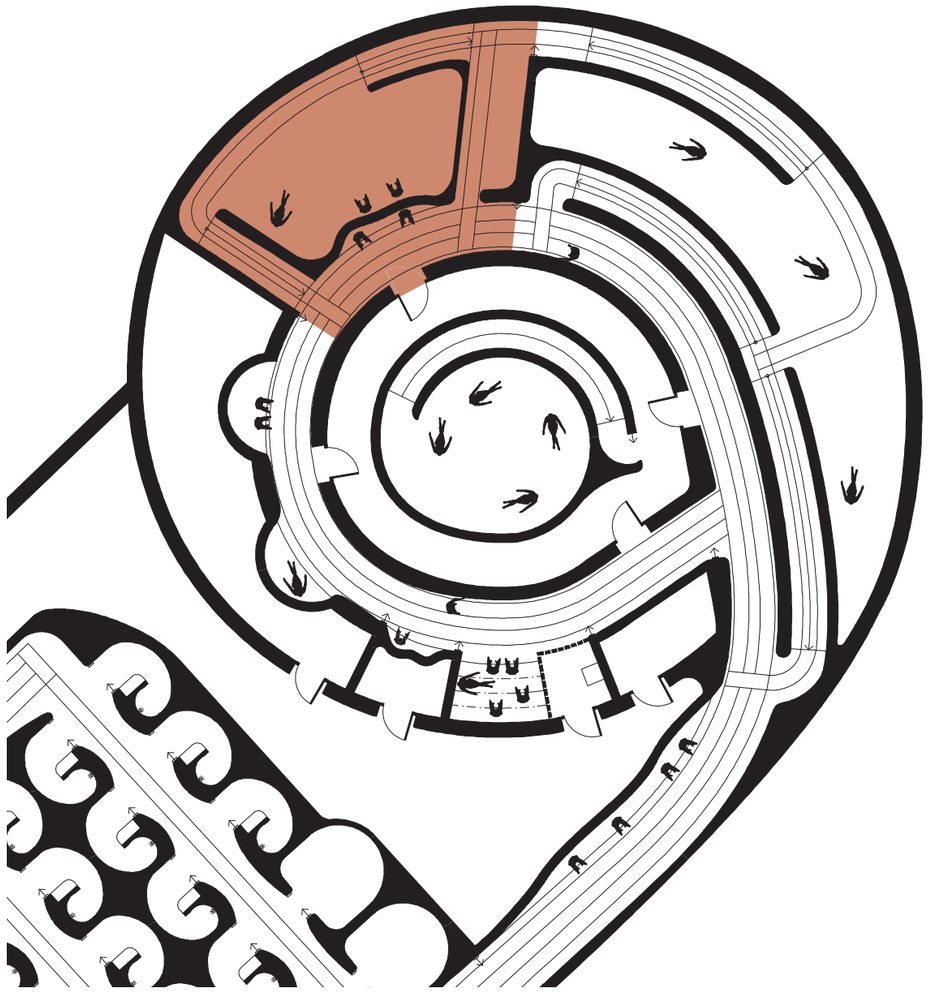


Figure 13: Diagram showing placement of summer area

SUMMER

After passing through spring, the visitor is guided into the heat of summer. A ramp leads into the hot pool inside the space, which is heated to 35^{0} C. The pool is shallow, with a water level between 350 mm and 600 mm, making it the perfect pool for the visitor to sit or lie down. The water level makes it possible for the visitor to control the amount of heated water which covers their body while enjoying a back or foot massage from the jets placed in the pool. The space of summer is not as directional as spring, with a more even ratio between width and length, allowing for a more resting space. This rest symbolises how the temperature is no longer rising, as in spring, but has reached its peak.

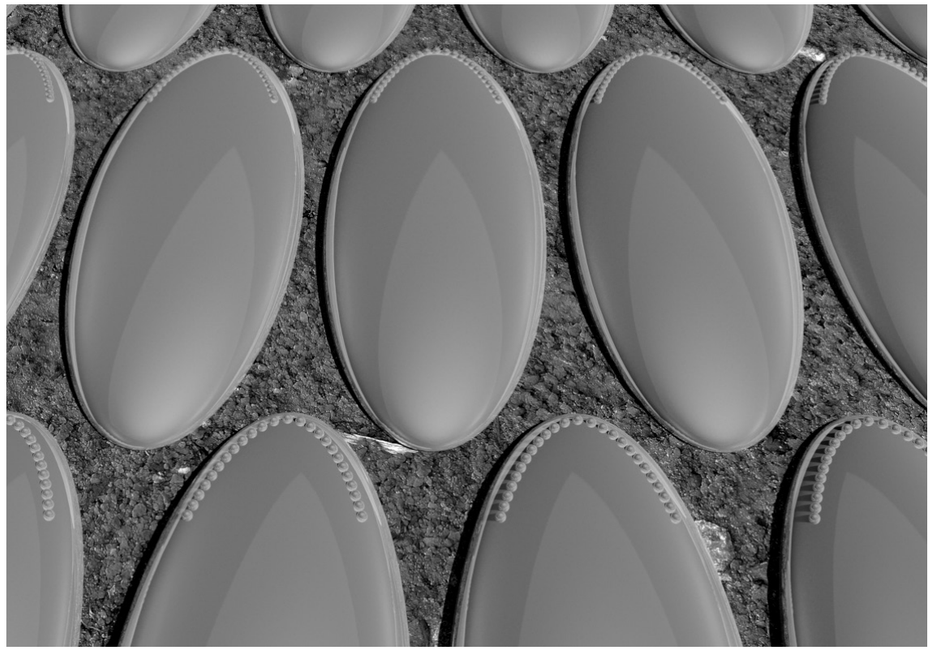


Figure 14: Tactile trail pattern summer

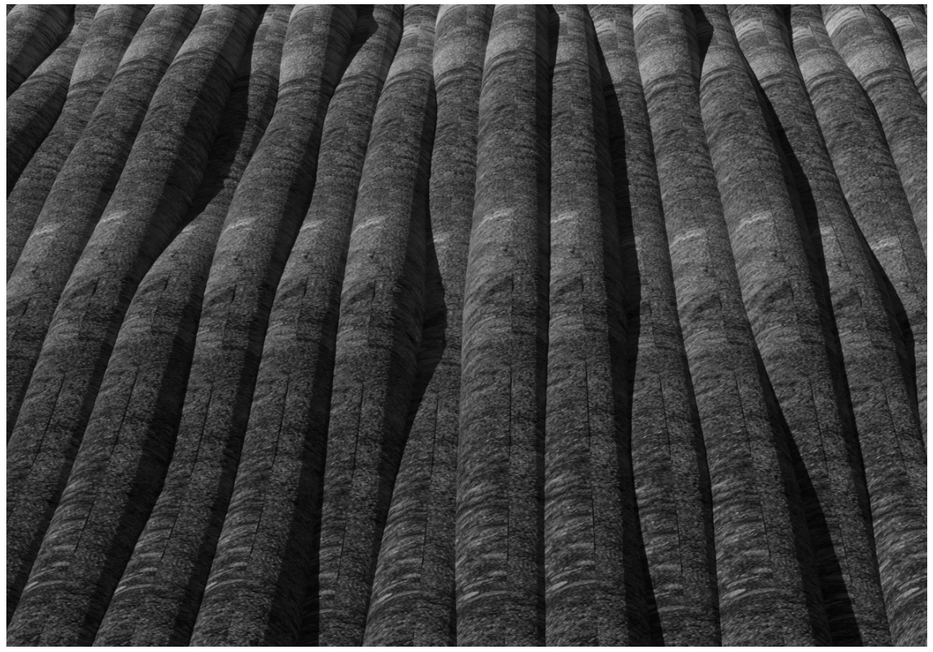


Figure 15: Wild pattern summer

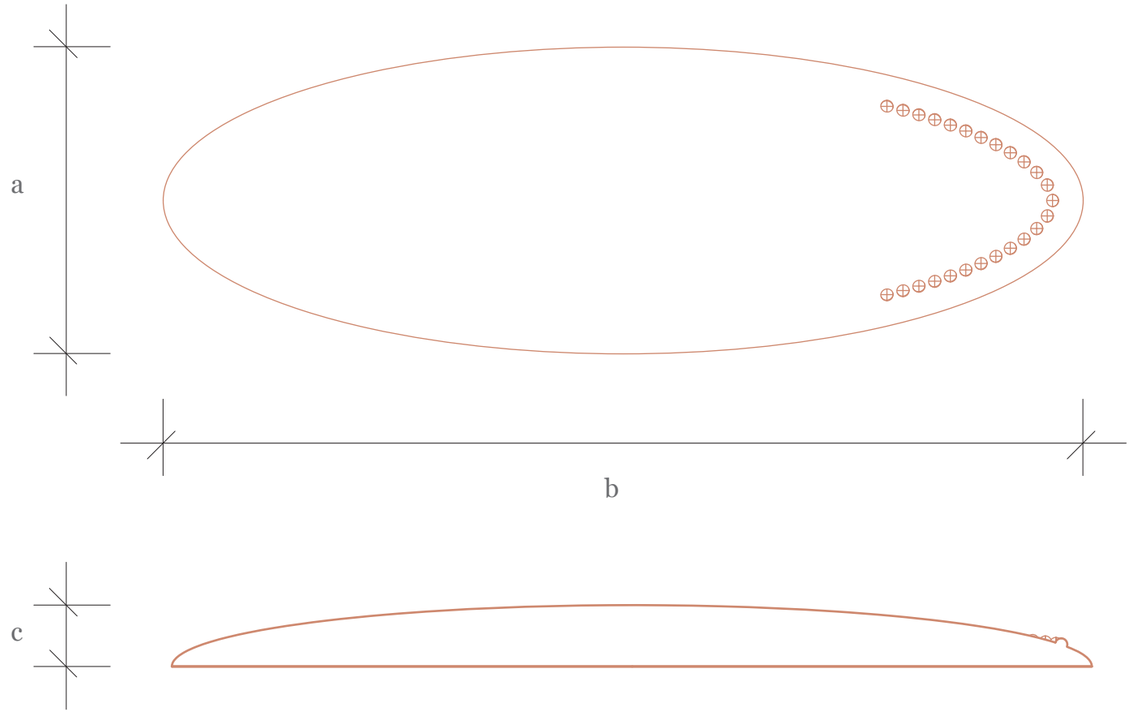


Figure 16: Plan and section for summer trail pattern tile. The size of the tile varies depending on which body part it comes in contact with and the measurements are as follows: a = 25/50 mm, b = 75/150 mm, c = 5/10 mm. The smaller measurement is used for the hand trail, while the larger one shows the tile size for the foot path.

TACTILE TRAIL PATTERN

The pattern for the tactile path of summer uses the smooth and curvy forms of the oval. Through the proportions between width and length it is possible for the visitor to orient their direction in the space. Furthermore, the small dots at the front of the tile makes it possible for the visitor to understand whether they are moving forwards or backwards within the space. The material for the tactile path of summer is ceramic, which gives a stark contrast to the rough stone that is otherwise spread throughout the space.

WILD PATTERN

The wild pattern of summer is inspired by grass. The long smooth lines, made in a rough stone, grow wildly through the space. The material choice of stone has warm associations, as does the smooth lines of the pattern. The wild pattern of summer is, thus, a combination of heat and heat, representing how the rise in temperature has reached its peak.

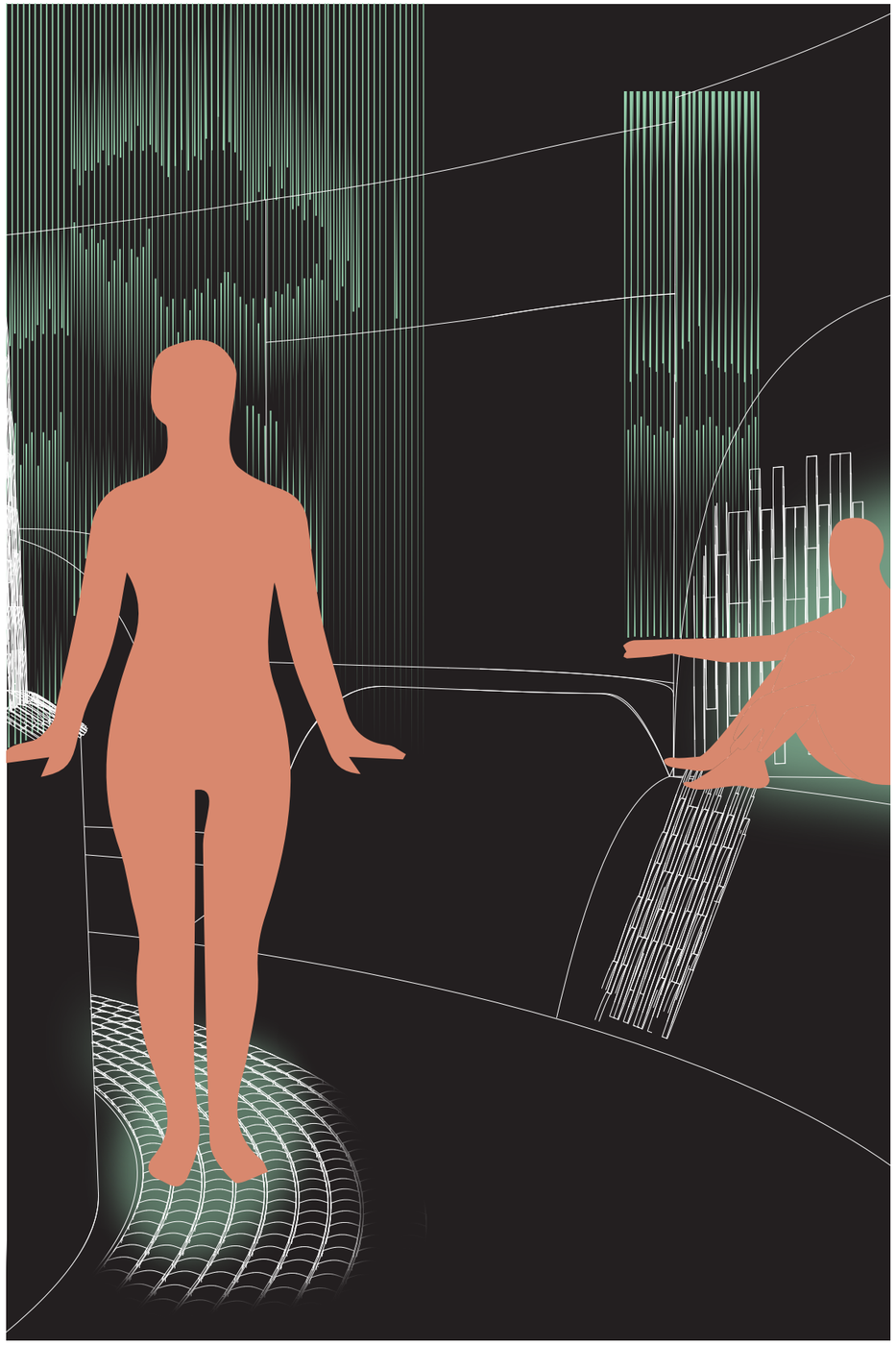


Figure 17: Perspective of autumn space

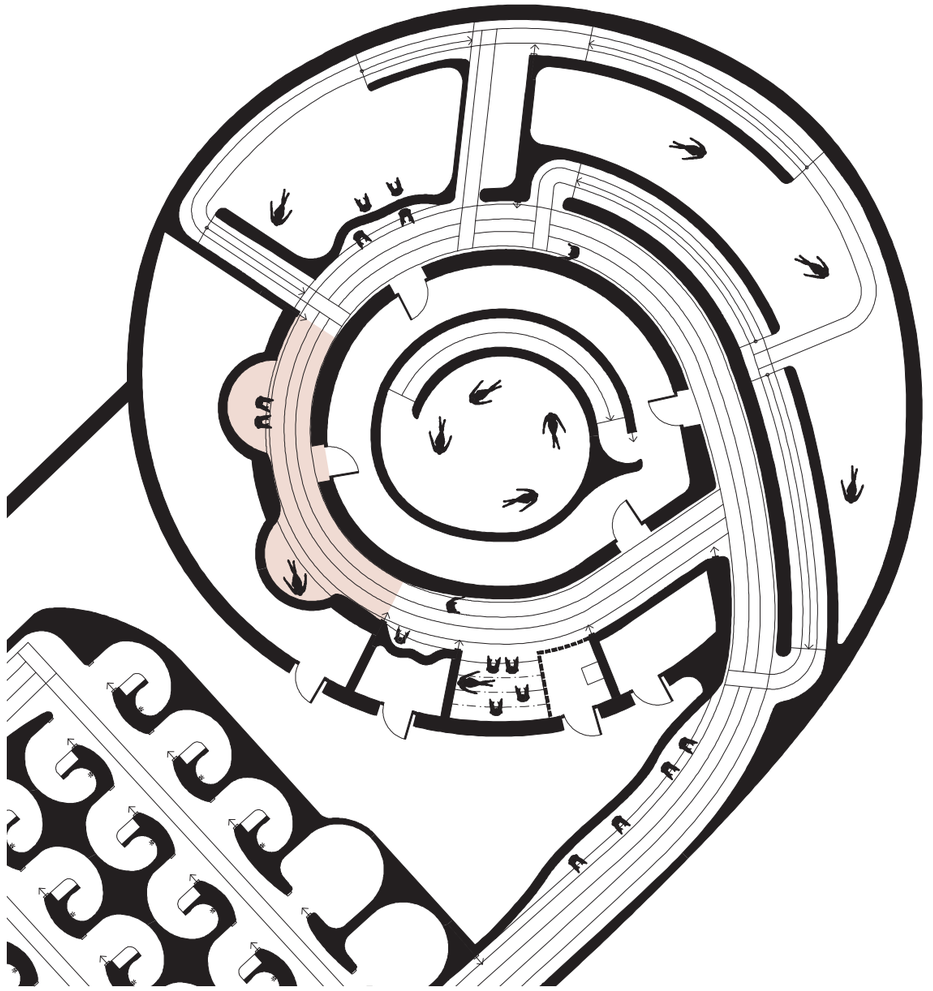


Figure 18: Diagram showing placement of autumn area

AUTUMN

Having walked through summer, the visitor continues their path into autumn where they enter into a room full of rain. A steady stream of water, heated to 25º C, falls from the sealing down on the passing visitors and their surroundings. Along the path there are pods where the visitor has the opportunity to stay and listen to the drumming of the rain. The inspiration for this room comes from the documentary *Notes on Blindness*, where the professor John M. Hull documents his transition to blindness. In the documentary he states:

"Rain brings out the contours of what's around you. In that, it introduces a blanket of differentiated and specialized sound which fills the whole of the audible environment. If only there could be something equivalent to rain falling inside, then the whole of a room would take on shape and dimension."

(Middleton & Spinney, 2016)

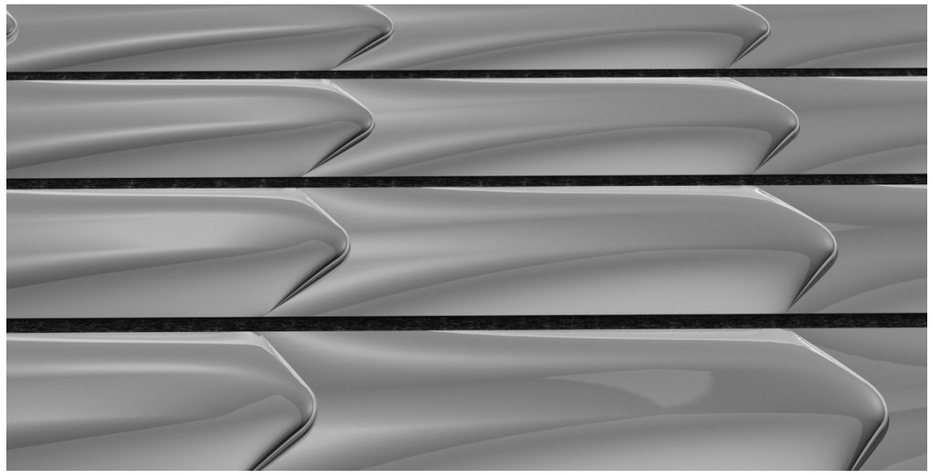


Figure 19: Tactile trail pattern autumn

Figure 20: Wild pattern autumn

HIDDEN POEMS

Poems in braille have been placed inside all spaces of the bath to create a role reversal in which the visually impaired, rather than people with sight, receive additional information from the space. The poem in Figure 21 is written by Swedish poet Tomas Tranströmer and reads "*Hör suset av regn. / Jag viskar en hemlighet / för att nå in dit.*" which roughly translates to "*Hear the hum of the rain. / I whisper a secret / to reach within.*" (Tranströmer).

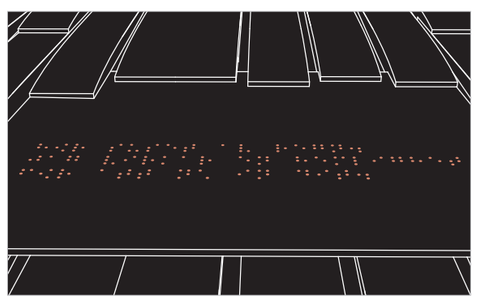


Figure 21: Hidden poem in braille

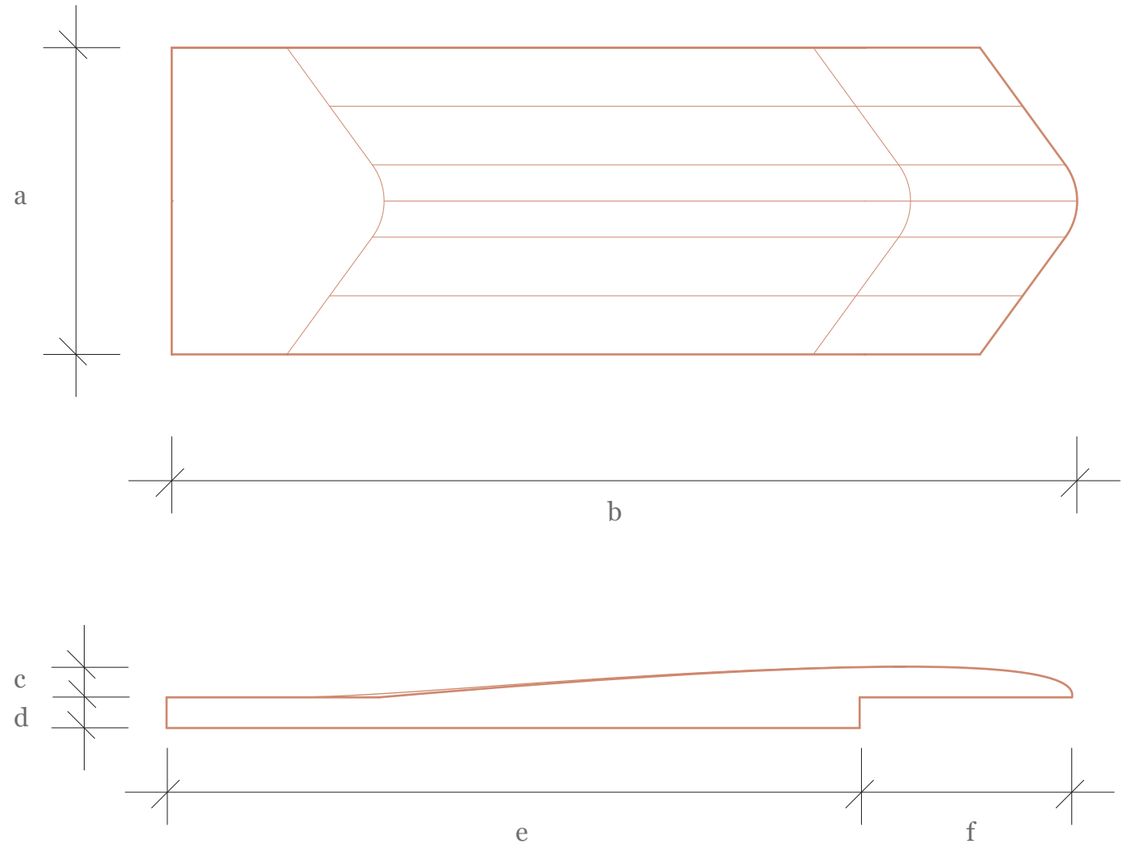


Figure 22: Plan and section for autumn trail pattern tile. The size of the tile varies depending on which body part it comes in contact with and the measurements are as follows: a = 25/50 mm, b = 75/150 mm, c = 5 mm, d = 5 mm, e = 55/110 mm, f = 20/40 mm. The smaller measurement is used for the hand trail, while the larger one shows the tile size for the foot path.

TACTILE TRAIL PATTERN

The pattern for the tactile path of autumn mirrors that of spring, showing the connection between the two transitional seasons. The pattern of autumn relies on the same logic of overlapping tiles, however, instead of the smooth circular overlap of spring, autumn has a more pointed design. In this space, the overlapping tiles are inspired by the scales of a fir cone. The smooth material of ceramic has been applied to the path to give a contrast to the rough stone that is otherwise used in the space.

WILD PATTERN

The overlapping characteristic of the path pattern has been picked up by the wild pattern of the autumn space. The pattern consists of overlapping tiles made of rough stone, inspired from the pattern of tree bark. In this pattern, rough stone material, associated with warmth, is combined with harsh edges, which are often associated with cold. The combination of warmth and cold symbolises the transition from the heat of summer to the coldness of winter.

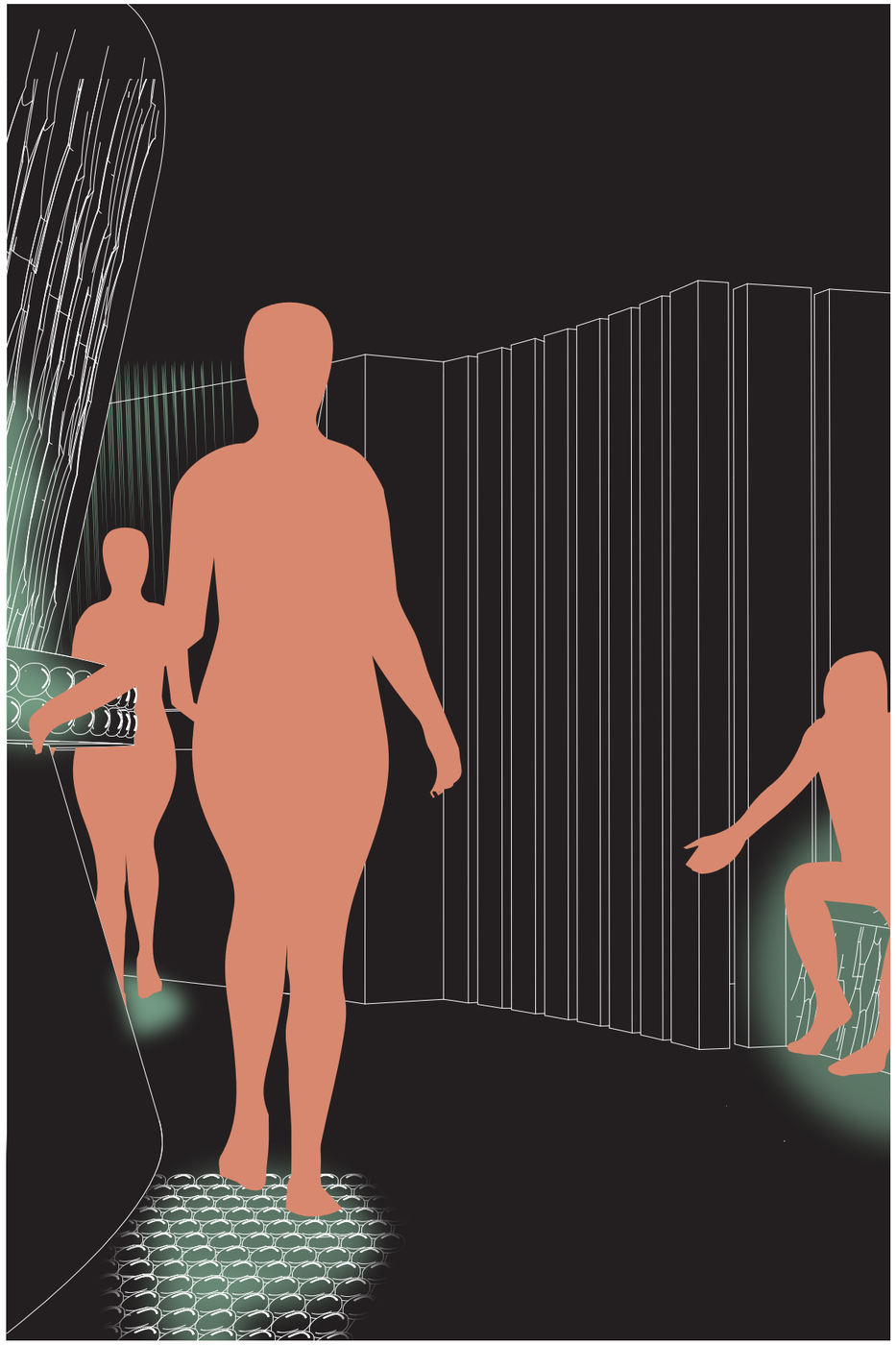


Figure 23: Perspective of winter space

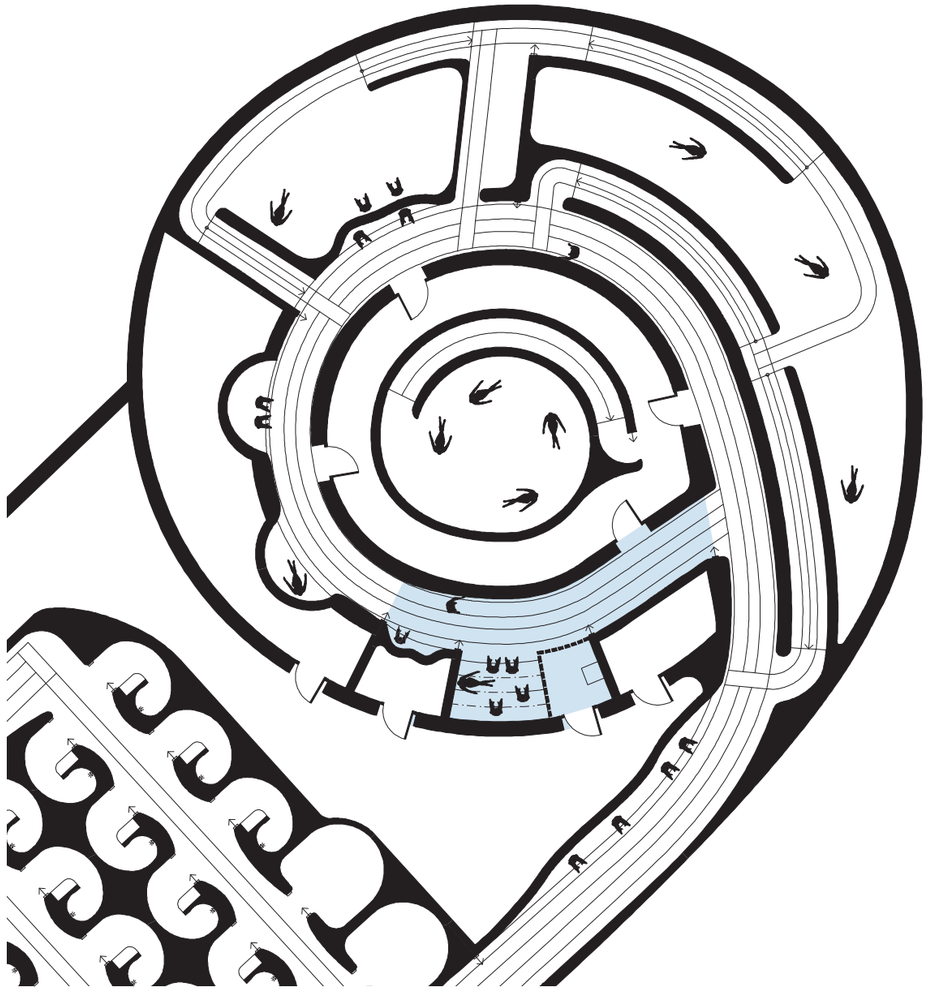


Figure 24: Diagram showing placement of winter area

WINTER

The final space to enter along the circular route is the season of winter. At the beginning of this space there is a cold room with a temperature of 17º C, which in turn leads to a hot sauna. In the sauna there is the possibility to stay and heat up, before going into another section with a colder space. Along the path of this space the visitor will pass through a cold shower, a stark contrast to the hot sauna, before leaving winter and returning to the warm space of spring, where the visitor is once again greeted by the smell of flowers.

Figure 25: Tactile trail pattern winter

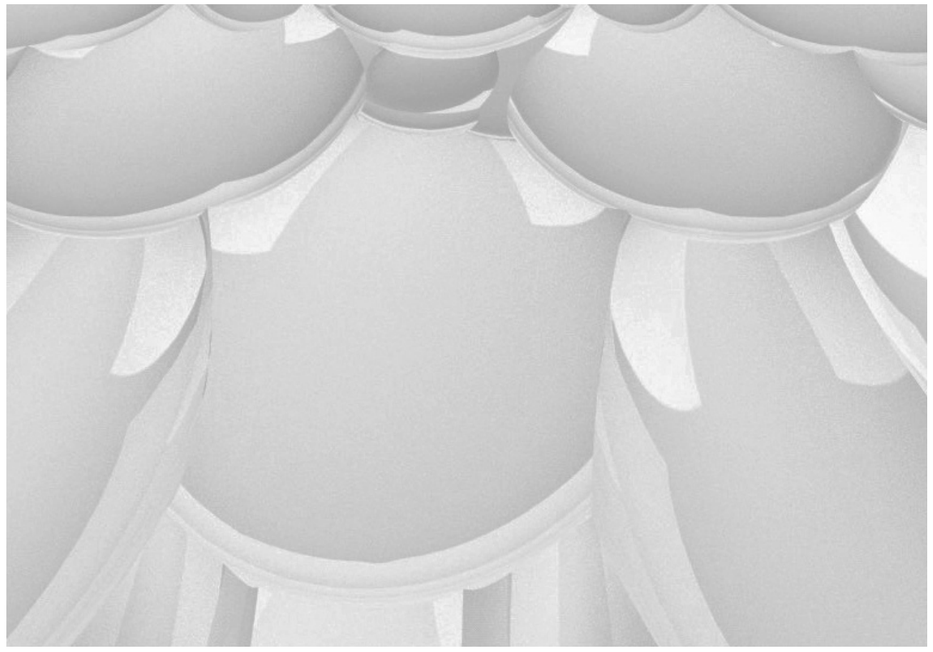


Figure 26: Wild pattern winter

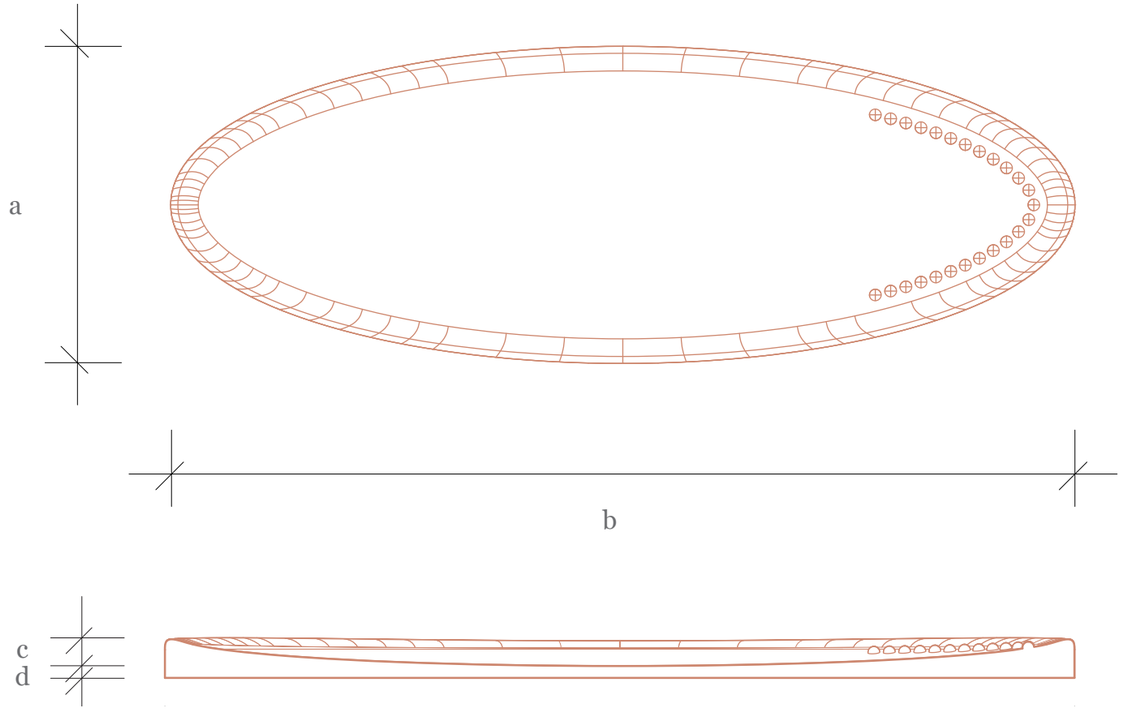


Figure 27: Plan and section for winter trail pattern tile. The size of the tile varies depending on which body part it comes in contact with and the measurements are as follows: a = 25/50 mm, b = 75/150 mm, c = 4 mm, d = 2 mm. The smaller measurement is used for the hand trail, while the larger one shows the tile size for the foot path.

TACTILE TRAIL PATTERN

The pattern used for the tactile path of winter mirrors the pattern used for summer, linking the two seasons with the most extreme temperatures. The oval, convex in summer, has been inverted and is concave in winter. Along the tip of the front there is a string of spheres to mark which direction is forwards. The ratio between the width and length of the oval makes it easy to understand which direction of the room the visitor is facing. The material used for the path is a rough stone, which is used to contrast the ceramic material used in the wild pattern.

WILD PATTERN

The wild pattern of winter is also based on concave geometries. The pattern is made by overlapping different sizes of concave ovals and the inspiration to it comes from the pattern of an ice cave. In this pattern the coldness of harsh edges is combined with the cold material of ceramic. The combination of cold and cold makes the pattern a representation of how we in winter have reached the year's coldest temperature and are no longer descending along the curve. Furthermore, the concave shape, in combination with the harsh reflecting material of the tile, creates a cold acoustic in the space.

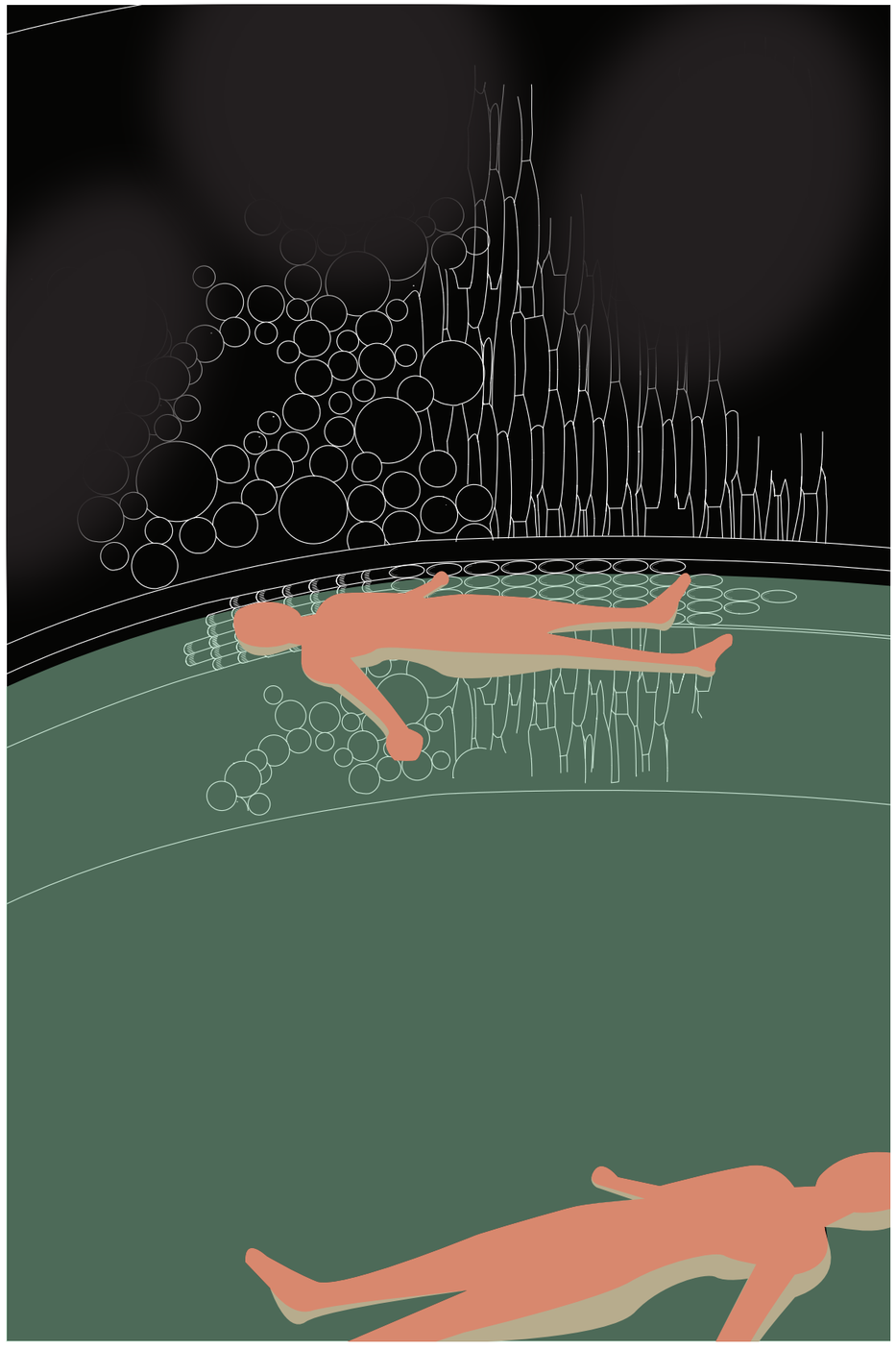


Figure 28: Perspective of the space of the present

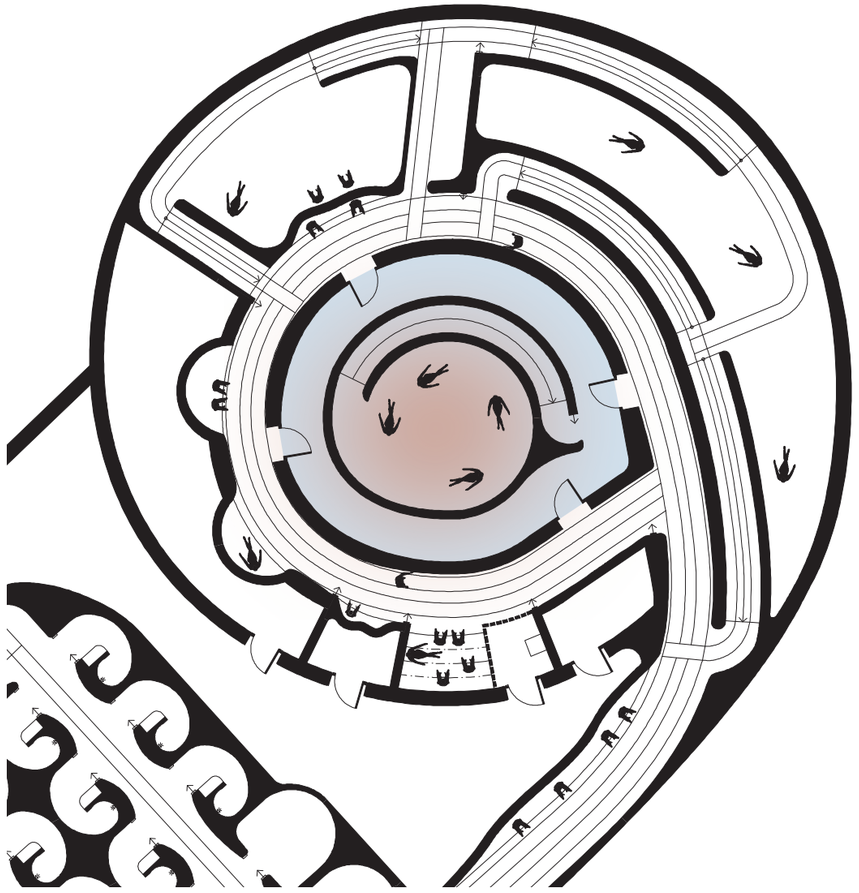


Figure 29: Plan showing the space of the present

THE PRESENT

In the centre of the bathing area there is an outdoor pool. This pool creates a connection between the different seasons, both in the way it allows for visitors to pass straight from summer to winter, or autumn to spring, and in the way that it always represents the season of the present time during the visit. In summer, the water of it remains unheated, but otherwise it has a temperature of 35° C. In the pool, which contains the patterns of all four seasons, the visitor can float along a circulating stream - a reflection of the circular motion of the ritual inside.

THEORY

"Modernist design at large has housed the intellect and the eye, but it has left the body and the other senses, as well as our memories, imagination and dreams, homeless."

Juhani Pallasmaa

ARCHITECTURE & THE SENSES

Our world is ruled by the eye. In Western society vision is viewed as the supreme sense and is, thus, often prioritized over the other four senses. We live in an occularcentric paradigm and this dominance of vision can be seen in everything from philosophy, where for instance Aristotle considered sight to be “the noblest of senses”, to language, where we can see metaphors such as “the mind’s eye” and “to have a vision” (Pallasmaa, 2012, ss. 18-19). Architecture is no different. Modern architecture relies heavily on visual stimulus, something that is often done at the cost of our four other senses, but should this be the case?

A WORLD OF DISTANCE

Vision stands for 80% of our sensory impressions, while hearing is usually measured to 10-15%. The remaining few percentages are split between touch, smell and taste (Kännbart). The heavy impact of vision within the sensory impressions could help explain its dominance in Western society, though, perhaps a re-evaluation is needed regarding the extent with which vision is blindly trusted. In his book, *The Eyes of the Skin*, Juhani Pallasmaa criticises the dominant role vision has within the field of architecture. Pallasmaa believes that the inhumanity of contemporary architecture could be explained as a consequence of the neglect of the body and the senses (Pallasmaa, 2012, s. 21). He further means that this visual domination tends to push us into detachment, isolation and exteriority.

”*The eye is the organ of distance and separation, whereas touch is the sense of nearness, intimacy and affection. The eye surveys, controls and investigates, whereas touch approaches and caresses. During overpowering emotional experiences, we tend to close off the distancing sense of vision; we close the eyes when dreaming, listening to music, or caressing our beloved ones.*”

(Pallasmaa, 2012, s. 50)

SENSES IN DESIGN TODAY

Pallasmaa, who wrote his book in 1996, has been widely quoted among architects and the longing for a more multisensory experience in architecture appears to be a popular subject in the profession. Despite this, the majority of todays' architectural design is still heavily focused on the visual, and the designs that do focus more on the other four senses are often of a temporary nature, such as pavilions, temporary exhibition spaces or art installations. As late as 2018, more than two decades after the first publication of Pallasmaa’s *The Eyes of the Skin*, designer Bruce Mau writes that:

“*when it comes to the culture of architecture and design, we create and produce almost exclusively for one sense – the visual.*”

(Lipps & Lupton, 2018, s. 20).

WHY MULTISENSORY DESIGN?

There are several arguments that speak in favour of a multisensory design. In their book *The Senses: Design Beyond Vision*, Ellen Lupton and Andrea Lipps, write that a multisensory design supports everyone’s opportunity to receive information (Lipps & Lupton, 2018, s. 14). Additionally, sensory design has the ability to enhance health and wellbeing, such as when a scent player - a device which diffuses scents into a room - is used with Alzheimer’s patients to distribute scents of food at mealtimes and, thus, stimulate appetite. But not only does multisensory design contribute to a more inclusive environment and show beneficial health affects, it also enriches the experience of space, where “*[s]ensory design slows space down, making it feel thick rather than thin.*” (Lipps & Lupton, 2018, s. 14)

SIGHTLESS ARCHITECTURE

Pallasmaa is not the only one to critique how the architectural profession tends to rely heavily on visual design. Chris Downey is a blind architect based in San Francisco, California, who aims for a multisensory approach to architecture. Downey has stated that he is *"interested in how to convey delight in architecture whether it is seen or not."* (Lipps & Lupton, 2018, s. 130)

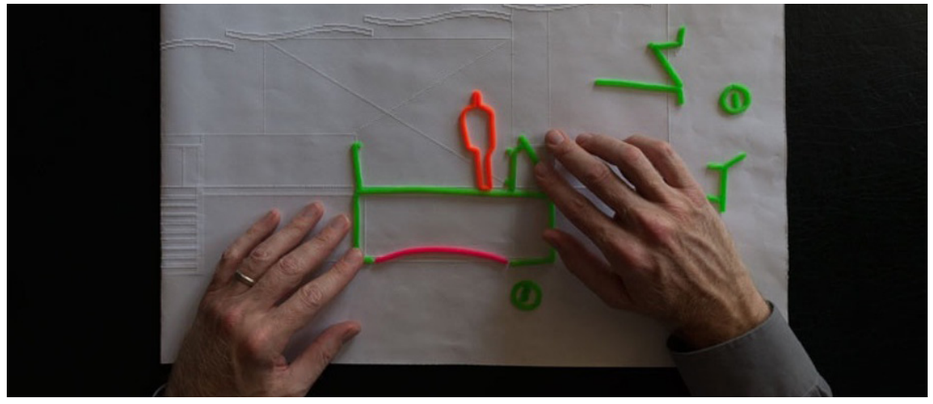


Figure 30: Wax stick sketch on embossed section drawing of lobby Bridge. (Fogg, 2017)

BLINDNESS AND ARCHITECTURE

Downey lost his sight in 2008 during brain surgery, but decided to keep practicing as an architect and learned through his altered life state that he had new, important tools to use in his work. In his Ted Talk *Design with the Blind in Mind* Downey states that:

“*My unsighted experience was so far more multi-sensory than my sighted experience ever was.*” (TED, 2013).

He further argues that not only is the city important for the blind, but more importantly, the blind are important for the city. By designing with the blind in mind we would improve our infrastructure, have a rich walkable network as well as have an active ground level with multiple options of activities (TED, 2013).

NON-VISUAL DESIGN

The development of blind design is similar to one with vision, though it uses other tools. Downey, for instance, makes his sketches using flexible wax sticks that are easy to press together or remove depending on how the idea develops. He also uses a specific printer which allows him to print his drawings with embossed lines that read like braille, making the spaces readable by the finger (A Man with a Vision). Blind designers, working in other professions than architecture, have developed other means of working. Joshua Miele, a designer, scientist and educator, have been designing tactile maps since 2003. The maps, originally created to simplify orientation for those who are visually impaired, uses data from OpenStreetMap to quickly generate printable, tactile maps (Lipps & Lupton, 2018, s. 160). Emilie Gossiaux, a visually impaired artist, creates sculptures and drawings through the help of raised tactile lines. One of the tools she uses is the rubber drawing board, a board which creates tactile lines in the places her pencil meets the paper (Lipps & Lupton, 2018, s. 175).

TOUCHING SPACE

Different parts of the body have different interactions with space. The foot is nearly constantly rooted in earth, creating a haptic connection between body and architecture, while the hand makes important, but sporadic contact with the environment. Considering how the body interacts with space, what is the potential to experience space for different parts of the body?

Figure 31: Sense of touch over the body. Darker colours represent more sensory receptors.

THE SOMATOSENSORY SYSTEM

The somatosensory system, which is part of the sensory nervous system, informs us about our external environment as well as the position and movement of our body parts. The system gives us information about things such as temperature, pain and material tactility. This type of information is received through touch receptors, which signal external and internal sensory information to our brain (Chapter 2: Somatosensory Systems).

DISTRIBUTION OF TOUCH

Touch receptors are located all over the body, but the density of them vary in different body parts. This difference in the number of receptors affect the ability to sense touch and explains how certain parts of the body are able to sense the difference between small objects touching the skin, while others cannot. Body parts that are particularly sensitive are hands, feet and face, while back and thighs have a lower resolution in their registration of touch (Making Sense of Touch).

HEARING SPACE

Space affects sound. Singing in a voluminous stone church is vastly different from carrying the same tune in your own bedroom. This is beautifully illustrated in the video *The Wikisinger*, directed by Vincent Rouffiac, where Joachim Müllner performs an original song while in 15 different locations. The video is created without adding any artificial reverb, and the effect of the different rooms can be heard throughout the song (Creative Touché Videoproduktion, 2015).

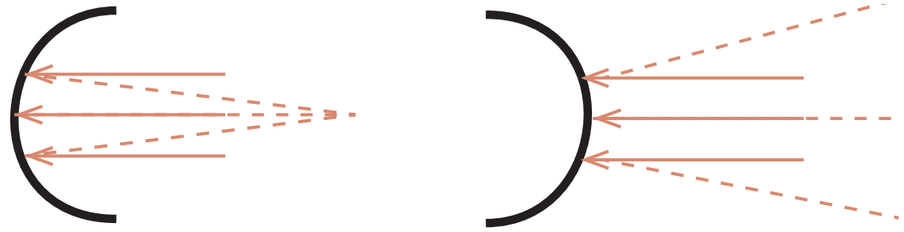


Figure 32: Geometric effects on sound. The diagram illustrates how sound is scattered by concave surfaces, but gathered to focus points by convex shapes.

GEOMETRY & ACOUSTICS

The boundaries of a room greatly affect how sound is perceived inside. The surfaces and obstacles within the room reflect and scatter the sound, changing its properties. Several geometrical parameters, such as size, proportions and shape, affect the acoustical properties of a space. A big voluminous space usually has a longer reverberation time and is more likely to create echoes than a smaller space. The proportions of a space are a deciding factor, especially in smaller rooms, where a similarity in dimensions between length and width result in coinciding resonances. The shape of a room affects the reflection patterns of the sound, where irregular shapes have the potential for better design control, but are also more complex to predict (Grueneisen, 2003).

MATERIAL & ACOUSTICS

Material is of great importance to the acoustics of a space. There are several characteristics of a material that determine its acoustical qualities, among them are its density, elasticity and plasticity. Sound moves quickly through steel, which is densely packed, but is deadened or absorbed by cotton (Lipps & Lupton, 2018, s. 49). Brick, tile, glass and plaster causes sounds to bounce and echo, while surfaces that are soft, perforated or furrowed can control the overall loudness of a room as well as make speech more intelligible (Lipps & Lupton, 2018, s. 127).

METHOD

“Even the eye touches; the gaze implies an unconscious touch, bodily mimesis and identification.”

Juhani Pallasmaa

METHOD

The project has been examined through an explorative and iterative process, going back and forth between design and research. Overall the exploration has been made through physical tests, digital modelling, interviews as well as through development of prototypes.

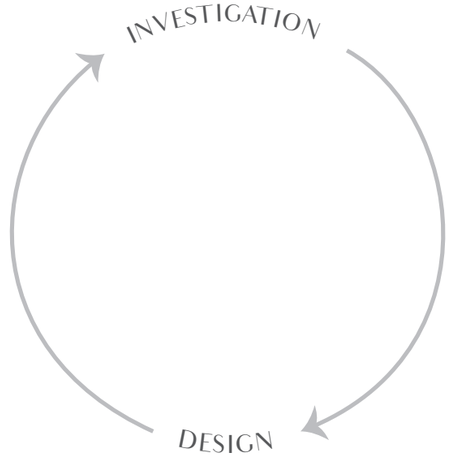


Figure 33: Illustration of method

DELIMITATIONS

HAPTICS IN FOCUS

To focus on all the non-visual senses, and still manage to create a deep and rich analysis of their usage, would be too big of a project for this thesis. Thus, the main focus has been on tactility and how the sense of touch can be used in architecture to improve the overall experience of the building. The focus on touch, rather than sound or smell, fell naturally when the initial design investigations and interviews showed that tactility was currently underused while simultaneously being desired in architecture. That being said, acoustical elements and scents have been added to the final project proposal, though they are not in focus.

INSIDE OVER OUTSIDE

As tactility is on a very zoomed in scale, the bigger picture of the bathhouse has not been in focus. An overall design of a floor plan has been made, where spaces that are outside the bath ritual have been allocated a space. However, as these spaces are not the main focus of the project, they have not been developed to as high of a resolution as the actual bath sequence. This further applies to the exterior of the building, which has been left out of focus in favour of the buildings internal experience.

INFORMATION AND TACTILITY

The tactile patterns of the building have been created with a focus on the tactile experience of the pattern as well as it’s ability to guide the visitor through the bath. The manufacturing process of the patterns have not been in focus, but rather how these patterns can contribute to the tactile experience of the bath.

DESIGN INVESTIGATIONS

"The dominance of the eye and the suppression of the other senses tend to push us into detachment, isolation and exteriority."

Juhani Pallasmaa

INVESTIGATION 1: BLIND WALKS

METHOD

The method for this investigation was to walk through Valhalla, Hagabadet, Art Garden Spa and Svettekörka twice: once with eyes closed and once with eyes open.

AIM

The aim is to reflect over how the sensory experience of a bathhouse changes when the visual input is taken away. Does any of the senses become more dominant? What logistical problems occur?

SELECTION

The four bathing facilities that have been chosen for this experiment are all of different functions. One is mainly meant for exercise, one is meant for relaxation, one is a cultural experience and one is a historic cleansing space for the city.

VALHALLA

Valhalla is a swimming facility in central Gothenburg that opened in 1956. The facility is mainly used for exercise and consists of two larger pools, which are used for swimming and diving, as well as two smaller pools, which are mainly used for teaching swimming and catering to smaller children.

HAGABADET

Hagabadet is the oldest facility of the four baths, built in 1869. The bath was originally built as a cleansing place where the public of the city could go to wash up, but has in later years been viewed as more of a combination between spa and sports facility.

ART GARDEN SPA

Art Garden Spa, placed on Hisingen, is part of hotel Arken and focuses on relaxation. With a multitude of pools and saunas, the spa has a gradient of temperatures and offer a variation in activities.

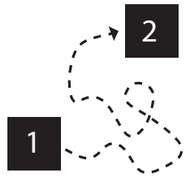
SVETTEKÖRKA

Svettekörka is a public sauna in central Gothenburg, which was inaugurated in 2015. The new addition to the city is part of a public swimming park which also contains two swimming pools. A visit to the sauna lasts for little under two hours and the visitor can go back and forth between the hot sauna and the chilly outdoor pool.

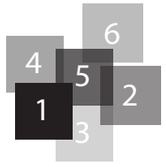
OBSERVATIONS

Below are some observations made during the Blind Walks design investigation.

CIRCULATION



There is nothing that signals in which direction one should go



The organization of the spaces felt confusing

SAFETY

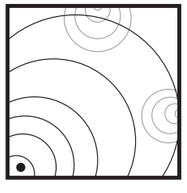
Unless you can have a haptic connection to the environment besides your feet, you feel unsafe

SEATING

Potential to sit or lie down in pools were appreciated

SOUND

Nature sounds, such as water, were calming



Many rooms with echoes and long reverberation times

SMELL

Strong smell of chlorine, that gradually becomes fainter

Nature smells, such as wood and flowers, were appreciated

TOUCH

Most floors had square tiling that felt bland and uninformative

Pending between hot pools and cold showers gives a refreshing experience

The shape and surface structure of geometry was important to how they were perceived when touched

Contrast in roughness next to each other felt interesting to explore

Only water and air touch all parts of the body

Water fountains can be used for back and neck massage

SIGHT

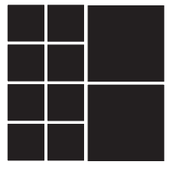
Different temperatures give different comfort levels: below 28^{0}C can appear a bit chilly, 34 ^{0}C is bordering too hot for comfort without the ability to cool down

Other things than darkness can be used to obscure sight, such as bubbles or steam

CONCLUSIONS

Below are some conclusions made from the observations gathered in the first design investigation.

SIZE



ORGANISATION

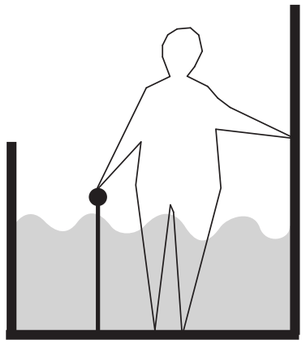
In order to make the building feel logical when it comes to orientation it is important to optimize the organization of spaces.

DIRECTION

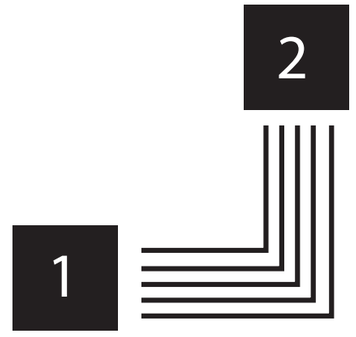
FLATNESS

Possible things that could help increase the pleasantness of floor tiles is sizing, organization, direction and height differences.

Contrasts are important and should be used in, for instance, temperatures, materials and surface structures.



To feel safe in a space it needs to feel like it's not just one big open room. This does not necessarily need to be fixed by walls, but can be done, for instance, through a connection to a railing, by having clear tactile paths that guide the visitor through the space or through feeling like you are part of a smaller space within the space, such as a pool.



Navigation of space is important. To help make space more easy to navigate tactile paths would be useful.

INVESTIGATION 2:
DOCUMENTATION OF TOUCH

Figure 35: Photo taken during the sighted walk

METHOD

This design investigation was made by walking through a bathhouse and documenting everything that was touched. A sighted walk and a blind walk was compared to each other.

AIM

The aim of the investigation was to find architectural elements that needed extra attention in regards to haptic design.

SIGHTED WALK RESULTS

Figure 36: Photos showing all touch points during the sighted walk.

REFLECTION

Throughout the bathhouse the main body parts that were in contact with the environment were feet and hands. While seated the legs and back were in contact with the surroundings as well. The only full-body contact with the surroundings were with water, either from pools or showers.

OBSERVATIONS

The roughness of the stone was almost like a massage while walking on it.

The smooth hand rails and door handles felt bland.

The square tile pattern was difficult to understand with your feet.

The main touch points in the bathhouse were:

- floors
- hand rails
- door handles
- railings in pool
- shower knobs
- water
- seating
- walls that take you into smaller spaces

BLIND WALK RESULTS

Figure 37: Photos showing all touch points during the blind walk.

REFLECTION

Once again, hands and feet were the main body parts in contact with the surroundings. The main difference from the sighted walk was that the use of hands increased. Aside from their previous functions, they were now, furthermore, used to guide the visitor through the space.

OBSERVATIONS

The rectangular tiles made it easier to distinguish direction.

The position of door handles can be tricky to find without sight.

While walking one felt at most comfortable while holding one or both hands against something.

The main touch points in the bathhouse were:

- floors
- walls
- hand rails
- door handles
- railings in pool
- shower knobs
- water
- seating

CONCLUSION

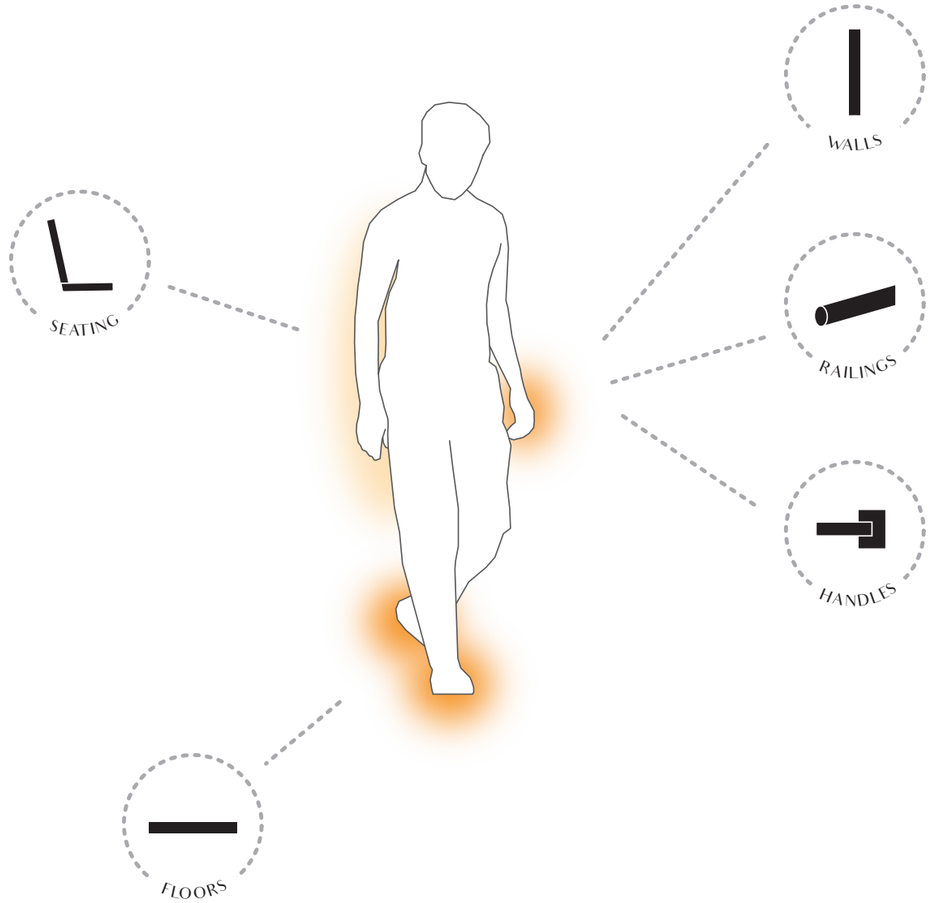


Figure 38: Diagram of how the body interacts with space.

Both during the blind and the sighted experiment the main touch point between body and architecture came through feet, closely followed by hands. Hands were used frequently during both walks, but were used in higher frequency once vision was taken away. While blinded, the hands were used like haptic eyes, searching for spatial borders and information regarding the room. Thus, during the second walk, walls were touched with a higher frequency than during the sighted walk. Other connection points for the hands were handles, hand rails and shower knobs.

Aside from hands and feet, the back and thighs were also in direct contact with the environment. This mainly occurred while seated.

The only elements that touched the entirety of the body were air and water.

INVESTIGATION 3: INTERVIEWS

METHOD

During this investigation three people were interviewed, all of whom have a sight disability. The interviews were conducted one on one and were done in the form of qualitative semi-structured interviews.

AIM

The aim was to gather input regarding how people with sight disabilities experience space as well as their view on the bath experience.

PARTICIPANTS

The three participants are all members of SRF (Synskadades Riksförbund) and all three live in Gothenburg. One of the participants have been blind from birth. The other two participants have been living with their sight disability around a decade and would grade their sight disability a 3-4 on a scale of 1-10, where 1 is blind and 10 is full sight.

QUESTIONS

The following questions were used as an outline for the interviews:

1. On a scale of 1-10, where 1 represents completely blind and 10 would be full sight, how would you rate your vision?

2. How long have you been living with your visual impairment?

3. Describe a route you often walk.

4. Describe the room we are in.

5. Describe a place that you like.

6. Describe a place that you dislike.

7. How often do you visit baths?

8. What kind of public baths would you most likely visit?

9. Do you usually go to baths alone or with someone?

10. Describe a bathing experience you remember.

11. How do you perceive architecture to be adapted for the visually impaired today?

12. How do you feel that architecture can be improved to better suit people living with a sight disability?

SUMMARY OF INTERVIEWS

This section contains a summary of comments that were made during the three interviews.

SPACE

Rooms are mainly described by their physical environment, such as room size and furniture. Descriptions about sound, smell or taste barely occurs.

The size of a space can impact the mood of the environment. One such example which is mentioned is how a large room volume contributes to the epic feel of a church.

A space is interpreted as more pleasant if it has a personality. Standardized spaces are interpreted as boring and as if they are not as thoughtfully put together as more personalized spaces.

Most participants described a desire to stay in one place for a longer period of time. This was mainly due to the stress of not knowing how other people move in the space.

NAVIGATION & CIRCULATION

Spaces that do not feel too narrow are easier to navigate, but there is a limit. If the place is perceived as one big, open area, such as a square, the space becomes difficult to understand. Corridors are described as easier to understand than big, open spaces.

Inaccessibility in regards to space mainly correlates to navigation. A commonly mentioned example is how to find a reception when entering a building, as the placement of the reception is not always obvious to someone who has a visual impairment. Things that are mentioned that would help this navigational issue are organisation of functions, tactile floor paths as well as contrast in light, colour and touch.

Mobile objects, such as cars and people are the most difficult to navigate around. It can be difficult to understand where other people are within the space.

Tactile paths should be planned according to circulation and the placement of them should be done while considering how different paths intersect.

Organisation of functions and tactile paths are important for the navigation and experience of a space.

The placement of tactile paths should be designed so it discourages future placement of objects on the path, which then would block the trail.

Tactile trails should coincide with general walking paths.

If one is unable to see the number of a locker, it is more useful to remember the placement of it.

The tempo at a spa is slower than that of everyday walking.

The sequence of functions should be logical and it should be easy to go from one function to the next. If there are multiple doors in between the different functions it becomes difficult to understand the layout of the space.

Logical naming of spaces help navigation. Instead of naming a room after a person, it is more helpful to give it a name which corresponds to its function and/or placement in the building.

Straight paths are easier to navigate than ones that are skewed. Roundabouts are more difficult to navigate than crossings. Always consider that the person wants to take the simplest route to their destination.

There was an occurrence of counting steps in staircases in order to know when they end. There could be a tactile marking at the first and final step so this would not be necessary. It also gives the opportunity of giving a poetic meaning to the numbers.

SAFETY

Stairs that lack handrails are experienced as intimidating and unsafe. The same goes for stairs with handrails that start at the same position as the stair itself. Ideally the handrails can be found before the stairs start so that the visitor is guided to the stairs before going down or up.

Open areas, such as squares, can be perceived as confusing and unsafe.

Ramps into the pool creates a more pleasant transition between land and water, where the unsafe feeling of the sudden height drop has been removed.

TOUCH

Pleasant temperatures, such as that of the sauna or of a pool, are mentioned throughout the interviews.

Several spa facilities lend out slippers that are compulsory to wear inside the building. The slippers have been described as a safety hazard as they often are of a size that do not suit the feet, causing falls. Furthermore, the connection to the ground is removed.

Water overflowing from pools cause the floor to feel slippery.

The weight and surface structure of a material is important for the overall feel of a space.

Tactile trails should communicate when something new is happening along the path. For instance, where a path is forked into several different paths, or where a ramp starts. This communication could, furthermore, be applied simultaneously for the hand in railings or on the wall.

Contrast in touch is important in order to create a tactile communication system.

Tactile trails in the shape of sinus waves can be felt through shoes by most people who have a sight disability.

Tactile paths could have different designs depending on what they lead to.

Tactile signs could be used for lockers.

The tactility of a material is important for the overall experience of a space. Wood is described as warm and beautiful, while metal is described as cold.

Wood railings are preferred over ones made of metal because of their haptic qualities. Metal railings feel cold and can be experienced as unclean since the smallest change on the surface can be felt due to the smoothness of the material.

The geometry of a railing is important. Metal railings that are uniform are not appreciated, while wooden railings, where the geometry changes at the start and end, are described in a positive light.

Orientation of the building can be made easier if railings have the level of the building written in braille at the end of them.

Round surfaces are described as warm, while clean, hard surfaces are described as cold.

Being able to pass through contrasting temperatures during the ritual can add to the experience.

SOUND

Speakers can be used to give information about location. An example that was used was tram stops and trams.

Acoustics should fit the function. Long reverberation times are considered annoying for spaces where the main activity revolves around talking, however, long reverberation times are described as calming and beautiful in places that are mainly silent.

If the surrounding sounds are not absorbed, they can hinder the function of the room.

Sound is the main sense used in order to understand the surroundings.

Sounds of functions can be used to guide, such as the sound of water from showers.

The acoustics of a building can be a conclusive factor whether that building is perceived as beautiful or not.

The acoustics of a space can be described as warm (absorbing sounds) or cold (reflecting sounds). Spaces with a warm sound have been described as preferable when talking and also makes a space easier to navigate. Spaces with a cold sound has been described as good for singing, but can also be thought of as sterile, impersonal and at times difficult to navigate.

The shape of the ceiling, as well as its material, is crucial for determining the acoustics.

The size of the space can affect the acoustics. Large spaces have a higher chance for echoes that can be confusing and distracting to the user.

SIGHT

Glass doors are difficult to perceive by someone with a sight disability.

Contrast in colour or light can be used to highlight important parts of the building.

CONCLUSION

Navigation of the building, both towards the building and inside of the space, was touched upon several times during all interviews.

Tactile trails were mentioned several times by all participants.

Organization of functions was commonly talked about.

Circulation was a common topic in all the interviews.

Acoustics and tactility was mentioned by all participants.

Contrasts in tactility, acoustics and experiences were mentioned several times.

INVESTIGATION 4:
PATTERN MEETINGS

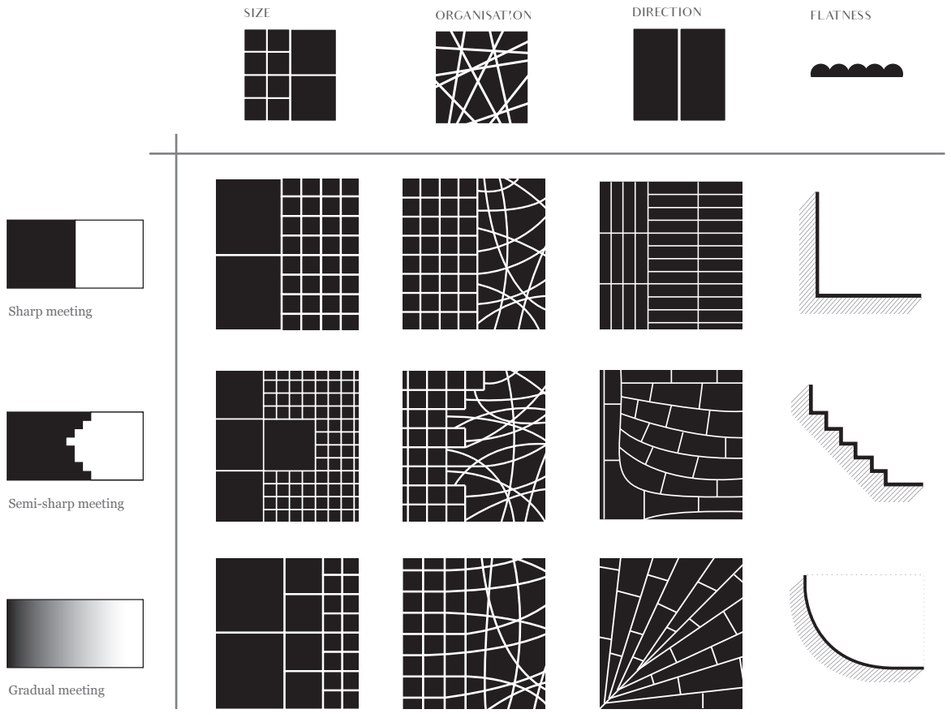


Figure 39: Chart of pattern meetings

METHOD

This investigation was done by sketching different pattern meetings through the parameters found for floor patterns in design investigation 1.

AIM

The aim was to find different types of meetings between patterns and analyse how they could be beneficial in the bath house.

RESULTS

Three types of meetings were found and studied for the different pattern qualities: the sharp meeting, the semi-sharp meeting and the gradual meeting. These meetings have different properties, making them useful for different functions in the bath house. For instance, the sharp meeting can be useful when wanting to create a stark difference, such as informing the visitor if they are on the tactile path or not, while the gradual pattern could be of interest in meetings concerning body parts, such as if a pool floor morphs into seating.

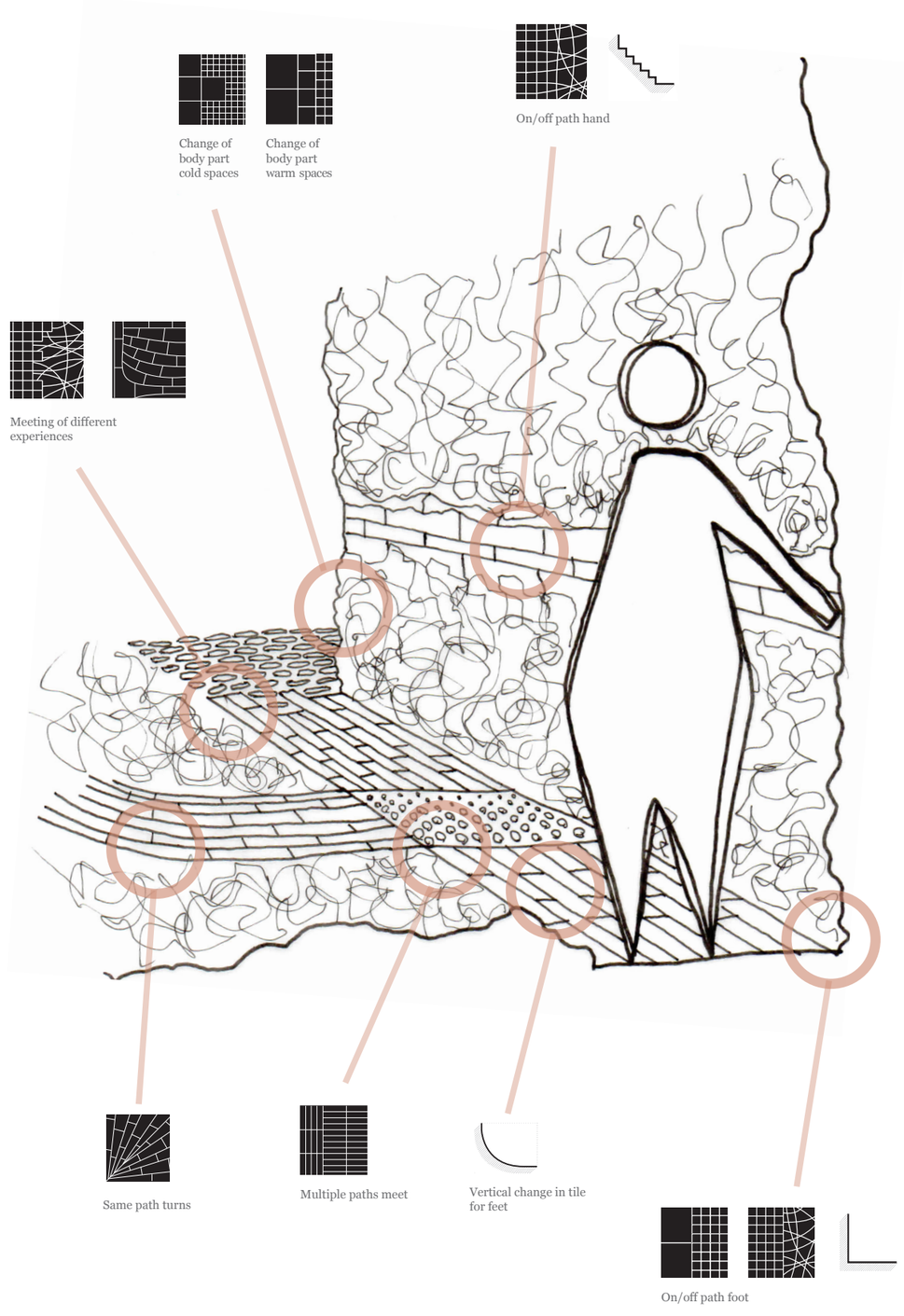


Figure 40: Application of pattern meetings

INVESTIGATION 5: FOREST PATTERNS

METHOD

The method of this investigation was to document and analyse common forest patterns.

AIM

The aim was to find patterns that could be used in the bathhouse and to look into pattern strategies overall.

RESULTS

Aside from finding several patterns that could be used for the building, the experiment also revealed certain overall parameters about pattern logic in general. One such major insight was that frequently, in nature, inner patterns existed within outer patterns. One such example is how the fir cone has an overlapping, radial pattern of flakes, and then on each flake it has an inner linear pattern. This way of having a multi-layered system of patterns could be used in the tiles for the tactile paths in order to give a multitude of information within one system.

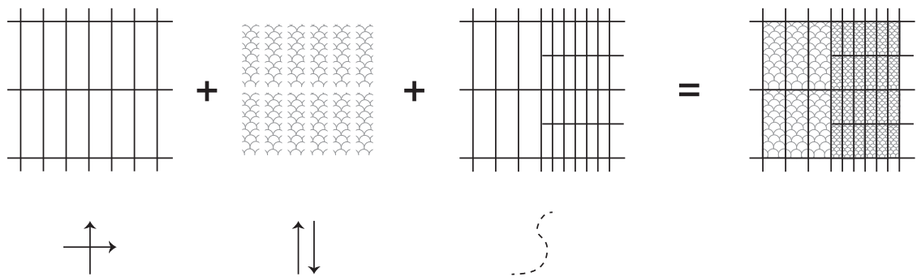


Figure 41: Diagram of tactile pattern logic. An outer pattern makes it possible to distinguish between the x- and y-direction of a room. An inner pattern allows for knowledge of whether one is moving forwards or backwards. A disfigurement of the pattern, such as change in size or z-direction, makes it possible to know whether one is on the tactile path or not.

Figure 42: Moss

Figure 43: Leaves

Figure 44: Bark

Figure 45: Inside meets outside

Figure 46: Radial meets linear

Figure 47: Pine

Figure 48: Mushroom

Figure 49: Fir cone

Figure 50: Bark Pine

INVESTIGATION 6:
TILE RATIOS

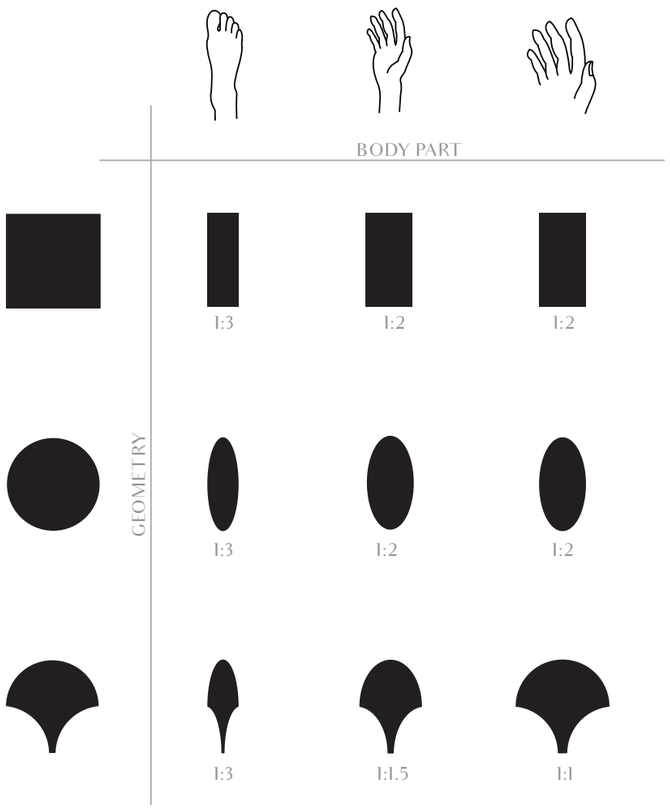


Figure 51: Table showing the results for different body parts. All geometries have a length of 100 mm.

METHOD

The method was to create prototypes of common tile patterns with different ratios between height and width and then test them on different body parts.

AIM

The aim of this investigation was to find which ratios made it possible to sense a direction in the tile.

RESULTS

Feet needed the most difference between length and width in order to sense a direction. Hands and fingers generally could sense a direction with similar measurements. The geometry which was not symmetrical in two directions was easier for the hand and finger to sense a direction in, without having that much difference in the ratio. However, this shape was difficult to understand by foot.

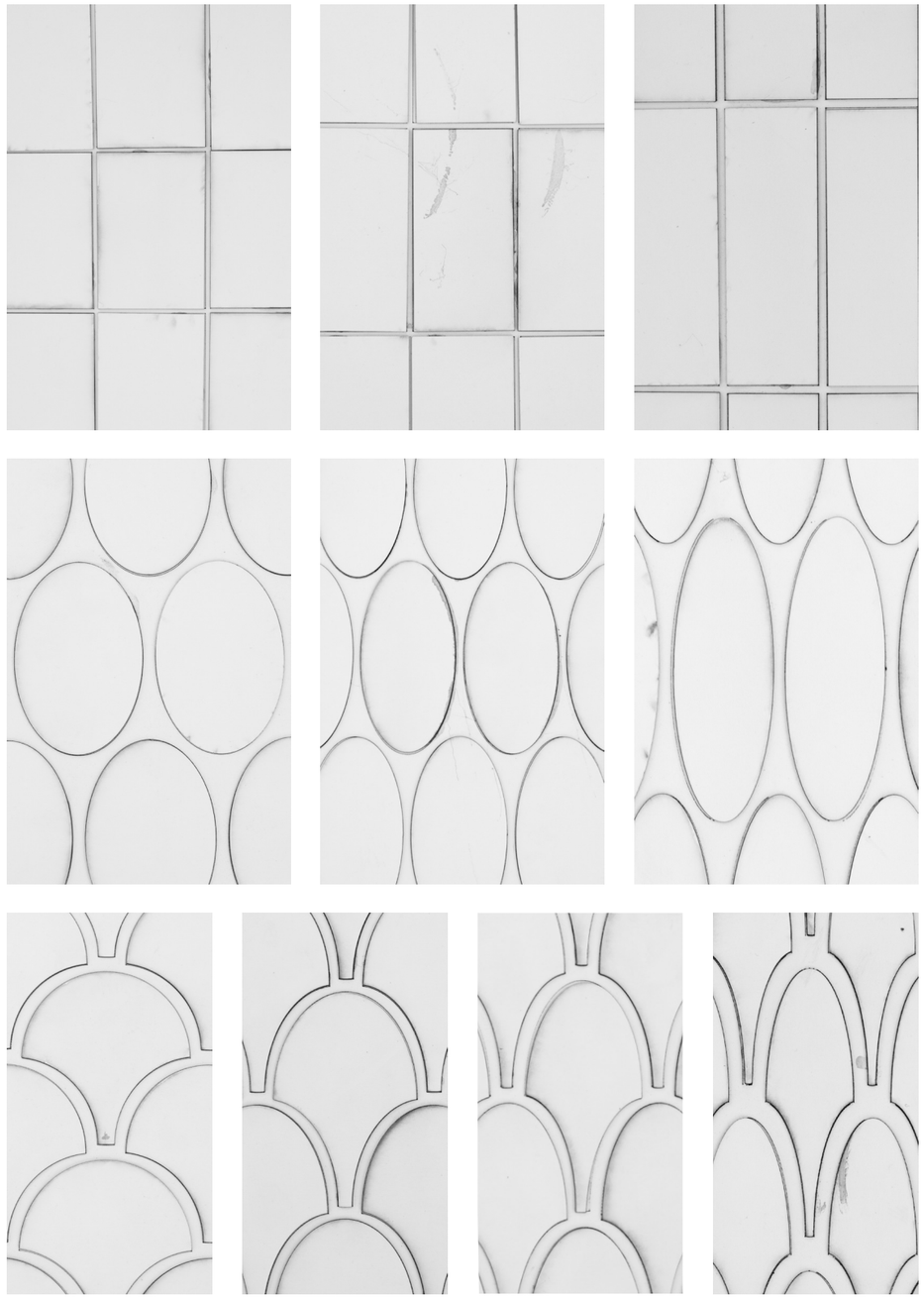


Figure 52: Photos of physical models. All models were made with the height-length ratio of 1:1,5, 1:2 and 1:3. The third tile pattern was furthermore made with the ratio 1:1, but as the circle and the square are symmetrical in two directions, prototypes of them were not made with this ratio.

INVESTIGATION 7:
TILE SIZE

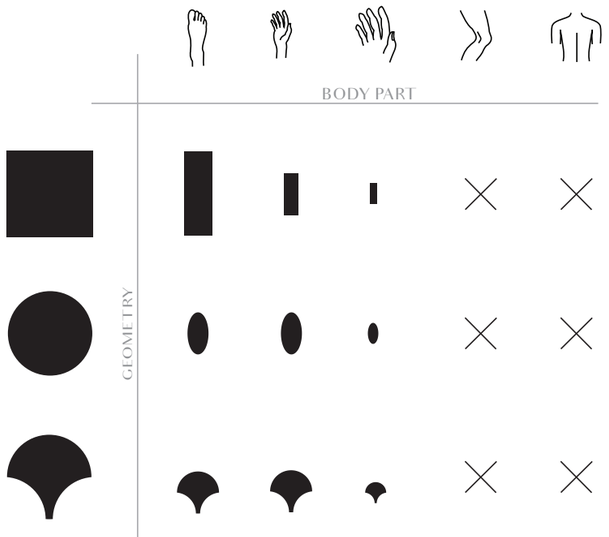


Figure 53: Table showing the results for different body parts. The medium size has a length of 100 mm. The largest size is twice as big. The smallest size is half the size of the medium size.

METHOD

The method was to create prototypes of different sizes based on the patterns found in Investigation 6 and then test these prototypes on different body parts.

AIM

The aim of this investigation was to find how the size of a tile is experienced for different body parts.

RESULTS

In general, the medium size was the most appropriate for both hands and feet, while fingers were capable of distinguishing even the smallest pattern. For feet the size of the tile was not as relevant as the ratio between grout and tile. If the grout was too small, it was impossible to sense the pattern by foot. The patterns were impossible to determine for back and leg.

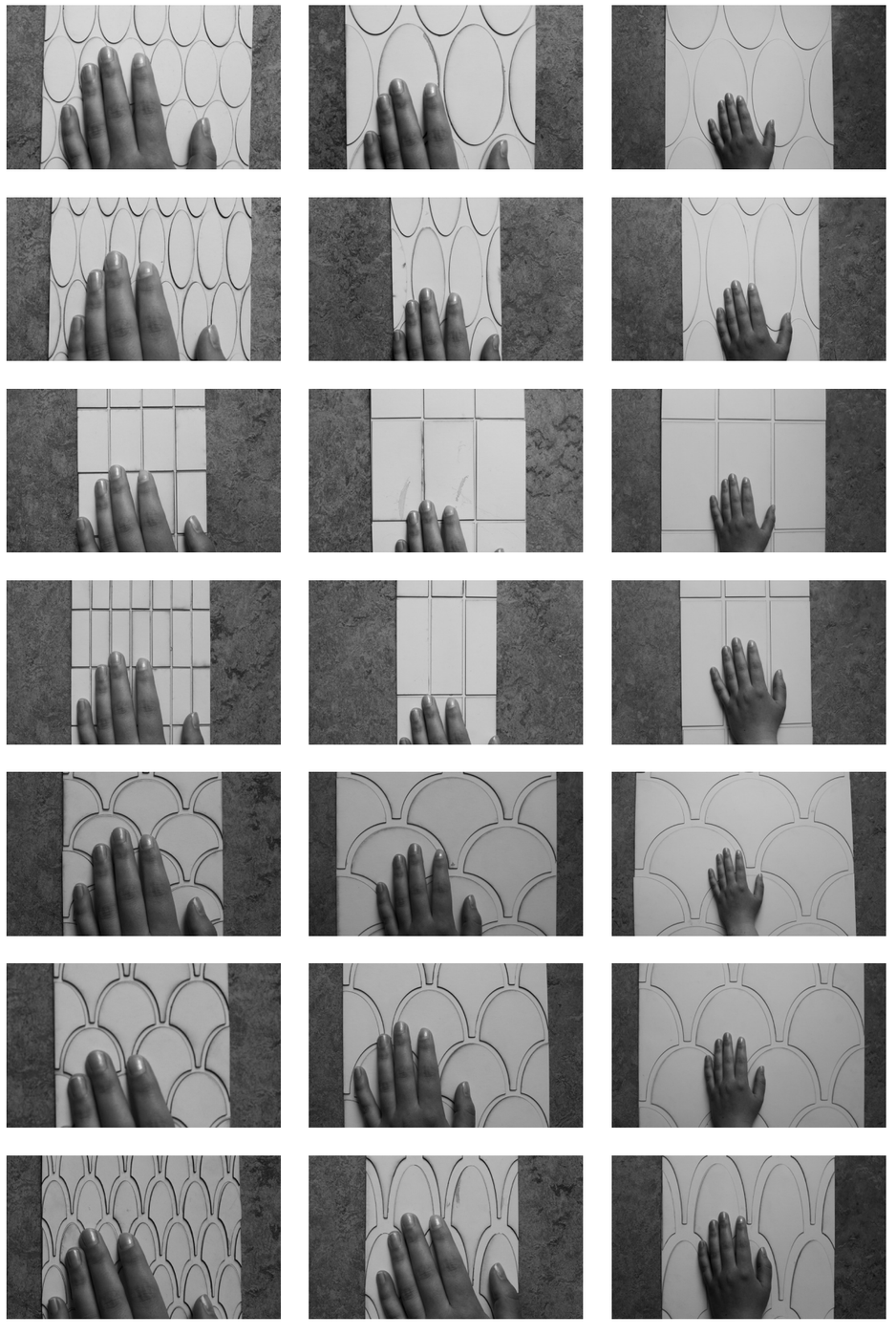


Figure 54: Photos of physical models

INVESTIGATION 8: ORGANISATION

METHOD

Investigate how the shape of the building affects the organisation of spaces by sketching different floor plan options. The investigations will look at floor plans with a rectangular, square, circular and oval courtyard.

AIM

The aim of this investigation was to see which shape would be most suitable in regards to organisation and circulation.

RESULTS

The circular courtyard gives the optimal floor plan in regards to circulation and of these the plan in row two, column one, is best suited for the theme of the four seasons. This plan would yield two longer spaces with a clear direction for spring and autumn, while winter and summer will lack direction and are given good proportions.

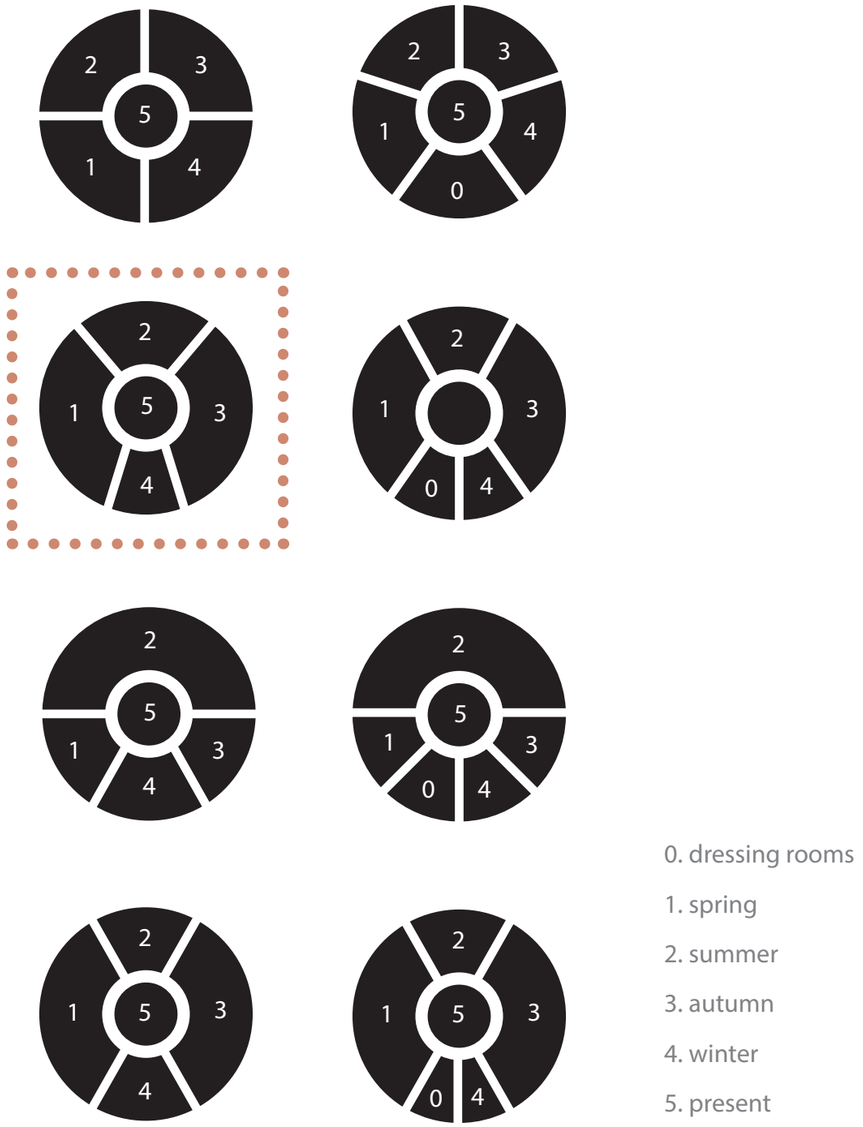


Figure 55: Investigations of floorplans with a circular courtyard.

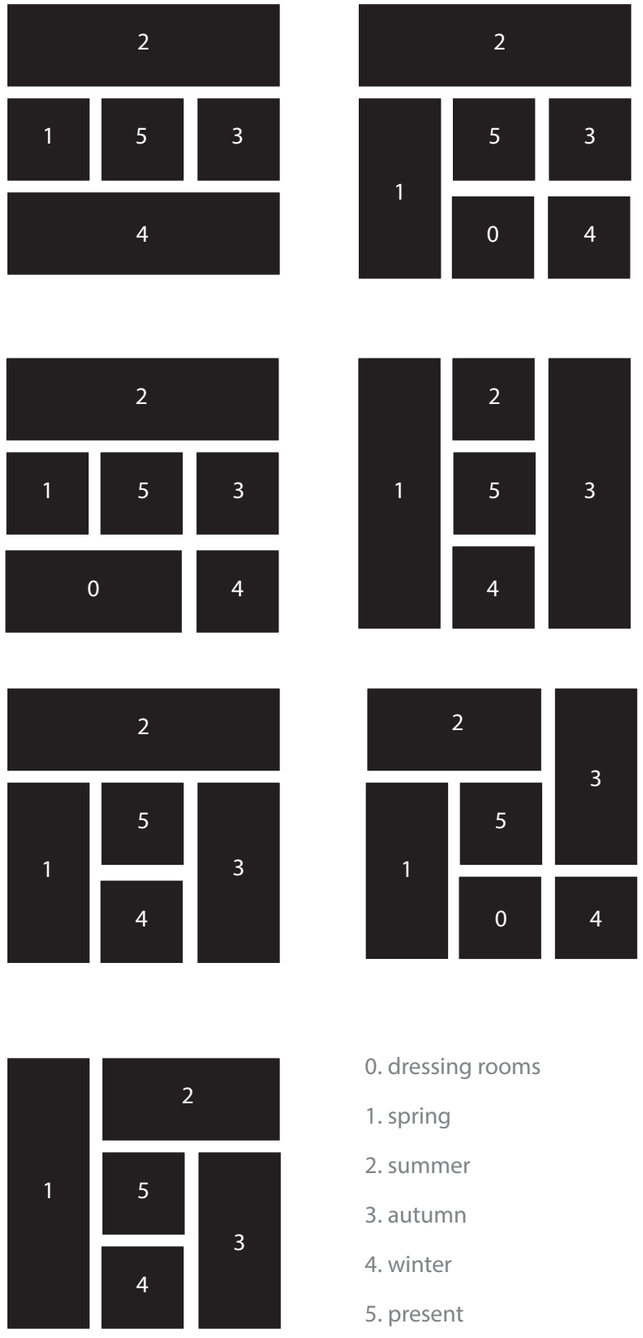


Figure 56: Investigations of floorplans with a square courtyard.

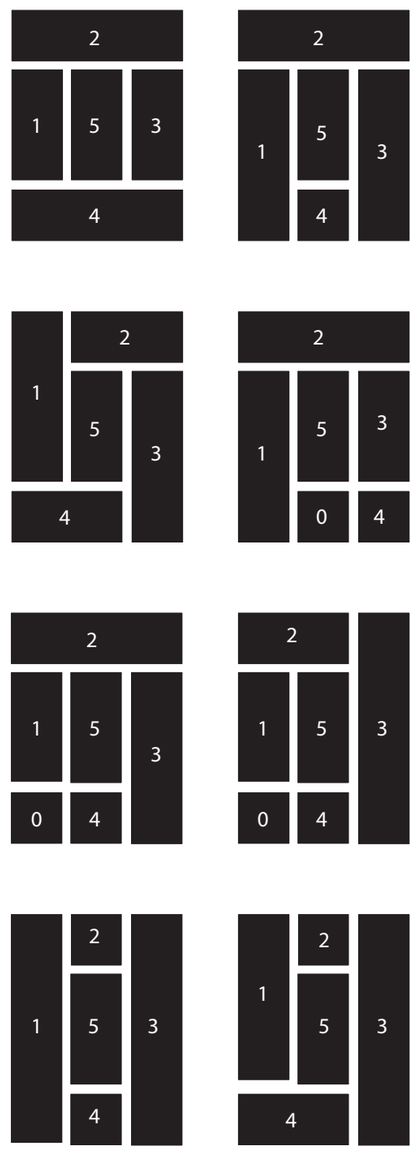


Figure 57: Investigations of floorplans with a rectangular courtyard.

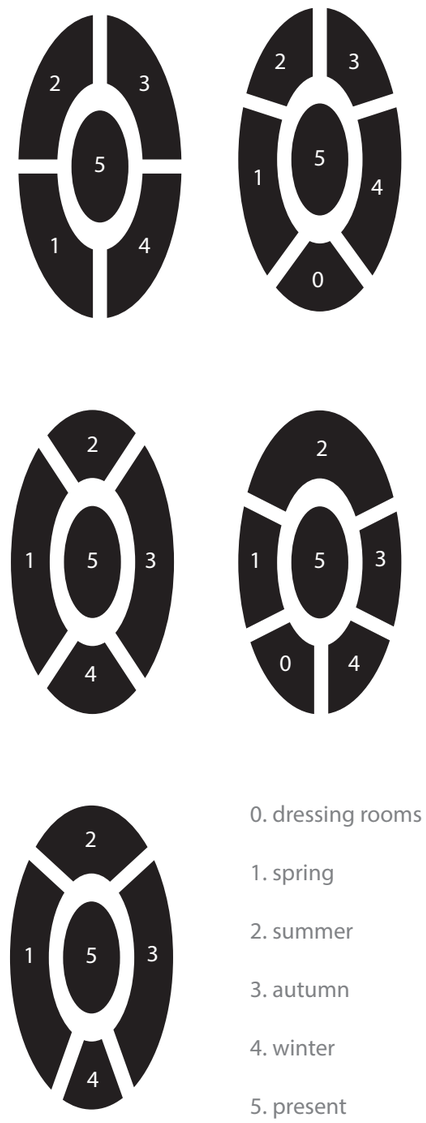
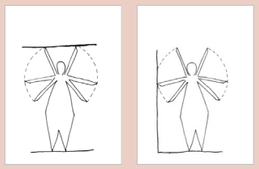
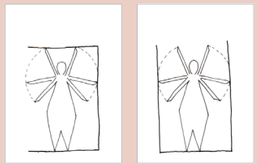


Figure 58: Investigations of floorplans with an oval courtyard.

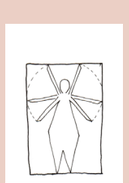
One connection



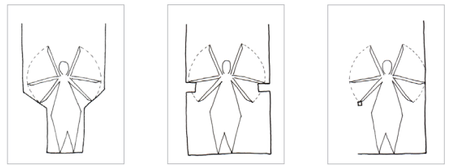
Two connections



Three connections



Four connections



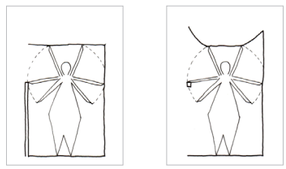


Figure 59: Section sketches sorted after the amount of connection points that exists between body and space. On the left the amount of connection points can be seen, while the images on the right show examples of such connections.

INVESTIGATION 9: TOUCHING SPACE

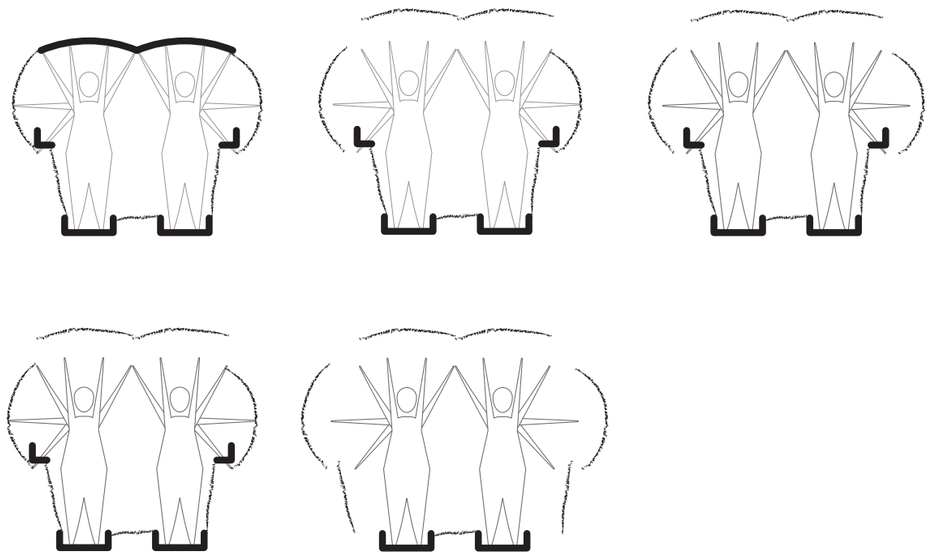


Figure 60: Examples of how the analysis can be used in the project. The shape of the space is determined by the reach of a body. The thicker line shows where tactile trails for orientation would go. The thinner line represents a surface with a non-orientation-related tactile pattern.

METHOD

Create investigative sketches that study the tactile connections between body and space.

AIM

The aim of this investigation was to examine the scale in-between room and furniture in order to see how space is affected by creating a design focused on tactility.

RESULTS

Through the sketches it became apparent that there are four different levels of touch between body and space, ranging from only having one connection to having four connections with space. If there is only one connection this will be between feet and floor. If there are several connections, they can be created in a multitude of ways. Although, because of different body heights, the ceiling is difficult to use as a tactile element.

DISCUSSION

”It is evident that ‘life-enhancing’ architecture has to address all the senses simultaneously, and help to fuse our image of self with the experience of the world.”

Juhani Pallasmaa

The main point of this thesis has been to explore the non-visual elements of design and in extension create a piece of architecture which carries a richness to those who are visually impaired. The research has focsed on the tactility of space and has in such resulted in a spa experience where all elements of the building, ranging from space to details, have been designed with tactility in mind.

WHAT IS LEFT OF ARCHITECTURE IF WE TAKE AWAY THE VISUAL STIMULUS?

The method used when designing this project, to imagine a space without visual stimulus, guided the project away from designing for the eye. In this process it became apparent that non-visual senses can give as much depth and beauty to a project as that of the visual aesthetics. It also became evident that the lack of visual information gave way to new design problems, such as how the visitor would be able to navigate inside the building. The focus for this spa has been the haptic experience and how tactility, both in material and in space, can enhance an architectural experience. This focus on the sense of touch gave an expression to new types of spaces where the reach of the body and the distribution of the nervous system inform the design.

HOW CAN THE NON-VISUAL SENSES BE USED IN ARCHITECTURAL DESIGN TO ENHANCE THE EXPERIENCE OF A BATHHOUSE?

The bathhouse, as a building type, is the piece of permanent architecture with the most non-visual stimuli. Despite this, today’s architectural design of the bath is mainly focused on the visual experience. Through the design investigations made in this thesis it became evident that tiles in most bath spaces were generally designed for vision and function, with little to no thought of their tactile potential. By designing for the tactile experience of the spa, this thesis has been able to add another dimension to the sensory experience of the bathing ritual, allowing for the haptic experience to become more than just a movement between varying water temperatures. Further investigations into sound and smell would be an interesting continuation to the project. How would a deeper analysis of these two senses change the design of the spaces?

HOW CAN AN ARCHITECTURAL IDEA BE COMMUNICATED WHEN VISUAL INPUT IS UNAVAILABLE?

This question has been made increasingly difficult due to the ongoing pandemic of covid-19 which enforced a digital presentation format. The presentation idea that would have best suited the design result would have consisted mainly of tactile models where the visitor can trace plans and sections through their fingers as well as experience the patterns in their physical form. Through the lens of the pandemic the project was forced to present these findings visually, which gave an added difficulty, but also another dimension, to the project. For instance, the situation gave birth to illustrations where the visual look of the image is not the important part, but that the drawing highlights the tactile experience of the visitor. It was not only the presentation of the project which needed to be adapted due to the situation with social distancing, but also the method. Initially, the interviewees were meant to be incorporated as a focus group as well, giving them the opportunity to impact the ongoing design through workshops. These workshops would not only evaluate the design itself, but also the tactile communication of them, looking into tactile design methods and how these could be used in the design process.

HOW CAN THE EXPERIENCE OF A BATHHOUSE BECOME MORE ACCESSIBLE TO THE VISUALLY IMPAIRED?

Today, the spa experience is perceived as hazardous and scary to someone with a visual impairment. Through interviews it became evident that a spa retreat was not possible to do alone as the environment was too difficult to navigate and presented too many possibilities for injury. The final design proposal gives a proposition to a spa that would be accessible to non-sighted, as well as sighted, visitors. This is done by using ramps instead of ladders, consequently using tactile trails throughout the spa and by creating a clear layout that guides the visitor through the ritual.

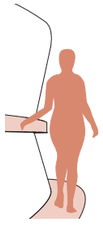
The main outcome of this thesis are the design strategies that can be implemented in other projects in order to receive a more multi-sensory architecture. The strategies mainly increase the sense of touch in a project, but some can be applied to other senses as well.

EXLUDE VISION

In order to refrain from getting seduced by mesmerizing visuals it is important to let go of visual design initially. Even while designing a space covered in darkness it was difficult to not consider how the design would look like and this habit of letting the eye decide is quite rooted in our decision making. Therefore, regardless of which of the non-visual senses one wants to incorporate, it is important to consider them while excluding the visual experience. How should it feel to touch this space? What does it sound like? What scents linger here?

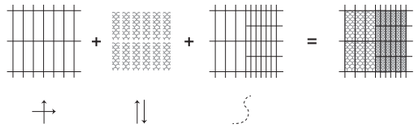
FOCUS ON HANDS

In most public buildings, our hands are our main tactile connection to architecture. Shoes prevent a close connection to the floor, but hands are at most times, free to explore architecture. Therefore, in order to design for touch, focus on design for hands. Door handles, railings and walls create great opportunities to explore tactile design.



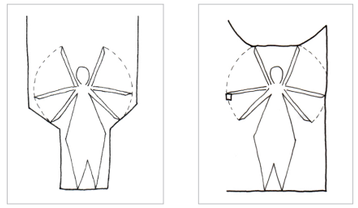
HAND TRAILS, NOT JUST FOOT TRAILS

The freedom of the hand can further be utilized in tactile trails. Today, tactile trails are designed for the feet, but when possible, creating a complement for the hand would be useful. More information can be interpreted through fingers than is possible through feet, especially while wearing shoes, and it also creates the possibility of incorporating information through braille.



COMMUNICATION THROUGH TOUCH

Information received through tactile trails tends to only give information regarding whether one is on or off the path. By rethinking the design of the trail pattern it is possible to give additional information such as in which direction the person is moving, whether you are moving towards or away from something as well as which type of activity the trail leads to.

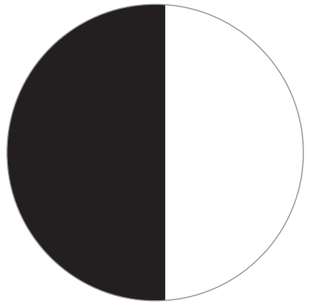


BODY AND SPACE

Something that becomes more evident when designing for touch is the relationship between body and space. The reach of the body determines the touchable boundary of the space and this should be considered when designing for a haptic experience. By considering how body and space interacts it is possible to direct the tactile experience of the building, controlling which parts of the architecture that are within reach and which are not.

BODY AS A PARAMETER

The resolution of the nervous system varies over the body, which is important to consider when designing for a haptic experience. To design a tactile pattern for the fingers is wildly different than designing one for the back. It is important to consider how the body will interact with the area and, in consequence, how this affects parameters such as size, roughness and sharpness of the tactile pattern.



CONTRASTS

It is important to consider contrasts when designing a tactile experience. A smooth material, in close proximity to a rougher texture, creates an interesting dynamic. A warm material combined with a cold material enhances both experiences. This tactic should not be solely used for tactile design, but can be applied to all senses and, thus, help create diverse and interesting spaces.

A MULTI-SENSORY DESIGN

Blind Trust has been a project investigating the possibilities within non-visual design. The aim of the project is not to exclude the visual design from architecture, but to critique the current domination vision has in architectural design. Ideally, ideas from this thesis can be used in combination with visual design, giving a holistic architectural experiences where all senses are meticulously considered in the design process.

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"The tactile sense connects us with time and tradition: through impressions of touch we shake the hands of countless generations."

Juhani Pallasmaa

HISTORIAL DE LA GRANDE GUERRE

Year: *1992*
Architect: *Henri-Edouard Ciriani*
Building type: *Museum*
Location: *Péronne, France*

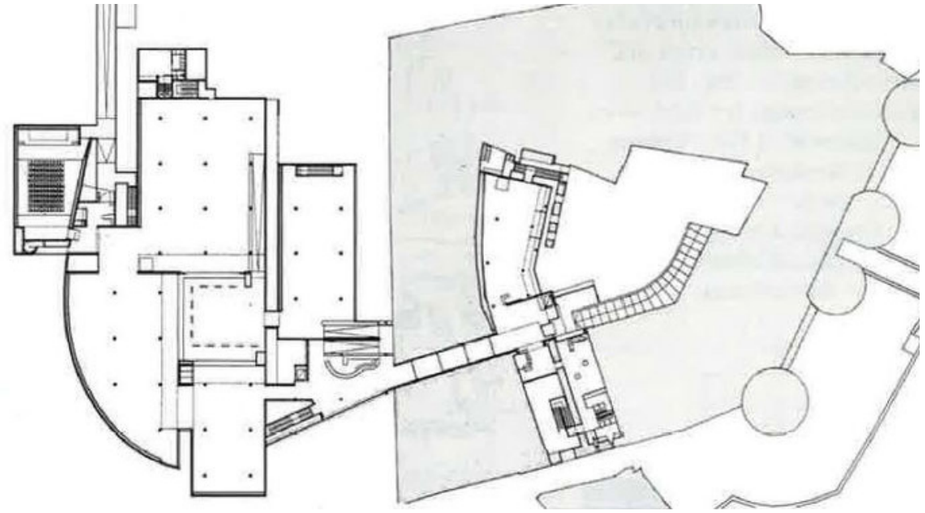

Figure 61: Plan du niveau haut : Historial de la Grande Guerre (Ciriani, 1992).

Historial de la Grande Guerre, designed by French architect Henri-Edouard Ciriani, is a museum located in Péronne, France. The museum displays the history of World War I from a new perspective by looking at daily experiences related to war and not just reducing the conflict to battles (Cercel, Parish, & Rowley, 2019, s. 198).

DIRECTING SPACE

The walk through the Historial is carefully planned. The different rooms represent different parts of the war, starting before the war breaks out and finishing in the fake promise of peace. In between the rooms the visitor will walk along ramps, symbolizing the decline into war itself.

ATMOSPHERE

As the different rooms represent different time points surrounding the war, the atmosphere within them is very different from one another. The first exhibition space, which represents a pre-war era, is clad in warm colours and wooden materials. The second room, representing the start of the war, is made with harsh concrete. The third room, which shows the acceleration of the war, has a shape which gives the room a directional force. The fourth and final room, which represents the promise of peace that never remain more than a promise, is white with lots of light while simultaneously being made out of harsh and cold materials.

ENCLOSED SPACES

The museum spaces are enclosed and introverted. The exhibition halls have no windows at all, while the passageways connecting them settle for a few, well-chosen views to the outside world. The framing of these lookouts have been meticulously designed and show only elements of nature, allowing for the visitor to get a glance of the water or experience a peek of the sky.

THERME VALS

Year: *1996*
Architect: *Peter Zumthor*
Building type: *Thermal Bath*
Location: *Graubunden Canton, Switzerland*

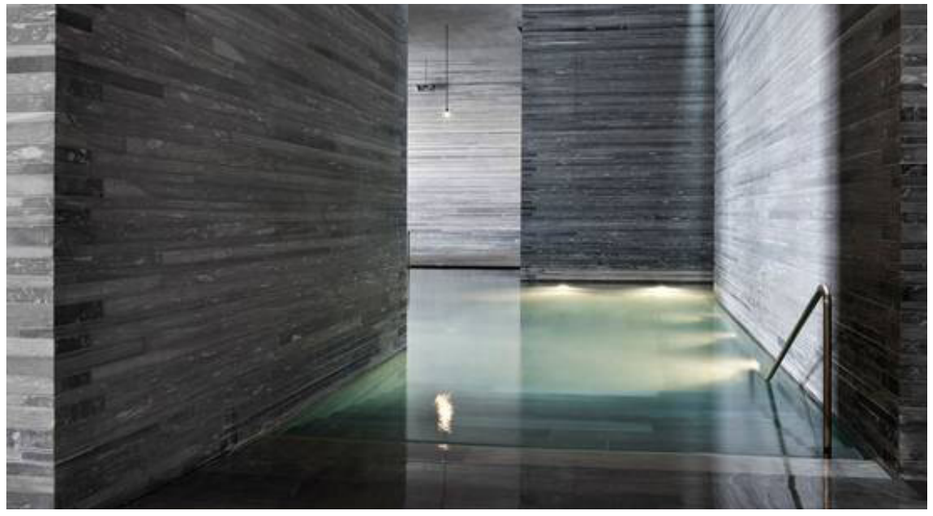

Figure 62: Einen Ausflug Wert: Therme in Vals (Therme Vals, n.d.)

Therme Vals, located over the only thermal springs in the Graubunden Canton in Switzerland, is a thermal spa designed by Peter Zumthor. Considered an architectural masterpiece, the baths were granted protected heritage status shortly after their completion and are a highly appreciated experience, both for the buildings relaxation as well as its architecture (7132 Thermal Baths and Spa).

ATMOSPHERE

The thermal bath consists of several different pools, giving the visitor a varied experience in temperatures, smells and acoustics. The pools are of different sizes and depths, allowing for both intimate and bigger, more open spaces. The ceiling height in one of the pools makes for wonderful acoustics for singing, another smells constantly of flower petals, a third is uncomfortably cold and placed right across from a fourth pool that is almost uncomfortably warm. One of the pools continues outside, allowing for the visitor to, at once, feel both the warm pool water and the fresh outside air.

MATERIALITY

The spa has meticulous lighting. Inspired by Kahn's way of designing with shadow, Zumthor designed most pools without windows in order to create silent spaces (Schielke, 2013). The light that is used enters the rooms mysteriously, through an opening, and highlights the texture of the locally quarried Valser Quarzite slabs that are used throughout the bath.

BLUR BUILDING

Year: *2002*
Architect: *Diller Scofidio + Renfro*
Building type: *Temporary Pavilion*
Location: *Lake Neuchatel, Switzerland*

Figure 63: Diller Scofidio + Renfro -- Blur Building, Exposition Pavilion, Swiss Expo, Yverdon-Les-Bains. (Widmer, 2002)

The Blur Building was designed as a temporary media pavilion for the Swiss Expo 2002. Hovering over the water of Lake Neuchatel, while being completely covered in mist, the pavilion is an architecture of atmospheres (Blur Building Swiss Expo 2002).

BLOCKING VISION AND SOUND

The building is constantly covered in mist, produced from the lake below. When entering the pavilion one looses both vision and sound, as only the big nozzles, which are used to mass produce the surrounding fog, can be heard. Inside the pavilion "*there is nothing to see but our dependence on vision itself*" (Blur Building Swiss Expo 2002).

WATER AS BUILDING MATERIAL

The Blur Building is completely covered in fog. A smart weather system analyses the current conditions and regulates the water pressure accordingly. Thus, the water becomes not only the walls and borders of the building, but fills up the entire volume, affecting space itself. Furthermore, the fog as building material is used to affect the senses. It works as a haptic component of the building, lingering against the visitor's skin, and as a culinary pleasure, making it possible to drink the building.

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