DIALOGUE IN THE DARK

Designing inclusive space for the visually impaired

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THANK YOU

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ABSTRACT

Dialogue in the dark explores architectural strategies to enhance the social inclusion of people with visual impairment. In the latest world report on vision (WHO, 2019), at least 2.2 billion people around the world have a vision impairment. The figure in Sweden is approximately 100,000. It is quite a large group in the world. However, due to their dysfunction problems and the lack of inclusive environment, they are easy to be excluded by most of the architecture today. Even worse, they have a higher risk of being marginalized in society. There seems to be an invisible wall dividing the visually impaired and the sighted.

The thesis aims to break down the “invisible wall” and create opportunities for equal dialogue between these two groups. Mutual understanding is the key to social integration and interaction. The idea is to encourage the visually disabled to embrace the world and to raise public awareness and overcome prejudice and stereotype.

To achieve the goal, it starts with the question - what type of buildings do we need, and how could it interact with the public? By literature study, case, and historical study, it resulted in an activity center for the visually impaired but also shared by the public. The building provides an inclusive, collaborative, and creative environment for everyone. It is a place where the visually impaired can gather around and provide peer support for each other. Besides wandering around the building brings people into an immersive multi-sensory journey, which slows us down and focus on the body itself and its relation with the external environment.

Another intention of the thesis is to explore the possibility of materializing the abstract senses and investigating how to stimulate them by architecture. Instead of a thorough study of all the senses, it mainly focuses on haptic perception and how to use architectural materials to support active and passive touch.

Hopefully, the thesis will lead to a discussion about how to emphasize the visually impaired in design and architecture and therefore contributing to an inclusive society.

Visual impairment, social inclusion, activity center, multi-sensory design, haptic design

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01. INTRODUCTION

In chapter one, the motive and academic framework of my thesis will be presented. There is a reading instruction for the booklet in the end.

MOTIVE

Why the visually impaired?

Over a billion people live with some form of disability, corresponding to 15% of the total population (WHO, 2017). Due to their dis-functional problems and social barriers, they are easy to be excluded by access to healthcare, education, and employment. They are among the most marginalized and most impoverished groups in the world (WHO,2017). In a healthy, justice, and sustainable society, everyone should fully and equitably enjoy human rights and live with dignity and happiness. In an inclusive society, it is crucial to care for vulnerable groups, and that is the initial motive for the thesis work.

To limit the scope, I will only focus on people with impairment. Here are the three main reasons.

1. Large group
In the latest world report on vision (WHO, 2019), at least 2.2 billion people around the world have a vision impairment. In Europe, the number is 30 million, which means an average of 4 in 100 Europeans is affected by vision loss (European Blind Union). In Sweden, Synskadades Riksförbund (The Swedish Association of the Visually Impaired, SRF) estimates approximately 100,000 people have a visual impairment.

2. Isolated
Given the adverse effect on mobility and lack of inclusive built environment, people with visual impairment are more likely to be excluded by architecture today. Kempen et al. (2012) concluded that vision loss has a substantial impact on mental health issues, such as depression and anxiety. Both mobility and emotional issues enhance their feeling of loneliness and social isolation.

3. Dominant sense
In western culture, sight has historically been regarded as the noblest senses (Pallasmaa, 1996). It is wildly known that vision has a dominant position in perception, while the other senses are suppressed. This phenomenon also exists in the built environment. Architects are used to relying on the vision to consider spatial qualities, function, and aesthetics (Pallasmaa, 1996). As an architecture student, I regard this thesis as an opportunity to open up perspectives for designing and explore how to integrate all the senses.

THESIS QUESTIONS

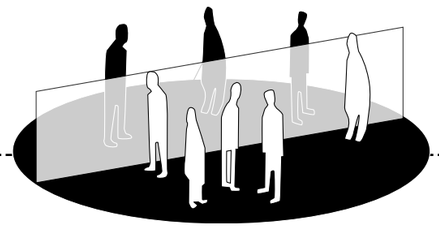
Main question

How can architecture enhance the social inclusion of people with visual impairments?

Sub questions

01. What type of public building can include them in society?

02. How can abstract senses be materialized and stimulated by architecture?



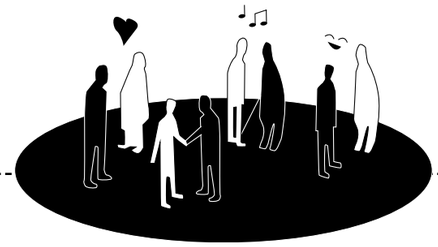
PURPOSE & AIM

Purpose

The thesis's intention is for me to get a deep understanding of the visually impaired and to implement the inclusive designing method for the architecture design process. Another intention is to explore the possibility of materializing senses and stimulating them by architecture.

Aim

The thesis aims to break down the "invisible wall" and create opportunities for equal dialogue between the visually impaired and the sighted. In order to enhance social inclusion, it is crucial to encourage the visually impaired to embrace the world. For the sighted, the aim is to raise their awareness for the blind and overcome prejudice and stereotype.



DELIMITATION

The main focus is to build a strong relationship between the sighted and the visually impaired. Therefore research on social isolation is more important than the visual impairment itself. The intention is not to have thorough research on eye disease, nor try to address their physical health issues and provide vision-related rehabilitation.

The thesis is focusing on the user perspective, which makes it crucial to study interaction with the built environment. Technology such as blue tooth devices and GPS will make it easier, but in the thesis, only architectural elements will be used for orientation and social inclusion.

The site selection and the program are based on academic research and will not consider the economic realism or business model.

METHOD

The thesis is build up as a combination of research for design and research by design approaches. It starts with literature studies on the field of visual impairment, social isolation, vision loss and mental health, multi-sensory design, and inclusive design.

The method through the design process is to work with five architectural domains (use, urban, story, composition, and atmosphere), which is the primary method used in the healthcare direction. Instead of a linear process, the idea is to work simultaneously with three domains each week. It helps to see all aspects and relations and get an overview of all different aspects, to be able to come up with integral decisions (Dooren, E. van, et al., 2013).

READING INSTRUCTION

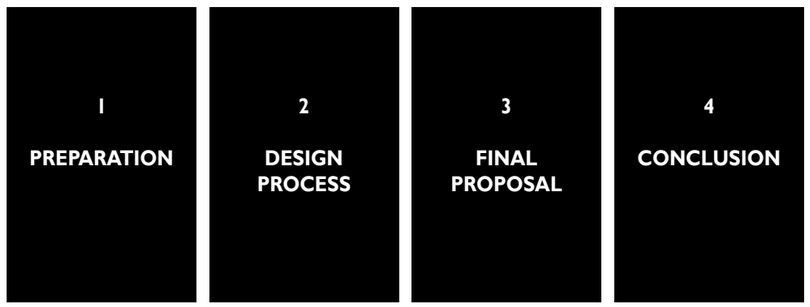
The booklet aims to present a continuous workflow of the thesis. It consists of seven chapters, which can be divided into four parts.

The first two chapters are the preparation part. The motive and academic framework will be presented in chapter one to make a bright red thread for the project. Chapter two includes some research from different fields. The idea is to get a thorough understanding of the users and support theories as a preparation for the following design.

Part two is the design process. Based on all the information from part one, a criterion is set for the selection of site and program. These will be present in chapter three, together with analysis, diagram, and reference project. Chapter four consists of sketches, physical models, references, and diagrams, investigating different architectural aspects of the project.

Part three is the final proposal. There will be plan drawings, section and facade, illustrations, diagrams, and rendering pictures.

The final part is to conclude and reflect the thesis work。

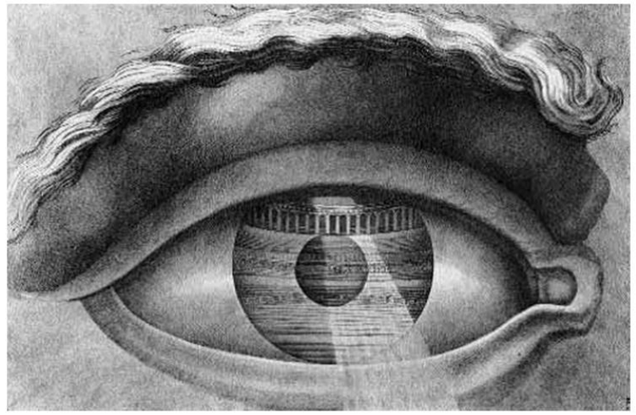


02. BACKGROUND

Story & Use
Relevant background study about visual impairment and five senses will be introduced in this chapter. It contributes to the visions, concept, site selection and architecture program.

SENSES

Sight, hearing, taste, smell, and touch are the five basic human senses, which enable us to get information about the world. From infancy, human creatures engage in countless acts of lifting, licking, touching, sniffing, throwing, dropping, hearing, balancing, and more, constantly testing the edges of physics to understand (or "make sense of") the world we were born to discover (Lupton and Lipps, 2018). Among the basic senses, vision plays a dominant role in perception. Around 80 percent of our sensory impressions are registered through our eyes. Dominance makes us neglect the importance of other senses. The Finnish architect Juhani Pallasmaa writes in his book, "The dominance of eye and the suppression of the other senses tend to push us into detachment, isolation, and exteriority." The imbalance in our sensory system results in the inhumanity of contemporary architecture and cities.



Eye Reflecting the Interior of the Theatre of Besançon, engraving after Claude-Nicolas Ledoux.

VISUAL IMPAIRMENT

Visual impairment means certain degrees of vision loss, which is not fixable by glasses. The term “visually impaired” is defined as both blind and partially sighted people.

The most common misconception is that the blind can only see the darkness. Nevertheless, there is only a small amount of people losing their sight completely. Different eye conditions result in different forms of vision distortion. Some can distinguish light and darkness; some may have a perception of color, while others may lack central vision, side vision, or have a blurry vision. Not all the visually impaired see the same thing.

NORMAL SIGHT

DIABETIC RETINOPATHY

GLAUCOMA

CATARACT

BRVO

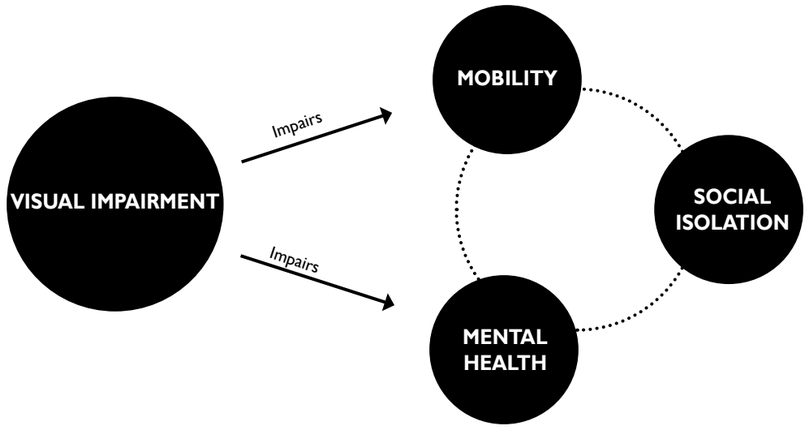
COMPLETE BLINDNESS

Consequence of visual impairment

Visual impairment has a significant impact on those who are experiencing it. The consequence is not limited to eye health. Instead, it negatively affects one’s quality of life, the ability to live independently, mobility and accessibility, mental health, social function, employment, and education attainment (National Academies of Sciences, Engineering, and Medicine, 2017).

A sighted person use vision as a dominant sense for navigation and orientation. Therefore vision loss will, without a doubt, affects mobility. Compared with the sighted, they are two times more likely to have a fall while walking (WHO, 2018). Many people with visual impairment use a white cane to scan their surroundings for obstacles. Some may use hearing as a way to orientate and navigate spaces. However, in an unknown or open space, it is usually impossible to get there without other’s help. Besides, the lack of an inclusive built environment makes the situation even worse.

Given the physical impairment and social harms of the sight loss, there is a well-established link between eye health and mental health (Unite for Sight). Kempen et al. (2012) concluded that vision loss has a substantial impact on symptoms of depression and feelings of anxiety. The figure provided by SRF shows that 35% of the visually impaired in Sweden suffer from anxiety. Social withdrawal is another primary psychological consequence of vision loss. Their mobility impairment pushes them away from social contacts, which may result in social isolation, disengagement, loneliness, and loss of social support.



SOCIAL ISOLATION & VISUAL IMPAIRMENT

Text from *Being noticed for the way you are: Social inclusion and high school students with vision impairment,* an interview with partially sighted students about social inclusion. It reveals the fact that many students suffer from social isolation even in an inclusive school.

What is social isolation?

Social isolation results from the lack of social contact with other people. It is often associated with loneliness. However, social isolation is a more objective state, whereas loneliness is a subjective individual experience in which the individual feels a lack of meaningful connectedness to other people (Hodge & Eccles, 2013). The isolated state can be triggered by many factors such as mobility issues, illness, disability, unemployment, as well as psychological problems. All of the factors can segregate people from their social networks.

Social isolation and visual impairment

Although there are not many quantitative studies of social isolation prevalence in the visually impaired, and majority of them are relating to the older people, they are still defined as a high-risk group for social isolation. As mentioned in the last section, vision loss impairs mobility and mental health and may reduce one's quality of life. These factors increase the risk of social isolation and loneliness.

As Hodge and Eccles (2013) conclude in their literature review, loneliness and social isolation interact with other factors as part of a reinforcing process, resulting in a decline in psychosocial and physical wellbeing. Difficulty with functional activities such as shopping, cooking, mobility, and leisure pursuits play a particular part in the process.

Addressing social isolation

It is not the number of people's relationships that are most important in mitigating loneliness, but how people feel about those relationships, whether they feel cared about, and feel that they receive the support that they need and expect (Hodge & Eccles, 2013). Therefore creating an inclusive environment where they could be noticed, understood, and supported may help to address social isolation.

Peer support is another useful way to deal with social isolation. Research from Lee and Brennan (2006) shows most visually impaired rely primarily on their resources rather than on external support to cope with sight loss; peer support can serve a vital function in helping to develop and reinforce those resources. They are more likely to understand what each other is going through and share experience, practical life skills, and advice. Besides, offering psychological and functional support can help with this issue.

THE VISUALLY IMPAIRED IN SWEDEN

SRF estimates that approximately 100,000 people in Sweden have varying degrees of vision impairment. There are three key findings in Sifo's quality of life study among the visually impaired in 2018.

Firstly the unemployment rate is much higher among the visually impaired. Only 47 percent of people have employment, while the number is 82 percent in the entire population. Secondly, they are more likely to suffer from poverty. The survey shows that 13 percent have difficulties in paying living expenses. The figure is four times higher than that in the total population in Sweden. The last finding reveals their worse physical and mental health than the sighted. Nearly half of them have pain in the shoulders, neck, back, and hip. 46 percent have a sleep disorder, and 35 percent suffer from anxiety.

The study concludes that the reduced quality of life results from factors such as lower employment rate, a concern of losing a job, financial insecurity, discrimination, and lack of accessibility.

External support

People with vision loss can get help from many sources. For instance, in Gothenburg, anyone above 18 can contact the municipality to get assistance from syninstruktör (vision instructor). They provide home service and aims at giving advice and tips to make their everyday life work as well as possible.

Syncentral (low vision center) provides habilitation and rehabilitation of people with moderate to severe visual impairment of all ages. It includes mobility and orientation training, daily living skills, psychosocial support, and technical aids.

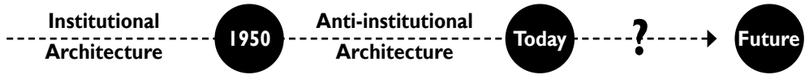
Five folk high schools invite older adults to courses where they can train mobility, their devices, daily living skills, meet others in the same situation. Some of the folk high schools invite people of working age to train their technical devices.

Synskadades Riksförbund (The Swedish Association of the Visually Impaired, SRF) is the leading Swedish organization of the blind and partially sighted. It is run by the visually impaired themselves. SRF aims at enabling people with visual impairments to live a productive and independent life by providing individual support as well as different activities. Skapa loss is SRF's cultural project. The project wants to show that it is possible, as visually impaired, to resume or develop a new interest. The project is based on the conviction that everyone has the right to create.

Peer support is always regarded as important external support. However, in Sweden, there are not any policies for developing peer support for habilitation and rehabilitation. Nor are there any resources for peer support services (EUB,2018).

Institution for the visually impaired in Sweden

The development of blind institutions in Sweden reveals people's attitudes towards social inclusion. Before the 1950s, blind people were segregated in institutions like fattighus and blind school. They provided essential facilities for society and shelters for the visually impaired. However, institutional architecture is associated with control and segregation. With a call for a more inclusive society, people started to pursue anti-institutional architecture. Nowadays, all the blind and partially sighted kids study at regular schools, and there are not institutions only for the visually impaired anymore. In one way, they are more integrated within the society, but the social connection within the group seems weaker than before. We need to rethink institutional architecture and how to promote integration and interaction within society and the sense of community.

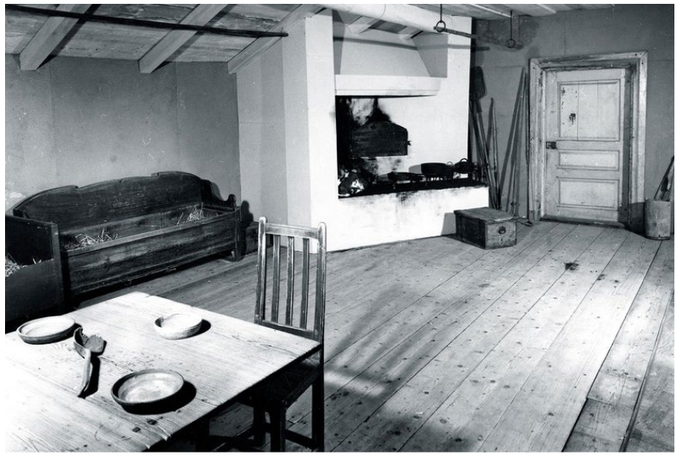


1600s

Poor and disabled people, including those with visual impairment, were settled in prisons, orphanages, and if they had more severe disabilities, they would be sent to hospitals. The intention was that they could work and make a living at the institutions.

1700s

A fattigvårdslag was introduced, where every parish was obliged to keep a fattigstuga(poor house). Many blind people ended up in the fattigstuga. Those who were born in wealthy families had the opportunity to develop a high level of education.



Nybble fattigstuga, sörmländska Julita

1809

Pär Aron Borg (4 July 1776 – 22 April 1839) was a Swedish pedagogue and a pioneer in the education for the blind and deaf. In 1809 he founded Allmänna institutet för döfstumma och blinda å Manilla (Public Institute of the Blind and Deaf at Manilla). It is the Swedish first school for blind and deaf students.

Manilla, Djurgården in Stockholm

1896

The most crucial decision at this time was that teaching blind children became mandatory. From then on, parents' poverty or lack of interest would not put obstacles in the way of blind children's opportunities for entering school.

1950s

Due to the call for integration, people started to consider allowing students to study at regular schools.

1986

The integration idea slowly took shape. In 1986 the school part at Tomteboda closed completely indicates the end of blind school.

Blindinstitutet, Tomteboda in Stockholm

Today

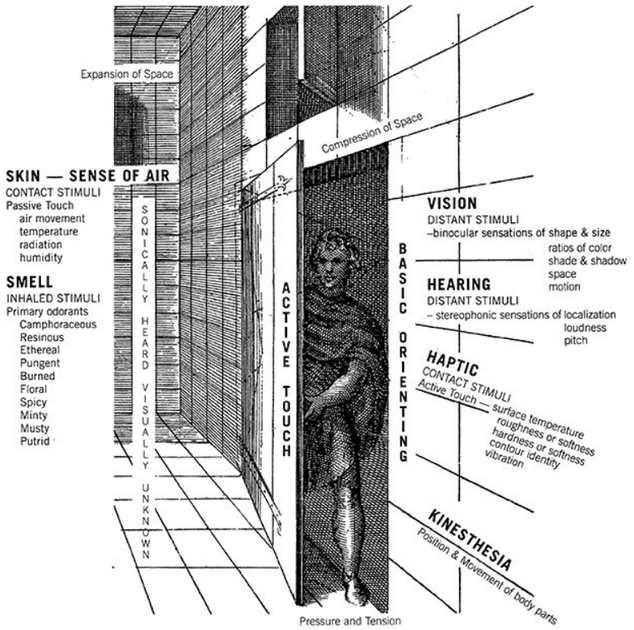
Nowadays, all the blind and partially sighted kids study at regular schools, and there are not institutions only for the visually impaired anymore. The blind center is not common in Sweden. As for participation in cultural life, recreation, leisure, and sport, there are several organizations providing opportunities for them.

Dalheimers hus is open for people with different types of disabilities. It consists of a restaurant, conference rooms, activity center, and short-term accommodation. SRF will organize some activities here.

Dalheimers hus, Gothenburg

"As buildings lose their plasticity and their connection with the language and wisdom of the body, they become isolated in the cool and distant realm of vision."

(Juhani Pallasmaa, 1996)



Ranges of the Senses, from *Sensory Design* by Joy Monice Malnar and Frank Vodvarka

SENSORY DESIGN

Instead of creating mere objects of visual seduction, architecture relates, mediates, and projects meanings, which brings our consciousness back to the world and emphasize self-existence (Juhani Pallasmaa, 1996). We experience architecture through body movement, which enables us to build a relationship with the world. Senses move us through space. Hearing helps with navigation and differentiate the space volume. Touch tells the texture of material, whether it is hard or soft, cold, or warm. Our skin senses the movement and temperature of the air. Traditionally, designers focused on creating static artifacts—the monument, the vessel, the elegant monogram, or the essential logotype. Today, designers think about how people interact over time with a product or place (Lupton and Lipps, 2018).

Sensory design is inclusive. As architects are used to relying on the vision to consider spatial qualities, function, aesthetic and so on, people with visual impairment may not get a rich experience of buildings. Even worse, they could be excluded by many architectures today. Thus by working with multi senses, architects can support a diversity of human conditions to create a more inclusive world.

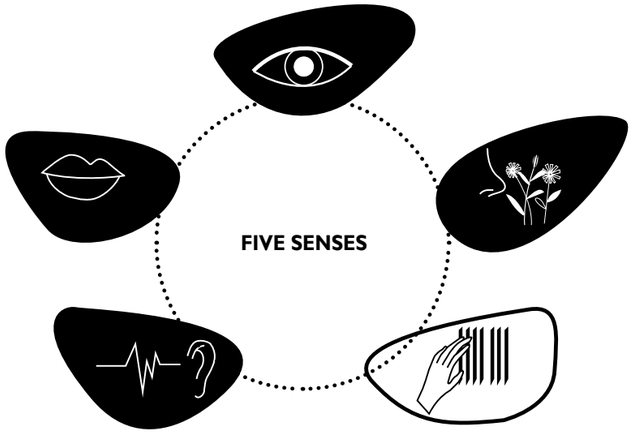
HAPTIC DESIGN

Géza Révész first introduces “haptic” in 1950, which is originally from the Greek haptikos, “able to come in contact with”. Haptic perception involves connections between touch and movement, depending on skeletal and muscle developments, and on orientating and spatial processes (Millar, 2005). Compared with the other four basic senses, haptic enables people to interact with the external environment to the greatest extend. We passively receive information through hearing, seeing, smelling, and tasting, but we can actively change the environment through haptic body movement.

In the built environment, Herssens and Heylighen (2008) classified haptic perception into active, dynamic, and passive touch. When the movement comes from the body itself, it can be defined as active and dynamic touch. While passive touch is caused by movement in the environment.

In the following text, they gives a vivid and clear explanation about haptic perception.

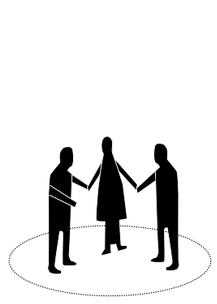
“When crossing a square, for instance, you actively feel the texture and form of the cobblestones you are walking on, while you dynamically feel the dimension of the square when sliding your feet along its boundaries and you passively feel the wind blowing through the streets adjacent to the square, which consequently informs you about the connection between the square and the surrounding environment.”



CONCLUSION

Aspects

Based on the background study above, three aspects are developed to address social isolation issues. The first one is to build a strong sense of community. Therefore people could get support from their peers. No resource for peer support services in Sweden leads to motivating a public building, gathering them together. The second aspect is to raise public awareness. In an inclusive environment, people should be noticed, understood, and supported in the right way. To achieve the goal, establishing public understanding and mutual respect is crucial. The last one is collaboration. The public building should be a social platform where the blind and the sighted could come together to promote social interaction and integration.



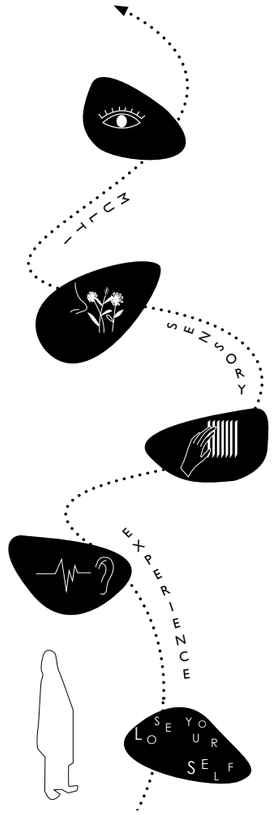
SENSE OF COMMUNITY

PUBLIC AWARENESS

COLLABORATION

Sensory journey

By working with multi senses, architects can support a diversity of human conditions to create a more inclusive world. In the thesis, the most critical strategy to emphasizing the visually disabled is multi-sensory design. Vision no more plays a dominant role in the design. Therefore, the main path in the public building is a sensory path. It provides a multi-sensory journey for the public in order to bring people's attention back to their body and awaken their empathy to the exclusive group. Another intention is to use the surfaces around the path to simulate haptic perception for the visually impaired, which helps with navigation and orientation.



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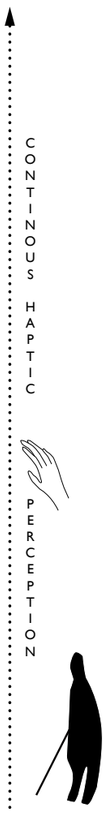


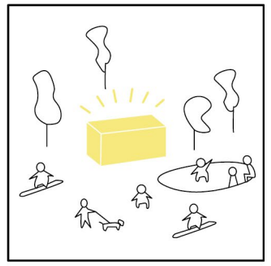
03. CONTEXT

Story & Urban & Use
In chapter three, the selection of site and program study will be introduced

SITE

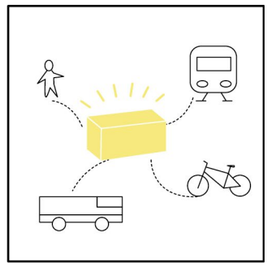
Site selection

The site selection is based on three aspects. In order to raise public awareness and promote collaboration, an active and inclusive area provides a possibility to attract more people and more interaction. As it is a public building for the visually impaired, the accessibility and a quiet environment are needed.



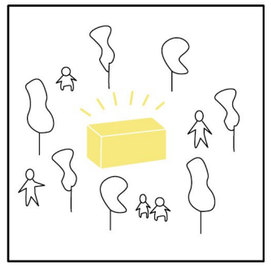
ACTIVITY

Different existing activities contribute to more potential users and the chance for social inclusion.



ACCESSIBILITY

It should be easy to access by public transportation. Nevertheless, close distance to transport node should be avoided, since people with visual impairment requires a quiet environment.



NATURE

A close connection to nature will be attractive and suitable for people's health.

Frihamnen

Emphasizing aspects as activity, accessibility and nature, as well as the potential to have an actual influence in current development plans - Frihamnen is chosen as site for the design studies of this thesis.

Frhiamnen is located in the heart of Gothenburg, connecting two sides of Göta Älv. The shipbuilding industry has left its mark on this inner harbor, giving it a raw and industrial look. For now, the area is under new development. The vision is a sustainable and inclusive neighborhood for everyone, which is consistent with the thesis's goal. It will be a highly dense area with a mixture of housing, workplaces, schools, public transport, greenery, and innovation. It is also an event place for gathering, festivities, and recreation.

The area is divided into many phases. Now it is still at the early stage of development, leaving a lot of things uncertain. The project thus uses the latest detailed plan from the homepage of Gothenburg municipality.

Vision of Frihamnen from homepage of Gothenburg Municipality

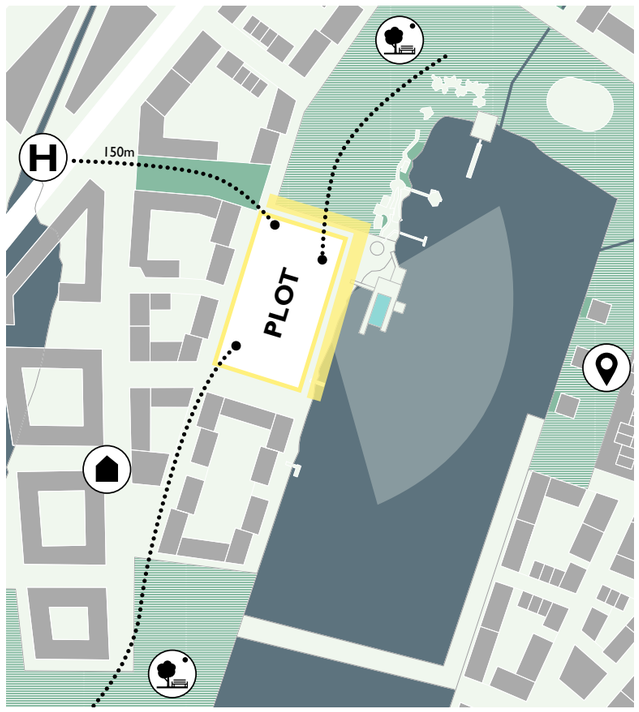
Site

Site analysis

Site analysis - zoom in

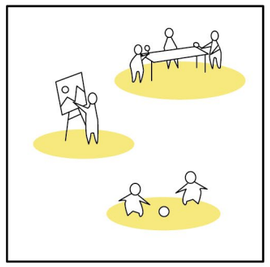
The plot is located just by the water and next to Jubileum park, which is a meeting place that takes the city closer to the water. The sauna, swimming pool, the bath, and the playground active the area. The plot is surrounded mainly by housing. Across the river, the industrial building Park 113 will be transformed into a cultural building that holds events and exhibitions. The closest bus station is only 150 meters to the west. The north and east sides are public, and the other sides have a more community characteristic.

Overall the surrounding context enables to attract public. The close connection to water and the park gives a natural feeling. Compared to other plots around Jubileum park, the surrounding housings also ensure a quieter environment for the specific users.



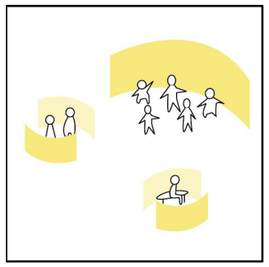
PROGRAM

Attracting people in the same place at the same time is just the prerequisites for social inclusion. What matters is the program. Can the program promote social inclusion and build the relation is the main question. As the proposal is for the visually impaired of all ages and encourages public participation, it should contain public functions as much as possible. After looking at reference projects, a detailed program will be presented later.



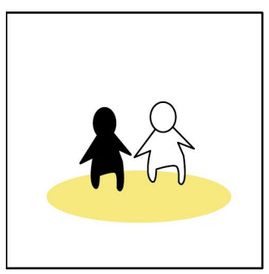
VARIOUS OF ACTIVITIES

The visually impaired should be encouraged to find their interest and participate in different activities, both with peers and the sighted. Participation in activities has a positive impact on social inclusion.



SOCIAL SCALE

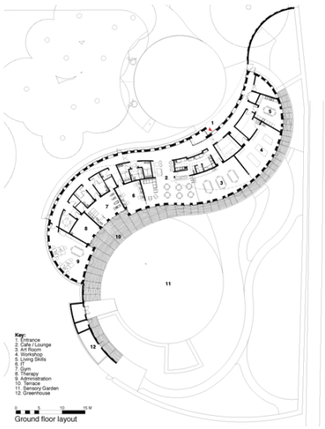
The appropriate social scale is essential for combat isolation. It should allow individual people to enjoy their surroundings in their own space, as well as a group of people to spend time together.



TOGETHER

The building should be a social platform for different groups of people where they can spend time together.

Center for Scottish War Blinded
Wilkieston, Scotland



Type: Day care and rehabilitation center
Users: Visual impaired of all ages (mainly used by the elderly)
Main program:
Workshop, art space, training areas, gym, therapy spaces, remembrance room, sensory garden

Pictures from https://www.dezeen.com/2011/06/30/centre-for-scottish-war-blinded-by-pagepark/

Center for the Blind and Visually Impaired
Mexico City, Mexico

Type: Activity and rehabilitation center
Users: Visual impaired of all ages
Main program:
Cafeteria, sound and touch gallery, arts and crafts workshops, classrooms, library, gymnasium-auditorium, swimming pool.

Pictures from https://www.archdaily.com/158301/center-for-the-blind-and-visually-impaired-taller-de-arquitectura-mauricio-rocha

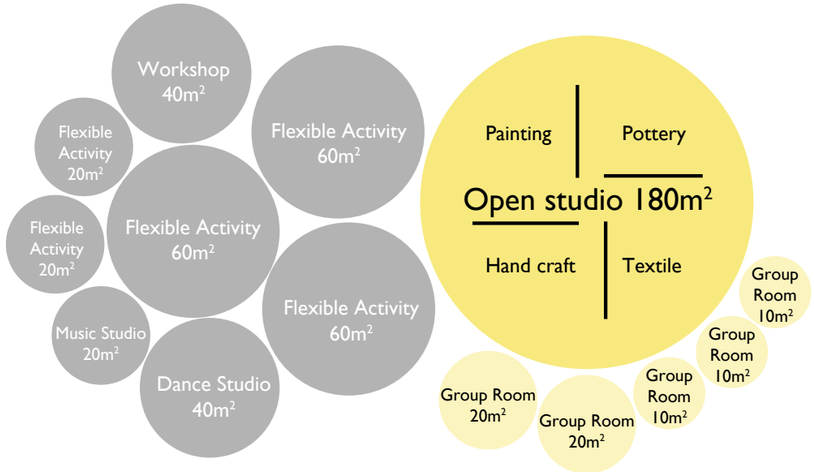
Activity center

The design proposal is an activity center for the visually disabled. It consists of ample studio space, gallery, library, restaurant, auditorium, and administration area. The public can share most of the functions.

It is a place to gather people with vision loss together. They can meet in the same place. They can talk, enjoy a movie together, share experiences, and support others.

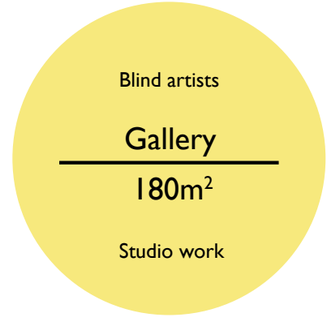
Disability will not disable the passion for life. It is common for the sighted to show the wrong sympathy for them. The studio space provides excellent opportunities for the public to see their ability and join them together. A gallery space to exhibit their work also helps to change people's stereotypes.

It is also a place for collaboration. Everyone is welcomed to join the activities and work together. The restaurant, library, auditorium, and studio space are open for everyone.



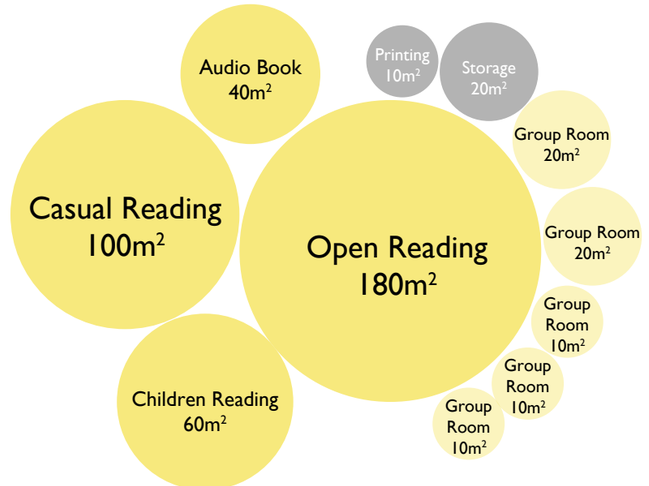
STUDIO SPACE 570M²

Studio space provides an inclusive and collaborative environment for everyone. It is a place for creation and interaction. Open studio is a flexible space that supports art and crafts activities, such as painting, pottery, textile, and handcraft. There are also rooms for dancing and singing. People are always encouraged to participate in any activity they like. Therefore the different sizes of the flexible room can be arranged for a different purpose. It also has the potential for life training skills.



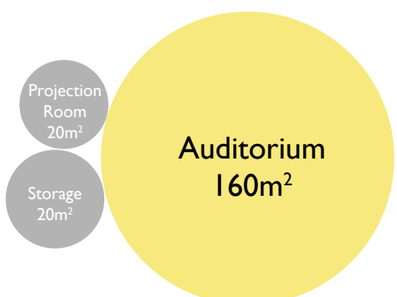
GALLERY 180M²

The gallery consists of two parts. One is to exhibit works from blind artists. It aims at inspiring the visually impaired and also the sighted. The other part exhibits the work from the studio space, giving them a place to shine.



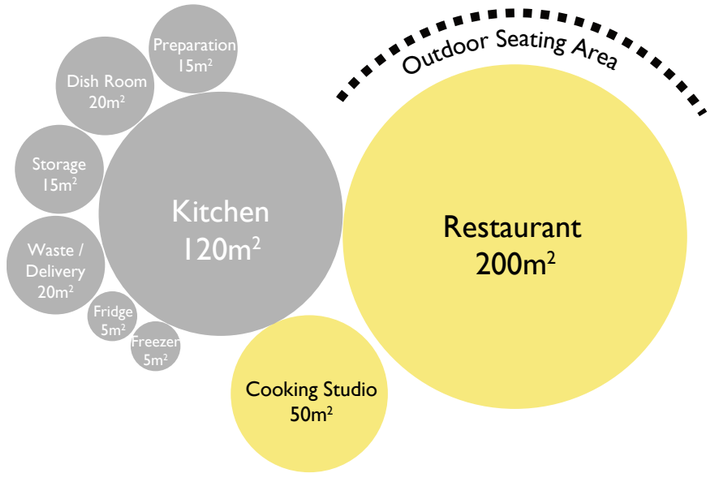
LIBRARY 480M²

It includes open reading and casual reading areas. Stacks in the open reading area will provide storage for books, including braille books for the visually impaired. The audiobook can be found in the quiet reading zone. It provides conferences and meeting rooms for group work and a children reading area.



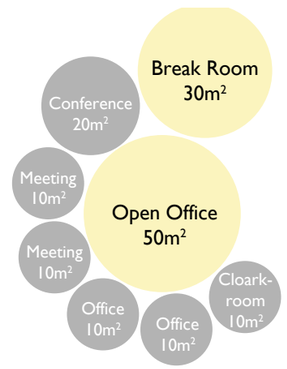
AUDITORIUM 200M²

The auditorium can accommodate 120 people. It provides an accessible experience to enjoy movies, concert, opera, and dance performance.



RESTAURANT + KITCHEN 450M²

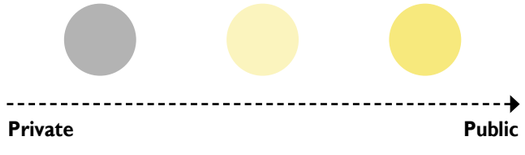
It is a typical restaurant with outdoor seatings. There is a cooking studio where both the sighted and blind are encouraged to cook together.

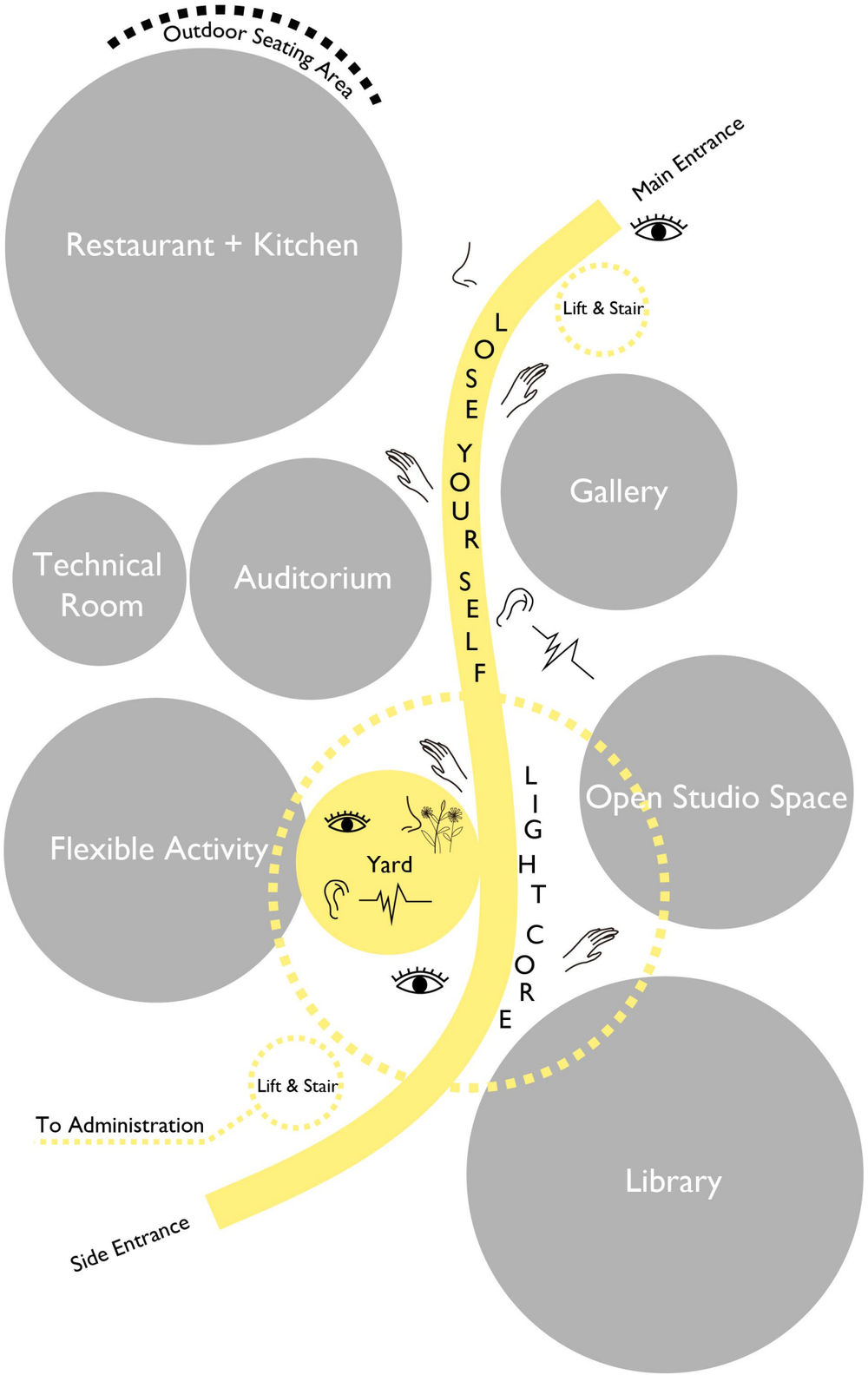


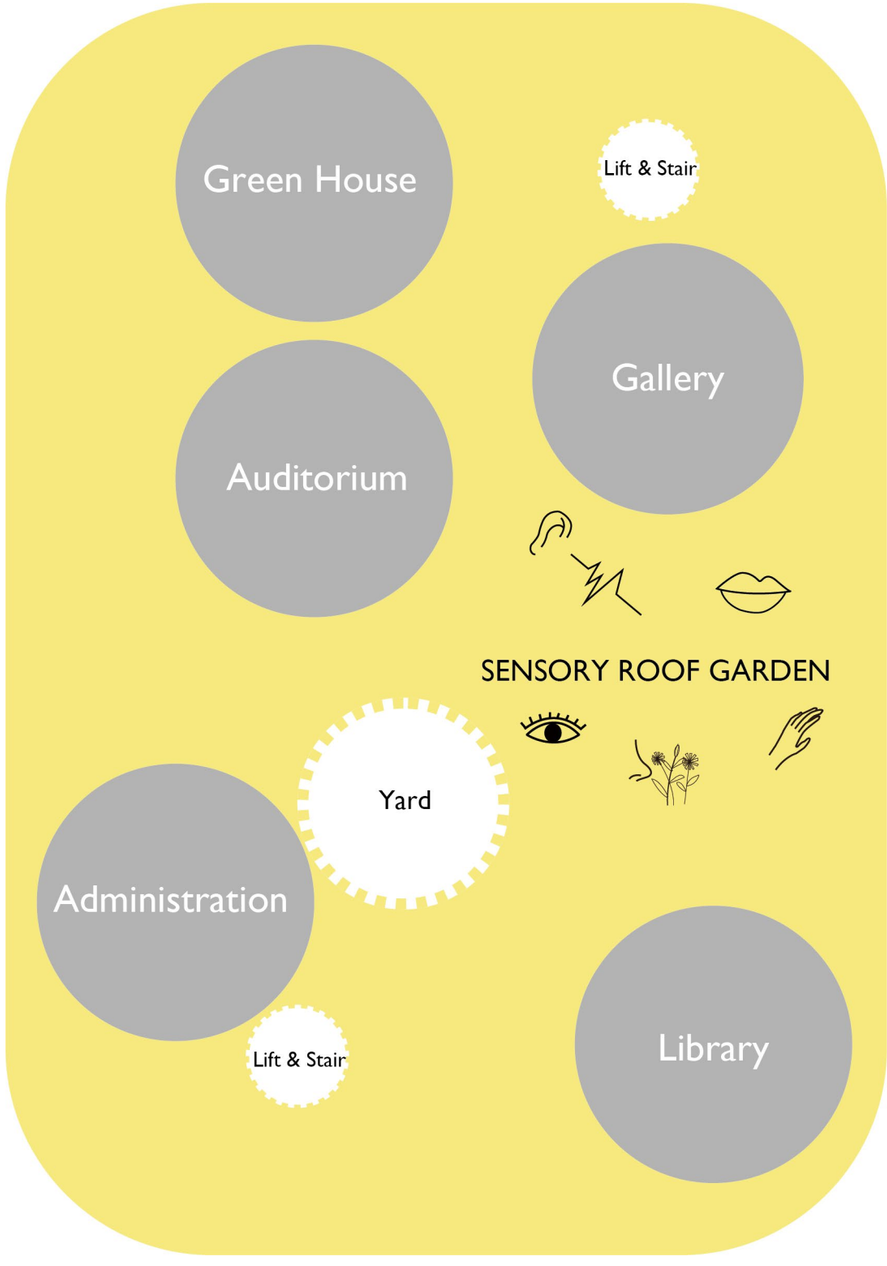
ADMINISTRATION 150M²

It includes an open office, several offices and meeting rooms, a conference room, and a break room only for the staff.

TECHNICAL ROOMS 100M²




Outdoor Seating Area
Restaurant + Kitchen
Main Entrance
Lift & Stair
L O S E Y O U R S E L F
Technical Room
Auditorium
Gallery
Flexible Activity
Yard
L I G H T C O R E
Open Studio Space
Lift & Stair
To Administration
Side Entrance
Library

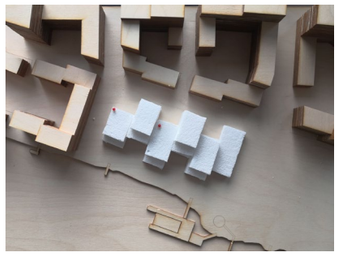
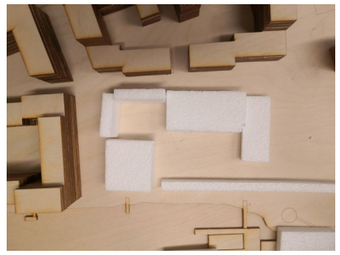

Green House
Lift & Stair
Gallery
Auditorium
SENSORY ROOF GARDEN
Yard
Administration
Lift & Stair
Library

04. DESIGN INVESTIGATION

Atmosphere & Composition
In chapter four, sketches, physical models, references and diagram in relation to different architectural aspects of the project will be presented.

VOLUME STUDY




Initial decision

SHAPE

The curvy wall takes people closer to water and makes a more blurred edge to Jubliem park.

Some geometric shape objects will stick out to create an exciting roof landscape.

MATERIAL

The glass box with objects sticking out creates a contrast between solid and void space.

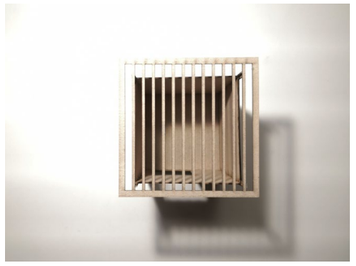
The transparent facade expresses an inviting feeling to attract public.

Model photo

MULTI SENSORY DESIGN

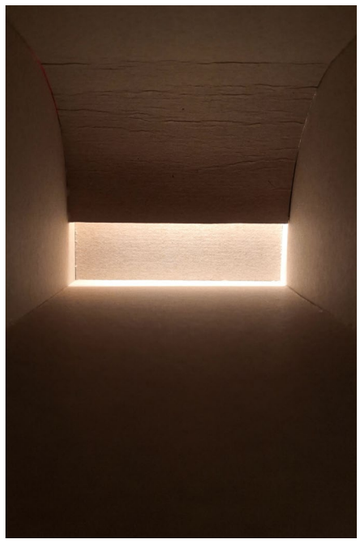
Metal tube to lead water, wind and light
Water to reflect light

Hearing + Seeing + Smelling



Light going through from wood raster above
Feel the rain, the wind, the sunlight
Tree in the middle

Sense of Temperature + Seeing + Smelling



Heavy concrete to store heat
Dark space with light squeezing in

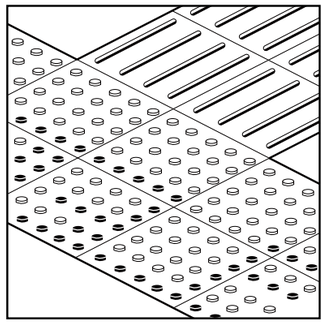
Losing Yourself + Sense of Temperature

Curvy wall + Straight wall
Light from narrow opening for navigation
Touch the wall

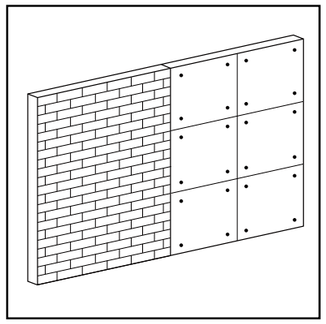
Losing Yourself + Touching

HAPTIC DESIGN

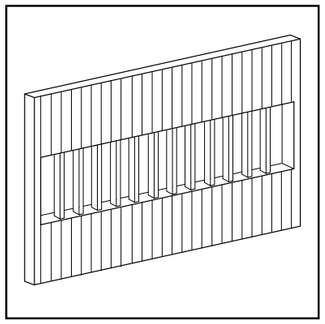
01. TEXTURE



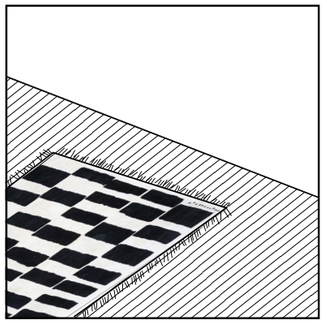
TACTILE PAVEMENT



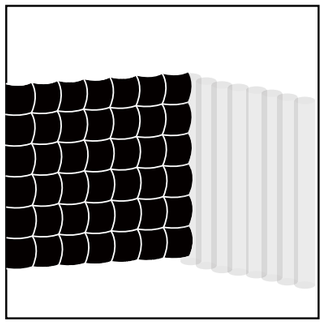
ROUGHNESS & SMOOTHNESS



PATTERN

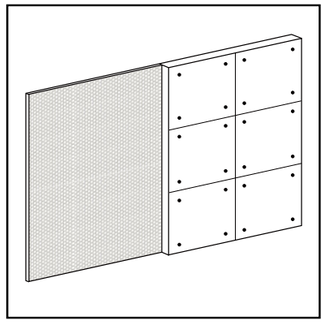


FLOOR MATERIAL

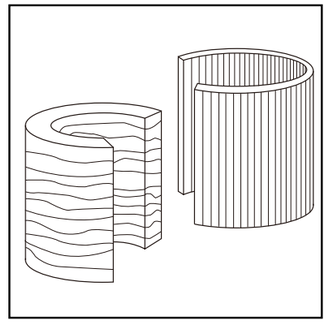


SOFTNESS

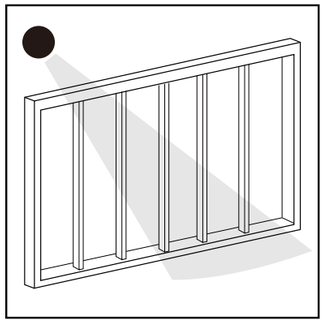
02. TEMPERATURE



SURFACE TEMPERATURE

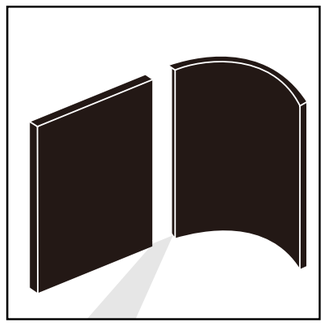


THERMAL MASS

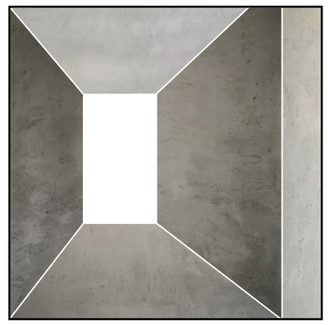


GLASS

03. LIGHT



LIGHT AS NAVIGATION



LOW REFLECTIVITY

LOW REFLECTIVITY

In a built environment, when space needs orientation and function, the surface materials should support active touch, whereas the passive touch is more like to provide a particular atmosphere. The matrix is a guideline for haptic design. To be more logical, I set three design parameters, texture, temperature, and light, to investigate materials. From left to right, the strategy will be applied from active touch to passive touch.

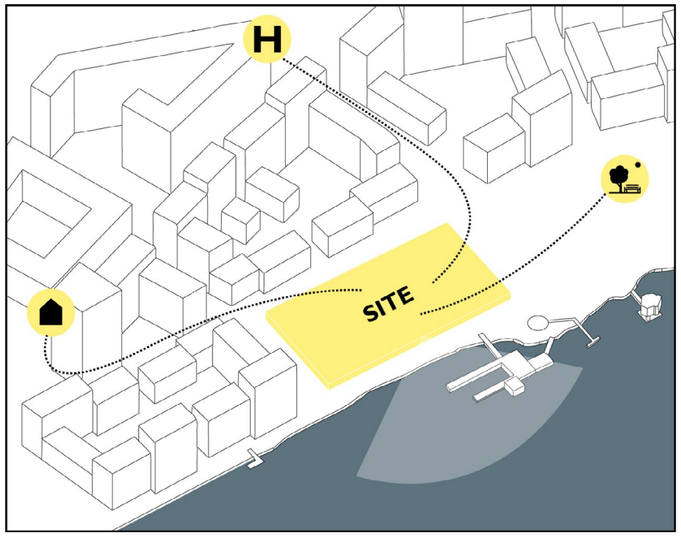
ORIENTATION ⟵ **ATMOSPHERE**

ACTIVE TOUCH ⟵ **PASSIVE TOUCH**

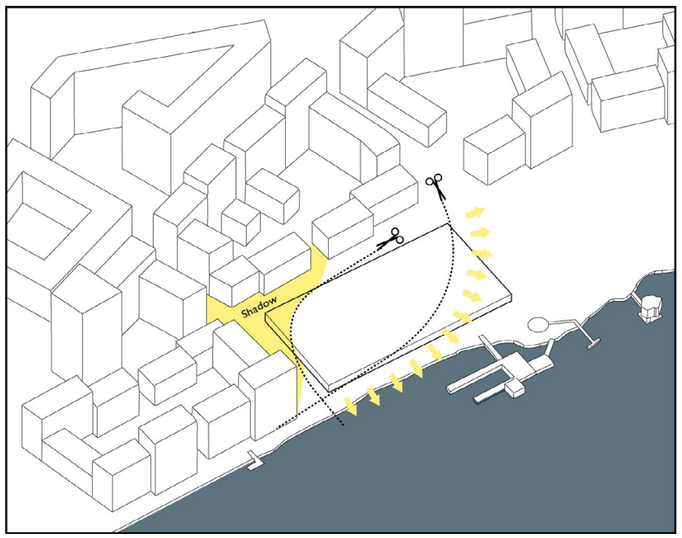
05. DESIGN PROPOSAL

Plan drawings, section and facade, illustrations, diagrams and rendering pictures will be presented to show the final proposal.

CONCEPT

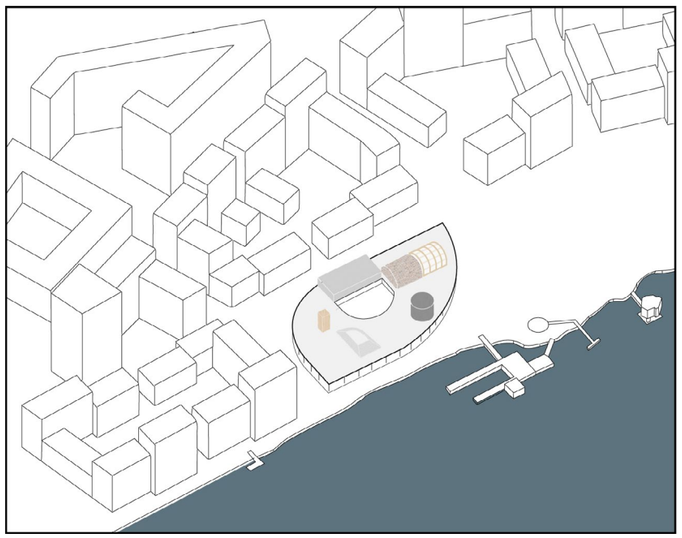


01. The main people flows come from three directions, Jubileum park, nearby bus station, and the neighborhood to the south.



02. Use curve lines to cut the northeast and southwest corners. On the front side, it creates a continuous and smooth facade. On the backside, it helps to avoid the shadow as well as create an entrance plaza for the neighborhood.

03. Some different shapes of objects are inserted in the volume, defining public, semi-public and private zones. The sticking out geometric shapes can help the blind to navigate space as well.

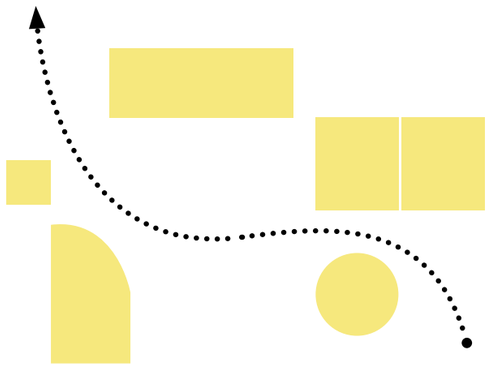


04. Different materials are applied to those objects for better orientation. The overall impression is a glass box with massive objects. It creates a contrast between solid and void. The transparent and welcoming facade attracts people to observe and to participate in activities.

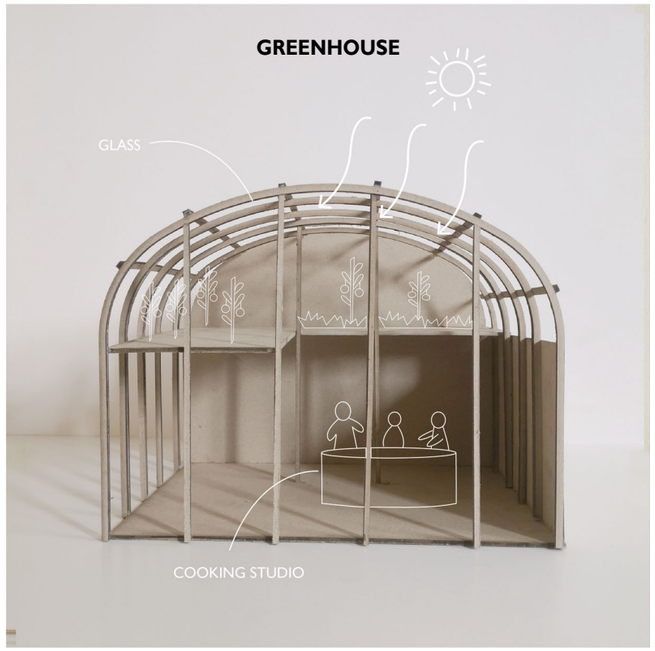

JUBILEUM PARK
DELIVERY
MAIN ENTRANCE
SIDE ENTRANCE
0
10
20M

Site plan

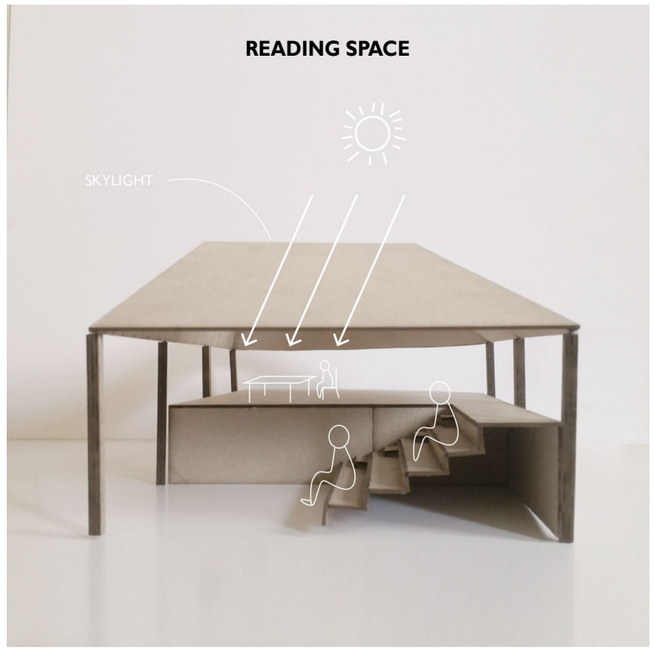
OBJECTS AND SHAPES



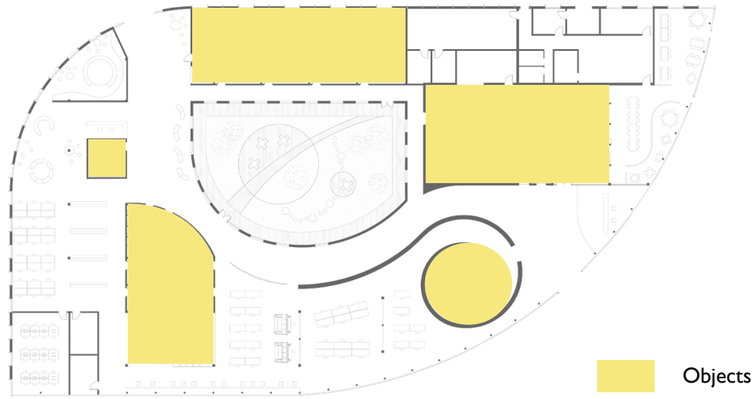
Each object includes one specific function. Based on the different spatial qualities and atmosphere for each purpose, the shape and materials vary. In the layout, they help to divide the activity center into public, semi-public and private zones.

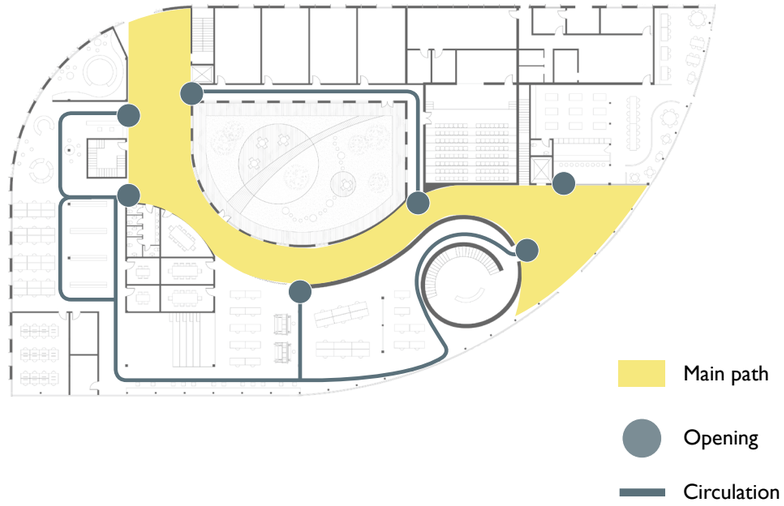


Objects and shapes



PLANS





Plan diagram

First floor plan

CHILDREN AREA

INFORMATION

CASUAL READING AREA

LIGHT TOWER

OPEN READING AREA

QUIET ZONE

STORAGE

PRINT

FLEXIBLE ACTIVITY ROOM

FLEXIBLE ACTIVITY ROOM

FLEXIBLE ACTIVITY ROOM

FLEXIBLE ACTIVITY ROOM

YARD

SEATING STAIR

VENTILATION ROOM

HEATING

ELECTRIC

PROJECTION ROOM

AUDITORIUM

OPEN STUDIO AREA

GALLERY

WASTE

DELIVERY

DISH ROOM

F

F

PREP.

KITCHEN

COOKING STUDIO

RESTAURANT

OUTDOOR DINING

RECEPTION

LOBBY

First floor plan

0 5 10M

58

59

A protected sensory garden is on the roof, providing a variety of experiences that brings joy to the everyday life of its users. It consists of a large food production area where people can plant and grow food themselves, stimulating taste and smelling perception. The intimate garden is where lush plantings grow. Their smells and colors change through seasons and stimulate the senses. Besides, there is another bigger space for public gathering.

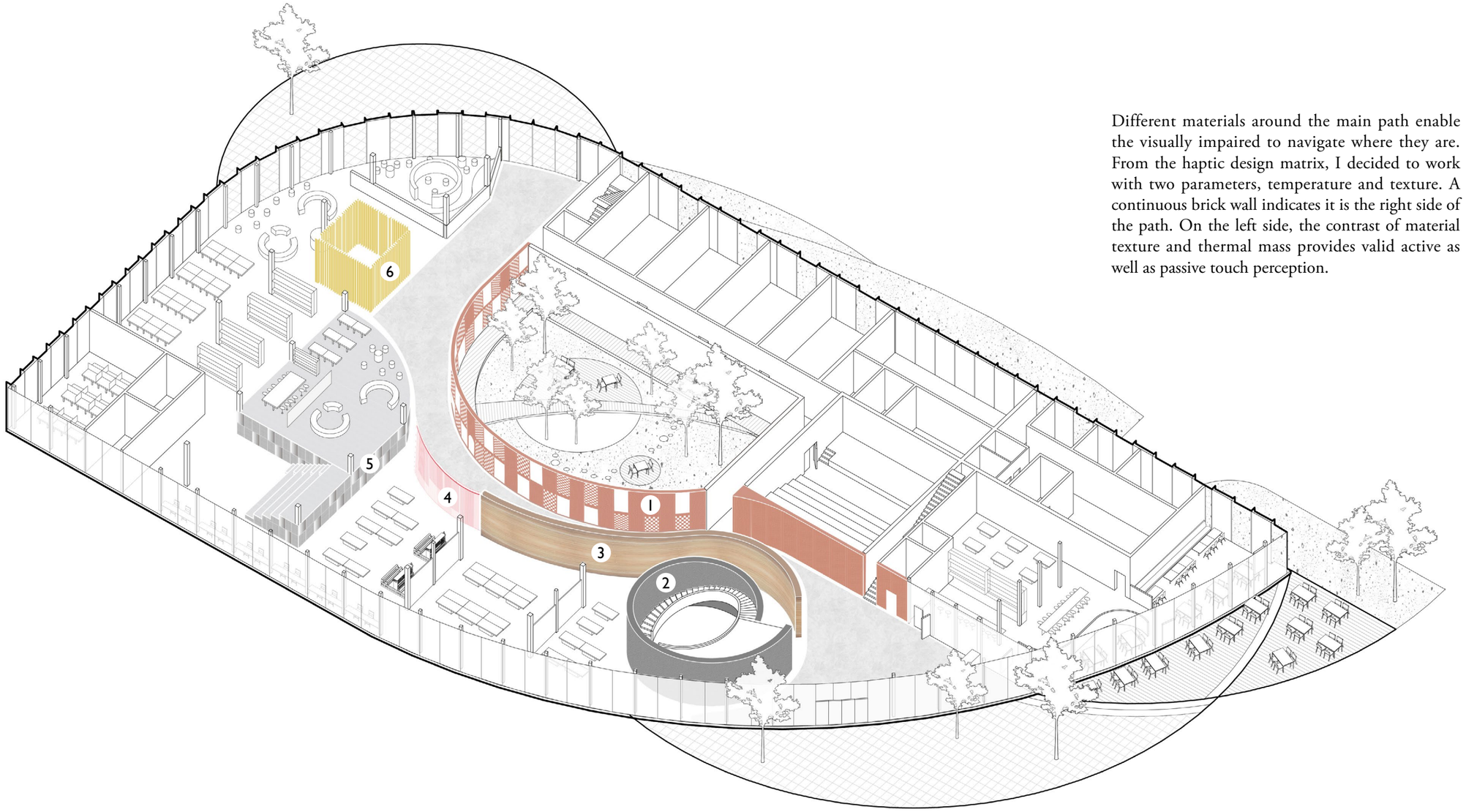
0 5 10M

Second floor plan

STUDIO SPACE

COOKING STUDIO

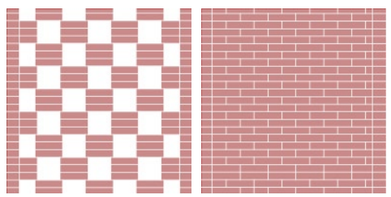
AXON



Different materials around the main path enable the visually impaired to navigate where they are. From the haptic design matrix, I decided to work with two parameters, temperature and texture. A continuous brick wall indicates it is the right side of the path. On the left side, the contrast of material texture and thermal mass provides valid active as well as passive touch perception.

AXON

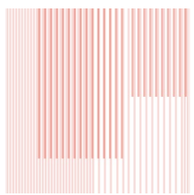
1. BRICK + GLASS BRICK



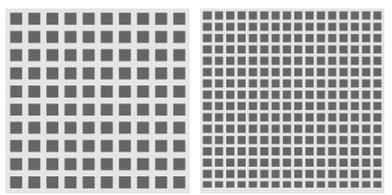
2. CONCRETE

3. RAMMED EARTH

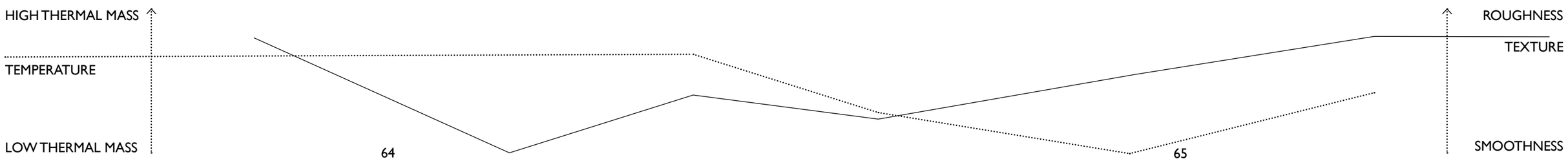
4. TEXTILE



5. PERFORATED STEEL

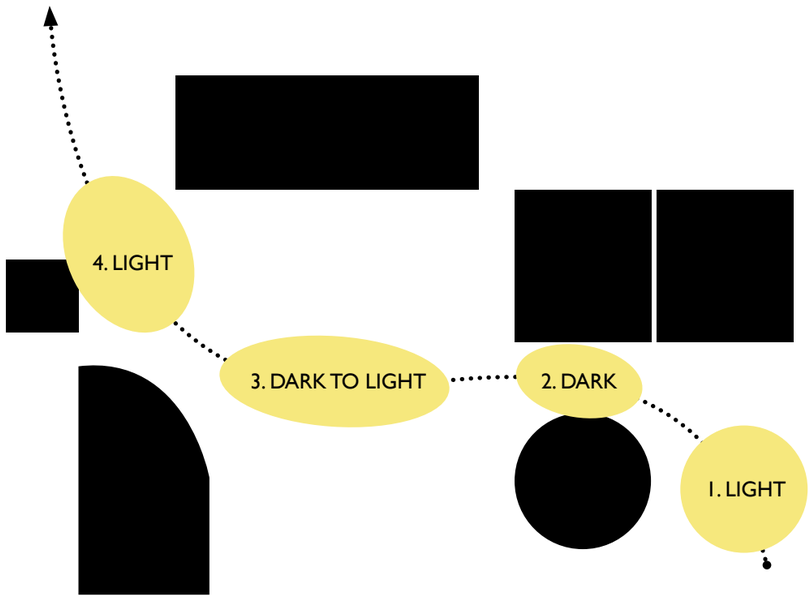


6. WOOD RASTER

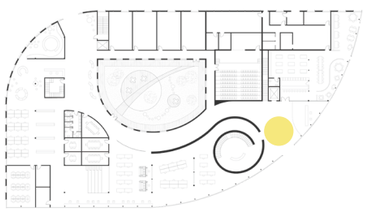


SENSORY JOURNEY

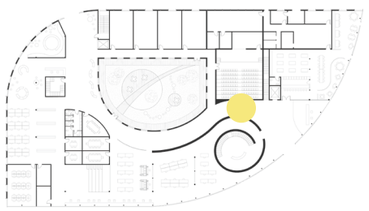
The one way layout enables people to fully experience the sensory journey that I would like to provide. People can follow the sequence from a light entrance to a dark space and then gradually go back to the light area. Coming up through the staircase in the light tower, you will reach the end of the journey, the sensory roof garden.



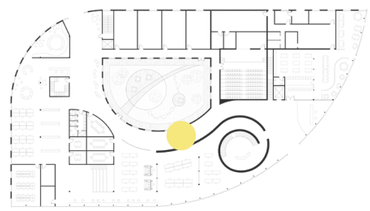
LIGHT ENTRANCE



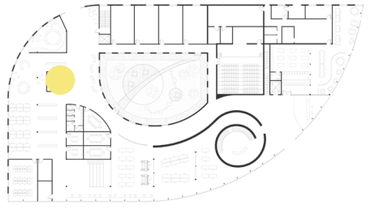
DARK CORRIDOR



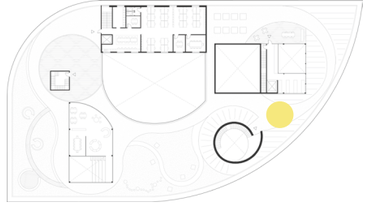
TRANSITION



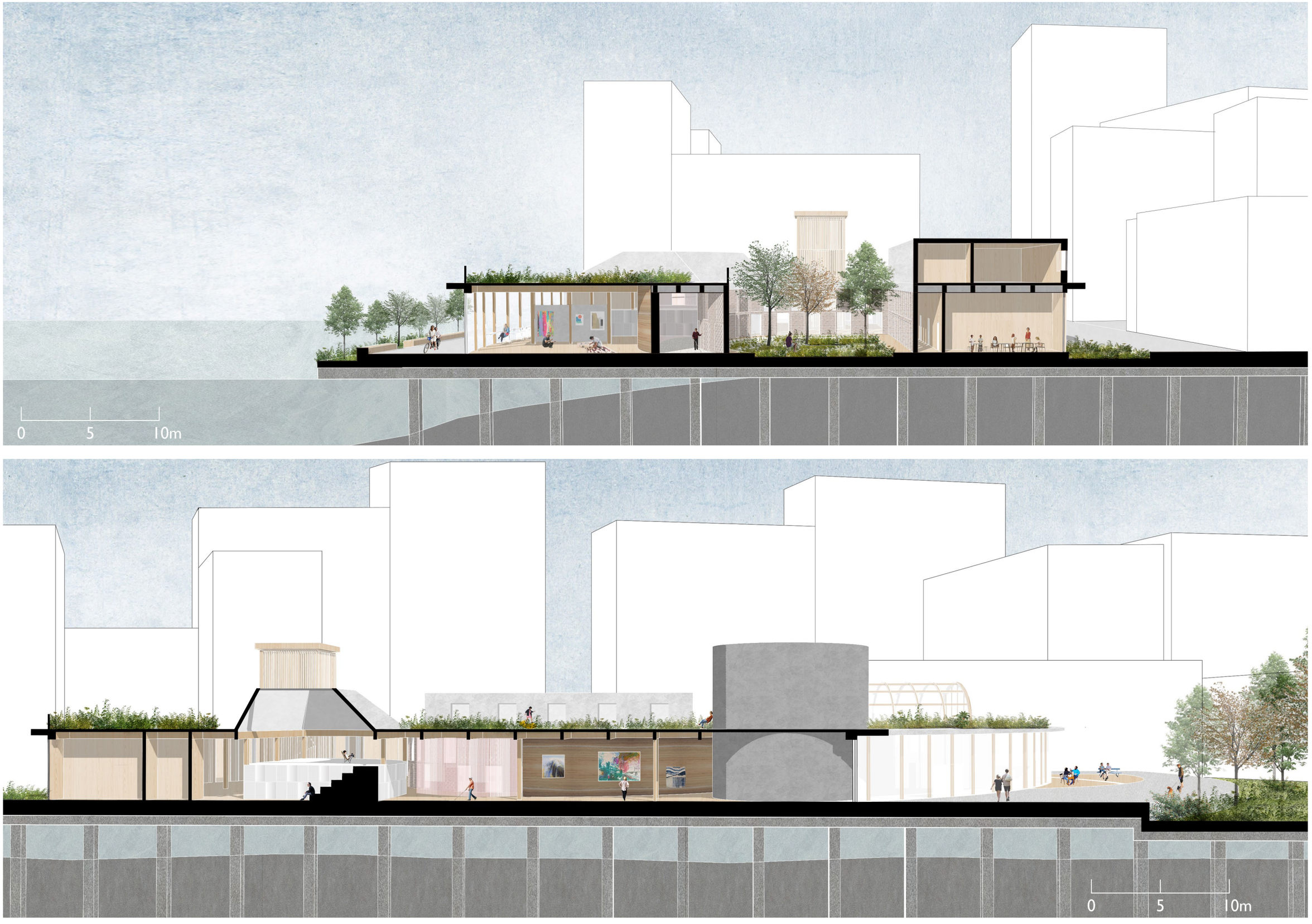
LIGHT TOWER



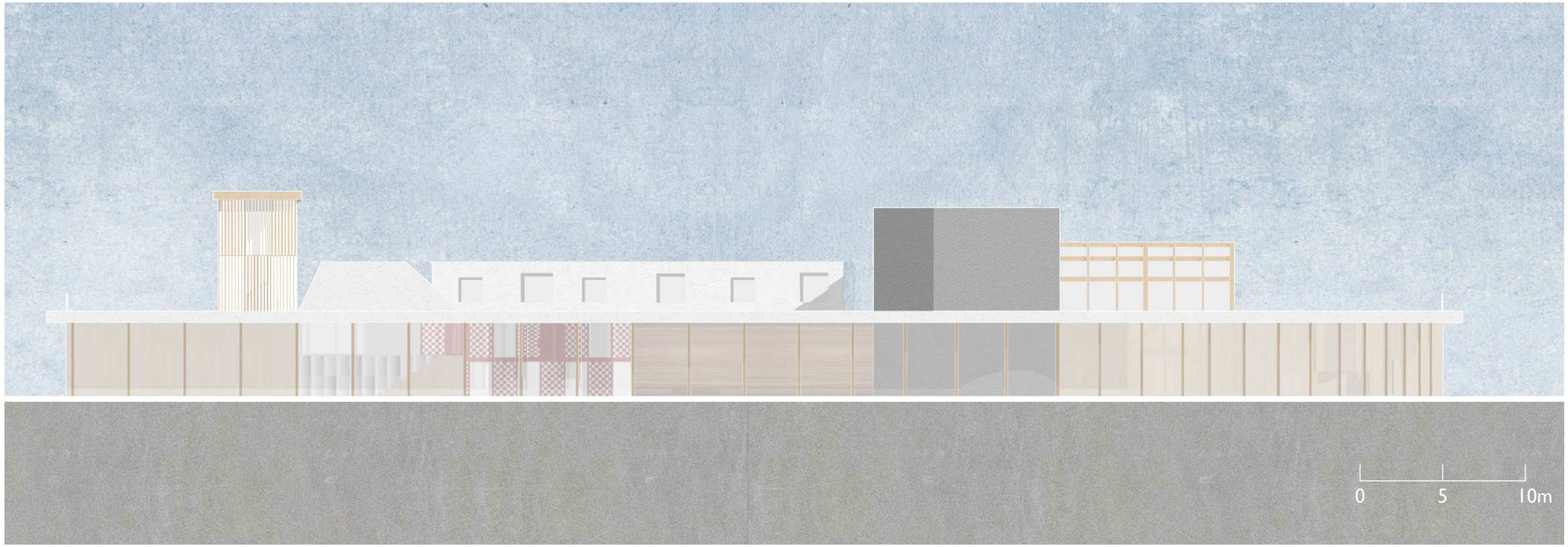
ROOF



SECTION



SECTION



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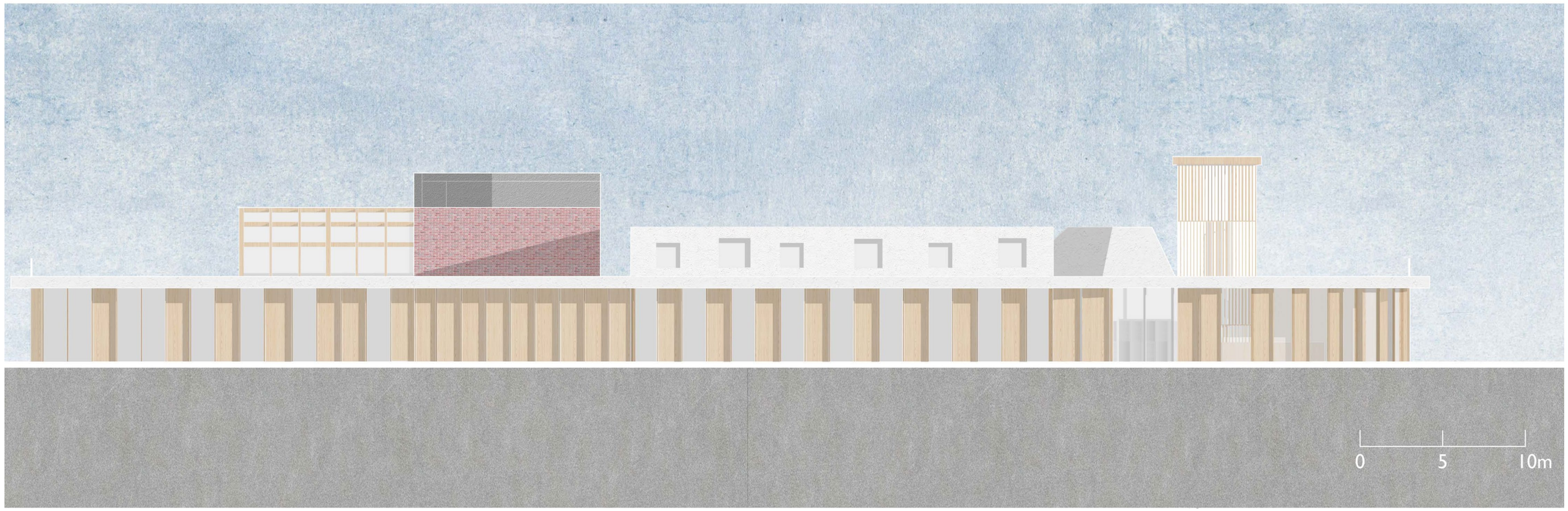

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06. CONCLUSION

The thesis seeks the answer to one central question. *How can architecture enhance the social inclusion of people with visual impairments?* It aims to create an equal dialogue between two groups, the sighted and the blind.

To begin with, I researched the field of visual impairments and social isolation. The intention is to get enough knowledge about the visually impaired and figure out the reasons triggering social isolation. From literature reviewing, rebuilding social relationships and peer support are useful ways to deal with isolation. People always overlook or show the wrong sympathy towards the blind group, thus creating the social barrier. In order to address the issue, it is crucial to increase empathy and establish mutual respect.

Research on Swedish blind institutions is a vital link in the process. The development of the facilities has mainly gone through two stages. Before the 1950s, blind people were segregated in institutions like fattighus and blind school, often associated with control and segregation. With a call for a more inclusive society, people started to pursue anti-institutional architecture. They are more integrated within the society now, but the social connection within the group seems weaker than before.

Lack of peer support resource in Sweden and the weak social connection motivates a public building, promoting interaction and the sense of community. Besides, it should contain functions that can raise public awareness. Then I started to answer the sub-question *What type of public building can include them in society?*

The design proposal is an activity center for the visually disabled. It is a place for collaboration. Everyone is welcomed to participate in the activities and work together. It is also a place to gather people with vision loss. Here they feel safe and belonging; they share experience and get support. The studio space provides excellent opportunities for the public to see their ability. A gallery space to exhibit their work also helps to change people's stereotypes.

Emphasizing aspects as abundant existing activities, accessibility, and close to nature, as well as the potential to have actual influence in current development plans - Frihamnen is chosen as the site for the design studies of this thesis. The vision of future Frihamnen is a sustainable and inclusive neighborhood, which is consistent with the thesis's goal.

In terms of architectural expression, the design proposal aims to create an iconic building in the riverside area, obviously standing out from the surrounding blocks under the premise of fitting the site. The concept is a glass box with massive objects sticking out to create an interesting roof landscape. It expresses a contrast image between solid and void. The transparent and welcoming facade and the playful shape become the attractions for more public observation and participation.

The second sub-question *How can abstract senses be materialized and stimulated by architecture?* invites a broader discussion about our body relation with the external environment.

The start point of the sensory design was to create an inclusive space for the visually disabled. The proposal challenged the dominant role of vision in design and perception. The main path in the activity center is defined as a sensory path, which helps people with vision loss to navigate and orientate. It provides a rich and immersive sensory journey by following the sequence “light-dark – light.” It forces the sighted people to jump out of the comfort zone and experience the darkness. In the journey, people can start a conversation with their bodies and senses, touching the texture, sensing the variation of temperature, feeling the sunlight drying the skin, and wind blowing. Sensory design is also used to create particular atmospheres in each geometric object as well as the roof garden design.

The thesis mainly focuses on haptic perception. It enables the interaction with the environment to the greatest extend. In the thesis, I used Herssens and Heylighen’s classification of haptic perception, active, dynamic, and passive touch. Relating to the built environment, when space needs orientation and function, the surface materials should support active touch, whereas the passive touch intends to provide an atmosphere. To be more logical, I set three design parameters, texture, temperature, and light, to investigate materials and create a guideline matrix. In the final proposal, I mainly work with material temperature and texture to support active touch for the main orientation path. Passive touch strategies add more luxurious spatial experience in the sensory journey, different rooms, and the sensory roof garden.

As the Finish architect Pallasmaa said, “As buildings lose their plasticity and their connection with the language and wisdom of the body, they become isolated in the cool and distant realm of vision.” During the design process, I realized vision blinds us and cuts off the intimate connection with surroundings, while haptics allows us to rebuild the connection. The thesis is an attempt about haptic design and creates a basic matrix guideline. I would like to further explore other options for the parameters and how to implement them in architecture.

Emphasizing the disabled does not merely mean the accessible application. In the thesis, I work with the activity center to include the marginalized group in society. Hopefully, it can start a conversation about what kinds of public buildings are inclusive and what we should priorities while planning the use of public spaces. In the activity center, people with visual impairments become the dominant occupants of the space. It is inclusive and welcome to stay and gives them a sense of belonging. But in most normal public buildings such as a library, bathhouse, shopping mall, and train station, the sighted always take dominance. It will be interesting to explore further how to create similar belongings in these spaces.

Hopefully, the thesis can trigger a conversation about the social inclusion of the visually impaired and how to challenge the visual hegemony in architecture.

07. BIBLIOGRAPHY

Downey, C. (n.d.). *Design with the blind in mind* [video file]. Retrieved December 10, 2019, from https://www.ted.com/talks/chris_downey_design_with_the_blind_in_mind.

Göteborg Stad. (2015). *Detaljplan för Blandstadsbebyggelse i Frihamnen, etapp 1*

Herssens, J., & Heylighen, A. (2010). *Blind body language.* In Proceedings of the 5th Cambridge workshop on universal access and assistive technology (pp. 109-118). University of Cambridge; Cambridge (UK).

Herssens, J., & Heylighen, A. (2012). *Haptic design research: A blind sense of space.* The Place of Research, the Research of Place, 374-382.

Hodge, S., & Eccles, F. (2013). *Loneliness, social isolation and sight loss: a literature review conducted for Thomas Pocklington Trust.*

Holl, S., Pallasmaa, J., & Gomez Alberto Perez. (2008). *Questions of perception: phenomenology of architecture*. San Francisco: William Stout.

Kempen, G. I., Ballemans, J., Ranchor, A. V., van Rens, G. H., & Zijlstra, G. A. (2012). *The impact of low vision on activities of daily living, symptoms of depression, feelings of anxiety and social support in community-living older adults seeking vision rehabilitation services.* Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation, 21(8), 1405–1411. https://doi.org/10.1007/s11136-011-0061-y

Lamoureux, E. L., Hassell, J. B., & Keeffe, J. E. (2004). *The determinants of participation in ac-tivities of daily living in people with impaired vision.* American Journal of Ophthalmology, 137(2), 265–270. doi: 10.1016/j.ajo.2003.08.003Pinquart,

LEE, E.-K. O. & BRENNAN, M. (2006) *Stress constellations and coping styles of older adults with age-related visual impairment.* Health & Social Work, 31, 289-298.

M., & Pfeiffer, J. P. (2011). *Psychological well-being in visually impaired and unimpaired individuals.* British Journal of Visual Impairment, 29(1), 27–45. doi: 10.1177/0264619610389572

Millar, S. (2005). *Network models for haptic perception.* Infant Behavior and Development, 28(3), 250-265.

National Academies of Sciences, Engineering, and Medicine. (2017). *Making eye health a population health imperative: vision for tomorrow.* National Academies Press.

Nolen, E. (2015). *Arhitecture without vision.* Retrieved from https://www.semanticscholar.org/paper/Architecture-Without-Vision-Nolen/b0cc792a22fa0340d238ca514b6c2aeb4779e08a#references

Pallasmaa, J. (1996). *The eyes of the skin: architecture and the senses.* London: Academy.

Révész, G. (1950). *Psychology and art of the blind.*

European Blind Union. *Sweden - Article 26.* (n.d.). Retrieved from http://www.euroblind.org/convention/article-26/sweden

Unite For Sight. (n.d.). Retrieved from http://www.uniteforsight.org/community-eye-health-course/module11.

World Health Organization. (2018). *World report on disability.* Retrieved from https://www.who.int/disabilities/world_report/2011/report/en/.

World Health Organization. (2019). *World report on vision.* Retrieved from https://www.who.int/disabilities/world_report/2011/report/en/.

Zumthor, P. (2006). *Atmospheres: architectural environments - surroundins objects.* Basel: Birkhauser.