In a State of Nature

Design of a Recreational Pavilion Concept to Nuuksio National Park

Bachelor Thesis
Maria Holthoer
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Metropolia University of Applied Sciences
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Interior Architecture

Tiivistelmä

tekijä: **Maria Holthoer**

otsikko: **Luonnon tilassa**
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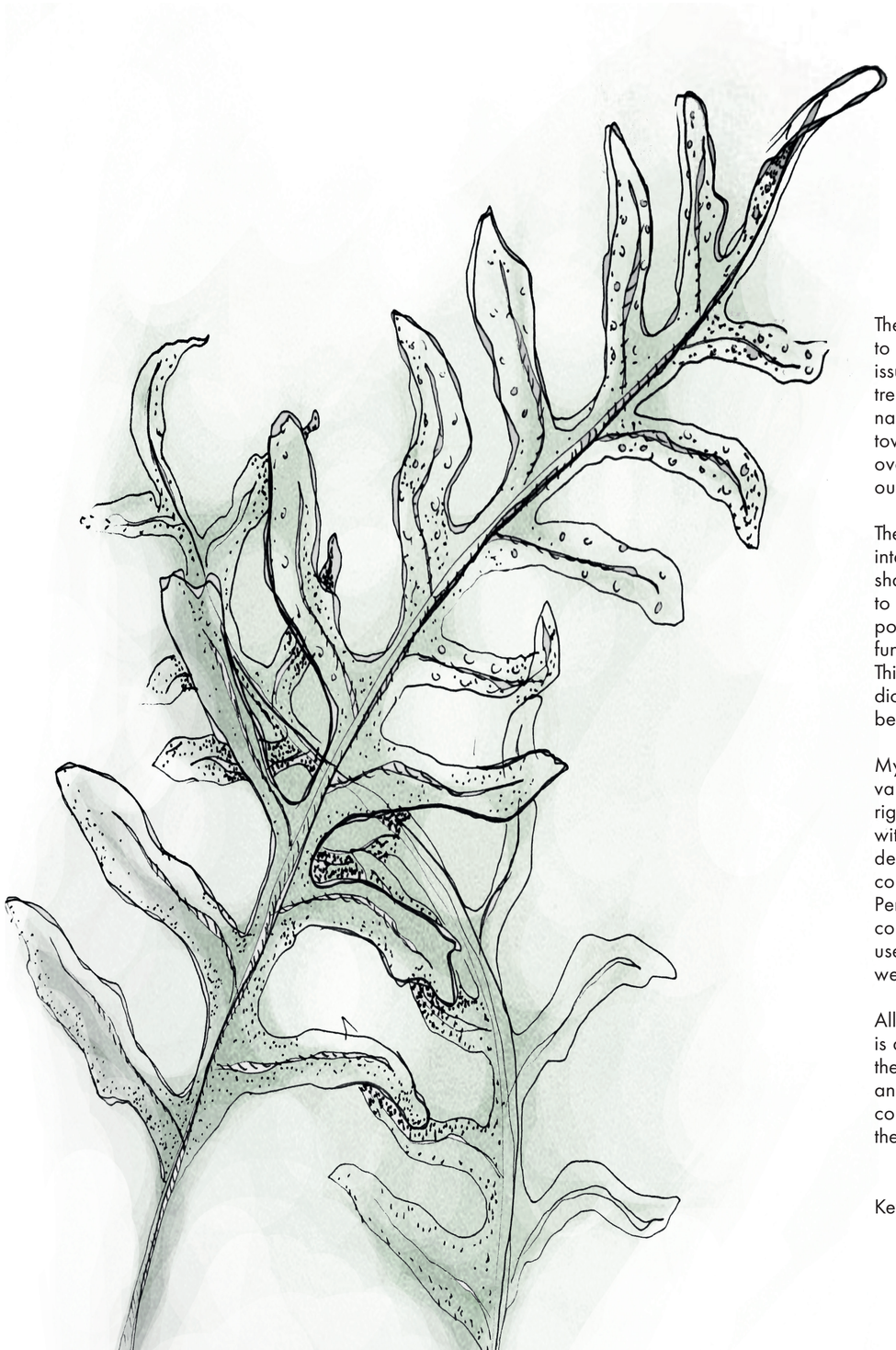
Opinnäytetyöni teesinä on toiminut ajanvietteellisen paviljonkirakennuksen konseptin suunnitteleminen Nuuksion kansallispuistoon. Työn aihe pohjautuu kahden ongelman risteyskohtaan. Ensinnäkin urbaanien alueiden asukkaiden fyysisestä sekä henkisestä kuormituksesta, jota voidaan ennaltaehkäistä sekä hoitaa ohjaamalla toimintaa lähiluontoon. Toisekseen kansallispuiston uuteen hoito- ja käyttösuunnitelmaan, jonka pyrkimyksenä on johdattaa kävijävirtaa puiston laita-alueille johtuen nykyisten aktiivialueiden ylikuormittumisesta. Tämän ohella paviljonki vastaa lisääntyvään luontopalveluiden tarpeeseen Suomen luontomatkailun sekä -turismin kasvaessa.

Näiden ilmiöiden teoreettinen tutkimus johti minut kestävän suunnittelun pariin. Haastatteluiden, keskusteluiden, lukemisen sekä luonnostelun kautta huomasin, että koskemattoman luonnon muovaaminen muuttaa aina ympäristöä, jonka rinnalla paviljongin tulisi elää harmoniassa sekä yhteistyössä. Tämän myötä suunnitelmani raamiksi muodostui pyrkimys luoda jotakin, joka ottaa ympäristöltään mahdollisimman vähän ja antaa takaisin enemmän ohjaamalla ihmisten toimintaa sekä ajatuksia, luomalla sosiaalista sekä kulttuurillista merkitystä ja uudenlaista arvoa ympäröivälle luonnolle. Lisäksi teemoihin sisältyy myös raakamateriaalien rekonstruointi, hiilidioksidineutraalius, ruumiillisella työllä rakentaminen sekä visuaalisten jännitteiden sekä yhtenäisyyksien tasapainotus luonnon ja rakennuksen välillä.

Tutkiva ja kokeellinen lähestymiseni johti minut monille sivupoluille, erilaisten ratkaisujen ja materiaalitutkimuksen ääreen. Lopputulos rakentui vasta, kun konsepti oli harkittu ja hiottu - näköalatasanteen ja katsomoportaan hybridi, jossa näkymät aukeavat jokaisesta kolkasta ympäröivään luontoon. Arvostusta luontoon olen ylläpitänyt säilyttämällä skaalan maltillisena mielessä pitäen ihmisvoimalla ja -työllä rakentamisen, luonnonmateriaalit paikallisesti tuotettuina, hiilidioksidineutraaleina sekä käsittelemättöminä. Lisäksi sinnikäs tutkimus saattoi minut monien innovatiivisten rakenneratkaisujen pariin, jotka soveltuvat konseptiin loistavasti. Niin Nuuksion kuin käyttäjänkin tarpeet, rajoitteet, hyvinvointi sekä tulevaisuus ovat pysyneet mukana koko prosessin, ja suunnitelma toimii sujuvasti näiden osapuolien risteyskohdassa ja vastaa niihin ongelmakohtiin, joita alun perin lähdin ratkaisemaan.

Lopputulos on pitkälle edistetty paviljonkirakennuksen konsepti. Työn teema on ajankohtainen niin tutkitun kohderyhmän, urbaanien ihmisten, kuin Nuuksionkin suhteen, mutta myös teemoissaan kestävästä suunnittelusta, puurakentamisesta, hiilidioksidipäästöjen rajoittamisesta ja ympäristön kunnioittamisesta rakennushankkeessa. Yhteiskunnallisia kipukohtia on suotavaa miettiä suunnittelutehtävissä, sillä hyvin suunniteltu on puoliksi tehty ja jälkikäteen on vaikea korjata niitä haasteita, joita valtaosa rakennushankkeista tänä päivänä tuo tullessaan.

Avainsanat: rakennustekniikka, kestävä suunnittelu, puurakentaminen



Abstract

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The main theme of my thesis was to create a recreational pavilion concept to Nuuksio national park. The subject stems from the crossroad between two issues. Firstly the mental and physical load of urban population that can be treated and prevented with leading activity to nearby nature. Secondly the national park's new usage and maintenance plan that strives to direct user flow towards the outskirts of the area due to the currently popular areas stuggles with overcapacity. In addition, the pavilion responds to the demands on recreational outdoor services due to increasing trends of nature travels and - tourism in Finland.

The theoretical study on these topics led me to explore sustainable design. Through interviewing, discussing, reading, sketching and ideation I came to notice that shaping the untouched nature always changes the context that the pavilion strives to live alongside of in harmony. Therefore, the design strove to have as little as possible effect on the surrounding and create additional value by shaping user function, by creating new social and cultural value and giving the site new worth. This approach also includes the reconstruction of raw, natural materials; carbon dioxide neutrality; using manual labour in construction and finding the balance between visual disharmony and similarities between the built and the existing.

My exploratory and experimental approach lead me to many bypaths, investigating various solutions and materials. The outcome was not formed until the concept felt right and well-thought-out - a hybrid between a viewing platform and stadium stairs with views to the nature from every corner. I have kept the aspects of respectful design in mind through the process by keeping the scale suitable for manual labour construction, using sustainable, carbon neutral, locally produced and raw materials. Persistent studies also took me to many innovative building solutions that suite the concept well. The limitations, wellbeing and future of both Nuuksio as well as the user have been considered during the whole process and the final design works well as the link between the two and in responding to the problems I set to solve.

All in all, the outcome is an advanced concept of a recreational pavilion. The theme is also current and not only for the studied user group of urban population and for the needs of Nuuksio, but also for the theme of sustainable design, wood construction and respecting the environment in built projects. Social issues should be taken into consideration when designing since, as they say, well planned is half done. Moreover, the damages done by many construction projects today are very hard to fix afterwards.

Keywords: building technology, sustainable design, wood construction

content

Introduction

1.1 Topic and Design Problem

My bachelor thesis focuses on creating an inclusive, free of charge recreational pavilion concept to Nuuksio national park. The pavilion will seamlessly correlate with its surroundings while giving shelter and a moment of peace for its visitors.

The concept stems from a high level of urgency taking place in especially urbanized surroundings in Finland that cause struggles including a growing disconnect from nature. The pavilion communicates about these issues by working as a stop sign that makes one slow down and sit down for a longer period of time than usual when exploring nature and focus on the moment presented. The pavilion can also work as a destination and therefore a reason to go explore outside of the urban environment. The intent is to provide a recreational moment of calm and relaxation justified by what being in nature can measurably provide in health and wellbeing benefits.

The concept is smoothly integrated to the new maintenance and usage plan of Nuuksio national park that is currently under making and foreseen to be completed by the beginning of 2021. The plan is to prevent the growing public interest from overcrowding the protected areas of the park by leading more activity to the outskirts and surroundings of the park. This means that location plays a big role in the pursuite of providing and protecting both visitor and the environment.

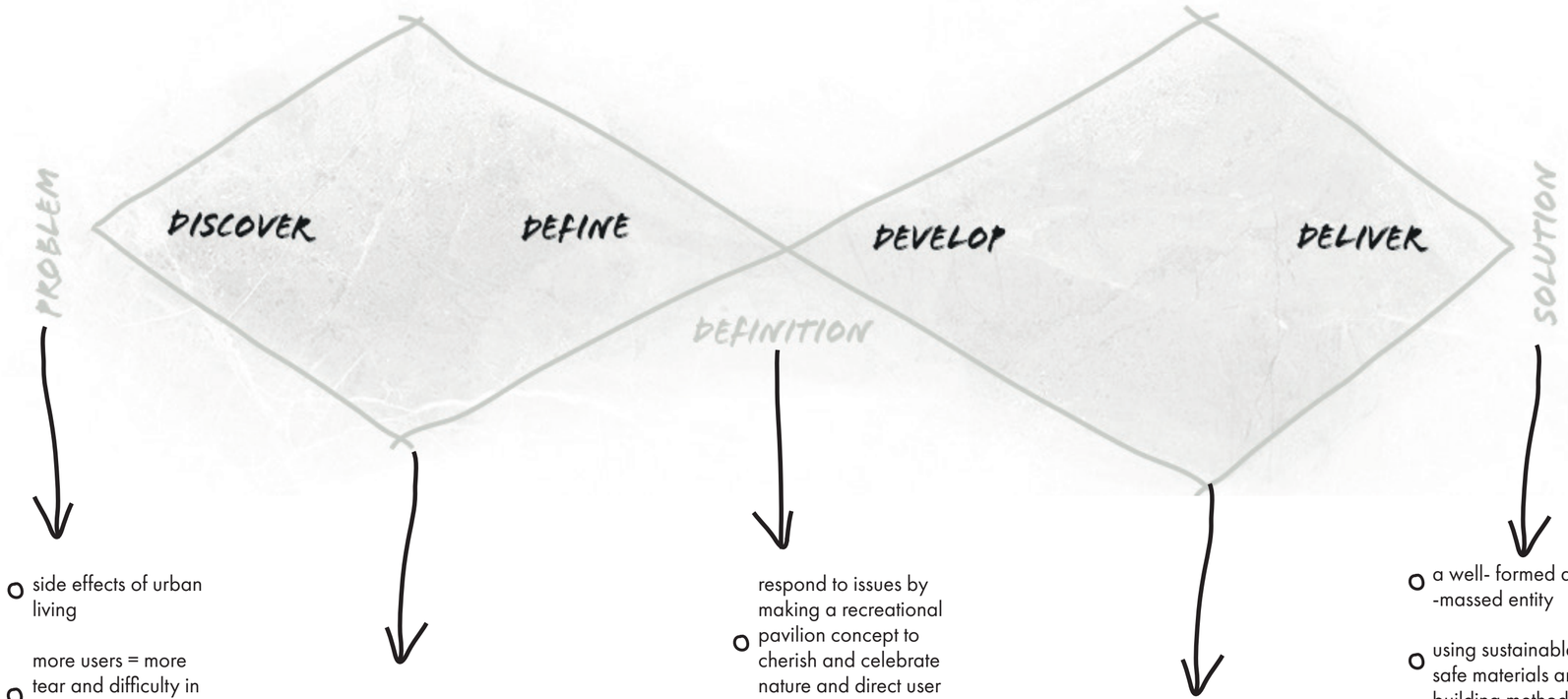
Faced design problems include reaching a purposeful design that is eye-catching and ergonomic, environmental aware and safe, well-formed and massed in correlation with the surrounding nature and reaching the set goal of making the user pause, focus, rewind and find a moment of wholesomeness in the urgency of urban living.

1.2 Relevance

Being a current and growing phenomenon urbanization faces constant research showing its impact and side effects on social and physical well being. Increasing sense of urgency, heightened stress rates, higher blood pressure and a growing disconnect from nature makes it an extensive issue. This hyphens the importance of nature in urban surroundings and creates strong trends within the field of design of preserving nature as a theme in the urban.

Homeland travel, nature activities and nature tourism are a strong and current trend. This shows that people in urban areas are finding inexpensive and beneficial ways of spending leisure time in nature. In tourism and travel there is a growing interest of Finland being a valued nature destination. These trends show in example vise Nuuksio's number of visits growing by almost 400 % from the beginning of year 2000. This results in a bigger demand of recreational services within nature destinations.

It is both important and current to strive to finding solutions and tools to work with such issues and demand. My design responds to it in an experimental way by providing an outlet from living for the extrinsic values and finding a certain level of intrinsic value in the multi-sensory world of nature.



- side effects of urban living
- more users = more tear and difficulty in the pursuite of nature conservation in Nuuksio
- increased demand on services in nature

- researching topics to define methodology
- relevant interviewing
- shaping goals and standards to reach purposeful solutions

- respond to issues by making a recreational pavilion concept to cherish and celebrate nature and direct user functions
- sustainable design- being environmentaly aware for respectful design
- counteracting urban stress with nearby nature
- directing user flow and function in Nuuksio
- providing more nature services

- benchmark analysis
- sketching and ideation
- material and construction research
- site visits and landscape study
- information modeling, polishing, detailed problem solving

- a well- formed and -massed entity
- using sustainable and safe materials and building methods
- leading activity to lake Meerlampi
- a creation suited for human ergonomics and functions
- creating a design that coexists peacefully with the environment
- documenting the concept in a way suited for presenting the plans to possible clients and profesionals in other fields for when moving on to the project phase

Diagram 1
Double diamond

1.3 Study Methods

I have utilized a work method called the double diamond in order to reach a great understanding of each aspect of the design process. This process starts of by realizing a faced design issue, studying that issue and methology to create a correlating concept, defining the core of the problem and ways to respond to it, developing that response and delivering the end result to display a solution.

My study includes extensive reading and analysing data from written sources including articles, books and magazines. In addition, I will be collecting knowledge by committing semi structured qualitative interviews. Gathering comprehensive data about both users and location is essential and an important tool for a successful design and setting the correct goals and standards.

For design drivers and further inspiration, I will be analysing accurate benchmarks, exploring the site and Finnish nature in general. Shape, rhythm, growth in nature are some of the fascinating sources of inspiration that I will be exploring for smooth integration of the built and the green. Researching location, materials and building methods are very important for reaching the set design goals. This part of the study will be achieved by site visits, interviews in the methods of design thinking and applying previously learned knowledge of materials and building technology. Materials will be furthered researched by studying manufacturers and previously learned information of such materials.

For accuracy and correctness in building technology and spatial design I will be gathering data from the Finnish building regulations and standards according to SisäRYL 2013, MaaRYL 2010 and RunkoRYL 2010.

1.4 Goals and Guidelines

The core goal is to design a recreational pavilion concept. From a functional point of view the design is set to work as a nature attraction that both invites and serves as an exciting place that makes the visitor want to stay and soak in the healing qualities of the nature. Observing from the National Park's point of view the pavilion expands activities provided to users and leads more visitors to the planned activating of the Nature centre haltia surroundings.

Spatially the design shall work with human ergonomic standards and requirements as well as being a safe and low carbon dioxide building that lives up to Finnish building regulations and code.

Visually the design will form a wholesome entity with the surrounding nature while providing something new, fresh and exciting for the visitor. An aspect of playfulness is in creating an interesting solution for the cohesion of the built and nature. The balance between an appealing construction that accentuates the surrounding without overshadowing it is an important aspect.

Building and construction vise my strive is to create a space that can be built on site using manual labor reassuring the preservation of the building site. Regarding materials the strive is to reconstruct nearby resourced and manufactured carbon neutral, raw materials that contribute to a lasting, sustainable and respectful design.

Methodology

STUDYING the problem and demand on a user level.

FINDING a platform suitable to respond to the previously mentioned problems and demand

UNDERSTANDING the platform and it's possibilities but also needs and limitations

DEVELOPING a knowledge base on how and by what terms to approach the problem solving

2.1 Urban and Nature

As urbanization in Finland has led to 80 % of the population living in urban surroundings the side effects are inevitably visible in human individuals. As this phenomenon grows the mentality of 80 % of the population preferring the countryside lifestyle stays. The presence of nature is still an important value for even the urban population. (Jaskari & Nironen, 2018)

When comparing people in urban areas and in the countryside areas their mental health, physical health and levels of stress do differ. While access to health care and employment is profoundly better in urban areas the growing gap in income, segregation from society, higher cost of living, changes in brain functions regarding stress regulation and emotional processing, access to processed foods and exposure to air pollution all create higher risk of stress, mental illness and health defects that are not as visible in those who live in the countryside. (ICSU Planning Group, 2011, 10-14)

When looking at data it is notable that the use of anti-depressants in the age group of 25-65 in relation to inhabitants is generally higher in urban Finland than in example vise Lapland. (Lehtonen & Kauronen, 2013, 114-124) Research also shows changes in the amygdala and limbic system of metropolitan inhabitants when faced with stressful situations. The weakened connection between the two also effect and regulate how the brain processes negative feelings. In conclusion exposure to urban living does change brain functions relating to how people react to stress factors and therefore making the impact of phenomenons in an urbanized environment harder on personal wellbeing. (Lederbogen F et al. 2011, 474:498)

With nature being the pre-set of preferred environment in the human brain it is concluded that many of the negative urban side effects can and are counteracted with being in nature. Stress, blood pressure, urgency and illness all decrease while a sense of happiness, social sensory, physical activeness and mental health improve. (Kaikkonen et al. 2014,20-33) The effects come quickly, as fast as 15 minutes and stay with the individual for a long period of time. (Sitar & GreenCare Finland, 2013)

It's a causal relationship that shows the importance of counteracting urban environments and its effects with leading people to nature and giving cause to stay for a longer time. The multi-sensory experiences in nature do improve wellbeing and are very important especially with the growing gap between the urban and the green. Finding a balance between the two and activating the nature in a climate where the distance is growing is essential in improving the health of urban people. (Frumkin et al. 2017)

2.2 Nature Travel and Activity in Finland

With 96 % of Finnish land exercising every man's right nature travel is not only good for health, wellbeing and sustainable but also accessible and equal. (Rautiainen et al. 2012, 13.)

Nature travel and activity in Finland are constantly increasing and at an ever high as the effects of urbanization, development of technology and increased awareness of wellbeing and health drive people towards the outdoors. With Finland being marketed and even lifted as a nature destination even the foreign tourism flow is blooming mostly for the sake of experiencing authentic Finland as the land of sauna, lakes and forest. (Koskinen, 2017)

The seek of experiential activity, a sense of making conscious choices in traveling and the simplicity of just leaving out the excess of everyday life and spending leisure time with ease are big attractions of nature. There is beauty and thrill in just being in balance to the urgency of everyday urban life. (Business Finland, Visit Finland, 2018)

While being a destination for activity and travel the nature of Finland is often also part of cultural heritage that needs to be preserved and taken care of as much if not more than the visitors. Recreational activity in the nature needs to be free and equal as well as directed and lead so that it remains safe for both user and destination. Services and a level of comfort is essential for user experience and brand that strengthens the appeal of the destination while preserving the fragile nature and leading user activity to desired places. (Neuvonen, interview 16.05.2019)

Image1
Map of Nuuksio area

2.3 Nuuksio National Park

Nuuksio national park is a lake upland nature destination located in Espoo, Kirkkonummi and Vihti in southern Finland. A high visitor rate, well maintained and versatile routes, good accessibility by car and public transport (Metsähallitus, 2019) and authentic Finnish nature makes it a true nature gem in the urban capital area.

The full area currently covers 4287 ha of forest, authentic nature, uncommon species of animals, rock formations and plants and 169 ha of water areas. (Metsähallitus 2006, 12) This combined with Finnish architecture and an expanding variety of leisure activities and services and communally owned recreational areas makes it a popular destination amongst both tourists and locals and therefore is constantly evolving in the field of user comfort and activities. (Neuvonen, interview 16.05.2019)

The area gained rights to be a national park in 1994 and since then the number of visits has grown by nearly 400 %. The opening of the Haltia nature centre increased number of visits by 40% annually making Nuuksio the second most visited natural park in Finland. The interest creates a growing demand of services in the area but also issues for the maintaining of Nuuksios core value. (Neuvonen, interview 16.05.2019)

Preserving the protected nature and uncommon species is the main purpose of Nuuksio but the growing demand and number of visits makes user comfort a priority as well. Directing the visitor flow is very important for the preserving of nature and preventing issues caused by human traffic which currently expands the social capacity.(Ormio & Rasinmäki 2006, 23-24) While protected areas are hard to protect from wear from the amount of visits they can and are protected from built environments. (Neuvonen, interview 16.05.2019) This it-self makes sure the destination remains a quite authentic nature experience.

Image2
Nuuksio National Park

2.3.1 Interview - Built Environments and Architecture in Nuuksio

On 16.05.2019 I committed a semi-structured qualitative interview with Liisa Neuvonen, Senior Planning Officer for Metsähallitus, who specializes in Forrest and Park Services in Finland, mostly Nuuksio national park and Sipoonkorpi recreational area. The part of the interview displayed in chapter 2.3.1 includes questions about built environments and architecture in Nuuksio relating to user satisfaction and need for built environments in the mission of protecting nature (see attachment for specific questions). The interview was performed in Finnish and the translation has been committed by me. The interview result is presented as a manuscript that is not literal but refers accurately to statements given by Neuvonen.

The most important mission of Nuuksio National Park is to preserve and take care of the prestigious nature. However, the growing public interest means there is a need for services responding to user needs. Such services include seating, bathrooms, fire pits and constructions helpful to mobility in the park and even souvenir shops. These services are used to lead visitors to where the impact and wear is not crucial for the maintenance and safety of the future of the park's nature. As an example the construction and communication of Haltia as a gate leads visitors to the outskirts of the park to non-protected areas and simultaneously provides services that strengthen user satisfaction and are beneficial to the mission of nature education.

Haltia is a prime example of how architecture has benefited Nuuksio. It communicates about the nature and importance of nature preservation while drawing attention of the public and increasing appeal of the natural park. It also provides a certain level of comfort like running water and bathroom facilities that especially tourists desire. Haltia itself has increased the number of visits by an annual 40 % and it is no surprise that it charts as one of the most searched subjects on the website www.visitespoo.fi. In many ways it's a building that benefits both Nuuksio and the users.

Generaly people respond well to the built things in the park. However, it must be noted that they desire simple things that don't take away from the nature experience. Accordingly to the nature travel trends the visitors desire to feel a disconnect from the urban and modern environments but still have a certain level of comfort and safety. The built that works hand in hand with the nature experience has an impact on the time spent in the park. By providing even simple activities like a place to take a seat or a covered space people tend to take advantage of it and spend more time in the outdoors even in situations they usually would leave such as when it rains.

The increasing number of visits has notably lifted demand on such recreational comforts. There is a demand from both the user and park point of view. On the user spectrum it responds to needs of having covered spaces and a place to be seated for a while and increases appeal of the park. Finding interesting things in the nature can also strengthen and make the nature experience more valuable and memorable. From the parks point of view building and locating things strategically is an important way of communication — it shows where we want to direct users and strengthens status of for example the paths that need activation. In a sense it helps preservation and safety in Nuuksio and directs and leads user behaviour.

2.4 Design and Nature

Spaces coexist with the surrounding nature forming entities, landscapes limited by the horizon. While the built has existed as shelter since caves providing protection, they have always had a rhythm different from only a roof over one's head. The functions performed inside, and the circulation created by walls, floors, interior elements the built creates an entity that works in many ways as a forest does. While the forest is directly result of random factors it is the same factors that affect how to build and how to design. Wind, sun, ground, water are some of the basic particles that determine how and where while human functioning is another much nature driven instinct that creates guidelines for ergonomic design exactly as with how the surrounding nature is created and how the inhabitants function. As random as it is all created in a very organized and calculated manner determining the functions. (Fujimoto, 2009, 22; Ishigami, 2011, 67)

When looking at human functioning and wellbeing nature is a strong driver which reflects directly to the field of designing for humans. However, in crowded urban areas it often seems like the driving force behind all, nature, is second and the built is first with landscapes of concrete to where the eye meets the horizon. It is a juxtaposition instead of a cohesion. The architectural philosophy of organic design however realizes the manufacture fact of "strong architecture" and tends to stem from that to a healthier, more natural and respectful direction in finding smooth integration of nature and urban. (Ishigami, 2011, 94)

2.4.1 Organic Design

Design gives and design takes. In exploring sustainable architecture and design I found that most measurable scales of doing ecological and nature aware design is based on damage control more so than helping the preservation of the site. Carbon neutral materials, respect to natural and cultural heritage of the site and using locally produced materials rose as key factors in achieving what could be considered ecologically friendly design. (Van der Ryn & Cowan, 1996, 19-30)

When exploring respectful design, it often comes down to what message it sends. Effectively communicating about a topic and therefore increasing awareness and directing human functioning. In the pursuit of damage control the most important factor might just be to get to an equation that equals zero. So, while taking things away from the nature the benefits to the nature should be equal to the loss and the created excess value be for the user, the culture and other tangible things it strives to effect. (Lopez, 2007, 26-28)

When considering the construction factors like energy efficiency and using renewable energy make for a more environmentally aware building. Having empathy for the surrounding landscape and the preservation of it also reduce the foot-print on site. For example, using heavy machinery in nature environments can be majorly damaging to even more than just the building site. A key factor in environmentally sustainable design is also designing something that lasts and has good abilities regarding maintenance and reparation. (Iranmanesh & Iranmanesh, 2012, 245-248)

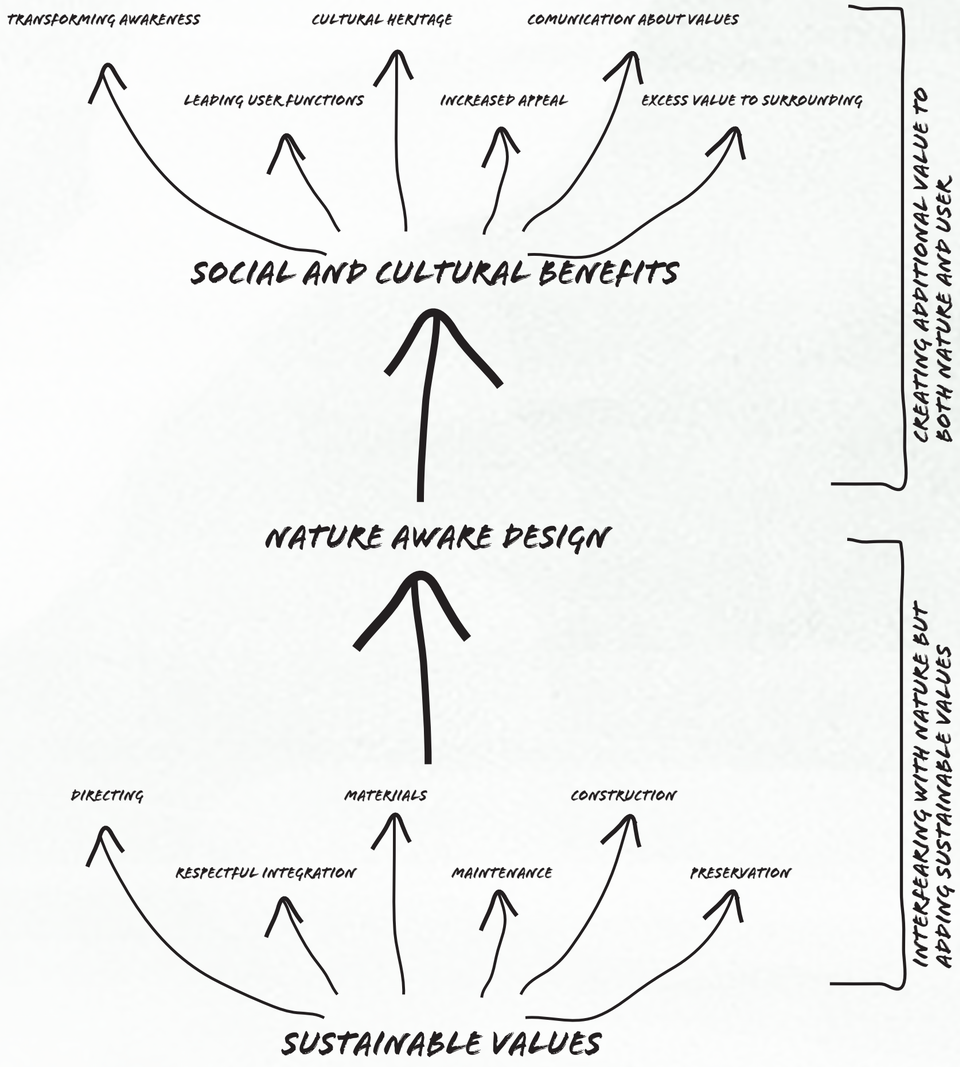


Diagram 2
Correlation between nature and design

2.4.2 Sustainable Use of Materials

Sustainability in materials, energy and ways of construction mean less negative impact on natural resources and humans. It stands for avoiding depleting or degrading the environment. The way sustainable practices do this is by creating fewer stress factors on the environment and therefore are reliable to society from today to the future. (Acciona, 2018)

As products have a life cycle from production to disposal raw and sustainable resources are measured by taking in to account each step on the way. This way they seek to avoid negative environmental consequence throughout their existence. As an example wood ; it is resourced in the nature, preferably nearby, goes through manufacturing processes that can be monitored for lesser impact on the earth, brought to site and preferably constructed by energy and petroleum efficient means that if used right and maintained stays safe and good to use for a long period of time and after this has many options of recycling and finally coming to the end of its lifespan by for example going through a natural decomposition process. During its life span it collects carbon making it emission neutral or positive depending on the manufacturing process and while it works as a component new forest can be planted and grown to keep the cycle going. (Acciona, 2018)

Construction and built environments and their use in Finland make up for 40 % of used energy and results 30 % of the emissions. Most of these emissions and energy consumption takes place during the use of the environments. However, construction and materials make up for 20 % of these statistics. The strive is to lessen the impact and using a natural material like wood is one way of seeing better statistics in the future. In resourcing, construction, use and disposal wood in numbers generally consumes 20 % less energy, emits 29% less greenhouse gases and releases 12 % less pollutants in to the air and 300 % less water pollutants than concrete. In addition, it is a naturally insulating improving energy efficiency, it stores carbon helping to migrate climate change and doesn't require large amounts of fossil fuels in production. (Rakennusteollisuus; American Forest Foundation, 2019)

2.4.3 Green Construction

Constructions impact on the environment is significant both on a local and global scale. From the mining to source materials, the transportation of materials, construction process to the waste removal and disposal after work. One of the effects is in carbon dioxide emissions caused by burning fossil fuels that then promote the greenhouse effect. In order to minimize the impact, it is crucial to understand the effects. Other harmful factors are methane emissions and waste products that pollute both air and water. (Tyler, 2017)

The biggest harm in terms of climate change is operation of heavy machinery throughout the building process. This itself makes for 5 % of global carbon dioxide emissions. This is also harmful on site - the noises, the tear and harm highly impact the water, ground and species on site. The environmental damage is very hard and expensive to fix in retrospect and therefore should be considered in the design phase. (Tyler, 2017)

By designing with this in mind the use of heavy machinery and power tools can be limited. Producing local and using manual forces in production, protection of the site by researching the location and it's species, timing the construction in correlation to the previously mentioned, using human power in the construction itself and being cautious on using non-toxic elements and making sure that waste disposal is being done correctly. These are all steps that can and should be taken into consideration when designing. The scale, purpose and applications should all be considered by the terms of achieving these values. (Snook, 2017)

2.5 Conclusion of Methodolodgy

"Design transforms awareness. Designs that grow out of and celebrate place ground us in place. Designs that work in partnership with nature articulate an implicit hope that we might do the same."

-Sim Van der Ryn and Stuart Cowan, 1996, Ecological Design

- Due to the increasing urbanization taking place in Finland and its effect on inhabitants it is essential to preserve the nearby nature we have and lead people towards it.
- Natures healing qualities work as an effective remedy to both mental and physical effects of urban environments.
- Even a 15-minute period spent in nature is efficient enough for long lasting health benefits.

- Nature tourism in Finland has significantly increased which creates higher demand on provided activities.
- The every man's right guarantees nature is for all. No surprise the Finnish fauna has appeal to not only inland travellers and explorers but also for tourists.

- Nuuksio National Park is the second most visited natural park in Finland and located in the middle of three urban centrals and a very short distance from the capital, Helsinki.
- It is an accessible nature destination for both locals and tourist
- Nuuksio's infrastructure is under development and one mission is to lead activity away from the protected areas towards the entrance ports one of them being the Haltia area.
- Activities, services and built environments are important because they have a mission of leading user functioning.

- When designing built environments in fragile areas it is important to consider and respect the site. Nuuksio for instance has very specific rules and guidelines for design.
- When creating respectful design, it must be noted that it is always harmful to some extent. It cannot be a part of untouched nature, but it can oblige the rules of what and how nature creates, how it works and by what standards.
- Creating sustainable and surrounding aware design it should reach benefits for the site in its existence. It can be purposeful for both the nature and it's users but to reach that it requires understanding for the site as an entity and user functioning.

Diagram 3
Summary of methodology

Benchmark analysis

3.1
Inverted Portal, Landscape Structure

Ensemble Studio
Montana, US
2015

Image 3
Inverted portal

- Nonorganic material but interesting and innovative building method of welding concrete to a mould formed in the ground.
- Concrete takes on organic material from the welding process. The reconstruction of soil and rock is very fascinating.
- The human made structure becomes part of the surrounding by in my opinion adding value as a disharmonic yet very harmonic element.
- As an installation it takes on a very massive size but becomes small in comparison to what is around it.
- It is an attraction by waking curiosity and therefore leads people to explore the outdoors.

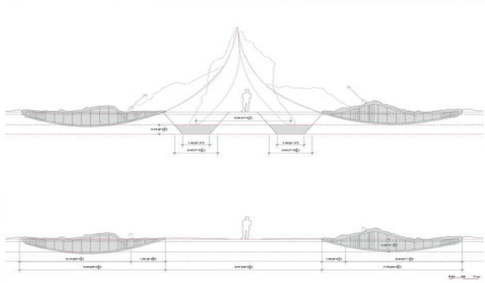


Image 4

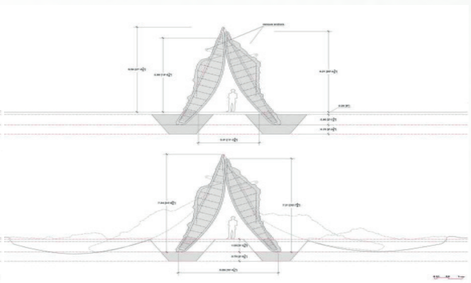


Image 5

Image 6

Image 7

Image 8

3.2
Sandworm, Installation

Marco Casagrande
Wenduine, Belgium
2012

- Only organic material found on site and free curved shapes created by the terms of the material.

- Pays tribute to local materials and building methods without disrupting the site.

- Very interesting visual appeal. Again, disharmonic to the site yet synchronized to how the sand dunes look like. Plays with sunlight in a very fascinating way.

- In the interior it gives a lot of focus to itself and leaves only part of the surrounding to be seen. This in a way contradicts my cause of giving the limelight to appreciation of what is already there in-stead of the built.

Image 9
Sandworm

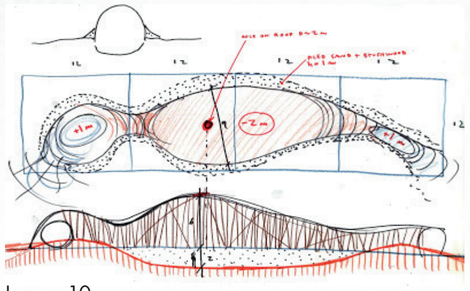


Image 10

Image 11

Image 12

Image 13

Image 14

3.3
Russell Cave, Historical Monument

Nature formed
Alabama, US
300 million years ago

Image 15
Russell cave

- Proving a point of how fundamentally similar designed spaces are to what nature creates by its terms.
- Similar functions to the built-in terms of providing shelter, a place to live, sleep, eat.
- The beauty of the view opening up. The cave frames the view and gives space to appreciate the light, the movement and peacefulness in a way that otherwise might get lost.
- It is amazing how lasting natures structures are. It gives perspective on the simple, yet complex qualities natural materials withhold.
- I am very inspired with how the once "home" is part of nature and how the fauna has grown on it, in it, around it.

Image 16

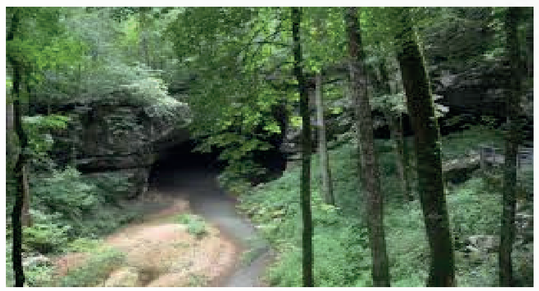


Image 17

Image 18

Image 19

3.4
Ring Around a Tree, Fuji Kindergarten

Tezuka Architects
Tokyo, Japan
2007

- Elements are clearly human made and non-organic, yet the construction rises on the terms of the tree.

- A touching harmony of users, the children, connecting with the nature. It is a great example of nature upbringing and directing appreciation and respect by making it fun and exciting when it might normally be just a tree.

- I am fond of the way it utilizes cubic meters and not only squares. it displays many levels of perspective provoking curiosity and a different view everywhere.

- It displays how even small actions in big urban areas can show empathy for our roots.

- The design is simple yet smart. The simple shape is very light and airy yet opens up many possibilities of circulation.

Image 20
Ring around a tree

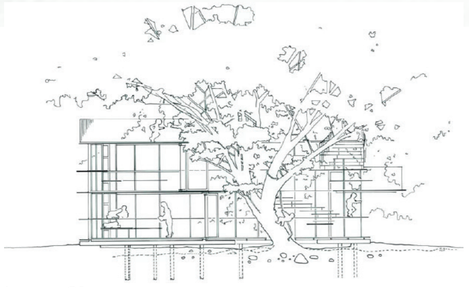


Image 21

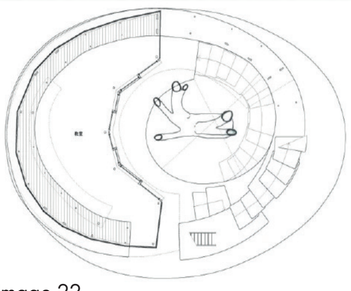


Image 22

Image 23

Image 24

Image 25

4 design process

4.1 Location

Nuuksio stands out as a very popular area with national park status and a problem to solve. Located in a very urban environment and proximity to the airport and constantly increasing number of visits and the struggle of balancing that with the mission to protect nature makes it a great location for the pavilion.

Nuuksios new usage and maintenance plan strives to lead masses away from the currently crowded Haukkalampi area and expand activity to envisaged portal areas. With the Haltia area being the most popular of these portals and having a strong infrastructure of services and pre-existing routes it became my area of interest for the site.

Most of the Haltia area is not natural park area which makes it more realistic to try to get a building permit. Most of the area is owned by the city of Espoo but also by the city of Helsinki, who then rents out the area to businesses and services. Most of the routes pass through the Northern side of the Haltia building and I focused my search for location there due to accessibility.

My fascination with the rock formations of Nuuksio was an important theme in finding a location with inspiration for a concept. Also, an overlook of water, a slightly sloping ground with a strong bedrock for a stable foundation and forest view became corner pieces for the correct location. This led me to inspect the lakes in the northern Haltia area with route infra around them or leading to them but with the authentic forest feel with zero to little built environment.

My initial idea was the connection trail between Haltia and Haukkalampi but where the waterline can be seen it becomes protected park area and the terrain is hard and not very accessible when thinking about a manual labour building.

Exploring both online and on site lead me to lake Meerlampi located only two kilometres from Haltia. Meerlampi is quite unknown and untouched, has some lesser known route infrastructure leading to both sides of it and a naturally formed rock cave called the Meerlampi Lippaluola resemblant of a big rock visor. It ticks all of my boxes for location, so I decided not to look any further but to set my location here.

Image 26
Lake Meerlampi

Image 27
Location

Image 28
Location

4.1.1 Experiencing the Path

The existing infrastructure played a big role in chosing the right location. Existing trails and their attributes contribute to the experience of the walk from location of arrival. In this case they make up for cirka 20 minutes per way. This means that the comute is just short of two kilometes to arrive from Haltia and two kilometers back. Full acessibility is hard to solve in nature. I pondered on this and decided on a route that is mostly wheelchair acsessible but not all the way due to it not setteling in with the existing infra in correlation to the designs site. This still means that there is something for everyone during the full experience. The two kilometer comute trail includes:

1. Wide, well maintained trails with signage
2. A climbing park
3. Rentable cabins and fire pits
4. Benches, views and nature
5. A sight seeing patio with Pitkäjärvi views
6. Seasonal activities such as a maintained ski trail, lots of berries and mushrooms to be picked and hiking
7. Nature attractions like the Lippaluola cave
8. Great lanscapes and historical nature
9. A ”hidden” water view, Meerlampi lake

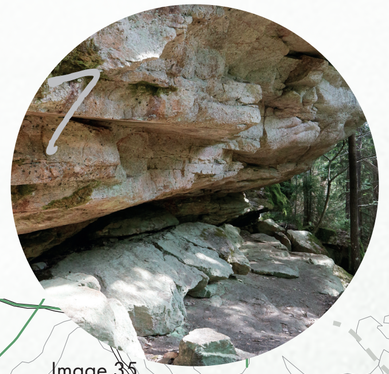


Image 35

Image 36

Image 37

Image 29

Image 30

Image 31

Image 32

Image 33

Image 34

4.1.2 Light

Since I have wanted to create very organic and simplistic value that co exists with the site I decided against using artificial light. Therefore the natural light is a very important design factor.

Pictured is lake Meerlampi and the envisaged location for the pavilion. The picture demonstrates the suns location both annually and hourly. As can be seen the southern exposure lights the area all year round from over the lake giving the location some extra value.

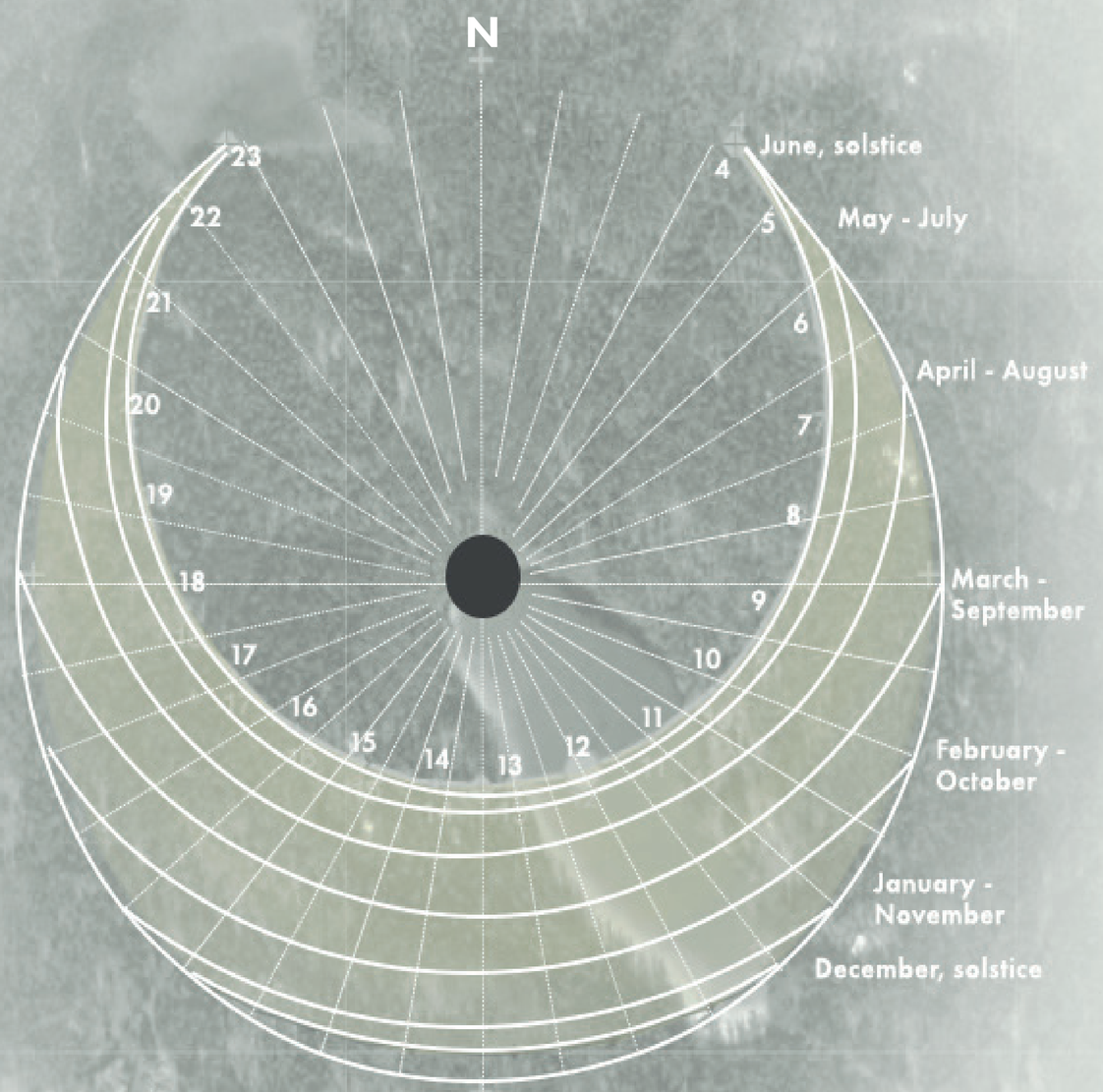
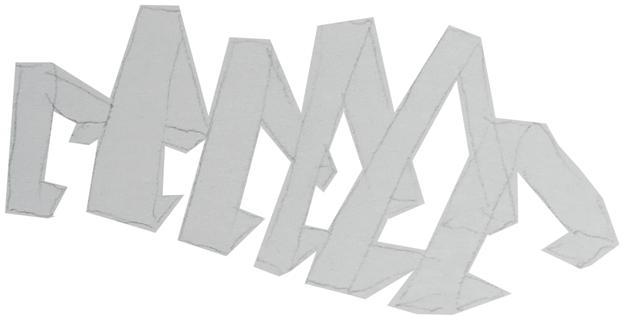


Diagram 4
Natural light through out the year

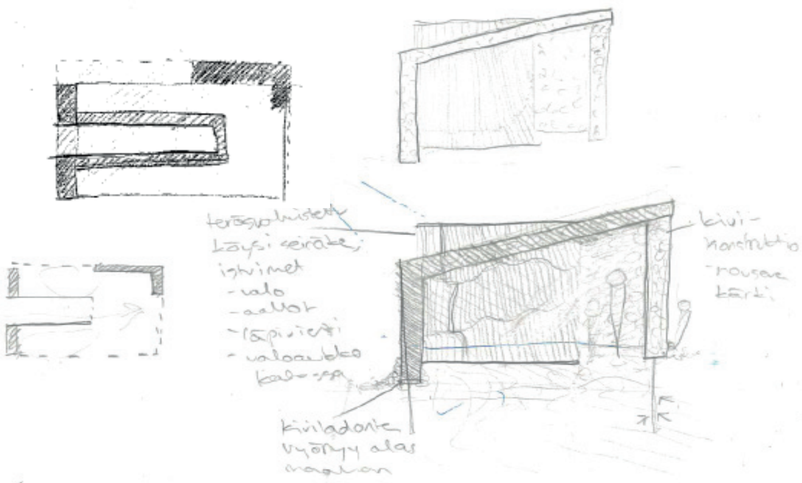
4.2 Sketching and Ideation

Since I have quite strictly followed the work method of the double diamond and taking my time with the research, I decided to parallelly work on free sketching to see how my thought process evolves alongside of the research, site visits and time. This has resulted in along the lines of 10 different options and ideas that all have chronologically inspired the next one with improvements based on research and setting the location.

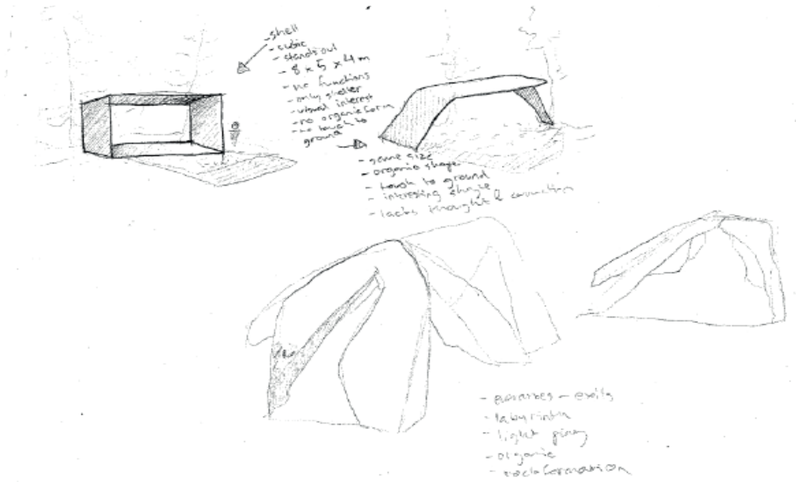


I started off with being inspired by the form of water, so I started illustrating wave like spaces. This however felt overly complex and lacked a purpose since the focus became the space instead of being a space that supports and exaggerates the surroundings.

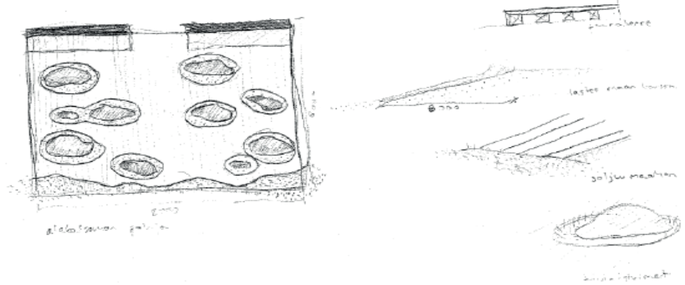
I then started abstracting the wave and ended up with a very cave like construction which I am still very fond of. It had a clear theme, a visual appeal and the excitement of exploration but again it felt like taking away from the set purpose. Also, it felt like a big mass that would require material to match and my mind immediately went to rock. In this specific form it felt too massive and like a logistical nightmare.



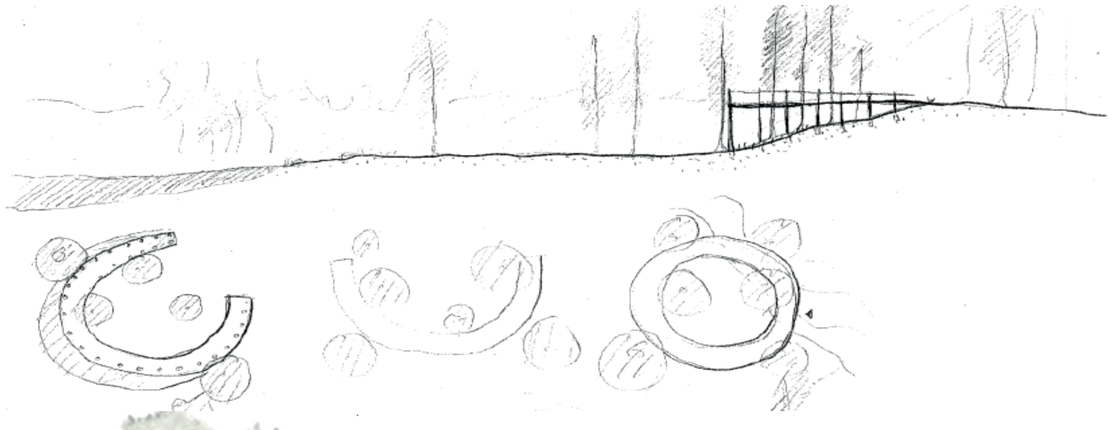
Rock stuck with me since I found it to be very organic, lasting and of historical value to the location. I reconstructed the massive rock blocks to smaller particles that could form a very linear entity. My strive was to make the heavy construction light by opening up both main facades to create a view to the open nature and by bringing light through the roof. And then I thought of a rope installation that would let through the light from the roof opening. And then the rope installation took the form of a bench. Lots of creative energy was flowing to this one but the longer I drew it and thought of it the further away it seemed to flow from the purpose. I was looking for unnatural solutions to fit the ideas to the concept and after some thought decided to move on.

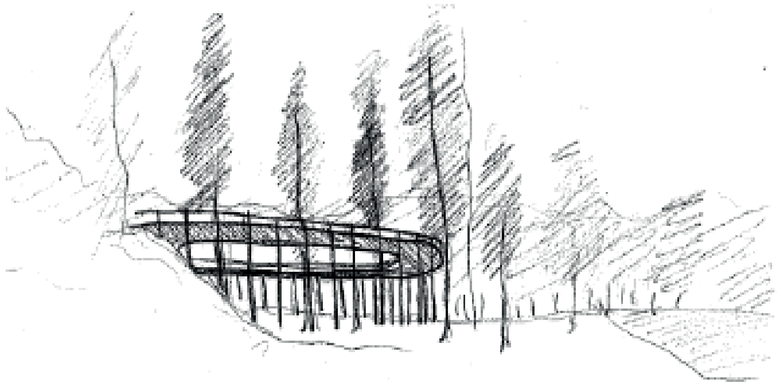


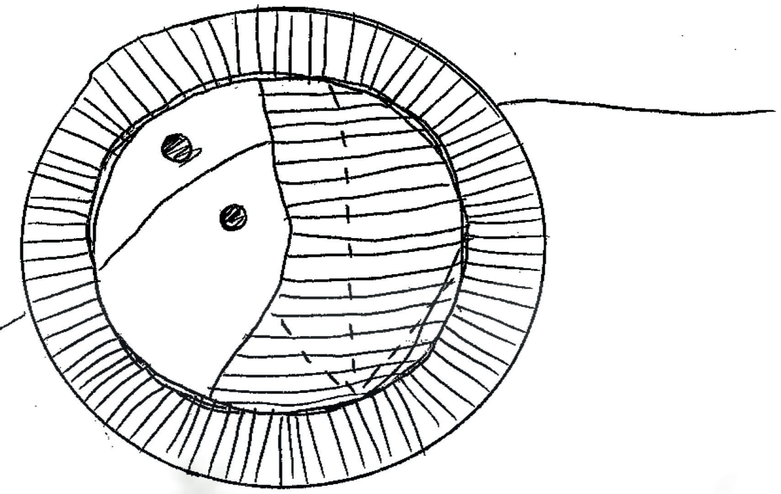
I started over but with stricter design drivers. I started with a cubic shell, moved on to make it organic and ended up with multiplying the organic shell to again a cave like formation. So, I ended up with a very similar issues to the beginning and knew that this was not the direction. At this point I had made two daytrips to Nuuksio for the sake of exploring the route structures, taking pictures and notes.

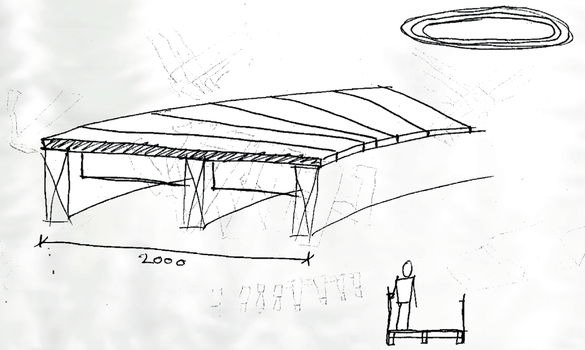


I took some time of the sketching and focused on the writing. I had not set the perfect location yet, so I read more about the outskirts of Nuuksio and made a third daytrip with the destination of Lippaluola rock formation and Meerlampi lake and this was the game changer. I was clearly very fond of the rock ideas and caves, so I started drawing a very literal visor form that sort of flowed with the sloping ground. The idea of opening up views to two directions took a turn with getting a view in two levels and all directions. This idea felt more purposeful, in touch with the location and still not very far from realistic. There were however aesthetic issues when applying measures and structures that would be necessary. I tried many options and researched solutions for building balconies as construction benchmarks and still it kept becoming less attractive. But the idea was there, the theoretical framework was done, location was set so I was happy to move on with all of this.









Over a few week period I was reconstructing the previous ideas and ended up with a floating disc, a viewing platform with a 360 view, working hand in hand with the geography, playful with light, working with the nature and not against it and with interesting options for the ground level. Even when adding on needed supporting constructions and railings it didn't feel disruptive to the horizontal line that I have kept in mind to work with as the outline for the imagery I am creating.

I did however want to utilize the ground level under the disc but due to the existing routes location and the steep slope under the disc I started thinking about how to take the basic idea to a more purposeful direction.

I drew a set of stairs. It turned out resembling an auditorium which supports the idea of admiring the open nature. The first draft was too stiff next to the organic curvature around it, so I moved to a more organic shape inspired by the Lippaluola cave. It flowed with the topography, made the ground level usable and made the surrounding more moveable for the user. Also, the stair set gave more flexibility to how to create less visible foundation to the floating disc.

4.3 Construction Methods

Construction is a big part of the result. It reflects very directly to safety, aesthetics, sustainability and the footprint the construction has on site. The visual impact the structural design has is given heightened importance in my concept because of my strive to keep it simple and not to use material wastefully. This meaning that the structure is left visible as a part of the exterior surface.

From the start using heavy machinery on site felt like a deal breaking contradiction to sticking to sustainable values. For the sake of staying true to the set values and goals using manual labour on site felt like the best approach. I chose a location with a steady bedrock to avoid massive work on a foundation. Exploring this option lead me to research how patios and piers are built by connecting bearing vertical or horizontal structures to the bedrock.

4.3.1 Load Bearing Design

For the bearing structure I had to be more creative because of my ideas of the half floating platform. Steel seemed like an easy and bearable material but again not very according to concept. Exploring durable wood beam solutions became my focus. Glulam beams would be a very standard option with great durability yet as light as 51mm x 200 mm dimensions. It can also be bent to circular forms without risking fractures or loss of durability. (MetsäWood) The glue however is not the most sustainable option and the durability in intense and changing weather conditions is questionable when left exposed, so I did some further researching.

Looking in to CLT and MHM elements I stumbled across a Finnish innovation called Aalto Haitek which is a crosslam material with wavy edges on the components that connect to each other with a lasting grip with a wider surface for increased friction. The components are anchored and pressed together. The material can be naturally processed for better durability on ground and it is very flexible for creating curved shapes. The production, resourcing and innovation is completely Finnish. (Kpedu, 2018 ; Aalto Haitek) All of this make it a great and innovative material to explore further.

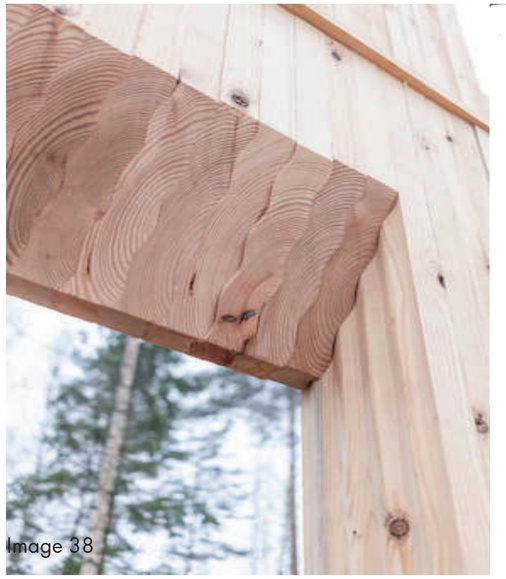


Image 38

Image 39

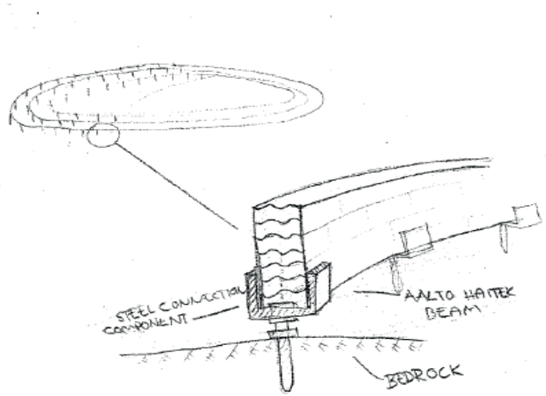


Image 40

Diagram 5
Aalto Haitek

STAIRS
WHAT HAS TO BE CONCIDERED:

- SAFETY : RAILING, RISER AND TREAD
- STRICT BUILING CODE
- ERGONOMIC STANDARDS
- WELL FORMED, INTEREST IN DETAILS
- DURABILITY
- CREATING STANDARDIZED MEASUREMENTS FOR ORGANIC FORM

Diagram 6
Stairs

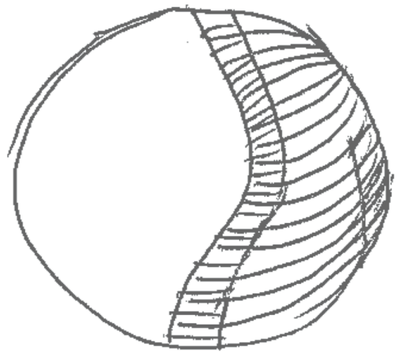
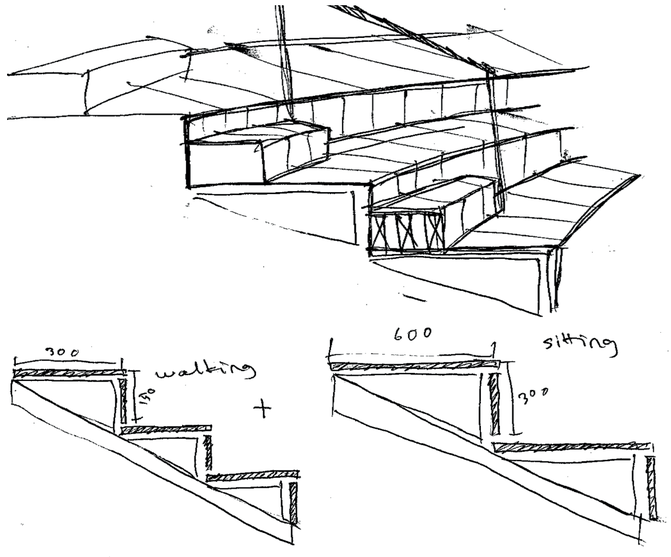


Image 42



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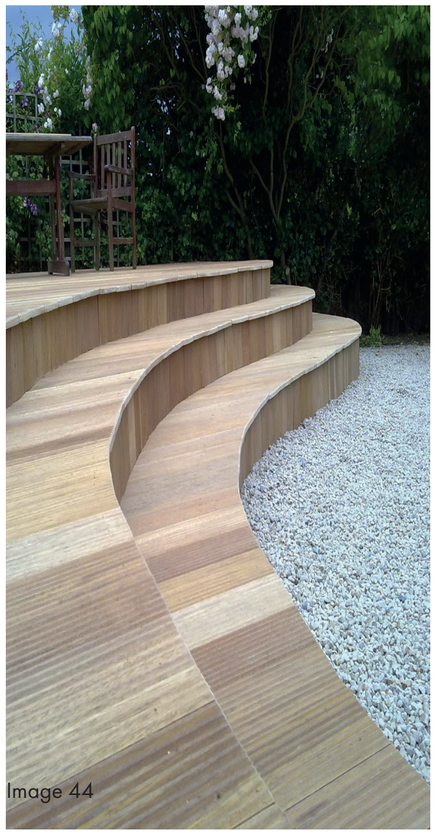


Image 44

4.3.2 Stairs

Since coming up with using stairs as a big component of the pavilion it started to become one of the most complex particles. From the start going with organic shapes felt like an appealing option that refers to water, to nature and the main form of the construction.

The most important factor were seating, walking, safety and form which started to feel like a very complicated combination to fulfil. Building requirements suggest that an easy to walk on stair has a riser of 150 mm, regular at 180 mm riser and hard at 200 mm riser. A riser over 250 mm should not be built. When building in the outdoors the suggested riser height is suggested to not exceed 150 mm. The riser depends on the number of stairs and the total rise from level A to level B. The tread can be calculated by using a standard human step length of 630 mm with an equation of 630 – 2 x riser = tread. (RT 88-11018)

Due to the height between A level and B level would be around 6000 mm in my design it means that an easily accessible stair would be very long. This means that it requires a min 1200 mm flat area between every 10 steps. In addition, I want to incorporate the round shape and seating to justify the ease of staying in the nature and creating unanimous design. Therefore, the walking stairs only make up for one part of the stairs and has to be suited with the seating part.

When considering human ergonomics an optimal general seating height would lay between 400 mm to 500 mm. With the other measurements in the designed stairs the ideal height for the seating would be only 300 mm. Despite not ideal I committed some testing with what could be considered standard length and health people from ages four to fifty-five and concluded that with a depth of 600 mm and a handrail for assisting getting up it works alright although not optimal. The option of having your knees up or your legs stretched to the front without interfering with people walking on the stairs makes it decent for sitting. (RT 09-11137)

When it comes to material, I wanted to be true to the reconstruction of wood which lead me to look up patio stairs. A standard kosour structure seems ideal but due to the stairs sloping very much alike the ground the kosour board and triangle both take up quite a lot of height and ideally, I would like for the stairs to flow in to the bushes, grass and branches on the site. By removing the bedrocks 100 mm coating of grass and soil and moving it to the areas affected by the construction could lower the stairs to only be 150 mm to 200 mm off the ground at each step and make up for the slight tear happening on site.

4.4 Materials & Components

From the start I wanted to use a palette of natural and sustainable materials. Not only does it speak for the authenticity, but I also find it interesting to reconstruct the natural elements of the site in creating something different that still contributes to surrounding. Being sustainably aware and using a material that can be grafted easily on site with as little effect to the natural site as possible were important factors too.

Due to Nuuksio being known for its rare rock formations I explored rock as a material and the naturally formed rock constructions of Nuuksio alongside of wood. I wanted to use materials found on site but in my interview with Liisa Neuvonen I found that leaving the fallen trees to rot to become manoeuvre and leaving the rocks untouched is very important for the natural flora and fauna in the natural park. Taking this in to account I decided to focus on durable wooden materials but leaving the materials from the site untouched.

4.4.1 Paneling and Stairs

I have been fascinated with a sustainably and naturally produced material called Accoya. It is a hardwood material that goes through a nonchemical cell changing procedure that makes it incredibly durable, weather resistant both in ground and on ground. However, the production takes place in Arnheim in the Netherlands and the raw wood material is imported from outside of Finland. (Accsys Technologies 2018) This makes it less appealing when considering the positive effect that inland resourcing and production has. Looking in too Finnish materials with similar attributes to Accoya became the most appealing option for me, for the authenticity and the set values.

The site consists of mainly spruce, birch and larch trees which when made into hardwood products are not the best when it comes to aging. They are very prone to yeast and microbial growth which damage the construction making it unsafe and hard to maintain. Saturating the material would give it a longer life span but then again inducing chemicals and less recycling options made it a strong no for the project. (Puuinfo) I researched natural options and came across a method called Organowood that gives the raw material similar attributes to saturation but such as with Accoya production takes place abroad and the attributes are still not as good as Accoya's. (Organowood AB)

Looking further into raw tree materials with good abilities I found Siberian larch which is an extremely durable wood material even in tough conditions. Especially the heartwood is very durable and naturally resistant to yeast and microbial growth. It is foreign to Finnish fauna but can and is grown due to high demand in exterior cladding and application.

Research testing shows that Siberian larch heartwood grown in Punkaharju, Finland showed no signs of deterioration either in- or on ground during the 11-year test period. The estimate for the deterioration to begin in ground was 10 more years. (Venäläinen, Heikkonen, Terziev, Torniainen, 2017, 2-5)

Image 45

Image 46

Image 47

ACCOYA

- \+ DIMENSIONALLY STABLE
- \+ INSECT BARRIER
- \+ INCREDIBLE DURABILITY
- \+ RETAINED STRENGHT & HARDNESS
- \+ CONSISTANT QUALITY THROUGHOUT
- \+ NON-TOXIC & RECYCLABLE
- \+ LOW MAINTENANCE
- — PRODUCED ABROAD
- — RESOURCED ABROAD
- — SHIPPING
- — COST

SIBERIAN LARCH

- \+ INLAND PRODUCTION
- \+ INLAND RESOURCING
- \+ GREAT OUTDOOR DURABILITY
- \+ COMPLETELY NATURAL
- \+ LOW MAINTENANCE
- \+ GREAT LOOK, BOTH OLD AND NEW
- \+ COST EFFICENT
- \+ CARBONMONOXIDE NEUTRAL
- — SHORTER LIFESPAN THAN ACCOYA
- — MIGHT BREAK DURING DRYING
- — PRONE TO SPLINTERS

Diagram 7
Comparison between Accoya and siberian larch

WOOD RAILING
WHAT HAS TO BE CONCIDERED:

- VIEW, LIGHT, ACESSIBILITY
- STRICT BUILING CODE
- ERGONOMIC STANDARDS
- SAFETY
- WELL FORMED, INTEREST IN DETAILS
- DURABILITY
- KEEPING IT LIGHT AND IN SYNC WITH DESIGN

Diagram 8
Railing

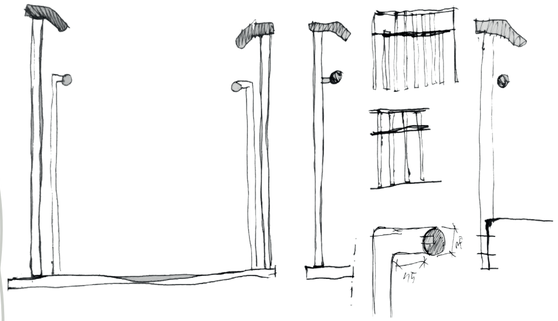
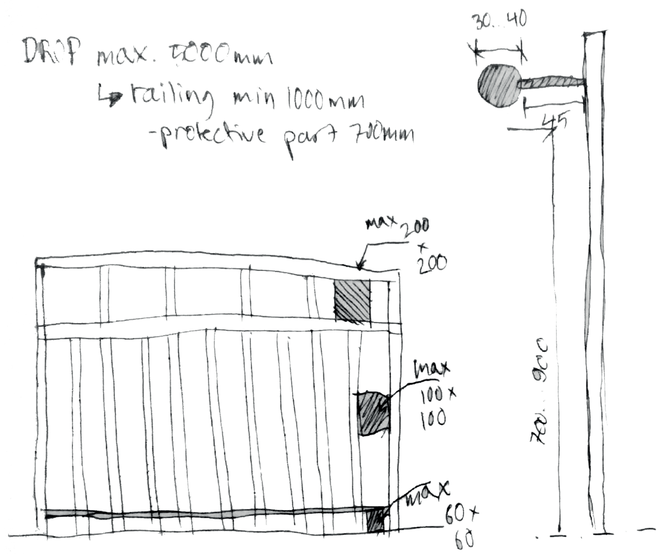


Image 49

Image 48



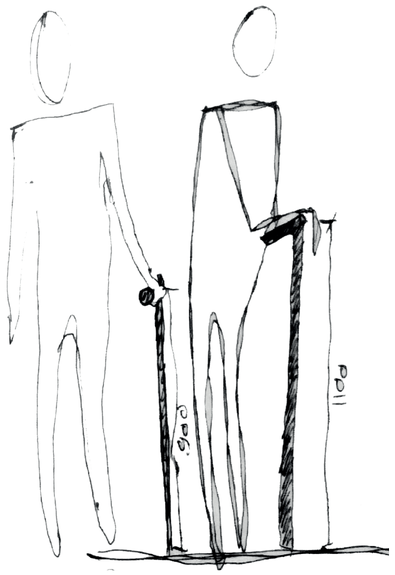


Image 50

4.4.2 Railing

When designing off the ground there are many limitations and requirements regarding safety that need to be taken in to account. One of the most important safety standards are railings. My main goal is to avoid creating unnecessary mass to the seemingly floating structure, so glass was my first thought.

I researched durability of glass and looked into Pilkington's safety glasses that are either tempered, laminated or a mixture of both. The thicknesses of the float glass used should be on the thicker side so that it not only is safe but also looks and feels safe. I set the thickness at 15 mm so that it would work with most railing systems as well.

I further researched 15 mm Pilkington OptiWhite float glass with applied Pilkington Toughened Glass attribute with pencil polished edges. The OptiWhite collection is completely colourless with low reflectivity so its colour reproduction abilities are great. Because of the reduced green tint typical for glass the edges can be left visible. (Nippon Sheet Glass Co., Ltd.)

After applying the railing to a 3D model and consulting with my instructor I found that overcoming the unsafe feeling that glass gives at such high heights and the struggles of maintenance in such a remote place I started to reconsider my choice. Glass is see through but it is heavy, it gets dirty and it contradicts the theme of reconstructing natural components. Through sketching, researching different kinds of railing and applications I leaned towards using wood again.

Due to choosing Siberian larch for the main structure I decided to use the same material for the railing also. Personally, I am very fond of monolithic things but when it comes to reaching openness and lightness with a solid ma-terial it can be difficult. Form giving meets strict building regulations and solid meets transparency and light - a great challenge to take on.

WOOD RAILING

- + RECONSTRUCTING NATURAL MATERIALS
- + FLEXIBLE
- + FEELS SAFE
- + CREATES A MONOLITHICAL FEEL
- + SUSTAINABLE
- + INLAND RESOURCING AND PRODUCTION
- + EASY MAINTANANCE

Diagram 9
Railing

1

- I created the exact height curves in AutoCAD.

Image 51

2

- Imported the dwg height curves to Revit in the actual cordinate system and gave the exact height position to each curve.

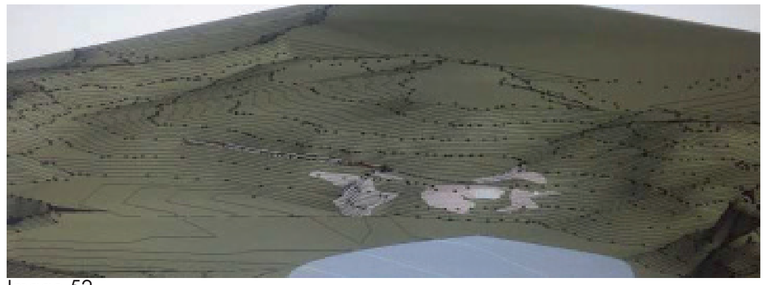


Image 52

3

- Started modeling the pavilion acording to plans and having it fitted to the landscape. This made it possible to adjust the stairs to exact and correct measurements.

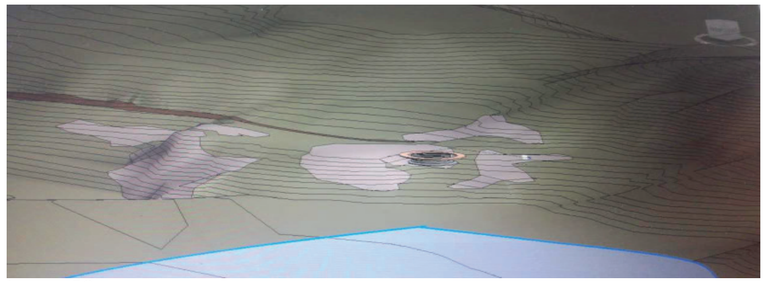


Image 53

4

- Created the forrest landscape using the Enscape internal library.

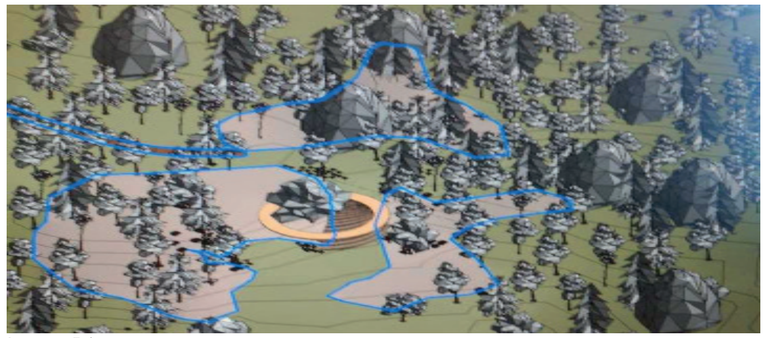


Image 54

5

- Began the real time render to explore, adjust and visualize.

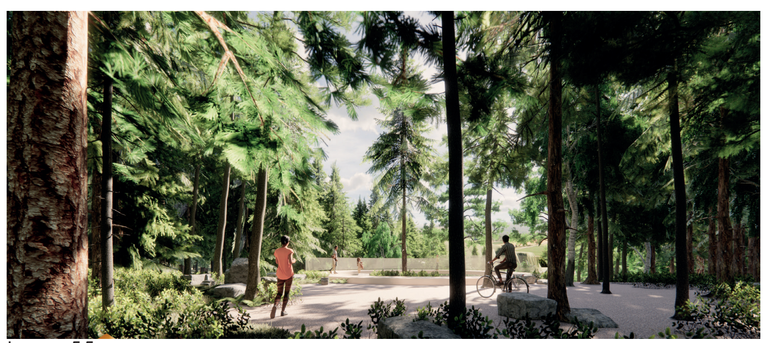


Image 55

4.5 From 2D to 3D

While moving to a more detailed level I started to work on a 3D model. I decided on using Revit which is an Autodesk based building information modelling software that I had no previous knowledge of. I however find it to be such a common and useful tool in the work field that learning it seemed almost essential. Also, the compatibility with AutoCAD is a big plus.

For me being able to see the full design being built in a three-dimensional world helps understand the full picture, figuring out every connection and measurement that might not get solved when making 2D images. For me it's a quick and easy design tool that I apply to nearly every project I work on. When it came to this project it became a necessity because of the importance of the landscape and its slopes and how the pavilion be fitted with these.

For creating visualisations, I wanted to challenge myself and apply a new tool. I decided to look for a Revit compatible tool with an ability render real time so that the rendered space could be explored, and the changes made in the information model would be applied to the render instantly. I found a software called Enscape and decided to give it a try.

What was pleasant about it was the incredible internal library with 3D objects and the very usable user interface. One great asset was the setup tools that you could adjust resolution, image size, colours, backgrounds and light while rendering real time.

Completed Design

5.1 Final Form

The final creation is a wooden, recreational pavilion celebrating nature. A slight disharmonic element in the wood's worth meandering through the paths surrounding Haltia to see or to stumble upon and slow down, even stop, and see the expanding views of the mixed forest and lake Meerlampi opening towards the South.

It grounds smoothly in its place curving down according to the topography while grounding the visitor to the place and moment. At its height placing the explorer five meters over ground level waking curiosity for the new perspective.

In its material choices it is a homage to the durability, sustainability and cultural heritage of wood. The reconstruction of hardwood materials gives it the strength and beauty from core to surface and flexibility in construction to be able to reference the organic shapes and rhythms found around it.

Image 56
Arrival to the Pavilion

5.2 Site Plan

The final location is the Northern part of Lake Meerlampi. The location is owned by the city of Espoo and is not of natural park status meaning that it is not protected. Accessible by foot and bike on an existing trail only two kilometres from Haltia. On the route there are firepits, rentable cabins, bird watching station, a maintained ski trail during winters, a wheelchair accessible portion of 1,5 km and nature attractions such as the Lippaluola cave located only 100 m from the pavilion.

The trail is also accessible for maintenance vehicles which helps construction and bringing material to site without harming the forest by having to create trails.

The water level of Meerlampi stands at 50 meters above ocean surface level and the pavilion is located at a point where the hill steeps down from 60 meters to 55 meters on a 20-meter span. after reaching the 55-meter mark the slope towards the lake is much smaller and easy to walk.

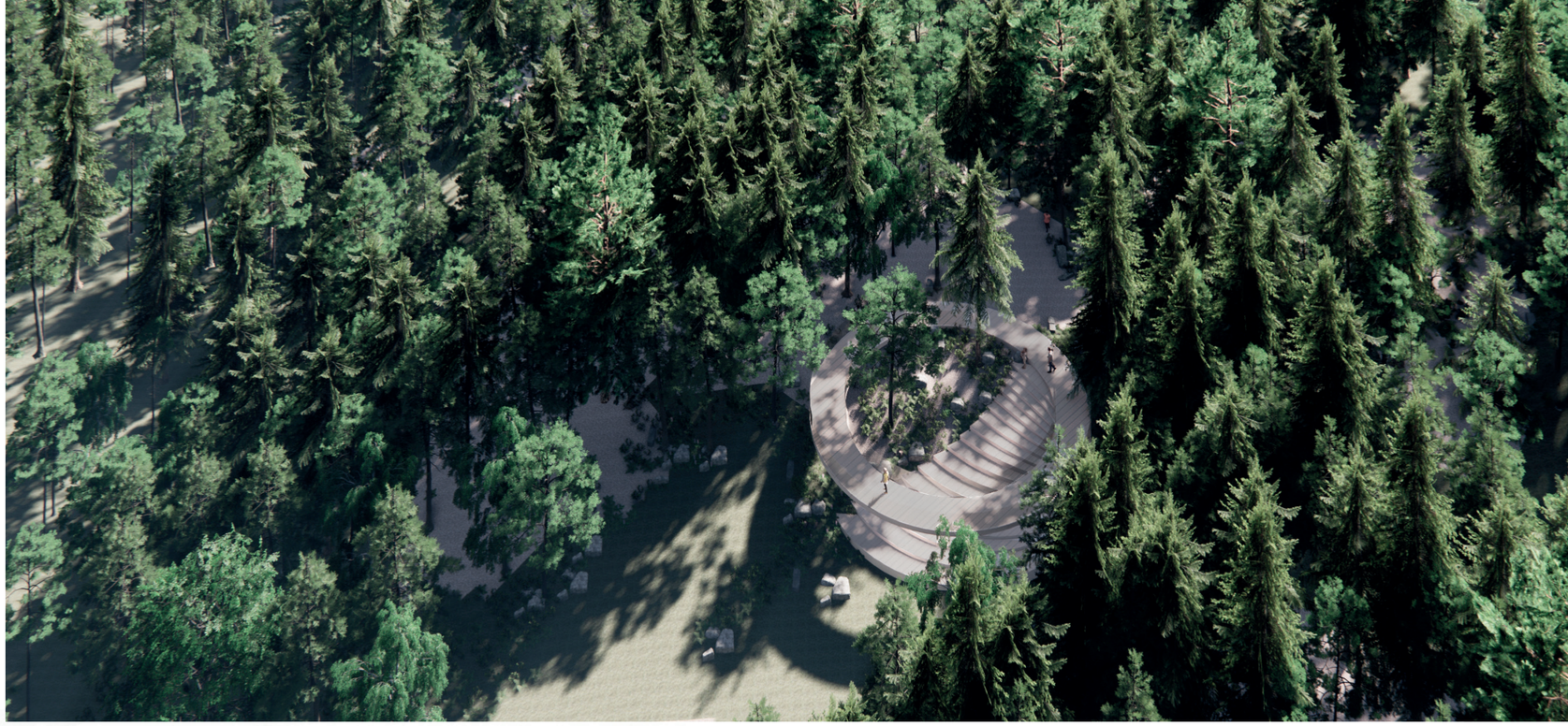


Image *57*
Bird view of Pavilion

Site Plan, 1:500

Due to the very thick forest the site will require cutting down a few either fallen down or rotting trees from in front of the lake. In addition to this a standard clean-up of branches and thick bushes on the waterfront will be done to hyphenate the view. The five trees that are trimmed down will be left in the surrounding to rot and turn to ground material to ensure the natural recycling process.

In addition, the earth on top of the bedrock where construction will take place will be safely removed and stored before building the stairs and anchoring the Haitek beams. After this process the stored earth mass will be relocated to around the structure and on site for damage control and ensuring as little as possible wear from the construction phase.

For the time of the construction, although manual, the trees surrounding and left in the middle of the pavilion will be protected by a plank fence reaching a minimum height of 1500 mm. The fence will be removed after construction ends

After these steps are completed the result is that lake Meerlampi peaks through the greenery and light reaches the location better. Also, the clean-up ensures movability from the path to the lake and back via the pavilion.

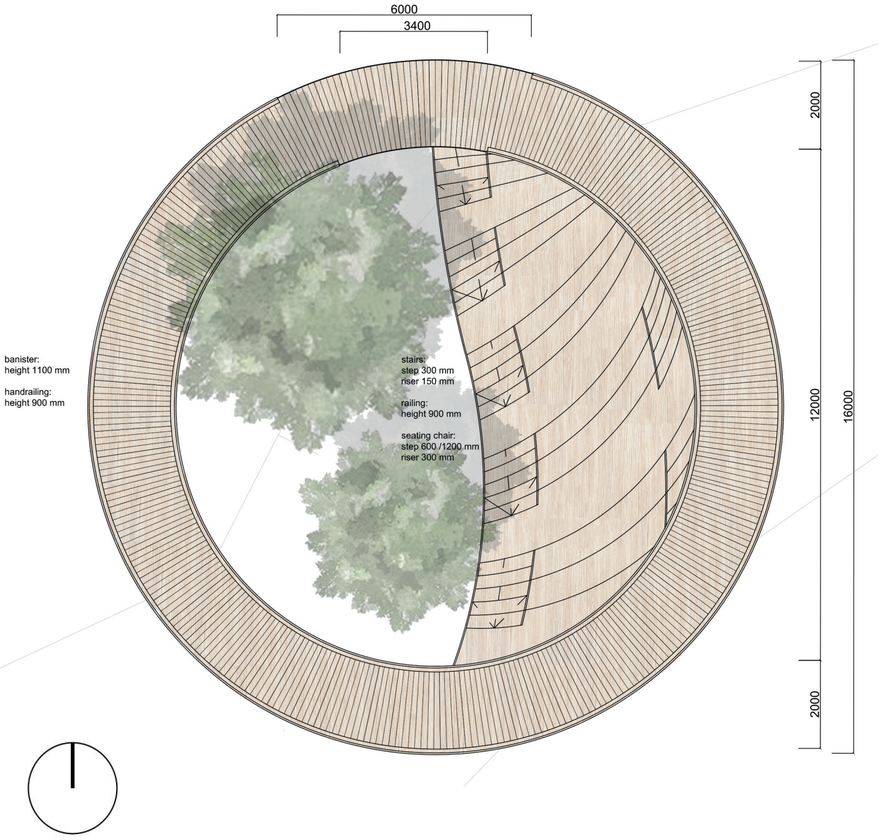
✕	removed from site
L	Larch
S	Spruce
B	Birch

5.3 Facades and Plan

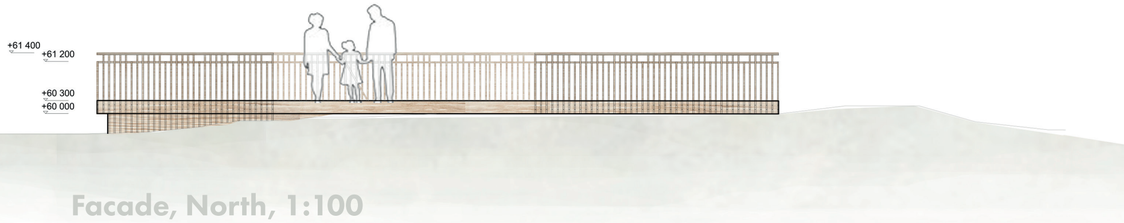
The pavilion is in its basic form a circle with a diameter of 16 meters. The top circle is two meters wide to comfortably fit people walking side by side and passing from both directions.

The lower ground level is connected to the plan level by stairs that flow according to the form and descent of the slope. The stairs are designed with both safety and relaxation in mind. It consists of a middle section of deep, wide and high enough to comfortably sit on and side sections optimal and safe to walk on.

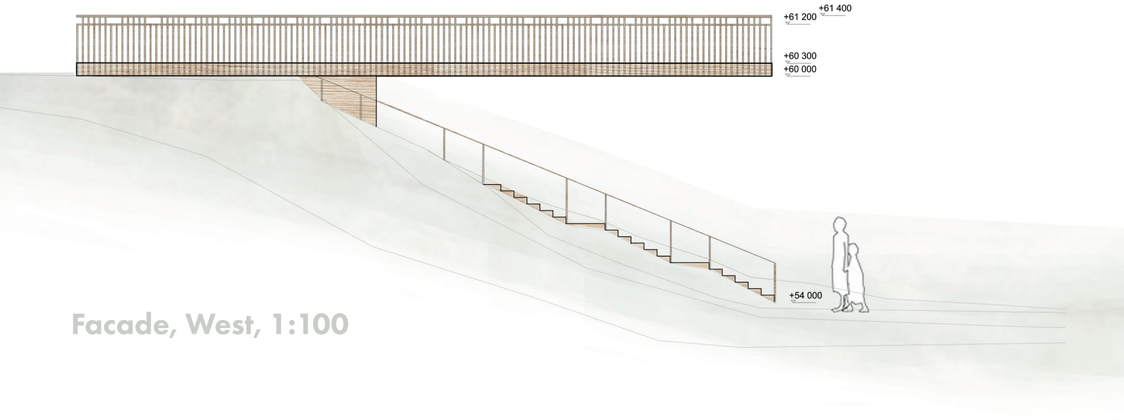
The top level is not wide enough to make a competent protective ceiling but for smaller rain showers and creating shadow to protect from the South sun it is a great addition to the benefits of the design. It allows light to puncture the pavilion and for both sky and ground to be seen and for the natural flora and fauna to keep growing.



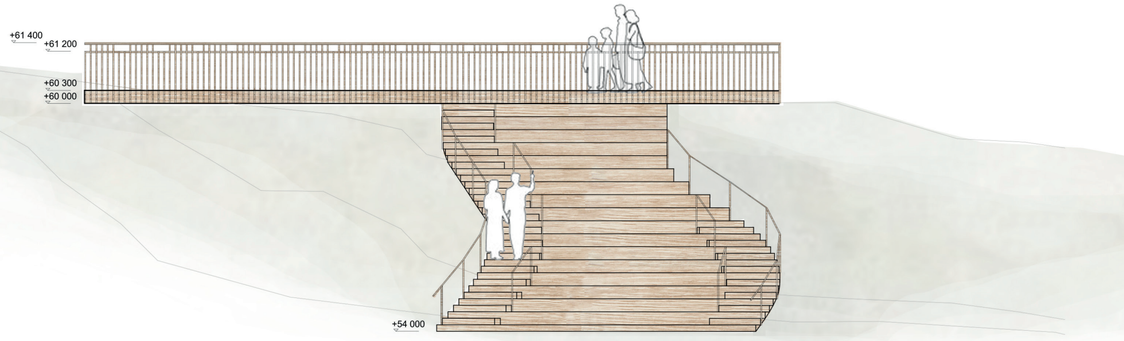
Plan, 1:100



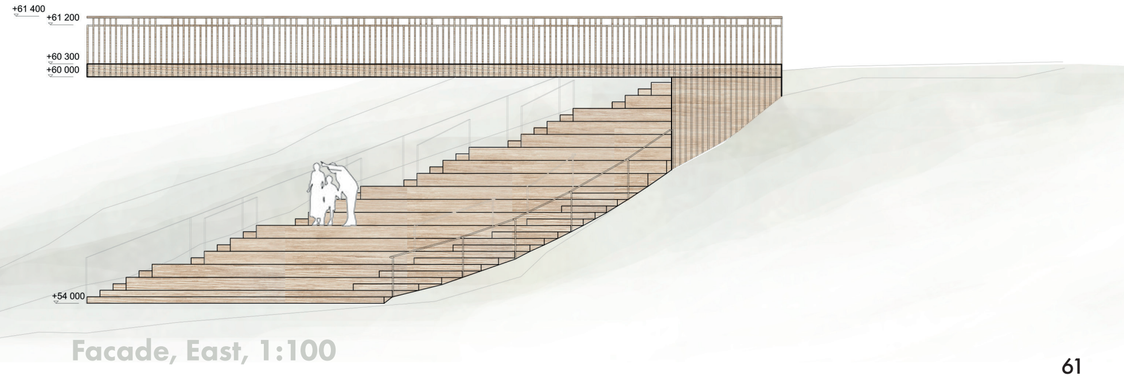
Facade, North, 1:100



Facade, West, 1:100



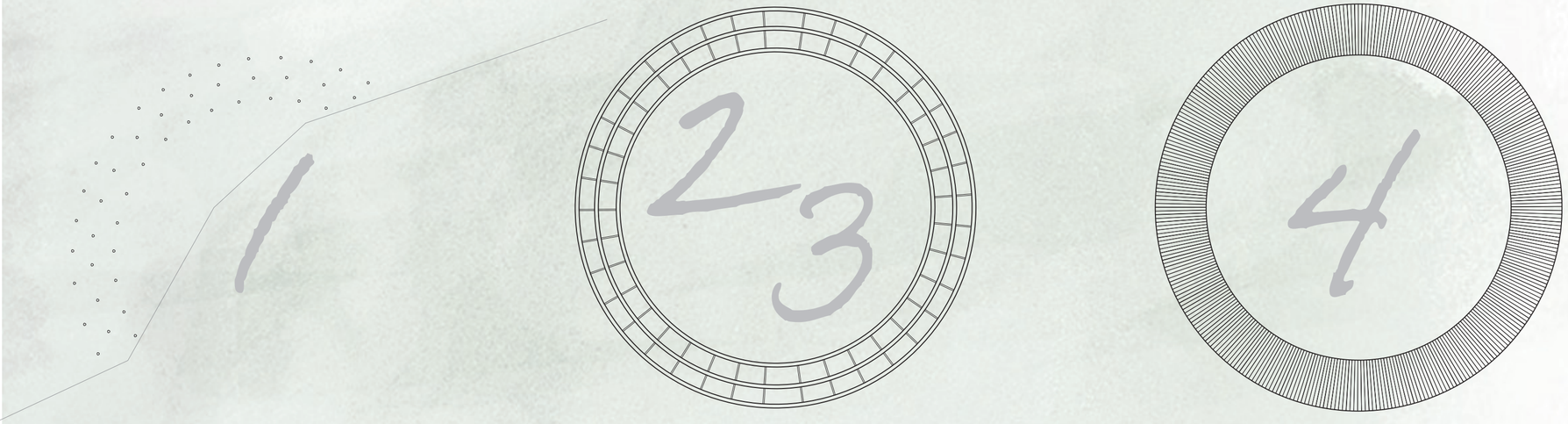
Facade, South 1:100



Facade, East, 1:100

5.4 Structural Design

5.4.1 Load Bearing Structure



01 For the foundation three rows of stainless-steel column bases will be anchored to the bedrock at the 60 000 mm height mark. The bases will be installed every 2000 mm.

02 Three pre manufactured Aalto Haitek beams are installed to the column bases with stainless steel screws. The anchoring point span is wide enough to give support from the bedrock to the floating part of the structure.

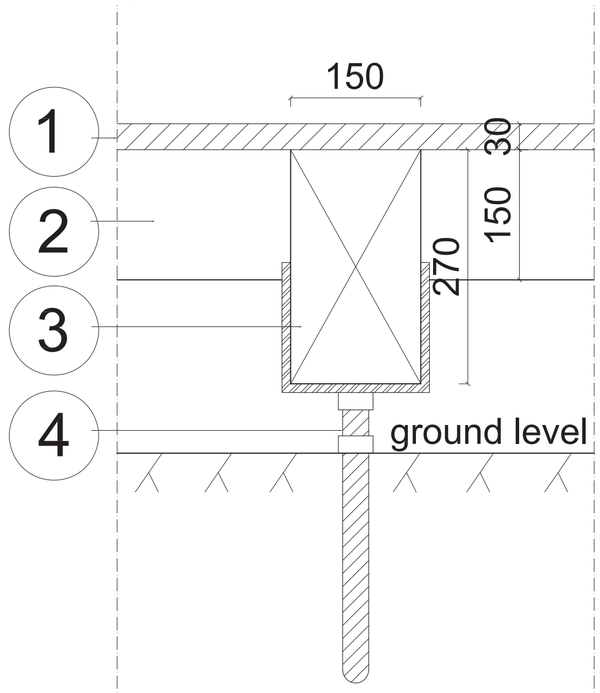
03 The beams are vertically supported by connector beams also made of Aalto Haitek. The smaller beams are installed between the load bearing beams every 1000 mm.

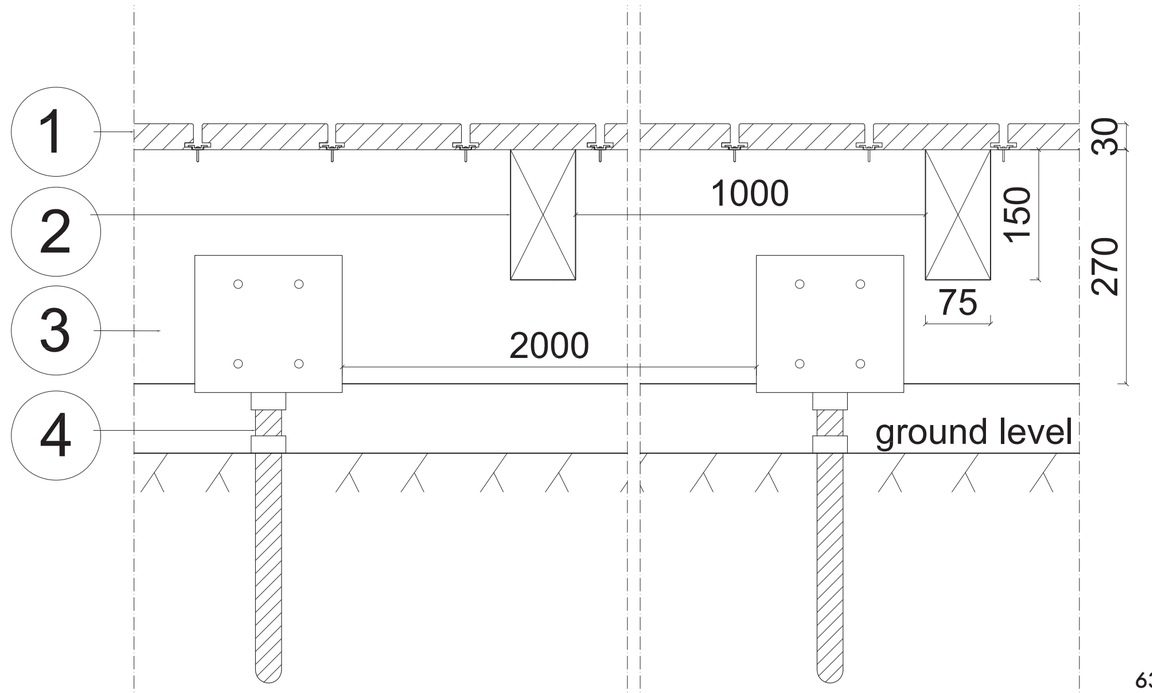
04 The surface level is made of Siberian larch planks that are installed with stainless steel components to the load bearing beams. The larch planks are given a profile suited for the hidden fastening components.

Details of load bearing components, 1:5

Details pictured as straight surfaces for measurement accuracy.

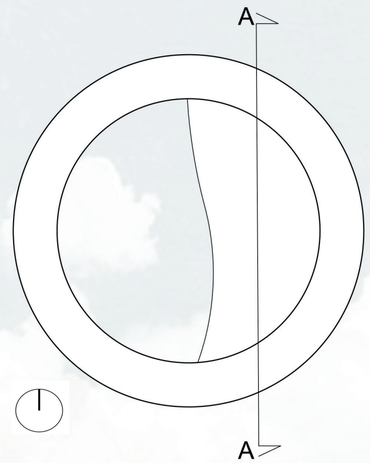
1. Floor boards, Siberian larch
2. Connector beams, Aalto Haitek
3. Load bearing beams, Aalto Haitek
4. Column Base, Strongtie CBQGT

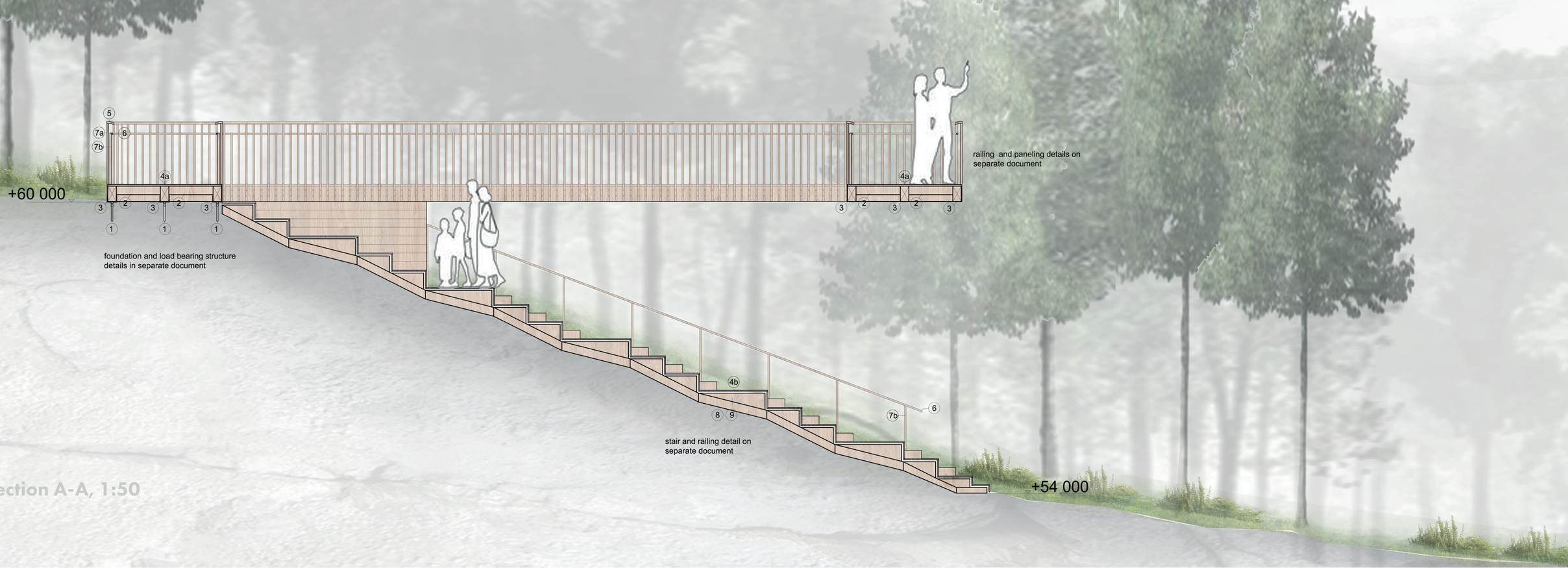




5.4.2 Section A-A and Components

1. Column Base, Strongtie CBQGT
2. Connector beams, Aalto Haitek
3. Load bearing beams, Aalto Haitek
4a. Floorboards, Siberian larch
4b Panelling on stairs, Siberian larch
5. Railing 1, Siberian larch,
6. Railing 2 & 3, Siberian larch
7a. Railing 1 vertical structure, Siberian larch
7b. Railing 2 & 3 vertical structure, Siberian larch
8. Kosour, triangle, Siberian larch
9. Kosour, Siberian larch





Section A-A, 1:50

5.4.3 Stairs

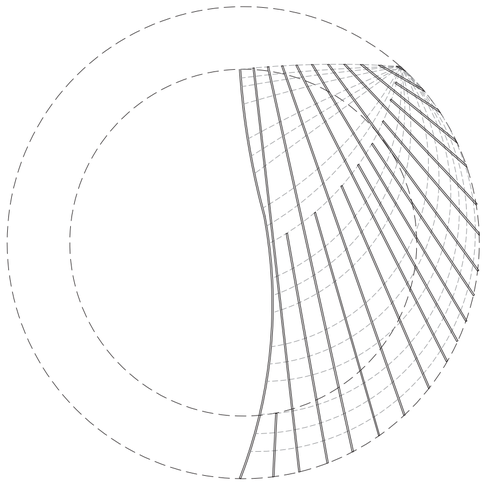
The main structure of the stairs consists of two 600 mm deep steps and one 1200 mm step with 300 mm walking steps on the sides multiplied to reach a descend of 6000 meters and end exactly at the edge of the top circle. The walk paths are equipped with 900 mm high handrails.

The stairs flow down the slope supported by a group of kosours aligned to create the free curve shape. The kousours are installed with a maximum distance of 1000mm in between and supported by anchoring to the bedrock. Despite Siberian larch having a cellular structure that becomes stronger and even more measurement accurate in water damp proofing will make its life span longer. A layer of tar will be spread on the kosours to reasure a longer maintainance free expectancy.

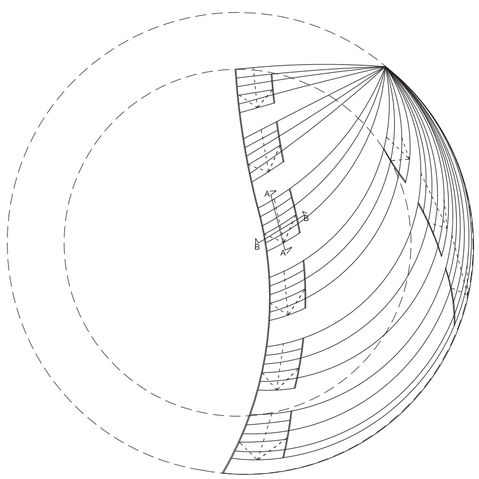
Panelling is installed in the direction of the slope due to the round shape on each stair. Each stair has the same starting point on the East side from where they curve according to the top circles radius to reach their full depth of 600 mm /1200 mm narrowing down to the East side.

The East slope being steeper than the West one results in the stairs not directly reaching ground level before the 7th step. The East outer edge will be vertically panelled to conceal the stair structure. On this area the top circle outer railing will be extended to ground level to create connection between the top and bottom as pictured on the image below.

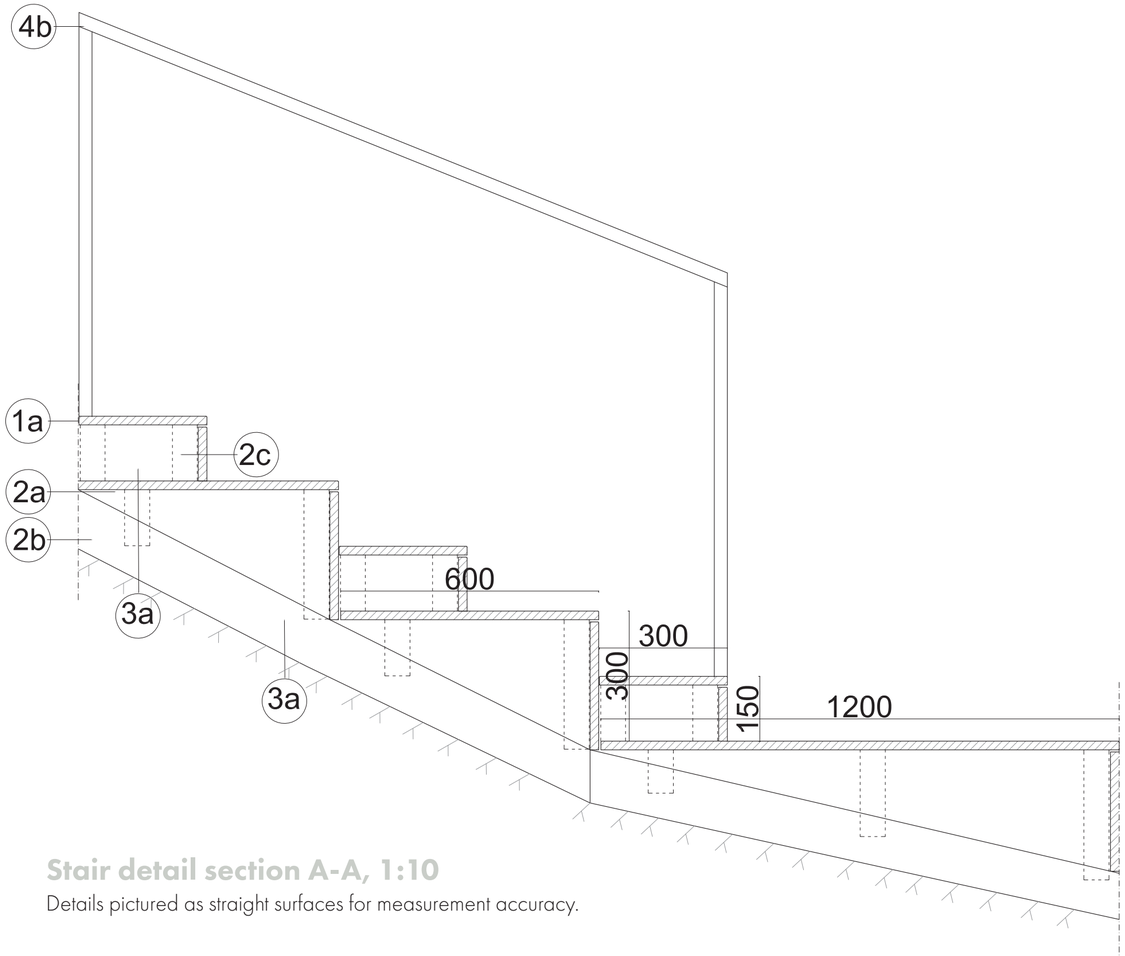
1a. Stair riser and tread, Siberian larch 20 mm paneling
1b. Side covering, Siberian larch 20 mm paneling, cut ccording to ground level
2a. Kosour, Siberian larch, connected to lower kosour
2b. Kosour, Siberian larch, connected to bedrock and upper kosour
2c. Rectangular kosour, Siberian larch, connected to paneling belove
3a. Connector plank / supportive railing, siberian larch, supports the kosours 2a, 2b, 2c and paneling, installed between kosours
3b. Stepping stair connector plank /supportive railing, siberian larch, supports kosours 2c and paneling, installed to paneling belove
4a. Railing type 3, handrail one direction, Siberian larch, see railing type 2 for principle
4b. Railing type 3, handrail both directions, Siberian larch, see railing type 2 for principle



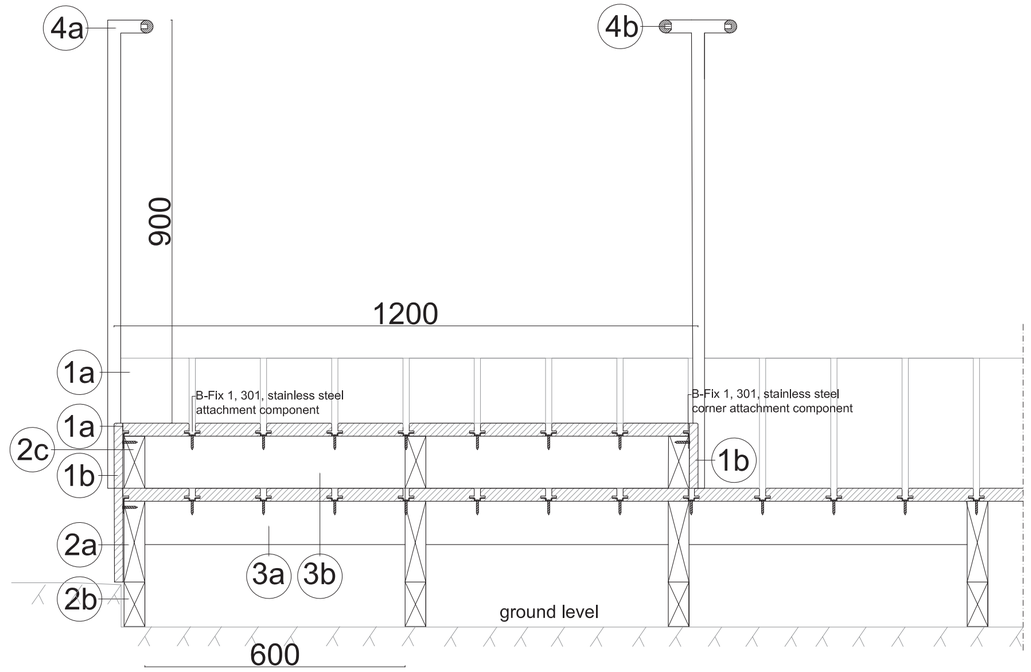
Kousor placement, 1:150



Stair principle, 1:150



Stair detail section A-A, 1:10
Details pictured as straight surfaces for measurement accuracy.



Stair detail section B-B, 1:10
Details pictured as straight surfaces for measurement accuracy.

5.4.4 Details

Floor boards

The Siberian larch boards flow in a circular motion on top of the Haitek beams giving the structure further strength for the top load while maintaining a visually clean look.

For the panels to create a perfect circle with the same measurements all the way through with the outer width being 150 mm the inner width must be 117 mm. The gap is set to 10 mm taking into consideration living of the material and the fastening components requirements. The length of the boards is set to match the circles width of 2000 mm.

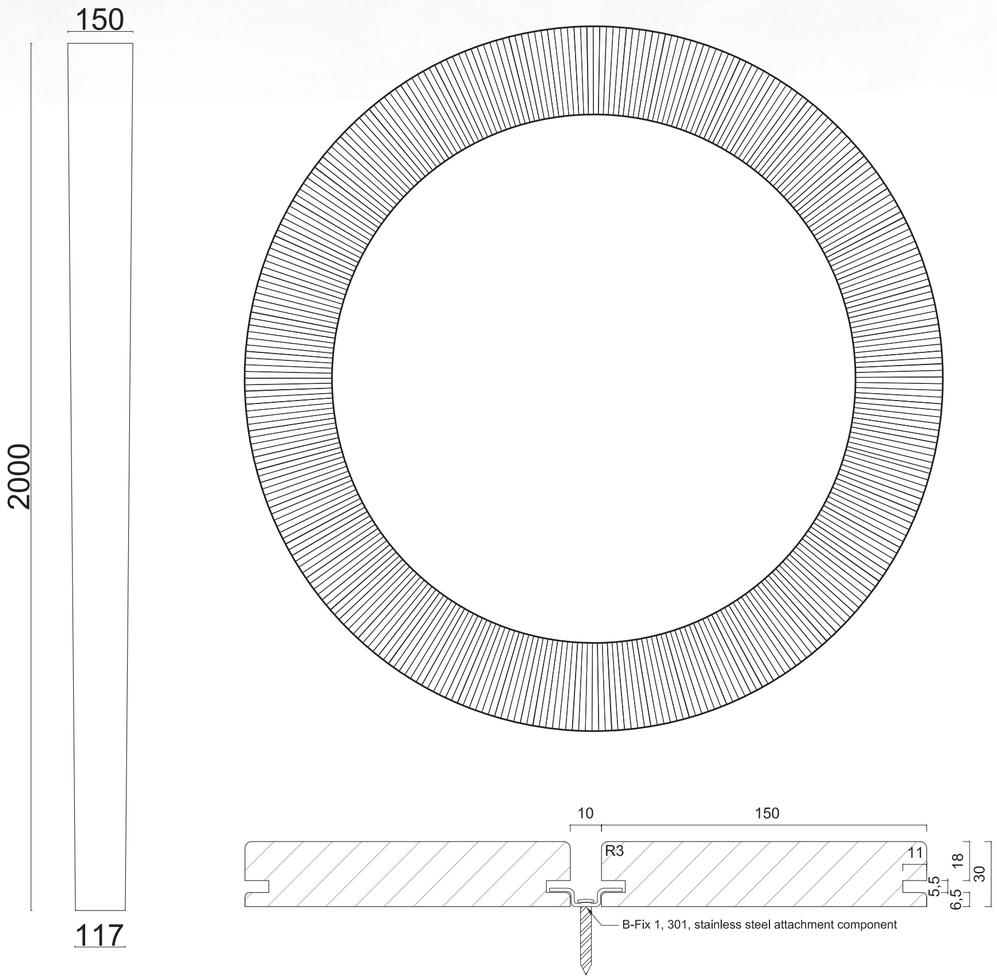
The boards will have a pre-cut profile shown below to match the hidden attachment components.

Railing

The top railing consists of two different principles, railing 1 being the 1100 mm high resting rail and railing 2 being the handrail at 900 mm.

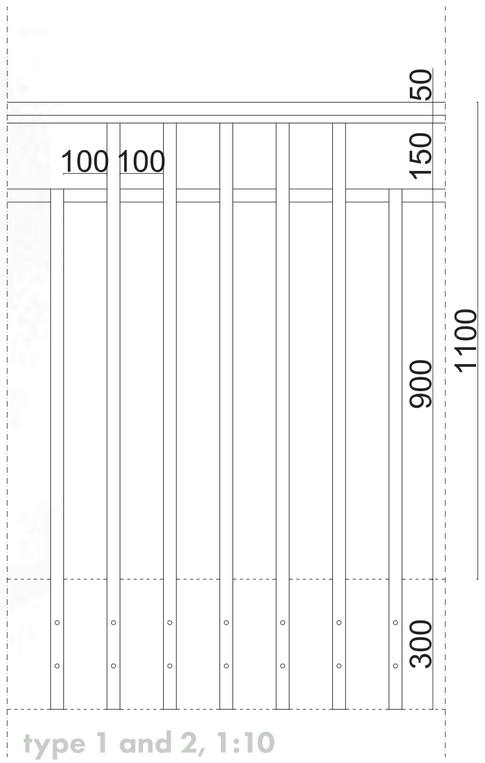
The two railing types form a ring around the inner and outer circle on top guaranteeing safety and comfort with the natural and organic feel applied to it visually.

They work as an entity with five consecutive 1050 mm high vertical structures connecting to the resting rail and then one 900 mm high vertical structure connecting to the circular handrail. Both rails are supported by being connected to the horizontal rails but also by being fastened to the outer and inner Aalto Haitek beams.

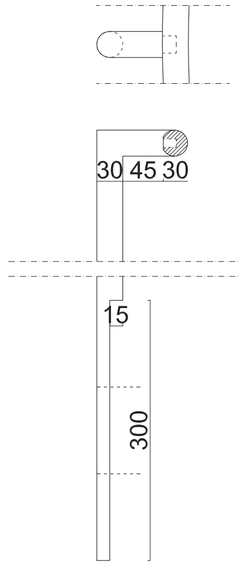


Flooring details, 1:10, 1:2

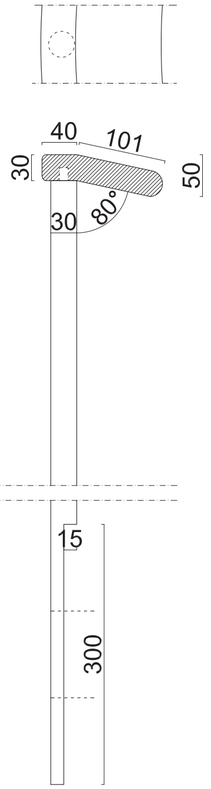
Railing type 1 and 2, the principles of railing 2 are applied to railing type 3 used on the stairs.
Details pictured as straight surfaces for measurement accuracy.



type 1 and 2, 1:10



type 2, 1:5



type 1, 1:5

Image 5.8
Front view of Pavilion

5.5 Summary

The importance of leading the urban people to nature, to help solve Nuuksios issues of directing user behaviour and just simply celebrating the beauty of our nation's nature are evident as core values to the pavilion.

In its completed form and function the pavilion strives to create a reason for curiosity and exploration in the outdoors. It provides and caters for the needs of what humans experience in an urban environment and for the needs of the nature that it coexists with. It is a gate, it is a viewing platform, it is a leader and a place to rewind. It is inclusive and it is respectful and aware of where and by what terms it exists. This is what makes it a good take on how design can create new meaning and importance to what it stands for.

Obviously it takes in the sense of making untouched touched but the importance is on what it gives back - the cultural and social values in respecting how and with what we build and what can be achieved in the protection of Nuuksios fragile nature while catering to user needs all the way from a seat to one's health and wellbeing. It is a statement on how design can speak up and take the lead in multiple beneficial ways. In my design these being example vice in what simple yet thought out means it can improve our surroundings and form how we as humans behave, how we function and how we think and feel and what impact this can have on its context, the nature.

Image 59
View of Pavilion

conclusion

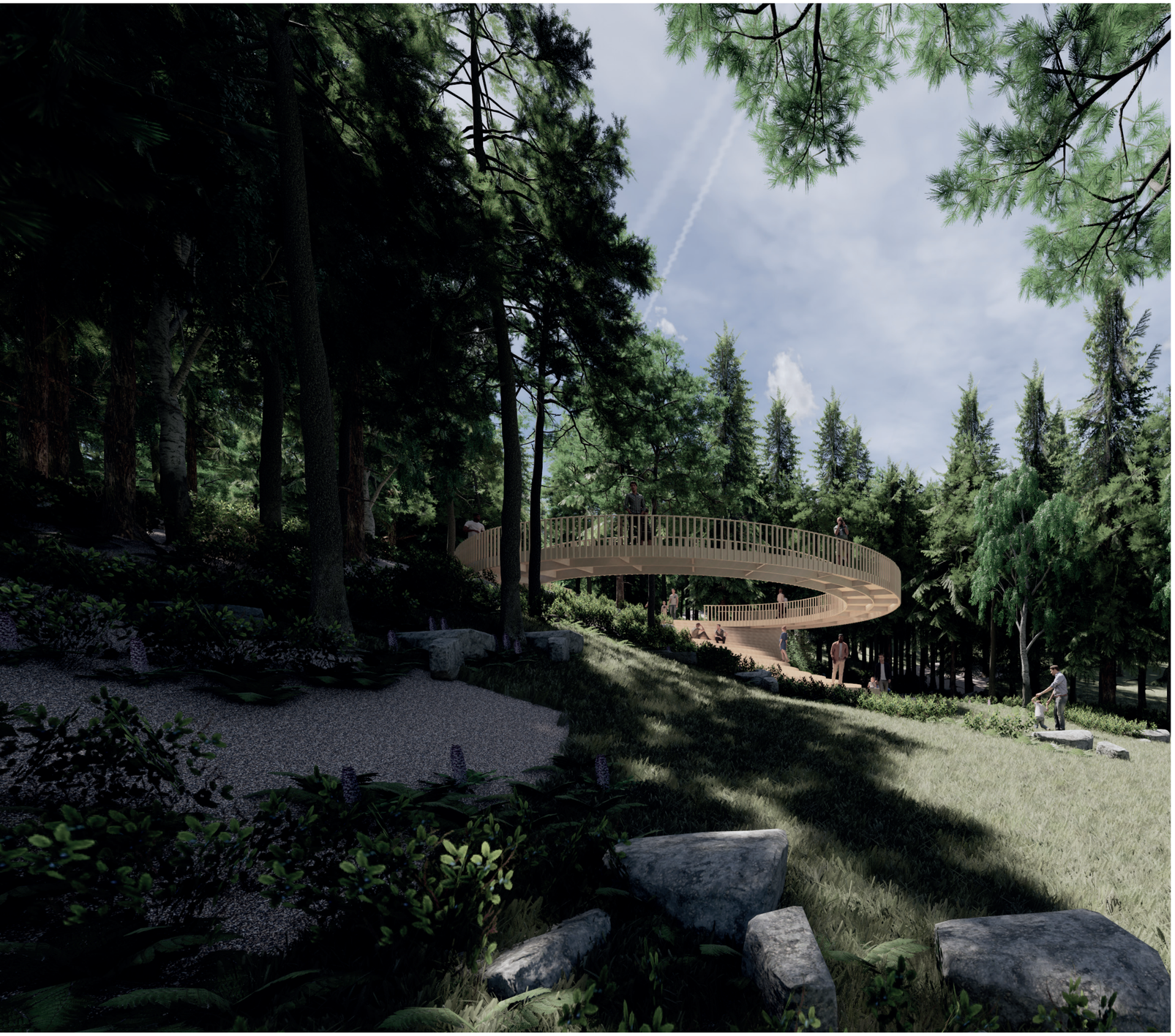


Image 60
View of Pavilion

6.1 Further development

Next up would be consulting professionals in the field of structural design and building technology. Despite doing my research and consulting professionals the construction is somewhat special and requires specific calculation when it comes to drilling depth, amount, positioning and durability of the bedrock connections and the overall durability of the Aalto Haitek beams. What is presented in my drawings are estimates according to my study, knowledge from providers and consulted professionals.

Since my discussion with Liisa Neuvonen from the Forrest and Park Services of Finland there have been some doors opened for possibilities of furthering the concept to actual development. During the planning of the usage and maintenance plan I do have a gap to present my work to possible clients to see if the interest shown could be taken further. Prior to this I would however have to create a more specific budget and find funding. This then again would result in probably revision of the concept which has not been developed with much limitation regarding budget.

With the design itself I would like to take a bit more time with the stairs. Despite hard efforts and many hours, I was unable to so far complete the design on them. The panelling is yet to get an actual calculation and although the main principles are set there is some detailing that regards more thought put into it.

6.2 Personal reflecting

To sum it up I am proud and happy of my efforts and work and there is not a part of it I would change. Probably make a few more revisions but in the given time and working on a concept level, not change. Time management, personal growth, reaching ambitious and creative design that communicates with today's design yet is not stuck on trends, atmosphere, the site and the user were completed even better than I expected. Picking a subject within the field of building technology I was hesitant weather or not I would be able to incorporate enough of clearly interior architecture related themes but in my eyes I was successful in doing so ; materials, construction, design thinking, spatial design on a spectrum of ergonomics, measurements, light, accessibility, circulation and building code were all studied and applied to the project. Not to mention working with a wide set of design tools and methods.

During the years of studying I have gained confidence in my abilities as a designer but often working with very limited time has resulted in moving past the design phase too quickly. My personal challenge for this project was to go through the steps properly and not be afraid of redoing and not stopping until I feel content with everything from a full picture to detail level. This resulted in me taking my time. Sometimes even a week long break from drawing and writing but still constantly thinking and processing, researching and visiting the site for further inspiration. This worked out well for completing a project without stress and also being able to balance my hectic life at home and a new job while letting the ideas mature before jumping head first with a less than satisfying concept.

6.3 Acknowledgements

Despite being an independent and strong-willed worker my bachelor thesis would not have been completed without all the helpful, inspiring and challenging people in my life:

A big thank you to my lecturers Annaleena, Pasi and Merita for teaching me, sharing your knowledge with me, questioning me, challenging me and first and foremost believing in me and my abilities.

Special thank you to Merita and Ville-Matti, my thesis instructors, who have taken the time to look at my project and give such valuable feedback even during their own summer vacation.

Thank you and much love to my family at home, Juho and Aurora, for motivating me, loving me and appreciating me and being patient with me and my nose glued to the screen for too many hours this summer and keeping all the site visits fun.

Thank you to my parents and brothers who are always willing to listen and help. Your trust and belief in me keeps me working hard. And honestly, I would not be able to if it wasn't for your constant support.

A thank you to my friends, who I have been ranting to and confiding in during this process. The fact that you take time to listen, evaluate and give feedback to my work, my feelings and thoughts means a lot to me.

Image 61
Taking notes in Nuuksio

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All sketches, drawings and backdrops presented by author.

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attachments

Qualitative Interview- Questions

16.5.2019
Maria Holthoer
Metropolia University of Applied sciences
Interview for Bachelor Thesis

Haastattelu Nuuksion Kansallispuiston rakennetuista ympäristöissä sekä kehityksestä.

Haastattelu toimii osana opinnäytetyötäni Metropolia Ammattikorkeakoulussa. Haastattelu suoritetaan nimellisesti ja tuloksia käytetään osana opinnäytetyöni metodoligiaa. Kysymykset esitetään samassa muodossa, mutta englannin kielellä. Opinnäytetyö kokonaisuutena julkaistaan verkossa pysyvässä osoitteessa www.theseus.fi ja julkaisun jälkeen myös haastattelun sisältö on julkista tietoa, jota kuitenkin suojaa opinnäytetyön harjoittama tekijänoikeus. Haastattelun tekijä, Maria Holthoer, sitoutuu käsittelemään vastaustietoja oikein viittauksin sekä todenmukaisesti vastausten sisältöä muuttamatta.

1. Esittelisitkö itsesi ja suhteesi Nuuksion Kansallispuistoon ammatillisesta näkökulmasta?
2. Mikä on Nuuksion kansallispuiston nykyinen vuosittainen kävijämäärä?
3. Mitkä ovat Nuuksion kansallispuiston ydinarvot ja houkutus?
4. Kuinka Nuuksion kansallispuistoa kehitetään tulevaisuudessa?
5. Miten tämä tulee vaikuttamaan Nuuksioon kansallispuiston tulevaisuuteen?
6. Minkälainen reaktio kävijöillä on rakennettuihin ympäristöihin Nuuksiossa? (laavut, saunat, vuokrattavat rakennukset yms.)
7. Onko luontokeskus Haltian avaaminen vaikuttanut Nuuksion kävijärakenteeseen ja asiakastyytyväisyyteen?
8. Vaikuttaako rakennettu ympäristö (penkit, laavut, Haltia, luontokokemusta tukevat rakennukset yms.) käyttäjien Nuuksiossa vietettyyn aikaan ajallisesti?
9. Onko rakennetuille ympäristöille (penkit, laavut, luontokokemusta tukevat rakennukset yms.) kysyntää kävijäpinnassa?
10. Koetteko, että Nuuksion Kansallispuiston käyttäjien asiakastyytyväisyys sekä aktiivisuus voisi hyötyä luontoa kunnioittavan arkkitehtuurin yhdistämisestä luontokokemukseen?
11. Minkälaiset edellytykset Nuuksion Kansallispuistossa on rakennetuille hankkeille?

Suostun haastattelun vastauksia käytettävän nimellisesti osana julkisesti julkaistavaa opinnäytetyötä siten, että yllä mainitut ehdot täyttyvät.

Allekirjoitus

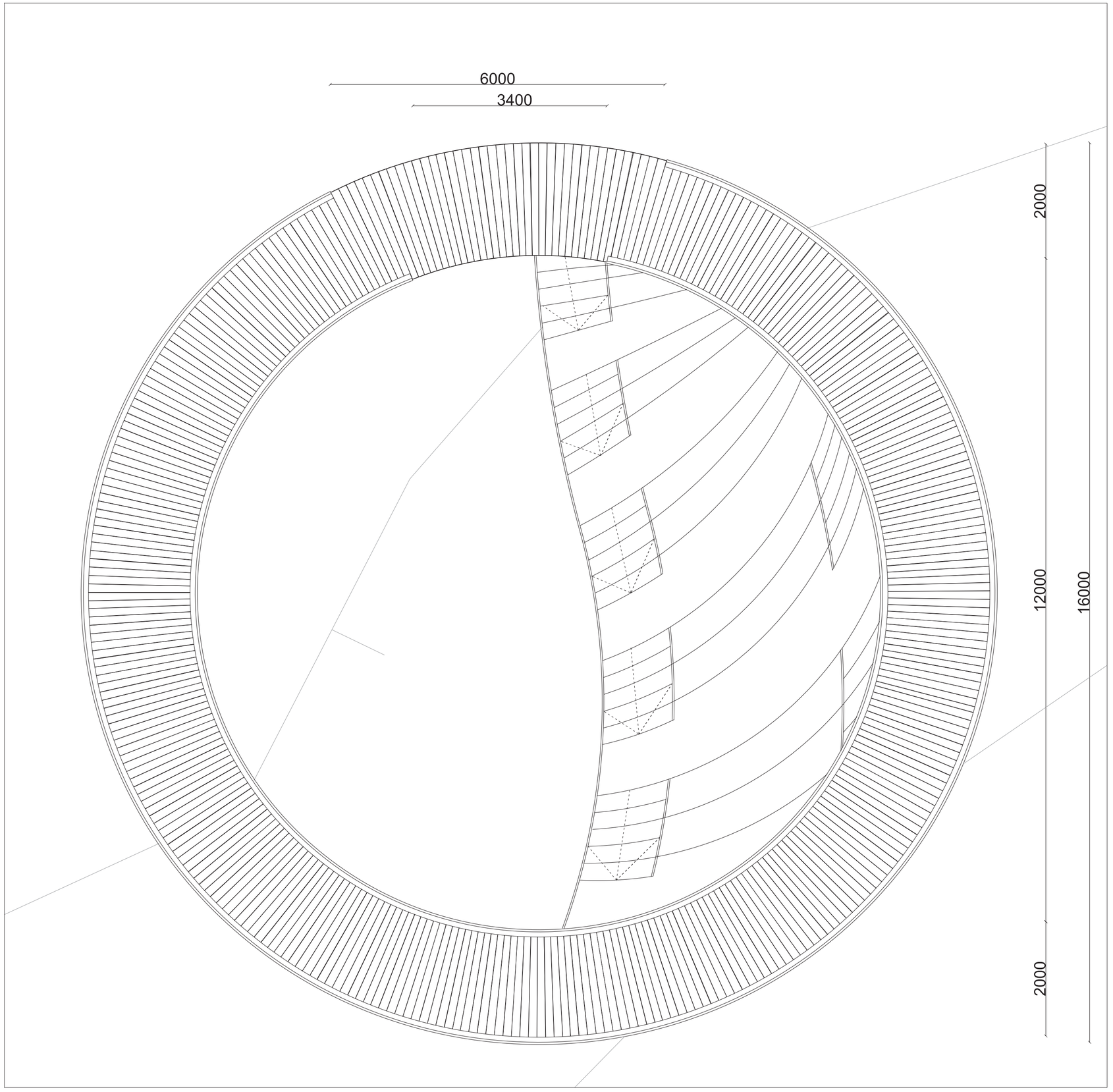
Aika
Paikka

MASTER PLAN, CONCEPT PHASE DRAFT

1. Location of pavilion
2. Lake Meerlampi
3. Existing trail from Haltia to Meerlampi
4. Solvalla sport institute
5. Nature Centre Haltia
6. Free parking
7. Bus stop
8. Nuuksiontie, road from Helsinki through Espoo, through Nuuksio to Vihti
9. Lake Pitkäjärvi

MEASUREMENTS MUST BE CHECKED ON SITE!

city			
Espoo		drawing category	**Project phase draft**
name	**Case Pavilion**	content	scale
address	**Meerlampi**	**Master Plan**	**1:5000**
postal code	**02820**		
designers	**MH**	drawing code	
date	**15.09.2019**	ARK001	

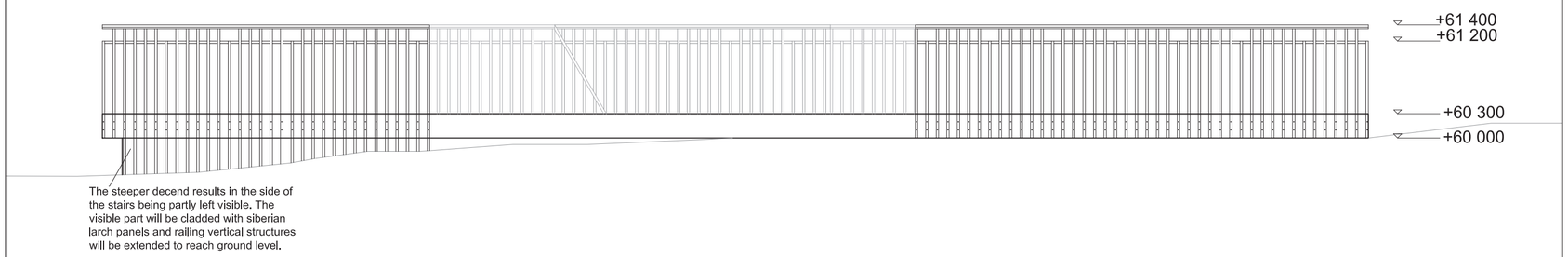


PLAN, CONCEPT PHASE DRAFT

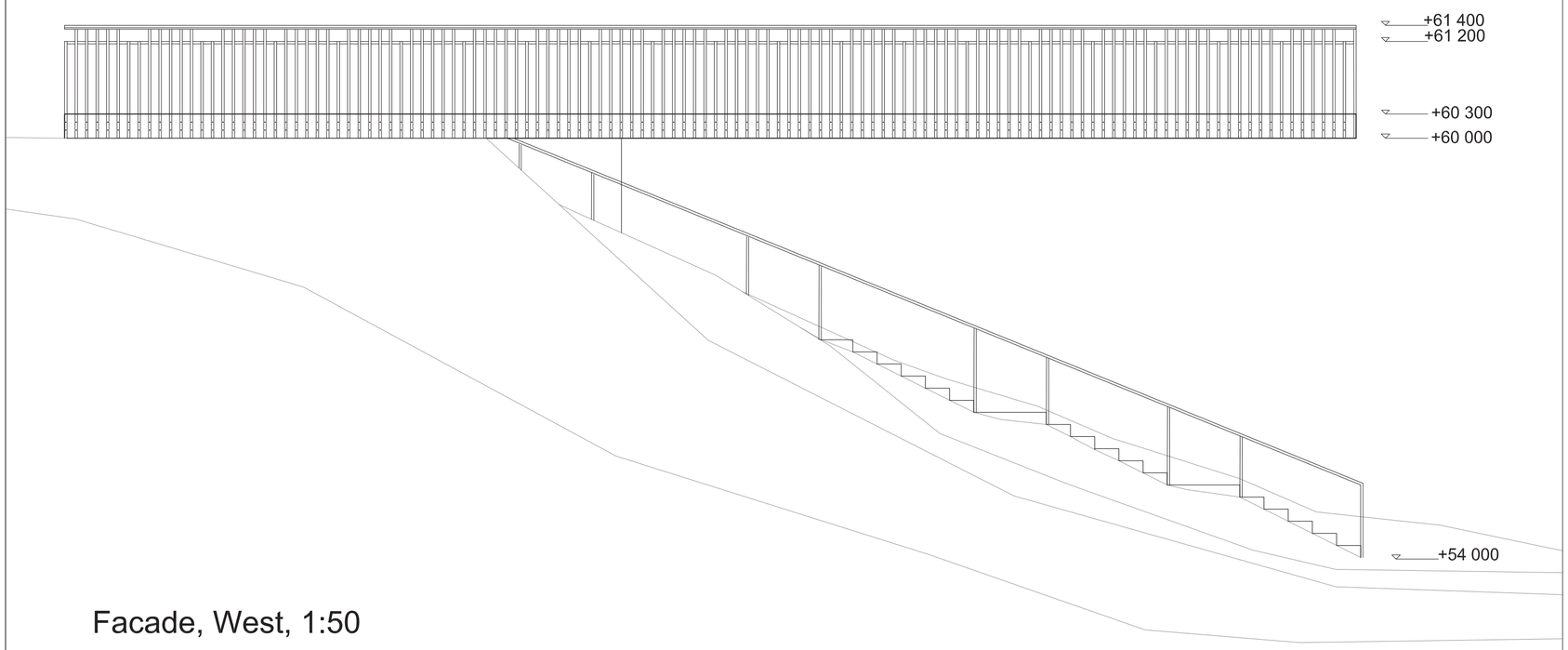
MEASUREMENTS MUST BE CHECKED ON SITE!

city			
Espoo		drawing category	**Project phase draft**
name	**Case Pavilion**	content	scale
address	**Meerlampi**	**Plan**	**1:50**
postal code	**02820**		
designers	**MH**	drawing code	
date	**15.09.2019**	ARK002	

FACADES, CONCEPT PHASE DRAFT



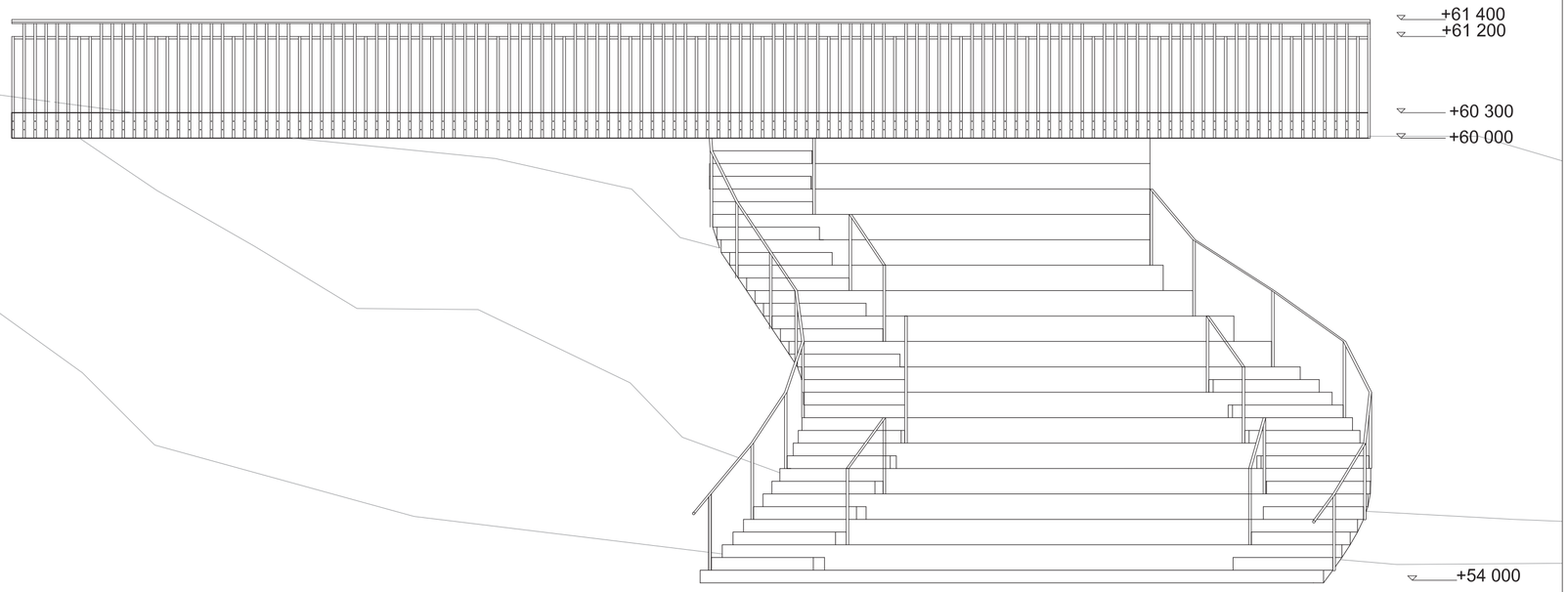
Facade, North, 1:50



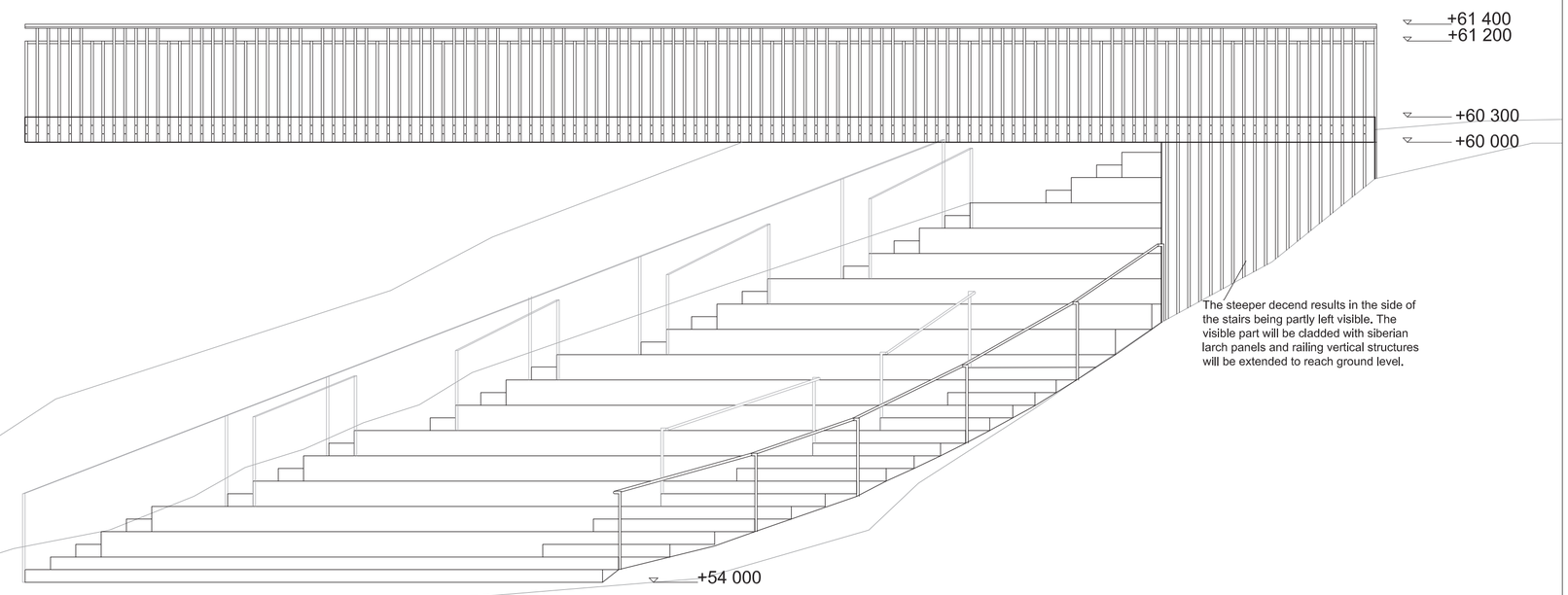
Facade, West, 1:50

MEASUREMENTS MUST BE CHECKED ON SITE!

city			
Espoo		drawing category	**Project phase draft**
name	**Case Pavilion**	content	scale
address	**Meerlampi**	**Facade, North** **Facade, West**	**1:50** **1:50**
postal code	**02820**		
designers	**MH**	drawing code	
date	**15.09.2019**	**ARK003A**	



Facade, South, 1:50



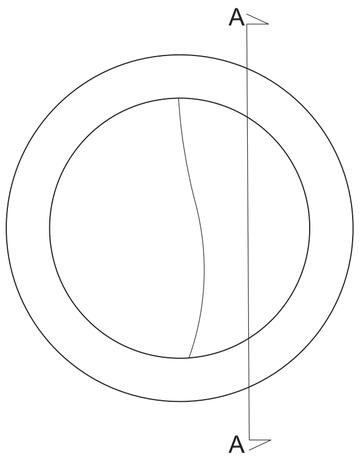
Facade, East, 1:50

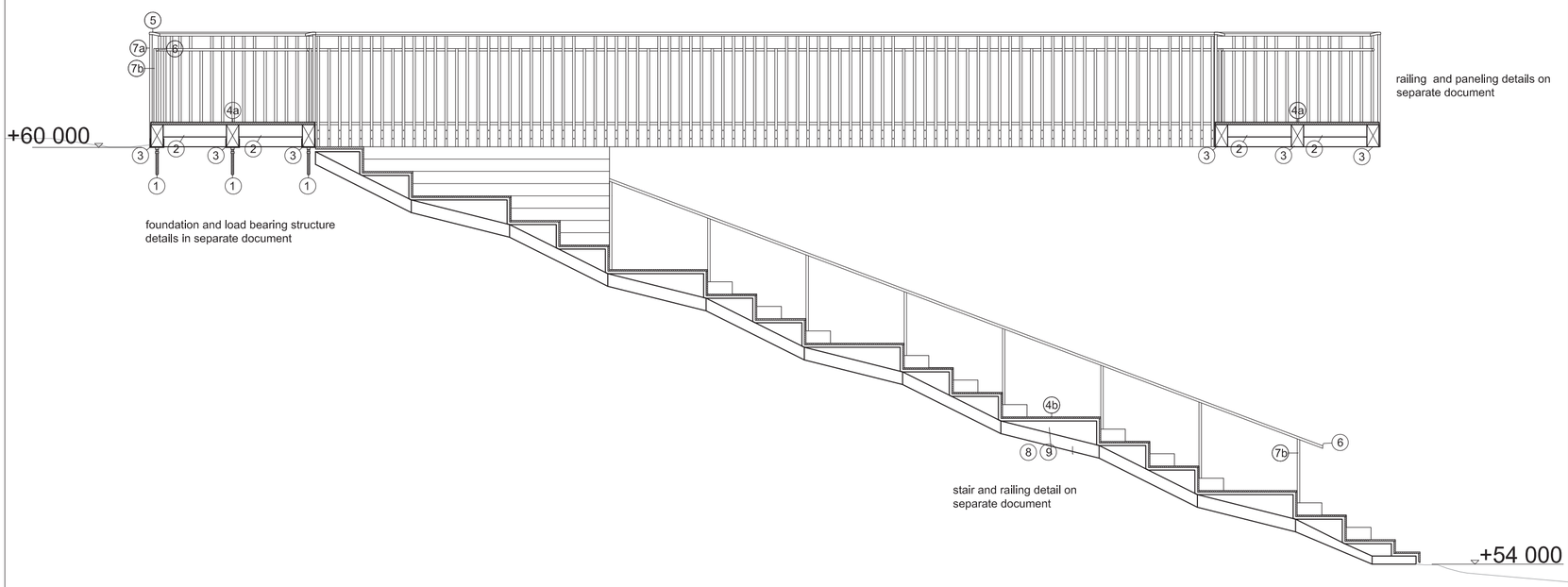
FACADES, CONCEPT PHASE DRAFT

MEASUREMENTS MUST BE CHECKED ON SITE!

city			
Espoo		drawing category	**Project phase draft**
name	**Case Pavilion**	content	scale
address	**Meerlampi**	**Facade, South** **Facade, East**	**1:50** **1:50**
postal code	**02820**		
designers	**MH**	drawing code	
date	**15.09.2019**	**ARK003B**	

Technical Drawings, concept phase draft - Section A-A



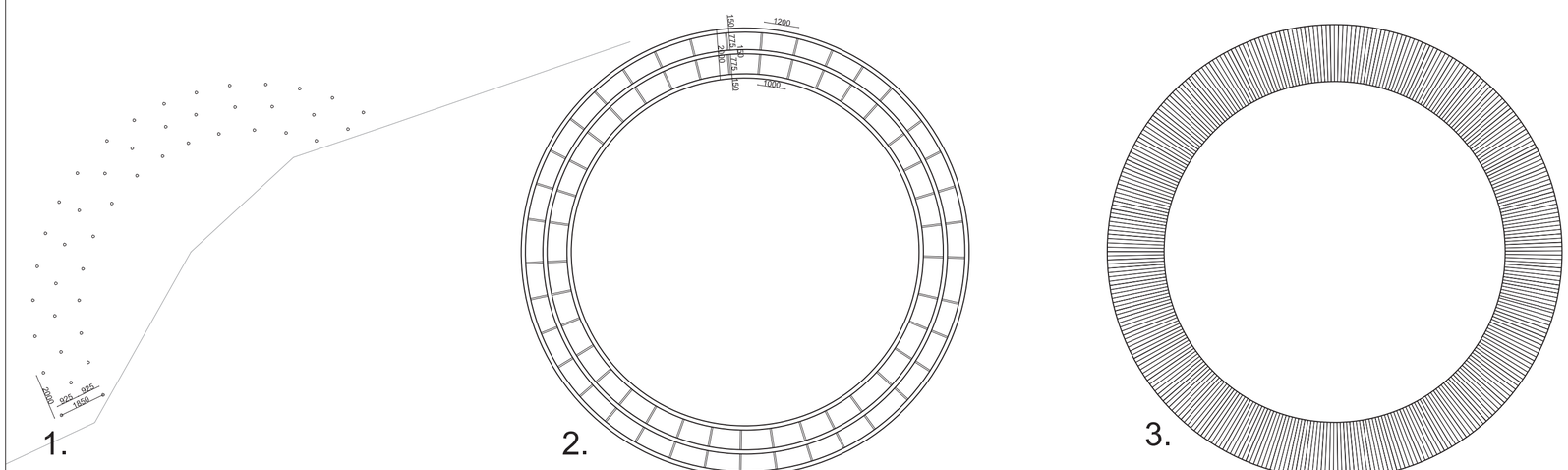


SECTION A-A, CONCEPT PHASE DRAFT

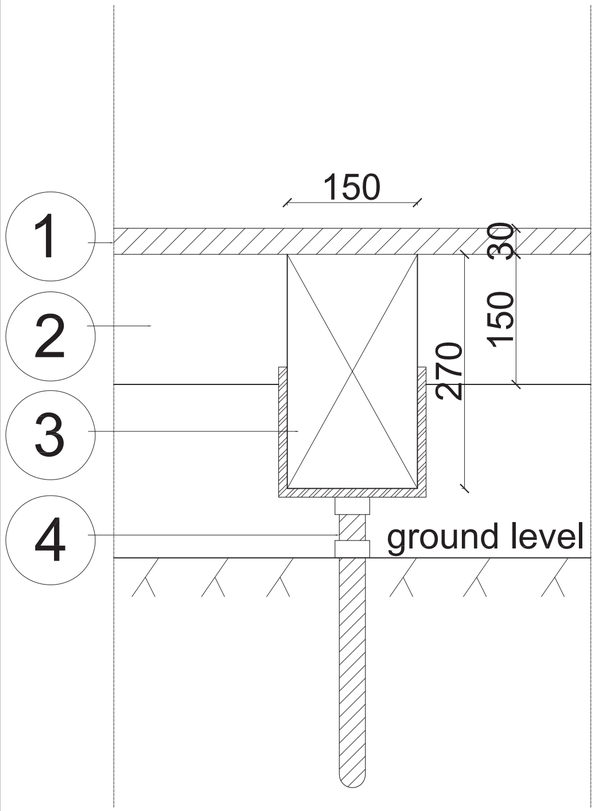
1.Column Base, Strongtie CBQGT
2.Connector beams, Aalto Haitek
3.Load bearing beams, Aalto Haitek
4a.Floorboards, Siberian larch
4b.Panelling on stairs, Siberian larch
5.Railing 1, Siberian larch,
6.Railing 2 & 3, Siberian larch
7a.Railing 1 vertical structure, Siberian larch
7b.Railing 2 & 3 vertical structure, Siberian larch
8.Kosour, triangle, Siberian larch
9.Kosour, Siberian larch

MEASUREMENTS MUST BE CHECKED ON SITE!

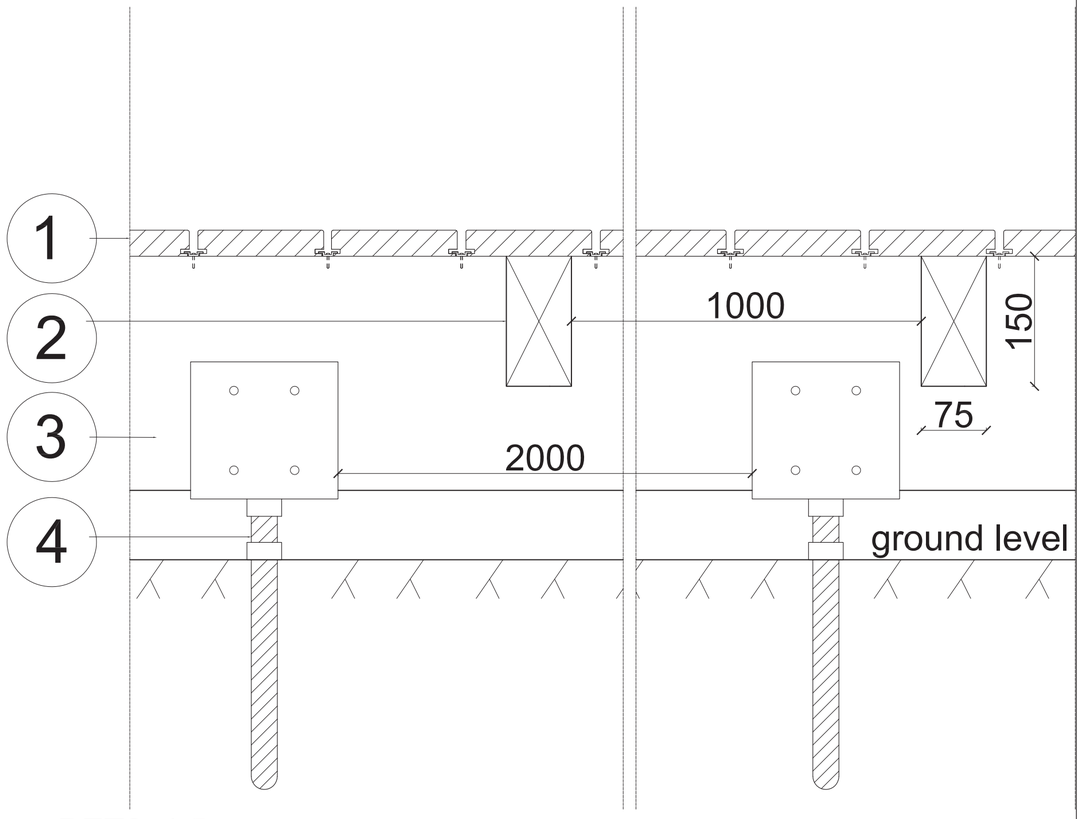
city			
Espoo		drawing category	**Project phase draft**
name	**Case Pavilion**	content	scale
address	**Meerlampi**	**Section A-A**	**1:50**
postal code	**02820**		
designers	**MH**	drawing code	
date	**15.09.2019**	ARK004	



Load bearing structures, 1:150



DET1, 1:5



DET2, 1:5

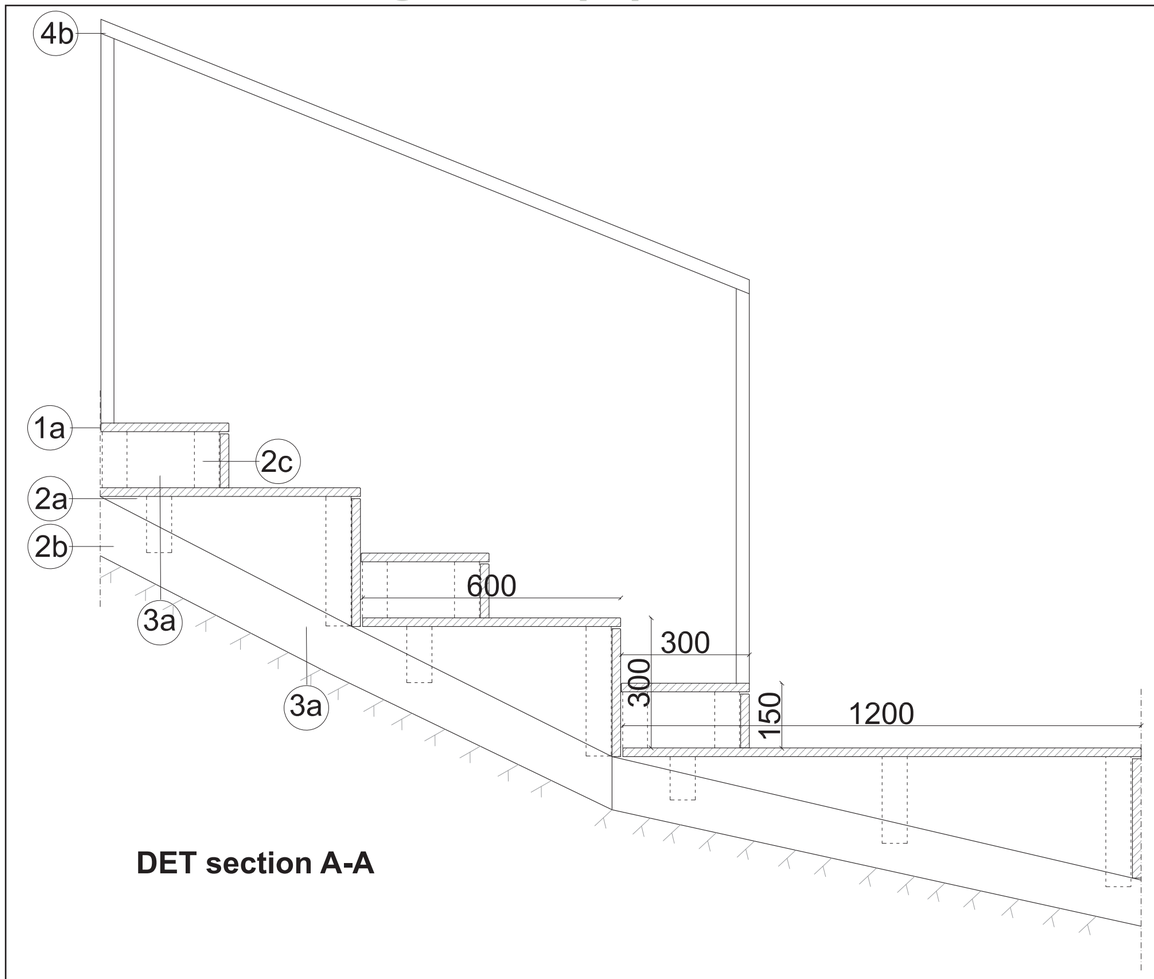
LOAD BEARING STRUCTURES, CONCEPT PHASE DRAFT

1. Anchoring points for column bases
2. Aalto Haitek load bearing beams and connector beams
3. Siberian larch cladding

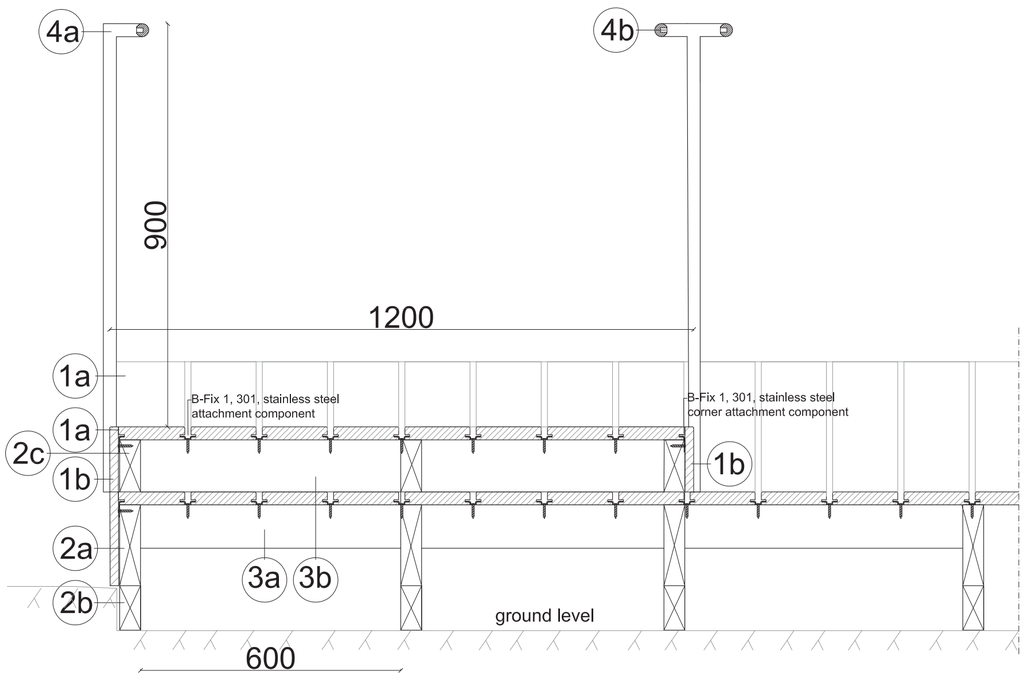
1. Floor boards, Siberian larch
2. Connector beams, Aalto Haitek
3. Load bearing beams, Aalto Haitek
4. Column Base, Strongtie CBQGT

MEASUREMENTS MUST BE CHECKED ON SITE!

city			
Espoo		drawing category	**Project phase draft**
name	**Case Pavilion**	content	scale
address	**Meerlampi**	**Load Bearing Structures** **Load Bearing Structures, DET 1 & DET 2**	**1:150** **1:5**
postal code	**02820**		
designers	**MH**	drawing code	
date	**15.09.2019**	**ARK005**	



DET section A-A



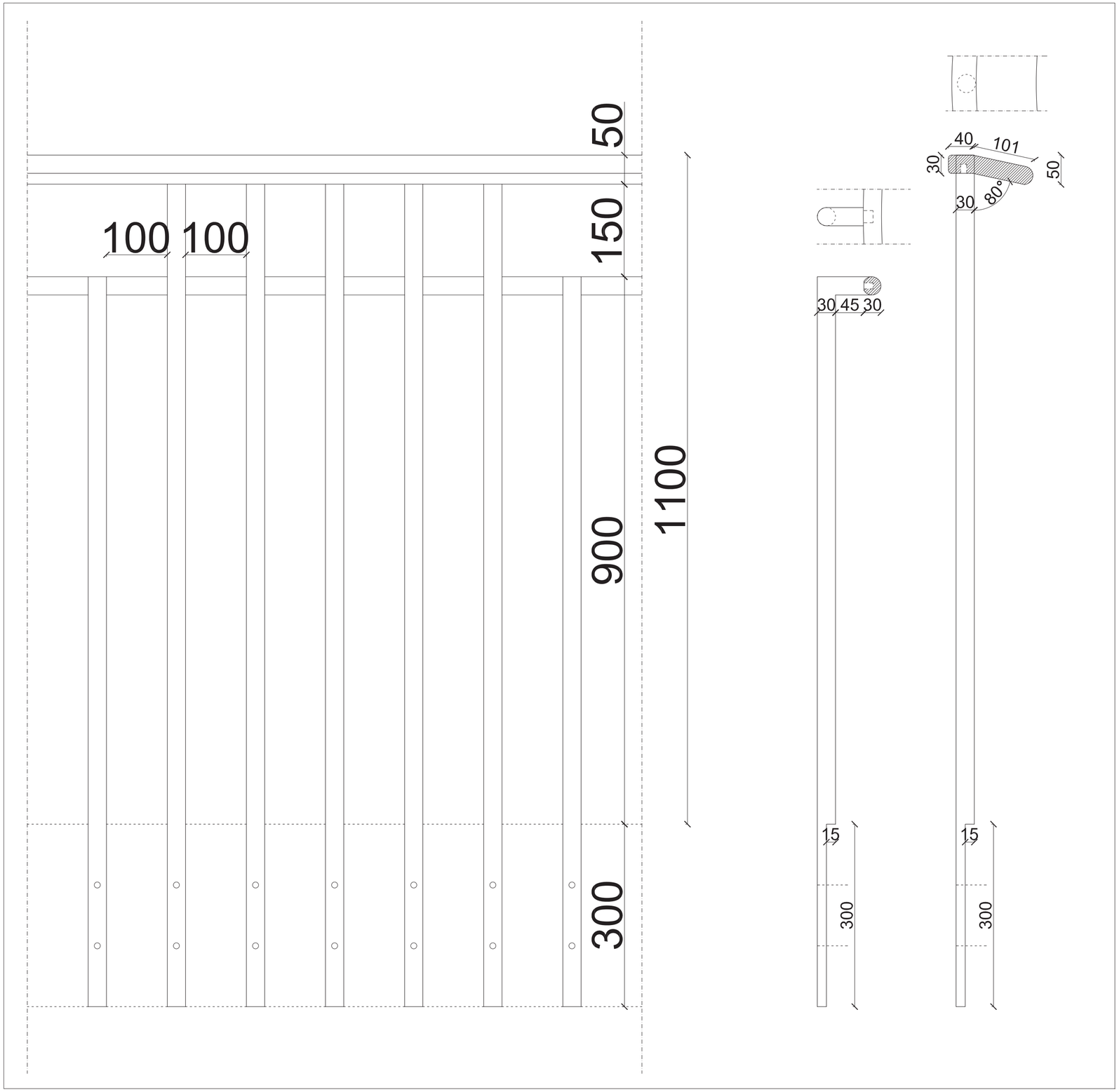
DET section B-B

STAIR PRINCIPLE, CONCEPT PHASE DRAFT

1a. Stair riser and step, Siberian larch 20 mm paneling
1b. Side covering, Siberian larch 20 mm paneling, cut ccording to ground level
2a. Kosour, Siberian larch, connected to lower kosour
2b. Kosour, Siberian larch, connected to bedrock and upper kosour
2c. Rectangular kosour, Siberian larch, connected to paneling belove
3a. Connector plank / supportive railing, siberian larch, supports the kosours 2a, 2b, 2c and paneling, installed between kosours
3b. Stepping stair connector plank /supportive railing, siberian larch, supports kosours 2c and paneling, installed to paneling belove
4a. Railing type 3, handrail one direction, Siberian larch, see railing type 2 for principle
4b. Railing type 3, handrail both directions, Siberian larch, see railing type 2 for principle

MEASUREMENTS MUST BE CHECKED ON SITE!

city			
Espoo		drawing category	**Project phase draft**
name	**Case Pavilion**	content	scale
address	**Meerlampi**	**Stairs, DET section A-A** **Stairs, DET section B-B**	**1:10** **1:10**
postal code	**02820**		
designers	**MH**	drawing code	
date	**15.09.2019**	ARK006	



RAILING, CONCEPT PHASE DRAFT

MEASUREMENTS MUST BE CHECKED ON SITE!

city			
Espoo		drawing category	**Project phase draft**
name	**Case Pavilion**	content	scale
address	**Meerlampi**	**Railing type 1 & 2 principle**	**1:5**
postal code	**02820**		
designers	**MH**	drawing code	
date	**15.09.2019**	ARK007	

PRELIMINARY MATERIAL AND COMPONENT SPECIFICATIONS

Recreational Pavilion
Meerlampi , 02820, Espoo
Finland
Maria Holthoer

The following document regards the design and construction of a recreational pavilion to the Northern shore of lake Meerlampi in Nuuksio national park. This specification documents regards the standards and specifications of materials and components. All orders, work and constructions must be performed according to MaaRYL 2010, RunkoRYL 2010 and SisäRYL 2013 standards and regulations. The full construction must follow all specifications and directions specified by material and equipment providers and sources and documentations provided by designer unless stated otherwise.

GENERAL NOTES AND PRACTICES

Siberian Larch

-All Siberian larch hardwood must be sourced from Finland from a certified provider. After cutting down material source trees new must be planted to reassure perseverance and continuity.

-The material used shall have a standard classification of US-III and of heart wood timber.

-Timber material must have a moisture percentage of approximately 18 %. The drying process must be committed carefully according to providers specifications.Moisture content requirements that deviate from this must be specially mentioned in the contract/order confirmation.

-Strength classifications must be according to EN 338 standards.

-All wood material must be sanded before construction.

-A minimum of 95 % of the exterior timber material must fill all set standards.

-The material must be stored on site without on ground contact. The conditions should be similar to the conditions the material will be in after application.

VIEWING PLATFORM

Component	Material	Work Specification
Column Base	Strongtie CBQGT Stainless Steel	The column bases are installed to the bedrock in three rows with approximately 2000 mm in between.
Structural Beams	Aalto Haitek, ring beams 150 mm x 270 mm. Length to be specified in next design phase.	The three pre manufactured structural beams are installed to the column bases. For application all used components must be of stainless steel.
Connector Beams	Aalto Haitek 75 mm x 150 mm x 850mm	The connector beams are installed between the structural beams every 1000 mm measured from the inner edge of the largest Haitek structural beam. For application all used components must be of stainless steel.
Floor boards	Siberian larch, heartwood of US-III classification. Measurements specified in separate document.	The floorboards are pre manufactured according to a specified STP-profile and measurements. The boards are installed on top of the structural Haitek beams with hidden B-fix stainless steel connectors. A gap of 10 mm must be left between boards during installation.
Railing type 1 and Banister	Siberian larch, heartwood of US-III classification. Vertical structure of protective part d30 and h 1350mm . Banister according to separate document. The vertical structure + banister combined height set to 1100mm of walking level.	The vertical protective structure is is cut in half from the bottom to + 300 mm and attached to the outer edges of the inner and outer structural Haitek beams so that the bottom of the railing component is at the same level as the beams bottom edge. The vertical railing components are installed with 100 mm in between in groups of five leaving a 200 mm gap for Railing type 2 to be installed. The banister will have pre cut

		holes in the bottom edge to match the vertical structures. The banister is installed to the vertical structures after they have been installed and fastened to the Haitek beam. For application all used components must be of stainless steel.
Railing type 2 and hand railing	Siberian larch, heartwood of US-III classification. Vertical structure of protective part d30 mm and h 1200mm. Handrail d 30 mm.	The vertical protective structure is is cut in half from the bottom to + 300 mm and attached to the outer edges of the inner and outer structural Haitek beams so that the bottom of the railing component is at the same level as the beams bottom edge. The vertical railing components are installed with 100 mm in between them and railing type 1 vertical structures. Every 6th vertical structure being railing type 2 and the rest railing type 1. The handrail will have holes to match vertical structure attachment components and be installed to these after they have been installed and fastened to the Haitek beam. For application all used components must be of stainless steel.

STAIRS

Kosour components 1, 2 and 3	Siberian larch, heartwood of US-III classification. Kosour component 1 : triangular structure Kosour componen 2: on ground component, plank Kosour component 3: horizontal connector component, plank	100 mm of ground material is removed from the stair placement area to leave bedrock visible. Kosour component 2 is given a tar surface for water insulation in on ground contact. The kosours are placed according to drawing and fastened to the bedrock by stainless steel column bases.
		Kosour component 1 is attached to component 2 with stainless steel fastening components. Component 3 is the installed between each row of component 1 and 2.
Stair cladding	Siberian larch, heartwood of US-III classification. Pre-cut panel. Measurements specified in separate document.	The stair structure is cladded in the walking direction, from North to South. Both vertical and horizontal surfaces will be cladded. The panels are attached to kosour component 3 with a 10 mm gap with stainless steel components. The vertical and horizontal seam line must remain at same placement.

-