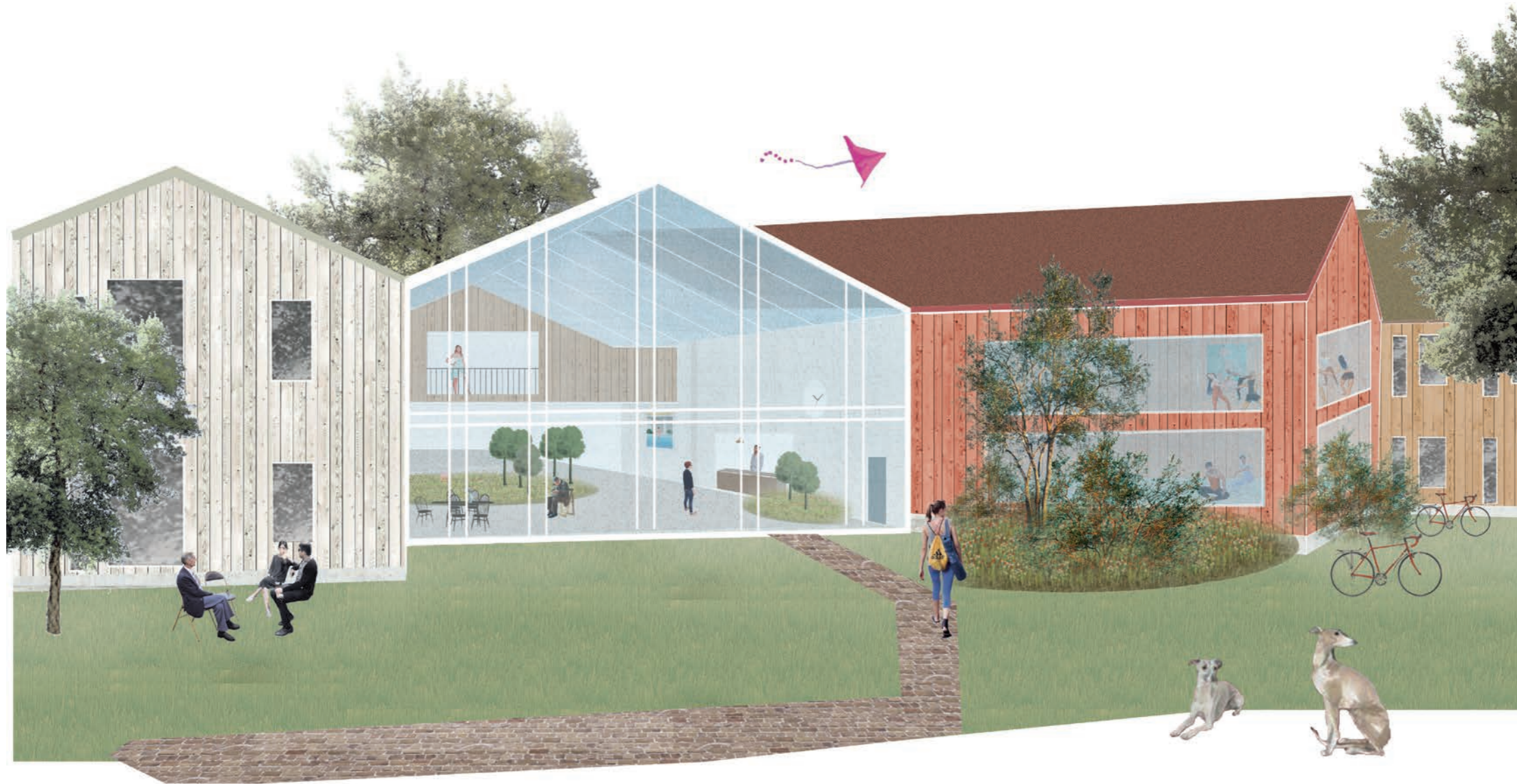


# Healing Empowerment



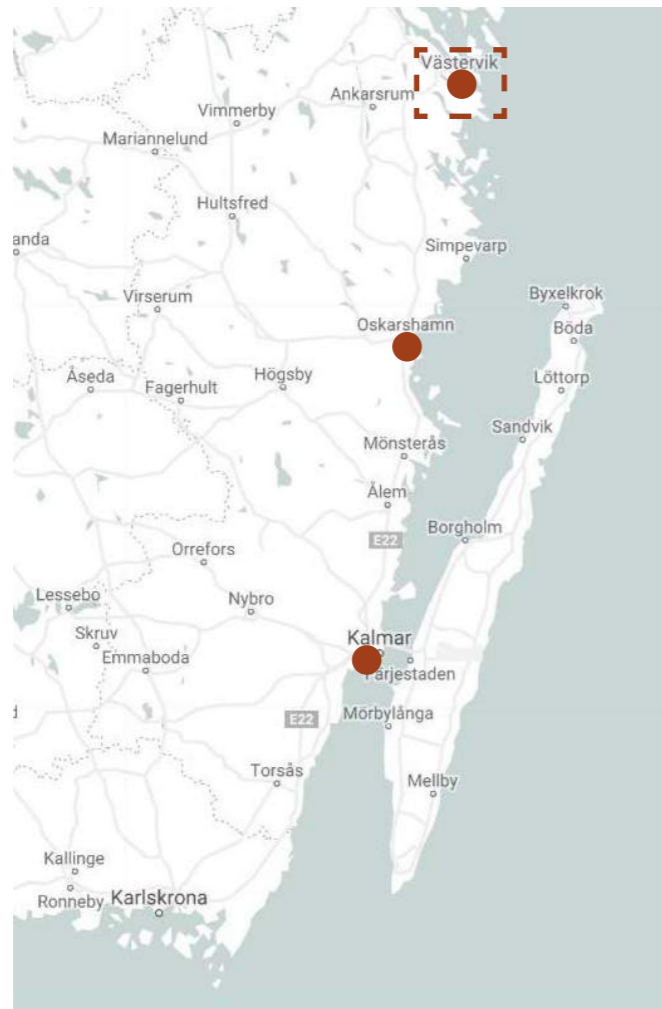
Team 9

Elin Nilsson  
Toivo Säwén  
Yunfan Zhang

Team 9 Project Booklet 181221  
ARK263 - Healthcare Architecture Autumn 2018  
Examiner - Peter Fröst  
Supervisors - Christine Hammarling, Elke Miedema



SWEDEN



KALMAR COUNTY  
● Psychiatric hospital sites

## PSYCHIATRIC CARE IN SWEDEN

Psychiatric care in Sweden is provided through public welfare financed largely through taxes. Most patients are treated in primary care provided by the municipality. Care for patients with severe issues is provided by the county.

One fifth of Swedish citizens receive treatment for mental health issues regularly. The majority are treated as outpatients. All patients in inpatient care are treated individually based on their needs. The treatment methods include psychotherapy, CBT and medications.

## VÄSTERVIK HOSPITAL

Västervik is a coastal town in the east of Sweden, founded in the 13th century. The economy was historically focussed on shipbuilding, an industry which declined in the 20th century, replaced by other small industries. Presently the economy is largely driven by tourism. Some demographic trends is an increased migration as well as an aging population due to senior citizens moving in. Another important goal for the region is realigning to a sustainable economy and building stock.

The current hospital in the town centre first opened in 1860 and has gradually expanded. The town's old psychiatric hospital at Gertrudsvik opened in 1912, and has since been replaced. The current psychiatric facilities built in 1972 are in need of replacement. To meet this demand a new psychiatric building is to be constructed, housing adult psychiatry for the northern region of Kalmar county, and forensic as well as child and youth psychiatry for the entire county. The entire hospital area is intended to gradually be replaced over the course of the 21st century.

## SITE CHOICE

Two sites are proposed for the new psychiatric hospital:

- Urban site: An infill location on the existing hospital site.
- Rural site: A new location in the farmland next to the lake Kvännaren.

A SWOT analysis was performed to evaluate the two sites:

### Urban site:

- + Excellent connection to the somatic care
- + Economical to reuse existing facilities
- + Good access using existing infrastructure
- High density would be required
- The site would not fulfill Evidence Based Design (EBD) requirements of access to nature and physical activity

### Rural site:

- + Excellent healing environment based on EBD principles
- + Potential to create a new hospital site with sustainable technologies
- Existing buildings would need to be demolished
- Recreation area is affected

In addition, the project is a comment on the relationship between psychiatric and other healthcare. Some want to destigmatise psychiatry by colocating it with somatic care, acknowledging that there is no difference between mental and physical health. Others argue that psychiatry should be separated to reduce the sense of being "ill".

Views are split and each patient has different needs. By providing view over and access to greenery in combination with a lot of daylight have according to EBD provided great healing results. The less dense site also gives the possibility to provide privacy for the patients. Therefore, providing a good healing environment was the deciding factor in our choice of working with the rural site.



Proposed project site

VÄSTERVIK



VÄSTERVIK OLD TOWN

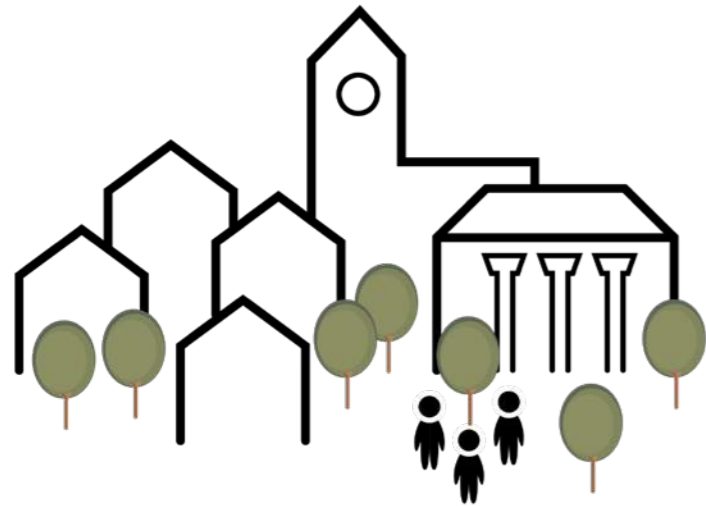


VÄSTERVIK HOSPITAL

# ANALYSIS VÄSTERVIK

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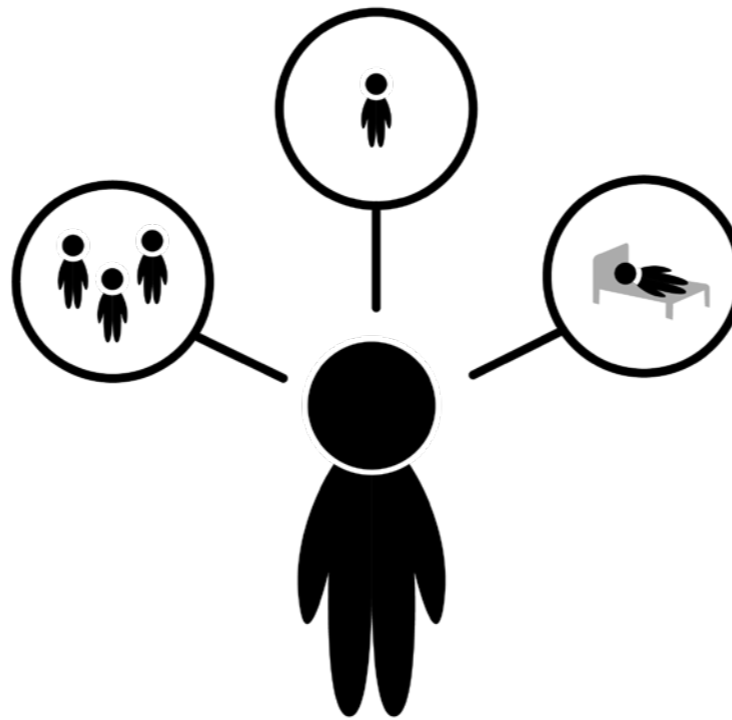
# DESIGN VISION



## HEALING ENVIRONMENT

- Access to greenery
- Access to daylight
- Promote physical activity
- Contact with staff
- Feeling of a home

# CARE VISION



## HEALING EMPOWERMENT

- Choice of space
- Choice of interaction
- Low social density
- Safety and privacy
- Practice for society

# FUTURE VISION



## HEALING THE ENVIRONMENT

- Self-sustaining
- Low impact
- Resilient
- Expandable
- Adaptable

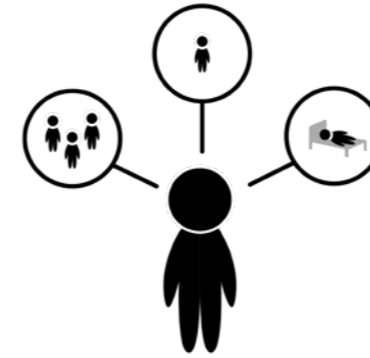
The design project is guided by our three main visions: a care vision of an autonomous patient in control of their situation; a design vision of a healing environment providing access to greenery, daylight, physical activity and a feeling of being at a home rather than an institution; a future vision of a building with a low environmental impact and a concern for possible future scenarios.

# VISION

To realise our vision in an architectural project, we considered how each aim can be met in the different scales of the building. From the private room of the patient, to the ward unit where they spend most of their days, to the connections between the building units and the urban context, we make sure that our visions are fulfilled. This is a valuable tool both to guide the design, and to evaluate the result.



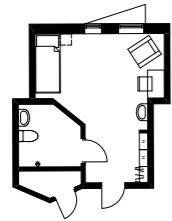
## HEALING



## EMPOWERING



## SUSTAINING



### ROOM

All patient rooms and workplaces have access to daylight and view of greenery.

The rooms are designed so that patient surveillance can be achieved with minimal intrusion into the patients personal space.

The rooms are designed to be adapted to multiple future uses. There are multiple ways of furnish the rooms and the celing hight provides future installations for somatic care.



### UNIT

The unit can be divided into smaller clusters which provides a calmer environment and reduces stress.

A low social density and a variety of spaces means the patient can choose their level of social interaction.

The floor plan system allows for future expansion of the ward units.



### BUILDING

The large garden for inpatients provides opportunities for walks and other physical activity. The garden is protected from outside view of the patients.

The building represents a gradient of support, where each space is designed to provide a different amount of autonomy for the patient.

The building provides large areas of soft ground and green roofs to handle water treatment on the facility grounds.



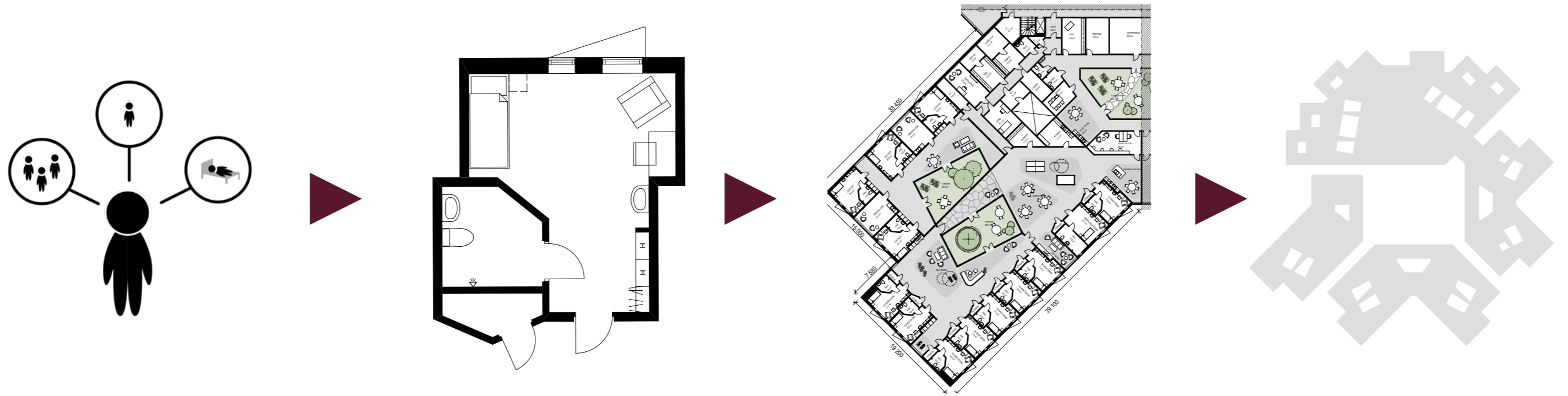
### URBAN

The broken up scale of the buildings reduces the institutional feeling and has a familiar look.

There are multiple ways of approaching the building. It is easier to reach the public parts of the building, the housing wards are placed more privately.

A new hospital development means the possibility of implementing sustainable systems for energy and water.

# STRATEGY



The design process and building logic start at the patients and their individual needs with the patient room providing the basic component of the building. The patient room is the most important healing environment, and EBD inspired design values like access to greenery and good daylight conditions must be achieved at all costs. The ward unit appears as the rooms are assembled,

with each unit adapted to its specific needs. Finally, the building is assembled in embracing the large central garden. The most public functions are oriented toward the town centre and infrastructural access, while the more private rooms are facing the nature. This is our process of assembly, and the presentation of the project in this booklet will follow the same logic.

# ASSEMBLY

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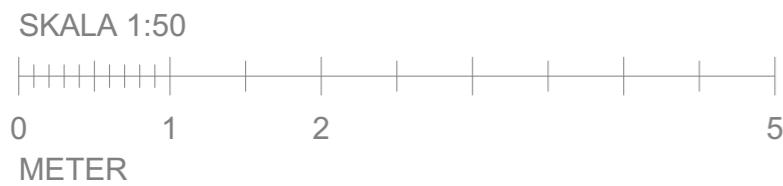


SECTION A-A SCALE 1:50



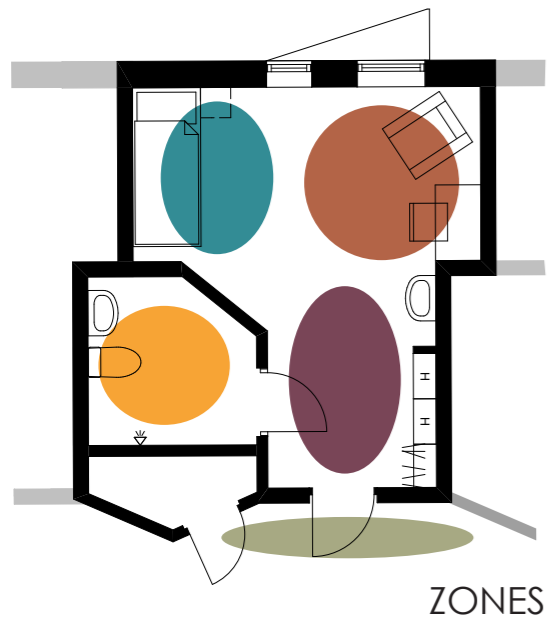
SECTION A-A SCALE 1:50

The patient room is the atomic component of the building. It needs to be a calm space providing privacy, sleep and individual activity. It is a firm point for a turbulent mind. A place where the patient can feel like they belong and is in control of their situation. The scale of the room is chosen to provide enclosure. The windows provide daylight and views of greenery without compromising the patient privacy. A highly placed window in the toilet wall provides indirect daylight into the bathroom.

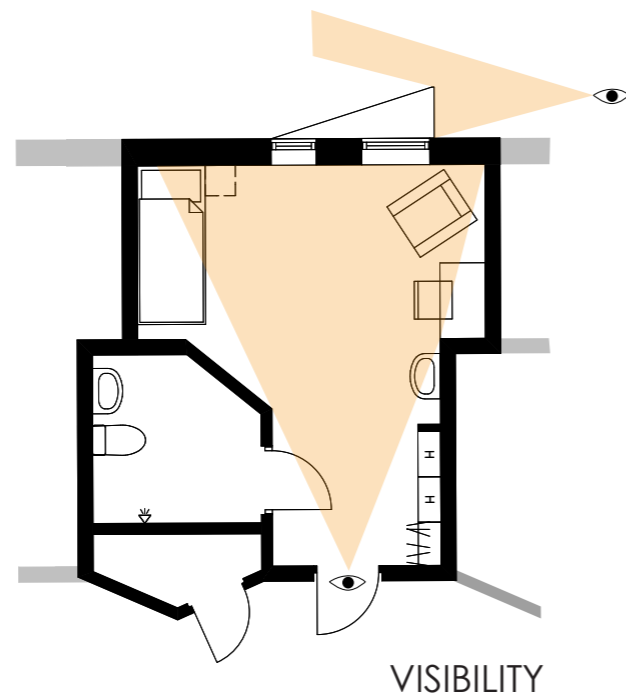


# PATIENT ROOM

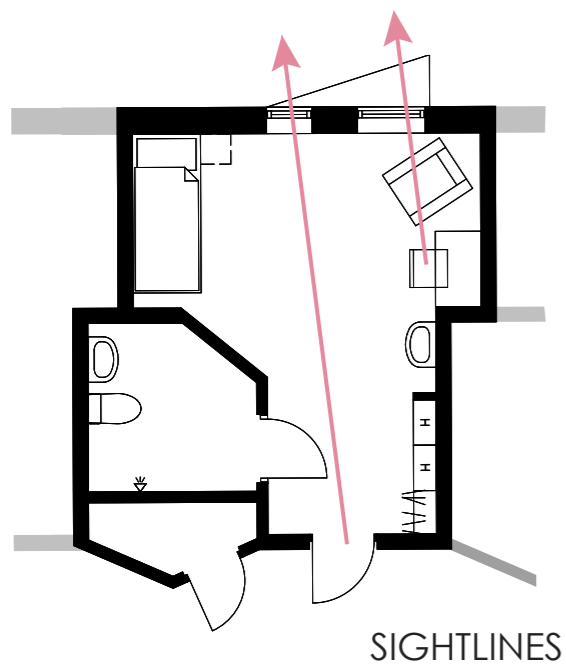
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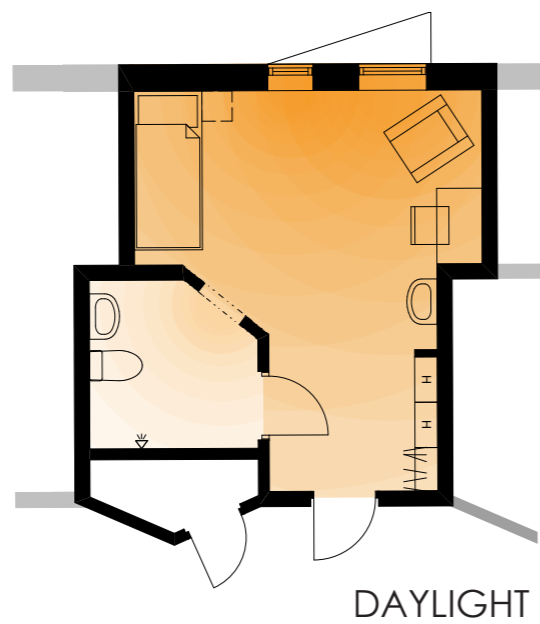
The room shape allows for different zones where the patient can choose their level of activity and move freely through the space. The undulating corridor creates small entrance zones, breaking the monotony of the corridor without creating hidden corners. Also, it provides a small zone outside the room which becomes the porch of the patient room.



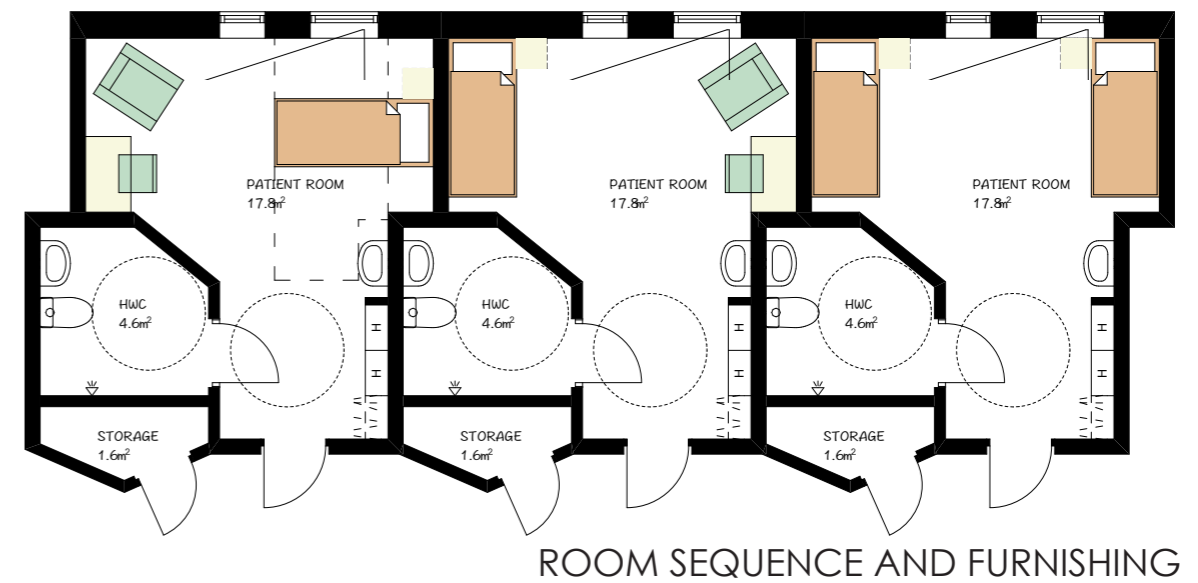
The high visibility means staff can survey the room without entering, improving the patient integrity. The sunscreen serves both to reduce strong sunlight in the space and improves the privacy by blocking sightlines from other rooms.



A slit facing the entrance as well as a larger window near the "activity space" provide views of greenery.



Daylight enters the space and penetrates into the bathroom through a high window.



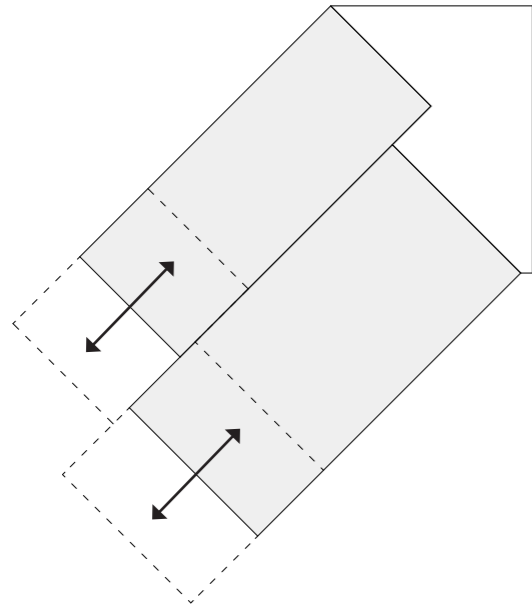
The rooms are designed so that they can be furnished in multiple ways. The middle one is the standard furnishing, with loose furniture so that the patient can refurnish according to their preference. To the left the room is furnished for more somatic care with easier access for the staff around the bed. The room to the right shows that there is a possibility for patients that wish to share room to do so in a regular room.



PATIENT ROOM PERSPECTIVE

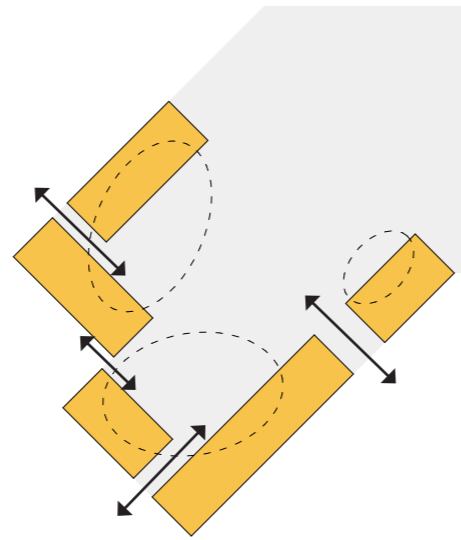
# PATIENT ROOM

Team 9 - Elin Nilsson, Toivo Säwén, Yunfan Zhang  
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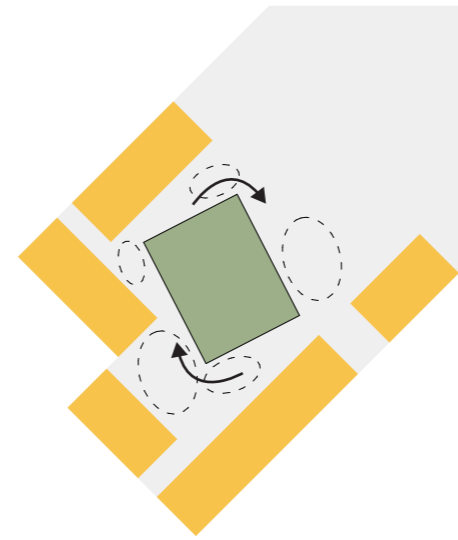
### EXPANDABLE - REDUCEABLE

The building consists of two bodies that are pushed in and out to expand or reduce space for different needs in the program and in the future.



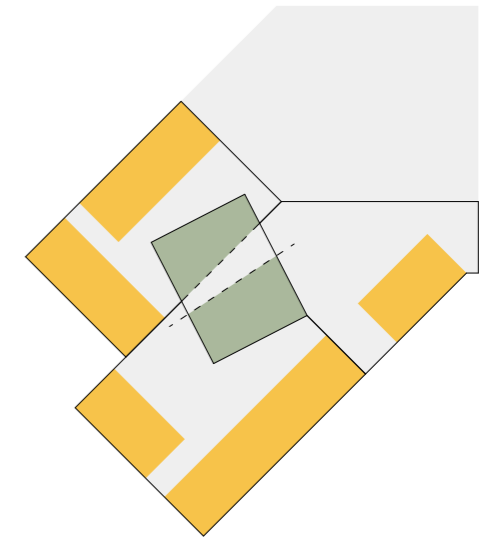
### LIGHT - VIEW - CLUSTERS

The rows of rooms are placed towards the light and split to get light into the ward. This provides a view of the nature and creates smaller social units, clusters.



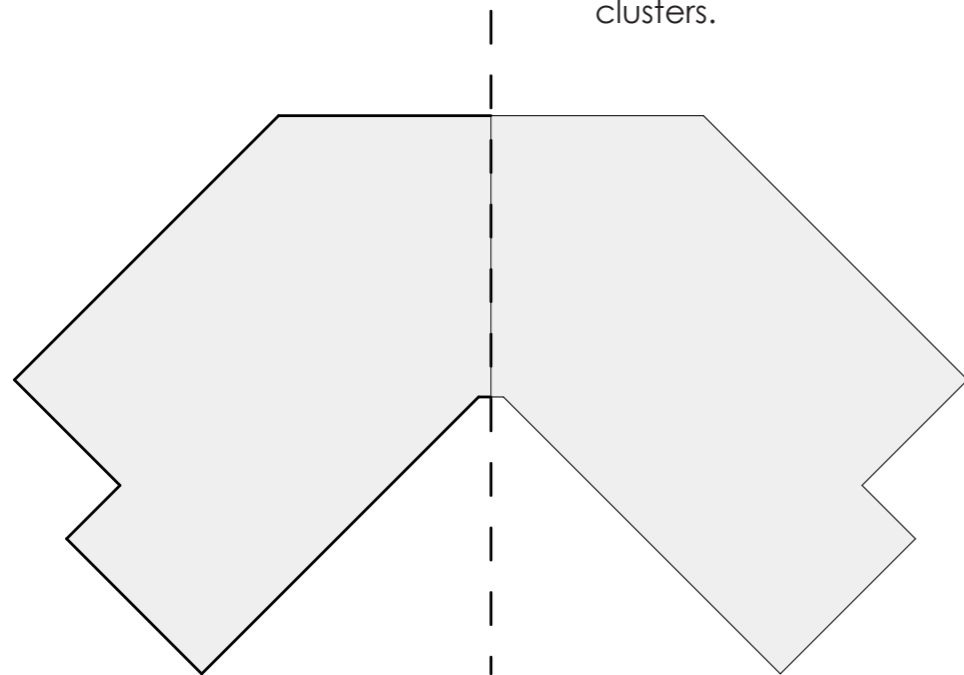
### ROTATE - SPACES

A garden is put in the middle to provide the possibility to walk around it, promoting movement. The garden is twisted to avoid long corridors and to create spaces.



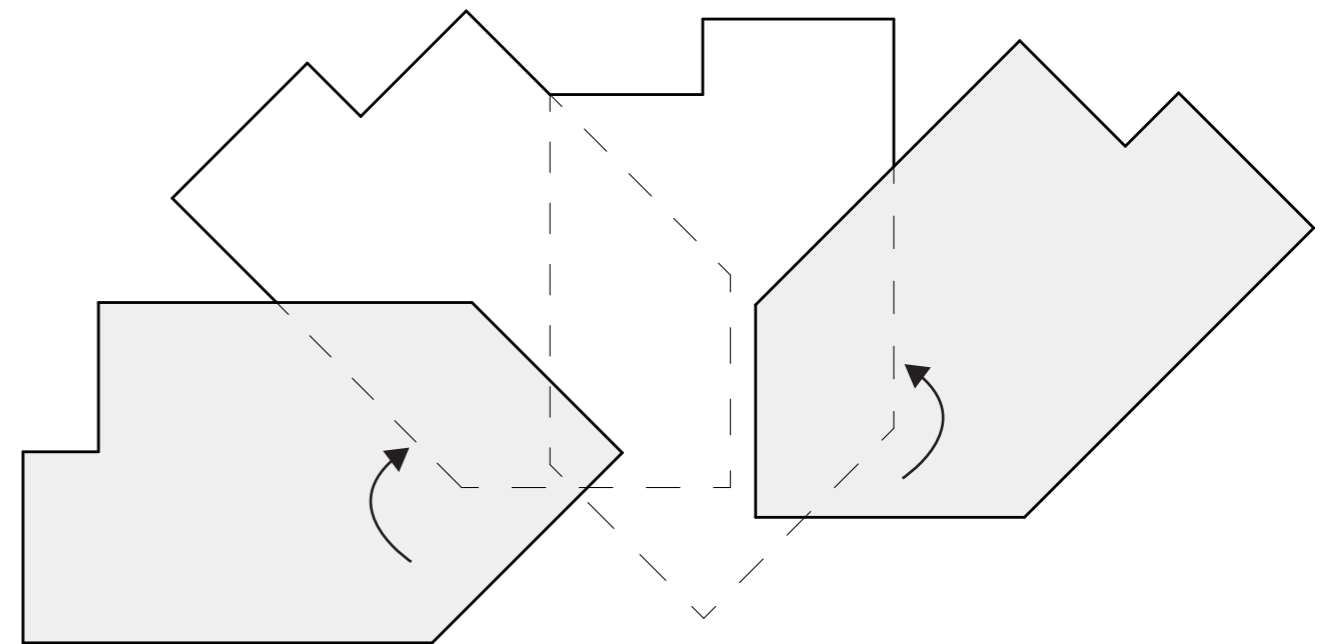
### SPLIT GARDEN - SUBDIVIDE

The garden is split to provide two choices for the patient. This also gives the possibility to subdivide the wards into smaller units if needed.



### INPATIENT WARD - MIRROR

The structure is mirrored to create the inpatient buildings. The staff spaces are concentrated in the division of the two wings for good overview of the whole ward. The same system is used in all inpatient wards.



### MENTAL HEALTH CENTER - SUNFEATHER SHAPE

The structure is formed like a sunfeather to create the mental health center. Two wings are twisted away from each other. Then the same shape is mirrored. This way there is a lot of facade area for rooms that need light, e.g. consulting rooms.

# BUILDING STRATEGY

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VÄSTERVIK OLD TOWN

To allow close access to nature and gardens with lots of daylight, the inpatient buildings has only one floor. This also creates a small scale impression of the building, which when further broken up create a less institutional character.

The facade material is wood, which is a traditional material used in the old town of Västervik. The windows are carefully placed not to allow views between patient rooms, and the sun screens reduce the amount of direct sunlight in the rooms.



FACADE WEST

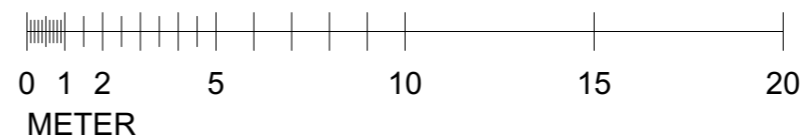


FACADE SOUTH



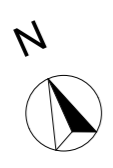
FACADE NORTH

SCALE 1:200



# FORENSIC WARD

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M H C  
FLOOR 2

- Adult outpatient
- Child outpatient
- Administration  
Staff spaces  
Visitor rooms

The building containing the Outpatient psychiatry spaces, administrative offices as well as the shared facilities of the hospital, has been redefined as a "Mental Health Centre". It is a place where no difference is made between different people in society, and everybody is invited to be made aware and take care of their mental health.

The mental health center is designed as a gradient. The visitors enter into the atrium, that is the most public part. It provides a café, gym and yoga studio, reception, conference and other spaces where exhibitions about mental health awareness can be displayed. There are pool tables and pingpong for a bit of social and physical activity, seatings for conversations or for rest. The atrium also contains small islands of greenery to create spaces of privacy and a organic flowing through.

In this space there is also peer support persons working to interact with persons who dont have access to therapy or inbetween therapy sessions. As an everyday supporting professional friend.

This is to become the societys livingroom, were you can come and socialize, activate yourself, whichever health state your mind is in. It is a place to educate people before, during or after mental illnes, a prevention center.

The further into the building you get, the more private you become. Like a gradient of support and social density.



M H C  
FLOOR 1

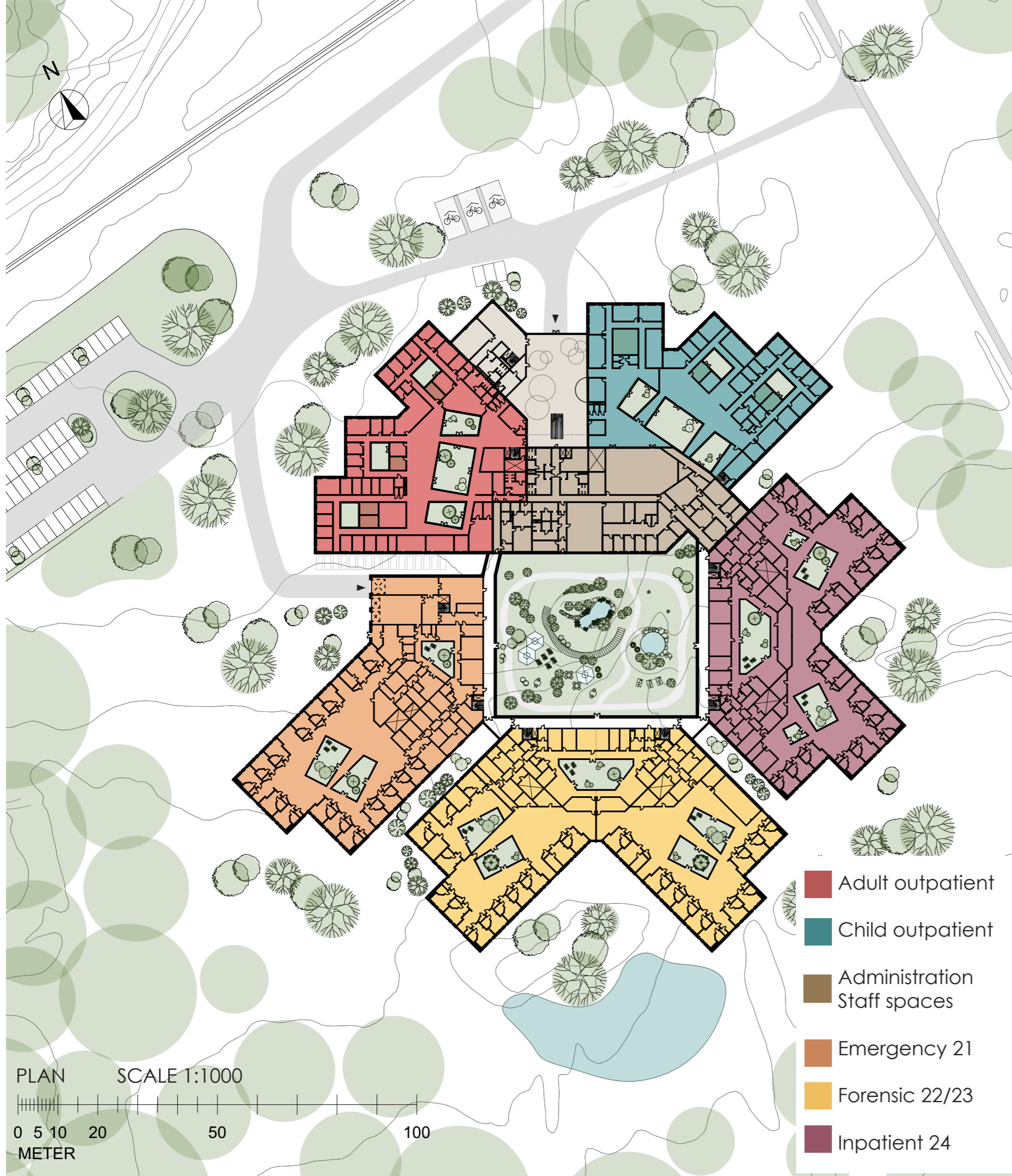
SCALE 1:500



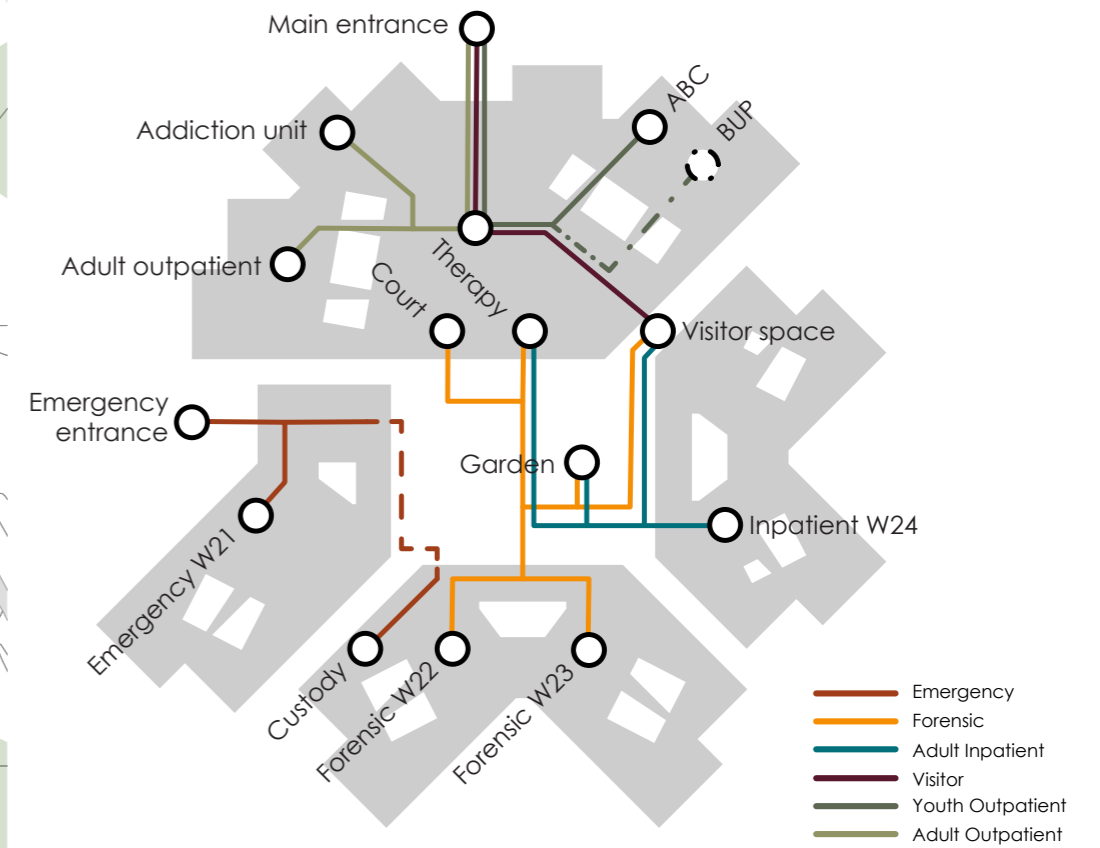
# MENTAL HEALTH CENTER

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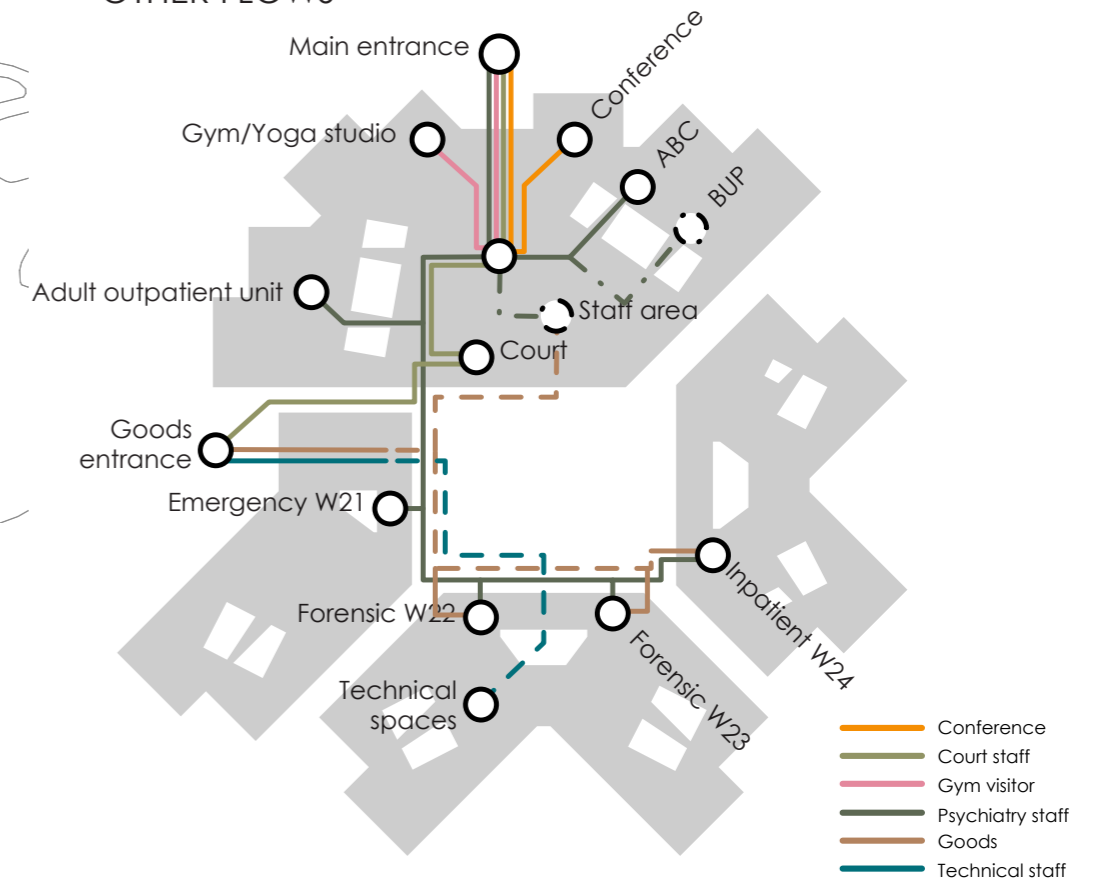




PATIENT FLOWS



OTHER FLOWS



TOTAL BUILDING SIZE = 20 200 M<sup>2</sup> **BUILDING**

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PERSPECTIVE ENTRANCE

The scale of the Mental Health Centre building with the traditional gabled roofs have a familiar character avoiding an institutional feeling. The atrium serves as a clear yet undramatic entrance point, with the adjacent building volumes embracing a small entrance square in front of the building. Facing the inpatient part of the building, the windows are placed to avoid a feeling of being surveyed by staff from above, considering the patient integrity.

The facade materials are chosen to give a different character to each volume, mimicking the style of the Västervik town centre. Wood is the main structural and surface material, with a low environmental footprint and careful finishing to improve durability.



FACADE NORTH EAST



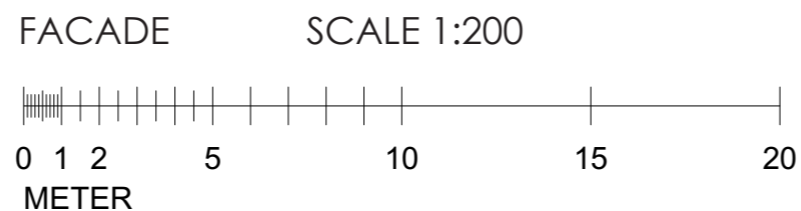
FACADE EAST



FACADE SOUTH

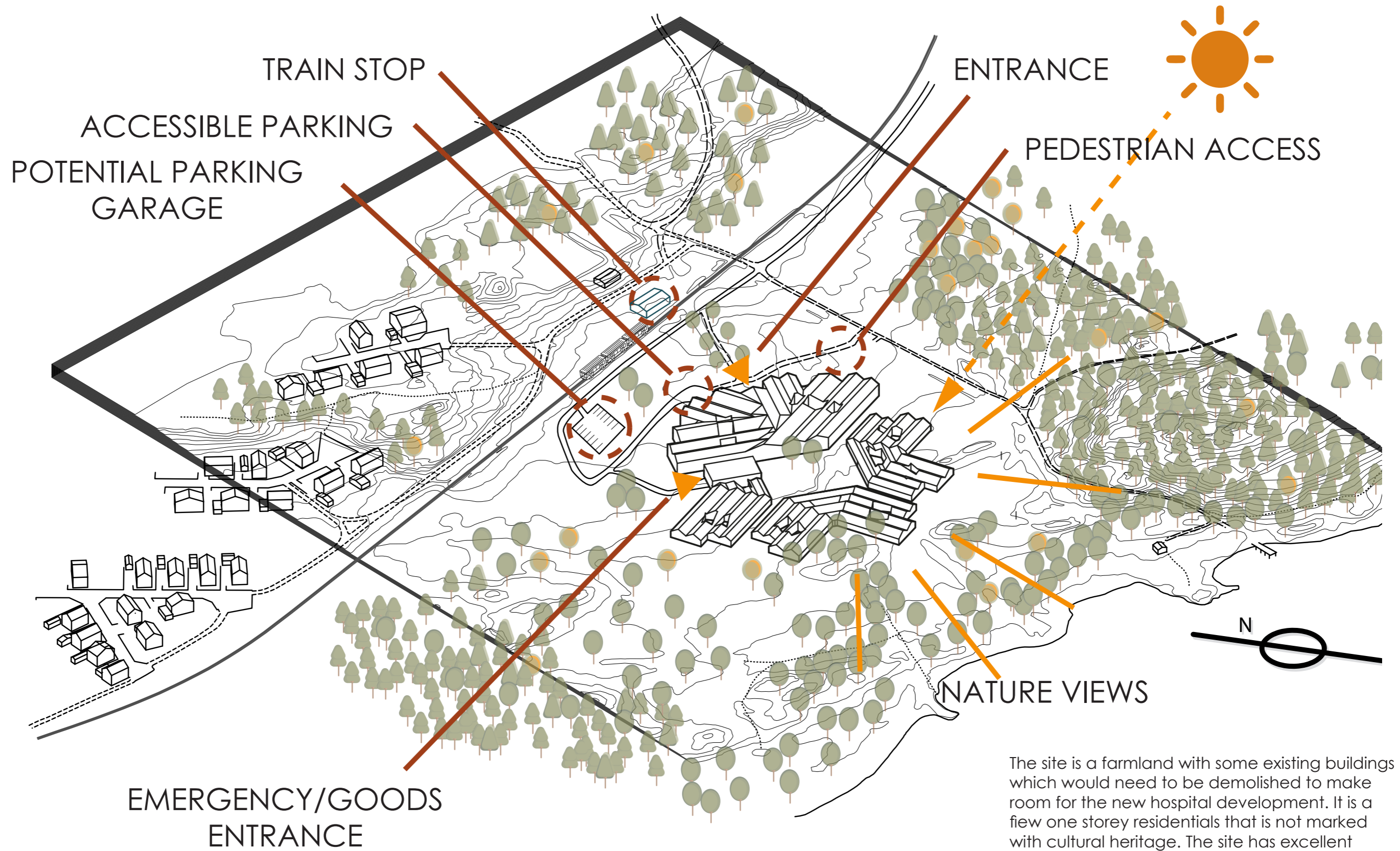


FACADE SOUTH WEST

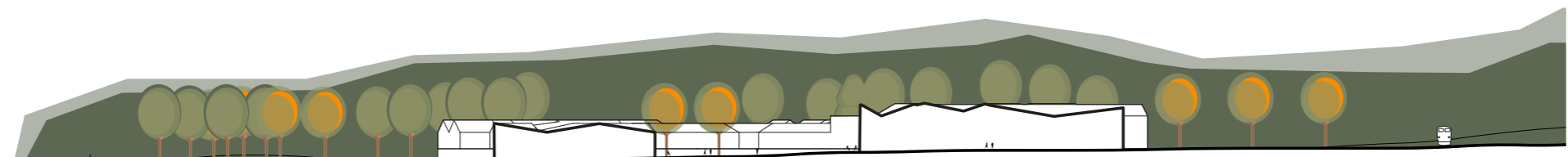


# MENTAL HEALTH CENTRE

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The site is a farmland with some existing buildings which would need to be demolished to make room for the new hospital development. It is a few one storey residentials that is not marked with cultural heritage. The site has excellent access to nature with the forest and the lake nearby. The access to the site is good with some infrastructural improvements. A new train station and bus stop would allow good public transport. The development can become a new urban hub serving the existing residential area to the north.

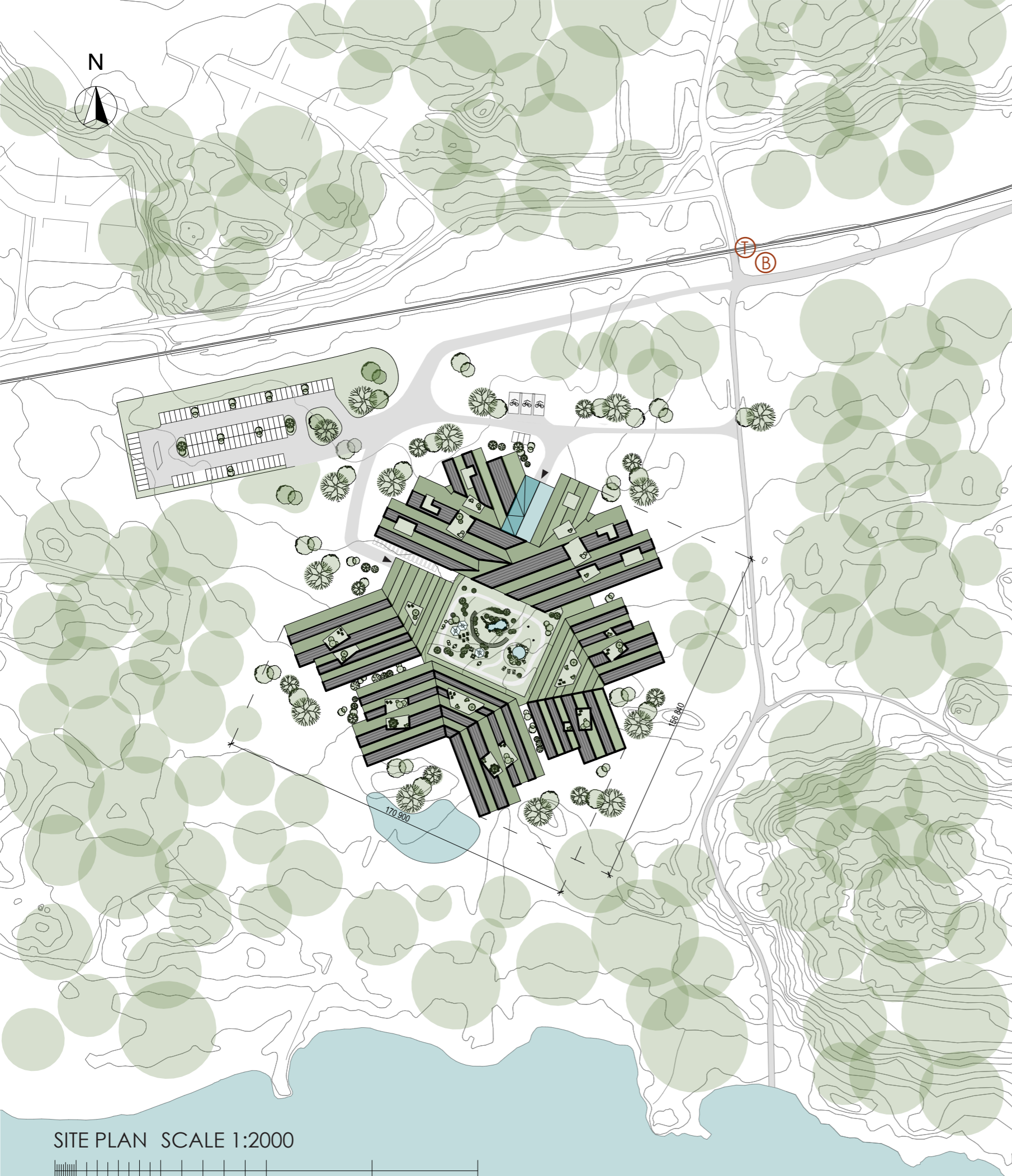


SITE SECTION SCALE 1:2000

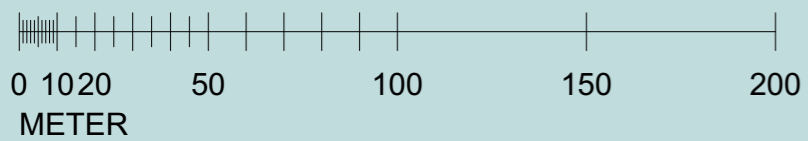
# SITE ANALYSIS

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SITE PLAN SCALE 1:2000



The building is oriented to provide southeast-southwest facing windows for all inpatient rooms, with priority for the longer staying forensic patients. Public transport is available at a new train stop and bus stop, and bikes can be parked near the entrance. Accessible parkings are provided close to the entrance. Car parking and the main emergency access are placed to the side to reduce their impact on the hospital activities. The gentle slope of the site creates slight natural elevation of the inpatient units, bringing them about a metre from the surrounding nature which improves the patient privacy.

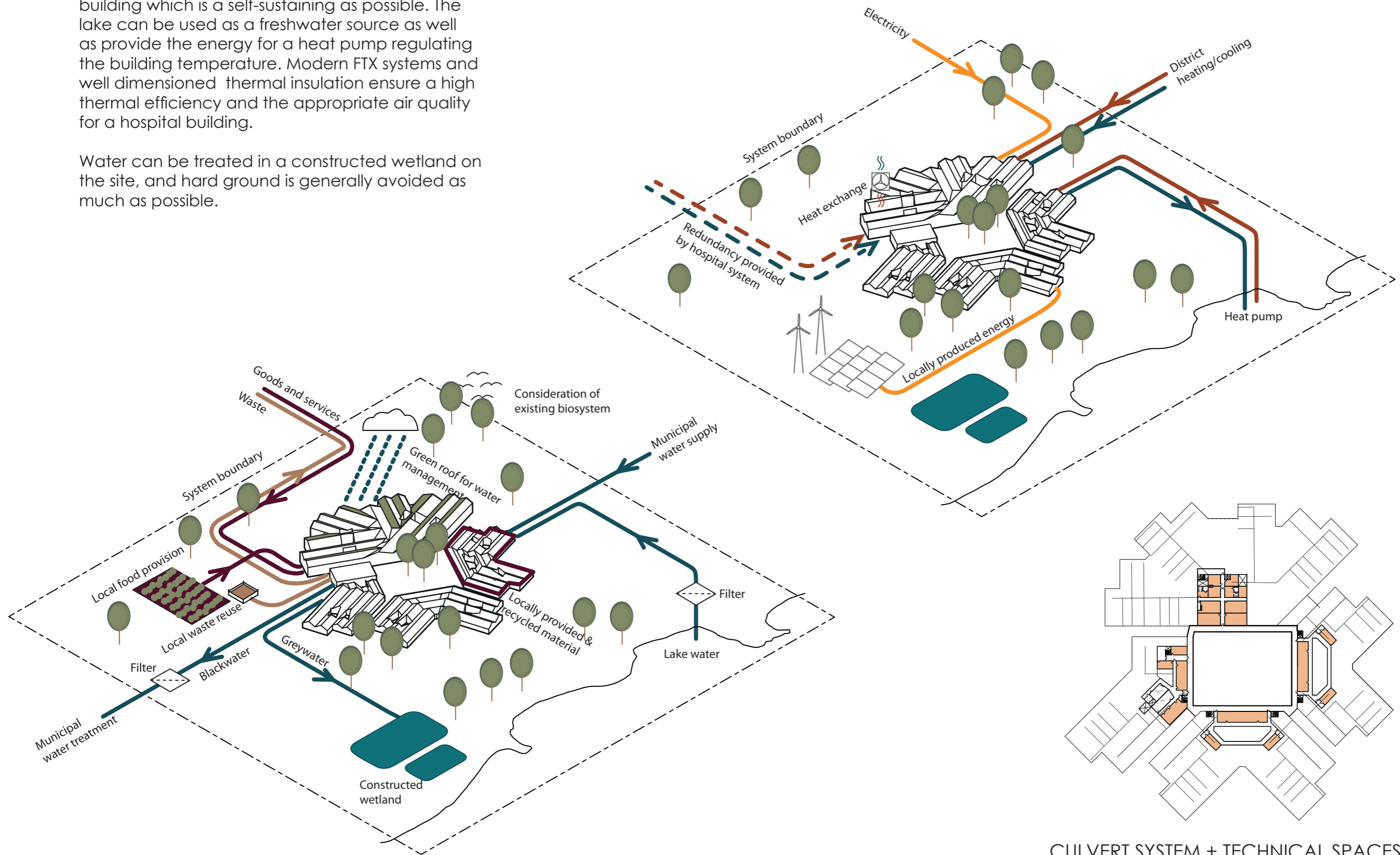
South facing roofs have solar panels to use as much renewable energy from the site as possible. North facing roofs are green to provide a cooling effect, collecting storm water and increasing the biodiversity of the site.

# SITE PLAN

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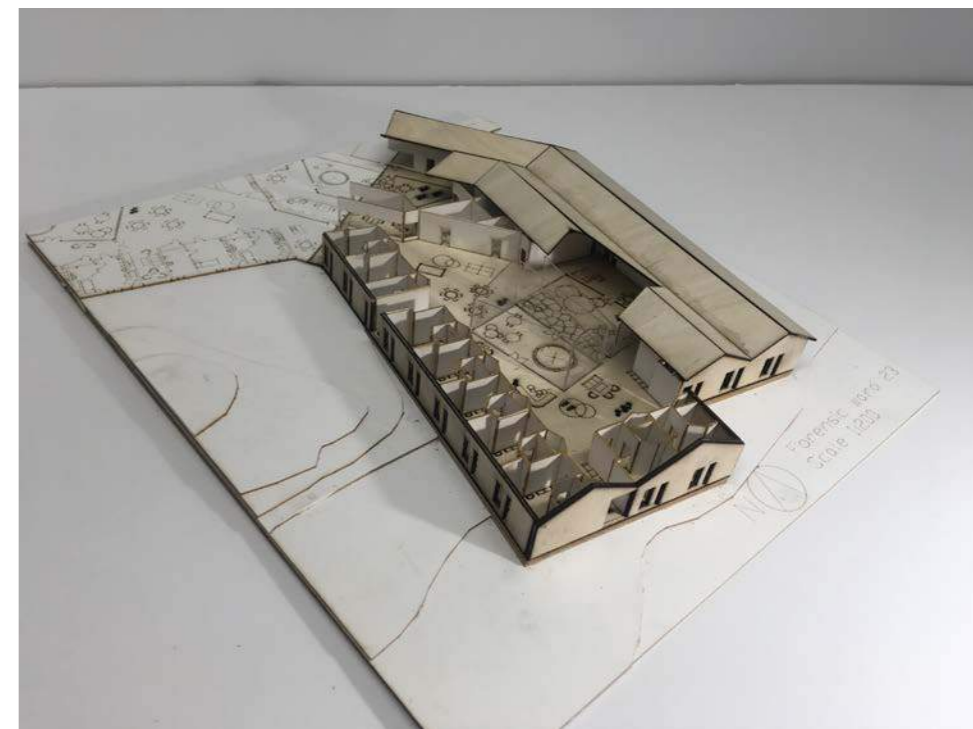
The technical systems are intended to create a building which is as self-sustaining as possible. The lake can be used as a freshwater source as well as provide the energy for a heat pump regulating the building temperature. Modern FTX systems and well dimensioned thermal insulation ensure a high thermal efficiency and the appropriate air quality for a hospital building.

Water can be treated in a constructed wetland on the site, and hard ground is generally avoided as much as possible.



# TECHNICAL CONCEPT

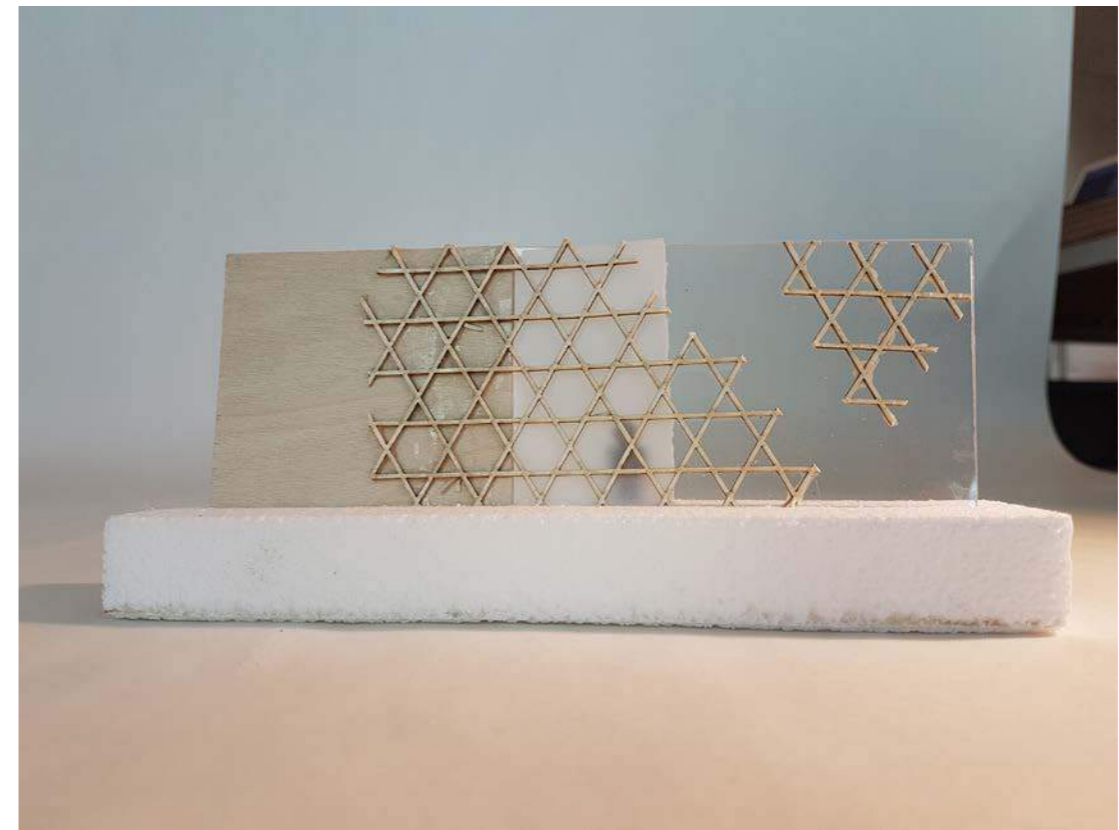
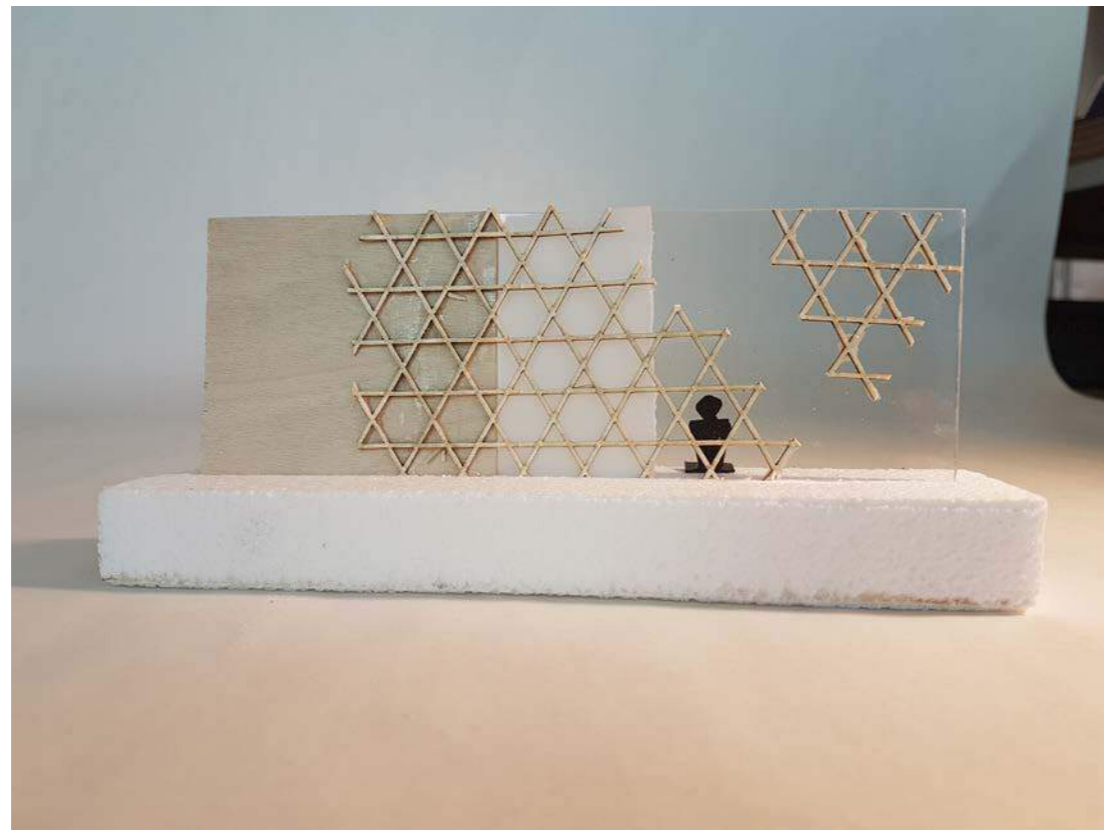
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# PHYSICAL MODEL

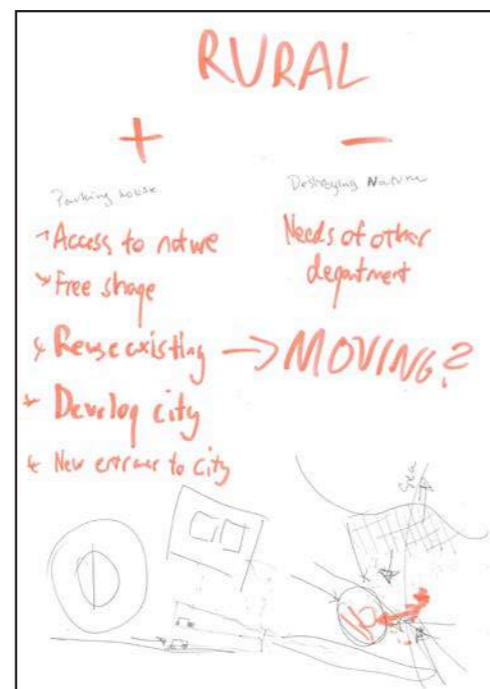
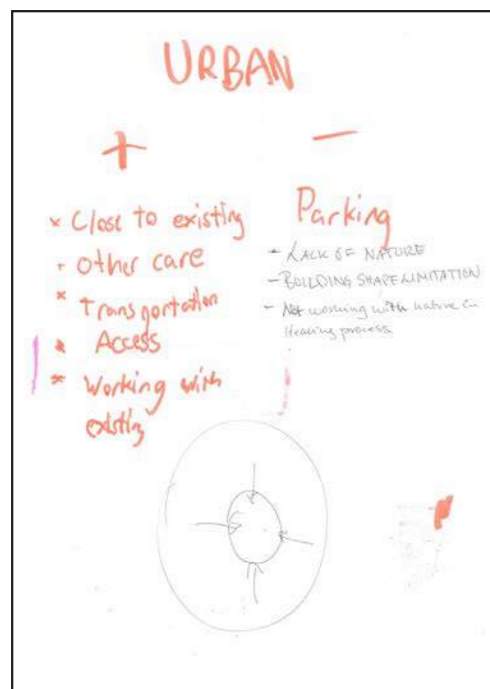
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# Process



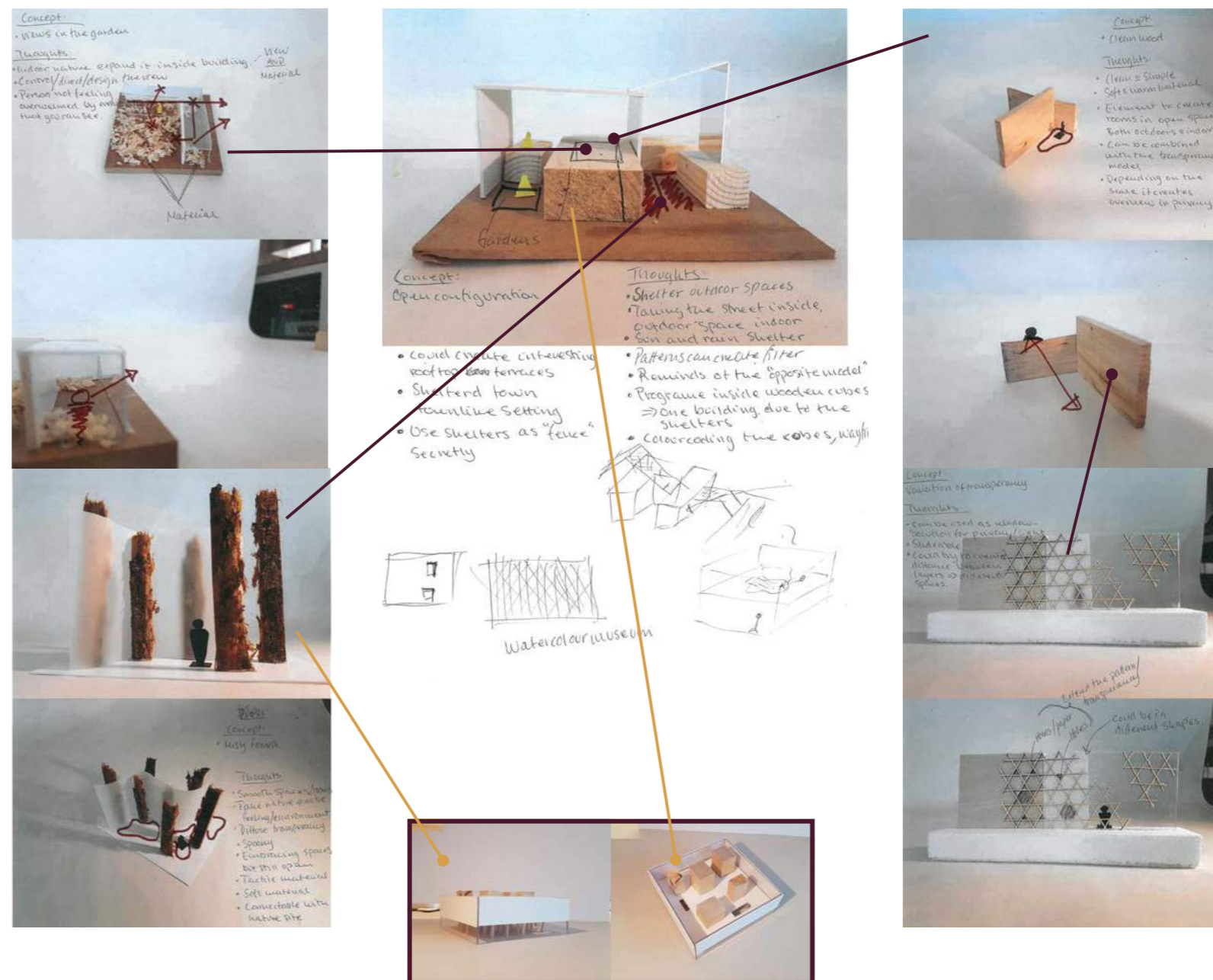
Team 9  
Elin Nilsson  
Toivo Säwén  
Yunfan Zhang

Team 9 Project Booklet 181221  
ARK263 - Healthcare Architecture Autumn 2018  
Examiner - Peter Fröst  
Supervisors - Christine Hammarling, Elke Miedema



Being in the group unsure of which site to work on we made a pros and cons list of the sites. We discussed a lot and sketched our ideas.

We came to the conclusion that we want to work with healing architecture with access to nature. We chose the rural site because we think that we have the best possibility to create a healing environment here. We see a possibility to move the hospital to the rural site and spare the existing hospital for other purposes. We are also more free in the shape of the building.

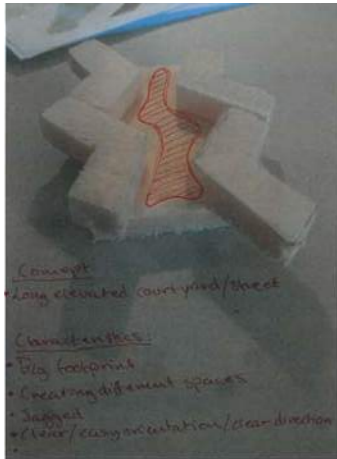


The main outcome before the concept critique was the idea of the Sheltered Society. We wanted to create a shelter space where the patient can practice for their every day life. Our different concept models were combined to show different aspects such as transparency, height differences, and being able to choose how to interact with the spaces. Later in the process this became the inspiration for our "gradient of support" which represents how the building offers different amount of autonomy to patients with different severity of mental health problems.

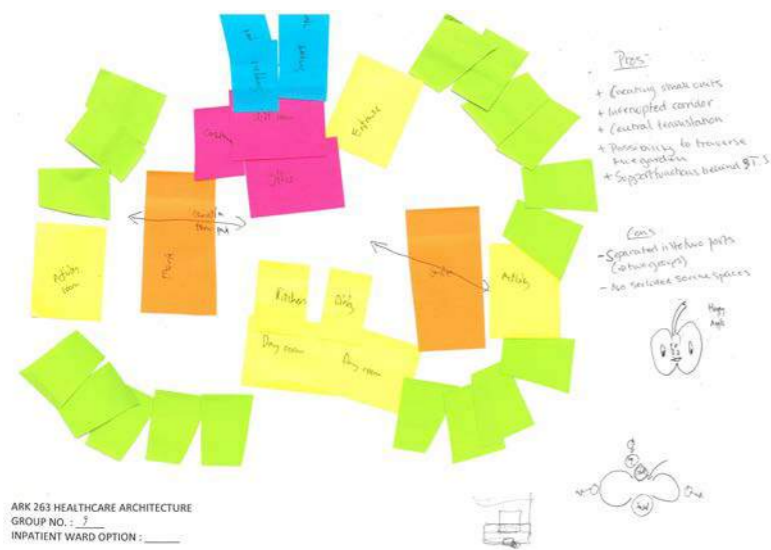
# CONCEPT



Printing the model photos from our continuous work with Björn Gross workshop, though not opposite, and analysing what the concept and characteristics of the model is.



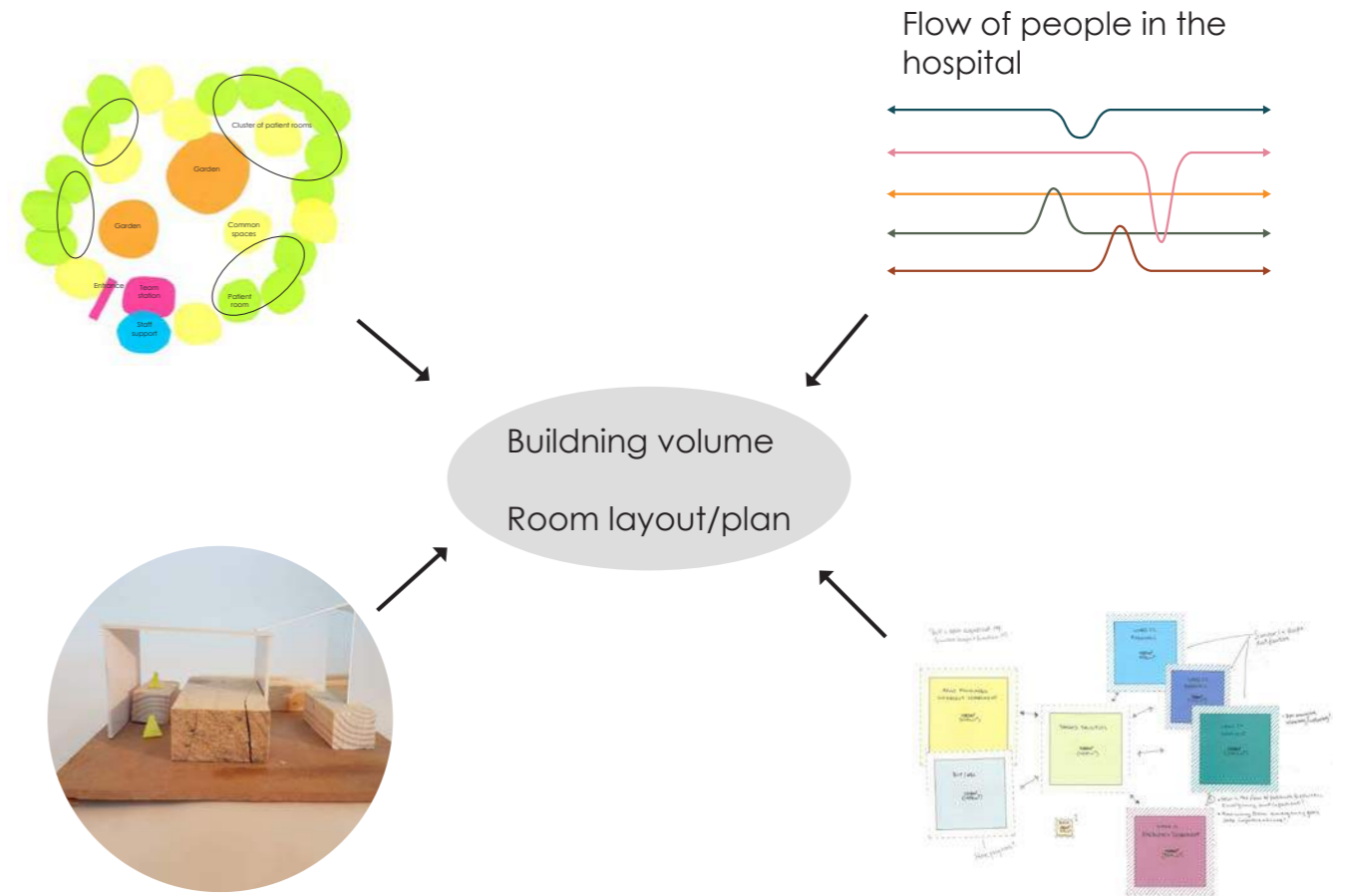
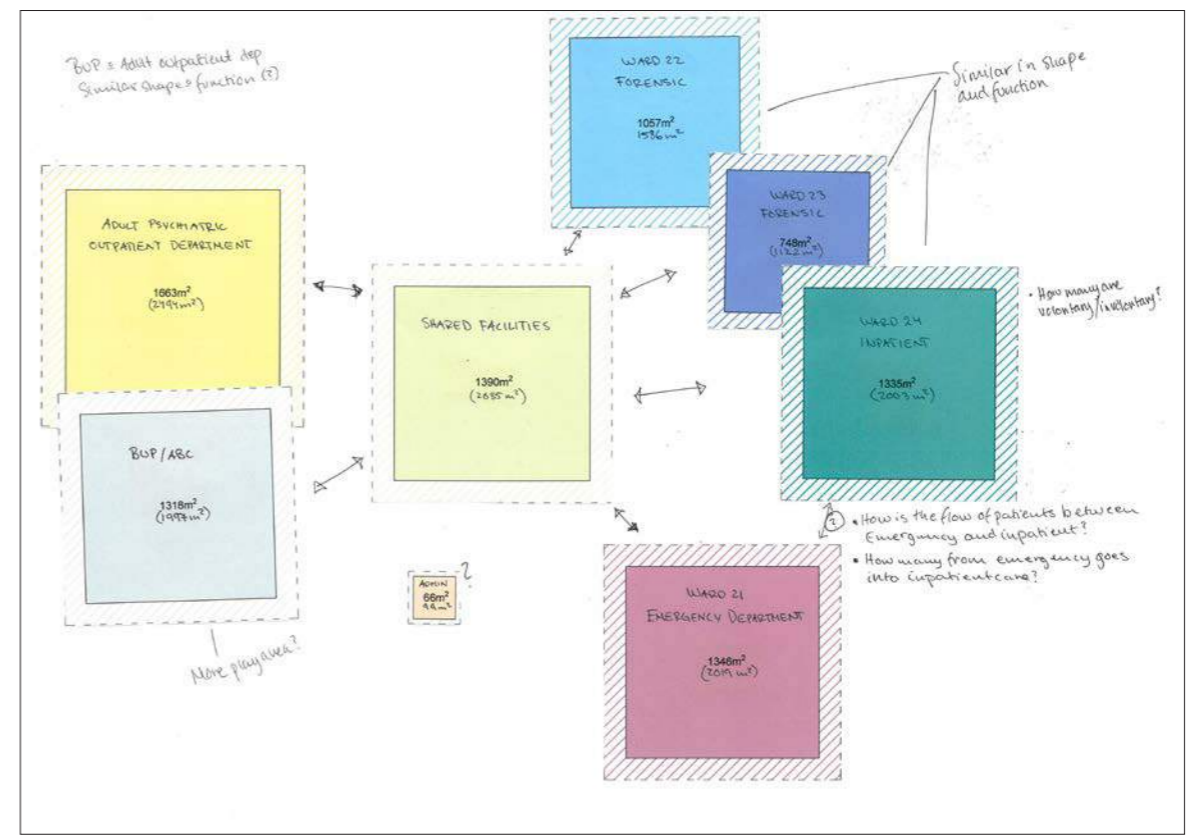
In the beginning we didn't like the models we made and felt a bit lost, but after analyzing them like this we actually found interesting and positive aspects in all of them, though we don't like the shape as a whole. Afterwards we feel like this was a really effective and good method to put down into words what we think about the models and not only discuss it and most of the thoughts get lost.



Legend:

- Patient rooms
- Patient social area
- Staff area
- Garden
- Staff support area

Empowerment - giving choice.  
 Try to disrupt the symmetry in the wards.  
 Clusters of rooms create choice.  
 Centralized or decentralized TS?  
 Think about "universal design" or  
 "inclusive design".  
 Possibilities to practice on privacy...

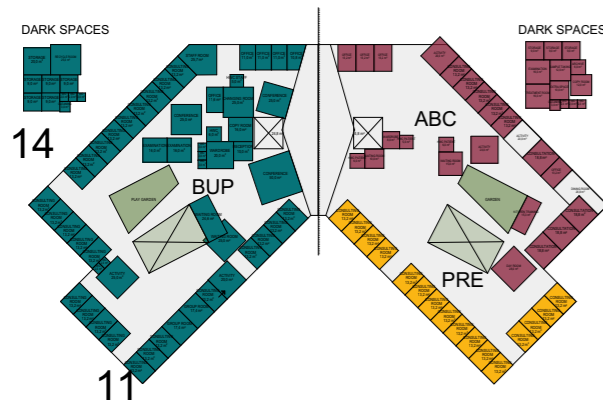


Final page of the concept critique. Our next step was to combine the flows, unit layout diagrams, volume studies and program interpretation into one design.

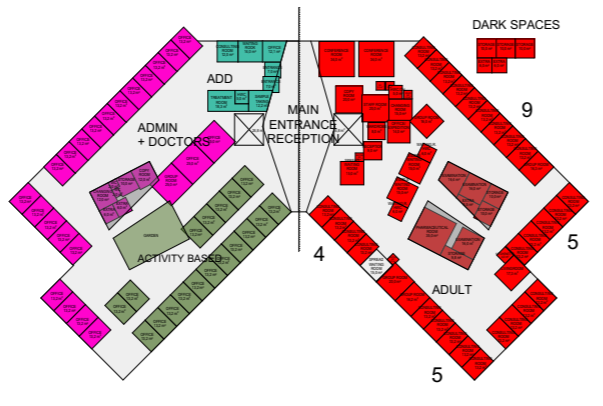
# INSPIRATION

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 ARK263 - Project Booklet

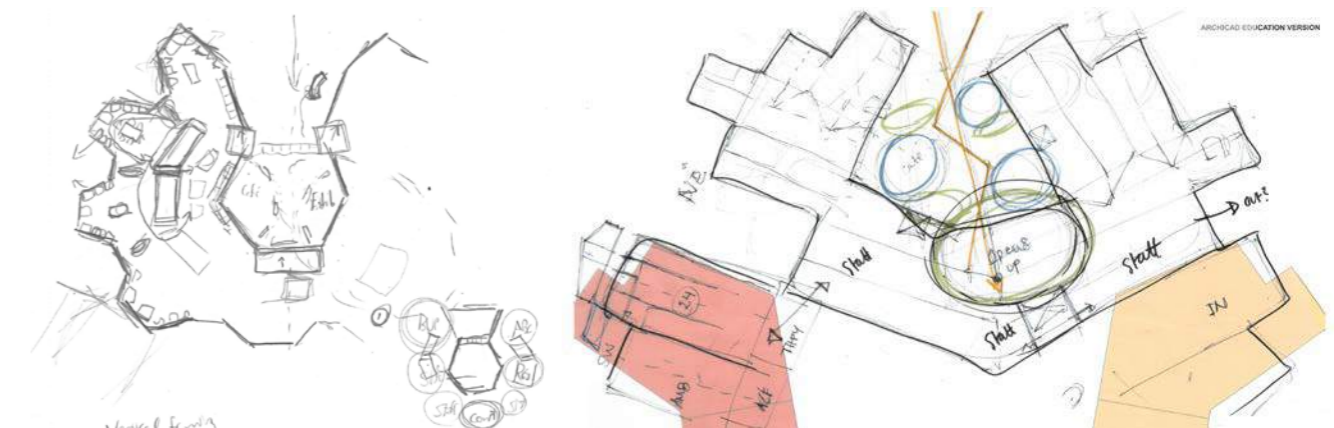




2  
BUP/ABC/PRE



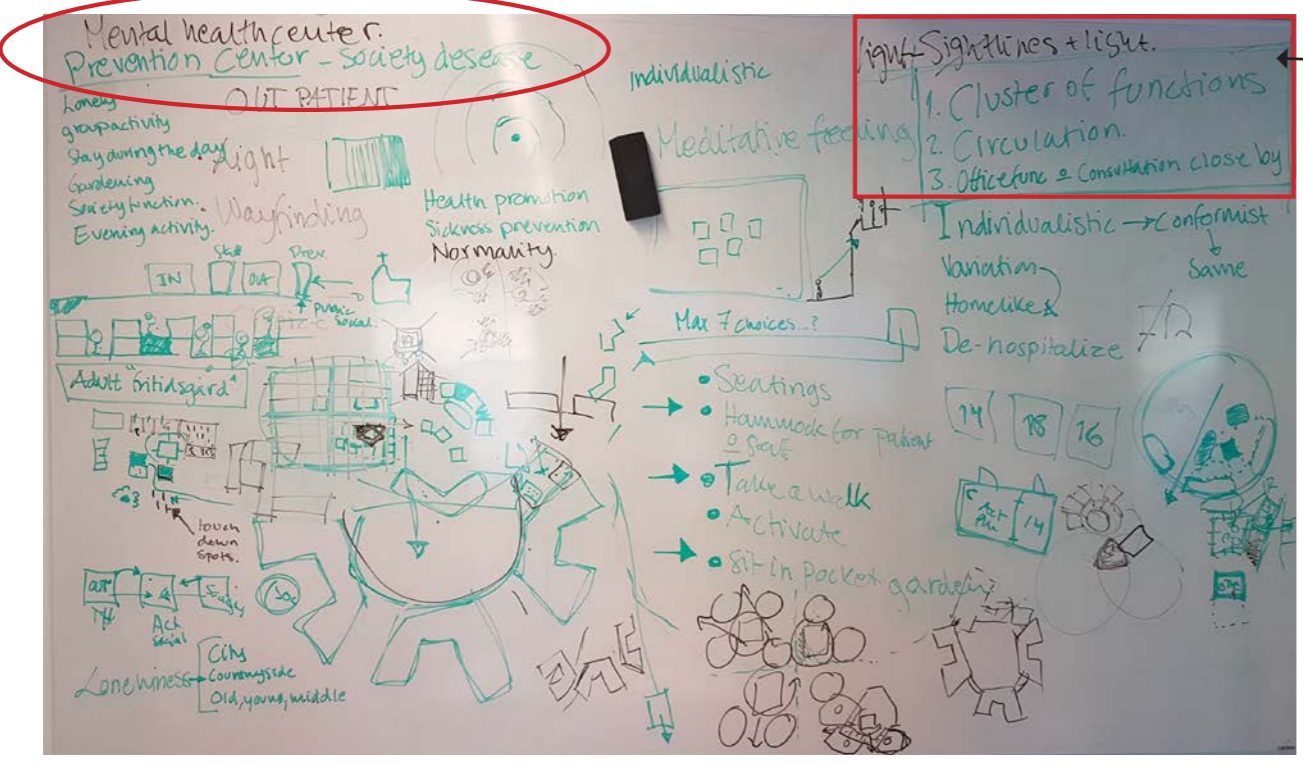
1  
ADULT  
ADDICTION  
ADMIN AREA



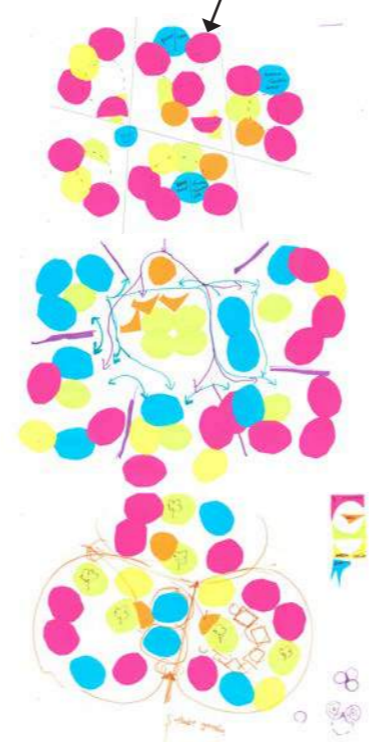
Tried to fit the outpatient program into the same shape as the inpatient building. After the sketch crit we  
 After discussions with Elke the conclusion was that the inpatient building shape is so specialized and good for inpatient care but using it on another place with another function actually can make the inpatient concept weaker. If we were to use the inpatient shape for outpatient care as well, it wouldn't be optimal for outpatient and then it weakens the project that inpatient is the main focus when outpatient care is as important as inpatient care.

We wanted to keep the pushing in and out method from inpatient structure to have a coherence with the rest of the buildings and tried different ways of making clusters with circulations and create an atrium for the entrance.

In the outpatient building in two floors the old idea about gardens in different levels came to life again, what didn't fit the inpatient building actually created our consulting gardens.



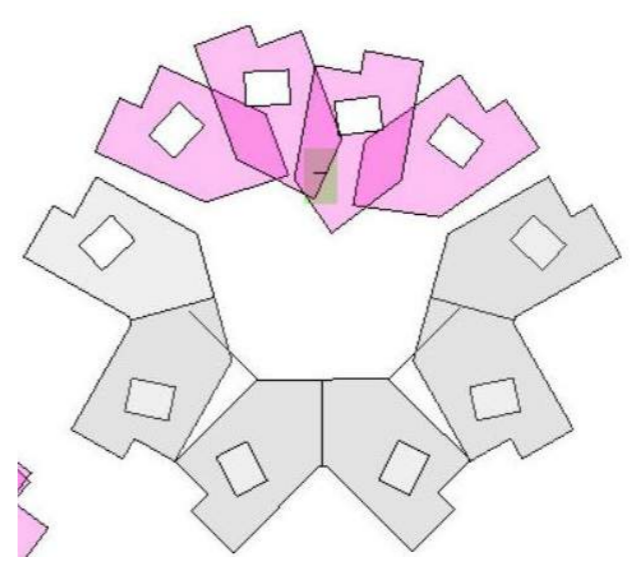
We detected four important design qualities that we wanted to bring from inpatient into the mental health center. With them in mind we created one diagram each with was the base for upcoming work with the plans.



One important thing was to find the right angle of the buildings for the entrance through the atrium. A welcoming angle that leads the visitor into the building. We wanted it to look something like the perspective above.

We decided to sketch for a new shape of the outpatient building. Elke challenged us to be visionary and create a different concept for outpatient care than the normal corridor of rooms that is both the therapists office and consulting room. We wanted to create a neutral space where the therapist and the patient enters on the same premises.

This picture shows our own brainstorm/workshop where we came up with the idea of using the health promotive idea and create a Mental health center, where therapy and meaningful social activity is combined like a gradient from the entry into the consulting rooms. This should be a building where "mentally healthy" persons from society can come before they get sick and are in need of therapy. A place that could use the lecture halls to inform about mental health e.g. how to cope with stress. Have social and physical activities like a café, pingpong and a gym to attract persons that normally wouldn't come to the hospital.



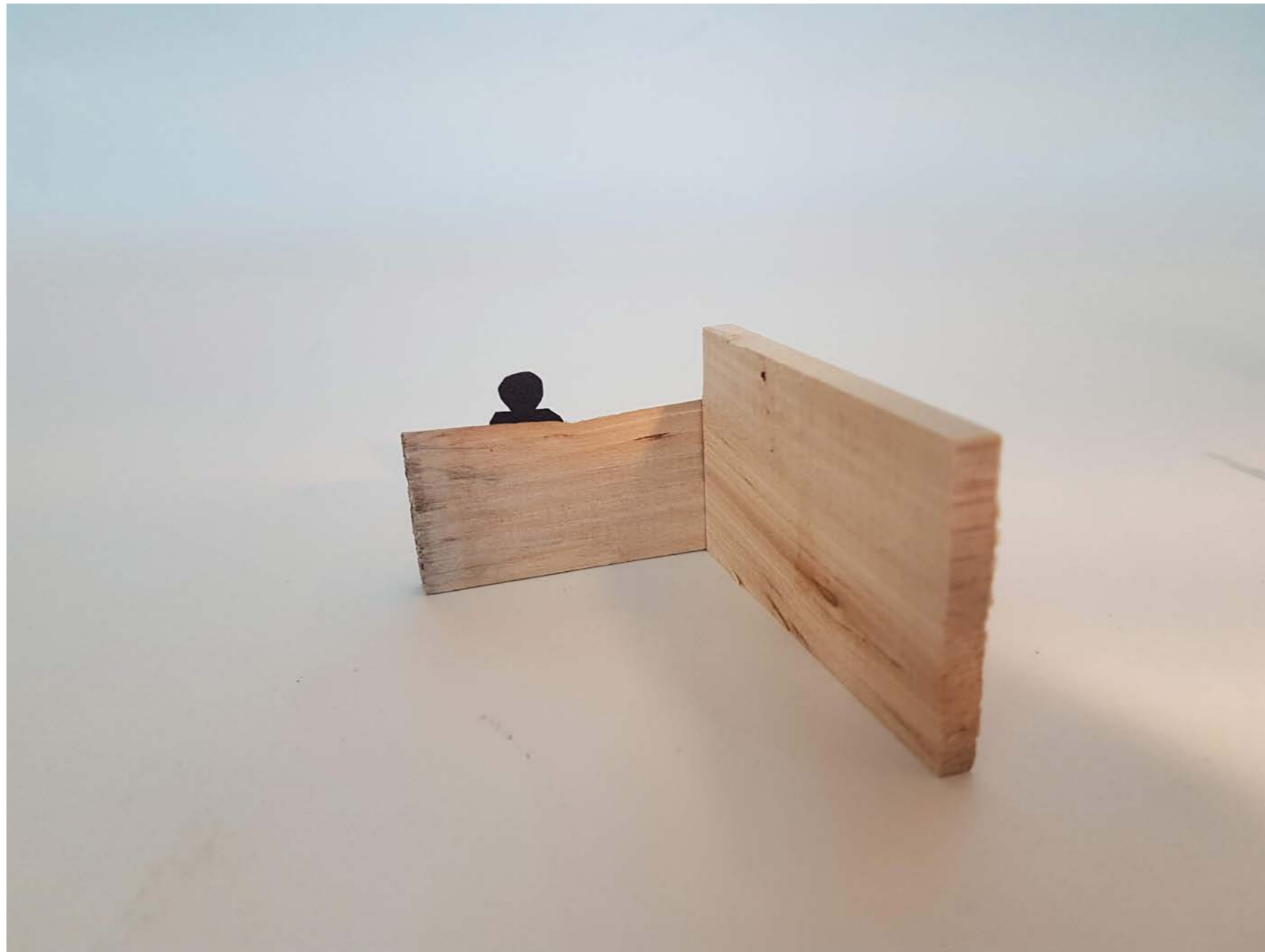
Coming really far with the plans in this shape we felt that something wasn't right, the building had a low coherence with the rest of the hospital and we came up with the shape on the right, which is based on the inpatient wing but creating a sunfeather shape and use it in a different setting but with the same shape. This idea felt very coherent and created the feeling of everything being one hospital.

# IMPLEMENTATION

Team 9 - Elin Nilsson, Toivo Säwén, Yunfan Zhang  
 ARK263 - Project Booklet



# Themes



Team 9  
Elin Nilsson  
Toivo Säwén  
Yunfan Zhang

Team 9 Project Booklet 181221  
ARK263 - Healthcare Architecture Autumn 2018  
Examiner - Peter Fröst  
Supervisors - Christine Hammarling, Elke Miedema

Research informed design principles are key to the realisation of a hospital project. As the environment is a key part in the healing process, the same principles that are guiding the evaluation of healing methods can be applied to the evaluation and design of hospital spaces.

The key notion that pervades our project is bringing greenery into the building through the numerous garden, as well as allowing both patient rooms and workplaces views of greenery. This has been shown to improve the healing process of surgery patients [1]. However, the definition of greenery is something that we could have explored further. It is clear that a nature view is good, but does an internal garden have the same effect? Would images of nature be sufficient to have a healing effect? What is the effect of being in nature, with the smell and other sensory experiences? Are there some mental ailments which

are more influenced by nature views, possible some to which it is detrimental? Further investigation is needed to find the answer to this question.

We have also worked with daylight, and giving the longest staying patient the best lighting conditions in their rooms. For instance, east-facing windows have been shown to reduce the length of stay for inpatients compared to other directions [2]. This, however, has to be achieved with the privacy in mind, as windows facing other buildings may cause patients to choose to pull down the blinds, thus removing the healing effect. We have chosen to have a moderate amount of windows in each room, adding screens which remove the strongest daylight and reduce views, and to orient the patient rooms away from each other.

We have chosen to work with single patient rooms guided by EBD [2], which

reduces the stress caused by other patients. However, some patients may feel isolated in such a situation, so we provide the opportunity to place two beds in one room if necessary.

In general, the concept of social density has been applied throughout the building [3]. This means a number of smaller spaces are created as opposed to a big one, which means a user of the space can choose how to locate themselves in relation to other users, and move between spaces if a stressful situation arises.

The outpatient building also follows the principle of reducing stress in several ways. The broken up volume creates a familiar appearance as opposed to institutional. As the patient enters the building, they are greeted by staff to support wayfinding. The waiting rooms are separated into multiple spaces, following the low social density principle.

#### Sources:

[1] Ulrich, R., View Through a Window May Influence Recovery from Surgery, *Science*, 224(4647):420-1, 1984, <http://doi.org/10.1126/science.6143402>

[2] Ulrich, R., Essay: Evidence based healthcare architecture, *Lancet*, Vol 368, 2006, [https://doi.org/10.1016/S0140-6736\(06\)69921-2](https://doi.org/10.1016/S0140-6736(06)69921-2)

[3] Ulrich, R. et al., Psychiatric ward design can reduce aggressive behavior, *Journal of Environmental Psychology*, Vol. 57, 2018, <https://doi.org/10.1016/j.jenvp.2018.05.002>



Inpatient ward with different choice of space and activity

## RESEARCH INFORMED

Team 9 - Elin Nilsson, Toivo Säwén, Yunfan Zhang  
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Our approach to health promotion ties into the Evidence Based fact that physical activity greatly improves mental health [1]. It is important for us to provide the opportunity for all patients, independent of their state of mental health, to physical activity including walks, table tennis, spinning bikes etc. based on their own preferences.

As many patients with mental illness suffer from somatic diseases associated with sedentary behaviour [2], providing even the smallest opportunity for physical activity may greatly improve both their mental and physical health. From a building design perspective this means providing multiple spaces where such activity is possible, which also doesn't force the patient to experience an unsolicited social situation. The design of our inpatient wards means the patient

always has overview over who is using a certain space. If they want to take a walk around the courtyard they can do so when nobody else is there. There are also always multiple ways of going outside, to ensure that there is always a way of getting fresh air and a quick stretcher.

The large internal garden is another important health promoting factor. The concept of "getting your jacket on and going into society" when moving between living and therapy/court spaces includes an important aspect of physical activity. In the act of moving between the home and the activity space, there is an element of inspiring to every day physical activity. The programmed activity spaces have also been extended with a gym for the patients as well as a gym and relax area

for staff, giving them a space where they can breathe out after a hopefully not so stressful day.

We have redefined the outpatient part of the program to be a Mental Health Centre. This means a place where anybody can receive information and inspiration in taking care of their mental health. The idea is for the building to be welcoming not only to those who are admitted to psychiatric care, but provide a space where the focus is upon reflection on mental wellbeing. This includes a gym space and a yoga studio for quite literal mental wellness, but also exhibition spaces and activity spaces where people from all parts of society can meet and discuss and be made aware of their state of mental health.

#### Sources:

[1] Stephens, T., Physical activity and mental health in the United States and Canada: Evidence from four population surveys, Preventive Medicine, Volume 17, Issue 1, 1988, [https://doi.org/10.1016/0091-7435\(88\)90070-9](https://doi.org/10.1016/0091-7435(88)90070-9).

[2] Richardson, C. R., Integrating Physical Activity Into Mental Health Services for Persons With Serious Mental Illness, <https://doi.org/10.1176/appi.ps.56.3.324>



Section showing access to gardens and physical activity

# HEALTH PROMOTION

Team 9 - Elin Nilsson, Toivo Säwén, Yunfan Zhang  
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Our main approach to future proofing has been considering the future of psychiatry in Sweden, and what this would mean for the development of Västervik hospital. The current trend is of a declining mental health among the general population, especially how youth estimate their own well-being and how often they experience anxiety [1]. If this trend continues, it would mean an increased need for psychiatric facilities, and the need for expansion may be great.

However, an opposing trend of replacing traditional psychotherapy sessions with pharmacotherapy [2], meaning shorter patient visits and less focus upon the therapy space as a healing environment. Considering these two trends in parallel it is clear that the future needs for psychiatric buildings are uncertain.

To respond to these changing needs, we have developed a rational building system where any given part of the building can be expanded and remodelled to support a different use. The choice of an activity-based office environment means the potential for a changing organisation in the outpatient care based on current needs, not locked into traditional divisions into ward units. The inpatient units also follow a rational scheme which can easily be subdivided should the requirements change.

#### Sources:

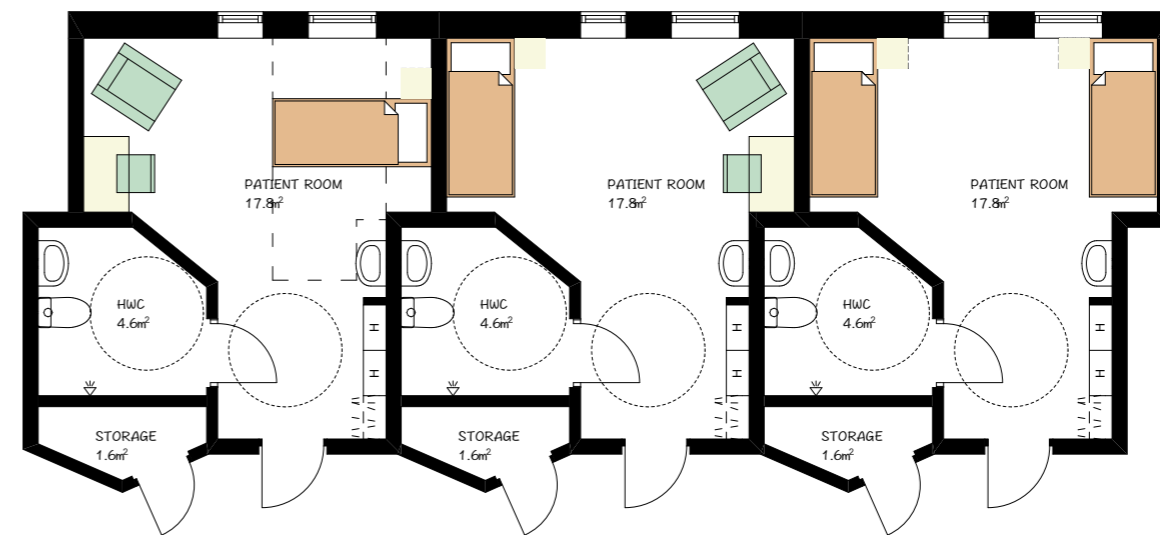
[1] Hagquist, C., Ökar den psykiska ohälsan bland ungdomar i Sverige?, Socialmedicinsk tidskrift, Volume 88, Issue 6, 2011, <http://socialmedicinsk.tidskrift.se/smt/index.php/smt/article/view/837/657>

[2] Mojtabai R, Olfson M., National Trends in Psychotherapy by Office-Based Psychiatrists. Arch Gen Psychiatry. 2008;65(8):962–970. doi:10.1001/archpsyc.65.8.962

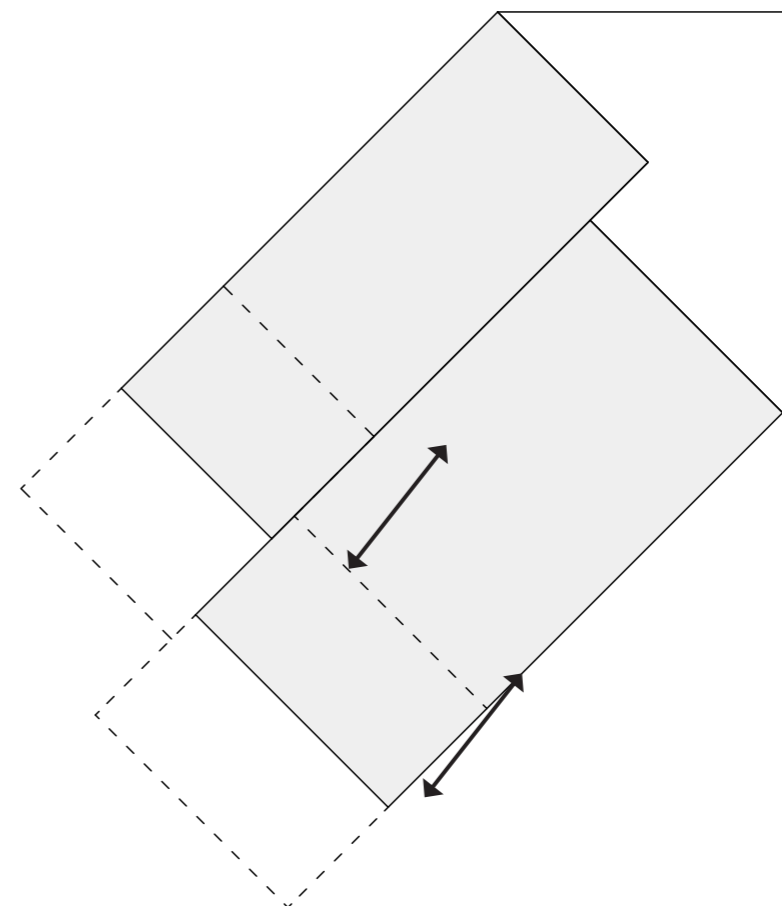
[3] Pinfold, V. et al., Working with young people: the impact of mental health awareness programs in schools in the UK and Canada, World Psychiatry, Volume 4, <https://pdfs.semanticscholar.org/3543/56181bab0a323d490ac500ae8d9b66aaabf2.pdf>

Another important trend in psychiatry is an increasing awareness and destigmatisation of mental health issues [3]. This has been shown to improve the attitudes towards people with mental health issues, and may also cause an increased demand for psychiatric services. To face this demand, we have redefined the Outpatient portion of the building as a Mental Health Centre, where not only admitted patients but the general public can be educated about mental health.

In a wider perspective, the future will include large changes, both environmental and societal. We have responded this through a sustainable design, where for instance hard ground is avoided to be able to handle heavier rainfalls as a result of climate change. From a societal perspective, migration streams are likely to increase, which would mean psychiatry would need to provide spaces for people with different backgrounds and social needs. Our project follows a rational concept to meet demands based in Evidence Based Design, providing single patient rooms with views of daylight and greenery. An improvement to the project would be to consider even more potential users, and provide an array of different rooms suitable to differing needs both from a cultural perspective and one of mental health.



Array of patient rooms with different uses and organisation



Potential to extend or reduce the shape based on demands

# FUTURE PROOFING

Team 9 - Elin Nilsson, Toivo Säwén, Yunfan Zhang  
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For an architectural project designed in 2018, achieving sustainability is a baseline requirement. It is commonly related to the definition of sustainable development: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [1]. This means achieving a design which fulfils requirements of social, ecological and economical sustainability. However, in today's rapidly changing climate it is likely that a sustainable solution is not enough.

Today researchers are talking about resilience and other terms to describe the effect of a proposed project [2]. For instance, it is no longer enough to keep the environmental impact as low as possible - it is required to have a net positive effect on the global environment.

Hospital buildings typically have a large environmental impact due to advanced equipment, continuous operation and high redundancy needed to support e.g. life supporting systems [3]. However, psychiatric buildings have the advantage of not needing that much equipment, instead relying on the environment as treating the patient.

As the psychiatric hospital constitutes a large complex, the possibility to integrate sustainable technology in the building is great. In addition, our choice of relocating the hospital to a greenfield site means the necessary infrastructure can be constructed from the ground up in a sustainable way. The roofs are

oriented to achieve maximum solar panel efficiency, the heating/cooling system uses the nearby lake for a heat pump system, and the farmland can keep its use to provide food and treat waste locally.

From a thermal perspective, the correct insulation system must be chosen to ensure a good performance. However, the choice of a one floor solution with multiple penetrating gardens will inevitably be less efficient than a more compact volume. However, in this instance the healing effect of greenery had the highest priority.

For social sustainability it could be argued that a large hospital complex is detrimental to the urban development of the area near the lake Kvännaren. The hospital is also further from the city than its current location, which may reduce access. However, it may give back to the area as the Mental Health Centre becomes a community centre, and may also become a gateway to the nature site near the lake.

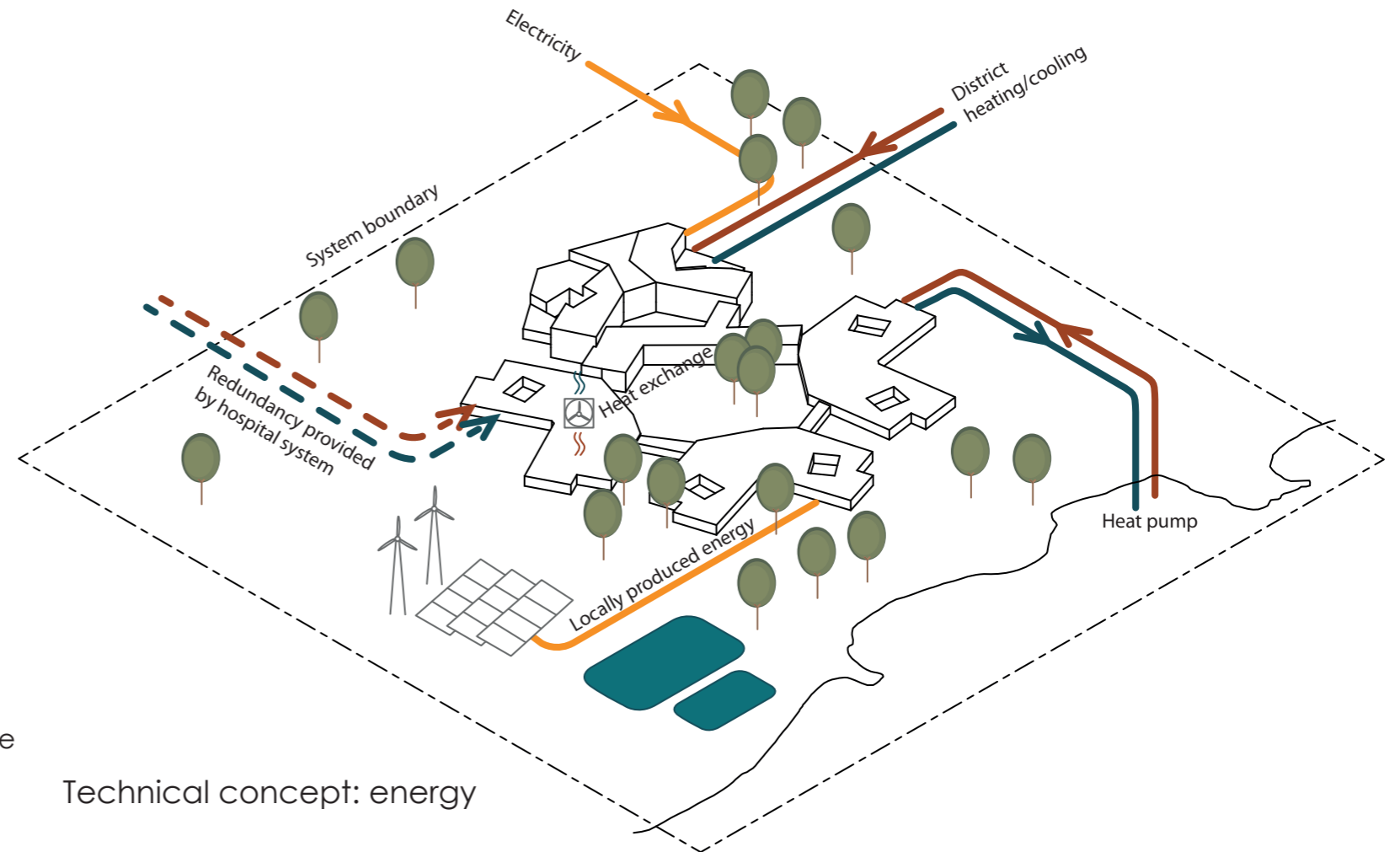
From an economical perspective we have worked with a rational plan, which will allow a rapid construction process and the use of local materials. While we have mostly stayed true to the program, we have introduced some functions which will serve both to tie the hospital site closer to the site, but also may provide income for the hospital through conference visitors etc. Working with EBD design principles is also clearly sustainable, as better working conditions for staff reduce the number of sick days and improves staff retention.

**Sources:**

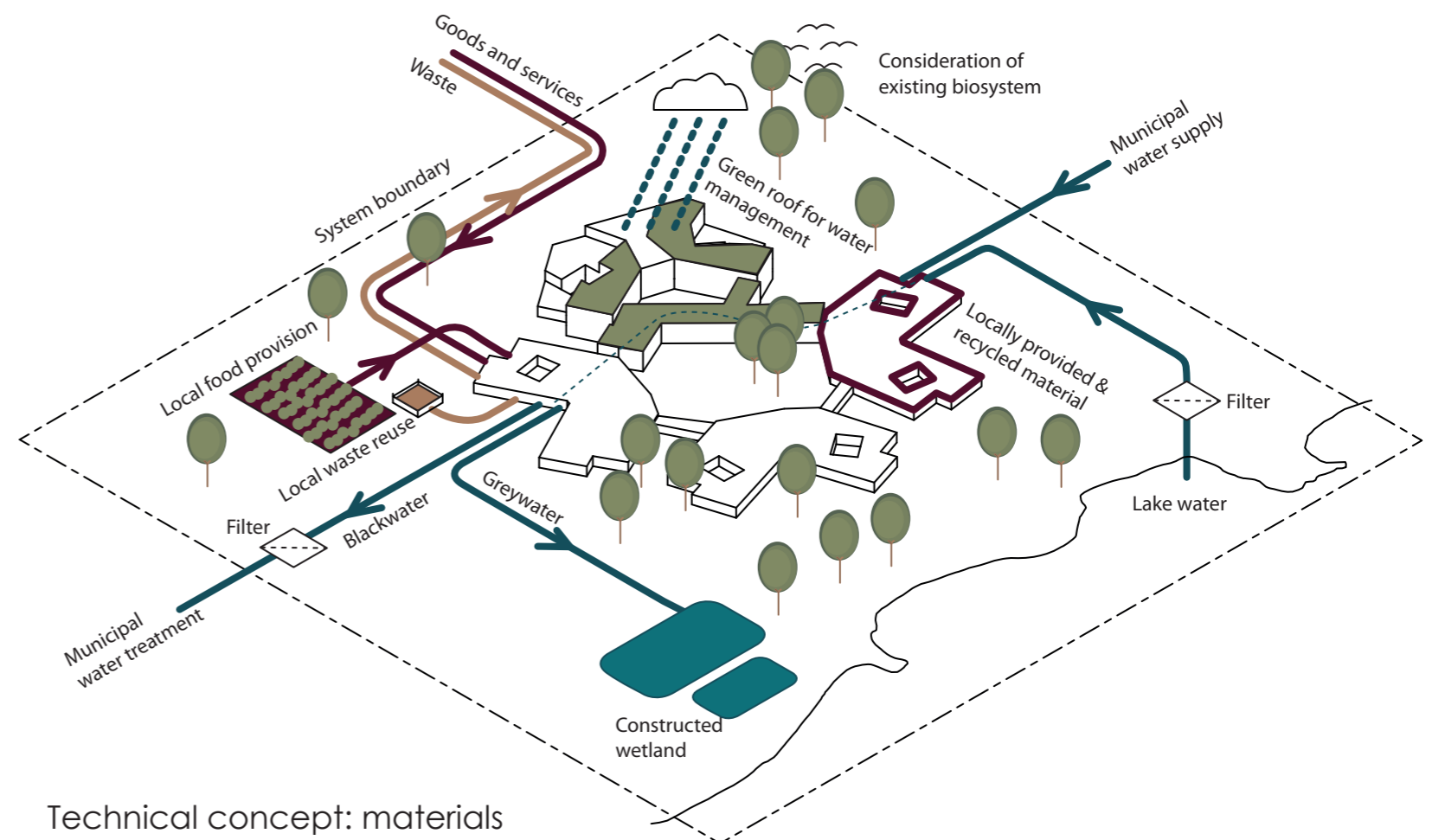
[1] United Nations General Assembly (1987) Report of the World Commission on Environment and Development: Our Common Future. <http://www.un-documents.net/wced-ocf.htm>

[2] Passer, A., Habert, G., Kromp-Kolb, H. et al. Int J Life Cycle Assess (2018). <https://doi.org/10.1007/s11367-018-1550-9>

[3] Castro, M., Mateus, R. & Bragança, L. Environ Dev Sustain (2015) 17: 1381. <https://doi.org/10.1007/s10668-014-9611-03>



Technical concept: energy



Technical concept: materials

# SUSTAINABILITY

Team 9 - Elin Nilsson, Toivo Säwén, Yunfan Zhang  
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