

Örebro Närsjukvårdscentrum

ARK263 - Future visions for healthcare, 2017



Andersson, M. Sahlberg, J. & Dupille, F. V.

THE COMMISSION

THE COMMISSION

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THE EVOLUTION

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INTERNAL COMMUNICATIONS

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SECOND FLOOR

PRIMARY CARE

BASEMENT, THIRD FLOOR & FOURTH FLOOR

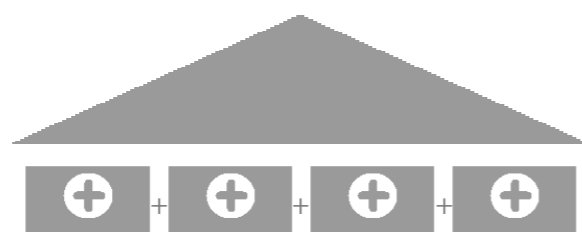
SECTIONS



The site is located just north of Örebro city center and close to the trainstation.



The site consists of older healthcare buildings and senior residential.



The region of Örebro wants to build a new healthcare center, combining the four existing primary healthcare centers of Karla, Varberga, Mikaeli and Olaus Petri. Together they have around 50 000 listed patients. Apart from the existing primary healthcare functions the new center will have an emergency unit and other more advanced functions to offload pressure from the Örebro University Hospital.



The municipality wishes to expand its offices from the other side of Ribbingsgatan and wants an office for 120 employees. Calculating the total space required using the number 15 square meter per person gives an area of about 1800 square meters.



Folk tandvården wants to have a dentist with 32 examination rooms. Examination rooms are divided between hygienists and dentists but this still implies a fairly large department by Swedish standards.

THE CONTEXT

BUILDINGS ON THE SITE - DIRECTIONS OF INTEREST - URBAN STREET - SPACES OF INTEREST

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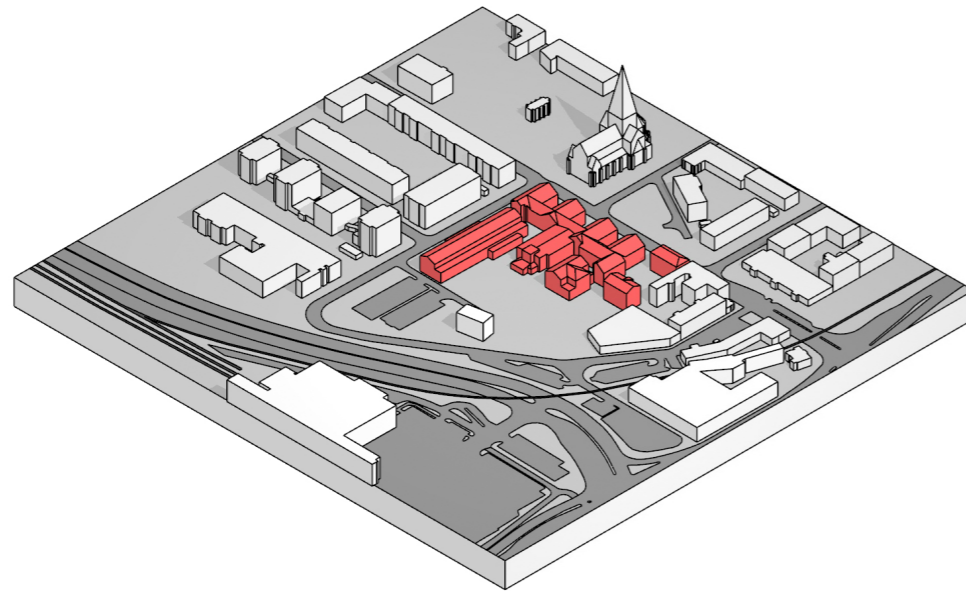
PRIMARY CARE

BASEMENT, THIRD FLOOR &
FOURTH FLOOR

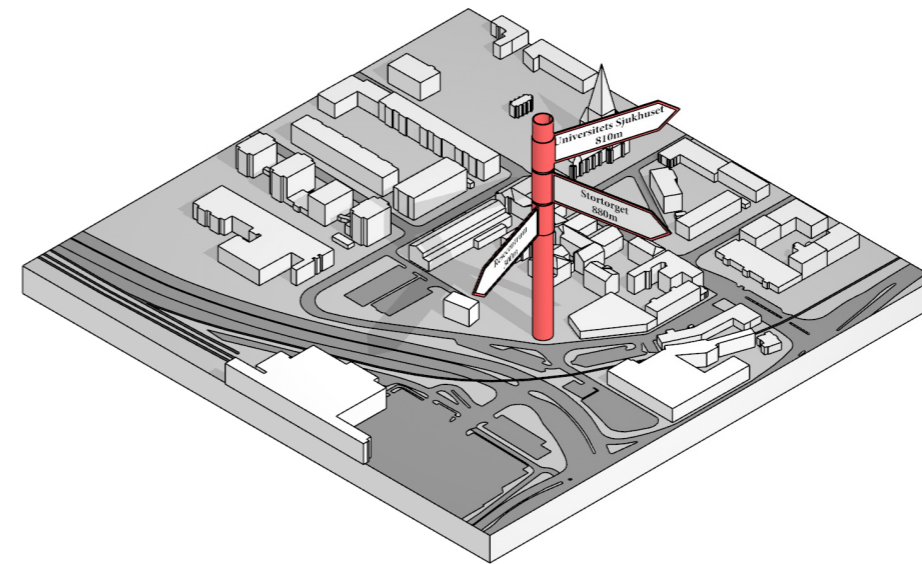
SECTIONS

While studying the context we identified four primary factors to consider:

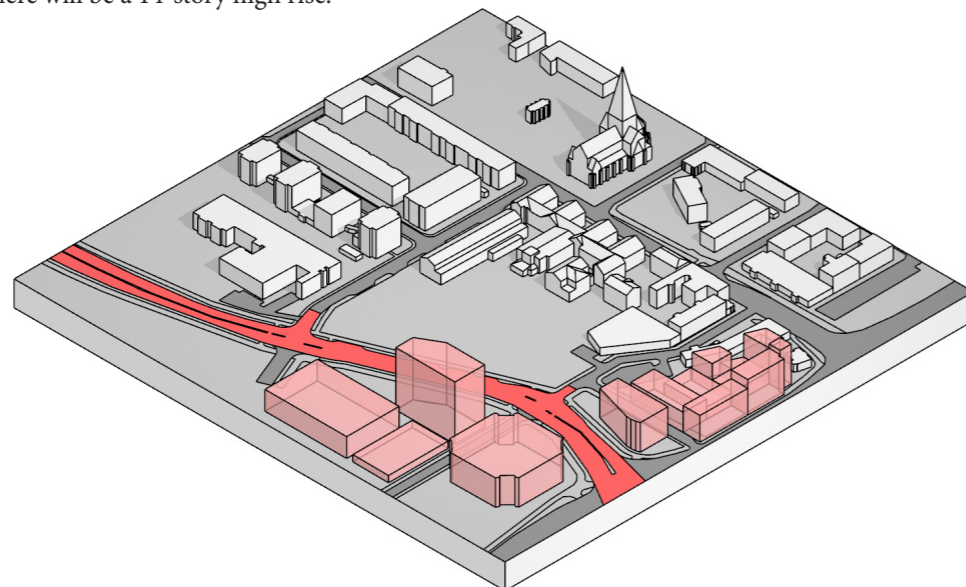
(A) **The Current buildings on the site;** we want to conform with the scale of the current buildings on the site.



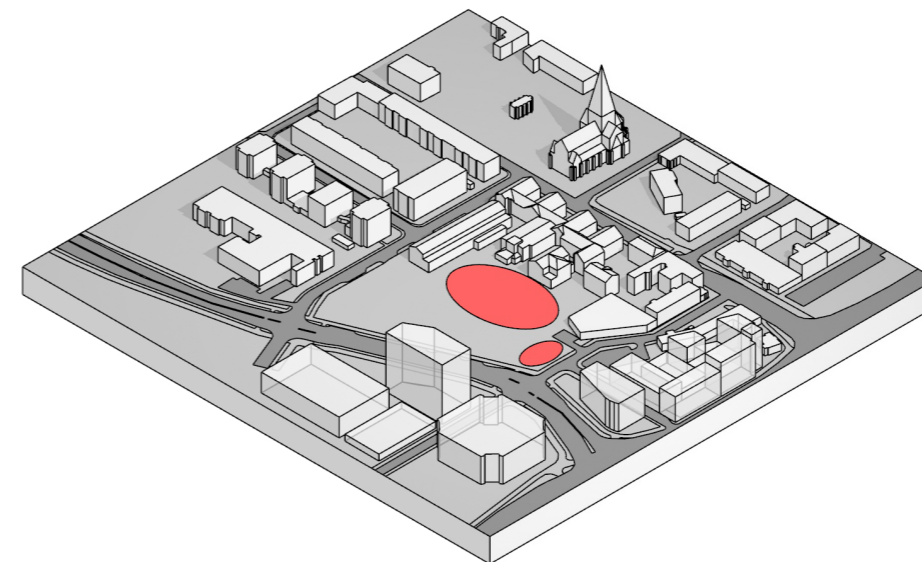
(B) **The direction of the city center, the university hospital and the central station;** with all things considered, it stands to reason that the major flows towards the site will be from the south.



(C) **The future vision of Östra Bangatan;** there are plans for new development surrounding the site. In a future perspective, the scale will be bigger and more urban. Östra Bangatan will evolve into a boulevard and on the opposite side of the street there will be a 14-story high rise.



(D) **A park and plaza;** we identified a need for a calm green area sheltered from the big road. A plaza to the south can host an entrance and contrasts to the future 14-story high rise.



THE EVOLUTION

SOLID - DAYLIGHT - BREAK LOSE - ALIGN

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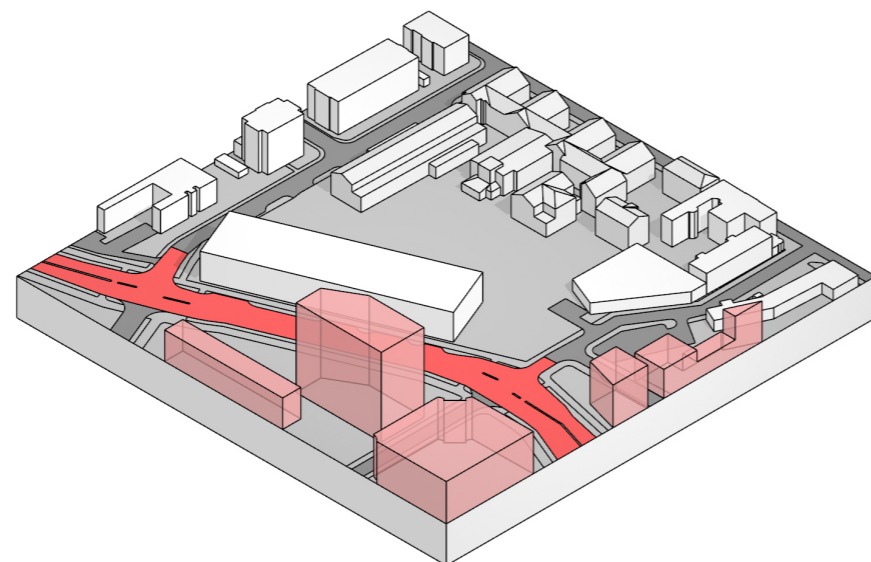
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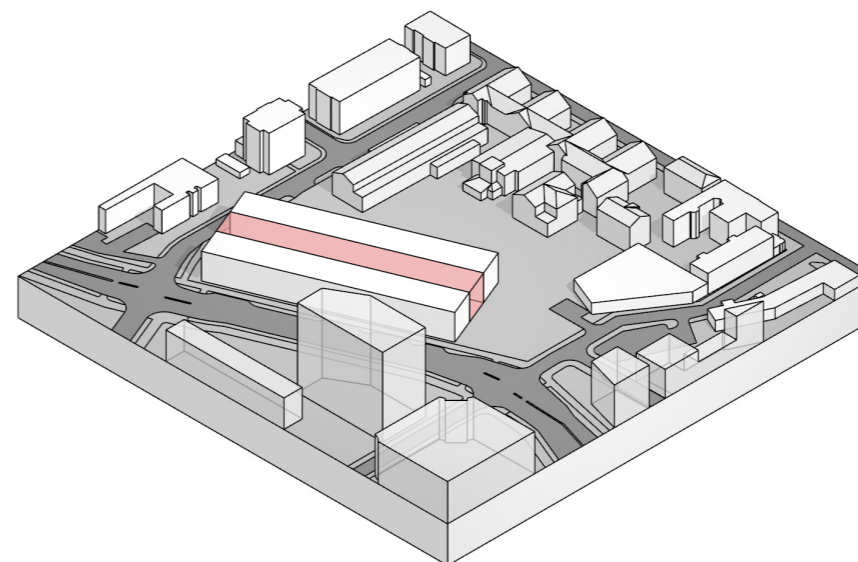
SECTIONS

The building is the synthesis of our understanding of the commission and the context.

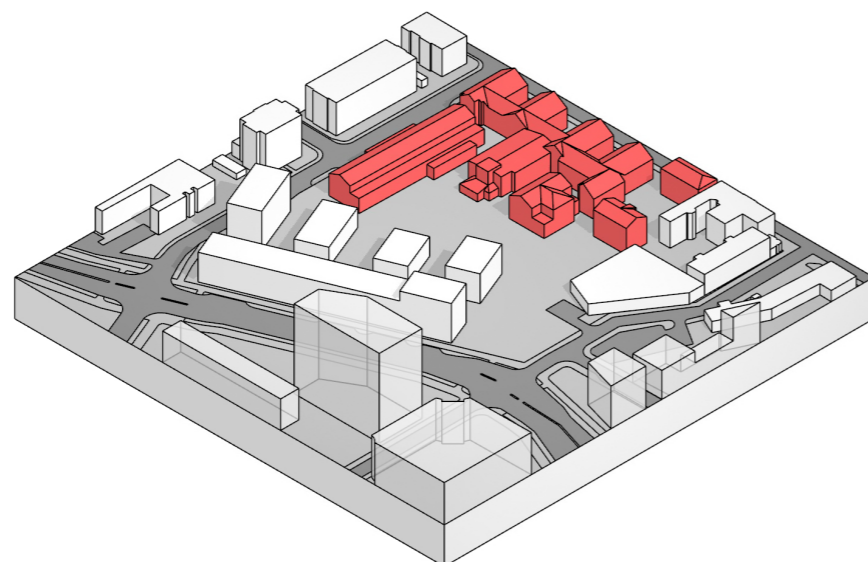
(A) We started with a solid body of an approximate volume along Östra Bangatan. Conforming to the new boulevard while also creating a calm side towards Olaus Petri.



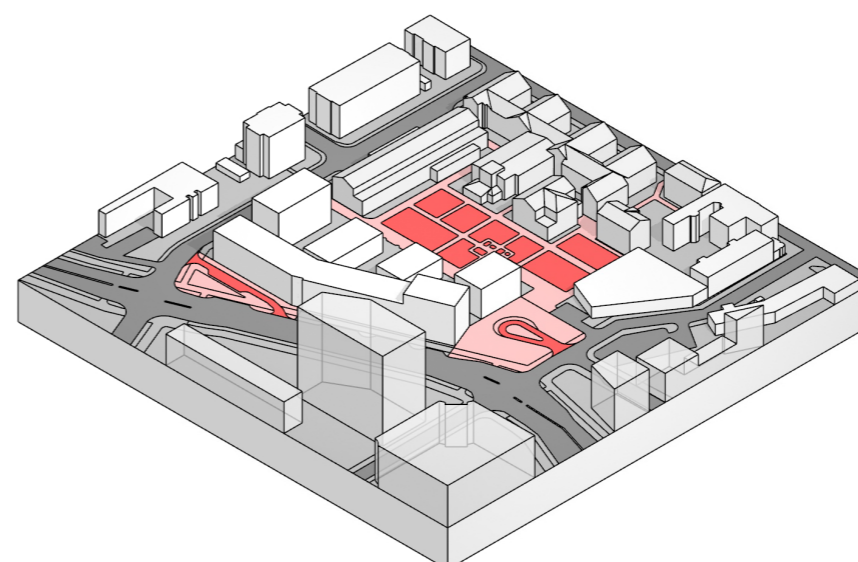
(B) To make the volume less massive and to get some sunlight in to the building we split it in two along a north to south axis.



(C) We break down the inner volume and scale it down to meet the current buildings on the site.



(D) Finally, we align the volumes with the context and define the surrounding spaces.



THE FORM

COMMISSION & CONTEXT IN FORM

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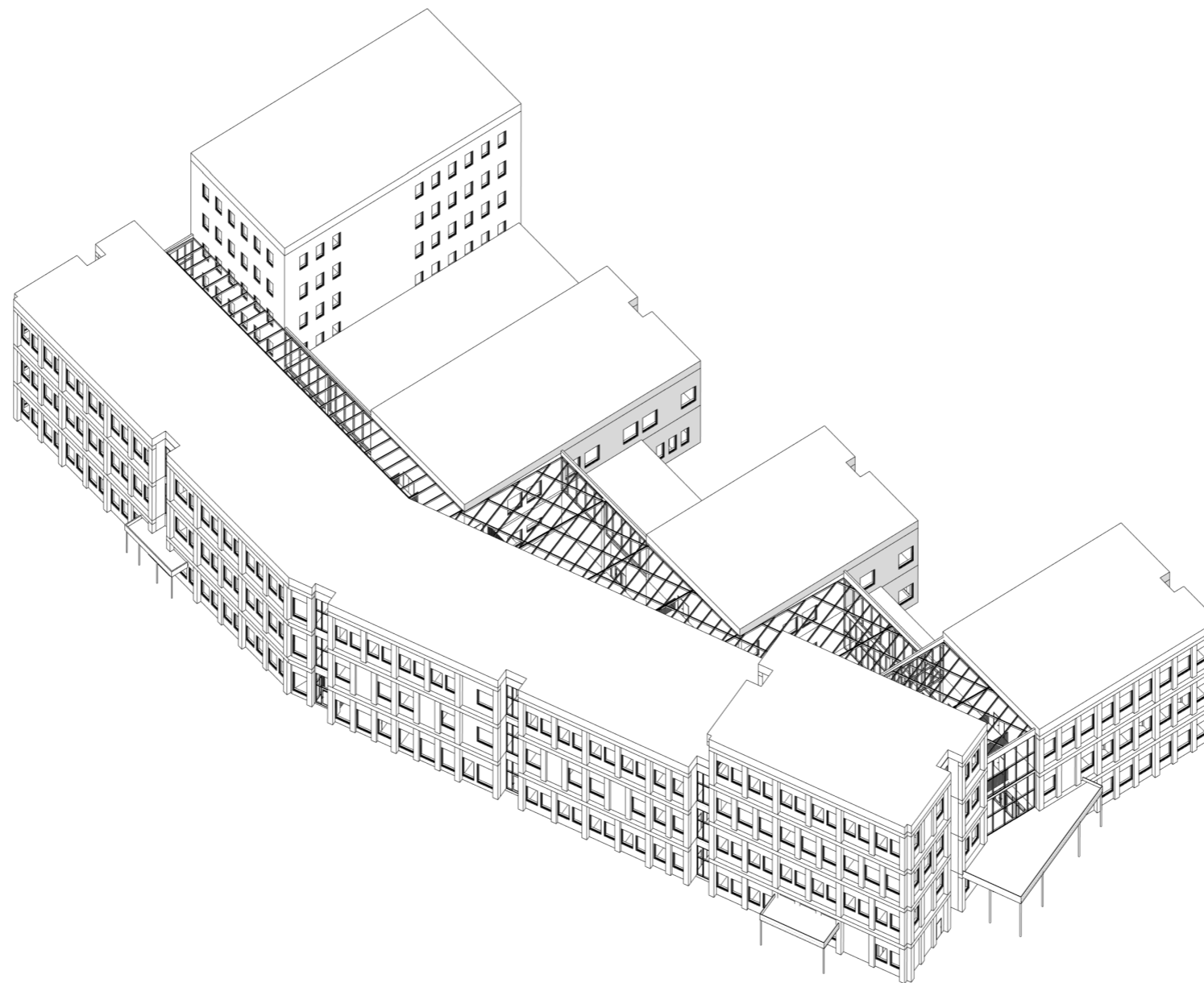
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The final volume consists of a complex with a central main building along the street with wings extending toward the park. The fourth wing, in the north, houses the municipality offices and the northern part of the main building houses the dentist.

The house volumes are strictly based on a grid, this is to maximize the flexibility in the parts of the building that have the most requirements of functionality.

Where the two building typologies meet is where the public space is situated. Here we allowed ourselves to work with a greater freedom of form, focusing on the visitor experience and spatial qualities, tackling the sharper angles that arose when we aligned the volumes to multiple sources.

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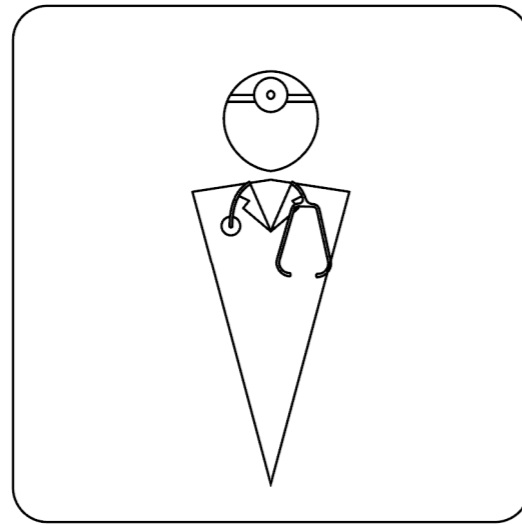
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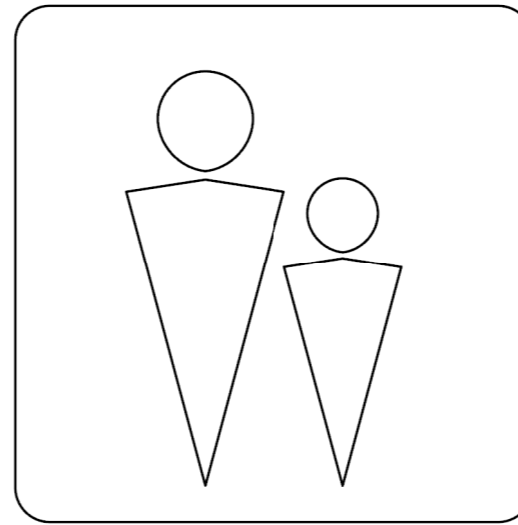
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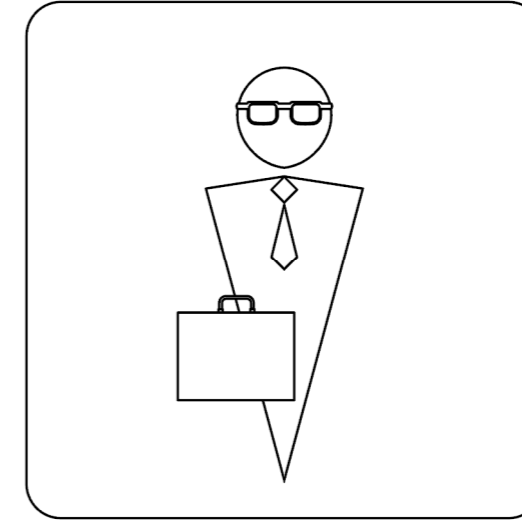
SECTIONS



Support the functions and the workplace environment for the healthcare without compromise.
Efficient layouts and flows.



Provide a welcoming and positive environment for visitors and make it inclusive for all people.
Make a building that is easy to understand.



Make the building flexible and easily adaptable and uses proven building techniques. The project should relate to its context.

The working environment and the functionality of healthcare is given the top priority in this project. The needs of the visitors are to be accommodated if they fulfill the criteria's of: not interfering with core functions of the facility, are based on evidence and/or best practice. In an inpatient facility the inpatients would be given an equal priority as the staff based on efficiency and cost effectiveness.

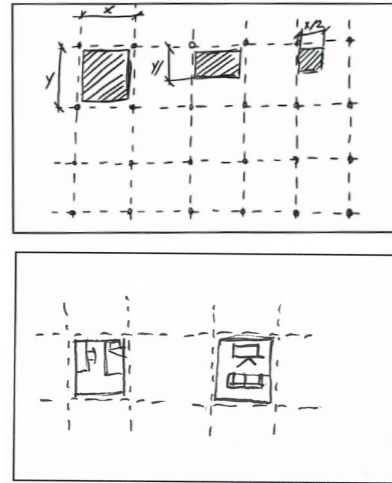
In this specific case all resources for the project comes from taxpayer money and there is a responsibility to the residents of Örebro to use these resources in the best way possible.

We worked from the conviction that it's is not what we as architects want but what the staff, the patient and the city of Örebro needs that is our touchstone.

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THE CONCEPT

HOW TO ACHIEVE THE VISION



The usage of generic rooms and repetitions in the structure makes the building easy to understand and gives greater efficiency of the spaces. Designing generic rooms to fit into larger modules with fixed dimensions and the ability to put those modules into repeating patterns gives us a powerful tool to design a cost efficient and practical healthcare building.



To avoid conflicts of interest between the need of functionality for the staff and the need for a pleasant environment for the visitors, these spaces will be separated. Spaces for people preferably close to nature while also being as close to the rational healthcare functions as possible.



To bridge the difference in age and style between the new and older parts of the project site we gradually break down the building from Östra bangatan towards Storgatan

THE MODULES

STRENGTH OF WORKING WITH MODULES

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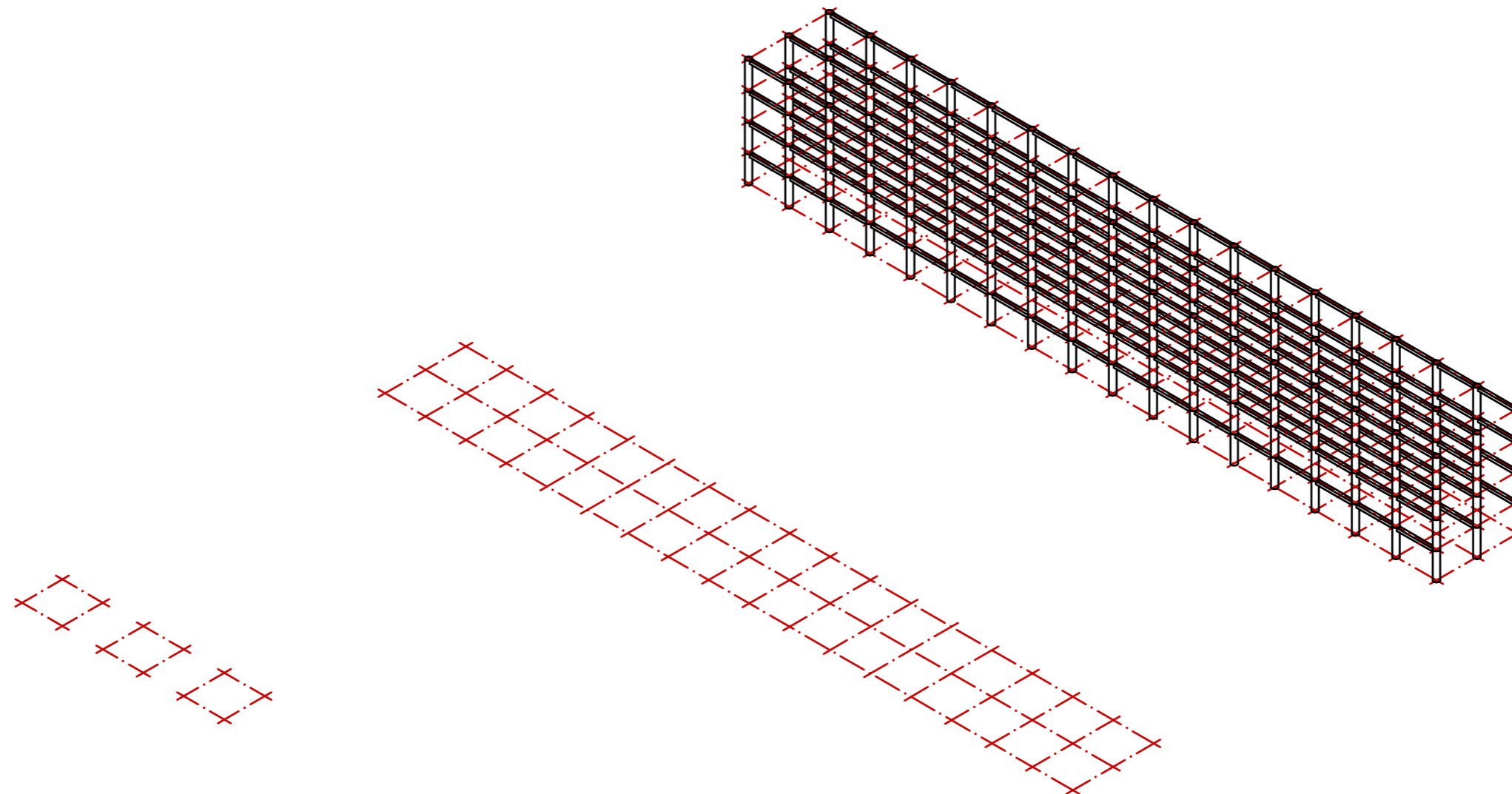
EMERGENCY

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SECTIONS



The idea was that the understanding of how a health center works would come together in workstations, furniture and equipment, all arranged into rooms. The rooms come together into modules, modules into departments and departments into structures. This gives tremendous flexibility in the layout, allowing us to swap modules around as needed. We would like to state here that the layouts presented in this project should not be viewed as something static, but rather as a dynamic arrangement that we have worked with, arranging the modules in the best of our knowledge while still allowing for a high degree of flexibility in rearranging them to fit the end users needs.

To be able to mirror and rotate modules we work with a grid that has perfectly square cells. The grid also works as the basis of the construction since we work with a post and lintel load bearing system, placing pillars in every intersection of the grid.

To counteract shearing the walls surrounding the elevators are load bearing. No other walls need to be in fixed locations and no consideration for this is needed when remodeling the floor plans.

THE MODULES

7,5 X 7,5 METERS

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The size of the modules were given by working from the inside out and from the small scale to the big picture. This allowed us to detail how the staff work and the functionality of the working environment while still maintaining consistency with the big picture.

A module size of 7.5 x 7.5 meters allows for all of the functions and rooms to fit while also being dividable with 2, 3, 5 and 6 in whole centimeters.

With a few examples of working generic modules they can be put together into functional departments. Further work can then be based on the number of modules that each department needs.

CALCULATING SPACES

USING THE AMOUNT OF STAFF/PATIENT & STAFF/MODULE

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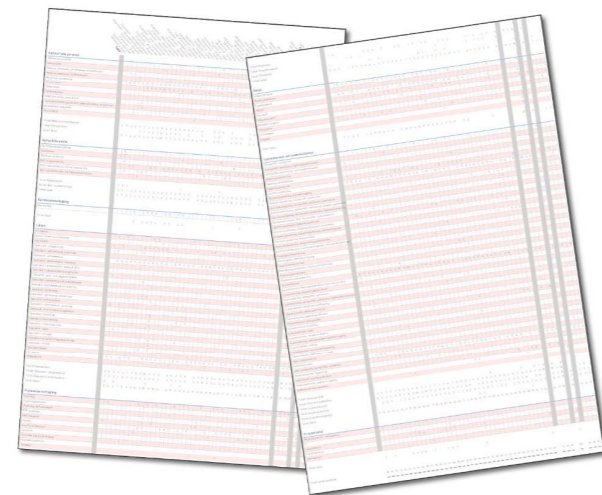
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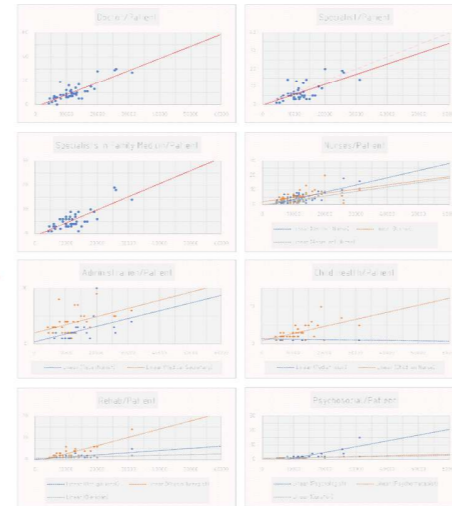
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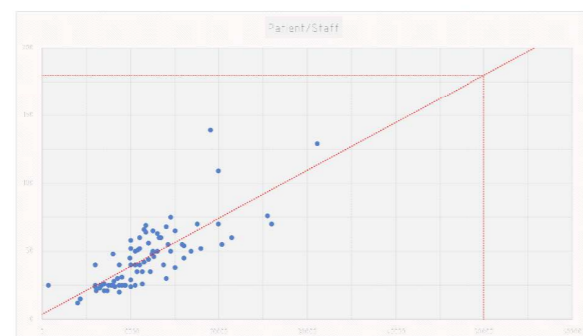
Staff Distribution Statistics from 50 Health Centers



Forecast of Staff Divided by Occupation



Staff Divided by Occupation



Forecast of Staff (Total) per Patient



Approximate Number of Staff (Total)

To find the number of modules we need we have to find the number of staff for the different departments.

Data from 50 different health care centers, detailing the number of staff and their occupations, is used to make scatter plots and trend calculations to forecast the amount of staff required to handle 50 000 listed patients. The imaging-, internal medicine- and the psychosocial departments lacks enough conclusive data so in these cases we used the information given to us from the stakeholders.

To estimate the size of the dentist, we have calculated that a dentist uses two rooms at a time and usually a hygienist uses one room which gives about 10 dentists and 10 dental hygienists for 32 rooms. We assume that they work in two shifts which double the number of dentists per room. A comparison with other newly built Folkandvården dentists (Solna Centrum, Södra Torget Borås and Angered) in regard to staff per exam room the same numbers appear. Based on a report about facility usage in Borlänge the department gets approximately 120 square meters per dentist for a total of 2000 square meters.

CONNECTING THE DOTS

PUTTING IT ALL TOGETHER

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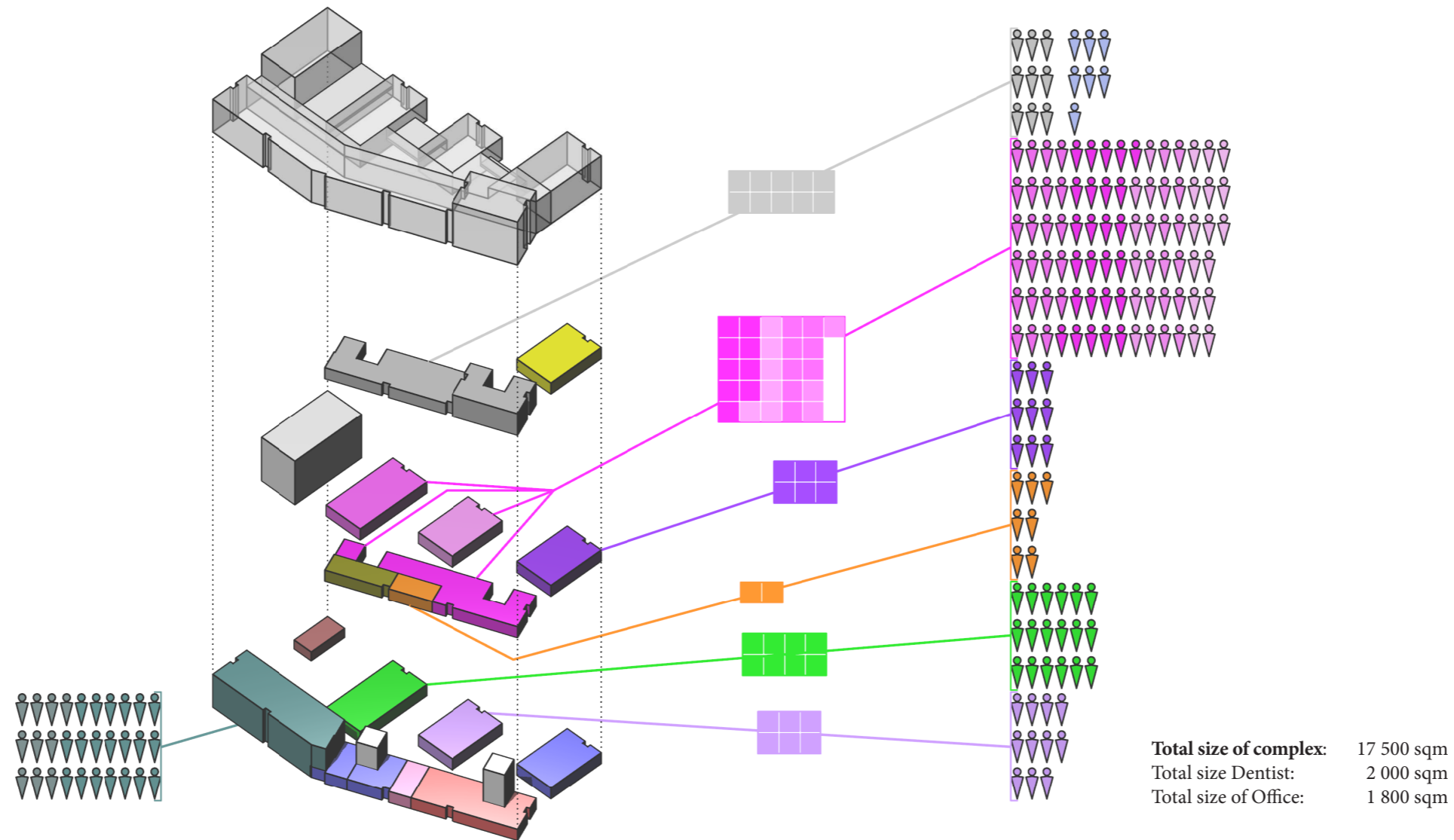
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Staff is translated into modules and creates different parts of the building.

When converting the number of staff into the number of modules, we devised a method to gather the information into a table that allowed for varying “quality” of data. We can then base our calculations on the highest quality data at our disposal and it allows for cross-referencing entries with multiple sources for validation.

Having the number of modules for each department it is just a question of arranging them into functional units and arranging the units to a building.

The physical location of departments and specific functions is decided by their need for co-operation and special requirements, as in the case of the imaging department needing to be in the facade. These needs and requirements are sorted out with a diagram of desired connections.

We also had an opportunity to find a new purpose for the old Olaus Petri health care center. Because of limitations in its construction, only a few types of functions could be placed here. After consideration we decided to place the psychosocial department, the family- and elderly center here.

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The plaza is a visual marker for the main entrance and works as a contrast to the planned 45 meter office building on the other side of the boulevard. It is easily accessible by vehicles to help people with disabilities.

The old healthcare building is reused for the psychosocial department, family central and the elderly central.

All three have good use for their proximity to the park and the psychosocial department can have an entirely separate entrance.

In the park the elderly can stroll around and sit in the sun. There are visual connections into the waiting spaces and all bottom floor departments has direct access. There is an outdoor gym for when the weather is nice.

The site is made up of mainly three parts: the main building complex, the park and then the original buildings on the site. The original buildings varies greatly in age, style and form and consists of the old healthcare center of Olaus Petri, senior housing along Storgatan and administration.

The main complex has a large body along Östra Bangatan and breaks down in form and scale towards the original buildings on the site. The park acts as a boundary between the old and the new and offers a calm and green space for relaxation and some activities.

The main complex is separated with a courtyard covered with a glass roof. The main building is oriented north to south and it is higher than the roof of the courtyard so that it is naturally protected from overheating during the afternoons.

Future expansion without interfering with the park would be achieved by replacing the old healthcare building. Any kind of expansion is easily connected to the rest of the complex thanks to the grid system and that all corridors ends in the facade.

ILLUSTRATION OF ENTRANCE & PLAZA



INTERNAL COMMUNICATIONS

GOODS, STAFF & VISITORS

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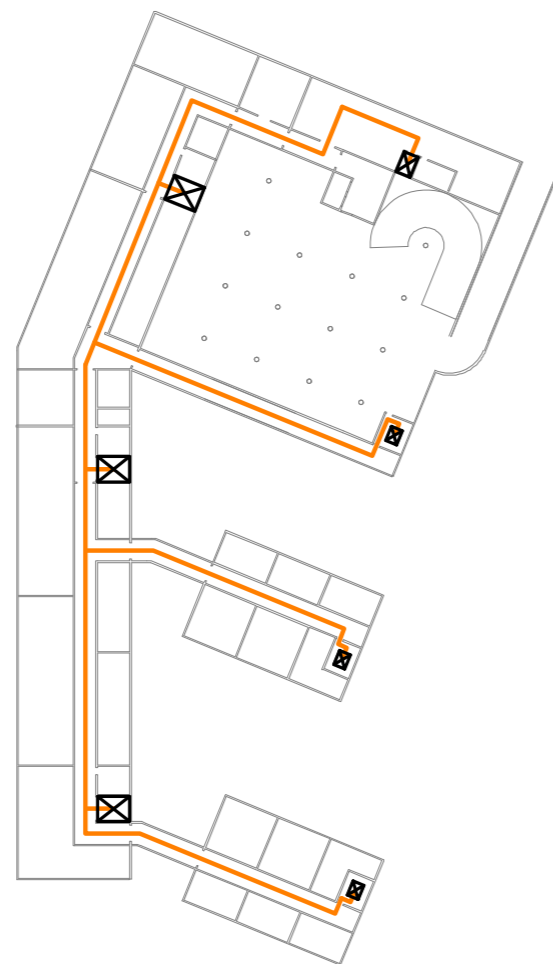
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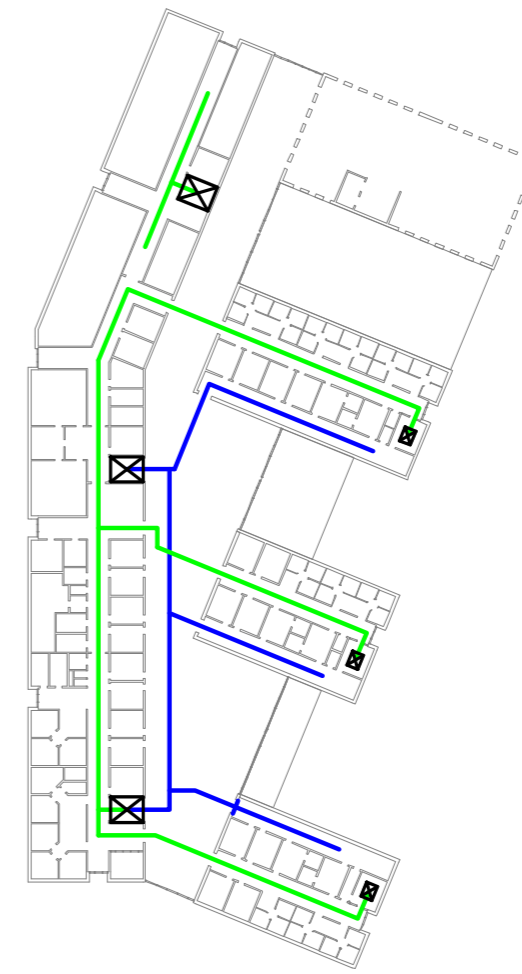
SECTIONS



Basement: Goods distribuion.



1st Floor: Entrances and services makes for more visitor flows.



2nd Floor: Clinics and mostly staff flows.



Goods enter and exit from Ribbingsgatan in the north and the goods department is located on the entrance floor and basement in the municipal office building. Goods is further distributed by a corridor network in the basement to the different healthcare departments.

The visitors and staff are mostly separated so that the staff has its own corridors and work spaces and visitors move and access functions from the central public areas and corridors that branch out from there.

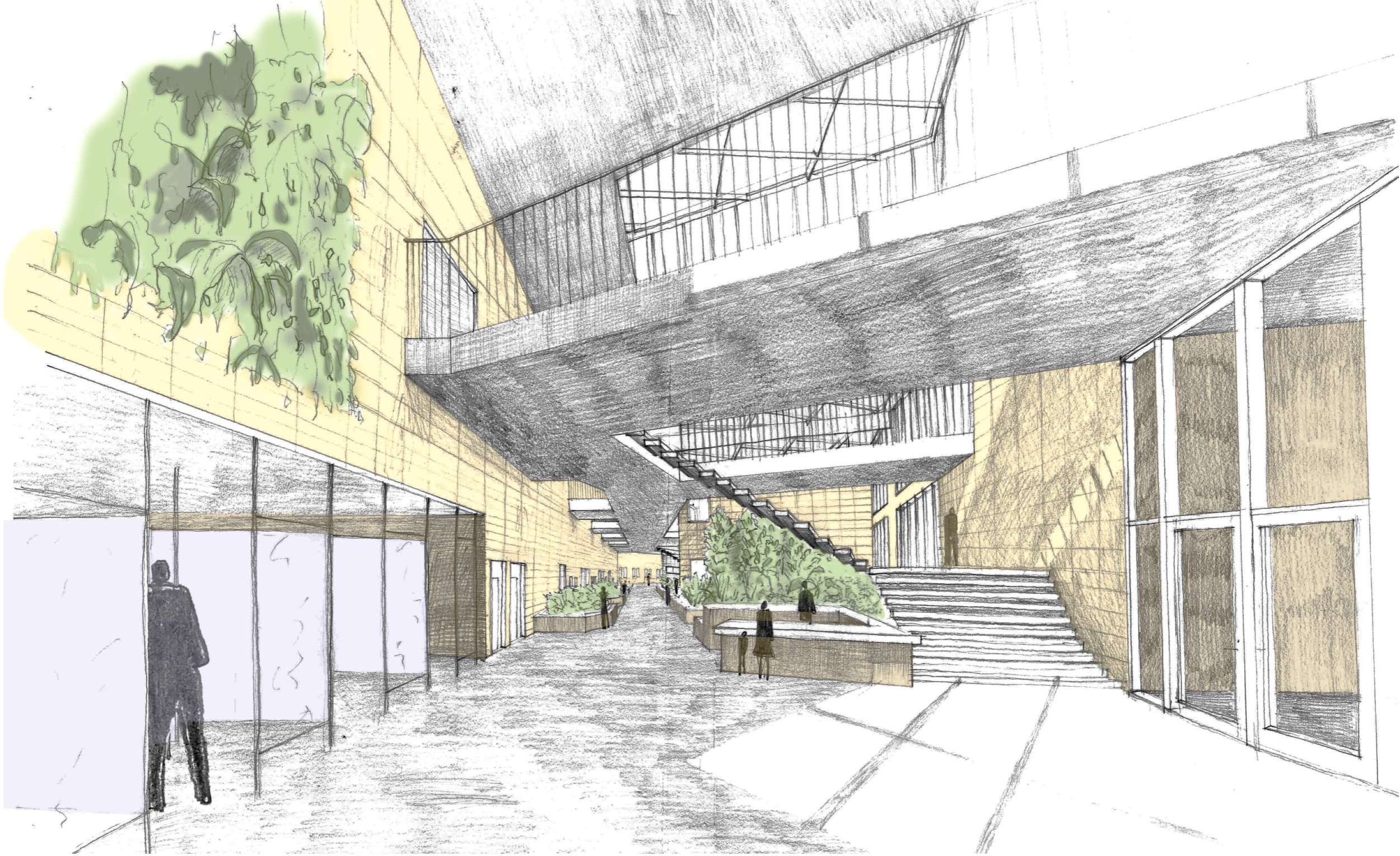
The central building has three main vertical access points and the tip of each wing has its own access point. The office building is working as its own separate building and has a central access point that serves the office floors there.

The dentist part of the main building owns the topmost of the vertical access points.

Entrance to garage is via a ramp to Ribbingsgatan in the north.

ILLUSTRATION OF FIRST FLOOR PUBLIC AREA

COMING IN FROM THE MAIN ENTRANCE



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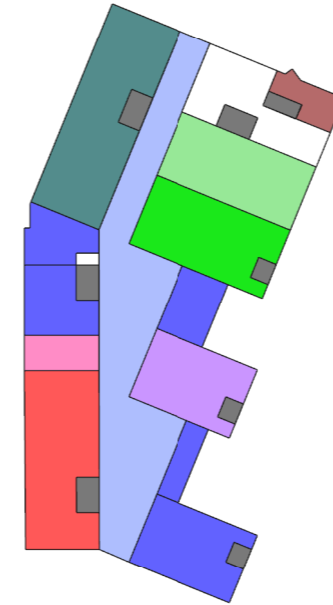
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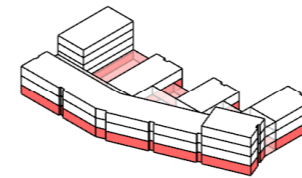
SECTIONS

FIRST FLOOR

LAYOUT & DEPARTMENTS



- Emergency
- Internal Medicin
- Childrens Health
- Rehabilitation
- Gym
- Vertical Communication
- Pharmacy/Cultur Scene
Cafe/Library/Restaurant
- Dentist
- Office
- Goods



Total floor size (excl. office):	4 900 sqm
Public Spaces:	1 100 sqm
Services:	1 000 sqm
Emergency:	550 sqm
Rehab + Gym:	900 sqm
Childrens Health:	350 sqm
Internal Medicin:	120 sqm
Dentist:	700 sqm

The public space is divided in two areas, themed as the forest and the ocean for easy visual identification. The forest is filled with green trees and plants and in the ocean, instead of vegetation, there is water flowing on rocks and aquatic plants.

At the main entrance and next to the forest area is the emergency.

Beside public functions such as a pharmacy, café and restaurant, the children health- and the rehabilitation departments are also located on the ground floor, the reason being that baby strollers and crutches don't work well with stairs.

The library and the culture scene is placed between the building wings towards the park, working as a threshold between the outer and the inner spaces. Since there are no aspects of privacy to consider when it comes to the culture scene or the library, they both have glass walls, turning them into transparent dividers between the park and the public areas, allowing for a closer connection between the indoors and the outdoors.

In the southern most building wing is a fully equipped public restaurant with almost 100 seats and an open-air section with approximately 40 seats.

Between the rehab department and the municipality office there is a public gym that co-operates closely with the rehab.

EMERGENCY

LAYOUT & PATIENT FLOW

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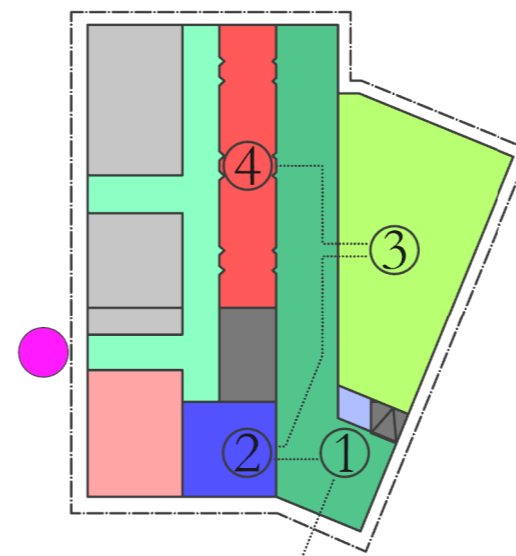
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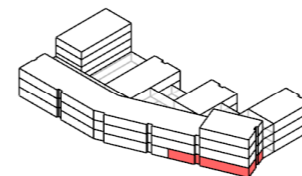
PRIMARY CARE

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SECTIONS



- Information Desk
- Reception
- Waiting Area
- Exam Room
- Patient Flow
- Vertical Communication
- Staff Flow
- Administration
- Infection
- Ambulance



We wanted the visitors to get sense of security and immediately feel that they are taken care of when they enter the building, therefore the first thing they see is a general information desk (1) where they're greeted by a host/hostess, helping them with directions and general information. Here, the patients self check in and get a que number for the emergency reception. The possibility to also handle this digitally would be preferable, but considering those who handle new technology poorly, the human to human interaction is important.

Afterwards they meet with a receptionist in private (2) and describe the reason of their visit, this is the first stage of the triage.

The visitor goes to the waiting area (3) until either further triage or treatment. The waiting area is designed so that no visitors face each other and with an abundance of visual stimuli for positive distraction. We believe that with future advancement of mobile technology the way that we wait will change. Appointment times and places might get updated in real time, similar to the way trains work with departures and tracks. Therefore we have used the way people wait in train stations as an analogy and have designed our waiting areas as such.

The treatment rooms (4) are generic and the doctors and patients are assigned to any room that is available.

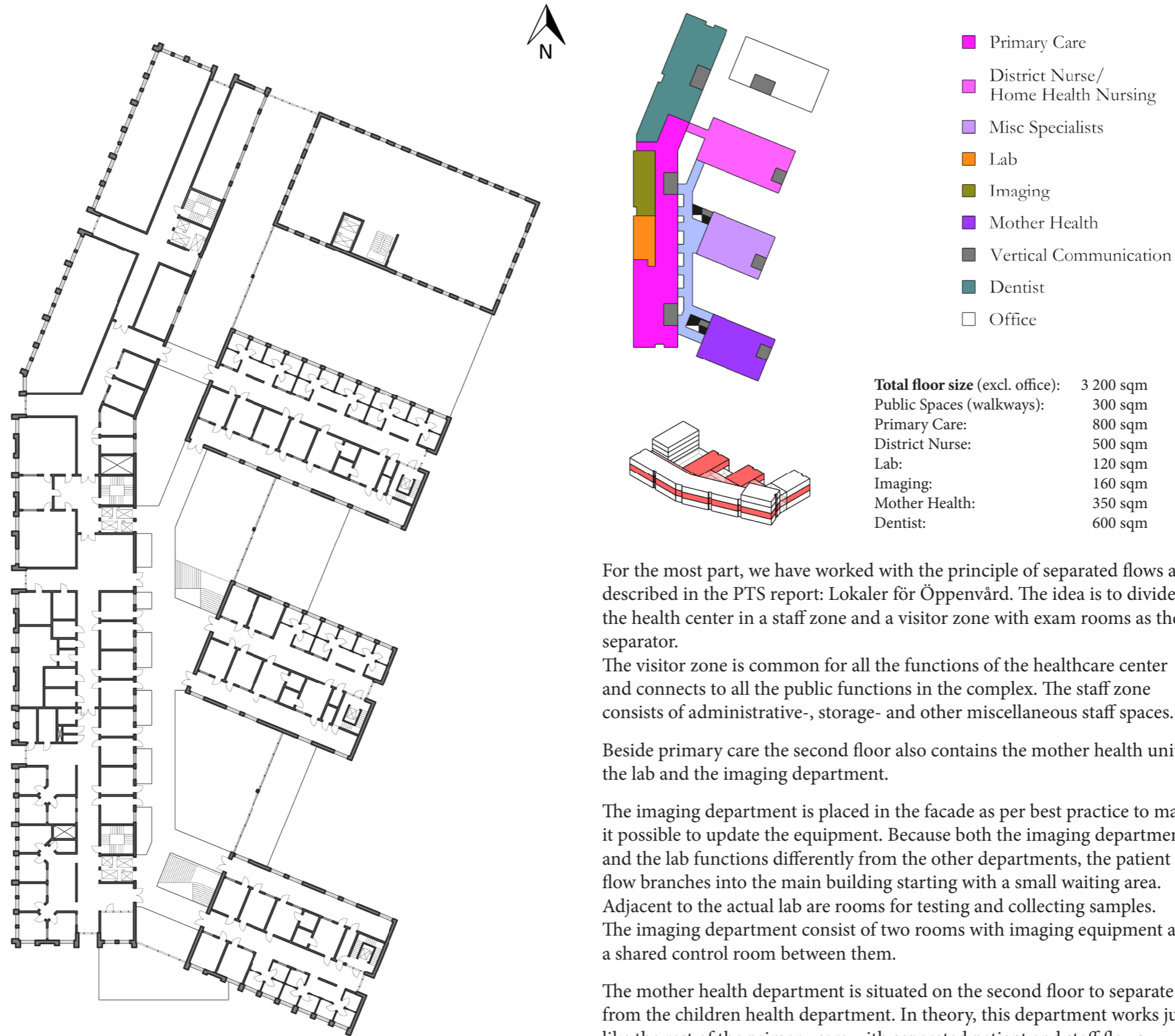
The infection unit has a separate entrance and two isolated treatment rooms. The unit is in contact with the reception and allows the receptionists to communicate with patients without risk of getting infected.

The ambulance has a pickup point is just outside the building along Östra Bangatan.

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SECOND FLOOR

LAYOUT & DEPARTMENTS



For the most part, we have worked with the principle of separated flows as described in the PTS report: Lokaler för Öppenvård. The idea is to divide the health center in a staff zone and a visitor zone with exam rooms as the separator.

The visitor zone is common for all the functions of the healthcare center and connects to all the public functions in the complex. The staff zone consists of administrative-, storage- and other miscellaneous staff spaces.

Beside primary care the second floor also contains the mother health unit, the lab and the imaging department.

The imaging department is placed in the facade as per best practice to make it possible to update the equipment. Because both the imaging department and the lab functions differently from the other departments, the patient flow branches into the main building starting with a small waiting area. Adjacent to the actual lab are rooms for testing and collecting samples. The imaging department consist of two rooms with imaging equipment and a shared control room between them.

The mother health department is situated on the second floor to separate it from the children health department. In theory, this department works just like the rest of the primary care with separated patient and staff flows.

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PRIMARY CARE

LAYOUT & PATIENT FLOW



The doctors for the primary care Karla, Mikaeli, Varberga and Olaus Petri have an estimate of 212 patients per day. If there are 26 specialists and they spend 40% of their workdays with examination of patients (PTS 2015) we can calculate that every patient gets roughly 20 minutes exam time, followed by approximately 20 minutes of patient related administrative work for the specialist.

$$\frac{(\text{specialists} \times \text{work hours}) \times 0.4}{\text{total patients}} \times 60 \text{ minutes} \approx 20 \text{ minutes per patient}$$

Working with general rooms, where no specialist has their own personal exam rooms, and administrative work is done in offices shared with two other colleagues, we can devise a schedule where each exam room goes through 18 cycles of 20 minutes examination followed by 10 minutes preparation over the course of nine hours. Using this method, we can calculate that we would need 6 modules of exam rooms and 3 modules for administration to handle that number of patients, giving us a total of 9 modules.

$$\text{total patients/cycles} \approx 12 \text{ exam rooms}$$

Comparing this with a more traditional setup where each specialist has a personal exam room, where we would need 13 modules of exam rooms for the 26 specialists, we save almost 30% space.

BASEMENT, THIRD FLOOR & FOURTH FLOOR

THE COMMISSION

THE CONTEXT

THE EVOLUTION

THE FORM

THE VISION

THE CONCEPT

THE MODULES

CALCULATING SPACE

CONNECTING THE DOTS

SITE PLAN

INTERNAL COMMUNICATIONS

FIRST FLOOR

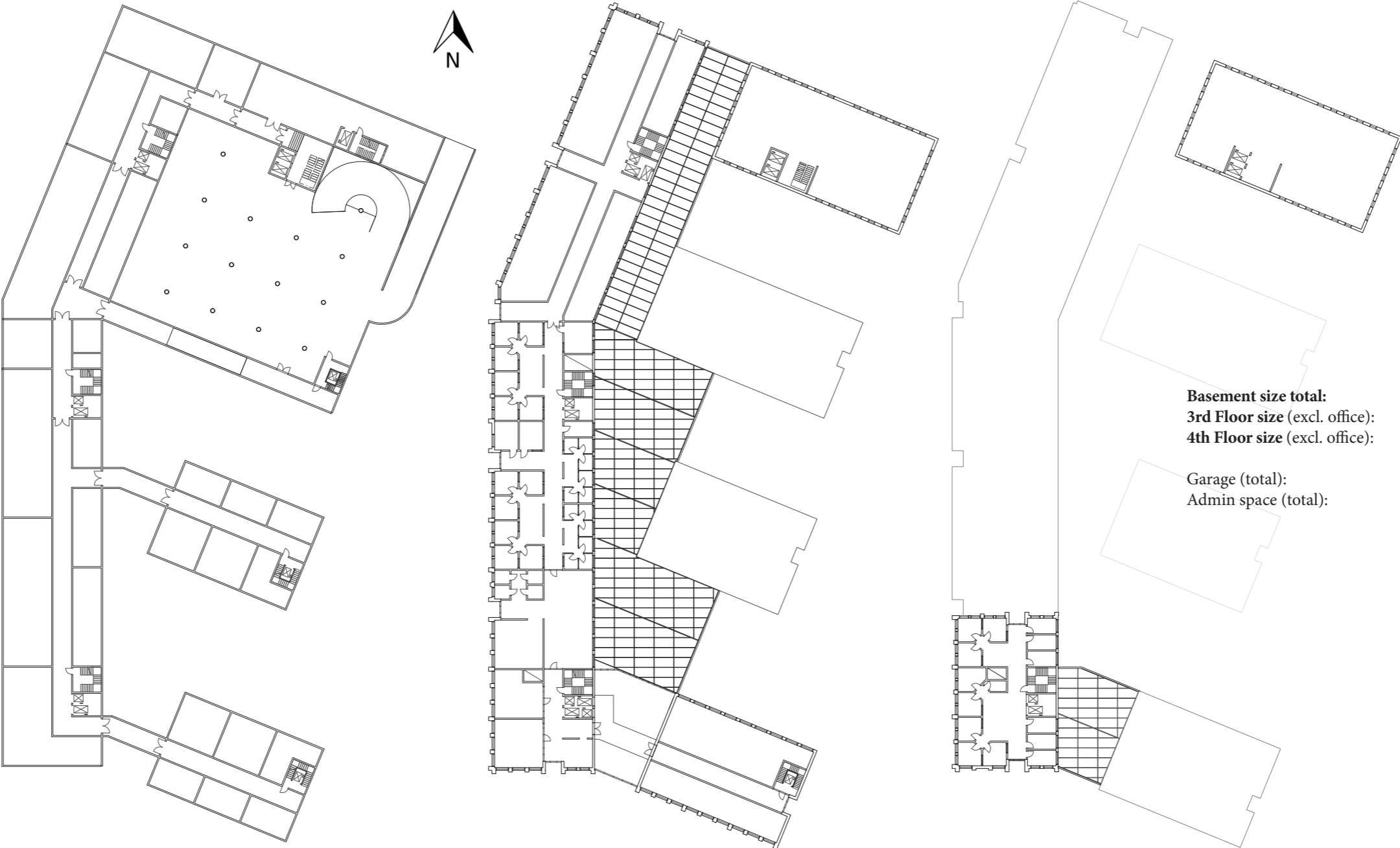
EMERGENCY

SECOND FLOOR

PRIMARY CARE

BASEMENT, THIRD FLOOR & FOURTH FLOOR

SECTIONS



Basement size total:	5 000 sqm
3rd Floor size (excl. office):	300 sqm
4th Floor size (excl. office):	2 200 sqm
Garage (total):	2 000 sqm
Admin space (total):	1 300 sqm

Basement.
Technical installations, goods and staff changing rooms.

3rd Floor, administrative floor.
Lunch room, medical secretaries and meeting rooms.

4th Floor, administrative floor.
Offices.

The basement consists of two parts. One main basement floor for technical installations, changing areas for staff and a communication network for staff and goods flows. The other part is the parking garage, only for the staff since the area is inside what is considered to be the central town and visitor parking is referred to designated city parking facilities.

The third and fourth floors consists of general administrative areas and meeting rooms. The third floor has the main lunch room and kitchen. The wing towards the plaza has a third floor to give the plaza and entrance a more consistent frame. This extra floor houses the educational facilities.

SECTIONS

THE COMMISSION

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FIRST FLOOR

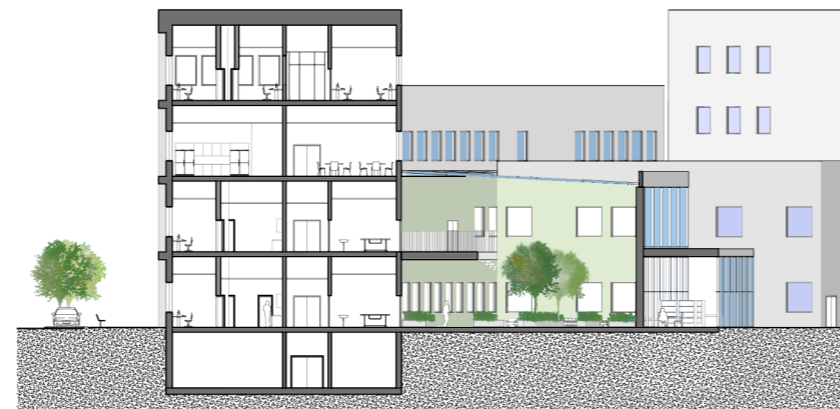
EMERGENCY

SECOND FLOOR

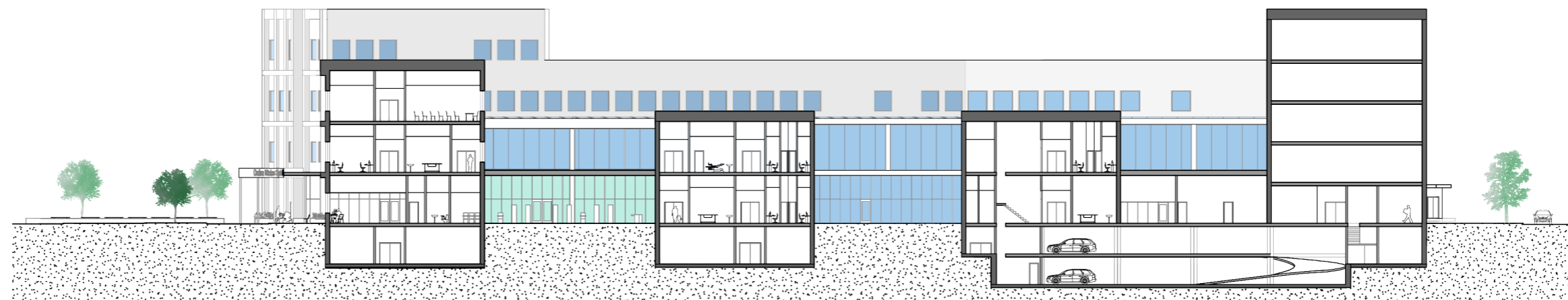
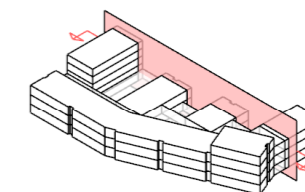
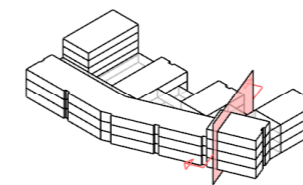
PRIMARY CARE

BASEMENT, THIRD FLOOR &
FOURTH FLOOR

SECTIONS



Section West to East showing main building and the public space.



Section South to North showing the distribution of the wings and parking in basement.

The illustrated sections show the relations between the different parts of the building complex and its surroundings. In general, there is a 5 meter floor to floor height with internal ceilings that allow for technical installations.

The top section cuts through the main building from west to east and shows part of the boulevard and how this relates to the urban style part of the healthcare center. It then cuts through the public space with the forest theme where the elevated walkway is seen with the waiting area beneath.

The lower section cuts through the three wings of the healthcare center and, to the right, the municipality offices. It cuts from south to north and the background shows the silhouette of the main building.

The healthcare building has its tallest part toward the plaza and defines a setting for the main entrance.

The basements have a general floor to floor height of 4 meters with the exception of the garage, which has a floor to floor height of 3 meters.

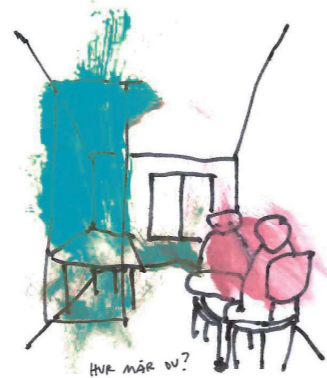
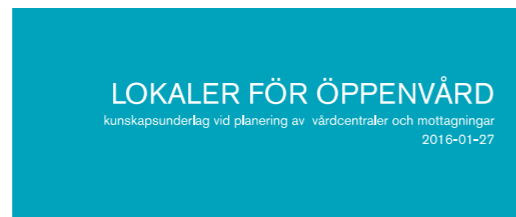
EVIDENCE BASED DESIGN

THEME 1

Our project is using evidence based design in every part we can. All our decisions are based on the best information we could find.

Some examples are:

-Finding out the sizes and distribution of the departments by looking at other healthcare providers and collecting data to be able to extrapolate the information into our project.



-Reading through reports and documents from different sources such as the PTS or policy documents from VGR and applying knowledge and research when designing the modules.

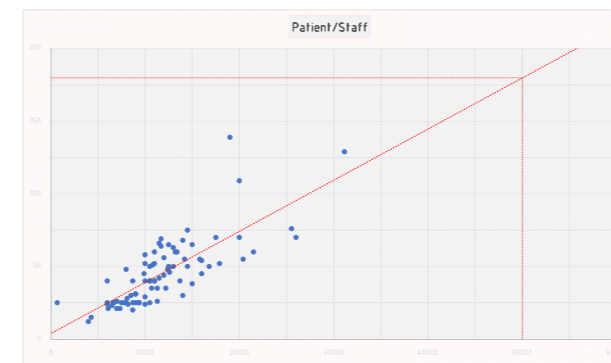


Diagram and sheets of data to calculate departments.

-Using personal contacts from the practices to learn how different departments operate. This has been used for the departments of psychosocial, rehab, and dentist.

HEALTHCARE + ARCHITECTURE

THEME 2

As the project site is filled with several generations of older buildings for healthcare we needed to conform our project in some way to consider them. At the same time the city center of Örebro is expanding past our site with a modern and urban landscape. We tackle both of these challenges and use our proposal as a bridge between the scales and the styles.



The contrast between the old and the new at the project site.



We accommodate both the professional working environment, with the rational buildings where everything needs to function, and the in-between visitor spaces that are spacious and is there only for the comfort of the visitors.



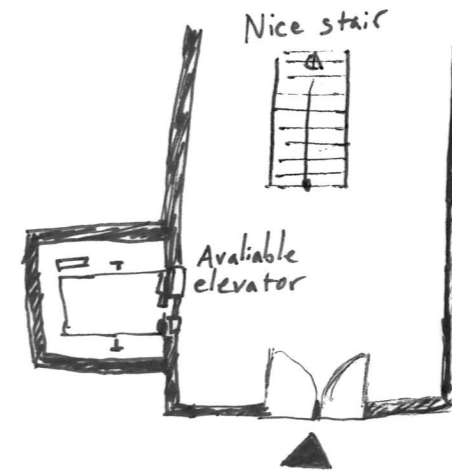
A nice environment for visitors that is separated from the strict functional structure.

HEALTH PROMOTION

THEME 3

The project is filled with health promoting ideas but we avoid pushing outright exercise onto visitors where it might be unwanted. We make stairs and walkways inviting and visible but never try to hide the elevator since that is a disservice to those who needs them.

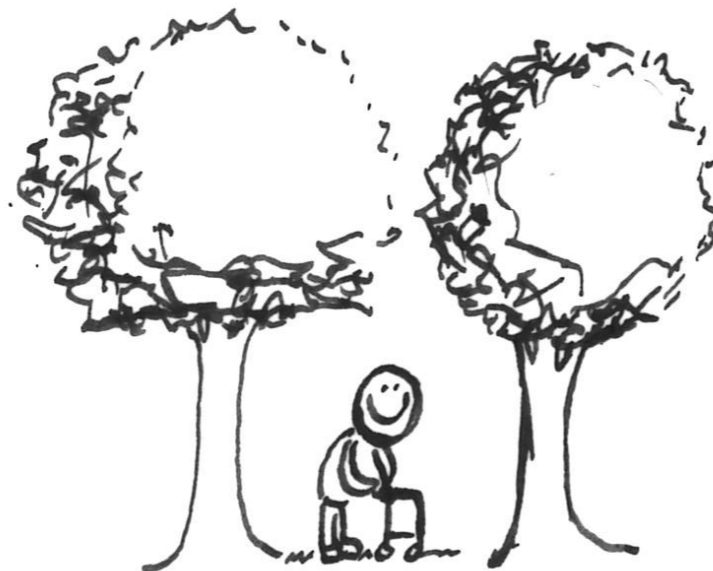
We promote nature throughout the public spaces and promote efficiency and functionality to those who work there.



A person in a wheelchair wants the elevator to be available.



Not everyone is comfortable around other people.



Old people are happy in parks.

We use the space between the old site and our new building for a park and give the department that needs it the most the best access to it.

The children can see and access a playarea in the park from the BVC-department,

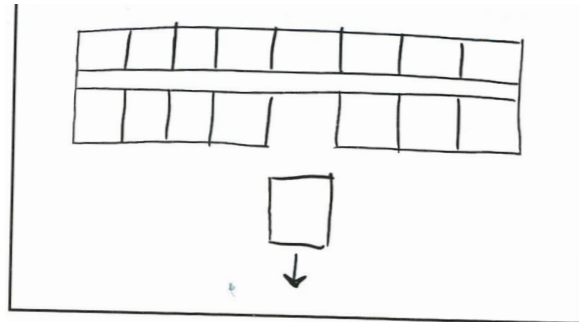
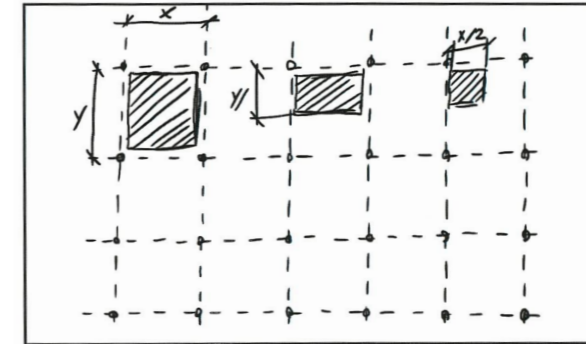
The elderly can stroll around easily or just relax as they want.

Those going to any of the psychosocial departments and maybe feeling anxious or afraid don't have to go through corridors or having to deal with other people, they can use other ways and entrances.

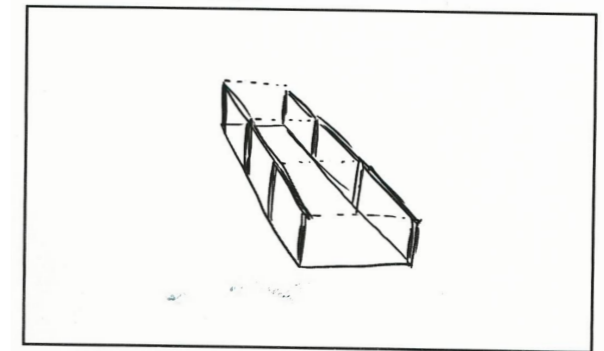
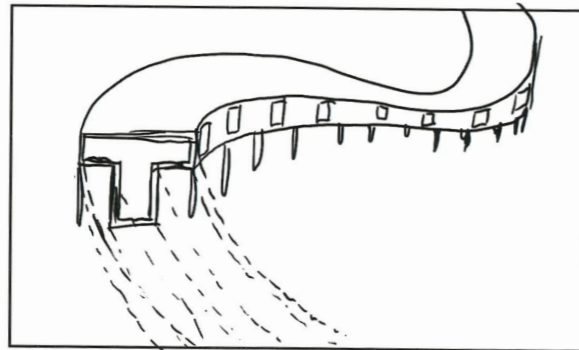
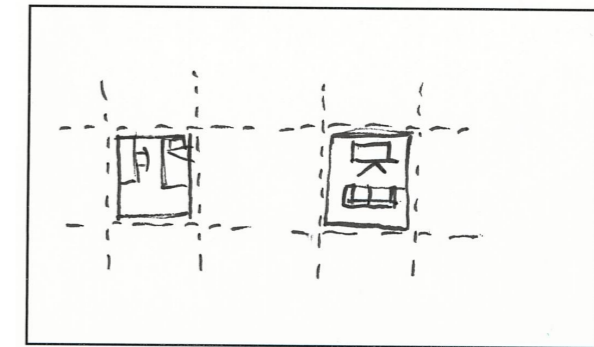
FUTURE PROOFING

THEME 4

The projects core concepts of using grids, modules and generic rooms are some of the things that makes for great future proofing. Most rooms can switch functions or departments without remodeling. When remodeling is necessary any or even all walls can be removed and the distance between the loadbearing pillars is always the same.



Extensions and attachments to the buildings can be done almost anywhere without affecting the functions in the existing building since all corridors access the facades or branch out to the facades in the longer stretches of the buildings.



Sustainability in this case is not to try to be cheap on the environment in the short run but to use materials and practices that are guaranteed and proven to work for a long time. The worst we can do for the environment is to risk the integrity of such a large complex that is so dependent on its functions.

