

# A LUST TO LEARN

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- an exploration of how to create atmospheres contributing to learning  
and mental wellbeing



Sandra Andersson  
Tutor: Lin Tan  
Examinator: Peter Fröst

THANKS TO:

The Dilan och Moa podcast for inspiration to this thesis.

My fellow students in the healthcare studio for always being there with advices, knowledge, warmth, laughter and shoulders to cry on.

Robin for reminding me to have fun.

Lin for encourage and for pushing and me to always be better.

Elke and Saga for great preparation and support.





**CHALMERS**

A LUST TO LEARN

- an exploration of how to create atmospheres contributing to learning and mental wellbeing

Sandra Andersson  
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Architecture and Urban Design  
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2019



# ABSTRACT

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Sweden suffers from a lack of schools where temporary solutions using containers have led to buildings lacking architectural qualities. Still, attending these facilities is compulsory. Research show that many children today feel stressed and suffer from psychosomatic disorders. This is much due to worries about their future in a more specialized labour market. With today's technology knowledge could be gained from anywhere digitally but schools are not about sheer facts. They are a first encounter with society and should therefore form a good frame for this meeting.

This master thesis aims to investigate atmospheres and their effect on our wellbeing to answer the question: How can a school building support mental wellbeing and learning through its design? The goal of this thesis is to design a building children long to go to, with rooms where they can find a lust of learning and sense of meaningfulness. The object for the study is a secondary school in Frihamnen which is an old harbour area in Gothenburg about to be transformed into a dense, mixed-use district. Interviews and literature studies have informed the project on how architecture can impact on our wellbeing. Hand sketches, physical and digital models has been used in the design.

The result is a school complex open to the public but safe for children. The exterior communicates that the buildings host something of importance. It has an open interior where functions are connected to each other allowing and suggesting for the children to use them as they please. Openness to the public invites children to use the facilities also after school hours creating a sense of possessing and being a part of the space.

Drawing a school spans many scales; from the divergence between building dense and giving schools appropriate space, to the texture of the wall finish which you lean your back on while reading. This thesis takes in many aspects that of course could be investigated further but focus has been creating a coherent whole.

Keywords: school, atmosphere, mental wellbeing Frihamnen, learning environments, open to public

AIM:

This master thesis aims to investigate atmospheres and their effect on our wellbeing

RESEARCH QUESTION:

How can a school building support mental wellbeing and learning through its design?

DELIMITATIONS:

The site of this thesis is Frihamnen, an area which detail planning is in an early stage and does not have legal force yet. Assumptions have been made of things not stated in documents available on the homepage of the municipality of Gothenburg

READING INSTRUCTIONS:

The pictures in the background chapter taken on my study trip and are supposed to give an atmosphere to the text but do not have a direct relation to them.

# STUDENT BACKGROUND

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SANDRA ANDERSSON

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Architecture and civil engineering  
Chalmers university of technology  
fall 2013 - spring 2016

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Architecture and Urban Design  
Chalmers University of Technology  
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Sustainable development and the design professions

Material and Detail 1

Architectural competitions

Future visions for healthcare, housing and work 1: Residential healthcare - housing for seniors

Masters thesis preparation course 1

Masters thesis preparation course 2

## EXCHANGE SEMESTER AT UNIVERSITAT POLITÈCNICA DE CATALUNYA

Town planning IV

Architecture and design workshop VII

Inside

## INTERNSHIPS AND WORK

Markgren Arkitektur fall 2016 - spring 2017

Monsén arkitekter fall 2018 - current





Archade at Rue de Rivoli, Paris

# TABLE OF CONTENT

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ABSTRACT	1	
BACKGROUND	7	
Introduction		9
Health among students and teachers		11
Buildings and behavior		13
Today's teaching		15
Nature, space and health		17
REFERENCES	19	
Biblioteca deposit de aigues		20
Xavier Corberó		20
Öregaard gymnasium		21
Glömstaskolan		21
METHOD	23	
Research for design		24
Research by design		25
Concept		27
SITE	29	
Frihamnen		31
Site analysis		33
USER	35	
Program		37
room layout		38
distribution of functions		39
PROCESS	41	
Prerequisites		43
The rooms		44
Composition		46
Volume		48
Vertical communication		49
Facades		51
DESIGN PROPOSAL	55	
Site plan		56
Entrance floor		59
North building		60
Administration		70
Spatial concepts		72
School		75
REFLECTION	93	
LITERATURE	94	
PICTURES	95	



Bibliothèque Sainte-Genève, Paris



“Kanske beror det på att vi inte kan gå tillbaka i tiden, medan vi kan återvända till platsen för en kärlekshistoria, ett brott, en lycklig tid eller ett fatalt beslut; platserna är det som består, det vi kan ta i besittning, det som är odödligt. Platserna blir minnets konkreta landskap, det som formade oss, och på något vis blir även vi till platser. Det är dem vi kan ta i besittning och de som i slutändan gör detsamma med oss.”

- Rebecca Solnit, Gå Vilse. En fälthandbok.

# BACKGROUND



Corner of the Carrer del Carme and Carrer del Dr. Dou, Barcelona

# INTRODUCTION

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I got the idea to this master thesis when listening to a podcast called Dilan och Moa. The hosts talked about how the aesthetics of the indoor environment affects us. They are not architects or designers and their basis was that we should not build ugly environments. One of the hosts talked about her old school where the ceiling was low, had strip lighting, grey walls and a total lack of all living things. It was still expected of her to be there every day and be stimulated to learn.

I wanted to work with atmospheres and materiality but also put it in a social context working with architectures effect on mental wellbeing which is why I chose to focus the secondary school. Here young people in an age group reporting growing numbers of mental illness are forced to spend three years in a specific building. My aim is to design a building which children and teachers long to be in. I want this building to help the students in their studies by being inspiring and stimulating but also a place where they can be present in the moment and rest. Eventhough talking about beautiful and ugly I think the things the podcast pinpointed, such as lack of living things and low ceiling, are very relevant. They can all be related to biophilic design and how important the environment is to our wellbeing. If education and wellbeing of young people is important to society, the architecture of our schools should consolidate this.

According to Forum bygga skola Sweden will need 1000 new schools in 10 years. In the past, the school was built in the middle of the village. Today, school buildings compete for land with housing exploitation with better returns and are often planned to late in the detail planning process (Opinion Bygga Skola, 2018). Daylight and greenery is important for our wellbeing but schoolyards in urban centres gets smaller and darker. The site of this project, Frihamnen, is planned as a very dense area. To fulfill the requirements on free area per child public parkes will be used by the schools on daytime as green space. A problem with this is that the areas get scattered and that shift workers might not have access to green space on their free time. Schools are not used 187 days a year and the rest 178 there closed more than half the day (Opinion Bygga Skola, 2018). In a dense area like Frihamnen is supposed to be this is a waste of resources. Rather than the shared green spaces I have focused on how the indoor spaces can be shared and used moreover the day and year. When living dense you do need green spaces but in our climate a place indoor with enough space, hosting activities where you are not only a customer but also a participant might be as important for our well being.





Top of Montjuïc overlooking the sea and the harbour, Barcelona

# HEALTH AMONG STUDENTS AND TEACHERS

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A report from Folkhälsomyndigheten from 2018 shows that twice as many youths report psychosomatic disorders today as in mid 1980s. Psychosomatic disorders are symptoms of mental illness such as; insomnia, depression, irritation, nervousness, headache and stomach ache. Children feel stressed about their future in a more specialized labour market and a relationship between poor results in school and a higher risk of mental illness can be seen. Numbers showing that 49 % of the girls and 29 % of the boys reports that they feel relatively or very stressed (Folkhälsomyndigheten, 2018).

I interviewed Maja Grafström, a psychologist working at Psykologenheten at Hisingen. Grafström describes a situation in the schools where she works where both children with high and poor results in school suffer from mental illness, either because of high demands on themselves or because they have lost hope of achieving something in their life already and feel no affiliation with the school. She portrays a lack of contact with an adult the youths confide in. Part of the problem is that contact between students and teachers only occur during the lessons. Teachers meet the students seldom and therefore it is hard for them to acknowledge psychosomatic problems. Spaces outside the classroom are divided between adults and children where it is hard for both parts to take a casual contact. An including space where the teacher do not have to step into the childrens space could facilitate the relation between teacher and student.

Taking responsibility for the children's health might be adding a further burden to a stressful situation experienced by many teachers today. 50 percents of the teachers find their workload too heavy or far too heavy. To sort out tasks not related to the teaching and a stronger student health is asked for (Niklas Arevik, 2018). Teachers tend to change workplace often due to how the pay rice system is constructed and dissatisfaction at work (Maja Grafström, personal communication, February 7, 2019).





Reading balcony Biblioteca deposit de aigues

# BUILDINGS AND BEHAVIOR

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The way buildings and rooms are formed guides our behavior. Inge Mette Kirkeby describes this in her book *Skole finder sted* where she defines five different rooms in the school. Among them are the behavior regulating space and space as a conveyor of meaning. Schools are a part of power structure which the behavior regulating space applies to. They way the rooms and furnitures are structured implies how to act in the room. Glazed corridors and visual connections between spaces allows overview for children but are also part of this power structure where the teacher supervises the ongoing activities. In a context of today's approach to education this applies more to safety of the children then to foster them. The space as a conveyor of meaning talks about how the visions and thoughts behind the design bears an importance and shows how the spaces are supposed to be used.

To maintain the school building it is important that the children feel apart of the school and have the opportunity to affect it. As Maja Grafström states; you are more likely to take care of an environment that you have been part of creating, for example through a common garden. Children who feel alienated from the school has a tendency to address their frustration to the physical environment. To be able to use the school building also after teaching hours makes the children feel that they possess the building. A consideration must thou be done between the possibility for the children to use it and safety from people who do not belong to the school to enter. Charlotta Thodelius, doctor at Chalmers with a masters degree in Criminology, argues that having only one entrance which is also connected to the administration is recommended. In this way people who should not enter the school can be stopped and people who are visiting can get guided where to go.

The canteen and the gymnasium are two areas connected to a lot of stress for children. In the canten there is a big flow of people and a high sound level. The flows in and out of the canteen needs to be planned well to make this an environment for rest. Showering and changing are the main problems when it comes to the gymnasium. Many children do not change after gym class since they do not want to shower in public. Transportation between classrooms are also a stressor since some students are unable of keeping a track of a schedule, where to be and what to bring. Throng is something that makes us feel stressed. A space where a lot of people moves which narrows creates conflicts and aggression. If this narrow passage is where one pass into the classroom agressions will be brought into the class (Maja Grafström, personal communication, February 7, 2019).





Plaza España, Seville

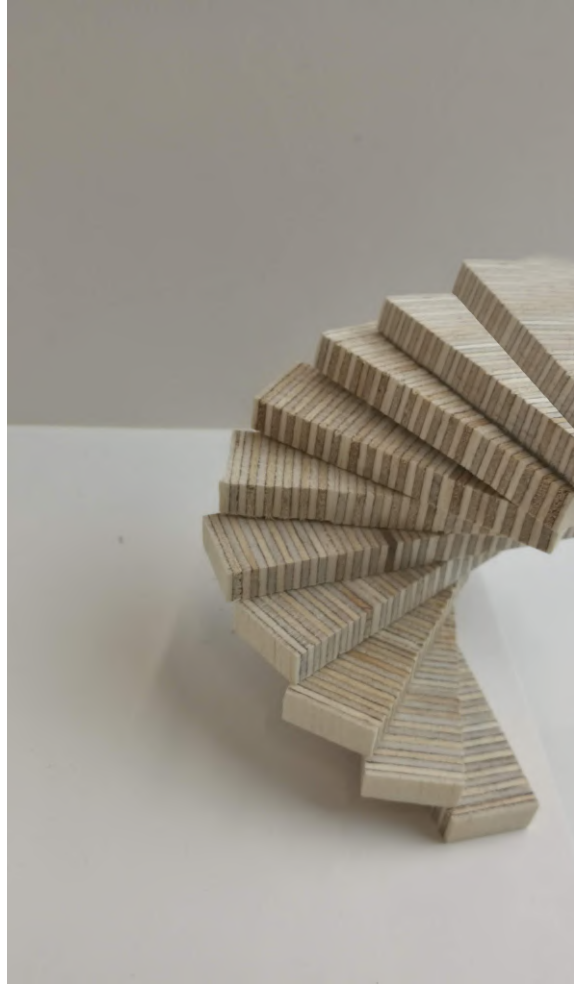


# TODAY'S TEACHING

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Sweden has a very ambitious curriculum for school stating that “The school shall in cooperation with the family support the versatile personal development to active, creative, competent and responsible individuals and citizens. School shall be defined by care for the individual, attention and generosity.” (Erik Wallin, 2000). To understand how school works today I interviewed strategic planners at the municipality of Gothenburg, Madeleine Nordenknekt architect at Liljewall and Helene Mattsson communicator working at Kunskapsskolan.

When meeting with the strategic planners in the municipality of Gothenburg Malin Michaelsson pointed out the divergence between that it is stated in the curriculum that “every student should be able to learn in their own way and phase” and that we have a hourly plan saying how many hours every student shall spend on each subject. This contradiction can be overbridged in an environment with subjects and classes interacting with each other. Madeleine Nordenknekt (personal communication, February 4, 2019) explains that about 10 years ago Sweden experienced a shift in teaching methods where classes were replaced by teams. Working in teams ment work in groups where about 3 teachers handles 100 students. The traditional way of teaching had been a one-teacher system where one teacher thought one class. With the system with teams two or three-teacher together take care of about 100 students. In this way the resources can be more effectively used. Big spaces where tutorials can be held for all of the students at the same time are important. New facilities are often ambiguous and forward thinking but older schools built in a corridor typology are not fit for today's pedagogy. They are arranged for a one way communication where the teachers talks and the student listens. These rooms do not support discussions, individual work or group work. Hans Björklund, head of property development at the municipality of Gothenburg, has worked as principal and timed tutorials during a lesson of 45 minutes to an hour. Regardless age of the students or subject an average tutorial is 10 minutes, the rest of the time is individual or group work. The school building is often referred to as the third pedagog. 85 % of the learning is due to the teaching and 15 % due to the environment (Madeleine Nordenknekt, personal communication, February 4, 2019). Activating as many senses as possible is good for learning.



Models from workshop inspired by the paper 14 patterns of biophilic design

# NATURE, SPACE AND HEALTH

Contact with nature and natural cycles is proven to be beneficial for our mental and physical health. Roger Ulrich has in his research shown that seeing nature is beneficial for us in many aspects. In several studies where views dominated by nature (greenery, flowers or water) were compared to views dominated by built environment views to nature were significantly more effective in restoration from stress and promoting recovery. This was measured in terms of blood pressure, heart activity, muscle tension, and brain electrical activity. Persons exposed to natural scenes also reported lower levels of anger and fear and higher level of positive feelings (Ulrich, 2002). Many of Ulrich studies involves patients at hospitals but also staff has been part of studies reporting increasing satisfaction at the workplace where they have access to a garden. Students attending schools with quality daylight show higher productivity and report more positive mood. Daylight is also important to our circadian rhythm. It regulates the production between serotonin and melatonin which can be linked to sleep quality, mood, alertness, depression and other health conditions (Browning, William, Ryan, Catherine, Clancy, Joseph, 2014).

Biophilic design is a concept often used today spanning a wide area including greenery, daylight and natural cycles. The paper 14 patterns of biophilic design describes biophilia as humankind's innate biological connection with nature. This paper defines aspects of nature that impact our satisfaction with the built environment. Out of the patterns defined I have found the following most interesting for my work:

## Presence of water

A condition that enhances the experience of a place through the seeing, hearing or touching of water.

## Prospect

An unimpeded view over a distance, for surveillance.

## Refuge

A place for withdrawal from environmental conditions or the main flow of activity, in which the individual is protected from behind and overhead.

## Mystery

The promise of more information, achieved through partially obscured views or other sensory devices that entice the individual to travel deeper into the environment



Biblioteca de Catalunya, Barcelona

“Titta på många befintliga projekt. Det kan vara luring att bara leta i sitt inre. Det tenderar ofta att vara ganska tomt”

- Peter Fröst

## REFERENCES

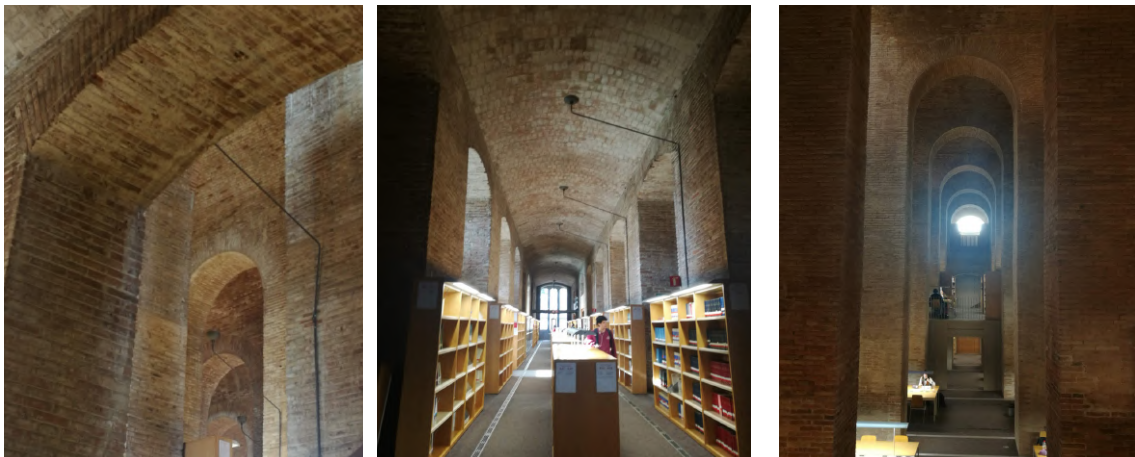


## BIBLIOTECA DEPOSIT DE AIGUES

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This is a building drawn in the 18th century as a cistern for the water now turned into a library. I visited it on my study trip. To enter the building you need to go through a tunnel starting at the inner yard of the block next to the library. When you enter you feel awe. The room has a massive height and the yellow brick vaults are simply beautiful. The vaults transform into pillars creating rooms within the room. The place gave a feeling of importance and matter.

What I bring from this project is the proportions of the vaults, the embracing feeling the heavy materials gave and the calmness of the airy room.



## XAVIER CORBERÓ

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The home of the catalan artist Xavier Corberó is a spectacular labyrinth of arches. It is not open to public and I have therefore only studied it photos.

What inspires me with this building is how it works with the classic element - the arch - in a contemporary way.



fig 1



fig 2



fig 3

# ÖREGAARD GYMNASIUM

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Öregaard Gymnasium is a high school in Denmark by the architects Edvard Thomsen & G.B Hagen was built in 1923 -1924. Also this project is studied only in books and photos. What appeals to me in this project is the dignity, the calmness and elegance derived from the material, the soft skylight and the proportions of the openings between pillars and floor slab.

What has been brought into my project is an airy and light entrance hall and soft colour scheme.



fig 4

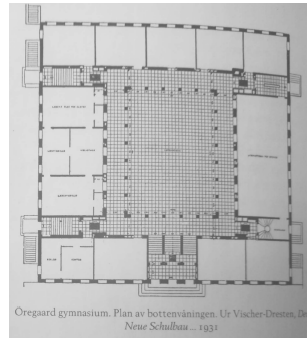


fig 5



fig 6

# GLÖMSTASKOLAN

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Glömstaskolan by Origo arkitekter was built in 2013-2014. It has a generous staircase and interesting rooms.

What I bring into my project is the absence of corridors and the many connections between the rooms allowing circulating rather than dead end spaces.

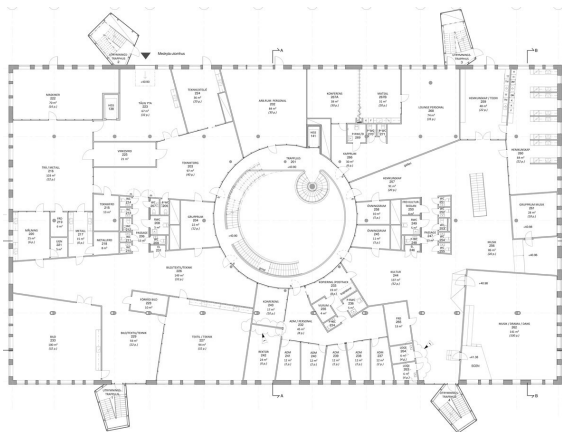


fig 7

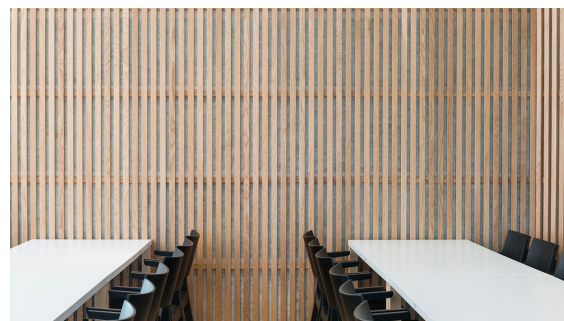


fig 8



Model of assemblyhall made during preportory course



“Atmosfärer tenderar ju att dyka upp. Frågan är bara hur man styr dom.”

- Peter Fröst

# METHOD

# RESEARCH FOR DESIGN

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## LITERATURE STUDIES

To inform this project a wide range of literature has been studied; from atmospheres and materiality to evidence based design and swedish history of school building.

## INTERVIEWS

The quickest way to knowledge is asking the ones who already know. I have interviewed people working in and within school buildings; Helen Mattsson working at Kunskapsskolan, Maja Grafstöm psychologist working at schools at Hisingen, Madeleine Nordenknekt architect at Liljewall specialized in schools and planners working at the unit for schools at the municipality of Gothenburg.

## STUDYTRIP

Chasing a feel and atmosphere of old public buildings I went on a study trip to Paris and Barcelona. Apart from the atmospheres of the streets and squares of the cities some specific buildings were visited during the study trip. Most of them are libraries since they are public buildings easy to access. The following buildings were visited during the study trip:

Bibliothèque Sainte-Geneviève by France av Henri Labrouste, Paris

Bibliothèque Mazarine, Paris

Centre Pompidou by Renzo Piano, Paris

Louvre, Paris

Opéra Garnier by Charles Garnier, Paris

Bibliothèque nationale de France by Dominique Perrault

Sant Antoni Joan Oliver Library by RCR, Barcelona

Biblioteca de Catalunya, Barcelona

Dipòsit de les Aigües, Barcelona

Sala Beckett by Flores and Prat, Barcelona

# RESEARCH BY DESIGN

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## SKETCHES

Drawing by hand has been important tool to work freely and jump quickly between scales

## SKETCH MODELS

To explore volume and atmosphere I have worked in model. The work has often been scaleless to then be processed as collages with scale figures that gives them their context

## DIGITAL MODELS

To examine the building as a whole and in precise measurements 3D software has been used.

## RENDERS

To try out atmospheres and materials I have used renders.

## PHYSICAL MODEL

To fully examine the building in relation to its surroundings or to be able to feel the layeredness of the facades I have made physical models.



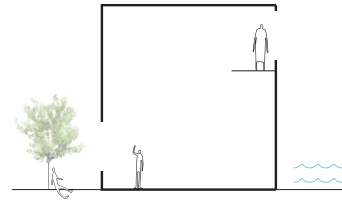
Model of atmosphere made during preparatory course

# CONCEPT

From the methods three main concepts for the project has derived:

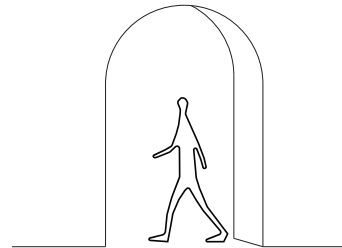
## ABILITY TO CHOOSE

Everyone shall have the opportunity to choose learning environment to be able to find the atmosphere they like to have the best possibilities of learning. Choosing creates awareness and through that a lifelong knowledge of which atmosphere to seek in what kind of mood. Depending on mood and task the level of interaction can be chosen.



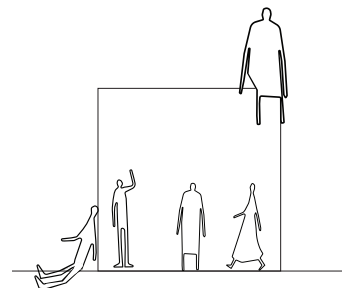
## MEANINGFULNESS

When entering the building you should feel that someone cared for this building because the activity it houses is important. Materials and typology shall be dignified and spaces shall inspire to sit down. The rooms shall have qualities that makes teachers and children long to be in them.



## CONTACT WITH NATURE

Nature is proven to be good for our wellbeing especially when dealing with stress which is a big issues in schools today. The site has great possibilities of views to both water and greenery.





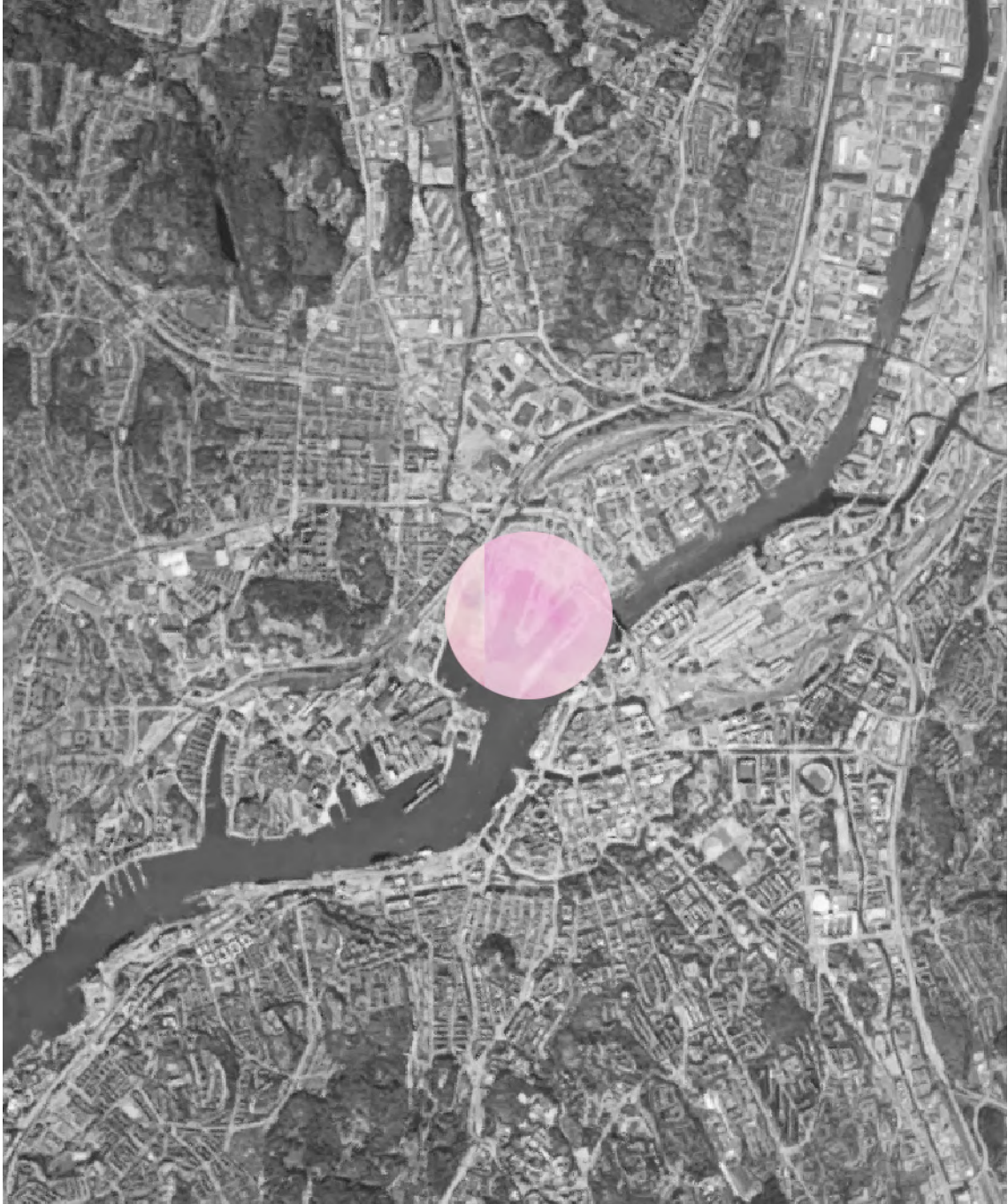
The site today

“Skolhuset läge bör på landet alltid väljas uti det möjligaste skönaste landskap; och både på land och i stad böra de allranärmaste omgifningarne vara de skönaste som, under förevarande omständigheter, natur och konst kunna åstadkomma. En flod, en sjö, ja till och med havet - kanske inte alldeles inpå men inom räckhåll - tillmätes ett extra värde. Motsatsen låter så här: Lägg skolhuset på en ödlig sandmo, eller på ett naket berg, eller i en håla, eller i en smutsig stadsgränd, och man försakar en uppfostrande inflytelse som af inga böcker och inga lärare kan ersättas”

- Per Adam Siljeström

# SITE





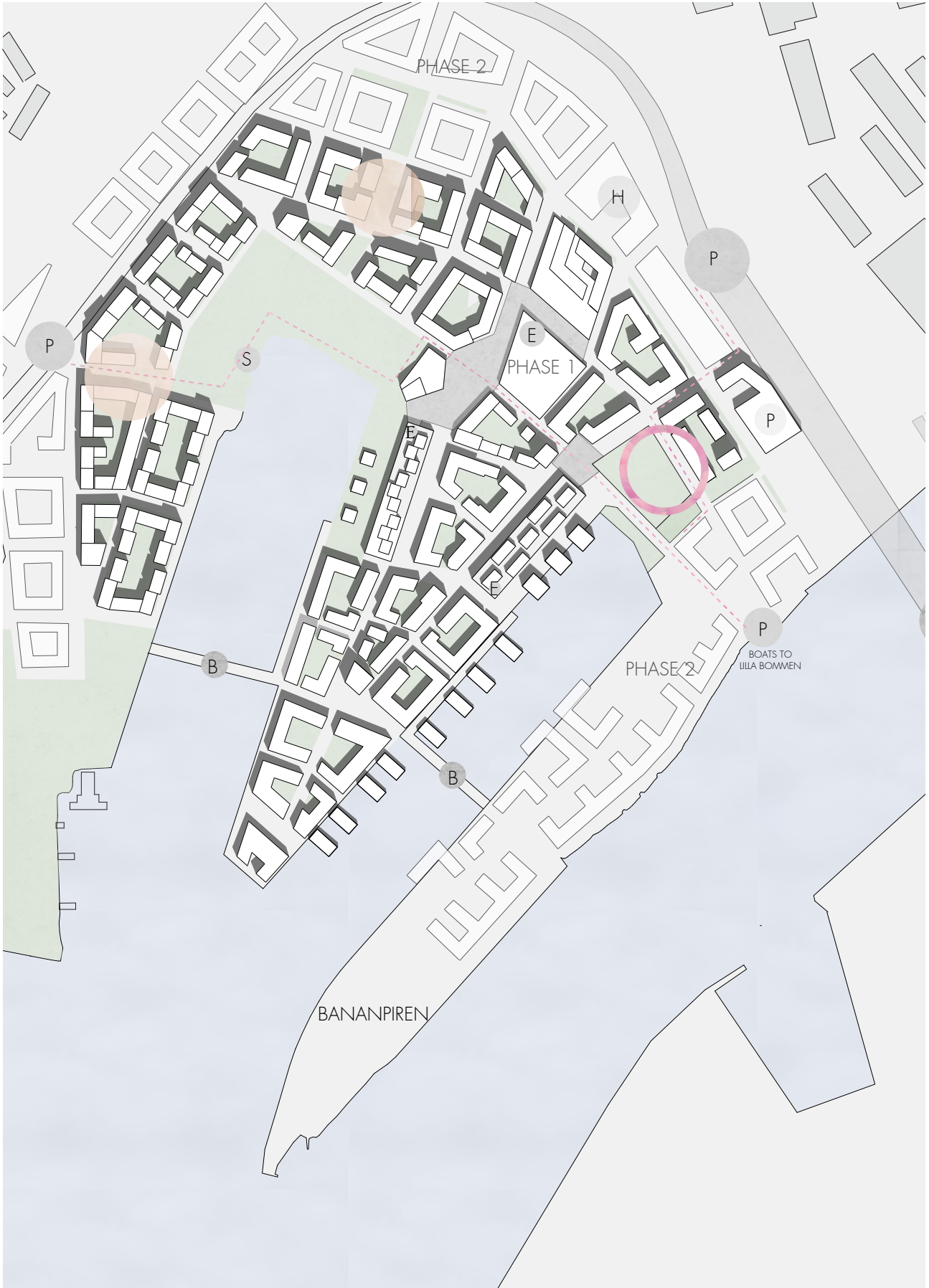


# FRIHAMNEN

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The site of the project is Frihamnen. A former harbour area about to be transformed into a dense mixed-use area. Today some industrial buildings are found in the area, a sauna and public bath and an urban park which won 2018 years Sienna prize. The area is used for big temporary events, especially on bananpiren. The development is divided into a number of phases where bananpiren is in the second phase, allowing it to host activities also during the first phase including the building of the schools.

The latest detail plan available on the homepage of the municipality have been used as basis for this project but this does not have legal force yet. Heights of buildings and typology is still very free. To get information on how many children are supposed to go to school in this area I have been in contact with Stadsbyggnadskontoret. Two schools are planned in this area; Parkskolan which is a primary school for children from 7-10 years and Broskolan which my projects looks into with 720 children in the age 10-16 years divided to primary and secondary school. Both school areas shall also contain a preschool. The planning of the area is very free but allowing and suggesting very high buildings at parts of each block. To make the project economically sustainable the green spaces are shared meaning that the schools use them during daytime and that they are open to public in the evenings. The demands of free space per child could not be fulfilled if parks outside the plots were not used. Demands on free space per child is 35 sqm per child in preschool, 20 sqm per child in primary school and 15 sqm per child in secondary school.



# SITE ANALYSIS

siteplan 1:4000

- PROJECT SITE
  - ADDITIONAL PLANNED SCHOOLS
  - B NEW BRIDGES
  - P PUBLIC TRANSPORT
  - S PUBLIC SAUNA AND BATH
  - E EXISTING BUILDINGS
  - H HOSPITAL
  - P PARKING
- foot path to school from public transport



The site today





Salle D'exposition Et atrium, Barcelona



“The chief benefit of the house, the house shelters daydreaming, the house protects the dreamer and the house allows one to dream in peace. But even more, an architectural space frames, halts, strengthen and focuses our thoughts and prevents them from getting lost. We can dream and sense our being outdoors but we need the architectural geometry of a room to think clear. The geometry of thought echoes the geometry of the room.”

- Juhani Pallasmaa, The eyes of the skin

# USER

## SOCIOECONOMIC BACKGROUND

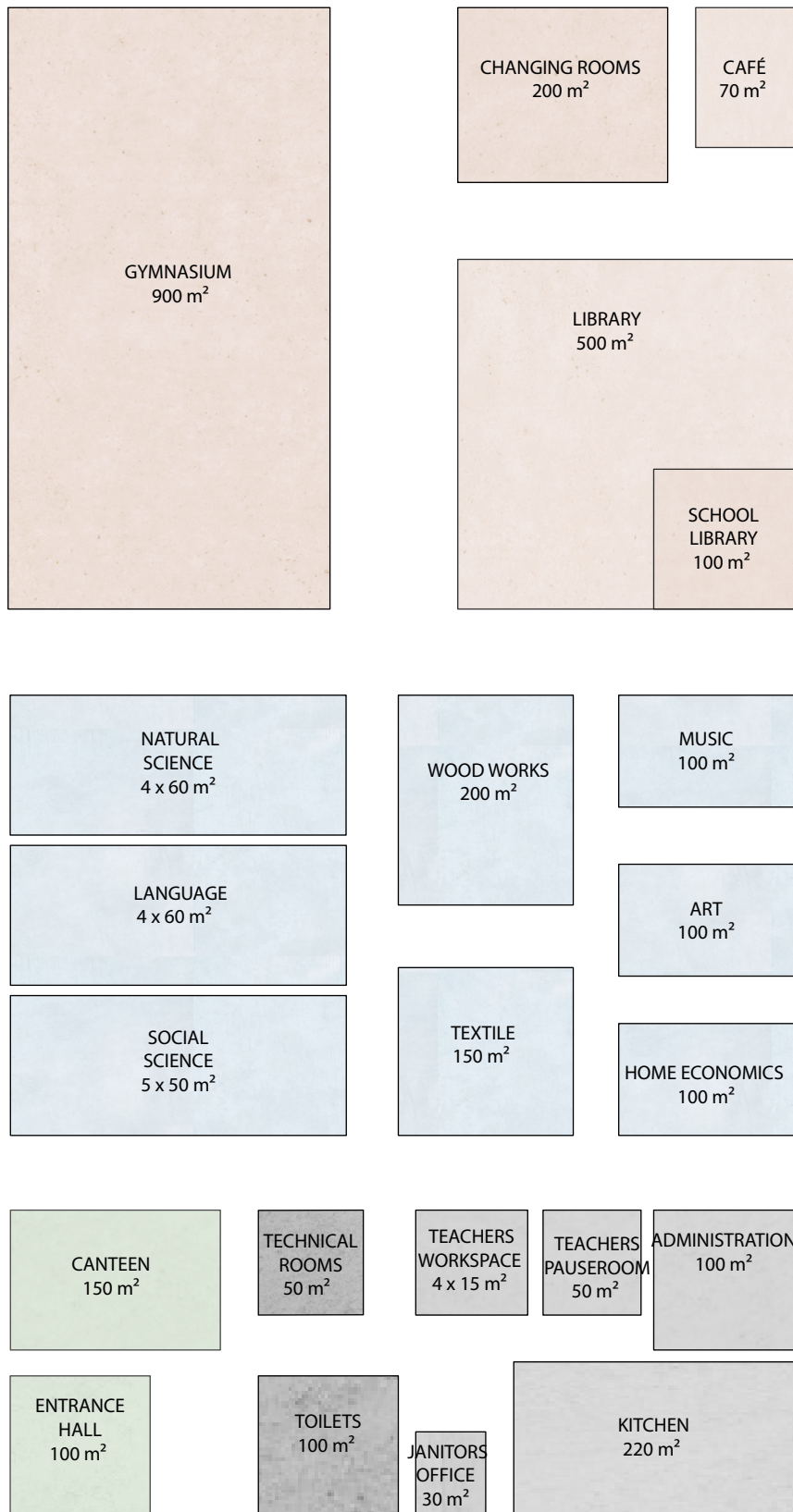
Two schools are planned in Frihamnen and in total 1120 children are supposed to go to school here. Since the area is very central the school will probably attract students from other areas. What tram- and bus lines has direct connection is key to who will go to school here (Malin Michaelsson, personal communication, February 19, 2019). With the free school choice a tendency for parents to place their children in central school rather than the one closest to their home can be seen. If other schools in the area have a low standard students from other catchment areas are likely to seek these new schools facilities.

<b>Parkskolan</b>			
8 avdelningar	144 barn	1.700 BTA	12 kvm/barn
F-3	400 barn	5.000 BTA	12,5 kvm/barn
<b>Broskolan</b>			
8 avdelningar	144 barn	1.700 BTA	12 kvm/barn
4-9	720 barn	15.840 BTA	22 kvm/barn
<b>Friytor kvm/barn</b>			
	min.krav	kompensation	tot
FSK	20	15	35
F-3	10	10	20
4-9	5	10	15

Program recieved from Stadsbyggnadskontoret

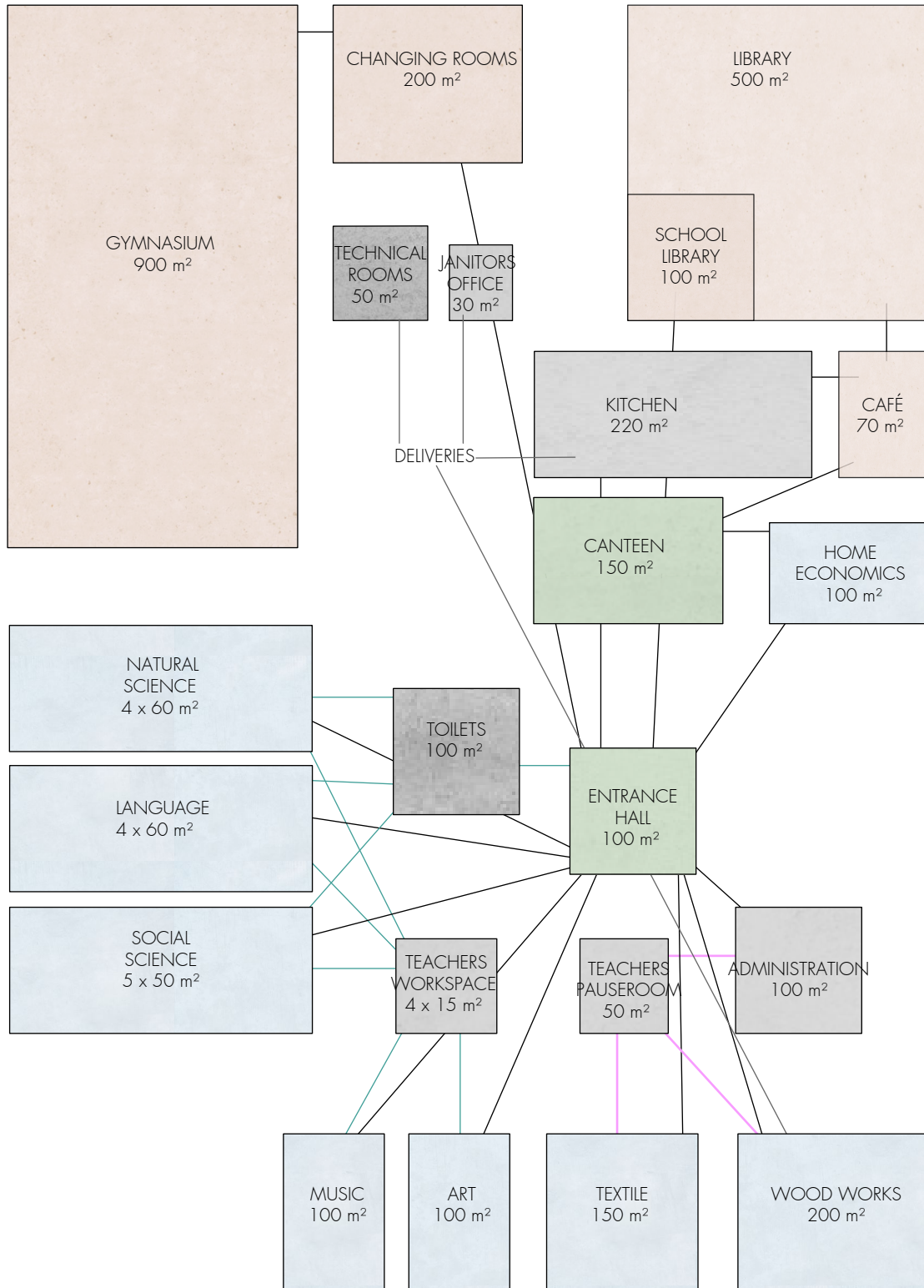
# PROGRAM

spaces and their sizes



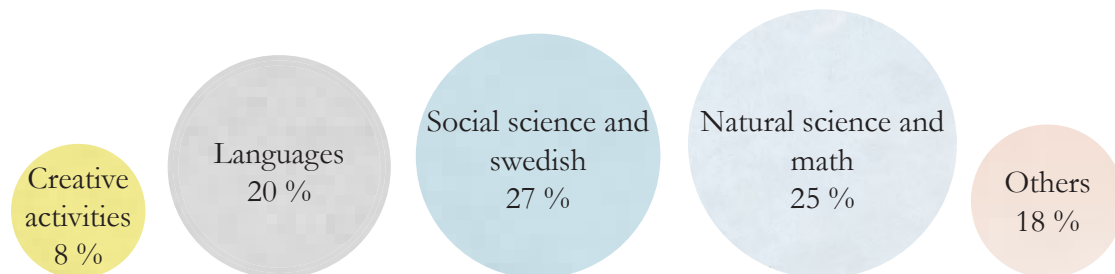
# ROOM LAYOUT

relations and distribution of space



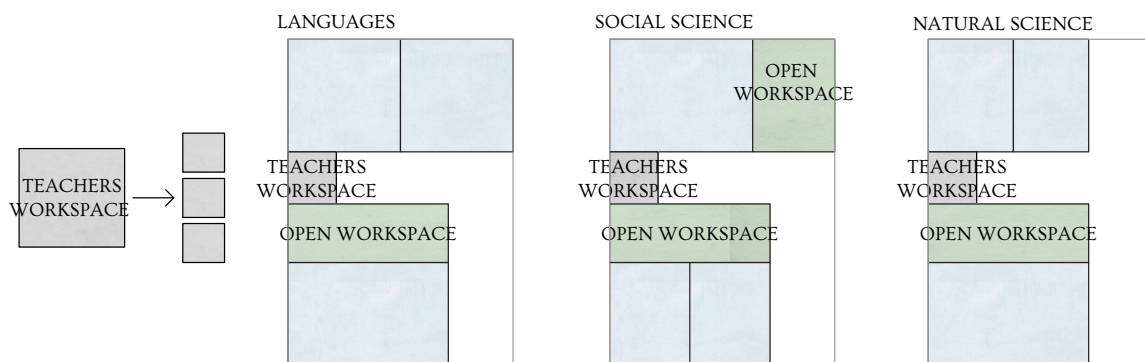


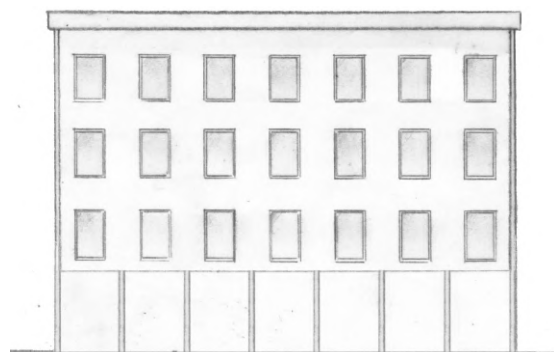
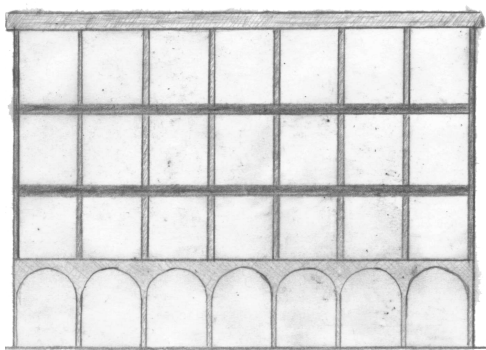
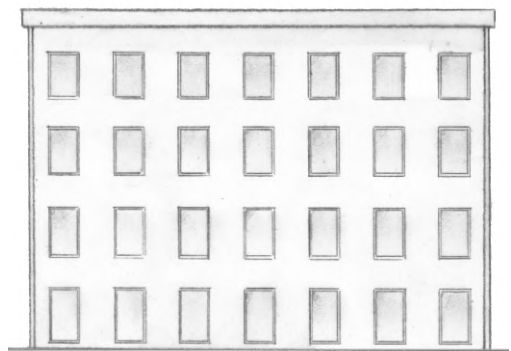
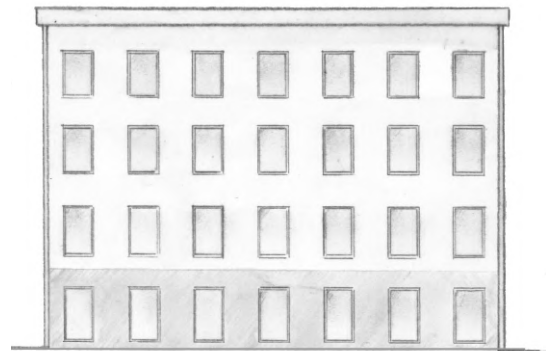
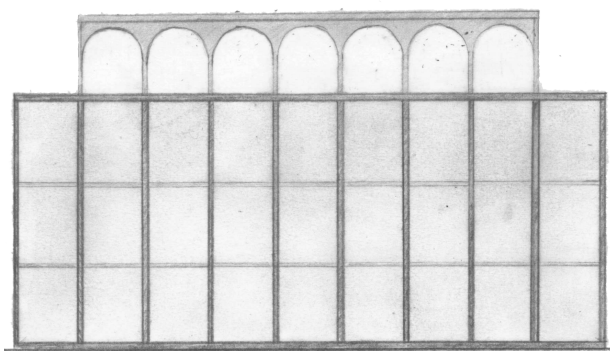
# DISTRIBUTION OF FUNCTIONS



Time distribution in secondary school according to swedish curriculum

The classrooms are divided in three clusters; social sciences, natural sciences and languages where the teachers working with the same subjects have their workspace. Inspired by my meeting with Madeleine Nordenknekt the teachers workspace are distributed close to the classrooms. This to create a closer relation between the students and teachers instead of assembling all the teachers workspace in one place separated from the children. The forums are meant to enable interdisciplinary work and for the children to have a more individual distribution of their schedule but still access to teachers assistance.



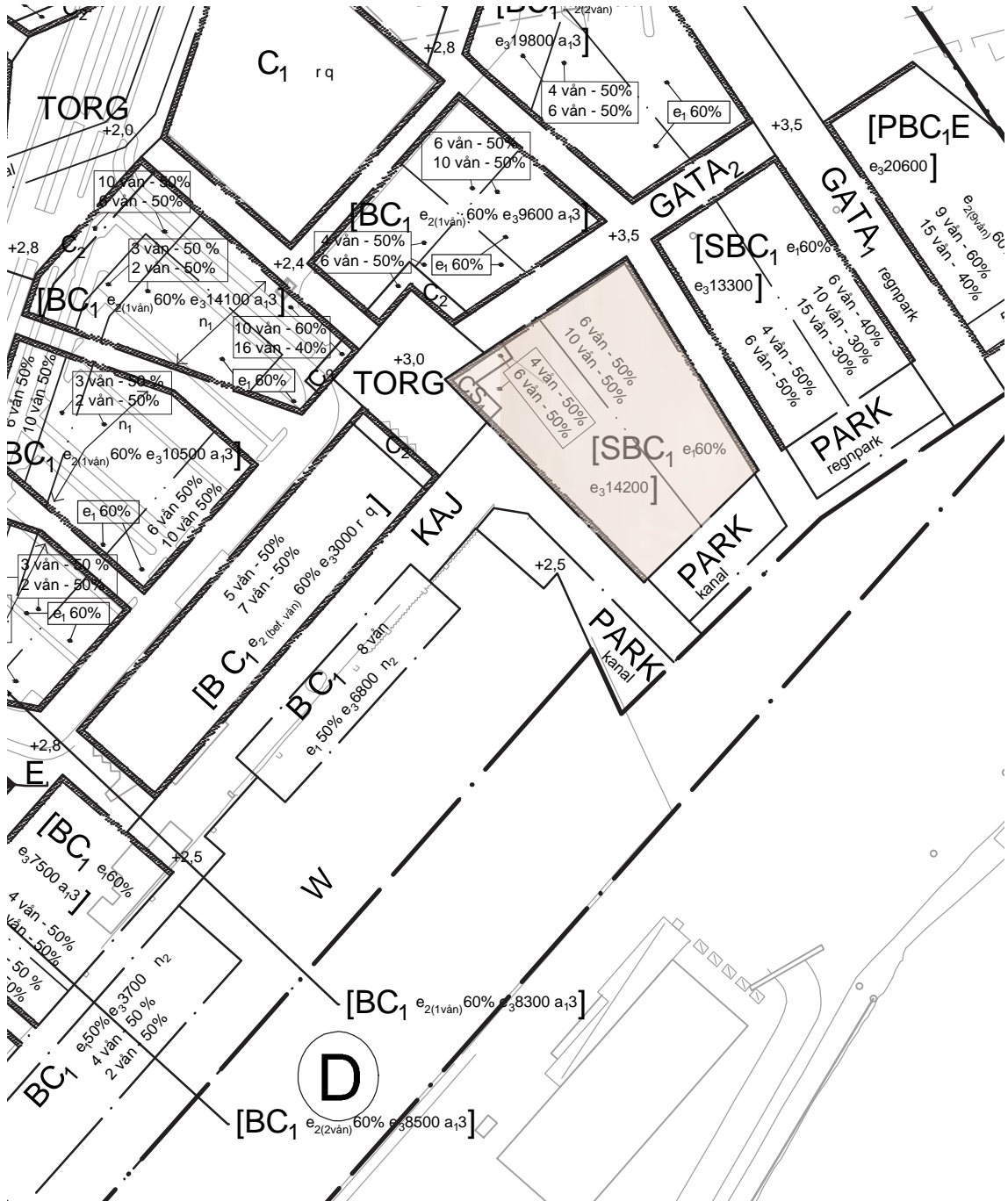


Early sketches of facade

“The sense of gravity is the essence of all architectonic structures, and great architecture makes us aware of gravity and earth. Architecture strengthens the experience of the vertical dimension of the world. At the same time as making us aware of the depth of the earth, it makes us dream of levitation and flight”

- Juhani Pallasmaa, The eyes of the skin

# PROCESS



Detail plan retrieved from the homepage of the municipality of Gothenburg

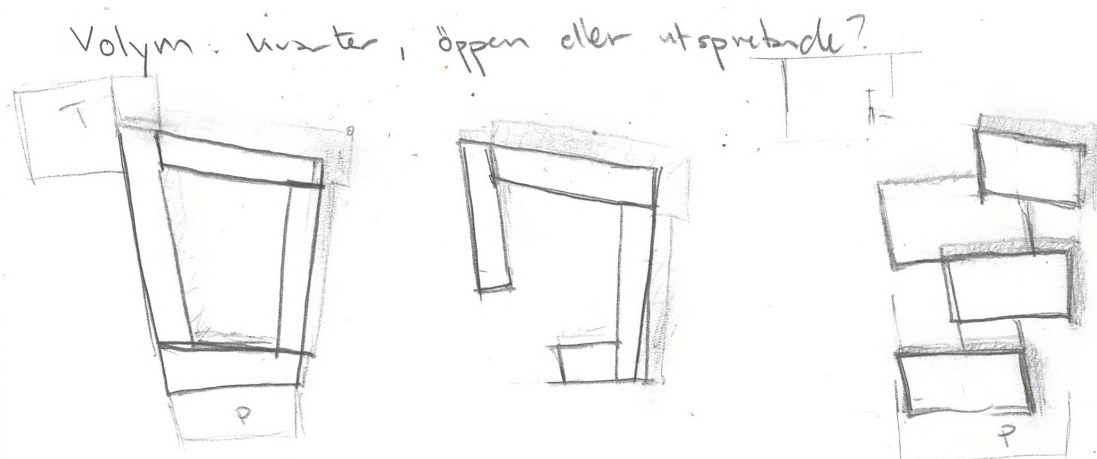


# PREREQUISITES

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The design work has been an iterative process alternating between scales and letting them inform each other. The rooms and their needs have been studied to know where the best placement for them would be, the volume looked at as a whole to explore site conditions for sunlight and overall composition, facades and materials tried out to see what best communicate desired atmosphere.

A major part of the process has been to define my task and set up delimitations. The plans for Frihamnen is still very vague and there is no program for the schools planned there. To have a framework for the project I have followed the detail plan found on the homepage of the municipality of Gothenburg. The detail plan says that the plot can be used for school, dwellings and public functions. The levels should stretch from 4 - 10 levels. I have chosen to keep the functions I am drawing as close to the street and the user as possible and place the dwelling on top of this giving them privacy and views. After being in contact with Stadsbyggnadskontoret I understood that there is an urge to build dense to get the project economically sustainable and therefore I implemented the dwellings in my composition. To narrow down my project only the secondary school and the functions connected to its curriculum is drawn in detail. The dwellings, the preschool and the primary school has been studied only when it comes to flows and communication and have been allocated the approximate space needed.



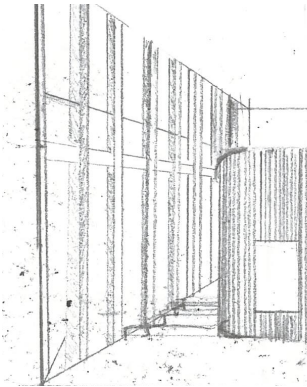
# THE ROOMS

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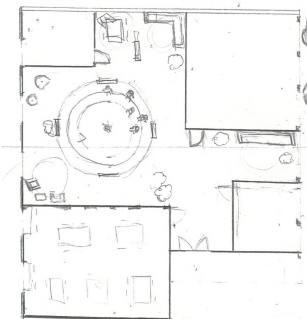
## CORRIDOR

Rather than corridors there should be inbetween spaces. This should be a place for recreation, interaction and concentration and not a directed space for movement. The atmosphere here is important to create an environment for recovery during the break or concentration when using it for studies. Daylight and greenery are keys in achieving this, as well as different spatialities where the pupils can choose which pace and degree of interaction they prefer.



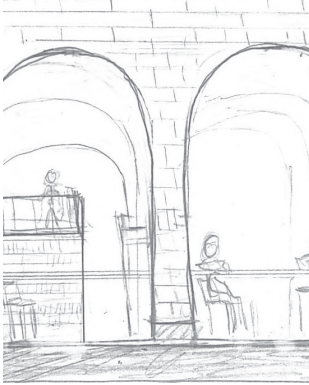
## ENTRANCE

This space shows that the building host an activity of importance. It should set a mood of dignity and calmness when passing through it. The entrance should also have contact with the administration in order to have a person greeting you when entering the school.



## CLUSTERS

These should be flexible with spaces that can be used with up to 100 persons at the same time but also embracing hideaways where one can work on their own. According to which subjects are thought in the cluster the needs will differ.



## LIBRARY

The library should be public and thus larger than a regular school library. This gives possibilities of more generous opening hours and to give the students a good place to study after school hours in case they lack such a home. The library should have solid materials and plenty of natural light, preferably from the north.



## GYMNASIUM

This should be bright and with beautiful views but not feel exposed. A sports hall is used during much of the day and night and thus creates life in the street by sending light to surrounding streets and also inspires to exercise. It should be open in the morning for the students who want to work out before school. Changing before and after the class is something many students find uncomfortable. Emphasis will be put on designing shower rooms where you do not feel exposed.

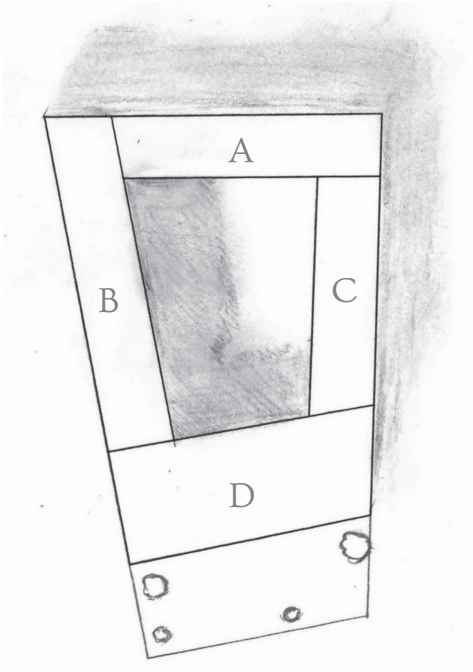


## CANTEEN

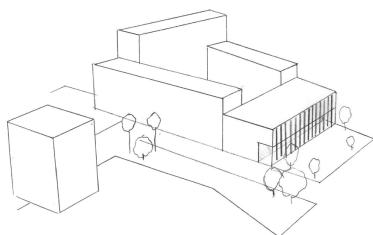
The lunch room is an environment that many students perceive as problematic as the sound level is high and there is a lot of movement. Solid materials, a fireplace and daylight creates a calm atmosphere. Acoustic ceilings and wooden walls or floors contribute to a subdued acoustics. Spaces are formed by level differences, niches, vegetation or pillars that create rooms in the room.

# COMPOSITION

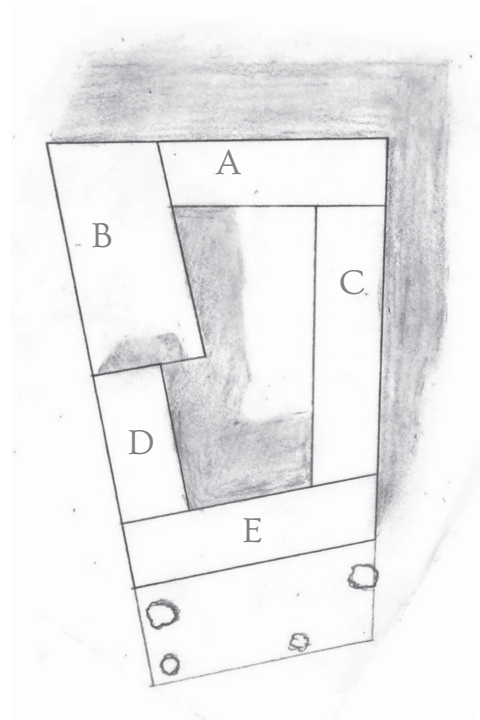
Closed block scaling down toward park



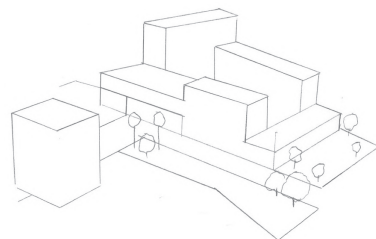
- A. 10 FLOORS  
Canteen and classrooms for crafts at ground level  
Dwellings above
- B. 6 FLOORS  
Library by the square  
Secondary school
- C. 6 FLOORS  
Primary school
- D. 4 FLOORS  
Entrance school, classrooms for music and art  
Gymnasium at top floors



Closed block scaling down toward park and square

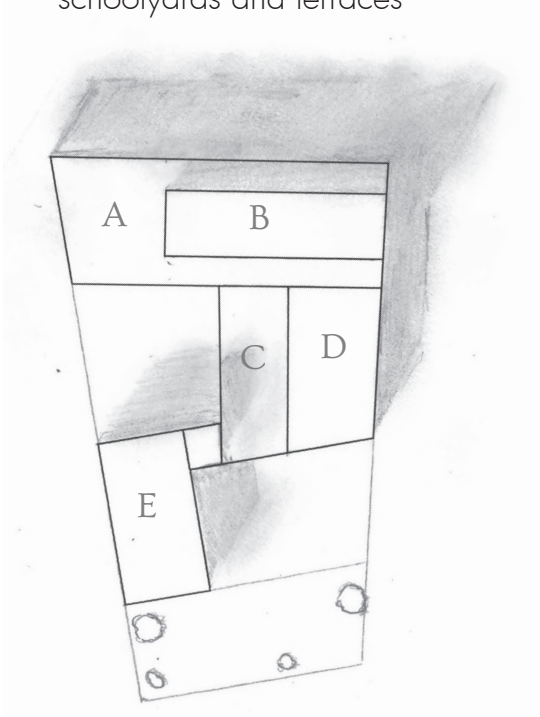


- A. 10 FLOORS  
Services at ground level  
Dwellings
- B. 4 FLOORS  
Library and classroom for crafts  
Gymnasium at top floors
- C. 6 FLOORS  
Primary school
- D. 6 FLOORS  
Secondary school
- E. 2 FLOORS  
Entrance school, classrooms for music and art

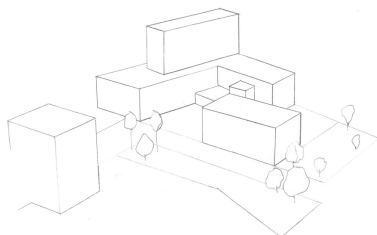




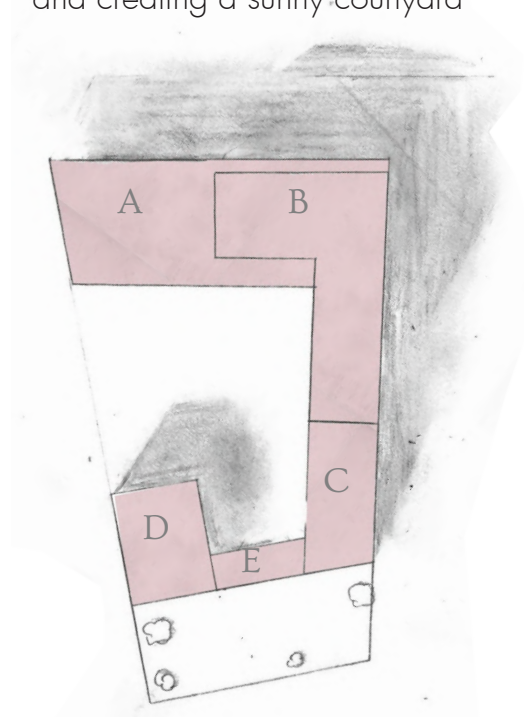
Block forming separated  
schoolyards and terraces



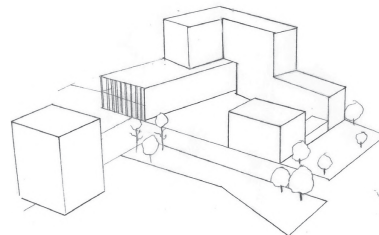
- A. 4 FLOORS  
Library, classroom for crafts, services  
Gymnasium at top floors
- B. 10 FLOORS  
Dwellings
- C. 1 FLOOR  
Entrance and music  
Rooftop garden with greenhouses
- D. 4 FLOORS  
Primary school  
Kitchen, canteen and home economics
- E. 4 FLOORS  
Secondary school



Block opening up to the water  
and creating a sunny courtyard



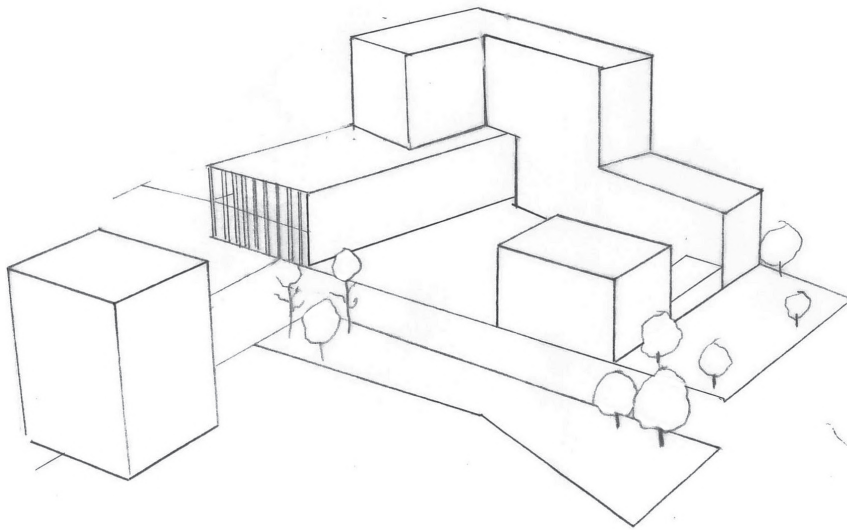
- A. 4 FLOORS  
Library, classroom for crafts, services,  
kitchen, canteen, home economics  
Gymnasium at top floors
- B. 10 FLOORS  
Dwellings
- C. 4 FLOORS  
Primary school
- D. 4 FLOORS  
Music and arts at ground floor  
Secondary school
- E. 2 FLOORS  
Entrance and administration



CHOSEN ALTERNATIVE

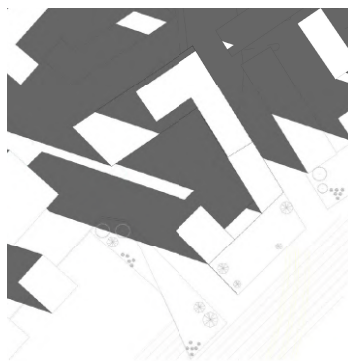
## VOLUME

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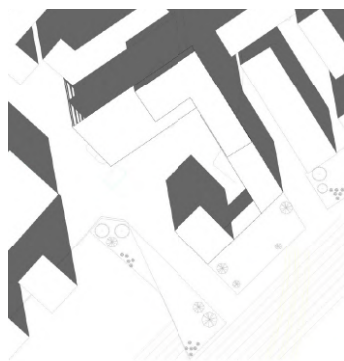


A lot of different volumes have been tried ending up in one connecting to the square and the water. Functions meant to be used by the public after school hours are places at the ground floor, mainly in the building facing the square.

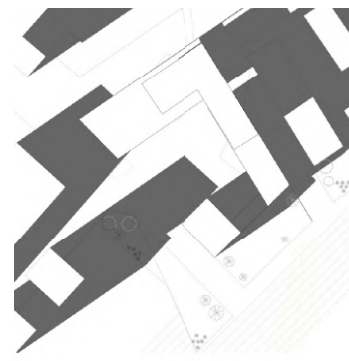
The plot for Broskolan stretches over two blocks and are planned to contain dwellings, school, preschool and public services. To gain more green space and privacy the preschool is placed at the block to the northeast. One of the main features of the site is the view over the water. The layout of the functions has been made to enable this from most parts of the plot. Opening up to the water also means opening up to south-west and for sunshine to enter the schoolyard. The secondary school is placed as a gable motive seen from the water and the other side of the river. The secondary school and the administration enters through the park on a path framed by trees. The functions meant to be used by public are placed in the north building facing the square which is lit up at night time the library and the glazed facade of the gymnasium.



MORNING 8:00 20/3



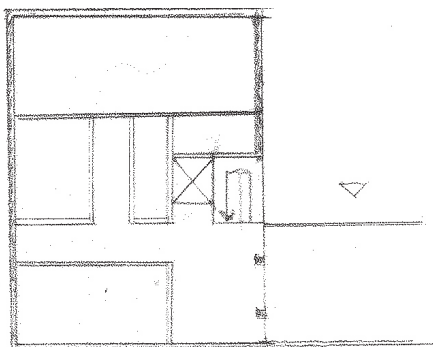
LUNCH 12:00 20/3



AFTERNOON 16:00 20/3

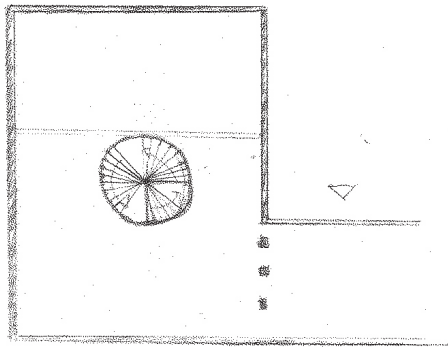
# VERTICAL COMMUNICATION

Vertical communication, especially stairs, is a potent and interesting design element where a third dimension is brought to our pattern of movement. The vertical communication is also key to the room layout of each floor. After trying three different concepts for the stair a staircase along the east facade connecting to each floor via a bridge creating a large and airy volume around and beneath it was chosen. The vertical communication connects to the facade where one can sit down in the window nisch with a feeling of being sheltered and embraced the building. The school is easily overviewed and oriented when you enter from the administration. Each floor is accessed in a different point which makes them all different. This requires a unique room layout for each floor.



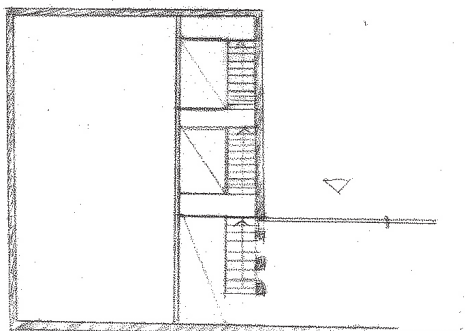
## COMPACT AND CENTRAL

To facilitate the layout of rooms the vertical communication is placed in central positing compared to the south-north midpoint of the school. The stair is placed next to the east facade to get a daylighted stair with a nice morning light inviting the students to use the stair. The staircase is in the same place at each floor which allows for a rational layout of the rooms.



## SCULPTURAL

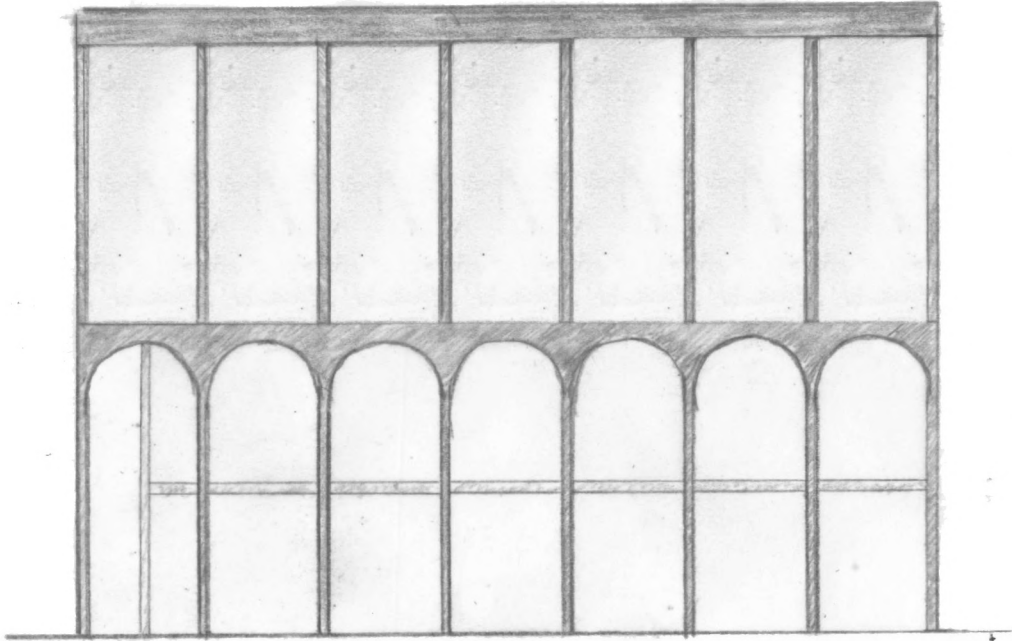
Here a spiral staircase is placed in the middle of the room with a skylight above sending light to the darker inner. The central position leaves the facades free for teaching spaces and is also a decoration in the room.



## IN LINE

The stairs follows the east facade creating a light communication space. The stair leads toward a partly visible view to the north inviting one to take the stair to reveal it all, connecting to the theme of mystery defined in the 14 patterns of biophilic design.

CHOSEN ALTERNATIVE



WEST FACADE OF LIBRARY

1 : 200

PROCESS

50



# FACADES

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The concept of meaningfulness have mainly been carried out through the facades. The facade is what communicates with surroundings and the citizens and the filter between the outside and the inside. The arches was one of the key elements brought from the study trip. To me the arches carry a sense of permanence and dignity. Implementing them in a modern project has been a struggle. I did not want to end in a postmodern design or a building looking like a pastiche of a renaissance villa. Proportions and layeredness has been my main tools to in finding an expression I find suitable.

The facade is built from a pillar structure with the bearing on the inside of the building forming famed view in which the students can sit shielded from what is going on around them. The pillars and the floor slabs form a grid of 4 x 13 openings on the long side facades. Each opening measures 2100 x 3500 mm. A lot of facade test took off from this grid exploring different levels of openness, layerdness and form. Test where made by hand sketches, renderings and some tested in physical model.

# MODELS OF FACADE TESTS

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## GLASS BETWEEN PILLARS

WITHOUT PILASTER



Arch on top level

WITH PILASTER



Arch spanning over two floors

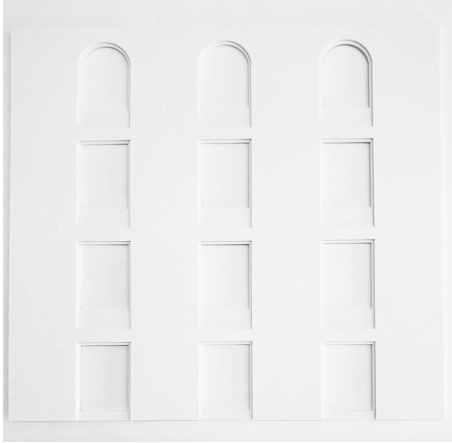


Rectangular windows



# WINDOWS IN WALL

WITHOUT PILASTER



Arch on top level

WITH PILASTER



Arch on the ground floor which is fully perforated



Rectangular windows



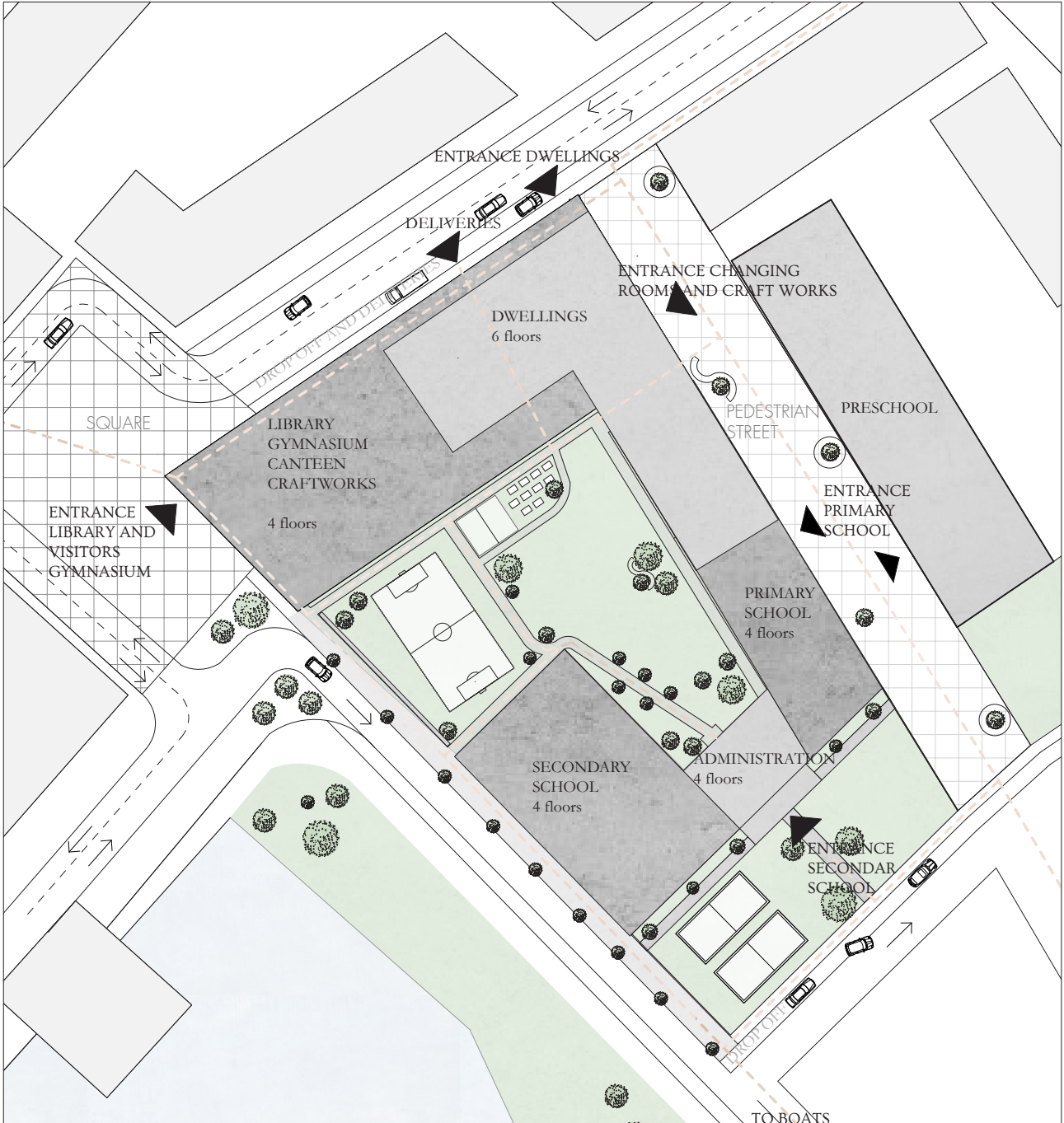




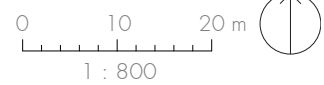
“ Or how a very slim and tall opening makes every one passing through it look great”

- Peter Zumthor, Atmospheres

# DESIGN PROPOSAL



SITEPLAN



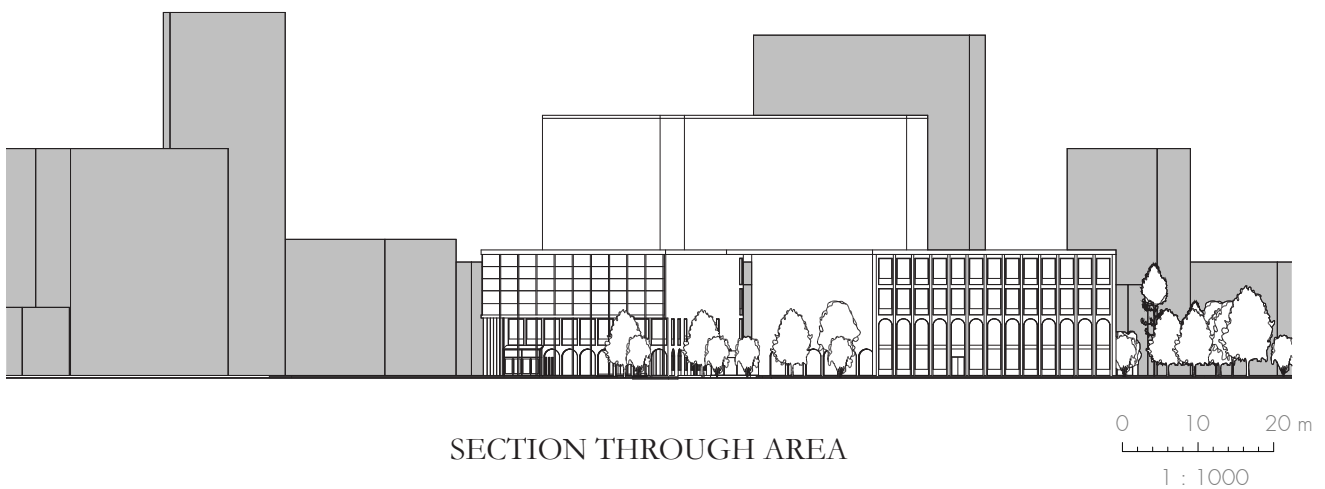
# SITE PLAN

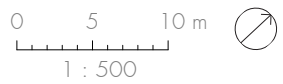
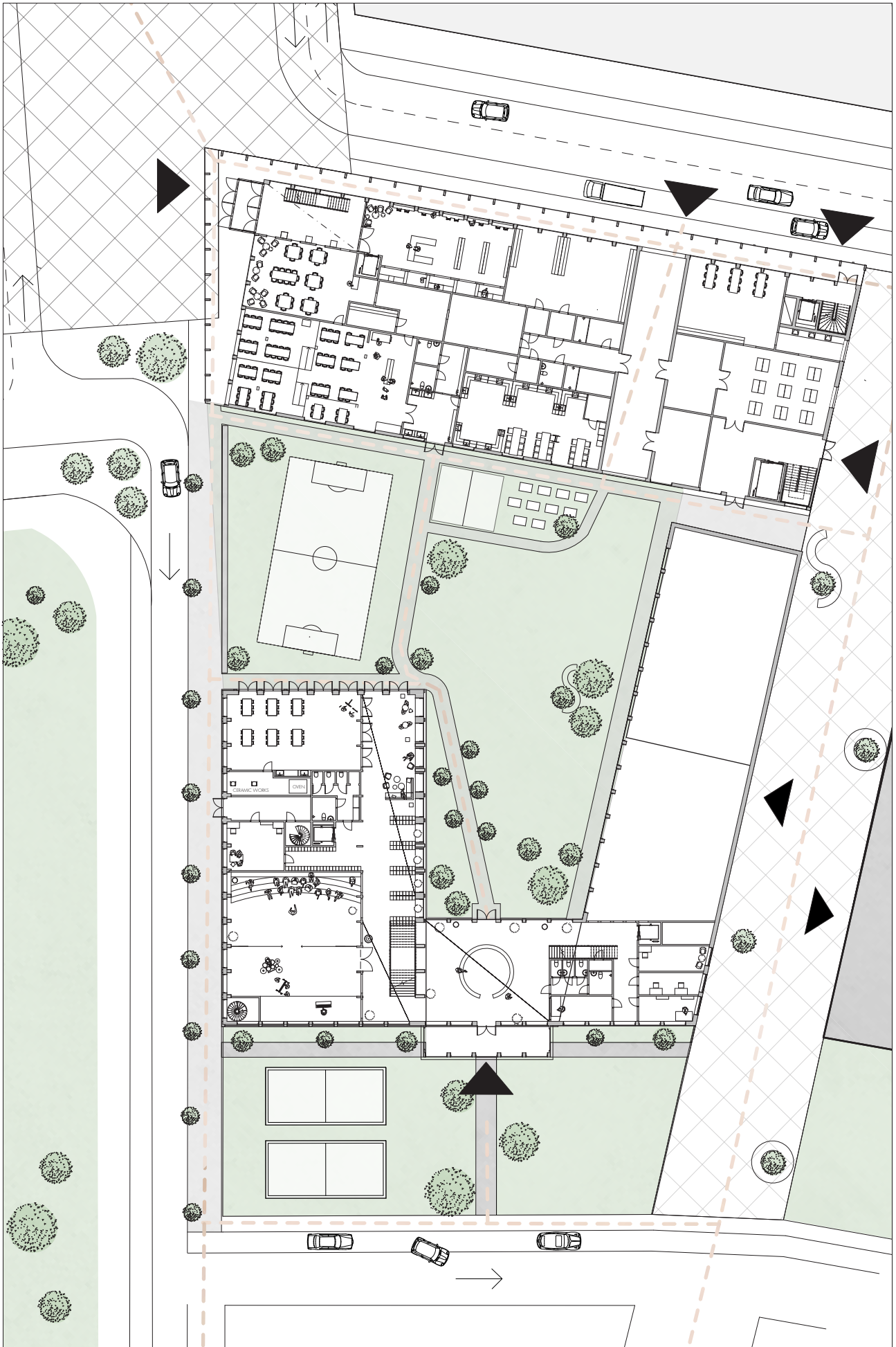
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A key quality on the site is the connection to the water and the distribution of the volumes is made to enable it from most parts of the block. The functions meant to be easily accessible to public are placed mostly in the north building which has its measurements from the gymnasium which is a full size indoor hall. The secondary school is placed as a gabel motive from the water and the other side of the river, fronting this new area. In the first phase of the development of Frihamnen nothing will be built south of the school and when arriving with boats from Lilla Bommen the secondary school will be the first building you meet. Those arriving from Nya Hisingsbron are met by a pedestrian street and a colonnade. The pedestrian street is where entrances to the preschool, primary school and changing rooms for the gymnasium are found. The colonnade leads to the square where the entrance to the library, the school library, the café and the spectators entrance to the gymnasium is found.

Traffic is kept mostly to the north of the building where deliveries arrive and cars can also drop of children. An other drop off zone is found on the south side of the building, here the road is one-way to make it safer.

The inner yard is where children walk to get to the canteen, home economics, gymnastics and craftworks. The sheltered and more easily overlooked inner yard is apart from transport met to be used mainly by the primary school while the secondary school distributes the park by the water.





DESIGN PROPOSAL



## ENTRANCE FLOOR

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The entrance floor is designed to be open to public and for the children to be able to use the facilities also after school hours. Functions are spread out around the ground floor to activate the surrounding streets. From the pedestrian street workshops for craftwork and the changing rooms for the gymnasium are reached. Spectator visiting the gymnasium enter from the square passing by the café and the library on their way up.

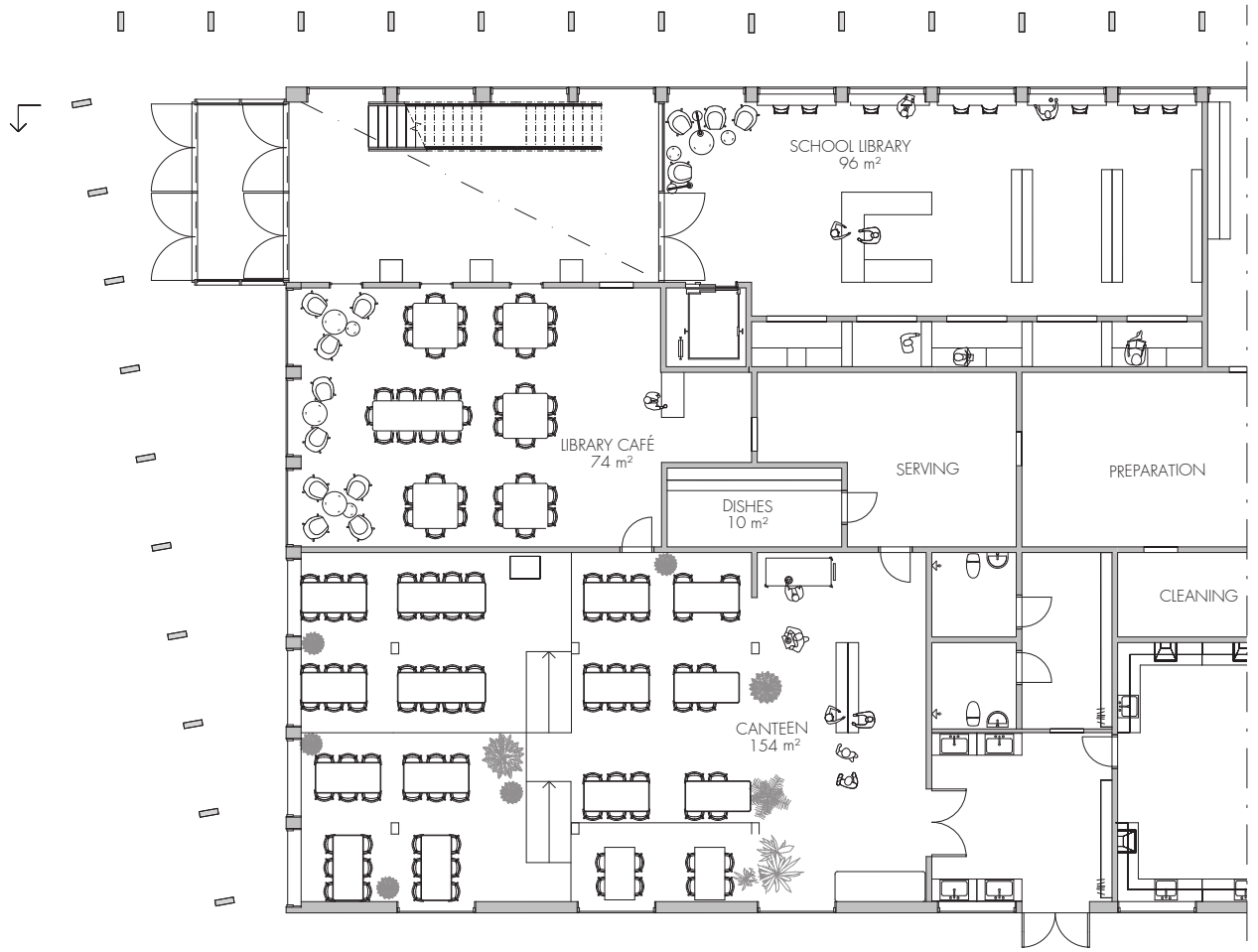
The school canteen overlooks the schoolyard, the water and the public square. The doors to the café allows for it to grow if more space is needed during lunchtime or for the library to use it for literature circles at night time. Connection to the home economics makes the canteen a perfect place to rent for bigger parties at weekends.

Deliveries are mainly meant to come through the passage connected to the road in the north of the building. Hard craftworks, janitors and kitchen which are supposed to receive most goods are placed with access to this passage. On the other side of the passage the schools kitchen garden can be found. What is grown here can be used both in home economics or for the food served in the canteen.

# GROUND FLOOR

## NORTH BUILDING

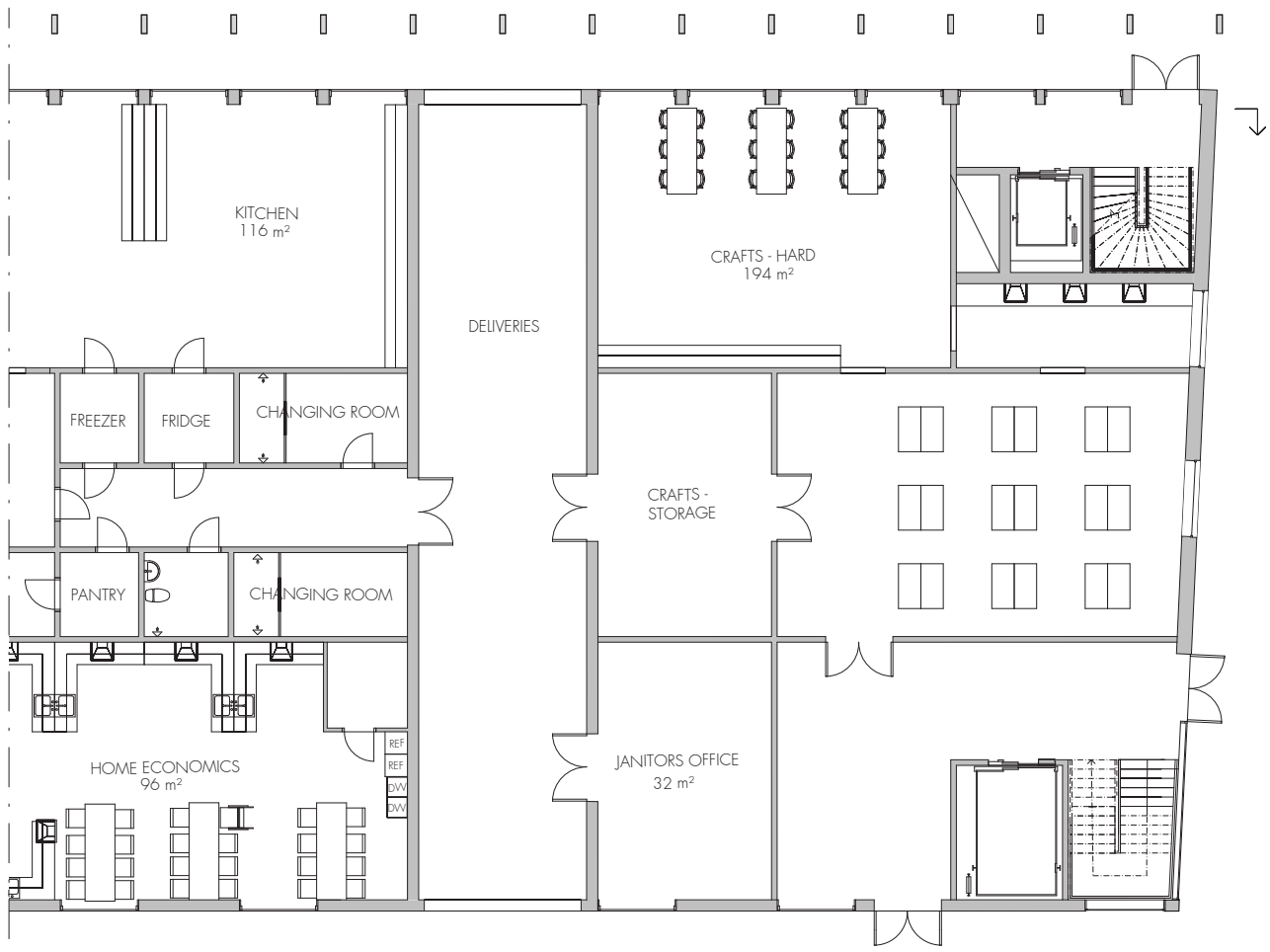
The north building is meant to host most of the functions that shall be easily accessible to public. The big glazed openings makes it easy to understand where to enter and the openness of the facades sens light to and enlivens the surrounding streets. There are three entrances to the building. One is in the north corner for the dwellings. One from the square meant to be used by spectators visiting the gymnasium, those who visit the library, the café and the school library. These common staircase is meant to inspire one to visit the activity you normally don't go to. To be close to deliveries the kitchen is placed in the north building and thereby the canteen which is connected to the café and the home economics. If more space is needed during lunchtime the café can be used and the café can use the canteen for literature circles or other events during nighttime. The canteen is also connected to the home economics which makes it a good place to rent for bigger parties or gatherings.



The third entrance is from the pedestrian street where a over-corner curtain wall emphasizes the stair to the changing rooms and the entrance for practitioners in sports or craftworks.

The building shall not only invite the public after school hours but also offer a place for the children to hang out. The school library is placed here to work together with the main library. It invites the children to spend there lunch break there or to stay after school doing their homework.

Psychologist Maja Grafström (personal communication, February 7, 2019) explained that the canteen can be a stressful place for children due to high sound levels and big flows. To make this a space for a peaceful brake flows of food, people and dishes has been kept to the area close to the entrance. Pillars and level differences divide the room into smaller spaces. A fireplace, plants and view to the water sets a calm atmosphere.



# CANTEEN

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# SCHOOL LIBRARY

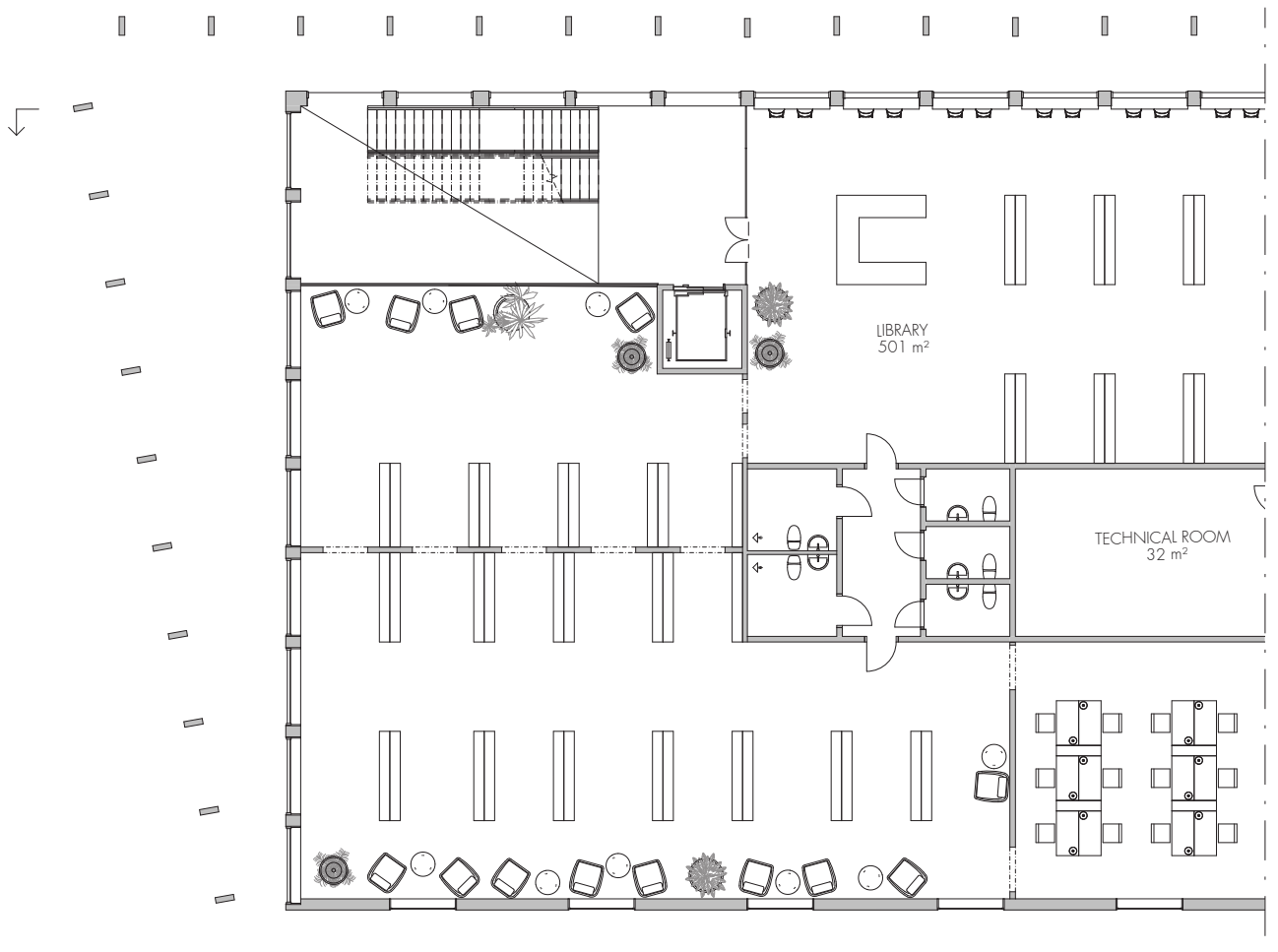
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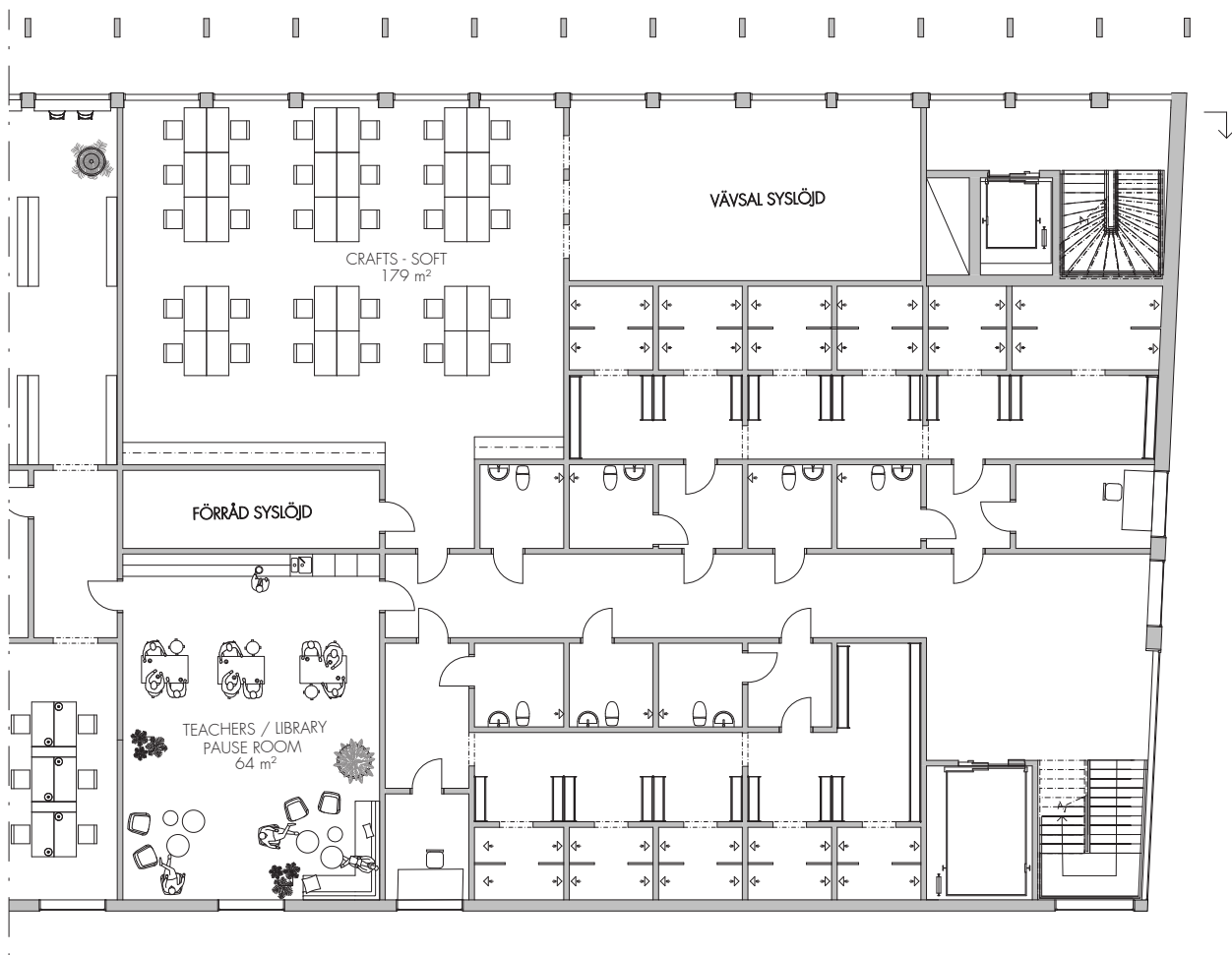


# FIRST FLOOR

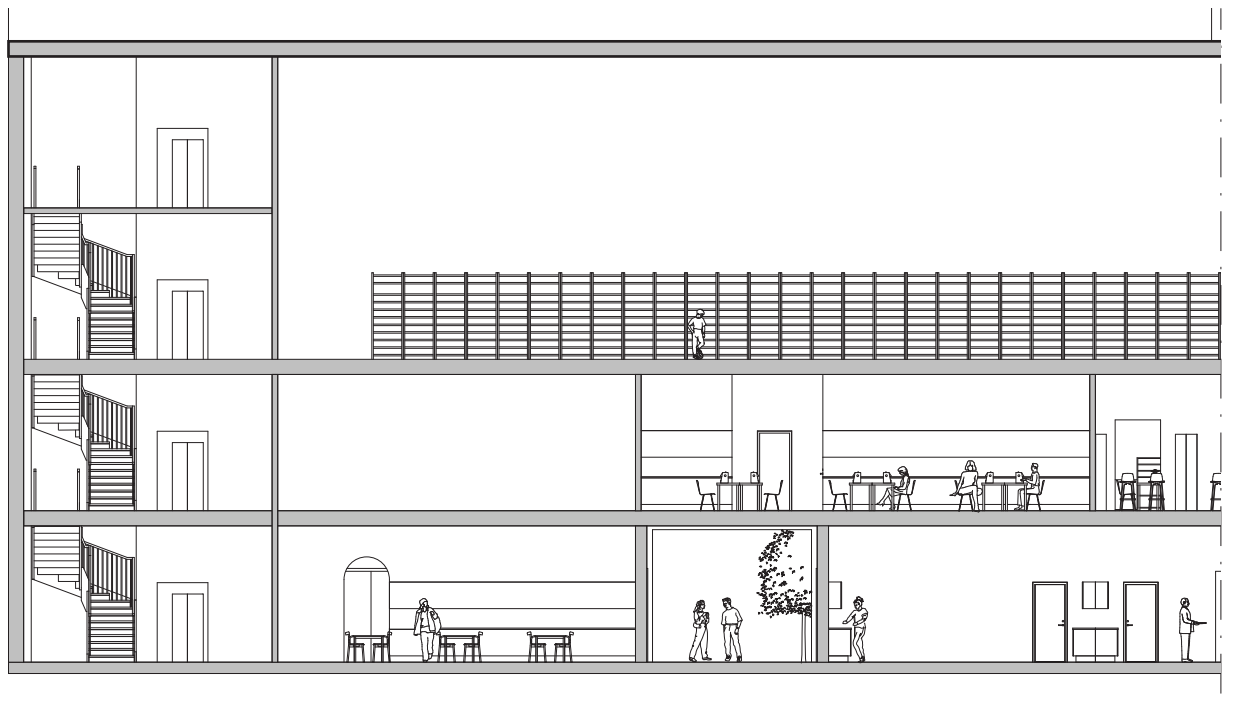
## NORTH BUILDING

On the first floor find the public library, soft craftworks and the changing rooms are found. The changing rooms are connected to a lot of stress for children. They are therefore divided into smaller spaces. There are also toilets which can be used to change and shower privately.

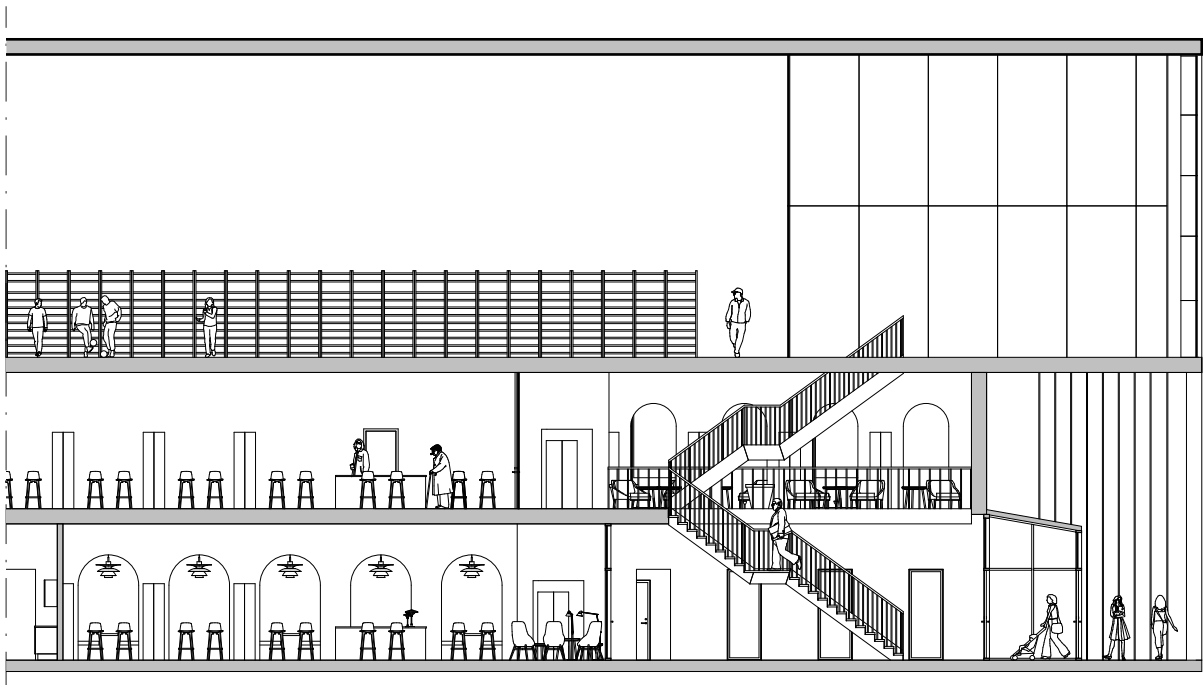




# SECTION THROUGH NORTH BUILDING



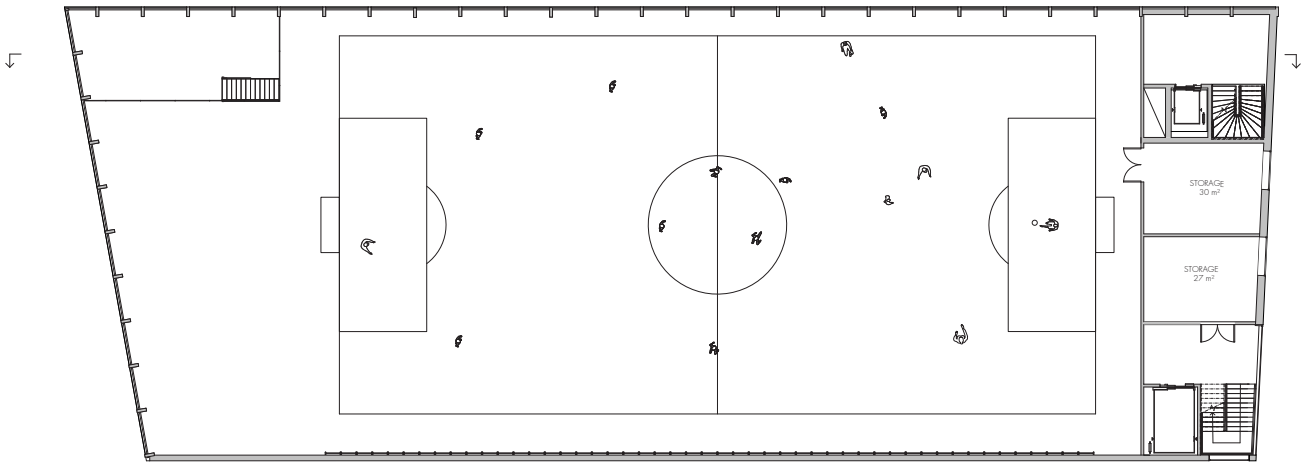




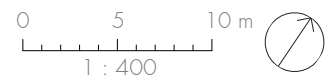
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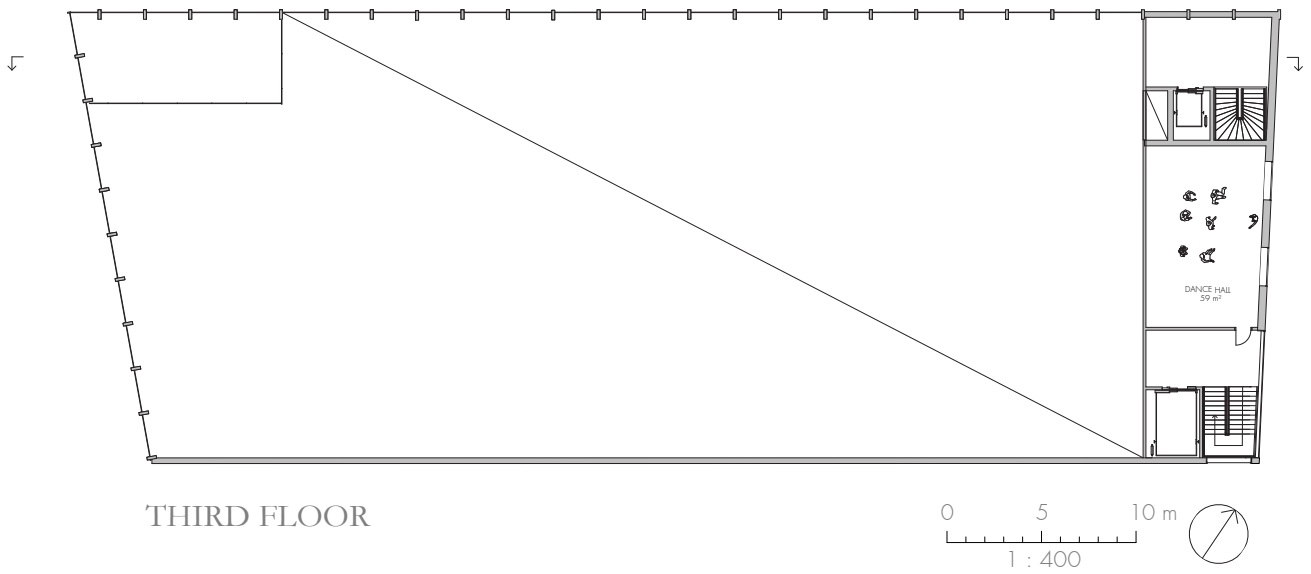
# GYMNASIUM

## NORTH BUILDING



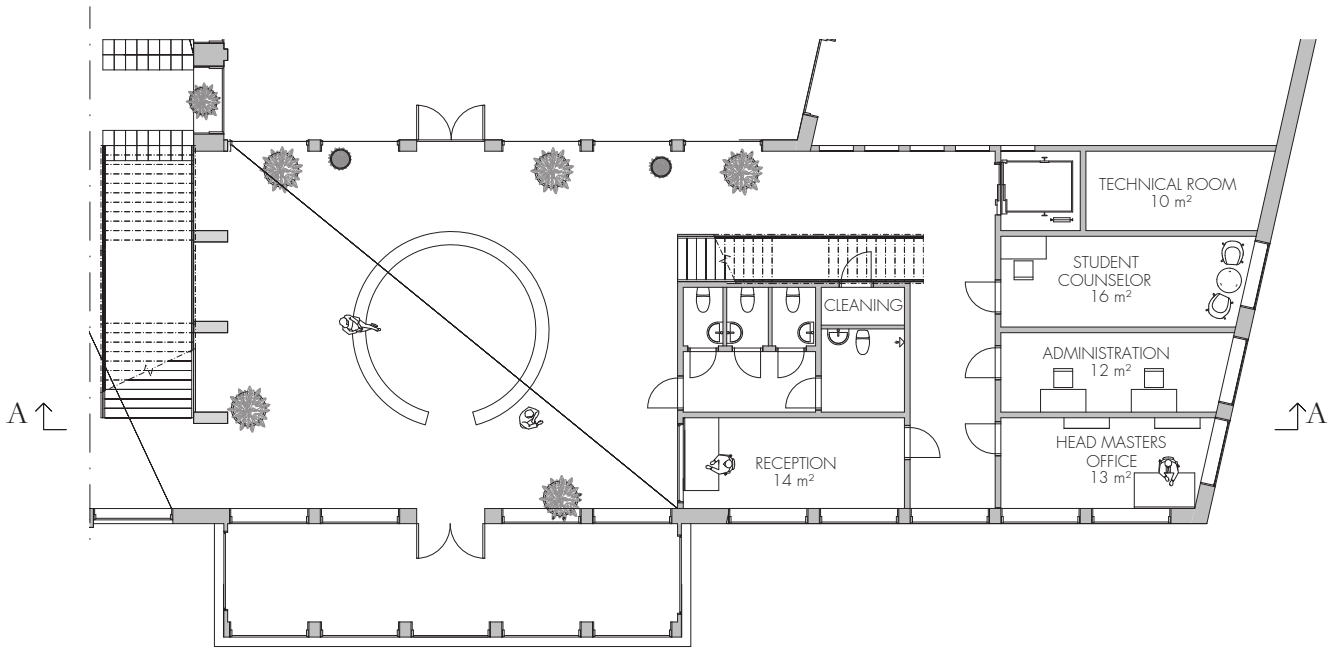
SECOND FLOOR



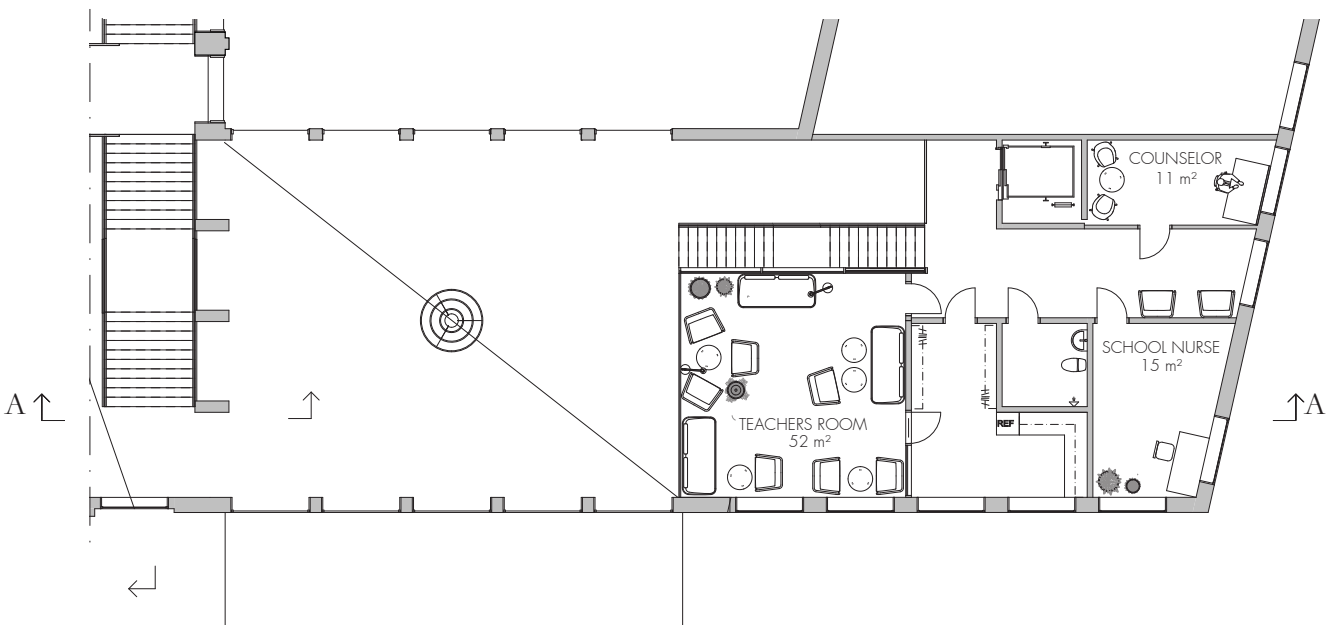


THIRD FLOOR

# ADMINISTRATION



GROUND FLOOR

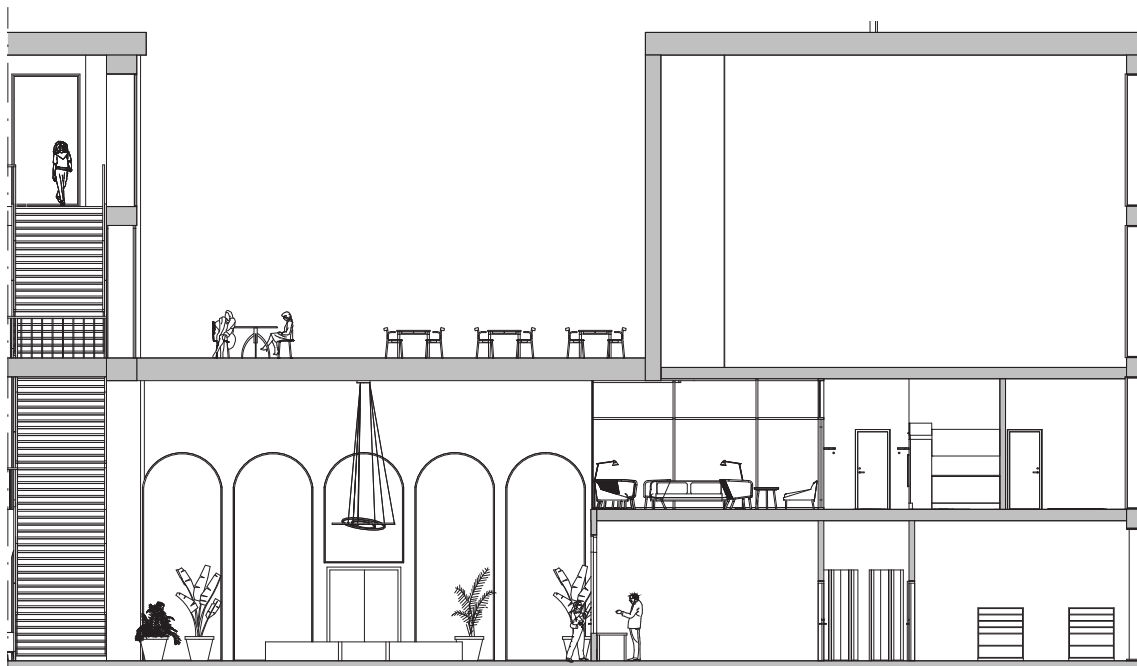


FIRST FLOOR





The secondary school is entered through the administration building. The reception desk is overlooking the entrance hall and a receptionist greets the children in the morning and guide visitors. Teachers pause space, school health and administration is found here. They shall all be easily accessible to the children and to each other.



SECTION A - A



# SPATIAL CONCEPTS

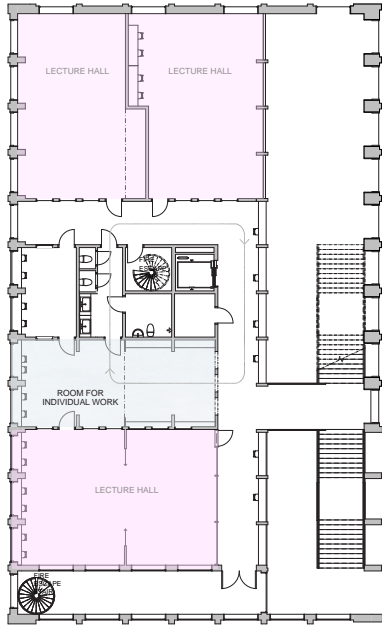
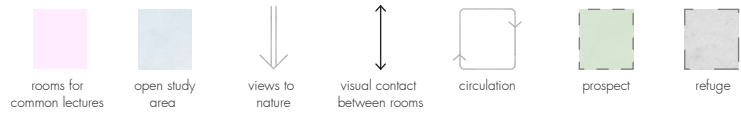
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secondary school

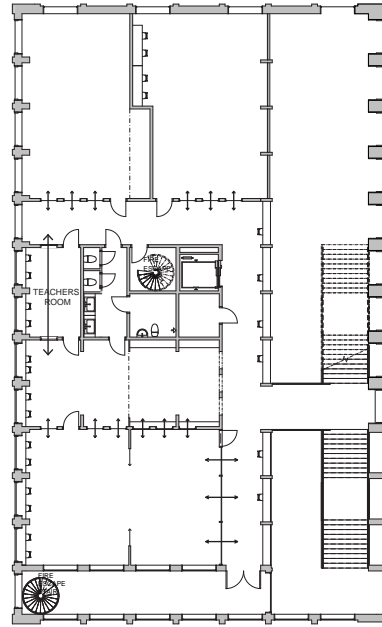
The school is divided into three main clusters; one for language, one for social science and one for natural science. When walking the stair up from the ground level they are placed on each floor according to level of interaction and concentration.

Each floor is accessed in a different point which makes them all slightly different but with common ideas behind how to move around and what kind of spaces are found. The floor plan of the clusters all consists of room for individual work, teachers workspace, a dark core with toilets and elevator connected to a corridor which enhances the view to the water. Each cluster have access to either a terrass or a balcony. There are windows from every classroom overlooking the corridors and the teachers workspace have a central position to see the children and for the children to feel that the teachers are accessible to them.

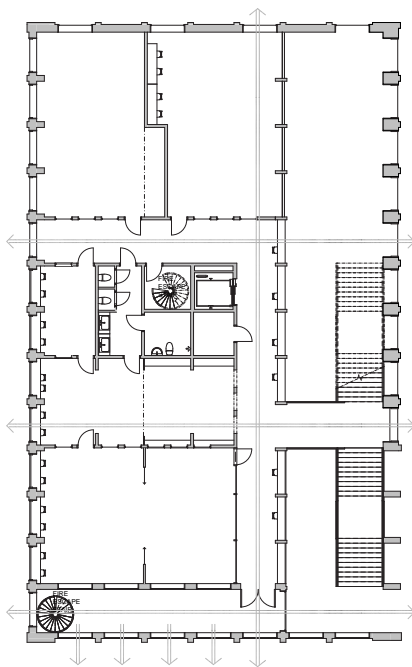
I was inspired by the paper 14 patterns of biophilic design and have incorporated the patterns visual contact with water, prospect and refuge. Both in the room for individual work and in some classrooms spaces with a lower ceiling and benches along the walls are found where one can be in an embedded atmosphere but still in contact with the others. Along the west facade there are seats shielded by the pillars overlooking the water and on the other side overlooking the airy and light room which is the staircase.



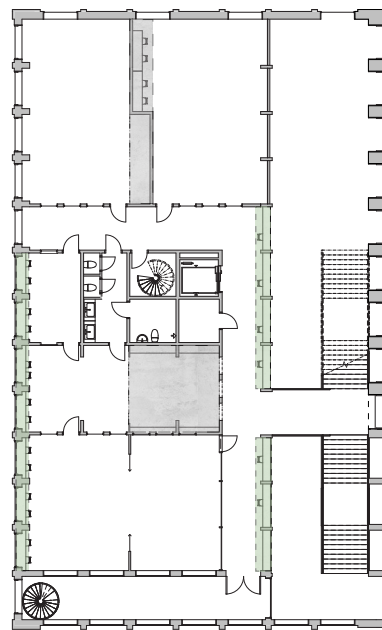
ZONING AND CIRCULATION



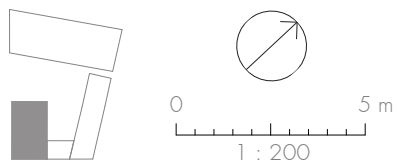
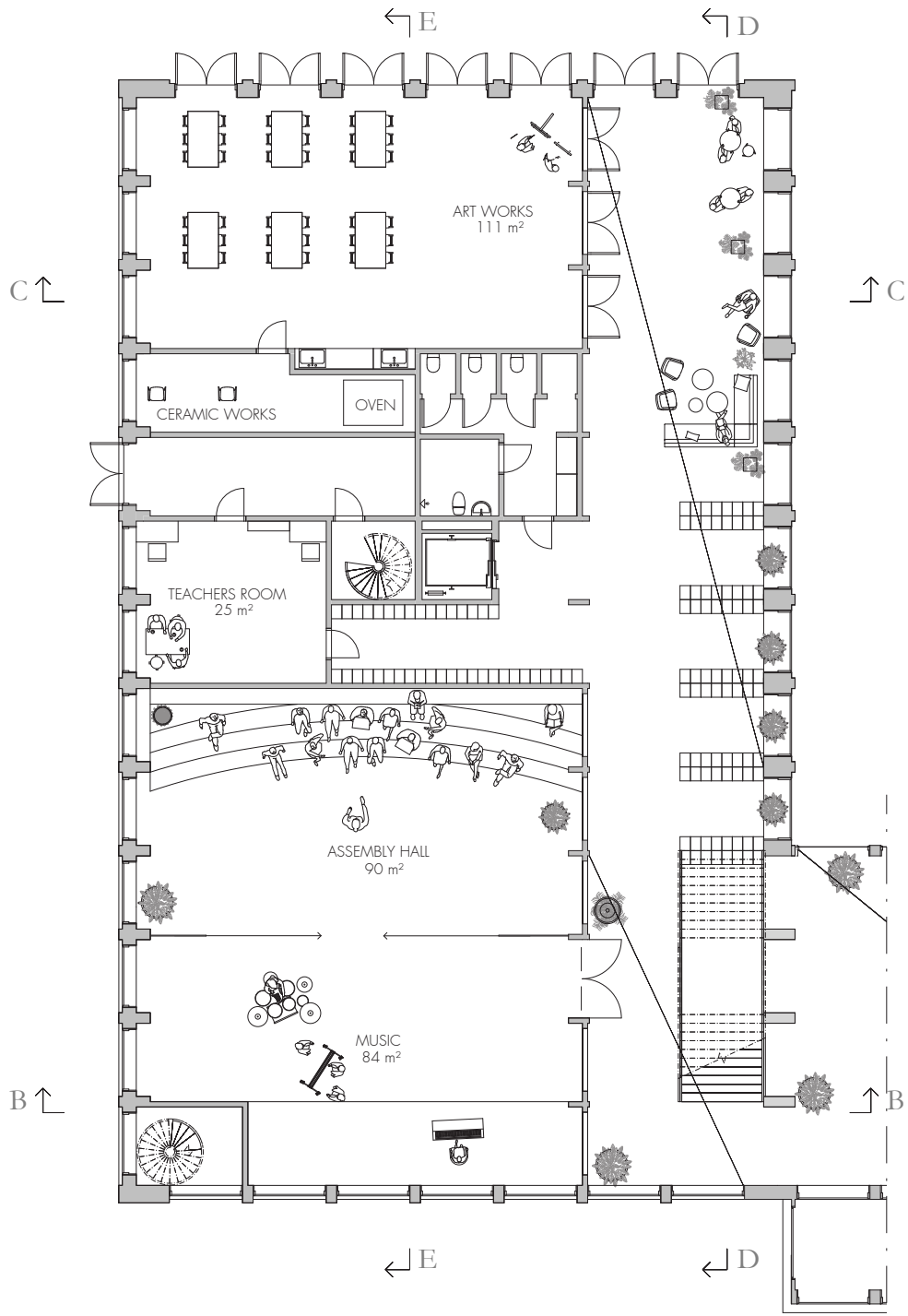
OVERVIEW AND TRANSPARENCY



CONTACT WITH NATURE



PROSPECT AND REFUGE



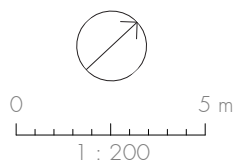
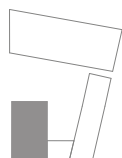
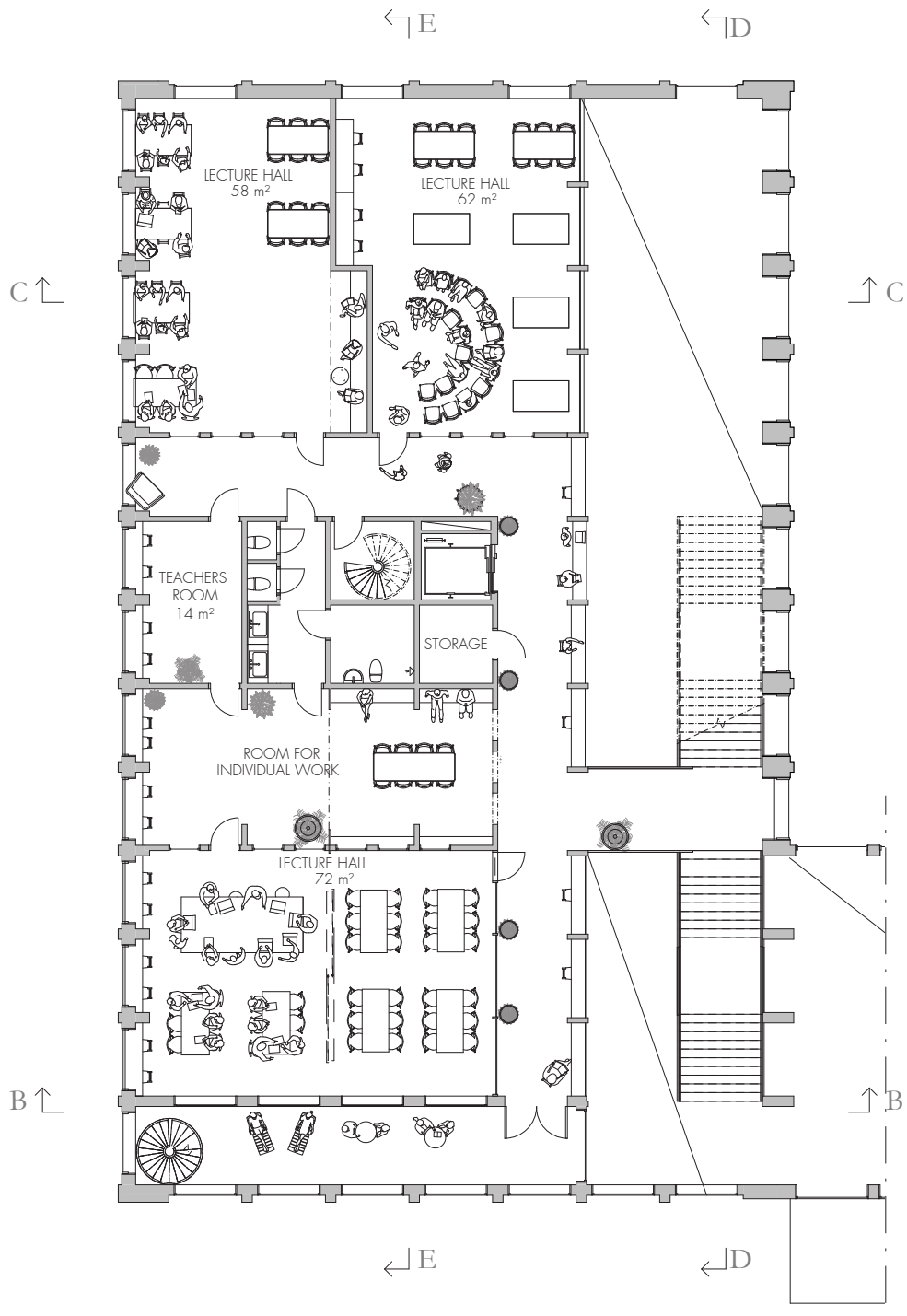


# GROUND FLOOR

secondary school



On the ground floor of the secondary school the classrooms for art and music are found. There is an assembly hall for bigger tutorials with sliding doors to the music hall that can be opened up into one big room during celebrations such as lucia. The ground floor is the main hang out area during breaks and i wanted it to inspire to do more than just sit along the wall watching people playing table tennis. Music and artworks are not a big part of the curriculum and these rooms are therefor not occupied most of the day. By making the spaces for music and art accessible and visible I wanted to inspire to a habit of using creative work as a positive distraction and recreation.



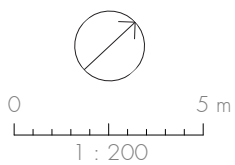
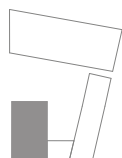
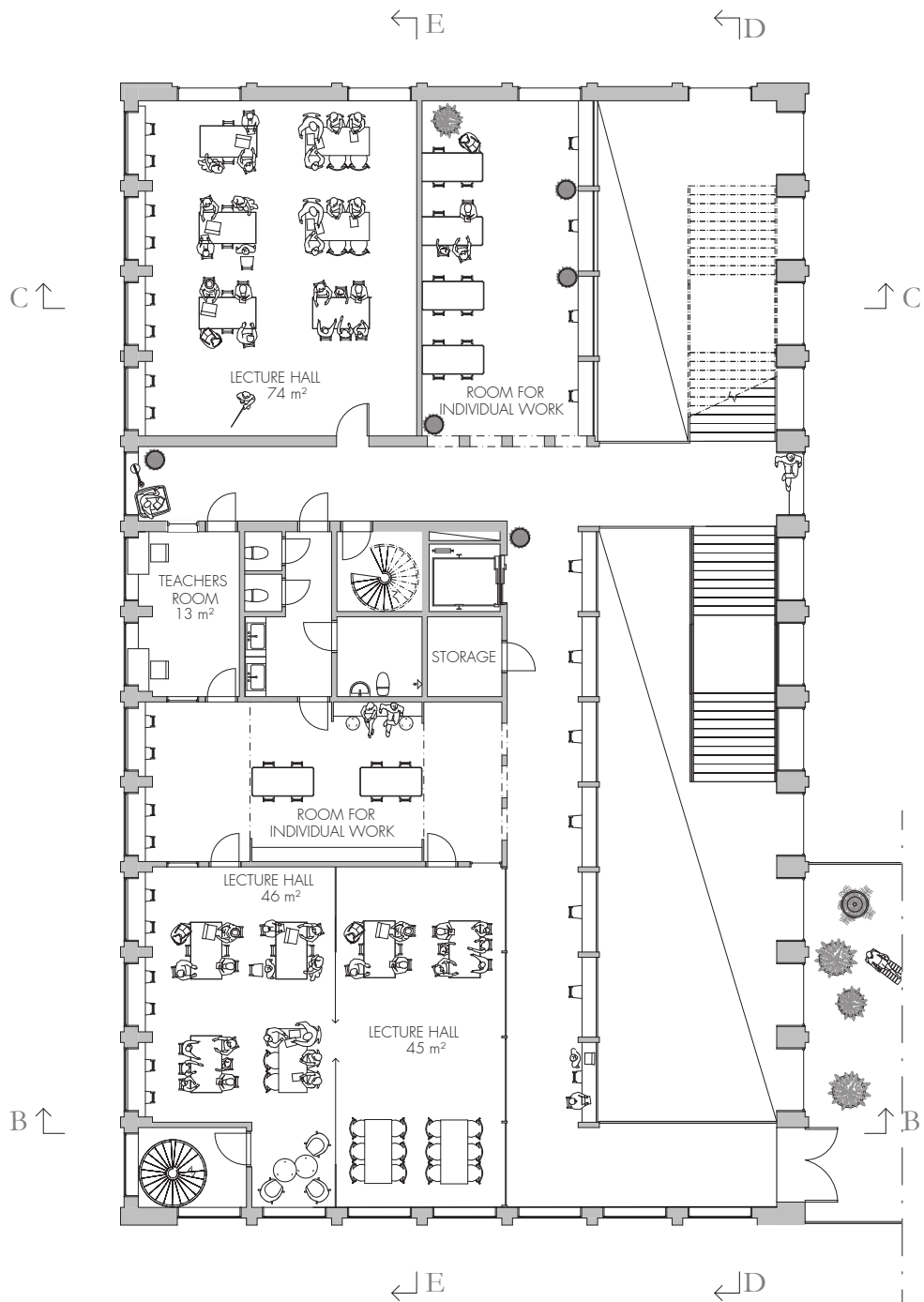


# FIRST FLOOR

secondary school



The first floor is the cluster for languages. Here the class is supposed to interact a lot with each other and the groups to be smaller depending on how many languages are available as second language. There is one bigger room for individual work and some more sheltered spaces along the walls separating the lecture halls to the north.





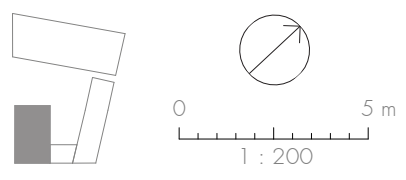
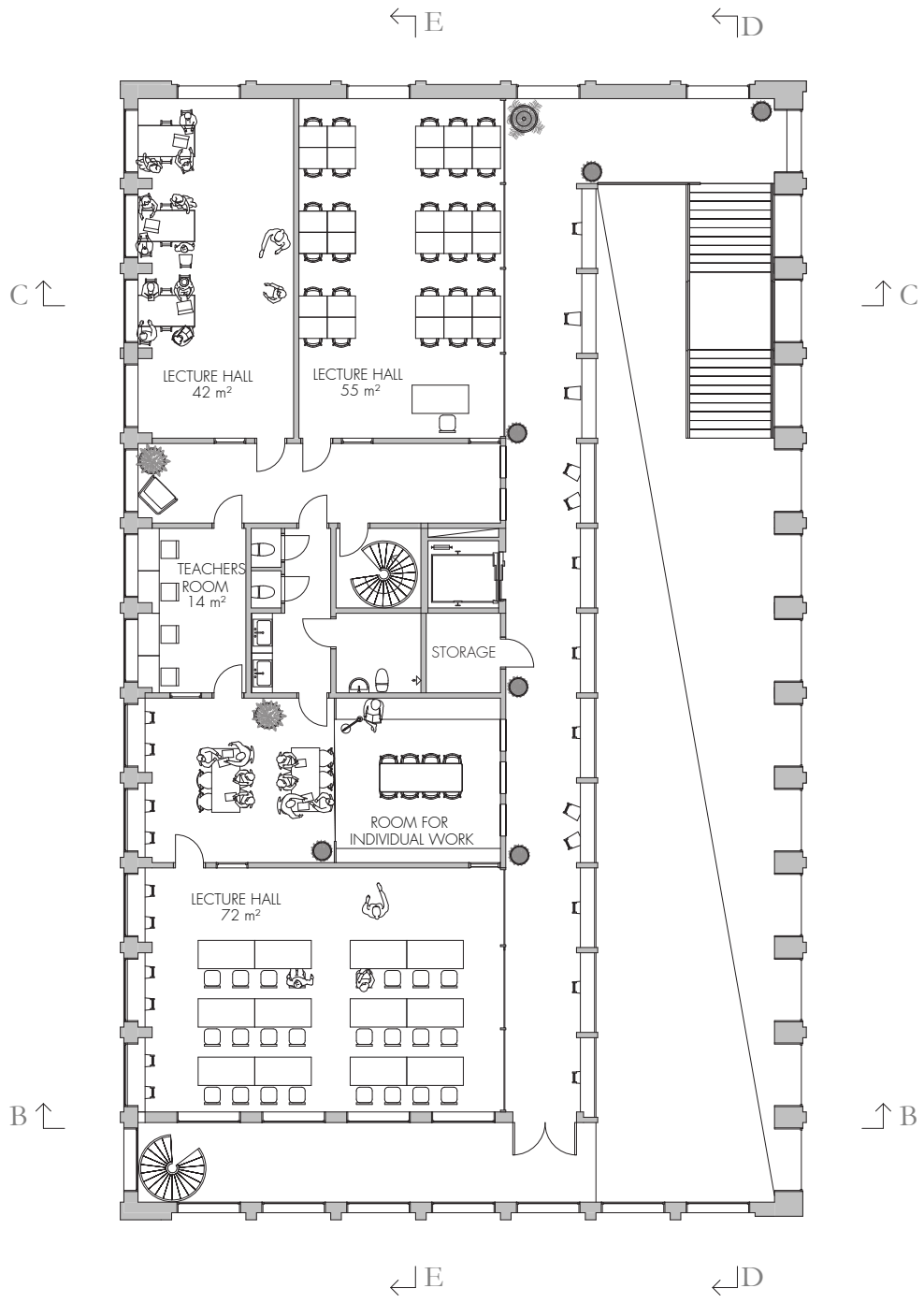
# SECOND FLOOR

secondary school



On the second floor you find the cluster for social science and swedish. Here the focus is more on group and individual work with shorter lectures maybe held for everyone at the same time in the assembly hall and with more spaces to withdraw. Here the outdoor classroom is accessed.





## THIRD FLOOR

secondary school



On the top level the cluster for natural science is found with a big lecture hall for laboratory work. On this level there is a nice view over the water with long sight lines. Shielded between the pillars the view frames the water and you can look out without having disturbing movements to break the concentration.

# SECTION B - B

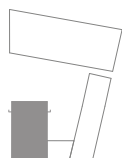
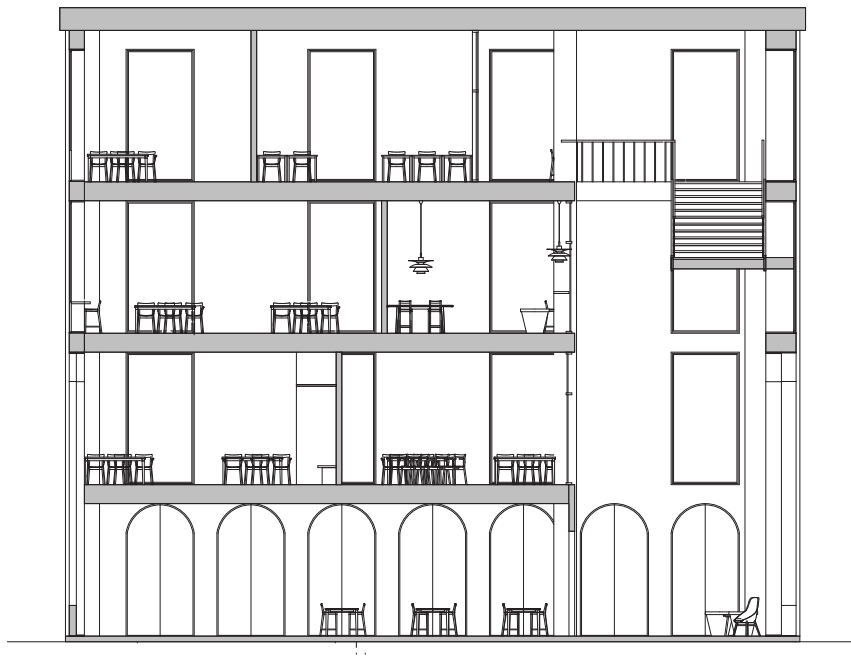
secondary school



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# SECTION C - C

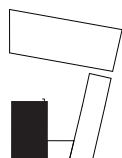
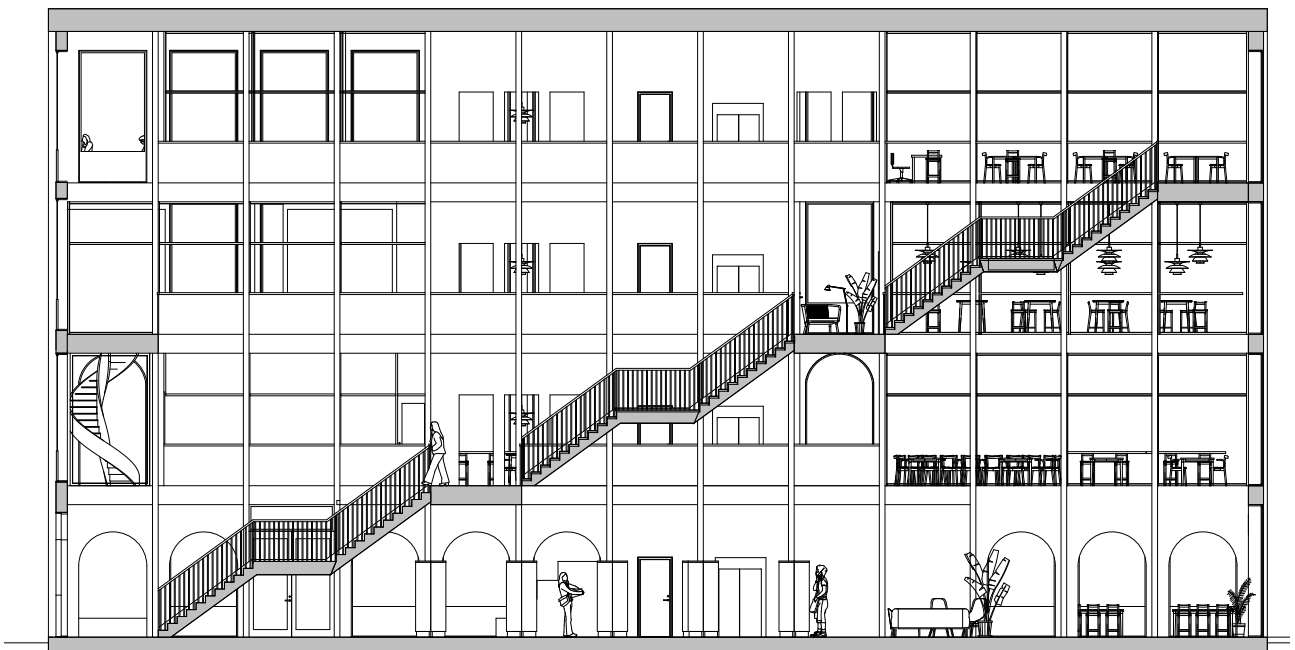
secondary school





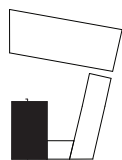
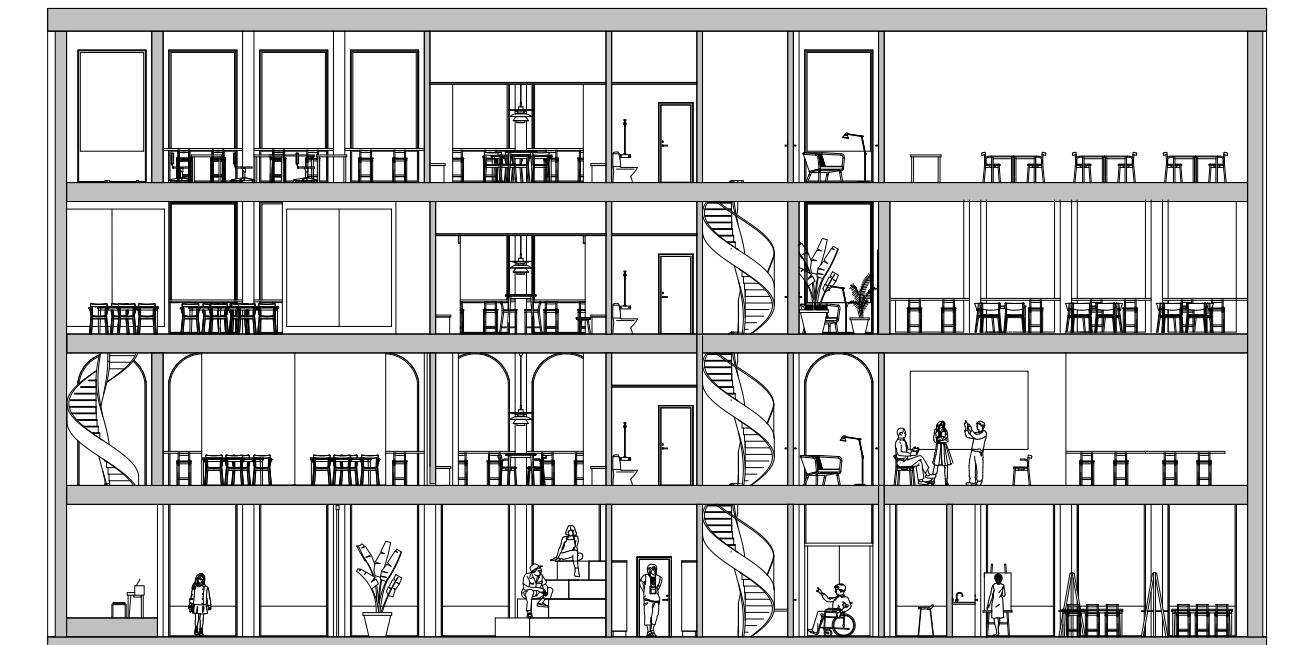
# SECTION D - D

secondary school



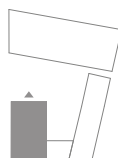
# SECTION E - E

secondary school



# NORTH FACADE

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# SOUTH FACADE

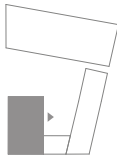
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# EAST FACADE

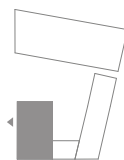
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# WEST FACADE

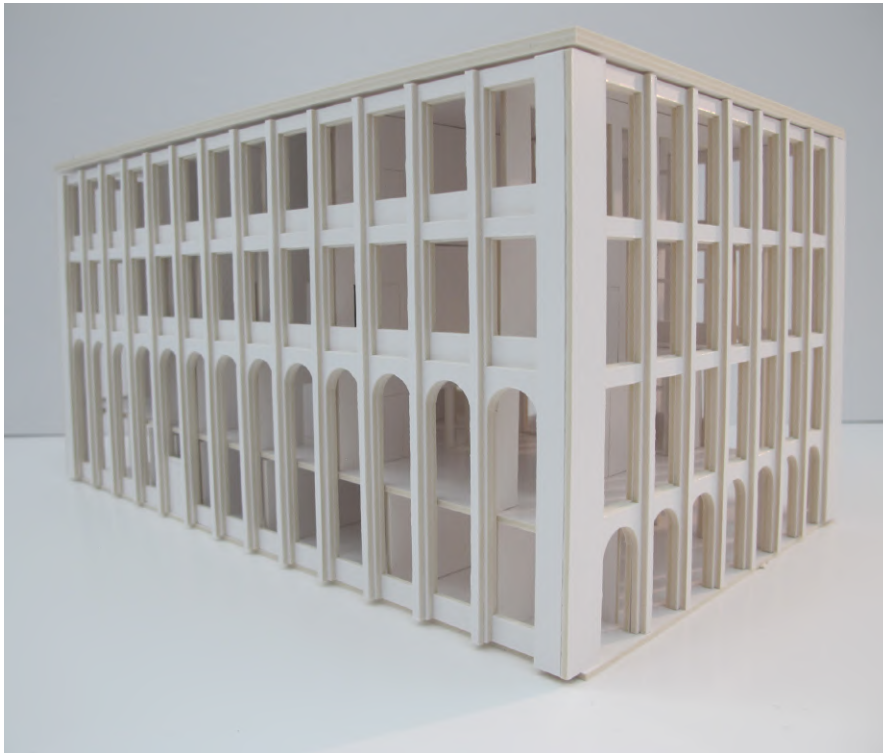
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# MODEL PHOTOS

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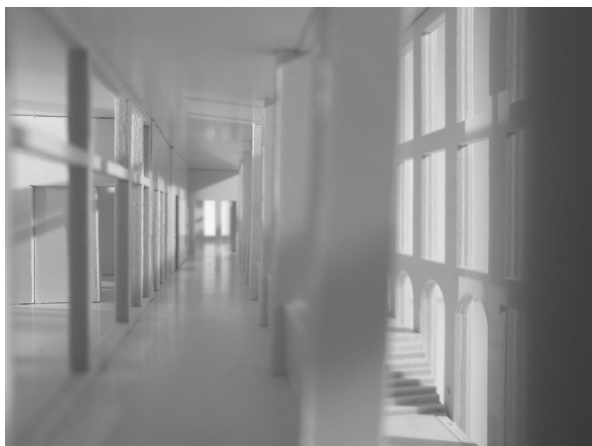
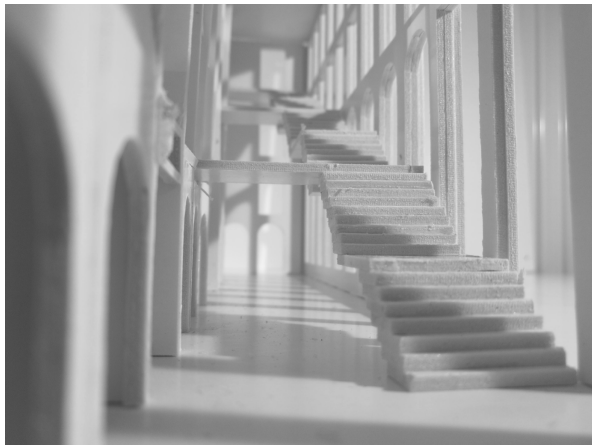
exterior



# MODEL PHOTOS

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interior

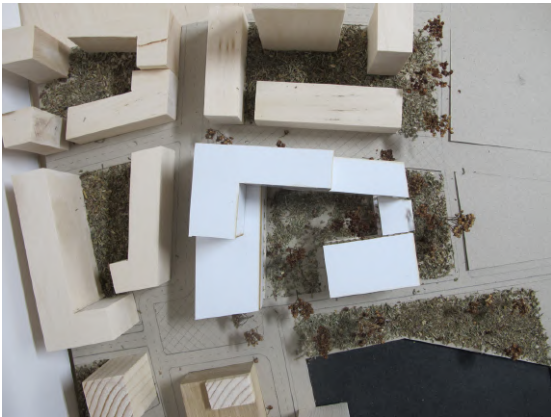




# MODEL PHOTOS

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site



## REFLECTION

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To conclude and answer my question; How can a school building support mental wellbeing and learning through its design? I would say it's through empathy and empowerment. By spanning from the big scale where the school is given a prominent placement in the city to the small niche where one can sit and watch a beautiful tree at its blossom. With an exterior that has a sense of permanence and that is showing that the activity inside is important and an interior with a lot of daylight and inviting spaces to sit down I hope that this building will give children and teachers a feeling of belonging, being seen and important and that it gives a lust to learn.

# LITERATURE

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Arevik, N. (2018, 4 June). Lärares stress svar. Lärarnas tidning. Retrieved from <https://lararnastidning.se/larares-stress-svar/>

Browning, W.D., Ryan, C.O., Clancy, J.O. (2014). 14 Patterns of Biophilic: Improving health and well-being in the built environment. Terrapin Bright Green. Retrieved from <https://www.terrapinbrightgreen.com/reports/14-patterns/?fbclid=IwAR3OSAnuP0GJ2HStsUwCdYGwtGmK0kNqi4rP8c3umfTI0VfMHXZ8p9JMNd8>

Folkhälsomyndigheten, (2018). Varför har den psykiska ohälsan ökat bland barn och unga i Sverige?. Retrieved from <https://www.folkhalsomyndigheten.se/publicerat-material/>

Kirkeby, I, M. (2006). Skolen finder sted. Hørsholm : Statens byggeforskningsinstitut.

Kristenson, H. (2005) Skolhuset : idé och form. Lund : Signum

de Laval, S. (2017). Skolans nya rum: En antologi om samspelat mellan pedagogik och arkitektur. Arkus.

Opinion Bygga Skola. (2018). 1000 goda skolor på 10 år: nu bygger vi våra barns framtid. Retrieved from <http://byggaskola.se/opinion/>

Pallasmaa, J. (2012). The eyes of the skin : architecture and the senses. Chichester : Wiley

Solnit, R. (2005) Gå vilse: en fälthandbok. Göteborg: Daidalos

Thodeluis, C., Andersson, B., (2019). Trygg och säker skola.

Ulrich R, S. (2002). Health Benefits of Gardens in Hospitals  
[https://www.researchgate.net/publication/252307449\\_Health\\_Benefits\\_of\\_Gardens\\_in\\_Hospitals](https://www.researchgate.net/publication/252307449_Health_Benefits_of_Gardens_in_Hospitals)

Wallin, E. (2000). Skola 2000. Nu!. Stockholm : Rådet för arbetslivsforskning

Zumthor, P. (2006) Atmospheres : Architectural environments ; surrounding objects. Basel : Birkhäuser

# PICTURES

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fig 1

Salva López (Photographer)

Retrieved from URL

<http://hicarquitectura.com/2017/04/xavier-corbero-casa/>

fig 2

Salva López (Photographer)

Retrieved from URL

<http://hicarquitectura.com/2017/04/xavier-corbero-casa/>

fig 3

Salva López (Photographer)

Retrieved from URL

<https://kinfolk.com/xavier-corbero/>

fig 4

Jens Frederiksen (Photographer)

Retrieved from URL

<https://arkitekten.dk/2018/02/hvor-blev-historien-af/>

fig 5

Kristenson, H. (2005) Skolhuset : idé och form.

fig 6

Retrieved from URL

<https://www.youtube.com/watch?v=5borTel9W9I>

fig 7

Planlösning Glömstaskolan

Retrieved from URL

<http://www.origoark.se/glomsta/>

fig 8

Matsalen Glömstaskolan

Retrieved from URL

<http://www.origoark.se/glomsta/>