MASTER'S THESIS, HEALTHCARE ARCHITECTURE

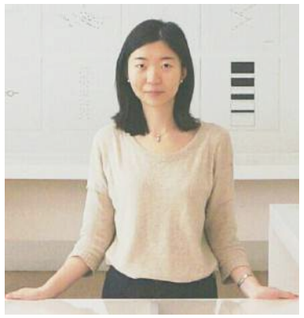
REPORT

2014
SPRING

FANGFEI WU

I N S E R T

New emergency building in Vrinnevi hospital in Norrköping



My name is **Fangfei WU**. I was born in Beijing. I have done my Architecture bachelor degree in Beijing, and this is the last year of my master study in Chalmers University of Technology, Major in Architecture and Urban Design.

My Master thesis is the New emergency building in Norrköping and has been presented publicly on May 27 at Chalmers. I heard from the hospital staff that Sweco Healthcare Architecture team in Stockholm is in charge of the same project right now.

EXAMINER: Ola Nylander

SUPERVISOR: Peter Fröst

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HEALTHCARE ARCHITECTURE IN CHINA

FANGFEI WU,2014-05-13

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BACKGROUND

Long periods of slow transition alternate with sudden changes, and sometimes these changes are real revolutions that drastically change the way hospitals operate and put new people in charge. Hospitals are buildings used for the care and cure of the ill and the injured.

The first example of hospitals emulate the model of the classical temple, which is hardly surprising, since the concept of healing was closely linked to religious rites and rituals. Besides, at that time the hospitals also connected to a church or a cathedral.

During 1400-1500, amoung the most famous is the Ospedale Maggiore, founded in Milan in 1456, and designed by Antonio Filarete. The first hospital to be designed according the geometrical principles of the Renaissance, it is a symmetrical composition with a large central courtyard; on both sides of it, the wings of the building delineate four smaller courtyards.

By the middle of the nineteenth century, the pavilion type had conquered the world, it was either almshouses with integrated healthcare, or an indispensable part of the military. But the corridor type showed serious deficiencies, besides, the sewage system and clean air also had problems. It was time for a change.

After 1950, lots of specialist hospitals came out, with L type, H type, K type or T type plan. After the public health age and technological age, we are now in the third, the age of the chronically ill and elderly, is witnessing a renaissance in public health.

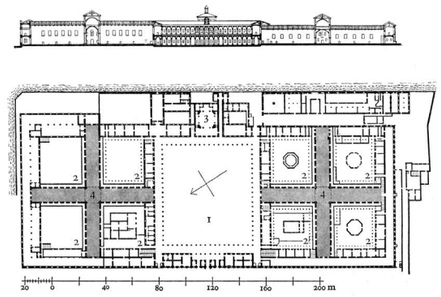
1100

Convents
Churches

Ourscamp(F)/ Infirmerie
(1129)

1400 - 1500

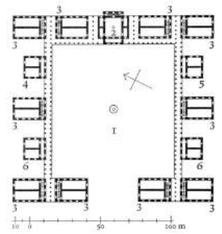
Renaissance
Palazzo



Milan(Italy)/ Ospedale Maggiore/
ark Antonio Filarete (1456)

1750

the Enlightenment
Pavilions



Plymouth(UK)/ Royal Naval
ark Rovehead (1756-64)

Frederiks Hospital/ Denmark
(1910)

1950 - 2000

Modernism
Systematic
Structure

I N S E R T

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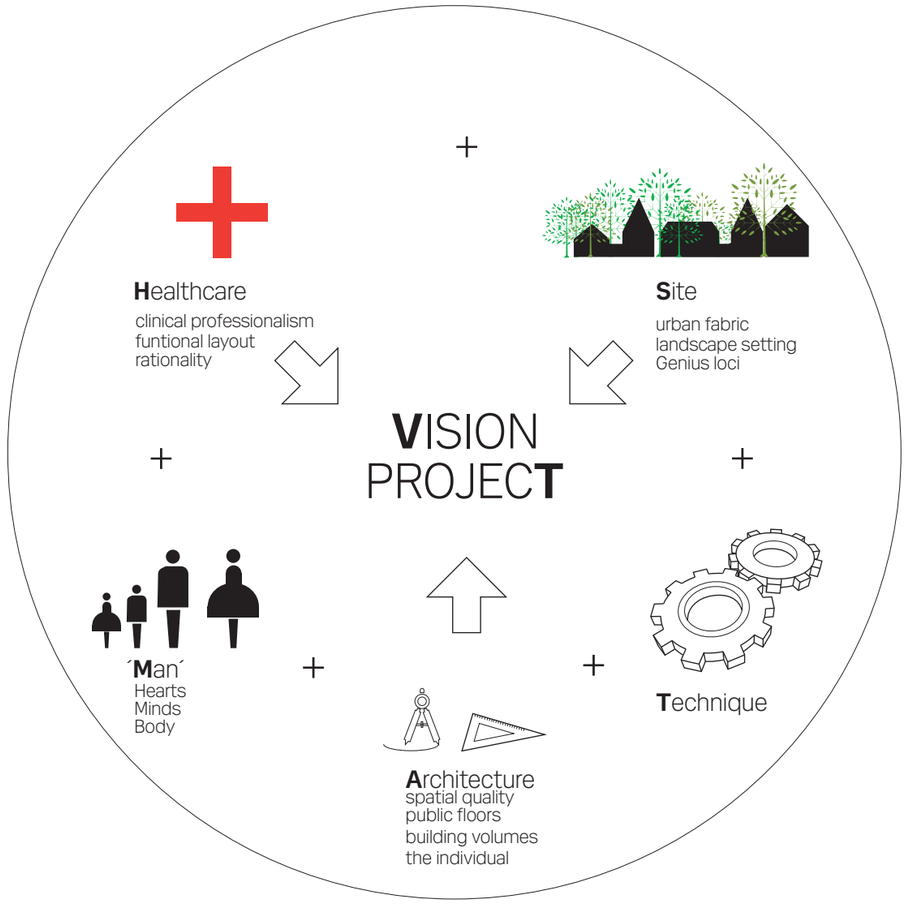
BACKGROUND

As architects and town planners, how can we be sure we have incorporated all the relevant aspects? Do we have enough information to analyze today's hospitals? Have we really taken into account all the opportunities and obstacles that should be included in a realistic view of the future?

Today, a lot is expected from the hospital: it should be accessible to all, humane, less expensive, and more efficient from a point of view. Can these contradictory demands be satisfied? And what about hospital architecture: can it meet all these challenges? Is esternal life an option for these buildings, whether they are old or new? Or, should we see new hospital architecture as provisioal, since hospitals have to accommodate permanently changing healthcare concepts and technologies?

The hospital : people live and die there, experiencing decisive moments in their lives-but how rare it is to see a hospital that is fit for living and really hospitable. It is much easier to talk about the functional efficiency of a plan, the techincal features of the medical equipment, the way patients are monitored, strategies to facilitate maintenance, standardization of space, and so on. In themselves, these are important enough issues, but if they are the only ones determining how a hospital is conceived, architects will fail in their primary mission: to humanize the hospital, instead of institutionalizing it.

It is safe to state that the hospital's layout has been determined by urban concepts, and the opportunities for change depend largely on design decisions made in the initial planning stages.



I N S E R T

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BACKGROUND

How can architecture contribute to healing?

This question touches on the essence of architecture. Even though design is its core business, has far more fundamental issues to solve than the visual appearance of buildings. Finding ways to optimize the way a building functions requires the architect to be involved in formulating the program, the list of requirements that a project has to be accommodate. Thinking about a building's functions, the architect may look to other building typologies for inspiration—in the case of hospitals, we already noticed a tendency to emulate either shopping malls or wellness centers.

Before an architect even thinks about what a project will eventually look like, he or she must address these functional considerations. In the context of healthcare architecture, there is one particular aspects of buildings that concerns the potential healing properties of hospital environments. These healing properties have inspired a whole new design approach that is generally referred to as Evidence Based Design. Architects who follow this approach to hospital design use knowledge on the health impacts of specific physical characteristics of designed space on patients, staff and visitors.

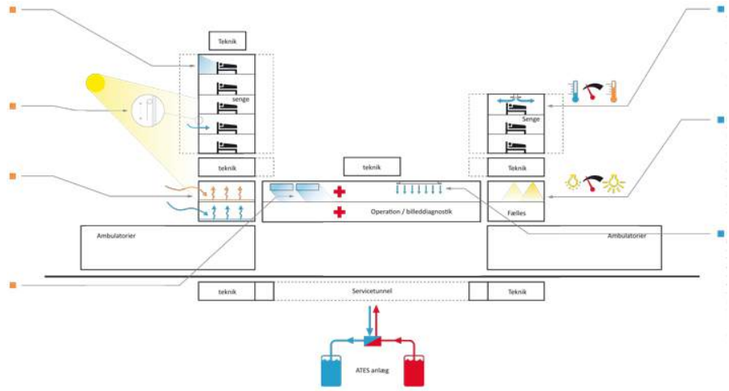
The architecture of hospitals should not focus on patient rooms and corridors, but rather on the construction of virtual, physical, and mental environments, thereby producing integral architecture at its best.

Sustainability

The likely future trajectory is quite straightforward when set within the following framework:

- Designing for lifecycle effectiveness. For the core (briefed) purpose, and from technical durability to a whole systems health economy
- Designing for adaptability
  Elasticity—changing demand
  Function—changing role
  Generality—intrinsic need
- Design as influencing culture as reflecting culture

This will require not only changes in investment criteria but recognition that we need to live in an age of 'frictionless' change. We need not only buildings (or portfolios of buildings) that are adaptable without major disruption, but also a workforce accepting of the need for continuous change as models of healthcare demand and response ebb and flows in the new landscape.



Evidence Based Design

Greater diversity will be essential to the success of future research endeavors in architecture for health. Evidence Based Design (EBD) sought, first and foremost, to place the patient at the center of the equation, not the machine. It was therefore humanist in its origins and aims. It is time to fully recognize that humanist-based research in architecture for health has so much to offer societies around the globe.

I N S E R T

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BACKGROUND

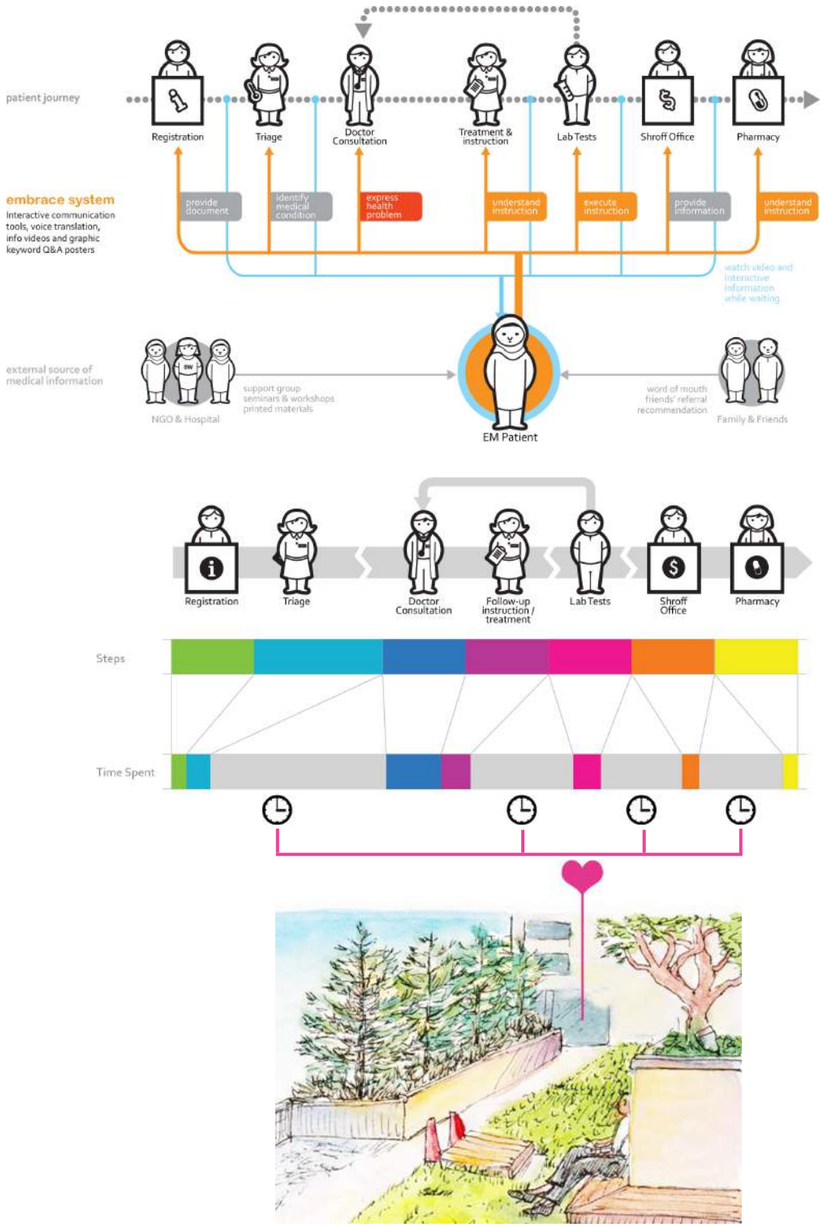
The healing garden

Healing is dependent on reestablishing successful relationships and developing reciprocity between these factors. In fact, healing is not a process of curing or fixing, but rather a return to balance between all of these components. Health, therefore, is understood as the presence of this balance; illness is its lack.

Accroding to today's analysis about daily patient journey in a hospital, it shows that patients and their relatives waste nearly 50% of their time waiting. So the idea to design the waiting area around the healing gardens is very important.

Healing garden is a place to be together and to be apart. Gardens derive their healing potential from the interaction of humans with nature, the community, and the self. Gardens should therefore accommodate a variety of groups and activities. Because gardens are holograms of more intimate realities, paths, walks, and enclosures can also symbolize the journey of life and the discovery of the self, rebirth and regeneration.

Not only are there advantages for the patients, but also for staff, who work in stressful jobs, under difficult conditions. Improving the work environment, including providing outdoor space for breaks, can be an important investment.



BACKGROUND

The healing garden

It is important to recognize that 'healing' is not synonymous with 'cute.' A garden cannot mend a broken leg or cure cancer, but it can do the following:
• Facilitate stress reduction, which helps the body reach a more balanced state
• Help patients summon up their own inner healing resources
• Help patients come to terms with incurable medical conditions
• Provide a setting where staff can conduct physical therapy, horticultural therapy, etc. with patients
• Provide staff with a needed retreat from the stress of work
• Provide a relaxed setting for patient-visitor interaction away from the hospital interior

The garden is to be used and reach its full potential:
• visibility
• accessibility
• familiarity
• quiet
• comfort
• unambiguously positive art

Not only are there advantages for the patients, but also for staff, who work in stressful jobs, under difficult conditions. Improving the work environment, including providing outdoor space for breaks, can be an important investment.

Light

A great deal of attention has also been devoted to the play of light and shadow which, naturally, has always been an important theme in architecture. It has direct consequences for the way a space is inhabited, as well as symbolic implications.

Light defines how a project manifests itself at different levels:
• The walkways and gardens, as well as the spaces between the buildings, derive their scale and proportions from the play of light and shadow
• The patios capture, reflect and distribute the light in the heart of the nursing units
• The patient room is defined by the window and the way it filters and spreads the light.

What is important is not the equal distribution of light, but rather the way it explains or, more modestly put, reveals, the essence of the spatial layout. What matters is how lighting helps to create relationships between the spaces in the hospital, while endowing them with their own characteristics. Sometimes the gallery is alternated with niches that invite people to sit down. Within the patient rooms, the windows are a frame and, at the same time, a separate space with a scale that relates to the scale of the room. The window marks a place of interaction with the world outsides; its proportions answer the twofold need to make the room a protected place that is also an open space -a place where there is shadow as well as light.

A new future for old hospital

Designing hospitals for the future is a hazardous task: developments inmedical science and technology requires them to be flexible, budget constraints necessitate economic and efficient buildings, and patients expect them to be comfortable. Thinking about the future of our hospitals, we should see them as part of (urban) life.

Integrating the old parts with the new volumes involves a play of connections. This play is not limited to the site of the hospital itself, but has an urban dimension as well. The magistrale is an 'in between' element, linking the historical monument with the world outside it. And the most gratifying is undoubtedly the transformation of the hospital area into a landscape garden in the city. Another advantage is increased flexibility, both in the spatial solutions it allows and in the ways the working procedures are organized.

What will the future hospital like? Instead of programming spaces, we should program hospital functions, and we should see them not as determined by medical procedures, but by human needs, which is the first guiding principle. But there are others, too:

- Hospitals should be part of urban life, not isolated from it.
- Hospitals should be able to absorb future changes without losing their characteristic features.
- Instead of minimizing construction costs, we should focus on running costs.
- Instead of isolating medical functions in large-scale centralized facilities, we should integrate them into society by the use of small-scale satellites.
- Finally, hospitals need to make full use of architecture.

Hospital Architecture in the year 2050

By 2050, for those fortunate enough to have one, the home, not the hospital, will be the enter of one's healthcare 'universe' supplemented by anyplace where one has online access to health information. Health promotion, sickness prevention education, and self-empowerment is inhibited by a global discrepany between high tech versus low tech societies and conflicting priorities between private and public agencies.

The hospital and its successor institution will, as a building type, retain its timeless, essential role in the care of the most acutely ill. This is already occurring: online medical databanks and telemedicine practices are being formed in anticipation of comingboom in home-based virtual healthcare.

The dwelling is being rethought in support of its new function as a virtual clinic. Holographic 'consultation sessions' with one's caregiver will occur in one's family room or kitchen. The possibility exists, in theory at least, that the patient, if one has access to such resources, will have access to health information anywhere, anytime.

Besides, many hospices are currently employing such humanist technologies as artificial landscapes, which have positive results. Today, hospital architects tend to think of the natural environment as itself therapeutic, yet still one step-removed form the formal language of architecture. Maybe the better way is to bring the nature into buildings as a means to protect the nature, to save the nature, ironically, from 'destruction,' and to preserve its inherent beauty for future generations to admire and take cognizance of.

Reference list:

Abram de Swaan et al. M. (2006). The Architecture of hospitals.
Robin Guenther and Gail Vittori, M. (2013). Sustainable healthcare architecture.

Some problems about Today's Hospital

E.R.

In some hospitals, patients by ambulances and patients visiting on their own are mixed. In this case, some seriously injured patients can be seen by others including non-patients who accompany other patients.

Ceiling Indicator

Emergency patients are limited by their conditions and cannot get up the bed. They are not able to predict what is going to happen next.

Bedrooms

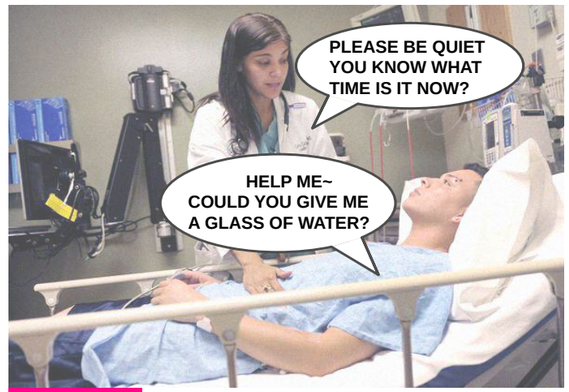
Patients have no choice in bed locations and the patients they share the room with.
Although patients are provided with a locker to store their belongings, patients still have to get of their bed to access it.

Personal Space

There is not enough space and furniture for simultaneous ongoing activities. The patient has constantly to re-arrange his belongings.

Bedrooms II

View protectors still donnot provide the necessary intimacy.



Bedrooms III

Incidents often occur in the evening and night. Patients call the nurses to get help whether they really need it or not. The other patients could get disturbed by such calls.

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STUDY TRIP REFERENCE

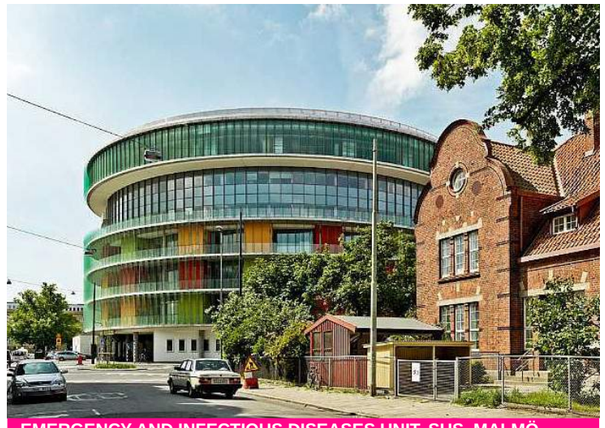
Study Trip (Reference)

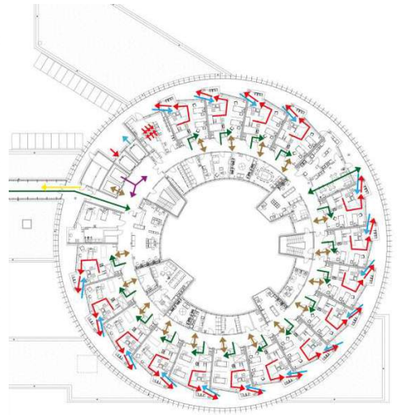
The university hospital area is a rapidly developing, hi-tech science center and is becoming increasingly bolstered by infrastructural projects like a city tunnel and public transportation, both of which converge at the site. The competition-winning proposal distinguished itself with a round, drum-like form that served to both exceed the logistical requirements of infectious disease healthcare as well as create an embracing, welcoming tectonic composition of colorful volumes and glass.

Terraced, plastered facades are cut by polychrome masses and protected by weather-deflecting glazed panes. Design becomes a form of infection control, in that patients enter an isolated ward via an airlocked hallway that surrounds the building. Interior and exterior elevators have expressly different purposes; patients of the units and hospital waste use the former, while staff, supplies and clean materials use the latter.

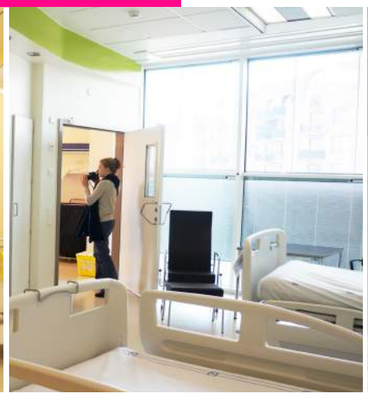
Following the principles of evidence-based design, single patient rooms for shorter stays are relegated to specific areas so as to avoid medical errors and each ward can be cordoned off into smaller units in the event of an epidemic.

Quality daylight and colorful finishes have been consciously employed to hasten the healing process and create a comfortable, therapeutic environment. The acute care department occupies the ground floor, upon which the glazed superstructure rests. Three levels are dedicated to the clinic while the top floor serves as the technology center and link to the existing surgery and ambulance buildings.





EMERGENCY AND INFECTIOUS DISEASES UNIT, SUS, MALMÖ by C.F.Møller



I N S E R T

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STUDY TRIP REFERENCE

Study Trip (Reference)

White's task was to provide for the needs of the complex activities comprising modern healthcare, but also to create a good working environment and a friendly, hopeful environment for the patients. An important element of the project was to ensure that the building, which is located in the centre of Lund, would become a profile building.

Creating a light, bright environment is challenging for healthcare buildings that have a lot of enclosed rooms. The solution here has been, as far as possible, to design the rooms with glass walls onto the corridors, with clear glass at floor and ceiling levels, and opaque obscured glass in between. Atria bring more daylight into the building. The larger glass sections from floor to ceiling in conference rooms, staff rooms and waiting rooms open up the façade and provide a view out.

As regards the exteriors, the thick concrete façades have been clad in a mosaic, with various nuances of shimmering glass, creating a feeling of lightness. The new and old buildings are linked together by a glass hall for the main entrance.

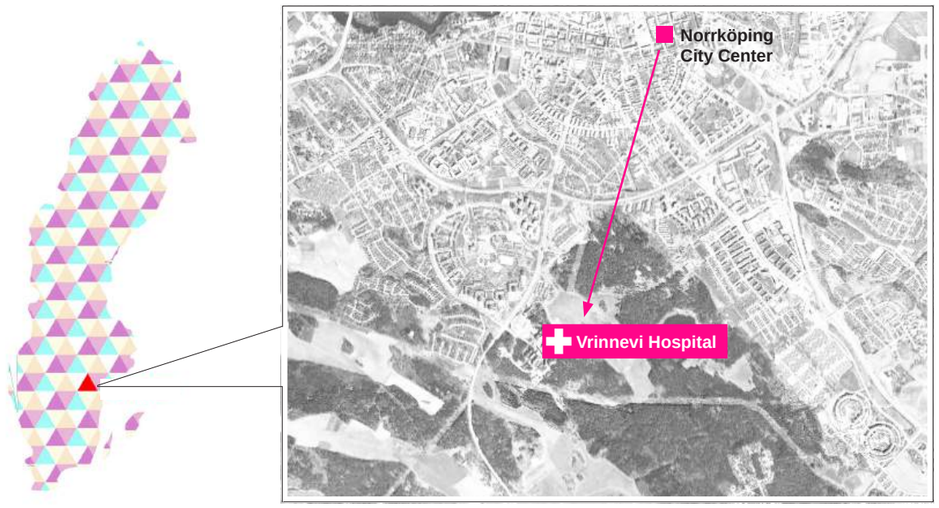
A beautiful building for the healthcare of the future in the embrace of a green forecourt.

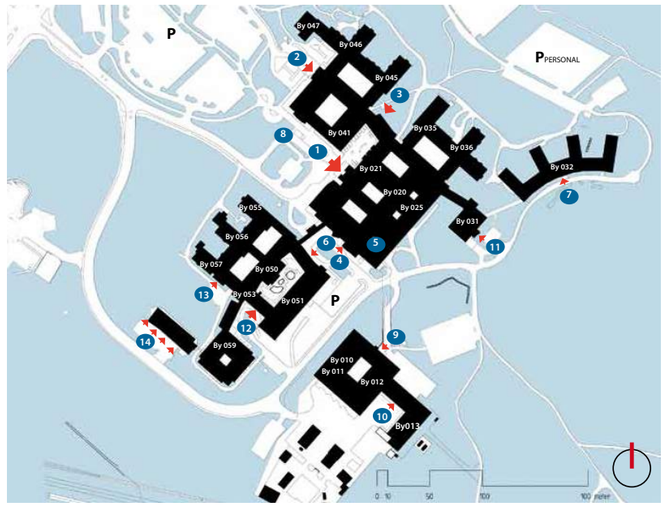
RADIOTHERAPY BUILDING, SKÅNE UNIVERSITY HOSPITAL, LUND by White

I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

CITY NORRKÖPING





1. Main Entrance
2. Blue Gate
3. Green Gate
4. Emergency Department
5. Helipad
6. Childbirth Entrance
7. Akute Ward, Adult Psychiatry
8. Bus Stop
9. Service Building Entrance
10. Goods receiving
11. Mortuary
12. Yellow Gate
13. Antenatal Clinic
14. Ambulance Station

Norrköping boasts a geographical location for both people and companies accentuated by an efficient transport hub featuring the railway, a net of highways, the airport and the second largest port, measured by the value of the cargo handled. By train you can reach Stockholm in 75 minutes and the same journey by car takes 90 minutes. We are around 132 000 inhabitant.

Vrinnevisjukhuset in Norrköping (ViN) is a county hospital for eastern Östergötland about 170 000 inhabitants. The hospital cooperates with other hospitals within the county, with the county body care centers and with institutions of Health Sciences.

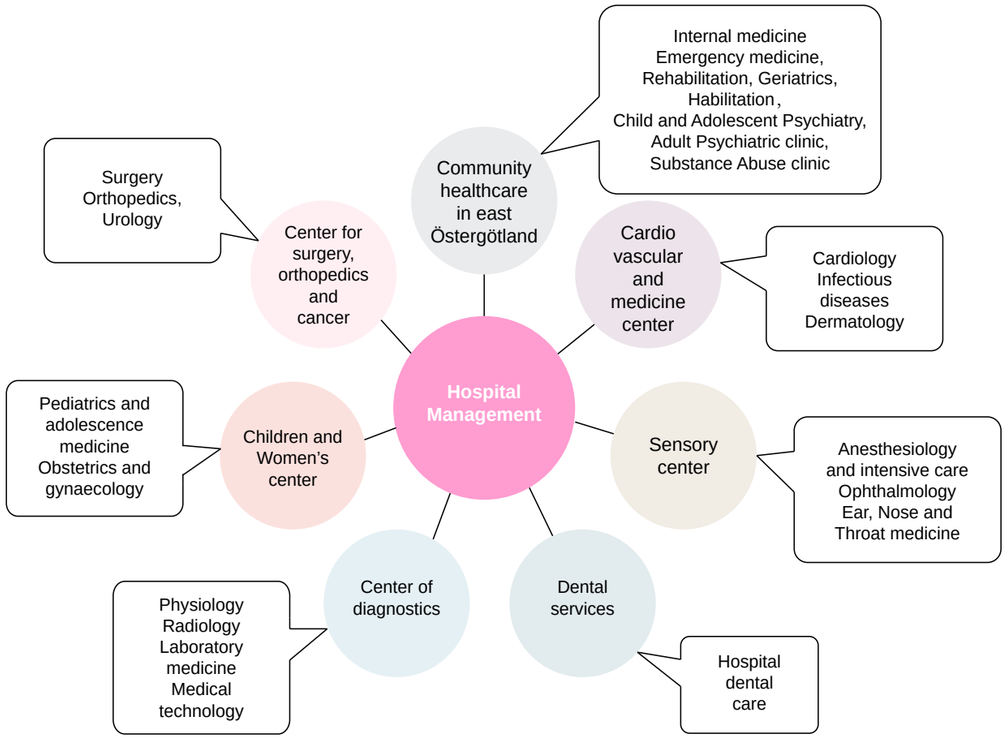
The hospital has about 310 beds and approximately 2,200 employees. Vrinnevisjukhuset offers a modern diagnostics, safe care and treatment. Acute seriously ill and injured a speedy and qualified medical assistance round the clock.

An emergency hospital with focus on:
•High patient safety
•Smooth collaboration
•Highquality education

I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

VRINNEVI HOSPITAL



Production example	2010	2020
Care episodes	22 513	24 430
Days of hospital stay	97 229	106 710
Outpatients visits	339 412	360 540
Emergency visits	50 000	
Surgery, inpatients	4118	
Daycare operations	7748	
Deliveries	2300	

The catchment area for Vrinnevisjukhuset is the eastern part of the county and consists of Norrkoping, Finspång, Söderköping and Valdemarsvik municipalities.

The total catchment area of the county Östergötland consisted of 429 642 inhabitants in 2010. Of these were172,581 residents in the eastern part of the county, i.e. (that is)40% of Östergötland population. The forecast of 2020, the population will increase to 180500 people in 2020. An increase of 4.6%. In 2020, persons 60 years or older will constitute 27 percent of the population in the eastern part of the county. Comparing with 2000 when they constitued 22.8%. This represents a 4.2% increase of the care-giving age group. Above all, the number of people 60-79 years old increase, while the number of people over 80 only increases marginally.

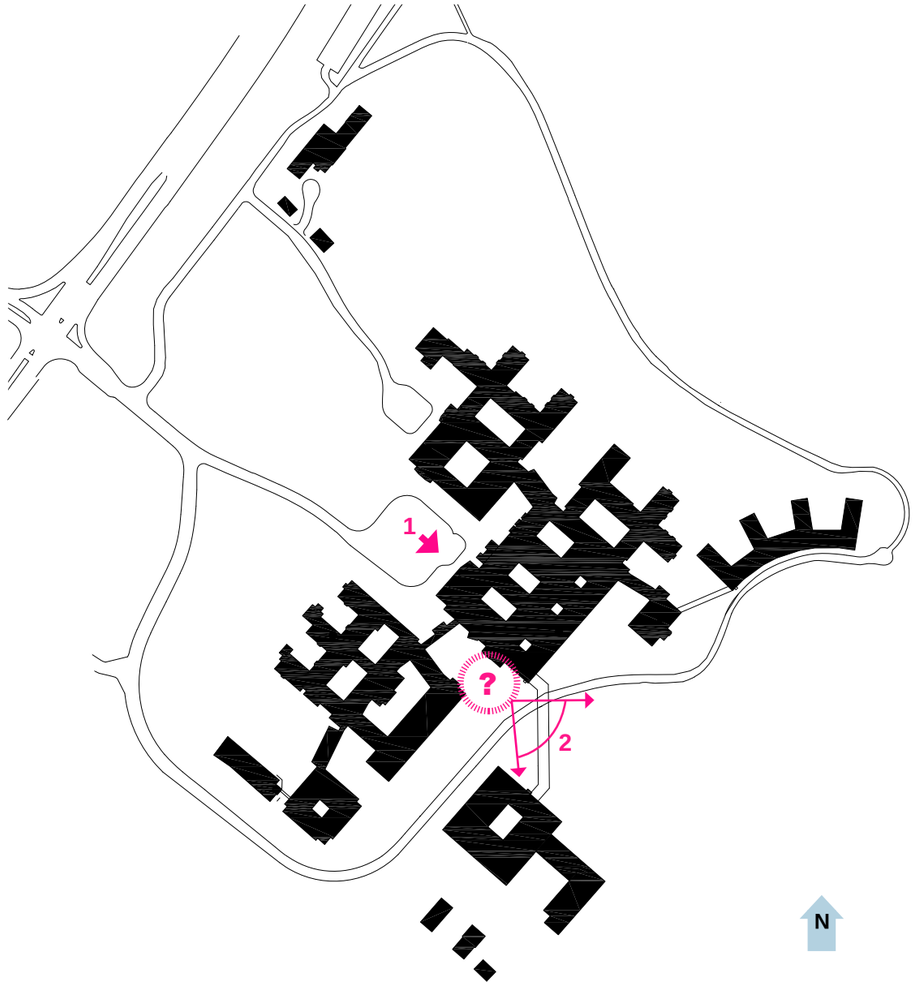
Vision 2020: Adapt our premises to meet the demands of healthcare in the future

- Modernize psychiatric facilities and create a sobering unit
- Patientsafe and effectively planned emergency unit
- Outpatient surgery unit (separation of inpatient surgery and outpatient surgery)
- Surgical units on the same floor as surgery and intensive care
- Medical units on the same floor
- Registration and payment will be made in the main entrance
- Patientsafe and flexible built wards > 50% single rooms
- Patient safe and modern premises for neonatology closely located to the labor ward and maternity department
- Conference, clinical research, education and training facility centre

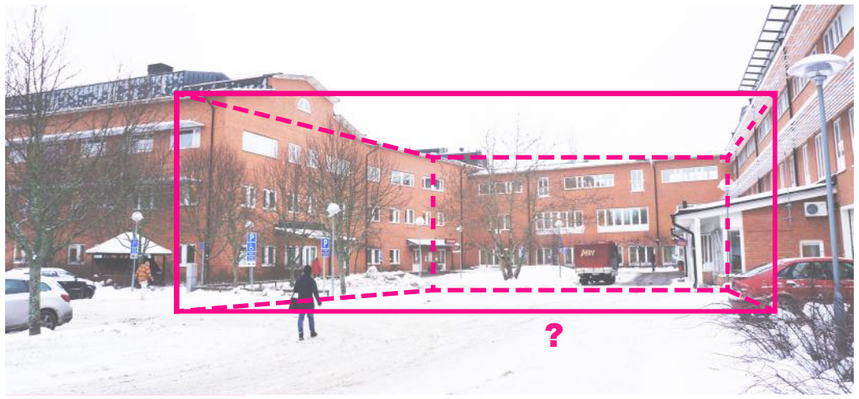
I N S E R T

New emergency building in
Vrinnevi hospital in Norrköping

THE SITE




1. Main Entrance



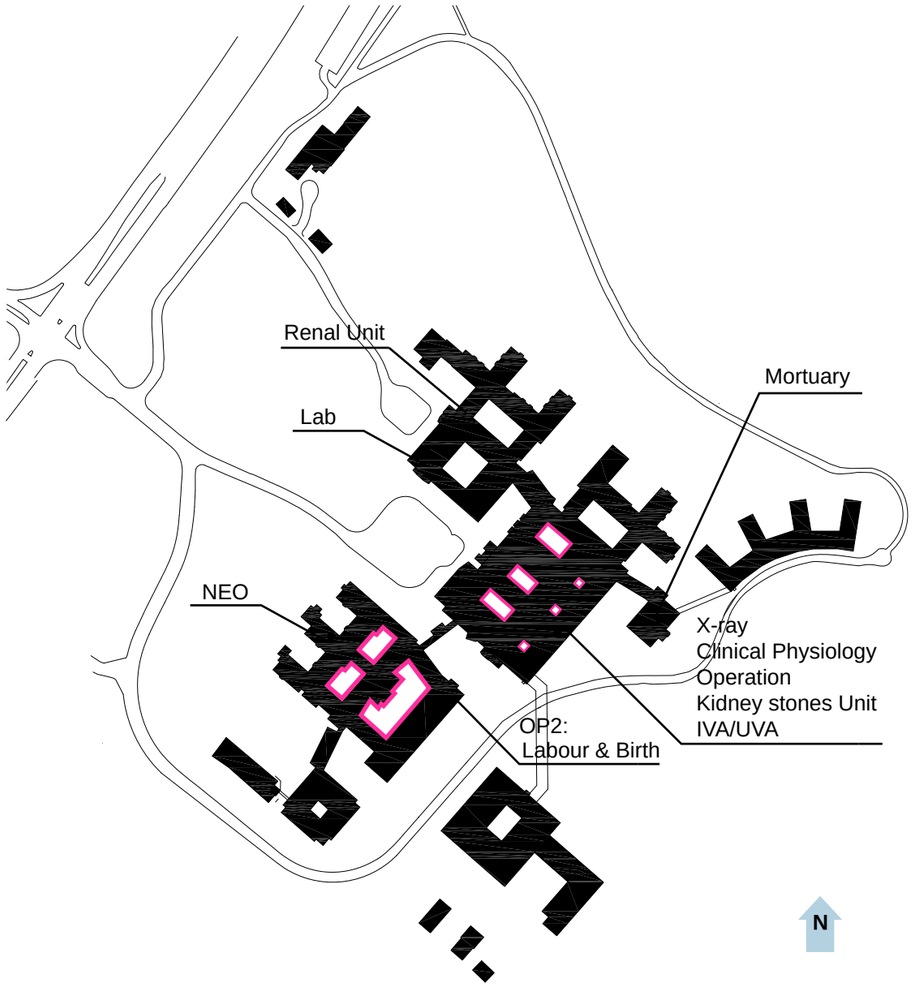

2. Natural Views

Health-promoting environments

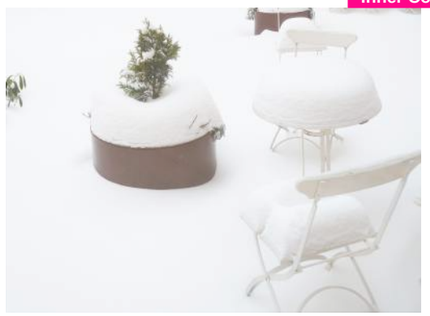
I N S E R T

New emergency building in
Vrinnevi hospital in Norrköping

THE SITE



Inner Courtyard



Vrinnevi Hospital in Norrköping, Swden, was planned between 1982-89 by Bo Castenfors architects. The project contained thoughts about humane environments that led up to Rikshospitalet. Castenfors himself was part of the team that won the competition for the Oslo hospital in 1991. Located in natural surroundings and possessing a gross area of 110,000m^2, Vrinnevi buildings have three above-ground stories, and are constructed on a slightly sloping site.

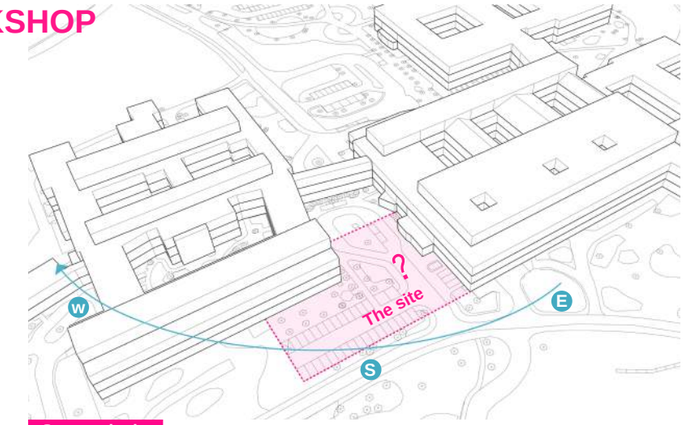
Main Conceptual ideas

- Daylight for most rooms
- A low, horizontal layout; access to nature
- A curved main street, with glimpses of nature
- The main entrance in the middle
- Human environment, with generous amounts of art in public spaces

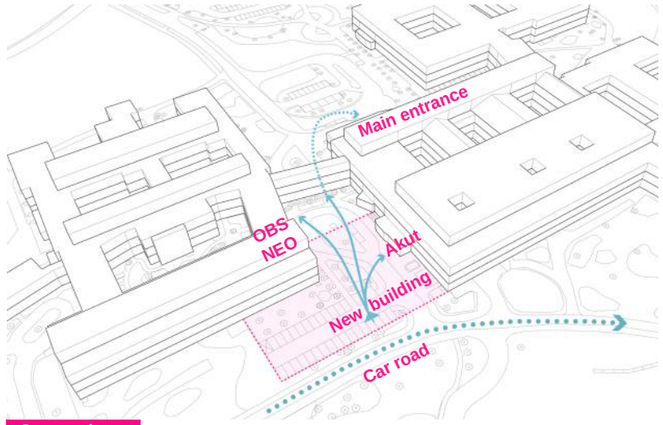
I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

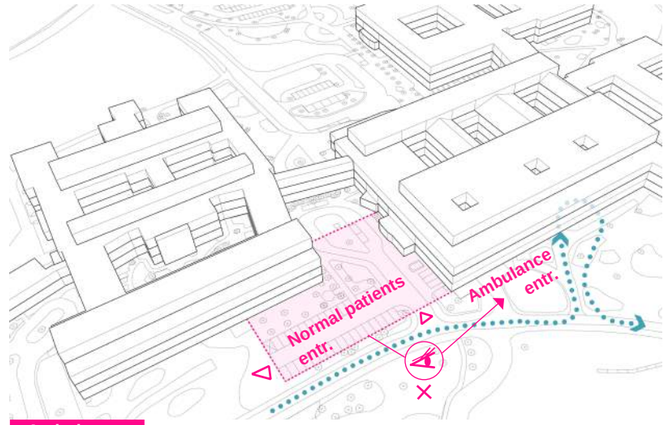
WORKSHOP



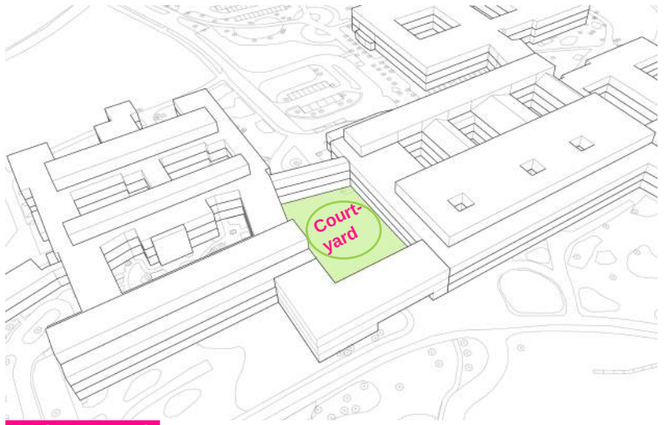
Sun analysis



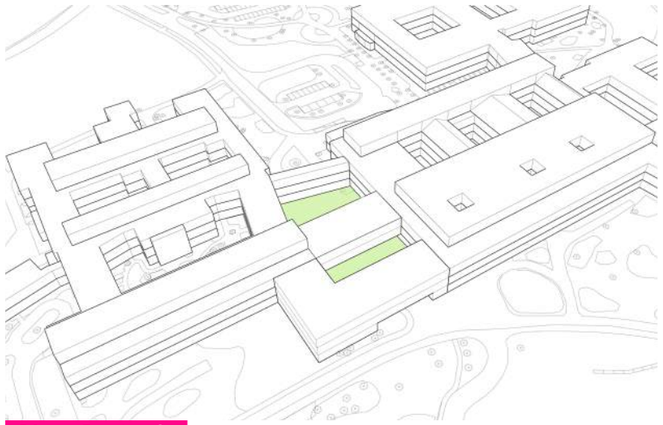
Connections



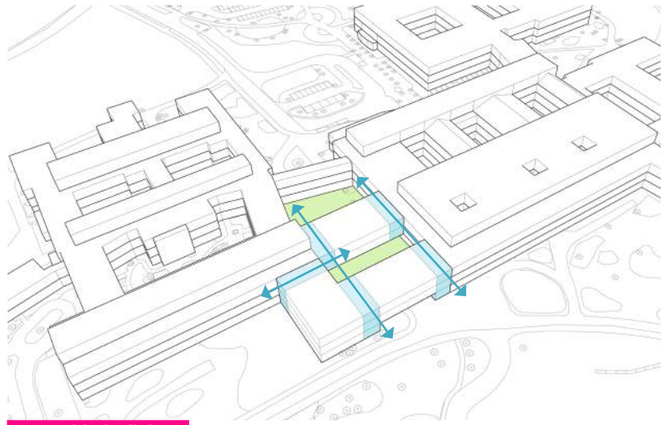
Ambulance



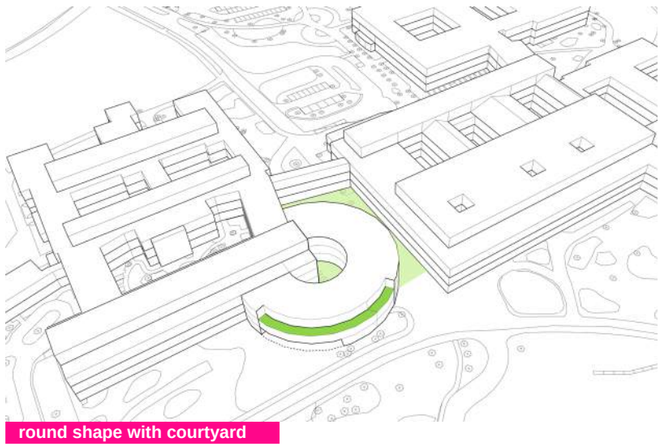
1 Big Courtyard



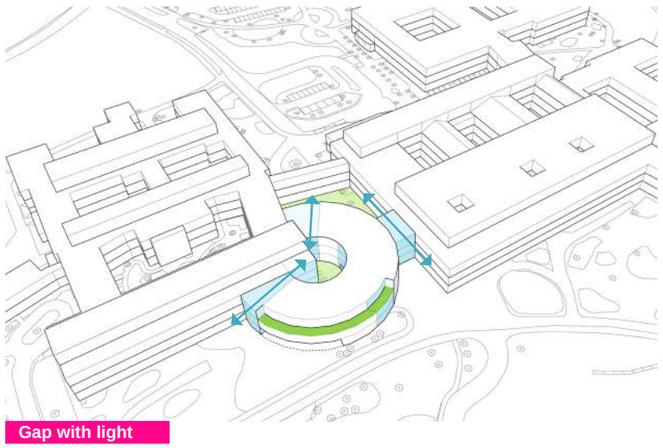
2 Inner Courtyards



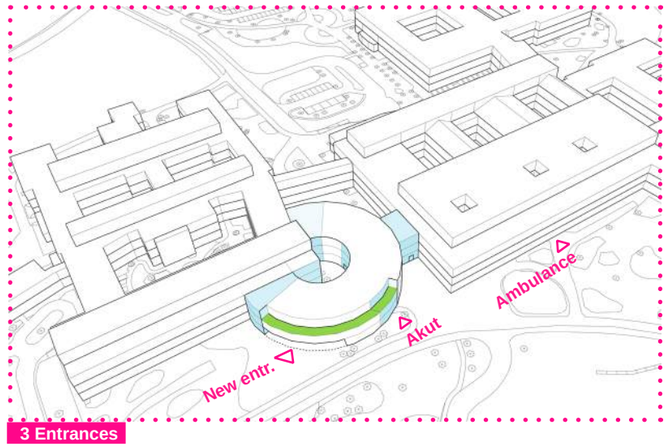
Gap with daylight



round shape with courtyard



Gap with light



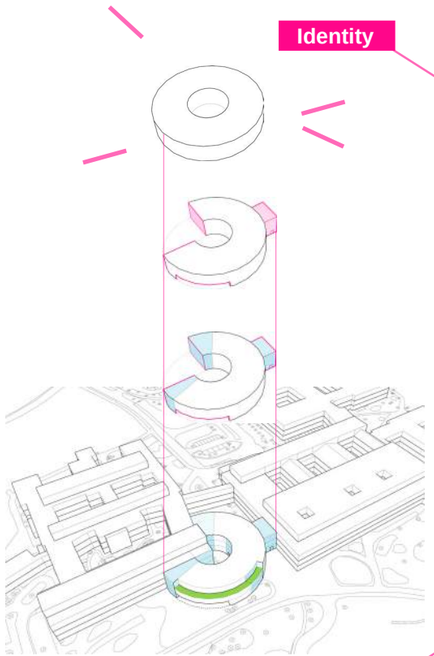
3 Entrances

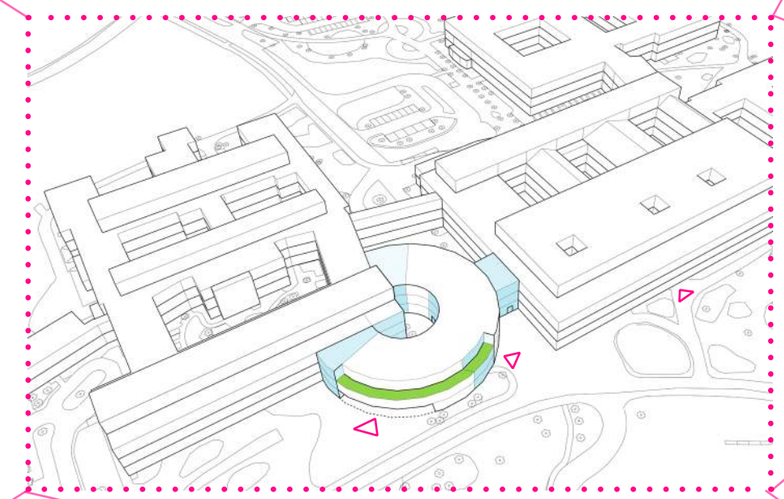
I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

DESIGN CONCEPT

Identity





Ambitions

- Space itself healing
- "urban courtyard" with nature
- "Open"
  (Daylight Fresh air View Communication)
- Medical neighborhood

Sustainability

Flexibility

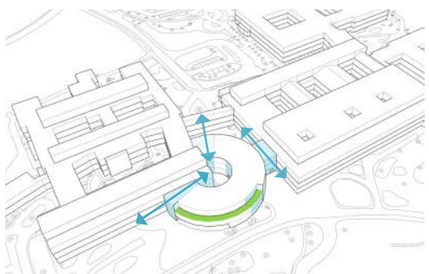
Energy Efficiency

- Reuse the old existing building
- Keep the old red brick walls
- Try to use Architectual ways to give the "Touching corner" life
- Make it as a centeral common communication place

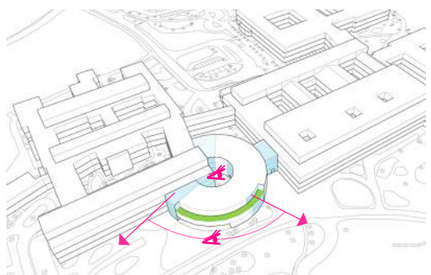
Reflected facade

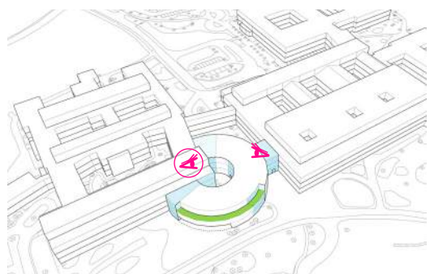
Warm color glassing

Good equal daylight & views

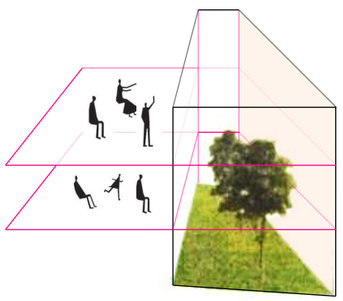


Visible flows





Common area with Healing Gardens



I N S E R T

New emergency building in
Vrinnevi hospital in Norrköping

I N S E R T

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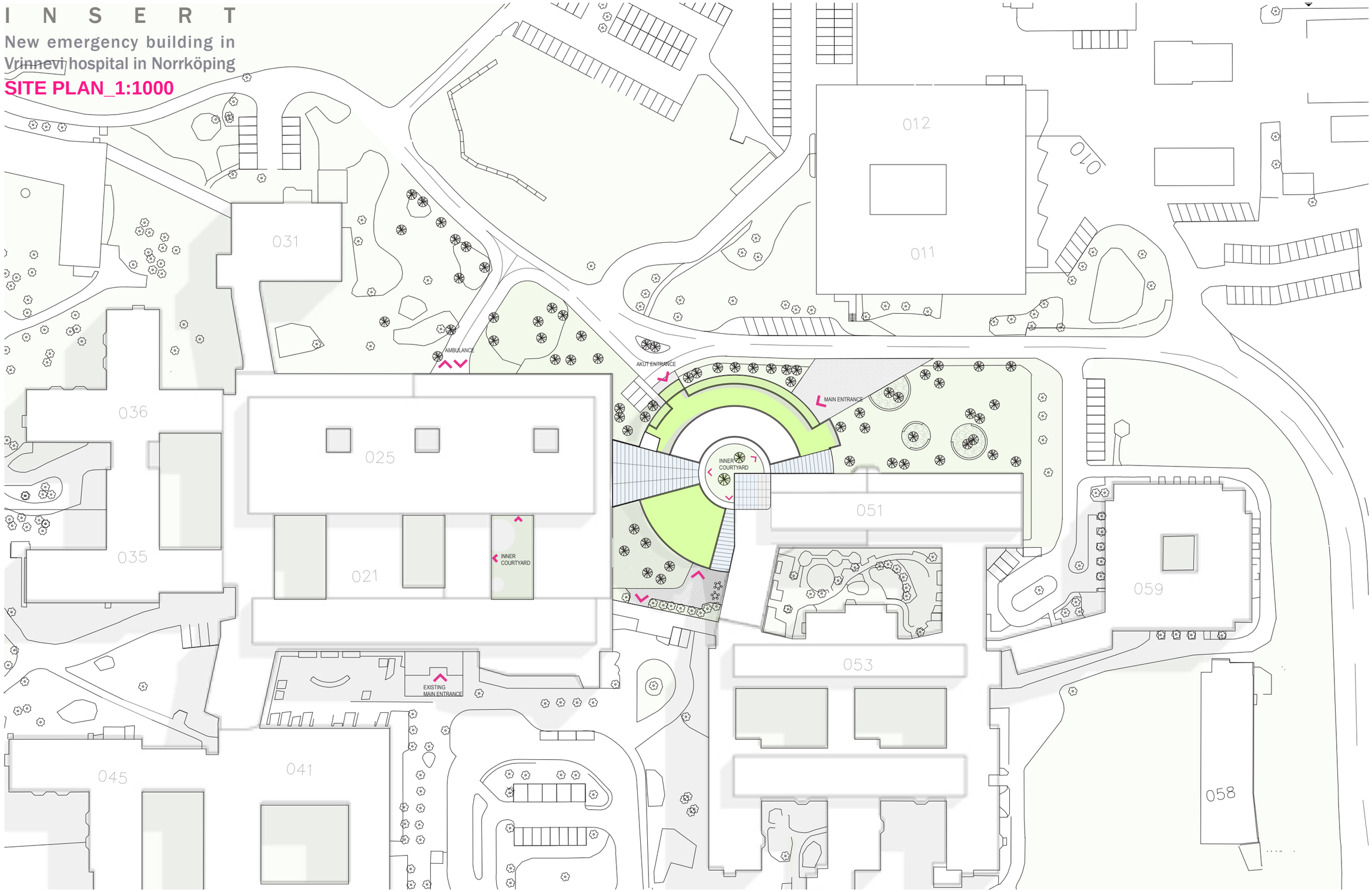
Vrinnevi hospital in Norrköping

SITE PLAN_1:1000



I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

ALL ROOMS

Rooms of Level 1

Level1_Ambulance

Name	Discription	N of rooms	Area m2	Close/Connect to
admini	5 work places	1	28	close to ambulance hall,separate fr emergency clinic teamstation
ambulance hall	6-7 cars,drive through, park stretcher,car cleaning	1	500	645×1.5=967.5
overloading place	change beds		45	future take place directly in reception room
Decontamination room	2 doors(from outside&ambulance hall)	1	26	get in from the ambulance hall
anteroom	take off clothes	1	10	before Decontamination room
Storage room	preparation goods for the car's next run	1	36	be a separate room near ambulance hall

Make sure the gas does not enter the exp and storage room in the ambulance hall.

Level1_Adult akut dept_3M

outer waiting room	adult w for untreated patients, facing a first assessment 10-12seats fika	1	36	
Triage (Team Station 1)	3 work stations see outer waiting room & ambulance center,take patients to 3 surgery rooms	1	30	160×1.5=240
guard room		1	9	close to the entrance
show room	10-15 people,easy to get out, without having to pass the waiting room. Ideally, a separate entrance	1	40	
interview rooms	for relatives before / after viewing	1	18	close to show room & RWC.
general RWC		3	5×3=15	
personal WC		2	3×2=6	
Storage carts&coaches		3	6	near reception
akut room	1-2 patients each room, 4-15 pers around,Op-lamp Write Places for 2 persons / room,1 glass door	3	88×3=264	direct connect to the ambulance intake and acute X-ray. 272×1.5=408
RWC Shower "inpatients"	clean the patient before emergency room	1	8	Close to ambulance intake
inner waiting	wait for treatment results & relatives	3	140×3	
exam team M.odule	each M connected 3-4 team stations,1 team room & disinfectant room, storage etc.	3		455×1.5=682.5×3
4 pers team station		3	20×3	
team room(quiet)	Group meeting,Write Place 1-2, non-permanent	3	30×3	close to each module
round	talk with patients&relatives,4-5 pers,1each M	3	16×3	
exam room	9*10 team = 30 rooms(excl.plaster room)+ 3 acute room = 33 rooms。wall storage.	3×10=30	20×10×3	
general RWC	1 in each M	3	5×3	
personal WC	1 in each M	3	3×3	
disinfectant storageroom	1 in each M	3	16×3	
storage linen	1 in each M	3	16×3	
printer room	1 in each M	3	9×3	
sluss		1	10	Directly close to Exam Room "Infection"
RWC Shower "infectious"	One for each room	2	5×3=15	next to the examination room "infection"
Exam Room "infection"	child&adult can share	2	20×2=40	75×1.5=112.5
Expedition "bosses"	permanent,Room for 2 pers	2+2+1+1=6	15×6=90	
Expedition "doctor"	non-permanent,Total 25 writeplaces,only directors&professors have their own room	1	24×4=96	388×1.5=582
conference	25 pers	1	60	
conference/show room	15 pers show room for collection of relatives	1	40	
copy room/storage		1	9	
WC / shower staff		2	10×2=20	close to changing room
Changing room		1	35	next to the toilet / shower staff
pharmaceutical storageroom		1	16	at AVA
main storage VNS	sterile material	1	16	
storage "linen products"	Storage of clean laundry,pediatric&adult emergency room&AVA	1	10	
medical equipment Storage	pediatric and adult emergency	1	10	
emergency equipment storage		1	10	
storage training	CPR dolls(house10)	1	10	
Staff rooms with pantry	heat their own food,40people	1	40	
Rest room	break nigh time for staff	1	16	

Level1_AVA(Akut wards_adult_3M **Each module : 6 single rooms and 1 twin, 1 team station, 1 team room, 1 disinfectant room, 1 storage**

Team station	2computer,1 for each M	3	10×3	
Team room	Conference table for 8 people,1 for each M	3	15×3	258×1.5×3=387×3
Telephone room	Small rooms,1 for each M	3	15×3	
single patient room	18 single patient rooms,relative bed,6 for each M	18	27×6×3=162×3	
2 bed room	no kin bed,1 for each M	3	36×3	
Disinfection room	1 for each M. dish washer, sink, laundry bag, garbage bag, waste separation	3	10×3	
near storage	around wards where clean goods can be downloaded into the wards	3	10×3	
staff rooms	heat food,meal Room for 30 people	1	40	Joint deployment with the one in emergency department
RWC staff	1 have shower	2	5×2=10	190×1.5=285
storage clean linen	Sheets, towels, patient clothing for the whole department	1	10	can be used jointly with emergency department
Storage media		1	10	
storage equipment		1	10	can be used jointly with emergency department
storage Drug		1	10	can be used jointly with emergency department
Conference Room	25 people	1	60	
Conference Room	16 people	1	40	may be in the department's fringe

Level1_Children akut dept

Waiting room (uninfected)	8 pers,Toilet	1	60	
kitchen	heat food to the children, parents waiting	1	15	87×1.5=130.5
WC general		4	3×4=12	
exam "normal"	6 pers Brits H:54-91cm B:75cm L.207cm 2chair	6	20×6=120	
Waiting room (infected)	family waiting urine from the toilet to the lab. 8 pers 2couches 2tables 4chairs wheelchair	1	60	210×1.5=315
RWC	urine sample,waiting room "infected"	2	5×2=10	between the bathroom&lab
lab Smatt		1	20	
Expedition	3 teams 8 pers	1	40	near emergency room with half glazed wall. overview of the waiting room infected.
call&printer room	A room where you can "walk away"	1	9	81×1.5=121.5
WC personnel		2	6	connect with kitchen
drug Box		1	16	
storage	sterile material and linen products	1	10	sterile material

Rooms of Level 2

Level2_Outpatient/ day surgery unit VIN

Name	Discription	N of rooms	Area m2	Close/Connect to
Waiting room 1 outpatient	Smaller Waiting Room for patient, 4 pers seated	1	30	close to the outpatient op hall have RWC
Disinfection room	Cleaning and disposal of dirty goods and waste, near elevator	1	20	50× 1.5=75
exam rooms	before / after operation, 2-4 people,Space for family members	3	25×3=75	close to the anesthetic flow waiting room 75×1.5=112.5
waiting room Mini	Outside the changing room for patients,Before the patient is admitted on Op hall	1	20	114×1.5=216
Small changing room for staff / Visit	1-2 pers	1	54	Toilet and shower in direct connection
storage "Anaesthetic"		1	16	
Pre Op area	Preparation Pre with / op clothes /	1	54	After talks with anesthetic
OP	5 narcosis Op(patients chang into op clothes)+1 outpatient op	5	55×5=275	522×1.5=783
Patients op changing room	1 disabled facilities with lift	4	40	output to a small waiting room while a dressed in op clothes
Uppdukningsrum - (OP)	Sterile uppdukning of instruments before surgery	1	20	link near the operating room for narcosis
preparation room	Management of formalin, water and sewer	1	20	close to the outpatient operating room
Disinfection room - (OP)	goods to sterile unit. Laundry / garbage chute	1	20	Near the elevator to transport down the dirty
WC - staff - (OP)		2	5×2=10	Outside op hall and close staffroom
Drug room OP		1	17	
Main Storage "Sterile material" - (OP)		1	30	
storage OP		1	50	
Main Storage Textiles - (OP)		1	30	
cleaning room		1	10	
Recovery (UVA) 12 seats	12 bed	12	16×12=192	
UVA treatment	Place of anesthesia cart, Write Place Small, linked with UVA	1	34	478×1.5=717
Step Down		1	150	
WC - staff - (UVA)		1	5	
Main Storage VNS - (UvA)		1	40	
Main Storage Textiles - (UVA)		1	10	
Kitchen /pantry - (UVA)		1	17	between step Down and UVA
Drug room(UVA)		1	17	
RWC – (UVA)		1	5	
WC - Step Down		1	5	
Staff room with pantry / group meeting	30-40pers	1	40	
conference	5-6 pers	1	14	178×1.5=267
Rest room for staff	1 Resting Armchair-bed	1	16	
Expedition	1-2 coordinators	1	15	
UVA Team expedition	2 write place for 3 people.	1	10	
Expedition "quiet room" at UVA (UVA)	1 per	1	10	
Expedition	1 per	1	10	
Expedition	1 per	1	10	
Telephoto Q cabin	1 per	1	10	
Expedition Health Administrator	3-4 pers	1	14	
copy room		1	9	
Expedition	1-2 pers	1	10	
Dictated ring room		1	10	

Level2_Endoscope dept VIN

Reception		1	14	
Waiting room "sitting"	part for "children"	1	46	99×1.5=148.5
Waiting room "beds"	2 beds	1	25	close to the WC / RWC
detector room		1	14	near endo halls
Changing room	showering after survey, transportable patient, lockers designed for 2-4 pers	1	54	Toilet and shower in direct connection
Exam Room "endoscopy"	4pers,Wash,	4	40 ×4=160	299×1.5=448.5
Preparation Room		1	40	
Disinfection room	Cleaning and disposal of dirty goods and waste	1	40	
RWC		1	5	near to the waiting rooms.
Expedition		1	10	near US room
Main Storage VNS		1	30	60×1.5=90
storage with DK Storage		1	20	

Rooms of Level 3

Level3_Neonatal Dept

Name	Discription	N of rooms	Area m2	Close/Connect to
Dayroom with parents	15 dining seats and 20 -togethers places.	1	50	
Kitchen "milk kitchen"	management of donor milk, Kitchen area with sink and cupboards	1	30	145×1.5=217.5
Scullery at " mjölkkök	A clean and a dirty side,Dish washing room	1	15	next to the " mjölkkök "
Kitchen "parents	parents to heat food,12 smaller pantry cabinets,who live in ward	1	50	
Transport incubator garage	Sliding door, staff work along the long side of the incubator.	1	15	
Akut room (emergency room children	this room will be shared with labor and birth, 2 children tables,3 seats with room for a team of 6-8 people, an OP.15 pers 2x Child table(90x 140)	1	50	125×1.5=187.5
The emergency room "doctor"	1 for primary emergency and 1 for on cal	2	30	in proximity of op.-t VA
storage" transport incubator "	" Garage "Waiting for 1st transport incubator (same size as a patient bed.	1	15	directly close to the treatment room " emergency room "
storage" outside ICU halls "	sterile material and linen products	1	15	
Hospital ward - Intensive "Neo"	4 beds and sliding walls between,a joint team station,half glazed, 2 pull - walls 3drag - walls, 2 doctors 2 nurses, parental bed with the child throughout the day space to take in the transport incubator(90x150),5-6 staff round	4	40×4=160	235×1.5=352.5
Wards " easy - IVA "	single room ,with 2 beds and sliding walls between ,2-3 staff working around parents / family to be with the child throughout the day	2	40	
isolation rooms	Own parent unit .The isolation room should be divided into 2 rooms with a solid wall between them with wide sliding door Parents should be able to stay in the room ,4 pers around,2 Parental beds 1st table with 2 chairs,X-ray,	1	35	At the beginning of dept.
Laundry		1	15	
Showroom "quiet room "	Chairs - number 6 , comfortable,Table - number of1	1	15	334×1.5=501
Disinfection room	goods&dirty waste	1	20	
Clean rooms "apparatus"	Cleaning of equipment and incubators	1	14	close sluice rooms with washer disinfector
RWC general		2	6	
WC with shower	Intended for parents	2	10	
WC Public	parents and visitors	2	6	
WC "staff"		1	5	
VEC Expedition	1 per	1	10	
Medical Expedition	2 Desk,1 bed to the doctor	1	15	
MLA expedition	2 pers, smaller meeting rooms,Tables and chairs for conversation 3 pers	1	15	
Expedition	3 pers.	1	14	
round	6 pers	1	14	
storage		1	10	
Conference	10 pers	1	20	
Conference	25 pers	1	40	
Main Storage VNS	sterile material. Number cabinet 4 pcs	1	15	
storage/Sanitation Products	Number of running meters 20 m	1	15	
Main Storage Tank	space for washing cars	1	15	
Storage equipment	Number hyllmeter20 m	1	15	
storage" drug pumps "	Storage of drug pumps connected to läkemnedelsrum	1	15	direct proximity to the drug room
Staff room with pantry	12 dining (table and chairs)Sofa& table	1	30	

Level3_Obstetrical Dept

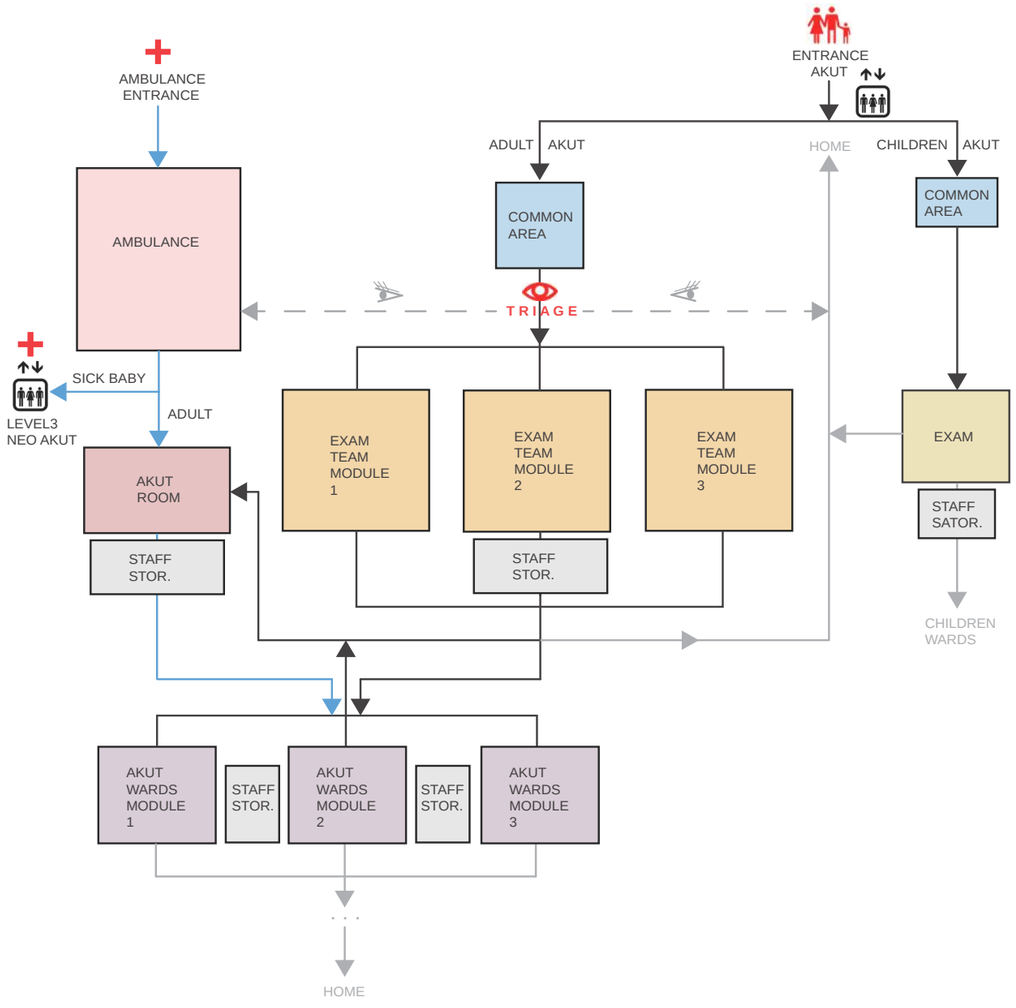
Waiting room		1	60	
Round	meeting	1	15	175×1.5=262.5
Waiting room (Day room	go home directly from the extension can wait here	1	50	
Kitchen/patients	to coordinate with BB	1	50	
OP- hall	Emergency caesarean section	1	70	Close between forgive rooms and op hall and emergency room
Monitoring / Recovery	Recovery with surveillance after cesarean	1	30	157×1.5=235.5
Akut room (emergency rooms Children	close to both forgive , neo and op.sal for emergency caesarean, 2 children	1	27	
Exam room	control patients taken care of in the future	2	30	Toilet right next to the room
Delivery Room	based on hospital wards - need to be a larger room	8	44×8=352	968×1.5=1452
Wards " mjukrum "	Care for pregnant patients at risk. Longer hospital stays, family to stay overnight	4	44×4=176	in connection with childbirth
Wards NEO-BB	Larger rooms with level of care for both mother and baby	10	44×10=440	
Expedition	5 pers	1	25	
Expedition	1 per.have smaller meeting room	1	12	191×1.5=286.5
Expedition / Coordinator		1	10	close to teams
Copy room		1	9	
Conference		1	30	
RWC Shower "patient"		1	25	Directly close to the postpartum rooms.
Disinfection room		1	10	
Läkemedelsrum	preparation of drugs	1	10	
Main Storage VNS	sterile material	1	10	
Sanitary storage of diapers		1	10	
Storage equipment		1	10	
Staff room with pantry		1	30	

I N S E R T

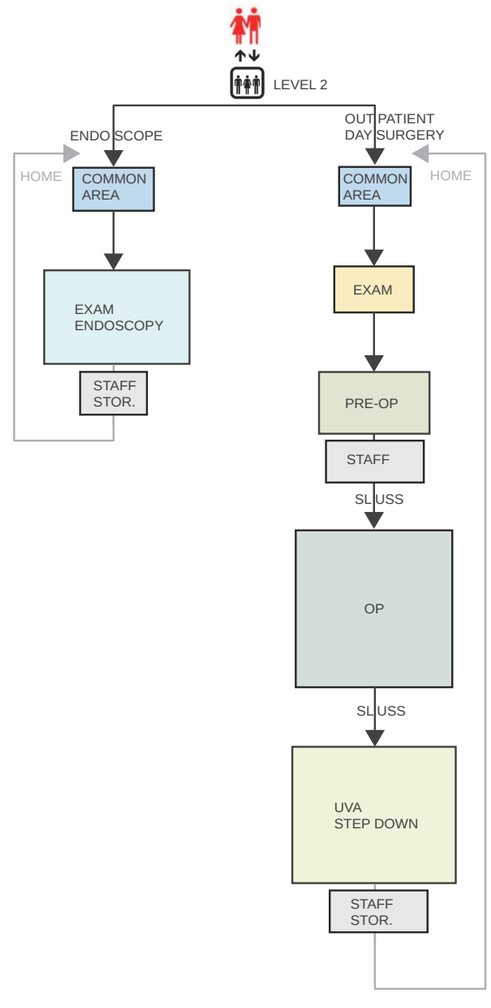
New emergency building in Vrinnevi hospital in Norrköping

JIGSAW_ FLOWS

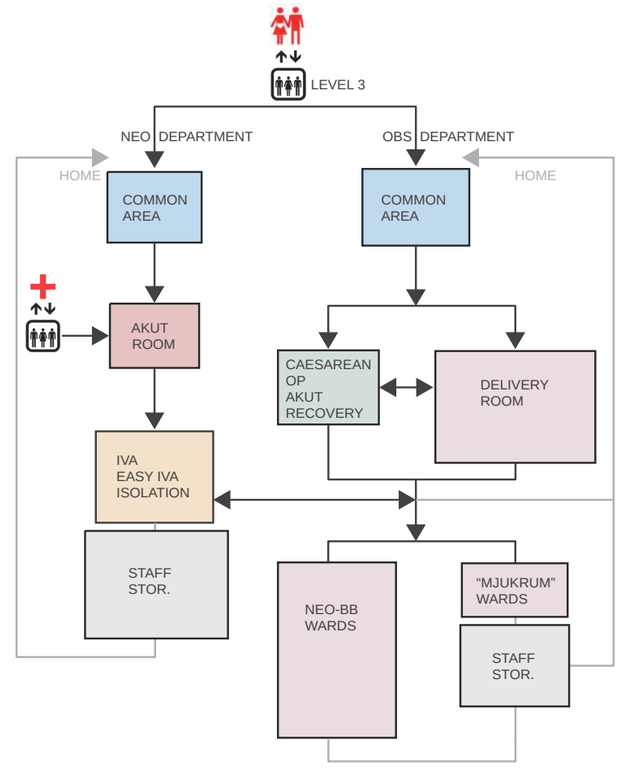
Flows of Level 1



Flows of Level 2



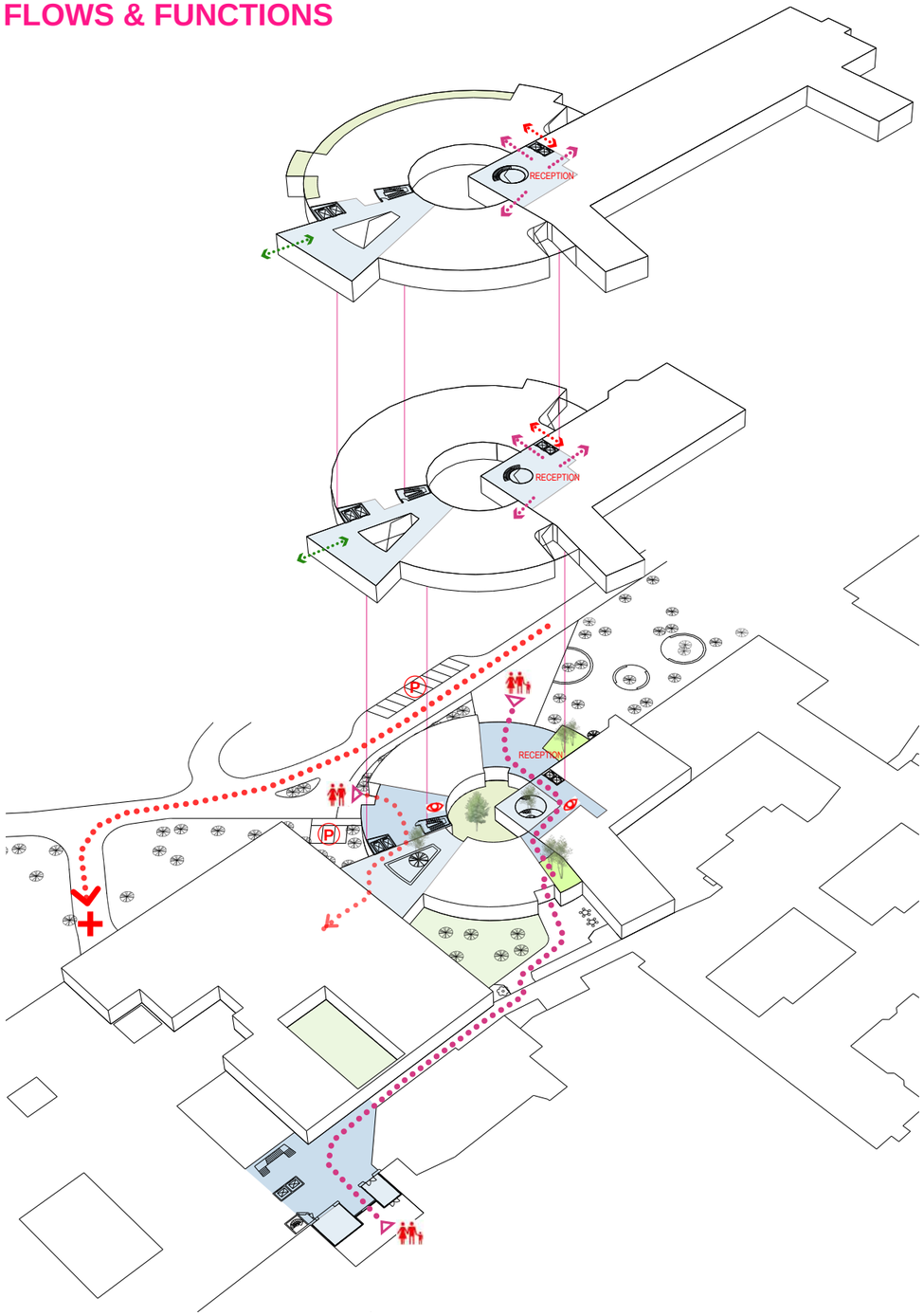
Flows of Level 3

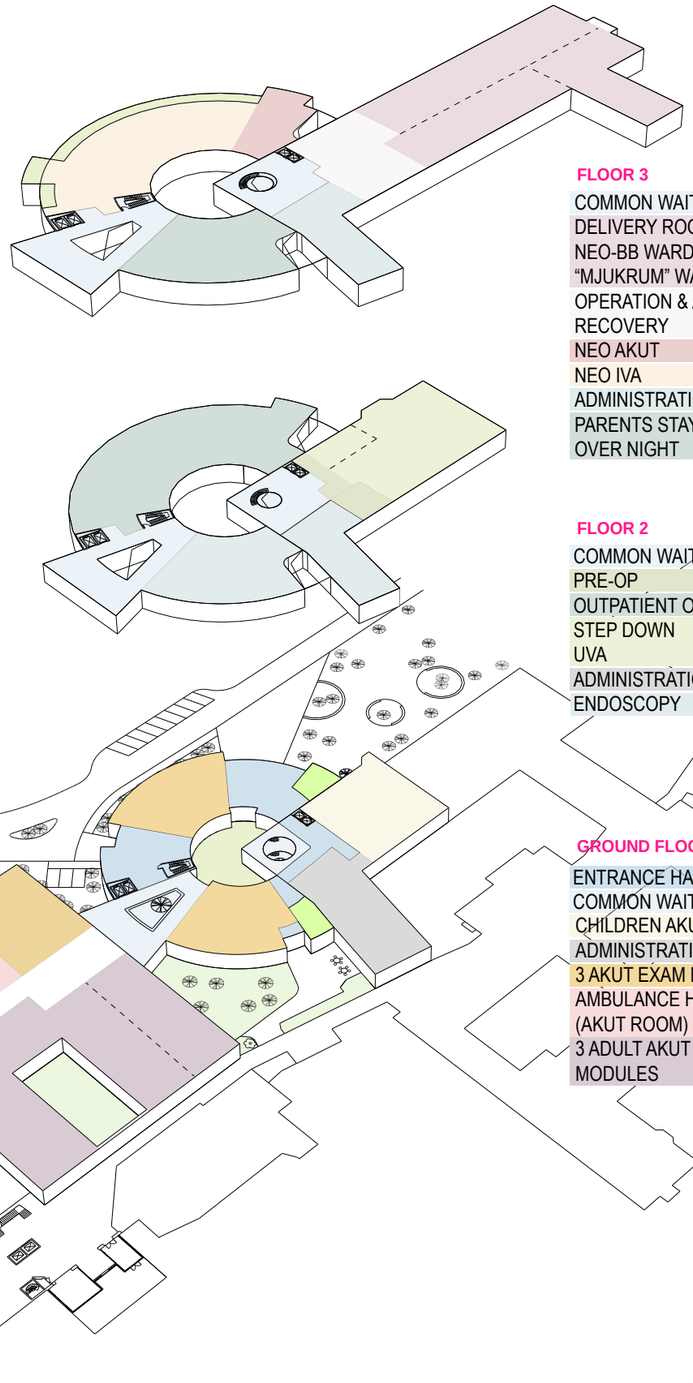


I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

FLOWS & FUNCTIONS





FLOOR 3

- COMMON WAITING AREA
- DELIVERY ROOMS
- NEO-BB WARDS
- “MJUKRUM” WARDS
- OPERATION & AKUT
- RECOVERY
- NEO AKUT
- NEO IVA
- ADMINISTRATION
- PARENTS STAY OVER NIGHT

FLOOR 2

- COMMON WAITING AREA
- PRE-OP
- OUTPATIENT OP
- STEP DOWN
- UVA
- ADMINISTRATION
- ENDOSCOPY

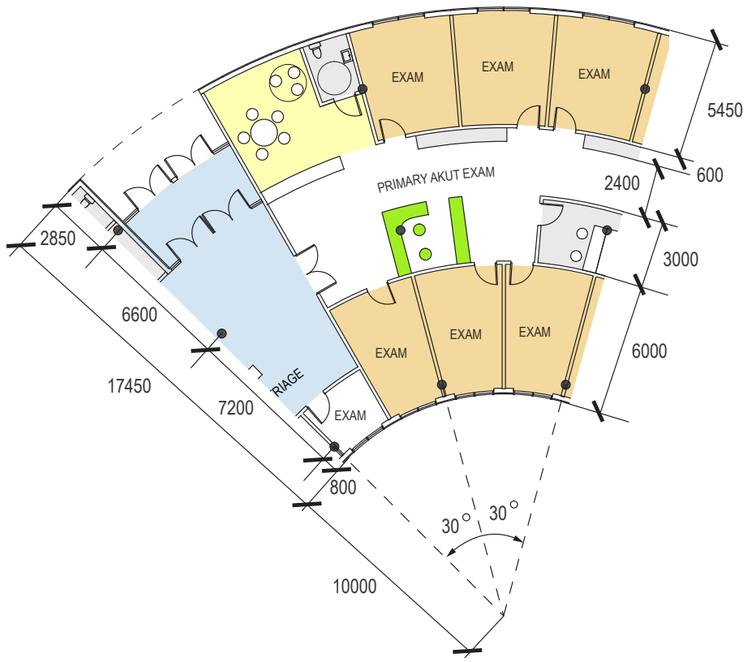
GROUND FLOOR

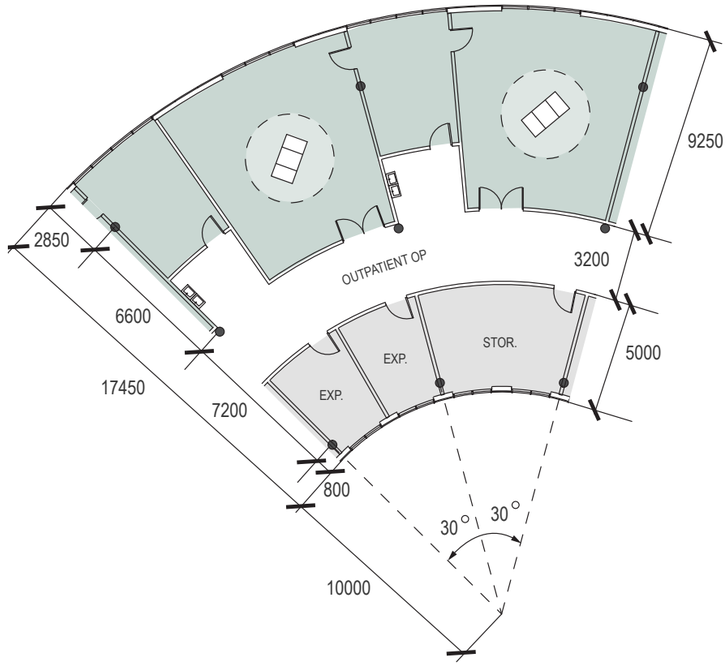
- ENTRANCE HALL
- COMMON WAITING AREA
- CHILDREN AKUT
- ADMINISTRATION
- 3 AKUT EXAM MODULES
- AMBULANCE HALL (AKUT ROOM)
- 3 ADULT AKUT WARDS MODULES

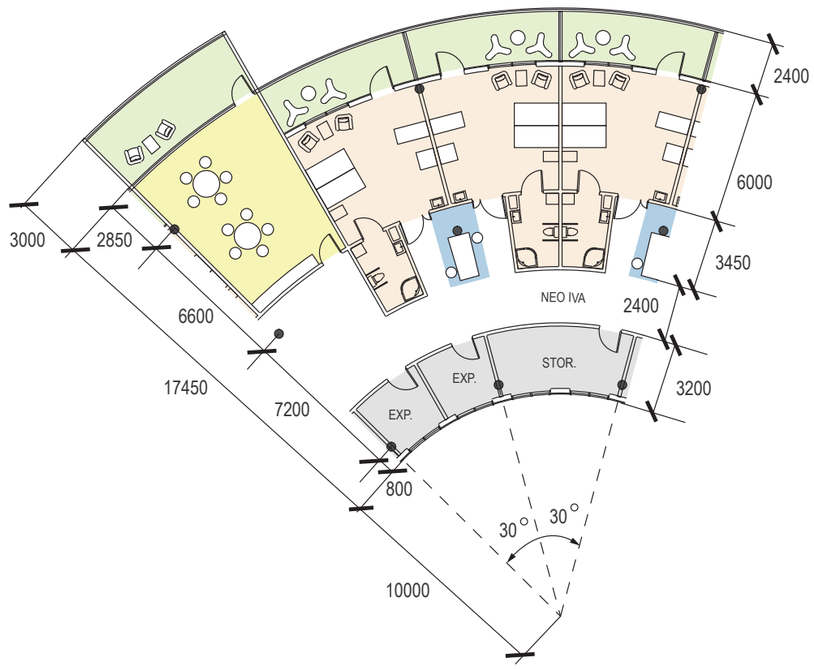
I N S E R T

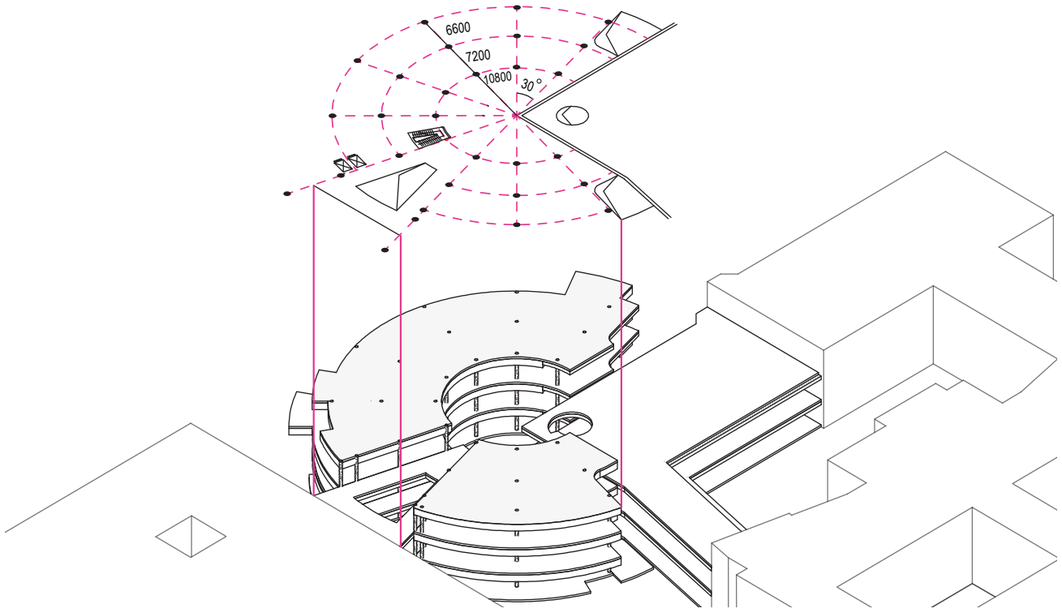
New emergency building in Vrinnevi hospital in Norrköping

ELASTICITY& FLEXIBILITY







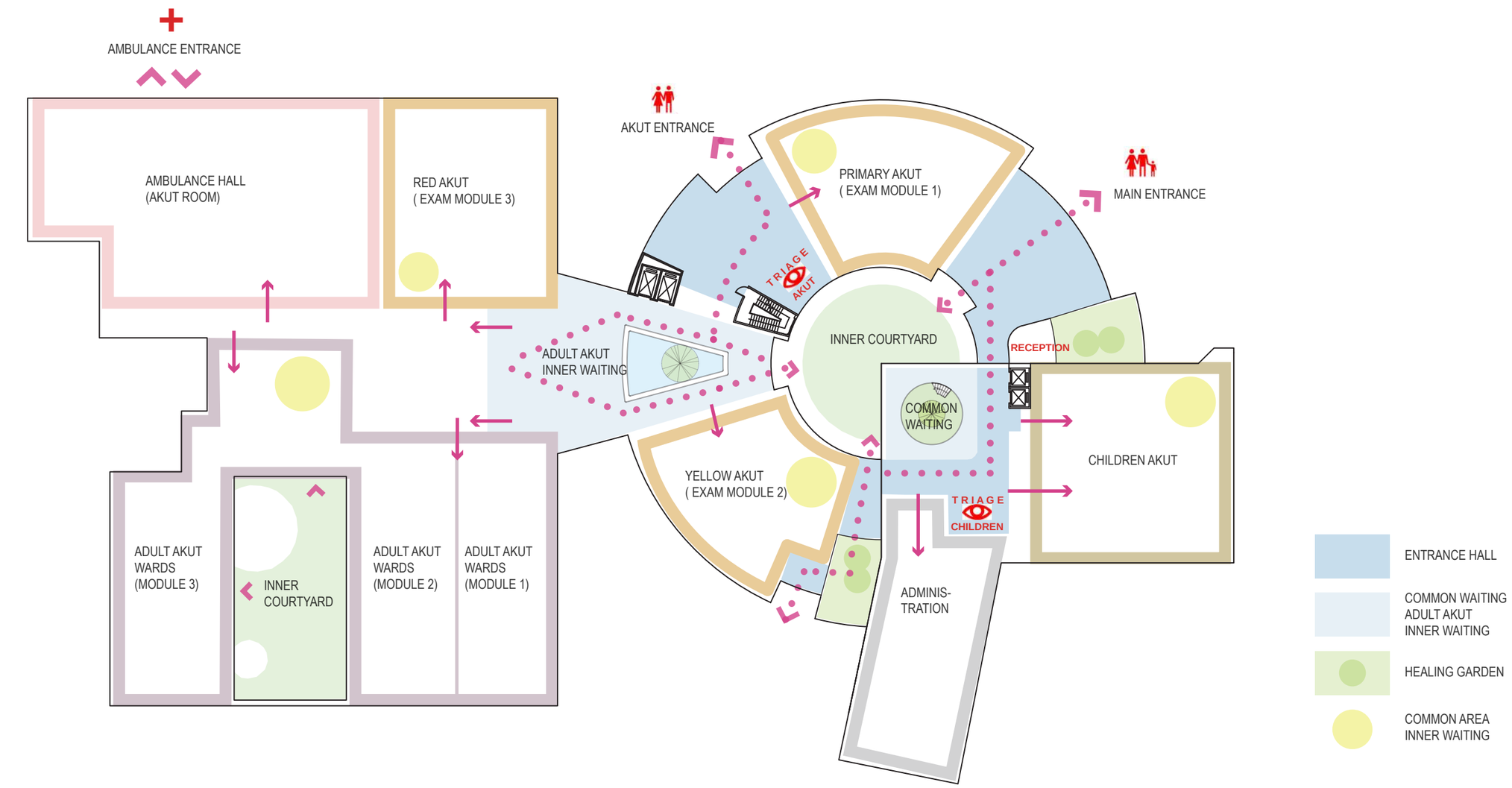


The round shape new building with the low bearing structure can supports itself from the existing building, which provides lots of advantages, such as protecting the old brick existing buildings, reducing the construction costs and giving elasticity and flexibility for different functions or even for future use.

I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

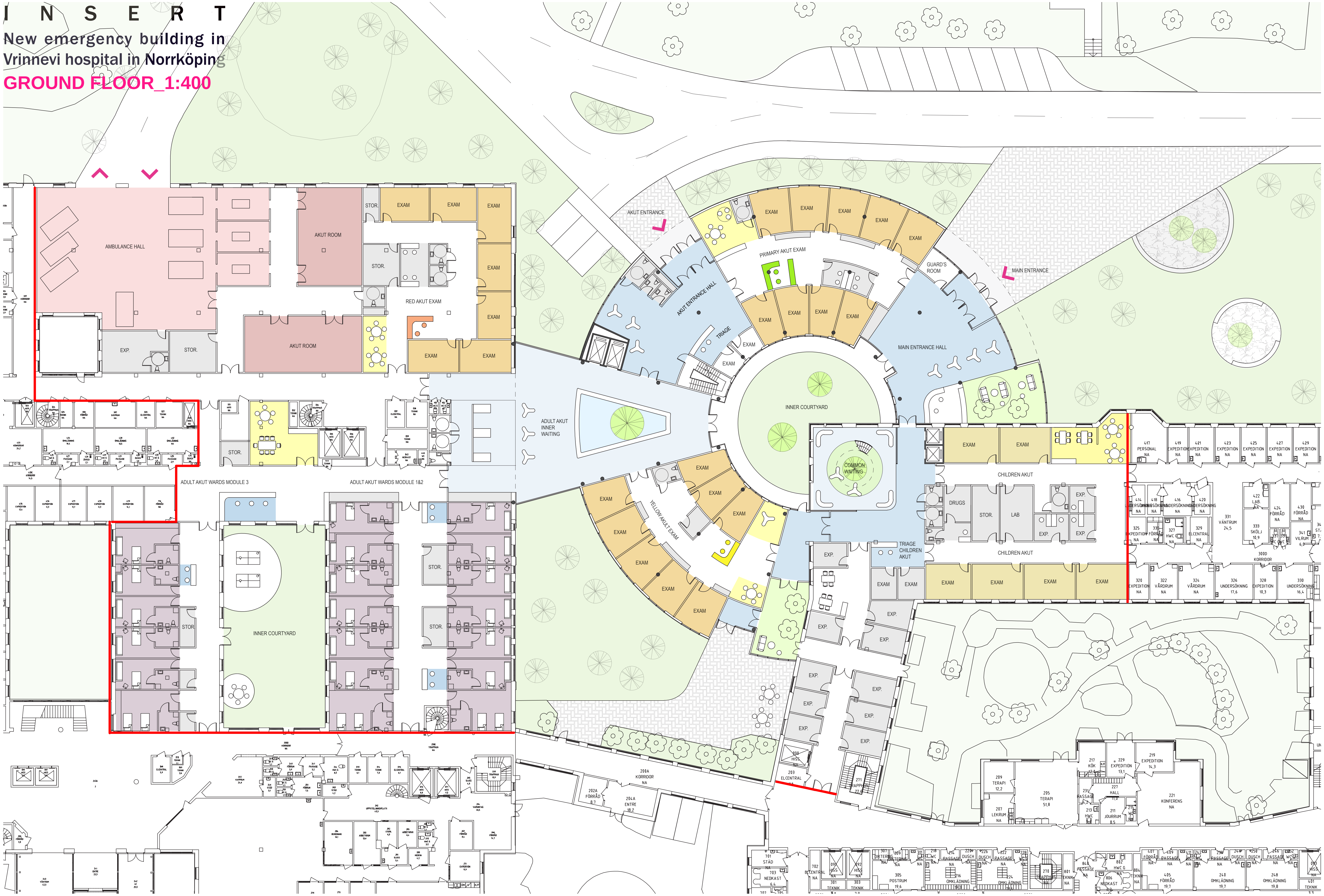
PLAN CONCEPT_GROUND FLOOR



I N S E R T

New emergency building in
Vrinnevi hospital in Norrköping

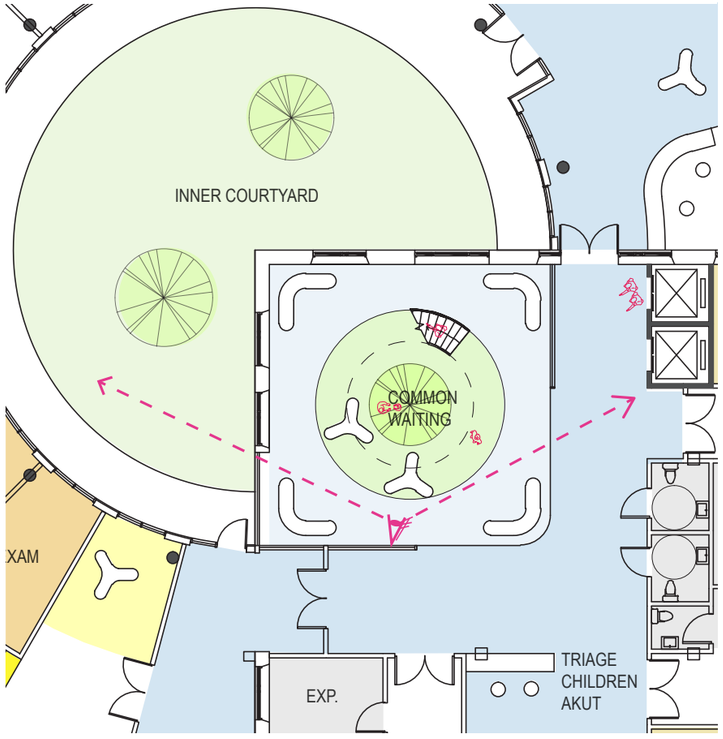
GROUND FLOOR_1:400



I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

COMMON WAITING_ GROUND FLOOR

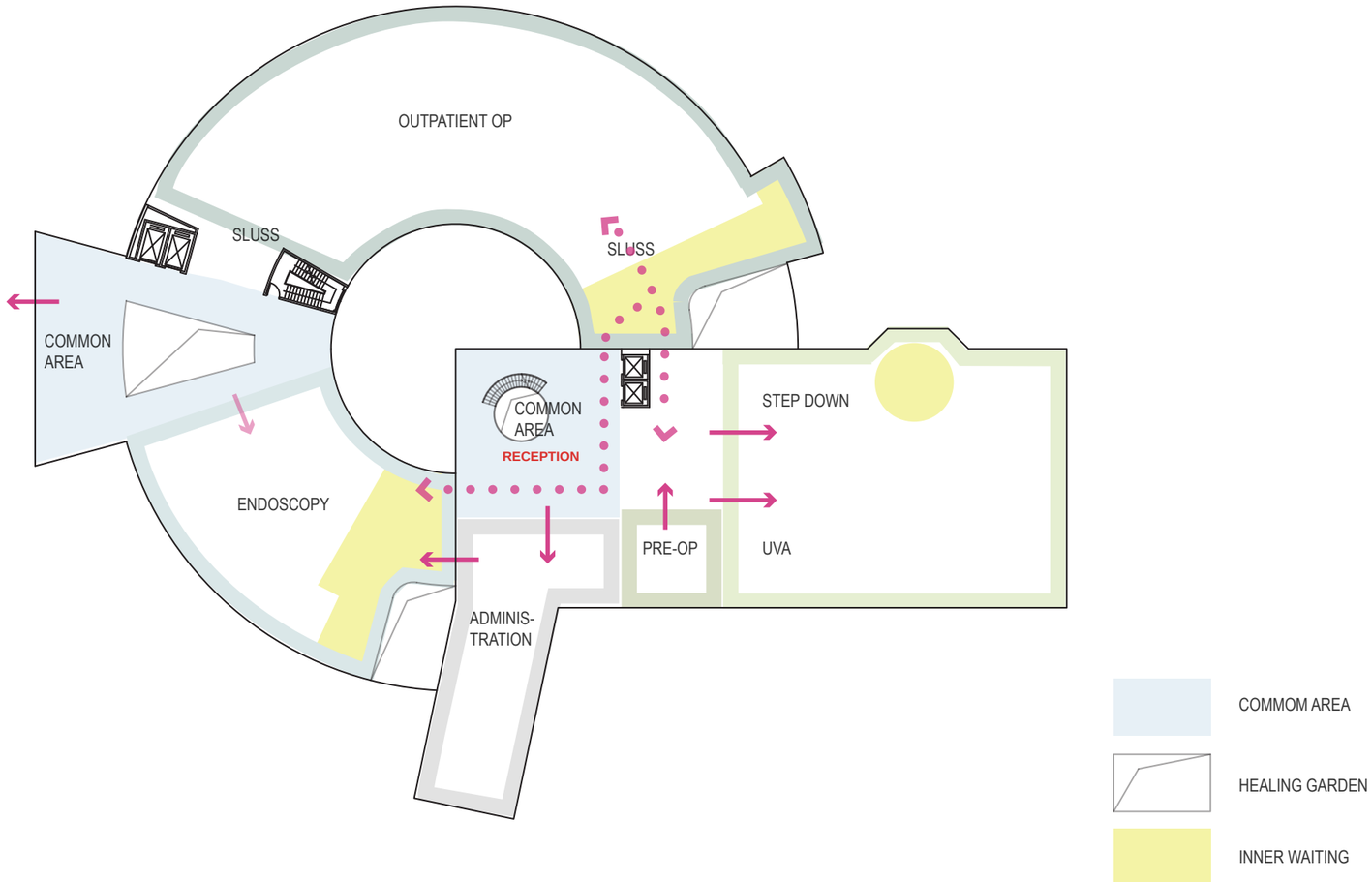


Zoming in plan 1:200

I N S E R T

New emergency building in
Vrinnevi hospital in Norrköping

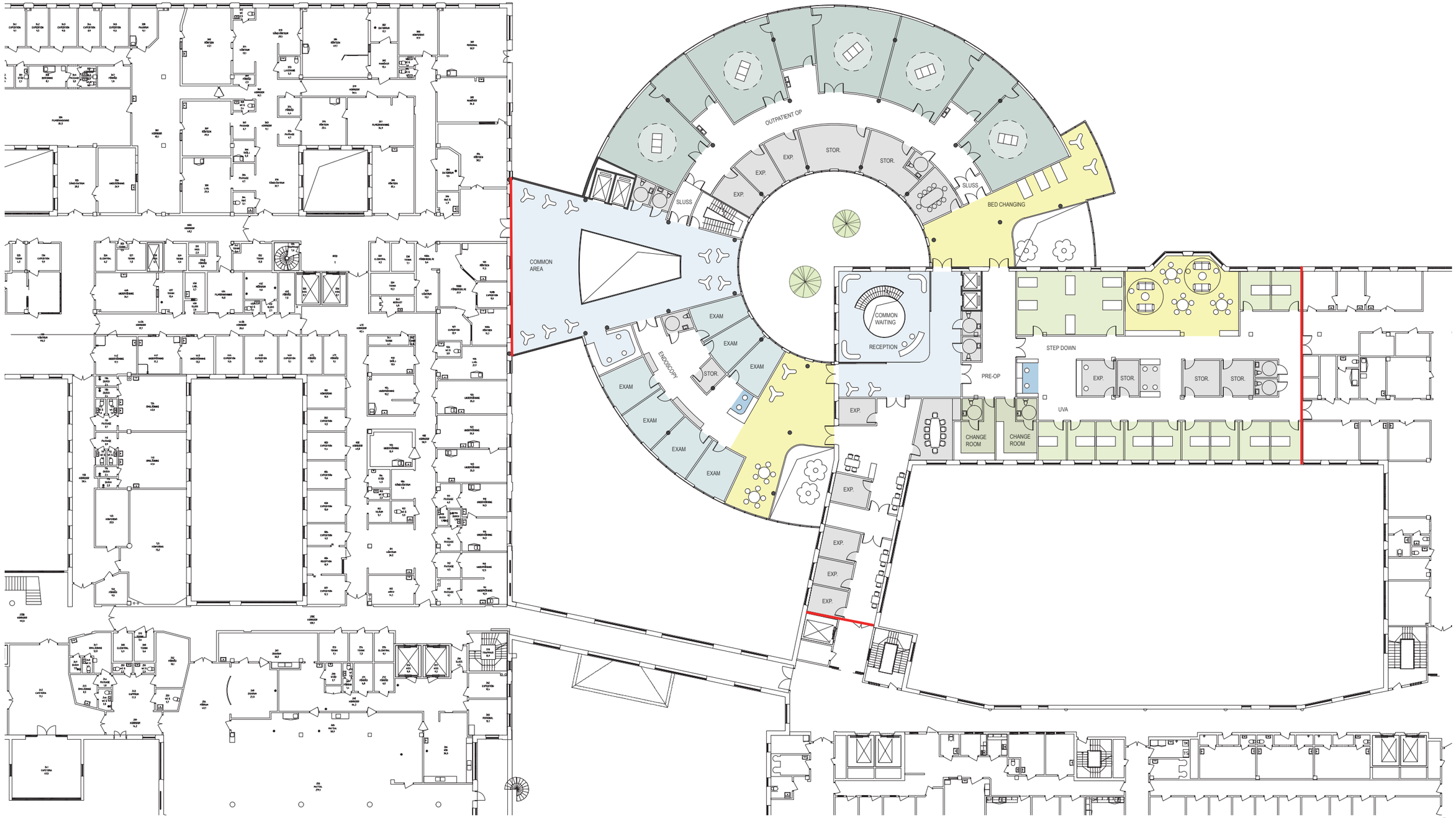
PLAN CONCEPT_FLOOR2



I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

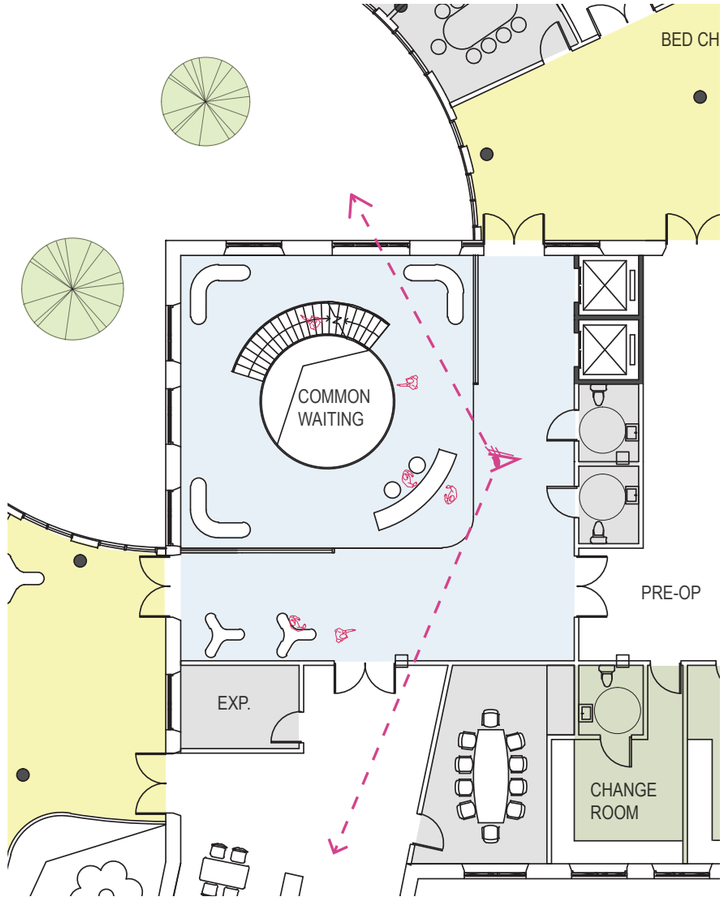
FLOOR2_1:400



I N S E R T

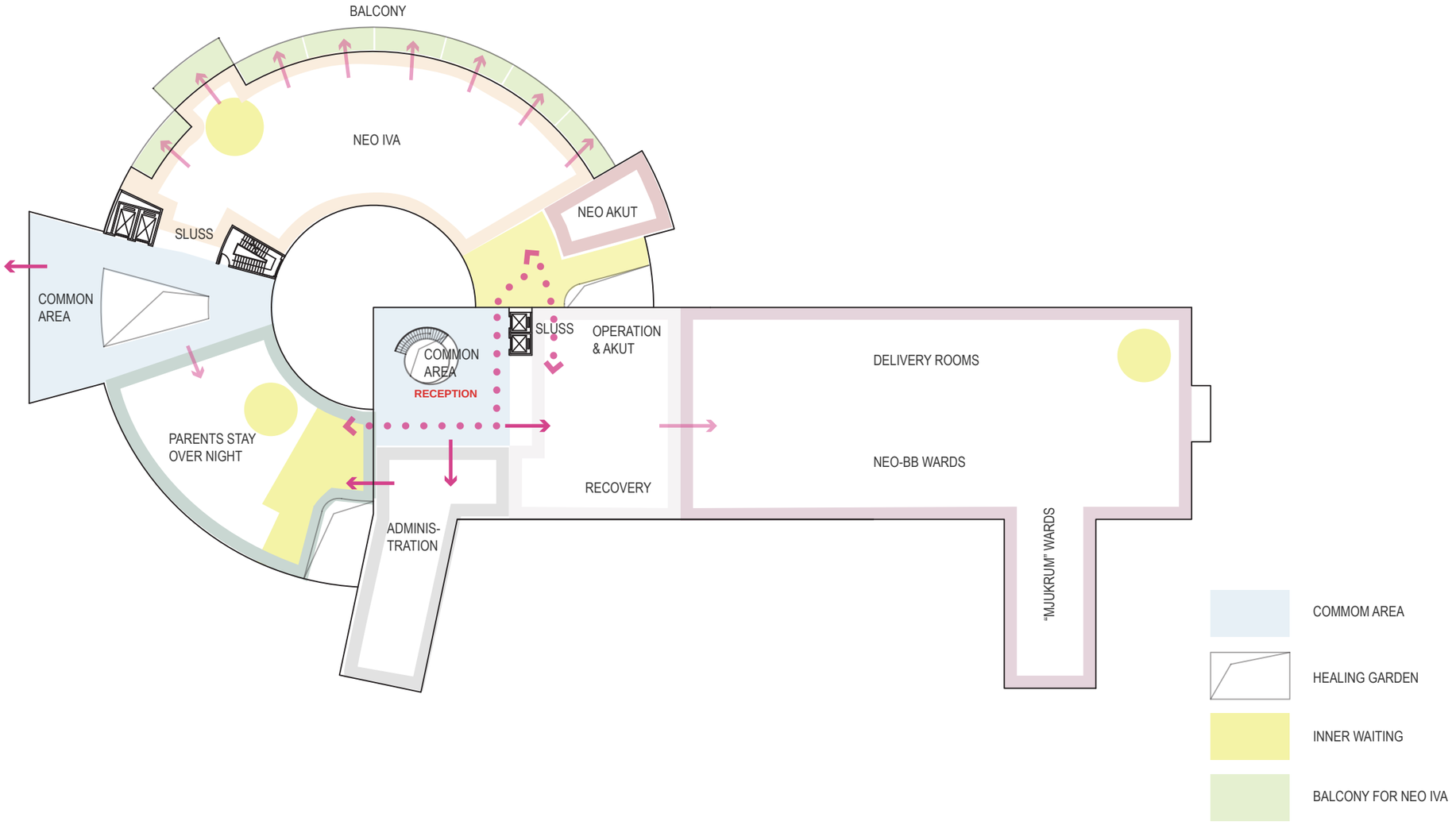
New emergency building in Vrinnevi hospital in Norrköping

COMMON WAITING_FLOOR 2



Zoming in plan 1:200

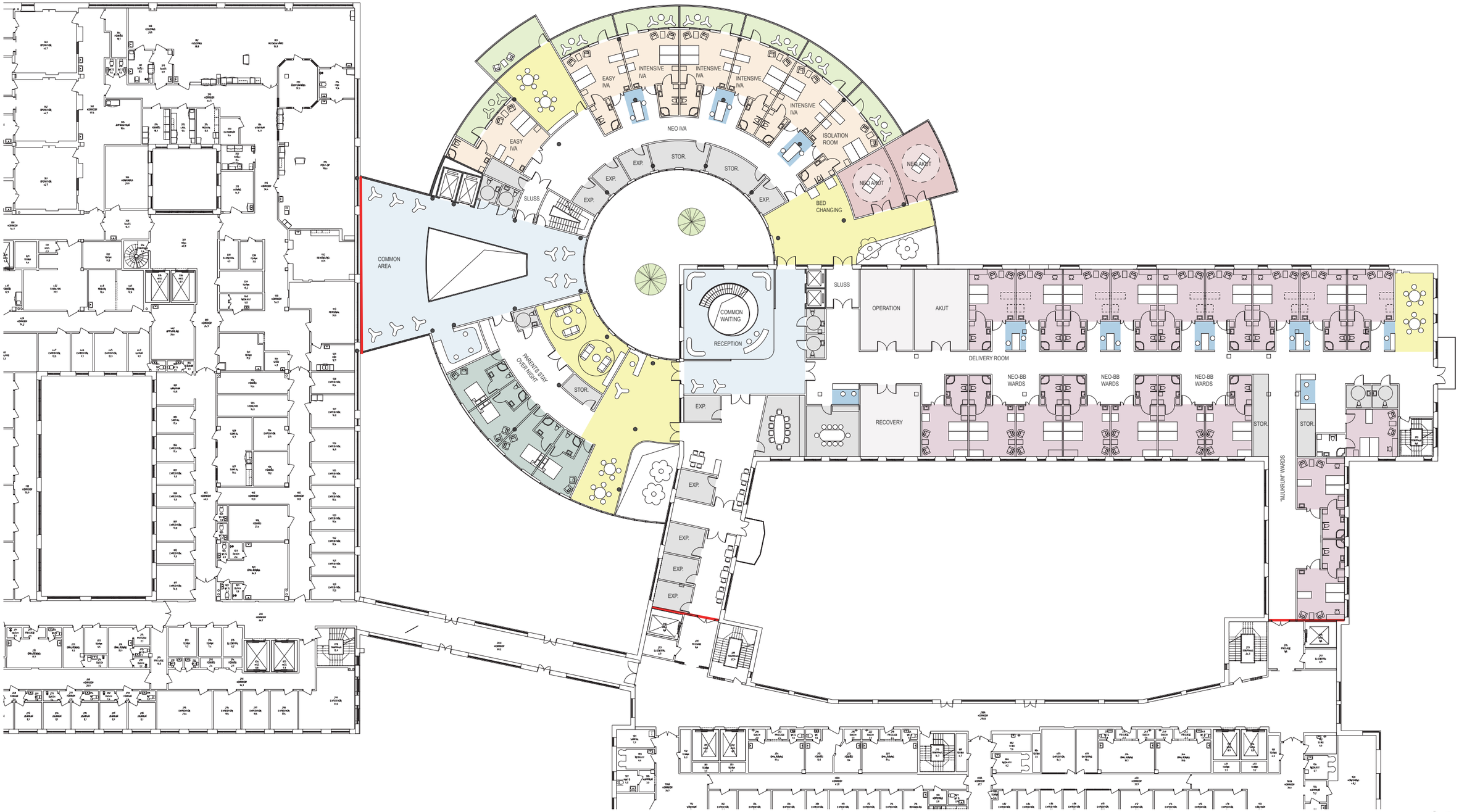
PLAN CONCEPT_FLOOR3



I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

FLOOR3_1:400

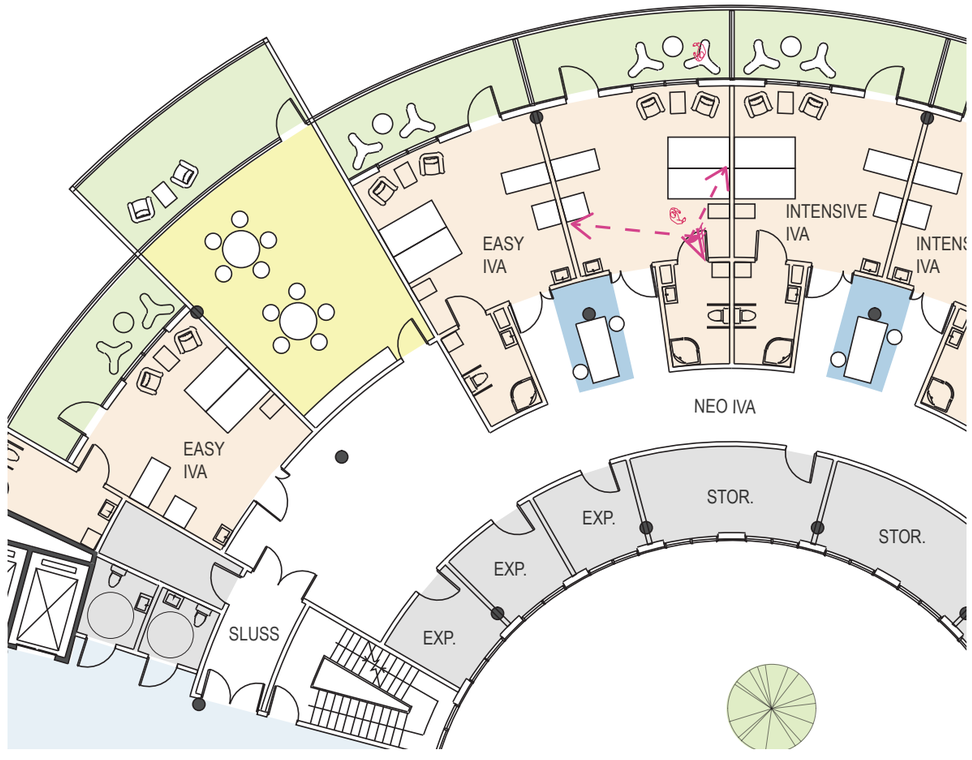


FANGFEI WU,2014-05-13

I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

INTENSIVE IVA_FLOOR 3



Zoming in plan 1:200

I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

DESIGN CONCEPT_FACADE

Add **NEW BLOOD** to the old existings = **MODERN HOSPITAL** + **IDENTITY** + **MAKE DIALOGUE** with the old in a postive way

(Minimalism, modularization, whole volume feeling, refect the surroundings, get more light and views in, keep privacy to exam or operation rooms, not so boring, be suited to the long dark cold snowing days in Norrköping, Sweden)

REFLECTION

- Two materials → Glassing + Metal plate → strong + slight reflex

LÄRARHÖGSKOLA (KV. ORKANEN)

- Only glassing → color glassing + normal glassing → strong reflex

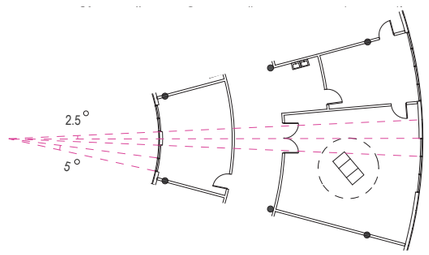
RADIOTHERAPY BUILDING (WHITE)

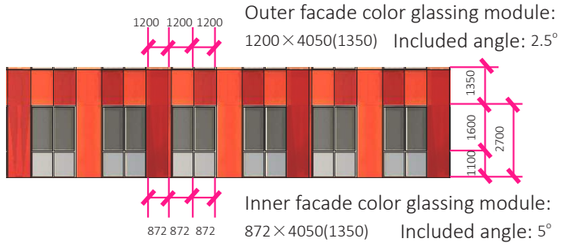
why not colorful !

COLOR

- Calm colors (Hospital = blue / green !?)
- Warm colors (**Becuse of the existing buildings**)

MODULE





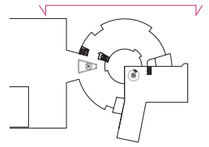
Outer facade color glassing module:
1200×4050(1350) Included angle: 2.5°

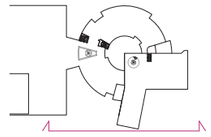
Inner facade color glassing module:
872×4050(1350) Included angle: 5°

I N S E R T

New emergency building in
Vrinnevi hospital in Norrköping

ELEVATIONS_1:400

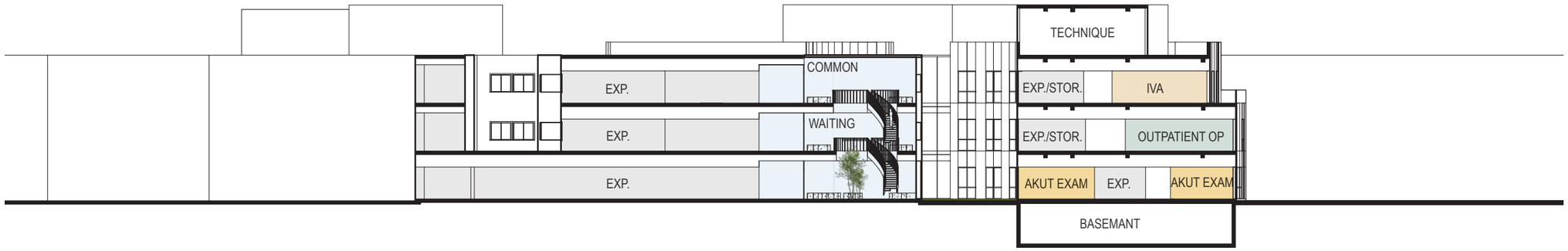


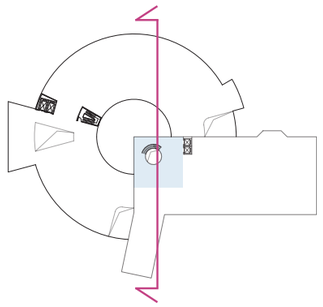


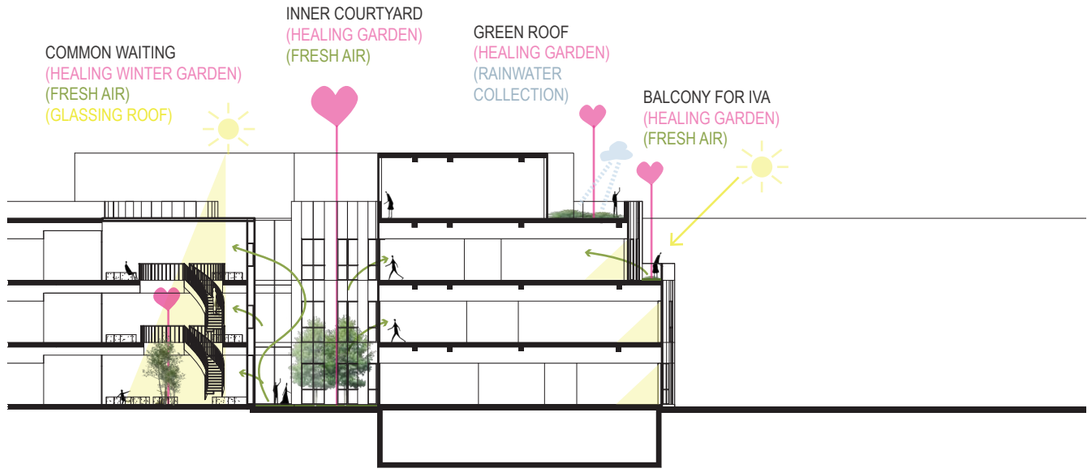
I N S E R T

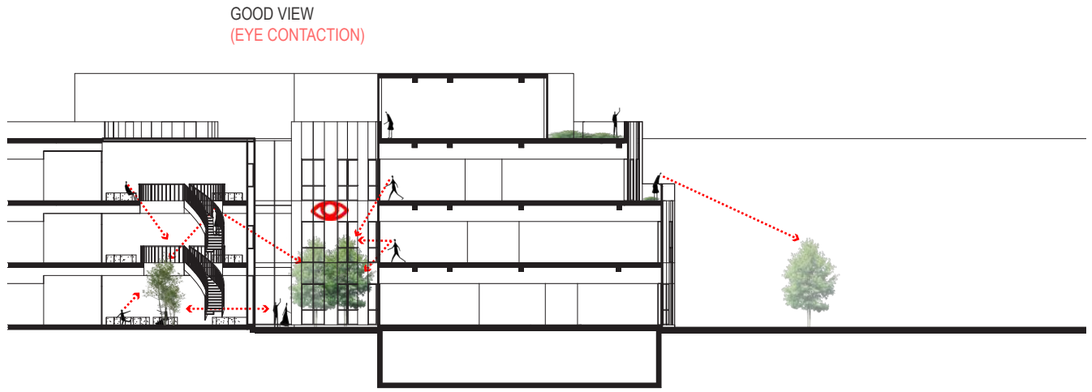
New emergency building in Vrinnevi hospital in Norrköping

DESIGN CONCEPT_SECTION1
HEALING GARDENS









I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

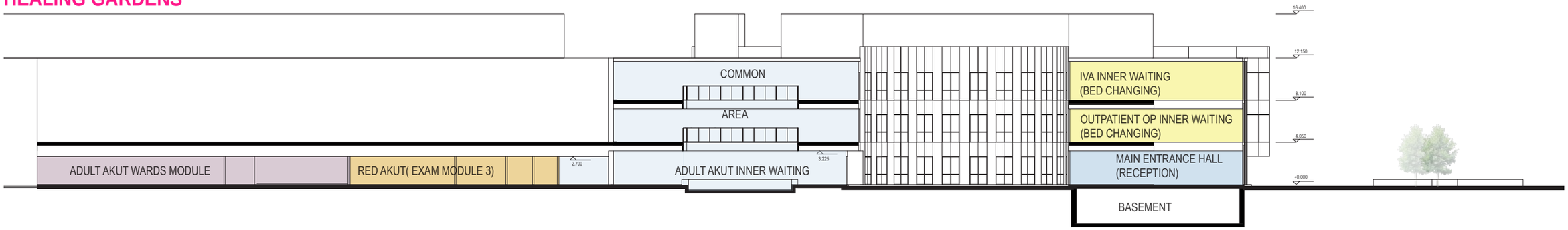
SECTION1_1:200

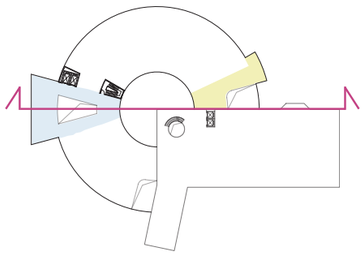
I N S E R T

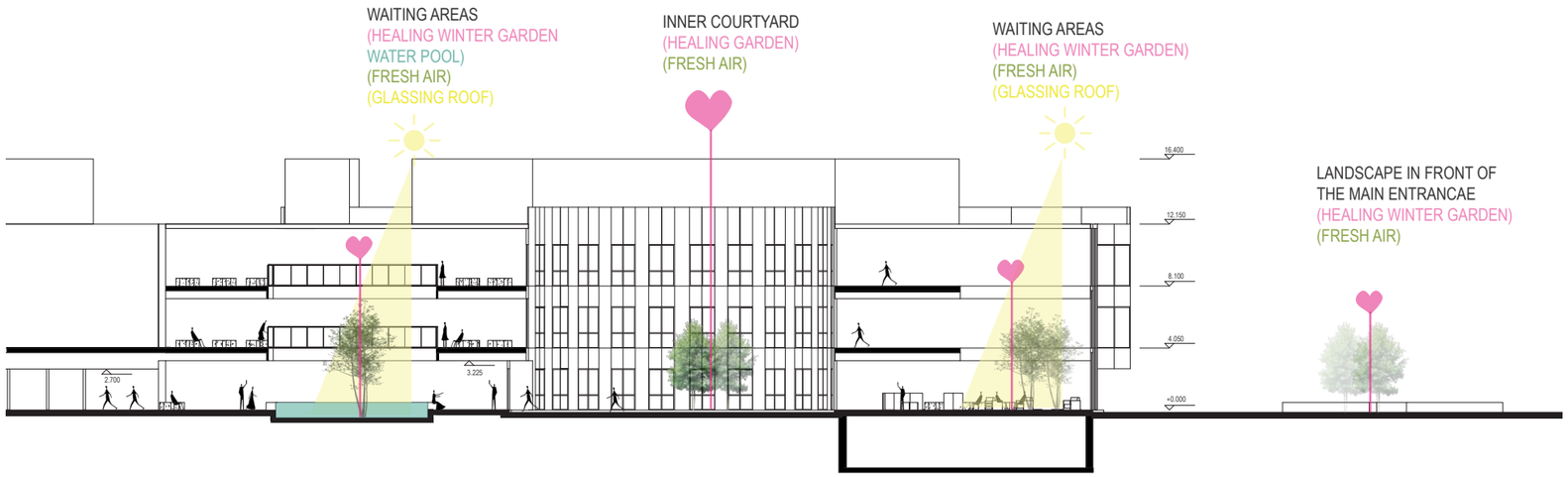
New emergency building in Vrinnevi hospital in Norrköping

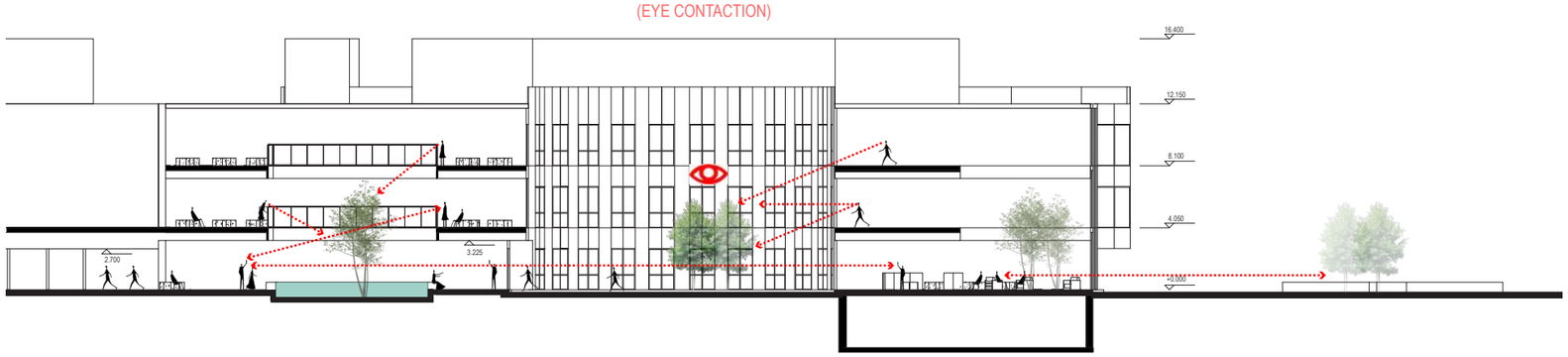
DESIGN CONCEPT_SECTION2

HEALING GARDENS









I N S E R T

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SECTION2_1:200

I N S E R T

New emergency building in Vrinnevi hospital in Norrköping

HEALTHCARE ARCHITECTURE IN CHINA

HEALTHCARE IN SWDEN

- People are living increasingly longer
- Cooperation on health and medical care
- Patient-oriented
- Attach great importance to patients' safety and privacy
- High-quality wards
- Daylight for most rooms
- Humanized design in the common areas

HEALTHCARE IN CHINA

- Large elderly populations → Extend the old hospitals (city center)
  Build new complex (Suburb)
- No daylight in OP rooms → Should pay attention
- No one-patient rooms → Design more in Suburb
- Rational but not very cozy → Bring nature inside
  Healing garden around the common area