Isala Zwolle

The new Isala hospital in Zwolle, the Netherlands:
Combining organic design, advanced technology and the spirit of collaboration

INTRODUCTION

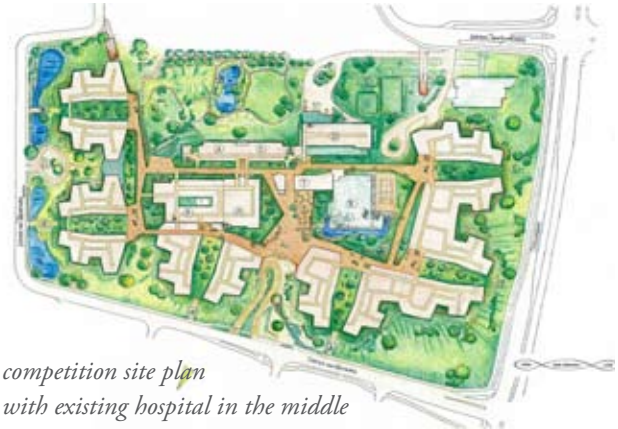
By planting the last shrubs and trees and by digging the ponds the last efforts of completion are made for an impressive and colourful hospital complex in the Netherlands. The hundred and eight thousand square meters area of building hardly resembles a hospital, and yet it is. The hospital was built on one of the two hospital premises in the city of Zwolle. When fully in use by August 2013, and by taking down the original hospital in the months to follow, a building process that led to one of Netherlands biggest and most advanced and dedicated hospitals will come to an end. All participants in the design and build process look back upon a very successful project. Apart from designing and building an excellent and most inspiring setting for patient treatment and care, the way in which building partners were selected and the way the building process was managed in full and respectful cooperation with all the parties involved, is a unique issue to be intensely promoted in Dutch building practice: Maximum quality was fully realized within set time and cost limits.

The project started with a design competition to be followed by the selection of the architect in 2000. Based on the competition entry a master plan was made, that can still be recognized in the built project of 2013, but in the course of time many amendments in the design have shaped the final project. One important reason for this was the change of Dutch hospital finance system. An extensive set of post war government guaranteed funding, based on budgets related to government assigned square metres of floor area, was replaced by private funding and input by private health insurers.
This resulted in reflection, and delay, but finally in 2008 the decision was made to progress by taking the project to the selection of a building partner. In September 2009 building started, to be completed in February 2013, to allow for a half year of implementation of technical facilities and testing.

This reader intends to give insight in a most remarkable project.
Conceiving such a vast hospital is not an easy task. We hope to bring forward a number of aspects regarding the design and the process that have been crucial for its success. We talk about the role of the architecture, the way the layout of the building was conceived in cooperation with client and advisers, and the aspects that led to a successful building process with our building partners.

A DESIGN COMPETITION

In 2000 Isala chose to build a new hospital. Earlier the merging of a catholic Hospital (Weezenlanden) and a general hospital (Sofia) had taken place. Time had come for Isala to think of a new building for a new hospital organization. A master plan was to be made, and a competition was set up to choose an architect to fulfil the needs and ambitions of Isala. The first objective was to produce a building that would be of the highest technical and top clinical performance. Additionally the building should give the patient a safe and welcoming environment. One of the participating candidate architects was Alberts & Van Huut architects, known for its organic architecture and for two of its mostly internationally rewarded projects, the Gasunie head offices in Groningen and the NMB/ING head offices in Amsterdam. The client advised Alberts & Van Huut to join with one of the architect offices specialized in larger healthcare projects. A/d amstel architecten (then called Nijst Idema Burger) was welcomed to participate in a joint competition entry. A/d amstel had gained over the last decades extensive experience in dealing with the specific Dutch healthcare building regulations, and participated in the design and building process of many Dutch hospitals. The office has contributed to a high standard Dutch hospital design with emphasis on flexibility to allow for changes of cure and care processes. The client gave generous input to the inhabitants of Zwolle and to its own staff in the evaluation of three submitted project entries. Finally a clear and overwhelming support led to choosing the joint Alberts & Van Huut and a/d amstel project.

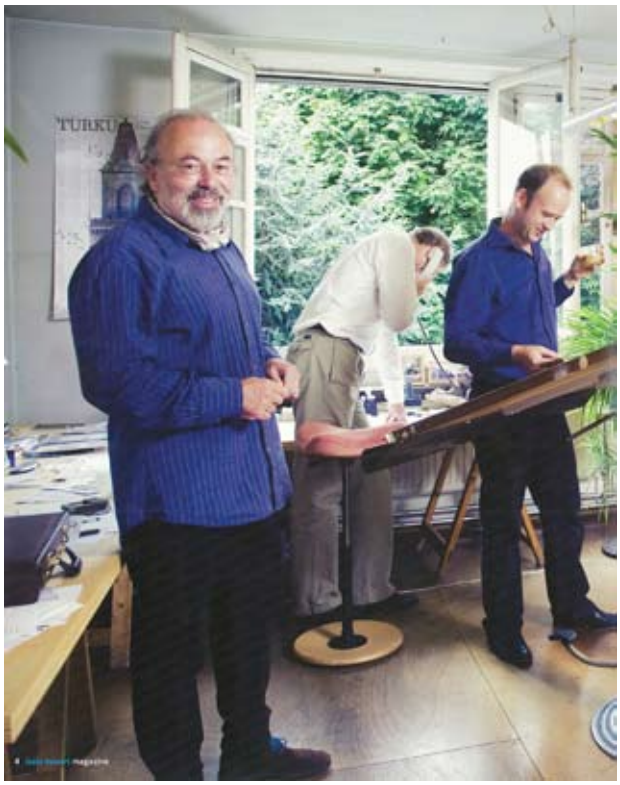


competition site plan
with existing hospital in the middle

COOPERATING ARCHITECTS

AMI (architects association Isala) was commissioned. In AMI also participated Alberts & Van Huut Partners, the engineering firm with large experience in making the organic shapes that represent Alberts & Van Huut's architecture buildable.

Always the design of a hospital starts with solving a very complex puzzle with a large number of variables. Logistics and necessary relation between hospital functions led to a scheme of designated areas, that are then slowly frozen into a set design. The cooperation with Alberts & van Huut



architects at work at Max van Huut's Keizersgracht studio (note: with open windows onto the garden, windows do open in Isala patient rooms also)

meant that parallel to talking about functions, the focus was constantly on experiencing the future building. Leading were questions like: How does a patient feel when he enters a hospital, what is needed to accommodate tranquillity and rest for a patient to deal with medical suffering? Can a corridor that serves in the quickest way to a doctor's room be more than just a corridor? How can we make an environment where it is a pleasure to work?

Greenery would not be put forward just to fill areas that would otherwise had been been left empty. A generous use of greenery would become an essential part of the building design. The corridor would become like a street with trees and benches, to wait, to just sit down after a visit of a treated relative, to look out into the garden, to find a shop or to drink a good cup of coffee.
Not only would be zoomed in on details of facilitating medical work flow, but a constant eye would be on the experience of place and space during the design process, witch attention for landscape, light, colour, material, and art.

BUTTERFLIES AS BUILDING BLOCKS

In the competition entry one sees that the scheme is already organised in building blocks that by their plan shape have adopted the name butterflies. In the signposting of the finished building the name butterfly (vlinder in Dutch) is adopted as a successful means to help understand the layout of the hospital.
Subdivision in smaller parts makes the building appear less massive and creates overview. It also allows for flexibility. Originally the competion entry showed 6 butterflies, with its articulating wings. Now there are 4 butterflies. During the design process, due to change of program, the number of butterflies changed, but not the building concept. Butterfly 1, the smallest one, is used only by hospital staff.

butterfly in prelimanary design

Here we find the logistic servicing, labs, central sterilization and the hospital pharmacy. An underground servicing corridor connects Butterfly 1 with Butterflies 2, 3 and 4.

Butterfly 3, centrally placed, contains main hospital functions: The emergency department on the ground floor, connected to an acute nursing ward, two operating room departments with connected intensive care departments, and a roof top helicopter deck. Also in this butterfly one finds the radiology department with extensive imaging facilities, the nuclear medicine department, as well as a centrally positioned management floor.

Butterfly 2 and 4 are butterflies with outpatient facilities on the lower floors and nursing wards on the higher floors. Child care and care for women are concentrated in butterfly 4.

The entrance hall is positioned between butterfly 3 and 4 to be entered from both the street side when coming by bus or taxi, and the central parking area. Next to the entrance hall is the visitors restaurant. From the entrance hall leading into two directions is the main corridor that meanders to the stairs and elevators serving each butterfly, with views on parks and ponds.

FURTHER ON BUTTERFLIES

Each butterfly has its own organization with central stairs and elevators and central facilities per floor; each butterfly has its own beautiful covered atrium garden.
The size and shape of the butterfly plan is determined by the arrangement of four general nursing wards on the upper floors with 1-, 2-, and 4-bed rooms plus added facilities. The shapes allow on the lower floors to accommodate a variety of outpatient facilities meeting the requirements of different medical departments. The use of standard 14 or 15 square metre rooms allows for maximum flexibility in accommodating future change in organizational layout.

floor plan 4th floor with maternity suites above entrance hall, and outside servicing corridors

Like in nature no two similar butterflies exist. Butterfly 1 is small and, due to the requirements of the labs, butterfly 1 floors span without intermediate support. Butterfly 2 is higher because of the hospital's situational setting. The hospital is higher at the town side and lower where it meets the countryside surrounding of Zwolle. Butterfly 3 is wider than the others to suit the requirements of the operating departments.

Isala has chosen within the mild arrangement of seperated butterflies, for maximum future flexibility and efficient relations. This is accommodated by service corridors outside the hospital wards (see image) to connect all butterflies.

upperfloor service corridor outside the hospital

groundfloor public domain and access to stairs

Most functions related to care for children and women are concentrated in Butterfly 4. So are hot floor functions concentrated in Butterfly 3. But functions easily extend to adjacent butterflies also. One example shows how maternity suites extend over the entrance hall from butterfly 2 to 3; Another example shows how heart en lung treatment is fully organized on the fifth floor of butterflies 2, 3 an 4, centred around the thorax operating rooms in the middle. Horizontal connections allow for future adding, moving or extending of functions, thus flexibiliy.

Outpatient and diagnosis functions are positioned at the lower floors to minimize walking distances by patients and the use of elevators, and to support the use of stairs.

EXUBERANT, WELCOMING AND RELAXING

On the outside the hospital shows itself as a rich and colourful building, initially not as a hospital. The building consists of different types of brickwork masonry. Masonry surfaces are alternated with copper cladding, zinc work and and sheets of titanium. At special places the masonry consists of bricks baked with sprinkled pigments. Windows seem to be accidentally placed but in fact neatly composed. The colours of the rainbow in the window frames, ranging from bottom to top, in combination with the various materials do not give the building one colour; the building itself *is* colour.

The building is embedded in comfortable surrounding of landscape with footpaths, ponds and benches. Above the slanted facades shapes of recessed "installation attics" protrude into the air. The atriums with lush greenery being the centres of the butterflies, have impressive glazed roofs with beautiful wooden trusses.
The glazed entrance hall and copper canopies welcome visitors.
From the central parking area the hospital exposes itself even more exuberant. The high butterfly cores with stairs

Looking at staircase butterfly 2, and glazed servicing corridors. Exuberant? (even without the green yet to grow up)

and elevators are held together by a large sloping curtain wall, behind which the servicing corridors provide horizontal building connections . The curtain walls are made up from glass and brightly coloured glass panels in the colours of the rainbow again. Under the curtain walling and protruding forward with a grass and herbs roof is the so-called southern corridor, linking the entrance hall with the butterfly staircases.

The entrance hall is not just a large hall. It contains on various floors, connected by voids, a variety of pleasant places for waiting, for meeting, receptions, church services and even theatre.
By an ingenious registration system visitors to the outpatient clinics are encouraged to stay in the lobby and the public south corridor with benches and reading tables, overlooking the gardens, with its abundant planting until just before their scheduled appointment.

Commercial spaces, including a visitors restaurant, and shops are located adjacent to the central hall and southern corridor.

The colour outside is taken inside to give to a warm, friendly and generous feel to the hospital building. Colour is used to add associative way finding: Each butterfly has it own linoleum floor colour. Also each butterfly has its own stained timber colour atrium facade. Throughout the

detail of entrance hall

building the range of rainbow colours outside is reflected in window colours inside. Consequently each butterfly floor has its own feel.

Architectural finishes have a natural feel throughout the hospital. Bamboo is generally applied to doors and counters. Within the colourful hospital setting, office furniture and waiting area furniture are applied generally throughout the whole building in natural materials adding to a timeless and comfortable atmosphere. Lush greenery in public areas add to this.

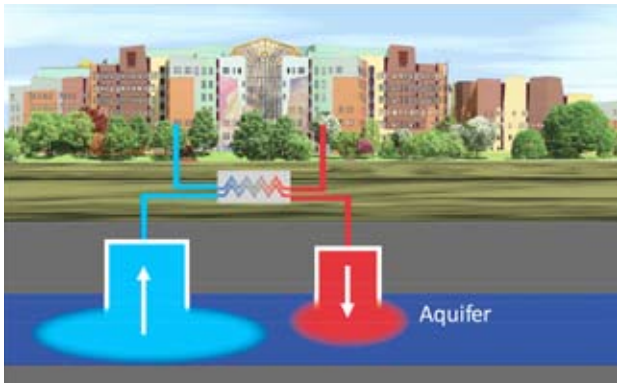
glaze technique

The entrance hall has a red granite floor, and the public southern corridor has ceramic tiled floor with an outside feel. Bamboo flooring is used for upper floors in the central hall area.

The four-story walls of the entrance hall are covered with the so-called glaze technique, in which transparent layers of colour are superimposed on each other in fading hues.

INTEGRATED AND DURABLE DESIGN BY COOPERATION WITH ADVISORS

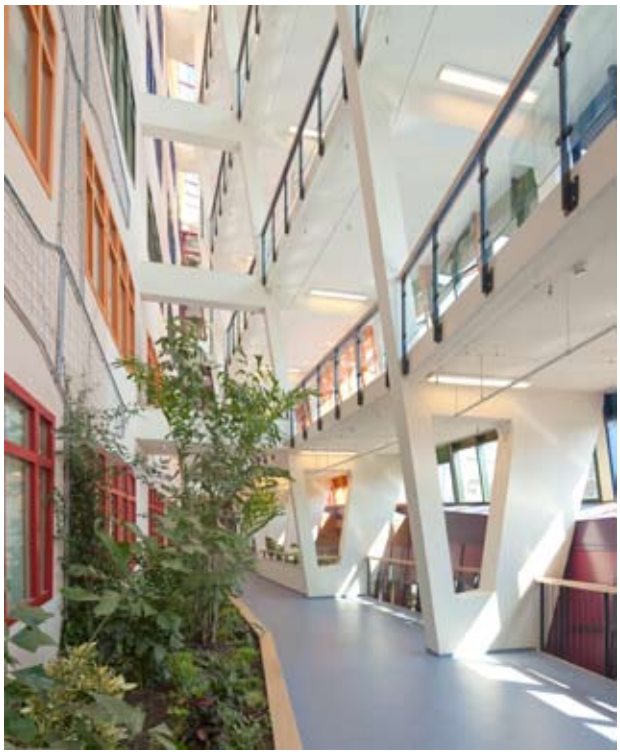
The organic design and technical and medical facilities are optimally integrated for efficiency and durability. An important role was played by the engineers and technical designers of Deerns NL. The new hospital is extremely energy efficient and reduces energy costs by 40%. Firstly building physics has been dealt with properly. Secondly the energy supply has been optimally introduced. There is not one main power station, but the building's subdivision in butterflies made in possible to locally generate energy in the butterflies' installation attics. This saves considerable loss of energy by transportation of heat. Thirdly durable energy generation is introduced by underground heat and cold storage.



Investments in the use of durable resources are paid back during operation. Also heat pumps, dry cooling and concrete core activation have been applied, as well as the use of cool air from the building's north side to cool the warmer south side. With concrete core activation the entrance hall, the southern corridor and the above walkways are given a pleasant atmosphere. Cold or warm water pipes are fed through concrete floors. Small changes in temperature are sufficient and thus energy saving because of the large radiation surface of the concrete floors. Also the generous amount of plants adds to the comfort of climate. A small but typical example showing the benefits of organic design and cooperation between partners during the building process are the distribution boxes that connect the cold and

warm water pipes. They were not foreseen but necessary, and could then easily be integrated by adjusting the shape of the big planters.
Numerous small energy saving and CO-2 reducing arrangements have been taken, like the use of energy saving armatures, automatically on and off switching of room lighting when entering or leaving. One unique example: The energy generated when the elevator descends is given back to the electricity net.

The structural design by DHV Haskoning consists of a column structure that allowed for a free and organic layout. Columns were also projected in de facade area, filled in with elements easily to be taken out in case of extension or growth sideways, or to allow big and heavy imaging apparatus to be placed inside. The walls necessary for stability have been placed strategically where no extensions are to be expected.
Worth mentioning are the organic big tree like colums in the entrance hal, that concentrate weight from the structure in the floors above, allowing more free space at ground entrance level. Also the structure designed to keep the servicing corridors away from the building facades, allowing light to enter into the patient rooms and respecting patient privacy, have added to a rich and pleasant environment.



servicing corridors

FROM ABSTRACT PROGRAM TO FLEXIBLE AND WELL CONSIDERED SCHEME

Manager / consultant Twynstra Gudde and Isala were responsible for the original brief. The program developed during the design process from abstract administratively assigned floor areas, through a very large number of consulting sessions with approximately 30 user groups, into a concrete and well considered scheme. Architects and technical installation designers interpreted with doctors, nurses and supporting hospital staff, applied work processes and subsequent needs, to be incorporated in the scheme.

stakeholders meeting

Very useful user input was given when testing inpatient and outpatient rooms that were built as full scale mock ups prior to the start of the building process. The rooms were fully equipped, and many small details could then be decided on, and amendments could easily be adopted.

During the course of the design and build process changes in the program occur, necessarily, inevitably. The organic architecture in Isala allowed for easily adopting changes. This was proved several times. A connecting corridor to a part of the existing building to be kept in use, a bigger ambulance hall to receive mobile intensive care units, a big imaging apparatus to incorporate, a patient pharmacy to be fitted in. These late changes were only to be accommodated by extreme good cooperation between all parties involved. With flexibility not only in the building or in the architecture but certainly in people's minds.

PROVEN FLEXIBILITY

Originally the new hospital was designed around the existing hospital building, that was to be fully renovated after the erection of the butterflies.
While preparing the building for building approval and tender in 2007 the newly appointed hospital CEO Mari-

anne Sint was confronted by the building developments of her hospital, while due to funding system changes the project was not financially secured at all.

The project was frozen for a year. After a year of calculations, consultations and thinking it was decided to progress, but not without some big changes in the design: The existing hospital building was to be taken down. Functions that were projected in the old building had now to be incorporated in the new building. We had to move the parking from the building basement to the area of the former hospital building. The time to accommodate the needed design amendments gave time to rethink a strategy on how to find a good contractor.

FINDING A BUILDING PARTNER

In The Netherlands we have a bad reputation of large projects and exceeding budgets. Also building projects of fellow hospitals were characterized by large budget problems. Partly because contractors continued to search for deficiencies in the specifications in order to claim more work. And simultaneously due to programmatic adjustments during construction to be incorporated, with subsequent problems of extra time and extra costs, and big discussions with letters and lawyers. To be able to avoid this either the specifications should be waterproofed, and the hospital was to abandon any new requirements during construction, or a completely new approach was to be found. Isala invested in finding ways to find a contractor or rather a building "partner", recognizing that client and contractor both would benefit from solid cooperation rather than fighting along.

Decided was to invite three consortia that had showed interest.

The candidates received a set of drawings. Instead of presenting the tender drawings that were made in preparation of a traditional tendering procedure, they received final design drawings, principle detailing, and a set of selction rules. 50% of the scoring criteria was related to a plan of approach to be submitted on how to deal with the clients building requirements, how to cooperate with the client and the consultants, how to reduce nuisance, how to deal with planning aspects and to present their team. 50% of the scoring criteria dealt with previewed building costs. The consortia were not asked to calculate quantities, they did not even get time to do so, but they were asked to fill in unit prices in a bill of quantities schedule, only related to a small but representative part of the building, plus overheads. A special role was played by a contract lawyer.

Instead of just writing conditions to be dealt with to reduce the clients risks, he designed a new concept contract based on mutual challenges, thereby fully neglecting any existing procurement regulation. Based on these figures, and the full knowledge of the design scheme, the costs expert was able to extract the total building sum, that would for the selected building partner be the starting point for a half year of exchanging knowledge between architects, consultants, engineers, and planners, to comprehend and optimize the building scheme, after which the contract would be signed.

The winning consortium D2B scored best on both the plan of approach and price.

Building started September 2009


Isala klinieken Consortium D2B AMI Deerns

Optimalisatiefase bouwplan Isala klinieken

Groudbeginselen (verkort)

1. "Het beste voor het Project"(zichzelfstaand); voor alle beslissingen en handelingen
2. "Open boek"; in alle opzichten
3. "Professionaliteit"; vanuit eigen bekwaamheden en vakkennis
4. "Verantwoordelijkheid"; ter voorkoming van nadeel
5. "Eerlijkheid"; eerlijk en naar waarheid de feiten verstrekken
6. "Betrouwbaarheid": als betrouwbare partners en nakomen toezeggingen
7. "Integriteit"; respect voor betrokken belangen
8. "Objectiviteit": op "arms' lenght" ieder potentieel conflictueel belang melden
9. "Voorkomen en vermijden van geschillen"

De tien omgangsregels

1. Wij spreken uit wat ons dwars zit
2. Als het moeilijk wordt zoeken we elkaar op
3. Wij hebben respect voor elkaars rol en werk
4. De belangen achter problemen maken we bespreekbaar
5. We hebben belangstelling voor elkaar
6. Communiceren doen we tijdig, ook als iets niet lijkt te lukken
7. Wij zijn in staat om elkaar iets te gunnen
8. Van openheid maken we geen misbruik
9. Wij hebben oog voor elkaars zwakke en sterke kanten
10. Waar dat kan geven wij elkaar complimenten

Twynstra Gudde

code of conduct with logos and signatures of all participants

BUILDING IS COOPERATING AND TRUSTING

Both the client and the building partner have invested in cooperation based on trust. Prior to construction a "code of conduct" was signed by all parties involved in construction, that was fixed on the wall in the site office. It was secured not to begrudge each other on a good job, and to discuss problems openly with each other and thereby to opt for self-examination rather than to blame each other of it.

The half year op optimizing the scheme with all parties involved was very succesfull. Architectural and technical works were wonderfully tuned. The engineering of prefabricated installation parts to be fully installed prior to inside walling can be called innovative. The architectural design was also tuned to optimize lean working methods. All this resulted in a very efficient and pleasant building process. It happened that the contractor proposed to take down a brickwork wall that he felt, although built according to the architect's drawings, could not have been the architect's intentions. Likewise, the architects have contributes during the building process to simplefy certain details to help the builders to proceed faster.

The way the building parters have completed this major project within the framework of the contract (that is time and cost), resulting in a high quality building is truly admirable.

No one of the participants of this construction project had experienced such a well organized project and such a pleasant construction. Everyone involved in the works was aware of the fact to be contributing to a special project, the success of which depended on respect and cooperation.

CONCLUDING

With immense ambition Isala and its partners have achieved to create a wonderful hospital in harmonious cooperation with everybody involved. What is the relevant key issue resulting from this project, relevant for a successful use of the building? Of course we would want to see that the positive attitude in the design and building process reflecting in a marvellous hospital building, results among doctors, nurses, examiners, supporting staff, and management in picking up some of the pleasure and care that was given to the building, and make a prosperous start in a new building to suit the needs of advanced, joyful, dedicated cure and care, in fruitful cooperation.

Amsterdam, May 2013

Appendix, hospital details and floor plans

The new Isala hospital:
(Isala is the Latin word for the northbound Rhine delta river in the Netherlands)

The Isala hospital provides all basic hospital services and specialisms, including extended trauma facilities, a dialyses centre, all relevant hospital labs and a production pharmacy.
Also prived are highly specialised facilities for heart and neuro surgery, stem cell and bone marrow transplants, perinatology and neonatology.

Number of beds: 859
of which:
Acute admittance Wards: 62
Intensive Care departments: 47
First Lung and Heart Aid: 14
Coronary Care Unit:14
Paediatrics: 60 (high care, medium care, daycare and nursing)
Maternity department: 41 (of which 32 maternity suites)
Neonatal Intensive Care: 17
Obstetric High Care: 12
Medium Care: 22
Daycare: 56
Ward for elderly people: 76

Surgery capacity:
8 standard clinical operating rooms
6 trauma en thorax operating rooms
6 operating rooms in daycare centre

Yearly number of in-takes: appr. 50.000
Yearly number of outpatient visits: appr. 550.000
Yearly number of days of day care treatment: appr. 50.000
Number of staff: appr. 5000

Gross area: 108.000 m2
Gross area totally for Isala premises: 150.000 m2 (including outpatient outposts and near future day care centre)

Total investment: appr. 450 million euro

Client:
Isala Hospital Zwolle
Director P.J. Smaling

Consultants:
Architects:
AMI (Architect Association Isala), consisting of:
Architectenbureau Alberts & Van Huut, Amsterdam
a/d Amstel architecten, Amsterdam
Alberts, Van Huut & Partners, Haarlem

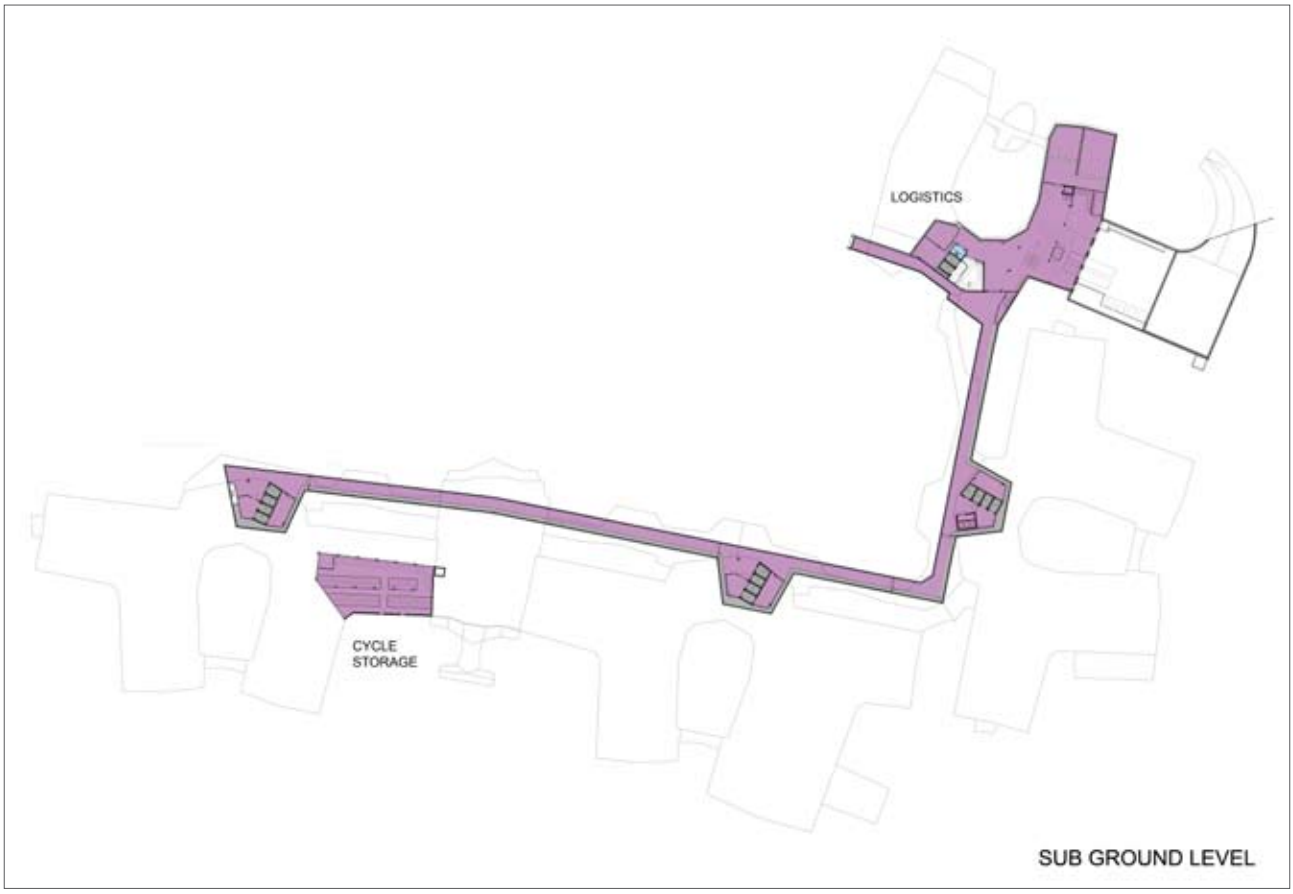
On behalf of AMI:
Building Physics: Van Zanten, raadgevende ingenieurs
Garden design: Jorn Copijn, Utrecht
Cost Advice: DHV-Haskoning (C. Regeling, 4-Building)

Projectmanagement: Twynstra Gudde, Amersfoort
Technical engineering: Deerns Nederland, Rijswijk
Structural engineering: DHV-Haskoning, Den Haag
Site managment: Stevens Van Dijck, Zoetermeer

Construction Partners:
Designed 2 Build (D2B), consisting of:
BAM Utiliteitsbouw Regio Oost
Unica Installatiegroep
Croon Electrotechniek
Kropman Installatietechniek
BAM techniek Regio Oost






LOGISTICS
CYCLE
STORAGE
SUB GROUND LEVEL


STAFF
WARDROBES
LABS
MORGUE
CENTRAL
STERILIZATION
OUTPATIENTS
BLOODSAMPLES
PATIENT
PHARMACY
RADIOTHERAPY
RECEPTION
GP CENTRE
THERAPIES
RESTAURANT
EXAMINATION
OUTPATIENTS
OUTPATIENTS
EMERGENCY
GROUND LEVEL


LABS
TECHNICAL FACILITIES
LABS
OUTPATIENTS
DIALYSIS
NUCLEAIR MEDICINE
OUTPATIENTS
OUTPATIENTS
OUTPATIENTS
OUTPATIENTS
RADIOLOGY
FIRST FLOOR


STAFF RESTAURANT
LABS
LABS
OUTPATIENTS FUNCTIONAL ANALYSIS
WARDS
WARDS
WARDS
MENTAL SUPPORT
BRAIN CARE
ACUTE ADMISSION WARD
OUTPATIENTS FUNCTIONAL ANALYSIS
MANAGEMENT
SECOND FLOOR


PSYCHIATRY
PHARMACY
PHARMACY
WARDS
CHILDREN DAYCARE
ENDOSCOPY
CHILDREN
WARDS
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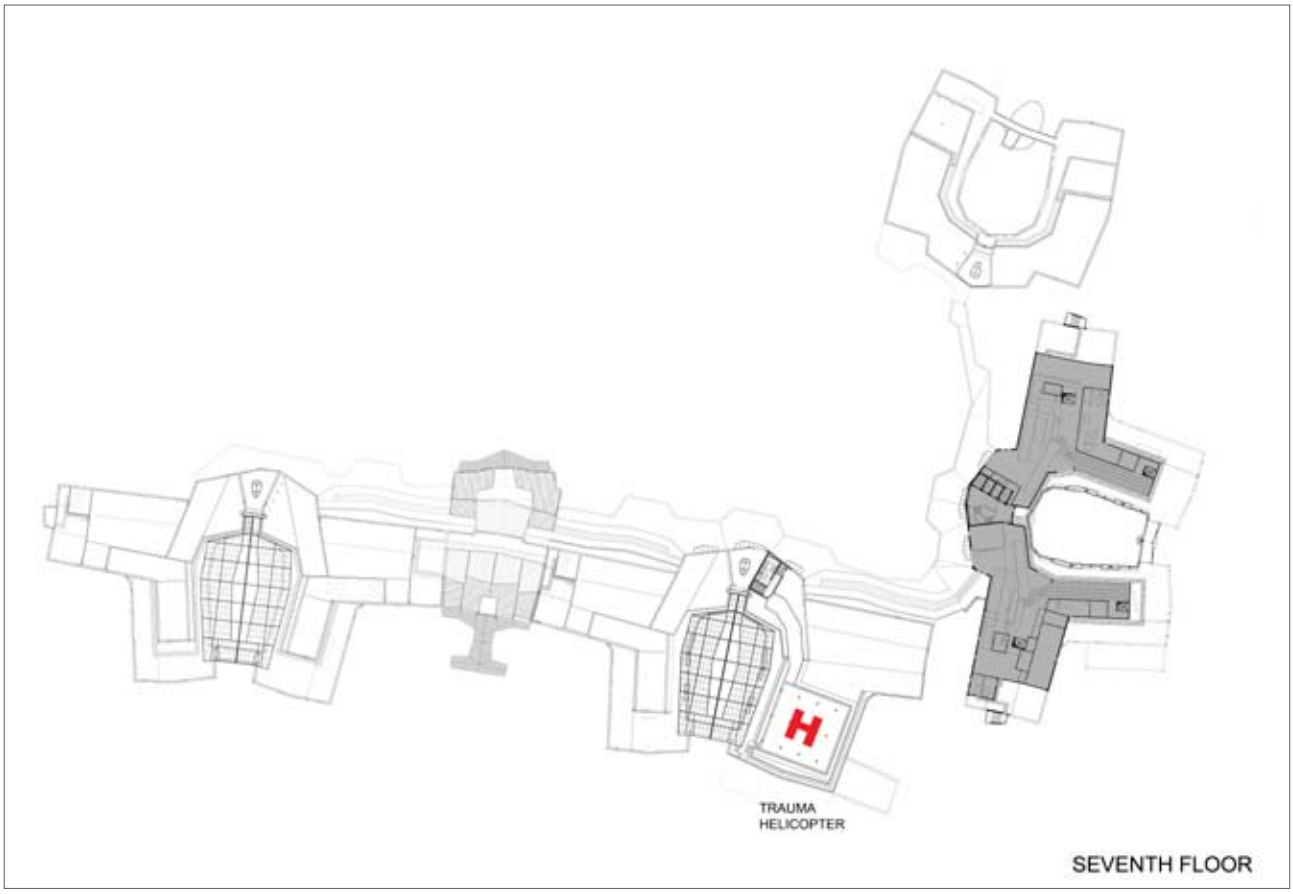
ACUTE
INPATIENT
WARDS
WARDS
DAYCARE
THIRD FLOOR


WARDS
NEONATHOLOGY
MATERNITY
OBSTETRIES
WARDS
INTENSIVE CARE
PLANNEND
SURGERY
FOURTH FLOOR

FIFTH FLOOR

SIXTH FLOOR


TRAUMA
HELICOPTER
SEVENTH FLOOR