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The Hospital back in the City

a public function for the regeneration of Zaandam Kogerveld

Graduation Studio
Urban Renewal, what next?

Hybrid Buildings - AR3AUH020
Densification around stations in the Zaanstreek

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<table>
<thead>
<tr>
<th>Index</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>4</td>
</tr>
<tr>
<td>2. Problem statement</td>
<td>6</td>
</tr>
<tr>
<td>3. Methods and techniques</td>
<td>8</td>
</tr>
<tr>
<td>3.1 Urban Analysis</td>
<td>8</td>
</tr>
<tr>
<td>3.2 Reading the city - Morphology</td>
<td>8</td>
</tr>
<tr>
<td>3.3 Strategy</td>
<td>9</td>
</tr>
<tr>
<td>3.4 Program</td>
<td>9</td>
</tr>
<tr>
<td>3.5 Architectural Changes – Size study</td>
<td>9</td>
</tr>
<tr>
<td>3.6 Typological research</td>
<td>9</td>
</tr>
<tr>
<td>3.7 Urban Plan</td>
<td>9</td>
</tr>
<tr>
<td>3.8 Scenarios – flexibility</td>
<td>9</td>
</tr>
<tr>
<td>3.9 Facade - Construction</td>
<td>9</td>
</tr>
<tr>
<td>3.10 The lectures Research Methods and Design Practices</td>
<td>9</td>
</tr>
<tr>
<td>4. Analysis and argumentation</td>
<td>10</td>
</tr>
<tr>
<td>4.1 Historical development</td>
<td>10</td>
</tr>
<tr>
<td>4.2 Special functions</td>
<td>10</td>
</tr>
<tr>
<td>4.3 Typologies</td>
<td>10</td>
</tr>
<tr>
<td>4.4 Connectivity area</td>
<td>11</td>
</tr>
<tr>
<td>4.5 Frame-Pattern-Circuit</td>
<td>11</td>
</tr>
<tr>
<td>4.6 HOV Zaancorridor</td>
<td>11</td>
</tr>
<tr>
<td>4.7 Reading the city - Morphology</td>
<td>12</td>
</tr>
<tr>
<td>4.8 Strategy</td>
<td>12</td>
</tr>
<tr>
<td>4.9 Program</td>
<td>12</td>
</tr>
<tr>
<td>4.10 Architectural changes</td>
<td>13</td>
</tr>
<tr>
<td>4.11 Size study</td>
<td>13</td>
</tr>
<tr>
<td>4.12 Typological Research</td>
<td>13</td>
</tr>
<tr>
<td>4.13 Urban plan</td>
<td>17</td>
</tr>
<tr>
<td>4.14 Scenarios – flexibility</td>
<td>19</td>
</tr>
<tr>
<td>4.15 Distribution rooms</td>
<td>21</td>
</tr>
<tr>
<td>5. Conclusion</td>
<td>22</td>
</tr>
<tr>
<td>5.1 The hospital as initiator of the urban transformation</td>
<td>22</td>
</tr>
<tr>
<td>5.2 How can the building of the hospital be interesting for other users in the future?</td>
<td>22</td>
</tr>
<tr>
<td>5.3 Which flexibility does the hospital need to be able to adapt to the technical changes?</td>
<td>22</td>
</tr>
<tr>
<td>6. Reflection</td>
<td>24</td>
</tr>
<tr>
<td>7. Literature</td>
<td>28</td>
</tr>
</tbody>
</table>
The Zaanstreek is an 8 km wide area from Zaandam to Krommenie, located at the north side of Amsterdam. The area is connected to Amsterdam by a provincial road (N203), a highway (A8) and 2 railroads. The NS is planning to intensify the schedule of the trains in this area, making the Zaanstreek area better connected to Amsterdam. In this way the Zaanstreek could become interesting to settle for people who work in Amsterdam but don’t want the negative aspects of the big city. There is more space, more green and a more quiet living environment. Houses are cheaper and, unlike Amsterdam, could be ground bound and have a garden.

To be interesting as location for commuters from Amsterdam these areas have to be near a station. The analysis “22 Stations Locaties” (Engel and de Waaijer, 2011) is the basis for our studio to select possible new dwelling areas for densification. In the analysis circles with a radius of 800m are drawn around 5 existing and 2 hypothetical stations in the Zaanstreek area. Theoretically the station could be reached from every house in this circle in a 10 minute walk.

The Zaanstreek area developed along the river Zaan and therefore has grown linearly. Perpendicular to the Zaan settled factories with small houses around them for the workers of those factories. On the east side of the Zaan, at the height of the Alexanderbrug, the industrial area reaches until the central traffic axis (Scholtenstraat and Heijermansstraat). Because the industrial areas are almost completely mono-functional, these areas could be used completely for dwellings when removing the industry. But that is not so easy. Industries have to get a financial motivation to leave and this motivation can only be given by developers who see the area as a potential dwelling area. The changing of the character of the industrial area is the central question here.

With larger urban extensions from the seventies until the developments of the Vinex-wijken changing the character was relatively easy: transforming a piece of agricultural land is easier than changing a (often polluted) piece of industrial ground. Because of the Sde Nota Ruimtelijke Ordening extensions of urban areas were limited. However the Nota was never fully established, many municipalities used the Red and the Green outlines (SER, 2001, p.13) and that lead to a stop of the expanding urban area. This meant that developments of dwelling areas should take place in the urban outline itself: urban densification. This lead in Zaanstad to a critical view towards the industrial sites in the city. The theme of the studio, urban densification, is worked out in a design question in Zaanstad, but is strongly related to a national discussion around the development of dwelling areas.
In my research I looked for ways in which the Hospital can initiate the transformation of the industrial area to a dwelling area. In the magazine Lay-Out 06 the “decentralized hospital” is proposed as “catalyst of urban renewal”. The hospital is divided in several units and after that a design research is done to investigate if the hospital, as a public function, can give the neighborhood a better image.

In my research I will elaborate in the concept of using a public function in order to improve the value of a part of the city. The Zaans Medisch Centrum, situated south-east side to my design location, is the biggest public function in the area and has plans to move. Therefore it is interesting to look if I can use this hospital, as a public function on my location, for the transformation of the Kogerveld area. A hospital has a high level of independency. It has a rather constant stream of visitors and has incorporated several other small public functions (supermarket, coffee shop, flower shop). Only a good connection with several roads is important.

Because of its independency it was possible to move the hospital, when it grew in the ’70’s, to the periphery. The colossal building didn’t fit anymore in the fine structure of the dwelling areas and wasn’t recognized as something of the daily life. Along with the degradation of the façade, the hospital alienated even more. The design theory for the hospital as an initiator of urban renewal is twofold. First the appearance of the hospital itself has to change in order to change the character of the area.

The research is also a contribution to the debate on how to develop dwelling areas in general. In the 80’s low-density dwelling areas could originate with a very mono-functional program. But nowadays the renewal of urban areas needs a public initiative. My design proposal, the initiative of the hospital, can be seen as one of the possible public initiatives.

My design research is interesting for hospital managements who are looking for ways to adapt their buildings better to the hospital as a “company”. Due to changing politics, hospitals are forced to act as private companies. Real estate, like in many other branches, is going to play an important role in the finances of hospitals. The trend goes towards renting the building from a private developer. That means that this developer is searching for a building that is suited for other purposes after the hospital is gone. Because of their form and their specific internal aspects, the current (big) hospitals have no more value after the hospital function is gone. By making the building more generic, concerning the structure, dimensions and appearance, the building can suite different users and the lifespan of the building can be prolonged.

Finally, in the design proposal is searched to a certain flexibility in the hospital itself. Bedrooms are lasting longer than treatment rooms because of technical developments. In my research I looked for ways to accommodate for these changing requirements without having to change the hospital tremendously or to move the hospital completely. I also took in account the possible expansion or shrinkage of several parts of the hospital. This will improve the lifespan of the hospital as well, and thereby raise the durability. However durability is not a main point in my research, the opportunities are obvious. Besides, improving the lifespan of a building is both related to financial reasons as it is related to durable development of buildings. By improving the financial aspect, often the durability is improved as well.
2) Problem statement

The main goal of the studio is densification of dwelling area as around stations. The area west of station Kogerveld is an industrial area, where the industry is slowly moving away. In this area a certain stalemate is blocking as well the developers (dwellings) as the entrepreneurs (functions). Both can change the character of the area, but both need the other to have reason to start a development in the area.

In the Masterplan II (Cuber, et al., 2012, p.13) is written that for the neighborhoods Kogerveld, Slachthuisbuurt and Hofwijk a density of 80 dwellings per hectare is needed. This influences the possible typologies for this area. The typologies could be stacked apartments or compact row houses. A garden will be difficult or can’t be very large. To meet the requirements of 80dw/ha the neighborhood has to get another quality in order to be interesting for future buyers. A standard quality for all the dwellings is a nearby station. Nevertheless there are no functions, few spatial quality and until now the areas are still occupied with industries.

The design problem for this location is how the character can be changed from an industrial to a dwelling area and which participator can initiate this change best. In the urban analysis I searched for a big public function and a strategy to transform this area. Once the character of the area is changed, also the developers will see this area as a possible living area and start their developments. The big public function has to be able to operate at the location independently. Also it has to be big enough to occupy a large amount of the site to have a mayor impact there so that the industrial character could be moved away.

From the analysis of Kogerveld became clear that Zaans Medisch Centrum has plans to move to a new building. They need a new location for that, which they now choose to use parking spaces in front of the hospital. I think the combination between a hospital and a station can be very interesting for both sides. The hospital can profit from the connection with the public transport and the station gets a higher public value. The hospital gets back out of its isolating place at the periphery and the station is improved with small public functions that were hidden in the hospital before. A hospital can function on its own and therefore meets one of the most important requirements. Nevertheless the hospital itself has to change its character in order to be able to change the character of the area.

Studies have been done to see how the hospital can be reintroduced in the neighborhood. This research is published in Lay-out 06 “Het decentrale ziekenhuis”. In this research the hospital is divided in smaller groups and integrated with the city. Also is tried to change and expand the offered care services. In the article “Architectonisch project” (Bogt, et al., 2008) new groups are made: Woman and Pregnancy,
For my research I selected 3 major research questions and added sub-questions to them.

Research Question 1: Can the hospital initiate the development of the area as dwelling area?
- Which hospital typology can connect better with dwelling areas, without losing functional quality of the hospital?
- How can the façade change in order to relate more to living areas?
- Can the hospital structure the new neighborhood in a way that it creates quality for the dwellings?
- How can the hospital instigate a connection between the neighborhood, the station and the Zaan?
- Can the hospital change adapt to the changes of the neighborhood until several decades?

Research Question 2: How can the hospital have a more generic building in order to have more value as real estate?
- Can a hospital have flexibility in its layout and to be able to disconnect several parts of the building for other functions?
- Which parts can be generic and for which parts is it financially unrealistic to build something generic?

Research Question 3: Can the hospital have an internal flexibility to adapt to new requirements of the health care institutions?
- Which parts of the hospital change more often than other parts?
- Is it possible to accommodate for all these different changes or should there be a selection of more likely changes?
- Can other care-related functions connect to the hospital?

The answers to these questions will be worked out in a design proposal of the urban area and the design of the hospital itself. In the first semester I focused on the bigger scale and on the scenarios of the hospital. Also some important knowledge about the smaller scale, like size of building blocks and connections between departments, have been studied. Conclusions from the urban analysis and the researches on hospitals have lead to an urban plan, a set of scenarios, a key-section and the typological choices of different parts of the design.
3) **Methods and techniques**

According to David Wang a method is a way to prove if a certain theory is valid (Groat and Wang, 2002, pp.75-76). A theory is a way to explain and predict a phenomena. A design theory is a combination of logical arguments in order to explain a desired development or, more generally, to describe the logic of a certain development.

The general method used to examine if my design questions are valid is to make a design proposal. While designing parts of the proposal different aspects as the typology, the urban context and the programmatic distribution are studied as separate questions. For each of these questions a different method of examining is needed. How I chose a suitable method for every part of the research is partly clear from the problem itself and partly the division in the 4 epistemes helped to find out to which field of architecture the problem is related.

Remarkable about the use of methods categorized in epistemes is that the problem, existing in a certain episteme, has a solution in another episteme. The functional layout of the hospital, for example, was for its complexity impossible to solve with just the requirements of every space. A typological study helped to get a grip on the endless list of spaces. A practical problem was solved with a typological study. Another example is the negative experience people have around hospitals. The type of the problem has to do with phenomenology but the solutions had to be found in the typology (smaller buildings), how people connect and move around a hospital (praxeology) and what the hospital meant for people (semiology). To change important parts of the hospital, elaborated from these 3 epistemes will in the end change something in the fourth episteme.

The epistemes, and also the notion of epistemological divisions in architecture were completely new for me. At first it was difficult to connect the examples given in the lectures with the design research. The explanatory lessons with Henk Engel clarified a lot of how to think in these epistemes. While I didn’t chose on forehand for a specific episteme, the analysis I’ve done could be structured using these epistemes.

**Urban Analysis**

To get a better grip on the whole area and to be able to make the Masterplan, several analyses have been done of the Zaanstad area. In the Historical Development a re-construction of several important elements of the past are mapped with the knowledge of old maps and texts regarding the history of Zaanstad. Because most of the inhabitants of Zaanstad were dependant on the factories, the development of roads, houses, shops and later railroads can be explained by the industrial process of these factories. Also the soil and the constant struggle with the water were important mechanical processes which structured the urban process.

The Special Functions and the Typologies were analyses searching for what kind of buildings were present in the area. But also the kind of functions can tell us something about the quality of the area and what kind of activities people undertake. The Connectivity, the Frame-Pattern-Circuit and the HOV-Zaancorridor analyses are all looking at how people move themselves through the area. These are mostly practical concerns. The Frame-Pattern-Circuit analysis, however, adds a quality of experience to these functional aspects. In the analysis first the connection between areas can be examined. Later the character of these areas can be determined according to the findings. Closed or open areas give opportunities for certain specific developments. Shops for example need a certain connected street, but dwellings have another, more subtle relation with being connected. In this analysis we see that practical concerns (praxeology) influence the experience (phenomenology).

**Reading the city - Morphology**

When adding new developments to an existing area it is important to find out what parts are characteristic for this area. Rafael Moneo described this as “to accept the rules in a consolidated field of action” (Moneo, 2010, p.441). As long as the character of the city is understood and continued, the architect has freedom in his design. The character of the city can be found in very different aspects like the identity, the typical form, the cultural development or religion. The difficulty with reading the city is that it is still my own perception. The real identity of the city has as many explanations as inhabitants and if we were able to know them all, it would be impossible to make a coherent design for them all. How would we choose between the different expectations of the inhabitants? Kevin Lynch showed us in his book how the inhabitants experience the city (Lynch, 1960). From his findings we can learn what kind of aspects could be interesting to observe in the city. Although we have to consider that his analysis dated back more than 50 years. People see the city differently, observe other aspects. In fact the only thing we can do is hear as much people talking about their city and try to find a something that represents that identity of the city for the people you have to convince.
with your project.

**Strategy**
The strategy is used to explain how the design proposal can intervene and contribute to desired developments. With knowledge of the analysis, and the experience of similar developments, a comprehensive story can be formulated. Also the effects (positive and negative) for the stakeholders are explained here.

**Program**
For a realistic program I decide to use the Masterplan II and combine that with the real program of the Zaans Medisch Centrum. The program presented now is still preliminary, but is already very specific in measurements (Stichting ZMC, 2011 and Goedhart, 2012). I also compared this program with the programs of other hospitals to see what kind of solutions were designed in early works.

**Architectural Changes – Size study**
From studying other existing hospitals some aspects became clear which I had to change in order to meet the requirements of my own assignment. Also the size study is a way to determine which aspects are important with the hospital on my location.

**Typological research**
Because the hospital has a very complex program, I did a typological research to find a system that organizes the different spaces. The hospital has to connect with the dwelling environment so I began my studies at a typology which used to connect very well with a dense urban context: the pavilion hospital.

**Urban Plan**
When the typology is developed the next step is to fit this typology on the plot. Because the requirements were so extensive I decided to make a series of models with different placements of the typology.

**Scenarios – flexibility**
To see if the typology and the specific placement on the plot can accommodate for all the requirements I made, a series of scenarios was made. The influences that could change the hospital during time were distilled from other life-stories of hospitals and the developments of the Zaans Medisch Centrum over the past years.

**Facade - Construction**
The façade is the connection from the hospital function inside the building to the citizens outside. The connection is very important because people have to live next to the hospital. The feeling most people have of the hospital is not very appealing. To change this perception the façade has to be studied. This study still has to be done and will be continued in the next semester. In order to be flexible the construction has to be demountable. How this can be done is studied in the next semester.

**The lectures Research Methods and Design Practices**
One of the major and interesting aspects about the epistemes is that they have the intention to study to the behavior of the user of the city. Through the years we are educated in solutions architects have given for certain problems. We studied their concepts, their reaction on social changes and their approaches in design proposals. But in fact the epistemes are the first scientific notions that help us to understand the behavior of people. How they react on certain phenomena and how they use the city.

Still in the lectures architects try to position themselves or other architects is a certain episteme. But the other lecture tried to use the epistemes to study the social collective – the people. In the lectures of Tony Fretton and Deborah Hauptmann this division was most clearly made. Both tried to study the people: Tony Fretton placed himself as a user of the park, explaining what he saw and experienced and Deborah Hauptmann explained, for example, the difficulty of people to understand the fast changes in technology which determined the work of the normal people.

Why is this interesting for me or for architects in general? The answer is rather simple: the success of your project depends on how the user will understand your solution for certain problems and if he will appreciate the solution you have given. The epistemes help to look at the effect of architecture in the real world, and not only as an academic achievement in a scientific world. But is does also give a scientific framework to study this human behavior.
4) Analysis and argumentation

**Historical development**
The historical development is mapped to see how Zaanstad has grown over the past 200 years. The city expanded along the river Zaan. After a period of mills and smaller industry (1800), big factories settled along lines perpendicular to the river (1900). Next to the factories arose houses for the workers of these factories. The development of houses is always related to the structural elements. First houses were developed around the factories and thus along the Zaan. Later the introduction of the train stimulated housing in the area between the Zaan and the railroad. Around 1950 we see that the railroad is also a limiting element, blocking the development in west direction. With the building of roads the development of houses moved to the east side of the Zaan. From the '70's, with the introduction of the highway, also the other side of the railroad is developed. For the Kogerveld area we see that some developments took place before 1850 and the rest was made from 1950 till 1970. Old industries are demolished (see the white spot on the riverside in the map of 1950, on the south side of the railroad) to make way for new industries and mono-functional neighborhoods.

**Special functions**
In the area around the Kogerveld station we find a church, who unfortunately doesn't open towards the square, a gas station, a fire station, a square in the neighborhood with some retail functions, schools and a hospital. We can say that the area has a low public level. The existence of industry is blocking the developments towards the Zaan.

**Typologies**
The areas are filled with a low variety of typologies. Due to the stamp structure the neighborhood Kogerveld (east) consists of single family houses, apartment blocks of 5 levels and flat buildings with 9 levels along the highway. In Hofwijk (at the south of the railroad) we see apartment buildings of 4 levels, row-housing and industrial areas. At the north side of the railroad, the Slachthuiswijk, consists of industry, row-housing from the '30's and a modern housing project. Interesting for me is that the industrial areas are al-
most completely mono-functional. In case of removing the industry the whole area becomes available for housing. In the south-east quadrant of the 800m circle we see some public functions (sports, fire station) and the Zaans Medical Centre. This public facility is placed near the highway (A7-A8) and the central road from north to south. We can also see that it is placed in a so-called peripheral area. The housing typologies are low-density and in my project I will add a higher density. Important is the way to connect these typologies: a smooth transition has to be made between the high-density of the new development area and the existing low-density neighborhoods.

**Connectivity area**

The Kogerveld area is connected with the A8 to Amsterdam and with the A7 to Purmerend and beyond. It is connected by train to Amsterdam, Purmerend and Alkmaar. 5 busses run through the area, mostly from north to south. One bus goes into the Kogerveld neighborhood itself. A new connection, the HOV-Zaancorridor, will be made in the future, connecting Kogerveld faster to Amsterdam-North. From there the Noord-Zuid Lijn goes further into the city.

**Frame-Pattern-Circuit**

To see how well the roads of the area are connected with the rest of Zaanstad a Frame-Patters-Circuit analysis was done. One part of this analysis is the 1-2-3-order frame analysis (de Bois, 2010, p.37) where you start on a certain road and you redraw this road until a choice of direction has to be made. This is the first step. From this first line we start the second step: all the lines deriving from the first line, drawn until a choice of direction has to be made. This is also done for the third step. How further the lines reach and the more the roads in the neighborhoods are filled with lines, the better the selected spot is connected with the urban area. This is a very practical way to analyze the area.

But the Frame-Pattern-Circuit goes further. Until now we analyzed how good the Frame (roads) is. The Pattern are the destinations on the Frame which people want to go to (shops, functions, stations but also their own homes). The Circuits are the routes people make over the Frame on their way to the elements of the Pattern. If the Frame is well connected and the Pattern is dense many Circuits will develop. Many circuits means that the area has a higher public character.

We were not able to do an analysis on the Circuits. But according to the theory we can suggest some conclusions. The Frame is good, although is it not connecting very well the access road with the Zaan (east-west), it reaches far into the urban tissue and locally in the neighborhoods. The Pattern is rather thin. Many ‘destinations’ are not present in this area. This means that the Circuits would lead from the homes out of the area to the functions over there. People don’t make many small routes through the area. Also the interest from people outside the area will be low. But there is a potential for this area to become of a higher public level. If more public functions are added, more Circuits will be made, making the area more public.

**HOV Zaancorridor**

The Stadsregio of Zaanstad has the aim for 2030 to improve the public transport and change the modal split to 70% of travelers using the bike or public transport (Slebos and Marijt, 2008).
Therefore the connection between Amsterdam and Zaanstad has to improve. In that report station Kogerveld is marked as a OV-hub. To become a hub the plans of the Stadsregio are to make a new bus route which will improve the connectivity of Station Kogerveld. (Slebos and Marijt, 2008, p.29).

**Reading the city - Morphology**

Zaanstad has grown because of the industrial developments along the Zaan. In the Morphological map the big building blocks on the riverbanks are clearly visible. In the south, at the east side of the river, new housing developments have continued this row of big blocks. I think this element, big building volumes along the Zaan, is key to the character of the whole Zaanstad area because it defines its existence as a city of factories and it frames the river that was so important for its development. I want to continue this row of volumes along the Zaan.

A second element is the connection of the houses behind the big volumes with the Zaan. This was in most cases organized by roads perpendicular to the Zaan. In my specific area these perpendicular connections are somehow forgotten because of other industries who didn’t need the connection with the Zaan. But they also disconnected the neighborhoods behind the central road from the Zaan. I want to bring back this element and redraw the perpendicular lines, opening up the visible connection from the Zaan to the road.

**Strategy**

To start the development the first step is to motivate the industry to move away. This could be done by housing developers. But they are only interested in investing if they know that people want to live there in the future. At the moment the character of the area is too harsh to be seen as living environment. A development can change small parts of this area but real quality can only be obtained when changing the whole area at a time. For developers and for a city like Zaanstad such a development is too big.

To start the development the area needs a public function with a certain size which could develop/occupy a large part of the plot and initiate the transformation of the character of the area. For my design location the hospital has a lot of potential. A hospital has a public character, a constant stream of users (patients as employees), it can occupy a big area and changing the character and it has incorporated functions (supermarket, coffee shop, flower shop, post office) which could be useful for the rest of the neighborhood. For the hospital it is interesting to move to the design location because it is next to the train station. When we extend the station to the other side of the road a direct connection can be made between the train, the station square and the hospital. This would highly improve the connectivity of the hospital for the employees or the patients who want to travel by public transport. On the former location the hospital was 800m away. But on the new location the entrance could be next to the station. Even stair-free connection could be made from the station to the hospital, which makes it possible for handicapped persons to use the train as well. The location has good views towards the Zaan and the green small harbor area east of the station which the hospital can benefit from.

**Program**

In the Masterplan II a total of 906 dwellings was asked for the area. Because the hospital will use big part of the plot, the amount is recounted according to the surface left around the hospital. The new amount will be 456 dwellings. The 456 missing dwellings could be developed on the old plot of the hospital, but this will not be part of my design.

In the annual report of the Zaans Medisch Centrum 2010, a new building is proposed for 90% of the hospital. The program includes a building for the organization, parking, a care-boulevard, a care-hotel and living (Communicatie ZMC, 2010, p.40). An alliance is made with the developer Vital Zorgvast. As in many cases in the Netherlands, hos-
Hospitals have to act more like a company. This means that the building itself as an investment becomes interesting for real estate developers. For the hospital it is financially interesting to rent the building from a developer than to own the building themselves.

The reasons for the hospital to move are that most of the building is old and not adapted to the current needs of the hospital. There are too many beds or places were beds have been, and too less space for polyclinics. The technical services are outdated and the floor plan of the ground floor is not coherent. Moving to another location would create a free space where housing developments can start. For the ZMC this would be interesting do invest in the new building. Only the psychiatric department is relatively new (6 years) and can stay.

The provisional program of the Zaans Medisch Centrum consists of 39.700m² surface. This program includes 310 beds, 6650m² hotfloor,12.250m² of hotel function (departments with beds), 6150m² medical and normal facility spaces, 9350m² polyclinics, 4650m² offices and an entrance of 750m² (Stichting ZMC, 2011, p.85). The Care-Boulevard will inhabit a physiotherapy, a restaurant for the staff, a pharmacy, shops, visitors restaurant, banks and possibly a hotel functions taking over some space of the hospital itself. Also a supermarket and some retail functions are taken up in the program.

Architectural changes
The architectural question when using a hospital to initiate a development of dwellings is how the hospital can connect to them. Hospitals have historically a remarkable connection with the city. The oldest hospitals were just places to put people away who were ill; these hospitals were disconnected from the city. Later when more influential people with know-how started to develop hospitals the building was placed more and more in the city. Sometimes an old estate was transformed to a hospital. During the first half of the 20st century the hospital had the best connection with the city. It was a building like the other buildings in the city only fenced off for safety reasons. In the late '60's until the '80's a modernization process took place and the hospital became big and disconnected from the city.

The architectural question has several aspects:
- The size of the complex: the building is too big to blend in with dwellings
- The composition: big car parks or supply routes make the building unreachable
- The façade: optimization and cost reductions took the quality away from the façade
These aspect are studied in several analyses. The size-study focuses on how the volume can be dealt with. The typological study searches other ways to arrange the program. A study for the façade has to be done in the second semester.

Size study
In this study I placed the building volume (40.000m²) of the hospital in different variations over the site. Several study goals were sought out. The first question was how the division of the volume in different volumes would fit on the location. How many space would be left if the blocks were placed, how the connection with the railroad and the station was made and finally how the placement would influence the possible routes en views through the location.

Typological Research
The former hospital of Groningen (the APSAZ) consists of 14 pavilions placed on a linear plot between the Oostersingel and the old canal. Every pavilion was very similar in size and materialization with other big buildings in the centre of Groningen. When studying an image of the site it is not possible to see if this assemblage of buildings is an estate or a hospital. The advantage of this type of hospitals is that new buildings can be made on the site according to new specifications while older blocks can be demolished. The hospital can renew on its own site while continuing its practice. (van den Noort, 1999, pp.19,23).

But during the '60's, when hospitals are centralizing, a new
concept of developing the area takes over. The new management emphasizes the need for a masterplan where the hospital buildings are part of a larger design. However the different designs for the new hospital elaborate on the idea of pavilions, the real sense of an ensemble of individual building blocks is lost. These designs use the quality of the pavilions to be flexible for changes. But because the buildings are closely connected, the in-between spaces are small and the blocks are not connecting to urban dwelling areas. (p86)

In the pavilion hospital of Sant Pau (Monum, 2001, p.50) we see around 30 pavilions with an underground system of tunnels connecting them. The central axis starts from the entrance building and leads us through the middle of the plot. The pavilions are placed perpendicular to that axis in order to create a private spaces between the buildings. Every pavilion has a private façade on the short side and a public façade on the long side. The in-between private space and the indirect contact with the façade play an important role in my own design.

The problem of the pavilion hospital is the connection between the pavilions and other practical problems like the use of many elevators. In modern hospitals optimization in the process and the assembly of several hospital functions lead to bigger buildings where the distances between the departments are as short as possible and all the routes are indoors. The typology changed to the Mono-Block Hospital, the Tower-on-a-Plinth Hospital and the Multi-Block Hospital (Monum, 2001, pp.2-3). These are mostly colossal buildings, impossible to connect with a neighborhood and therefore placed on the borders of the city.

For my research I needed another typology: a combination of the small scale of the pavilion, but with the same practical advantages of the new and bigger typologies. The new design of the Reinier de Graaf Hospital in Delft uses block pavilions with patio spaces inside. The pavilions are connected with several bridges and with a central covered space between the pavilions. The structure of a central core with blocks attached to it, give me the possibility to combine the quality of the small scale buildings with the practical advantages of the union of many hospital functions.

The typology of the pavilion blocks themselves, the block with the patio inside, doesn’t connect very well on the outside with the urban tissue. The block has a very massive wall placed towards the neighborhood. Here the quality of the placement of the pavilions in the Sant Pau Hospital is useful: directing the short façade to the neighborhood makes the visual connection smaller and indirect. Both the inhabitants as the patients are directed towards the space between the pavilions, but they are not connected directly. But if we use the pavilions like Sant Pau we end up with a lot of very small pavilions, making the central core too long. I combined two pavilions, on the side directing to the central core, with a block of the same size as the pavilions itself. In fact I changed two pavilions to one U-shaped building, the Court d’Honneur typology. This typology connects very
well with row-housing when they follow on from the wings of the U-shape.

The central core is in the case of the Reinier de Graaf Hospital an unidentified collection of bridges and passages. The distinction between treatment rooms and the wings with beds is very unclear. I assembled all the Polyclinics, the so-called “Hotfloors” and other facilities and placed them in the central core. Galleries between the pavilions and the central core connect all the departments and they create a clear access zone.

The concept of the central core gives us lots of new possibilities in flexible developments of the hospital. First we have to know that the medical treatment rooms change around every 7 years (Pütsep, 1979, p.139) due to technical developments. Bedrooms change less frequently. According to this we can make a division between the central core which has to be flexible for technical changes and the wings with the beds which can be relatively permanent. This has consequences for how both parts of the hospital are made. A flexible construction with modular rooms or generic spaces is needed in the central core and the pavilions can be made with more durable materials. The chosen typology, a core with adjacent pavilions, suits perfectly the division between flexible and permanent parts of the hospital.
Urban plan
The 3 urban plans give different qualities to the new neighborhood. The first model shows a hospital which is connected with both station and the Zaan. It is placed at the south side of the train track. Streets run parallel with the Zaan. There is a direct connection from the central road in the east towards the Zaan and when removing the inner part of the hospital a second direct connection comes up.

The second model directs all the streets to the Zaan. It continues a quality Zaanstad has along the river: perpendicular street connect the Zaan with the a parallel street along 400m. offset from the river. The created streets have always 2 qualities: a view to the Zaan, and a traffic connection at the other end of the street. The hospital is placed over the train track creating a natural division internally of a bigger and a smaller part.

The third model has the same direction as the first, but tries to have the same connection with the station as in model 2. Also a connection with the roundabout in the north-east part is created.
Current demand of space

Future shrinkage - removing the bridge and a part of the hall

Future extensions - extending the hall, connecting with 2 more pavilions

Future shrinkage - removing the bridge and a part of the hall

Leaving the site - the hospital moves to another building leaving 6 pavilions for dwellings
Scenarios – flexibility

“A cost-benefit based analysis should be undertaken as regards the polyvalence of the design and construction and the length of the building life. It would be false economy to reduce construction costs, if it would result in increased operating costs. It may be worth spending an extra 40 per cent for the initial construction to save 10 per cent in annual operating costs, at least in the USA” (Pütsep, 1979, p.137)

To test if the chosen typology is suitable for different developments of the hospital I first searched for influences that could have an effect on the hospital. With this information I could describe several scenarios of the hospital. Influences are, for example, the need for more polyclinics, adaptation of operation rooms or a financial disappointment leading to selling several buildings. A scenario is more a possible assembly of different influences placed in a specific order and on a specific time.

In the diagrams 4 scenarios are worked out. The hospital can shrink or grow according to their needs by removing or extending the inner hall and the internal bridge of the hospital. With this movement the pavilions are connected or disconnected with the hospital. When disconnected a space between the pavilions becomes free to fill with a small park and parking lots. On this way the area is immediately suitable for living.

U-pavilion

The court type was chosen for the pavilion because it suited best the needs for both the hospital and future dwellings. Also the type itself has some strong advantages: because it has 2 corners an inner part and an outer part is made. This creates a public and a private side.
Distribution rooms

For the distribution of the rooms inside the hospital several analyses were used to know which rooms should be connected.

On the first floor the surgery, radiology, ER and the intensive care are situated. The departments should be connected without any disturbance of other flows. The ambulance is placed at the top part (east) next to the cross-roads. The mother-child clinic at the left side (north) has its own Surgery and small ER. The operation rooms are connected under the train track with the central functions for the OR’s.

Storage, central kitchen and other services are placed on the right side (South). Around the street the healthcare shops are aligned. So that the shops are easily reachable by car (parking places in front of the shops) and to make this part of the design lively. Also going to the ER by car means using this street so special parking spaces are dedicated for urgency.

On the second floor the policlinics, the child department and revalidation are placed. Also a drug store is placed on the square. The policlinics are the most public part of the hospital and therefore they are placed around an inner square. This inner square is a continuation of the station-square and is the indoor connection to the shopping street. Though this floor has a certain public feeling, and connects to the city with 5 entrances.

Typologically my design is transformed from the Breitfuss type, with the hotfloor (Surgery, Radiology, ER, intensive care) and the policlinics mixed in the plinth. I separated the policlinics from the rest. Placed them on the first floor and then divided the upper part (wards and policlinics) in 2. A square in the middle is created.

The wards are lowered (distributed over the plot) and extra treatment rooms are pasted to the inner walls. A central bridge is placed in the middle and the square is roofed to create a nice indoor climate.

On the second floor wards (green) are placed in the long legs of the U-pavilion. In the middle doctors offices are placed. The extra treatment rooms (a division of the policlinics) are placed around the central hall (purple), with the doors towards the U-pavilions. A central bridge forms the main distribution of the medical staff and other personal. So above the public inner square, hangs the (less public) bridge for the internal function of the hospital.

This bridge goes along a restaurant with 2 entrances. The first entrance is from the hospital itself and the other is an urban stair (wide) leading to the stationsquare. The reason for this is that the restaurant will have 2 groups of customers: medical staff, and people from outside enjoying the view from the square towards the Zaan.

On the other side of the square the Dialyse and policlinics of the mother-child clinic are situated around a separate hall.

On the third floor the bridge is continued connecting the separate parts of the hospital for the medical staff and patients. The second half of the wards and the doctor offices are situated here. On top of the extra treatment rooms the laboratorias are placed (yellow).

Staff offices and administration are placed in the north part (blue) at the other side of the bridge. The bridge is can only connect both sides on the third level because the trains have to pass under it.
The hospital as initiator of the urban transformation.

To transform the character of the industrial area, with the use of the hospital, depends on a few related aspects. The first thing I noticed is that the hospital as a building should adapt to the dwellings. In order to adapt to a dwelling area, the building should be smaller or have the appearance to be smaller. The pavilion typology connects very well with the surrounding urban fabric, but does not function like the modern hospital should. Elaborating on the pavilion typology, using other hospital designs, I developed a new typology which functions like one big hospital but still has the quality to connect to the urban fabric. The central core with attached pavilions is a perfect combination between a functional and effective organization and a small scale appearance.

In the second semester I am going to research which façade can be placed between the hospital and the dwelling environment. This is an important part to give the hospital the aspect to live next to. Although this still has to be done, this is not a problem which can make the design question impossible.

In the urban plan we see that the hospital building structures the plot in a way that many of the dwellings have a connection with the Zaan. Important during the decision making was the condition that the hospital should give quality to the neighborhood, not consume all the quality itself. Also the stations-square has a visible connection to the river. These aspects give the urban plan quality and make the development, starting with a hospital, credible.

How can the building of the hospital be interesting for other users in the future?

Because the hospital is made of pavilions as independent elements they are very suitable for reuse by other functions. Every pavilion has its own elevator, own entrance and its own gardens. The hospital can withdraw gradually when we use a shrinking scenario. The central core can be de-mounted and then the pavilions disconnect from the hospital. While withdrawing the core leaves an open space between the pavilions which could be used as a park. Also in the urban plan the roads are already connected to the sides of the pavilions. The pavilions can be transformed in apartments, row houses and offices. Typologically it is possible to design a building suitable for all the different scenarios. In theory these buildings could keep their value when the hospital wants to move or shrink.

In the next semester I have to analyze and design how the building can change internally. Construction walls have to be placed in a way that all the scenarios are possible. Also how the central core can be demounted and changed is something to analyze in the technical development of this project. In order to conclude about this design question I need to go further in detail in the structural and technical details.

Which flexibility does the hospital need to be able to adapt to the technical changes?

Ervin Pütsep stated in his book Modern Hospital that if you design for flexibility you should design for very specific changing elements. You need to know which aspects can change and how the building should adapt to that. If you design in a “utopian desire to create universal adaptability” this will led to “unrealizable theories or to hospitals with the wrong kind of adaptability” (Pütsep, 1979, p.144). The problem with this statement is that flexibility is meant to adapt to situations you don’t know in the beginning.

I tried to make a list of possible changes in the coming years. And reading different histories of hospitals it is possible to get some grip on which changes are more likely than others. Through the years the hospital blocks (with the beds) don’t change much. Some electrical devices (like beds, tv’s and medical equipment near the bed of the patient) should be changed. But these changes don’t ask much from the building itself. Changing the Hotfloors however is way more difficult. New huge equipments have to be installed and with changing regulations around each tool also the floor plan will change. To adapt to this the design has open
spaces in the central core where new treatment rooms can be build while the old one still functions. The central core has 2 corridors flanking the treatment rooms in order to keep the hospital running if one corridor should be closed.

For this research question I need to continue in analyzing the technical boundaries in which the changes are possible. Very important when changing rooms or functions in rooms, the most difficult change is that of the technical services. Pipes and lines have to be moved, new installations have to be placed and the roof (or the floor) has to be closed again. For this type of changes a lot of research is already done and standard solutions are made. I only have to see if these solutions fit in my building and if the adaptability of these solutions is sufficient.
Relationship between the theme of the studio and my project

The themes of the studio are densification around stations and the reuse of industrial heritage. Old industrial areas located near stations are seen as new potential dwelling areas. Why? Because the importance of the train has increased during the last decades, and having a station nearby has become an important quality for people. Therefore, station areas have a large potential to become dwelling areas.

In the presentation of Hans Staller (municipality Zaanstad) became clear that due to the economical situation the municipality is not able to start large redevelopments. The industrial companies have the financial initiative in Zaanstad and they want to keep their businesses where they are. To attract investors to start housing projects in these industrial areas the character has to change first. HOW this character can be changed and WHO is the key initiator, were my main interests for defining my own theme.

In our analysis a potential initiator was found: the Zaans Medisch Centrum has plans to build a complete new hospital in front of the old one. Because the hospital has an important public function in the city, my research question arose if the hospital could change the character of an old industrial site and start the development of housing projects.

To examine this question I chose a huge site between station Zaandam-Kogerveld and the river Zaan. This site suited best my own theme and the themes of the studio: it is an old industrial site, next to a station and there is enough space to design a hospital and a new neighbourhood.

At the moment this location is occupied with small and medium size factories. The hospital can, because of its function, change the industrial character into a public/living character. Because of its size, it can structure the neighbourhood and determine new housing plots.

To be able to change the character of the old industrial area, the character of the hospital itself had to change first. The image of a closed institution had to be transformed into an institution which is part of the city and part of the neighbourhood. Because the Zaans Medisch Centrum itself also dealt with the issue of re-connecting with the city this research was also interesting for them.

Relationship between the methodical line of approach of the studio and my method

The method used by the studio was new for me: the general themes were explained but we had to choose the location, the project and the research question ourselves. The extensive urban analysis and the study on stations of the Zaanlijn helped us to understand more about the locations and discover new themes and possibilities in the area.

Defining our own connection between the themes ‘densification’ and ‘station areas’ was difficult because the sites were not prepared for developments. Therefore a logical explanation how to come to these developments was needed: this is the project. I used the hospital as key initiator for the developments - so the hospital is my project.

In the research question the project is stated as a question: “will the hospital start these developments?”. To examine the research question the project has to be analyzed on several aspects: urban, architectural, functional and technical. How the several aspects are handled in the design and how this is seen as valid solutions for the stated problem defines if and how the project gives an answer to the research question.

During the process I discovered that maintaining the initial goal was difficult especially because I chose a hospital. Many people have different experiences with - and therefore other wishes for - hospitals: getting information from several sources but not getting involved with their goals seemed difficult for me. In the last 2 months I re-established my initial goals and changed the project drastically. I think this design gives a stronger and more coherent answer to the research question.
The studio Hybrid Buildings derives from the chair of Typologies. Typological study helped me to examine different hospitals according to their form and make a relative quick decision between different basic layouts. As types the Spine-Pavilion was chosen and for the pavilion itself an U-shaped courtyard was the best solution.

Typological knowledge was also needed to emphasize different qualities in the facade. Not only recognition of a used element but also the implied qualities of that element were guiding in when to use them, and when not.

In complex programs like these, only the functional aspects of the desired rooms is not enough to design a building. Using types added a certain value to the separate rooms. Types offer specific spatial qualities and those qualities formed new categories to organise the demanded rooms. In some cases (like the placement of the Intensive Care) architectural/typological aspects were conflicting with the functional aspects - for these cases I used the facade to solve these discrepancies.

The last aspect of the studio is Hybrid Buildings. A Hybrid Building is a type of building that interacts with the urban scale. The actual relation between the building and the city, is studied in this track of architecture. This relation has a twofold character: the city influences the design of the building but the building can also influence the city due to its function, its form or its social value.

The idea that a building can have an influence on the city was a starting point for my strategy for the redevelopment. A hospital has a certain public/social value: connecting a wide variety of people to one building. And because the users are very dependant of the hospital it is possible to place the hospital in a desolated area in order to change the character of that area.

After depending on its social and functional influence, I used the hospital also in a formal way. Because it is the first building in the new neighbourhood the hospital will structure the perpendicular streets. Here the twofold relation between the city and the building is very clear, giving it the character of a Hybrid Building.

**Relationship between research and design**

The first part of the design process was mainly based on design by research. The qualities found in the analysis of the urban structure lead directly to the design of the perpendicular streets in the urban plan. Also the findings in the analysis that big buildings are mainly placed next to the Zaan was continued by placing 5-level apartment blocks along the river.

The location of the hospital itself was extracted from the research on stations. The loss of identity of the stations of the Zaanlijn gave reason to connect a new identity to this station. Therefore the hospital is placed around the station.

In a typological research the choice was made for a Spine-Pavilion type. With a functional analysis this type was analyzed to see whether the hospital would function. Therefore I did a research on the policlinics and a literature study concerning sizes and internal connections. Besides I discussed the functionality of my design with Eline van der Valk (a medical student), Arthur Notermans (a member of the board of directors) and Jan Goedhart (a chief commissioner of the ZMC). The first researches helped me to distribute the rooms in the plan, the last interview was more of a reality check to see whether the distribution worked well.

To know more about flexibility in hospital design I had an interview with Ronald Swinkels (a graduated student from the Faculty of Architecture in Eindhoven). He showed me how he incorporated the modular building technique in his design. After a first attempt to incorporate this technique in my entire building there were too many conflicting demands. Mostly the facade became impossible to be flexible for changing modules AND give the permanent look that my project needed. Because flexibility was not the main goal for my research, I chose to use this method only for a
small part of the hospital.

From this moment on the design process changed more to a research by design process. The inner hall between the pavilions was not designed by analyses or the use of types, but based on the grid of the columns supporting the roof. Bridges connecting the pavilions are hung up between the columns - giving the columns their stability.

Managing and designing the vast space between the pavilions seemed quite difficult. Creating an interesting space with the ability to connect the pavilions in a functional way brought up many conflicts. Only the functional aspects were not enough to determine what the hall should be. The design presented now has some qualities for the hall, but it could be worked out further.

The facades of the inner square are formed by large glazed facades and the pavilions in the other direction. For the outer layers of the pavilions a band of 2-floor-high openings is repeated over a formal brick wall. Next to the shopping street these openings are worked out as portals - forming an arcade. On the rest of the outer sides these openings are worked out as niches - providing shelter for the functions behind them. For the garden-side the brick facade has higher openings to emphasize the open relation with the garden. The facade is made as an infill of steel and wooden elements.

The relationship between the project and the wider social context
With this project I think I designed a building that has a good integration with the urban fabric. The hospital lost its massive appearance because it is split up in 6 pavilions and the separate blocks are placed between the streets. The permeability is even more emphasized by creating intermediate spaces like the hall and the arcade. These spaces allow people to be closer to the building but not in the actual hospital. These zones make connections between the hospital and the city.

By making several specific entrances a more personal approach to the hospital is created: it is not 1 door anymore, but people enter the building from their own side. Also the shopping street creates a buffering layer between the hospital and the city, giving the hospital a friendlier border.

With the urban plan the connection from the Heijermansstraat towards the Zaan is re-established and the design offers a great deal of interesting spaces for new inhabitants of the neighbourhood. The train track as a barrier is diminished by placing it on columns and this new bridge is surrounded by a park, creating a qualitative buffer. The station itself is integrated with a square between the hospital blocks - combining the hospital identity with this station.

Functional the hospital can be divided, but in relation with efficiency and costs certain issues were defined. In the presentation for the Zaans Medisch Centrum became clear that dividing the hospital is still very difficult, because of the extended walking routes. 70% of the exploitation costs of the hospital is labour (Notermans, 2013), so when extending these walking routes the costs will increase substantially.

When making the divisions, I focused on short routes between related specializations in order to reduce this walking time. But some connections will still have an increased walking distance: for example between the wards and the ER/surgery department. A positive effect of this extra space for the hospital is that future changes are possible within the existing building mass.

In the facade the last part of making the connection with the city is worked out. Brick is used to emphasize the permanent character of the building. It also creates a connection with dwellings or apartment blocks. Besides, the adage "Big buildings in Zaanstad are made of brick" (Goedhart, 2013) gave reason to give this public building a brick facade. The windows on the street sides are vertical giving it an urban character. Around the gardens the facades are more rustic and horizontal orientated. An open visual connection
between garden and the secondary street is made by creating a water barrier and not a fence. The balconies emphasize the border between the garden and the street.

Very important during the design process was the intention to incorporate the hospital in the architectural debate again. Hospitals are mostly created around doctors (Notermans, 2013) and therefore the layout, the materials and the interaction between rooms is based on the medical process. When I started this research it seemed that from the ‘60’s the role of the architect in hospital architecture has diminished drastically. Along the process I found more and more aspects to use for an architectural articulation. The hall, the arcade, entrances, bridges, balconies, the restaurant, the facade and the gardens were used as means to give a new expression to hospital architecture.

The design makes a statement about the loss of identity of stations in low urban areas. In a way we are highly tended to connect the station with consumer functions. My statement is that it is also possible to connect the station with other public functions which have an important role in society. I think that making more connections between daily functions and the stations (or transport in general) can give both elements more meaning.

A last remark is about the way the building is used as a housing solution for a public function. By making buildings more generic and to give them some extra dimension, these buildings are more adaptable and can inhabit new functions. In this way the live span of buildings could be extended. The architectural quality has an important role in the validation of the building and thus in the process of re-using the building.
Literature

Books

Analyses/Reports


Articles

Presentations
Interviews