CP
10
complex projects

LABORATORY

L I F E

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COMPLEX PROJECTS
Bodies and Building Berlin
AR3CP100

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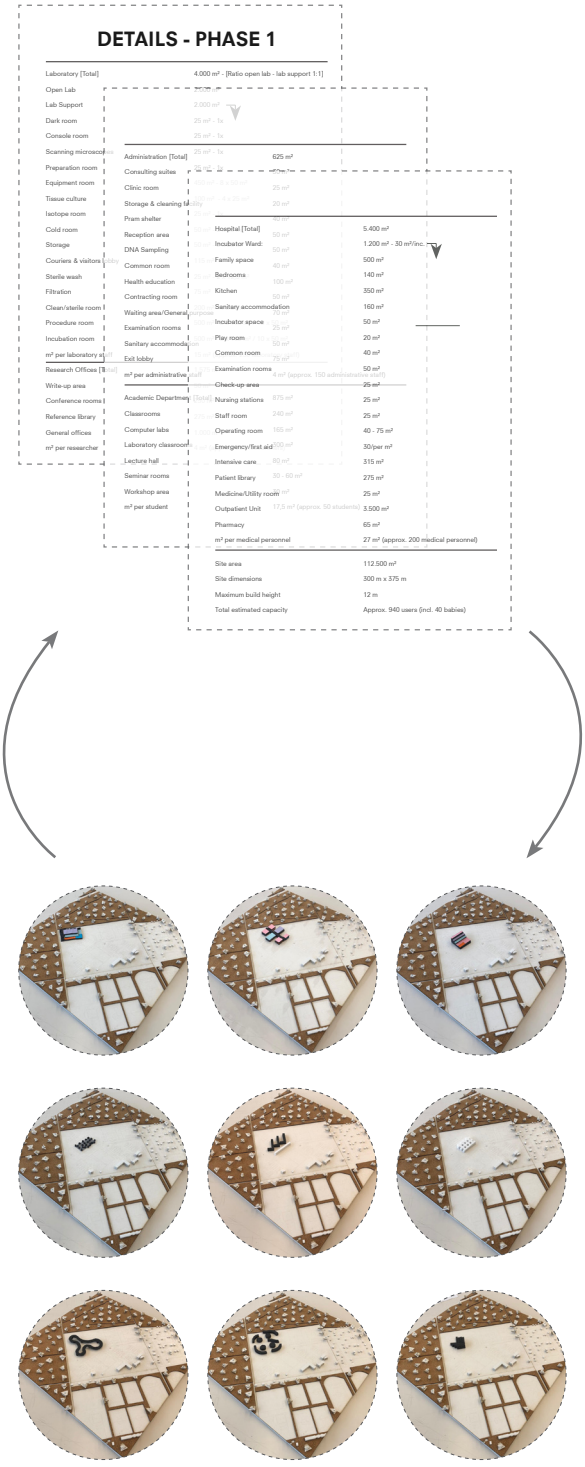
ASPECT 1: The relationship between research and design

The graduating studio for Complex Projects was divided into two semesters. The **first semester** focused on research to determine the goals for the project. The research looked into three key subjects:
1. What program should the building have?
2. Possible locations for this building.
3. Determine which clients will be required

To acquire this information, various research approaches were used, including Internet research, mapping, and speaking with external professionals (see Aspect 3). This was all part of the design brief, which formed the starting point for the design. The design was strongly influenced by the findings of the research during the first semester. Not only did the research show the best suitable location for the building, the Grunewald Forst, it also indicated which functions were necessary in the medical laboratory building.

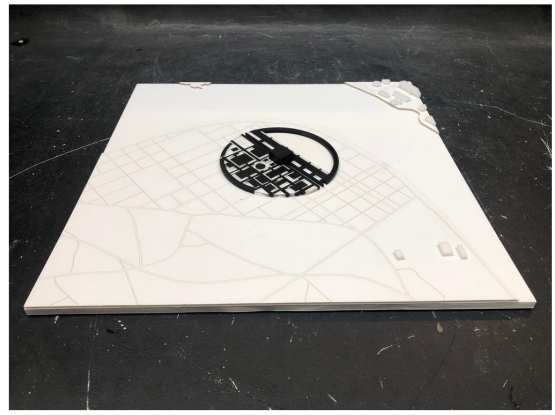
During the **second semester**, I began by creating 9 conceptual models of the building. All of these models focused on distinct approaches to the building. These approaches, in turn, demanded adjustments to the design brief due to several problems encountered during the design process. This turned into a back-and-forth between the design brief and the building's concept. This influence is most visible in the changes made to the program during the design process. The medical laboratory required a building of 80.000 m² - 100.000 m², however due to the sensitive nature of the project, it was not desirable to begin with such a large building when the outcome was unclear. Finally, I designed the first phase of the building, which was "only" 20.000 m². This did not mean that the 20.000 m² would be sufficient for the entire program. Instead, it suggested that the building should be expandable to the required 80.000 m² in later phases. This became one of the main concepts for the rest of the design.



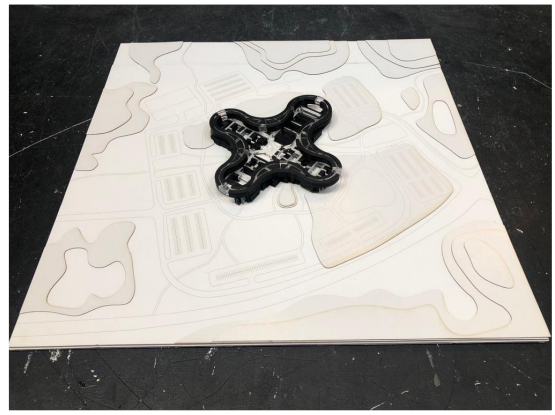
In addition to our individual projects, we were divided into two groups:

The first group consisted of up of 4 people who were all designing the **same building type**, which in my case was a hospital. With the hospital group, we created a benchmark for our own hospitals by doing case studies on hospitals to better understand their dimensions and ratios. To make a benchmark, we had to choose between several hospital projects, student projects, and completed projects. Ultimately, four models of the Vivantes Klinikum, New North Zealand Hospital, Brain Hospital, and Organ Factory were created and studied in terms of context, organization, and program. By creating and analyzing the models, we were able gain more understanding of how hospitals respond to their context, how they were organized, and what programmatic spaces we would need. For my project, it had the most impact on hospital organisation. The case studies showed that each hospital had its own layout depending on the program it was accommodating. Because my project was a combination of a laboratory and a hospital, it required a different approach than a regular hospital. It proved to be quite useful, but it also took up a lot of time, along with personal work and work for the second group.

To confirm the information gathered from the benchmark, we contacted architectural firms such as EGM Architecten and Gortemaker Algra Feenstra. These firms have developed hospitals and were willing to provide information on their approach to hospital design as well as other factors that should be taken into account. This proved to be more beneficial than I expected. Instead of going only once, we traveled numerous times to Gortemaker Algra Feenstra with the hospital group and ended up learning a lot about hospital design and materialisation. For instance, they told us that timber laboratory constructions are almost never used since they are highly susceptible to fungi. This was not something I encountered frequently or think about on a regular basis, therefore it had a big impact on certain material choices.

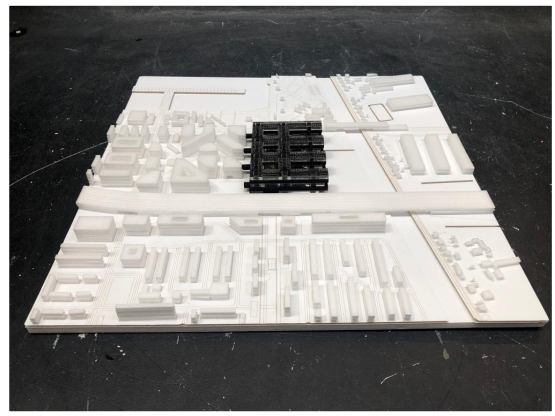


Brain Hospital



New North Zealand Hospital

Vivantes Klinikum



Organ Factory

The second group consisted of 9 people who all had **different building typologies** but were required to view their building through the same thematic lens. Our group had to look at our projects through the thematic lens of "energy". Because Berlin is currently facing an energy crisis, our aim was to contribute to the city's journey towards self-sufficiency. The people of Berlin had set ambitious goals to become climate neutral by 2030, which didn't pass due to having to little votes. Our goal was therefore to see what would happend if we continued on with the idea to make berlin self-sufficient.

To achieve this we did 2 things:

We created requirements for site selection that all our buildings had to abide to. All our 9 buildings had to be within a geotheermal potential zone, near an energy-efficient mobility node and built on existing potential for retrofitting. This restricted us, but also guided us, in a big way in terms of determining the most suitable location for our typologies.

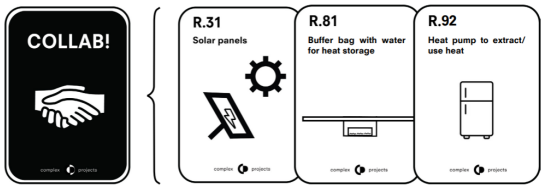
As a second thing, we introduced of a database of cards. This database contains cards that offer strategies to save energy. But these cards were not just ideas; they are actionable solutions that can be implemented across Berlin's built environment. The concept was very simple. Architects, developers, and contractors can access this database and integrate these cards into their projects. These cards cover a wide range of topics, organized into three main categories: construction, energy usage, and transportation. Moreover, these cards address site-specific strategies, architectural considerations, material choices, and installation techniques. What sets these cards apart is their impact. We've assigned points to each card based on the level of influence it has on design and energy savings. The cards range from one to three points, with each point representing a greater impact on both design and energy efficiency.

The 1 point cards, help save energy but have a small impact on the design and the amount that is saved is little compared to the higher point cards.

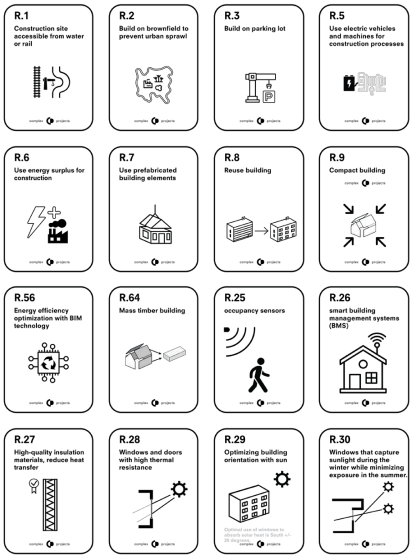
The 2 point cards impact the design and thus save more energy.

The 3 point cards have a great influence on the architectural concept of the building and also impact the climate concept of the building.

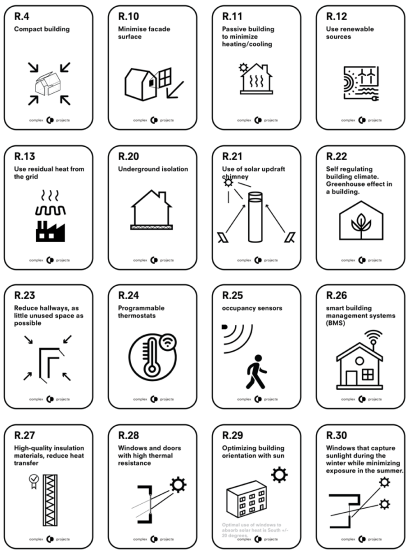
The cards had a significant effect on the design since we determined that everyone had to accumulate a minimum number of points for the building to be efficient enough to help establish a self-sufficient Berlin. The number of points required were determined by your building typology and the amount of energy it requires. Both laboratories and hospitals require a lot of energy 24 hours a day, so consequently I needed to use the collab card to combine numerous cards to get this required number of points. As an example, I used the collab card to combine solar panels, a water-filled buffer bag for heat storage, a heat pump, and a green roof, in addition to the geothermal card required of everyone. This also connected all of our projects together and influenced our program.



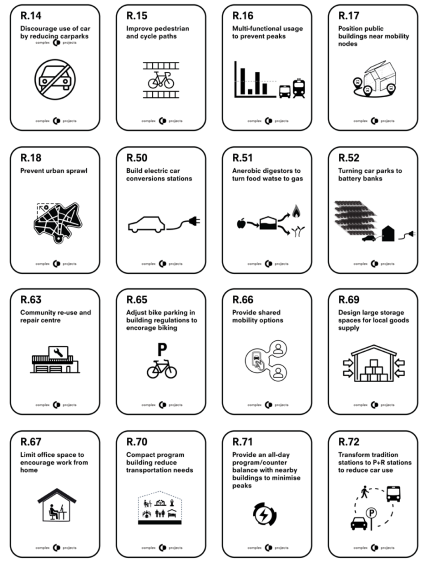
1 point card
This card **has little impact on the design** of the building and the energy saved is almost negligable



2 point card
This card impacts the design and detailing of the building and the energy saved is considerable



3 point card
this card defines the architectural concept of the building and impacts the building's climate concept



collab card
some strategies strengthen each other, which is expressed through this card. (Solar panels and green roof)

conflict card
some strategies don't work together, which is expressed through this card (minimize facade surface and maximize heat usage from solar radiation)

power-up card
The project's main card. An energy concept that defines the buildings' concept, is a large energy saver and impacts architectural expression (worth 10 points)

ASPECT 2: The relationship between your graduation topic and studio topic

The Complex Projects graduation studio focuses on the design of one-of-a-kind structures. Since there are already over 100 hospitals in Berlin I had to look into a new type of hospital that could be an addition to the healthcare that is already provided. I therefore decided to challenge the conventional architectural design of hospital buildings by exploring uncharted territory in design by creating a radical new typology: a combination between a hospital and a laboratory.

ASPECT 3: Research method and approach chosen by the student in relation to the graduation studio.

The research was devided into 3 core topics: client, site and program, which were provided by the Complex Projects studio. The research methods and approach that were used varied based on the different topics that were explored.

PROGRAM

1. Benchmarking - As explained in Aspect 1, for the program the hospital group carried out case studies on both hospitals to gain an understanding of the dimensions and ratios.
a. To create this benchmark, 4 models were made. These models of the Vivantes Klinikum, New North Zealand Hospital, Brain Hospital and Organ Factory were analyzed on the context, organization and program.
b. The benchmark of the laboratory part, a case study was conducted by myself of 8 laboratories, 6 medical- and 2 general laboratories, originating from the Laboratory design guide by B. Griffin (2005).

2. As also explained in Aspect 1, the hospital group used external expertise to verify the information gathered from the benchmark, by contacting architectural firms, such as EGM Architecten & Gortemaker Algra Feenstra.

3. Cinematic Exploration - A film analysis focused on the conceptual theme. An unusual new perspective that could enhance the program's creative elements.

CLIENT

4. Internet Research - Internet research will used to find clients for the project in order to make sure the clients fit the goals of the project.

SITE

5. Mapping - To determine the best location for the medical laboratory building, maps are made of the following:
a. A research collaboration map, showing the nearby network of hospitals, research facilities and universities.
b. A protected nature areas map, showing the protected nature areas in berlin.
c. A clean zones map, showing the areas with low air (CO_2) and noise pollution as well as a low crime rate %.
d. A retrofit map, showing the pieces of land owned by the government of Berlin that could be used to construct the medical laboratory.
e. A geothermal potential map, showing the sites with no soil restrictions for geothermal energy.
f. A energy efficient mobility map, showing the public transport network or Berlin and places where multiple mobility nodes come together.
6. These maps lead to 3 potential locations for the medical laboratory building. These locations are then analysed based on how well they fit within the requirements listed above.
7. After finding the most suitable location, an analysis per scale is made in the form of maps to get a better understanding of the location, looking into:
a. Scale XL – In what district the location is.
b. Scale XL – What localities these districts are known for.
c. Scale XL – The main traffic flows surrounding the location.
d. Scale XL – The nearby hospitals, fertility clinics and research institutes.
e. Scale L – The surrounding neighbourhoods.
f. Scale L – The busy and less busy areas nearby.
g. Scale M – The accessibility of the site.
h. Scale M – The heights of the surrounding buildings and trees.
i. Scale S – The current site occupation.
j. Scale S – The proposed site and it's measurements.

To conclude I feel like the research carried out to gather information on both the program and site was very thorough, and I presonally value the results quite high when compared to the client research. It was much harder to find information about which clients would be suitable for the project. I would have liked to make it reliable by introducing another research approach to the client.

ASPECT 4: The relationship between the graduation topic and the wider social, professional, and scientific relevance

Medical technology advancements and ethical considerations go hand in hand. Every time science makes progress, more questions arise. Current research and scientific developments are looking into the field of "reproductive engineering," which refers to tampering with the conventional methods of conception, pregnancy, and delivery (R. J. Buuck, 1977). Yet Germany has certain restrictions on access to medically assisted reproduction (MAR), a range of interventions designed to address various forms of infertility and fertility, compared to other countries. This includes all types of assisted reproductive technology (ART), as well as various insemination techniques and surgical procedures (Zegers-Hochschild et al., 2017, as cited by Köppen et al., 2021).

The legal framework that governs MAR in Germany is notable for its lack of flexibility as well as being obsolete. Despite that, reproductive medicine specialists continue to use the Embryo Protection Act (ESchG), which was passed in 1991, as the legal foundation for implementing MAR. Several ART-related procedures as well as some alternative diagnostic methods are prohibited by the ESchG. Egg cell donation, surrogate motherhood, and elective single embryo transfer are a few examples of such practices. Because of restrictive laws, men who are single or in same-sex relationships, as well as women who are unable to conceive using their own egg cells, are unable to access MAR in Germany.

This project looks into creating a new architectural typology that provides an alternative for people who are unable to start a family due to medical constraints or due to being part of same-sex couples.

ASPECT 5: Ethical issues and dilemmas you may have encoutered during graduation

Artificial birth itself endures a lot of ethical questions such as who is the legal mother and whether it should even be possible. During the research, it was raised whether this project could even come to fruition, with some even going so far as to say that, in Germany specifically, the chances of success were even lower due to the practices of Josef Mengele, who performed genetic experiments on twins, primarily children, for the SS during WWII.

I tried to separate myself from the ethical aspect because I believe it cannot be resolved through the design of a single building. However, I believe that this project could help integrate the idea in society and make it possible for people who are unable to carry their own children to become parents.

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