LIVING AT GELE SCHEIKUNDE

HOW TO REDEVELOP FORMER CAMPUS BUILDINGS BY INTEGRATING SOCIAL & ECOLOGICAL VALUES?

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Heritage & Architecture – Graduation Studio: Heritage4all | Univer-Cities | HEVA
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INTRODUCTION

OVERVIEW OF THE THESIS

The world around us is changing and has to turn the current lifestyle into a much more sustainable one. In the built environment, there is a need to address the problems of climate change together with the quality of life. Buildings impact on the environment, from their very presence by producing noise, shading, wind effects, and even visual impacts (Williamson et al, 2002, pp95-97). Based on the fact that buildings account for nearly half of the carbon emissions[1], targeting a climate-neutral built environment is a must.

Equally important, society must responsibly interact with the planet to maintain natural resources and avoid threatening the ability of the following generations to meet their needs in future. Consequently, looking after our environment is something we must all be a part of. After all, sustainable initiatives have a better chance to succeed if stakeholders (governments, municipalities, local communities and private companies) collaborate and commit to becoming more sustainable. Besides, achieving sustainability in architecture, in particular historic buildings, implies determining the stakeholders, identifying their vision and objectives for sustainability, and designing means of achieving performances that meet such criteria (Williamson et al, 2002, p66). Co-creation and co-production are keys to a better society. Moreover, sustainability is not only about protection of the natural environment, but it also involves the protection of 'genius loci' which means the spirit of space and represents cultural values of Heritage Architecture (Kepczynska-Walczak & Walczak, 2015).

Furthermore, it is crucial to focus on heritage sustainable development, since in the coming years the building industry will see an increase in need of adaptive re-use of vacant built environments. There are numerous reasons why buildings become vacant, related to economic and cultural issues. Usually due to a lack of demand from prospective occupiers or financial difficulties. In the Netherlands, the high structural vacancy in the Dutch office market (Remøy, 2010, pp16-17) is an ongoing problem[2]. This is evidence of a societal and environmental problem since the attitude of "throwing away" is threatening the built environment. As Power A. (2010) stated, building demolition is disadvantaging over refurbishment in terms of time, cost, community impact, protection of existing and energy use. Thus, repurposing vacant buildings is often a considerably greener option. Additionally, population growth has resulted in an urgent need for housing or additional space. In such a case, it makes sense to repurpose unused buildings.

The stated above problems are parts of a broader overview of the topics of Sustainability, Co-creation and Heritage Conservation, which represent my interest and motivation for learning. To explore these topics, the studio "Heritage 4all: Univer-cities" is chosen as the graduation studio at Delft University of Technology (TU Delft). "Heritage4all" studio is based on four themes: **Univer-Cities, Co-creation, Sustainability and Digital Heritage (see figure 1).** The main objective of the studio is to involve stakeholders related to a current debate of the built environment in a co-creation process, which is the main approach of the research and design assignments. The redesign process should include the interests and perspective of different stakeholders. They will be collaborating, co-designing and deliberating their design ideas. This co-creation process is facilitated through the implementation of a digital technology setting, for instance, a Minecraft workshop, with the aim to give this graduation thesis a real problem-solving platform.

However, a co-creation approach is not limited to one method. There are various ways to involve stakeholders: interviews, surveys, questionnaires and workshops, with or without heritage games. For this research, a combination of the above was chosen: interviews, surveys and a gaming workshop with Minecraft. Different stakeholders from different background and relation to the case study were interviewed and invited for the gaming workshop.

The chosen case study for this thesis is the TU campus in Delft, Netherlands. In particular, this research looks at Gele Scheikunde - a TU Delft chemistry department building constructed in 1945. The two pilot plants - Proeffabrieken, constructed in the 50s are considered to be an important asset of the site that has a valuable connection to the case study. The site served for educational purposes until 2012 and then was sold by TU for redevelopment (Connie van Uffelen, n.d.). The research booklet illustrates how former campus buildings can be reused for other purposes related to the needs of society. And aims to give an overview of the process of the redevelopment and management of the decision-making through a value-based design strategy and an innovative digital gaming tool.

Figure 1: Four themes of Heritage4all (Syllabus, 2010)

1. Building and construction activities together account for 36% of global final energy use and 39% of energy-related carbon dioxide (CO2) emissions when upstream power generation is included. Retrieved from UN Environment and International Energy Agency (2017): Towards a zero-emission, efficient, and resilient buildings and construction sector. Global Status Report 2017.

2. The estimation of the office vacancy was based on buildings larger than 500 sq. meters.

PRESENTATION OF CHAPTERS

This thesis booklet is structured in chapters according to the very themes of the studio "Heritage4all" which are: **Univer-Cities, Co-creation, Sustainability and Digital Heritage.** And is a combination of research and a design.

The first chapter "RESEARCH APPROACH," presents a research framework and a research methodology for this graduation thesis, developed as an assignment for the master course "Research plan." This course aimed to teach students critical analytical skills, to help them reflect on the methodologies, theories and ethics for the graduation research. In this chapter, the problem statement together with the main research question and sub-questions are explained. As well as, the theoretical framework which consists of theories, concepts and definitions which are used in this research. Besides, the "Research approach" chapter gives an overview of the method that was used for the co-creation process.

The second chapter "CASE STUDY," is a research of the Gele Scheikunde and two pilot plants, focused on the history of the site, its development and architectural styles. In this chapter, architectural analysis is done both in the urban and current building context.

The third chapter "VALUES & ATTRIBUTES ASSESSMENT" is research on values and attributes of the case study related to the approach of Pereira Roders (2007); Speckens (2010); Tarrafa and Pereira Roders (2011). In this chapter, the values and attributes of Gele Scheikunde complex are established, using the primary data analysis and the personal observation method. The established attributes are tested in the workshop and with the survey. As a conclusion, a mindmap is drawn and one of the sub-questions is answered.

The fourth chapter "CO-CREATION & CONSENSUS" is an explanation of the conducted workshop, outcomes of the survey and the presentation of interviews with experts. The preparations for the co-creation process are explained at the beginning of the chapter together with the used tool - Minecraft game. Then the real-life workshop is transcribed in details with the received results. This chapter aims to give the reader a profound understanding of the very process of the gaming workshop but also to shed some light on the future and power of participatory gaming (digital heritage) as a mixed heritage planning and management method.

The fifth chapter "VALUE-BASED DESIGN STRATEGY" aims to answer the last sub-questions. It is an elaborated conclusion of the values and attributes assessment, combined with the knowledge received from the interviews with experts and the workshop. The two sub-questions are related to the notions of sustainability and Univer-cities.

The sixth chapter "PRELIMINARY DESIGN" is a general conclusion of this thesis, which aims to answer the main research question. Which then is translated into a design strategy that will serve as guidelines for the redesign assignment. In this chapter, a preliminary design is shown.

RESEARCH FRAMEWORK

PROBLEM STATEMENT

In essence, the property market in the Netherlands has been tight for years and the housing demand is rising like in many cities worldwide, creating a challenge for city planning. Concerning Delft city, the ambition of the city is to increase the housing stock, which brings up a dilemma between densification and quality of life.[3] So in 2003, the city council of Delft decided to update and standardize its zoning plans[4]. Furthermore, the number of TU campus users has grown significantly in recent years, together with the number of employees of the university and businesses.[5] Consequently, the number of inhabitants and households in Delft is growing. Which is why abandoned or non-used buildings like TU faculty buildings "Yellow Chemistry" (Gele Scheikunde) and "Red Chemistry" (Rode Scheikunde) have been envisioned for housing purpose.[6]

Gele Scheikunde was sold to developers - Kondor Wessels Vastgoed and Amvest. About 300 homes, for purchase, rent and social housing, will be designed there. Besides, Proeffabrieken was sold to the Municipality of Delft and will be redesigned for an international school (Marjolein van der Veldt, n.d.). As said in the press release of two developers, *"The sale will reduce TU Delft's footprint"*[7], both buildings are being redesigned for a new purpose. Furthermore, according to the official regulations and the Commission for Environmental Impact Assessment (MER), there is a great potential in this university area to develop an innovative sustainable neighbourhood.[8] Thus, the question that arises is: How to redevelop campus buildings?

When making literature research on "Scopus"- one of the largest abstract and citation databases of peer-reviewed literature. The first keywords searched were "campus," "heritage" and "redevelopment," only two articles appeared, both dealing with the topic of energy refurbishment on the campus. Another attempt was to use keywords like "former" "university" "adaptive" "reuse", which resulted again in only two articles. For instance, one of them presented the conservation and architectural reuse analysis of the old barn and horse stables of the Chapingo Autonomous University - the main school of agriculture in Mexico (López et al, 2013). No research paper discussed the topic of the redesign of former campus educational buildings. More precisely, no research, on how to attribute a former campus building a new program was found.

When searching articles on "campus" "sustainability," 307 open access articles were found on "Scopus"[9]. Afterwards, the research was limited to the articles written in a period of the last 5 years, which gave 151 results. Then the research was narrowed down by excluding subject areas that were out of interest, like "medicine" or "physics," which narrowed the research to 90 results. Furthermore, based on the topics that are of high interest for this research paper; "green campus," "university sector" and "campus sustainability," 15 articles out of 90 were selected. All of them present theories and strategies on energy efficiency, waste management, water management, social-ecological urbanism and co-creation within the academic and public environment.[10] With the stated above in mind, a gap in academic

3. Information retrieved from official document: Belangenvereniging TU Noord. (2010). Zienswijze Startnotitie m.e.r. bestemmingsplannen Delft Zuidoost.
4. Information retrieved from official document: Gemeente Delft. (2007). Bestemmingsplan TU-Noord.
5. Information retrieved from the official document. Concept: advice from the quartermakers (2017). Gemeente Delft and TU Delft.
6. Information retrieved from official letter: Gemeente Delft. (2020). Informatiebrief Gele Scheikunde.
7. Information retrieved from the press release. 20200204-Persbericht-Gele-Scheikunde.pdf
8. Information retrieved from official document: Bestemmingsplannen Delft-Zuidoost; Advies voor richtlijnen voor het milieueffectrapport. MER. (2010, april). rapportnummer 2387-29

research is determined. Which is why this research aims to address the repurposing of the campus buildings, so finding new programs that fit in the urban tissue of Univer-cities, also that respond to societal needs and promote environmental sustainability.

Univer-city is a city that contains one or more universities in it, or/and, is an older city in which academia, business and local government work together for the greater social, civic and economic good (Anthony Soon Chye Teo, 2015). In this perspective, TU campus relates with the city of Delft, however, there is more potential. In 2016, TU Delft together with Municipality of Delft elaborated strategies for the coming years and ambitions for the future developed of the Campus areas.[11] This covenant has been developed in three themes: first -"City as a campus"; second- "Campus as an ecosystem for knowledge and Economy" and third - "City and residents." These strategies aim to integrate the campus, city and region more with each other into a complete and sustainable world-class ecosystem.

Indeed, Univer-cities are the pioneers in sustainability that should combine stable long-term economic growth with a resilient ecological system through co-creation and, as teaching institutions, the knowledge produced within campuses should be applied for the societal benefit (Andersson & Andersson, 2019). More precisely, this research aims to explore strategies that integrate socio-ecological values in campus building redesign together with stakeholders. Specifically, this research will investigate the potential of gaming as a simulation tool for decision-making.

QUESTION & SUB-QUESTION

The goal is to develop research on how to cope with abandoned campus buildings by including social and ecological values into the transformation and re-adaption design. The research question is formulated bellow and the following sub-questions are meant to help answer the main question. They are formulated around the four themes of the graduation studio: Univer-cities, co-creation, sustainability and digital heritage, to help develop the research framework.

HOW TO REDEVELOP FORMER CAMPUS BUILDINGS BY INTEGRATING SOCIAL & ECOLOGICAL VALUES?

Sub-questions:

1. What are the attributes and values of the Gele Scheikunde complex & who are the stakeholders?
2. How can digital heritage in the form of a game support stakeholders' design and decision-making?
3. How can Gele Scheikunde support greater sustainabillity between TU Delft campus & the Delft city?
4. How to integrate ecological values & technological strategies in adaptation reuse design?

9. When using keywords; "campus," "reuse," "sustainability" and "co-creation" at the same time, no articles were found on "Scopus". Which is why the literature research continued by using these keywords in a simpler combination.

10. For this research, 15 articles were selected exploring the topics of ecology, energy-saving and water-management, as these topics would be the most suitable for the Dutch environment. For instance, the initiatives based on solar photovoltaic (PV) system would not be so efficient in the Dutch climate.

11. The directors of TU Delft and the Municipality of Delft signed the 'Covenant 2016-2026 TU Delft and the Municipality of Delft for the further development of campus and city.' Information retrieved from the official document. Concept: advice from the quartermakers (2017). Gemeente Delft and TU Delft.

RESEARCH METHODOLOGY

AIMS, GOALS & EXPECTED RESULTS

This research aims at reflecting on the sustainable redevelopment of Gele Scheikunde complex - the former campus properties. The redesign process of the buildings is a perfect case study to explore social and ecological values attached to attributes of the former educational ensemble. As stated before, when searching for literature on "Scopus," no research on heritage values-based design of campus or educational buildings was found. However, many papers discussed the topic of values-based design in heritage interventions. Consequently, in this research, the value assessment is specifically focused on the values and the attributes of a semi-public building - institutional architecture. In the same token, some articles searched on "Scopus" presented the reverse scenario when a heritage building gets redesigned into an educational building. In this perspective, there is a gap in the topic of adaptive reuse of former educational buildings together with stakeholders.

Nevertheless, a big number of research papers exist regarding campus sustainable reuse and urban sustainability. For example, how to refurbish the campus building into a more sustainable one or what is sustainable urban planning for campus. Correspondingly, as Pereira Roders (2007) stated, sustainability is often perceived as a synonym of energy efficiency, production and implementation of new environmental- friendly materials, by many experts. But it can embrace much more. For instance, ecological values. As Pereira Roders states (2005), it is time to sensitize society for the vital importance of conservation of our existent resources guided by ecological values, taking into special consideration the current state of our planet and became conscious to the fact that slowly, one by one, we can start contributing directly for the re-use and the re-cycle of natural resources already altered by mankind and indirectly, by preserving the natural resources still available in our ecosystem (Pereira et al, 2005). Furthermore, there is a gap between the wanted ecological awareness and effective practice. So the intention of theis research paper is to develop a design process that could serve designers a guideline in adopting ecology in the design practice. For that, the knowledge shared by the experts of the ecology through interviews and workshop is adapted in the design strategy of the preliminary design.

Finally, gaming is a method for co-creation design and decision-making in this research. Such a method and tool (Minecraft) has already been used in some planning and design initiatives. This is why it can be further accepted and investigated in processes of heritage planning and management. By using the gaming method, this research aims to contribute to current consultation processes involving heritage listings and project decisions for sustainability. The Minecraft workshop is used to understand the stakeholders' values, visions and ideas to support the design. The goal of this workshop is to go in-depth with the design envisioned by the stakeholders, manage this design, have an open discussion and to draw out a related masterplan vision.

With stated above arguments, this research expects to fill the gap in the topic of adaptive reuse in former educational buildings. The collaboration with stakeholders gives certain results that then are analysed and discussed. These results are the main components for the design masterplan. In addition, the workshop can empower the use of participatory gaming for decision-making in design processes.

THEORETICAL FRAMEWORK

A values-based design approach is focused on the cultural significance that heritage conveys, such as the values (why is it heritage) and attributes (what is heritage), either tangible or intangible (Tarrafa & Pereira Roders, 2012). When conducting a literature search through "Scopus" on keywords "campus" and "values," five articles appeared. All of them discussed the history of an exact architectural style of chosen campus buildings, without mentioning the value of it as an educational building.[12] As a conclusion, all five articles were focused on historical values based on the materialist traditions of conservation practice, and none of them presented a value assessment for an educational building. For the identification of values and attributes of the campus building, this research categorizes historic values as cultural values together with social and ecological values as sustainability values.

There are several research methods to assess the significance of cultural heritage assets. One method was by Pereira Roders and Tarrafa Silva (2012) as part of a design process model to guide designers involved in rehabilitation interventions. This is a historical qualitative research method since the impact assessment framework is a result of the comparison of the pre-design with the design stages of heritage interventions.This assessment has three distinctive stages: First stage - 'relation between documents', starts with data collection, identification and analysis.[13] In summary, the first stage merely concerns the evaluation of the collected data according to the identified cultural values which are classified into 'primary values' and 'secondary values'[14]. The goal of the second stage - 'relation between documents and stakeholders', is to verify the relation between what was being written (policy strategy), to the real practices and experiences of the involved stakeholders (policy implementation). Also using 'primary values'. The third stage - 'relation between documents, stakeholders and the asset' is similar to stage 1 and 2, therefore, the goal is to understand which "official" attributes were identified and check if they were mentioned in the collected documents. This stage helps to find missing attributes

Equally important, is to determine the stakeholders of the future redesign. For this reason, the correlational approach discussed by Avrami and Mason (2019) will be addressed. In the heritage conservation process, a professional starts interrogating 'why' we conserve and 'what' we should conserve. After knowing the 'why' and 'what' a professional will find answers to guide 'how' we conserve.However, what is of interest, is their approach to combine 'heritage values' (materialist traditions of conservation practice) with 'societal values' (focused on the economic, political, social, and environmental uses of heritage). The conservation field must move beyond solely physical protection of heritage. In other words, 'societal perspective' enlarges certain categories of 'heritage value' (which are historic, artistic, aesthetic and scientific). This assessment follows that values must be understood in relation to the person or group ascribing value to a place, and concerning the place's physical and social histories (Avrami et al, 2019, p11).The Values-based conservation approach navigates interests like promoting public welfare and retaining the significant aspects of heritage by incorporating different perspectives in decision making.

12. The conclusion was made according to the found articles. (Hong, 2016); (Oyarzun et al, 2017); (López et al, 2013).

13. Concerning data analysis, two different approaches were undertaken – direct and indirect.

14. Table 1: The cultural values (ICOMOS Australia, 1999; Manson, 2002; Pereira Roders, 2007; English Heritage, 2008)

The research of Pereira Roders (2007) defined two taxonomies; built heritage and lifespan rehabilitation and provides an accurate survey on the phenomena of heritage, intervention and its relation to the ecological principles. It encloses ecological awareness and aiming to bring a different perception of the built environment, as well as, to show how current rehabilitation interventions could be undertaken.The biggest attention was given to the fundamental factors; 1-object, 2-action, and 3-tools characterized by the three sub-questions: 'what' (what is built heritage?), 'how'(how should rehabilitation be done?) and 'with'(which process, technologies and materials should it be done?). In conclusion, "Re-Architecture" (2007) is qualitative research focuses on the technical sustenance when performing rehabilitation interventions of built heritage.

Subsequently, to define the ecological values, a building sustainability assessment should be done. Well established assessment methods could have the ability to transform generic sustainability goals into specific performance targets (Bragança et al, 2007).To know 'What' and 'How' to measure varies widely between different assessment methods and even between users (Herda et al, 2017). For that, sustainability indicators are required, both for decision-making within design, production and management of buildings, as well as for indicating to the public and to clients the overall economic, environmental or social impact of buildings.[15] Given these points, discussed above theories will help this graduation research, such as the definition of the social values related to the process of co-creation and the notion of ecological values related to the design strategy.

To continue with co-creation, the redesign process should include the interests and perspective of different stakeholders. They will be collaborating, co-designing and deliberating their design ideas. In order to engage stakeholders, the principles of playful collaborative planning developed by Poplin A. (2017) is of high interest. Such theory and practice strive to engage different stakeholders in the planning activities based on the principles of communication, sharing ideas, expertise, and collaborating in finding solutions for sustainable environments. The dimension of play can be implemented in many ways, like walking and moving, sketching and drawing or digital storytelling (Poplin, 2017).

Games as digital simulation tools for heritage planning, design and management, aim at improving the understanding of possible ways to solve real-world problems. It is worth mentioning that the initiative in the Netherlands called 'Ecocraft', used Minecraft[16]-a block building hit game, to experiment with urban planning issues such as energy, waste management and transportation. The idea was to puts planning decisions in the hands of players, replicating the real world in three-dimensional bricks (Ecocraft, n.d.). Similarly, a team of professors and students collaboratively started to construct a Minecraft version of the TU Delft virtual campus to offer a new learning, interactivity and fun environments for students (Mining the Campus, n.d.).

15. ISO 21929-1:2011(E) - establishes a core set of indicators for assessing the sustainability performance of new or existing buildings. Retrieved from: https://www.iso.org/standard/46599.html

16. Minecraft agame created by Mojang in 2009. In the game, the three-dimensional created environment is purposefully "pixelated" (polygonal), which graphically enables the player to interact with space by building or destroying build structures.

In the research of Bai et al (2020, pp 559-560) a playable serious game was designed to simulate the further development of a university campus, taking into account the cultural significance of the old campus buildings, even if not all buildings are listed as cultural heritage. The goal of the game was to reach consensus with the key stakeholders on decision-making. As a conclusion, by getting stakeholders involved in the game workshop, the conflicting opinions on various actions and their consequences could be understood. Furthermore, interdisciplinary engagement in urban planning, more precisely, in campus planning is a gap in the academic research according to Erixon at al (2018, pp 6-12). Their research explores strategies for facilitating more integrated social-ecological approaches within urban design processes, referring to a design of a resilient campus in Albano area in Stockholm, Sweden.

The Albino campus design process is a result of a collaboration, which took the form of a series of workshops with key stakeholders and activist groups in which repeating prototyping was paralleled by critical reflections on outcomes. The working method was based on recurrent workshops with actors (managers, architects, researchers, planners) at regular intervals and with design sessions in between, where the designers concretized the discussions into sketches, diagrams, and models. During the discussions within the stakeholders (property owner, client, project developers), reflections and ideas were documented through notes, sketches and e-mails. Also, shared readings were made in relation to key literature from different fields; repeated visits to the site both as a group and individually were organized; studies of existing and previous plans for the area were made, as well as, analysis of existing ecological studies of the park; and, photographic analyses of site conditions and mappings of the various stakeholders and interest groups active in the park at the time. The workshop outcomes, the vision documents, tentative ideas and theoretical conclusions were gathered into a comprehensive sketch, called a 'prototype.' The prototype then was used as a base for discussions with scholars and other professionals for problem solving (Erixon et al, 2018). In conclusion, the project followed research through design (RTD) approach.

The ecological principles of the Albano Campus are of great interest as well, since, there is an opportunity for integrating ecosystems into urban planning and design practice of a former campus building. According to Nico Tillie, a researcher from the Faculty of Architecture and the Built Environment at TU Delft, "The Netherlands is slightly behind other countries like Germany or the UK. Every city in the country now has its own urban ecologist, but there is no degree programme in Urban Ecology in the Netherlands." He also states that 'Urban Ecology' can have a positive influence in many other areas in addition to biodiversity, such as climate adaptation, health, water and energy consumption and circularity. Especially on campus such as TU Deft, Urban Ecology should be right at home (Urban Ecology, n.d.).

The book "Principles of social-ecological urbanism: Albano Campus" (2013) is a starting point for a study on the social-ecological strategies, but also a source of advice on what can be done already. The topic of 'ecosystem' should be discovered. In the case of Albano Campus, after the collaboration with the ecologists and other experts and scholars, the design components were implemented. For example, pollination from bees and butterflies is decreasing worldwide as a result of changes in land use and habitat loss. Consequently, Albano campus was designed to counteract this trend. So the park with bee nests and rich plant green corridors were designed on the site of the campus. This strategy will serve an example when working with the TU Delft campus. In conclusion, ecological values should be the guideline in the XXI century, just like other Cultural and Historical values were guidelines in other centuries and societies (Pereira et al, 2005).

METHODS & TOOLS

The architectural 'epistemes' of this graduation research are; the typology of the campus building and praxeology based on the campus users engagement. Which result, first of all, in a campus plan analysis and then, peoples' co-creation as the research tools. For that reason, the methodological path follows mostly historical and qualitative research method and activities; e.g. archival data collection, theory generation, questionnaires survey, groups' observation and gaming workshop. The following chapter describes the approach and chosen method.

The working method is divided in three phases:

1) Historical evolution of the case study - Gele Scheikunde;
2) Co-creation design workshop using the block-building game Minecraft;
3) Heritage (socio-ecological) values-based design strategy.

FIRST PHASE: The research starts with the historical research of the Gele Scheikunde complex. Firstly, data collection on archives (e.g. architectural plans, old photos) is done alongside the urban tissue stratification analysis. Expert interviews with the chair of the TU Public Real Estate and the monument advisor of the Municipality of Delft are conducted in order to confirm the problem statement, research gap and data collected in archives. Secondly, the value assessment matrix is formulated. For that, the 'cultural values matrix' made by Pereira Roders and Tarrafa (2012) is used as a reference to analyse the findings, which are complemented with the fundamental factors determined in 'Re-architecture' (2007). In addition, Avrami's (2019) heritage assessment helps to determine stakeholders and involve their interests as 'societal values'. In fact, the influence of the economic thinking, the changing governance models, the transformative effects of digital technology, and the role of the built environment in responding to climate change, must be taken into account when assessing and recognizing values and attributes. By doing so, the views of many actors (with different decision-making power) can inform on 'what' and 'why' to preserve. And the notion of 'how' involves co-creation of a wider range of stakeholders (Avrami et al, 2019). Also, based on the social-ecological principles discussed in the theoretical framework, additional ecological values are added in the value assessment matrix. As well as, the additional actors, such as ecologists, students and scholars.

SECOND PHASE: The goal is to determine a new program for the former campus building. In order to facilitate co-creation and knowledge sharing between stakeholders and actors, a gaming workshop is organised using the block-building game Minecraft as a digital tool. The second phase has five subphases:

1- Game modelling: A 3D model of the case study buildings and area was generated in the Minecraft game environment and then tested during a trial workshop.

2- Trial workshop: The aim of the pre-workshop (trial) with students, which was held at the university, is to train for the main workshop with actual stakeholders and actors. Training is an important part of co-creation since students will represent the stakeholders and actors through a "role-playing" design method.

After that, the real workshop was organised. The groups of stakeholders (for instance developers, representatives of the Municipality of Delft, TU Deft real-estate) together with groups of actors (ecologists, TU scholars, students) were invited to participate in a "game of planning."

3- Survey: In the beginning, participants took a survey on values and attributes. This survey checked the participants' awareness of the values and attributes of Gele Scheikunde, as well as, their priorities. It is important to mention that the values (why) and attributes (what) determined during the first phase of the research are used in this survey.

4- Gaming Workshop: After that, participants were asked a question: "What are your design opinions in the sustainable redesign of Gele Scheikunde?" Each group of stakeholders and actors were asked to create a 'perfect scenario' for the redesign. By generating different scenarios of the redevelopment plan, the values of the heritage are analysed and discussed. The goal of the game is to reach a consensus between all participants. They need to rediscuss their scenarios and find a compromise.

5- Interviews: During all this research process many experts and stakeholders were contacted and interviewed. The gained knowledge is parts of the co-creation process and obtained information was used in this research and design.

THIRD PHASE: All information are analysed and specifically translated into design strategies in social-ecological values. A 'masterplan' is drawn as a conclusion for the future redevelopment of the Gele Scheikunde.

[This research involves working with human participants. We do not expect any potentially critical ethical implications of the research results. However, we comply with the European Legal Framework and apply its ethical standards and guidelines. Also, comply to relevant EU legislation, including:
- The Declaration of Helsinki in its latest version;
- The charter of fundamental rights of the EU (2000/C 364/01);
- The principles enshrined in the Oviedo Bioethics Convention;

Workshop facilitators monitored Covid-19 situation in Delft city, the Netherlands in order to control the number of participants and make sure 1.5. social distancing is being respected in citizens engagement workshops.

Protection of personal data:
We also comply with all requirements regarding data management, privacy and human research ethics. Personal data will not be disclosed and participants of the workshop will be kept anonymous.

Research integrity:
We comply with the new version of the Netherlands Code of Conduct for Research Integrity as from 1 October 2018, which includes five principles which form the basis of integrity in research: honesty, scrupulousness, transparency, independence and responsibility. Minecraft workshop is organized to provid with a working environment that promotes and safeguards good research practices. In event of an investigation into alleged research misconduct, all relevant research and data will be made available for verification.]

METHOD DIAGRAM

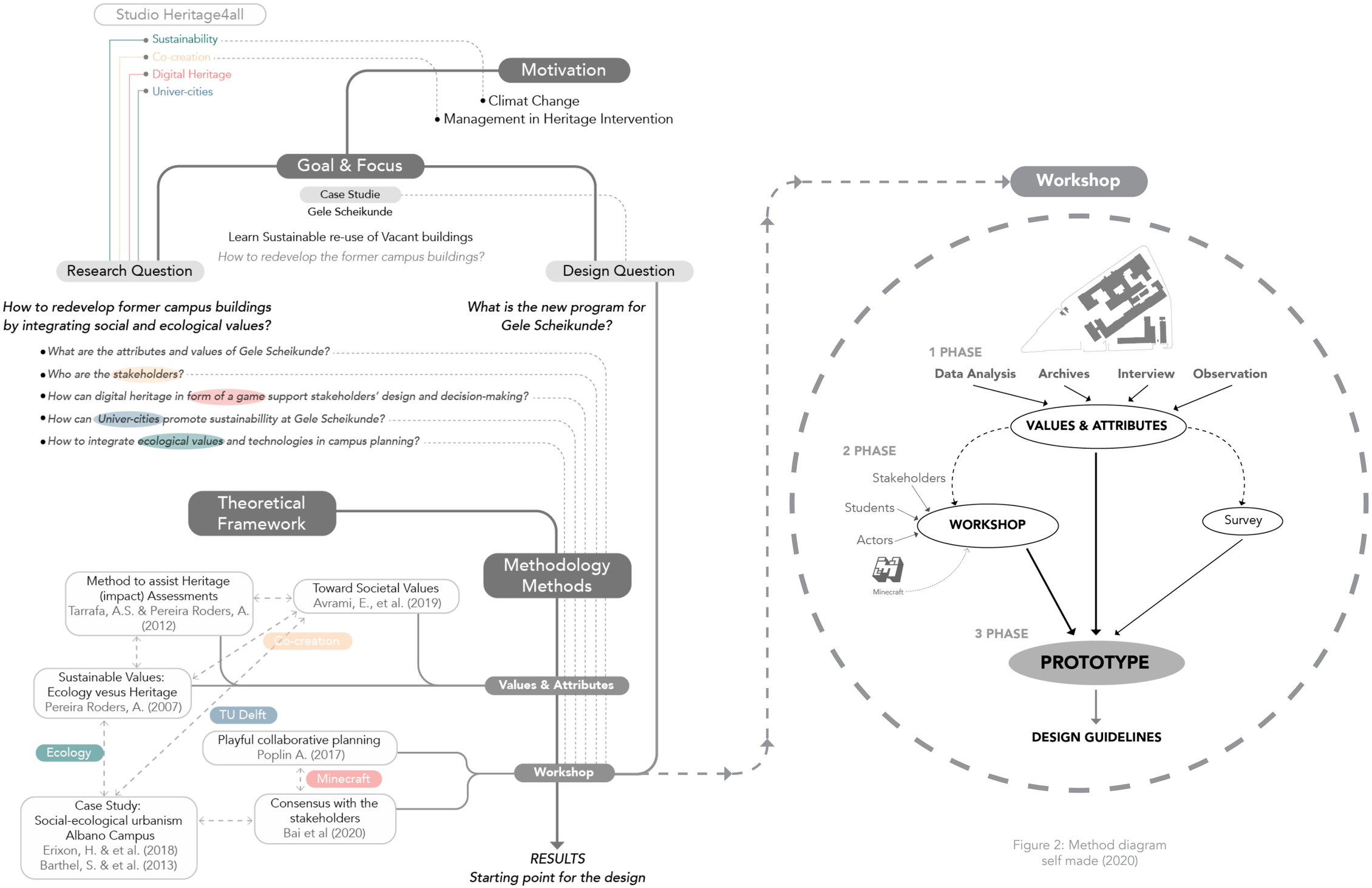

Figure 2: Method diagram
self made (2020)

CASE STUDY

Picture retrieved from Google Earth.

HISTORY: TIMELINE

Gele Scheikunde complex & TU Campus development

In this chapter, the historical evolution of the TU Delft campus with the development of the Gele Scheikunde plot is studied. All collected data retrieved from the primary sources (direct stakeholders, the archives, books and drawings)

In **1864** the Royal Academy was transformed to Polytechnic School (the previous name for TU Delft). Not only a name changed, but also an additional study plan was introduced: chemistry and naval architecture. (See Image 1)

The end of the **19th** century marked an important era for the construction of new university buildings in the Netherlands. Many of these new buildings were built for the three Dutch Government Universities in Leiden, Utrecht, Groningen and for the Polytechnische School in Delft. Most were used for laboratories and usually build on the edge of the old city, due to the risk of explosion[1].

Around the **19th** century the Polytechnische School was growing, getting more students and so expansion phase started out of the city centre towards North, known as Wippolder area (See Image 2). The main reason for the expansion is that the new buildings needed a large plot since buildings needed to have a large footprint to provide ample natural light to the laboratories[2].

In **1905**, the Polytechnic School changed into Technische Hogeschool (TH - the previous name for TU Delft), with which education became university recognized.

1908: Municipal architect M.A.C. Hartman designed a first municipal expansion plan for Delft. The existing educational buildings along the Schie were integrated into an expansion plan for a residential area the Wippolder. Hartman's plan dictated the buildings' orientation since they were placed along the designed roads. According to the "Expansion plan," (see Image 2), the plan had a centre point from which the roads started. The main radials were formed by Julianalaan and Nassaulaan[2]. We can also see that Julianalaan was designed to meet Rotterdamseweg, which is the main connection between Delft and Rotterdam. Also in 1908, the campus of the Technische Hogeschool was marked by the development of two landscaped zones in the Wippolder campus area, the Botanical Gardens and the de Vries van Heijstplantsoen[3] (See Image 2).

1914: The senate of the Technische Hogeschool requested the purchase of land in the Wippolder for the construction of a new laboratory for Analytical Chemistry as the current Chemistry complex at Westvest 9 ('Unesco IHE' is located nowadays) on the Oude Delft was getting too small [4] (See Image 1).

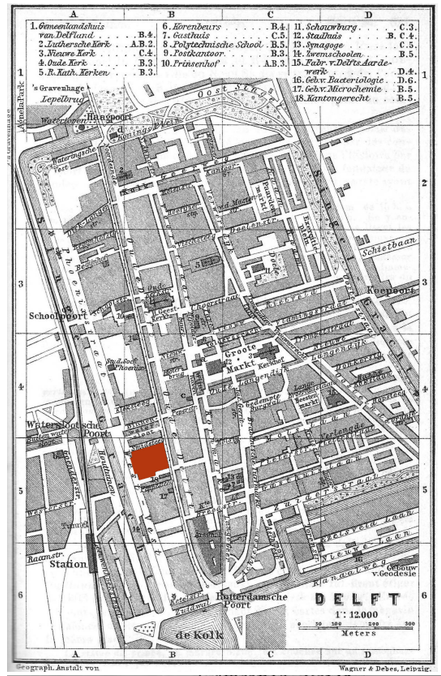

Image 1: Map 1905. The TU has existed for 175 years. There are traces of its history all over the city center. Polytechnic School was located in Oude Delft.

Retrieved from Uffelen, C. (n.d.). Speurtocht langs het verleden. https://www.delta.tudelft.nl/article/speurtocht-langs-het-verleden

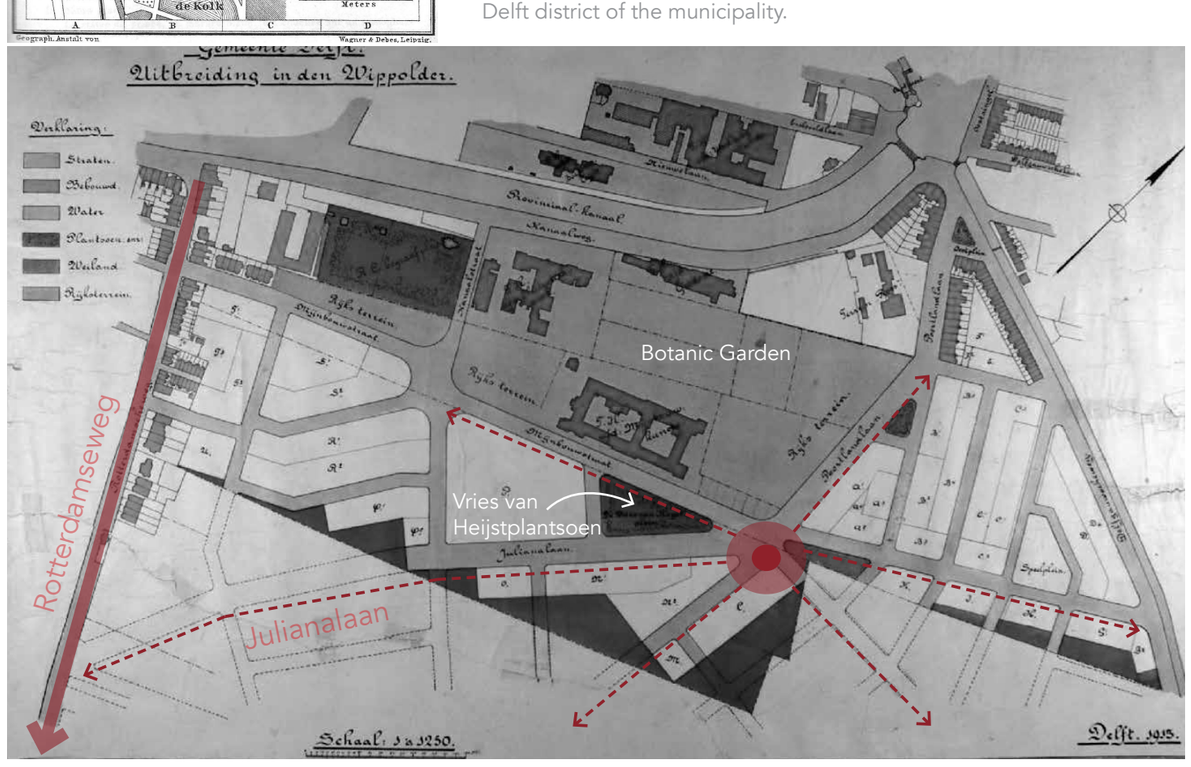

Image 2: Expansion plan Wippolder, 1915.
We can see the main radial of the plan - Julianalaan that meets the Rotterdamseweg.

Retrieved from Cultural Heritage Agency of the Netherlands, (2005). Explanation of the decision to designate the protected cityscape of the TU Delft district of the municipality.

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1. National Archive (The Hague), Archive TH-Delft until 1956 (acc.nr. 3.12.09.01), inv.nr. 113, Stukken betreffende ruimtegebrek 1883-1905

2. Macel, O., Schutten, I., & Wegner, J. (1994). Architectuurarchief Technische Universiteit Delft. Publikatieburo Bouwkunde, TU Delft. Pp 7-12

3. The new landscaped areas would help to fix the problem of the lack of "well-kept lawns or stately avenues." Hoogenbeek, E. J., & Verbrugge, B. D. (1982). Bedreigde gebouwen: Delft. Delft: Deltsche Universitaire Pers. p. 159)

4. "Delft Naoorlogse. architectuur en stedenbouw. 1940-1970. Part 1"

Due to the great interest in the field of chemistry, the building at Westvest 9 was troubled by vibrations, which endangered the chemical tests. In **1917** it was decided to build a new Chemistry Building on Julianalaan - 'Red Chemistry' which is 'Rode Scheikunde' in dutch[6]. (See Image 3) It was sort of a response on the 1st World War since the main fear of that period was poisonous gas attacks[7]. As a result, TH builds an enormous building. The design was made in the office of Government Architect for Education Vrijman (the same architect that designed Analytic Chemistry) in the Amsterdam School style oriented towards Julianalaan[8].
However, due to the economic crisis, it could not be finished so remained unfinished until the 50s. Afterwards, it was put into use as the 'Technische Hogeschool's main building and the faculty of Mathematics[8].

In **1921** another expansion plan was drawn up by a Commission of Urban Expansion set up by the municipality. These included H.P. Berlage, S.G. Evertsen and J.A.G. van der Steur. In this plan, the radial structure of Hartman changed into an orthogonal structure, parallel and perpendicular to Jaffalaan. As a connecting element, a triangular plot (See Image 4) was designed on the site where the northern extension of the cemetery would later be located[9].

1923: Construction of the new laboratory for Analytic Chemistry was completed[10].

1928: The 'Bataafsche Petroleum Maatschappij' (BPM-Dutch for Batavian Oil Company - SHELL) contacted the TH for cooperation research focused on industrial processes and knowledge on industrial production[11].

Since the Red Chemistry couldn't be finished and the chemical department needed a building, to break the deadlock, it was decided to design a new Chemistry Building.

1935: New building for the chemistry department should be cheaper, smaller than 'Red Chemistry," with a sober characteristic, low-rise building with a wing-ranging layout. Named 'Yellow Chemistry' - 'Gele Scheikunde' in dutch, because of the yellow brick.

1936: First design of Gele Scheikunde and Portierswoning (porterhouse) was presented by Hendrik Lambertus Engberts in collaboration with the director of the Government Building architect Gustav Bremer[12]. It was situated opposite the Laboratory for Analytical Chemistry at the De Vries van Heystplantsoen. The building was clearly designed with its face towards the Julianlaan, which provided the connection with the centre of Delft. (See Image 3)

6. "Delft Naoorlogse. architectuur en stedenbouw. 1940-1970. Part 1"
7. Retrieved from the Interview with a monument advisor at the Municipality of Delft on the 1st of October 2020. See the annexe.
8. Macel, O., Schutten, I., & Wegner, J. (1994). Architectuurarchief Technische Universiteit Delft. Publikatieburo Bouwkunde, TU Delft. pp.41-49
9. Prof. dr. ir. Paul Meurs et el. (2019) Gele Scheikunde en Kramerslaboratoium. Cultuurhistorisch onderzoek terrain en gebouwen. p7-9.
10. Hoogenbeek, E. J., & Verbrugge, B. D. (1982). Bedreigde gebouwen: Delft. Delft: Deltsche Universitaire Pers. p. 163
11. In 1928, a research laboratory of BPM was established in Rijswijk on Broekmolenweg against the border with Delft. The formal name was "Proefstation Delft".
12. "Delft Naoorlogse. architectuur en stedenbouw. 1940-1970. Part 1"

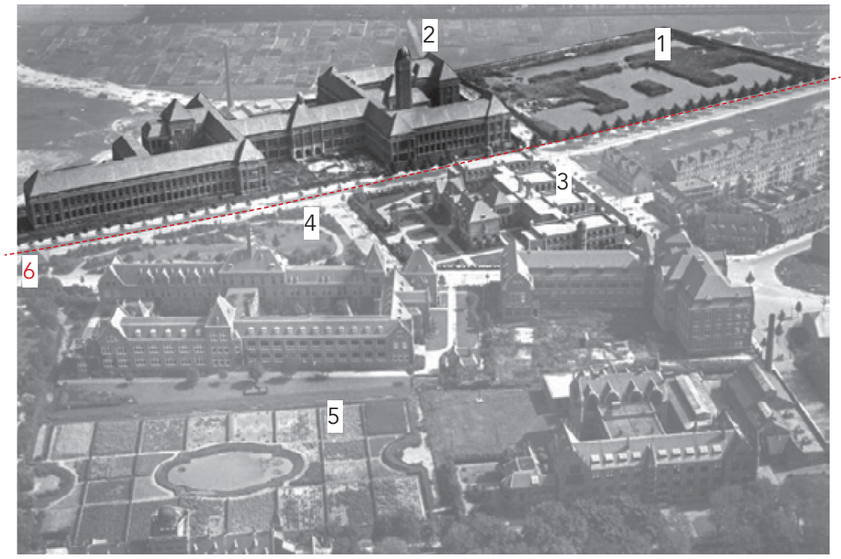


Image 3: Photo retrieved from Delft Stadsarchief

1. Gele Scheikunde plot
2. Rode Scheikunde
3. Analytic Chemistry Building
4. De Vries van Heijstplantsoen
5. Botanische Tuin TU Delft
6. Julianalaan

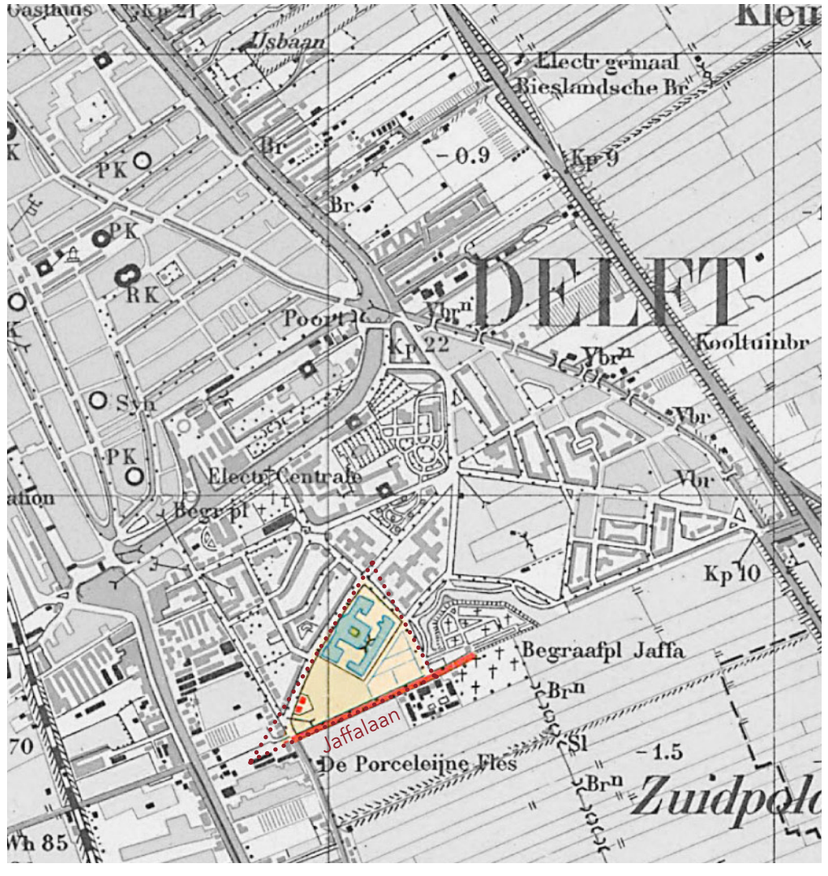


Image 4: Map retrieved from Delft Stadsarchief. Bonnekaart number 37E, 1940.

1938-1945: During World War II, construction of Gele Scheikunde was stopped and completed in 1945[13]. (See Image 5) This period is known as 'Reconstruction period' (1940-1965).

1946: TU Chemical department moved in Gele Scheikunde[13].

1947: Expansion of chemical laboratory. Additional structure, drawings by 'Ryksgebouwmeester'[14]

After the World War period, there was huge money influx in the industry of Technical Universities[15], especially in the Chemical-petroleum industry.

1946-1949: Construction of two plot plants for Physical and Chemical technology called 'Proeffabrieken', designed by architect Cornelis Adrianus Abspoel who was an architect form Shell (see Image 4).

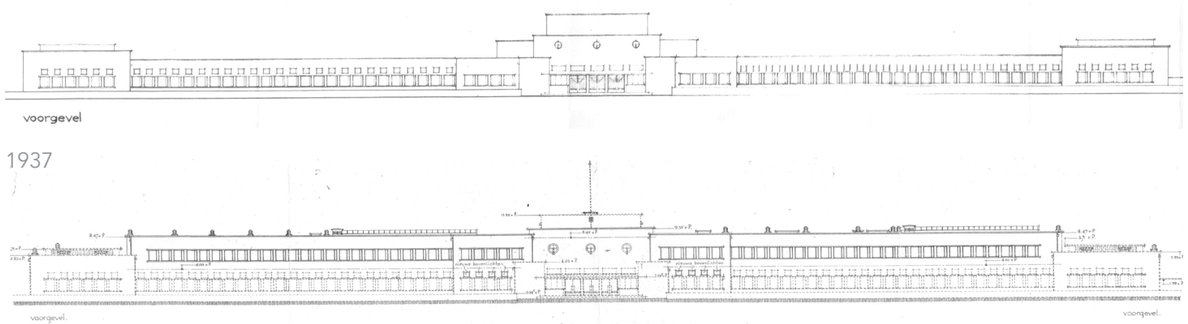
Yellow Chemistry and two plot plants clearly have a different style. They differ not only in form and design but are from a different chronological line of TU district development[16]. In these two pilot plants were located laboratories, where research focused on industrial processes and knowledge on production, took place since the goal was to introduce practical learning for chemical technological processes and methods. In 1946 BPM officially donated two pilot plants to TH[13].

1949: The Gele Scheikunde building was already too small and a second layer above the two side wings was added[17]. The side wings were then too high in relation to the central part adjacent to the lecture halls. To compensate for this difference, the outer walls of the entrance area were raised 120 centimetres higher (See Image 6).

Besides, construction of an additional chemical laboratory 'Scheikundig Laboratorium' took place, designed by Rijksgebouwendienst. The original design had taken into account a possibility for expansion.

Image 5: Retrieved from Delft Stadsarchief

1. Gele Scheikunde
2. Two plot plants



1937

1949

Image 6: Drawings retrieved from Stadsarchief Delft.

13. "Delft Naoorlogse. architectuur en stedenbouw. 1940-1970. Part 1"

14. Archives Bouwvergunningen Delft.. Inventory number 953.32284

15. Retrieved from the Interview with a monument advisor at the Municipality of Delft on the 1st of October 2020. See the annexe

16. Gemeente Delft. (2009). Randvoorwaarden Herontwikkelling Gele Scheikunde. Concept. p6

17. Archives Bouwvergunningen Delft.. Inventory number 953.10451

1950's: Technische Hogeschool published the new expansion plan on July 10, 1948, which became the basis for the further development of the T.H. district. It was decided to build a new neighborhood outside the center, further south, with the new Mekelweg as the central axis[18]. The Prins Bernhardlaan, near the Jaffa cemetery, was seen as the starting point. The orientation of the TU Campus changed. The campus area as we know it today was built along the Mekelweg. The extension plan was coordinated by the Chief Government Architect C. Friedhoff.

That is why most of the daily traffic flow sees the Gele Scheikunde building from the side. The building is clearly not designed for that. Viewed from this new traffic situation, the Julianalaan has become a side road.

1959: Later the Kramers Laboratory was built in the garden between the two chemical and physical technology pilot plants, named "de Witte Olifant," designed by K.J.Roosenburg, Verhave and Luyt[19].

1960: The buildings of the TU campus were constructed along a central axis: the Mekelweg (see Image 7). The buildings were oriented with entrances, parking areas and public transport stop on Mekelweg[20].

1961 & 1964: Renovations of the interior of Gele Scheikunde building[21].

1969-70: Expansion of Gele Scheikunde building. Construction of a Chemical warehouse - ' 'Chemicalien Opslag'[22]. The space between the laboratory and the office was closed with a workshop structure, designed by K.J. Roosendaal

1978: Zoning plan: Rotterdamseweg Noord developed. This zoning plan includes the destination "scientific education purposes" for Yellow Chemistry site, with a maximum building height of 12 meters and a maximum building percentage of 65% [23]"

1981: Refurbishment of the laboratory for organic chemistry at Gele Scheikunde. Renovation according to Fire Resistance norms[24].

1982-1983: Expansion of Gele Scheikunde building. Construction of Autoclavenlaboratorium [25] designed by Ingeniers - en Architektenburo, Roosendaal / Van Reijzen / Verbeer / Van der Veen B.V. (see Image 8)

18. Prof. dr. ir. Paul Meurs et el. (2019) Gele Scheikunde en Kramerslaboratoium. Cultuurhistorisch onderzoek terrain en gebouwen. p11-13.
19. Macel, O., Schutten, I., & Wegner, J. (1994). Architectuurarchief Technische Universiteit Delft. Publikatieburo Bouwkunde, TU Delft. pp.57-61
20. Macel, O., Schutten, I., & Wegner, J. (1994). Architectuurarchief Technische Universiteit Delft. Publikatieburo Bouwkunde, TU Delft. pp.14-15
21. Archives Bouwvergunningen Delft. Inventory number 953.32289 and 953.32288
22. Archives Bouwvergunningen Delft. Inventory number 953.10462
23. Gemeente Delft. (2009). Randvoorwaarden Herontwikkelling Gele Scheikunde. Concept. p7
24. Archives Bouwvergunningen Delft. Inventory number 953.32290
25. Archives Bouwvergunningen Delft.. Inventory number 953.10464 and 953.10465

Image 7: "The Mekelweg under construction, view from 'Red Chemistry',
Retrieved from Macel, O., Schutten, I., & Wegner, J. (1994). Architectuurarchief Technische Universiteit Delft. Publikatieburo Bouwkunde, TU Delft. p 12

1. Mekelweg
2. Kramers Laboratory, "de Witte Olifant"
3. Chemical warehouse

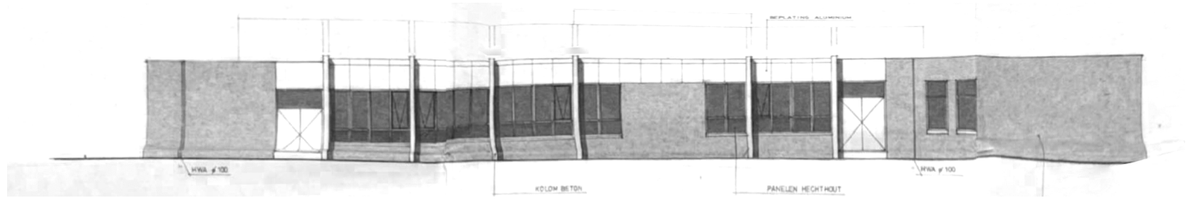


Image 8: Autoclavenlaboratorium facade

Drawings retrieved from Stadsarchief Delft. Inventory number 983.10464

2005: The 'Werkboek beeldkwaliteit Noordelijk TU-gebied Delft' provides guidelines for the treatment of existing buildings in reuse design and to establish an urban and architectural framework for the redevelopment of the area, was adopted by the Municipal Executive and by the parties involved in the TU Delft area (including Blauwhoed-Eurowoningen)[26].

2007: "TU-Noord" zoning plan was adopted by the Delft municipal council. The municipality had given Gele Scheikunde a residential destination to be worked out[26].

2012: "Technical Chemistry Department moves out[26] " The only occupants of the complex is the Hyperloop student team and some companies.

Gele Scheikunde complex had no educational function for some time and was therefore offered for transformation. TU prepared the redevelopment plan before selling, in order to give the expectation of what the selling price could be[27].

2016: The directors of TU Delft and the Municipality of Delft signed the 'Covenant 2016-2026 TU Delft and the Municipality of Delft for the further development of campus and city'[28].

2017: Decision to sale Yellow Chemistry for redevelopment[28].

2019: TU Delft sold the Kramerslab - two pilot plants, that was part of the Gele Scheikunde to Municipality of Delft to locate an international secondary school[29].

2020: TU Delft sold Gele Scheikunde to developers Amvest and Kondor Wessels Vastgoed[29].

26. Gemeente Delft. (2009). Randvoorwaarden Herontwikkelling Gele Scheikunde. Concept. p6-8

27. Retrieved from the Interview with a monument advisor at the Municipality of Delft on the 1st of October 2020. See the annexe

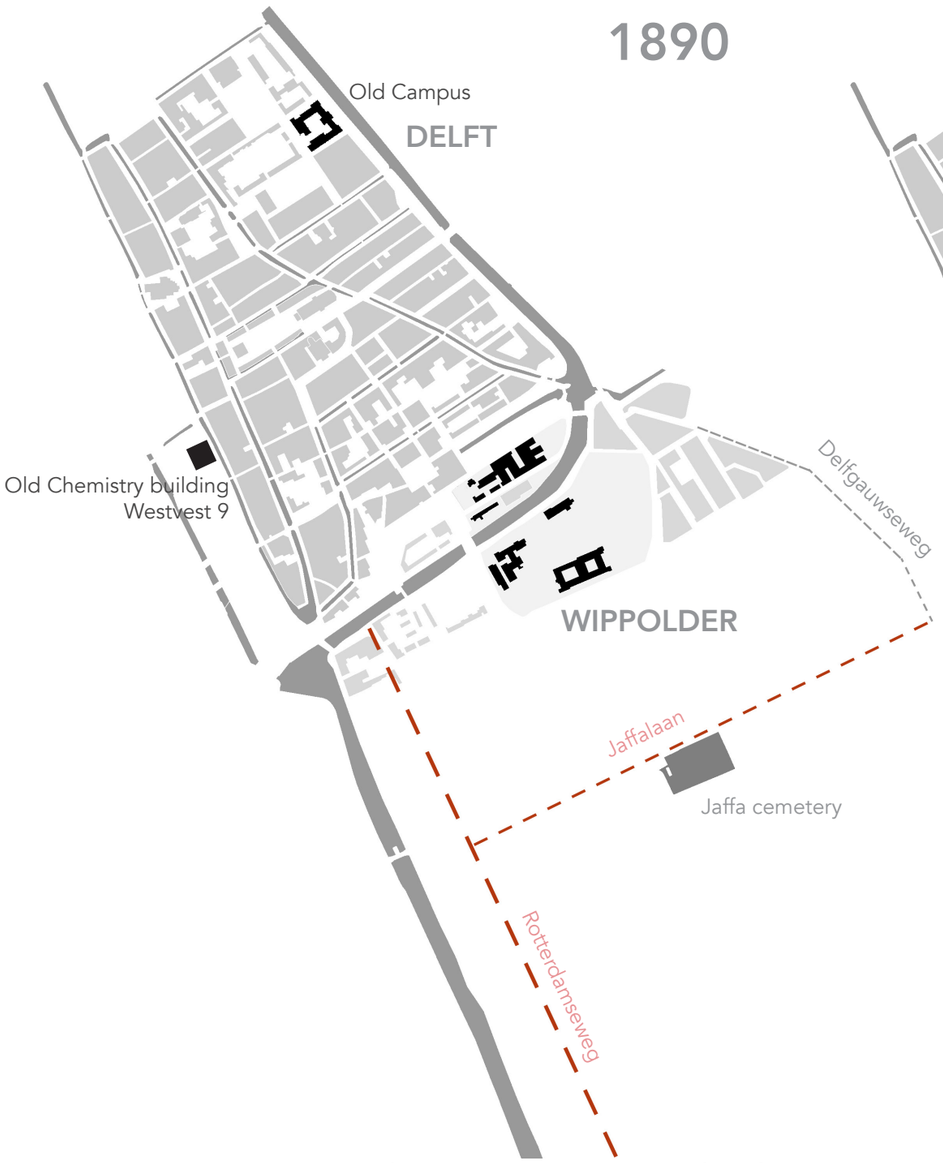
28. Concept: advice from the quartermakers (2017) Gemeente Delft and TU Delft.

29. Marjolein van der Veldt, (n.d.). Gele Scheikunde makes way for homes. Retrieved October 13, 2020, from https://www.delta.tudelft.nl/article/gele-scheikunde-makes-way-homes

HISTORY: URBAN TISSUE

Wippolder expansion: Triangular form of the Gele Scheikunde

1890



The most important area of the TH university had shifted from the old city centre. The new building and laboratories were clustered in the Wippolder, for the sake of safety (risk of explosion) and the scale of the buildings. The Wippolder area was delimited by the main road Rotterdamseweg, Jaffalaan which was a small road that ran perpendicularly from Rotterdamseweg to the Jaffa cemetery and Delfgauwseweg.

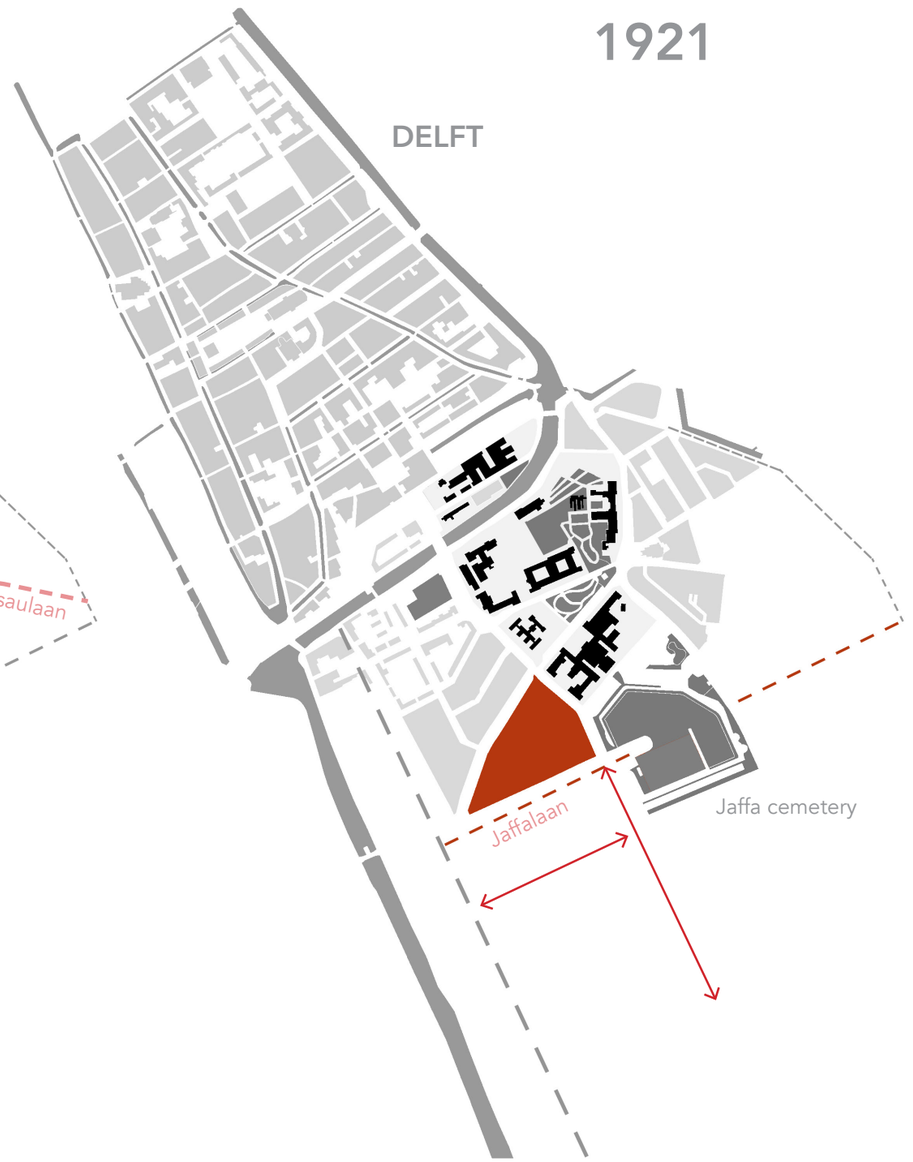
*The diagram is self made according to the Delft Archives and the bonnekaart acc.nr. b459, 1912-1913. (see the annex)

1908

The new campus was designed within the new Delft city expansion plan of 1908 by Hartman. The plan consisted of a radial street pattern; with Julianalaan and Nassaulaan as the main radials. In addition to the education buildings, the plan also contained houses for professors and of the Botanical Gardens with the de Vries van Heijstplantsoen next to the Microscopic Anatomy building.

*The diagram is self made according to the Delft Archives and the kaart from the Cultural Heritage Agency of the Netherlands, (2005).

1921



In 1921 another expansion plan was drawn up. The radial structure of Hartman changed into an orthogonal structure, parallel and perpendicular to Jaffalaan. The triangular plot was formed. With the expansion of TU campus, Jaffa cemetery became a part of the plan.

*The diagram is self made according to the Delft Archives and the kaart Delft acc.nr. 37 E, 1940. (see the annex)

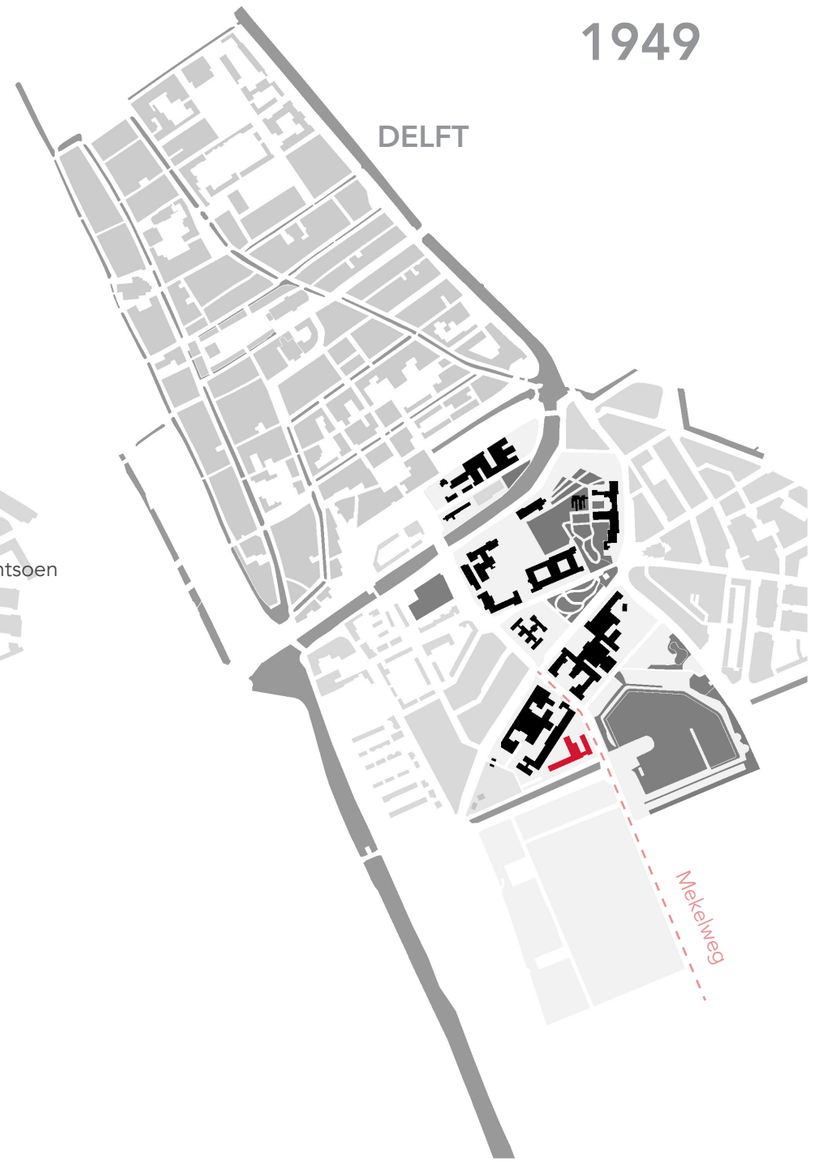
Wippolder expansion: Gele Scheikunde and TU Campus

1938

The campus was developed around the Botanic Gardens and the de Vries van Heijstplantsoen, forming the cluster. The condition of the old laboratories at Westvest 9 urgently required the transfer to a new building. However, the Rode Scheikunde (Red Chemistry) couldn't be finished so it was decided to build an entirely new building, which was much more austere and simpler than the Red Chemistry Building.

*The diagram is self made according to the Delft Archives and the Archive TH-Delft (1956), acc.nr. 3.12.09.01.

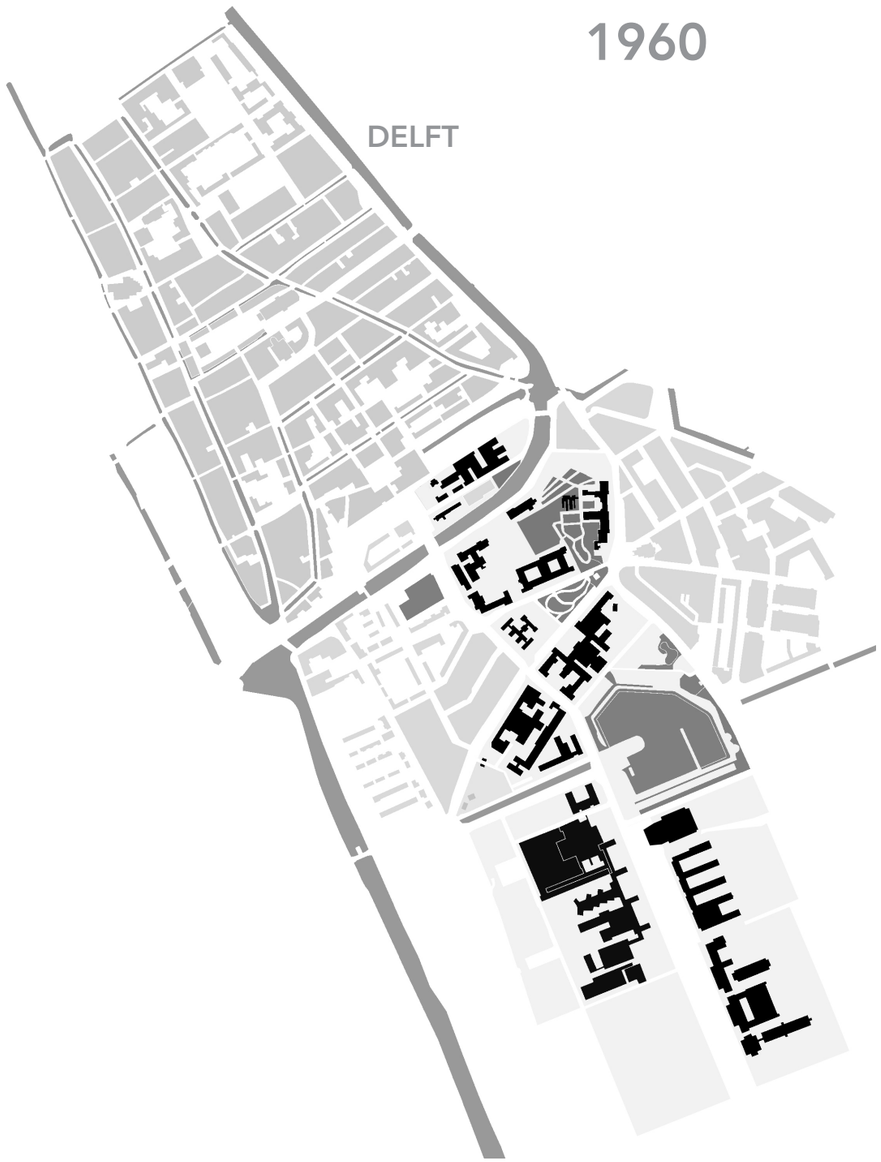
1949



In the 1950s the orientation of the TH Campus change. The new expansion plan became the basis for the further development of the TH district. The campus area was built along the Mekelweg, which connected the TH district with the pre-war TH buildings and with the city. During this period, the two plot plants were constructed, donated by Shell.

*The diagram is self made according to the Delft Archives and Delft Naoorlogse. architectuur en stedenbouw. 1940-1970. Part 1.

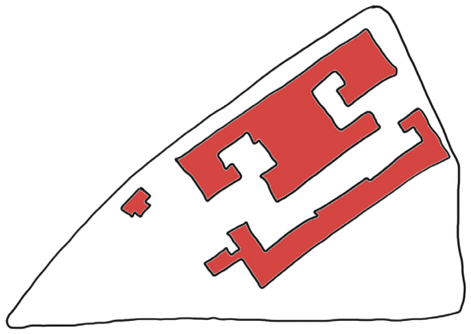
1960



The buildings of Gele Scheikinde complex represent two important phases of the history of the TU district. The first phase is marked by the decision to move the university institution outside the boundaries of the city centre. The second phase is marked by the realization of a fully-fledged university district in the post-war period with the ideals of that time. Besides the Gele Scheikunde was oriented according to the first urban plan by Hartman, consequently, nowadays the building's orientation doesn't correspond to the campus' one.

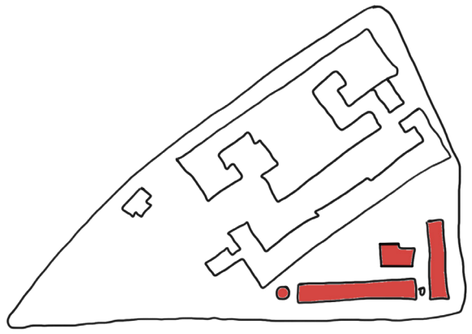
HISTORY: BUILT VOLUMES

Development timeline



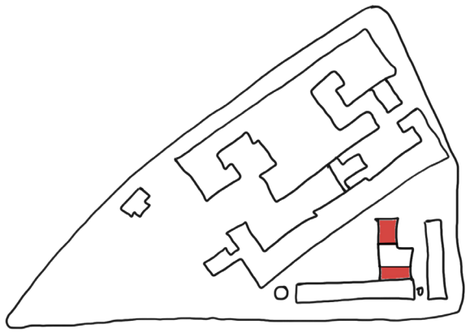
1938-1945

Construction of Gele Scheikunde & Pertierwoning



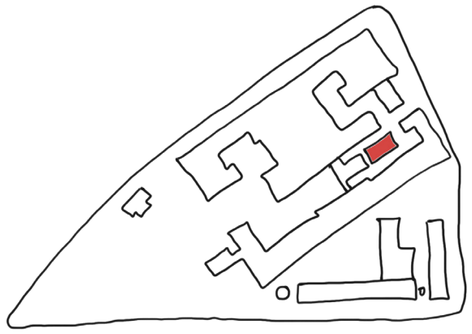
1946-1949

Construction of two plot plants: Physical and Chimical technology



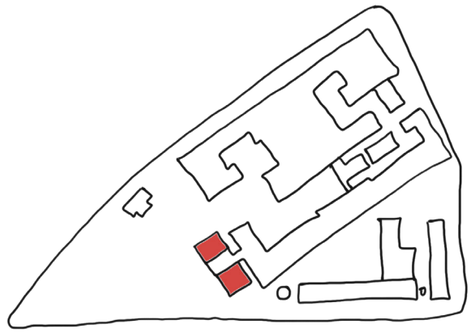
1959

Construction of Kramers Laboratory



1970

Construction of additional warehouse

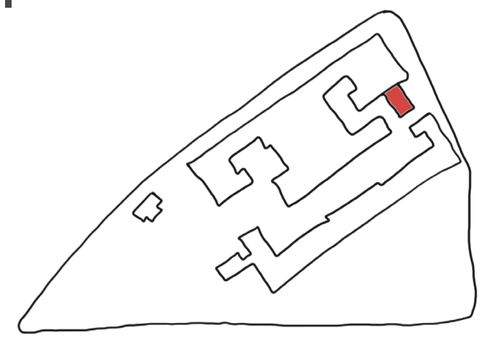


1982-1983

Construction of Autoclavenlaboratorium

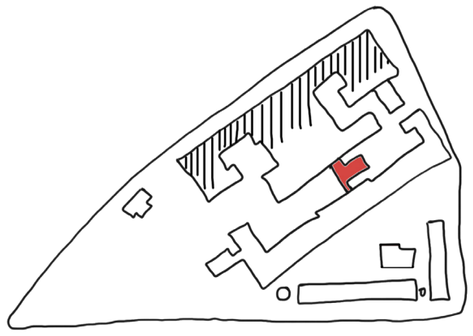
1947

Construction of additional laboratory



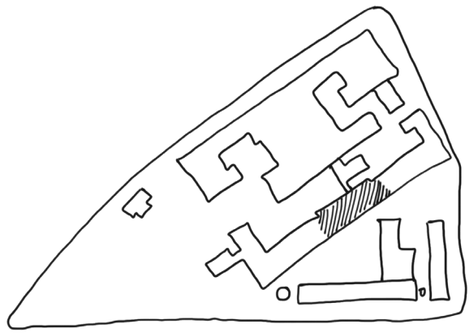
1949

Expansion of chemical laboratory and construction of additional level



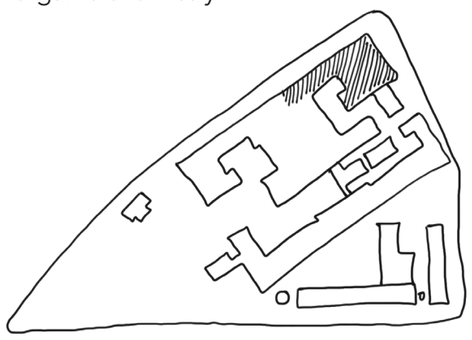
1961 & 1964

Renovations



1981

Refurbishmenta of the laboratory for organic chemistry



The Gele Scheikunde site is marked by various built volumes from different periods.
Several laboratories were added to the main building of Gele Scheikunde as a response to the lack of space.

The diagrams are self made according to the information, drawings retrieved from Archives, Bouwvergunningen Delft.
Inventory numbers: 953.10452; 953.10451; 953.32284; 953.32285 953.32289; 953. 32287; 953.32288; 953.32291; 953.10462; 953.32290; 953.10464; 953.10465; 953.32292; 953.19825

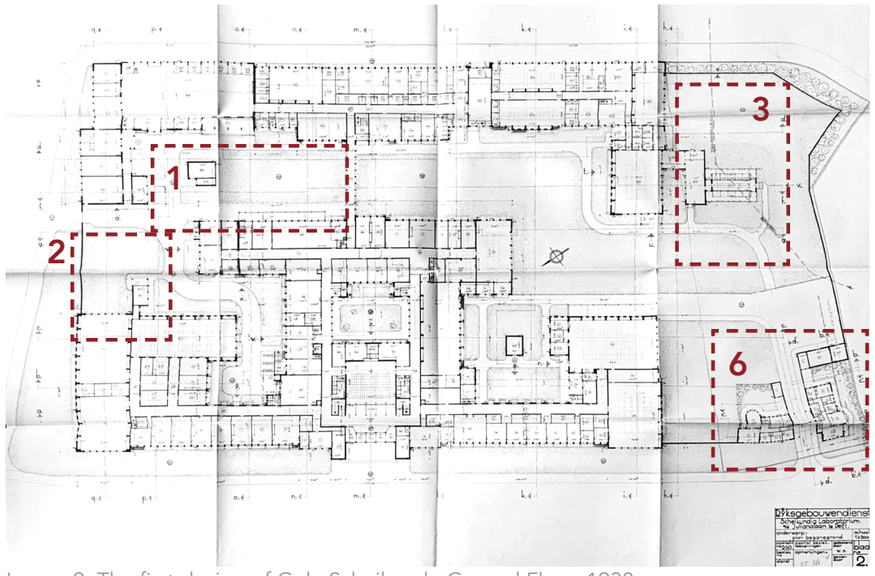
HISTORY: GELE SCHEIKUNDE BUILT VOLUMES

The floor plans of the ground floor and first floor are shown below.
Image 9 is the original design of 1938 and Image 10 is the current floorplans.

The built additions influence the original appearance of the building. They are marked on the floorplans; zone 1- warehouse and additional lab; zone 2 - additional lab; zone 3 - autoclavenlaboratorium and zone 4 - extra first-floor level. Some are an essential part of the building now, for example, the additional first floor (zone 4 and 5), however, some of them do not necessarily represent the Gele Scheikunde, so do not contribute to its identity.

For instance, the additional warehouse and laboratory are disturbing the inner space so the spacial composition, see zone 1 on the floorplans. The same can be said for zone 2, the addition is narrowing down the interior space. Besides, the Autoclavenlaboratorium (zone 3) doesn't have the appearance and construction principle of Gele Scheikunde (see image 8 from the history sub-chapter), consequently, doesn't contribute to its identity.

Finally, the porterhouse (zone 6), in the current situation doesn't look like it was originally designed, so its historic value can be discussed.



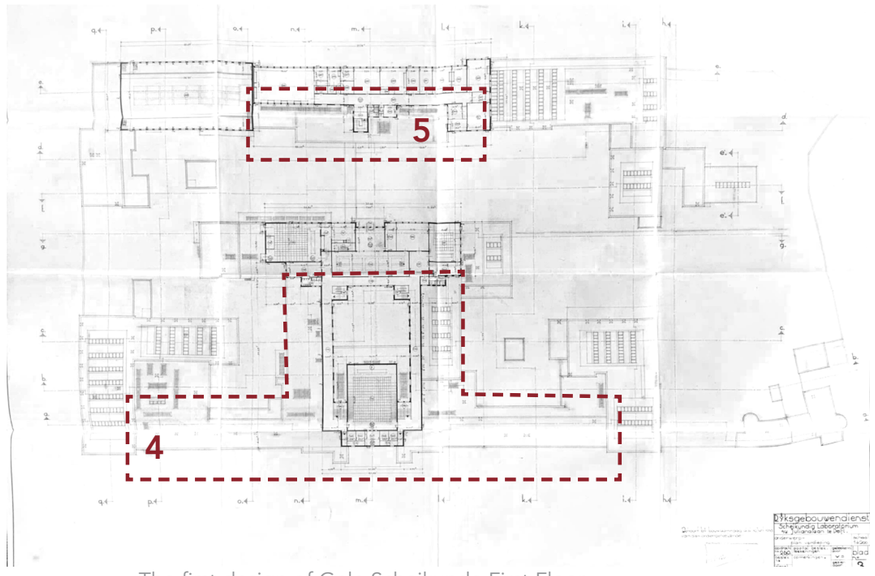
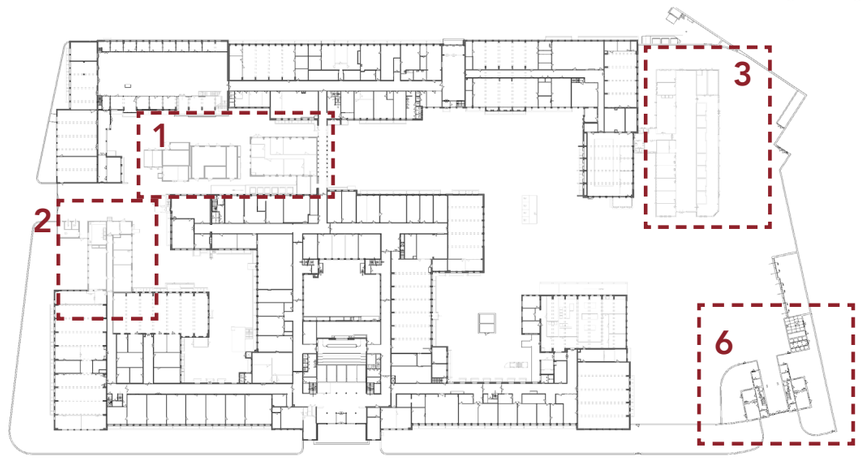


Image 9: The first design of Gele Scheikunde Ground Floor, 1938. The first design of Gele Scheikunde First Floor
Retrieved from Archives, Bouwvergunningen Delft. Inventory numbers: 953.10452.



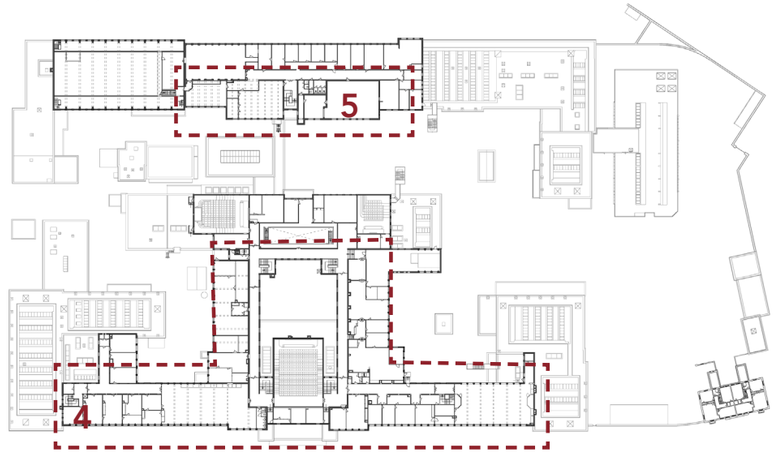


Image 10: Current state Gele Scheikunde Ground Floor. Self made (2020) Current state Gele Scheikunde First Floor. Self made (2020)

HISTORY: ARCHITECTURAL STYLE

Gele Scheikunde

The Gele Scheikunde building belongs to objects from the 'Reconstruction period' (1940-1965). It occupies a large plot of land as it is only two stories tall (see Image 11). The reason why the building is so low and wide is due to the popularity of the wide-open pavilion concept of those times. Besides, this concept met the functional requirements for the laboratories. Devices could be easily installed and the low hight could prevent progressive collapse in case of explosions. Nowadays, this set-up is considered impractical. However, the advantage is that most rooms are adjacent to external walls.

The Gele Scheikunde was designed by Rijksbouwmeester **Gustav Cornelis Bremer** with the help of engineer Hendrik Lambertus Engberts. The Rijksgebouwdienst's buildings were often educational buildings, hospitals and other governmental buildings.

Gustav C. Bremer studied at TH in Delft and graduated as an architectural engenieer. Bremer's buildings had clear characteristics, a monumental style with solidity and allure. Yet there is no clear architectural style in the buildings of Bremer. The Gele Scheikunde had a rather rigid and stark exterior without variation or decoration (see Image 11). This changes when you look at the ever-changing roofline of the building. The building contains elements of both classical and modern architecture, it is a combination of 'Nieuwe zakelijkheid'(New Objectivity[37]) and Art Deco[38]. The symmetrical construction of the front part of the building and the courtyard enclosed by a continuous corridor around (see Image 9) are signs of a classic architecture (Macel et al, 1994). However, the division of the complex into a various number of building volumes is a sign of a modern architecture[1]. In view of the cultural-historical values and the architectural qualities, it is recommended to assume conservation or at least the preservation of characteristic parts, like entrance, the central block, porterhouse and the wing form (Gemeente Delft, 2009, p6).

The Art Deco elements mainly concern the decorations of the building. At the entrance of the building, we can mark a combination of travertine flooring, colourful geometric yellow mosaic tiles, stained glass and richly detailed brass doors that create one of the most elaborated entrances of the pre-war Campus (see Image 13). The steps at the entrance are made of natural stone and the columns are covered with green tiles. The large interior lecture hall also has Art Deco decorations (see Image 13). It consists of two parabolic shells one containing the slope for seating and one consisting of a patterned glass roof letting in the daylight. The use of natural building materials is also a recurring feature in Bremer's architecture.

Image 11: Gele Scheikunde from Julianalaan

Fotografische Dienst TU Delft (1960) (c) Delft University of Technology. Creative Commons BY

Image 12: Photo self made of the Julianalaan entrance

Image 13: Lecture hall

Retrieved from Gemeente Delft. (2009).

37. The term 'New Objectivity' was incorporated into architecture in 1926. In contrast to the exaggerated emotionality and profusion of colors in expressionism, the new objectivity assumes: sleek shapes, banishing the incidental. Architects were looking for a new, pure architecture that only wants to be functional and is distinguished by clean and straight lines , a smooth surface, clarity and purity of proportions.

38. "Art Deco" movement in the decorative arts and architecture originated in the 1920s and 1930s. The distinguishing features of the style are simple, clean shapes, often with a "streamlined" look; ornament that is geometric or stylized from representational forms, and unusually varied, often expensive materials, which frequently include man-made substances (plastics, especially Bakelite; vita-glass; and ferroconcrete) in addition to natural ones (jade, silver, ivory, obsidian, chrome, and rock crystal).

HISTORY: ARCHITECTURAL STYLE

Proeffabrieken

The plot of Proeffabrieken is adjacent to the Gele Scheikunde plot and has an L-shape. The Proeffabrieken or Two Plot plants were designed by architect **Cornelis Adrianus Abspoel** in the 1940s and donated to the university by Bataafsche Petroleum Maatschappij (Shell). The peculiarity of the Gele Scheikunde is mainly the pavilion-like structure, which contrasts the two plot plants which are the large box-like volumes (see Image 14). The placement of the laboratories at the boundaries of the complex plot ensures that a courtyard is created. Closed building blocks and/or enclosed outdoor spaces are unusual types of space for the TU district (Macel et al, 1994, pp 57-62).

[Abspoel tried to design laboratories as flexible as possible, based on standard construction elements. The use of standardised interior walls allowed the creation of large and small spaces. The walls can be taken apart and be displaced. In this way, an attempt was made to avoid the need for radical changes after the completion of the laboratories. A lot of attention has been paid to details and this can be felt in the atmosphere of the building, both from the inside and outside. This attention enriches and accentuates the building construction. Abspoel did not participate in the architectural debate of his time, but one can see his visions in the light of the rise of the New Objectivity movement. (Macel et al, 1994, pp 57-62)]

The chemical technology pilot plant is located along the Mekelweg and the physical technology pilot plant is located along the Prins Bernhardlaan. The two wings are connected by an overhang, with the Praethuis. In the courtyard there used to be a smaller building which afterwards, was turned into a larger building and was named “The White Elephant” which is now known as the “Kramers Laboratory”. In 1969, the space between the laboratory area and “the White Elephant” was filled with workshop spaces to solve the lack of space. The Kramers Laboratory is a rectangular modernist building of three storeys with large glass facades. It functions as an office building.

The two plot plants are large elongated building that functions as big halls in which all kinds of test setups can be built and manufacturing processes can be tested. The appearance of the buildings hasn’t changed much. The buildings have a steel construction, which is seen on the facade and filled in with yellow brick matching the bricks of Gele Scheikunde. The halls have gable roofs. Another important aspect is the tower with long vertical windows with a concrete frame, giving the entrance a monumental impression (Delft Naoorlogse, p375-377).

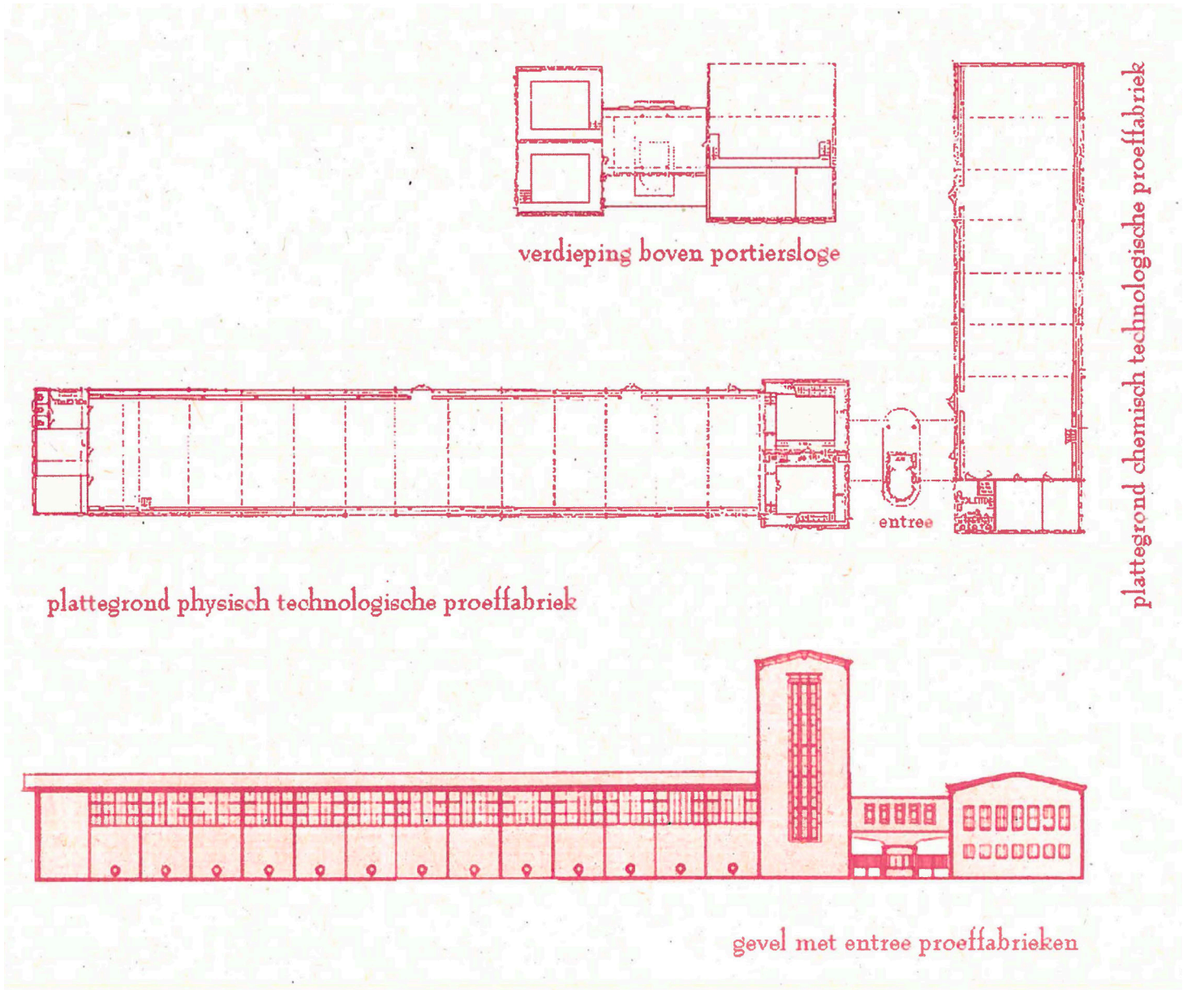


Image 14: Proeffabrieken ploor plan and elevation.

Retrieved from Macel, O., Schutten, I., & Wegner, J. (1994). Architectuurarchief Technische Universiteit Delft. Publikatieburo Bouwkunde, TU Delft. p58

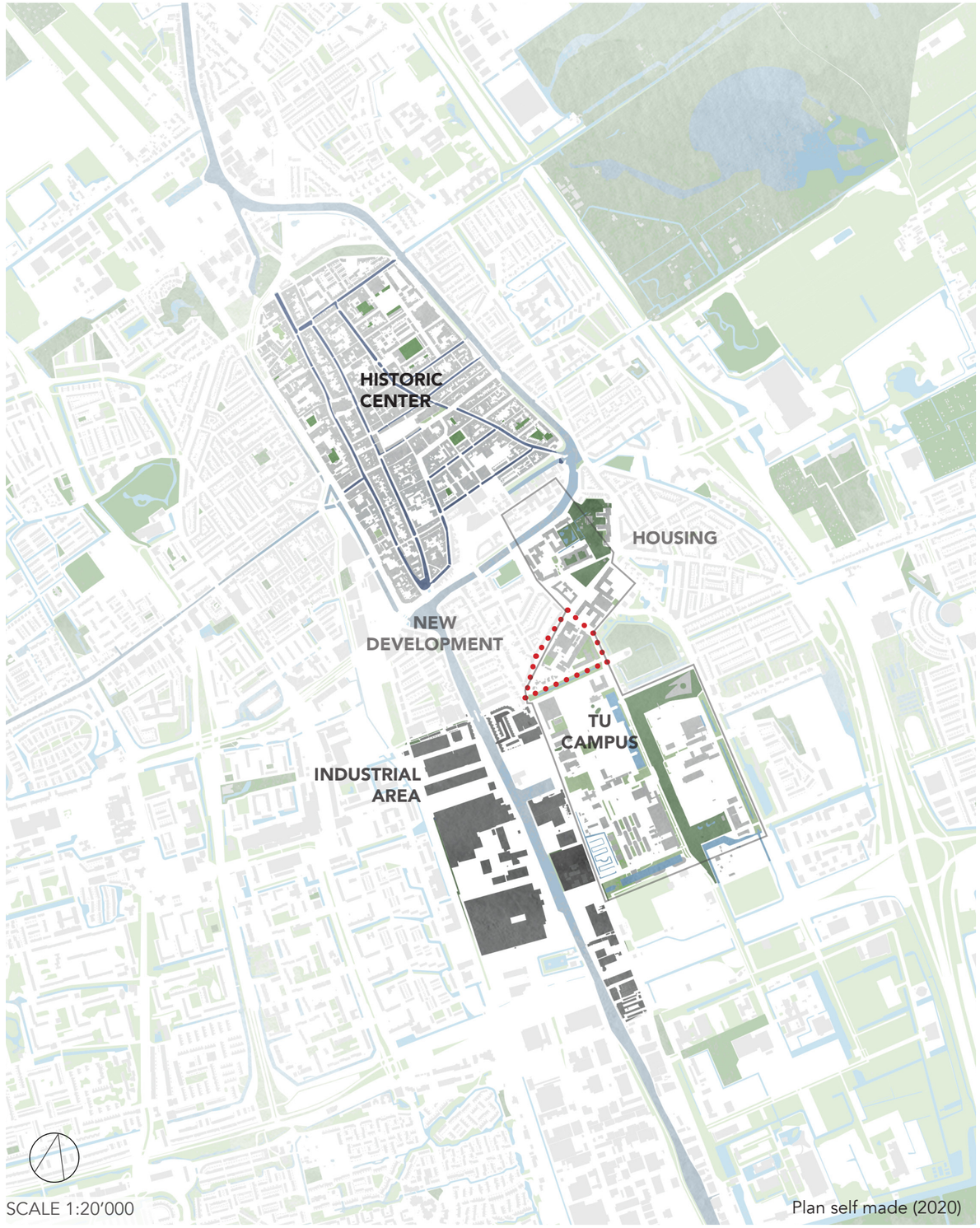
URBAN CONTEXT: THE CITY OF DELFT

The map shows that there is a variety of program in Delft city:

- A city centre - historic center
- Greenery
- Housing / New development
- Industrical area
- Univeristy campus

The site of Gele Scheikunde complex is located on TU North district, the oldest sub-area of the Delft University of Technology and in between different functions of the city.

A large part of TU North no longer functionally belongs to the university district. A number of faculty buildings in the TU North district have been redeveloped into homes and offices, with the exception of the former Red Chemistry complex (the current building of the Faculty of Architecture). The buildings on the Gele Scheikunde plot and Proffabrieken are no longer in use by the university.



SCALE 1:20’000

Plan self made (2020)

URBAN CONTEXT: CURRENT SITUATION

Private / Public

LEGENDA:

- Gele Scheikunde complex
- Private: Residential program
- Public: TU Campus
- Public: Industrial / Comercial
- Green space

SURROUNDING:

1. Red Chemistry
2. Former Analytical Chemistry
3. Former Physics Faculty
4. Minnig Engineering
5. Microscopic Anatomy
6. Botanic Garden
7. Physics & Electrical Engineering
8. Student housing
9. Geodesy
10. Student housing
11. Mechanical & Maritime Engineering
12. Elderly care
13. Jaffa cemetry
14. Delft train station
15. Royal Delft factory
16. TU Delft campus
17. International school
18. TU Aula
19. Library
20. The Hague University

SCALE 1:5'000

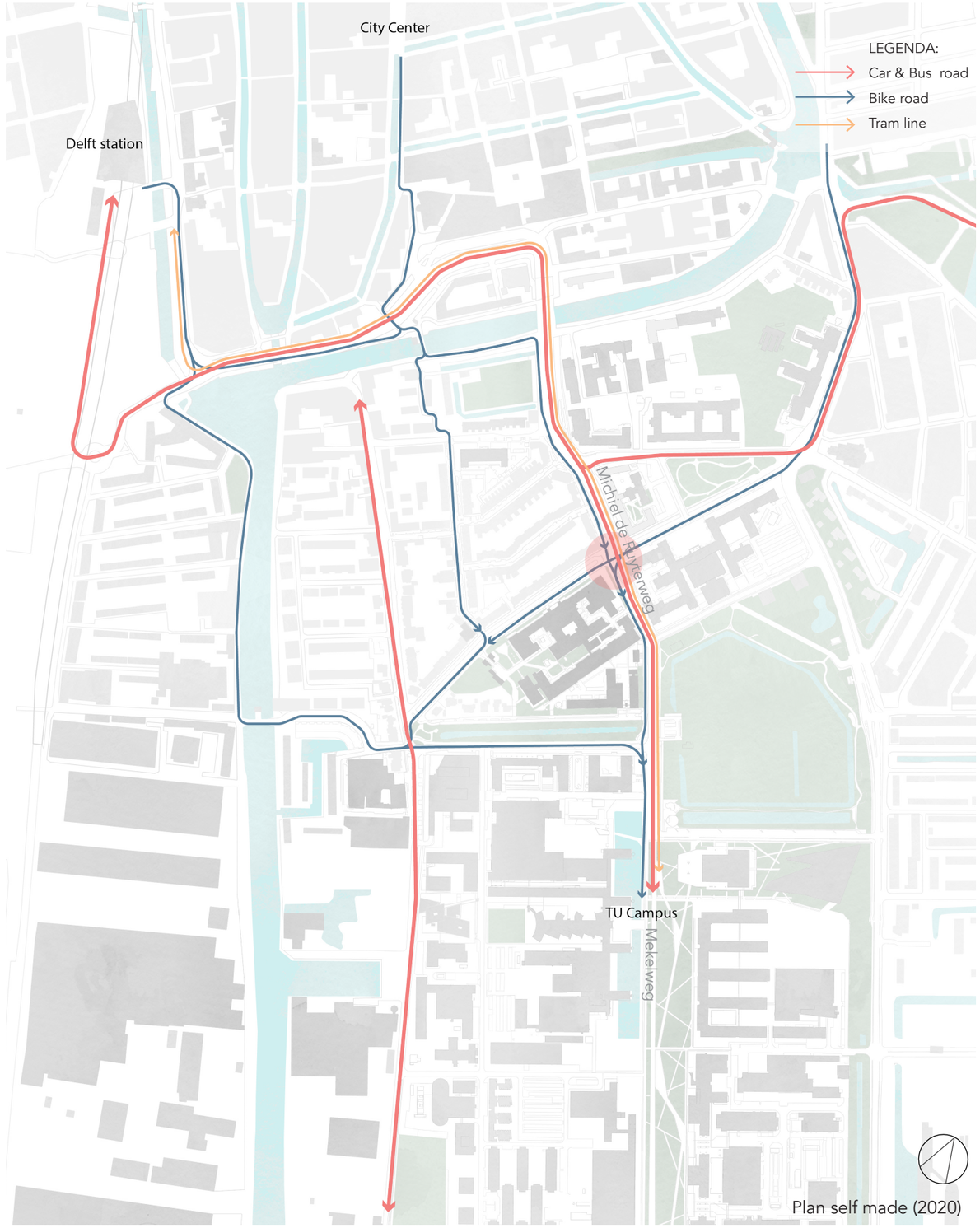
Plan self made (2020)

URBAN CONTEXT: MOBILITY

Current situation

Since the Gele Schiekunde complex is located between the TU Campus and the city of Delft, mobility is one of the main topics to look at for the redesign. This diagram shows the main connections; for cars, buses, bikes and trams.

The campus is mainly accessible via the Michiel de Ruyterweg and Mekelweg. The corner between the Julianalaan and Michiel de Ruyterweg, marked with a red circle is the busiest connection, which can become busier when 300 new homes will be developed in the Gele Scheikunde complex[1].



Plan self made (2020)

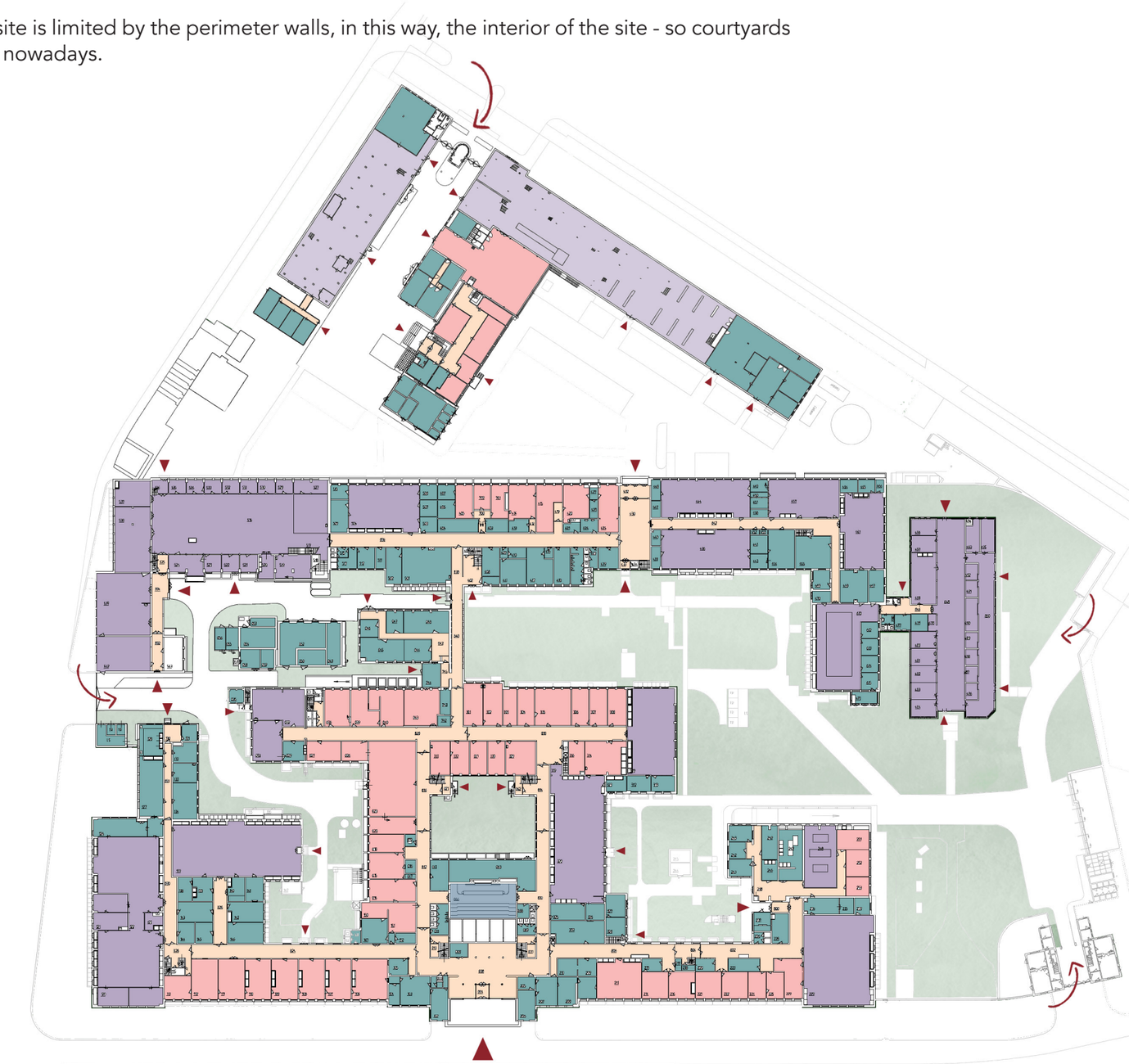
1. Retrieved from the Interview with a member from Belangen Vereniging TU-Noord on the 10th of November 2020. See the annexe

BUILDING CONTEXT: MORPHOLOGY & CIRCULATION

Ground floor

Gele Scheikunde building is characterised by the symmetrical construction of the front part of the building and the courtyard typology. Besides the interior layout is marked by continuous corridors. In general, the complex is divided into a various number of laboratory volumes and rooms.

The access to the site is limited by the perimeter walls, in this way, the interior of the site - so courtyards are private spaces nowadays.



LEGENDA:

Accessability

- Entrances
- Access to the site

Space typology

- Circulation - Corridor
- Laboratory
- Technical room, bathroom, storage
- Classroom, office
- Lecture hall, aula, library
- Private courtyards

SCALE 1:1'000

Plan self made (2020)

BUILDING CONTEXT: MORPHOLOGY & CIRCULATION

1st floor

As the ground floor, the interior layout of the first floor is marked by continuous corridors and is divided into a various number of laboratory volumes, rooms and study places.

LEGENDA:

Accessability

- Entrances
- Access to the site

Space typology

- Circulation - Corridor
- Laboratory
- Technical room, bathroom, storage
- Classroom, office
- Lecture hall, aula, library
- Private courtyards

SCALE 1:1'000

Plan self made (2020)

BUILDING CONTEXT: MORPHOLOGY & CIRCULATION

Basement

There is little information on how the basement was used in the past, judging by the space typology and climate, the basement might be used solely as storage and technique spaces.

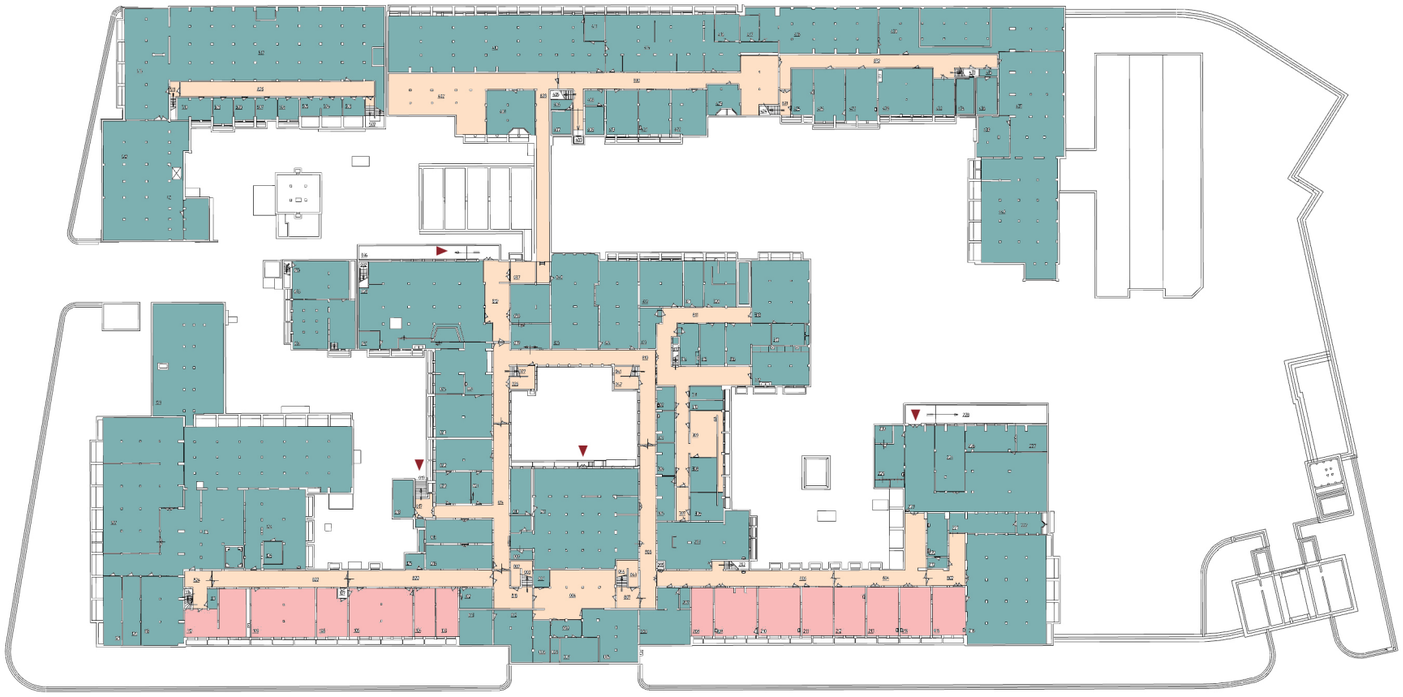
LEGENDA:

Accessability

- Entrances
- Access to the site

Space typology

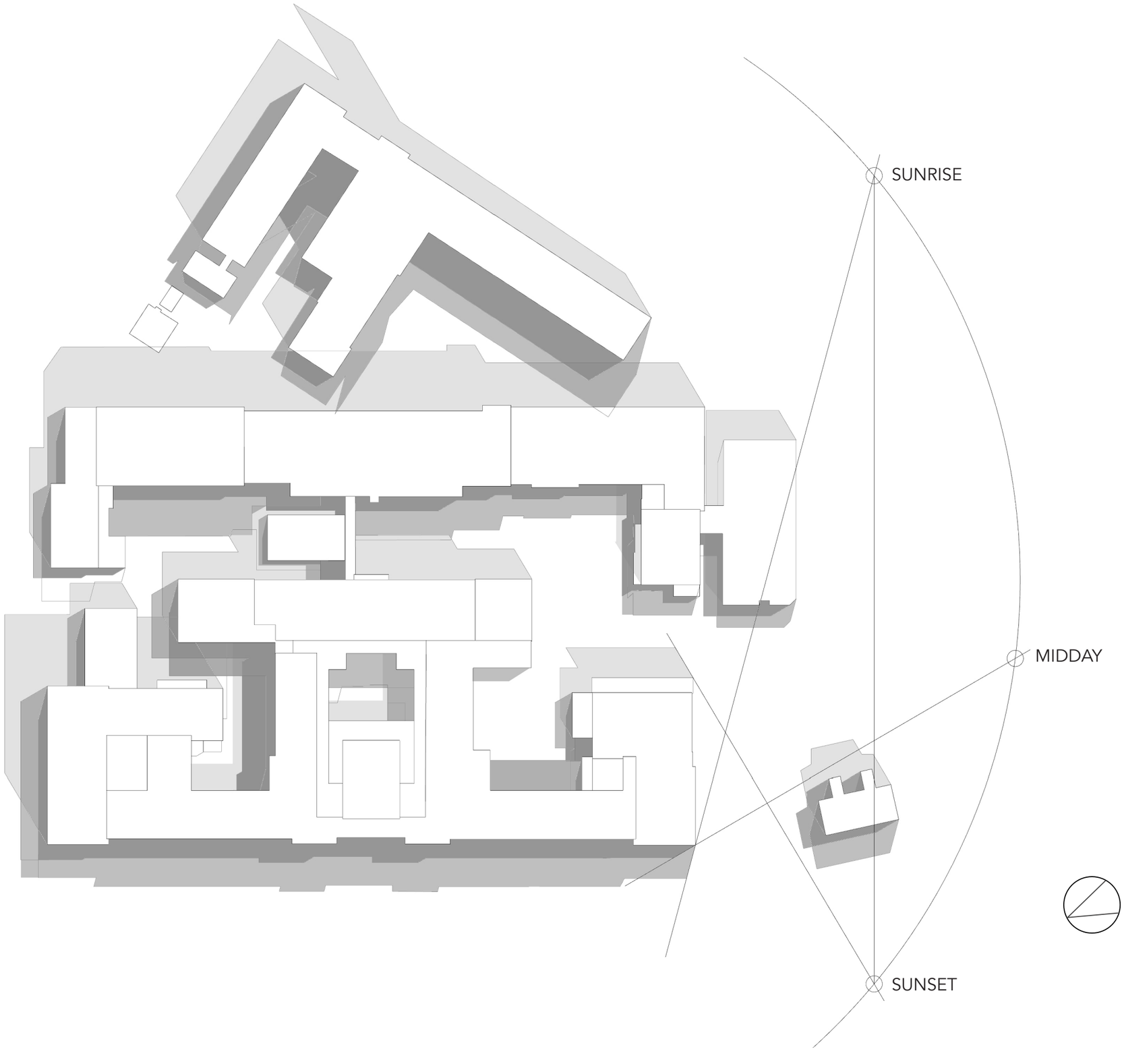
- Circulation - Corridor
- Laboratory
- Technical room, bathroom, storage
- Classroom, office
- Lecture hall, aula, library
- Private courtyards



SCALE 1:1'000

Plan self made (2020)

BUILDING CONTEXT: ORIENTATION



Self made (2020)

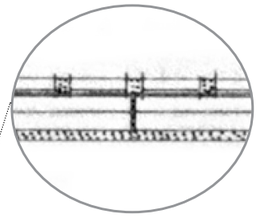
BUILDING CONTEXT: STRUCTURE & MATERIALISATION

The Gele Scheikunde building is made of concrete columns (on the basement level), concrete floors and roofs. Load-bearing inner walls, separation walls and facades are mostly made of masonry, however, some facades have concrete beams covered with masonry. On the floorplans, the differentiation between concrete structure and brick work (blue and green) is done according to the drawings retrieved from archives Bouwvergunningen Delft.

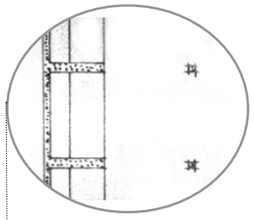
Concrete

Masonry

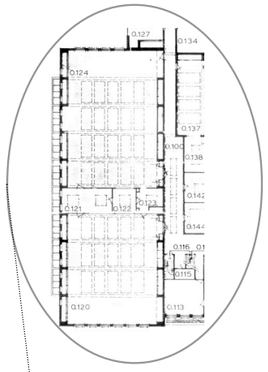
------- Beam structure



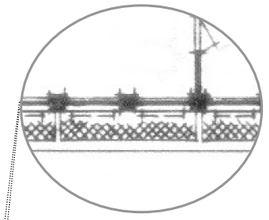
Basement Facade
Concrete with masonry



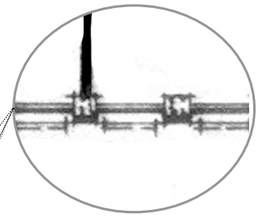
Basement Facade
Concrete columns with concrete base



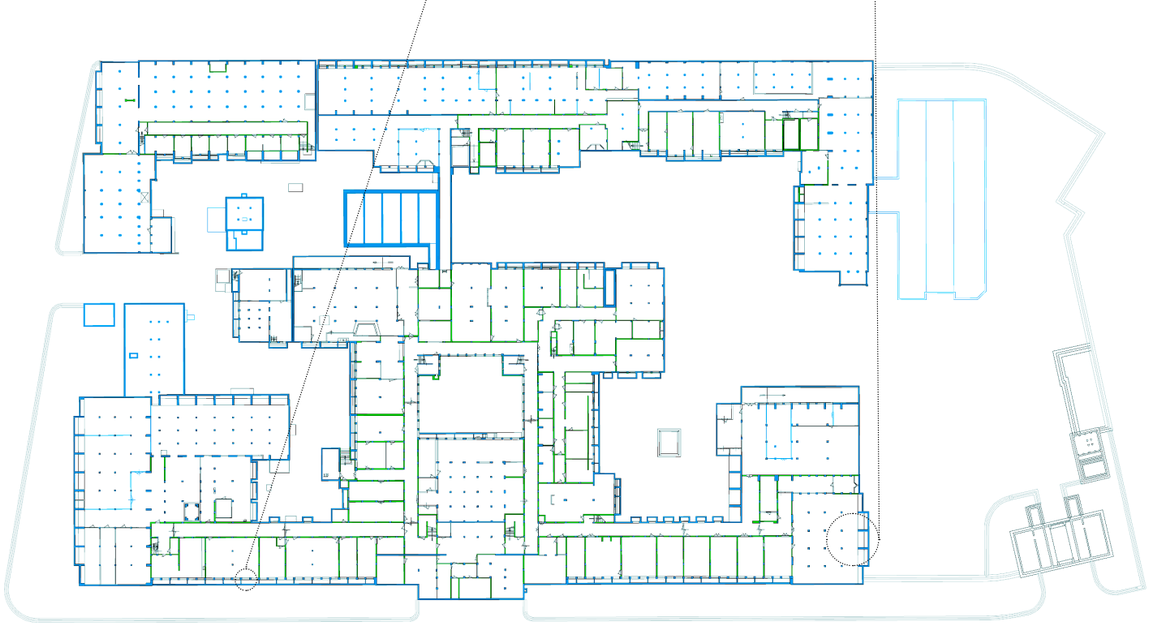
Ground floor
Brick facade and walls with roof beam structure



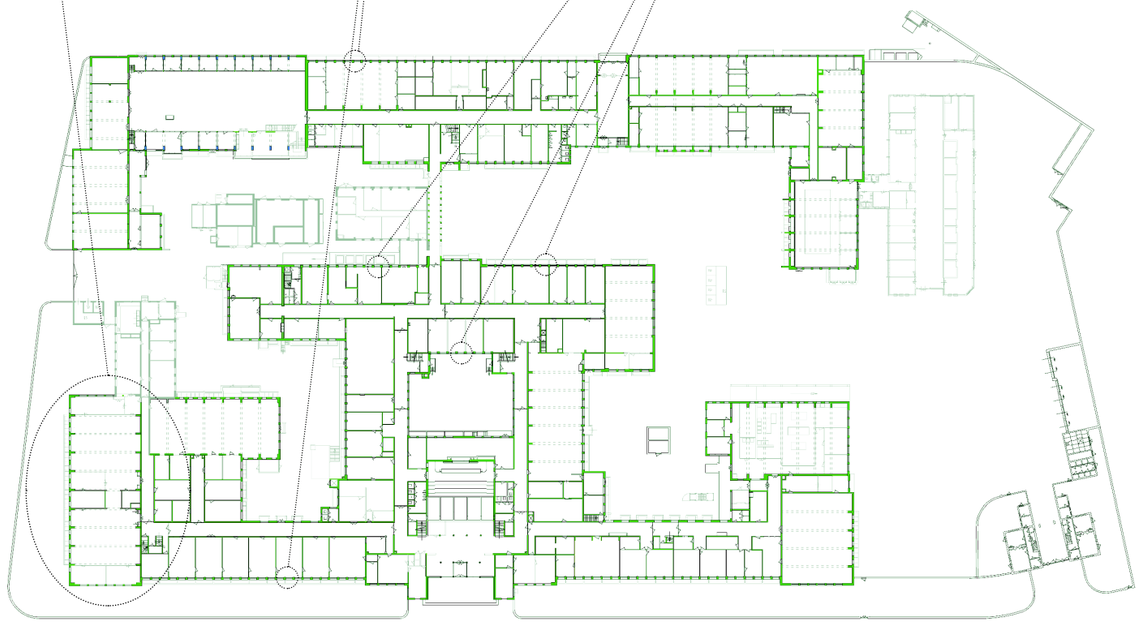
Ground floor Facade
Brick window beam



Ground floor Facade
Concrete with masonry



Basement



Ground floor

Information retrieved from Archives drawings, Bouwvergunningen Delft.
Inventory numbers: 953.10452; 953.32284;

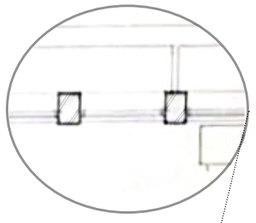
BUILDING CONTEXT: STRUCTURE & MATERIALISATION

The facades of the building are made of masonry (see window detail and sections CC' and EE'). The long facades are reinforced by the window strips with the continuous prefab concrete lintel above them (see window detail) and the slightly protruding concrete roof edge (Macel et al, 1994, pp 50-56). The first floor of the Julianalaan facade, which was built in 1950, consists of an inner bay of concrete covered with masonry (see section DD').

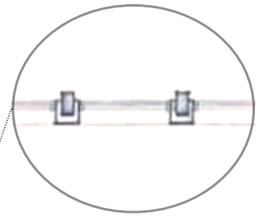
Concrete

Masonry

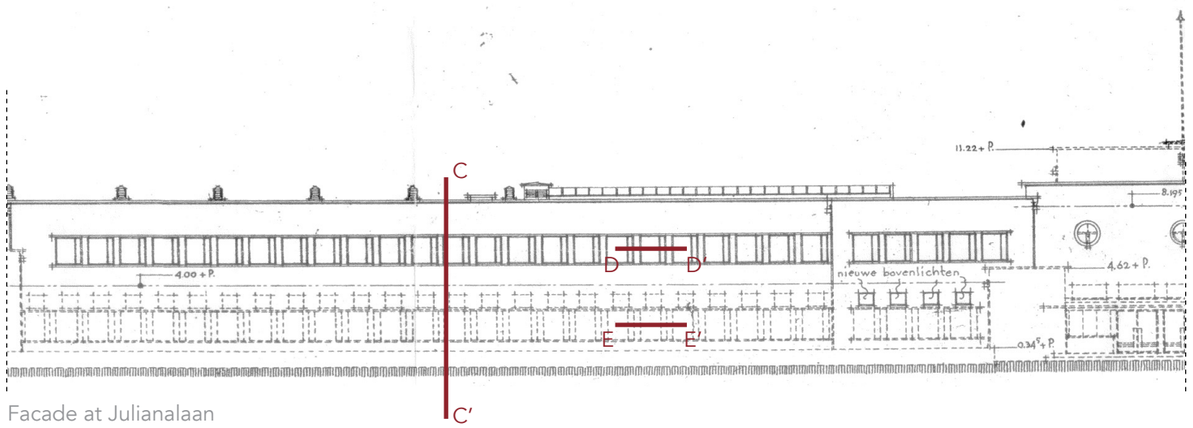
------- Beam structure



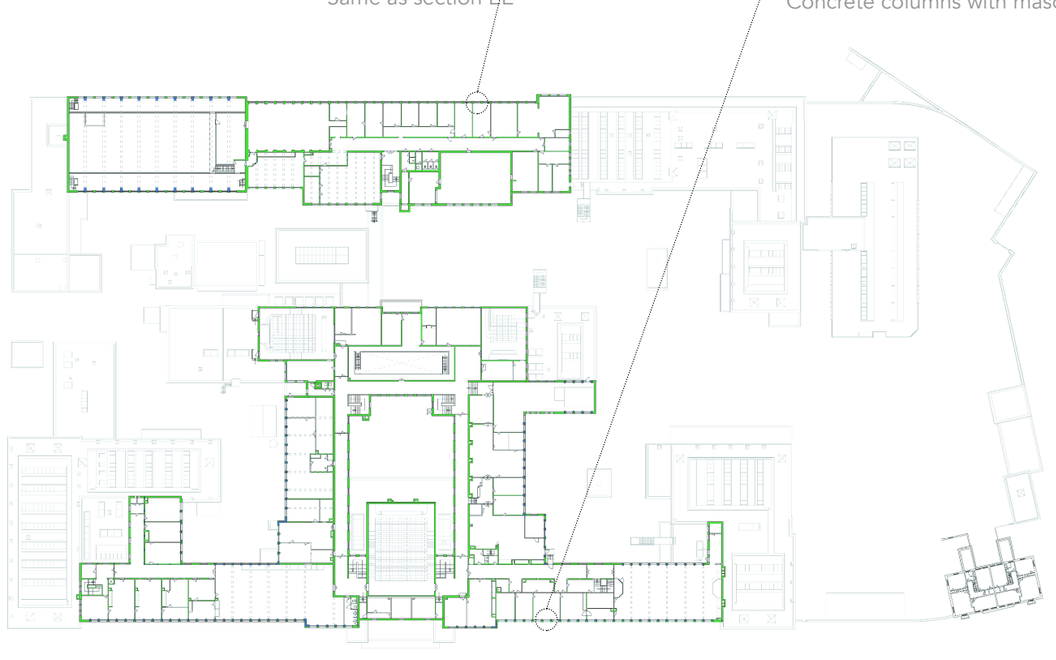
Ground floor Facade
Brick window beam
Same as section EE'



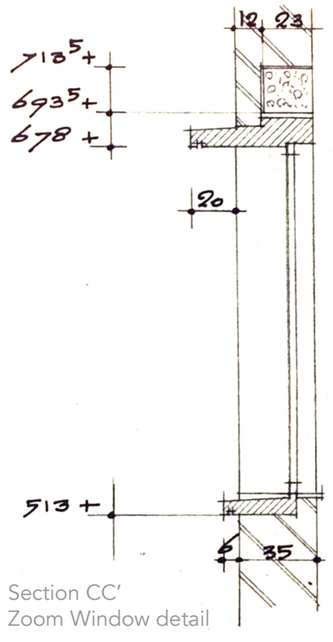
Section DD'
First floor Facade
Concrete columns with masonry



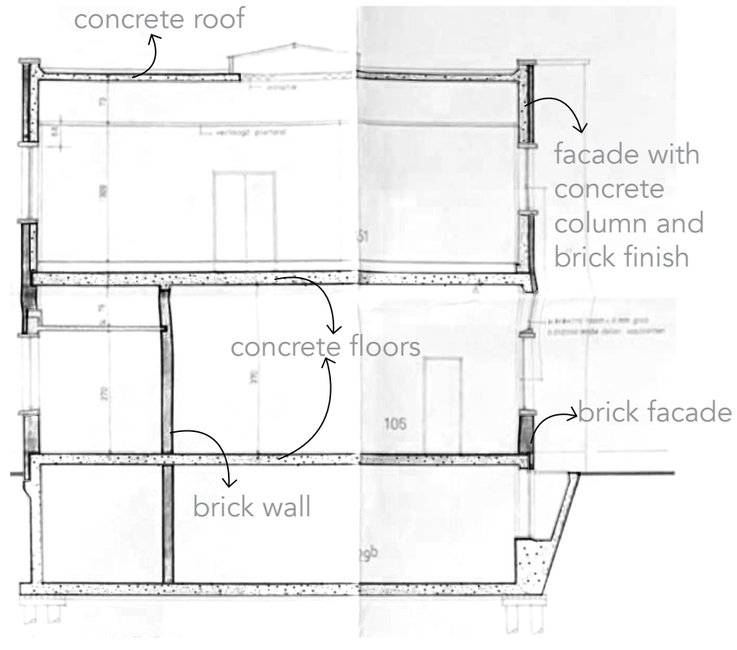
Facade at Julianalaan



First floor



Section CC'
Zoom Window detail

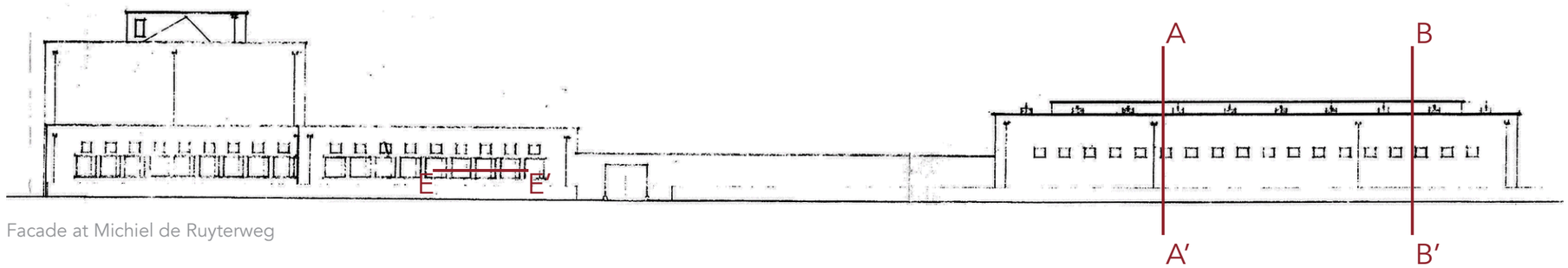


Section CC'

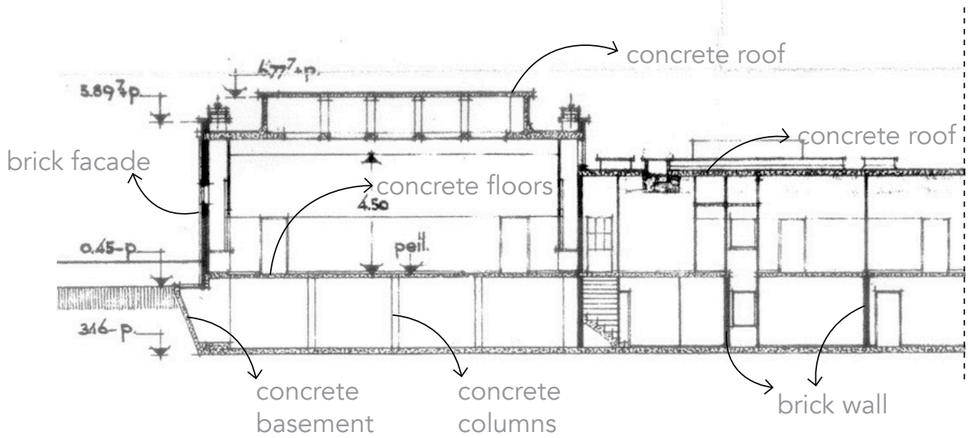
Information retrieved from Archives drawings, Bouwvergunningen Delft.
Inventory numbers: 953.10452; 953.32284;

BUILDING CONTEXT: STRUCTURE & MATERIALISATION

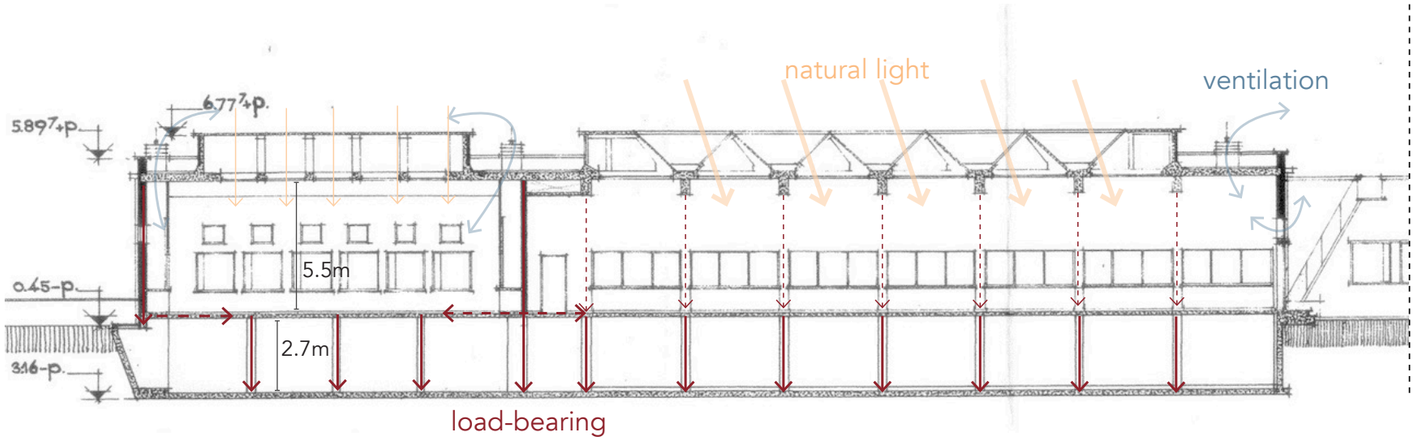
The facade at Michiel de Ruyterweg is chosen to study the structural aspects of the building together with its climate. The building is supported by the concrete columns on the basement level. On the ground floor, the building is supported by the brick inner walls. The laboratory spaces have columns on the facade walls that are then connected to the concrete roof beams. All laboratory spaces are characterized by the roof openings that provide the spaces with the natural light. And ventilation is made by the massive shafts.



Facade at Michiel de Ruyterweg



Section BB'
Materialisation



Section AA'
Load-bearing structure and climat

Information retrieved from Archives drawings, Bouwvergunningen Delft.
Inventory numbers: 953.10452; 953.32284;

VALUES & ATTRIBUTES ASSESSMENT

Picture retrieved from TU delft data base: Brightspace.

Sub-question: What are the attributes and values of the Gele Scheikunde complex?

A values-based design approach of Pereira Roders and Tarrafa Silva (2012) is focused on the cultural significance that heritage conveys, such as the values (why is it heritage) and **attributes (what is heritage)**. But what are values and what are attributes? These terms have been used by Avrami and Mason (2019) and by Pereira Roders and Tarrafa Silva (2012). In their articles, attributes would evidence the identified values of heritage. Attributes can be tangible (underline with a line) - something that doesn't change, able to be shown, touched, or experienced. Can be intangible (underline with a dashed line) something that changes, that is impossible to touch and can be natural (underline with a dots), like waterways, landscapes, woodlands, bogs, uplands, native wildlife, insects, plants, trees, birds and animals. In this chapter, the values and attributes of Gele Scheikunde complex are determined, for that, a clear definition of values and attributes should be stated.

According to the Cambridge Dictionary, the noun "attribute" is defined as a quality or characteristic that someone or something has; The noun "value" has several descriptions; it could be referred to "money", "numbers", "art" and "importance". For this research on heritage, the definition of values as the importance is the most appropriate. So, according to the Cambridge Dictionary, the noun "value" is defined as the importance or worth of something for someone. In this perspective, values are the themes of importance and attributes are the characteristics of these themes.

To start with, the values from my personal observation are shown and discussed. In addition, the geogame - PokemonGo is used to recognise and check the values and attributes of the society and give another perspective on the complex.

After that, the data from the historical evolution of the complex is used to recognise what is valued. For that, the historical qualitative research method by Pereira Roders and Tarrafa Silva (2012) is approached. This method meant to guide designers involved in rehabilitation interventions. Their developed "impact assessment framework" is a result of the comparison of the pre-design stage with the design stages of heritage interventions. This method is used to identify the Values and Attributes of Gele Scheikunde and has three distinctive stages:

First stage - *"relation between documents"*, starts with data collection, identification and analysis. In summary, the first stage merely concerns the evaluation of the collected data according to the identified cultural values which are classified into 'PRIMARY VALUES' and 'SECONDARY VALUES'. In order to identify the values, first, the content analysis is conducted. Data is retrieved from the primary sources mainly, using archives (drawings), documents (publications, books and cultural-historical research made by the direct stakeholders).

The goal of the second stage - *"relation between documents and stakeholders"*, is to verify the relation between what was being written (policy strategy), to the real practices and experiences of the involved stakeholders (policy implementation). For that, the gaming workshop with stakeholders serves as a tool to verify the determined values and attributes. Besides, the value survey is an additional tool to verify the recognition of values and attributes.

The third stage - *"relation between documents, stakeholders and the asset"* is similar to stage 1 and 2, therefore, the goal is to understand which "official" attributes were identified and check if they were mentioned in the collected documents. This stage helps to find missing attributes and the document "Ruimtelijk-programmatisch kader" made by PosadMaxwan for TU Delft to provide some guidelines for the redevelopment of Gele Scheikunde complex, is a good reference for this stage.

As a conclusion, a mindmap of the attributes and values will be made, inspired from the Values and Attributes workshop held on the 18th of November by A. Pereira Roders, A. Tarrafa Silva, M. Foroughi and B. de Andrade. The Sub-question: "What are the attributes and Values of Gele Scheikunde complex?" is answered in this chapter.

Below is the table inspired from the Values table by A. Pereira Roders (2007); Speckens (2010); A. Tarrafa and A. Pereira Roders (2011). The data analysis in the following sub-chapters is made according to this table.

Attributes	Primary values	Secondary values
Tangible	Social	Spiritual Emotional Allegorical
Intangible	Economic	Use No-use Entertainment
Natural	Historical	Educational Historic-Artistic Symbolic
	Architectural / Aesthetical	Artistic Conseptual Notable
	Age	Workmanship Maturity Existential
	Scientific	Workmanship Technological Conceptual
	Ecological	Spiritual Essential Existential

Table 1: Inspired from the cultural values, retrieved from Tarrafa, A.S. & Pereira Roders, A. (2012). Cultural Heritage Management and Heritage (Impact) Assessments. Conference paper.

PERSONAL OBSERVATION: GEO-GAME

Case of PokemonGo

Pokémon Go is an augmented reality (AR) mobile game developed by Niantic in 2016, resulted in popularizing location-based, promoting physical activity, and helping local businesses grow due to increased foot traffic. The importance of the place or area is marked by the presence of the "Pokemon Stop" and "Pokemon Arena", as those are places for social attraction. These stops and arenas are located at places of interest which are re-purposed "portals" from Ingress - Niantic's previous AR game. It is important to stress the fact that Ingress's, main goal was to place portals - physical points of interest where human creativity is expressed. Those are often indicating public art such as statues and monuments, unique architecture, historic buildings, local community hubs and other displays of human achievement. In other words, those are attributes of values that society recognize. In this way, the game makes the environment more attractive by means of interventions which are suggested by the players. Which mean that the geo-game involves Co-creation - so the development of interest and Co-production - the execution or placement of this interest.

What the game can tell about the built environment, more precisely about Gele Scheikunde complex? In this sub-chapter, the building is investigated through the Pokemon Go game.

When playing Pokemon Go, the placement of the "Pokemon Stop" and "Pokemon Arena" invites the players to discover the area. Firstly, the most intuitive route is to walk around Gele Scheikunde. The game proposes the same attitude since four "pokestops" are located on the periphery of the complex. In total, Gele Scheikunde has five "Pokestops": Two Entrances: **"Kramers Laboratorium"** and **"Faculty of Applied Sciences"** which is the entrance at the Julianalaan; an inside garden **"Giant Chess Game"; "Tiny Library"** and a **"Knooppunt 28"** stop. These pokemon stops suppose to be the most 'attractive' places for the public that should re-present social/cultural/economic values. In addition, the game often provides with some cultural or/and historic information about certain places. However, this is not the case for Gele Scheikunde neighbourhood, as the game delivered the plain descriptive information like "Historic chemistry lab" or to simply "TU Delft". Here arrises the following question: This simple information is due to real worthlessness of the place or is it due to imprecise game situation? Anyhow, as stated previously, the placement of the "pokestops" is related to the publics' interests and awareness. So these concerns should be taken into consideration.

Following, four "pokestops" will be examined. Firstly, two entrances of the Gele Scheikunde are marked with the "pokestop", which are "Kramers Laboratorium" located at Prins Bernhardlaan and "Faculty of Applied Sciences" located at the Julianallaan. Indeed, entrances in general, contribute positively to the streetscape and building facade design and provide functional, common areas. Also, the entrance of a building usually attracts social attention since they separate the public with the private. As for the "Giant Chess Game" stop, which according to the game is worth seeing, nowadays, is not accessible for the public since the inner courtyard is closed. Nevertheless, the existence of this "pokestop" means that the courtyard once was popular within the players - so the inhabitants. Secondly, concerning "Tiny Library" and a "Knooppunt 28" the value they present is purely societal. "Tiny Library" is a clear sign of collaboration and communication of neighbours as it promotes book exchanges. These libraries are non-profitable and are organized and supported by the citizens, but it doesn't exist anymore. Finally, "Knooppunt 28" is a part of two walking routes network of Zuid Holland region, one that goes around Wippolder and second that leads to the Schie area. The walking network is destined to help people map out the routes and make the trip even more pleasant as they are equipped with various catering and overnight options. However this stop also doesn't exist now.

Sketches self made (2020)

PERSONAL OBSERVATION: VISIT

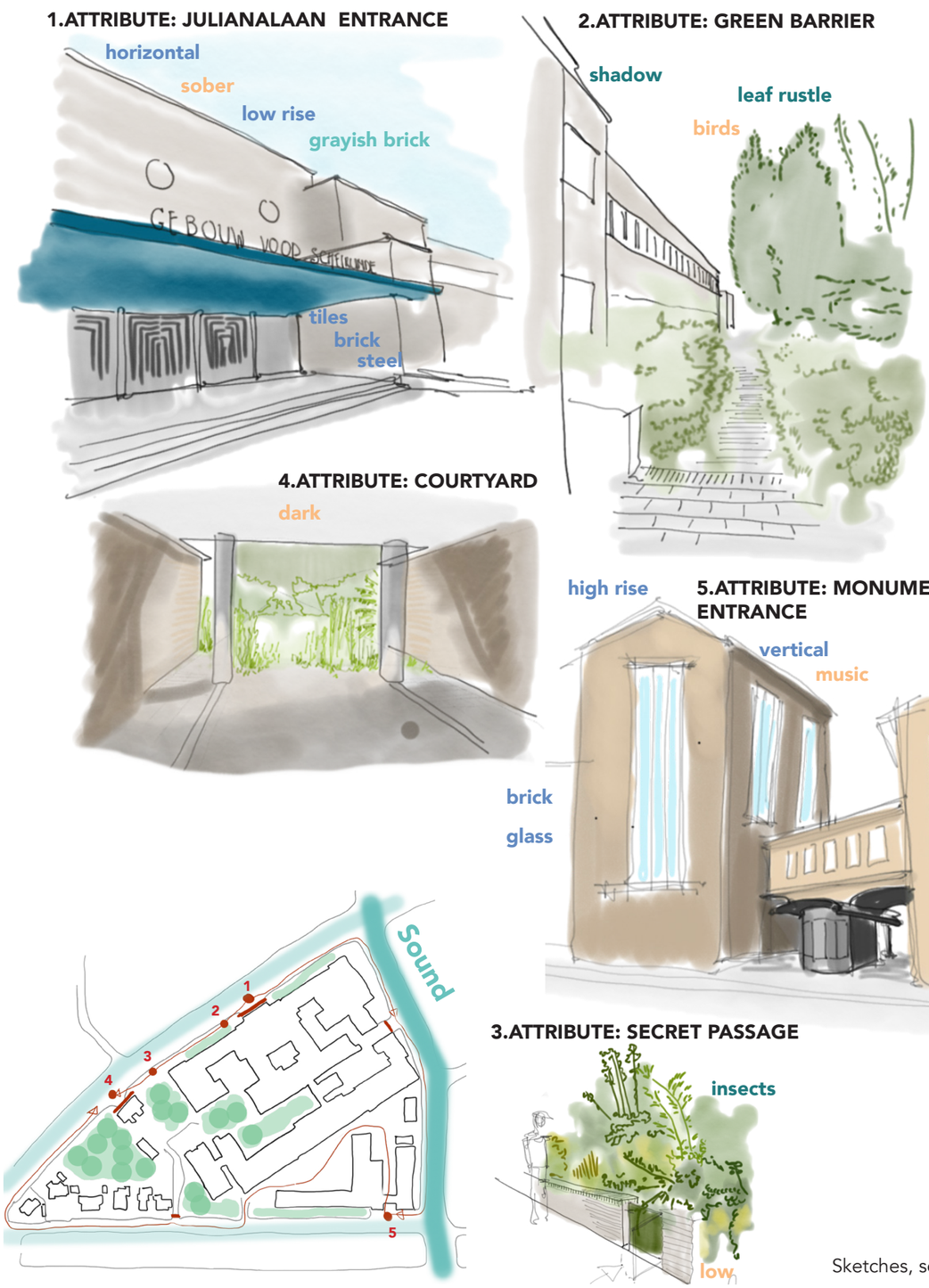
Exterior

Chombart de Lauwe notes in, Paris et l'agglomération parisienne (Bibliothèque de Sociologie Contemporaine, 1952) that "an urban neighbourhood is determined not only by geographical and economic factors, but also by the image that its inhabitants and those of other neighbourhoods have of it." In this perspective, personal observation is another source of information that provides with an alternative image of a space or site. In this sub-chapter, the situationist practice - the "dérive" is used to observe the site. Derive technique described by Guy Debord (1956) as a rapid passage through varied ambiences, which involve playful-constructive behaviour and awareness of psychogeographical effects and are thus quite different from the classic notions of the journey.

Gele Scheikunde from the Julianalaan street is hidden by the greenery. When walking on the Julianalaan, one might think that this greenery is a border between the building with the surrounding. First, you might think that the greenery is just a green mass - a fence, but when you approach if from the entrance you discover hidden paths. One leads you to the closed passage to the inner courtyard, which nowadays is closed for the public. And another runs towards the Bouwkunde. Besides, when you are in the Julianalaan street the sound of birds and leaves rustle destruct from the busy university environment. This calm atmosphere perfectly fits the residential character of the neighbourhood. You no longer feel like in the city but in a forest. Nowadays, the building feels abandoned, still, some music was heard from the upper windows. Most probably, some people still use the spaces in the Gele Scheikunde building. Even the texture of the facades reminds of something forgotten, hidden and old. The bricks of the Gele Schiekunde are no longer yellow as they suppose to be (the meaning of "gele" from dutch is yellow), they are greyish, brownish and in some places covered with algae, merging with the greenery.

The most intuitive route to follow is by the Michiel de Ruyterweg, the appearance of the Gele Scheikunde is not attractive and definitely not designed to be accessed from this road. Anther turning to the Prins Bernhardlaan, the observer sees the tower, which has a very monumental appearance due to the vertical window. The entrance is called **"Kramers Laboratorium"** and **"Physique en Technische Technologie"**. Because of the presence of "Delft Hyperloop" research and product development this part of the site is active. It is possible to go inside and find the interior of the chemistry pilot plant.

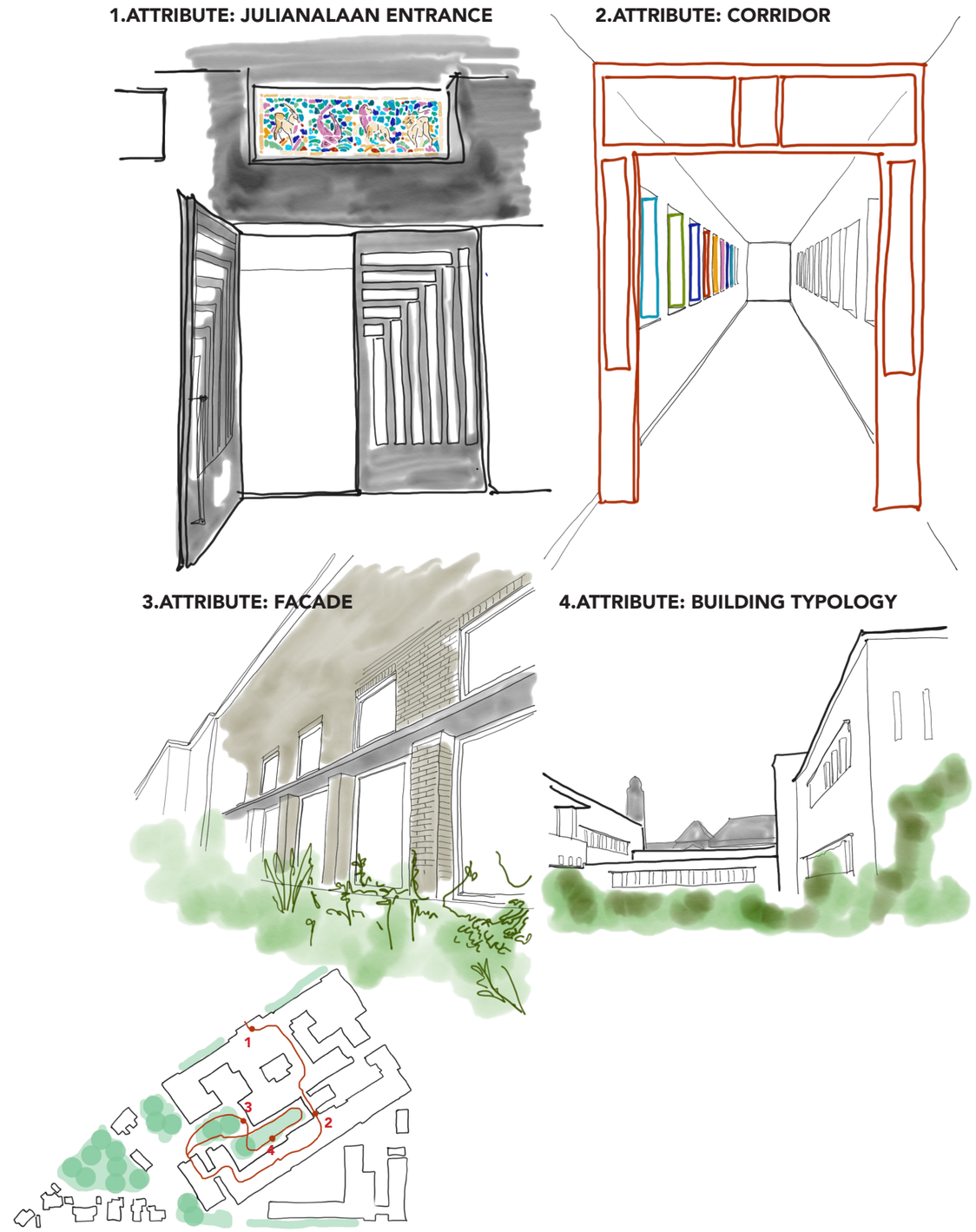
When further walking on the Prins Bernhardlaan street, freestanding family houses drag the attention. They are perceived as "foreign bodies" since they are located facing the TU buildings. In addition, the Michiel de Ruyterweg in comparison to Prins Bernhardlaan and Julianalaan is much busier, nosier as it is the main street of the TU campus.



Sketches, self made (2020)

Interior

During the second visit, the interior was observed. First, the visitor enters through the main entrance at the Julianalaan. Suddenly the three stained glass windows can be seen. They give the interior a certain mystery and are the decorative elements together with the steel ornamented entrance doors. The floors are covered with yellow mosaic tiles and the columns are covered with green tiles. This is an Art Deco interior. Then the visitor goes through long and narrow corridors. Spaces like laboratories and education rooms are accessed from the corridors. The laboratories are very bright, due to the skylights and are located at the edges of the corridors. After visiting the interior, the visitor can assess the inner courtyards. Those courtyards are forgotten, like the lost world, nature took over the architecture. The interior facades are covered with greenery. From the central courtyard, the Bouwkunde can be seen thanks to low rise typology of the complex.



Sketches self made (2020)

CONTENT ANALYSIS

Gele Scheikunde attributes & values

In this sub-chapter, the content analysis is conducted in order to identify the values and attributes. Sentances are retrieved from the primary sources - documents, which are publications, books and cultural-historical research made by the direct stakeholders. The used color code and line types refer to Table 1 from the sub-chapter "Definition & Methodology" page 34.

"**Gele Scheikunde** and Proeffabrieken form an important physical and chronological link in the TU district[1]"

"The porter's house should be preserved in its entirety. The coherent long facade of **Gele Scheikunde** is particularly decisive. The building wings establish a relationship with the porter's houses[1] "

"Government Architect, Bremer designed several laboratories in Wageningen, Utrecht and Groningen in the 1920s and 1930s, characterized as utility buildings with attention to functionality and responsible design. The floor plan of the building is an elaboration of the pavilion typology (paviljoenstructuur)[2]. "

"The long, horizontal shape of the **Yellow Chemistry Building** fitted in well with the two-storey houses with a roof along the Julianalaan, also was a safe construction for laboratories with a risk of explosion. This is visible in the placement of the labs at the tips of the wings[2]."

"The facades are mainly an expression of the functions within the building and do not form harmonious compositions. There is, however, a certain hierarchy: the corridors that run along the inner courts have small square windows, the stairwells have high vertical windows. The laboratories often have double windows, a smaller and a larger square window[3]."

"The placement and rhythm of the windows enhance the horizontality of the building, in keeping with the pavilion structure (paviljoenstructuur)[3]."

"Laboratories located at the ends of the corridors, have skylights positioned at right angles to the long side of the room, oriented to the north[3]."

"The main entrance makes a monumental impression. This part contains the hall and lecture hall, has a high interior value[1]."

"For facade rectangular yellow brick were used to provide the horizontal character (matching the pavilion design). Protruding canopy from natural stone were common in the "Interbellum" period. Elements such as stairs and window frames, which determine the building's recognisability were designed from naturall stone as well[3]."

"Modern laboratories, incorporating the latest technology, were built in the T.H. This created the perfect conditions for top international research. The laboratories became the showpieces of the T.H. Delft, with which the university took a leading role in technological research[4]."

"In the "Delftsche Courant", and according to Bremer the "highly functional laboratory design" was formed by two main parts: the wing on Julianalaan with the main entrance in the center, and a parallel strip wing at the back[2]."

"A green collar ran all around the site. The facade on Julianalaan was set back from the building line, making the long, strict facade less noticeable. At the main entrance, the green collar was broken open, showing the accentuation of the main entrance[3]."

"The incidence of light played an important role; the large and often deep spaces had to be well lit from all sides. The library and lecture halls were therefore often given skylights[3]."

"The two outdoor areas on either side of the building were accessible from Michiel de Ruyterweg and Julianalaan respectively[1]."

"The building contains elements of both classical and modern architecture, it is a combination of 'Nieuwe zakelijkheid'(New Objectivity[2]) and Art Deco[5]"

"An extra floor was built in 1950. The original design had taken into account a possibility for expansion.[6]"

"Preservation of the rows of trees and water structure is a requirement. With the redevelopment of the Yellow Chemistry site, a new comparable playground of at least 600 m2 will be provided. For the Yellow Chemistry area, access is assumed from Julianalaan (western part), in line with Maerten Trompstraat[1]"

[Valuation: culturally-historically valuable
- The object is important because of the architecture characteristic of the late 1930s.
- The object is important because of the careful connection of the large-scale building volume.
- The object is important because of the high aesthetic quality of composition, detailing and use of materials.
- Flawlessness: the exterior is unchanged; the interior has a striking new color scheme.] [6]

1. Gemeente Delft. (2009). Randvoorwaarden Herontwikkelling Gele Scheikunde. Concept. p8-15
2. Prof. dr. ir. Paul Meurs et el. (2019) Gele Scheikunde en Kramerslaboratoium. Cultuurhistorisch onderzoek terrain en gebouwen. p15
3. Prof. dr. ir. Paul Meurs et el. (2019) Gele Scheikunde en Kramerslaboratoium. Cultuurhistorisch onderzoek terrain en gebouwen. p17
4. Prof. dr. ir. Paul Meurs et el. (2018) Technische Universiteit Delft. Cultuurhistorisch onderzoek. p41
5. Macel, O., Schutten, I., & Wegner, J. (1994). Architectuurarchief Technische Universiteit Delft. Publikatieburo Bouwkunde, TU Delft.
6. Delft Naoorlogse. Architectuur en stedenbouw. 1940-1970. Part 1. p353-357

Proeffabrieken attributes & values

"Gele Scheikunde and **Proeffabrieken** form an important physical and chronological link in the TU district[7]"

"The buildings each cost 1 million guilders. They were designed by Shell's permanent architect, CA Abspoel (1899-1970)[8]."

"The original peripheral development of the **pilot factory** is a monument worthy in its entirety. The part in the courtyard that was built later is not worth a monument and therefore does not need to be preserved.[9]"

"The entrance emphasized by the tower is a crucial urban design marker on this corner of the site.[10]"

"The building along the Prins Bernardlaan is part of the corner-marking image-defining ensemble. This facade wall supports the corner building with the tower. That is why partial demolition of these culturally-historically valuable buildings is permitted if a meaningful continuation of the characteristic building parts to be maintained is thereby achieved.[7]"

[Abspoel tried to design laboratories as flexible as possible and based on standard construction elements. The installation of standard interior walls made it possible to create large and small spaces. The walls can be taken apart and placed elsewhere again. In this way, an attempt was made to avoid the need for radical changes after the completion of the laboratories. A lot of attention has been paid to detail and this can be felt in the atmosphere that the building radiates, both inside and outside. This attention seems to have a serving function, with the aim of enriching and accentuating the building construction. Abspoel did not participate in the architectural debate of his time, but one can see his starting points in the light of the rise of the New Objectivity in that period. Agreement with H.P. Berlage and J.J.P. Old is the mainly businesslike approach to give shape to the assignment, without losing the representativeness of the hewn yellow from it.][9]

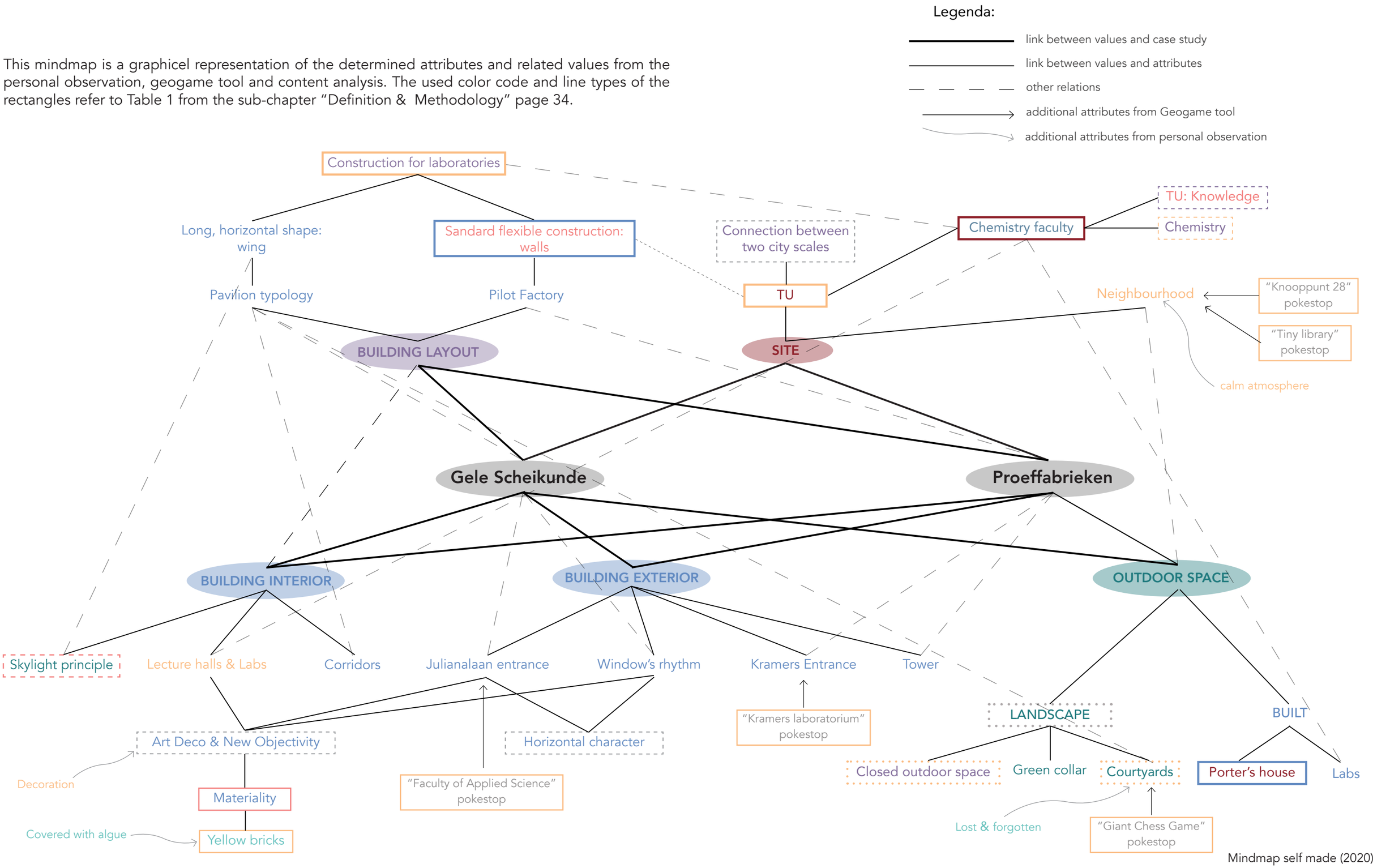
[Worthy of protection:
- The object is important because of the high aesthetic quality of composition, detailing and use of materials.
- The architecture, with its playful and decorative accents, is characteristic of the early 1950s.
- Neatness: exterior and interior are virtually unchanged.**]**[8]

[The peculiarity of the Gele Scheikunde complex is mainly the pavilion-like structure, which contrasts with the **Pilot factories** with the large box-like volumes in the TU district due to its diverse building masses. The placement of the laboratories at the boundaries of the plot, ensures that a courtyard is created. Closed building blocks or enclosed outdoor spaces are unusual types of space for the TU district. It is a pity that the White Elephant office building completely fills this space and does not nuance it any further.][9]

7. Gemeente Delft. (2009). Randvoorwaarden Herontwikkelling Gele Scheikunde. Concept. p7-10
8. Delft Naoorlogse. Architectuur en stedenbouw. 1940-1970. Part 1. p375-377
9. Macel, O., Schutten, I., & Wegner, J. (1994). Architectuurarchief Technische Universiteit Delft. Publikatieburo Bouwkunde, TU Delft. p57-62
10. Gemeente Delft. (2009). Randvoorwaarden Herontwikkelling Gele Scheikunde. Concept. p10

VALUES & ATTRIBUTES: MINDMAP

This mindmap is a graphicel representation of the determined attributes and related values from the personal observation, geogame tool and content analysis. The used color code and line types of the rectangles refer to Table 1 from the sub-chapter “Definition & Methodology” page 34.



Mindmap self made (2020)

VALUES, ATTRIBUTES & STAKEHOLDERS: CONCLUSION

What are the attributes and values of the Gele Scheikunde complex and who are the stakeholders?

The Gele Scheikunde complex consists of several of buildings between Julianalaan, Michiel de Ruyterwegen and Prins Bernhardlaan. The complex is not listed, however, it presents the historical value and some features of the former chemistry faculty building should be adapted in the new plans. To make a successful intervention, it is crucial to understand what should be kept, what can be changed and what demolished. For that, the very characteristic features of the complex should be recognised. Through the historical research, data analysis, observation and interviews with experts, some characteristic elements of the complex have been determined.

In the values and attributes mindmap, a technique learning at the 'Values & Attributes workshop' by Ana Pereira Roders, Mahda Foroughi and Bruno de Andrade on November 18th at BK, all attributes are represented. By camparing this mindmap with the document made by Posad Maxwan, "Gele Scheikunde ruimtelijk-programmatisch kader" (2019), Herontwikkeling Gele Scheikunde | TU Delft, a more clear image of important features can be made.

First of all, the relation of the site with the City of Delft and TU campus is important. Gele Scheikunde was a faculty building for Chemical Engineering of the TU Delft university for 70 years. In this way, the site is seen as a link between campus and city centre (Gele Scheikunde ruimtelijk-programmatisch kader, 2019, p4-5). Also, a link between education and living, which is why the plot should maintain this relationship with the campus to a certain degree. Accordingly, TU delft university is an important stakeholder of this case study.

Secondly, the buildings of the plot represent Architectural Heritage. For instance, the Gele Scheikunde building and two pilot plants - Proeffabrieken are of great interest for the historical and architectural aspects. Gele Scheikunde was designed as a response for World War and designed by Hendrik Lambertus Engberts in collaboration with the director of the Government Building architect Gustav Bremer. The reason why Gele Scheikunde is so low and wide is due to the popularity of the wide-open pavilion concept of the Reconstruction period. Besides, this concept met the requirements for laboratories and educational purposes. And two proeffabriek were designed by architect Cornelis Adrianus Abspoel and donated to the university by Shell. In this way, two plot plants are symbols not only of industrial chemical research but also of the collaboration between the university and other companies.

Besides, the design of both buildings was made to enable future adaption, extensions and changes. Gele Scheikunde in its layout has four extensions (two additional labs, autoclavenlaboratorium and warehouse) and the facade on the Julianalaan was enlarged by additional floor. Concerning Proeffabrieken, the Kramers Laboratory's workshop space was a result of an expansion as well.

Gele Scheikunde and Proeffabrieken are marked by the "New Objectivity" movement. In contrast to the exaggerated emotionality and profusion of colours in expressionism, the new objectivity assumes: sleek shapes and banishing the incidental. Architects were looking for a new, pure architecture that only wants to be functional and is distinguished by clean and straight lines, a smooth surface, clarity and purity of proportions. For these reasons, experts in history and architecture are stakeholders to take into account. Those are representatives of the City Hall (Gemeente Delft), Historical Association (Delfia Batavorum), Researchers and Professors in Architecture and of course the designers (Delft Design association).

In the "Gele Scheikunde ruimtelijk-programmatisch kader", the diagram shows what was valued as high, average and low (see Image 15). The building on the Julianalaan is evaluated as high value in both the mindmap and the document. This building is characterised by the entrance, the rhythm of the windows, its hights, interior and materiality. The two plot plants "Proeffabrieken" are highly valued as well both in the mindmap and the document. The added laboratories, warehouse and workshop spaces are considered as "indifferent value" in the document, and in the mindmap, laboratories are considered as the characteristics of the chemistry faculty, but since, those extension labs were not part of the original design these extensions can be demolished in order to improve the quality of the outdoor space which is of high value.

Thirdly, the site is famous for its green environment. Greenery is a very recognisable feature of the complex. Inside the plot, there are many courtyards which represent ecological values. The site can contribute to various urban ambitions in the field of living, green, blue and accessibility (Gele Scheikunde ruimtelijk-programmatisch kader, 2019, p6-8). In addition, it is required from the Municipality that the green and blue of the complex should be connected with the surrounding structure. Also to solve the problems of heat stress and the risk of flooding. As a result, ecologists, sustainability and environment experts (CE Delft) are the stakeholders.

Finally, the neighbourhood so the surrounding is a valuable attribute of the site. Moreover, the users and neighbours and valuable stakeholders as well. Their visions can give some alternative perspective for the complex. In the "Gele Scheikunde ruimtelijk-programmatisch kader" document, principles were identified from the municipality and local residents during the subsequent planning procedures. In a similar way, this research aims to provide a good picture of the opportunities and limitations of the site and test the values and attributes through the Workshop and Survey.

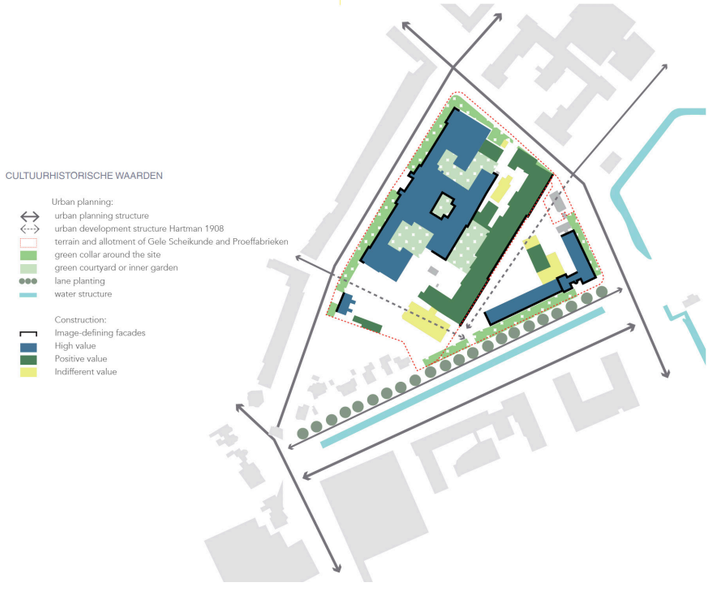
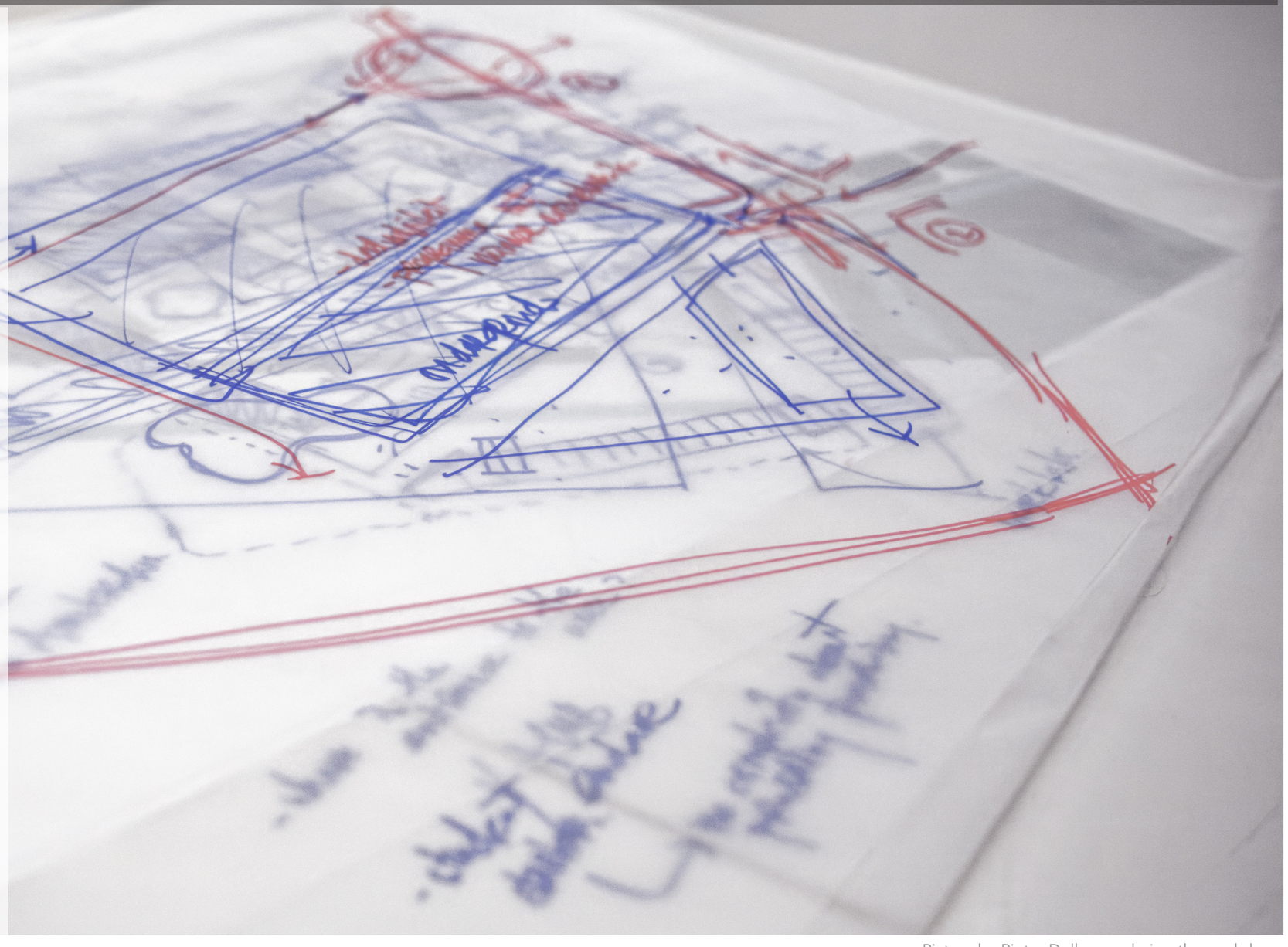


Image 15: Cultural-historical value

Retrieved from "Gele Scheikunde ruimtelijk-programmatisch kader" (2019), Herontwikkeling Gele Scheikunde | TU Delft

CO-CREATION & CONSENSUS



Picture by Pieter Delleman during the workshop, 02-12-2020.

WORKSHOP: PREPARATIONS & FORMAT

Introduction

The preparations for the workshop took place at the very early phase of the research. During the historical and architectural research (week 1.6: 5-9 October), the main stakeholders' groups or experts were identified (developers / owners; designers; users; former-owners; ecologists / researchers). They were contacted mainly by e-mail and interviewed via video call. The tutors assisted with these contacts and followed most of the interviews. During these interviews, experts were asked about their role in the Gele Scheikunde redevelopment and their visions for the future of the plot according to their very own professional backgrounds. The interview meetings were also used to invite the stakeholders to the workshop and explain the workshop co-creation design and decision-making process. Some people, especially those that had never heard and/or played the Minecraft, were suspicious and uncertain if the game Minecraft is relevant for the co-creation and decision-making process. Which is why the precise explanation and demonstration was needed. Below is the list of people with whom the interviews were organised and who was invited as a stakeholder. (The interviews were recorded, transcribed and returned to the experts so they can approve the use of the interview text in this thesis. The transcriptions of the interviews can be found in the annexe of this booklet.)

Firstly, a Minecraft model of the Gele Scheikunde and Proffabrieken was made. The defined heritage attributes were precisely modelled. The model itself was made to resemble the reality as much as possible due to limitations of graphic representation of the game of 1 m^3. See images 16, 17, 18.

Secondly, a trial workshop was organised with three TU Delft architecture master students. It aimed to test the Minecraft model and to train for the workshop with real stakeholders. This trial workshop was held at the BK faculty at the design studio area on the 26th of November (week 2.3) and lasted one and a half hours. All measurements for a corona-proof event were taken, such as social distancing, alcohol gel, masks, etc. Training is an important part of co-creation since students represented the stakeholders such as designers, city hall, developers and ecologists through a role-playing design method. It is also important to mention that all three master students from Heritage4all studio (Pien Tol, Mick Bloemendal and Diana Ugnat) were helping each other during the organisation of interviews and facilitating workshops.

The workshop with real stakeholders was held on the 2nd of December (week 2.4) at the BK faculty at the design studio area. All measurements for a corona-proof event were taken, including social distancing, alcohol get, masks, etc.

Image 16: Minecraft model birdeye view

Image 17: Minecraft model Julianalaan entrance

Image 18: Minecraft model Central courtyard

WORKSHOP: CIVIC ENGAGEMENT PROCESS

Overview

WORKSHOPS

11-11-20 MINECRAFT TRIAL WORKSHOP with TU Delft Heritage Minor Students
Facilitator: Bruno de Andrade
Assistants: Pien Tol, Diana Ugnat, Mick Bloemendal

26-11-20 MINECRAFT TRIAL WORKSHOP with TU Delft students for:
Prinsenhof museum; Gele Scheikunde; Kabelfabriek
Facilitators: Pien Tol, Diana Ugnat, Mick Bloemendal
Supervisor: Bruno de Andrade

02-12-20 MINECRAFT WORKSHOP GELE SCHEIKUNDE
Facilitator: Diana Ugnat
Assistants: Pien Tol, Mick Bloemendal
Supervisor: Bruno de Andrade

03-12-20 MINECRAFT WORKSHOP PRINSENHOF MUSEUM
Facilitator: Mick Bloemendal
Assistants: Diana Ugnat, Mick Bloemendal
Supervisor: Bruno de Andrade

04-12-20 MINECRAFT WORKSHOP KABELFABRIEK
Facilitator: Pien Tol
Assistants: Diana Ugnat, Mick Bloemendal
Supervisor: Bruno de Andrade

INTERVIEWS WITH:

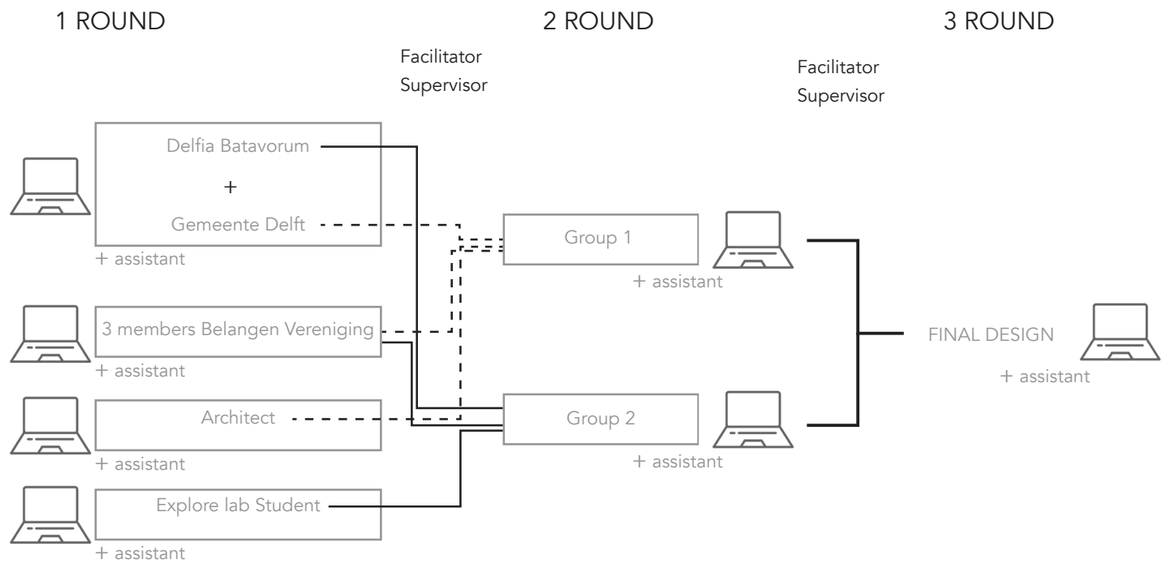
08-10-20 Chair of the Public Real Estate at the TU Delft.
08-10-20 Monument advisor at the Municipality of Delft.
15-10-20 Manager of Real Estate Development of TU Delft.
22-10-20 Project leader of the Gele Scheikunde from Gemeente Delft
and a project leader from Kondor Wessels.
30-10-20 Project leader of the Gele Scheikunde project from Barcode Architects.
06-11-20 Representative of DUWO, a student housing corporation.
10-11-20 Member from Belangen Vereniging TU-Noord.
19-11-20 Senior researcher / advisor from CE Delft.
19-11-20 Member of the Delft Design.
20-11-20 Landscape architect of the Gele Scheikunde project from Karres en Brands.
01-12-20 City ecologist of Delft and senior consultant for a green policy.

INVITED:

Posad Maxwan - made a design research / area vision for TU Campus and Gele Scheikunde site.
CEPEZED - working on the Gele Scheikunde project.
Delfia Batavorum - historical association with a heart for Delft.
A landscape architect, researcher Urban Metabolism, professor at TU Delft.
Explore lab student of an urban metabolism researcher, working on Gele Scheikunde as a case study.

* in black are participants of the Gele Scheikunde workshop

The workshop was organised in 3 rounds. During the first round, stakeholders worked individually. On the second round they worked in groups and by the end combined the ideas and created a final design-intervention strategy.



Trial Workshop with students

The trial workshop was held in the BK faculty on the 29th of November. Three architecture master students were invited. This workshop was facilitated by two master students from Heritage4all; the author and the research mentor.

During the introduction, the brief history of Gele Scheikunde was explained to the students. Then they were asked to choose a stakeholder role; of a developer, architect, city hall representative and ecologist. They were free to choose any role. All three students have never used Minecraft before, which is why they had 10 minutes to explore the model, learn how to navigate and get familiar with the game mechanics. After that, they had 20 minutes to make an intervention and think of a program for the buildings in the Minecraft model respecting the ideas and visions of their stakeholder role. Then they presented their interventions to each other. Besides, they were asked to think with whom (each stakeholder) they would like to continue working and with whom not to. As for the last round, they were asked to evaluate the heritage tangible and intangible attributes in high, average and low. What they found important to keep, what they thought could be changed and what demolished. For example, the entrance at the Julianalaan, the laboratories, the built volumes at the site, the chemical research function, etc. (These heritage tangible and intangible attributes are determined and presented in the chapter “Value & Attributes Assessment”)

One architecture master student, played the role of the ecologist. He planned to plant and keep as many trees and greenery as possible. He noticed that the excessed roof surface can be used to increase biodiversity. He used only Minecraft as a design-thinking method.

Second architecture master student, played the role of a developer. He used Minecraft combined with paper and pen for decision making. His idea was to demolish the free-standing laboratories to open up the courtyards and add more build volumes to the existing building. Also, to benefit from the location, which is close to the TU Campus, and implement the student accommodation.

Third architecture master student, played the role of a user. She thought of a program that could benefit the university - a student hostel or hotel. She also thought of how to open up the site and for that, the middle building can be demolished. She mainly used paper and pen as a design-thinking method and then presented the conclusion in the Minecraft model.

In the end, all three students marked the Julianalaan building and its entrance as high value together with the two Proeffabrien buildings and courtyards. And all the rest was evaluated as average value and low value.

The co-creation workshop aims to reach a consensus in building redesign ideas. So the social dynamics of the workshop would be to merge the groups until one final design model was reached. Due to the limitation in time, the participants were asked to imagine how they would proceed if they had to merge their ideas. Since, their interventions were not conflicting but adding to each other, they could easily continue working together without letting go any of their strategies.

Photo 1: Working in the model. Self made (2020)

Photo 2: Working in the model and drawing. Self made (2020)

Photo 3: Presentiong her intervention to everyone. Self made (2020)

Workshop with Stakeholders

PARTICIPANTS:
Gemeente Delft
Architect
Delfia Batavorum
3 members from Belangen Vereniging TU-Noord
Student

STAKEHOLDER GROUPS:
- City Hall
- Architect
- Historical Association
- Users
- Ecologist

Start at 13:30 - Welcome & Info

The Workshop was held in the BK faculty on the 2nd of December between 13:30 and 18:00 and was facilitated by two master students from Heritage4all; the author and the research mentor.

From 14:00 till 14:30

At the beginning of the workshop, the participants were asked to take the "value & attributes" **survey**. This survey aimed to test the values and attributes of Gele Scheikunde and Proeffabrieken determined in the "Value Assessment" chapter. They had to evaluate the attributes according to their knowledge. At the same time, they had 30 minutes to explore the model and **learn to use Minecraft**. During this assignment, they were asked to find in the game the attributes from the survey. And then build or remove some structures.

From 14:30 till 15:30

Next, the **First round** started, each stakeholder were asked to make an intervention according to their very expertise and professional background, and make sure their intervention represents the mindset of their stakeholder group. Then each stakeholder group had to present their intervention. Right after that, they had to choose with whom they would like to work on the next round and so create 2 groups.

Gemeente Delft: *"Building conservation, how can we keep the existing as much as possible, which is very important for the city and the government. When we have to choose the building conservation, then it is impossible to keep the green surrounding, the courtyards. For the function, living and working can be combined. And concerning the living program, the target group are elderly 50+, with that comes the idea of what the elderly want, community services, caretaking which is in shortage in Delft. And another target group are young people. So how to combine the mixed target groups, with living and working setting."*

Gemeente Delft and Delfia Batavorum representatives worked on the buildings on the Michel de Ruyterweg. In the model they added some layers on top of the building, also gave these buildings some public program on the ground levels like restaurants. Also thought of an entrance on the Michel de Ruyterweg.

Delfia Batavorum: *"It is very important to keep the outside so the skin as it is, that you can see how the buildings were built. Delfia Batavorum wouldn't agree on putting the extra levels and demolishing the buildings. "*

In conclusion, Gemeente Delft's ideas were to bring more volume to the buildings and more function. He raises the question of how to create a living quarter and how to give a new program to the interior? According to the Gemeente Delft's representative, if it is impossible to give a space a new program then you need to demolish it. This statement conflicted with the visions of the historical association that aimed to keep the building complex as it is as much as possible. However, they both agreed on the mixed target groups and living and working setting as a program.

Architect: *"How can this enclave become a part of the city and still stay as an enclave as it is now. For that, the existing low perimeter can remain and be enhanced since it is very characteristic of the area. Another suggestion is to get rid of the added, residual blocks that don't contribute to the main typology of the site. "*

The architect in the Minecraft model kept the building at the Julianalaan and the parallel one to it. Also worked on the entrance on the Michel de Ruyterweg, as a new main entrance and keeping the Julianalaan entrance. Another mentioned aspect was the green environment that should be continued in a new plan. In addition, the courtyards' sizes could possibly accommodate some pavilion structures with such programs as cafe or gym. In respect to the new program, housing is the main one. However, the site is a perfect location for the working environment, especially the plot factories.

Three members of Belangen Vereniging TU-Noord: *"We live on the Julianalaan. We agree to conserve the outside of the complex. For us, the mobility is quite important."*

The future of the complex will demand to accommodate more cars and the traffic / movement will increase. In the model, the accesses of the site on the Michel de Ruyterweg was worked out and the idea of a tunnel as an alternative car entrance, and a bridge for bikes came up to free the ground level.

Student ecologist: Introduced a connection between the disused entrance (the one facing the Bouwkunde) and proposed to use the building on the Michel de Ruyterweg as an extension for education. The courtyards spaces should be kept and be connected with each other and be accessible for the public. These green spaces can accommodate such a program as urban farming, so the paving can be replaced with green.

In the first round, all stakeholder groups chose to work on the buildings of the Michiel de Ruyterweg. They also chose to reflect on the entrance which is facing the Bouwkunde and implement a mixed program. On the first round, Gemeente Delft and Delfia Batavorum worked on the same computer due to the limitations of the workshop of a maximum of 4 computers available. This merging not only raised interesting conflicts on conservation and development, but also pushed them to start building consensus already in the first round.

From 15:50 till 16:50

At the **Second round**, experts had to make a new intervention in two new groups. Try to reach consensus and then present the outcomes of their design decisions to everyone. The groups were formed according to their ideas and perspectives. Belangen Vereninging TU-Noord representatives splited up to be in both groups. The Gemeente Delft and the Delfia Batavorum representatives also decided to split and to work with the stakeholders that had a similar approach to theirs. For instance, the ecologist student had more conservationist visions similar to the Delfia Batavorum. The Gemeente Delft and the architect together with the member of Belangen Vereninging TU-Noord decided to work on the mobility issue.

Group 1: Delfia Batavorum, Belangen Vereniging TU-Noord & Student Ecologist

The aim of the group was to use the visions of the ecologist, to connect different courtyards and to make the area greener and accessible for the public. Also implement an educational program like urban farming (see Images 19 and 20). They also thought about the international school program[1] that will be located at the pilot plant and decided to connect it with the complex via courtyards. In other words, to create a communal space that can have different use according to the daytime. They also worked on the bike path that could go through the complex (see Images 20 and 21). And regarding the working and living program, their idea was to place housing facing towards the inner courtyards and the working or more public functions facing outside.

Group 2: Gemeente Delft, Architect, & Belangen Vereniging TU-Noord

The goal was to merge the mobility vision of the TU-Noord group with the housing and programmatic options of an architect and the Gemeente Delft.

"The main question was, how can we decrease the number of cars in the area? So without thinking of buildings, how can we create a vision that we don't have so many cars and traffic entering the building?" as the architect presented the group design.

The group determined the conflicting zones, which are the junction with the Julianalaan and Michel de Ruyterweg and another one at the Prins Bernhardlaan. They stated that if the parking is facilitated in this area then it will be underground, providing parking both for the housing program and working, which would then double the needed amount of parking. They worked on two scenarios:

A) One where the entrance to the underground is located at the junction of Julianalaan and Michel de Ruyterweg

B) Another where the entrance is located at the junction of Michel de Ruyterweg and Prins Bernhardlaan (see image 20).

Both scenarios require an intervention to upgrade street profiles. Also to redirect bicycles, by splitting them up in different routes (see Image 22). As well as across the area through the neighbourhood. And from the architectural point of view, Michel de Ruyterweg is a street profile that needs to be strengthened, to mimic the profile heights and add more volume (see Image 23).

1. *"TU Delft sold the Kramerslab, that was part of the Gele Scheikunde, in April 2019. The Municipality of Delft paid the symbolic amount of EUR 1 for it. The Municipal Executive saw the area as the only option to locate an international secondary school. The Ministry of Education approved the Stanislas College application in January 2019."* According to Marjolein van der Veldt, (n.d.). Retrieved in October 13, 2020, from https://www.delta.tudelft.nl/article/gele-scheikunde-makes-way-homes.

Upper Image 19: New entrance at Michel de Ruyterweg that connects courtyards by Group 1 (screenshot from the Minecraft model)
Lower Image 20: Underground parking entrance, new bike path (in red) and rooftop urban farming by Group 1 (screenshot from the Minecraft model)

Image 21: New bike path in red. Autoclave lab (with a red cross on the roof) can facilitate bike storage by Group 1 (screenshot from the Minecraft model)

Image 22: Underground parking entrance (with greenery) and bike bridge (in grey color) by Group 2 (screenshot from the Minecraft model)

Image 23: Added volume on top of the buildings of Michel de Ruyterweg by Group 2 (screenshot from the Minecraft model)

From 16:50 till 18:00

The **Third round** is where all stakeholders worked together. The two groups from the second round merged, stakeholders had to combine the two models from the second round and discuss the compromise.

The main discussion was about what to keep and what to change. The need for increased housing density was in conflict with the need of the historical association to preserve the original appearance of the architecture. Delfia Batavorum representative aimed at preserving the building and the exterior view as it is which is in contrast with the vision of adding volumes on top of the buildings by the architect and Gemeente Delft. The compromise was reached, in the first place by determining what is characteristic for the area and what not. For instance, the building on the Julianalaan was agreed to be the most characteristic part of the Gele Scheikunde complex, together with the Proeffabriken and the Kramerslab. However, it was said that the facade of the Michel de Ruyterweg (the area of the discussion) doesn't support the identity of the Gele Scheikunde. Still, the original image of this facade can be maintained by adding volumes that are set-back from the view line and building those new volumes with transparent materials (see Image 25).

Concerning the opened up plinth/entrance on the Michel de Ruyterweg that was designed by the second group the consensus with the historical association was reached by adding to this intervention the program that can enhance the history of the area. Then to create a more artistic intervention with a certain transparency (see Image 25). The facade of the Michel de Ruyterweg was designed like the back of the building, as laboratory space. But now this facade is a front facade which needs to be enhanced. So the intervention on the Michel de Ruyterweg needs to mimic the very typology of the Gele Scheikunde architecture.

All stakeholders agreed on opening up the courtyards and making them accessible for the public. They also agreed on the design idea to make the interior of the Gele Scheikunde site, car-free and updating the street profiles, mobility and commercial / social program.

Image 24: Michel de Ruyterweg facade. Current situation. (screenshot from the Minecraft model)

Image 25: Michel de Ruyterweg facade. Third round - consensus. (screenshot from the Minecraft model)

WORKSHOP: RESULTS & DISCUSSIONS

Seven stakeholders participated in the workshop.Three master students, including the author, that follow the Heritage4All graduation studio together with the research mentor, assisted the participants during the entire workshop. The first phase of the workshop "Learn to use Minecraft" took impressively less time than expected (less than announced 30 minutes). In general, participants learned how to navigate and get familiar with the game mechanics quite fast, which is an advantage of the usability of the Minecraft tool. Most of the participants evaluated the "usability" (this refers to how quick and easy it is to accomplish the tasks in the game) of the game as 3 or 4 out of 5 in the evaluation form.

Some stakeholders started already thinking about the interventions at the learning phase. At the first and second round, some participants combined paper and pen with Minecraft. The architect used to analyse the site and buildings by drawing and after represented the intervention in the game. This is how in the architectural profession we are used to work. However, participants that were not coming from the architectural background used the game as the main tool for the thinking and designing process (with the help of the workshop co-facilitators). All explanations of the ideas were supported with the Minecraft models which allowed a more clear and precise discussion.

Nevertheless, all participants were not familiar with the Minecraft before this workshop, consequently, some advantages of the game, like a big range of building materials (e.g. steel, glass, brick), were not fully explored (like wood, different types of glass, steel and greenery). Also, the quickness use of the game depends on the experience of the users with digital devices and gaming technologies. This is one of the challenges in adapting the gaming tool for a co-creation process that involves different age groups, in particular older people. In other words, it is more natural and easy for the new generation to use the Minecraft rather than for a more older generation. A workshop that lengthened four and a half hours, including 3 breaks, was physically demanding. Interestingly, this didn't affect the level of engagement. Also, the graphic representation of the game of 1 m^3 was confusing for the participants. In a way, the range of m^3 simplifies the architecture which is an advantage since it allows rapid design actions. Still, the pixelization was another challenge due to a limitation on detailing architecture less than 1m. Equally important, in the evaluation form, the participants evaluated the "game design" (which refers to how a game is designed and the appealing, artistic visual design) once as 2 (by the student), and mostly 4 and 5 out of 5 by others. Implementing playfulness in solving real-world tasks requires innovative spirit (Poplin, 2017), which for this workshop meant keeping the level of engagement and a friendly environment for decision-making. Besides, time and effort needs to be invested in adapting Minecraft for architectural redesign in terms of being able to remove bigger parts of the building at once and detailing less than one meter.

Furthermore, participants agreed that the game encourages social interactions and provoke discussions. Which was the main goal of the workshop. By the end of the workshop, the participants produced the final model (see Image 26). Overall, a consensus that please the majority was reached. As described in the "Civic engagement process" page 45, the desire of the historical association representative to conserve the building in its existing condition as much as possible triggered interesting, contrasting and fruitful discussions over what to conserve, what to remove and why. The workshop consensus building dynamics on group merging supported such negotiations. The final model shows how to treat the Michel de Ruyterweg street profile and the facades so that visions of all stakeholders are considered and respected.

Photo 4: Open discussion, second round. Photo by Anja van der Watt during the workshop, 02-12-2020.

Photo 5: Delfia Batavorum's representative present the group work of the second round. Photo by Pieter Delleman during the workshop, 02-12-2020.

Photo 6: Explanation. Photo by Pieter Delleman during the workshop, 02-12-2020.

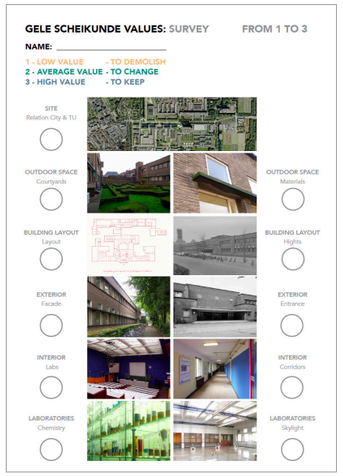
SURVEY: RESULTS

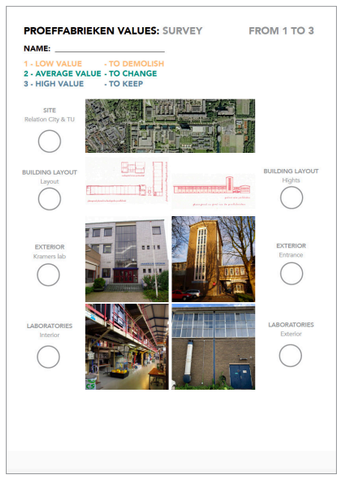
Gele Scheikunde & Proeffabrieken attributes

At the beginning of the workshop, the participants were asked to take the “value & attributes” survey. This survey shows the values and attributes of Gele Scheikunde and Proeffabrieken determined in the “Value Assessment” chapter. Experts had to evaluate the attributes according to their knowledge. The diagrams below represent the results of the surveys according to each stakeholder. The attributes are placed around the circle and each line (in-dots and in-dash) represents the experts’ answers.

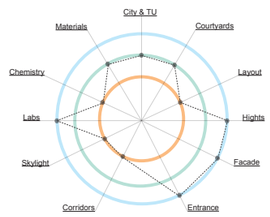
What they think is important and should be preserved should have a value 3 - BLUE
What is less important and can be changed has 2 - GREEN
What has a low value and can be possibly removed is 1 - ORANGE

Survey

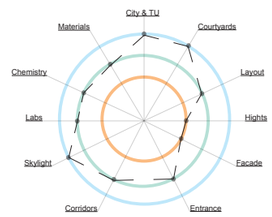




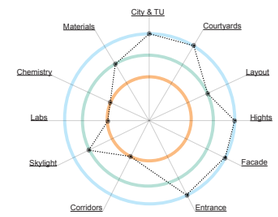
Gele Scheikunde



Gemeente Delft



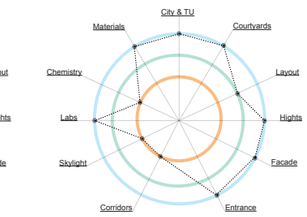
Ecology (student)



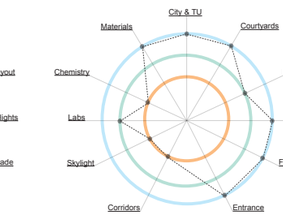
Architect

Delfia Batavorum

Representant of the TU-Noord 1

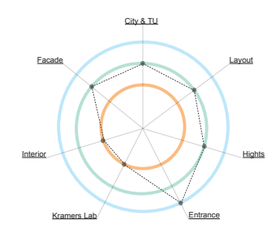


Representant of the TU-Noord 2

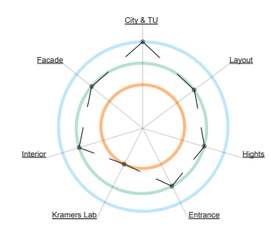


Representant of the TU-Noord 3

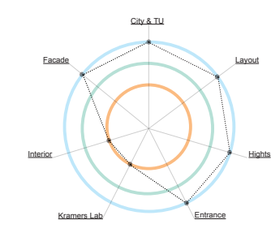
Proeffabrieken



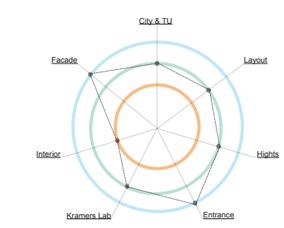
Gemeente Delft



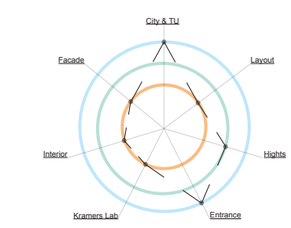
Ecology (student)



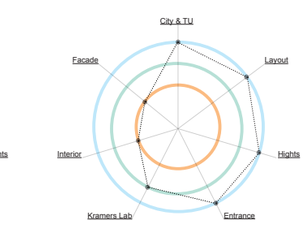
Architect



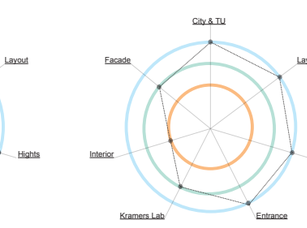
Delfia Batavorum



Representant of the TU-Noord 1



Representant of the TU-Noord 2



Representant of the TU-Noord 3

Diagrams self made (2020)

SURVEY: CONCLUSION

Gele Scheikunde & Proeffabrieken attributes

The two diagrams are a combination of all evaluations. With this graphical representation, we can see that almost all stakeholders value the facade of the buildings, the connection with the TU campus and the city, and the existing entrances with courtyards. The buildings interior layout and attributes like labs, corridors, chemistry and materials can be changed and demolished.

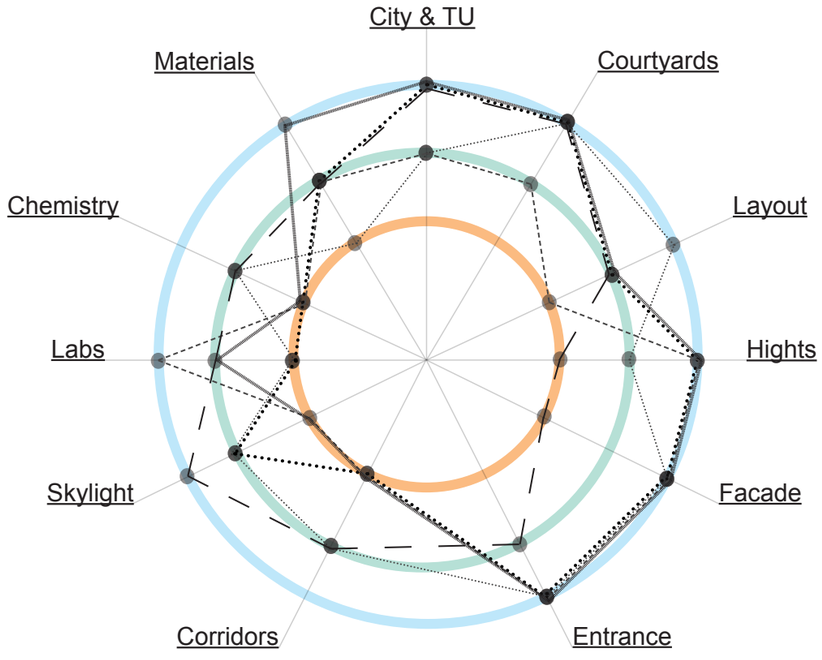
In conclusion, what is most valued by the stakeholders is the image of the complex - the exterior appearance. Gele Scheikunde complex is a place that revives our present by reminding us of our past. In other words its a spirit of the place - *"genius loci"*. John Nivala (1996) described this spirit as an atmosphere of a place concerning the impression that it makes on the mind, and in the built environment, it is a power of the structures to create these impressions.

This conclusion adds to one of the outcomes of the workshop, that dealt with the facade on the Michel de Ruyterweg. The original appearance of the Gele Scheikunde complex should be recognised in the new plan. Moreover, there should be a clear distinction between what is original and what is new.

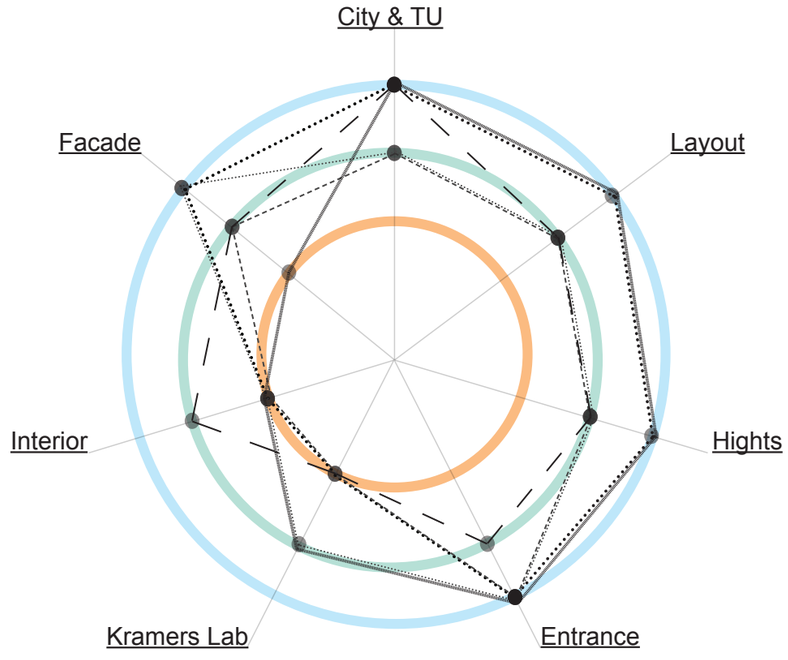
Legenda:

- Delfia Batavorum
- Architects
- Gemeente Delft
- Ecology (student)
- Average TU-Noord

Gele Scheikunde



Proeffabrieken



Diagrams self made (2020)

VALUES, ATTRIBUTES & STAKEHOLDERS: CONCLUSION

This is a visual conclusion of the research.

The values' color code is taken from the from Tarrafa, A.S. & Pereira Roders, A. (2012). Cultural Heritage Management and Heritage (Impact) Assessments.

STAKEHOLDERS' VALUES	SUB - ATTRIBUTES Gele Scheikunde	ATTRIBUTES	VALUES
+ +	Connection between two city scales	SITE	Historical
+	TU history		
-	spirit of the place: Chemistry faculty		
+	Green collar	OUTDOOR SPACE	Ecological
+ +	Courtyards		
-	Porter's house		
+	Pavilion typology	BUILDING LAYOUT	Economic
+ +	Long, horizontal shape - wing		
+	Construction for laboratories		
+ +	Julianalaan entrance	EXTERIOR: FACADE	Architectural/Aesthetical
+ +	Window's rhythm		
+ +	Horizontal character		
+	Materiality		
-	Art Deco & New Objectivity	INTERIOR	Social
-	Lecture halls & Labs		
-	Corridors		
+	Materiality		
-	TU: Knowledge	LABORATORIES	Scientific
+ +	Skylight principle		
-	Chemistry		

DIGITAL HERITAGE: CONCLUSION

How can digital heritage in the form of a game support stakeholders' design and decision-making?

When dealing with heritage, the sustainable management of the historic environment depends on sound principles, clear policies and the quality of decisions that stem from their consistent application (Drury & McPherson, 2008). Sustainable management of a place begins with understanding and defining its significance. Then it is crucial to know what attributes people value the most and/or are more vulnerable to harm or loss. This is why civic engagement should be an obligatory part of heritage design and planning.

This research tested the gaming approach for civic engagement according to a new trend in heritage studies field - Digital Heritage. According to the UNESCO's Charter for the *Concept of Digital Heritage* (2019); Digital Heritage is made up of computer-based materials of enduring value that should be kept for future generations. Moreover, using computers and related tools, humans are creating and sharing digital resources – information, creative expression, ideas, and knowledge that they value and want to share with others over time as well as across space.

For all stated above, the objective of the workshop was to initiate discussion and exploration of civic engagement in the redesign of a historic built environment - Gele Scheikunde. The question in the background of the research was whether such a task can be solved digitally and framed as games?

Firstly, the Minecraft workshop helped to visualize the personal visions and ideas of each stakeholder, thus to define the significance of the case study in terms of attributes and values. Then examine the consequences of each idea, how different visions affect the historic built environment. Secondly, it facilitated the discussion between conflicting visions and goals of the stakeholders, for instance, the controversies of conservation and development of the historic association, developers and city hall. More precisely, the workshop helped to clarify what is valuable at Gele Scheikunde and why, the genius loci (function and spirit of the place), the facades, the entrances, courtyards. As well as, what is not so valuable; like labs' facilities and the interior of the buildings.

The gaming workshop also brought up unobvious dilemmas like mobility and pinpointed the area that needs the most attention during the design process (Michel de Ruyterweg street profile and facade). In this way, the outcome of the workshops will serve as guidelines for further developing the design concept and intervention strategies as the next step of this research. Hence, the Michel de Ruyterweg area will be the main focus of the redesign together with the mobility principles.

VALUES BASED DESIGN STRATEGY

Picture retrieved from TU delft data base: Brightspace.

How to integrate ecological values & technological strategies in adaptation reuse design?

In the Sub-chapter "Personal observation," the very first description of the case study was the following: *"Gele Scheikunde from the Julianalaan street is hidden by the greenery."* This indicates the significance and identity of the Gele Scheikunde. Additionally, greenery is a very recognisable feature of the Gele Scheikunde, a paramount attribute which was highly valued by the stakeholders. The green environment needs to be integrated into the reuse design and be enhanced with ecological strategies.

According to the "Werkboek 7Seasons" (2013), the city is generally a rich biotope where different species are at home, some species are even unique to the city and do not live (anymore) in the rural areas. Consequently, when dealing with existing buildings or any environments it is important to understand what is there. In terms of ecological values, the existing ecological network should be studied. At Gele Scheikunde complex, many spices have already found their habitat. However, this ecological network is vulnerable because the habitats are often small (inner areas, walls and quays) and hardly or not at all interconnected (Vink et al, 2013). This sub-chapter looks at a strategy for enriching the biodiversity and quality of life of a Gele Scheikunde neighbourhood. As a case study, the strategy "Nature-inclusive building and design in twenty ideas" by Gemeente Amsterdam is studied together with the "De Stad Natuurlijk" by Gemeente Den Haag and research by TAUW[1].

This sub-chapter aims to explore **Nature inclusive designs** and to collect strategies and technologies that can support and enrich the Gele Scheikunde's ecology. Buildings offer many opportunities to increase biodiversity. By applying relatively simple and inexpensive interventions, buildings can take up a full place in an urban ecosystem. **Nature-inclusive construction** ensures a healthy, future-proof living environment for humans and animals (Gemeente Amsterdam, 2018). Besides, the Gele Scheikunde site, most probably, need to be increased in housing density because the housing capacity in Delft is urgent. Which makes it difficult to keep the same quantity of green areas. Clearly, the ecosystem should also increase within the city but in another way. The alternative for the landscape architect[3] and the city ecologist[2] is to implement green roofs (see image 26) with green walls (see image 27) and incorporate nest places as compensation for the lost green. Besides, greening roofs is the advised way for dealing with a flat roof that solves a big problem of this region - the excess of rainwater. A green rooftop, first of all, gets extra cooling in the summer, but it also collects the rain water[4].

Furthermore, it is important to connect the parks which are nearby and create good 'green corridors'. In this way, the density of the city increases with buildings and the possibilities for biodiversity is promised. For that, the biotopes and the species association in the surroundings of the area should be

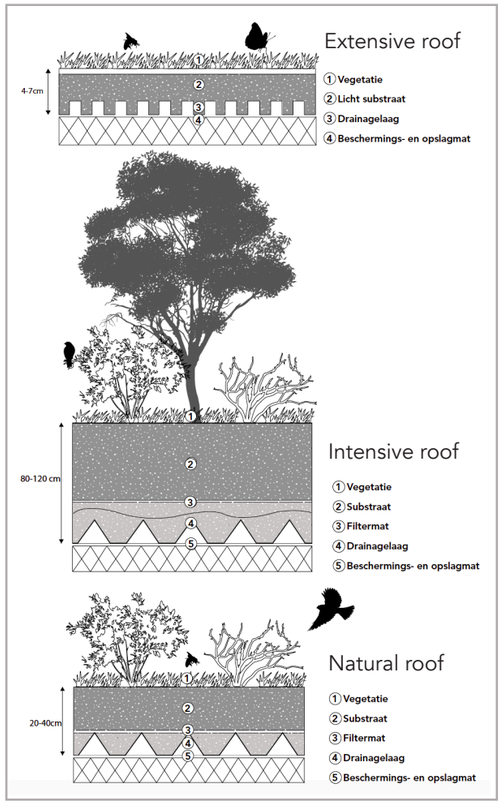


Image 26: Green Roofs

Retrieved from Gemeente Amsterdam. (2018). Natuurinclusief bouwen en ontwerpen in twintig ideën. pp17-18.

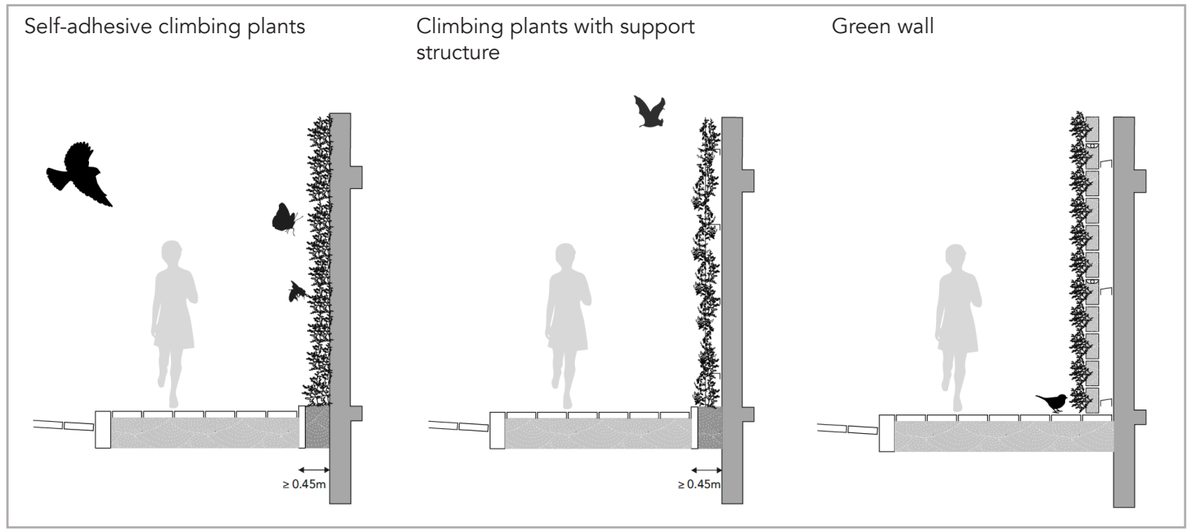


Image 27: Green Facades

Retrieved from Gemeente Amsterdam. (2018). Natuurinclusief bouwen en ontwerpen in twintig ideën. pp20-21.

1. TAUW is a company that privides expertise in different topics. At TAUW, Ecology stands for care for our living environment, so that it remains valuable for humans and animals in the future. TAUW's ecologists look beyond legislation and policy alone. They work on increasing biodiversity and sustainable solutions. They advise the business community, local and national governments on new developments, use, management and policy..

2. See the transcription of the Interview with the city ecologist of Delft in the annexe.

3. See the transcription of the Interview with the landscape architect in the annexe.

4. See the transcription of the Interview with the senior researcher/advisor and leader of the sector sustainable cities from CE Delft in the annexe.

looked at. All the stated above is supported by some of the ecological goals of Delft, which are; to increase greenery in gardens, implement green roofs and facades; and to strengthen building inhabiting species[5]. These goals will be the main ecological goals in this research paper.

Starting with species, TAUW researched protected species commissioned by the Gemeente Utrecht (2016). In such research, the species that are expected in an area were searched. For the Gele Scheikunde research, few spices are chosen as an ecological target group, for instance; bats, house sparrow, swifts, hedgehogs, bees and plants. This means that the range of types and measures investigated is limited (Vink et al, 2013). This species selection is not random.

First of all, according to the city ecologist of Delft, Gele Scheikunde forms an important habitat for bats[2]. Bats species use cavity walls in the houses and trees as their habitat (Tauw, 2016). At the site of Gele Scheikunde, there are a lot of trees suitable for bats. Together with the protruding concrete roof edge with brick walls that form cavities that bats use. As the city ecologist of Delft stated, if the building needs to be demolished, it is necessary to compensate for their habitat by putting nest boxes (see image 28) in the surrounding[2]. When bats relocate, then the building can be demolished.

Secondly, no swifts and house sparrow nests were found in the Gele Scheikunde area[2]. Probably, because house sparrows and swifts make their habitat in the old buildings with tiled roofs and buildings of Gele Schiekunde have flat roofs. However, swifts and house sparrow are the most common species in Delft. In order to strengthen building inhabiting species, the courtyards need to be enhanced to attract more fauna into the site. In the same perspective, other bird species can be attracted to the Gele Scheikunde site by placing nesting boxes and built-in nesting stones on the facades. Bird species that breed in urban areas often depend on permanent nesting sites in buildings (Gemeente Amsterdam, 2018). Each bird species uses its specific nesting stone (see image 29).

To strengthen biodiversity, the courtyards need to be enhanced to attract more fauna into the site. Same for bees, butterflies and other insects. As the landscape architect explained in the interview, the goal is to accommodate as many local plants as possible because then animals will be attracted. Besides, Delft is a bee-friendly city[2]. In order to feed the bees and facilitate the pollination, trees/plants which are blooming from early spring till the end of summer should be planted on-site (see image 30). The goal is not only to attract species to the site but also keep it attractive for a long time. Biodiversity also means diverse in flora layers that require working with diverse types of species. Which is a mixed planting that goes through the seasons[3].

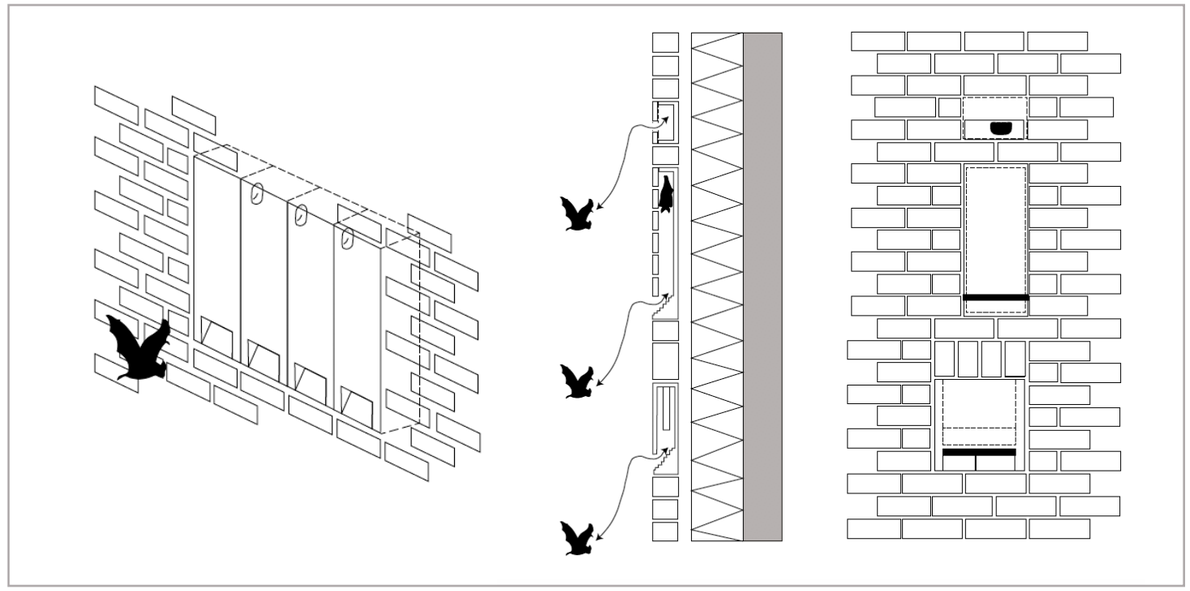


Image 28: Bat nests

Retrieved from Gemeente Amsterdam. (2018). Natuurinclusief bouwen en ontwerpen in twintig ideën. pp12-13.

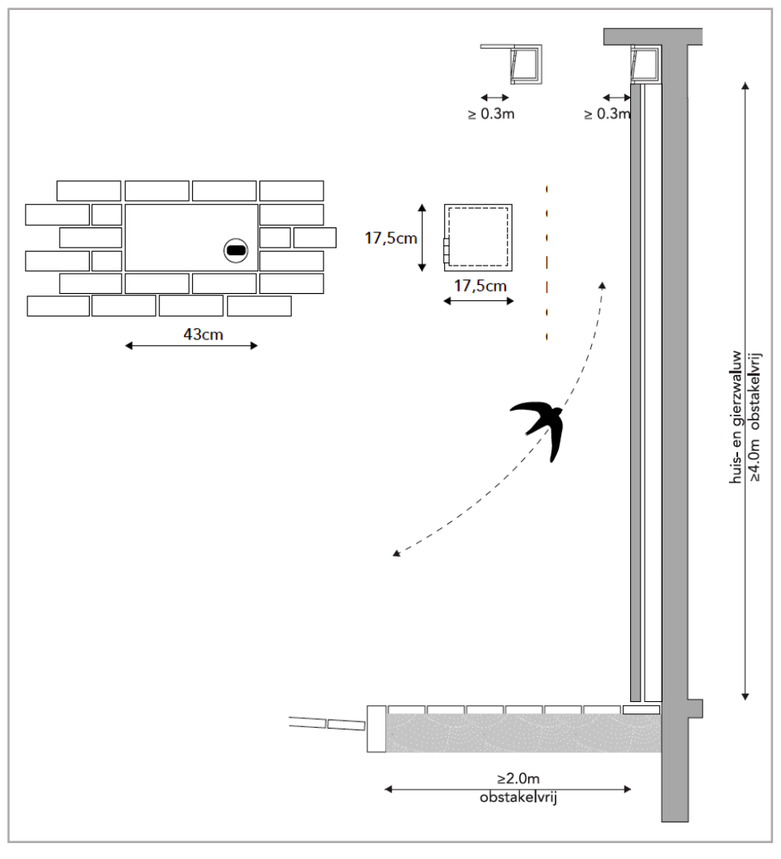


Image 29: Bird nests

Retrieved from Gemeente Amsterdam. (2018). Natuurinclusief bouwen en ontwerpen in twintig ideën. pp8-11.

2. See the transcription of the Interview with the city ecologist of Delft in the annexe.

3. See the transcription of the Interview with the landscape architect in the annexe.

5. Infotmation retrieved from the "Table of Ecological goals in Delft" provided by the city ecologist of Delft. See the annexe

As explained in the "Werkboek 7Seasons" (2013), there are four most important elements of the living environment of the target group; 1- Accommodation, 2- Food, 3- Safety and 4- Travel. Above the "accommodation" was explained. Concerning the "food", if a bird's nest box is hung in the garden, but there is not enough greenery in the area to collect insects to feed their babies, then the nest box will not be used (Vink et al, 2013). In this way, the mixed planting should respond to the needs of the ecological target group. As for the "safety" and "travel" element, they are explained below.

Finally, one of the outcomes of the Minecraft workshop with stakeholders was to interconnect the inner courtyards of Gele Scheikunde and make them accessible to the public. In other words, to design a communal garden or a park which can also encourage the diversity of the spaces. These communal garden, which was also advised by the landscape architect[3], will not only contribute to the quality of the Gele Scheikunde neighbourhood but enhance ecology on an urban scale and allow travelling. In fact, creating "green corridors" is the best way to facilitate species' displacement. According to the city ecologist, there is a "Fauna corridor" on the Mijnbouwstraat between the Botanic Garden and De Vries van Heijstplantsoen. This corridor specifically serves hedgehogs. These animals are frequently in the city but they are hardly seen because they are active at night. They walk from 1.5 to 3 km per night. They disperse to the city but the roads are the main barriers for them to overcome[2]. Consequently, fauna must be able to reach green places safely. This requires good infrastructure, without barriers. "Fauna corridor" under the road (see image 31) or a squirrel bridge over the road (see image 32) provide ecological connections. If places to stay are connected, the success of nature-inclusive strategies are much higher (Gemeente Amsterdam, 2018).

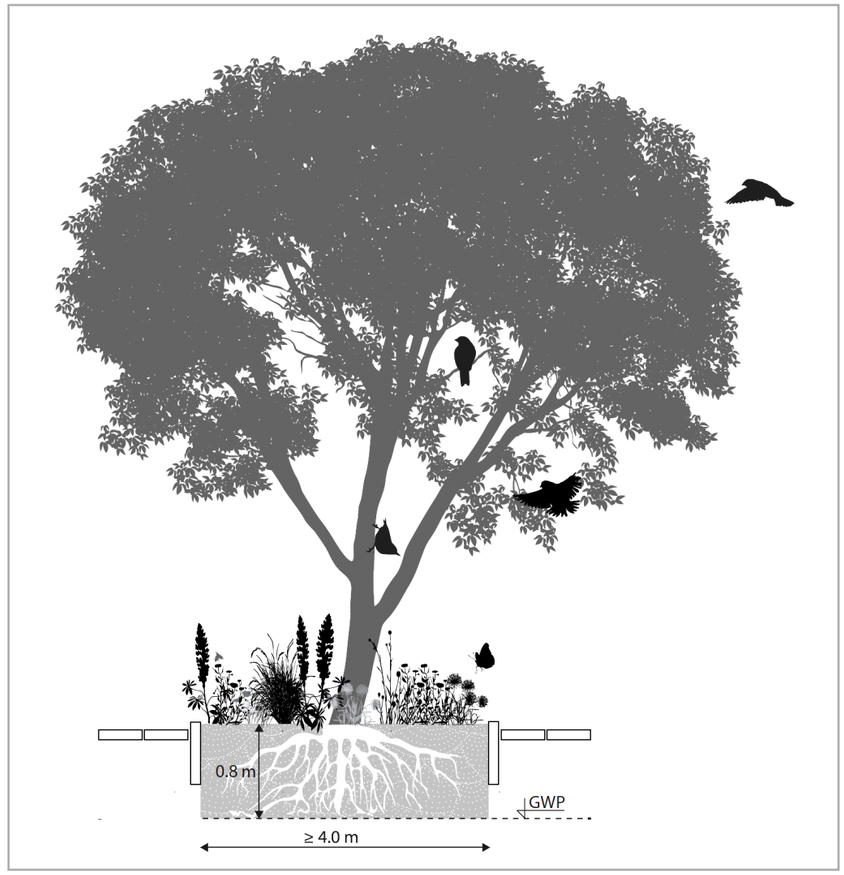


Image 30: Blooming trees and plants.

Retrieved from Gemeente Amsterdam. (2018). Natuurinclusief bouwen en ontwerpen in twintig ideeën. pp12-13.

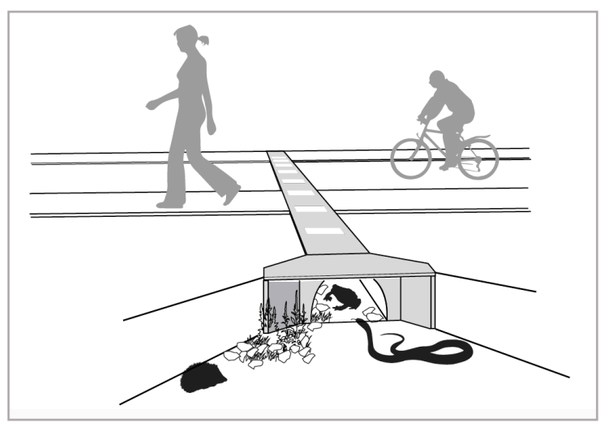


Image 31: Fauna corridor

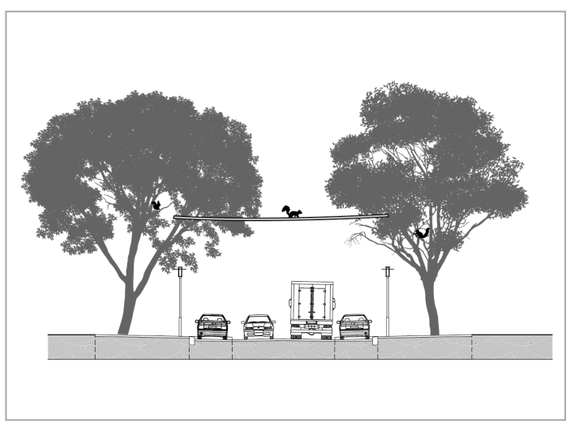


Image 32: Squirrel bridge

Retrieved from Gemeente Amsterdam. (2018). Natuurinclusief bouwen en ontwerpen in twintig ideeën. pp20-21.

2. See the transcription of the Interview with the city ecologist of Delft in the annexe.

3. See the transcription of the Interview with the landscape architect in the annexe.

How can Gele Scheikunde support greater sustainability between TU Delft Campus & the Delft city?

TU is the largest and oldest technical university in the Netherlands located in Delft. On 1 November 2016, the administrators of TU Delft and the Municipality of Delft signed the "Covenant 2016-2026 TU Delft and the Municipality of Delft" for the further development of campus and city. This covenant is a bundle of agreements to sustainably strengthen cooperation between campus and city. Already the sale of the Gele Scheikunde plot is one step towards more sustainable cooperation between two parties. As said in the press release of two developers, *"The sale will reduce TU Delft's footprint.[1]"*

As the chair of the Public Real Estate of the TU Delft explained, the university no longer uses some buildings and their maintenance is expensive while TU would prefer to spend the majority of the budget on education, salaries and research[2]. Consequently, the only solution is to sell non-used buildings. Furthermore, the number of TU campus users has grown significantly in recent years, together with the number of businesses (Gemeente Delft & TU Delft, 2017). Which result in an urgent need for housing. Consequently, Gele Scheikunde will be repurposed for housing.

According to the outcome of the Minecraft workshop, the relation between the city and the campus is valuable but also challenging. This relation brings up the notion of mobility which was one of the main discussion subjects. Apart from this, in the Spatial Development Perspective of TU Campus (2019), the campus in future should become "walkable" and the city "bikable." According to the campus visions, Mekelweg will become a Mekelpark. The vision's focus is on the pedestrian in the centre of the campus which means that the orientation of cyclists should change. The Mekelpark will become bigger and get higher quality if cycling crowds and cars will be removed from the Mekelweg. The main bike path will be crossing the Gele Scheikunde plot and cars will be moved to the perimeter of the campus and out of the city centre (see image 33).

Besides, since Gele Schiekunde is the border between the city and the campus, the best way to support the relation between those parties is by introducing programs that support the campus[3] like co-working and student housing. According to the interview with the representative of DUWO, Gele Schiekunde is the best location for student housing[4].

Another subject of the workshop with stakeholders was the profile of the Michel de Ruyterweg. The idea was to use the building on the Michel de Ruyterweg as an extension for education since it is facing the Architecture faculty. Also to introduce a public program like catering. Besides, currently the spaces in these buildings are rented to young professionals as workshop spaces. One of the Proeffabrieken laboratories is occupied by the research and product development Hyperloop. Another Proeffabrieken building will become a school[5]. Consequently, the Michel de Ruyterweg area could have a public program of research and catering to support the campus but also to remind of a past educational purpose.

Finally, according to the Spatial Development Perspective (2019), campus buildings will be more compact, space more efficient, more energy-efficient and flexible in use for multiple target groups at the university. This also means something for the use of public space and the green and blue structures on campus (see image 34). The integration of the campus in larger green and blue structures strengthens the ecological structure and forms the transition between the landscape of Midden-Delfland and the urban fabric of the city of Delft. Gele Scheikunde will serve as a connection point in the ecological structure.

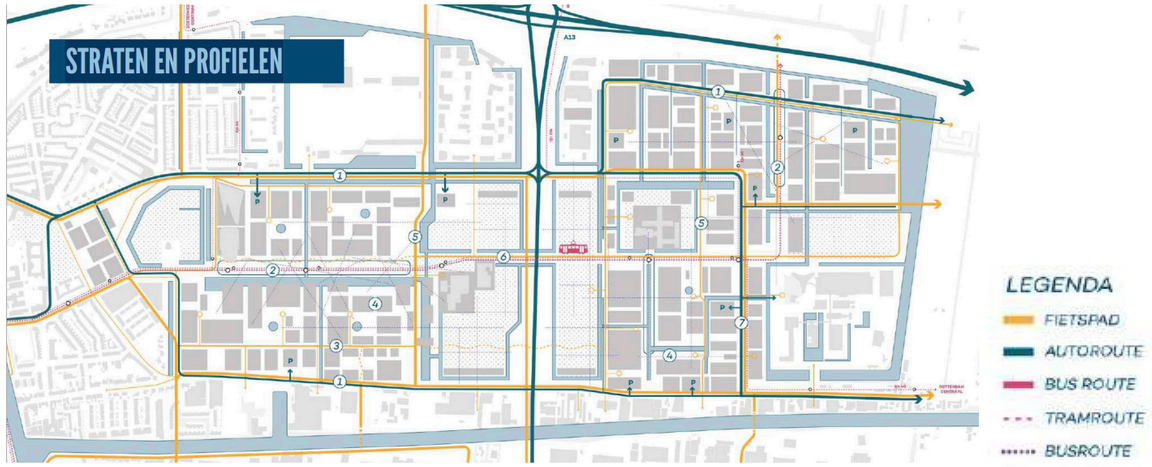


Image 33: Spatial vision "Change Orientation"

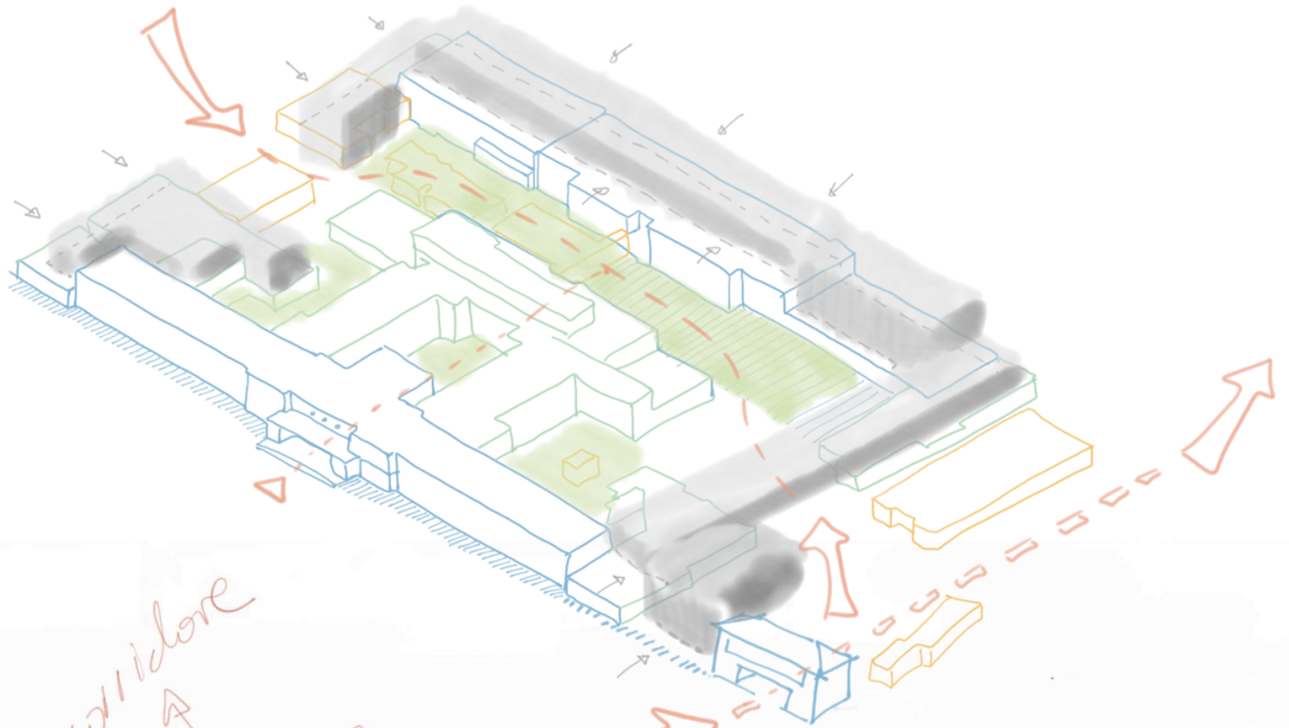
Retrieved from Posad spatial strategies. (2019) "RUIMTELIJK ONTWIKKELPERSPECTIEF TU CAMPUS" I TU Delft. p23

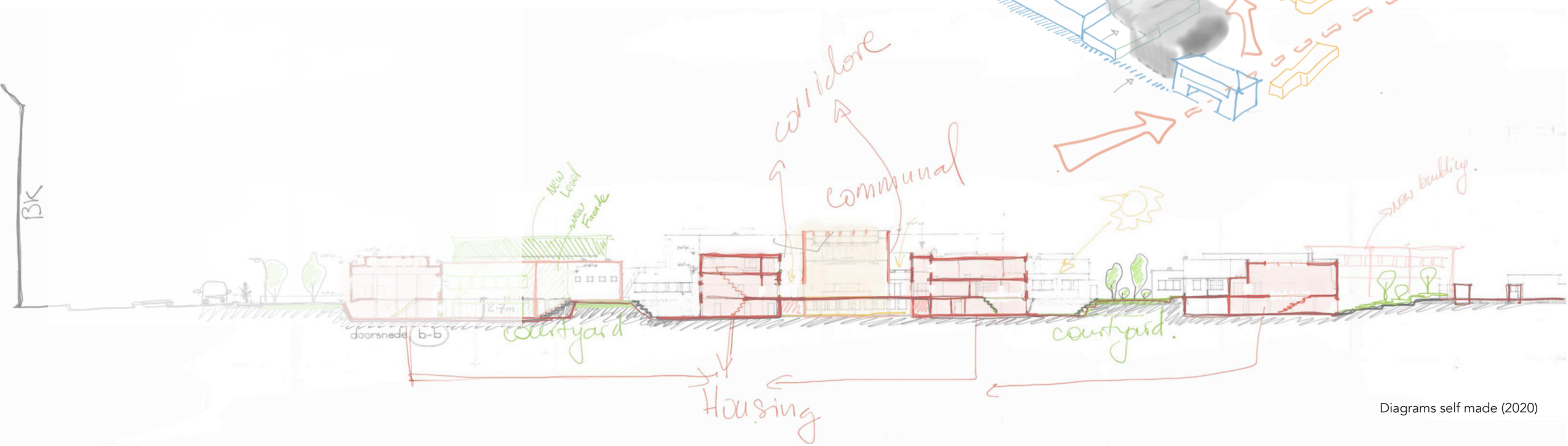
Image 34: Green & Blue structure

Retrieved from Posad spatial strategies. (2019) "RUIMTELIJK ONTWIKKELPERSPECTIEF TU CAMPUS" I TU Delft. p11

1. Information retrieved from the press release. 20200204-Persbericht-Gele-Scheikunde.pdf
2. See the transcription of the chair of the Public Real Estate of the TU Delft in the annexe.
3. See the transcription of the manager of Real Estate Development of TU Delft in the annexe.
4. DUWO is the largest student housing corporation in the Netherlands. See the transcription of the representative of DUWO in the annexe.
5. *"TU Delft sold the Kramerslab, that was part of the Gele Scheikunde, in April 2019. The Municipality of Delft paid the symbolic amount of EUR 1 for it. The Municipal Executive saw the area as the only option to locate an international secondary school. "* According to Marjolein van der Veldt, (n.d.). Retrieved in October 13, 2020, from https://www.delta.tudelft.nl/article/gele-scheikunde-makes-way-homes.

PRELIMINARY DESIGN



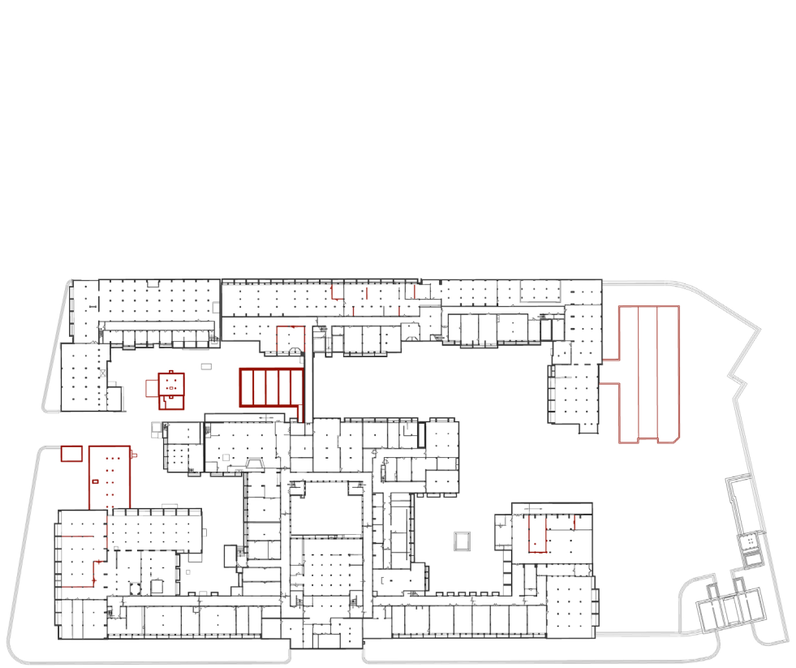


Diagrams self made (2020)

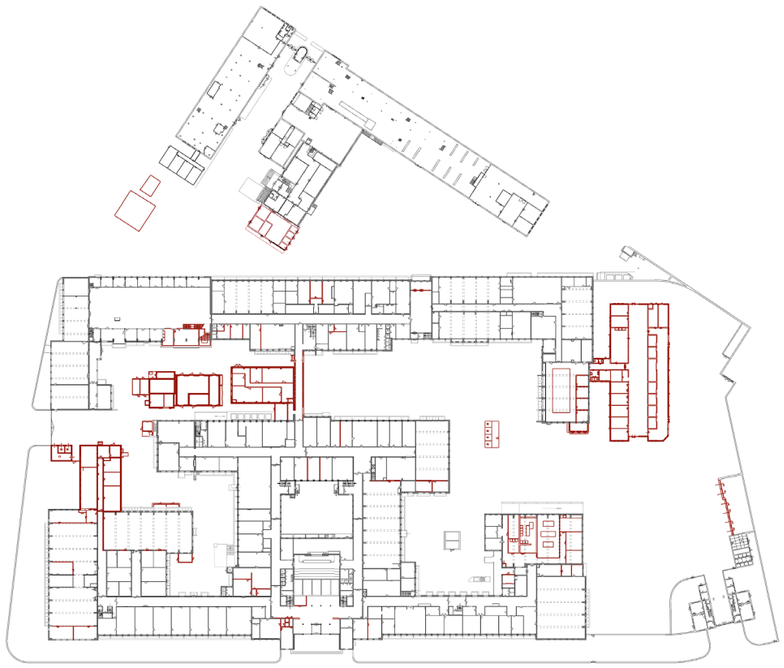
VALUES & ATTRIBUTES

TO KEEP, TO CHANGE, TO DEMOLISH

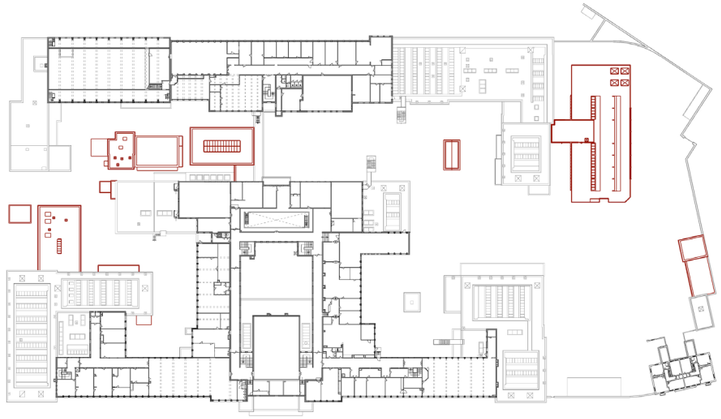
First Step: As concluded in the chapter “Case study” page 19 and 20, the Gele Scheikunde site is marked by various built volumes from different periods. Additions such as warehouse, additional lab and autoclavenlaboratorium do not represent the Gele Scheikunde, so do not contribute to its identity. For instance, the Autoclavenlaboratorium doesn’t have the appearance and construction principle similar to Gele Scheikunde. Warehouse with additional labs disturb the inner spacial composition. Which is why these additions (in red) can be demolished.



Basement



Ground floor

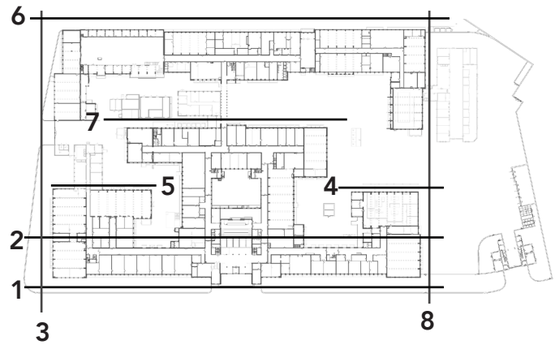


First floor

Diagrams self made (2020)

TO KEEP, TO CHANGE, TO DEMOLISH

Second Step: In this page, the facades are studied. As concluded in the chapter "Values & Attributes assessment" p41 and according to the outcomes of the workshop with stakeholders, the most recognizable features of the building are long facades which are reinforced by the window strips with the continuous prefab concrete lintel above them and the slightly protruding concrete roof edge (Macel et al, 1994, pp 50-56). These facades are marked with BLUE, and the facade parts that don't have the same concept and that have no specific value are in RED.



Drawings retrieved from Archives, Bouwvergunningen Delft. Inventory numbers: 953.10452; 953.32284;

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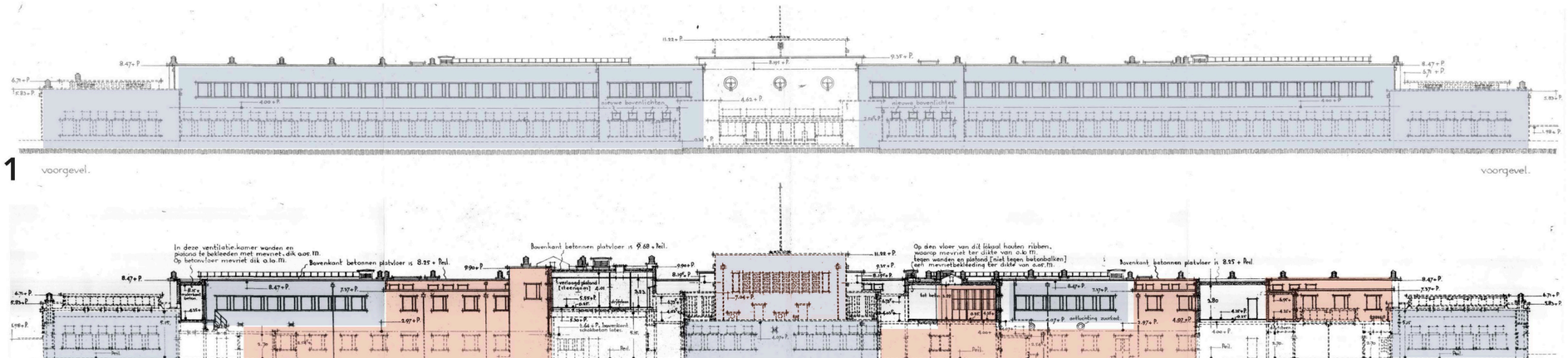

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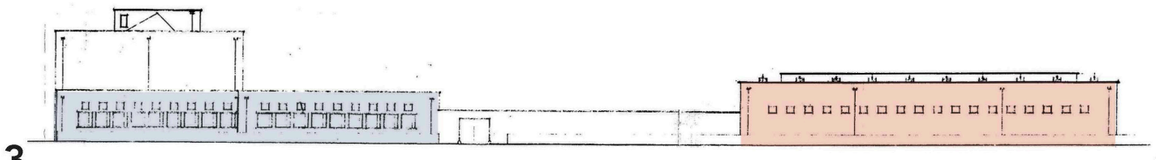

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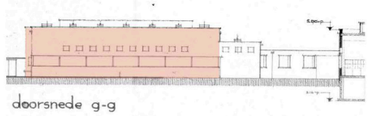

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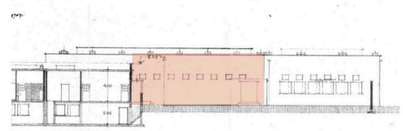

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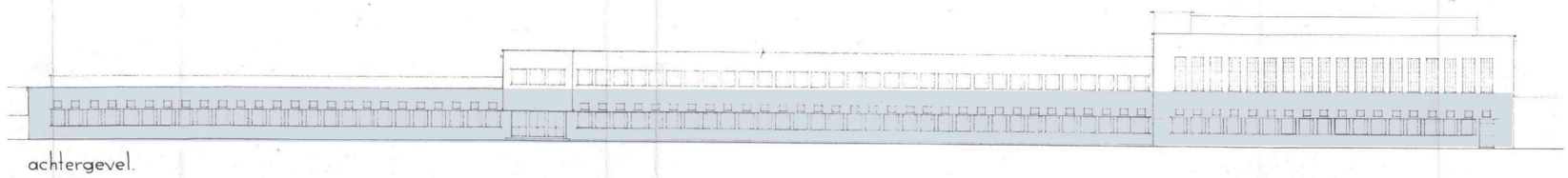

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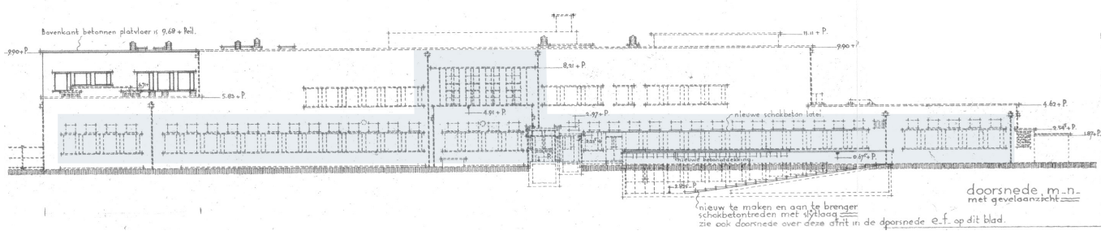

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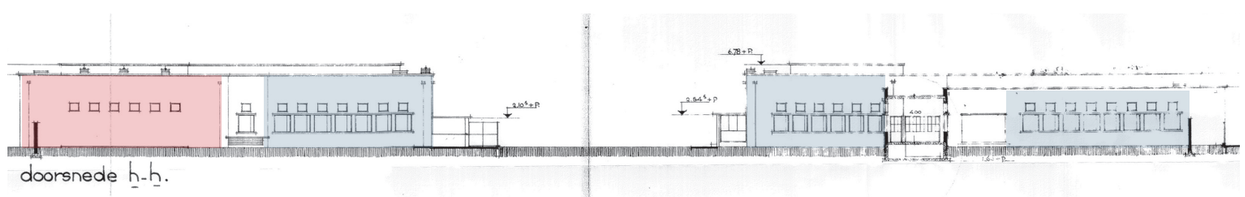


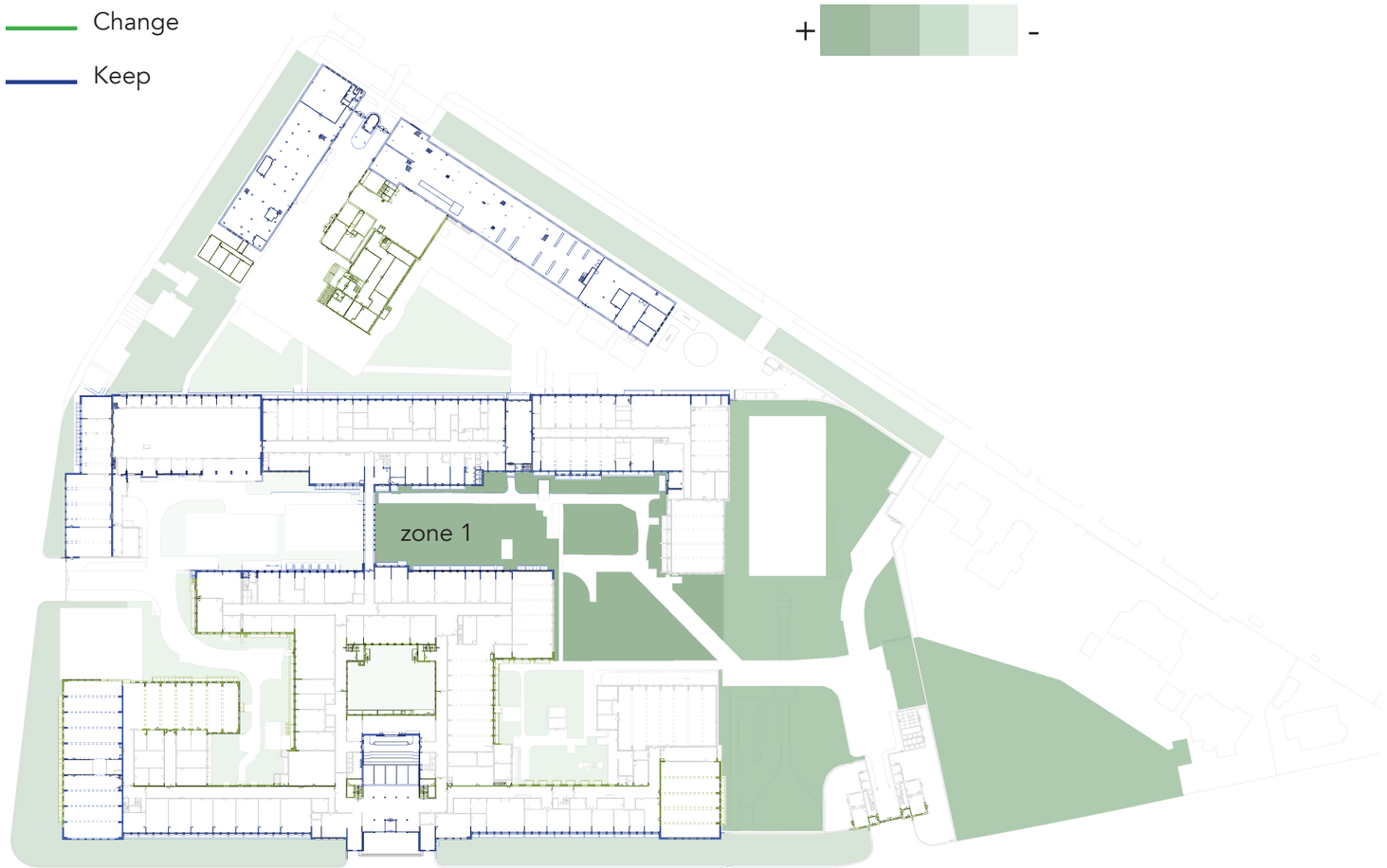
TO KEEP, TO CHANGE, TO DEMOLISH

Third Step: Following the previous page and combining with the conclusions of the chapter “Values & Attributes assessment” p41 and of the workshop with stakeholders, the most characteristic features of the Gele Scheikunde are; the skin - facades, the form - layout; the Julianalaan entrance; the porter-house facade and the courtyards. The interior, except for the lecture hall, can be easily adapted for the new function.

On the floorplans the most iconic features of the Gele Scheikunde and Proeffabrieken are marked;
In BLUE are parts that should be kept as original for the exterior appearance since they are character-ized by window strips with the continuous prefab concrete lintel.
In GREEN are parts that can be changed to respond better for the new use, but may remind of the original appearance if possible (according to the previous page).

The rest in GREY should be kept for structural needs only since the interior walls are load-bearing. For instance, the corridor walls are load-bearing, consequently, in the new plan, the corridor form will be recognised. The separation walls can be changed freely for the new functions. The basement is not shown below, however, its value is purely structural (see the conclusion p31-32).

The value of the greenery is marked with different shades of GREEN. The courtyards are an important feature of the complex, however, they were not maintained. Their value is judged according to the number of different species. Besides, the courtyards are an important visual connection for the interior of the building. It is difficult to judge how they were used in the past, however, according to the archive documents, the middle courtyard - zone 1, used to be a labyrinth, most probably accessible by the public. In the conclusion, the courtyards should be changed but the quantity of green should stay the same and be enhanced according to the conclusion of the sub-chapter “Ecology” p52.



Ground floor

First floor

Diagrams self made (2020)

MOBILITY

NEW AXES

As concluded in the chapter “Univer-cities” p55, and according to the outcome of the workshop with stakeholder, mobility is one of the essential subjects. In the future vision of the TU Delft, the main bike path will be crossing the Gele Scheikunde plot and traffic will be moved to the perimeter of the campus and out of the city centre (see image on p55). This vision serves as the starting point for the design.

This plan shows the new bike paths and a new car road. The traffic will be partially moved out from Michiel de Ruyterweg. The TU-Nord neighborhood will be accessible by cars solely for the residents. In red circle is the zone that might become busy if the parking and circulation are not carefully designed. Since, Michiel de Ruyterweg will be partially free of cars, the zone in the red circle is the most suitable location for the underground parking entrance.

The bike path that comes from Maerten Trompstraat, goes through the porterhouse. It will connect one of the main bike paths from the city centre with the bike path of the campus, which is also a way to make the site more accessible for the public.

Finally, nowadays the site is private. The interior courtyards are currently forgotten, although they have the potential of becoming a recreational area for the neighbourhood. The path in black dots is showing how the site will be opened up for pedestrians.

Plan self made (2020)

ECOLOGY

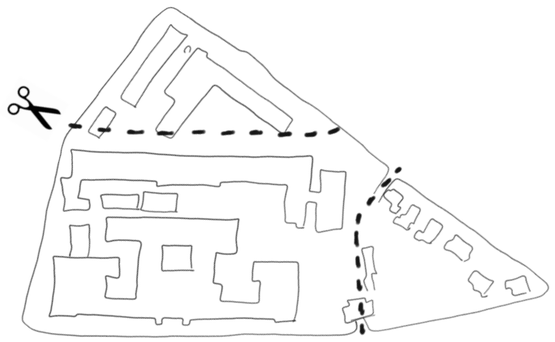
NEW CORRIDORS

As concluded in the chapter “Ecology” p53 and according to the outcome of the workshop with stake-holder, the courtyards of the Gele Scheikunde should be interconnected to give the inside of the site a better quality. Besides, the interconnected courtyards can become a communal garden accessible for the neighbourhood, which not only contributes to public life but will become a part of the green corridor. By creating the green corridor the possibility for biodiversity is promised.

Plan self made (2020)

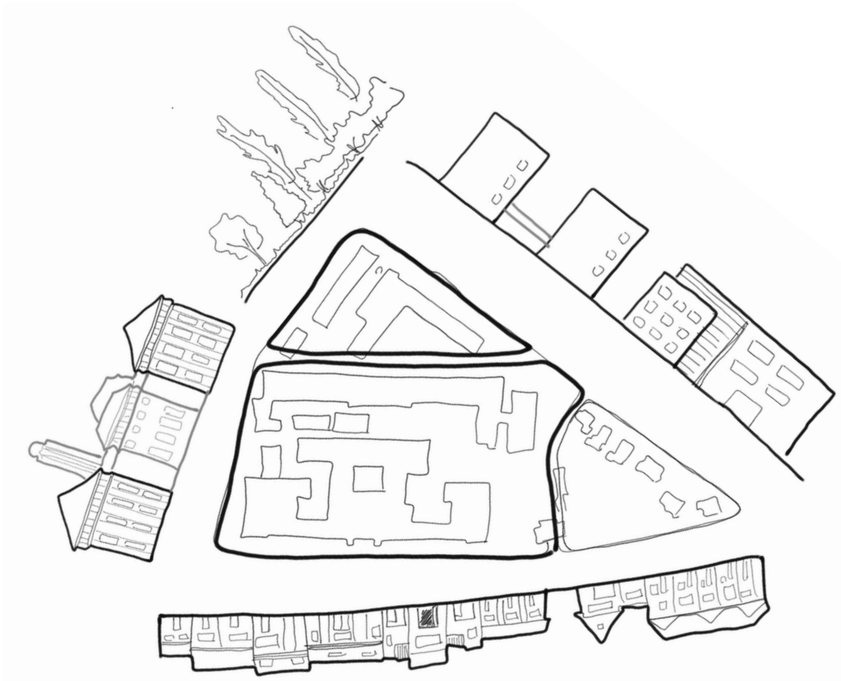
SITE CONCEPT

NEW AXES



In respect to the mobility outcomes, the new interior axes divide the site into 3 pieces.

RELATIONS



The surroundings influence each piece of the site giving them a different range of privacy.

PUBLIC / PRIVATE

Every part of the plot is given a specific function according to the characteristics of the piece. Public, mixed and private.

private — public

mix

Diagrams self made (2020)

MASTERPLAN

LEGENDA:

- Gele Scheikunde complex
- Private: Residential program
- Public: TU Campus
- Public: Industrial / Comercial
- Green space

SURROUNDING:

1. Red Chemistry
2. Former Analytical Chemistry
3. Former Physics Faculty
4. Minnig Engineering
5. Microscopic Anatomy
6. Botanic Garden
7. Physics & Electrical Engineering
8. Student housing
9. Geodesy
10. Student housing
11. Mechanical & Maritime Engineering
12. Elderly care
13. Jaffa cemetry
14. Delft train station
15. Royal Delft factory
16. TU Delft campus
17. International school
18. TU Aula
19. Library
20. The Hague University

SCALE 1:5'000

Plan self made (2020)

AXONOMETRY

200 HOMES

+

COMMERCE

50% GREEN

- **50% FOR SALE** (3 BEDROOM APPART; 2 BEDROOM APPART)
- **25% FOR RENT** (YOUNG PROFESSIONALS)
- **25% DUWO** (STUDENT HOUSING)
- **CATERING**
- **CO-WORKING**

The Gele Scheikunde site will have 200 homes for rent, purchase, social housing and student housing. Such programs as co-working, communal facilities and cafeteria are also envisioned. Besides, the master vision is to keep 50% of greenery on the site according to the regulations.
The new dwellings (in grey) should be stepped back from the existing facade plane to remind of the original appearance, both on the site and as additional rooftop levels. The basement level of Julianalaan is opened up to improve light penetration and usability. Furthermore, new facades are designed to respond to the nature-inclusive concept. Green roofs will be designed to compensate for the lost green on the ground, absorb rainwater and deal with the summer heat.

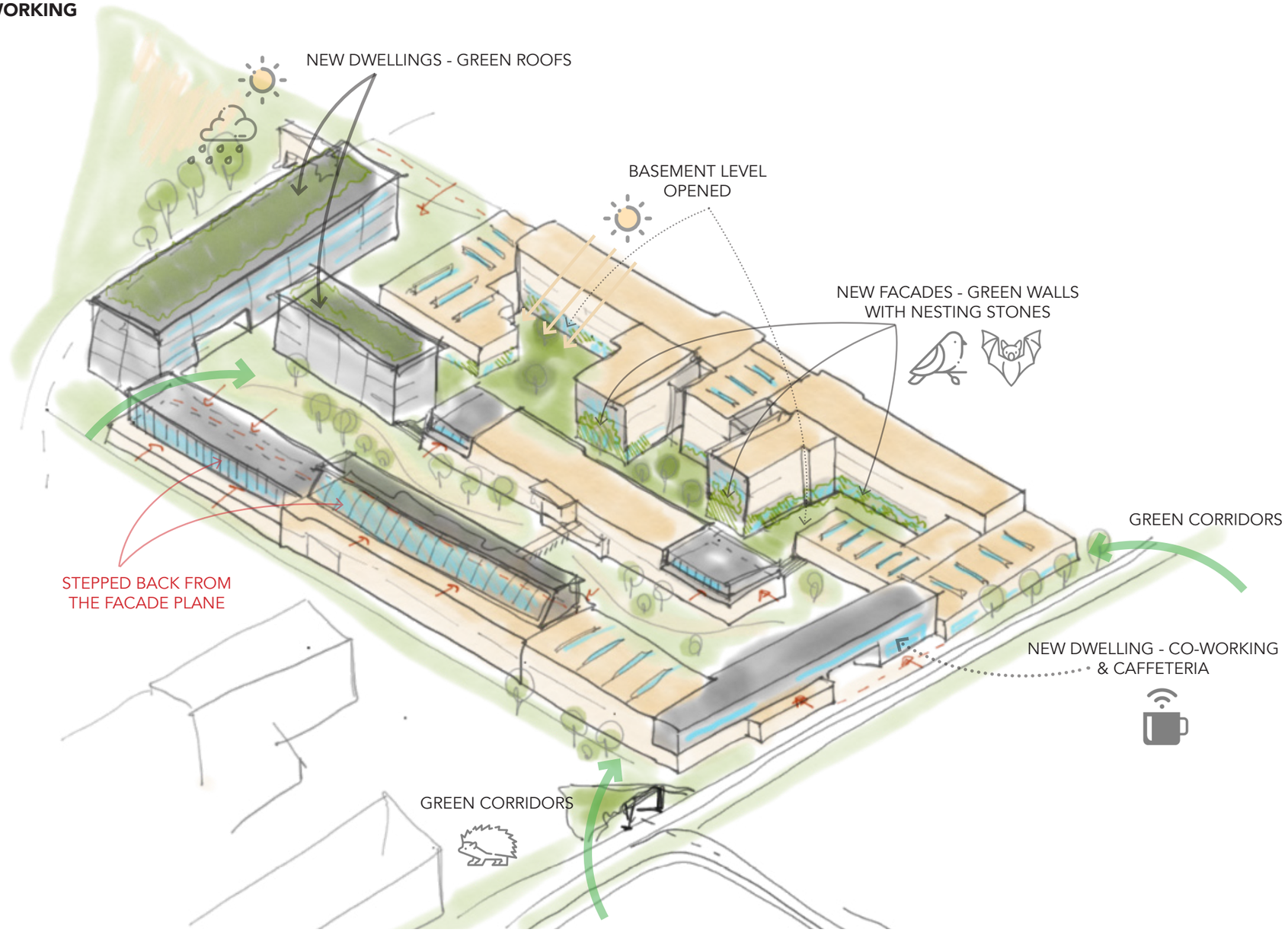


Diagram self made (2020)

FINAL DESIGN

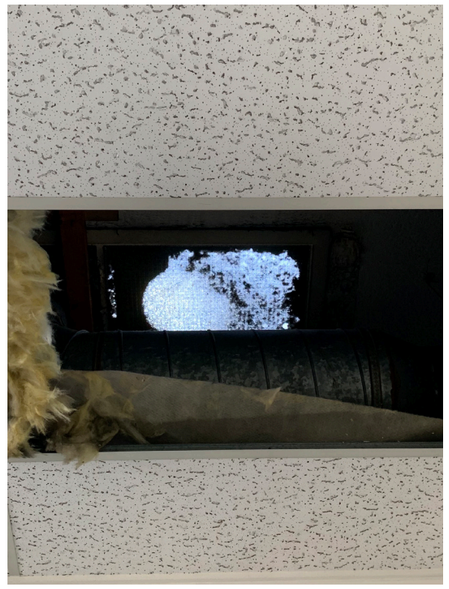
DILEMMAS & SOLUTIONS

EXISTING

Closed basment window = no light - not suitable for living

Long corridor with no natural light = not suitable for living

Technical instalation = no need



Closed ceiling light = no light

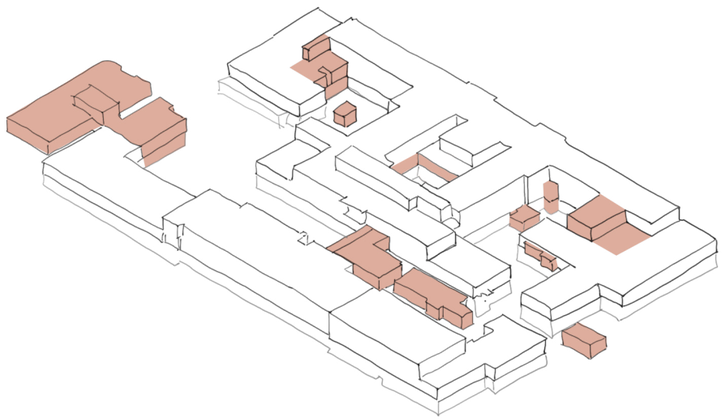
Facade with no proportion, no rythm system = no value

Interior is too busy =industrial character not suitable for living

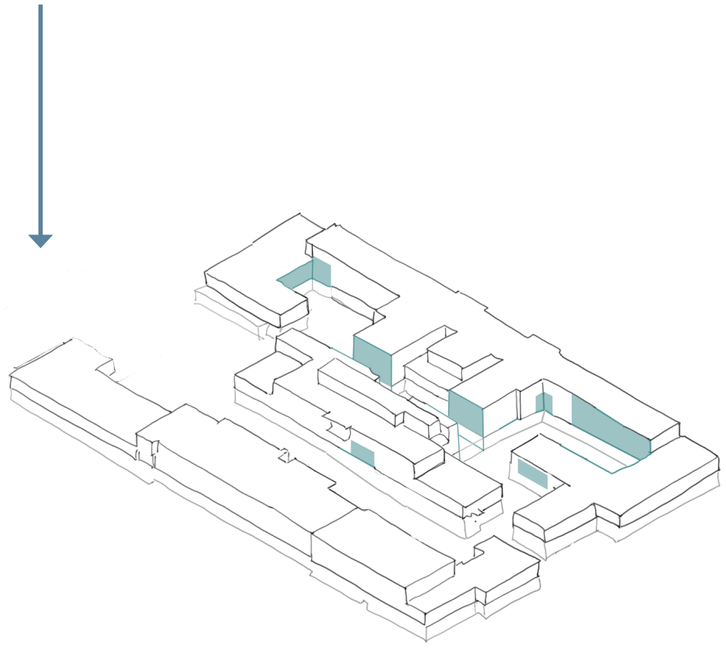
DILEMMAS & SOLUTIONS

3 STRATEGIES

CLEAN

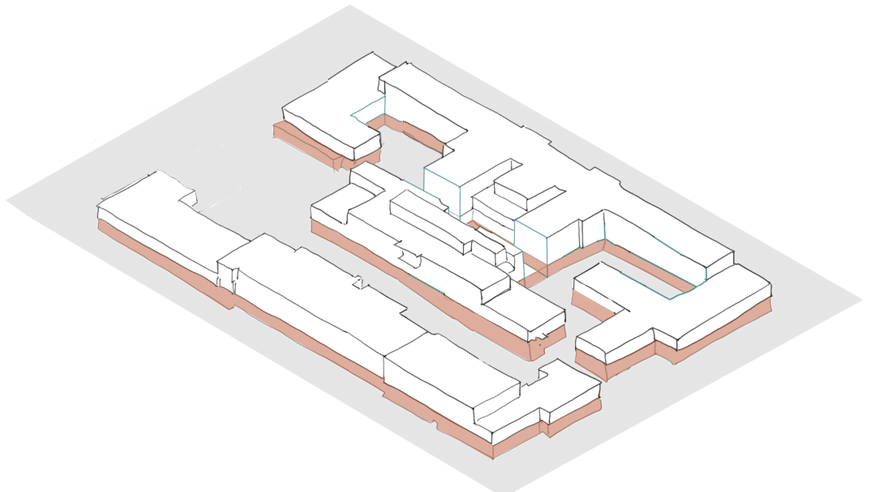


Unclear spatial qualities

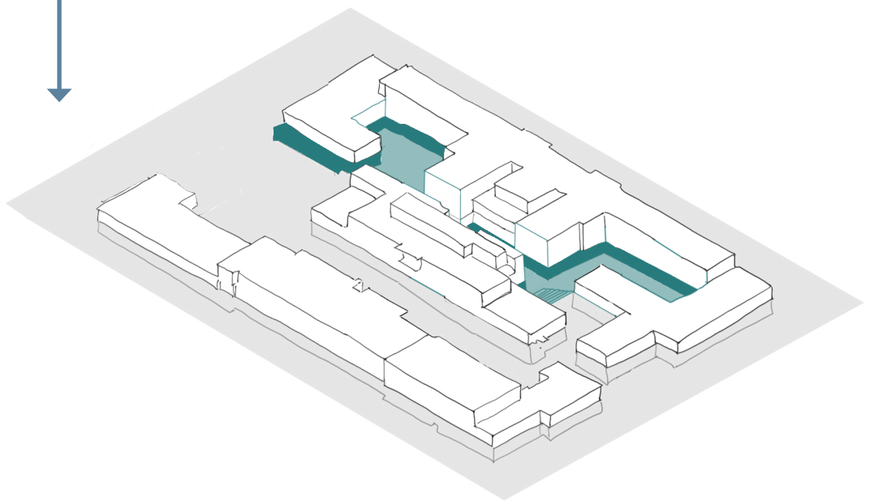


New qualities

OPEN

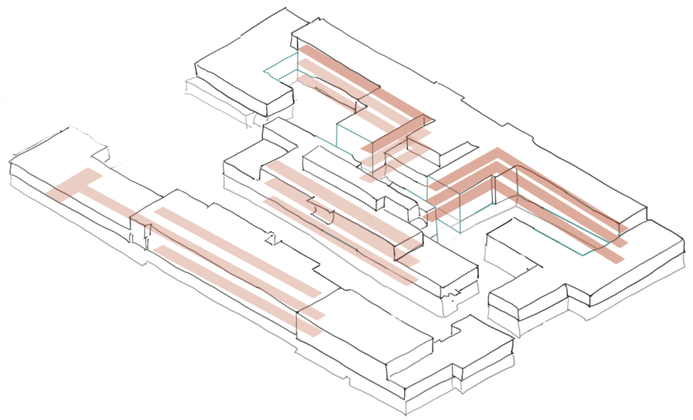


Dark underground basement

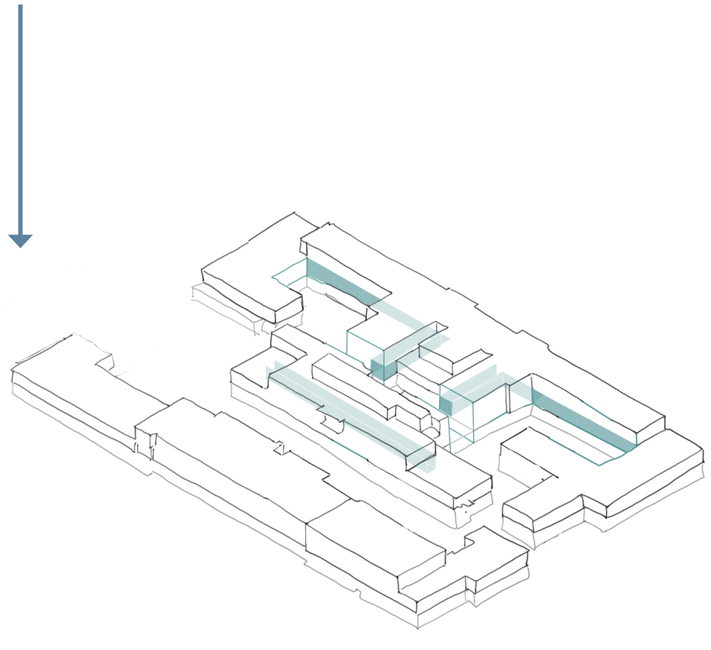


New level

SIMPLIFY



Too much long circulation paths



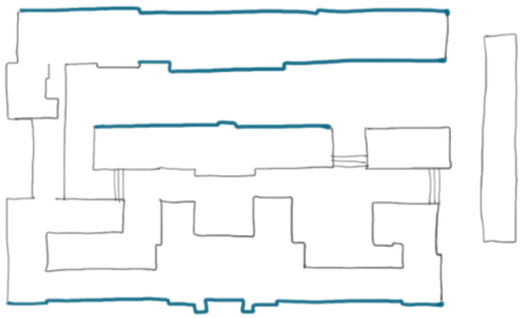
New circulation & centrality

APPROACH

EXTERIOR & INTERIOR

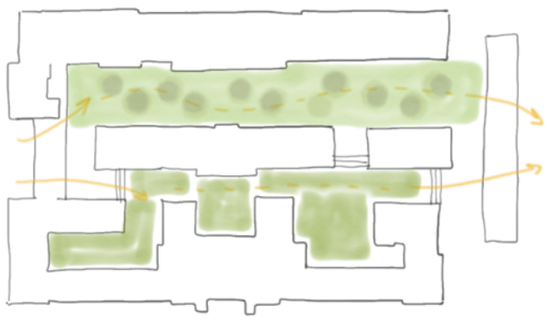
EXTERIOR SKIN

KEEP - VALUE



According to the evaluation of the stakeholders, the appearance of the Gele Schiekunde is of hight value due to its horizontal and long character.

GREEN

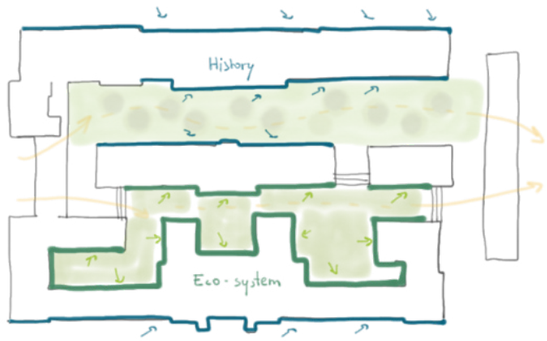


The ecological values dictate the quality of the interior of the site. Besides, the interior green should support the ecology of the neighborhood and respond to the nature inclusif concept.

INTERIOR SKIN

Change

Keep



The new residential program require radical intervention, both to improve quality of the space and sustainability. The removed parts of the building are replaced with a new climat adaptive and nature inclusive elements

APPROACH

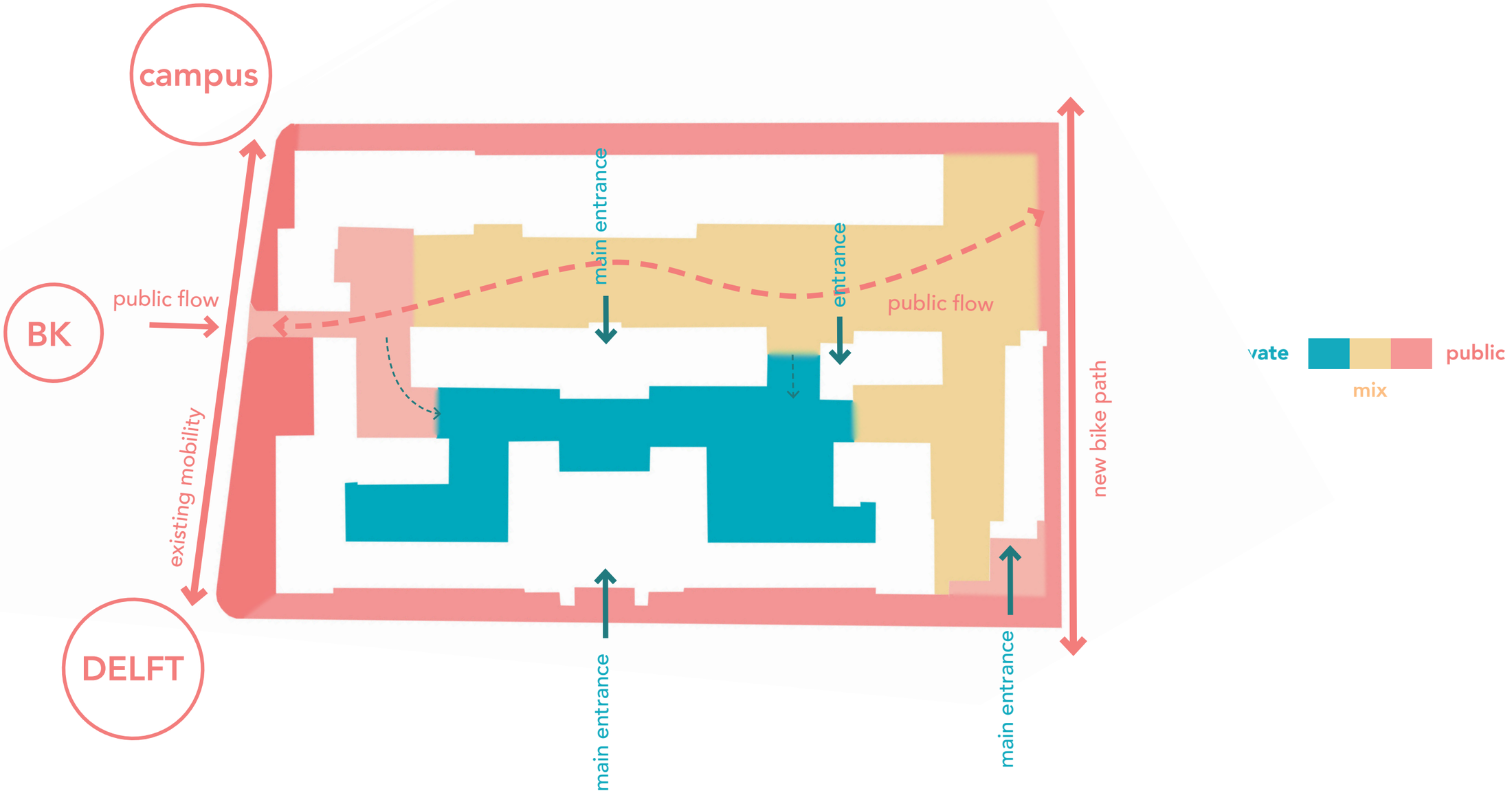
SITE CONTEXT

In respect to the relationship between the site and the Campus, the public and private programs are connected with intermidiate spaces.

The corner of the complex at Michiel de Ruyterweg which faces the BK is a public zone that supports the neighbouring university (in red)

The central courtyard is freed and is semi-public (in yellow)

The basement is one of the challenges of this project. It is lit only by the basement window. In order to transform the basement level into a living space, the ground level is adjusted and new courtyard created (in blue)

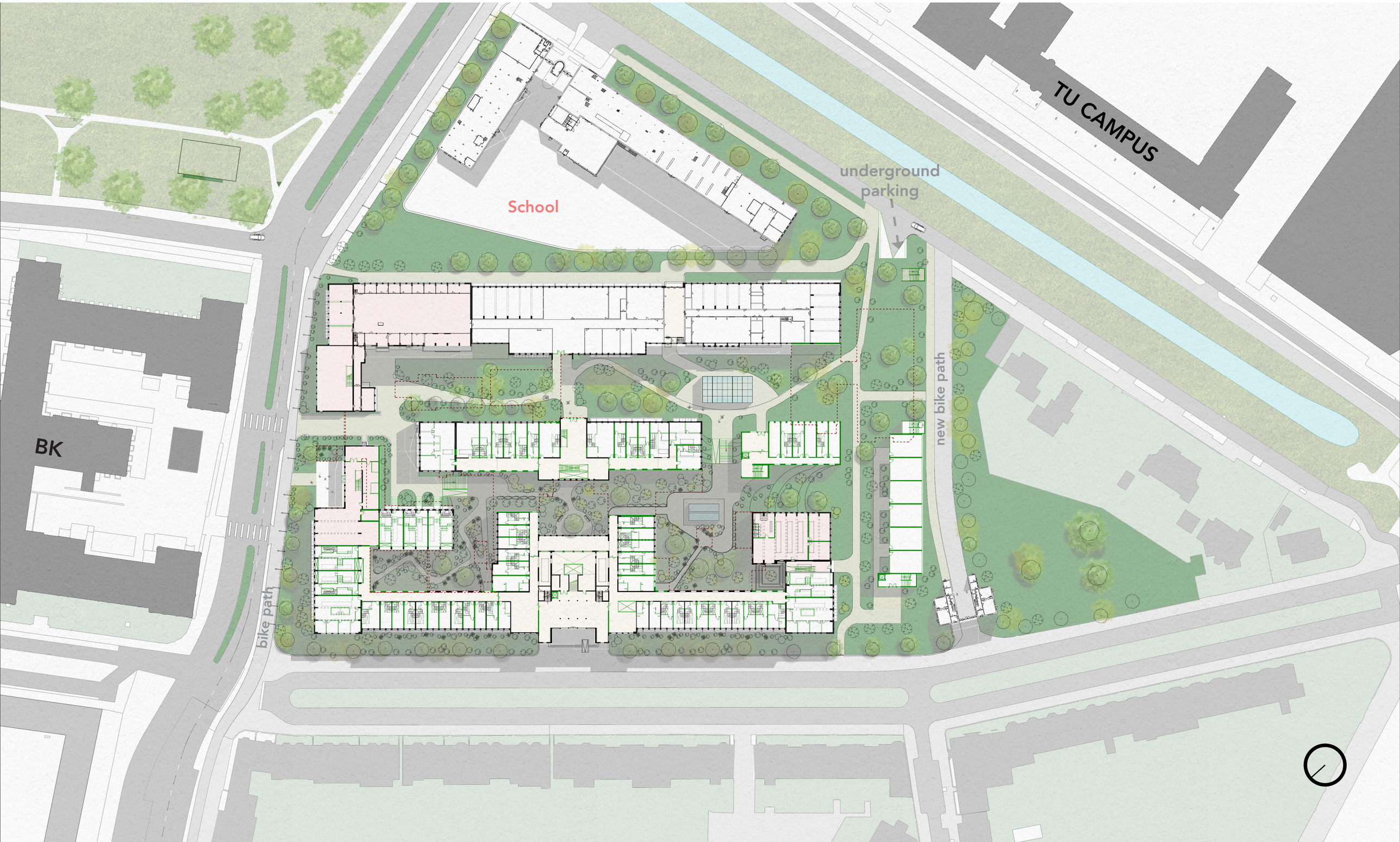


MASTERPLAN

1:5000

private public

mix

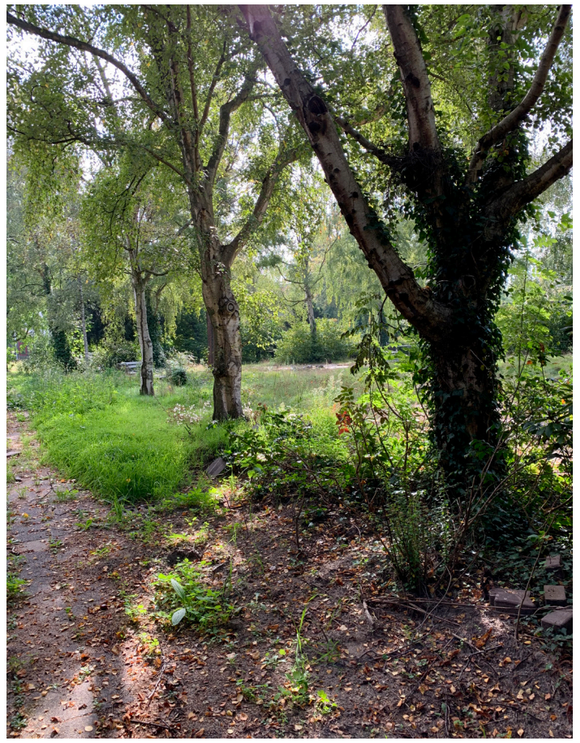


MOOD BOARD

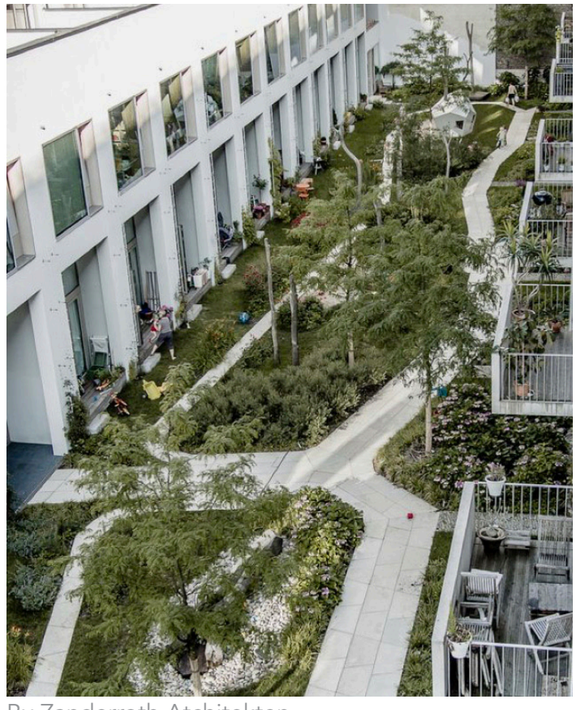
INSPIRATION

The following 3 pictures of Gele Scheikunde represent its identity. And these 3 atmospheres influences the way I decided to intervene in the existing building.

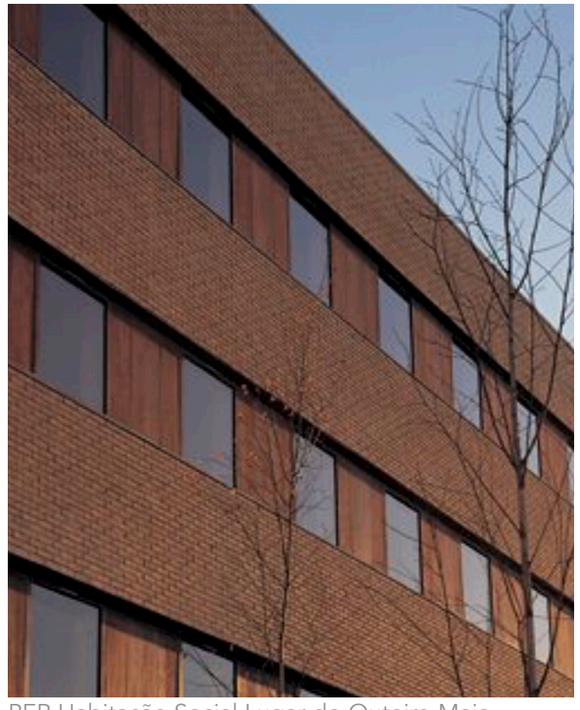
The 3 inspiration projects present qualities that I wanted to achieve in this project. So to integrate the built environment with nature, then to enhance this nature and make a usable for people and to design new architecture in a sustainable way all by creating unity with the existing.



Funenpark Amsterdam Dikke



By Zanderroth Atchitekten



PER Habitação Social Lugar do Outeiro Maia

SPACE PROGRAM

OVERVIEW

The program was developed according to the outcomes from the workshop, personal observations and research on social needs. Different housing types are distributed in different building parts. For instance, student housing is located in a separable part of a complex facing the school. While housing for families is located in a part that is facing residential buildings (Julianalaan).

FLOORPLANS

GROUNDFLOOR 1:500

Workshop

DUWO

STUDENT HOUSING ~200 STUDIO

Green house

TOTAL: ~300 LIVING UNITS

TOTAL: ~100 APARTMENTS

Entrance hall

~12 APARTMENTS

28 APARTMENTS

Cafe / Bar

60 APARTMENTS

Meeting

Co-working

Fitness club

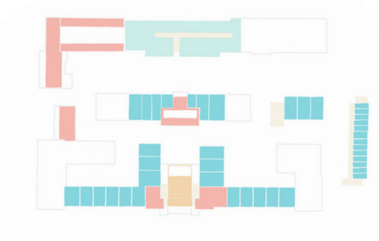
Shared lounge

Entrance hall

Shared lounge

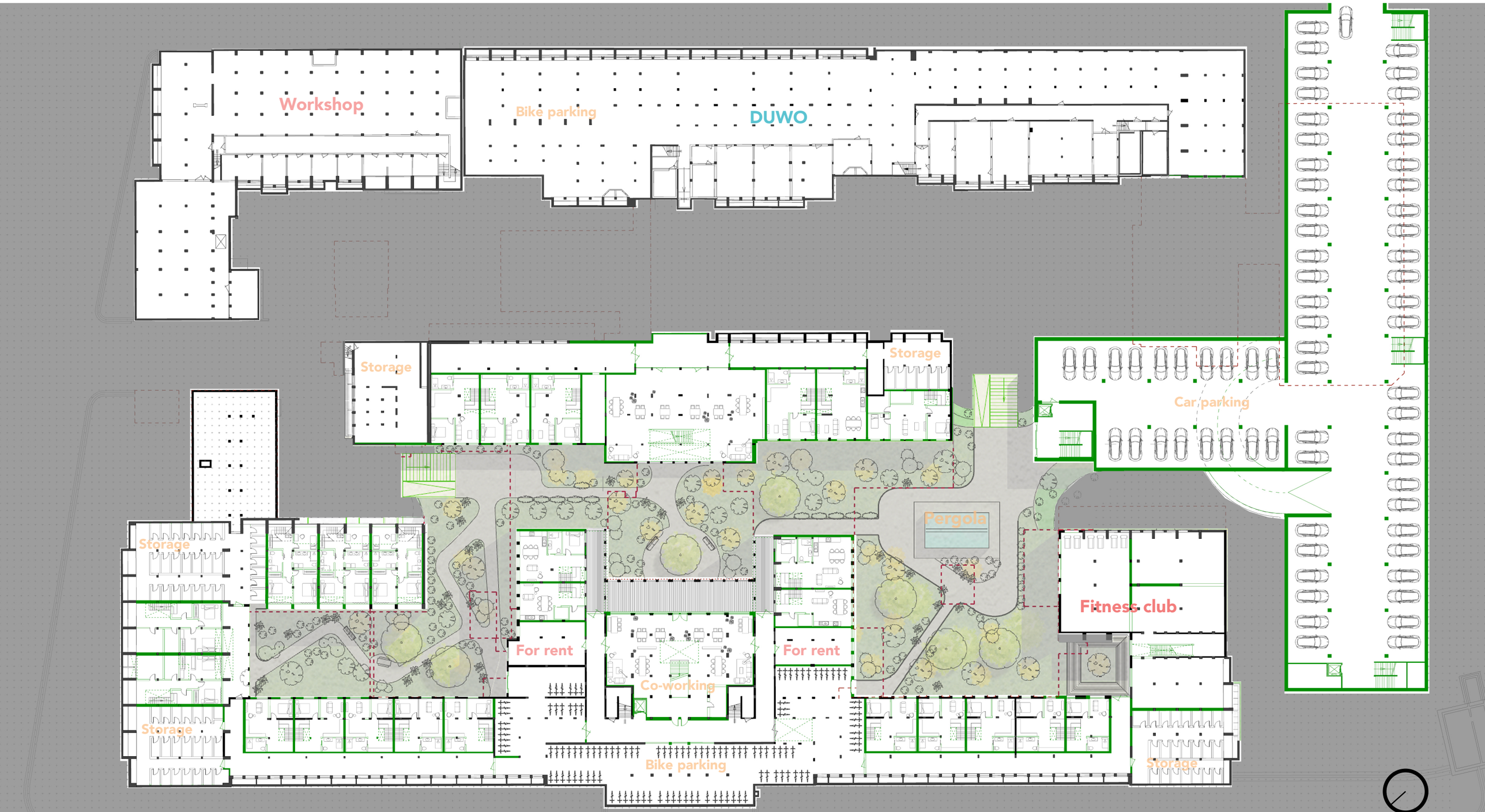
FLOORPLANS

1ST FLOOR 1:500



FLOORPLANS

BASEMENT 1:500



LIVING UNIT

TYPE “ROW” VAR 1

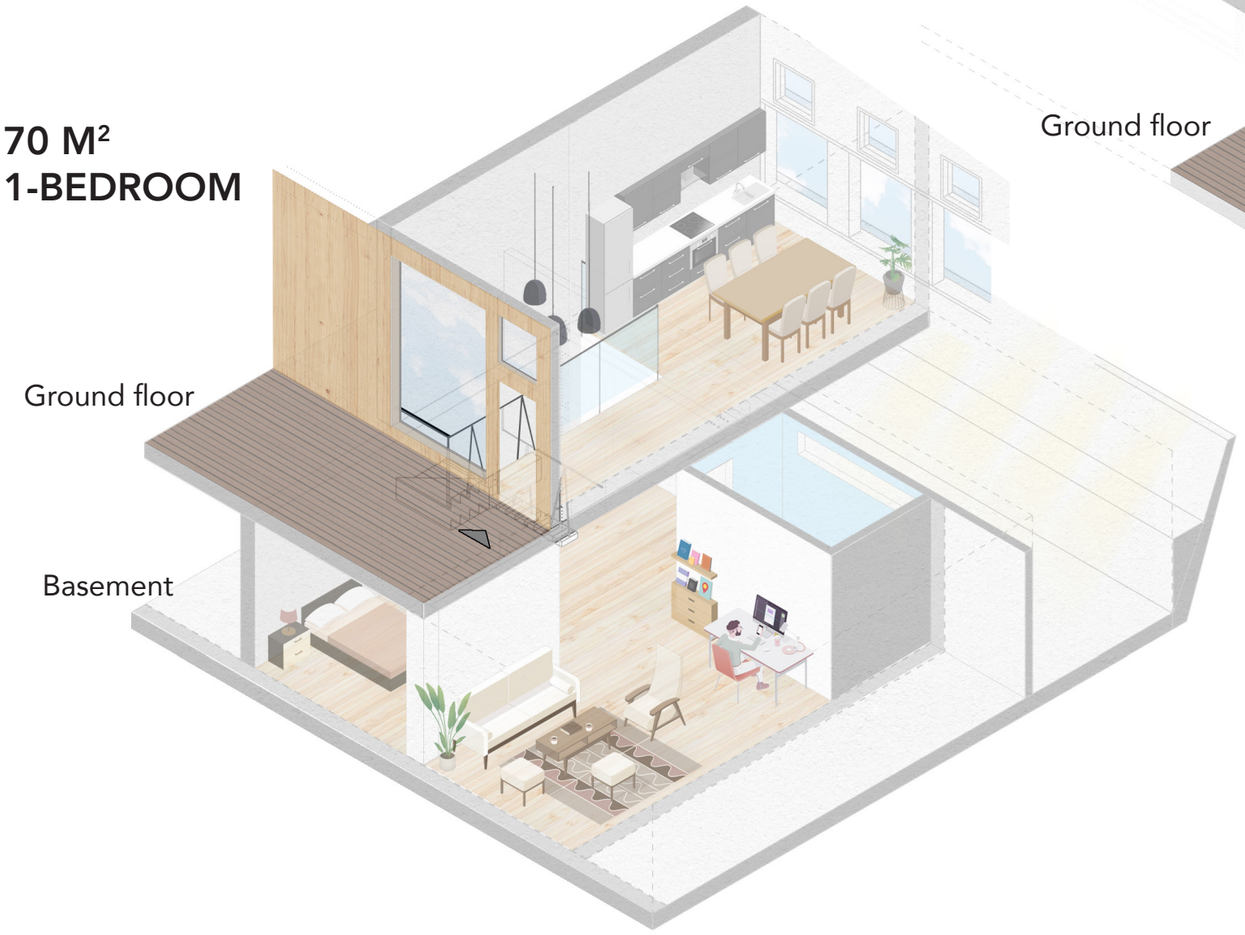
TARGET GROUP:

YOUNG PROFESIONALS

COUPLES

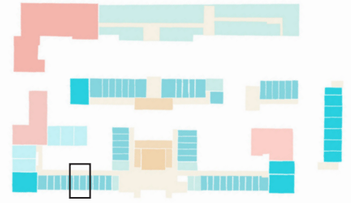
90 M²
2-BEDROOM

70 M²
1-BEDROOM



LIVING UNIT

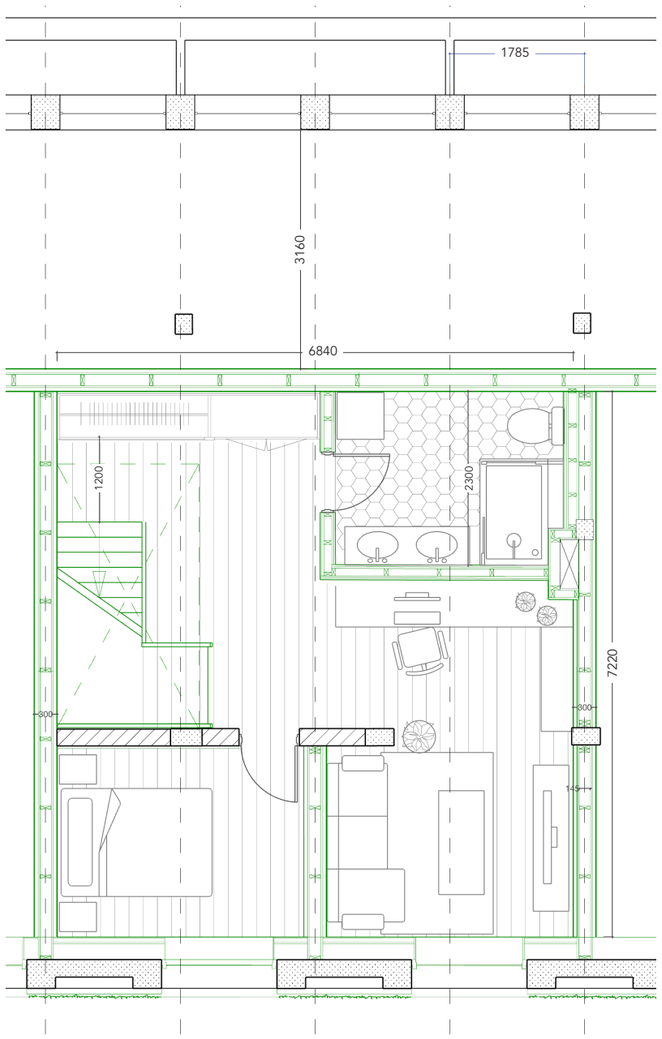
TYPE “ROW” VAR 1



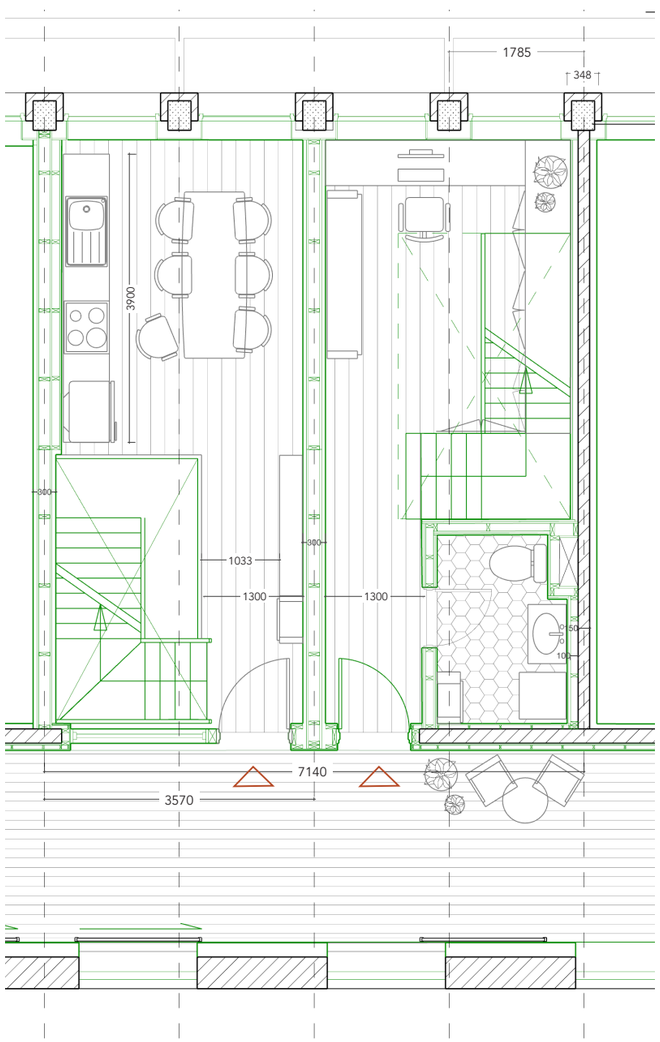
TARGET GROUP:

YOUNG PROFESIONALS

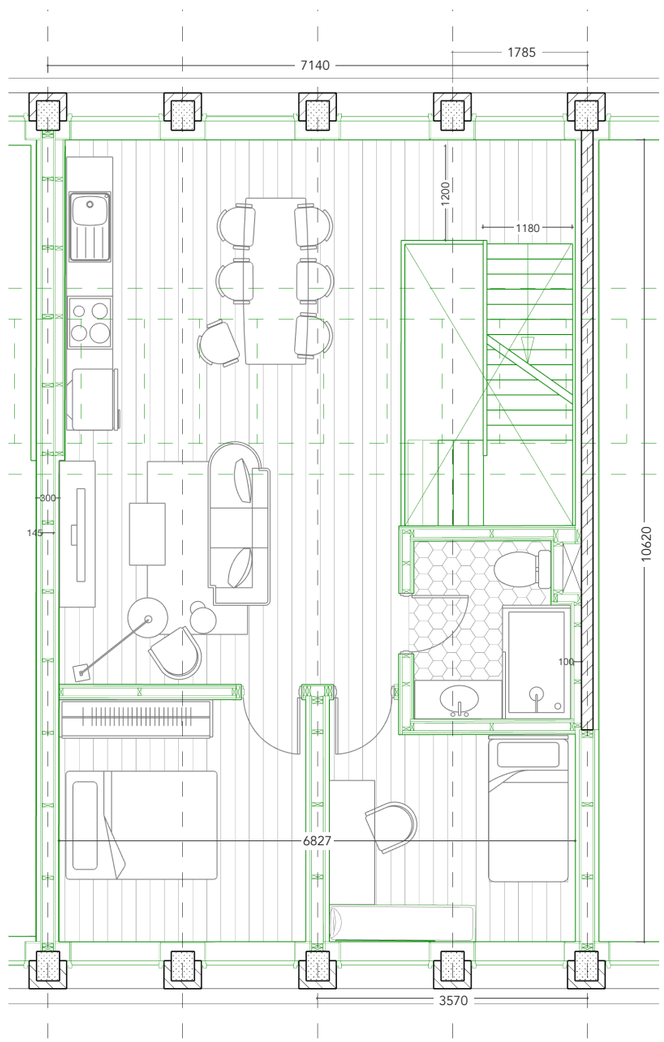
COUPLES



50 m²
Basement



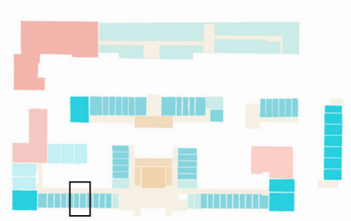
25 m² 20 m²
Ground floor



65 m²
1st floor

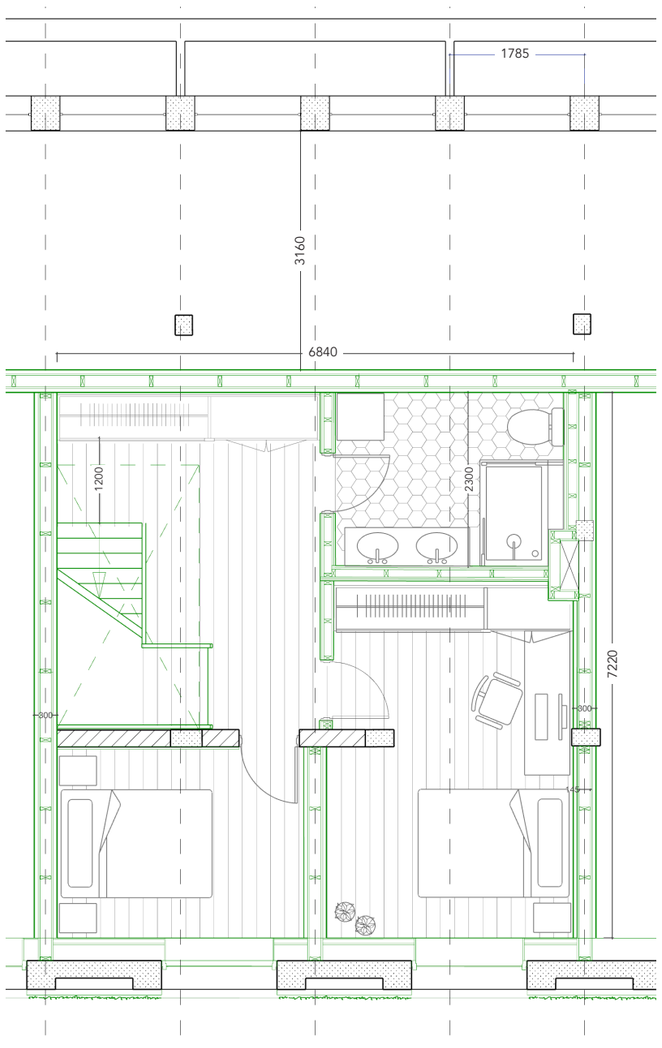
LIVING UNIT

TYPE “ROW” VAR 2

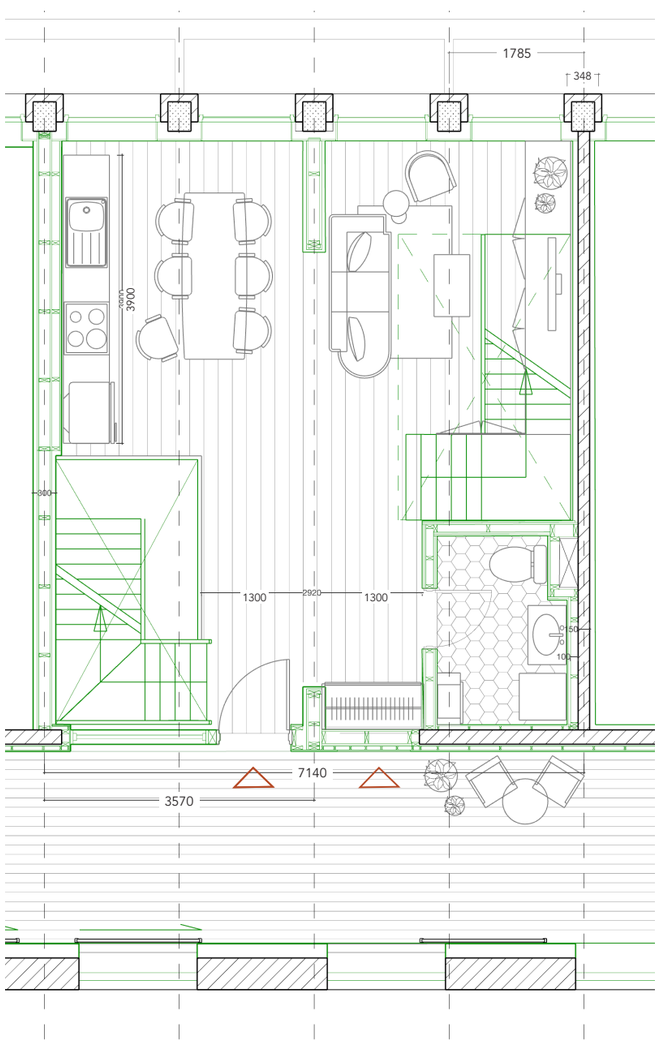


TARGET GROUP:

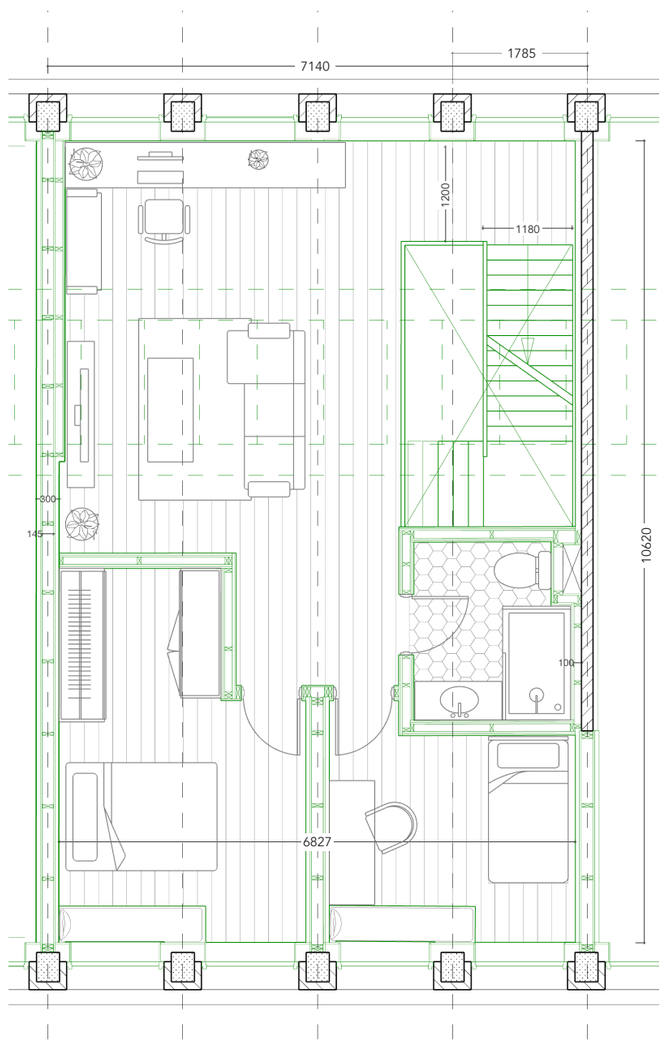
FAMILIES



50 m²
Basement



45 m²
Ground floor



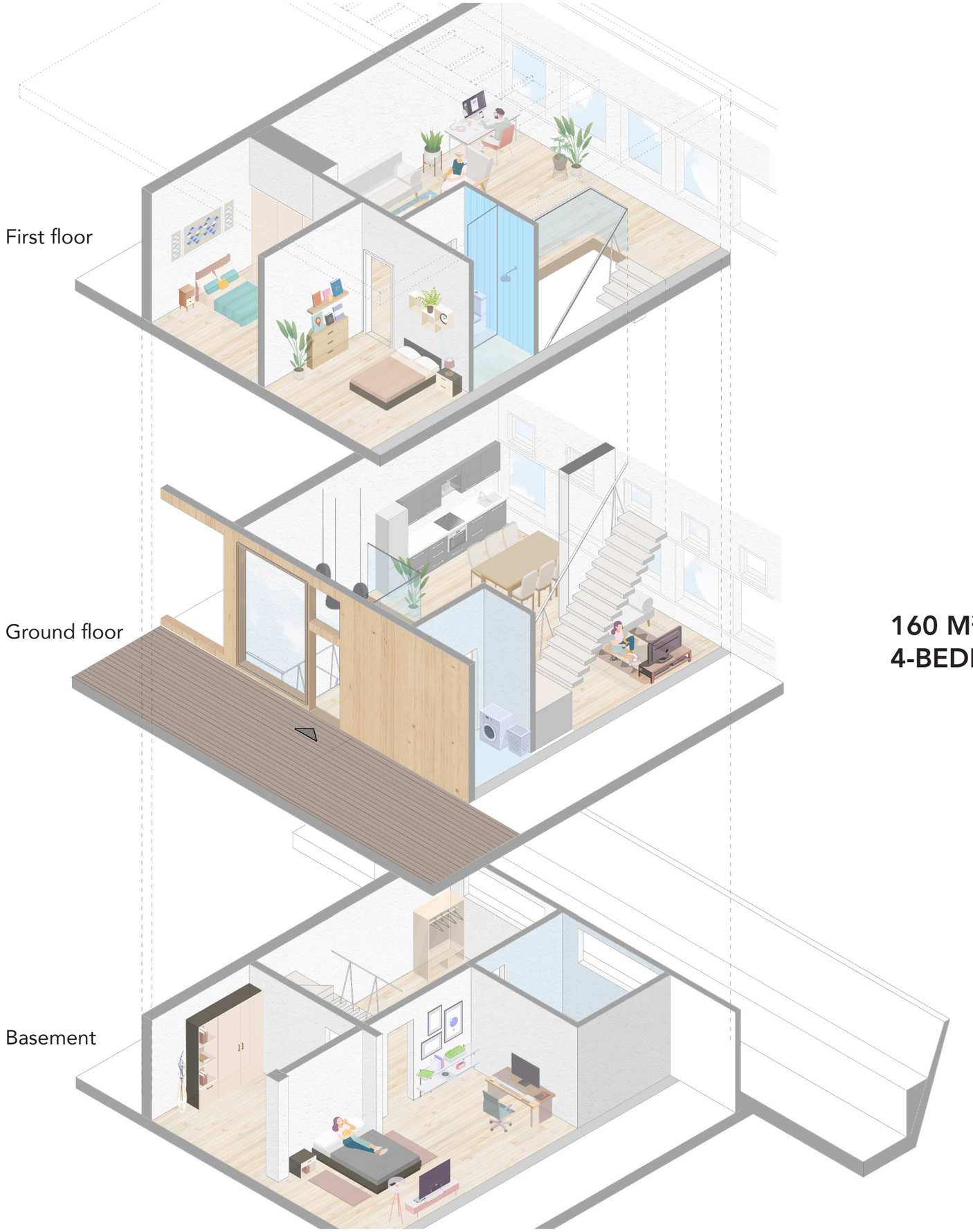
65 m²
1st floor

LIVING UNIT

TYPE “ROW” VAR 2

TARGET GROUP:

FAMILIES



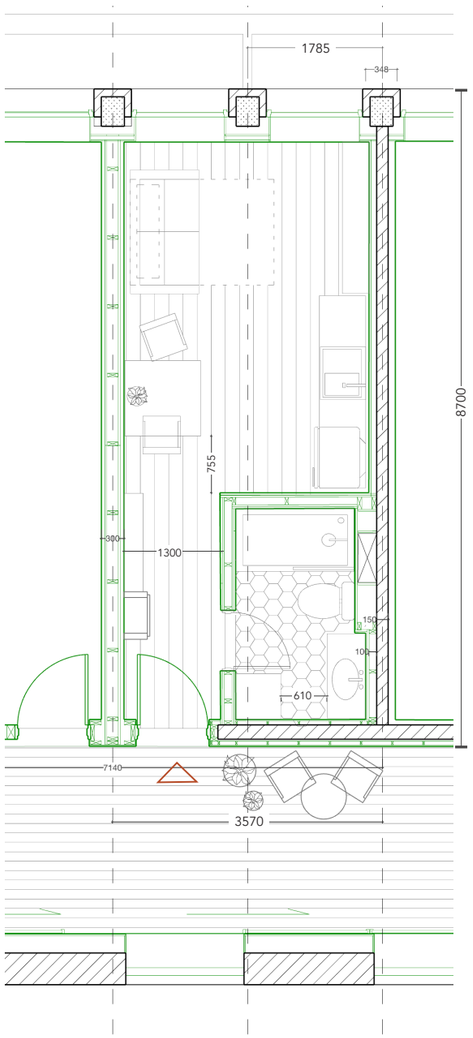
160 M²
4-BEDROOM

LIVING UNIT

TYPE “STUDIO”

TARGET GROUP:

STUDENTS



25 m²
Ground floor

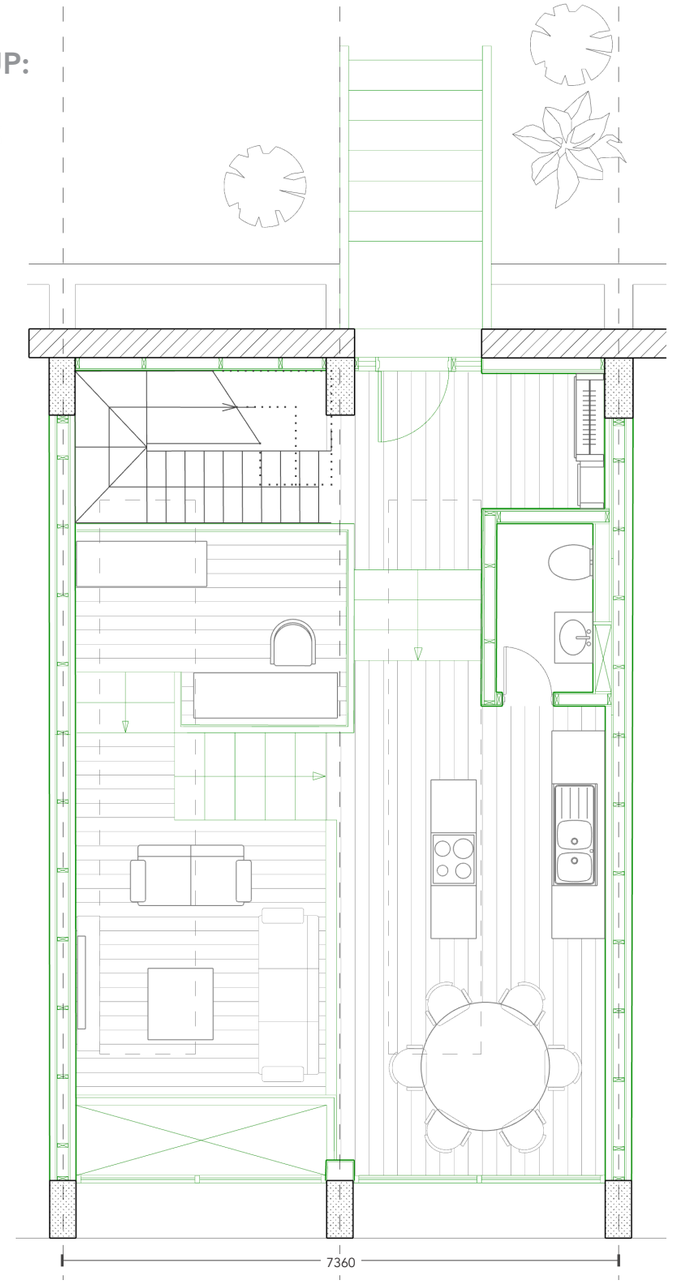
Ground floor

LIVING UNIT

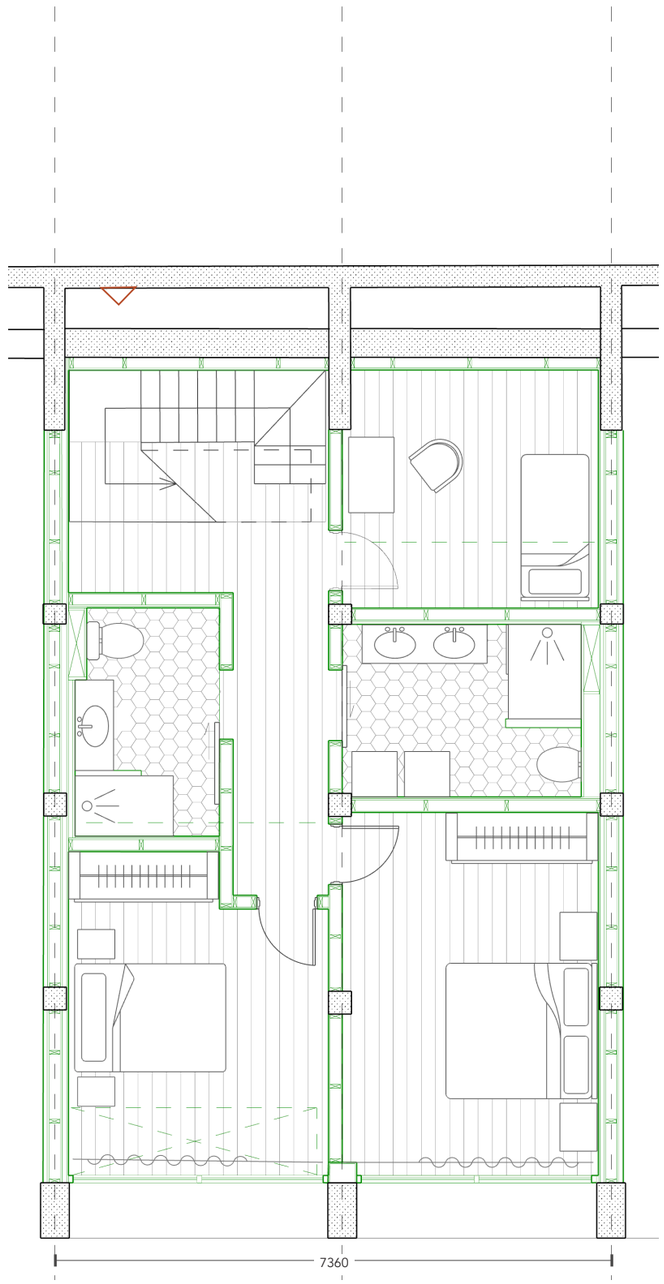
TYPE “LAB”

TARGET GROUP:

FAMILIES



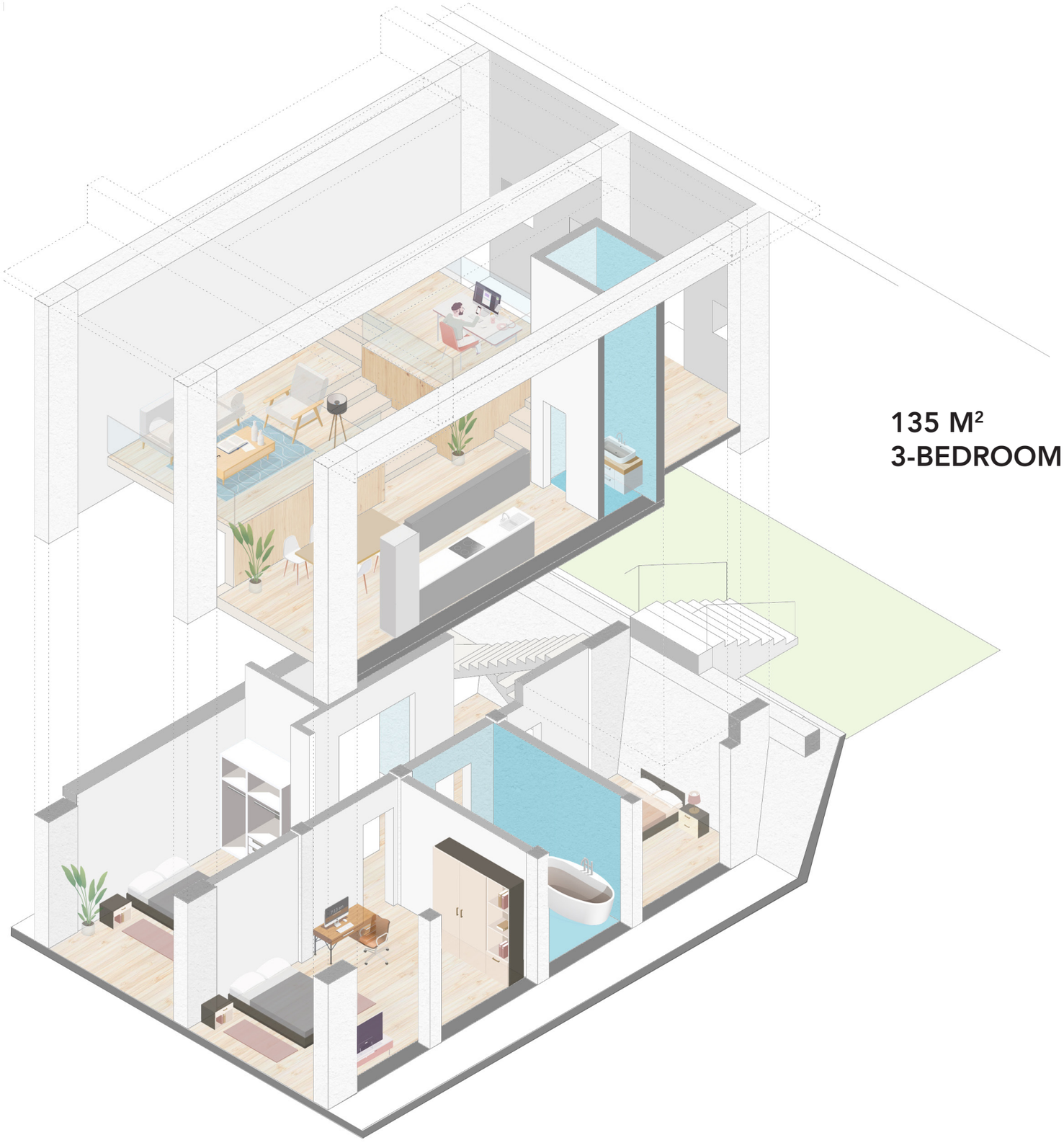
65 m²
Ground floor



70 m²
Basement

LIVING UNIT

TYPE "LAB"



135 M²
3-BEDROOM

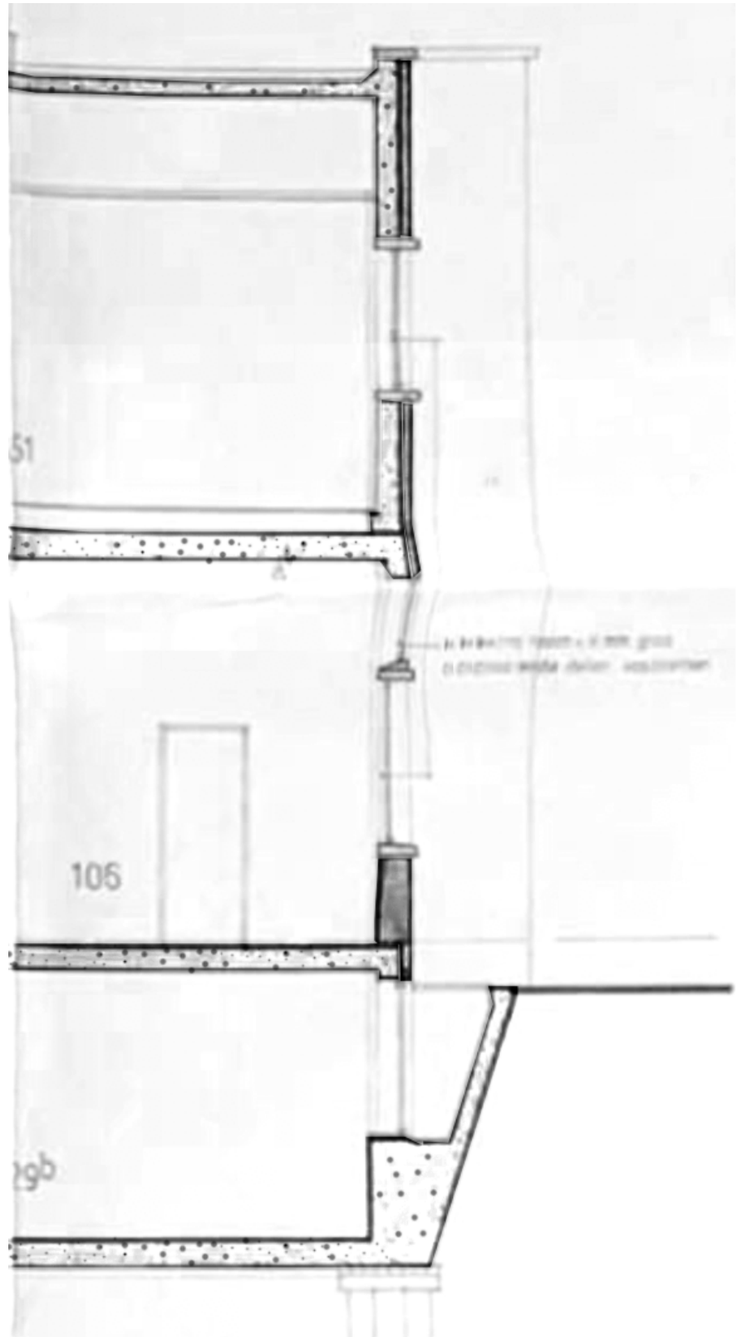
Ground floor

Basement

FACADE APPROACH

JULIANALAAN FACADE

Julianalaan is the most recognizable and most iconic part of the Gele Scheikunde. This facade is taken as a reference point for all interventions concerning the exterior skin of the complex.



Retrieved from Archives drawings, Bouwvergunningen Delft.
Inventory numbers: 953.10452; 953.32284;

DEMOLISH, KEEP & ADD

CONCEPT

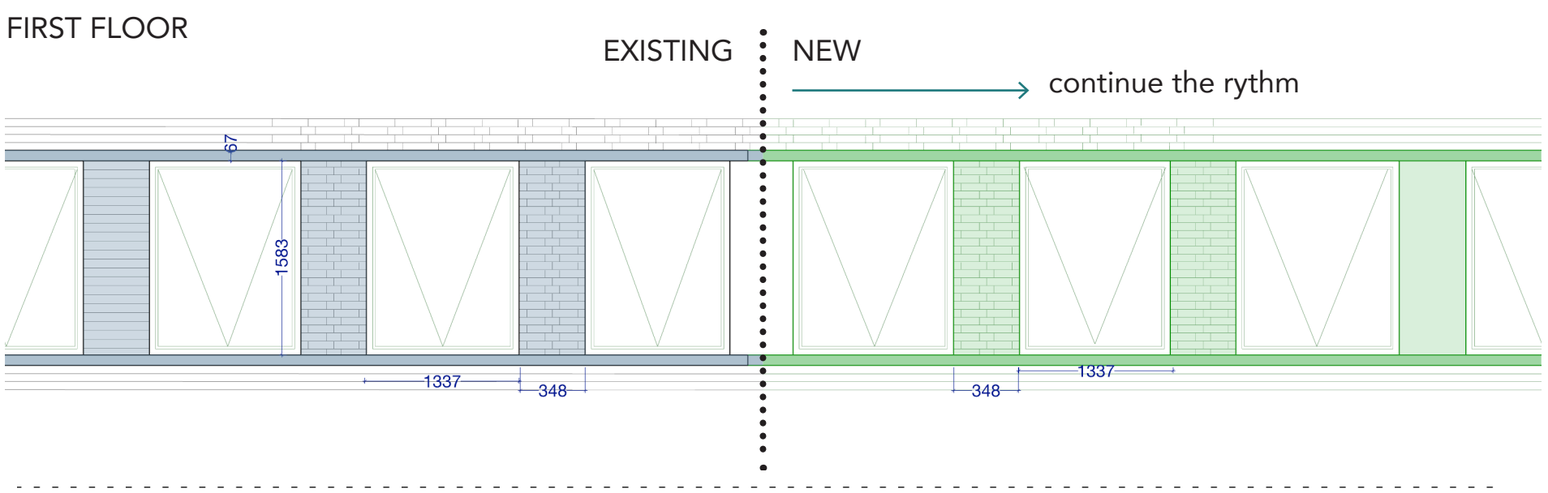
The Julianalaan facade is considered the most valuable part of the building. Is characterised by the horizontal lintel and the windows' rhythm. Which I use in my intervention.

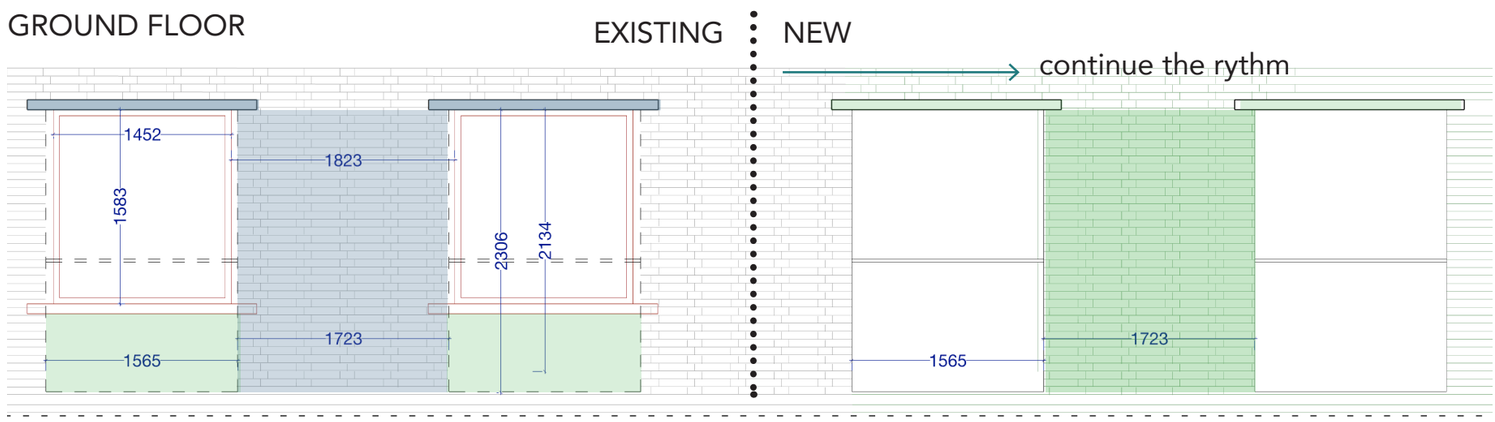
Since the building is very complex and every part of it is relatively different, I concentrate on the interior facade and the following drawings are elements of this specific facade. That varies throughout the whole complex.

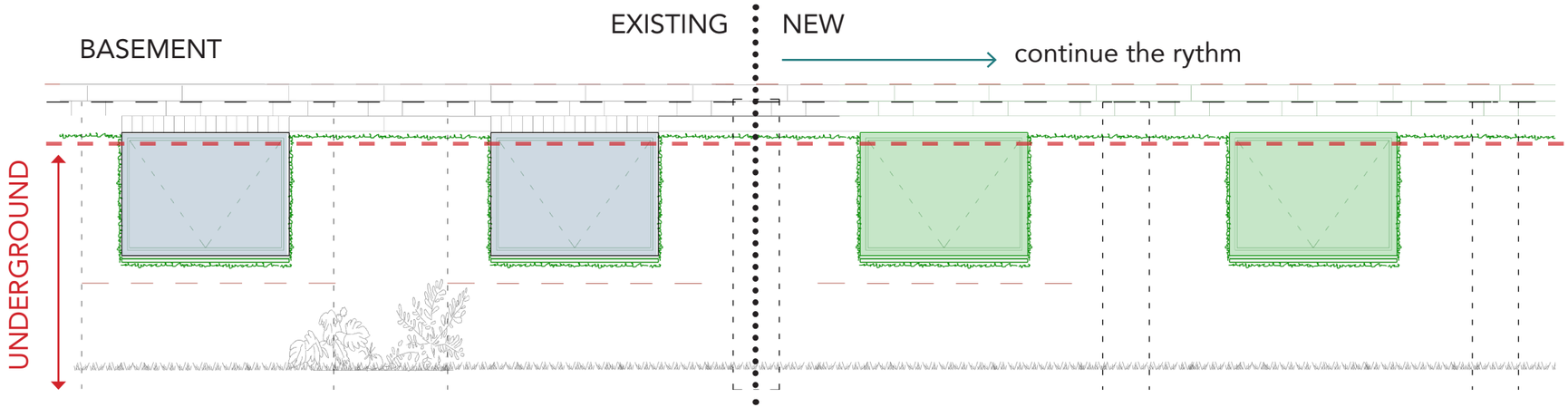
Some volumes need to be demolished. Which means a new facade to be added. So the ideas are to always continue the existing rhythm, proportion, so architectural language. On the 1 floor, it's the windows strip.

On the ground floor. It's again the rhythm but to maximise the light penetration, the openings are enlarged. Also, the new facades will be built with reused bricks.

And finally, the basement, so the existing structure is used and the facade will be cover with the living wall. In this way, the basement level is unified with the courtyard and it is a sort of reminder that once the basement was under the ground.







DEMOLISH, KEEP & ADD

SCENARIOS VISUALISATION

With respect to the surrounding and program needs, there are 3 scenarios for the building treatment and appearance. Every scenario responds to the posed goal.

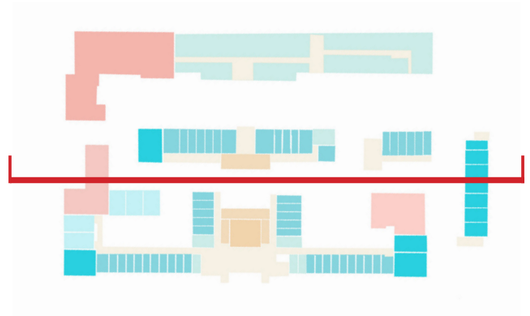
EXISTING

NEW

NEW

SECTIONS & ELEVATIONS

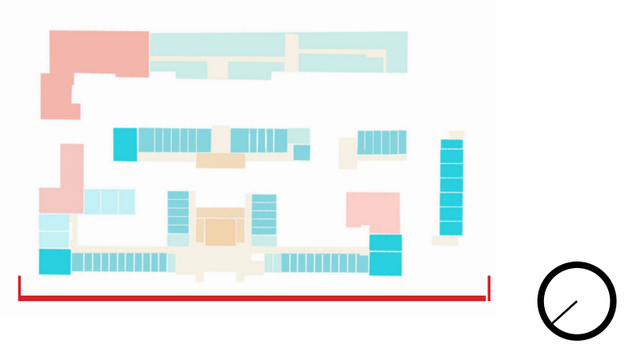
Since the wings of this section were dimolished to creat connection between courtyrds, The facade elements are designed to continue the rhythm and proportions of the existing. This elevation shows the continious green space, the new basement level and the combination of old and new



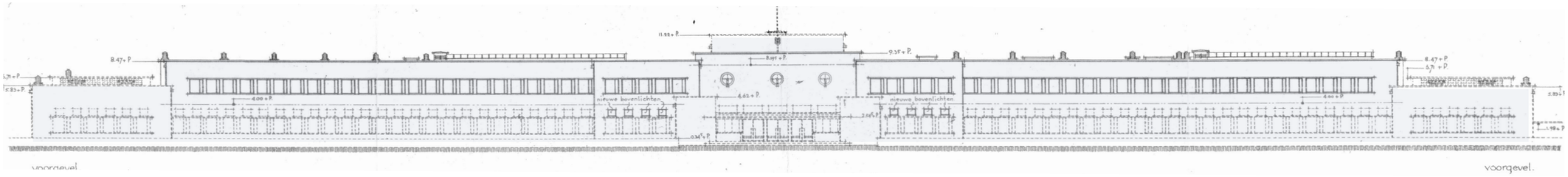
INNER FACADE (NORTH ORIENTED)

SECTIONS & ELEVATIONS

Julianalaan is the most recognizable and most iconic part of the Gele Scheikunde. This facade is preserved in its original appearance. The new windows (of wooden frame) from the exterior are painted white to respond to the original look. The entrance of the Julianalaan facade is the main entrance for dwellings and co-working area.



JULIANALAAN FACADE

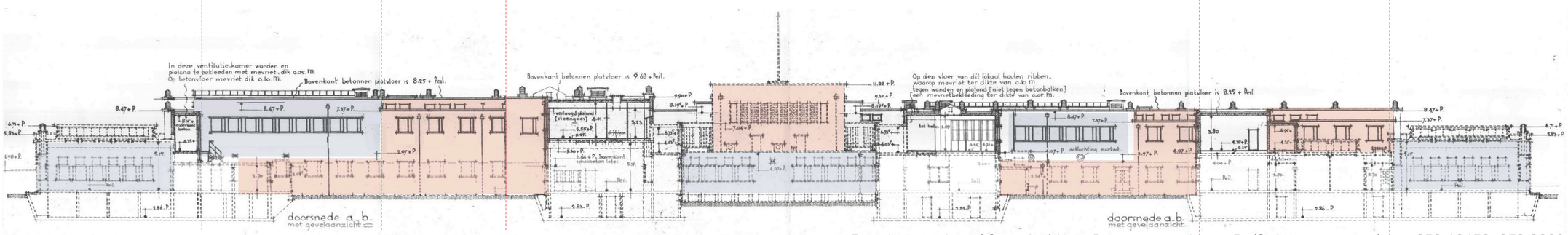


JULIANALAAN FACADE ORIGINAL

SECTIONS & ELEVATIONS

This section shows the relation between living and working. The central part of the building is designed for co-working (the existing aula). This semi-public space is connected with the living by corridors. The section also shows the new basement level and its use. On facades are visualized a combination of an old and new, which is obvious due to different materiality (green and brick). These facade elements are designed to continue the rhythm and proportions in order to create unity between different architectural languages.

INNER FACADE (SOUTH ORIENTED)



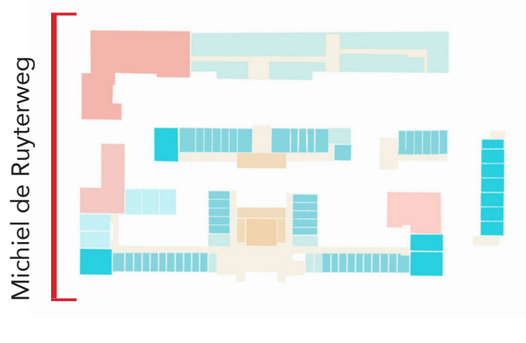
FACADE ORIGINAL

Drawings retrieved from Archives, Bouwvergunningen Delft. Inventory numbers: 953.10452; 953.32284;

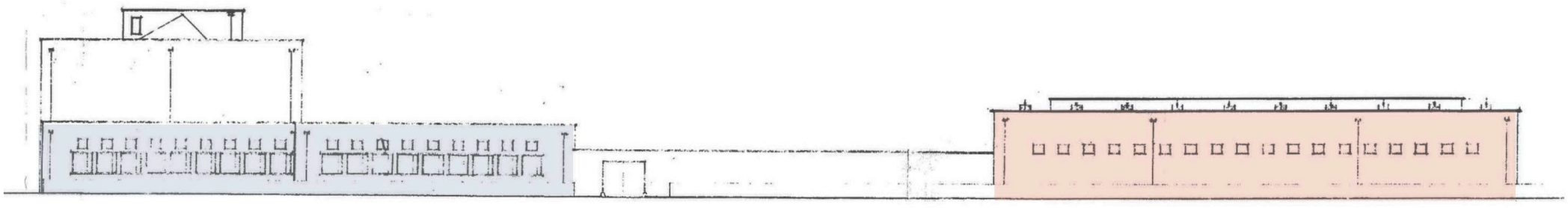
SECTIONS & ELEVATIONS

As stated in the “Urban Tissue” analysis (Ugnat, 2020), the facade at Michiel de Ruyterweg was designed like the back of the building, which became a front facade due to the changed orientation of the campus. Consequently, the facade should be adapted for the current orientation. Besides, Michiel de Ruyterweg facade is facing BK which is why this part of the complex should support the neighbouring campus. The corner of the complex at Michiel de Ruyterweg is destined for co-working and public programs like catering supporting the connection between the campus and the neighbourhood. The facade at Michiel de Ruyterweg is designed to be a combination of the exiting with new volumes (of yellow waste-based bricks).

Once again, the goal is to preserve the existing atmosphere of the former campus - so to create unity between old and new by continuing the rhythm and proportions at the new elements.



MICHIEL DE RUYTERWEG FACADE INTERVENTION



MICHIEL DE RUYTERWEG FACADE ORIGINAL

Drawings retrieved from Archives, Bouwvergunningen Delft. Inventory numbers: 953.10452; 953.32284;

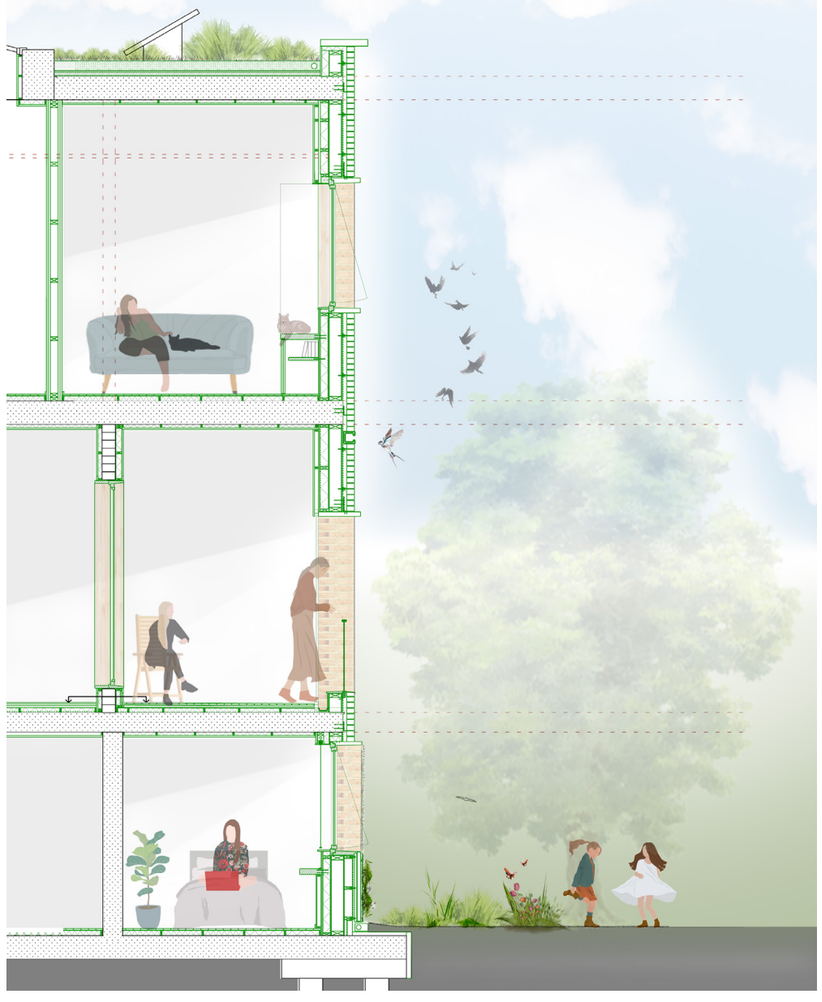
SCENARIOS DETAILING

3 scenarios have diferent detailing, materiality and function. However the tickness of the facade is identical in all 3 scenarios in order to create unity and allow future adaption.

EXISTING

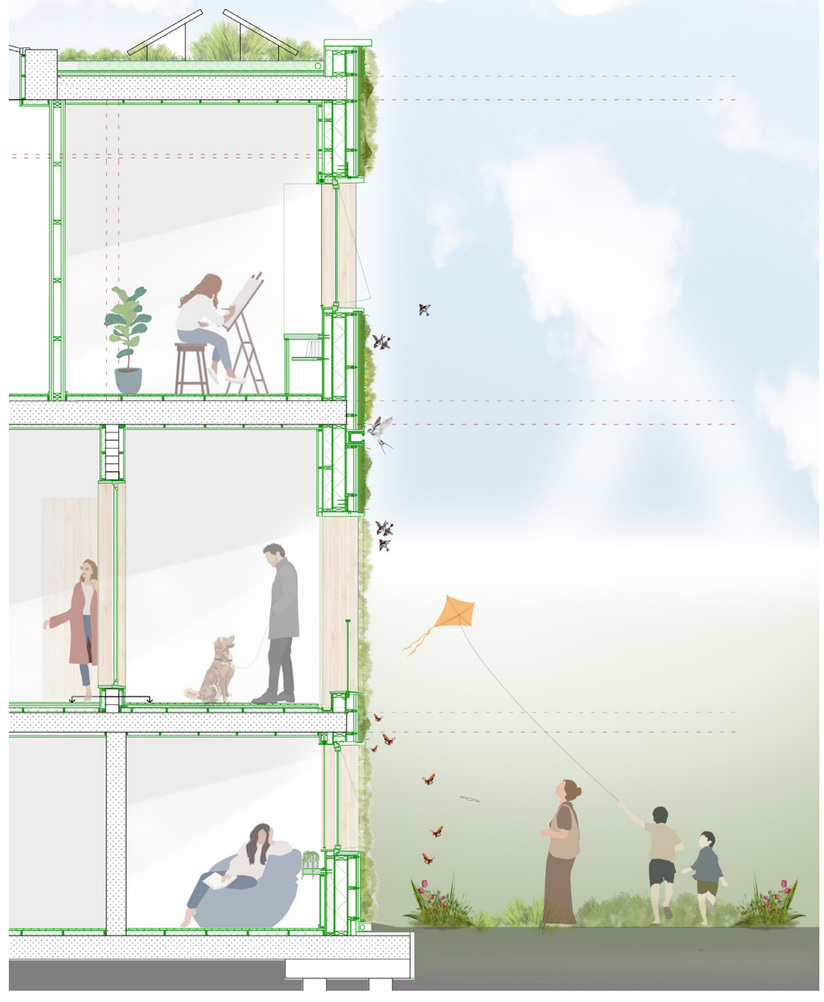
Some existing facades are valuable according to heritage values and are valued by people. So preserving the original appearance of those implies improving thermal qualities from the interior. And by that creating a comfortable interior suitable for the new program -"living"

NEW



Some parts of the building need to be demolished which means adding new elements to the existing built environment. The goal is to preserve the existing atmosphere of the former campus - so to create unity between old and new by continuing the rhythm and proportions at the new elements. This facade is north oriented which is the reason why the materiality for it is a waste-based brick of yellow colour (to remind that Gele Scheikunde was once of yellow)

NEW



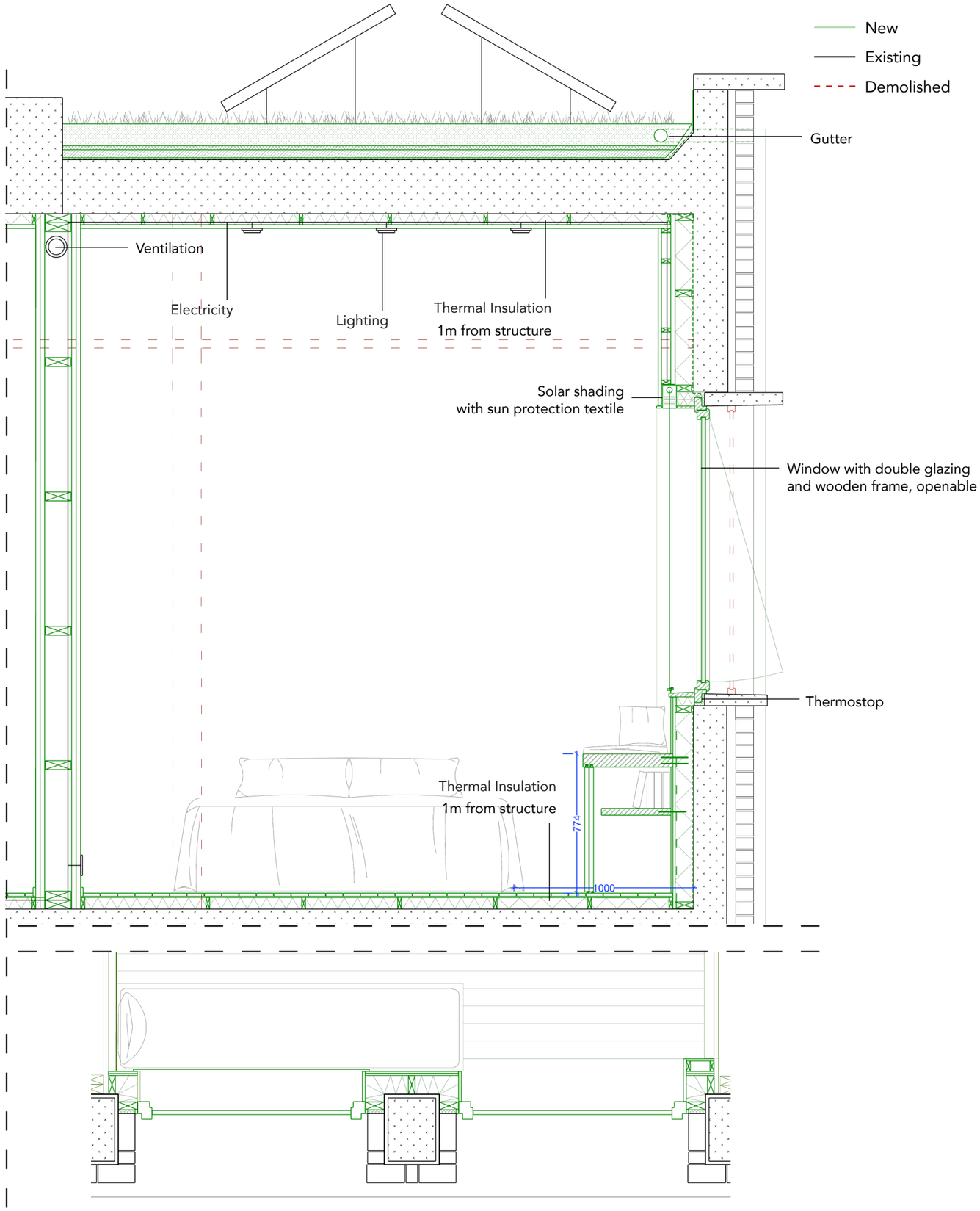
The goal is to preserve the existing rhythm and proportions. This facade is south oriented which is the reason why it is covered with the living system to respond to sustainability goals also to facilitate various aesthetic, environmental, social or economic functions and benefits.

DETAILS

EXISTING FACADE

This is an example of a refurbished existing facade where the exterior is kept and an interior skin is added which improves the thermal condition, interior climate and interior atmosphere.

Detail of living unit, with improved interior skin. And designed fixed furniture to allow interaction between interior and exterior.



COMBINATED GREEN ROOF WITH SOLAR PANEL

Solar panel
Solar stand
Vegetation
100mm Substrate
Separation layer
3mm Drainage layer
Root barrier
Waterproof layer
100mm Insulation
Vapour barrier
Existing concrete slab
Thermal Insulation to stop cold transmition from thermal bridge + sound insulation
ENRG Blanket *
9mm OSB
Mineral water-based painting

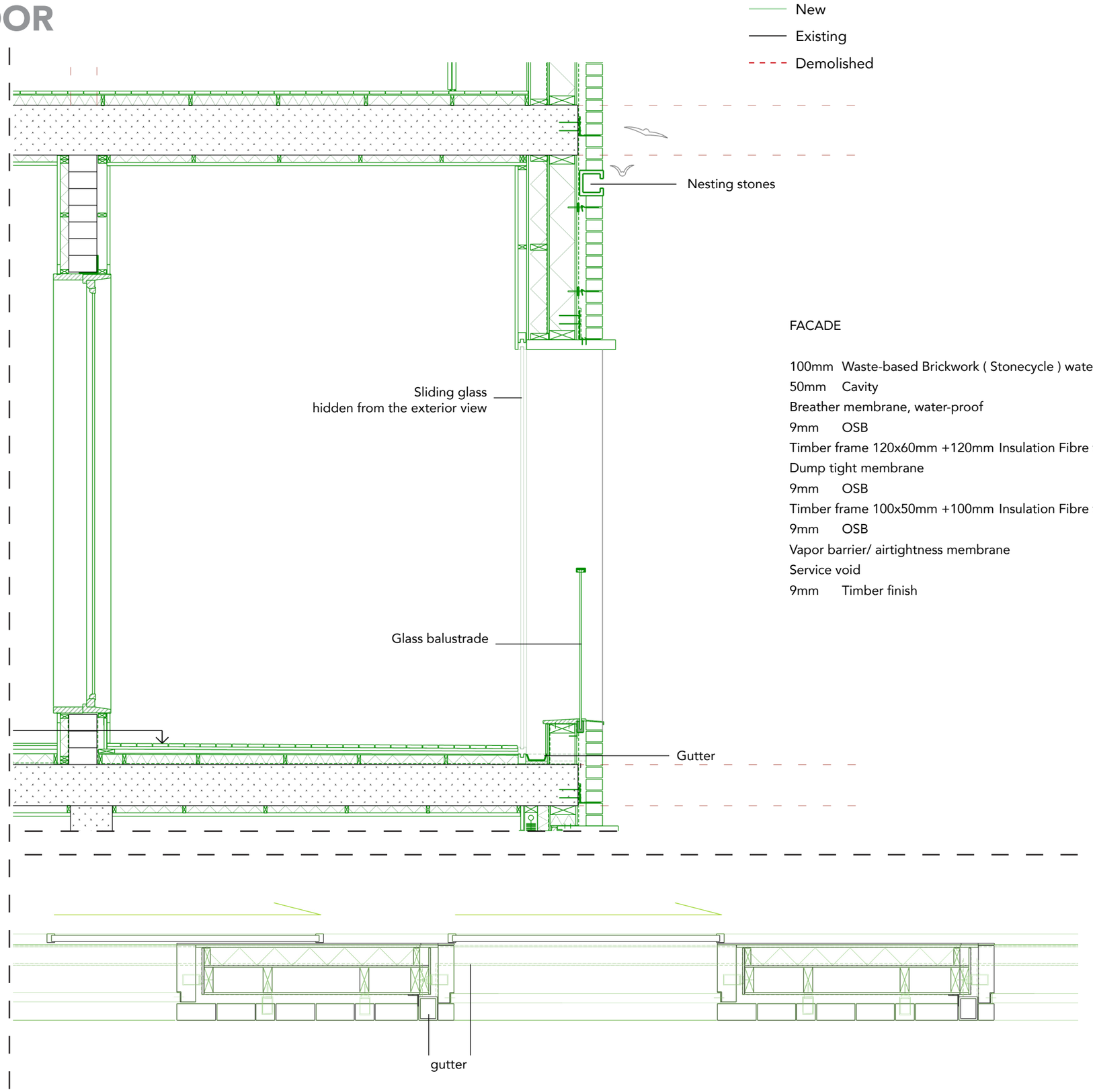
FACADE

100mm Existing Brickwork + water-shedding surface
50mm Cavity
200mm Existing concrete wall
Breather membrane, water-proof
Timber frame 100x50mm +100mm Insulation Fibre wool
Dump tight membrane
9mm OSB
Vapor barrier/ airtightness membrane
50mm Service void
ENRG Blanket (phase change material to control indoor climate)
9mm OSB
Mineral water-based painting

DETAILS

COMMUNAL CORRIDOR

This is a detail of a communal corridor, from where all apartments are accessible. Designed to be a transitional area between the exterior and interior. can be closed and opened by the glazing when needed. And this detail of glazing is designed to be hidden from an exterior view.



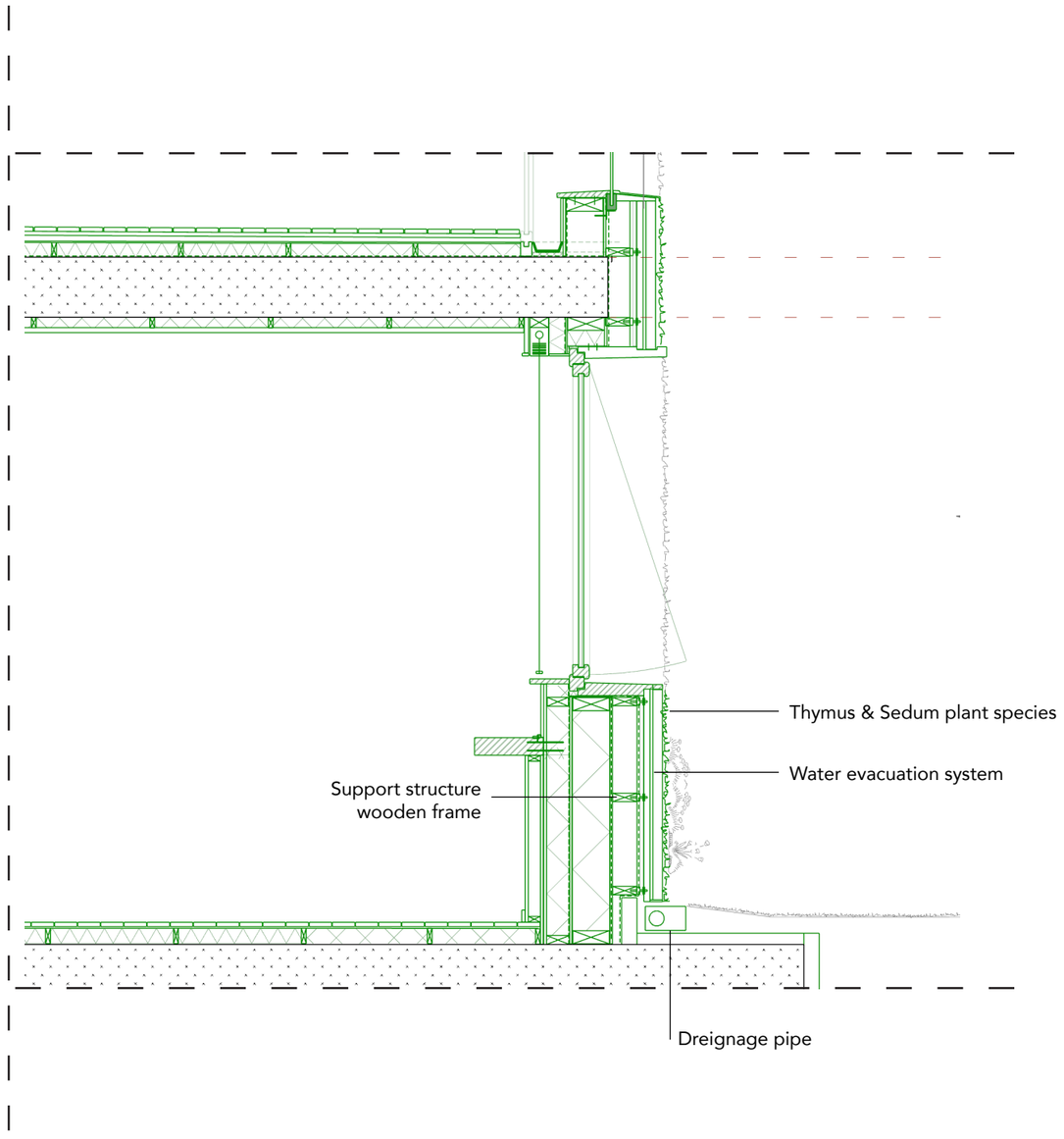
FACADE

100mm Waste-based Brickwork (Stonecycle) water-shedding surface
50mm Cavity
Breather membrane, water-proof
9mm OSB
Timber frame 120x60mm +120mm Insulation Fibre wool
Dump tight membrane
9mm OSB
Timber frame 100x50mm +100mm Insulation Fibre wool
9mm OSB
Vapor barrier/ airtightness membrane
Service void
9mm Timber finish

DETAILS

GREEN WAL

This is a detail of a basement that is covered with a living system made of a wooden frame which is protected from moisture and designed together with a building's water evacuation system.



New
Existing
Demolished

FACADE

Substrate module system
Wooden frame (water resistant) with support structure
Water evacuation system connected with a gutter
Geotextil
Air gap
Breather membrane, water-proof
9mm OSB
Timber frame 120x60mm +120mm Insulation Fibre wool
Dump tight membrane
9mm OSB
Timber frame 100x50mm +100mm Insulation Fibre wool
9mm OSB
Vapor barrier/ airtightness membrane
Service void
9mm Timber finish

SUSTAINABILITY

SECTION 1:500

This section shows the climate concept with the sustainable principles of the project. All spaces are provided with a balanced mechanical ventilation system combined with a cross ventilation setting.

Heating is done by floor heating which is connected to the central heating system in the basement and the Warmterotonde.

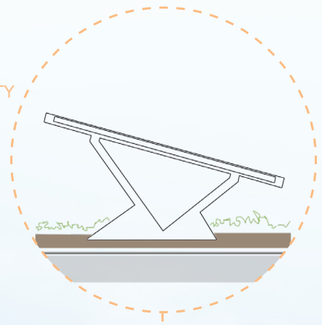
Besides it is necessary to keep the sun out to avoid overheat, there are several ways to limit solar radiation; 1- solar protective blinds; 2- trees that are placed in front of the south facades will create natural shading; 3- Living facade system will also regulate the indoor climate.

Roofs will be provided with solar pannels (oriented in a way to maximize solar gain) and combined with extensive green system to limit solar radiation, absorb water and support ecology.

In addition, the courtyards will be designed with respect to ecological principles. The plant species will be chosen according to the program needed. For example in the basement courtyard, it is necessary to deal with the groundwater so the courtyard will be designed with plants that can absorb water. And the public courtyard, which means a recreational area will be designed with blooming plants to attract different species and support biodiversity.

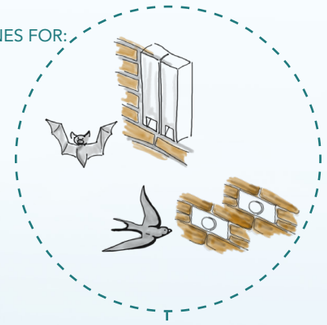
EXTENSIVE ROOF WITH PHOTOVOLTAIC SYSTEM:

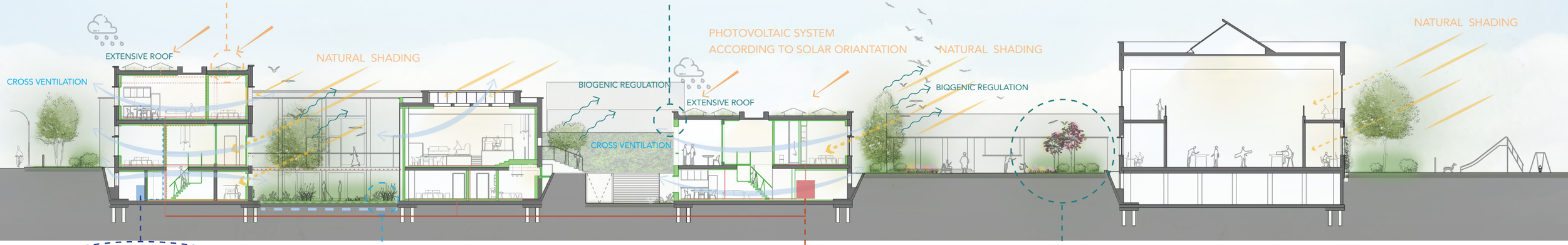
- RAIN WATER RETENTION
- LIMIT SOLAR RADIATION
- TRANSFORM SOLAR RADIATION INTO ELECTRICITY



NATURE INCLUSIVE NEW FACADES:

NESTING STONES FOR:
- BATS
- SWIFTS
- SPARROWS



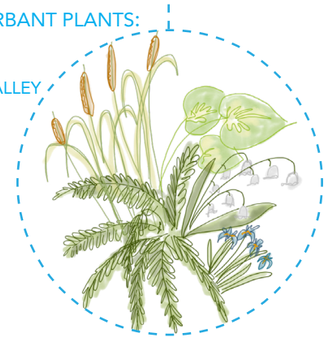


GREYWATER RECYCLING SYSTEM
BASEMENT TECH. SPACE

BASEMENT COURTYARD
WATER TIGHT
WATER PUMP

WATER ABSORBANT PLANTS:

- FERMS
- LILY OF THE VALLEY
- CATTILS
- ELEFANT EAR
- IRIS



CENTRAL HEATING SYSTEM
BASEMENT TECH. SPACE

HEATING
WARMTEROTONDE

BLOOMING LOCAL
PLANTS & TREES:

- NARCISSUS
- ANEMONE
- CONEFLOWER
- MAGNOLIA
- LAVENDER
.... ETC

SUSTAINABILITY

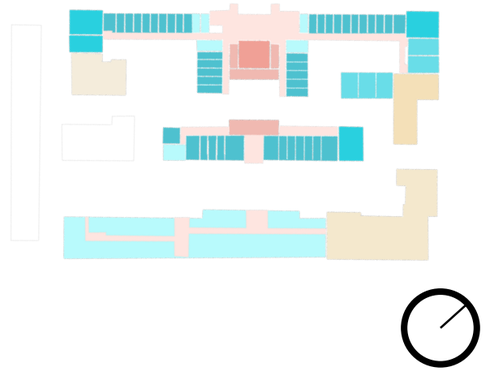
SECTION 1:100

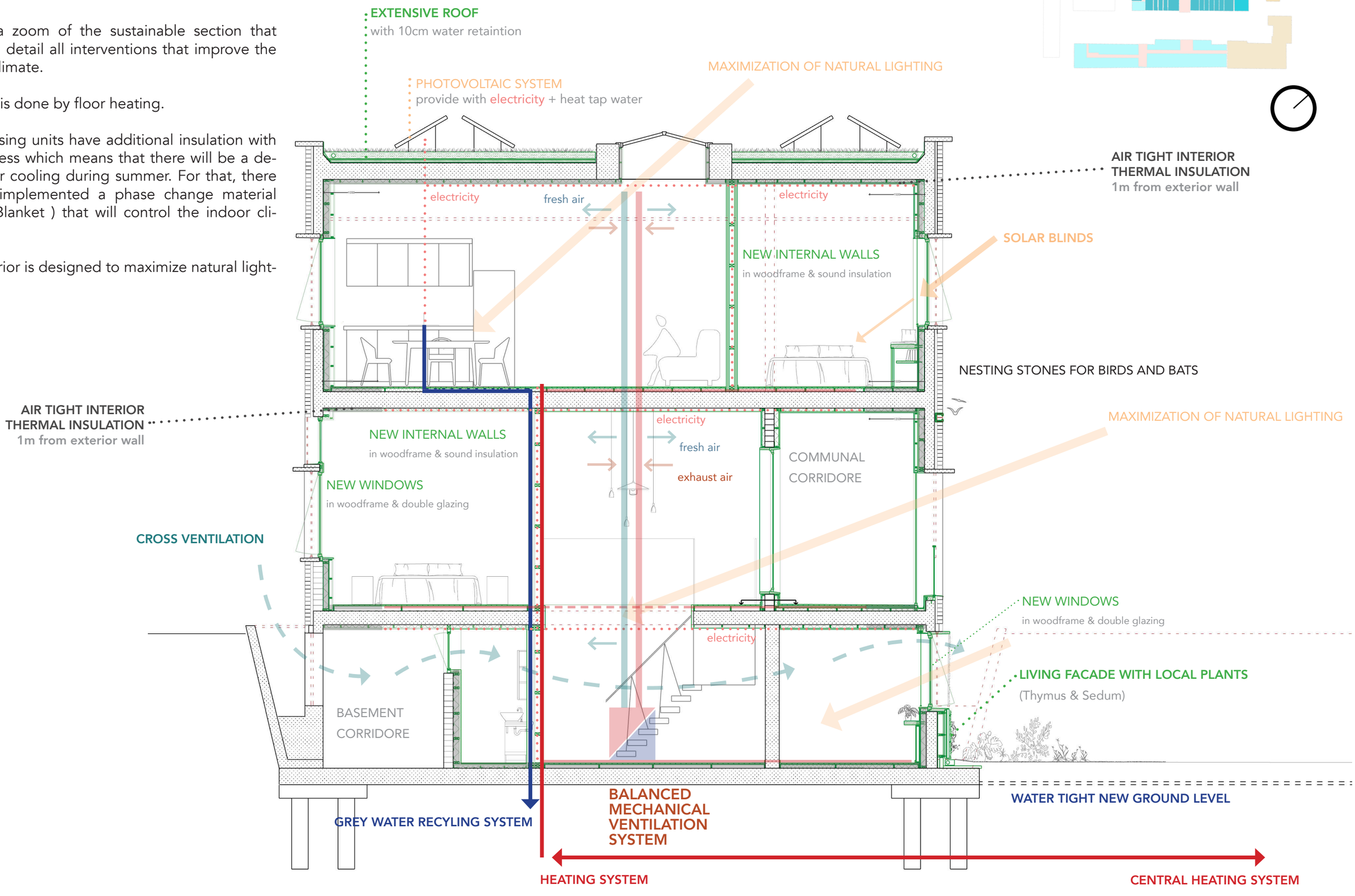
This is a zoom of the sustainable section that shows in detail all interventions that improve the indoor climate.

Heating is done by floor heating.

The housing units have additional insulation with airtightness which means that there will be a demand for cooling during summer. For that, there will be implemented a phase change material (ENRG Blanket) that will control the indoor climate.

The interior is designed to maximize natural lighting.

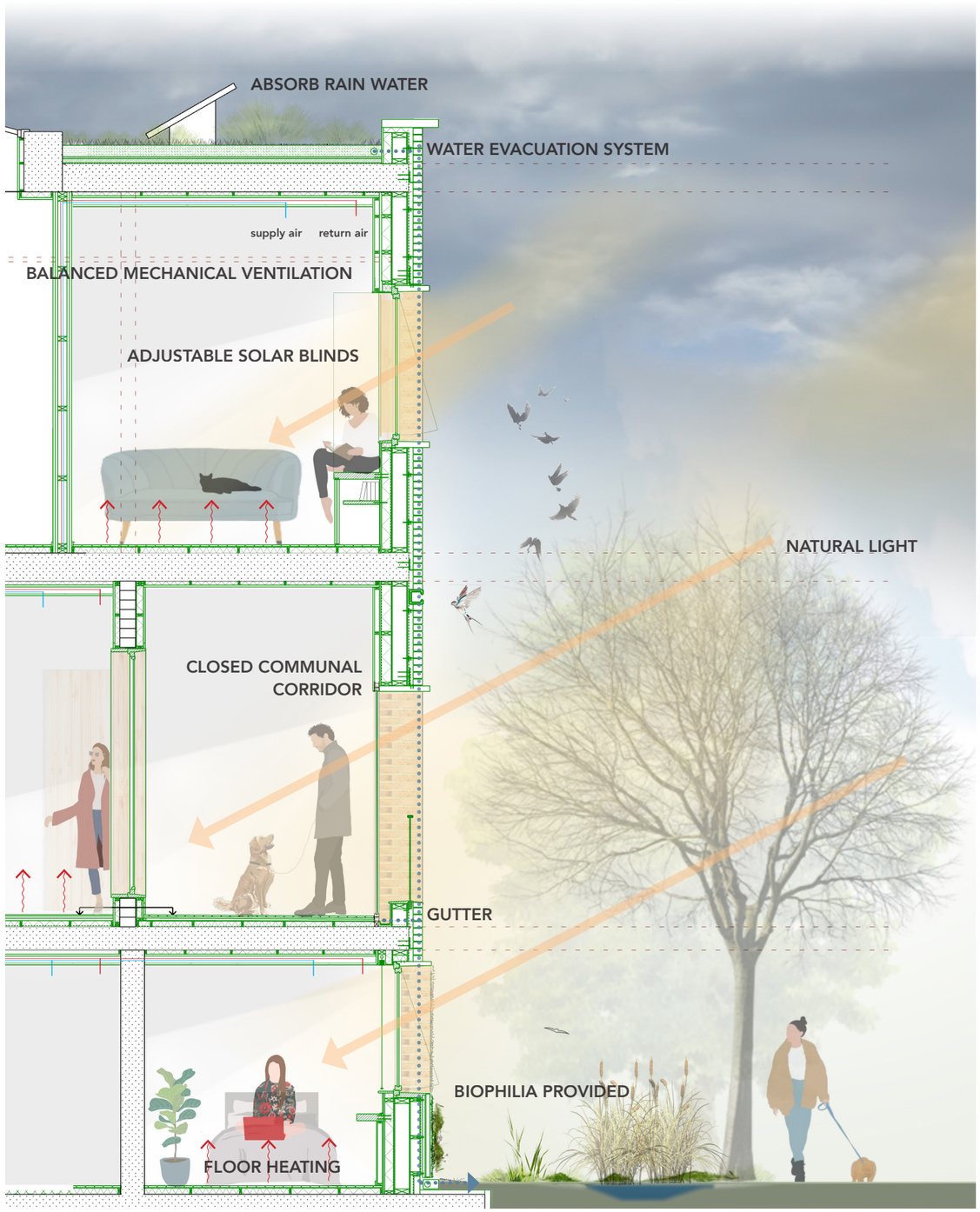




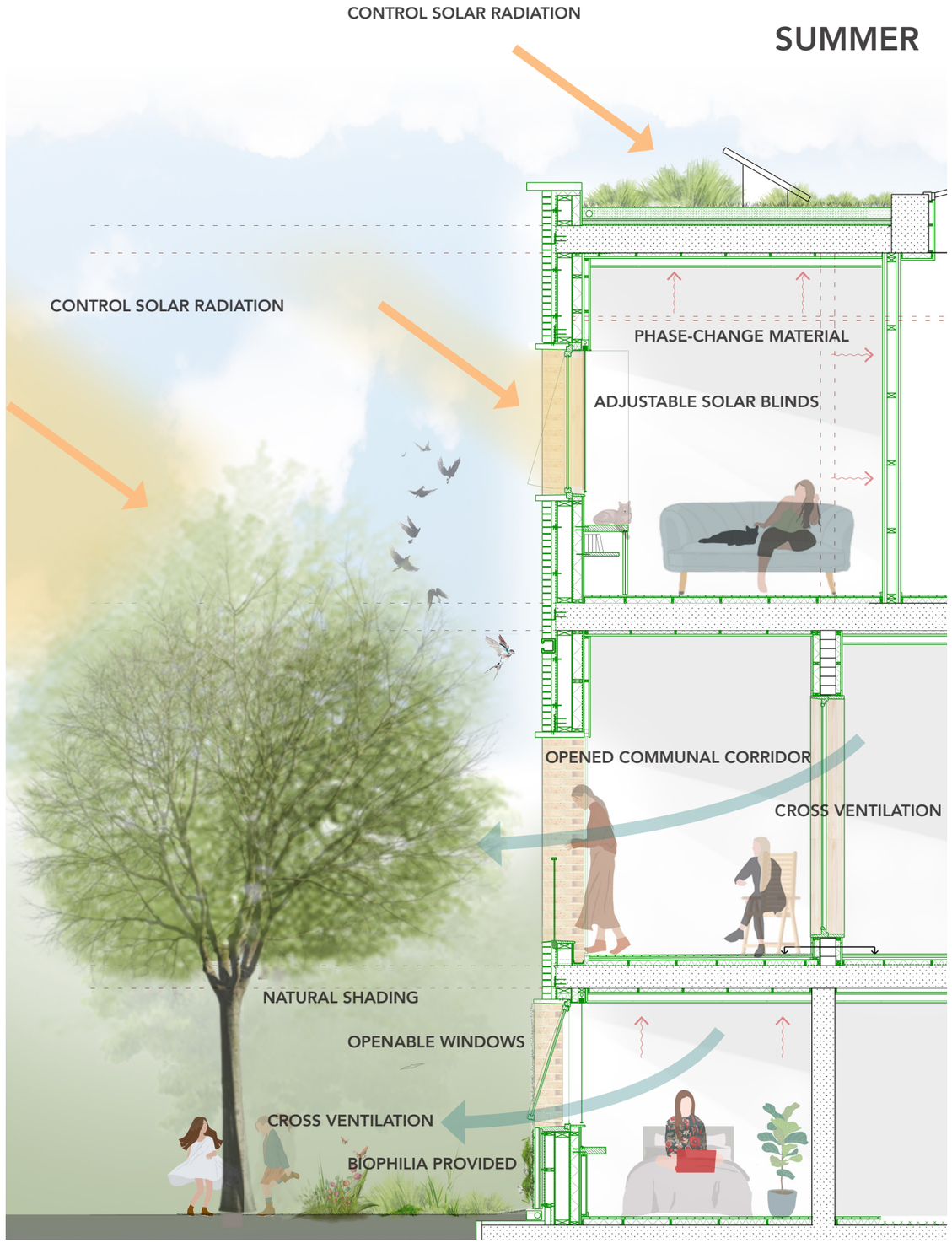
SUSTAINABLITY

SECTIONS 1:100

WINTER

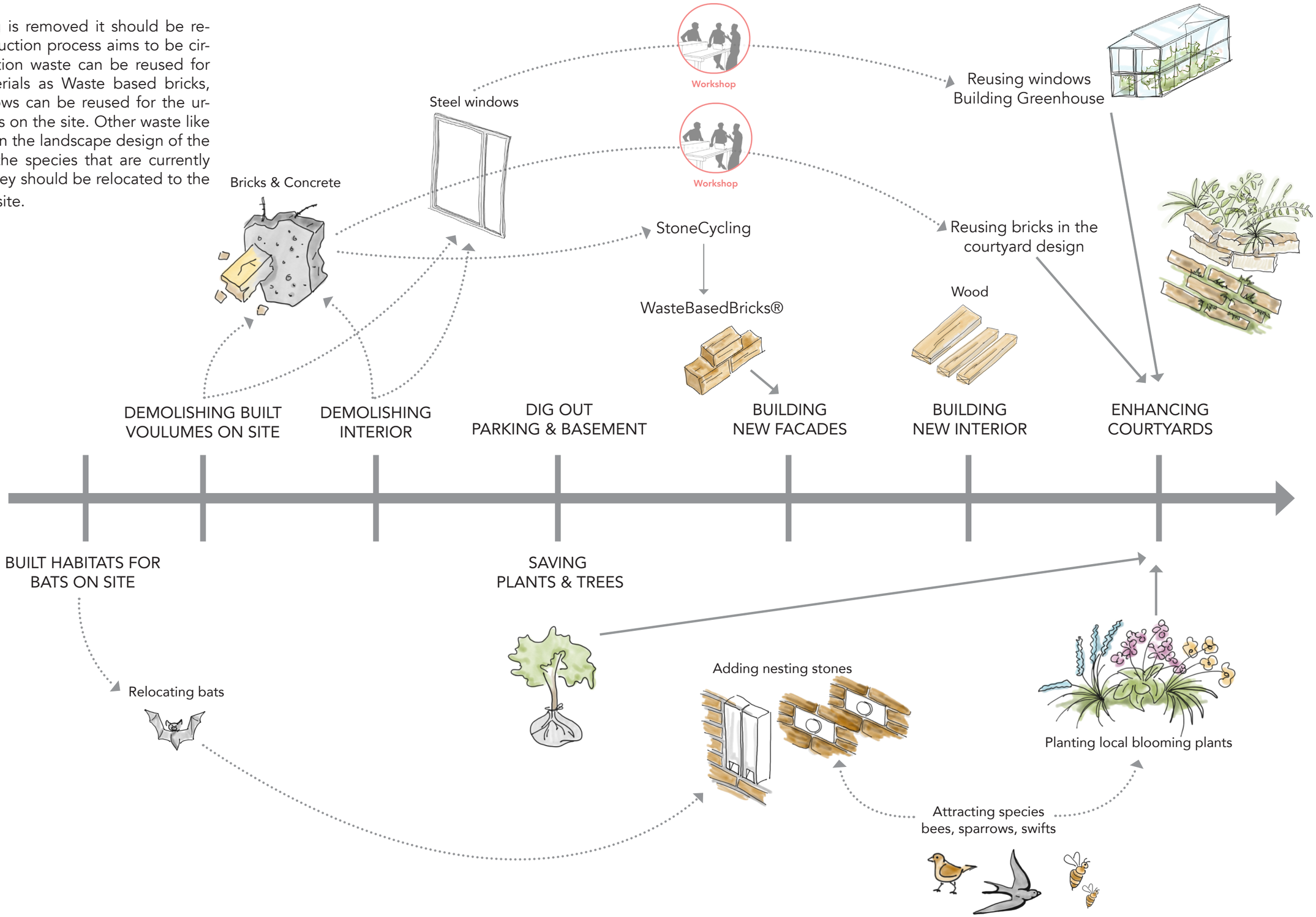


SUMMER



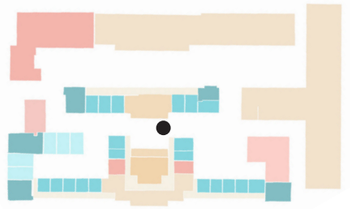
CONSTRUCTION TIMELINE

Whether something is removed it should be re-used. So the construction process aims to be circular. The construction waste can be reused for the new built materials as Waste based bricks, original steel windows can be reused for the urban farming which is on the site. Other waste like bricks can be used in the landscape design of the courtyards. As for the species that are currently living on the site, they should be relocated to the new habitat on the site.



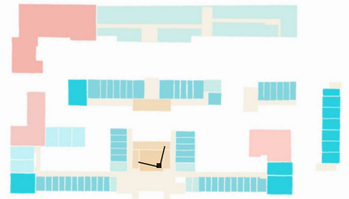
VISUALISATION

CO-WORKING & COURTYARD



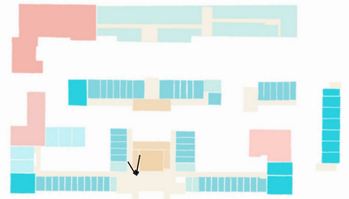
VISUALISTIONS

CO-WORKING



VISUALISATION

RELATION BETWEEN COMMUNAL AND PRIVATE



VISUALISATION

RELATION BETWEEN COMMUNAL AND PRIVATE

REFLEXION PAPER

This graduation research and project researched ways to manage the historic environment in a sustainable way. How can the intervention allow the community to use, enjoy and benefit from the historic environment? More precisely, how the architect should assist owners/stakeholders to sustain the heritage. To answer the stated above questions, the "Heritage4all" studio was chosen, as its essential concept is co-creation in a built environment. The importance is given to the values of the people involved in the case study.

This research looks at Gele Scheikunde - a TU Delft chemistry department building constructed in 1945, which served for educational purposes until 2012 and then was sold by TU for redevelopment. The goal was to research ways to cope with abandoned campus buildings by including social and ecological values into the transformation and re-design? When searching for literature on "Scopus," no research on heritage values-based design of campus or educational buildings was found. Consequently, in this research, the value assessment was specifically focused on the values and the attributes of a semi-public building – institutional architecture. The research question is: How to redevelop former campus buildings by integrating social and ecological values? The following sub-questions were formulated around the four themes of the graduation studio: Univer-cities, co-creation, sustainability and digital heritage, to help develop the research framework.

1.What are the attributes and values of the Gele Scheikunde and who are the stakeholders?
2.How can digital heritage in the form of a game support stakeholders' design and decision-making?
3. How can Gele Scheikunde support greater sustainability between the TU Delft campus and the city of Delft?
4. How to integrate ecological values and technological strategies in adaptation reuse design?

The approach for the research was to involve stakeholders in the co-creation process. This co-creation process was facilitated through the Minecraft workshop. During this workshop, not only experts (e.g. architects, designers, planners) but also external parties (e.g. neighbours, users, ecologists), decided over the built environment. However, a co-creation approach is not limited to one method. There are various ways to involve stakeholders: interviews, surveys, questionnaires and workshops, with or without heritage games. For this research, a combination of the above was chosen: interviews, surveys and a gaming workshop with Minecraft. This approach provided information on what is valued in the case study, why it is valued, what should be kept and what can be demolished. Besides all stakeholders shared their opinion on what would be the best "new program". They also brought up some dilemmas (like the mobility of the neighbourhood, the need to increase the housing stock). The gathered information from the workshop and interviews was compared with the value assessment (based on collected data) and with personal observations and opinion. The conclusion then served as guidelines for the design phase. This approach definitely works well, because the real dilemmas, ambitions, wishes and needs are received from people related to the case study which helps to sharpen the design decisions.

So this approach relates to the real-world architectural practice and helps to design for people. As an overview, the methodological path followed mostly historical and qualitative research method and activities; e.g. archival data collection, theory generation, questionnaires survey, groups' observation and gaming workshop. The working method was divided into three phases:

1) Historical evolution of the case study - Gele Scheikunde;
2) Co-creation design workshop using the block-building game Minecraft;
3) Heritage (socio-ecological) values-based design strategy.

The design phase followed this method, first the building and urban context was treated according to the historical values and respecting wished and need of the stakeholders. Then the program was developed. And then the sustainable design strategy formed. In the built environment, there is a need to address the problems of climate change together with the quality of life. Gele Scheikunde has a very natural environment inside the plot, which is one of the focuses of this project – Ecology. The ecological strategy was developed through the stakeholders' outcomes (from the ecologist and the landscape architect) mentors' feedback and personal research. Besides one of the topics of the graduation studio was "Sustainability" and the developed ecological strategy is an answer to this topic.

As it was also discovered the ambition of the city of Delft is to increase the housing stock, furthermore, the number of TU campus users has grown significantly in recent years. This brings up a dilemma between densification and quality of life. For these reasons, abandoned or non-used buildings like the TU faculty building Gele Scheikunde can be envisioned for housing purpose. Thus, the question that arises is: How to redevelop the former campus buildings? Furthermore, the theme Univer-City was addressed. The case study is the former university building and is located in between the city and the campus. The relation with the campus is determining for this project. Which means that the design should support this relationship. The conclusion of this graduation research was the mixed program "living & working" which was also confirmed by stakeholders. All stated above are the aspects of the graduation project that reflect on important topics of the master track. In this way, the research process of this project supports the heritage track and relates to architectural education. The relevance of this research lies in the fact that little research on campus buildings' reuse design exists. Besides, a big number of research papers exist regarding campus sustainable reuse and urban sustainability. For example, how to refurbish the campus building into a more sustainable one or what is sustainable urban planning for the campus.

And finally, gaming is a method for co-creation design and decision-making in this research. Such a method and tool (Minecraft) has already been used in some planning and design initiatives. This is why it can be further accepted and investigated in processes of heritage planning and management. By using the gaming method, this research aims to contribute to current consultation processes involving heritage listings and project decisions for sustainability. During the research and design phase, the mentors gave feedback related to the "private an public setting", which in this project resulted in a design of communal, transitional spaces. Also concerning the program so "living and working". And ecology as a method to improve social interactions, the quality of life and building climate. Those are addressed in the detailing, materialisation and spatial organisation. All of the stated above was a continuous learning process that will continue till the final phase, however, the focus will be on the ecological strategy and spatial organisation of the building (private and public).

INTERVIEWS

This research involves working with human participants. We do not expect any potentially critical ethical implications of the research results. However, we comply with the European Legal Framework and apply its ethical standards and guidelines. We also comply with all requirements regarding data management, privacy and human research ethics.

All experts were considered as important stakeholders of the case study.

LEGENDA:

Underlined sentences represent knowledge/ opinion and wishes that are used in the research and in the design.

Bold sentences represent the preliminary design or a program

Interview with the chair of the Public Real Estate

1st of October 2020
The specialisation of the chair of the Public Real Estate at TU Delft is planning, design and management of university campuses and buildings also generating management information for real estate decisions.

What are the plans for the development of the Gele Scheikunde?
According to the article by Marjolein van der Veldt, TU Delft sold the Kramerslab to the municipality that will locate there an international secondary school. Why school?
Expert: By placing the school at the TU's former property, Gele Scheikunde could keep the educational purpose to a certain degree. Anyhow, the decision was made by the municipality, who purchased the building.

How much space an educational institution could need?
Expert: Any campus dedicates only 15% of the space to education. Which seems very little, however, 33% of the space is occupied by offices, labs, research spaces, employee space and storages. She says that it is crucial to mention that these office spaces are not fully used during the week as they are purely private spaces and students have no access to them. At the same time, the university is always in need of workspace for students and the fact that offices and research labs remain inaccessible, raises the new debate on the efficiency of the space use. Could space sharing be a solution? People are not willing to give up their offices or to share them. This is a mindset related to people's desire for possessing very own space. A desire for privacy. Here arises the topic of a reservation for the target groups. How to solve this problem? For now, there is no answer. Even Though TU Delft is aiming for a sustainable campus environment, the question of smart space use is not answered.

Why TU Delft is selling buildings?
Expert: First of all, TU no longer uses some of them, like Gele Scheikunde. However, to maintain these buildings becomes expensive while TU would prefer to spend the majority of the budget on education, salaries and research. So the only solution is to sell non-used buildings.

Are there other important stakeholders / program for Gele Scheikunde?
Expert: The new program for the former faculty Gele Scheikunde, should not be too distant from TU purposes, which is one of the reasons a secondary school is chosen as an alternative program. Here again, the topic of a mixed target group is mentioned. Subsequently, how to merge the school with the university, since children become an additional target group. The TU's goal is to blur the boundary with the city of Delft. Heritage you have to share! The city should become more active in promoting its own image by collaborating with the university. It is already happening, for example at the Pathe cinema and the Theatre de Vest where TU has held graduation events and some lectures.

Interview with the monument advisor at the Municipality of Delft

1st of October 2020.
A monument advisor at the Municipality of Delft informs monument owners about subsidies and advises on policy matters regarding cultural heritage and monuments.

What can you say about the historical development of the Gele Scheikunde. What was there before?
Expert: Starting with the history: TU started in Delft around the end of the 19th century. For instance, the buildings where Unesco IHE is located nowadays on "Oude Delft" and the student housing, there used to be the old university buildings. Around the 19th century the university was growing, getting more students and so expansion phase started out of the city centre. Now it's a TU-Noord area. Nowadays, TU in the process of selling all these buildings because TU is not using these old faculty buildings. There is a lot of redevelopment in this area. In the time, when TU started to build towards the south of the city centre, there was not such a connection as there is now. There was no Sint Sabastiaansbrug. The main connection from TU area was via Julianalaan. We can see that Yellow Chemistry is along this Julianalaan has a different orientation in street. This access from Sint Sabastiaansbrug, then Michiell de Ruyterweg and Melaweg is developed later in time. From that time on, we see different orientation in the city layout of this area, which is a more north-south orientation.

I can't remember what there was before Yellow Chemistry. But first of all, Yellow Chemistry is a younger sister of Red Chemistry. Red Chemistry - Bouwkunde, was planed in the 30s, as a Chemistry building. Red Chemistry is sort of a response on the 1st World War. Poisonous gas attacks, so poisonous war was the biggest fear of the 30s. Red Chemistry building was not only for industrial purposes, but for the knowledge of the gas attack, and what it can do. So TU builds an enormous building, and when the crisis came, it could not be finished. So Red Chemistry remained unfinished until the 50s. So after the 2nd World War, TU finished this building. But then people were not so afraid of the chemistry anymore. Nuclear bomb attacks were a new fear of society. So the focus on Chemistry in the TU became smaller, so TU didn't need such a big building, which is why they build Yellow Chemistry. The architect of the Yellow Chemistry was Bremer, the famous national architect. In your story, you included the Proeffabrieken, the buildings behind Yellow Chemistry, which are built later, for different researches. In 'Proeffabrieken' are located laboratories where they did research, focused on industrial processes and knowledge on industrial production. An interesting fact is that the Aula of TU was sponsored by Shell. In the 50s there was huge money influx in the industry on TU. After the World War period, there was a strong relation between Industry and Technical university. So 'Proeffabrieken' are an example of this relation.

Gele Scheikunde is not listed, not protected. Why not? What are the criteria?
Expert: Listed buildings are selected by their architectural quality and historic value. Before we give a building the quality "listed" we do research to study the monumental values of the existing buildings. **Gele Schiekunde had less value compared to the other buildings that are listed. Furthermore, it is a question of budget.** There often is a wish to protect more buildings if it would be possible. But we have to make a choice. We cannot protect everything.

What is the relation between the limited budget and the site?
Expert: If we protect more buildings then there is less possibility for buildings' reuse. Which means also more limitation for the owner. In this way, we have to find a balance between what to protect and what to give for future reuse.

If you want to protect more building, you need to do research, inventory, give argumentation and these needs time?
Expert: Not only this. In general, according to the law. The democratic system has stated that if we want to protect more buildings, we limit the owner of the building. And In return, the owner will get a subsidy to maintain the heritage and overcome the limitation. This is the real debate. For the TU as an owner, to have a listed building is a financial limitation. So it's been a huge debate between the city of Delft and TU every time concerning the heritage buildings of TU. Sometimes TU wins the debate, sometimes Gemeente does. There are some nationally protected buildings form the technical university others are locally protected buildings from the technical university. For Yellow Chemistry we want to make redevelopment possible but we also want to keep the historic development of the site visible. Therefore, we decided to protect the volumes of the building. We cannot protect every part of the building like every window, but we decided to protect the urban volumes of the building and the main layout. So the new plan should be related to the existing volumes and layout, which is, of course, vague. It's a challenge for the owner, designers, developers and TU. So in the debate concerning Yellow Chemistry, TU protested against this protection of the building. So when TU sold it they said that it's not a listed building, which is correct. But it indeed is protected a little bit. So there is a contentious debate about the protection of the buildings.

TU has sold the building, what voice can TU have in the new development?
Expert: TU sold it with the promise of making dwelling possible in the high density. TU earn more if they sell it with the possibility for developing the site in a high density.

But the process of selling is done. So TU has no affairs left right?
Expert: Yes, this is what is going on. But I want to say that there is some protection. So TU already made the development plan before they sold it. Furthermore, the TU is a stakeholder as owning a lot of area around the plan. So if the new plan has a negative impact on the surroundings, the TU can use its right to oppose to a change that has a negative impact on its surroundings

How TU as a stakeholder would take a role in this debate? How TU is helping to define the future of this area? In terms of decision making.
Expert: I don't know if TU still owns part of the building. Or whatever they sold everything. Anyway, once it is sold the new owner has a main 'saying' in this. As I know about the status of the moment; the urban layout is protected, some facades and some elements of the building which are very elementary, characteristic of the area are protected and have to find a place in a new housing plan. In my prediction, it will be impossible to protect the entire building, since the development plans and the financial outcome of the project have to be that a big number of dwelling is realized. And with a current building which is a very low building, developers will have to build more layers so higher. The area will transform for sure. And the challenge is, for the city of Delft, to debate on what elements are the most characteristic.
There are certain regulation - 'Land use plan' (bestemmingsplan). However, the city of Delft can decide not to follow the land use plan (which are made by the city of Delft) and make a new plan. And once they make this decision not to follow the land use plan, people can appeal against this decision. These rules are not national, they are made by the city so as long as they have arguments, they can decide to change, and so the stakeholders can protest (as a democratic process).

So the stakeholders have a voice and can rise a resistance? What is the process of communication with different stakeholders?
Expert: From the current law, if a stakeholder wants to change the land development plan, the city of Delft has to make this new plan and open it up for discussion/consultation. So people can respond to it. It is announced in the newspaper and people have 6 weeks to respond to it. And according to the law, the city of Delft has to do proper city planning. So if someone thinks that what city of Delft is doing is not a proper plan, then they can protest. For example, some can say that the heritage site is not properly treated and then there should be arguments why not. For the Yellow Chemistry, it will not be very likely to achieve the listed status. Gemeente concluded that the architectural elements of the Yellow Chemistry are not that unique to deserve a status 'listed'. Still, the urban layout is unique and the volumes should be preserved, it should be possible to recognise something. If the developer doesn't recognise anything, so it is just 'tabula rase' then inhabitants will have serious arguments to explain why it is not good planning. They will write a letter saying that the plan is not good and after, the city council should answer and explain why something is happening. And if inhabitants are still not happy with the outcomes, then they can go to the highest court, to continue the debate about the location.

Interview with the Manager of Real Estate Development of TU Delft.

15th of October 2020.
A manager of Real Estate Development of TU Delft is facilitating the users of the campus built environment

What are the opinions of the stakeholders', visions for Gele Scheikunde? And what is the perfect scenario for the redevelopment of the building, to meet a more sustainable future? How could these projects be of benefit for the university and for the community?
Expert: Apart from functions that are relevant for TU campus and for the different stakeholders on campus. Personally, I think in our job, it's in general, very important to be aware of all the stakeholders and be very aware of how to give them a role in the whole process. To be very precise on who deserves what role because depending on if your owner or neighbour or just interested, you need to be very precise about what their role is what their relation is to your assignment/project. Personally, I take a lot of interest in and find it very important that we show awareness that now nobody can design and develop projects just from your expertise. It's very important to work with your stakeholders and be open and transparent about your goals. I think it's very important that you're willing to learn also from stakeholders. Maybe you studied specific expertise. But it doesn't mean that your opinion is more important than an opinion of a neighbour. The IRE department also has to learn, we are discussing how we can organise the involvement of the community on campus. Give everybody the role and position in all the development that they deserve.

As a starting point for your project, because you always bring into the job, who you are and how you work and live yourself, that's always you. So that's a very important starting point, I think, to realise when you start with your project, and also reflect on the fact that other stakeholders may live, work in a totally different way. I'd like to ask attention for that. We are all a little bit narrow-minded because we have a job or you study. So try to relate as much as possible on others to the stakeholders, in order to get a really open communication and get the best result because if you really relate to stakeholders, only from your very own perspective, then you will not get into a discussion but then you will get into exchanging ideas instead of communicating about ideas.

We need to have a good vision about what the campus is about, and the plans for the future. We need to know the campus a little bit better to represent TU. So you maybe be representing somebody in future, it's probably your clients that you're doing assignments for. And it's perfectly fine. If as a student, you are happy with experiencing only a small part of the campus or a small part of the city. But try to relate to stakeholders and try to imagine how they would use the city how they would use campus. Try to relate it to them before you get into contact. So that you are prepared for, what I call communication, instead of projecting your ideas. ~~How you experience campus projecting your ideas on those stakeholders. It's always easier to get into a real discussion and communication if you prepare yourself. If I would be in their shoes. So how would I live? would think? and then maybe you cannot know everything from sitting behind your laptop.~~

Why you sold the Gele Scheikundeand why did it happen that way? Did it lose interest? so what was going on in this debate and right now what is the current relationship with this area?
Expert: The TU campus is not only very big but also the number of square metres of buildings - so faculty buildings and other buildings are huge! Over 600,000. In the ideal world and the experts decided that 450,000 square metres would be enough for the campus. So if TU delft could start all over again, and make perfect buildings to create them according to the ideal world, then instead of 600,000 we would all be happy with 450,000 square metres. So that means that there are 150,000 square metres that on a daily basis need attention! So you could imagine that costs a lot of money, money that cannot go to education and research. So TU decides to renew the whole portfolio and to get rid of a few buildings that maybe look nice when you cycle along but those buildings are not efficient anymore.

So Gele Scheikunde was not feasible anymore. So there's a new building on the south side of the campus. And we can get rid of those not efficient square metres and very expensive square metres because the building is old. It's not sustainable. The universities decided that the building needs to be sold. So, we developed a strategy where we said we, on the one hand, would like in the future, to have functions that are helping the TU delft community. So, we would like functions there that are supporting education, and research and valorization. On the other hand, TU also needs money to invest in new buildings. So, then we decided, from discussing with stakeholders that we would like to sell Gele Scheikunde to a new owner with specific expertise and interest in renewing historical buildings, and that has specific expertise in operating that type of buildings for a community.

So we also decided that, because we also need money for renewing the portfolio, we would have to develop a strategy that in the first place gives very big results and a very big selling price. But having said that, we are also very aware that the plot is very big. So the whole redevelopment will have a big impact on what we call campus north or this part of Delft. And, we think that TU Delft is a big Institute with a large impact on the total functioning of Delft. So we also thought it would not be respectful to all of the stakeholders, by simply putting in an advertisement in the newspaper for sale. 'Whoever can pay the most is the lucky winner and can buy it'.

It is also not good if the whole planning process will take years and years if someone protests against. Not good for the community either if the complex is not used properly, which is also not good for the future owner and will result in a lower selling price. So, having said all that, we decided that we would start a process with the neighbours to learn from them what their ideas are about the future of recycling. And so we had a few discussions and also we told them that because we need money it would be very important to relate their ideas and wishes about the future of Gele Scheikunde to our goal making the best selling price.

We were helped in the discussion by Maxwan. So they helped us in interacting as a mediator between TU delft and stakeholders. He showed us what would deliver the best selling price. So put as much housing in the location, high rise buildings, and then make sure that there there are as many apartments in the location as possible. So we put those ideas next to neighbours who said - "well, it's a very charming building. So we would like certain parts of the building, return or get the next life into the in the redevelopment plans." And, of course, if you live on Julianalaan, it's not very nice to see high rise buildings just in front of your door. They were people who were very concerned about parking and car traffic issues. That it gets too busy in Juianalaan, which is now a quite nice street.

So learning from that we agreed on a set of requirements and programmatic requirements. This document was part of the selling procedure. Which was sent to the city of Delft, who participated in the discussion about future requirements for the redevelopment of Gele Scheikunde.

When we finally put the advertisement in the newspaper, we also said, please be aware of this set of requirements. It was discussed with the neighbours, it was recognised by the city of Delft. So we think it's a document that has a lot of consensus with the neighbourhood with the department of urban planning, and the politics of Delft. Then from that advertisement, there were over 20 parties, large companies, that all showed their interest in their location. So we organised walkarounds to make sure that they could have a good look at the buildings, the quality. We gave them all the information that we had. TU tried to make sure to be a good neighbour and make sure that the potential buyer did not buy something, which in the near future gives them a lot of nasty surprises.

There is another requirement, we experience that Michiel de Ruyterweg is very busy in the morning and evening with cyclists. So in the set of requirements, there is a request to make a cycling road through Gele Scheikunde to connect with Leigatastraat to spread the number of cyclists. So to make a better cycling network. Another requirement is to improve the profile of Michiel de Ruyterweg in order to improve its green quality.

Are these requirements related to the new zoning plan of 2007?
Expert: Yes, correct. This plan set a requirement for the maximum number of housing that could be added to the plot. These requirements were the starting point of the set of requirements. The city and the neighbourhood

said that they would like if the new owner would develop the space for smaller companies to create a balance between day and night activity. And to introduce catering along Michiel de Ruyterweg.

Concerning Ecological quality?
Expert: The neighbours mentioned that there is a lot of green along Julianalaan, but you can not use it, it is not a quality that you can experience in daily life. The green is not connected in an interesting network and the ecological importance is zero. The ecological quality should be added at the TU-North developments. So in the Gele Scheikunde redevelopment, the space around the Bouwkunde can help in greening the whole neighbourhood.

Can you comment on Proeffabrieken? It is envisioned for a school, so how this program can help TU Delft community?
Expert: The city entered the discussion and demanded the place for a school. Selling a plot to a school would not make the best selling price. So we asked the city, why they chose this plot which is expensive and challenging since some parts of the building are historical and needs to be reused. The inventory on the historic values/ qualities of the buildings was made. Besides, we asked the city if they did the study of the location. In the end, the city convinced that it was the best option. So TU sold the small part (White elephant) of the plot to the city of Delft. The city of delft is a key stakeholder for pleading historic buildings. And the sold plot is a challenge since it has a lot of monumental value. I think it is a difficult assignment to create a school at this location.

Interview with the project leader from Barcode

30th of October 2020.
Barcode Architects are making the design for the transformation of Gele Scheikunde together with CEPEZED and Karres en Brands.

Can you present yourself, tell me about your role in the project? What are the visions for the redevelopment of the Gele Scheikunde complex? And what are the dilemmas now?
Expert: I've been working on many different projects previously. I worked in Norway for some time also for Concrete in Amsterdam, which I was part of the creative team, developing ideas and creative solutions. I moved to Rotterdam and work for Barcode. I have to say that this type of reuse renovation project is something new for me. But the urban scale is what I like a lot. At the moment we are in the phase of a masterplan VO. So together with the developer and CEPEZED and Karres en Brands (landscape architect), we are designing a vision for this area. We have frequent meetings with the municipality to understand what their aim and ambitions are for this area. As a team we developed a master plan vision. We don't consider how to demolish buildings for now; how to retain if we have to demolish the buildings; what to do with the residual materials. That is something that can come in a later stage because now it's more about creating the vision.

So the whole process is to map out the current location. Over the course of the years, this whole area has been cluttered with newly built buildings. And the question is: How to deal with it by making this area into a lively area that suits the modern housing development of the city of Delft? Also, pinpoint heritage buildings that are considered worth keeping. One of it is the large, building Gele Scheikunde block on the Julianalaan. We see this as one of the larger pieces of heritage that really characterise the area. All the other more industrial buildings can be beautifully renovated and programmed with housing, shops, cafes, restaurants ,pop-ups, etc. We find that we can develop this area in a more dense way also in relation to the demand for housing requested from the municipality. Not to just renovate because that is something not beneficial for it.

And what can you say about the program?
Expert: We're trying to keep also the corners alive in this project and implement a certain amount of new builds. The main idea is also that nowadays you can't really, build only houses without adding an additional programme to it, more like public programmes, schools, shops, even commercial programmes. So what we have in the mix now is that we established a centre area for public functions. We established that it should have access. It's quite a traditional set up of master planning, of urban planning. We have a school to influence also the type of users of the area and there's a large portion of housing with different typologies that invite certain tenants. There is gonna be an amount of apartments in the Gele Scheikunde block for which we delivered casco and then the ones buying the place are finishing it. So you get a really good mix of the type of apartments, luxury apartments, social housing. This type of demography mix will influence the site.

Another ambition is to connect to this more urban setting of Michiel de Ruyterweg. To go along with the scale of the Prins Bernhardlaan. That's quite a green suburban area with a lot of beautiful trees and parks. We have the ambition to attach the development to the existing green and the park. We noticed that the way this old Gele Scheikunde block has been constructed is by interlocking volumes. Looking at the historical plans and development also is that there was a certain rigidity in how the plan was envisioned by Hartman, and that currently the triangle (plot), which is not finished as the way it was planned, but it kind of falls off the whole area. And we want to kind of embrace this as a full area.

The commercial program is not very present?
Expert: It really has to do with what the municipality really pinpoints for the newly developed areas. So we're not focusing on the commercial. We imagine a green heart and the public space, combined with some commercial programme. But it's not the main.

Something to consider in the master plan is also the heights. Because it is in somewhat of a suburban area, but it leans towards the Bouwkunde building but also towards the TU area. The profile builds up in height. In order to really maintain the characteristics of the area, we think the Scheikunde building is the main feature. It was important to maintain this icon. The vision is to connect to all those different type of scales in the context

You are using also the programme document made by Posad Maxwan? Which was a part of the sale.vision.
Expert: Yes! Most of the square metres will be filled with housing. So let's say the diversity of programming is not so much there. The answer of the Gemeente is also to provide a certain quantity of houses. It's not focusing on startup communities. Let's say it's more based on either communal living with smaller studios, but not so much towards working.

CEPZED is doing most of this renovation of the Gele Scheikunde part which is at the Julianalaan. They're describing why, how and what is valuable to maintain and what are the core values.There's a lot of cool typology of houses possible to develop in this strip.

Now that you're preparing the master plan, is there someone else involved in this process? Except for the architects, landscape designers and developers? Some other stakeholders?
Expert: Yeah, for sure. Once the masterplan VO is compiled, there will be these presentation moments throughout the area. There is a moment where you go to the real world and stress test the idea, and whatever feedback from that comes back, we then decide how to adapt or not.

The complicated part is when you want to keep old buildings, like heritage, especially for the developer, the question is not only an emotional choice to keep beautiful buildings. But it really depends on how can we make it work!

I heard that the current challenge is parking.
Expert: **it is quite challenging because there is, at the moment, only underneath Gele Scheikunde a cellar, we are investigating if this is feasible for parking or storage.** Based on a requirements from the municipality of Delft, we would need to provide parking for the new built houses. That is a challenge for sure.

And what about the bike path?
Expert: We are considering all sorts of mobility routing. How to deal with ambulances and fire trucks and the trash. Any proposal for the mobility strategy will need to relate to the existing traffic layout. We don't want cars to enter the area. Because we like this kind of ambiences for public life where also we can add more green.

Interview with the representative of DUWO

6th of November 2020.
DUWO is the largest student housing corporation in the Netherlands (in total 33'000 homes). The interview was conducted with a branch director of DUWO Delft who is responsible for renting out DUWO's houses and the realisation of new complexes. And with a director of public affairs, responsible for the communication with stakeholders and renting for international students, and contracts for institutions. DUWO wanted to buy Gele Scheikunde.

Gele Scheikunde will be redeveloped for housing for rent and sell. How DUWO chooses locations for housing? The site is located right at the campus isn't it the best place for student housing?
Expert: I wish we had a choice. Locations are so hard to get. We did speak with TU Delft, about Gele Scheikunde, it would be a perfect location for us. But they wanted to put the highest price. So we couldn't afford to build there.
And how do we choose locations? Firstly, we choose from what is available. Secondly, the distance to the university is important, together with the distance to the local pubs. Those are important for our students. They don't want to live at the outskirts of Delft; they don't want to live far away from the campus; they don't want to live far away from the entertainment facilities. **So our perfect location is actually Gele Scheikunde.** There are shops nearby. Then campus of course. We could have realised at Gele Scheikunde something very beautiful. Besides, student housing should be affordable for the students. So it could have been too expensive for us to realise affordable housing with such a high selling price.

Was there a discussion of buying maybe a part of Gele Scheikunde?
Expert: I guess we would buy the whole building, and therefore we would buy the whole site. We would redevelop it for a part within the existing blocks for apartments.

And was there also negotiation with the municipality?
Expert: Municipality prefered to have housing for adults so for sale and rent instead of students. So it was difficult for us to realise the student housing at Gele Scheikunde.
The university wants to attract a lot of foreign students. Consequently, you need to offer them accommodation. We realise that. If we have the possibility, we realise special accommodation for them. We are willing to do that. We have the money but what we need is a place to do it. Statistically, around 10,000 new foreign students come in August. So we need to have 10,000 available rooms for them.

Your target group is only students? or young professionals also?
Expert: We are a student housing organisation. So the core businesses is students and PhD researchers. In the past, we were asked to get some housing possibilities for staff. So we do some housing for staff members, but in the social housing sector, so with a maximum rent of 700 euro for people younger than 30s with a low income.

Interview with the member from Belangen Vereniging TU-Noord.

10th of November 2020.
Belangenvereniging TU-Noord translates as "Interest group TU North". All members of this group live in the TU Noord area.

So first of all, I would like to ask you some questions about your visions and ideas of Gele Scheikunde. And you can present yourself and TU -Noord Belangen Verenining?
Expert: I live in the Julianalaan almost straight across from the main entrance of Gele Scheikunde. My family and I have been living here for almost 20 years now. So we've seen a lot happening in the area, in the neighbourhood. Obviously, it's an area which is sort of squeezed in between the centre of Delft and the university. Which brings, a lot of life to the area, a lot of possibilities, but also a lot of potential issues that we need to address and try to prevent. About three years ago, I joined the Belangen Vereniging and we're actually had already been a member for almost 20 years that we live here. We try to, as the name says (Belangen Vereniging), represent the area. So it's also, the other side of the coin, is that we represent people, in any project that concerns the area. That could be anything from, a project like Gele Scheikunde to the infrastructure. We are, I think, the well-respected speaking partner also for the municipality. Obviously, Gele Scheikunde is one of the important projects that are upcoming in the next couple of years.

You participated in the programmatic special plan planning for the redesign that was created by Posad Maxwan. What can you say about it?
Expert: This plan is sort of an "envelope" that was part of the sale of the land and the buildings. Although it's not something that is "written in stone" or you know, supported by any law. It is a strong advice to the developers. Which contains things like the maximum number of houses and the maximum height of the buildings.

And by what means TU -Noord Belangen Verenining participated? Was there a workshop or open discussion?
Expert: There have been several workshops. We were there ourselves. TU, Gemeente, Postman Maxwan were there. That's, where we start to play our role in making sure that the right people, know about these workshops and that they actually attend. Obviously, we participate, and we try to gather as much information as possible, how do people in the area think of this project; what are their ideas.

Was the discussion, in your opinion, well managed? Now, the program for Gele Scheikunde is rental houses and houses for sale, no students housing is envisioned. So what can you comment on that? Is it a missed opportunity?
Expert: In itself, the question of student housing was not a subject in any of these workshops. Because that was said by the municipality that they want to have a certain kind of housing in that area, like, X% of houses for rental and x for sale within certain price categories. So, that's not something we don't want. That's not where we try to interfere. Our role is more to think about how is it going to affect the people that live in the area right now. If their quality of living going to be changed or not. If so, then how it is going to change. Can we do something about that? The fact that there was or was not going to be any student housing, that's not something that really came up in any of these workshops.

What were the most important aspects for the neighbourhood that you proposed?
Expert: I think the total number of houses. Obviously, already a couple of years ago, there was this environmental impact analysis, which says that if you want to stay within the extracted limits than, there **cannot be more than 300 houses**. We make sure that it's not going to change. Also, for example, at the Julianalaan which is nice and green. If the hight of the buildings increase, let's say to 10-storey high apartment buildings, then it will change the quality of life and that's where we would have an opinion. We, push a lot on, keeping the current height, and not moving the buildings towards the streets. Also on the Julianlaan, there is a grass field with a couple of trees, where children play and so on. Initially, that was going to be used as a building site as well. So that's something that we got, assured that this is going to stay green. Another thing is that if you want to put houses in an area, and you want to make that attractive, in order to sell it well then, people want it to be green. Which is **difficult because of parking places**. You see this trend, in any new development, you need to account for every person a certain number of cars. This number, I think, is something below 1. But that number is drastically being reduced in new developments. With the idea that in the future people may not own a car, but they will share a car. We are pushing the use of bicycles and so on. Which we obviously, hope is going to happen, but the reality is that it's not happening yet. If you reduce the number of parking spaces, then where are these people going to leave their car. That is something that is going to give issues in the future. For example, the initial idea was that the whole area was going to be more or less closed. So all the cars are going to go in and out of the area via the Julianalaan. Then we have 900 bicycles per 15 minutes in traffic hours on the Michiel de Ruyterweg. So if you add 300 more houses, and those people need to cross the cycle lane, than that's already an issue, that will become larger. So that are the kinds of things that we bring up in this kind of meetings.

So they're thinking now how to solve the parking problem and would it be better to completely live out the parking from Julianalaan or is it a good location for that?
Expert: Julianalaan now is not too busy yet. So there is obviously space for a number of cars. It depends a bit on the time. Now it is working well. The thing is that there's going to be 300 more houses and we know from before that this is really a popular place to park for people who want to visit the downtown of Delft. Now it's not possible because now you need to have a licence. But within a couple of months, it is going to be very busy. There are only a few paid parking spots, close to the hotel Juliana, and there's one or two that went to the supermarket. But otherwise, you can only park if you have a licence. There are also a number of changes happening, which will change the parking situation dramatically.

And there will also be located an International School at Proeffabrieken. So, what can you say about that? Was there a discussion about this programme, was it important for the neighbourhood?
Expert: No, not really. I think people are living in an international environment. You need to have this kind of facilities, it's also not something that's going to disturb our way of life in any way. So no, I mean, that's fine. It was mostly about Jullianlaan density of housing and about this facade of Julianalaan.

What are the architectural values that you think are important to keep?
Expert: Yeah, so that's a subject that did come up. There wasn't really an opinion on that subject. There are people that say, that it's still a nice building, we like it. So let's try to keep that and build apartments or housing inside. There are other people that like the old style and the character of that. It may also be that they say, well, we know what we have and if we take it away, we don't know what we're gonna get. My answer always is well, it may be better. It's not always going to be for the worse. But I think it's more, sort of people either like it or not. Obviously, you can have the discussion about it, and give your opinion, but we know, we were never going to have any way of influence on it anyway when the real design is going to start. So we'll see what happens.

Are there any other dilemmas?
Expert: No. I mean, the main things were already talked about. If there are going to be any dilemmas in the near future, that's something else. I mean, they're not there yet.

Okay, so you really have the feeling that your voice is being heard.?
Expert: Yeah, this is one of the better examples and obviously, this is only the first step and we're going to have to be in close contact about the next steps. But till now, this has been a pretty good process. Yeah.

And concerning the programme, was there any talks about maybe other functions, which we did not know or did not talk about? Or was it always clear? Dwellings, international school. But what about enterprises? Or did you had commercials?
Expert: Yeah. So there's a couple of things that were discussed. One is something like a **restaurant or a bar** or something. There are always two sides to it, noise during the night, there's one thing but the other thing is that we do not have a lot of comercials in the area. No space where you can just go and have a drink and meet friends and also have meetings between the citizens and students, for example. That's something that people are really

positive about. As long as it's arranged well and you don't stay awake during the night.
So that's one part of it. So the opposite side of the BK faculty, there are duplex houses. There is a discussion if they stay or not. So if they stay then you can hardly do anything about moving the street. If they would become part of the project, then we can move the street profile a little bit into the site. Obviously you can get a lot more space for cyclists and it also allows people to get out of the faculty or get off their bike and have a bit more space where you can meet people. There's also a discussion of having enterprises. Probably related to the university.

Interview with the advisor from CE Delft

19th of November 2020
The senior researcher/advisor and leader of the sector sustainable cities of CE Delft advices on the sustainability aspects of the project.

The interview started with the discussion of the redevelopment of Kabelfabriek (a case study of another master student from Heritage All). This advice applies to the Gele Scheikunde.

How to redesign the Kabelfabriek on sustainable attributes while preserving cultural values? So at the moment, I'm seeking design solutions that are sustainable, that doesn't touch the cultural value of the factory.
Expert: What will be the purpose of the building?

Mainly residential functions.
Expert: The main question is how to incorporate sustainable energy system within the existing building. Also, produce some renewable energy on the building or near the building. This is your question to me? What kind of ideas there are or what kind of options there are? It is a monument?

No, it is not listed.
Expert: It's easier on one side. But on the other side, since it's not listed, you do have to comply to all regulations. Which means that the most strict regulations are the BENG norms - almost energy neutral buildings. Which means that the energy use per square meter is limited. The amount of primary energy that you use is limited and you have to produce a certain amount of renewable energy on your own building or on-premises. First of all, look at ways to insulate the building. Probably the outside is the valuable part so you can't touch it. Then you have to do everything inside. There are a lot of options for that. The most logical option is to put the extra walls in front of the original walls with the insulation. That's quite easy and not that expensive. The most expensive part is the glass. All the glass needs to be refitted, probably to the same dimensions of the "rasters". After the installation, you have to look at the ventilation and eventually, to how you need to arrange the heating, the cooling and the hot tap water. The last one is important because you have to have quite a high temperature of a heating system to arrange the right tap water. For heating in Delft, a very large project is being developed in the entire region here, the "Warmterotonde". It's the "heat roundabout" where heat from Rotterdam, the harbour, is transported via Delft to The Hague and Leiden. Which is a transport system that can also incorporate geothermal energy. For example, all the geothermal plans that are built in the horticulture in Westland. They can also, put the geothermal energy from the horticulture, the "glas tuinbouw" into the "warmterotonde" and transport it to Delft, to The Hague, to Leiden and all other cities in between. It heats from 70 degrees and that's important because especially with old buildings, it is quite difficult to get them warm with lower degrees, lower heats. So 70 degrees is excellent for heating a well-insulated old building. You can get hot tap water from 70 degrees conform the older regulation there. So one of the options is to see if you can connect the building on the large plan, the development of the geothermal energy or the university campus will probably also connect to the large plan. The Kabelfabriek is a exactly in the middle of the university and Tanthof. Both are developing the geothermal source. So you're right in the middle of it, so you can probably be a linking pin between the two developments. Otherwise, you have to look for another heat source. That was likely if it isn't a district heating system like geothermal, then you have to do it electrically. Via a heat pump, and that will be quite a large set of heat pumps to produce enough heat to get all the apartments and all the office buildings hot enough. The extra part is that the heat pumps also can provide cooling in the summer, of course, they are quite good at it. That's just another system, including possibly an aquifer thermal energy storage, a "WKO", which you can also adapt the building providing heating in the winter and cooling in the summer. The underground in Delft is quite good for such systems. But most likely, because it's quite an old building, the installation will be a bit hard.

Besides, you also need to produce your own renewable energy. So you have to think about putting extra solar panels on the roofs. You can try some more innovative ways of introducing solar panels within the building, and not just clamping down on the roof, making a little deviation. Also, there are some extra things like a **green**

rooftop. There's a big problem with all of the rain that is coming. So if you get a green rooftop, it gets extra cooling in the summer, but it also collects the rain a lot. Other ways of producing your own energy, for building in that position are very experimental, like the windmills. Horizontal turbines on the rooftops are not that efficient and they're quite expensive and they do give some discomfort for the habitants because of all the vibration and sound they cause. The best is to use solar PV panels and maybe some solar thermal collectors which can add to the renewable production.

Is it possible to use the heat of the data centre of the TU?
Expert: Most data centres provide like 30 degrees heat so you can't heat a building like Kabelfabriek with 30 degrees. So you have to upgrade it to 70 degrees most likely, so you need a large heat pump to do that. That's not impossible, but it's a bit more expensive. The campus has a lot of new buildings which can use 30 degrees much more efficiently then residential redevelopment like the Kabelfabriek. You can use it for the heating of spaces, however, since it will be residential you really need more heating for the hot tap water.

30 degrees system would make a lot of projects more easy to realize. But do you think that in future a low temperature water system will be enough to heat the building? You said that for the tap water you need to update heating from 30 to 60 degrees, which I understand, then you maybe need an extra electricity heater to solve that?
Expert: It possible today, it's not that difficult to upgrade 30 degrees to 70 degrees. It's cheaper to do the upgrade than to insulate the building so you can heat with 30 degrees. Because heat will be scarce. And you can probably apply a 30 degrees heat easier in the newly built buildings on the campus or other newly built buildings near the train station, more easily then completely refitting an existing building. You need a system that is really slow, floor heating or "Betonkernactivering" to keep the building continuously warm, if you heat it with 30 degrees. It is all possible, there are a lot of examples in the Netherlands which get that but they are all very expensive! And they are really hard to execute and deliver.

It depends on your source?
Expert: Yes, of course. At the moment, we are developing the "Transitie visie warmte" for the municipality of Delft. It's the big plan on how to heat all the different suburbs. All different neighbourhoods at Delft with high temperature, medium temperature, low temperature, heat grids, all electric versions, biomass. In those plans, you look to all the buildings that are in Delft and try to divide the heat sources that you have over the different neighbourhoods of Delft. Delft has the advantage of having quite a lot of heat in the ground, like geothermal heat and heat from Rotterdam which can be applied. You have something to choose in some other cities where you can't do that you can't choose anything, you just have to grab anything you have. In Delft you can make the decision to transport 30 degrees heat from the data centre to the Kabelfabriek and place like a large heat pump, or place the heat pump at the data centre and transport 70 degrees to the Kabelfabriek, they're both options. I don't know if you know the "Start analyse". The government developed the guidance on what you can do for each neighbourhood. They analyse the every neighbourhood in the Netherlands, which is the best option, including the low temperature heat sources. But for all calculations, the best, economically viable option is upgrading the low temperature heat sources to 70 degrees. So that you have a 70 degrees distribution, not a 30 degrees distribution that needs an individual upgrading. It's just economical optimization. But technically both routes are possible. If you look at the "Mine water concept" in Heerlem, they work with 30 degrees, a low temperature distribution, and with individual heat pumps. That's the other options. That's technically an excellent option. But financially, it's a bit more difficult. But everything is possible! It's possible today, there are examples today. But it is just easier to have a 70 degrees distribution grid.

How can you use the heat of the sun?
Expert: The climate is changing and it is a problem for new and existing buildings. Designs are based on the situation in which the heat demand is larger than the cooler demand. But eventually the heating stress will most likely be a bigger problem than the heat demand. Heating is not the problem, but cooling is the problem. You really have to think of keeping the heat in the summer out, like special glass or shutters. Or you really have to have a good cooling system, that can extract the heat from the building and put in an aquifer, like "WKO", with a really high capacity.

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My case study is Gele Scheikunde, a former campus building, not listed. Will be redeveloped into housing. I can imagine that all the stated above for Kabelfabriek applies to my case study.
Expert: yes.

Currently, on the site. there are a lot of facility buildings, like electricity pilot plot plant and TU experimental sources for electricity. Could those be used to provide the residential housing with elecricity?
Expert: It's better to design a completely new system, but it's fun to integrate the old system of course, if there are spaces that can harbour the whole energy producing techniques. Also, if the techniques are mature enough to make sure that the building is comfortably heated. But the level of comfort needs to be quite high. The level of availability as well, it needs to be always there. That's why it's always a problem with experimental heating techniques, that you really have to make sure the residents know that they are using experimental techniques. We have quite a lot of regulations in the Netherlands regarding techniques and the availability of the heat and if you are like a heat supplier for district heating, then you get quite a large fine if your heating grid is out for a certain amount of time. If the experimental technique doesn't work, and your residents are complaining that you most likely have to pay them. So they choose for technique this stable certain. But on the other hand, it is the university - Campus, it is an experimental area. So, if you make sure that, including all the regulations for lifting there are suitable for having an experimental heat source than why not!! Especially if the building can harbour them, you can try it. But they're no such a small scale energy producing installations available at the moment.

Interview with the landscape architect from Karres en Brands

20th of November 2020.
Karres en Brands are involved in the redesign of Gele Scheikunde. And are working on the urban development of the site together with CEPZED and Barcode Architects. Karres en Brands office is specialised in Landscape and Urbanism.

How to integrate ecology in the reuse design? Gele Scheikunde is surrounded by the green and has several courtyards inside its plot. How you as a landscape architect approach this site.
Expert: Karres en Brands started working on Gele Scheikunde project, beginning of this year. It's a quite fascinating complex, the existing architecture is beautiful and a couple of studies were made about values, cultural values, historical values, and ecological studies. There is a document which is set on the historical values of the architecture and landscape (Programmatisch kader Gele Scheikunde). Which shows what is actually needed to be kept and what not. Then we look at the ambition of a client. In this situation, what do they want to develop. This is a starting point and we look on the big scale. We zoom in much more than just Julianalaan, we look at long connections. We try to spot out places, which are ecologically interesting. You have on the north a cemetery and there's the Botanic Garden, which are all a culturally and ecologically valuable areas. Also, there are long corridors, which are very important for all the animals to move in between the spaces.

For example Julianalaan not only row of trees between the parking spots are important but also lush vegetation along the Gele Scheikunde building. This vegetation is ecologically very interested and important. Besides, you need to allow continuity of green connections in the city which are important for animals. So those are actually the starting points for our vision. We have green and blue research in the city. We use it to see how things work and to develop our plan. Further we check the qualities on the site, which are starting point for the design.

The green triangle at the Julianalaan is interesting. The area just before this triangle is actually really green with a lot of existing trees. If you work on an existing site, you always have to think about how to keep the trees, think about the species. It's also important for biodiversity. The ambition is always to keep as much as possible. We have to see how much we can keep and what we can do to keep them or replace them somewhere else if there is money available. Then our idea is to connect as much as possible. The plot has to have green areas as much as possible. We have to address also the water retention and the overheat. Currently, there is too much paving, too much of buildings' roofs, which attracts sunlight. By making it greener, making it absorb more water, you cool down this whole area. The following brings up the idea of a nature inclusive design. Which is also a question of the space you have on-site.

What about Biodiversity?
Expert: Biodiversity in this project is improved by use of diversity of plants. But if you think about it, it's also the way how you maintain it. Usually we try to use in our designs many local plants as possible because then you're sure that local animals will be attracted by them. Mixed planting, which is actually going through the seasons. We would like to feed the bees, consequently we would like to go for the trees which are blooming from early spring till the end because then you have enough funding for them. Your goal is not only to attract species to your site but also keep it attractive for a long time.

Since there is a need in housing and the density needs to be increased, then is there a dilemma to keep the green or not?
Expert: I don't think they (developers) have these dilemmas. Now, they (developers) are very practical and try to make their business case. I think open green spaces is amazing quality for the future inhabitants.

Of course, they are not maintained, but if you keep the same spaces, and you just make them more attractive? then is there a minimum % of the site that should stay green?
Expert: It's the regulations that you get from the city. You know how much green spaces you should have. These regulations say that; you need to have 50% of open green spaces which are public, and you need to have 3% or 5% of water retention surface. If you think about it, concerning the built densities, I am pretty sure we are not going to reach 50%. Our goal will be just to enlarge the green roofs and limits the paved areas. To really push the quality of the green spaces.

What would be your intervention in the Gele Scheikunde site according to your very expertise and profession? Your intervention represents the mindset of a landscape architect only!
Expert: Keep the important historically buildings, limit the housing program, make more collective spaces and increase green areas.

Interview with the city ecologist of Delft

1st of December 2020.
The city ecologist and senior consultant green policy (including ecological, economic, social, spatial and physical values of green and tree policy and climate adaptation) is involved in many projects and area developments.

What is the role of the city ecologist?
Expert: I'm the city ecologist for more than 20 years now. And the focus of each city ecologist can be different. I'm primarily focused on the policy. And not only for ecology but for the green in general. I wrote the policy for The City of Delft and made difference for the green perspectives. So green has perspectives; firstly for ecology; also for social functions, like where people meet each other, or recreation. Then the economic perspective, what are the cost benefits? And the structural perspective; the structures of the tree, or the parks. And the physical perspective; that's more related to the effect of green on climate adaptation or how can we use green to mitigate heat stress, or to mitigate the dust and define pollution. Also, how to realise natural banking rivers or the bankings of the canals. Besides, I'm also working on the neighbourhoods of Delft. So the Delftse Hout, which is the recreation area, the South area, but also incorporation with the other cities, like Rotterdam and Schiedam. So all these cities around the mid-Delft area.

Is there a minimum percentage of the green that the city should have in a perfect scenario?
Expert: Well, that is difficult. I think in the 80s, the national governments had a policy what say that each house should have about 80 square metres of green. But it's not really a strict rule. And it is also a very difficult one. What is in this 80 square metres? is also the creation area or not? Nowadays, you can see that the national government and people are thinking about the green norms, in relation to biodiversity. So probably, they will be a new norm soon. I try to incorporate it in our policy of Delft, but our local government doesn't want it, because it's very difficult. For example, Schieovers which is a transformation area for housing, which probably will have a very dense area of housing. So it will be difficult to incorporate a lot of green compared to other areas, with a more green environment. So I think Schieovers is very important for housing. I still hope this year, to have a policy of nature inclusive buildings.

What does this policy of nature inclusive buildings mean?
Expert: Depending on a different scale of the new development, people have to incorporate nesting places for birds or for bats; to have also green roofs or green walls, and also to have green around the building, otherwise, it's not useful to have only a nest or a nest box for a bird without the surroundings. Gele Scheikunde for instance forms the habitat for bats. So when you destroy the building, you have to compensate for their habitat by putting nest boxes in the surrounding. So when bats relocate, then the building can be demolished. So you have to look for the compensation places for species. No places for swifts and house sparrow were found. Also, there are several wall plants which are wall fern, tongue fern etc. We have to think about the habitats of the species. To develop and to help the biodiversity in the city. Furthermore, be focused also on the bees. We are a bee-friendly city. We try to plant trees and plants that can facilitate the pollination for bees.

In the redevelopment of the Gele Scheikunde site, the goal is to increase the housing density which affects the green zone percentage. From the ecologist point of view, what percentage of the green area should be envisioned in this redesign?
Expert: Yes, I want as much green as possible. But on the other hand, we know that the housing capacity is urgent. I also didn't want to expand the city to our recreation areas. So that means that we increase the density within the city. Then you think in another way and use the green roofs and the walls and incorporate the nest places as compensation for the green. Also, it is important to connect the parks which are nearby and so create good 'green corridors'. In this way, you intensify the density of the city with buildings and increase the possibilities for biodiversity. So you have to think about it and look at the biotopes and the species association in the surroundings of the area.

For example, in new Delft, in the area around the station, there are new buildings and they have an underground parking area, with a big green area on top. There is enough space for pollination for bees and for butterflies. People can sit there, can play and, there are also a lot of possibilities for house sparrows and nest boxes. We need to think about more integrated ways to a building. Besides, since there is green in the parking places, you have also less heat stress. As the green lower the temperature.

You mentioned the 'corridors'. Those are connectors between green areas that facilitate the species' displacement. In this way, is it possible to connect the Gele Schikunde site with the Botanic Garden which is nearby?
Expert: That depends on the species, for example, for birds its no problem, although, for example, for house sparrows, it is very difficult because they have an expansion of 300 metres per year, so they disperse very quickly. For other species, you have to look to the corridors. To look if it is possible to have the corridor from the Julianalaan over the Michiel de Ruyterweg to Gele Schiekunde. There is a 'Fauna corridor' on the Mijnbouwstraat between the Botanic Garden and De Vries van Heijstplantsoen, especially for the hedgehogs. These species are frequently in the city but you hardly see them because they are active in the night. They walk from 1.5 to 3 km per night. So they disperse to the city but the roads are the main barriers for them to overcome.

So there should be a continuous green line?
Expert: Yes. or under the way, which is also possible.

Is it possible to make the links with the canal?
Expert: No, because of the different water level. In Delft, there are different polder system so you cannot connect water so easily. Also, it is not the best solution to connect the water underground. The quality of water depends on that. It is best if the water is opened up so we try to connect the water system but it is very difficult and expensive.

Bonnekaart number b459, 1912-1913

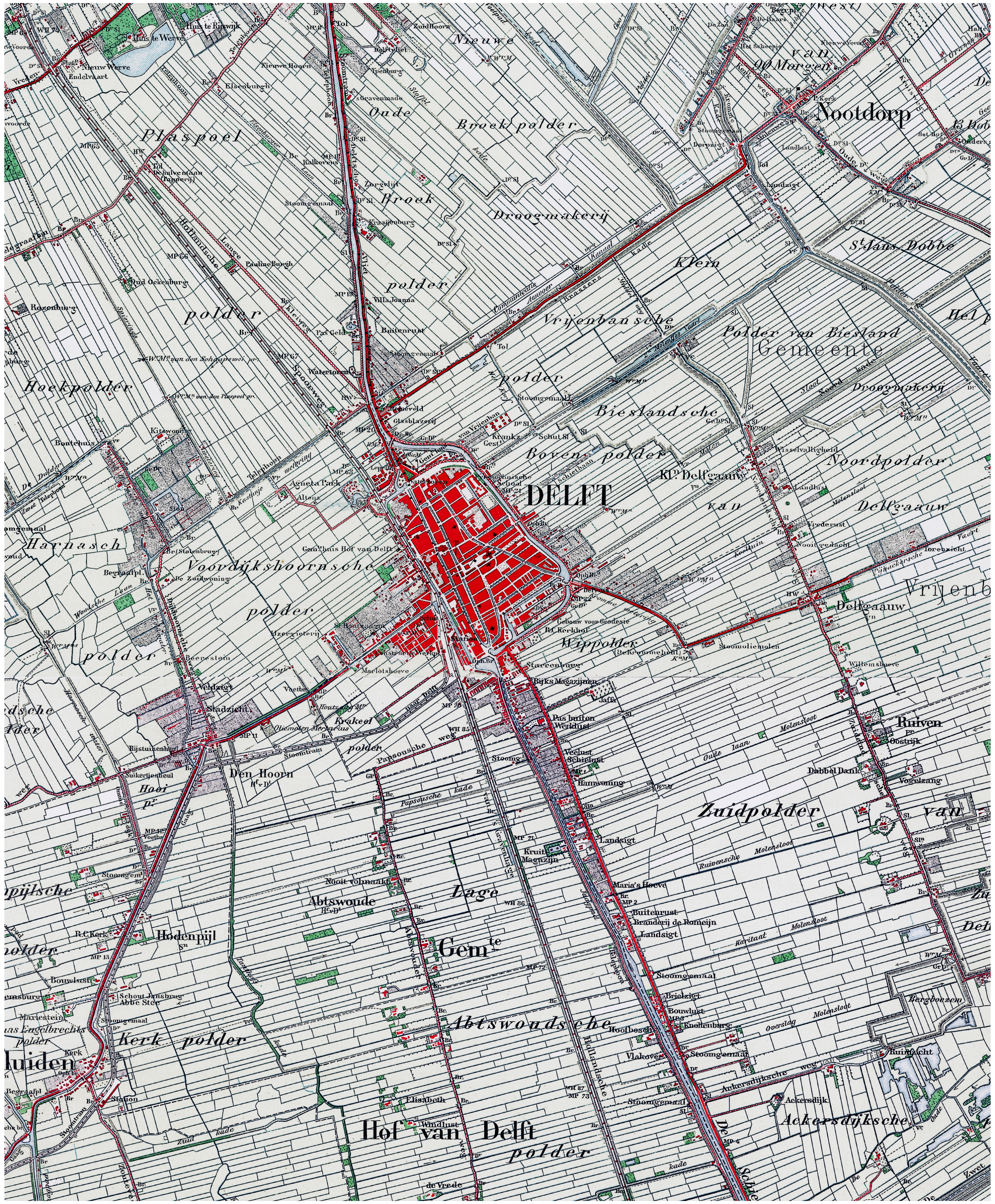

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Figure 1: Four themes of Heritage4all (Syllabus, 2010)

Figure 2: Method diagram self made (2020)

Table 1: Inspired from the cultural values, retrieved from Tarrafa, A.S. & Pereira Roders, A. (2012). Cultural Heritage Management and Heritage (Impact) Assessments. Conference paper.

Photo 1, 2, and 3: Self made (2020)

Photo 4: By Anja van der Watt (2020)

Photo: 5 and 6: By Pieter Delleman (2020)

Image 1: Retrieved from Uffelen, C. (n.d.). Speurtocht langs het verleden. https://www.delta.tudelft.nl/article/speurtocht-langs-het-verleden

Image 2: Retrieved from Cultural Heritage Agency of the Netherlands, (2005). Explanation of the decision to designate the protected cityscape of the TU Delft district of the municipality.

Image 3: Retrieved from Delft Stadsarchief

Image 4: Map retrieved from Delft Stadsarchief. Bonnekaart number 37E, 1940.

Image 5: Retrieved from Delft Stadsarchief

Image 6: Drawings retrieved from Stadsarchief Delft.

Image 7: Retrieved from Macel, O., Schutten, I., & Wegner, J. (1994). Architectuurarchief Technische Universiteit Delft. Publikatieburo Bouwkunde, TU Delft. p 12

Image 8: Drawings retrieved from Stadsarchief Delft. Inventory number 983.10464

Image 9: Retrieved from Archives, Bouwvergunningen Delft. Inventory numbers: 953.10452.

Image 10: Self made (2020)

Image 11: Fotografische Dienst TU Delft (1960) (c) Delft University of Technology. Creative Commons BY

Image 12: Photo self made

Image 13: Retrieved from Gemeente Delft. (2009).

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Image 16, 17, 18, 19, 20, 21, 22, 23, 24 and 25: Minecraft model screenshot

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Image 36: Retrieved from augustinundfrank.de

Image 37: By Zanderroth Atchitekten. Retrieved from Gallery of BIGyard.

Image 38: Funenpark Amsterdam Dikke

Image 39 and 40: Retrieved from How to make a Japanese House, 2015, nai010publishers