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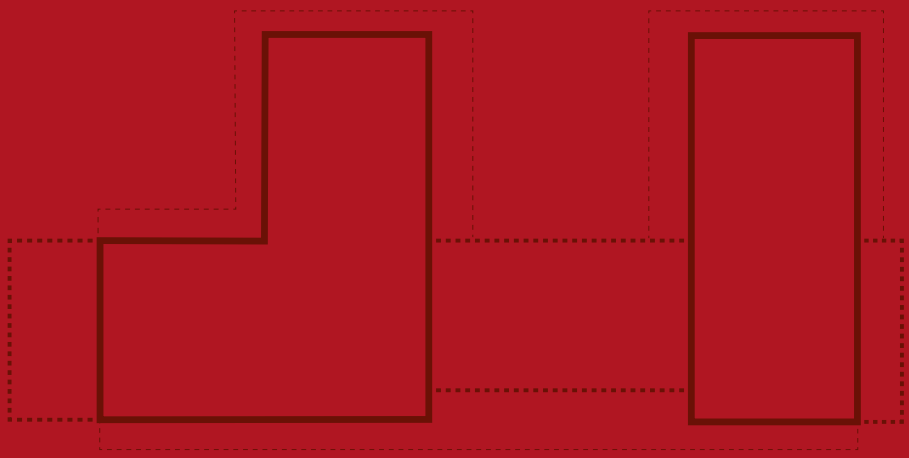

'A critical arrière-garde has to remove itself from both the optimization of advanced technology and the ever-present tendency to regress into nostalgic historicism or the glibly decorative'

Frampton, 1983

Delft University of Technology
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Prologue

Throughout my study I have been drawn to the broader perspective. Problems that are comprehensive, encompass multiple facets and are therefore complex interest me. Furthermore, by studying architecture, you learn to observe, to use the power of your eyes differently than before and others. When looking for a graduation topic, this habit of looking around and trying to make sense of the world by observation inspired the focus of my research.

During this process of observing architecture, I began to look critically at the buildings I saw on Instagram, LinkedIn and in the physical world. The invention of social media has facilitated the widespread availability of architectural content from all across the globe. Never was it so easy to see so many buildings around the world, ranging from all the high-rises in Azia, to the wooden architecture in Scandinavia.

However, when you 'consume' so much architecture, with a trained eye, you also start to compare them. This is which started the process of seeing a homogenized architectural landscape. Lists showcasing high-rise buildings constructed worldwide shows a plethora of buildings with similar shapes, all clad in a mirror like glass façades: all built in different countries and continents (Arch Daily, 2022). Closer to home, a list of Dutch high-rise buildings all completed in 2023 showing similar looking boxes lacking both quality and identity (hoog500, 2023). Moreover, the trend of future wood architecture propagated by cutting-edge render companies like Mir and Barcelonaplay on Instagram highlight a trend of modern construction using the same type of materials and building methods.

Diving deeper into the subject, I discovered that the concept of an homogenized architectural landscape was not a new concern. Kenneth Frampton, in his most famous essays 'Towards a critical regionalism, Six points for an architecture of resistence', addressed this issue by stating that:

'Modern building is now so universally conditioned by optimized technology that the possibility of creating significant urban form has become extremely limited.' (Frampton, 1983)

'When you 'consume' a lot of architecture you will notice a homogenized architectural landscape'

He proposed six points for architecture to align with, emphasizing aspects like topography, context, Climate and others contextual aspects. Reading his essay, the idea seemed compelling.

However, now, almost 40 years later, the tendency of architects designing un-contextualised architecture remains unchanged. Therefore, this thesis serves as a plea for change. A critical comment on today's architecture, but in the same time a positive one. It argues that it should indeed be possible, even in modern times, to build with respect to the local context. To design an architecture that reflects the local traditions and culture, and forms a basis of identity.

Figure 1:
High-rises constructed in 2023 in The Netherlands
(hoog500, 2023)

Table of Contents

Figure 2:
Photo of Friche

Introduction

01

Studio

1.1

My graduation project is part of the ‘Urban Architecture’ studio. The studio focusses, as the name suggest, on more than only architecture as a sole object. It looks at the broader urbanistic scale, the relation between architecture and the context it lies in. The studio is therefore site driven: the context is from huge imporantance and should serve as a starting point for all the projects within the studio.

Therefore, within the graduation year, we went on three site visits with the studio. Already within the first week we visited Brussels and wandered around and even on the Friche. In november, we went to Geneva, Switzerland, mainly to look at co housing projects. After the P3, we went again to Brussels to not only visit the Friche, but also interesting architecture in the City.

Besides this, the studio is known for its hands-on approach. This has effect on how students work within the studio. The research methods are not solely bound to pure scientific research, but focus more on hands on antrophological methods. During designing, the tools that are used are not only digital, but instead, model making is from huge importance.

This way of working was one of the reasons for choosing this studio. The aim of this year was to learn how to look at architecture from another perspective using different methods than I was used to.

Figure 1.1:
Group photo studio in Brussels
(2023)

Location 1.2

This years Urban Architecture graduation studio focusses on the Friche, a former marshalling yard in Brussels. The Friche is situated close to the well-known Josaphat Park in Brussels in the Schaerbeek commune and on the border of Evere. La Friche, which translates literally as “the Wasteland” from French, is a 25-hectare area that has been left fallow since the 1990s and can now be described as underdeveloped and undiscovered. The current friche hosts an industrial site in the east, and green embankments in the west. A railway line serves as a physical division between the two.

The Friche itself is not open to the public because of fire, trash dumping, and vandalism. As of right now, only community gardeners and naturalists can access it to record their observations. In the direct surroundings, a residential area and structuring space are present, as well as sports and recreation facilities.. Except for a small mixed-use office sector along Leopold III Avenue, the urban fabric around the site is thus primarily residential.

In 2013, the railway marshalling yard was dismantled, and the area was cleared, levelled and turned into a floral grassland. It has progressively changed, becoming a more untamed, semi-natural wasteland with an increased diversity of wildlife. In order to preserve the site’s biodiversity as much as possible, certain initiatives intend to conserve a certain amount of the natural zones (Be Josaphat, 2023). Following this intervention, the Josaphat site—which is home to 1,200 species, including over 100 species of birds, unusual dragonflies, and wild bees—became one of the most biologically significant locations in the Brussels region. The 25 acres of open space also act as a significant natural buffer against flooding and excessive heat.

‘It has progressively changed becoming a more untamed, semi natural wasteland with an increased diversity of wildlife’

Besides the built industrial zone, the seemingly vacant ecological area of The Frche is also being used. Some of these activities are temporary, such as the Royal Flemish Theatre’s mobile production, Kamyon. Others are connected to the site, including the Rock Oasis Festival, a longstanding event organized by local residents in the area since 2002, and at Josaphat since 2015. Furthermore, the Les Nouveaux Disparus performing arts company, with its home base on the site, hosts an annual festival.

Additionally, collectives established under the initiative of ‘Commons Josaphat’ have recently united to establish a non-profit organization, ‘JOSAPH’AIRE’, dedicated to promoting various activities that encourage public participation on the site.

The Friche is so far somewhat objectively described in this chapter. In this section of the chapter, the human layer of the Friche will be unravelled trough the lens of

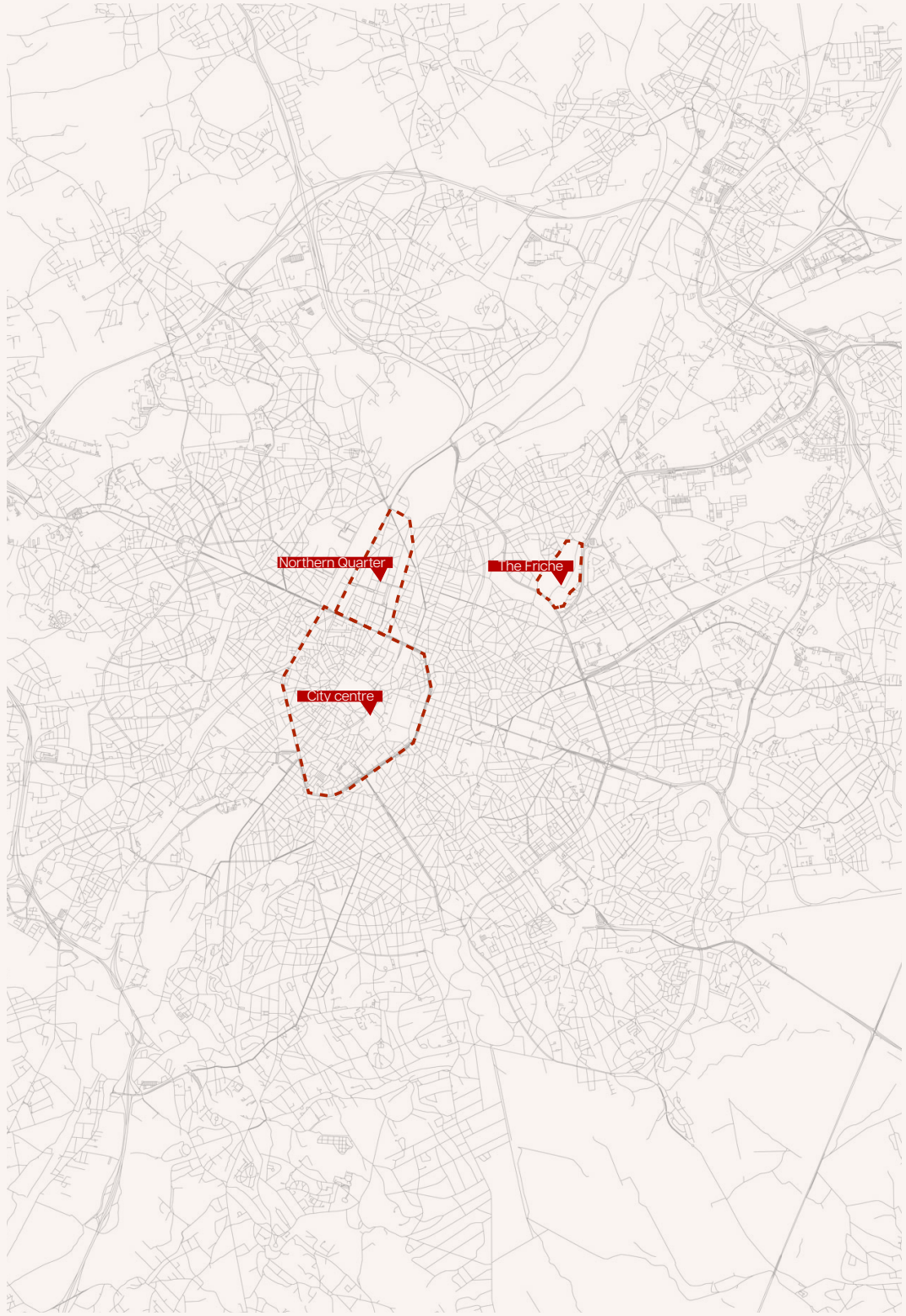


Figure 1.2:
Map of Brussels
(Author, 2024)

personal narratives based on (personal) feelings and significances that we (productive city group) encountered during our site visit.

Frequently, we found ourselvces characterzing the Friche an island. The Friche is secluded from its surroundings, its topography marked by its lower position and dense packages of bushes and trees that form a physicial boundary with the city contribute to that. The open areas, are now enclosed of by gates and thus controlled by humans. On the South, there are sportsfields, but they too feel secluded and unreachable from the surroundings, in keeping with the prevailing ambience of the Friche.

'Frequently, we found ourselvces characterzing The Friche an island'

The Friche is divided by a railway, cutting it into two distinct sectors, the industrial zone and the vacant ecological rich area. In a way the industrial zone feels as an area where buildings were just placed randomly, almost unplanned. The shapes of the building are tailored to their function, almost without consideration for their contextual surroundings. A road traverses the Friche, serving as the only connecting factor to the city. Cars are driving with a fast pace trough it, with no pedestrian walkways, rendering the area unwalkable. This too, contributes to the unplanned feeling.

The range of companies that are existent in the area is quite diverse. It spans from almost corparate companies, with multiple globally operating ones, to small local orientated ones. The activies are mainly centred around distrubution. However, a repairshop focussing on radiotors and old doors and an eventlounge are also apparent. The diversity in function can be felt in the area, and too with their relation to the place. However, generally, it is safe to say that individuals working in this area were content with their working environment.

Opposingly, the west zone can be described as a gem in the city. A last piece of natural green land that remained untouched and impassible by humans for a long time. This abandonment gave it its intrinsic qualities, qualities that have to be kept in the future, even when redesiging the site.

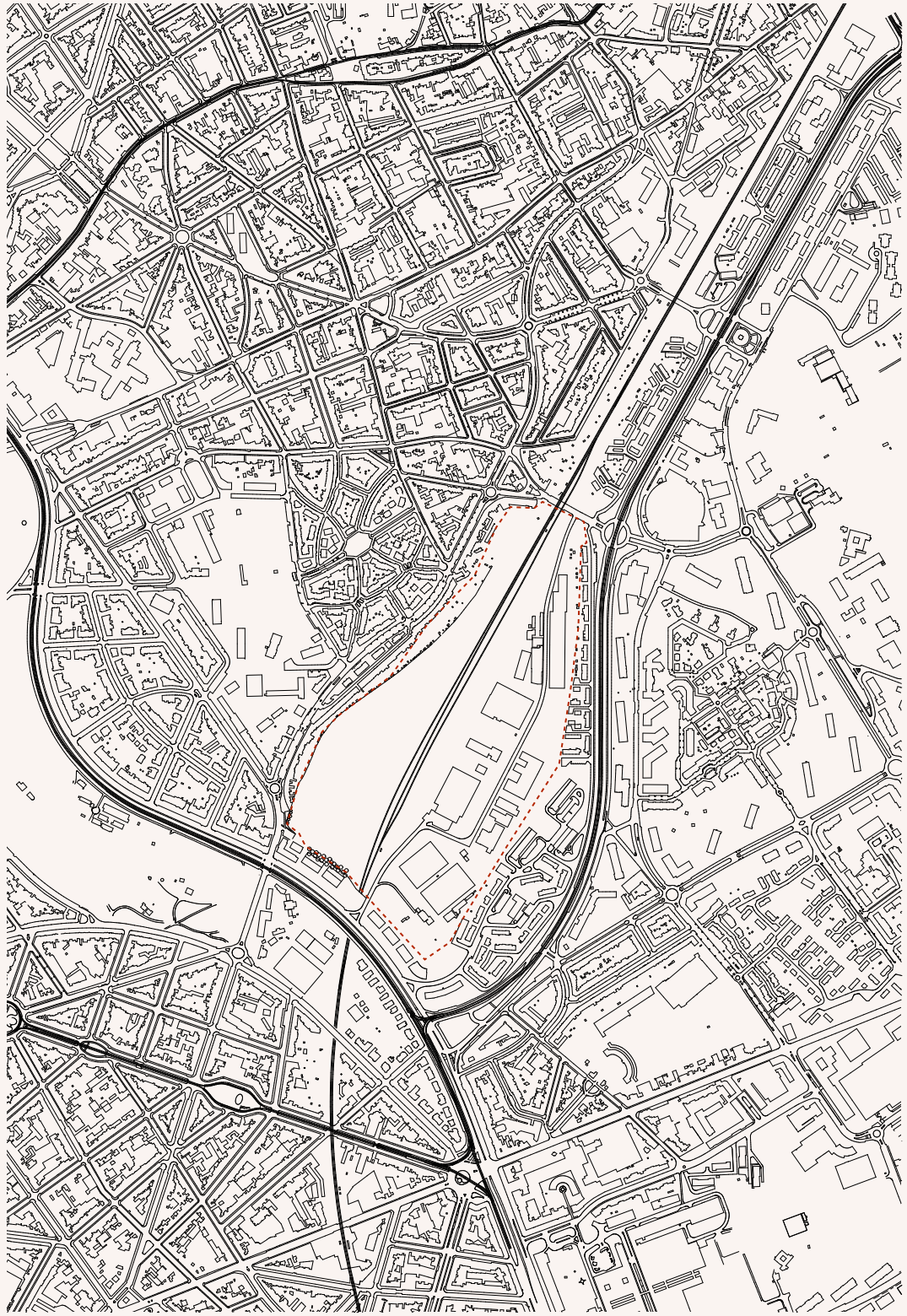


Figure 1.3:
Map of The Friche
(Author, 2024)

Assignment 1.3

As mentioned before in the location paragraph, The Friche is an area with a high biodiversity. This biodiversity has grown due to a long time of non human intervention. However, the current housing crisis in Brussels made the Friche subject to heavy political debate. The question of this years Urban architecture graduation studio entails how to cope with this: where do you built, and what stays nature?

In the graduation manual the assignment is described as follows:
The friche poses questions on why it matters to make cities more climate resistant. The studio locates the site towards contemporary debates (and older plans and ideologies as well) on nature and city, as it explicates in the ideals of the garden city movement, in notions of social inclusivity of the living city, in attention to the sensitivities of material culture and in the objectives of ecological planning and nature-inclusive design. The studio works on the last green in town. What used to be a railway yard, now is a field of grass. Where is the town? How to work with nature? Our studio refutes the opposition between relieving the housing crisis and the crisis of climate and biodiversity. The site is a city in limbo. Are cities bound to fill all blanks? Should trees be considered urbanites? Can nature be urban?

The site shows the city at its limits. Questions arise as to how the landscape serves as a productive resource, for growing food, for gardening, for countering soil contamination. Reversing the image of a solitary structure in an open field, here agricultural fields have conquered a valuable piece of urban land, challenging the commonplace image of a dense city surrounded by open land. Contemporary urban discourses on sustainable cities call for a less frenetic exploitation of the urban soil and plea to preserve unbuilt areas, not just for parks but also for growing food, by inhabitants or urban agriculture firms, or for coping with surplus water. If open land can be built, can buildings be removed to create new open urban land?

To find an answer to all of these questions, the academic year is divided into four quarters. The first quarter is about finding a personal topic of interest for the research that will be conducted mainly in the second quarter. Furthemore, an exhibition about the Friche as a site was designed. In the second quarter, the individual research was conducted. Moreover, a masterplan for the whole of the Friche was made with two teammates. The last two quarters were intended to work on the personal design project within the aforementioned masterplan.

Figure 1.4:
Photo Friche
(Fellow students photo)

Productive City 1.4

The first quarter consisted mainly of group-work. Together with five fellow students, we researched Brussels as a ´productive city´. We started the research by trying to define 'productive'. Thereafter, we conducted desk research about the history of Brussels manufacturing. We went on site visits to visit the productive area of The Friche to find out what kind of companies there are.

In the end, we finished our research with three products. We made a model of Rova, a small local company that fixes old radiators and doors and is located on The Friche. Furthermore, we made a booklet, that contained the theoratical research that we did. And finally, we were part of a larger studio exhibition.

For the exhibition, we strived to translate the ambience of The Friche into a sound landscape. Our aim was to juxtapose the natural sounds of The friche to the sound of production. How can production and manufacturing take place in a natural site?

We programmed a keyboard with sounds that we derived from the Friche using soundrecorders. Moreover, we added 'productive' sounds, like traficnoise, hammers and drills, but also productiveness in a broader scale, like agricultural sounds. In this way, every person visiting the exihibition could compose their own 'productive Friche'. How much noise are you allowing to be draped over a natural landscape?

Figure 1.5:
Photo Friche
(Fellow student's photo)

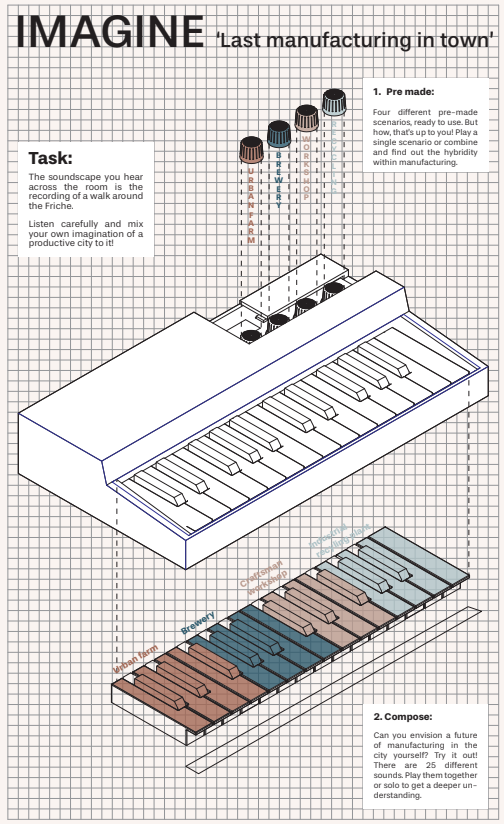


Figure 1.6:
Photo Friche
(Author & fellow students)

Figure 1.7:
Photo Friche
(Fellow student's photo)

Figure 1.8:
Photo Friche
(Fellow student's photo)

Figure 1.9
Photo Friche
(Fellow student's photo)

Research

02

Introduction 2.1

This chapter will describe the problem that will be discussed in this thesis. Subsequently, the research questions will be outlined.

Until now, I have walked the city of Brussels three times, but mainly wandered around the area of our project, in Schaerbeek. However, during the site visits, the notable contrast in the area of the North station, where the Brabantwijk is juxtaposed against the modern North quarter of Brussel, caught my attention the most. The train station acts as a physical division, accentuating the differences in wealth and prosperity. The Northern quarter has been built relatively recently, and therefore reflects a time defined by globalization. This can be easily spotted; the buildings often consist of simple geometric volumes, and the facades are made of reflecting glass.

Because of these specifics, the buildings have no relation to their surroundings, forming almost an island within the city. The same island can be placed in any other random business district: it is anonymous, unpersonal, and it is hard to relate to or form a connection with. In this research, this kind of architecture is called 'homogenized architecture', defined as:

An architecture that has no connection to the local culture, context, history, and building methods.

Because of this, the architecture becomes ignorant to the place identity.

One of the main reasons for homogenized architecture is the trend of globalization that started after the industrial revolution (Kinoshita et al., 2012). This trend is likely to persist, especially since building with sustainability in mind becomes evident. There is a possibility that a universal sustainable building recipe, which most likely contains wood as the main material, will be developed in the near future. This will further contribute to a uniform architectural style.

As a solution to the above mentioned problem statement, this research aims to provide an alternative for this homogenized architecture. As can be seen in the above mentioned definition of homogenized architecture, it stands free from the local culture, context history and building methods. The solution will thus be to find a design method that connects to these issues again. Hence, by identifying the local culture, context, history and building methods and applying that in a design, a grounded architectural design will arise. While doing this, the question of scale should constantly be thought of. It is important to critically consider at which scale-level these aspects should be looked at.

'the research will focus on the principles behind the way in which they used to build.'

Vernacular architecture is a type of architecture that is known for its local qualities and grounded-ness. By studying the local vernacular architecture, the way in which they used to built architecture that is known for its local qualities can be discovered.

However, replicating this kind of architecture will not be a sufficient solution to the aforementioned problem. It would lead to a historizing architectural structure which will not be recognized in today's society and will thus not contribute to the local identity. Therefore, the research will focus on the principles behind the way in which they used to build. This research is thus about finding out if applying these principles in a contemporary manner could lead to a modern version of vernacular architecture.

However, only researching vernacular architecture will not make a building contextualised. Therefore, an in-depth analyses into the current local architecture in the region should complement the vernacular principles. The principles of the local vernacular architecture and the contextual elements distilled out of the current local architecture will be combined in a new design. This approach aims to create a local architecture rooted in the current context as well as in the long standing traditions and culture. The design that will follow out of this research should ideally function as an example, as a lab, to showcase that architecture, even in modern times, can reflect locality.

The following research questions will be answered in this thesis:

RQ: How can a building connect to and stimulate local identity?

SQ 1: From what aspects can architectural identity be derived?

SQ 2: From what scale level should the architectural identity of the aspects mentioned above be derived from?

SQ 3: What are the architectural specifics of the elements that inform the aesthetics of the design?

SQ 4: How to construct a building in a sustainable way while contributing to the local identity?

Chapter 3 will focus on defining vernacular architecture. Subsequently, chapter 4 will built upon that by analysing the vernacular architecture of Brussels. Chapter 5 will be an outline of the current architecture that is surrounding the project location of the design. In chapter 6, the difference between Vernacular architecture and the Friche will be shown. Chapter seven describes the lessons' learned and will create the framework which can be used in the design. Thereafter, chapter 8 describes how the principles are translated into the design phase. Chapter 9 is about how to visually represent the project.

Figure 2.1:
Brussels Business district
(Davidson, 2023)

Defining vernacular 2.2

Vernacular architecture is a term that is frequently used in relation to architecture and identity. In literature and practice, the definition of 'vernacular' is greatly discussed and remains somewhat unclear. This paragraph tries to outline the difference between the most common definitions of the vernacular. In addition, an attempt will be made to bring the concept of vernacular architecture into the contemporary context by translating the main principles into design principles that can be used in the contemporary design practise.

The first mentioning of the term 'vernacular architecture' was by Rudofsky, who used it as an synonym for 'anonymous' or 'spontaneous' (Rudofsky, 1964). After that, a plethora of attempts have been made to pinpoint a precise definition of vernacular architecture. However, they all have encountered challenges due to the diverse range of building types, traditions and contexts it has to encompass (Oliver, 1997). Despite the difficulty, Oliver proposes his own comprehensive definition:
'Vernacular architecture comprises the dwellings and all other buildings of the people. Related to their environmental contexts and available resources, they are customarily owner or community-built, utilizing traditional technologies. All forms of vernacular architecture are built to meet specific needs, accommodating the values, economies and ways of living of the cultures that produce them.'

This definition is much more extensive than others, such as the one from Joseph Kenndy. He states that vernacular architecture is an architectural style that develops from the particular climate and social conditions of a place. Rodufsky (1964) dismisses vernacular as a 'style', mentioning that: 'vernacular architecture does not go through fashion cycles. It is immutable, indeed, unimprovable, since it serves its purpose to perfection.'

Another interesting approach is that of Eric Mercer (Mercer, 1975), who introduces the concept of shared type and focuses on the number of buildings, within a geographical area and a given time:

"Vernacular buildings are those which belong to a type that is common in a given area at a given time. It follows that a kind of building may at any one time be 'vernacular' in one area, and 'non-vernacular in another and in any one area may change in the course of time from 'nonvernacular' to 'vernacular'. In other words, no building is or is not vernacular for its own qualities but is so by virtue of those which it shares with many others, and the identification of vernacular buildings is very much a matter of relative numbers"

'Some argue that vernacular architecture should also be built without experts, with only local residents '

Some argue that vernacular architecture should also be built with local residents, that it is non-expert architecture. 'Time' serves in this case as the expert. Through generational knowledge transfer, construction methods evolve naturally. Some researchers go even further by claiming that the rise in vernacular architecture studies academized the identity of vernacular architecture. Architects, conservation practitioners, legislators and urban planners are therefore becoming more and more aware of the value of vernacular architecture. They warn that 'under the control of experts, vernacular architecture may lose its intrinsic popular character away from local agents and a sort of natural evolution' (Donovan & Gkartzios, 2014).

Despite all the differences, there are loads of similarities as well. The recurrent association of vernacular architecture with sustainability is often emphasized (Fernandes, Mateus, Bragança, & Correia, 2015). It uses local materials, and is considerate to the local climate and topographical conditions and therefore minimizes environmental impact.

Moreover, experts unanimously agree that vernacular architecture is closely related to contextual elements, encompassing social, economic, environmental, and cultural factors. Christian Norberg Schulz defines this clearly as a 'contextualized architecture', belonging to a particular country of regional/geographical area. It therefore emerges out of the genius loci.

However, one can say that every architecture is in a way contextualised: each building has to, in some way, react to its context. It may connect to it or disregard it completely, but nevertheless a relation is inevitable. Nonetheless, what distinguishes

Figure 2.2:
Iglo: vernacular in optima forma
(https://pl.wikipedia.org/wiki/Igloo)

vernacular architecture from 'the rest' is its intimate relationship with its context. Vernacular architecture's relationship with its context is direct, deep and forms the foundation. One can say that it is therefore a more honest architecture, one that is not concerned about creating an aesthetical façade. Conversely, the aesthetics of a vernacular building are more a by-product of its intrinsic motivation to connect to the local aspects influencing it.

'What distinguishes vernacular architecture from 'the rest' is its intimate relationship with its context.'

To conclude, no clear definition of vernacular architecture can be found. Every expert has its own interpretation of the term. However, for this research to be conside, it is important to stick to one definition. Therefore, the following definition will be adhered to:

Vernacular architecture is an architecture that has a deep, direct and intimate relationship with its context, encompassing economical, social, geographical and environmental aspects. The aesthetics of such an architecture are determined by its functionality. Aesthetics are therefore never an stylistic choice. Furthermore, local building methods improved over time by generational knowledge are always utilized in buildings defined as vernacular.

This research tries to use all the above mentioned characteristics of vernacular architecture to find an answer to the loss of identity in contemporary architecture.

The influx of global styles and techniques that do not align nor reflect with the particularities of a city is the reason for this. Conversely, vernacular architecture is a sign of identity. It is a mirror of nations that reflects place, time and culture (Salman, 2018). A modern version of such an architecture can still be created. It is not an architecture that is built by the people and for the people, however, it can still be an architecture that reflects the local context: a contemporary vernacular.

Figure 2.3:
Brussel North
(Wikipedia, 2023)

Brussels' vernacular Identity 2.3

This chapter will provide a general overview about the history of Brussel's architecture. It is not an in-depth analyses of the complete history, but more an exploration that will serve as an inspiration tool in the design process. It should built upon the exploration of the definition of vernacular architecture. Hence, this chapter will describe how Brussels' vernacular architecture related itself to themes as geography, climate, materials and culture/traditions. The aim is to find out how they dealt with principles which should inspire the designer to come up with similar approaches in a more contemporary way.

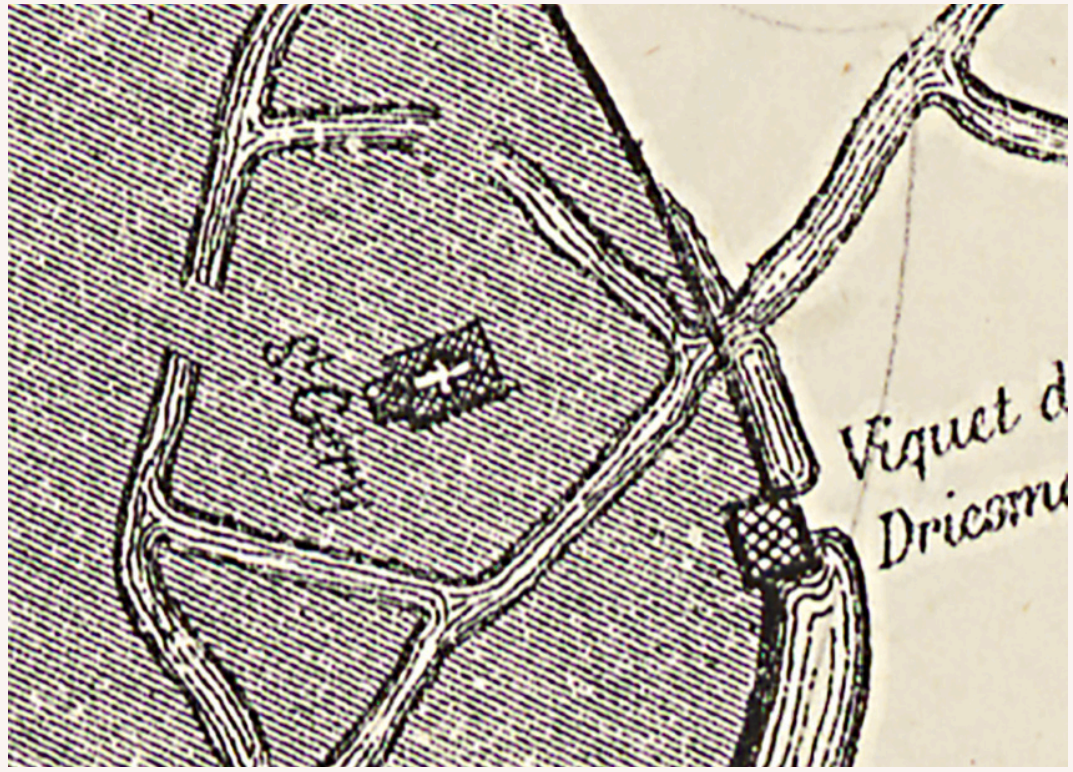
In the Bronze Age or Iron Age, around 2000-700 BC, the first buildings on the place were brussels is currently located were built. A couple of centuries later, the romans also built villas there around 100-200 AD. However, around 1000 AD, the city of Brussels emerged under the name of Bruoscella. To demarcate the research and to not make it too extensive, it is chosen to start from about this period. The research focusses around the area of Brussels until the 19th century. After the 19th century the industrial revolution took place which destroyed the habit of building in a vernacular way.

The decision to explore vernacular architecture at the city scale in Brussels stems from initial research that pointed out substantial differences in construction traditions over short distances. A mere fourty kilometres can signify a whole other tradition regarding the construction of buildings. Unfortunately, conducting an even more in-depth analyses of vernacular architecture around the Friche itself proved impossible due to the scarcity of information.

The chapter is divided into geography and materials (1.1), climate (1.2) and architecture (1.3). These subjects are chosen according to the definition that is used in this research for vernacular architecture. The geography and materials paragraph will focus on the geography of Brussels and how it influenced the material use in the building history. In the climate paragraph, the way in which the buildings dealt with the influence of climate will be outlined. The architecture paragraph will go more in-depth into the architecture of Brussels' vernacular.

Figure 2.4:
Reconstructed farm from the Iron Age
(OnzeGeschiedenis, 2020)

Figure 2.5:
First map of Brussels
(Brusselse chronologie, 2019)



2.3.1
Geography and materials

The city of Brussels was established around fourty kilometres south of the North sea. It was founded on an important crossing road between two trade routes: the Senne, a river flowing from south to North, and an route that connected Flanders to the Rhineland going from east to west (Charruadas, et al., 2023). The building materials of Brussels originated from three regional sources (Charruadas, et al., 2023). The first one was the Sonian forest. The Sonion forest is almost 10.000 hectares and was managed by the Ducal Forestry of Brabant, the Chamber of Accounts, and the Finance Council in the 13th-15th century. Another source of material were privately owned forests, mainly by abbeys, convents and individuals that mostly consisted of smaller woods. The last source were hedgerows and rows of trees along roads, rivers, and on the borders of farms. As per Paul Warde's findings (Warde, 2004), the majority of the trees utilized were part of this category.

The earliest building method that was apparent in Brussels made use of the plethora of trees that were regionally available. By stacking trees horizontally, the first form of a wall was invented. The houses that were build this way were called knut (Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950). However, extensive wood usage in construction, coupled with wood's role as a heating system, led to major deforestation. As a solution, the local government banned the sourcing of wood in the 12th century (Trefois, Van vakwerk tot baksteenbouw, 1979).

In response, the half-timbered construction technique (In Dutch: vakwerk-techniek) emerged to reduce the amount of wood that was used while constructing buildings (Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950). This method featured vertically placed columns filled with loam for water-resistance. On top of these walls, a roof frame made out of oak was constructed.

Given the Sonian forest's less dense nature than the Ardennes, the trees that were growing there were knottier. Other cities such as Ghent and Bruges could import their hardwood from other cities such as Dordrecht and Gdansk (Vandenabeele, 2022). However, the Senne, the river connecting Brussels to other cities, was only medium sized with an irregular flow which was not favourable for bigger ships to import the timber that was needed (Charruadas, et al., 2023). Nevertheless, Brussels was one of the most densely populated areas in the southern Netherlands in the pre-industrial period, creating a massive demand for hard wood.

As a solution, the roof shapes and carpentry technique in Brussels are different from other cities in the region. Brussels developed unique roof shapes and carpentry techniques, introducing portal frames to support smaller-span roofs (Vandenabeele, 2022). These frames allowed for less straight timber usage,

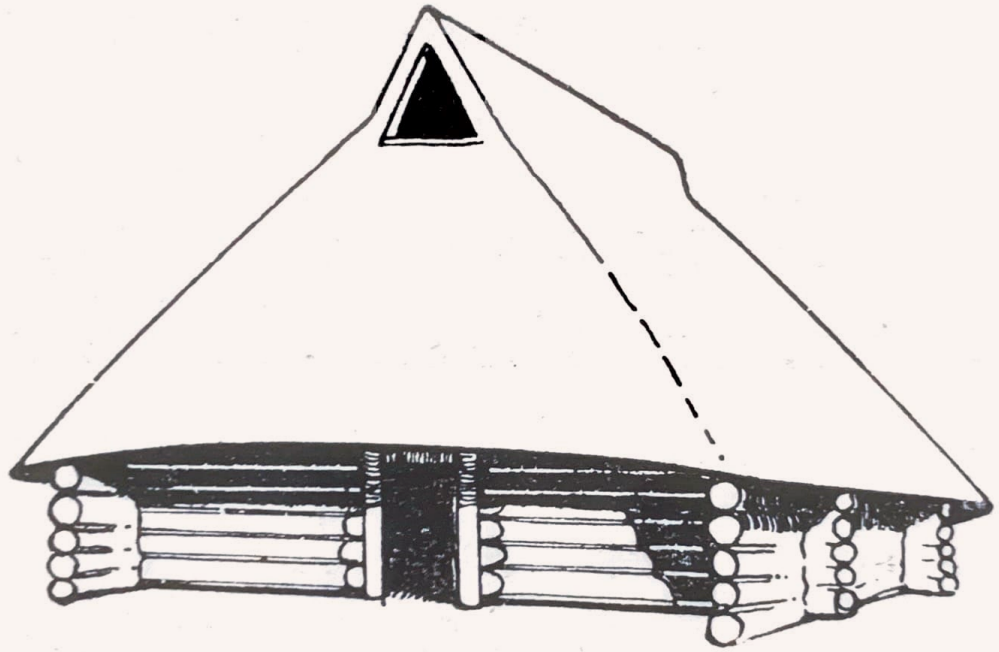


Figure 2.6:
'Knut', first wall by stacking trees
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

Figure 2.7:
House made by half-timbered technique, Pepingen, Brabant, Belgium
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

incorporating wood from open environments like hedgerows.

By the 13th century, brick was introduced as a replacement for timber construction. The silty and sandy-silty soil on which Brussels was constructed proved to be excellent for the production of bricks called ‘sandstone banks’, also commonly known as ‘Brabant stone’. (Charruadas, et al., 2023). That is why around the 14th and 15th centuries, brick was locally produced by state owned factories (charruadas & sosnowska, 2013). In this period, brick became more popular in urban environments because it proved to be cheaper than constructing with wood as the main material. This was due to the fact that it did not require highly skilled workers, and it was beneficial for heating the building because of its thermal mass (charruadas & sosnowska, 2013).

‘By the 13th century, brick was introduced as a replacement for timber construction. ’

In 1591, Brussels was finally better connected to other areas by the opening of the Willebroek canal, replacing the river Senne. The opening of this canal made sure Brussels could also import wood and other building materials (Charruadas, et al., 2023). This proved to be crucial during the city’s reconstruction after being bombed by troops of Lodewijk XIV in the 17th century. During the reconstruction period, the shortage in resources was so significant that other species of wood had to be used in construction. It was a huge turning point in history. Although the fundaments of the roof constructions did not change much, the wood that was used was significantly more heterogeneous (Charruadas, et al., 2023). The other wood species were also employed in floorboards, making Brussels unique in its wide variety of wood species between the 16th and 19th century. Additionally, materials like brick were imported from The Netherlands. The shortage of construction material also led to the use of cheaper materials like stone (Charruadas, et al., 2023).

Figure 2.8:
Scale model Brussels in 13th century, showing the first brick architecture
(Urban Brussels, 2001)

Figure 2.9:
Scale model Brussels in 13th century, showing the first brick architecture
(Urban Brussels, 2001)

2.3.2
Climate

As previously mentioned, the first buildings that were constructed employed a half-timber system for walls. This system made use of two materials: wood and loam. Both materials were not highly resistant to moisture, making prevention of dampness a crucial concern. The first method to address this issue was to make a foundation of stone, known as a 'stoel'. Besides preventing water from going up, it also formed the basis on which the timber frame could be installed (Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950).

To safeguard the upper side of the walls from rain impact, an overhang was incorporated into the gable roof. However, when building multi-story buildings, this method proved to be insufficient. Therefore, every story that was additionally built on top of the ground floor was constructed on a cantilever of up to one meter. The top floor was then again protected by the overhang of the gable roof (Trefois, Van vakwerk tot baksteenbouw, 1979).

In the geography and material paragraph, the shortage of wood is already extensively discussed. However, wood was also utilized for heating the buildings, creating dual challenges when a wood shortage was apparent. From the 16th century onward, wood became even more scarce than before. The petrification (the transformation of cob and timber constructions into stone and brick structures) of Brussels was a logic consequence (charruadas & sosnowska, 2013).

Notably, there is a significant distinction in the petrification between the urban and the more rural parts around the city. In the urban environments, bricks and natural stone were introduced way before they were used in the country side. This was due to the fact that in the urban environments there was less fire wood available. Therefore, the thermal mass of brick and stone were beneficial for heating. Conversely, in the countryside, fire wood was more readily available, while building with brick deemed more costly (charruadas & sosnowska, 2013).

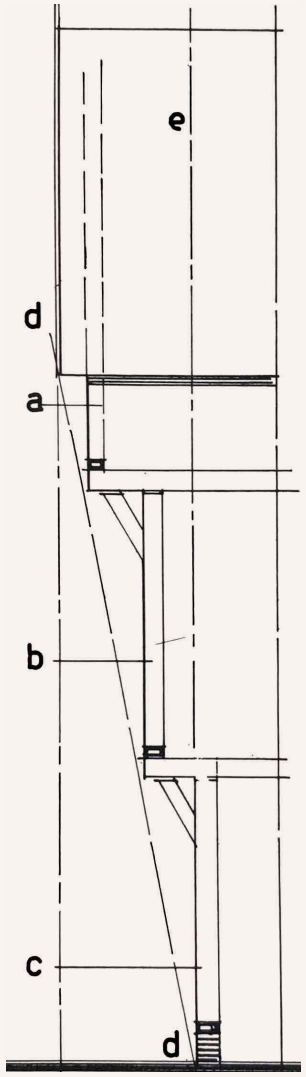


Figure 2.10:
Secion cantilever technique for rain impact
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

Figure 2.11:
'Stoel' foundation for the prevention of moist going up
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

Figure 2.12:
Farmers house with brick infill in half timbered technique (Groot Leysele, 1530)
(Trefois, Van vakwerk tot baksteenbouw, 1979).

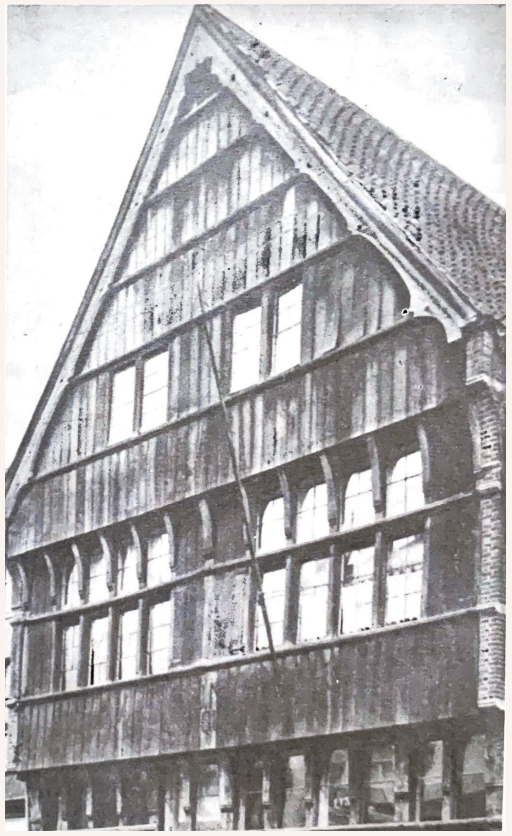


Figure 2.13:
Photos cantilever technique , Mechelen
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

2.3.3
Architecture

The way in which buildings were constructed around the 12th century is already shortly discussed in this chapter. However, a closer examination reveals interesting details. The exact construction method varied significantly per region. The half timber technique can be distilled into three different techniques in Belgium alone. In Brussels, the Kempo-Brabantse-Vlaamse technique was employed (figure 18), minimizing horizontal and vertical frames to conserve wood, given the critical shortage in the region (figure 16). The minimizing of timber can also be spotted in figure 17 where the distance between the vertical frames are shown (Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950).

The timber frames were crafted in a workshop by local carpenters. After shaping them, the carpenter would number the frames so that it would be easy to place them on a construction site, akin to modern pre-fabricated buildings. These frames were usually placed on a 40 cm foundation made of stone and then filled with reed and straw (Trefois, Van vakwerk tot baksteenbouw, 1979). In the end, the walls were finished with clay, making it a smooth surface. A timber roof frame was then installed atop of the walls (Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950).

Besides the building method, the type of farms that were built also differed a lot. Figure 19 shows a map of around the 12th century illustrating different farm types across the region during this period. In Brussels specifically, the closed farm (in

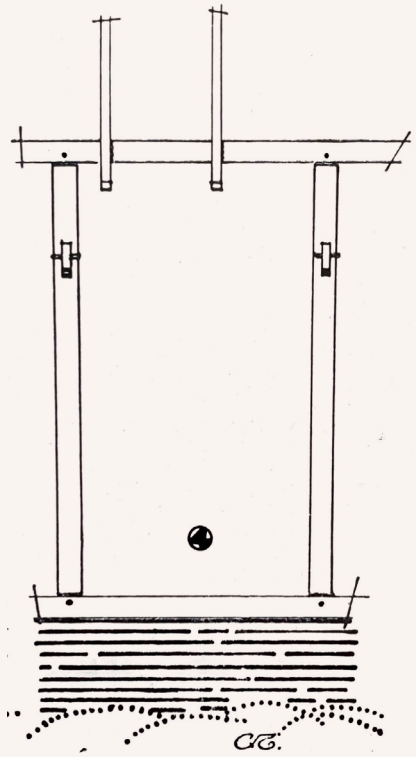


Figure 2.14:
Kempo -Brabantse-Vlaamse technique
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

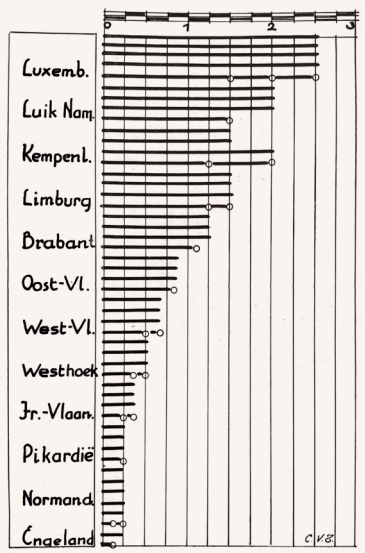


Figure 2.15:
Table showing distances between vertical framing
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

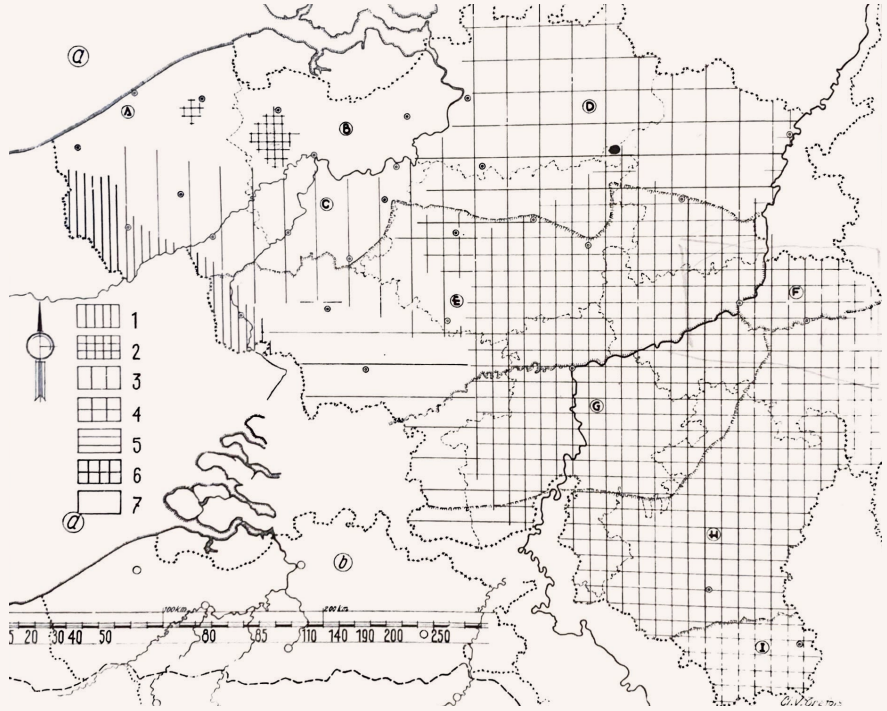
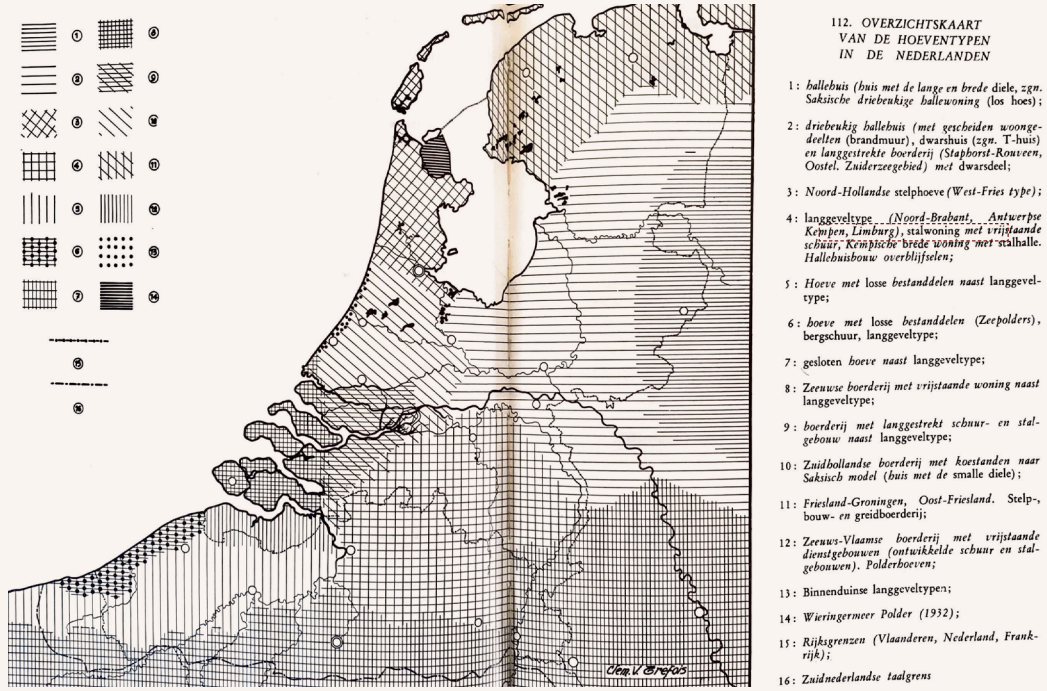


Figure 2.16:
Map showing the different timber techniques that were used in the region
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

Figure 2.17:
Map showing the types of farms per region
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)



112. OVERZICHTSKAART VAN DE HOEVENTYPEN IN DE NEDERLANDEN

1: *hallehuis (huis met de lange en brede diele, zgn. Saksische driebeukige hallewoning (los hoes);*

2: *driebeukig hallehuis (met gescheiden woongedeelten (brandmuur), dwarshuis (zgn. T-huis) en langgestrekte boerderij (Stabhorst-Rouveen, Oostel. Zuiderzeegebied) met dwarsdeel;*

3: *Noord-Hollandse stelphoeve (West-Fries type);*

4: langgeveltype *(Noord-Brabant, Antwerpse Kempen, Limburg),* stalwoning *met vrijstaande schuur, Kempische brede woning met stalhalle. Hallehuisbouw overblijfselen;*

5: *Hoeve met losse bestanddelen naast* langgeveltype;

6: *hoeve met losse bestanddelen (Zeepolders),* bergschuur, langgeveltype;

7: gesloten *hoeve naast* langgeveltype;

8: *Zeeuwse boerderij met vrijstaande woning naast* langgeveltype;

9: *boerderij met langgestrekt schuur- en stalgebouw naast* langgeveltype;

10: *Zuidhollandse boerderij met koestanden naar Saksisch model (huis met de* smalle diele);

11: *Friesland-Groningen, Oost-Friesland.* Stelp-, bouw- *en* greidboerderij;

12: *Zeeuws-Vlaamse boerderij met vrijstaande dienstgebouwen (ontwikkelde schuur en stalgebouwen). Polderhoeven;*

13: Binnenduinse langgeveltypen;

14: *Wieringermeer Polder (1932);*

15: *Rijksgrenzen (Vlaanderen, Nederland, Frankrijk);*

16: *Zuidnederlandse taalgrens*

Dutch: gesloten hoeve) and the long-façade-type (in Dutch: Langgeveltype) were prevalent. Figure 22 showcases a typical floorplan of a Brabant-Kempisch long-façade-type that once existed in Vilvoorde near Brussels (Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950).

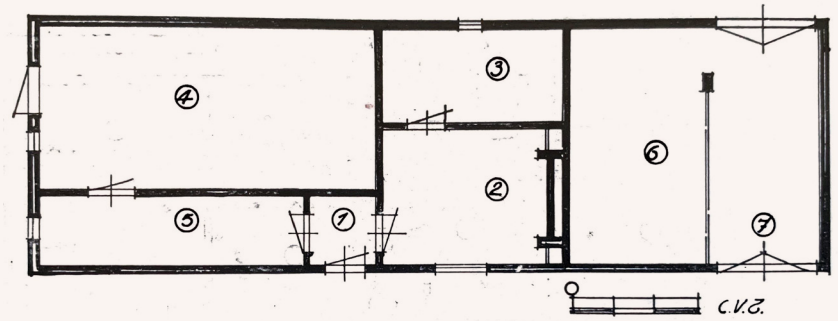
'In Brussels specifically, the closed farm and the long-façade-type were prevalent.'

Another farm that was previously mentioned that founds its roots near brussels was the closed farm. In figure 21, a closed farm in Vossem is shown. The closed farm type evolved out of a typical building type that used to exist. Often, a farm was separately built next to a shed on fire-distance. The evolution from this type to a close farm relates to the rise in productivity and the application of new farming methods. In the area were these farms were built, a significant amount of transitional forms are existing, ranging from L shaped farms to more closed of ones. The closed of farm is the culmination of this evolution and found its origin around the 16th century (Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950).

The entry gate of a closed of farm is typically the only ornate element. It is often overhanging and when entering the courtyard it feels like entering a small town. The windows of the buildings are mostly oriented towards the inner courtyard, making the outside of the farm closed off with only small windows apparent. Around the area of Brabant, which was a clay rich area, the farms were often built with bricks giving them a more robust appearance than similar farms in other regions (Trefois, Van vakwerk tot baksteenbouw, 1979). Figure 22 shows a floorplan of such a farm near brussels (Pietrain) (Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950).

Figure 2.18:
Long facade type farm
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

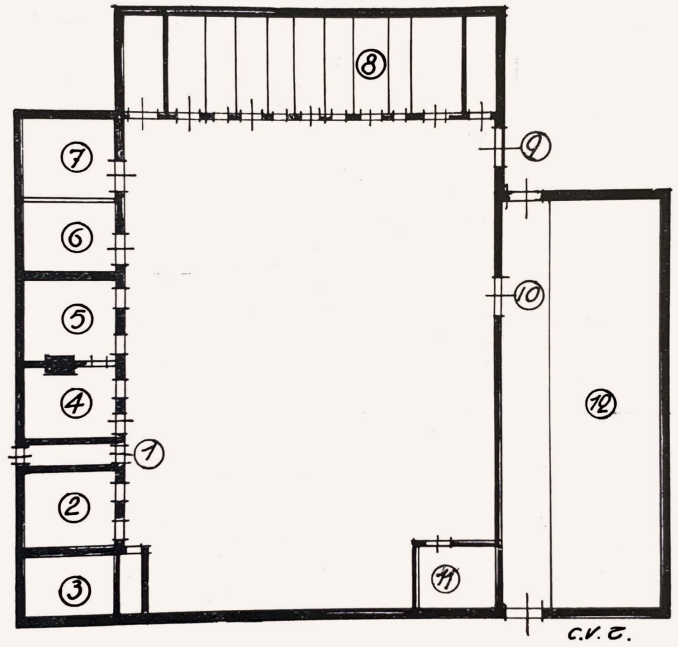
Figure 2.19:
Hoeve Vossem, Brabant, Belgium
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)



123. *Brabants-Kempisch langgeveltype (Peuti-Vilvoorde).* 1: *portaal;* 2: *woonkamer;* 3: *slaapkamer;* 4: *stalling;* 5: *gang (vroeger voedergang);* 6: *tas;* 7: *schuurvloer*

Figure 2.20:
Brabants-kempische long-facade-type, Peuti-Vilvoorde, Belgium
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

Figure 2.21:
Closed-farm-type Pietrain, Brabant, Belgium
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)



157. *Plattegrond van gesloten hoeve (driekwart) te Pietrain (Brab.).* 1: *ingang;* 2: *kamer;* 3: *bergplaats;* 4: *woonkamer;* 5: *slaapkamer;* 6: *melkkamer;* 7: *bras- en loofkot;* 8: *stallingen;* 9: *hoofdingang;* 10: *schuur-ingang;* 11: *paardentuig;* 12: *schuur*

Local Identity 2.4

In addition to the research into the vernacular architecture of Brussels, this chapter will dive into the local current identity of Brussels. It is chosen to focus very specifically into the architecture around the project location itself. Because my project will be a train station that is located on the North of the Friche, the two adjacent areas are researched (see the map on the right). The areas are divided based on their architectural significances and will be analysed separately.

For each neighbourhood an introduction with a small phenomenological text will be given. Thereafter, based on pictures that were taken during multiple site visits, an analyses of the neighbourhood will be shown. The subjects on which the neighbourhoods are researched are related to the definition that this research adheres to for 'vernacular architecture'. A list containing the subjects and sub-elements can be found below:

Geography
- How does the place deal with height differences

Available materials
- Materials façade
- Materials window frames
- Materials Roof
- Materials Doors

Climate
- Overhangs
- Gutters
- Rainwater drainage
- Curtains
- Shutters
- Leakage sills
- Solar panels
- Grilles in façade
- Orientation
- Weathering

Architectural specifics
- Building mass
- Window composition
- Outside spaces
- Building method/structure
- Ornamentation

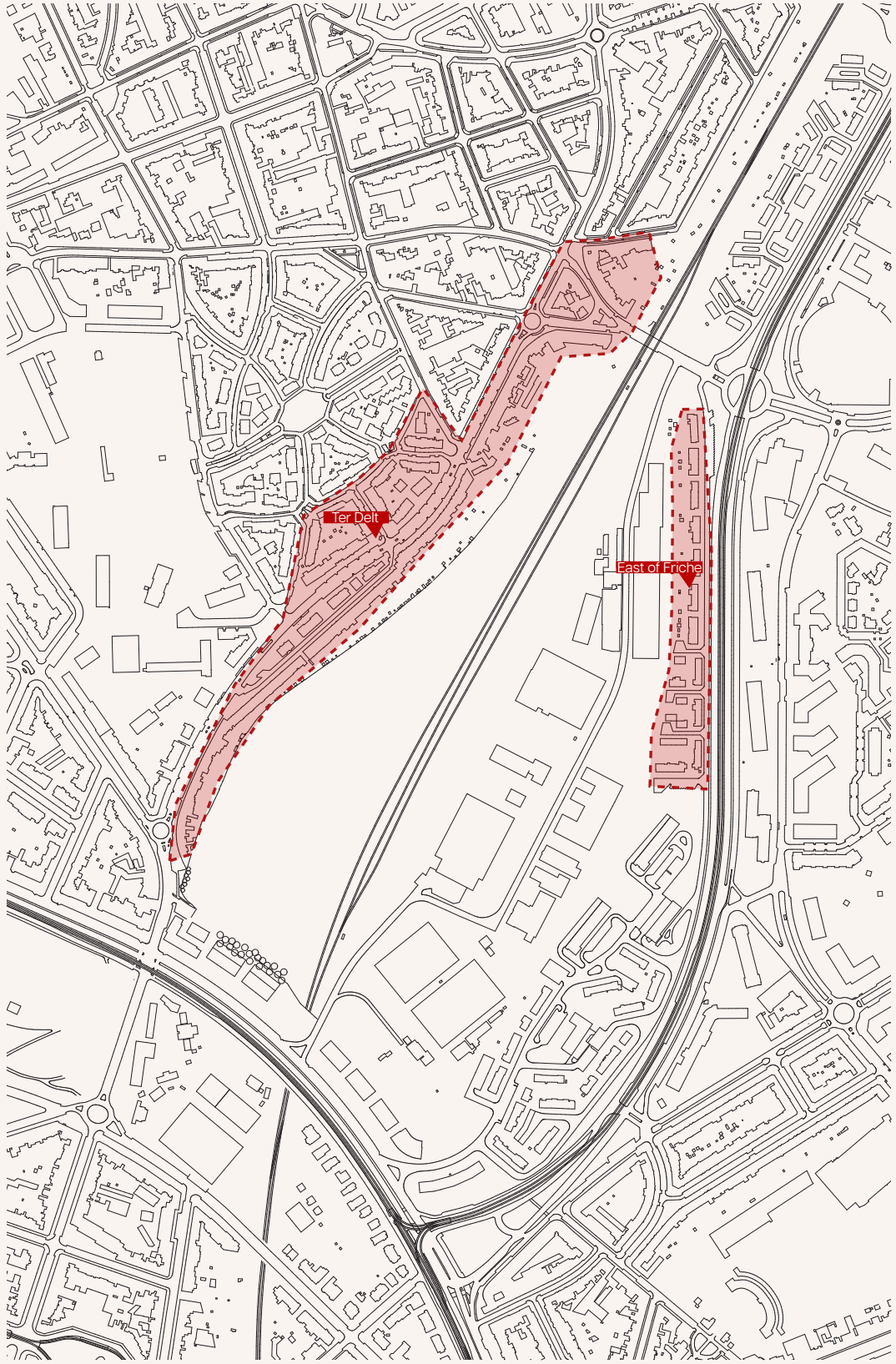


Figure 2.22:
Map showing the two areas that will be analyzed
(Author, 2024)

2.4.1

Ter delt
Personal perception of Area

Time's influence

Seated on a bench in Ter Delt Garden city, I am immersed in a world of history, yet disappointed about its mediocracy. I perceive a plethora of small houses, each unique but all designed with the same idea about living together with nature. Is this chaos or order? I am not sure.

Looking around, I am trying to find the order in the chaos, can I abstract the essence? Looking at it, it all seems just not perfect enough, not maintained enough. It is like a recently abandoned theme park, once flourishing with visitors, now forsaken and weathered by the passage of time.

The facades, eroded by the touch of wind, sun and rain shows the times careless. Gentle interventions to mask the times influence are visible. Houses subtly, yet inelegantly modernized: it influences the overall quality. Once wooden thick doors are now replaced with modern plastic ones. Only a few of these changes already waste the overarching quality. The essence of excellence lies in the once so apparent 'unity'.

Suddenly, I observe the sun piercing through the clouded sky. Am I trapped in negativity? Can the sun shed a new light upon my surroundings, elevate it perhaps? Laughter of children, their unlimited energy and with it positivity harmonizes with the suns brightness. Emerging from my bubble of thoughts, I cast a renewed gaze on things.

An array of houses, all singular entities, but collectively recognizable: together they form one. It is never boring, every piece of architecture provides new details to look at. Trying to capture the neighbourhoods specifics has resulted in at least 200 pictures. Yet now, its essence can be distilled in a mere handful photographs. Is that true architectural quality?

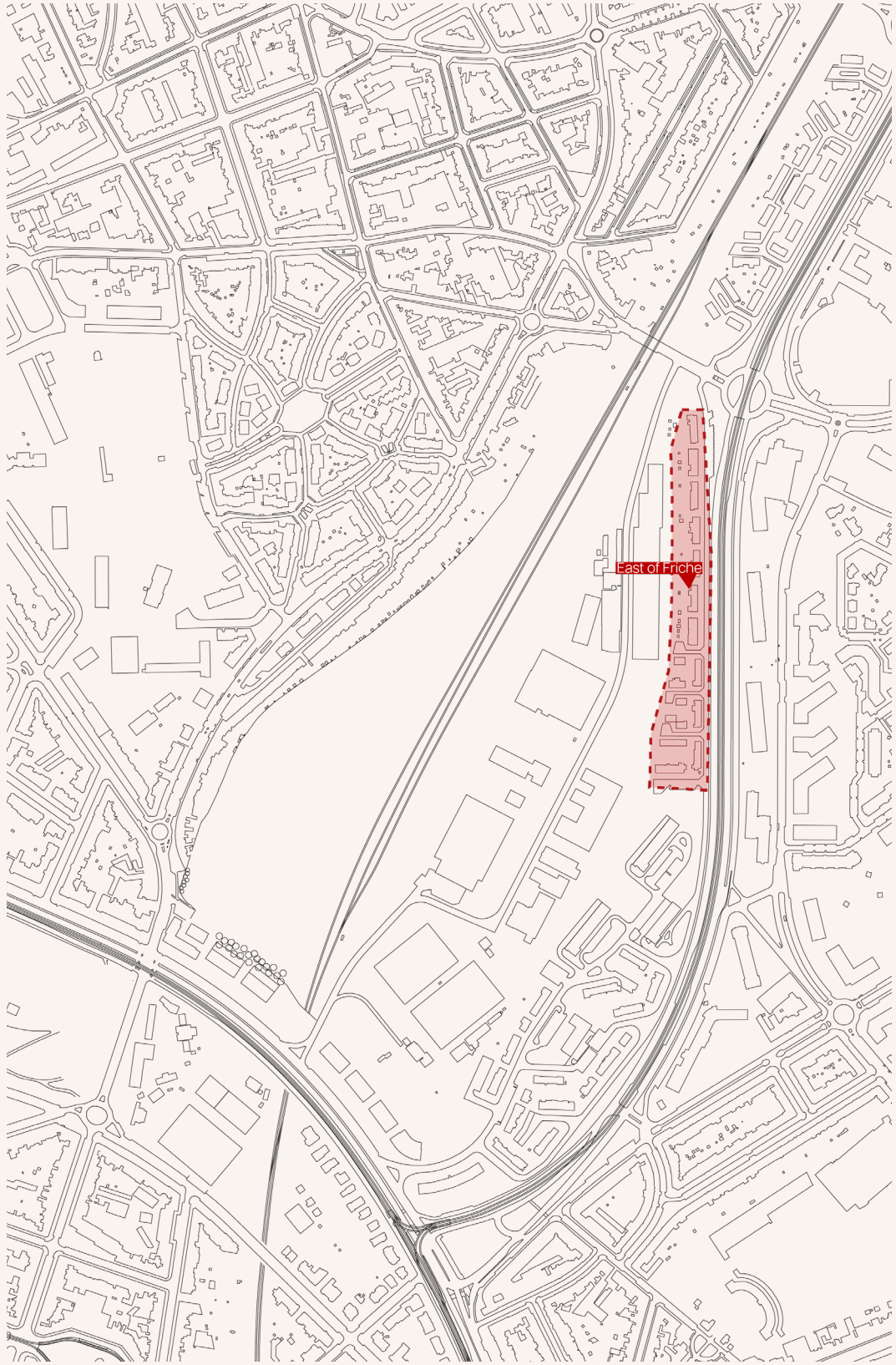
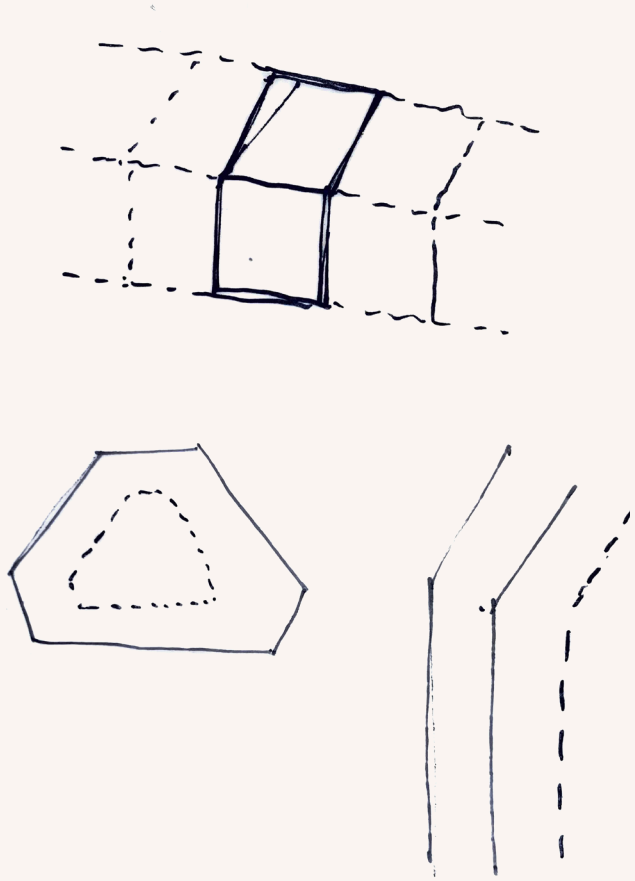


Figure 2.23:
Map showing the area of Ter Delt
(Author, 2024)

Urban morphology



The urban morphology consists out of cellular shapes with buildings that clearly define the street. Within these cellular shaped forms a courtyard is placed. The courtyard is often filled with gardens, but sometimes building are also placed there.

The only area which is unique is the one which alignes with the friche. Here, the houses are solely orientated towards the street and have a backgarden.

Lastly, the houses are all terraced with a pitched roof.

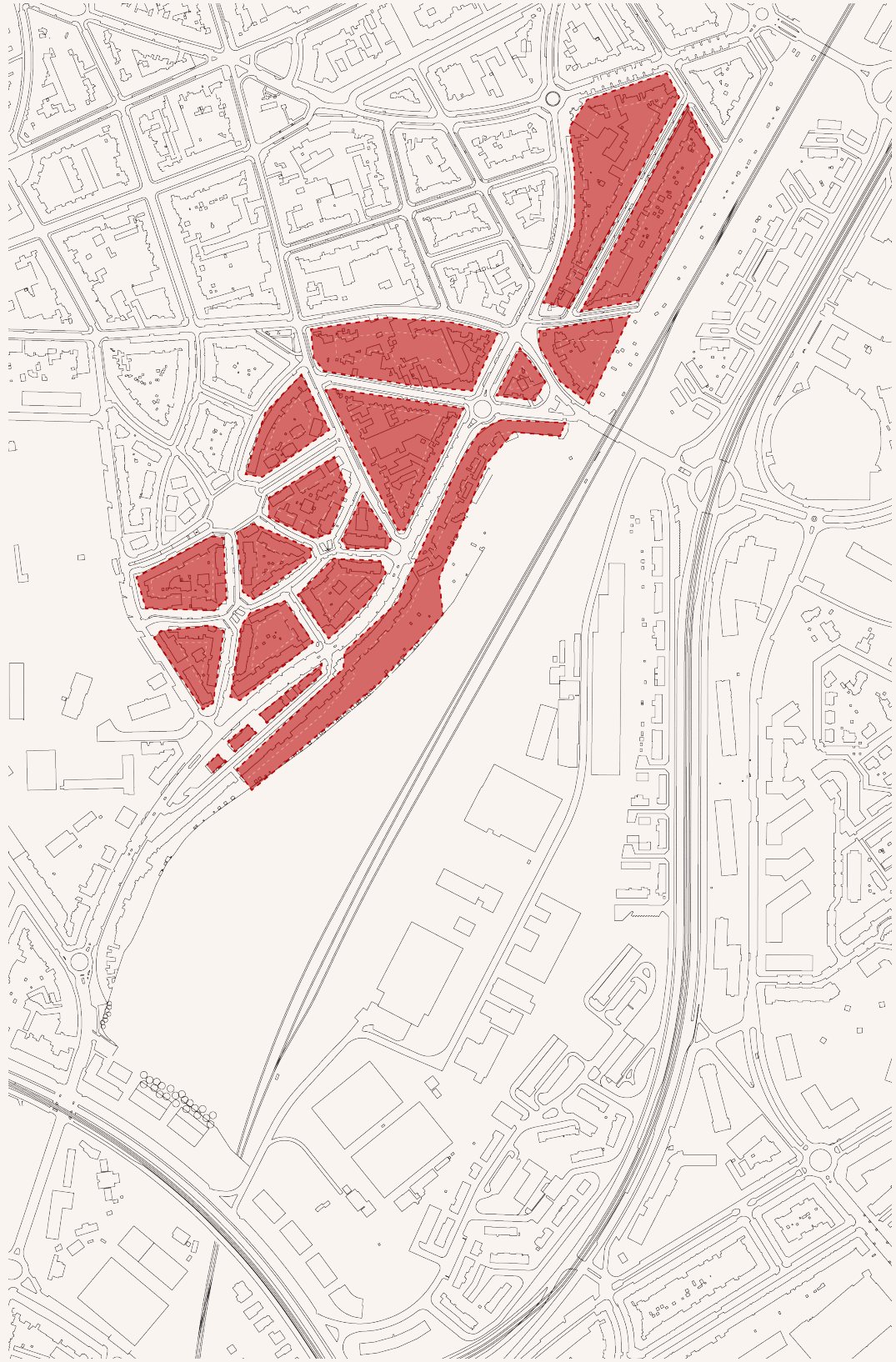
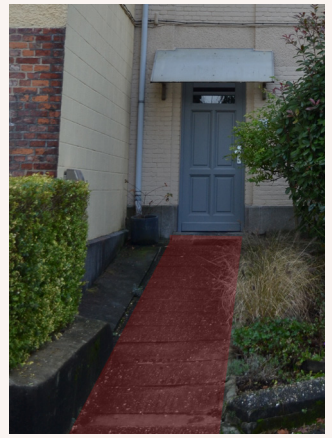
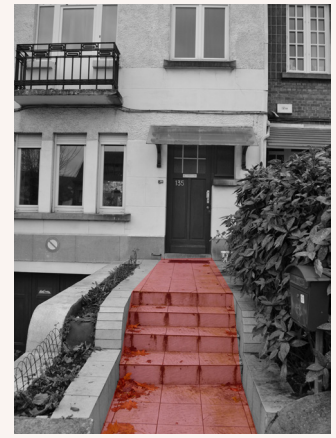


Figure 2.24:
Morphology of Ter Delt
(Author, 2024)

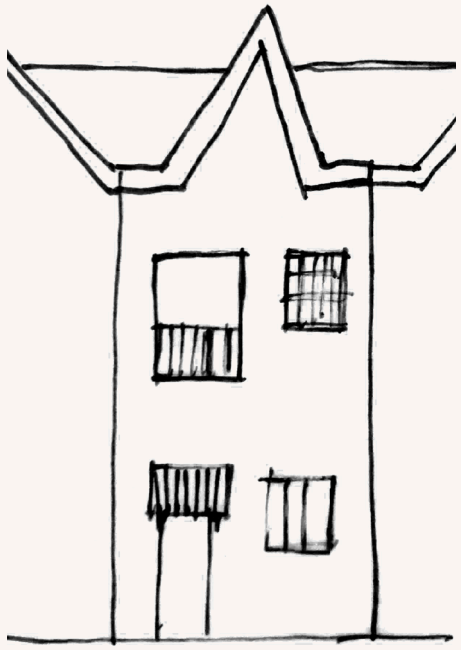
Geography

There is a lot of heightdifference in Terdelt. Most of the buildings are elevtated, their entrance door a few steps away from the troittoir. Some of them use ramps to cover this heightdifference, but most of them stairs. Some buildings make use of that heightdifference. Some garages under the houses can be spotted, with a steep slope leading towards it.





Available materials:
Facade + roof



The facades mostly consist out of brick and plaster. The roofs are all clad with shingles. Almost all of them are sort of orange. Every individual house differ from each other, making the collection of it a sort of collage of differences.

Yellow bricks

Red bricks

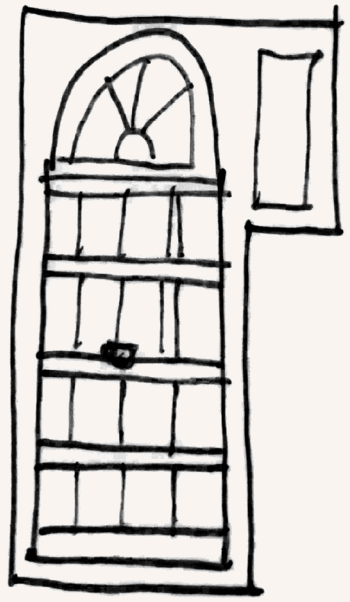
Plaster



Plaster + bricks

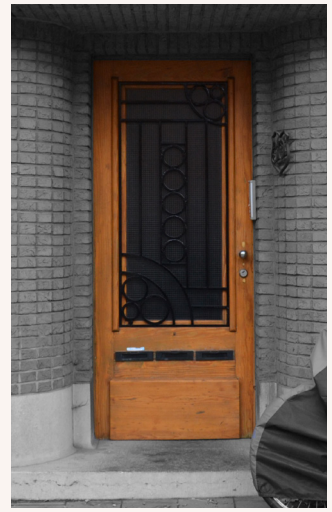

Facade + roof-facade

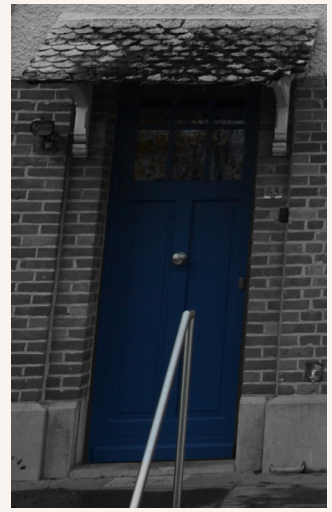
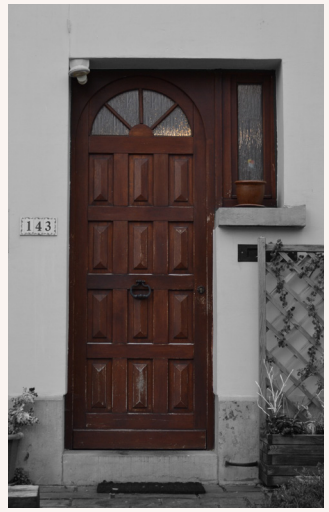
Available materials:
Doors

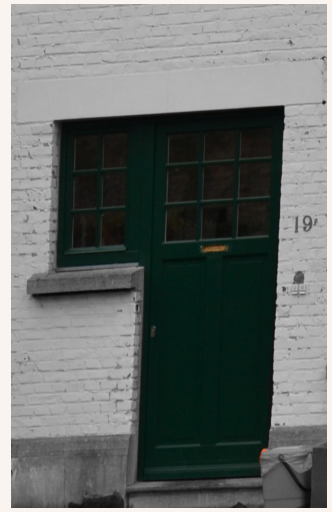


The doors are mostly made out of wood. They come in a lot of dirrerent colors. Probably a lot of them are not original anymore. Some seem more modern than others.

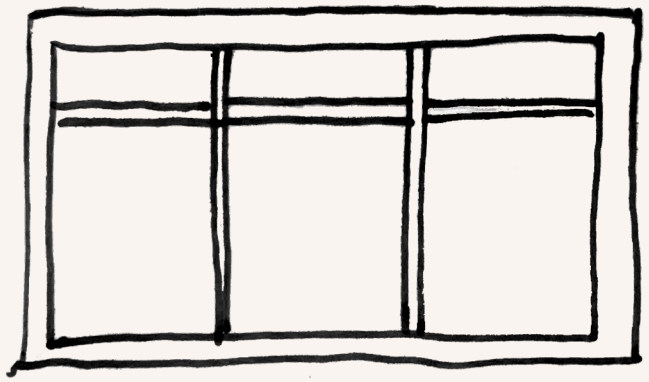






Available materials:
Windows



The windows are mostly made out of wood. They come in a lot of dirrerent colors. Probably a lot of them are not original anymore. Some seem more modern than others.

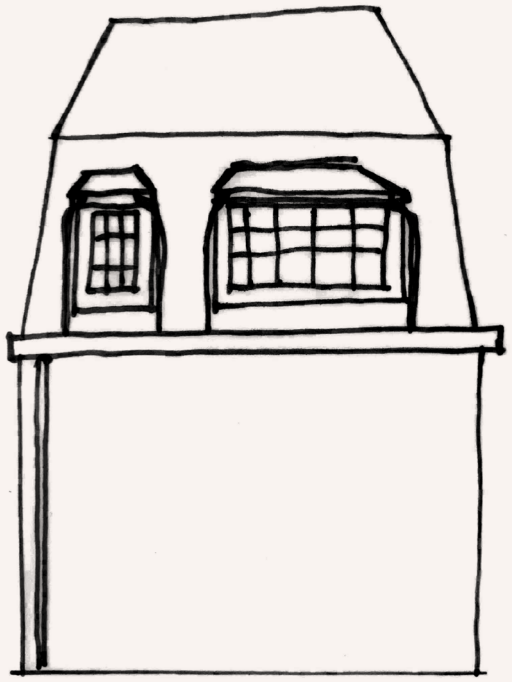








Climate:
Water

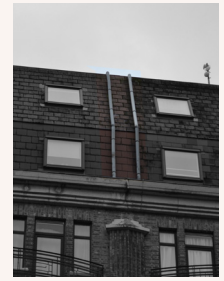


The houses all have gable roofs with in the end a gutter that collects the rainwater and guides it towards the rainpipe. The rainpipe is always in front of the facade and leads the water to the sewage system.

Some buildings have bay windows. The roofs of the bay windows have water overflows that spreads the water to the front garden.

Some buildings also have dormers. All these dormers have individual rainpipes that guides the water towards the same gutter as the main roof.

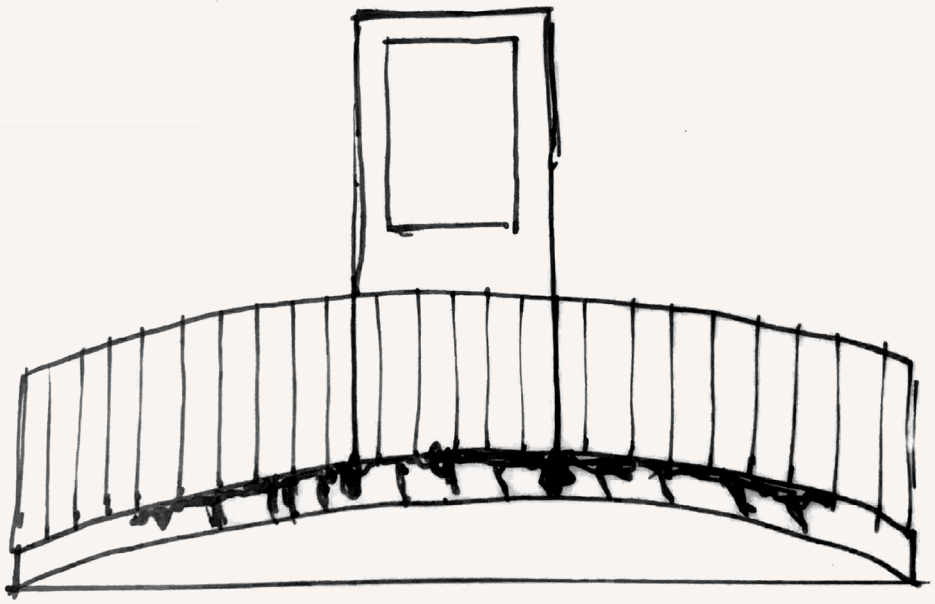
Gutters + rainwaterpipes



Rainwaterpipes on roofs

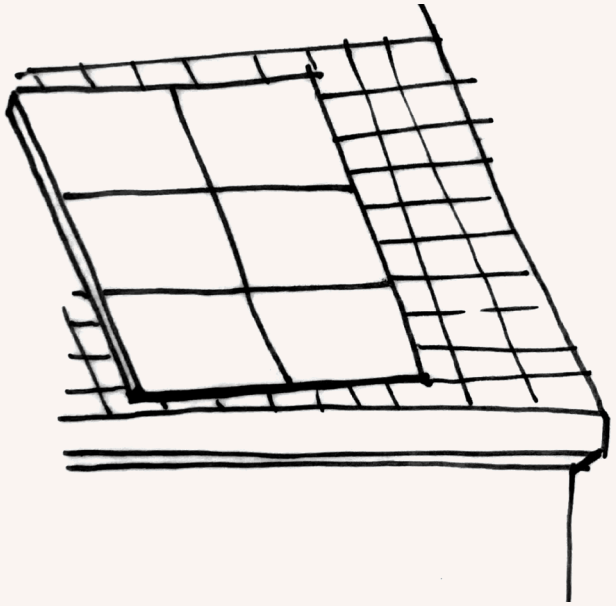
water overflow

Climate:
Weathering



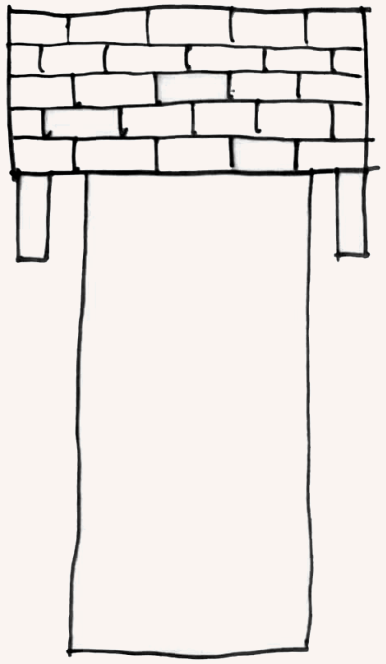
Weathering often can be spotted around overhangs.

Climate:
Solar Panals



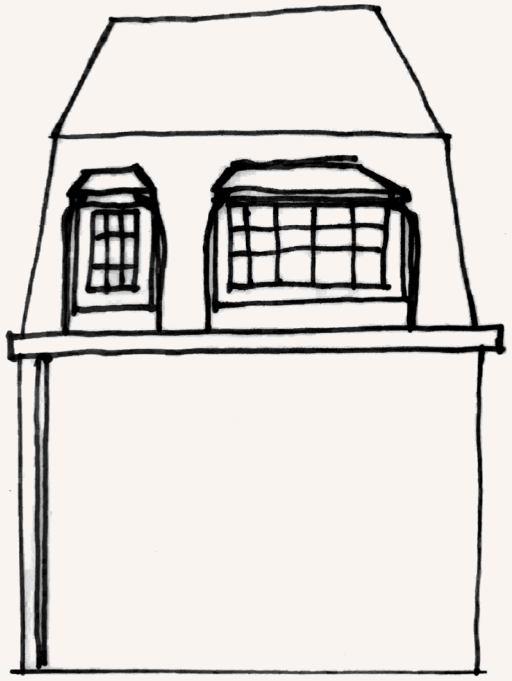
Some houses already have solar panels. What strikes is that some solar panels are east facing and some west.

Climate:
Overhang



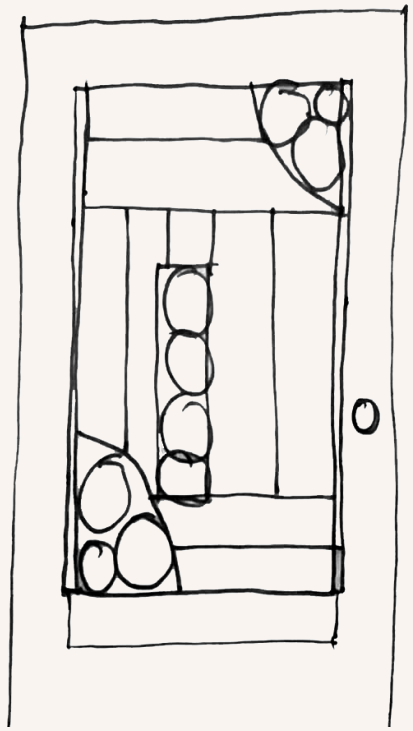
On a lot of doors, there is a overhang above it in the form of a small wooden structure with a roof. I am not sure wheter this is an architectural choise or a climatical one.

Architecture:
Dormers



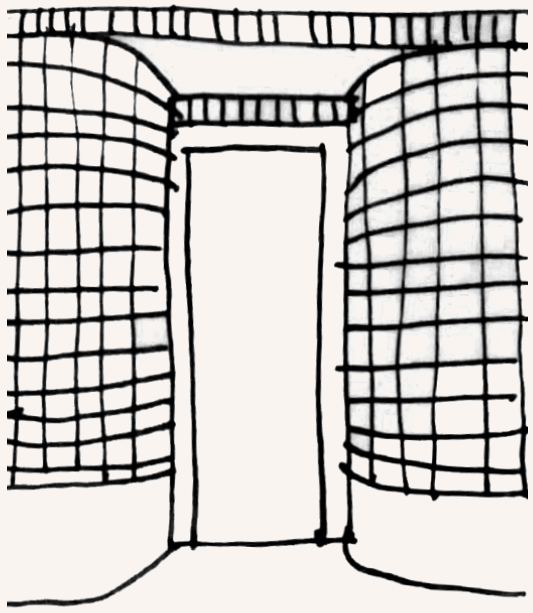
There are a lot of dormers on the roofs of the buildings. They change in form. Most of them are small, one or two windows wide.

Architecture:
Iron details

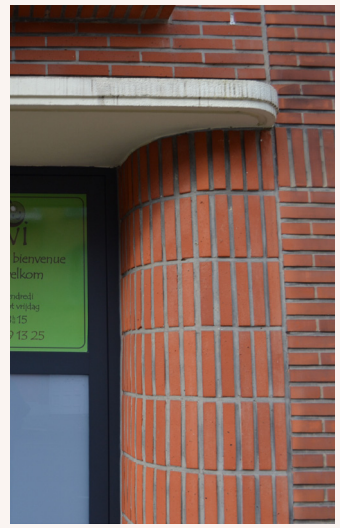


One of the architectural elements that can be observed is the use of ornamental ironwork. It is mostly used in railings, but also in doors and windows.

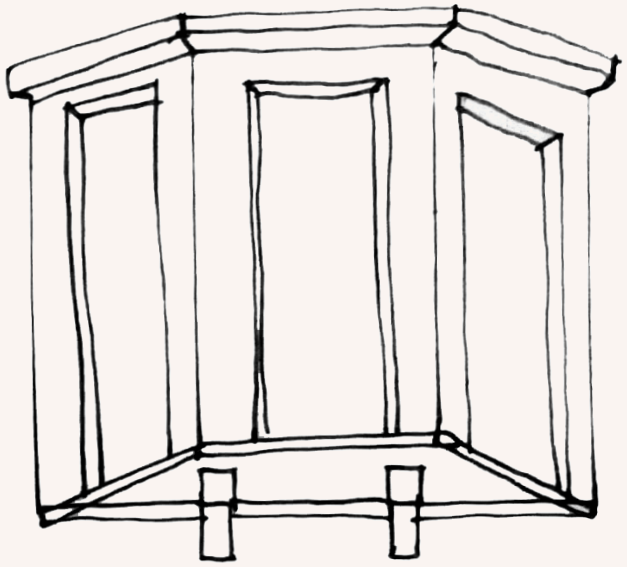
Architecture:
Brickwork details



Besides iron detailling, brick is also used as a means of giving architectural significance to the buildings. The entrance is often clad by a curved composition of bricks.



Architecture:
Bay windows



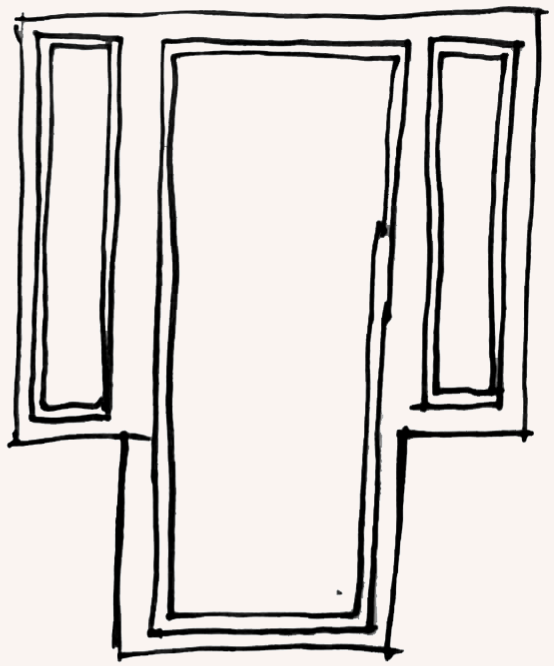
Almost all houses have bay windows. They come in two shapes, squared or a triangle form.








Architecture:
Window composition I



The above shown window composition is often used in this area. Two small windows adjecant to a door form this composition.

Architecture:
Window composition II

This is another windowcomposition that is often used. It is again a composition of three windows, this time all of equal vertical length.






2.4.2

East of Friche
Personal perception of Area

Blendered bland

Once again, I find myself seated on a bench, looking around. Again, order within chaos is what comes to mind. This time, unlike Terdelt, historical charm is not what this area can lean on. However, the architecture, starkly different from Terdelt, still adheres to the same principle.

Variety in unity is still existent. A, what I guess six meter grid, is separating the row of houses into individual dwellings, each enclosed within its own defined space. The grid, made up by a vertical rectangle of brickwork of around 600 mm wide, forms a robust framework. The unity, the constant factor forming this framework, is much more rigid than in Ter Delt, autistic even. Within this autism inspired architcture, materiality, window frames, doors, details, are all composed differently.

Yet, unlike TerDelt, this place fails to bring appreciation for its chaos within order. The elements that in Terdelt made the architecture shine, now look cheap. The materials are indeed cheap: plastic, fake wood, panels sometimes alternated with brick. However, actually looking at it, it is not solely the cheap materials that render this area mundane. No, this time, the overwhelming chaos is too much. The unity is only defended by the sturdy grid which is just not powerful enough to defend the attacks by the chaotic army of materiality and details. The balance is gone. There is too much chaos within the too distinct but weak borders.

Within the chaos, there are some elements that are distinct and come back often: horizontal window frames that let me think about Corbusier's villa Savoye, and a vertical grid like Mies van der Rohe's signature style. However, any attempt to compare this architecture to Mies's or Corbusier's feels of course misguided. The architecture that I see looks like mixing the two in the poorest way: it's like putting pizza and pasta in a blender.

What I wrote about Terdelt's architecture, questioning whether its true architectural quality and thereby appreciating its existence, lacks here: completely.

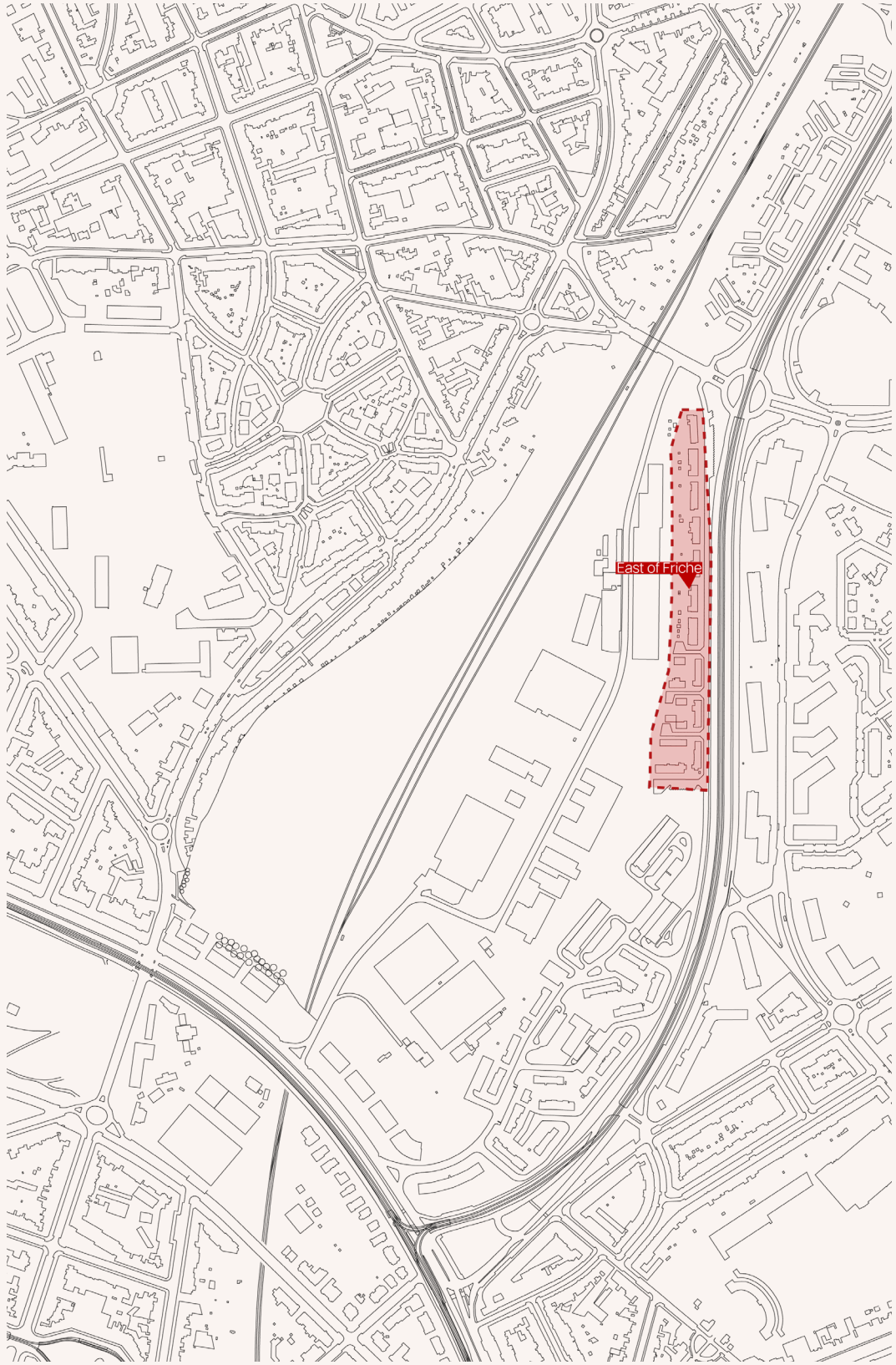
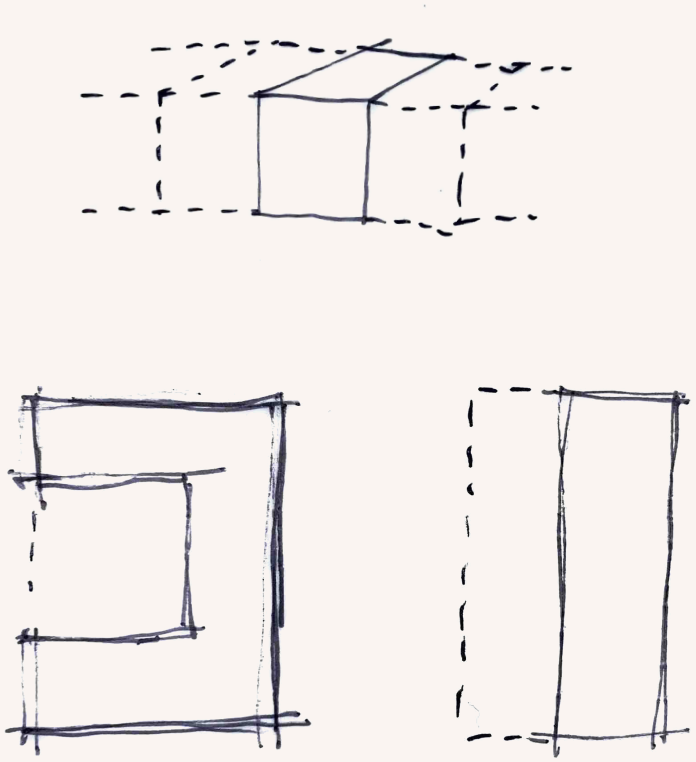


Figure 2.25:
Map showing the area East of the Friche
(Author, 2024)

Urban morphology



The urban morphology of the East of the Friche consists out of orthoganal forms. Courtyards and buildings placed next to each other with their own backyard are prevalent. The houses are all terraced with a flat roof. Actually, the houses are quite similar to those of Ter Delt but in a more orthoganal way.

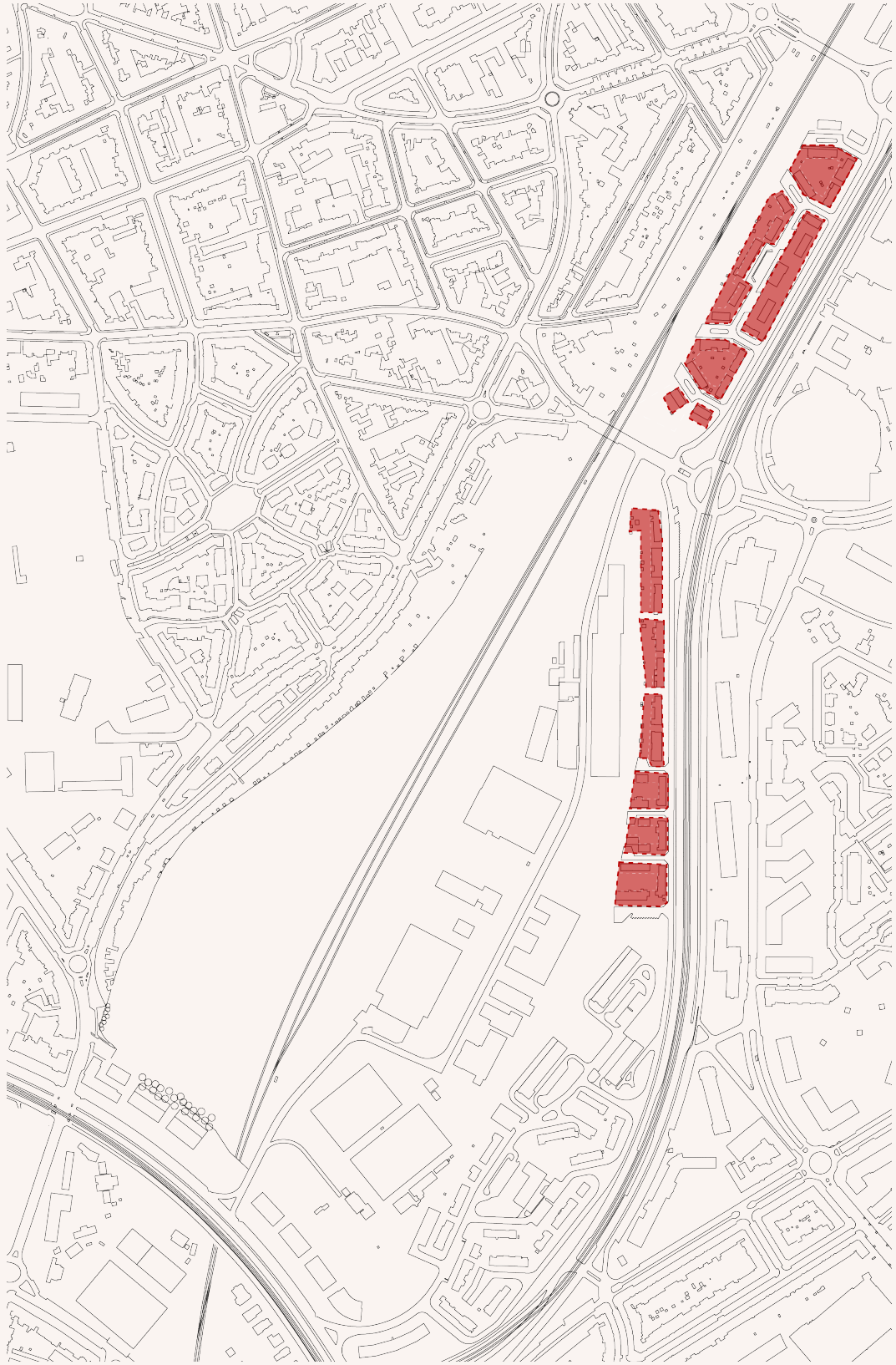
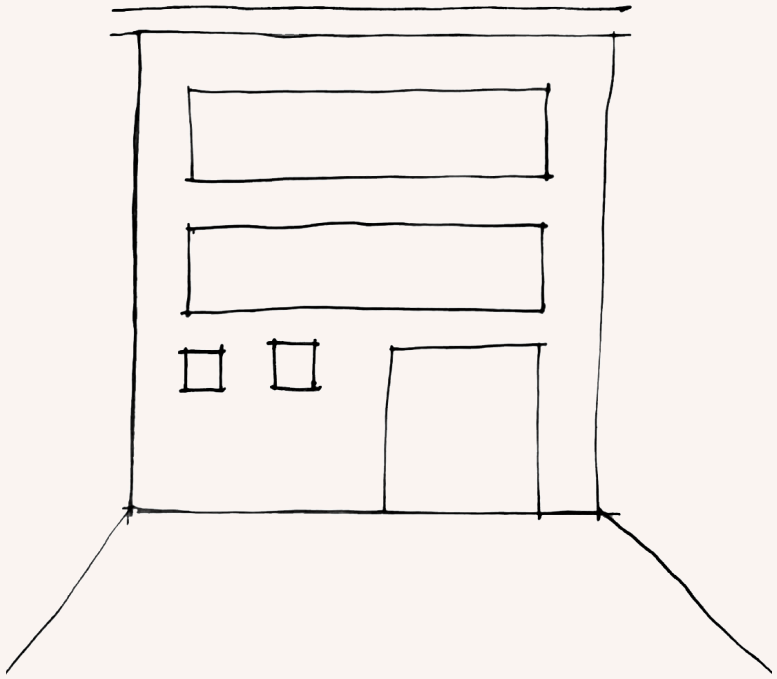


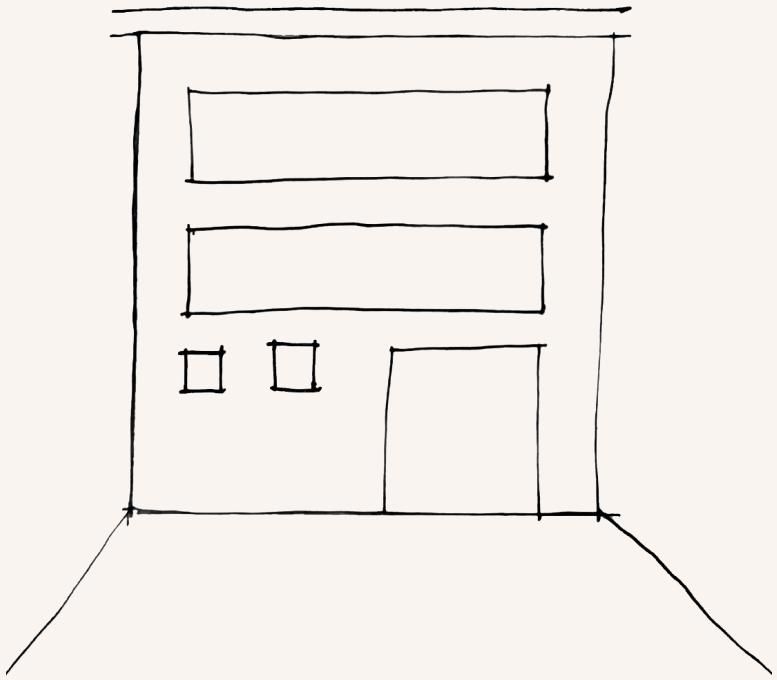
Figure 2.26:
Morphology East of the Friche
(Author, 2024)

Geography



There is not much height difference within this area. Most of the houses are level with their surrounding troittoirs.

Available materials:
Facade + roof



The materialpallete is four folded. Brick, Wood, panneling and natural stone. The front facades differ a lot from the back facades. The front facades are seperated by a strurdy grid while the facades at the back from a unity.
All the roofs are flat and made of bitumen.



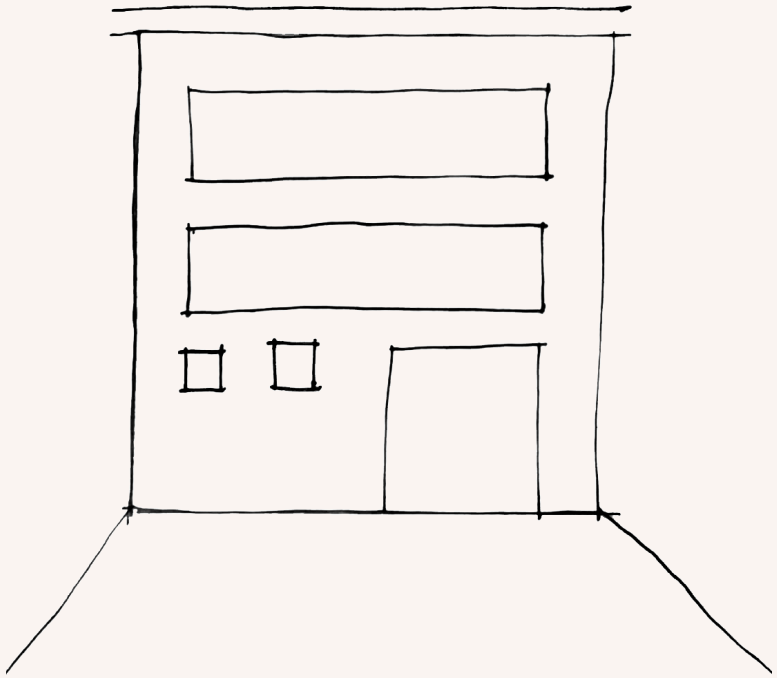
Brick



Natural stone mixed with pannelling

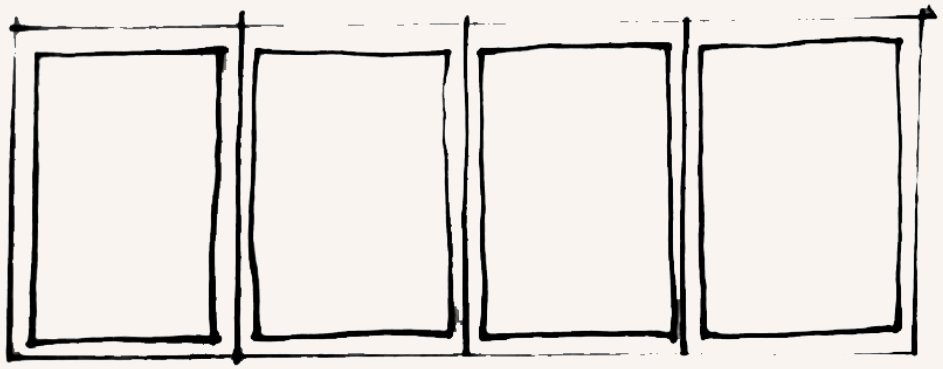
Brick on backside

Available materials:
Doors



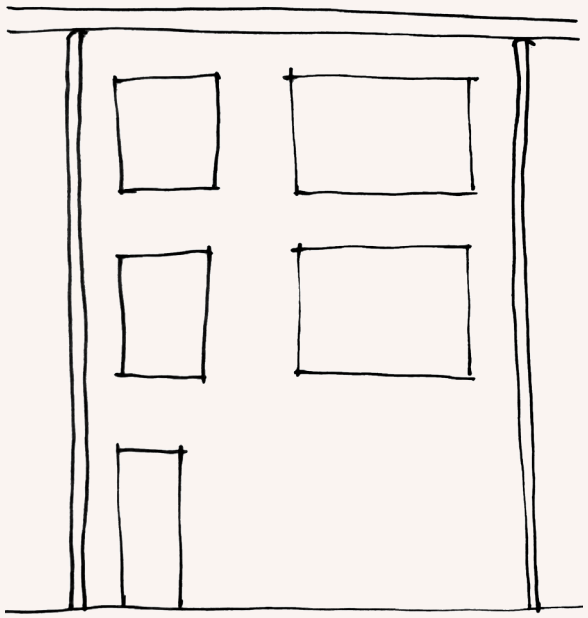
The materialpallete is four folded. Brick, Wood, panneling and natural stone. The front facades differ a lot from the back facades. The front facades are seperated by a strurdy grid while the facades at the back from a unity.
All the roofs are flat and made of bitumen.

Available materials:
Windows



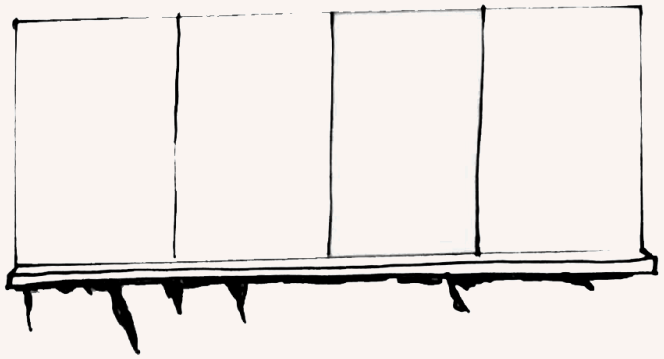
The windows are all made of white plastic.

Climate:
Water



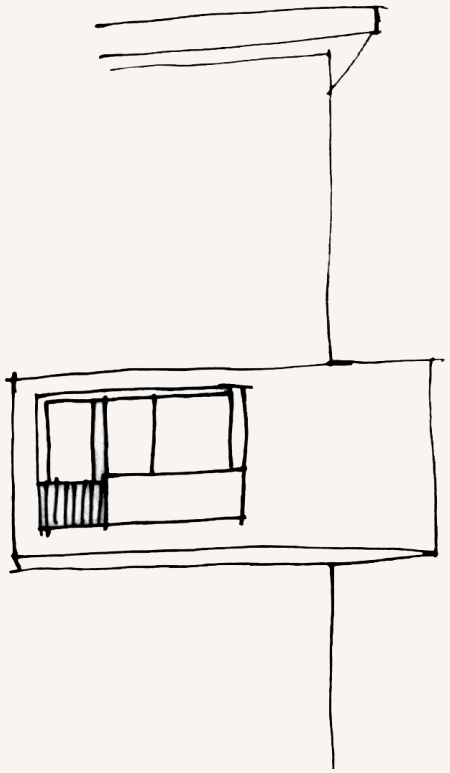
The gutters on the front facade seem ‘fake’. They merely serve as an decorative element. All the rainwater is collected on the flat roof and guided to the backside of the buildings. Here, one gutter collects it and guides it towards a rainpipe.

Climate:
Wheatering



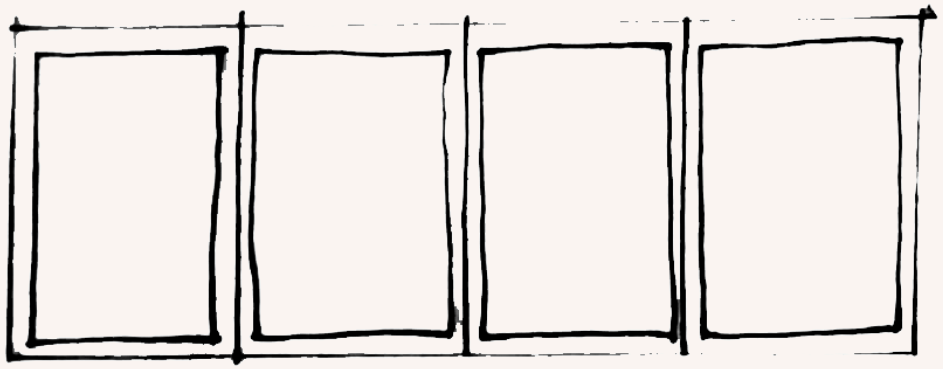
Weathering is scarce, but can be mainly spotted around overhangs.

Architecture:
Baw windows on corners



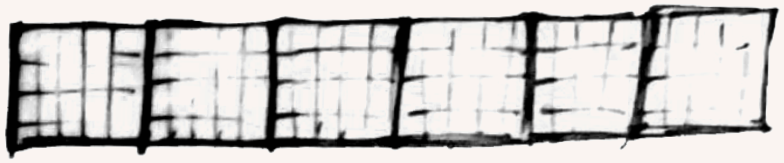
An architectural detail that is common is the use of bay windows on significant corners in the area. They differ in form, but do form a theme in the area.

Architecture:
Window composition

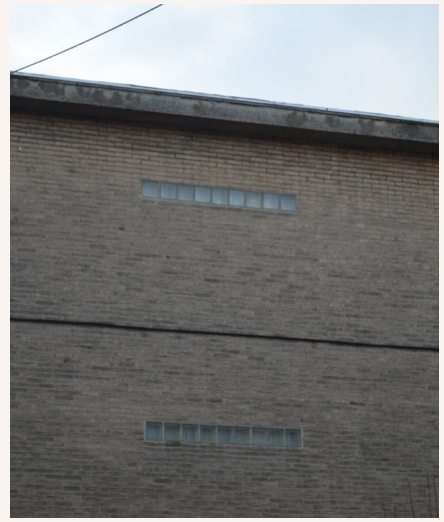


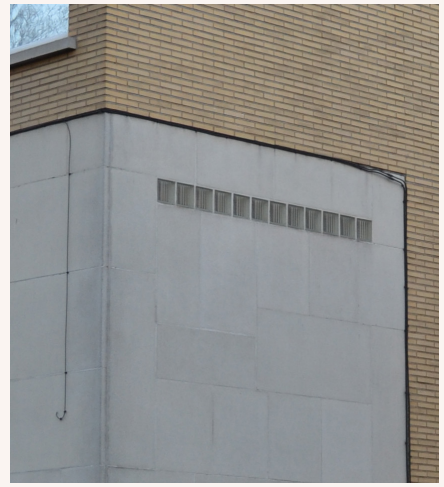
The windows are often horizontally orientated and are made out of 4 or more indivial windowframes.

Architecture:
Glass bricks



Glass bricks are used as architectural details, often in the side or back facades.





Vernacular ‘versus’ Friche

2.5

After analysing both the Friche and the vernacular identity of Brussels, the inquiry into their distinctions becomes apparent. As previously mentioned, all architecture relates in some way to its context. The main difference is that vernacular architecture does so in a much more direct way. This can also be easily concluded after the research. Despite limited information on the specifics of both Ter Delt and the East of the Friche, educated assumptions based on literature research can be made to showcase the difference between the past and the present.

‘The use of so many non-local materials also has a significant influence on the building’s façade, making the identity of the buildings generic.’

If looked specifically at the East of the Friche, research shows that post-war architecture often relied on very specific materials. For the structure, light weight concrete blocks imported from Sweden was a common building material. In addition, light-weight concrete was used for the fabrication of prefab floors. For insulation, fibreglass, rock wool and cellular glass were popular. Besides this, synthetic materials such as expanded polystyrene (PS) and polyurethane foam (PUR) revolutionized the 1950s the insulation market. For window frames, the most popular material was metal, although other materials such as aluminium, bronze, stainless steel and even PVC were also available (Voorde, Bertels, & Wouters, 2015).

Conversely, the glass of the windows were locally produced and also by local resources. The production of glass in Belgium was founded in 1836 and continued to rise after the 1950’s. Belgium is therefore one of the biggest exporters of glass in the world (Voorde, Bertels, & Wouters, 2015). Despite this, most of the materials that were used were non-local, significantly impacting the buildings’ façades, resulting in a generic architectural identity.

For the Ter Delt area, information is scarcer. It is evident that the façade of most of buildings are made out of brick. It remains unclear whether they are locally produced and if there is an additional structural layer behind it. The use of bricks give the building a more vernacular character since this building material was used in the past as well. The same goes for the window frames, which are made out of wood. However, again, there is no information to be found on their origin. The one material which is clearly not local are the iron bars, which were widely prevalent on the doors, windows and balconies.

Figure 2.27:
East of the Friche
(Author, 2023)

Figure 2.28:
Ter Delt garden city
(Author, 2023)

Figure 2.29:
Scale model Brussels in 13th century, showing the first brick architecture
(Urban Brussels, 2001)

Both areas were less reactionary to climatical aspect typically associated with vernacular architecture. Orientation did not play a role in both neighbourhoods since there is no difference in the back- or front façades. Moreover, the use of overhangs was only observed above the entrance door, which seems like an architecture choice rather than a climatical one. Furthermore, the buildings on the East of the Friche showed a fake gutter on the front façade, completely withdrawing itself from the honest approach vernacular architecture has. The prevalence of "flat" roofs necessitating water pipes for drainage, along with the need for a slight tilt to direct water, rendered them even more non-vernacular.

In conclusion, despite the limited information, significant distinctions between vernacular architecture and the local architecture that is currently prevalent in the Friche can be noticed. The idea of a Garden city such as Ter Delt came from England, which makes the nature of the neighbourhood already non-vernacular. The East of the Friche is from the post-war period, shaped by the urgent need to address housing shortages rather than a focus on architectural identity. Although the result did not came as a surprise, recognizing these differences sharpens the understanding of vernacular architecture.

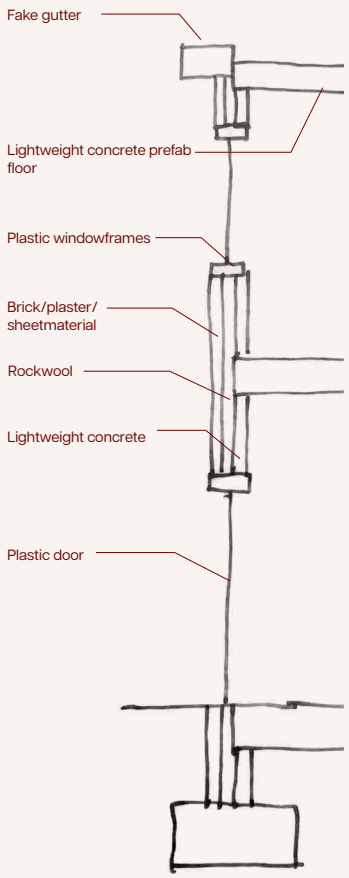


Figure 2.30
Sketch section East of Friche building
(Author, 2023)

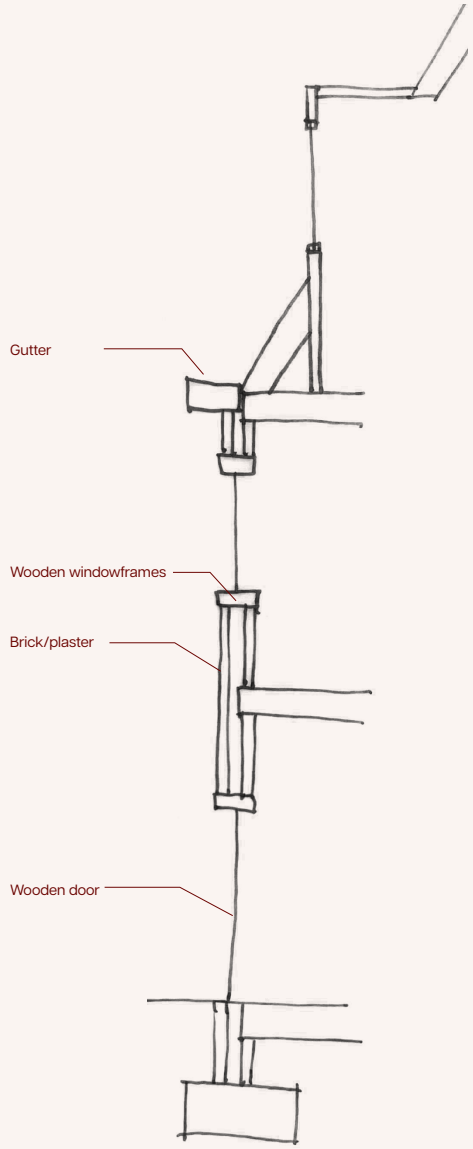


Figure 2.31:
Sketch section Ter Delt building
(Author, 2023)

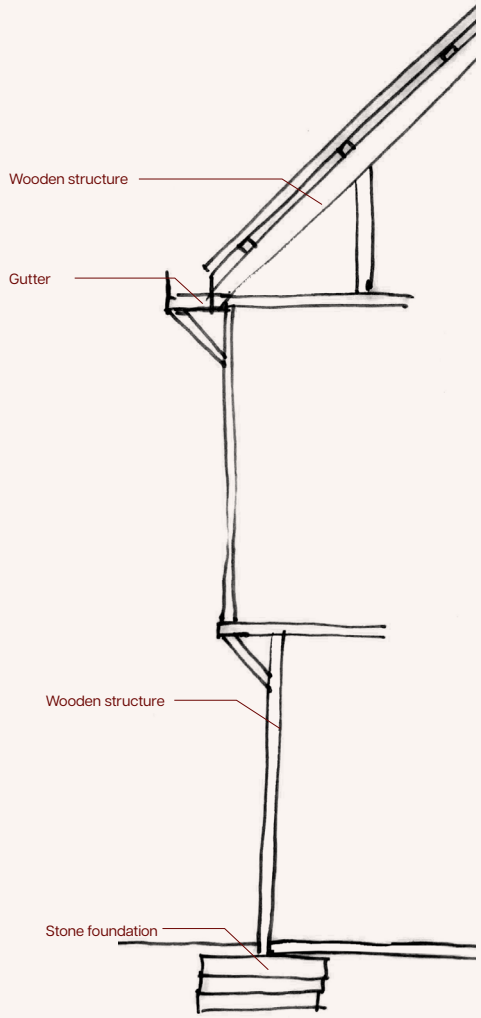


Figure 2.32:
Sketch section vernacular building
(Author, 2023)

Contemporary vernacular

2.6

This chapter will provide the key insights gathered from the previous chapters. It will give an answer to the main question of this research: How can a building connect to and stimulate local identity? By answering this question, this chapter can be used as the starting point of the subsequent design phase.

Definition
The search for a definitive definition of vernacular architecture proved to be challenging. No clear definition where multiple experts agreed on could be found. Therefore, the definition remains ambiguous. However, what experts do agree on is the deep and direct relation to the context the building sits in, encompassing the social, economic and ecological context. This research does adhere to a clear definition, namely:

Vernacular architecture is an architecture that has a deep, direct and intimate relationship with its context, encompassing economical, social, geographical and environmental aspects. The aesthetics of such an architecture are determined by its functionality. Aesthetics are therefore never an stylistic choice. Furthermore, local building methods improved over time by generational knowledge are always utilized in buildings defined as vernacular.

Vernacular Brussels
After the definition was researched, a more precise analyses of Brussels' vernacular was conducted. The objective was not to replicate the methods people used in the past, as this could lead to a historizing architecture which would not contribute to the local identity. Conversely, the research sought inspiration from past principles that were found in the search of a definition and used in the contemporary context of today. Therefore, it was important to find out how they were practically implemented in the past. This method can then be copied in a more contemporary context of today and used in the design phase. This results in four principles that are vernacular-inspired:

'the research sought inspiration from past principles that could be used in the contemporary context of today.'

The first principle is the use of local materials. In Brussels, one of the main sources of material in the pre-industrial period was the Sonian forest, which provided both soft- and hardwood. Initial research shows that the forest still produces around 20.000 m2 of timber today, which is currently mostly being shipped to China (OSMOS, 2020). Further research must be conducted to see if the timber could be utilized in the design phase, but it is an interesting start.

Principle 1: make use of local materials

Because in the past, the supply of hardwood was not sufficient enough, the building-techniques that were utilized differed from other regions. One example is that besides hardwood, they also used other types of wood such as soft wood. In addition, they created further distances between the frames so that less wood had to be used. This technique showcase the adaptability to resource limitations.

Be creative, use the available material in its full potential while utziling a locally inspired construction technique
Another source of material that was used is brick, that could be locally produced because of the soil in Brussels. One of the main pros for this material is its higher thermal mass, which used to be positive for heating. This aligns with current environmental concerns where thermal mass is still of importance. A first exploration shows that the current soil in Brussels could still be used to create bricks. A local company called BC materials uses the soil to create carbon neutral loam bricks (BC materials, 2024).

Pay attention to the sustainable properties of materials when choosing them

Besides thermal mass, there were other climatological aspects that had to be considered when constructing buildings. Moist was a huge issue when building with wood and loam as the main material. Therefore, a stone foundation was needed to prevent moisture from going up. Furthermore, by creating a roof-overhang with a gable roof and creating small overhangs in every floor, the rain impact on the façade could be minimized. With today's more contemporary building methods, this is less of an issue. However, the strategic use of overhangs continues to offer climatic advantages.

Principle 2: 'design' features (like overhangs and orientation) can be used with regard to climatic benefits

Local identity
When designing a building with only the vernacular principles in mind, a building that is suited for whole of Brussels arises. To make the building more site specific, an architectural analyses of the local architecture is needed. Utilizing some of the characteristics of the local architecture will ensure that the building connects to the local architectural identity. Until yet, there are no clear design-principles that follow out of this research. However, there could be looked at architectural composition (both in mass and façade) and at architectural details like iron and brick.

In conclusion, the research into the vernacular architecture led to a deeper understanding of how context influences architecture. It illustrates how architecture always used to be reactionary to social-economical and ecological circumstances. It also led to the realisation that after the industrialisation, architecture did not need to be that reactionary anymore. The present-day climate and identity crises invite a re-evaluation of these foundational principles. Vernacular architecture serves as an inspirational source which is constant, one that does not change anymore. Be relating to this, architecture always becomes more local. By combing this with the current architecture that is on site, an architecture that connects to the local characteristics of both today and to a more 'timeless source' arises.

Research to Design

03

Vernacular interpretation 3.1

Materiality

This chapter gives an overview of how the outcomes of the research are translated into the design. It shows the specific inspirational sources of the research. The chapter is divided into two sectors. First, the elements out of the vernacular research are shown. Thereafter, the inspirational source of the local identity will be shown.

The first principle has to do with the materiality of the architecture. First of all, it dictates to use local materials. Secondly, these materials should be used in their full potential. This means, when using a heavy material, it should be logical to use it. When a light material is needed, choose a lighter material. Lastly, when using this materials, sustainable properties should be included in the desicion making process.

However, first an exploration into the definition of ´local´ has to be made. When is something considered local? A quick exploration leads to two benchmarks. The first is the zero kilometre philosophy.

The term km 0, or 0 km, was derived from the Slow Food movement. As a clear counterpoint to fast food chains, the idea of the movement is to promote the consumption of local ingredients, reducing the distance between producers and consumers. The 0 km architecture approach primarily aims to provide more sustainable, healthy, economical, and socially accessible buildings that are strongly linked to the identity of their site Minimum Standards of the Zero Kilometre architecture:

1. At least 2 main local materials
2. >30% of the materials used on site must be local
3. At least 50% of the materials used in the building must be purchased to suppliers established within 200 Km from the construction site
4. None of the materials may cause harm to human health

The second benchmark is the LEED standard. In LEED v4, the extraction, manufacturer, and now, also purchasing (including distributing) locations must be within 100 miles (160 km) of the project as well as meeting at least one of the sustainable criteria, that being certification or recycled content, etc.

In the design, four main regional materials are utilized. The first material is a brick from BC materials. BC materials uses excavated earth from building sites to make loam bricks. These bricks have excellent thermal characteristics, furthemore, they are not baked, making them far more sustainable than regular bricks. However, these bricks are not resistent to direct water impact. In the next chapter, it is shown how to cope with this.

The second material is timber from the Sonian forest. Anually, about 20.000 m3 of wood is harvested out of this forest. The types of timber that are harvested differ, this is shown in figure 34. The different types of timber can be utilized in different parts of the building. For example, the oak can be used for window frames, while Pine can be used for beams and columns. Furthermore, beech and oak can be used for furniture and indoor finishes.

The third local material is glass, locally produced by AGC. As mentioned before in this research, already in the 19th century Belgium was renownded for its glass production. AGC continues to produces locally because its resources are harvested locally. The company has a production site in Moustier, located a mere seventy kilometres from the Friche.
The fourth and element in the building which can be produced locally is the flooring system, which uses timber hardwood beams and in between rammed earth.

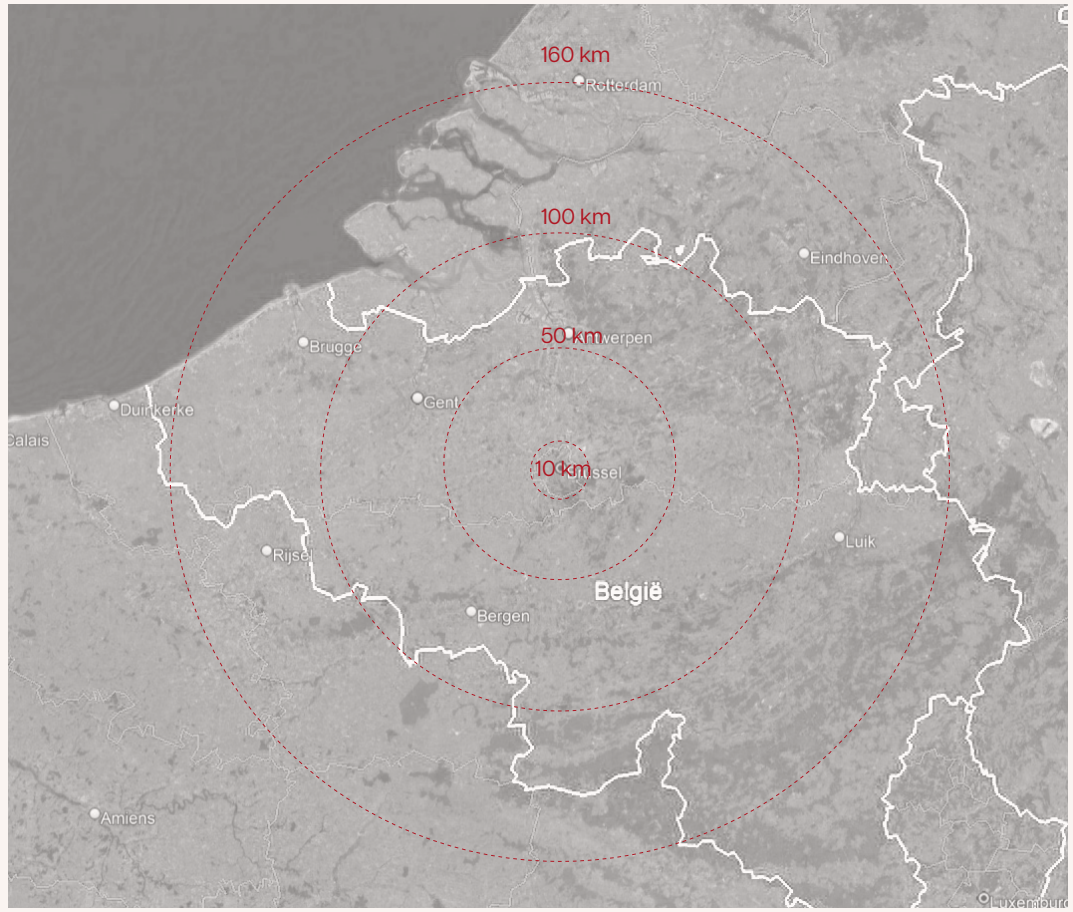


Figure 3.1:
Distances from Brussel
(Author, 2023)

Climate

Besides using local materials, the second principle is about using design features in relation to climatical aspects. As mentioned before, in the past the strategic use of overhangs prevented rainwater from impacting directly on the water-sensitive facades. Later, bricks were used in times of timber shortages because of their thermal mass which proved to be benificial for heating.

In the design phase of the Arriere garde project, similar aspects have been used. First of all, the ambition to make a passive design to react to the local climate was set. This resulted in numerous design choices that finally led to a specific architecture. In the text below, a brief summary of the measures are described:

Orientation
Passive design requires attention regarding the subject of orientation. This mainly has to do with heating and venitlation. In winter, the heat of the sun can be used to heat the building. Therefore, attention has to be put into the composition of the facade regarding window placements and size of the windows to optimally use this heat. By reducing the windowsizes on the north, the loss of heat is prevented.

Ventilation
Passive ventilation in the form of natural in- and output requires openable windows and optimzed orientation. The flow of the wind should assure a cross ventilation flow troughout the building, again, window placement is crucial.

Shading
In order to not overheat the building in summer, thought has gone into the use of passive shading. Measures like trees, overhangs, and placing the windows deep into the walls should prevent the building from overheating.

Materials
The use of materials is important. A high thermal mass can be used to store heat during the warm periods of the day, which can then be released slowly during the colder parts. This helps in summer to prevent the building from heating up to much, and in winter to prevent the building from becoming too cold. The use of the thick loam brick walls ensured the high thermal mass. The rammed earth floor system and the concrete basement structure that is partly built under ground further contributes to this matter.

Figure 3.2:
Case study: 2226 by Baumslager Erbele (Lustenau, Austria)
(Baumslager Erbele, 2024)

Massing

Altough the principles that were deducted out of the research into vernacular architecture were inteded functionally, of course the architectural specifics of the history could not be disregarded. The buildings that were constructed in the past still inspire designers today, and the Arrierde garde project forms no exception. Thefefore, a modern interpretation of the farms that used to exist in Brussels was sought to align to the precedessors in Brussels.

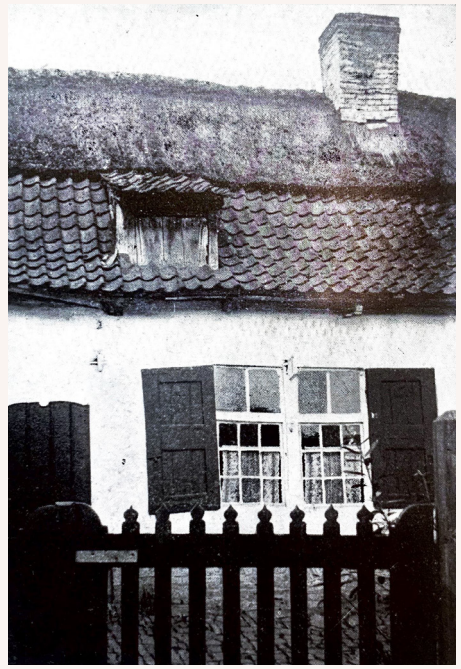


Figure 3.3:
House made by half-timbered technique, Pepingen, Brabant, Belgium
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

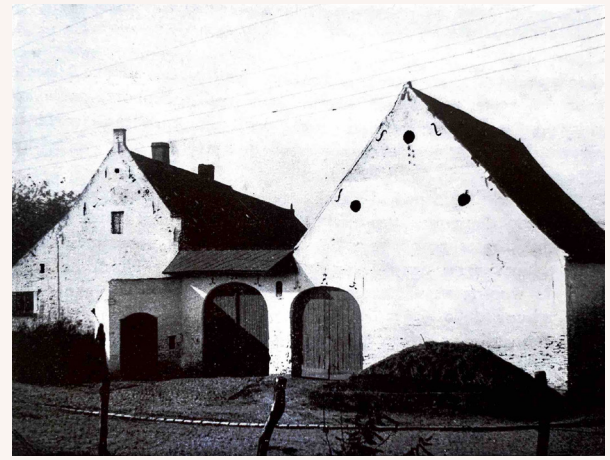


Figure 3.4:
Hoeve Vossem, Brabant, Belgium
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

Figure 3.5:
Long facade type farm
(Trefois, Ontwikkelingsgeschiedenis van de landelijke architectuur, 1950)

Local interpretation 3.2

Materiality

The horizontal lining in both Ter Delt's and the post war's neigbourhoods' architecture is striking. Ter Delt is more dogmatic in its materiality, brick and plaster form the basis. In the post war neighbourhood, this is altered with wood, plastic and natural stone. However, the horizontality within the verticality of the different houses is still strikilingly visible. This horizontality within vertical borders forms the second inspirational source.

Figure 3.6:
Materiality photos
(Author, 2023)

Massing

Contrary to the vernacular research, the research into the local architectural identity was far more focused on images, on the pure architectural sensation that the buildings convey. The first inspirational source was the massing. The houses were all built with the same pithced roof but with a different height. This creates a play in height that is strikinly visible in the area. The materiality is mostly brick, however, the colour difference between them makes the play in height stronger. Altough the colour is different, the use of a uniform material still creates an architectural image that can be considered as ‘a whole‘.

Figure 3.7:
Massing Ter Delt Garden city
(Google maps, 2024)

Details

Bay windows were widely prevalent in Ter Delt. Most of them were either triangular shaped, or cutted of triangles.

Small hints of glass bricks could be found in the facades all along the neighbourhood. Never were they dominant, but always subtally visible. Often they formed horizontal lines, composed of multiple bricks.

The dominant prevalence of brick details was prominent. This tendency to ornament bricks has never vanished and is used often in contemporary buildings. The rounded shapes were especially particular in Ter Delt.

Figure 3.8:
Architectural details
(Author, 2023)

Design

04

Masterplan
Goal and concept

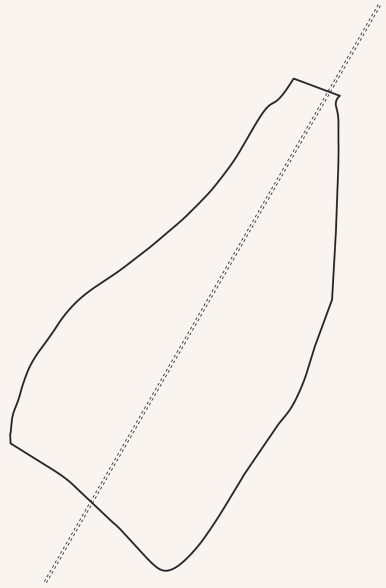
4.1

In a way, the masterplan has the same approach as the research. We (masterplan group) believed that the current Friche is an island within the city (1), that it is not connected to the local urban morphology and that it therefore has no clear function to the city. The masterplan we designed changes this.

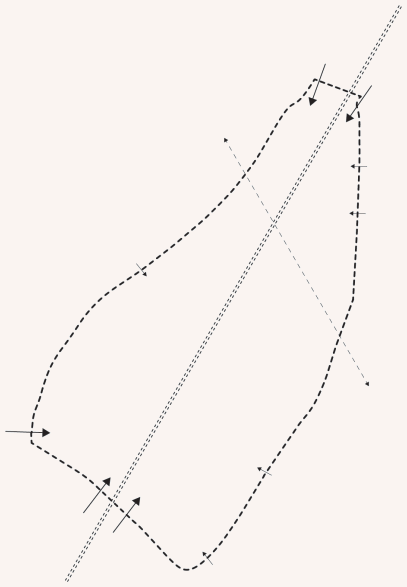
The masterplan breaks the clear borders by making it more porous. Five main entrances were made, in the North and South. Besides this, seven smaller entrances in the West and Sast were constructed that were intended for walking and biking (2).

Then, buildings on the edges of The Friche are constructed. These volumes connect to the scale of the other buildings that are currently surrounding The Friche, so that they align with the context. By constructing these new buildings, a new ‘front’ to the friche is made: people look at it again (3).

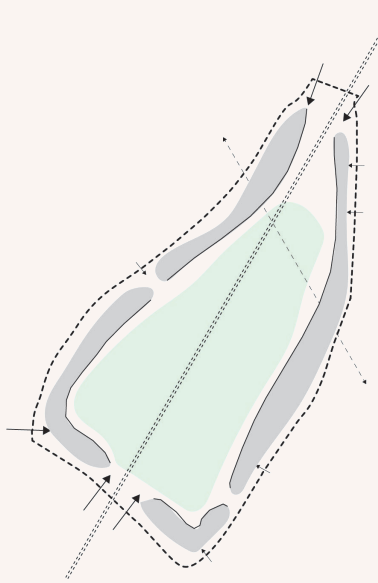
The building were divided into three themes, the darkest grey is the high-dense more urban section with higher buildings ranging up to twelve levels. The lightest grey is apartment buildings of three to four levels, situated in green. The middle grey is an in-between-form, and also the location of cultural activities. The green part is now the new friche, a land that remains untouched and somewhat impassible by humans, but in the same time protected by the humans that now live very close to it and therefore relate to it (4).



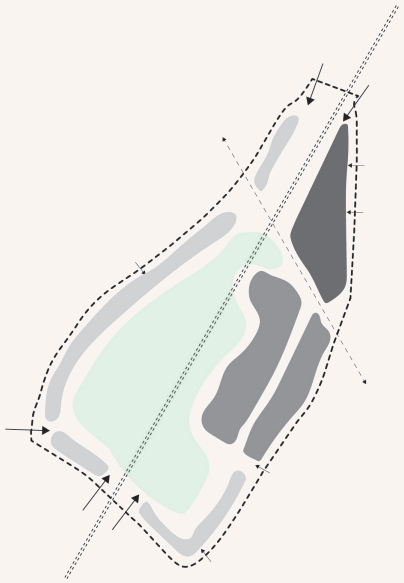
1. Friche as an island within the city



2. Breaking the boundaries



3. Constructing along the edges

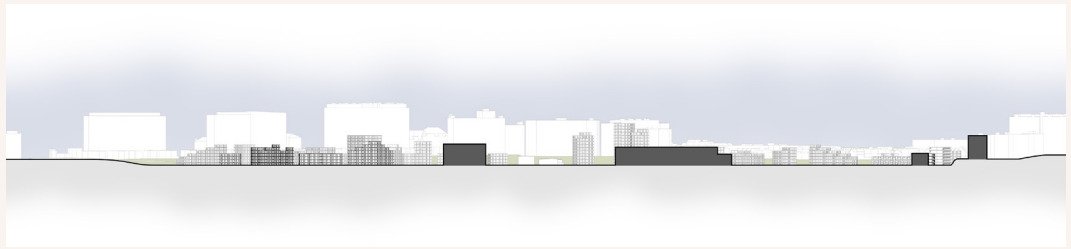


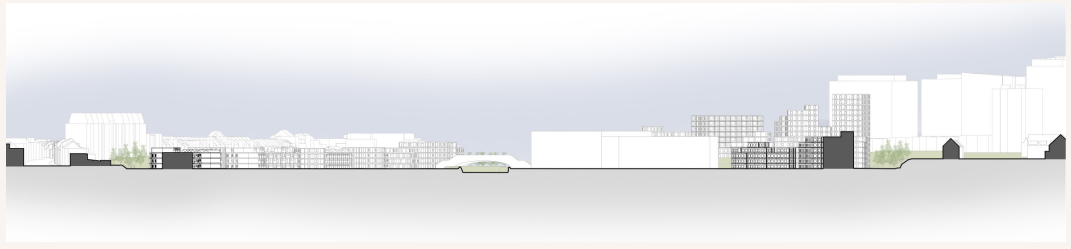
4. Dividing in urban themes

Final Masterplan

The image on the right shows the final masterplan. It is the culmination of the concept that was described before. It is tried to position the buildings alongside the new Friche in such a way that all apartments have a view onto the Friche.

In the sections below, it is visible that the train track is lowered 1,5 meters and a 1,5 meter hill is created. This minimizes the impact of the railway track as a divider. Instead, it is visually less apparent while animals still can cross it so that The Friche remains one natural land.





Sections

Final masterplan

Impression living in green

Impression streetlife

Architecture

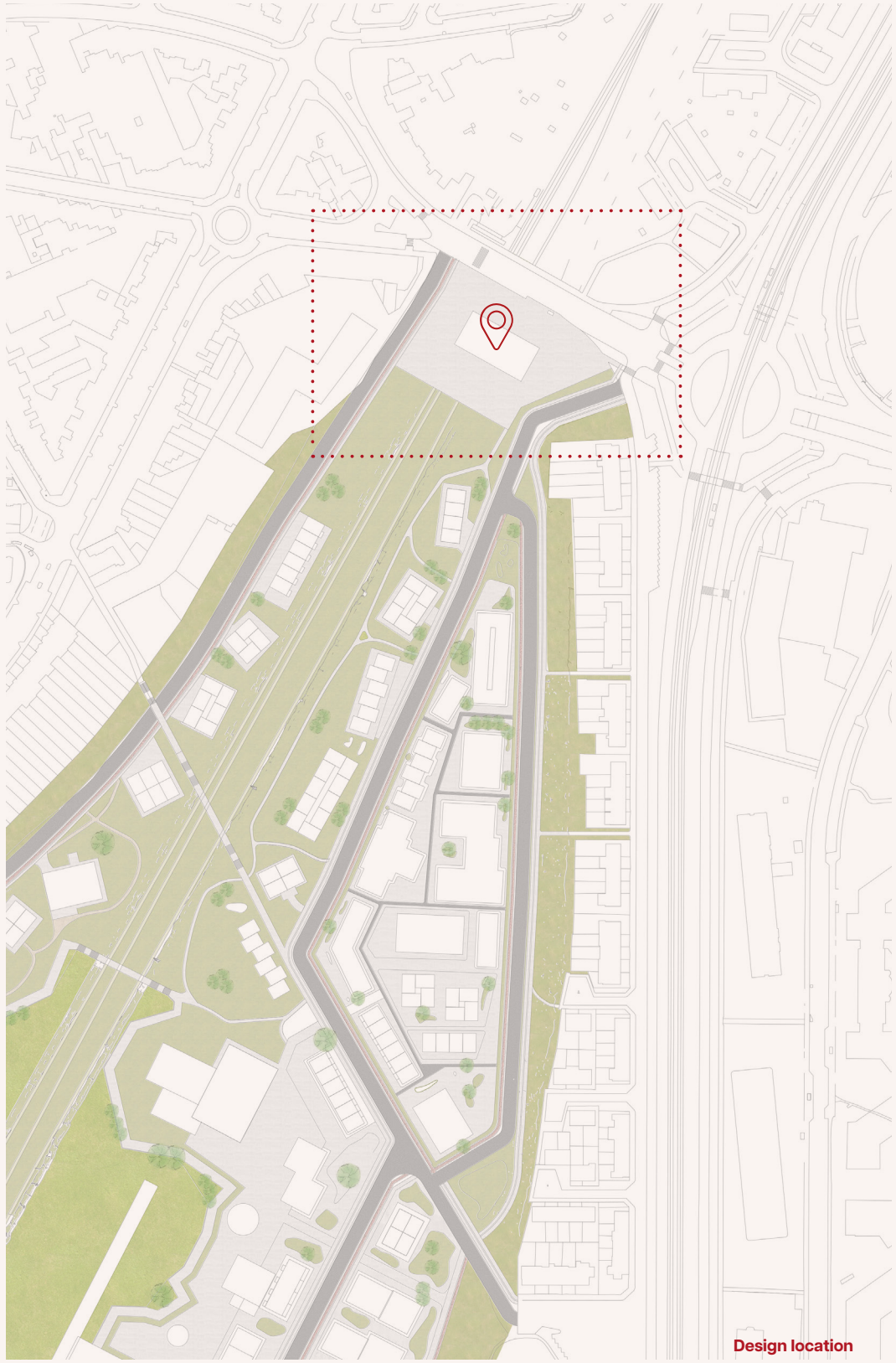
Location and goals

4.2

I chose to design a train station, located in the North of the masterplan, as can be seen in the right image. This is already the location where the current train station is situated, so choosing this location was logic. However, what was more important, was that this location formed the spill between the new masterplan and the current neighbourhood. It is the place where the two main entrances of the Friche are now situated. The building can therefore help to form a seamless connection between the two neighbourhoods, and therefore actually contribute to both the goal of the masterplan: to make The Friche part of the city, and the research question: to make a building that connects to both.

From the research, a train station formed a logical step to the design phase. First of all, train stations were often very un-local buildings and general in the past which the new design aims to counteract. Secondly, a train station also serves as an entrance point for a neighbourhood, making it an excellent building to connect the current neighbourhood with the new masterplan.

To conclude, the goal is to design a building that connects the current neighbourhoods with the new masterplan. This is achieved by its programme that serves both the current local inhabitants as well as travellors. Furthermore, by desiging a building that connects to both the local architecture as well as incorporating contemporary architecture, a building that relates to the current context arises. This then again contributes to the goal of connecting the masterplan with the current neighbourhood. The position of the building, on the cross points of the two current neighbourhoods as well as the new masterplan adds even more to this.



Design location

Programme and design requirements

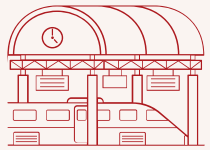
By combining a train station with other functions, the train station is not only a functional building, but serves a public function as well. In this way, the building becomes the hub were local inhabitants come to, and travellers also can use. The programme of the building will therefore consists out of a train station with platforms and waiting areas. A modern library were people can lend books, work and study. And additional commercial functions serving both the traveller and the local inhabitants like a café and a co – working area.

The scheme on the right shows how the goal of the design is achieved. The buildings main goal, as mentioned before, is to connect to the urban context it lies in. It does this on three scale levels: urbanistically, architecturally and technically. Urbanistically, the masterplan connects to the current neighbourhood by making the boundaries porous, the location of the building is situated in such a way that it forms the spill between the current and new neighbourhood. The programme of a train station with local functions contributes to this even more.

Architecturally, the buildings uses local features such as massing, materiality and details to connect to the local architecture, which will be explained in more detail in this chapter. The local materials also contribute to the technical aspects since they are used in their full potential. The design also had to be adapted to the technical ambition of building accoring to the passive standard.

Library (1800 m2)
Book lend area
Study rooms
Reading rooms

+



Trainstation (200 m2)
Waiting areas
Platforms

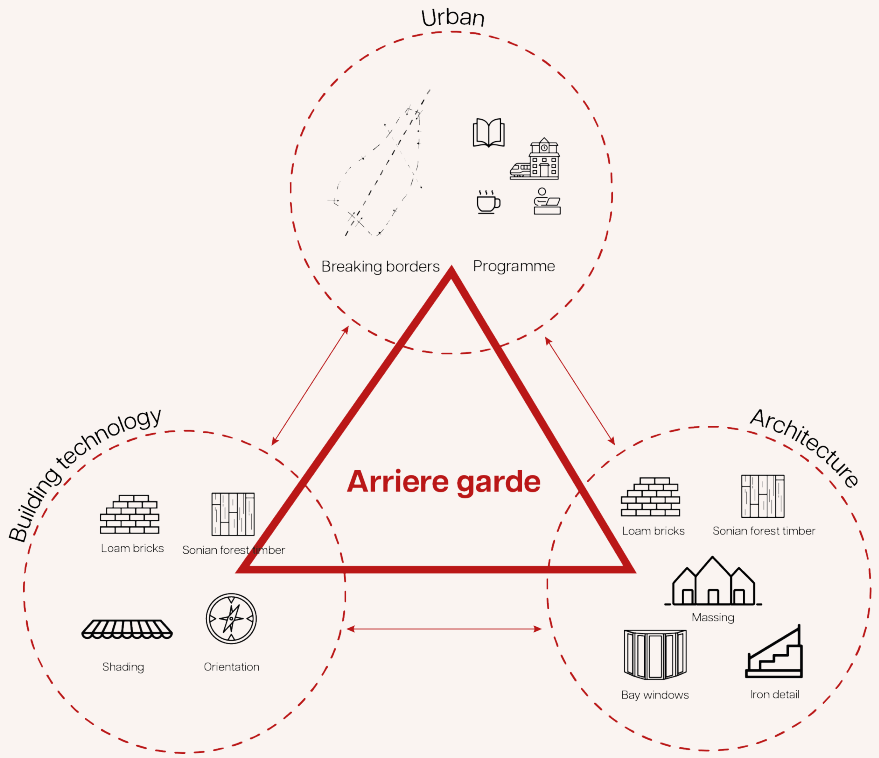
+

Co-working (400 m2)

+

Bakery/coffee bar (500 m2)

Programme overview

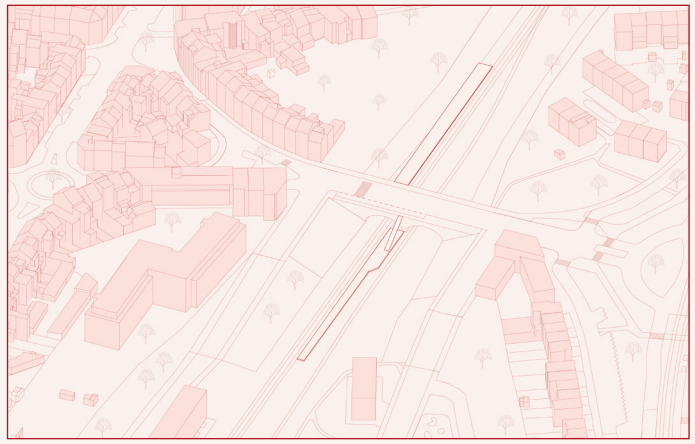


Design summary

Concept

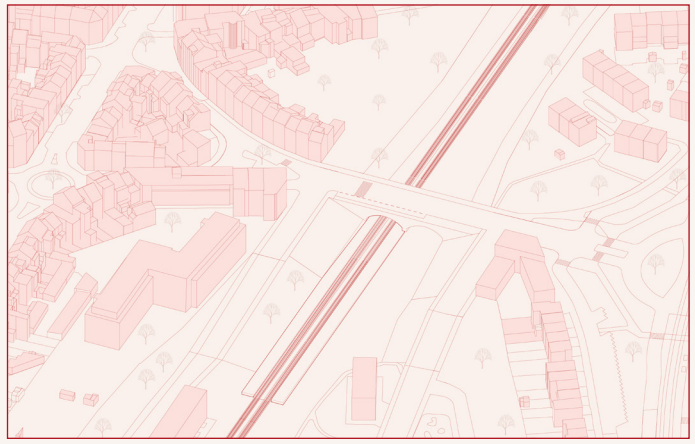
1. Current situation

In the image on the right it is visible that the train station is currently divided into two areas. One is North of the bridge, and the other South. The bridge acts as a divider. There is also a seven meter height difference between the train station's platforms and the upper road and buildings.



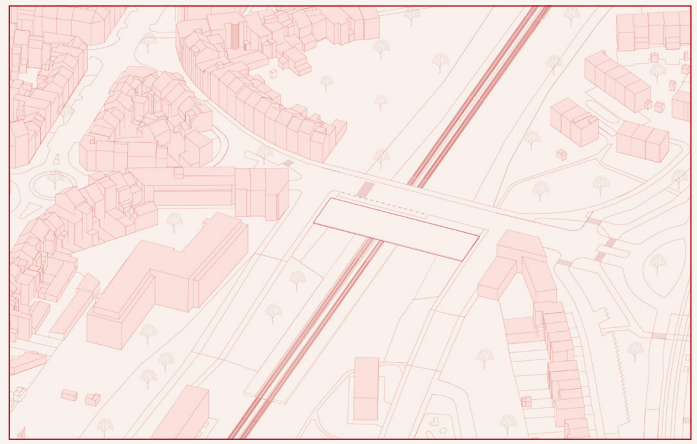
2. New situation

For the building to work, all the platforms are moved to the South side of the bridge so that the platforms are closer to each other and it is thus easier to connect the building with the platforms. Furthermore, by removing the unused railwaytrack on the right, room for a building volume on the right side of the track arises.



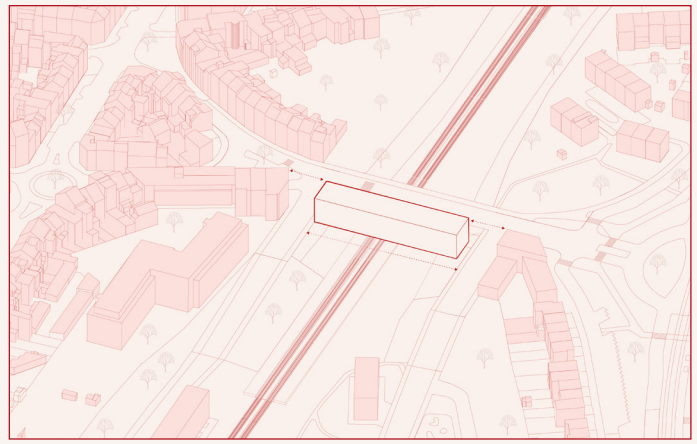
3. Extending bridge

By making a sort of terrace above the platforms, and thus extending the current bridge, room is created for a volume on the road level.



4. Urban morphology

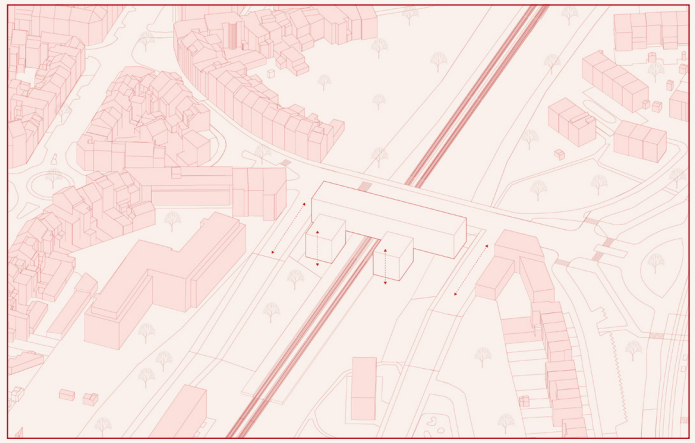
The building is placed in line with the other buildings, that are all clearly defining the street because they are very directly placed onto it. The building will do the same. In this way, the building blend sin with the local context on a morphological scale. Furthermore, the building's height relates to the existing buildings. Furthermore, the building spans the full width between the two entrance roads, connecting to both of them.



Concept

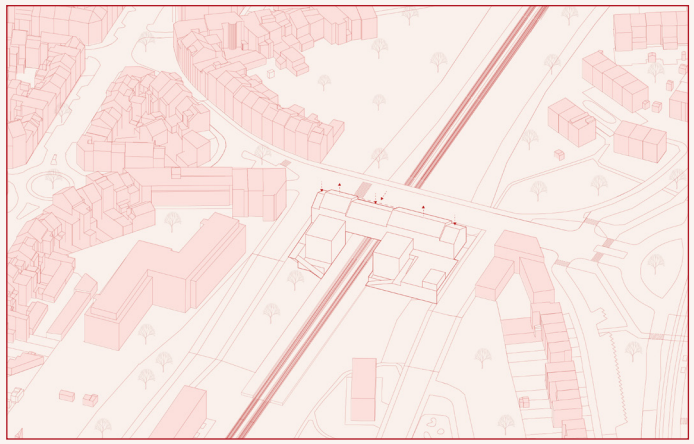
5. Landing in Masterplan

To the rectangular volume, two smaller volumes were added so that the building ‘lands’ in the masterplan. These volumes also act as an connector to the platform level. Hereby, the integration between the upper building and the platform is established.



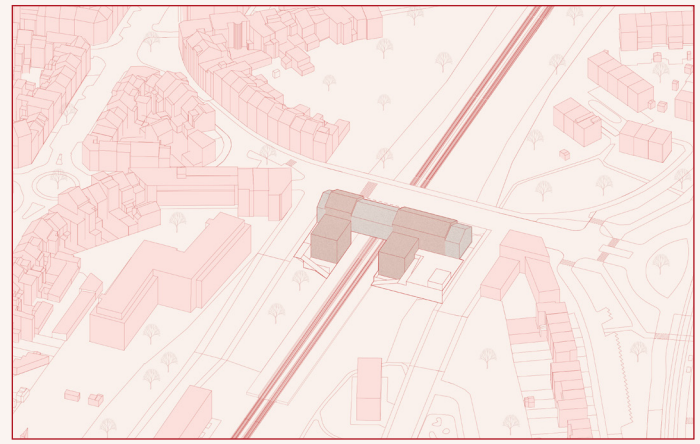
6. Pitched roofs

The shape of the rectangles were changed into multiple pitched roofed volumes, creating a play in height and shape, following the urban masses of the garden city.



7. Materiality

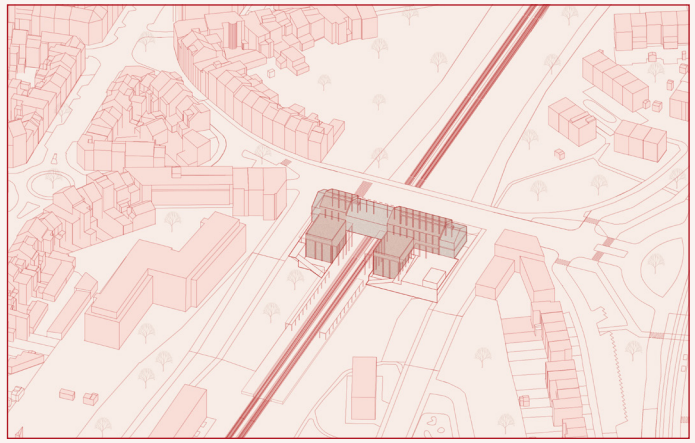
By changing the materials of the volumes, the difference between them is highlighted and the play in heights becomes stronger. The main volumes are made out of brick, connecting to the local context. The volume in between, serving as a new bridge serves as the entrance of the building and is made out of wood. The light wood is here beneficial because of the span that the bridge has to make. This aligns with the principle that was mentioned before, regarding using the materials in their full potential. The two volumes on the far end side serve as highlighters of the entrance roads of the friche and are therefore also made of wood.



Concept

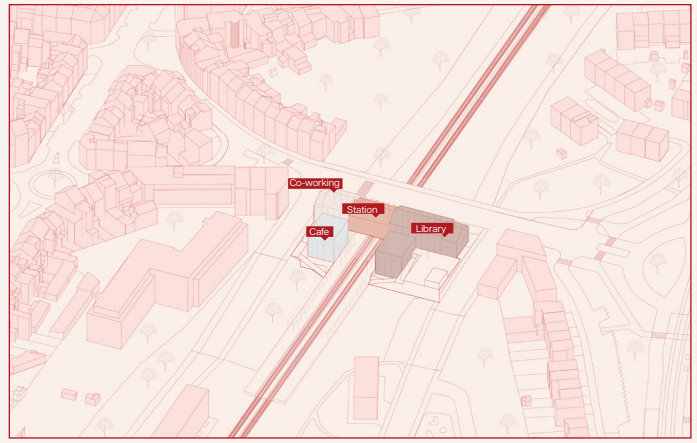
8. Creating unity

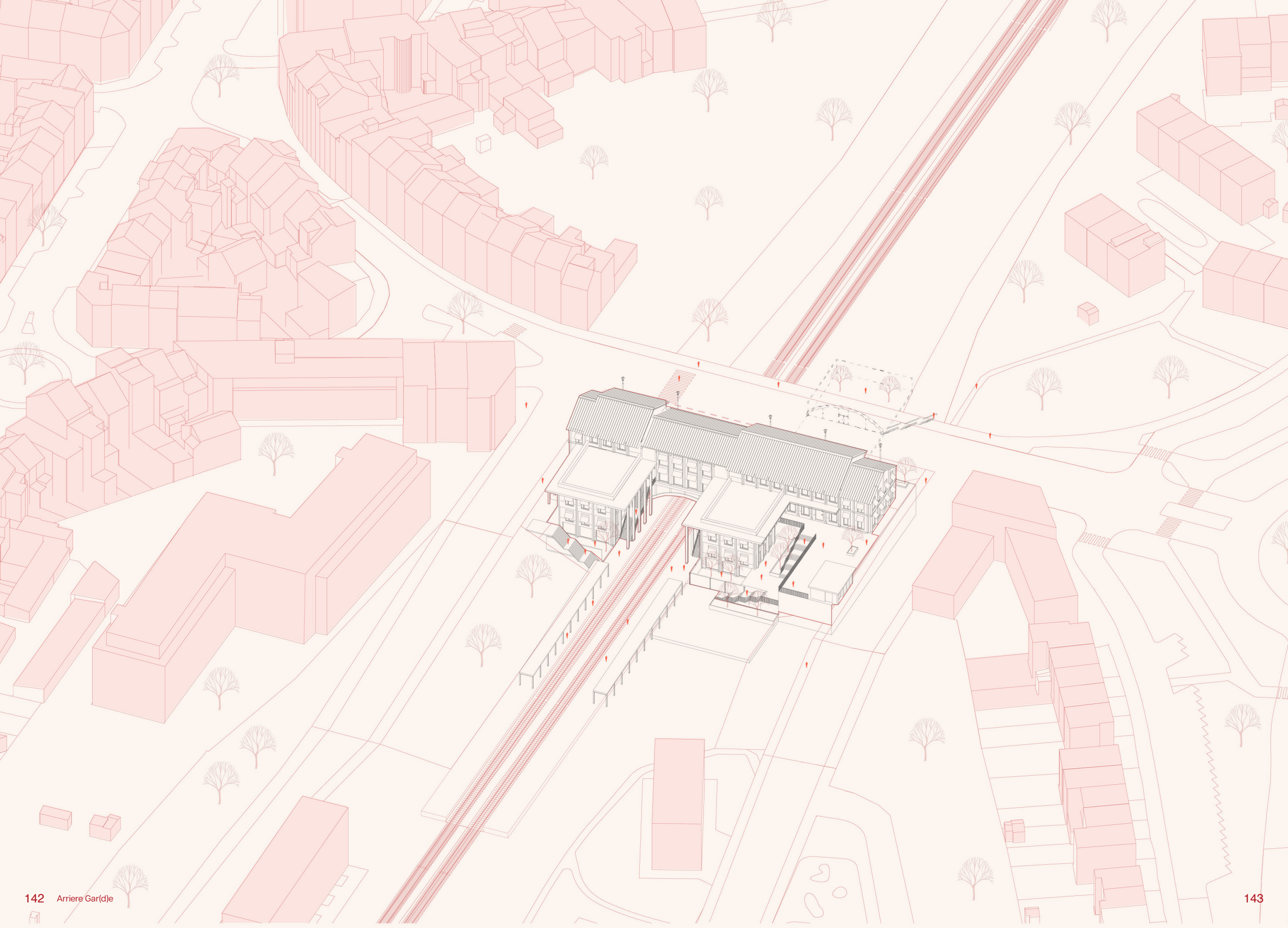
However, this scheme leads to five somewhat separate buildings. Although the play in height and the difference between them should be highlighted, the aim was to design one building. Therefore, a wooden structure that merges out of the wooden volumes and connects them, embraces the brick volumes and ensures an architectural unity.



9. Programme division

Programmatically, the building is divided in roughly following the materiality. The station hall is situated in the middle, serving as a mediation between the two outer volumes, and also as the main entrance of the whole building. On the right, there is a library, which connects to the square and lower platform. The café is located on the left side. Besides a café, coworking spaces, and a waiting room are also on the left side. The co working spaces also have their own entrance in the left wooden volume.





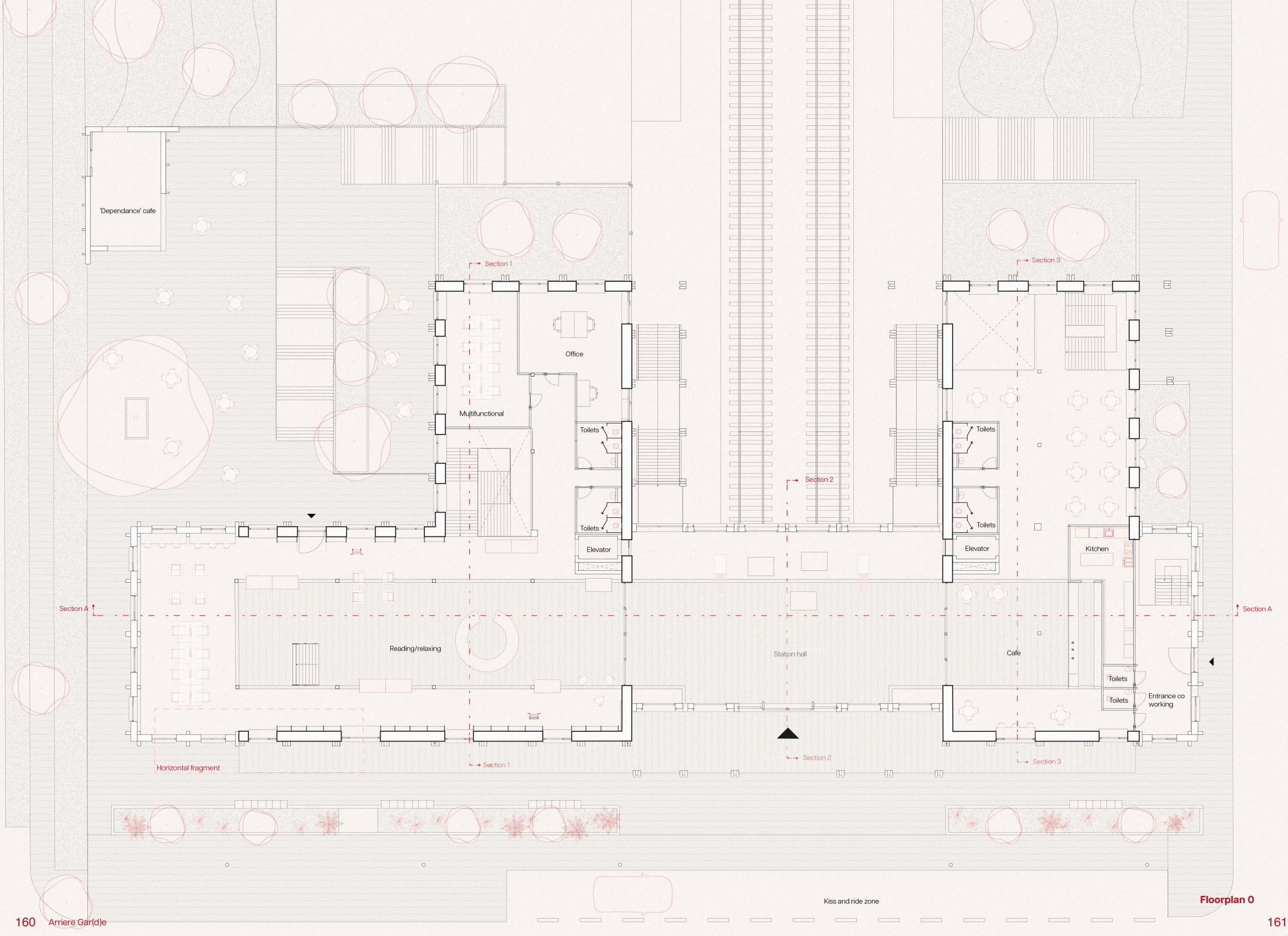
Impression front

Impression front

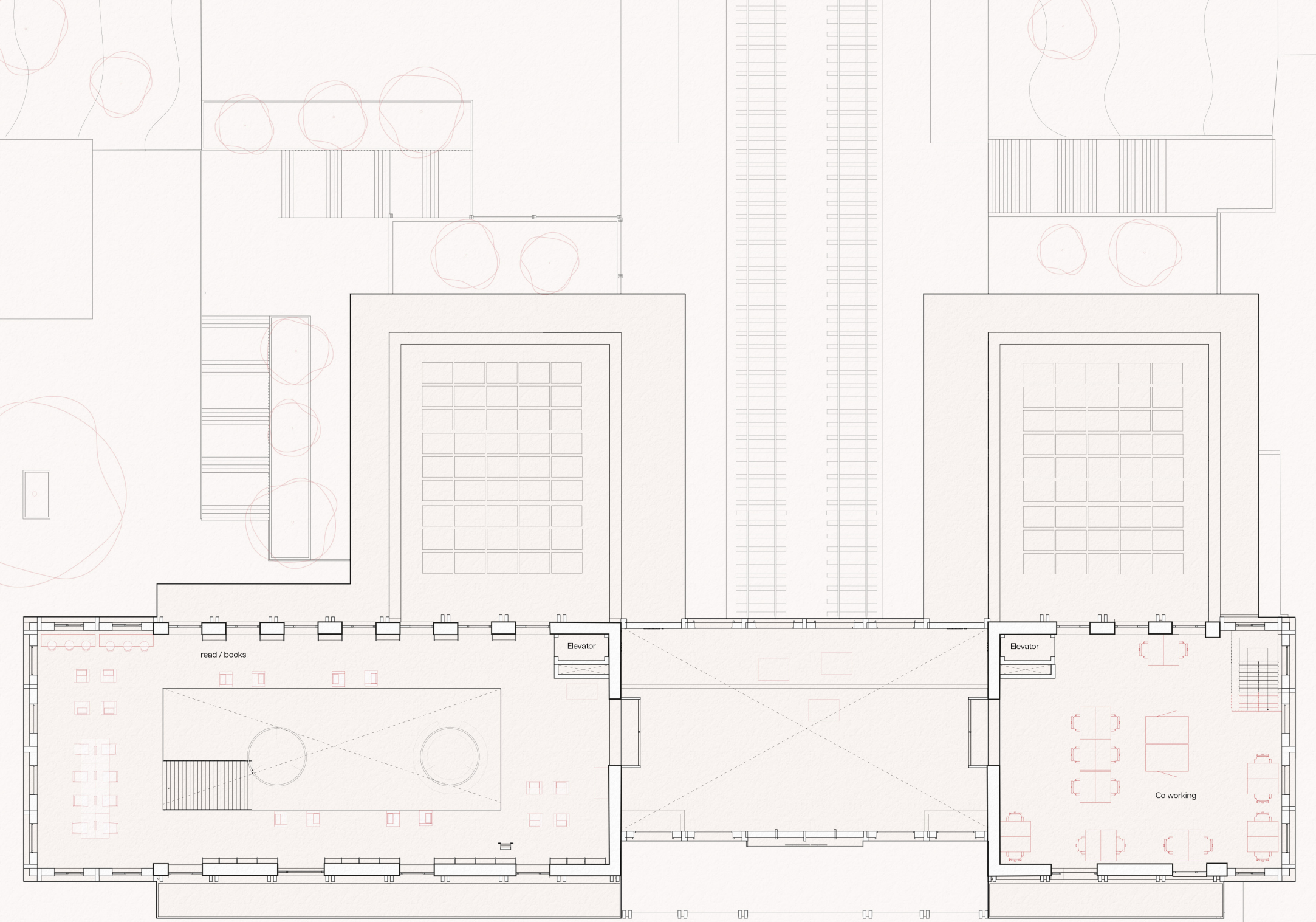
Impression entrance

Impression station hall

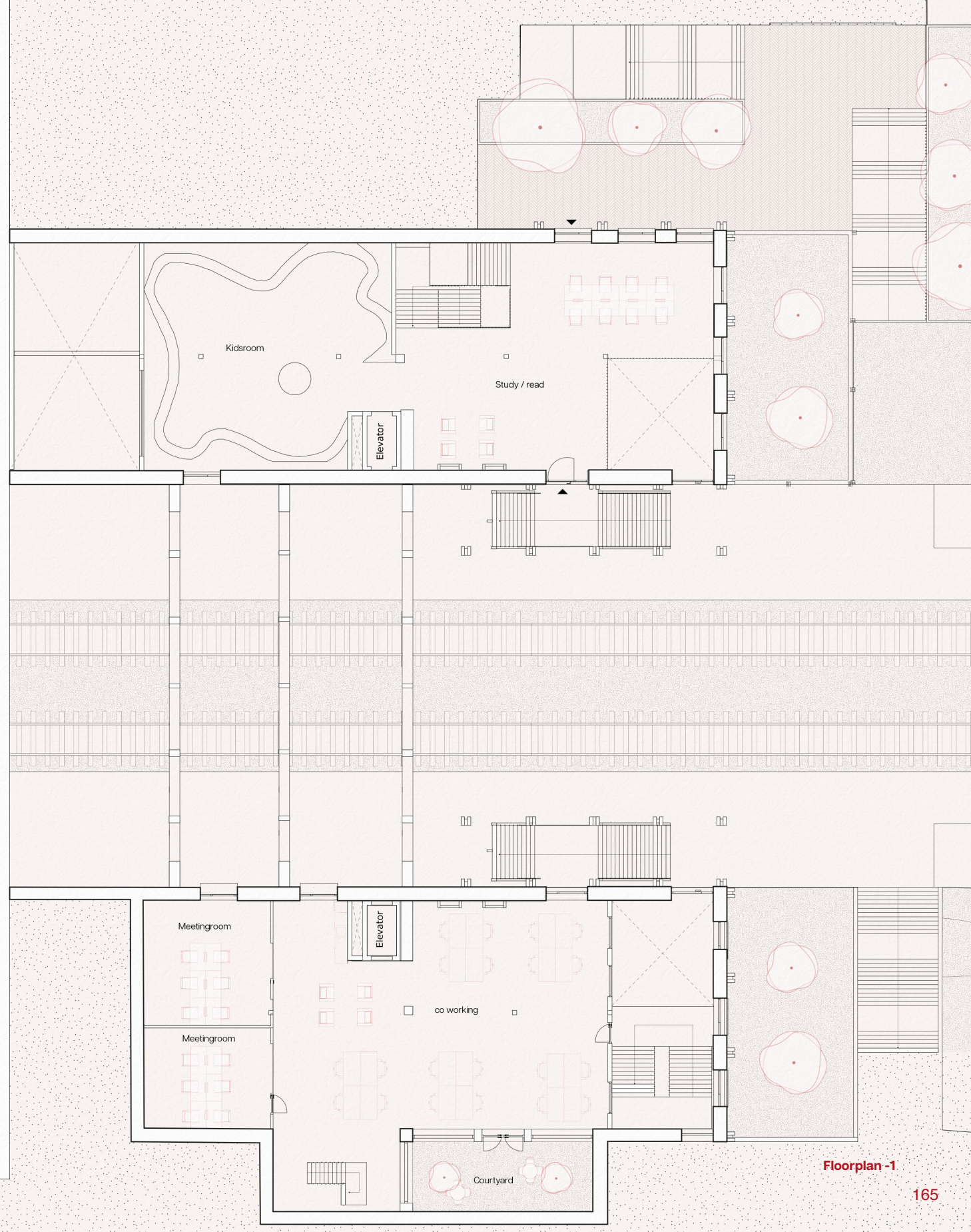

Fiction/fiction
Fiction/fiction
Fiction/fiction


'Dependance' cafe
Section 1
Office
Multifunctional
Toilets
Toilets
Elevator
Section 2
Section 3
Toilets
Toilets
Elevator
Kitchen
Section A
Section A
Reading/relaxing
Station hall
Cafe
Toilets
Toilets
Entrance co working
Horizontal fragment
Section 1
Section 2
Section 3
Kiss and ride zone

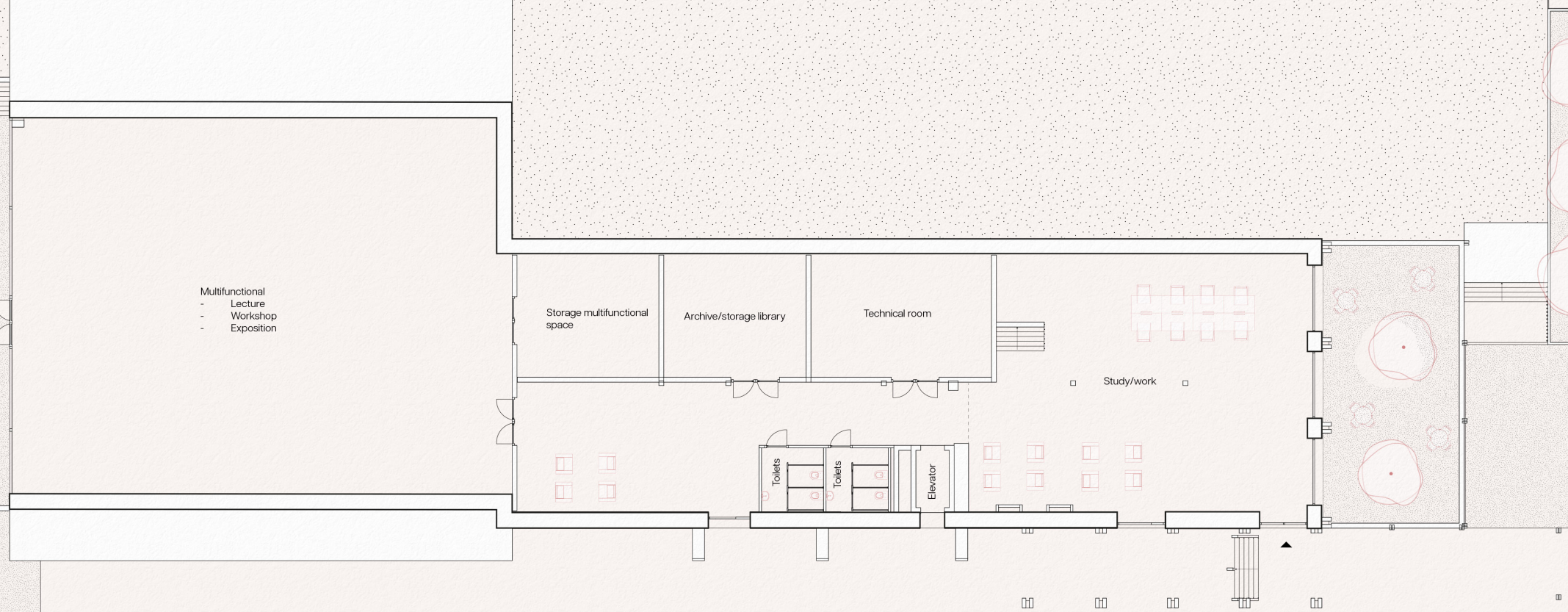
Floorplan 0

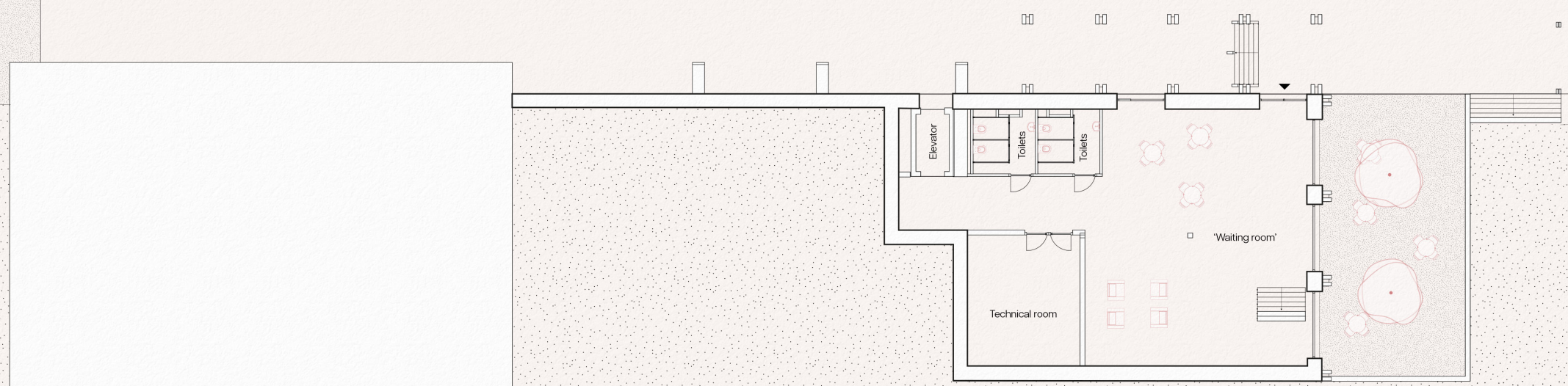


Floorplan 1

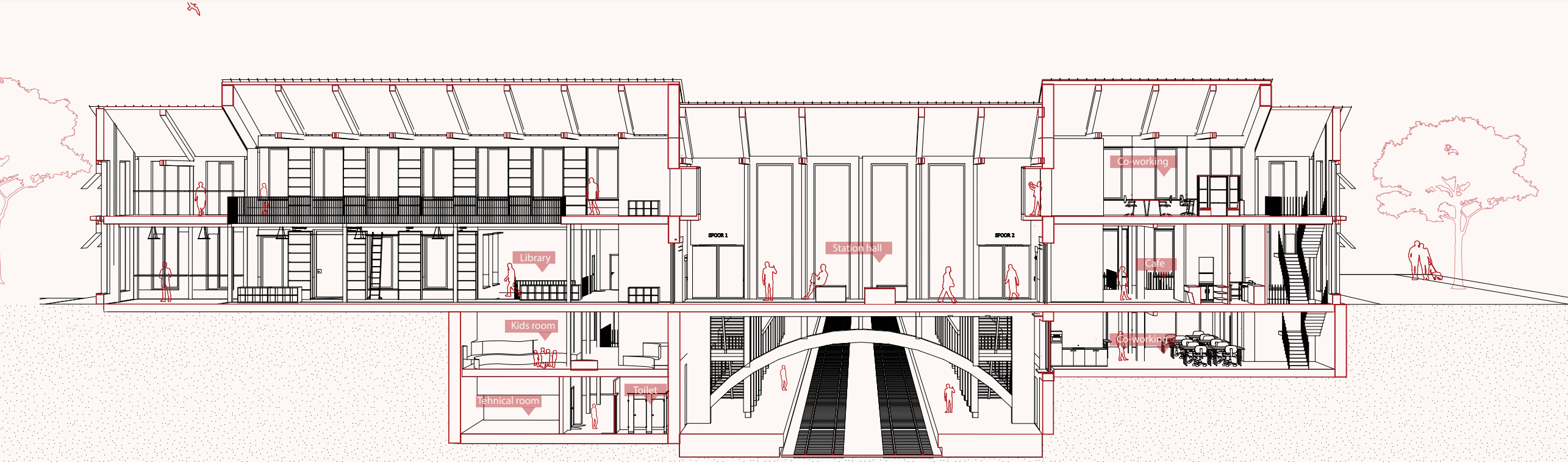

Kidsroom
Study / read
Elevator
Meetingroom
Meetingroom
Elevator
co working
Courtyard

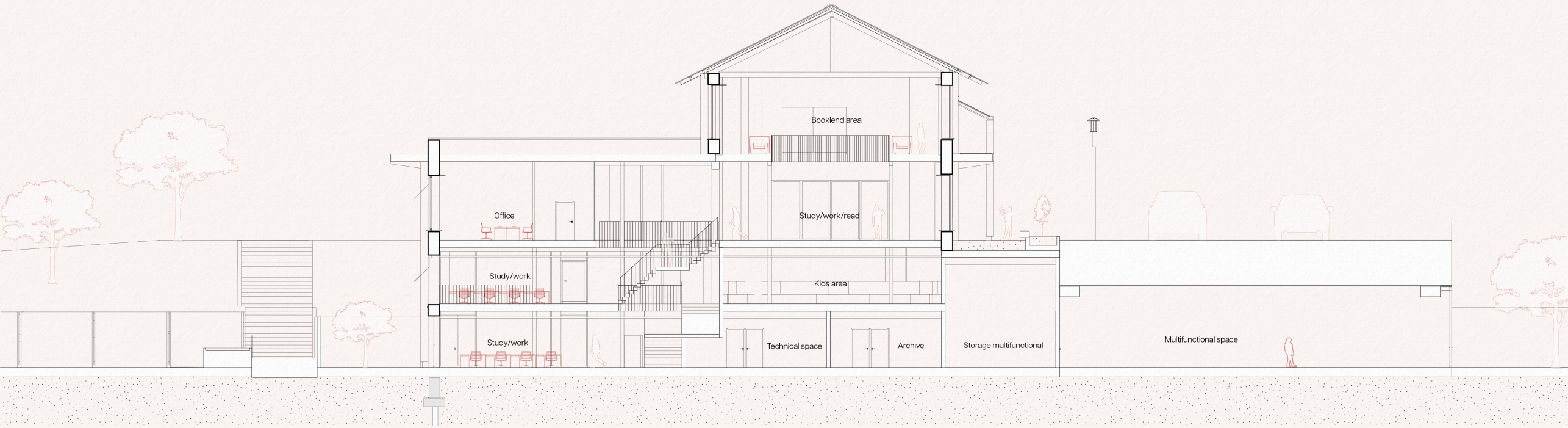
Floorplan -1


Multifunctional
- Lecture
- Workshop
- Exposition
Storage multifunctional space
Archive/storage library
Technical room
Study/work
Toilets
Toilets
Elevator

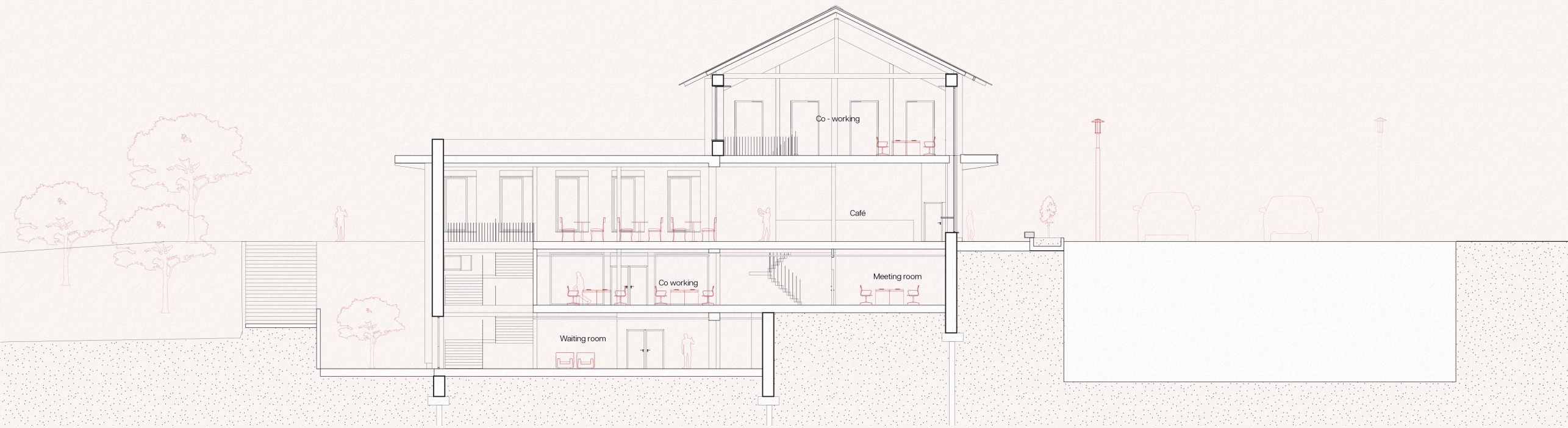

Elevator
Toilets
Toilets
'Waiting room'
Technical room

Floorplan -2


SPOOR 1
SPOOR 2
Library
Station hall
Co-working
Cafe
Kids room
Co-working
Tehnical room
Toilet


Booklend area
Office
Study/work/read
Study/work
Kids area
Study/work
Technical space
Archive
Storage multifunctional
Multifunctional space

Section 2



Section 3

Building Technology 4.2

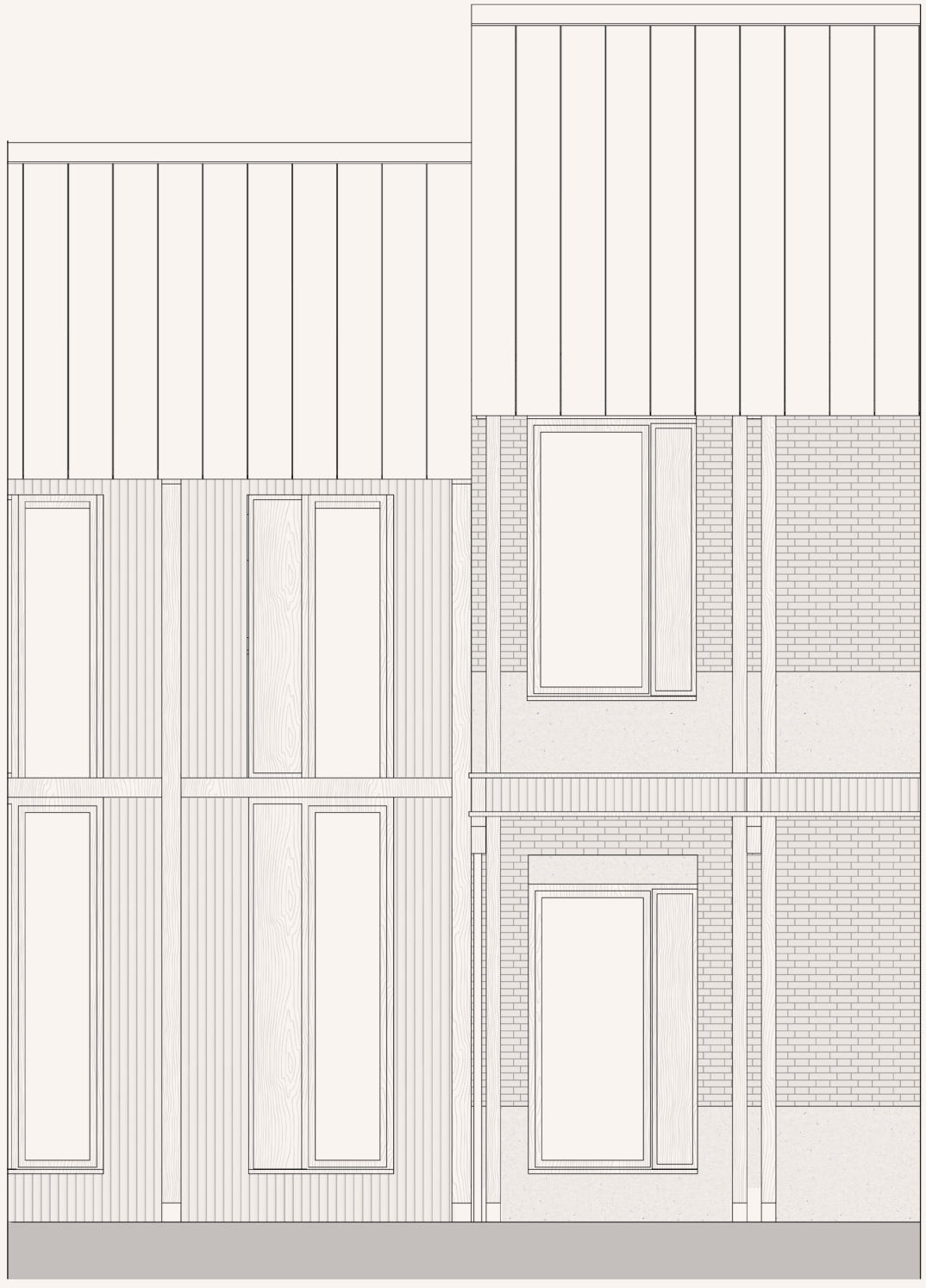
Materiality

The building technology aspect follows the theme of the overall building. During the technical phase it was tried to connect to the context as much as possible. This was already ensured by using the local materials, as mentioned before. Furthermore, by building passively, the buildings orientation and building method had to be adjusted. In this chapter, it is shown how this aim of connecting to the local context was achieved.

Starting with the materiality. The building is made from wood from the Sonian forest and bricks made from excavated earth from construction sites. These bricks are far more sustainable than regular bricks since they are not baked. However, although many positives, the bricks from BC materials cannot withstand direct impact from rainwater. Therefore, the design had to be adjusted to make use of this material.

In the image on the right you see the culmination of this concept. The pitched roof made of seams ensures a canopie above the first floor. A timber canopy does so for the ground floor. This canopy is thus not only an architectural feature but serves a functional purpose as well.

Using the pros of the loam bricks as an advantage in the design and adapting the building on them, is the contemporary vernacular, where the design adapts itself to the principles, creating an unique piece of architecture that is suited to exactly this place. In the following pages, it is described in more detail how this works technically.



Fragment facade

Climate

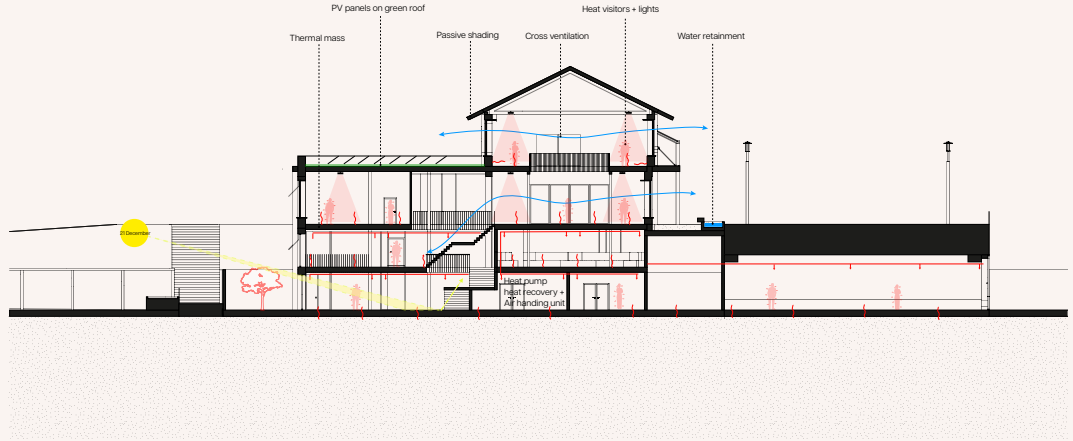
One of the ambitions was to make a passive building. A passive building is a building that is truly energy efficient, comfortable and affordable at the same time. These kinds of buildings can be achieved by several ways, but in this case it was achieved by not using installations of any kind. This suits the ambition of a contemporary vernacular, whereby the design of the building is adapted to the local climate. For this to work, the thermal mass of the building needed to be very high to store the heat or cold in summer or winter. Besides this, the building needed to be airtight so that the heat or cold cannot escape. The building also needed big windows on the South side, drawing in daylight so that in winter the building could be heated via solar heat. However, in summer, the windows needs to be shaded to prevent overheating.

In the schematic sections on the right, it is shown how this is all achieved. In summer, when the temperature rises during the day, the high thermal mass is beneficial for keeping the temperature at a reasonable figure. The green roof ads even more to this. At night, when the temperature decreases, the openable windows open and ventilate the building, cooling down the thermal mass.

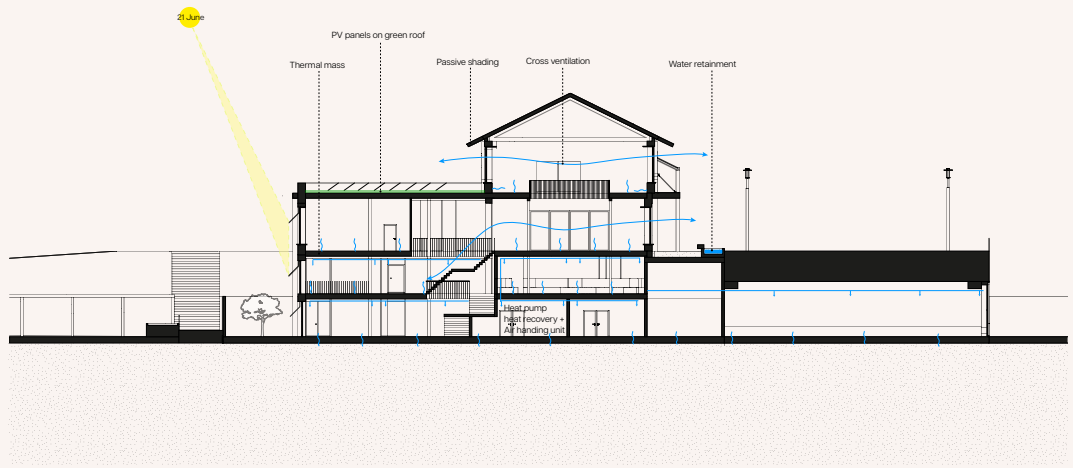
In winter, when the temperature is lower, the heat produced by visitors heats up the building. Furthermore, the warmth created by the lighting and computers inside the library and co working place also contribute to this. In winter days, when the need for artificial lighting rises, the artificial lighting system is put on a bit more so that the temperature rises, serving as a backup system. When the CO2 level rises and the need for ventilation is required, the openable windows open automatically. The natural ventilation is ensured by cross ventilation of two windows directly opposite to each other, creating a small breeze. For a short period the temperature in the building will drop, however, the thermal inertia of the building quickly warms up the building again.

Unfortunately, the part of the building which is built partly underground, could not make use of natural ventilation. However, the high thermal mass of the concrete basement and the stable temperature underground still is beneficial climatic wise. A technical room with an air handling unit, and a heat unit with heat recovery provide the mechanical ventilation that is also used to heat and cool the these parts of the building. It also ensures a stream trough the atriums that help naturally ventilate the upper floors.

If, during the lifetime of the building, the natural ventilation on the ground and first floor proves to be insufficient, installations in shafts next to the elevator, which al already installed, can provide heating and cooling by connecting to the mechanical installations. The floorheight is large enough so that a lowered ceiling to hide the ducts can be installed without problems.



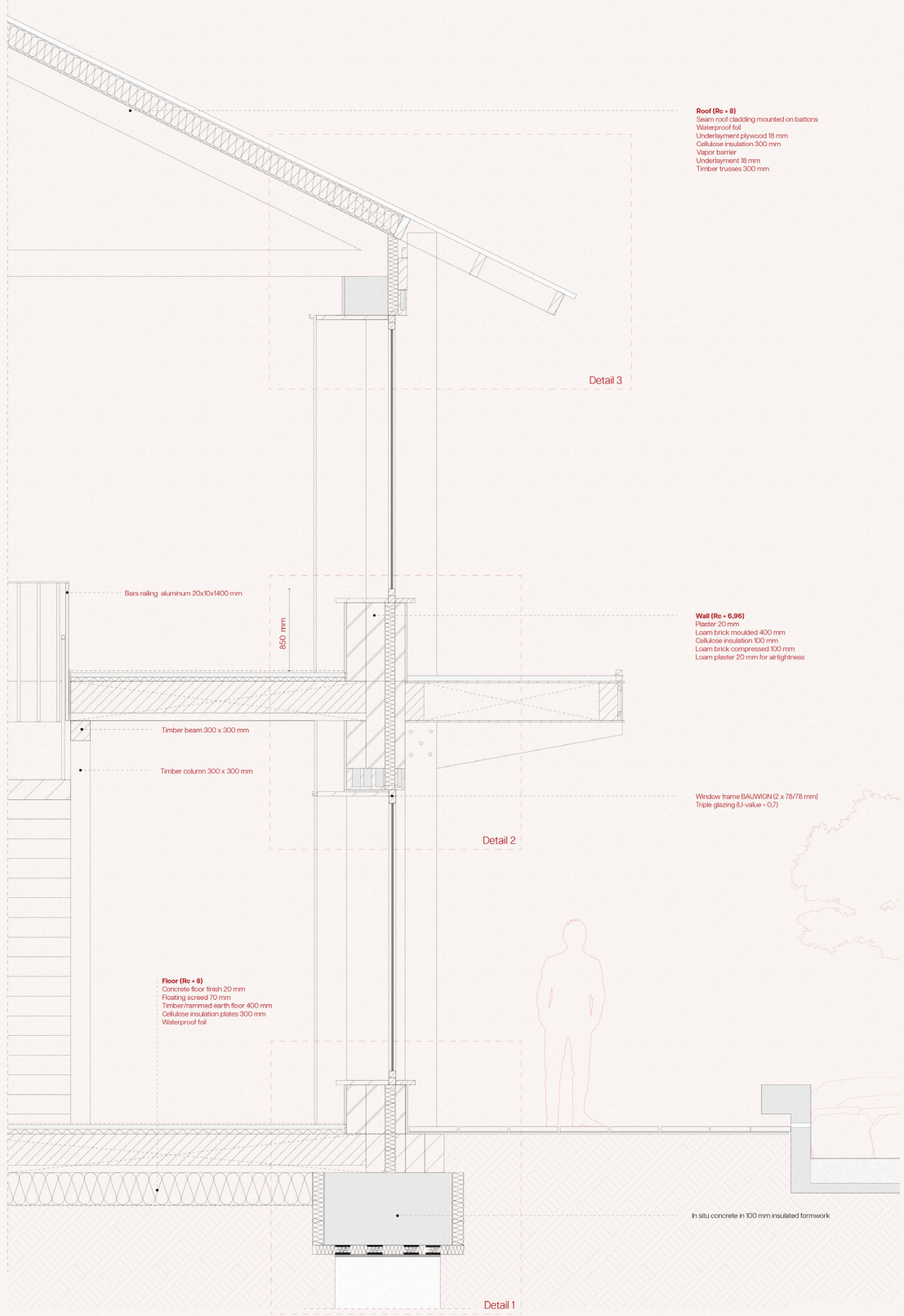
Climate section winter



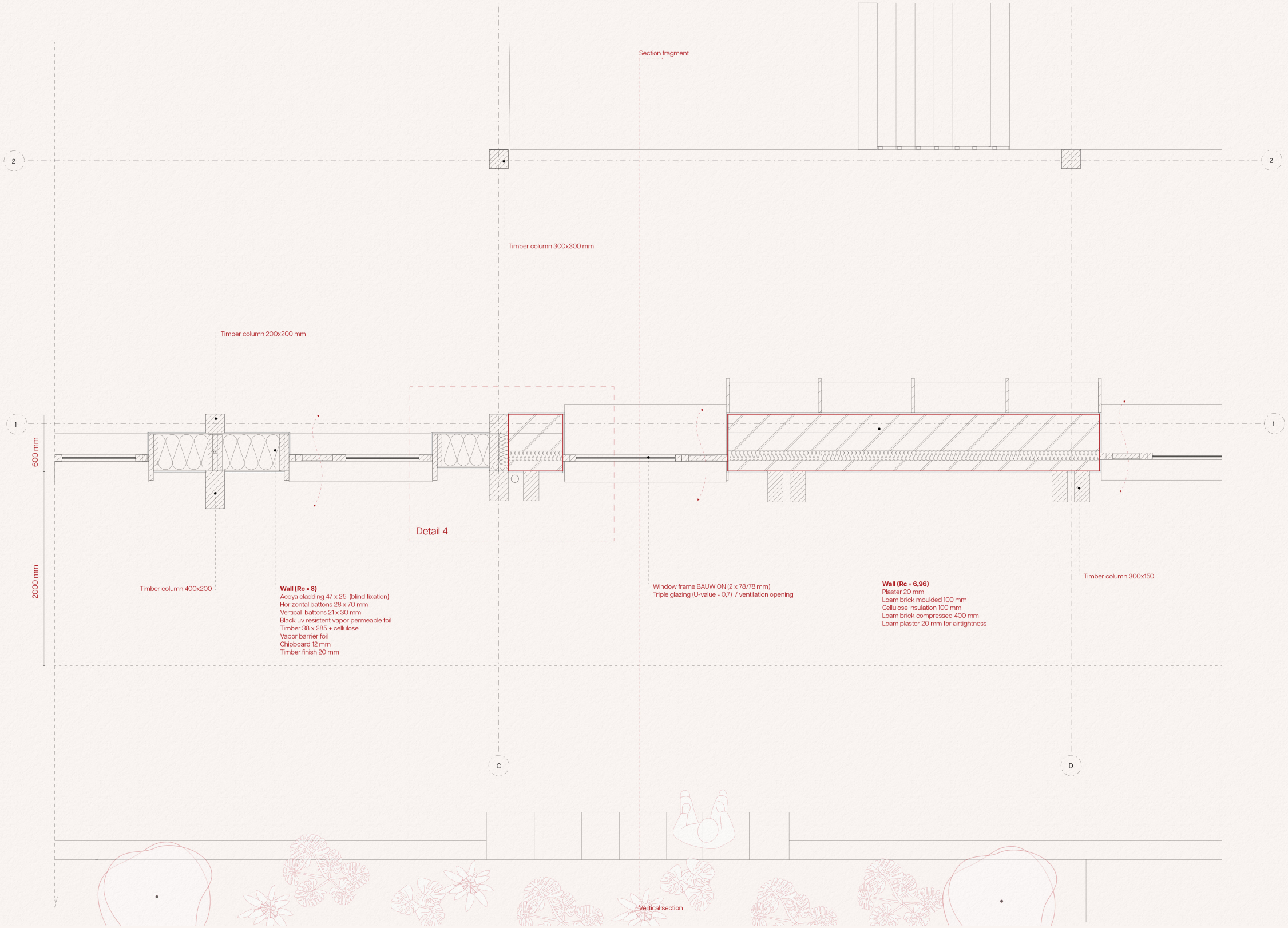
Climate section summer

Fragments 1.33

In this section, an elaboration of the technical aspects is shown. The natural ventilation is ensured by openable panels besides the windows, clearly visible on the façade drawing. The loam bricks are used to create the high thermal mass, using them in their full potential. However, as said before, they cannot withstand rain-water impact. Therefore, The pitched roof overhang ensures the canopy above the first floor. A timber balcony like structure does this for the ground floor. Besides this being needed for the rain protection, the overhangs also prevent heat going in in summer. The overhang is also beneficial for the urban space in front of the building. Travellers are embraced by it and can walk dry towards the entrance of the building. Because the building is placed on a bridge, water retainment is an issue. Therefore, raingardens, separating the trottoir from the busy street in front, create both climatic and urban design benefits.



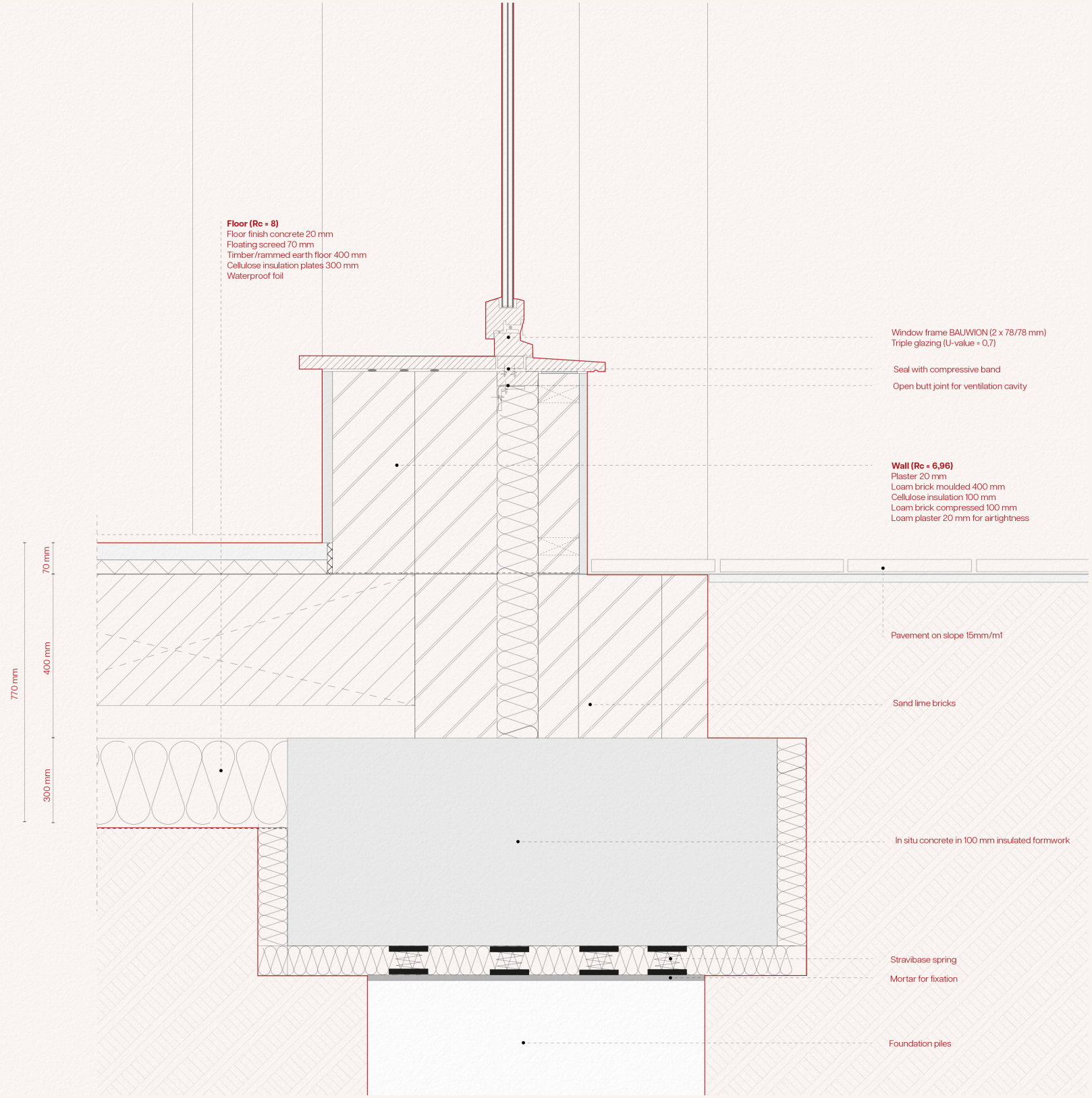
Building technology vertical fragment



Building technology horizontal fragment

Foundation detail

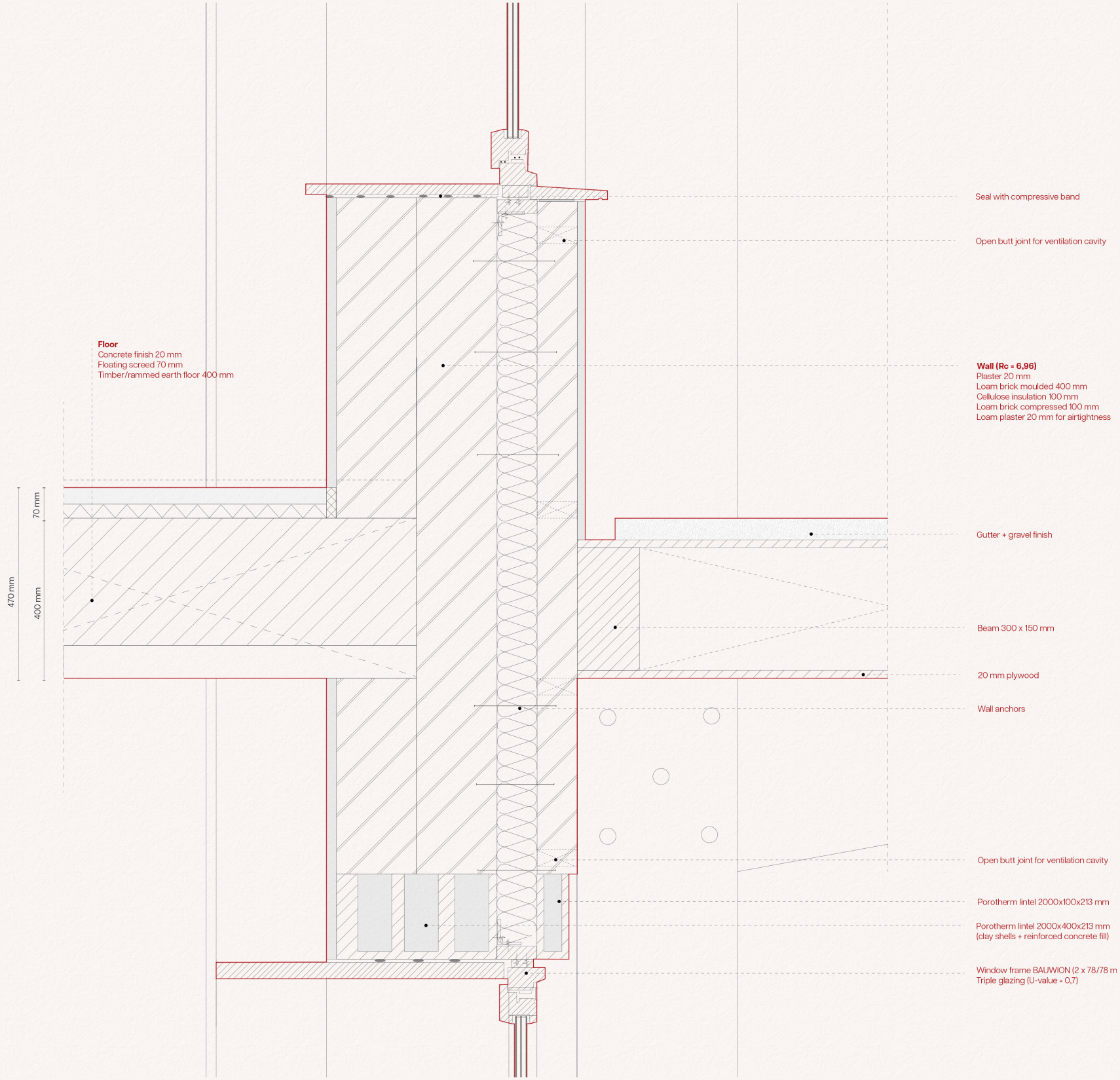
The 1:10 details show even more clearly how this system works. The thick masonry walls, with in between cellulose insulation, provide the thermal mass. The rammed earth/timber floor ensures extra thermal mass. The building is placed on top of springs, reducing the noise from the train station. The inner plaster layer ensures the airtightness, while the low U value windows make sure the heat cannot escape.



Detail 1: Ground floor connection

First floor detail

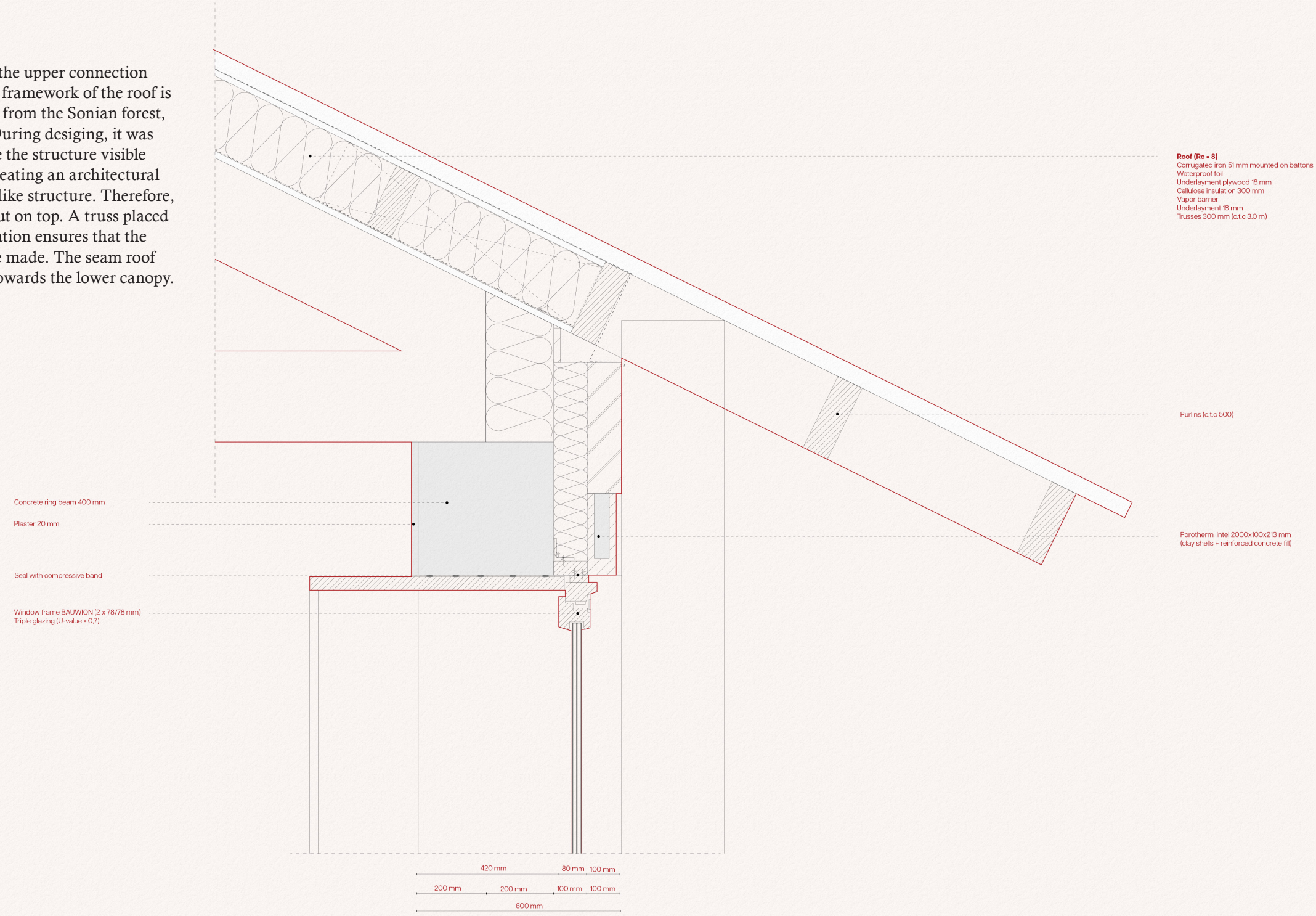
This detail shows the connection on the first floor. It shows in more detail how the wooden canopy is made. Timber fins, attached to the vertical columns, provide structural stability for the timber canopy. The canopy is finished with a timber cladding, while the gravel layer on top ensures that the splashes of water are captured.



Detail 2: First floor connection

Roofcc

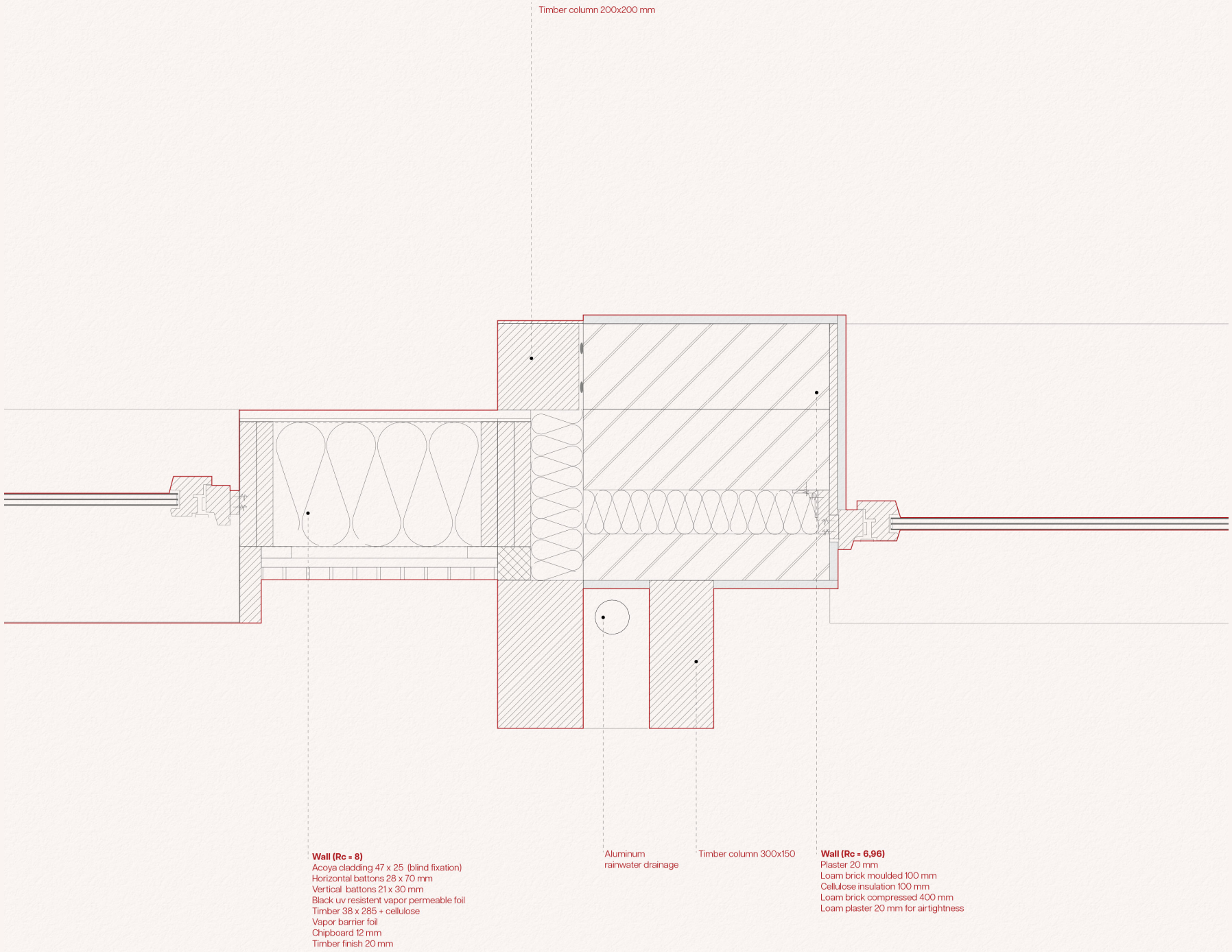
This detail shows the upper connection detail. The timber framework of the roof is made from timber from the Sonian forest, a local material. During desiging, it was important to make the structure visible from the inside, creating an architectural image of the shed like structure. Therefore, the insulation is put on top. A truss placed between the insulation ensures that the canopy can still be made. The seam roof guides the water towards the lower canopy.



Detail 2: Roof connection

Horizontal detail

Because the building is composed out of multiple volumes with different materials, the joint in which these materials come together is important to design. This detail shows exactly that. The columns of the timber parts continue in the same line as the columns in front of the brick. In the interior, there is a small set back in the facade, the timber columns that carry the load of the floor do follow the same line as the brick wall. The rainwater drainige pipe is carefully placed in between the two wooden columns.



Detail 4: Horizontal connection

Model 4.3

Photo front

Photo back

Photo back

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