Retelling Kloos Kinderdijk



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PREFACE

This booklet is an extended outline of my graduation project "Retelling Kloos Kinderdijk." Combining research and design, I am intrigued by how our industrial past can live on in the present day. The desolated industrial area of the former company Kloos Kinderdijk is the location for a transformation project. In the research part of the project, I focused on the tangible and intangible values of industrial manufacturing sites, and how they can be translated into a transformation project of such a site. Along the way, I could implement these findings in the design part of the project. This way, I tried to create a well-reasoned design for the transformation of Kloos Kinderdijk.

The design combines the findings from the research and translates these in the transformation of Kloos Kinderdijk. Going from a vacant site, a combination of residential, commercial and recreational gives the area a new life. The waterfront is opened up to the community of Alblasserdam, strengthening their physical connection to water.

This booklet is divided into three parts, more or less chronologically. Part I is the research paper as an introduction to the topic of industrial heritage and its values. Part II consists of the analyses conducted at the start of the project as well as interesting projects that have helped inspire me along the way. Part III shows the design development from vision to the actual design.

Roxanne De Weerdt

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Part I

Research Paper

TELLING THE STORIES OF INDUSTRIAL HERITAGE SITES

Revealing tangible and intangible values in the transformation of industrial manufacturing sites

After decades of high industrial activity, deindustrialisation in the second half of the 20th century resulted in the vacancy of many industrial sites. In today's post-industrial society, interest in these vacant places as a catalysator for redevelopment offers opportunities to emphasise the industrial nature of these sites. In the case of industrial manufacturing sites, numerous of the characteristics are signified by the production process. This research aims to investigate the tangible and intangible values of industrial manufacturing sites and the way they can be translated into a mixed-use transformation project. A theoretical framework compares two important documents on Industrial Heritage, the Nizhny Tagil Charter and the Dublin Principles, to their implementation on the typology of manufacturing sites, more specifically sites of the heavy manufacturing industry. Following this, a contemporary example of a regeneration project of such a site (Dok Noord, Gent) is investigated by looking at the risks and opportunities of the narrative of the industrial story in the transformation.

INTRODUCTION

The rapid growth of industrialisation characterised the 19th and beginning of the 20th century, whilst the end of the 20th and 21st centuries signify the opposite: deindustrialisation. The industrial society was "a good-producing society where men, materials, and markets were united to produce and distribute goods," Chilingaryan summarises.[1] In today's post-industrial society, we are left with the remains of industrialisation in the shape of Industrial Heritage. The Industrial Heritage includes different industries, from mining to the textile industry, infrastructure to energy and many more.[2] This research focuses on a specific typology of Industrial Heritage rather than on a specific time: namely the manufacturing industry. Manufacturing sites were destined to produce ready-to-use goods. More specifically, this research focuses on the *heavy* manufacturing industry, meaning that it covers the industries where large goods are produced such as trains, cars, large turbines and so on.

Deindustrialisation resulted in the vacancy of numerous industrial buildings.[3] A blessing in disguise, the vacant buildings now offer great opportunities for redevelopment through transformation. Initially, interest in the transformative reuse of industrial sites originated from the spatial opportunity it presented. Now, raised attention to other qualities of the Industrial Heritage offers an additional opportunity to tell the stories of the industrial heritage and its characteristics.[4] These characteristics encompass both the tangible and intangible values of the Industrial Heritage.

Nevertheless, the extent to which the values are communicated depends on the new function of the heritage site. In the case of an industrial museum, both tangible and intangible values can be more clearly conveyed, given that the primary purpose is to narrate and educate about the industrial processes.[5] Conversely, other functions may pose challenges in highlighting these values, as their primary objective is not to spotlight them but rather to establish the essential environment for their use.

This paper investigates how the industrial manufacturing sites can be re-used through transformation while paying attention to the characteristics of the heritage: "In which ways can the values of Industrial Heritage be translated into a transformation of manufacturing sites?" First, the paper goes on to theoretical research defining the tangible and intangible values of Industrial Heritage by comparing the Nizhny Tagil Charter[6] and the Dublin Principles[7] to the characteristics of the typology: "What are the tangible and intangible values of industrial manufacturing sites?" Afterwards, a methodological case study looks at the possibilities of narrating the industrial heritage in the transformation of manufacturing sites into mixed-use developments. This is done by applying a three-layer method on the transformation of Dok Noord in Ghent: 'Locus of Imaginaries' where the objective, the industrial heritage and the actual transformation are put next to each other to find solutions for the storytelling of the values through transformation: "How are manufacturing sites transformed into mixed-use redevelopment projects?"

1 Naira Chilingaryan, "Industrial Heritage: In-between memory and transformation," (PhD thesis, Bauhaus-Universität Weimar, 2014), 12.

2 Michael Falser, "Is Industrial Heritage under-represented on the World Heritage List?" *Global Studies: Industrial Heritage Analysis, World Heritage List and Tentative List, UNESCO World Heritage Centre*, 2001, 13.

3 Benjamin Fragner, "Adaptive Reuse", In *Industrial Heritage Re-Tooled: The TICCIH Guide to Industrial Heritage Conservation*, ed. James Douet (Routledge, 2013), 111.

4 Ivan Nevzgodin, "A Paradigm Shift in the Adaptive Reuse of Dutch Industrial Heritage in the 1990-2010s," In *Distinctive and Attractive Utilization for Conservation of Modern Industrial Heritage*, ed. Hidetoshi Saito and Yasunory Kitao (2016), 41.

5 Octave Debary, "Deindustrialization and Museumification: From Exhibited Memory to Forgotten History," *The Annals of the American Academy of Political and Social Science* 595 (2004): 130.

6 The International Committee for the Conservation of the Industrial Heritage (TICCIH), *The Nizhny Tagil Charter for the Industrial Heritage*, 2003.

7 ICOMOS, *TICCIH Principles for the Conservation of Industrial Heritage Sites, Structures, Areas and Landscapes (The Dublin Principles)*, 2011.

TANGIBLE AND INTANGIBLE VALUES

a. Nizhny Tagil Charter and Dublin Principles

The need for an international framework for the conservation of Industrial Heritage led to the establishment of *the Nizhny Tagil Charter* in 2003 by The International Committee for the Conservation of the Industrial Heritage (TICCIH) and the International Council on Monuments and Sites (ICOMOS), This marked the initial step in preserving Industrial Heritage. In 2011, *the TICCIH Principles for the Conservation of Industrial Heritage Sites, Structures, Areas and Landscapes (Dublin Principles),* drafted by ICOMOS and TICCIH, expanded on the Nizhny Tagil Charter. Both documents give a clear definition of what exactly Industrial Heritage is (Table 1), the Dublin Principles specifically emphasise "intangible dimensions", something that was mentioned less explicitly in the Nizhny Tagil Charter.

Furthermore, both documents identify key values that signify the Industrial Heritage. From the Nizhny Tagil Charter, five main values can be extracted[8]:

1. Universal value: the evidence of activities has a profound historical significance

2. Social value: record of the lives of the men and women of the industrial society

3. Technological and scientific value: shows the history of manufacturing and engineering

4. Aesthetic value: the quality of the architecture, design and planning

5. Rarity value: survival of particular processes adds value and pioneering examples are of importance

Remarkably, the Dublin Principles copies the statement of the Nizhny Charter that "the values are intrinsic to the site itself, its fabric, components, machinery and setting, in the industrial landscape, in written documentation and also in the intangible records of industry contained in human memories and customs."[9]

From both documents, a division between the tangible and intangible values of Industrial Heritage can be made (Tables 2 and 3). Tangible values consist of material assets, moveable or immovable, which were physically present at some point. Intangible values are the elements that characterise the Industrial Heritage, but which cannot be held physically.[10] In the case of manufacturing sites, an important characteristic is the production process.[11] The tangible and intangible values of these sites also signify this.

8 TICCIH, 2.

9 TICCIH, 2; ICOMOS, 3.

10 Cansin Caner Keskin, "Evaluating the Industrial Heritage," *The Institute of Social Sciences at Istanbul Bilgy University*, 2016, 3.

11 Gustav Rossnes, "Process Recording," In *Industrial Heritage Re-Tooled: The TICCIH Guide to Industrial Heritage Conservation*, ed. James Douet (Routledge, 2013), 65.

Table 1 Definitions of Industrial Heritage as mentioned in the Nizhny Tagil Charter and the Dublin Principles

Nizhny Tagil Charter (2003)	Industrial Heritage consists of the remains of industrial culture which are of historical, technological, social, architectural or scientific value. These remains consist of buildings, machinery, workshops, mills and factories, mines and sites for processing and refining, warehouses and stores, places where energy is generated, transmitted and used, transport and all its infrastructure, as well as places used for social activity related to industry such as housing, religious worship and education.
The Dublin Principles (2011)	Industrial Heritage consists of the sites, structures, complexes, areas and landscapes as well as the related machinery, objects or documents that provide evidence of past or ongoing industrial processes of production, the extraction of raw materials, their transformation into goods, and the related energy and transport infrastructures. Industrial heritage reflects the profound connection between the cultural and natural environment, as industrial processes – whether ancient or modern – depend on natural sources of raw materials, energy and transportation networks to produce and distribute products to broader markets. It includes both material assets – immovable and movable –, and intangible dimensions such as technical know-how, the organisation of work and workers, and the complex social and cultural legacy that shaped the life of communities and brought major organizational changes to entire societies and the world in general.

Table 2 Tangible and intangible values as mentioned in the Nizhny Tagil Charter (2003)

Tangible values	Intangible values
Fabric	Human memories and customs
Components	Record of the lives of ordinary men and women
Machinery	
Setting	
Written documentation	

Table 3 Tangible and intangible values as mentioned in the Dublin Principles (2011)

Tangible values	Intangible values
Material fabric	Memories, arts and customs
Components	Technical know-how
Machinery	Organisation of work and workers
Setting	Social and cultural legacy
Written documentation	

TANGIBLE AND INTANGIBLE VALUES

b. Tangible and intangible values of industrial manufacturing sites

Combining both documents, a revised version can be made. In addition to the defined values by the documents, two more aspects should be addressed in the case of industrial manufacturing sites. A specific tangible value for manufacturing sites is the goods they create; this is an important material legacy they leave behind as it is a direct result of the activities on site. In reference to this, productivity needs to be added to the column of intangible values. The production process is an essential characteristic of manufacturing sites and this is reflected in many ways but the busy atmosphere that it created is reflected in productivity. Table 4 shows the division of values applied to manufacturing sites. Some values can have a specific interpretation for manufacturing sites, others are similar to the other typologies of industries.

Being a former ship-constructing company, the factory halls of the Rotterdamse Droogdok Maatschappij (RDM) had to be of significant size to fit the components of the ships (Fig. 1). The solution for this heavy labour is a strong steel structure that covers the large spans and carries the machinery used for assembly. The material fabric of the manufacturing sites resembles the intensity in characterising high halls which were made possible by the structural innovations of large metal constructions. Large windows and skylights are recurring features in the manufacturing halls to ensure sufficient daylight.[12]

The interdependence among all components within manufacturing sites is integral to their coherent functioning.[13] Moreover, the evolution of these components is linked to technical developments, with new production processes often leading to extensions. The cohesion of these components is significantly influenced by the production process, often showing in clear zoning of input and output on-site.[14] This is visible on the schematic floorplan of the former site of Ateliers de Constructions Électriques de Charleroi (ACEC) in Ghent (Fig. 2).

An important feature of the heavy manufacturing industry is all the machinery that was necessary in the process. Sadly, it is often removed when the companies are closed, making original machinery rare. Despite this, the machinery plays a significant role in telling the production process's story. Characterising in the manufacturing halls are the large cranes spanning from one side to another that can move through the hall to carry heavy loads. In the case of the Atelier de Préfabrication n° 2 (Halle AP2) in Dunkerque, a newer version of the crane is still used to carry heavy loads such as large artworks for the new museum FRAC Dunkerque that is now located at the site (Fig. 3). [15]

The tangible value of the setting focuses on the surroundings and location of the site. A good example is the former site of ACEC which is now transformed into a mixed-use location with working, living and recreation purposes: Dok Noord. At the border of the site, next to the water, an old blue crane has been transformed into an office (Fig. 4). The crane is part of a whole entity of cranes around the waterfront.[16] Furthermore, a recurring characteristic of manufacturing sites that can be recognised is the proximity to transportation routes such as waterways, railroads or highways. Additionally, the sites are either situated close to a city centre, in the case of early development around the turn of the 19th century or the opposite, further away from the city centres in the 20th century.[17]

From 1875 to 1982, the s.a. de Construction et des Ateliers in Willebroek, also called 'den Ijzeren', constructed large metal constructions. Unfortunately, all the former company locations have been dismantled over time, leaving no physical evidence in Willebroek of den Ijzeren.[18] However, through extensive documentation, including archival pictures and postcards, the legacy of the manufacturing site can live

Table 4 Tangible and intangible values of industrial manufacturing sites

Tangible values	Intangible values
Material fabric	Memories and stories
Components	Working class society
Machinery	Human skill and knowledge
Setting	Organisation of labour
Written documentation	
+	+
Created goods	*Productivity*

12 Manuela Grecchi, "Industrial Heritage: Sustainable Adaptive Reuse," In *Building Renovation: How to Retrofit and Reuse Existing Buildings to Save Energy and Respond to New Needs*, (SpringerBriefs in Applied Sciences and Technology, 2022), 55.

13 ICOMOS, 3.

14 Rossness, 65.

15 FRAC Grand Large – Hauts-de-France, "Architecture," n.d., https://www.fracgrandlarge-hdf.fr/en/architecture/

16 See Appendix 1

17 G. M. Isenia, "Adaptive reuse of Industrial Heritage: empirical building and location factors," (Master Thesis, Eindhoven University of Technology, 2022), 17-18.

Fig.1.1 Condensor in the boilerroom of the Rotterdamse Droogdok Maatschappij (source: Stadsarchief Rotterdam)



Fig.1.2 Schematic floorplan of the ACEC site around 1922 (source: Vlaamse Vereniging voor Industriële Archeologie vzw)

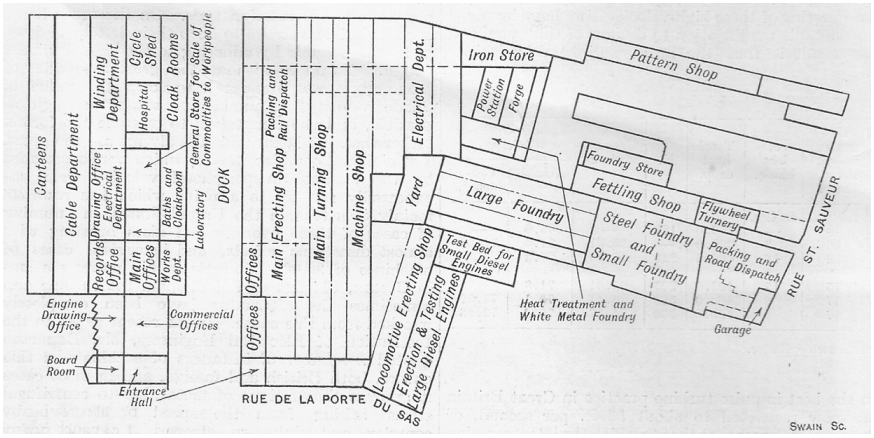


Fig.1.3 New version of a crane in the transformed Halle AP2 in the design by Lacaton & Vassal (source: ArchDaily)



on. The documentation preserves both the material fabric, which can take on new life through plans and pictures, and the social life surrounding the company, capturing it in time.[19]

Outside of Willebroek, den Ijzeren leaves its traces in the form of their created goods all around the world. Other than the famous Laeken Greenhouses, den Ijzeren also produced the signature bridge Ponte Dom Luis I in Porto which is remembered through a memorial plaque(Fig. 5).[20]

The memories and stories of the workers and their families are an important element of the heritage of manufacturing sites. These can be positive and negative. A memory of a strong sense of community or a bad story about an accident on the field are both important.[21]

Industrialisation had a significant role in society itself, it created new social groups: the industrial bourgeoisie and the industrial proletariat.[22] When Gebrüder Sulzer and the Scheizerische Lokomotiv- und Maschinenfabrik (SLM) founded their companies in respectively 1834 and 1871, the society of Winterthur (Switzerland) changed drastically, it became strongly influenced by industrial activity. For example, the cafés and restaurants did not offer any alcohol after 11 pm to prevent people from going to work in the factory while drunk.[23]

Industrialisation was only possible because of the technical knowledge that kept evolving. Learning schools at the manufacturing site contributed to transferring craftsmanship and know-how. A constant need for evolution in production processes and techniques made the industry an everchanging business.

Designed by Peter Behrens (1868-1940) as an industrial temple for the Allgemeine Elektricitäts-Gesellschaft (AEG), the Turbine Factory in Berlin still has its current use and has never stopped producing gas turbines. Nowadays the technology has been adapted but the factory has remained productive. Sites that are still in use have a big advantage in preserving their productivity, which is at the base of the manufacturing process.[24]

Manufacturing companies exhibit a profound organisational structure, evident in the hierarchic division between management and labour. This is reflected in the layout and architecture of the buildings, with higher-ranking functions enjoying better-quality work environments. Furthermore, a common pattern in the organisational structure is the merging and acquisition of industrial companies. The ACEC site in Ghent started as Carels n.v. founded by Charles Louis Carels in 1839. In 1921, a merger with Société d'Electricité et de Mécanique (SEM) led to the first large administrative change. Followed by fusions with Anciens Ateliers Van De Kerckhove and ACEC, in 1934.[25]

The mentioned tangible and intangible values are often intertwined. Productivity is visible in the type of material fabric or machinery. The hierarchic organisation of labour and the working class are closely knit together. It is thus more a way of emphasizing specific values for a manufacturing site, not all the values are always applicable or evenly important for an individual case. Nevertheless, it is the dynamic balance between the tangible and intangible values that give the manufacturing site its character and heritage status.[26] Important when working with the heritage is attention for the need to sterilize the past, the negative interpretation of the values is often not shown. Nevertheless, it is an important element of the whole.[27]

18 Willebroek Info, "den Ijzeren", 21 October, https://www.willebroek.info/HANDEL/STRATEN/WILODSTA/WILODSTA_013_YZR.htm#NieuweAteliers

19 Belem Oviedo Gámez, "Industrial archives and company records," In *Industrial Heritage Re-Tooled: The TICCIH Guide to Industrial Heritage Conservation*, ed. James Douet (Routledge, 2013), 72.

20 Willebroek Info, "den Ijzeren."

21 Neil Cossons, "Why Preserve the Industrial Heritage?," In *Industrial Heritage Re-Tooled: The TICCIH Guide to Industrial Heritage Conservation*, ed. James Douet (Routledge, 2013),9.

22 Helmuth Albrecht, "What does the Industrial Revolution signify?" In *Industrial Heritage Re-Tooled: The TICCIH Guide to Industrial Heritage Conservation*, ed. James Douet (Routledge, 2013), 18.

23 Andreas Hofer, "The Sulzer/SLM Site in Winterthur, Switzerland: From Factory to the New Town – The Reinvention of the City," In *Industrial Heritage Sites in Transformation: Clash of Discourses*, ed. Harald A. Mieg and Heike Oevermann (Taylor & Francis Group, 2014), 83.

24 Paul Hardin Kapp, "Intangible Industrial Heritage" (US/ICOMOS, 2016), 2.

25 Adriaan Linters, "13 Oktober 2018 bezoek 'Dok Noord'" (Vlaamse Vereniging voor Industriële Archeologie vzw, 2018), 1.

26 Michel Cotte, "World Heritage, concepts and criteria," In *Industrial Heritage Re-Tooled: The TICCIH Guide to Industrial Heritage Conservation*, ed. James Douet (Routledge, 2013), 173.

27 Keskin, 4.

Fig.1.4 Transformed blue crane at the edge of the former ACEC site in Ghent (source: Dok Noord)



Fig.1.5 Memorial plaque for the official opening of the Ponte Dom Luis I in Porto (source: Willebroek Info)



ADAPTIVE REUSE OF INDUSTRIAL MANUFACTURING SITES

The concept of adaptive reuse refers to the change in function of a building to revive its life after the original function became obsolete. For this, interventions in structure, architecture, and performance are needed to make that change possible.[28] The practice itself has been around for ages, it used to be driven by common sense and economic benefit.[29] Multiple societal evolutions have made adaptive reuse of manufacturing a viable solution for the vacancy that occurred after deindustrialisation. Environmentally speaking, the reuse of the existing structures is of significant benefit in lowering the carbon footprint of the design. The embodied energy stays stored in the materials.[30] But, there is also a significant educational benefit in reusing the industrial heritage at hand. The shift from the focus on the spatial possibilities of the manufacturing halls towards the possibility of revealing the tangible and intangible values creates a more grounded design which can additionally be of economic importance. The reasoning behind the adaptive reuse of an industrial manufacturing site could be the regenerative effect it has on the surroundings and society.[31] It gives back a lost identity as the vacant sites are often a place of neglect and unsafety.[32]

There are multiple ways to tackle the transformation of the sites, Benjamin Fragner divides them into two categories.[33] First, intensive interventions, often made by an important name in the architecture world, are a way of drastically transforming the location. This strategy is more doubtful according to heritage specialists as it results in irreversible changes to the fabric. Secondly, a more step-by-step development, where the project grows organically according to the changing needs of the location.

The new function can have a large impact on the level at which the tangible and intangible values can be honoured, it has to be carefully investigated what is suitable for the location depending on its past and the scale of change.[34] A common solution is a transformation into a museum. In this case, it can be more evident to tell the story of the production process by emphasizing the tangible and intangible values. However, museumification of the industrial remains is not the solution for all the vacant sites. A valid opportunity lies in the return of some form of productivity. This strategy is gaining more interest and successful projects have proved that it is a solid way to reveal the production process subtly. The transformation of the RDM site has created a hub for innovation in the former shipyard. It is a place where students can learn about the maritime industry while working in the field. No ships are produced here anymore but the general atmosphere combined with innovation has been given room to evolve again. Other possibilities for new functions are mixed-use transformations. Because of its strong dependency on the individual situation, it is hard to define what exactly a good mix of functions entails for the reuse of manufacturing sites. Many projects such as the redevelopment of Dok Noord in Ghent (the former ACEC site) have managed to successfully combine living, working, culture, and recreation.

28 James Douglas, *Building Adaptation* (Second Edition) (Oxford: Elsevier Ltd., 2006), 14.

29 Fragner, 110.

30 Mark Watson, "Adaptive re-use and embodied energy", In *Industrial Heritage Re-Tooled: The TICCIH Guide to Industrial Heritage Conservation*, ed. James Douet (Routledge, 2013), 136.

31 Kapp, 1.

32 Cossons, 9; Grecchi, 53.

33 Fragner, 113-114.

34 Grecchi, 53.

35 Debary, 130.

FROM CARELS TO DOK NOORD

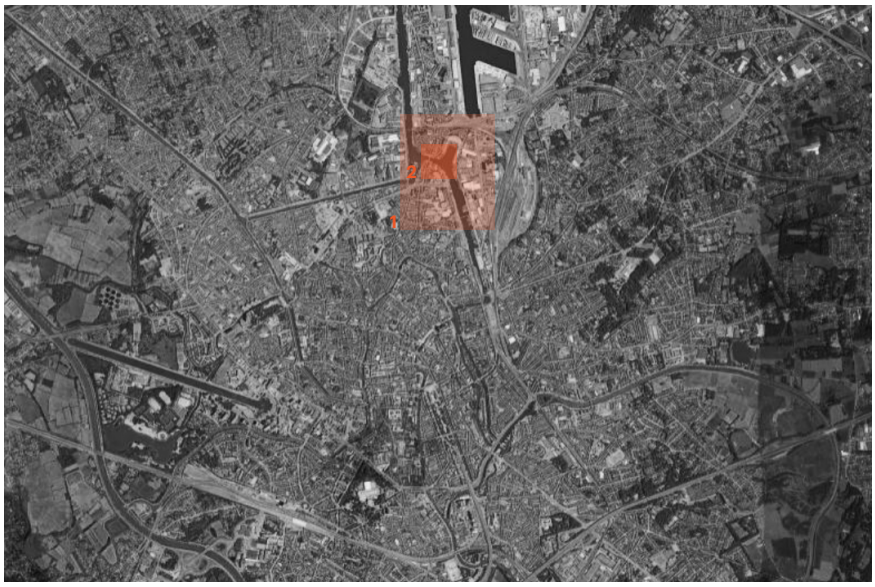
Manufacturing sites are complicated locations that are very different from one another yet very the same. In the previous chapters, some examples of transformed sites have already been mentioned. To define possibilities and risks in the transformation of such sites, a case study of Dok Noord (Ghent) is conducted following a three-layer method. This method focuses on the variety of narratives of a case study, following the concept of 'Locus of Imaginaries' used in the doctoral research of Chilingaryan.[36] The stratification of these narratives in this research is divided into the objective view, the industrial heritage and the actual transformation (Table 5). The first layer investigates the past and the present of the location as a framework for the context. Next, the previously defined values from the theoretical part are applied to the site as a means to determine its characteristics. Lastly, the values from layer 2 are tested on the transformation to distinguish the current industrial experience of the transformed site.

The former workshops of Carels are located in the city of Ghent in Belgium (Figure 6). With its direct position next to the water, the location has a great position for trading. Dok Noord itself is part of the area Oude Dokken where many large companies were situated before industrial activities were moved more outside the city, towards the North where there was a direct connection to the canal Ghent-Terneuzen.

Table. 5 Methodology: "Locus of Imaginaries"

LOCUS OF IMAGINARIES			
layer	theme	objective	data
layer 1	What was there? What is there?	objective view on past and present	plans and images
layer 2	Industrial Heritage perspective	tangible and intangible values	archival images
layer 3	How is it transformed?	current image of the heritage	location visit and sources of involved partners

Fig.1.6 Location Oude Dokken (1) and Dok Noord (2) in Ghent (source background image: Google Maps)



36 Chilingaryan, 55-145

FROM CARELS TO DOK NOORD

a. Layer 1: Past and present

The company Carels has had a rich history (Figure 7). Founded in 1839 by Charles Louis Carels, the company moved from the Tichelrei (in the city centre of Ghent) to Klein Meerhem (only two streets away from its final location) in its first years. Later, in 1861, production was growing and the company moved to the location at Dok Noord.[37] There was already the gas plant "Etablissements du gaz", the sawmill Fiévé and the flax-spinning mill Van Crombrugghe.[38] Carels took over the site of the gas plant as there were great possibilities to expand in the future and the proximity to the water offered many opportunities After Charles Louis' death, the management was taken over by his son, Gustave Carels, and later his grandsons, Georges and Gaston Carels.[39]

Carels was one of the most progressive industrial companies. It has exported its goods all over the world and is known for the production of engines, locomotives and transformers. Thanks to its strong connection with the inventor of diesel, Rudolf Diesel, Carels was the first company to obtain a license for the production of diesel engines.[40] Carels was even one of the initiators of the World Expo 1913 in Ghent.[41] Furthermore, the transmission of knowledge and innovation was the incentive for Gustave Carels to found the Carels School of Metalworking in 1899, one of the first educational institutes where young men were technically educated.[42]

After the First World War, the company lacked knowledge of electric engines as these had become the new future of that time. Georges and Gaston were forced to join forces with Société d'Electricité et de Mécanique (SEM). In 1934, Carels merged with Atelier Van de Kerchove to be acquired by Ateliers de Constructions Électriques de Charleroi (ACEC). ACEC was acquired by Pauwels Trafo in 1986, as the last owner of the site Pauwels Trafo continued producing transformers until 2005.[43]

After definite closure in 2005, the site was regenerated as part of an urban renewal project organised by the municipality of Ghent in 2004.[44] Real estate company Vastgoed Noord bought the entire site and through a step-by-step strategy, the abandoned site has been revitalised into a lively space for interaction at the border of the city of Ghent. Dok Noord functioned as one of the pilot projects to put the regeneration of the area into motion.

37 Bart D'Hondt, *Van Andriesschool tot Zondernaamstraat – Gids door 150 jaar liberaal leven te Gent* (Ghent: Liberaal archief, 2014), 252.

38 Dok Noord, "Het Verleden Beleven | Terug tot 1834," 7 December 2018, https://www.doknoord.be/geschiedenis/het-verleden-beleven/.

39 Gilbert Boerjan, "Zeventig jaar Anglo-Belgian Company-Dieselmotoren te Gent," *Tijdschrift voor Geschiedenis van Techniek en Industriële Cultuur* 5, no. 17 (1987): 41.

40 Boerjan, 41.

41 D'Hondt, 254.

42 D'Hondt, 253.

43 Marieke Gruwez, *Ontwikkeling van een winkelcomplex op de voormalige ACEC-terreinen te Gent* (2010), 91.

44 Stad Gent, "Erfgoed in De Oude Dokken," n.d., https://stad.gent/nl/oude-dokken/genieten-de-oude-dokken/erfgoed-de-oude-dokken.

Fig.1.7 Timeline history Carels - Dok Noord (1839-2016)

Charles Louis Carels founded the company at Tichelrei 2 — **1839**

company moves from Klein Meerhem to Dok Noord — **1861**

founding of the Carels School of metalworking — **1897**

first license for diesel engines — **1900**

fusion with Société d'Electricité et de Mécanique (SEM) — **1921**

fusion with Ateliers Van De Kerckhove — **1934**

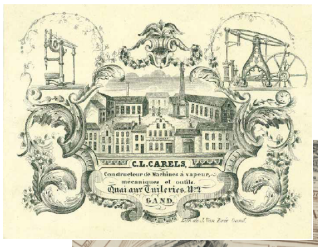
acquisition by Ateliers de Constructions Électriques de Charleroi (ACEC) — **1961**

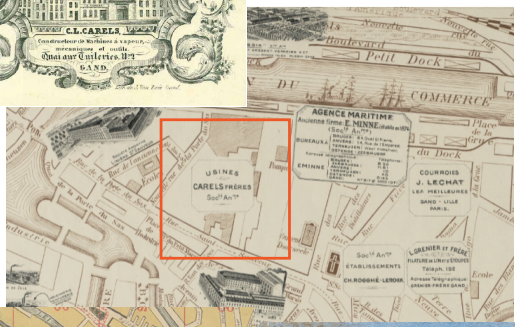
acquisition by Pauwels Trafo — **1986**

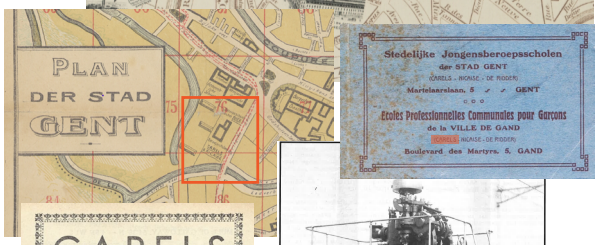
closure of resting activities — **2005**

start redevelopment by Vastgoed Noord — **2010**

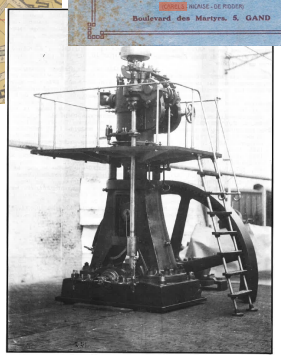
opening Dok Noord — **2016**



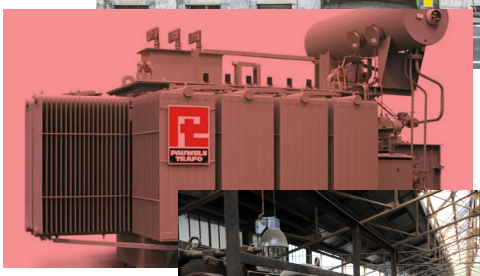




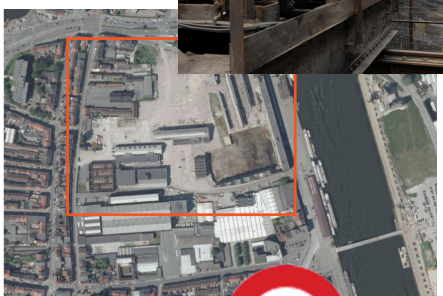




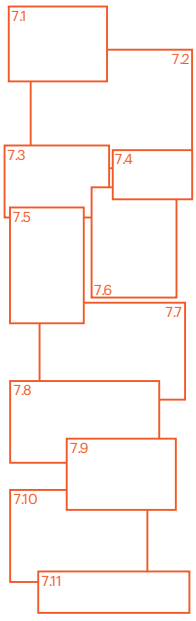








DOK NOORD



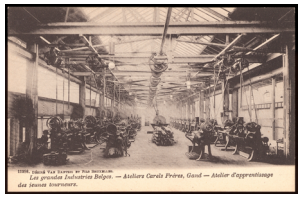
FROM CARELS TO DOK NOORD

b. Layer 2: Industrial Heritage

Comparing the earlier defined values of industrial manufacturing sites to the workshops of Carels, the typology's characteristics are largely reflected (Table 6 and 7). The organisational structure with its many mergers as explained in the previous chapter is only one of the many intangible values. The Carels School of Metalworking signifies the focus on innovation and technical knowledge. With Pauwels closing in 2005, many of the former workers are still alive with vivid memories of the workplace, a public Facebook group "Acec & Pauwels trafo vrienden en collega's" was established to connect people who worked at the factory when it was owned by ACEC and later Pauwels Trafo. Looking through the pictures that are posted in this group, one can imagine it was tough work but there was time for fun camaraderie. It shows that there was a strong sense of community. An interview with Jean Behaegel, a former worker from SEM and ACEC, goes into the work conditions. He recalls many strikes and a café nearby where his colleagues would go after hours. On Monday mornings in winter, the halls would be extremely cold as the factory shuts down over the weekend. Whereas in summer, it would be very hot in the halls with all the machines turned on.[45]

In a previous chapter, the components and the setting have already been partially explained concerning the site as tangible values. A major characteristic of the area is the monumental facade on the side of Dok Noord, the many windows and shallow rooms offered qualitative offices for the management of the company. Furthermore, being a quite densely built site, the overhead light in the production halls was a must for sufficient daylight at the workplaces.[46] The halls have a characteristic steel construction that allowed the open space needed for the large goods that were created. Carels produced many famous products, one of which was the first diesel engine. Its created goods are therefore an important element of its heritage. Although not many of the goods are still existing, it does place the company in the foreground of technical innovation.

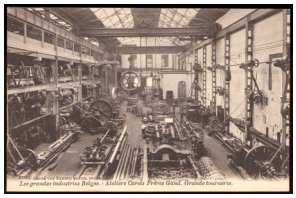
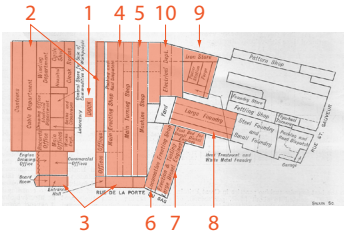
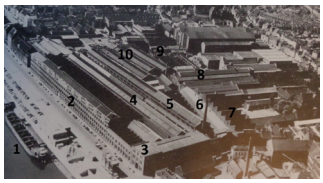
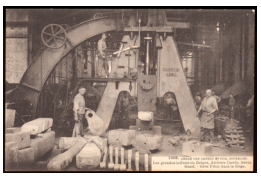
Table 6 Intangible values of Carels' workshops

intangible value	ACEC site
memories and stories	story of 'metallo' Jean Behaegel: *interview with former worker of ACEC going back to Dok Noord reminiscing to the past* community: *group on social media gathering pictures and connecting former workers of ACEC and Pauwels Trafo* 
working class society	strikes: *Jean Behaegel recalls many strikes at the factory which characterised the socialist movements of the 20th century* free time: *worker would go to the café nearby after hours and meet workers from the other factories*
human skill and knowledge	professional school 'Carels': *Carels founded the professional school at the Martelaarslaan* specialities: *every worker had its own speciality, some worked on the large objects, some on the smaller transformers* Teaching school on site: *an atelier functioned as the main teaching place for new workers other than the school*  
organisation of labour	offices on the waterfront: *prominent space for management* mergers and acquisitions: *from Carels to Pauwels, the management structure of the company changed four times* wages dependent of size of machinery: *the bigger the product a worker produced, the higher the wage*
productivity	manufacturing process: *whole site functions together and has possibility to produce heavily* war: *forced to produce for the German occupier during the First World War* variety: *the workshops have produced many different types of products over time and have kept evolving with time*

45 Industriemuseum, "Het Verhaal Van 'metallo' Jean Behaegel," 2022, https://www.industriemuseum.be/nl/verhaal-over-metaal-jean-behaeghel.

46 Gruwez, 92.

Table 7 Tangible values of Carels' workshops

tangible value	ACEC site
material fabric	steel construction: *massive profiles and complex structures* large open halls: *open spaces were needed for the large machinery* overhead light in halls: *halls were built next to each other so overhead light is the only possibility for daylight* shallow offices with many windows: *offices are at the edge of the site, close to the street with monumental facades*  
components	different buildings for different functions: *compartmentalised locations offered better productivity efficiency* densely built site: *new buildings were added over time but space was limited so they are very tightly knit together* orientation based on access to outside: *functions needing railway connection were located close to railway*  
machinery	cranes: *overhead cranes could move all the way through the hall* rails: *rails on-site made it possible to move materials and products around*  
setting	Oude Dokken: *histrorical centre of industrial activity for Ghent* Blue cranes as part of the crane landscape: *along the docks the blue cranes were characterising* proximity the the water and railway: *location gave opportunities to do business outside of the city* 
written documentation	archives (Industrial Museum, Ghent University): *images and books on the different stages of the company* postcards: *collection of postcards dating back to Atelier Carels Frères (1905)*   
created goods	first diesel engines: *Carels obtained first license* transformers boat components locomotives   

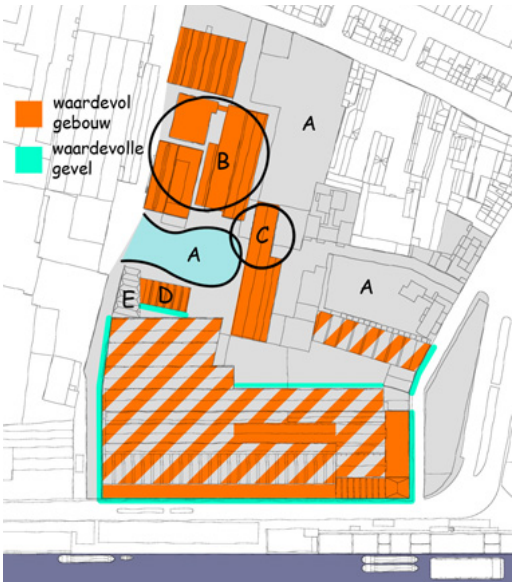
FROM CARELS TO DOK NOORD

c. Layer 2: Transformation

When Vastgoed Noord acquired the site in 2005, it was still in relatively decent shape as it was in use until right before. The plan keeps the majority of the facades (Fig. 8). The morphology of the former flax-spinning mill is conserved (B), as well as the former forge (D). The largest part of the halls is demolished to enable the new functions and underground parking (shaded). A part of de middle hall (C) is stripped to enable continuous transparency connecting the open spaces (A).[47]

Tables 8 and 9 show the values applied to the interventions made in the transformation. The interventions are divided on the effect (positive or negative) it has on the experience of the industrial heritage. Combining all those elements, it can be stated that the positive effects outweigh the negative effects. Visitors can thus experience the industrial site in its current state while being subtly reminded of its former use. Nevertheless, interventions could be made to make them consciously more aware of the specific background of the industrial site. People without prior knowledge of the factory behind ACEC, probably have no clue what was produced there. By opening up the site, it loses a bit of its tangible value but that does not outweigh the effect it has on the visitors of the experience of the whole area, it enables them to move around freely and some of the original elements are more visible this way.

Fig.1.8 Morphological vision on the built fabric of Dok Noord (source: Dok Noord)

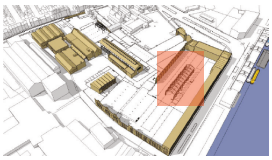


47 Dok Noord, "Het Verleden Beleven | Architectuur Binnen De Site Van Dok Noord," 7 October 2020, https://www.doknoord.be/geschiedenis/reconversie/.

Table 8 Perception intangible values at Dok Noord

intangible value	positive interpretation after transformation	negative interpretation after transformation
memories and stories		atmosphere lacks: *there is no space to experience the atmospere, where there is a glimpse of the stories from its past*
working class society	small-scale industry: *some smaller scale offices are now located at the side of the dock and in the rood addition. There is a big variety in types of firms located but many of them focus on small-scale industry*	clash in time of use: *although there are many offices at the site, during a weekday the site feels very quiet. This is in sharp contrast with the hours of activity of the factory*
human skill and knowledge		innovation is not main objective: *the main focus of Dok Noord lies in the combination of residential units, offices and mostly retail and recreation. With those last two, the main focus shift from knowledge to entertainment regardless of the many start-ups situated in the offices*
organisation of labour	naming: *the Direkteurswoning refers to the head of management in the factories. The open spaces that are created are given names reffering back to the former company names: "Van Crombrugghepark" and "het Carelsplein"* 	
productivity	Dok Brewing Company: *in one of the original halls, Hall 16, a small-scale foodcourt with a beer brewer brings back some of the production ideas. Although not about heavy material, the idea of something being made there from scratch does emphasize the factory part of the site's history* 	

Table 9 Perception tangible values at Dok Noord

tangible value	positive interpretation after transformation	negative interpretation after transformation
material fabric	**steel construction:** *although not always the original position, the visitor is confronted with the massive constructions that are stripped for visibilty*  	**addition:** *other than the facades, almost all the halls were completely demolished. New additions were built to refer to the hall structure but it can be wrongly experienced as original structures as the form language lies closely to the old fabric* 
	furniture shop Direkteurswoning: *kept intact for a great part, possibility to experience the structure inside the hall and partially in the exterior*  	**overhead light effect has dissapeared:** *in one of the early stages of the redesign, an interior hall was kept as a gallery. The atrium was later removed from the plan and replaced by the outer gallery* 
	facades Dok Noord: *all facades on the waterfront are kept, including the signage*  	
	coffeebar: *inside the coffeebar, the original columns are clearly visible, the structure is almost untouched and interventions are easily reversible* 	
	additions: *roof addition is clearly distinguishable from the original fabric. Housing blocks follow a characterising typoloy of industrial architecture but it is still clear that it is new* 	
components	**fragmented zoning:** *where previously the site was fragmented on the different elements of the porduction proces, fragmentation now occurs in the form of dividing the different functions* 	**open structure:** *the site was opened up more to create a coherent area. This results in a lower experience of the densely built site as it was, it now feels spacious whereas before it was a patchwork of building with smaller courtyards in between*  
	naming components: *some of the names of the different building return in the same way as before* 	

tangible value	positive interpretation after transformation	negative interpretation after transformation
machinery	**Crane:** *one original crane can still be recognised at site* 	**Rails:** *only one railtrack is still visible, and it is not even directly on site but across the street at the dock making it hard to recognise this evidence of activity* 
setting	**Blauwe Kraan:** *Vastgoed Noord has its own office in the crane in front of the site. It is reused and integrated in the network of cranes around the Old Docks*  **Location:** *The location of Dok Noord and its proximity to the highway and the railway station makes it an interesting spot for bussinesses as it is easily accessible for people outside of Ghent as well*	
written documentation	**Pictures:** *some archival images have been printed out in big and put at the passage of the main entrance. It gives visitors a peak on what the previous function of Dok Noord was*  	
created goods		**No trace:** *there is no trace of the products which were made at the factory. Maybe an archival piece could help to make visitors more aware of the former industrial activity and the importance of it in the technological field*

CONCLUSION

Industrial Heritage with its wide scope is a whole separate department of heritage. The typology of manufacturing sites has some main features which can be brought back to the tangible and intangible values as defined by the Nizhny Tagil Charter and the Dublin Principles. Important to notice when evaluating such a site is the individuality of every specific site, not all the values will be strongly recognisable or as important in its whole story. In some way, all the values reflect the production process which is the most important overarching value of these sites.

Applying the values to the case of Dok Noord and its transformation, some opportunities arise as well as some risks and difficulties. The value given by material fabric can be more easily transferred in the transformation. Other values such as created goods, are often more tricky with many of the products being non-existent on site, while transferring this value to the new situation could actually add a lot to the experience of the industrial past for visitors. The intangible values are more indirectly visible in the function of the new site. Creating opportunities for small businesses and industries revives the productive character of the factory. At Dok Noord, the rich history of acquisitions is nicely shown in the naming of the components of the site. This way, the visitors are subconsciously informed of the past of the location.

REFLECTION

Looking back at the process of the research, I am glad I decided to narrow down my focus to the typology of manufacturing sites. This enabled me to go more in-depth and look at the specific characteristics of this type. It took me some time in the beginning to form a clear structure but the initial plan of the 'Locus of Imaginaries' did give me some guidance as it facilitated a more methodical examination of case studies. However, the methodology underwent significant changes over time. Starting with the layers as used in Chilingaryan PhD research – objective, expert and media – it evolved to better suit the nuances of the case study: objective, heritage values and the values in transformation. Nevertheless, an in-depth interview with the involved parties in the transformation would have been nice, but as I realised along the way, the length limitation of the paper would have probably resulted in a rather superficial outcome of the interview. If the paper could have been longer, I think the expert's view and the public's view would have generated a better understanding on respectively the intentions and the perceptions. Layer 3 is now mostly based on my personal perception, elements (or the lack of) that stood out to me when visiting the site. This is not quite realistic as I have done a lot of research on the values of industrial heritage, enabling me to see more. One of the times I visited Dok Noord, two of my friends came along and they had quite a different understanding of the industrial characteristics. A more extended research could thus be grounded a bit better combining expert and public, as my position is currently somewhere in between.

In regards to the whole of the graduation, this research has left a profound mark on the design process. Not only did the theoretical chapter enable me to analyse the industrial site of Kloos more in-depth towards its characteristics, but the methodology gave me knowledge on the transformation of manufacturing sites. In general, I think I can say that the research gave me new glasses to look at an industrial site. During the year, I visited various other industrial sites – C-Mine (Genk, Belgium), Gare Maritime (Brussels, Belgium) and the Sulzer Areal (Winterthur, Switzerland) – and having this theoretical base of both the historical values and the transformation of them has made me more aware of interventions made to emphasise the industrial past.

It was a constant process of going back and forth between research and design and in the end, there are some clear connections between both. The majority of the values are transferred into the new design (Fig. 9 and 8). The only value which has not been completely redeveloped is the value of 'created goods'. A value which can give much knowledge to the visitors, but after multiple attempts I could not find a solution for this specific case. I think in the case of a train construction company or turbine factory, it can be easily shown by placing one good somewhere at the site. But in the case of Kloos, where they constructed bridges and train tracks, something will first have to be torn down before it can be placed at the site. It is unclear which products were made at the site that are still present in the current infrastructure and will be deconstructed in the future. In the end, I think the public function of offices and recreation could have been developed a bit more to emphasise productivity better, for example by having one main function – fashion, furniture, design, etc. – around which everything developed going from supplier to selling, to production, etc. Programmatically, my focus was more on collective housing and the need for multigenerational housing which does relate to the value of a strong sense of community but not so much to productivity. The strongest interventions to showcase the industrial past are probably the naming of the components and the design of the landscape which reintroduces the previous setting subtly.

The past year was for me the perfect end to my master's studies at TU Delft. I very much liked the combination of research and design. I was quite scared in the beginning that I would get tired of focusing intensely for such a long period on only one topic, but I could not have been more wrong. The fact that there was the possibility to shift between both research and design made the whole process much easier. Mostly in the beginning when I started developing the design and I was stuck, I was advised to look back at the research and that gave me new ideas for the design. Complemented with some site visits in between, I stayed very passionate about my project.

Fig.1.9 Tangible values of Kloos before and after transformation

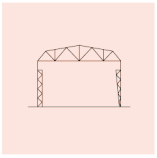
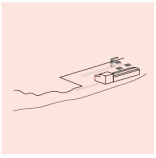
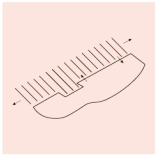
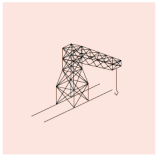
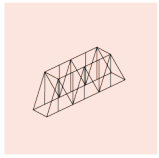
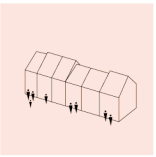
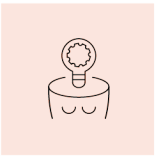
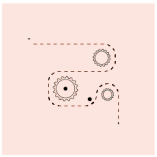
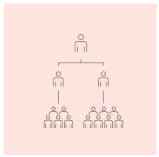
material fabric	components	setting	machinery	written documentation	created goods
					
steel frame openess created by the steel framing	large site with buildings from different times the site has grown over time	next to the water	cranes and crane rails air ducts from Spraypaint cabin	photos create idea of how the site was used original plans in the archives images of the workers and the production process	bridges built by Kloos high voltage towers
steel frame is kept facade of Hoge and Lage hall is repaired	zoning between housing and other functions division busy/quiet returns in the zoning	its proximity to the water is used as a feature	rails are used for routing Merconpavilion refers to a crane	use of archive images to bring back some elements (branding on the roof, form of the crane for Merconpavilion)	not included

Fig.1.10 Intangible values of Kloos before and after transformation

memories and stories	working class society	human skill and knowledge	productivity	organisation of labour
				
small village, everyone knew each other	religious character hard working	technical innovation	busy, loud atmosphere complex entity of the different steps in the manufacturing process	different types of functions in the chain
small scale community entities	returning working functions to the location (start-ups, small offices)	information for visitors	functionality creates constant use route along the water implies production process	naming of the components (Klooshal, Montagestraat, Merconpavilion)

FIGURES

Figure 1. Condensor in de ketelmakerij van de Rotterdamsche Droogdok Maatschappij. 9 July 1951, RDM-14326, 4181, Collectie Rotterdamse Droogdok Maatschappij (RDM), Stadsarchief Rotterdam, Rotterdam, https://stadsarchief.rotterdam.nl/zoek-en-ontdek/beeld-en-geluid/zoekresultaat-beeldgeluid/?mivast=184&miadt=184&mizig=299&miview=gal&milang=nl&micols=1&mizk_alle=Condensor.

Figure 2. Schematic floorplan of the ACEC site around 1922. Adriaan Linters, "13 Oktober 2018 bezoek 'Dok Noord'" (Vlaamse Vereniging voor Industriële Archeologie vzw, 2018), 2.

Figure 3. New version of a crane in the transformed Halle AP2 in the design by Lacaton & Vassal. Image by Philippe Ruault. Cristian Aguilar, "FRAC Dunkerque / Lacaton & Vassal," ArchDaily, 12 March 2021, https://www.archdaily.com/475507/frac-of-the-north-region-lacaton-and-vassal.

Figure 4. Transformed blue crane at the edge of the former ACEC site in Ghent. Dok Noord, "De blauwe kraan," n.d., https://www.doknoord.be/geschiedenis/de-blauwe-kraan/.

Figure 5. Memorial plaque for the official opening of the Ponte Dom Luis I in Porto. Willebroek Info, "den Ijzeren," 21 October 2023, https://www.willebroek.info/HANDEL/STRATEN/WILODSTA/WILODSTA_013_YZR.htm#NieuweAteliers.

Figure 6. Location Oude Dokken (1) and Dok Noord (2) in Ghent. Background image from Google Maps, edited by the author.

Figure 7. Timeline history Carels - Dok Noord (1839 - 2016). Collage made by the author.

Figure 7.1. C. L. Carels. Bart D'Hondt, *Van Andriesschool tot Zondernaamstraat – Gids door 150 jaar liberaal leven te Gent* (Ghent: Liberaal archief, 2014), 253.

Figure 7.2. Detail from Industrial Map of Ghent 1912. Auguste Verwest, *Plan Industriel De La Ville De Gand Et De Ses Environs. Indicateur De Ses Établissements* (Gand: Madame Edouard Sterheim de Vienne, 1912).

Figure 7.3. Detail from Map of Ghent 1914. *Plan Der Stad Gent* (Gent: Vanderpoorten, 1914).

Figure 7.4. Logo Professional Schools of Ghent. Gent-Geprent, "Beroepsscholen Stad Gent / Gebouwen B / Bijzondere Gebouwen | Gent-Geprent," n.d., https://www.gent-geprent.com/bijzondere-gebouwen/gebouwen-b/beroepsscholen-stad-gent.

Figure 7.5. Advertisement for Carels (SEM) Dieselengines. Koninklijke Oostendse heem- en geschiedkundige kring vzw, "Advertentie : Carels (SEM). Scheepsdieselmotoren. Dok 50, Gent," 1936, https://www.deplate.be/nl/advertentie-carels-sem-scheepsdieselmotoren-dok-50-gent.

Figure 7.6. First diesel engine produced in Ghent through license Diesel-Carels, 1902. Gilbert Boerjan, "Zeventig jaar Anglo-Belgian Company-Dieselmotoren te Gent," *Tijdschrift voor Geschiedenis van Techniek en Industriële Cultuur* 5, no. 17 (1987): 40.

Figure 7.7. Facade at Dok Noord. Dirk Panier, "Winkelcentrum Dok Noord in Gent," 2021, https://www.industriemuseum.be/nl/collectie-item/winkelcentrum-dok-noord-in-gent-4.

Figure 7.8. Pauwels Trafo transformer. Pauwels Transformers, "Pauwels Trafo transformer | Homepage," n.d., https://www.pauwels.com/.

Figure 7.9. Vacant hall at Dok Noord. Dok Noord, "Reconversie | Architectuur Binnen De Site Van Dok Noord," 7 October 2020. https://www.doknoord.be/geschiedenis/reconversie/.

Figure 7.10. Areal photo 2012, Construction works. Vlaamse Overheid, "Geopunt | Digitaal Vlaanderen," 4 March 2024, https://www.geopunt.be/.

Figure 7.11. Logo Dok Noord. Dok Noord, "Dok Noord | Homepage," 29 February 2024, https://www.doknoord.be/.

Figure 8. Morphological vision on the built fabric of Dok Noord. Dok Noord, "Reconversie | Architectuur Binnen De Site Van Dok Noord," 7 October 2020. https://www.doknoord.be/geschiedenis/reconversie/.

Table 6. Intangible values of Carels' workshops. (from top to bottom, from left to right)

Figure 1. Jean Behaegel aan Dok Noord, de voormalige ACEC-site in Gent. Image by Martin Corlazzoli, Industriemuseum, "Het Verhaal Van 'metallo' Jean Behaegel," 2022, https://www.industriemuseum.be/nl/verhaal-over-metaal-jean-behaeghel.

Figure 2. Logo Professional Schools of Ghent. Gent-Geprent, "Beroepsscholen Stad Gent / Gebouwen B / Bijzondere Gebouwen | Gent-Geprent," n.d., https://www.gent-geprent.com/bijzondere-gebouwen/gebouwen-b/beroepsscholen-stad-gent.

Figure 3. Postcard of training workshops. *Les Grandes Industries Belges. Ateliers Carels Frères, Gand. Atelier D'apprentissage Des Jeunes Tourneurs* (Bruxelles: Désiré Van Dantzig et fils, 1905).

Table 7. Tangible values of Carels' workshops. (from top to bottom, from left to right)

Figure 1. Interior of an industrial hall, mushroomcolumn. Suzanne Van Aerschot-Van Haeverbeeck, *Bouwen Door De Eeuwen Heen: Inventaris Van Het Cultuurbezit In Belgie: Architectuur. 4nb: Stad Gent, Noord-Oost* (Gent: Snoeck-Ducaju, 1979), 497.

Figure 2. Postcard of the Large Turnery. *Les Grandes Industries Belges. Ateliers Carels Frères, Gand. Grande Tournerie* (Bruxelles: Désiré Van Dantzig et fils, 1905).

Figure 3. Schematic floorplan of the ACEC site around 1922. Adriaan Linters, "13 Oktober 2018 bezoek 'Dok Noord'" (Vlaamse Vereniging voor Industriële Archeologie vzw, 2018), 2.

Figure 4. Areal photo of Carels' workshops in 1950. Fabriekofiel, "Gent B," 4 September 2023, https://fabriekofiel.com/gent/.

Figure 5. Postcard of a view at a courtyard. *Les Grandes Industries Belges. Ateliers Carels Frères, Gand. Vue D'une Cour* Bruxelles: Désiré Van Dantzig et fils, 1905).

Figure 6. Postcard of the Locomotives' Assembly Hall. *Les Grandes Industries Belges. Ateliers Carels Frères, Gand. Halle De Montage Des Locomotives* (Bruxelles: Désiré Van Dantzig et fils, 1905.

Figure 7. Oude Dokken. Stad Gent, "Erfgoed in De Oude Dokken," n.d., https://stad.gent/nl/oude-dokken/genieten-de-oude-dokken/erfgoed-de-oude-dokken.

Figure 8. Postcard of a big pestle in the forge. *Les Grandes Industries Belges. Ateliers Carels Frères, Gand. Gros Pilon Dans La Forge* (Bruxelles: Désiré Van Dantzig et fils, 1905).

Figure 9. Workshop. Dok Noord, "Het Verleden Beleven | Terug tot 1834," 7 December 2018, https://www.doknoord.be/geschiedenis/het-verleden-beleven/.

Figure 10. Dining Hall. Dok Noord, "Het Verleden Beleven | Terug tot 1834," 7 December 2018, https://www.doknoord.be/geschiedenis/het-verleden-beleven/.

Figure 11. Train at the dock. Dok Noord, "Het Verleden Beleven | Terug tot 1834," 7 December 2018, https://www.doknoord.be/geschiedenis/het-verleden-beleven/.

Figure 12. Diesel engine. Dok Noord, "Het Verleden Beleven | Terug tot 1834," 7 December 2018, https://www.doknoord.be/geschiedenis/het-verleden-beleven/.

Figure 13. Cylinder for Cross Compound Engine. Adriaan Linters, "13 Oktober 2018 bezoek 'Dok Noord'" (Vlaamse Vereniging voor Industriële Archeologie vzw, 2018), 4.

Table 8. Perception intangible values at Dok Noord. (from top to bottom, from left to right)

Figure 1. Furniture shop 'Direkteurswoning'. Image by Tim Van De Velde, Allaert Aluminium, "De Direkteurswoning in Ghent," n.d., https://www.allaertaluminium.be/en/projects/realisations/de-direkteurswoning-ghent.

Figure 2. Interior of Dok Brewing Company. Dok Brewing Company, "DOK BREWING CO | Bierbrouwerij Op Dok Noord in Gent," n.d., https://www.dokbrewingcompany.be/en.

Table 9. Perception tangible values at Dok Noord. (from top to bottom, from left to right)

Figure 1. Gallery at Dok Noord. Image taken by the author, 23 February 2024.

Figure 2. Van Crombrugghepark. Image taken by the author, 23 February 2024.

Figure 3. Areal photo 2012, Construction works. Vlaamse Overheid, "Geopunt | Digitaal Vlaanderen," 4 March 2024, https://www.geopunt.be/.

Figure 4. New fabric imitating original morphology. Image taken by the author, 23 February 2024.

Figure 5. Partially stripped hall. Image taken by the author, 23 February 2024.

Figure 6. Interior of the furniture shop 'Direkteurswoning'. Image by Tim Van De Velde, Allaert Aluminium, "De Direkteurswoning in Ghent," n.d., https://www.allaertaluminium.be/en/projects/realisations/de-direkteurswoning-ghent.

Figure 7. Initial plan for the conservation design. Marieke Gruwez, *Ontwikkeling van een winkelcomplex op de voormalige ACEC-terreinen te Gent* (2010), 93.

Figure 8. Facade at Dok Noord. Dirk Panier, "Winkelcentrum Dok Noord in Gent," 2021, https://www.industriemuseum.be/nl/collectie-item/winkelcentrum-dok-noord-in-gent-4.

Figure 9. Facade at Sassevaartstraat. Image by Martin Corlazzoli, Industriemuseum, "Het Verhaal Van 'metallo' Jean Behaegel," 2022, https://www.industriemuseum.be/nl/verhaal-over-metaal-jean-behaeghel.

Figure 10. WAY Coffee Roasters. Stad Gent – Dienst Tourisme, "WAY Specialty Coffee Roasters | Gentse koffiebranderij en -shop," n.d., https://visit.gent.be/nl/eten-drinken/way-specialty-coffee-roasters.

Figure 11. Housing block at the central square. Image taken by the author, 23 February 2024.

Figure 12. Zoning plan. Dok Noord, "Reconversie | Architectuur Binnen De Site Van Dok Noord," 7 October 2020, https://www.doknoord.be/geschiedenis/reconversie/.

Figure 13. New morphological structure creating openings. Image taken by the author, 23 February 2024.

Figure 14. Hall 16. Image taken by the author, 23 February 2024.

Figure 15. Directions plaque. Image taken by the author, 23 February 2024.

Figure 16. Existing crane. Image taken by the author, 23 February 2024.

Figure 17. Rails at Dok Noord waterfront. Image taken by the author, 23 February 2024.

Figure 18. Blue Crane. Dok Noord, "De blauwe kraan," n.d., https://www.doknoord.be/geschiedenis/de-blauwe-kraan/.

Figure 19. Archive image printed in large. Image taken by the author, 23 February 2024.

Figure 20. Archive image printed in large. Image taken by the author, 23 February 2024.

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Part II

Design Research

The site is located in Alblasserdam, a town in the province of South Holland in the Netherlands. The plot itself is an outer dike area between the Noord River and the West-Kinderdijk. Behind the dike, the landscape of the windmills of Kinderdijk defines the swampy Uiterwaard.

This part of my graduation booklet focuses on the design research on Kloos Kinderdijk. Throughout the project, I have conducted several analyses which have contributed significantly to the creation of the design in the end. Furthermore, I have gathered some inspirational reference projects and shortly give some information on the extent to which they have helped me in the process.

Fig.2.1 Location of project's site Kloos Kinderdijk

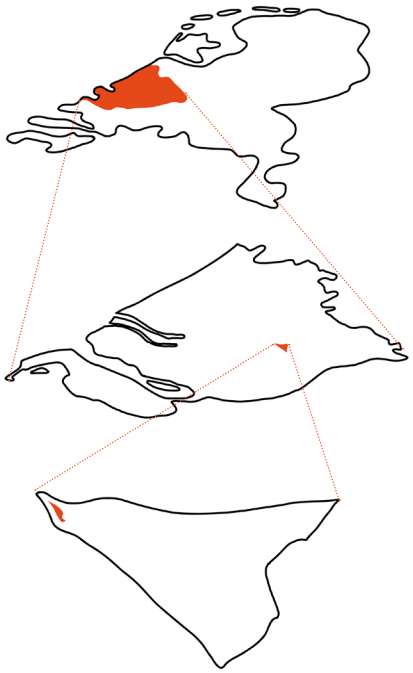
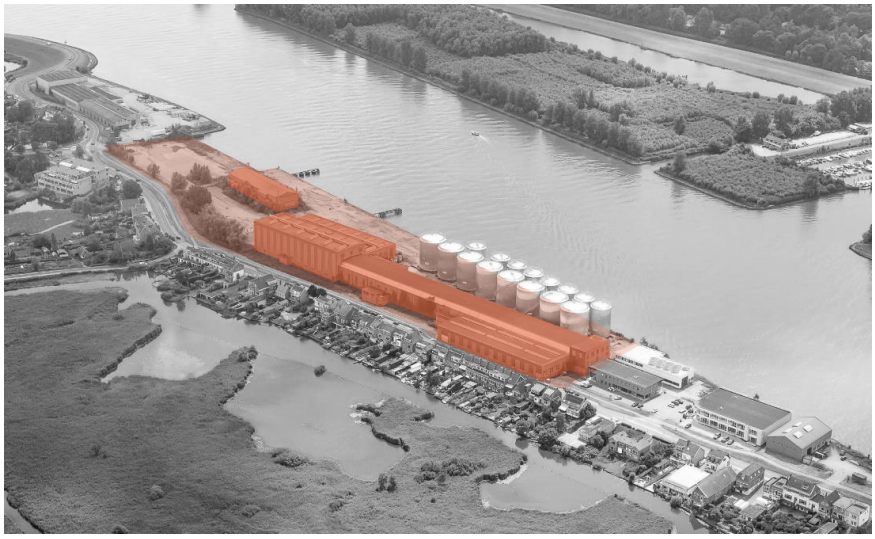


Fig.2.2 Site Kloos Kinderdijk (source background image: XX)



HISTORY

Floris Kloos arrived in Alblasserdam in 1843 from Ameide, where he was born. He started the company Kloos Kinderdijk in 1849 when he bought a tiny piece of land on an outer dike area from C. Smit. He had met Smit when he was commissioned by Smit to build the windmill 'Ons Genoegen'.

Before the land was used for industrial purposes, the outer dike land was used as a 'griend'. This is a humid and wet area used to produce willow or reed, a common agricultural practice around the area.

When Floris Kloos died in 1892, the company was left to his sons and went on as N.V. Kloos & Zonen's Werkplaatsen. In the beginning years of the company, the expansions were quite small-scale.

During the interbellum, the economic recession did not influence the bridge department of the company. As of 1941, the site started taking shape in the way it is presently known. Even after the war, the company played an important role in the post-war reconstruction of the Netherlands.

In 1968, Kloos & Zonen celebrated its 125th birthday. Considering this, the company publicised a booklet of its history. Only a decade later, the company was taken over for the first time and merged with Hollandia, forming Hollandia-Kloos. A big recession in the metal industry led to another merger, with Mercon. Kloos at that time was in very heavy waters and was dismantled for the biggest part during the new ownership.

Eventually, Mercon sold the site to a project developer as they only used the buildings for storage. The building has now been vacant for over 20 years.

(main source: Geschiedenis van Zuid-Holland, 2021)

Fig.2.3 Kloos Kinderdijk in the 19th century (source: Regionaal Archief Dordrecht)



Fig.2.4 Kloos Kinderdijk at the beginning of the 19th century (source: Regionaal Archief Dordrecht)



griend

Floris Kloos builds the windmill "Ons Genoegen" — 1842

Floris Kloos buys an outer dyke piece of land and start Kloos Kinderdijk — 1843

the company starts constructing steel ships — 1860

start of infrastructural projects such as railway bridges — 1870

with the passing of Floris Kloos, the company is taken over by his sons: Kloos & Zonen — 1892

large scale expansions (Montagehal, Hoge and Lage Hal, Draaierij) — 1941-1955

responisible for the construction of electricity poles — 1944

additional fous on railway construction: expansion with the Wisselloods — 1962-1967

celebrating 125 years of Kloos Kinderdijk — 1968

acquisition by Holandia: Hollandia Kloos — 1977

acquisition by Mercon: Mercon Kloos — 1985

definite closure of the factory — 1999

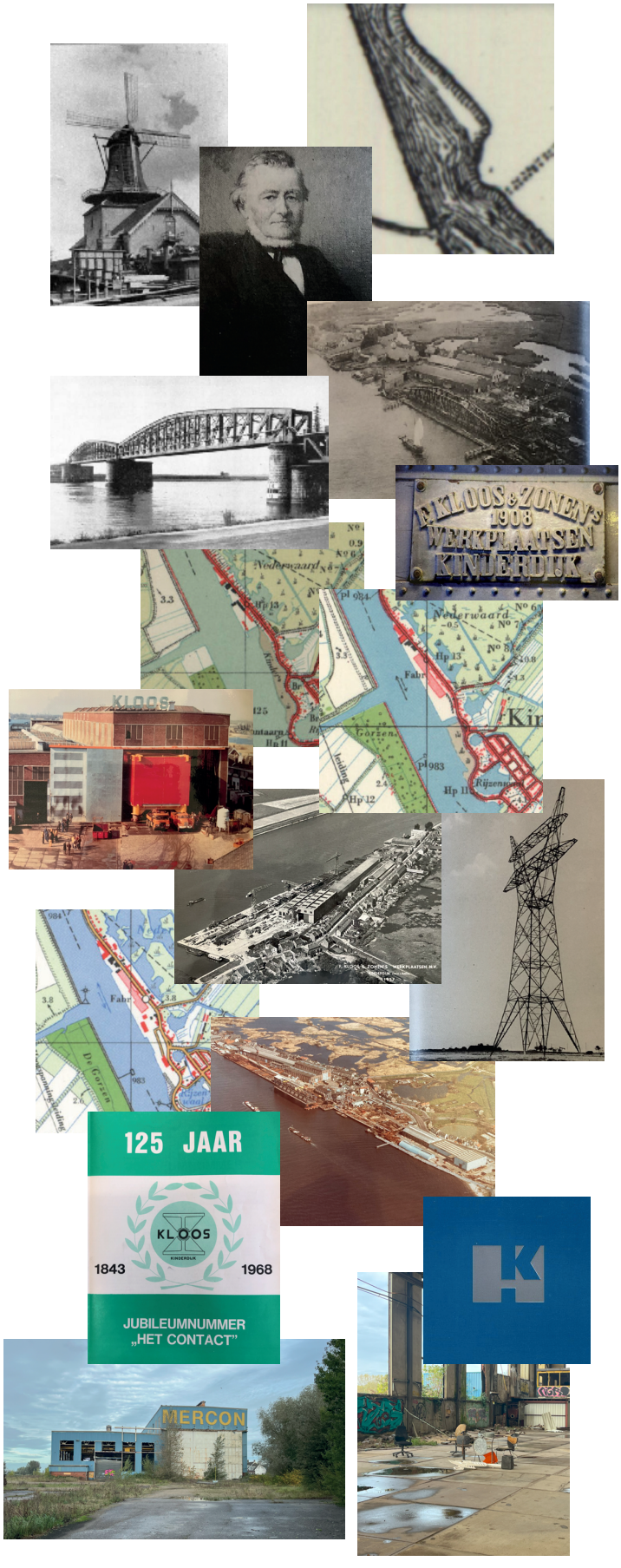


Fig.2.5 Timeline of the Kloos Wharf

ANALYSIS

a. Morphology

In addition to the morphology research conducted at the beginning of the semester, two smaller studies are executed to look at the morphology of the dikes (1) and the dwellings in Alblasserdam (2).

(1) In the form of the existing dike, a clear pattern can be seen. Originally, the dikes were built in generally straight lines along the waterline. Nowadays, bents distinguish the form of the dike. Many of these bent are the result of the dike breakouts that created Wielen. When the dike was repaired, it was constructed on the outside of the Wiel making these inner dike areas. The dotted line shows the original direction of the dike.

(1) The developments of Alblasserdam characterise the main pattern of dike villages. At the start of the development, housing was located around the dike, creating a 'dijklint'. Small workshops could have direct access to the water in this way.

Fig.2.6 Morphology of the dikes. Breakthrough resulted in bent in the dikes around the formed Wielen



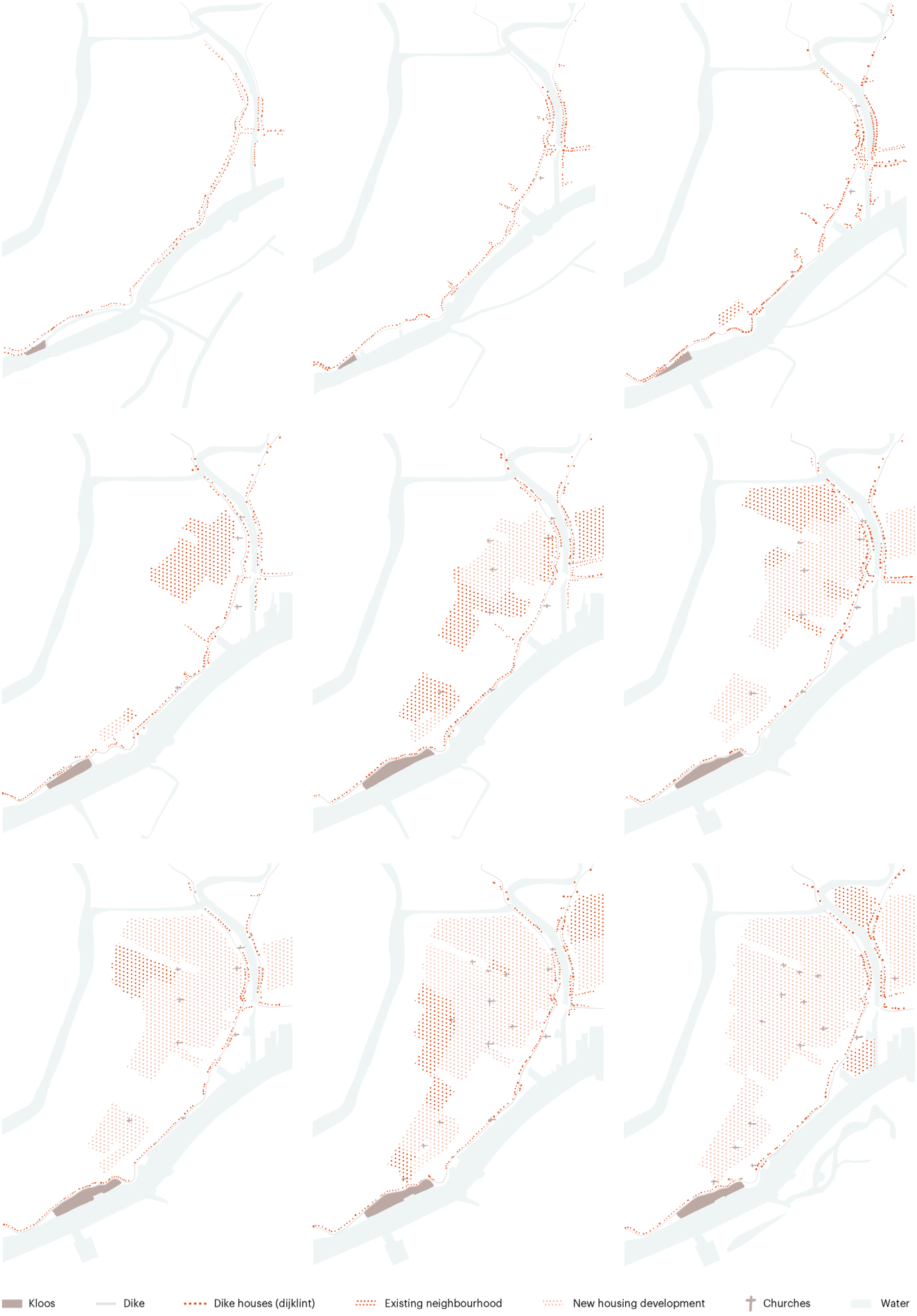


Fig.2.7 Morphological evolution of dwelling in Alblasserdam. From left to right, top to bottom: 1850-1881-1936-1958-1969-1981-1989-1995-2023

ANALYSIS

b. Waterfront use

When looking at the use of the waterfront of Alblasserdam and Kinderdijk in extension, it is significant that almost none of the waterfront is used qualitatively. Nevertheless, the water is an important part of the character of the dike villages.

Almost the whole of the waterfront is used for transportation such as bikes and cars. Pedestrians mostly have to walk on the inner side of the dike resulting in almost no visual connection to the water.

Furthermore, much of the waterfront is privately owned, either for housing or for companies.

A small part of the waterfront in Kinderdijk and Alblasserdam enables a passive enjoyment of the waterfront for users (yellow). Here, there is a sense of appropriation by the residents. Regardless, these spaces a scarce but do give a sense of identity for the community and their closeness to the water.

The quality of the biodiversity around the waterfront is monotonous. There where the waterfront is not a hardened quay, the waterfront is mostly just a plain grass field. It lacks character and diversity.

Fig.2.8 Waterfront use in Kinderdijk and Alblasserdam





Fig.2.9 Kloos waterfront



Fig.2.12 Housing - privatised waterfront (Google Earth)



Fig.2.10 Use for transport (Google Earth)



Fig.2.13 Industry - privatised waterfront (Google Earth)



Fig.2.11 Use for passive activity (Google Earth)



Fig.2.14 No visual connection to the waterfront (Google Earth)

ANALYSIS

c. Current state

The Montagehall (Dutch. Montagehal), the longest hall connecting the management building and the High and Low Hall (Dutch. Hoge en Lage Hal), has a steel construction still in good shape. The skin of the hall on the other hand has damage at multiple places and has been covered over time with blue cladding. The High and Low Hall are in a similar state. In the Montagehall and de Low Hall, some cranes still hang on the construction. These are in the typical yellow colour which can be often seen in industrial halls. The Spraypaintcabine (Dutch. Verfspuitcabine) is not accessible as the building is marked as having asbestos. Made from steel construction, an assumption is made in this case that the construction itself is still intact but that it needs to be stripped naked in the case of a new use.

Fig.2.15 Montagehal (Eng. Assembly hall)



source background image: Regionaal Archief Dordrecht)

Fig.2.16 Current state of the assembly hall



Fig.2.17 Hoge en lage hal (Eng. High and low hall)



Fig.2.18 Current state of the high and low hall



Other existing construction on-site is the management building at the end of the Montagehall. This building has suffered some minor fires and as a result, it is in quite a bad state. The Dijkloods, next to the Montagehall, was a later addition. With dike reinforcements after its construction, the building created a narrow space between itself and the houses opposite the street. The outside wall currently functions as part of the dike, but it has a strongly negative effect on the surroundings. Other smaller extensions to the halls are often in a bad state. Among others, the Turnery (Dutch. Draaierij) was partially burned down due to vandalism.

Fig.2.19 Dijkloods



Fig.2.20 Later extensions



Looking at archival pictures taken from the air, it becomes clear how the site was used. Other than the halls, the outdoor area was also a place of production. The northern part of the site was mostly used for storage of materials. The area between the halls was used for manufacturing. This can be seen in the density of the cranes and the rails, as well as the presence of the pontons in the water where bridge parts were constructed.

Some of the original crane rails are still present. Two rails by the water and two rails starting from the High Hall crossing each other. There is also archival proof of housing at the edge of the site, near the dike. These houses were probably demolished for obvious reasons, need for dike reinforcement but also the fact that it was too close to industrial activities.

Fig.2.21 Storage area



Fig.2.22 Outdoor production area



Fig.2.23 Crane rails



Fig.2.24 Dike houses on the indsustrial site



The site is characterised by a patchwork of different pavement typologies. A mix of stelcon slabs, poured concrete and brick creates a vibrant entity. As a result of many years of vacancy, a big part of the site is now overgrown with greenery. But in essence, the industrial past does insist on a need for soil decontamination as the ground may be damaged. The stelcon slabs are mostly situated directly near the halls, at their entrance but also around the facades. A large part of the interior was also covered with these slabs. Closer to the Spraypaintcabine, poured concrete can be seen, as this part of the site was developed in a later stage. In between the Spraypaintcabine and the High and Low Hall, there is a patchwork of bricks in different patterns.

Fig.2.25 Patchwork of concrete bricks and stelcon slabs



Fig.2.26 Patchwork of brickpatterns



Fig.2.27 Patchwork of bricks and asphalt



Fig.2.28 Patchwork of bricks and stelcon slabs



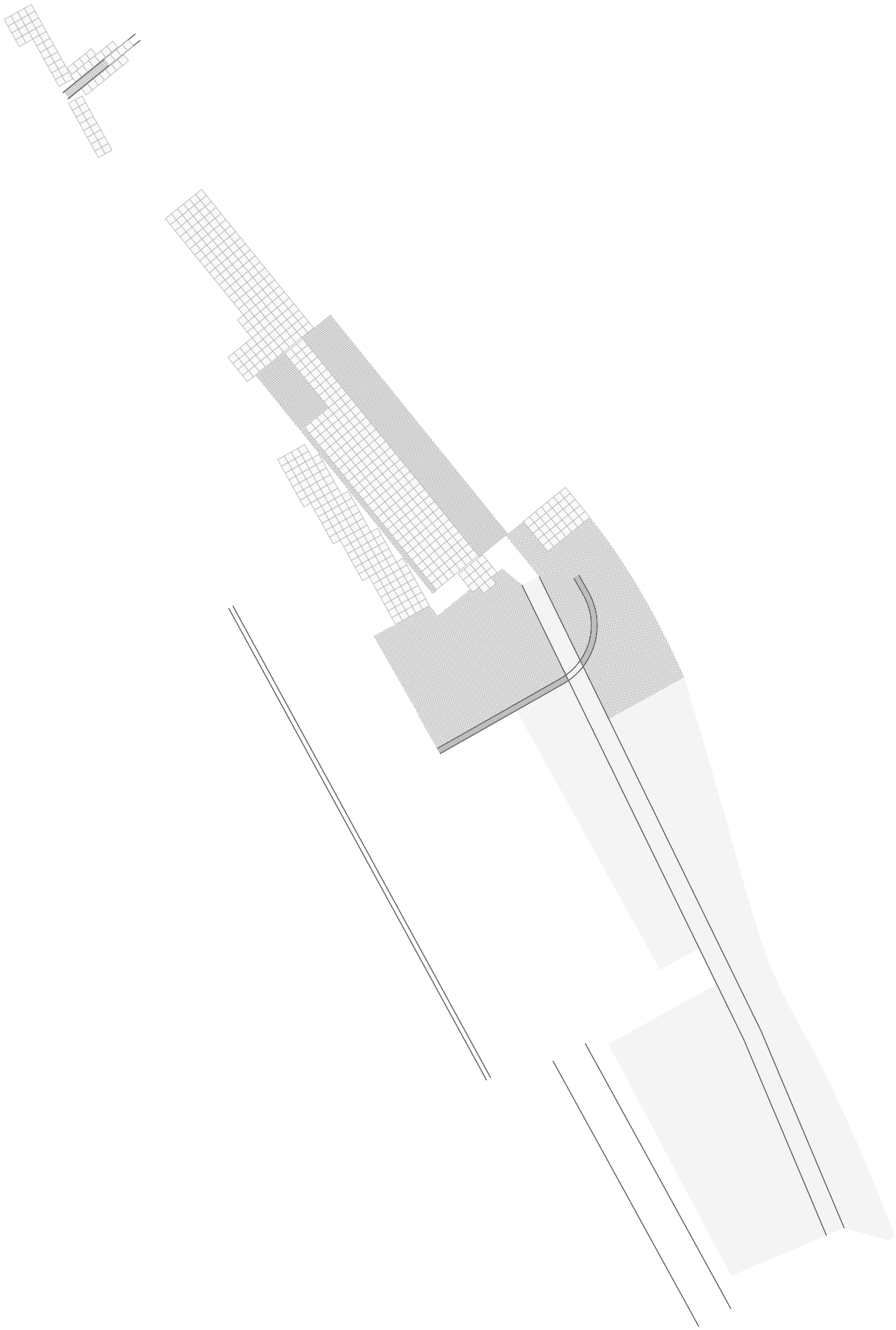


Fig.2.29 Existing patchwork of pavements

STRUCTUURVISIE ALBLASSERDAM 2040

The goals of the municipality of Alblasserdam can be summarized into one concept: "Bedrijvig Hollands Dijkdorp" (Eng. Busy Dutch Dike Village). Its aims to accentuate its maritime industrial heritage with the site of Kloos as a great opportunity for development. Furthermore, as a result of recent societal changes, Alblasserdam hopes to individualise society. Instead of the general top-down method, local initiatives of the residents and organisations of Alblasserdam should contribute to the community.

Fig.2.30 Bedrijvig Hollands Dijkdorp (source: based on Structuurvisie Alblasserdam 2040)



ARCHIVAL RESEARCH

The Regional Archive Dordrecht has many documents on the Kloos factory. Detailed plans of the existing halls and calculations of the profiles of the High and Low Halls helped significantly in the drawing of the plans. But even more so, have the plans and images contributed to the general understanding of the site and how it was used.

Other than the plans from the RAD, the Historical Association Alblasserwaard (Historische Vereniging Alblasserwaard) has many pictures and documentation on Kloos. One of those is a poster with the title "Kloos Kenmerken", it is not clear what the purpose or reason for this poster is but it does resemble the magnitude of the cranes that were operating at the site. Furthermore, in the color scheme blue very much stands out with different shades as this reflects the relation the the water.

An image which stood out during a meeting with the Historical Association was a coloured picture of the South façade of the Halls. Since the current building is covered in blue metal cladding, it was hard to uncover how it looked when it was first delivered. Pictures like this show the magnitude of the site and the productivity happening there. A prominent sign 'Kloos' on the roof in contrast to the current yellow letters of 'Mercon' are similar in showing the importance of the company. The massive steel doors with the orange beam signify the large-scale building elements.

Areal photos show the way the outdoor area was used. The area next to the Montagehal mostly functioned as storage of materials, a long rail went all the way to the northern part, probably to carry the materials back to the front to use. The area between the High and Low Halls and the Spray-painting cabin was the outdoor assembly zone. A ponton in the water and the density of the crane rails reflect this.

Fig.2.31 Poster Kloos Kenmerken, date unknown (source: Historische Vereniging Alblasserwaard)



Fig.2.32 Colored image of the south facade, date unknown (source: Historische Vereniging Alblasserwaard)



Fig.2.33 Aerial photo of the site, 1957 (source: Historische Vereniging Alblasserwaard)



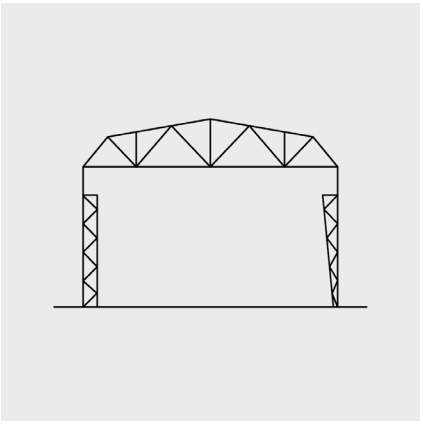
Fig.2.34 Aerial photo of the site, estimated between 1967 and 1981 (source: Historische Vereniging Alblasserwaard)



VALUE ASSESSMENT

a. Tangible values

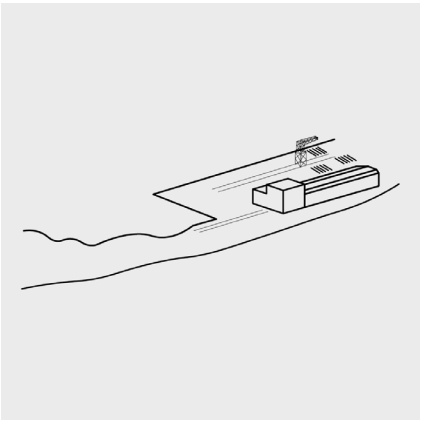
Fig.2.35 Material fabric



Material fabric

A characterising steel structure that creates openness and resembles the intensiveness of industrial activity. Behind the blue cladding panels, the brick façade is still present. The steel frames in the façade have made the rhythm and the large windows possible.

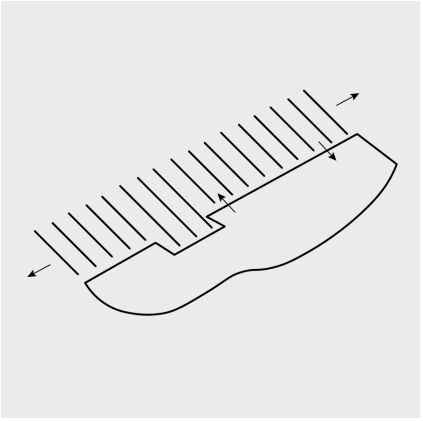
Fig.2.36 Components



Components

There is a clear division visible on site, traces of former buildings are visible through the patchwork of the pavements. The site has grown over time as a result of upscaling activity. A clear zoning division can be seen in the presence of the crane rails.

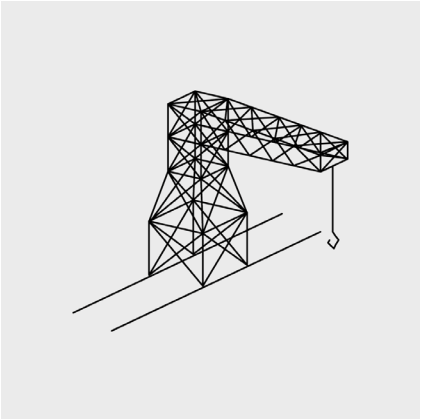
Fig.2.37 Setting



Setting

Its location is evident for the type of activity. The company transported large goods over the water. A ponton reveals that bridge parts were constructed right next to the water and then moved with a crane on boats to be transported.

Fig.2.38 Machinery



Machinery

Some of the overhead cranes are still present in the halls, they are probably newer versions and are painted in a characterising bright yellow colour as is often seen for this type of machinery. The rails are still visible on site, however, they are often cut short probably due to later changes in the layout of the area

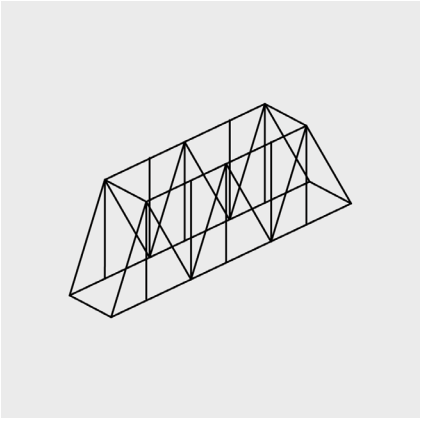
Fig.2.39 Written documentation



Written documentation

The archives offer many images of the location informing us how the site looked and was used. Furthermore, it gives the original plans and structural calculations, making drawing the existing situation easier.

Fig.2.40 Goods created by the industry



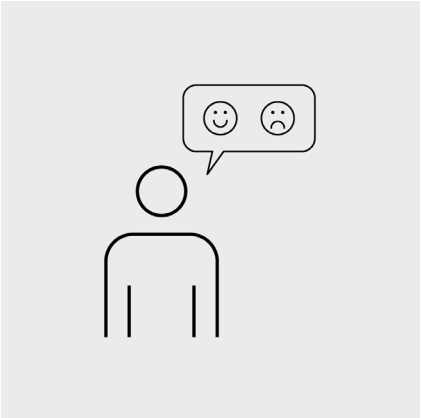
Goods created by the industry

Some of the bridges built by the company are still intact. However, it is not well documented which structures they constructed and are still standing.

VALUE ASSESSMENT

b. Intangible values

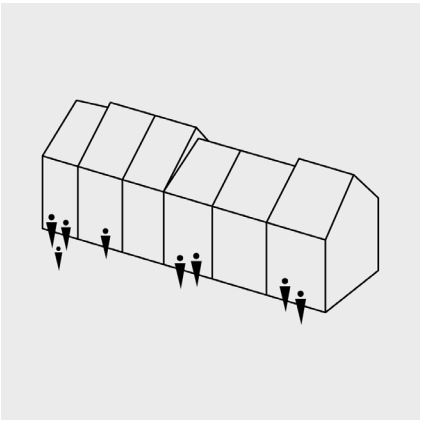
Fig.2.41 Memories and stories



Memories and stories

Alblasserdam is a small town where almost everyone knows someone who used to work at Kloos Kinderdijk at some point.

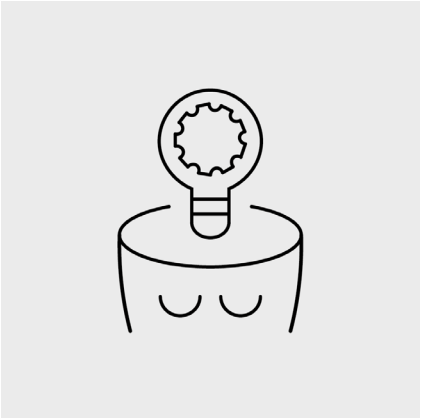
Fig.2.42 Working class society



Working class society

The hardworking mentality is still present in Alblasserdam. There are still many industrial companies where the residents are working. The religious character of an industrial village is very visible with the presence of multiple churches in the village.

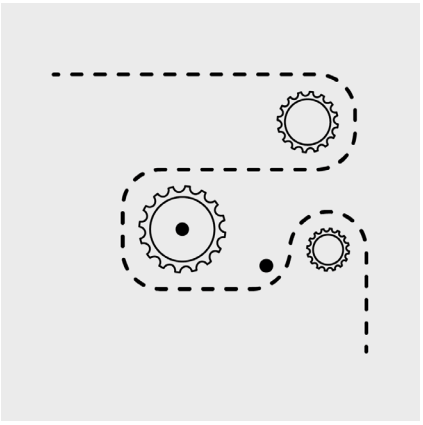
Fig.2.43 Human skill and knowledge



Human skill and knowledge

Kloos Kinderdijk evolved a lot over time, adjusting to new technical processes and innovations. It expanded from ships to bridges to railway infrastructure.

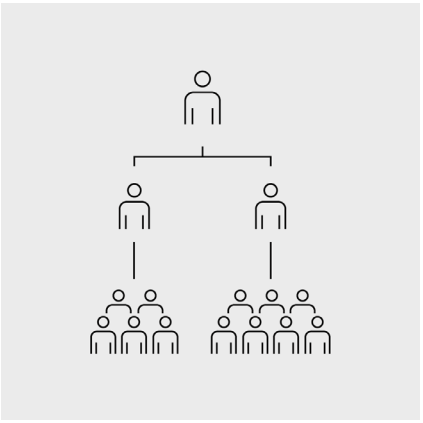
Fig.2.44 Productivity



Productivity

The different components signify the complexity of the production process as they all have their specific position in it. Working with such heavy machinery, it was a loud and chaotic place to work.

Fig.2.45 Organisation of labour



Organisation of labour

There was a clear hierarchy where the directors were often quite strict. Socially, there was a strong division between management, drawers and the labour workers. Kloos Kinderdijk has been taken over multiple times over the years changing names and structure.

REFERENCE PROJECTS

a. C-Mine, Genk

visited on 20th of November 2023

At the beginning of the design process, I visited C-Mine in Genk. This former mining site has now been redeveloped into a mixed-use area. It has been an ongoing project that started in 2010, but in 2023, the leading architecture office 51n4e has relaunched the masterplan and questions its masterplan from a decade ago. It suggests a more fragmented development open for later change.

There are some essential differences between C-Mine in Genk and Kloos Kinderdijk. One of them being the location. C-Mine is located at the border of a big city in the province of Limburg in Belgium, whereas Kloos Kinderdijk is a bit more on the outskirts of a small town. This makes the type of functions suitable for C-Mine very different. A faculty of the Luca School of Arts is situated on this site, a function which is to dependent on the city fabric to be suitable for a place like Kloos Kinderdijk. Furthermore, the total area of C-mine (336.000m²) is way bigger than Kloos Kinderdijk (av. 60.000m²). This has an effect on the space between the different clusters. The housing area has a direct connection to the more public areas but because of the distance, it feels more residential and private. In the case of Kloos Kinderdijk, the different functions will be closer to each other so the boundary will have to be clear in some other way. Lastly, one of the main features of C-mine is the museum located in the old building. The museum with its large auditorium and event space is on a completely different scale as Kloos Kinderdijk. Adding another museum so close to the windmills of Kinderdijk would generate a saturation from which the residents of the neighbourhood will not benefit, therefor a museum function is not suitable for the design case. Smaller interventions made to contextualise the past are also visible at C-mine. At every building, a small plate gives some knowledge on the history and the mining process.

Fig.2.46 Renewed Masterplan C-Mine Genk 2023 (source: 51n4e)

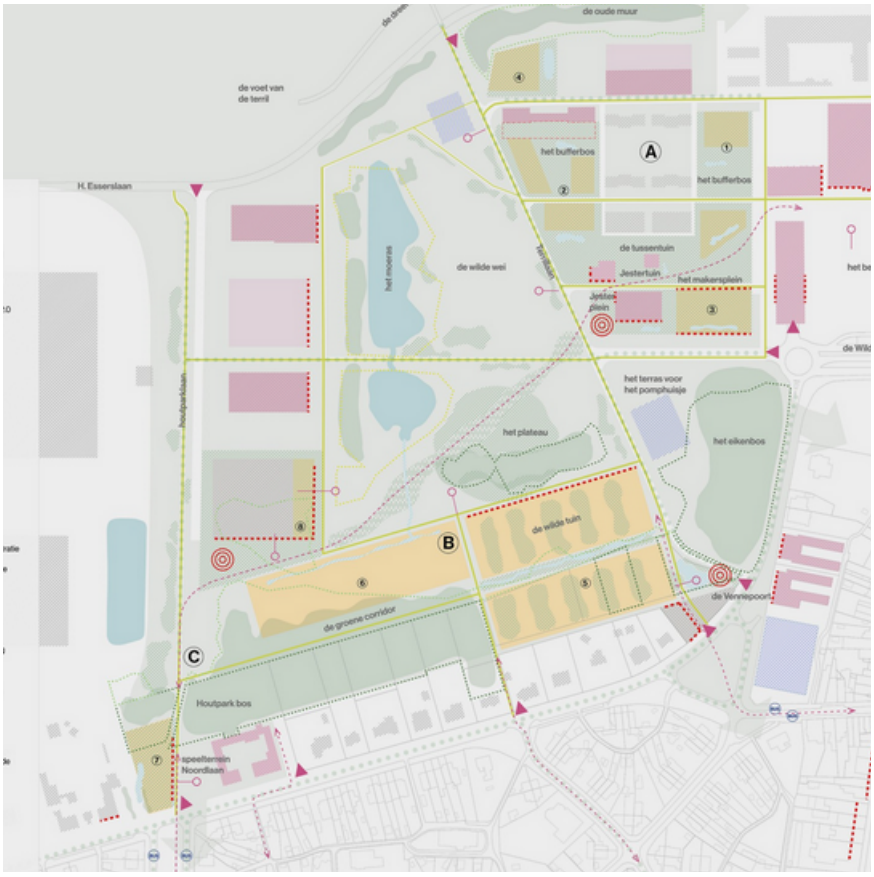
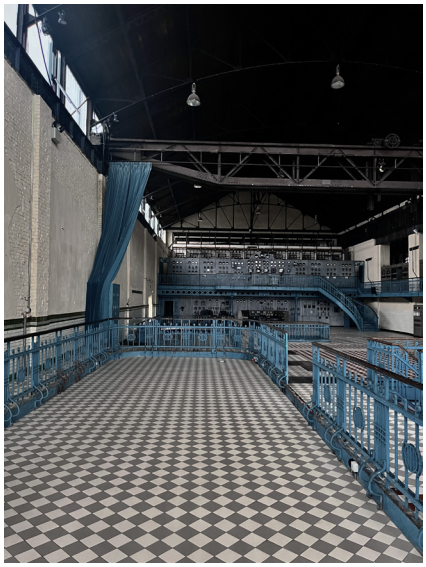


Fig.2.47 Museumbuilding C-Mine designed by 51n4e (source: 51n4e)



Fig.2.48 Eventspace in main building



REFERENCE PROJECTS

b. Gare Maritime, Brussels

visited on 28th of January 2024

I visited Gare Maritime in Brussels to get an idea of the indoor space of a large hall. Gare Maritime used to be a cargo station for Tour & Taxis. It was built in 1907 and transformed into a place for retail, work and recreation by Neutelings Riedijk. Furthermore, Gare Maritime aims to open up for events varying from flea markets to fairs, photoshoots and many more. Its design enables this by having an open space indoors where a food market functions as a permanent element but other than that great flexibility is offered for the different events. The two halls on the sides are used for the retail and workspaces. Timber structures are placed into the contour of the hall.

Visiting this building in winter, the indoor temperature was very pleasant but it required a coat nevertheless. It creates the atmosphere of an indoor street, protected from wind and rain but on a sunny day you feel the warmth through the windows and on a cloudy day a coat can keep you warm. In summer, the roof windows can be opened up enabling natural ventilation.

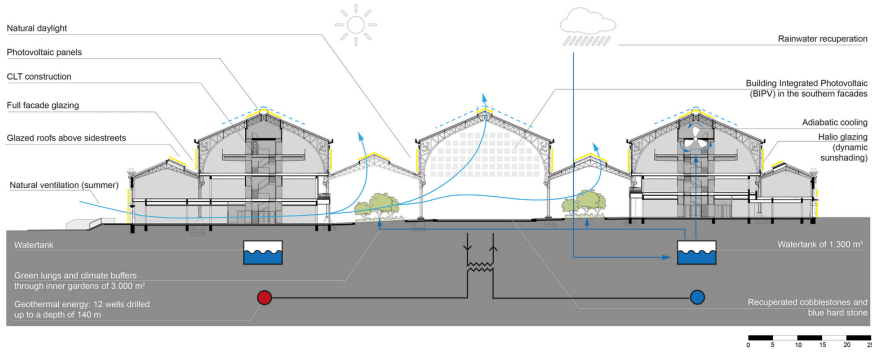
Fig.2.49 Central courtyard of Gare Maritime (source: Tour&Taxis)



Fig.2.50 Gare Maritime (source: ArchDaily, Filip Dujardin)



Fig.2.51 Sustainability scheme Gare Maritime (source: ArchDaily)



Historic renovation

Flame retardant treatment of steel columns

Historic wooden roof was sand-blasted and restored locally

Integrated openable skylights

7.500 m^2 of historic cobblestones are removed and then flattend to smooth patina pavers

350 m^2 of blue hard stone from historic quays are recovered and reused

Sustainable construction

10.000 m^3 of wood for the construction

Mechanically anchored CLT elements

Finishings of the internal facades in oak (EU origin)

Avoiding the emission of 3.500 tons CO_2 through the use of wood

Certified wood (FSC quality mark)

Natural climate

In closed spaces:
· Heat and cold generated through geothermal energy
· Adiabatic cooling: evaporation of water to cool the air
·Air-conditioned ceilings

In the halls:
· Natural ventilation (summer)

Solar-energy

10.000 photovoltaic panels on an area of 17.000 m

Production of 3.000 MWh/year = consumption of 850 housholds

Building Integrated Photovoltaic (BIPV) in the southern facades

Watercirculation

200.000 tons of soil removed by ship

2 rainwater reservoirs of 1.300 m^3, 2 m wide and 200 m used for::
· Flushing of toilets
· Watering of green spaces
· Adiabatic cooling

Intended certificate

BREEAM Excellent

REFERENCE PROJECTS

c. Dok Noord, Ghent

visited on 22nd of February 2024

This project is already covered in depth in Part I: Research Paper. It has contributed a lot to my design, next to the research. I personally feel that architecturally it is not the strongest design. The day I visited this building, was a weekday in the afternoon. Probably all the offices were full of people but on the main squares and public areas, it was very desolate. I do remember, on the other hand, coming here for dinner some years ago in summer and then it was a very lively space. The fragmentation of the use is very big, maybe due to the strong clustering of retail, recreation and work. The offices have no strong connection to the public areas which results in quiet spaces during weekdays.

The subtle reminder of the industrial heritage is helpful to recognise the past. It could have been emphasised stronger but the large posters at the main entrance, the bare steel structure at the public areas, the naming of the spaces, and the morphology of the narrow streets of the former Van Crombrugghe factory make the visitor aware of the site's history.

Fig.2.52 Former Van Crombrugghe morphology



Fig.2.53 Back facade at Sint-Salvatorstraat



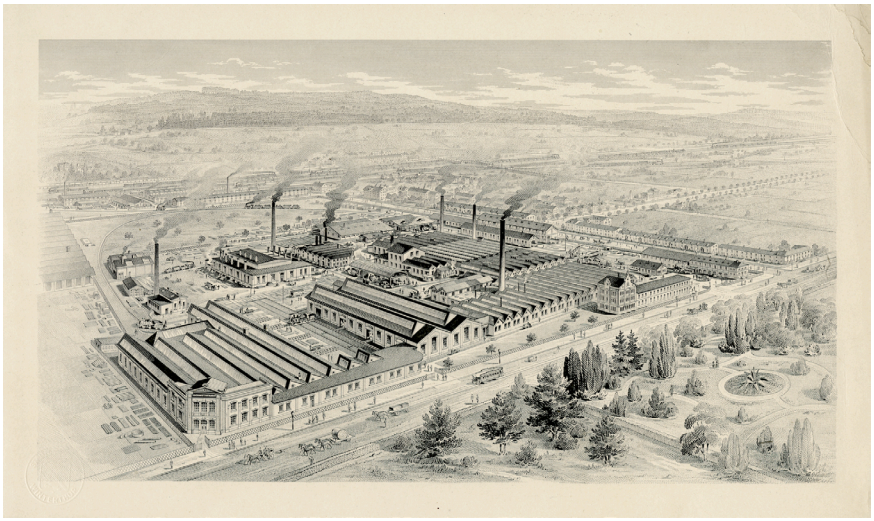
REFERENCE PROJECTS

d. Sulzer Areal, Winterthur

visited on 7th of April 2024

Close to Zürich, Winterthur developed as an important industrial city in Switzerland during the 19th century. Right next to the railway, the area was occupied by a steel producer, Sulzer before being vacated as a result of de-industrialisation. What is quite remarkable about the redevelopment process of the area is the balance of influence in the planning between Heimatschutz (the Heritage Society of Winterthur), Sulzer Immobilien (the project developer) and the involved governments (source: Edition Winterthur).

Fig.2.54 Sulzer Areal, Winterthur, around 1900 (source: Landesmusum Zürich)



While visiting the area, it stood out to me how the complexity of an industrial area is still present. The area is densely built and it can be challenging not to get lost. Small alleys lead to different parts and public spaces create a sense of smallness compared to the magnitude of the industrial buildings. The whole site has so many different characteristics, at one end there is an architecture faculty in one of the industrial halls, a cinema and a hostel. At the same time, there are many residential buildings both completely new built and transformations of the industrial buildings.

There is a great variety in the way the existing architecture is treated when being transformed into a new function. Just the way the windows are handled: replacing the glazing, a new window on the outside of the existing window, a completely new window but with the addition of the existing rhythm and many more.

Fig.2.55 View on a narrow connecting path between a mix of new and old buildings

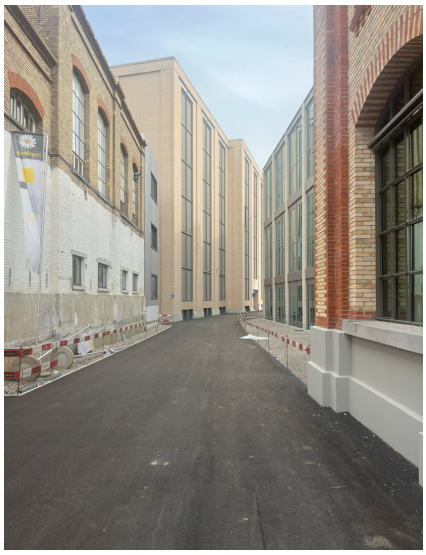


Fig.2.56 Architektur-Halle 180, former industrial hall transformed into an architecture faculty in 1991 (source: Espazium)

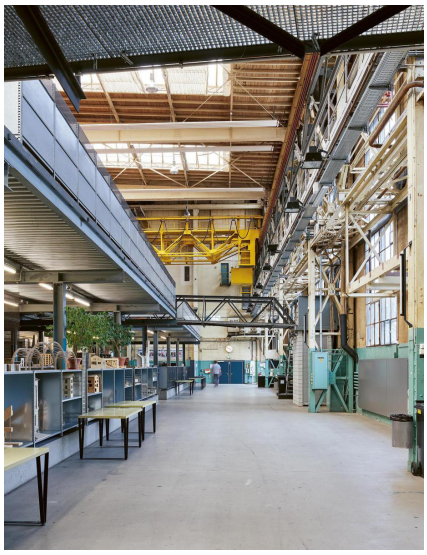


Fig.2.57 Wohnüberbauung Lokomotive by architecture office Knapkiewicz & Fickert (2001-2006) (source: Winterthur Glossar)

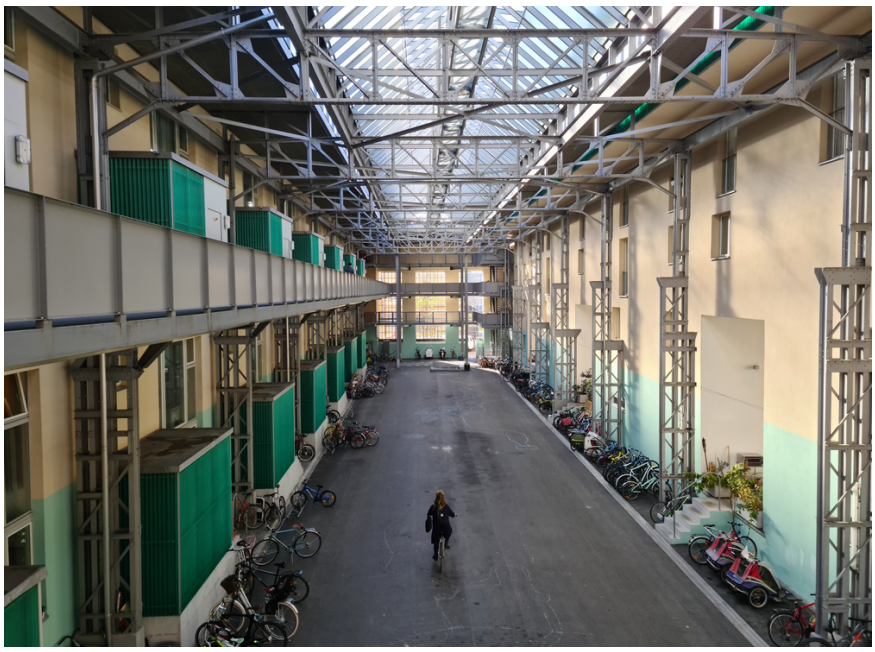




Fig.2.58 Intervention to glazing: repairment of the glazing in its original frame



Fig.2.59 Intervention to glazing: additional window frame on the outside of the existing

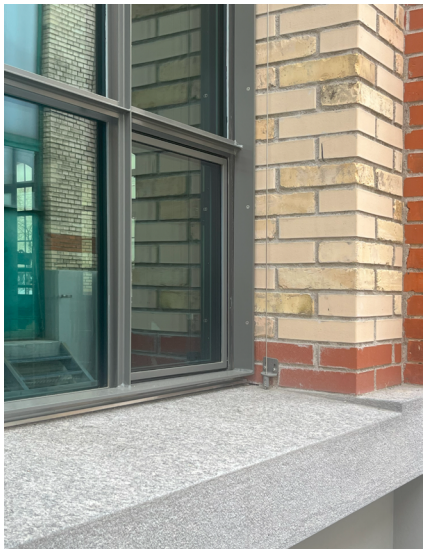


Fig.2.60 Intervention to glazing: new window frame with addition of an outside structure to mirror the former rythm

The visit inspired me immensely, not only on an architectural and functional level but also on the topic of landscaping. Small interventions in the public space revive some of the industrial features. The presence of the old rails, the position of construction parts here and there and the patchwork of pavement. Referring to the oldest construction, a red drainage channel emphasizes the entrance of the former coal mine (source: Public Space).

Fig. 2.61 Original rails and steel construction elements create an industrial atmosphere



Fig. 2.62 Red drainage pipe signifies the entrance of the former coal mine



Fig. 2.63 The largest open public space at the site, the Katherina-Sulzer-Platz , defined by restored crane tracks



Part III

Design

The design follows the research on manufacturing sites and the case's analysis. Combining both topics, the site will be regenerated into a mixed-use area with starting points from a social, spatial and heritage perspective. This part of the booklet dives into the graduation design where architecture and technology are developed simultaneously. First, the overall idea of the design is explained with its starting points and general overview focusing on functionality, infrastructure and the masterplan. Next, the design is divided into three chapters: the landscape design, Montagestraat and the KloosHal. The technical elaboration of the Montagestraat and the KloosHal is explained in PART IV.

STARTING POINTS

a. Social perspective

Alblasserdam would benefit from a more grounded housing program where small-scale and encountering is a feature. By introducing an innovative way of living together, the community can count on each other rather than being dependent on higher institutions. To strengthen Ablasserdam's weakened relationship with the water, the waterfront is opened up towards the public making a new public area for recreation and social engagement.

Fig.3.1 Bedrijvig Hollands Dijkdorp (source: based on Structuurvisie Alblasserdam 2040)



STARTING POINTS

b. Spatial perspective

With its great location next to the water and its immense size, the area offers many possibilities for redevelopment. Nevertheless, the area also creates some tension for the surroundings. Later expansions have created narrow and dark areas on the West-Kinderdijk. The difference in scale between the small dike houses and the massive anonymous industrial building creates a weird atmosphere. Additionally, the building creates a visual and spatial boundary towards the water. Opening up the structure would create a better connection between Alblasserdam and its waterfront.

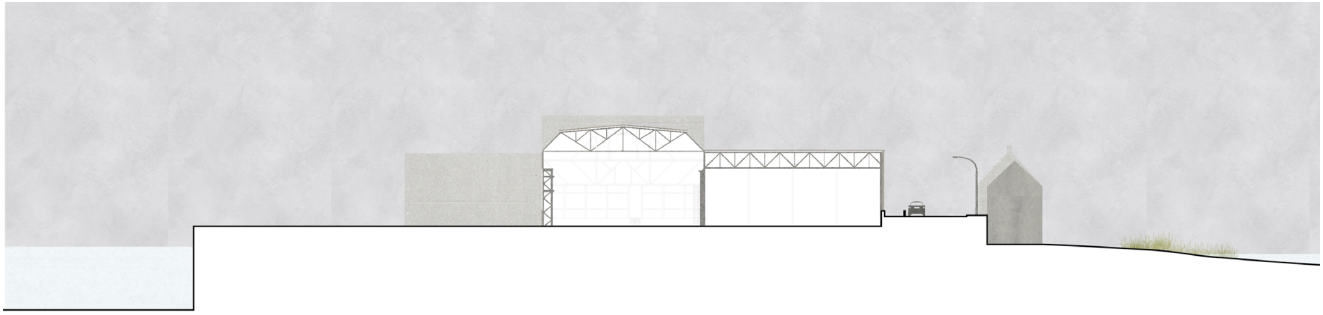
Fig.3.2 Visual bandary created by the industrial hallls (drawing by Paul Fucarev as part of the group work)



Fig.3.3 Narrow street (drawing by Paul Fucarev as part of the group work)



Fig.3.4 Section of the current structure



STARTING POINTS

c. Heritage perspective

The history of the location is versatile. Starting as an agricultural area, it was developed into a lively and busy industrial site which grew over time. The growth with its peak around 1950 resulted in the existing fabric. Subsequently, the deindustrialization had its effect on the industrial activity of the company as well. It has now been vacant for over 20 years which has had some consequences for the material fabric. The site now resembles this downfall with a melancholic atmosphere of desolation. In the redevelopment, not only the high industrial activity is emphasized but also what came before and after as all the stages are important for the location's history.

Fig.3.5 Agricultural landscape (source: Topotijdreis)



Fig.3.6 Start of the industrial activity (source: Historische Vereniging West-Alblasserwaard)

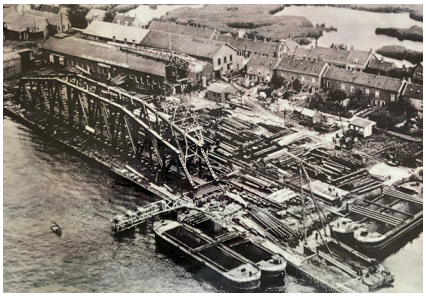


Fig.3.7 High industrial activity in the 20th century (source: Historische Vereniging West-Alblasserwaard)



Fig.3.8 Vacancy and decay in the 21st century



INFRASTRUCTURE

Kloos Kinderdijk has a valuable position in the urban network. Its great proximity to Dordrecht and Rotterdam through various transportation types (car, train, (water) bus and watertaxi) makes the area well-connected with its larger surroundings.

Zooming in a bit more, the nearby UNESCO World Heritage site of Kinderdijk lures people to the area. Kloos Kinderdijk has a significant position inbetween Kinderdijk and Alblasserdam located next to the connection street of both towns.

The main access routes of Kloos Kinderdijk are the West-Kinderdijk (Alblasserdam and Kinderdijk), Het Zwarte Paard (Alblasserdam) and Molenkade (windmills of Kinderdijk). The whole site is a slow-traffic-only area to ensure safety and a pleasant environment. To make this possible and to comply with parking demands, a parking space is built on the edge of the site right next to the dike.

Fig.3.9 Urban infrastructure

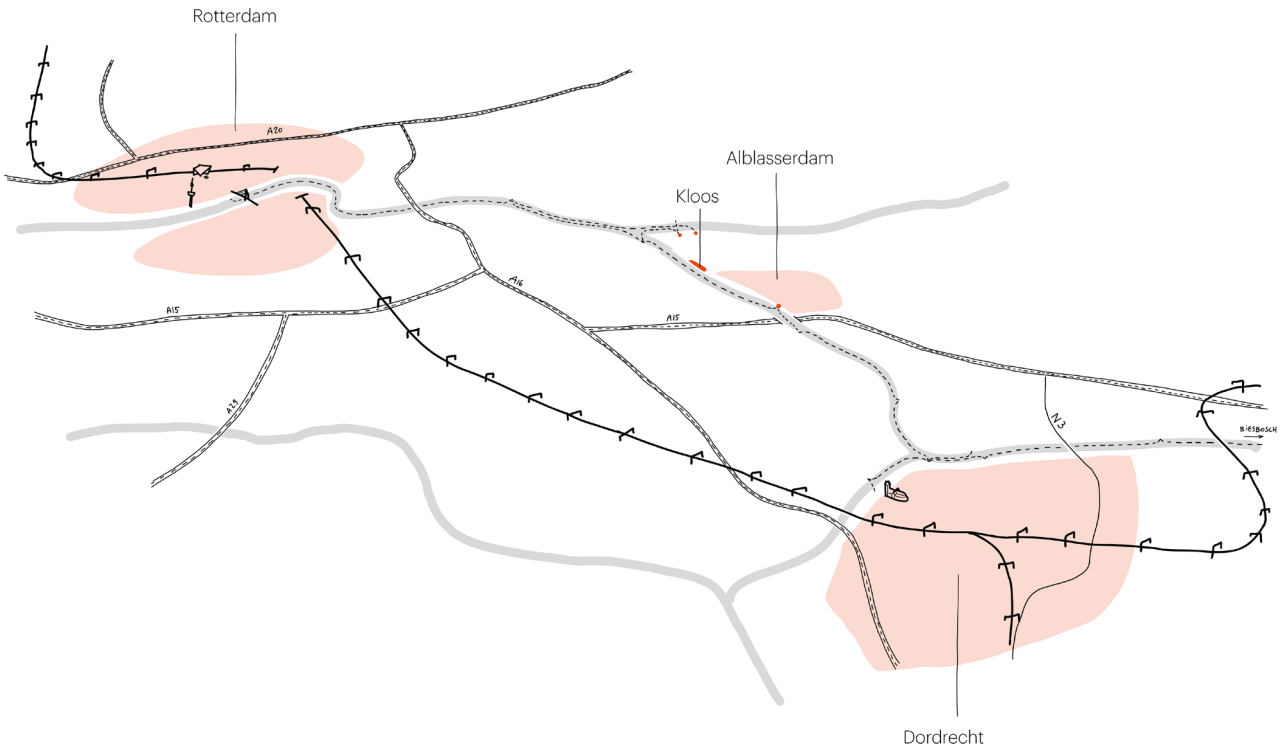


Fig.3.10 Regional infrastructure

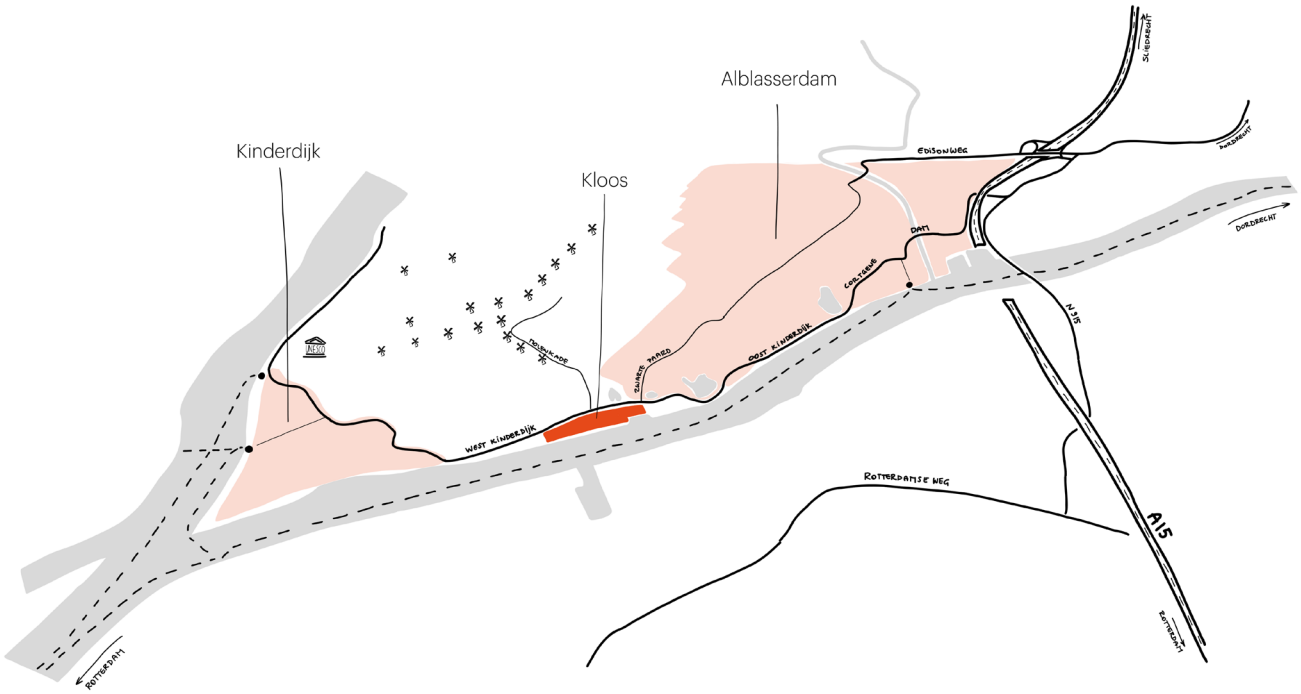
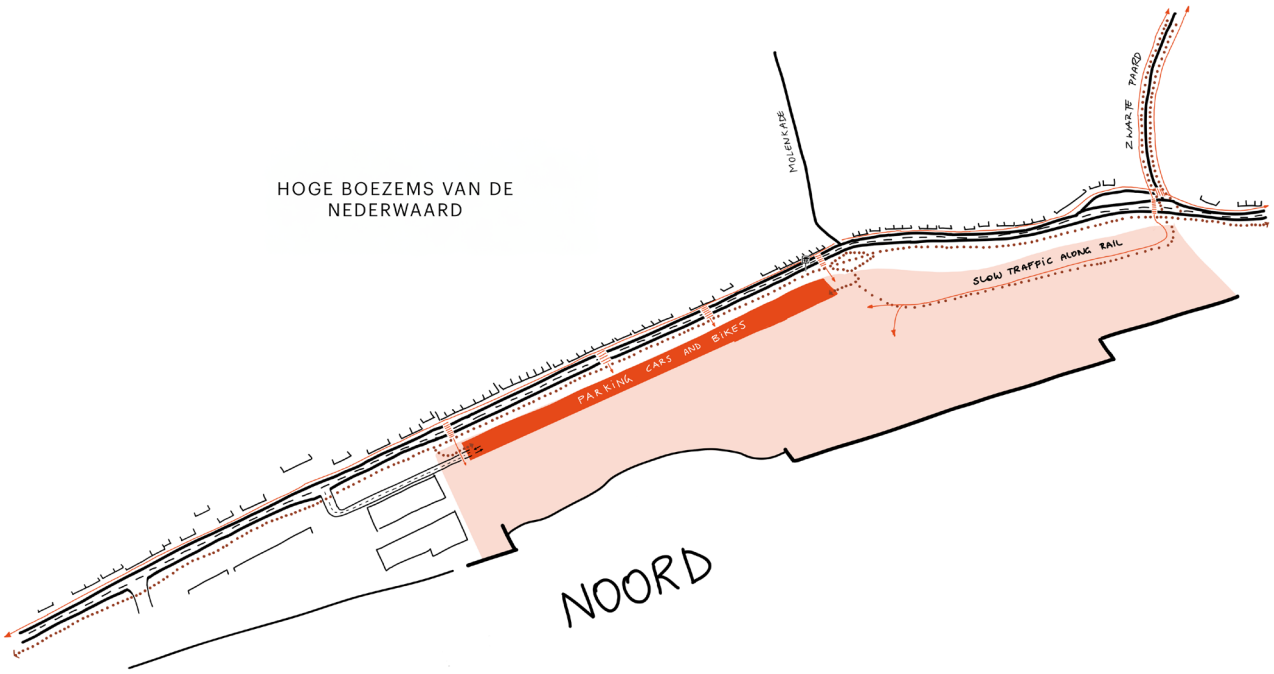


Fig.3.11 Local infrastructure



FUNCTIONALITY

The area is developed into a mixed-use program combining residential, recreational and commercial spaces. This creates a versatile spectrum of users and time of use. In between the different users and programs, they can benefit from each other's presence at the site.

The Montagehal is transformed into the Montagestraat, a multigenerational complex where families and elderly people support each other in both directions.

Being well-accessible and near larger infrastructural networks, the area offers a great opportunity for public development as well. The Hoge and Lage Hal in its turn is developed as a public area, the KloosHal. The shops, restaurants and cafés offer a wide range of services for visitors and residents of Ablasserdam. Furthermore, the hall also creates office spaces for smaller companies and startups where productivity and innovation find their way back to the location of Kloos Kinderdijk.

Fig.3.12 Program, network of users

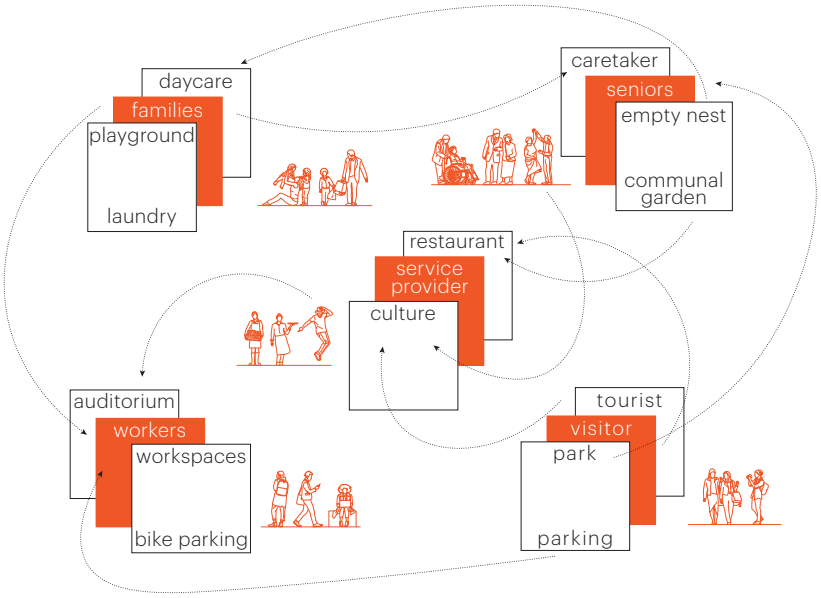
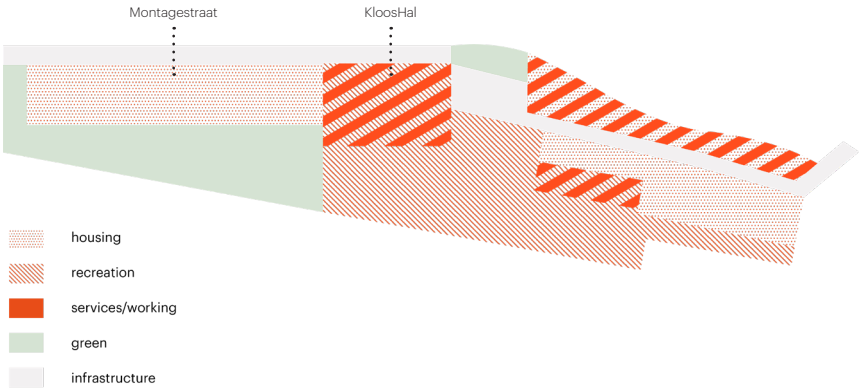


Fig.3.13 Zoning functions



INDUSTRIAL HERITAGE APPROACH

The choices made towards the industrial heritage stem from the value assessment conducted at the beginning of the semester following the Brand-Riegl-Roders matrix and the value assessment made as a result of the Research Paper. Furthermore, the analysis of the state of the existing also plays an important role in defining whether something is still repairable.

The first approach is focused on the demolition of largely damaged building components such as the later annexes. The whole façade of the Verfspuitcabine contains asbestos whereby needs to be dismantled as well. The decision is made to demolish the Dijkloods as this creates too big of a problem spatially with its surroundings. The skin of the Montaghal is also stripped as this is in a very bad condition as a result of decay.

Following demolition, all the steel structures are kept. The present rails on site are as well and by removing the weeds they are made more visible. For the Hoge and Lage Hal, the blue cladding panels are removed and the original brick façade is made visible again. All the overhead crans that are still present in the halls are kept.

By reintroducing some elements, the industrial history can be retold. Originally, the rails were all over the site. By extending them in some way, the trace is returned. Looking at archival pictures, a former blasting facility was located between the Lage Hal and the Verfspuitcabine. Tracing the footprint of this facility shows the density of the industrial halls. Over time, the company logos have disappeared, reintroducing them will make the area stand out again.

Fig.3.14 Industrial heritage approach: demolish

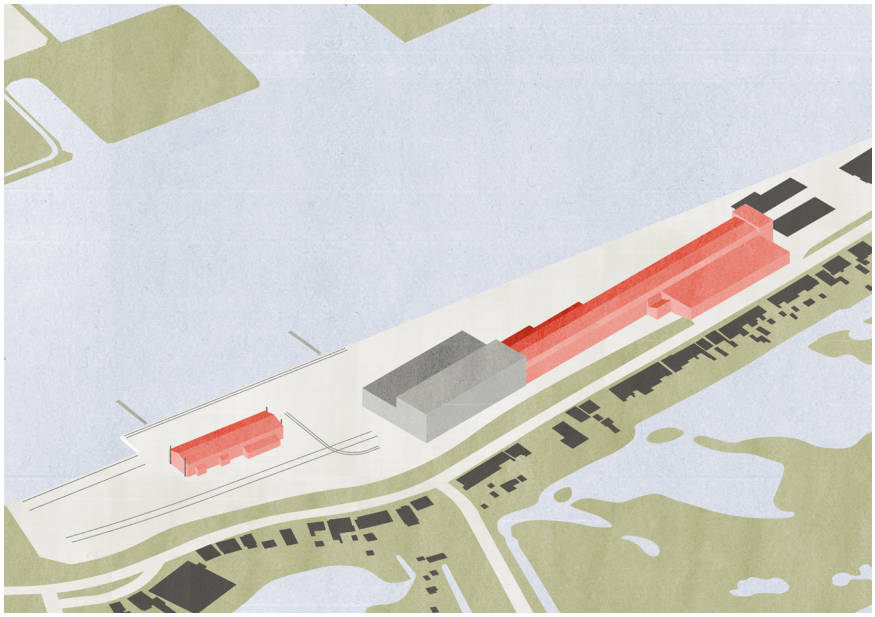


Fig.3.15 Industrial heritage approach: keep

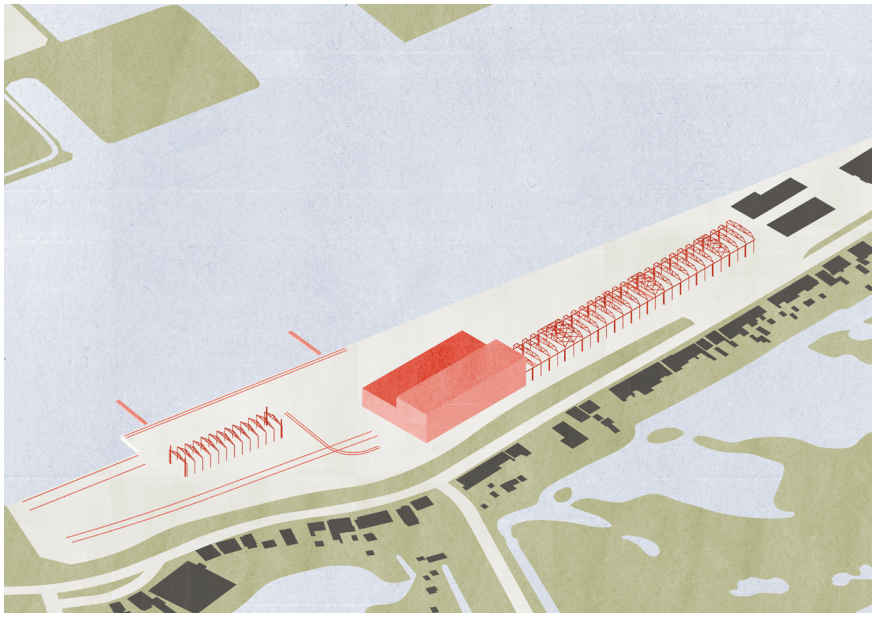
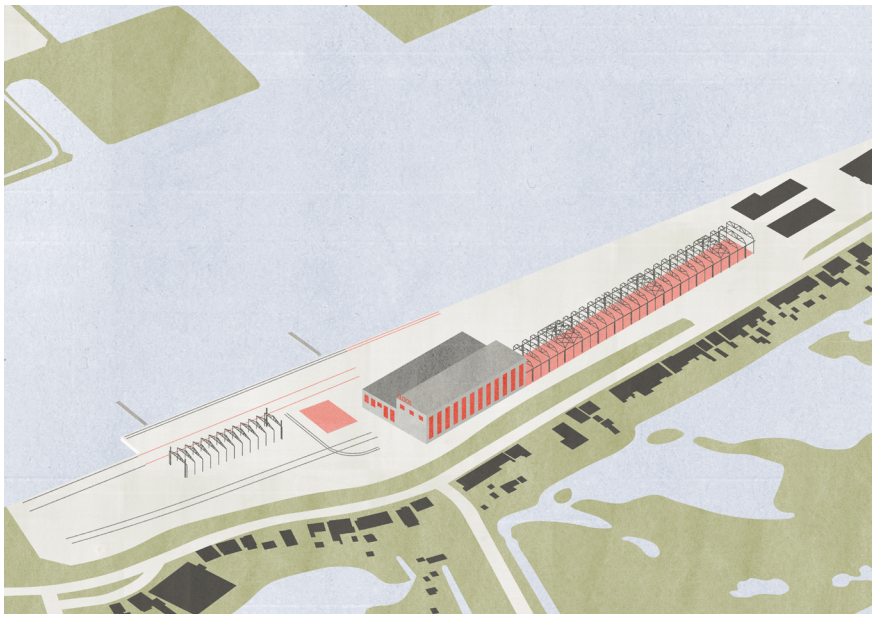


Fig.3.16 Industrial heritage approach: reintroduce



MASTERPLAN

The whole site is opened up to the public. In between the trusses of the former Montagehal, the Montagestraat creates communal space for the residents. The quay near the housing is broken out to create a small-scale tidal park and give more space to the Noord. Along the waterfront connecting the tidal park and the hardened quay there is a path. On top of the parking space, a wildflower park creates a buffer zone between the dike houses and the former industrial site. The rails function as a way of creating a connection axis along the area.

As part of the masterplan, a part of the area is proposed as additional residential development. But as changes over time are characteristic of industrial developments, the masterplan is open to changes. In a sequence of developments, first, the Montagestraat and the KloosHal are developed. Later, the other side of the area can develop into housing, public space or more functional green space.

Fig.3.17 Masterplan 1:2.000

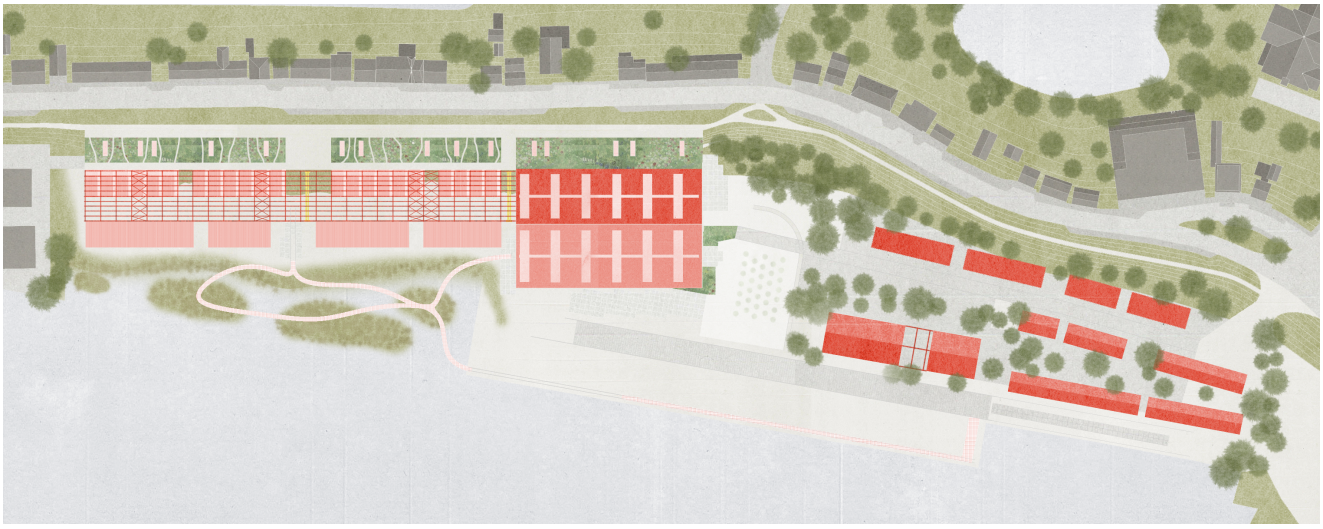


Fig.3.18 Stage 0: current state



Fig.3.19 Stage 1: removal of site elements and casco renovation

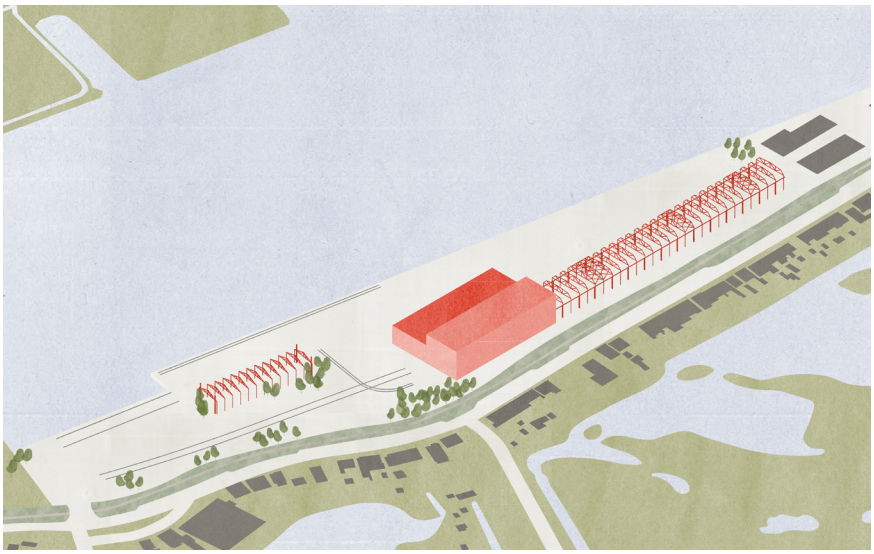


Fig.3.20 Stage 2: first developments: main building and quay



Fig.3.21 Stage 3a: developing housing



Fig.3.22 Stage 3b: developing public space



Fig.3.23 Stage 3c: developing nature



LANDSCAPE

a. Design

The landscape design is based on some core choices from the heritage perspective. By keeping the rails and extending them, more of the diagonal lines are recurring. Furthermore, the tidal park gives a nod to the agricultural past as a griend field. The transition from an industrial quay to a natural park is given form by stepping stones which additionally create a nice outdoor seating area close to the water.

The footprint of the former blasting facility is emphasised by TREE. These give the impression that something was there while keeping a see-through vision possible.

On the roof of the parking space, the bike path is widened creating an additional walkway. Creating some passageways in the Montagestraat, the dike is connected with the public waterfront. By reusing the bricks from the façade of the Montaghal and the stones of the floor in the halls, new walkways are created by remembering the past.

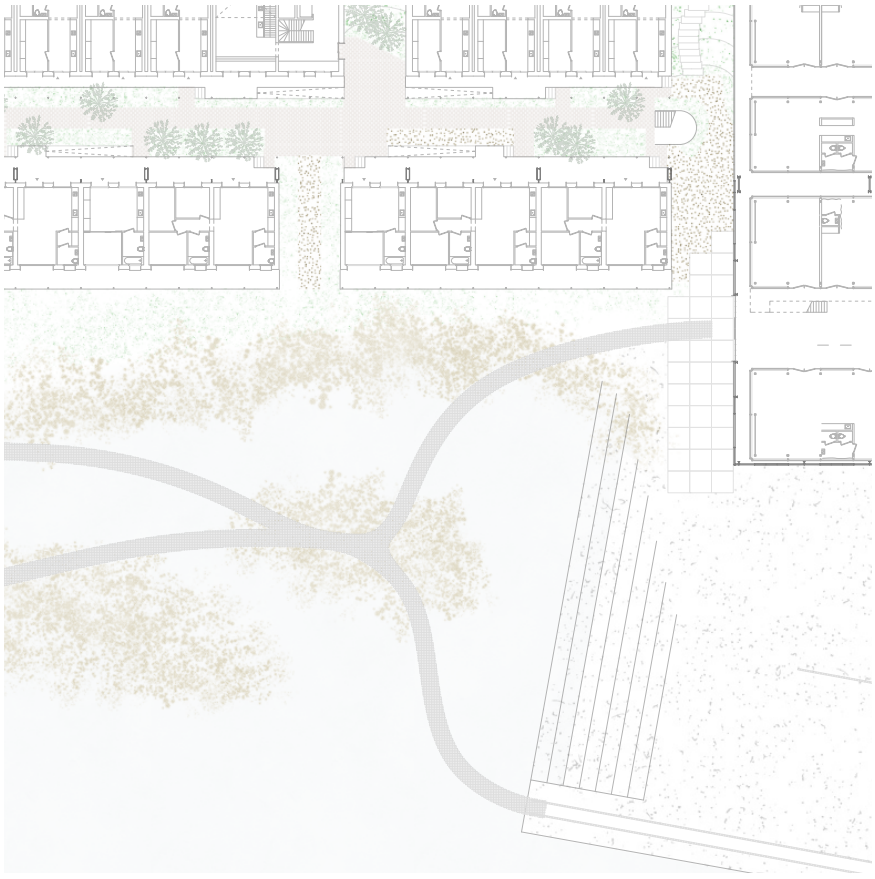
Fig.3.24 Landscape design



Fig.3.25 Trace of Verfspuitcabine



Fig.3.26 Transformation of the quay



LANDSCAPE

b. Public path

The public path along the waterfront reflects the duality of the site's history, natural griend and later industrial developments. It transforms the first developed area back into its past structure. With the idea that everything works as a cycle. When the path crosses the tidal park, it takes an organic shape. Once developed, the reed will start growing and can grow through the holes of the metal grating panels that are floating above the water on poles.

At the hardened quay, the path changes from a floating platform above existing rails to a path made from the stelcon slabs between the wide rails.

When following the path, the visitor gets an overview of the whole industrial site and is educated on the different components with information plaques along the route.

Fig.3.27 Pathway along the waterfront combining natural and industrial elements

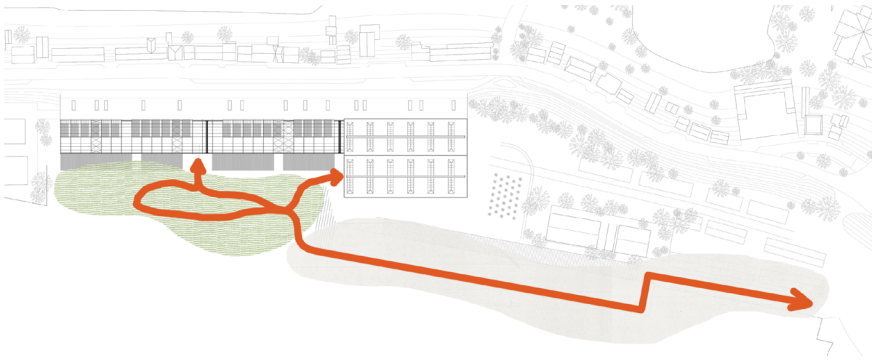


Fig.3.28 Natural elements of the path

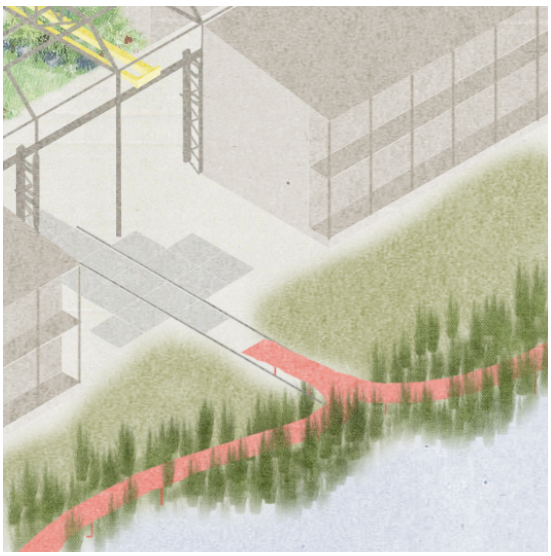


Fig.3.29 Transitional elements of the path

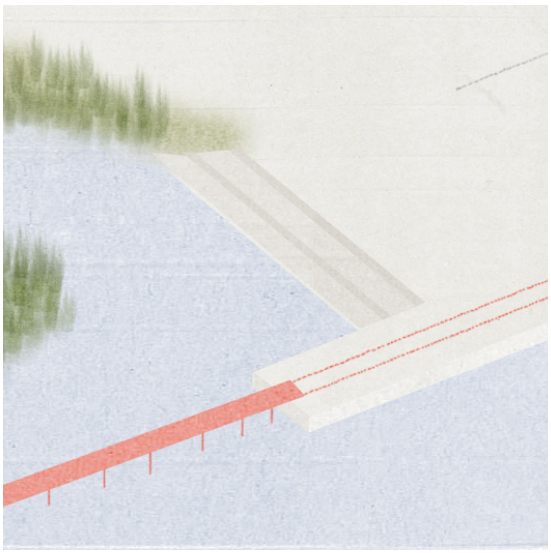
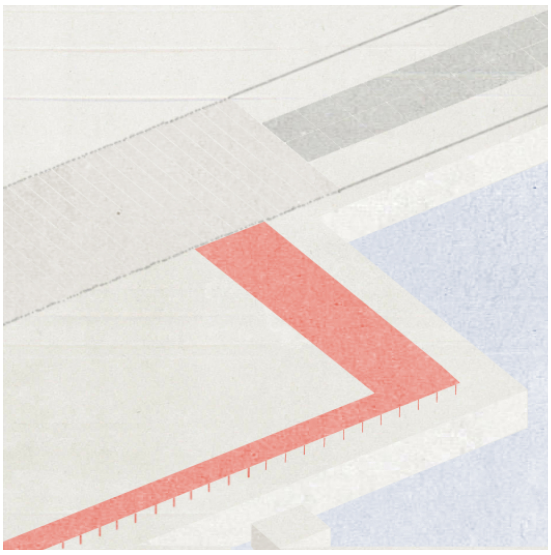


Fig.3.30 Industrial elements of the path



LANDSCAPE

c. Patchwork of pavements

By building on the existing patchwork of pavements, the language continues. The existing patchworks are a result of changes over time. They are a combination of different pavements: concrete, bricks, stelcon slabs, and stones.

The new patchworks are designed deliberately. It creates a variety of pavement typologies by reusing existing materials (brick and stone). Playing with the density of the material, the public space is zoned in a tactile way while enabling accessibility for wheelchair users. Deviating from the central axes, the density of the hard material is lowered by the incision of soft materials such as grass and gravel.

Existing rails are extended with a line of bricks to differentiate the past, present and future languages. The past is retold by extending the existing with a new material.

Fig.3.31 Existing patchwork at the Montagestraat



Fig.3.32 Existing patchwork in front of the KloosHal



Fig.3.33 New patchwork in the Montagestraat

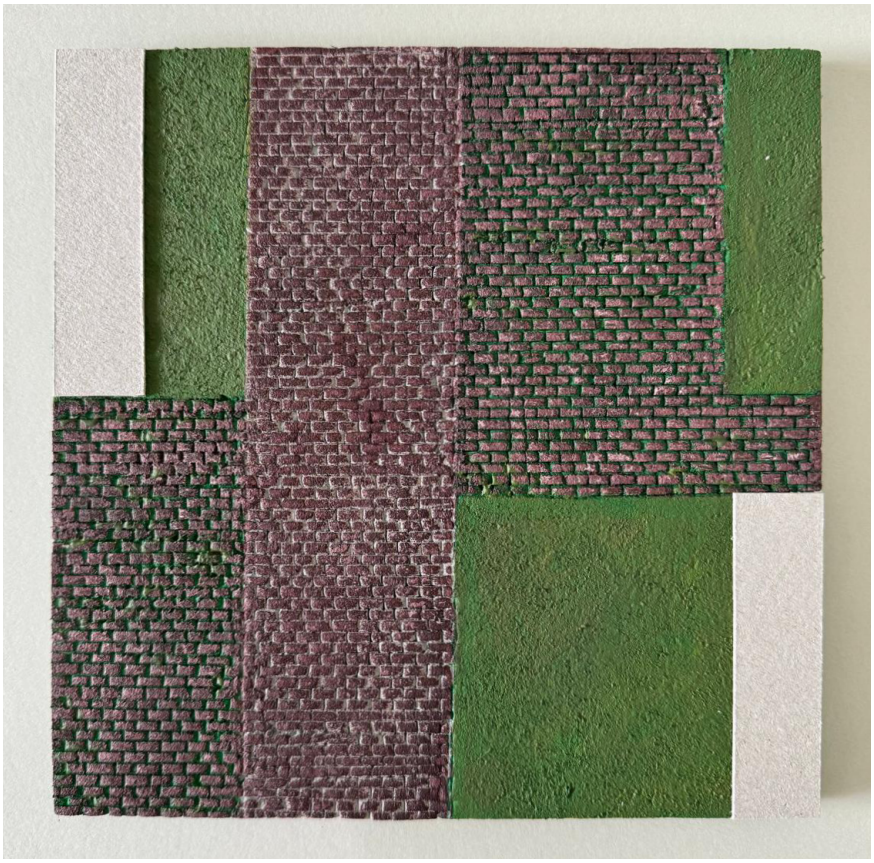
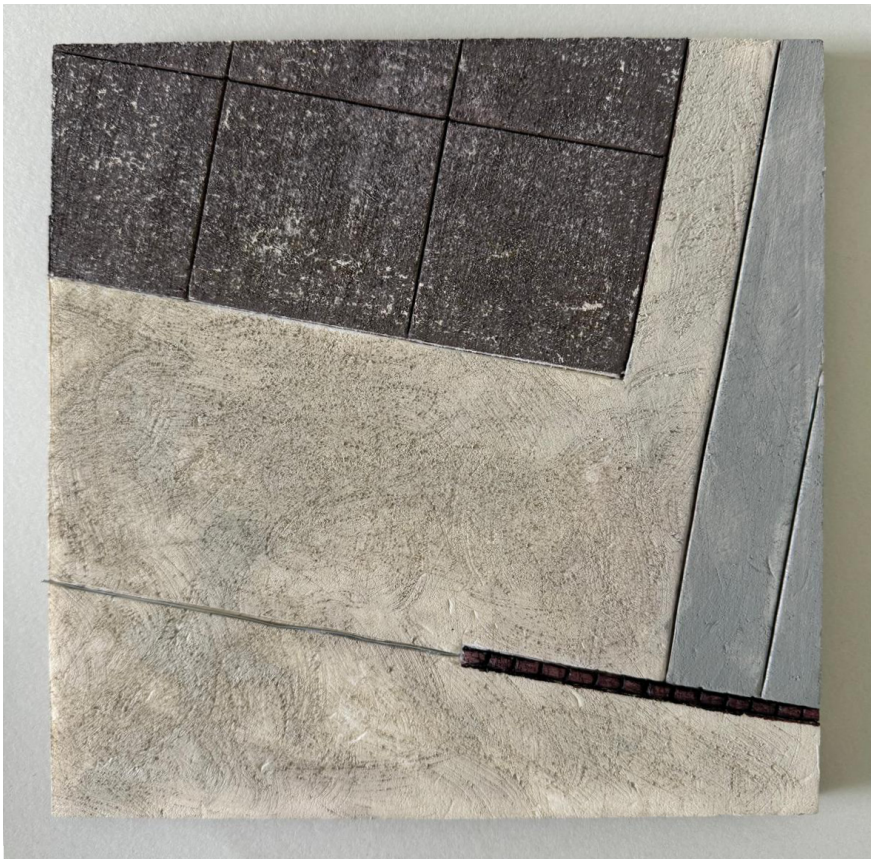


Fig.3.34 New patchwork at the waterfront



MONTAGESTRAAT

a. Multigenerational housing

Multigenerational housing has been around for centuries. Only now it has regained momentum as there are many benefits to it: sharing caregiving responsibilities in both ways, cultural and social engagement. By looking at references, there are some recurring design aspects to create a successful multigenerational complex.

Communal areas function as the heart and lungs of the complex, they are extensions of the private living quarters of the households. Common shared spaces are a large kitchen and a dining area, a living room where families can gather, laundry rooms and guestrooms. The private living quarters are much like a regular apartment other than that thanks to the shared spaces they can be set up more compactly. No need for a second bedroom for guests, no need for a large bathroom with space for a laundry machine, ... In addition to the indoor spaces, an outdoor communal area is of great importance. Play areas where all the kids can enjoy their free time together in proximity to their homes and places for encountering one another and organising larger gatherings. Nevertheless, private outdoor areas are also essential such as a balcony or a small garden to allow personal relaxation.

Another recurring feature is the amount of households that relate to a common space. Understandably, if the residents from fifty units all come together in the common areas, there is not much of a communal atmosphere as that is quite a big amount. Therefore, references often divide the units into compartments with their own shared space.

Specific to multigenerational housing is the differentiation of ages sharing the space. Elderly people can count on the more vibrant and fit to look after them as well as families can count on the retirees to watch after the young kids from time to time. Taking into account mobility, accessibility is an important part of the design.

By designing different sizes of units, people get the opportunity to stay in their community for a longer time. For example, if a family moves in and grows old, the kids move away and the parents can move to a smaller apartment that fits their new household. This way, they stay in their community and make space for a growing family in their old apartment.

MONTAGESTRAAT

b. Collective space

The Montagestraat is divided into two housing groups that both have their own collective space. The space is situated centrally in its housing group. Directly connected to the collective street and the gallery, it also functions as the main vertical circulation as the elevator is situated here. Functioning as circulation as well, it encourages sudden encounters with fellow residents.

The collective garden/street functions as additional outdoor spaces for the apartments. It can be a chaotic but lively place where all sorts of activities are happening at the same time. Being connected to the plinth and the gallery, it creates a multifunctional outdoor area being both practical and recreational.

The indoor shared spaces consist of a large living and dining room on the ground floor where larger gatherings can be organised, a dinner can be cooked but also boardgame evening can be organised. On the ground floor and the first floor, there is a laundry room. The guestrooms are accessible through the small kitchenette. There is one small room on the first floor and a bigger loft with one bedroom and an optional additional bedroom in the wintergarden. The other wintergarden can be used as a small office next to the quiet reading area.

Fig.3.35 Location collective spaces

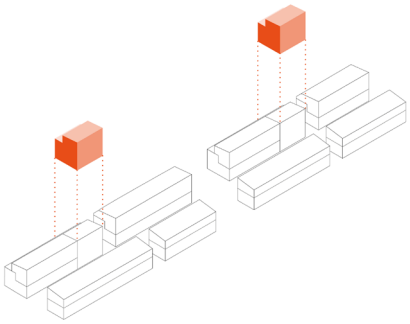


Fig.3.36 Social liveliness in the Montagestraat



Fig.3.37 Ground floor collective space



Fig.3.38 Cross section collective space

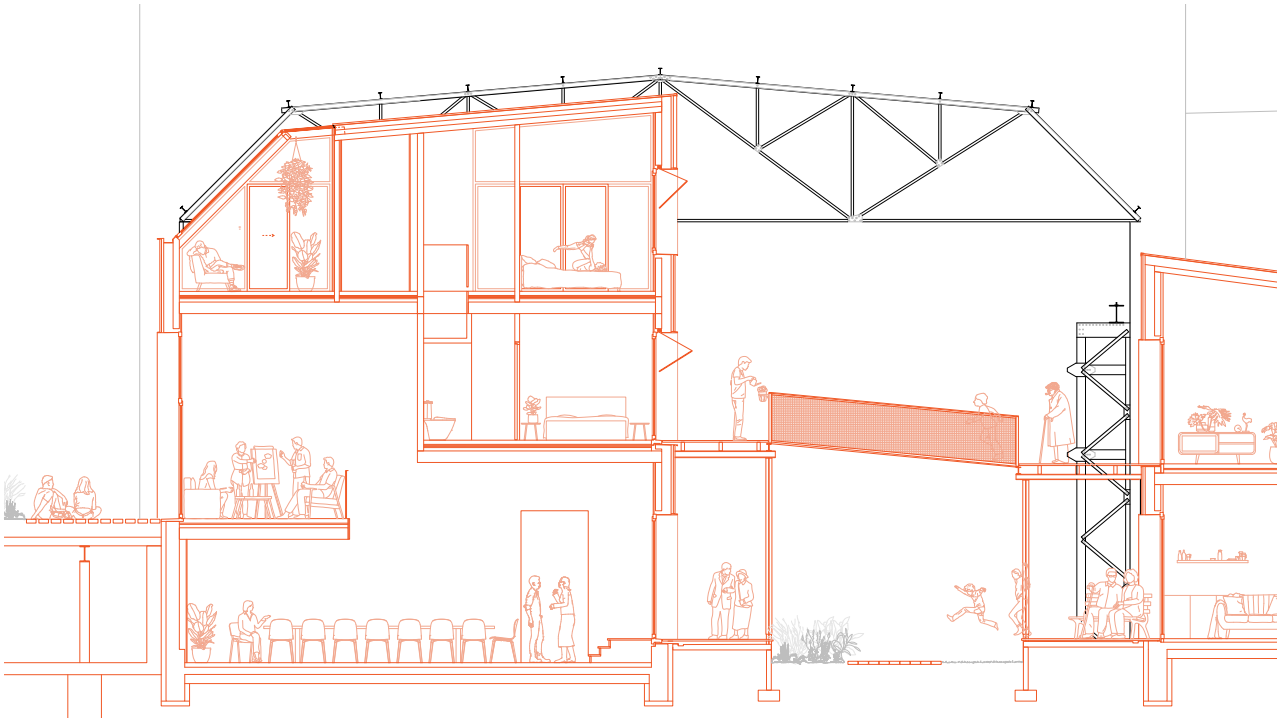


Fig.3.39 First floor collective space

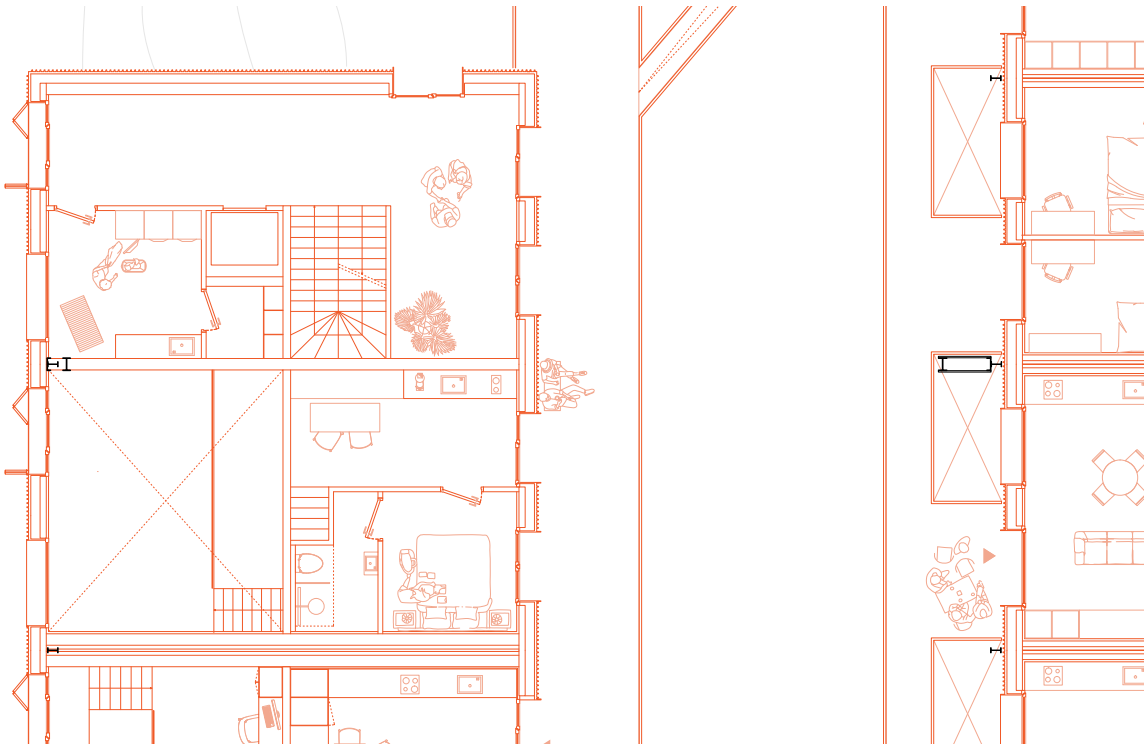
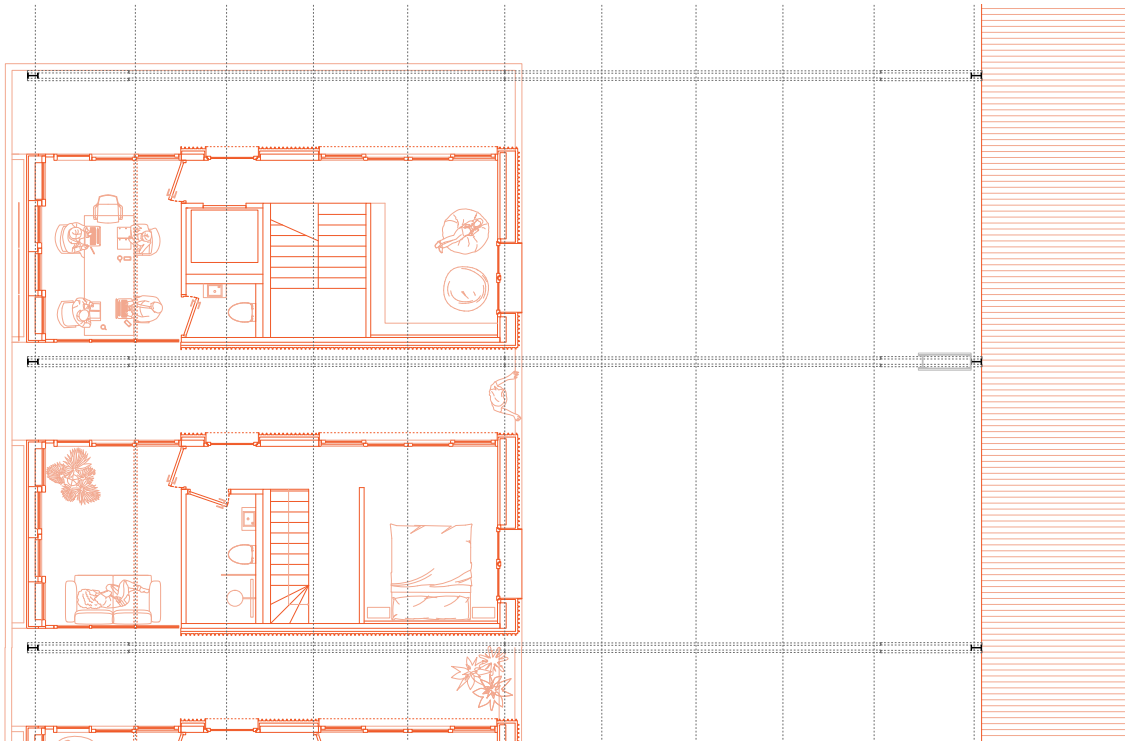


Fig.3.40 Second floor collective space



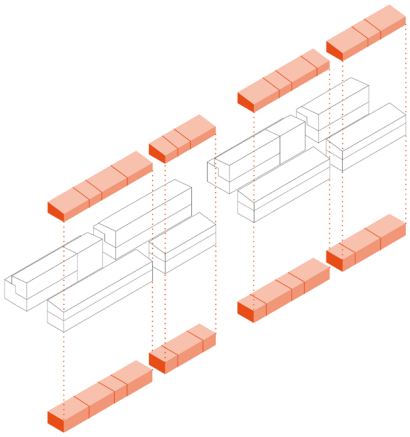
MONTAGESTRAAT

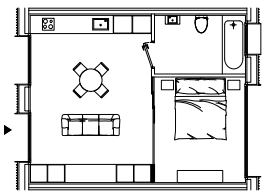
c. Housing typologies

As part of the effectiveness of the multigeneration design, there are different sizes of apartments. The first typology is the waterfront apartment. These are completely wheelchair accessible both in their architectural design and circulation wise. The waterfront apartment is either a small loft unit with one bedroom or a big apartment with three bedrooms suited for families. At the waterfront façade, all the apartments have a little balcony for private outdoor relaxation.

The second typology is built next to the dike, the dike apartment. This apartment type has two bedrooms, on on the ground floor and a bigger bedroom on the first floor. To solve the height difference as a result of the underground parking space, a large atrium gives this apartment a spacious feeling regardless of its compactness. The private outdoor area is a small garden at the West-Kinderdijk.

Fig.3.41 Waterfront apartment typology





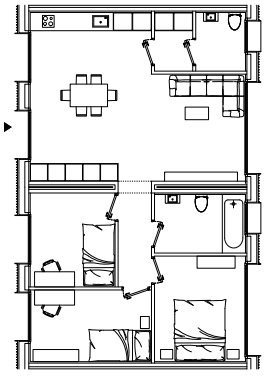
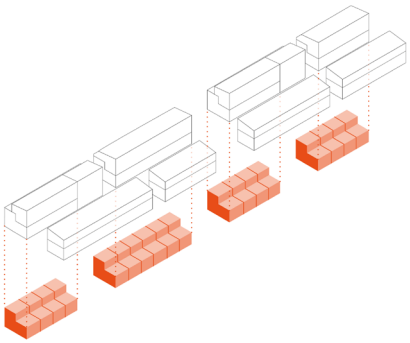
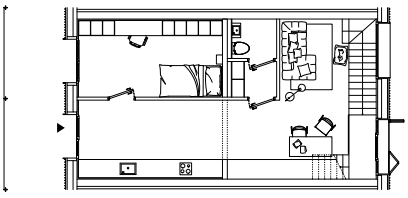
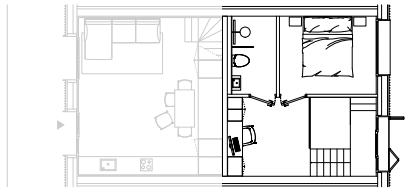


Fig.3.42 Dike apartment typology

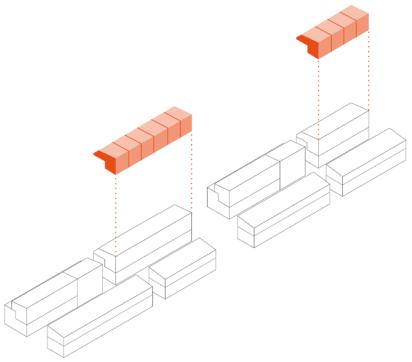


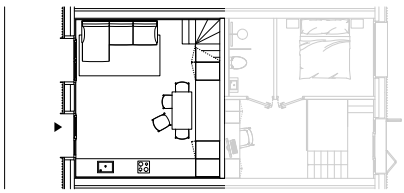




The last two typologies, rooftop apartment and the wintergarden loft, are mostly similar. Accessible from the gallery, they have an open living space on the first floor. The sleeping quarters are located on the second floor between the trusses of the existing steel construction. There is a large bedroom at the side of the Montagestraat connected to the balcony. The difference between these two typologies lies in the space at the back of the apartment. The rooftop apartment has an additional bedroom here, whereas the wintergarden loft has a semi indoor/outdoor area. A glass construction covers this space making it an additional indoor area in winter and the large sliding windows give the possibility to completely open up the space in summer.

Fig.3.43 Waterfront apartment typology





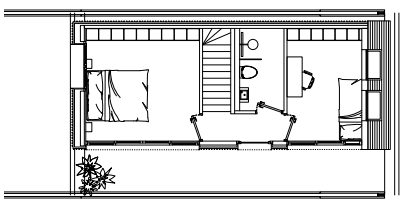
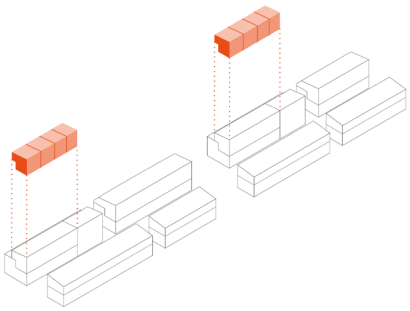
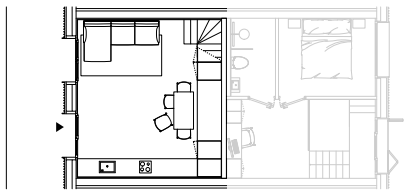


Fig.3.44 Dike apartment typology





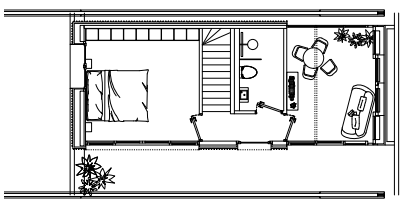


Fig.3.45 Section housing

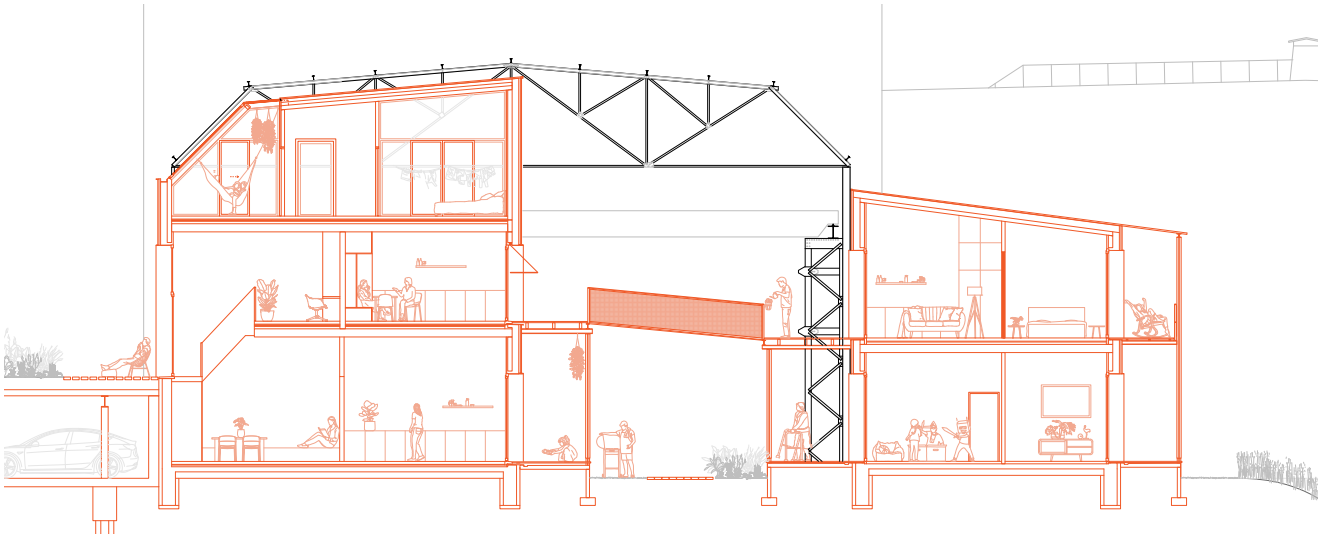


Fig.3.46 Wintergarden

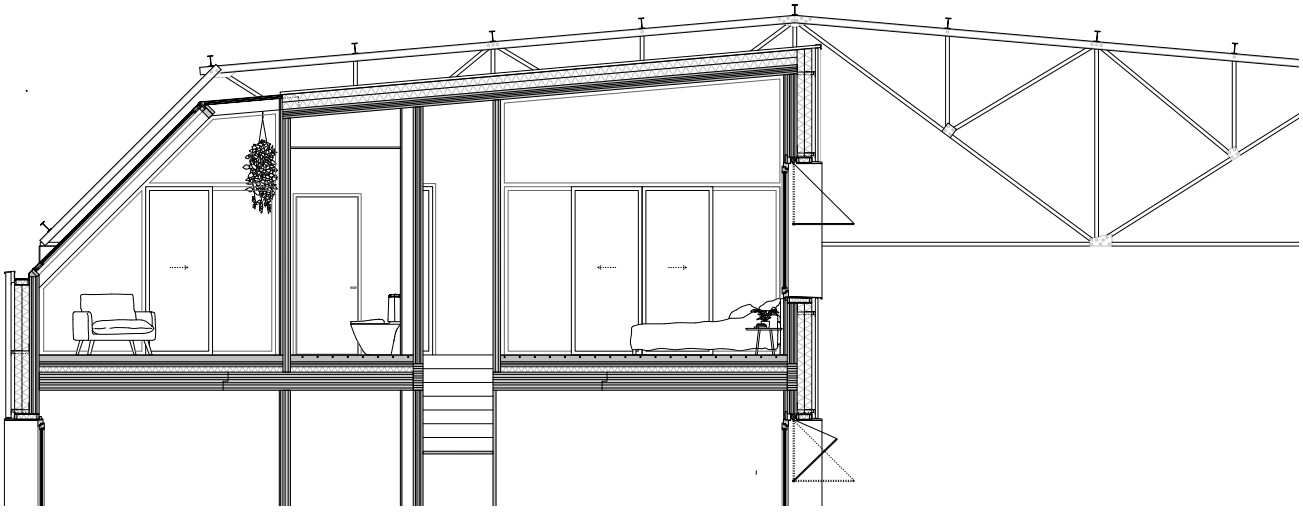
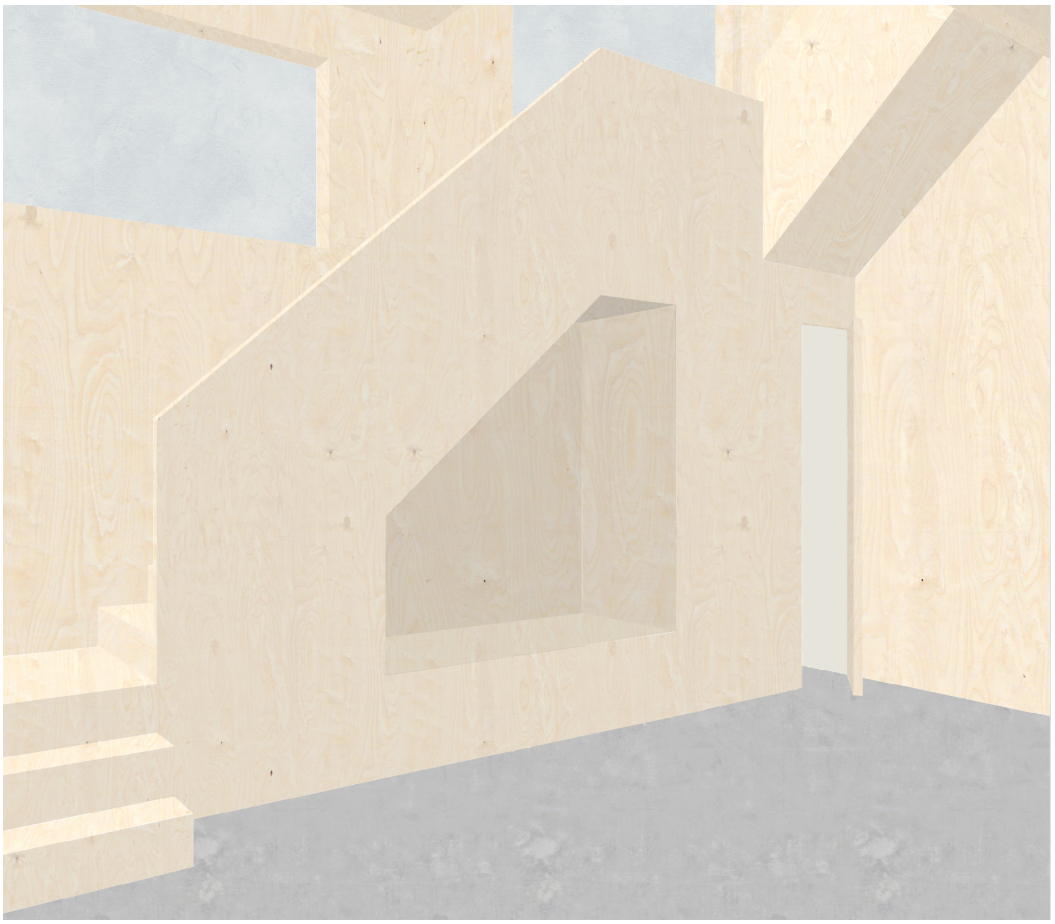


Fig.3.47 Interior impression staircase in dike apartment



KLOOSHAL

a. Box in box

The public function is housed In the former Hoge and Lage Hal, now the KloosHal. By implementing the box-in-box system, the existing structure is kept intact and the largeness of the space can be used efficiently. The boxes are placed in a way that a central axis forms a public indoor boulevard and larger open spaces are kept free for big gatherings and organised events. The upper floors are accessible through a gallery that is connected to the elevators in the unit of the technical rooms. These rooms are kept visible so the visitors are made aware of the technical support of the building.

In the boxes, separate units with different sizes enable a differentiation in functions. Smaller units are 6x7.5m, medium units are 9x7.5m and the large units are 12x7.5m. The ground floor is mainly interesting for commercial spaces such as shops and cafés, whereas the upper floors are preferred for office spaces and workshops. The differentiation of the units creates a lively and varied public activity.

Fig.3.48 Ground floor KloosHal

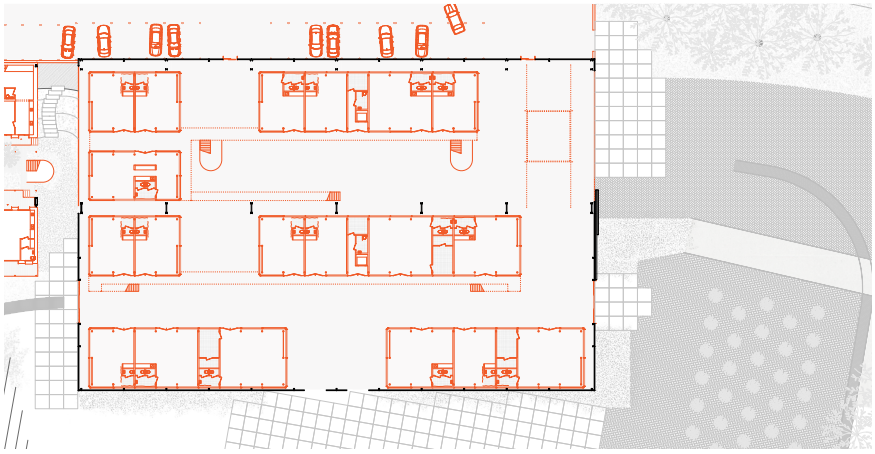


Fig.3.49 First floor KloosHal

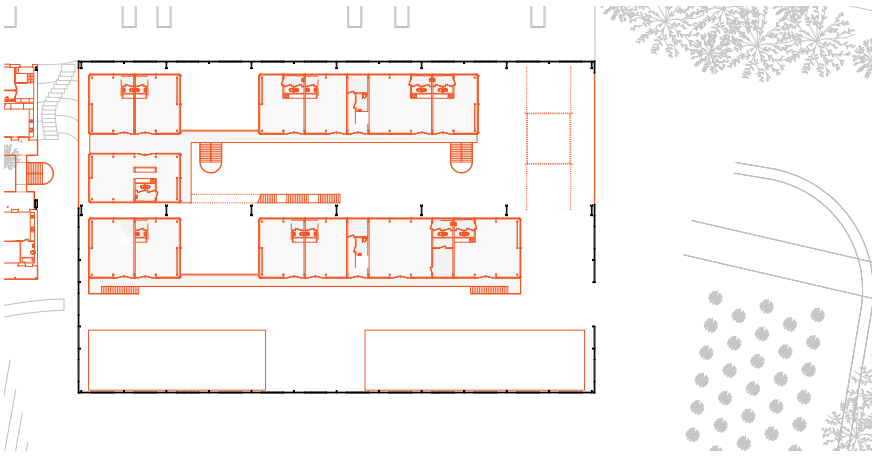


Fig.3.50 Section KloosHal

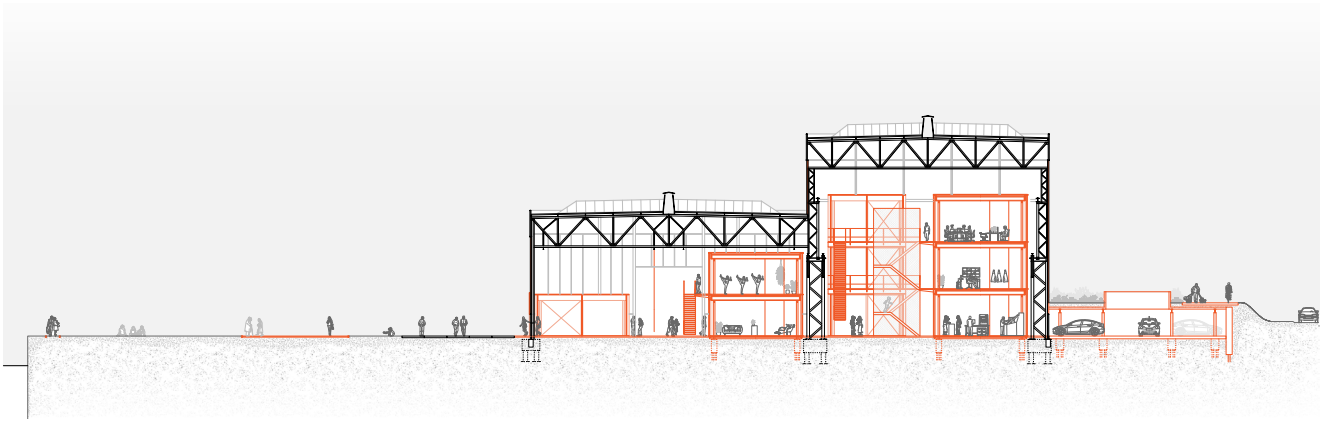


Fig.3.51 Variation of units



KLOOSHAL

b. Intervention to the exisiting

Although the box-in-box system requires no adjustments to the existing structure, some interventions need to be made in order for circulation to improve. By opening up the brick façade and inserting an up-sliding door, the public indoor space is directly connected to the public square in front. Secondly, the existing openings in the lowest hall are used as the main entrance. A frame which fits in the opening sticks out a bit to be visible as the main entrance point.

Fig.3.52 Intervention in brick facade

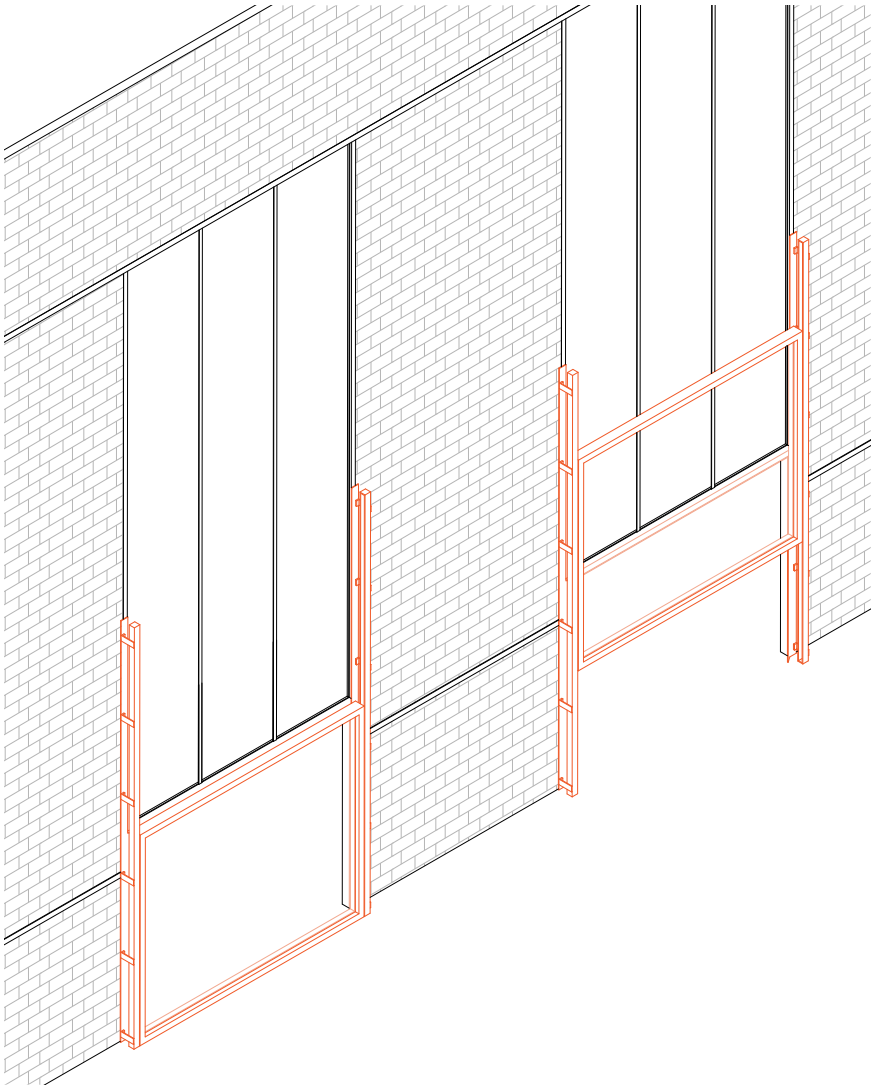
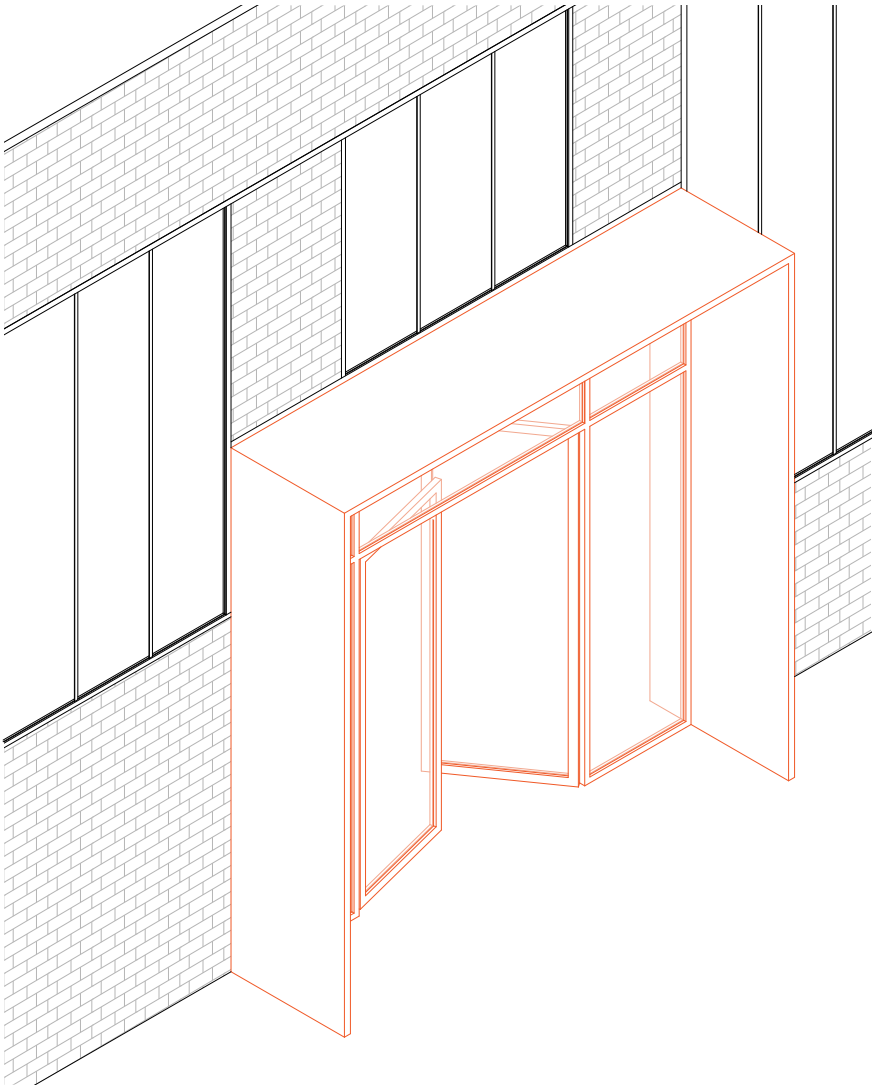


Fig.3.53 Accentuation of the main entrance in an existing opning



KLOOSHAL

c. Merconpavilion

With the archive drawing as an inspiration, a hanging pavilion refers to the functionality of the heavy steel structure: carrying heavy loads. From the archival drawings, it can be concluded that the steel structure in the Hoge Hal was designed to carry a load of 15 tons twice. Considering a changeable load of 5kN/m2 for a public gathering function, the pavilion is designed as a hanging steel structure of 6 by 7 metres.

The pavilion is located above a free area to experience the hanging structure. The existing sliding steel doors are pushed aside to make the pavilion visible through the new large window in the opening. The space can have a versatile use, from after-work drinks to speeches, lunch breaks and ceremonies, but even to hang out and feel free from the ground as you are hanging 8 metres above ground.

Fig.3.54 Archival drawing of the Hoge and Lage Hal (source: Regionaal Archief Dordrecht)

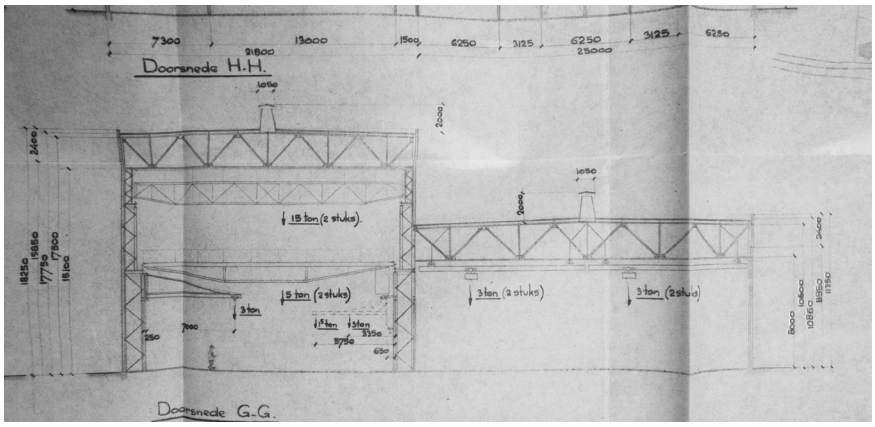


Fig.3.55 Sketch of Merconpavilion

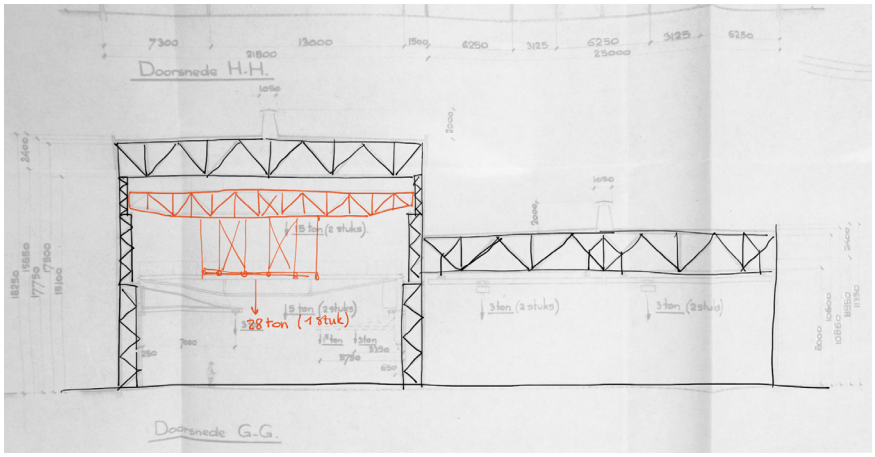
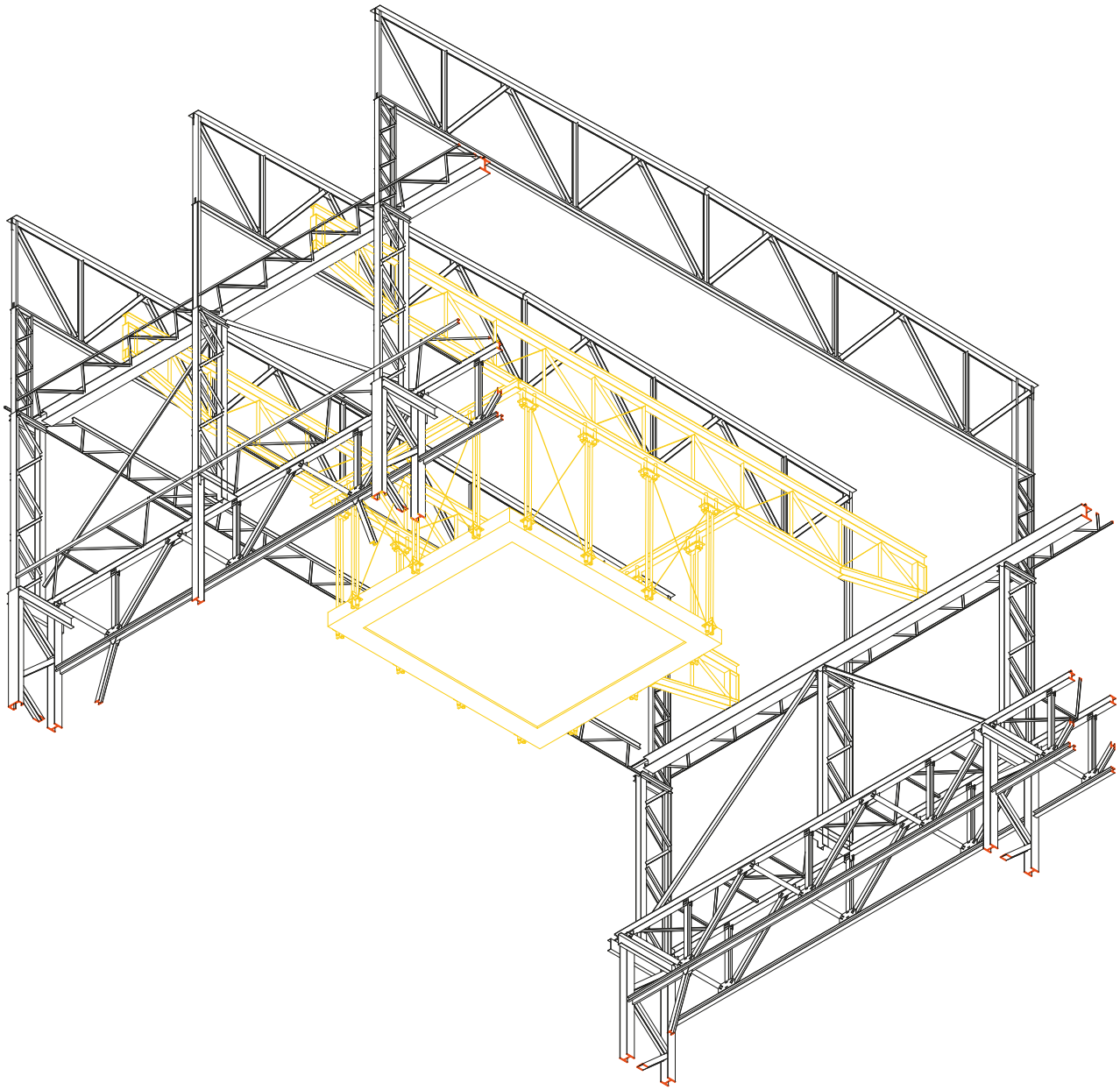


Fig.3.56 Southfacade with visible Merconpavilion

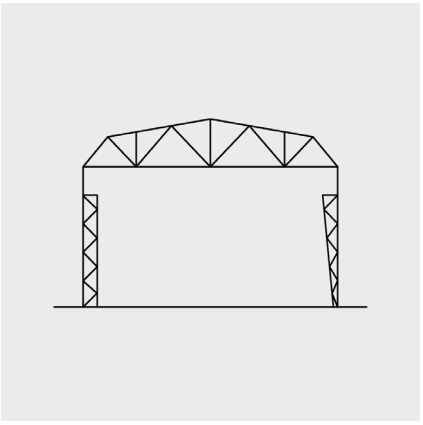


Fig.3.57 Merconpavilion



a. Tangible values

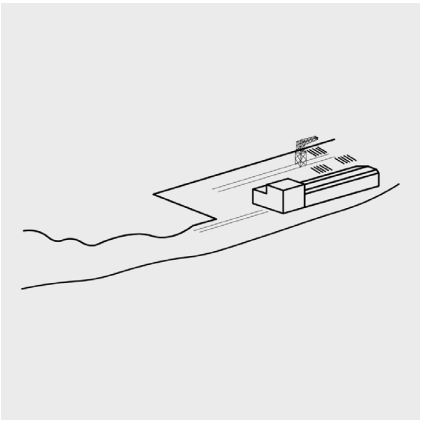
Fig.3.58 Material fabric



Material fabric

The magnificent steel structure is kept intact, where needed it is repaired. In the KloosHal, the steel structure is kept as it is without painting it, this way the graffiti from over the years stays visible. Since the steel structure in the Montagestraat is subject to the outdoors, the steel will be treated and painted in grey. The materials from the demolishments are reused in some cases for the landscaping of the area.

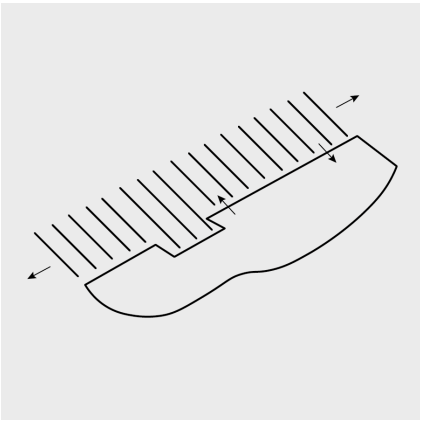
Fig.3.59 Components



Components

The patchwork of pavements is an important element in the design. By inserting spatial elements to retrace the site's history the complexity of industrial sites is regained. The zoning between the former busy area and the storage area is translated in the division of public/private area.

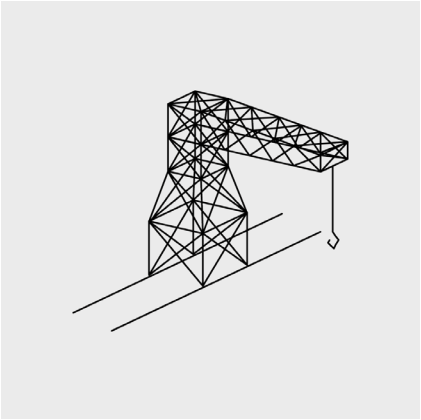
Fig.3.60 Setting



Setting

The water being its most important setting feature is put forward by the path following the line of the quay. Furthermore, by making the waterfront public the relationship between the residents of Ablasserdam and their water character is strengthened.

Fig.3.61 Machinery



Machinery

Where present, the cranes are kept in their original yellow colour and structure. The Mercon pavilion is a figurative architectural translation of a yellow crane hanging on a steel structure.

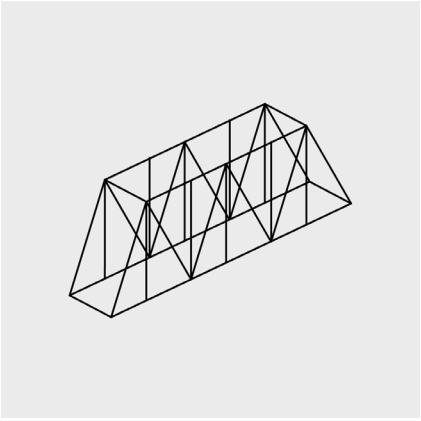
Fig.3.62 Written documentation



Written documentation

Archive pictures are displayed in the public KloosHal. Along the waterfront path, the information plaques tell the story of the site's history and its components using archival knowledge. As inspiration for the materialisation of the housing, the 'Kloos Kenmerken' poster functions as the main colour palette.

Fig.3.63 Goods created by the industry



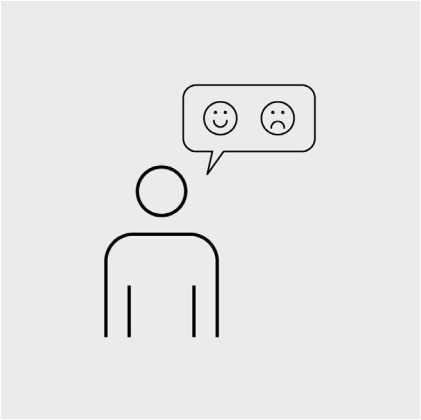
Goods created by the industry

Currently, there is no visible translation of the created goods value. When in the future a structure made by Kloos is deconstructed, it can be transported and used as a sculptural piece.

VALUES IN TRANSFORMATION

a. Intangible values

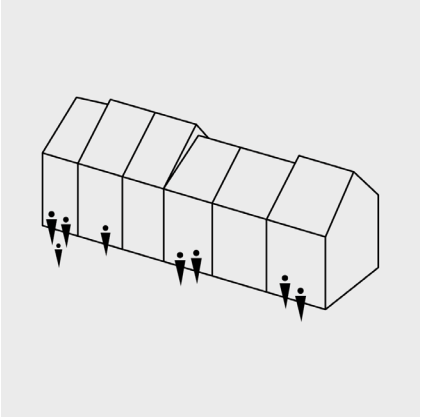
Fig.3.64 Memories and stories



Memories and stories

The tight-knit community created in the Montagestraat reflects the former small industrial community of Alblasserdam.

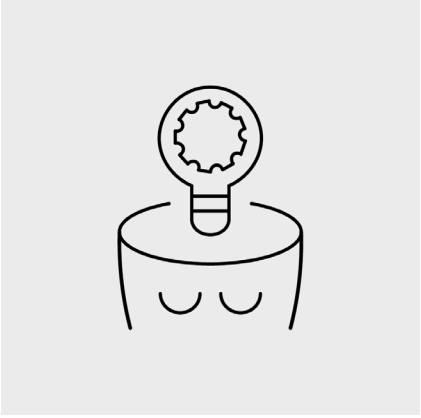
Fig.3.65 Working class society



Working class society

By returning workplaces in the KloosHal, the working class in its contemporary forms is reinstated.

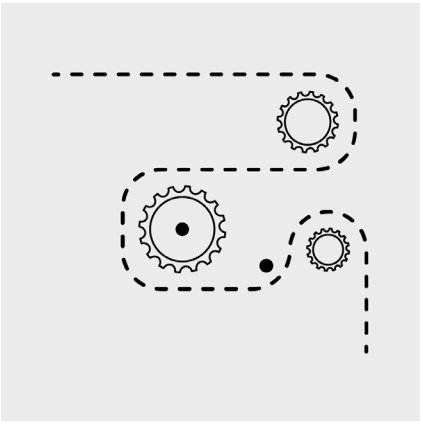
Fig.3.66 Human skill and knowledge



Human skill and knowledge

Although rather small businesses can be situated in office spaces, they can be innovative companies and workshops. Multigenerational housing is an innovative way of living, it would require people to get used to the idea of sharing specific spaces but it has been proven to work in multiple cases already so is certainly a future way of living.

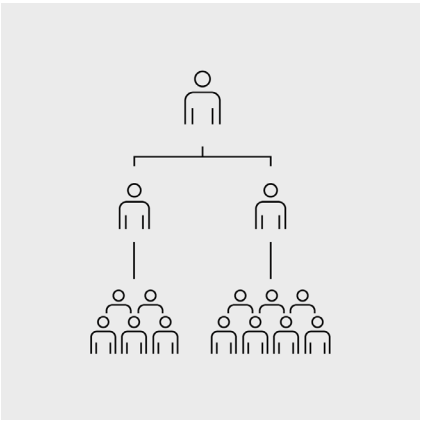
Fig.3.67 Productivity



Productivity

The productivity as know in factories is gone, but the general atmosphere of busy spaces in the hall represents this productivity. By implementing public functions, the area is lively used during the day while at night, tranquility returns.

Fig.3.68 Organisation of labour



Organisation of labour

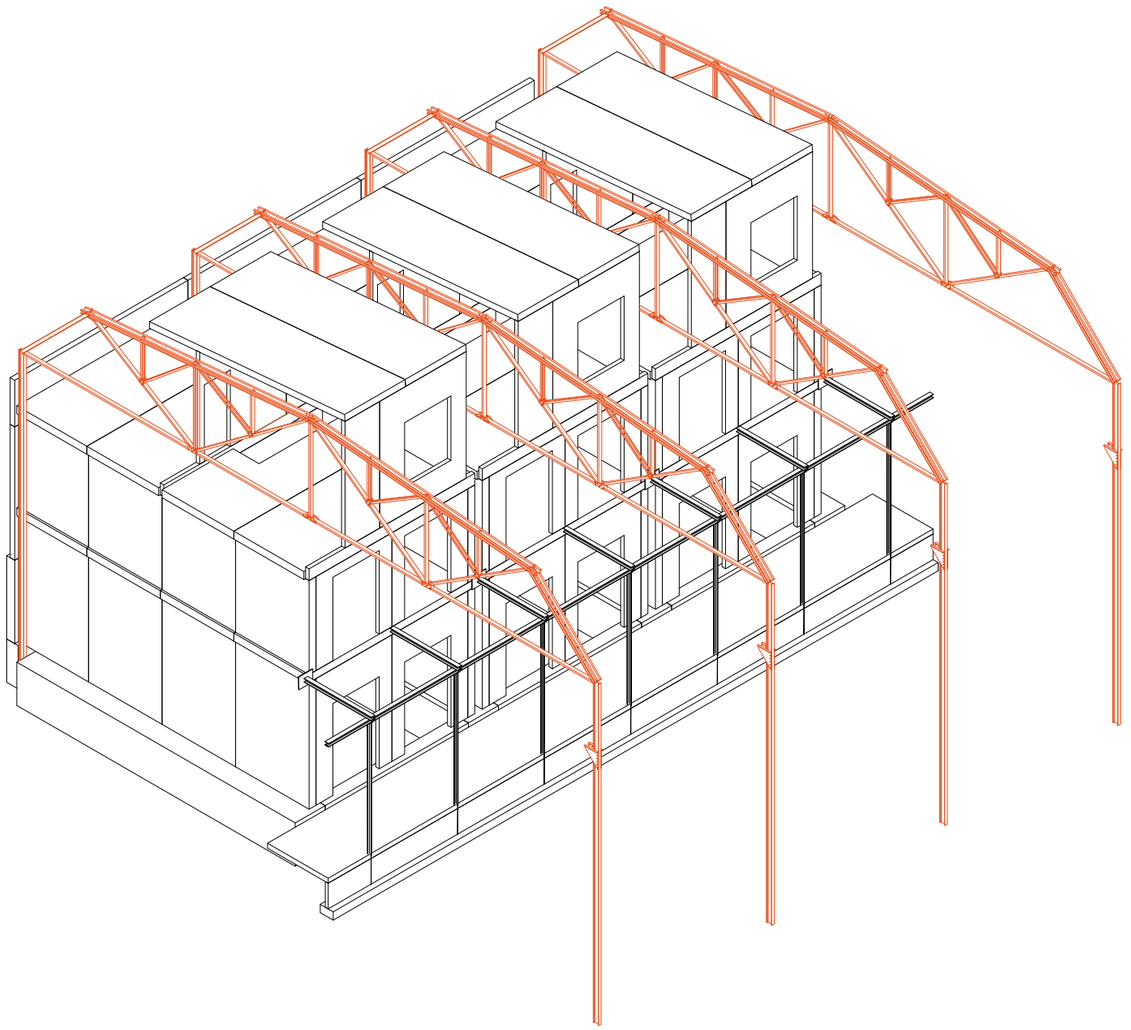
The naming of the different areas is a direct translation of the ownership in the past: KloosHal and Merconpavilion refer to respectively its founder and the last owner.

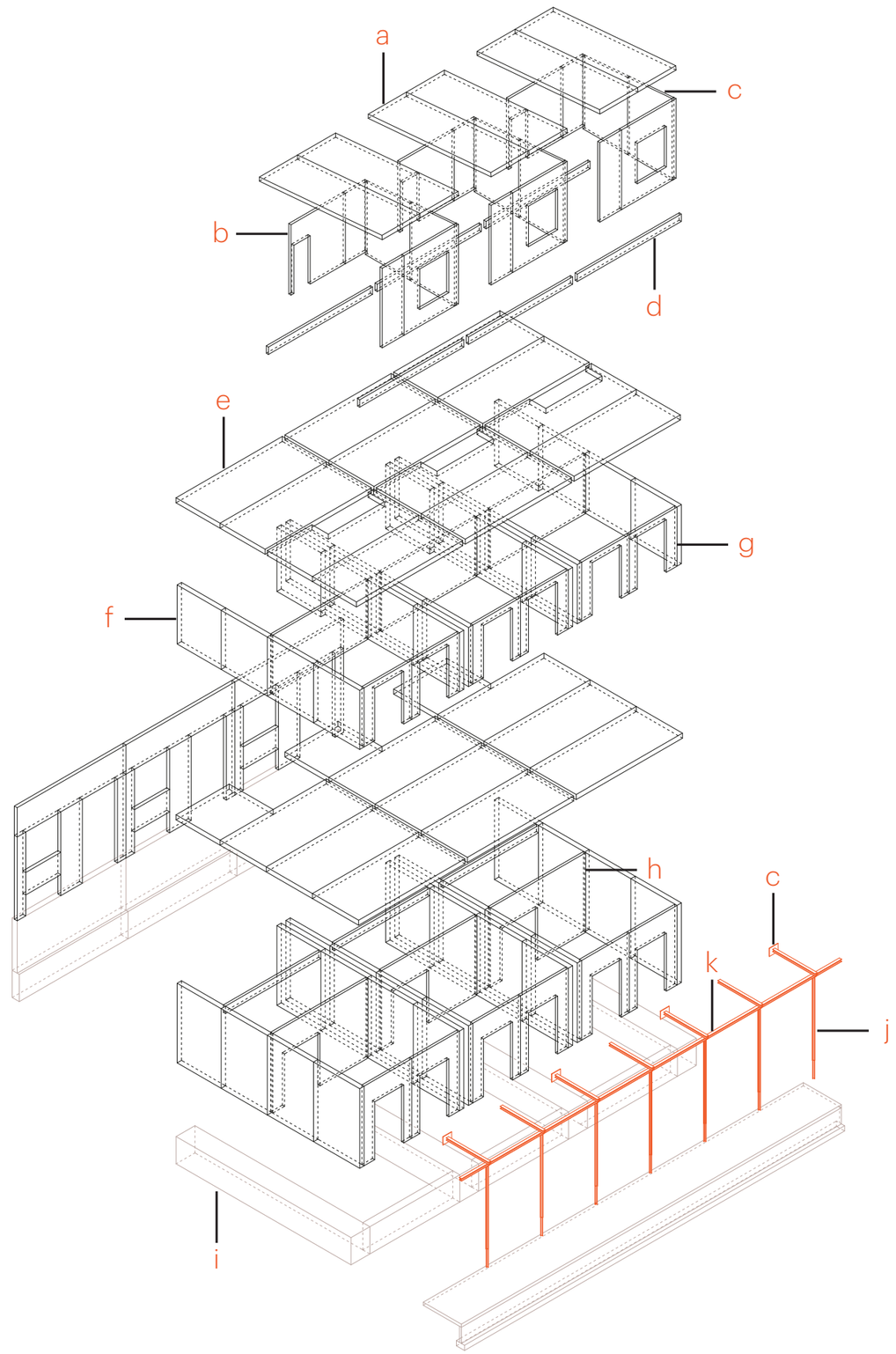
Part IV

Technical design

MONTAGESTRAAT

b. Construction



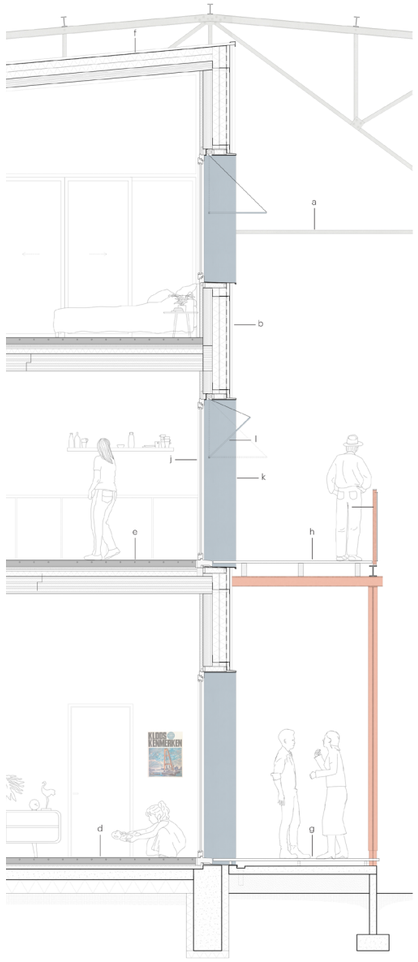


Axonometric construction

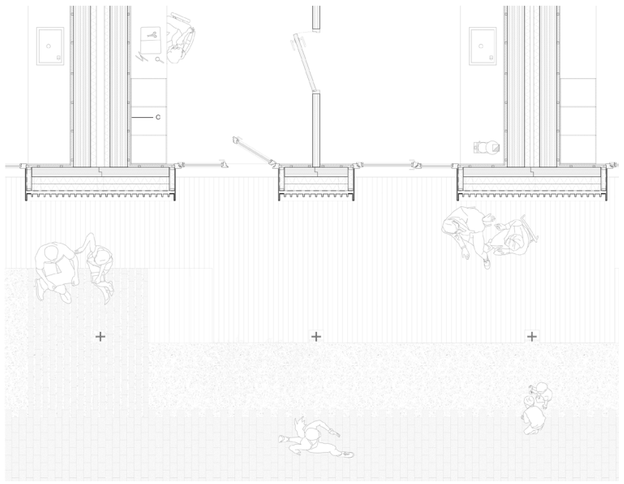
a roof: 120 mm 5-ply CLT board
b loadbearing wall 2nd floor: 130 mm 5-ply CLT board
c external wall 2nd floor: 100 mm 3-ply CLT board
d 130/352 mm glulam beam
e 1st and 2nd floor slab: 240 mm 7-ply CLT board
f loadbearing wall: 240 mm 7-ply CLT board
g external wall: 130 mm 5-ply CLT board
h internal wall: 130 mm 5-ply CLT board
i concrete foundation
j 120/120 mm steel column, cross profile
k 120/110 mm steel beam, I-profile
l fixing plate

MONTAGESTRAAT

c. Facade fragment







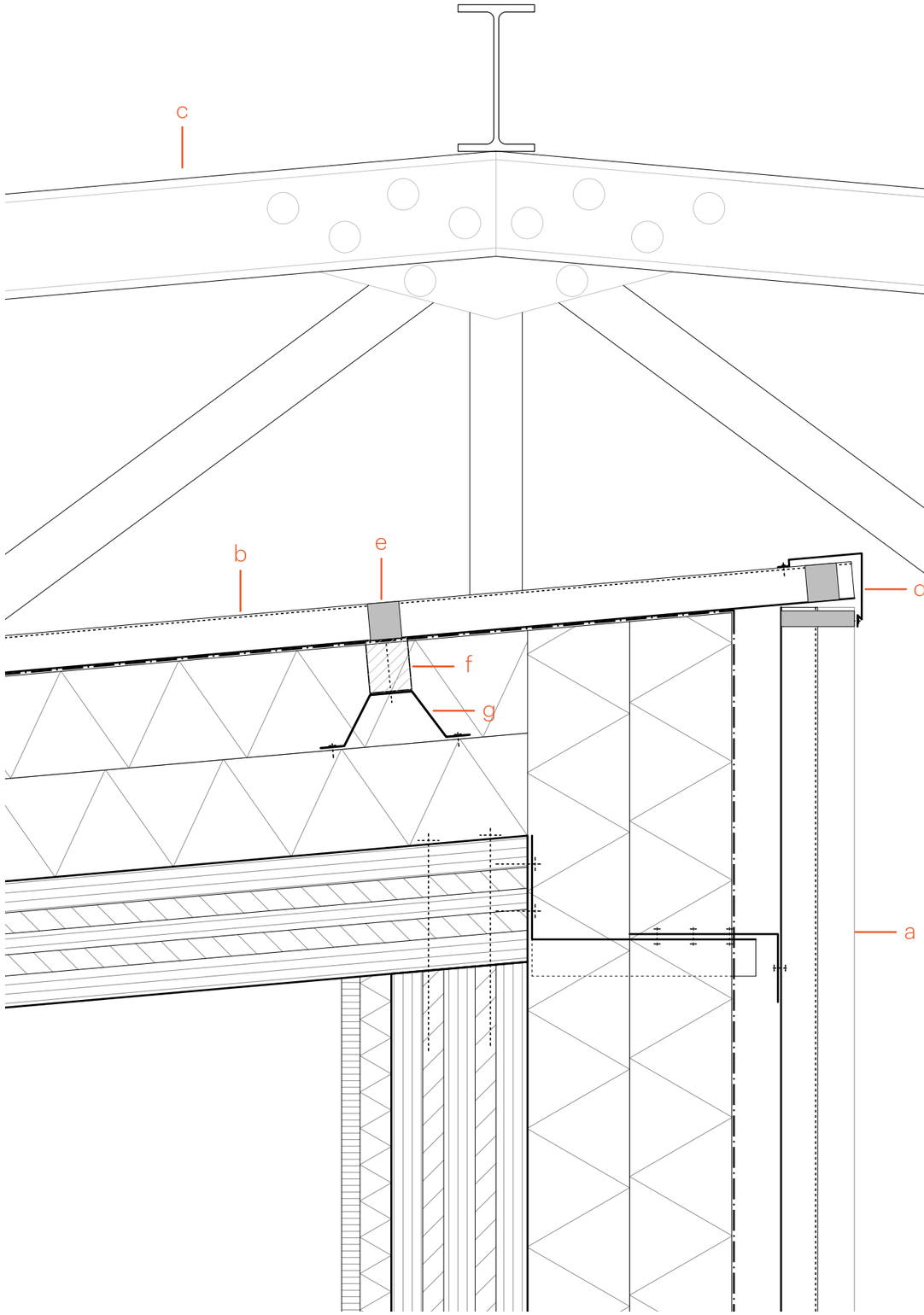
Section

1/20 scaled

a existing steel framework
b facade: 35/250 square profiled steel sheet, 50 mm enamelled steel substructure / cavity ventilation, 195 mm mineral wool insulation, 120 mm 5-ply CLT board, 30/30 mm vertical studs and insulation, 20 mm plywood panel
c seperating wall: 20 mm plywood panel, 30/30 mm vertical studs and insulation, 240 mm 7-ply CLT board, 80 mm insulation, 110-50 mm cavity, 80 mm insulation, 240 mm 7-ply CLT board, 30/30 mm vertical studs and insulation, 20 mm plywood panel
d ground floor: 4 mm PVC floor covering, 80 mm cement screed with floor heating, 20 mm impact insulation (damping 4dB), 50 mm pressure-resistant insulation, 150 mm reinforced concrete slab, vapour barrier, 190 mm insulation, soil
e floor: 4 mm PVC floor covering, 50 mm cement screed with floor heating, 20 mm impact insulation (damping 4dB), 22 mm fibre board, 95 mm floor joists with insulation, 240 mm 7-ply CLT board
f roof: 35/250 square profiled steel sheet, 195 mm mineral wool insulation, 120 mm 5-ply CLT board
g plinth: 75/35 mm wooden planks, 60-70 mm timber joist, boardmarked concrete plinth
h gallery: 75/35 mm wooden planks, 45/83 rectangular hollow steel joist, steel beam and column structure
i steel railing with stainless steel wire rope mesh
j door/window: oakwood frame, inswing, triple glazing
k steel frame color coated in blue supported by isolated timber frame
l folding arm awning

MONTAGESTRAAT

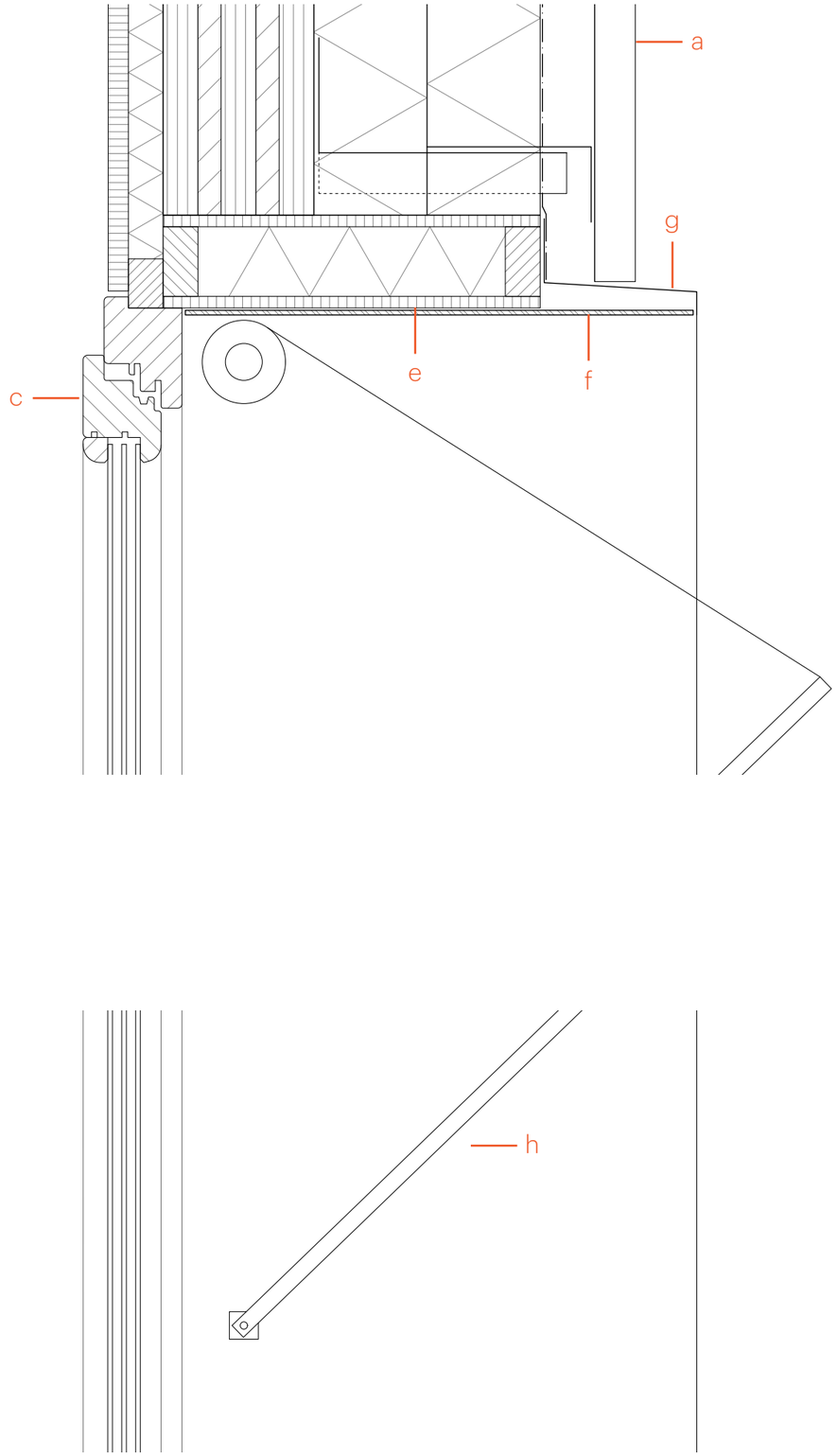
d. Buildingconstruction



Detail roof

1/5

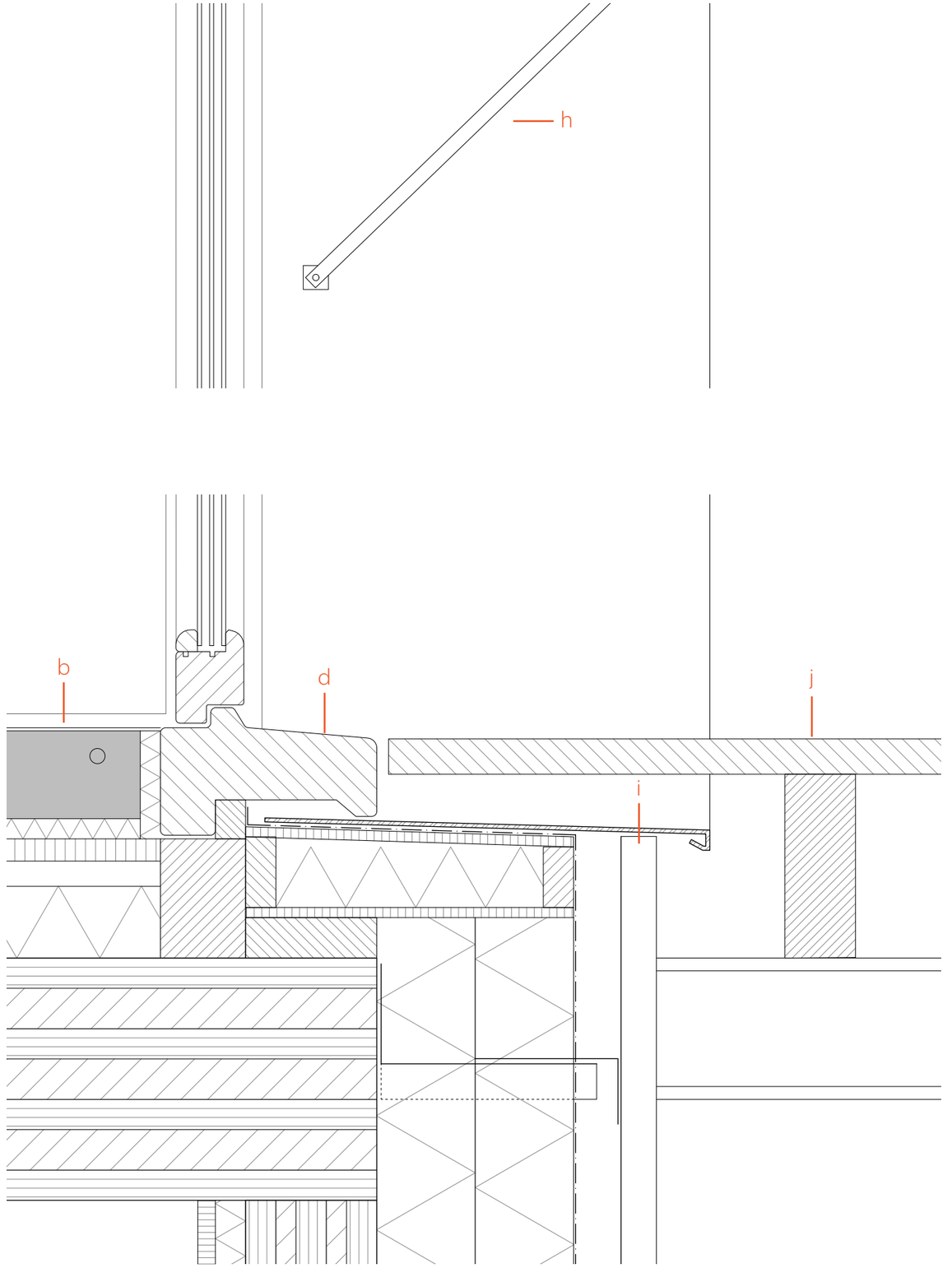
a 35/250 square profiled steel sheet, 50 mm enamelled steel substructure / cavity ventilation, 195 mm mineral wool insulation, 120 mm 5-ply CLT board, vertical studs and insulation, 20 mm plywood panel
b 35/250 square profiled steel sheet, 195 mm mineral wool insulation, 120 mm 5-ply CLT board
c existing steel frame
d ridge cap
e filler strip
f thermal bridge breaker
g omega profile



Detail entrance door (vertical)

1/5

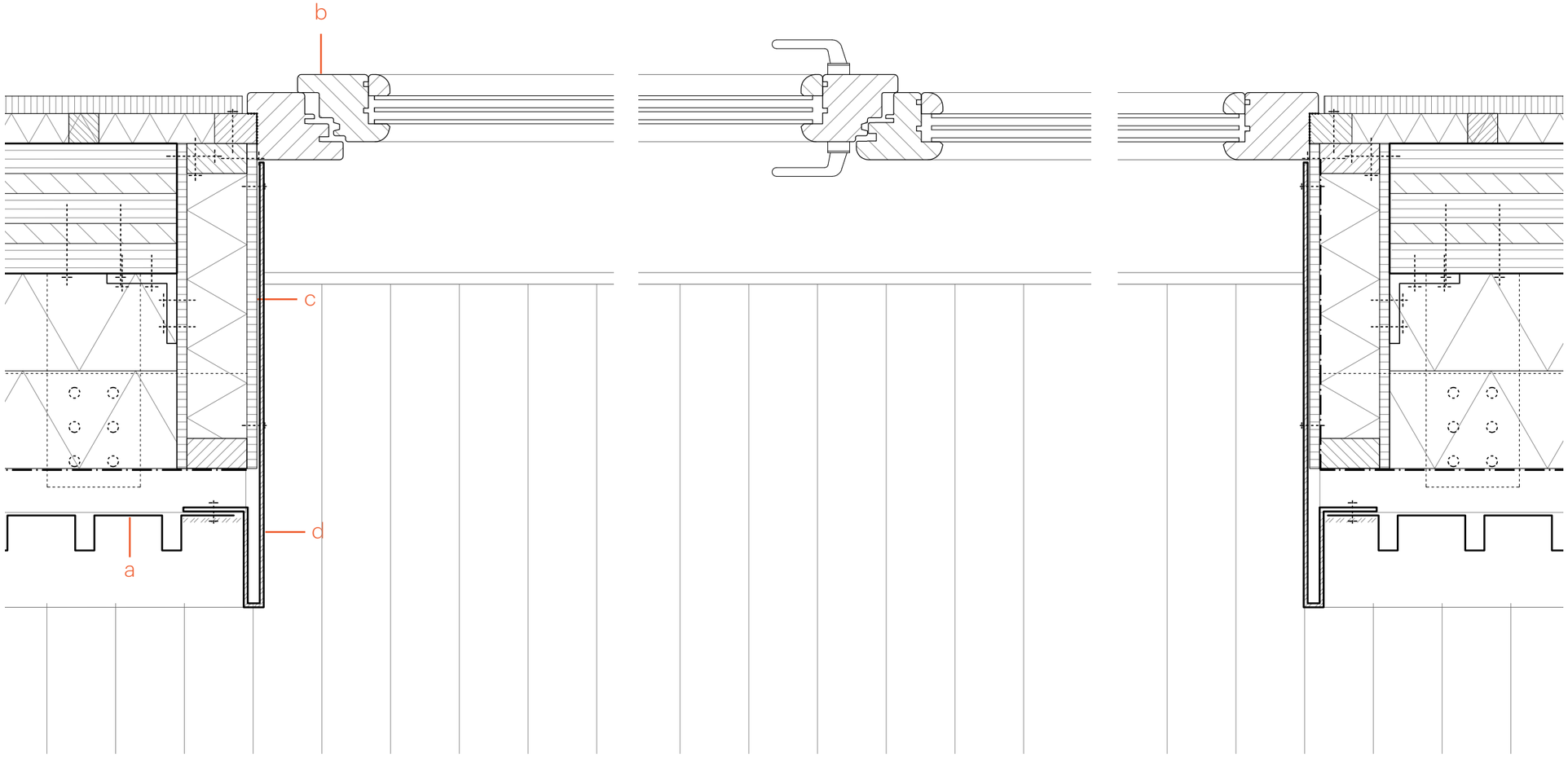
a 35/250 square profiled steel sheet, 50 mm enamelled steel substructure / cavity ventilation, 195 mm mineral wool insulation, 120 mm 5-ply CLT board, vertical studs and insulation, 20 mm plywood panel
b 4 mm PVC floor covering, 50 mm cement screed with floor heating, 20 mm impact insulation (damping 4dB), 22 mm fibre board, 95 mm floor joists with insulation, 240 mm 7-ply CLT board
c entrance door: oakwood frame, inswing, triple glazing
d timber sill
e insulated timber frame support structure
f steel frame
g drip sill
h folding arm awning
i filler strip
j gallery



Continuation detail entrance door (vertical)

1/5

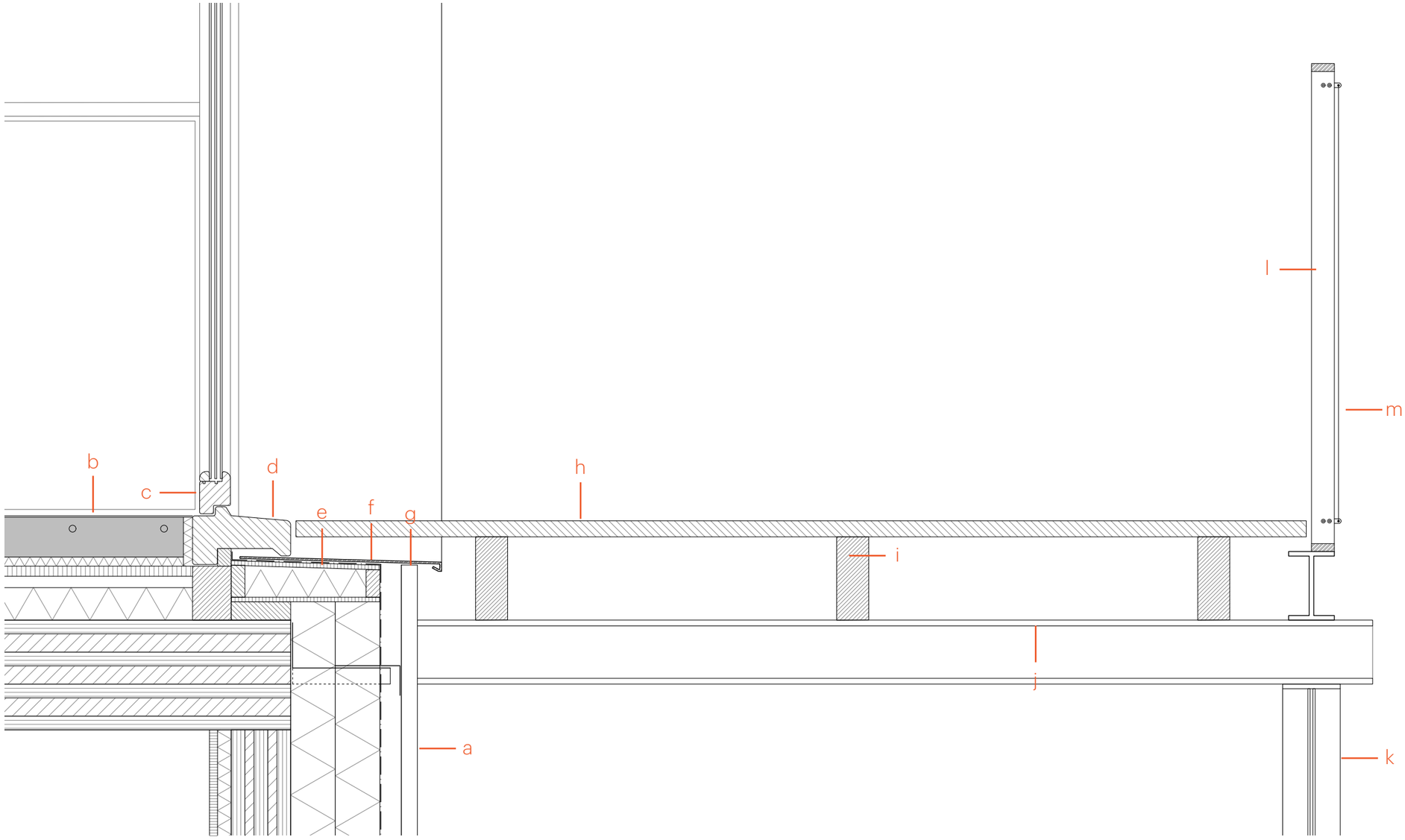
a 35/250 square profiled steel sheet, 50 mm enamelled steel substructure / cavity ventilation, 195 mm mineral wool insulation, 120 mm 5-ply CLT board, vertical studs and insulation, 20 mm plywood panel
b 4 mm PVC floor covering, 50 mm cement screed with floor heating, 20 mm impact insulation (damping 4dB), 22 mm fibre board, 95 mm floor joists with insulation, 240 mm 7-ply CLT board
c entrance door: oakwood frame, inswing, triple glazing
d timber sill
e insulated timber frame support structure
f steel frame
g drip sill
h folding arm awning
i filler strip
j gallery



Detail entrance door (vertical)

1/5

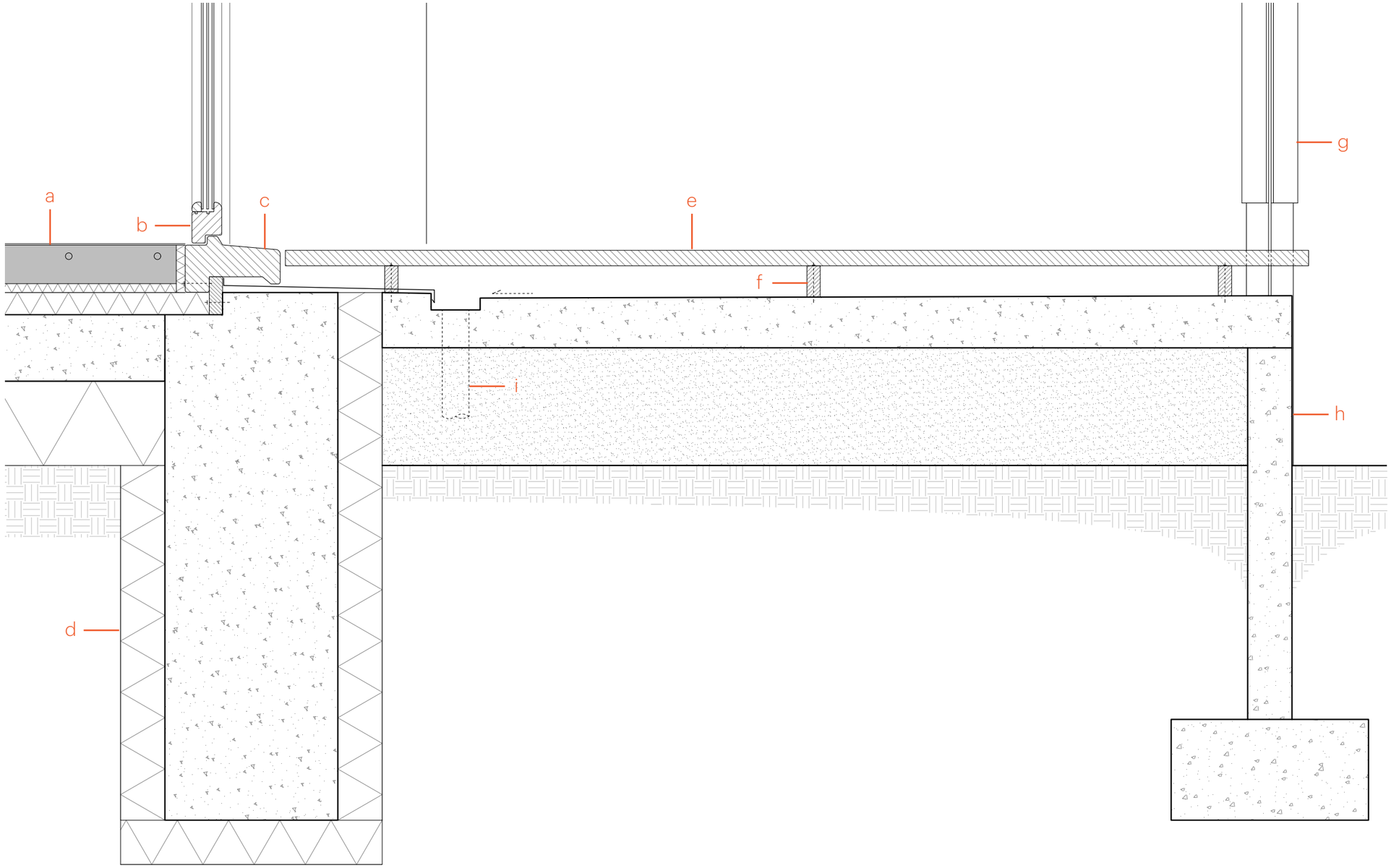
a 35/250 square profiled steel sheet, 50 mm enamelled steel substructure / cavity ventilation, 195 mm mineral wool insulation, 120 mm 5-ply CLT board, 30/30 mm vertical studs and insulation, 20 mm plywood panel
b entrance door: oakwood frame, inswing, triple glazing
c insulated timber frame support structure
d steel frame



Detail gallery

1/10

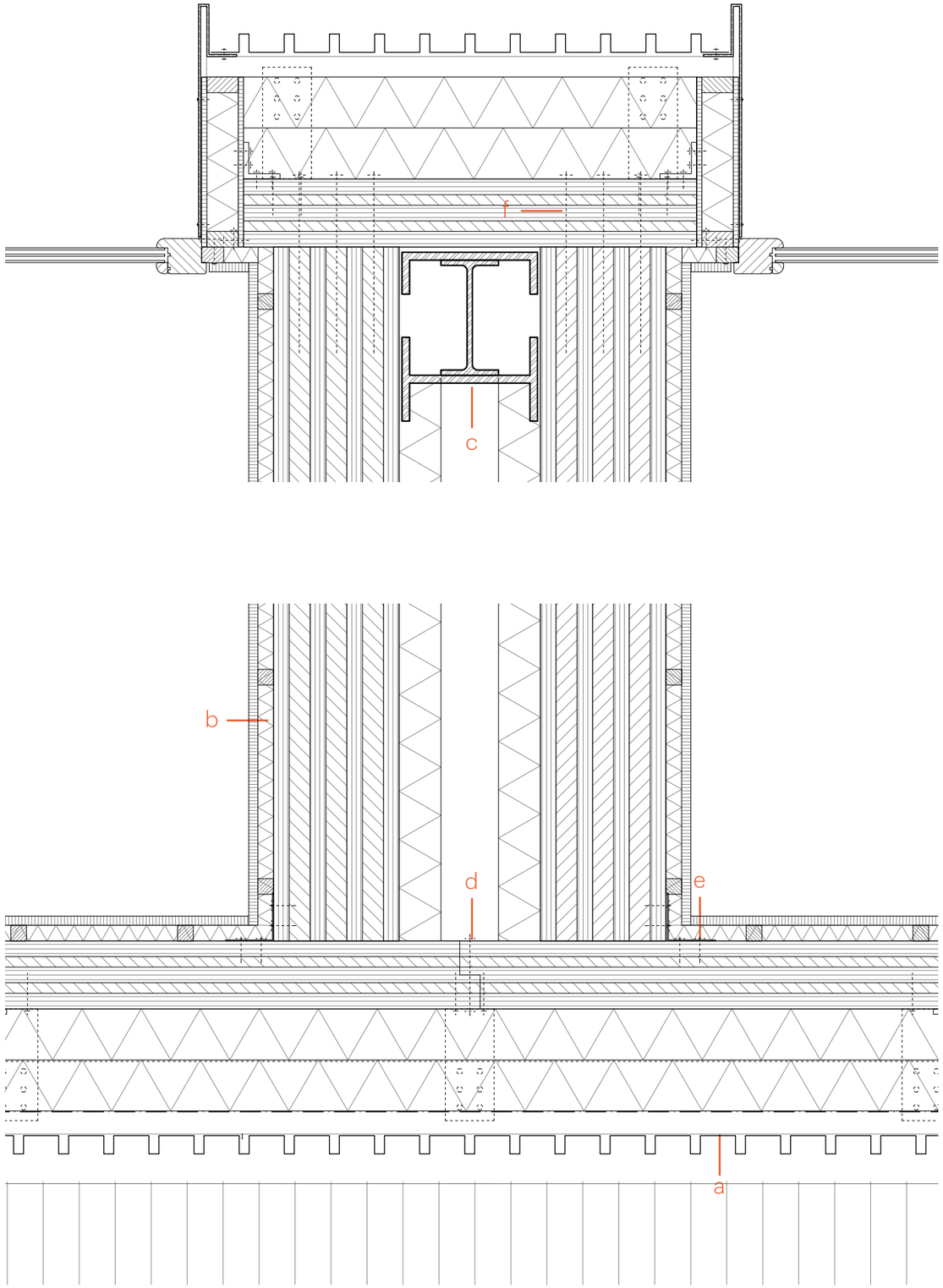
a 35/250 square profiled steel sheet, 50 mm enamelled steel substructure / cavity ventilation, 195 mm mineral wool insulation, 120 mm 5-ply CLT board, vertical studs and insulation, 20 mm plywood panel
b 4 mm PVC floor covering, 50 mm cement screed with floor heating, 20 mm impact insulation (damping 4dB), 22 mm fibre board, 95 mm floor joists with insulation, 240 mm 7-ply CLT board
c entrance door: oakwood frame, inswing, triple glazing
d timber sill
e insulated timber frame support structure
f steel frame
g filler strip
h 75/35 mm wooden planks
i 45/83 rectangular hollow steel joist
j steel beam, I-profile
k steel column, cross profile
l steel railing
m stainless steel wire rope mesh



Detail plinth

1/10

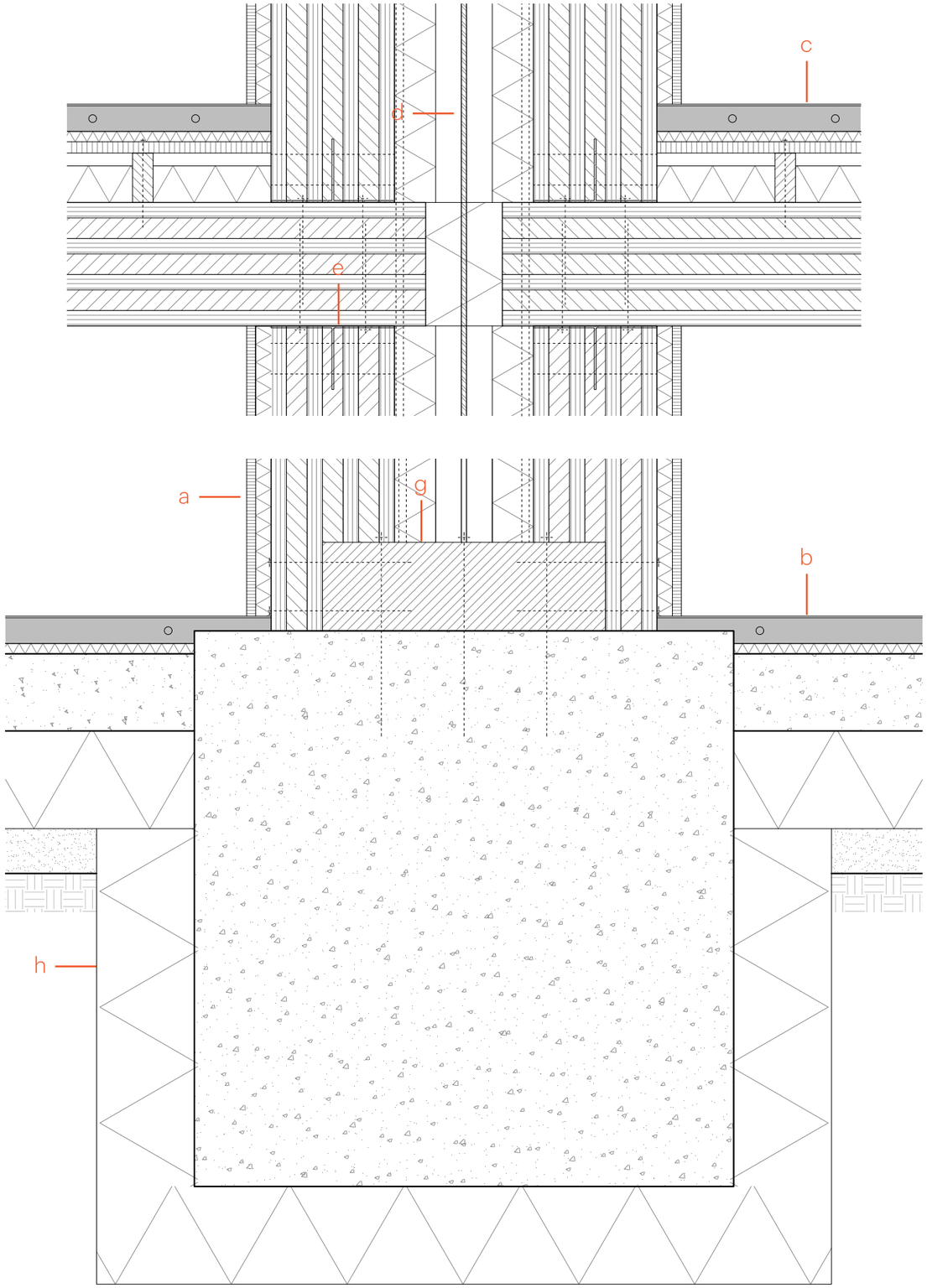
a 4 mm PVC floor covering, 80 mm cement screed with floor heating, 20 mm impact insulation (damping 4dB), 50 mm pressure-resistant insulation, 150 mm reinforced concrete slab, vapour barrier, 190 mm insulation, soil
b entrance door: oakwood frame, inswing, triple glazing
c timber sill
d insulated concrete foundation
e 75/35 mm wooden planks
f timber joist
g steel column, cross profile
h boardmarked concrete plinth
i drainage



Detail loadbearing wall (horizontal)

1/10

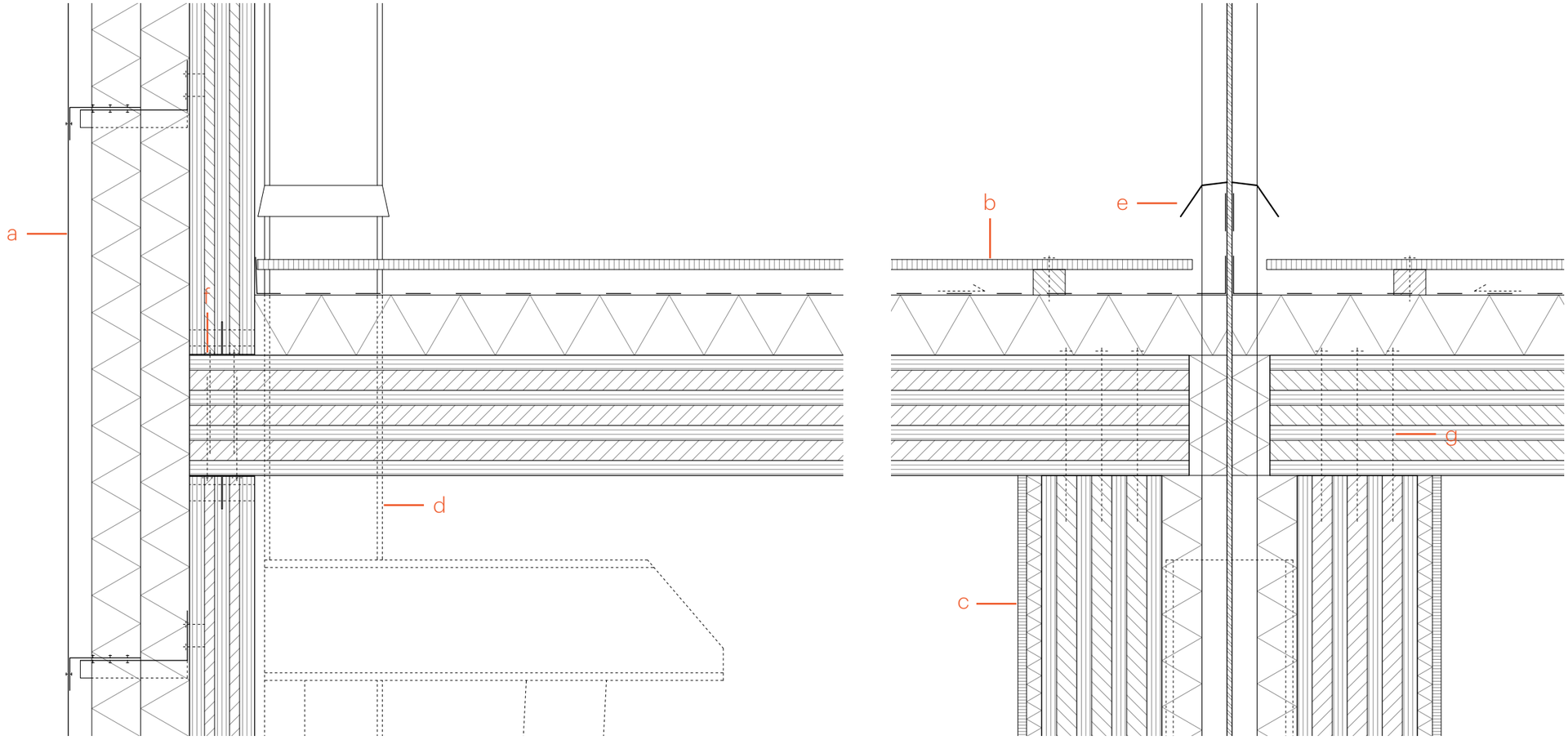
a 35/250 square profiled steel sheet, 50 mm enamelled steel substructure / cavity ventilation, 195 mm mineral wool insulation, 120 mm 5-ply CLT board, 30/30 mm vertical studs and insulation, 20 mm plywood panel
b 20 mm plywood panel, 30/30 mm vertical studs and insulation, 240 mm 7-ply CLT board, 80 mm insulation, 110-50 mm cavity, 80 mm insulation, 240 mm 7-ply CLT board, 30/30 mm vertical studs and insulation, 20 mm plywood panel
c existing steel column
d half lap joint
e angle bracket joint
f screw joint



Detail loadbearing wall (vertical)

1/10

a 20 mm plywood panel, 30/30 mm vertical studs and insulation, 240 mm 7-ply CLT board, 80 mm insulation, 110-50 mm cavity, 80 mm insulation, 240 mm 7-ply CLT board, 30/30 mm vertical studs and insulation, 20 mm plywood panel
b 4 mm PVC floor covering, 80 mm cement screed with floor heating, 20 mm impact insulation (damping 4dB), 50 mm pressure-resistant insulation, 150 mm reinforced concrete slab, vapour barrier, 190 mm insulation, soil
c 4 mm PVC floor covering, 50 mm cement screed with floor heating, 20 mm impact insulation (damping 4dB), 22 mm fibre board, 95 mm floor joists with insulation, 240 mm 7-ply CLT board
d existing steel column
e slotten in steel plates
f screw joint
g wooden guide rail
h insulated concrete foundation beam



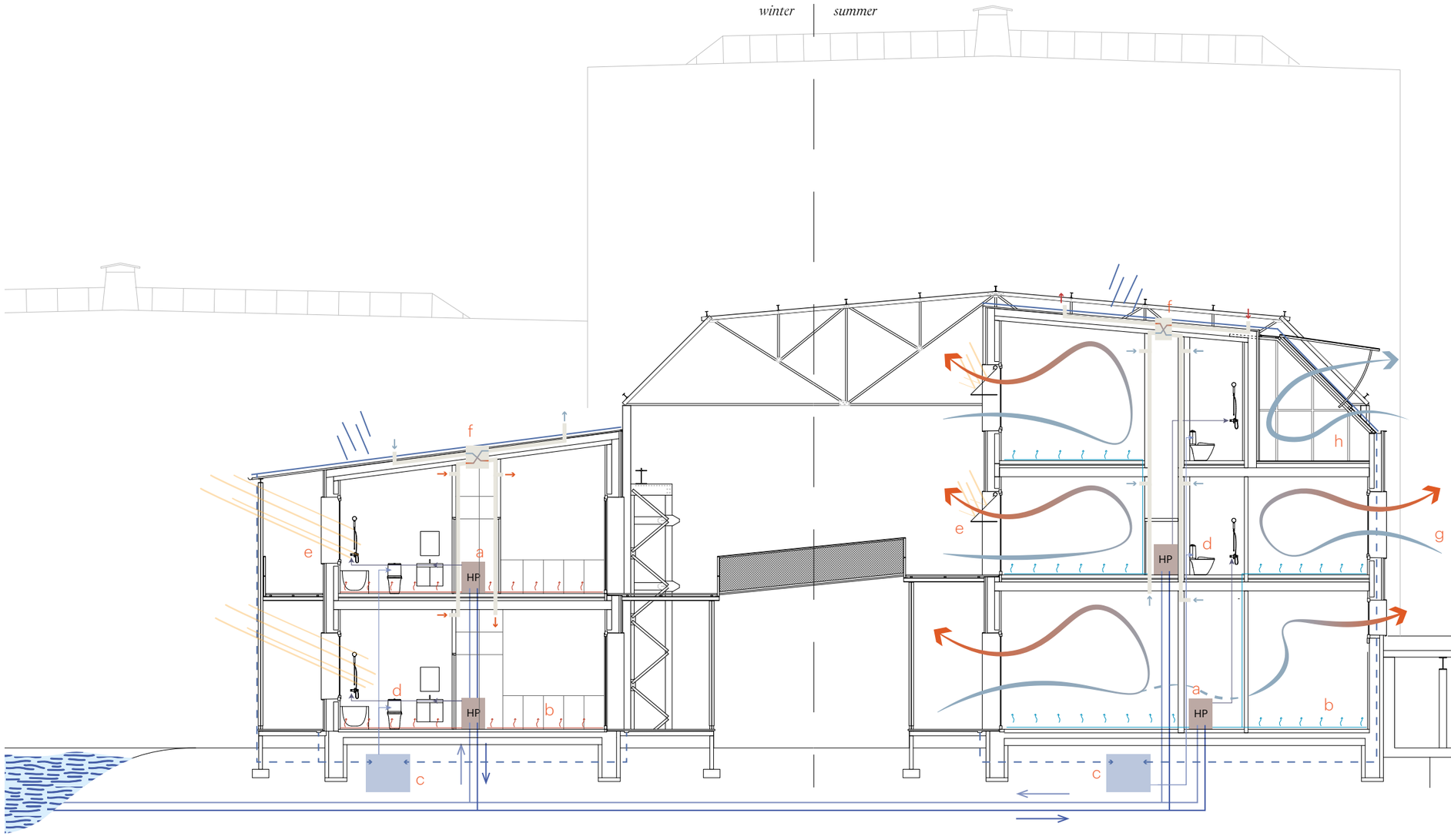
Detail existing column (vertical)

1/10

a 35/250 square profiled steel sheet, 50 mm enamelled steel substructure / cavity ventilation, 195 mm mineral wool insulation, 120 mm 5-ply CLT board, 30/30 mm vertical studs and insulation, 20 mm plywood panel
b 75/20 mm wooden planks, 63/50 mm timber joist, roofing, 120 mm pressure-resistant insulation, 240 mm 7-ply CLT board
c 20 mm plywood panel, 30/30 mm vertical studs and insulation, 240 mm 7-ply CLT board, 80 mm insulation, 110-50 mm cavity, 80 mm insulation, 240 mm 7-ply CLT board, 30/30 mm vertical studs and insulation, 20 mm plywood panel
d existing steel column
e welded steel cap
f slotten in steel plates
g screw joint

MONTAGESTRAAT

e. Climate design



winter

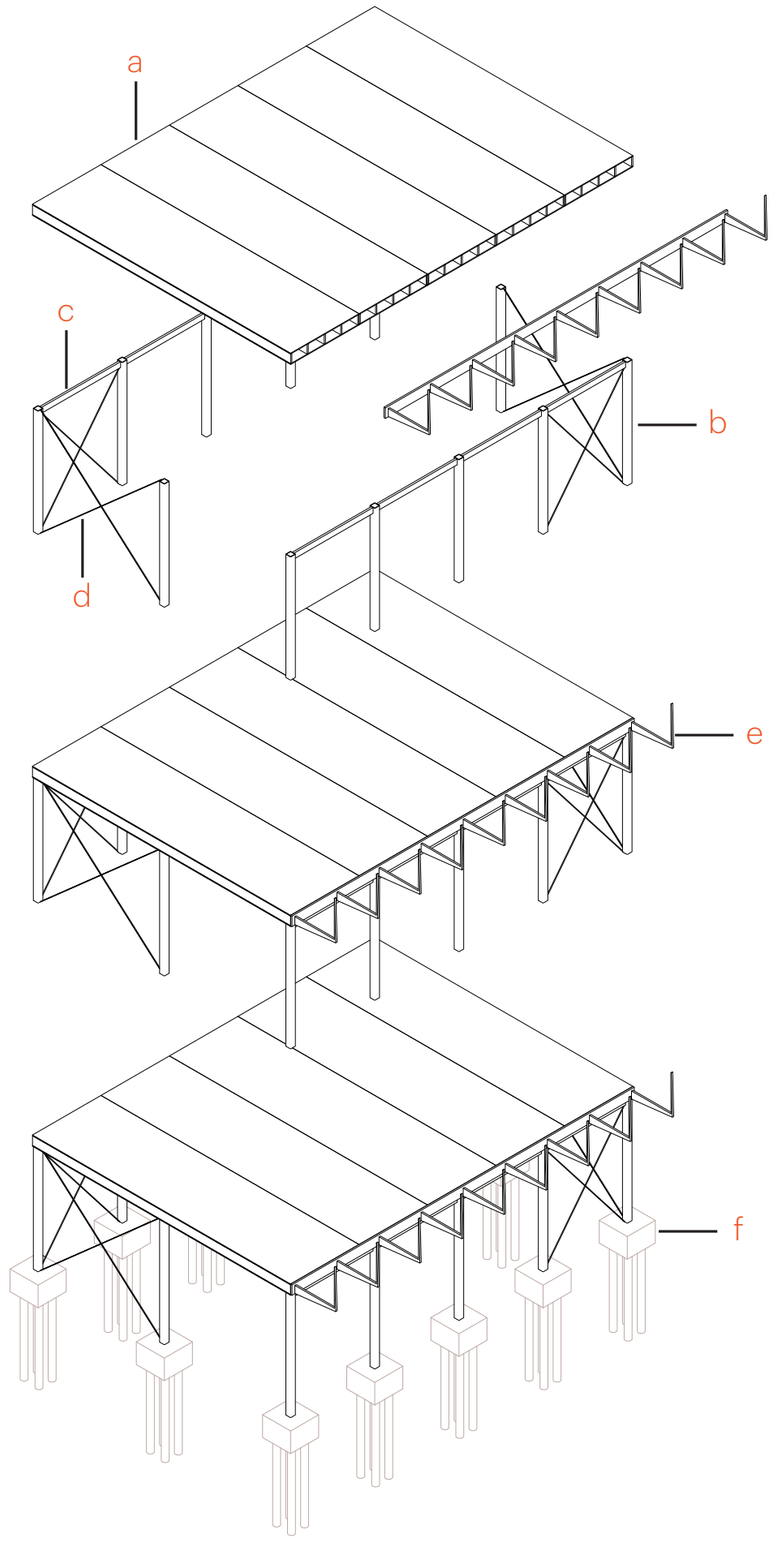
a heat pump for warm water, Noord River as thermal source
b floorheating
c rainwater collection and storage
d use of grey water for toilets
e access of sunlight as additional heating
f heat recovery unit, incoming air is heated by the outgoing air

summer

a heat pump for warm water, Noord River as thermal source
b floorcooling
c rainwater collection and storage
d use of grey water for toilets
e awning and overhang to prevent heat from sunlight entering the building
f heat recovery unit with bypass, incoming air is cooled by the outgoing air, possibility to cool directly with incoming air when it is colder outside
g natural ventilation with openable windows
h wintergarden/summer terrace

KLOOSHAL

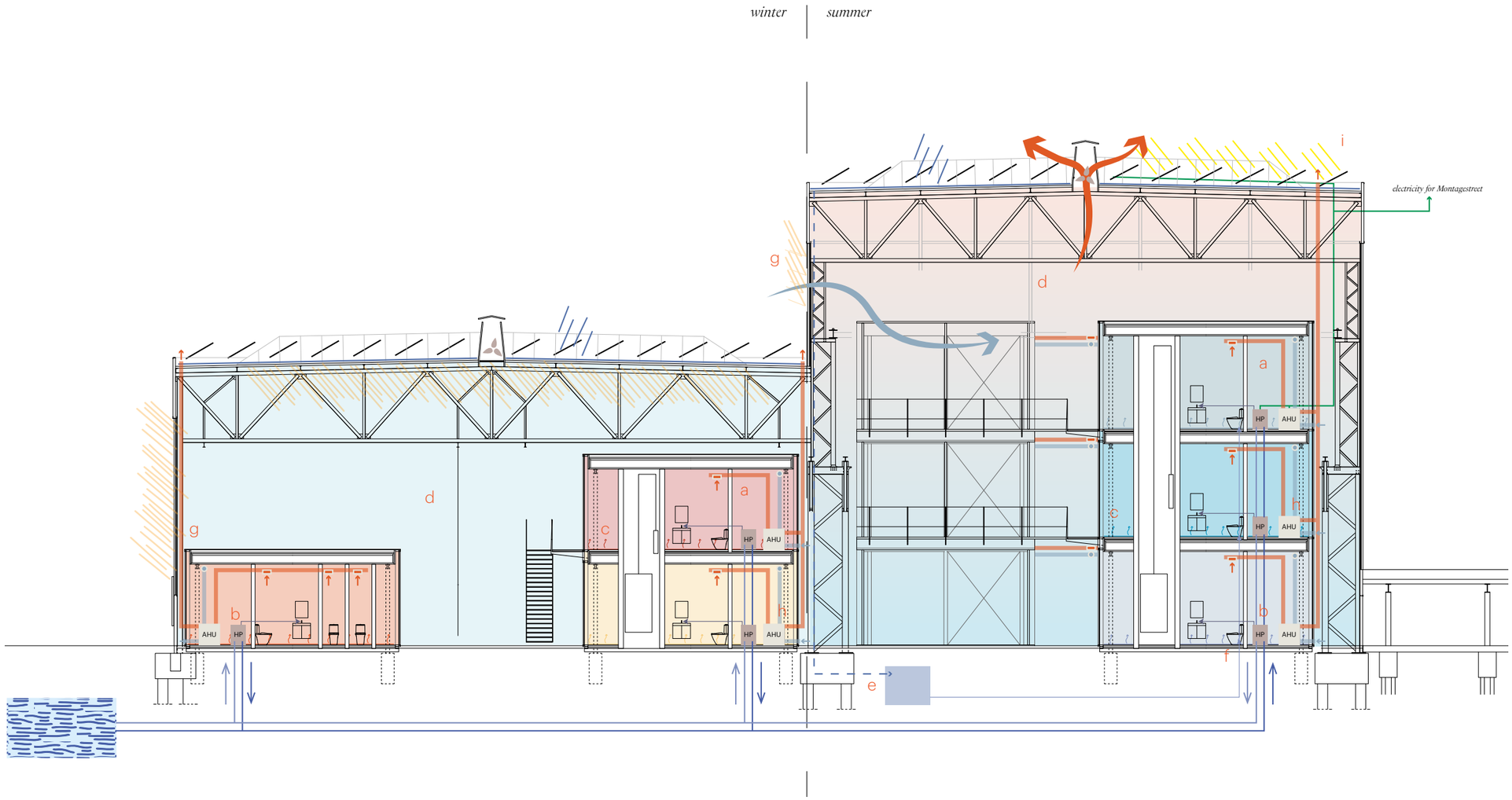
a. Construction



Axonometric construction

a 7500-9000 mm Kerto Ripa Box floor slab, KRB-2400x31-5x51x400-2400x2
b 180/10/3300-3900 mm square hollow steel column
c 60/180 mm glulam beam
d stability bracing
e steel gallery structure, cantilivering consoles
f concrete foundation, pile footing

b. Climate design



winter

a five technical rooms, visible installations
b heat pump for warm water, Noord River as thermal source
c floorheating, seperately regulated per unit
d medium temperature semi-outdoor space, free from rain and wind
e rainwater collection and storage
f use of grey water for toilets
g access of sunlight as additional heating
h air handling unit, 780/780 mm diameter

summer

a five technical rooms, visible installations
b heat pump for warm water, Noord River as thermal source
c floorcooling, seperately regulated per unit
d medium temperature semi-outdoor space, naturally ventilated, additional mechanism for higher air flow
e rainwater collection and storage
f use of grey water for toilets
g integrated sunshading
h air handling unit, 780/780 mm diameter
i energy generation with solar panels for whole site