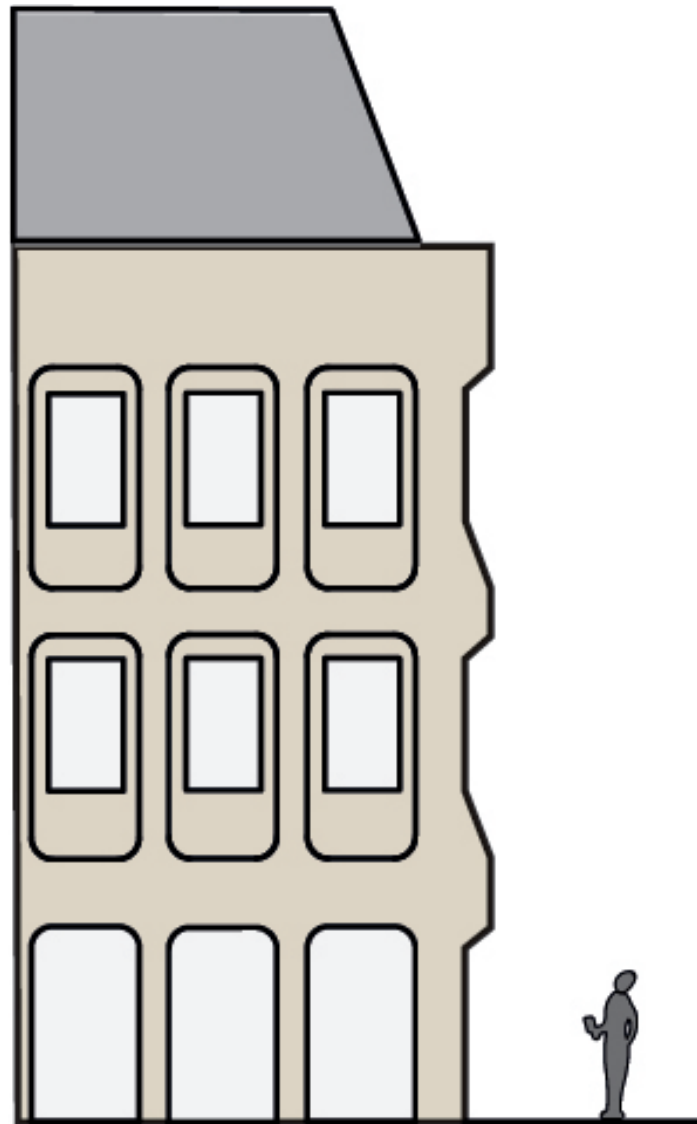


Products booklet

Storming the Castle

AR3AH105 Graduation Studio Adapting 20th Century Heritage



Mentors

A Joana Dos Santos Gonçalves
R Wido Quist
BT Frank Koopman

Ferran van der Klip
4454065
15-6-2022

Introduction

Storming the Castle is the name of this graduation project. These three words metaphorically reference to my approach on the graduation project: the police headquarters in The Hague. The castle I am referring to is the facade of the extension of the police station, built in 1980, which is made out of precast concrete panels that together form a strict pattern that sends the message: 'keep out!'. This message is similar to a castle, hence the name. The meaning of 'storming' is threefold. It can be interpreted as a battle tactic, because in order to storm a castle you need a solid strategy. This resembles the research I did on post-war precast concrete facades through historic and case-study analysis, which led me to design conclusions. On the other hand, it can also be interpreted as something physical. Storming a castle often results in walls being torn down. This references to my design approach on the façade. Because my aim in the design was to make the building part of the neighbourhood again, a shift in expression was necessary: from admonishing and strict to transparency and openness. This was achieved by removing precast façade elements and replace them with a glass façade.

Last, when a castle is stormed, the defender plays an equally important role as the attacker. From the perspective of the defender this meant I had to 'defend' the valuable parts of the building as much as possible, and give up some of the less valuable parts in the building. This defender perspective is a metaphor for the archival research and value assessment I did, that gave me the knowledge to know the building from the inside out.

The reason why I decided to storm this castle, the process of it and the result of this storming is shown in this booklet.

Table of contents

1.	Analysis	4
1.1	Urban context analysis	5
1.2	Architecture analysis	24
1.3	Building technology analysis	40
2.	Process	70
2.1	Starting points	71
2.2	Program	72
2.3	Concepts & Testing	74
3.	Design	84
3.1	Overview	
3.1.1	Floorplans	86
3.1.2	Sections	93
3.1.3	Routing	94
3.1.4	Program	95
3.1.5	Renders	100
3.2	Park	
3.2.1	References	109
3.2.2	Intentions	110
3.2.3	Result	111
3.3	1980 Extension	
3.3.1	Section	112
3.3.2	Details	113
3.4	Swimming pool	
3.4.1	Section	119
3.4.2	Details	120
3.5	Climate design	
3.5.1	Winter situation	122
3.5.2	Summer situation	123
3.5.3	Thermal zones	124

1. ANALYSIS

A thorough analysis on the police headquarters was done during the first semester of this graduation year. This analysis consists of an urban context, architecture and building technology analysis. The methods used to find answers on this research consist of a group building visit, archival research, map research and demographic research. Information, especially on building technology, was often difficult to find, due to drawings being incomplete, wrong or missing. However, the Schokkabeton archives provided an important detail that would clear a lot of missing information up. Pictures made during construction of the 1980 part provided insights in the way precast facade elements were connected to one another.

Because I live close by the police headquarters in The Hague, I often passed the building to gather more information, such as dimensions, to make clearer drawings. The 1958 part had drawings available in the archive that were made in 1972, at the time the extension was being designed. The dimensions of these drawings were very wrong most of the time.

This analysis has helped me decide on my research topic. As stated earlier, I missed a lot of information on the precast concrete facade in the 1980 part. The search for similar case-studies to fill the gaps in this analysis became a necessity if I wanted to continue with an intervention on the facade.

Last, I would like to thank Michail Mexis and Arne Boenders for their contribution to this analysis. By combining our time and strengths, we were able to create this analysis faster and better, so that we could spend more of our time to our research and concept creation.

1.1. URBAN CONTEXT ANALYSIS - Cultural-political influences

The three pictures summarize the cultural and political influences The Hague has to deal with.

The Peace Palace, a worldwide icon for peace and rights, was the first step that led The Hague to become the City of Peace. The neutral city was the perfect place to host the first Peace-conference of 1899.

The Atlantikwall was a scar of the WWII. It's not only a symbol to what the war did to the city, but also marked the start of many new expansions.

The presence of the Peace Palace and the scars of the war: peace and war, lay the foundation for The Hague to become the City of Peace. It is now represented by the presence of many international institutions (tribunals, law, etc).

The Hague is also the political centre of The Netherlands. Many ministeries are thus located in the city.

The result of these cultural-political influence is that the municipality of The Hague is very much oriented towards politics and a business climate.



House of Representatives



Peace Palace



The Atlantikwall

1.1. URBAN CONTEXT ANALYSIS - Historical development



1300



1900



1500



1950



1800



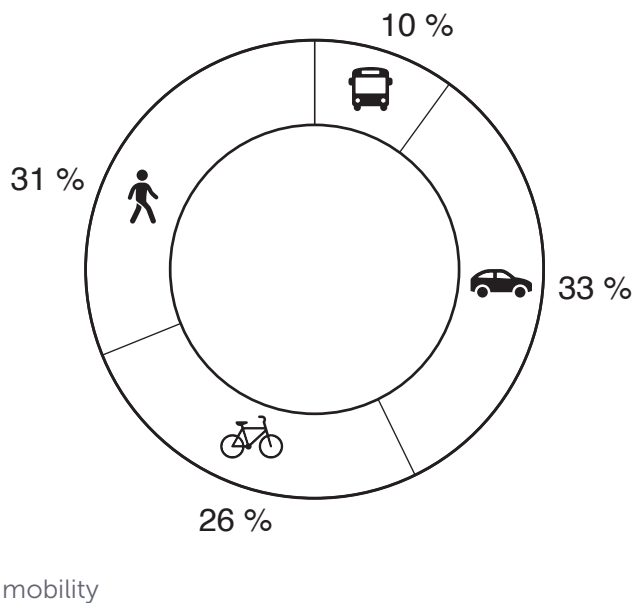
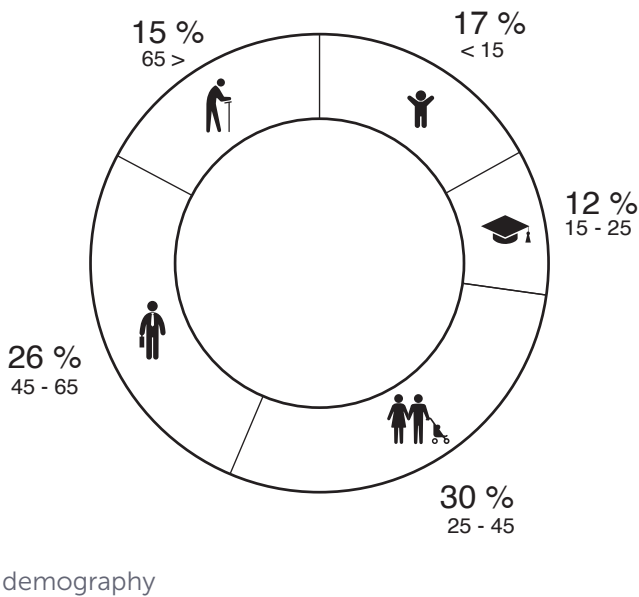
2000

1.1. URBAN CONTEXT ANALYSIS - General information

The demography of The Hague is quite mixed with the biggest group being between 25-40 years old. The most used form of transport in The Hague is the car with 33% followed by walking with 33 and then the bike with 26%. Only 10% of the traveling is done with public transport.

The Hague started in 1300 as an ensemble of buildings around the Vredespaleis (a palace). It grew around this center to a small town in 1500. Until 1800 the city grows circular around the old center and starts to expand towards the sea. In 1900 the city has developed around some natural parks which form open spaces in the city fabric.

The direction of the new neighborhoods is closely related to the manmade water structure that was already present in 1300 Between 1900 and 1950, the Hague underwent a huge expansion in all directions, still following the structure of the canals and avoiding natural parks. In 2000 some new neighborhoods were developed, but substantially less than the time period before.



inhabitants	548.320
0-15:	91.370
15-25:	68.313
25-45:	164.895
45-65:	142.397
65+:	81.345
average income	€27.000

demography

housing:	272.463
other functions:	10.881
industrial:	5.415
retail:	5.009
office:	2.904
meeting/gathering:	2.210
housing + retail:	2.024
housing + office:	1.163
lodging:	753
education:	471

functions

1.1. URBAN CONTEXT ANALYSIS - Infrastructure



primary roads



secondary roads



tertiary roads



all roads

The road system indicates a city that was built over time, not following a strict orthogonal grid. Concerning the accessibility to the police station, it is apparent that the building is easily accessible, as a primary road passes in front of it. What else is suggested by these diagrams is the relation of the roads, to the levels of safety and noise in each area, but also the facilitation of commercial activity.

legend

- road
- water
- police station

Based on information from © OpenStreetMap-contributors

1.1. URBAN CONTEXT ANALYSIS - Green



Despite the density of The Hague, there are numerous green areas within the urban fabric, and especially at the vicinity of the case study. Also, the existing canals, influence the positioning of the road system.

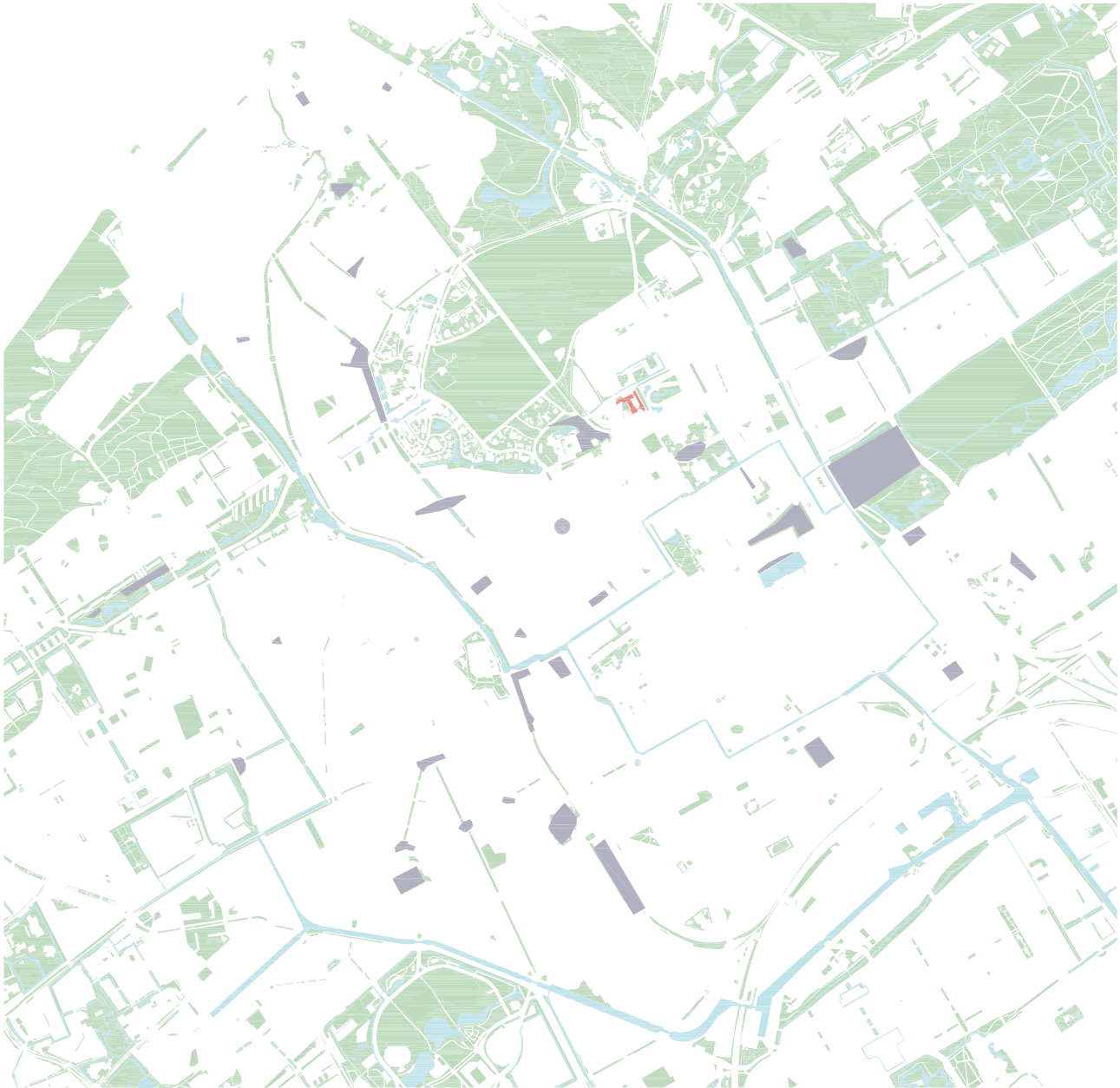
legend

- green
- police station

Based on information from © OpenStreetMap-contributors



1.1. URBAN CONTEXT ANALYSIS - Public spaces



This map indicates the public spaces by means of public squares and not parks, so there can be a distinction about the public parks and the public spaces designed purely for public interaction. These spaces are formed by the enclosure of open spaces within the urban fabric. Not far from the police station, relatively large public areas are located, which could be used as an element in the design process.

legend

- public space
- water
- green
- police station

Based on information from © OpenStreetMap-contributors





1.1. URBAN CONTEXT ANALYSIS - Water



The water structure of The Hague consists out of a couple of large canals around the city centre and some smaller water elements inside parks. The water structure of the 14th century did influence the spatial planning of the building blocks which were later built on that land.

legend

-  Water
-  police station

Based on information from © OpenStreetMap-contributors



1.1. URBAN CONTEXT ANALYSIS - Future developments



This map shows the International offices located in The Hague. The city has set its sights on creating a strong business climate for International organisations. Under the trademark: City of Peace, The Hague will have a strong connection with these buildings through important routes, as shown in orange.

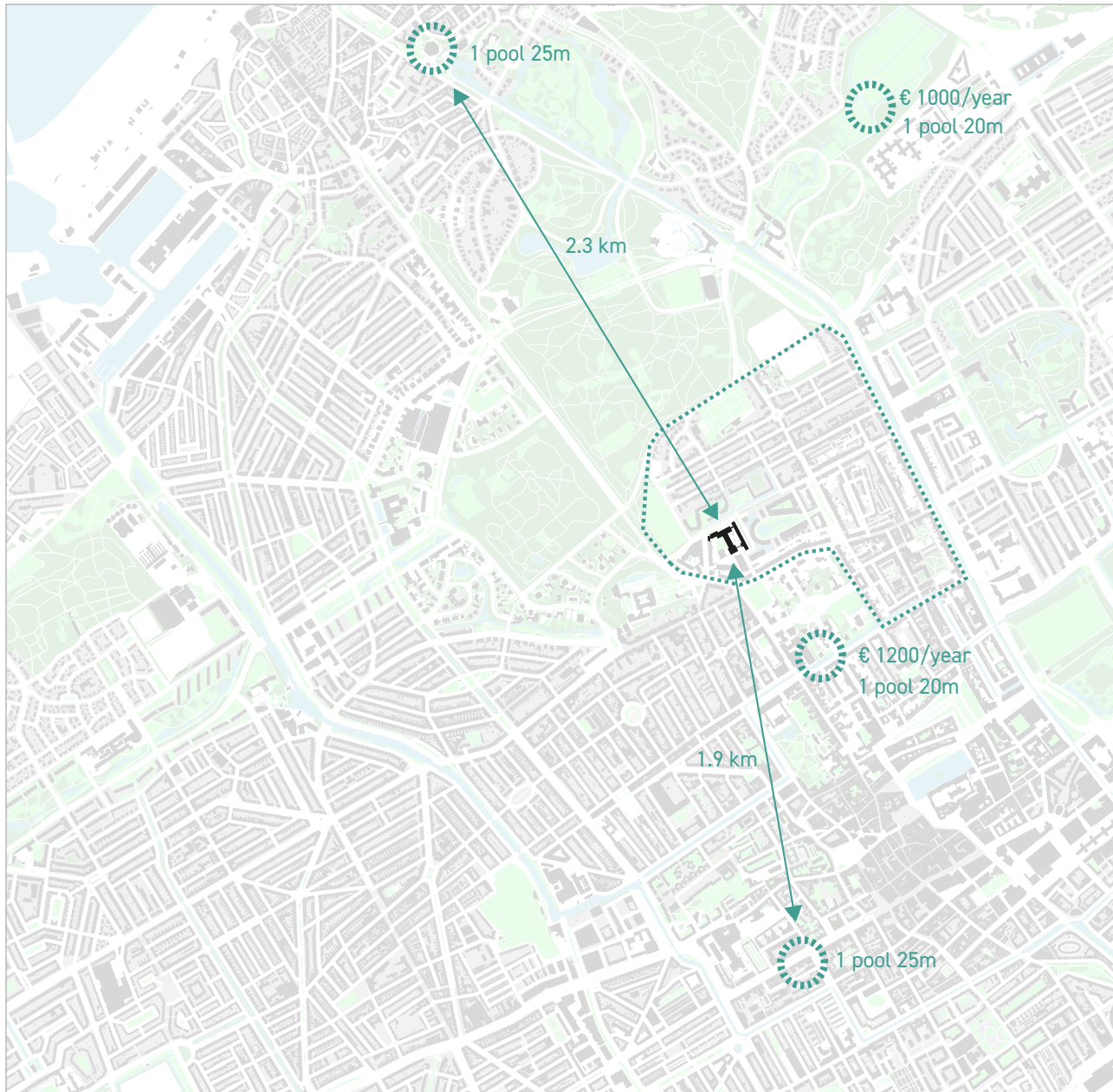
legend

- Important network
- International organisation
- International hub

Based on information from Gebiedsvisie Internationale Zone




1.1. URBAN CONTEXT ANALYSIS - Proximity swimming pools



The availability of swimming pools in relation to the police headquarters is analysed in this map. It shows how there are only few swimming pools available in this part of the city, of which two of them are connected to a health club, making them very expensive and overpriced if they would only be used for swimmers.

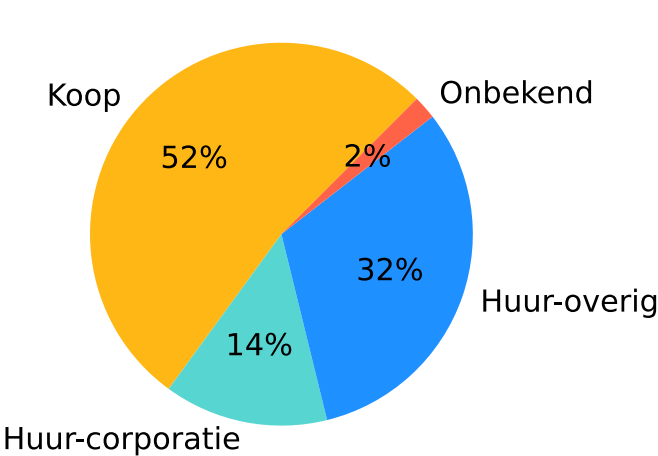
legend

-  Swimming pool
-  Archipel neighborhood

Based on information from © OpenStreetMap-contributors

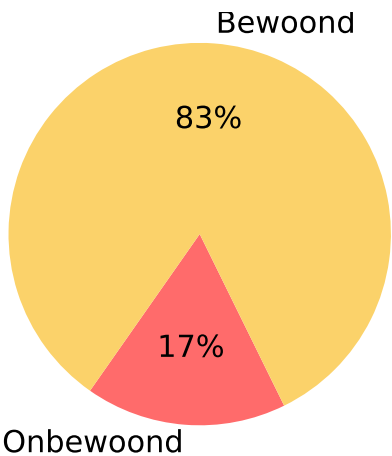


1.1. URBAN CONTEXT ANALYSIS - Housing information



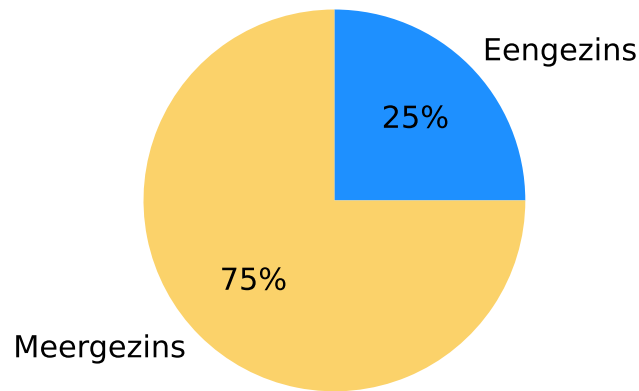
buy	52%
rent - corporation	14%
rent - other	32%
unknown	2%

ownership



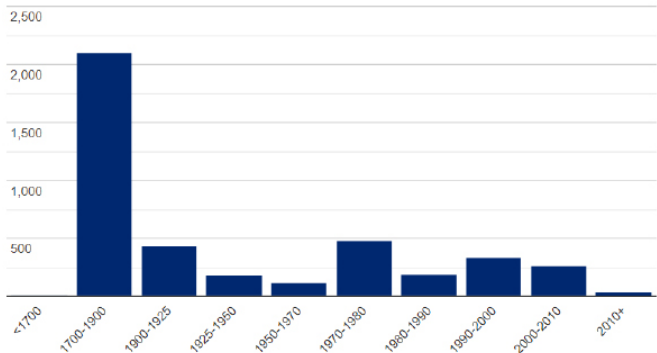
habitated	83%
unhabitated	17%

occupied



single family house (rowhouse)	83%
multiple family house (apartments)	17%

type of house



1700-1900	2103	1980-1990	194
1900-1925	438	1990-2000	336
1925-1950	182	2000-2010	263
1950-1970	117	2010>	40
1970-1980	480		

building age

3.699 dwellings

average house value (WOZ) €527.000

Housing

Based on information from <https://allecijfers.nl/straat/archipelstraat-den-haag/>

1.1. URBAN CONTEXT ANALYSIS - Archipel neighborhood



The Archipel neighborhood, also called the Indische Buurt, is a district in the center of The Hague. The neighborhood borders the districts Willemspark, Zorgvliet, Van Stolkpark and Scheveningse Bosjes, and Benoordenhout.

The Archipel neighborhood was built between 1860 and 1890 on the former estate Duinweide. One finds many houses in the Neo-Renaissance style that was very popular in the Netherlands at the end of the 19th century. Until the end of the 18th century the area where the Archipel neighborhood is now located was a dune landscape. There were some country houses, there was hunting, there were mills, cows grazed, and there were some vegetable gardens.

In the 19th century much changed with the arrival of the French in 1795, and of the Dutch royal family in 1815. Prosperity came and many people moved to The Hague. Although Willemspark had just been built, The Hague was in urgent need of housing. A new barracks was built, the Alexanderkazerne (1848), on the present Burgemeester Patijnlaan. The soldiers had to live somewhere, as did the blacksmith, the tailor, the laundress and so on. The officers lived in the broad streets, the narrow streets were for the common people. Sand and shells were transported by ships from the Nassaukade via the Schelpkade to the city, where many houses were built. In 1883 the Nassaukade was covered; from then on it was called Nassauplein. The Archipel area is, together with Willemspark II, one of the 19 protected townscapes of The Hague.

1.1. URBAN CONTEXT ANALYSIS - Buildings Archipel



Most of the urban blocks follow an orthogonal grid and are made up out of smaller individual houses. The main exception on this grid is around the police station where larger building blocks form ensembles which then form the urban blocks.

legend

 Buildings

Based on information from © OpenStreetMap-contributors

0 10m 

1.1. URBAN CONTEXT ANALYSIS - Green Archipel



The neighborhood has a lot of green nearby, mostly in the form of trees along the streets, small parks, cemeteries, and gardens. The neighborhood is enclosed by a large park to the north called the Scheveningse bosjes. Other important green areas are the three cemeteries in the north and the gardens of the Peace palace.

legend

 Green

Based on information from © OpenStreetMap-contributors

0 10m 

1.1. URBAN CONTEXT ANALYSIS - Water Archipel



As is visible from the map, not a lot of water is currently present in the neighborhood. The main canal on the left forms the border of the neighborhood. One of the living complexes in the neighborhood is enclosed on three sides with small canals, while one other living ensemble has three water elements, of which two at the corners and one more organic in the middle.

legend

 Water

Based on information from © OpenStreetMap-contributors

0 10m 

1.1. URBAN CONTEXT ANALYSIS - Road network Archipel



The neighborhood exists of a grid of streets, with a couple bigger main streets. One of these main streets is the Burgemeester Patijnlaan (S100), which is located next to the police station and cuts the neighborhood in two parts. This street is connected to the Koningskade, which goes to the station in the south.

legend

 Road

Based on information from © OpenStreetMap-contributors

0 10m 

1.1. URBAN CONTEXT ANALYSIS - Public transport Archipel



The neighborhood is well accessible with public transport. The bus stops are located on the main street of the neighborhood, while the tram stops can be found at the edges of the neighborhood. From these bus and tram stops, the train station is easily accessible from which the rest of the Netherlands can be accessed.

legend

- Tram station
- Bus station

Based on information from © OpenStreetMap-contributors



1.1. URBAN CONTEXT ANALYSIS - Monuments Archipel






The Archipel neighbourhood was set up in the late 19th century as a residential area for a wide variety of social classes. In the narrow streets, houses are designed for the middle class. The wider streets are designed as mansions for the upper class and the courtyards served for the workers. Due to these buildings being constructed by private entrepreneurs without following an architectural design/vision, a mix of designs was created.

These buildings have become inseparable from the townscape, resulting in many of them becoming a monument, in order to maintain the status of the Archipelbuurt as a protected townscape.

In red, these monuments are highlighted, whereas in a lighter red tone, the character-defining ensembles are shown. The cemeteries are also protected due to their cultural-historic and scenic value, in combination with their many funerary monuments.

legend

-  Road
-  Cemetery
-  Unique ensemble

Based on information from Monumentenzorg Den Haag

0 10m 

1.1. URBAN CONTEXT ANALYSIS - Functions Archipel



This map shows the function of each building for the Archipel neighbourhood. Although the neighbourhood was built only for housing, a shift can be seen from the Police Station and southwards, as these functions tend to shift more to a working environment. Three shopping streets are also present: the Bankastraat, the Frederikstraat and the Javastraat.

legend

- Living
- Work
- Services
- Retail

Based on information from © OpenStreetMap-contributors



1.1. URBAN CONTEXT ANALYSIS - Public/Private Archipel



The dark coloured areas show the inaccessible parts to the public. This is noteworthy, because it shows how not all the green in the neighbourhood is accessible, as these are closed cemeteries.

Also, Plein 1813 looks like a meeting place for the city from a mapping perspective, but is actually a very private part and only used for traffic.

The Peace Palace is also completely closed to the public.

legend

 Private

Based on information from © OpenStreetMap-contributors

0 10m 

1.2. ARCHITECTURE ANALYSIS - Architects background

Van de Erve, born in 1914, was a representative architect of the 'Nieuwe Bouwen'. He trained as a structural engineer at the TU Delft and graduated in 1937, specializing in industrial construction.

In 1938 he started working as an architect for the NV van der Heem, where he gained experience by building the company's head office.

Like other architects of his time, he was involved in building physics, building research, standardization, organization, coordination and economics. During work trips and in practice, Van de Erve also focused on the application of new materials, new construction systems and new construction methods.

Van de Erve believed that 'great architecture' was reserved for the very best. He has designed many buildings with a large utility factor, in his own words precisely because utility construction was his weak point during his studies in Delft. He was of the opinion that if you do not know a subject well enough, you should study that subject in order to turn a weakness into a strength.

Van de Erve also did a lot of housing construction, because in his view the ordinary Dutch person was entitled to good and comfortable living space. The architect's most prestigious designs are the Renault branch in Amsterdam, residential flats in Zandvoort and the new Staatsdrukkerij and UTS in The Hague. His architectural firm, also realized the Turmac factory in Zevenaar, Blik NV in The Hague and the Succes buildings in The Hague and houses and villas in Vlissingen and The Hague.



Blik N.V. in the Hague



Turmac Fabriek in Zevenaar



Renault-office in Amsterdam

1.2. ARCHITECTURE ANALYSIS - Cultural & Social perspectives

The police headquarters were designed two times. The first started around 1954 and the second around 1972. These two time periods were very different from each other.

The 1954 design didn't have much resistance, as the situation of the police was a mess, due to the police station being scattered amongst mansions. Besides, at that time, the former town hall was located next to the design location, making it blend with its direct surroundings. Another possible reason is that the typical Bauhaus elements present in the first wing were loved by the community. The look of the building was a very strict one, as the task of the police was to maintain order. This was generally accepted and thus the character of the building matched its functions.

However, the 1972 design for the extension had to deal with a lot of critique. The role of police was still to maintain order, but they were not above the people. The design resembled a castle, meaning it was interpreted as standing above the people. This was not received well by the Archipel neighbourhood, especially because of the height of such keep. The first designs were all higher than the surrounding buildings. Later designs changed the heights, made it smaller and also more sober to level with the social rank of the people.



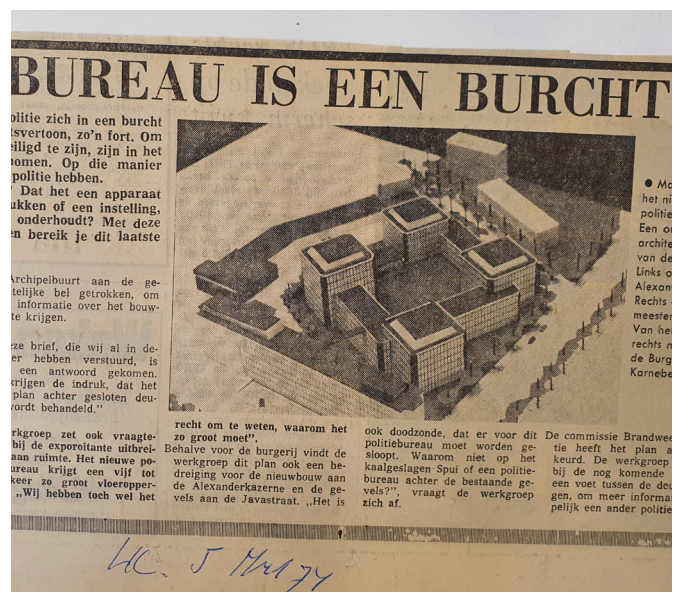
Neighbourhood committee asks to revise the plans for a castle-like design



New police headquarters are criticized



Archipel neighbourhood doesn't agree with the large police headquarters

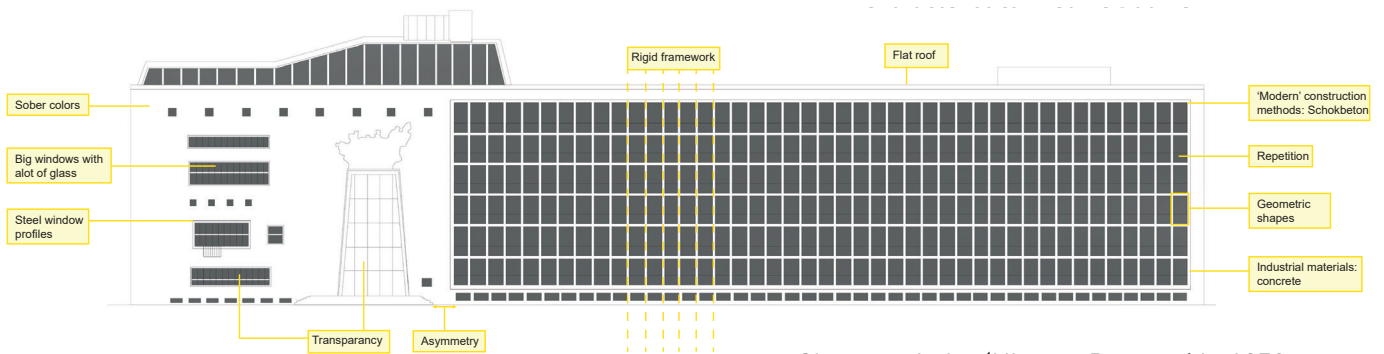


New police headquarters design resembles a keep

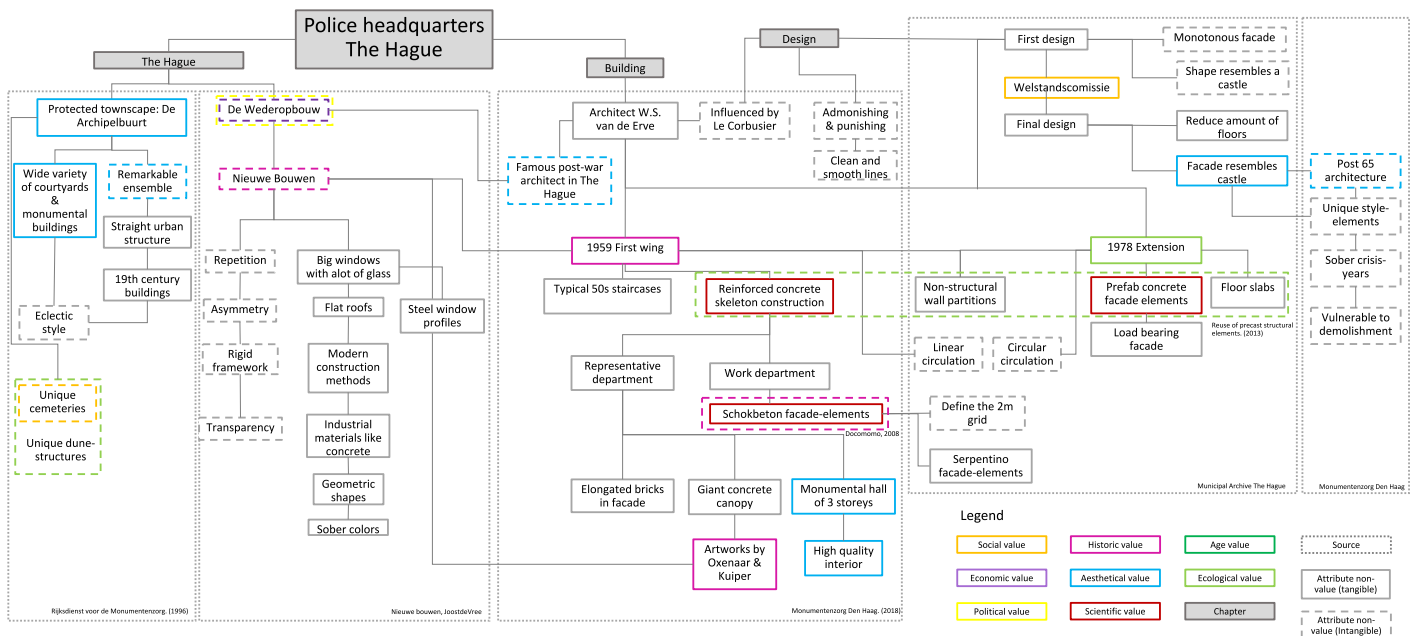


Protests result in a lower, smaller and more sober design

1.2. ARCHITECTURE ANALYSIS - Addressing attributes & values



Characteristics 'Nieuwe Bouwen' in 1958 part



Value assessment

1.2. ARCHITECTURE ANALYSIS - Urban positioning



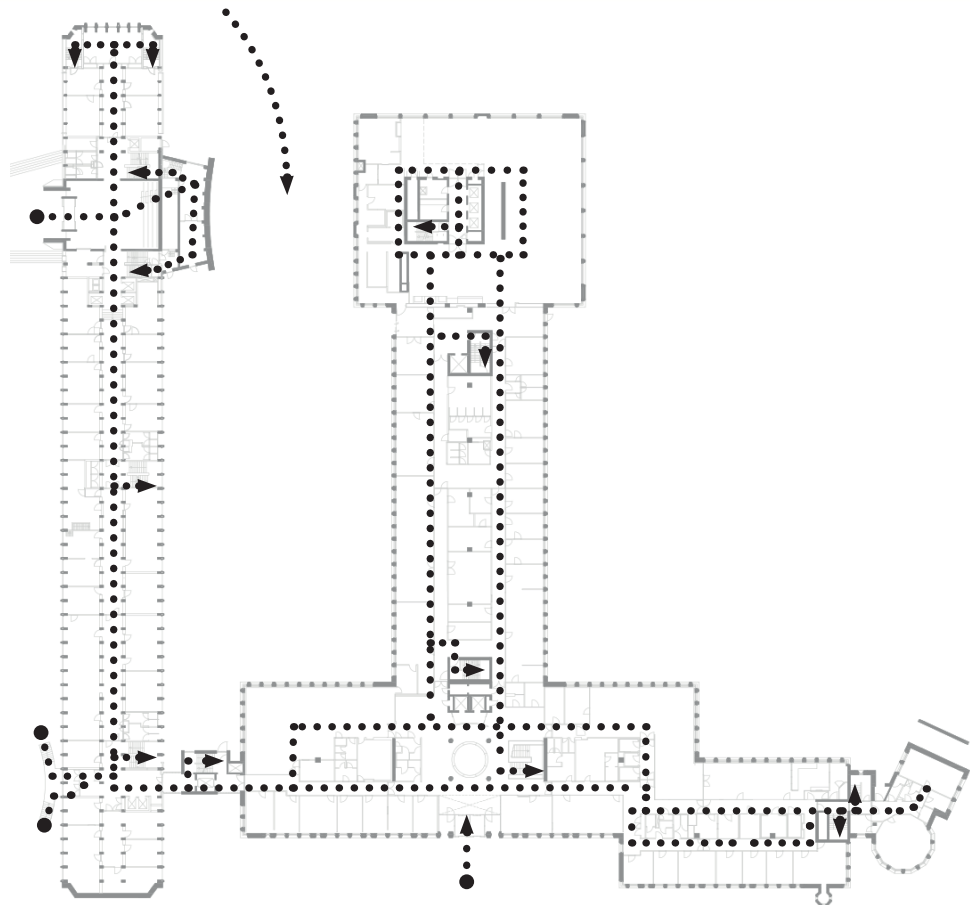
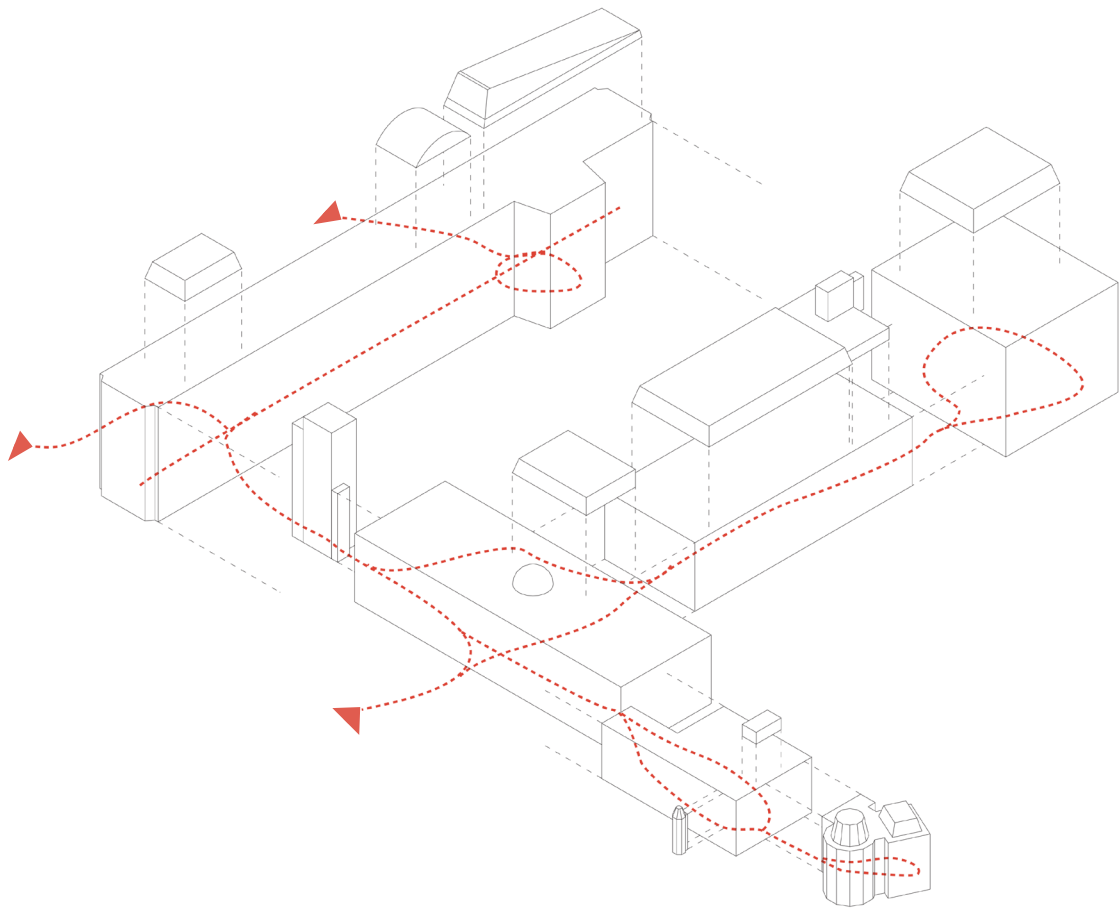
The current situation, with the residential complex designed by the Spanish architect Ricardo Bofill

The positioning of the building in the urban fabric, can be justified by the vicinity of the site to former town hall.

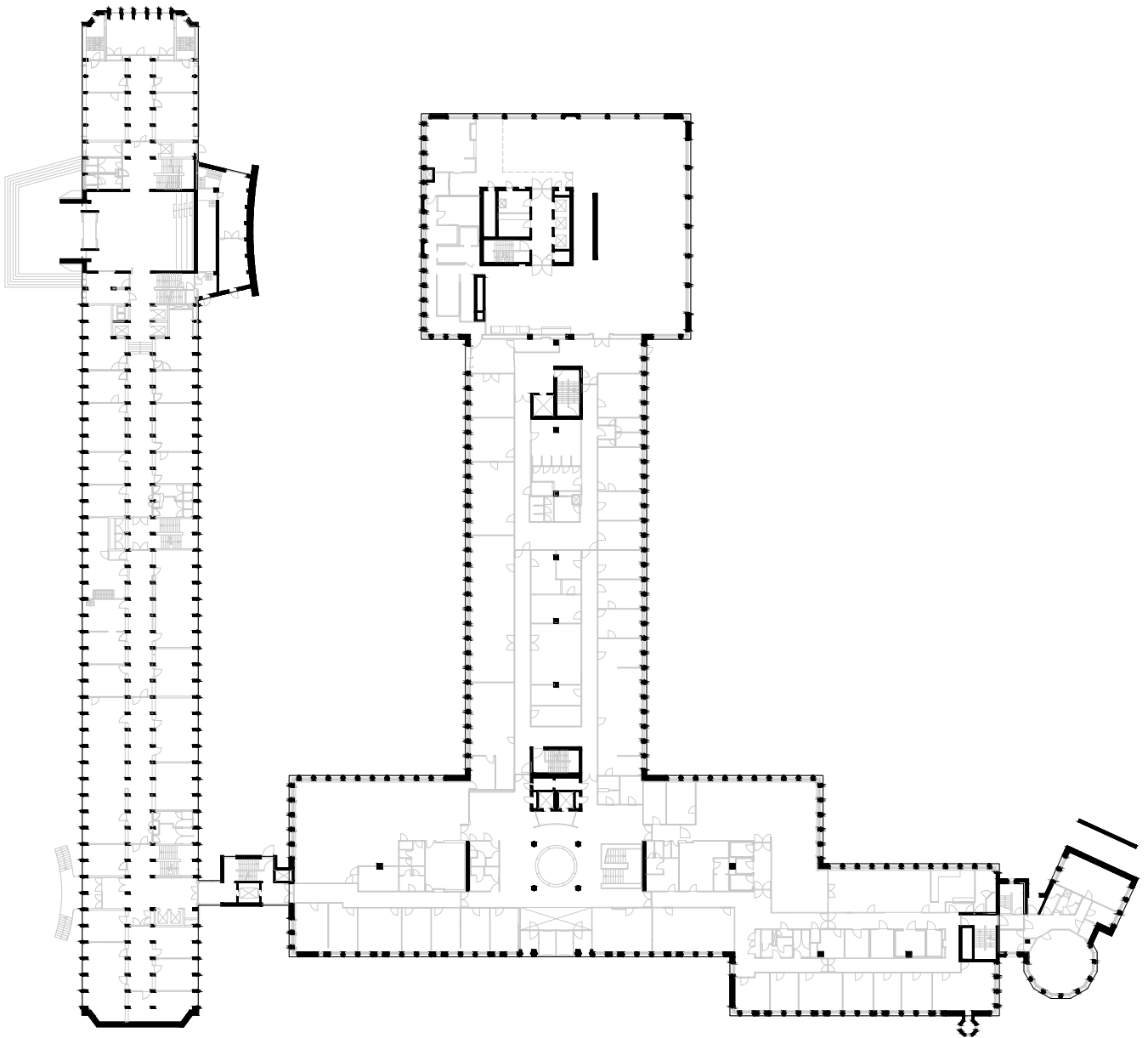
The two buildings could work more effectively when they were positioned close to each other, and it was also convenient for the Hague's citizen too.

The large scale of the building, did not fit in the historic, low-rise historic center, therefore it was located in the International zone, which is easily accessible and is characterized by large institutions and embassies, strengthening the sense of security. The urban fabric has changed over the years and the Police station played a certain role in developing the image that this region of the Hague currently has.

1.2. ARCHITECTURE ANALYSIS - Spatial sequence



1.2. ARCHITECTURE ANALYSIS - Floor plans

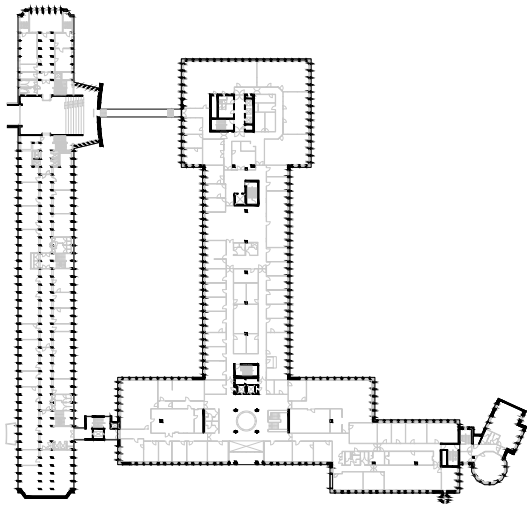


The police station consists of two buildings, and five floor levels. At the left, the long, monolithic block was initially built and afterwards a more fragmented extension was added, designed by the same architect.

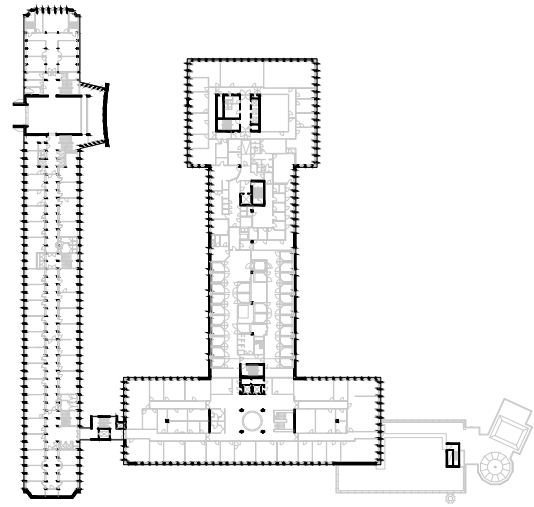
The first building features a monumental entrance, which is unique for the typology of police stations, but also a lecture hall on the top level.

Concerning the extension, the added volume is more introverted with no public functions, and features cells on the top level for security purposes. On both buildings the interior space is defined and divided by non-structural wall partitions.

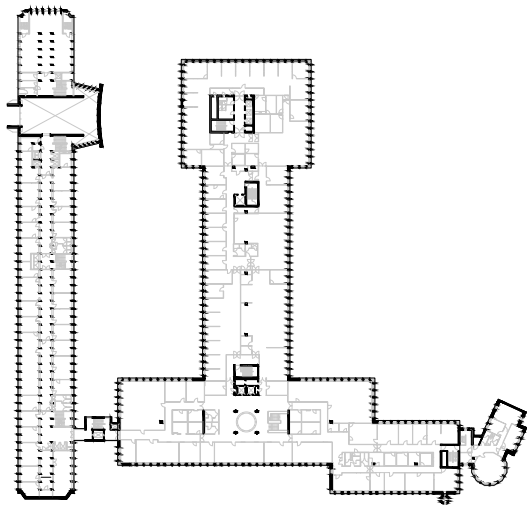
1.2. ARCHITECTURE ANALYSIS - Floor plans



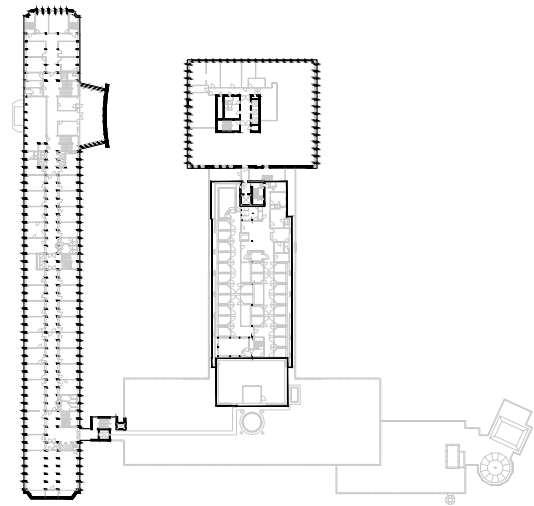
1st



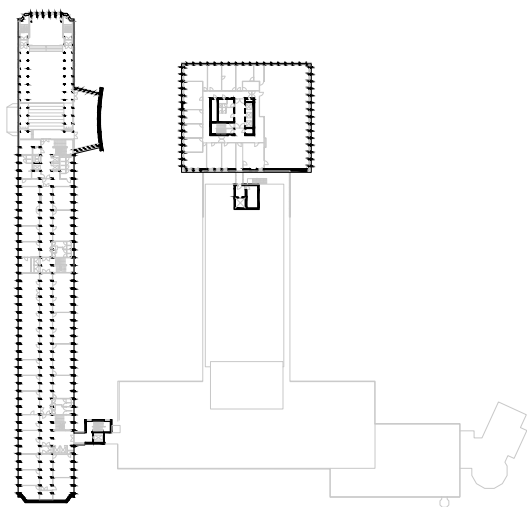
3th



2nd floor



4th floor



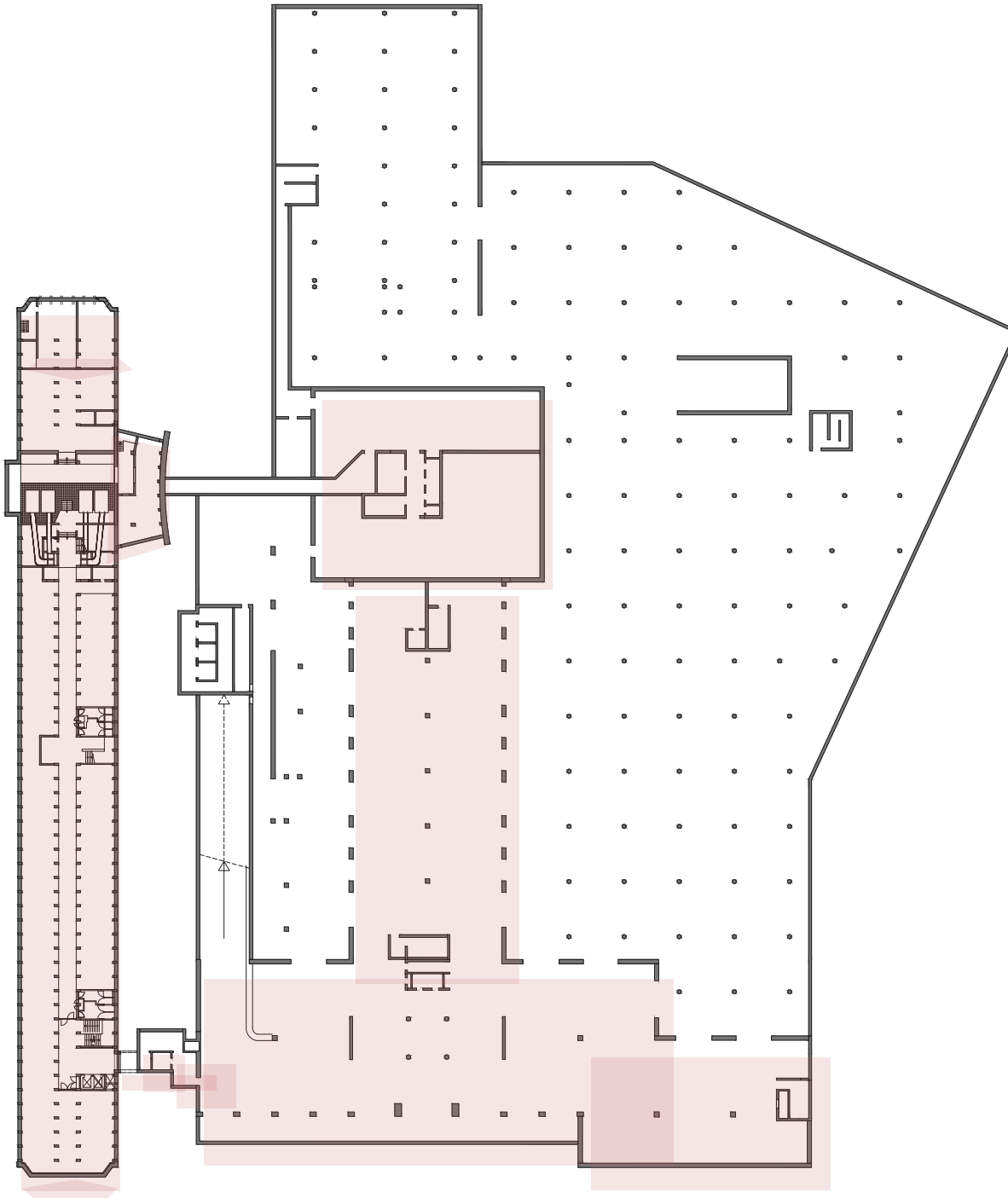
5th floor

From the rest of the floor plans, it can be concluded that they follow an extrusion of the ground floor.

A deviation from the grid can be seen on the upper part of the monument, where the span becomes larger from the third level and above. Also, on the 5th level where the amphitheater is located, the columns of this level are not aligned with the ones below, since a longer span was needed for the purpose of this space.

Also, it can be observed that the extension rises in height towards its backside, where the tallest volume is located; a cube of 900m² per floor.

1.2. ARCHITECTURE ANALYSIS - Basement plan



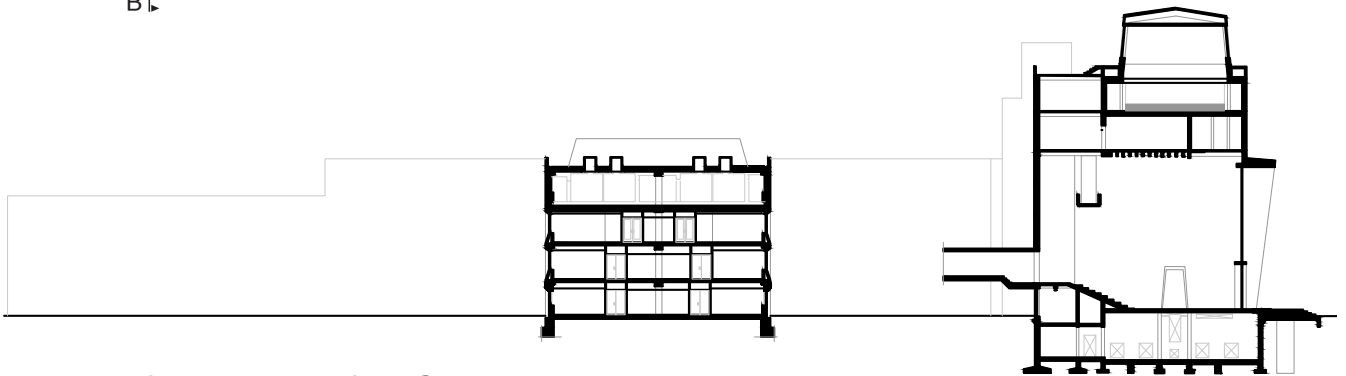
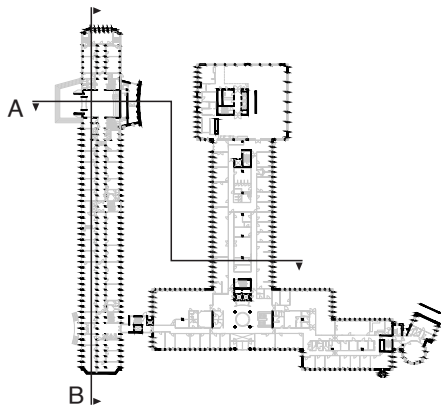
The basement plan shows an expansive parking lot beneath the extension and beyond its footprint that can host approximately 370 cars.

The monument has also a basement which features storage spaces and an area beneath the main hall, where the old mechanical ventilation units were located. It should be noted that at the time, they made use of coal to operate and had been replaced throughout the lifetime of the building, by new units that are located on the roofs.

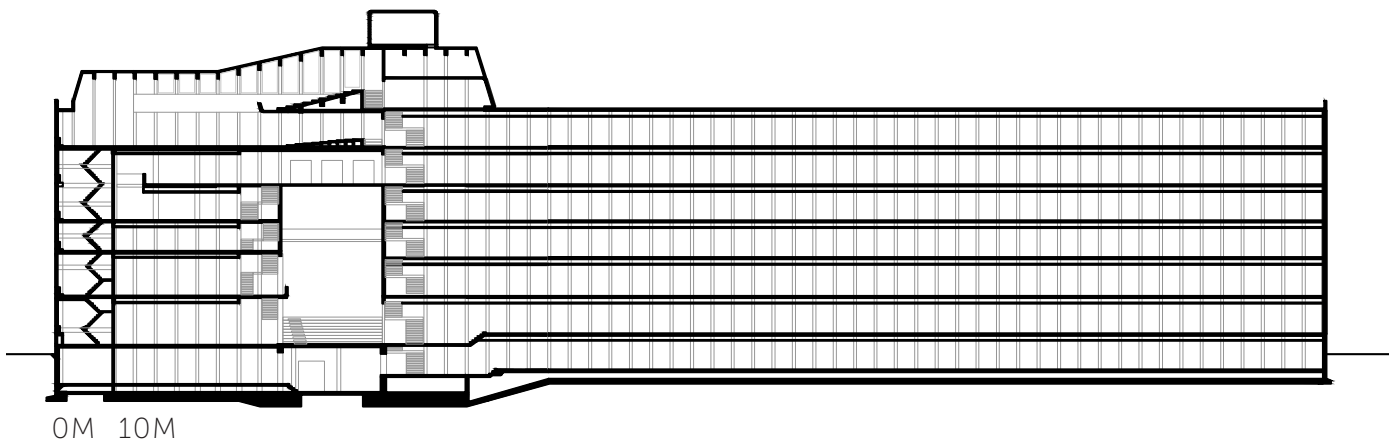
The relation between the structure and foundations is depicted through this drawing, as both buildings use strip foundations, and the perimetrical walls of the parking space are retaining walls.

Finally, the circulation cores can be observed that are present in each floor and penetrate the building vertically.

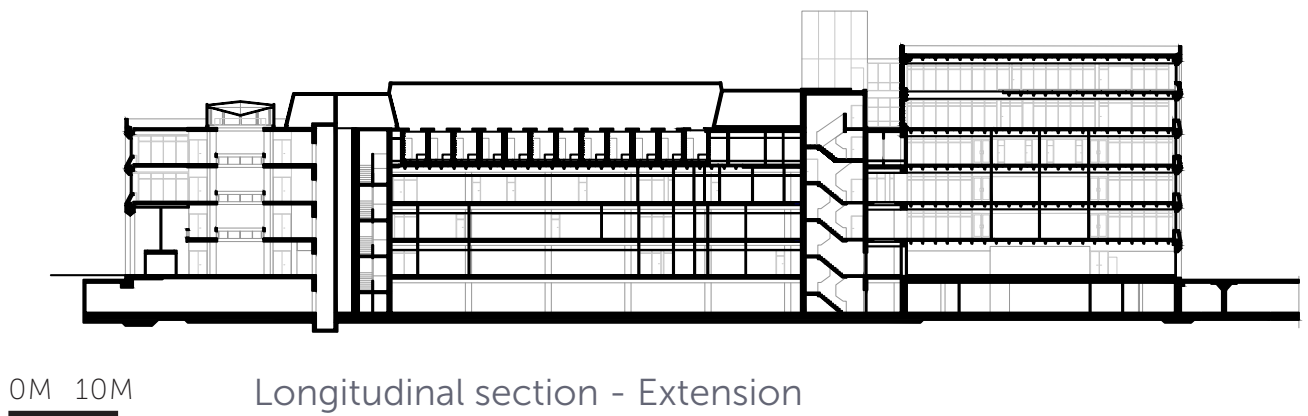
1.2. ARCHITECTURE ANALYSIS - Sections



Cross section - extension & monument



Longitudinal section - monument



Longitudinal section - Extension

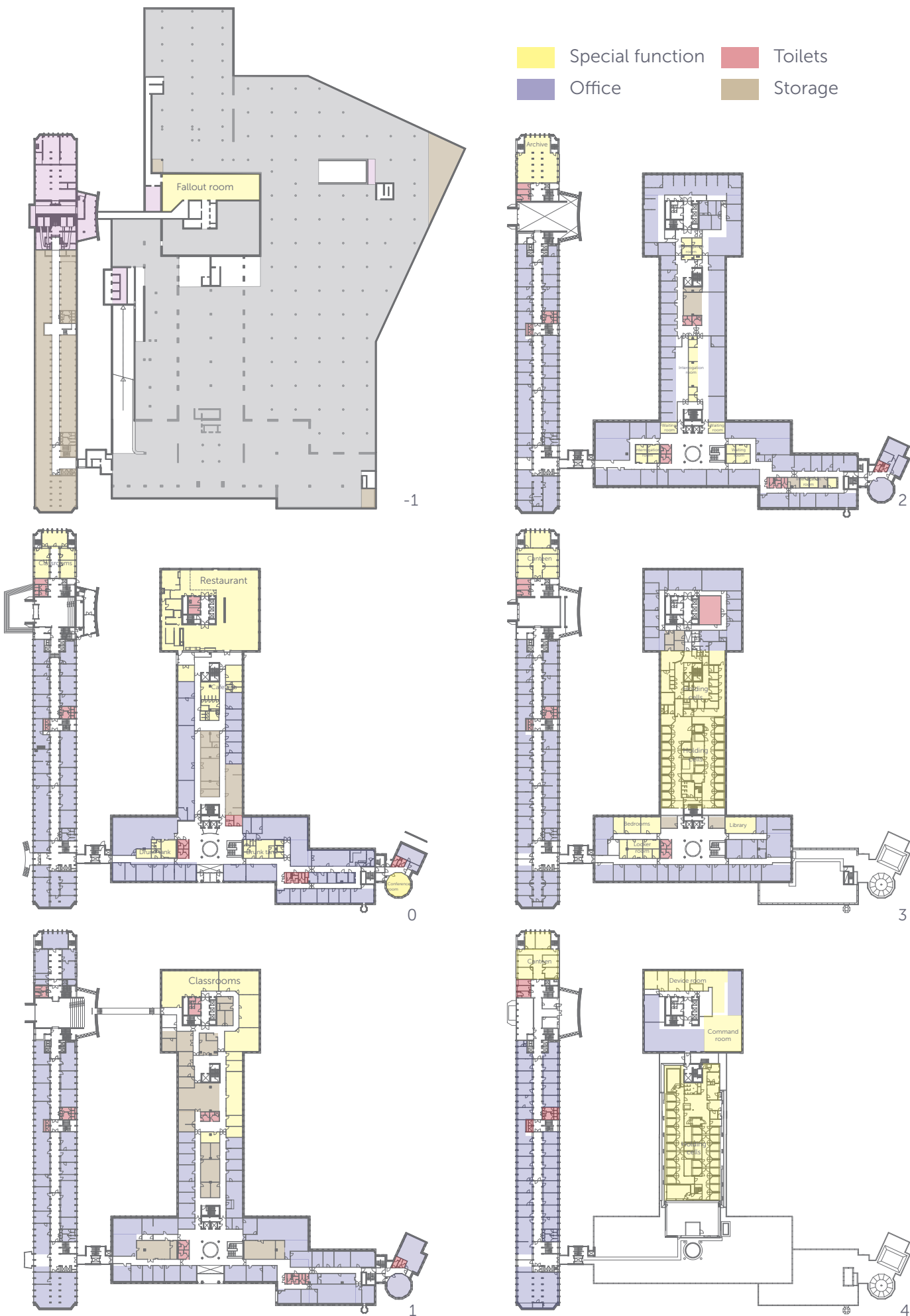
1.2. ARCHITECTURE ANALYSIS - Program

- Special function

Office

Toilets

Storage



1.2. ARCHITECTURE ANALYSIS - Access



parking entrance



private entrance



secondary entrance



old main entrance



main entrance from Burgemeester Patijnlaan



main entrance

1.2. ARCHITECTURE ANALYSIS - Interior routing



central corridor - monument



main hall



transition space between the two buildings



atrium of main entrance

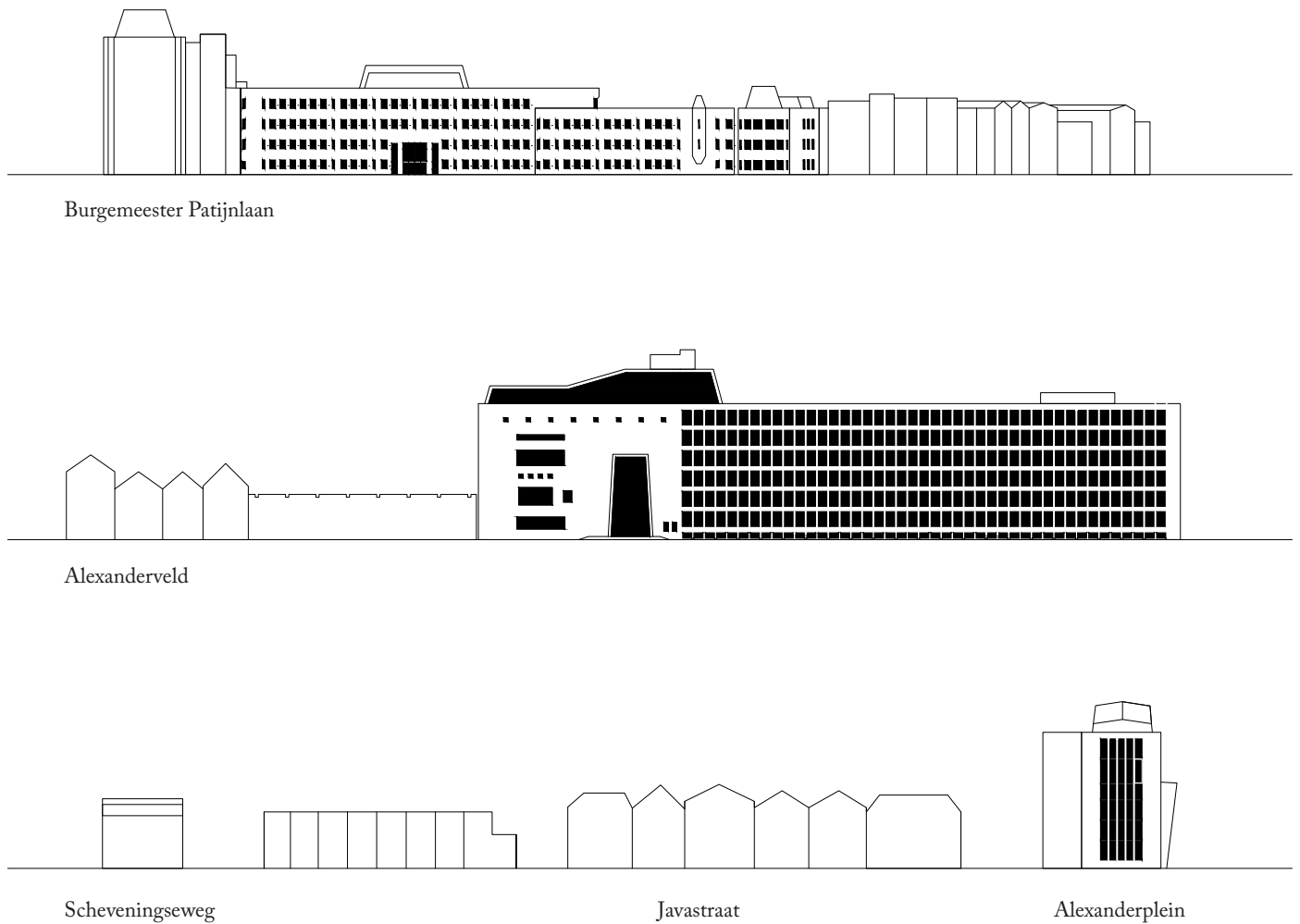


dark corridor system



vertical circulation cores

1.2. ARCHITECTURE ANALYSIS - Facade transparency

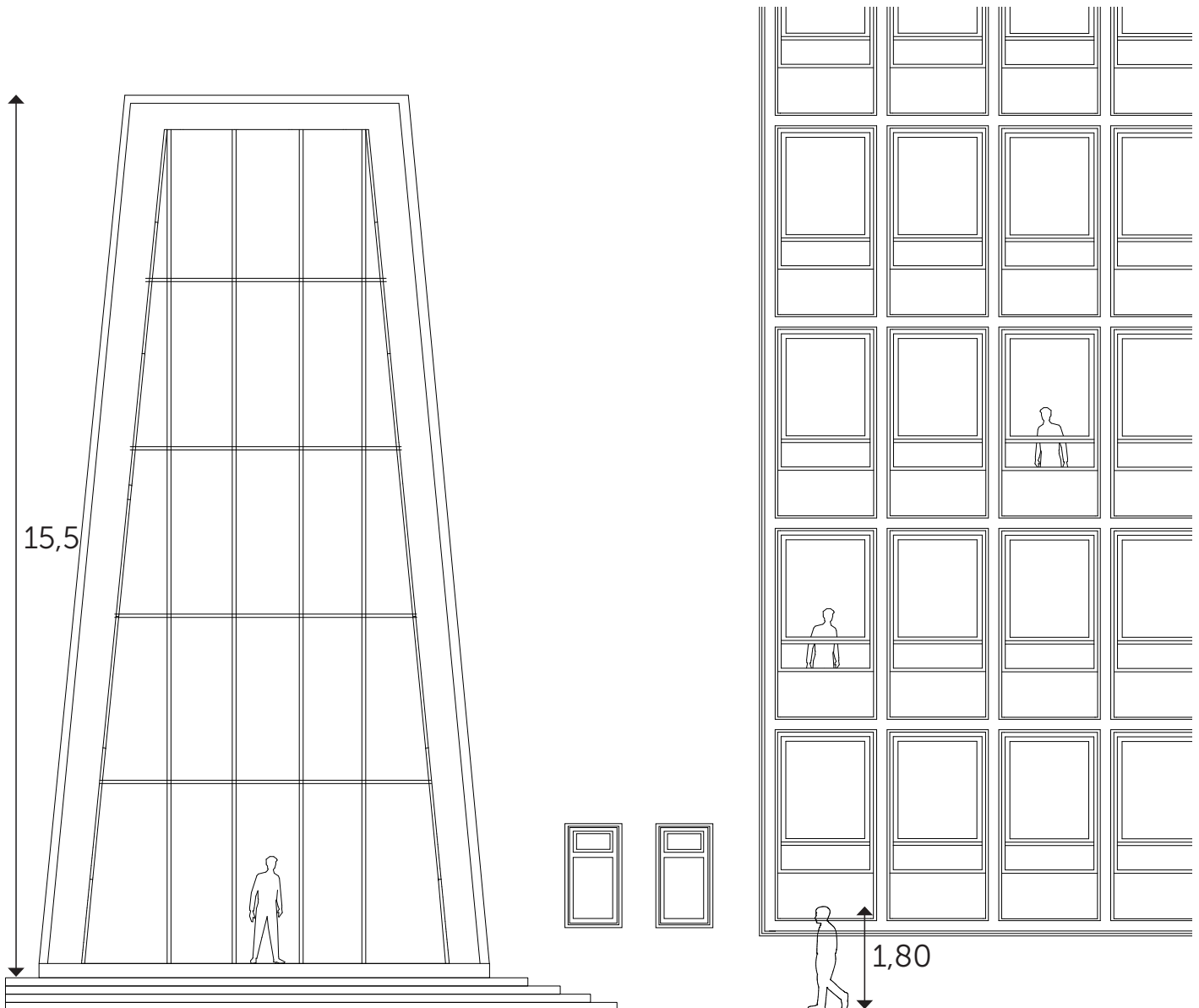


From the facades, the level of transparency can be understood. Marked in black, it is obvious that there is a transparency difference between the two buildings.

The monument's facade is divided into two parts; on the working area, there is an extensive use of glazing, allowing for transparency and views towards the outside.

On the contrary, the extension has more uniform application of glazing, through smaller windows, which are integrated in the prefabrication facade panels. There is no division of the facade, and the level of transparency and as a consequence, amount of daylight, is rather uniform throughout the building.

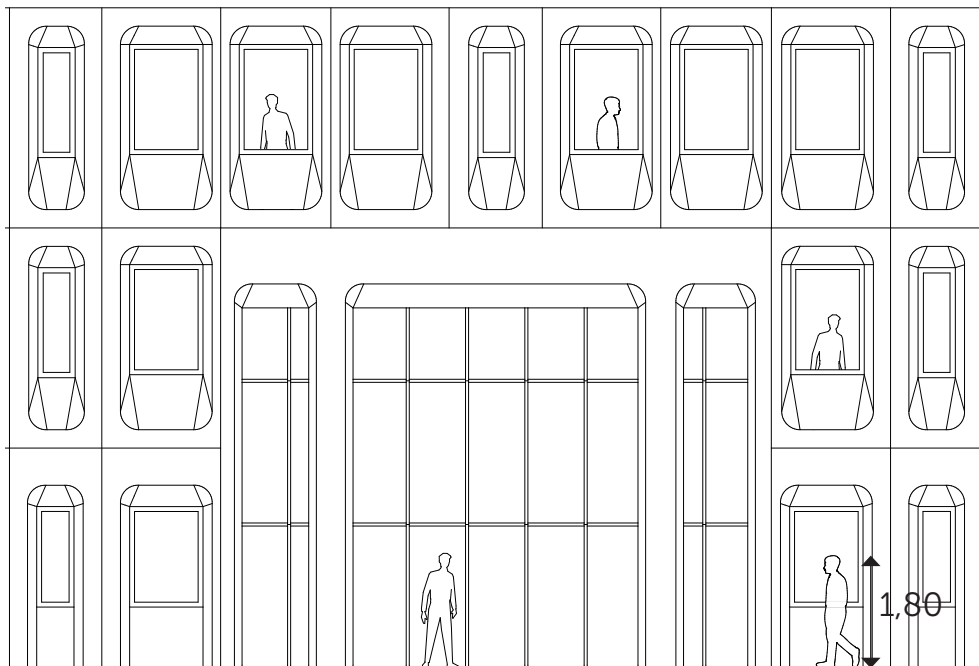
1.2. ARCHITECTURE ANALYSIS - Proportions 1958 part



In this drawing the scale of the Schokbeton elements and the canopy becomes clear. By using the scale of a person, which is set to 1.8m in this drawing, you can see how big the Schokbeton elements are in comparison to a person. When walking around the building, your eyes meet the top edge of the precast concrete elements. When inside the building, your eyes will be in the exact middle of a Schokbeton frame.

The scale of the entrance is very big compared to a person, and even to the building. With 15.5m in height this entrance is used to show to power of the police by impressing the visitor.

1.2. ARCHITECTURE ANALYSIS - Proportions 1980 part



The precast facade elements are 3.60 in height and 1.50 or 1.80 in width. Because the shape of these elements falls inwards and matches the window frame size, the facade elements don't look the same from the inside compared to the outside. From the inside they look like normal windows in a straight wall, but from the outside the windows are hidden more from sight and the brutalistic character is enforced.

In contrary to the 1958 part, the eye level meets the center of the windowframe instead of the bottom of the precast element. The human scale is taken in better consideration here.

1.2. ARCHITECTURE ANALYSIS - Materialisation 1958 part

Colour

Material/texture



Window
Glass

Window frame
Black painted aluminium

Schokbeton precast facade element
Washed aggregate finish

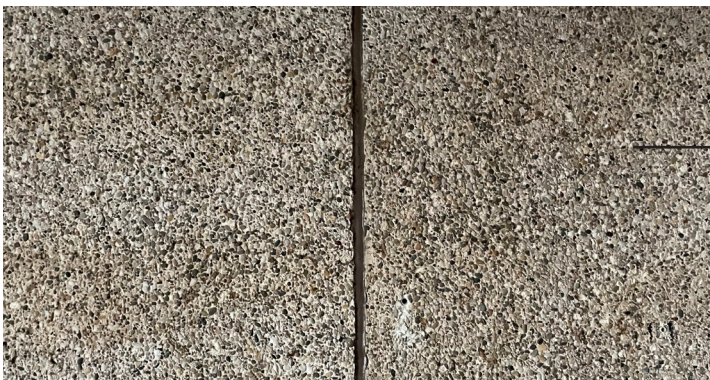
Elongated bricks
brown brickwork in combination
with red brickwork
with 5:1 ratio.



Natural stone slab
Serpentino stone

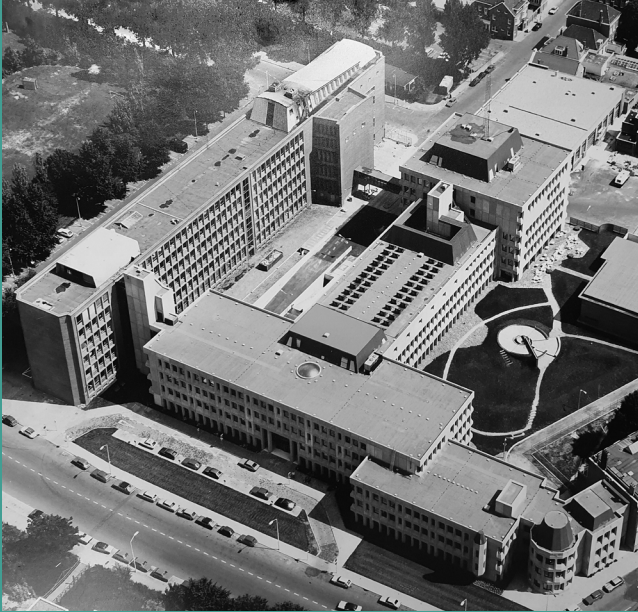
Schokbeton precast facade element
Washed aggregate finish

Elongated bricks
brown brickwork in combination with
red brickwork
with 5:1 ratio.



Precast facade elements
Washed aggregate finish

1.3. BUILDING TECHNOLOGY ANALYSIS - Added elements



Old situation



Roof additions



Entrance canopy (old condition)



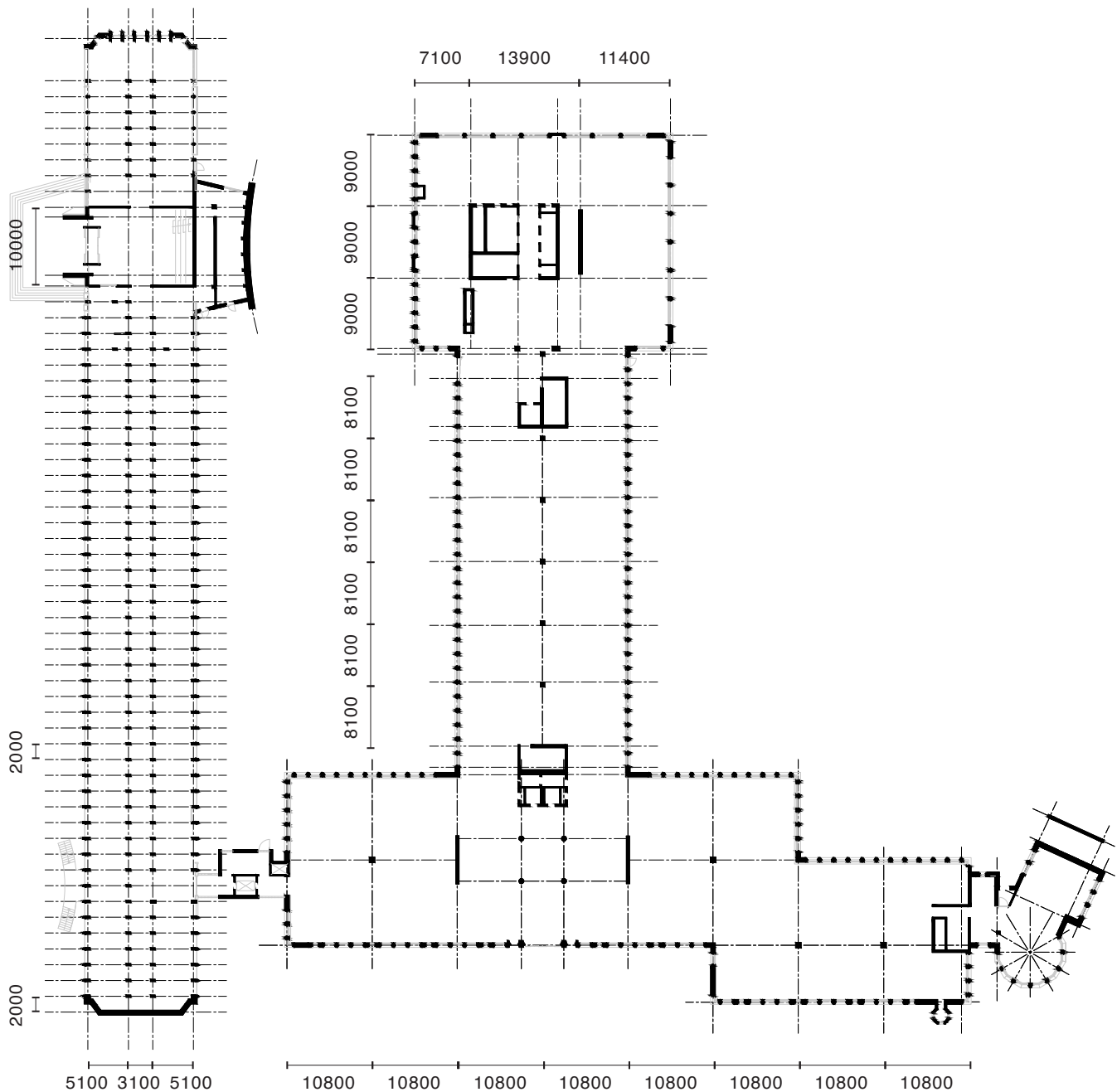
Entrance canopy (addition of statue)

The most important addition, was that on the extension. Another level was added on top of the existing, where the cells would be located. The construction of it is made out of steel, making it lighter.

On the other hand, the monument is mostly unaffected. The only significant change that is recorded by photo-investigation, is the addition of the statue on top of the existing canopy.

Over the years, new air-handling units have been added to the roof of the monument, to support its climate needs.

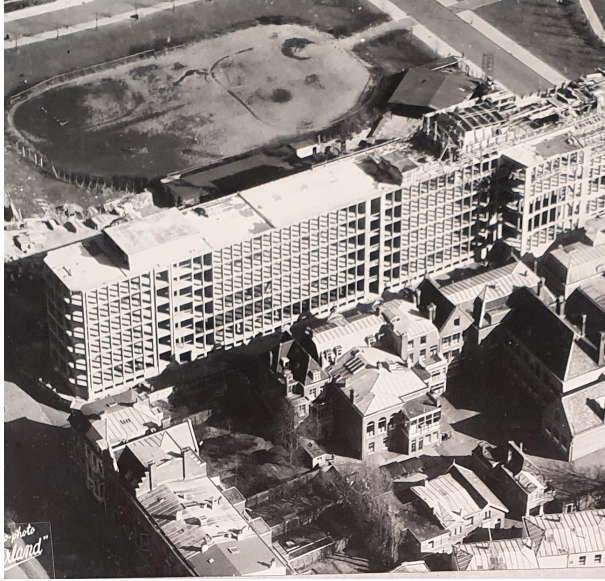
1.3. BUILDING TECHNOLOGY ANALYSIS - Loadbearing structure



Two main observations can be made regarding the structural grid; The monumental part has a dense column grid of concrete columns, with a 2m span, and is associated with the modular façade partitions that compose the grid of the façade.

On the other hand, the 1980 extension's structure consists of floor slabs that span all the way onto the load-bearing façade, leaving an almost column-free floorplan.

1.3. BUILDING TECHNOLOGY ANALYSIS - Material



concrete skeleton



concrete columns & beams



Concrete reinforcement



mashrooms columns - basement

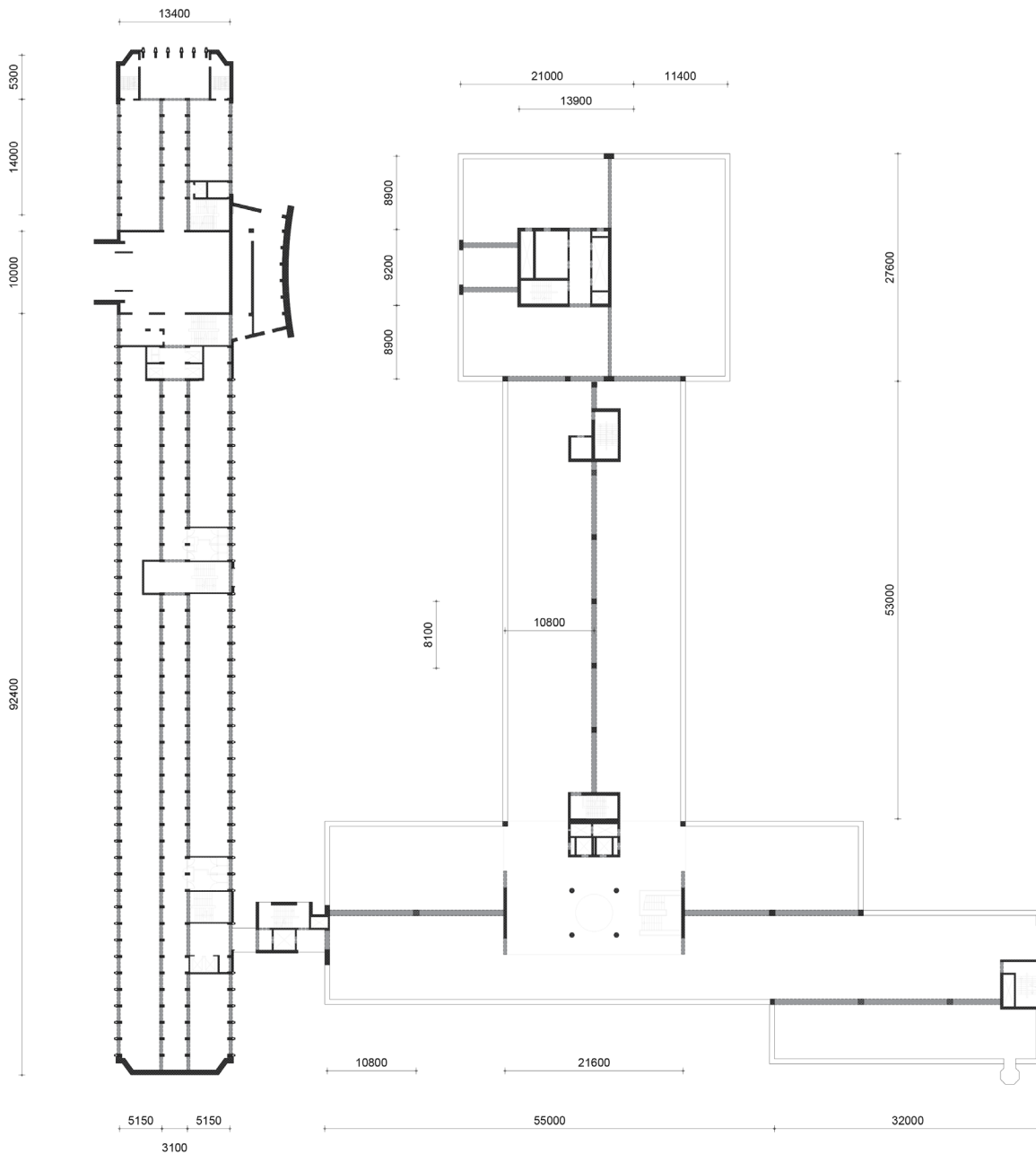


prefabricated elements attached to the facade



Prefabricated facade elements

1.3. BUILDING TECHNOLOGY ANALYSIS - Columns and beams

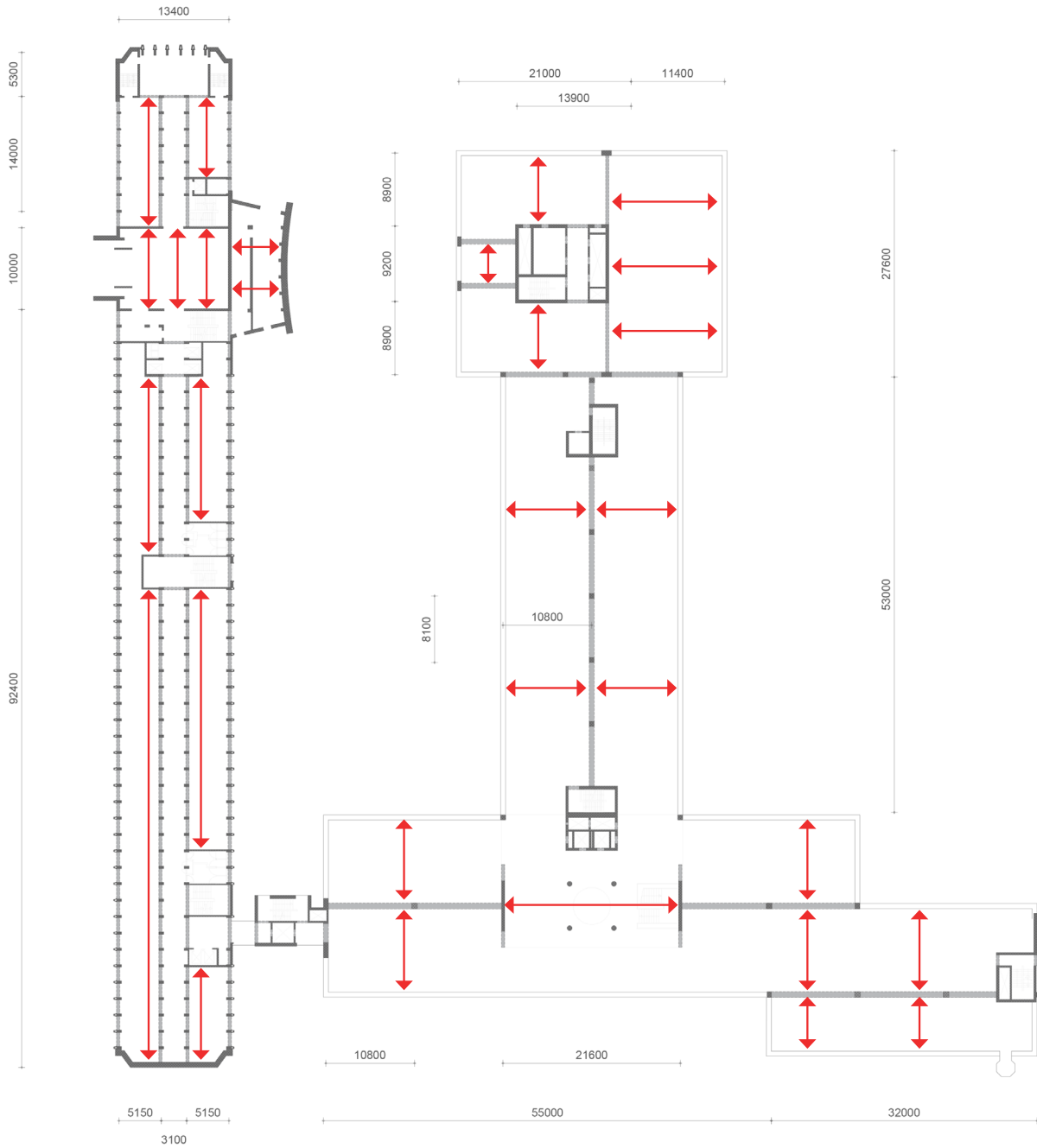


From this drawings, one can understand the primary load-bearing structure (columns) and the secondary (beams), upon which the floor plates rest.

The extension consists of a load-bearing facade which is not highlighted in this diagram, so as to clearly show where the columns are located.

It is important to notice, that the load-bearing facade is not capable to withstand on its own the weight delivered by the beams, therefore it was necessary to integrate in this facade, some reinforced concrete columns that would assist in the load resistance of the structure.

1.3. BUILDING TECHNOLOGY ANALYSIS - Span direction



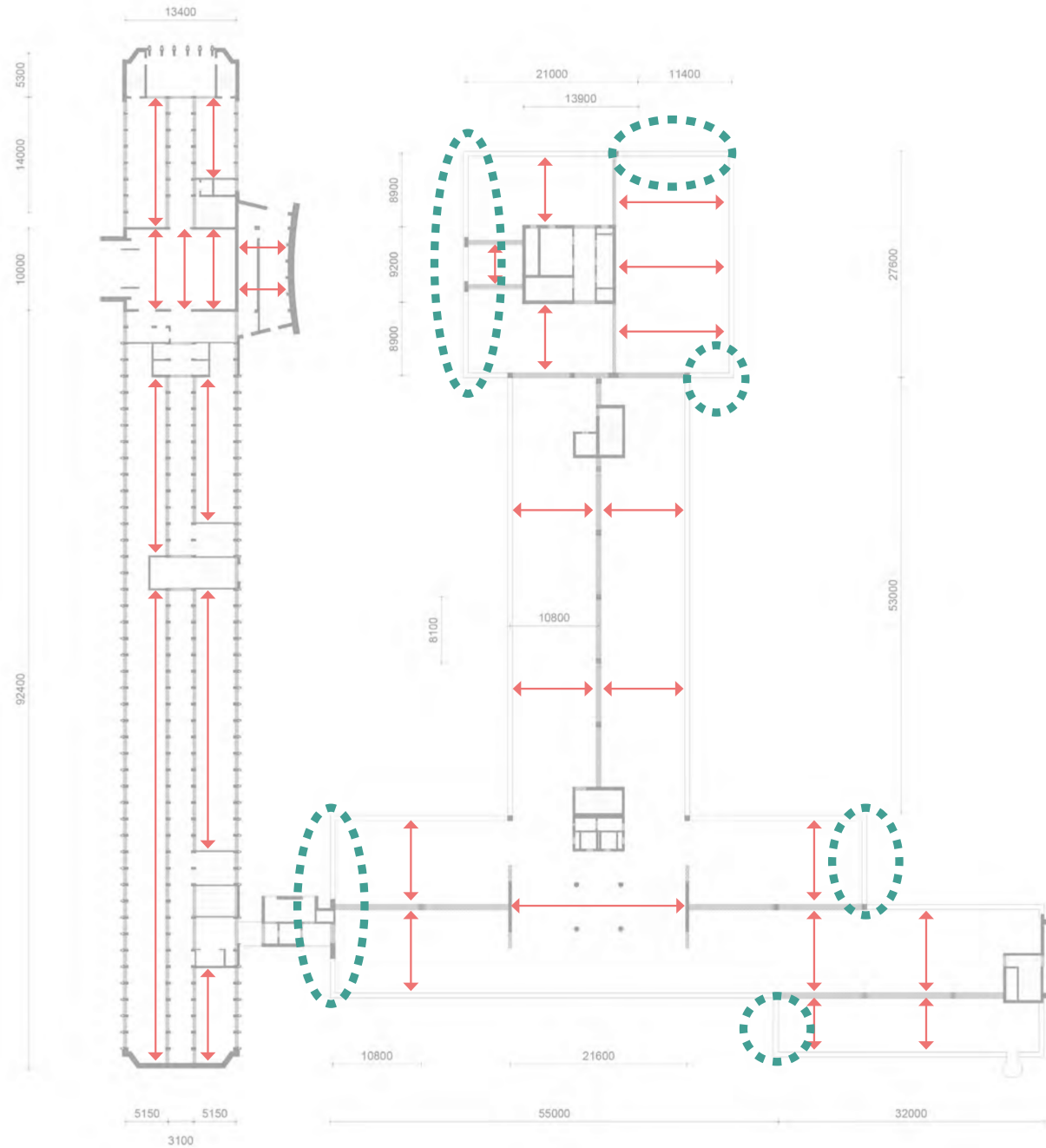
The monument consists of an external collonade, running along its perimeter and two collonades that form a corridor. The span is vertical throughout the building and its is interrupted at certain point from the vertical circulation cores, that enhance the lateral stablity of the building.

The extension though, feautures a beam, centrally located in all volumes, apart from the square one with has a system of beams, but the principle remain the same. Prefabricated concrete floor plates stretch across the shortest distance between the beam and load bearing facade which is supporting the load of the floors.


0M 10M



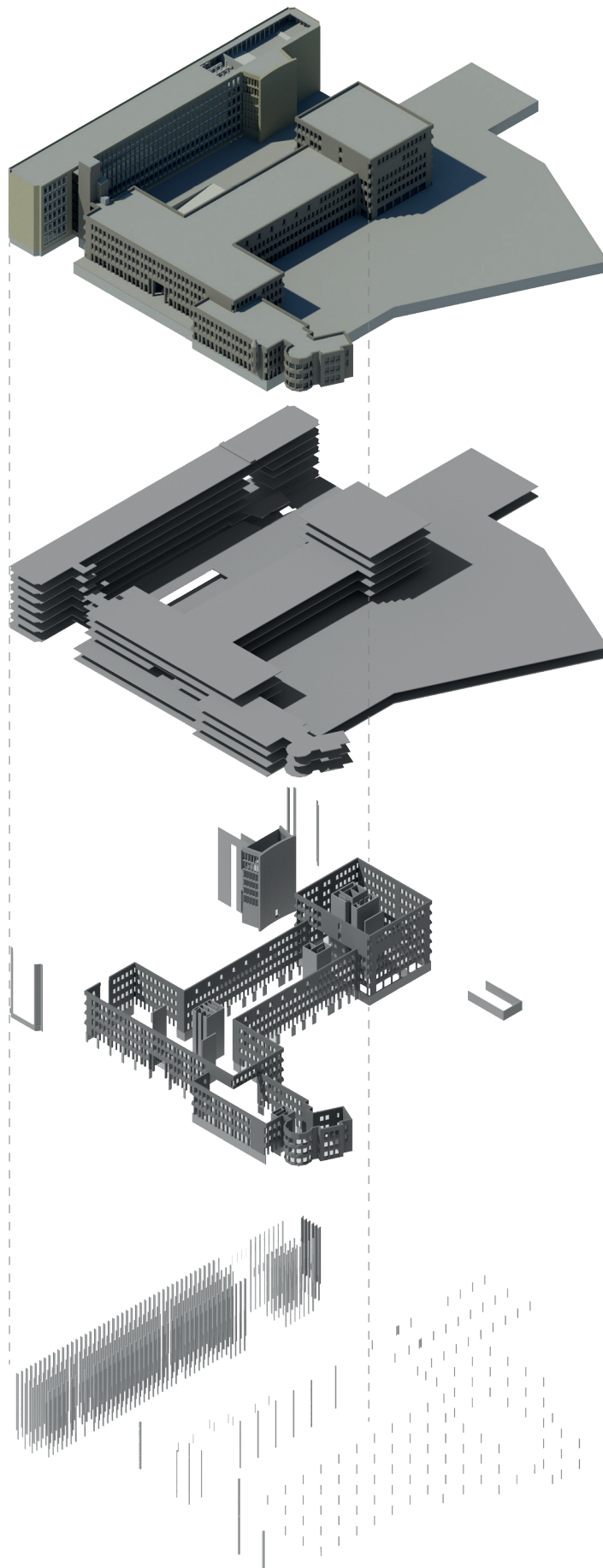
1.3. BUILDING TECHNOLOGY ANALYSIS - Section 1980 extension



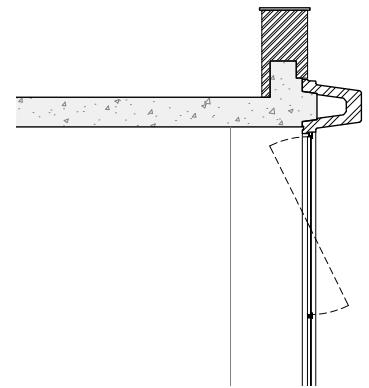
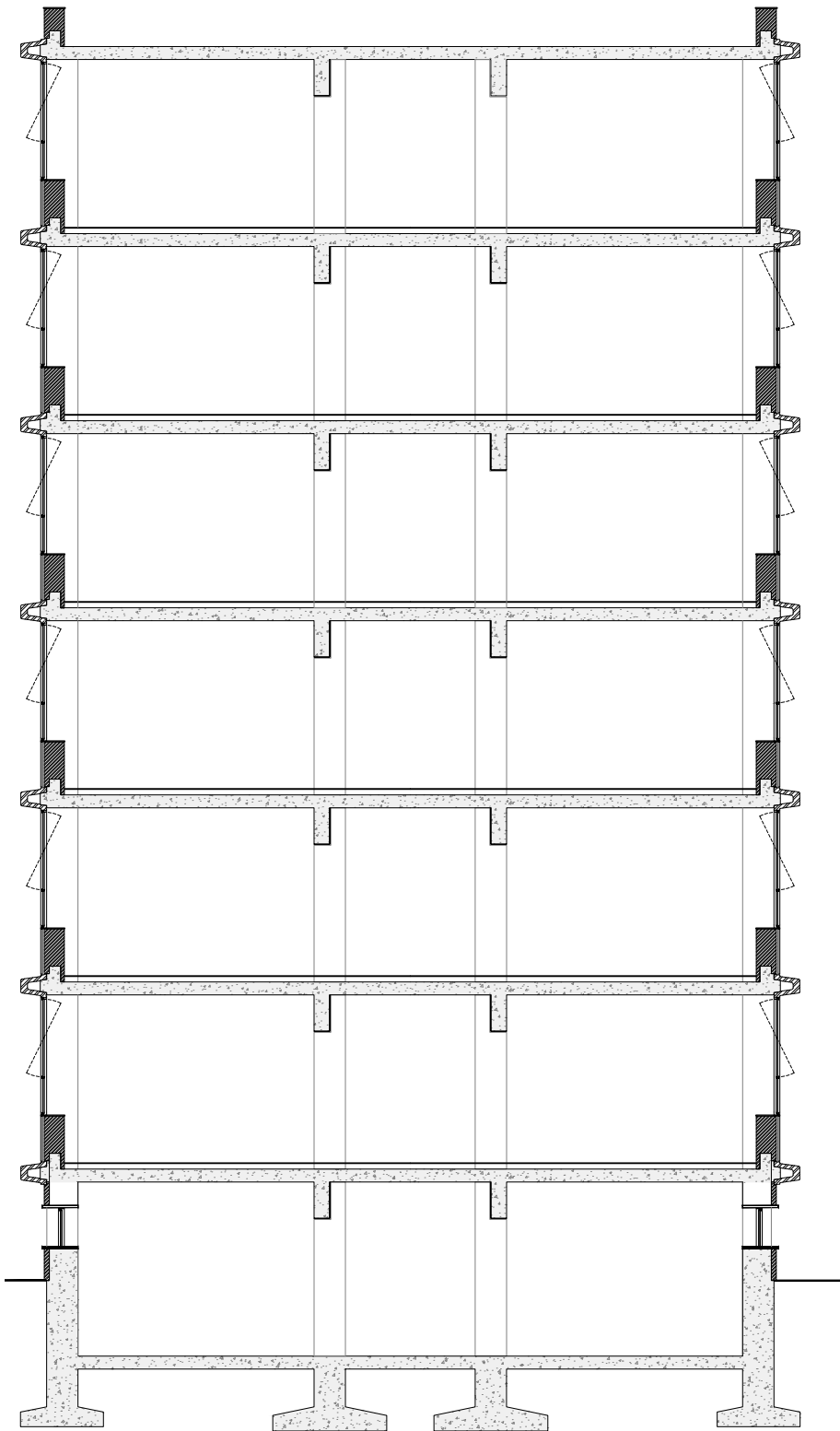
The parts encircled in green show the non-loadbearing parts of the 1980 extension. These parts have a double-T floor which spans parallel to the facade, making the loadbearing precast panels at these spots lose their function, but are nevertheless placed there to continue the rhythm of the facade.

 Non-loadbearing facade

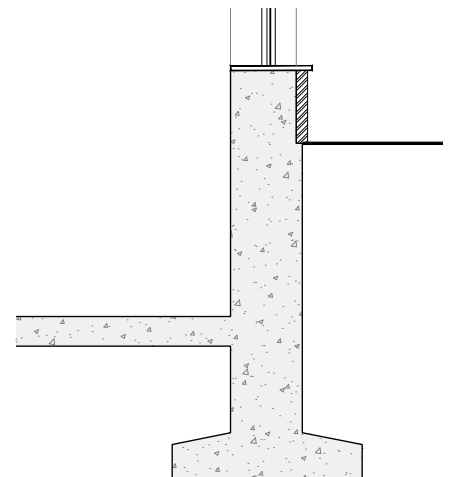
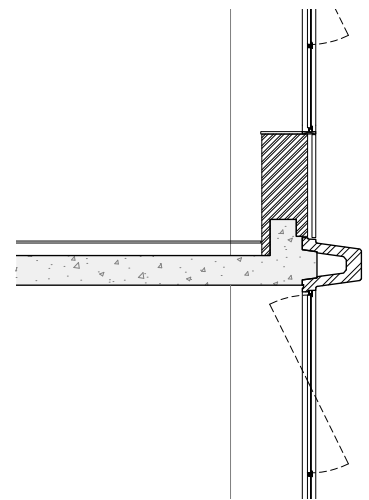
1.3. BUILDING TECHNOLOGY ANALYSIS - Axonometry overview



1.3. BUILDING TECHNOLOGY ANALYSIS - Section 1958 part

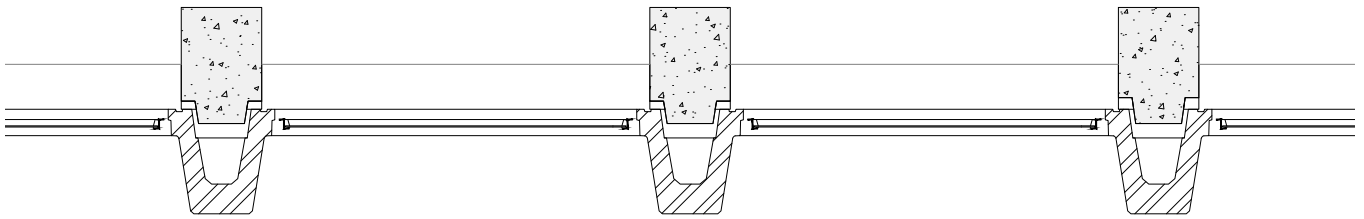


parapet

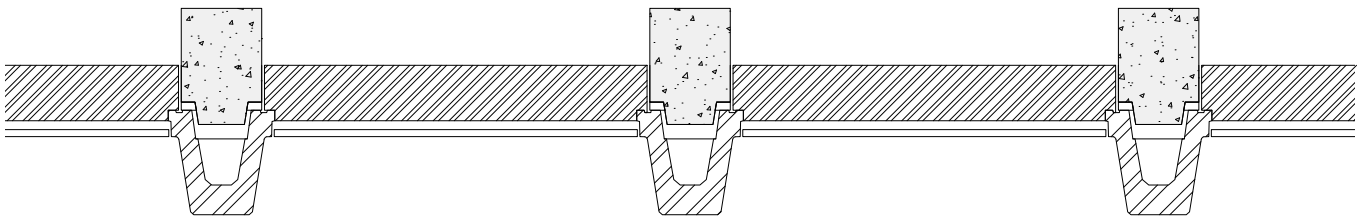


strip foundation

1.3. BUILDING TECHNOLOGY ANALYSIS - Horizontal section

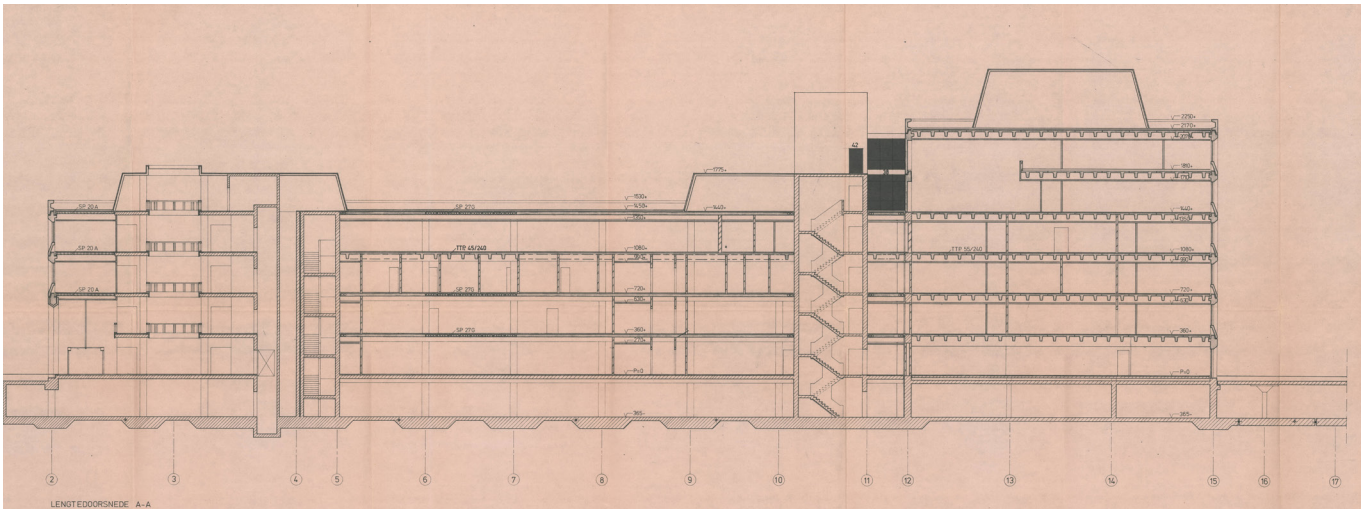


1:20 horizontal section - glazing

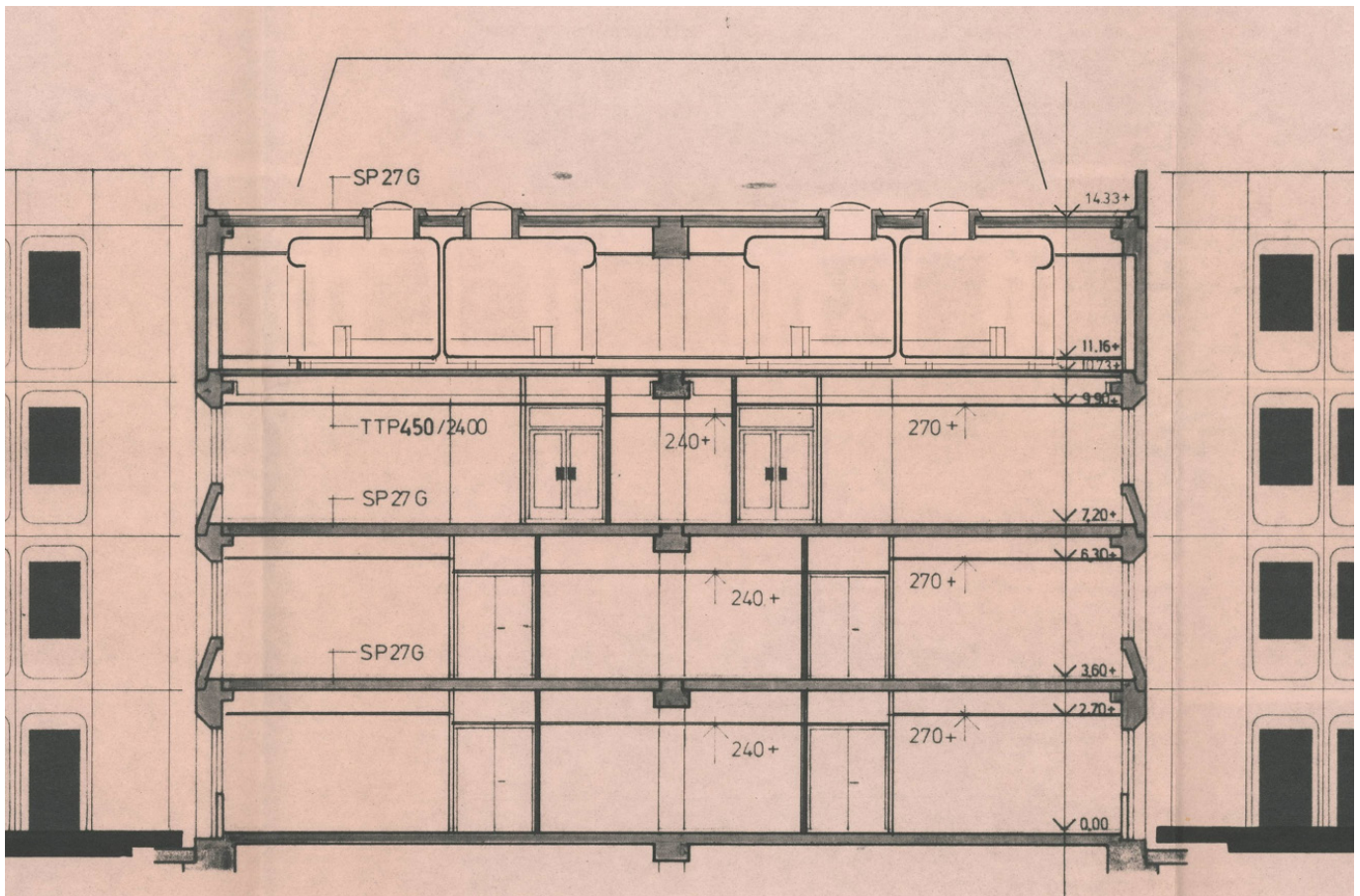


1:20 horizontal section - bricks

1.3. BUILDING TECHNOLOGY ANALYSIS - Main sources 1980 part



Longitudinal section of the 1980 extension, showing a clear overview of the floor types: hollow-core slabs of 265mm and double-T floors of 450mm (TTP45-240)

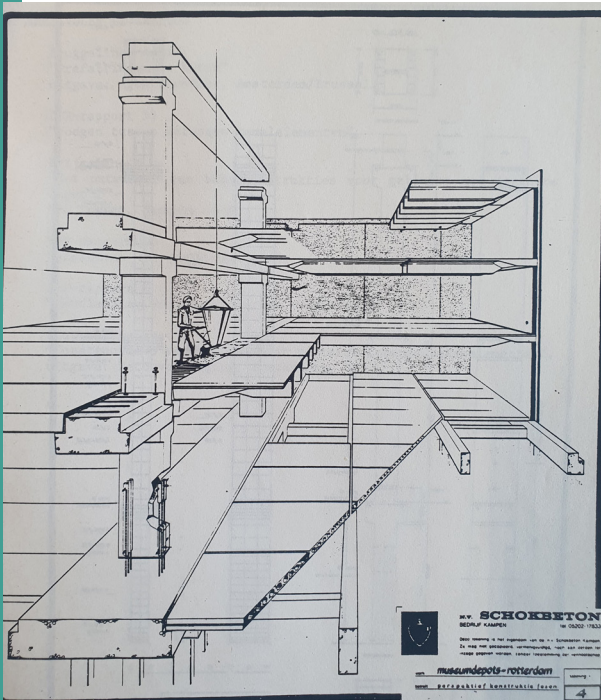


Cross-section of the part I intervene on, showing a clear overview of dimensions, floor type and precast facade element use.

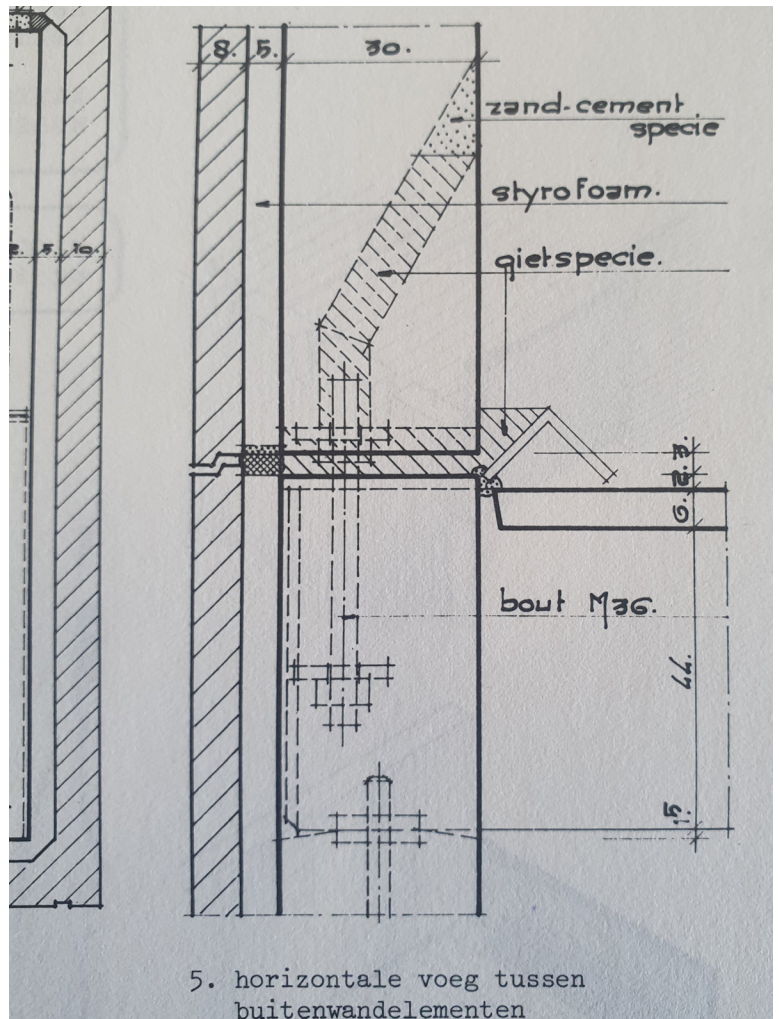
Also, the precast concrete element in the facade is different on this level, as holding cells barely have any windows, resulting in panels without windows.

The third floor (top floor) has the holding cells, which have a higher floor load compared to the offices beneath due to thicker wall requirements. The assumption is made that as a result, a double-T floor is used on this level as it is stronger compared to the 265mm hollow-core slabs.

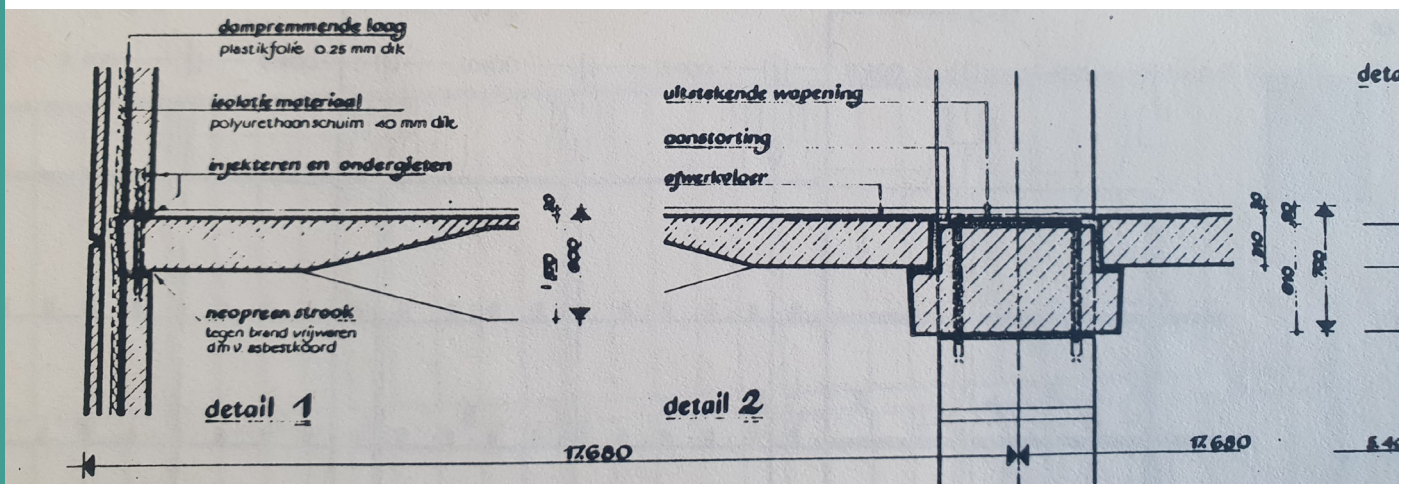
1.2. BUILDING TECHNOLOGY ANALYSIS - External sources



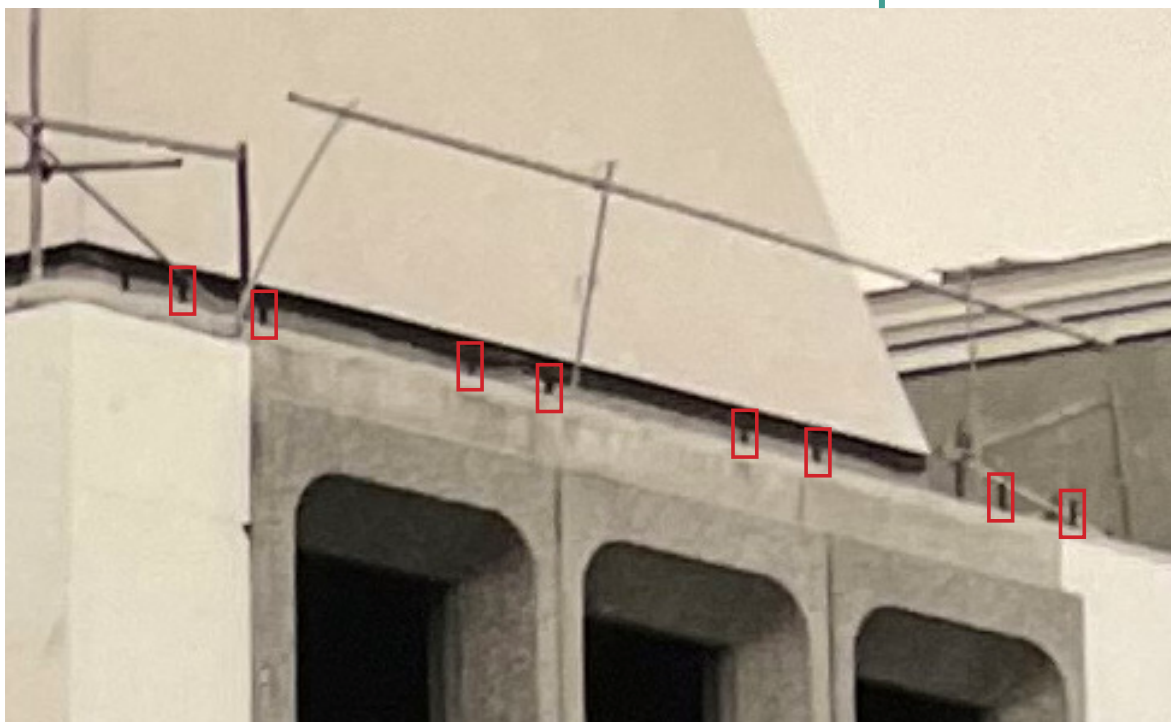
A 3d drawing of a similar building to the 1980 extension, manufactured by Schokbeton. It shows the same inverted T-beams, hollow-core slabs, double-T floors and loadbearing precast facade system.



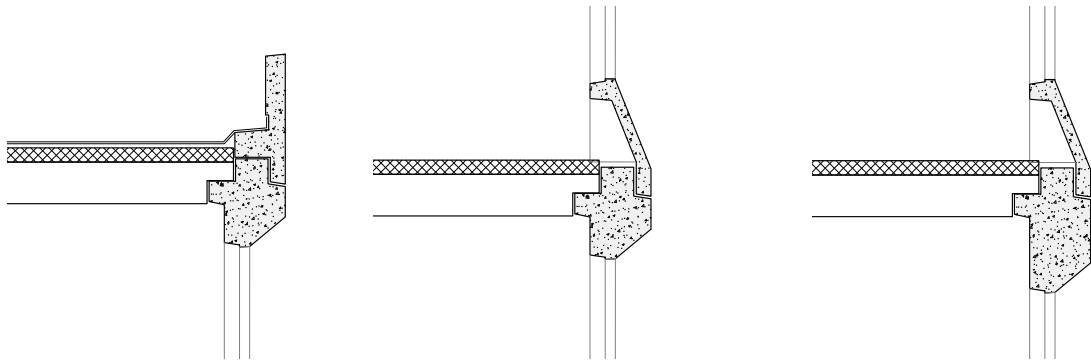
The connection between the loadbearing precast facade elements is drawn here, showing how a steel M36 Bolt is connected to the top part of the precast elements. The bottom part of the facade element is then placed on top and a concrete mixture is poured in, connecting both parts. The joint inbetween these elements is also connected by pouring in concrete



1.3. BUILDING TECHNOLOGY ANALYSIS - Element connection

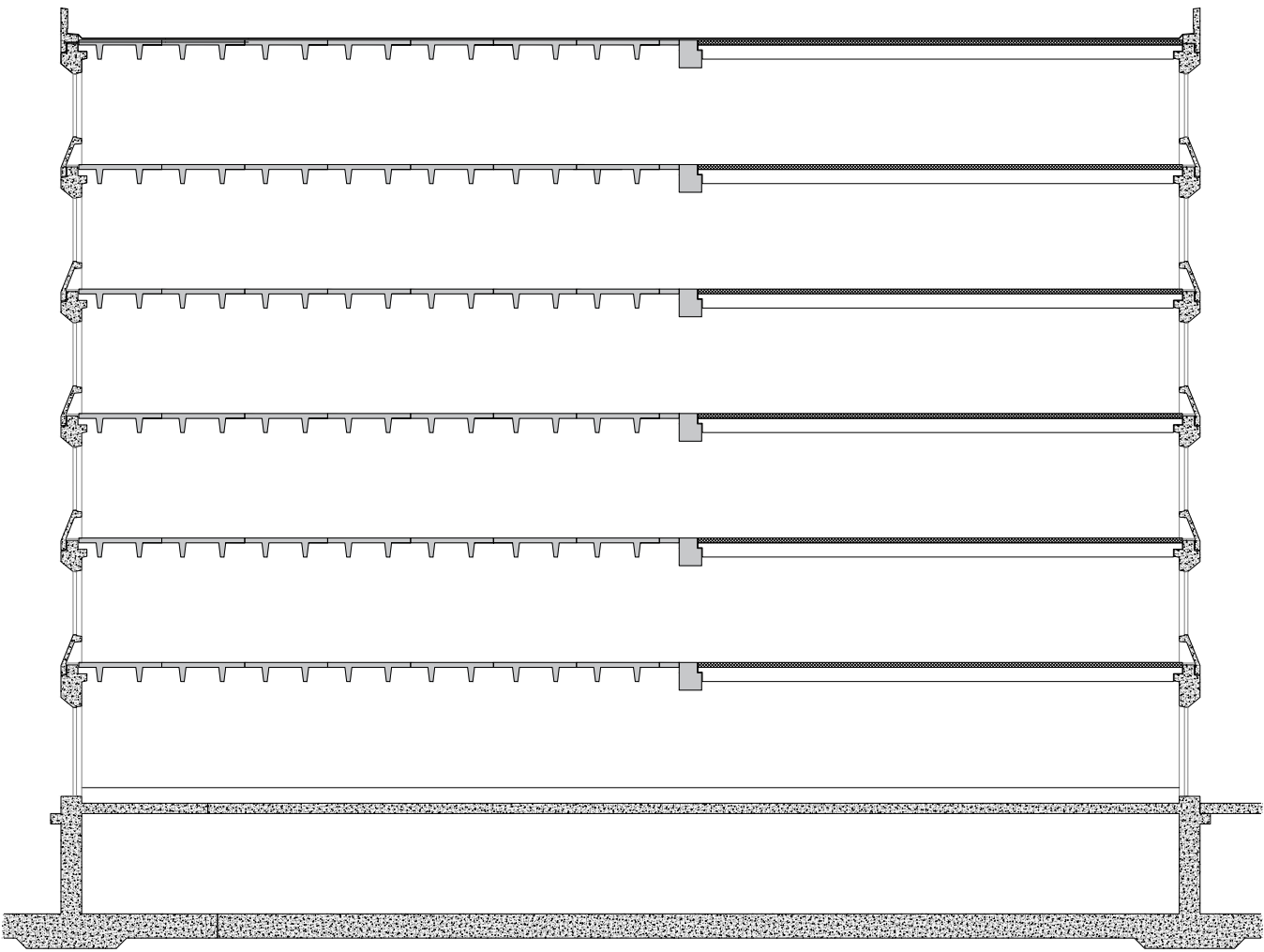


1.3. BUILDING TECHNOLOGY ANALYSIS - Section 1980 extension

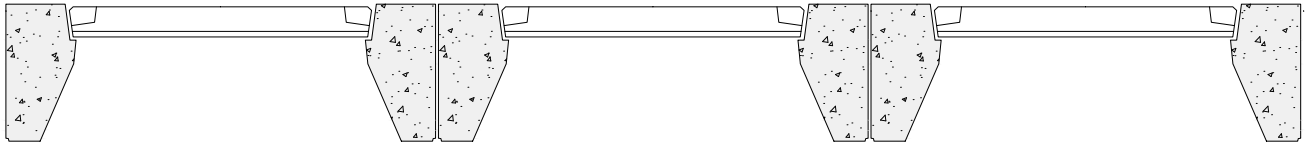


parapet

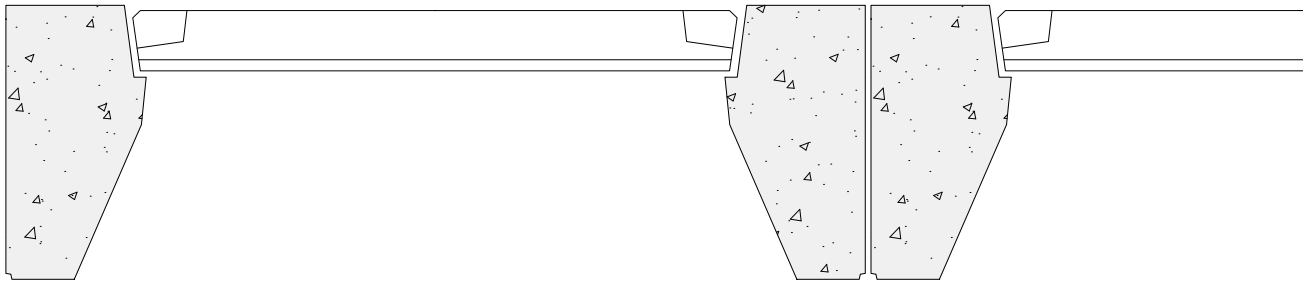
floor support



1.3. BUILDING TECHNOLOGY ANALYSIS - Axonometry overview

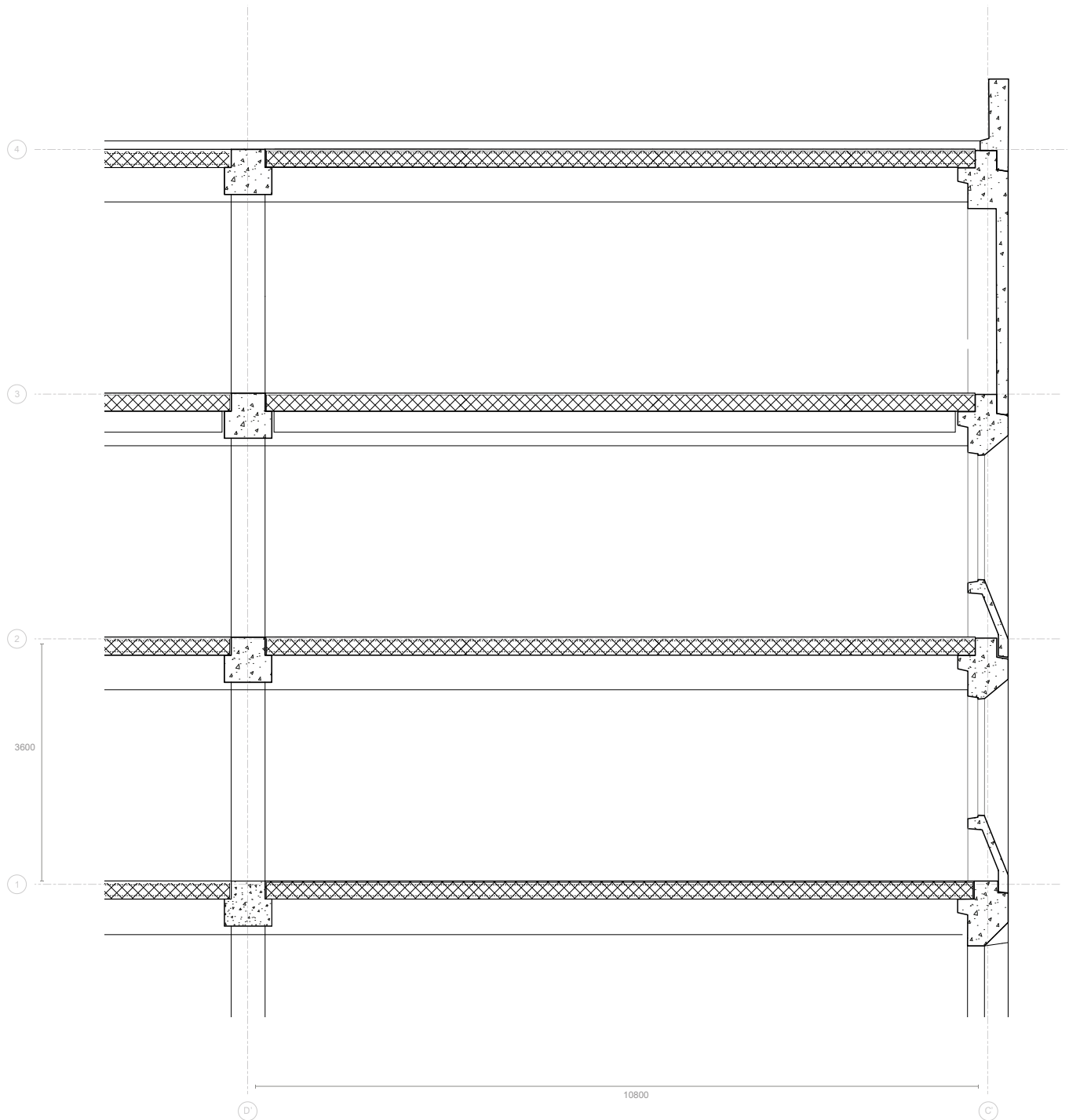


1:20 horizontal section



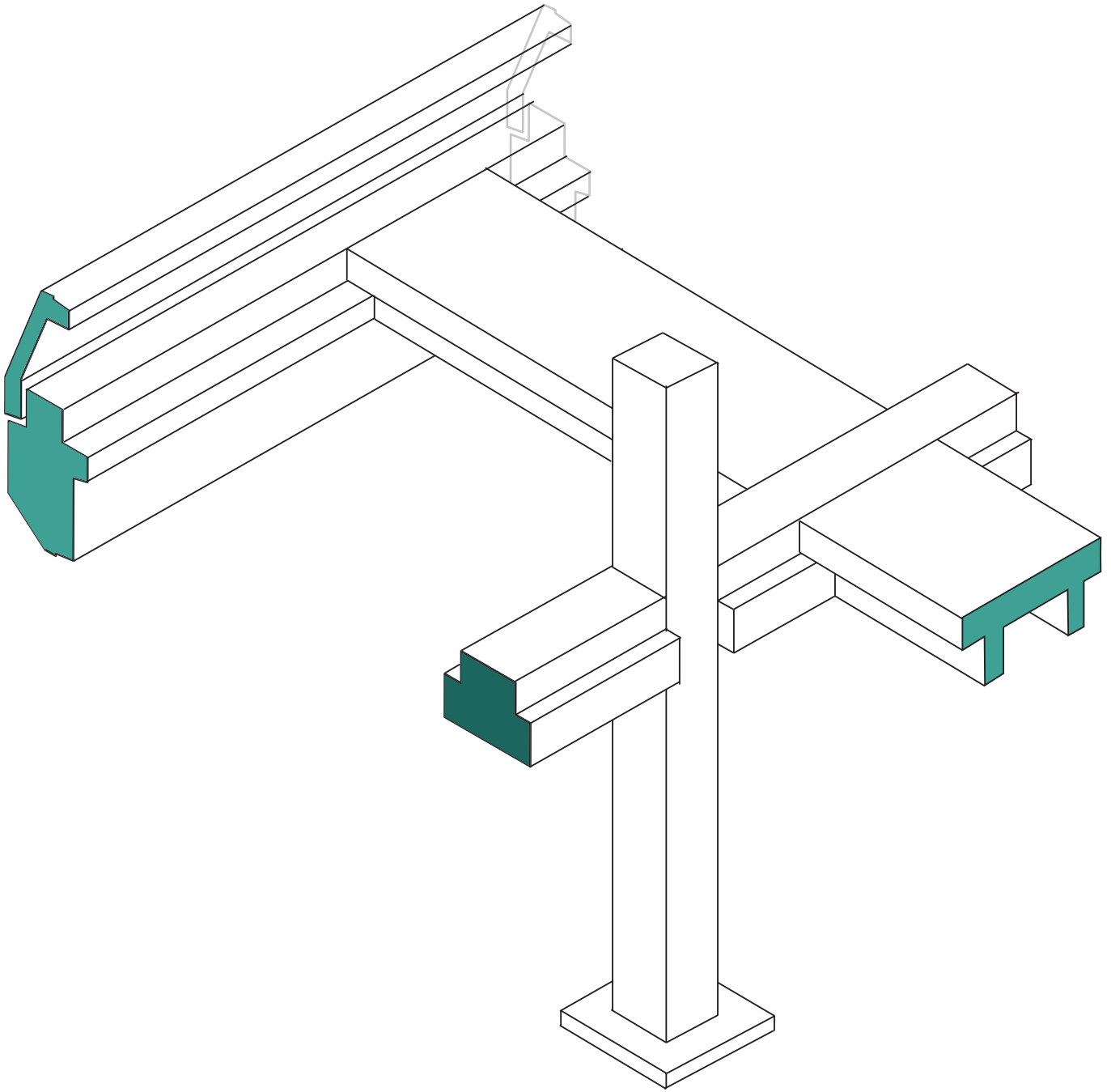
1:10 horizontal section

1.3. BUILDING TECHNOLOGY ANALYSIS - Extension structure



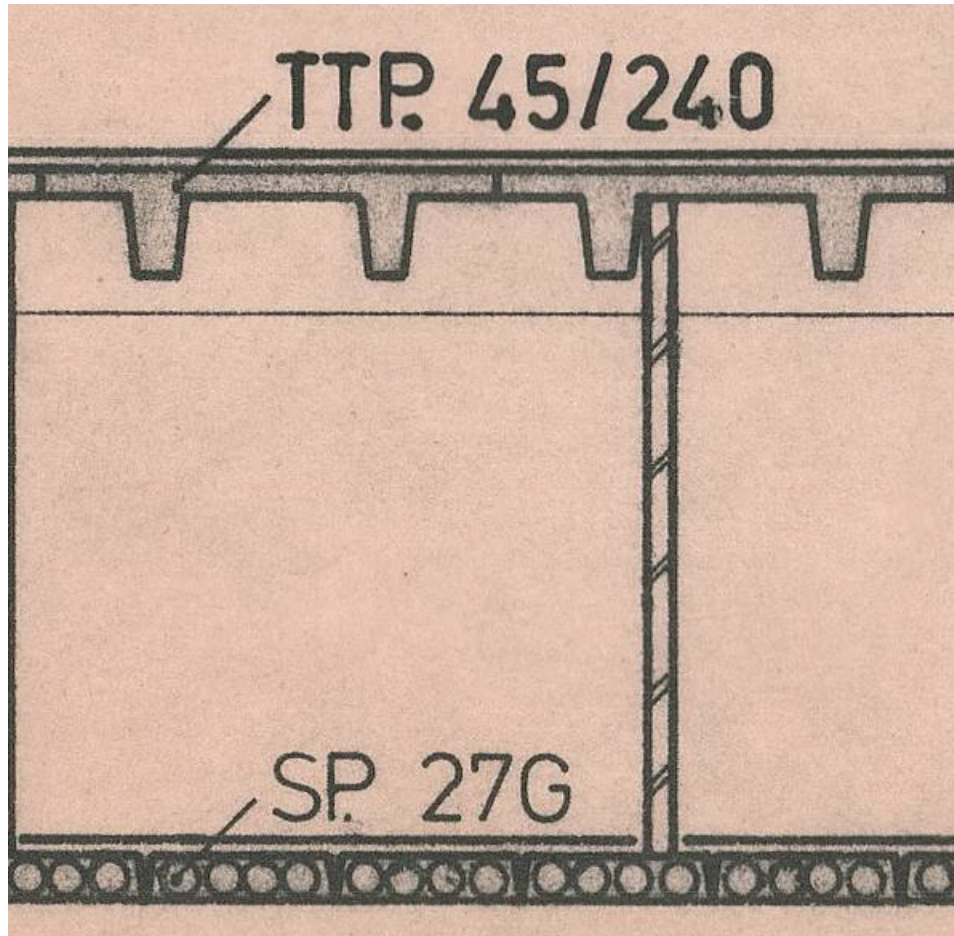
1980 extension part where I intervene on.

1.3. BUILDING TECHNOLOGY ANALYSIS - Extension structure



The main structural system of the extension: double-T floors span 10.8m from the inverted T-beam to the precast facade.

1.3. BUILDING TECHNOLOGY ANALYSIS - Floor connections



The two present floor types in the 1980 extension: double-T floors and hollow-core slabs.

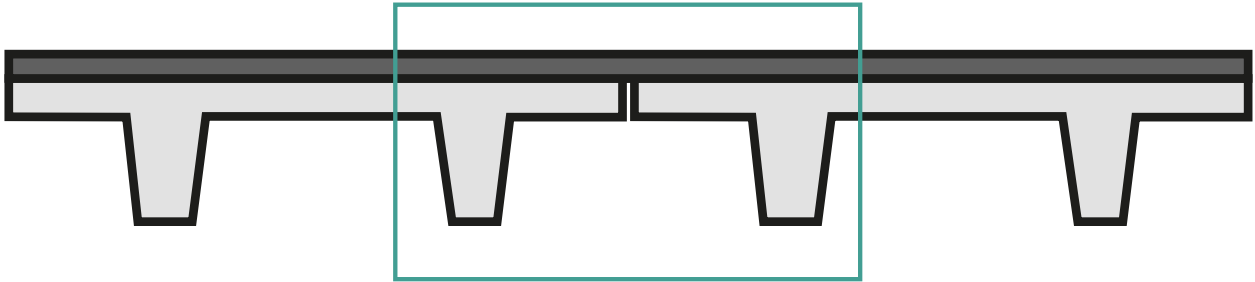


TTP. 450mm/2400mm double-T floor.

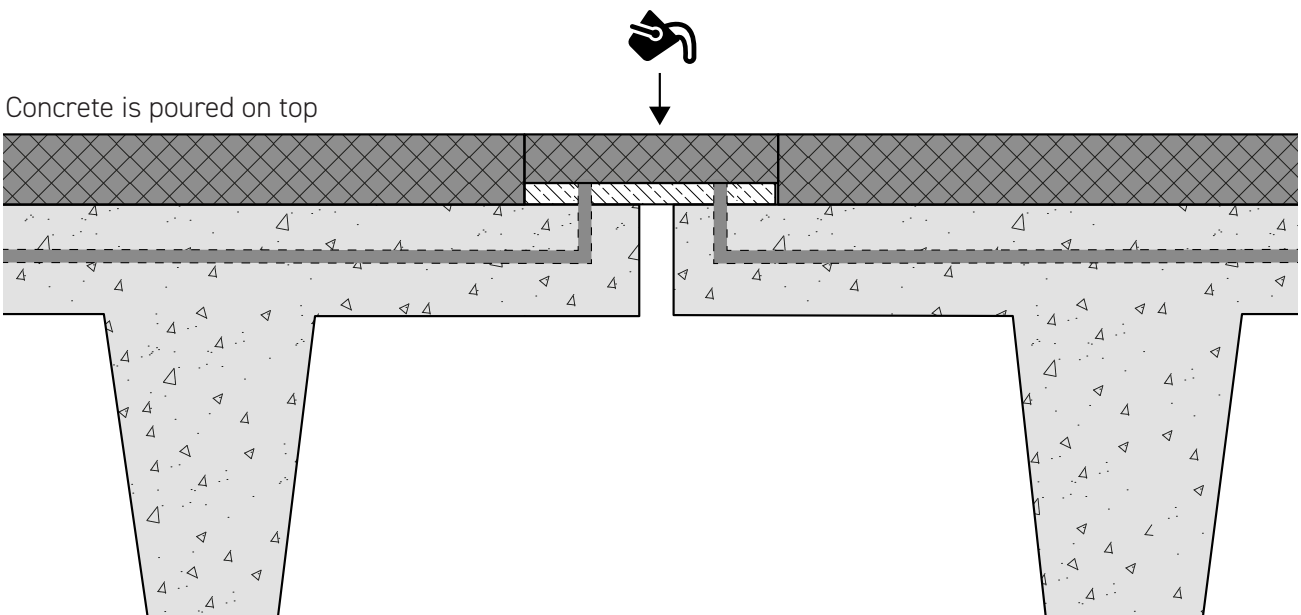
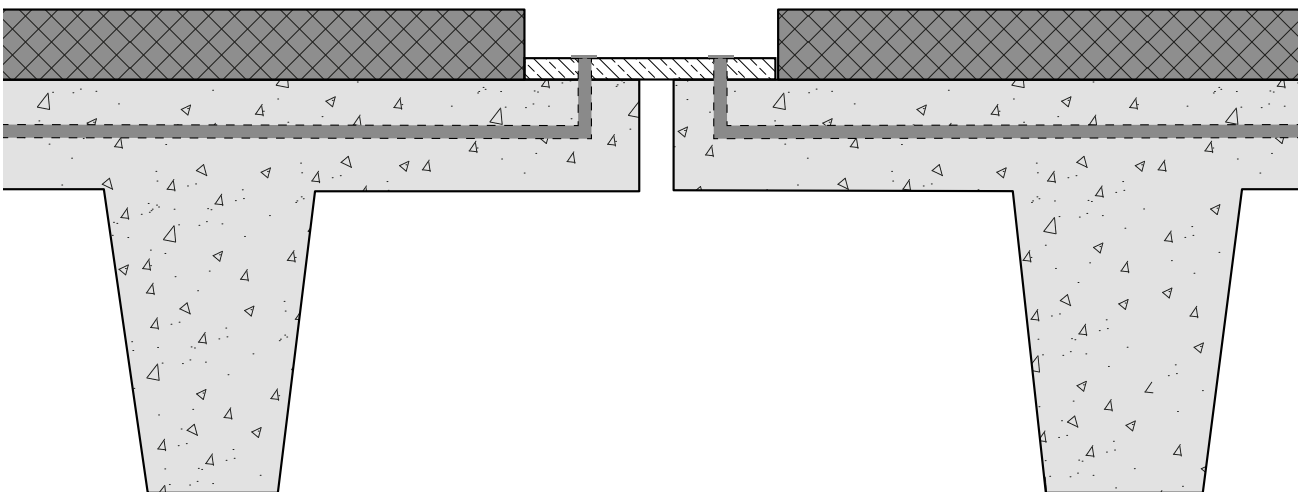


SP. 27G hollow-core slab (265mm) with 70mm concrete topping.

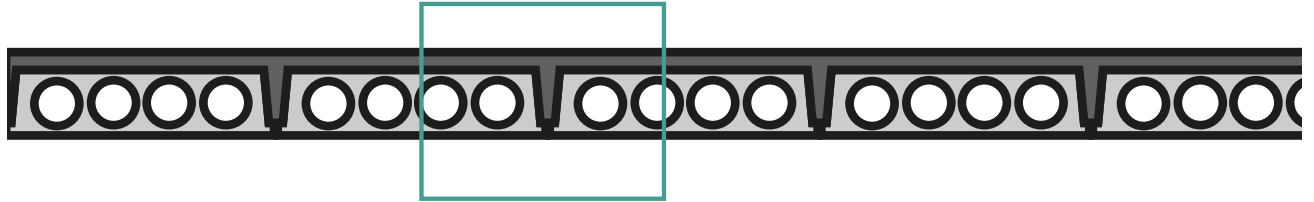
1.3. BUILDING TECHNOLOGY ANALYSIS - Double-T connection



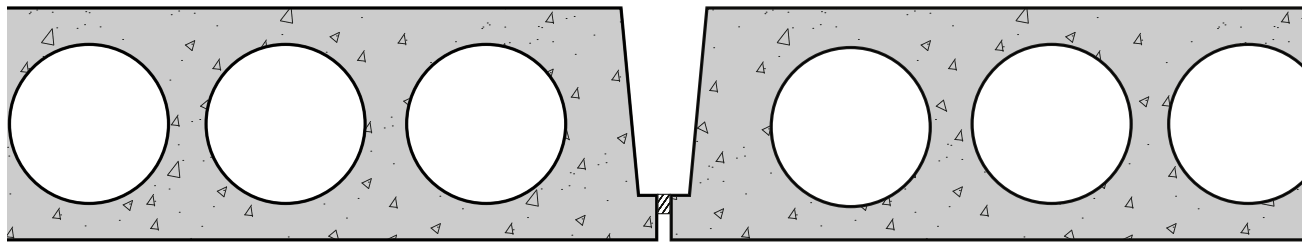
Steel plate is welded on the steel reinforcement of the double-T floor



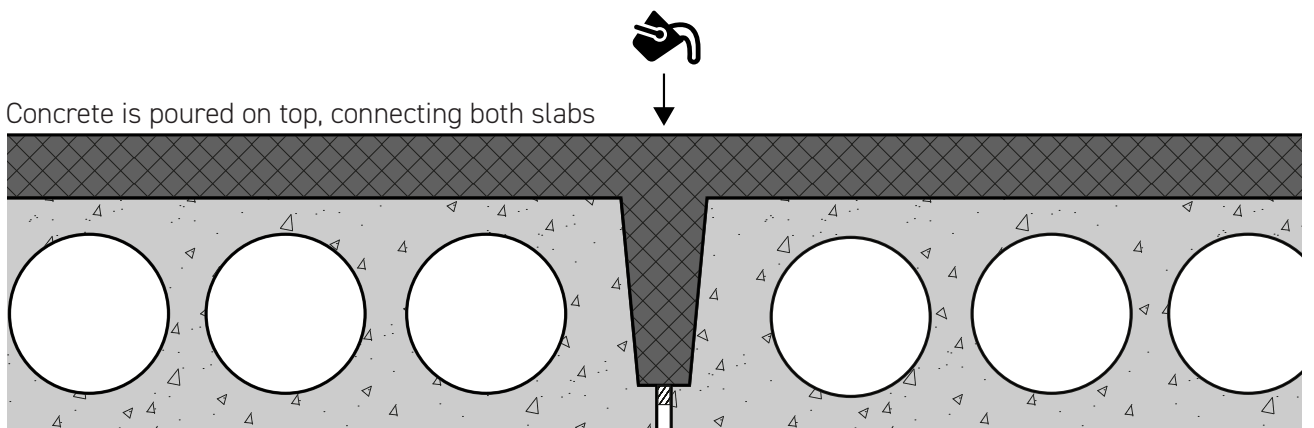
1.3. BUILDING TECHNOLOGY ANALYSIS - Hollow-core connection



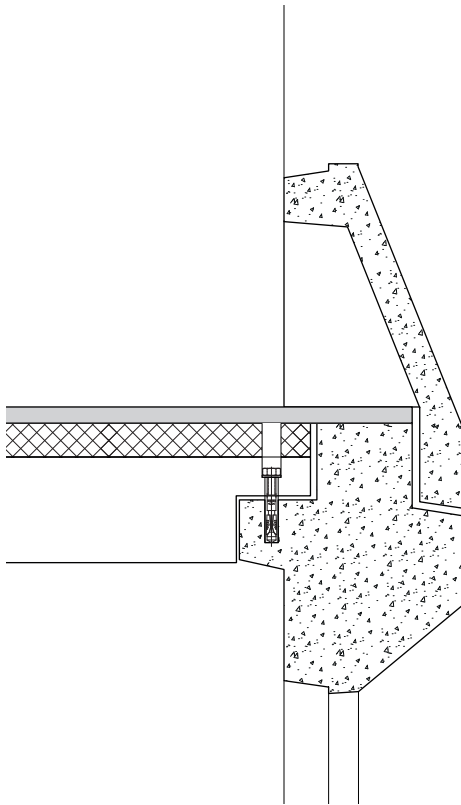
Opening between hollow-core slabs due to trapezium shape.



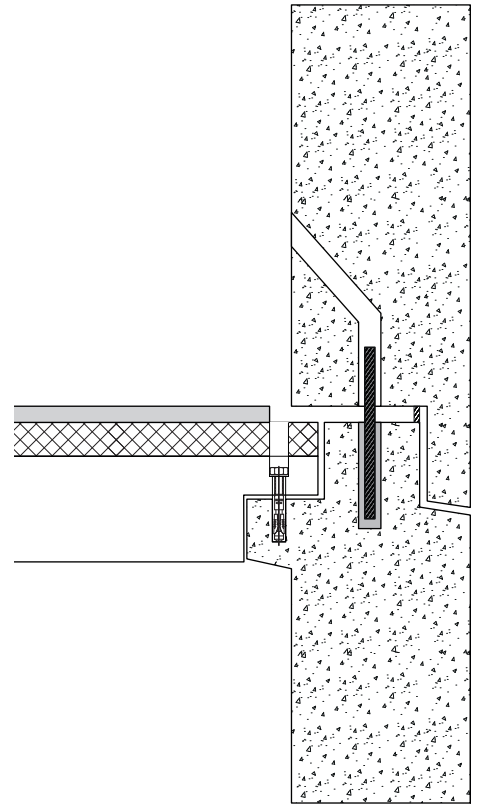
Concrete is poured on top, connecting both slabs



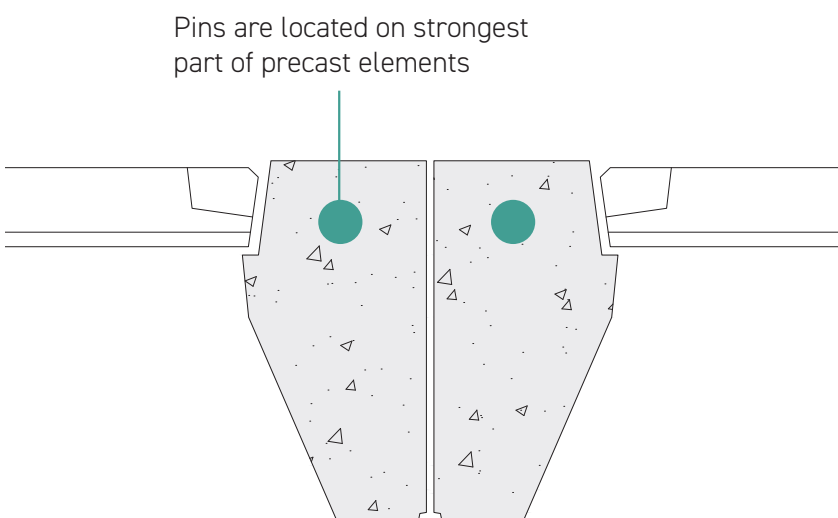
1.3. BUILDING TECHNOLOGY ANALYSIS - Precast element connection



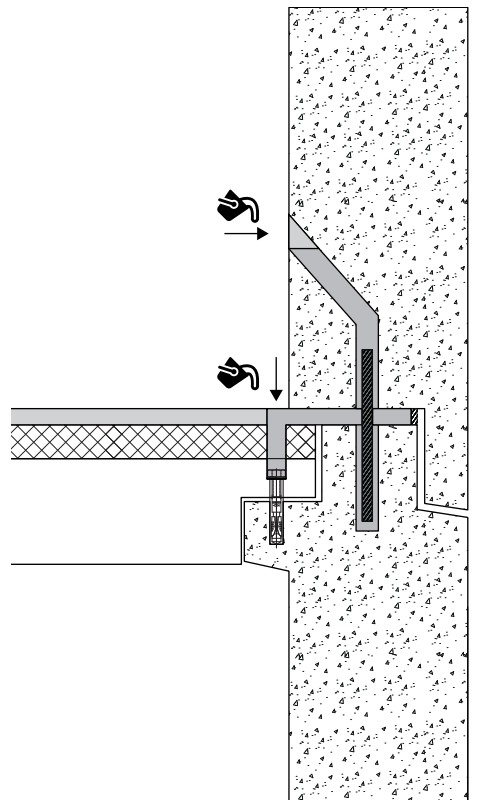
Connection between the floor and the precast elements



Connection between the precast elements: a steel bolt is fixed on the top part. Then the next precast element is put on top

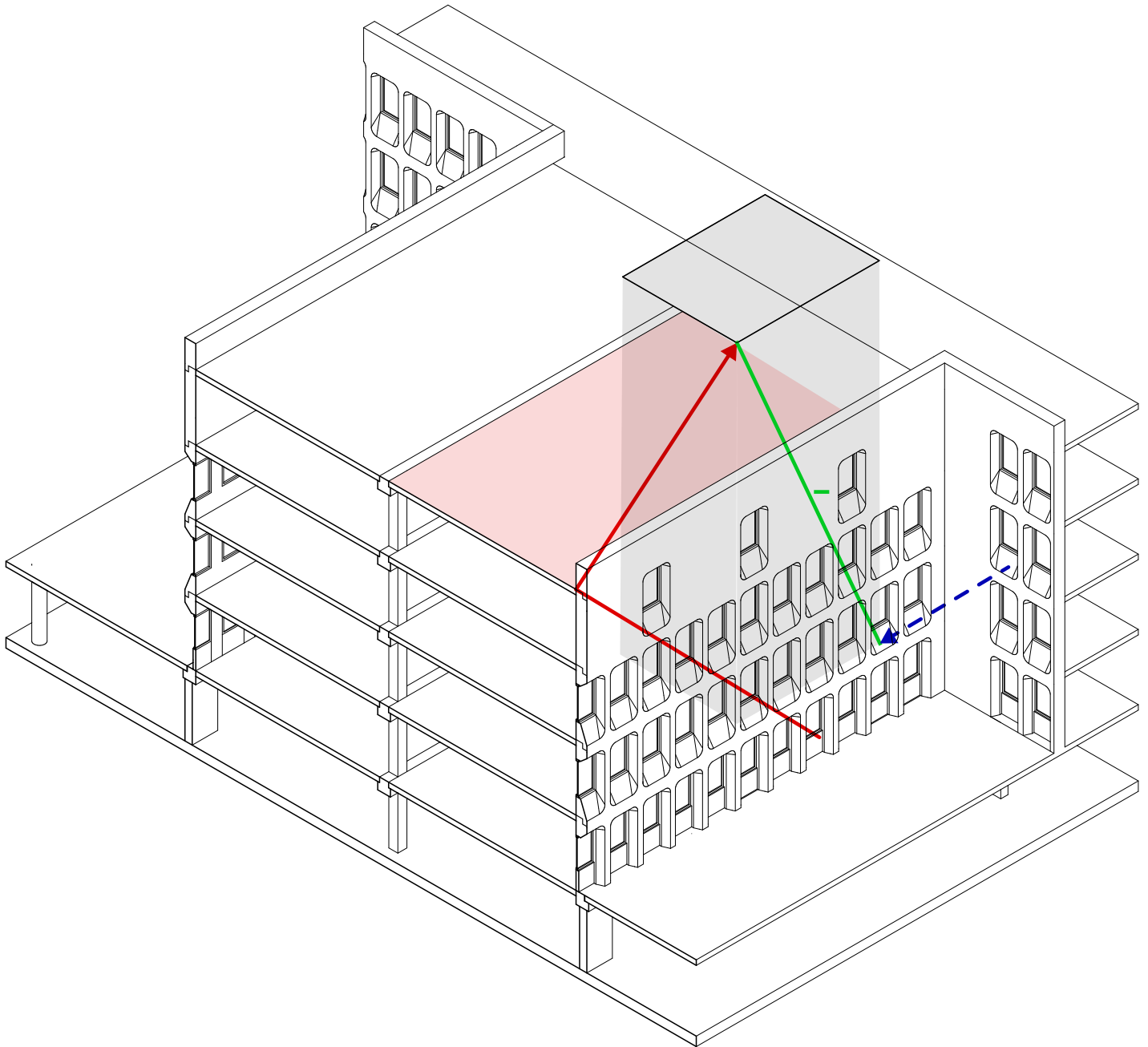


Pins are located on strongest part of precast elements



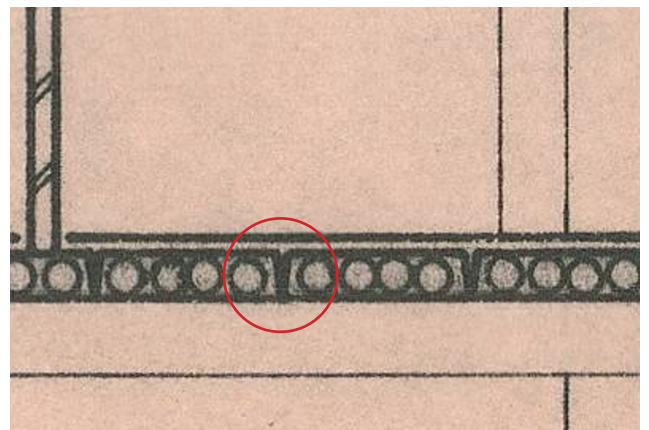
A concrete mixture is poured in to connect the elements.

1.2. BUILDING TECHNOLOGY ANALYSIS - Stability in extension

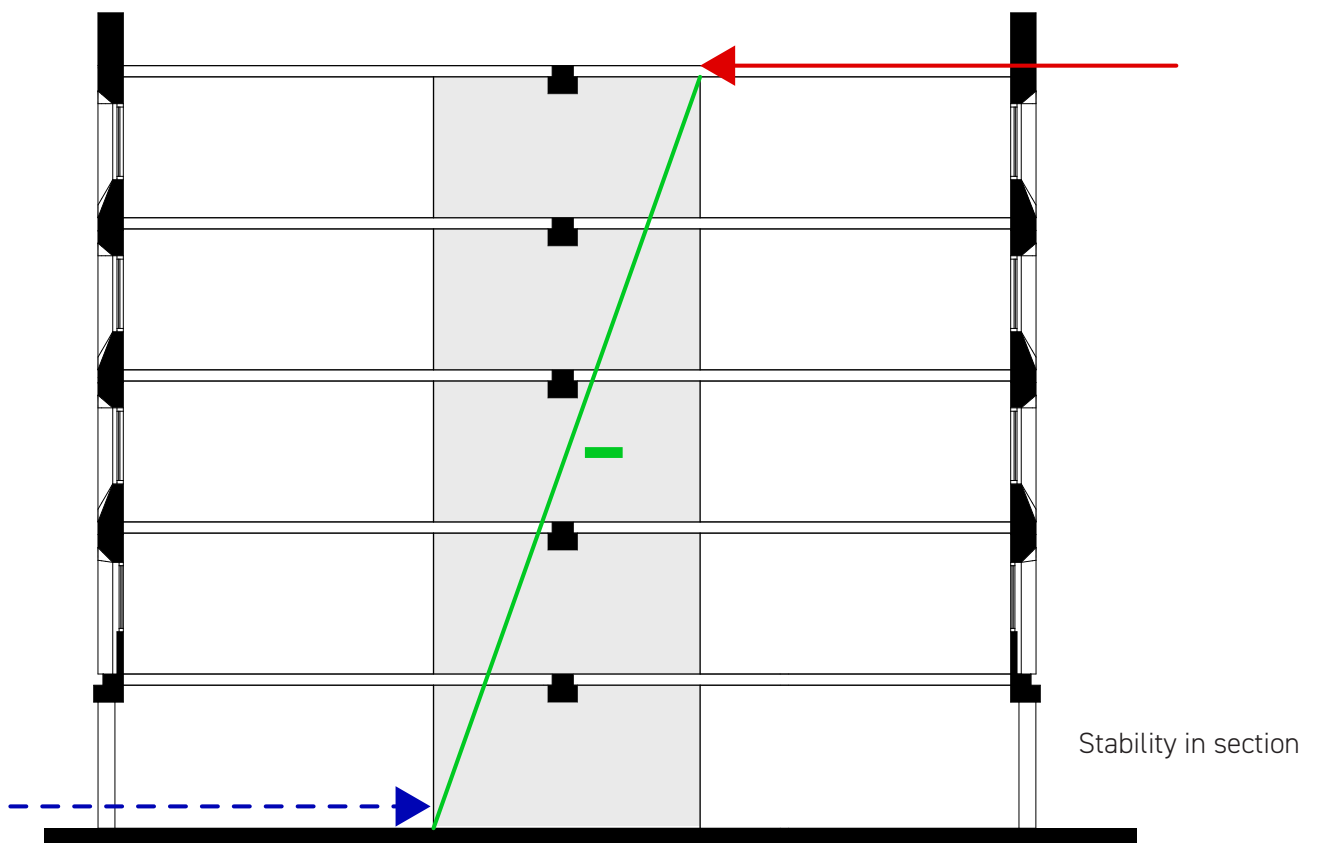
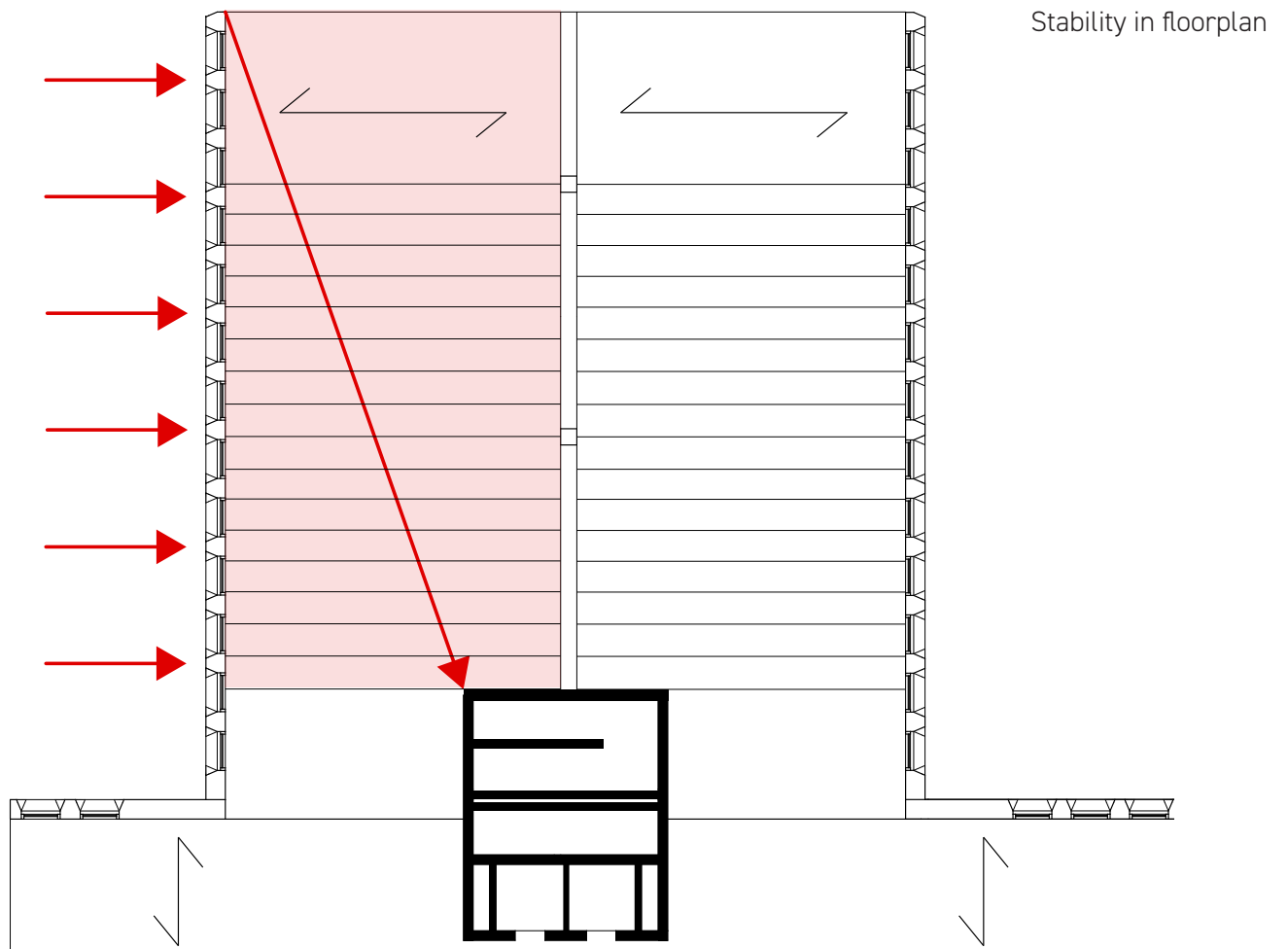


Stability in the 1980 extension is achieved through structural cores, the loadbearing facade and the floors. Vertical forces are absorbed in the facade while lateral forces such as wind forces are absorbed in the hollow-core slabs and the double-T floors and carried on to the cores. In order to make the floors absorb the lateral forces, they need to be connected as one element

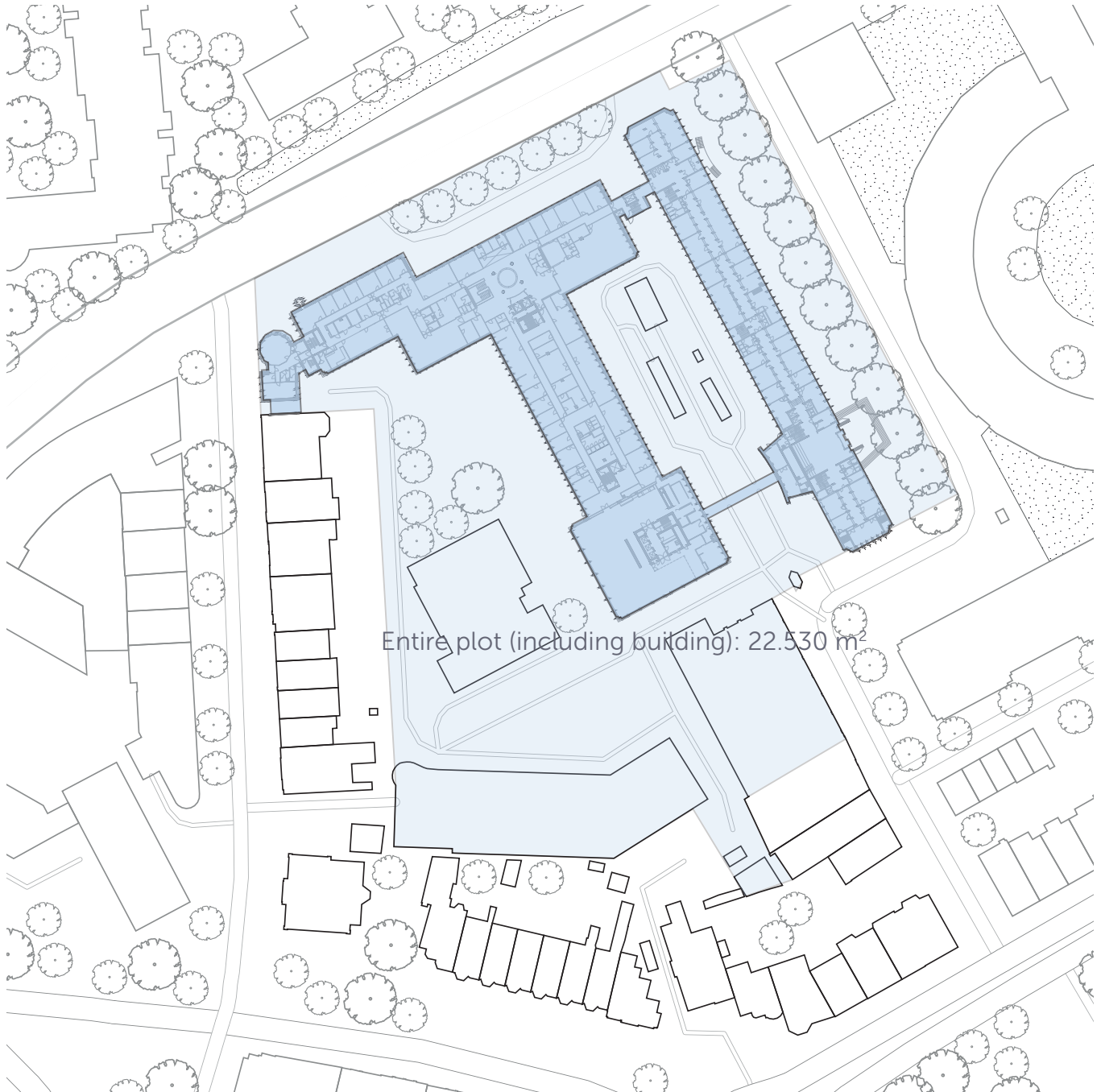
The red encircled part shows how this is done on the third floor. The shape of the hollow-core slabs allow the concrete topping to go in these wedges, making the floor stiff.



1.3. BUILDING TECHNOLOGY ANALYSIS - Stability in extension



1.3. BUILDING TECHNOLOGY ANALYSIS - Rainwater/climate



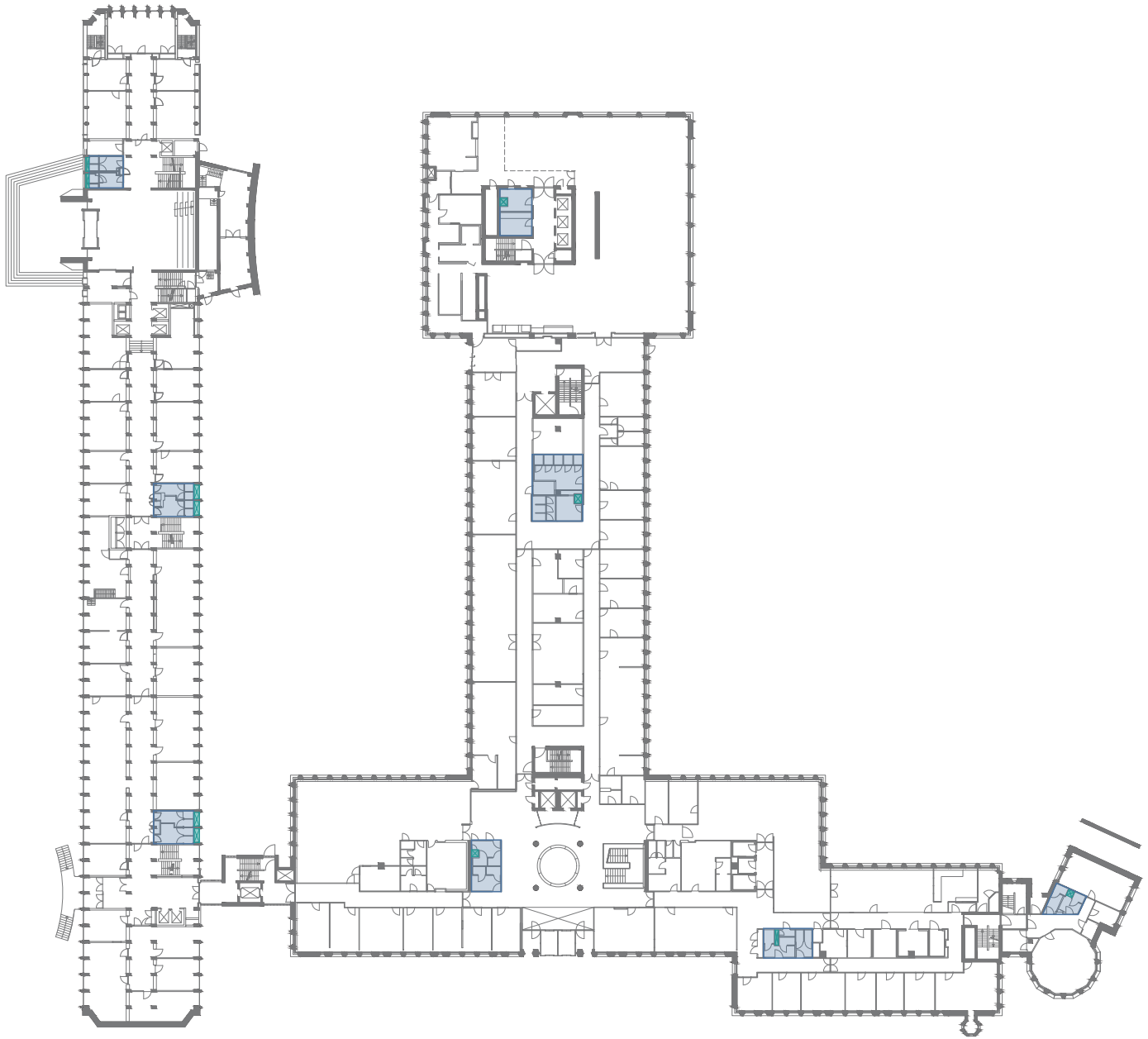
Entire plot (including building): 22.530 m²

normal rain: 0.1 L - 3 L per m²
heavy rain (1% of time): 3 L - 10 L per m²
800 L per year per m²

Entire plot (including building): normal rain 67.590 L / heavy rain
225.300 L / yearly 18.024.000 L

Roof building: normal rain 18.000 L / heavy rain 60.000 L /yearly
4.800.000 L

1.3. BUILDING TECHNOLOGY ANALYSIS - Plumbing installations



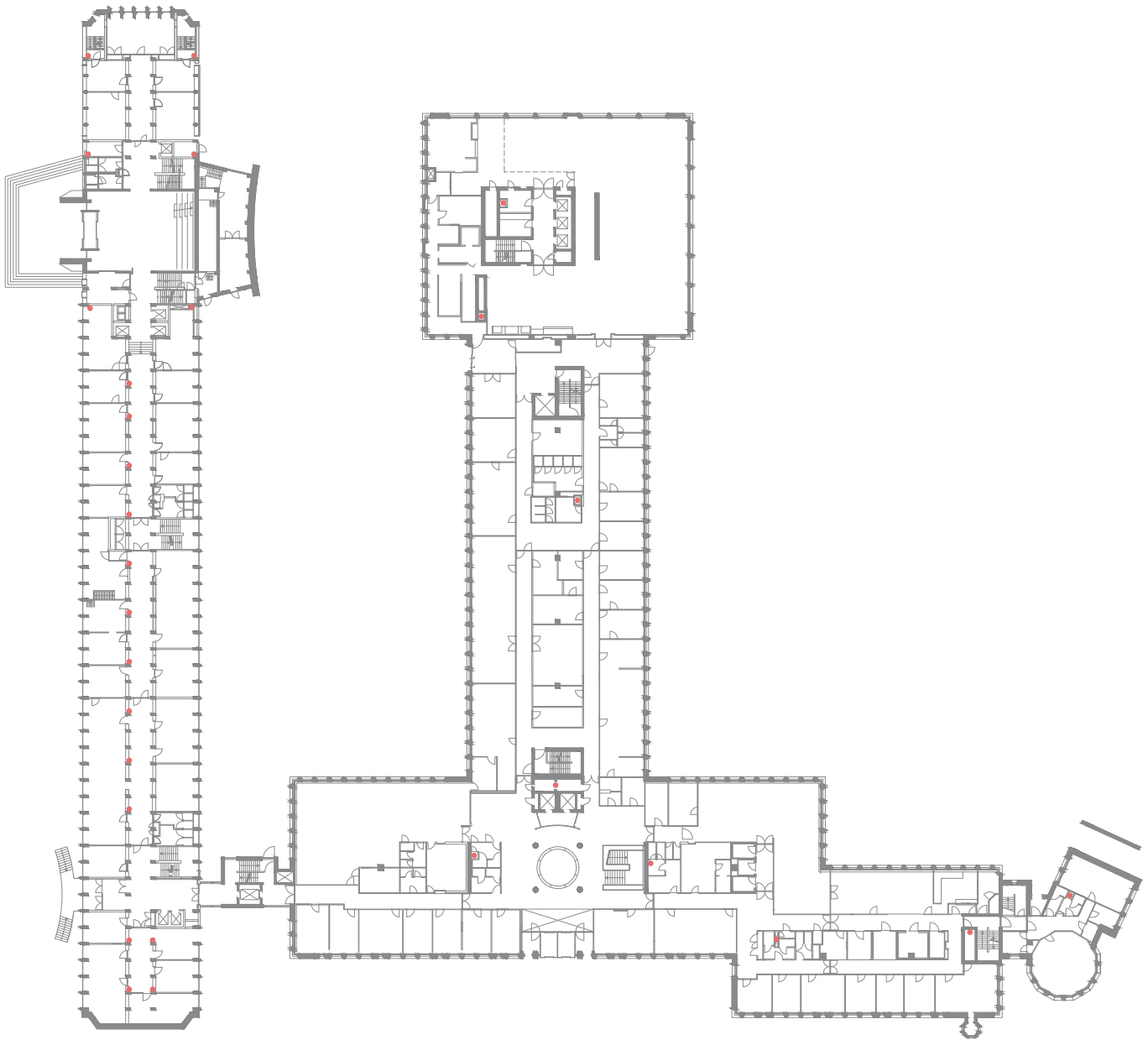
The main wetcores are indicated on the drawing. In the old building there are three wet cores that are at the same location throughout the entire building. These wetcores are located next to the stair and elevator cores.

In the newer building there are five cores spread out over the floorplan. In this building part the wetcores are also always located above each other.

legend

- wet core
- shaft

1.3. BUILDING TECHNOLOGY ANALYSIS - Rainwater/piping



The rainwater drainage is solved internally as there are no visible rainwater pipes on the outside of the building. The rainwater pipes in the old building are placed in sight in the corridor in the middle of the building (see picture below). They follow a fixed rhythm with three columns in between each next rain pipe.

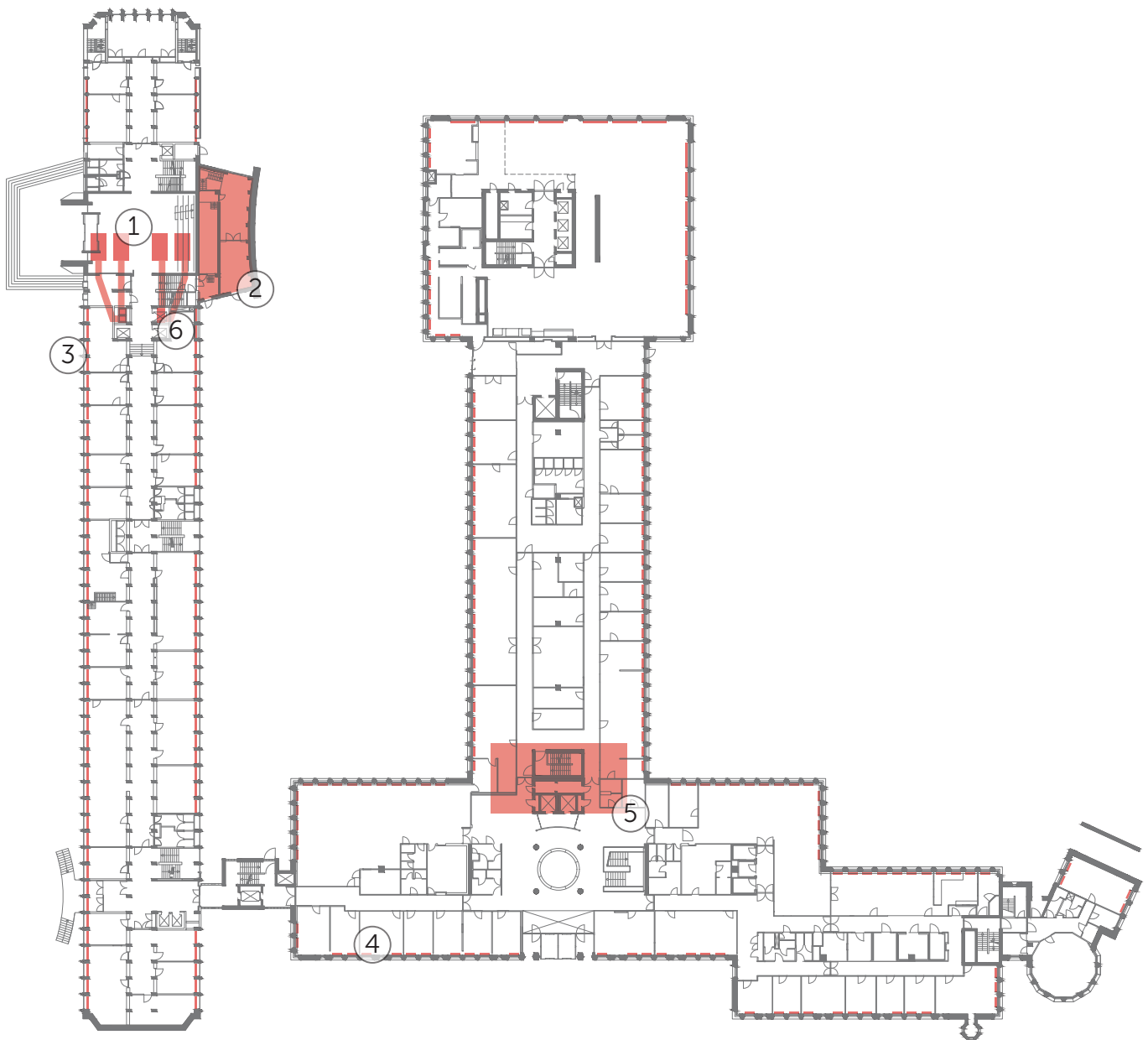
The rainwater pipes in the newer building are also installed internally and probably run through the same shafts that are used for the wetcores.

legend

 rain pipe



1.3. BUILDING TECHNOLOGY ANALYSIS - Heating

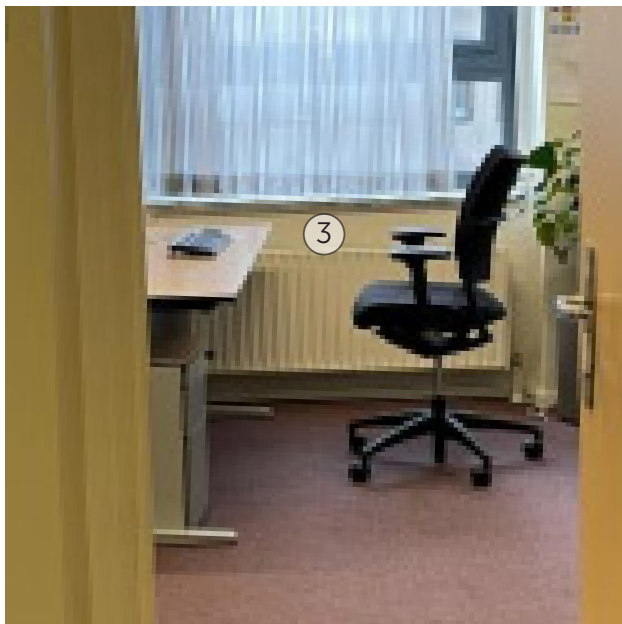
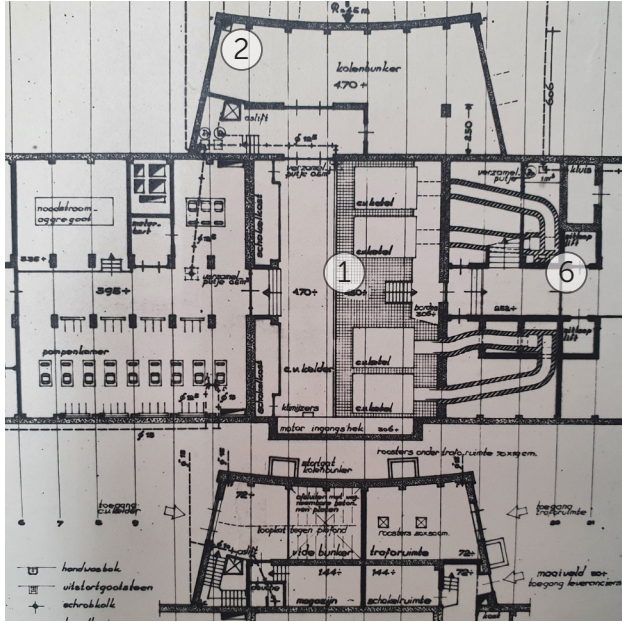


legend

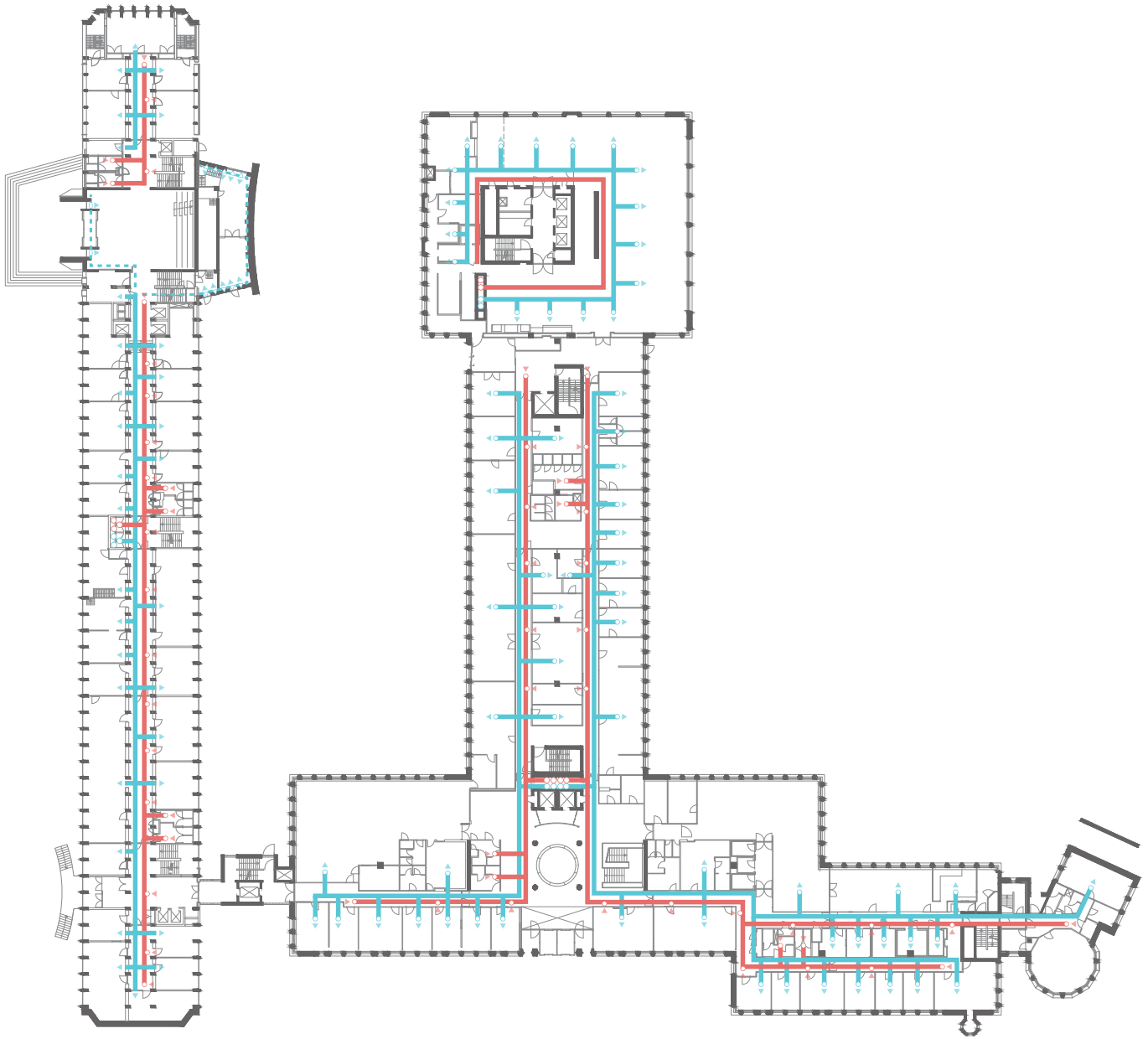
The heating in the building is supplied by central boilers, currently probably working on gas, but in the old building it used to run on coal as there was a coal storage (2) in the basement. The spaces are heated with radiators which are situated below the windows. The radiators in the new building are integrated with the windowsill (4).

- ① boilers (cv-ketel) in basement
- ② coal storage in basement
- ③ radiators under window (old building)
- ④ radiators integrated in windowsill (new building)
- ⑤ installation room on roof
- ⑥ chimney

1.3. BUILDING TECHNOLOGY ANALYSIS - Heating



1.3. BUILDING TECHNOLOGY ANALYSIS - Ventilation



The ventilation ducts mostly run under a lowered ceiling in the corridor. In the old building there are ventilation grills visible in the ceiling, probably used for exhaust. Some of the offices have an air inlet from the wall, but it is not clear which ones. Most of the ventilation in the building is probably natural ventilation through the windows.

For the newer building grills have been seen in both the corridor and in the lowered ceiling of the offices. The grills in the corridor are used for exhaust and the grills in the offices are used for inlet air.

The air handling units are placed on top of the roof of the two building parts in technical rooms.

legend

- inlet air
- exhaust air

1.3. BUILDING TECHNOLOGY ANALYSIS - Ventilation



ventilation inlet entrance old building



ventilation inlet entrance old building



ventilation inlet auditorium old building



ventilation inlet hallway old building



ventilation inlet hallway new building



ventilation ducts new building



ventilation inlet office new building

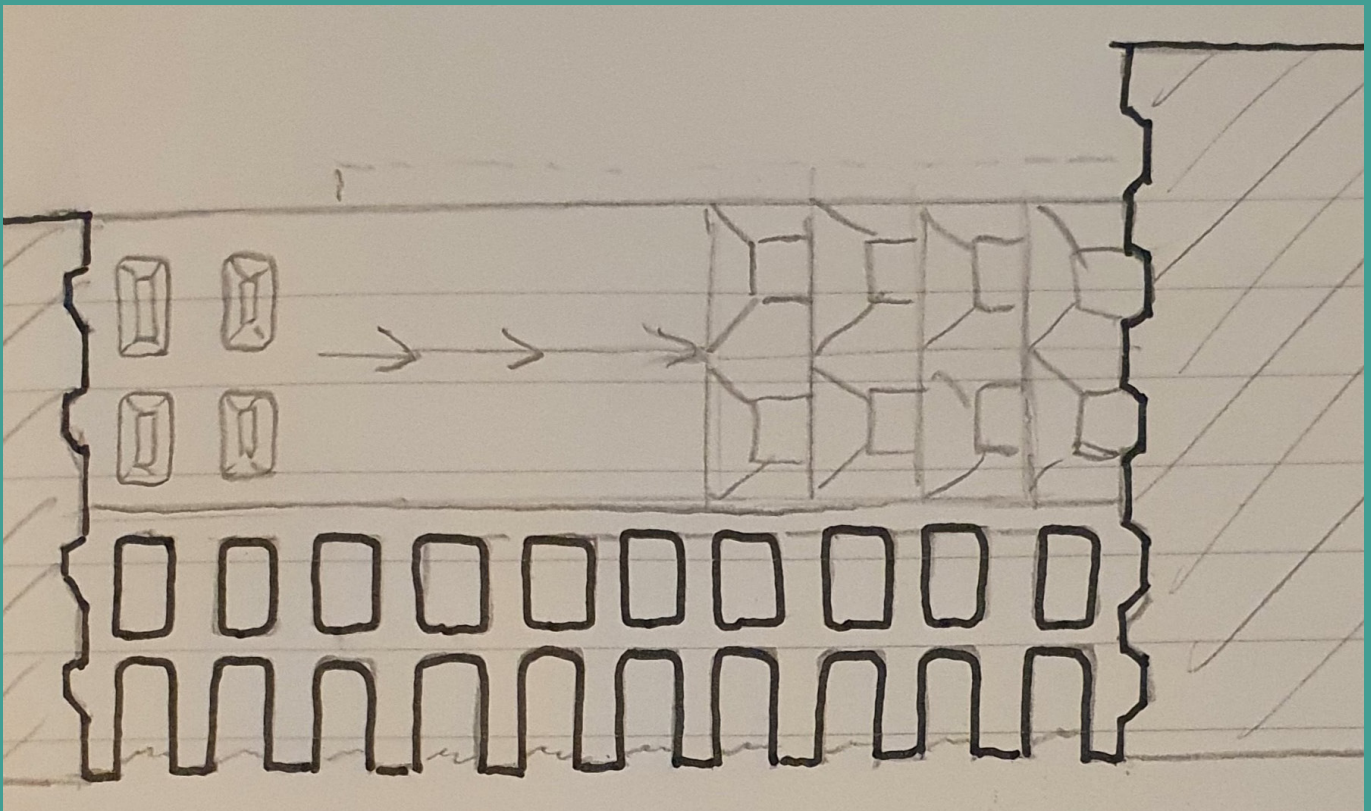


ventilation ducts new building

2. PROCESS

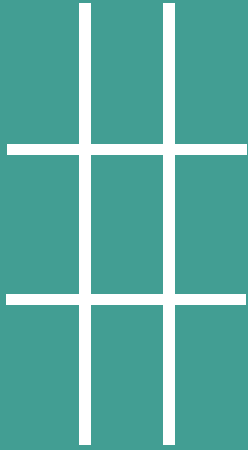
The first semester focused on research, analysis and program definition. However, a start on concepts was already made, since more and more became clear every week and there is no harm to testing. Due to the massive scale (45.000m²) of the police headquarters, I had to shift my attention to a part of the building. I decided on the 1980 extension, since my personal fascination lies in visible structures. This came with a problem, as building technology analysis was yet incomplete and any intervention on the facade would be unsubstantiated. I decided to continue with the concept creation, because to stand still is to move backwards. This resulted in very 'unbounded' concepts, that would not hold against any critique. These concepts did have one thing in common: they were all breaking apart the precast facade in some way, which inspired my working title 'Storming the Castle'. From this point on, the design process really started.

This chapter shows the design starting points that resulted from my ambition for the location and the research on precast concrete facades. Furthermore, program is shortly introduced and the concepts and testing is shown.

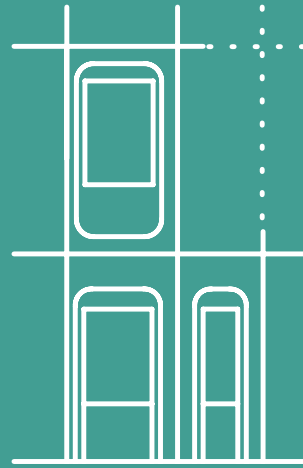


Early sketch

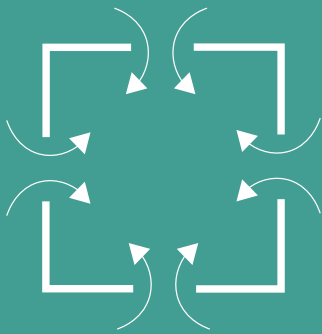
2.1. STARTING POINTS



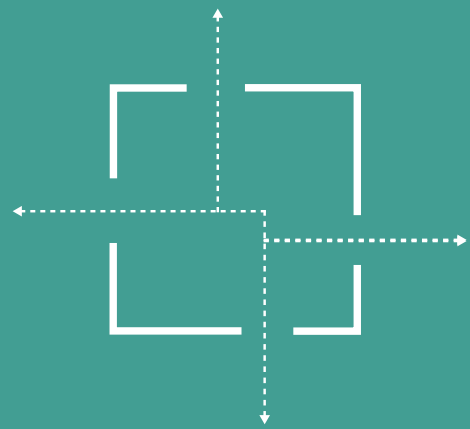
PRESERVE + EMPHASIZE THE SCHOKBETON FACADE



ADJUST CHARACTER TO FUNCTION



OPEN UP A CLOSED-OFF PART OF THE NEIGHBOURHOOD TO THE CITY



ENHANCE NETWORK WITHIN THE NEIGHBOURHOOD



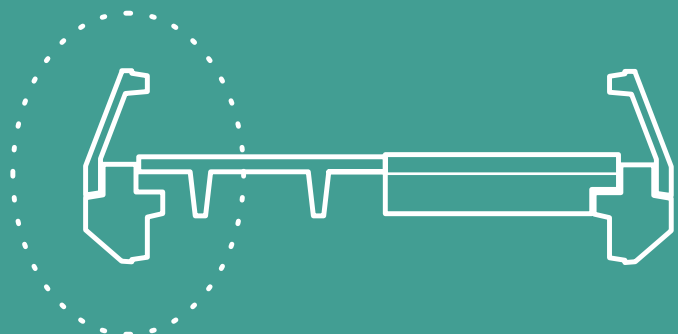
CREATE A RELATION BETWEEN 1958 AND 1980 PART



ASSIGN FUNCTION BASED ON STRUCTURAL PLAN

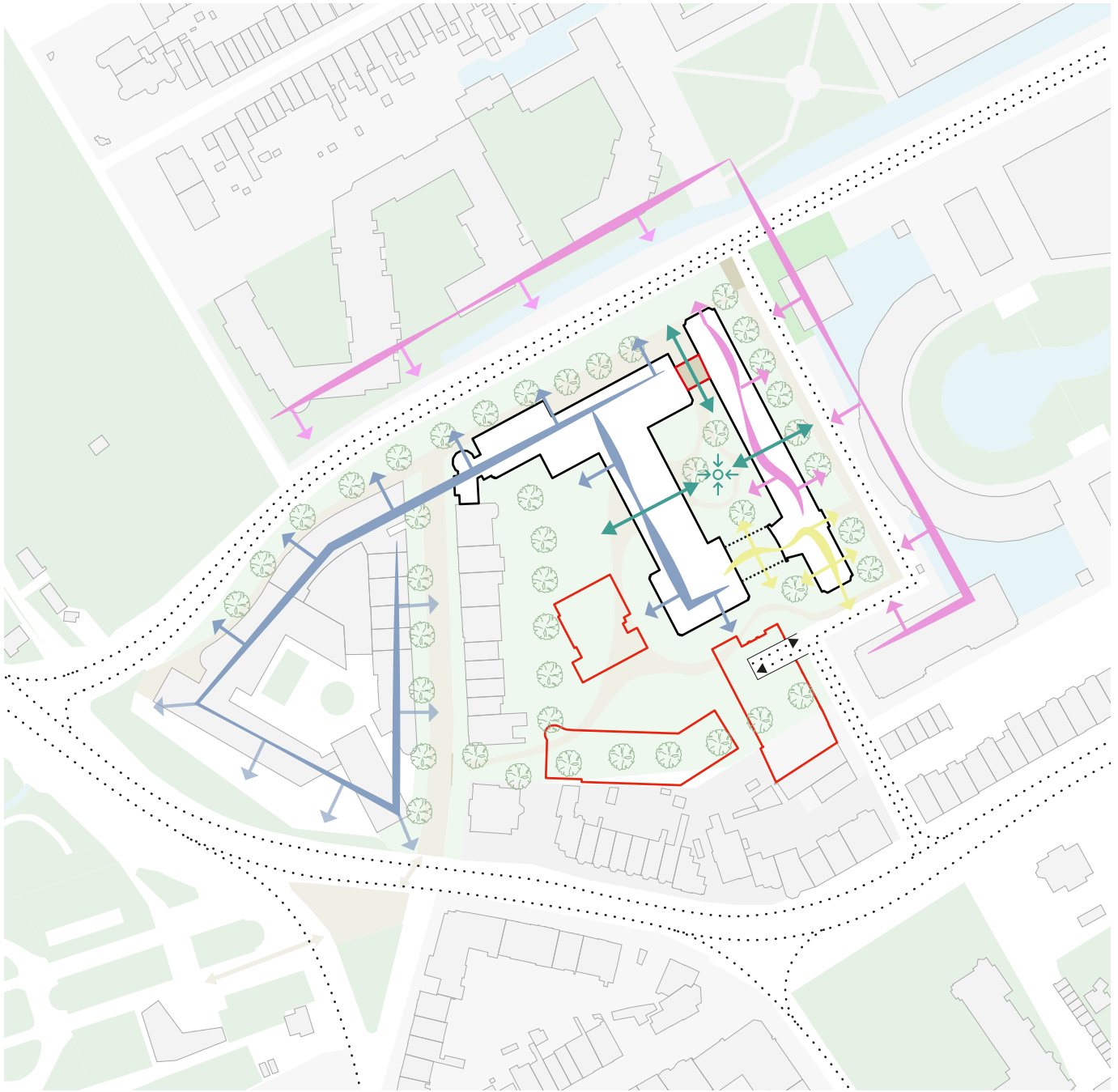


USE LEISURE TO ENHANCE BOTH WORKING AND LIVING SPACE



OPERATE ON NON-LOADBEARING PARTS

2.2. PROGRAM - Vision map

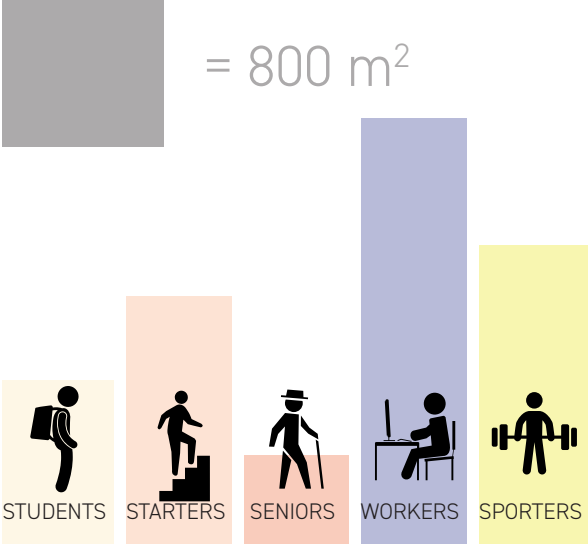
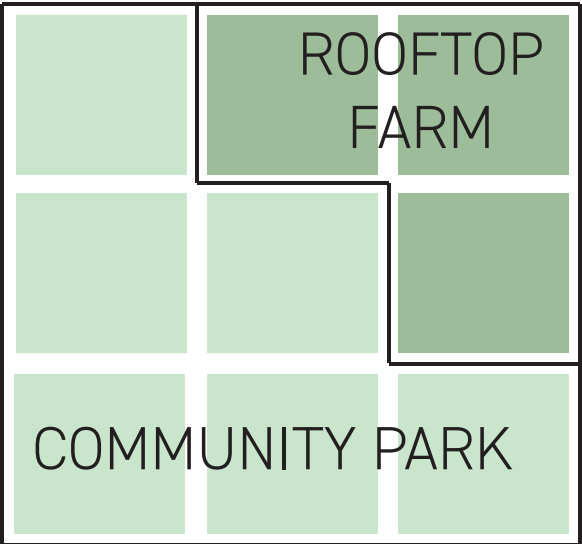
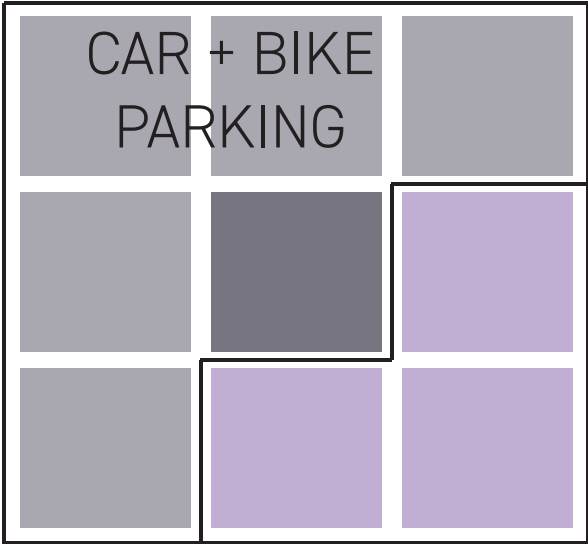
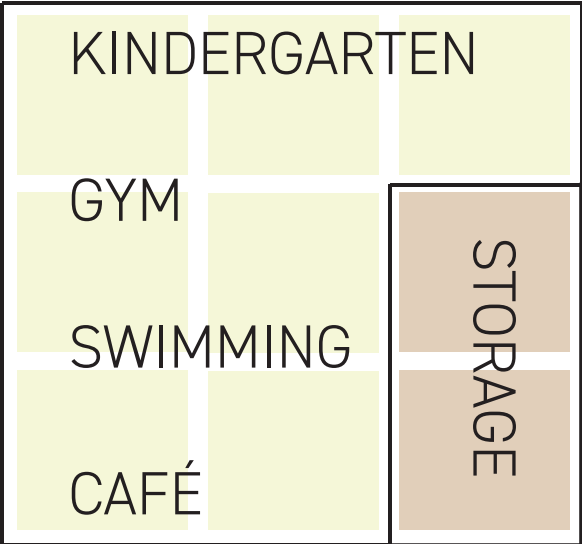
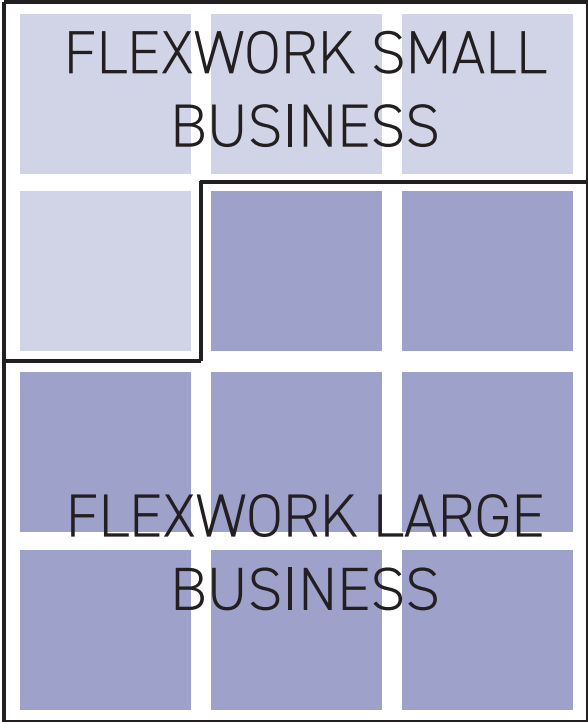
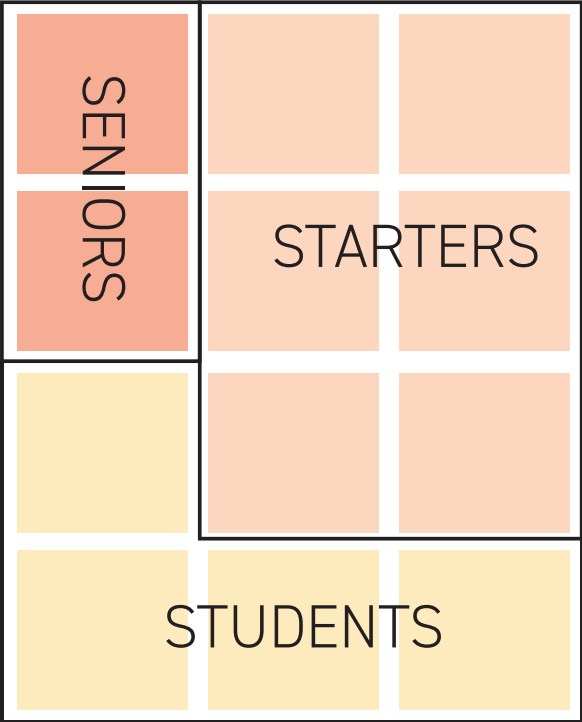


The functions present in the Archipelbuurt are combined into a smaller scale to soften up the border between the neighbourhood and the office hub, giving back this part of the Archipel which was once taken away by the police. To integrate working with living, a mix of functions is created where both residents and office workers can benefit from. Leisure in the form of sport and restaurant is chosen, as it can be used by both. The southside of the 1958 is used as the location for leisure, because the monumental hall divides the building into two, making the smaller part fit the smaller program requirement.

- Housing
- Leisure
- Offices
- Demolished
- Connection

0 50m

2.2. PROGRAM - Program of requirements



2.3. CONCEPTS & TESTING - Redesign options



- Eliminate
- Continue
- Obscure
- Reconfigure
- Repurpose
- Density
- Copy
- Overlay
- Reimagine
- (Re)Start
- Abstain

1 Stair concept

1980 Eliminate + Reconfigure

1958 Abstain + Repurpose

3 Atrium concept

1980 Eliminate + Copy

1958 Abstain + Repurpose

2 New skin concept

1980 Obscure + Overlay

1958 Abstain + Repurpose

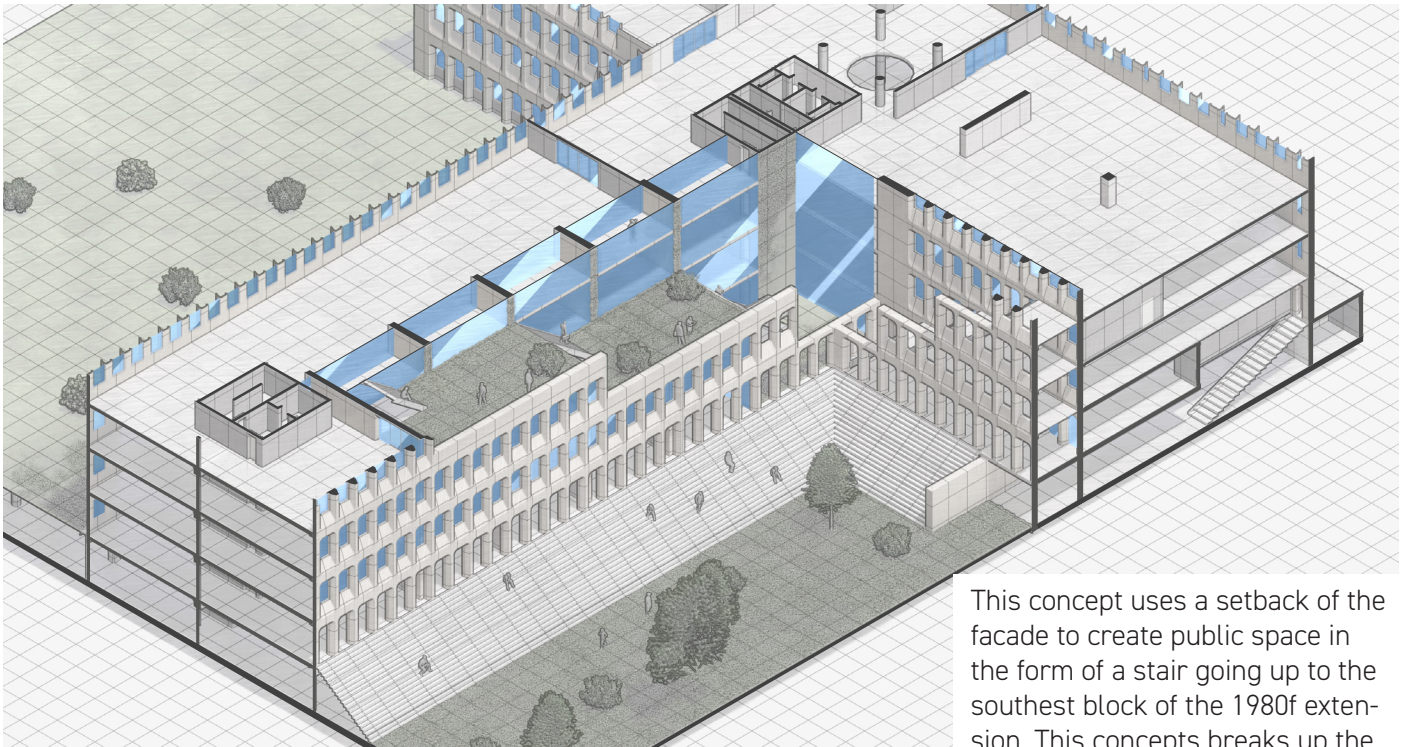
4 Terrace concept

1980 Eliminate

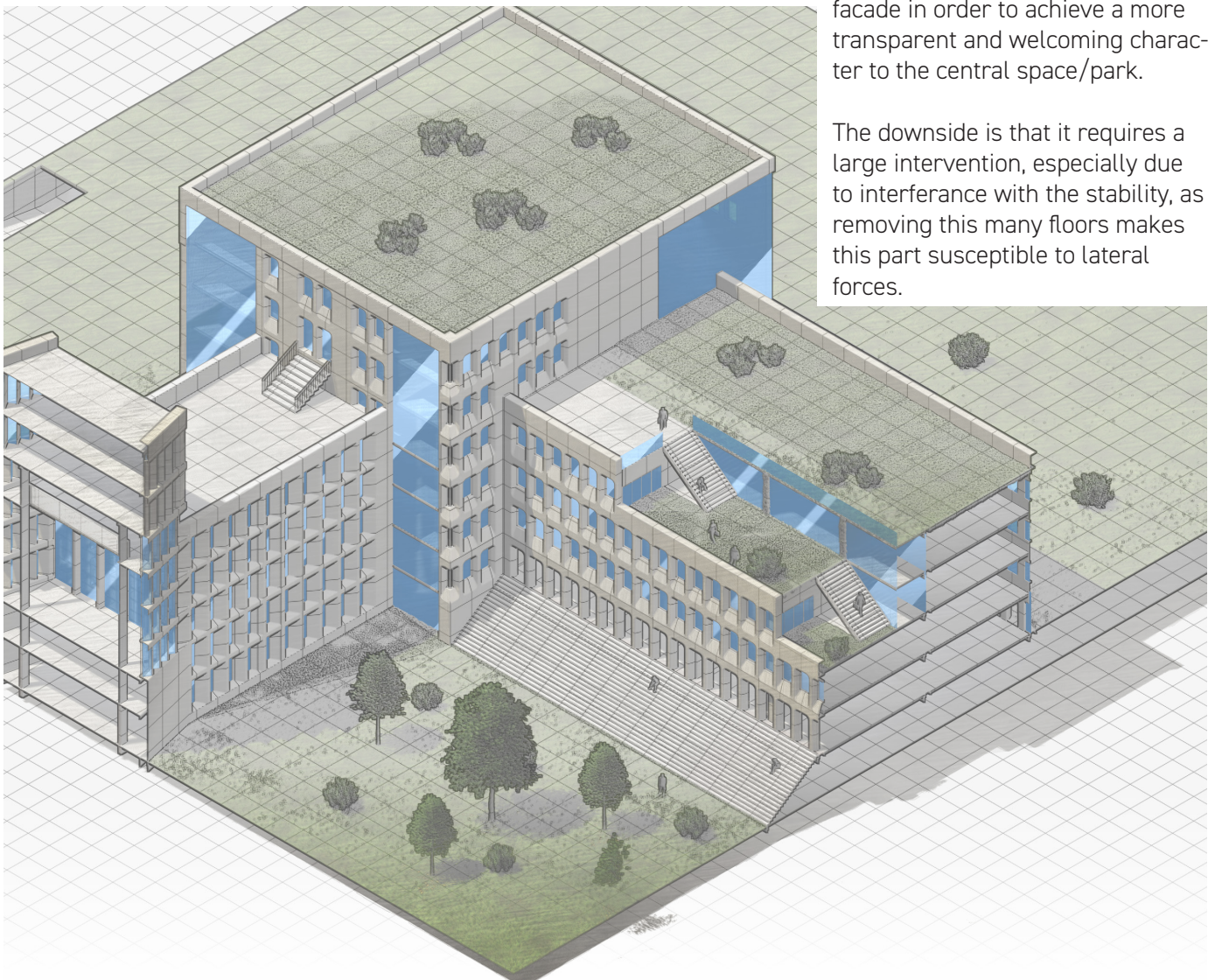
1958 Abstain + Repurpose

Van Alkemade et al (2020) describe eleven possible ways to deal with a redesign. When I first started with the concept creation I sought inspiration in the ways I can deal with a redesign. I did not test every way of intervention, but played around with a few and tested combinations. This resulted in four main concepts that I could expand on after P2.

2.3. CONCEPTS & TESTING - Elimination & Reconfigure

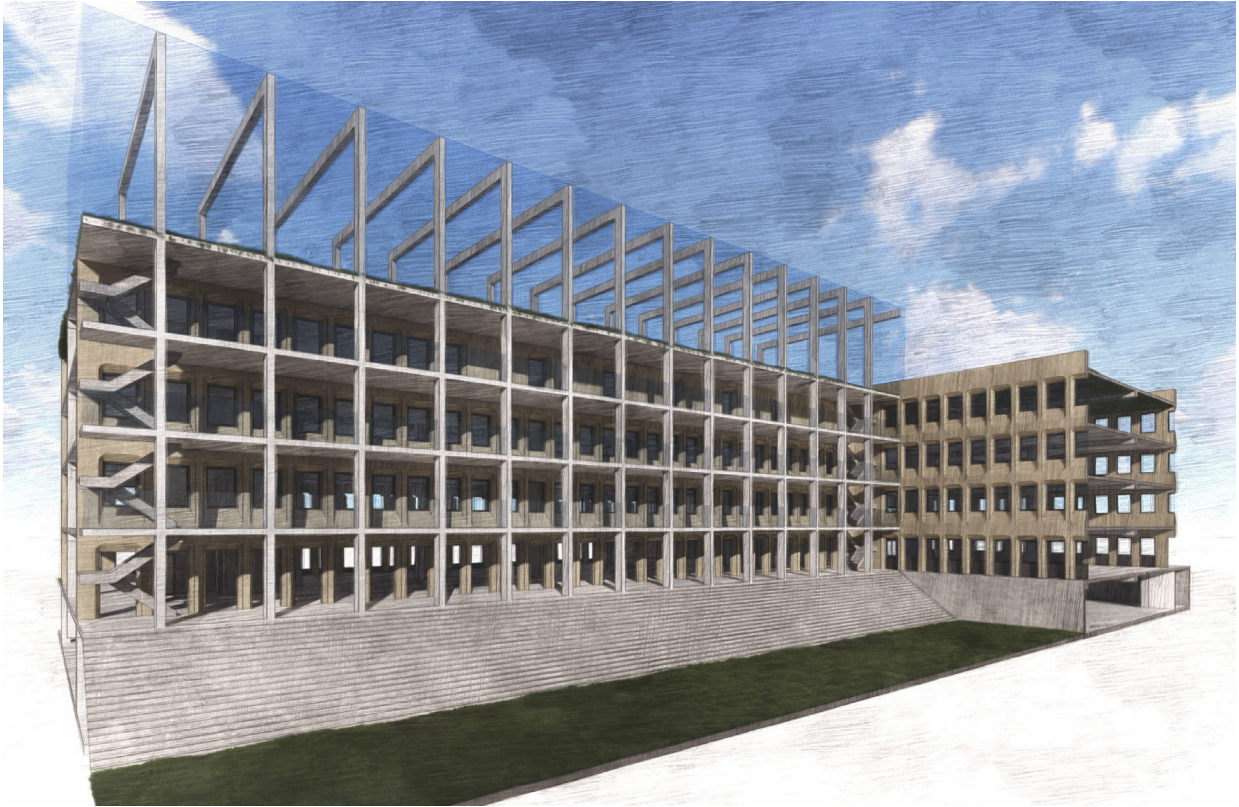


This concept uses a setback of the facade to create public space in the form of a stair going up to the southeast block of the 1980f extension. This concept breaks up the facade in order to achieve a more transparent and welcoming character to the central space/park.



The downside is that it requires a large intervention, especially due to interference with the stability, as removing this many floors makes this part susceptible to lateral forces.

2.3. CONCEPTS & TESTING - Obscure & Overlay

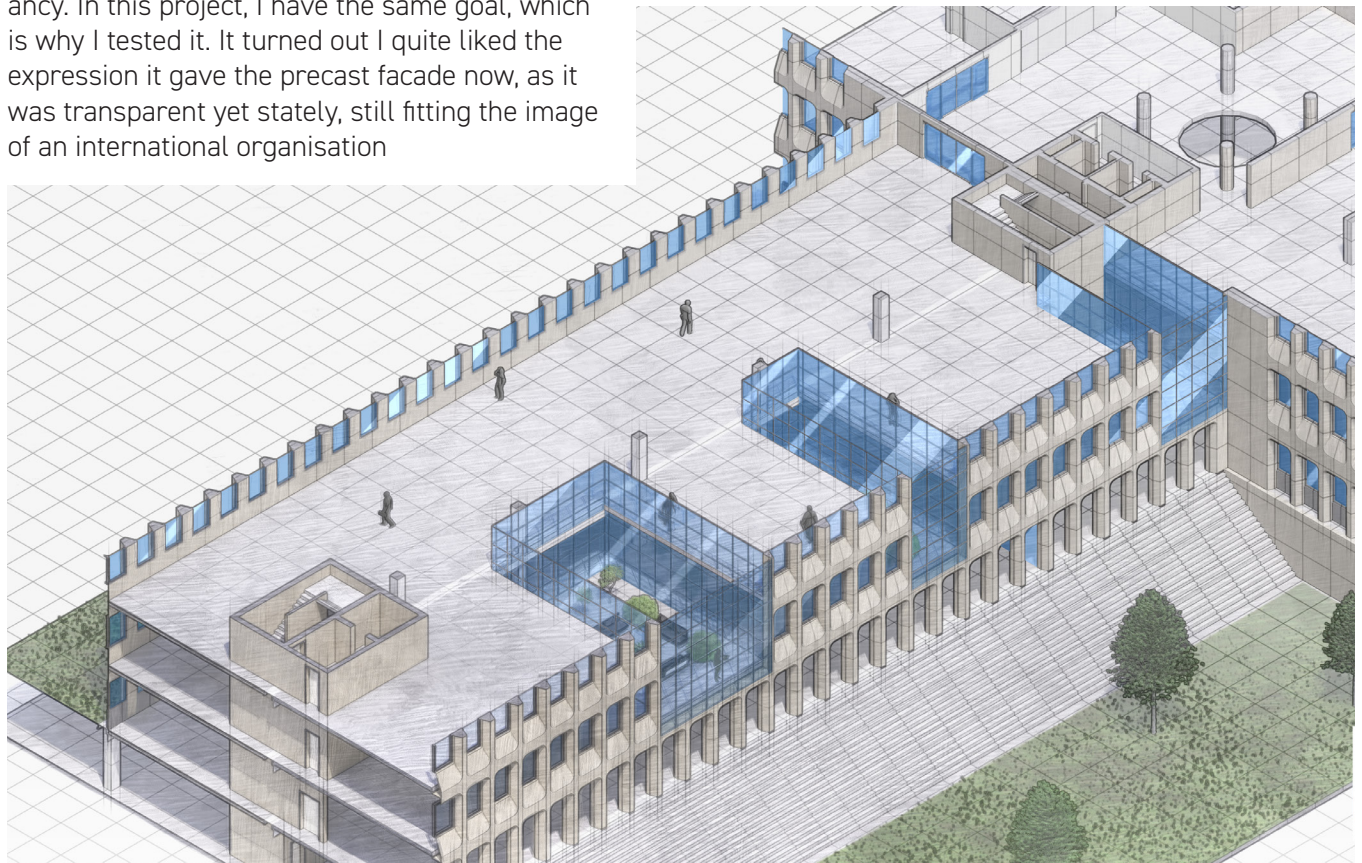


This concept uses a second skin to alter the expression towards the park. It requires little intervention but if I choose to hide the precast concrete facade, I feel like I run away from the 'problem'. Besides the story paired to it, the precast facade in The Hague has something beautiful to it that has to be put to its right. This concept was the other side of the spectrum I was thinking in, and used to stir things up in my design process.

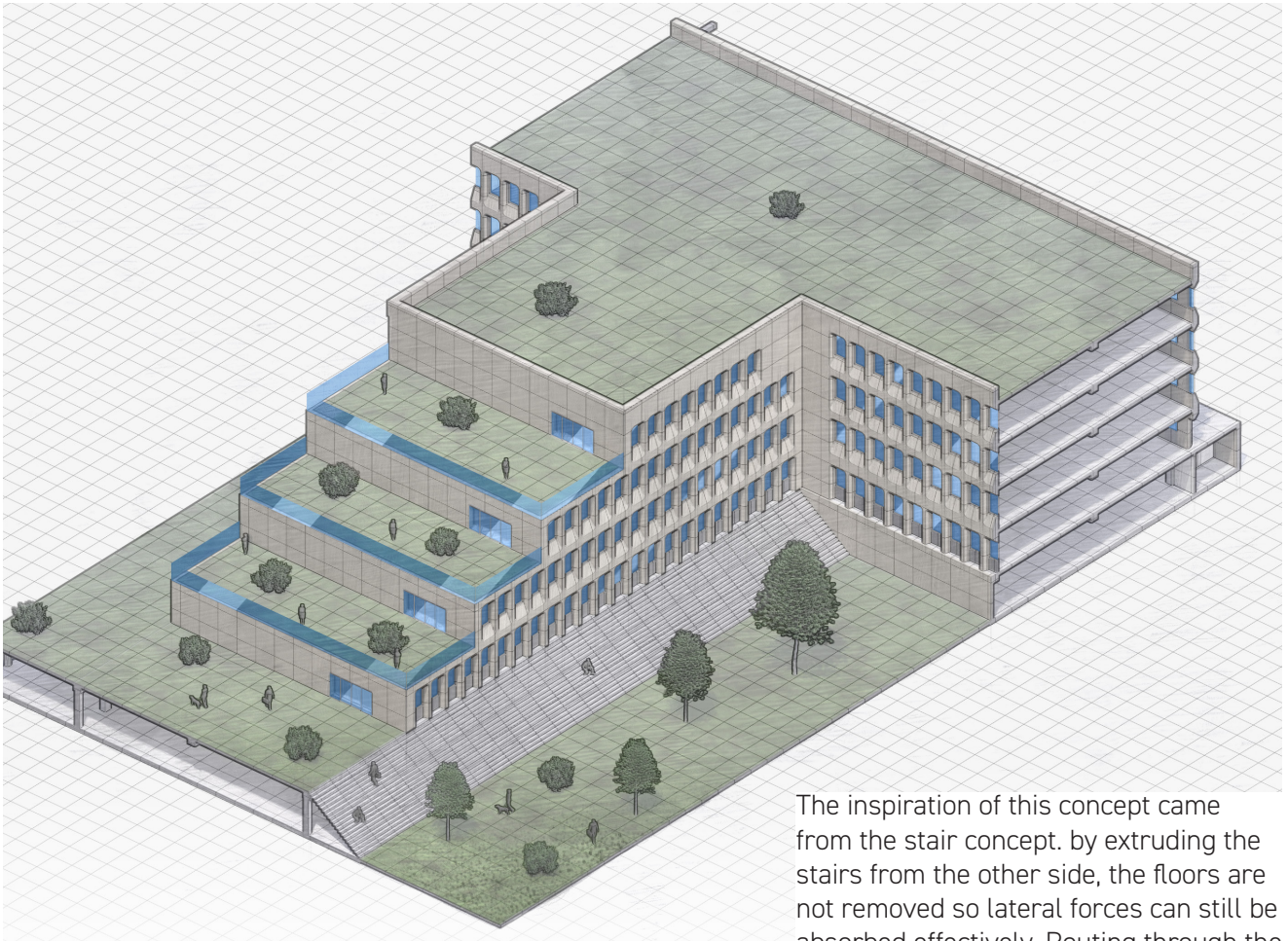
2.3. CONCEPTS & TESTING - Elimination & Copy



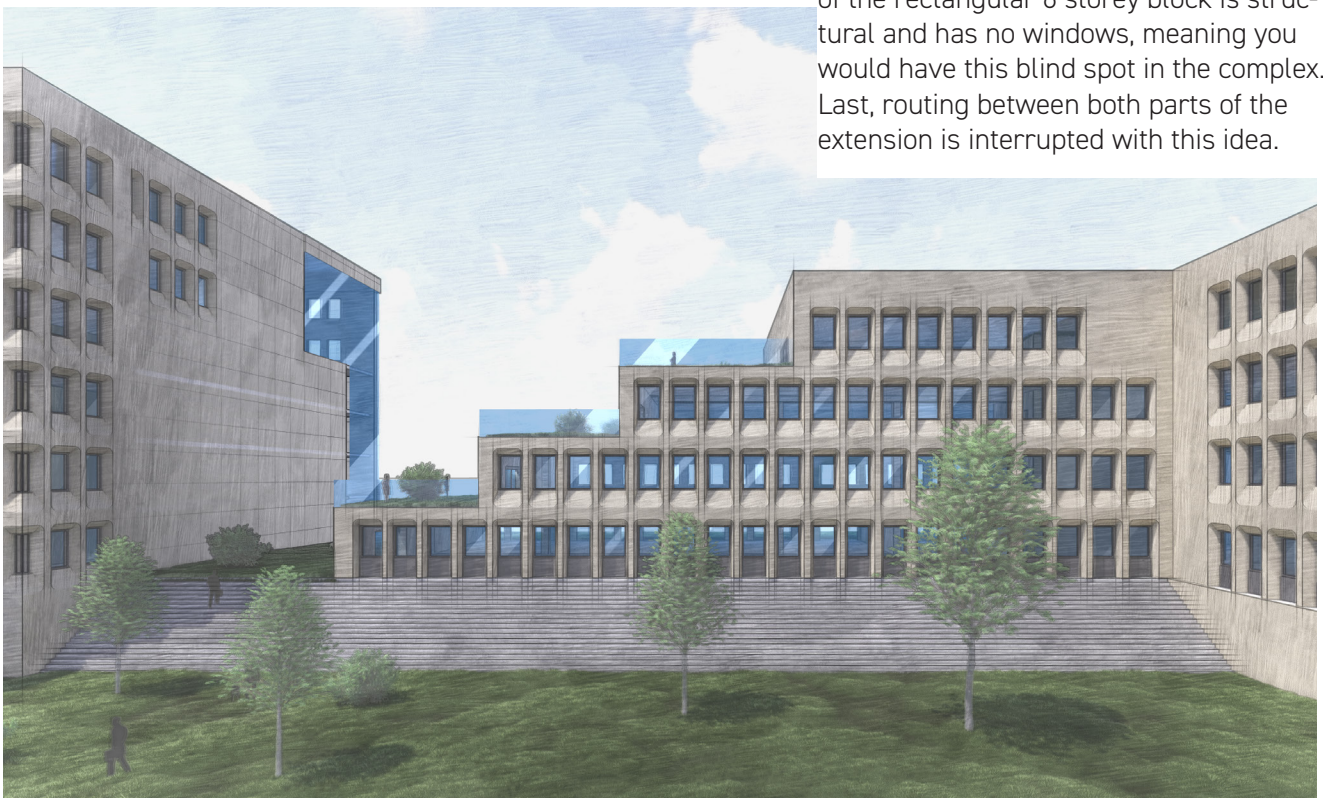
This concept is inspired on the Ministry of Foreign Affairs in The Hague. It hosts three large atriums that create space, daylight entrance and transparency. In this project, I have the same goal, which is why I tested it. It turned out I quite liked the expression it gave the precast facade now, as it was transparent yet stately, still fitting the image of an international organisation



2.3. CONCEPTS & TESTING - Elimination



The inspiration of this concept came from the stair concept. by extruding the stairs from the other side, the floors are not removed so lateral forces can still be absorbed effectively. Routing through the complex is also emphasized better. The downside of this concept is that the facade of the rectangular 6 storey block is structural and has no windows, meaning you would have this blind spot in the complex. Last, routing between both parts of the extension is interrupted with this idea.



2.3. CONCEPTS & TESTING - Chosen concept



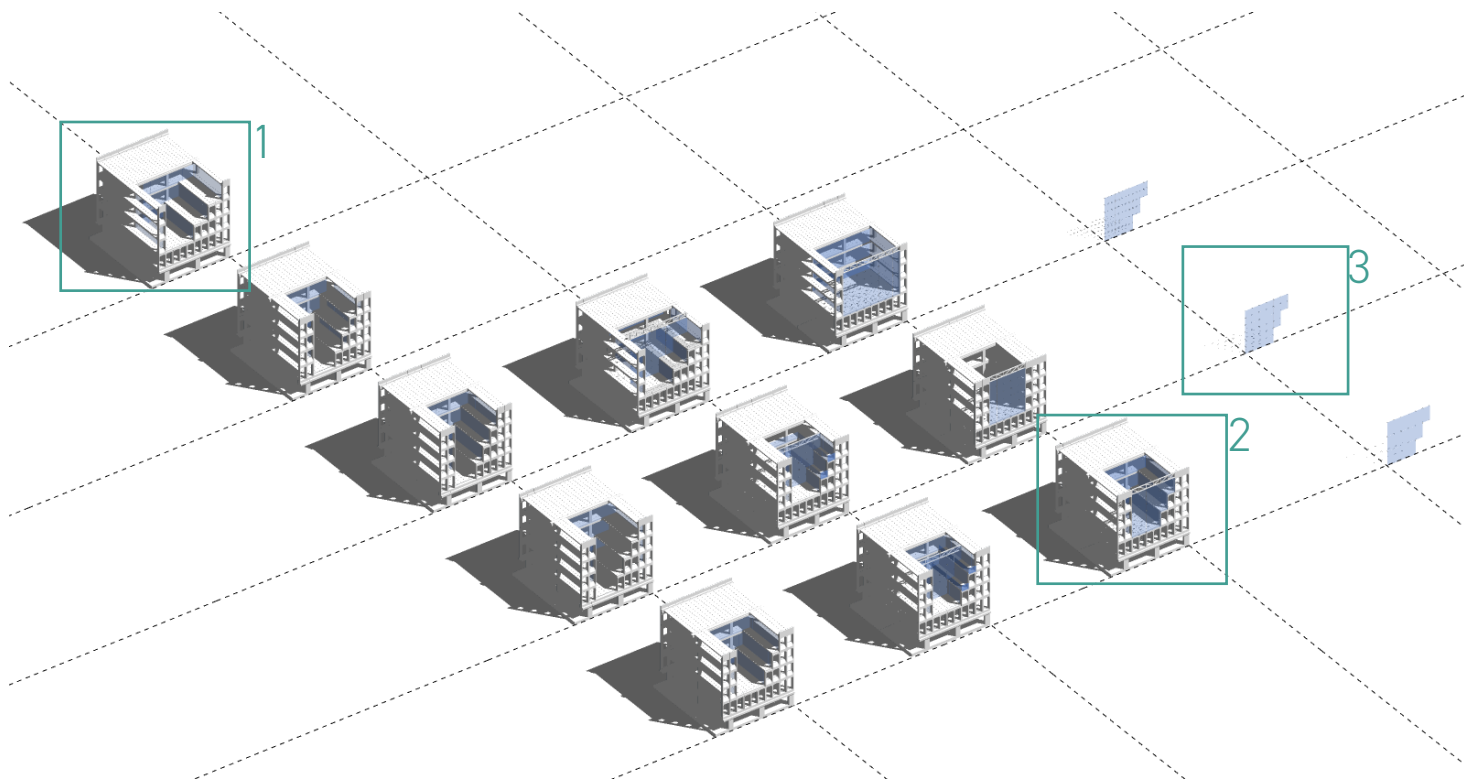
The atrium concept was chosen for three reasons:

- The atrium concept adds transparency and a more welcoming character to the precast concrete facade in the extension.
- The atrium provides daylight entrance which is needed in the central parts of the building if the modern office standard aims to be achieved.
- The office of the future needs more than a work-space: it needs a place to relax, to eat, to walk around, etc. The atrium adds to this mindset. It provides a quiet space, a space to sit down, an outside space, a space to call someone privately, a space to eat, etc. The quality of life improvement on this office building is much needed when aiming to transform it into a workspace hosting international organisations.

The developments made in the design between P2 and P3 are mainly the way the atrium repeats itself and the shape of the atrium itself. The atrium removes 4 precast elements at the 1st floor, 5 at the 2nd and 6 at the third floor. It is also set back to 5m from the facade in order to have a mix between inside and outside.

The park in the middle consists of lounge stairs that connect the lower park at -1 (-3.5m) to the park on top of the parking. On a larger scale, this green route connects the Archipel neighbourhood with the Peace Palace.

2.3. CONCEPTS & TESTING - Optimisation



After P3, more detailed drawings of the construction were needed. This again resulted in design obstacles, as the type of glass facade was very dependent on the structure that carried it, and the glass-carrying structure was influenced by the structural capabilities of the precast facade elements and the hollow-core slabs. In order to get things clear, I made an overview of the possibilities I had with my concept. Three types were studied: the glass facade on the precast facade level, the glass facade in the middle and the glass facade on the beam level.

Because I wanted to have an outside with an inside space, I highly preferred the design where the glass facade was put halfway. However, this would result in extra beams spanning to the facade, as putting a glass supporting truss in the center of a 265mm hollow-core slab would have many complications.

This made me think about the idea of having an inside and outside space again. The solution was always there: one facade extrusion would be an atrium (2), and the other would be an outside space (1). This way, no truss would be put in the middle and the benefits to the office user were equal.

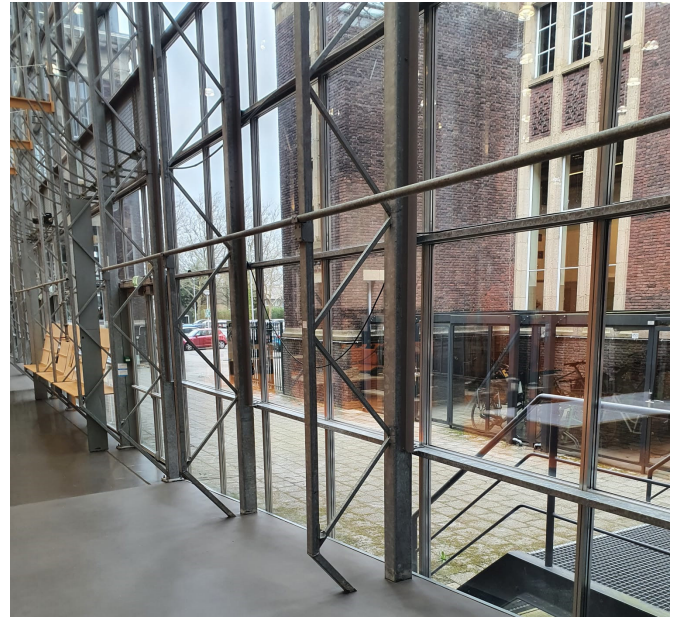
2.3. CONCEPTS & TESTING - Choice of glass facade

The choice of glass facade had still to be made. There were three options I considered: a glass-fin facade, a curtain wall with truss structure and a spider curtain wall with a cable-net structure. Glass facades like the glass-fin and the cable-net use tension to create a stiff cable that supports the glass panels. This tension must be provided by a supporting beam on top of the glass structure, as well as a strong foundation to resist the tensile forces.

Precast concrete panels might not be the safest foundation, so I looked into the curtain wall with truss structure, similar to the one in the Oranjezaal at the Faculty of Architecture. Although I am looking for transparency and openness in the facade, the repetition achieved with mullions and the structural advantages made me decide on this glass facade.



Glass-fin system

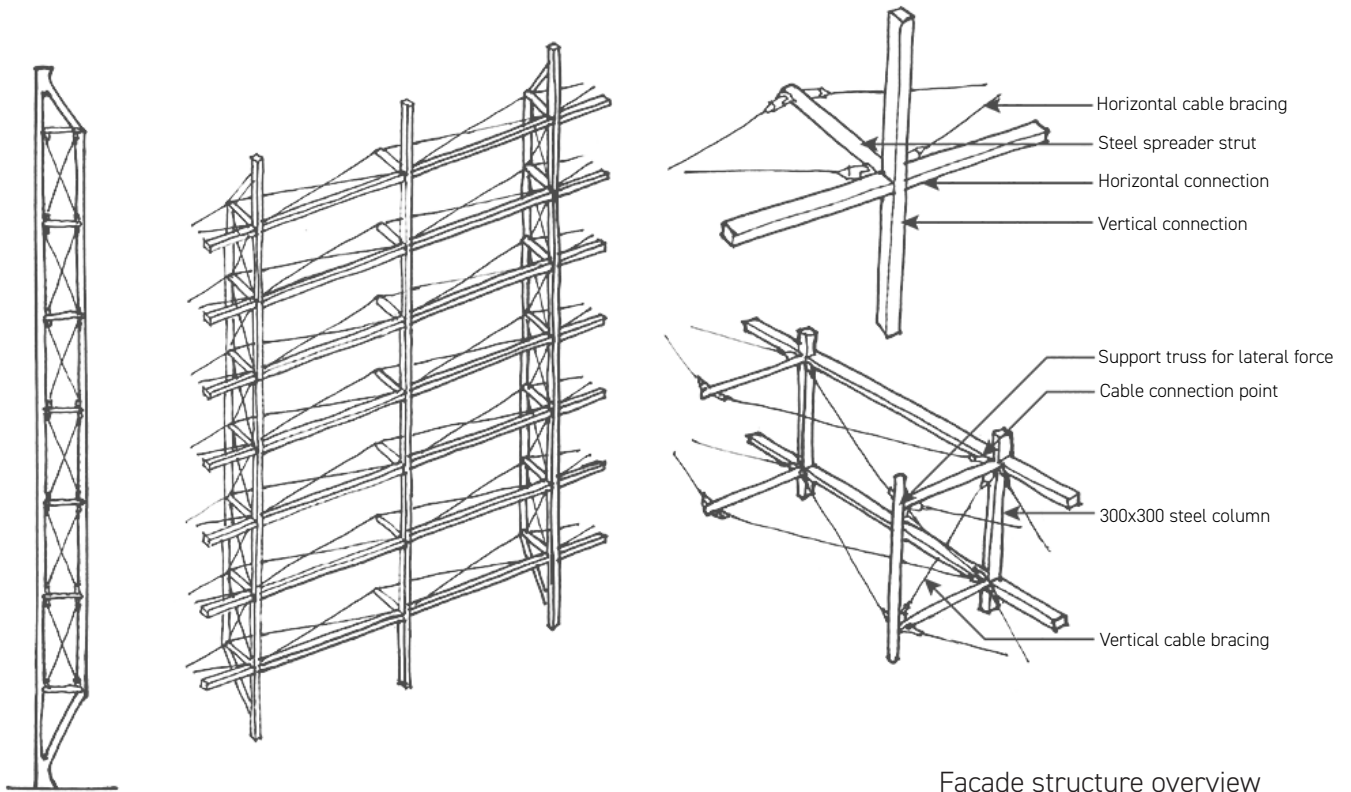


Truss structure system



Cable-net system

2.3. CONCEPTS & TESTING - Truss structure system



The system used is shown in this image. It uses a combination of the truss system with the cable net, which is useful to my intervention for the following reason:

To carry the roof of the atrium, a beam must span the 11m that is removed with the facade opening. Steel columns support this beam, but also the mullions of the glass facade. Because repetition is sought, and glass panels off sizes as big as the precast concrete panels are extremely inefficient, the steel columns are placed once every 3.6m: the width of two precast panels. The glass panels however are 1.8m in width, so they would need an extra steel column to support them.

This facade system uses cables and a steel spreader strut to support this vertical mullion, reducing the need of extra material and leaving a more transparent facade.

2.3. CONCEPTS & TESTING - References/Inspiration



3. DESIGN

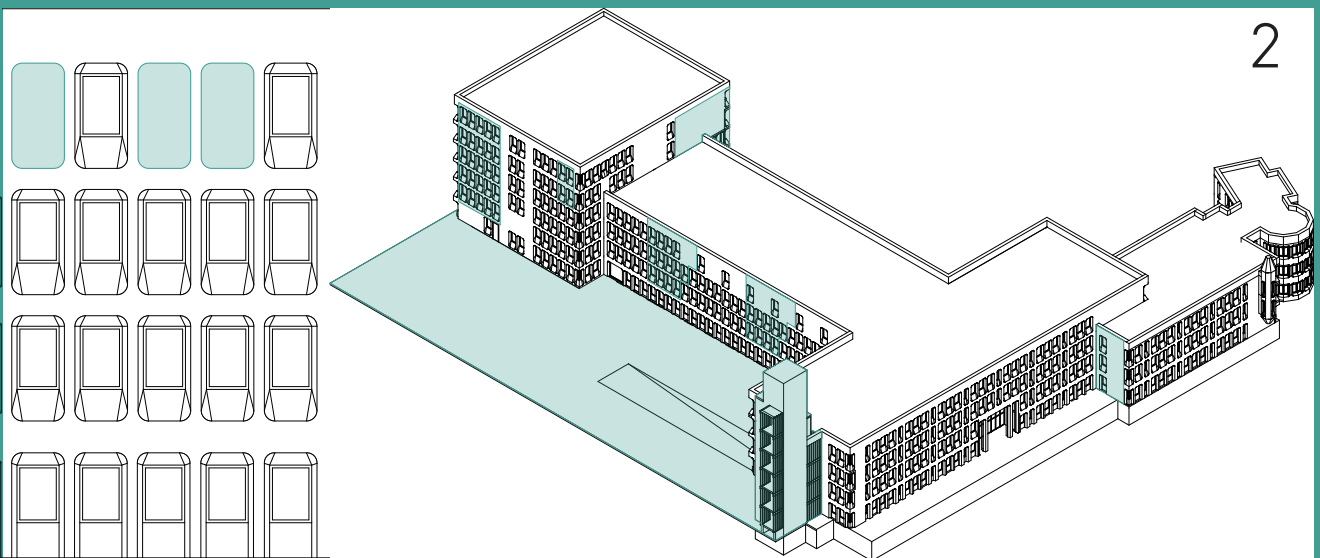
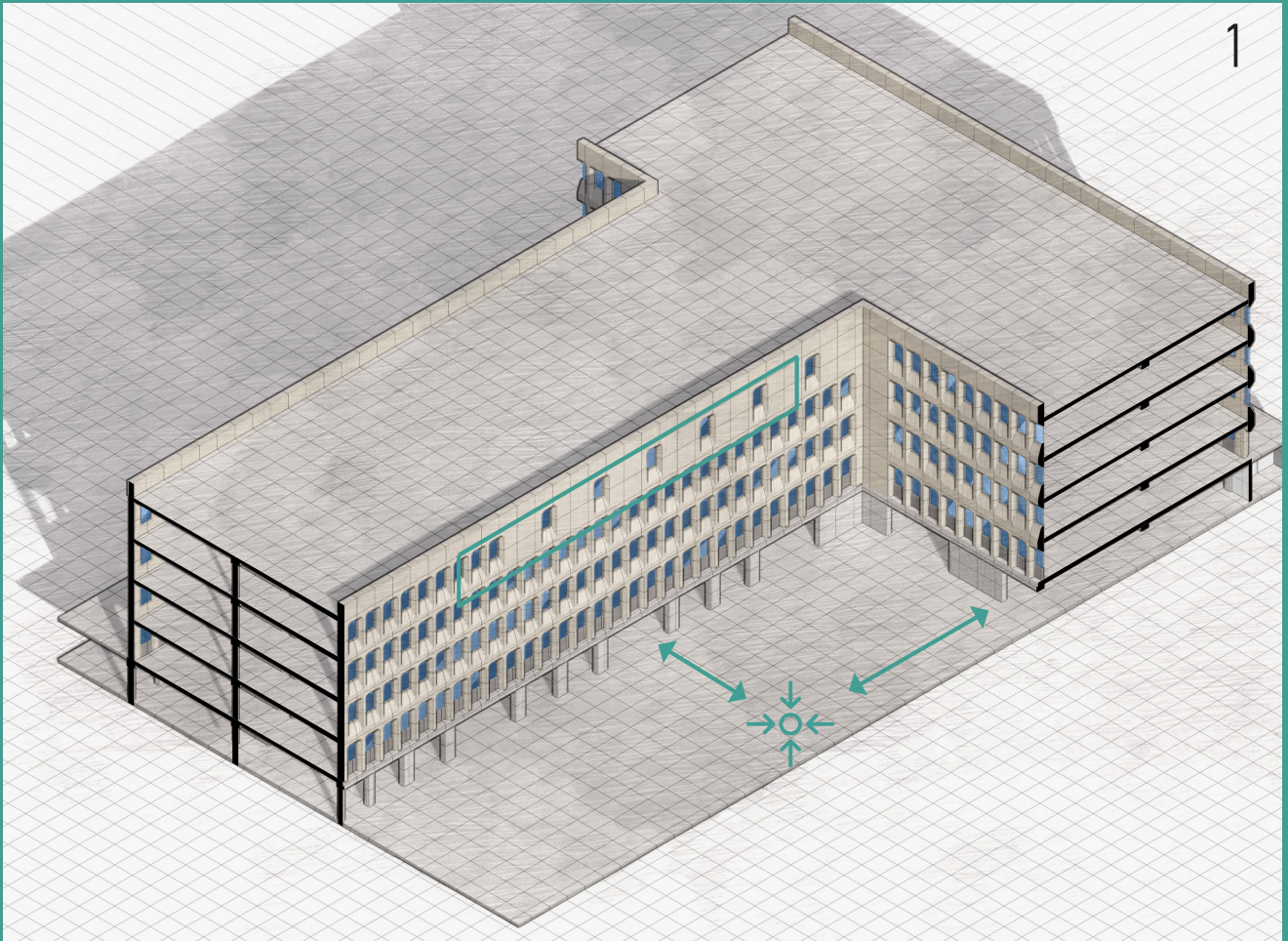
The result of my ambitions, starting points and concept brainstorm is visualised in the final design. The largest obstacles were the floorplans and the design of the intervention in the 1980 extension.

Due to the scale of the complex, floorplans with a logic routing for the three different users required a lot of thought. For the design of the extension intervention, thorough research in the building technology was required (which was not always possible due to missing drawings).

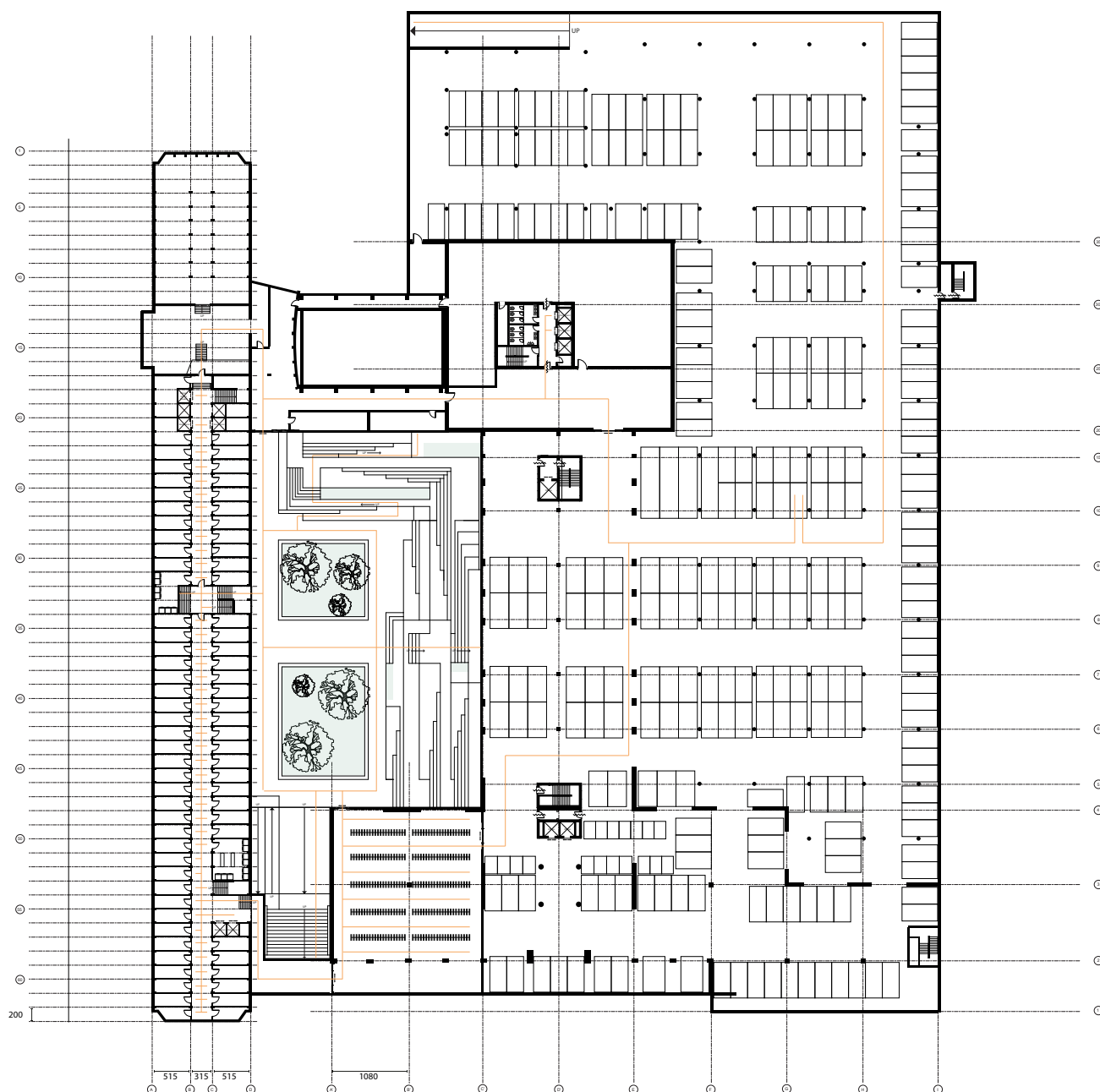
This design is an example of adaptive reuse. The word reuse has a double meaning in this project. In most cases it means a transformation: how can the outdated building be reused in another function with some alterations. For this building, reuse could also literally mean: how are the precast concrete panels reused when they are removed?

This thought kept me busy, as I did not know if this was even possible with panels the size of 1.8x3.6m. However, the first idea I got came when I looked again at the facade that I wanted to intervene on. Figure one shows precast panels of a much smaller size, closing this facade off even more. This is due to the holding cells located behind. Figure 2 then shows how I want to shift the panels that are removed from the non-loadbearing parts onto the parts where the precast panels have lost their function, such as the holding cells.

This leaves me only with reusable panels that are either completely blind or with small window openings. These could then be used to design the playground which is located at the park above the parking. This decision was inspired on the playground made by 2012Architecten named Wikado. They used a demolished wind turbine to create ramps and tunnels for children to play in.

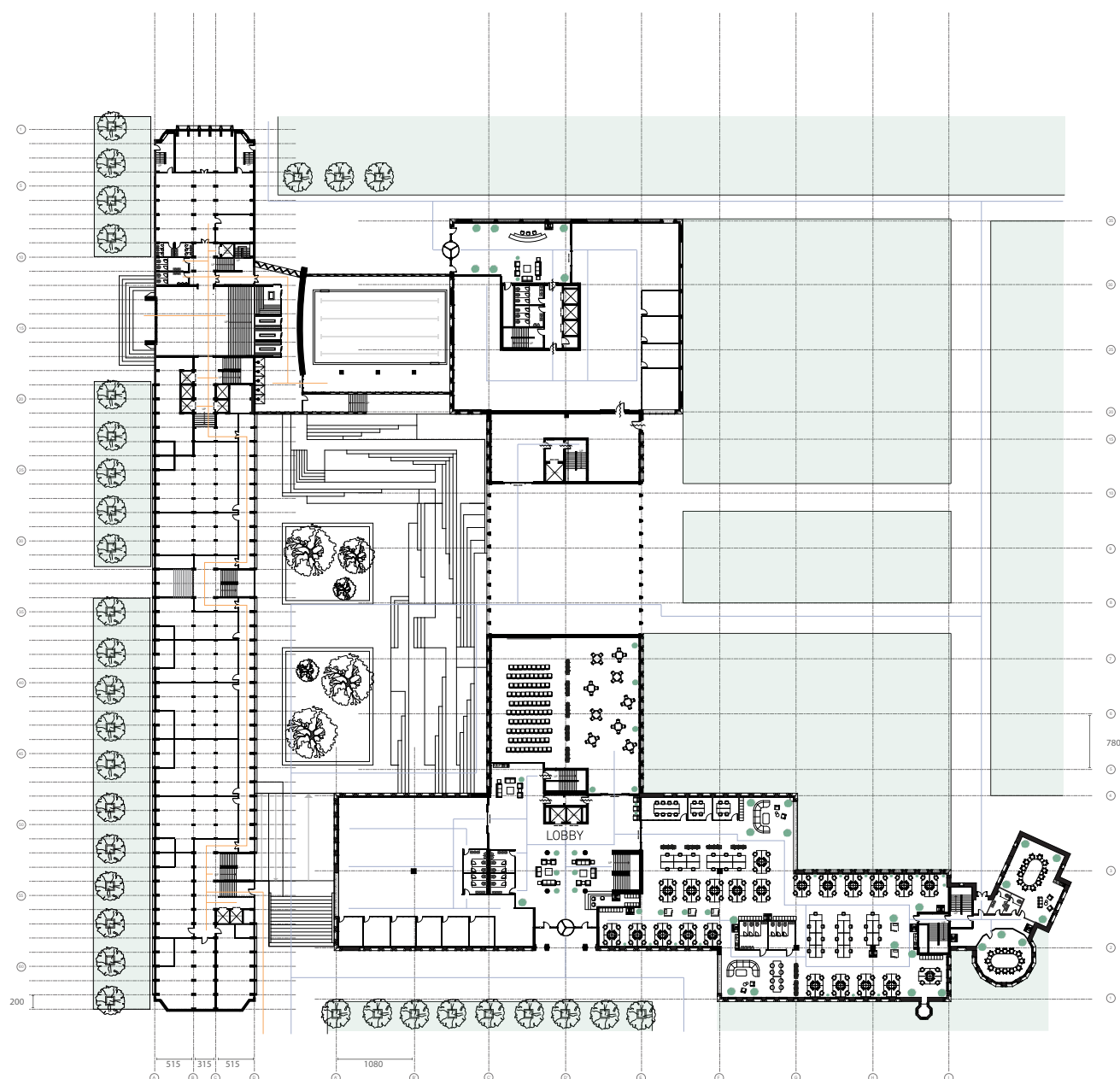


3.1.1 OVERVIEW - Floorplan level -1



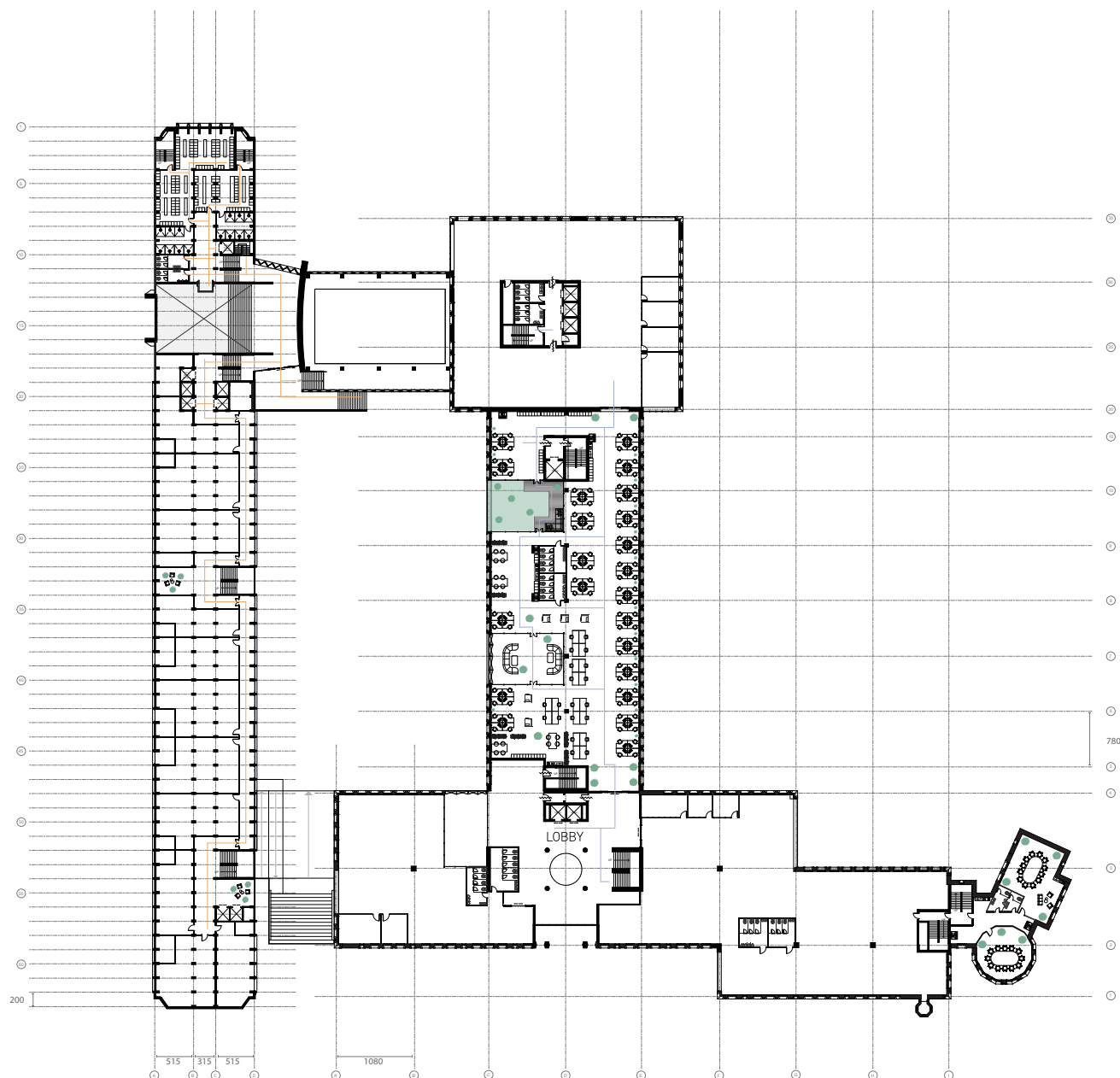
-1 is where the central park is located. The park is surrounded by parking, storage and installations, but due to the stair design, none of that is visible.

3.1.1 OVERVIEW - Floorplan level 0



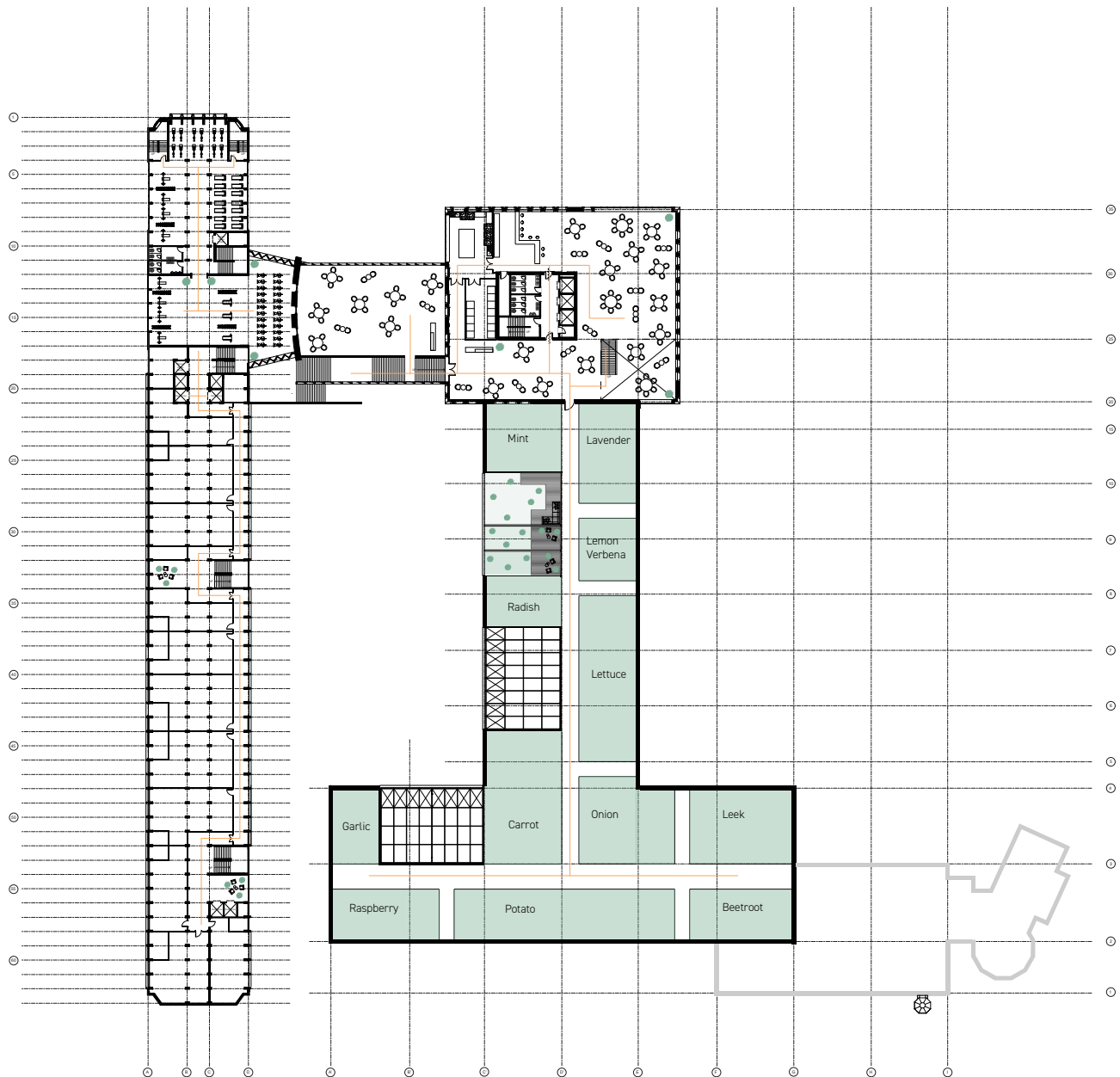
Level 0 is ground level. This is where the park on top of the parking is located, and where the visitors for leisure can enter through the monumental hall in the 1958 part. From here, they can drop their child at the kindergarten, go to their home, go to the locker rooms on level 1 and then go back down to visit the swimming pool.

3.1.1 OVERVIEW - Floorplan level 1



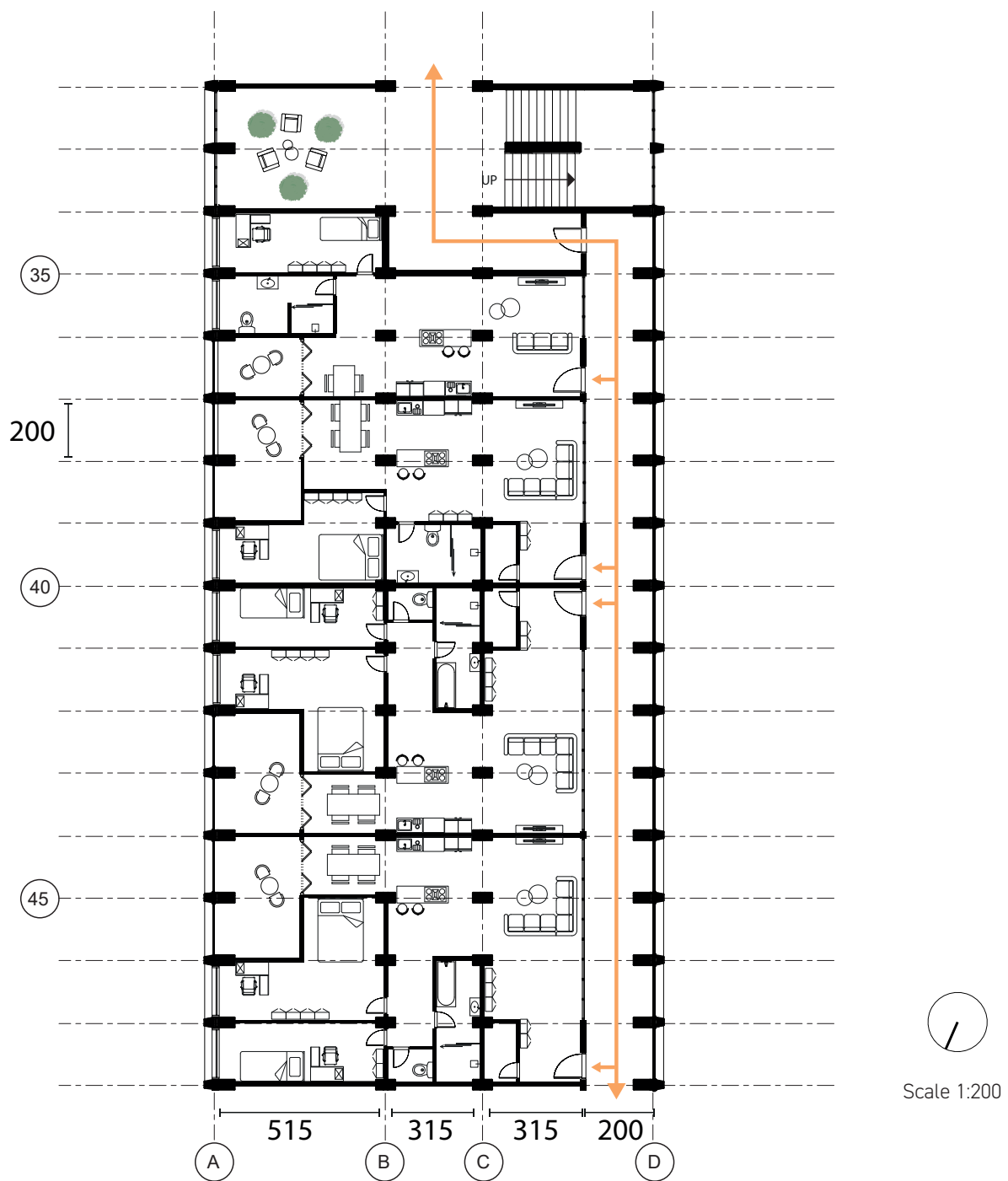
Level 1 is the first office floor that has the atrium concept visible, which is later shown on a smaller scale. This floorplan is the most common floorplan, as floors 2 and 3 are almost similar.

3.1.1 OVERVIEW - Floorplan level 4



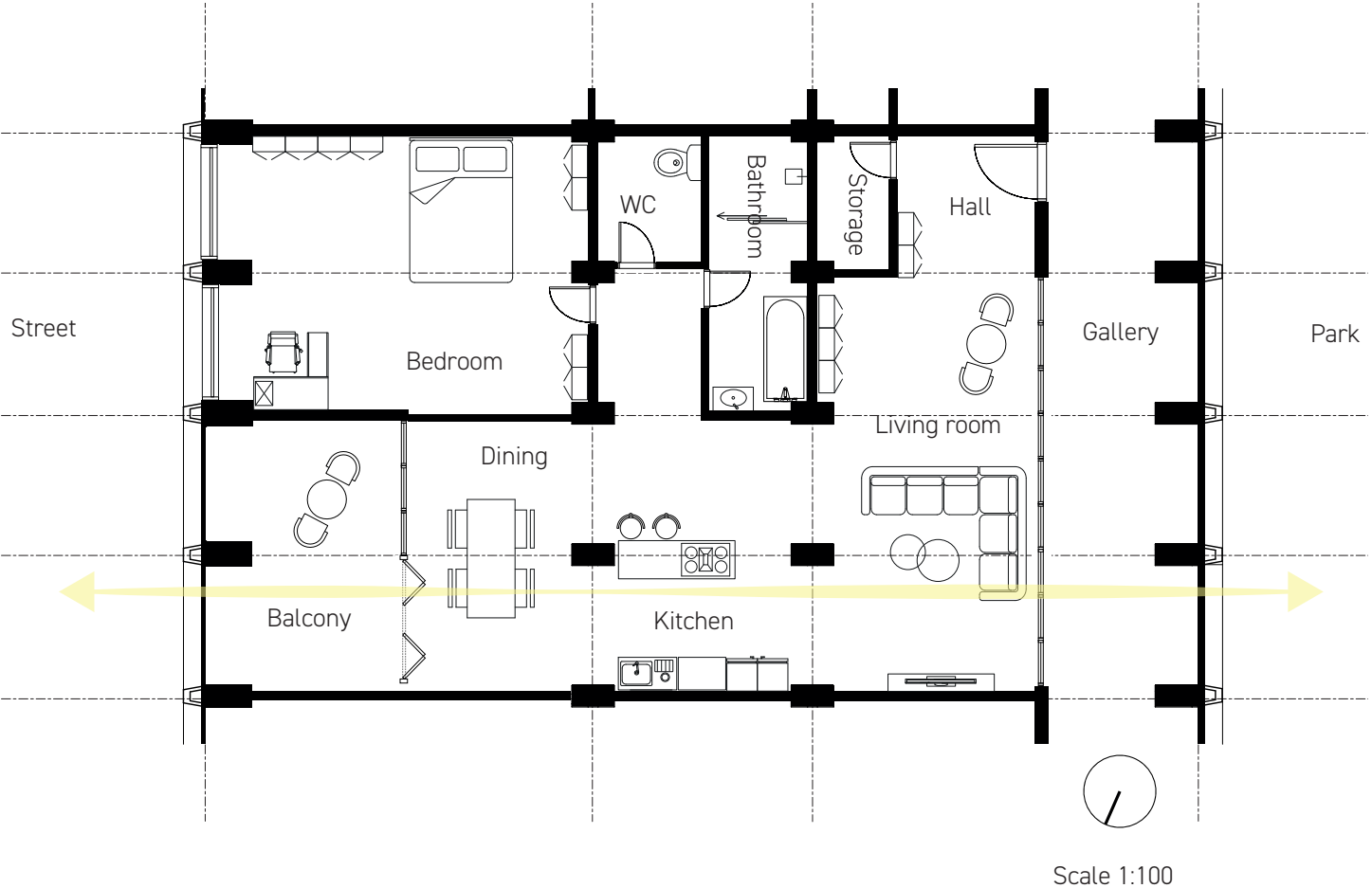
This floorplan shows the fitness and gym in the 1958 part, the terrace with restaurant and the urban garden on top of the 1980 extension. The type of plants on top of the green-roof are picked for their capability to grow on roofs.

3.1.1 OVERVIEW - Floorplan residences 1:200



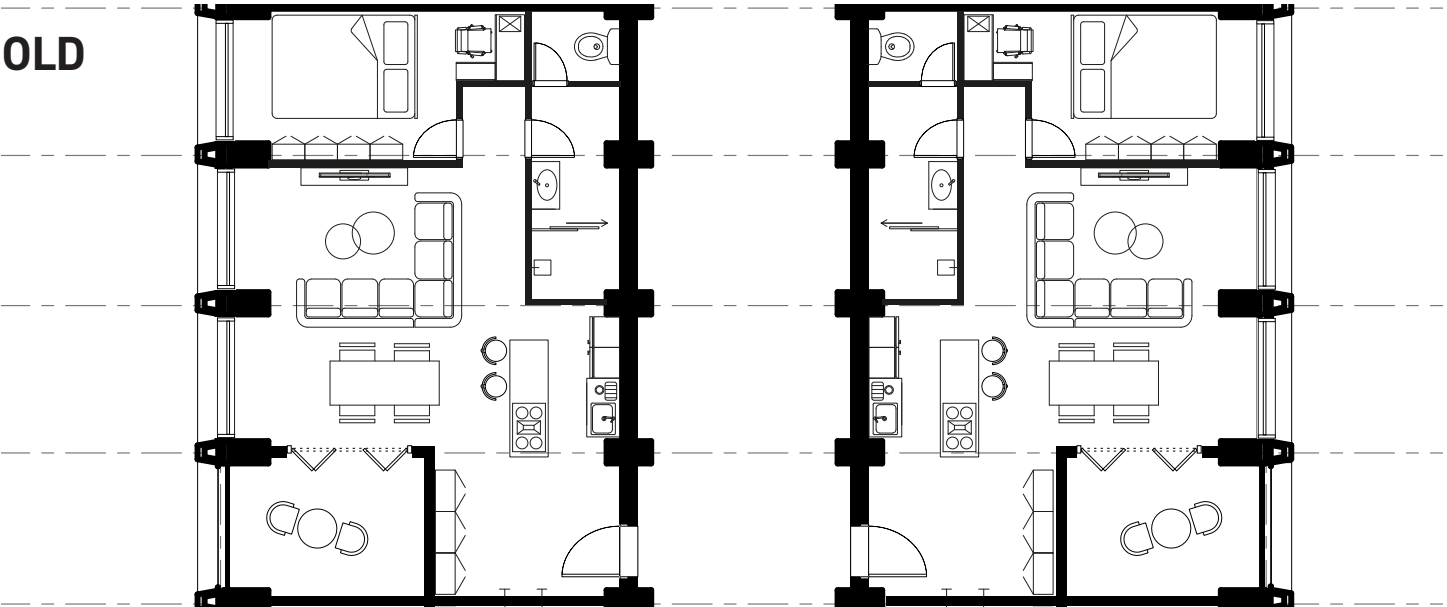
One of my design starting points is to emphasize on the Schokbeton facade. With the creation of a gallery on the side instead of the currently used central corridor, I increase the living quality of the apartments while freeing the Schokbeton elements from the windows, making them better visible. The gallery is shown in more detail in this 1:200 floorplan.

3.1.1 OVERVIEW - Floorplan senior apartment 1:100

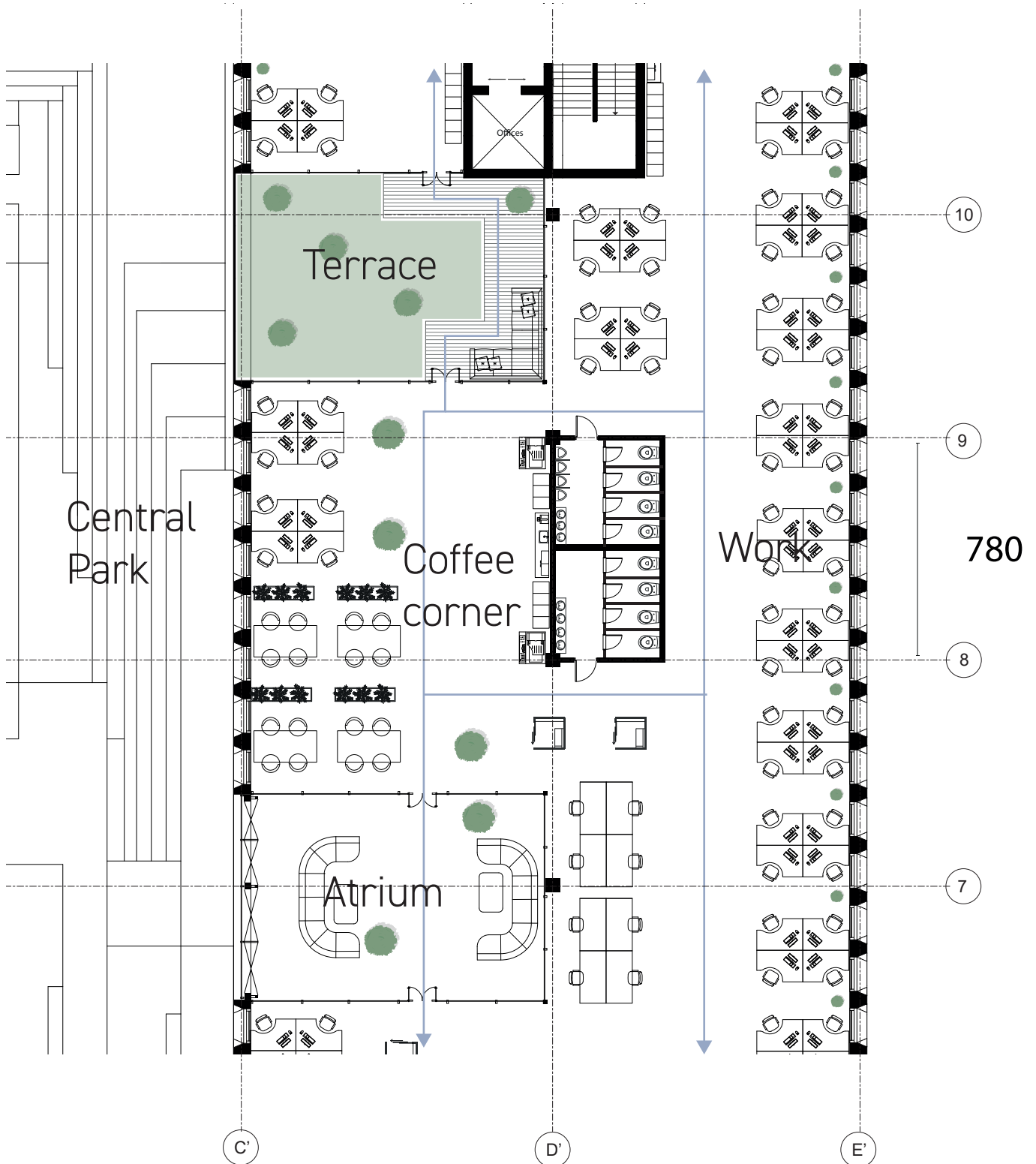


This senior apartment above is shown to illustrate how the floorplans for the residents have changed after P3. Daylight entrance is now on both sides of the apartment, and the floor area is increased by 100% for all apartments. The downside of this intervention is the reduced amount of houses, but quality was chosen above quantity.

The older floorplans do however eliminate the column grid inside the apartment. Careful placement of partition walls has solved this problem for the biggest part, and leave a much bigger space as the apartments are now 13.5m wide instead of only 5.15m.



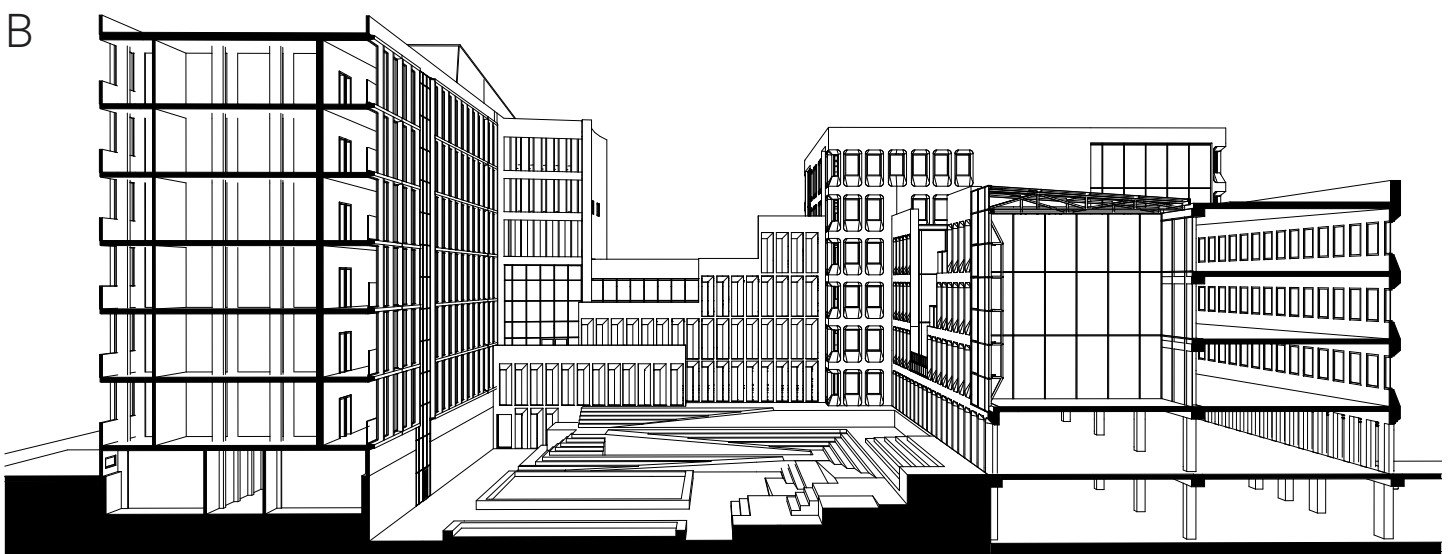
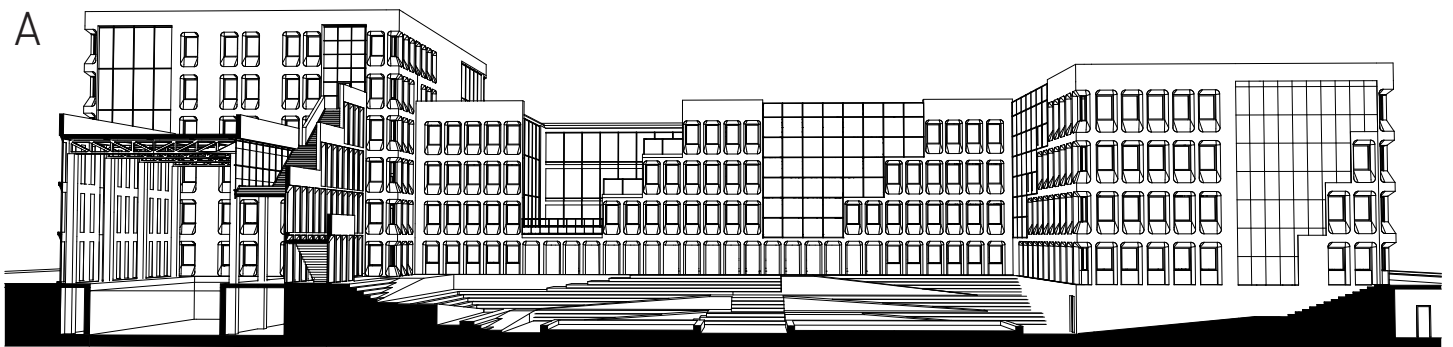
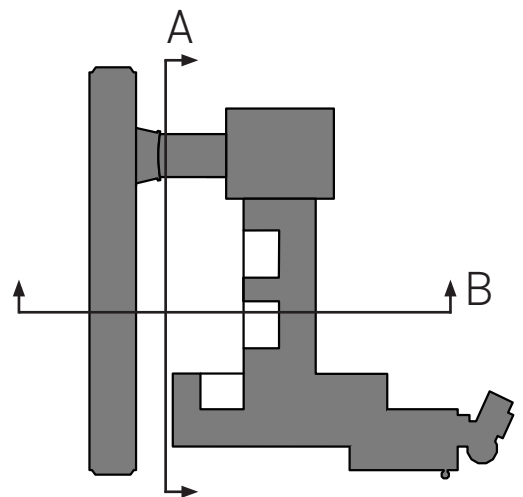
3.1.1 OVERVIEW - Floorplan office 1:200



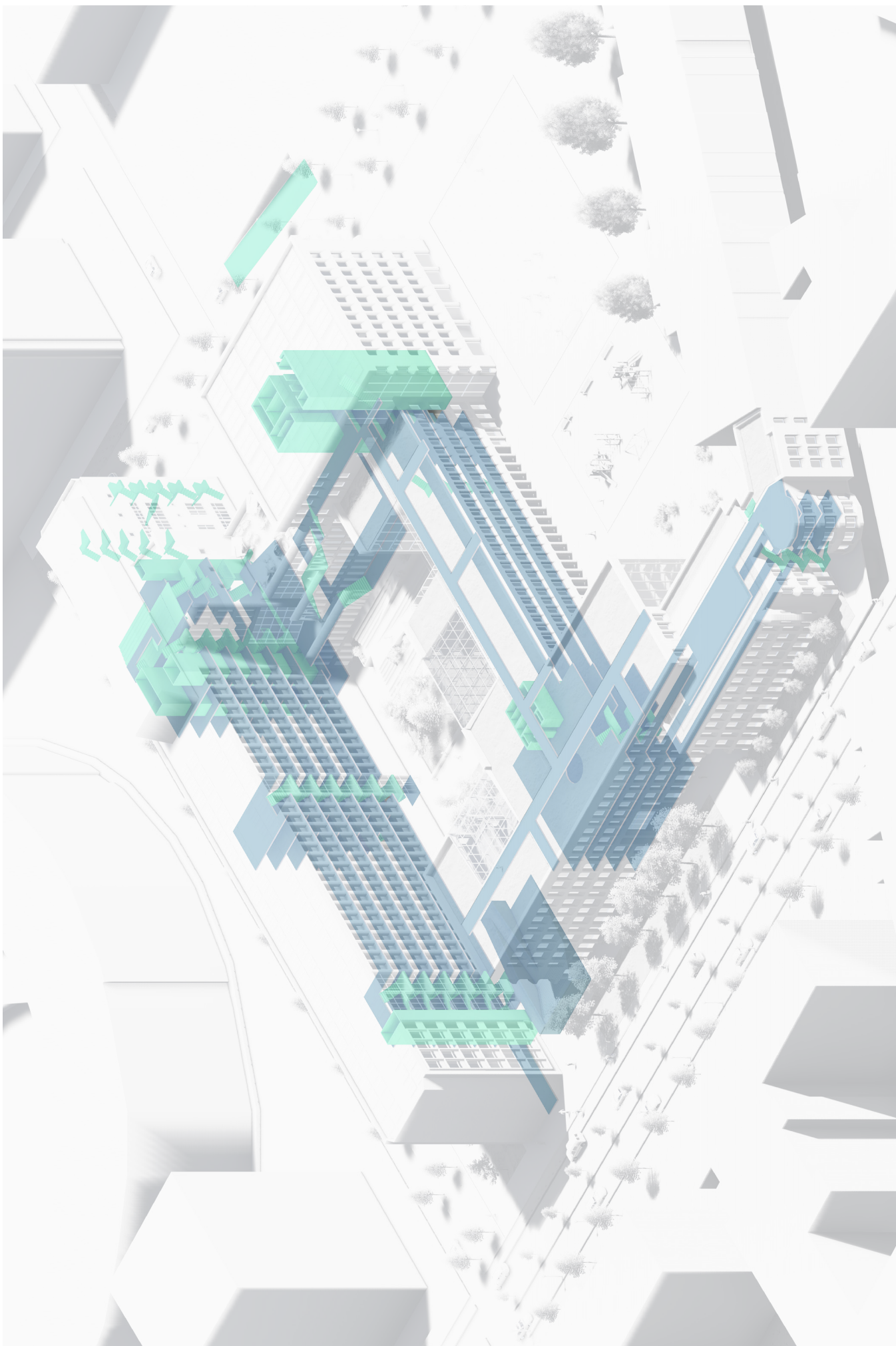
The office floorplans have two ambiances: the parkside is the relaxing side due to the presence of the atrium, terrace and coffee corner while the other side has the work stations and the main walking route. This division is intentional, as the park requires a welcoming and transparent character from the office, which is experienced better when you see people talking or relaxing for a bit instead of people sitting behind their desk.

3.1.2 OVERVIEW - Sections

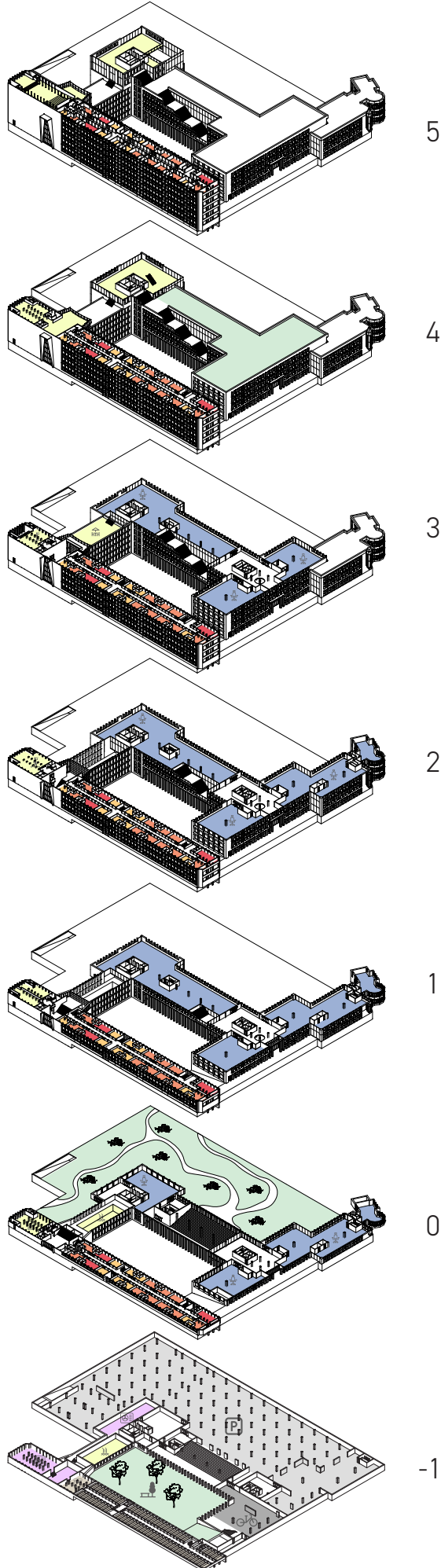
These preliminary sections show the interventions I am proposing. Section A illustrates the exchange of non-loadbearing parts for a curtain wall and section B shows the variety of precast concrete facades in the ensemble: the Schokbeton facade in the 1958 part, the loadbearing precast concrete facade in the 1980 extension and then the heavy prefab system used in the swimming pool connecting building. When standing in the central space (the park), the progression of our construction history is made visible.



3.1.2 OVERVIEW - Routing



3.1.3 OVERVIEW - Program



The overview on the left shows the program which was set at the P2. The next two pages show the program from the P4.

The 1980 extension hosts international offices, with an average of three offices per level, ranging from surface areas of 800m² up to 2000m². This diversification is necessary to create the transparent and welcoming character of the building, as a large multinational corporation would need increased security and other requirements that do not fit in this complex which is shared with residents.

The 1958 part mainly consists of housing for students, starters and seniors. House sizes range from 40m² for students up to 70m² for starters and 100m² for seniors.

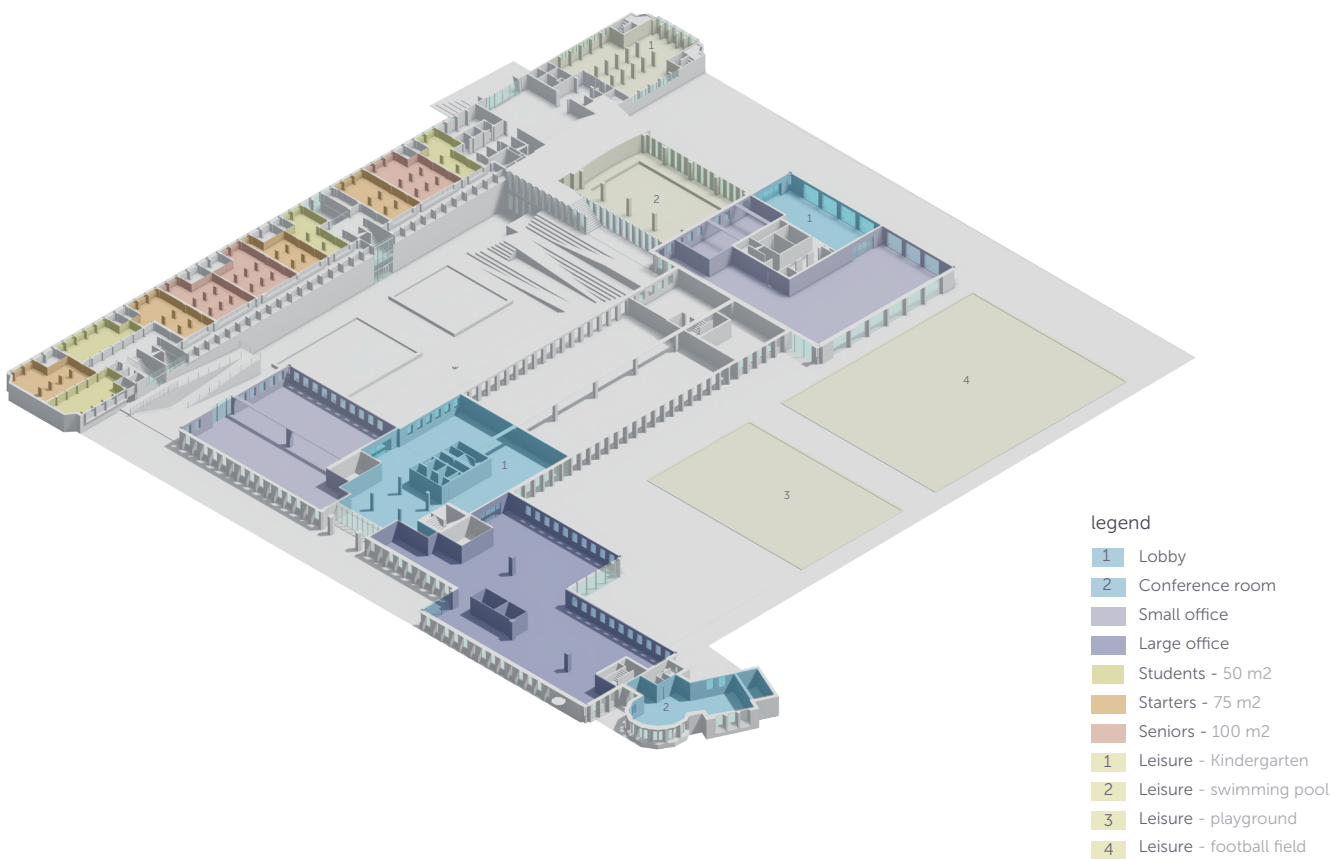
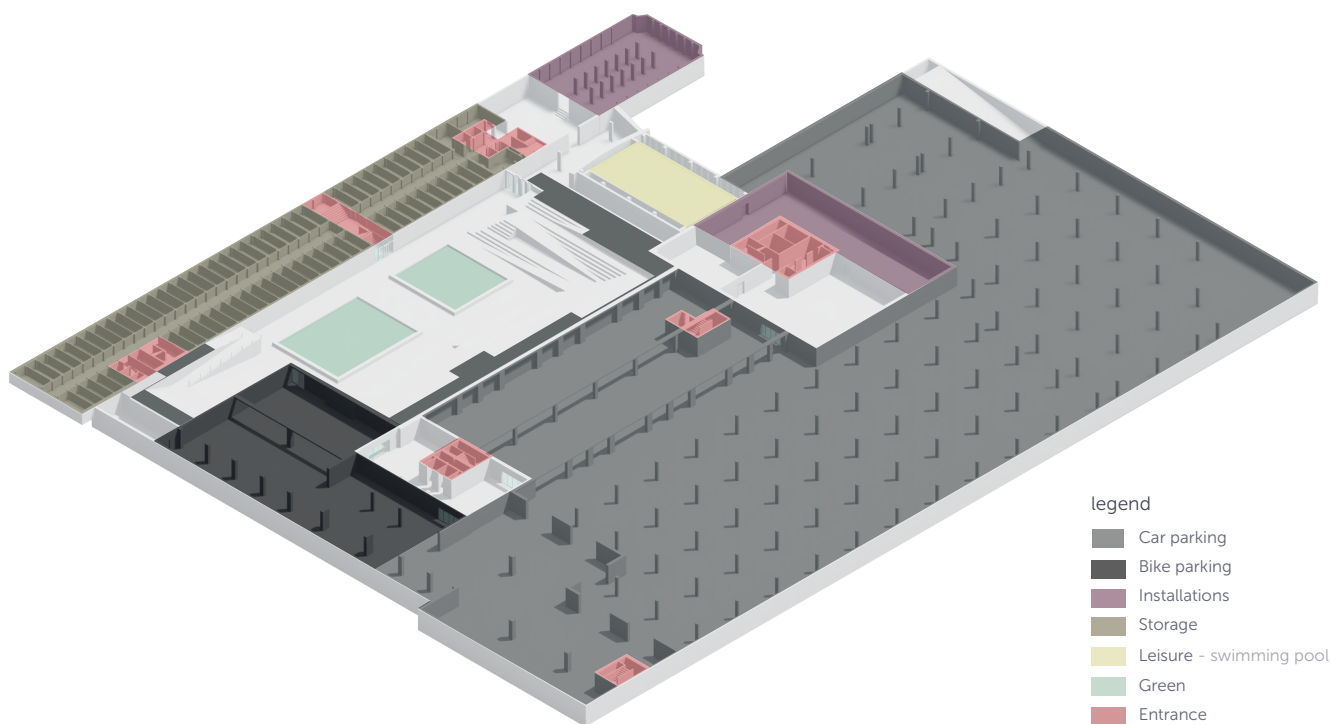
The southside of the 1958 part hosts all leisure program, from a kindergarten on ground level to locker rooms on the 1st level, then three storeys of fitness and gym and on the top level, where the auditorium is, a dance school.

The new building is a swimming pool and connects the 1958 with the 1980 part both visually as physically.

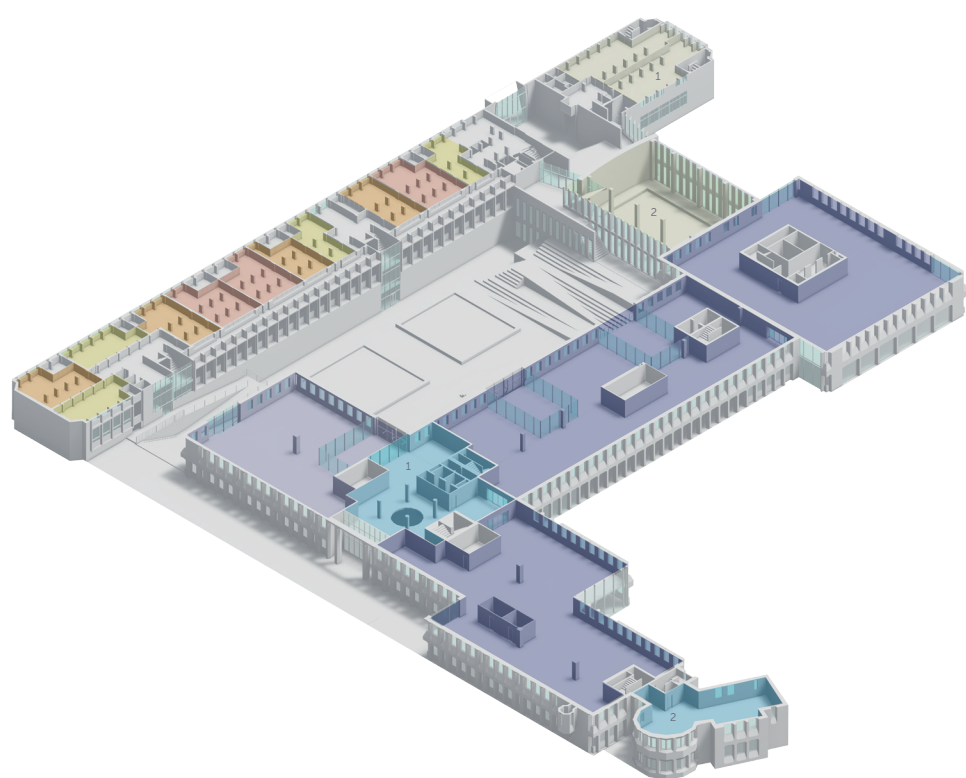
legend

- Leisure
- Seniors
- Starters
- Studios
- Office
- Storage
- Installations
- Parking
- Park

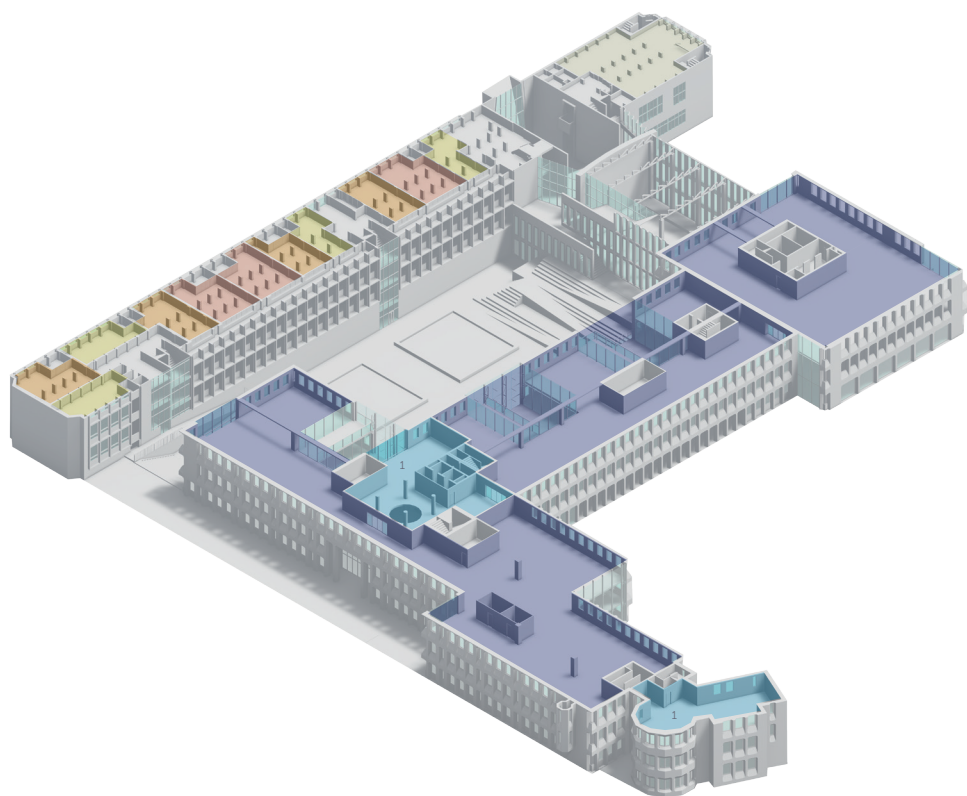
3.1.3 OVERVIEW - Program -1 & 0



3.1.3 OVERVIEW - Program 1 & 2

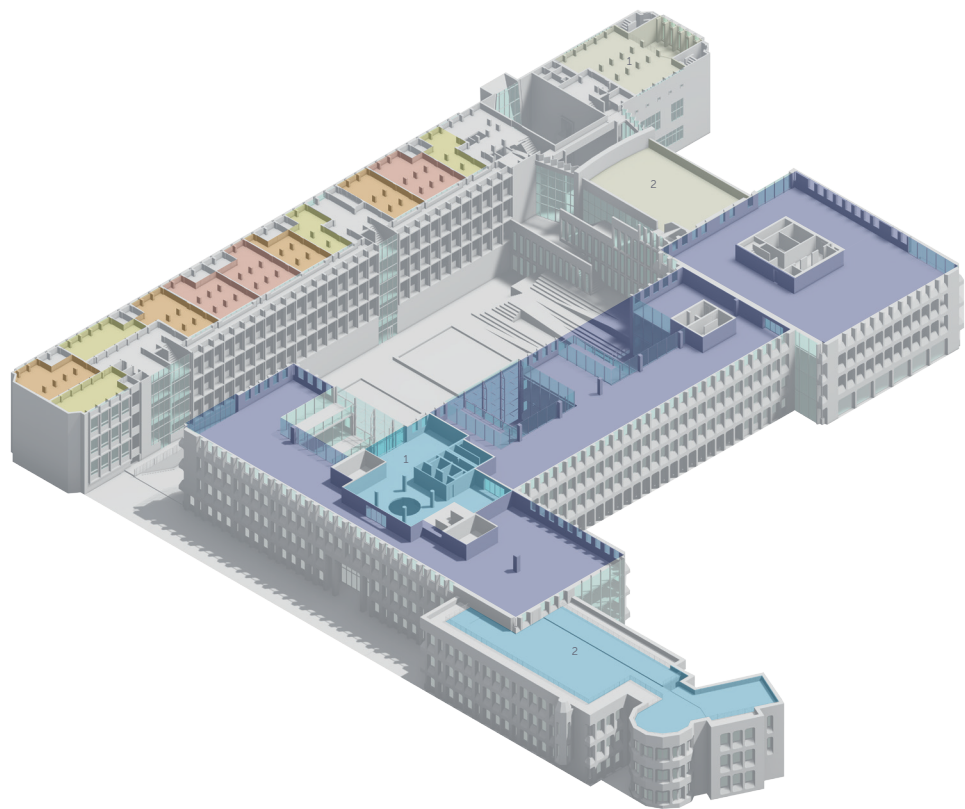


- legend
- 1 Lobby
 - 2 Conference room
 - Small office
 - Large office
 - Students - 50 m2
 - Starters - 75 m2
 - Seniors - 100 m2
 - 1 Leisure - locker room
 - 2 Leisure - swimming pool

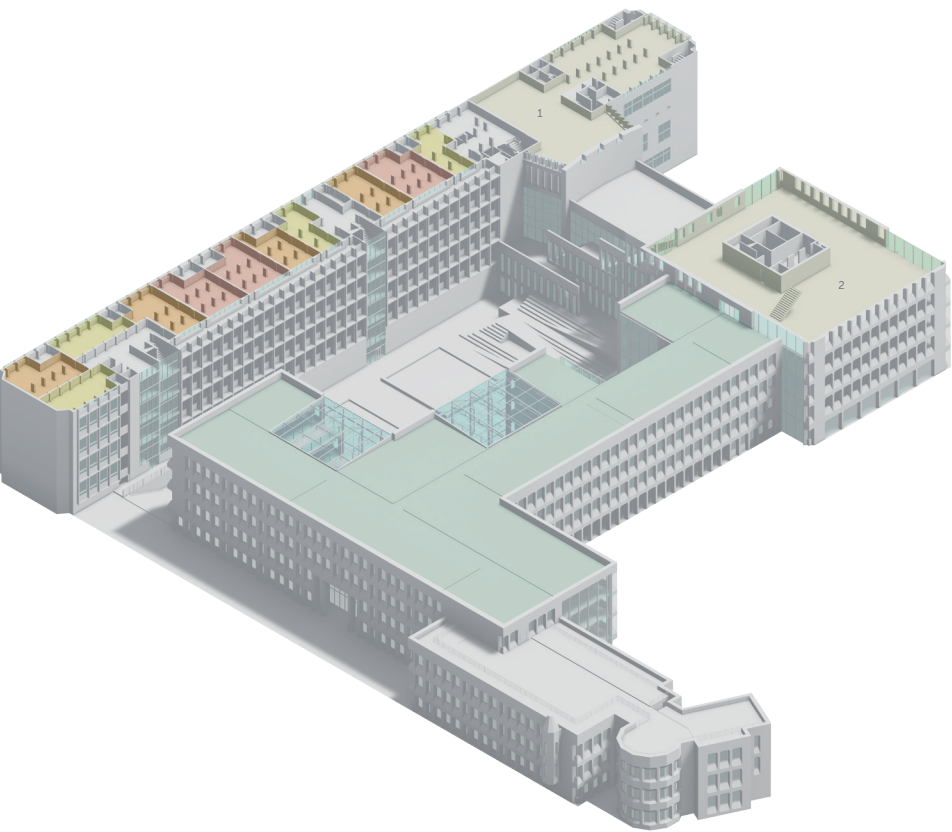


- legend
- 1 Lobby
 - 2 Conference room
 - Large office
 - Students - 50 m2
 - Starters - 75 m2
 - Seniors - 100 m2
 - Leisure - fitness

3.1.3 OVERVIEW - Program 3 & 4

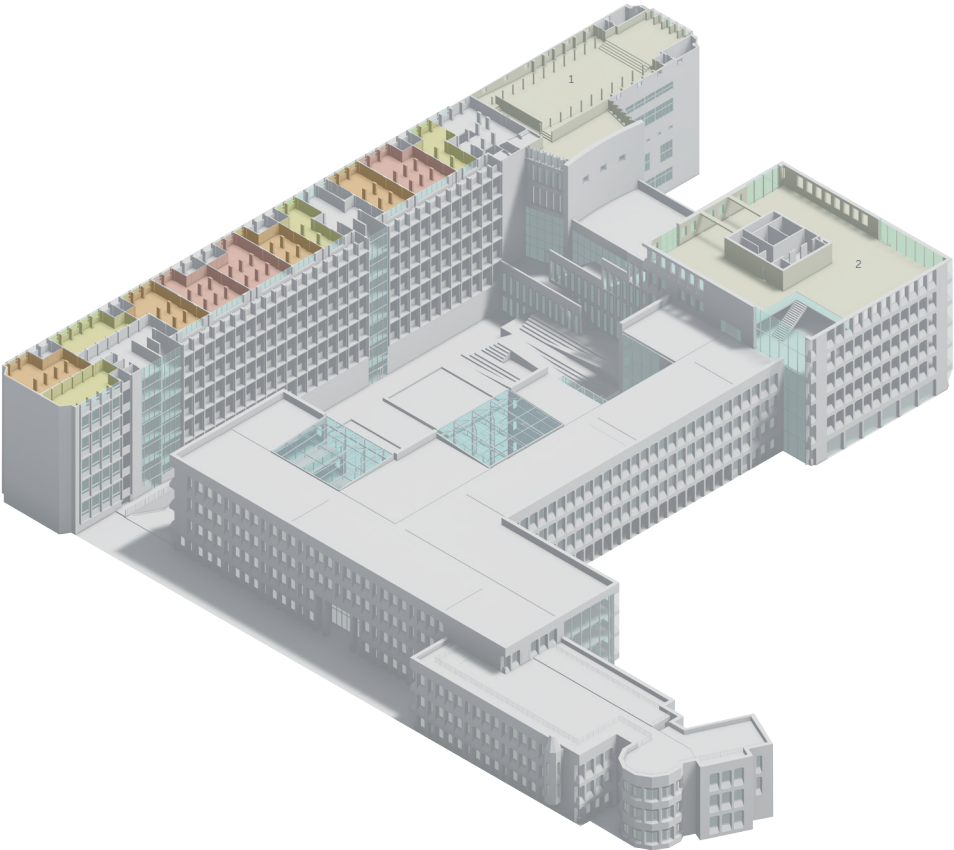


- legend
- 1 Lobby
 - 2 Office roof terrace
 - Large office
 - Students - 50 m²
 - Starters - 75 m²
 - Seniors - 100 m²
 - 1 Leisure - fitness
 - 2 Leisure - terrace



- legend
- Rooftop farm
 - Students - 50 m²
 - Starters - 75 m²
 - Seniors - 100 m²
 - 1 Leisure - fitness
 - 2 Leisure - café

3.1.3 OVERVIEW - Program 5



3.1.3 OVERVIEW - Renders - overview



3.1.3 OVERVIEW - Renders - cross-section



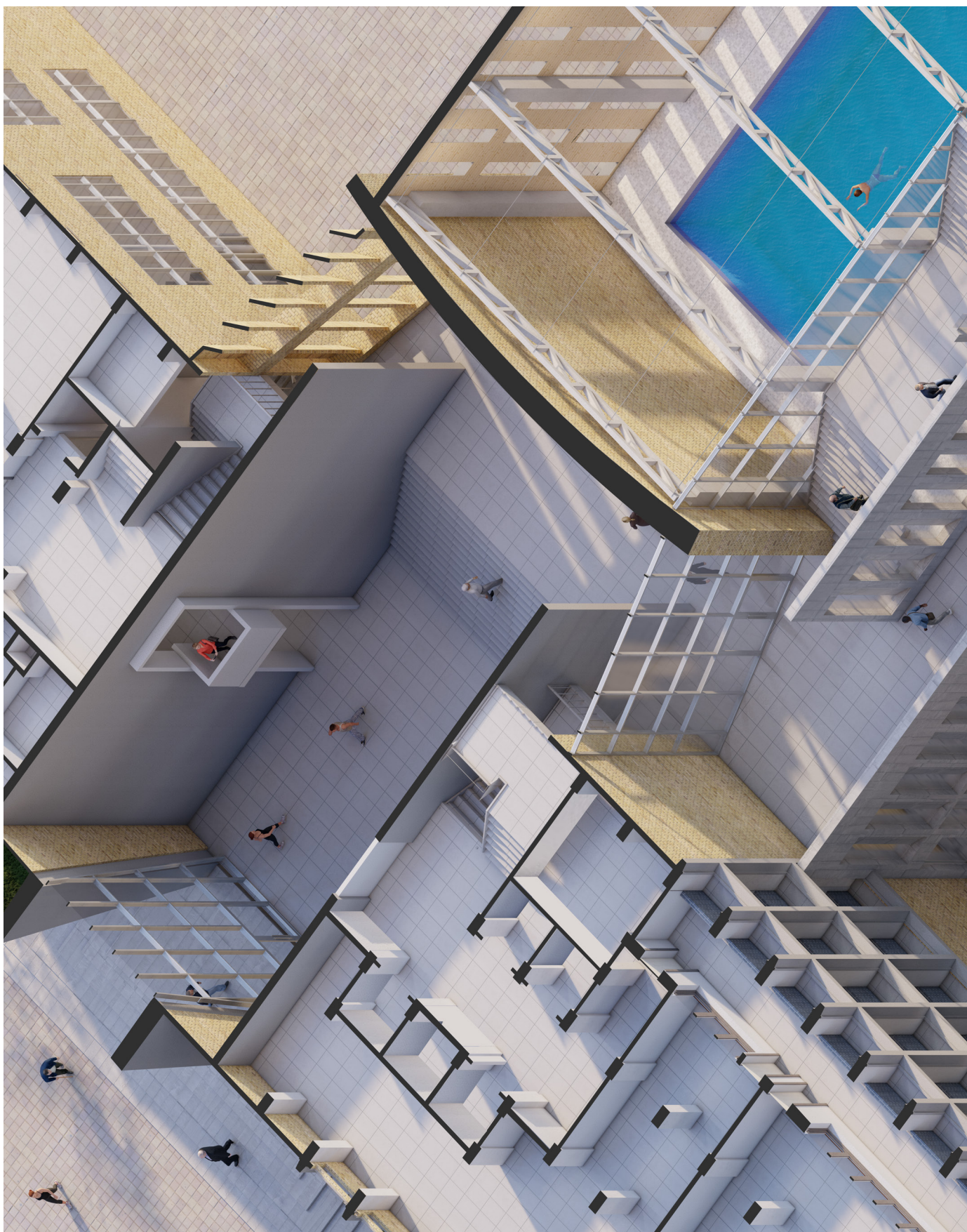
3.1.3 OVERVIEW - Renders - longitudinal section



3.1.3 OVERVIEW - Renders - nighttime



3.1.3 OVERVIEW - Renders - monumental hall



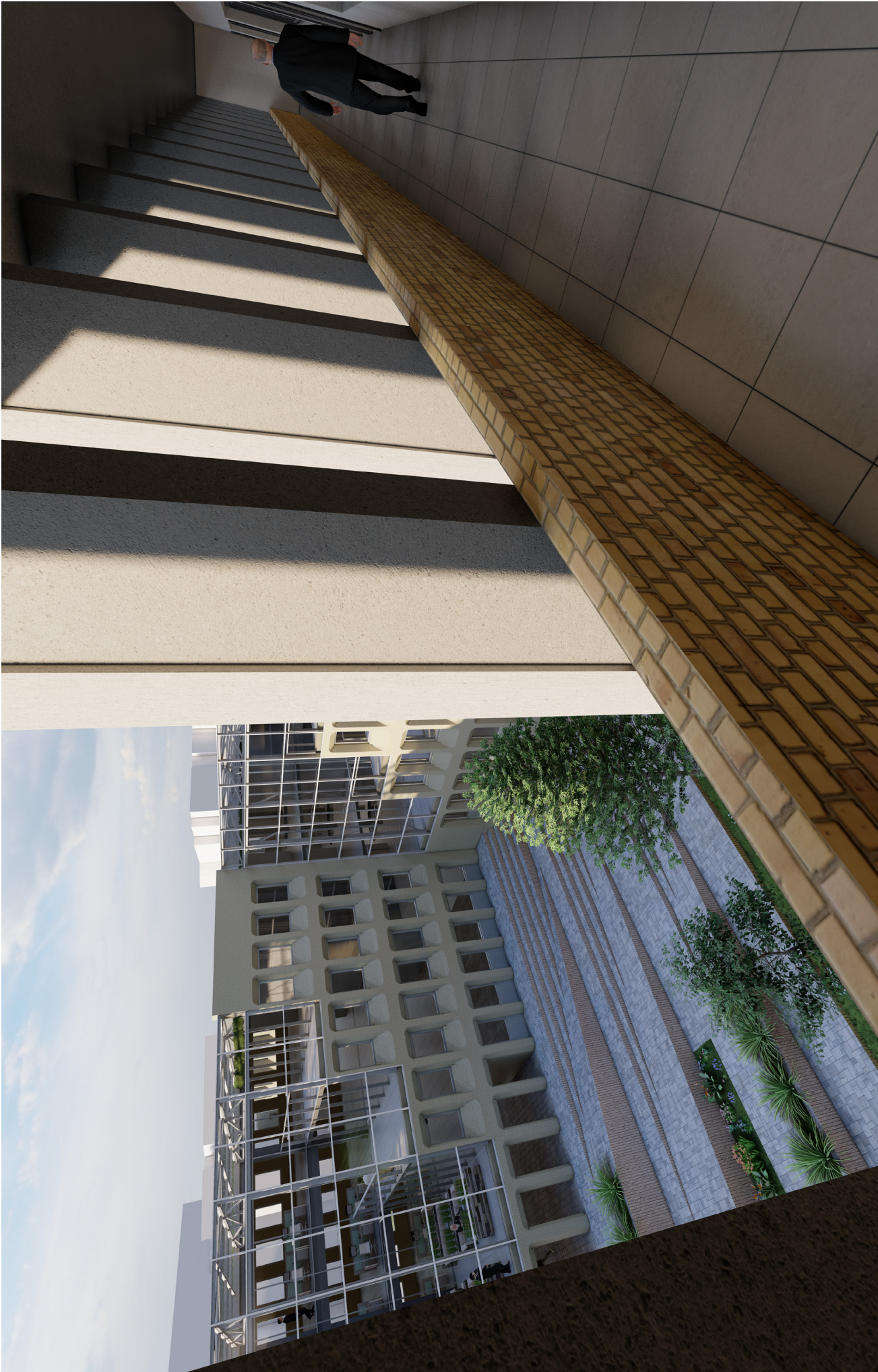
3.1.3 OVERVIEW - Renders - ambiance atrium



3.1.3 OVERVIEW - Renders - ambiance swimming pool



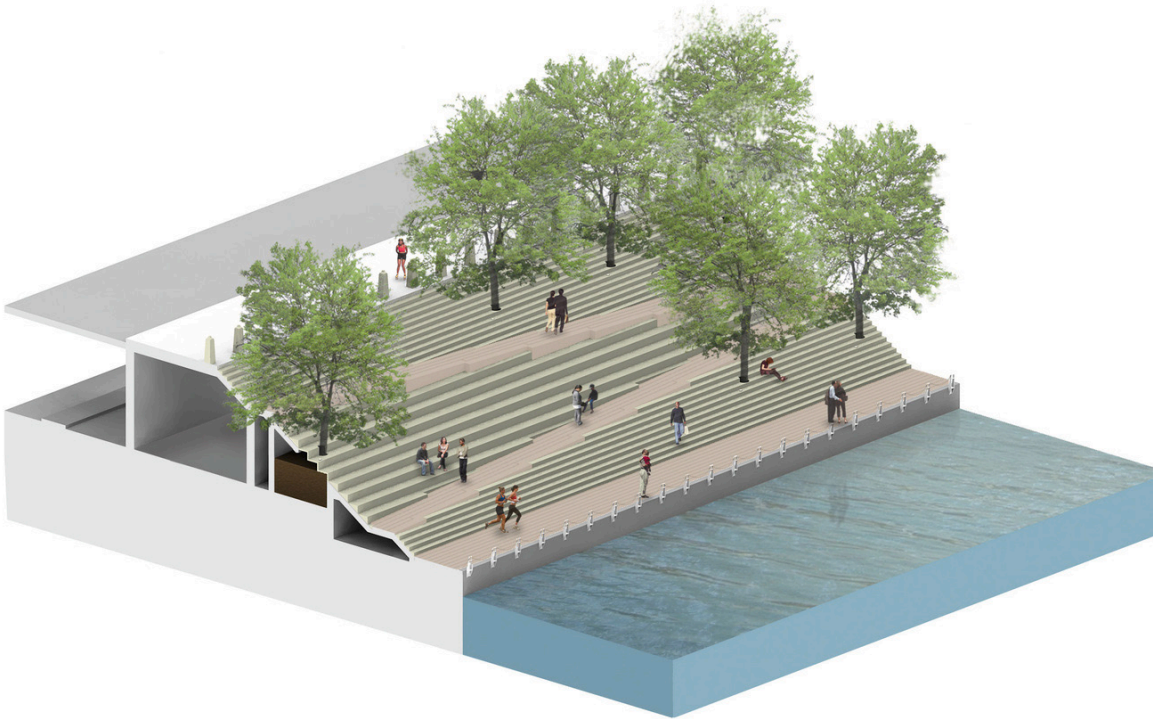
3.1.3 OVERVIEW - Renders - ambiance 1958 gallery



3.1.3 OVERVIEW - Renders - ambiance park



3.2.1 PARK - References



3.2.2 PARK - Intentions

The park in the middle of the complex is not used to create a vibrant social interactive space. The park adds green to the currently completely paved site and centers around routing and moving instead of staying. The references I chose to inspire my design are picked on their innovative routing integrated in the lounge stair concept. The renderings on this page were from my P3 but do still show

my intentions: a route through the complex that opens up this location to the neighbourhood and provides a route to the Peace Palace.

Because the P3 concept of the stairs looked somewhat like a Mayan temple the references helped me design a more gradual progression in height, as the height difference is 3.5m which is quite a lot for a single stair.



3.2.1 PARK - Result

The result of a park centered around routing and transition through the complex can be seen in the renderings below. They do not only physically connect the green spaces in and around the complex, but also create a visual connection

with the precast concrete facades in the ensemble, as the stairs reach to the different levels where the facades are at.

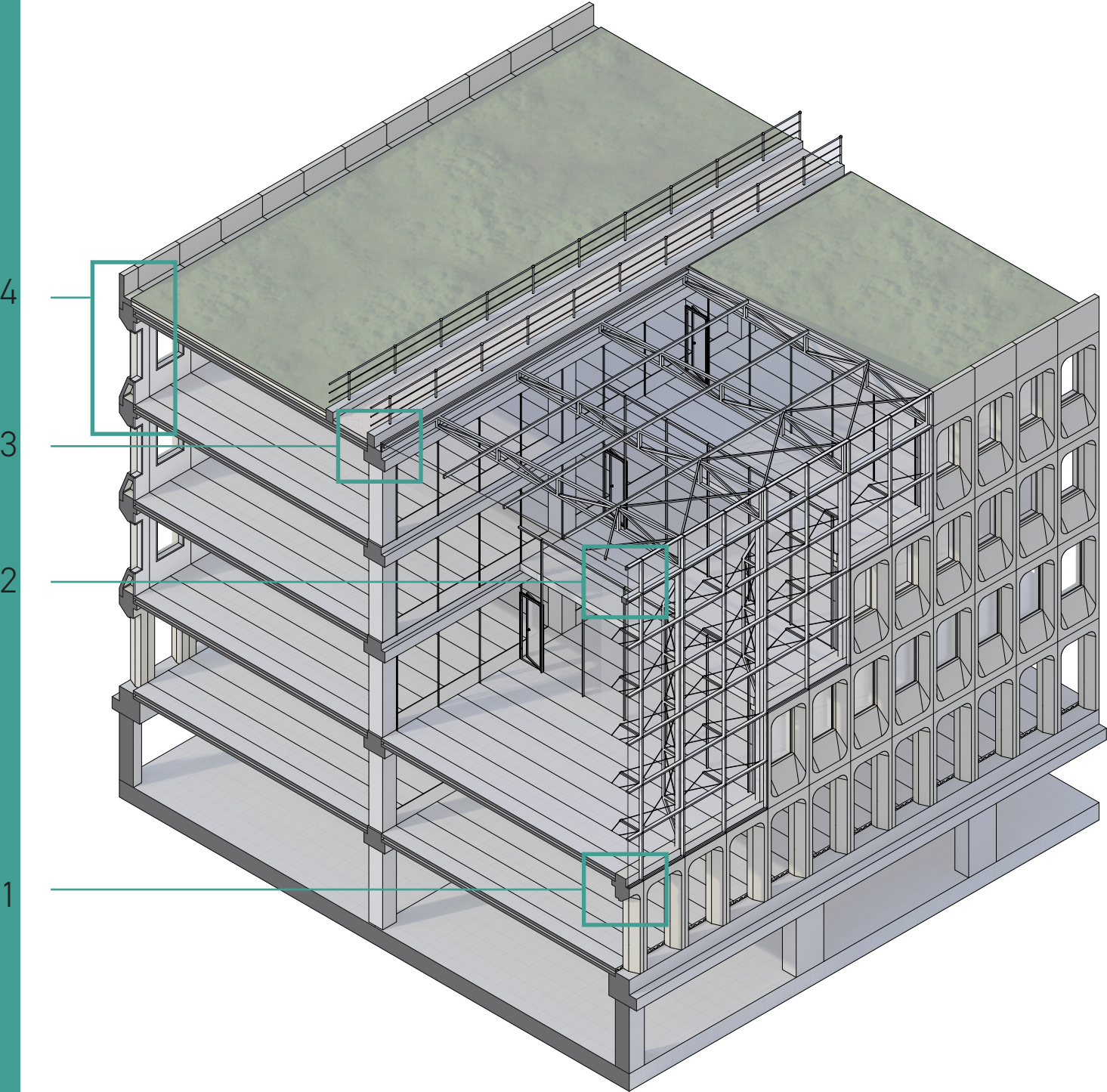


When standing on the lowest level of the park, the stairs will have a warm tone as the vertical parts are finished with wood. The paving is made of water-permeable stones, to reduce the rainwater overload by slowing down rainwater infiltration into the ground.

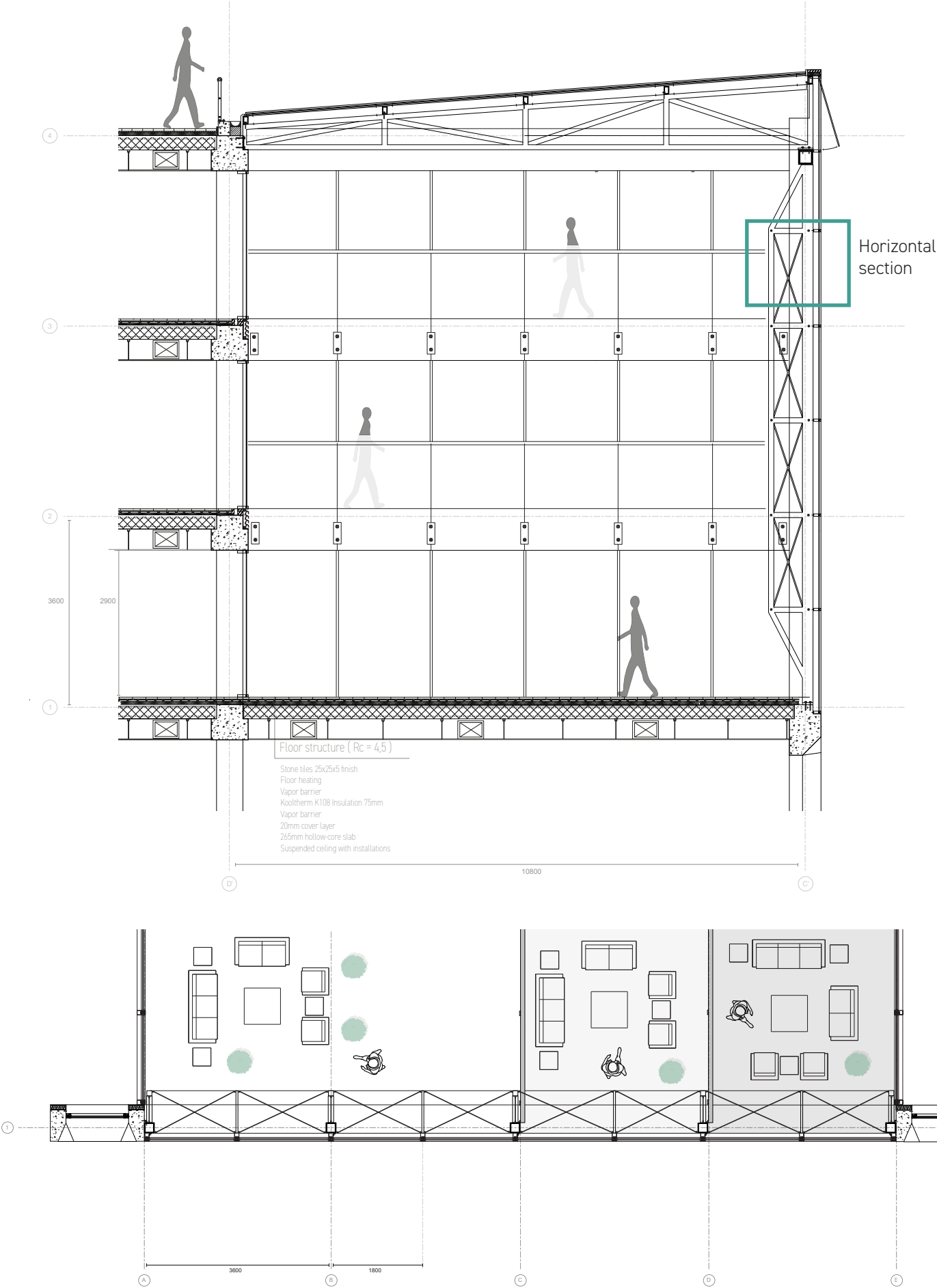
As this park is set at 3.4m below ground level, and groundwater level is set at 2.2m here, water is pumped upwards (2.6m) to the sewage system, set at 0.8m below ground level, in order to prevent drainage problems.



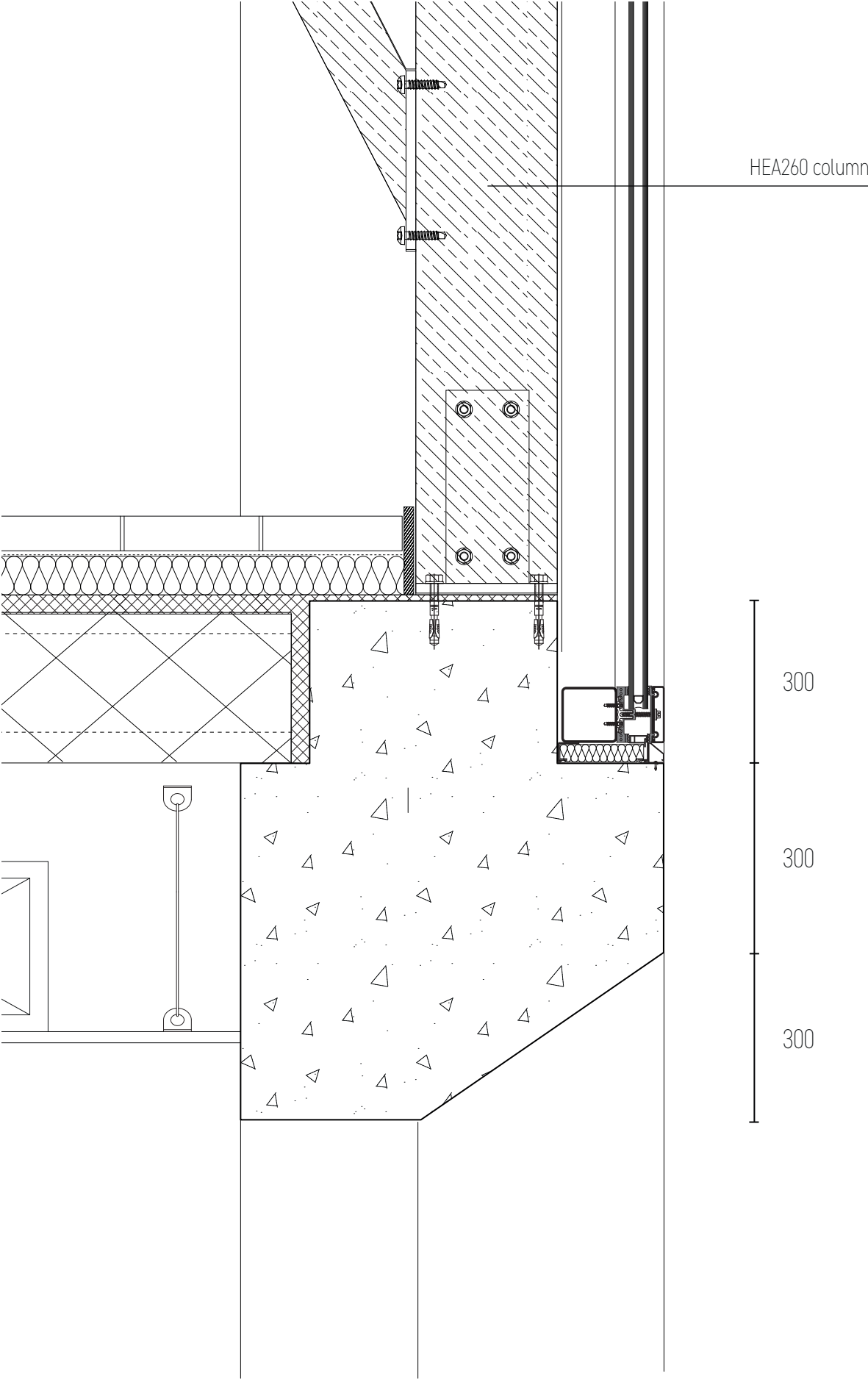
3.3.1 Extension intervention - Section



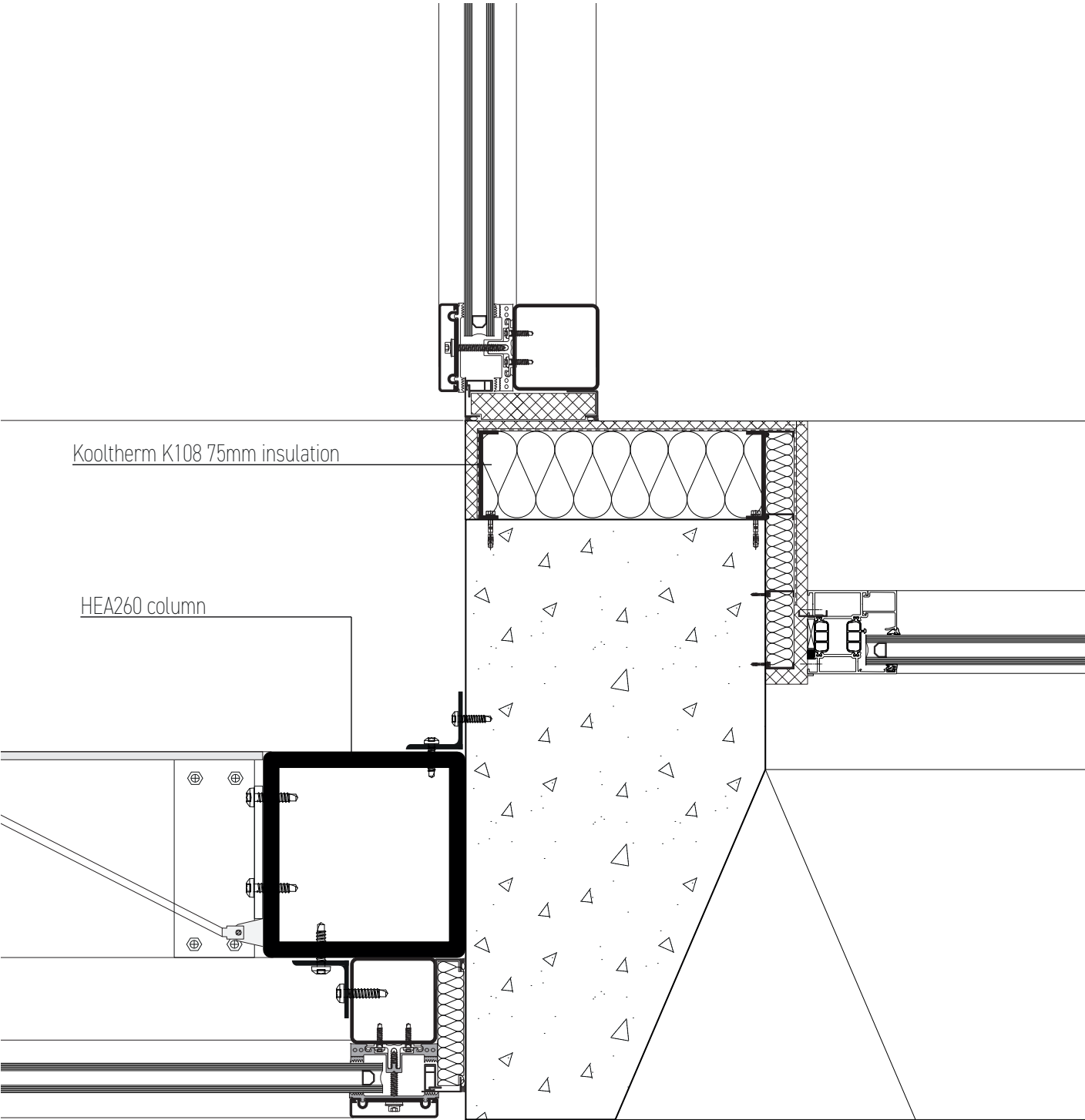
3.3.2 Extension intervention - Section overview 1:100



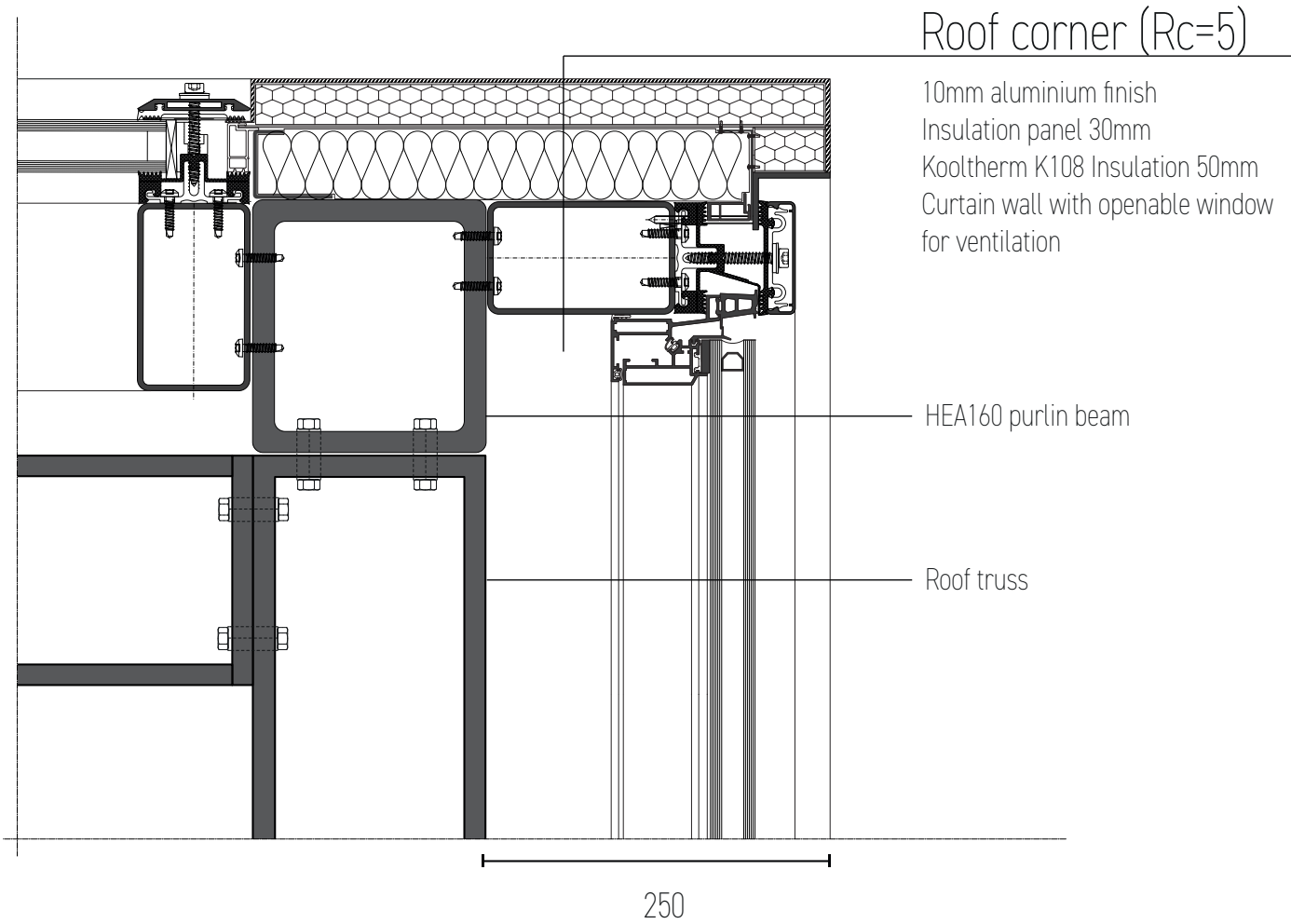
3.3.2 Extension intervention - Section 1 scale 1:10



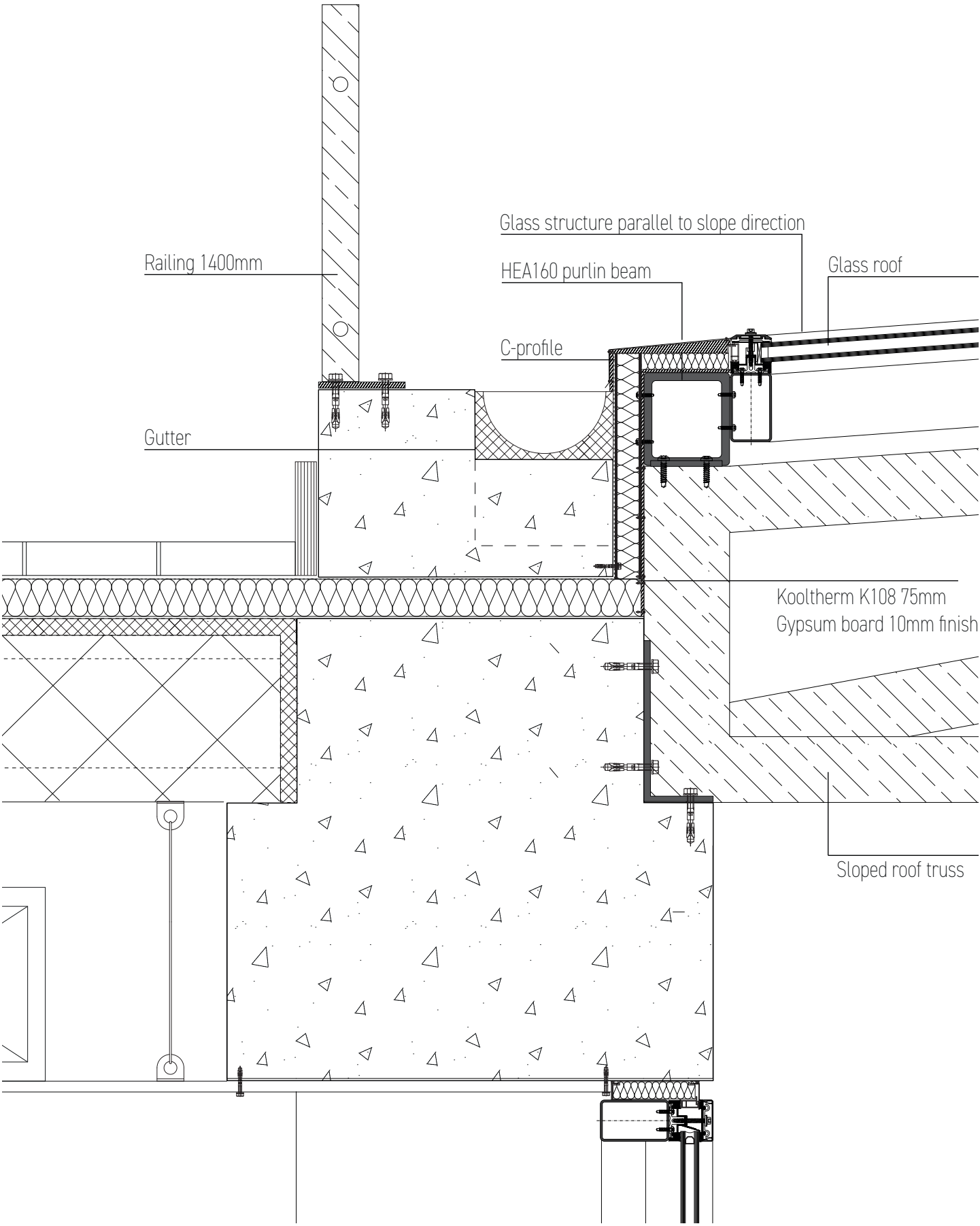
3.3.2 Extension intervention - Section 1 horizontal scale 1:5



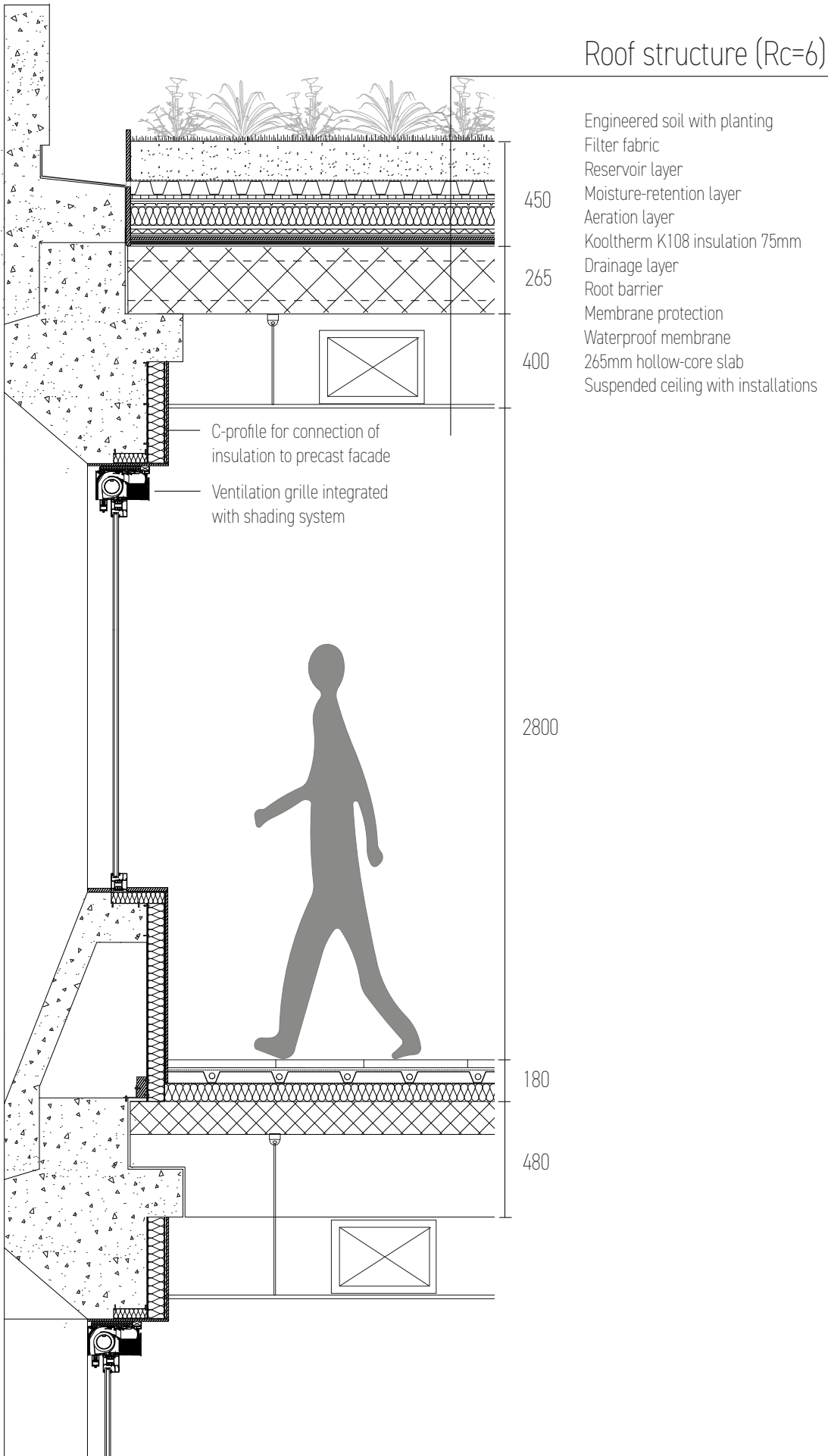
3.3.2 Extension intervention - Section 2 scale 1:5



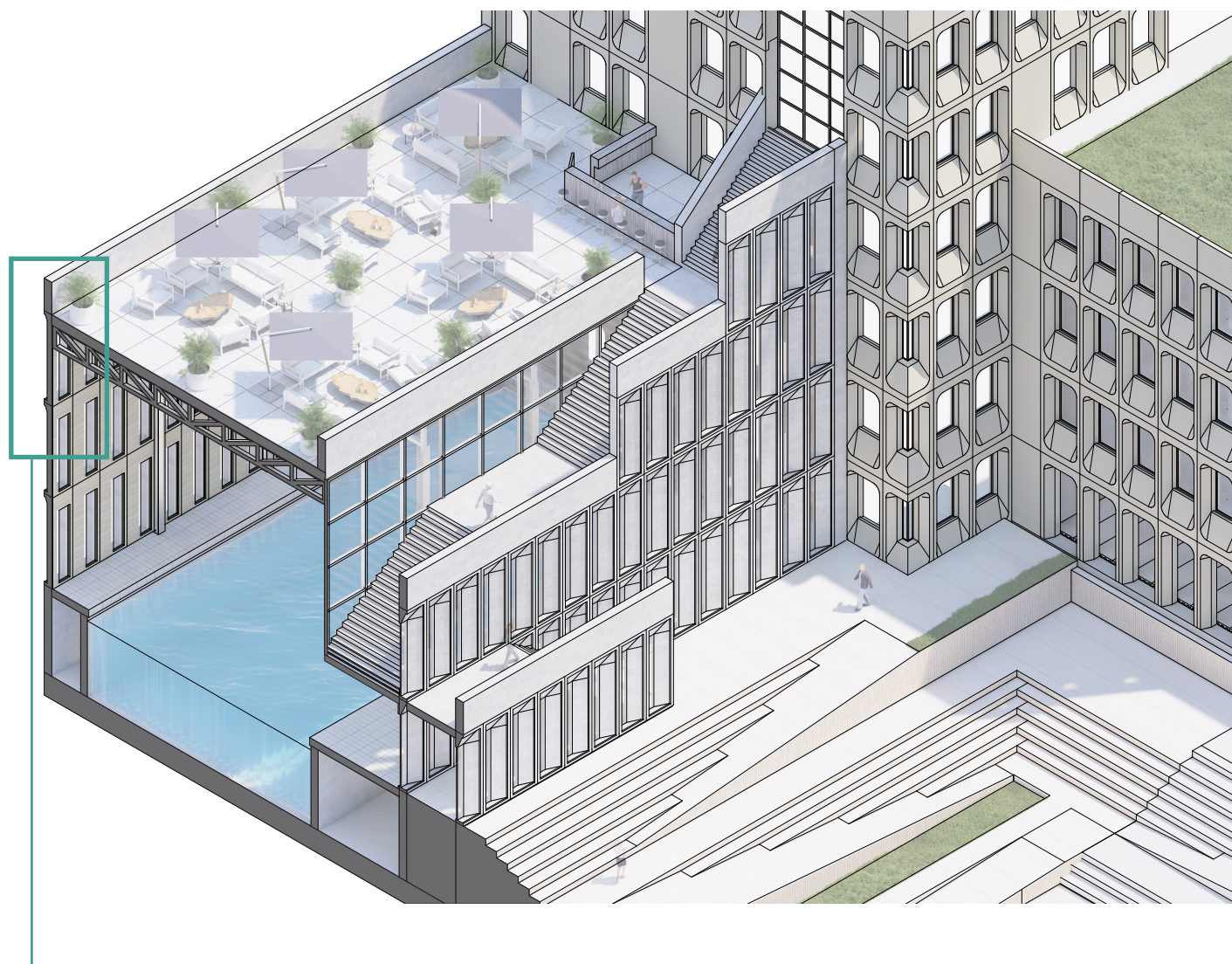
3.3.2 Extension intervention - Section 3 scale 1:10



3.3.2 Extension intervention - Section 4 detail level 1:20

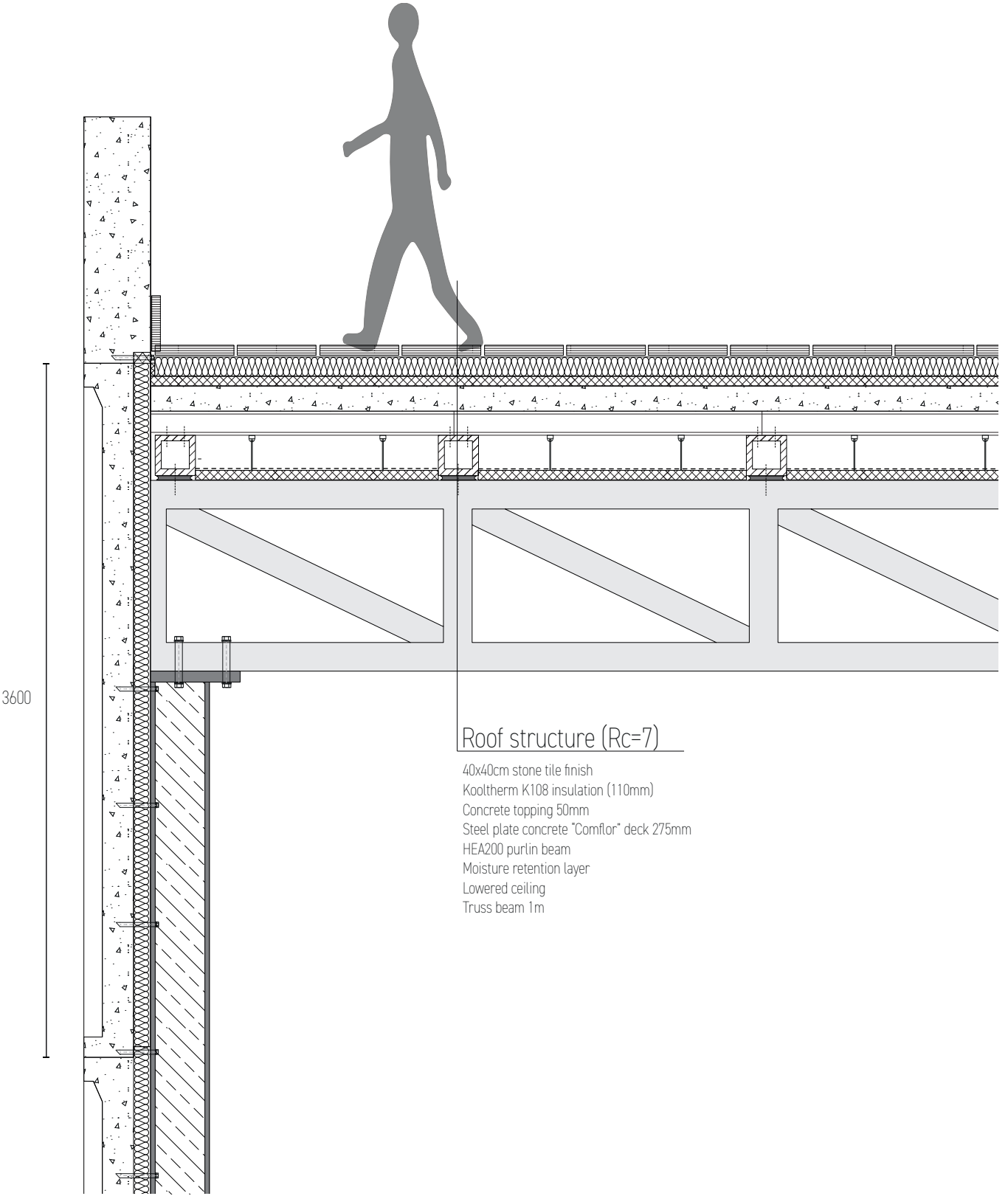


3.4.1 Swimming pool - Section

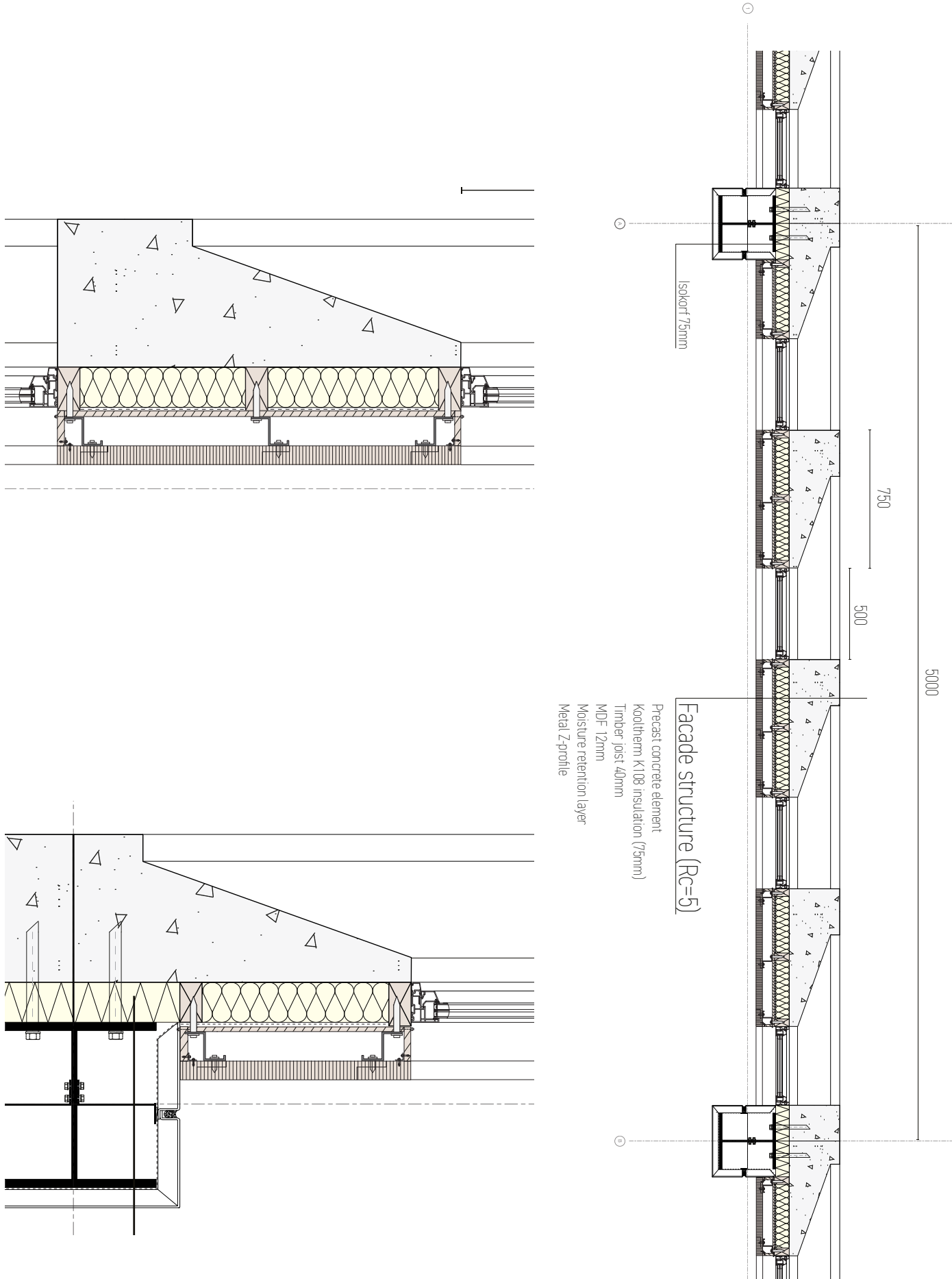


1

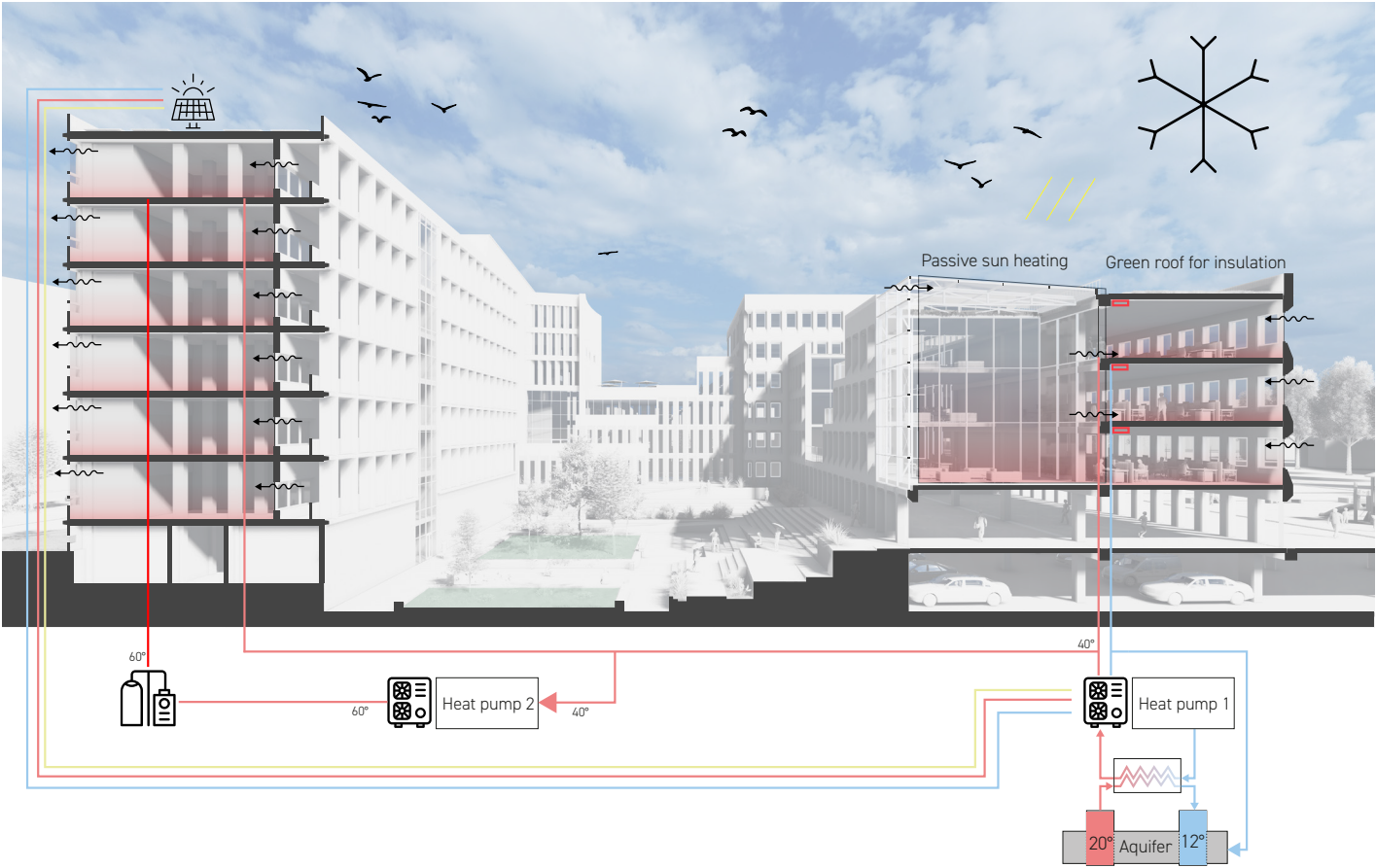
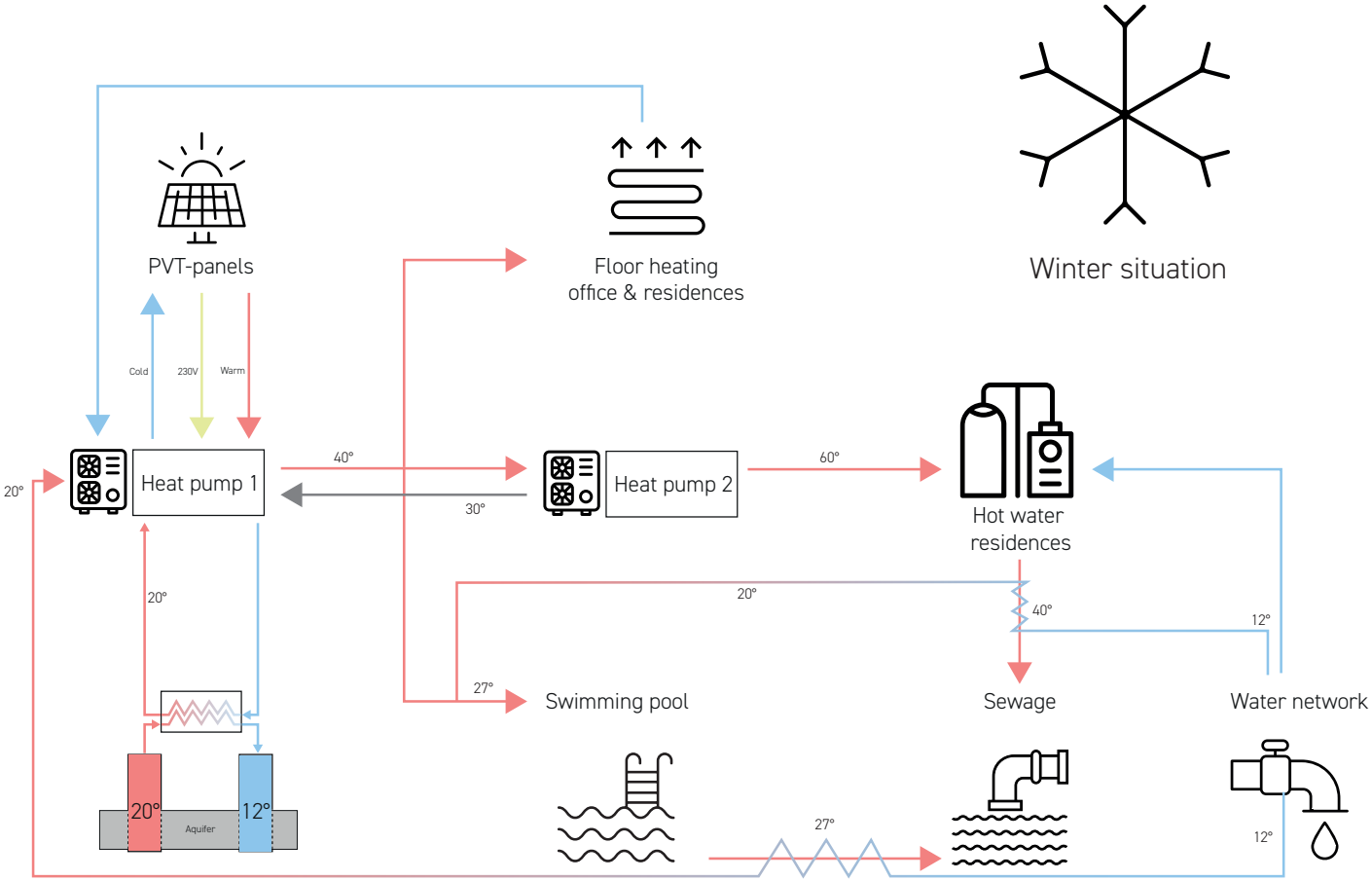
3.4.2 Swimming pool - Section 1



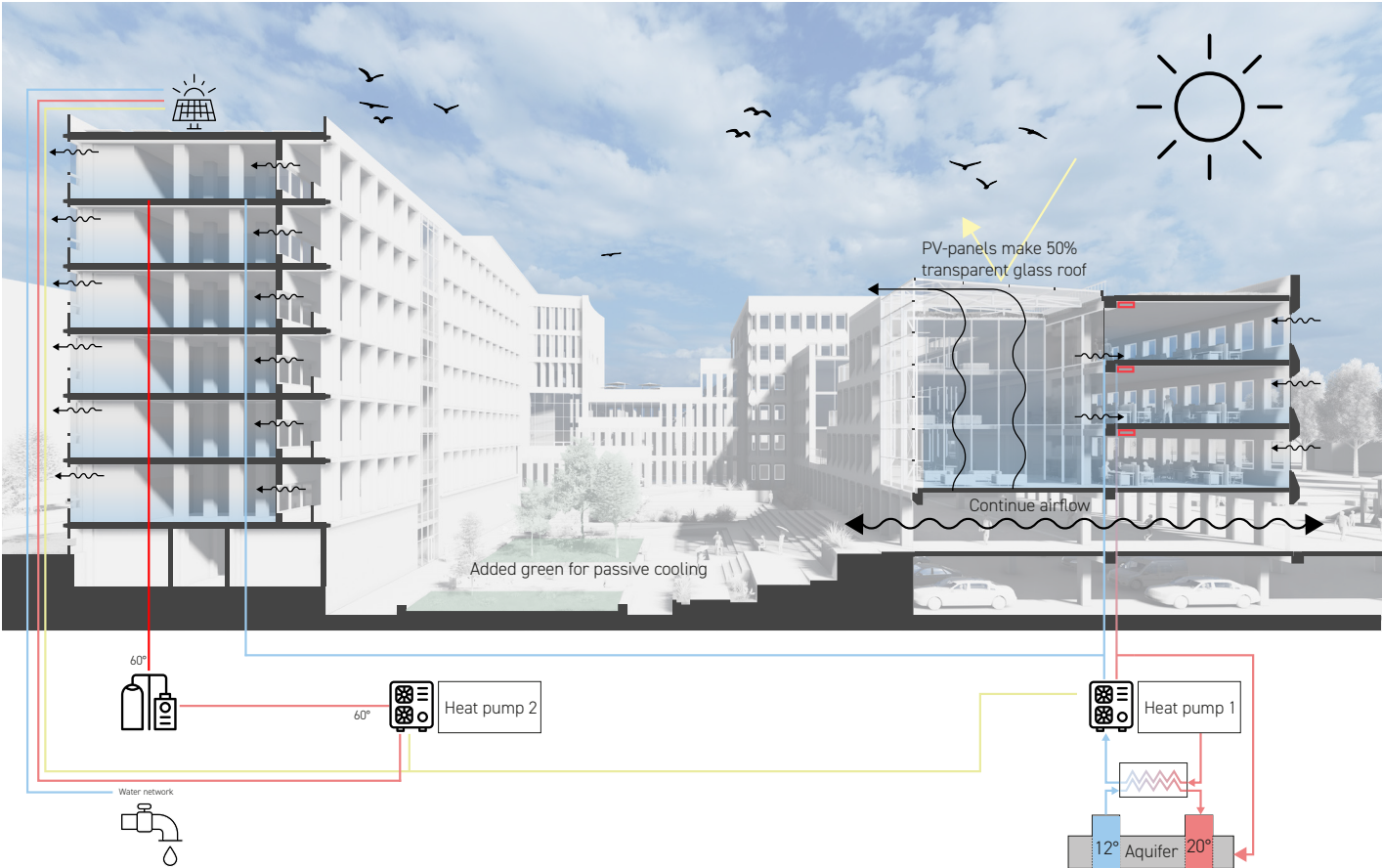
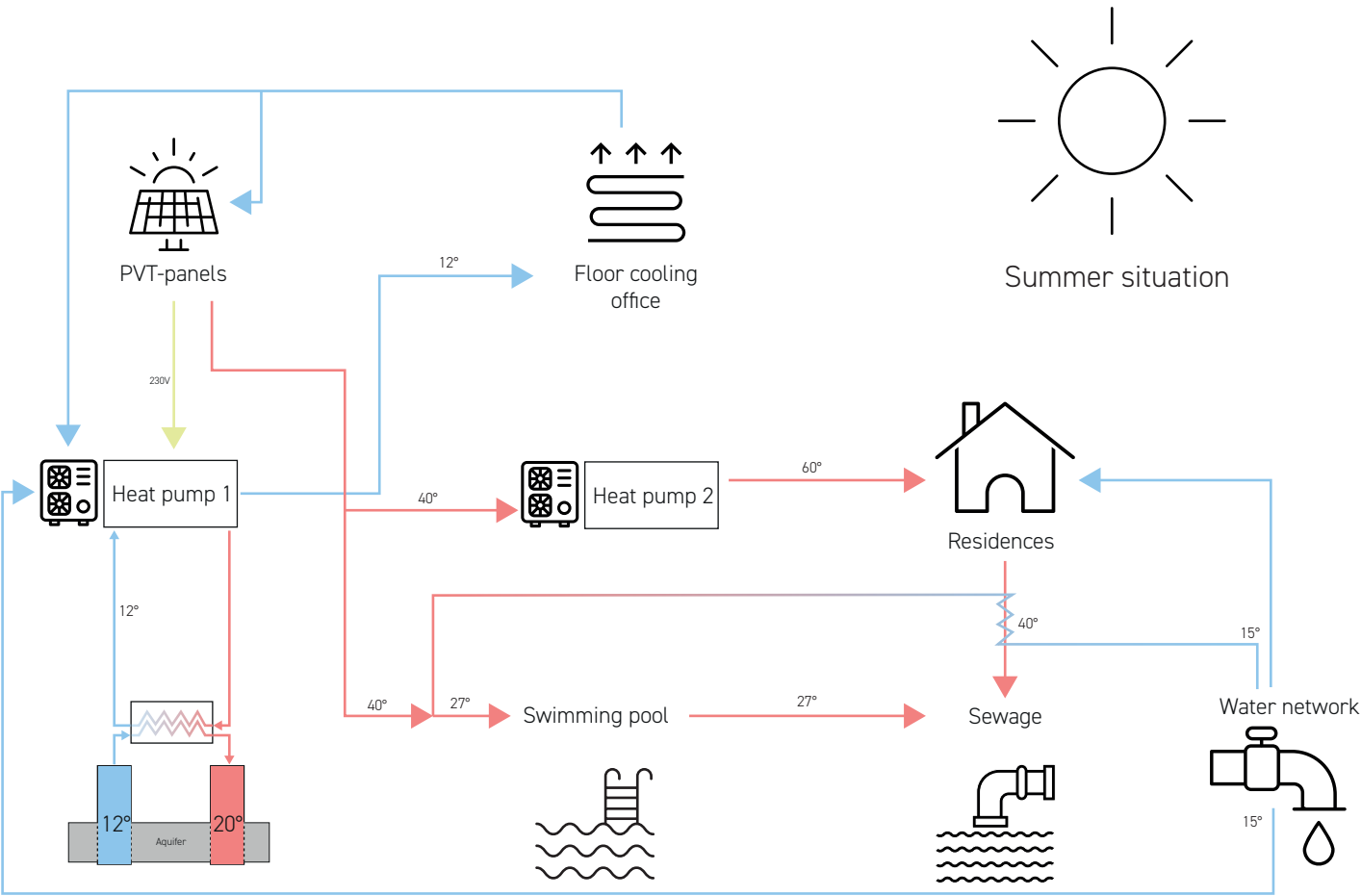
3.4.2 Swimming pool - Section 1 horizontal



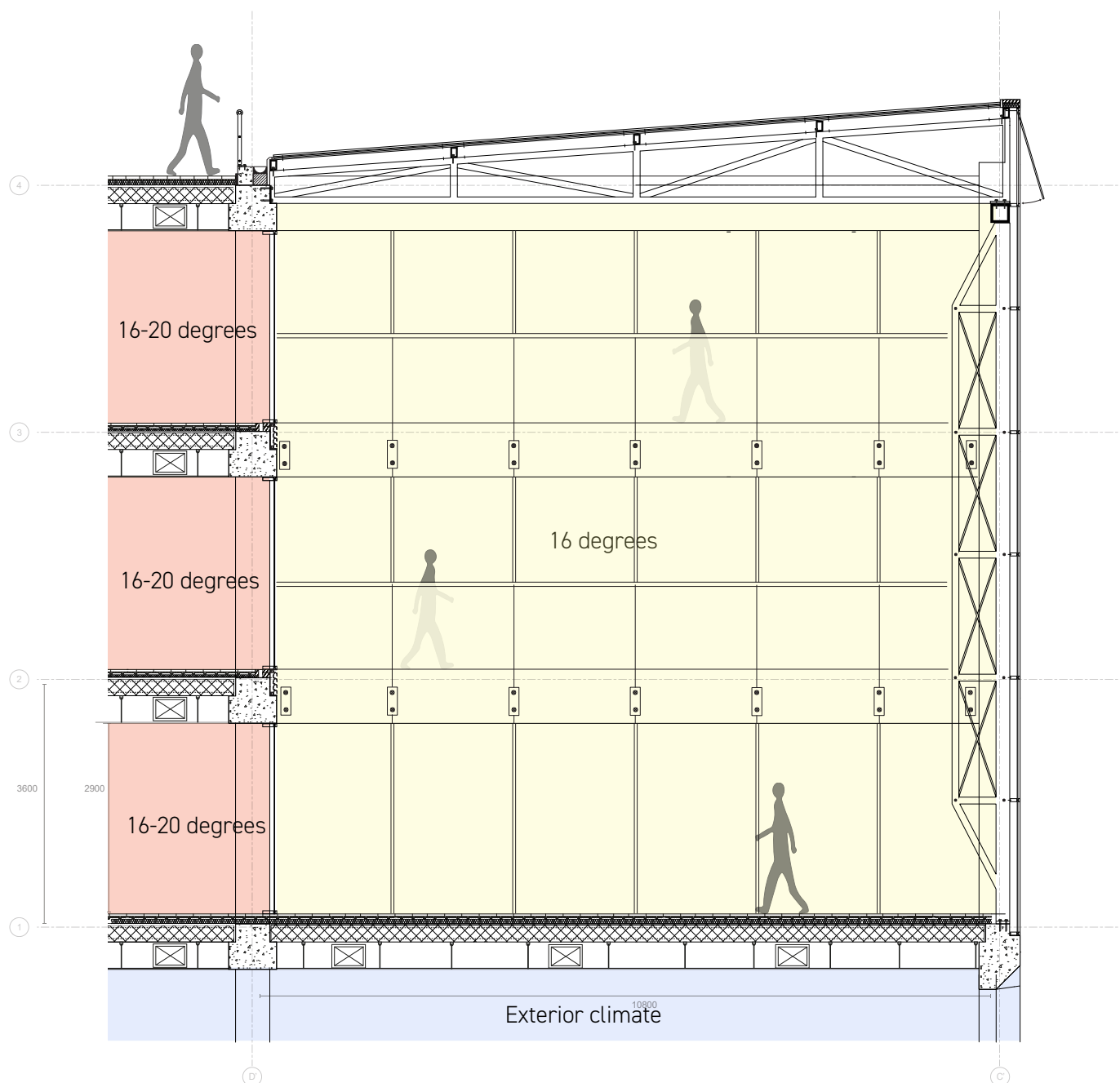
3.5.1 Climate design - Winter situation



3.5.2 Climate design - Summer situation



3.5.3 Climate design - Thermal zones



legend

- 16° : atrium heated by residual heat and floor heating
- 16-20° degrees : offices need 20°, and lower to a minimum of 16° when empty
- Exterior climate : pedestrian route underneath building