ERA

Graduation Studio - Heritage & Architecture - Re-Housing
Analysis Group ERA - Jan Ksiazek - Simone Schade - Dimitrios Papatheodorou - Eva Führer

PREFACE

This paper partially fulfils the requirements for the P1 Graduation Stage at the Faculty of Architecture of the Delft University of Technology. The graduation studio's theme is Re-Housing and is part of the Chair of Heritage & Architecture at the faculty. More specifically, the studio's topic is about finding new interpretations of housing in existing buildings of the 19th century. The buildings of focus for this paper will be the ones designed and constructed with the ERA (van Eesteren Rationele Aanpak) construction system and are located in the neighbourhood of Ommoord in Rotterdam Prins Alexander. The purpose of the paper is to present and analyse the results of the research conducted in a group of four students. The research was focused on the ERA buildings of Ommoord, which are mainly owned by housing associations, serving the social rent sector, and are currently undergoing renovation operations related mainly to energy upgrades. The research covers the urban scale, the architectural scale and the related building technology. Additionally, the cultural value of the assigned buildings and site are assessed along with possible transformation approaches. The research was conducted in the means of site visits, consulting relevant literature, interviewing residents while being constantly guided by staff of the department. As a result of the research conclusions are drawn, which can be carried forward in the individual design process of the graduation project and will be presented in this paper.

As aforementioned, the staff of the faculty and the invited guests played an important part in the formulation of the research method and the review of the results. Special thanks go to Ms. Anne Lacaton of the office Lacaton & Vassal in Paris who is co-leading the graduation studio. Moreover, many thanks go to Ms. Lidwine Spoormans, Mr. Bas Gremmen, and Mr. Nicholas Clarke who according to their respective roles of Architecture, Building Technology and Cultural Value tutors provided us with invaluable information and guidance in this crucial research phase and tools to adopt further in the design process. Finally, many thanks go to ERA contour - the contractor of the original buildings and currently undertaking the renovation operations - for providing us with relevant information, data and drawings that were used in the research and graphic representations.

CONTENTS

INTRODUCTION

This report is going to analyse the ERA construction system in the specific case of Ommoord. The analysis of the building system is structured around the concept of 6 "S"s (fig.1) presented in Stewart Brand's book "How Buldings Learn". Brand introduced the concept of "shearing layers of change"- that different parts of buildings age at different rates, causing buildings to constantly change and evolve. There are six "S"s - Site, which is eternal; Structure, which can last hundreds of years; Skin, perhaps 20 (although brick is pretty eternal); Services, the electrical and mechanical, 7 to 15; Space plan, the interior layout in commercial space can last as little as 3 years; and Stuff, the items we bring in, "things that twitch around monthly." There is another layer included in this report, the Story, which includes the more intangible features related to the buildings. In addition, Riegl's theory on Values is taken into account when exploring the 7 "S"s to assess the importance of the building layers in terms of their cultural value and significance and the subsequent transformation approach.

More in detail, the first issue to be addressed will be the Site. The history of the development and the historical circumstances under which it came into existence will be brought forward, presenting the process and the reasoning behind the design decisions. The urban layers, will be then analysed , including the Green/Blue space and the infrastructure to examine how the site functions and is linked with the surrounding context. The typology of the built environment and the urban morphology will also be analysed in terms of the organisational principle and aesthetic appearance of the site.

The next chapter will be about the Structure, focused on the principles of the ERA system. The reasoning behind the development of the system will be discusses along with the method of construction and the related facts and figures. Structural details will be analysed to examine the potentials and weaknesses of the system.

Subsequently, the Skin of the building will be

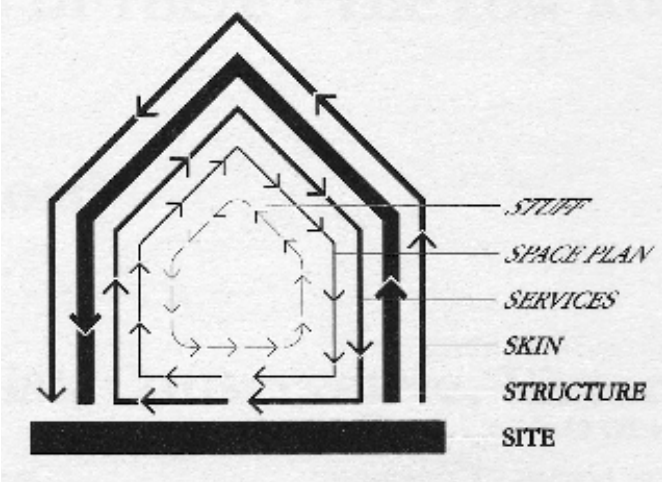


Fig. 1. 6 "S"s (Brand, 1994)

analysed as a result of the structure. Notions such as pattern, symmetry, composition and materiality will be addressed to assess the aesthetic appearance of the façades and how they formulated the perceived image of the ERA blocks.

The Services will also be examined in terms of their functionality, efficiency and their impact on the living environment.

Another important topic to be covered, will be the Space plan. The routing and access to the building will be included along with the flat typologies and their possible configurations. Flexibility, spatial qualities and functional arrangements will be discussed to examine the relevance to current living conditions.

In the Stuff & Story chapter, the demographics of the area will be analysed to reach conclusions related to the composition of the population and their associated lifestyles, which can lead to design decisions around the needs of the area. Moreover, to get more insight into lifestyles, results from apartment visits will be included and will explain how current residents have occupied their space and transformed it according to their needs and personal preferences.

The 7 "S"s section will be concluded with a statement of Cultural Value, which is going to be assessed in the form of a matrix including the "S"s

on the y-axis and different values on the x-axis such as historical, artistic, use and dilemmas. In this way the qualities of the ERA buildings will be highlighted and can be carried forward in the design process.

The next chapter will be focused on transformation approaches. The basis of this chapter is the “Plus” book by Druot, Lacaton & Vassal, which showcases and documents their transformation approach of existing buildings. Biq architects’ transformation of building blocks in Ommoord will be compared side to side with the “plus” approach to examine the reasoning behind each of them and the resulting impact on appearance, functionality and ways of living.

Concluding this research, the notion of quality of living will be addressed with four different approaches, each from the four authors of this report. Our personal views on quality of living will be presented and indicate a direction towards the personal transformation approach that will be followed in the subsequent design stage.

ERA

1. Analysis of the system

1.1 SITE

I.1.1 Situation

Reconstruction in the Netherlands

Fig. 2. Reconstruction Areas (Rotterdam Ommoord: Een wederopbouwgebied van nationaal belang, 2016)

Fig. 3. Ommoord aerial view

After the second World War the Netherlands went through an intensive period of reconstruction in their destroyed cities. Besides the reconstruction, other goals were also met after the war during the reconstruction period, as the expansion and modernisation of the cities and the countryside.

The lack of living space, led to an intensified serial production of city blocks all over the country (fig. 2). The construction of new neighbourhoods happened mostly with a lot of green and followed the principle of light, air and space. There were often own services, as shops, schools, churches and health care facilities, in walking distance within the neighbourhoods.

This principal was also applied by Lotte Stam Beese for the post-war neighbourhood of "Ommoord". The entire urban design followed the idea of high-rise in green space ("hoogbouw in het groen") (fig. 3).

The neighbourhood became, therefore, a representative example for the post-war reconstruction in terms of standardisation in architecture, urban planning and the new ideas about light, air and space (Rotterdam Ommoord: Een wederopbouwgebied van nationaal belang, 2016).

Ommoord

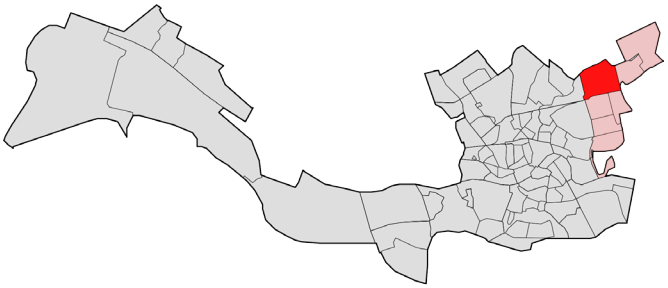


Fig. 4. Prins Alexander Polder (Anon., n.d.)

Fig. 5. Ommoord

Ommoord is situated in the northeast of Rotterdam (fig.4), in the south of the Rotte and the Lage Bergse Bos It is also located north of the A20 motorway and in close proximity to the Rotterdam Alexander train station.

Characteristic of the urban design is that Ommoord is situated in a rectangle ("de ruit") (fig. 5).
The focal point of the design was the high-rise. All the buildings outside the rectangle are realised in low-rise form. Ommoord shows, thanks to the long construction time from 1967 till 1975 , a varying picture of the post-war residential program and production.

Architect R.H. Fledderus designed the apartments which were carried out by ERA. Ommoord is the biggest neighbourhood of its kind, applying the ERA- system for construction. The neighbourhood contains 2016 appartments designed and built with the ERA-System (Rotterdam Ommoord: Een wederopbouwgebied van nationaal belang, 2016).

1.1.2 History

The Urban Development of Rotterdam-Oost

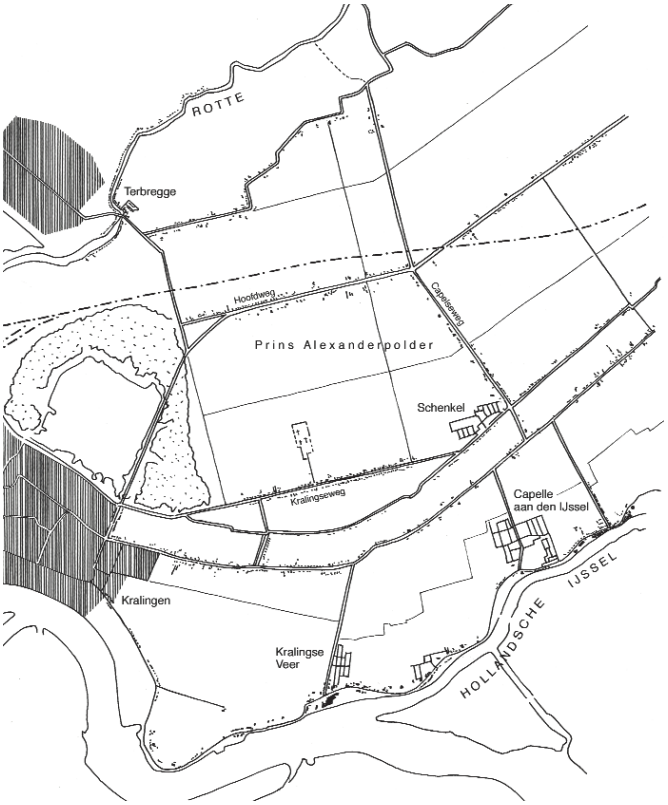


Fig. 6. Morphology of the Prins Alexanderpolder (Jansen, et al., 2005)

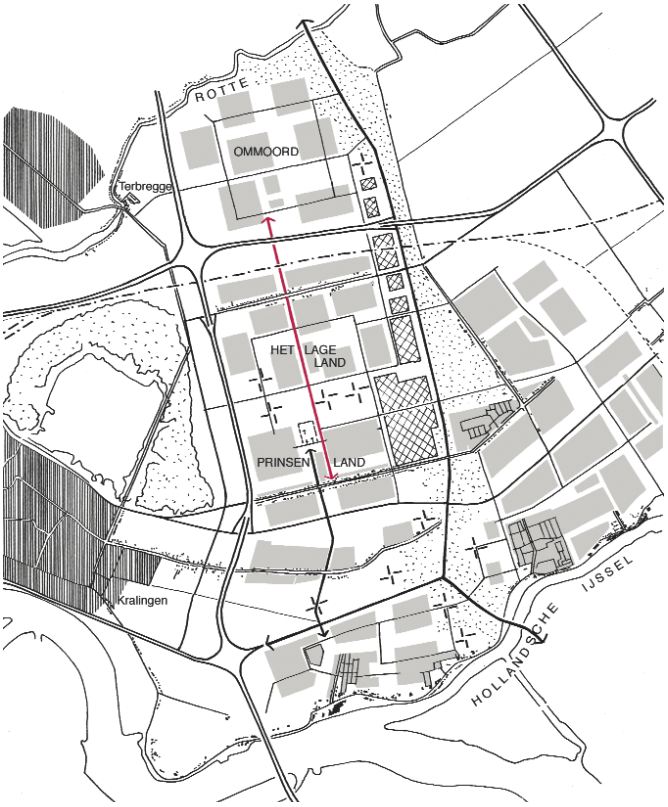


Fig. 7. 1960 (Jansen, et al., 2005)

The Development of the Prins Alexander Polder

The northeast of Rotterdam changed over time several times from water to land and from land to water, due to the fact that it was mainly used for farming and fuel reservoir. In the twelfth century the land was owned by individual leaseholders, which lead to digging of peat without any plan. As a result, the peat bogs developed, which were dried in the 19th century, so that the Polders came into existence. In the middle of the 19th century the drainage of the Prins Alexander Polder became the goal of the government. After the compulsory acquisition, the digging of the sloten started. The Polder got the name of the youngest son of King Willem II and Queen Sophie (fig. 6).
Before the urbanisation of the area happened, the polder was a plane of humid grassland, which clashed with the dikes at the edges. At the end of the 19th century the first phase of urbanisation took place. The polder is subdivided into two parts. One parts is situated along the delta rivers, whose subdivision follows the course of the river. The other part has a subdivision from the 19th century, which is perpendicular and independent from the course of the river.

The plan development

The first plan development for the Prins Alexander Polder was made in the preparation for the Nationale Nota Westen des Lands. That was a framework, in which the new concepts for the Randstad were discussed. The development of the Alexanderstad, a city in the Alexanderpolder, is a product of this. The idea was to make an independent side city on an area which was between two municipalities, separated from Rotterdam by a extensive green space, consisting of the Kralingse Bos and several new recreation spaces and green spaces along the river Rotte (Jansen, et al., 2005).

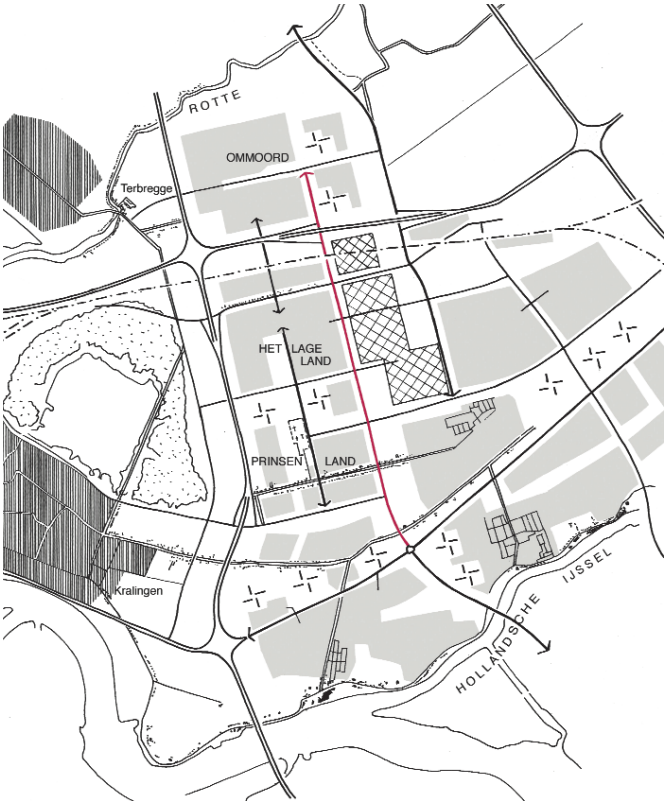


Fig. 8. 1962 (Jansen, et al., 2005)

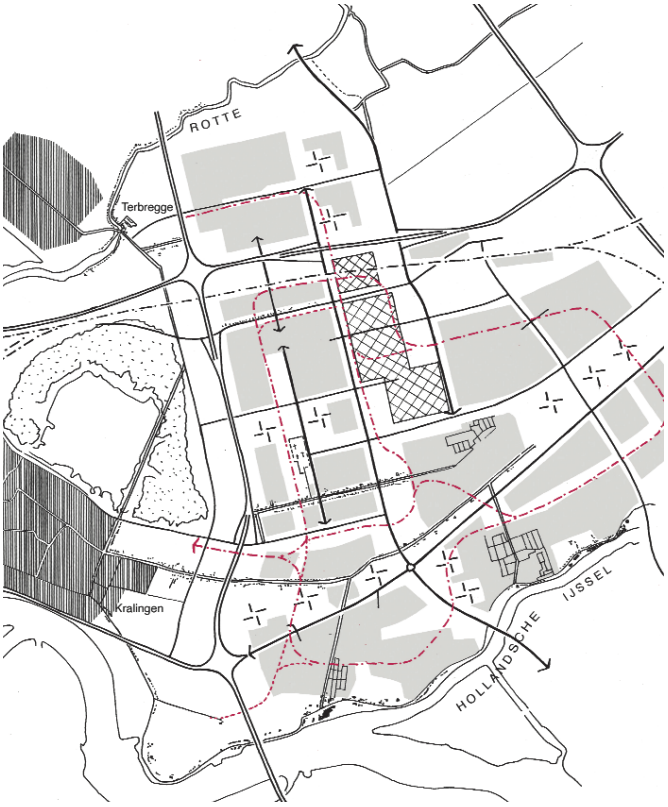


Fig. 9. The Metro Line (Jansen, et al., 2005)

The plan development from 1951

The plan development for the Alexanderpolder was executed along two tracks: the formal process focussed on the city development and reconstruction and the research track from the architects. Both of the tracks were supervised by the main architect and urban planner Lotte Stam-Beese (Jansen, et al., 2005).

Lotte Stam-Beese

Lotte Stam-Beese (1903-1988) studied from 1926 till 1929 at the German Bauhaus. She moved together with her later husband to the Netherlands and got in contact with the "Kring Nederlandse Nieuwe Bouwers" and the architecture associations "de 8" and "Opbouw". Stam-Beese enrolled in the first year of the war at the school for "Voortgezet en Hoger Bouwonderwijs" in Amsterdam.
After she graduated, she was hired at the "Adviesbureau Stadsplan Rotterdam" as "stedebouwkundige architect".
Her design ideas for Ommoord were influenced by her education from the Bauhaus and her membership in the associations "de 8" and "Opbouw" (Jansen, et al., 2005).

The Municipal plans

The Alexanderpolder was perceived as the worst for gardening and farming of South-Holland. Therefore the decision was made to use it as residential area.
A research of the year 1952 states that there is a shortage of 8108 apartments, which increases in the next years to 37,000. The Alexanderpolder and the polder Kralingen were suitable expansion areas.
The topic of developing the Alexanderpolder got more and more importance in 1954 and the

municipality gave the advice to develop a plan as soon as possible. The start for the constructions of the first apartments was planned for 1959. Those were planned for the lowest part of the Netherlands 7 m beneath N.A.P. and are protected by a double keir. The need for the water keirs got more crucial due to the plan to build 102.000 new apartments between 1955 to 1980 (Jansen, et al., 2005).

The Plan for Rotterdam-Oost 1980

Due to the earlier mentioned plans for the extension of Rotterdam, there was the a "structuurschets Rotterdam-Oost 1980" (structure plan Rotterdam-East 1980) developed. Lotte Stam-Beese was a member of the design team.
Till 1980 the construction of 60.000 apartments was planned and between 1980 and 2000 another 26.000 apartments were supposed to be constructed in the plan for the side city.
The plan had to flexible, since the planners took into account that there will be different perspectives and circumstances appearing after a certain time.
In 1957 there were three main areas chosen for the expansion of Rotterdam: Ommoord, Het Lage Land and the Prinsenland.

The following discussions were mainly about the question if the side city should be autonomous or if it should be part of Rotterdam. Furthermore, there were intense discussions over the position of a new centre and a related green space (fig. 7&8).

In 1967 the idea of an autonomous side city was abandoned. At the same time the subject of a metro system appeared. This metro line was a connection between the new neighbourhoods and Rotterdam (fig. 9).
The metro line was simplified in the year 1972, by taking the ring line out.
The urbanization got more concentrated around public transport in the structure plan of 1973. This concentration of neighbourhoods around the metro line led to a north-south green space which connected the Kralingse Bos with the Hollandsche Ijssel. The planned centre had to make place for more residential area (Jansen, et al., 2005).

The 9th CIAM

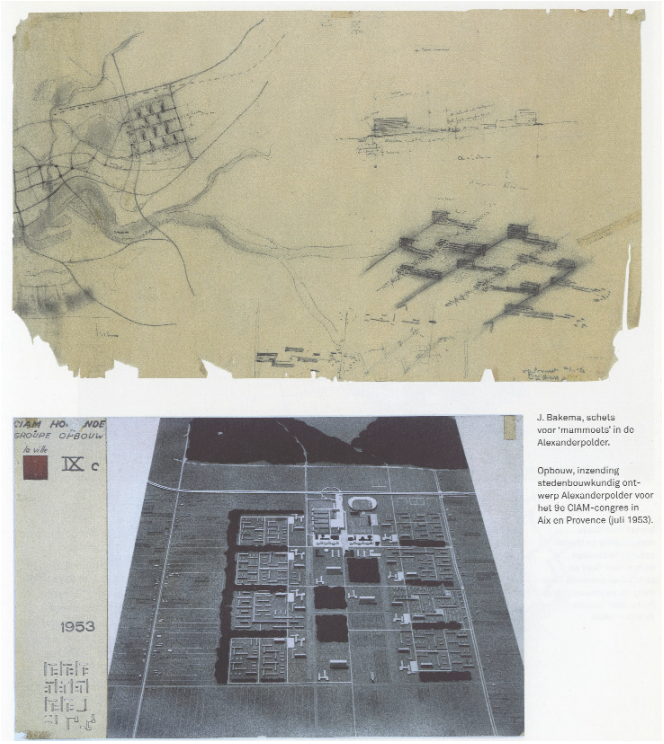


Fig. 10. Design for the 9th CIAM (Jansen, et al., 2005)

Approximately at the same time as the municipal planning for Rotterdam-Oost, Stam-Beese started togerther with Opbouw a design for the Alexanderpolder (fig. 10). This process had a character focused on research and was chosen for the 9th CIAM congress by Opbouw in 1953.

The 9th CIAM congress focused on the importance of the public space and aimed to explain how people identify with their environment. This understanding of the built environment through the notion of social practice caused a radical shift in the modern movement's conception of dwelling. As a result of CIAM 9, some of the architects attending the congress drafted a statement on the concept of "habitat".
The term "habitat" should be understood differently than the functionalist approach as that of Le Corbusier, which describes the living space as a machine.

The design shown at the CIAM went on with the design idea to make an autonomous city out of the Alexanderpolder. With this Opbouw seperated themselves from the ideas of the municipality.
Stam-Beese argues that a romantic urban design is against the modern housing production. According to her, it is not possible anymore that a city grows organically by itself. The focus of the design was, therefore, on the question if the neighbourhood of the future can be constructed out of big volumes. Due to that, options of big volumes in green space were researched, which represented the ideas of vertical neighbourhoods, in which all the services were included. The bad ground quality of the Alexanderpolder supported those ideas. This vertical neighbourhood was supposed to work as one social community and was during the further procedure named as "mammoet". The idea was that every "mammoet" would have its own "core" for all the services.
Following the ideas of the CIAM congress, Stam-Beese combined the high-rise buildings with green space for leisure and sports areas. To provide the flexibility for further development in the future Stam-Beese saw a necessity to free the ground from private use. She, decided, therefore, against private gardens at the ground floor.

The designs for the 9th CIAM congress from Opbouw were not used after the congress. The topics of those designs on the other hand served as examples for the later design of the Alexanderpolder. Stam-Beese integrated several ideas, like the "mammoet", the high-rise and the green space for new residential areas. Ommoord is one example of that (Jansen, et al., 2005).

The Urban Development of Ommoord

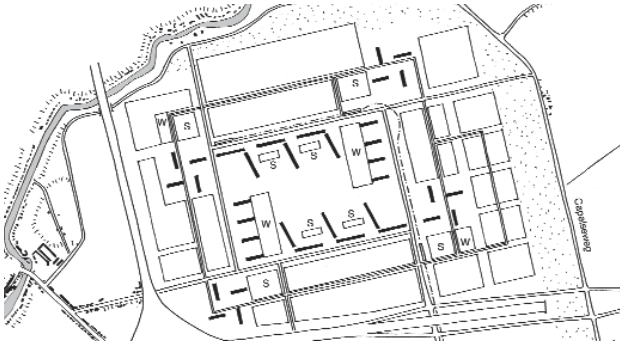


Fig. 11. 25th of June 1963 (Jansen, et al., 2005)

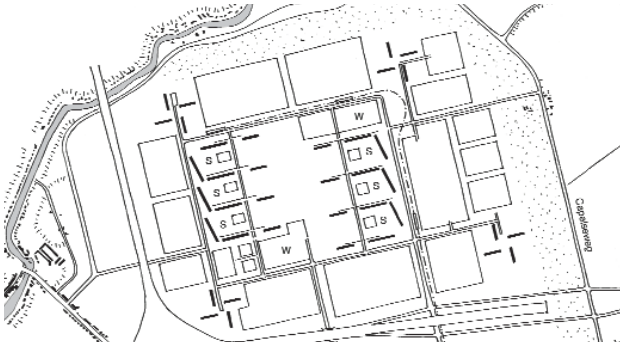


Fig. 12. 26th of June 1963 (Jansen, et al., 2005)

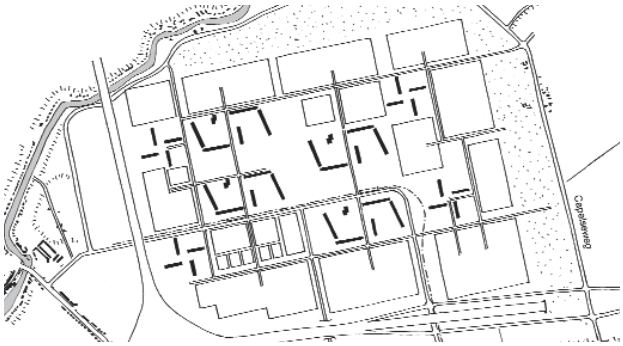


Fig. 13. 24th of July 1963 (Jansen, et al., 2005)

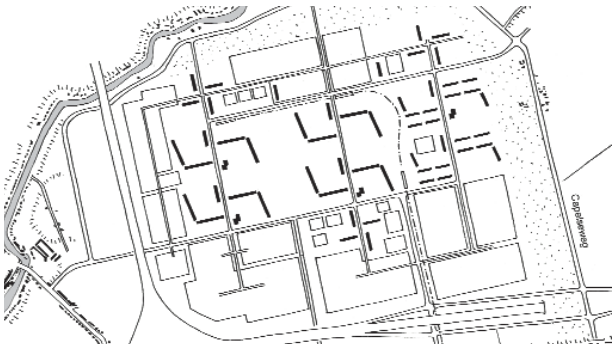


Fig. 14. 24th of July 1963 (Jansen, et al., 2005)

The design process for Ommoord used the approved structure plan for the Prins Alexanderpolder as a basis.

Ommoord was planned at a time when there was a reversal in the perception of the modern urban development. High-rise was accepted in the urban development of the future. The negative overtone of high-rise shifted under the influence of designers. High-rise was a compromise in the fight for a good life and housing of the modern individual.

The decision to assemble Ommoord out of high-rise and low-rise without the integration of middle-rise was made due to financial issues. A middle-rise flat turned out to be more expensive than a low-rise and a high-rise flat.
The initial planned ratio between high-rise and low-rise of 40% to 60% was shifted in 1963 and resulted finally in a ratio of 64% to 36% (Jansen, et al., 2005).

1963

In the year 1963 Lotte Stam-Beese made several different structure plans for Ommoord. At that moment, the aim was to make an urban design for 7,500 new apartments.
Stam-Beese chose for a pragmatic and very schematic urban design: the high-rise in the rectangle, the low-rise in a circle around it. The border of high-rise and low-rise is very clear in all of those plans. In the plans there is a development. In the first 2 sketches the high-rise is arranged around a middle "core" (fig. 11&12).
In the later structure plans, the high-rise buildings are arranged in a way that they enclose and define a smaller space (fig. 13&14).
All of the building compositions are surrounded by a rectangular arrangement of streets. The low-rise areas are situated outside of those compositions and are clearly separated by the streets.

The entire area of Rotterdam-Oost was a transition

Fig. 15. 17th March 1965 (Jansen, et al., 2005)

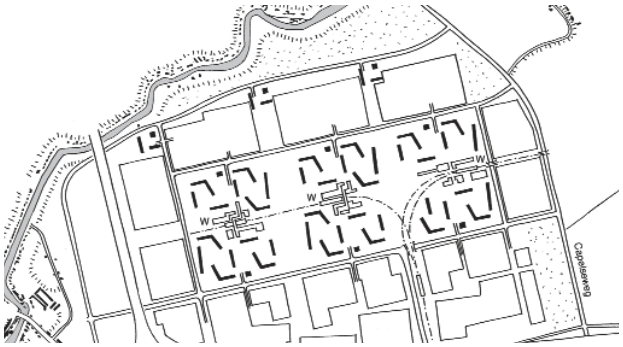


Fig. 16. 6th May 1965 (Jansen, et al., 2005)

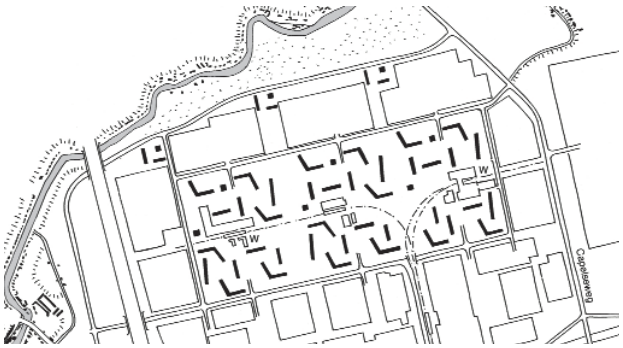


Fig. 17. 23th September 1965 (Jansen, et al., 2005)

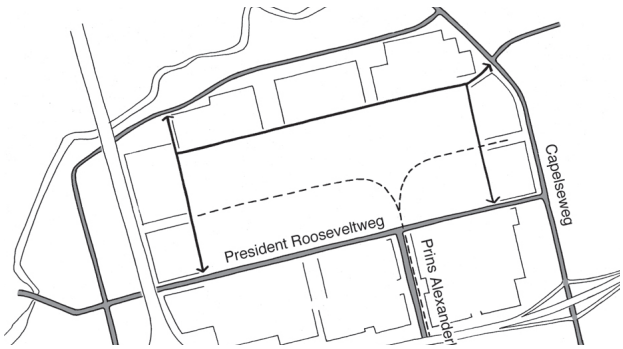


Fig. 18. The Transport System (Jansen, et al., 2005)

zone between the agrarian Capelle aan den Ijssel and the urban Rotterdam. Due to the fact that the need for living space was growing over the years, the number of apartments to build increased to 11,000. The design of Ommoord was addressed mainly to people who worked in or around that area. Nevertheless, the target group was formulated vague and there was no age group addressed. Because there was no sociological group addressed, Ommoord got divided into a subsidised part and a private sector one with a ratio of 61.3% to 38.7%. Within the design area of Ommoord there was place reserved for other functions other than just living. Space was reserved for a neighbourhood park and services like schools, shops and health care facilities. Those services were arranged in two centres (fig. 15) (Jansen, et al., 2005).

1965

At the beginning of 1965, the definite development period of the concept for Ommoord started. Also the connection of Ommoord with Rotterdam by a metro line got ultimate during that time. The metro line was meant to provide the inhabitants of Ommoord with the possibility to reach the city centre of Rotterdam as fast as possible.
The intention of all the plans of 1965 was to make a clear hierarchy of routes, metro line and green space (fig. 15-17). As in the concepts of 1963 the rectangle of Ommoord was formed by surrounding streets. In the south there is a connection to the neighbourhoods Het Lage Land and Prinsenland. Those connections were made to support the increasing amount of cars (fig. 18). In the plans of 1963 the car plays a more subordinate role. Lotte Stam-Beese initiated a separation of streets and other traffic systems.
The aforementioned metro line formed in the concepts of 1965 was the backbone of the central services of Ommoord. The intention was to create an integrated transport and service structure. In the plans of 1965 the fusion of service and transport happened around the three metro stops

The Urban Development of Ommoord

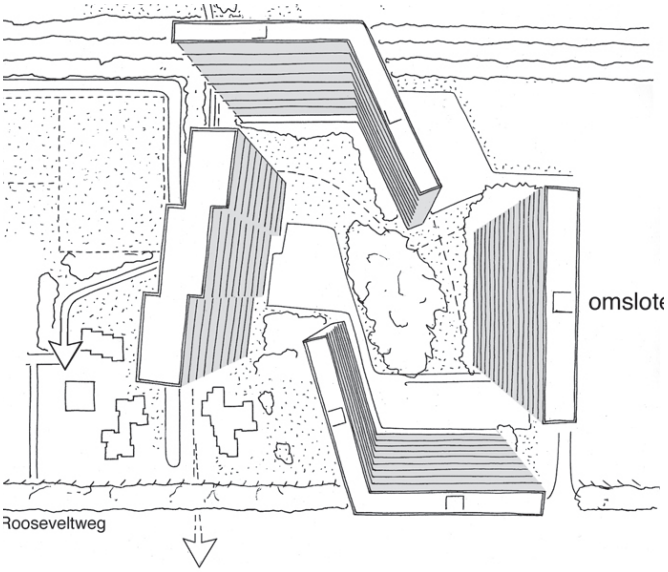


Fig. 19. Defined Green Space (Jansen, et al., 2005)

in Ommoord. It was the first time that the fusion of transport and service points was done and it became a national topic (fig. 16&17).
Very important in the design for Ommoord and in the intention of Stam-Beese was the relation between the individual and the green space. As mentioned before, Stam-Beese followed the zeitgeist of that time and applied the topics exhibited and discussed on the 9th CIAM. In her design the building structure, especially the high-rise, and the transport systems support the green space, by zoning and enclosing it (fig. 19). The green space will be discussed in more detail later.
In the composition of the high-rise buildings Stam-Beese chose for a mix of block buildings and kinking buidlings to get rid of the name "Wailing Wall" ("klaagmuren"). With those kinking buildings Stam-Beese supports the idea of enclosing outside space. In contrast to that, the space between block buildings was often perceived as left over space (Jansen, et al., 2005).

The Realized Urban Design

Fig. 20. Parts that were not Errected (Jansen, et al., 2005)

Fig. 21. Added buildings (Jansen, et al., 2005)

The erection of the neighbourhood started in 1967 and lasted over a period of ten years. The erection was based on the concept of the 23rd of September 1965. Some parts of the finalised design for Ommoord were not realised (fig.20) or got changed:

- The transport system stayed unfinished, which leads to the fact that Ommoord is not as easily reachable as it was planned.
- Instead of raising the metro line, it stays on the ground level. This causes a disconnection between the two sides of the metro line and by this a disconnection of the services, situated at the sides.
- Against the ideas of Lotte Stam-Beese there are ground-bound apartments which have their private garden in the high-rise area. This contradicts with her ideas of keeping the green space public.
- Besides that, some high-rise buildings were not realized, while some low-rise buildings were added later (fig 20&21) (Jansen, et al., 2005).

Phasing

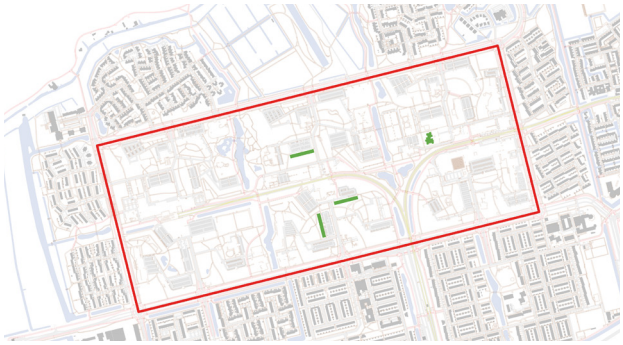


Fig. 22. Construction Period 1967

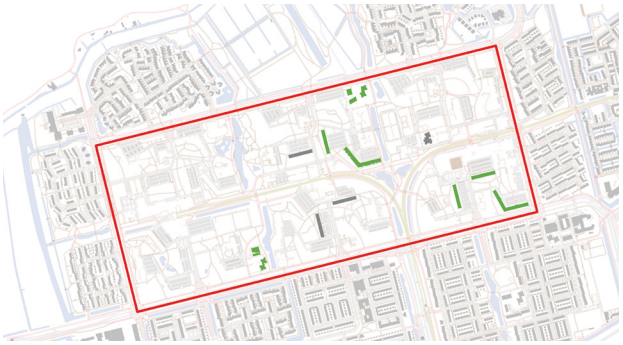


Fig. 23. Construction Period 1968

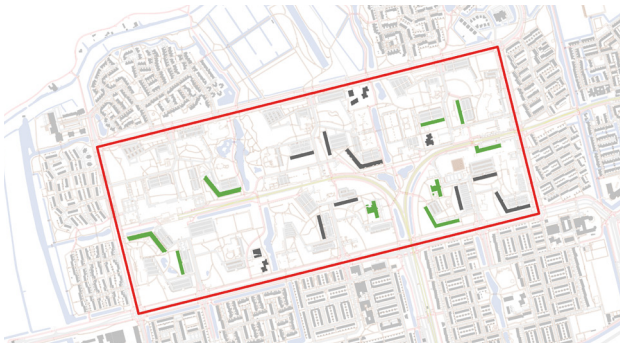


Fig. 24. Construction Period 1969

Fig. 25. Construction Period 1970

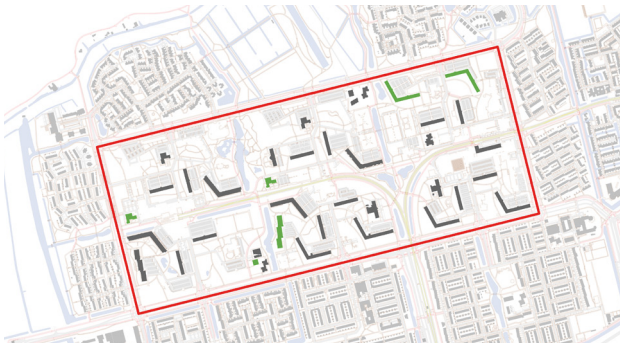


Fig. 26. Construction Period 1971

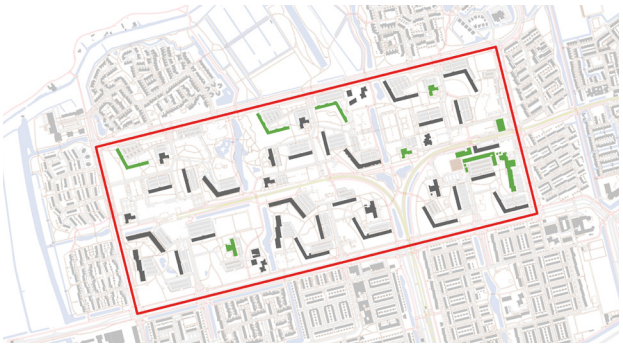


Figure 27. Coonstruction Period 1972

Fig. 28. Construction Period 1973

Fig. 29. Construction Period 1974

Phasing

Fig. 30. Construction Period 1075

Fig. 31. Construction Period 1976

Fig. 32. Construction Period 1977

Fig. 33. Added Buildings in the 1970s

Fig. 34. Added Buildings in the 1980s

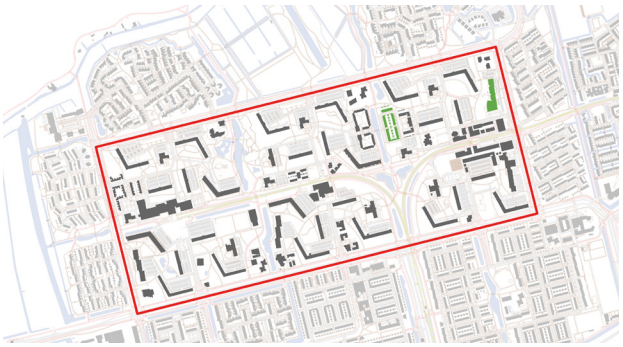


Fig. 35. Added Buildins in the 1990s

Fig. 36. Added Buildings in the 2000s

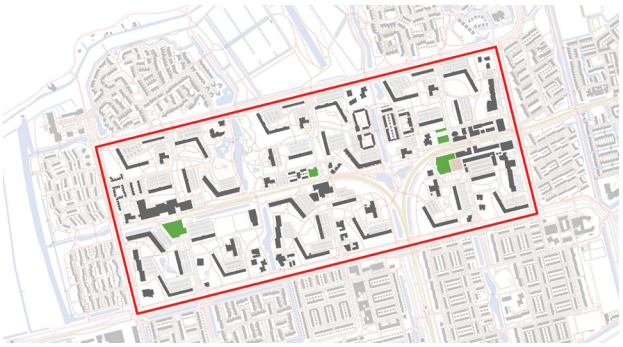


Fig. 37. Added Buildings in the 2010s

The official construction period of Ommoord, following the urban design of Lotte Stam-Beese took place from the year 1967 till 1977. In this span of ten years the buildings were erected one after the other (Jansen, van Velsen, Ruitenbeek, & Veenstra, 2005).

Remarkable is that the process of construction was not about completing one neighbourhood or one smaller building ensemble and even not starting with one building type. Instead, the construction of the straight blocks constructed in the ERA-system took place at the same time as the erection of the kinking ERA-Buildings. Even the construction method is mixed. The kinking high-rise buildings are constructed in two different construction methods, the ERA-system and the RBM sytem (fig. 22-27). The high-rise towers were all erected between the years 1970 and 1972 (fig. 25-27).
Also, the erection of the commercial services around the metro was done bit after bit. Not even following the logic of providing services to all of the already erected buildings. Instead, it started at the metro stop at the east of the neighbourhood and went on with the metro stop in the west (fig. 27, 30, 37) . The services around the middle were erected last. This might have to do with the construction of the metro line (fig. 34).

The first 5 years of construction seems to be the most intensive building period of Ommoord. Most of the high-rise buildings were erected during that time (fig. 22-25). In the years 1973/74 just three more high-rise buildings were constructed (fig. 28&29), followed by the services in the years after.

After the main construction period, there were buildings added which were not intended in the original design by Lotte Stam-Beese (fig. 33-37). Especially in the 1990s there were many buildings added (fig. 35), which were mainly low-rise. Those do not follow the intentions of Stam-Beese not only in terms of the mixture of low-rise with high-rise, but also because the dwellings own their private gardens.

1.1.3 Urban Layers
Green Space and Blue Structure

Fig. 38. Build Environment

The urban design of Ommoord follows mainly 3 main principles. The focus of the design of Lotte Stam-Beese is focused on the combination of infrastructure, dwelling and surrounding green space (Studio LS, 2014).

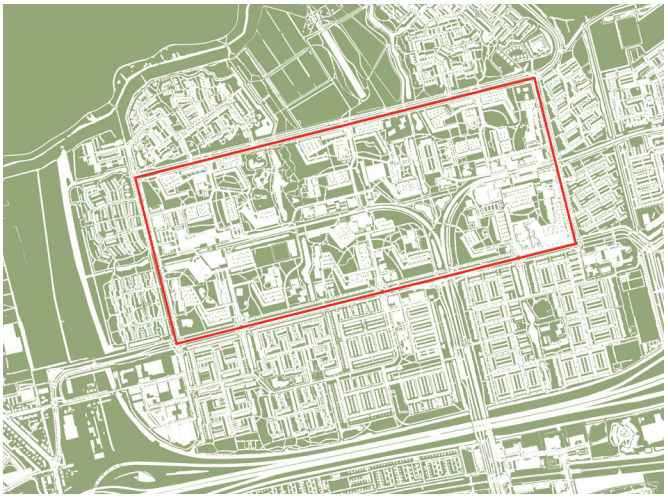


Fig. 39. Green Space

During the time when Ommoord was erected, the importance of green space in living areas was increasing. Crucial in those uprising ideas were the combination of light, air, space and the idea about providing public space for activity.
Differently than in previous designs the concept of green space in Ommoord seems to be a naturally grown space. In Lotte Stam-Beeses opinion, a natural surrounding is better than an artificial one, due to its imperfection.
Besides that, the park like green space softens the dominant presence of the high-rise in Ommoord (Studio LS, 2014).

Fig. 40. Water

Situated in the Prins Alexander Polder, Ommoord has to deal with the negative features of water and the risk of flooding. Also in Ommoord the characteristic appearance of the polder landscape has great influence on the appearance of the urban design. The “square” of Ommoord gets separated by sloten, which bring new qualities to the landscape design of Ommoord (Studio LS, 2014).

Infrastructure

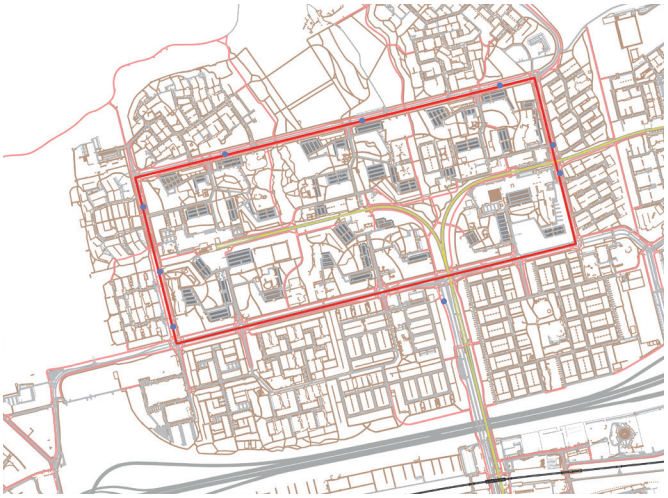


Fig. 41. 4 transport systems

The arrangement of the infrastructure in Ommoord is crucial for the success of the area. Even though Ommoord is situated far away from the city centre of Rotterdam, it is well connected. The composition of the infrastructure consists of 4 different transport systems which are not designed separately, but in as an entirety.

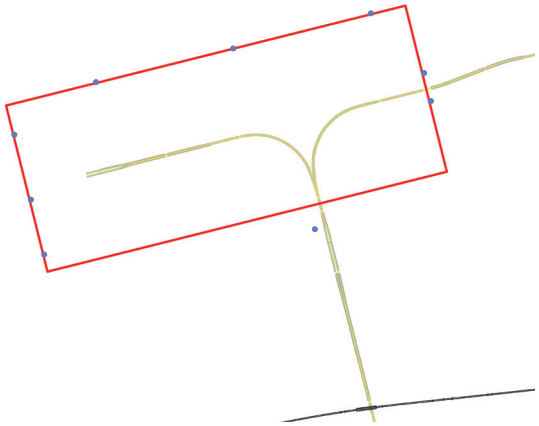


Fig. 42. Public Transport

The city centre of Rotterdam is reachable within 20 minutes by public transport, thanks to Ommoord's 3 metro stops. Those are situated on an axis which cuts the "square" longitudinally into two parts. Furthermore, each of the stops forms central point in the neighbourhood. Besides that, the train station Rotterdam Alexander is in close proximity and the "square" is connected to its further surroundings by several bus lines.

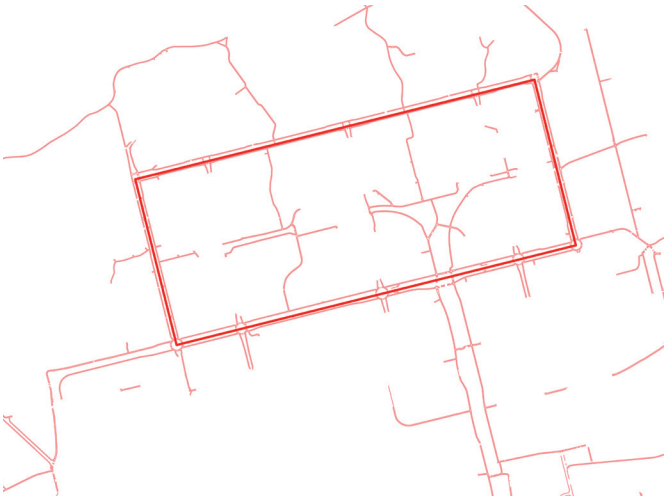


Fig. 43 Bicycle Lanes

As in most of the Dutch neighbourhoods the bicycle is of crucial importance. Due to that there are several bicycle lanes connecting the different parts of the district and connecting the neighbourhood with its surroundings. Even though some of the bicycle paths are interrupted, it does not mean that one cannot go on, instead it is possible to continue on streets or pedestrian ways.

Infrastructure

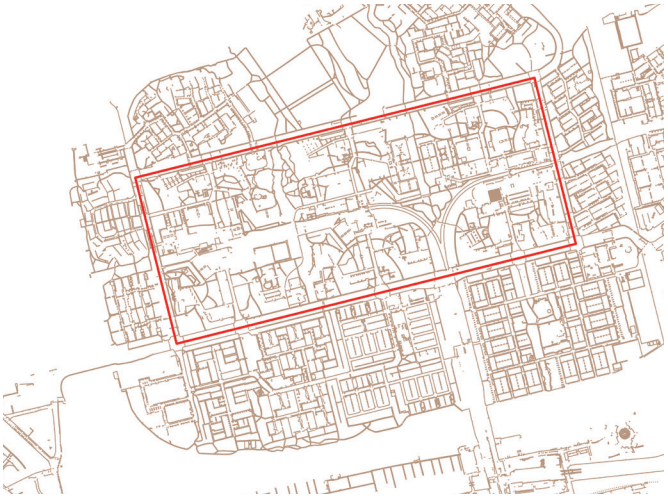


Fig. 44. Path Ways

The several pedestrian pathways in Ommoord functions as a connector between other transport systems and the different neighbourhoods and centres. Differently than initially designed, the paths have an organic arrangement, which leads to disorientation and long walking distances. Due to the fact that there are no direct connections, the pedestrian pathways have a labyrinth-like appearance.

Fig. 45. Streets

Due to the previously described transport systems the use of the car could be limited to a minimum (Studio LS, 2014). There are no car connections going through the neighbourhood. All the streets end in dead ends. Due to that just cars with the aim to enter Ommoord do so. Thanks to that, the car does not play a big role in Ommoord and the district is kept quite.

Fig. 46. Parking

In every grouping of buildings, there are parking places situated. Most of them are situated at the dead ends of the streets and provide the inhabitants which parking space.

1.1.4 Typology
High rise/ Low rise

Fig. 47. Ommoord flats

The urban design of Ommoord is based on a collection of high rise buildings organized in a rectangular shaped plot (fig. 47) Typical for Ommoord is that every building outside this plot is low rise. In the period between 1963 and 1965 a number of different design variants were made for Ommoord. Characteristic for Ommoord is the rectangle-shaped road that separates high and low rise.

Ommoord flats

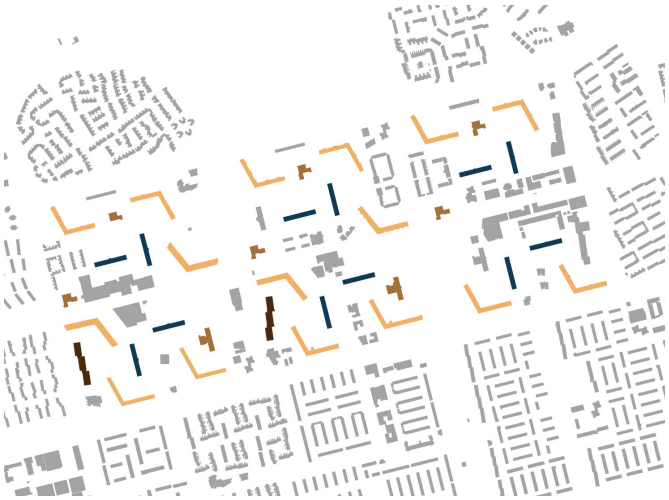


Fig. 48. Flat types

There are four different kinds of high rise flats (fig. 48, 49) The knikflat, a linear flat, the tower flats and a linear one consisting of three parts.

Knikflat
Torenflat
Linear flat
'stepping flat'

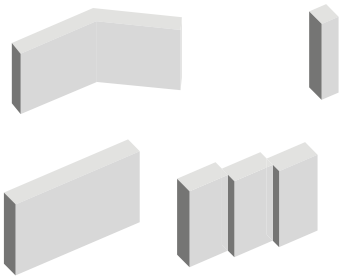


Fig. 49. Ommoord flats

Fig. 50 Planned irregularities

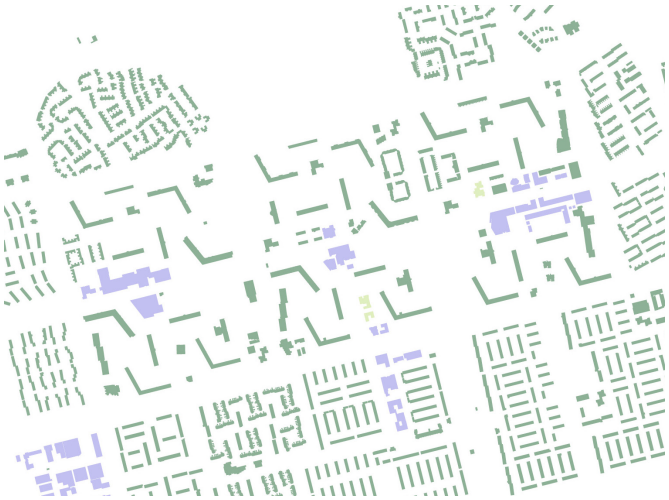


Fig. 51 Functions

Characteristic of Ommoord is the strong and unique composition, at least on the map, is still largely recognisable. The exact design of the rectangle was subject to change, mainly because of the increasing expectation of the number of dwellings in the district: from 7,500 in 1963 to 10,000 in 1965 (Zweerink, 2005). The square shaped road acts as a separation, of low-rise buildings outside the Square and mere high-rise buildings in the Square. However some exceptions had emerged during the design process. These exceptions can be seen at the entrances of the neighbourhood. They are all low-rise neighbourhood facilities. Schools are organised in the green zones that separate the high-rise ensembles (fig. 50).

The high-rise ensembles are arranged around open central areas, the 'cores'. This is the place where communal and economic life occurs
(fig. 51) For example, shop and facilities are situated in these cores, including a kindergarten and other amenities (fig. 52).

Irregularities
Commercial
Services
Dwelling

Fig 52. Commercial area in Ommoord

1.1.5 Urban Structure
Urban Morphology

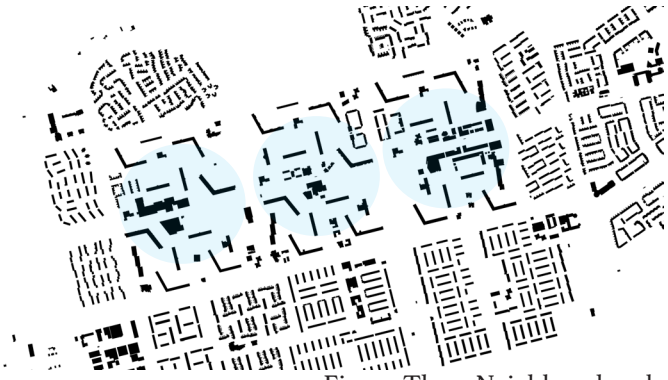


Fig. 53. Three Neighbourhoods

Fig. 54. Neighbourhood with ensembles

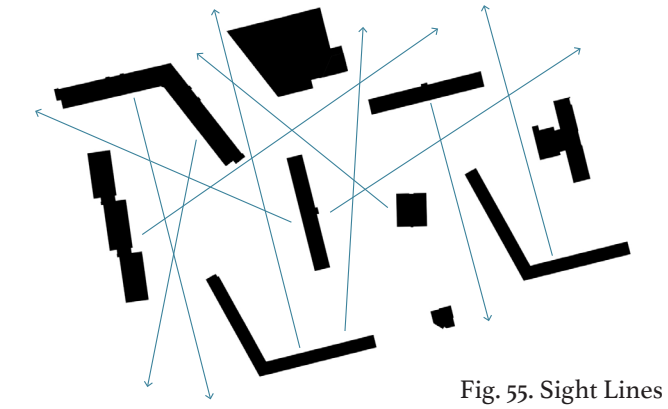


Fig. 55. Sight Lines

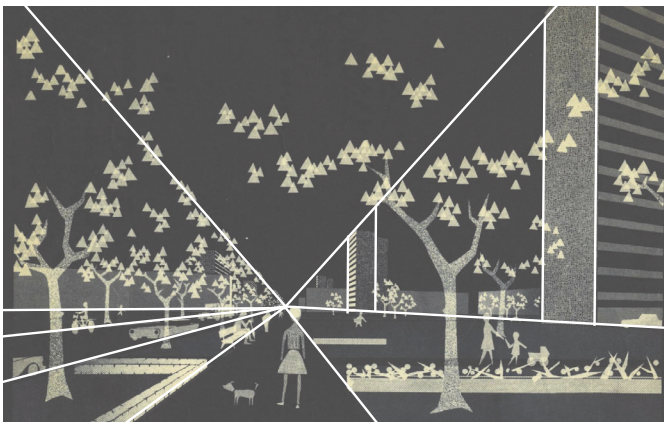


Fig. 56. Views & Axes (Lotte Stam-Beese)

The Square of Ommoord is characterised by a great level of homogeneity. There is a great contrast in the urban morphology between the Square and the surrounding context. The square is separated from the surroundings by a wide open area, which works as the ring road. While the majority of the context consists of low rise developments arranged around strict grid lines the Square follows a less rigid pattern with long linear high rise blocks dispersed in a lower urban density pattern. The ratio of the built space to the open areas is very small, with the public open spaces dominating the extents of the site. (fig. 53)

The Square is divided into three virtual neighbourhoods, according to the respective three metro stops. Each neighbourhood follows a similar urban pattern. Concentrated commercial facilities are located around the metro stop, which form the centre of each neighbourhood. Around the centres, Lotte Stam-Beese positioned building blocks into distinct residential clusters in such a way that their forms enclose public green space. (fig. 54) The grouping of buildings is chosen so that spaces emerge, which can be clearly identified as belonging immediately to the surrounding flats, enhancing the sense of community and belonging. However, the enclosed space cannot be clearly perceived in reality, highlighting the weakness of realisation against the design aim.

The ensembles interact with each other in the way their building blocks are positioned. They are positioned relatively far apart making sure that there are not any major overlooking issues. In addition, the sight lines between the buildings provide unobstructed views further away from the site boundaries. (fig. 55)

It was the artistic intention of the architects and planners to create an urban structure dominated by axes and long views. The formal language of modern post-war architecture consists of a spatial composition of horizontal and vertical planes, open and closed. The positioning of the building blocks, their long linear shapes and the landscape, all work towards this direction. (fig. 56)

Street Profiles & Site Sections

Fig. 57. Street View, Google

Fig. 58. Ring Road Section

Fig. 59. Street View, Google

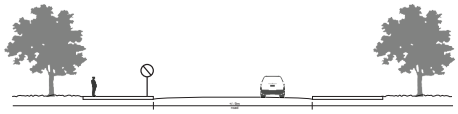


Fig. 60. Main branch section

Fig. 61. Street View, Google

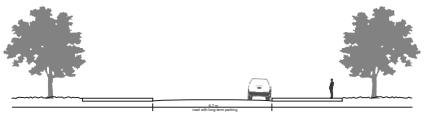


Fig. 62. Residential Street Section

Fig. 63. “Square” Cross Section

The vehicular network without through-routes within the Square only works in combination with a fast main road around. The disorientation of the irregular structure within the Square is compensated with a “super-orientation” in the ring around it. The orientation is achieved as a hierarchy of traffic (transit or destination) marked with variations in the profile and materialization of the streets. (Studio LS, 2014)

The ring road is very spacious with all tarmac lanes and paths separated by wide tree lined grass verges. (fig. 57, 58) This profile justifies the rapid, continuous function that the ring road has.

At each intersection of the Square and the ring road, the materiality changes immediately. Instead of asphalt, all branching paths are paved within the Square. The main branches deriving from the ring have a profile of approximately 9 meters wide, where parking is often prohibited and the pavements are of varying width. (fig. 59, 60)(Studio LS, 2014)

The main streets within the square then lead to narrower branches, often with a road width of 6 to 7 meters. Because long term parking is allowed in most cases, this street profile is actually even smaller. (fig. 61, 62)The road sections are marked with the type of traffic that is required at that location.

Looking at the overall profiles of the whole Square, the distinction between the surroundings becomes clear. The square is mainly surrounded by low rise housing. The ring road marks the boundary between high rise and low rise. From the ring road and moving towards the centre of the square the buildings’ height rises progressively. (fig. 63) In addition, the tallest buildings are located around the metro stops with the height dropping between two subsequent different stops. (fig. 64) In this way, three main clusters of high rise buildings are formed, each around a metro stop, enhancing the three “neighbourhoods” concept on a vertical axis.

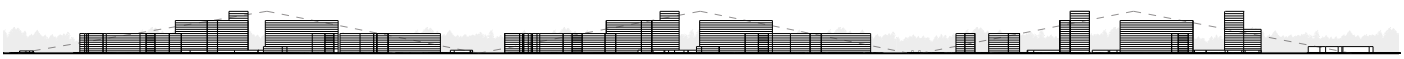


Fig. 64. “Square” Longitudinal Section

Green Space

Fig. 65. Lush & Mature Greenery

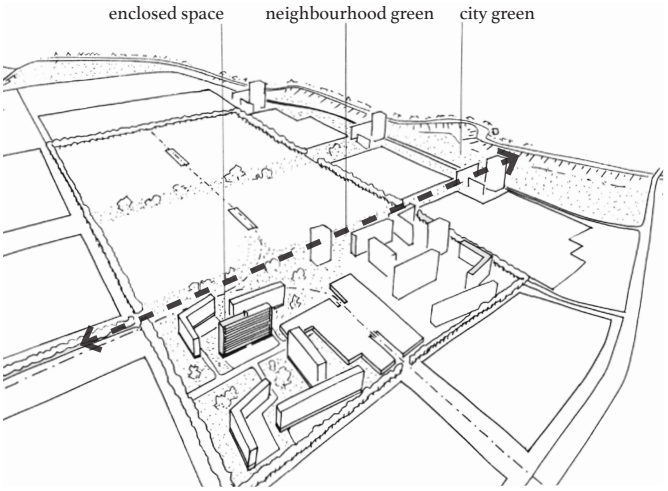


Fig. 66. Green Space Variation (Hage, 2005)

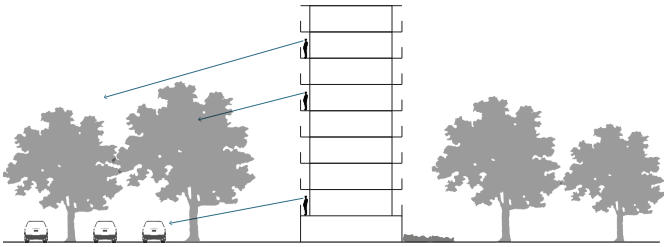


Fig. 67. Views

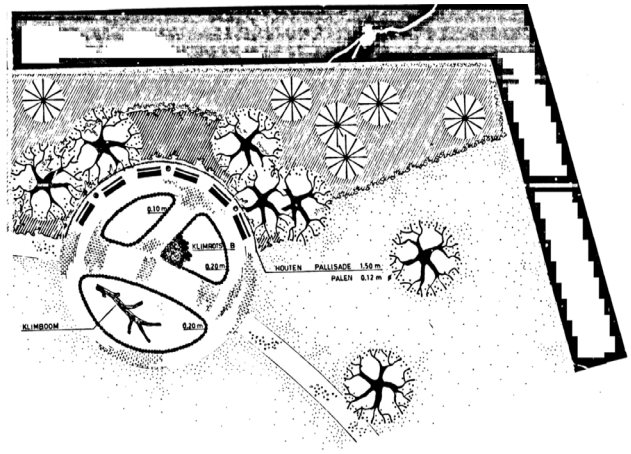


Fig. 68. Garden Landscape Design (Studio LS, 2014)

The green in Ommoord is diverse and scattered throughout the neighbourhood occupying an important position. Modern post-war planning called for light, air and space. Inextricably associated was the role of greenery in housing which no longer merely fulfilled a decorative function, but often an active function. Building high provided the opportunity to realize more green within the city. (fig. 66) Simultaneously, the green was needed to mitigate the high rise. Stam-Beese saw green and water as the necessary link between the large scale of high-rise buildings and the human scale. (Studio LS, 2014)

Another point of focus is the public nature of the gardens. Stam Beese's ideology was that the ground floor is free of private everywhere. (Studio LS, 2014) The landscaped gardens are therefore all designed for common use and entirely positioned in the public space. Public green was what the people got back in exchange for the lack of a ground-level house with a private garden. The continuity of the green common area is supported by the housing typology. The ground floor is intended for access and storage and the houses are raised above ground level. Bushes are directly planted against the building to smoothen the transition between the green and the building plinth. (fig. 67)

The trees have grown considerably in the last forty years and there are large mature trees scattered around. The green forms a beautiful backdrop for a pedestrian to walk through and for the tall buildings that are 'popping up' in between. (fig. 65) Also, from within the building and the balconies, the green dominates the atmosphere and the view is defined by the view of the trees. (fig. 67)

What is striking is the contrast between the urban plan, which is sleek orthogonal and the gardens' plans with more natural forms. The linearity of the communal gardens gave way to a greater variety of curved, polygonal and amorphous forms with more emphasis on the wild. (fig. 68) The gardens cooperate in mitigating the development's link with the human scale. (Studio LS, 2014)

1.1.6 Environmental Analysis

Sun, Wind, Noise

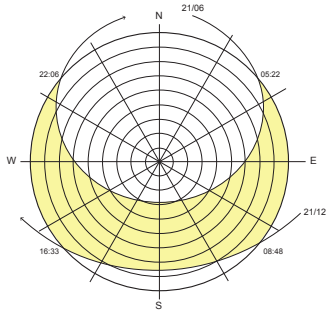


Fig. 69. Sunpath

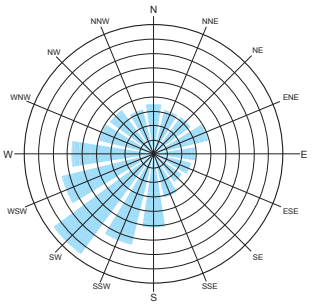


Fig. 70. Prevailing winds

As most western European countries, the Netherlands have a temperate maritime climate influenced by the North Sea and Atlantic Ocean, with cool summers and moderate winters. The city of Rotterdam enjoys long hours of daylight reducing the needs for artificial lighting. The hours are reduced approximately by half in the winter. (fig. 69) The main wind direction is from the southwest providing opportunities for natural ventilation. (fig. 70)

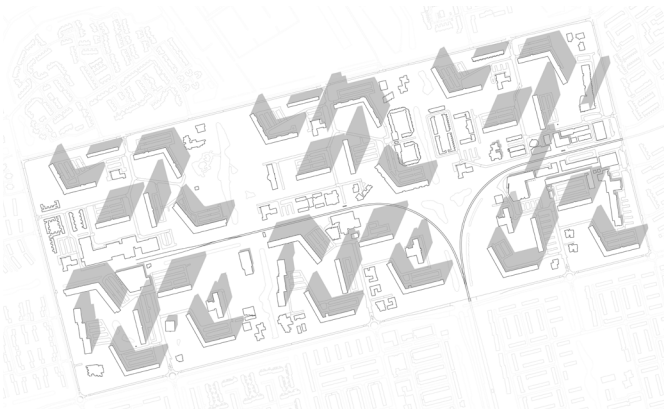


Fig. 71. Shadow Study

Lotte Stam Beese's positioning of the buildings does not compromise the access to sunlight for any of them. The distance between the buildings ensures that they are not overshadowed for most time of the day throughout the year. (fig. 71)

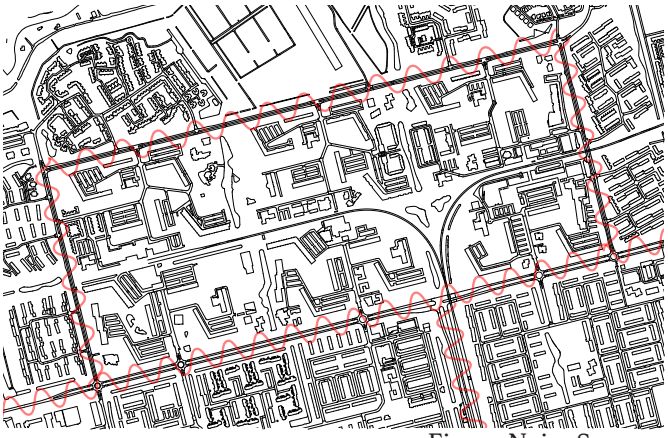


Fig. 72. Noise Sources

Across the site there is mainly calm traffic thus diminishing the potential noise sources. There are not any through-routes within the Square and therefore no transit traffic. However, the ring road surrounding the Square carries substantial traffic accommodating major car and bus routes. Consequently, it is a major noise source for the area. (fig. 72) Especially the areas and the buildings placed in close proximity to the road might be prone to uncomfortable noise levels.

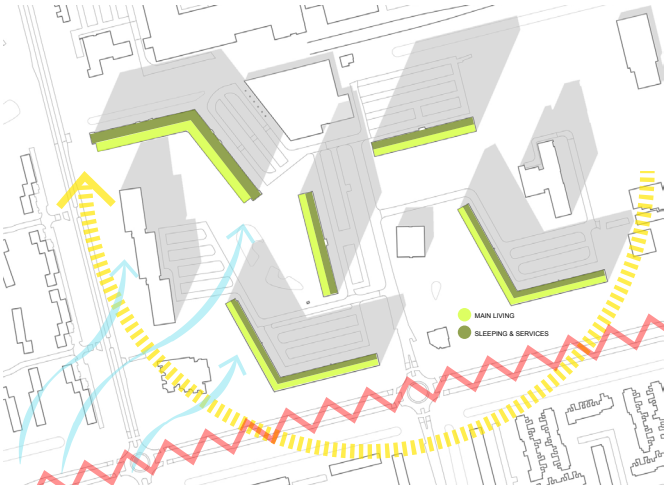


Fig. 73. Environmental Conditions & Living

Examining the ERA blocks more closely, their flats consist of two main zones, the living and the sleeping & services. All the flats are orientated in such a way that they enjoy maximum access to direct sunlight. The living area is facing a south/southwest orientation supporting the need for daylight in living activities. The sleeping and services zone face north/northeast receiving less or no sunlight for activities that do not require it. Moreover, all the living areas take advantage of the prevailing southwesterly winds for their natural ventilation. For flats located next to the ring road there could be some excessive sound levels. (fig. 73)

ERA

1.2 STRUCTURE

1.2 Structure & Construction

This part of the research is based on "Niet-traditionele woningbouwmethoden in Nederland" by prof. Hugo Priemus published in 1971. The book present the catalogue of Dutch not-traditional methods in the housing building production.
Comments of the authors, which reflect current state of visited buildings in Ommoord will be highlighted by italic paragraphs.

1.2.1 Main characteristics of the system

Building technique was developed by J. P. van Eesteren in 1960's and used by ERA contractors company in housing high-rise buildings.
Steel tunnel is used as a casting form, allowing to obtain 7.8m span between the construction walls. Concrete is poured into the formwork on site, where reinforced bars are put before.

The concrete structure from today's perspective can be considered as extremely simple, aesthetically minimalistic. At the same time the system proved to be efficient and the method of prefab formwork and casting concrete in-situ is still used.
In the construction system, which has no load-bearing elements within the apartment it can be seen the realization of the John Habraken philosophy. It propose to separate the construction from interior, allowing to create flexible dwelling (Habraken, 1961).

1.2.2 Construction Method

Description of the system.
Basic principle is to separate the load-bearing structure from the other elements of the building. The structure is carried out by in-situ casting process with use of gravel-concrete reinforced by steel bars.
Other buildings elements come as prefabricated parts, such as:

- Inner partition walls, manufactured by ERA own factories The interior walls are fabricated in their own factories. De separating walls of the bedrooms and living room are sandwich panels made from gypsum and insulating foam. The walls in the bathroom and toilet room fenolspaanplaat (chipboard panel) is uses instead of gypsum.
- The inner doors, painted in factory
- Facade windows and doors

Those elements are packaged in sets and transported to the construction site as an easy to assemble parts.
Elements for services, such as pipes for central heating and sanitary elements are make in the factory lines as well.
All concrete components which are exposed to the exterior are prefabricated, with an adjustable connection to the load bearing structure. Galleries and elements of the balcony are placed on the cantilevering consoles with a layer of felt in between.
Cantilevering consoles are also concrete, prefabricated elements, fixed to the casted concrete structure. Besides its load-bearing function they include built-in lightning.

Execution.
The walls and floors are result of pouring concrete into smooth steel tunnel molds, with additional molds for special walls and floors. For moving, setting in place and pouting the concrete the construction crane is used.

To sum up, all the building's elements are parts of the building system, produced and also built by one company. As we see in Ommoord, there are housing estates which were made only from this one building system. In this cases the built environment is defined by the construction system (fig. 74).

Fig. 74. ERA block of flats, basic type, 13 stories, 12 apartments per floor. Ommoord, Rotterdam, 2016

1.2.3 Building Physical properties

Materials.

- Floors and load-bearing walls - reinforced concrete
- Partition walls - sandwich panels made of wooden frame, filled with expanding plastic foam and closed by plasterboard
- Wet areas partition walls - particle board with phenol-based resin instead of plasterboard
- Facade - redwood or meranti wood
- Carpentry details are made of natural wood (redwood, mahogany, Parana pine)
- Metal elements are hot-dip galvanized, some exposed elements are enamelled for aesthetic reasons.
- Residential side of facade is mostly equipped with double glazing.

Finishing layers.
The concrete surface coming out of the molds does not require further plastering.

Selection of materials and finishing layers vary in the buildings. It depends on a place and time when they were erected. Visited building in Ommoord has originally brick-finished end walls, single glazing from the gallery side and double glazed facade from the balcony side.

Thermal properties.
Due to lack of precise information it is assumed that concrete walls and floors have normal thermal conductivity for reinforced concrete.

Soundproofing.
Concrete walls of 20 cm have an +3 dB index to air noise (class "good"). Concrete floors (with 2cm concrete floor finish) have an insulation index for contact noise of +4 to 10 dB (depending on the square meters, a messing hammer is used for measurements). An insulation index for impact noise of +6 to 12 dB (depending on the square meters, a rubber hammer is used for measurements).
Application of "hard floor finishes" such as ceramic tiles, have a negative impact on sound insulation.
In case of sandwich-gypsum finished panels the sound insulation index is 21dB (according to the measurements of Ratiobouw). According to TNO an index of 28 dB is used. Which is the same as the sound insulation of a rhenisch brick wall (7 + 2 x 1=9 cm). The same applies to the plasterboard walls.

Additional annotations.
For concrete walls nails cannot be used by dwellers.
Fire resistance of concrete walls is more than 6 hours. For the plasterboard and sandwich partition walls this time is 23 minutes.

From today's perspective cold bridges on exposed concrete elements are problematic. Concrete floors are also not good in reducing the impact noise.

Fig. 75. Construction progress

1.2.4 Machinery and equipment

In transport.
Concrete comes at the site already mixed in truck mixers. Facades and partition walls, with carpentry elements are coming as prefabricated elements from ERA-factory in Bergambacht.
Despite the painted elements are coming from another line in the factory, special sets of elements are collected and packed in a truck. One truck can deliver all components needed to complete 10 dwellings.
During construction on site.
For basic ERA-building 13 uniform steel tunnel molds (fig. 76) are used (12 dwelling + 1 staircase module). There are positioned by a building crane.
Costs of construction equipment and transportation:

13 molds (including heating)	f 750 000 -
Two construction cranes	f 500.000, -
Miscellaneous	f 250.000, -
TOTAL	f 1.500.000, -

In total, Van Eesteren company has operated 55 tunnel (4 construction sets), and the 8 cranes (2 cranes per one constructed building) (fig. 75).
For finishing the newly casted concrete floors the vibrating beam with a length equal to the floor span was used.

Fig.76. Construction method

Equipment additionally used at the site:
- Ceiling grinder to smooth irregularities
- Electric drills and screwdrivers
- Tractors for transportation on site
- Trolleys for transporting reinforcement bars and finishing materials
- High pressure spray equipment for applying sealing joints and (asbestos?) paste in the window frames
- Submersible pumps for pumping out water on site
- Compressor and pneumatic tools used for placing foundation piles.

1.2.5. Labor force on site

5.1 Occupancy
During the project in Ommoord the average occupancy in the week of 25/7 till 31/7 was as following:

carpenters	27	paperhangers	1
concrete finishers	4	crane worker	3
excavation worker	-	roof deckers	1
carriers	19	maintenance	1
mason	9	tile installer	3
hod carrier	1	metal braiders	6
scaffold builder	1	windowinstallers	2
joint fixer	2	pile drivers	6
ceiling sprayers	6	measurerers	1
electricians	6	monitors/leaders	6
metal workers	-	executers	1
plumber	5	miscellaneous	7
C.V. fitter	5	guard	1
elevator fitter	4	warehouse	2
kit squirter	-	administrator	1
floormaker	4	work preparator	1
painters	2		

1.2.6 Development and application

History.
The construction method was developed by adopting society J. P. Eesteren of close cooperation between the Department home industry and road construction department. After an extensive study of existing systems was not decided to an assembly building method, but a casting building method where the starting point was a integrally industrialized process. After a trial construction of single units was started in 1964 the first building power in the Prince Alexander Polder to Rotterdam. The design of the houses came about as a team, which the Housing Department were involved Rotterdam, Office Rein H. Fledderus as an aesthetic consultant, the design department of Eesteren N.V.

Production capacity and production rate.
The production capacity is determined by the number of streams construction and the capacity of suppliers. It has now been This approximately 2,000 homes per year (500 homes per building power). The optimum construction speed is reached at the stake Two construction cranes on a construction site and a production15 units per working week.

Batch size and site size.
The minimum lot size is about 600 homes. In a series may be different house types, because each series are used less than six molds, which are mutually can differ.
The minimum size construction site is in accordance with the promoter approximately 200 homes.

Developments.
All the building materials and equipment are constantly tested and are constantly improved even during the building process. Plans are now ready for the construction of very high residential buildings and star flats.
Industrial manufacturing detached houses have been developed as well. These family houses are characterized by:

- implementing of free spans
- industrialized making of the building structure at site
- prefabrication for dismantling

Furthermore, plans are in preparation for a new type gallery house and build a type of porch in building heights from 8 to 14 floors.

1.2.7 Organisational Structure

ERA-home industry J. P. van Eesteren N.V. is a sister company
of J. P. van Eesteren N.V.
As part of its holding, the following suppliers are present:
- Interior walls (Bergambacht)
- Painting hall (Bergambacht)
- Carpenter (Bergambacht)
- Pile driving (Bergambacht)

Transports are partially powered by its own material, partly outsourced. The agency Fledderus at involved ERA development as aesthetic advisor. The choice of architect for the client is fully open.

1.2.8 Analysis

Experience.
With this building the system, man has gained a reasonable experience. Given the age of the system it has shown spectacular production speed and quality. The Of Eesteren group is capable of linking back many building methods in the housing industry.

Urban planning implications.
The minimum height is, according to the producer, 8 stories. The Maximum building height is, with the current status, 15 stories. By adjustment of the material the building height can reach up to, 25 stories. The block length should not be preferably shorter than 100 m. It is possible with one dilatation joint. In this case the lifts are used optimally, with reasonable walking distance for all residents. For larger block lengths, decrease of the cost price is achieved. At the location of the staircase, a slight bend (knik) can relatively easily be achieved in the block.

Design.
The depth of the property is not influenced by the construction method. The distance between the construction walls is 7.80 m in between the modules (7.60 actual span). This turned out the be financially and technically reliable. If the span increases, the dimensions of the concrete construction should be adjusted, which will increase the building costs. The building costs will also rise when the distance between the supporting walls is less than 4,50 m.

It is worth mentioning that van Eesteren company could develop a system with such a complicity, which demands a large scale operation to be economically reasonable, only because of the stable market subsidized by the government. As Nicholas Clarke said, it was an advanced system, a top product of years of ongoing research in the building systems, available by unstopped subsidizes.
According to ERA contour company, 63 building were built, with 11000 apartments, which makes the ERA system a significant part of the housing stock built during that time.

ERA

1.3 SKIN

1.3 Facade & Details

1.3.1 Main characteristics

The skin layer of the building within ERA system follows principals of integrity between system elements. Therefore it is hard to extract this from the general description of the system. In "Niet-traditionele woningbouwmethoden in Nederland" prof. Hugo Priemus mentions briefly the materialization of the facade, but it is sufficiently explained with the drawings.
ERA system also contains solutions for connection details, explaining how the glazed facade and end walls cladding are connected to the structure.
(fig. 77, 78, 79, 80)
On the other hand, the skin layer is in the center of attention in the renovation process, which we observed in Ommoord (fig. 82, 83). Based on this, following chapter contains description of our observations regarding the renovation process.
Following the "2.3 Materials" chapter in the book:

Materials
- (...)
- Facade - redwood or meranti wood
- Carpentry details are made of natural wood (redwood, mahogany, Parana pine)
- Metal elements are hot-dip galvanized, some exposed elements are enamelled for aesthetic reasons.
- Residential side of facade is mostly equipped with double glazing.

1.3.2 Current state

ERA-blocks in Ommoord initially had single glazed facade from gallery side (fig. 81). In ongoing refurbishment process gallery facades are improved by double glazing and additional mineral-wool insulation panels (fig. 82, 83). Balcony facades are getting triple glazing. In both cases, the existing window frames are kept. All concrete elements are covered by white paint, except some balcony-supporting beams which are painted in, matching facade, dark gray/brown color (depending on building). End walls are finished with bricks, although this is a result of thermal renovation when additional insulation was put between concrete end wall and new brick finishing layer.

1.3.3 Cultural values

Facade, because of its dominant visual aspect, defines the appearance of the building. It is clearly visible, that in current renovation the design and appearance of glazed facades are being preserved. Existing frames are still in use, and its repetition in every dwelling is one of the main factors defining aesthetic value of the building.

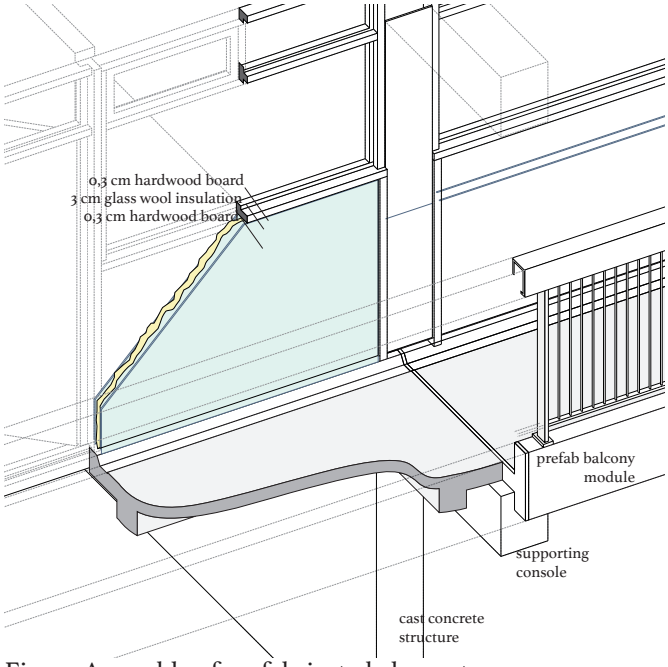


Fig. 77. Assembly of prefabricated elements

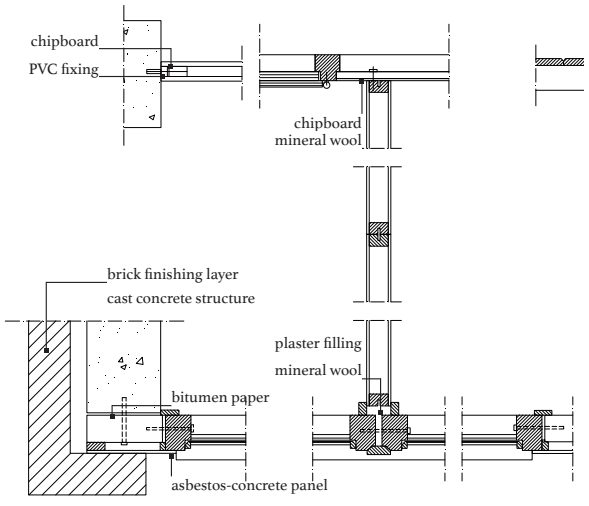


Fig. 78. Facade / Dry Walls detail connection. 1:20

1.3.4 ERA system details. Connections skin elements - structure. 1:20

Fig. 79. End Wall finishing and roof connection

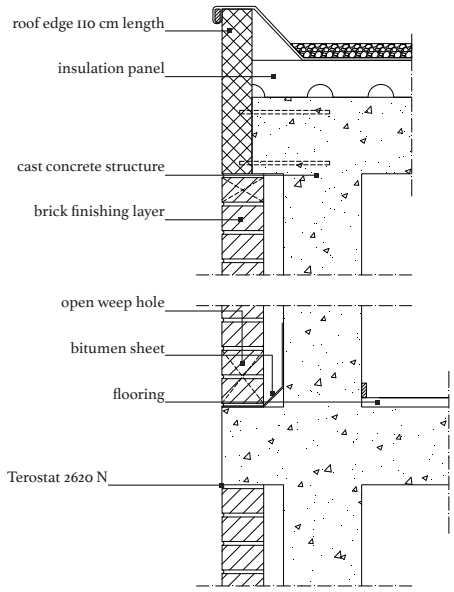


Fig. 80. Gallery / Balcony element connection

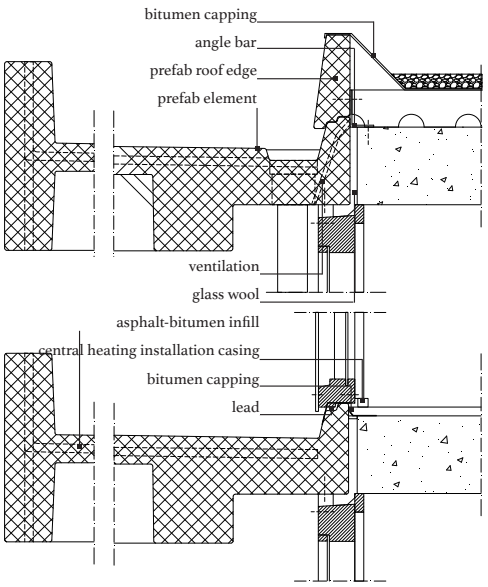


Fig.81. Original single glazed windows

Fig. 82. Insulation of concrete structure

Fig. 83. Refubrishment of facade panels

Current state under renovation in Knikflats, Ommoord, Rotterdam. New insulation layers and finishing panels.

1.3.5 Facade aesthetics

Fig. 84. Facades rhythm

The main facade is perceived as a set of long linear elements stacked on top of each other. The concrete balcony edges form elongated planes that come in contrast with the glazed areas behind. (fig. 84) The side end wall is also composed of linear elements with the floor slabs exposed on the wall surface in the form of linear concrete bands contrasting withe the masonry surface. (fig. 85)

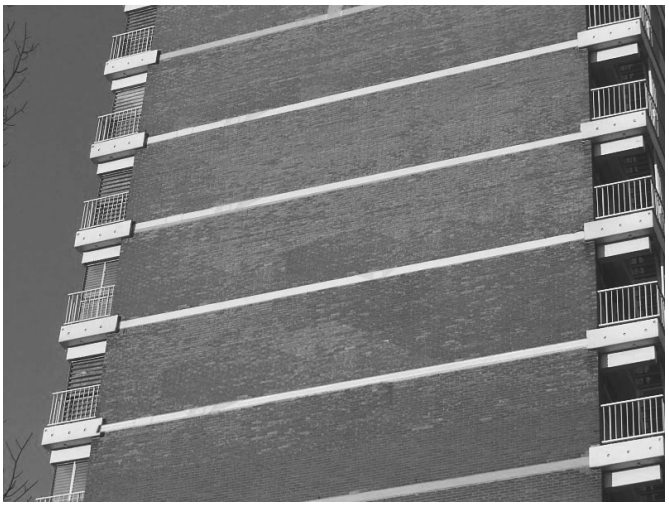


Fig. 85. End Wall Materiality

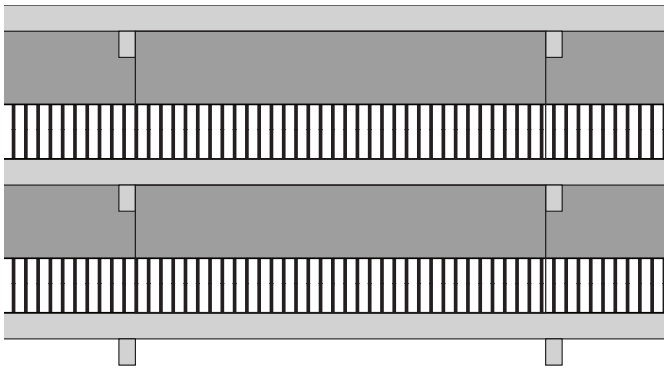


Fig. 86. Facade Composition

Looking closer at the composition of the facade, it consists of the linear balcony band and the cantilevered load bearing beams as points of punctuation. The hand rails are another important element extending along all the galleries and balconies. Behind the handrails, the facade is made up of the window framing forming a continuous plane along the building. (fig. 86)

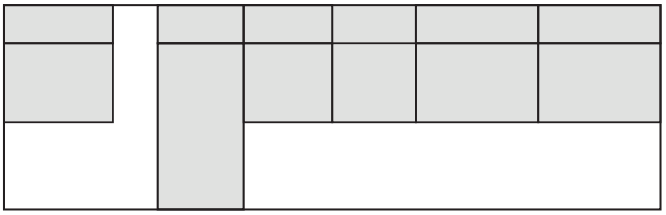


Fig. 87. Gallery Side Framing

Looking closer at the window framing itself, it is split up in smaller parts corresponding to the internal layouts. The frame is also broken up to accommodate the operable parts of the glazed area. On the gallery side the window sills are located higher up compared to the living area. The lower sills establish a better visual connection with the outside. (fig. 87, 88)

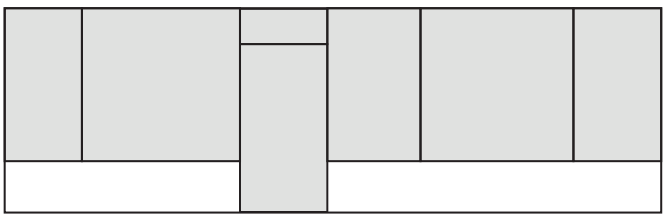


Fig. 88. Balcony Side Framing

ERA

1.4 SERVICES

1.4 Services

Heating - Ventilation - Water

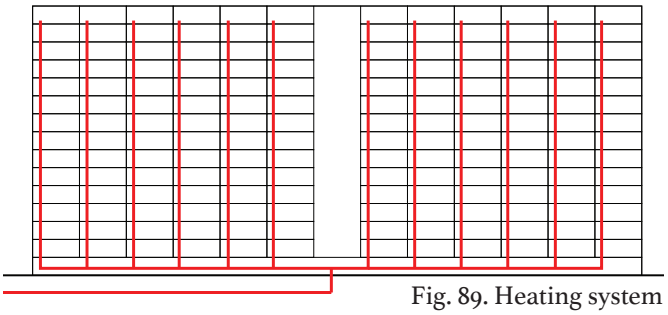


Fig. 89. Heating system

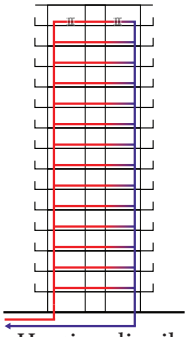


Fig. 90. Heating distribution

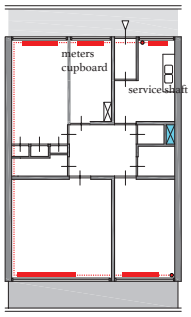


Fig. 91. Flat heating equipment

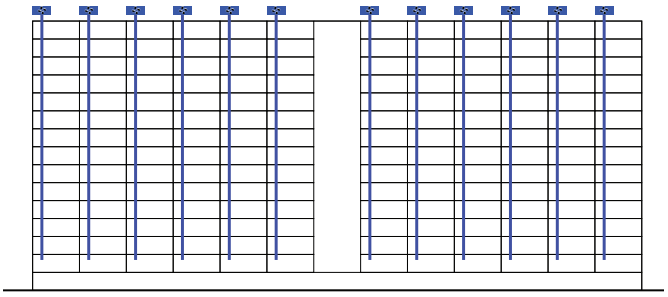


Fig. 92. Ventilation System

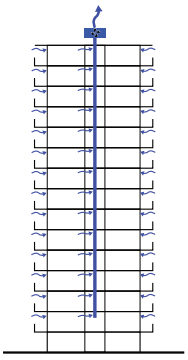


Fig. 93 Natural Ventilation

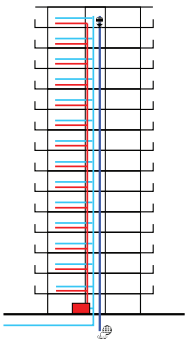


Fig. 94. Water Treatment

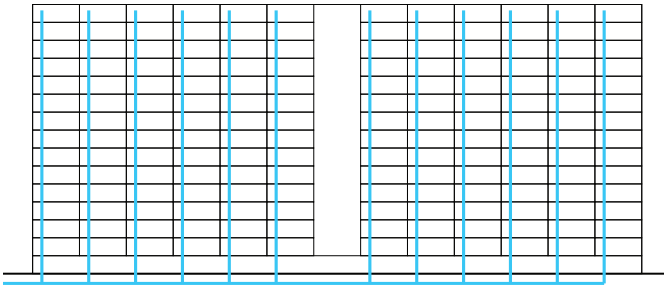


Fig. 95. Water distribution

Space heating is provided by central district heating. (fig. 89) Distribution to the dwellings is done in vertical sections, vertical piping. (fig. 90) Distribution inside the dwelling is down by radiators located under the windows. (fig. 91) Originally the radiators were connected through a circuit ring circling the whole dwelling. Because of the energy inefficiency of this system (all rooms are heated all the time) it was replaced by radiators with separate regulators.

Ventilation is done naturally. The opening of windows works as inlet on the gallery side. On the balcony side, opening windows, the balcony door and air vents integrated into the window frames also work as inlets. The extraction of air is done in the kitchen, toilet and bathroom. (fig. 93) Natural suction is created at the roof through the use of suction caps, which through air ducts connect the dwellings in a vertical section. All ducts are accommodated in a vertical service shaft. (fig. 92, 93) The problem with this system is that often the suction caps do not create enough suction. Residents tried to deal with that by installing ventilators blowing into the extraction duct. This results in stale and smelly air being blown into adjacent dwellings. The use of natural ventilation especially in the colder periods of the year has a significant influence on the energy demand for heating.

Water is distributed through the vertical shafts where the sewage pipe is also accommodated. (fig. 95) Warm tap water is provided by a central boilers located at the ground floor. (fig. 94) The existing boilers are outdated, which results in a low efficiency and failure.

In addition to the services being generally outdated, there is an aesthetic issue, which is the result of ill-thought detailing over the initial design process. As a result, most of the service runs such as heating and water pipes, cables are totally exposed undermining the quality of the interior's aesthetic appearance. Finally, the fixed shafts and meter cupboards limit the flexibility of future interventions.

ERA

1.5 SPACE PLAN

1.5.1 Floor Plan

The ERA system is partly inspired by the philosophy of the architect John Habraken. In his philosophy he proposes a system where the bearing structure is separated from the non bearing structure, this creates lots of flexibility in the dwelling (Habraken, 1961) This 'Open building' concept gave almost total freedom to the residents to design their own interior. Residents became partially in control of their own floor plan. Although large variations were possible in this system, most projects were equipped with the standard interior. In later projects, residents had more influence on the interior design and they could select a preferred interior design that suited their lifestyle.

Innovative construction methods achieved large spans and thus offer a lot of freedom in the plans. The houses of the ERA-flats and the kink flats have an area of about 85 m² . The inner walls are non-bearing and can be moved or removed. (fig 96) This makes individual wishes easy to realise, which is more common in owner-occupied homes than rent. The ERA-flat has a very large free span of 7,6 meters. The units in some knikflats exist of two load bearing walls and are therefore less flexible. The units in the tower blocks are smaller (45 m² , 55 m² , 70 m²). (fig. 95)

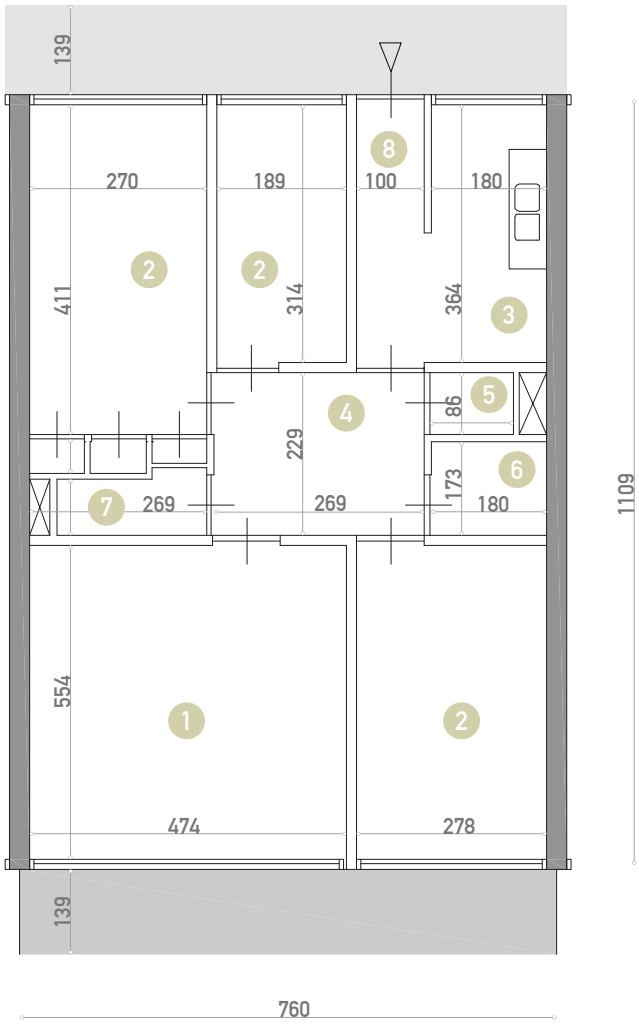


Fig. 95. ERA standard interior arrangement

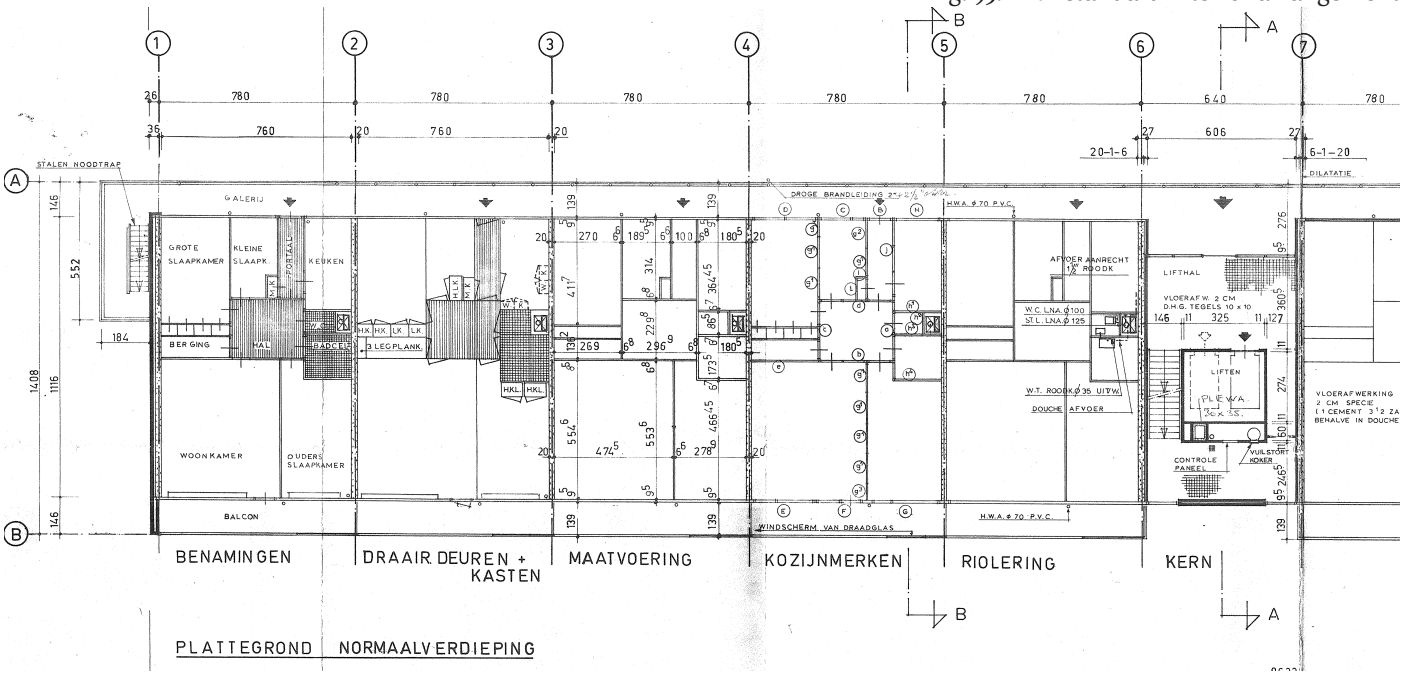


Fig. 96. ERA Floorplan

1	Livingroom	21,5 m2
2	Bedrooms	13 m2 11,5 m2 5m2
3	Kitchen	5,5 m2
4	Hall	8m2
5	Toilet	1m2
6	Bathroom	2,8m2
7	Storage	3m2
8	Balcony	10m2

Because of the flexibility of the non bearing separating walls, many different varieties of floor plans are possible. (fig. 97) Typically, the living space is situated on the side of the balcony. The bedroom can either be situated on the side of the gallery of on the side of the balcony. Many other options are possible. The positioning of the kitchen and bathroom are not as flexible because of the fixed shafts. This make the floor plan not completely flexible.

The flat is designed for a 4 people household. A man and wife, with two kids. With a possibility of 3 bedrooms. One for the parents and two for the children, every extra child would be able to share a bedroom. Nowadays most households in Ommoord consist out of one or two persons, which results in unnecessary and unused bedrooms.

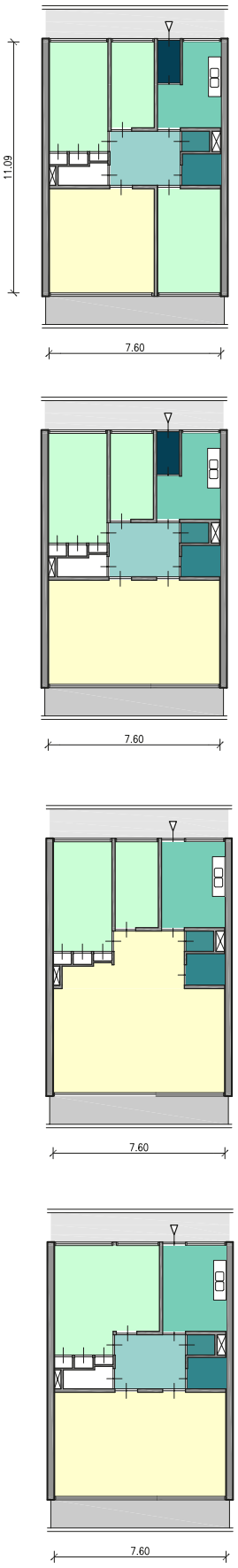


Fig. 97. Possible internal configurations

Although the flats are situated in a beautiful green park-like stetting and there is sufficient parking space, the once planned 'modern' design of public space has nowadays failed in its purpose. The idea of the design was that the collective green space should play a role in improving social cohesion of the area. Residents would feel responsible for this green space. However because of the change in time and the individualisation of today's society this concept has no leg to stand on and has turned the space into a deserted park.
The deterioration of the ground level is also influenced by the blind plinth. (fig. 102) The blind plinths derived from the ideas of CIAM. Garages and storage units are placed on the ground level. (fig. 101) Therefore, there is no direct contact between the residents' flats and the public space, except through the main entrance of the building.


Fig. 98. Current state bathroom

Balcony
Looking at the total amount of square meters of the balcony it could be considered quite spacious. However, due to it's 1,40 m depth it can be impractical. There is hardly any space to facilitate chairs or even a small table. (fig. 100)

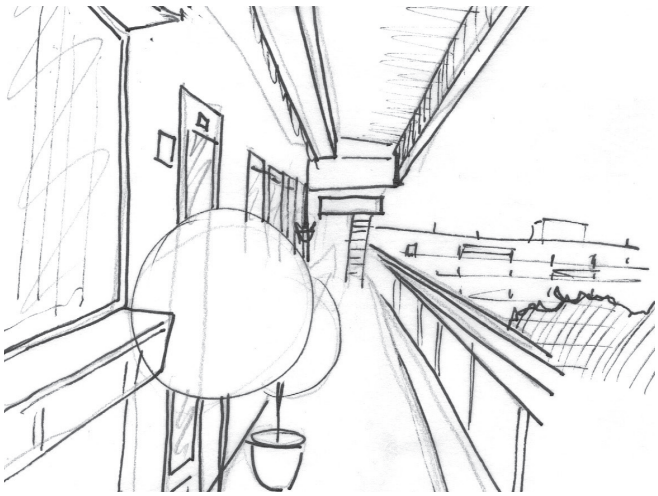


Fig. 99. Gallery view

Gallery
A gallery is a less preferred way of entering the flats. While the gallery has brought a lot of innovation and even today still has major advantages it still has its disadvantages. Because the gallery runs high along every dwelling people can look straight into every apartment, reducing the amount of privacy of the residents. (fig. 104, 106) One other obstacle of the gallery is the battle with the influence of the weather conditions, for example wind or heavy rain. (fig. 99)

Furnishing
The deterioration of some of the furnishing in the apartment is visible in many dwellings in Ommoord. Most of the furnishing in the kitchen and bathrooms are outdated an need replacement. Elements that need replacement or renovation are for example, the kitchen tiles and the equipment in the bathroom, toilet and kitchen. (fig. 98)

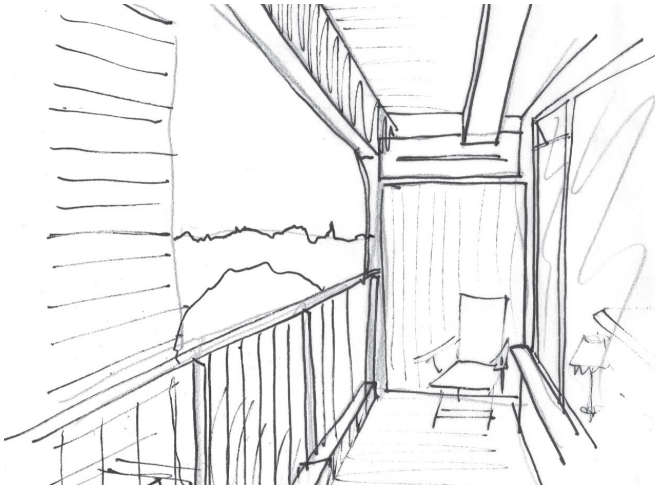


Fig. 100. Balcony view

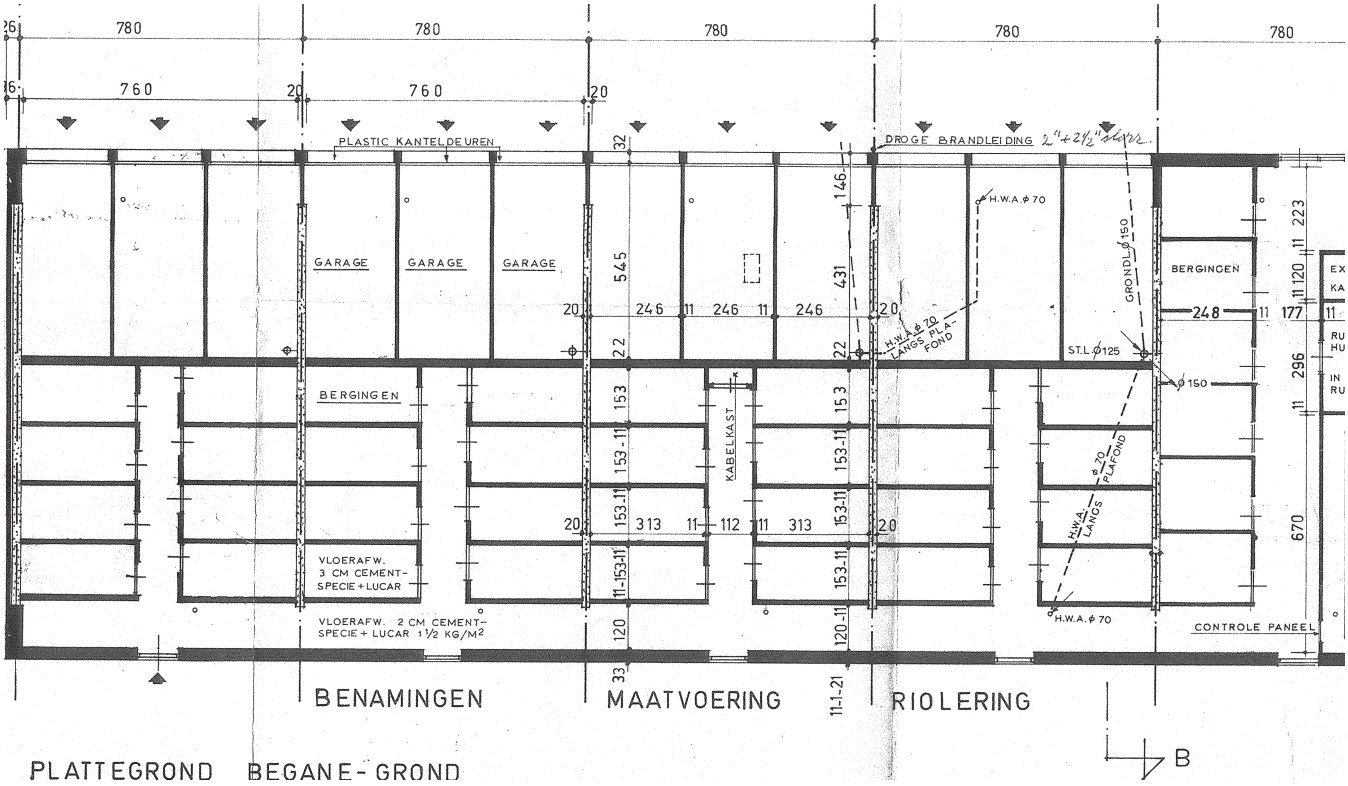


Fig. 101. Ground Floor Plan

Fig. 102. Blind Plinth

1.5.2 Circulation

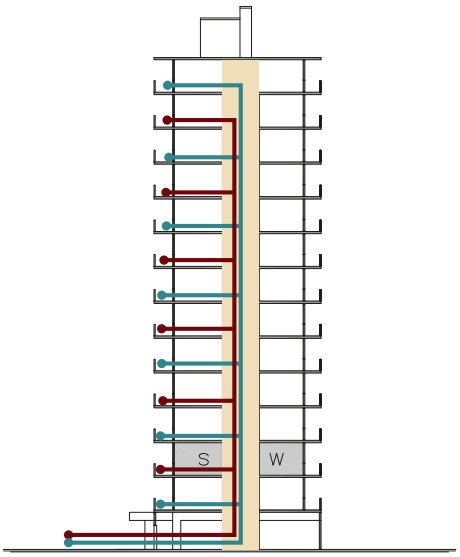


Fig. 103. Circulation Section

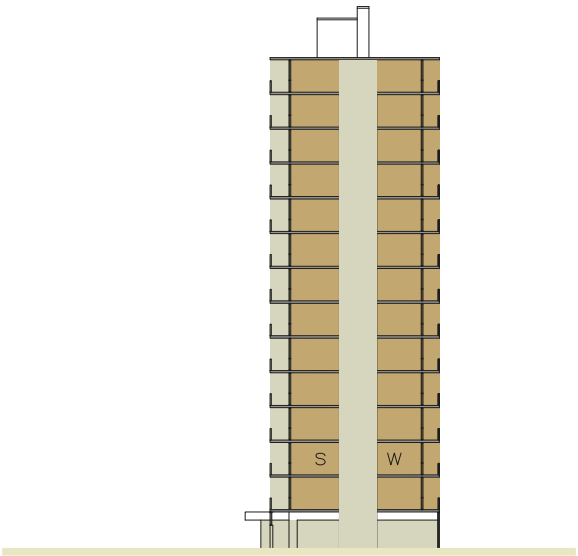
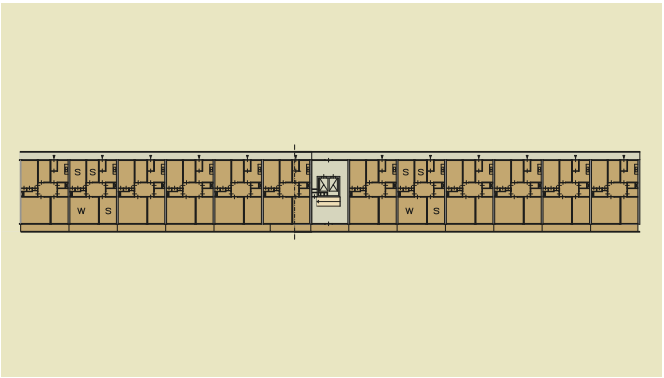


Fig. 104. Public vs Private section



Even levels circulation
Odd levels circulation
Elavator shaft

Fig. 105. Circulation building

Private
Semi-private
Public

Fig. 106. Private/ public/semi public

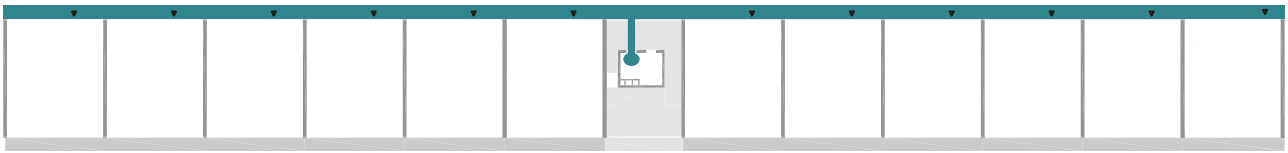


Fig. 107 Gallery

Fig. 108. Entrance view

The entrance of a flat is always situated on one side of the building. (fig. 103) This a means that the other side of the building creates a barrier in the urban layout of Ommoord. It disconnects the galleries from the public green space. The green space is often organized on the balcony side of the building and the parking spaces on the entrance side of the building.

The flats could benefit from an entrance which is connected to the front and the back of the building to improve the connection and circulation to the public space.

From this main entrance hall the galleries can be reached through a staircase or elevator. (fig. 103, 105, 106) There are two elevators, one for even levels and one for odd levels. So, the elevator doesn't stop at every level, making is harder for people to reach an even to an odd level and visa versa.

The galleries and the entrance hall also serve a purpose in social aspects of the building. This is the place were residents meet and have social encounters.

In the origin plan the entrance hall were quite modest and non outspoken, making it difficult to distinguish one entrance from an other. In the renovation of the entrance halls more identity was created by giving each building entrance a different appearance and 'look'. (fig. 108) In this way the individuality and identity of each building is enriched. Also, changes were made to the mailboxes. They became larger because of the fact that people received more post than in the sixties.

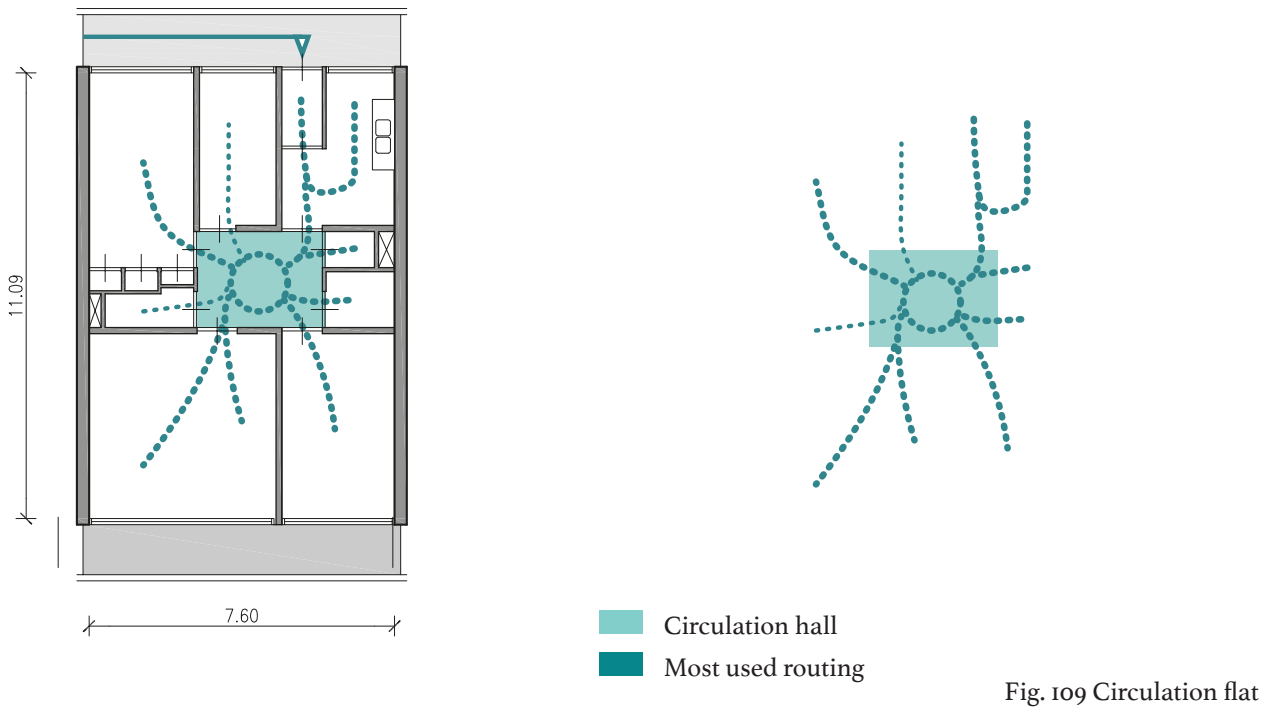


Fig. 109 Circulation flat

The ERA flat is a typical gallery flat where a gallery runs along the individual dwellings on the upper floors. These galleries lead to a central stair and elevator. In the ERA knikflat there are two main vertical circulation cores, with two elevator shafts and a staircase. One elevator can reach all odd level and on elevator all even levels. The elevators and galleries could be considered as the infrastructure on the scale of the building.

In the ERA knikflat there are two main vertical circulation cores, with two elevator shafts and a staircase. One elevator can reach all odd levels and on elevator all even levels. This means that two elevators are used for 23 dwelling on one level. The gallery route could be shorter or more comfortable with the addition of extra vertical access points.

In the dwelling itself, the so called 'play hall' functions as the central circulation core. (fig. 109) All the rooms in the dwelling can be entered from this central hall.

When visiting the the ERA-flats. A few thing were striking. Almost all people we had met in the ERA-flat we're living on their own or living with two persons. In most cases, kids moved out or partners passed away. As a consequence many extra bedrooms are not used or are being used as storage and are just collecting dust. (fig. 109) Even though the inner partition walls are very flexible and can bedrooms can be converted into other spaces or can be combined with the living room. Most elderly people don't want bother with all the hassle that a rebuilding will bring. This given minimizes the possible use potential of these units.

Back in the sixties it was preferred that the kitchen was separated from the living space. Nowadays a kitchen connected to the living space is preferred. Because of the fixed positioning of the shafts, replacement of the kitchen is difficult. However there are some foreigner residents that still prefer a separate kitchen.

ERA

1.6 STUFF & STORY

1.6.1 Flat Observation #1

Pink Paradise

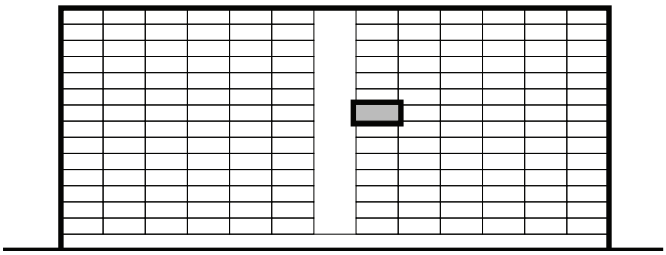


Fig. 110. Flat # 1 Location

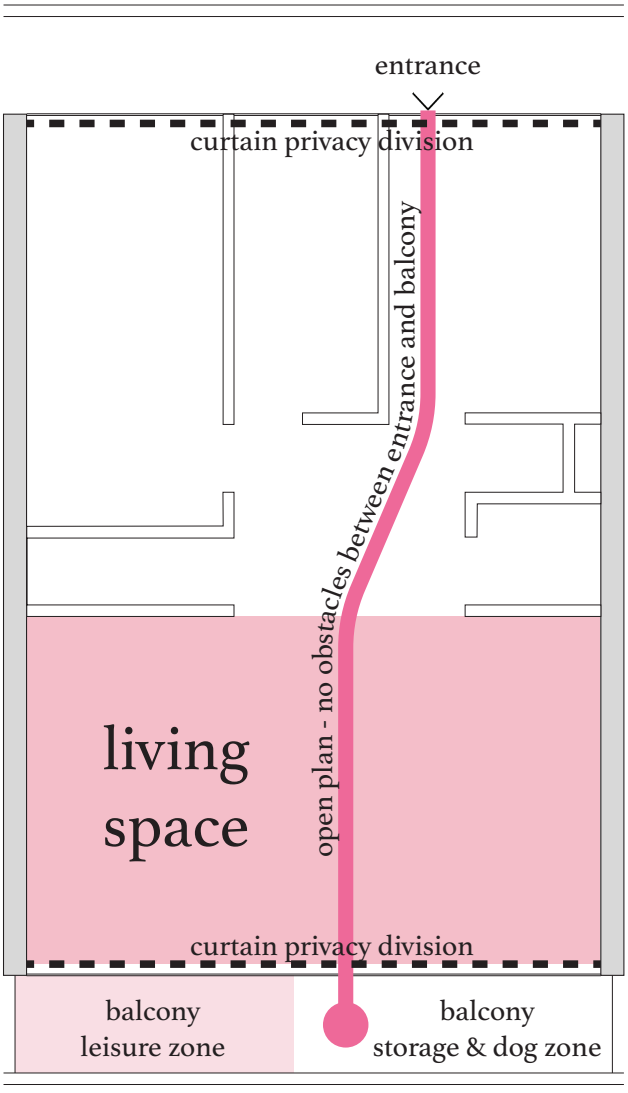


Fig. 111. Flat # 1 plan

Peter & Annie

Have been living in the flat for about 30 years. Were living there with their two kids. They have since moved out.

After their kids moved out, they removed the dividing wall in the living room. (First three bedrooms, now one and one for their grandchild)

How would you describe the quality of living:

All facilities nearby, lots of green and living in a park like environment with plenty of space for their grandkids to play.

Peter an Annie have both been living in the Ommoord area their whole lives. Annie works at a company across the street and peter is retired. They both feel like they have everything close by, work, family and all facilities. Annie says she doesn't need to go to the city centre often because of these reasons. Peter and Annie have good relations with their neighbors of the gallery. Often they have have small conversations on the gallery of in the entrance hall, but they never ever meet in their own flat or someone else's flat. They don't miss a communal space to meet their neighbors elsewhere. On of the pro's of living here is that it is 'gelijksvloers' (on the same level)

What would you like to change?
Annie would like a bigger kitchen. Peter and Annie are not happy with the landlord, and about the maintenance of painting the window frames.

Peter and Annie wouldn't change anything about their flat and are very content. The atmosphere is friendly, this is mainly due to the attitude of the residents. They are not planning to leave this play except if they win the lottery.

Fig. 113. Flat # 1

Fig. 114. Flat # 1

Fig. 115. Flat # 1

Fig. 116. Flat # 1

Fig. 117. Flat # 1

Fig. 118. Flat # 1

1.6.2 Flat Observation #2

It's all about the centre

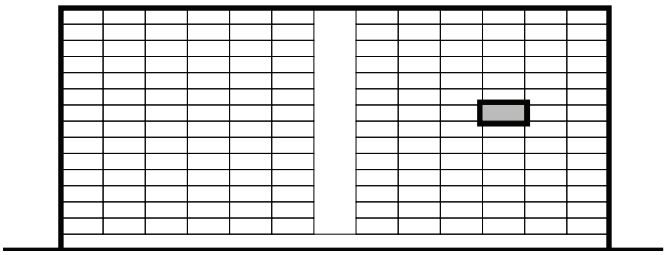


Fig. 119. Flat # 2 Location

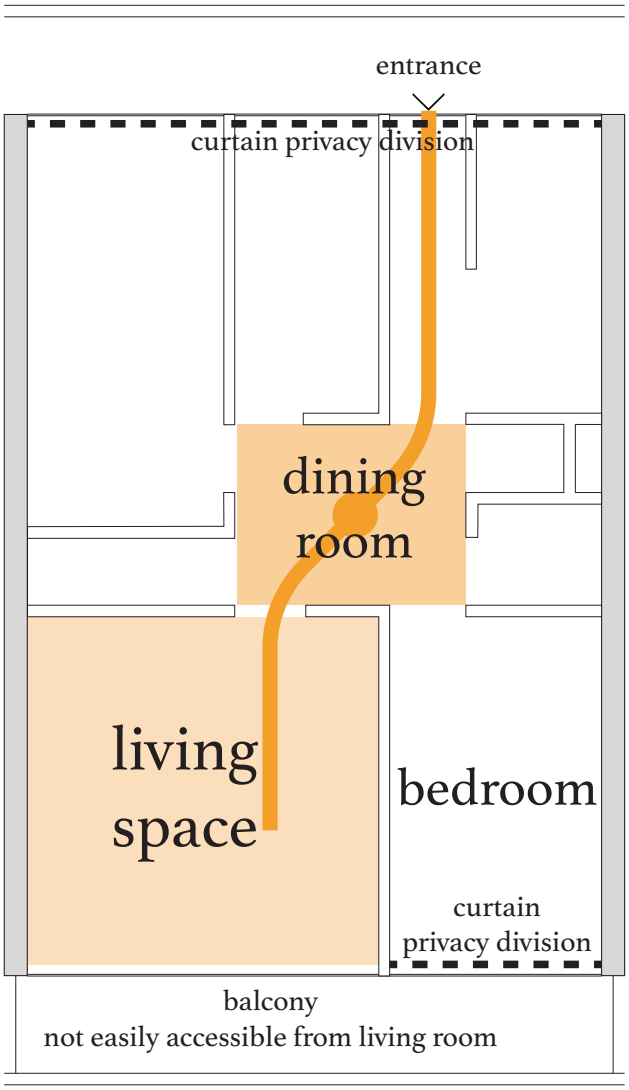


Fig. 120. Flat # 2 plan

Rita van Eeuwen

Has been living in the flat for 22 years
Has been living alone since her husband passed away 6 years ago.

Rita has been living in Ommoord almost her whole live. Her sister lives in the same building. Rita has a second residence in the summer months, a 'tuinhuisje' outside Ommoord.

How would you describe the quality of living:

Rita is very satisfied with the neighborhood and has been living in the area since childhood. There is no need for her to go to the center of Rotterdam because everything is nearby. Rita is happy with all facilities in its surroundings and find it 'gezellig'.

What would you like to change?
A number of things can be improved according to Rita in the flat. Rita is experiencing severe nuisance of their Somali neighbors above (mother and 4 small children). She experiences lots of noise nuisance, garbage being trout down onto her balcony etc. The degree of disturbance is of such that Rita really wants her upstairs neighbors to move out. "I will not stop until they're gone'
The upstairs neighbor managed to insulate their floor with a sound-absorbing layer. This was unfortunately not enough.

Rita has curtains on the side of the gallery, but this is for decoration. Rita loves the contact she has with other residents through the kitchen window. Rita has good and close contact with her neighbors in the gallery but misses a meeting place where she can drink coffee with the other residents. There was once an office of the caretaker on the ground floor where residents could meet and drink a cup of coffee but this is now no longer open.

Fig. 121. Flat # 2

Fig. 122. Flat # 2

Fig. 123. Flat # 2

Fig. 124. Flat # 2

Fig. 125. Flat # 2

1.6.3 Flat Observation #3

Accessibility?!

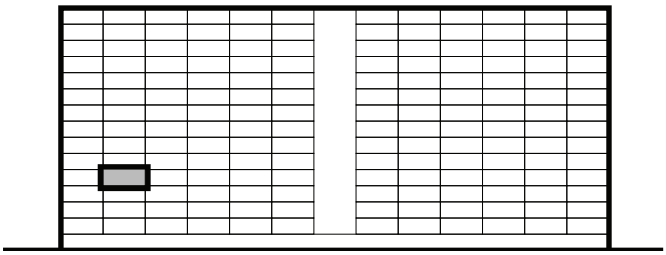


Fig. 126. Flat # 3 Location

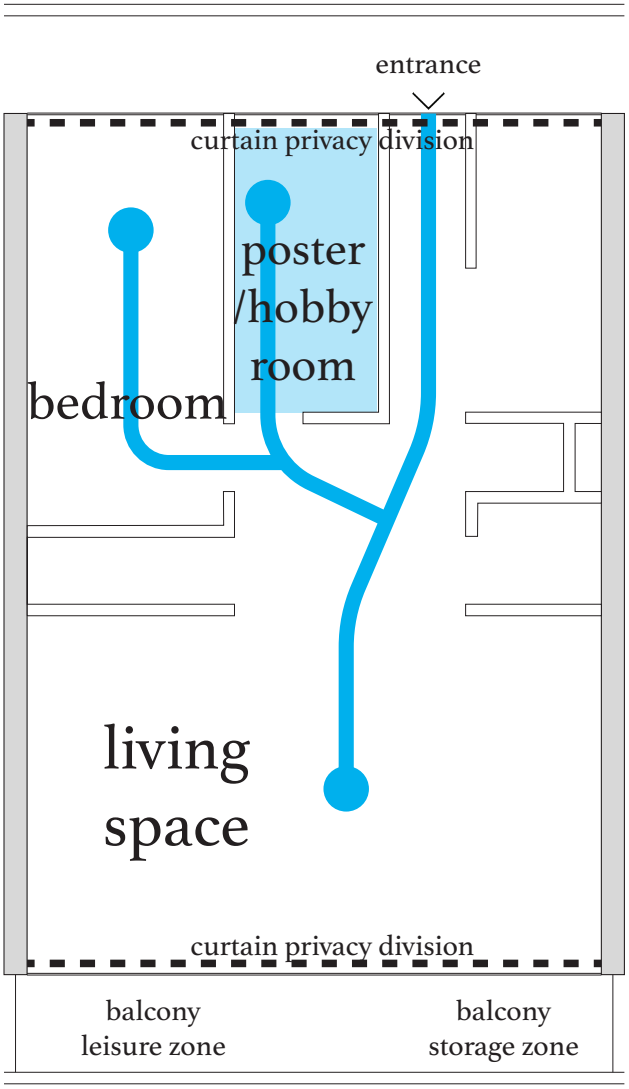


Fig. 127. Flat # 3 plan

Jan Westwijk

Jan is living alone since the passing away of his wife.
Jan has lived in the flat since the completion of the buildings in 1970.
Jan is remarried to his new wife from Chili. She stayed with him two months and is coming back in December. Jan is disabled and has a wheelchair.

Quality of living:
Jan used to do lots of volunteer work for the neighbourhood. He did this together with his wife. Together they owned a cafe/ restaurant at the childrens' farm in Ommoord. He worked here for 18 years (1979-1995). 'Everybody knows who I am'. Ommoord has sentimental value to him.

What would you like to change?

Jan is satisfied with the layout and design of his flat and wouldn't change a thing. Even though Jan had trouble opening his front door for us. We felt like the hall way was very impractical for a disabled man.

Jan has closed the curtains in the kitchen because he is no longer able to open it himself.
Jan has a lot of contact with his neighbors of the gallery, they often help him out. He has however no contact with the immigrants in the flat.
Jan has removed the wall in the living room when the children had left home.
Jan has recently married a women from chili who he had never met but she keeps him company for a couple of months in the year. "It was not love'

Fig. 128. Flat # 3

Fig. 129. Flat # 3

Fig. 130. Flat # 3

Fig. 131. Flat # 3

Fig. 132. Flat # 3

1.6.4 Flat Observation #4

The white house

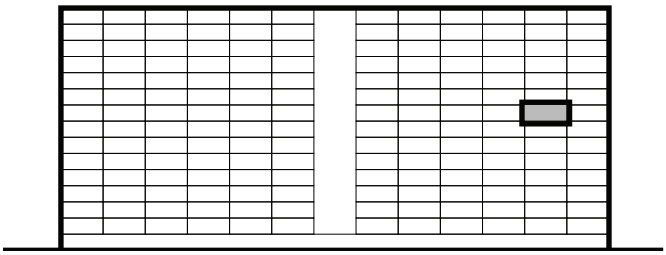


Fig. 133. Flat # 4 Location

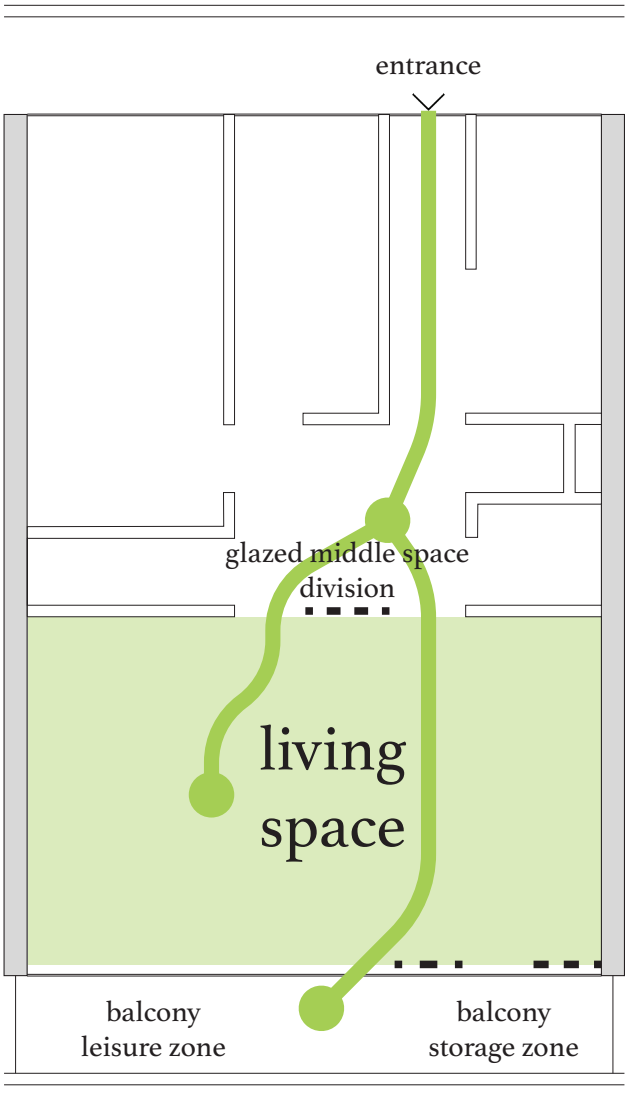


Fig. 134. Flat # 4 plan

Ruud & Will

Have been living there for 22 years.
Used to live in the flat with their two children.

Quality of living:

View and living in a green park with good access to public transport. I can take the metro and I'm in the city right away. I'm always glad when I get back home after an exhausting day in the city. We really enjoy the peace here.

Ruud & Will enjoy living in the flat and would not go away for anything. They love the nice green environment and all the facilities. They have good contact with the people on the gallery. They have small talks but don't feel the need to visit each others homes. Will does not like decorating the window and doesn't want to close the kitchen window off. She doesn't feel like they need the extra privacy. Will often takes the metro to go to the centre for fun.

What would you like to change?
Ruud and Will think that the neighborhood has deteriorated. The elderly disappear and are replaced by immigrants. The don't feel like the immigrants want to have a relationship or contact with the Dutch tenants.

They are satisfied with the baseboard heat. Ruud and Will will only leave 'between six boards'.

Fig. 135. Flat # 4

Fig. 136. Flat # 4

Fig. 137. Flat # 4

Fig. 138. Flat # 4

Fig. 139. Flat # 4

Fig. 140. Flat # 4

1.6.5 Flat Observation #5

Silver Fox

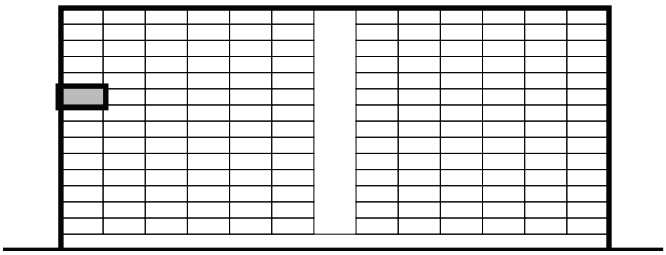


Fig. 141. Flat # 5 Location

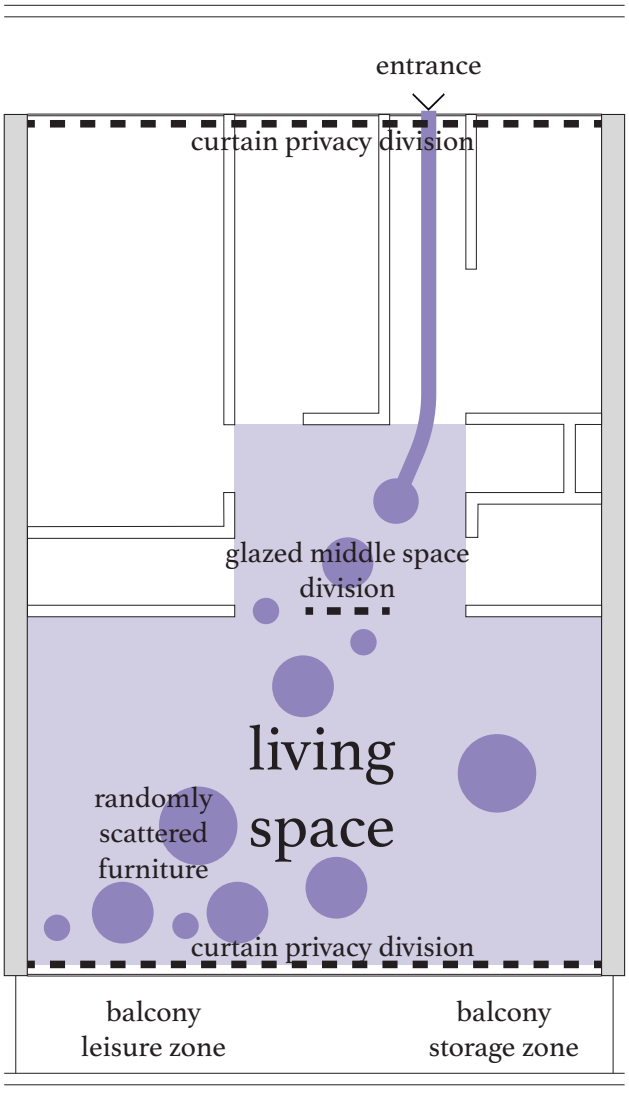


Fig. 142. Flat # 5 plan

Wim

Wim lives alone since the passing away of his partner.
Wim has been living in the flat for 21 years.

What is the quality of living:

Has all the facilities nearby. Things like friends, physio, shopping, subway etc. Doesn't want to live anywhere else. "I'm in Rotterdam in 20 minutes!' He has close contact with the people on the gallery and feels part of the community.

What would you like to change?
Wim is very satisfied with his living situation and wouldn't really change anything. He does however feel like the neighborhood is changing. More and more immigrants are replacing the elderly Dutch people. The new people don't mingle with the Dutch people and this has a negative effect on the whole atmosphere in Ommoord. Wim feels like people can make the change by having a positive attitude.

Fig. 143. Flat # 5

Fig. 144. Flat # 5

Fig. 145. Flat # 5

Fig. 146. Flat # 5

Fig. 147. Flat # 5

Fig. 148. Flat # 5

1.6.6 Customisation

Fig. 149 Initiated Furnishing of the Apartments

Fig. 150. Entrance customisation

The flexibility of the apartment gives the inhabitants not only flexibility for the layout of their flats, but also in terms of furnishing their spaces. As visible in the furnishing initiated by the architect, the rooms get ascribed functions. When comparing those layouts to the above mentioned observations, it becomes clear that most people stuck to those assigned functions (fig. 149).

Since the observations were mainly made in apartments of couples without children (or grown up children) or widowed inhabitants living on their own, most of the them found new functions for the spare rooms and removed the wall between the living room and one of the sleeping rooms.

An exception in this is Rita van Eeuwen. Even though, she is living on her own, she did not remove walls. Instead she moved the dining table to the hall way and kept the other sleeping rooms as guest rooms.

Besides that, the observation of Jan Westwijk's apartment shows that there is not enough accessibility is given in the building. The threshold at the entrance is bridged by a small added ramp so that Jan Westwijk can enter. But besides that he is not able to use every part of his flat in a proper way. The kitchen and the doors are too narrow and he is not able to get on to his own balcony, due to another threshold.

Besides the customization of the flat many people in the ERA-buildings decorated their front doors (fig 150). It seems like the inhabitants of those flats try to break with the anonymity of the contractors architecture.

While I approach the building its hard to recognize my own front door. As typical gallery flats contain more than 100 generic dwellings, resulting in a very repetitive facade, I have to count rows and columns to locate my home.

This customisation of the apartments together with the decoration of the entrances show clearly the urgency of the inhabitants to identify with their living space and the need to break the anonymity of the building.

Additionally, the equipment of the flat is often outdated. The fixed furniture like the kitchen and the bathroom equipments needs to be replaced in a lot of apartments.

Important to notice is, that we mainly met elderly peoples during our observations. This is partly reflecting the demographics of Ommoord, but might be effected by the daytime of the observations. Since we made the observations during a Monday morning and early afternoon, there is a high chance that young families, young couples and young singles were at work, and therefore not at home.

The question how other target groups experience their life in the ERA-buildings occurs and can just be answered by guessing.
Since some of the interviewed inhabitants stated that they do not like it, that the neighbourhood changes and more and more immigrants move to Ommoord, it seems evident to have a look on the life of them.

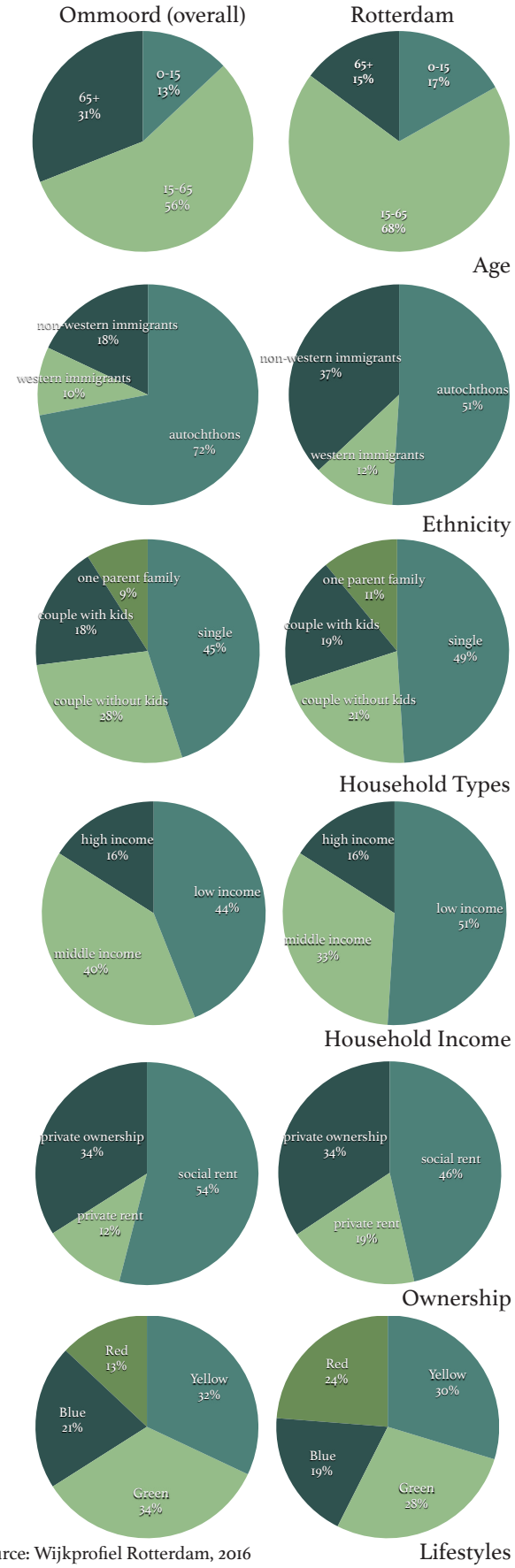
We do know from the complains of Rita van Eeuwen that she a Somalian woman lives above her with 4 children. Thus the in this apartment there are in total five persons living. The size and the layout of the flat do not support this family composition and it is no surprise that Rita van Eeuwen complains about noise nuisance.
Since many flats in the ERA-buildings are property of social housing companies, there is a high probability that the demographics change to a low income group. Because of that there is also a high chance that more and more immigrants are moving there, also current happenings like conflicts in different parts of the world might have an impact on the demographics, due to higher numbers of refugees coming to the Netherlands. As part of the low income group it might be that they will move to Ommoord. Family compositions as the Somalian family are due their different culture also possible.

Besides that, there is a trend of an increasing number of single households in the Netherlands and the question occurs if the layout of the flat with a big living-room and two sleeping rooms and the flat size itself is still suitable.

This shows that the flexibility of the flat reaches its limits when the number of inhabitants is too big or too small. Even though the apartments itself are flexible, the building is not.

1.6.7 Demographics

Fig. 151. Comparative demographics charts



Source: Wijkprofiel Rotterdam, 2016

The composition of Ommoord consists of a relatively large concentration of elderly people, nearly double the percentage of that for the whole city of Rotterdam. Therefore, there is an ageing population whose needs have to be addressed within the framework of any design decision. Also, the population of Ommoord consists mainly of autochthons with fewer immigrants compared to the city of Rotterdam. Thus, the population of the neighbourhood is quite homogeneous without facing major challenges related to cultural integration. Moreover, most households are made up of single persons, being quite comparable with the overall Rotterdam situation. The various household types suggest the need for housing typology supply that reflects more on the demands of specific groups. In addition, most of Ommoord's residents fall into a low to middle income range. However, there is a greater number of middle income households, compared to that of Rotterdam. Regarding the ownership status of properties in Ommoord, there are less social rent properties than Rotterdam and more private ones. Considering the households' income and the ownership status, it seems that the number of people meeting the circumstances for social rent in Ommoord are less, with its residents being better off than the average. Finally, taking different lifestyles into account, the residents of Ommoord have a relatively strong social cohesion with family playing an important role. Social interactions in more exclusive circles are also quite important with some tendencies towards career and social status. However, there is much less importance in freedom and total independence, as a result of the aforementioned population composition.

NOTES ON LIFESTYLES (SmartAgent, de Grote Woontest 2012)
Yellow: engagement and harmony. Yellow is committed to social contacts in the area. The family occupies a central position. Yellow consumer focuses on the residential neighbourhood and is charmed by traditional and cosy living.
Green: security and certainty. The Green group is group oriented, but has a much less open character. It moves in a small circle of family and neighbours with which it has intensive contacts. Residential ambitions are modest.
Blue: ambition and control. The blue group is very intensive and driven by its career progress. Status is considered important. Blue focuses on quiet, spacious living environments, but also in (high) urban locations.
Red: freedom and flexibility. The Red Group is a consumer with a free and wilful spirit that sets independence above all else. Red has an urban orientation, without actually having actually having to live in urban settings.

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1.7 VARIATIONS

1.7.1 ERA Variations

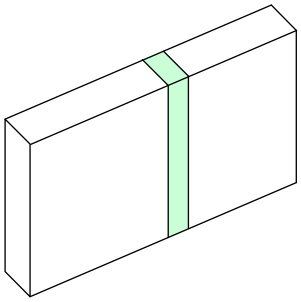

Fig. 152 standard arrangement

One unit or dwelling of the ERA-system can be seen as a module of which various arrangements can be made. The most used arrangement is the standard single block building, which has a central circulation core with elevators and a staircase that lead to the galleries in front of every level. (fig. 152, 155, 156) The standard ERA building consists of 12 dwellings on one level and the height of the building block can vary between 10 or 13 stories. The standard ERA flat can also be found in Delft, Buitenhof. Compared to the Ommoord ERA flat it is valued more negatively.

In Ommoord we can also distinguish different arrangements of the ERA modules. For instance, the knikflat, which basically consists of two standard single building blocks, which are slightly angled and connected. (fig. 153, 157, 158) This creates the bend (in Dutch 'knik'). The have two vertical circulation cores and count 23 dwellings on each floor.

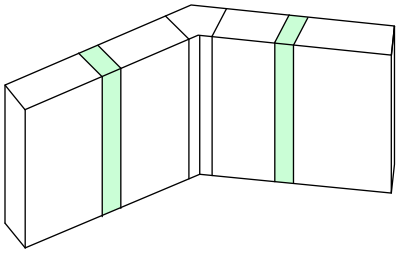

Fig. 153 'knik' arrangement

One other variant of the ERA system can be found in Delft, they are the so called sterflats. As the name already suggests they are shaped in a star formation. (fig. 154, 159, 160) The sterflat is an arrangement of three standard era flats which meet in a centre. This central core also facilitates the vertical circulation.

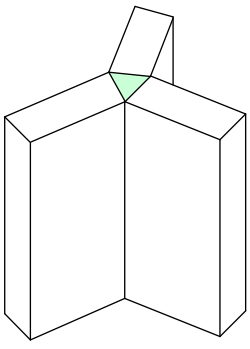

Fig. 154 'star' arrangement

The flats are in the sight lines of the Buitenhofdreef and Martinus Nijhofflaan and are marked as the most important crossroads of the last large-scale expansion area in Delft. The floor plans of the first till the fourteenth floor are equal, just as the organization of the three 'points' of the star, where three gallery flats of different width are adjacent. The accuracy of the tunnel construction system with cast steel mould construction of wall-to-wall construction made it possible for the inner walls, façades, wet cells, and as complete built-in packets to be prefabricated at a factory. In 1994, the apartments have been thoroughly renovated by Draijer and Engelkes.

Fig. 155 standard arrangement

Fig. 156 standard arrangement

Fig. 157 'knik' arrangement

Fig. 158 'knik' arrangement

Fig. 159 'star' arrangement

Fig. 160 'star' arrangement

1.7.2 Other Locations
Gallery flats

Fig. 161 Location map

Location: Zaandam
Periode: 1967
Contractor: ERA Contour

In Zaandam, large new housing estates were also built, namely Poelenburg, Peldersveld and Kogerveld. (fig. 161) Initially almost all housing units were built by housing associations with loans from the government. The district Poelenburg was an exception because it was built on the initiative of the Zaandam business. The first generation of flats was built as a porch-floor building in three or four floors. The real high-rise appeared in the late sixties with the fourteen-storey ERA flats in districts such as Peldersveld, Brandaris, Pharus, Perim, North Wachter and IJdoorn. The ERA flat in Zaandam was the quick solution to the post-war quantitative housing shortage. The flats could rise rapidly due to it's rational industrial process and helped big groups of people get good and affordable living space. In recent years these apartment blocks have been renovated in a variety of ways. Because they are renovated in occupied state, the inconvenience was restricted to a minimum.

The Peldersveld district is now more than 50 years old. (fig. 162) ERA-flats have also undergone several upgrades over the years. The housing associations have given all the flats their own character, such as giving different colours to distinguish better from one another than in the initial period. Several flats are now sold as owner-occupied.

The Brandaris and Pharus Perim were built in a so-called "extended Z-shape; a middle section with a bent side wing on both sides. North Wachter and IJdoorn do not have these wings. All dwellings are built around the central hall (the arcade), where all rooms are connected to. They also have a spacious balcony over the entire width of the house. Striking were the "chutes", allowing residents to throw their garbage from their own floor to the ground floor.

Lately, these districts in Zaandam have had some negative publicity. Poelenburg is nowadays more know for its bad reputation. The district is now nationally known as the site where a group of young people creates a lot of inconvenience for other inhabitants.

Fig. 162 ERA Zaandam

Fig. 163 Location map

Location: Amsterdam
Periode: 1968-'69
Architect: Siegfried Nassuth

The Bijlmermeer (or Bijlmer) is a residential area of Amsterdam in Amsterdam-South, in the Dutch province of North Holland. (fig. 163) In the past this area was marked by high-rise buildings of ten floors in a typical hexagonal honeycomb structure and greenery, which was built in between 1968-'69.

The Bijlmermeer was characterized by its high-rise flats in honeycomb structure. (fig. 164) In the renewal of the Bijlmer, most high-rise flats were replaced by low- and new construction. Some flats, or (small) parts, escaped demolition and were renovated.

At the renovated apartments the outer walls have been replaced largely and the (semi-) public space has been addressed. (fig. 165) The Bijlmermeer was built as a 'model' district, a district for the modern man. In practice, this was not consistent, the Bijlmermeer was within the ten following years nationally known for its social problems. Because the level of facilities in the district lagged behind expectations at the time of construction and because the modern, spacious apartments had to compete with new single-family homes elsewhere in the region, the Amsterdam families stayed away. The design for the Bijlmer lacked diversity in the housing, making it sensitive to the developments in the Amsterdam housing market.

Instead concentrated large groups of working class in the district, including many immigrants from the colony gained independence in 1975, Suriname. Some places in the Bijlmermeer were plagued by crime, degradation and menace. There was also considerable unemployment. It turned out, that this modern idea of the functional city was less functional than expected. The strict separation of living, working and recreation ensured that some parts of the Bijlmer turned into deserted ghost towns during the night.

A large part of the high-rise building has been demolished and replaced with smaller homes, including many housing in the owner-occupied sector.

Fig. 164 Bijlmer

Fig. 165 Bijlmer

Fig. 166 Location map

Location: Delft
Periode: 1979
Architect: Fledderus, R.

Buitenhof is a wide-ranging post-war neighbourhood with wide access roads, greenery and plenty of water in Delft. (fig. 166) The lanes and canals cut through the neighbourhood defining residential neighbourhoods with their own atmosphere. The area is characterised by great diversity, in terms of buildings and population.

In the Buitenhof district there are several gallery flats including the ERA-flats and three-star apartment in Gillis / Diepenbrock. As of January 1, 2002 there are about 14,837 people in Buitenhof, making it the largest district of Delft.

In 2002 the gardens and pavement at the ERA-flats were renovated, as well as the flats themselves. There was a hefty redesign of the green and pavement around the Listz- and Franck flats.

Like other projects mentioned before, also this neighbourhood had some bad promotion. The socio-economic situation of some of the Buitenhof relative low to the rest of Delft and many families live on a minimum income. Parts of the Buitenhof are characterised as a so-called problem area. Buitenhof is a typical sixties and seventies expansion area. The district consists of many gallery flats, placed in a spacious green area. (fig. 168)

A good example of this cooperation is the approach of the gardens and pavement at the ERA-flats and the open Gillis in 2002. (fig. 167)
In 2002, a large-scale renovation instead of the ERA-flats and a hefty redesign of the green and pavement around the Listz- and Franck flats. In the green 28 uprooted trees, shrub planting was pruned and there were 165,000 bulbs planted. Strips of green were converted at the request of residents, asphalt paths were refurbished, the banks of the “so called” egg were rearranged and a picnic table was placed. The grass plot to Mozartlaan got a major makeover. The work began in late 2002 and completion is scheduled for the first quarter of 2003.

Fig. 167 Buitenhof

Fig. 168 Buitenhof

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1.8 CULTURAL VALUE

1.8 Cultural Value Statement

The site of Ommoord is the legacy of the 9th CIAM congress and is therefore of significant architectural, historical value. It is one of the finest, unspoilt examples of modernist planning on such a big scale. The artistic intention of the planners was to create a landscape dominated by long axes and views. (fig. 169) Their intention is realised in the form of long linear structures with expressive, repetitive elements that stress the horizontality and monumentality of the built environment. The original landscape design comes in contrast with this intention using more organic and free shape forms to relate to human scale. The structure, constructed using the ERA method, remains today in perfect shape giving it a very strong use value. (fig. 171) Due to that and in terms of **sustainability** it is one of the main priorities that the structure continues to play its role for years to come. In addition, the structure allows for great **flexibility** in terms of individual unit floor plan, thus providing the opportunity to accommodate changing lifestyles. (fig. 170)

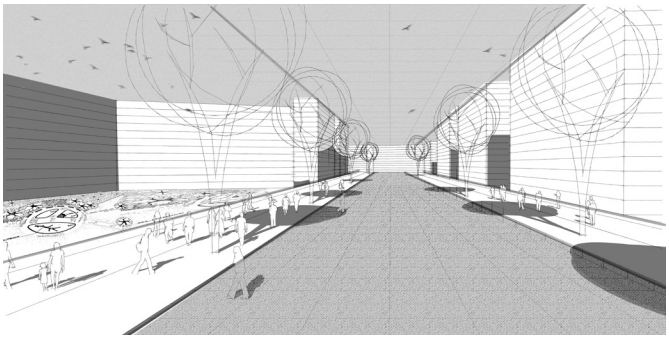

Fig. 169 axes/views

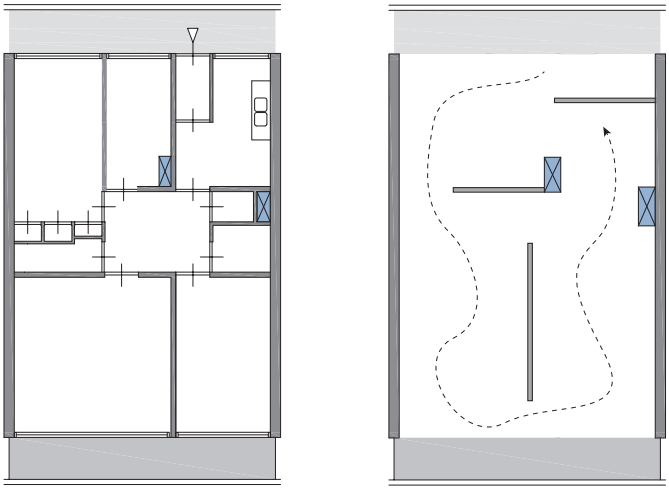

Fig. 170. flexibility

Fig. 171. structure

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1.9 CONCLUSIONS

1.9 Conclusions

A house was the place that the people after the end of WWII needed the most to establish their long gone sense of safety and security to raise and nurture their growing families. Under extreme pressure on the housing sector caused by the booming population, the Dutch government had to come up with ways to tackle the housing shortage especially in the mass destructed cities. There was a need for quick, innovative, and cost effective solutions to restructure the post war cities and focus mainly on the production of new dwellings. The neighbourhood of Ommoord was created under such circumstances. Architects and planners came in with visionary plans for new housing estates. After long years of eclectic styles, there was a new trend among them for a new architecture characterised by equality and transparency reflected on the design of dwellings. The main answer to the housing shortage, was the modernist high-rise estate in the park, a long linear, block with flats stacked on top of another, of which examples are the buildings constructed with the ERA system.

The development of Ommoord was a subject of discussion at the 9th CIAM congress, where its design foundations were set. The result was based on modernist principles, which are reflected in all aspects of the urban plan. One of the main issues about site planning was the separation of traffic. The site consists of an extensive network of circulation dedicated routes, including streets, pedestrian paths, cycle paths and public transport infrastructure. The site, although relatively far from Rotterdam city centre, is very well linked through the metro network providing the required accessibility to main transport hubs for the residents. In addition, there is an extensive street network, without through routes and most streets ending in dedicated car park spaces, resulting in calm traffic across the site. The distance from the city centre might account for the need of car and the provision of car park spaces for the residents, despite the good public transport links.

Also, the artistic intention of the planners and architects was the creation of long axes and views composed of vertical and horizontal planes. The scale of buildings is rather large evoking a sense of grandeur and contrasting with the human scale. The effect is not as clear on a site level anymore due to the growing greenery between the buildings. Also, the intention is not that relevant nowadays, which becomes obvious with the introduction of more irregular building plans.

The site mainly consists of high rise blocks placed in large public green spaces. The green space aimed for recreation and outdoor activities is not as extensively used as intended. The ground floor in all blocks is dedicated to storage and there are consequently no apartments with direct access to the green space, resulting in hard boundaries between the green and the buildings. As a result, the public space feels rather secluded and isolated from the surrounding buildings, which could highlight the need for new ground floor functions in order to activate the public space. Nonetheless, the green space provides a nice backdrop for the dwellings that can enjoy the views of mature greenery from within their flats.

The ERA blocks have a very rational structure made of tunnel forms, with each tunnel defining a single dwelling. The tunnel system creates a great level of flexibility on unit level, providing the freedom for various internal configurations due to its big span and the lack of any structural elements within. Flexibility, is quite important when catering for the needs of continually changing lifestyles. However, considering the whole building, the repetitive structure poses limitations in terms of variation. The resulting dwelling units have exactly the same size across the entire building, limiting the opportunity for providing additional housing typologies to attract different target groups. The intention of providing typology variations, especially bigger ones, would possibly require a costly intervention to the structure. Providing smaller typologies could be more straightforward, working within the relatively spacious tunnel form.

Moreover, the concrete structure is in very good state, being built in the 1970's. It is serving its structural function today and can continue to do so in the future considering that it is not exposed to any natural phenomena that could cause it to decay. To be built, it required effort and material, relating to the concept of embodied energy. When it comes to the future of the structure, it is important that it is maintained to address sustainability. Maintaining a structure of this scale is more economical and can save considerable human and material resources.

The ERA blocks were designed for efficiency, with the role of the architects being very limited. That's the reason it is usually categorised as contractor's architecture. Consequently, the aesthetics did not play a big role in the building design. Despite the lack of thoughtful aesthetics consideration, there is a strong resulting image. The blocks are composed of long linear elements, such as the balconies and expressed floor slabs, stressing their horizontality. The glazed areas infill the gaps between the structure enhancing transparency and good daylight conditions inside. Elements such as windows and handrails that form the skin of the building, are repeatedly used in every single dwelling unit. . This creates a sense of anonymity, which went in line with the intention of equality among the Dutch society at the time. Nowadays, the anonymity remains making it hard for the residents to relate to the building and as a result there are signs of personal expression in the façades.

At the time when the ERA blocks were constructed, sustainability was not a major concern. As a result, when it comes to energy saving, the buildings would massively fail in current standards. Due to poor detailing, there is insufficient insulation and there are many cases where thermal bridges occur resulting in an uncomfortable indoor climate and cases of condensation. To address such issues action would have to be taken, including more insulation layers and resolving the poor detailing. In such case, interventions at the skin of the building could completely change its image and could possibly interfere with its current visual aesthetic and composition.
Furthermore, considering the age of the building and the technological advancements at the time it was built, the services, including heating and ventilation, are not very efficient when compared to current sophisticated climate systems. Therefore, the current services might end up quite costly to run and do not provide comfortable and healthy indoor living environments, highlighting the need for them to be updated. What is more, most of the services runs and controls are accommodated in shafts and cupboards, whose location in the floor plan might interfere with the overall flexibility and dictate the positioning of functions in internal layouts. Additionally, much of the piping and cabling is exposed, affecting with the aesthetics of internal rooms.

When it comes to the space plan of the individual unit, as discussed before, it is characterised by great flexibility in spatial configurations. Existing internal layouts are quite functional but not necessarily correspond to contemporary living standards. Main issues are the disproportionate and compartmentalised rooms. Also, despite the existence of outdoor space, its proportions do not allow to be used to its full potential. Another issue of layout and use has to do with the ground floor store rooms that create the blind plinth. As stated above, the introduction of new functions in this space could create more social control on ground level and enhance the feeling of safety and security.

The entrance of a flat is always situated on one side of the building. This means that the other side of the building creates a barrier in the urban layout of Ommoord. It disconnects the galleries from the public green space. The green space is often organized on the balcony side of the building and the parking spaces on the entrance side of the building. The flats could benefit from an entrance which is connected to the front and the back of the building to improve the connection and circulation to the public space.

The ERA block, is a typical gallery typology. Access to the galleries is provided by a central circulation core. The gallery was quite common in high-rise developments of the past but is not the most preferable option in contemporary buildings. Galleries can cause discomfort as far as privacy is concerned as passer-by's can look directly into the flats. Residents have tried to address the issue by adding curtains, showing their concern about privacy. The gallery's size in the ERA blocks, dictates that the distance between the passer-by and the dwellings' hard boundary is very small, without any buffer zone between the public and private zone. The combination of the gallery and the high rise may create exposure to more intense weather phenomena, with winds being stronger in higher levels and opening doors facing such weather conditions directly. Despite the gallery's drawbacks it still serves the function of a social space, as it is where most resident encounters take place.

Finally, the residents of Ommoord have occupied their space and adjusted it according to their needs, creating their small "worlds" inside. However, the rapidly ageing population of Ommoord denotes the end of an era and the changes that are about to occur in the near future. The flats were mainly intended for families but the current composition of the population does not reflect that need anymore. Single households are becoming more and more common. Also, our societies are becoming more culturally mixed with immigration being on the rise. As a result, the changing population and the need for new typologies could provide the opportunity for regeneration, renewal and the creation of something new standing up to everyone's expectations and promoting an enhanced quality of living.

2. TRANSFORMATION APPROACH

2.1 General Information

Bois-Le-Prêtre Tower Block, Paris

Fig. 172. Original state (Ayers, 2011)

Fig. 173. After the First Renovation (Anon., n.d.)

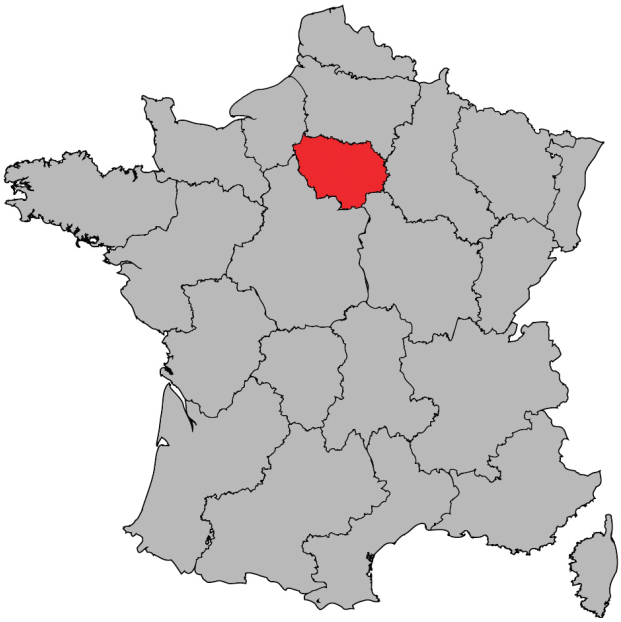


Fig. 174. Location map

Promotor: Offices Publics de l'Aménagement et de la Construction (OPAC), Paris.
Location: Boulevard Bois-le-Prêtre, Paris.
Programme: 97 flats (96 flats + a caretaker's flat).
Surface area: 6,288 existing usable m2 + 5,400 m2 enlargement (including surface areas of the balconies), total: 11,688 m2.

Architects: Frédéric Druot, Anne Lacaton & Jean-Philippe Vassal.
Engineers: VP & Green Ingénierie, INEX.
Budgeting: E21.

Project Period: 2005-2011
Costs: 11,250,000 € (112,000€ per appatment) (Druot, Lacaton, & Vassal, 2007)

The Bois-lePrêtre tower block is situated in Paris, in a complex of high-rise buildings next to the Paris ring road in the north (Druot, Lacaton, & Vassal, 2007).
The building was constructed between 1958 and 1961 by Raymond Lopez. After a thermal renovation in the 1980's, the elegance of the tower was gone and left behind was an anonymous high-rise tower.

The building consists of 16 storeys with 96 apartments.
When the discussion came to the demolition of the tower, Lacaton & Vassal made a renovation proposal which saved the construction and turned out to be more affordable than the demolition and a new construction (Anon., 2012).

Knikflats Ommoord, Rotterdam

Fig. 175. Before the Renovation (Kuijpers, Wessels, Stunnenberg, & Jaarsma, 2009)

Fig. 176. Location map

Promotor: Woonbron, Rotterdam i.s.m. klankbordgroep bewoners
Programme: 4 knikflats, each 176 existing flats
Surface area: 17.280 m² (including surface areas of the balconies and galleries)

Architects: biq architecten
Engineers: Pieters, Delft
Budgeting: Van der Ree & Vermeulen, 's-Gravenpolder
(biq, n.d.)
Project Period: 1999-2009
Costs: 70,000,000 € (99,431 € per appartment)
(Kuijpers, Wessels, Stunnenberg, & Jaarsma, 2009)

The project was erected in 1969 in Ommoord, a neighbourhood in the east of Rotterdam. The applied building system is called RBM. Each building contains around 176 apartments. The number of apartments increased in some of the projects.
A renovation was carried out on four of those buildings. The focus of this analysis will be put on just two of the buildings, due to the common approach and result. The buildings are situated at the Niels Bohrplaats and Einsteinplaats. Data will nevertheless talk about all four renovated buildings.
Instead of the inhabitants carrying out the desired improvement, the building was renovated entirely and improved (Kuijpers, Wessels, Stunnenberg, & Jaarsma, 2009).

2.2 Transformation - Current State

Basement and Groundfloor

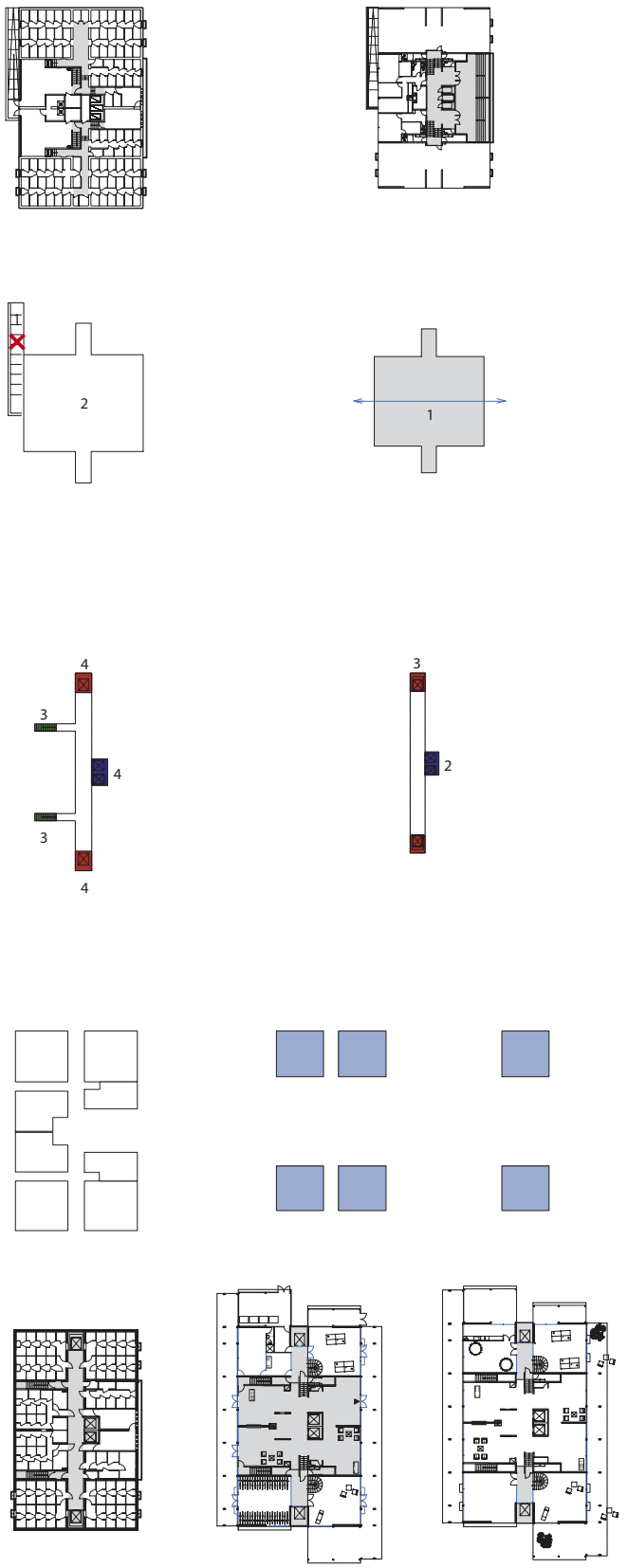


Fig. 177. (Druot, Lacaton, & Vassal, 2007)

Bois-Le-Prêtre Tower Block, Paris

Basement

In the current state of the basement, there was a ramp leading down from the ground level. Furthermore, there were several height differences within the basement, which result from the arrangement of the rest of the building as a split level organisation. The use of the basement storage space for the apartments gets complicated due to that. Besides, over the ramp the storage rooms were just reachable by the use of elevators.

In the transformation the ramp disappeared. To simplify the use of the storage the height differences disappeared. Instead of an access over the ramp and the small elevators, there are now two staircases leading from the hallway of the ground floor. Furthermore, the storage rooms got reorganised into eight closed units.

Ground floor

Also, at the ground floor the split level organization of the buildings caused problems. There was no accessibility guaranteed. The entrance to the building was already over stairs leading upwards. The circulation on the ground floor consisted of three small lifts. Besides that, the entrance hall was narrow and did not provide a nice spacious experience.

In the transformation the ground floor level was homogenized. Instead of walking up a stair to reach the entrance, the level of the entrance is now on the ground level without any threshold. The inter-crossing hallway gives now the possibility to enter the building from both sides. To simplify the circulation of the building even more, the three small lifts got replaced with two bigger ones and there were additionally two new lifts installed at the ends of the building. Due to that, the lifts stop now on all the split levels. Additionally the rearrangement of the ground floor results in bigger communal premises. (Druot, Lacaton, & Vassal, 2007)

Ground floor

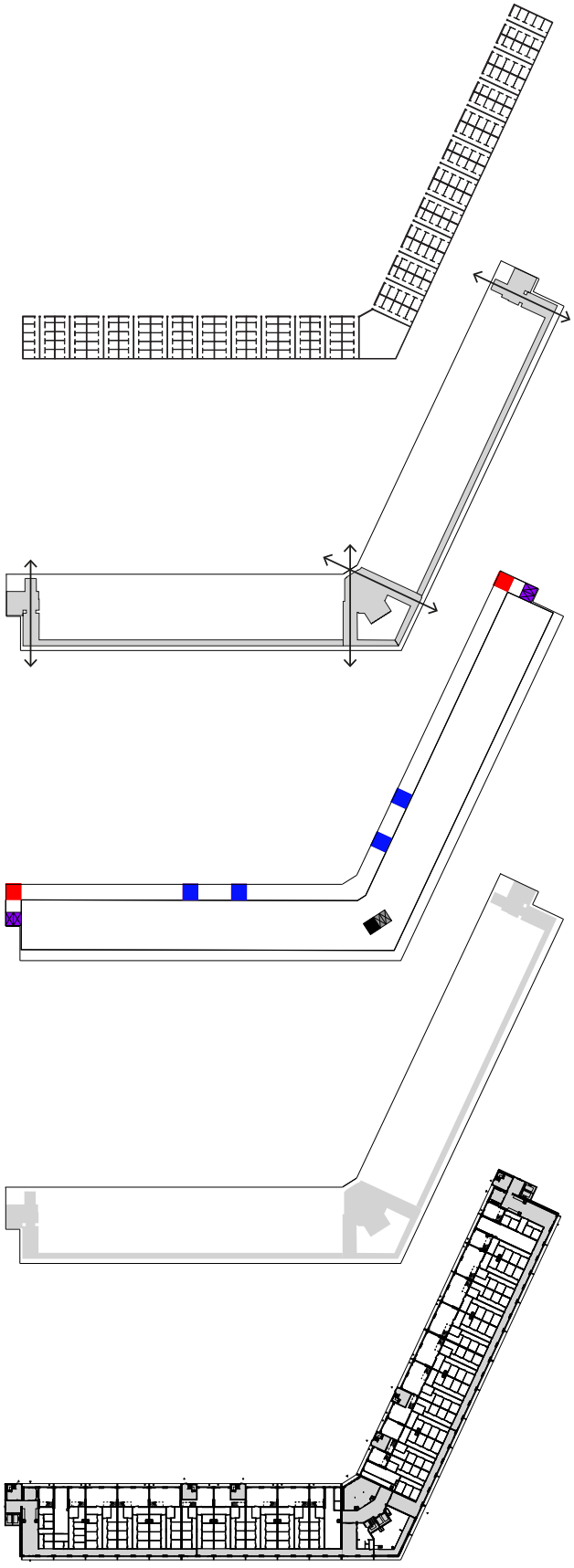


Fig. 178. (Kuijpers, Wessels, Stunnenberg, & Jaarsma, 2009)

Knikflats Ommoord, Rotterdam

The renovated knikflats in Ommoord had mainly problems with nuisance and vandalism and were perceived as boring and monotonous.
In the current state of the building there was just one entrance with one entrance hall, one staircase and two elevators, which were just serving either the even or the odd levels, serving the whole building with its 176 apartments. Besides that, due to the length of the buildings there were problems with the emergency staircases. The escape routes were too long.

In the transformation there were 2 new entrances added at either end of the building. That divides the building in three compartments. In this way, one entrance serves maximum 56 dwelling units. On all the other floors the compartments are also separated.
In each of the new entrances there were two new elevators and one staircase added. Besides that, the building got four new emergency staircases in front of it. Between two of the staircases there is a break between the 3 compartments of the building. Due to an extension of the building at the ground floor, the communal premises grew in the form of a corridor. Because of the separation of the compartments less people use these communal premises and the communication between the compartments was reduced.
Additionally, there was a rearrangement of the ground floor. As already mentioned, the building got an extension which forms the entrances to the mezzanine flats of the ground and first floor. The entrance does not only serve as access to the mezzanines, but also provides an additional room, which can be used, so that the ground floor gets more function, than just the former function of storage (Kuijpers, Wessels, Stunnenberg, & Jaarsma, 2009).

2.3 Transformation - Facade

Bois-Le-Prêtre Tower Block, Paris

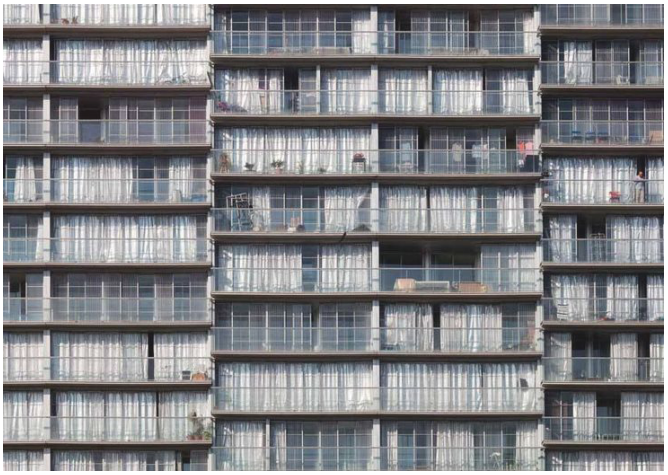
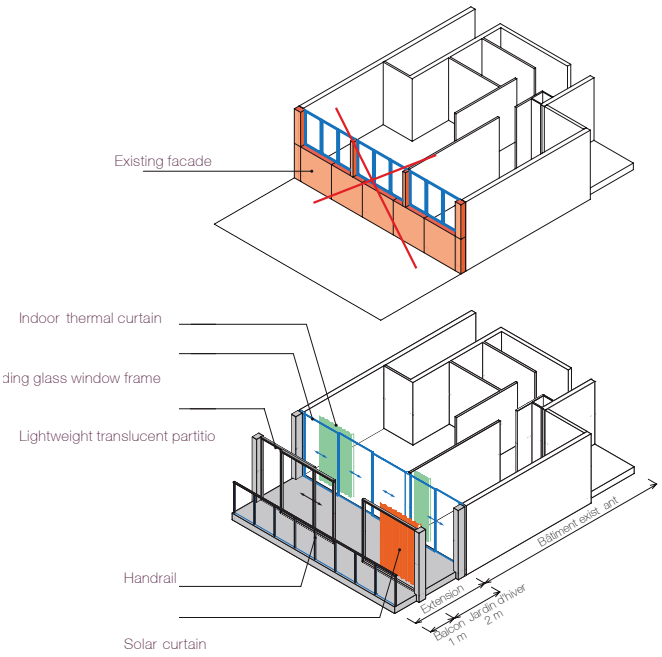


Fig. 179. Facade Impression (Anon., n.d.)



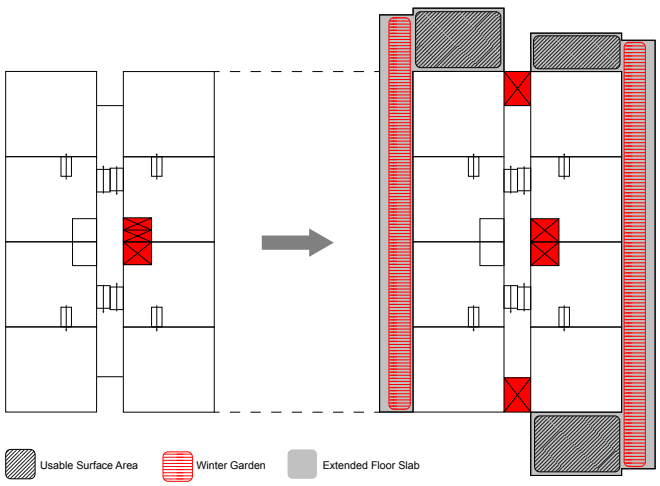


Fig. 180 (Druot, Lacaton, & Vassal, 2007)

Instead of just insulating and painting the facades again, Lacaton & Vassal proposed to remove the old facade and open it up in the same layer. Additionally, they proposed to enlarge the existing apartments by adding a new floor slab on the outside. This enlargement forms a winter garden. The winter garden extends then into a balcony in front of the winter garden. This intervention provides a new form of comfort, due to visual connections with the outside, more daylight, due to bigger openings and an improved thermal insulation, solved within the winter garden (Druot, Lacaton, & Vassal, 2007). The construction of the new winter gardens and balconies has the advantage that it is self-bearing, which actually makes the construction possible and easy. The facade was replaced by prefabricated modules and was possible while the inhabitants remained in their flats. Integrated in the facade are curtains one in the winter garden at the screen towards the outside, which is a solar curtain, used in summer time to keep the sun outside and another in the inside of the apartments, which is a thermal curtain, used in winter time to keep the warmth in (Anon., 2012).

Besides that Lacaton & Vassal aim to solve all problems within the newly added skin. Besides being an extension of space and a thermal insulation, the improvement of the vertical circulation also gets integrated into the skin.

Furthermore, the transformation of the facade led to a new appearance of the facade. The faceless former facade disappeared and is transformed into a timeless, internationally accepted design which by standing out in its surroundings creates a new identity for the building and the neighborhood.

Knikflats Ommoord, Rotterdam

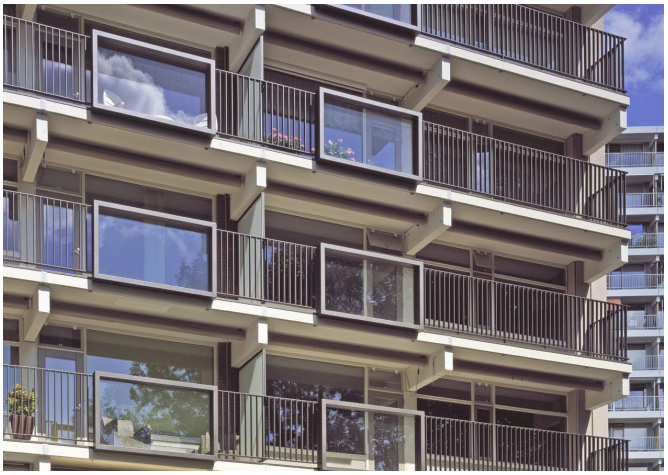


Fig. 181 Facade Impression (Kuijpers, Wessels, Stunnenberg, & Jaarsma, 2009)

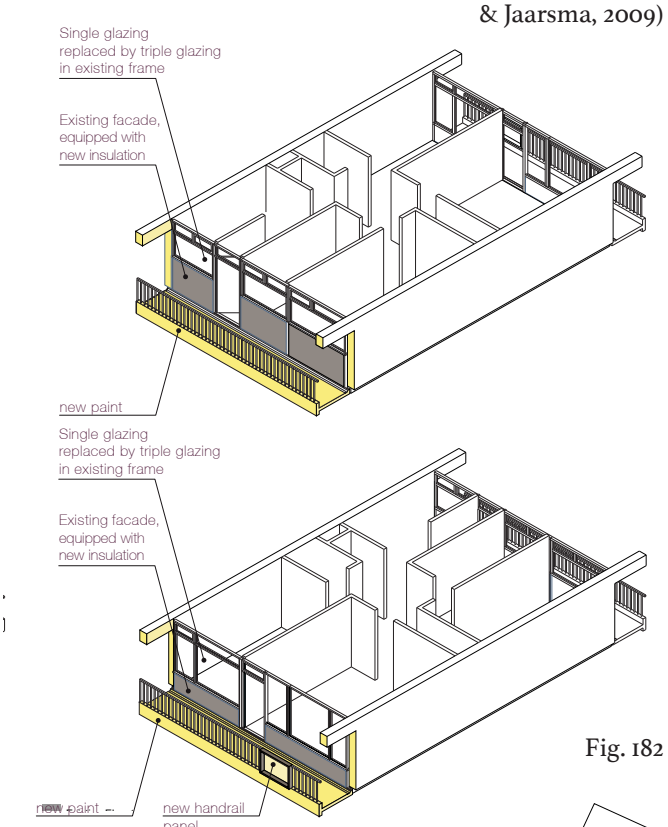


Fig. 182

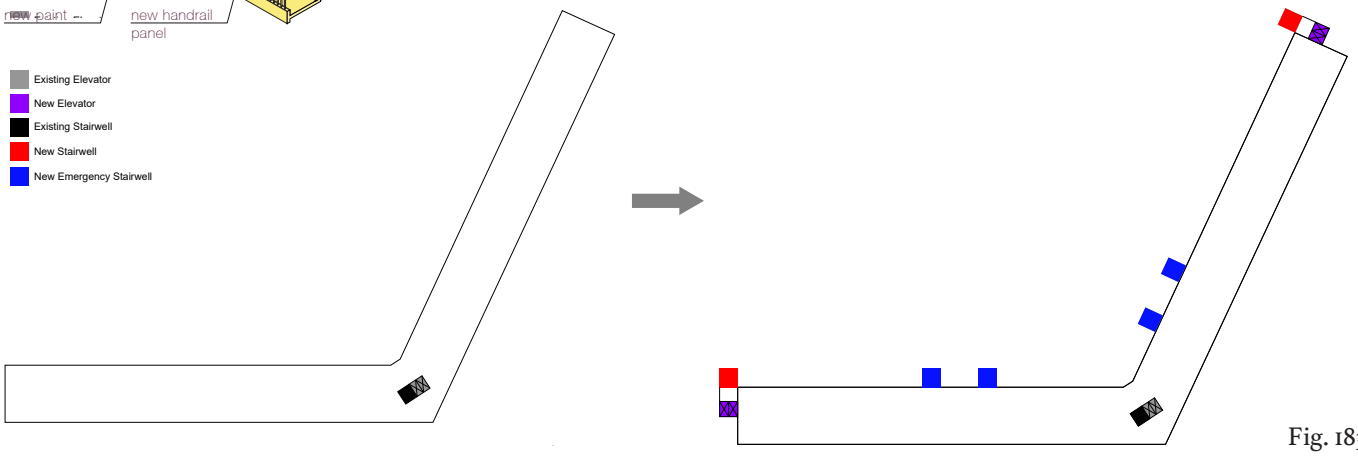


Fig. 183

The renovation of the facade in Ommoord happened in a totally different way. A thermal improvement of the facade happened in a way that the panels underneath the windows were newly insulated.

More visual impact was created through the new circulation in front of the building and the new handrails at the balconies which include feature glazed frames, providing a view to the ground and the public green space. Those two interventions break the anonymity and the monotonous appearance of the building.

The facade of the building gets divided vertically in three parts, the heavy plinth, the middle part and a continuous cornice. The plinth got extended and seems to carry the building. It is clearly separated from the rest of the building by creating a contrast in materiality.
The whole appearance of the building stays within the concept of Ommoord and stays in its appearance as “aanemers architectuur” (contractors Architecture) (Kuijpers, Wessels, Stunnenberg, & Jaarsma, 2009).

2.4 Transformation - Apartment

Bois-Le-Prêtre Tower Block, Paris

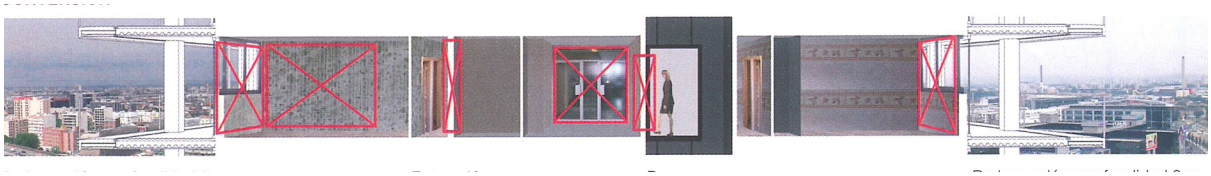


Fig. 184. (Druot, Lacaton, & Vassal, 2007)

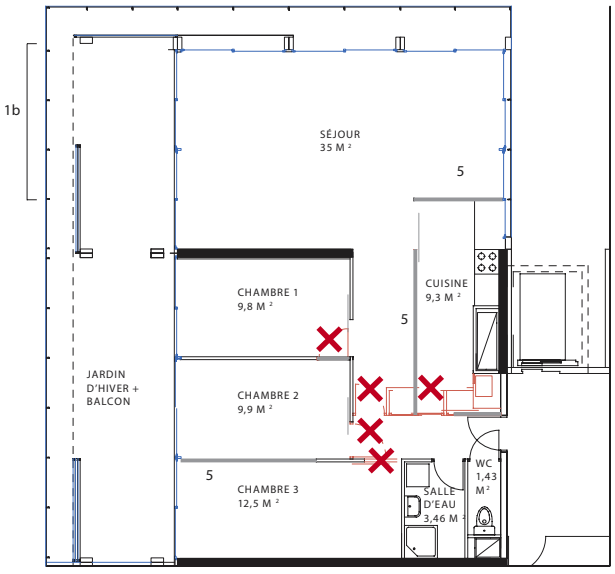


Fig. 185. Transformation Apartment (Druot, Lacaton, & Vassal, 2007)

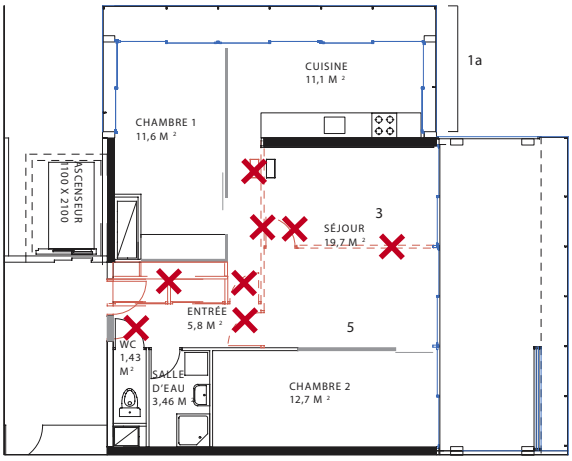


Fig. 186. Transformation Apartment (Druot, Lacaton, & Vassal, 2007)

The impacts of the transformation were kept minimal with a maximal effect. As mentioned already, it was not necessary for the inhabitants to leave there flats during the transformation process. The transformation of the flats was mainly done in extending it at the outside and enlarging the living area thereby. The inhabitants were provided with an unprogrammed space and are free in the use of it.
Additionally, the apartments were opened up, to let more daylight enter and provide new views.

Within the flats walls were taken out, if possible and suitable for the inhabitants. By that, the narrow corridors disappeared and rooms got enlarged (Druot, Lacaton, & Vassal, 2007).

Knikflats Ommoord, Rotterdam

Fig. 186.

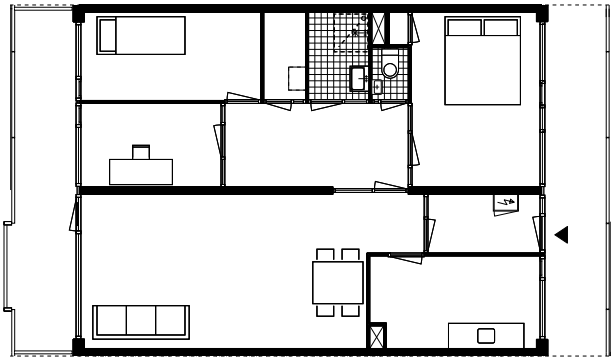


Fig. 187 Apartment Before / After (Studio LS, 2014)

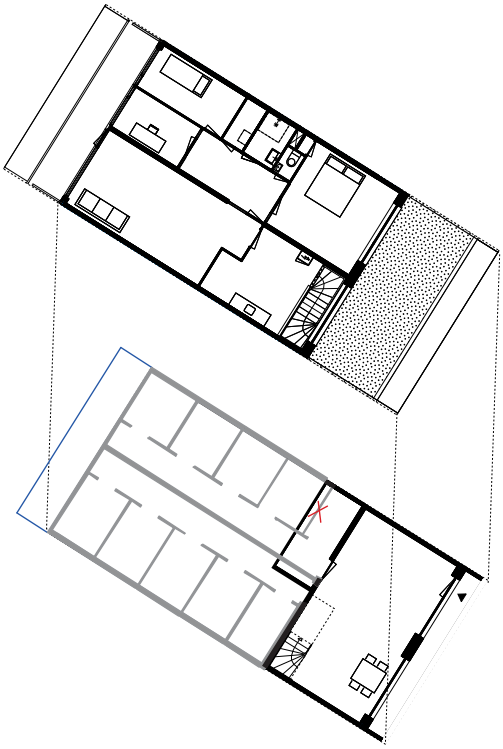


Fig. 188. Transformed Apartment

The transformation of the apartments in Ommoord were kept small.
The main interventions was to equip the apartments with new installations and adding sound insulation. The layouts of the apartments from the second floor upwards, were not changed. The renovation of the flats was done within three weeks and it was ensured that all the services in the flat were fully working every evening again.
The added sound insulation resulted in a lower ceiling height. Due to that the ceilings are now lower than they would be in a new building.

The apartments at the ground floor had to deal with bigger interventions. Due to the transformation into a mezzanine apartment the transformation was more complicated. The apartments also got bigger by getting the gallery space as part of their flat (Kuijpers, Wessels, Stunnenberg, & Jaarsma, 2009).

2.5 Approach

Bois-Le-Prêtre Tower Block, Paris

The overall approach of Lacaton & Vassal is to improve the quality of living of the inhabitants. The approach is mainly applied on existing buildings. By that they manage to save the buildings from being demolished. Another important point in their approach is a social aspect. The inhabitants are provided with new qualities, which are focused on providing them with an unprogrammed extra space, which is meant to improve their quality of living in an affordable way. The extra space gives the possibility to develop their own individuality. Furthermore, the quality of the existing flat is improved in terms of climate, daylight and spacious feeling.
Also important in their approach is the idea of solving all the problems if possible within the envelop.
Since Lacaton & Vassal apply their approach on buildings, which would be demolished, their is no great appreciation of the existing. The buildings are often declared as non-habitable anymore and the former qualities are often already destroyed, as in the case of the Bois-le-Prêtre tower block by a former intervention.
By analysing the approach of Lacaton & Vassal superficially, it often seems like they copy their own system to all their renovation projects. One could argue that the renovation lacks in variety and thereby in a lack of identity for the locations in which the buildings are situated in.

Fig. 189. (Frearson, 2013)

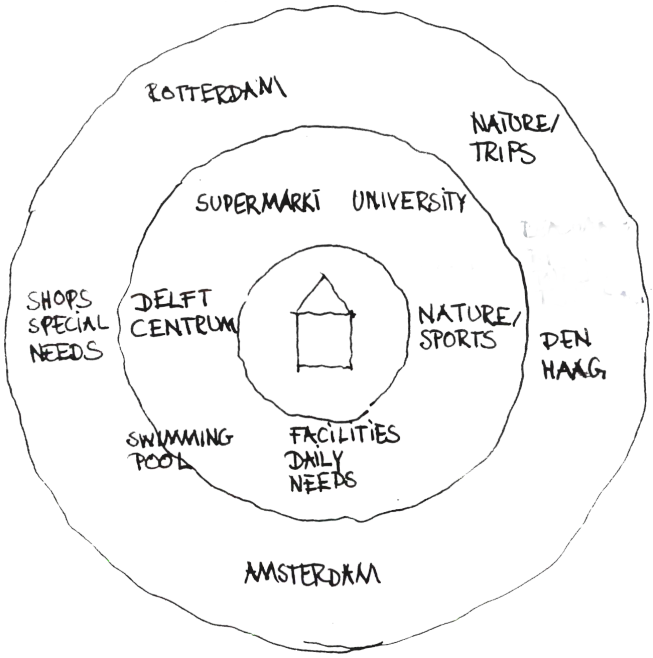
Knikflats Ommoord, Rotterdam

The renovation of the knikflats Niels Bohrplaats and Einsteinplaats follow in general a social approach. Besides updating the building it was important that the inhabitants agree with the proposed transformation. There were due to that several information evenings and discussion.
When looking on all four renovated buildings the social approach becomes even more visible. While the two analyzed buildings were not focused on one target group the others were focused on people with an age of 55+.
Besides that, the transformation tries to solve conflicts within the building, such as nuisance and vandalism, by creating smaller compartments and more identity in the buildings.
Compared to the transformation of the Bois-le-Prêtre tower block, the transformation dealt with the existing in a sensitive way. The choices made were strengthening the qualities of the existing. The glazed fames in the hand rails for example strengthen the connection with the surroundings. Finally, the choices of colours and materials chosen for the renovation stay in the context of the "aannemers architectuur".

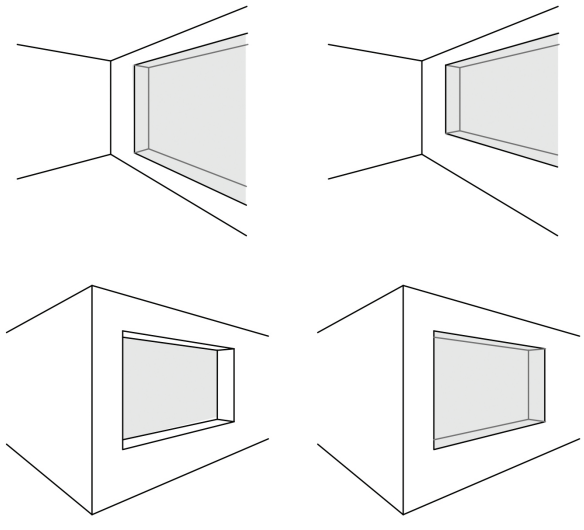
Fig. 190. (Kuijpers, Wessels, Stunnenberg, & Jaarsma, 2009)

3. QUALITY OF LIVING

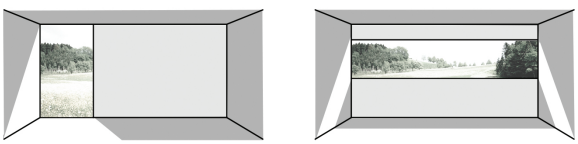
3.1 The Sum of Qualities



Location



Spatial Impact



Light

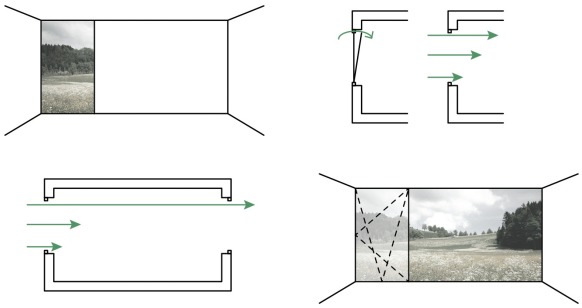
For me the quality of living is the sum of qualities, which provide me with a living space that equips me with all features, I need for my daily life and my well-being.
Since the quality of living cannot be defined by one quality, but is the of qualities the focus should not lay on one specific quality. Furthermore strong qualities can (under certain circumstances) make up for missing or weaker qualities.
Because of sustainability reasons the focus should, furthermore, lay on the basic qualities, one needs for daily life and well-being and should be distinguished from the term luxury. Quality of living should be also provided to everyone, thus also to future generations.
Quality of living is the sum of the qualities: location, social system, security, the connection to the outside, comfort, space, privacy, costs/rent.

Social System
The social system is strongly connected to the location. Social systems means the demographics of the neighborhood, but also having friends and family in a reasonable distance. In my opinion, it is not important, what kind of social system on finds in his surroundings, it is more about having a suitable and working social system.

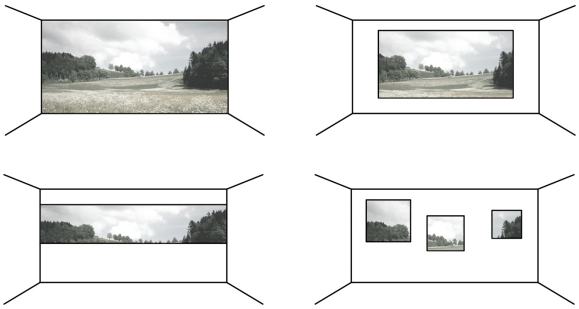
Security
Important for the personal physical, but also mental well-being, is the security of a living space.

Privacy
The living space, as the place where we can be who we are and where we can behave the way we want, should give a certain degree of privacy to ask. This supports our feeling of security and therefore also our well-being.

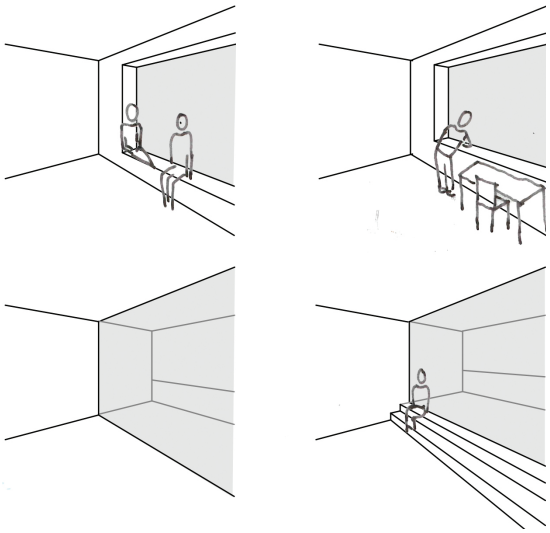
Comfort
Comfort as a quality of living is mainly about a healthy indoor climate. The comfort is determined by the temperature, visual properties, acoustic properties and olfactory properties. An important role in the quality of comfort plays the materialization of a space, due to their different properties



Air



Visual Connections



Additional Functions

in terms of smell accumulation of heat and their different surface textures.

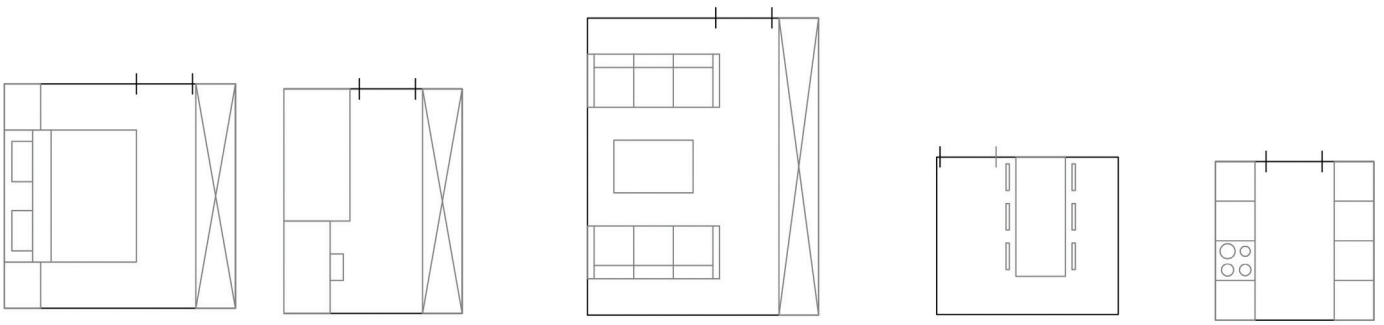
Location
The right location is a really important quality. Important here is the right distance to the facilities which serve the daily needs, like supermarkets, doctors, schools, university, city centre and sports facilities. These facilities should be, depending on the urban context, lay in close proximity, preferable in walking distance. Other facilities, which are necessary for life, but not the daily life, can be situated with greater distance, but must be reachable by public transport.

Outside
The is maybe the most important quality for our well-being. The connection to the outside can be designed in different ways and all of them give different qualities with different influences on the space.
The connection to the outside is especially important in terms of light, air and space and also forms the “entrance” to the outside. This connection is mostly done in the form of windows. Besides, that every window form equips the space with different qualities, the shape of the window can also add extra functions. The window also influences the appearance of the outside and therefore the acceptance of a location.

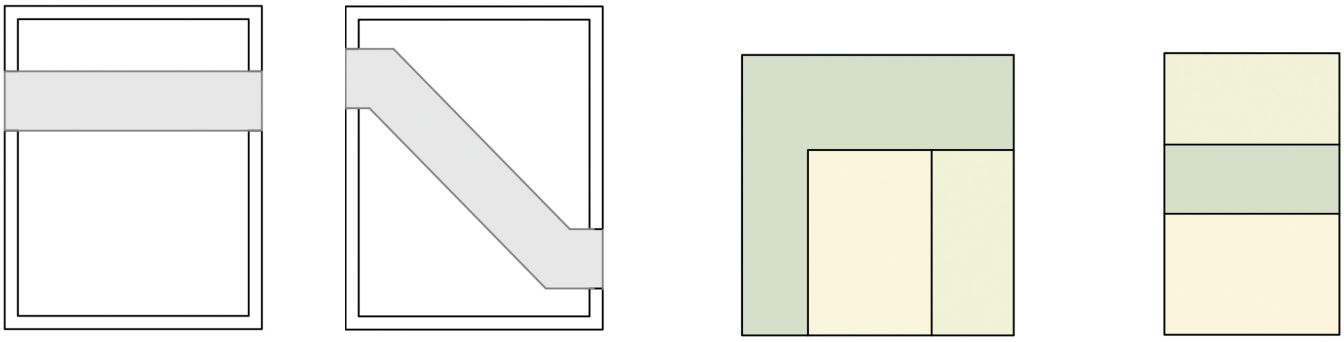
Space
Influenced by the connection to the outside, the space is a very important quality. Here it is important to mention, bigger is not always better. It is more about a suitable size. Spatial quality is about the proportion, the logic, the functionality, organization and light entering a space. The window is the extension of the interior.

Cost/Rent
Since the best qualities do not help our well-being, if we are not able to pay it and we have to worry about money, the rent/costs have to be suitable to our life style for our well-being.

The Outside Space



Proportion of Space



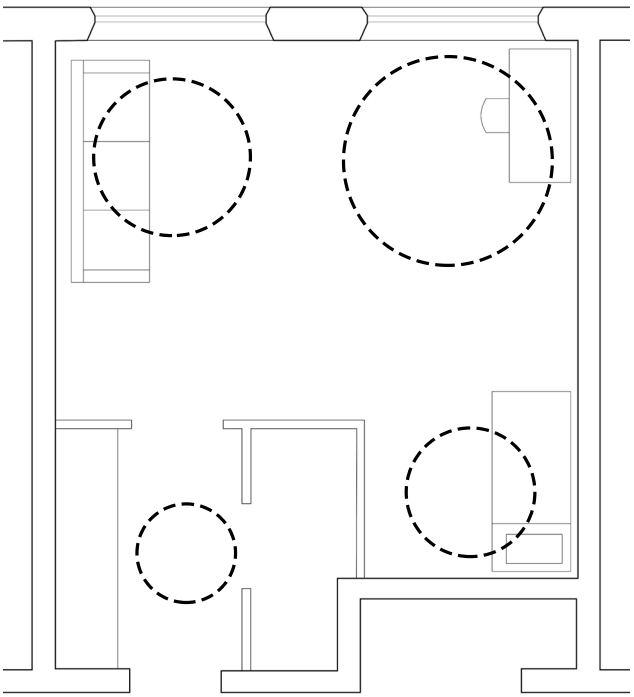
Circulation

Orientation

3.2 Blurring the boundaries

"The one who builds a dwelling...makes a statement about the relationship between...being outside and being inside."
Peter Sloterdijk

"The task of the house is to reveal the world not as essence but presence, that is, as material and colour, topography and vegetation, seasons, weather and light."
Christian Norberg-Schulz

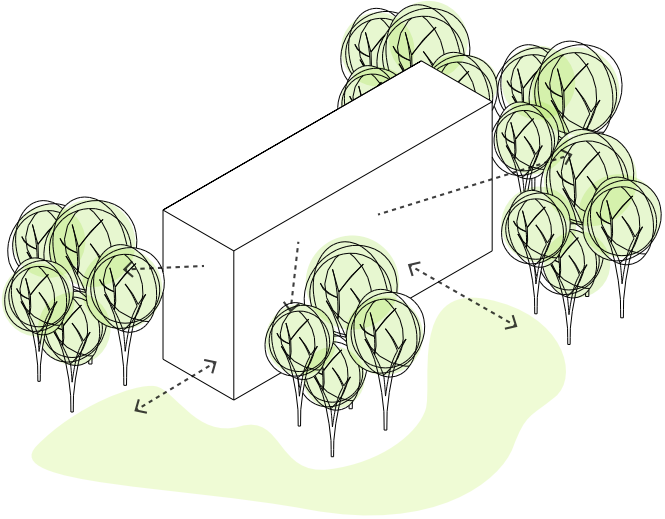


Area of my main daily activity is close to the windows, maintaining the contact with the external environment.

Blurring the boundaries

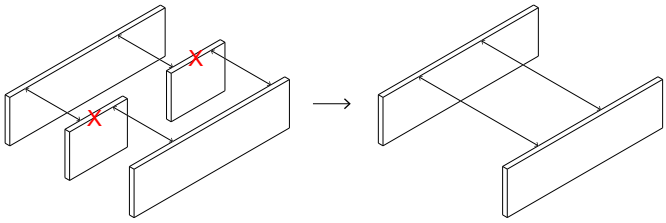
Design guidelines

Site



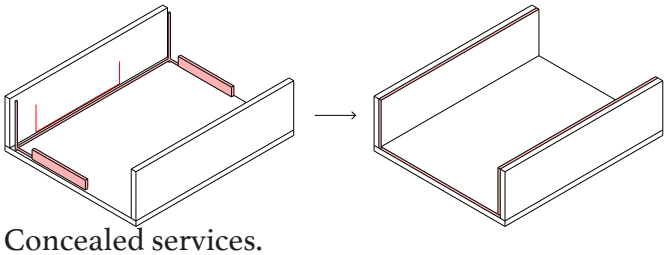
Good links to the external environment.

Structure



Structure not interrupting the space.

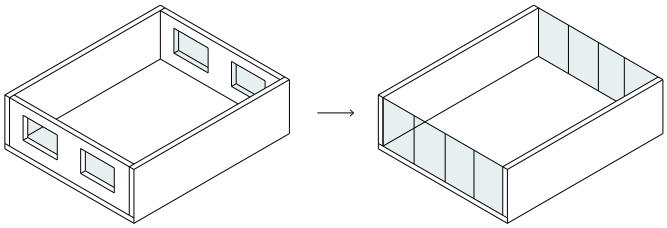
Services



Concealed services.

Skin

Facade

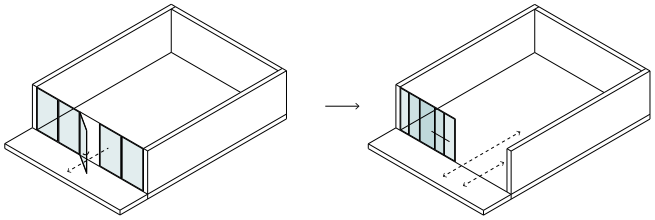


Maximized glazed areas.

Window framing

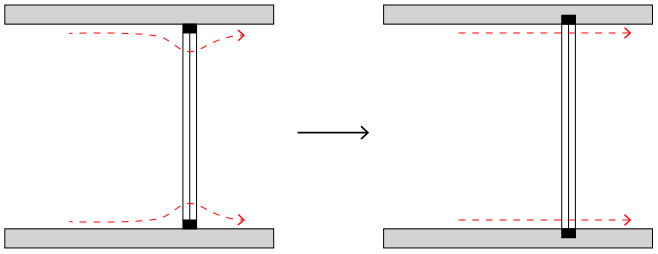
Minimal framing.

Window operability



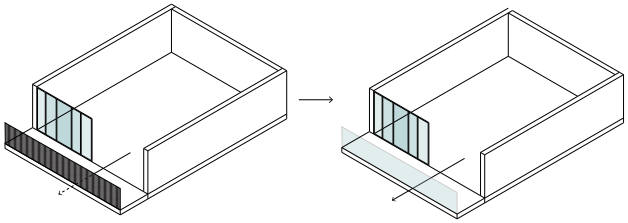
Maximum operability.

Thresholds



Thresholds not interrupting flow of space.

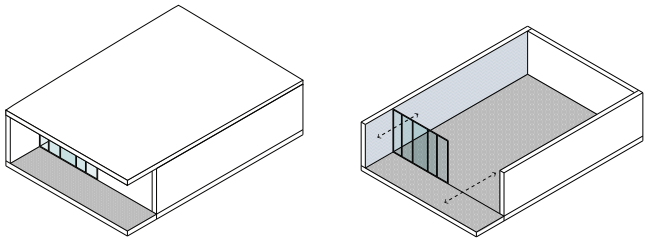
Railings



Railings not blocking views.

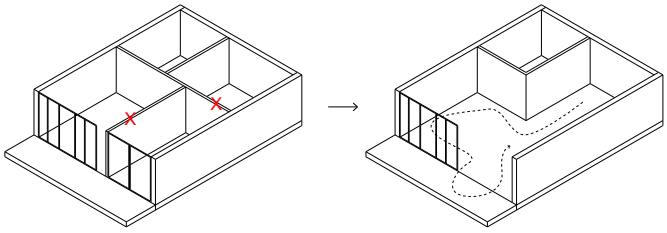
Space Plan

Outdoor space



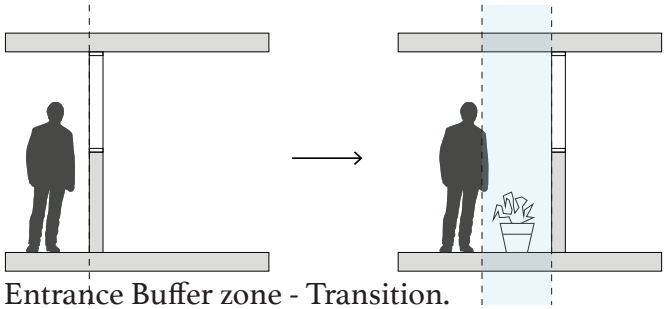
Sheltered outdoor space. Material continuation.

Open plan



Open plan & free flow.

Entrance zone



Entrance Buffer zone - Transition.

Blurring the boundaries
Application to ERA

3.3 Re-Housing Manifesto

A PRIORI

"The different spaces would be strongly characterised, not only by precise functions, but by extremely strong qualitative particularities. A priori, no bedrooms, living rooms or bathrooms, or premeditation when it comes to conceiving the places for relaxing, working or eating in. Rather, a catalogue of spaces with contemporary and contrasting qualities."

The small, dark room, kept fresh by the pool, the padded floor, the big, sunny spaces of the swimming pool and the alcoves.

"It is necessary to confront the oversizing of the surfaces and of the volumes.

The building standards, acoustic and thermal, can only be applied to part of our spaces.

This would favour migration within the dwelling, in accordance with the seasons."

The spaces around the bath are very separate, those of the car less so; the open-air duplex enables one to live totally outdoors in summer, to sleep alfresco without going out of the house.

"The installation wouldn't be specialised, but always ambivalent and ambiguous."

The washbasins are fountains and the bathtub a swimming pool.

"The installations need specific technologies."

The acme of the facilities: access to the sounds, images, communications of the entire dwelling and of the whole world, the managing of comfort.

"The installations that cause inconvenience are the object of particular procedures."

The machine room is perfectly separate. "The relationships between property, furniture and the clothing will be reinterpreted."

The glass staircase will be transformed into a library, the car will be considered a genuine piece of furniture, foldable seats, independent heating, music, data handling.

A cover protects the pullovers, a textile ladder adorns the gestures, it's an article of clothing, a fashion accessory, it has a futile quality that guarantees "the renewing of appetites by means of the convention of appearances."

1. There is no city habitat where people cannot access to the basic services and public transport within the walking distance.

2. Building in the city which accommodate living is sustainable in terms of energy, social comfort, economical aspect and quality of living (luxury).

3. Energy sustainable buildings are one reusing existing structures (making use of already embodied energy) and improved to the level of zero-energy demand and without harmful impact on the environment.

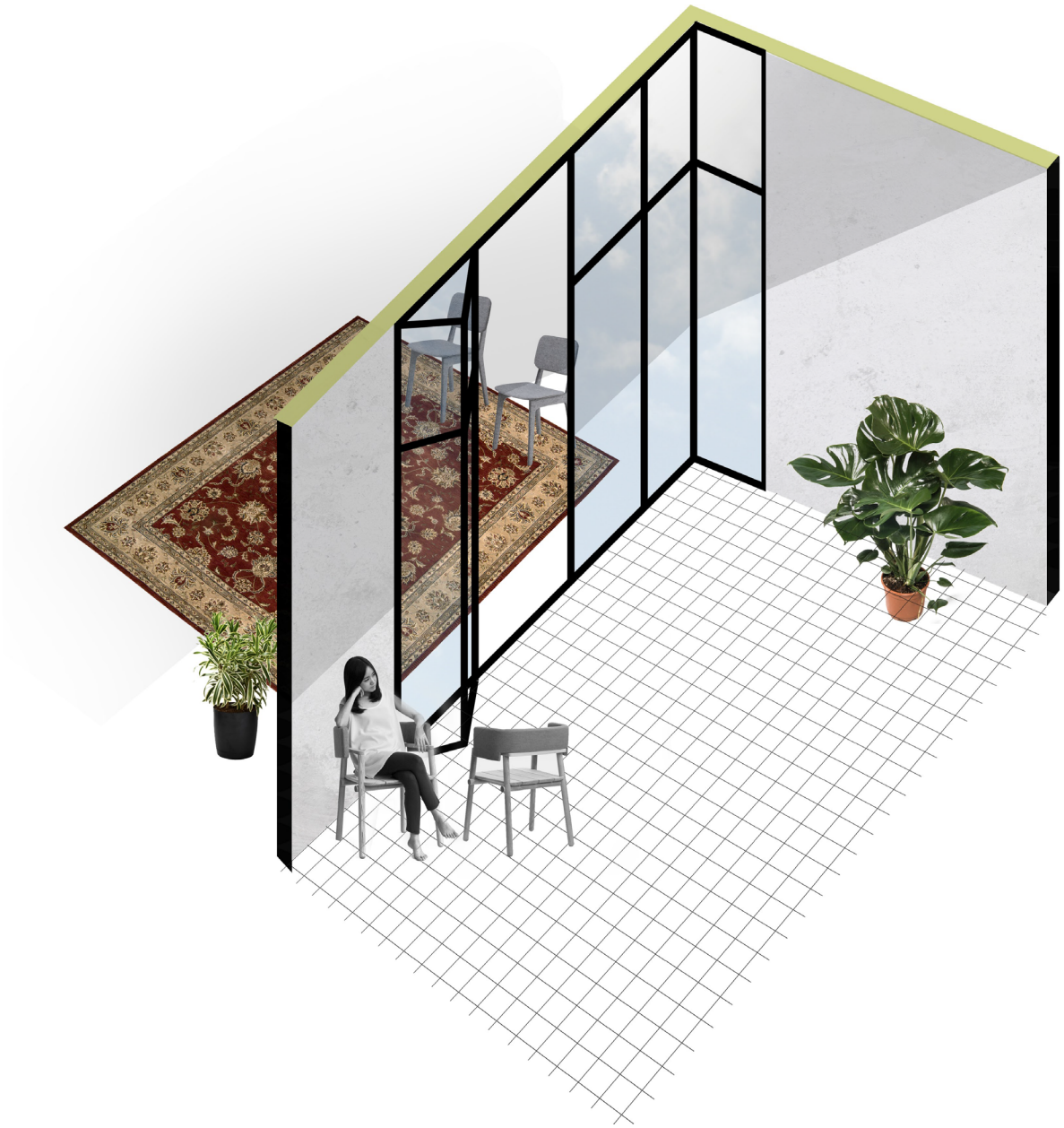
4. Sustaining the social comfort is accomplished by providing accessibility, privacy and safety by design, at the same time making possible to develop the sense of community within the place of living.

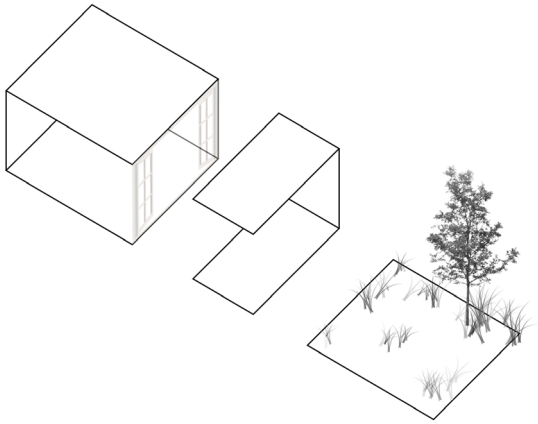
5. The building design alongside with the social housing policy makes possible for every inhabitant to sustain in the life-time ability to cover the costs of the living.

6. The housing building provides long-term, sustainable quality of living, both in the building and household-dwelling scale.

7. Living quality within the dwelling is made of:
- sufficient space dedicated to every person living in one dwelling.
- adequate design, allowing households members to realize their life needs, such as: shelter from elements, sleep, place to eat and prepare food, work, etc.
- the needs are different to the users and therefore customization is easily possible. Spatial layout is flexible to sustain quality of living in a life-time of inhabitants.

3.4 Living outside





Goals:

Reintroduce the communal and outdoor space as a fundamental quality of a place.

Using the private outside space as a passage to the public realm.

Having a comfortable space outside which shelters you from the elements and is an extention of your indoor living space.

Caves are winter shelter. On a summer's day, which of us chooses to remain inside? The response of our ancestors seems to have been the same.

Being able to live in a space which has the same qualities of an outside spice. Having a comfortable space outside which shelters you from the elements.

Giving the outside space the same qualities as the inside space and visa versa. Blurring what is inside and what is outside. Using the private outside space as a passage to the public realm.

Mimicking the qualities of inside to the outside. Blurring restrictions like walls and closed windows. Make the connection to the outside not just visibly but physically.

In social housing a garden would be considered a luxury. The possibility to live outside gives us human beings a sense of freedom. A sense of escaping the restricted living space and expanding the living space into the outside world.

When looking through a window one should not feel like this is the boundary which separates inside from outside, behind the window there should be a space which reflects the same comforts as inside

Being able to walk outside the boundary of what is inside and what is outside, should not be a luxury. It should be possible for every human being.

To create an outdoor room that extended from the living room to the back yard or balcony

An extension of the interior space. Balconies that are protected by a roof, sheltering them from the elements: a semi-exterior condition is generated, allowing for the space to be used most of the year. Extending private realms to a balcony, from balcony to public realm.

Reintroduce the communal and outdoor space as a fundamental quality of a place.

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5. APPENDIX