

VELOCITY

towards an healthy living environment

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Introduction

In front of you is my graduation thesis for the studio Dutch housing as part of the master track Architecture at the TU Delft. It addresses the topic of health and well-being in relation to the way we dwell. Although our expected life years is increasing, our health life years is decreasing. Chronic diseases have the most significant influence on these healthy life years and have become the most significant burden in the Netherlands and other western countries. A way to prevent further development of the chronic diseases is to stimulate physical activity. Studies show that physical activity can help prevent some chronic diseases and form a preventive medicine.

The thesis provides strategies for the building to stimulate physical activity and discourage passive behaviour for pedestrians and cyclist. These strategies can be applied to the location of the graduation studio namely minervahaven Amsterdam.

During the Msc3 course, we have developed an urban design for the transformation of the harbour area into a residential area. Before this design, Borneo-sporenburg has been researched as a case study for a former harbour area. This new urban design forms the location for the design based on the research in the graduation thesis.

Prior to the design process case studies show how the strategies in the investigation of assignment and topic are applied in the built area. These translate into tools to use in the upcoming design process of Msc4. This report shows the first principles of the translation from the research into the design which will further develop in the next semester.

Manifesto

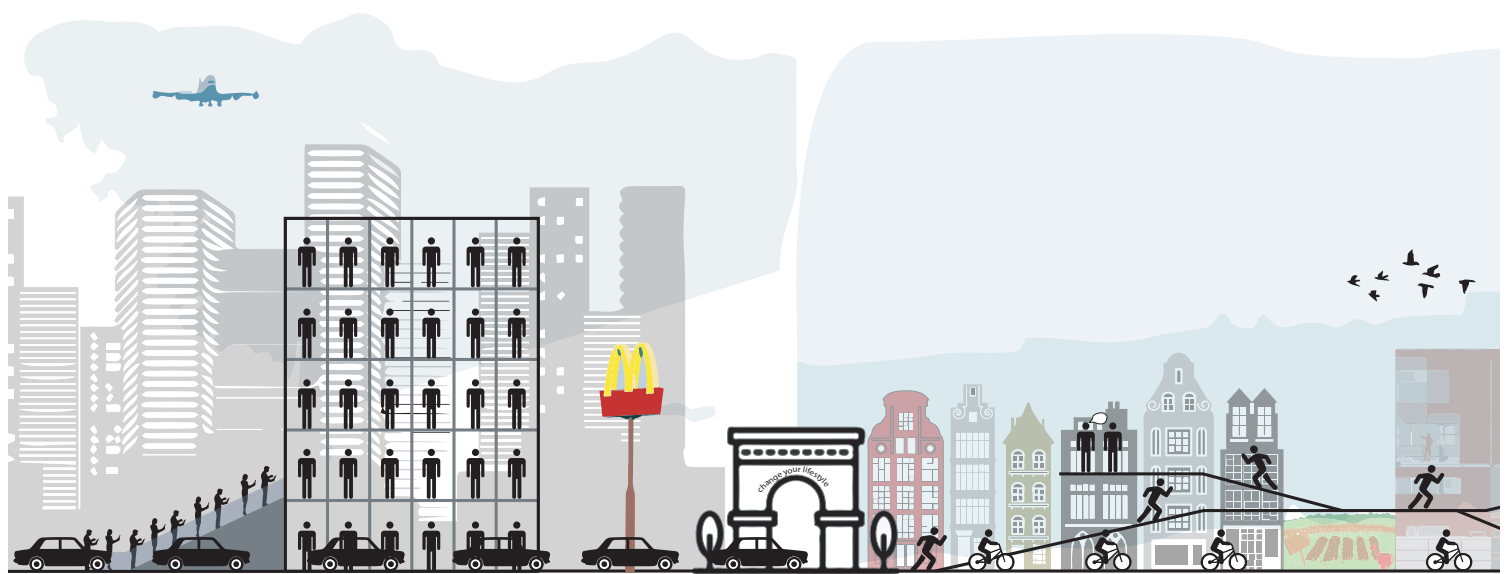


Fig 1. Change from an automated, self-centered city into an active, social and open city

Manifesto

- mobile city -

People have always been ill. In Amsterdam people used to live in the slums with little hygiene. Families of ten were living in small rooms with little access to daylight and fresh air. The canals were used as sewers. In the late 19th and 20th century, regulations and inventions such as a sewer system have reduced infectious diseases to the bare minimum.

Next to the inventions that help us cure infectious diseases other inventions made us seemingly thrive as a society. Places that were unreachable became reachable and the communication has never been this easy. But these new innovations also have a unprecedented negative effect on society. Obesity and depression rates have never been this high and are still rising. Our illness in society has changed from infectious diseases to chronic diseases caused by our society and lifestyle.

These changes in society and lifestyle resulted in a society which strives for individual freedom. Although this notion seems harmless it has an alarming negative effect on society. We have been blindly focusing on individual successes causing privatization and commodification in a competition driven society. Everything has been automated and this competition has made us self-centered. This competition may result in a few individuals who thrive and transcend but, it also causes people to feel like they will never be good enough. This can lead to dangerous illnesses such as depression, distress, and anxiety. Do we want to keep on living in an environment which stimulates these illnesses?

Only 20% of our lifespan is determined by genes, this means that 80% comes from external factors that are greatly influenced by our lifestyle. We need to change our lifestyle to become a healthier society. To change this lifestyle, we should not only look at the physical aspect of health but also to the mental and social well-being. We need a more holistic approach to our lifestyle.

Let us redesign our cities so that we become more active. Let us create places where we can meet and socialize. Let us create places so that we can create a sense of belonging. Let us create inclusive and diverse places to repair the social cohesion. Let us create places where we get inspired to change this lifestyle. Only then can we cure our society of its illnesses and create a healthy city.

Investigation of assignment & topic

This section presents the investigation of the assignment and topic. This research aims to address the subject of health and well-being concerning the way we dwell. It relates to an increased number of chronic diseases which is (partly) stimulated by our built environment that stimulates passive behaviour. Our 'obesogenic' environment stimulates us to make choices that are convenient and satisfactory but have a negative influence on a healthy lifestyle. This research defines the problem and offers strategies to create an active design. The research question that follows from the stated problem is:

How can the buildings circulation system stimulate physical activity and discourage passive behaviour?

It starts with a definition of health to create a framework for the research. By relating the topic to historical development, it shows how the issue of health and well-being developed over time. After that, a literature study is translated into four domains of active design with strategies to stimulate physical activity. Finally, a different mode of transport is challenged to apply in a building.

The research translates in a design assignment about how to apply the strategies of active design in a building that stimulates physical activity and how does this translate in form?

1. Defining health

Over the past decade's cities have rapidly evolved to meet the needs and desires of its inhabitants. These ever-changing needs and desires have a significant impact on the way we dwell in cities. A topic that is always up for discussion is the issue of health and well-being since this is one of the fundamental rights of every human being.¹ To address this issue, it is essential first to define health. According to the World Health Organization (WHO), health can be defined as:

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity".²

This definition suggests that health is about the whole person, mentally and physically, and addresses the influence of social influences which affects health and health inequalities.

In this understanding, health is not merely affected by someone's physical condition but is also part of a greater network of factors such as mental and social well-being. This network is influenced by factors such as context and social changes. According to the research rapport of CABA *Future health*³, the following social changes can be noticed:

1. Greater understanding of health impacts

We have a greater understanding of the effects of environmental factors on our health. These are factors such as food of low nutritional value, poor air quality and lack of exercise opportunities.³

2. The Changing nature of diseases

The effects of unhealthy eating and lack of exercise place a growing burden on health, as do smoking and excessive alcohol consumption. These are often the result of socio-economic inequalities and poor lifestyle choices.³ The nature of our diseases has changed from infectious to chronic diseases.

3. Demographic changes

Ageing of society, our life expectancy is increasing while the number of births is decreasing.³

Since we have a greater understanding of health and the elements that affect our health and well-being one would expect that our number of healthy life-years is increasing over time. Nevertheless, the opposite is happening. One of the reasons that our healthy life-years are decreasing is due to the changing nature of diseases such as the change from infectious diseases to chronic diseases.

These chronic diseases are currently the leading cause of death in the Netherlands.⁴ While, As shown in figure 2, our life expectancy is increasing and the number of healthy life-years is decreasing.

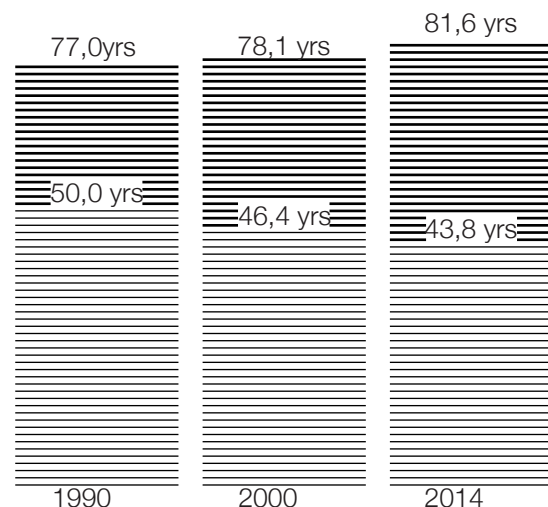


Fig 2. Healthy life expectancy in the Netherlands

—— healthy life expectancy
—— life with a chronic disease

Source: Statistics Netherlands, Statline & active design for buildings

2. Facts & Figures

Since chronic diseases are the leading cause of death⁴, we need to understand which diseases affect our lives. According to the 'volksgezondheidsregister' diseases such as anxiety disorders, coronary heart disease, diabetes mellitus, and depression have the biggest impact on someone's positive life years.⁵ The number of prevalence's of these diseases is increasing as shown in figures 3,4 and 5.⁵ Because of the growing impact of chronic diseases they have become the most significant burden in the Netherlands and other western countries.⁶

Approximately half of this burden is a result of unhealthy behaviours such as smoking, physical inactivity, and an unhealthy diet.⁶ This unhealthy behaviour is not only affected by individual choices, but also by the 'obesogenic' environment. Our environment stimulates us to make decisions that are convenient and satisfying but have a negative influence on a healthy lifestyle.

An example related to urban design can be found in the growing importance of using a car. Although this might be a necessity and convenient choice, taking the bike or walking instead leads to physical activity which is proven to be good for your health.⁶

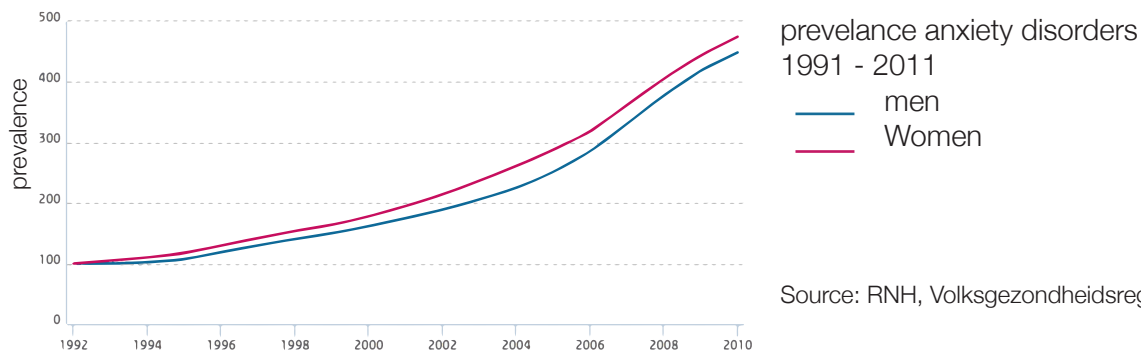


Fig 3. prevalence anxiety disorders

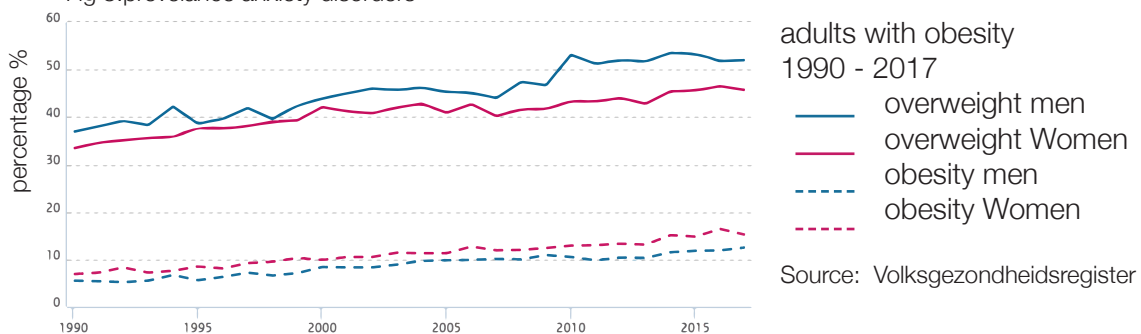


Fig 4. adults with obesity

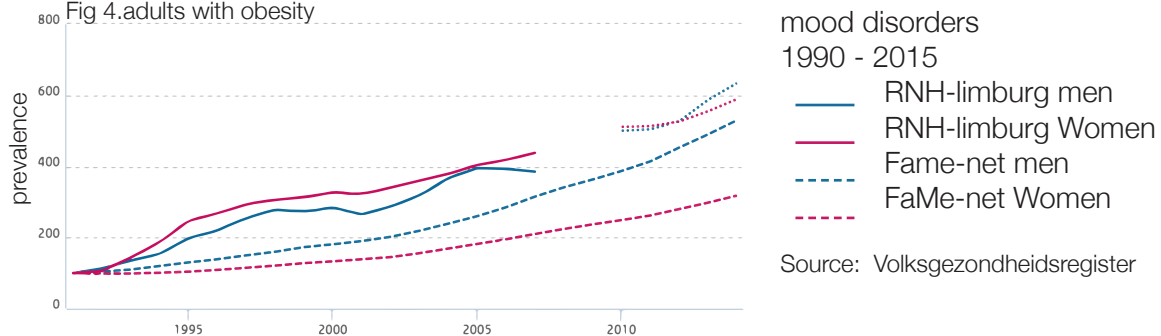


Fig 5. mood disorders

3. Historical perspective

Over the past 150 years, we have made enormous progress in creating a healthier living environment. At the end of the 19th century, 19,1% of all deaths in Amsterdam were due to infectious diseases such as bronchitis.⁷ But in the year 1937, this number has dropped to 6.9% and in the year 2014 it reached a historically low point of 0.1%.⁷ This downfall was the result of advanced studies and progress in healthcare and medicines, but the developments in the built environment also had a significant influence.



Fig. 6: Kattengat/singel, 1920 source: gvn1



Fig. 7: Lindengracht 244, 1895 source: beeldbank

Many developments in the built environment can be related to health. Earlier, when there weren't any building regulations or urban plans, people used to live in poor living conditions. Streets were narrow, and houses were small with little access to daylight and fresh air. These are one of the reasons why the rate of infectious diseases was this high. As a result of the housing shortage, real estate merchants bought all the houses and converted them into smaller apartments while they paid little attention to hygiene.⁸ These real estate merchants bought these buildings for speculation reasons with the aim to gain maximum profit. They had the advantage that rules did not bind them.⁸

To prevent further development of these poor living conditions in the future the building act (woningwet) of 1901 was introduced.⁹ This act was set up to address the abuses in the housing sector such as overcrowding, sanitation, ventilation and weather resistance.⁹ The most influential elements that were introduced by this act were clean drinking water and a closed sewage system to prevent the spread of infectious diseases.⁸

One of the reasons for the adverse conditions in the city was due to the increase in population. The urban growth of Amsterdam created cobbled homes of poor quality. In 1898 Ebenezer Howard published a book where he advocates the garden city as the ideal alternative for the big modern city.¹⁰ These garden cities are a combination of the advantages of the city and the county. He saw the city as an opportunity for social interaction with its busy nightlife, high payrolls, job opportunities, sewers, streetlights and rich forms of architecture.⁸ However, these cities also had clear disadvantages such as lack of nature, lonely crowds, distances between

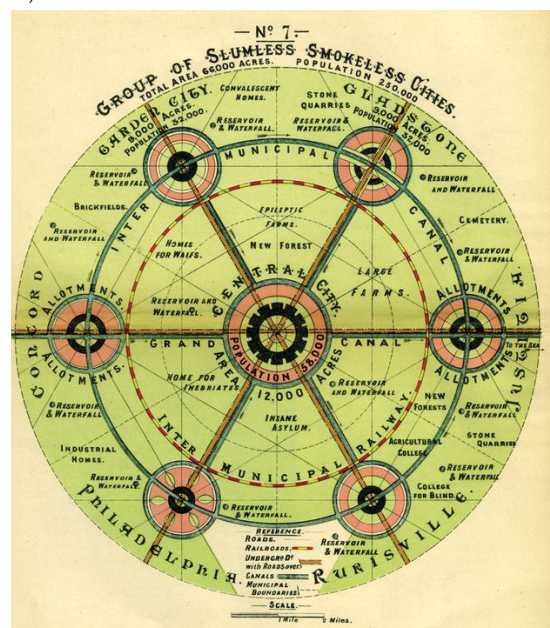


Fig. 8: principle of garden city source: scodpub.wordpress

work and living, high rents, air pollution and inadequate sanitary conditions in the slums. In the country, he saw the advantages of the greenery, fresh air, and clean drinking water.⁸ The garden city gave the urban design a new perspective. In the late nineteenth century, the large cities were expanding rapidly using the newfound principles of the garden cities. It further developed in the twentieth century, new districts were built using public gardens, streets with front gardens, roads with green strips and, if they were big enough, a park.

For the first time, within these garden cities greenery, sport, and playgrounds were given a structural position in urban planning. In the same period, the architect Berlage designed the neighbourhood Amsterdam-Zuid. Sport and playgrounds form a fundamental part within this urban fabric. The Olympic stadium (1928), the swimming pool (Mirandabad) and an urban sports park (Olympiaplein) are central elements within the neighbourhood.¹¹



Fig. 9: sanatorium zonnestraal source: architectuur.org

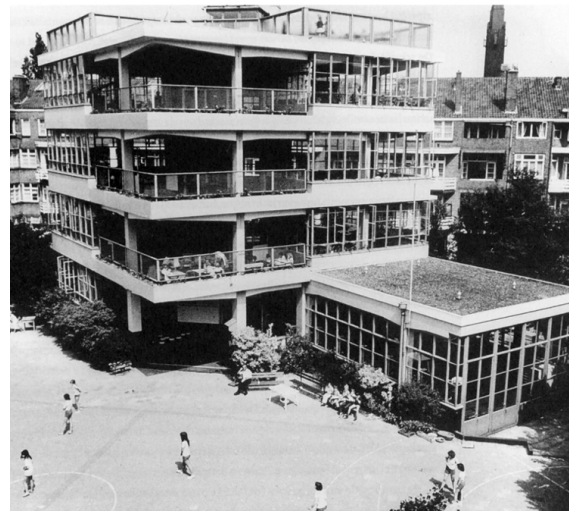


Fig. 10: Openluchtschool Amsterdam source: ARCAM

What followed was a revolution in health in architecture and urban planning. It was the start of new building types. The most famous examples in the Netherlands are the sanatorium zonnestraal (fig. 9) built in 1928 in Hilversum and the openluchtschool (fig. 10) built in 1930 and situated Amsterdam by the architect Jan Duiker. These facilities were designed with the idea that illnesses such as tuberculosis can be cured and prevented with access to fresh air and daylight.

These new building types were part of the modernist movement. This movement had a newfound emphasis on ventilation, hygiene, and the benefits of sunshine. They were convinced that the previous form of housing had significant health risks. Sub-standard housing was linked to tuberculosis and other diseases.¹¹ This form of housing had a lack of (roof) gardens, large windows, and outdoor spaces such as balconies or loggias.¹²

Within the housing sector, significant health improvements were made by the introduction of the principles of light, air and open space. As an example, public greenery and outdoor areas surrounded the residential building blocks while the dwellings had large windows with a balcony and cross ventilation. However, on an urban scale, the emphasis lay on separating land uses, such as those for residential, retail, work and leisure purposes. This resulted in heavy reliance on roads and motorized vehicular access to connect those separate areas. It was the beginning of the decentralisation and separation of functions.

While the modernist movement implemented their new-found principles, they were radically interrupted. During the second world war, many houses were destroyed which caused in a new housing crisis. The period after the second world war is characterised by an extensive system of norms and regulations and strong legal and policy-based management of spatial planning.¹¹ During this 'wederopbouw' period the modernist movement was still the dominating 'style' with their emphasis on hygiene and health. In their design open green areas functioned as recreational and leisure areas. They often integrate a safe playground for children in these public spaces. Separation of functions and differentiation were still leading factors in spatial planning. As a result, the reliance on vehicular access increased and areas became more separate.

In the seventies and eighties, the medical sector and the built environment developed further causing the number of infectious diseases to drop enormously.¹² In these years the emphasis of the spatial planning changed from separation to social cohesion and the pursuit of collectivity.¹¹ Due to this new-found emphasis, the health benefits in the residential areas focused more on walking, cycling and playing in the immediate living environment. As a result, young families moved out of the cities in this 'anti-urban' period, and the inner cities started to decline.¹¹ They moved to suburban neighbourhoods because they offered a healthier and safer living environment. Examples can be found in the so-called 'satellite cities'. For Amsterdam cities such as Almere and Purmerend offered a safer, healthier and cheaper living environment.

Urban renewal was necessary so the cities could be a safe, healthy and attractive living environment again. Predecessors of these developments were New York city activist Jane Jacobs. She saw the automobile as one of the chief destroyers of American communities and argued that the urban renewal did not respect the needs of city-dwellers.¹³ Jane Jacobs shows that urban districts with a mixed and diverse program are attractive and can cause movement of people in public space.¹¹

"Not TV or illegal drugs but the automobile has been the chief destroyer of American communities"

Jane Jacobs, 1961¹³

Architecture and Health have a long-lasting relationship starting at the desire to improve health and well-being. The city planners have always been one of the frontrunners in these developments. Although in contemporary city planning the matter of health only comes back in aspects such as safe living environment (air quality, clean water), sustainability (ecology, greenery, sustainable transport) and social cohesion.¹¹

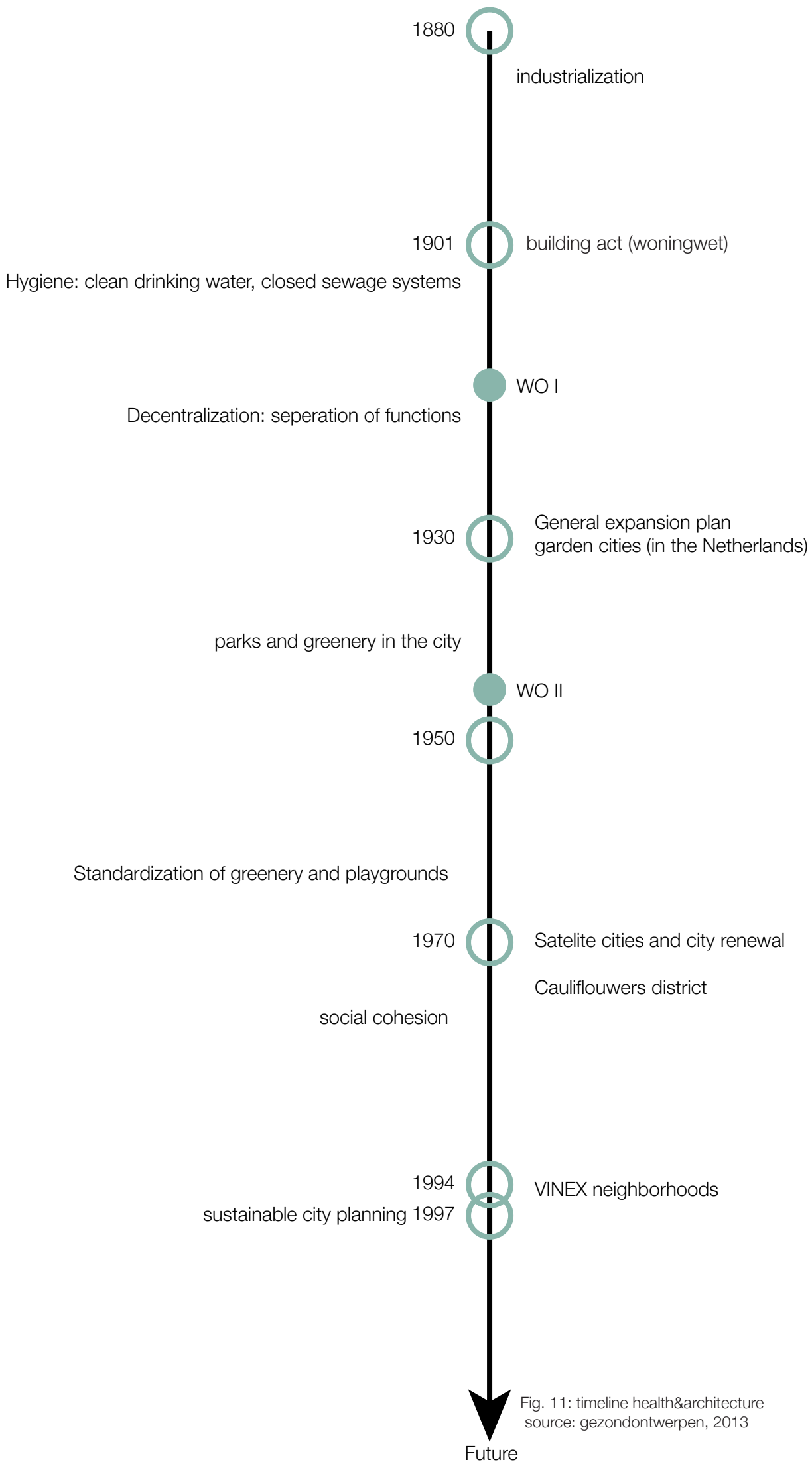


Fig. 11: timeline health&architecture
source: gezondontwerpen, 2013

4. CONTEMPORARY UNDERSTANDING

Now that we know how our built environment has developed in the case of health and well-being we can look for a new approach to prevent the development of chronic diseases. According to the research rapport, *active design in buildings*: 'Directly or indirectly many chronic diseases are the result of our economy. Modern comfort, combined with sedentary labour, stress, poor eating habits, and alcohol consumption contribute to the unhealthy lifestyle of the average Dutch citizen'.¹⁷ This modern comfort such as the car and the smartphone often involve less physical activity. But if there is such a clear correlation between health and physical activity why are we so inactive?

HUMAN EVOLUTION

Of all primates, human beings consume the most metabolic energy. We need this metabolic energy mostly to fuel our brains.^{14,15} To save energy we have developed energy-saving measures during the evolution of the human body. These include the reduction of locomotion^{15,16} and the capacity of the human body to store energy as fat.^{14,15} Inactivity is a result of human evolution which is stimulated by our economy of modern comfort.

This inactivity to save energy has become part of our daily routines and lifestyles. Within the built environment, we can design our buildings to stimulate physical activity. By identifying the opportunities in the built environment and reinforcing them, we can encourage people unconsciously to become more active.

ACTIVE BUILDINGS APPROACH

To stimulate physical activity in the built environment, we first need to understand why we make certain (conscious) decisions by understanding what we find appealing and unappealing. According to the research of *active design in buildings*¹⁷ an approach to active buildings can be divided into two aspects:

1. Discouraging passive behaviour;
2. Encouraging active behaviour

By discouraging passive behaviour, you can think of strategically placing the elevator. If the first thing you see when you enter the building is the stairs, people are more likely to take it. We can encourage active behaviour by making it attractive ore rewarding to take the active route.

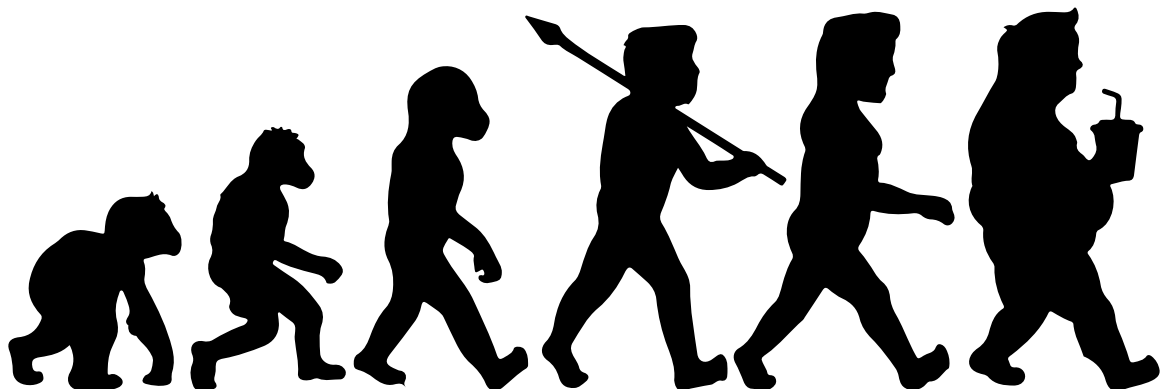


Fig. 12: Human evolution

5. Four domains of active design

To systematically analyse physical activity, we can compare the results of two studies about active design. The first study is *the active design guidelines*¹⁶ by the city of New York. This publication seeks to educate designers about opportunities to increase physical activity within the built environment. The second study is *active design in buildings*¹⁷ by BETA office commissioned by the city of Amsterdam. The publication presents a survey on how building design can encourage people to engage in physical activity. Both studies show a toolkit with different intervention methods placed in different domains. In the active design guidelines, the domains are divided into circulation system, individual building elements, building program, and activity space. The active design in buildings used these domains as a starting point but divided the individual building elements into the other three domains and added a fourth domain namely building surroundings. In the second study, they changed to name of building program into destinations. The building program forms destinations within the building which can be an incentive to become physically active.

In both studies, most attention is given to the domains of the circulation system and building program/destinations. These two domains account for the most physical activity and have the most significant impact on the building structure.¹⁷ The routes, destinations, and activity program directly influence the pedestrian precinct within the structure. The building surroundings provide guidelines for the relation between the structure and the urban fabric. These studies resulted in the following four domains for the design strategies to improve physical activity.

1. Circulation system

The circulation system forms the way people move within the building. They connect the program and the different destinations within the building. Routes consist out of different accessibility features such as stairs, elevators, and ramps.

2. Destinations

The destinations are places that can be connected by the routes. They can evoke movement by strategically placing them in the building. They can form an incentive to be active and provide opportunities for social interaction.

3. Activity program

An active program relates directly to physical activity. These include sports facilities, bicycle storages etc. These elements can encourage active behaviour by providing opportunities and comfort in relation to sport.

4. Building surroundings

The building affects its surroundings and can, therefore, influence human behaviour. Annoying gusts of wind and monotonous building facades affect the walkability of the neighbourhood. By interacting through massing, materials, a degree of transparency and programming we can positively influence active behaviour.

5.2 Circulation system

The circulation system is one of the main elements to stimulate physical activity and shape the pedestrian precinct. By designing the routing in a way that it stimulates physical activity and discourages passive behaviour it can have a positive effect on the user's health and well-being.^{15,17} For example, the use of stairs burns calories, and research has linked stair use to health benefits such as improved cardiovascular health.¹⁵ To understand how the pedestrian precinct can influence the health and well-being we can define the following strategies.

2.1

STRATEGIES

1. Designating stairs for everyday use

By assigning one or all stairs in a building for daily use, it can become part of the principal means of travel. Whether in the form of a grand staircase or fire stairs, by strategically placing them it can become part of the routine of its everyday users. Another tool to make the stairs part of the daily use is to integrate it with the principal areas of orientation and travel. This can be achieved by including the stairs as an integral component of the circulation system of the building. For example, by placing it in the primary orientation lobby and as an extension of the most travelled paths. To stimulate the use of the stairs they need to be accessible from the public areas of the building, and when possible, eliminate locks. Stairs that require locks or access cards are less frequently used.^{15,17,18}

2.2

2. Stairs location and visibility

The location and visibility play an essential role in stimulating usage. By locating the stairs near the building's entrance, it is proven to be more frequently used.^{15,19} The entrance often consists of a staircase and a (hidden) lift. By locating the stairs near the lift, and making it visible for users it can be an alternative solution while waiting for the lift. An essential factor in the visibility of the stairs is to avoid enclosing the stairs with a solid material. For example, fire staircases are often hidden behind thick concrete walls but can also be enclosed by fire-rated glass.

2.3

3. Stair dimensions

The stairs need to be able to accommodate different users, including large or small groups. The stairs can make multi-floor travel physically more comfortable by applying the right dimensions. To accommodate the travel of groups the stairs need to have a minimum width of 1,42 meters.^{19,20,21} To design safe and comfortable stairs, the risers need to have a minimum dimension 17,8 centimetres and treads of 28 centimetres.^{20,21}

2.4

4. Appealing stair environment

An attractive stair environment encourages the use of stairs through experiences.¹⁹ These experiences can be shaped by articulating unique stair compositions. Grand, sculptural staircases often define the sequence through a building and form the main routing. When it is not possible to design a grand gesture, it is possible to design appealing stair constructions with detailed elements such as balustrades and handrails. As a result, the stair or routing appeals to the senses and create different experiences. Ways to incorporate different senses can be by different views, include artwork, natural ventilation and by selecting bright and inviting colours.¹⁹

2.5

5. Ramps

So far, we have only discussed the stairs as a principle means of vertical transportation. Another way to facilitate physical activity is through the use of ramps or slopes. The earlier discussed strategies of designation (2.1) and location (2.2) also apply for ramps. The advantage of ramps is the multi-usage since they are also accessible by bike. In the Netherlands, there are 22 million bicycles which comes down to 1,2 per person making it a popular mode of transportation.²² The bike is something that we cannot forget to include in a building for active design in the Netherlands.

To define what a suitable ramp would be for cycling, we can look at the research from fietsberaad Nederland.²³ They use a rule of thumb of $1:10 \times H$ to define the length of a ramp. In this case, H is height. For example, to climb a height of 3m, you would use the formula as followed: $1: 10 \times 3$. To simplify this, we can bring it back to 1:30. This would mean that to climb 1 meter; the ramps need to be 30 meter. So, for the full length of 3m, this comes down to a slope of 90 meters.

In the design manual for bicycle traffic, they apply a width of 2 meters.²⁴ This figure comes from the maximum width of a bicycle of 75 cm. As cyclist sway naturally these 2 meters gives it the right dimensions so that cyclist can go past each other.

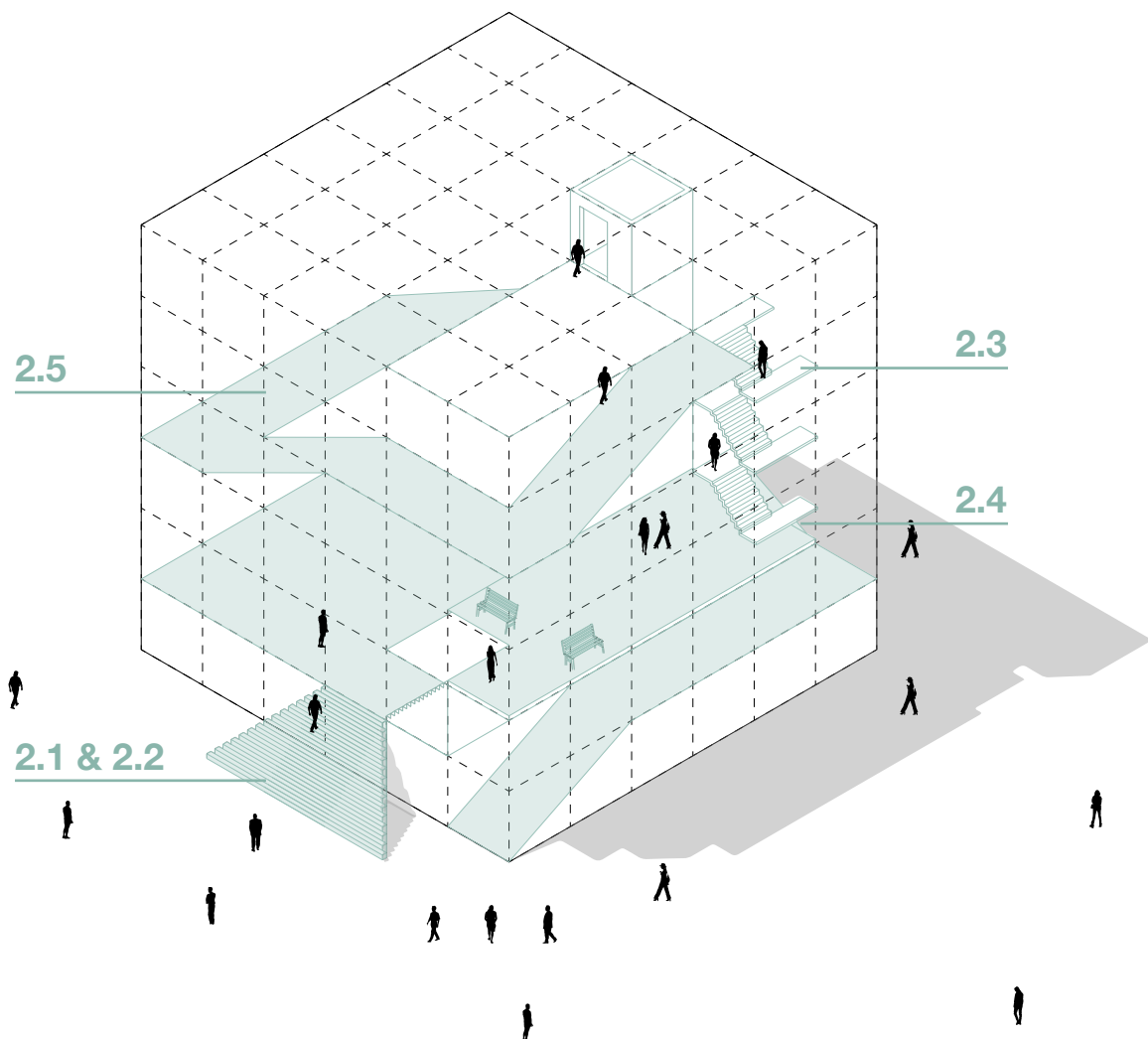


Fig. 13: Diagram of the application of circulation system

5.3 Destinations

Destinations are attractive or useful functions that form a focal point for physical activity. These destinations vary in each building, but in a residential building, we can think of destinations such as apartments or a central garden. Strategically dispersing destinations throughout a building can increase physical activity since it requires the users to travel short distances. The routing between these destinations, need to accommodate a pleasant walking experience and avoid an excessive distance between the destinations.¹⁷ By applying the following strategies, these destinations can promote physical activity.

STRATEGIES

3.1

1. Social hubs & collective space attract

Human beings are social by nature, which draws them to places with a potential of social exchange.¹⁷ These are often informal locations that can be part of the primary circulation system. By introducing a structure and urban furniture in such a way that it stimulates interaction it can provide these social exchanges.^{15,17}

Collective functions are used by multiple inhabitants of the building and by creating a common goal, it may benefit the social contact, and the amenity in the building.¹⁵ Examples of collective functions are a shared laundry room, kitchen or gym.

3.2

2. Combine destinations and routes

Attractive destinations are more likely to be used when they are combined with high- quality routes. The combination of routes and destinations can also enhance the spatial experience of a building.¹⁷ It forms an incentive to move and engage in social interaction.

3.3

3. Combine outdoor spaces and routes

Communal outdoor areas such as community gardens form a focal point for interaction and movement. These spaces should be placed along the main route to make them visible. The communal outdoor areas should offer a pleasant environment which can, for example, be achieved by incorporating seating and plants.¹⁷

3.4

4. Place frequently used functions at a distance

Consider placing frequently used functions at a greater but pleasant walking distance to evoke movement.¹⁷ For example, by including a collective garbage system, and mailboxes.

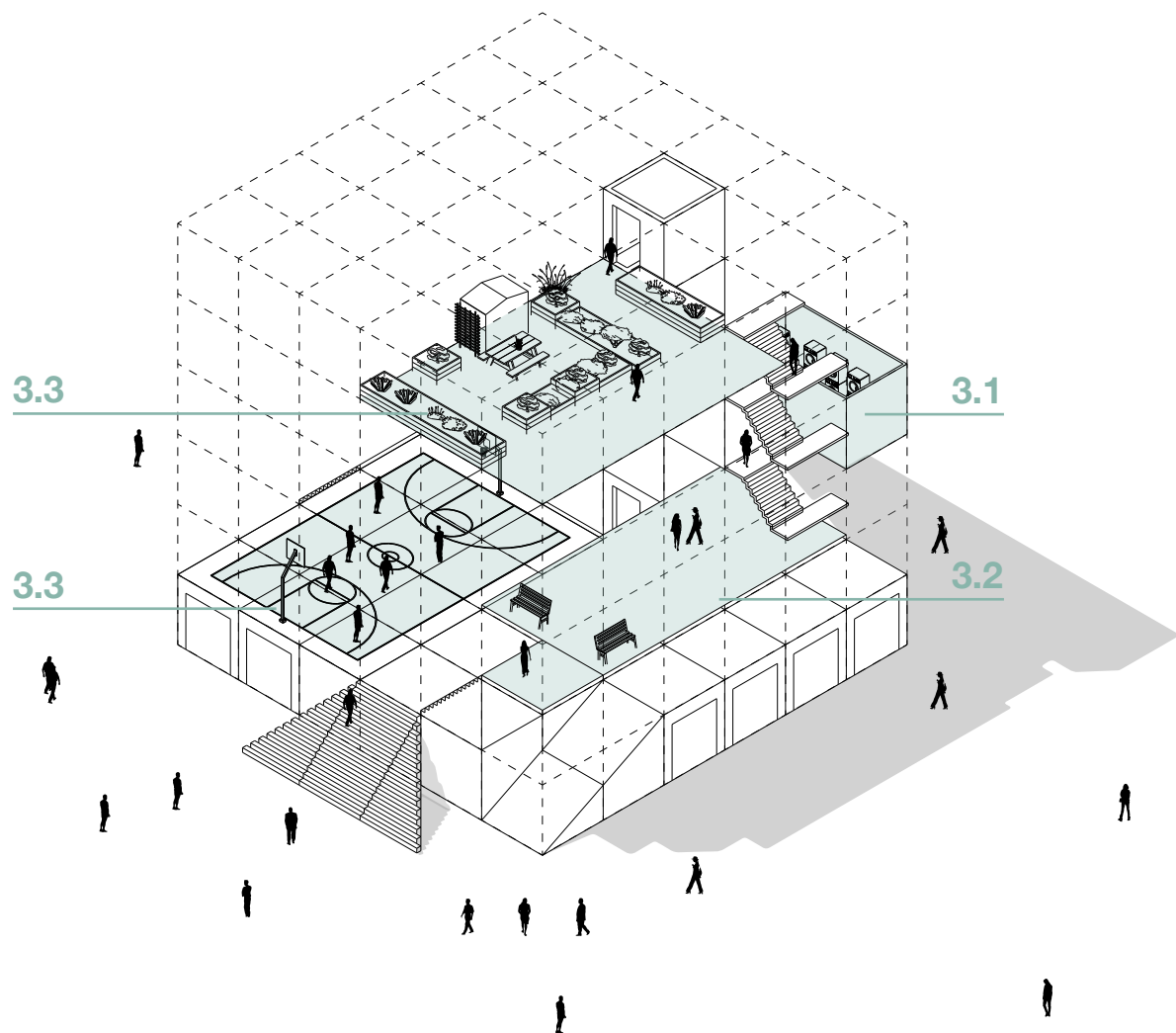


Fig. 14: Diagram of the application of destinations

5.4 Activity program

Activity program is a collective name for spaces or furnishing that directly contribute to increased physical activity.¹⁷ For example, gyms, swimming pools, playgrounds and multifunctional areas. The presence of communal functions that are specifically for physical activity increase the usage and stimulates physical activity. By defining the right activity program and position them within a residential building the physical activity can be encouraged.¹⁷ To achieve that the following strategies can be applied

STRATEGIES

4.1

1. Activity spaces promote physical activity

The presence of communal activity space can increase the likelihood of the usage and stimulate to engage in sports activities.¹⁵ By making the activity program visible and accessible, it provides an extra opportunity for exercise. Especially lower income groups have less access to private activity space while these demographic groups have a higher prevalence of inactivity and obesity.

4.2

2. Visible activity spaces are more frequently used

By ensuring the visibility, the activity program becomes a focal point. This can be achieved, for example by making it part of the primary routing to increase the awareness of these spaces and thus increase the likelihood of usage.^{15,19}

4.3

3. Activity spaces with a view are more frequently used

Research indicates that exercise with a view of other human activity or the natural surroundings is perceived to be more pleasant and stimulating.^{15,17}

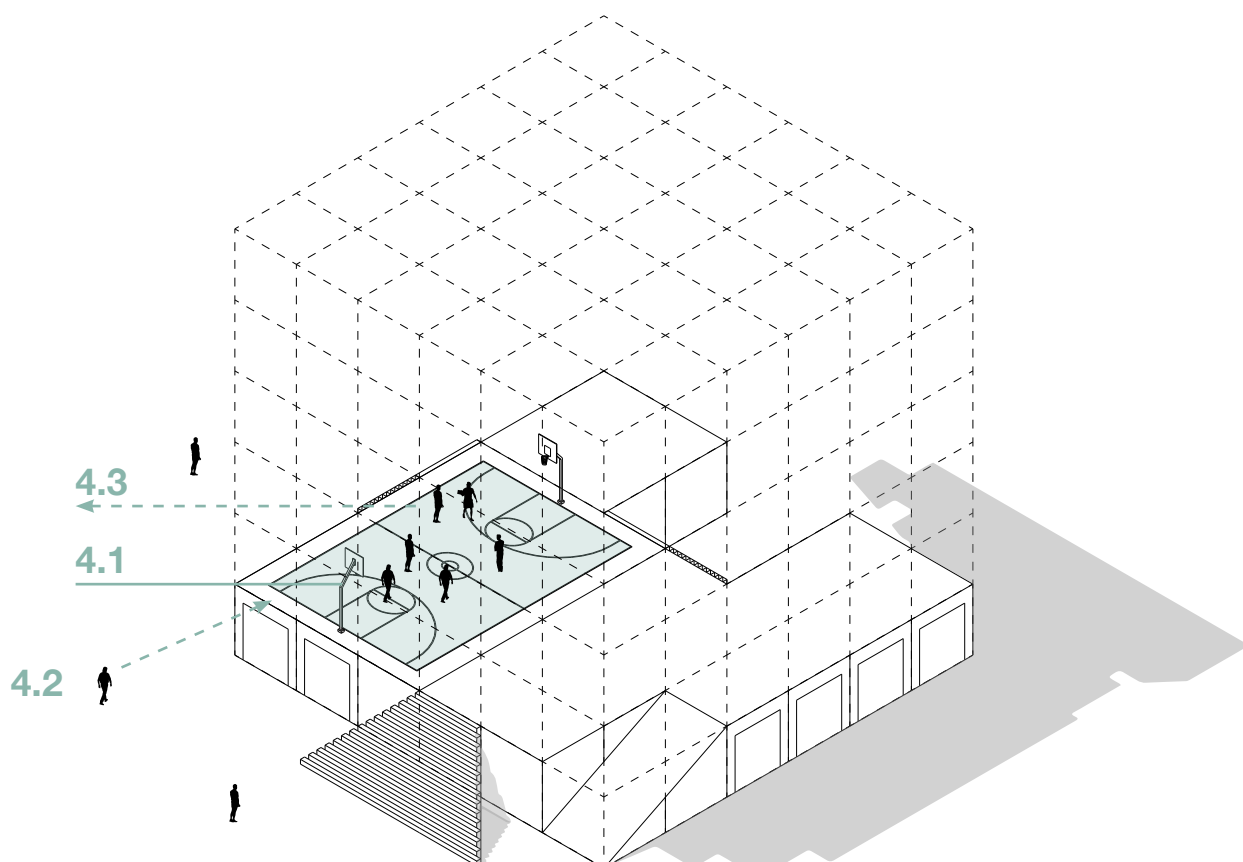


Fig. 15: Diagram of the application of activity program

5.5 Building surroundings

So far, we have only focused on the relation between the circulation system and the functions within the building. But the connection between the building and its surroundings can also stimulate physical activity in and around the building. The functions in the plint of the building can form an incentive to move in and around the building. By applying the following strategies, it can stimulate physical activity.

STRATEGIES

5.1

1. Variety and continuity encourages physical activity

The program and detailing of the two lowers floors strongly influence the experience of the pedestrian precinct around the building.^{15, 24} Furthermore, the principle of 'eyes on the street' which was introduced by Jane Jacobs provide a sense of security in the public space making it more pleasant to move around the building.¹³

5.2

2. Multiple entrances and transparency activate public space

An activated public space is more pleasant for commuters.¹⁷ By placing multiple entrances of public, collective and private functions, it generates activity in the public space and contributes to the accessibility and experience on a human scale while it adds to the eyes on the street principle.

5.3

3. Well integrated entrances generate movement between interior and exterior

By positioning the entrances so it connects with the surrounding urban fabric, it can generate movement. By connecting the interior with the exterior, it makes the transition more gradually and encourages movement between the exterior and interior.²⁵

5.4

4. Prevent adverse effects on livability

Walking in the shadow or sudden gusts of wind can negatively impact the livability. The pedestrian can be protected from these elements by implementing arcades, cantilevers and such.¹⁷

5.5

5. Stairs and ramps act as a buffer between private and public space

In residential buildings, exterior stairs and ramps can provide a transition and welcoming zone between the public and private realm. By applying ramps in these transition zones, they also increase the accessibility for people with a disability.^{17, 25}

5.6

6. Destinations in public space encourage physical activity

By adding public functions to surroundings such as a bench, drinking fountain or clusters of easy-to-move tables and chairs it increases the liveability of the surroundings.^{19, 25} These destinations can also be combined or be an extension of the destinations in the residential building.

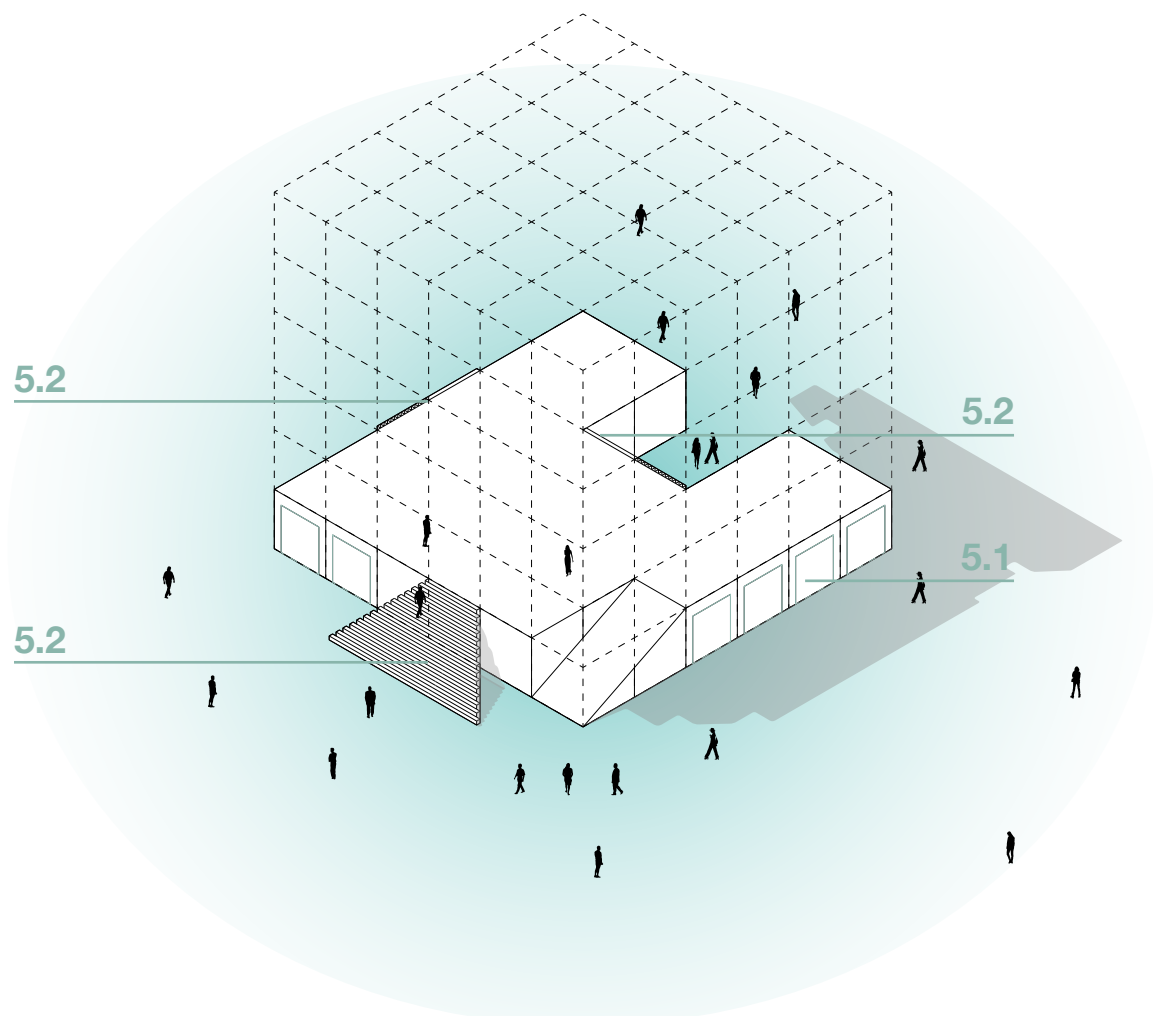


Fig. 16: Diagram of the application of building surroundings

6. Bicycle buildings

The focus within these four domains has been mainly on the walkability and the program. Even though the use of the bicycle is emerging. Cities such as New York are changing their streets by designating one lane on most Avenues to cyclist only.²⁶ In city centres such as Paris, Copenhagen, Amsterdam we see a fast emergence of shared bicycles. If you consider that we are talking about a mode of transport with numerous health benefits, has no pollution, the amount of space needed compared to cars is far less, costs are lower for the users and the government it seems almost self-evident to stimulate cycling.²⁶

In any era, architects have a strong relationship between buildings and the mode of transportation. In the first period of the twentieth-century architecture derived its authority from machines. For example, Le Corbusier strongly emphasised the emergence of ships and aeroplanes, but mostly cars. In his Villa Savoye, he built a U-turn within the structure for the enjoyment of driving inside a building. Architects as Mies van der Rohe, Walter Gropius and other architects designed car-centric buildings at a time when mass car ownership, freeways and sprawl, were only fantasies.

According to architect and professor Steven Fleming designers are at a similar juncture today with their thinking, only now it is mass bicycle transport that is a fantasy.²⁶ This doesn't stop architects such as NL Architects (Bicycle Club) & Bjark Ingels (8-House) to make bike-centric buildings. To introduce the bicycle in the future, Steven Fleming presents the following principles to make this happen on a city and building scale.²⁷

6.1

1. Make bicycles handy things to use within buildings

Bike theft is still a significant problem in Amsterdam. The estimates vary, but it is generally assumed (by the police, among others) that between 50,000 and 80,000 bicycles are exchanged involuntarily each year.²⁸ This can be easily prevented by taking the bike into the building. This provides the user with new opportunities. He or she would be able to ride the bike from inside their apartment directly to the supermarket or work.

6.2

2. Let the bike be the quickest way to leave home

Cycling can be stimulated if the bike is the fastest way to leave home. In apartment buildings with aerial slopes such as BIG's 8-House in Copenhagen, the quickest way to ground level is by bike. Direct access to the bike creates a lower boundary to use it.²⁷ Thus, buildings should have a bike storage directly connected to the apartment and connected to the bicycle path. In the book *Velotopia*, architect Steven Fleming proposes ideas on how to integrate the bicycle into the building by aerial slopes that directly connect the bicycle path to the apartments.²⁹ He introduces a spiralling gallery where the dwellings are attached to this gallery, causing the apartments to be slightly lifted from its other while spiralling around a collective courtyard.

6.3

3. Weather protection

Rain discourages a lot of people from cycling to work or school. Although we cannot control the weather, we can create a pleasant cycling experience within the building. If the cyclist is confronted with harsh winds when leaving the building, it can discourage cycling. By protecting the cyclist from the wind, harsh sun and the rain the cyclist are on equal footing with other all-weather modes when the protection continues in the urban fabric.²⁷

6.4

4. Sculpt the terrain to control cyclists' speed

To avoid dangerous traffic situations, the cyclists speed needs to be managed. The speed of the cyclist can be managed in two ways. First, we can introduce turns after every level as Steven Flemings proposal in *Velotopia*.²⁹ Secondly, the cyclist can be saved the hassle of braking if the ground is raised at the end of the slope. The cyclist will slow as they rise, then regain their speed as they dip.²⁷

6.5

5. Make peace between bikes and pedestrians

When introducing a cycling path into the building, the cyclist will also encounter pedestrians. The reduction of speed plays an essential role in the relation between cyclist and pedestrians since speeding cyclist can create dangerous situations. To avoid these dangerous situations on the slopes and at the front door their needs to be a clear distinction and transition zone.²⁷

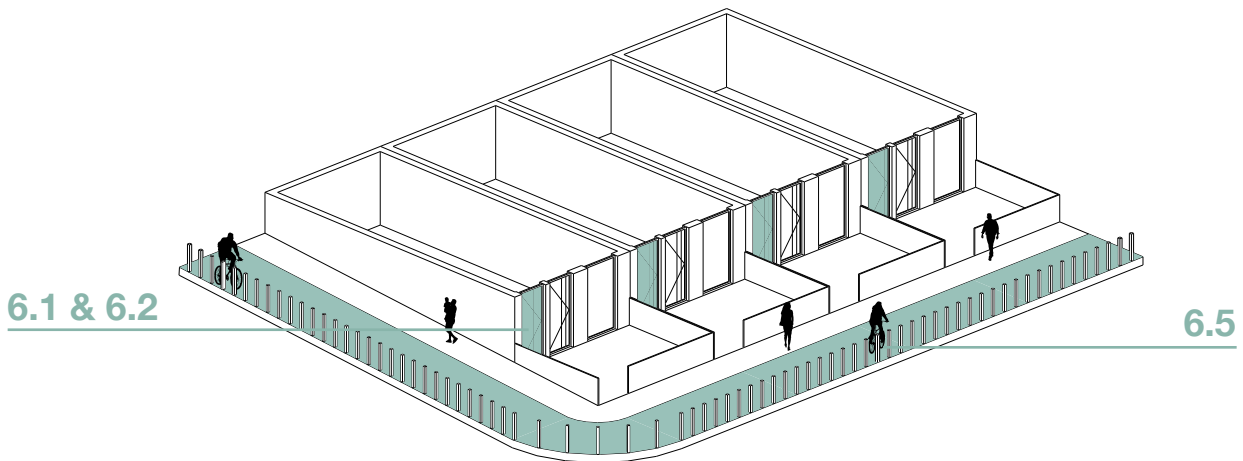


Fig. 17: Diagram of the relation between the dwellings and bicycle path

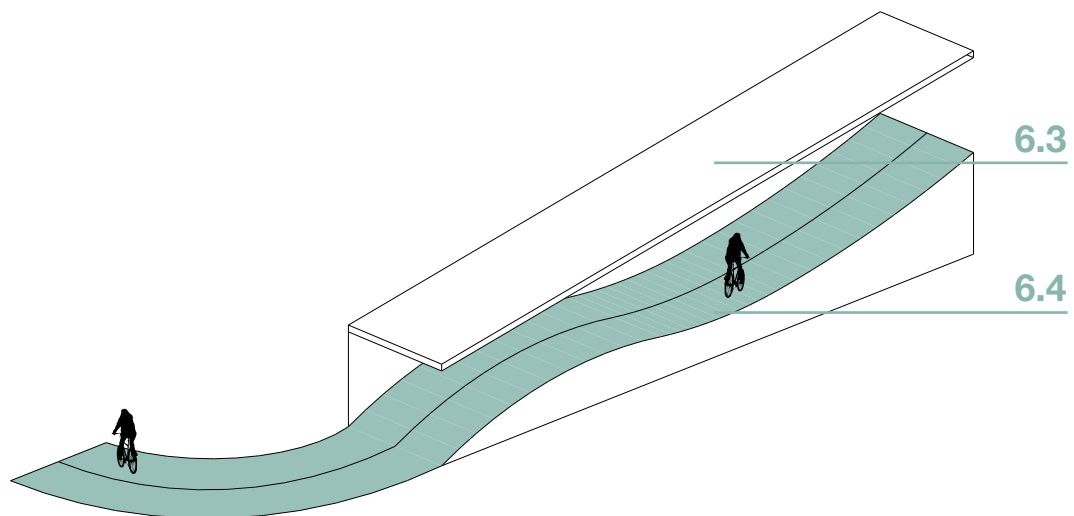


Fig. 18: Diagram of the reduction of speed for cyclist within the building

By implementing a cycling path into the design, the measurements of the bicycle and cycling path are necessary.

Basic parameters bicycle³⁰

Length: 1.94 m

Width (legal max. bicycle with two wheels: 0.75 m, tricycle: 1.5 m) 0.64 m

Seat height 0.90 m

Average bicycle speed 18 km / h

Basic parameters cycling path²³

Width: 2 m

Height: 2,3 m

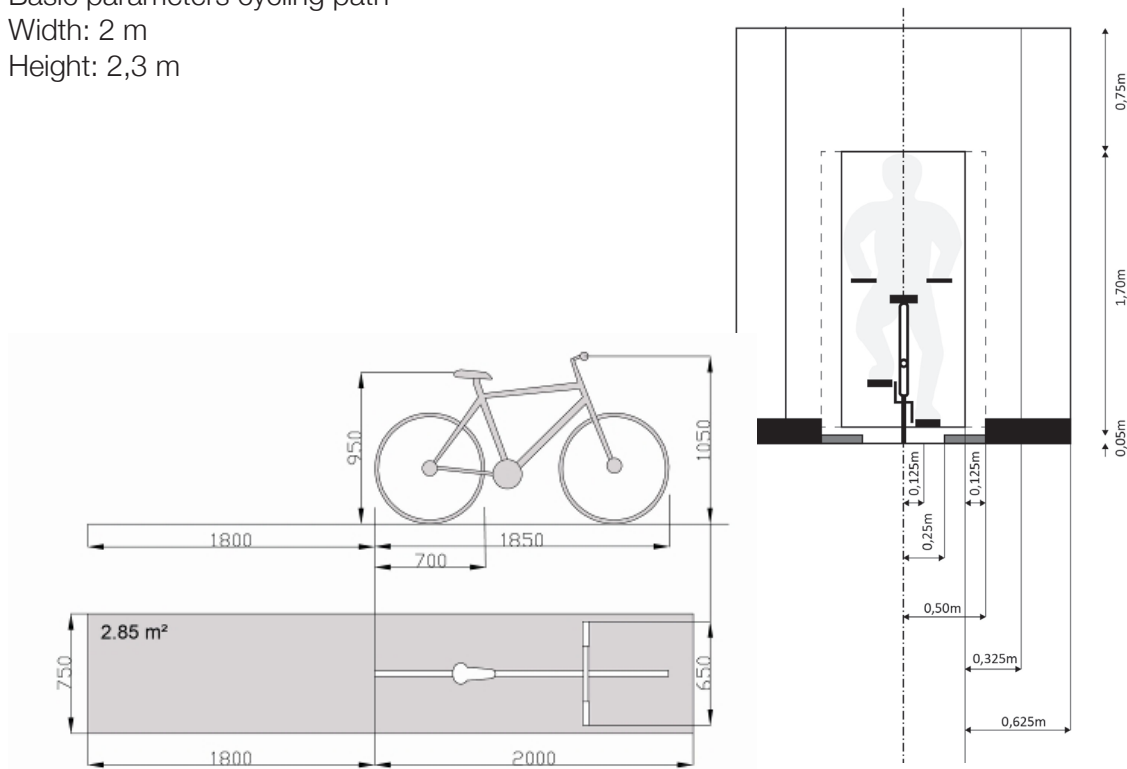


Fig. 19: Measurements bicycle source: toegankelijkestad zwolle

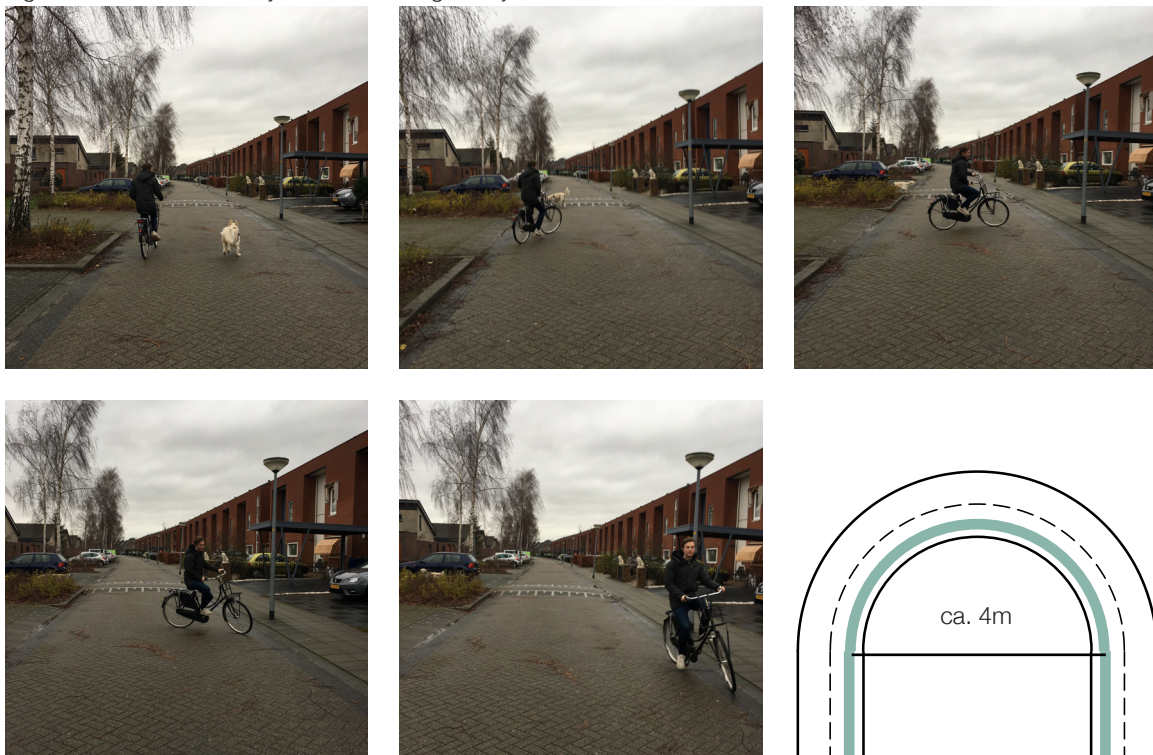
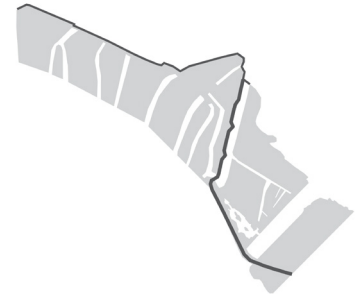
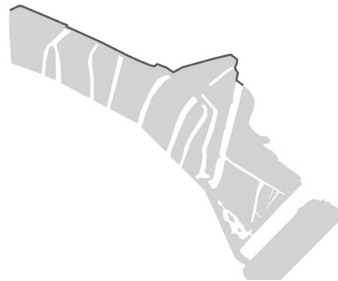


Fig. 20: Test for the radius of a U-turn

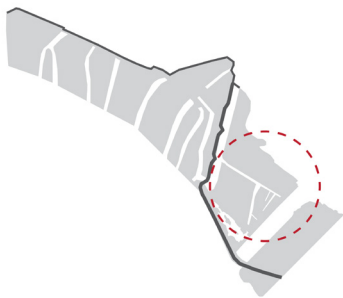
Urban precedent analysis

1550-1650: Growth

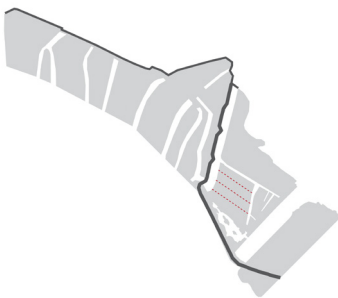


Zeedijk protects the city from the sea water

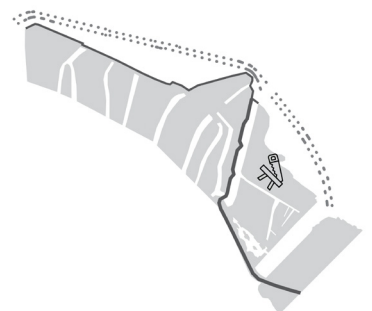
Eastern wall separates the city



The Lastage, one of the first important harbour of Amsterdam



For the first time in the harbor a system of urban planning based on mathematics, with straight streets and orthogonal parcelisation



In the Lastage carpenters, lanes and other companies related to shipping were established. The IJ was with a double poles row (the 'trees') closed to make ships a safe berth to bed. These pile rows also had a military function, as fortification of the port.

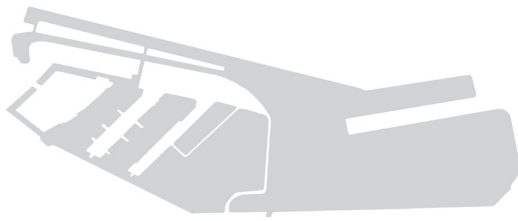


The port expanded strongly in the 17th century. Around 1660 the Eastern Isles were created

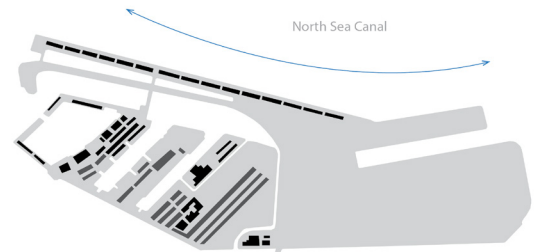


Construction of the Eastern Docklands in 1826. With the growth of the city, an archipelago of port islands developed on the east side of the city, which became more and more spatially and functionally separated from the city. Beginning of a new era

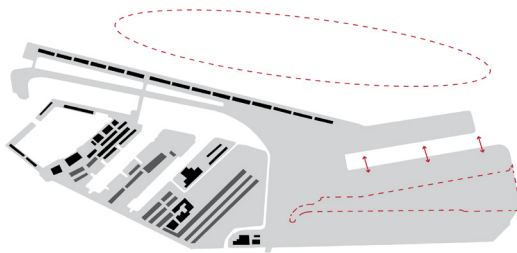
Fig. 21: Overview of the historical development of Borneo-sporenburg



The North Sea Canal (opened in 1876) makes the port of Amsterdam finally easily accessible. And the canal is large and deep enough for the new-fashioned steamships, which have already almost displaced the sailing ships.



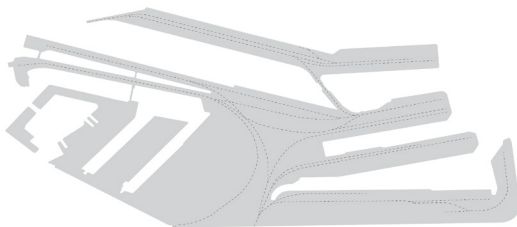
The Amsterdam economy is booming and the city is growing sensationally. After two centuries, the urban area will finally be extended again, with new residential areas such as the Kinkerbuurt, De Pijp and Oosterparkbuurt.



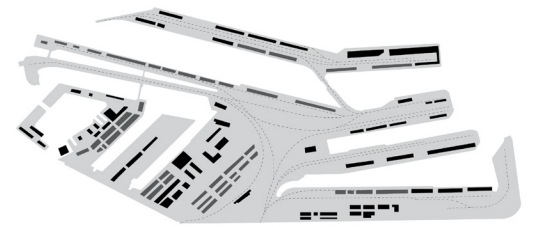
Due to the increasing trade, more and more quays are needed. In 1874, the Railroad Basin was dug in the grubby Rietlanden: tracks along the quays were built on the peninsulas that formed on both sides (later 'Borneo' and 'Sporenburg').



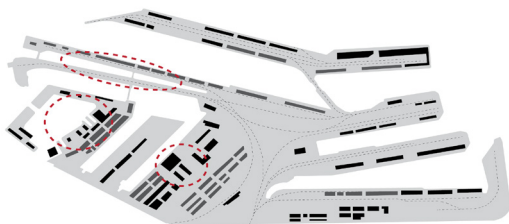
The connecting dam between the IJkade and the Handelskade was equipped with a fixed bridge.



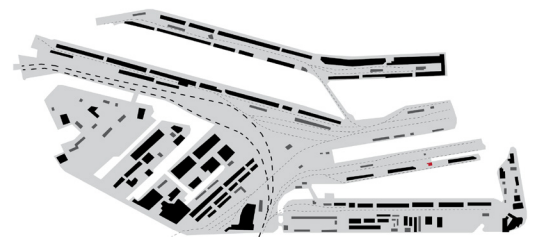
The Eastern docks an important transport area with the construction of the railways with the ships, quays, warehouses and sheds



After a short but intense bloom, after the Second World War it went downhill with the eastern harbor area. The new bulk transport and container shipping industry required larger quay lengths than were available in the Eastern Docklands.



The Eastern Docklands was not very favorable to the North Sea Canal. The rise of aviation did the number of passengers on the high speed greatly reduce. The Western Dock had a greater potential for growth with a bigger area for unlimited possibilities.



The Eastern Dock area was eventually sold to the municipality. It was designated as residential area

■ warehouses, sheds, containers
■ cranes & other dock machinery
■ Only remaining building on the current site

Fig. 22: Overview of the historical development of Borneo-sporenburg

Urban analyses

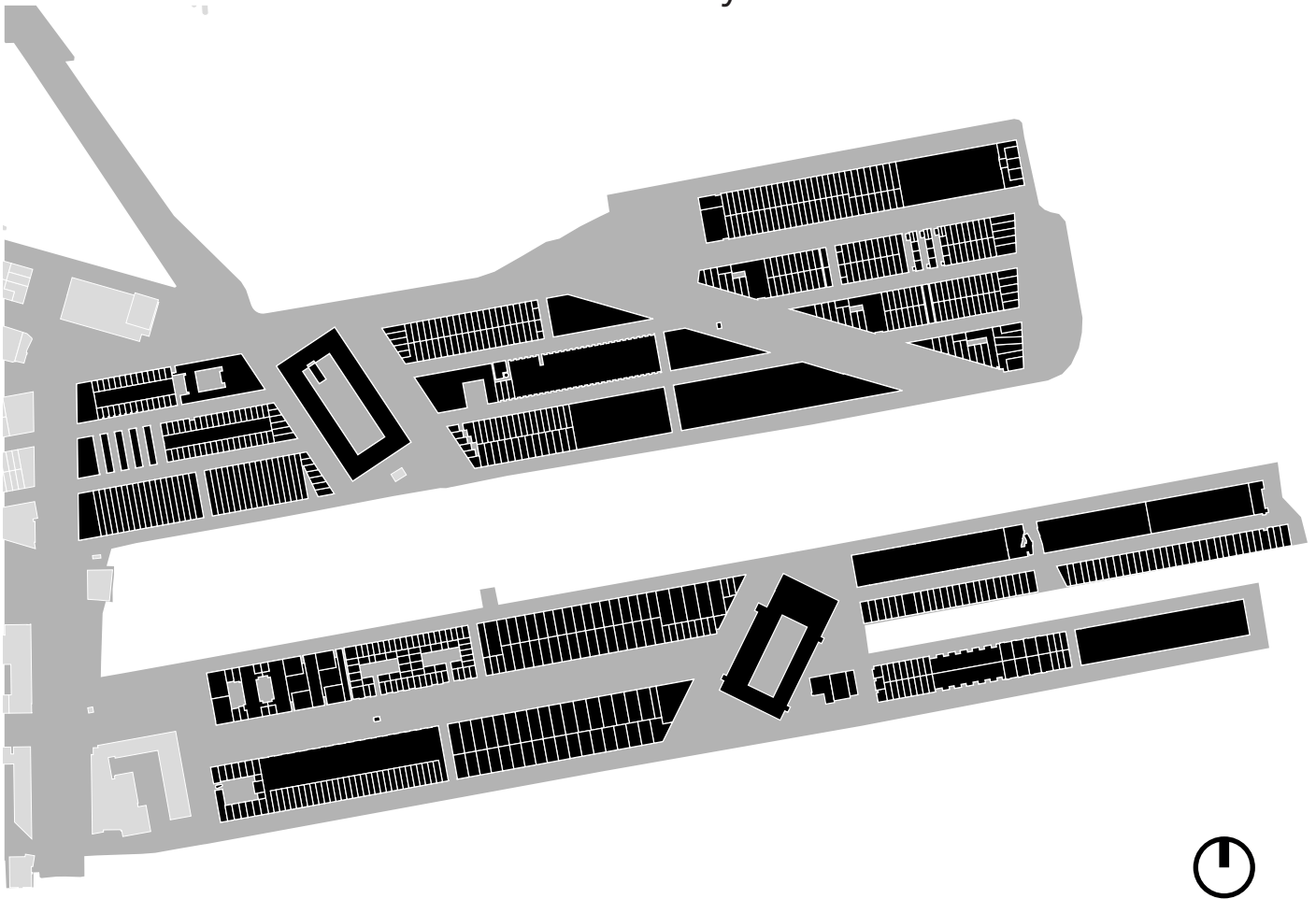
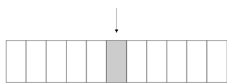
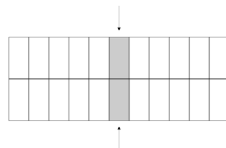


Fig. 23: Urban morphology of Borneo-sporenburg (no scale)

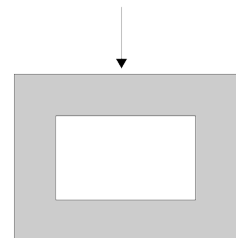
Within the design of Borneo Sporenburg by West 8, three urban typologies can be identified namely: Single row houses, Back-to-Back houses and the Perimeter block. The perimeter blocks are placed diagonal on the conventional street pattern. The Single row houses and back-to-back houses are enclosed within these conventional street pattern. These typologies translate the idea of West 8 that the focuss should be on the private realm. This also comes back in the new developed housing typology.



Single row



Back-to-Back



Perimeter block

Fig. 24: Three urban types

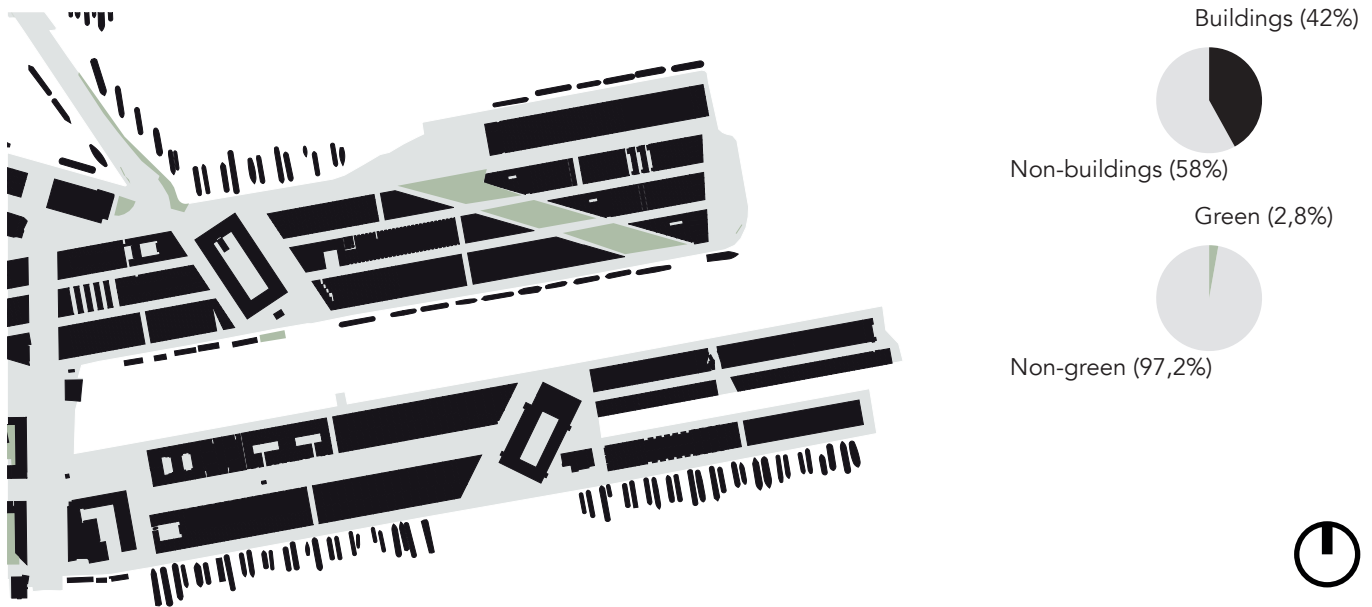


Fig. 25: Ratio of building and non buildings & green and non-green

Urban morphology of Borneo Sporenburg (no scale)

Within the design of Borneo Sporenburg, different ways of building are to be found. This is the building of buildings, but also the building of non-buildings. The ratio of building and non-building is approximately 42-58. With this ratio in mind, Borneo-Sporenburg can be used as a reference when designing a whole new site.

Presence of green of Borneo Sporenburg (no scale)

In the analyzed area not a whole lot of green is to be found in the plan. Just one real presence is to be found in the diagonal line of a park shaped area, as shown on the image above. The percentage shows there is just little green. But the vast amount of water in the area takes over the role of the greens quality of processing precipitation.

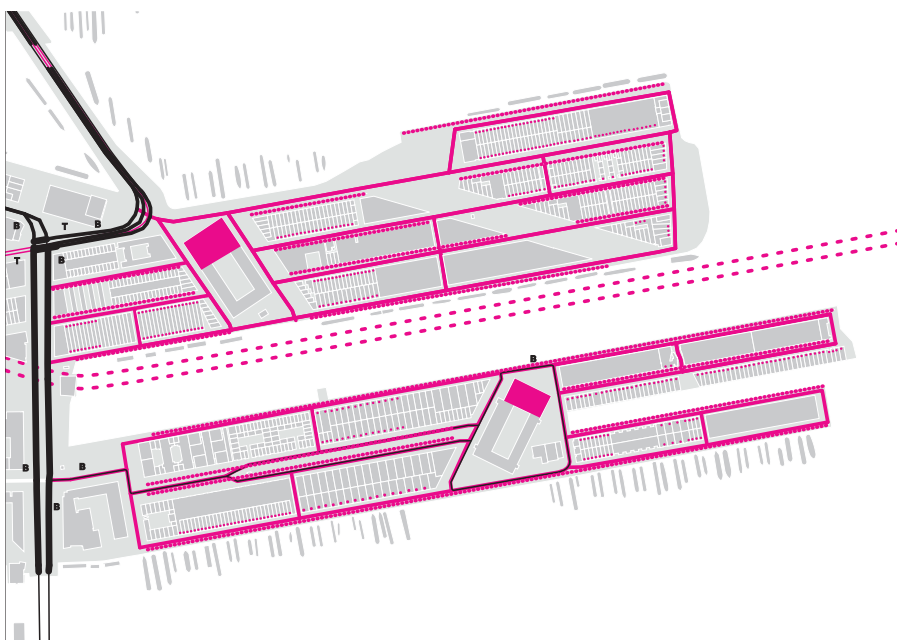


Fig. 26: Infrastructure of Borneo-sporenburg (no scale)

Infrastructure of Borneo Sporenburg (no scale)

The area is accessible by car, bus (limited), bicycle, most other transport devices, and foot. Notable is the way cars get parked in the area. This happens in three different ways. Namely: in a parking garage (marked with rectangles), on the street (marked with dots) and under houses (also marked with dots)

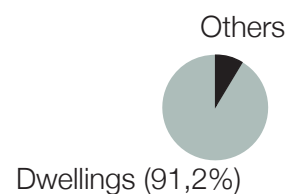
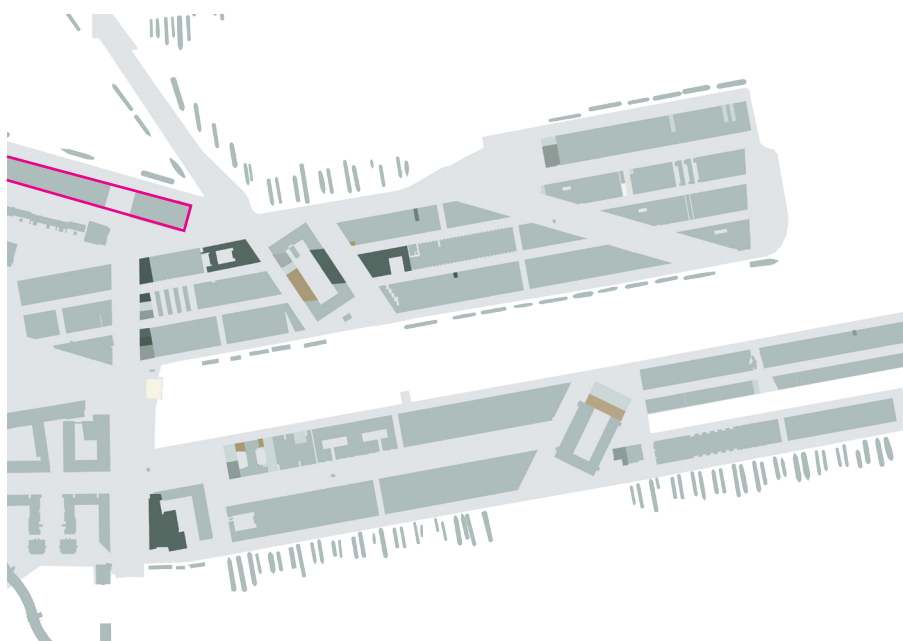


Fig. 27: Different functions on Borneo-sporenburg (no scale)

Functions of Borneo Sporenburg (no scale)

Several functions are to be found in the area. But the biggest part of the program is dwelling. A whopping 91,2% of the buildings are appropriated to dwellings. Amenities are to be found outside the area. These are marked on the map with a magenta line.

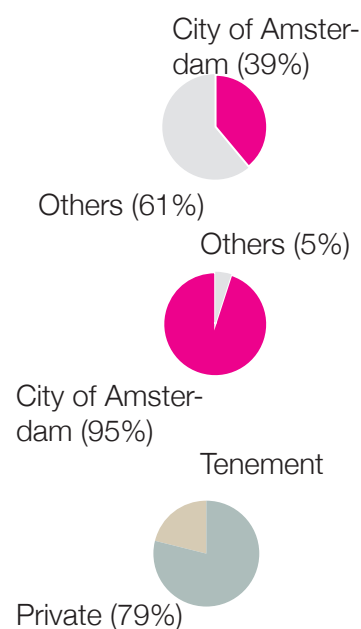
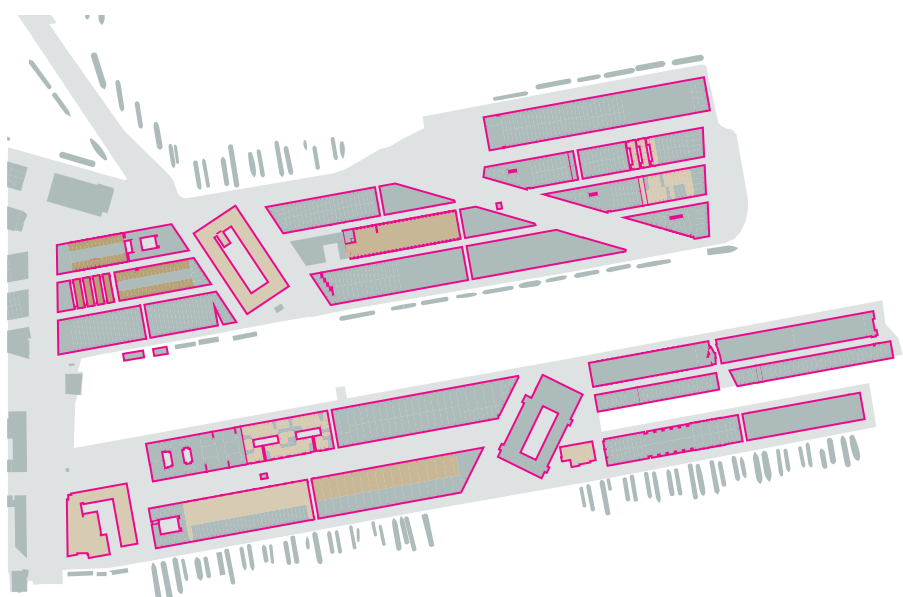
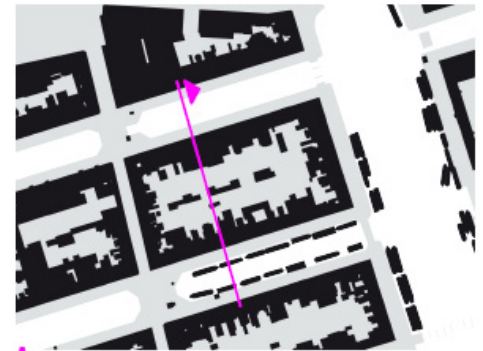
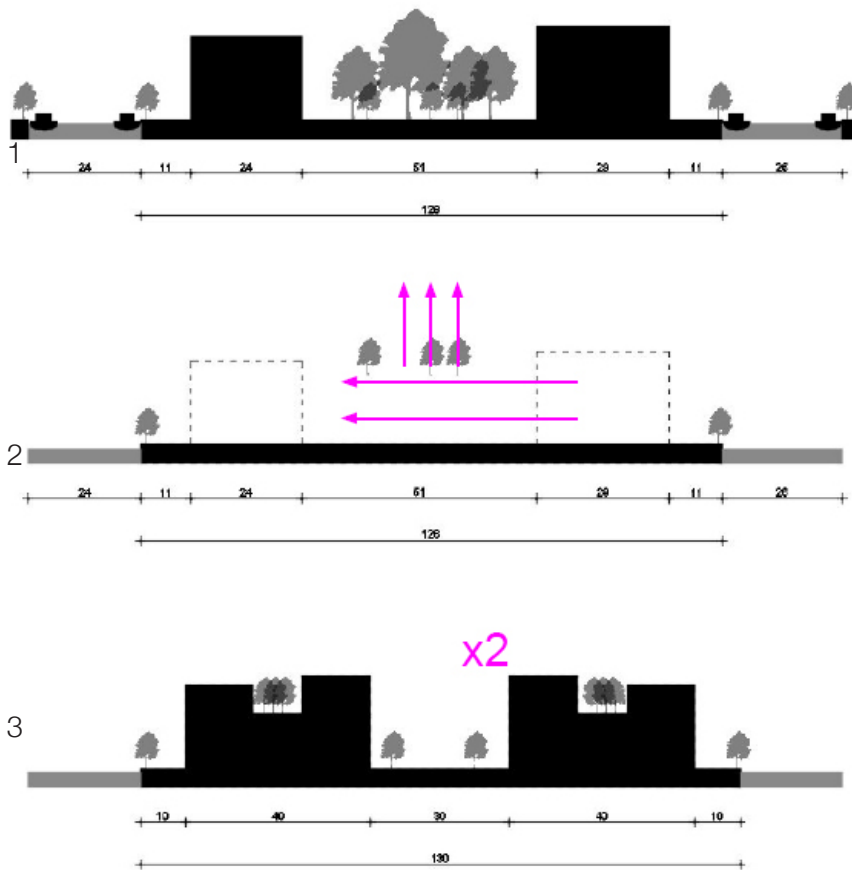


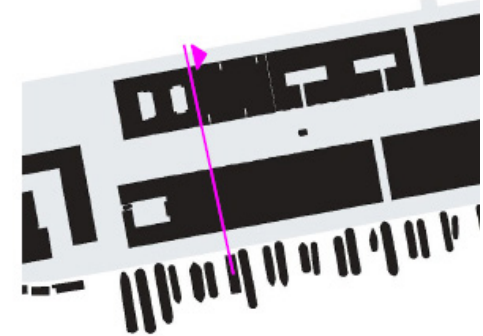
Fig. 28: Ownership of land on Borneo-sporenburg

Ownership of Borneo Sporenburg (no scale)

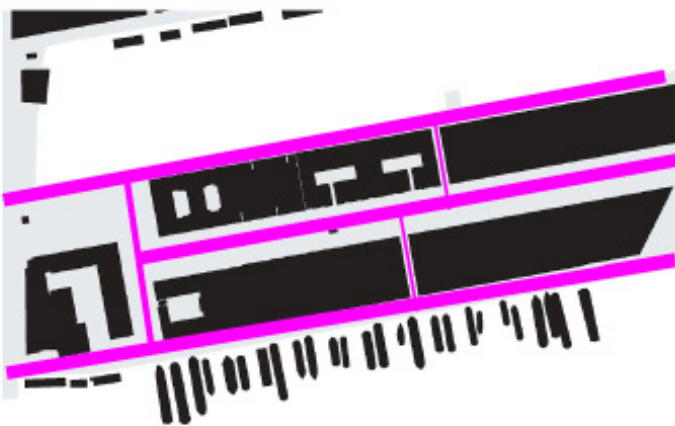
Notable regarding the ownership of Borneo Sporenburg is the ownership of the ground where buildings are placed. Almost all of this area is in ownership of Amsterdam. This means Amsterdam owns 39% of the area and 95% of the ground where buildings are placed. Within the area buildings are built 21% is Tenement and a whopping 79% is private.



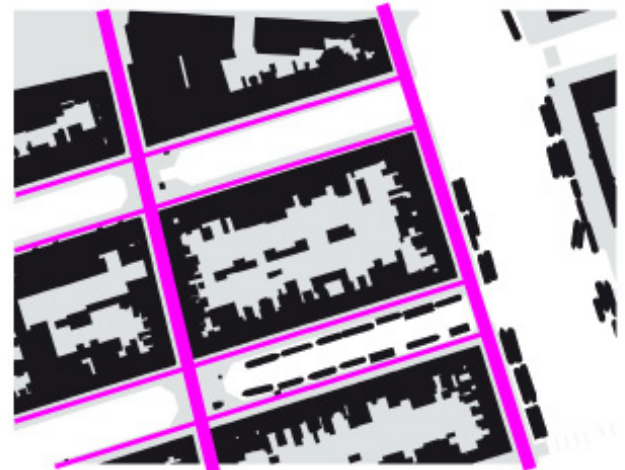
A: Herengracht, Keizersgracht



B: Stuurmanskade, Borneokade



B: Stuurmanskade, Borneokade



A: Herengracht, Keizersgracht



Fig. 29: Comparison between Stuurmanskade, Borneokade and Herengracht in Amsterdam.

In comparison to a typical Amsterdam perimeter block surrounded by canals, one can state that the typology has acted as a base for the block on Borneo and Sporenburg. As the three images on the top left indicate the two blocks of the Amsterdam perimeter block are attached to each other as back to back whereas the courtyard is moved upwards (to the roofs). This back-to-back block times two creates the section of Borneokade and Stuurmanskade. The reasoning for placing two blocks instead of one has to do with the role of the area. The Amsterdam perimeter block acts as a connection over two axes whereas the block on Borneo on one ax. Apart from that, the developed typology gave the opportunity to built more dwellings/ha.

Street profiles

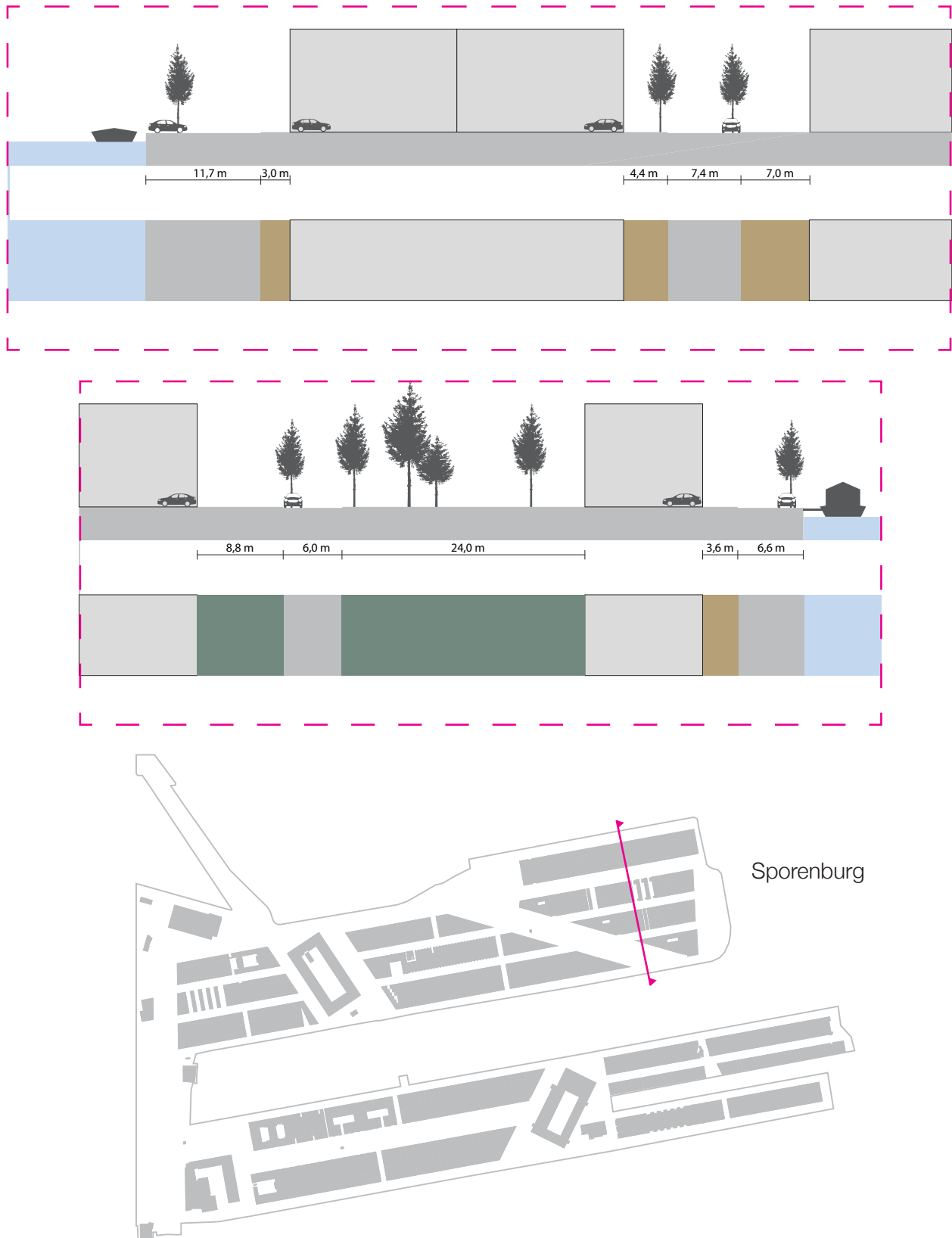


Fig. 30: Street profiles

All the street profiles are similar, consisting of only pavers on both road and sidewalk. The building heights are three storeys and all dwellings have their access at street level creating including a car garage on the ground floor. Cars dominate the street views together with relatively small trees.

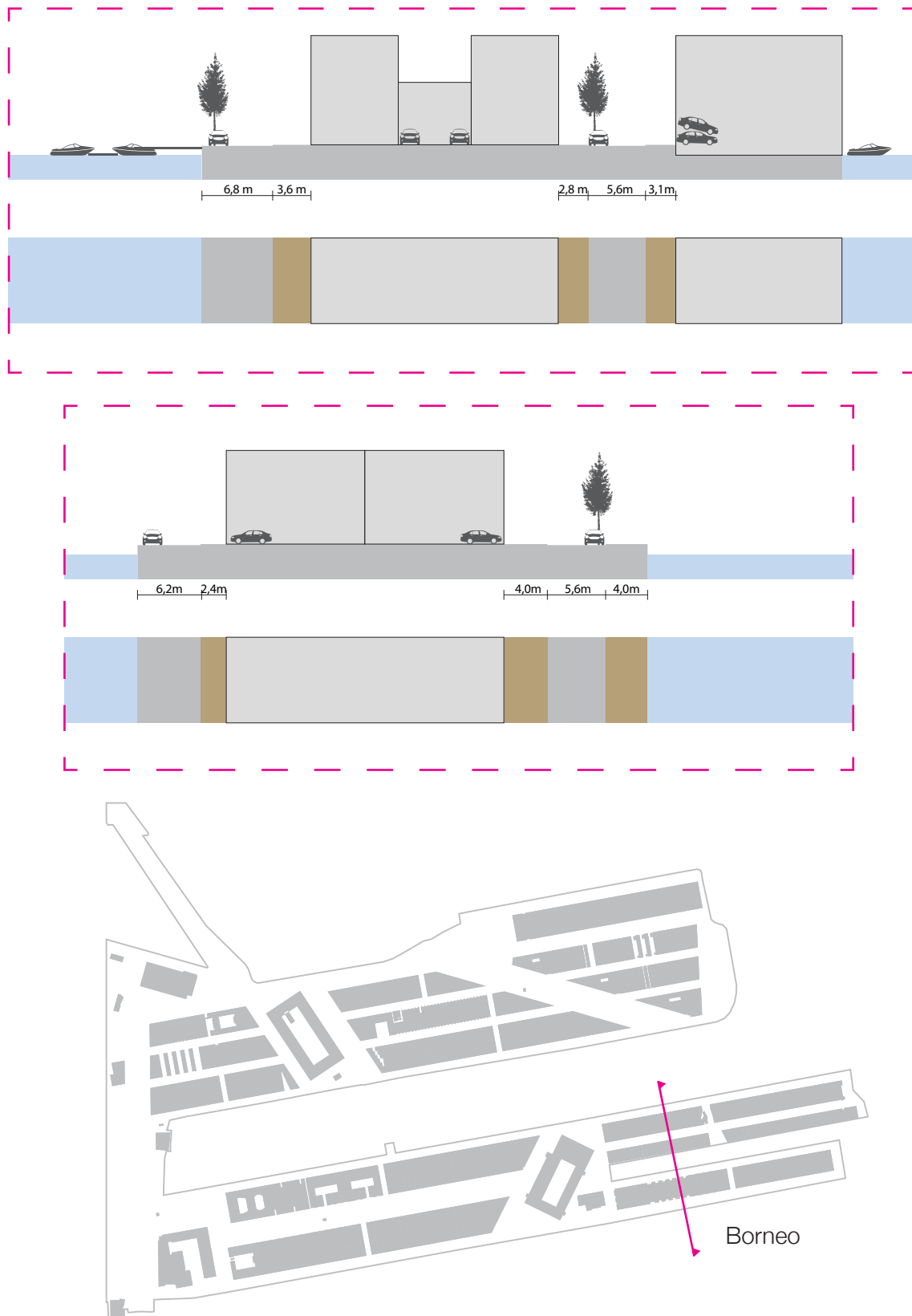
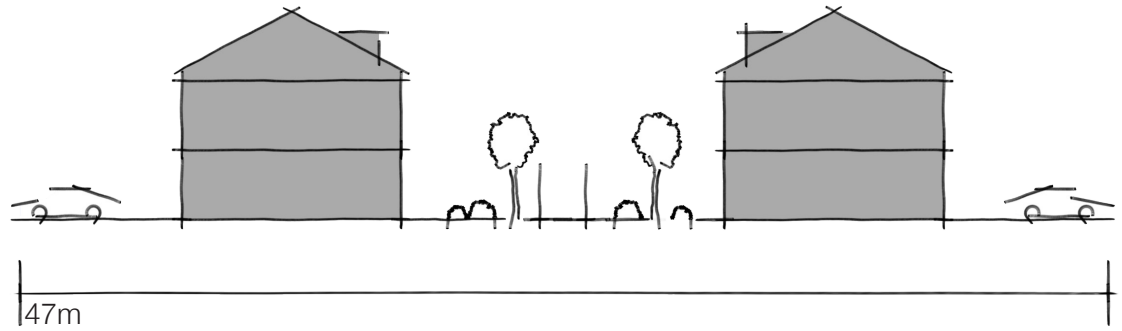


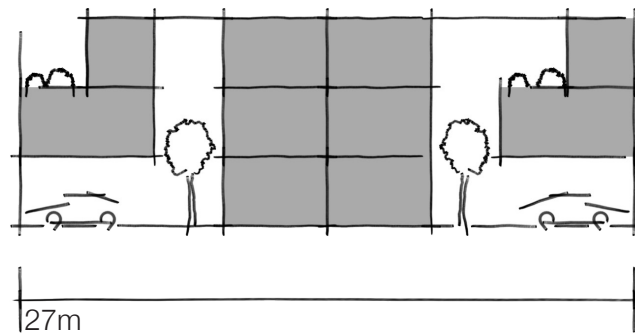
Fig. 31: Street profiles

Dwelling Types

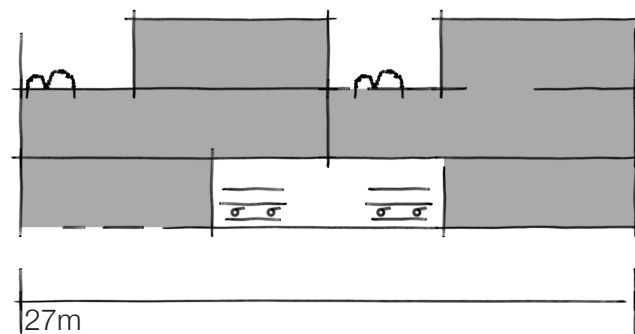
Typical Dutch rowhouse



Borneo-Sporenburg back-to-back



Borneo-Sporenburg back-to-back



Back-to-back in enclosed block

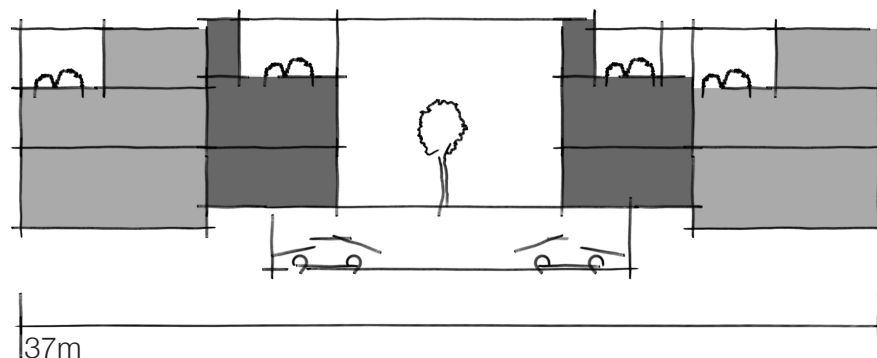


Fig. 32: Section of dwelling types

To be able to reach the expected residential density with similar qualities of the typical Dutch rowhouse, on Borneo Sporenburg gardens and parking have been implemented within the territory of the back-to-back dwellings.

If we project the urban design on the site of minervahaven it shows that that the site has corresponding dimensions. To illustrate the possibilities of minervahaven we applied the same structure as Borneo-sporenburg. It shows that the dimensions of the site create the same possibilities.

The demand for dwellings in 2050 increasing the density in cities, might start alternative research in finding space. In order to house the same amount of dwellings on less space, the density will decrease and the SPR might as well. Next are some alternative solutions, showing possibilities creating land in water.

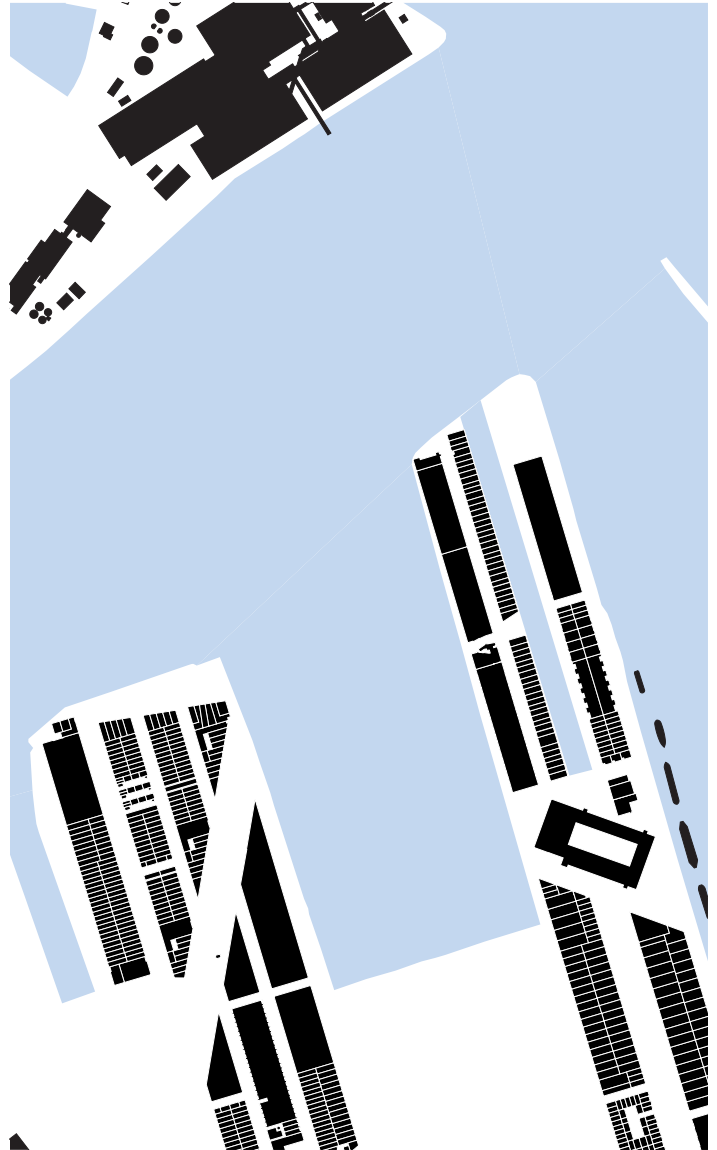


Fig. 33: Applying the design of Borneo-sporenburg on the site of Minervahaven



Fig. 34: Current situation Minervahaven

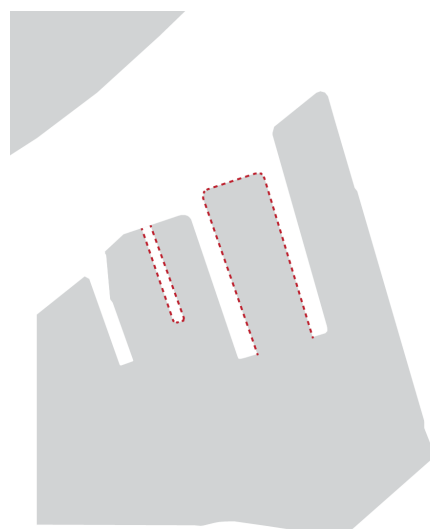


Fig. 35: Adding space between peninsulas

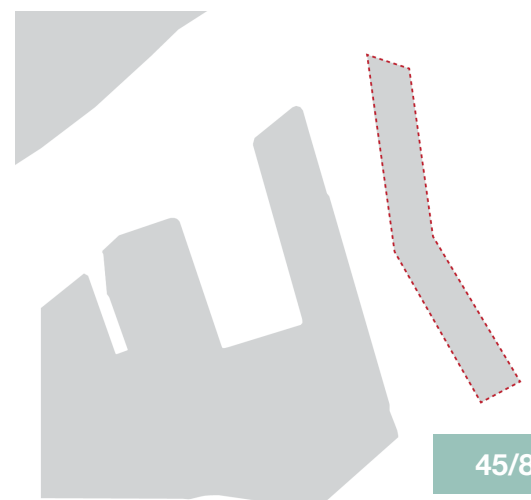


Fig. 36: Adding an 'extra' island

Urban design proposal

INTRO

The following pages contain the urban design proposal for Minervahaven. In this part, Minervahaven is analyzed and redesigned for new demands. As part of Westelijk havengebied, Minervahaven is being researched to transform from a high potential area to high-dense areas filled with mainly housing, in 2050. In regard to this research, a smaller piece, a new concept on Minervahaven is designed. With an analysis, an interpretation is made of potentials. These potentials combined with a vision have created a new concept of Minervahaven; "The active Harbor".

Analysis of Minervahaven combined with case-studies of Borneo-sporenburg, Müllerpier, Hamburg, and Norfolk have fed the design process for "The active Harbor". Besides the analysis, visualizations by drawings and models have helped to develop and elaborate on the new interpretation of Minervahaven. These products are shown in the following pages.

"The active Harbor" aims to focus on the scale of the human being. Organizations of amenities alongside the bay and fluctuations in building heights are examples of how this is aimed to be succeeded. A harmonious play between anonymity and identity keep the public realm a vivid experience to move through.

HISTORICAL DEVELOPMENT

The Houthaven was developed in 1876, similar to the construction of the North Sea Canal, for the skip and storage of wood. It was the first dug harbor in Amsterdam. In the past, the profile of the area was clear; timber trade, transshipment, and storage took place in the area.

A map overview from 1867 from Minervahaven shows that the area is characterized by a continuous transformation. Depending on the need for space and the wishes of the users of the area, quays have been constructed, the land has been won, port facilities have been laid out and some of them have been filled in. Road and rail infrastructure has been realized. In the course of time, the built-up area has also increased.

Until the sixties and seventies, the business activities were 100% focused on wood transshipment and timber trade. In the 1970s and 1980s, the functional character of the area changed from large-scale water-based activities to more small-scale, land-based business activities. Wood companies in the area transport their raw materials and products less and less over the water and more and more often by road. Since the 1970s, other types of business activities have also entered the area. Wholesalers, machine factories, DIY stores are located in the area (Amsterdam 2007, p.7).



Fig. 37: Historical development of Minervahaven

Existing qualities



Harbor activity



Cultural heritage



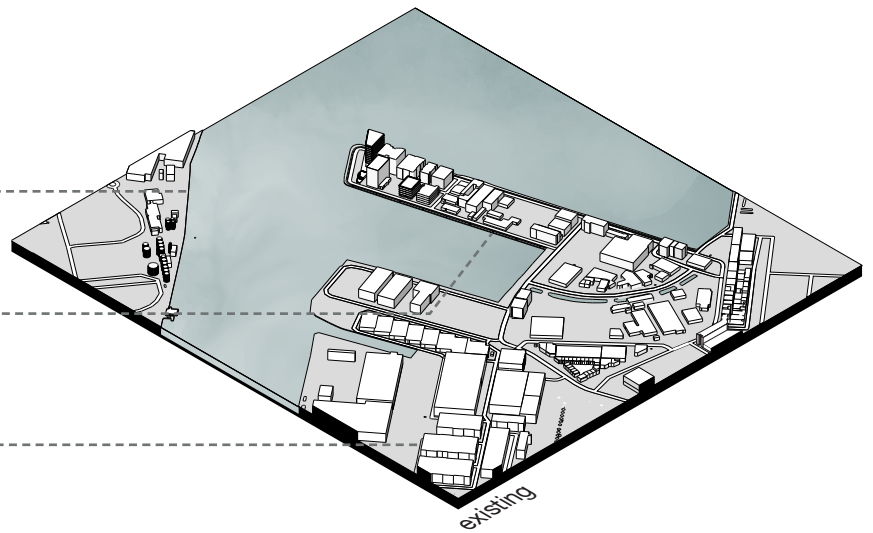
Historical elements



Quay



Harbor furniture



New qualities



Identity vs. anonymity



Orientation points



Free sight with diagonal



active harbor



Infrastructural hierarchy



High density in urban area

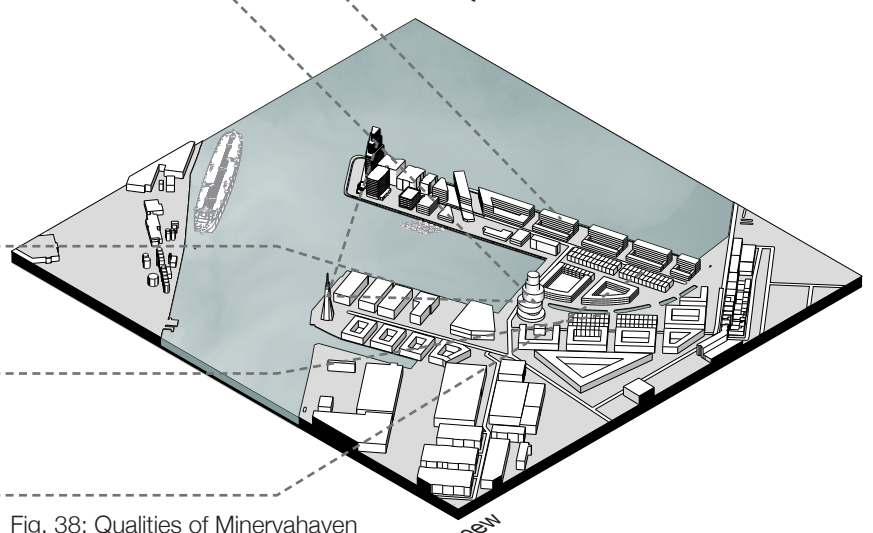
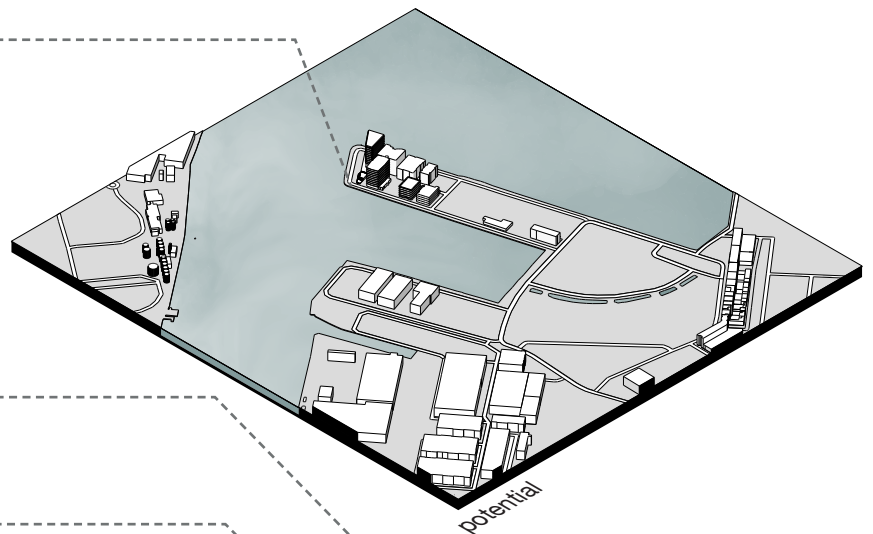


Fig. 38: Qualities of Minervahaven

QUALITIES

In to the characteristics of Amsterdam, the area of Minervahaven have some qualities of great potential. Above an overview of these qualities is illustrated. The most significant characteristic of Minervahaven is the presence of water. Spatially this water creates a quality of emptiness, a visual connection over “free-space”.

Specified in the illustration are existing qualities complemented with newly introduced qualities. The existing qualities pointed out, are characteristics which make Minervahaven unique in comparison to the context of Amsterdam. It is a merely generously set up area in regard to spatiality. With its harbor-like identity, it creates a robust finish and a defined scale. The furniture, measurements, and heritage become the identity bearers of Minervahaven.

In combination with its existing qualities, new elements are introduced. These elements enforce the functional transition taking place in this area. These elements aim to make Minervahaven a pleasant place to live.

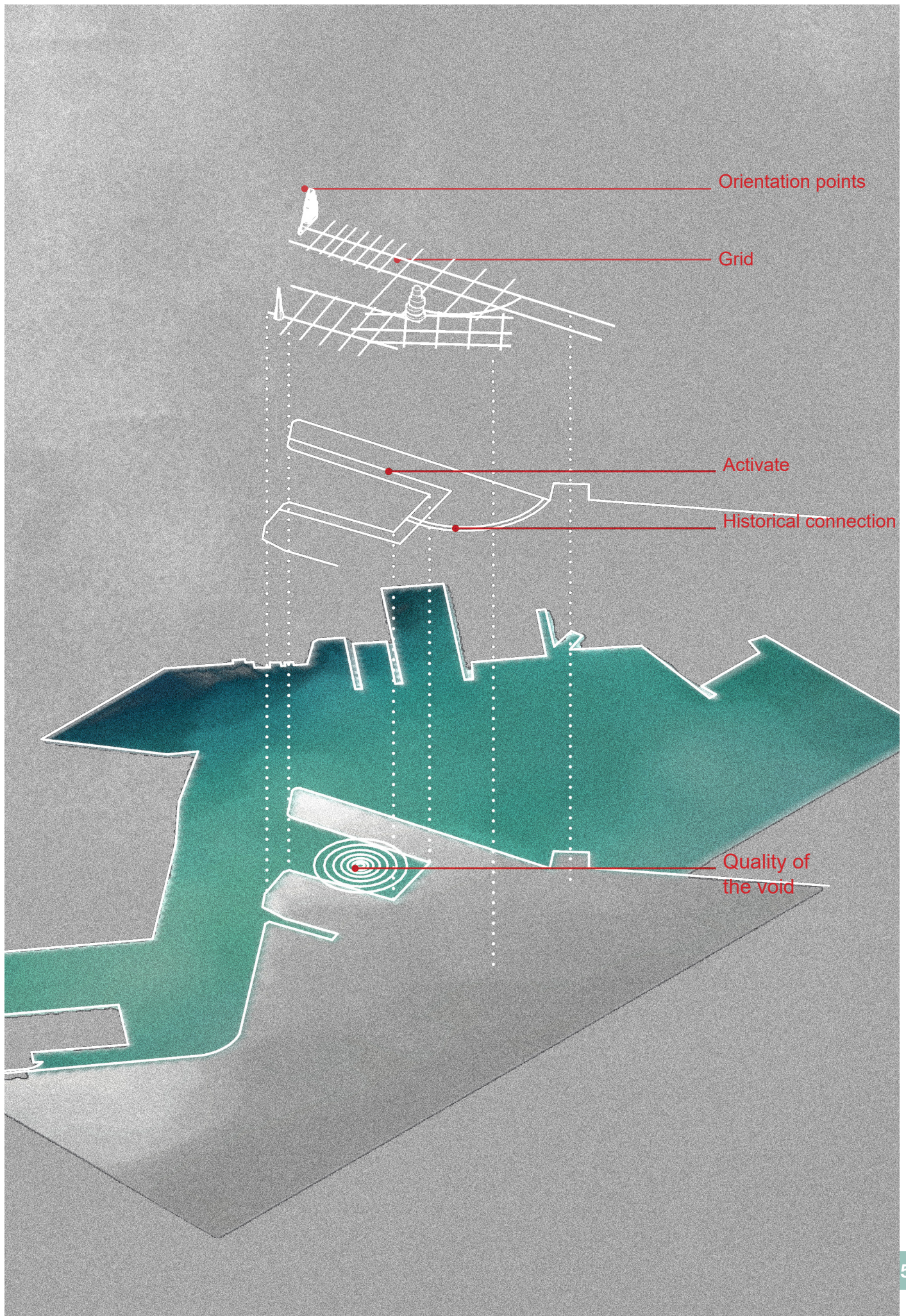


Fig. 39: Concept of the new design

MORPHOLOGY

The design integrates 100 dwellings per hectare in the harbour area. It combines the existing morphology with the newly integrated dwellings. On the pier, the existing structure is still recognisable by its form and orientation. The re-integrated Danziger bocht determines the morphology on the new developments on the south side.

The design has four types of building blocks to offer a diverse spectrum of dwellings for different target groups. Combined with a diverse program of public amenities it creates a vivid experience to live in.

SIGHTLINES & LANDMARKS

The design uses landmarks and sightlines as orientation points in the urban design. The Landmarks are three hybrid buildings with leisure, commercial and residential purposes. These landmarks can be distinguished by their shapes and heights.

The most common access point of the plot is the road that connects the harbor to the Houthavens, on the south-west side. By entering the plot a diagonal building frames the view towards the open water. The theatre and transit-hub are designed to guide the view towards this diagonal.

INFRASTRUCTURE

The area is characterized by its many car-free zones while all the buildings are easily accessible from the car parking. By strategically placing three parking in the harbor it provides enough parking space for the residents and visitors and ensures its connectivity.

One of the landmarks is the transit-hub. This transit hub has parking space, a bus stop and a metro station. This hub forms the connection to the other districts of Amsterdam. In the future this sub hub may connect to a bigger hub and station Sloterdijk.

- car
- - - Bus
- - - Metro
- P Parking

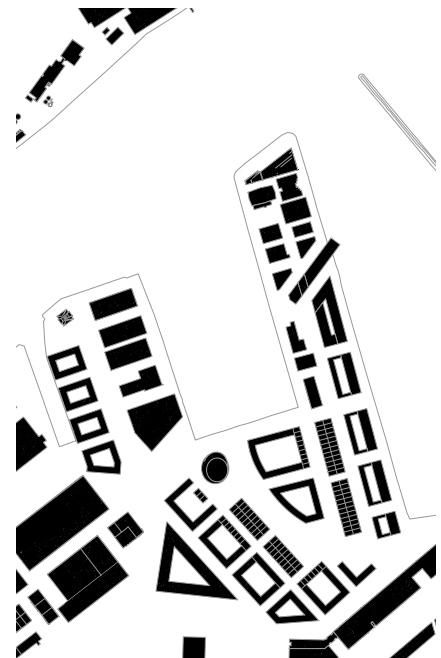


Fig. 40: Morphology of Minervahaven

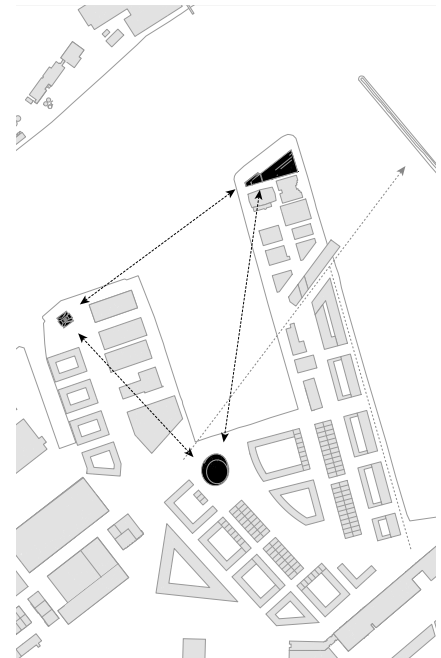


Fig. 41: Landmarks and sightlines

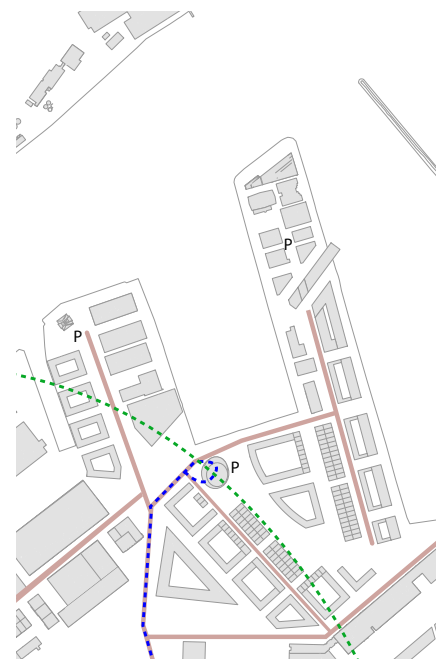


Fig. 42: New infrastructure



Fig. 43: Different urban types in the new design

* measurements per dwelling

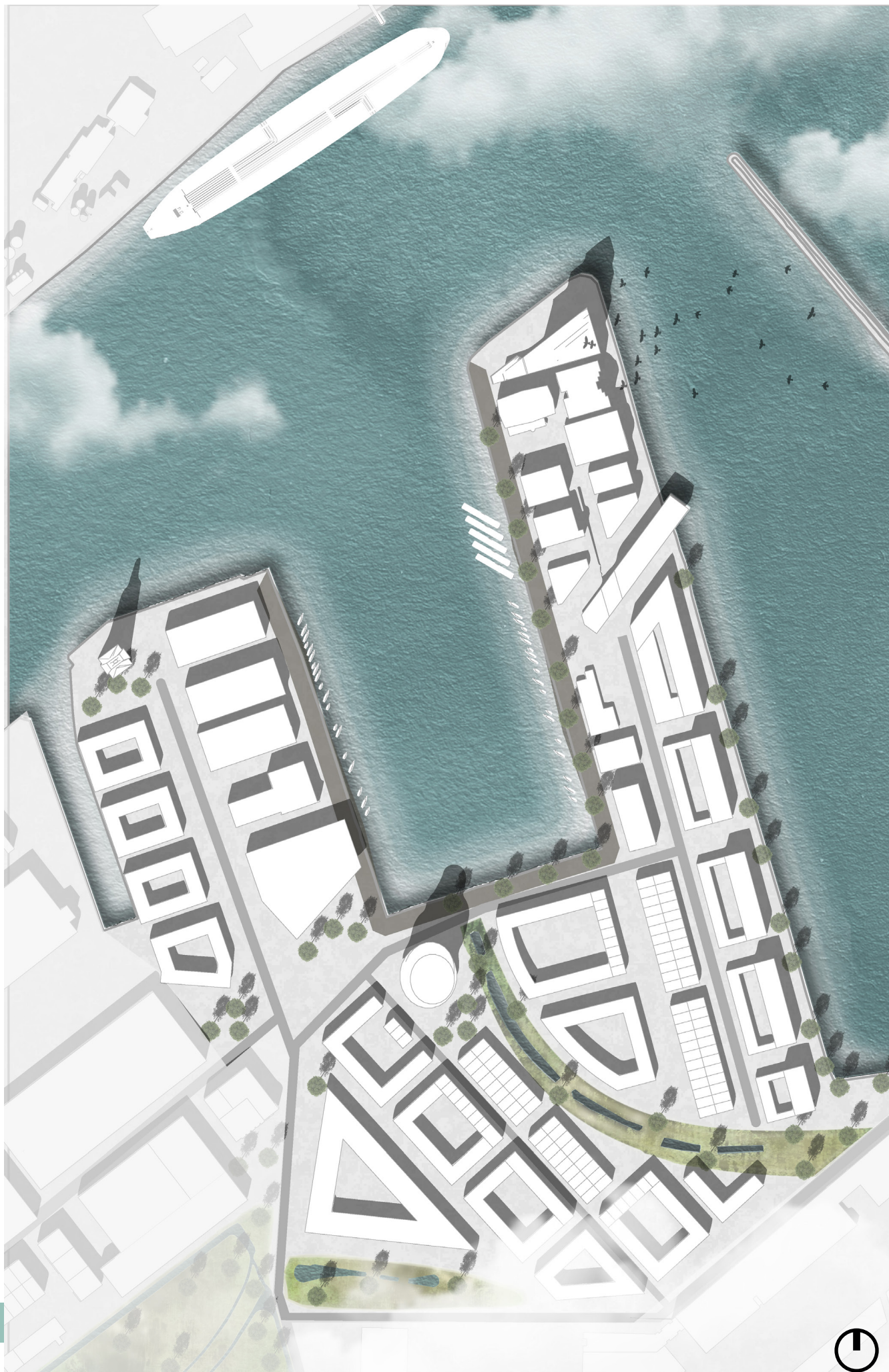


Fig. 44: new urban design of Minervahaven (no scale)

MASTERPLAN

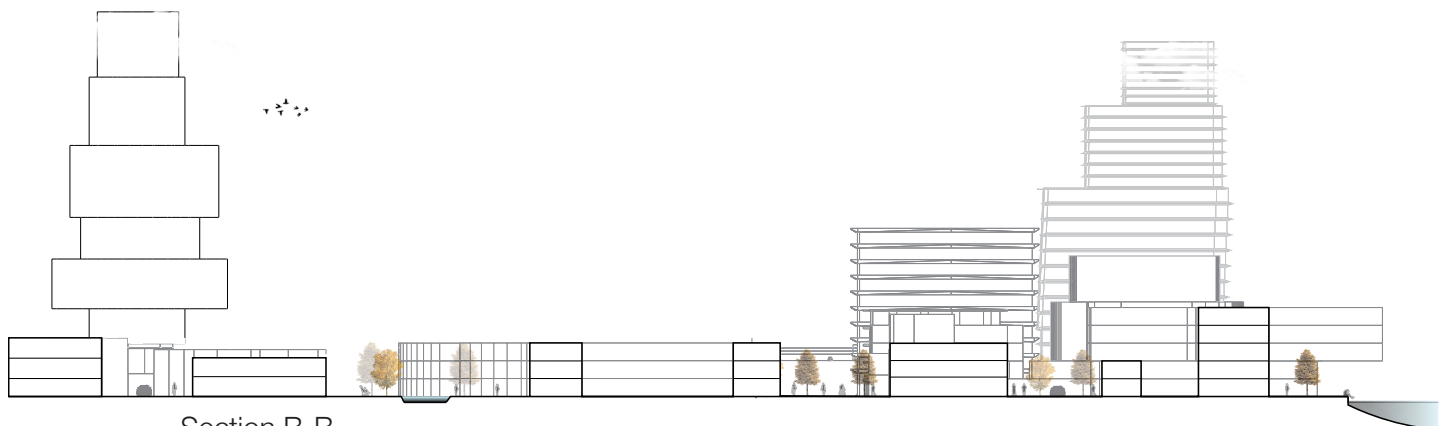
Minervahaven shows that the area is characterized by a continuous transformation. Depending on the need for space and the wishes of the users of the area, quays have been constructed, the land has been won, port facilities have been laid out and sometimes again filled up and road and rail infrastructure has been realized. Even now, the Minervahaven is being transformed into a residential and work area.

In front of you lies the new Master Plan. The former activity on the south side of the master plan is giving way to the new developments. Some of the existing historic and office buildings on the north side are retained. The identity of the area is created by the height accents, the cultural activities, the sight lines and a variety of special forms of living. The central Hub forms a connection point with the city. The former waterway that connects the Minervahaven with the Nieuwe Houthaven is being transformed into a park for the new residents. The connection with the Houthavens forms the area into a whole. The buildings vary greatly in terms of experiential value as diversity. The two sides of the master plan are characterized by a large scale, the warehouse size. Towards the Minervahaven, the buildings are becoming smaller and more intimate.



Section A-A

Fig. 45: Section A-A of new design



Section B-B

Fig. 46: Section B-B of new design



Fig. 47: Impression on the quay adjacent to 'het ij'



Fig. 48: Impression on the active harbour

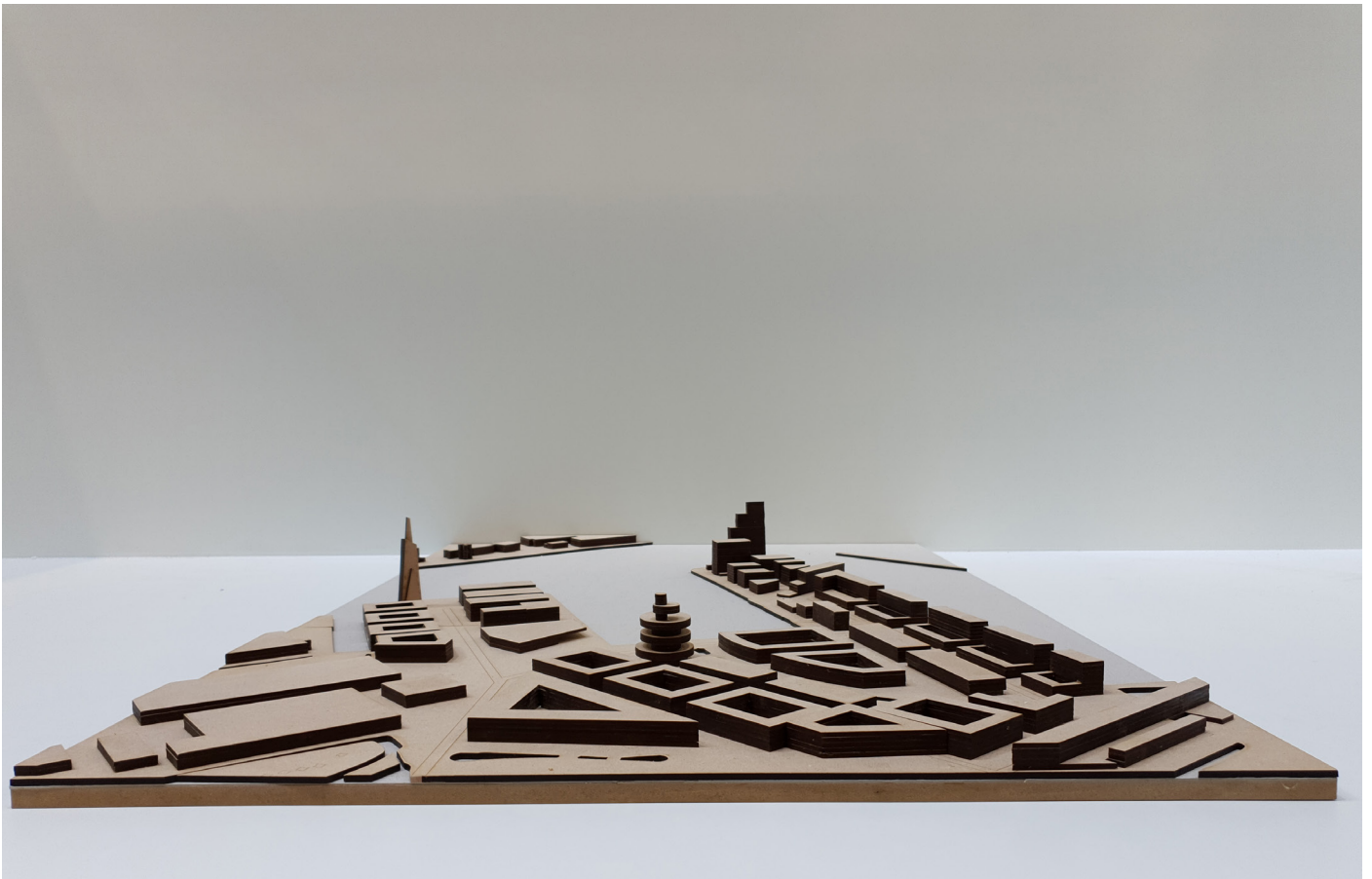
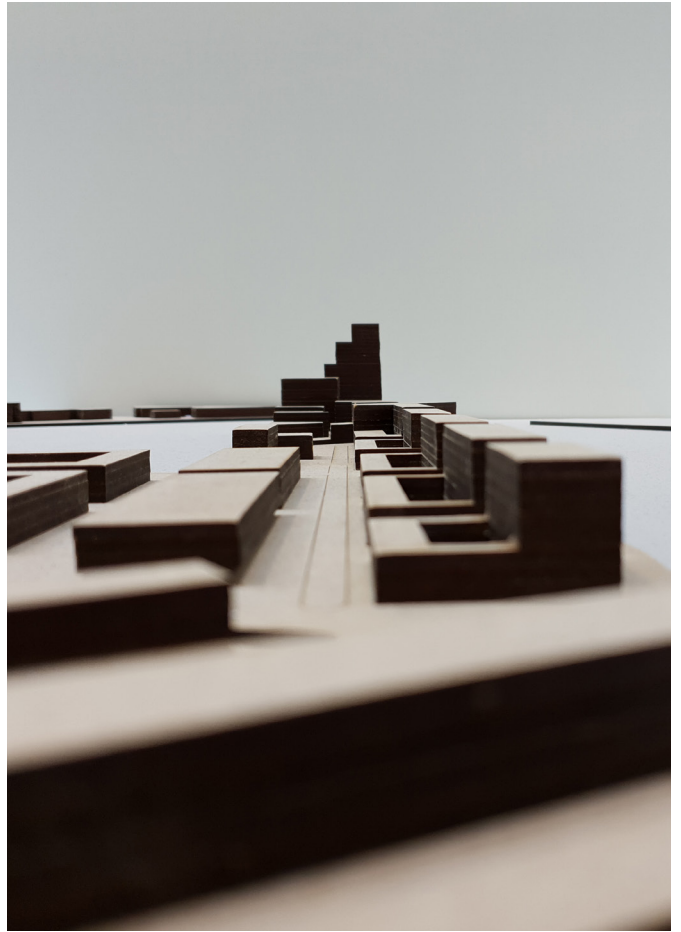


Fig. 49: Photos of the 1:1000 scale model

Site analysis

Minervahaven is located at the western harbour of Amsterdam and part of a bigger development plan for 'haven stad'. With the new plans for haven stad, the municipality aims to transform the harbour into a more vivid living, leisure and work environment. It is therefore about the realization of a complete piece of the city, with all the accompanying urban facilities such as schools, sport, art & culture, shops, recreation and green areas.

The minervahaven is in full development where it is no longer about pure harbour related activities. It is rapidly changing into a popular location for offices in the creative sector with hotels and leisure amenities. This proves the enormous potential of the location. Currently, the minervahaven is turned into a mixed-use location but without housing. The municipality plans to change this by the year 2029, taking into account the current challenges such as sound and air pollution.



Fig. 50: Map with location of minervahaven with the cycling distances to popular areas

If we look at the connectivity of the location it shows that most of the work and leisure areas in the city of Amsterdam are within cycling distance. The location provides a good connection for cyclist and users of public transport to the rest of the city. The difference in time between the usage of a bike or public transport is negligible. For example, the Zuid as is within 30 minutes cycling and 35 minutes travelling with public transport.

Looking at the current situation it shows a mixture of buildings developed in a short period of time. The popularity of the location has been rapidly growing translates into the morphology map as shown in the figure 49 . On the north side, the harbour activity is ongoing. The Minervahaven has no current harbour activity although it still has one saw-mill. The other building for the harbour activity has been replaced by offices and hotels as shown in figure 50. it shows that the pier mostly consists out of offices while in the area around de danzigerbocht consist of small to middle size companies.



Fig. 51: Morphology of current situation



Fig. 52: Current program on Minervahaven

Figure 51 shows the current infrastructure in the Minervahaven. The area is accessible by car and bus. The streets follow the quay.

The area is still influenced by the surrounding harbour activity which produces a sound of ca. 60 dBA. According to Dutch building regulations, dwellings may only be built in areas with less than 55 dBA.

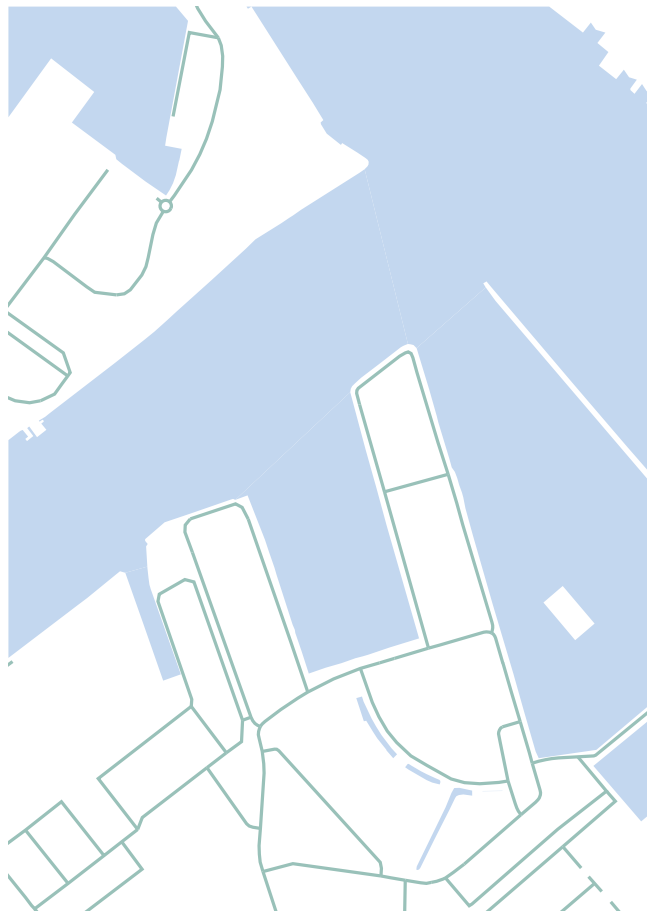


Fig. 53: Current Infrastructure on Minervahaven



Fig. 54: Current soundpollution in Minerahaven

Figure 53 shows the most common wind direction in the area.

When looking at the sunlight both long sides of the facade are exposed to sunlight.

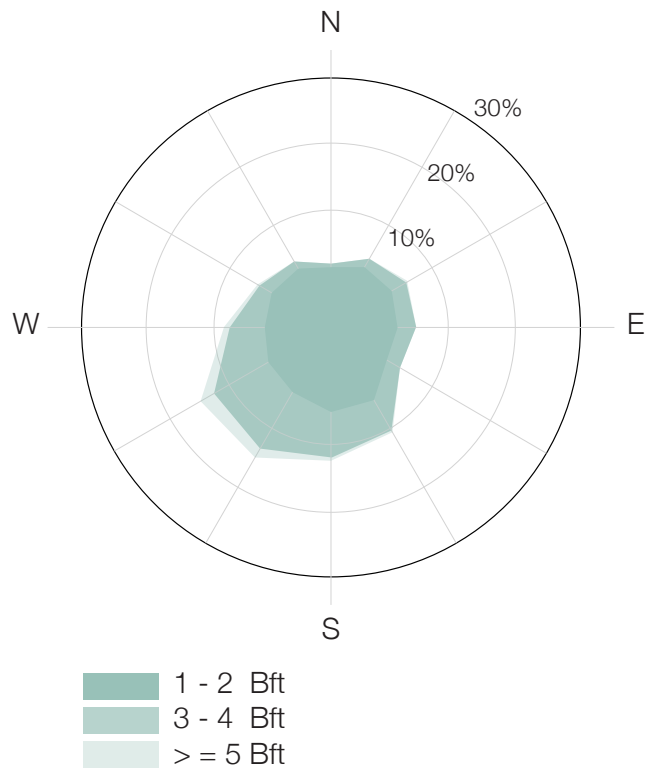


Fig. 55: Windroos de Bilt source: KNMI

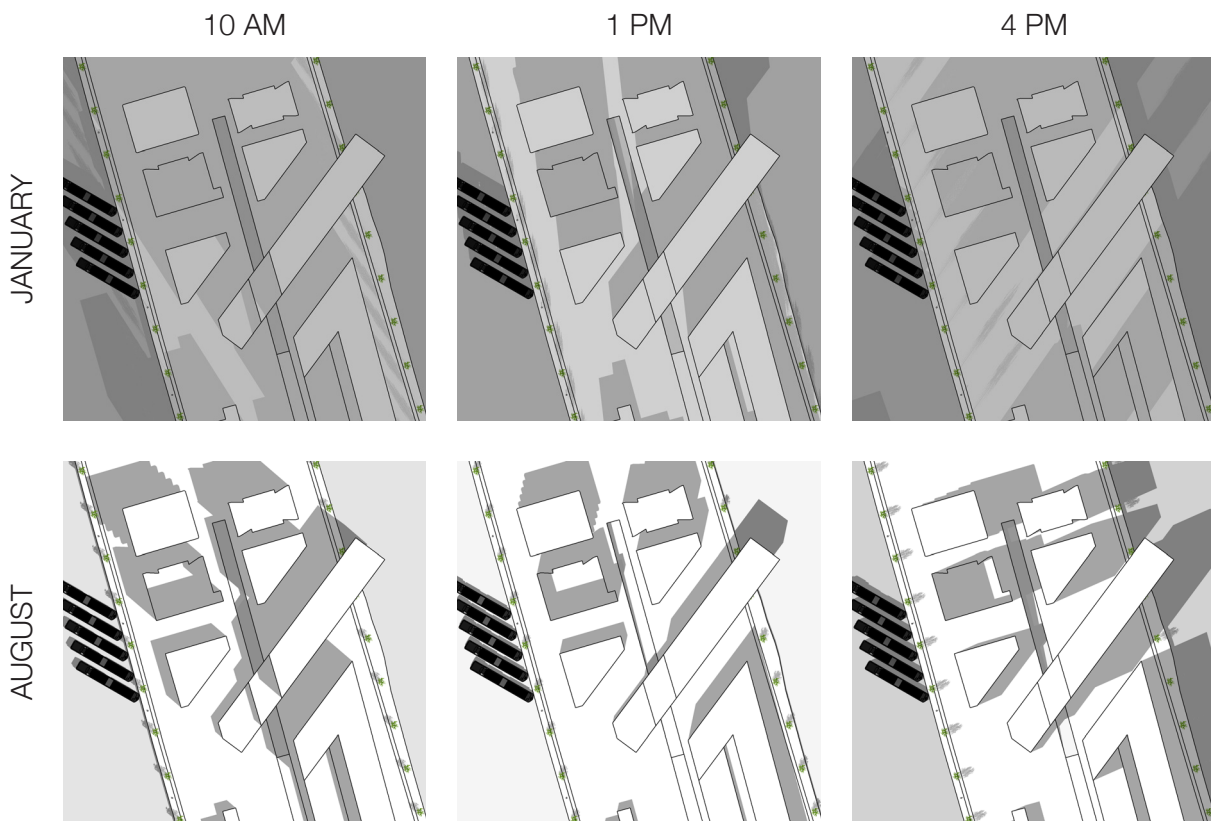


Fig. 56: Studio on the location in relation to sunlight

Plan analysis



Fig. 57: Artist impression source: Lauren Boodt Architecten

Toren van Babel

Architect: Laurens Boodt
 Location: Netherlands, Rotterdam, Lloydpier
 Year: 2016 - now
 Floor area: ca. 3800m² (24 dwellings)

The tower of Babel is a residential building on the Lloydpier in Rotterdam. To attract more families into the city centre of Rotterdam the design focusses on creating an optimal home for families within this high density. By elevating the street around the building there is a connection between the street and the dwellings. A wide stair connects the ground level to a communal square on the first level. Adjacent to the square is a communal space which makes these to spaces for communal gatherings ore shared functions as communal gardens, picknicks, children parties, flex-working etc.

The elevated street runs upwards along the houses and connects various platforms. These stairs and platforms form a place to sit down and relax while enjoying the view. For the children, it can function as a playground.

The elevated street is not the only access system for the dwellings. The core has a lift and stairs that provide access to every floor with an even number. Since all the dwellings are townhouses they consist of two stories with an entrance on the ground floor.

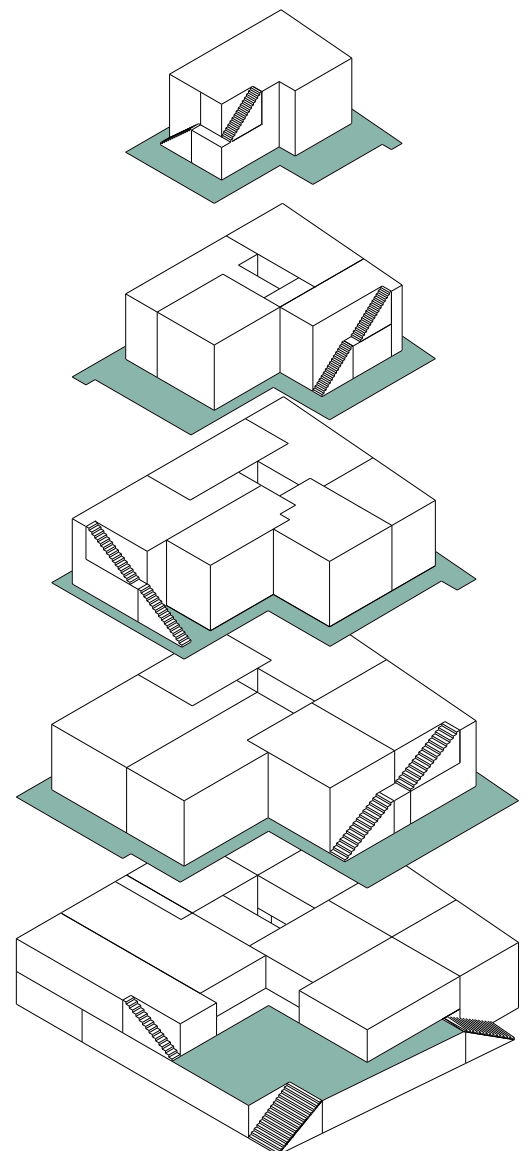


Fig. 58: Exploded view of dwelling units and outdoor circulation system

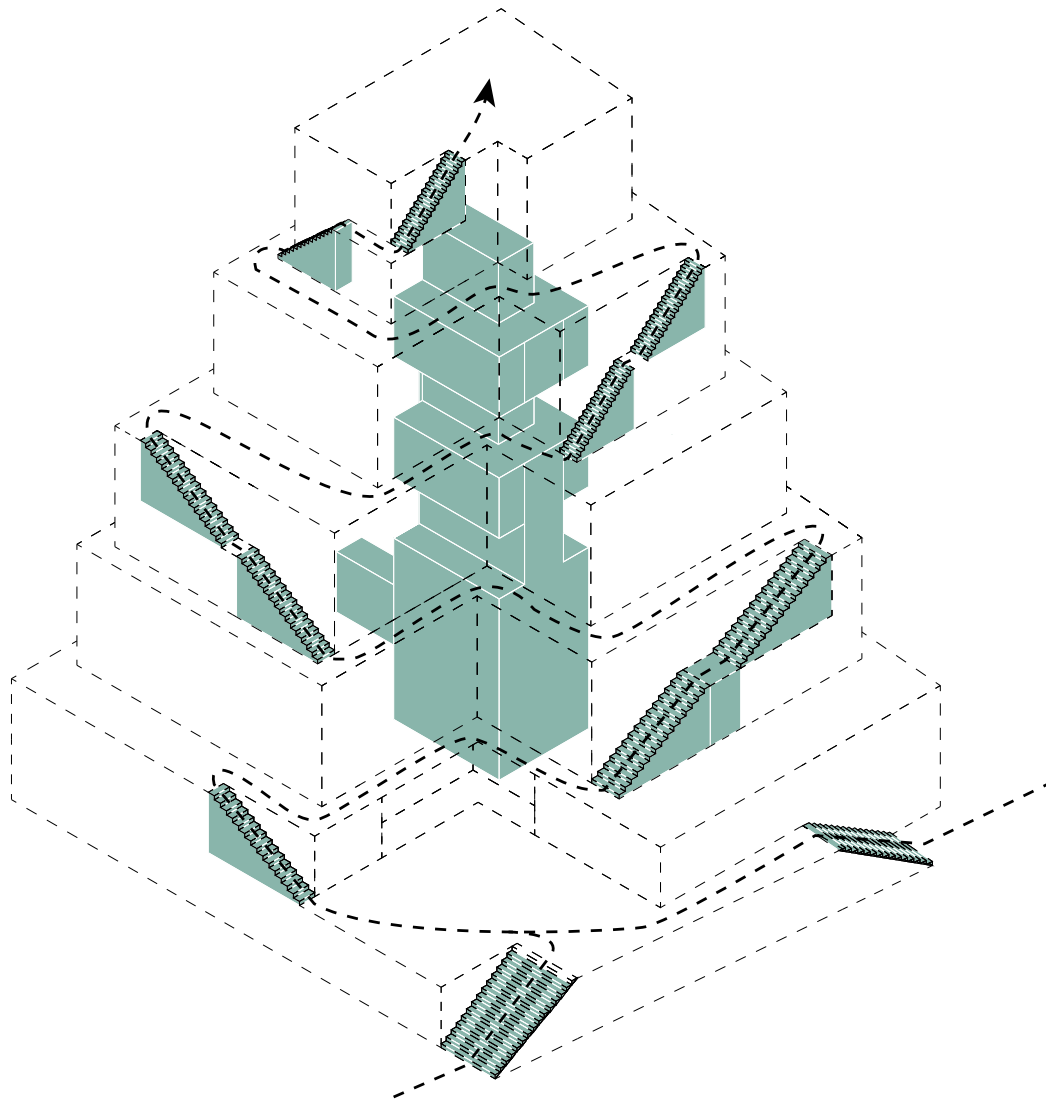


Fig. 59: Circulation system of Toen van Babel by Laurens Boodt

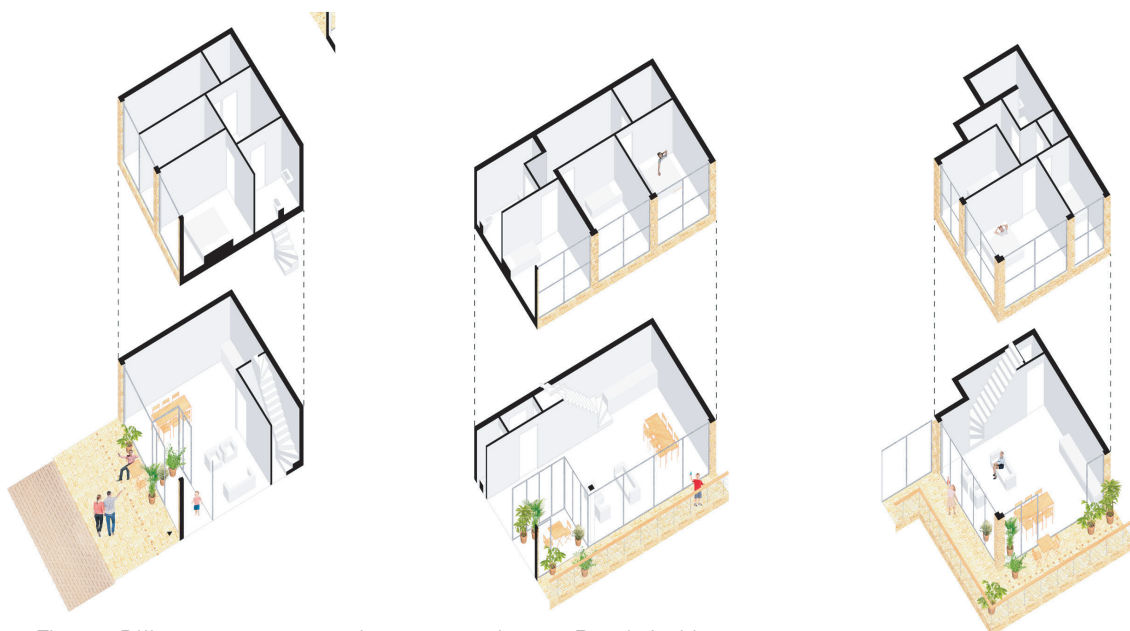


Fig. 60: Different types of floorplans source: Lauren Boodt Architecten



Fig. 61: Photo of Mirador source:MVRDV

Mirador

Architect: MVRDV
 Location: Spain, Madrid
 Year: 2001 - 2005
 Floor area: ca. 18,300m² (156 dwellings)

Mirador is a residential building consisting of mini neighbourhoods stacked vertically around a semi-public sky-plaza. The neighbourhoods can be identified by the different facades, the location of the access systems and floor plans. The access system connects the different neighbourhoods and the sky-plaza similar to a street. The stairs have a bright and inviting colour which is also articulated in the facade. With every neighbourhood, the access system has a different orientation which frames different views.

The building in itself also frames the distant landscape of the Guadarrama Mountains through the large lookout. This lookout is located at 40 meters above ground level and also provides outdoor space and community gardens.

The floorplans show a different kind of access systems. On the floorplans, the staircases and the different neighbourhoods are highlighted in different colours. The floor plans of level five and six show the places of the risers in the building. On level six a 'square' which forms the transition between two neighbourhoods is shown.



Fig. 62: Floorplans

Urban community

The access system provides four 'squares' that form the connection between the different neighbourhoods in the building. On the top levels is an outdoor-corridor which provides access to the townhouses.

Together with the central sky-plaza they provide communal places for collective activities and gathering. They form destinations within the building which may form an incentive to become physically active.

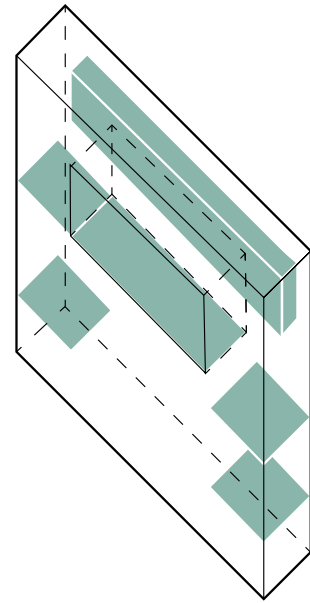


Fig. 63: Urban community

Clustering

The dwellings form different neighbourhoods or clusters within the building.

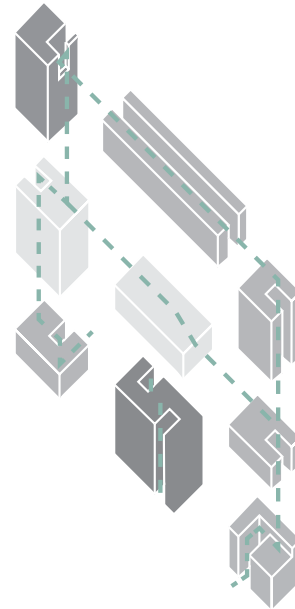


Fig. 64: Clustering and routing

Access system

The access system forms a continues routing that connects the different heighbourhoods. The access system has a dif-ferent charahter for every neighbourhood but together form a continues routing.

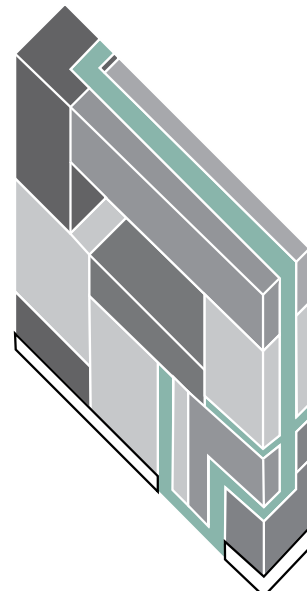


Fig. 65: Access system



Fig. 66: Photo of Kalkbreite source: flex-kalkbreite.net

Kalkbreite

Architect: Müller Sigrist Architekten
 Location: Zwitterland, Zurich
 Year: 2014
 Floor area: ca. 22,900m² (88 dwellings)

Kalkbreite is a mixed-used building, it combines residential, service and commercial users in a large but compact form. The complex is mostly known for its flexible forms of living and working, serving as a model for cooperative living in the city. The ground floor has commercial functions orientated towards the outside. The stairs on the ground floor form a grand gesture towards the inner courtyard which is a combination of a communal garden and playground. A cascade of access points links the indoor and outdoor space with a walkable roof and shared roof gardens. This makes the access system a combination of indoor and outdoor spaces.

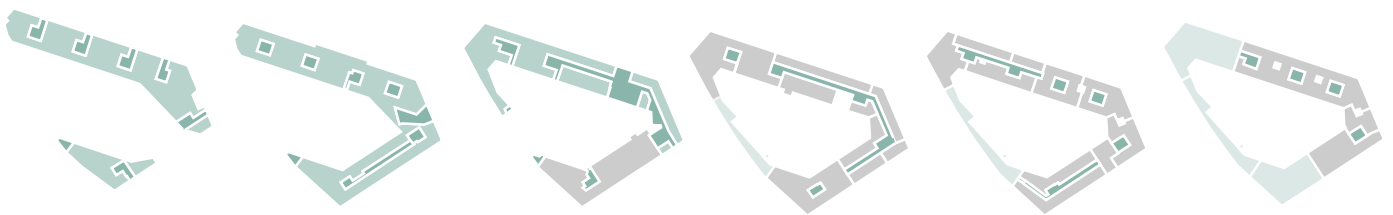


Fig. 67: Floorplans of Kalkbreite

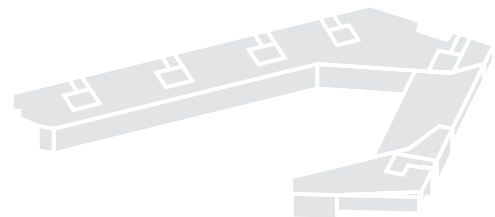
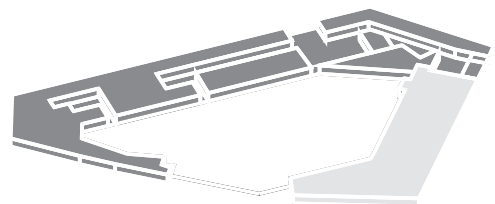
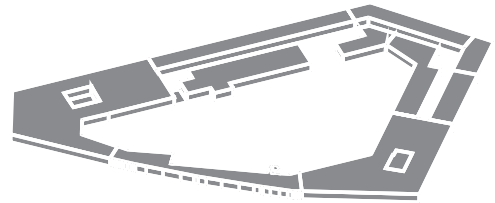
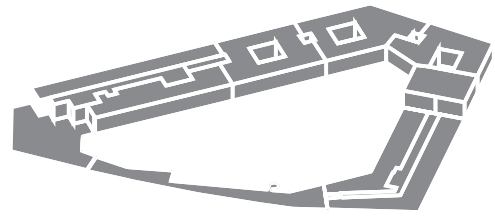


Fig. 68: Public to private

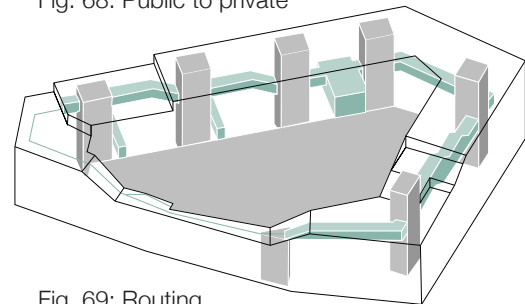


Fig. 69: Routing

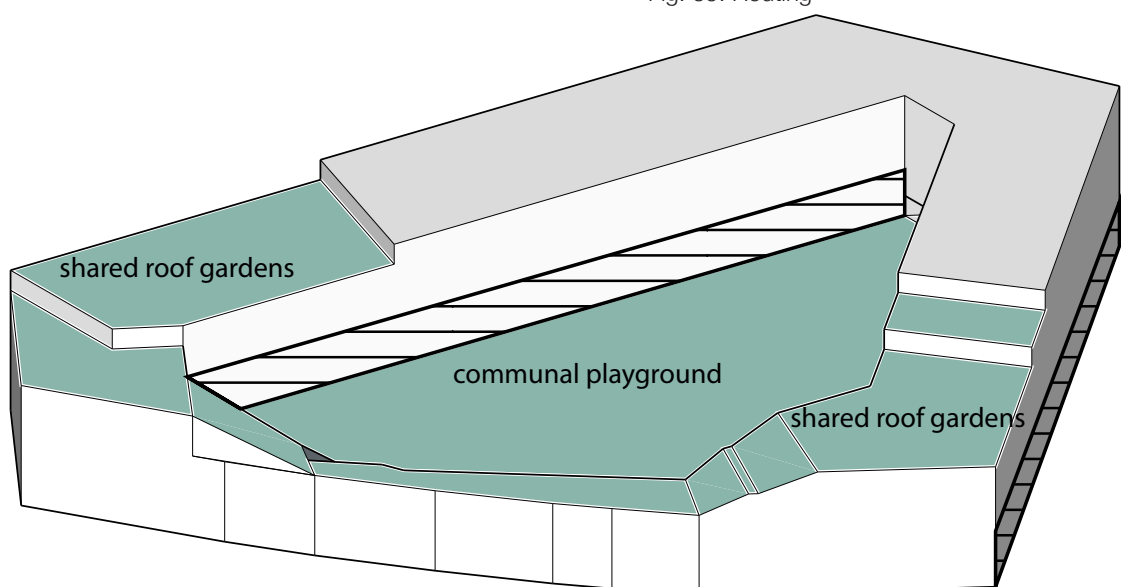


Fig. 70: Shared functions in Kalkbreite



Fig. 71: Artist impression of 8 house design source: BIG

8 House

Architect: BIG
 Location: Denmark, Copenhagen
 Year: 2010
 Floor area: ca. 91,100m² (475 dwellings)

<https://www.designboom.com/architecture/big-architects-8-house-under-construction/>

The complex is a mixed used building with housing, shops, offices and a kindergarten all connected by sloping walkways that connect to the central courtyards. The sloping street is placed on top of the shops on the ground floor. On top of the shops are three types of dwellings namely townhouses, apartments and penthouses. The sloping street connects the townhouses with the upper penthouses. The apartments are placed in between and accessible from risers that are connected to the sloping walkways. The town, - and penthouses have a frontgarden to create a transition from the front door towards the street.

The architect Bjark Ingels compares his building with the robinhood gardens by The Smithsons. In the robinhood gardens they applied the principle of the 'street in the sky'. Ingels believes that providing more direct access to the ground level with sloping – rather than parallel – walkways has made 8 House more successful.³¹



Fig. 72: 3 types of floorplans in 8-House

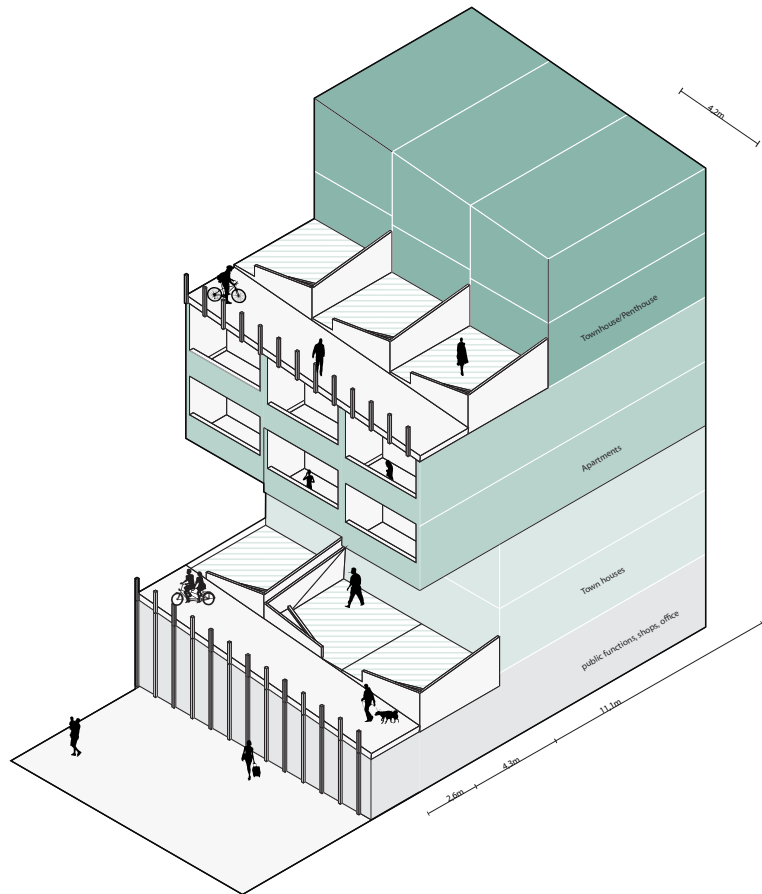


Fig. 73: Clustering of dwelling types

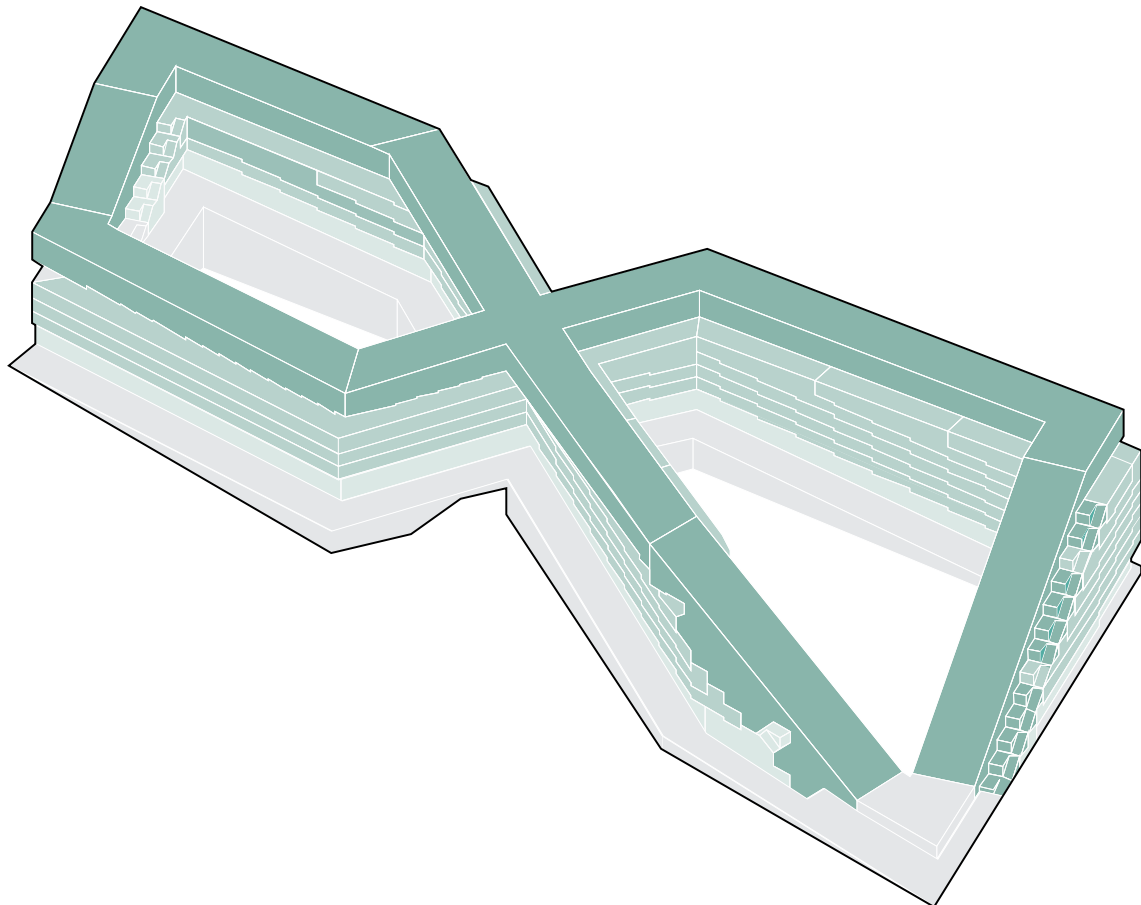
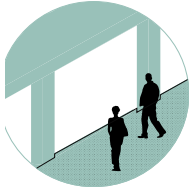


Fig. 74: Clustering of dwelling types and integration of slope

Brief of own project
& conceptual design

Brief of own project

The topic of health and well-being does not relate to a particular target group. Since health is one of the fundamental rights of every human being the design aims to address different target groups. This translates into three different types of dwellings namely studios, apartments and townhouses. A diverse target group combined with the results from the investigation of assignment & topic and the research into the location translates into the following brief.



PUBLIC GROUND FLOOR

Different entrances to the dwellings on the top floor combined with shops and leisure functions on the ground floor.

Floor area: 2044 m²



INDOOR COMMUNAL AREAS

spaces for communal gatherings or shared functions as, shared kitchen, children parties, flex-working etc.

Floor area: 150 m²



OUTDOOR COMMUNAL AREAS (COMMUNAL GARDENS)

Community gardens

Floor area: 70 m²



ACTIVITY PROGRAM

- Playground

Floor area: 356 m²

- Cycle path through building



TOWNHOUSES

Quantity: 16

Average floor area: 134 m²

Features: Private outdoor space, Private bike storage, two stories



APARTMENTS

Quantity: 41

Average floor area: 64 m²

Features: Private outdoor space, Private bike storage,



STUDIOS

Quantity: 29

Average floor area: 30 m²

Features: Private outdoor space/French balcony

Conceptual design

CIRCULATION SYSTEM & DESTINATIONS

By combining destination such as a public ground floor, communal indoor and outdoor areas, activity program and the dwelling units to the circulation system users become physically active within the building.

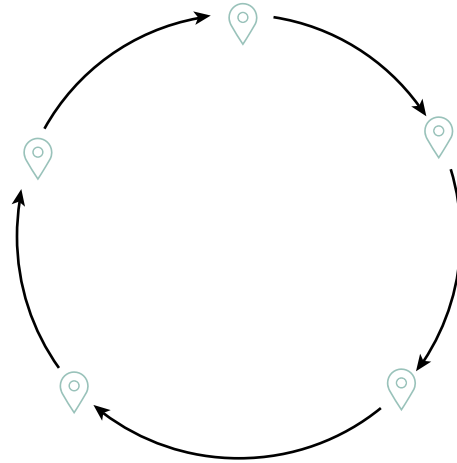


Fig. 75: Diagram of circulation and destination

INVITING ENTRANCE

The entrance invites users to take the stairs to the first level. The first level offers a public function and activity program in the form of a playground combined with benches. It provides a view over the harbour and a resting place.

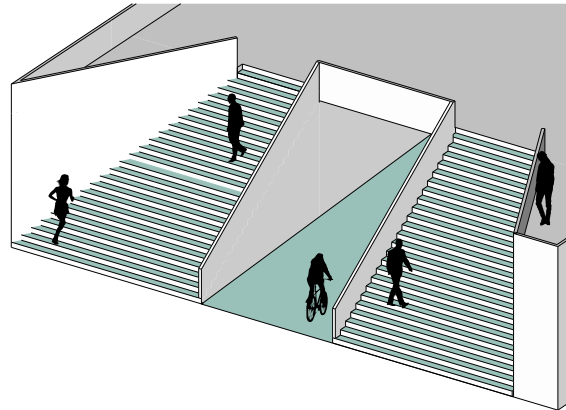


Fig. 76: Proposed entrance

CYCLING STREET

The three different types of dwelling are accessible from a bicycle path that connects all the dwellings in the building. To prevent dangerous situations the dwellings have a small transition zone in front of the dwelling.

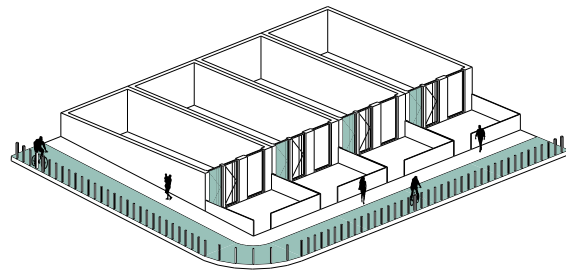


Fig. 77: Cycling street and apartments

DIVERSE DWELLING TYPES

The dwelling types are clustered on a public plint. The smallest studios are on the first level. On the top are townhouses to provide space for private outdoor areas. In between these two types are apartments dwellings.

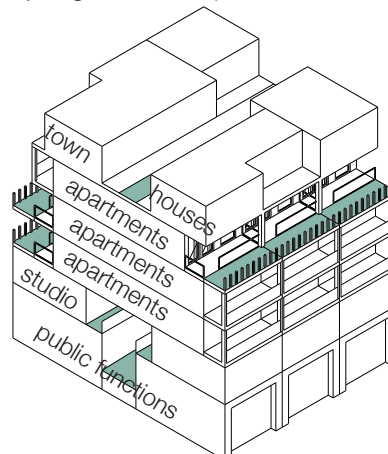


Fig. 78: Clustering of dwelling types

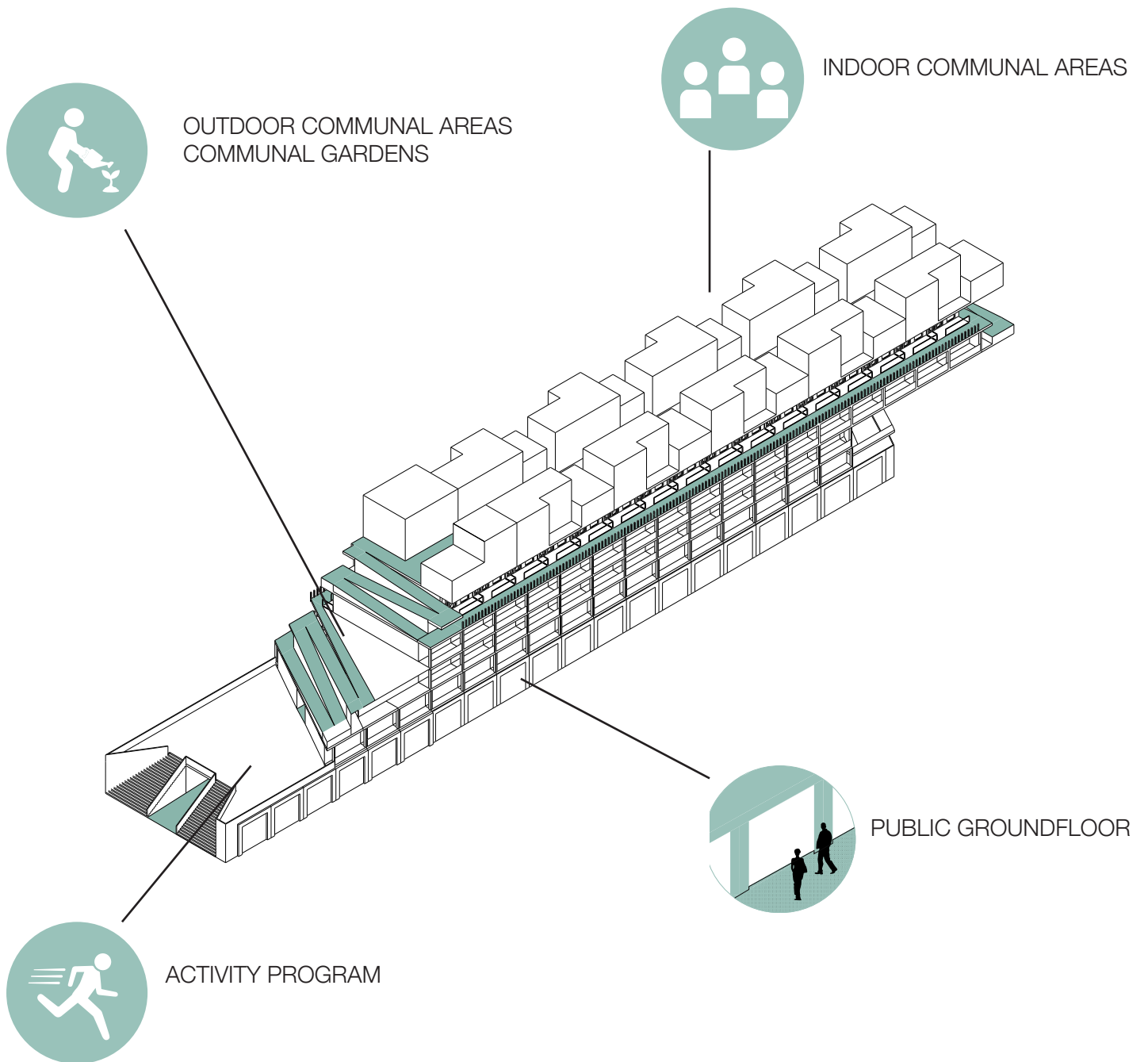
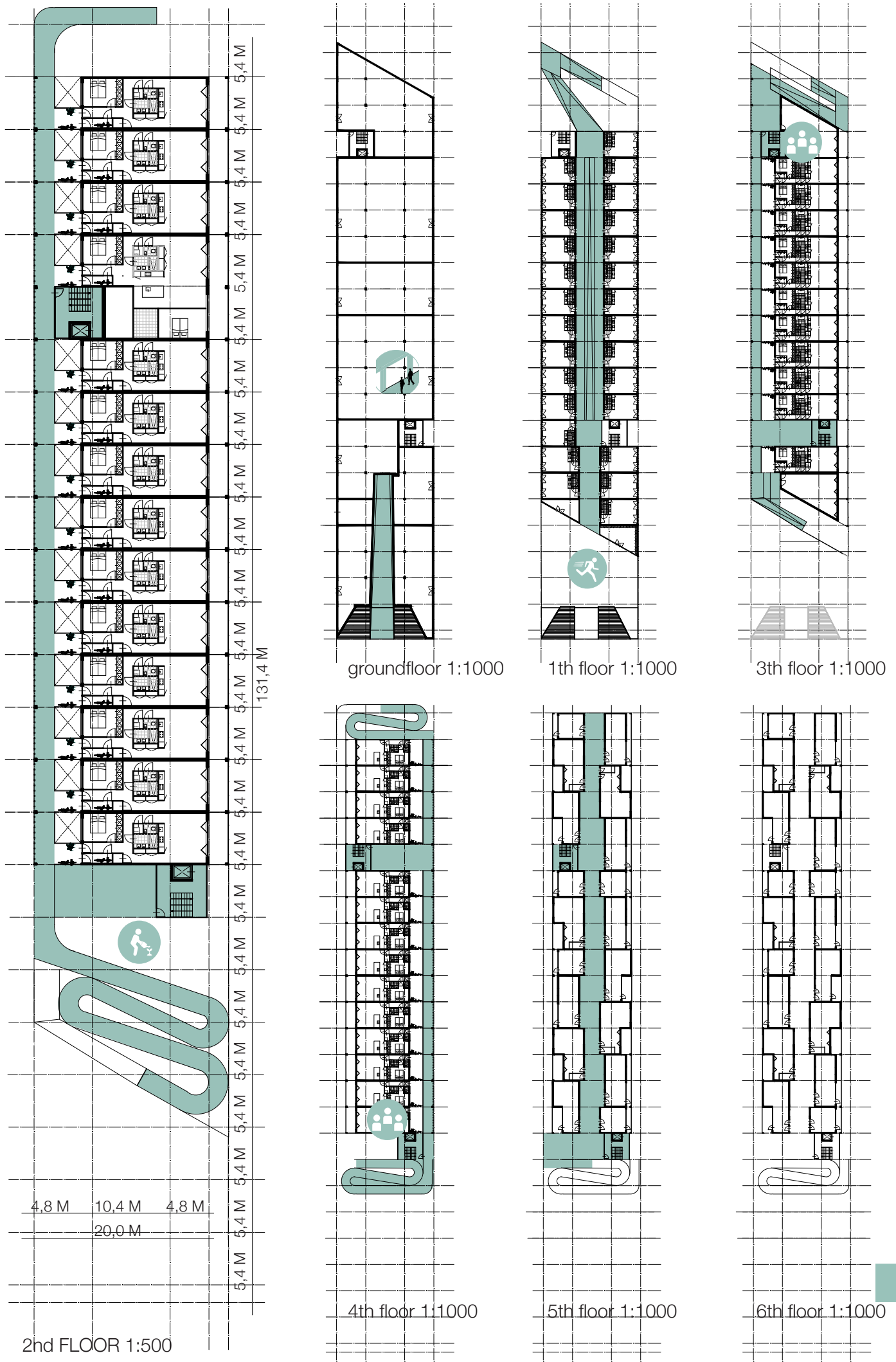


Fig. 79: Axometry of conceptual design



SECTION

The section shows how the apartments are clustered on top of each other. The studios of ca. 30 m² are on the first floor with a bicycle path separating them. The Apartments of ca 60 m² have a transition zone inbetween the frontdoor and the bicycle path. The townhouses are situated on the top level which makes it possible have a bigger private outdoor space.

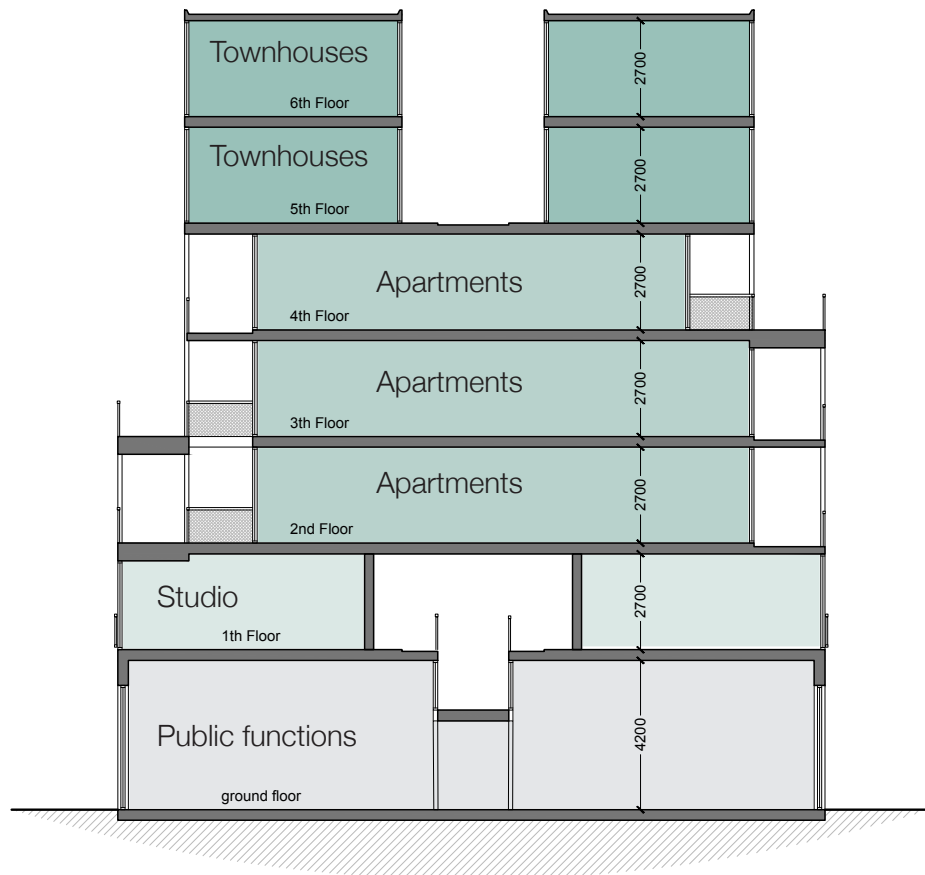


Fig. 81: Section of conceptual design (no scale)

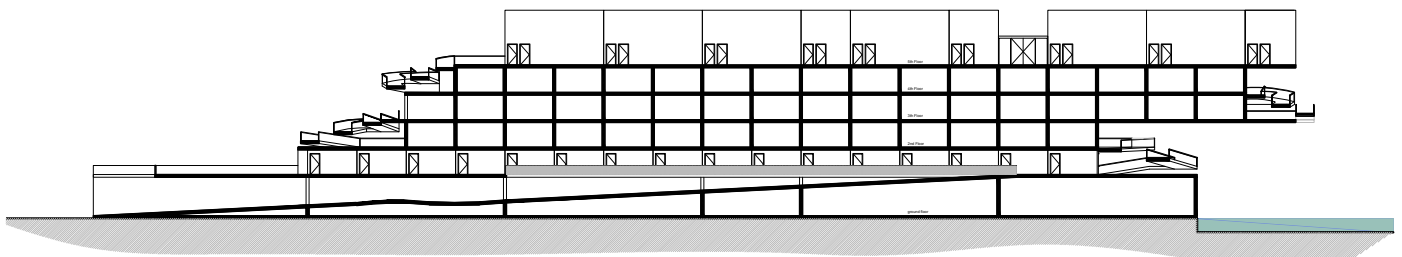
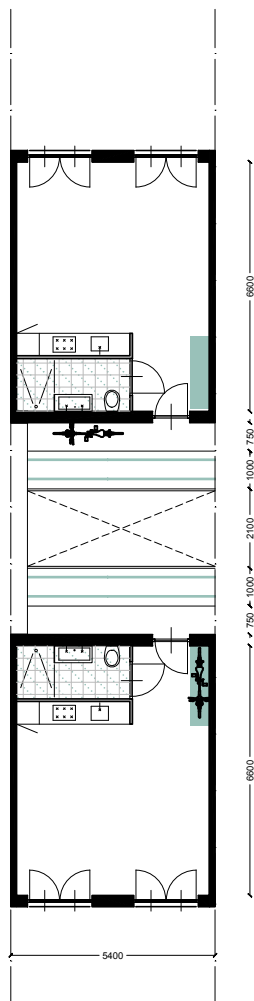
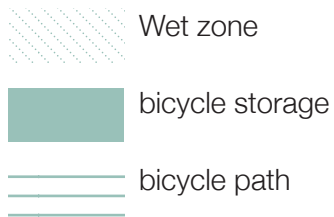


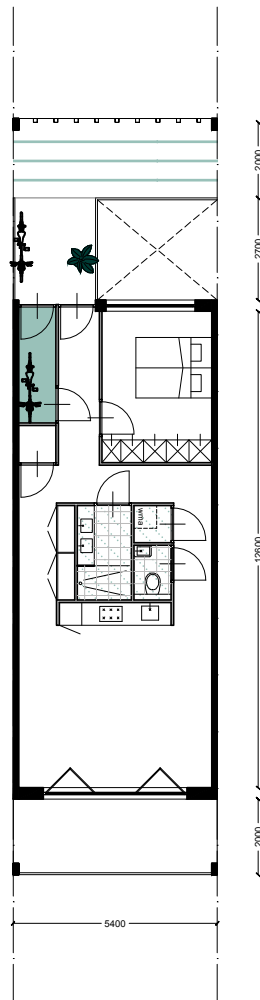
Fig. 82: Section of conceptual design (no scale)

DWELLING FLOORPLANS

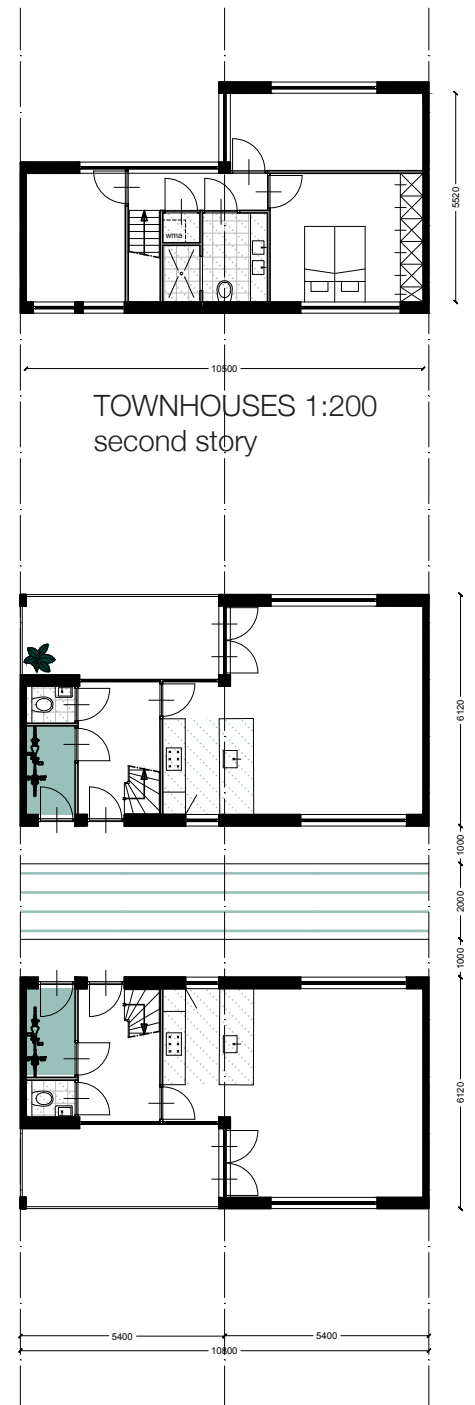
The building has three types of floorplans namely: studios, apartments and townhouses. Within every dwelling type, there is a place for bicycle storage. The apartments and townhouses have a separate entrance while the studios have a designated space.



STUDIOS 1:200
ca. 30 m²



APARTMENTS 1:200
ca. 64 m²



TOWNHOUSES 1:200
first story
ca. 134 m²

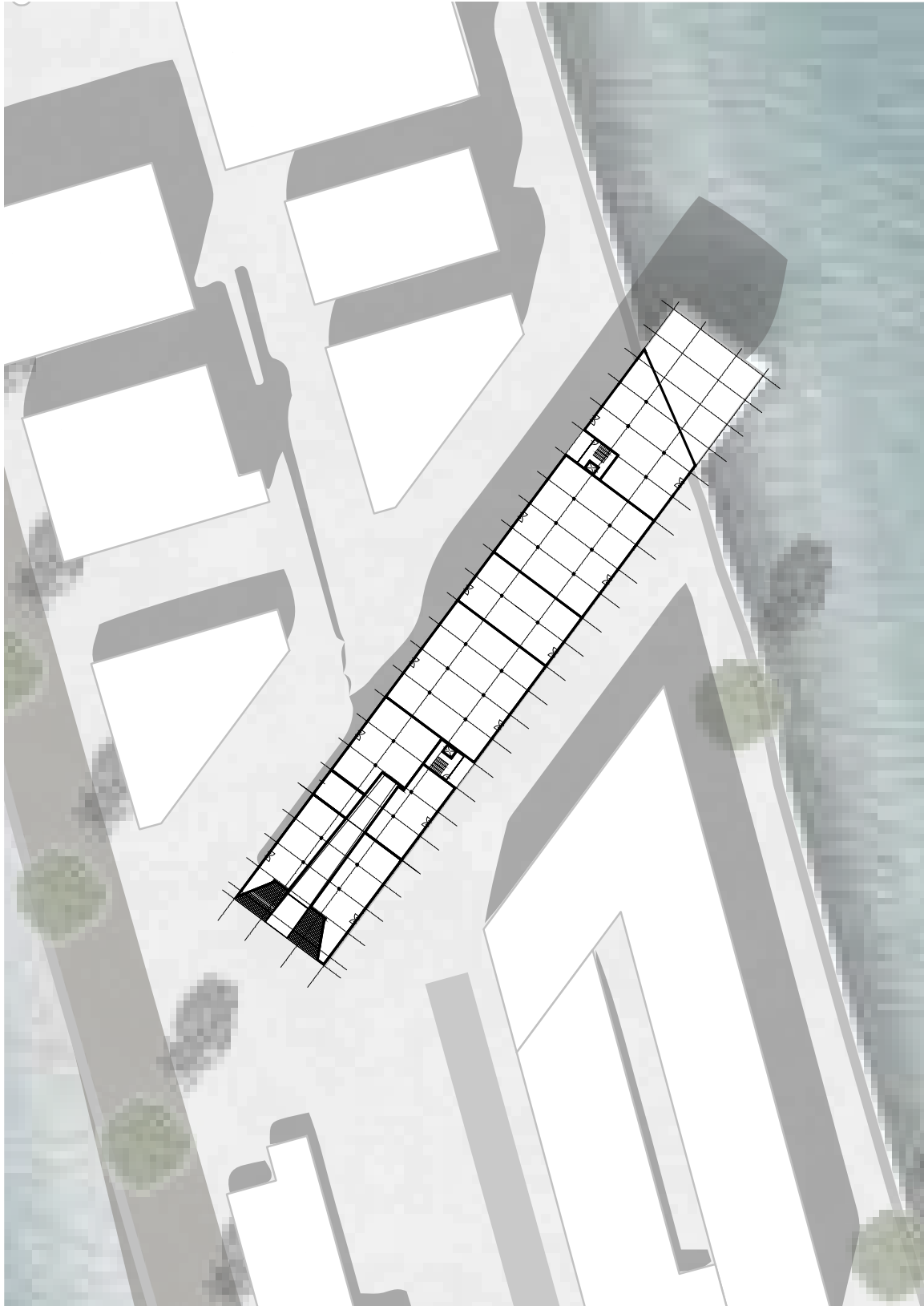


Fig. 84: Design within context (no scale)



Summary

Personal information

Name	Teun Kakes
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Telephone number	0620797828
Private e-mail address	teunkakes@msn.com

Studio

Name / Theme	Dwelling / Dutch Housing
Teachers / tutors	Pierijn van der Putt, Theo Kupers
Argumentation of choice of the studio	I choose the Dutch housing graduation studio because it addresses the relation between architecture, socio-politics and engineering. I want to focus on the relationship between well-being and architecture in relation to the way we dwell.

Graduation project

Title of the graduation project	The mobile city – a preventive medicine
Location	Minervahaven, Amsterdam
The posed problem	There is an increased number of chronic diseases which is (partly) stimulated by our built environment that stimulates passive behaviour. Our 'obesogenic' environment stimulates us to make choices that are convenient and satisfactory but have a negative influence on a healthy lifestyle.
research questions	How can the buildings circulation system stimulate physical activity and discourage passive behaviour?
design assignment in which these result.	How can the design of a building stimulate physical activity and how does this translate to form?

The problem is identified based on statistics that show an increased number of prevalences of chronic diseases. The development of health and well-being is placed into a historical perspective in relation to the built environment to analyse the development and relate it to our contemporary understanding.

The goal of the research is to identify factors that stimulate passive and active behaviour. The factors are divided into domains where every domain offers different strategies to stimulate physical activity. These strategies can be researched in case studies to see how strategies are applied in the built environment. It results in a design that stimulates physical activity such as walking and cycling.

Method description

Analyses
Literature studies
Model making
Drawings

Literature and statistics are first categorized, analyzed and then translated into a suitable presentation of the information mostly by the translation into drawings.

Reflection

The topic of health and well-being relates to the Dutch housing course since it influences the way we dwell. Thereafter these ideas can be challenged to marry idea with form and architecture.

The research translates literature studies into design strategies that stimulate physical activity. It challenges the way we think about health and how our environment influences the passive or active choices we make.

The matter of health and well-being has always been a part of the debate in the built environment. The contemporary understanding of the WHO shows that health and well-being are about a state of complete physical, mental and social well-being which is influenced by environmental and societal factors. The historical development of health and well-being in the built environment shows that these environmental and societal influences changed the nature of diseases from infectious to chronic. These chronic diseases are now the leading cause of death in countries such as the Netherlands.

A significant development in history are the influences of the modernist. On a building scale, they had newfound emphasis ventilation, hygiene and outdoor spaces which resulted in healthier living environments. On an urban level, the modernist believed in the separation of functions with an emphasis on transportation by motorised vehicles. These developments resulted in a changing lifestyle with heavy reliance on the car.

This new lifestyle stimulates physical inactivity while inactivity is strongly associated with the development of chronic diseases. Within the built environment we can stimulate physical activity and discourage passive behaviour. Studies show that active design can be divided into four domains namely: circulation system, destination, active program and building surroundings.

The most emphasis in the design should be on the circulation system, and the destinations since these two domains account for the most physical activity and have the most significant impact on the building structure. Physical activity can be stimulated by creating stairs that are designed for everyday use, are visible and located strategically. Besides, the dimensions and environmental factors such as sightlines, and connection to destinations form an essential strategy in stimulating physical activity. These destinations form the incentive to move within the building. Communal and social spaces attract users and can influence other health and well-being factors such as social well-being. These destinations can be combined with outdoor and activity spaces to offer diverse and pleasant experiences. The last domain, building surroundings, can influence movement in and around the building on the ground floor.

Another way to stimulate physical activity is by introducing the bike into the building since the bicycle is a frequently used mode of transportation that needs physical activity. By making the bike a handy thing to use within the building and the quickest way to leave home, it can stimulate physical activity. To create a safe environment the terrain needs to be sculpted to reduce cyclist speed and not interfere with pedestrians.

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