NATURAL ENCOUNTERS

Reinvigorating a post-war neighbourhood for living in social and natural harmony.

ARA010 | Graduation Report
AR3AD100 | Advanced Housing Design
Delft University of Technology, June 2024
by Bo Versluijs

Design Mentor: Harald Mooij
Building Technology: Florian Eckardt
Research Mentor: Robbert Guis

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Preface

In this graduation research, I was able to combine my interest in nature, the history of a place and my passion for empathising and designing for on behalf of the individual. From the start, the green, open and peaceful character of the post-war Groot-IJsselmonde district attracted me. I saw this as an opportunity to deepen my interest in the natural environment while taking on the challenge of seeing how I, as well as others, could and would like to live in an urban environment. With a focus on improving the connection with the natural environment, I decided to focus on the intermediate space; the space between buildings, between public, collective and private. A space that defines the connection between the individual and the environment, both the natural and the social. But is also of great value for the identity and quality of the street, neighbourhood , district and city. A place where, in my opinion, everything unites.

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"People are ever more separated from nature in today's world, especially in the modern city and built environment. This growing disconnect from nature is due to many factors. Fundamentally, it reflects the underlying assumptions of a technologically oriented, sedentary society that spends most of its time indoors [...] "

Stephen R. Kellert (2018: p.3)

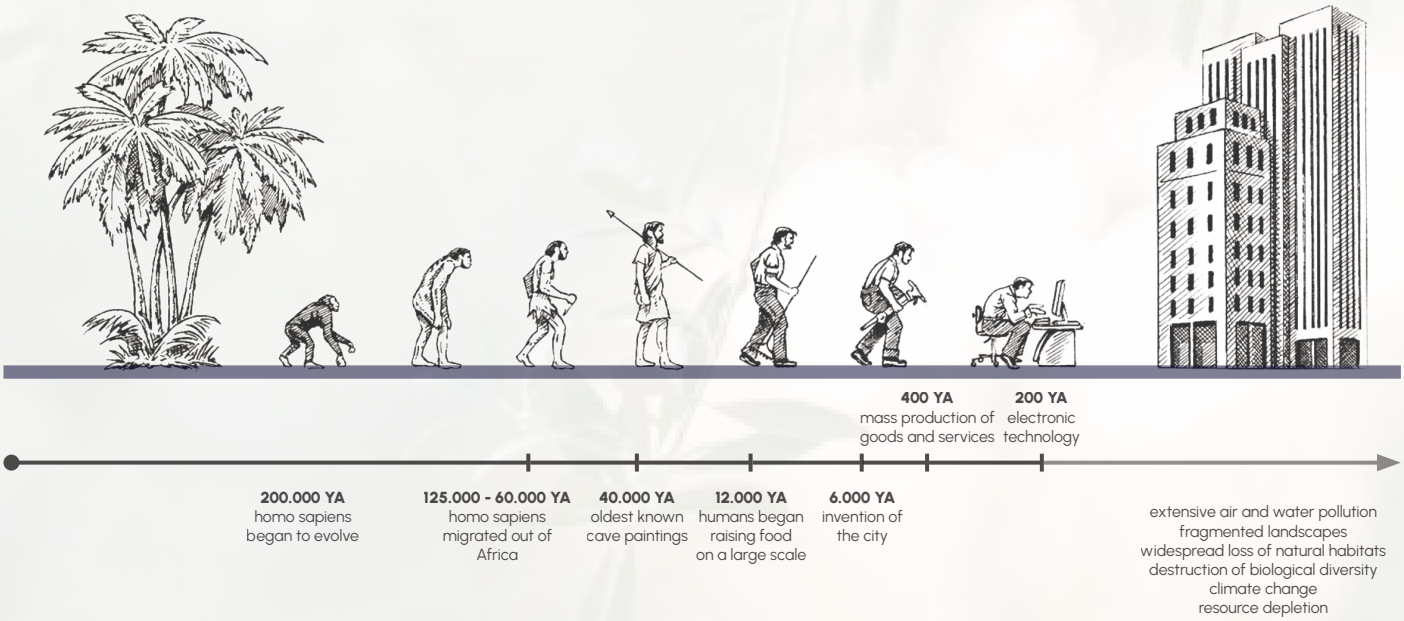


Figure 1: Timeline evolution human in the built environment (edited by B. Versluijs, 2023 based on Kellert, 2018)

1. Introduction

HOUSING CRISIS IN THE NETHERLANDS

Due to a growing influx of migration, an ageing population and a decrease in household size, the number of households in the Netherlands is increasing. Together with a lack of affordable housing, this poses an urgent challenge, the housing shortage (Boelhouwer and van der Heijden, 2022). The government set a target to build about 900,000 homes in the next seven years, of which at least 33 percent are affordable rental and owner-occupied homes; approximately 600,000 homes (NOS, 2022). In addition, climate and environmental requirements make this objective more difficult, delaying the production of new dwellings (Boelhouwer and van der Heijden, 2022). Overall, the combination of the housing shortage, climate and environmental requirements, changing household sizes, together with growing attention to the variety in needs of different target groups and changing lifestyles requires innovative and integrated solutions.

ALIENATION FROM NATURE

Another important aspect that should be addressed is the fact that people have never before lived so separated from nature as today. Whereas today we live in a world where we are provided with access to a vast amount of information and products that are available anytime and anywhere, and technology allows us to communicate with each other even over great distances in a matter of seconds. The human body, mind, and senses evolved, for much of human history, within a natural, not human-engineered or -invented, environment. An environment in which people needed to adapt to nature's cues and relied on it for survival [Figure 1] (Kellert, 2018). Due to this innate connection to nature, humanity developed an inherent love for living things that make people tend to align with natural patterns and processes, known as *biophilia* (Kellert, 2018).

However, in the modern urbanised and specifically technological-oriented world, this inborn connection has become increasingly lost and resulted in a society that spends up to 90% of its time indoors. As most buildings are designed without the awareness of the importance of nature in the built environment as well as the knowledge on how to create a strong connection with nature, this is having a negative impact on people's overall health and well-being (Kellert, 2018).

SENSORY DEPRIVED BUILT ENVIRONMENT

One of the challenges of today's built environment is that most of the historical urbanisation projects converted the variety of nature into large homogeneous landscapes of non-absorbing surfaces, produced enormous quantities of waste and pollutants, and used huge amounts of materials and resources. With this, the dissociation with nature in the built environment not only has a negative impact on human health and well-being, but also led to indisputable threats, like extensive air and water pollution, fragmented landscapes, a significant reduction in biodiversity, climate change, and resource impoverishment (Kellert, 2005). This shows that growth and civilisation coexist with alienation from nature.

Figure 2: Monotonous facade post-war neighbourhood Groot-IJsselmonde in Rotterdam (BTR - Architectuur + Bouwkunde, n.d.)

GROWING NEED FOR NATURE AT HOME

The importance of nature for people's health and well-being became even more apparent during the lockdowns of COVID-19. As people were forced to spend even more time in and around their homes, the built environment's liveability, adaptability, and compatibility to the rapidly changing and even more technologically oriented society was put to the test in a very short period of time.

Remarkably, this period showed a growing appreciation for nature and an intensified experience with it is needed. As only the natural environment was accessible as a form of recreation, people went massively to the heathlands, beach and forests, as well there was a huge trend to visit parks closer at home (Natuurmonumenten, 2020).

Despite the fact that there has been some time passed since the last COVID lock-down, research shows that people continue to seek more natural, quiet and spacious environments. It appears that this shift is reflected in the housing preferences as well. So are more and more people, especially people in their thirties, leaving the city to find a less expensive place in a more spacious, green and calm environment (CBS, 2022). Although the graph shows that this trend already started in 2013, the arrival of COVID in 2019 made it increase even more. The main argument cited for this is that people more often work from home and are, therefore, more willing to live further from work. At the same time, working from home makes the garden, the green in the street, the park in the neighbourhood and nearby nature even more important (Bons, 2021).

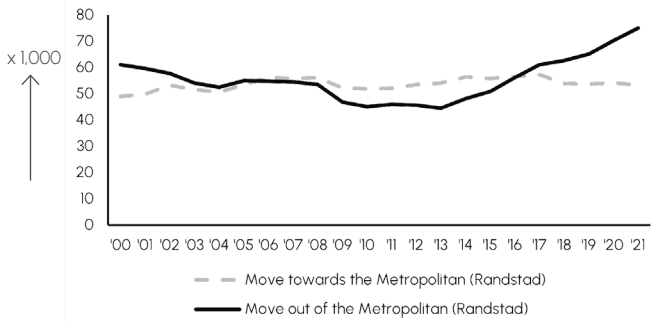


Figure 3: Move out of the Metropolitan (edited by B. Versluijs, 2023 based on results CBS, 2022)

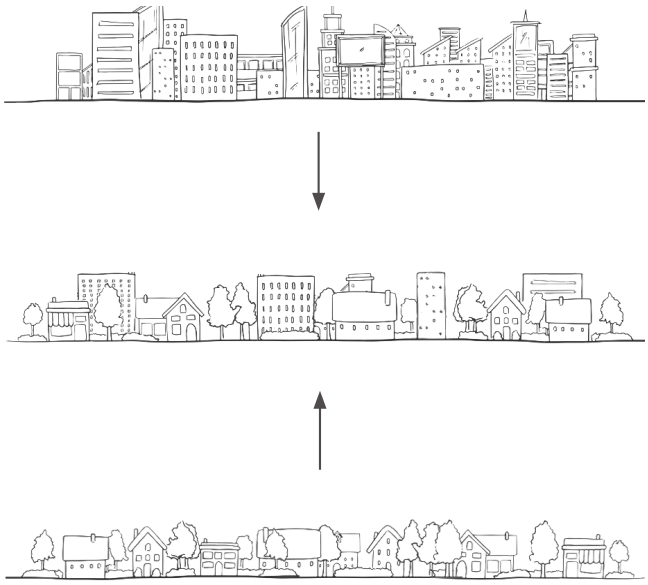


Figure 4: The surburbs as an opportunity (edited by B. Versluijs, 2023)

THE POST-WAR SUBURBS

In order to complement the existing housing stock as well as to protect the existing remaining nature from further depletion, solutions are being sought to make better use of space within the existing borders of the city. The study 'Ruimte zat in de Stad' by KAW published in 2020 examines these opportunities and highlights that the population in suburban neighbourhoods is in fact shrinking. Compared to the 1970s, the average number of people per household has fallen by 40%, while the size of the houses and streets remained the same (KAW, 2020).

As a negative consequence, the liveability and quality of the neighbourhood deteriorate; the viability of facilities such as schools, shopping centres and employment is decreasing and there is increasingly less life on the street. Although quality of life is difficult to measure because this involves individual interpretation and experience, the Leefbarometer of BZK gives a good indication; national rated at spatial, social, and economic level. In this light, it is a salient fact that in all cities, large or small, and in peripheral or rural areas, especially post-war neighbourhoods and districts are found problematic (BZK in KAW, 2020).

The poor quality of life and liveability, together with the potential latitude in these areas offer good chances to improve for people who already live in the neighbourhood and to become more attractive to the ones that leave the city. There is room to transform as well as expand the existing housing stock with affordable dwellings that respond to the changing patterns of life.

CASE STUDY: GROOT-IJSSELMONDE

This study examines these interconnecting potentials using the case study Groot-IJsselmonde; a post-war neighbourhood in the suburbs of Rotterdam, the Netherlands.

This neighbourhood was designed using Ebenezer Howard's Garden City principle in combination with the concept called 'geleding' van de stad (Zweerink, 2005). Although much attention has been paid to create an environment that combines the qualities of city and country with lots of green and open spaces, the separation between architecture and nature can be experienced in today's Groot-IJsselmonde (Zweerink, 2005). It is an exemplary project of a sensory-depriving environment with mostly uniform functional landscapes and monotonous facades; produced with enormous quantities of unsustainable materials and the use of pollutive resources. At its core, it represents mass production to tackle the housing shortage after World War II as well as to create an improved living environment distinct from the polluting industrial working area (Zweerink, 2005).

Although we nowadays have to tackle similar issues, there is an improved understanding of how an environment influences human well-being, and therefore, quality of life. More is known about how the places in which we live shape our perceptions, behaviour, emotions, sociability, feelings, and can even shape the sense of our identity (Goldhagen, 2017). As well there is more knowledge about the required quality of nature to improve the quality of life considering people as part of nature.

This new and improved knowledge provides an opportunity to improve current housing in Groot-IJsselmonde, add new homes, and at the same time develop a stronger relationship with nature to create a healthy and sustainable living environment.

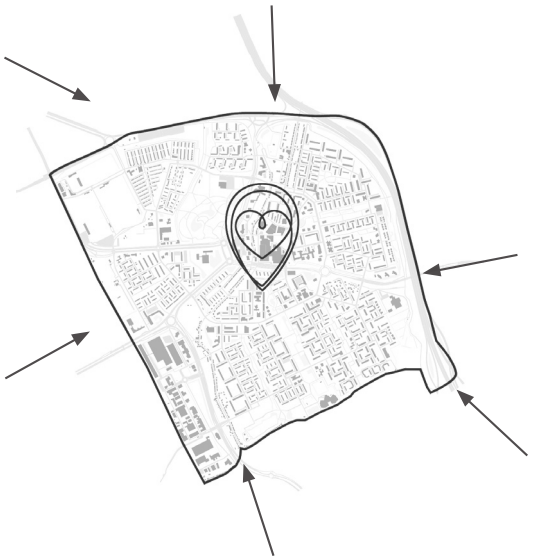


Figure 5: Post-war neighbourhood Groot-IJsselmonde as an opportunity to become a beloved place (created by B. Versluijs, 2023)

BIOPHILIC DESIGN

The integration of nature in design offers a promising and beneficial approach to tackle these issues. An approach that enhances a stronger connection between people and nature by integrating nature into the design of the built environment to create a good habitat for people as biological organisms is called *biophilic design* (Kellert, 2018). Although the impact of biophilic design interventions has proven to be beneficial for our health and well-being as well as for the environment, studies on the emotional impact on attachment to nature and place, as well as their potential to enhance a sense of place are limited. Also, because it is a relatively new concept there is also a lack of information on how biophilic design integrates within a place narrative and how it could improve the trajectory of place and place identity.

SCOPE OF STUDY

This study will focus on the importance of retaining and strengthening the connection with nature in order to enhance and improve the identity of Groot-IJsselmonde as a Garden City and to create a healthier, more future-proof living environment for both the community and individual. Therefore, the main question this study is:

"How can biophilic design strategies be implemented into the design of a post-war neighbourhood undergoing densification to enhance a sense of place and belonging for resilient community well-being?"

The answer to this question will be sought by examining the following subquestions:

1. How has the approach of the relation between human and nature in the built environment developed throughout history? And how does this relate to the narrative and identity of Groot IJsselmonde as a Garden City?

2. How can nature be integrated into the built environment and how can this enhance a strong connection between people and nature in an existing neighbourhood? (city, neighbourhood, dwelling)

3. How can the integration of nature in design (biophilic design) interventions in an existing neighbourhood enhance a sense of place to create a place of belonging and attachment to place? (city, neighbourhood, dwelling)

4. How can the integration of nature in design (biophilic design) interventions in an existing post-war neighbourhood positively affect health and well-being? (individual and community)

"Architecture is essentially an extension of nature into the man-made realm, providing the ground for perception and the horizon of experiencing and understanding the world. It is not an isolated and self-sufficient artifact; it directs our attention and existential experience to wider horizons. Architecture also gives a conceptual and material structure to societal institutions, as well as to the conditions of daily life. It concretises the cycle of the year, the course of the sun and the passing of the hours of the day."

Juhani Pallasmaa (1996)

2. Theoretical Framework

This theortical framework explains the different topics of this study and provides an overview of the gathered information on existing academic literature. The studies can be divided into four main categories: the history of nature in the built environment, biophilic design, a sense of place, and health and well-being.

THE HISTORY OF NATURE IN DESIGN

THE GARDEN CITY PHILOSOPHY VS. THE SUBURBS

Back in the days, the Garden City philosophy of Ebenezer Howard dealt with similar issues as the ones that we are facing today, like the housing shortage and the industrialisation; which today evolved into the digital revolution. Howard already saw the opportunity of the suburban areas as a so-called magnet that combines the qualities of both the city and the countryside, in the town-city [Figure 6]. Whereas more people nowadays move out of the city towards the country to seek a more spacious, calm, and green living area, this vision seems more relevant than ever. Especially because Howard already envisioned the integration of the "beauty of nature" to provide a good quality of life in the neighbourhood (Howard, 1902). An elaborated study on the vision of the Garden City as well as the development of other Garden Cities over time might provide important insight into how the integration of nature in the built environment has been approached and developed over time.

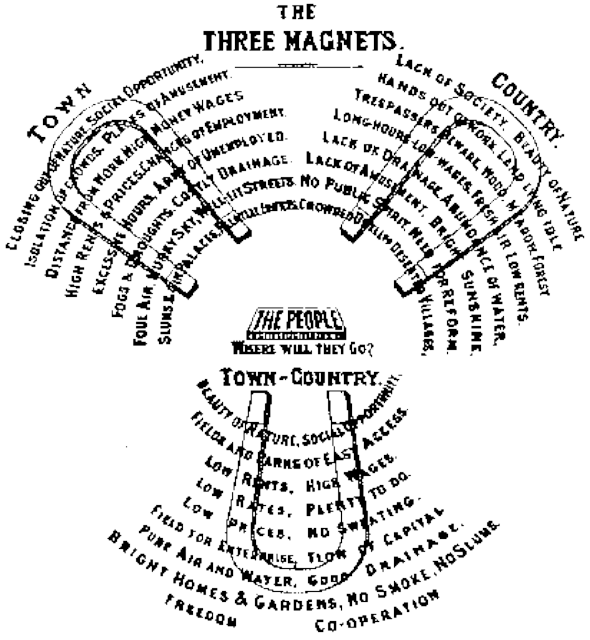


Figure 6: The three magnets of the Garden City philosophy (Howard, 1902)

BIOPHILIC DESIGN

BIOPHILIA

Although several concepts that integrate nature into design exist. The approach of biophilic design differs because of its aim to create experiences of nature through buildings and spaces that are beneficial for people's health, fitness and wellbeing by considering people as biological creatures in the contemporary world (Kellert and Calabrese, 2015). Before explaining the concept of biophilic design, the term of biophilia or "love of life" that is used within this approach needs to be defined. This approach is based on the term biophilia, which consists of the conjunction of two words taken from the ancient Greek: "life" (bio) and "love" (philia); literally meaning the love of life (Barbiero and Berto, 2021).

Erich Fromm, a German-American psychologist and philosopher, was the first person who introduced the word biophilia and developed the term as "the passionate love of life and of all that is alive; the wish to further growth whether in a person, a plant, an idea or a social group."(Fromm, 1973, p.406). However, it is American biologist Edward O. Wilson's rephrasing of biophilia that provides the main idea behind the biophilic design concept, described as "is the innately emotional affiliation of human beings to other livings organisms" (Wilson, 1984).

In 1993, Wilson, collaborated with American social ecologist Stephen R. Kellert and published 'The Biophilia Hypothesis'. This publication consists of a collection of essays that attempt to elaborate and clarify the concept of biophilia. In addition, it implies the significant impact for our well-being as society becomes further disconnected from the natural world. As it leads to further environmental destruction and has a significant impact on our quality of life, not only material but also psychological and even spiritual (Kellert and Wilson, 1993). In the book 'Birthright: People and Nature in the Modern World' Kellert emphasizes that our ability to feel, think, communicate, create, and find meaning in life all relies upon our inborn connection with nature. And that this relationship got lost because of its undervalued importance for our lives (Kellert, 2012). For this reason Kellert aims to find strategies on how we can restore this connection to nature by looking at different aspects, like the way we use land and consume resources, develop and design buildings and communities, conduct our ethics, raise children, educate ourselves, and behave in our daily lives (Kellert, 2012).

BIOPHILIC DESIGN FRAMEWORK

As this study already forms the fundament of biophilic design, Kellert can be seen as a biophilic design pioneer. Together with other researchers, architects and designers there has been a lot of research on the practice of this concept. Addressing the shortcomings of contemporary buildings and landscapes practices is considered the main challenge of biophilic design (Kellert et al. 2008; Kellert, 2005; Kellert and Finnegan, 2011; Browning et al., 2014; Kellert and Calabrese, 2015). Therefore, several frameworks have been developed which provide the fundamental principles to create a beneficial experience of nature in the built environment.

In 2015, Kellert and Calabrese published 'The Practice of Biophilic Design' which contains a framework with experiences and attributes of biophilic design. This framework is categorised into three types of nature experiences, including the direct experience of nature, the indirect experience of nature, and the experience of space and place (Kellert and Calabrese, 2015). The direct experience of nature is about the direct contact with natural attributes in the built environment, such as plants, animals, water, landscapes, but also natural air and light. The direct experience of nature is about the direct contact with natural attributes in the built environment, such as plants, animals, water, landscapes, but also natural air and light. The indirect experience of nature refers to contact with the process of changing nature from its initial state, the image or representation of nature, or the exposure to natural processes and patterns. Among these are natural materials such as cotton fabrics and wooden furniture, pictures and artworks, decorations inspired by forms and shapes found in nature, or environmental processes that played an important role in the evolution of humans, including the passage of time, ageing, and natural geometries. Lastly, the experience of space and place alludes to spatial features of nature that supported human health and well-being. These include features like organised complexity, mobility and orientation, prospect and refuge, and more (Kellert and Calabrese, 2015).

Although the framework '14 Patterns of Biophilic Design' by Terrapin (Browning et al. 2014) seems quite similar to Kellert and Calabrese's framework, the comparison between the two may provide new insights that can be useful for this study as well.

MULTISENSORY EXPERIENCES

Kellert and Calabrese (2015) encourage the importance of multisensory encounters of nature in the built environment as all the different biophilic design patterns are experienced through the various human senses including vision, sound, touch, smell, and movement.

Although they state visual perception as the primary way people perceive and anticipate to the natural world, triggering various physical, emotional, and cognitive responses. Sensory experiences of nature through the other senses are also considered significant. For example, the sound of water, the smell of flowers, the touch of plants, and experiencing the movement of the air evoke both emotional and intellectual responses. The integration of multisensory experiences of nature in our built environments can enhance comfort, pleasure, fulfilment, and cognitive ability (Kellert and Calabrese, 2015).

THE EXPERIENCE OF SPACE / PLACE

This research aims to improve the relationship between people and their environment and create a sense of belonging through the implementation of biophilic design strategies. To do so, it is important to gain knowledge of how both the landscape and urban environment impact our experiences and perceptions. In 'The Experience of Place', Hiss explores the meaning and impact of places on human life. He focuses on the relationship between people and their environment, and how specific places, both urban and landscape, can evoke certain emotions, memories and a sense of belonging (Hiss, 1990).

Other publications that discuss the relationship between people and the perception and meaning of place include 'From Object to Experience: the new culture of architectural design' by Harry F. Mallgrave (2018), 'A Pattern Language' and 'The Timeless Way of Building' by Christopher Alexander (1977; 1979).

Both Mallgrave and Pallasmaa argue that traditional approaches to architectural design often prioritize the creation of visually striking buildings or objects, while neglecting other experiential aspects of architecture (Mallgrave, 2018; Pallasmaa, 1996). In order to create meaningful and engaging environments Mallgrave (2018) mentions the necessity to adopt a more holistic approach, one that considers the sensory and embodied experience as a fundamental aspect of architectural design.

For example, 'A Pattern Language' by Alexander (1977) presents this more holistic approach by exploring archetypal patterns that can be applied to create functional, livable, and culturally rich environments. Throughout the patterns described in the book, there are numerous references to the integration of natural elements, such as "Accessible Green", "Public Outdoor Room", "Courtyards Which Live", and "Indoor Sunlight" (Alexander, 1977). As some of these patterns align with the patterns and elements of biophilic design, the comparison of these patterns can provide information to create a toolbox with strategies that can be implemented into the re-design of post-war neighbourhoods, like Groot-IJsselmonde.

HEALTH AND WELL-BEING

LIVING IN THE CITY

'Cities for People' by Gehl (2013) explores the principles and practices to design cities with a focus on human needs and experiences. Gehl discusses topics such as the importance of public spaces, the impact of architecture on human behaviour, the role of steets in fostering social interaction, and the need for inclusive and accessible urban environments (Gehl, 2013). 'Soft City: Building Density for Everyday Life' by Sim and Gehl (2019) examines the challenges and opportunities of urban density for the happiness and well-being of the city's inhabitants. Sim explores how cities can be planned and designed to accommodate a larger population while maintaining a high quality of life. He addresses various aspects of urban life, such as public spaces, streets, housing, transportation, and social interactions. Overall, these frameworks give an overview of different strategies to enhance a healthy environment for people within a (dense) urban environment.

NATURE FOR HEALTHY ENVIRONMENTS

In addition, more specific studies have been done on the beneficial impact of nature to create a healthy living environment. For example, Kaplan (1995) studied the restorive benefits of nature experiences to recover from fatigue and stress from environmental psychological perspective. This study shows that natural environments provide a lot of characteristics that are needed to create restorative experiences (Kaplan, 1995). Another beneficial outcome of the experience in natural environments is that it can actually prevent people from stress. Overall, Kaplan (1995) proposes an integrative framework that acknowledges the impact of an environment on people's ability to recover from stress and fatigue.

The research by Ryan et al. (2014) reviews existing literature and categorised their findings into an overview with the different biophilic design patterns that have been proven to promote a healthy living experience through the connection with nature. However, Ryan et al. (2014) indicate that some aspects of biophilia are hard to quantify, and because this concept is relatively new, additional research is needed. To find the appropriate solutions, it is important to understand the needs of a specific space and of the people who will use it. It is also important to explore whether these needs differ in various environments and how we choose to define "nature". Also, additional research is needed about how much nature is needed to have a positive impact on long-term health and identify the contributing factors (Ryan et al. 2014).

"Objects alone do not make a place. It is how people feel about and respond to the elements in their environment, as well as other people who share their space, that help determine what a place is."

Leonardo Vazquez (2012)

3. Methodology

This chapter explains more about the different methods that will be used in the course of this study; divided into the four sub-studies. As this research deals with the emotional impact of the environment on user perception and feelings, this research will consist of mixed methods research that combines both qualitative and quantitative to answer the research question and to test the design hypothesis. Overall, the research diagram in Figure 7 provides an overview of the four sub-studies, the research methods, and the expected form of output.

SUBSTUDY 1: HISTORY AND DEVELOPMENT

The first section examines the history of nature in the built environment. This includes studying the paradigm shift between the human-nature relationship and its impact on housing design, with a focus on modern movements. This will be investigated through a literature review and possibly complemented by the analysis of case studies which will be selected at a later stage.

The context study examines the design concept of Groot-IJsselmonde and its effect on the identity of the area. It zooms in on the thought process of the relationship between people and nature in the original design and how this has evolved over the years by adapting to the changing wishes, needs, but also, for example, climate requirements. To this end, both the original philosophy of the Garden City and the concept of Peter van Drimmelen, the architect of Groot-IJsselmonde, will be studied. For information on the Garden City, the book 'Garden Cities of To-morrow' by Ebenezer Howard will be used. In addition, to study the original design as well as the changes in the course of time of Groot-IJsselmonde, the book 'Van Pendrecht tot Ommoord' will be examined, which deals with both the history and the future of post-war districts in Rotterdam.

This study will provide insight into the timeline and developments of different views and applications of nature in the built environment. In addition, it will contribute to clarify the story and trajectory of Groot-IJsselmonde, creating a better understanding of the site and its history in order to know how future designs can respond to this.

SUBSTUDY 2: BIOPHILIC DESIGN

The second sub-research deals with the integration of nature in the built environment and how this can strengthen the relationship between humans and nature, or in other words improve the human experience of nature in the built environment. This is done through literature research on biophilic design and the creation of multi-sensorial experiences. The research on biophilic design uses publications by Kellert, the founder of the concept, among others. To gain more insight into the human experience and multi-sensory design, publications such as the book 'The Eyes of the Skin' by Juhanni Pallasmaa and 'Creating Sensory Spaces' by Barbara Erwine will be reviewed. Overall, these literature studies serve to gain a general knowledge of the subject and more insight into the role of architecture in strengthening the relationship between people and nature, to know better what to focus on when analysing both the case studies and the context study of the design project.

In addition to the literature review, aspects such as how much nature is needed in a built environment to create a strong relationship with nature and in what ways nature can be integrated into compacted cities and existing (post-war) neighbourhoods will be examined. This will be done through morphological as well as typological analyses and, if possible, observations of to-be-selected case studies.

Finally, this section analyses and observes the existing context of the design task in Groot-IJsselmonde. The original design of the neighbourhood will be compared with the current state of the neighbourhood to find out how it has been modified over time. To get an overall picture of the situation, this analysis will be done at the city, district, and housing scale. This analysis will consist of documenting morphology and typology. In addition, human perception will also be investigated through empirical observation and multi-sensory mapping. The findings from this study will provide a basis for developing design strategies.

SUBSTUDY 3: SENSE OF PLACE

The third sub-study explores the ways in which the integration of nature in design interventions can positively enhance a place's feeling of belonging and identity in order to contribute to creating a sense of belonging and attachment to place. First, literature research is conducted on the influence of architecture on the identity of a place, feeling of belonging, and attachment to place. in this research include: 'Cities for People' by Jan Gehl, 'Soft city: Building Density for Everyday Life' by David Sim, 'From Object to Experience: the new culture of architectural design' by Harry F. Mallgrave, 'A Pattern Language' and 'The Timeless Way of Building' by Christopher Alexander. This research will also address how the integration of nature into the design of both the neighbourhood and the home can contribute to enhancing the sense of place.

Using both case studies along with the context study of Groot-IJsselmonde, the integration of nature in existing neighbourhoods and houses will be studied to see what impact it has had on the identity of the place, the meaning of the place and the sense of belonging and attachment to place. These case studies will be observed and analysed to serve as empirical evidence. An example of an investigation into a city's identity and meaning for people living in the city is 'The Image of the City' by Kevin Lynch (1960). Here, Lynch used a phenomenological approach, focusing on people's perceptions, experiences and perceptions to understand their connection with the city. He conducted this through in-depth interviews with city residents, by asking them, for example, to describe favourite routes and places in the city and draw mental maps of the city.

The same can be done at neighbourhood and housing level to find out which elements contribute to the experience and identity of a place and what role nature plays in this. In addition, observation, multi-sensory mapping, and semi-structural interviews will be used to gain insight into what value people attach to the place and what their wishes and needs are in relation to nature in the built environment.

Overall, the outcomes will contribute to a list of applicable elements, wishes and needs of residents, which can be used to design interventions in the existing environment. It will provide insight into how these interventions can contribute to enhancing the significance of a place, identity and sense of belonging in Groot-IJsselmonde.

SUBSTUDY 4: HEALTH AND WELL-BEING

The fourth section seeks answers on how biophilic design interventions can improve the health and well-being of both the individual and community in an existing neighbourhood. To understand the overall effect of biophilic design on health and well-being, a literature review will be done. For example by reviewing the books 'Cities for People' and 'Soft city: Building Density for Everyday Life' by Jan Gehl. These books provides insight into principles and practices to design cities with a focus on human needs and experiences. To complement this, case studies focused on biophilic design in healthcare will be studied. An example are the Clinics, which apply natural elements through light, air, material, texture, and colour to create a healing and homely place where people affected by cancer, both patients and loved ones, can go for psychological, physical and practical support.

As it is difficult to measure health in an existing environment because of personal perception, in the case of the context study, the wishes and needs of the residents of Groot-IJsselmonde will be examined through semi-structural interviews. In this process, target groups will be formed to gain insight into the eventual overarching wants and needs of the community.

DESIGN EXPERIMENTS

Based on the outcomes of the sub-studies, strategies will be designed and tested through experiments, which can be implemented, tested, and optimised in the design project of Groot-IJsselmonde.

4. Research Diagram

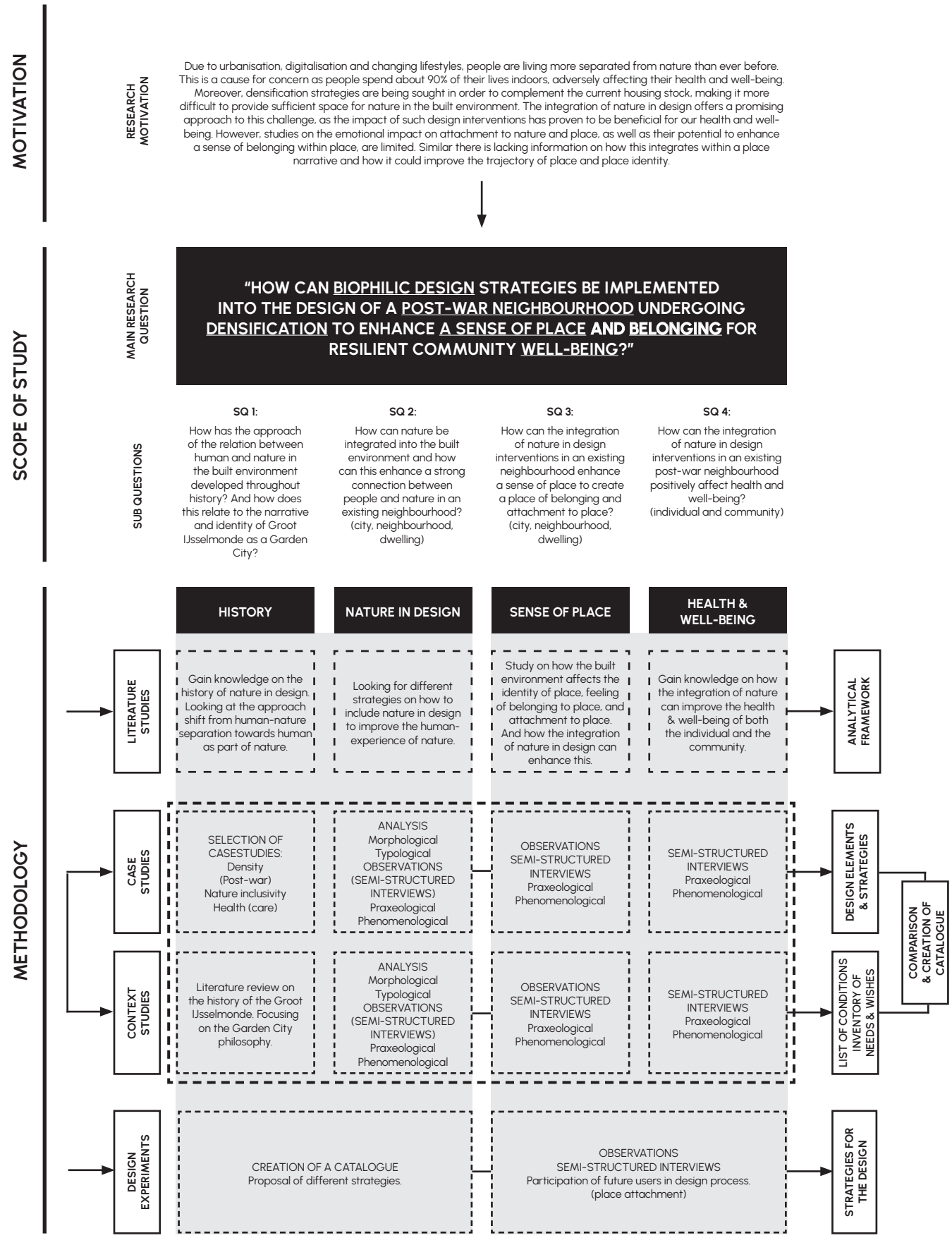


Figure 7: Research Diagram (created by B. Versluijs, 2023)

5. Design Hypothesis

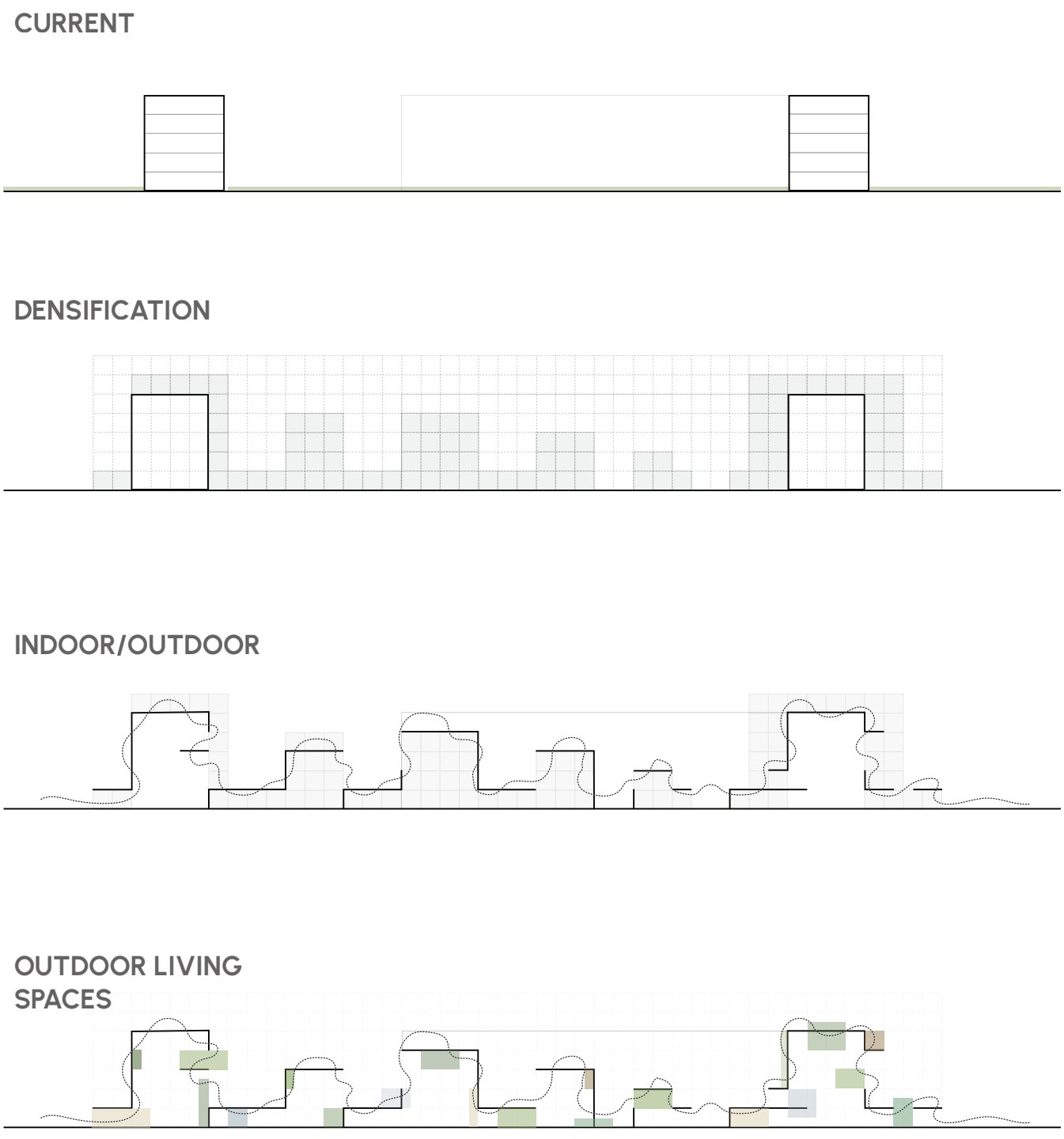
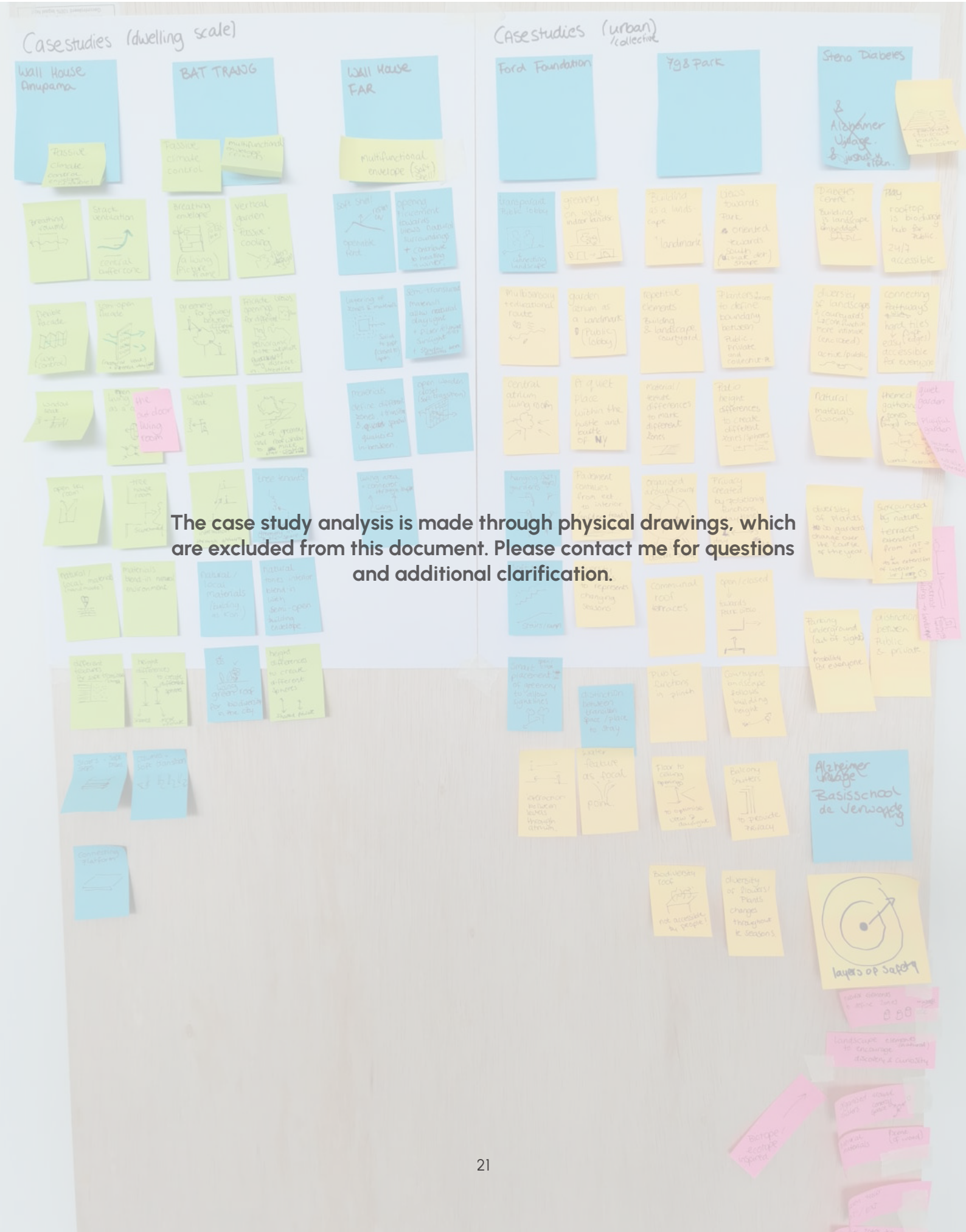


Figure 8: Diagram Design Hypothesis (created by B. Versluijs, 2023)

6. Casestudies



The case study analysis is made through physical drawings, which are excluded from this document. Please contact me for questions and additional clarification.

Collective Buildings: Urban/Building Scale

Ford Foundation Manhattan, New York City, United States (1967) (renovated in 2018) Design by Dan Kiley and Kevin Roche John Dinkeloo and Associates (1967) Gensler with Raymond Jungles Studio (2018)	**79&Park** Stockholm, Sweden (2018) Design by BIG Architects		**Steno Diabetes Center** Herlev, Denmark (2021) Design by Mikkelsen Architects, STED, Vilhelm Lauritzen Architects	**Basisschool De Verwondering** Almere, The Netherlands (2021) Design by ORGA Architect
transparant public lobby (connecting landscape)	building as a (wooden) landscape landmark of the city		building as a landscape (embedded in landscape)	building inspired by concept of biotopes, habitats & ecotopes; creating zones and clusters
	courtyard landscape follows building height	repetitive elements building & courtyard (courtyard becomes part of the building)	roof is biodiversity hub 24/7 accessible for public	
			prominent staircase leads to rooftop	
greenery indoors (indoor landscape)	shaped to create views towards park		diversity of landscapes & courtyards (matching function adjacent space)	clusters organised around a central space
garden atrium as a landmark	shape passive climate (low on S-side and high on N-side)		connecting pathways (tiles of natural stone) accessible to everyone	natural elements are used to define different zones (water, plants, wood)
multi-sensory/educational route	biodiversity roof		natural materials (wood)	different zones to stimulate children to be more aware of nature (natural playground, fruit & vegetable garden, animals, outdoor classroom)
	diversity of flowers/plants changing throughout the seasons			
central atrium living room	planters and terraces define the boundary between public-collective-private		diversity of plants representing changing seasons over the course of the year	green walls both INT/EXT
a quiet space within the hustle & bustle of the city	material & texture differences are used to mark different zones within open space		terracces are extended from interior to exterior (soft transitions)	natural building materials (stimulate the scent of wood)
hanging gardens (soft edges)	patio height differences create different spheres/zones (higher enclosed = more intimate/private lower balustrade = more public/panoramic view)		themed gathering zones/matching outdoor space quiet garden (knowledge hub) playful garden (entrance) active garden (active hub) edible garden (nutrition hub)	building shape inspired by natural forms tree colums & leaf roof
pavement continues from exterior to interior (soft edges)	organised around courtyard double-sided oriented		distinction is made in public & private zones open space = fluid space private smaller spaces & niches	
	privacy created by smart positioning functions (day/night use)	balcony shutters to provide privacy		
a landscape of stairs and ramps create soft transitions	communal roof terraces			
a diversity of plants represent the changing seasons	public functions in plinth			
smart placement of greenery to create sightlines through space	floor-to-ceiling openings to optimise views & daylight			
interaction between levels through atrium (atrium acts as a connector)				
water feature as focal point				

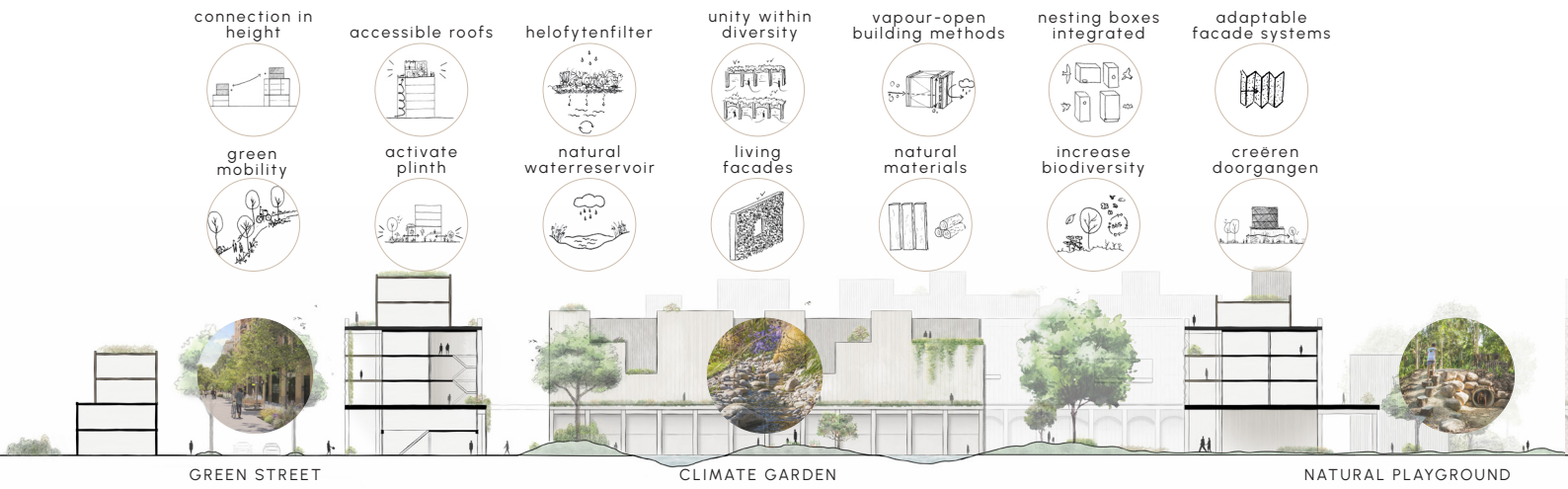
Dwellings: Building Scale/Dwelling Scale

Wall House Auroville India (2000) Design by Anupama Kundoo		**Bát Tràng House** Bat Trang, Vietnam (2020) Design by VTN Architects		**Wall House (2)** Santiago, Chile (2007) Design by FAR frohn&rojas	
passive climate control (breathing volume/flexible envelope)		passive climate control (double-facade-layers/ fixed semi-open envelope)		multifunctional envelope	
breathing volume	stack ventilation through central bufferzone	breathing envelope openings in facade	vertical stacked gardens filtering sunlight and creating a 'living picture frame' from the different spaces	reflecting soft shell/openable tent	
flexibele facade (user control)		greenery for privacy between zones		placement opening oriented towars views on natural surroundings & these larger openings contribute to heating in winter	
semi-open facade		facade openings creating different views, matching the space (panoramic and more intimate)		layering of zones & materials (from soft (EXT) to solid (INT)) create distinct qualities in-between	
window seat		window seat		semi-translucent materials	
				allow natural daylight while filering/eluminating direct sunlight	shadow patterns of the trees appear creating a vibrant/ lively sphere
outdoor living room		use of greenery and a roof window to make stair-climbing more pleasant		open wooden framework/furniture element create a soft transition between living spaces and transition space in-between soft shell	
open-sky room		"tree tenants" trees visible through facade increases the amount of greenery in public space		living area as a fluid connector through buffer-space	
treehouse room		interaction through atrium			
natural / local materials (handmade)		natural/local materials (building as ceramic beacon to the city)			
materials blend-in natural environment		natural tones in interior blend-in with semi-open building envelope			
different textures for soft transitions/thresholds		living green roof for biodiversity in the city			
height differences to create different spheres (shared - higher ceiling) (private - lower ceiling)		height differences to create different spheres (shared - higher ceiling) (private - lower ceiling)			
connecting platform (soft edges)					

7. Design Strategies

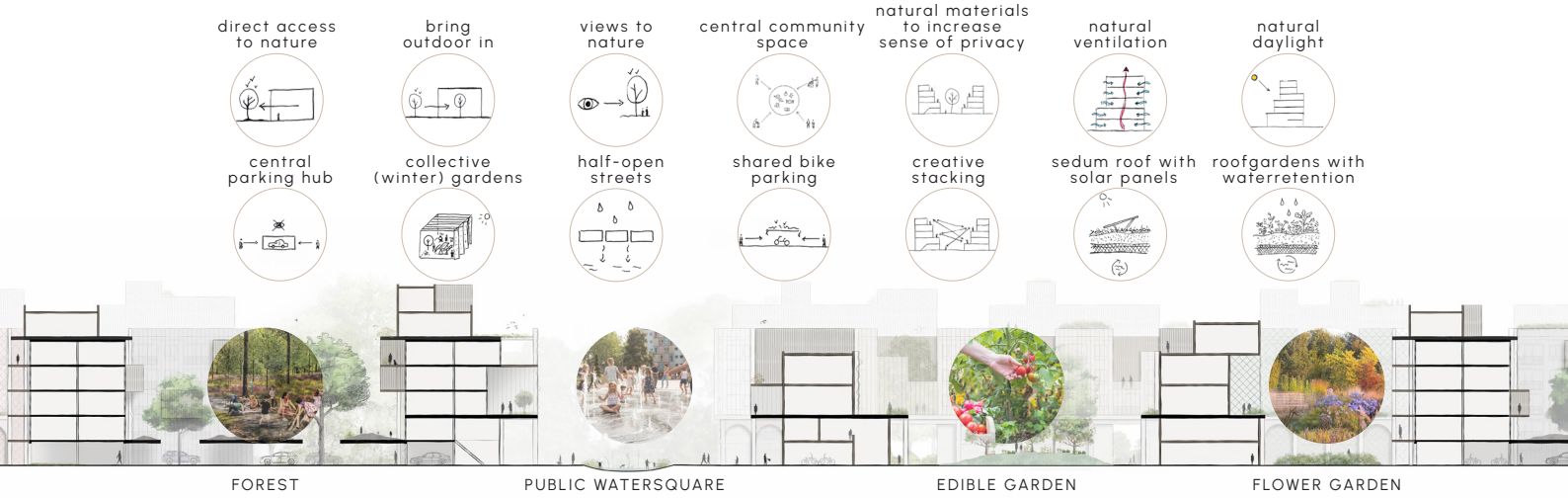
Urban Design Strategies

- green mobility
- diversity of buildings
- soft boundaries/transitions
- improve nature accessibility
- diversity of outdoor spaces
- shared courtyards
  (stimulate participation)
- social mixture
  (income/generations)
- redefine urban boundaries
  (public-collective-private)
- sensory spaces



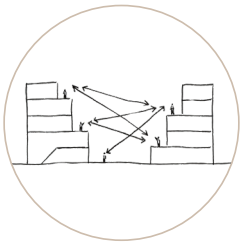
Building/Dwelling Design Strategies

- natural/local building materials
- natural daylight
- natural ventilation
- dynamic shading
- private hybrid zone
- sensory spaces
- user adaptability
- shared spaces
- direct views to nature
- direct access to nature
- soften boundary between indoor/outdoor (bring outdoor in, and indoor out)

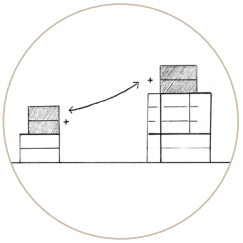


green mobility

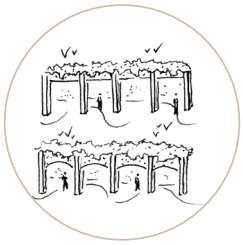
creative stacking



connection in height



unity in diversity



increase biodiversity

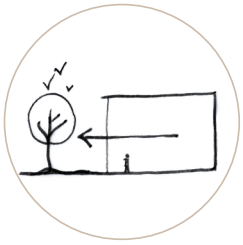
connections between zones

accessible roofs

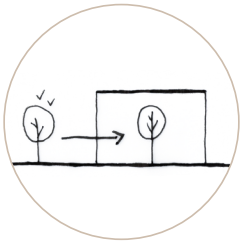
activate plinth

natural materials

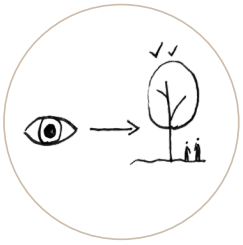
direct access to nature



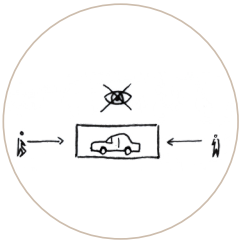
bring outdoor in



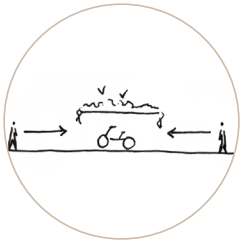
views to nature



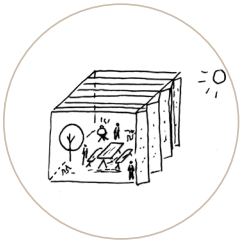
central parking hub



shared bicycle parking



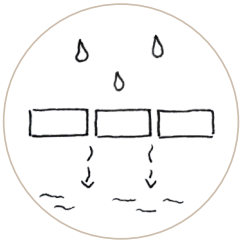
collective wintergardens



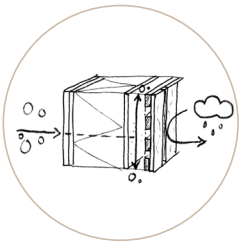
natural waterreservoir

helofytenfilter

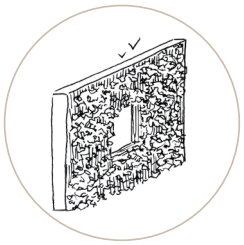
half-open streets



vapour-open building methods



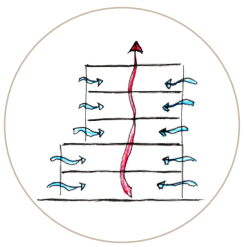
living facades



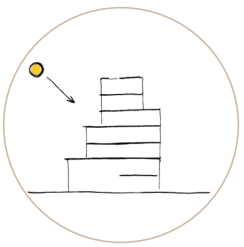
adaptable facade systems

natural materials to increase sense of privacy

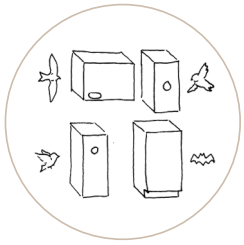
natural ventilation



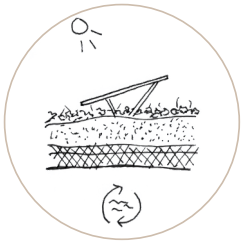
natural daylight



integrate nesting boxes



sedum roof with solar panels



roofgardens with waterretention

Active movement & Improve Access to Natural Areas

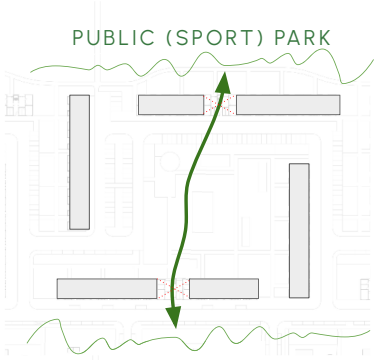
The immediate residential environment greatly impacts daily life, with 5 to 20 minutes of outdoor nature immersion boosting positive emotions and mental wellbeing. Designing neighborhoods for active movement and easy access to nature encourages daily outdoor time and social interactions (Terrapin Bright Green, 2014; Sim, 2019).

Creating sightlines and interactions between these zones can spark curiosity and exploration, encouraging movement and boosting spontaneous social interactions (Heath et al., 2021).

Current Situation

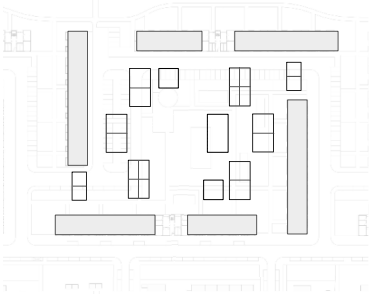
1. Breaking Barriers

By breaking barriers and opening up the existing block, I are created a new public path through the center, while also transforming the main street into a green zone.



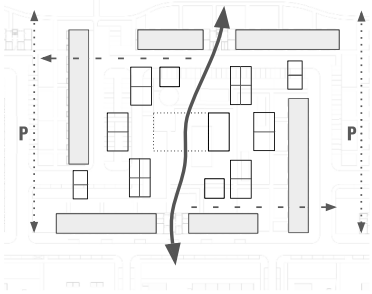
2. Redefine Boundaries - Courtyards & Streets

Transforming the existing buildings and densifying courtyards can enhance urban structure and foster a stronger sense of ownership. To redefine boundaries, improve the human scale and increase the diversity of spaces, new buildings are designed within the current courtyard, creating smaller zones of courtyards and streets.



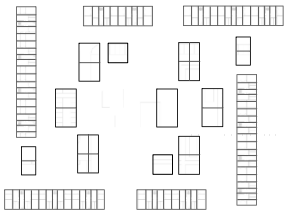
3. Car-free Zones

Centralizing parking in neighborhoods away from homes increases street activity, promotes outdoor movement, and encourages spontaneous interactions with both neighbours and visitors (Gehl, 2011). This also creates car-free zones, which are safer and allow for natural sounds to take the place of traffic noise.

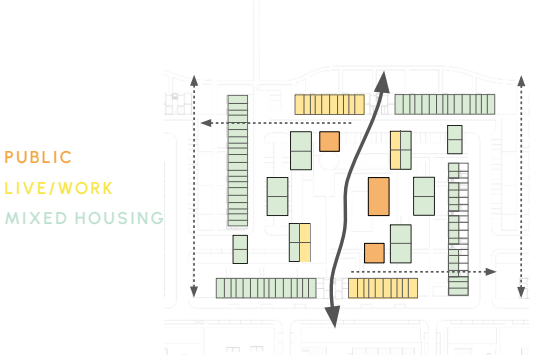


4. Activate Ground Level & Function/Social Mix

Closed plinths with functions as storage spaces create barriers, making it difficult for buildings and their residents to connect with their surroundings. This has led to people feeling unsafe in the neighborhood. By introducing a greater diversity of housing and functions on the ground floor, we can bring more life to the streets, both day and night, and enhance the overall sense of safety. As Sim (2019) pointed out, a diverse mix of residents, workplaces, businesses, and services strengthens community cohesion and neighborhood safety by ensuring continuous presence and activity, which is crucial for preventing crime. In my design, the location within the plan determines the function integrated in the plinth.



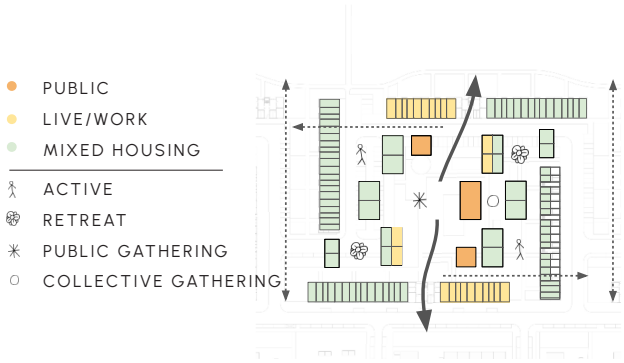
So, along the public route, I've located public functions that promote a more active lifestyle and foster social interactions, both within the neighborhood and with visitors, such as a nursery or sport facility. At the heart of the neighborhood, adjacent to the public route, is a community center where people gather and connect. As well as work-live units that have the option with a workspace on ground level. Overall a variety of housing options is created to foster a social mix, including a blend of social rental, mid-rent, and ownership opportunities.



5. Levels of Vibrancy

Residents' ability to regulate their privacy is crucial for fostering social interactions (Altman, 1975). Without adequate privacy control, individuals may miss social opportunities, experience loneliness, face crowding-related stress, and feel anonymous. Therefore, designing environments with clearly defined zones for different types of social interactions is essential for building meaningful connections (Van Dorst, 2005).

In this context, the main paths and smaller public routes play a key role in defining the outdoor spaces, offering a range from communal areas to spots for activity or relaxation. This variety matches the diverse needs and preferences of the community, creating an inclusive environment where everyone can find a sphere that matches their personal preferences and lifestyle.



6. A Diversity of Restorative Outdoor Spaces

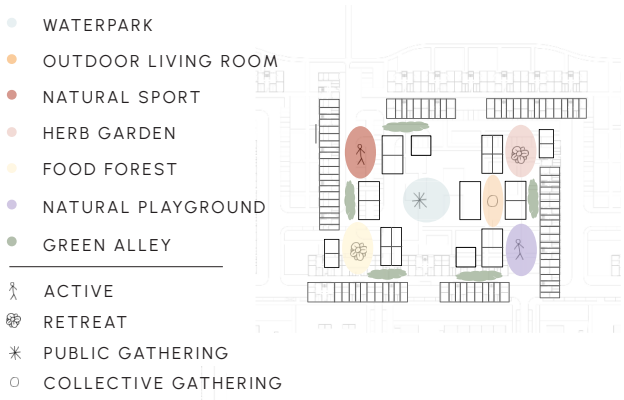
Even though the visual perception is considered to be primary for spatial experience, a positive experience can be greatly enhanced by also including elements for sounds, touch and taste stimuli. So can engaging with natural elements like the sound of water, the scent of flowers, and the touch of plants deepens our connection to the environment and enhances our quality of life (Kellert and Calabrese, 2015).

Therefore, this design includes zones that engage with the various senses, such as a public gathering waterpark in the center, natural playgrounds, and places for gardening. However, it is important to make sure that spaces do not deprive or overwhelm our senses, because only then it can foster a feeling of physical and emotional secure (Kellert and Calabrese, 2015).

To maintain harmony and align experiences with the atmosphere of each space, the more active functions, such as sports and playgrounds, are placed in socially active zones, while the herb garden and food forest are located in areas meant for retreat.

At the same time, integrating new residents into an existing neighbourhood and promoting inclusivity can be challenging, however, by designing a diversity of collective spaces where people can discover common interests and develop shared responsibilities.

So, by combining sensory-rich environments with community involvement, this design create spaces that enhance well-being, build connections, and deepen our relationship with the natural environment.

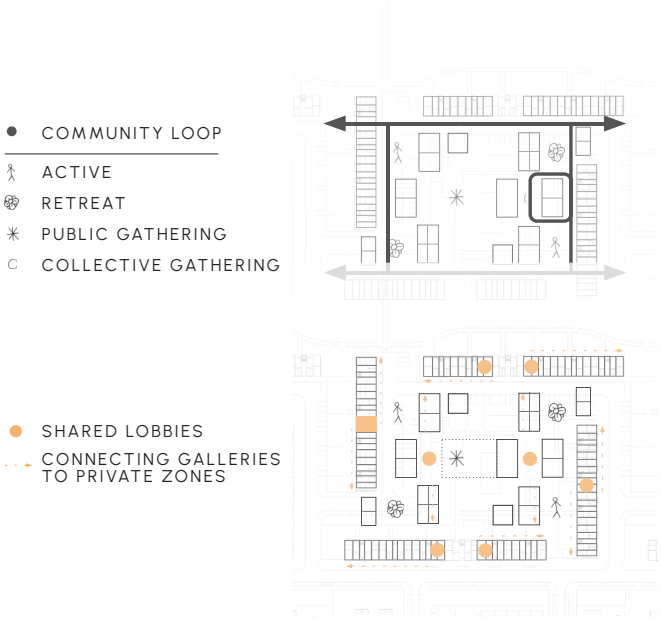


7. Multi-Sensory Community Loop

To encourage movement and foster social interaction, various zones are interconnected through a multisensory and educational community loop. Whether walking the dog, taking a stroll while working from home, or dropping off the children at daycare, these routes provide opportunities to promote physical activity and spontaneous encounter while immerse oneself in a natural environment.

8. A Network of Residential Clusters

Overall the neighbourhood will consist of a network of residential clusters, having both shared lobbies and more private branches.



Conclusion

During my research, I discovered that the key to social and ecological harmony lies in the connections between the different scale levels—connections that are currently missing in Groot-IJsselmonde. By developing corridors and natural routes, integrating welcoming gardens and lively places of encounter, and creating a diverse mix of households, I was able to add important connecting elements. The overall result is an enhancement of the neighbourhood's natural character: a lively, inclusive and sustainable living environment that enables social and natural harmony.

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Getting to Know the Neighbourhood

Observations & Conversations

Housing Corporation

Communication Issues
Difficult to communicate with some residents, many do not speak the Dutch language.

Lack of Safety
There is a very big difference in the atmosphere here between day and night. "If you really want to taste the atmosphere, you should actually walk through the neighbourhood at night. If you dare to do so of course, otherwise maybe you could meet with a neighbourhood police officer".

Lack of Responsibility
Nuisance from young people and people not taking responsibility, throwing rubbish in the bushes or using the balcony to put rubbish down etc. This in turn attracts pests in due course.

Plans to Improve the Collective Gardens - Create more Diversity
To improve the inner gardens and counteract the monotonous image, several designs have been made to use greenery to give different characters to the inner gardens, such as a forest or a flower garden.

Young Family
(father, mother and three children)

Introduction/Main Concern
Family has lived there for 10 years, safety in the street has changed: "Safety in the street has changed, we don't feel safe anymore".

Talked to on the street by a 10-year-old boy, curious about what I was doing with my camera. He too spoke briefly about street safety, mentioning that there are regular incidents with knives and large groups of youths gathering to fight. Whether this is entirely true or was created from the child's fantasy world, of course I don't know, but it does say something about this boy not feeling safe in the neighbourhood. Incidentally, it was palpable that he was very much exploring the neighbourhood, for instance, he showed me the different supermarkets in the neighbourhood (in his words, the cheap ones in his neighbourhood and the expensive ones in Reyeroord).
At the end of the green strip between Reyeroord and Hordijkerveld is another large playground. I asked the boy if he had been here once, to which he replied: "I have been there once, but it costs money. That's why we never actually go there." But he explained that he actually enjoys playing in the green belt just as much. This way, he has a lot of contact with other neighbourhood children, most of whom he also knows from the neighbourhood school.

After the tour of the neighbourhood, the boy introduced me to his mother, who lives in a two-room flat on Emelissedijk, the middle stamp. She explained that the flat is actually too small for the family of two parents and three children. Also mentioning that they have lived there for about 12 years now, she noted that the mainly safety in the neighbourhood has deteriorated over the past 10 years. In particular, she mentioned the road, Emelissedijk, where everyone always drives very fast and accidents happen regularly. She also mentioned that she is bothered by noise pollution: "It is not only unsafe, but especially the motorbikes make a lot of noise".

Community Worker

Marjolein works for the community from Stichting Tussentuin and calls herself "the social garden lady" and wants to make everyone feel welcome.
For instance, Marjolein caught on to the fact that we were doing a survey and immediately invited us to also take a seat at the picnic table over a nice hot cup of tea.

Marjolein started setting up 'Buurttuin Oeverloos' in 2020 with the idea of serving as a link, without barriers, between the diversity of residents in the neighbourhood. For this reason, it is located around a central spot in the neighbourhood and was named Oeverloos. They started with a container, vegetable garden and fenced dog park. To spend the whole year in the garden, a greenhouse has since been added.

The community garden is open four times a week, or at least, four times a week Marjolein or someone else from the foundation is there. Meanwhile, local residents also have keys to the greenhouse; the picnic table and garden are always accessible to everyone.

Everyone has their own task to bring something of their own, this way Marjolein puts some responsibility on the residents: "This makes them feel that they also matter and that they can also contribute something through small gestures".

In addition, between approximately April and November, Marjolein also organises larger events that are free to attend, for both residents from the neighbourhood and people outside the neighbourhood. Every last Saturday of the month is dedicated to 'Jam in the Park', which aims to bring people, from young to old, together while enjoying acoustic music, homemade soup from world cuisine and other fun activities.
Here too, local residents are actively involved and volunteer to help out during these events. The reason this is not organised from December to March is because it is often not feasible in terms of weather conditions.

Jam in het park programma 2023

Zaterdag 29 april
- Kindermatinee
- Schminken met Eef
- Jongleren Marvin
- Duo No Nonsens acrobatiek & jongleren i.s.m. Circusstad
- Speciale verassing vanuit het jubileum van Circusstad
- Akoestische Muziek
- Cosmic Surf Trio: zwoele bossanova en jazz
- Wereldkeuken: zelfgemaakte soep uit de heksenketel

Zaterdag 27 mei
- Kindermatinee
- Schminken met Eef
- Jongleren met Marvin
- Akoestische muziek & workshop
- Klassiek op Zuid: kamermuziekgezelschap voor en door mensen uit Rotterdam Zuid.
- Wereldkeuken: zelfgemaakte soep uit de heksenketel

Zaterdag 24 juni
- Kindermatinee
- Workshop percussie Basic Drum
- Akoestische Muziek
- Cumbaquin: swingende Zuid Amerikaanse percussie
- Wereldkeuken: zelfgemaakte soep uit de heksenketel

Zaterdag 29 juli
- Kindermatinee
- Schminken Eef
- Goochelaar Olivier Quist
- Muziek
- Ukulele Paradijs: play along show met de ukulele
- Wereldkeuken: zelfgemaakte soep uit de heksenketel

Zondag 20 augustus
- Kindermatinee
- Schminken met Eef
- Poppenvoorstelling de Fighter
- Akoestische muziek
- Jans Anders: smartlappen en covers, i.s.m. (de koepels/podium van) het Volkstheater in het kader van Zomer op Zuid

Zaterdag 30 september
- Kindermatinee
- Poppentheater Wim Noordgraaf
- Springkussen
- Akoestische muziek
- Jesus Evil Highway: Oldtime Hillbilly
- Country & Bluegrass Music

Steeds wisselend programma met de vaste onderdelen:
Kindermatinee om 13:00 uur
Akoestische muziek om 14:00 uur
Wereldkeuken om 15:30 uur
Afbouwen/einde 16:30 uur

Alle helpende handjes zijn van harte welkom!

Buurttuin Oeverloos is en laagdrempelig wijkcentrum op de groenstrook tussen de Hinkelenoord en de Thamerdijk in Reyeroord.
Wij zijn open op dinsdag, woensdag, donderdag en vrijdagmiddag.

Wij zijn te vinden op Facebook & Instagram.
Met dank aan: Cultuur Concreet, Gemeente Rotterdam, Circusstad, Zomer op Zuid, Fix a Party.

OEVERLOOS

Elderly Woman

Physically impaired, has lived all her life in Groot-IJsselmonde. Still goes outside every day for a stroll and to visit 'Oeverloos' for cup of tea and a chat with the neighbours. The community has "adopted her as a mother" and takes care of her.

Herma

Herma (62) has lived in the neighbourhood for 56 years and therefore grew up here. She named that it has changed an awful lot since before. She thinks that the changing atmosphere is mainly due to the fact that the neighbourhood used to be known as a neighbourhood for the 'elites' and now mainly attracts people who have not necessarily chosen to live here.

Social Disconnect
In her view, the biggest change is the lack of social control and connection: "I don't know my neighbours and it seems like nobody wants to know each other either, because they almost all keep the curtains close".
Before, if I was uncomfortable once and put a rubbish bag in the hallway, the neighbour would come and ask if something was wrong and throw the rubbish bag away for me. If I do this now, the rubbish bag could easily sit there for a week, no one looking after it or would bother to ask me how I am doing.

Lack of Safety and Social Control
Especially in the evening and at night, a lot of unpleasant things happen. Regularly, there is a lot of shouting, but because it is so often, people are not surprised at it anymore and don't look what is going on. So once something is really going on or someone needs help, it remains to be seen whether anyone is aware of it and actually bothers to still go and look. As for my own safety, I am glad that we can also get to the courtyard side via the porch. Late at night, when my dog still has to do his business, I can check shortly beforehand whether, and if so, who is downstairs, and if I find it more comfortable, I can stay in the doorway myself. I like that very much.

Quality of the Apartment
The apartment is perfect as far as I am concerned in terms of layout and space. The only downside is that it is not well insulated. In summer it gets very hot inside, while in winter I have to stoke hard to get it warm.

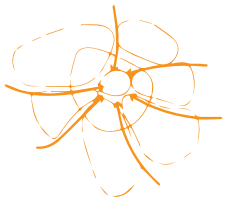
No Sense of Home
All in all, Herma is very dissatisfied with the neighbourhood. Due to health problems, she unfortunately cannot work, but if she could have afforded it, she would have left the neighbourhood a long time ago.

Kees

Kees (60) has known Herma since childhood and expresses: "We used to be able to play safely in the streets, nowadays the streets are full of cars and they drive very fast".

Lack of the Elevator
All three residents cite the lack of an elevator as something they miss tremendously. Kees says: "I am getting a day older than my dog too. My dog is too big and heavy to lift, there will come a time when we won't be able to go up and down." Besides, Herma especially finds it a chore to lift the heavy shopping bags upstairs.

Pets as Social Connectors
The conversation reveals that most residents got to know each other while walking the dog. They now meet daily in the garden to catch up.



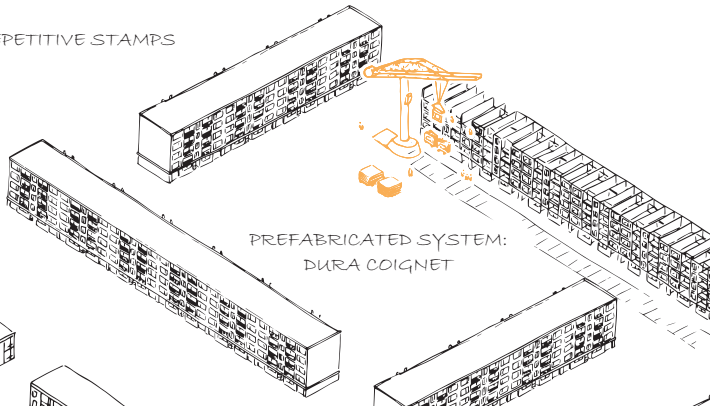
CENTRE

TRAMS ARE PASSING

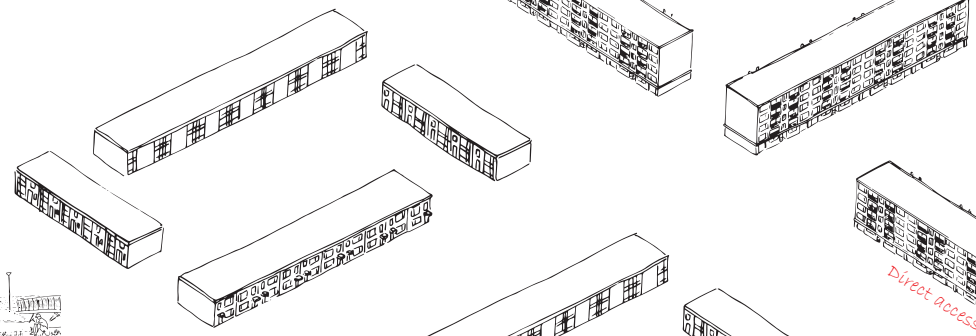
BIRD

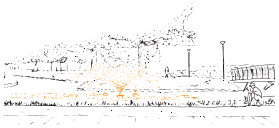
"you can hear

REPETITIVE STAMPS



PREFABRICATED SYSTEM:
DURA COIGNET



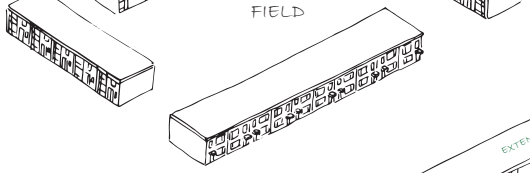


WATER FEATURE &
RAISED EDGE FOR SEATING
masks road noise

COMMUNAL
FIELD

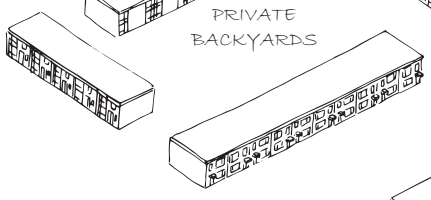
Direct access to parked c

WIDE & L
STRAIGHT



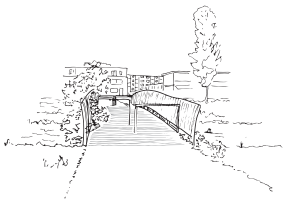
EXTENSIONS + FLOORS

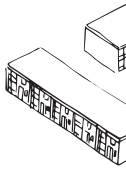
PRIVATE
BACKYARDS



CONNECTING BRIDGE

NEIGHBOURHOOD GARDEN
CORRIDOR





RECOGNITION

COLOURS

DISTINCTION MADE IN COLOURS

ENTRANCES

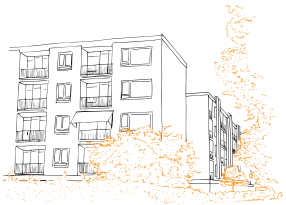
PICTURES OF NATURE (REPETITIVE)

S ARE SINGING

that spring is making its entrance"
- Harald Mooij
site visit
17 March 2023

CLOSED FACADES (PLINTHS & END WALL) HAVE BEEN TRIED TO SOFTEN BY PLANTING

EDGES ARE TRIED TO SOFTEN BY LOW (NON-DIVERSE) HEDGES



EDGES ARE SOFTEN BY PLANTING

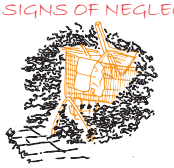
NATURAL GREEN CORRIDOR

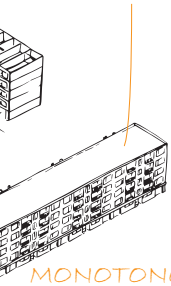
COMMUNITY GARDEN OEVERLOOS

"people gathering"

FLAT ROOFS

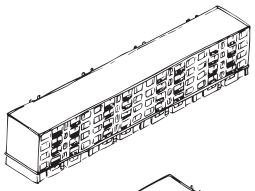
SIGNS OF NEGLECT



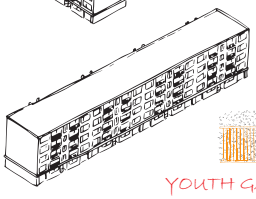


MONOTONOUS COURTYARDS

"we are trying to improve the courtyards and give them distinct characters, like a forest & flower garden."
- worker from housing corporation



ONG
ROADS



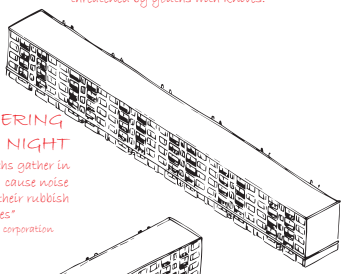
PARKING IN SIGHT

DANGEROUS!
PEOPLE DON'T FEEL SAFE

"I have heard that people are being threatened by youths with knives."

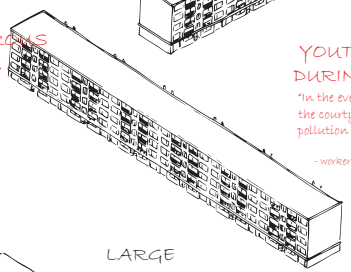
YOUTH GADERING DURING THE NIGHT

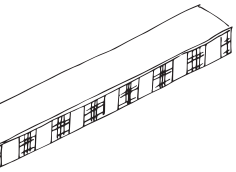
"In the evening, youths gather in the courtyards. They cause noise pollution and throw their rubbish in the bushes"
- worker from housing corporation



NOISE POLLUTION & DANGEROUS
speeding cars & motorcycles

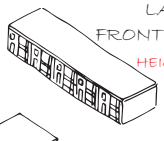
"it feels like I live next to a circuit"
- resident

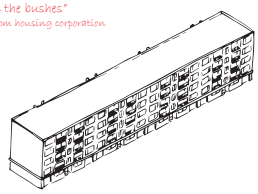


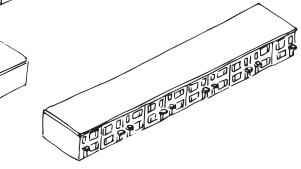


LARGE FRONTGARDENS

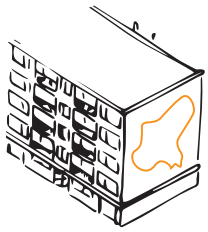
HEIGH GREEN BARRIER OR PAVEMENT







PEOPLE TAKE THE SHORT-CUT TOWARDS THE CENTRE!



PAINTINGS & WRITINGS ON CLOSE END FACADES SENDING PEOPLE A MESSAGE: TO ENHANCE SOCIAL CONTACT