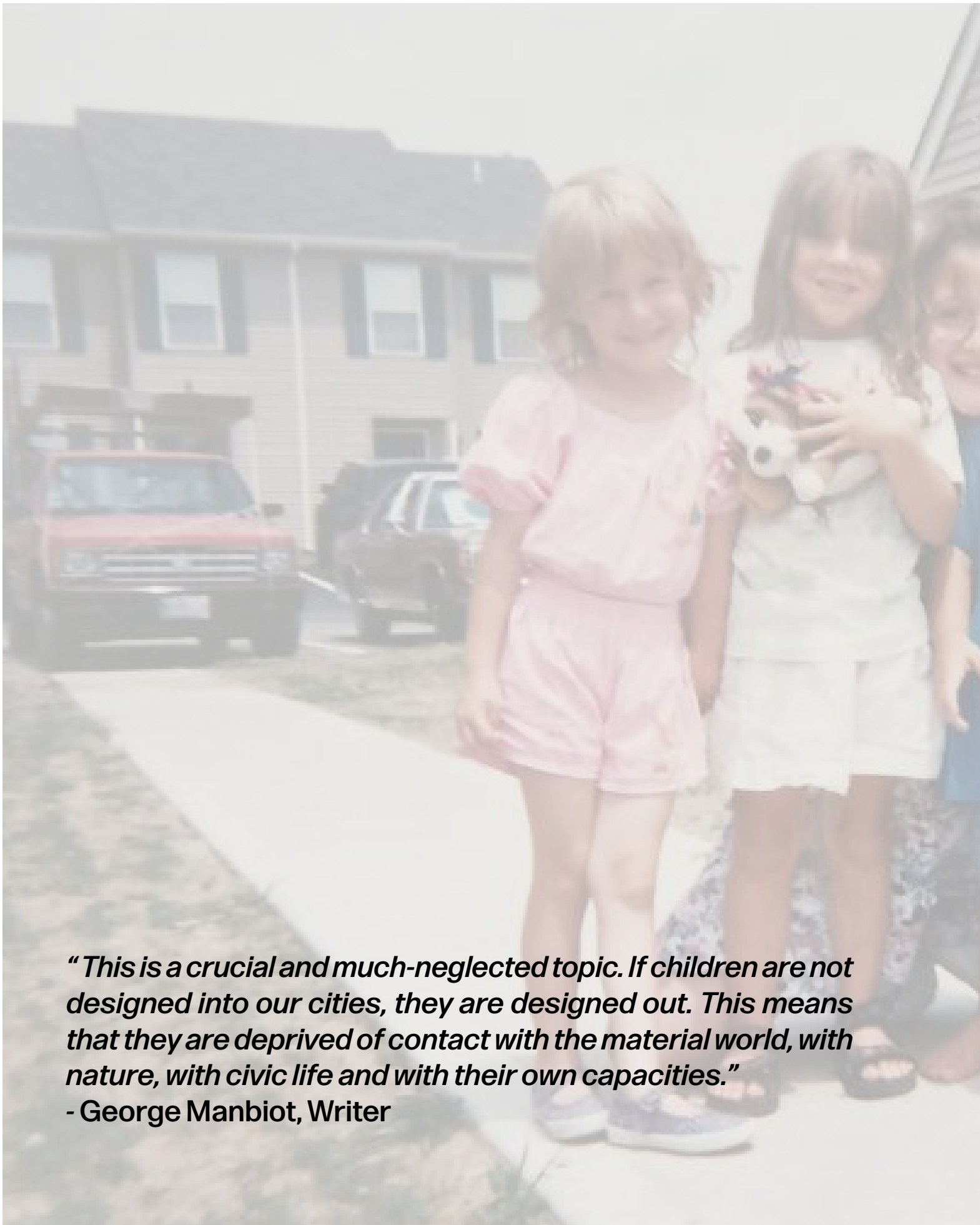




Growing Up in the City: Enhancing Safety and Liveability for Children in Established Urban Areas



“This is a crucial and much-neglected topic. If children are not designed into our cities, they are designed out. This means that they are deprived of contact with the material world, with nature, with civic life and with their own capacities.”

- George Manbiot, Writer

Figure 1. Author and friends as children



LUND
UNIVERSITY

**Growing Up in The City: Enhancing Safety and Liveability for Children
in Established Urban Areas**

Master's Degree project in Sustainable Urban Design
May 2023

Sustainable Urban Design (SUDes)

Department of Architecture and Built Environment
Lund University

Author:

Salóme Rósa Þorkelsdóttir

Supervisors:

Teresa Arana Aristi, Lecturer SUDes, LTH

Ida Sandström, Associate Senior Lecturer, Department of Architecture
and Built Environment, LTH

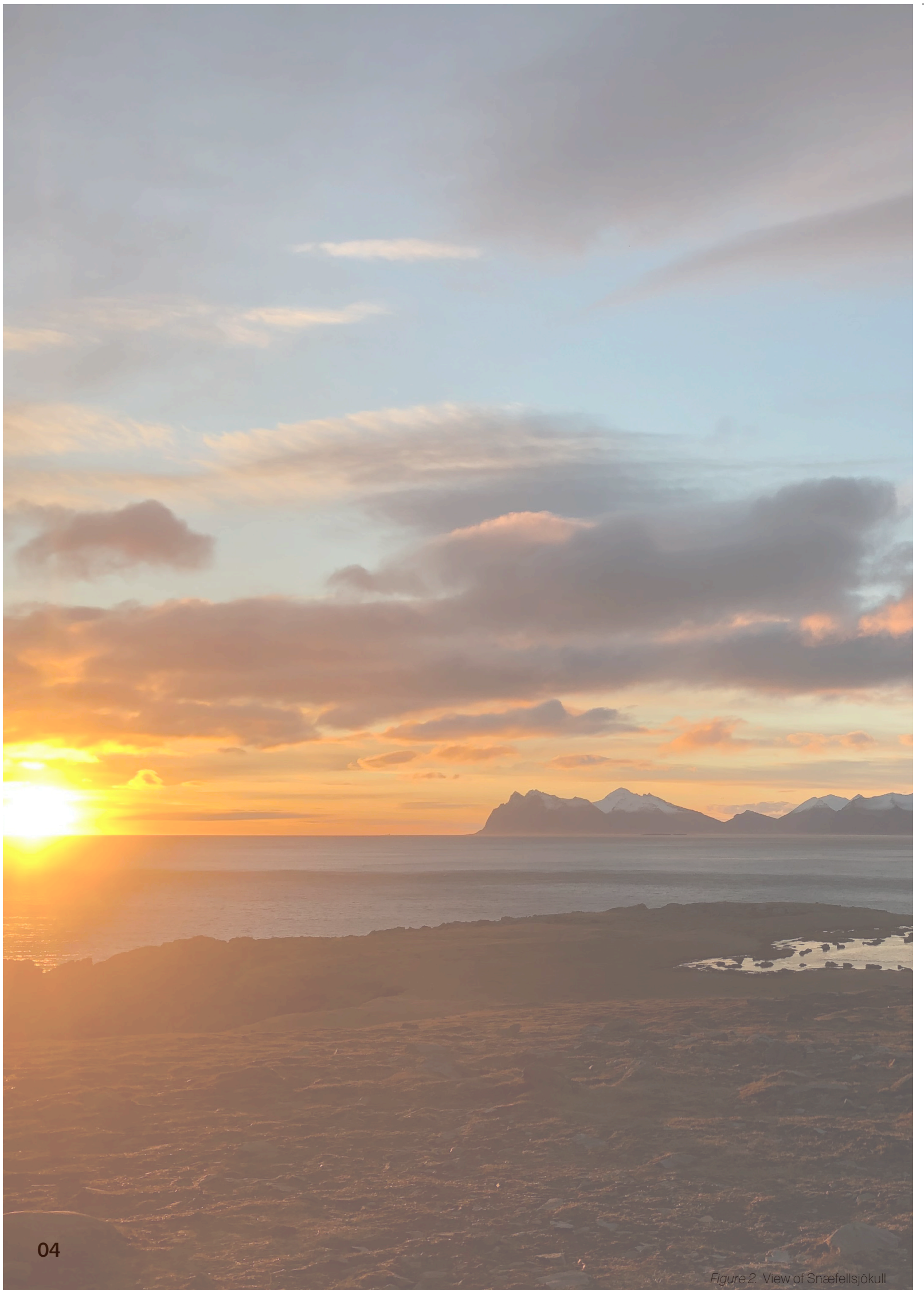
Examiner:

Lars-Henrik Ståhl, Professor, PhD, Director of SUDes, LTH

Keywords:

Urban design, children, child-friendly, play, mobility network

All graphics and images are authors own, unless noted otherwise.



ACKNOWLEDGEMENT

I would like to express my heartfelt gratitude to some special people who have been instrumental in the completion of my master's thesis. Firstly, a big thank you to my supervisor, Teresa, for her patience and help throughout the last two years and during the process of writing my thesis. I am also grateful to my secondary supervisor, Ida Sandström, and my examiner, Lars-Henrik Ståhl, for their valuable input.

I would like to extend my thanks to all my lecturers and the entire SUDes team for providing an exceptional learning environment over the past two years. Their expertise and commitment have broadened my knowledge and contributed significantly to my growth as a designer.

To my fellow students, thank you for the fantastic time we've had together in Lund and for your support and friendship. I feel lucky to have shared this journey with all of you.

A special thank you goes to my mom and dad for their unwavering support and belief in my abilities. Their encouragement and love have been my driving force. I am also grateful to my grandma, Rósa, and my late grandpa, Kjartan, for their constant support. Thank you for being part of this incredible journey and for helping me reach this important milestone.

ABSTRACT

This thesis explores various aspects of urban design and societal factors that contribute to creating child-friendly environments. The study begins by examining child-friendly design, emphasizing the significance of considering children's needs in urban planning. Following this, a city-wide analysis of Reykjavík is conducted, exploring the swimming pool culture, the preschool and school system, and the development and policies surrounding playgrounds and open play areas.

Subsequently, the focus narrows down to the district of Grafarvogur, where a design site is chosen and a more detailed analysis is conducted. Utilizing the research and surveys, three toolboxes are presented as guidelines for designing new neighbourhoods or enhancing existing ones to prioritize child-friendliness. These toolboxes encompass playful city features, walkability, and safety measures, which are crucial for fostering children's well-being and development in urban settings.

Applying the three toolboxes to the chosen site in Grafarvogur, the thesis transforms the area into a vibrant urban environment that places a strong emphasis on the well-being and development of children. By integrating these child-friendly design principles, the resulting neighbourhood becomes a model for creating inclusive and engaging spaces for children in urban contexts.

Overall, this thesis contributes to the understanding of child-friendly urban design and its significance in promoting the overall welfare of children. It provides practical guidelines through the toolboxes for creating and improving neighbourhoods and demonstrates their successful application in Grafarvogur.

CONTENTS

I	BACKGROUND	08
INTRODUCTION	08	
Project aim	11	
Research questions	11	
II	THE CHILD-FRIENDLY CITY	12
Playful City	12	
Streets for Kids	12	
A Safe City	15	
Survey	15	
III	REYKJAVÍK	22
IDENTITY	22	
Reykjavík City Municipal Plan 2040	28	
“A Better City for Children”	28	
Pre-schools and primary schools	28	
Swimming pools and sports	32	
Public /play/ spaces	35	
Choice of site	40	
IV	SITE ANALYSIS	42
North Grafarvogur - Current situation	42	
Municipal plan	42	
V	DESIGN PROPOSAL	50
Strategy	50	
Vision	50	
MASTERPLAN	66	
Childrens network	69	
Public functions and communal spaces	69	
Street network and parking	71	
Green connection	71	
Residential	73	
Shared paths	73	
Detail design 1 - neighbourhood centre	74	
Section 1 - communal and public spaces	76	
Section 2 - communal and public spaces	78	
Detail design 2 - preschool	80	
VI	CONCLUSION	82
VII	REFERENCES	84
Written references	84	
Photo references	87	

This master's thesis explores the concept of designing a child-friendly neighbourhood within Reykjavík, Iceland. The initial inspiration for this project emerged from the book "Feminist City," which shed light on the male-centred design prevalent in urban environments and its wide-ranging effects. The original idea was to design a mother-friendly neighbourhood in Reykjavík, given its high prevalence of single mothers, with 88% of single-family households in the city being headed by single mothers. However, throughout the research process, significant challenges emerged, highlighting the pervasive gender biases within architecture and urban planning. Existing resources addressing the creation of mother-friendly cities or neighbourhoods were scarce, often focusing on frameworks for enhancing women's safety or unrelated to Western European cities like Reykjavík.

To overcome these challenges and broaden the project's scope, the focus shifted toward designing for children. The underlying premise is that by creating safe, inclusive, and stimulating urban environments for children, we can positively impact their well-being and development. This shift is driven by personal experiences, including working as a nanny in Zurich and engaging with children in Reykjavík through working at preschools, which have deepened my interest in child-centric design.

In summary, this thesis delves into the design of a child-friendly neighbourhood in Reykjavík, building upon the original intention to create a mother-friendly environment. Recognizing the limited research in the mother-friendly domain, the project now centres on creating urban spaces that prioritize the needs, safety, and independence of children. By considering children's experiences and incorporating their perspectives into urban design, this research aims to contribute to the development of neighbourhoods that promote children's well-being, stimulate their growth, and foster a sense of community.

FIGURE 3. LIFE IN AN URBAN AREA -
AUTHOR AS A YOUNG CHILD





FIGURE 4. AUTHOR AS A CHILD

Project aim

The main objective of this thesis project is to explore innovative approaches to designing an urban environment that caters to and prioritizes the needs of children. It seeks to expand the concept of child-friendly spaces beyond traditional playgrounds and homes, extending it to encompass various urban settings.

By researching child-friendly design and conducting surveys targeting mothers, the aim is to develop practical toolboxes that can be applied to any urban neighbourhood, whether new or established, enabling the creation of an inclusive environment where children can freely and safely navigate their surroundings. Emphasizing the integration of playfulness into streets and spaces between buildings, this research aims to foster an urban fabric that encourages children's well-being and autonomy.

Research questions

This thesis has the following research questions as a framework:

What is child-friendly design? How can urban designers enhance safety and liveability for children in established urban areas? Looking further than playgrounds, how can designers include play in the design of public spaces within the urban fabric?

Playful City

Play is essential for children's happiness, well-being, and healthy development. It supports their holistic growth, including emotional, social, physical, cognitive, and creative skills. Through play, children gain flexible competencies and personal capacities, building resilience and creative problem-solving abilities. Outdoor play also benefits communities, fostering social cohesion and reducing anti-social behavior. The United Nations Convention on the Rights of the Child, established on November 20, 1989, recognizes the fundamental right of all children to engage in play, yet opportunities for play are limited globally. Despite its proven importance, play is undervalued and given low priority in children's lives, resulting in decreased playtime and missed developmental opportunities (Arup & The LEGO Foundation, 2021, p. 3).

Cities can offer critical opportunities to better realize the potential for learning through playful experiences, moving away from playground provision as the sole focus. An integrated approach is needed to deliver a successful children's infrastructure network that encompasses a range of streets and spaces.

Play is an integral part of a child's life, occurring in various locations and environments. By incorporating playful elements into urban planning and design, we can promote both the health of children and their ability to tackle future challenges. The built environment, when designed to facilitate meaningful play and exploration, can foster pro-social behaviours and enhance skills development.

Considerable play value can be found in green spaces and community art installations, which can be seamlessly integrated into the design and planning of public spaces. This transformation of everyday routes, like the way to school, offers unique learning opportunities and encourages children's engagement in play (Arup & The LEGO Foundation, 2021, p. 9).

Streets for Kids

Streets represent a vast interconnected public space network within a city, serving as a platform for mobility and granting or hindering access to urban resources. Approaching the design or redesign of urban streets with a focus on children highlights the importance of elevating standards for safety, accessibility, and enjoyment. The environment in which children grow up can profoundly impact their long-term health, physical and cognitive development, and social well-being. By prioritizing street design that caters to the needs of children, city leaders create streets that better serve the entire community (Officials & Initiative, 2020, p. 3).

Streets for kids should be:

Safe and Healthy

Streets and mobility options should prioritize safe infrastructure and unbiased access to city services. This involves designing streets that minimize life-threatening risks, promote physical and mental well-being for children and caregivers, and offer elements such as safe cycling and transit facilities, accessible pedestrian infrastructure, appropriate vehicular speeds, clean air, access to nature, adequate lighting, and opportunities for physical activity (Officials & Initiative, 2020, p. 5).

Comfortable and Convenient

Well-designed streets can attract more usage from kids and caregivers by going beyond necessities. This includes providing reliable transit options, comfortable seating areas for rest and connection, clear signage and schedules, suitable shade and shelter, and convenient amenities like restrooms and drinking fountains. These thoughtful details make streets more enjoyable, encourage additional trips, and allow families to plan their routines with ease (Officials & Initiative, 2020, p. 5).

Inspirational and Educational

Great streets for kids and caregivers go beyond basic functionality, providing joy, education, and inspiration. These streets are destinations themselves, fostering learning, play, and imagination through beautiful design, interactive elements, and stimulating environments. By incorporating vibrant imagery, captivating colours, engaging textures, and interactive games, these streets ignite the spark of curiosity and offer endless opportunities for exploration. They create a sense of wonder and discovery (Officials & Initiative, 2020, p. 5).

FIGURE 5. AUTHOR AS A CHILD





FIGURE 6. AUTHOR AS A CHILD

A Safe City

Improvements to both actual safety and perceived safety have far-reaching benefits, including creating a more enjoyable, welcoming, and inviting city. When children feel safe and have the freedom to explore their neighbourhood, parents experience reduced stress and have more flexibility in their daily lives. This reduces the need for constant supervision and travel, allowing children to engage with their surroundings in an unstructured manner. Effective planning, design, and management of urban spaces transform a city into a family's "backyard," offering access to recreational areas, cultural institutions, and a robust social infrastructure.

Addressing adults' fears involving children is crucial for fostering positive interactions and reducing feelings of isolation and mistrust. When communities actively engage with children, it promotes a sense of safety and belonging for them. Additionally, children are empowered to play a more active role in shaping the places where they live. By creating an environment that instils a sense of safety and encourages positive relationships between adults and children, cities can foster stronger communities and provide a nurturing space for children to thrive (Williams et al., 2017, p. 33).

Survey

For this thesis, a survey was conducted involving 42 mothers residing in Iceland and 23 Icelandic mothers living in Sweden. The primary objective of the survey was to establish the public spaces where mothers feel the highest level of comfort when accompanied by their children, as well as identify the spaces that evoke discomfort or feelings of unsafety. Furthermore, the survey aimed to explore the main concerns mothers have regarding the design of their neighbourhoods and determine the types of public spaces where they are most at ease allowing their children to spend unsupervised time. Additionally, the survey sought to gather information on the modes of transportation used most often by mothers when travelling with their children.

The survey findings indicate a notable disparity between mothers in Iceland and Icelandic mothers residing in Sweden in terms of their utilization of public transportation when accompanied by their children. A significant majority (76.2%) of mothers in Iceland reported never using public transport, citing reasons such as unreliability, lengthy travel times, inadequate spacing of bus stops, and infrequency of service. In contrast, only a small proportion (8.7%) of mothers living in Sweden indicated never using public transport. Moreover, mothers in Iceland engaged in an average of 3.7 trips per week on foot or by bicycle with their children, primarily for commuting to and from school or visiting relatives. On the other hand, mothers in Sweden went on an average of 8.9 such trips per week. While it is worth considering the influence of Iceland's weather on walking and cycling patterns, the lack of sufficient infrastructure to support sustainable modes of transportation, such as walking, biking, and public buses, contributes to the prevalence of car usage among individuals with children. In contrast, Sweden's prioritization of snow removal from sidewalks and cycling lanes facilitates a greater inclination towards biking or walking over driving, despite sometimes harsh weather conditions. Unfortunately, the same level of attention and prioritization is not the case in Iceland.

The survey findings also revealed the preferred locations for mothers to spend time with their children outside the home in Iceland and Sweden. In Iceland, the most popular choices were 1. Public swimming pools, 2. Playgrounds, and 3. Public parks, with swimming pools being the overwhelmingly favoured option. On the other hand, mothers in Sweden preferred 1. Public parks, 2. Playgrounds, and 3. Large nature areas.

Despite the popularity of playgrounds as a recreational option, a significant proportion of mothers expressed discomfort in allowing their children to visit playgrounds unaccompanied or with friends in both Iceland (57.1%) and Sweden (56.4%). In Iceland, the primary concern was related to the need for children to cross heavily trafficked streets to access these spaces. In Sweden, the main apprehension revolved around the fear of crime or potential harm befalling their children.

Interestingly, in sharp contrast to the discomfort of children going to playgrounds alone, an overwhelming majority of mothers in Iceland (95.1%) stated that they would feel at ease allowing their children to go to the swimming pool unaccompanied once they have reached an appropriate age.

The responses regarding desired changes in their neighbourhood for the benefit of their children varied among the survey participants, but a significant majority of mothers expressed their concerns regarding playgrounds. They emphasized the need for a diverse range of playgrounds, including ones tailored to different age groups, such as play areas for toddlers or more dynamic spaces for older children. Additionally, many mothers expressed the desire for newer playgrounds, as numerous existing ones in their areas were run down.

Another common request related to sidewalks. Mothers highlighted the importance of wider sidewalks and emphasized the need for prioritized snow removal during winter months. Several mothers with infants specifically mentioned the challenges they faced in leaving their homes on foot during winter due to completely inaccessible sidewalks covered in snow and ice.

In summary, the survey conducted among mothers in Iceland and Icelandic mothers in Sweden provided valuable insights on public spaces, transportation, and desired neighbourhood improvements for their children's well-being.

Mothers in Iceland showed a significantly lower inclination to use public transportation due to concerns about reliability and infrequent service. Walking and cycling are not preferred modes of transportation for mothers in Iceland, while mothers in Sweden are much more likely to walk or cycle.

Preferred locations for spending time with children differed slightly between the two groups. Public swimming pools ranked highest in Iceland, while public parks were favoured in Sweden. Despite the popularity of playgrounds, a significant proportion of mothers in both countries expressed discomfort in allowing their children to visit playgrounds alone.

Mothers voiced a strong desire for improved playgrounds that cater to different age groups and the maintenance of existing facilities. They also emphasized the need for wider sidewalks and prioritized snow removal during winter months to enhance walkability.

These findings emphasize the importance of addressing transportation infrastructure, public space design, and maintenance considerations to create safe, accessible, and enjoyable environments for children and their caregivers. By addressing these concerns, policymakers and urban planners can enhance the well-being of families, promote active transportation modes, and create vibrant community spaces that foster positive interactions and engagement among residents.

FIGURE 7. PLAYGROUND IN LUND, SWEDEN





FIGURE 8. PLAYGROUND IN DEBRECEN, HUNGARY

FIGURE 9. PLAYGROUND IN DEBRECEN, HUNGARY





FIGURE 10. PLAYGROUND IN BADEN, SWITZERLAND

FIGURE 11. PLAYGROUND IN BADEN, SWITZERLAND

THE CHILD-FRIENDLY CITY



Reykjavík, the capital city of Iceland, embodies a unique cultural and architectural identity that is deeply rooted in its natural surroundings and historical context. The city's urban design and public spaces play a crucial role in shaping this identity, reflecting the values of sustainability, community, and innovation.

Reykjavík's urban design is characterized by its integration with the surrounding environment. The city centre's compact layout encourages pedestrian-friendly streets and a strong sense of community (Reykjavík Municipality, n.d.-f). The emphasis on walkability and the relatively recent focus on making the city bike-friendly aligns with the city's commitment to sustainable transportation options (Reykjavík Municipality, n.d.-h). Reykjavík's current urban planning policies also prioritize mixed land use, allowing for a diverse range of activities within walking proximity (Reykjavík Municipality, n.d.-a).

Public spaces are an integral part of Reykjavík's urban fabric, serving as gathering places for residents and visitors alike. Tjörnin, a picturesque pond located in the city centre, illustrates the city's commitment to preserving and enhancing natural features within the urban environment. The lake is surrounded by parks and walking paths, providing a peaceful and calm space away from the hustle of the city (Chapman, 2022). Public art installations, such as the Sun Voyager sculpture located by the northern shore, contribute to the cultural identity of Reykjavík and add an artistic touch to the public realm.

One of Reykjavík's most iconic public spaces is Austurvöllur, a central square in the heart of the city. Austurvöllur is a hub of political and social activities, hosting events, gatherings, and protests. It serves as a symbol of democracy and civic engagement, allowing citizens to exercise their right to free expression. The square is surrounded by historic buildings, including the Parliament House, which further emphasizes the connection between Reykjavík's architectural heritage and its public spaces (Iceland Travel, n.d.).

Reykjavík's architectural identity is a blend of contemporary and traditional styles. Traditional Icelandic architecture, with its turf houses and timber construction, still influences the design of some buildings, particularly in the older parts of the city. The use of local materials, such as Icelandic stone and timber, helps create a sense of place and sustainability in architectural design. Additionally, Reykjavík is known for its unique use of colourful corrugated steel, which is not commonly used for residential housing in other places in the world. This distinctive feature adds a playful and vibrant element to the cityscape, as buildings adorned with hues of red, blue, green, and yellow create a striking contrast against the natural surroundings. The colourful corrugated steel facades not only serve as an aesthetic expression but also offer practical benefits such as durability and protection against the harsh Icelandic weather (Nordsteien et al., 2007, p. 4). This fusion of traditional elements, modern designs, and the use of colourful corrugated iron showcases Reykjavík's architectural diversity and its ability to blend heritage with contemporary aesthetics. The city also embraces modern and innovative architecture, as seen in Harpa, the award-winning concert hall and conference centre. Harpa's glass façade reflects the surrounding natural elements, capturing the changing light and offering stunning views of the city and the ocean (Bergmann, 2023).

The residents of Reykjavík are an integral part of the city's cultural and architectural fabric. The people of Reykjavík are known for their strong sense of community, creativity, and resilience. The city's relatively small population fosters a tight-knit community where individuals often have a sense of familiarity and interconnectedness. Reykjavík has a reputation for being open-minded, progressive, and inclusive, reflecting the values of equality and social justice. The city's vibrant arts and music scene, as well as its thriving creative industries, further contribute to the dynamic identity of its residents (Arts and Culture in Iceland, n.d.). Additionally, the connection to Iceland's stunning natural landscape and the spirit of adventure and exploration inherent in Icelandic culture infuse the people of Reykjavík with a deep appreciation for nature and a love for outdoor activities.

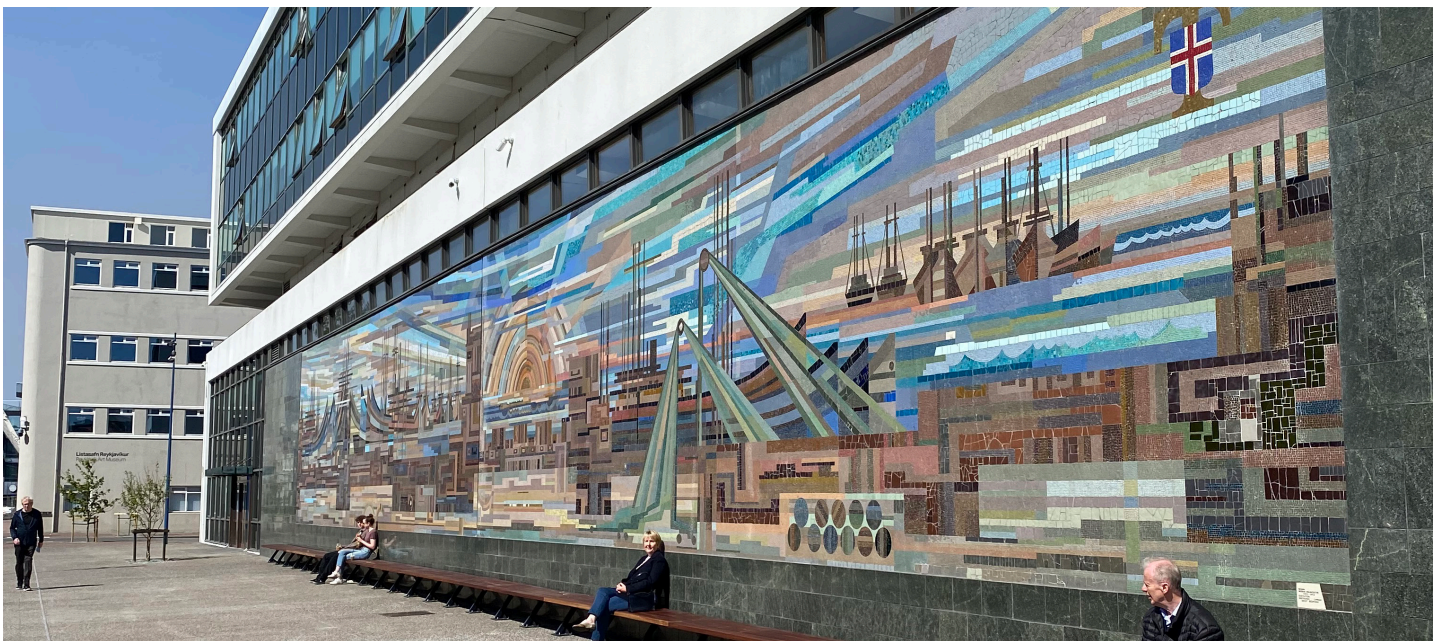


Figure 12. The Sun Voyager

Figure 13. Mosaic art on a building in downtown Reykjavik

Figure 14. Austurvöllur on a summer day

FIGURE 15. THE POND WITH TJARNARGATA IN THE BACKGROUND, ONE OF THE CITIES OLDEST STREETS



FIGURE 16. A HORSE FARM WITHIN THE CITY LIMITS







FIGURE 17. A BUILDING WITH GREEN CORRUGATED STEEL SIDING IN THE CITY CENTRE

FIGURE 18. A BUILDING WITH BLUE CORRUGATED STEEL SIDING IN THE CITY CENTRE, HALLGRÍMSKIRKJA IN THE BACKGROUND

BACKGROUND



Reykjavík City Municipal Plan 2040

The Reykjavík City Municipal Plan 2040 was officially approved on October 19th, 2021, and is a continuation of the 2030 plan that was initially implemented in 2014 (Reykjavík Municipality, 2022).

The main objective of this plan is to advance sustainable development, create dense and mixed-use urban areas, and promote sustainable modes of transportation, all while preserving the untouched nature on the periphery of the city. By expanding the existing urban fabric, the city aims to reinforce established neighbourhoods, reduce distances to everyday functions, and lay the groundwork for the upcoming construction of a Bus Rapid Transit (BRT) system, planned to start construction within the next few years. This densification of current neighbourhoods will also maximize the use of the city's investments, such as in the school system. It is worth noting that the Municipal Plan gives minimal attention to child-related matters, with this being the only explicit mention of children (Reykjavík Municipality, 2023).

"A Better City for Children"

The Reykjavík Municipal initiative „A Better City for Children“ started in 2022 and has five main goals:

1. Better support for school and recreational staff.
2. Apply methods of early intervention.
3. Better services for children, youth, and their families in the City's school and recreational activities.
4. Tighter cooperation between the Department of Education & Youth and the Department of Welfare.
5. Move the services increasingly into the school environment of children and youth (Reykjavík Municipality, n.d.-b)

„The Better City for Children initiative aims to improve services for children, youth, and their families in school and recreational activities.“
(Reykjavík Municipality, n.d.-b)

The services are a variety of courses and counseling sessions with professionals such as behavioral counselors, speech therapists, and social workers.

Pre-schools and primary schools

In Reykjavík, there are 68 city-run and 17 private preschools accommodating over 6000 children, with specialized nursery divisions in 28 city-run preschools for infants up to age two. Parents have the freedom to choose any preschool, provided their child's legal and permanent residence is in Iceland (Reykjavík Municipality, n.d.-c).

FIGURE 19. PRESCHOOLS AND PRIMARY SCHOOLS IN REYKJAVÍK

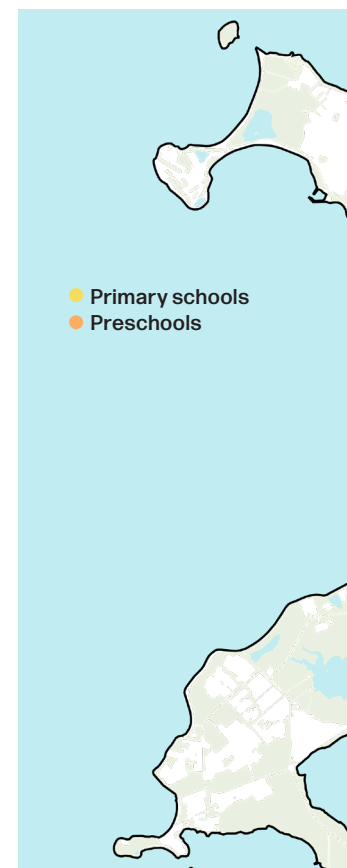
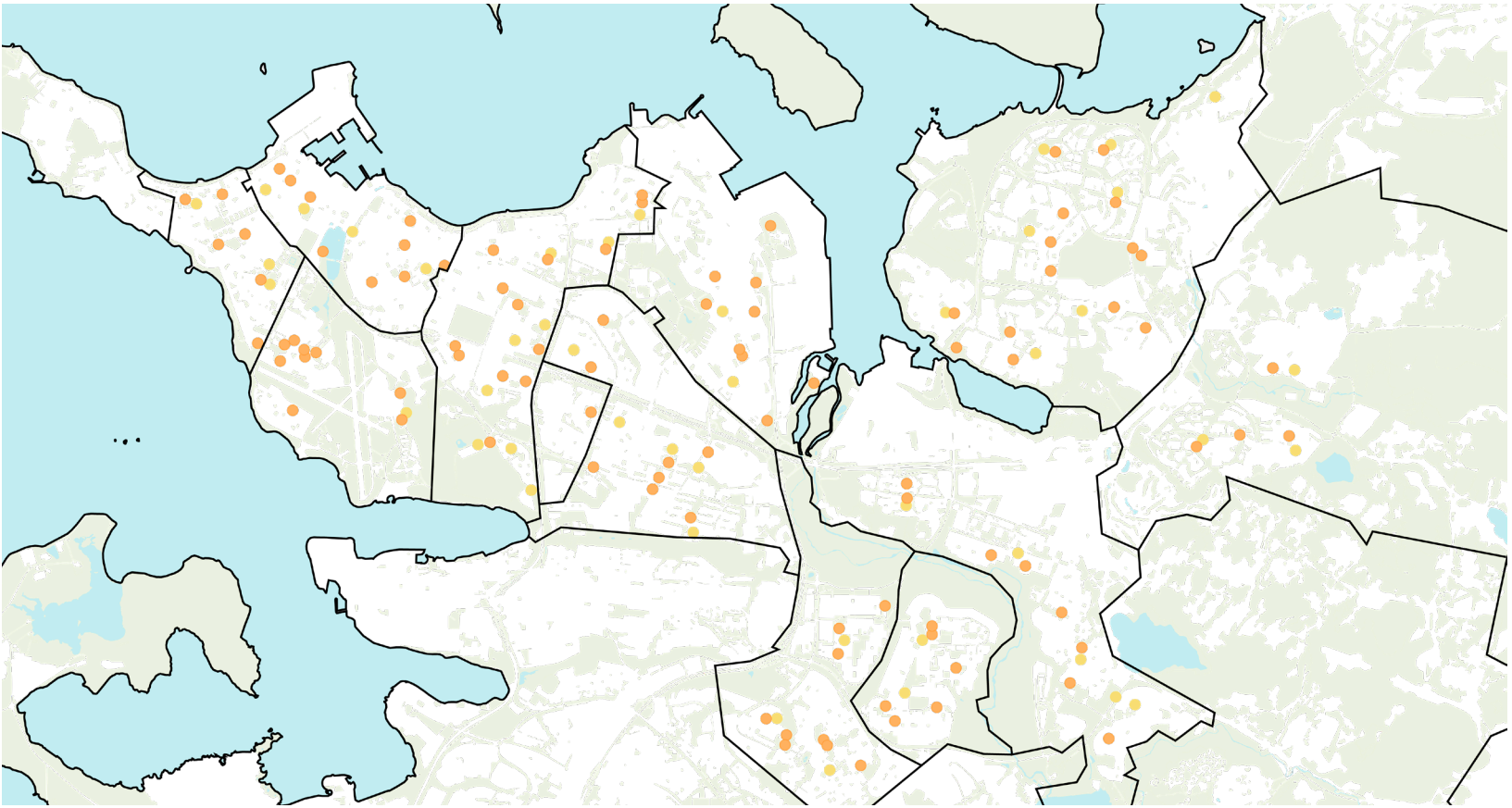


FIGURE 20. PRESCHOOLS CLOSING FULLY OR PARTIALLY





City-run preschool fees are divided into two categories. Category 1 covers married parents, cohabiting partners, and households with one parent in school, with prices ranging from 11.580 kr. to 35.275 kr. per month. Category 2 includes single parents, households where both parents are in school or have a disability, and households with a parent employed in Reykjavík City preschools, with prices ranging from 6.360 kr. to 22.416 kr. per month (Reykjavík Municipality, n.d.-k). Private preschool fees vary but tend to be more expensive, such as Ársól preschool with prices ranging from 24.897 kr. to 66.989 kr. in category 1 and from 13.674 kr. to 44.543 kr. in category 2 (Ungbarnaleikskólinn Ársól, n.d.).

Issues surrounding the preschool system in Reykjavík have sparked discussions, particularly regarding limited availability, resulting in long waiting lists and the fact that parents who default on payments to the Department of Education and Youth risk their child losing their preschool spot (Reykjavík Municipality, n.d.-i). In 2020, eight children had their offers rescinded, and seven children had their current spots revoked due to parental defaults, contradicting the municipality's policy of not denying access to basic services based on financial status or debt (Rögnvaldsson, 2020).

Parents can apply for a preschool immediately after their child's birth, but they are not placed on a waiting list till at 12 months. The goal stated by the municipality is to provide all children with a spot by 18 months (Reykjavík Municipality, n.d.-i), yet the average admission age over the past four years has been 20.1 months (Guðmundsson, 2023). This poses challenges for parents during the eight-month gap between the end of maternity leave (12 months) and preschool admission. Single mothers, comprising 87% of single-parent households in Iceland, are particularly affected (Statistics Iceland, n.d.-a).

To address the lengthy waiting time, the city council implemented the action plan "Bridging the Gap" in 2018. The plan aims to construct ten new preschools, add 12 nursery divisions, and expand multiple existing preschools by 2026 (Reykjavík Municipality, n.d.-d). This plan should have ensured that every child in Reykjavík was placed in a preschool by the age of 12 months by autumn 2022 (Þórhallsdóttir, 2022). However, 24 out of 68 municipal preschools have closed or are planned to close due to poor housing conditions, causing longer waiting times at receiving preschools. Some preschools now only admit children aged 2.5 years or older (Guðjónsson, 2023/2023).

While private preschools offer an alternative for those who can afford them, enrolling a child in a private preschool forfeits their place on the waiting list for city-run preschools (Reykjavík Municipality, n.d.-l). In that case, private preschools are not a solution for bridging the gap as suggested by solutions put forward by the City Council except in cases where parents can afford to pay double or triple the price of a city-run preschool.

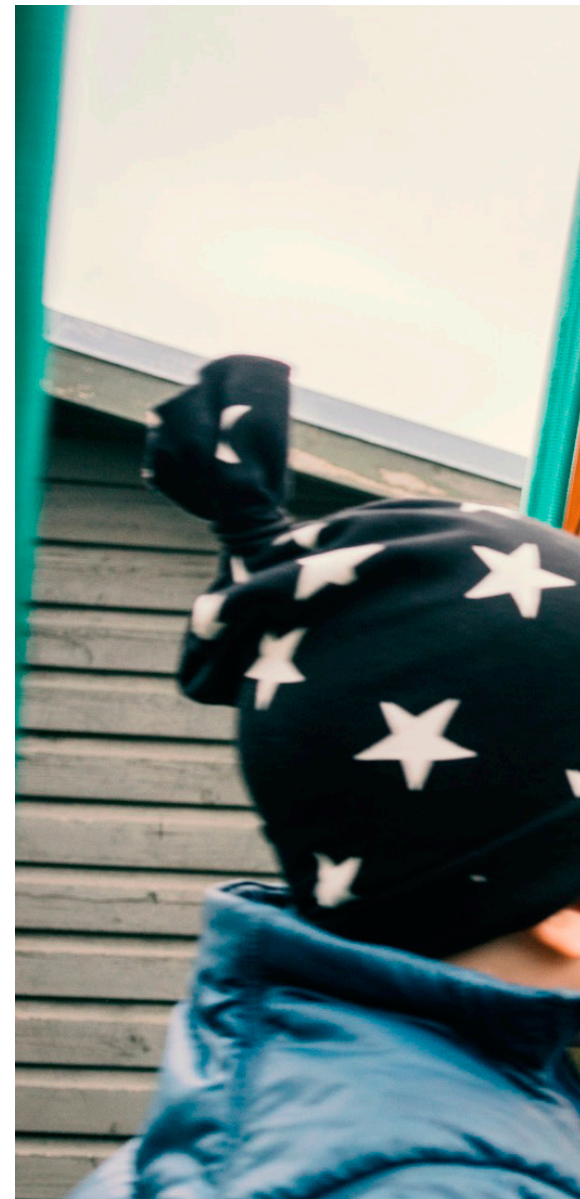


Figure 21. Author working at a Preschool in Reykjavik (Sou



vik (Source: Efling, 2018)

Swimming pools and sports

The swimming culture in Iceland can be hard to understand for those unfamiliar with it. The local swimming pool transcends its purpose of mere swimming; it serves as a hub for community-building, socializing with both familiar faces and strangers, quality time with loved ones, and unwinding. When you strip down to your bathing suit and sit in a hot tub, a sense of equality permeates the atmosphere.

Swimming pools hold deep roots in Icelandic culture, dating back to the construction of the first geothermal pools in the 13th century. One notable example, Snorralaug, named after the renowned poet and historian Snorri Sturluson, still stands as a testament to this tradition (Swimming Pool Culture in Iceland, n.d.). The significance of swimming is intertwined with Iceland's rich fishing heritage, as the shores claimed the lives of many fishermen, emphasizing the urgency of swimming proficiency. Official swimming lessons were introduced in Eyjafjörður in 1821 (Landsbókasafn Íslands - Háskólabókasafn, 1957). Today, swimming is considered an essential skill, with children starting lessons at an early age and swimming instruction being a mandatory part of primary school education from first grade onwards.

Reykjavík boasts a total of eight public swimming pools, with nearly one pool for each of the city's ten districts (Reykjavík Municipality, n.d.-m). These pools are designed to be inclusive and accessible to all, regardless of financial circumstances. Children up to the age of 16, seniors over 67, individuals with disabilities, those receiving financial aid, and employees of the City of Reykjavík all enjoy free access to the pools. For others, the swimming pools offer affordable rates, and a multi-access card can be purchased at up to 60% off the single-access price (Reykjavík Municipality, n.d.-e).

Children aged 10 and above are permitted to visit the swimming pool unaccompanied, while those below this age must be accompanied by someone aged 15 or older (Reykjavík Municipality, n.d.-o). Going to the pool independently is a popular activity for children, allowing them to experience a sense of independence and enjoy time with friends. It's worth noting that adults and lifeguards are always present at the pool, ensuring the safety and well-being of all visitors.

Like swimming lessons, school sports are a part of the obligatory curriculum through primary school and high school. School sports revolve however more around free play and running around rather than organized sports. The majority of primary schools in Reykjavík have their own sports hall or access to one within walking distance. Organized sports are taught at many of these sports halls. Around 40% of school kids aged 6-10 practice organized sports, with the percentage declining with age. Boys are also more likely than girls to partake in organized sports (Reykjavík Municipality, n.d.-j).

In order to encourage kids and teenagers to exercise and play sports despite financial status, the City of Reykjavík offers The Recreation Card.

„The aim is for all children and young people in Reykjavik ages 6-18 to be able to participate in recreational activities regardless of their economic and social circumstances. The Recreation Card is intended to increase equality in society and diversity in the practice of sports, arts, and leisure activities.“ (Reykjavík Municipality, n.d.-n)

An average of 60-70% of kids between the ages of 6-18 take advantage of the Recreation Card, depending on neighbourhoods.

FIGURE 22. PUBLIC SWIMMING POOLS

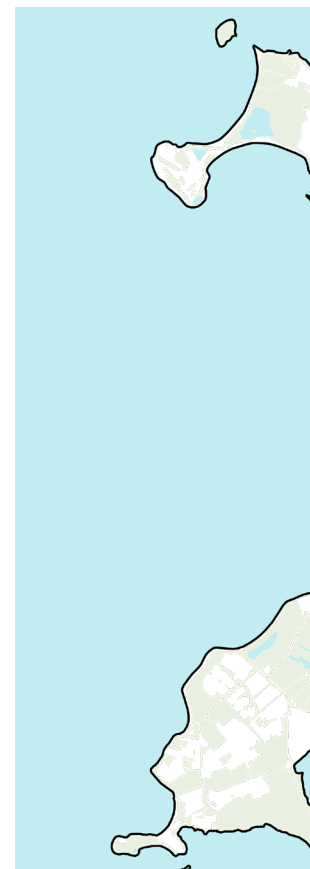
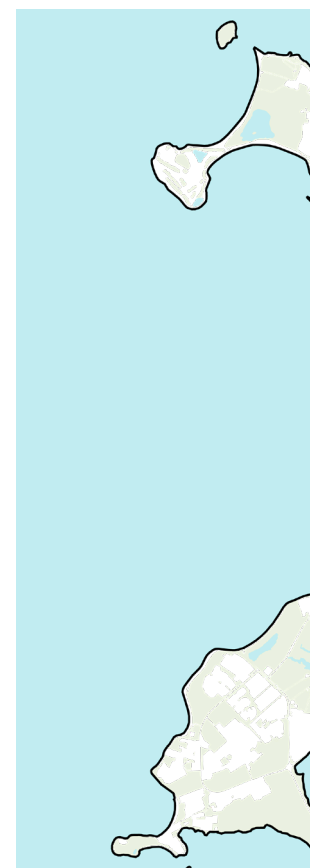
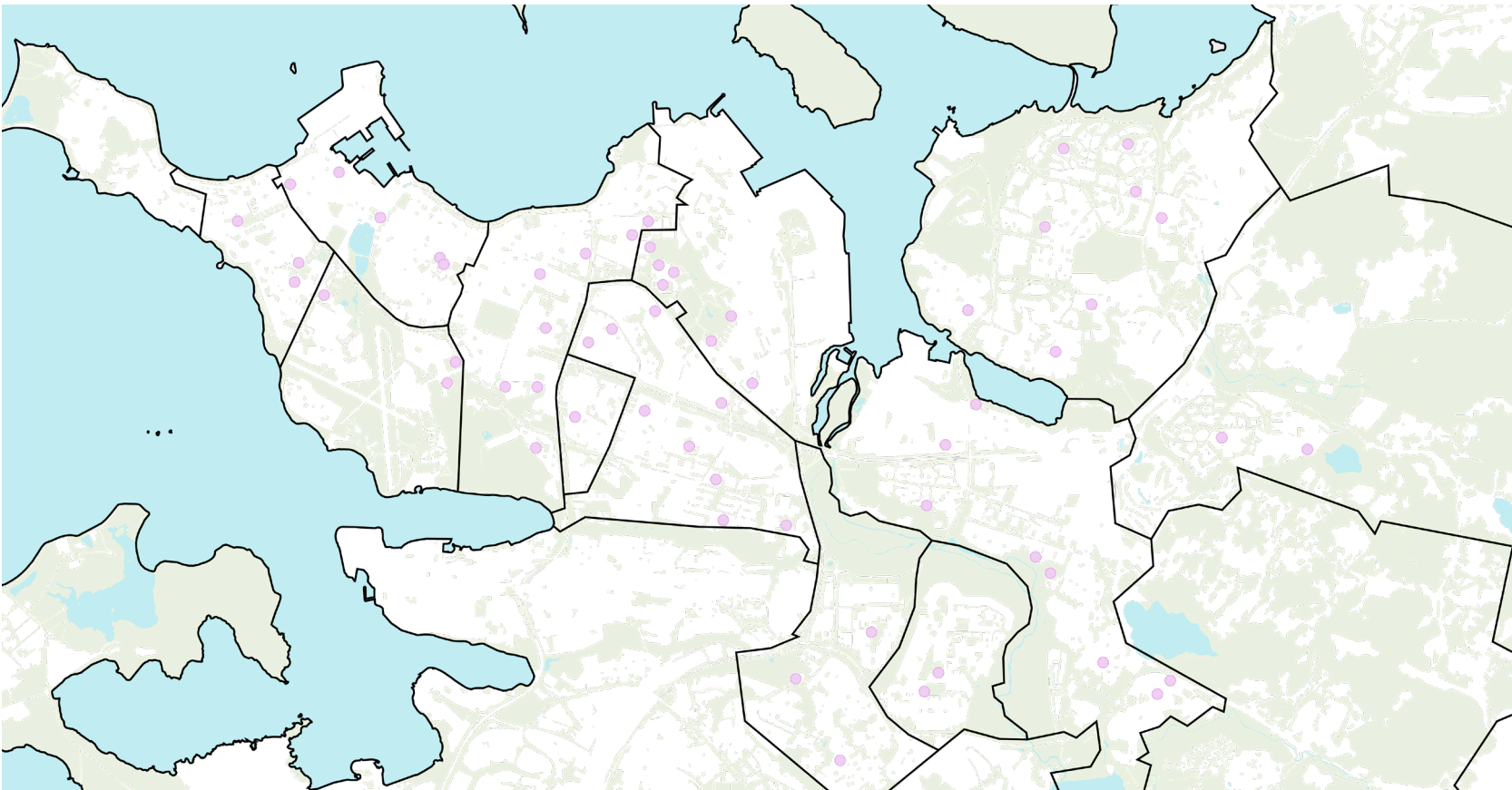
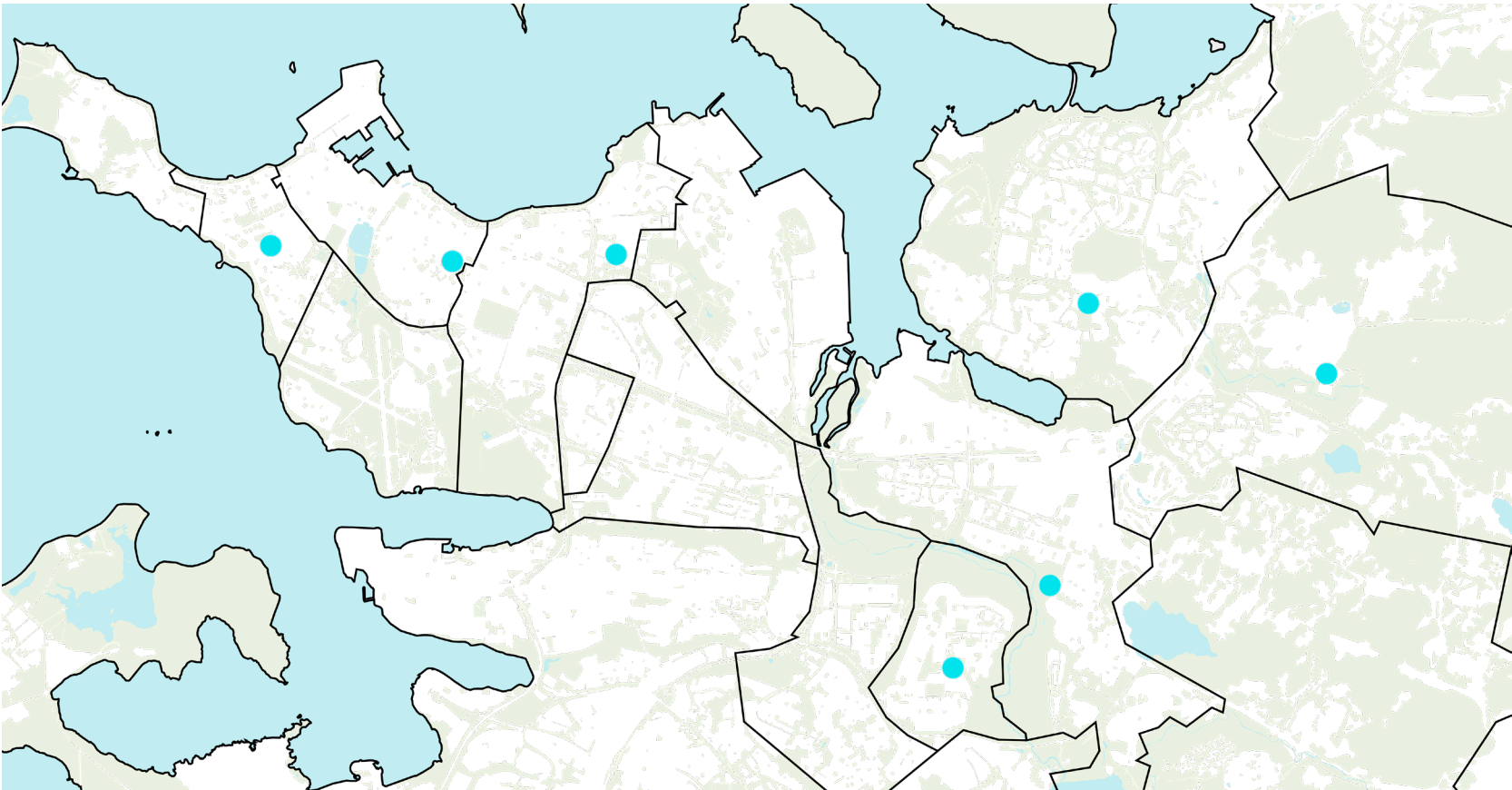


FIGURE 23. PLACES FOR ORGANIZED SPORTS





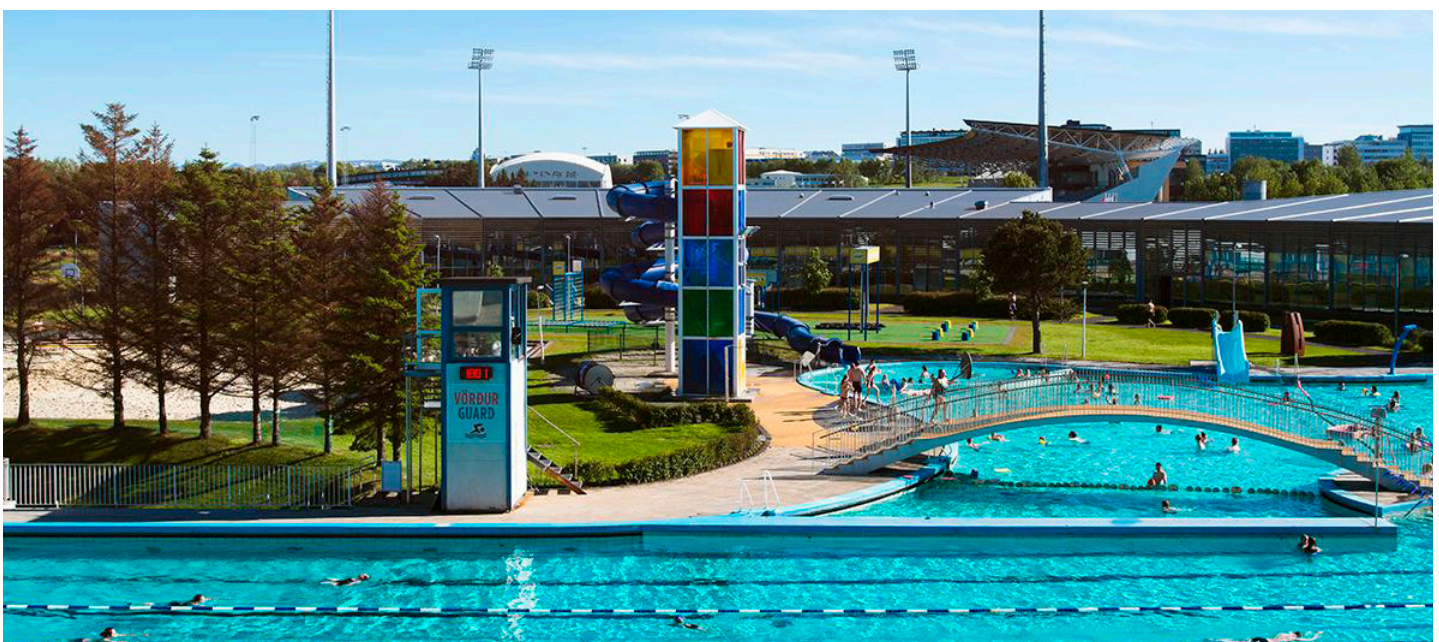


Figure 24. Árbæjarlaug (Source: Reykjavík Municipality, n.d.).

Figure 25. Sundhöllin (Source: Reykjavík Municipality, n.d.).

Figure 26. Laugardalslaug (Source: Reykjavík Municipality, n.d.).

Public /play/ spaces

Reykjavík offers numerous playgrounds and open spaces for play, although, upon closer inspection, many of them may consist of just one or two play equipment pieces. The city's largest playgrounds are typically found at primary schools and public parks near the city centre. Interestingly, there is limited public information available on the playgrounds in Reykjavík, and it remains unclear which department within the city is responsible for overseeing these play areas.

In 2010, the City of Reykjavík established a new playground policy with the involvement of a steering committee consisting of experts from various departments including the Office of Operations and Maintenance, Department of Environment and Planning, and the Department of School and Recreation. The primary objective of this committee was to create diverse and engaging outdoor play environments in Reykjavík, encouraging residents to spend more time outdoors. The policy encompassed four distinct categories of play: classic playgrounds, theme playgrounds, small green spaces, and neighbourhood parks. The aim was to design playgrounds that catered to different age groups, incorporated biological diversity, and provided accessibility for all residents. However, the current information available on the city's homepage does not provide further details regarding the policy or any subsequent changes implemented since the formation of the steering committee in 2010 (Reykjavík Municipality, 2012).

While working as a project manager for the Urban Design Department of the City of Reykjavík, the author was involved in implementing new areas for play around the city, for example, an active area by the harbour at Miðbakki, a swingset by Hallgrímskirkja and a playground for toddlers at Káratorg.

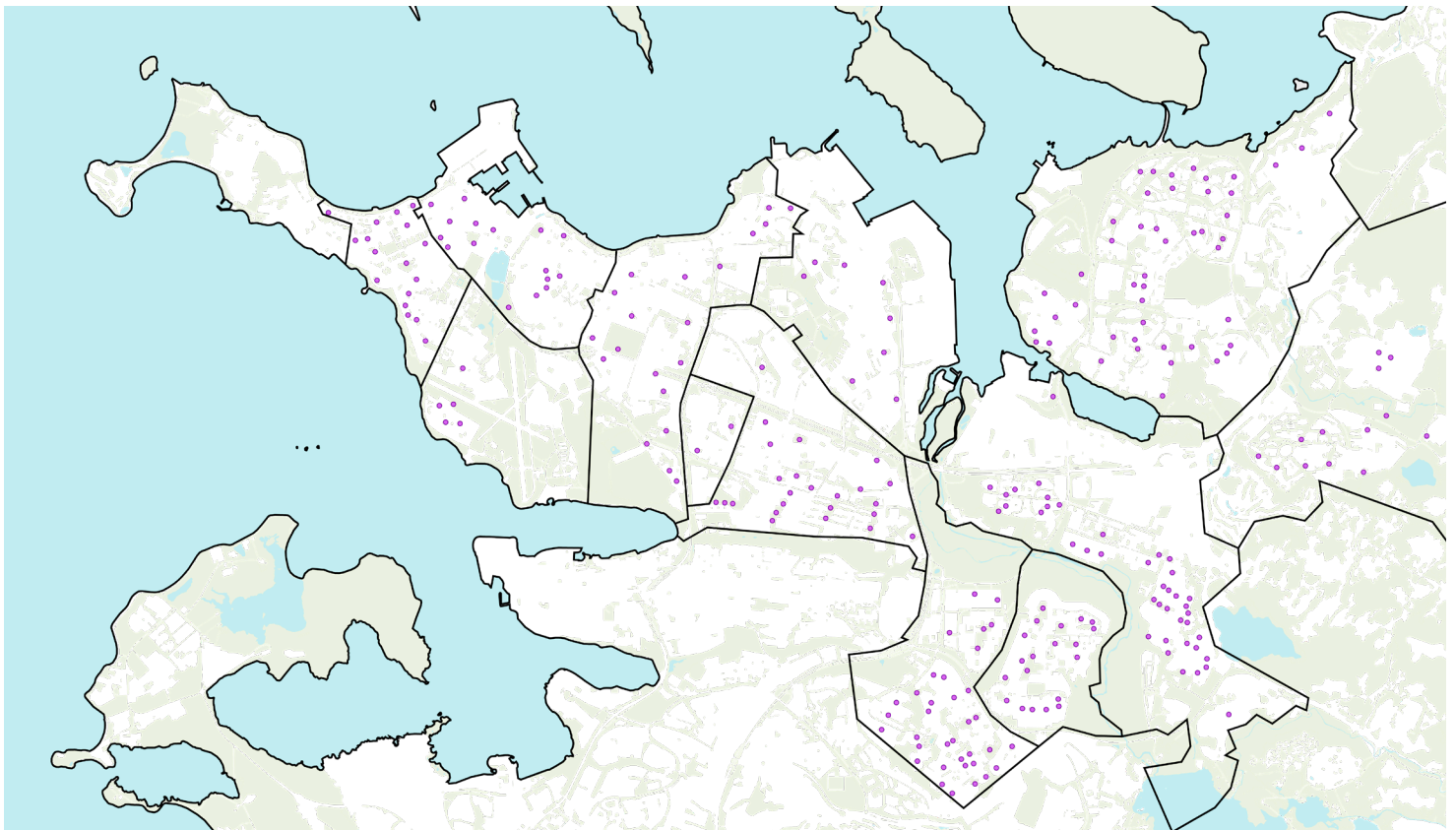


FIGURE 27. OPEN SPACES FOR PLAY

FIGURE 28. ACTIVE PLAYGROUND BY THE REYKJAVÍK HARBOUR

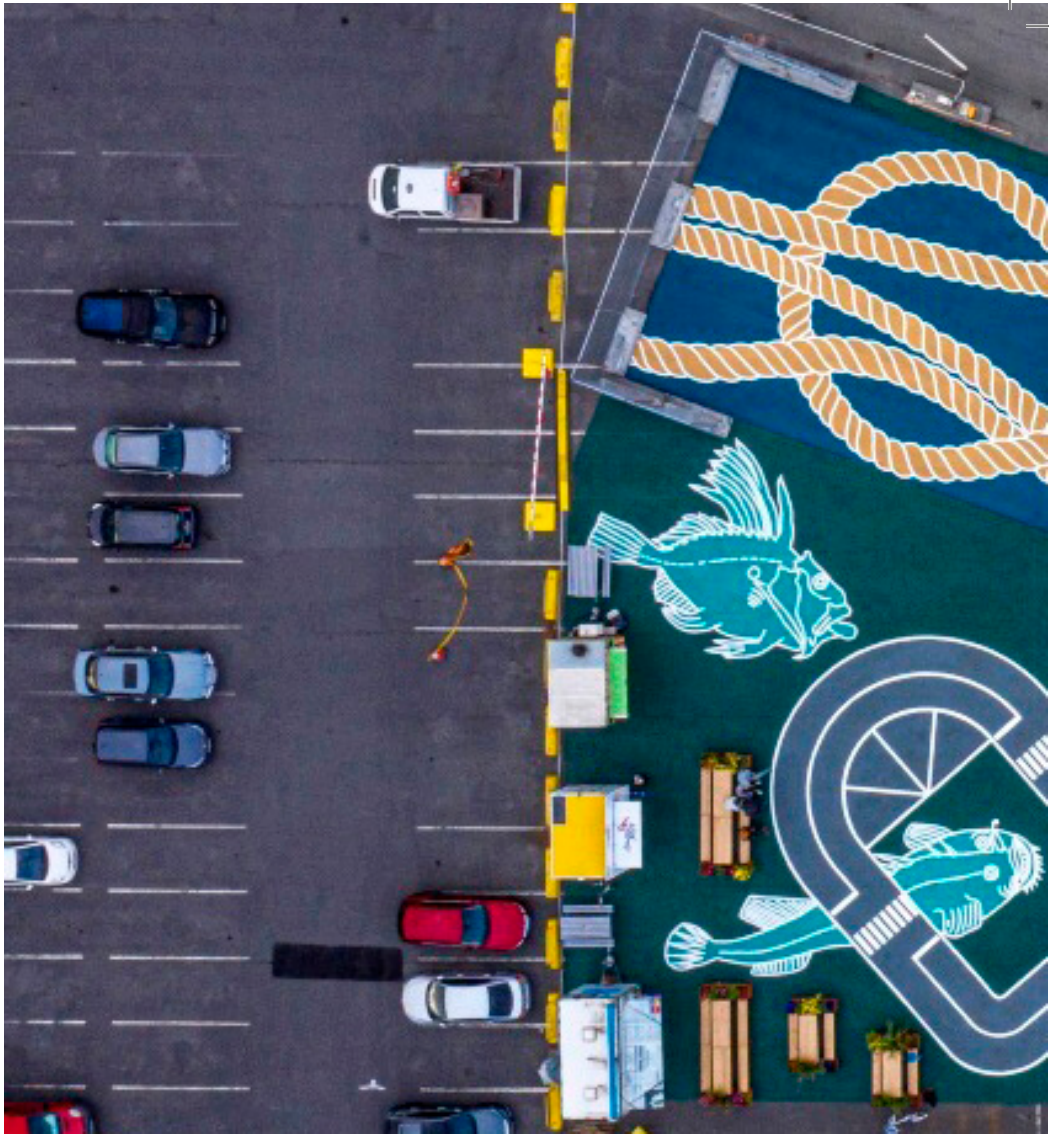


FIGURE 29. ACTIVE PLAYGROUND BY THE REYKJAVÍK HARBOUR



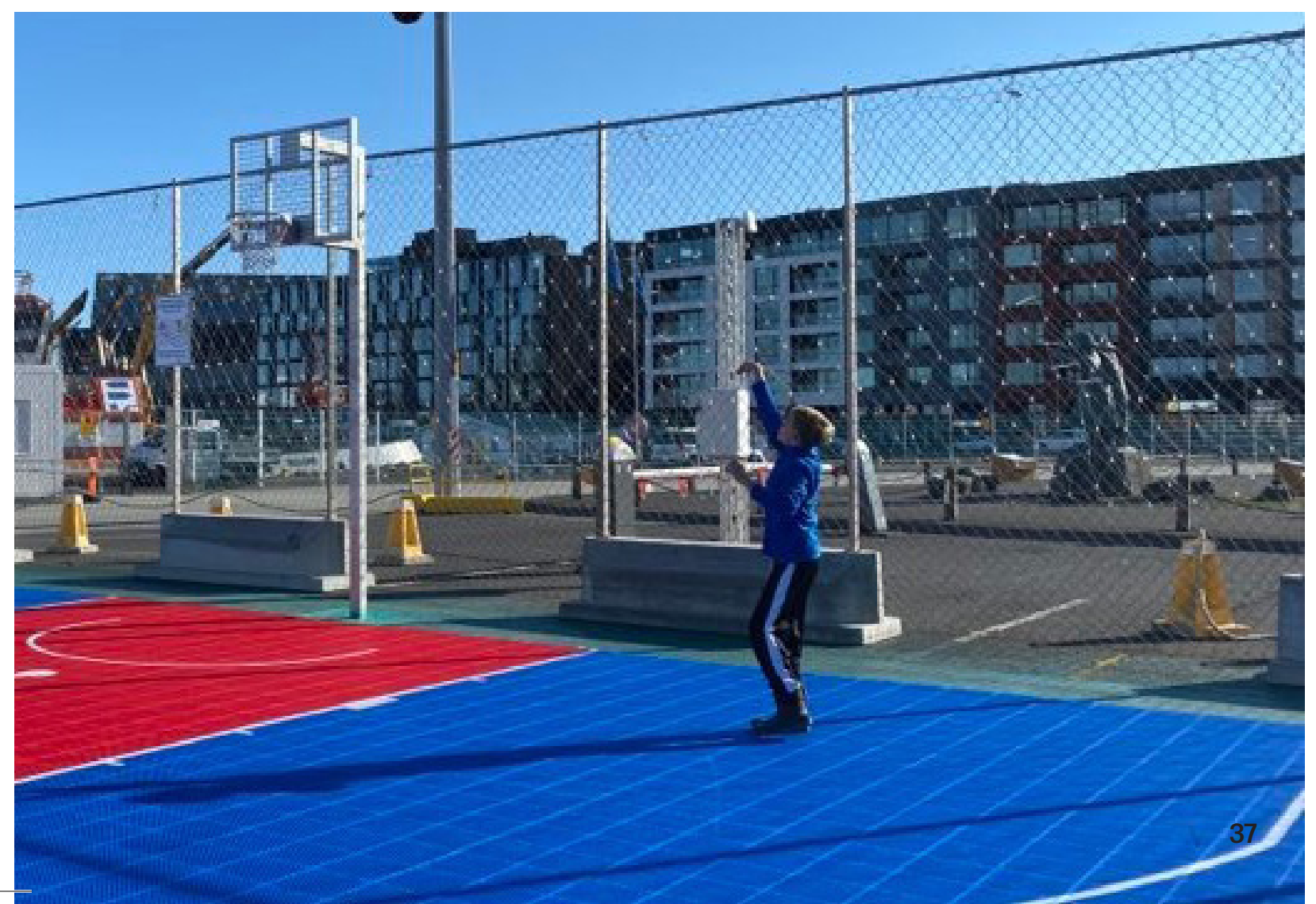
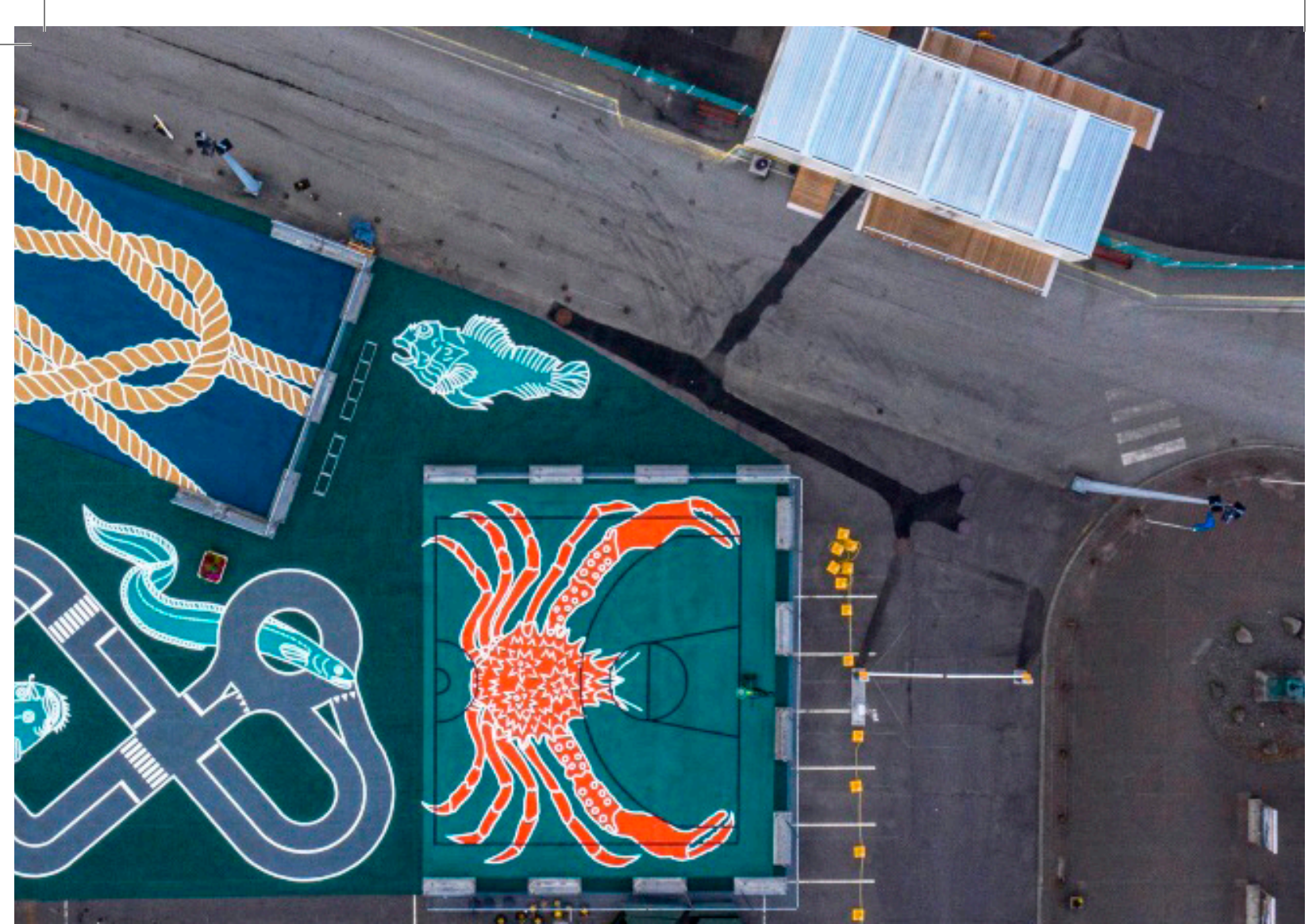




FIGURE 30. SWINGSET BY HALLGRÍMSKIRKJA



FIGURE 31. PLAYGROUND FOR YOUNG CHILDREN - BERNHÖFTSTORFA

FIGURE 32. SKATEPARK BY THE HARBOUR AREA



FIGURE 33. PLAYGROUND FOR TODDLERS - KÁRATORG



Choice of site

After conducting a comprehensive analysis of Reykjavík and examining each postcode individually, it can be concluded that the different parts of the city exhibit considerable similarity when it comes to functions that relate to children. As is typical with urban areas, the availability of these functions diminishes as one moves farther away from the city centre. However, it became apparent that the eastern part of the city stood out as having the greatest need for child-oriented implementations.

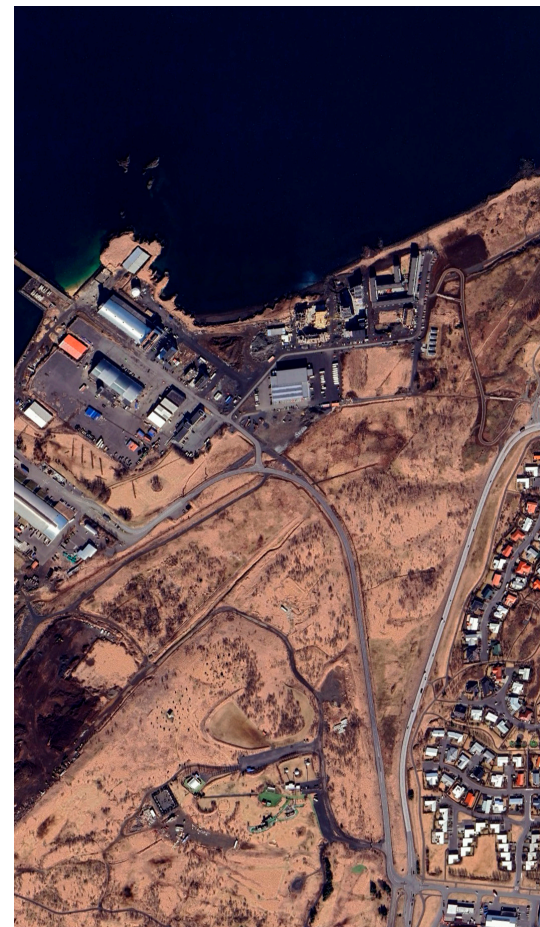
To determine the best location, additional factors were taken into consideration. Specifically, the number of children between the ages of 0 and 12 and the proportion of trips made by car in each postcode were examined. This analysis led to a clear choice: Grafarvogur, a district situated in the northeastern part of the city. Grafarvogur has the highest percentage of car trips, as well as the second highest number of children aged 0-12. Furthermore, there has been a decline in the number of children in recent years, decreasing from approximately 2,900 in 2018 to 2,463 in 2023 (Statistics Iceland, n.d.-b).

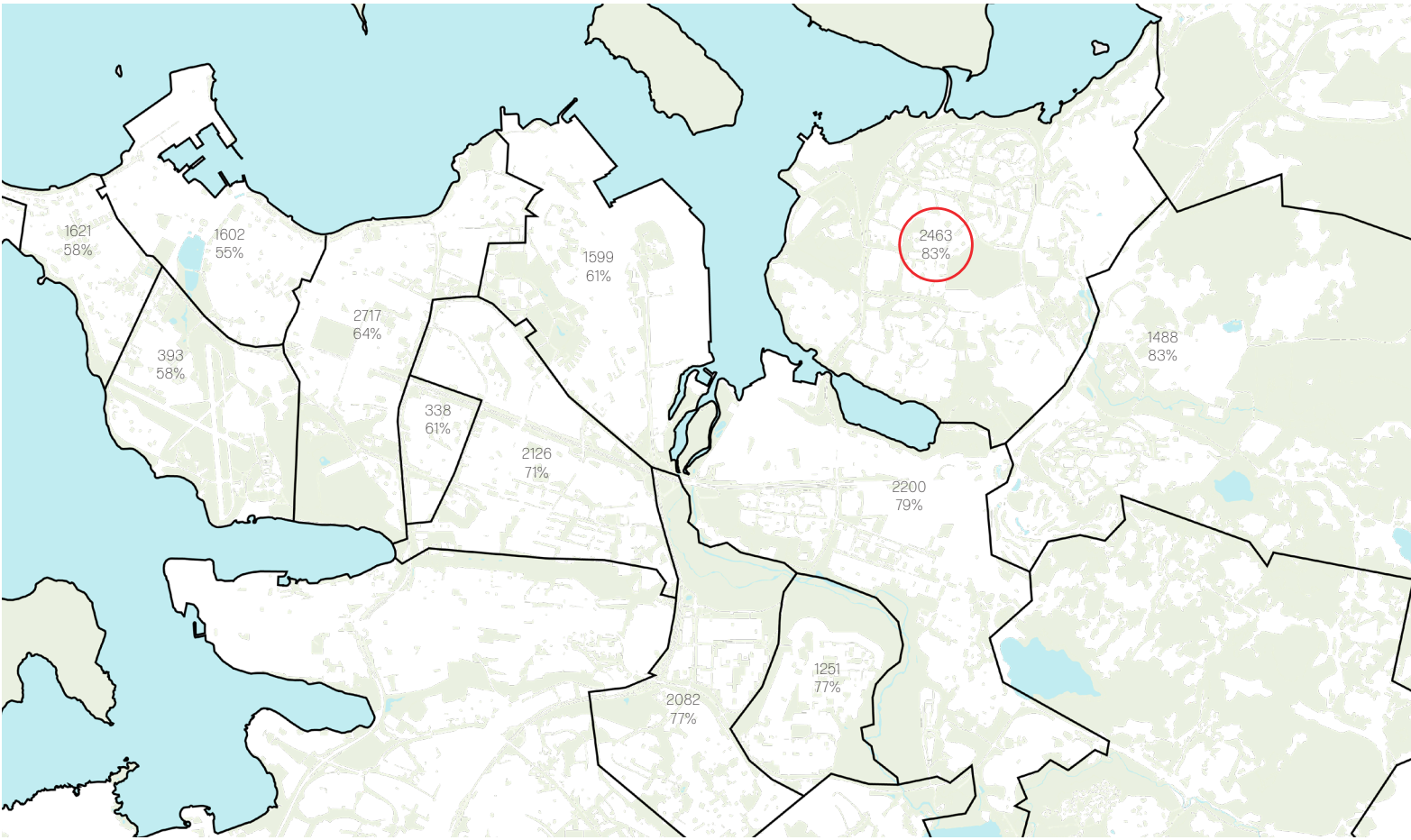
The majority of Grafarvogur is comprised of single-family homes, with the northern portion characterized by a greater number of rowhouses and low-rise apartment buildings. Therefore, nearly half of all children in Grafarvogur live in the northern section. This raises the question of how to transform this specific area of Grafarvogur into a child-friendly neighbourhood, a place families do not want to move away from but rather, are attracted to.

FIGURE 34. NUMBER OF KIDS AGED 0-12 NAD % OF TRIPS MADE BY CAR



FIGURE 35. NORTH GRAFARVOGUR (SOURCE: GOOGLE EARTH, N.D.).





North Grafarvogur - Current situation

North-Grafarvogur is an established district in Reykjavík containing three sub-neighbourhoods, Borgir, Víkur, and Engi. The area is characterized by its low-rise apartment buildings, hard surfaces, slightly hilly topography, and the presence of families with children. As depicted in the accompanying maps, a large portion of land within the neighbourhood is allocated for parking purposes. Unfortunately, the area lacks public spaces, with the only available options being categorized by the city as “open spaces for play.” However, these spaces are unremarkable and uninviting, ranging from simple grass fields with no specific functions to small playgrounds featuring only a limited number of play elements. Despite it being a weekend and one of the first sunny days of the year, there were no children playing in these areas at the time the following photos were taken, highlighting their lack of appeal.

North-Grafarvogur is well-equipped with essential amenities, including a library, health centre, music school, grocery stores, and a few small restaurants, as well as an elderly home. Additionally, the area is served by three primary schools, two of which cover grades 1 to 7, while the third accommodates grades 8 to 10. However, the third school recently underwent a change in its grade structure due to the departure of many children from the district (Daðason, 2019).

Currently, the majority of streets in the area have a speed limit of 30 km/h, excluding the main ring road surrounding the neighbourhood and a few access roads. However, the city has plans to implement a uniform speed limit of 30 km/h throughout the area, not including the ring road (Reykjavík Municipality, 2021). Although a cycling network exists, it is extremely disconnected, with cycling lanes sporadically located and often lacking connections between segments.

Municipal plan

The Reykjavík City Municipal Plan 2040 proposes several changes within the Grafarvogur district. The plan includes the designation of two areas for future building development. The selection of these two areas for growth aligns with the strategic placement of the new Bus Rapid Transit (BRT) system.

The first one is the central area (91) on the accompanying map (figure 36), where various functions are currently concentrated. In this zone, the plan outlines the construction of 5,000 square meters of commercial buildings alongside the development of 150 new apartments. Adjacent to the central area, eastwards (93), lies a grass field near the high school, where future development is also planned. The exact nature of this development is currently unspecified but is categorized as “social services” (Reykjavík Municipality, n.d.-g, pp. 291-293).

Grafarvogur district is projected to experience significant growth before 2040, subject to the Municipal Plan’s timely implementation. The numbered areas on the accompanying map indicate designated development sites. As per the plan, approximately 1,200-1,500 new apartments are slated for construction, with an additional undetermined number of apartments to be built in a new neighbourhood in the southeast of the district known as Keldur (Reykjavík Municipality, 2023, p. 3). These proposed developments, if realized, will significantly shape the future of the Grafarvogur district in line with the objectives outlined in the Reykjavík City Municipal Plan 2040.

FIGURE 36. FUTURE BUILDING DEVELOPMENT AREAS - GRAFARVOGUR
(SOURCE: REYKJAVÍK MUNICIPAL PLAN 2040., 2022).

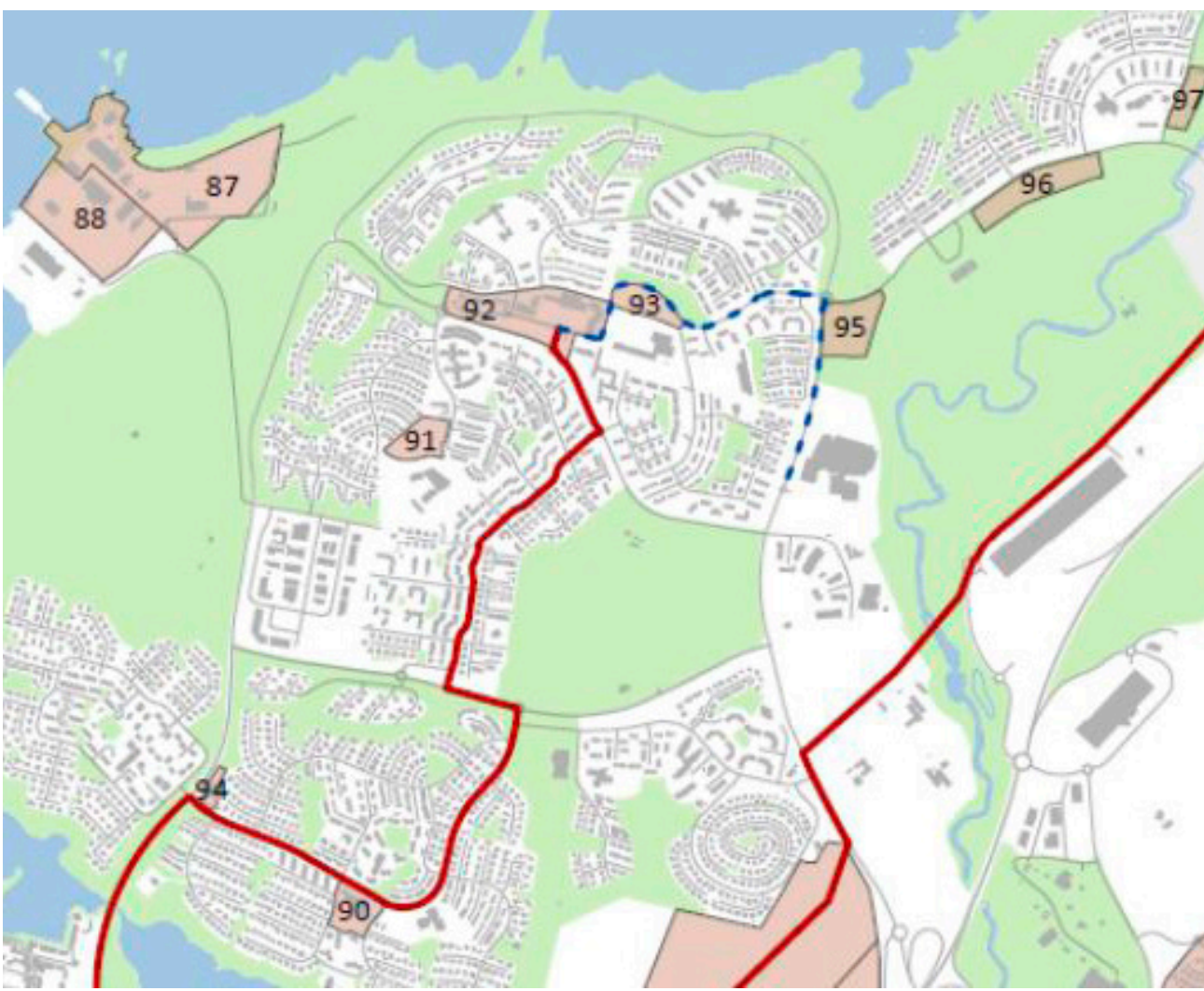


FIGURE 37. RESIDENTIAL BUILDINGS



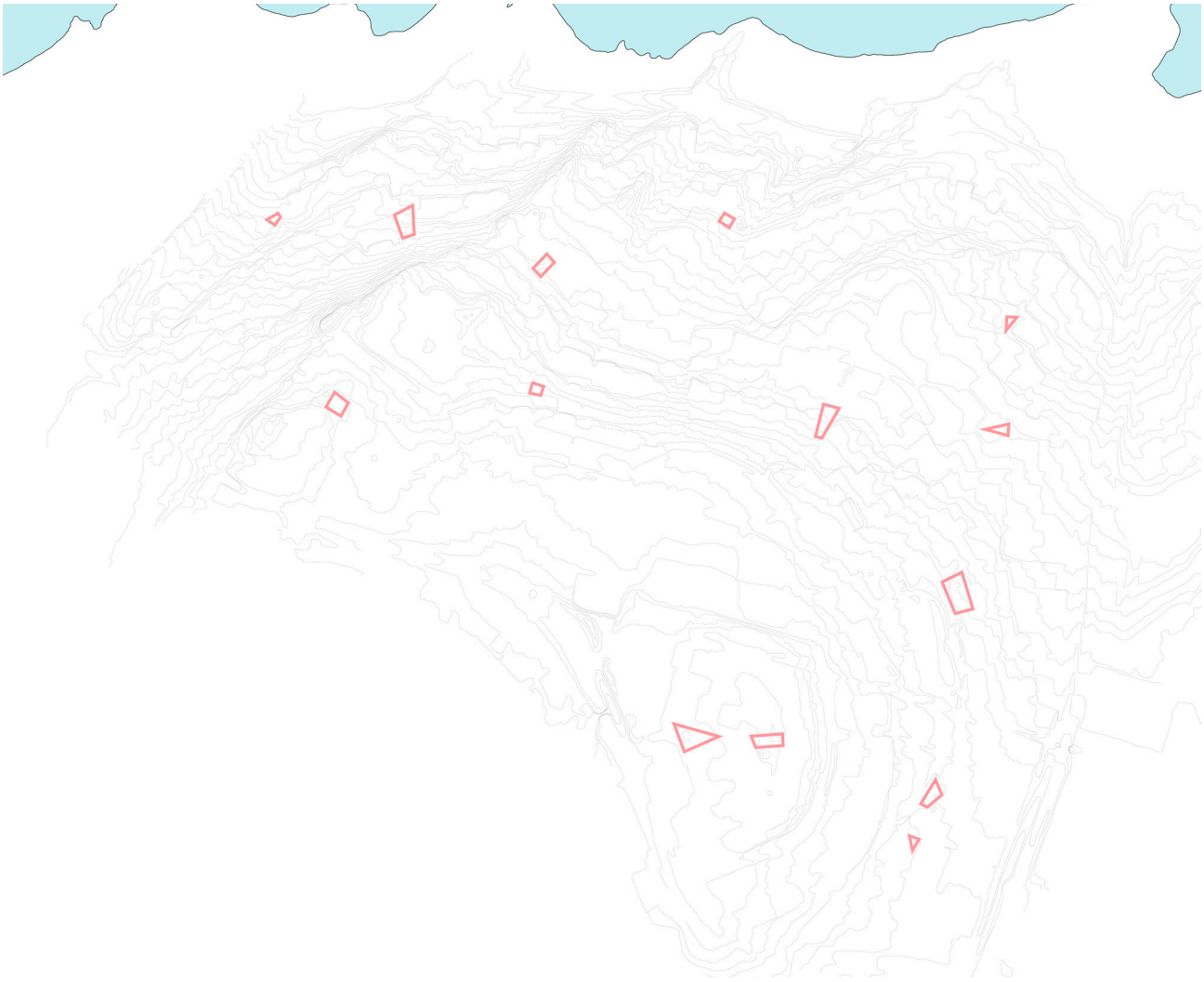


FIGURE 38. PUBLIC PLAY SPACES

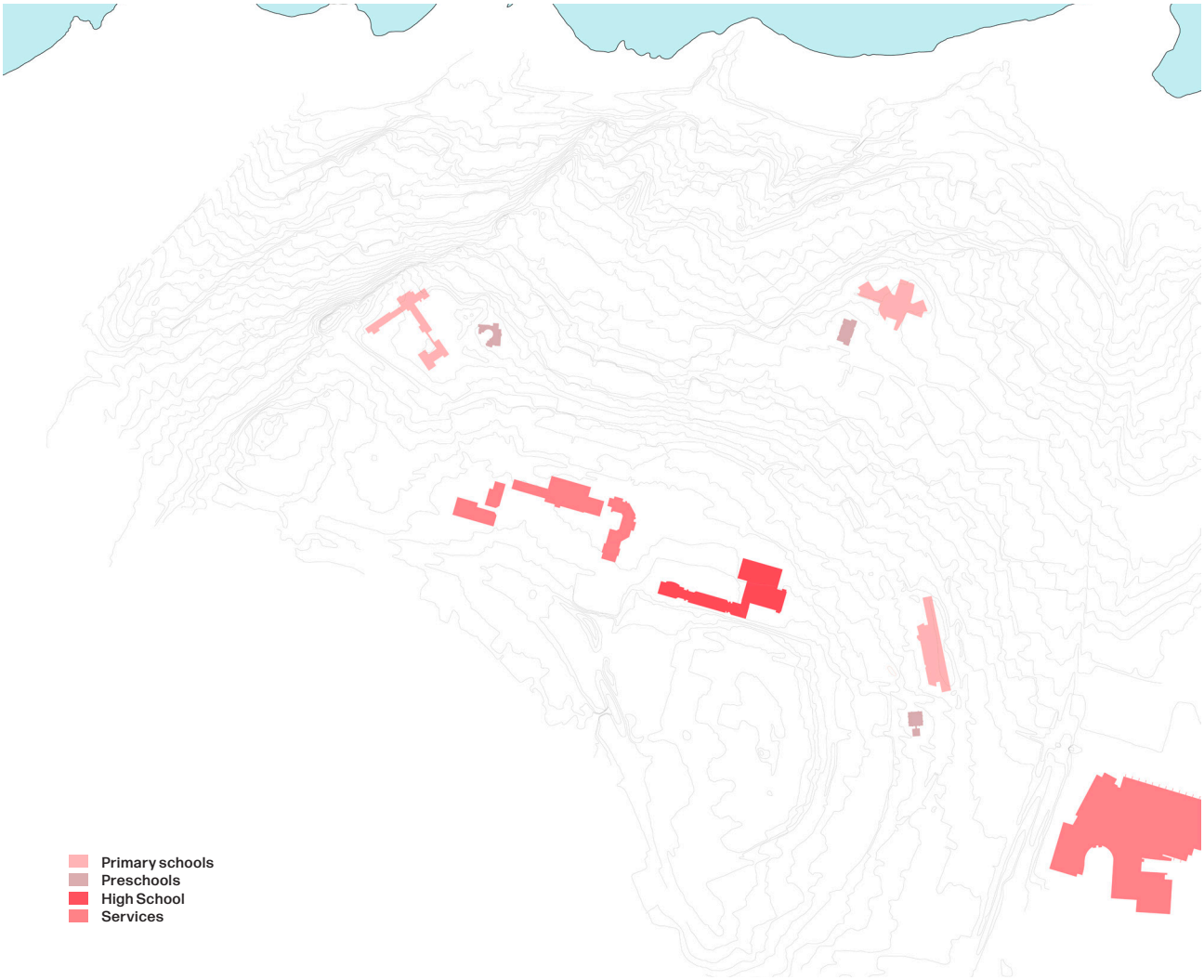


FIGURE 39. PUBLIC FUNCTIONS

FIGURE 40. STREET NETWORK AND PARKING



FIGURE 41. CYCLING NETWORK





Figure 42. Parking around the shopping centre
Figure 43. View of the shopping centre from the ring road
Figure 44. View from behind the elderly home



Figure 45. Typical building typology in the site
Figure 46. Typical building typology in the site Laugardalslaug
Figure 47. Topography in the area



Figure 48. Uninviting surrounding of the High School
Figure 49. Parking around the public functions
Figure 50. Mountain view from the site



Figure 51. Uninviting playground
Figure 52. Narrow cycling path
Figure 53. Unexciting playground

Strategy

Based on extensive research on child-friendly design and the insights gained from the conducted survey, three toolboxes have been developed as practical guidelines. These toolboxes serve as a reference for designing new neighbourhoods or enhancing existing ones to become more child-friendly. The implementation of each toolbox's components will depend on the specific context and site requirements. While these toolboxes encompass elements that benefit people of all ages, they primarily focus on creating environments conducive to children's optimal growth and well-being.

The first toolbox emphasizes the importance of a playful city. This entails incorporating features like playful street furniture, climbable objects, diverse play areas such as nature play and junk play, and spaces that foster intergenerational play. Additionally, indoor communal spaces for play can be particularly beneficial, especially for families with limited home space for passive indoor activities.

The second toolbox promotes the concept of a walkable city. Key elements include ensuring short distances to everyday amenities, providing ample public seating, implementing playful street crossings, establishing reliable public transportation options, and establishing designated child-friendly routes within the neighbourhood.





Lastly, the third toolbox focuses on creating a safe city. While playfulness and walkability are essential, ensuring safety is paramount. Addressing the concerns raised by mothers in Reykjavik, this toolbox emphasizes the importance of living streets, minimizing street parking when feasible, enforcing low-speed limits, and fostering a strong sense of community where residents actively look out for one another's well-being.

Vision

















The overarching vision is to foster a child-friendly urban environment by creating a comprehensive network of paths that interconnects each sub-neighbourhood and links them to every primary school. This interconnected network will be thoughtfully designed to incorporate diverse play areas, well-defined signage for easy navigation, adequate lighting, and abundant green spaces, all while minimizing the need for street crossings.

The ultimate objective is to empower children in the community with greater autonomy for unsupervised exploration and movement. This vision will be realized by integrating key elements derived from the three toolboxes created for a child-friendly neighbourhood.

Playful City

- | | |
|---|--|
|  Playful Street Furniture |  Designing for Flexible Use |
|  Sidewalk and Street Games |  Intergenerational Play |
|  Natural Play Areas |  Quiet Zone |
|  Temporary Street Closure |  Communal Spaces |
|  Climbable Objects |  Moveable Objects |
|  Street Art |  Objects at Child's Eye Level |
|  Living School Grounds |  Communal Toy Box |
|  Junk Playground |  Covered Outdoor Spaces |
|  Community Garden |  Pocket Parks |
|  Playground seating | |

Walkable City

- | | |
|---|--|
|  Street Green |  Bicycle Network |
|  Shared Space |  Pedestrian Route |
|  Alternating pavement |  Public Transportation |
|  Narrowing Streets |  Short Distances |
|  Playful Street Crossings |  Prioritized Snow Removal |
|  Public Seating |  Smooth Ground Material |
|  Coffee House |  Public Restrooms |
|  Stroller Friendly |  Integrated Child-Care |
|  Neighbourhood Child Route | |

Safe City

- | | |
|---|---|
|  Lighting |  Wide Sidewalks |
|  Maintenance |  Bicycle Lane Buffer |
|  Semi-Private Spaces |  Tighten Corner Radii |
|  Low Speed Limits |  Living Streets |
|  Removal of Street Parking |  Laneways Designed for Everyday Play |
|  Fostering Community | |



FIGURE 54. YOUNG GIRLS CLIMBING ON A TABLE
TENNIS | NZURICH, SWITZERLAND

FIGURE 55. YOUNG BOY CLIMBING ON A STATUE IN ZÜRICH, SWITZERLAND





FIGURE 56. YOUNG BOY AND HIS UNCLE PLAYING IN A PARK IN REYKJAVÍK, ICELAND

FIGURE 57. FATHER AND DAUGHTER PLAYING AT A PLAYGROUND IN BADEN, SWITZERLAND



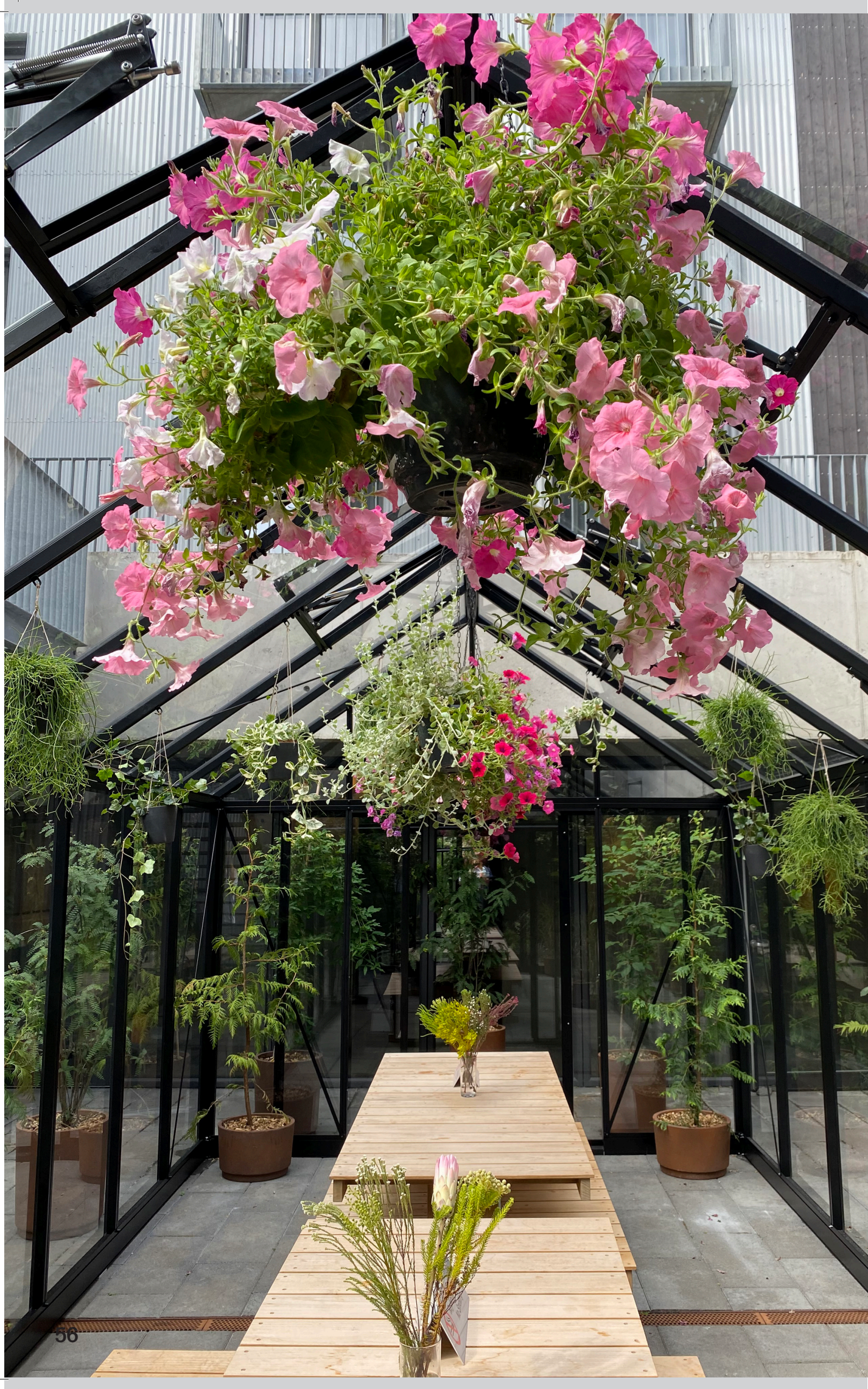


FIGURE 58. VIEW OF A SEMI-PRIVATE COURTYARD IN REYKJAVÍK, ICELAND

FIGURE 59. A GROUP OF MEN AT A PUBLIC GREEN HOUSE IN REYKJAVIK, ICELAND





FIGURE 60. A COMMUNITY GARDEN IN REYKJAVÍK, ICELAND

FIGURE 67. STREET GREEN IN PRAGUE, CZECH REPUBLIC





FIGURE 62. OBJECT AT CHILD'S EYE LEVEL IN REYKJAVÍK, ICELAND

FIGURE 63. PLAYFUL STREET FURNITURE IN REYKJAVÍK, ICELAND





FIGURE 64. A YOUNG BOY IN FRONT OF STREET ART IN REYKJAVÍK, ICELAND



FIGURE 65. STREET ART ON A BASKETBALL COURT IN REYKJAVIK, ICELAND



FIGURE 66. PUBLIC SEATING IN REYKJAVÍK, ICELAND

FIGURE 67. PUBLIC SEATING IN REYKJAVÍK, ICELAND



DESIGN PROPOSAL



FIGURE 68. MASTERPLAN OF NORTH-GRAFARVOGUR





FIGURE 69. CHILDRENS NETWORK

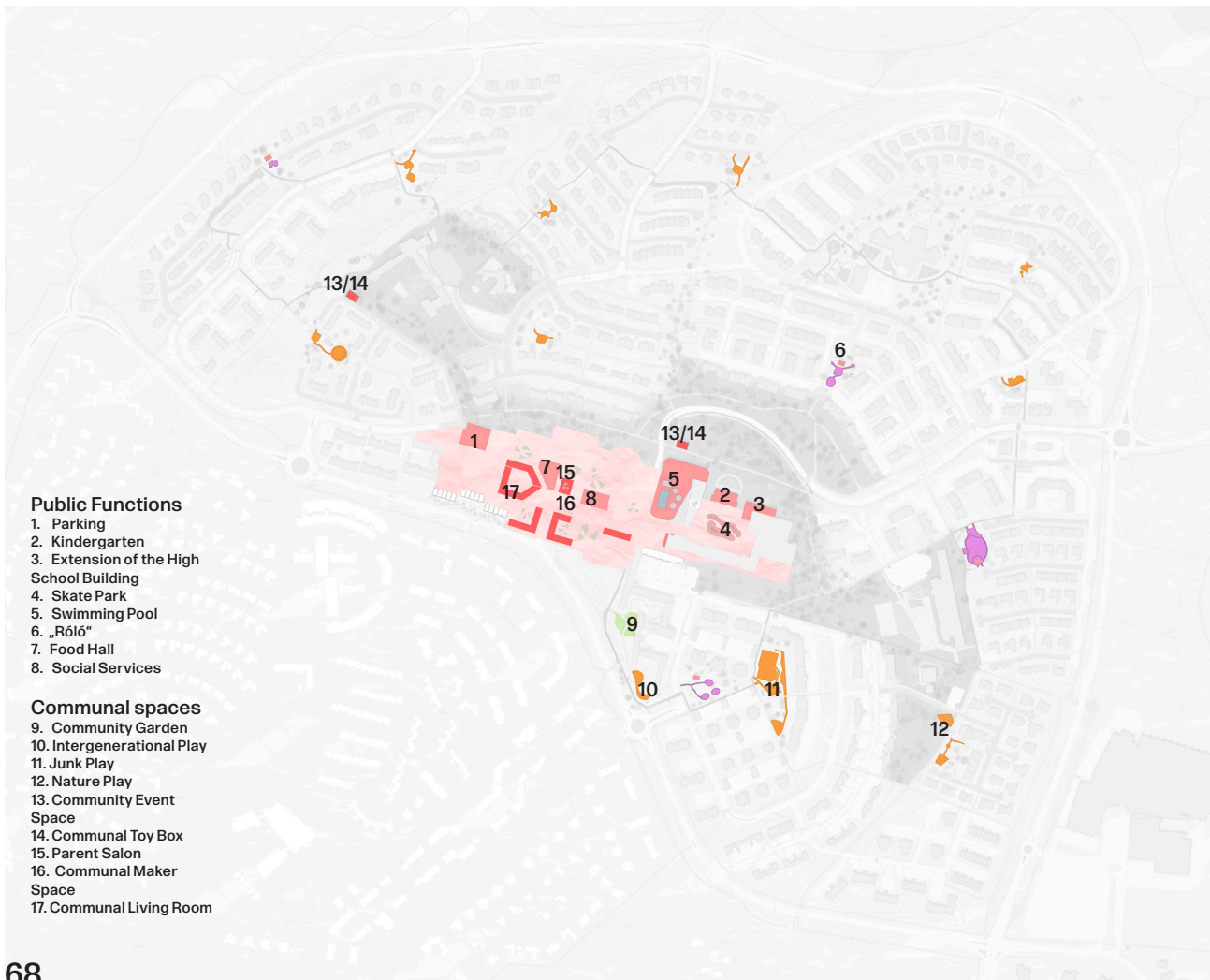


FIGURE 70. COMMUNAL SPACES AND PUBLIC FUNCTIONS

V

DESIGN PROPOSAL

Childrens network

The proposed children's network is designed to prioritize child-friendly travel routes throughout the entire neighbourhood, connecting each primary school and multiple playgrounds along the way. These routes incorporate playful street crossings that engage children's imagination and promote their safety. To ensure easy navigation, informative infographics are strategically placed to assist with wayfinding, while also serving as reminders for children to be cautious of traffic.

One of the key considerations in designing this network is ensuring well-lit pathways, providing a sense of security for children and their caregivers. By incorporating adequate lighting, the routes become inviting and encourage children to explore and move around the neighbourhood with confidence.

Another essential aspect of the children's network is minimizing the number of street crossings. This helps to enhance safety and reduce potential risks. By carefully planning the routes the need for street crossings is minimized, creating a more secure environment for children.

Ultimately, the children's network not only connects each neighbourhood with primary schools but also provides multiple opportunities for play and recreation through the inclusion of various playgrounds. These accessible and engaging spaces along the routes serve as destinations for children, encouraging physical activity, social interaction, and overall enjoyment of the urban environment.

Public functions and communal spaces

Figure number 70 and the accompanying legend show the main public and communal elements of the masterplan.



Figure 71. Vision of a nature playground



FIGURE 72. STREET NETWORK AND PARKING



FIGURE 73. GREEN CONNECTION

Street network and parking

Significant changes have been implemented to the street network. One of the key modifications involves reducing the speed limit on all streets, previously set at 50 km/h, to a lower and safer limit of 30 km/h. This adjustment prioritizes the safety of pedestrians, particularly children, by creating a more secure and comfortable environment for them to navigate.

To further promote the well-being of children and expand public spaces for play, many smaller residential streets have been transformed into living streets. By designating these streets as living streets, the public space is expanded, allowing for more recreational activities and play areas for children. Moreover, these modifications also contribute to enhanced safety measures, ensuring that children can freely engage in outdoor activities without the risk of vehicular traffic.

To optimize the use of space and create vibrant community areas, several unnecessary streets have been removed, as well as the large parking lots adjacent to the shopping centre and high school. This transformation opened up opportunities for new buildings and public spaces, fostering a sense of community and providing areas for social interaction and recreation.

Additionally, the proposed Bus Rapid Transit (BRT) line has been introduced to improve transportation connectivity to the neighbourhood. The BRT line, originating from the south, extends northward and then eastward, enhancing accessibility for residents and promoting sustainable modes of transportation.

Green connection

The green connection functions as a linear park, seamlessly linking the living school grounds of the two primary schools housing grades one through seven. Moreover, the green connection serves as a vital pathway, seamlessly connecting the three sub-neighbourhoods within the community.

By establishing the green connection, a continuous and cohesive network is created, providing a safe and enjoyable route for children to travel between different areas of the neighbourhood. These pathways not only facilitate easy access to the schools but also encourage physical activity, exploration, and interaction with nature.

The green connection serves as more than just a corridor. It is designed as a vibrant and inviting space, featuring greenery, benches, and recreational amenities that promote outdoor activities and social engagement. These spaces also provide opportunities for educational experiences, such as learning about local flora and fauna and fostering a deeper connection between children and their environment.

In addition to the functional aspects, the green connection contributes to the overall aesthetics and environmental sustainability of the neighbourhood. The presence of green corridors enhances the visual appeal, creates a sense of tranquility, and promotes biodiversity within the urban fabric.



FIGURE 74. RESIDENTIAL BUILDINGS



FIGURE 75. NETWORK OF SHARED PATHS

V

DESIGN PROPOSAL

Residential

Considering the area is quite built as is, adding new residential buildings was not a focus of this design. However, a few residential buildings are introduced to the site, utilizing the large parking lots, and effectively transforming them into new public areas, both outdoors and indoors. By strategically placing these residential buildings, the design optimizes the available space and enhances the overall urban environment. The focus is on creating inviting public spaces that promote community engagement and facilitate various recreational activities.

This integration of residential development and the establishment of vibrant public areas contributes to the liveliness and appeal of the neighbourhood, providing residents, particularly children, with a well-balanced combination of private and communal spaces to enjoy.

Shared paths

The disconnected cycling paths have been upgraded. The design integrates and expands the existing cycling and pedestrian networks, resulting in a comprehensive and interconnected system that covers the entire area and connects to the cycling paths which lead to other parts of the city. The paths have been widened to accommodate both cyclists and pedestrians, ensuring a safe and comfortable experience for all users. The inclusion of enhanced lighting improves visibility and promotes safety during the day and night.

Additionally, the network incorporates three fast-track cycling lanes, offering efficient connections to pathways leading to other areas of the city. This comprehensive improvement in cycling infrastructure aims to encourage active transportation, promote sustainable mobility, and enhance accessibility within the neighbourhood and beyond.



Figure 76. Vision of the living street connecting the preschool and nature play

V DESIGN PROPOSAL

Neighbourhood Centre Detail

1. Living Street
2. Alternating Pavement
3. Climbable Objects
4. Playful Street Furniture
5. Communal Living Room
6. Street Green
7. Public Seating
8. Semi-Private Courtyard
9. Food Hall
10. Outdoor Restaurant Seating
11. Parking Garage
12. Pedestrian and Cycling Paths
13. Lighting
14. Pocket Playground
15. Car-Free Centre



Figure 77. Vision of a communal living room

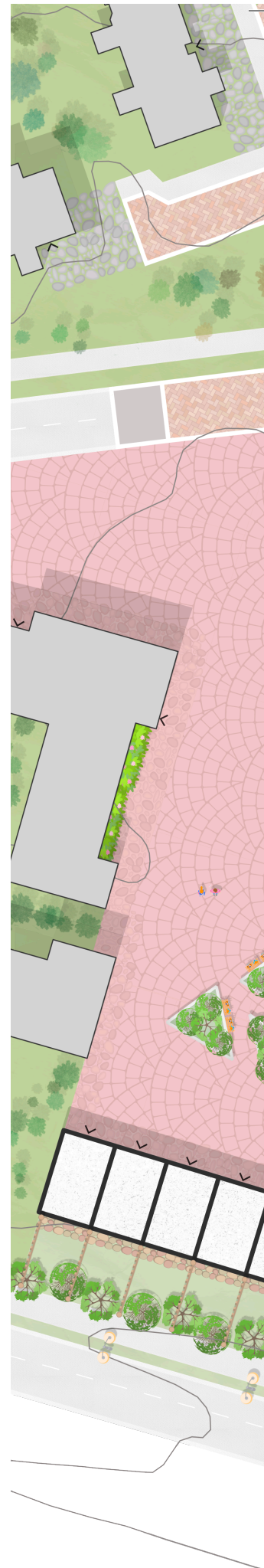
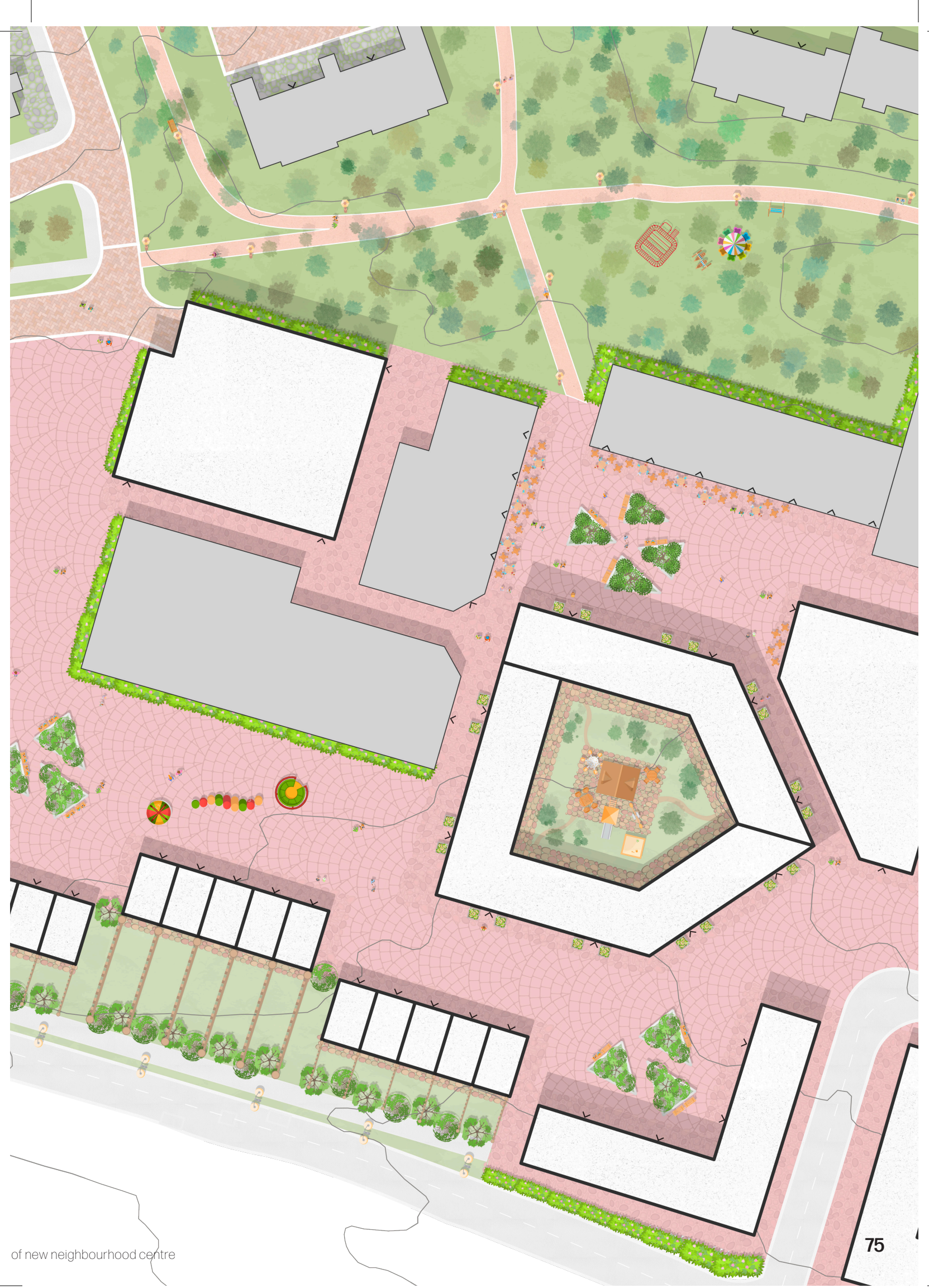


Figure 78. Detail design of new neighbourhood centre

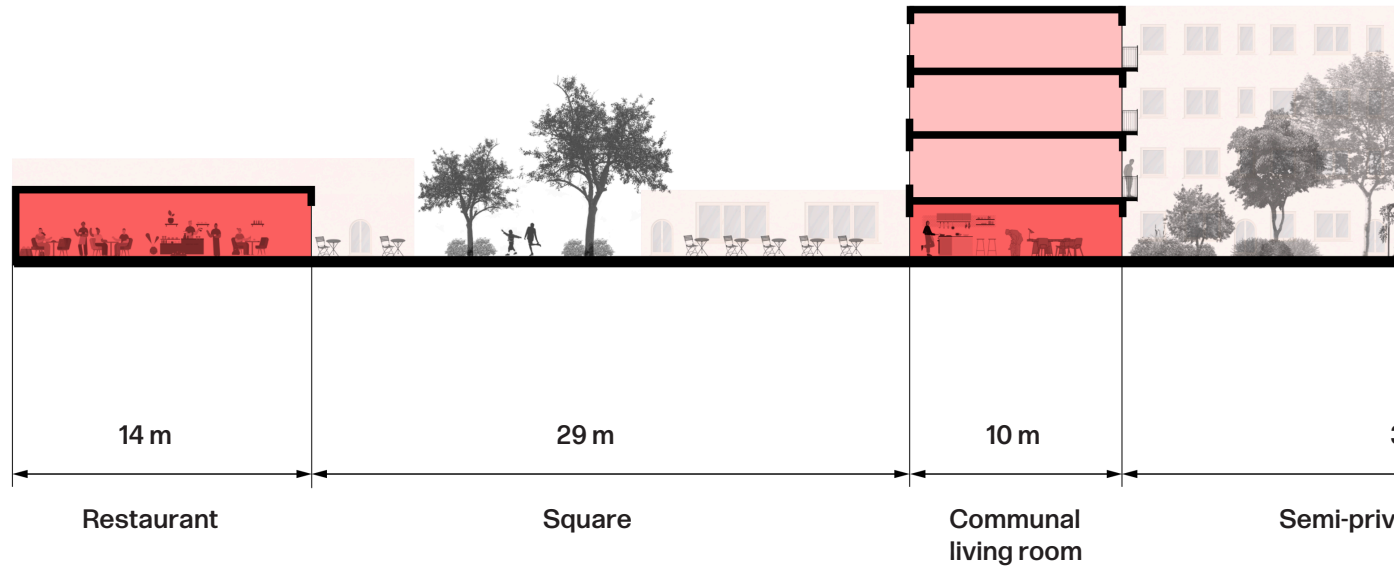


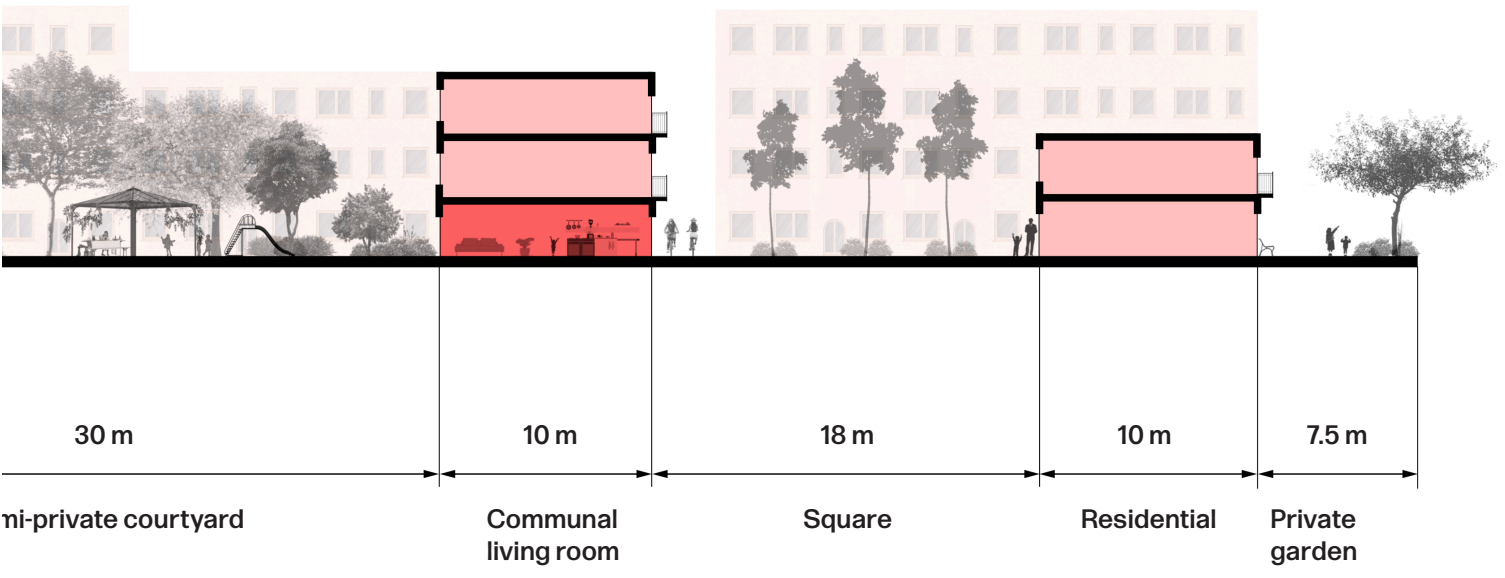
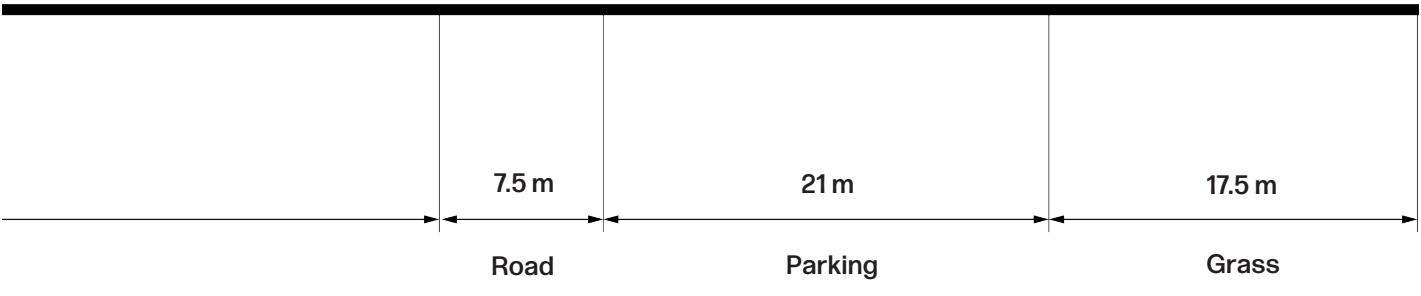
V DESIGN PROPOSAL

FIGURE 79. SECTION A1-A2 BEFORE



FIGURE 80. SECTION A1-A2 AFTER





V DESIGN PROPOSAL

FIGURE 81: SECTION B1-B2 BEFORE

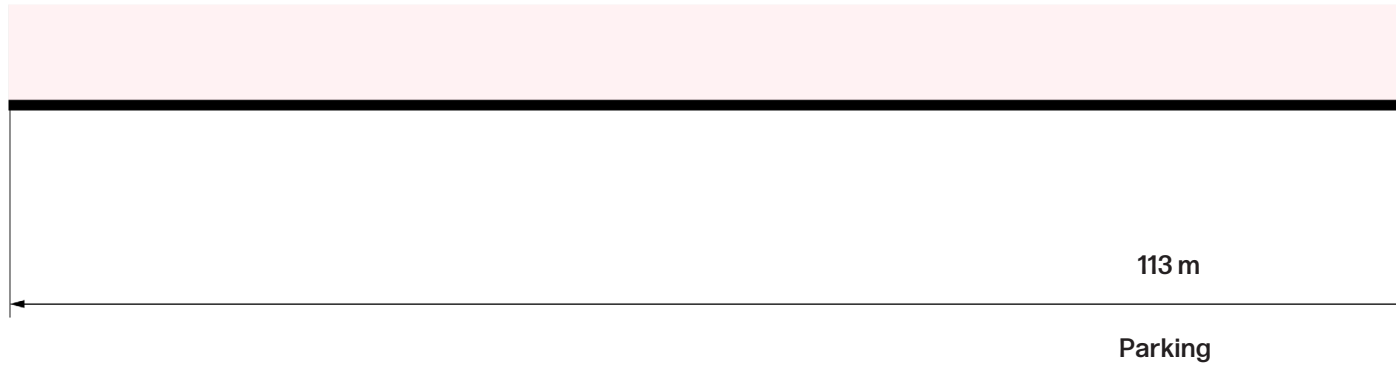
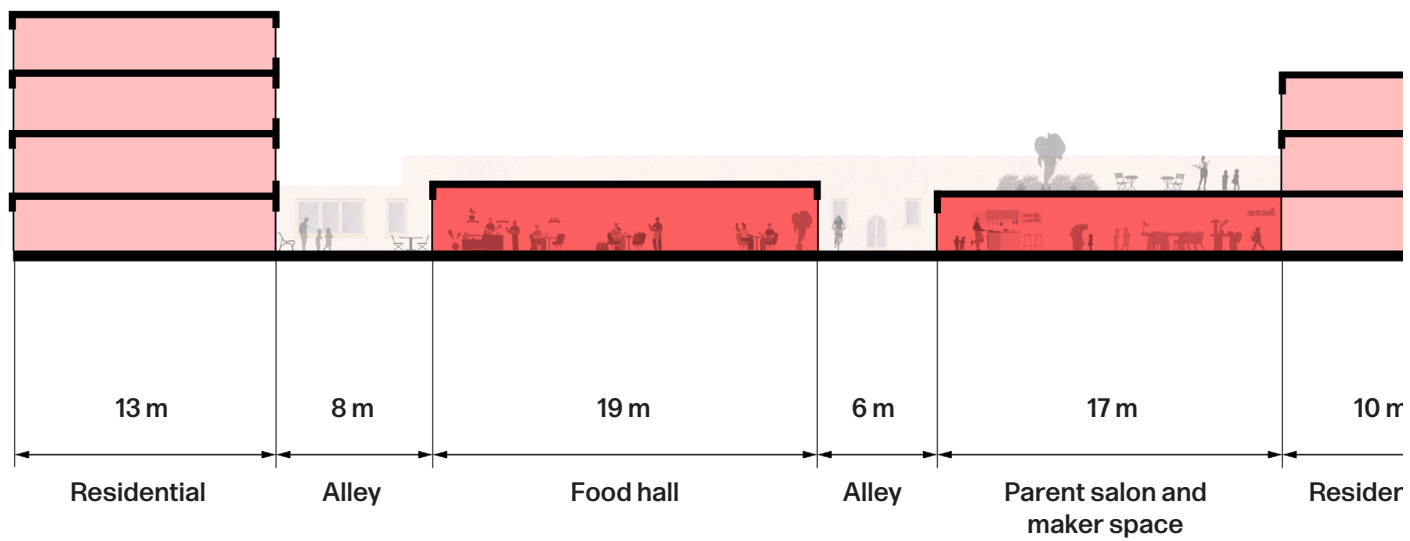
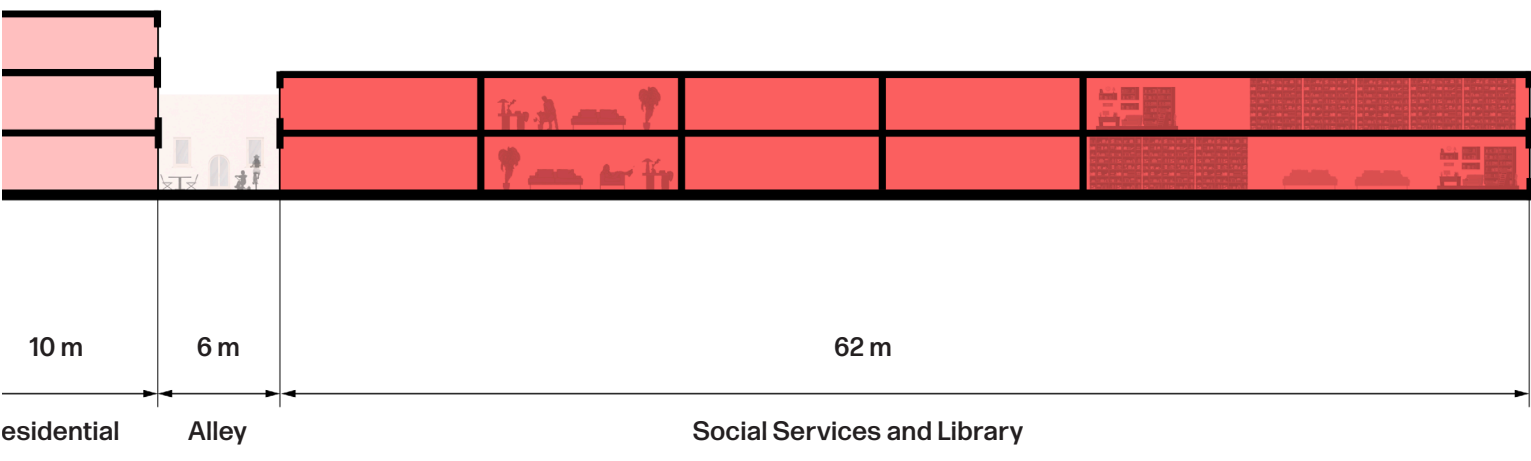
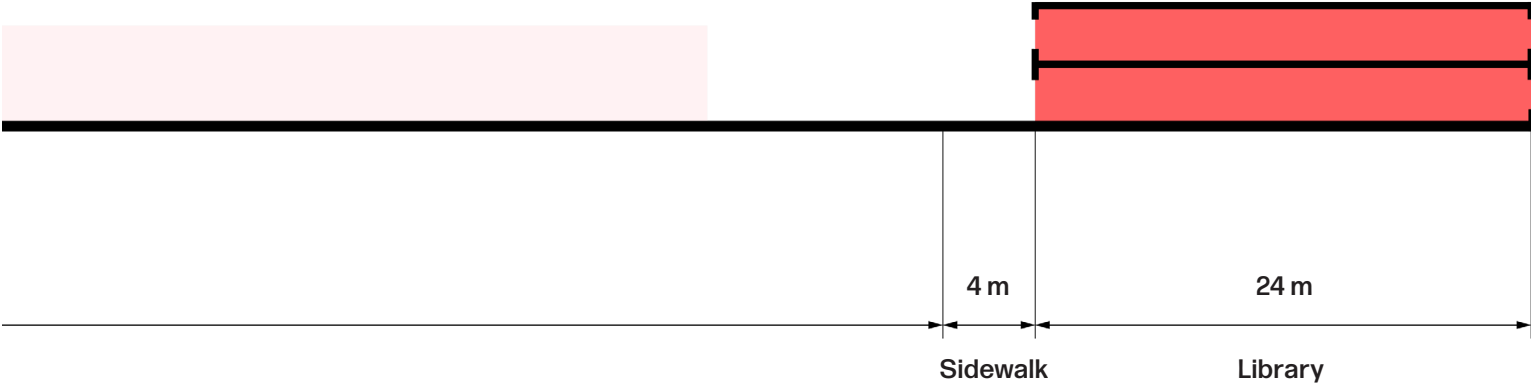


FIGURE 82: SECTION B1-B2 AFTER





V DESIGN PROPOSAL

Preschool Detail

1. Living School Grounds
2. Living Street
3. Playful Street Crossing
4. Street Games
5. Nature Play
6. Playground Seating
7. Pocket Park
8. Lighting
9. Quiet Zone
10. Neighbourhood Child Route
11. Public Seating
12. Pedestrian and Cycling Paths
13. Street Art



Figure 83. Detail design of the area around the preschool in the east



In conclusion, this master thesis has explored the crucial aspect of creating child-friendly urban environments and the significant impact that small-scale implementations can have on enhancing the well-being and quality of life for children.

The research findings have highlighted the importance of considering children's needs in urban planning and design, emphasizing the potential for positive change through thoughtful and intentional interventions. By incorporating playful city features, promoting walkability, and enhancing safety measures, urban areas can be transformed into inclusive and engaging spaces that allow children to thrive and explore their surroundings with freedom and independence.

Throughout the research process, it became evident that simple interventions can make a significant difference in creating a child-friendly environment. From the design of an interconnected children's network to the provision of ample and varied play spaces, proper lighting, communal spaces, and the integration of greenery, each element contributes to the overall experience and well-being of children in urban areas.

The findings of this thesis also shed light on the need for further research and collaboration among urban designers, policymakers, and stakeholders to prioritize the needs of children in urban planning processes. The potential for creating child-friendly urban environments is immense, and even small-scale implementations can have a lasting impact on the lives of children. By considering their needs, providing opportunities for play and exploration, and fostering a sense of safety and belonging, urban areas can become vibrant and inclusive spaces that support the growth and happiness of children. It is our collective responsibility to continue advocating for child-friendly urban design and to strive for the creation of environments where all children can thrive, explore, and enjoy their urban surroundings to the fullest extent.

Moreover, it is crucial to recognize the need for further research and exploration into mother and women-friendly urban design. While the initial goal of this thesis was to design a mother-friendly neighbourhood, the limited research in this area prompted a shift towards a broader focus on child-friendly design. However, it is important to acknowledge that the experiences and challenges faced by mothers and women in urban environments warrant further investigation and consideration.



Figure 84. A make-shift play kitchen in a park in Lund, Sweden



in a private garden

Arts and Culture in Iceland. (n.d.). Visit Iceland. <https://www.visiticeland.com/article/culture>

Arup & The LEGO Foundation. (2021, November). *Playful Cities Toolkit: resources for reclaiming play in cities - Arup.* Arup. <https://www.arup.com/perspectives/publications/research/section/playful-cities-toolkit-resources-for-reclaiming-play-in-cities>

Bergmann, S. (2023). The History of Icelandic Architecture. *Guide to Iceland.* <https://guidetoiceland.is/history-culture/icelandic-architecture>

Chapman, M. (2022). Tjörnin | The Pond in Reykjavik. *Guide to Iceland.* <https://guidetoiceland.is/reykjavik-guide/tjornin-the-pond-in-reykjavik>

Daðason, K. T. (2019, November 12). Samþykkt að loka Kelduskóla Korpu. *visir.is.* <https://www.visir.is/g/20191054580d>

Guðjónsson, V. (2023, March 16). Stefnir í neyð í Reykjavík. *mbl.is.* https://www.mbl.is/frettir/innlent/2023/03/13/stefnir_i_neyd_i_reykjavik/

Guðmundsson, A. S. G. (2023, March 22). Lengri biðröð og hærri meðalaldur. *mbl.is.* https://www.mbl.is/frettir/innlent/2023/03/22/lengri_bidrod_og_haerri_medalaldur/

Iceland Travel. (n.d.). *Austurvollur Square in Reykjavik.* <https://www.icelandtravel.is/attractions/austurvollur-square/>

Landsbókasafn Íslands - Háskólabókasafn. (1957, August 1). *Menntamál - 01.08.1957 - Tímarit.is.* Landsbókasafn Íslands - Háskólabókasafn, Þjóðarbókhöðunni, Arngrímsgötu 3 - 107 Reykjavík. <https://timarit.is/page/4556606#page/n91/mode/2up>

Nordsteien, J., Skúlason, M., & Gunnarsson, G. (2007). Gömul Timburhús: Útveggir, grind og klæðning. *Minjastofnun.* Ritröð Húsafriðunarnefndar ríkisins. <https://www.minjastofnun.is/static/files/skjol-i-grein/Timburhus.pdf>

Officials, N. a. O. C. T., & Initiative, G. D. C. (2020). *Designing Streets for Kids* [PDF]. Island Press. <https://globaldesigningcities.org/publication/designing-streets-for-kids/>

Reykjavík Municipality. (n.d.-a). *2. Þétt og blönduð byggð.* Reykjavík. Retrieved May 15, 2023, from <https://reykjavik.is/tett-og-blondud-byggd>

Written references

Reykjavík Municipality. (n.d.-b). *A Better City for Children*. Reykjavík. Retrieved March 4, 2023, from <https://reykjavik.is/en/a-better-city-for-children>

Reykjavík Municipality. (n.d.-c). *Allir leikskólar*. Reykjavík. Retrieved February 12, 2023, from <https://reykjavik.is/allir-leikskolar>

Reykjavík Municipality. (n.d.-d). *Brúum bilið*. Reykjavík. Retrieved March 5, 2023, from <https://reykjavik.is/bruum-bilid>

Reykjavík Municipality. (n.d.-e). *Gjaldskrá sundlauga*. Reykjavík. Retrieved March 9, 2023, from <https://reykjavik.is/gjaldskra-sundlauga>

Reykjavík Municipality. (n.d.-f). *Göngugötur*. Reykjavík. Retrieved May 15, 2023, from <https://reykjavik.is/gongugotur>

Reykjavík Municipality. (n.d.-g). *Grafarvogur - borgarhluti 8*. Reykjavík. Retrieved February 19, 2023, from https://reykjavik.is/sites/default/files/adalskipulag/08_grafarvogur.pdf

Reykjavík Municipality. (n.d.-h). *Hjólaborgin Reykjavík*. Reykjavík. Retrieved May 15, 2023, from <https://reykjavik.is/hjolaborgin>

Reykjavík Municipality. (n.d.-i). *Innritun í leikskóla*. Reykjavík. Retrieved March 1, 2023, from <https://reykjavik.is/innritun-i-leikskola>

Reykjavík Municipality. (n.d.-j). *Jafnréttisúttekt íþróttafélaga í Reykjavík 2021*. Reykjavík. Retrieved March 9, 2023, from https://reykjavik.is/sites/default/files/ymis_skjol/skjol_utgefid_efni/jafnrettisuttekt_ithrottafelaga_i_reykjavik_2021_26.11.2021.pdf

Reykjavík Municipality. (n.d.-k). *Preschool fees*. Reykjavík. Retrieved March 2, 2023, from <https://reykjavik.is/en/preschool-fees>

Reykjavík Municipality. (n.d.-l). *Sjálfstætt starfandi leikskólar*. Reykjavík. Retrieved March 9, 2023, from <https://reykjavik.is/sjalfstaett-starfandi-leikskolar>

Reykjavík Municipality. (n.d.-m). *Swimming pools*. Reykjavík. Retrieved March 9, 2023, from <https://reykjavik.is/en/swimming-pools>

Reykjavík Municipality. (n.d.-n). *The Recreation Card*. Reykjavík. Retrieved March 9, 2023, from <https://reykjavik.is/en/recreation-card>

Reykjavík Municipality. (n.d.-o). *Umgengnisreglur sundlauga*. Reykjavík. Retrieved March 9, 2023, from <https://reykjavik.is/sundlaugar/umgengnisreglur>

Reykjavík Municipality. (2012, March 22). *Leiksvæðastefna Reykjavíkur*. Reykjavík. https://reykjavik.is/sites/default/files/skrifstofur_radhuss/skrifstofaborgarstjora/Stefnur/20120322-leiksvaedastefna.pdf

Reykjavík Municipality. (2021, April 14). *Aukið umferðaröryggi í Reykjavík*. Reykjavík. <https://reykjavik.is/frettir/aukid-umferdaroryggi-i-reykjavik>

Reykjavík Municipality. (2022, January 13). *Aðalskipulag Reykjavíkur 2040 tekur gildi*. Reykjavík. Retrieved May 16, 2023, from <https://reykjavik.is/frettir/adalskipulag-reykjavikur-2040-tekur-gildi>

Reykjavík Municipality. (2023, February 6). *Aðalskipulag Reykjavíkur 2040: Meginmarkmið um þróun byggðar og bindandi ákvæði um landnotkun, byggingarmagn, þéttleika og yfirbragð byggðar*. Reykjavík. <https://fundur.reykjavik.is/sites/default/files/agenda-items/ar2040-kynning-grafarvogur-6feb2023.pdf>

Rögnvaldsson, F. (2020, August 25). Börnum vísað úr leikskóla vegna skuldavanda foreldra þeirra. *Heimildin*. <https://heimildin.is/grein/11792/>

Statistics Iceland. (n.d.-a). *Hagstofan: Fjölskyldan*. Hagstofa Íslands. Retrieved March 8, 2023, from <https://www.hagstofa.is/talnaefni/ibuar/fjolskyldan/fjolskyldan/>

Statistics Iceland. (n.d.-b). *Hagstofan: Yfirlit mannfjölda*. Hagstofa Íslands. Retrieved February 23, 2023, from <https://www.hagstofa.is/talnaefni/ibuar/mannfjoldi/yfirlit/>

Swimming pool culture in Iceland: WHERE SWIMMING IS PART OF THE CULTURE. (n.d.). Visit Iceland. <https://www.visiticeland.com/article/swimming-pool-culture-in-iceland>

Ungbarnaleikskólinn Ársól. (n.d.). *Skóli / Karellen - Leikskólakerfi*. Retrieved March 5, 2023, from <https://arsol.skolar.is/>

Williams, S., Wright, H. F., & Dohna, F. (2017). *Cities Alive: Designing for urban childhoods*. Arup. <https://www.arup.com/perspectives/publications/research/section/cities-alive-designing-for-urban-childhoods>

Þórhallsdóttir, Þ. L. (2022, March 3). Við brúum bilið. *visir.is*. <https://www.visir.is/g/20222230262d/vid-bruum-bilid>

Figure 21. [Photograph of the author working at a preschool]. (2018). <https://www.efling.is/>

Figure 24. [Photograph of Sundhöllin]. (n.d.). <https://reykjavik.is/en/sundholl-reykjavik-pool>

Figure 25. [Photograph of Árbæjarlaug]. (n.d.). <https://reykjavik.is/arbaejarlaug>

Figure 26. [Photograph of Laugardalslaug]. (n.d.). <https://reykjavik.is/en/laugardalslaug-pool>

Figure 35. [Aerial photograph of Grafarvogur]. (n.d.). <https://earth.google.com/web/>

Figure 36. [Map of future development areas in Grafarvogur]. (2022). <https://fundur.reykjavik.is/sites/default/files/agenda-items/ar2040-kynning-grafarvogur-6feb2023.pdf>

Lund University, Sweden
Sustainable Urban Design Programme
School of Architecture
Faculty of Engineering, LTH
Sölvegatan 24, 223 62 LUND, Sweden
Defense: May 12th, 2023
Publication: May 22nd, 2023

Salóme Rósa Þorkelsdóttir
Master's Degree Project
May 2023

Supervisors:
Teresa Arana Aristi, Lecturer SUDes,
LTH
Ida Sandström, Associate Senior
Lecturer, Department of Architecture
and Built Environment, LTH
Examiner:
Lars-Henrik Ståhl, Professor, PhD,
Director of SUDes, LTH

Growing Up in the City: Enhancing Safety and Liveability for Children in Established Urban Areas