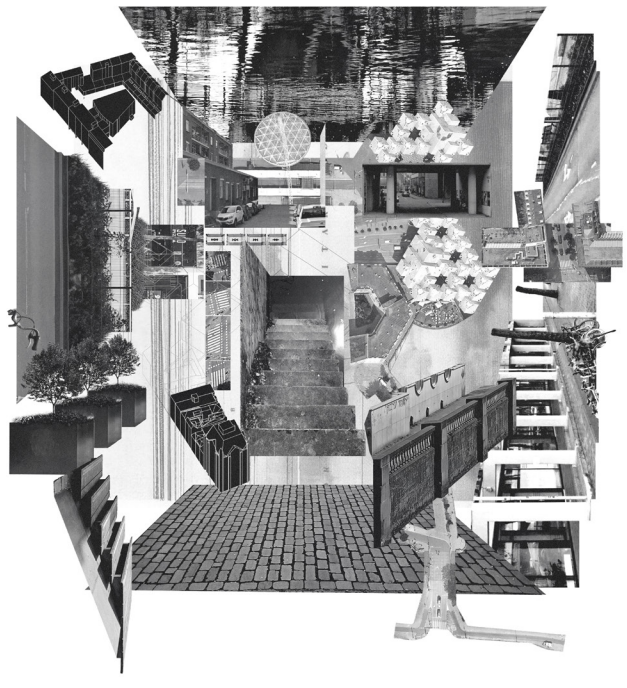
The 0th Place

Utilizing Urban Cracks as Experimental Sites



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2024

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Disclaimer

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Delft, The Netherlands

June, 2024

Acknowledgment

First and foremost, I would like to thank my first mentor, Luca Iuorio, for his guidance, feedback, and patience. He understood my challenges and encouraged me to push my limits. My second mentor, Birgit Hausleitner, also deserves special thanks for her support and inspiring feedback, which directed the project to its current state.

I am deeply grateful to Robert Jan, my previous first mentor, for his inspiring site selection. His understanding of my goals and crucial input were pivotal to the project.

I would also like to thank Claudiu Forgaci, Stefano Corbo, Mohammad Nahleh, and Wael Samhouri for their insights and new perspectives, which enriched the project's approaches.

Thank you to Lisette, Esiline, Gaby, and William for your support throughout the entire journey.

To my family—Mom, Dad, Lujain, Boudor, Sama, Tasneem, Assil, Adam, and Bader—your unwavering support and belief in me provided everything I needed. Without you, I wouldn't be who I am today.

Ahmad Alsalhi, your insights and transparent feedback were eye-opening and inspiring. Fares Whby, your vision and experience were particularly inspiring, especially for specific sections of the project. Zoë, thank you for the presentation notes and your support throughout the project journey.

Oudai, Lucas, Feike, and Marah, thank you for the inspiring conversations.

Thanks to Majd, Zaki, Rami, Jad, Harara, Hussam, Boushi, Othman, Fares, Ahmad, Ammar, Hassa, Fadi, Mahmoud, and Moath for the enjoyable moments during breaks. Many nuanced aspects of the project were inspired by our insightful conversations.

Special thanks to my roommates, Andreh and Mahmoud, for their patience with my all-nighters and their constant support.

Lastly, to all my friends and teachers, thank you for your support and input throughout this journey.

Abstract

Left-over spaces within the city present problems on various scales and mediums. While these left-over spaces, named as Urban cracks, are necessary for the city's structure, they hold untapped potential. This project aims to systematically identify, analyze, uncover, and activate these spaces in Rotterdam, specifically in the Brandgrens area. The objective is to define them as "0th places," where the space functions as a regulated yet adaptable zone to host site-specific activities and remains flexible to allow for change.

The Brandgrens area was chosen due to its significant history, particularly after the World War II bombings, where new developments emerged adjacent to the old urban fabric. This pattern can occur in any city, as new developments continuously create new urban cracks.

The methods used included Research by Design, Critical Mapping, Fieldwork, Data Mining, Morphological Analysis, Modeling, and Literature Review. The results produced an analytical framework to identify these spaces within the city, understand their various relationships (a map of opportunities), and develop a final detailed design showing different scenarios and a city-scale strategy to extend the intervention's effects.

The conclusion is that these spaces can indicate problems in their surroundings, if not within themselves. They require further study from different perspectives and approaches to bridge the gap between urbanism and architecture and to enable people to reclaim their space. While the project can be applied globally, the differences in urban fabrics, functions, cultures, social groups, environments, and economic situations mean that urban cracks, their potential, and their necessity will vary. The exploratory approach in this project allows for flexibility in addressing the ambiguities related to urban cracks in different contexts.

Table of content

1.0 Introduction

1.1 Urban Cracks

1.2 Brandgrens as an Entry Point

1.3 Related Challenges

1.4 Research Framework

2.0 Research Design

2.1 0th Place

2.2 Conceptual Framework

2.3 Methods

2.4 Methodology Framework

3.0 Design Research

3.1 Situating Urban Cracks (SRQ1)

3.2 Qualitative Identification

3.3 Quantitative Identification

3.4 Uncovering the Potential (SRQ2)

4.0 Design

4.1 0th Place (SRQ3)

4.2 Selection Criteria

4.3 Fieldwork

4.4 Problematization

4.5 Strategizing

4.6 Description

4.7 Final Design

4.8 Urban Evolution

4.9 Scaled-up Brandgrens Strategy

5.0 Conclusions

6.0 Reflection

7.0 Bibliography

8.0 Appendix

1.0 Introduction

1.1 Urban Cracks

It all began with my observation of leftover spaces, prompting questions about their existence—why are they abandoned, and what potential lies within them?

Urban cracks denote neglected or deteriorating spaces within cities, coming from flaws in urban planning, governmental neglect, or the abandonment of certain areas. These spaces arise from various factors, including social inequalities, economic downturns, shifts in industrial landscapes, and evolving urban demographics.

Urban cracks manifest in diverse forms, ranging from abandoned buildings to vacant lots. Their presence challenges the functionality of cities due to their disorderly composition, inactive status, and propensity to attract unsanctioned activities. These spaces emerge across different urban areas, contributing to the ever-evolving urban landscape.

Regarding the conceptualization of urban cracks, they embody various metaphorical notions such as interstices, playgrounds, and transit zones. These terms carry nuanced meanings, reflecting the multifaceted nature of urban cracks.

Characteristics of urban cracks include their positioning between conventional boundaries of urban planning. Often absent from official city maps, they are situated in nameless or deteriorating areas. Lacking a definitive order, purpose, or intention, urban cracks exhibit a distinctive unruliness. (Steel, Eeghem, Verschelden, & Dekeyrel, 2012).



Fig.1 Urban cracks by Steel, R., Van Eeghem, E., Verschelden, G., & Dekeyrel, C. (2012)

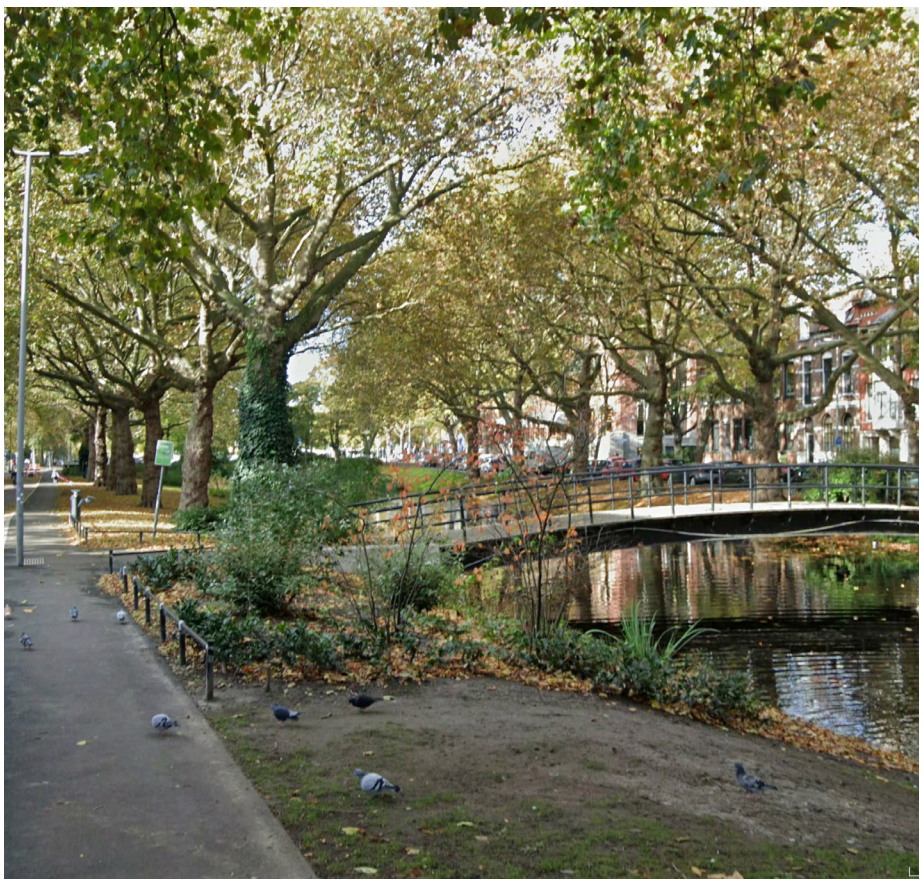


Fig.4 Urban cracks captured by the author



Fig.2 Urban cracks by Steel, R., Van Eeghem, E., Verschelden, G., & Dekeyrel, C. (2012)



Fig.3 Urban cracks by Steel, R., Van Eeghem, E., Verschelden, G., & Dekeyrel, C. (2012)



Fig.5 Urban cracks captured by the author



Fig.6 Urban cracks captured by the author

1.2 Brandgrens as an Entry Point



Fig.7 Arial view on Rotterdam mapped with it's main boundries (the selected location)



Fig.8 Aerial view of Rotterdam three years after the bombing (https://commons.wikimedia.org/wiki/File:Luchtopname_van_Rotterdam_drie_jaar_na_het_bombardement.jpg)



Fig.9 Aerial view of the extent of the destroyed city center of Rotterdam with the ports and Nieuwe Maas (https://commons.wikimedia.org/wiki/File:Luchtopname_van_de_omvang_van_de_verwoeste_binnenstad_van_Rotterdam_met_de_havens_en_Nieuwe_Maas_1946.jpg)

Rotterdam emerges as an ideal entry point for the project due to its dynamic urban landscape characterized by ongoing transformations and diverse porosity-related topics. The city's rich history of urban development offers a compelling backdrop for exploring how changes in urban blocks and city transformations influence everyday life. By focusing on urban cracks, the aim is to uncover hidden narratives and understand the socio-spatial implications of these transformations. Porosity in Rotterdam encompasses a diverse mix of architectural styles, urban planning methods, and social interactions that shape its dynamic urban landscape. When studying porosity, particularly in relation to urban cracks, Rotterdam presents a unique context.

Unlike other cities, Rotterdam's approach to urban cracks involves a blend of historical preservation and modern adaptation. The city's rich history of rebuilding after World War II, coupled with its ongoing efforts to revitalize neglected areas, creates a distinct environment where urban cracks serve as both remnants of the past and opportunities for future development. Rotterdam's porosity study, therefore, delves into how these urban cracks reflect the city's resilience, its ability to adapt to change, and its commitment to inclusive urban design principles. This approach sets Rotterdam apart from other cities and underscores the importance of understanding the socio-spatial dynamics within its urban fabric.

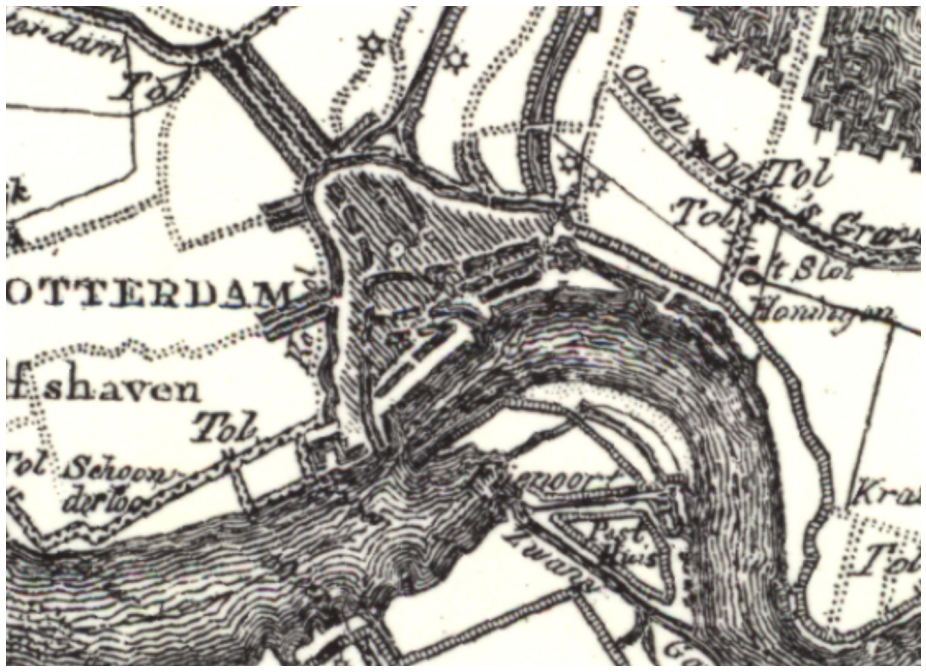


Fig.10 Rotterdam 1815

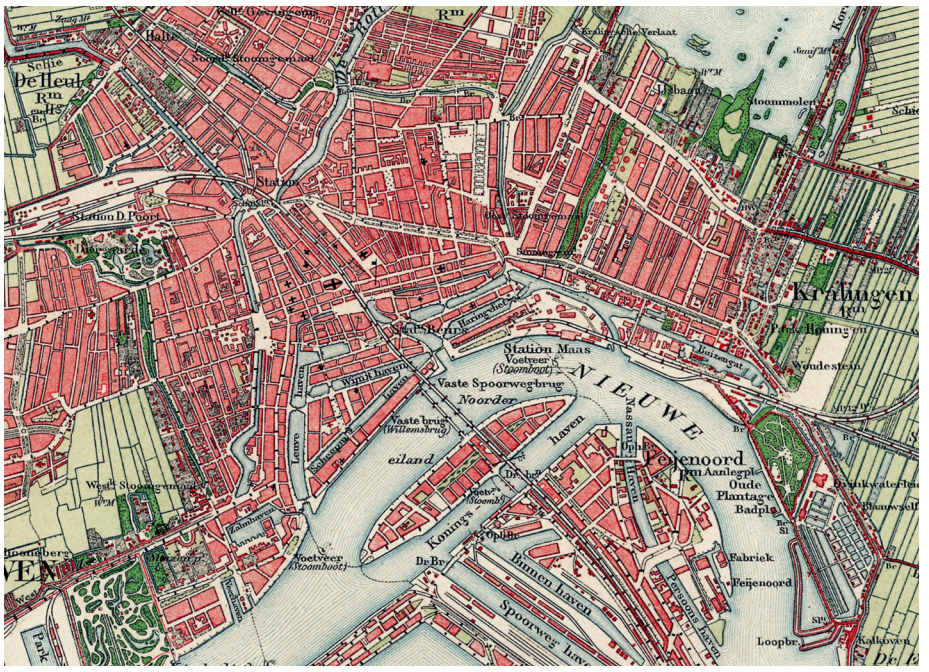


Fig.11 Rotterdam 1918

Before the war, Rotterdam had its own unique character that distinguished it from cities like Amsterdam, Utrecht, or Leiden. It was already in the midst of architectural changes, aiming to mirror the style of cities such as Chicago and New York. The vision was for a modern center focused on business, with fewer residents, and at the time, the city center boasted over 25,000 houses (Globonaut, n.d.). Rotterdam's urban planning journey showcases a dynamic evolution, navigating through various changes in design philosophy and approaches. Following the Great War, reconstruction efforts led by W.G. Witteveen in 1927 envisioned Rotterdam as a planned metropolis, emphasizing canal networks, railway improvements, and green spaces (Wagenaar, 2016, pp. 287-292). However, these plans faced obstacles, including legal challenges and opposition to annexation.

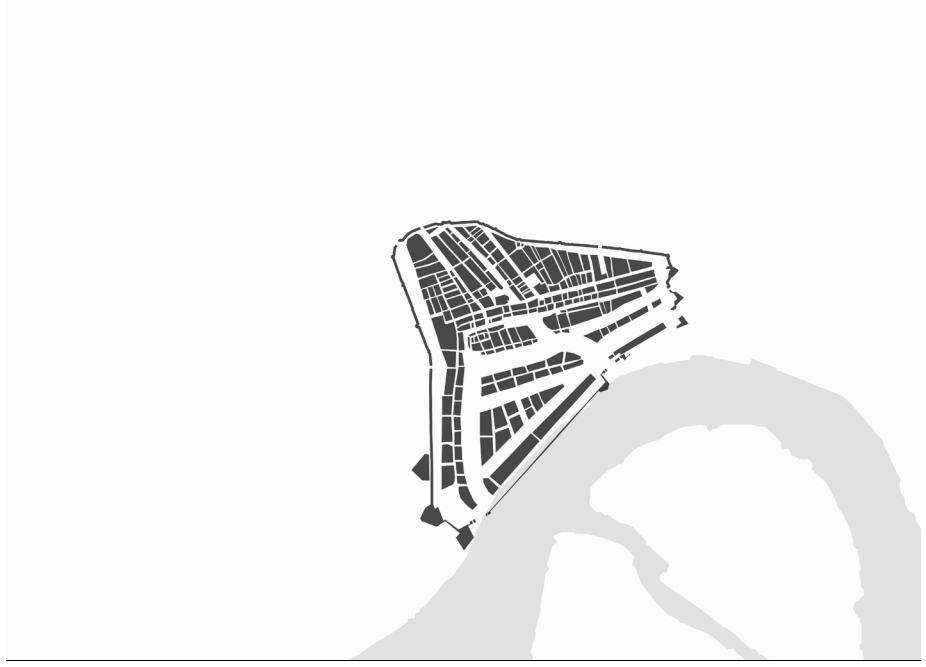


Fig.14 Rotterdam Nolli map 1815



Fig.15 Rotterdam Nolli map 1918

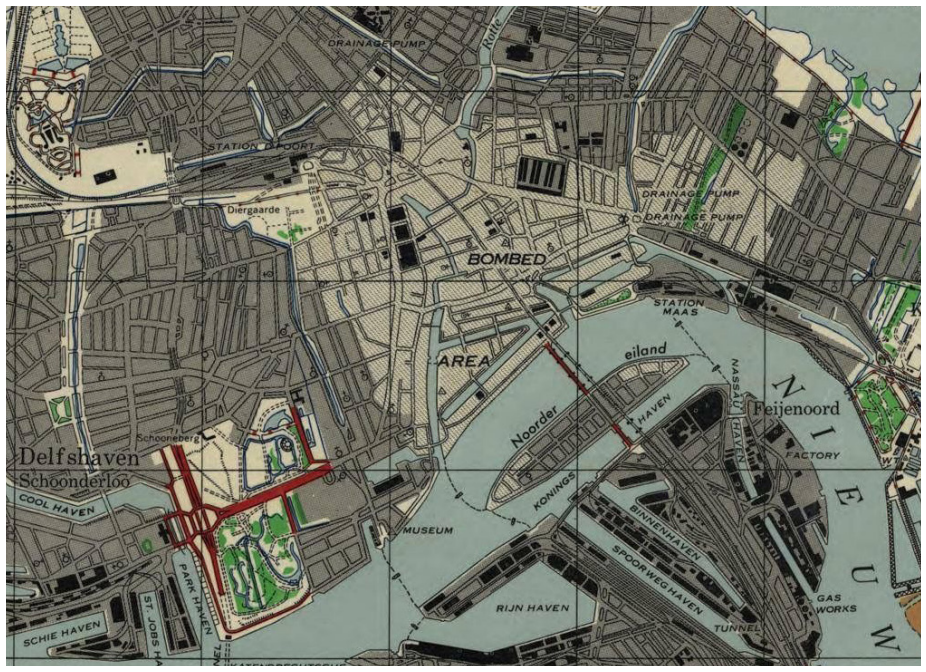


Fig.12 Rotterdam 1940

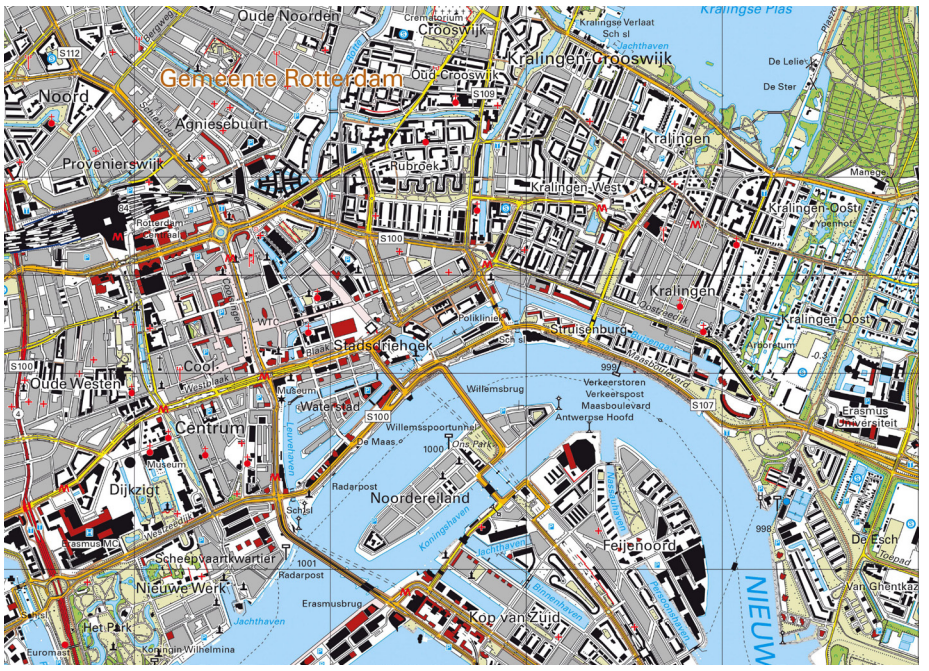


Fig.13 Rotterdam 2021

Despite these challenges, post-World War II reconstruction brought about a sense of optimism, driving efforts towards modernization. Key spaces like Hofplein Square underwent transformations, focusing more on practicality (Wagenaar, 2016, pp. 337-341). Adaptations to changing socio-economic conditions saw Rotterdam transitioning from cozy neighborhoods to denser developments in the late 1980s. Embracing iconic architecture and cultural initiatives, Rotterdam continues to shape its identity, aiming for vibrant, livable spaces amidst challenges such as opposition from certain groups and the complexities of large-scale changes (Wagenaar, 2016, pp. 370-375). Through thoughtful interventions and a commitment to preserving its heritage while embracing modernity, Rotterdam emerges as a beacon of urban renewal, blending tradition with innovation to shape its dynamic urban landscape.

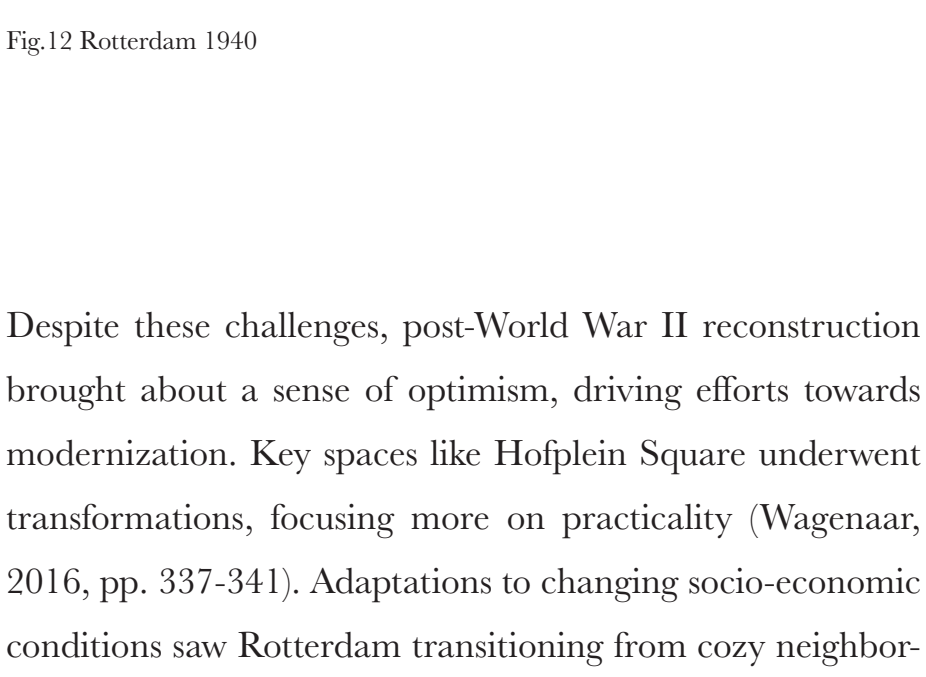


Fig16 Rotterdam Nolli map 1948

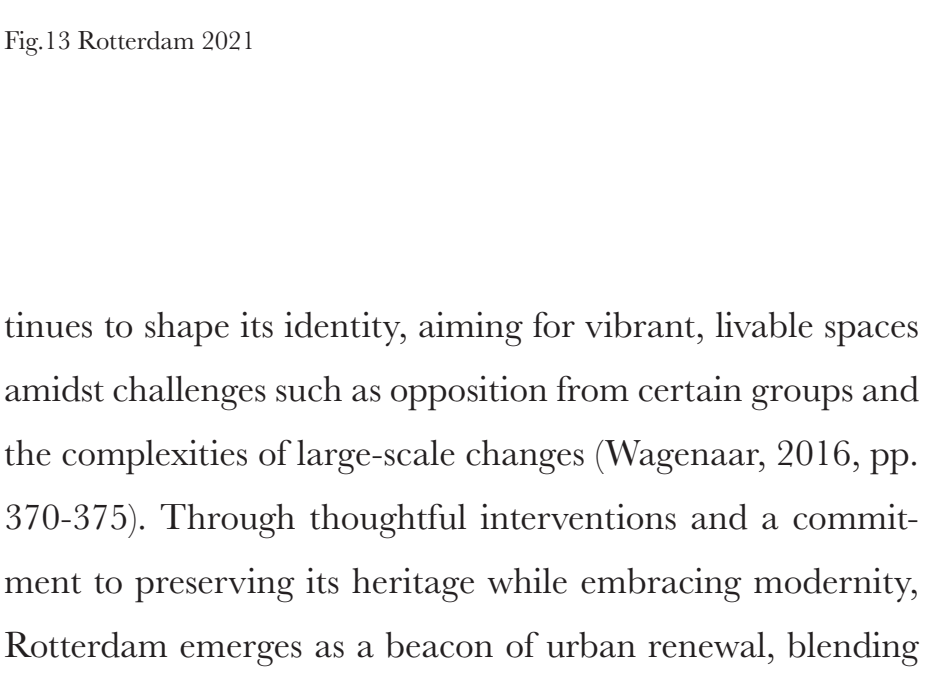


Fig.17 Rotterdam Nolli map 2023

1.2 Brandgrens as an Entry Point

Historical Analysis

Pre-1920s:

Traditional street layouts fostered moderate permeability and accessibility.

Canals and harbors served as natural transportation routes, enhancing connectivity.

1920s - 1930s:

Introduction of fan-like road patterns in south Rotterdam improved circulation.

Adoption of a grid-like structure on the north bank further facilitated movement.

1940s - Post-War Reconstruction:

Reconstruction efforts maintained the city's triangular shape while upgrading infrastructure.

Limited external intervention minimized fractures in the reconstruction process.

1950s - 1960s:

Reinforcement of wide boulevards and zoning systems maintained material continuity.

Functional zoning potentially reduced permeability in certain areas.

1970s - 1980s:

Densification campaigns introduced new vertical elements, altering urban density and permeability.

1990s - Present:

Attention to architectural quality and public spaces improved material porosity.

Embrace of iconic architecture introduced new focal points and mixed-use developments.

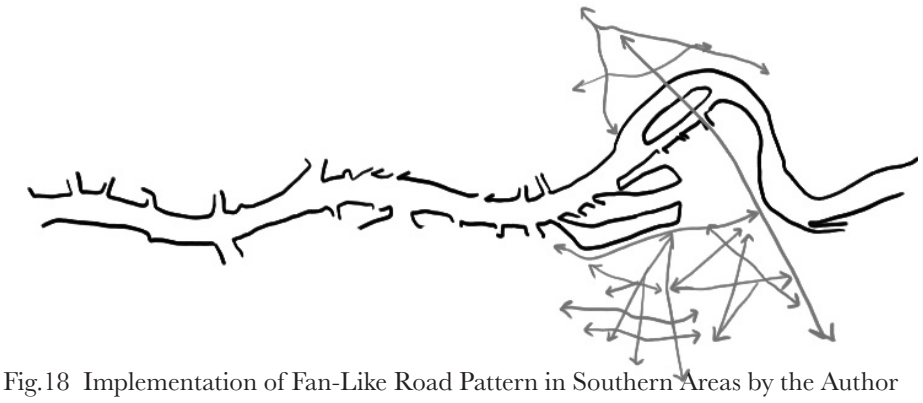


Fig.18 Implementation of Fan-Like Road Pattern in Southern Areas by the Author

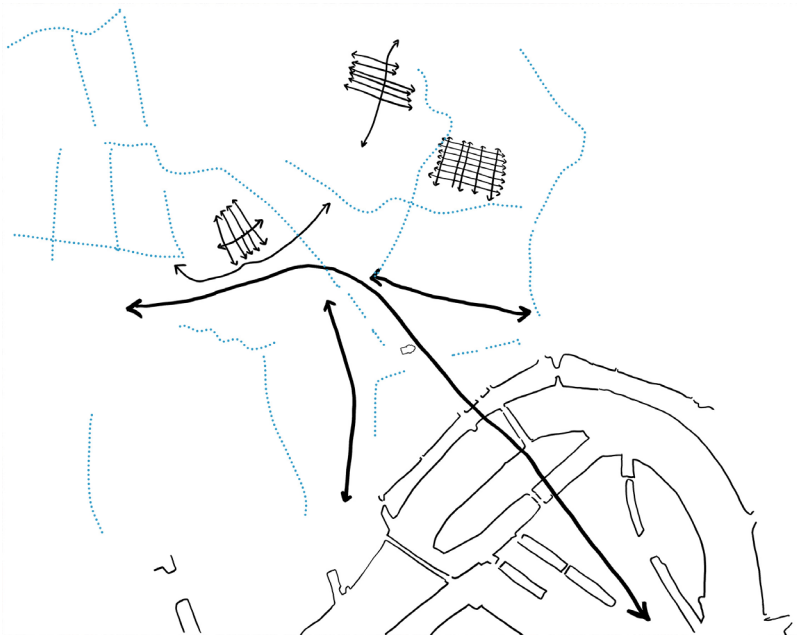


Fig.19 Adoption of Grid-Like Structure on North Bank with Creation of Canals by the Author

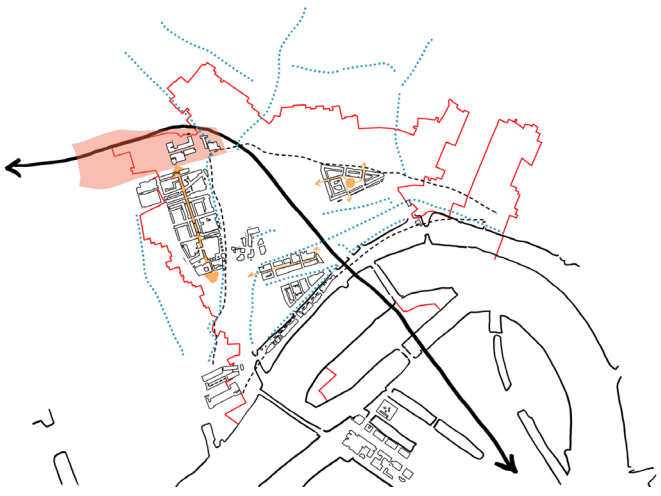


Fig.20 Introduction of Wide Boulevards and High Rises by the Author

Wagenaar, C. (2016). Town planning in the Netherlands since 1800: Responses to enlightenment ideas and geopolitical realities. International Planning History Society Proceedings, 17(5), 213, 287-292, 337-341, 370-375, 382-408, 517-540.

1900s-1930s:

Streets: Traditional mixed-use streets, like Witte de Withstraat, predominated.

Building: Urban blocks featured closed or partially open structures, with rear passageways and private gardens.

Collective Space: Introduction of communal gardens within urban blocks.

Buildings showcased compositional façade patterns, emphasizing block unity.

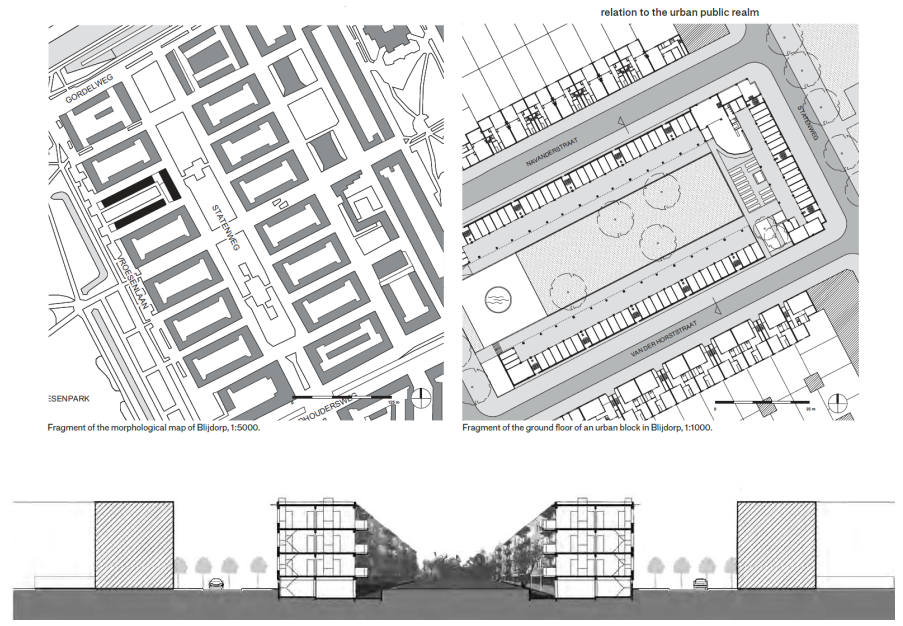


Fig.21 Plans and perspective cross-section of an urban block in Blijdorp, 1:500. (Komossa, S, 2010).

1930s-1950s:

Streets: Transition to more functionally segregated areas.

Building: Shift towards modernist designs with open corners and functional layouts.

Integration of communal spaces within dwellings and neighborhoods, emphasis on functionality and efficiency, reflecting modernist ideals.

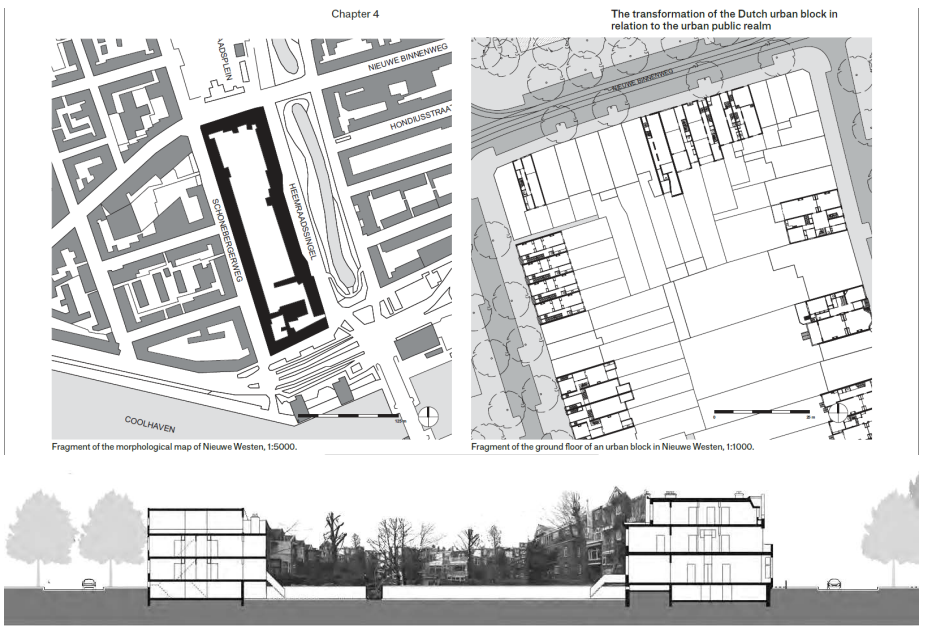


Fig.22 Plans and perspective cross-section of an urban block in Nieuwe Westen, 1:500. (Komossa, S, 2010).

Post-WWII Reconstruction Period:

Streets: Introduction of a three-dimensional, segregated layout.

Building: Adoption of various building types based on family structure.

Expansion of communal green spaces. Dwellings designed to visually connect with collective realms.

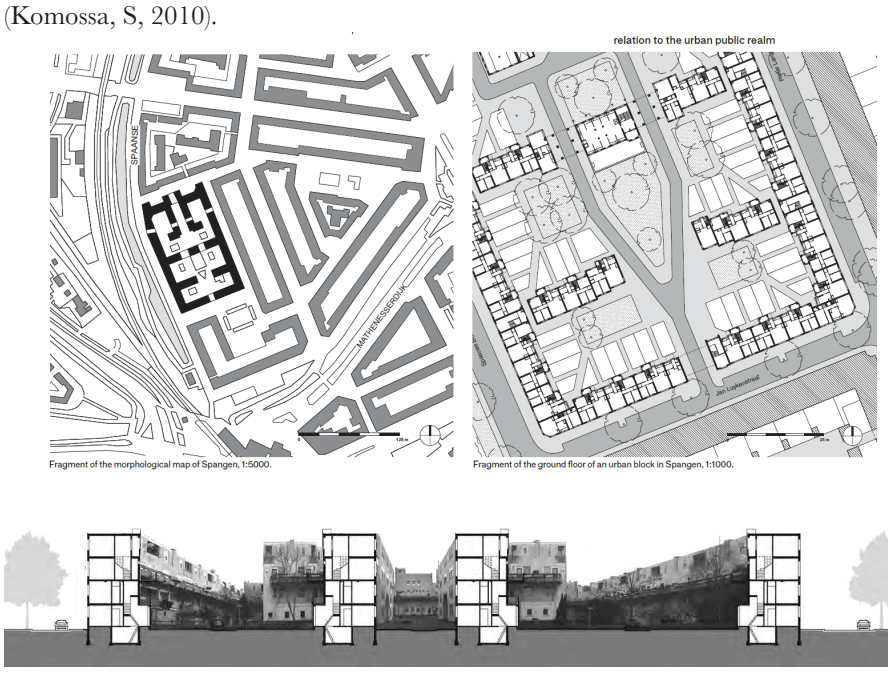


Fig.23 Plans and perspective cross-section of an urban block in Spangen, 1:500. (Komossa, S, 2010).

Late 20th Century (1960s-1980s):

Blocks: Development of urban blocks with modernist and post-modernist architectural styles.

Streets: Expansion of road networks and pedestrian-friendly features.

Building: Construction of iconic landmarks and use of innovative techniques.

Integration of public spaces into urban design. Efforts to conserve historic buildings and neighborhoods. Expansion of parks and adoption of sustainable practices.

Rehabilitation of waterfront areas and incorporation of water features. Adoption of sustainability-focused planning strategies.



Fig.24 Play areas and galleries Blijdorp, Delftse Poort mixed-use street Witte de Withstraat, Transitioning streets Schiedamseweg, Bospolder/Tussendijken

Post-1980s and Beyond:

Transition towards densification and revitalization efforts.

Continued emphasis on architectural quality and public spaces.Embrace of iconic architecture and revitalization plans.

Komossa, S. (2010)

1.3 Related Challenges

Urban cracks present a mix of problems and opportunities. This chapter explores them in two categories: **urgencies** and **trends.**

Urgencies include **social** safety risks, **environmental** issues like heat stress and water flood risks, scarcity of green space, and **economic** burdens linked to illegal dumping.

However, these spaces are also intertwined with global **trends** that address **social** urgencies such as densification and feelings of loneliness. They can also play a pivotal role in urban strategies for **climate** resilience and circular **economy** initiatives.

Urgencies:

Analyzing the dispersal of sexual violence cases in Rotterdam at the neighborhood level, based on data from the Rotterdam police (January 2012–June 2017), highlights areas needing safety improvements. By identifying these urban cracks where incidents are more common, we can transform them to enhance public safety.

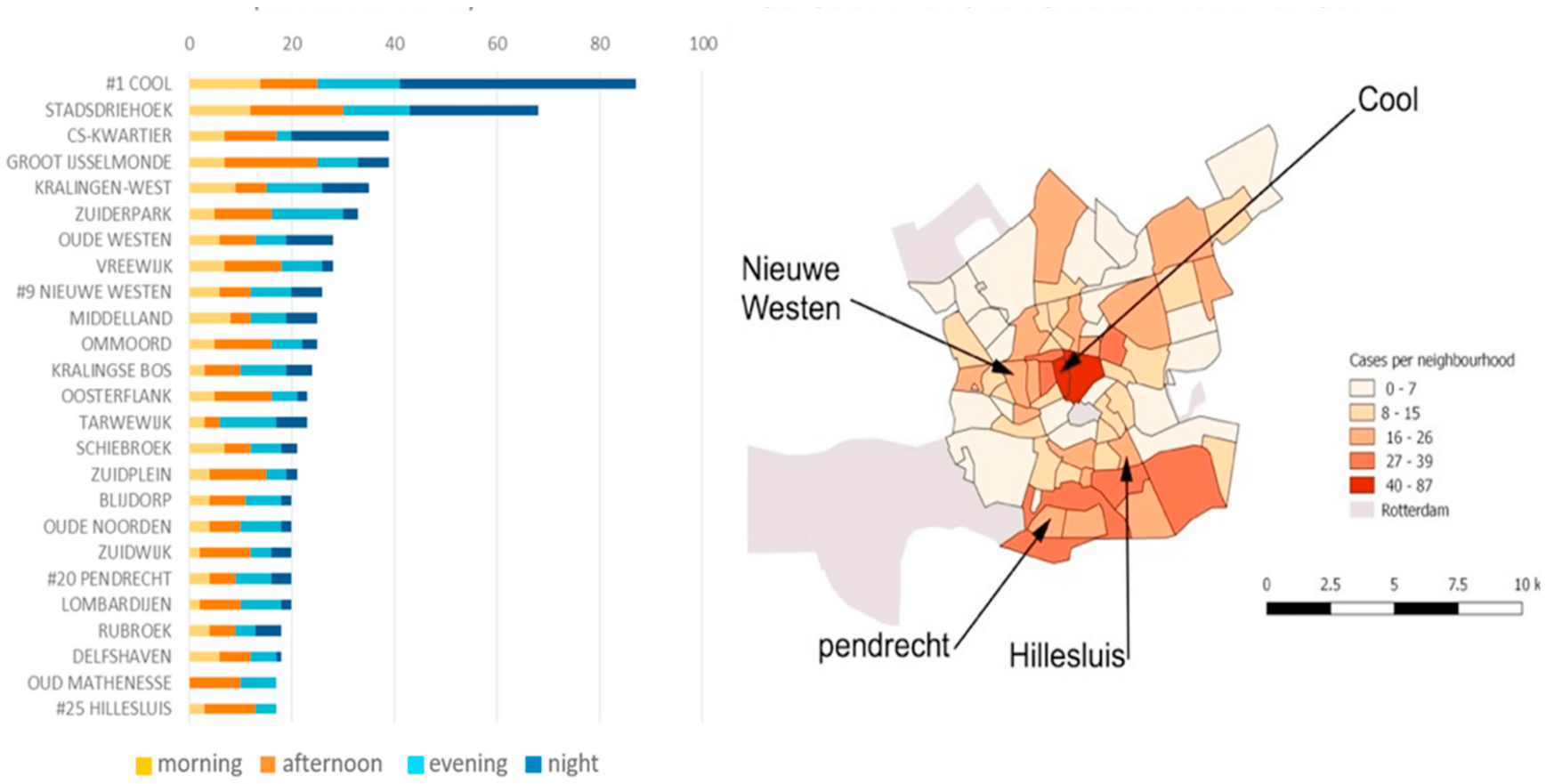
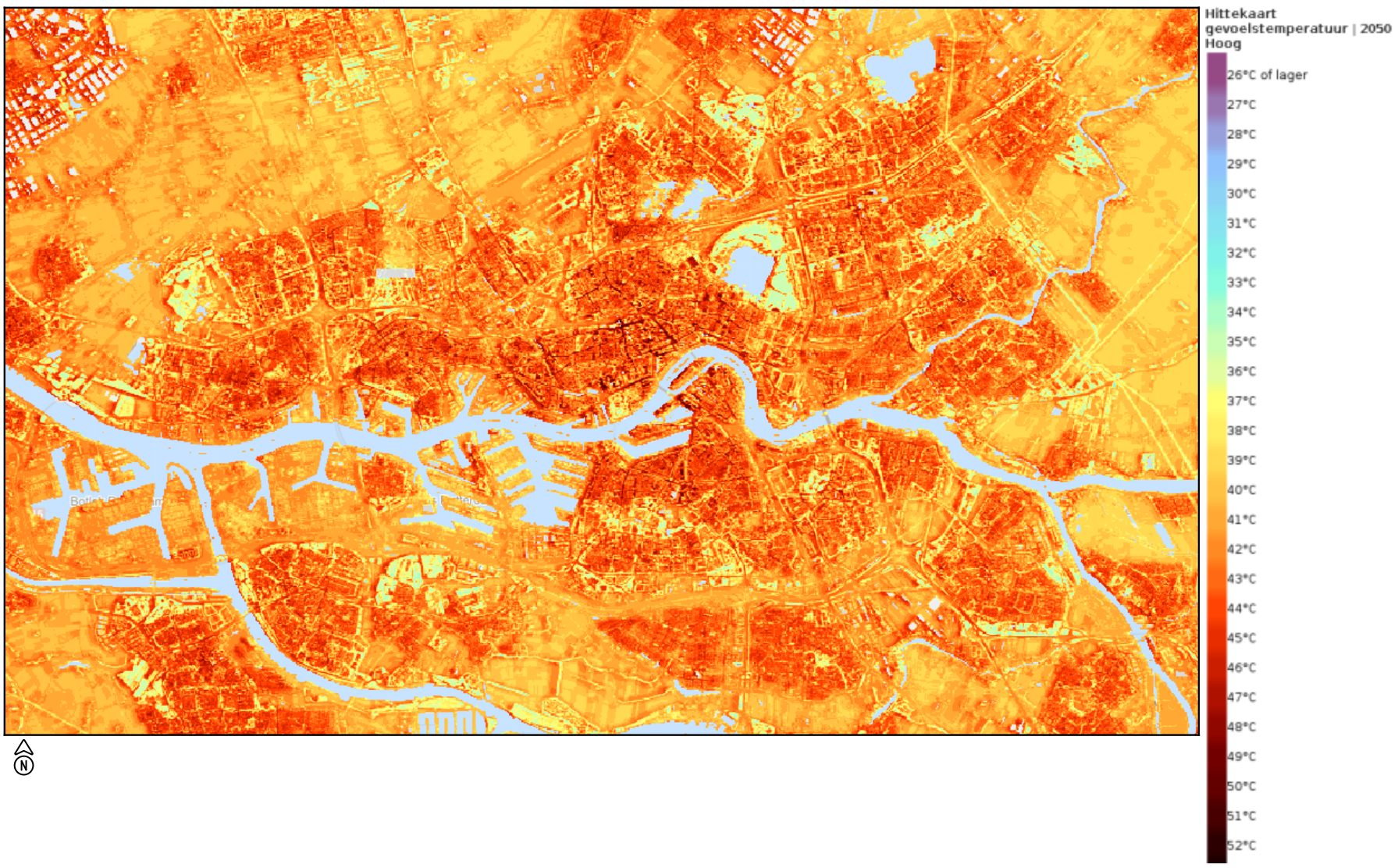


Fig.25 Dispersal of sexual violence cases on neighborhood level in Rotterdam with temporal distribution. Spatialized data of reported cases of sexual assault and rape on the streets. Source: Rotterdam police, January 2012–June 2017.

Fig.26 Rotterdam has a notable urban heat island effect, with temperature differences between urban and rural areas reaching up to 8 degrees Celsius during windless summer nights. This effect is exacerbated by climate change and disproportionately affects vulnerable groups such as the elderly and low-income populations (Klimaatadaptatie). (https://www.klimaateffectatlas.nl/nl/)



Urgencies:

Fig.27 Current greenery coverage in Rotterdam's urban area is around 22%. The target for 2025 is to increase this to 35% to help mitigate heat stress and improve overall climate resilience. It can be observed that the center has the least amount of greenery, ranging between 10-20% (https://www.klimaateffectatlas.nl/nl/).

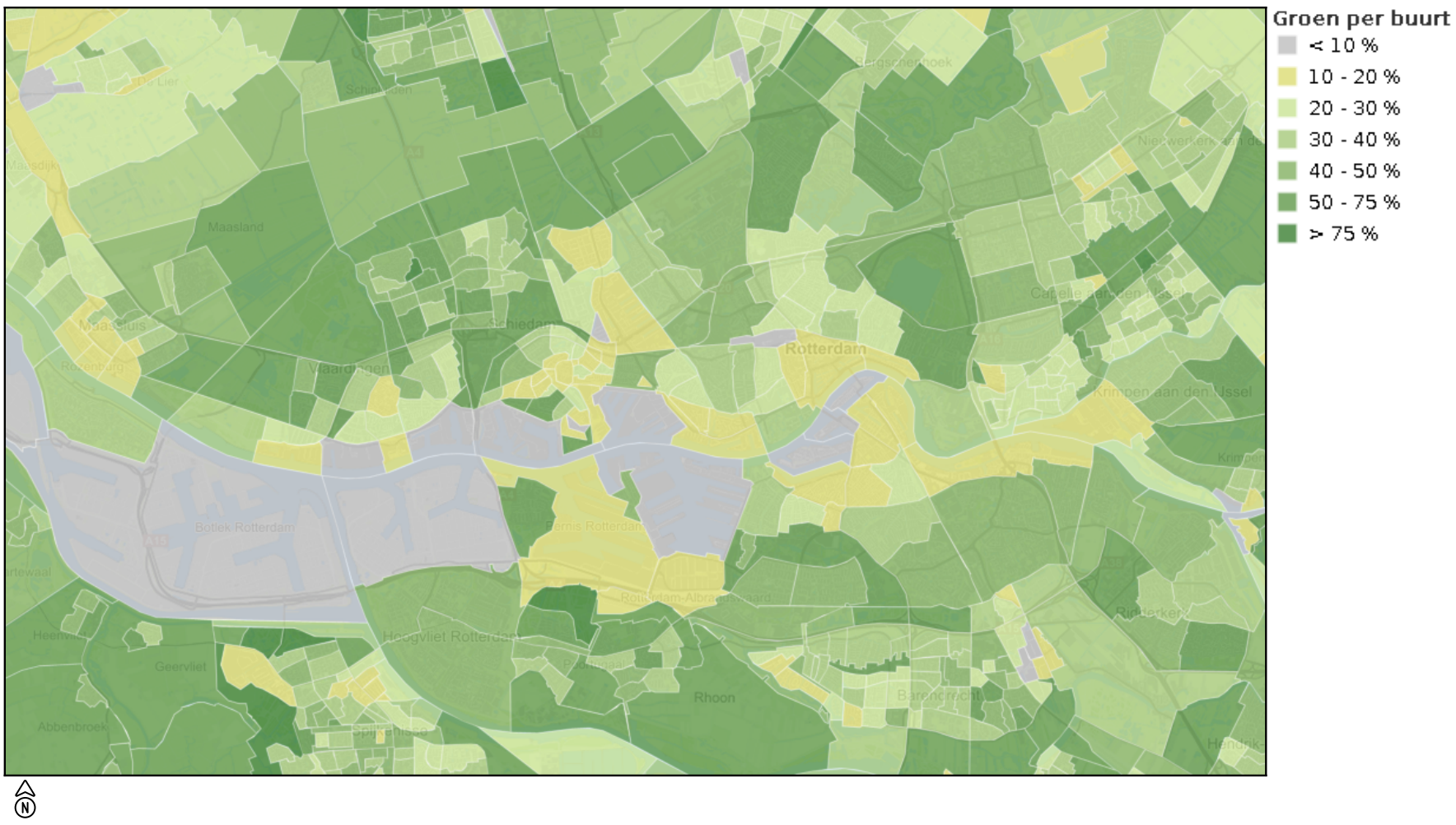
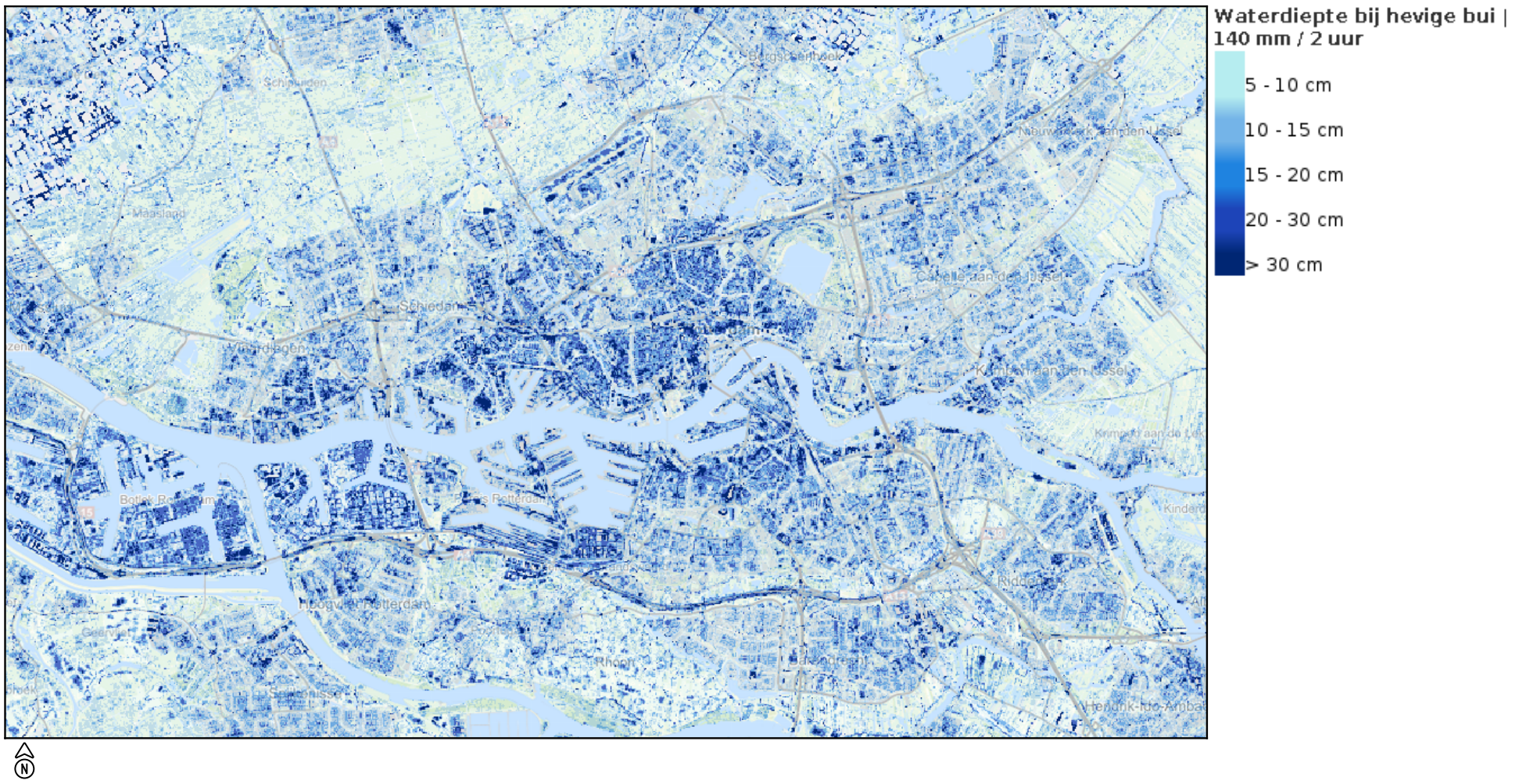


Fig.28 It can also be observed that water depth during heavy showers is highest in the city center, indicating the need for more water management actions. Rainwater can reach depths of more than 30cm during heavy showers (https://www.klimaateffectatlas.nl/nl/).



Trends:

Density

Given the expected population growth to 1.048 million by 2030 in Rotterdam (cbs.nl), enabling new public spaces presents a significant challenge. This growth necessitates innovative approaches to urban planning, particularly the strategic utilization of urban cracks.

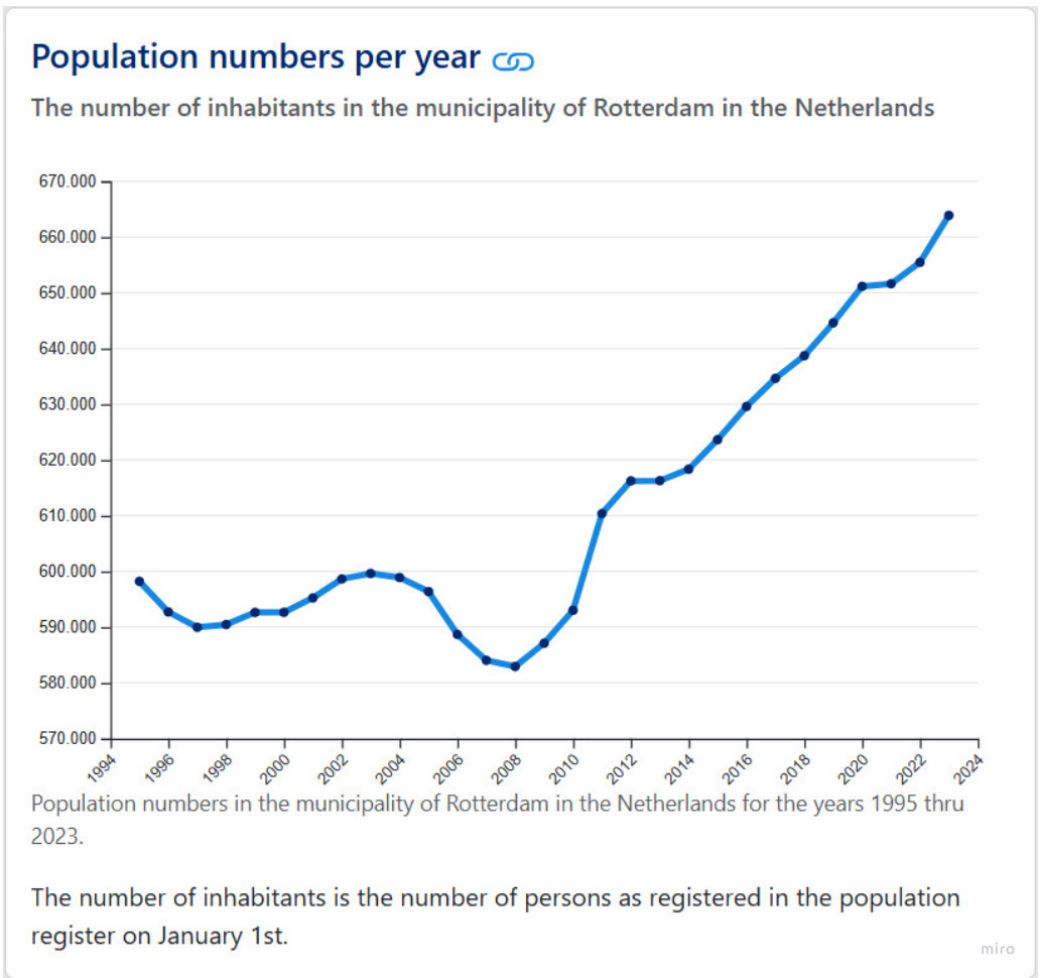
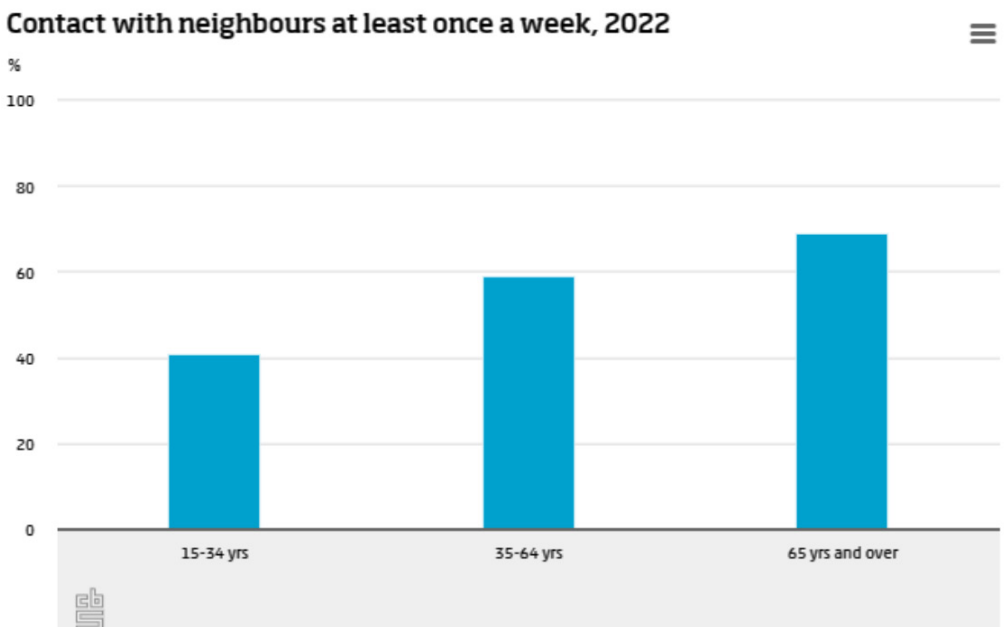


Fig.29 https://allcharts.info/the-netherlands/municipality-rotterdam/

Loneliness

The absence of essential low-profile activities within communities can exacerbate feelings of severe social loneliness. When individuals lack opportunities for casual social interactions with family, friends, and neighbors, they may experience a heightened sense of isolation. This issue is particularly evident among different age groups, with both younger and older demographics reporting high levels of loneliness. where Absence of social contacts may lead to feelings of severe social lonelinessnoot1, where people would like to have more contact with family, friends and neighbours. In 2022, 12 percent of over-65s said they felt very lonely. This is the same percentage as the youngest age group, the under-35s. People aged 35 to 64 years experienced feelings of severe social loneliness most (16 percent). Severe social loneliness has fallen by most in the 25 to 34 year age group.



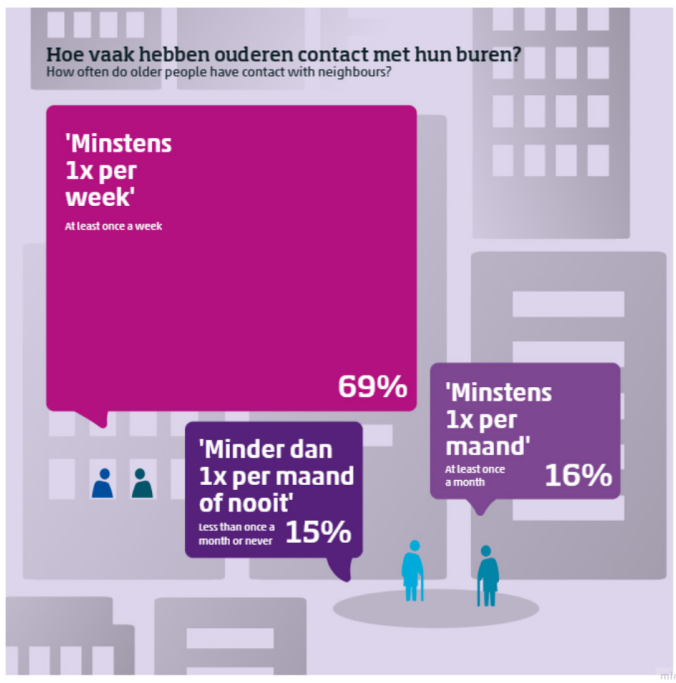
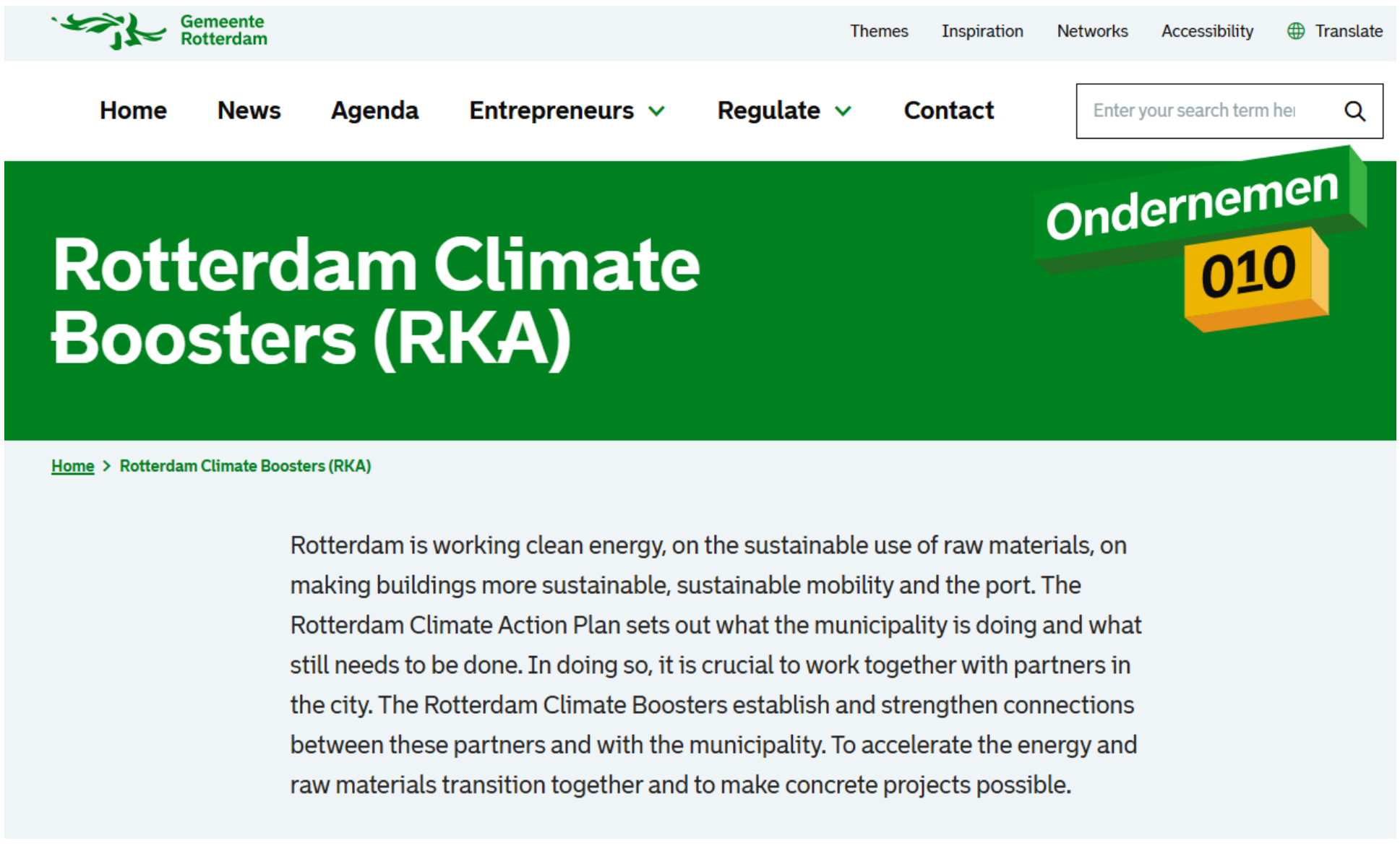


Fig.30 https://www.cbs.nl/nl-nl/nieuws/2023/38/bijna-70-procent-van-ouderen-heeft-minstens-elke-week-contact-met-de-buren

Trends:

Rotterdam Climate Agreement:

Fig.31 In 2019, the Rotterdam government and over 100 companies and organizations signed the Rotterdam Climate Agreement.
The agreement outlines measures to achieve a fully circular society and a climate-neutral city by 2050. It emphasizes reducing greenhouse gases and promoting a CO2-free economy3. (https://www.ondernemen010.nl/rotterdamse-klimaata-anjagers-rka/)



Conclusion:

In light of the challenges posed by the expected population growth in Rotterdam and the various urban issues highlighted, Urban cracks serve as both the breeding ground for urban challenges and the potential solution.

1.4 Research Framework

This chapter gives an overview of the project, starting from motivation to project location, problem statement, research question, and research aims.

Fueled by curiosity about leftover urban spaces and their potential, the project seeks to explore and repurpose these "urban cracks" to enhance urban vitality.

[Motivation and Relevance]

Examining the potential of tactical urbanism interventions to transform overlooked 'urban cracks,' into vibrant community hubs in Rotterdam.

[Problem Field]

Rotterdam, Urban Design, Tactical Urbanism, Resilience, Urban Cracks

[Key Words]

Brandgrens, Rotterdam, Netherlands

[Location]

Porosity, Open City, Resilience, 0th Place, Tactical Urbanism

[Theories and Concepts]

[Problem Statement]

The redevelopment of Rotterdam's city center post-World War II aimed to create an inviting urban environment but inadvertently left behind neglected areas termed as 'urban cracks.' These cracks, representing missed opportunities, pose significant challenges to effective placemaking and community vibrancy. They manifest social divisions, contributing to social isolation and economic disparities within communities. Additionally, urban cracks often suffer from environmental degradation, serving as sites for pollution and illegal dumping.

[Research question]

How can the 'urban cracks' in Rotterdam, particularly within the Brandgrens area, be revitalized to foster resilience, vibrancy, and inclusive placemaking, while mitigating social, economic, and environmental challenges?

[Research Aim]

Redefine urban cracks as resilient and vibrant places (0th place) through tactical urbanism interventions to enhance Social Integration, Economic Equity, and Climate Resiliency. Investigate the relationship between urban cracks and the broader urban fabric to understand their influence on city dynamics.

1.4 Research Framework

Sub-Research questions

[Research question]:

How can the ‘urban cracks’ in Rotterdam, particularly within the Brandgrens area, be revitalized to foster resilience, vibrancy, and inclusive placemaking, while mitigating social, economic, and environmental challenges?

To address Research Question 3, a series of sub-questions were formulated, each utilizing a distinct methodological approach.

The first sub-question involved an **analytical** examination of urban cracks, aiming to understand their characteristics and implications.

The second sub-question focused on investigating the **potential** of these urban cracks, exploring opportunities for intervention or enhancement.

Finally, the third sub-question centered on **design** possibilities, considering how these insights could inform the development of urban spaces.

[Sub-Research question 1]:

What spatial characteristics and physical features define urban cracks, and how can they be distinguished from other urban spaces?

[Sub-Research question 2]:

What are the existing and potential functions and activities that urban cracks can accommodate, and how do these contribute to the vitality of the city?

[Sub-Research question 3]:

What are the key characteristics of the ‘0th place’ concept, and how does it differ from traditional urban spaces?

1.4 Research Framework

Theoretical Framework

[Theories and Concepts]:

Porosity, Open City, Resilience, 0th Place, Tactical Urbanism

The project integrates concepts from, Resilient Cities, Tactical Urbanism, and the Open City to redefine urban cracks.

Resilient Cities focus on absorbing, recovering, and preparing for shocks, sustainable development, robustness, redundancy, flexibility, and community engagement (Ribeiro & Gonçalves, 2019).

Tactical Urbanism involves small-scale, temporary interventions, community-driven approaches, lighter, quicker, cheaper implementations, and adaptive, creative responses (Lydon & Garcia, 2015).

The Open City emphasizes porous edges, incompleteness, and unresolved narratives, encouraging interaction, flexibility, and adaptability within urban spaces (Sennett, 2013; Urban Springtime).

Porosity refers to a material's ability to allow percolation and infiltration, which significantly impacts how urban spaces are used and navigated by different city users. It isn't static; it evolves over time as urban spaces respond to various influences like practices, movement, pressure, and neglect (Secchi & Viganò, 2009). In porous architecture, buildings and actions blend together in courtyards, arcades, and stairways, creating room for new and unexpected configurations. Architecture in these spaces becomes civilized, private, and ordered, especially evident in large hotels and warehouse buildings on the quays (Benjamin, 1925). This concept of porosity directly relates to urban cracks, as these overlooked spaces can transform and adapt, fostering unexpected uses and interactions.
By synthesizing these concepts, the project aims to create resilient and vibrant urban environments that prioritize community engagement, adaptability, and inclusivity.

Also, the project centers around spatial morphology, perception, and place-making.
Spatially, the emphasis lies in defining "cracks" and voids, drawing inspiration from works such as "Finding Lost Space" by Roger Trancik, "The Charged Void Urbanism" by Simthons, "City Within the City" by Ungers, and "Porocities" by Paula Vigano.

Exploring perception involves delving into Place Identity, where insights from philosophers like Merleau-Ponty, Deleuze, Guattari, Lefebvre, Goodman, and Virilio are in the "Thinkers for Architects" series. These theories, encompassing embodied experiences, non-hierarchical spatial arrangements, socially constructed space, perceptual shaping, and technology's impact, form the basis for the argument on how we perceive these spaces.

2.0 Research design

2.1 0th Place

This chapter will discuss the methodology and clarify the project framework. Beginning with the research aim, it will then systematically outline each subsequent stage of the process.

[Research Aim]:

Redefine urban cracks as resilient and vibrant places (**0th place**) through tactical urbanism interventions to enhance Social Integration, Economic Equity, and Climate Resiliency. Investigate the relationship between urban cracks and the broader urban fabric to understand their influence on city dynamics.

What is the 0th Place, and Why the 0th Place?

In sociology literature, places are defined by how people occupy them in their daily lives. The first place is the home, the second place is the workplace or school, and the third place is a public space where people gather and interact outside of their first two places. This concept of first, second, and third places was introduced by Ray Oldenburg.

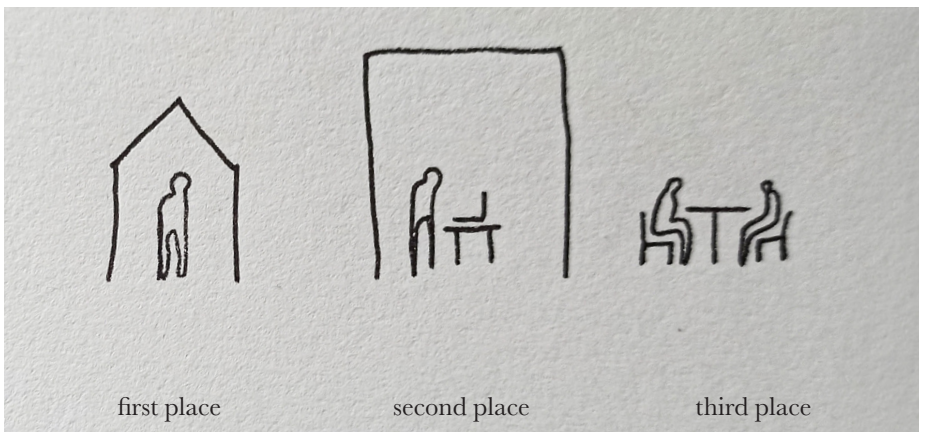


Fig.32 Illustration of 1st, 2nd, and 3rd place (author)

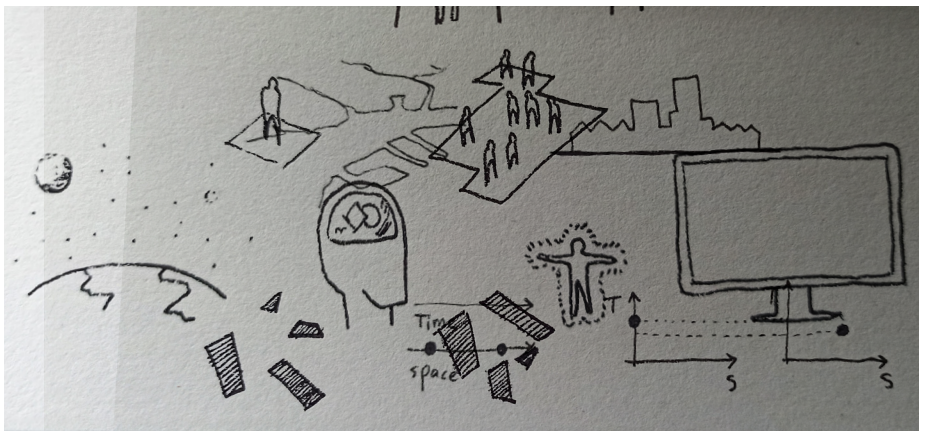


Fig.33 Different categorizations of places come from various mediums, like art: outer place, inner place, personal place, and pictorial place. In philosophy, place is categorized into absolute place and relative place, etc. (author)

The idea of the 0th place emerged as a response to non-places—spaces that are either feared or purely transitional. But what if there was a space that could evolve over time and adapt to different uses by different groups?

The **"0th place"** is a concept that refers to a theoretical social space acting as a reset point for place identity. It serves as a potential nest for new, site-specific functions within urban design and sociology. It is a space of freedom and encounter that challenges traditional interpretations of place.

2.1 0th Place

Tactical urbanism

Tactical urbanism refers to a rapid, low-cost, and scalable approach for making temporary changes to the urban environment. It often involves short-term interventions in urban gathering areas, aiming to improve public spaces and address environmental, social, and economic challenges. These interventions can be seen as "bricks and mortar" street-level actions that animate tangible urban change (Elzenga, L., 2023).

For me, tactical urbanism is about leveraging the outcomes of these small interventions by using design knowledge and skills, not solely relying on limited tactical urbanism tools. It's about pushing the boundaries of tactical urbanism with the help of thoughtful design to create meaningful and lasting impact.



Fig.34 An example for project aims. Activated Street with Wooden Intervention https://www.archdaily.com/799277

2.2 Conceptual Framework

The conceptual framework of this research focuses on transforming urban cracks into 0th places through the application of tactical urbanism. This framework moves from identifying the problem (urban cracks) to exploring the potential (tactical urbanism) and finally, testing the opportunity (0th place).

This approach not only addresses existing problems but also reimagines urban cracks as opportunities for positive change. Through thoughtful design and community engagement, urban cracks can become valuable assets that contribute to a more cohesive, equitable, and sustainable urban landscape.

Problem: Urban Cracks

Urban cracks represent problems in three main categories: social, economic, and environmental. Socially, urban cracks host segregation and isolation. Economically, they highlight disparities and underutilized resources. Environmentally, they suffer from degradation and neglect.

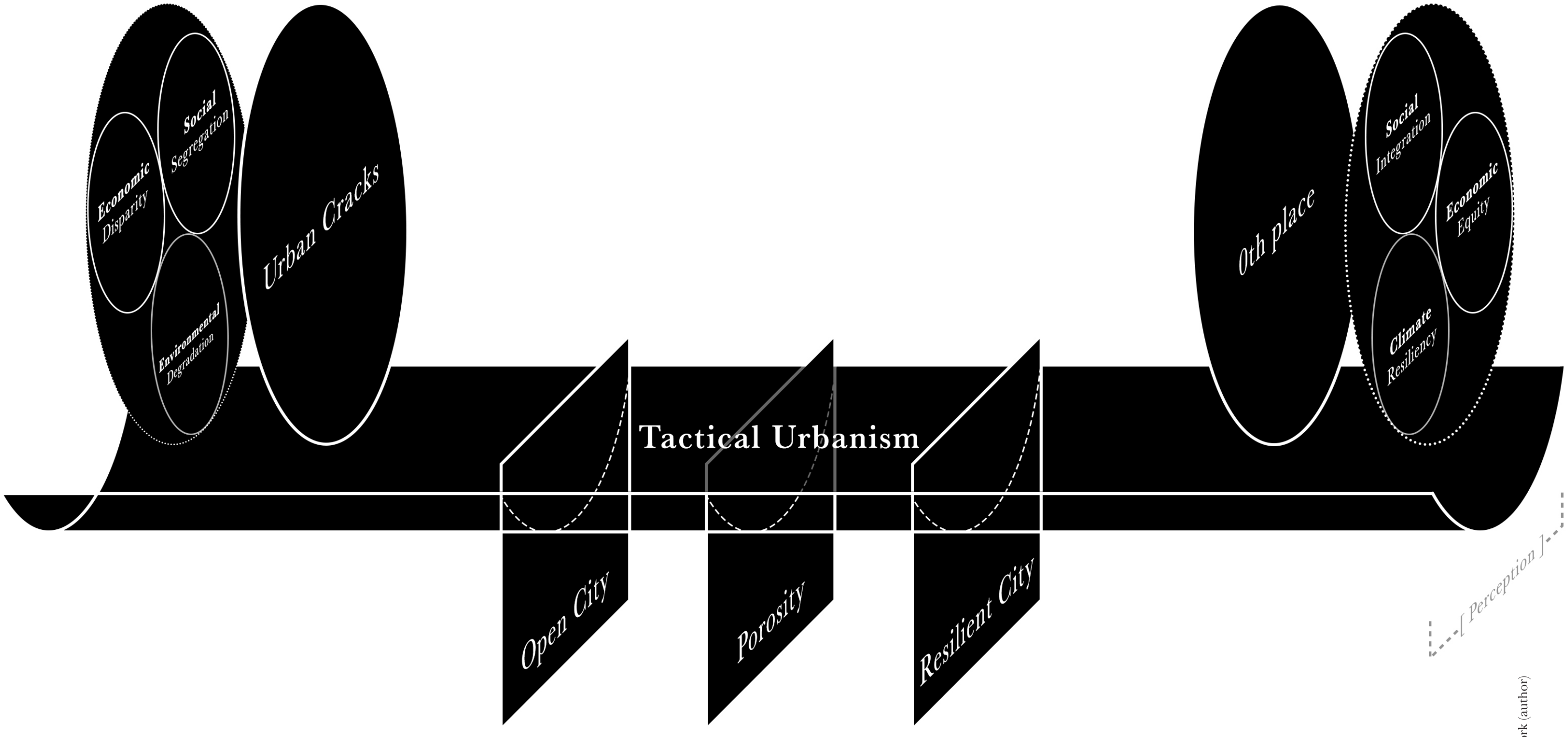
Potential: Tactical Urbanism

Tactical urbanism offers a way to address these issues through small-scale, low-cost, and temporary interventions. Supported by theories from the Open City, porosity, resilient cities, and perception-related philosophy, tactical urbanism aims to redefine urban cracks and unlock their potential.

Opportunity: 0th Place

The goal is to transform urban cracks into 0th places. These are spaces that integrate diverse social groups (social), achieve economic equity (economic), and enhance climate resilience (environmental). By leveraging the principles of tactical urbanism, we can create vibrant, adaptable, and inclusive urban environments.

[Problem] [Potential] [Opportunity]



[Perception]

[Theory]

Fig.35 Conceptual Framework (author)

2.3 Methods

In the pursuit of understanding the urban cracks and the impact of tactical urbanism on it, this study employs a research-by-design approach, supplemented by critical mapping, fieldwork, data mining, morphological analysis, modeling, and literature review. Each methodological approach is carefully chosen to address specific research objectives and contribute to a nuanced understanding of the subject matter.

Research by design approach:

In the realm of research, testing, and design, play pivotal roles, as illuminated by three core hypotheses (Vigano, 2019), which are going to be used to explore the impact of tactical urbanism on the context.

-**Conceptualization:** Questioning the value of ideas in the present context, innovating, and reimagining concepts to address contemporary needs, analogous to characters adapting in a story. Through this approach, fresh ideas are generated, questioning their relevance in the present, and thereby contributing to new knowledge.

-**Description:** By creating a relationship with the environment, patterns are uncovered. Projects are used to narrate and understand the built environment, similar to describing a story's setting, revealing hidden patterns within spaces to deepen understanding and develop theories for change. Understanding how space could evolve during scenario exploration contributes to the body of knowledge.

-**Future:** With forward-thinking design, envisioning potential scenarios and anticipating changes to contribute to a deeper understanding of future possibilities, thus enriching collective knowledge.

Critical mapping:

Critical mapping is an approach to cartography that goes beyond conventional practices by analyzing maps with a "critical perspective", aiming to uncover power dynamics and challenge dominant narratives, while acknowledging choices of what to include or exclude.

Field work:

A crucial aspect of primary data collection, allowing for firsthand observation of neglected urban spaces. These visits involve documenting physical characteristics, observing user behavior, and gaining a contextual understanding of the spaces in question.

Data mining:

The data mining method involves extracting insights from diverse urban data sources such as historical maps, satellite imagery, and demographic statistics

Morphological analysis:

It is a combination of qualitative and quantitative methods, including observation, historical mapping, and data analysis. Additionally, spatial analysis tools are used to analyze and interpret urban form data, such as Space Syntax, which analyzes how the arrangement of spaces influences movement patterns, accessibility, and social interactions within urban environments.

Modeling:

Making models will be used for exploring spatial arrangements, building forms, and urban layouts. Maquettes allow for hands-on exploration, facilitating discussions, feedback, and iterative design processes. They help refine concepts and identify potential issues efficiently.

Literature Review:

A review of scholarly works pertaining to neglected urban spaces, placemaking, spatial morphology, perception shaping, place identity, urban voids, non-western urbanism, and the open city concept will be conducted. This will serve as the foundational step to build upon existing knowledge and theories in the field.

2.3 Methods

The table shows which methods are being used to answer each question.

When addressing **Sub-Research Question 1:** What spatial characteristics and physical features define urban cracks, and how can they be distinguished from other urban spaces?

Methods such as **Critical Mapping** (using space syntax, constitutedness analysis, and layering of findings on maps), **Fieldwork** (to investigate the characteristics of urban cracks and evaluate them in person), **Data Mining** (to map different environmental data and search archives for relevant information), **Modeling** (to understand and investigate urban cracks spatially), and **Literature Review** (to identify all characteristics of urban cracks) will be employed. These methods aim to **identify** urban cracks as initial sites for in-depth problem investigation.

The same applies to **Sub-Research Question 2:** What are the existing and potential functions and activities that urban voids can accommodate, and how do these contribute to the vitality of the city?

Methods such as **Morphological Analysis** (to analyze and understand the types of opportunities allowed based on the interaction between different densities), **Critical Mapping** (to intersect this morphological analysis with the previous findings from Sub-Research Question 1), **Fieldwork** (to verify if the quantitative findings align with the qualitative ones), **Data Mining** (to find, modify, and validate the data used in morphological analysis), and **Literature Review** (to compare the methods used with the potential findings) aim to create the **Map of Opportunities**. This map lists design locations and highlights their potentials.

For **Sub-Research Question 3:** What are the key characteristics of the '0th place' concept, and how does it differ from traditional urban spaces?

When addressing the design aspect, **all** the mentioned **methods** will be employed to create an **8-step design framework,** emphasizing the **Research by Design approach.** This framework aims to produce a **design**, a **tactical urbanism catalogue**, and a **final strategy** and **framework.**

Method \ Sub-Research question	[Sub-Research question 1]: What spatial characteristics and physical features define urban cracks, and how can they be distinguished from other urban spaces?	[Sub-Research question 2]: What are the existing and potential functions and activities that urban voids can accommodate, and how do these contribute to the vitality of the city?	[Sub-Research question 3]: What are the key characteristics of the '0th place' concept, and how does it differ from traditional urban spaces?
Research by design approach:	○	○	●
Critical mapping	●	●	●
Field work	●	●	●
Data mining	●	●	●
Morphological analysis	○	●	●
Modeling	●	○	●
Literature Review	●	●	●
Expected outcomes	Identifying urban crack typologies as initial sites for in-depth problem investigation	Map of Opportunities: Design locations listed, highlighting their potentials.	The result is the creation of a design and strategy through an eight-step process.

2.4 Methodology framework

The methodology framework provides an overview of the project's process, detailing the types of questions posed and the approach taken to guide subsequent steps.

The **first column**, labeled **'Entry Point,'** addresses the **'why'** question, aiming to **investigate** and **understand** the topic within the **discourse** of urbanism and urban design.

The **second column** focuses on the **'where'** question (to find where the urban cracks are), **identifying** urban cracks to answer Sub-Research Question 1. **Qualitative** and **quantitative** methods are utilized to **locate** and **characterize** these urban features.

The **third column** addresses the **'what'** question (to understand the potential of them), exploring the **potential** of urban cracks in alignment with Sub-Research Question 2. This involves creating an **opportunity map** that informs the subsequent steps.

Finally, the **fourth column** addresses the **'how'** question, focusing on **design** strategies and implementation. This phase **synthesizes findings** from previous columns into a **systematic** approach to **uncover** and **maximize** the **potential** of urban cracks. It culminates in a detailed design strategy aimed at promoting urban resilience through targeted interventions that optimize resources and minimize environmental impact.

2.4 Methodology framework

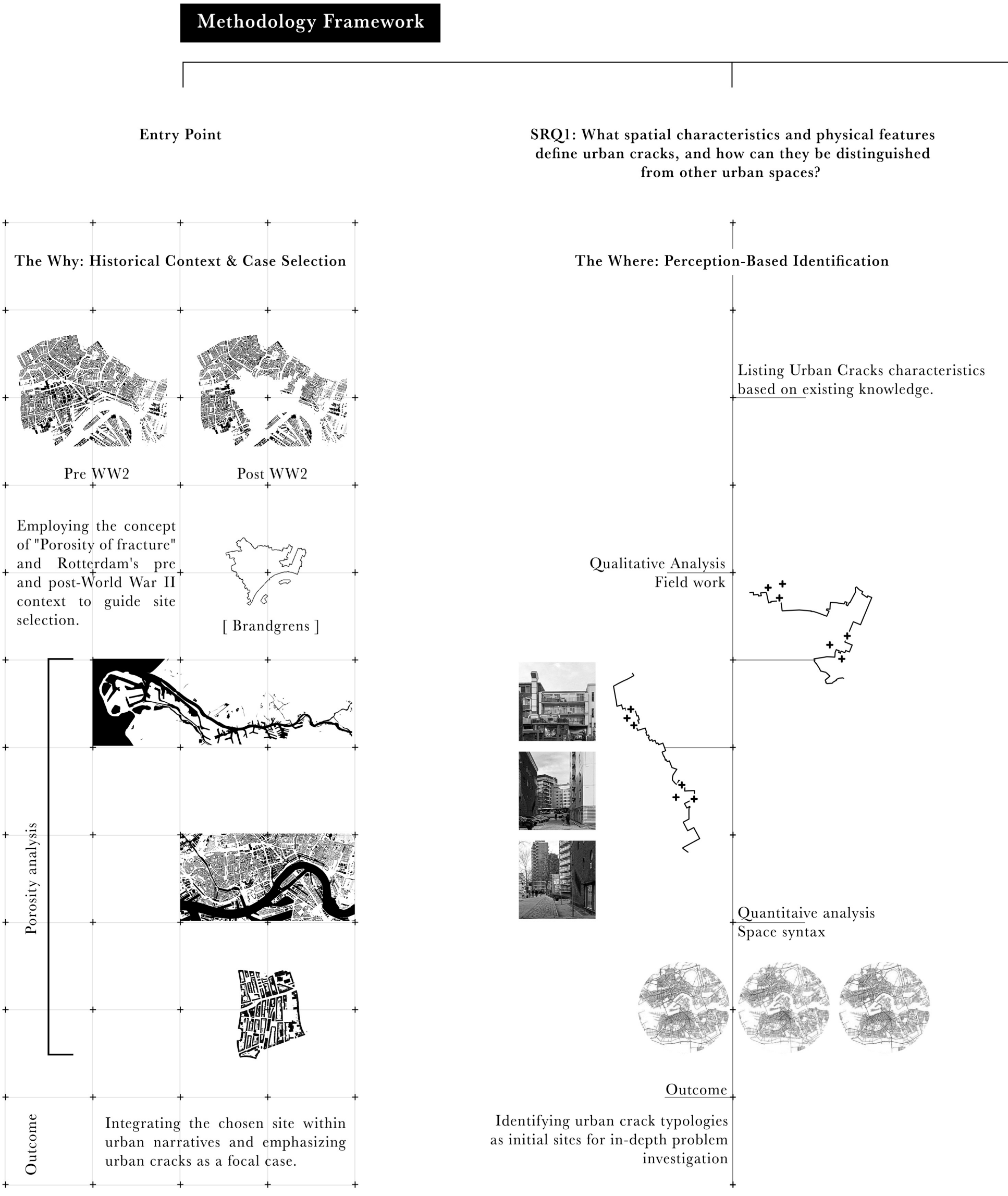


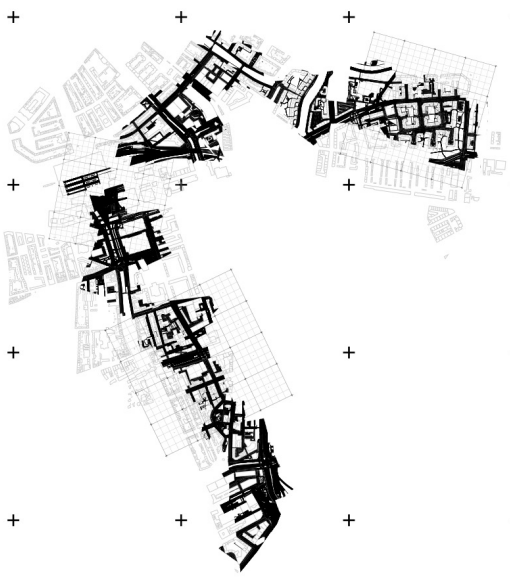
Fig.36 Methodological Framework (author)

SRQ2: What are the existing and potential functions and activities that urban voids can accommodate?

The What: Opportunities
Social, Environmental, Economic

[Critical mapping]

Mapping with the problem in mind “critical perspective” to aiming to uncover the challenges in the 3 mentioned groups



[Social] [Economic] [Environmental]

[Density based analysis]



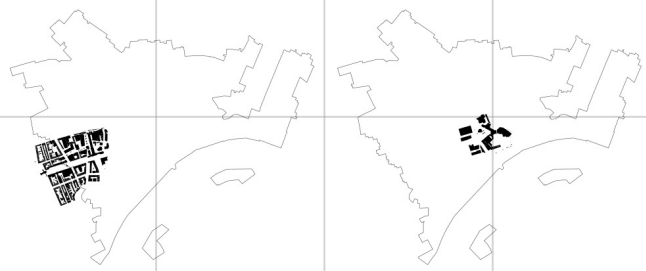
Outcome

Map of Opportunities: Design locations listed, highlighting their potentials.

SRQ3: What are the key characteristics of the ‘0th place’ concept, and how does it differ from traditional urban spaces?

The How: Design

[Selection Criteria]



[Field work]

[Problematization]

[Strategize]

[Description (research by design)]

[Final Design]

[Urban Evolution]

[Scaled-up Brandgrens Strategy]

3.0 Design research

3.1 Situating urban cracks (sq1)

What spatial characteristics and physical features define urban cracks, and how can they be distinguished from other urban spaces?

To address the questions, two approaches are being employed: qualitative and quantitative. The following methods will be utilized:

Literature review:
The characteristics of urban cracks and distinguishable aspects will be defined through the examination of existing literature.

Fieldwork:
The spaces alongside the Brandgrens will be assessed through on-site evaluations.

Critical mapping:
Problems related to social, economic, and environmental aspects within the spaces will be identified through critical mapping.

literature review

How do urban cracks exist and what causes them?

Urban cracks exist as neglected or disintegrating spaces within cities, stemming from flaws in urban planning, administrative oversight, and societal shifts. Causes include social inequalities, economic downturns, shifts in industrial landscapes, and changing urban demographics. These spaces manifest in various forms, ranging from abandoned buildings to fallow lands, and challenge the functioning of cities due to their disorderly composition, on-hold status, and propensity for unruly activities (Steel et al., 2012).

Problems related to urban cracks and challenges:

Urban cracks present numerous problems such as deteriorating infrastructure, social exclusion, crime, and environmental degradation. These issues are compounded by bureaucratic hurdles, limited resources, and community resistance to change. Social problems like poverty, unemployment, and inadequate housing are exacerbated in these areas, further contributing to their marginalized status within the urban landscape (Steel et al., 2012).

Handling urban cracks:

Addressing urban cracks requires inclusive urban renewal projects driven by community engagement, creative interventions, and sustainable development practices. Revitalization efforts should focus on improving infrastructure, providing social services, and enhancing public spaces.

Collaborative approaches involving diverse stakeholders such as artists, urban planners, policymakers, and residents are essential for successful outcomes. Embracing principles from Sennett's Open City theories, such as porous edges and seed planning, can further enrich strategies for handling urban cracks, promoting dynamic, resilient, and inclusive urban landscapes (Sennett, 2013; Steel et al., 2012).

The term "urban crack" critiques the interchangeable use of various terms such as interstice, playground, borderland, transit zone, and in-between space, which fail to capture the nuanced complexities of urban environments. Unlike terms like "non-lieu," "brownfield," "terrain vague," or "no-man's-land," "urban crack" aims to convey a plural and intricate understanding of urban spaces (Arendt, 1961; Augé, 1992).

This complexity reflects the evolving nature of contemporary spatial experiences as discussed by Sennett (1976) and Verschaffel (2006). Sennett's exploration of the public sphere in "The Fall of Public Man" highlights the blurred boundary between private and public spaces, while Verschaffel emphasizes the heterogeneous nature of contemporary spatial experiences (Sennett, 1976; Verschaffel, 2006).

In essence, urban cracks represent spaces where the boundary between private and public realms is vague and shifting. Navigating through urban cracks, individuals move from the private sphere of living into a space lacking clear ownership or community integration—an urban "no-man's-land." These spaces, characterized by neglect, underutilization, or disconnection, pose both challenges and opportunities for urban planners and policymakers to reimagine and revitalize urban landscapes (Arendt, 1989; Augé, 1992).

In **summary**, **urban cracks** encompass **neglected, underutilized, marginalized, fragmented, inaccessible, abandoned, disorganized, or disconnected buildings, sidewalks, streets, parks, squares, infrastructure, and vacant lots**

3.1 Situating urban cracks (sql)

State/Condition	Buildings	Sidewalks	Streets
Neglected	Neglected buildings	Neglected sidewalks	Neglected streets
Underutilized	Underutilized buildings	Underutilized sidewalks	Underutilized streets
Marginalized	Marginalized buildings	Marginalized sidewalks	Marginalized streets
Fragmented	Fragmented buildings	Fragmented sidewalks	Fragmented streets
Inaccessible	Inaccessible buildings	Inaccessible sidewalks	Inaccessible streets
Abandoned	Abandoned buildings	Abandoned sidewalks	Abandoned streets
Disorganized	Disorganized buildings	Disorganized sidewalks	Disorganized streets
Disconnected	Disconnected buildings	Disconnected sidewalks	Disconnected streets

Fig.37 Characteristics of urban cracks (Author.)

Parks	Squares	Infrastructure	Vacant Lots
Neglected parks	Neglected squares	Neglected infrastructure	Neglected vacant lots
Underutilized parks	Underutilized squares	Underutilized infrastructure	Underutilized vacant lots
Marginalized parks	Marginalized squares	Marginalized infrastructure	Marginalized vacant lots
Fragmented parks	Fragmented squares	Fragmented infrastructure	Fragmented vacant lots
Inaccessible parks	Inaccessible squares	Inaccessible infrastructure	Inaccessible vacant lots
Abandoned parks	Abandoned squares	Abandoned infrastructure	Abandoned vacant lots
Disorganized parks	Disorganized squares	Disorganized infrastructure	Disorganized vacant lots
Disconnected parks	Disconnected squares	Disconnected infrastructure	Disconnected vacant lots

3.2 Qualitative identification

Fieldwork

Fieldwork 1

A qualitative approach begins with a site visit, allowing intuition and the city itself to guide the exploration. The objective is to comprehend the essence of "urban cracks" by examining public spaces through diverse lenses. Rather than following a predetermined route, the exploration began organically from the arrival point in Rotterdam, which is the central station. The sequence of porosities naturally led the exploration path.

Various flows were observed within the urban environment, encompassing diverse user groups, modes of transportation, lifestyles, natural elements, and perceptual aspects. The preliminary differentiation of observed phenomena relied on three key characteristics: accessibility, enclosure, and function. Spaces 1 and 2 were linked spaces; one is more linear, and the other one is an unused accessible roof. Spaces 3, 4, and 5 were unused buffer zone parks, while space 6 was an unused shared space in a residential complex. Space 7 is a water edge that is unmaintained due to gentrification separation, while space 8 is a squeezed inaccessible space. Lastly, space 9 is a very common parking space.

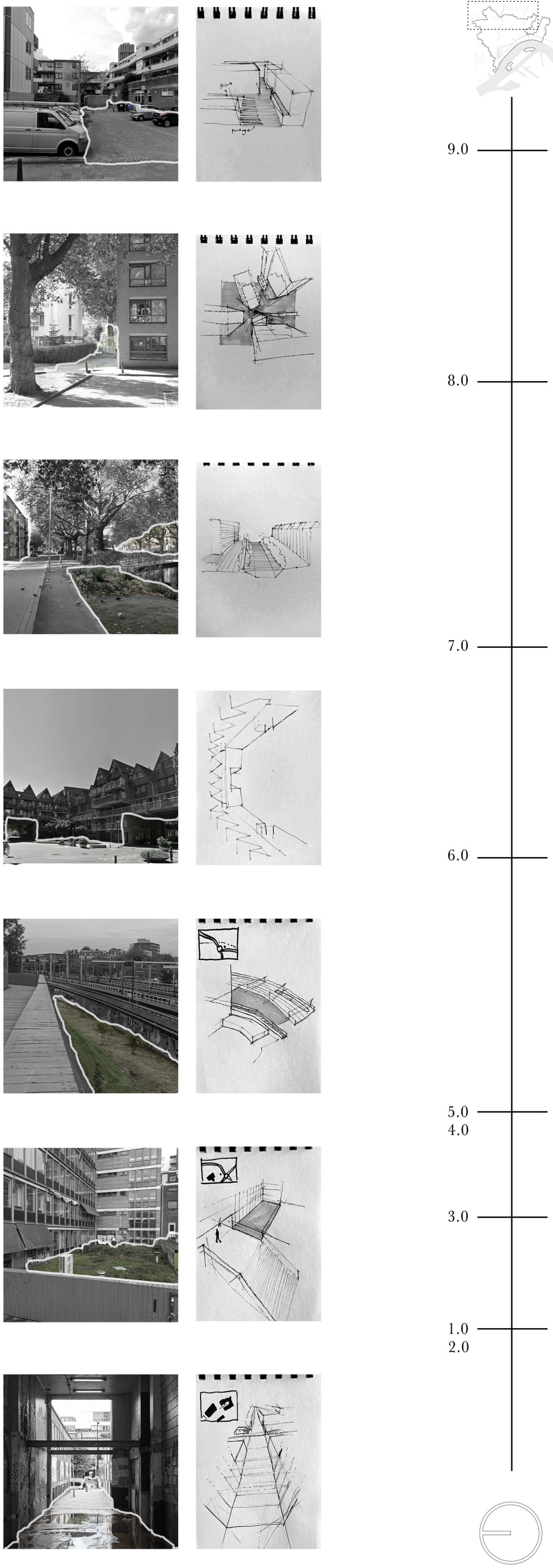


Fig.38 Fieldwork Part 1 (author)

Fieldwork 2

1-2 Gradients and ruptures in flows, levels, boundaries, and guidance, along with different building typologies and their effects on the built environment, as well as pedestrian and bike flows and their impact on circulation and space perception.

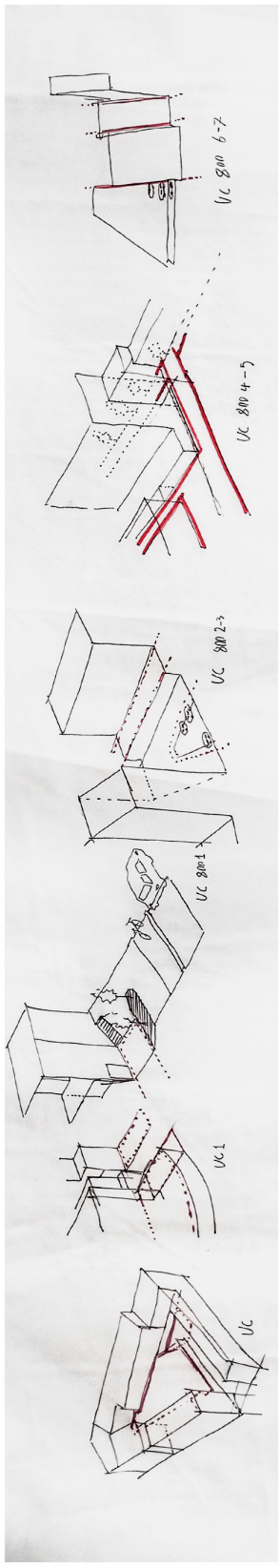
3-4-5 Nuanced habitat co-living within these spaces, including observational analysis of the utilization patterns.

6-7 Clustering, and the intermediate architecture and urban design vertical dimension play a crucial role in the urban cracks equation.

8-9 Highlighting the importance of time in relation to perception, different flows, and routes, especially during the night, alongside the varied usage of space. Recognizing the significant role of lighting in guiding spatial experiences.

The initial impressions of the built form types were mixed activity/performance types, reflecting a more qualitative approach.

In conclusion, these spaces are often associated with the backs of the cities.



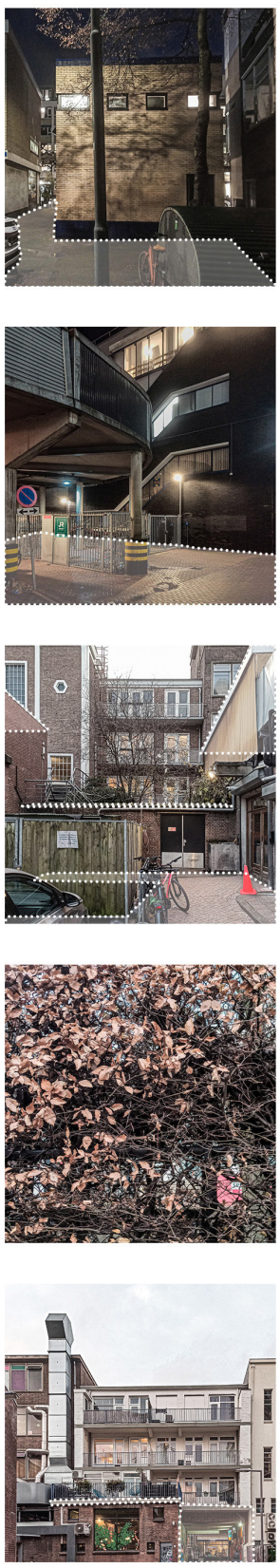




Fig.39 Fieldwork Part 2 (author)

3.2 Qualitative identification

Critical mapping



Fig.40 Heat stress map (author)



Fig.41 Water flood risk map (author)



Fig.42 Constitutedness, physical condition, safety, and social map. (author)

After analyzing heat stress, water flood risk, and social conditions through mapping, it becomes evident that urban areas with identified cracks are particularly vulnerable. This underscores the importance of promptly assessing these spaces.

3.2 Qualitative identification

Initial conclusions

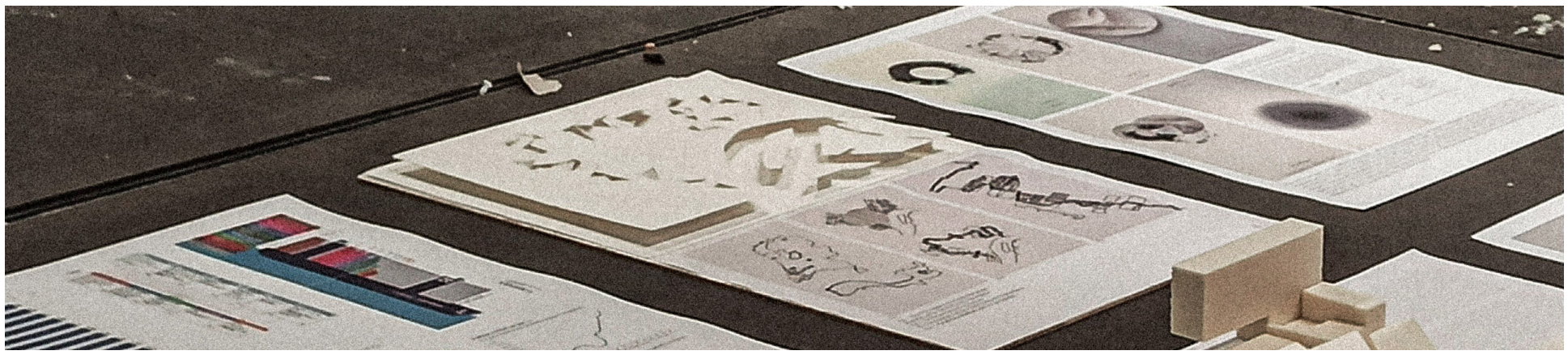


Fig.43 Urban cracks model (author)

The initial findings were illustrated through a model, showcasing the spatial aspects of these areas.

The model represents my interpretation of the “cracks” in Rotterdam, depicting them as a faded zone of neglected spaces rather than a linear trajectory.



Fig. 1 - Rapid Development Areas in the Netherlands
Rotterdam and the Selected Location (Brandgrens)
Fig. 2 - Diverse and Intersecting Functions
New Developments and Areas Intersecting with the Brandgrens
Fig. 3 - Parcels, New Buildings, and Fracture Layering



Fig.44 Urban cracks model (author)

Maquettes 1, 2, and 3 represent spatial configurations of areas around the Brandgrens, taking into consideration their spatial morphology. These configurations were observed during site visits and were assessed based on the criteria for 'terrain vague' spaces. the targeted spaces are highlighted in red.

(1) Non-Accessible: A 3/4 enclosed 3D space, situated between private and public functions.

(2) Semi-Accessible: A 3/4 enclosed 2D space, serving as a squeezed non-functional area between private functions.

(3) Accessible: A 1/2 enclosed 3D space dedicated to public functions.

Maquettes 4, 5, and 6 provide insights into non-Western urban perspectives, characterized by reduced segregation and a distinct perception of public spaces

(4) The street as a building (not only from point A to point B)

(5) Souk Layouts: Traditional Middle Eastern souks create labyrinthine networks of shaded, intimate streets, encouraging exploration and discovery.

(6) Verandas and loggias section, shaded, semi-enclosed outdoor spaces, allowing outdoor activities.

3.3 Quantitative identification

Methods used:

Critical mapping
Morphological analysis

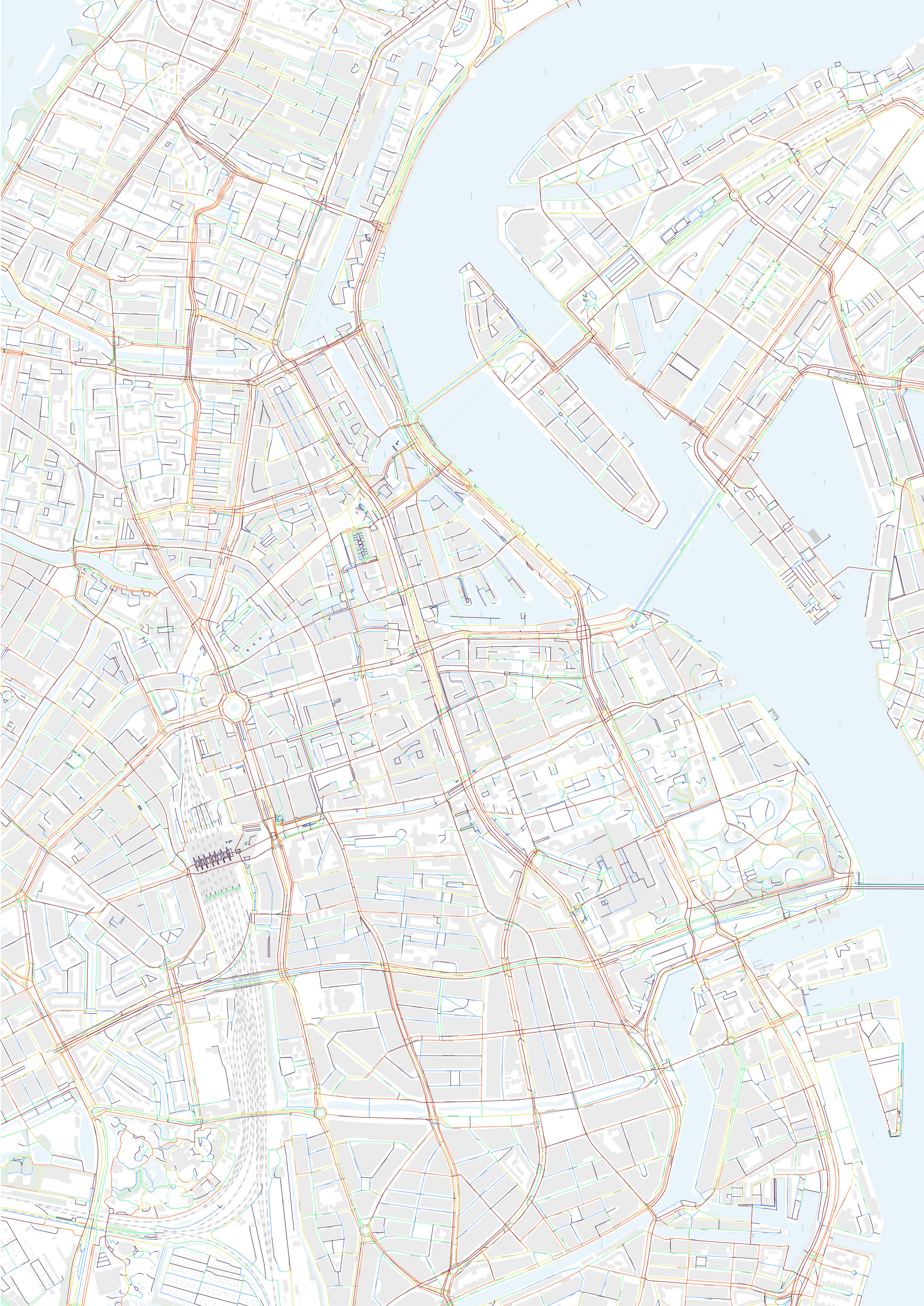
Then a quantitative approach was taken to ensure a data-driven analysis, aiming for concrete and evidence-based insights. The primary tool used was **space syntax**, chosen for its ability to systematically identify neglected urban spaces. This involved two types of simulations: **Angular Choice Analysis:** how probable a street is chosen to move through, and **Angular Integration Analysis:** how easily can a street/place be reached?

These simulations were conducted at two radii—800 meters for pedestrian accessibility and 2 kilometers for vehicular accessibility. The goal was to gain a understanding of spatial dynamics in the urban fabric.

In both the 800-meter and 2-kilometer analyses, specific streets stood out as noteworthy in the Angular Choice and Angular Integration Analyses, identified as “least chosen for walking through” and “least easily reached,” respectively. These indicators were considered potential markers for identifying “urban cracks.”

A notable finding emerged during this analysis—these identified indicators were predominantly situated in the “Backs” of the city. This observation highlighted specific spatial characteristics associated with neglected areas, contributing to a nuanced understanding of the urban environment.

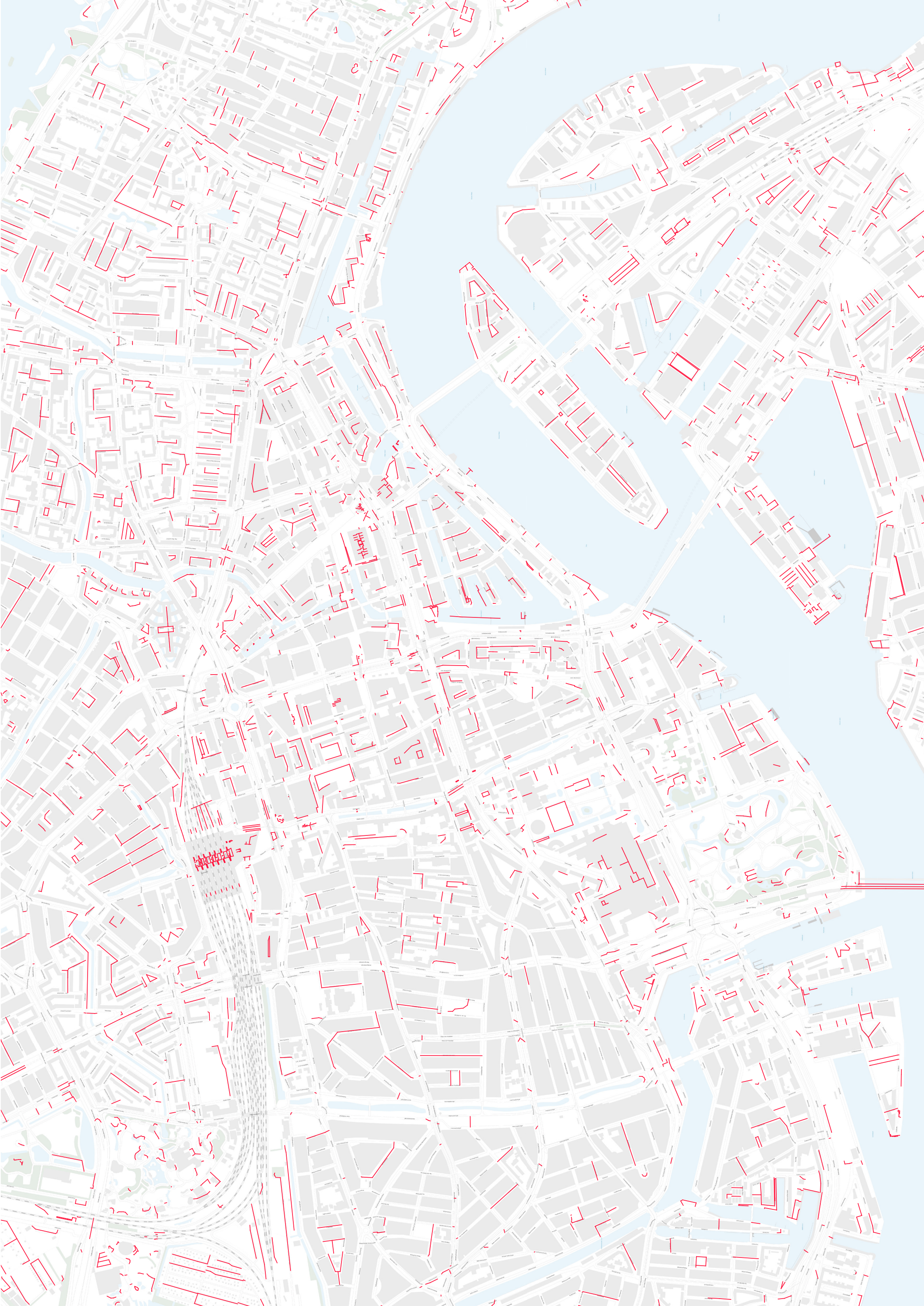
Fig.45 **Angular Integration Analysis:** how easily can a street/place be reached?
800 meters for pedestrian accessibility, where the blue is easiest to be reached, and red is the least easily reached



3.3 Quantitative identification

Fig.46 Isolating the red streets that are the least easily reached, for initial investigation.

With an average area of approximately 525 square meters per space, the combined total of 600 spaces within the range of 50 to 1000 square meters amounts to approximately 315,000 square meters. To put this into perspective, 525 square meters is roughly the size of two tennis courts or a bit larger than a standard basketball court, making each space versatile for various urban uses. Collectively, 315,000 square meters is approximately equivalent to 44 soccer fields or a significant portion of a large university campus. This is approximately the amount of underused and marginalized space within the Rotterdam city center area.



3.3 Quantitative identification

Fig.47 Intersecting the zone of the burning edge with the space syntax analysis to shed the light on the focused areas

Conclusion:

Drawing from existing literature, all potential urban cracks have been identified and are open to further investigation. These findings align with the predefined urban cracks identified through qualitative approaches.



3.4 Uncovering the Potential (SRQ2)

What are the existing and potential functions and activities that urban cracks can accommodate?

To address this question, a mixed systematic approach was adopted. Density-based analysis using Geoda was employed to define a typology and explore relationships, aiming to uncover the potential of each type in terms of social, economic, and environmental opportunities.

Methods used:

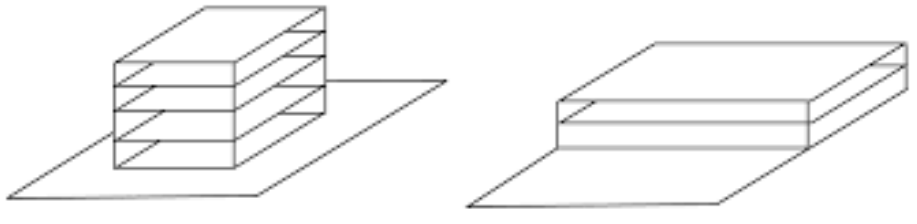
Data mining
Morphological analysis

Why density based analysis?

allows for more nuanced and tailored urban planning. By recognizing different types of urban configurations, planners can design streets, blocks, and buildings that better accommodate a mix of activities

Pattern Recognition uncover correlations between urban configurations and activities

Scalability and Transferability By identifying recurring patterns, it enables scalable solutions across urban contexts.



A
FSI = 1,0
GSI =0,25
L= 4,0
OSR=0,75

B
FSI = 1,0
GSI =0,5
L= 2,0
OSR=0,5

Fig.48 the Floor Space Index (FSI), Ground Space Index (GSI), number of Layers (L), and Open Space Ratio (OSR) (https://www.pbl.nl)

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Method:       KMeans
Number of clusters:  8
Initialization method:      KMeans++
Initialization re-runs:     150
Maximum iterations:  1000
Transformation:      Standardize (Z)
Distance function:   Euclidean

Cluster centers:
   |FSI_22  |GSI_22    |
---|--------|----------|
C1|0.457192|0.185848  |
C2|0.729274|0.272515  |
C3|0.100839|0.0538186 |
C4|1.49603 |0.370909  |
C5|0.751817|0.458465  |
C6|1.26526 |0.951462  |
C7|3.32584 |0.424458  |
C8|8.29437 |0.57      |

The total sum of squares:   22140
Within-cluster sum of squares:
   |Within cluster S.S.|
---|-------------------|
C1|431.032             |
C2|585.106             |
C3|185.653             |
C4|691.498             |
C5|288.484             |
C6|241.096             |
C7|478.709             |
C8|155.279             |

The total within-cluster sum of squares: 3056.86
The between-cluster sum of squares:      19083.1
The ratio of between to total sum of squares:   0.861931
```

Fig.49 'kmeans' method in Geoda data output

The typology was generated using Geoda and data from Rudifun_PV28_Zuid_Holland, employing the 'kmeans' method to create categories based on FSI and GSI. This resulted in 8 types, ranging from very dense to low density.

3.4 Uncovering the Potential (SRQ2)

Diverse Urban Configurations: C1 to C8



Type	FSI_22	GSI_22
C1	0.457192	0.185848
C2	0.729274	0.272515
C3	0.100839	0.0538186
C4	1.49603	0.370909
C5	0.751817	0.458465
C6	1.26526	0.951462
C7	3.32584	0.424458
C8	8.29437	0.57



Fig.50 Density typology map (author)

3.4 Uncovering the Potential (SRQ2)

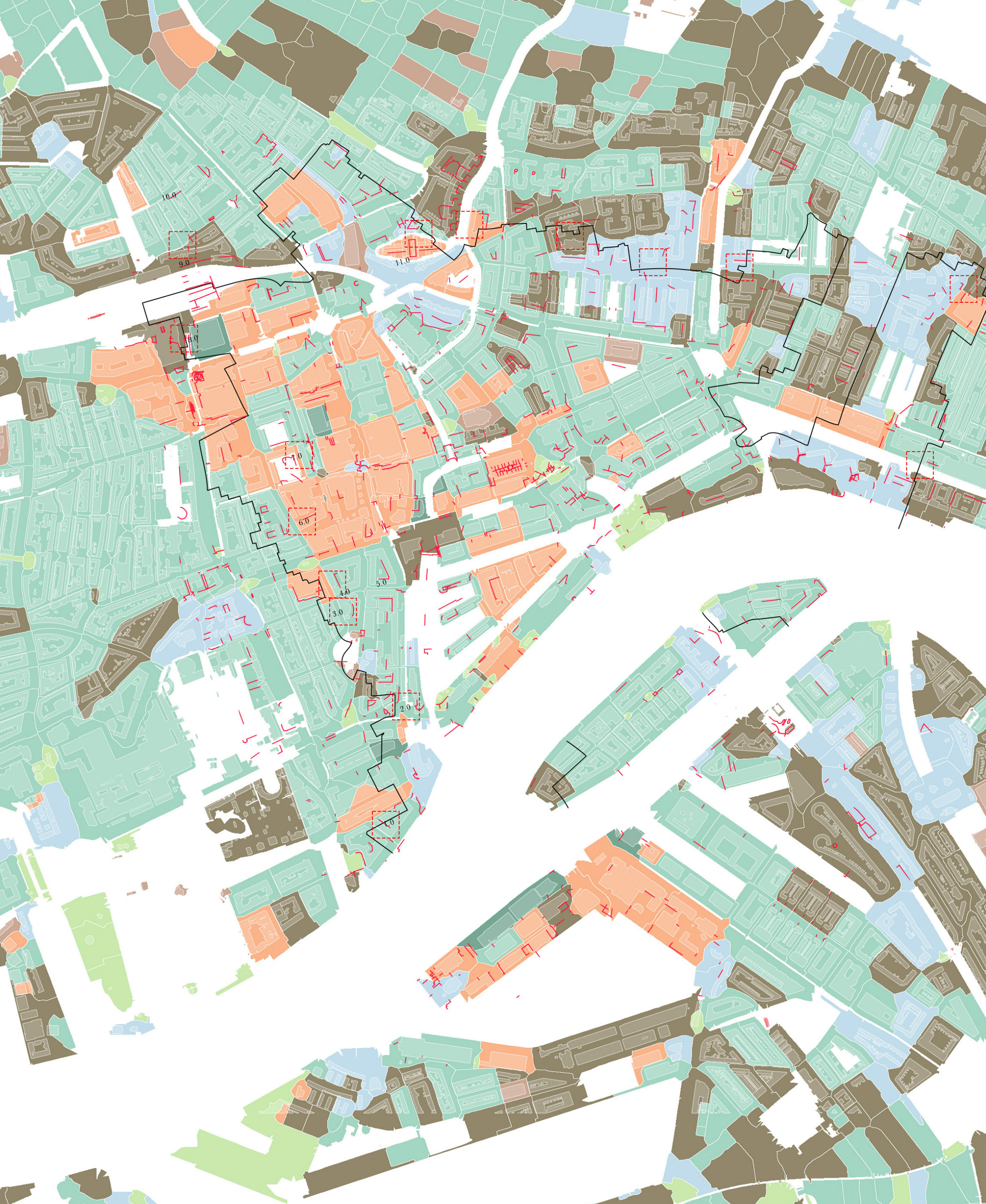
Diverse Urban Configurations: C1 to C8

These configurations, labeled from C1 to C8, display diverse levels of density and spatial organization. C1 and C3 exhibit lower density, whereas C6, C7, and C8 demonstrate higher density, with C8 being the densest configuration.

(C1) represents residential areas with low Floor Space Index (FSI) and Ground Space Index (GSI). (C2) consists of diverse mixed-use areas with moderate FSI and GSI. (C3) includes public spaces with very low FSI and GSI. (C4) combines residential and mixed-use functions with high FSI and moderate GSI. (C5) encompasses mixed shops with moderate FSI and high GSI. (C6) denotes high-density areas with unspecified functions. (C7) predominantly features mixed-use functions with high FSI and moderate GSI. Finally, (C8) comprises areas with meeting, industry, office, and retail functions, characterized by very high FSI and GSI.

Type	FSI_22	GSI_22
C1	0.457192	0.185848
C2	0.729274	0.272515
C3	0.100839	0.0538186
C4	1.49603	0.370909
C5	0.751817	0.458465
C6	1.26526	0.951462
C7	3.32584	0.424458
C8	8.29437	0.57

Fig.51 Density typology map zoomed-in (author)

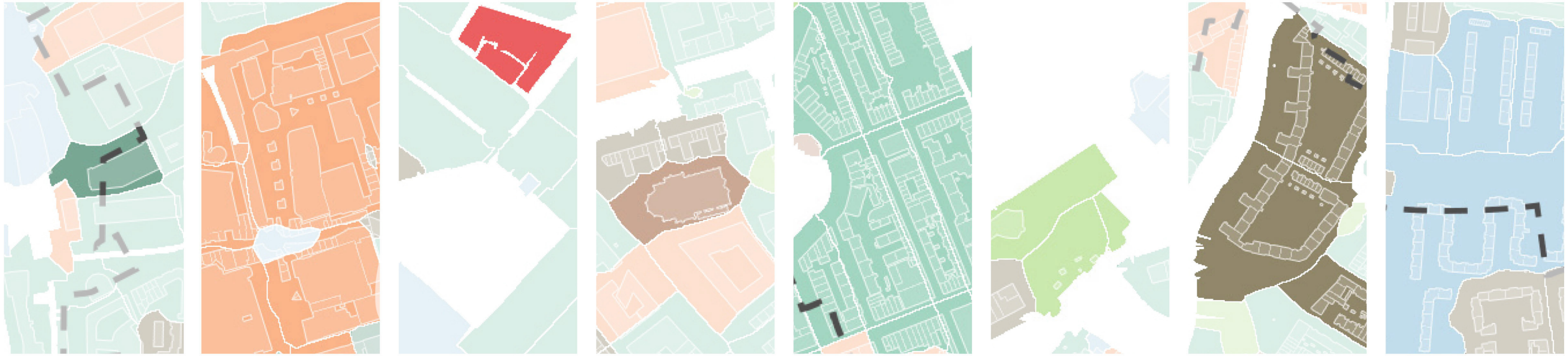

10.0
9.0
11.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0

3.4 Uncovering the Potential (SRQ2)

Diverse Urban Configurations: C1 to C8

	Type	FSI_22	GSI_22	Function
	C1	0.457192	0.185848	Residential
	C2	0.729274	0.272515	Very diverse mixed-use (retail, residential, commercial)
	C3	0.100839	0.0538186	Public spaces (parks, open areas) with very low density
	C4	1.49603	0.370909	Residential with ground-floor shops and some mixed-use (bars)
	C5	0.751817	0.458465	Mixed-use with shops (retail and commercial)
	C6	1.26526	0.951462	High-density residential with a mix of commercial and office spaces
	C7	3.32584	0.424458	Predominantly mixed-use (offices, health care, industrial, retail)
	C8	8.29437	0.57	High-density mixed-use (meeting, industry, office, retail, other uses)

Fig.52 Mapping the functions related to the 8 types. (author)



| C1 | 0.457192 | 0.185848 | C2 | 0.729274 | 0.272515 | C3 | 0.100839 | 0.0538186 | C4 | 1.49603 | 0.370909 | C5 | 0.751817 | 0.458465 | C6 | 1.26526 | 0.951462 | C7 | 3.32584 | 0.424458 | C8 | 8.29437 | 0.57 |

3.4 Uncovering the Potential (SRQ2)

Analyzing Connections

To understand how the types are connected, the following points were useful for analyzing their relationships:

Configuration Relationships: The first step was to identify the potential relationships between different configurations (c1 to c8). This involved understanding how each configuration could interact with others in an urban environment.

Urban Challenges and Urgencies: Next, the analysis considered the urgent issues and challenges facing urban areas, as outlined in the provided information. These include climate change adaptation, transportation issues, public health concerns, and more.

Alignment with Trends: The analysis also took into account the broader trends shaping urban development, such as smart city initiatives, sustainable transportation, mixed-use development, and circular economy practices. Each combination of configurations was evaluated in terms of its alignment with these trends.

Feasibility and Impact: Lastly, the feasibility and potential impact of each combination were assessed. This involved considering the practicality of implementing the proposed configurations in real-world urban settings and evaluating their potential to address urgent urban challenges effectively.

For example, **C3** (public with low density) and **C7** (high density and mixed functions) show different needs. The **urgency** for **C7** is the **lack** of **green** areas, which can be **compensated** by **increasing** the **green footprint** in **C3**. This can be achieved by **establishing** new **connections** between **C7** and **C3**. Improved connections would **enable** better **pedestrian flow**, allowing for **increased economic opportunities** in **C3**.

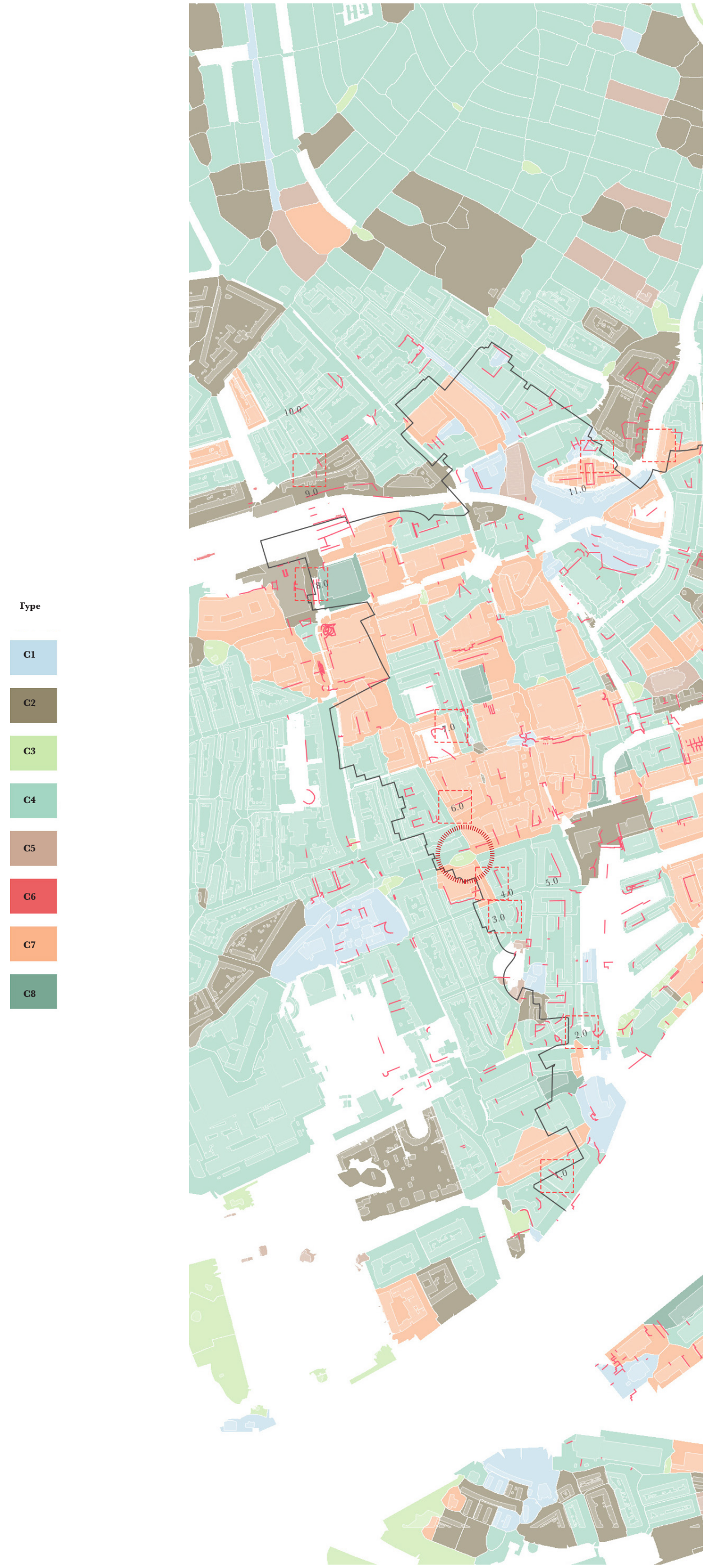


Fig.53 Showing the example of the relationship between C3 and C7. (author)

3.4 Uncovering the Potential (SRQ2)

Analyzing Connections

This approach identified 28 unique interdependencies spanning from C1 to C8. These relationships encompass various urban challenges, ranging from social inclusivity to economic growth to improving the green infrastructure.

Neighboring Pair	Relationship Explained	Urgency
C1 and C2	C1 (residential) benefits from connectivity to C2 (very diverse mixed-use) for access to amenities and services.	Promotes social inclusion and community engagement.
C1 and C3	C1 (residential) supports C3 (public with very low FSI and GSI) by providing pedestrian connections and residents for open spaces.	Enhances equitable access to basic services and public health preparedness.
C1 and C4	C1 (residential) and C4 (residential with shops and bars) create a dynamic area. C4 provides amenities and local services to C1.	Balances pedestrian flow and density while supporting community resilience.
C1 and C5	C1 (residential) and C5 (mixed shops) offer a strong local retail presence.	Supports economic growth and mixed-use development.
C1 and C6	C1 (residential) potentially benefits from C6 (no specific info) with potential residential connections.	Manages strain on resources and infrastructure.
C1 and C7	C1 (residential) and C7 (mostly mixed with high offices, healthcare, etc.) provide complementary uses.	Mitigates congestion risks and supports urban resilience.
C1 and C8	C1 (residential) connects with C8 (meeting, industry, office, other functions) for additional services.	Manages potential overcrowding and diversity of uses.
C2 and C3	C2 (very diverse mixed-use) and C3 (public) complement each other with a mix of diverse and public uses.	Enhances access to amenities and improves pedestrian flow.
C2 and C4	C2 (very diverse mixed-use) and C4 (residential with shops and bars) provide diverse and localized functions.	Supports social inclusion and economic opportunities.
C2 and C5	C2 (very diverse mixed-use) and C5 (mixed shops) together support a vibrant urban fabric.	Promotes efficient connectivity and economic activities.
C2 and C6	C2 (very diverse mixed-use) and C6 (no specific info) can complement each other with mixed functions.	Manages strain on resources and infrastructure.
C2 and C7	C2 (very diverse mixed-use) and C7 (mostly mixed) form a strong mixed-use area.	Mitigates risks of congestion and supports urban resilience.

C2 and C8	C2 (very diverse mixed-use) and C8 (meeting, industry, office, and other functions) offer complementary uses.	Enhances diversity of uses and community engagement.
C3 and C4	C3 (public) and C4 (residential with shops and bars) create a balance of open spaces and local amenities.	Supports equitable access to public services and social inclusion.
C3 and C5	C3 (public) and C5 (mixed shops) provide open spaces and economic opportunities.	Promotes pedestrian flow and efficient connectivity.
C3 and C6	C3 (public) and C6 (no specific info) may offer open spaces and residential areas.	Manages resource strain and enhances well-being.
C3 and C7	C3 (public) and C7 (mostly mixed) provide open spaces and diverse mixed uses.	Enhances resilience and pedestrian connections.
C3 and C8	C3 (public) and C8 (meeting, industry, office, other functions) offer diverse uses with open spaces.	Manages risks of overcrowding and ensures connectivity.
C4 and C5	C4 (residential with shops and bars) and C5 (mixed shops) provide strong local amenities and shopping options.	Balances density and pedestrian flow.
C4 and C6	C4 (residential with shops and bars) and C6 (no specific info) may offer balanced residential connections.	Manages strain on resources and pedestrian flow.
C4 and C7	C4 (residential with shops and bars) and C7 (mostly mixed) complement each other with diverse uses.	Enhances connectivity and supports community resilience.
C4 and C8	C4 (residential with shops and bars) and C8 (meeting, industry, office, and other functions) offer diverse uses and amenities.	Enhances community engagement and connectivity.
C5 and C6	C5 (mixed shops) and C6 (no specific info) may offer strong local retail options and residential connections.	Manages strain on resources and supports economic growth.
C5 and C7	C5 (mixed shops) and C7 (mostly mixed) provide strong mixed-use environments with retail and offices.	Promotes economic activities and community resilience.
C5 and C8	C5 (mixed shops) and C8 (meeting, industry, office, and other functions) offer complementary uses and activities.	Enhances community engagement and diversity of uses.
C6 and C7	C6 (no specific info) and C7 (mostly mixed) may provide strong mixed-use environments with diverse functions.	Manages strain on resources and supports economic growth.
C6 and C8	C6 (no specific info) and C8 (meeting, industry, office, and other functions) may provide diverse uses and residential connections.	Manages strain on resources and supports economic growth.
C7 and C8	C7 (mostly mixed) and C8 (meeting, industry, office, and other functions) provide strong mixed-use environments with diverse functions.	Enhances connectivity and supports community resilience.

Fig.54 Showing all the analyzed relationships.(author)

3.4 Uncovering the Potential (SRQ2)

Opportunities: Social, Economic, and Environmental

Based on the analysis, three primary types of opportunities have emerged:

1. Enhancing Connectivity and Walkability

Opportunity: Integration of Smart and Pedestrian Infrastructure

Description: The integration of smart city technologies and pedestrian-friendly infrastructure can significantly enhance urban connectivity and walkability. This includes the implementation data-driven urban planning, and the development of pedestrian and cycling networks. By focusing on these aspects, Rotterdam can promote low-carbon mobility, reduce traffic congestion, and improve air quality.

Related Configurations:

c1 (Smart Infrastructure) & c4 (Residential with Mixed Use)

c1 (Smart Infrastructure) & c5 (Mixed Shops)

c1 (Smart Infrastructure) & c7 (Mixed Functions with Offices)

Urgencies Addressed:

Climate change mitigation and adaptation

Traffic congestion and air quality

Sustainable transportation

Enhancing Connectivity and Walkability

Supporting Local Businesses through Mixed-Use Development

Developing Green Infrastructure

Neighboring Pair	Linkage to Trend		Linkage to Urgency
C1, C2	Supports smart mobility and sustainable planning.		Reduces emissions and addresses climate chang
C1, C3	Enhances community interaction and activity.		Improves resilience and local economy.
C1, C4	Promotes mixed-use development and quality of life.		Balances density and enhances well-being.
C1, C5	Advances sustainable development.		Reduces congestion and improves air quality.
C1, C6	Integrates pocket parks for health and well-being.		Manages resource strain and improves biodiversi
C1, C7	Uses green infrastructure for resilience.		Mitigates congestion and impacts from high dens
C1, C8	Enhances green infrastructure for resilience.		Manages density and resource strain.
C2, C3	Promotes walkable neighborhoods.		Improves mobility and air quality.
C2, C4	Improves quality of life with green spaces.		Addresses service disparities and sustainability
C2, C5	Promotes walkability and connectivity.		Reduces congestion and improves air quality.
C2, C6	Introduces green infrastructure for sustainability.		Enhances resilience and climate adaptation.
C2, C7	Supports sustainability and mobility.		Manages congestion and supports air quality.
C2, C8	Enhances pedestrian design and connectivity.		Promotes equity and reduces service disparities
C3, C4	Promotes mixed-use development and green spaces.		Improves quality of life and access to amenities

Fig.55 Showing all the analyzed relationships with the opportunities attached, part 1. (author)

2. Supporting Local Businesses through Mixed-Use Development

Opportunity: Mixed-Use Development and Placemaking
Description: Promoting mixed-use developments can foster vibrant, walkable neighborhoods that support local businesses. This involves creating spaces that combine residential, commercial, and recreational uses, encouraging community interaction and economic vitality. Such developments should emphasize placemaking to create attractive public spaces that reflect local culture and meet the needs of diverse urban activities.
Related Configurations:
c2 (Very Diverse Mixed) & c3 (Public with Low FSI and GSI)
c4 (Residential with Shops and Mixed Use) & c5 (Mixed Shops)
c6 (Urban Regeneration with Smart Tech) & c7 (Mixed Functions with Offices)
Urgencies Addressed:
Affordable housing and inclusive growth
Social inclusion and community engagement
Equitable access to basic services

3. Developing Green Infrastructure

Opportunity: Creation of Pocket Parks and Green Corridors
Description: Developing green infrastructure, such as pocket parks and green corridors, enhances urban resilience and environmental quality. These green spaces provide crucial recreational areas, improve mental and physical health, and support biodiversity. Incorporating green infrastructure into urban planning helps create sustainable, livable cities and mitigates the impacts of climate change.
Related Configurations:
c5 (Mixed Shops) & c6 (Urban Regeneration with Smart Tech)
c6 (Urban Regeneration with Smart Tech) & c8 (Circular Economy and Waste Management)
c7 (Mixed Functions with Offices) & c8 (Circular Economy and Waste Management)
Urgencies Addressed:
Biodiversity conservation and green spaces
Public health preparedness
Climate change mitigation and adaptation

C3, C5	Improves walkability and green corridors.		Enhances biodiversity and reduces car reliance
C3, C6	Integrates green infrastructure for quality of life.		Supports resilience and walkability.
C3, C7	Supports sustainability and well-being.		Manages congestion and enhances quality of lif
C3, C8	Enhances pedestrian infrastructure and resilience.		Improves connectivity and addresses density dispar
C4, C5	Optimizes pedestrian infrastructure and green spaces.		Balances density and ensures access to green spac
C4, C6	Enhances green infrastructure and resilience.		Manages climate impacts and supports adaptatic
C4, C7	Fosters mixed-use development and connectivity.		Manages congestion and enhances air quality.
C4, C8	Creates green spaces and pedestrian corridors.		Supports climate adaptation and walkable space
C5, C6	Creates green corridors and improves walkability.		Supports climate adaptation and manages resource s
C5, C7	Fosters mixed-use development and connectivity.		Reduces congestion and improves air quality.
C5, C8	Enhances pedestrian infrastructure and green spaces.		Supports housing needs and manages density.
C6, C7	Improves connectivity and sustainable mobility.		Manages congestion and enhances air quality.
C6, C8	Integrates green infrastructure and mobility.		Supports affordable housing and manages densi
C7, C8	Enhances green infrastructure and connectivity.		Supports resilience and access to services.

Fig.56 Showing all the analyzed relationships with the opportunities attached, part 2. (author)

3.4 Uncovering the Potential (SRQ2)

Conclusion (Map of opportunities)

After mapping all the identified opportunities to enhance connectivity, promote economic equity, and increase green infrastructure, an opportunity map was created. This map incorporates findings from the initial identification process related to sub-research question 1 and highlights new opportunities related to population densities. It will serve as a guiding tool for the design strategy in the following steps.

	Type	FSI_22	GSI_22	Function
	C1	0.457192	0.185848	Residential
	C2	0.729274	0.272515	Very diverse mixed-use (retail, residential, commercial)
	C3	0.100839	0.0538186	Public spaces (parks, open areas) with very low density
	C4	1.49603	0.370909	Residential with ground-floor shops and some mixed-use (bars)
	C5	0.751817	0.458465	Mixed-use with shops (retail and commercial)
	C6	1.26526	0.951462	High-density residential with a mix of commercial and office spaces
	C7	3.32584	0.424458	Predominantly mixed-use (offices, health care, industrial, retail)
	C8	8.29437	0.57	High-density mixed-use (meeting, industry, office, retail, other uses)

Enhancing Connectivity and Walkability

Supporting Local Businesses through Mixed-Use Development

Developing Green Infrastructure

Fig.57 Map of opportunities (author)

C1, C2
C1, C3
C1, C4
C1, C5
C1, C6
C1, C7
C1, C8
C2, C3
C2, C4
C2, C5
C2, C6
C2, C7
C2, C8
C3, C4
C3, C5
C3, C6
C3, C7
C3, C8
C4, C5
C4, C6
C4, C7
C4, C8
C5, C6
C5, C7
C5, C8
C6, C7
C6, C8
C7, C8



3.4 Uncovering the Potential (SRQ2)

Conclusion (Map of opportunities)



Fig.58 Map of opportunities (author)

Enhancing Connectivity and Walkability

Supporting Local Businesses through Mixed-Use Development

Developing Green Infrastructure

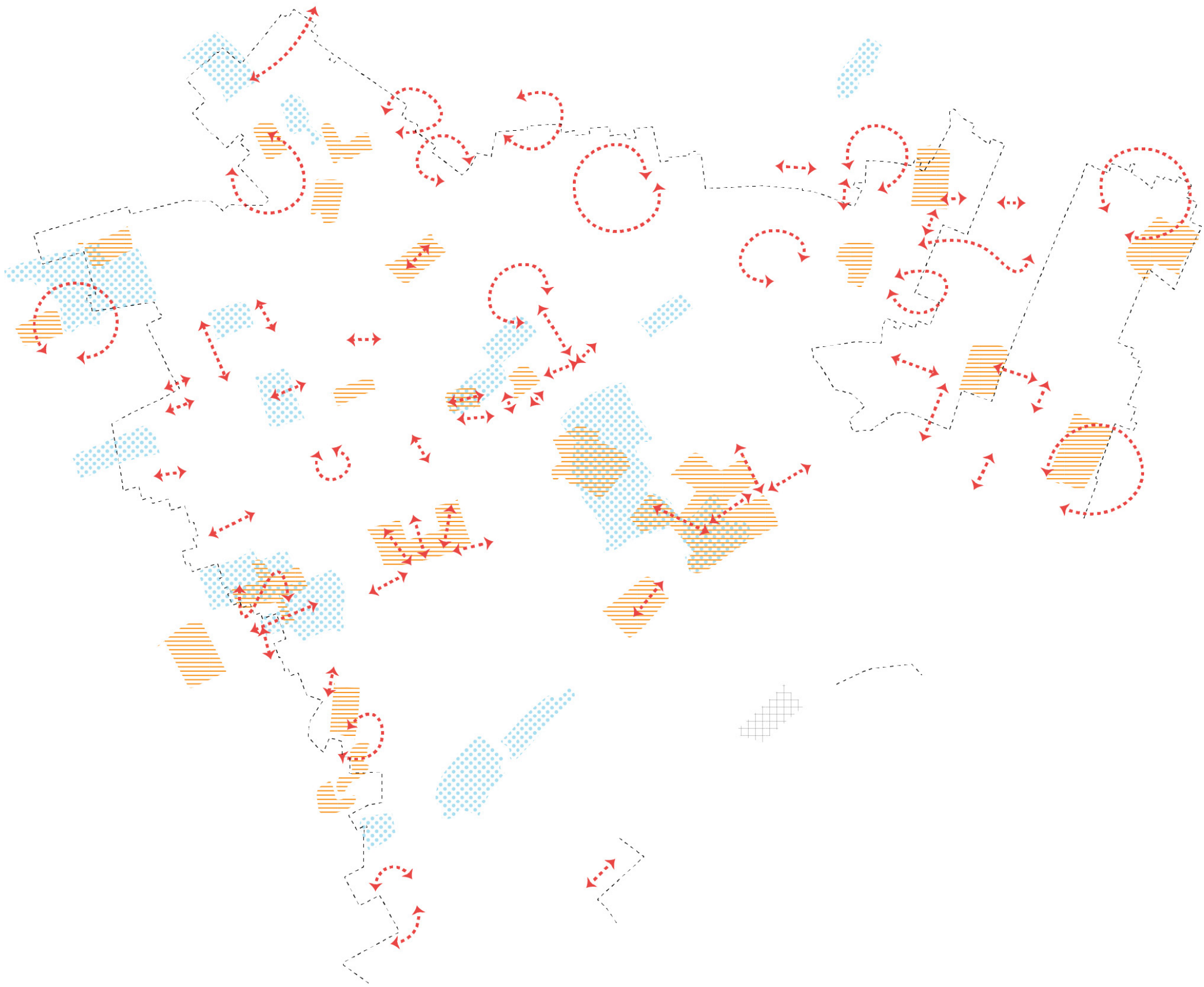


Fig.59 Map of opportunities (author)

Many opportunities exist where urban cracks are identified on the map, intersecting with the previous analysis. This intersection helps define the urban cracks and paves the way for the next step: selecting sites for design.

4.0 Design

4.1 0th place (sq3)

What are the key characteristics of the ‘0th place’ concept, and how does it differ from traditional urban spaces?

To answer these questions, an eight-step process will be undertaken:

1-Selection Criteria: This step involves identifying the optimal locations for interventions based on predefined criteria.

2-Fieldwork: Conducting comprehensive fieldwork to document all related issues at the selected sites.

3-Problematization: Mapping the identified problems in a visually understandable manner to develop a strategic approach.

4-Strategizing: Developing a strategy map based on the findings from the previous sub-research questions, incorporating opportunities and tactical urbanism design principles.

5-Description: As outlined in the methods chapter, this step involves design testing and the creation of an initial design to establish relationships with the sites, thereby uncovering site-specific patterns.

6-Final Design: Integrating all feedback from the description phase, this step focuses on refining the design and providing detailed outcomes.

7-Urban Evolution: Demonstrating how the new spaces are utilized by different groups at various times, thereby illustrating the ‘0th place’ concept in action.

8-Scaled-up Brandgrens Strategy: This step, to be developed after completing the previous steps, aims to evaluate and test the limitations of the design approach on a larger scale.



Enhancing Connectivity and Walkability

Supporting Local Businesses through Mixed-Use Development

Developing Green Infrastructure

4.2 Selection Criteria

1-Selection Criteria for Urban Cracks on the Edge of the Brandgrens (Westblaak street)

Transition Zone: Areas that lie at the intersection of the historically bombed and non-bombed sections of Rotterdam are focused on.

Social and Economic Disparities: Areas that exhibit social and economic contrasts are identified.

Connectivity Issues: Areas with poor connectivity or barriers to movement between different urban zones are examined.

Development Potential

Cultural and Recreational Opportunities: Spaces with potential for cultural and recreational activities are considered.

2-Selection Criteria for Urban Cracks within the Brandgrens (Gelderseplein area near de witte huis)

Historical Significance: Locations with historical relevance to the Brandgrens, such as areas directly impacted by the WWII bombings.

Spatial Discontinuity: Areas with visible spatial disruptions.

Vacancy and Underutilization

Community Engagement: Potential for strong community involvement in redevelopments.

Environmental Impact: assessed for their potential to improve environmental sustainability.

The focus shifted to the design in Westblaak (Urban Cracks on the Edge of the Brandgrens) due to time constraints. For details on the design development of this location, 'De Witte Huis,' please refer to the Appendix.

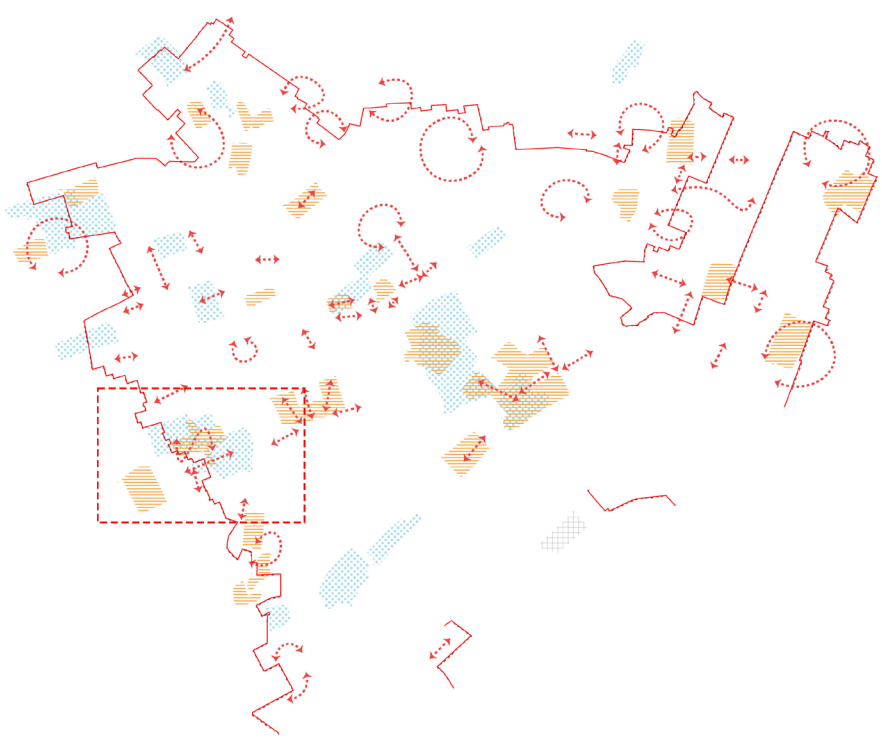


Fig.60 Westblaak street on the opportunity map (Author)



Fig.61 Westblaak street (Author)

4.3 Fieldwork

Findings from the fieldwork:

Transition Zone:

Blaak-Westblaak street, at the intersection of historically bombed and non-bombed sections of Rotterdam, is pivotal for urban redevelopment.

Connectivity Issues:

Originally car-oriented, Blaak-Westblaak faces pedestrian movement challenges.

Social Groups and Stakeholders:

Residents, Business Owners and Employees, Pedestrians, Commuters, Tourists, and Visitors.

Municipality and Urban Planners: Shape zoning and infrastructure.

Property Owners and Developers: Invest in renovations and construction.

Transport Authorities: Manage transportation and traffic.

Environmental Agencies: Address sustainability concerns.

Functions:

Commercial and Retail: Shops, cafes, and markets boost the economy.

Cultural and Recreational: Art, performances, and outdoor events.

Transportation: Connects city parts with transit, bike lanes, and crossings.



Fig.62 Site 2 Westblaak street (Author)



Fig.63 Site 2 three years after the bombing (modified) (https://birdinflight.com)



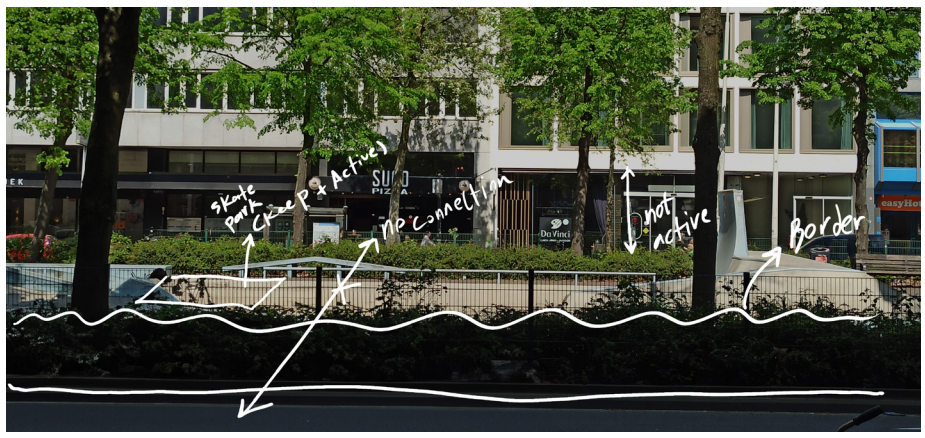
Fig.64 https://commons.wikimedia.org

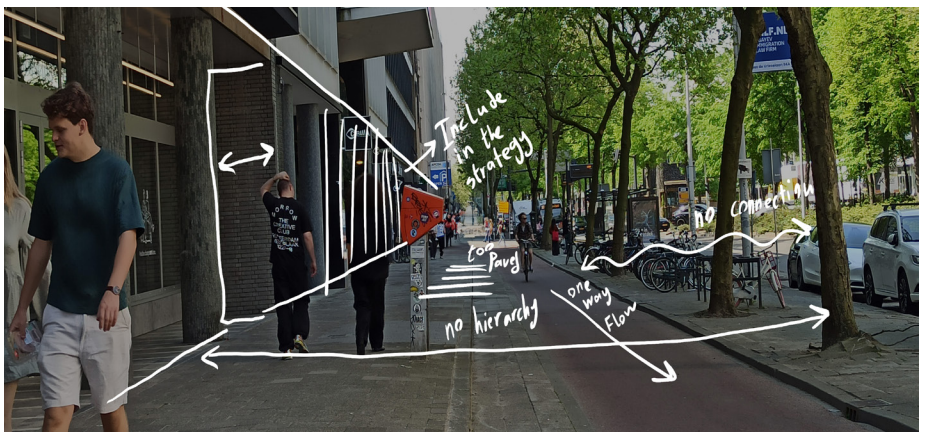


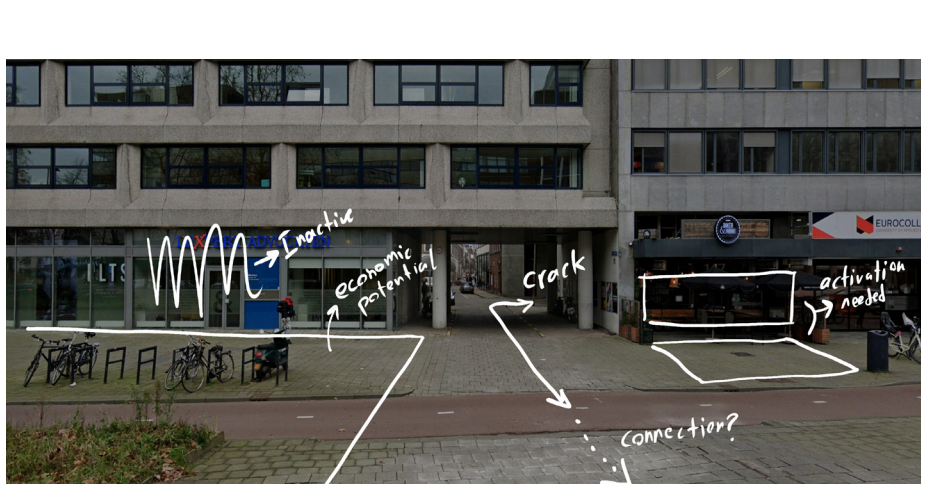
Fig.65 Shttps://commons.wikimedia.org



Fig.66 Arial view on selected site







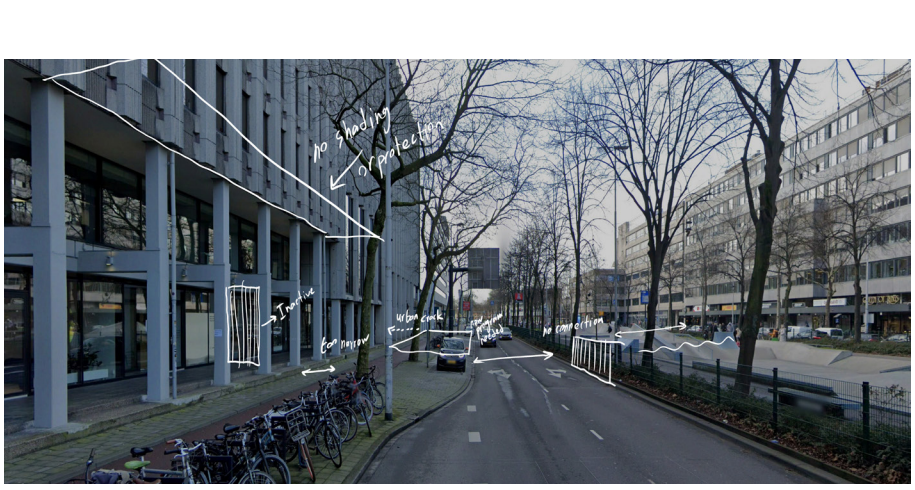


Fig.67 Fieldwork Observations

4.3 Fieldwork

Creative process

To ground the abstraction from the opportunity map into site-specific challenges, the fieldwork that was conducted was translated into a collage as part of my creative process.

The collage reflects my understanding of the site, its characteristics, relation to porosity, urban cracks, and opportunities. It was created in a perspective layout to highlight priorities.

Where the street profile (1) holds the highest potential for change and impact on its surroundings. This element is centrally positioned in the collage. The green boundary (2), part of the street profile, has potential secondary to the street, acting as a complementary aspect in the urban design framework.

Other elements, such as pedestrian crossings (4), enhance connectivity and are strategically placed to improve pedestrian flow. The potential for rooftop connections (5) is also highlighted, showcasing how linking lower roofs and pedestrian zones can foster more integrated urban spaces. Openings in the buildings (6) further contribute to this connectivity. These elements are given equal visual weight in the collage, reflecting their respective importance to the design.

Lastly, the lines in the background function as a datum for the collage, representing a simplified version of these cracks with their linear aspect (8). These linear aspects consistently influence the site, and using them as a guiding framework for both the collage and the overall design could be key to developing a cohesive urban plan.

Legend

(1) Street Profile and Opportunities for Expansion
(2) Buffer Zones and Green Barriers
(3) Public Borders and Inaccessibility
(4) Pedestrian Connections
(5) Roofs as Potential Development Sites
(6) Few Passages and Limited Sense of Control
(7) Inactive Corners
(8) Site's Linear Form

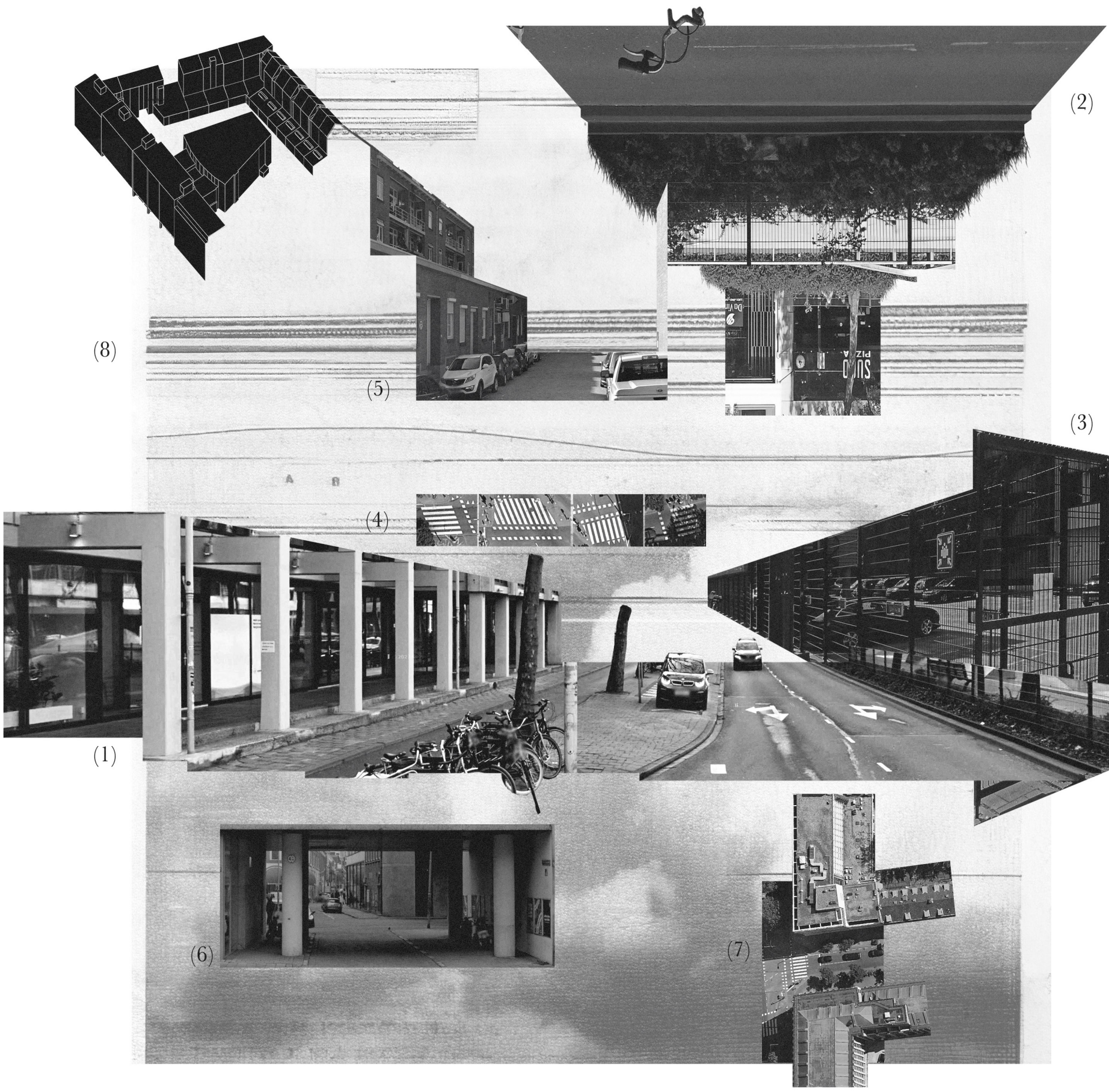


Fig.68 site 2 potential collage (author)

4.4 Problematization
4.5 Strategizing

The next step was to map the problems and opportunities identified through the fieldwork and the opportunity map.

Through the lens of social, economic, and environmental factors, specific potential areas were identified and mapped. This included highlighting urban cracks, existing infrastructure, and areas lacking connections. These insights are essential for informing strategic decision-making.

The strategy focused on mapping various elements: the street profile and its potential for expansion, buffer zones and green barriers, public borders, areas of inaccessibility, and pedestrian connections. It also involved evaluating roofs as potential development sites, the presence of few passages and a limited sense of control, inactive corners, and the linear form of the site.

In addition, the strategy emphasized new program activations such as urban farming, public cafes, stages, exhibition areas, sport facilities, and pocket parks. Functions were assigned based on their activity and their relevance to ground floor operations.

Secondly, the strategy addressed the creation of new connections and the hierarchy of pedestrian flows.

Fig.69 Mapping the problems and the potentials (author)

Fig.70 Strategy map (author)

4.6 Description

Description: By creating a relationship with the environment, patterns are uncovered. Projects are used to narrate and understand the built environment, similar to describing a story's setting, revealing hidden patterns within spaces to deepen understanding and develop theories for change. Understanding how space could evolve during scenario exploration contributes to the body of knowledge.

An initial design was created, establishing relationships with the environment to reveal unnoticed patterns within spaces. The exploration focused on understanding the potential of utilizing the full sidewalk profile, the hierarchy of flows, the new site program and activities, and the new connections. These findings were related to tactical and non-tactical interventions, articulating the relationships within the Brandgrens area. A final strategy map was developed, followed by the creation of a detailed design.

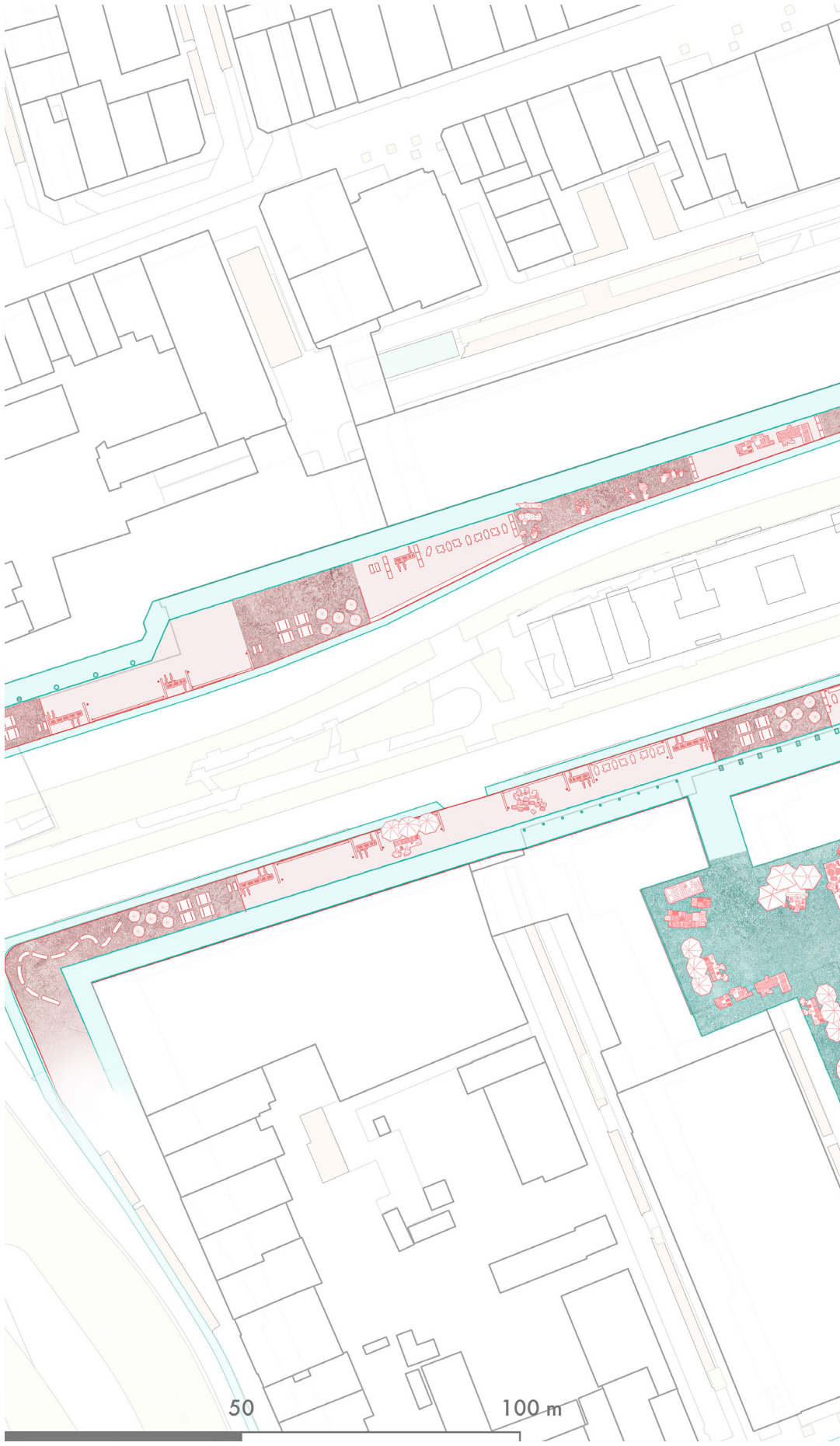


Fig.71 Initial design plan (author)

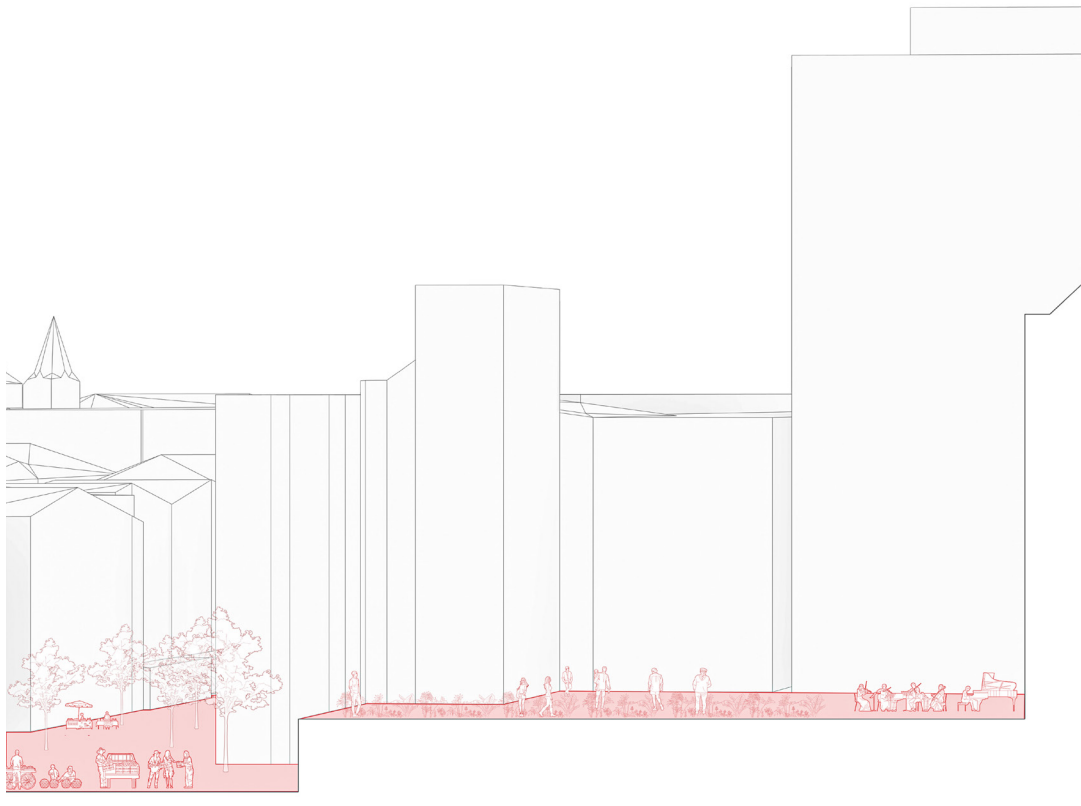
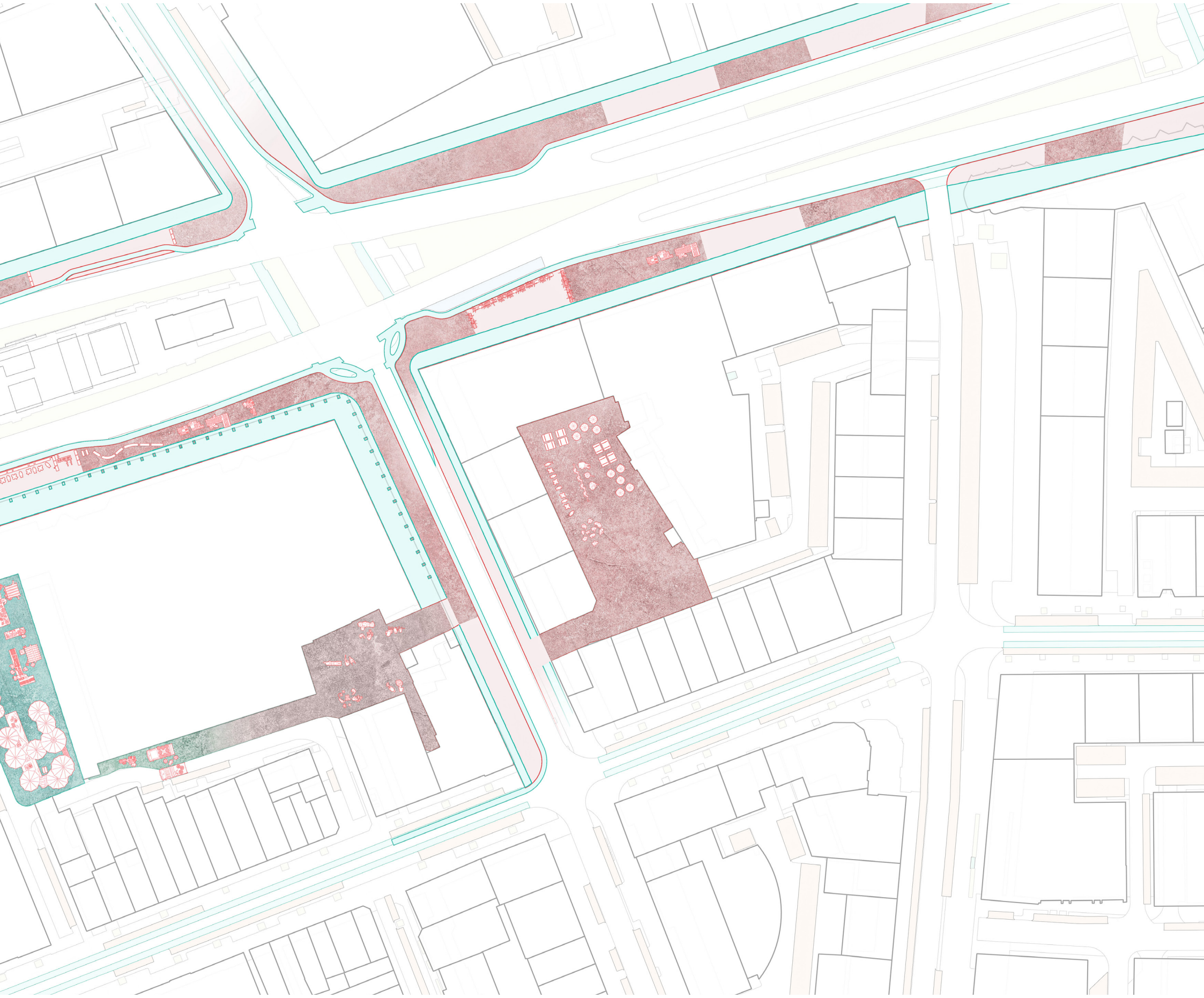
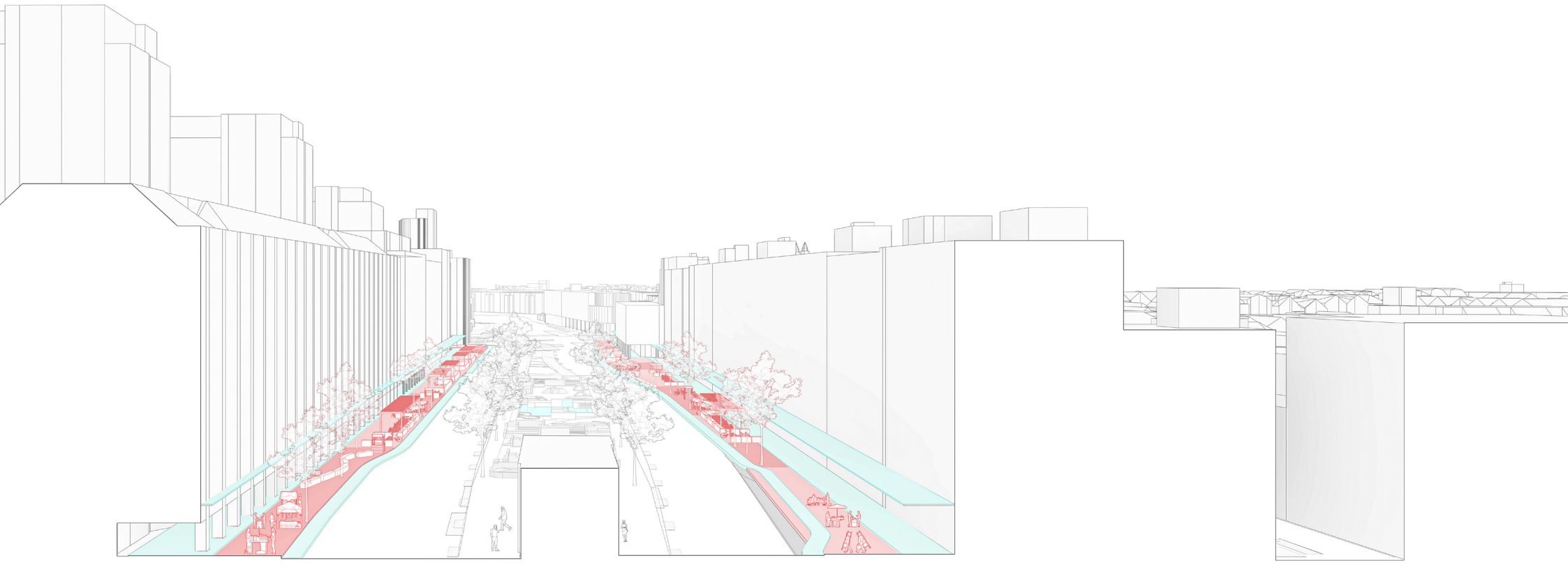


Fig.72 Initial design section (author)





4.6 Description

Tactical

Following the initial design phase, the methodology involved extracting **two** distinct **categories** of elements and configurations in urban design: tactical and infrastructural.

Tactical elements refer to installable features such as seating and temporary installations, aimed at enhancing functionality and aesthetic appeal in public spaces. On the other hand, **infrastructural configurations** define the spatial possibilities and potential uses within urban environments, guiding the layout and development of physical spaces.

This chapter explores the strategic extraction and application of these elements, examining their roles and contributions to urban design with a focus on clarity and practicality.

In the context of urban design, each implemented element operates strategically with defined functions and reasoning. For instance, tools of tactical urbanism, as outlined in "The Tactical Urbanist's Guide to Materials and Design v.1.0" by Street Plans Collaborative (2020), encompass resources such as paint, planters, seating, temporary street markings, and signage. These tools are pivotal for rapidly and economically transforming public spaces, offering precise guidance on their application, benefits, and installation.

Selected elements like palettes, trees, and benches transcend mere academic exercises, aligning with practical urban expectations. They embody principles drawn from Maurice Merleau-Ponty's philosophy for architects, emphasizing an experiential discovery of space through interconnected elements such as shading pergolas and artistic or green installations. This approach encourages physical engagement and movement, enriching the spatial experience (Hale, 2009).

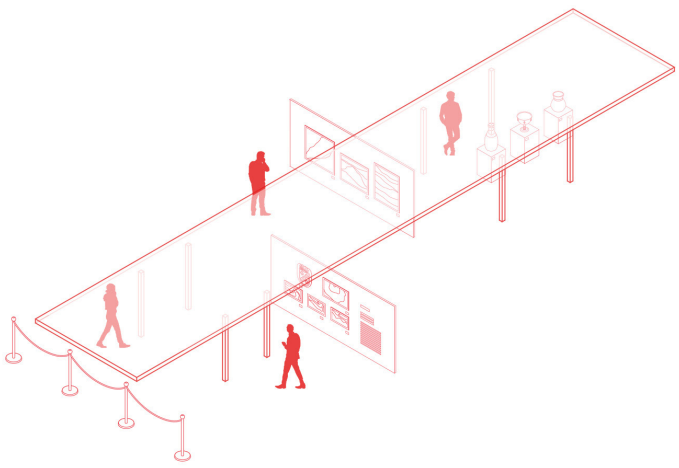
The first element, termed the "urban table," features a simple structure with slender columns serving multiple roles:

1-Connecting newly created spaces through an infrastructural approach, thereby expanding or repurposing urban courtyards.

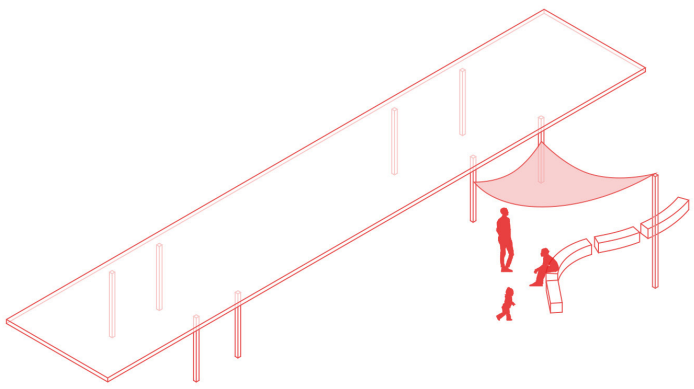
2-Acting as an anchor for additional elements such as shading devices for temporary events like festivals or film screenings.

3-Providing essential shading, thus influencing spatial qualities akin to a 4D porosity that enriches user experience without measurable volumetric constraints.

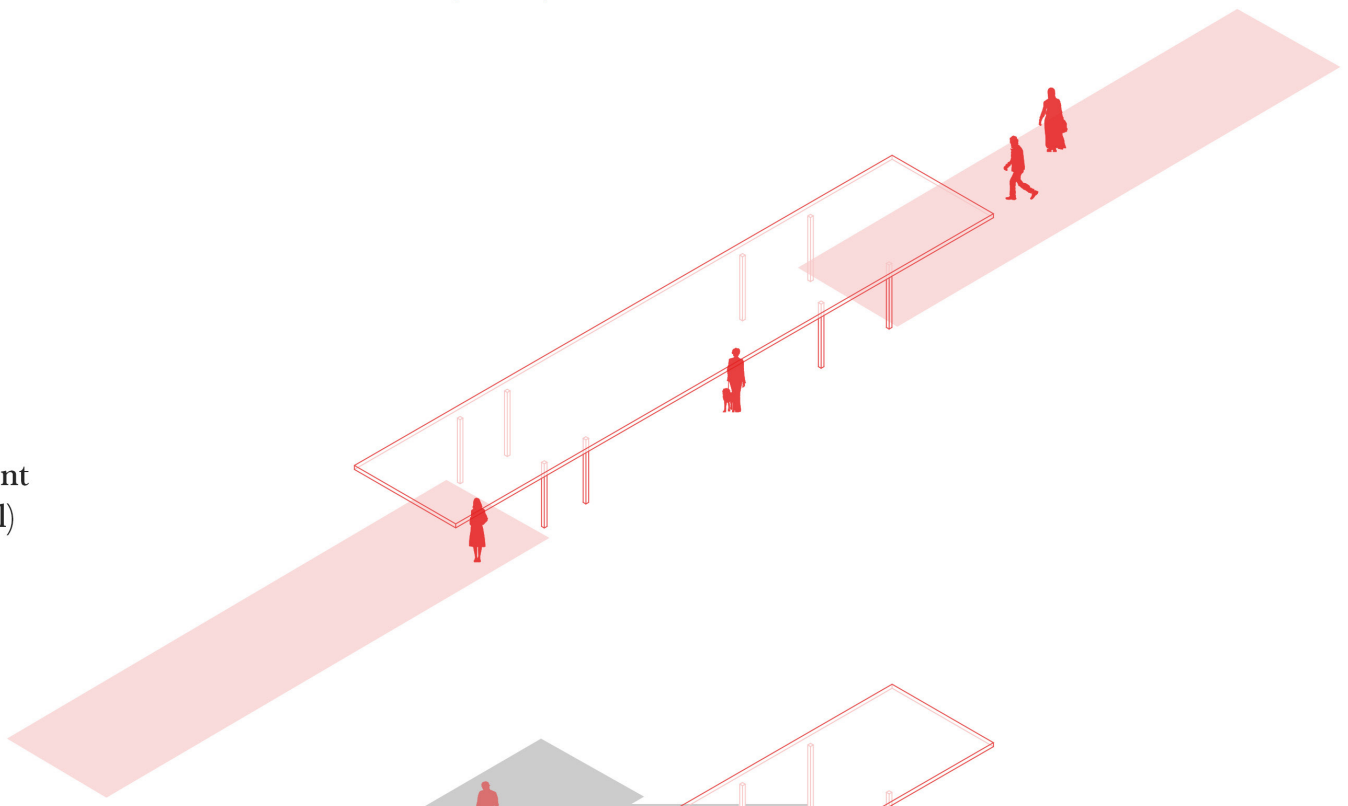
Exhibition Space



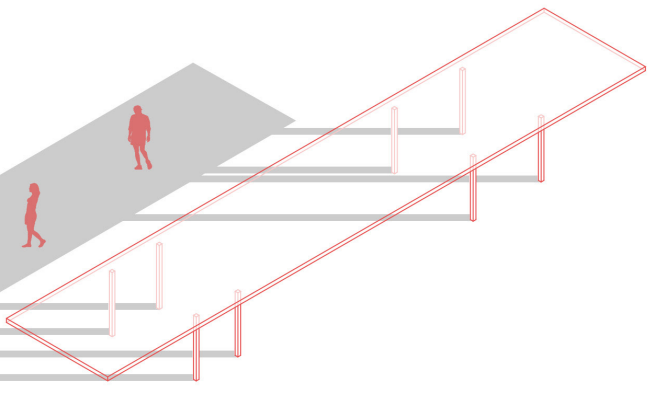
Shading Attachment



Connecting Element
(Spatial and Visual)



Shading Structure



Pop-up Cinema

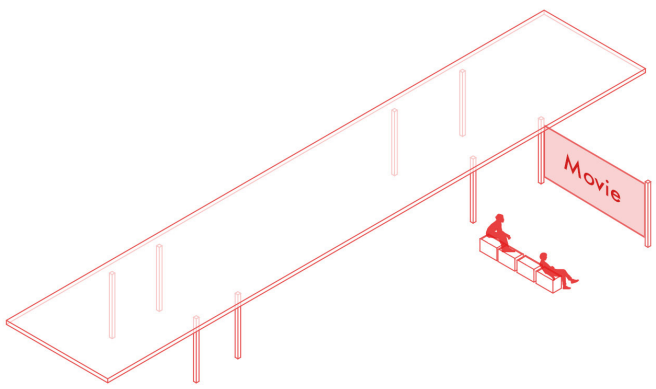


Fig.73 Tactical elements “urban table” diagram (author)

4.6 Description

Tactical

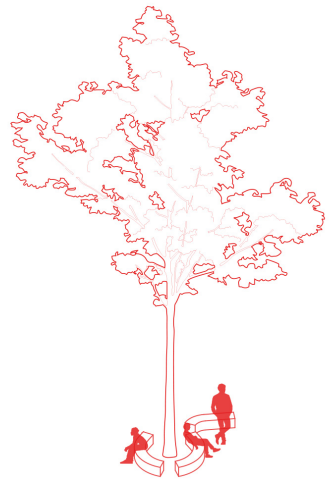
The second element, trees, function as vertical focal points within urban settings:

1-Creating attractive gathering spots that offer natural shade, enhancing the spatial porosity and inviting users to engage volumetrically.

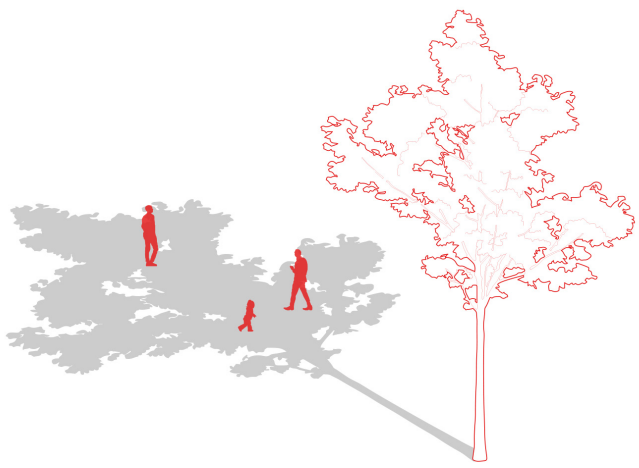
2-Similar to the urban table, arrays of trees establish visual and spatial connections within the urban fabric.

3-Supporting urban farming initiatives and activities like standing bars, thus serving as organic anchors in urban environments (Gehl, 2011).

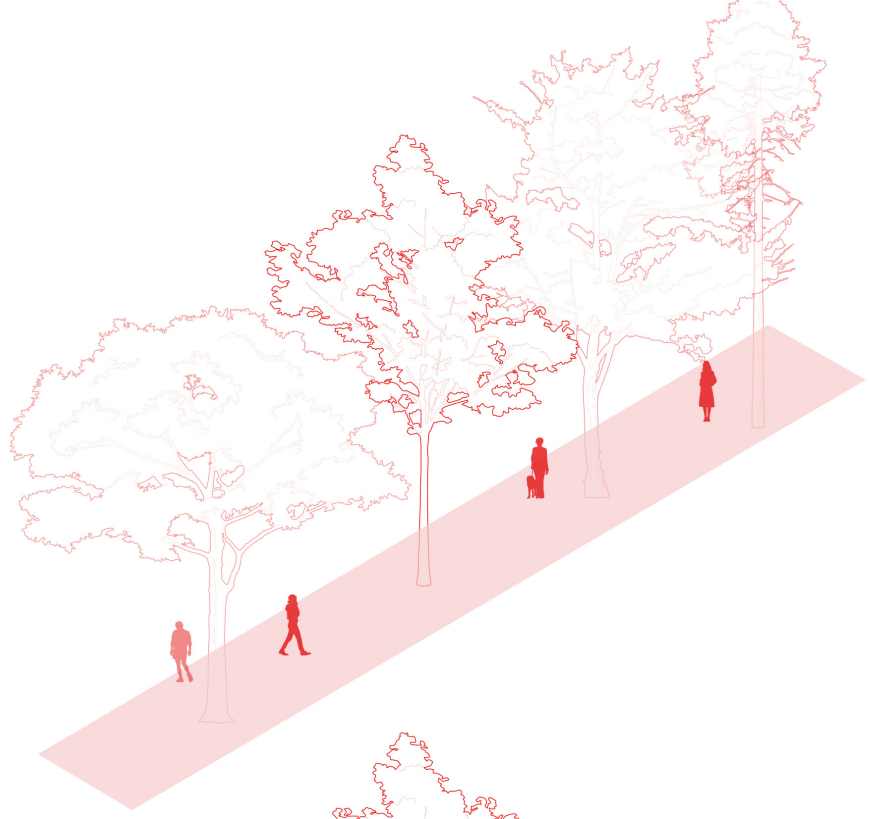
Urban Seating (Gathering Point)



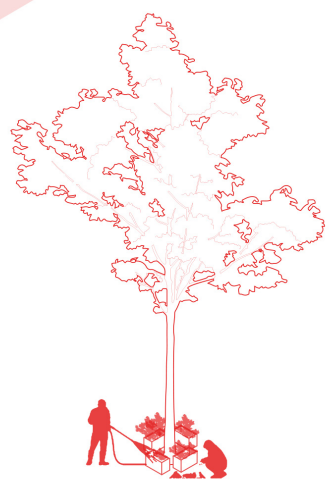
Natural Soft Shading



Connecting Element
(Spatial and Visual)



Attached Urban Farming



Standing Bar

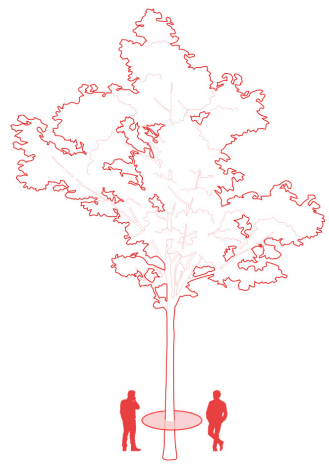


Fig.74 Tactical elements “tree” diagram (author)

4.6 Description

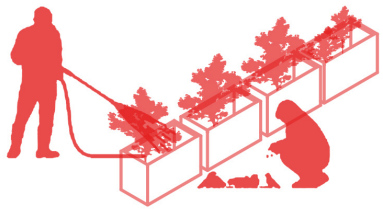
Tactical

The third element, modular planter-seating pieces, serves versatile functions:

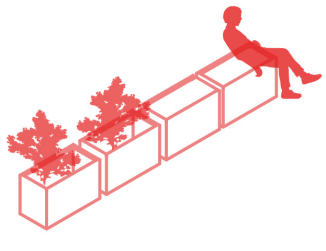
1-Enabling urban farming activities and introducing new forms of public seating to activate reclaimed urban spaces.

2-Partitioning space for different activities and providing visual demarcation akin to urban tables, stimulating exploration through directional shifts (Lydon & Garcia, 2015).

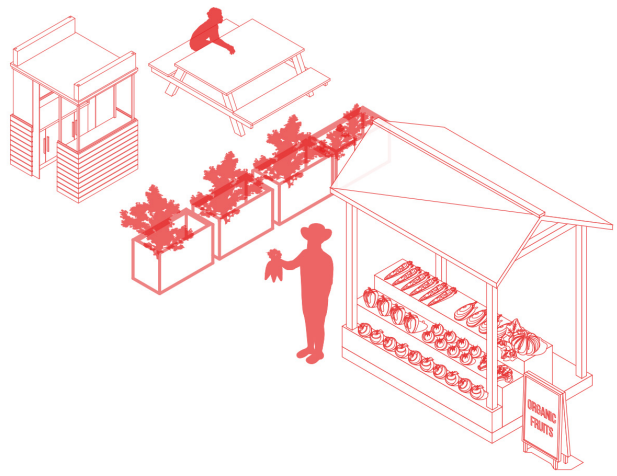
Urban Agriculture



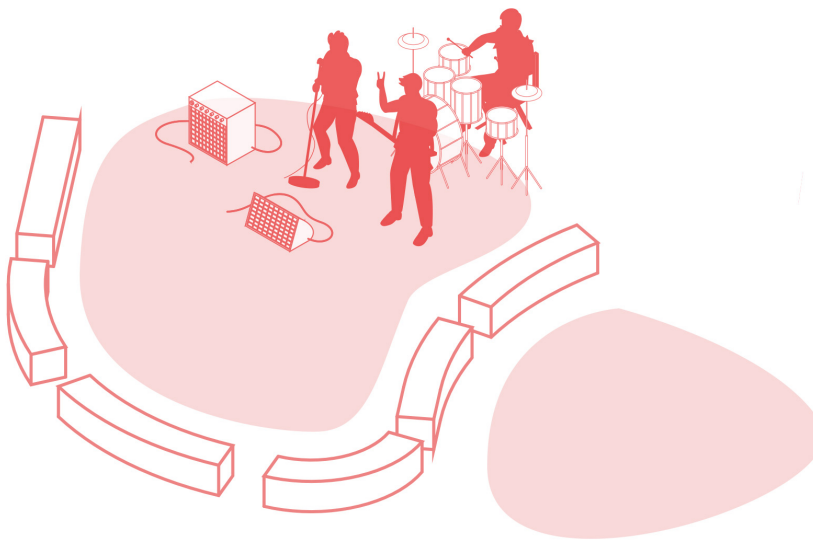
Public Seating



Partitioning Element



Zoning Element
(Performance and Pop-up Activities)



Visual Barrier for Site Program
and Directional Counterpoint

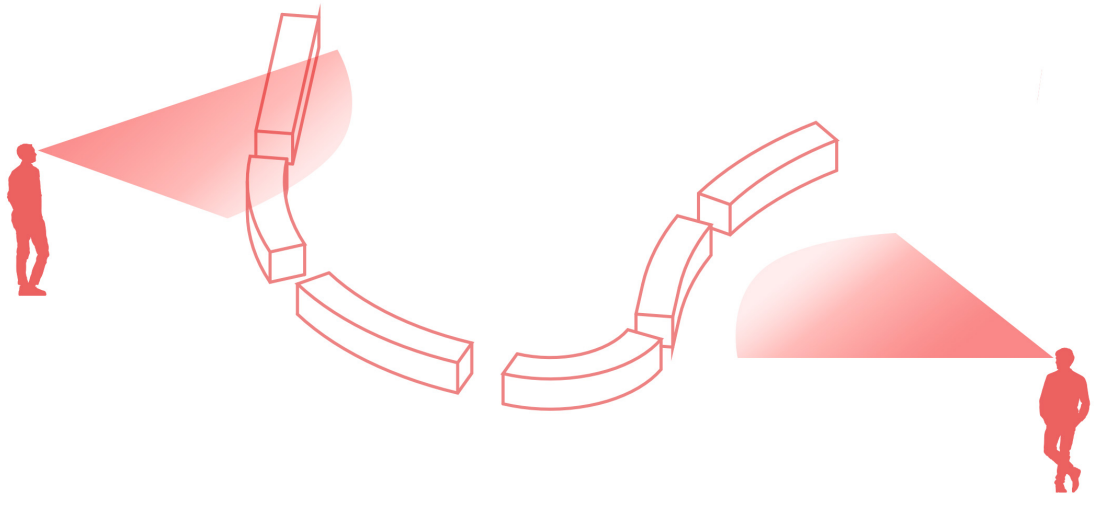


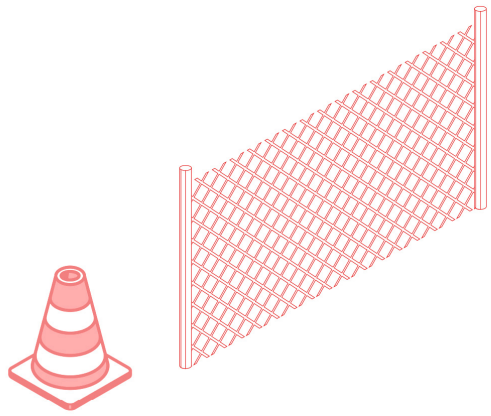
Fig.75 Tactical elements “modular” diagram (author)

4.6 Description

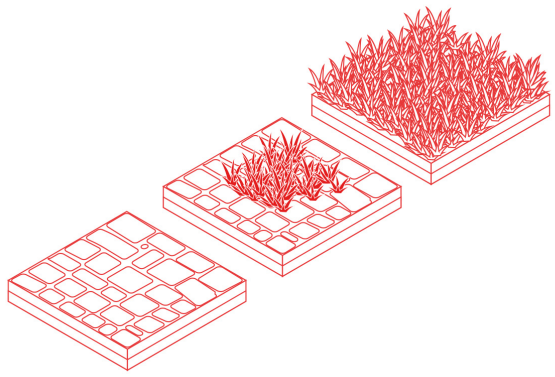
Tactical

Additional elements such as cones, fences, and temporary markers contribute dynamically to reshaping urban spaces. Tactical depaving, for example, reclaims land for greenery, while pallets serve as flexible elements for creating temporary stages within evolving programs.

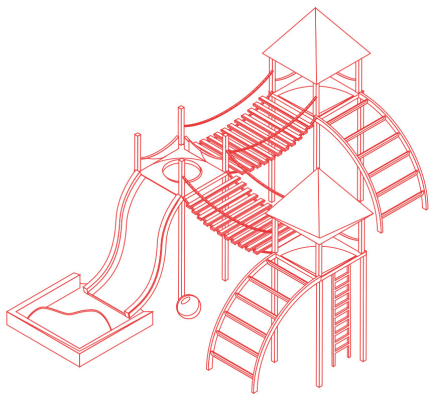
Temporary Boundary Markers



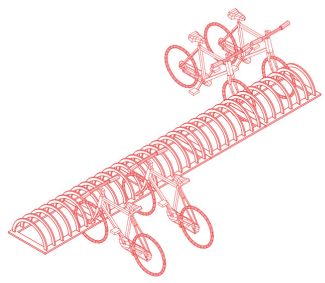
Tactical Depaving



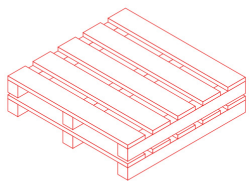
Children's Play Area



Bicycle Parking Facilities



Modular Platforms (Pallets)



Temporary Structures (Event-based Installations)

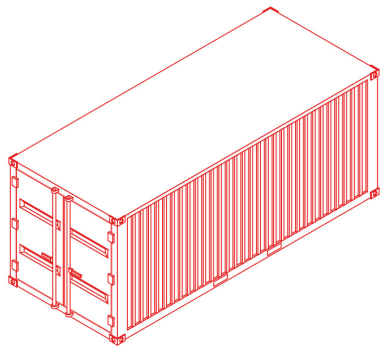


Fig.76 Tactical elements diagram (author)

4.6 Description

Infrastructural

The **infrastructural** intervention within the project unfolds across **three** distinct **configurations**: **Spatial Infrastructure, Policy Infrastructure,** and **Punctual Infrastructure.**

The **spatial infrastructure** has **three** main **configurations** based on spatial characteristics: **horizontal**, **vertical**, and **combined**. **Horizontal** surfaces integrate with **single vertical** elements, such as **sidewalks**; **two parallel vertical** elements form **corridors**, and **inner corners** feature two **perpendicular vertical** elements.

Spatial infrastructure:

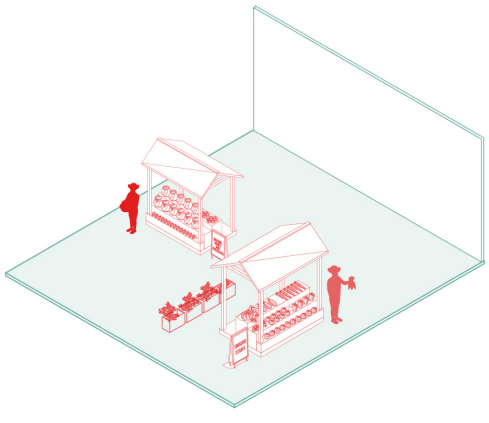
Flat Ground Surface with One Vertical Surface (Sidewalk):

1-This configuration enables seamless functional flow and supports activities such as pop-up markets, cafes, and bars.

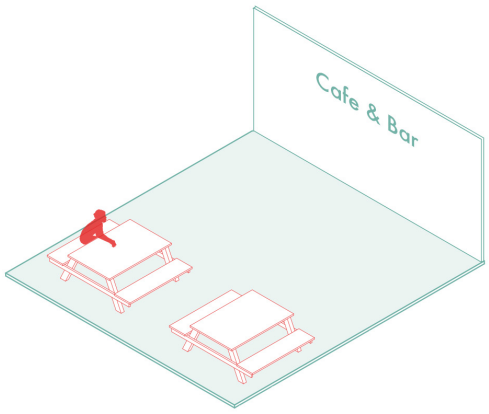
2-Utilizing tactical elements like modular planter-seating can transform the street environment into a less linear space.

3-Additionally, it allows for the reorganization of flow hierarchies; for example, relocating bike lanes to expand sidewalks can alter traffic dynamics effectively.

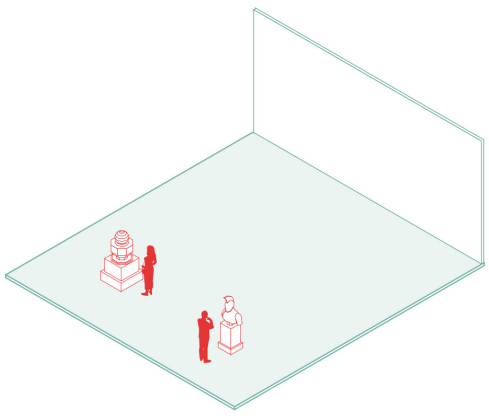
Pop-up Markets



Extended Building Functions
with Street Furniture (Benches)



Public Art Installations (Exhibitions)



Relocated Bike Lane

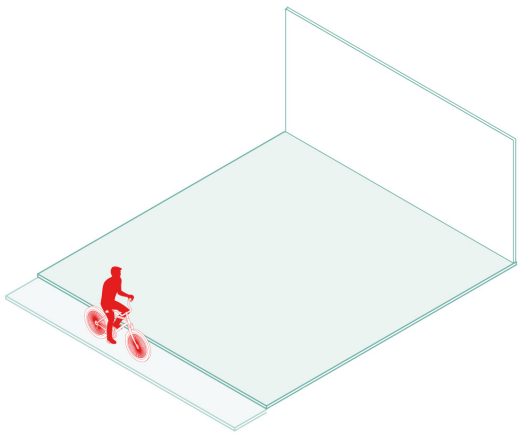


Fig.77 Spatial infrastructure type 1 diagram (author)

4.6 Description

Infrastructural

Spatial infrastructure:

Flat Ground Surface with Two Parallel Vertical Surfaces (Corridor):
Repurposing this layout creates opportunities for:

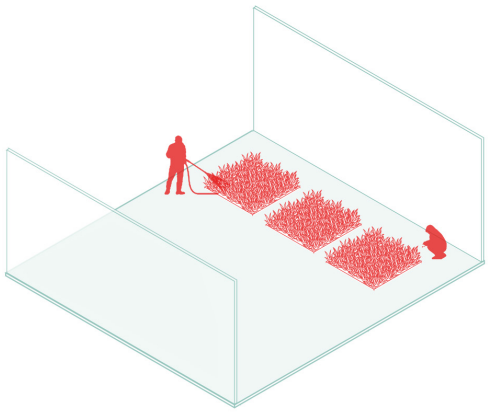
1-Tactical green corridors that respond to community engagement strategies outlined in the opportunity mapping.

2-Expression zones serving as transitional spaces conducive to artistic, musical, or even political activities, aligning with foundational project principles.

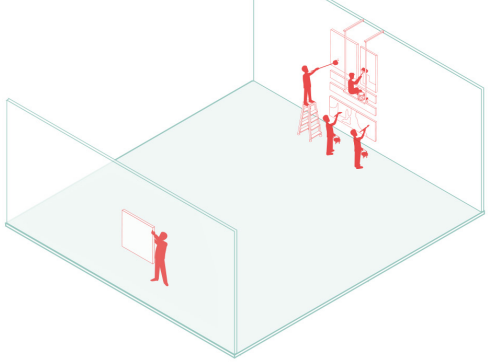
3-Acting as primary spatial connectors within the project, facilitating movement and interaction.

4-Applying tactical elements such as cones can temporarily transform these transitional spaces into communal areas.

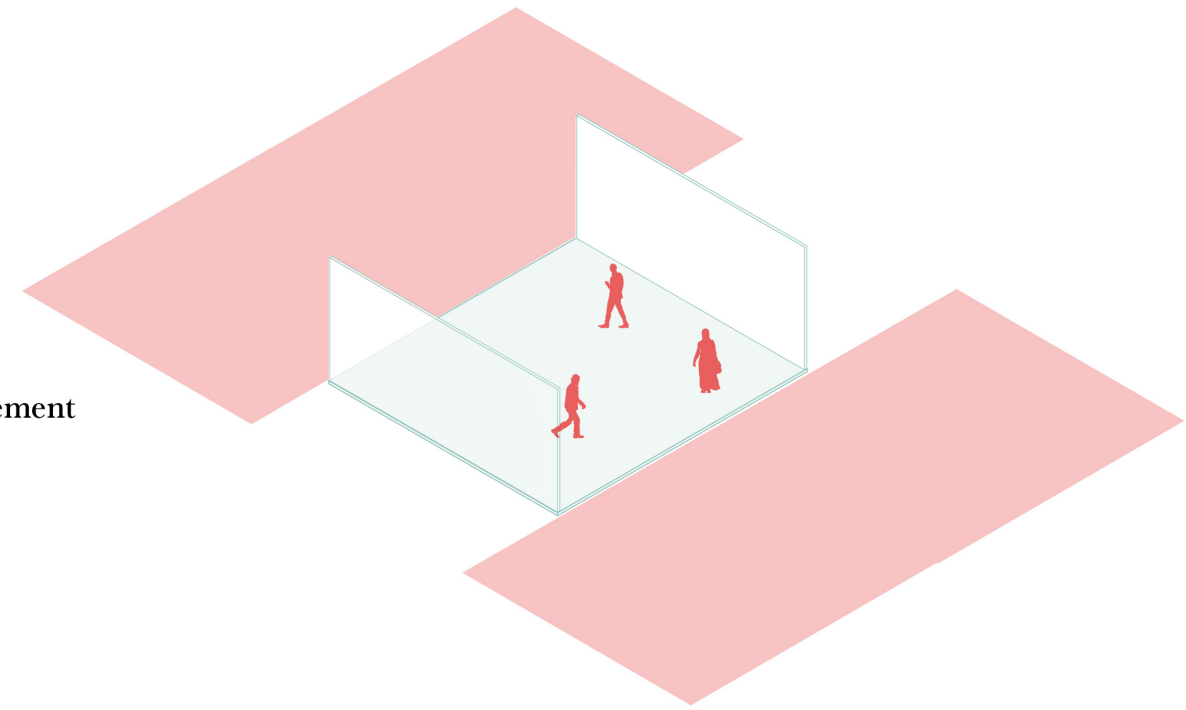
Tactical Green Corridors



Linear Creative Expression Zone
(Transitional Journey)



New 0th Places Connection Element



Temporary Reclaimed Enclosed Public Space
(Instantaneous Public Building)

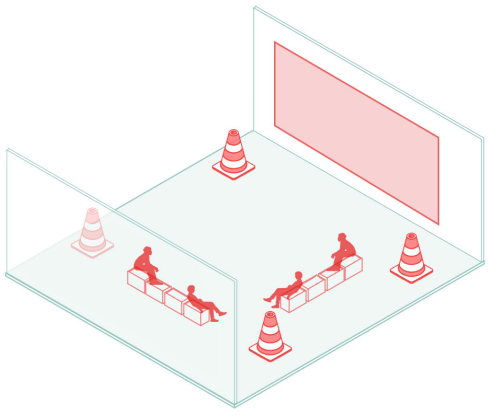


Fig.78 Spatial infrastructure type 2 diagram (author)

4.6 Description

Infrastructural

Spatial infrastructure:

Flat Ground Surface with Two Perpendicular Vertical Surfaces (Corner):

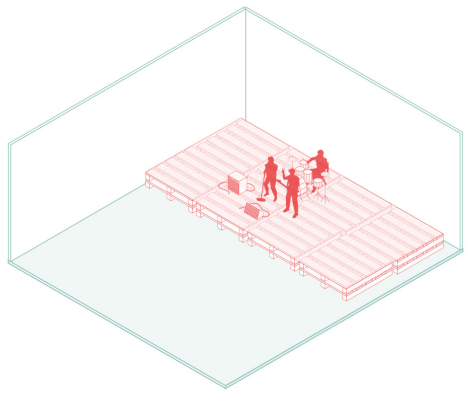
1-The enclosed nature of corner spaces supports functions such as tactical stages for gatherings and events.

2-In secure courtyards identified through safety analysis, these spaces are suitable for children's playgrounds, catering to the social needs of the surrounding community.

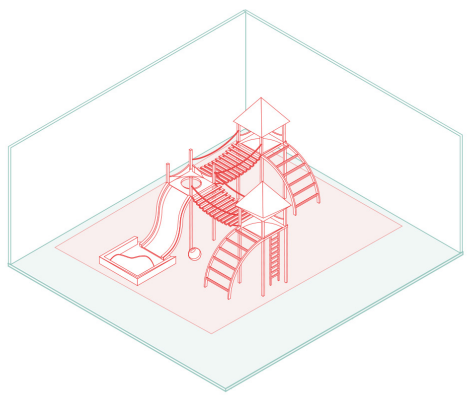
3-Less secure corners can be utilized for modular unit storage, potentially including prefabricated residential units, offering innovative solutions to housing challenges within the project scope (beyond the current study's focus).

4-Pocket parks are frequently integrated into corner locations to address urgent community needs identified through opportunity mapping.

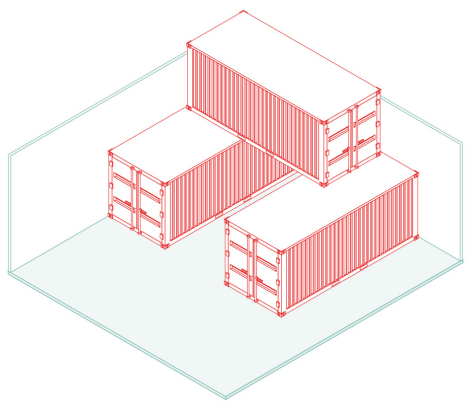
Pop-up Tactical Stage (Enclosed Event Space)



Children's Playground (Safety Enclosure)



Storage and Prefabricated
Modular Units



Pocket Parks

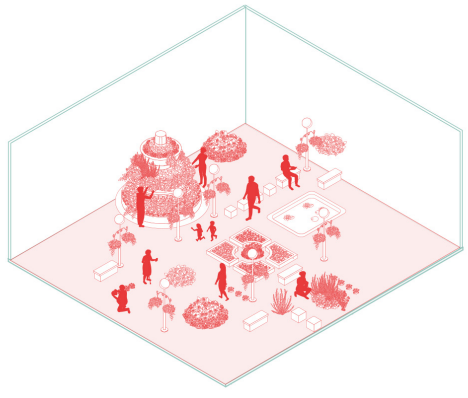


Fig.79 Spatial infrastructure type 3 diagram (author)

4.6 Description

Infrastructural

Punctual Infrastructure:

Signage:
Essential for all tactical elements to ensure the new spaces created are easily navigable and comprehensible.

Public Toilets:
Facilitates various functions associated with tactical urbanism; essential for events involving groups of people such as exhibitions, cafes, pop-up markets, and stages.

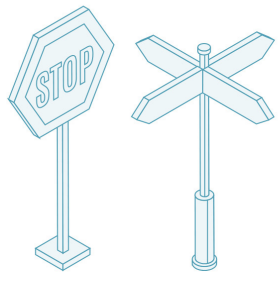
Public WiFi:
Similarly crucial, as it encourages interaction and gathering in new public areas, serving as an additional attraction for people.

Water Supply:
Vital for activities like pop-up markets and sports zones, and especially critical for installing and maintaining new green spaces and trees.

Electrical Outlets:
Equally indispensable as water supply; essential for functions such as exhibitions, cafes, pop-up markets, and stages. Webb et al. (2019)

Street Lighting:
Enables the existence of all tactical elements and new functions throughout different times of the day, facilitating evening activities and enhancing safety.

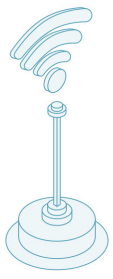
Signage



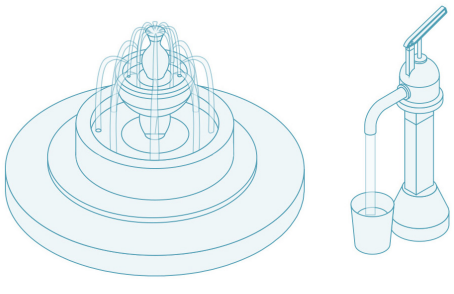
Public Toilets



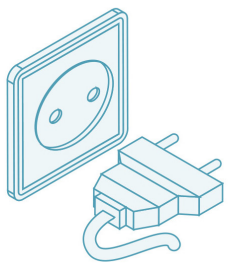
Public WiFi



Water Supply



Electrical Outlets



Street Lighting

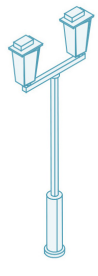


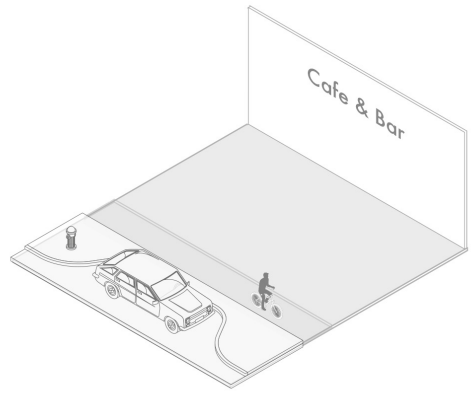
Fig.80 Punctual Infrastructure diagram (author)

4.6 Description

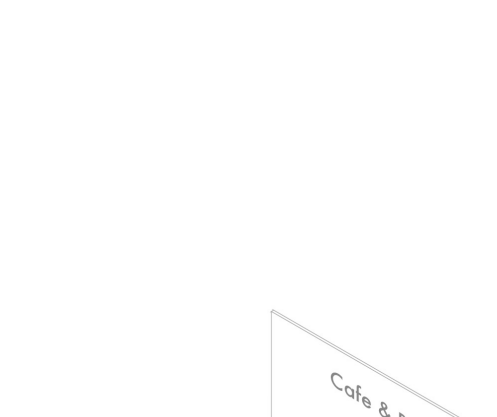
Conclusion

The initial ‘0th place’ concept is the result of integrating both tactical and infrastructural elements, each serving distinct functions. Tactical elements like seating, planters, and temporary markings are enabled by infrastructural configurations, both spatial and punctual, allowing for a variety of activities and interactions. Together, these elements transform urban environments, interconnecting spaces that respond to community needs and encourage engagement.

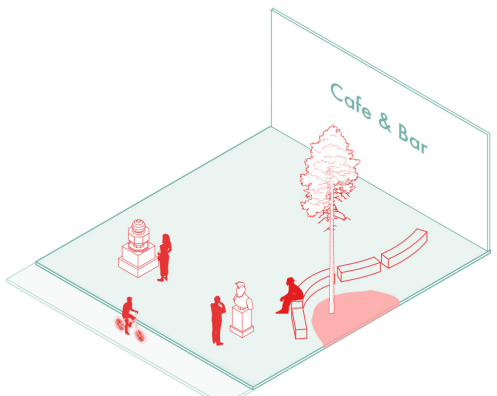
Urban Crack with Potential
(Underutilized Sidewalk)



Infrastructural Intervention
(Sidewalk Expansion,Bike Lane Relocation)



Implementation of Tactical Urbanism



Initial 0th Place

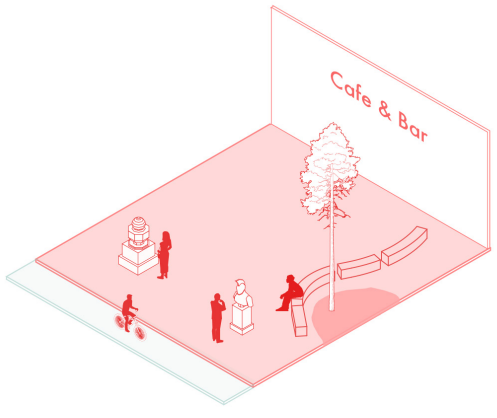


Fig.81 0th place formation diagram (author)

4.7 Final Design

The final strategy emphasizes key design aspects to enhance accessibility, safety, and community engagement. It includes relocating the bike lane for streamlined traffic flow and expanding the sidewalk to accommodate new programs. Reclaimed courtyards will be activated to foster interaction and sustainability through initiatives like urban farming. A temporal public square will serve as a vibrant hub during weekends and holidays, featuring an underground water storage facility for extreme weather. Additionally, tactical connectors, such as horizontal elements, greenery, and visual enhancements, will promote connectivity and aesthetic cohesion.

The zoom-in section was chosen for its diverse connections and conditions, showcasing various relationships, the presence of the Brandgrens, and existing urban cracks.

Legend

-Strategic Shading Elements (Tactical Visual Connectors).

-Expanded Sidewalk Enhancements (Mitigating Linearity and Embracing Discovery).

-Permeable Surfaces with Diverse Programming and Tactical Courtyards.

-Realigned Bike Lane Dynamics (Establishing Flow Hierarchy).

-Integrated Open Spaces Linked to the Skatepark with Temporal Sports Programming.

-Urban Temporal Square with Water Storage Infrastructure.

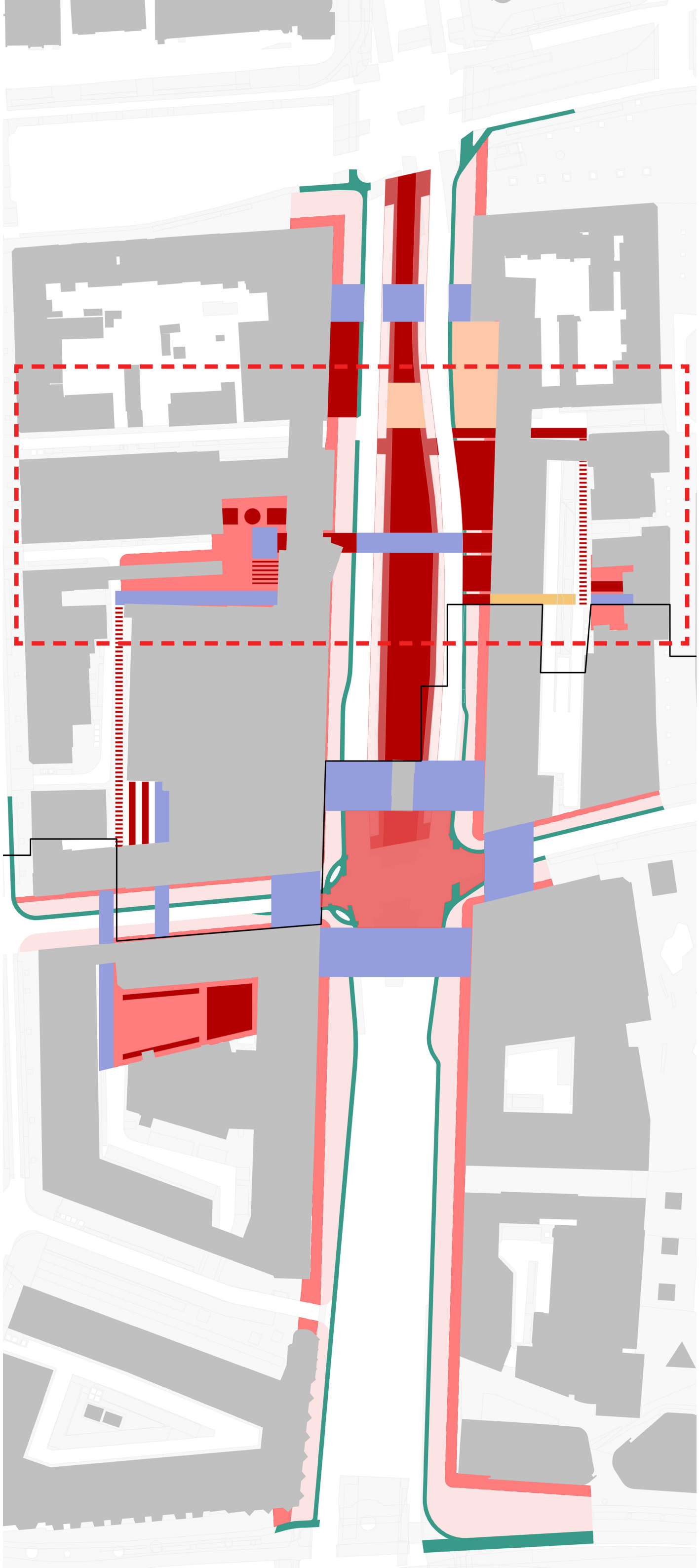


Fig.82 Final design diagram Site 2 (author)

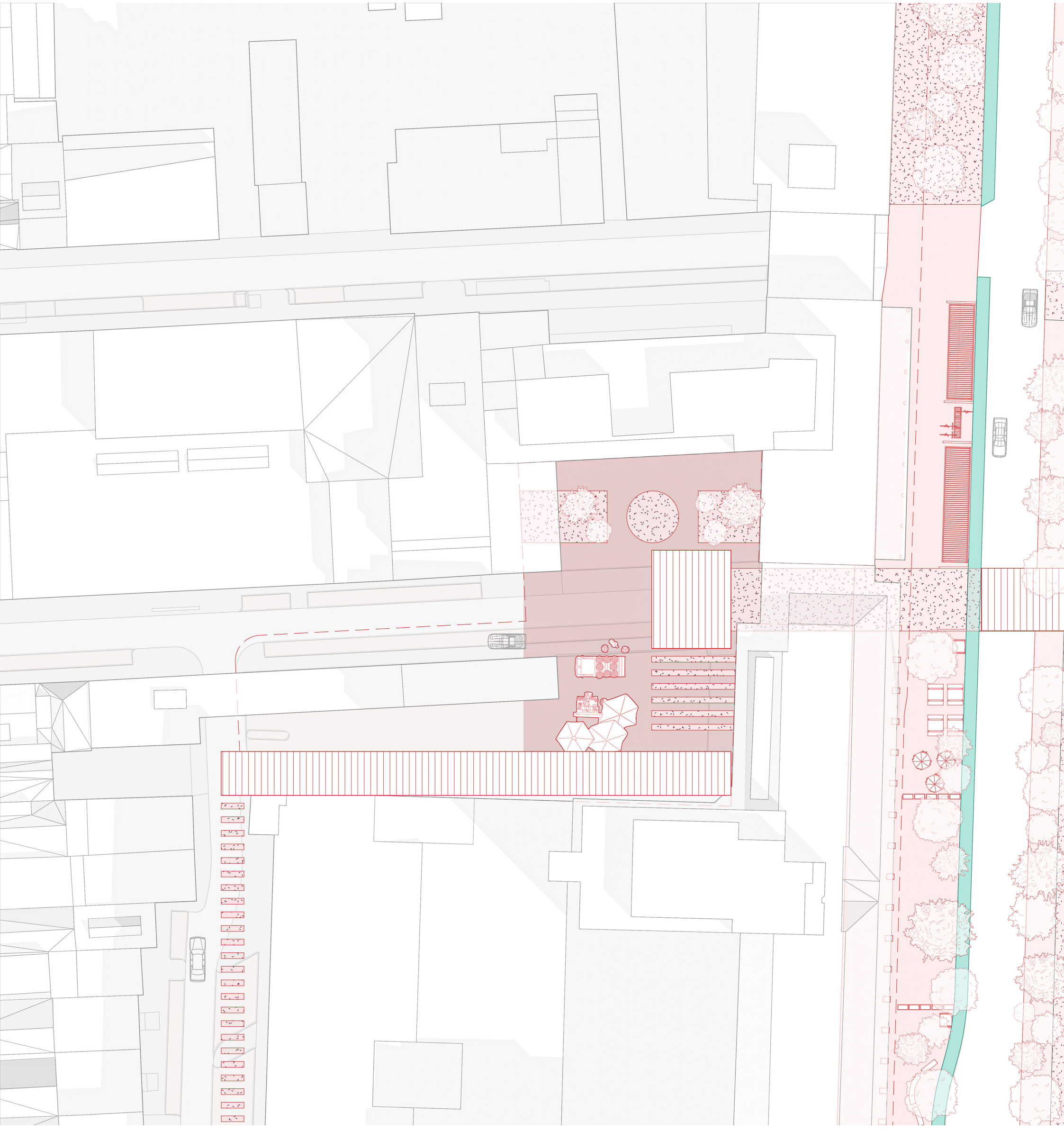


Fig.83 Final design detailed plan (author)

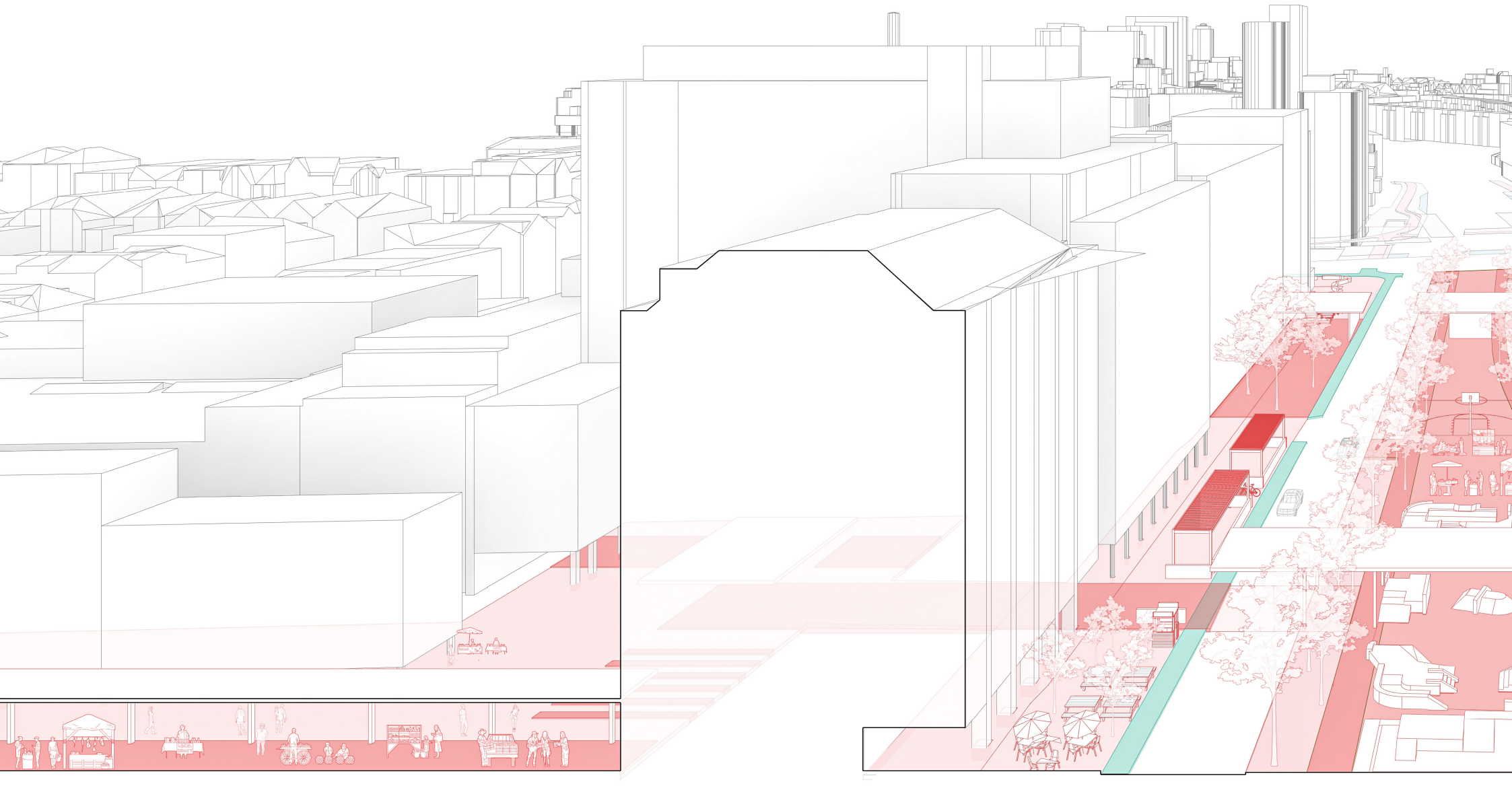
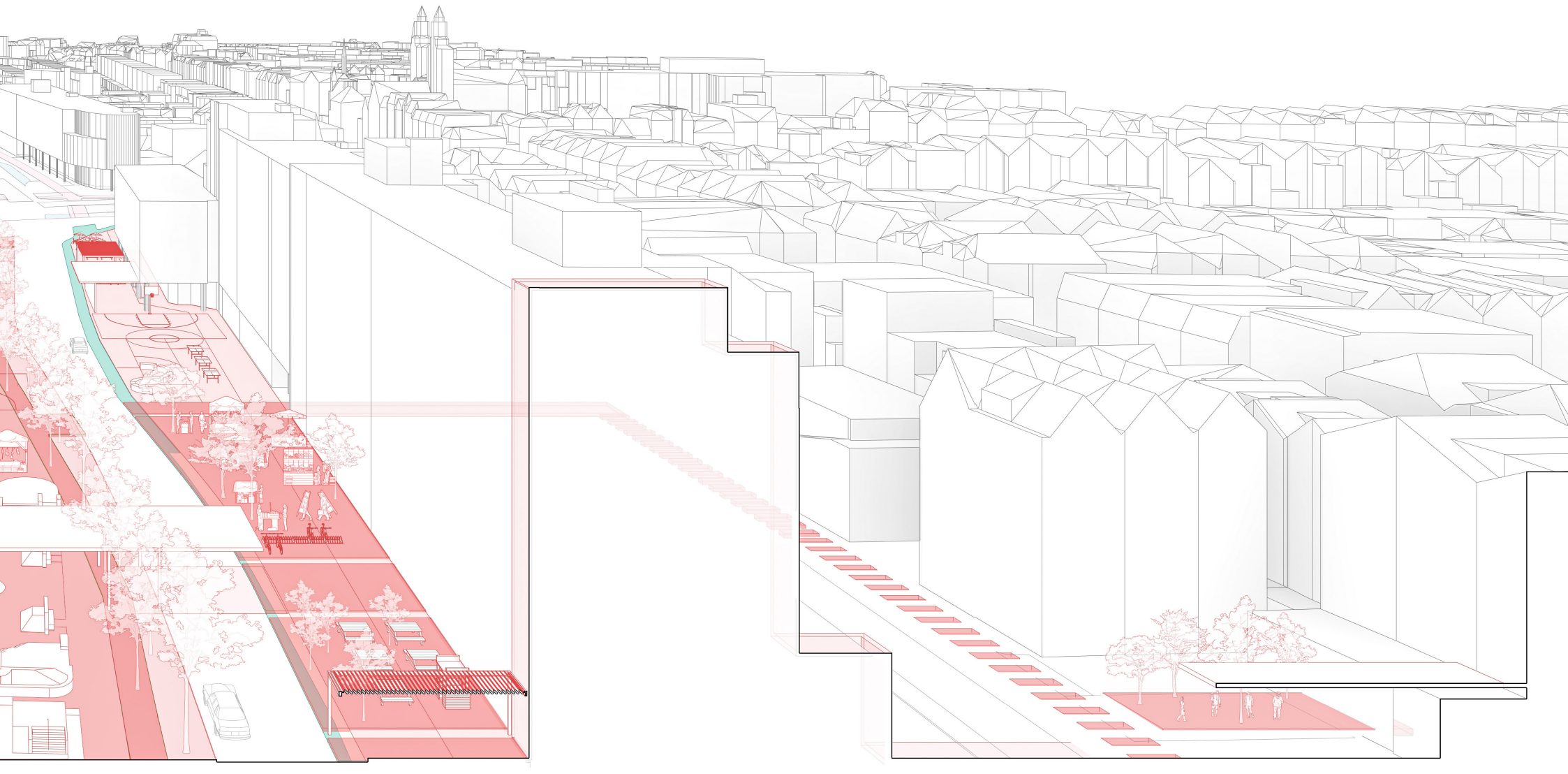


Fig.84 Final design detailed section (author)

The combination of tactical and infrastructural elements allowed revitalization and transformation to occur with minimal intervention and low cost, achieving the initial 0th place.

Different relationships between infrastructural and tactical elements are evident: from corridors (two parallel walls) with shading elements (urban tables(, to courtyards (two perpendicular walls) with trees, to expanded sidewalks (one wall) hosting pop-up markets. These connections will be explored further in the following chapter.



4.7 Final Design

Elaboration

This chapter will detail the final design, illustrating how the opportunity map is connected to the tactical tools employed and the infrastructure that supports them.

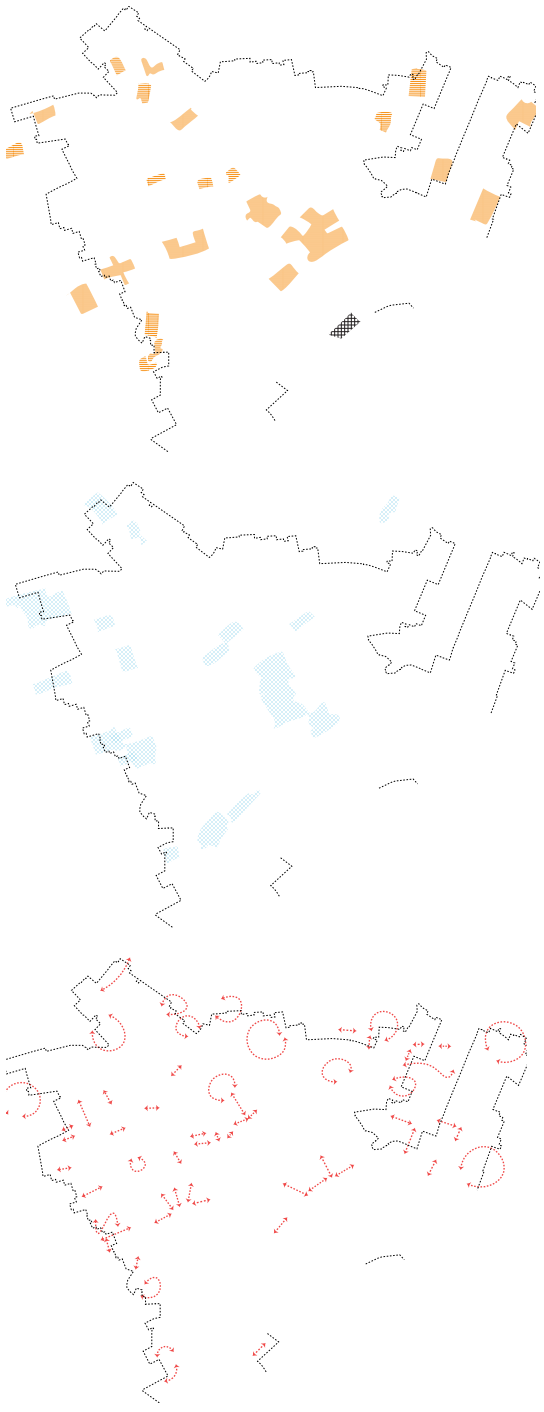


Fig.85 The first part outlines the types of opportunities presented, which include:

-Enhancing Connectivity and Walkability
-Supporting Local Businesses through Mixed-Use Development
-Developing Green Infrastructure

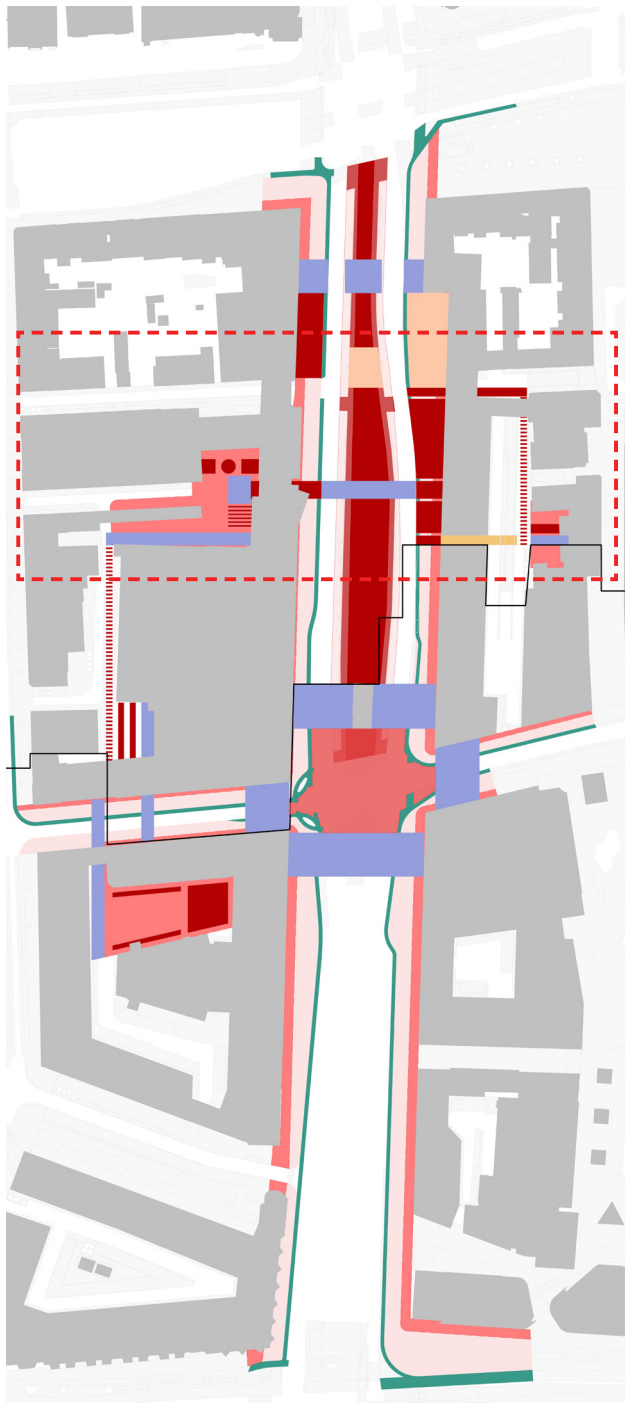


Fig.86 The second part will highlight the design strategies and elements related to each presented opportunity.

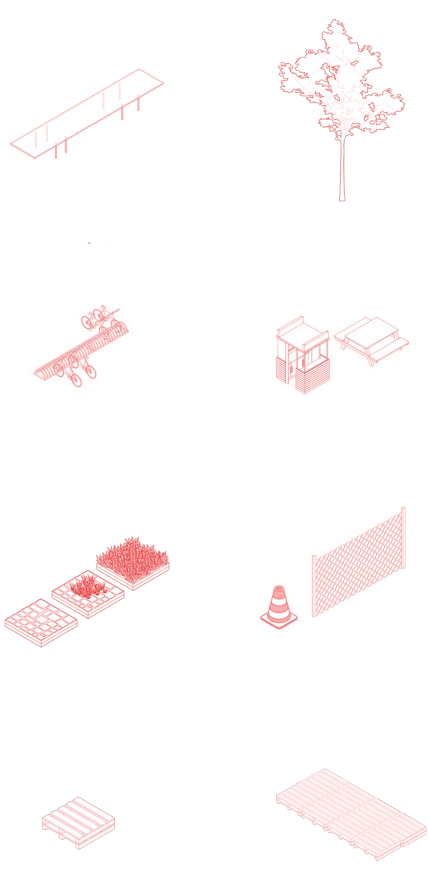


Fig.87 The third part will explain the tactical elements used and the rationale behind their selection.

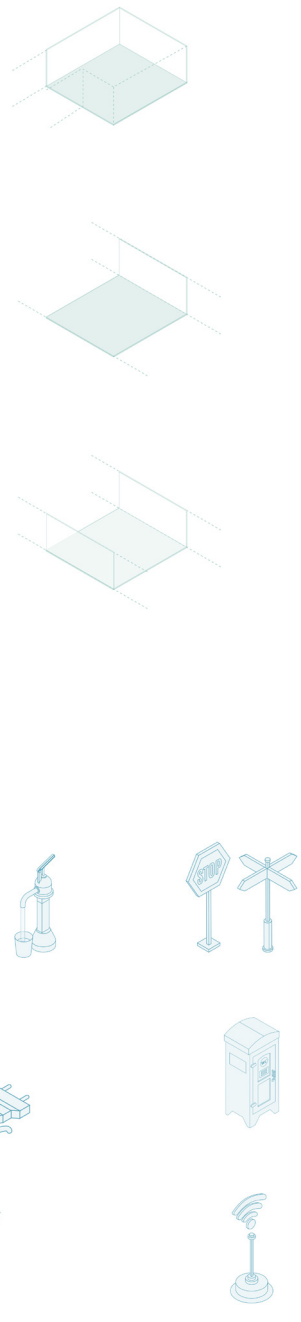


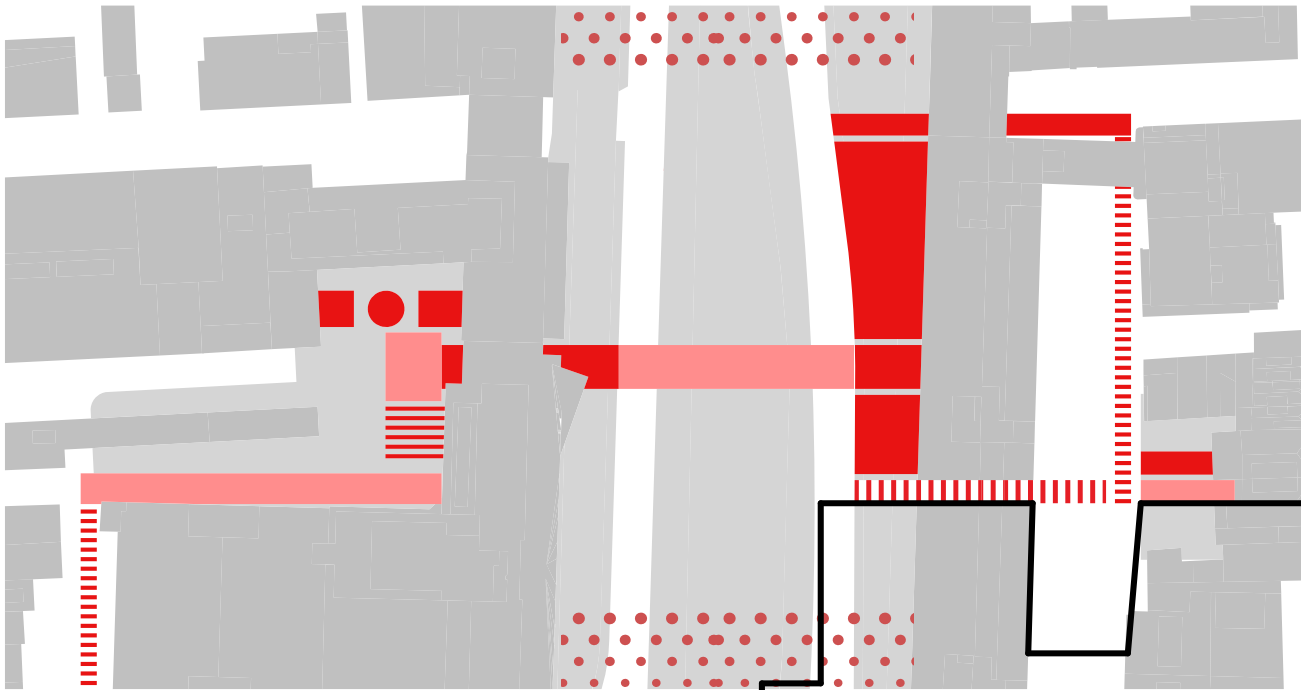
Fig.88 The final part will detail the spatial infrastructure implemented to host the tactical elements, the policies chosen or modified as infrastructural changes, and the punctual infrastructures that enabled the tactical urbanism to take place.

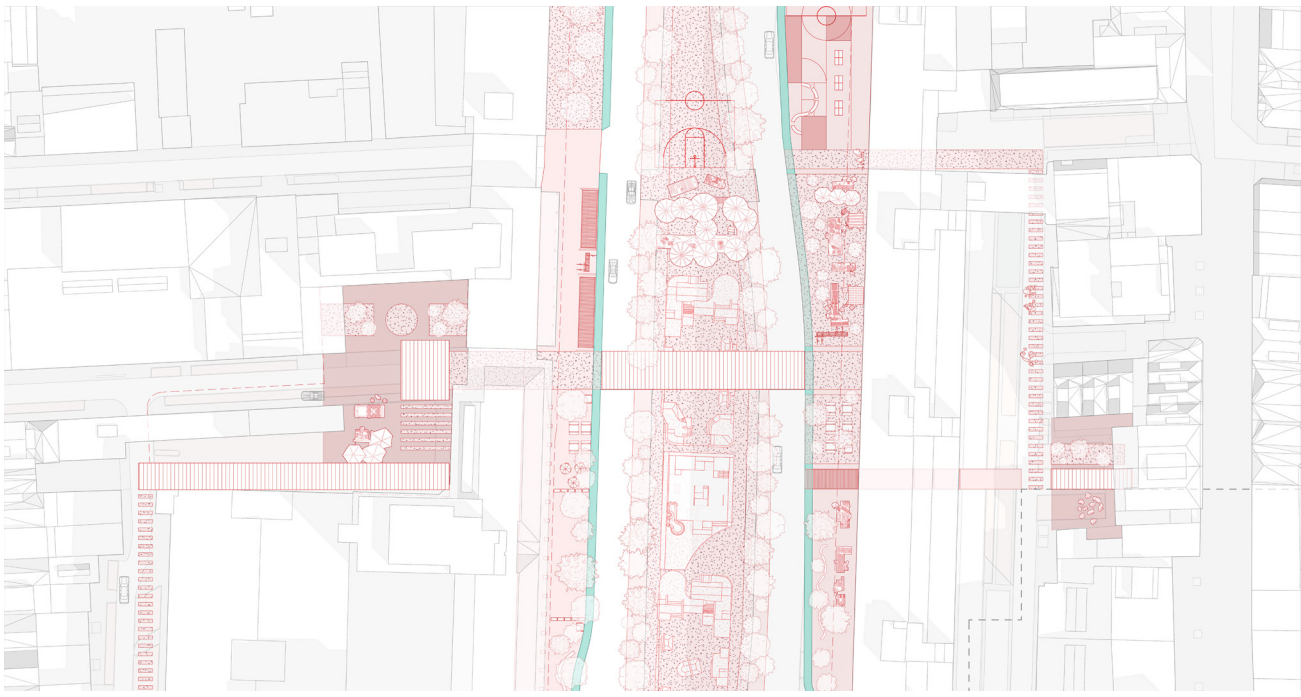
Implementing Tactical Connections

Enhancing Connectivity and Walkability



The Design





There will be three types of tactical connectors:

Horizontal elements such as shades and urban furniture.

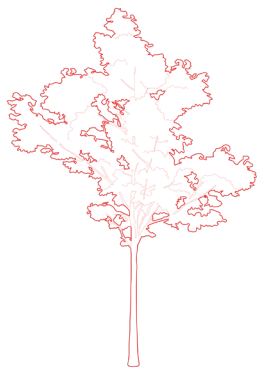
Green connectors like trees, bushes, and vegetation to link both sides.

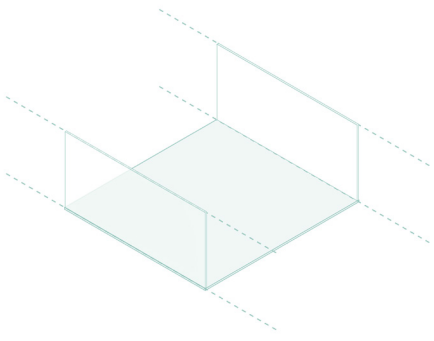
Visual connectors using tools like paint, Light installations, and art installations

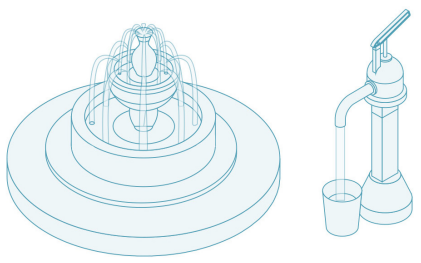
Tactical Elements

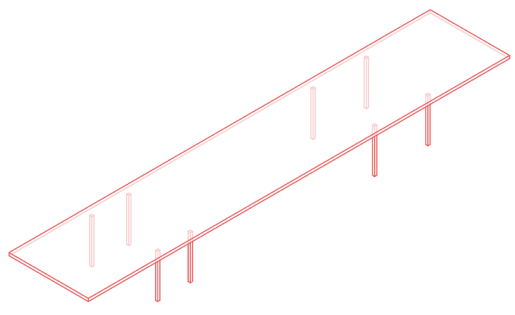
Spatial Infrastructure & Policy

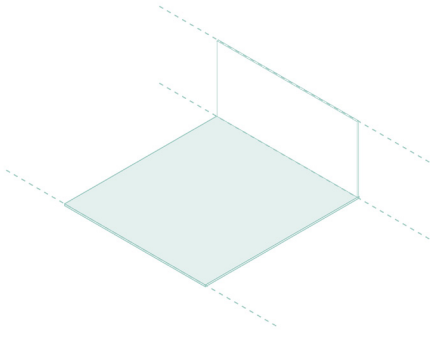
Punctual Infrastructure

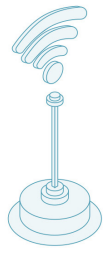


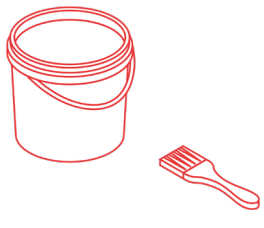


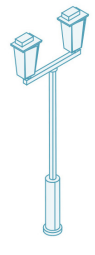












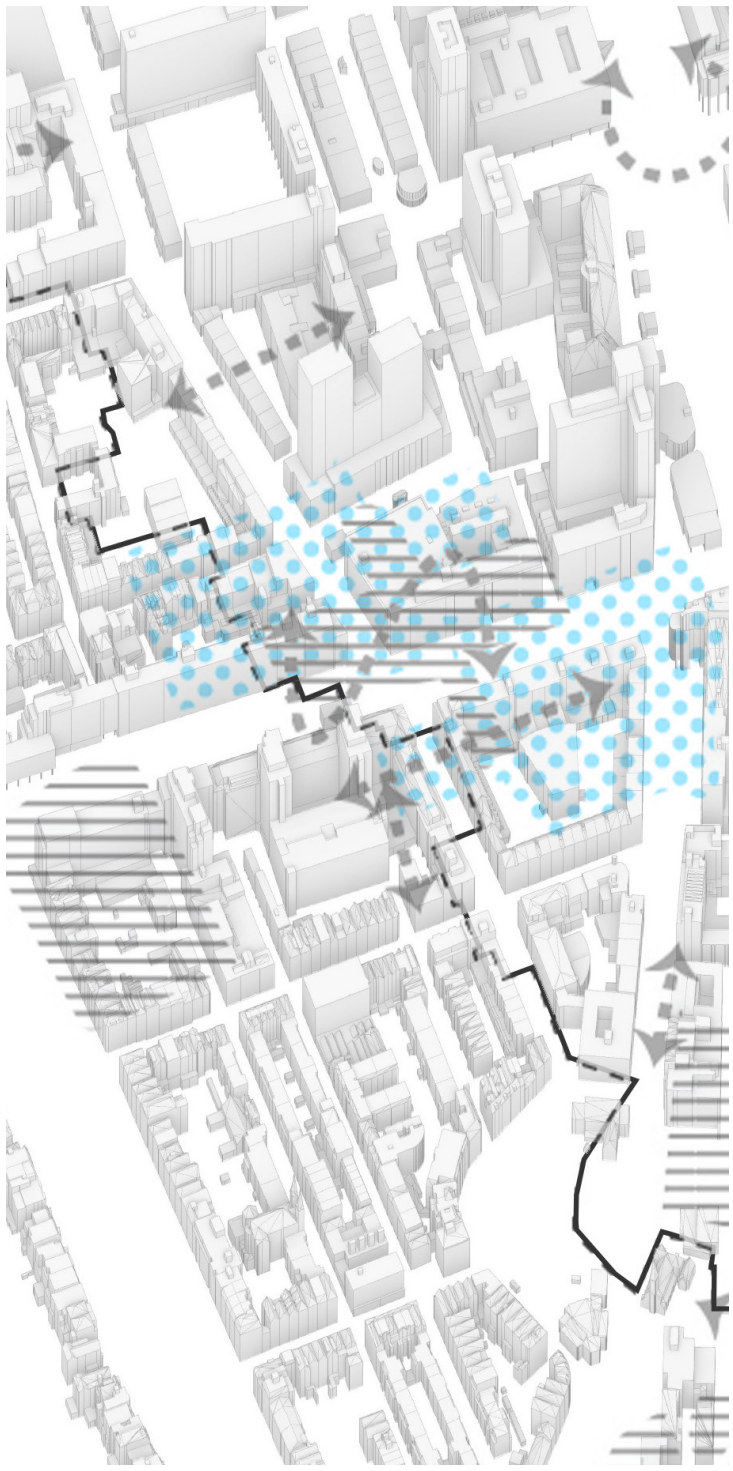
Trees and depaving were utilized as visual connectors, facilitated by the availability of sidewalks and corridors (spatial infrastructure type 1 & 2), a reliable water supply (punctual infrastructure), and policies supporting bottom-up participation (policy infrastructure).

The urban table was similarly supported by the presence of sidewalks (spatial infrastructure type 1).

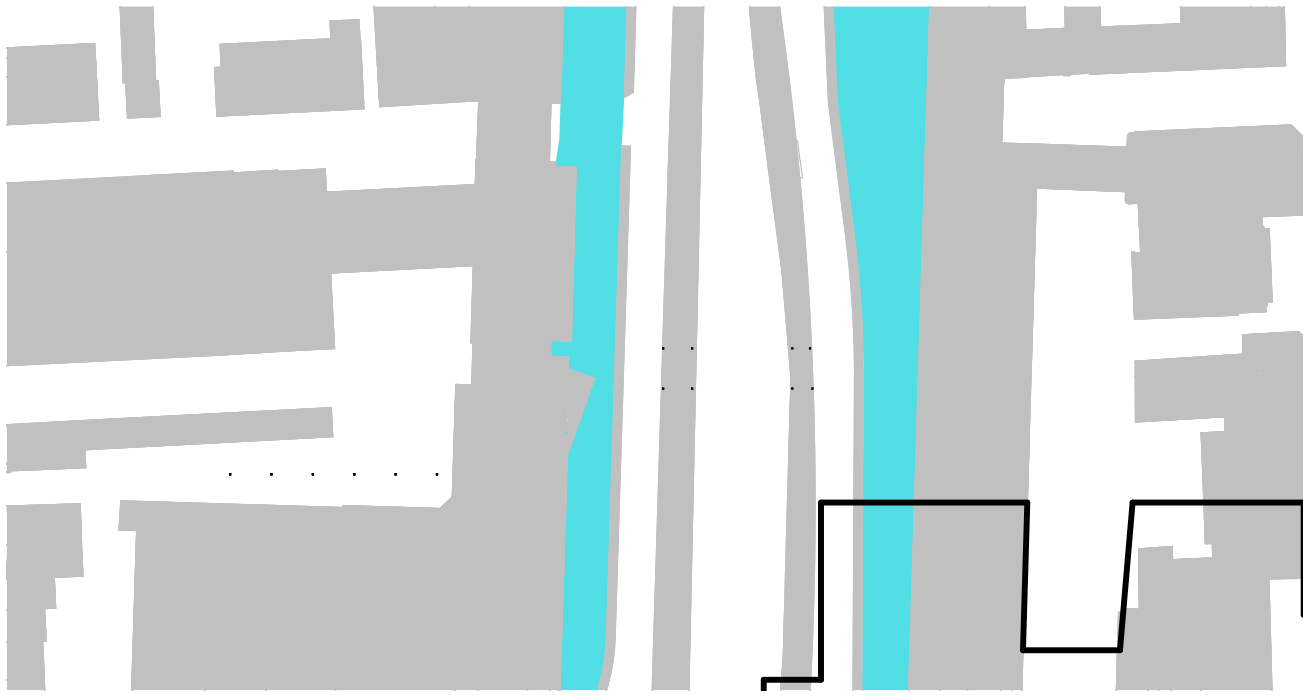
Other tactical elements, such as paint and lighting, also contributed to visual and perceptual connectivity. These were made possible through policies (policy infrastructure) allowing building surface painting and ensuring a steady electrical supply (punctual infrastructure).

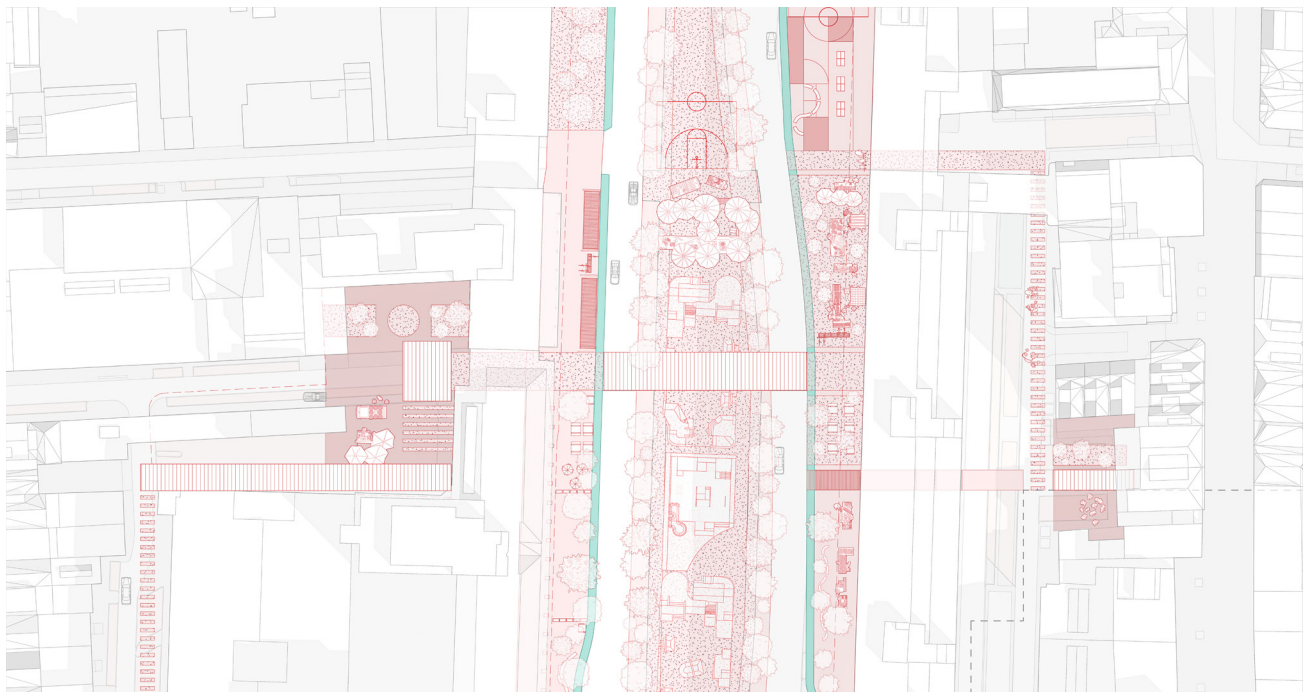
Reorganizing the Bike Lane & Expanding the Sidewalk

Supporting Local Businesses through Mixed-Use Development



The Design





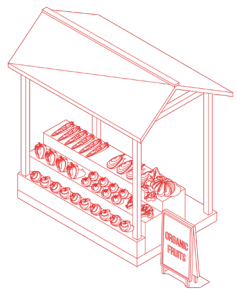
The bike lane will be moved next to the street to streamline the flow of traffic based on speed: cars, fast-moving bikes, and pedestrians. This street profile adjustment is crucial as it enhances accessibility and safety for all users.

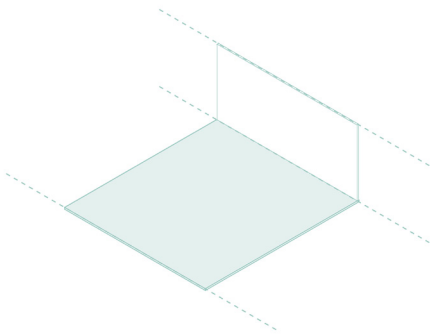
The sidewalk will be expanded to its maximum capacity to host new programs for locals, artists, and tourists. This boundary extension promotes interaction and diminishes the linearity of the site. It activates corner shops and encourages a sense of discovery with its horizontal layout, which is perpendicular to the street, connecting new tactical courtyards. This reflects Sennett's idea of incompleteness, where the urban environment remains adaptable and capable of evolving to meet changing needs.

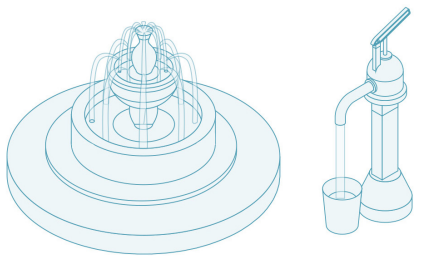
Tactical Elements

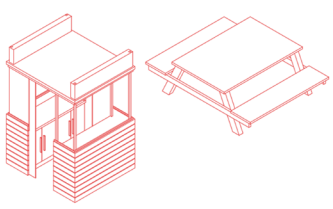
Spatial Infrastructure & Policy

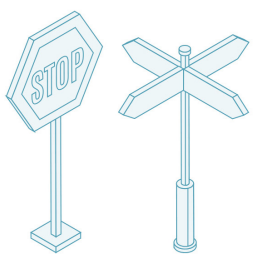
Punctual Infrastructure

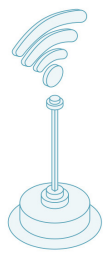


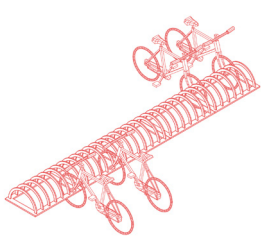


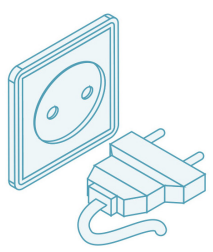


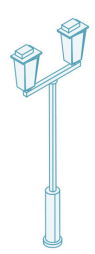










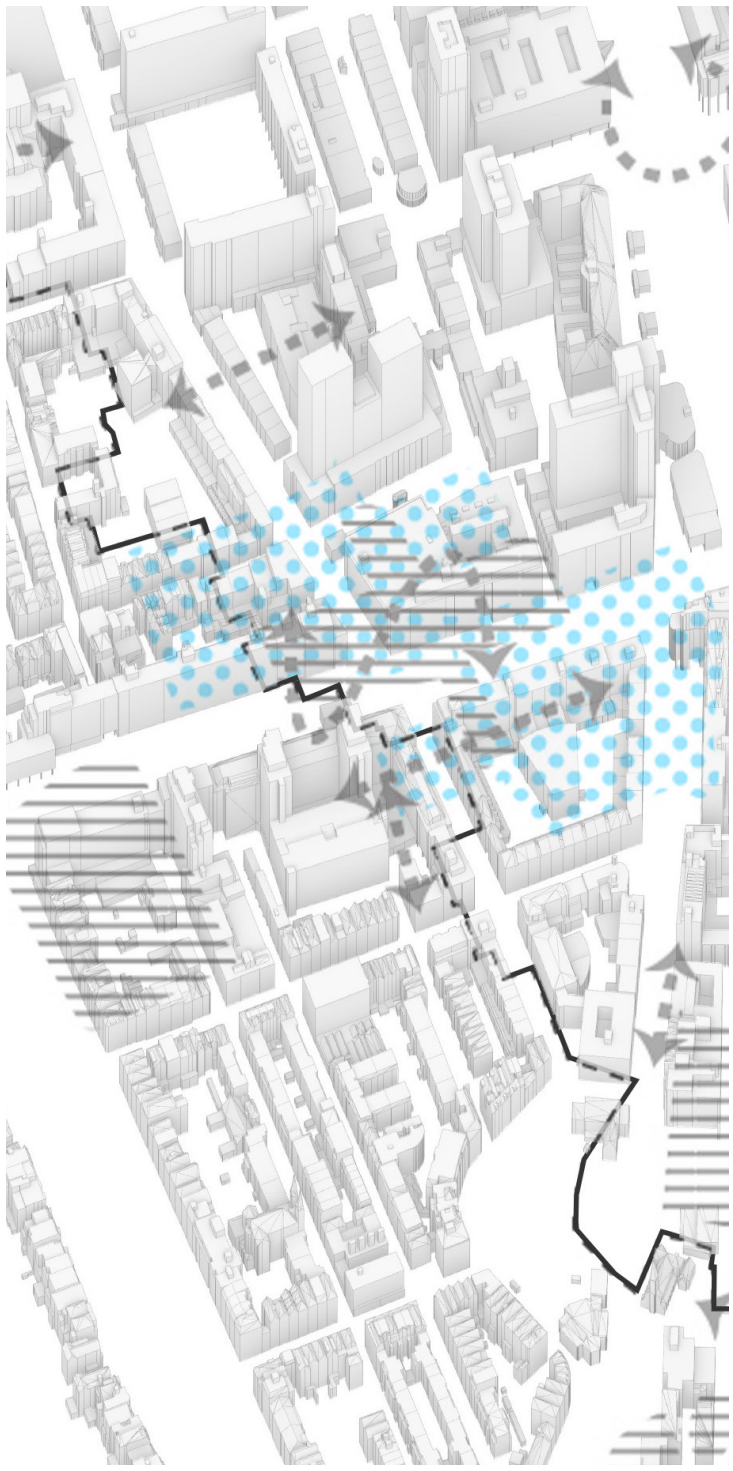


The new tactical features, such as micro-squares with benches and cafes, and pop-up markets, were made possible by the presence of sidewalks (spatial infrastructure type 1) and reliable water and electrical supplies (punctual infrastructure).

Additionally, other punctual infrastructure elements, like signage and public Wi-Fi, enhanced accessibility and ease of access, thereby contributing to both economic and social opportunities.

Connecting The New Courtyards

Supporting Local Businesses through Mixed-Use Development



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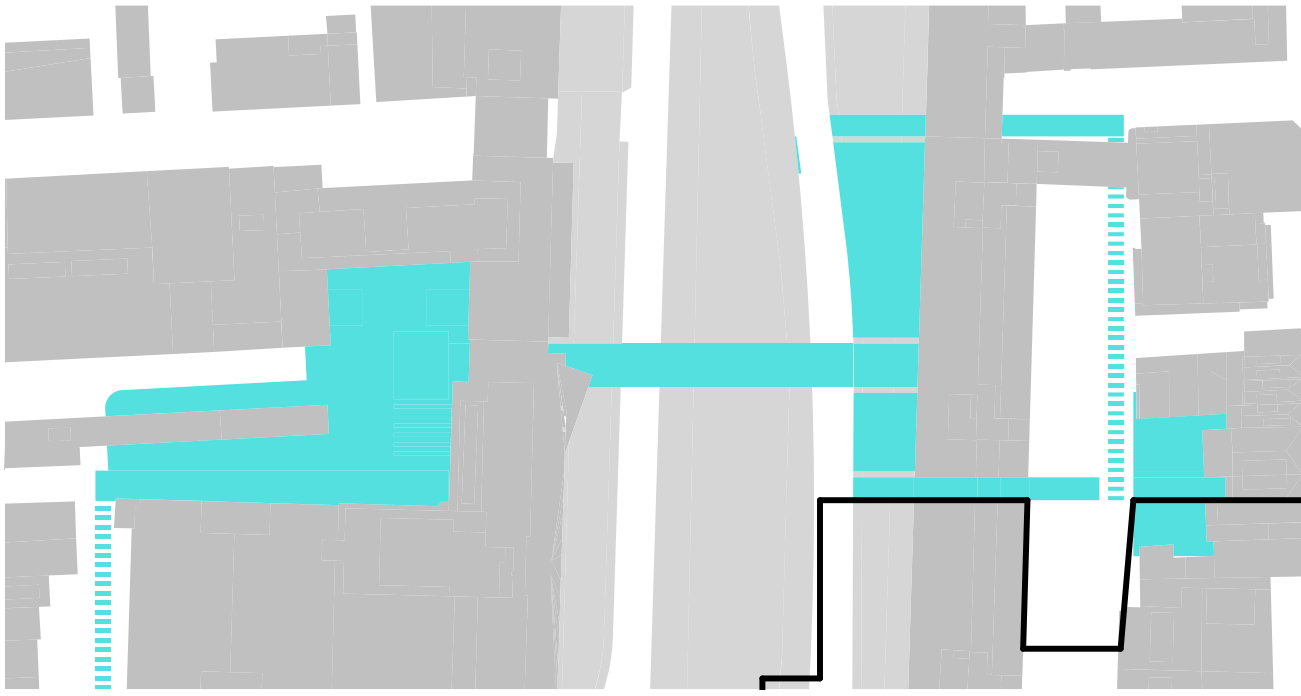
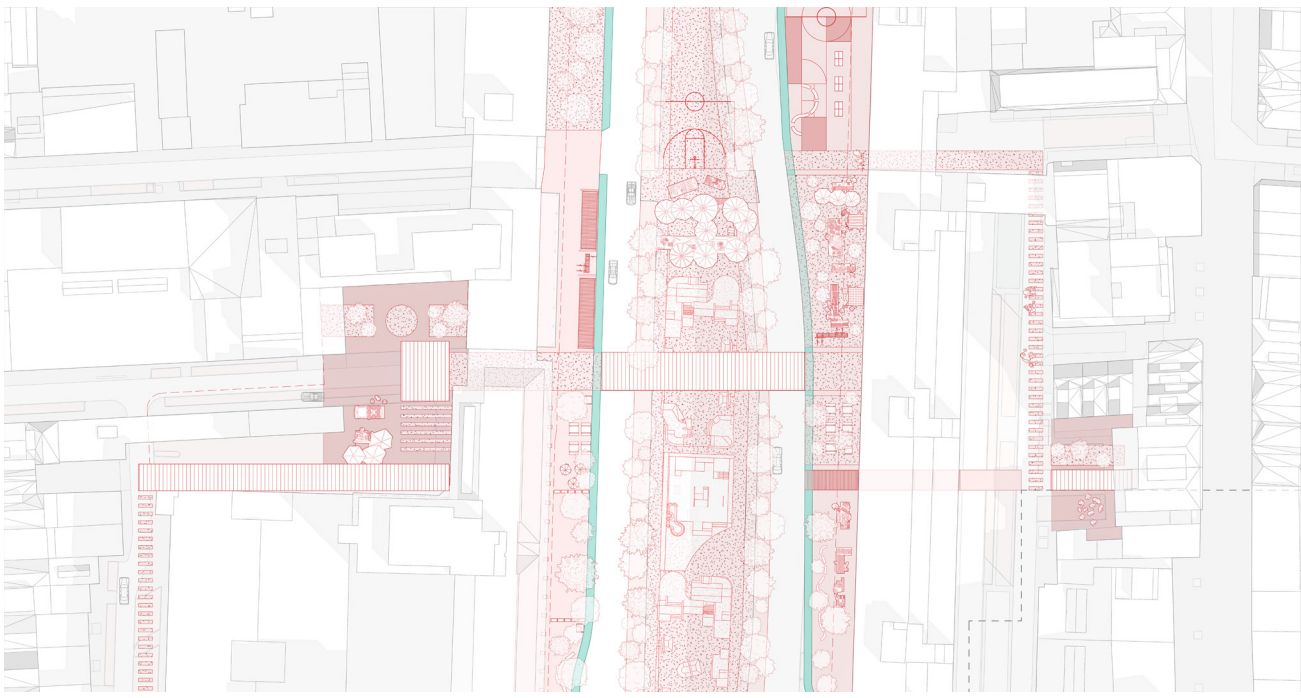


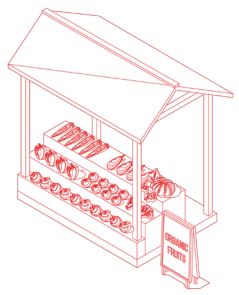


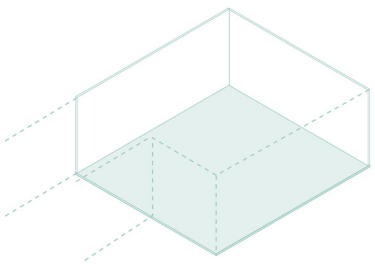
The newly reclaimed courtyards will be connected, activating new boundaries. Intersections with the Brandgrens will have observational roles with public stages. Additionally, accessible rooftops will be activated with local green functions like urban farming, enhancing community engagement and sustainability. This approach aligns with Sennett's idea of porous edges, where different groups interact, inviting continuous exploration and engagement.

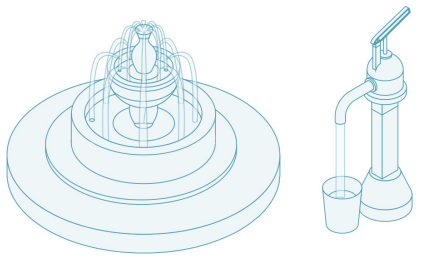
Tactical Elements

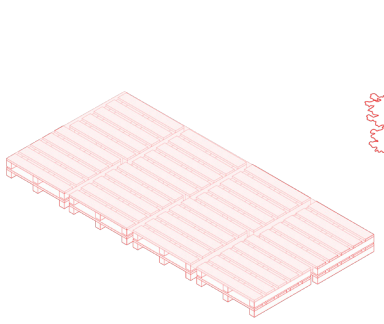
Spatial Infrastructure & Policy

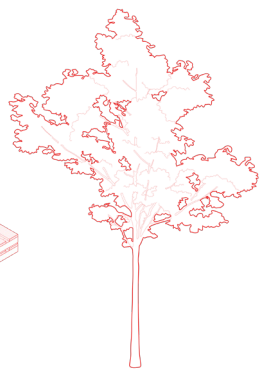
Punctual Infrastructure

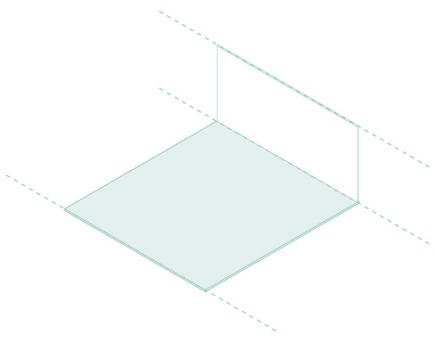


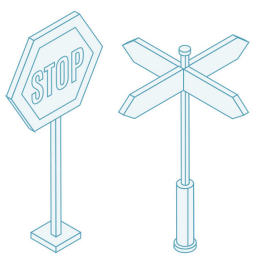


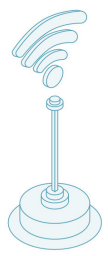


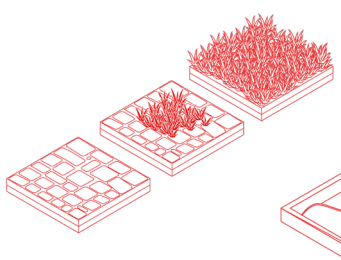


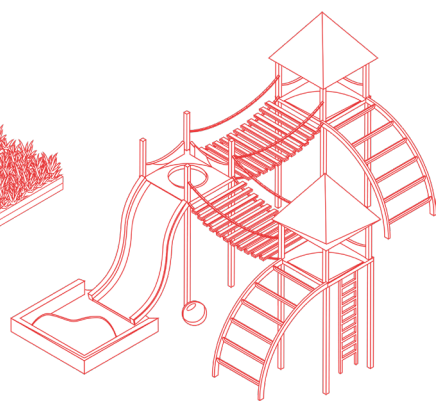


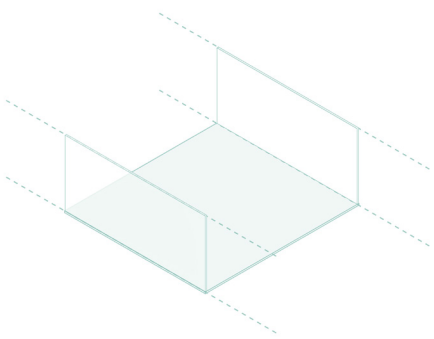


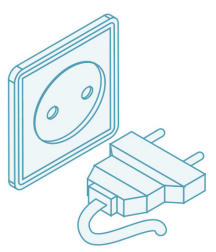


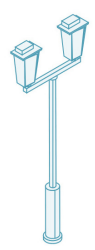












Connecting the courtyards, which were previously urban cracks, enabled functions such as the urban stage and kids' play zone to exist through (spatial infrastructure type 3), safety policies (policy infrastructure), and other punctual infrastructures like electrical supply for the stage (punctual infrastructure), signage for both (punctual infrastructure), and lighting for night shows (punctual infrastructure).

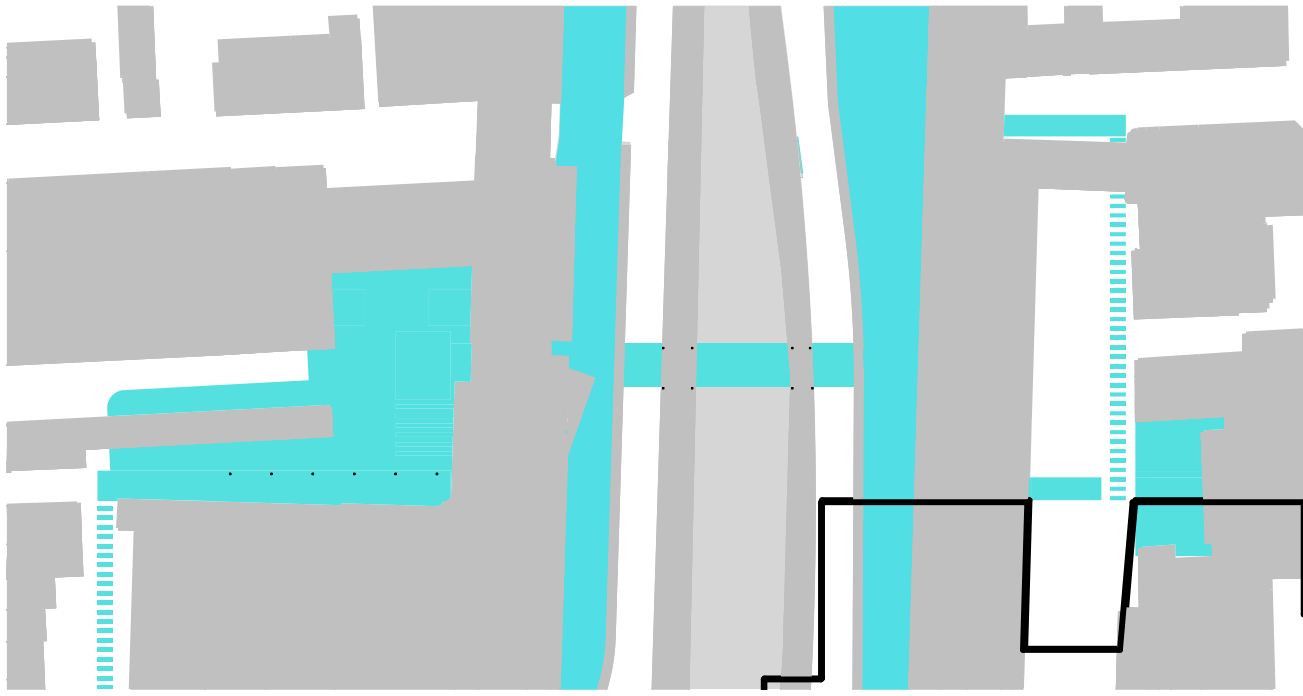
Depaving, as a bottom-up tactical act, occurred across all three spatial infrastructural types (spatial infrastructure types 1, 2, and 3), supported by participation policies (policy infrastructure), directional signage (punctual infrastructure), and essential water and electrical supplies (punctual infrastructure).

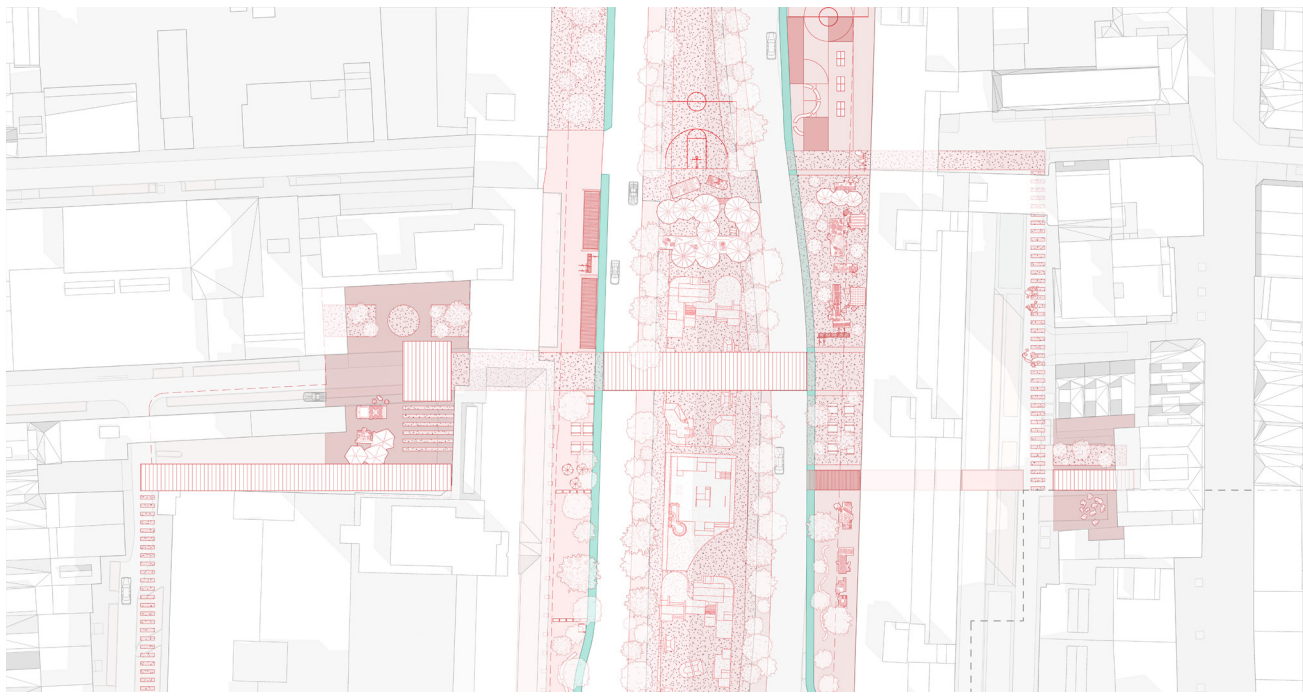
Creating ecological networks.

Developing Green Infrastructure



The Design



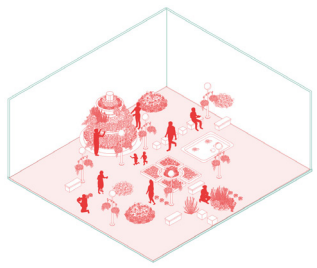


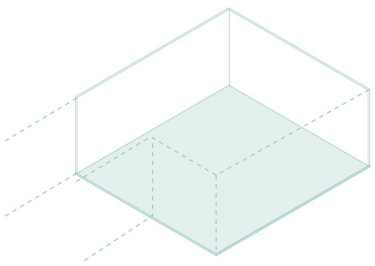
Enhancing the environmental value of the selected location took various forms. These included planting trees to serve as connectors, shading elements, and gathering points. Pocket parks were introduced in urban cracks, and depaving was initiated with a bottom-up approach to create new relationships with the land and among people. Other initiatives such as urban farming and green partitions were also implemented, transforming the new place into a small hub for a green footprint.

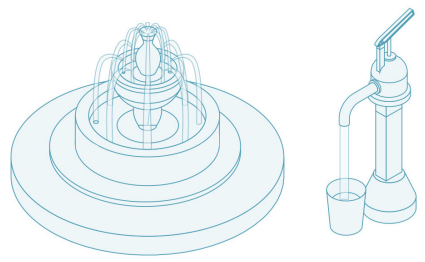
Tactical Elements

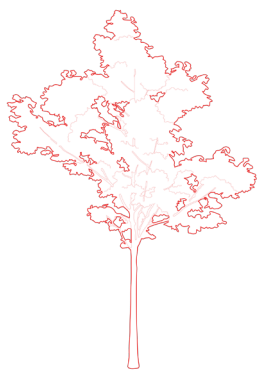
Spatial Infrastructure & Policy

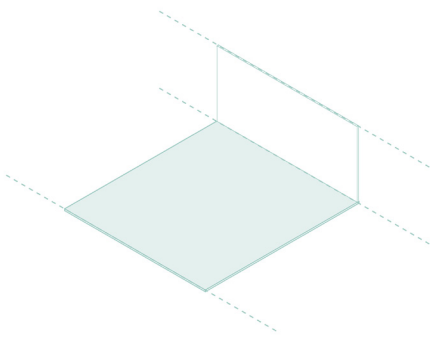
Punctual Infrastructure

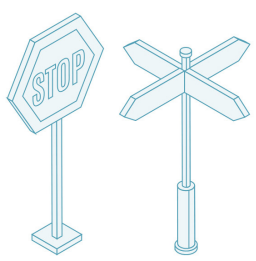


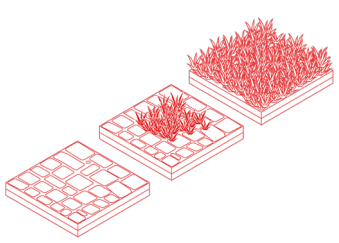


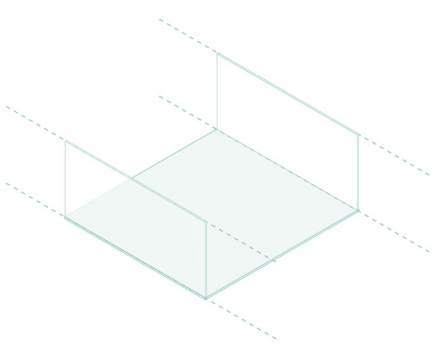














All the tactical elements and tools used—such as trees, depaving, urban farming, green partitions, and pocket parks—depended on essential infrastructure like water supply, signage, and public toilets (punctual infrastructure). The availability of space, represented by three types of spatial infrastructure—corridors, courtyards, and sidewalks—enabled these interventions. Corridors and courtyards facilitated depaving, sidewalks and courtyards accommodated tree planting, and courtyards and corridors provided the space for creating pocket parks.

4.8 Urban Evolution

This chapter explores how urban spaces can dynamically evolve over time, driven by the varied perspectives and activities of different community groups. The interplay between artists, locals, and occasional visitors transforms these spaces into multifaceted environments that cater to diverse needs and expressions.

From the artist's point of view, the corridors would act as expression zones, while the central space would be more for interactive art with people. New green spaces would serve as canvases for art installations. Other spaces would be designated as tourist attractions, while some may be intentionally avoided or exaggerated in terms of art marketing. Additionally, certain hidden corners could again become zones for unauthorized activities, which could quickly reset for other site-specific functions to take over.

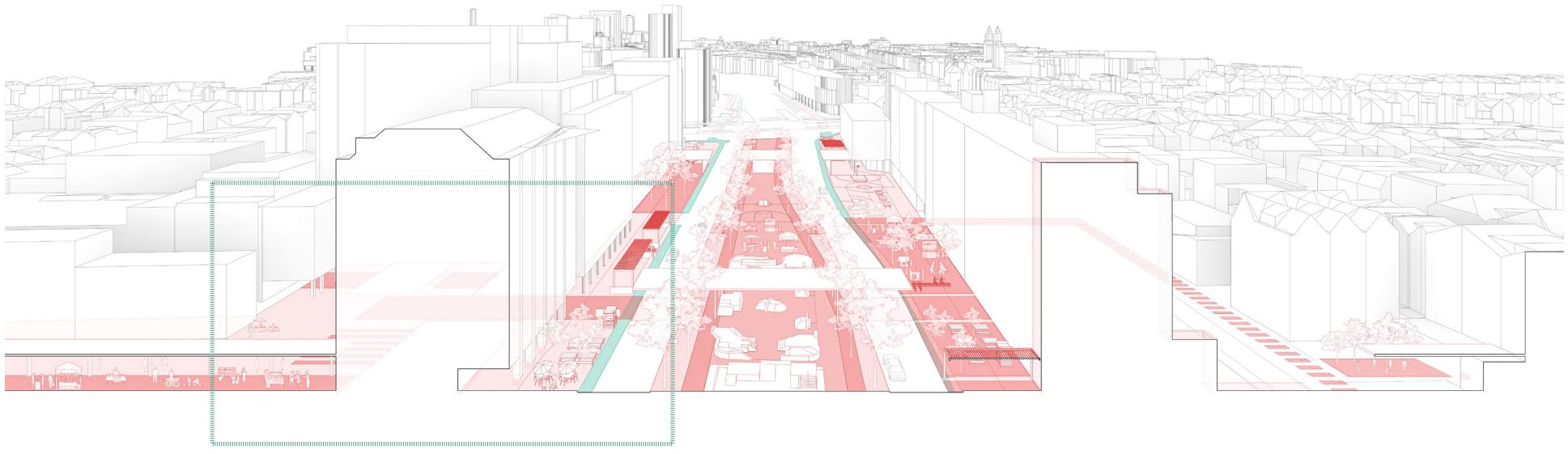
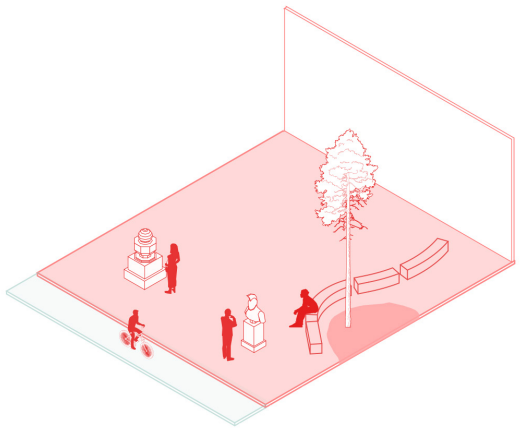
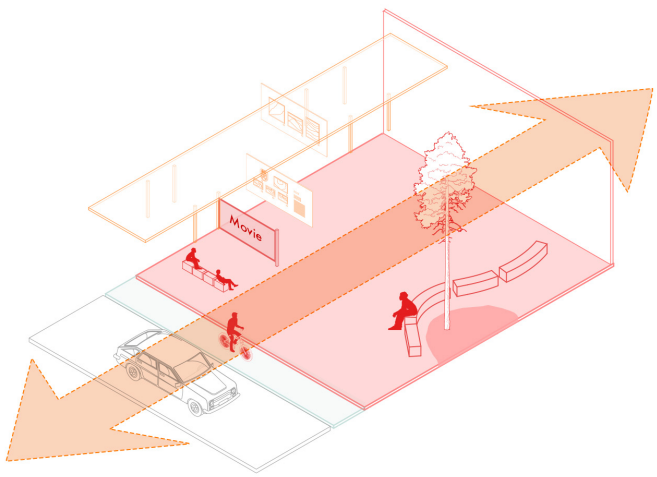


Fig.89 Zoom-in detailed section selection (author)

2024 - Winter
Initial 0th Place



2024 - Summer
Custom Tactical Elements
(Youth and Artists)



2025 - Summer
Temporary Expansion
(Advance 0th Place) Linking
Multiple Infrastructure Types

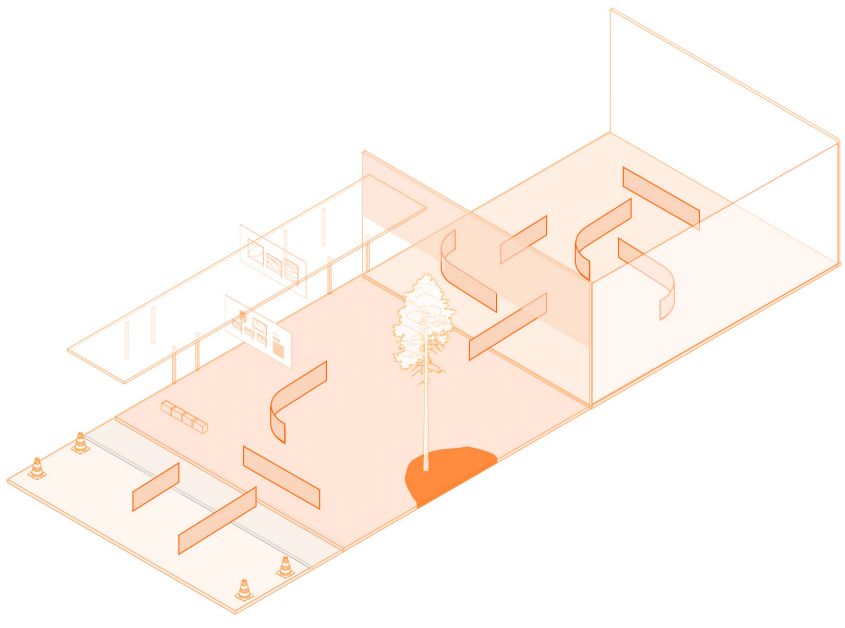
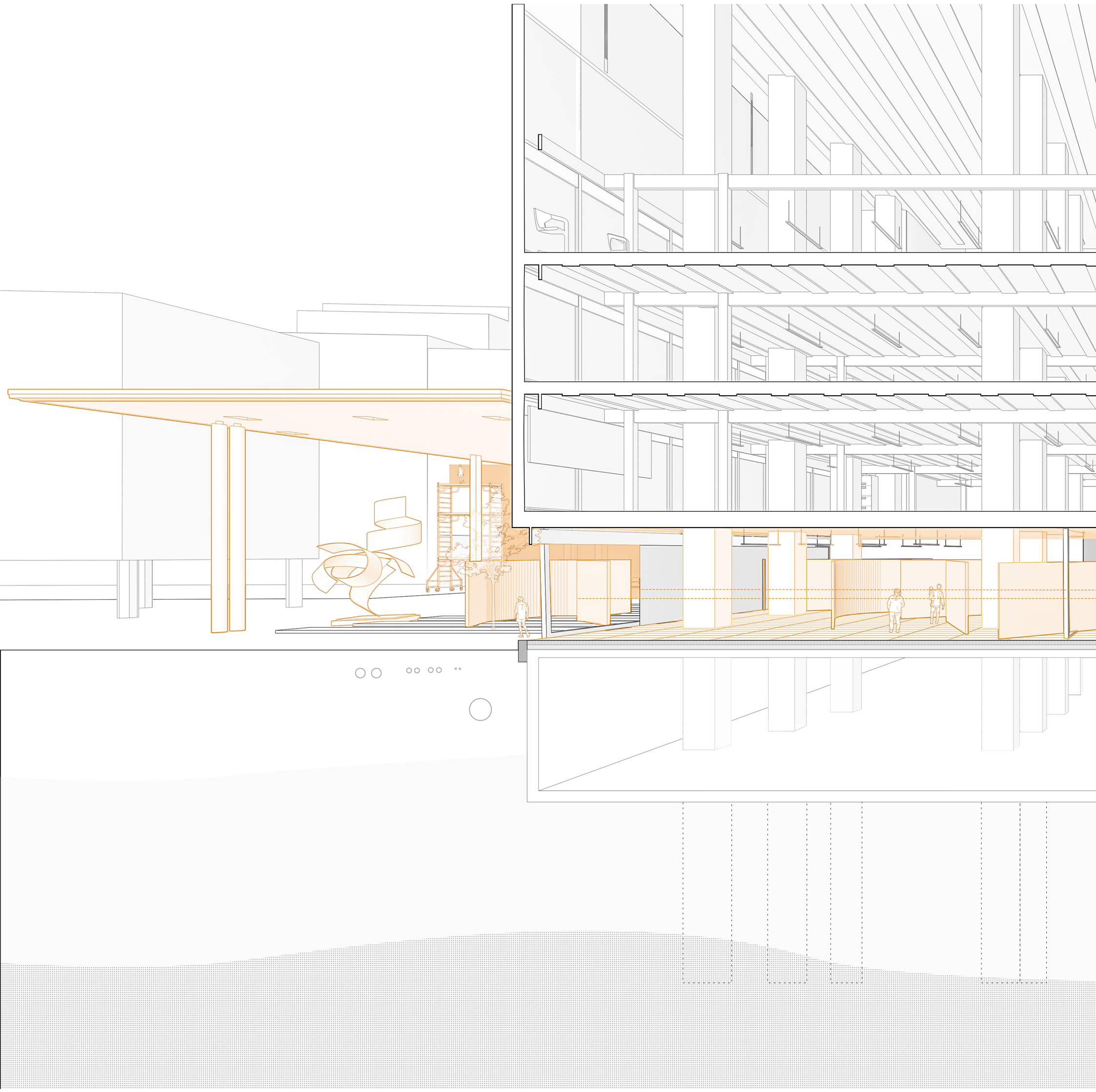


Fig.90 Art Community Perception of the 0th Place (author)

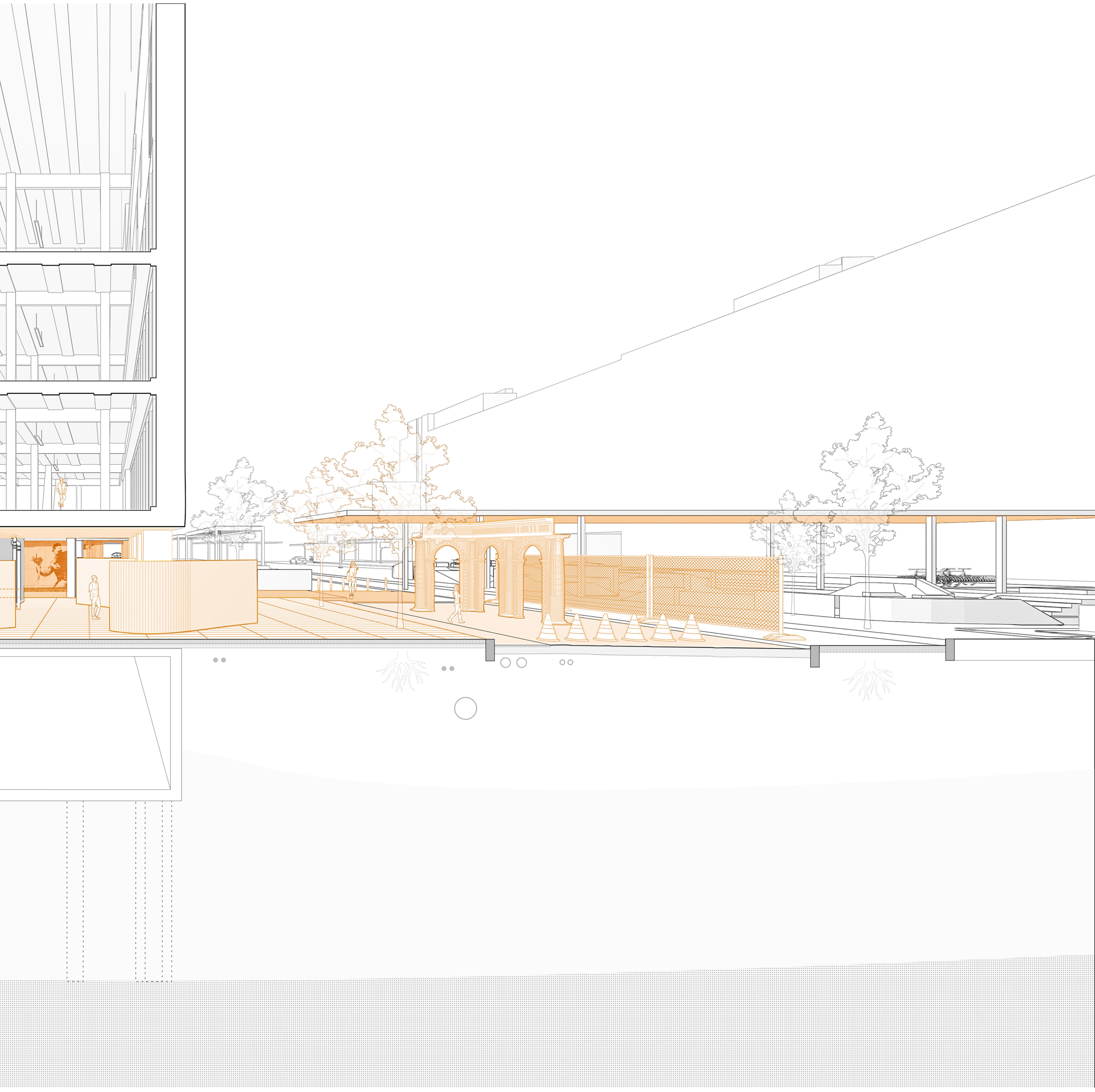
4.8 Urban Evolution

Youth and Artists



The ground floor can be conceived as an infrastructure that facilitates new forms of temporary connectivity and relationships.

Furthermore, the use of fences and traffic cones serves a dual role as both infrastructure and tactical elements, transforming spaces into temporary, user-specific functional “events.”



New policies that encourage expressive use of space could be introduced, allowing urban cracks to serve as areas for the freedom of expression.

Fig.91 Art Community Perception of the 0th Place Section (author)

4.8 Urban Evolution

Locals and Tourists

From the locals' point of view, the largest central space would be the biggest attraction, and that's where a pop-up market would take place on weekends, where the highest flow can be detected. The second-highest flow would be at "Jog's Corner," where the skate park would be active. The courtyards will take on different names based on their evolution every couple of years, transitioning from an artists' hub to a chill zone, and perhaps to a gathering zone during the World Cup or a protest zone, and sometimes into a local garden zone.

This fluid adaptation of the space exemplifies the '0th place' concept in action, showcasing its potential to redefine the urban landscape and promote inclusivity and cohesion among residents.

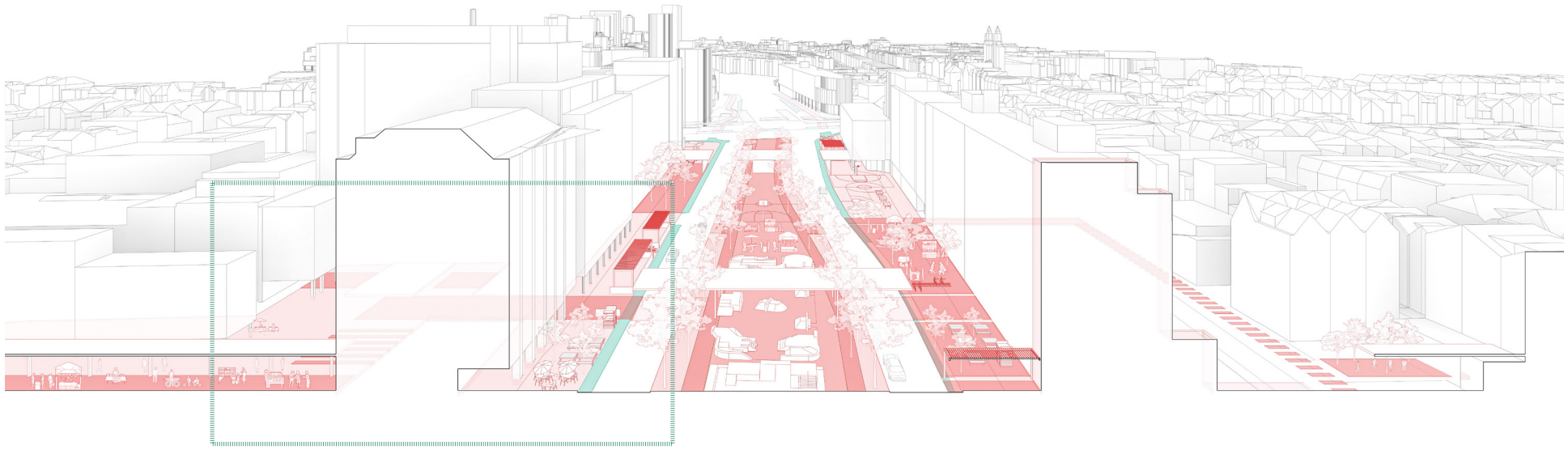
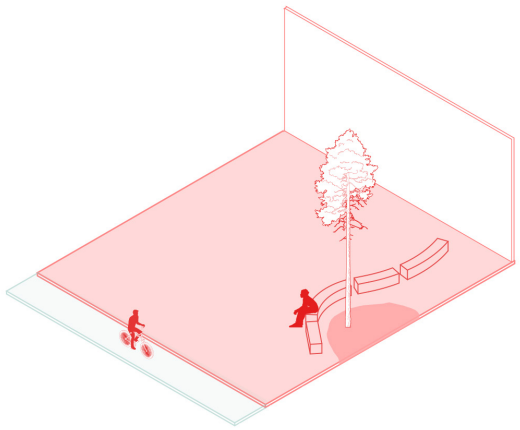
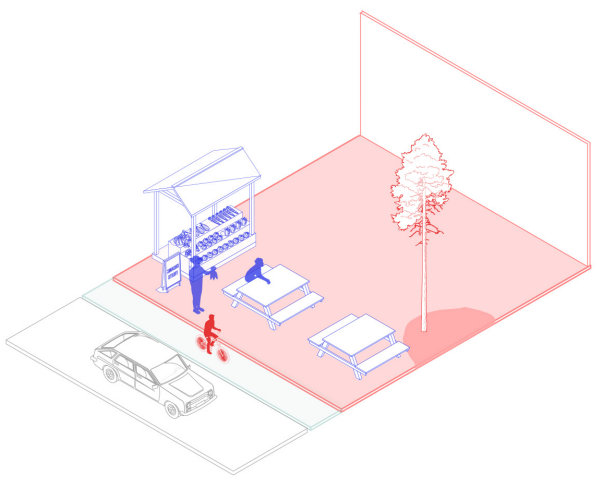


Fig.92 Zoom-in detailed section selection (author)

2024 - Winter
Initial 0th Place



2024 - Summer
Custom Tactical Elements
(Locals and Tourists)



2025 - Summer
Temporary Expansion
(Advance 0th Place) Linking
Multiple Infrastructure Types

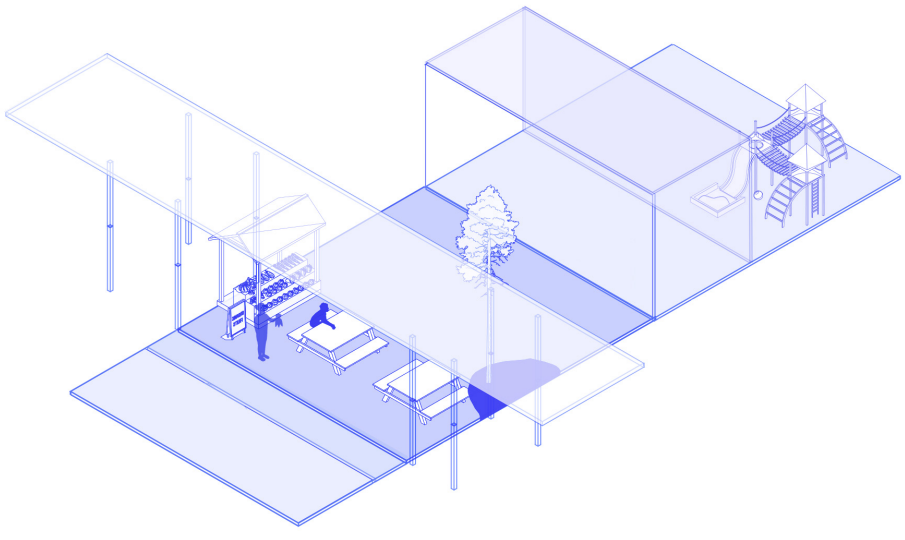
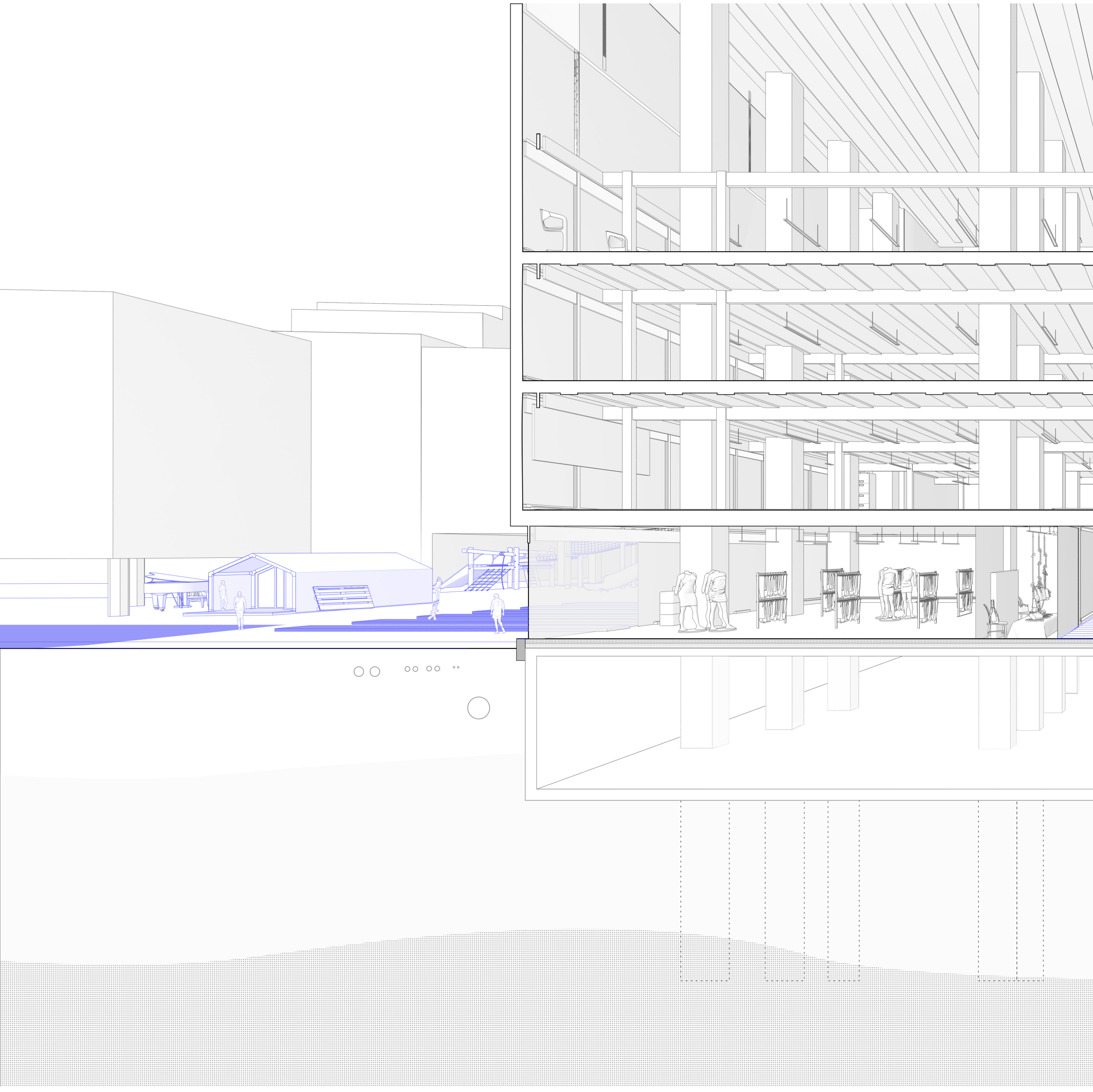


Fig.93 Locals and Tourists Perception of the 0th Place (author)

4.8 Urban Evolution

Locals and Tourists



The focus could shift towards regular community functions, where preferred areas host frequent pop-up events. Courtyards could be utilized for sports installations and children's playgrounds with updated safety regulations and necessary infrastructure. Also, these spaces could temporarily house units, serving as hubs for tourist groups and attractions rather than solving housing crises.

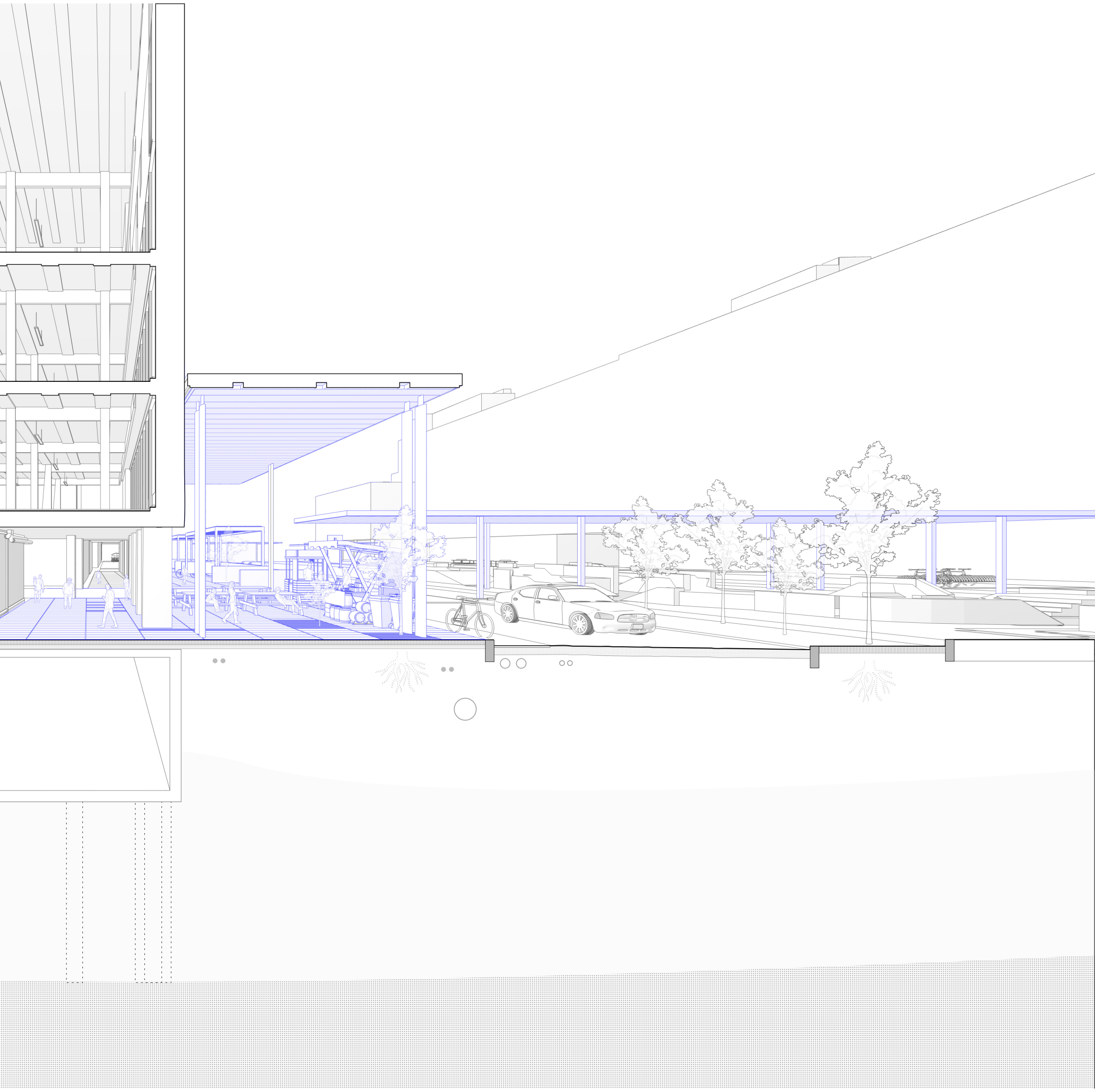


Fig.94 Locals and Tourists Perception of the 0th Place Section (author)

4.9 Scaled-up Brandgrens Strategy

This chapter concludes the design process by emphasizing the systematic and scientific scaling of findings. Utilizing the opportunity map and a catalogue of tactical and infrastructural interventions, the study explores their potential application on a city-wide scale.

Many of these cracks serve to balance out the highly active spaces. This selection process ensures that only those with the greatest potential are chosen for strategic purposes in the scaled-up strategy.

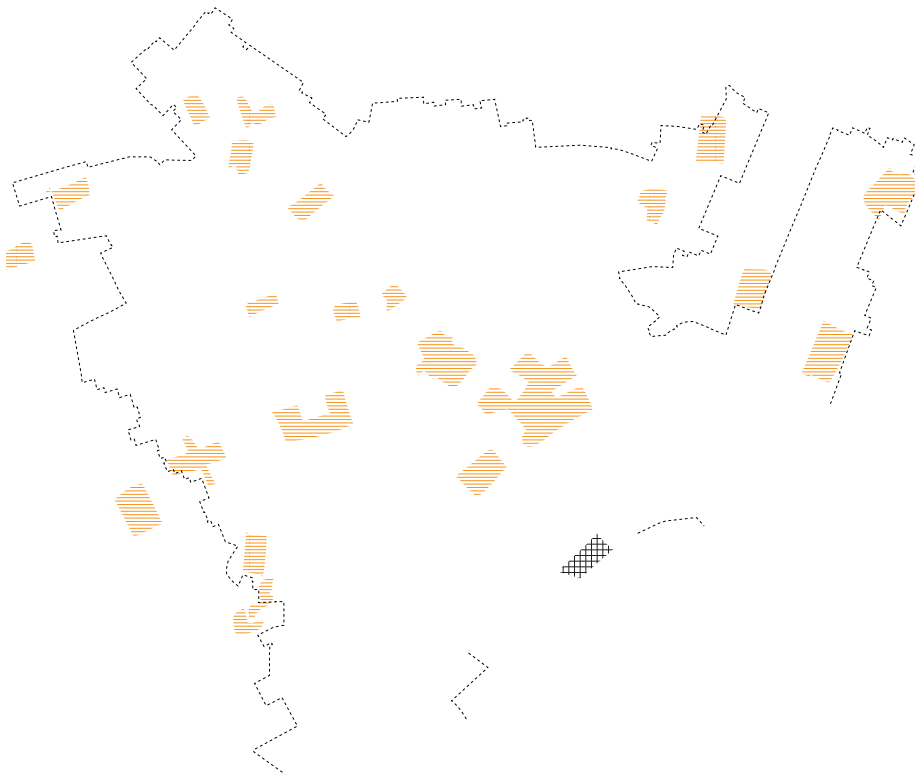


Fig.95 Opportunity map - Developing Green Infrastructure (author)

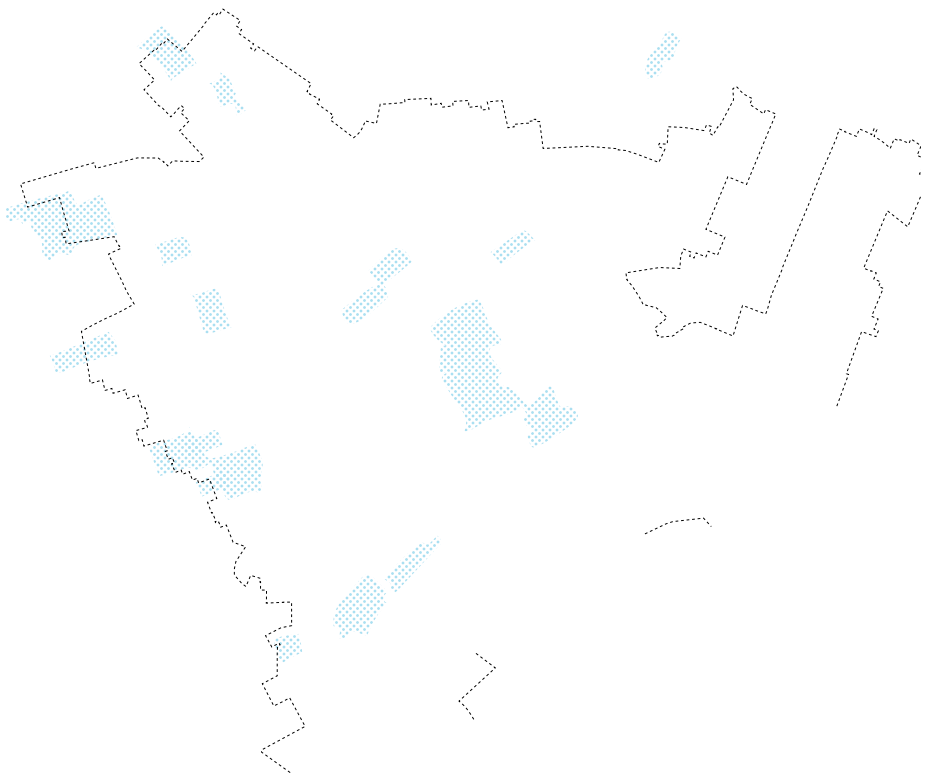


Fig.96 Opportunity map - Supporting Local Businesses and Economic Development (author)

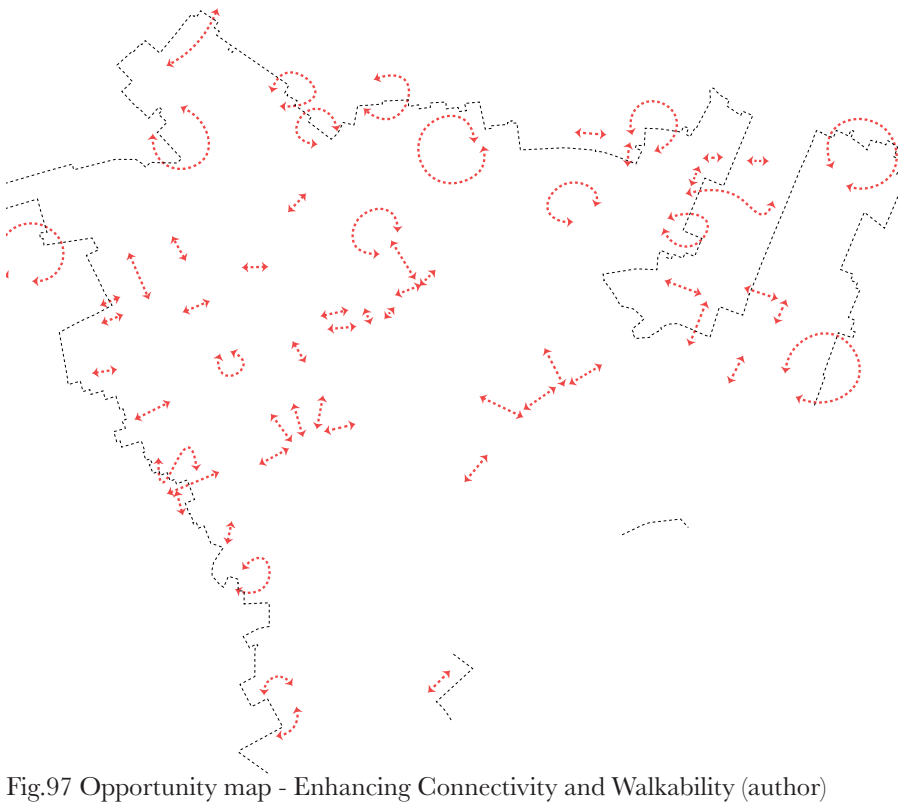
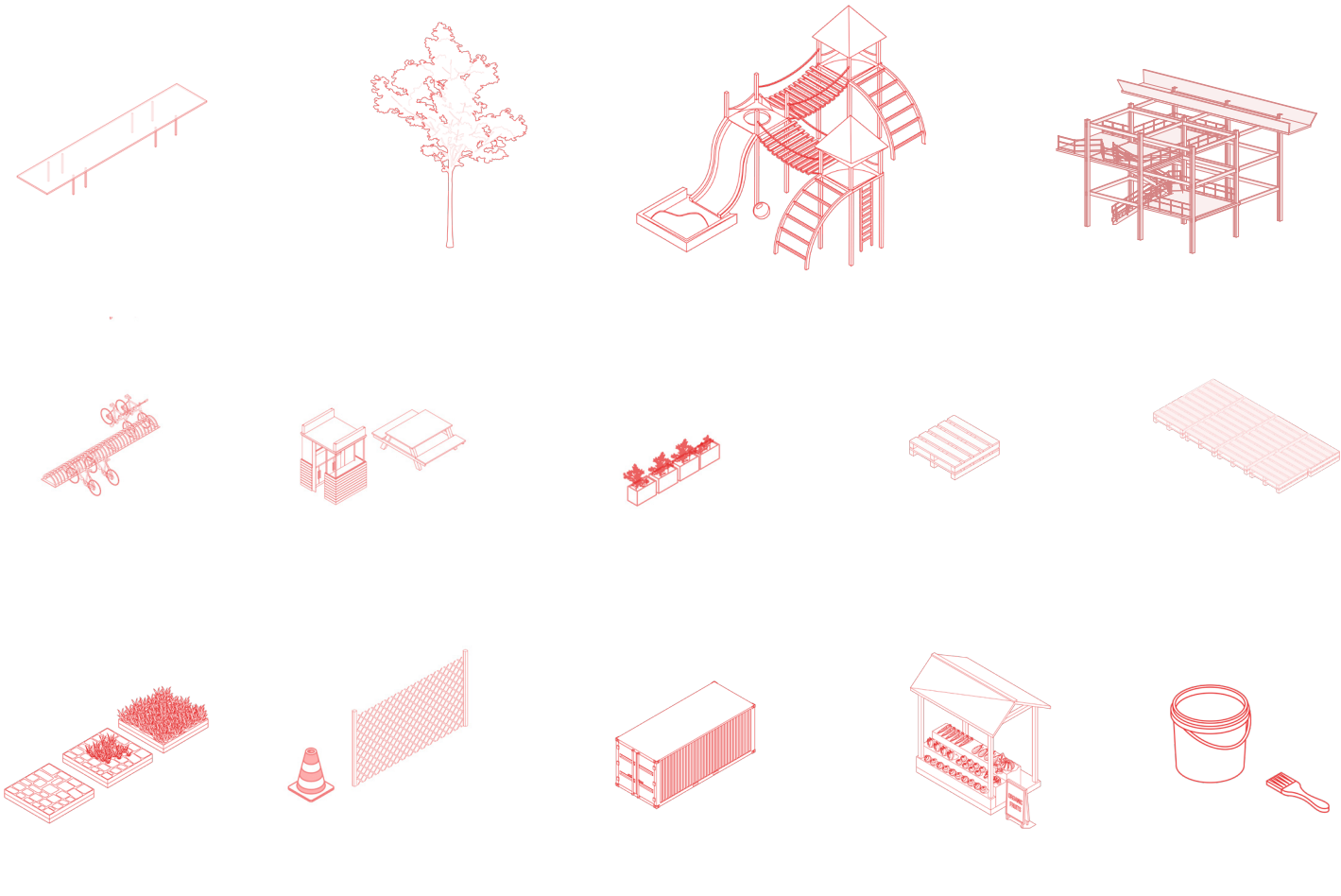
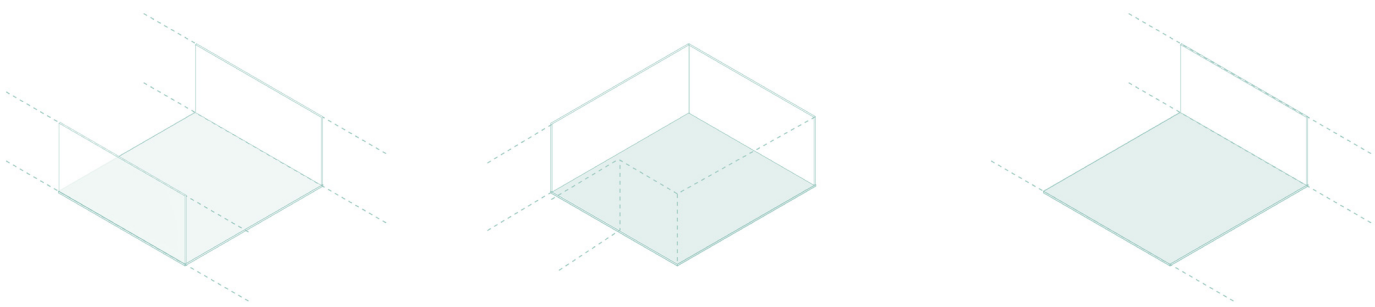


Fig.97 Opportunity map - Enhancing Connectivity and Walkability (author)

Tactical Elements



Spatial Infrastructure
& Policy



Punctual Infrastructure

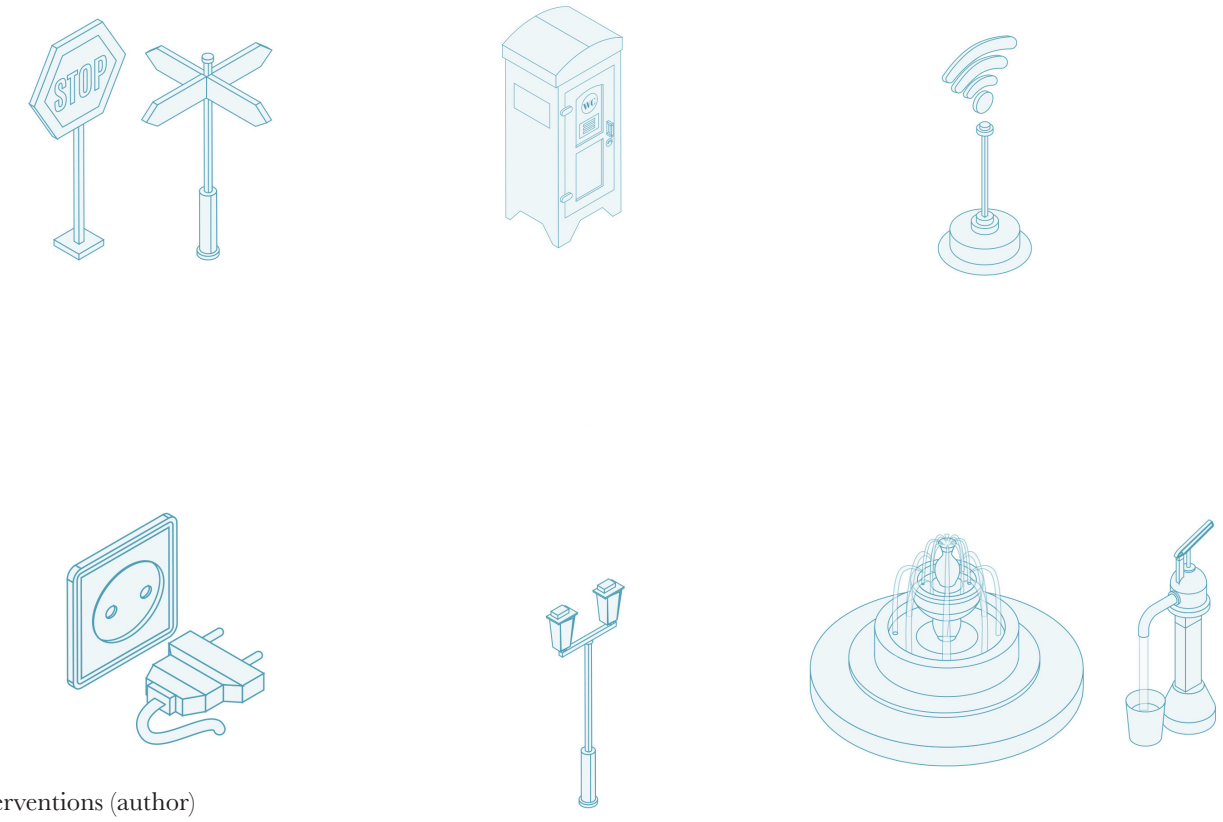


Fig.98 table of tactical and infrastructural interventions (author)

4.9 Scaled-up Brandgrens Strategy

Brandgrens sections

In a preliminary draft, constrained by time considerations, the findings illustrate how identifying urban cracks can offer fresh insights into available opportunities. Unlike conventional approaches that may solely focus on street-level projects, rooftop developments, or brownfield sites, pinpointing urban cracks allows for a nuanced blend of strategies to optimize outcomes. Moreover, scaling up these findings necessitates reference to the potential map previously developed. Identifying an additional 45 locations reveals the potential for approximately 200,000 square meters of resilient space. This expansion includes provisions for additional greenery, enhanced water storage, permeable surfaces, and supplementary areas for community engagement and development.

Small tactical elements (bench, depaving, palettes, etc.)

Green tactical elements (trees, green partitions, etc.)

Mid-scale tactical elements (public stage, pop-up market, kiosk, etc.)

Visual connecting tactical elements (urban tables, paint, light installations, etc.)

Infrastructural interventions (punctual, spatial, and policy-related)



Fig.99 Scaled up strategy sections map (author)

5.0 Conclusions

The conclusions that were made at each stage of the project were critical for informing and guiding the next steps, ensuring a systematic and scientifically grounded progression of the project.

Introduction

The conclusions drawn from the introduction section highlight the challenges posed by anticipated population growth in Rotterdam and the urban issues identified. Urban cracks are seen as both the breeding ground for urban challenges and potential solutions. Additionally, urban cracks will persist as long as new development continues.

Research Design

The conclusions derived from the research design section underscore the methodology framework, providing a detailed overview of the project's process. This framework outlines the types of questions posed and guides the subsequent steps in the study.

Design Research

Conclusion from the design research section: qualitatively, initial urban cracks were mapped using literature as a guide for their characteristics. Quantitatively, using Space Syntax to pinpoint the least accessible locations, all potential urban cracks have been identified, aligning with the qualitative findings.

To uncover the potential, quantitative density-based analysis provided configurations where the relationships between them helped identify opportunities based on urgencies, leading to an opportunity map that includes all identified opportunities to enhance connectivity, promote economic equity, and increase green infrastructure. It will serve as a guiding tool for the design strategy.

Design

The conclusions drawn from the design process reveal the development of a design framework that guided the creation of a detailed final design. This framework extracted essential tactical and infrastructural tools and elements, which were then applied to a scaled-up strategy. The opportunity map, together with tactical and infrastructural tools, synergistically demonstrates how minimal interventions can significantly enhance urban resilience.

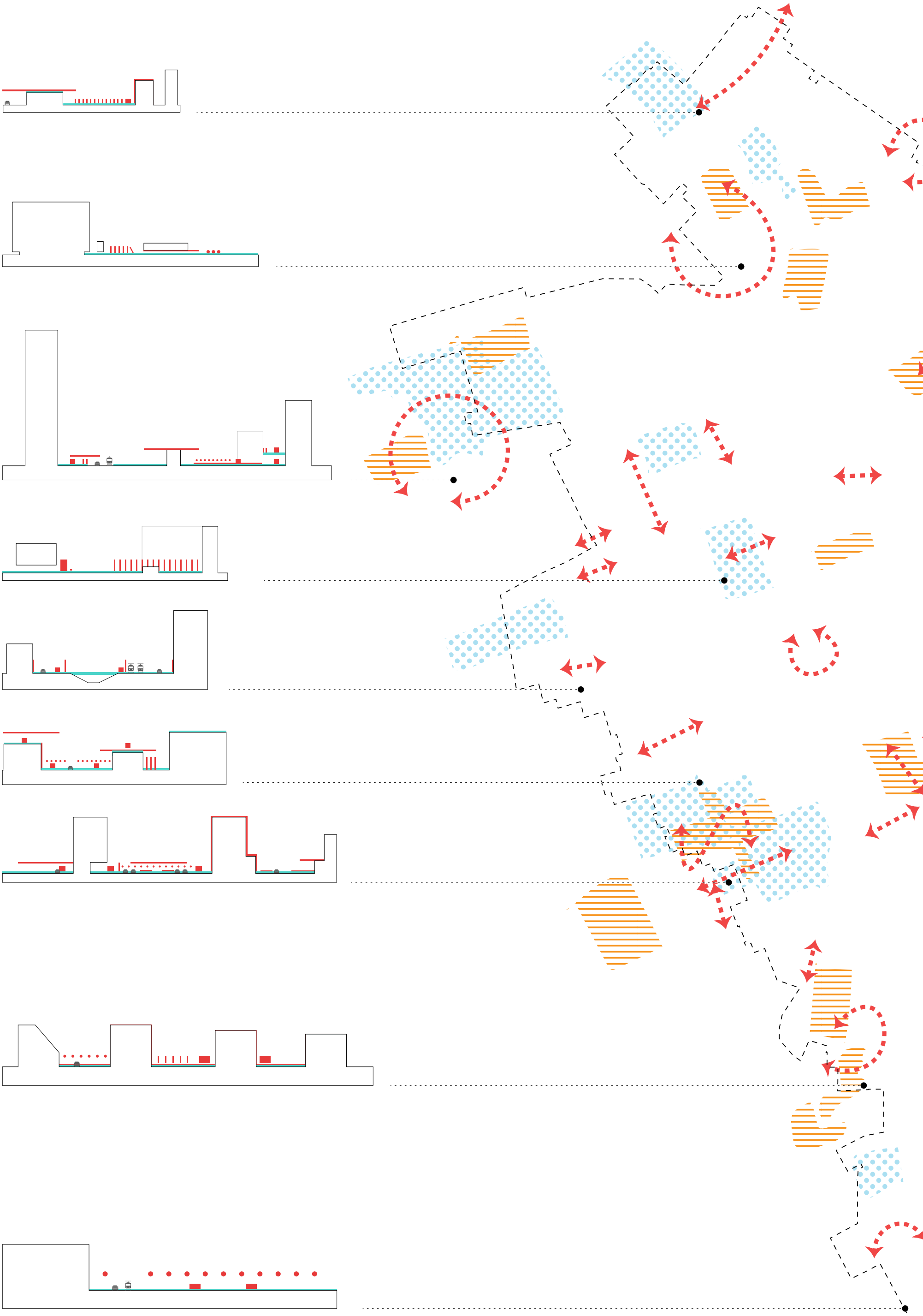


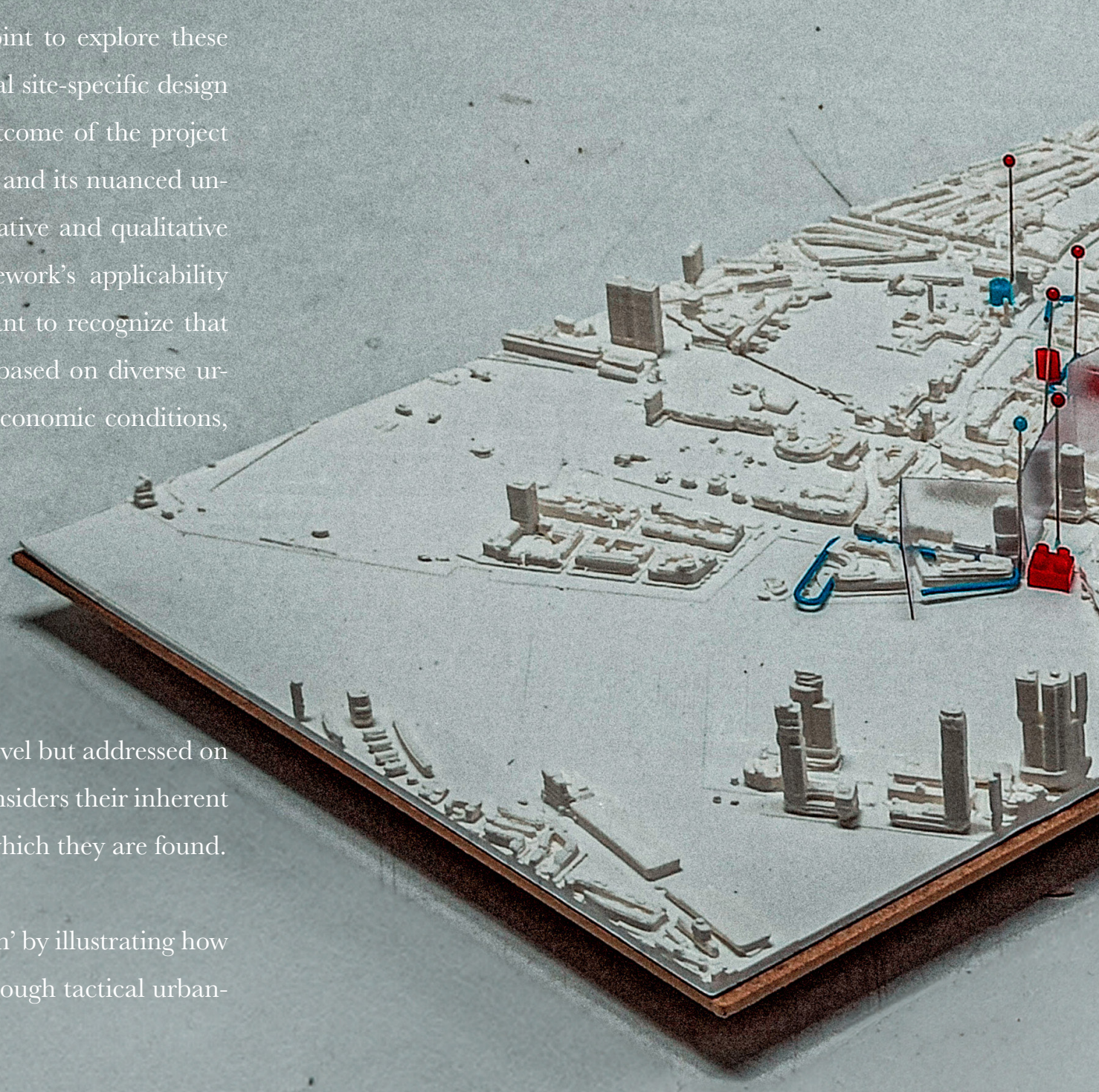
Fig.100 Scaled up strategy sections map (author)

5.0 Conclusions

Final conclusions

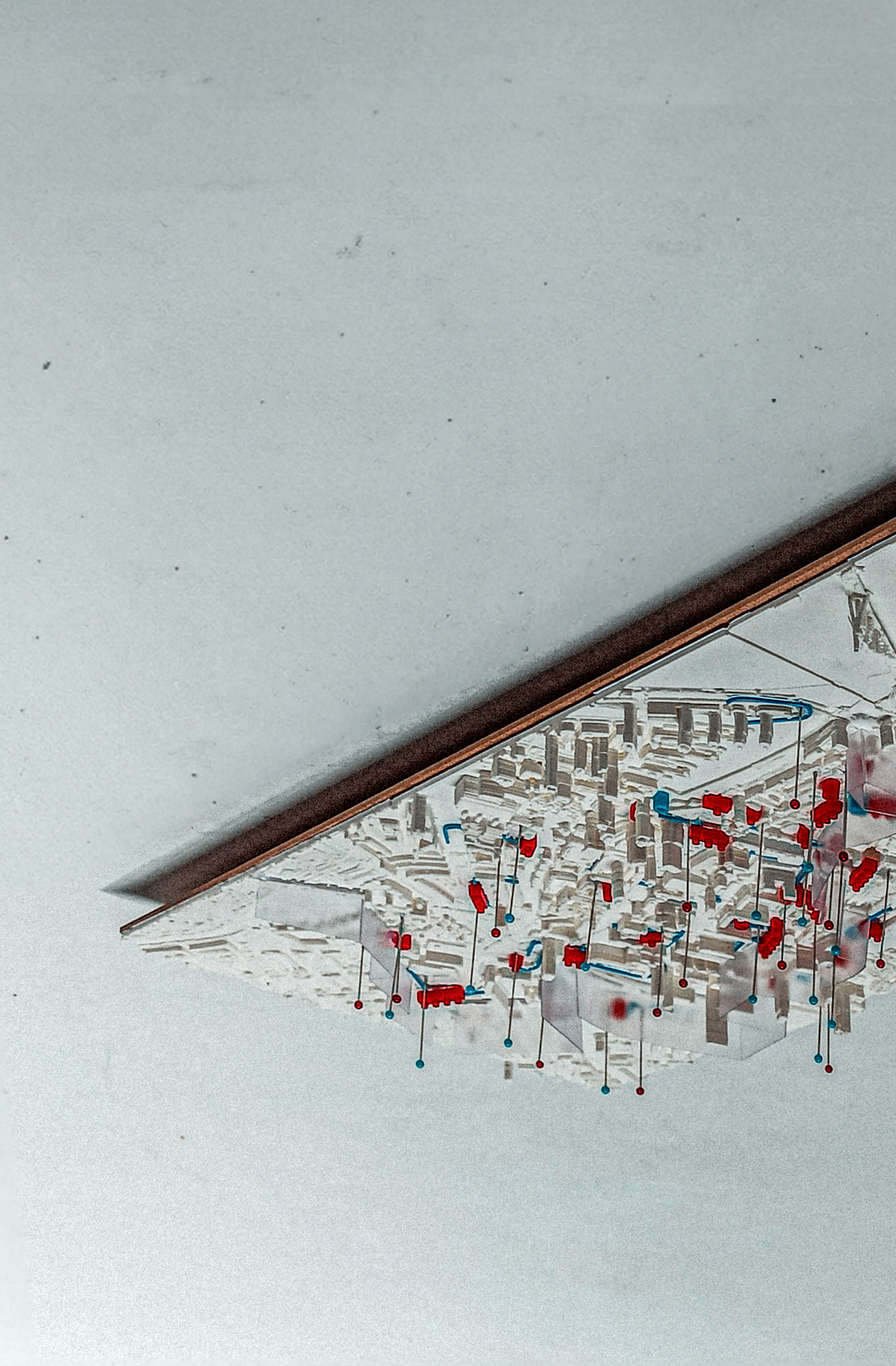
The process of identifying, uncovering potential, and designing has resulted in the development of a systematic framework for analyzing and designing urban cracks.

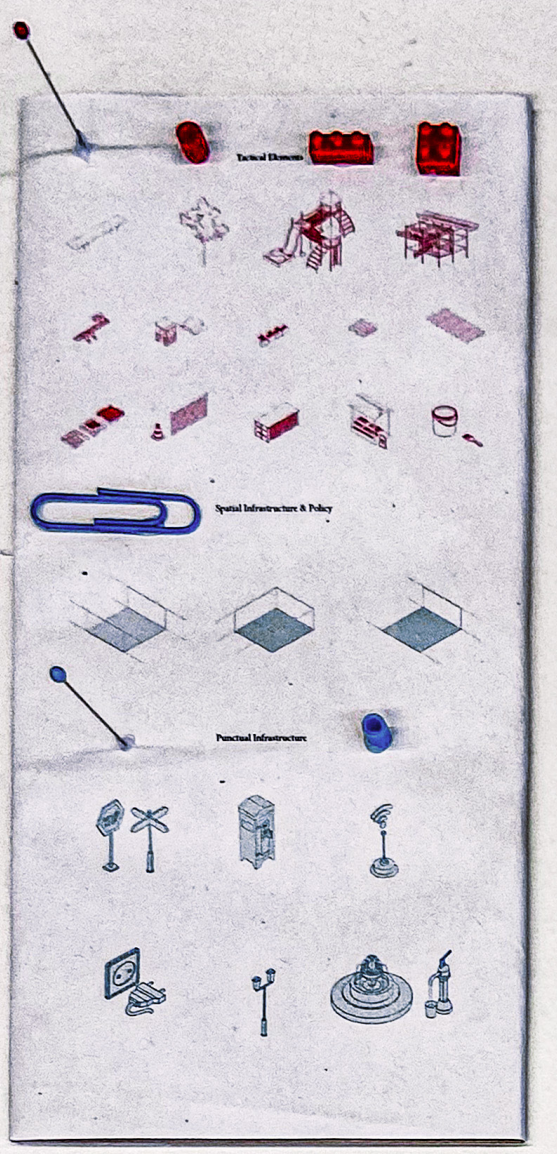
The Brandgrens served as an entry point to explore these urban cracks and contributed to the final site-specific design in Wesblaak. However, the primary outcome of the project lies in the new interpretation of the city and its nuanced understanding through a blend of quantitative and qualitative methods. When considering the framework's applicability to new cities and contexts, it is important to recognize that site-specific designs will naturally vary based on diverse urban fabrics, cultures, social dynamics, economic conditions, and historical contexts.



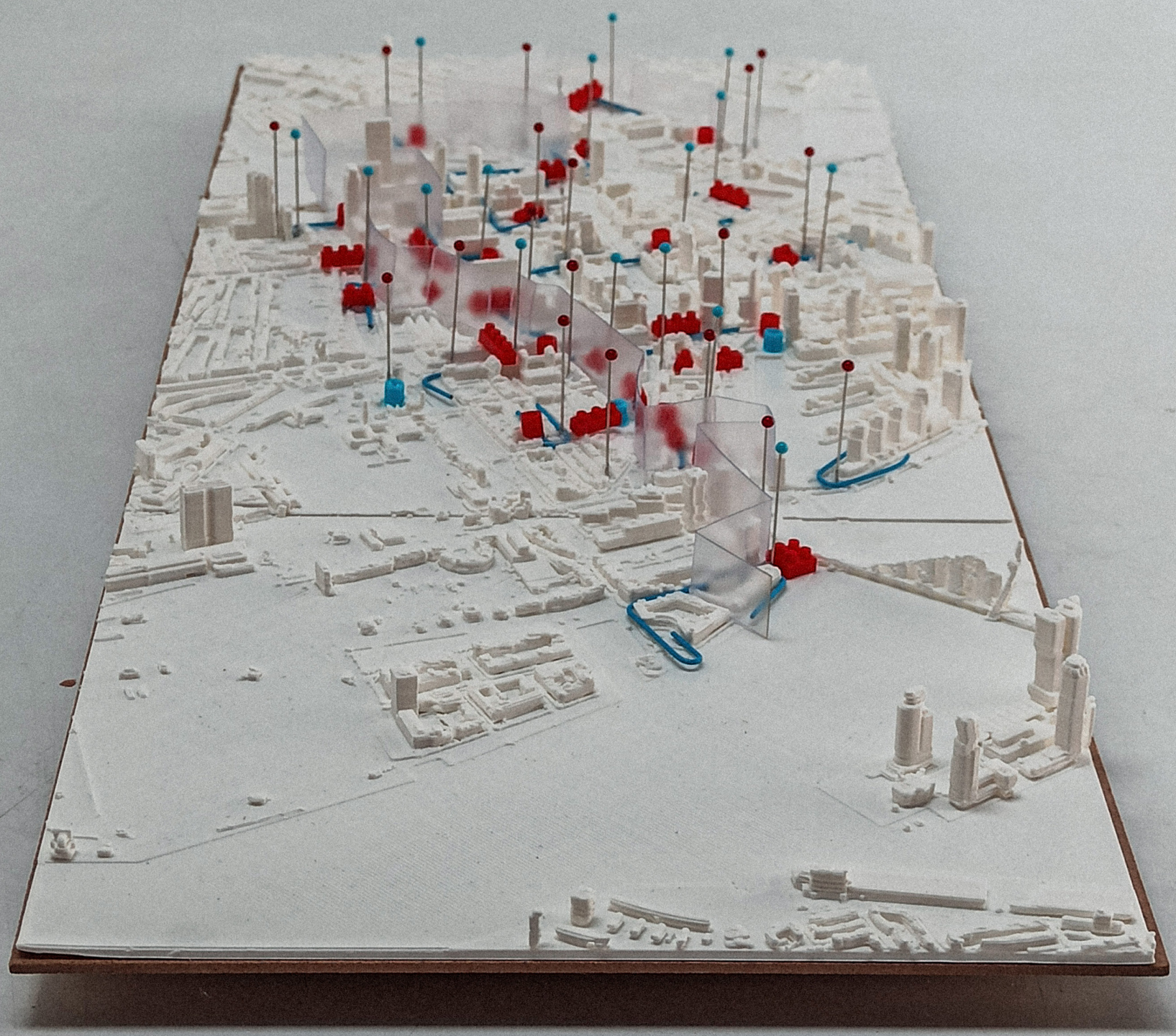
Urban cracks are examined at the city level but addressed on an architectural scale. This approach considers their inherent complexity and the diverse contexts in which they are found.

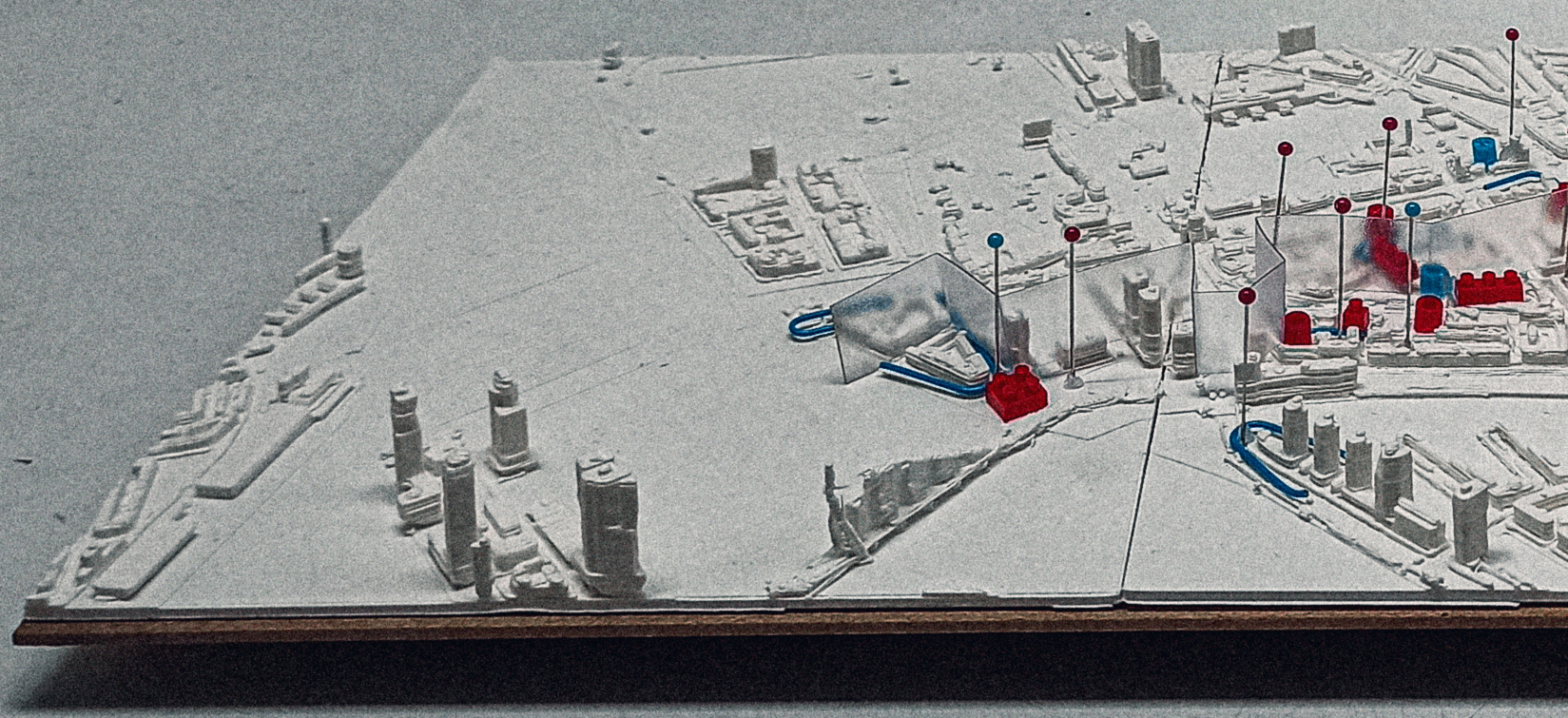
0th place resets the concept of 'separation' by illustrating how diverse neighborhoods can synergize through tactical urbanism and infrastructure interventions.

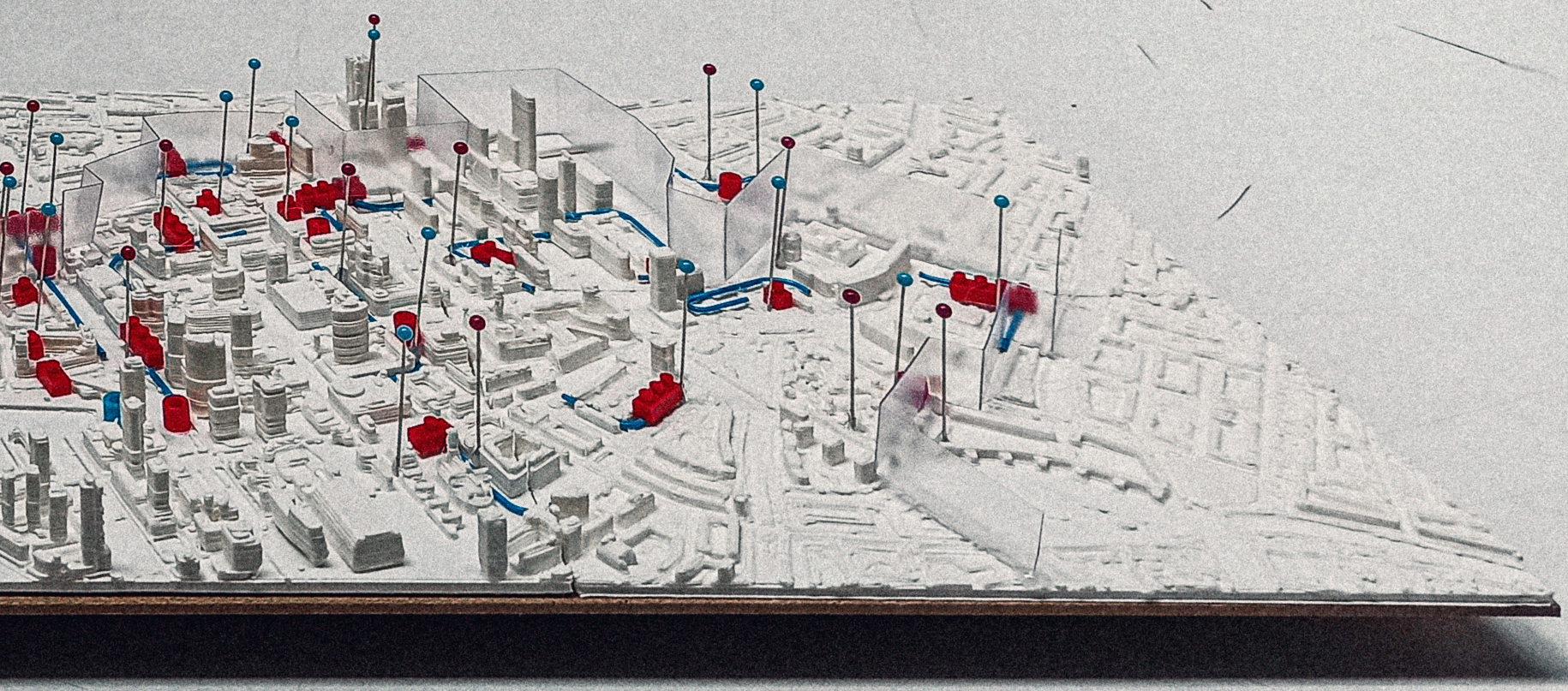



Tactical Elements
Spatial Infrastructure & Policy
Punctual Infrastructure









6.0 Reflection

The Relation Between the Graduation Project, Master Track, and Master Programme

The graduation project addresses the issue of leftover spaces within cities, referred to as "urban cracks." This topic is closely linked to the master's track in Urbanism. The Urban Fabric studio focuses on the intricate dynamics of urban spaces, including plurality and porosity. This project aligns with these themes by systematically identifying, analyzing, and activating underutilized spaces within the urban fabric, leading to new porosities and a reinterpretation of the city through detailed analysis and design processes.

Influence of Research on Design and Vice Versa

The relationship between research and design in this project was reciprocal. Research, analysis, and design became unified in the final scaled-up strategy. The research and methodology allowed for the exploration of existing conditions and the development of customized methods for the specific case, such as the Research by Design hypothesis, which was crucial in the design framework. The analysis phase, using both qualitative and quantitative methods, provided exploration and evaluation tools for creating the final opportunity map, a key component of the project. The design phase relied on these earlier steps and informed the methodology with new methods, such as creative fieldwork collages, which worked with the opportunity map toward the final design.

In summary, understanding research methods played a crucial role in shaping the design and recommendations. Methods like Research by Design, Critical Mapping, and Morphological Analysis provided a robust framework for understanding urban cracks. These methods facilitated a detailed analysis of the Brandgrens area, revealing the potential of these spaces. The design process, in turn, influenced the research by highlighting new patterns and insights through site-specific interactions. This reciprocal relationship ensured that both research and design components were deeply intertwined, enhancing the relevance and applicability of the final outcomes.

Assessing the Value of the Approach and Methodology

The approach, methods, and methodology were assessed by reflecting on the learning outcomes throughout the year. This new perspective on urbanism practice emphasizes the importance of systematic methods, whether qualitative or quantitative. While intuition can be part of the creative process, scientific evidence and evaluation are crucial for applicability. The explorative approach had both benefits and drawbacks; it allowed for the discovery of more analytical and design tools than anticipated. Through the project's process, an analytical framework emerged naturally, providing a solid evaluation of the approach.

Assessing the Academic and Societal Value, Scope, and Implication of the Project

The academic value of the project lies in its contribution to urban studies and design methodology. It introduces frameworks for identifying and addressing urban cracks, applicable to various cities worldwide, and offers a new way to interpret urban spaces.
Societally, the project has significant potential for enhancing urban livability by reclaiming underutilized spaces for community use.

Ethically, it promotes inclusivity and sustainability by considering diverse urban fabrics, functions, and social groups. The project underscores the importance of adaptable, context-sensitive design interventions that evolve with the city's needs, contributing to a more resilient urban environment.

Assessing the Transferability of Project Results

The transferability of the project results is a key aspect of its value. The analytical framework and design strategies developed can be adapted to different urban contexts globally. The site selection process served as an entry point for exploring urban cracks. While each city presents unique characteristics, the principles underlying the identification and activation of urban cracks are universally applicable. This adaptability ensures that the findings and recommendations can serve as a reference or starting point for similar urban regeneration initiatives elsewhere, extending the impact of the research beyond the specific context of Rotterdam.

The reinterpretation of urban spaces

Urbanists have different readings of cities: Kevin Lynch categorizes them by Paths, Edges, Districts, Nodes, and Landmarks; Aldo Rossi views cities through a historical lens and urban artifacts. Richard Sennett views the city through a lens of porous borders, adaptable structures, and organic, non-linear development. This project represents a reinterpretation of urban environments.

In contrast to traditional top-down zoning and bottom-up social approaches, this project introduces a novel understanding of the "in-between" scale. This scale encompasses spaces that do not fit neatly into typical urban design categories like neighborhoods or architectural plots. These spaces, often referred to as "left-over" or urban cracks, offer untapped potential for exploration. They can include corridors, streets, sidewalks, courtyards, or even buildings, though not every building or sidewalk qualifies as an urban crack.

This project positions itself at the intersection of urbanism and architecture, focusing on these overlooked spaces. While tactical urbanism has been a useful tool, its limitations are evident. Thus, the project underscores the importance of design expertise and a comprehensive grasp of both architecture and urbanism. By leveraging existing tools effectively, it aims to expand the possibilities within urban cracks.

6.0 Reflection

Personal Reflection

Throughout my journey, from analysis to design, I have often favored bottom-up approaches, leaving significant aspects of the design open for people to shape. However, I have also contemplated the delicate balance between the roles of urbanists and the contributions of individuals. I believe an urbanist's role is to thoroughly understand the components that make up a whole and to decide—guided by evidence—on the best use for each component. This requires maintaining equilibrium between what individuals can influence and what requires professional guidance.

As an architect, one of my motivations for pursuing the urbanism track was to gain a deeper understanding of the broader scale, which I believed would enhance my architectural practice. This was influenced by my admiration for architects who excel across various scales. After completing my first year in urbanism, my appreciation for architecture was stronger than ever before. However, upon graduating, I find myself increasingly drawn to urbanism. The depth of knowledge and potential impact on real-world issues at a broader scale make urbanism an immensely compelling field. Studying and comprehending cities or neighborhoods without being confined to narrow perspectives offer continuous learning opportunities, which I find truly stimulating.

A tutor once remarked to me that while we could survive without architects, we cannot thrive without urbanists. This statement resonates deeply with me now. A well-designed urban environment allows people to thrive in any building, whereas even the best-designed building cannot compensate for a poorly functioning urban environment.

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8.0 Appendix

4.2 Selection Criteria

Selection Criteria for Urban Cracks within the Brandgrens

Historical Significance: Locations with historical relevance to the Brandgrens, such as areas directly impacted by the WWII bombings.
Spatial Discontinuity: Areas with visible spatial disruptions.
Vacancy and Underutilization
Community Engagement: Potential for strong community involvement in redevelopments.
Environmental Impact: assessed for their potential to improve environmental sustainability.

The focus shifted to the design in Westblaak due to time constraints. For details on the design development of this location, 'De Witte Huis,' please refer to the Appendix.

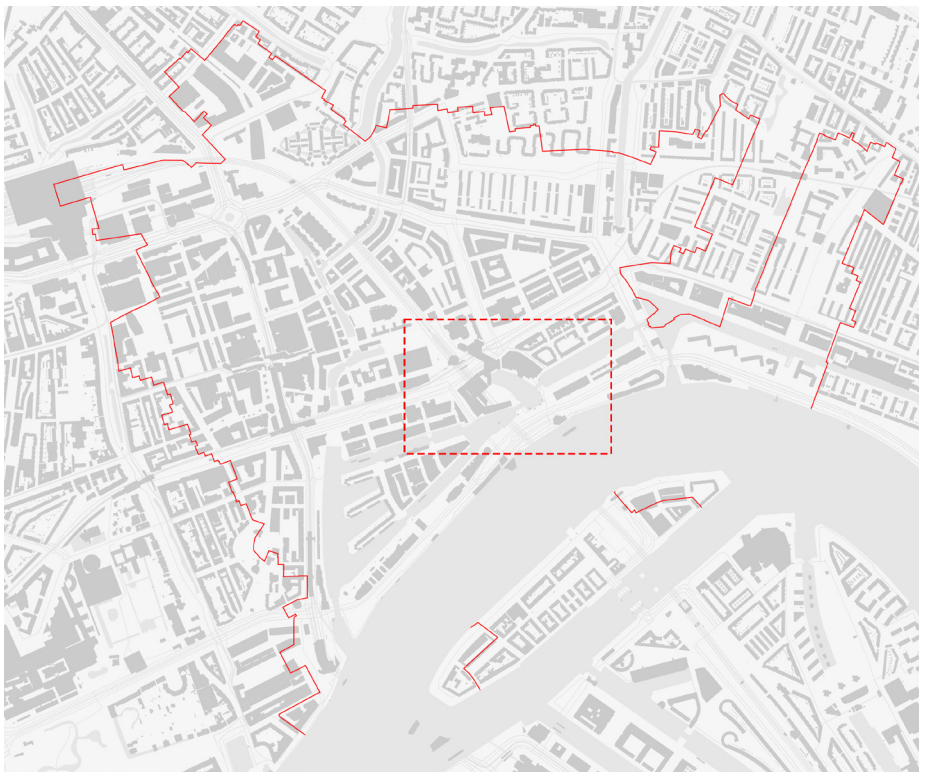


Fig.101 Site 1 Gelderseplein area near de witte huis (Author)

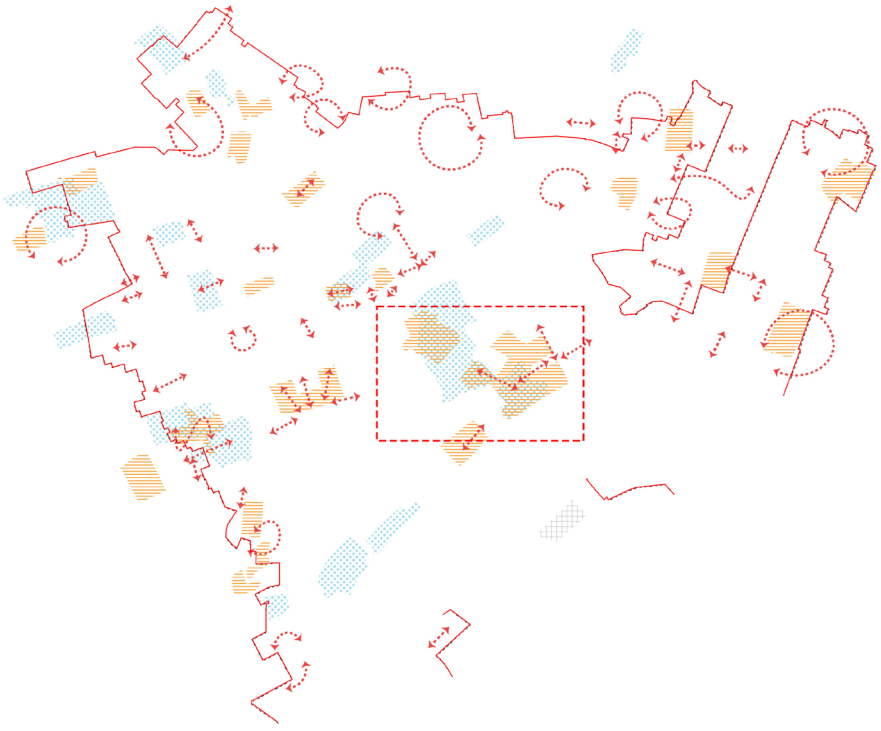


Fig.102 Site 1 Gelderseplein area near de witte huis on the opportunity map (Author)

Enhancing Connectivity and Walkability

Supporting Local Businesses through Mixed-Use Development

Developing Green Infrastructure

4.3 Fieldwork

Historical Significance:

Both Gelderseplein and De Witte Huis are historically relevant, with direct connections to the Brandgrens. Gelderseplein's destruction and subsequent reconstruction, along with De Witte Huis's survival, underscore their importance in preserving and revitalizing Rotterdam's heritage.

Community Engagement:

Involving a diverse mix of families, young professionals, elderly individuals, students and faculty members, artists, performers, enthusiasts, and tourists ensures that the revitalization efforts meet various needs and preferences.

Environmental Impact:

Heat stress, risk of flooding, and a small green footprint represent opportunities for sustainable interventions.



Fig.103 Site 1 Gelderseplein area near de witte huis (Author)



Fig.104 Site 1 three years after the bombing (modified) (https://birdinflight.com)

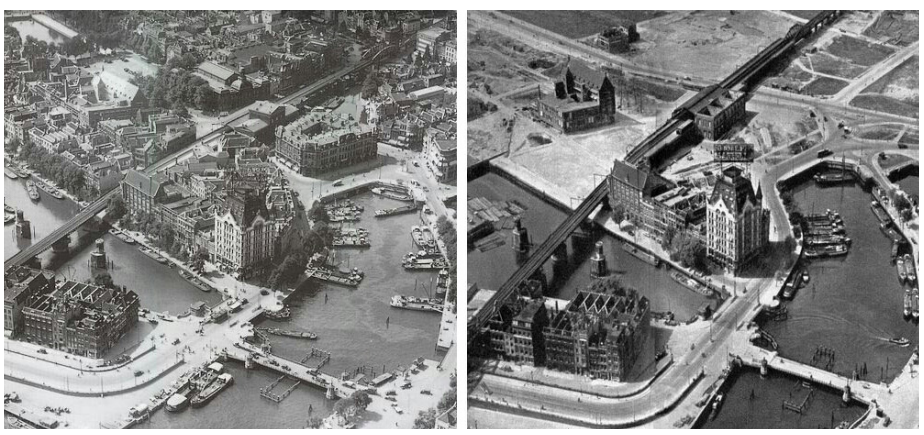


Fig.105 (https://www.reddit.com/r/BattlefieldV/comments/a0x7an/off_topic_aerial_photo_of_the_area_around_white/)



Fig. 62 Arial view on site 1



Fig. 63 Site 1 Fieldwork Observations



Fig. 69 Arial view on site 1

4.2 The Eight-Step Design Process

3-Problematization
Site1 Witte Huis

To translate the insights gained from the opportunity map into site-specific challenges, further fieldwork was conducted. This effort aimed to identify and analyze various site-specific challenges, relationships, and opportunities.

The collage reflects my understanding of the site, its characteristics, relation to porosity, urban cracks, and opportunities. It was created in a perspective layout to highlight priorities. For instance, the relationship to the water (1) and the heavily paved areas (6) are the primary focuses of the design. Secondary priorities include expanding boundaries on the right, such as improving pedestrian path flow (8,9), and removing inactive and imbalanced boundary elements on the left (4).

At the center of the collage is the juxtaposition of different scales, such as the aerial view and the old stairs leading down to the water (3, 10). This illustrates how I perceive the site, always shifting between scales. The use of different media, including images and diagrammatic isometric perspectives (11,12), emphasizes the transition between what is observed and what is quantifiable.

(1) Water Relationships
(2) Hard-Edge and Soft-Hard Landscape Interaction
(3) Historical Water Connections
(4) Ineffectual Boundaries
(5) Tactical Urbanism Approaches
(6) Extensive Paving and Limited Greenery
(7) Site's Bike and Car Pathways
(8) Pedestrian-Only Route (Through Cube House, Narrow Passage, and Spiral Staircase)
(9) The Narrow Passage
(10) The Spiral Staircase
(11) De Witte Huis and Surviving 1920s Buildings
(12) Architectural Patterns from De Witte Huis

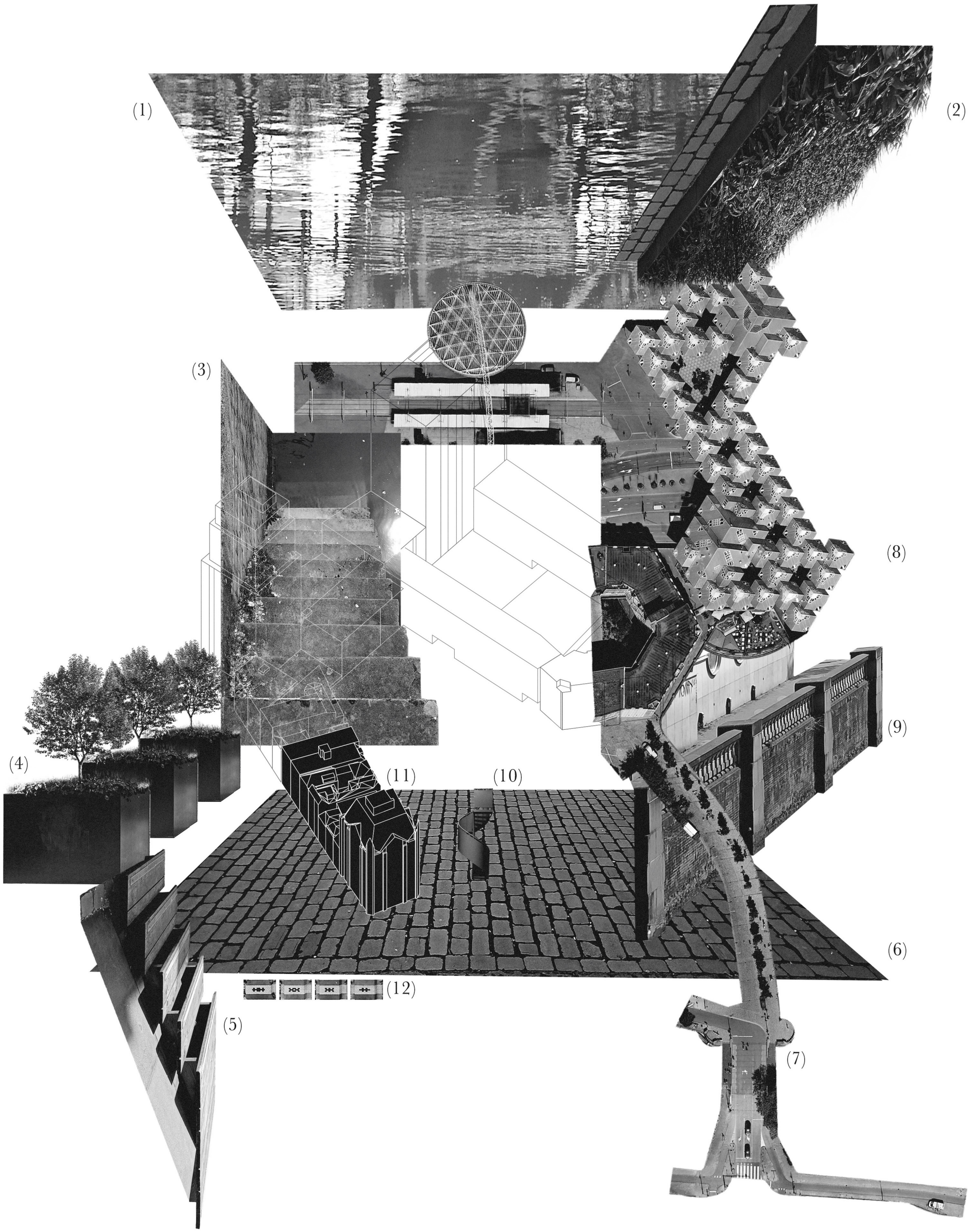


Fig. 70 site 1 potential collage (author)

4.2 The Eight-Step Design Process

3-Problematization
4-Strategizing
5-Description

Following the completion of fieldwork, the focus shifts towards mapping the site's potentials through an urban design lens, with particular emphasis on mitigating heat stress and fostering new relationships with water, drawing inspiration from historical connections uncovered during the site exploration.

This strategy mapping process is closely intertwined with the previously developed opportunity map, facilitating the emergence of novel connections, particularly concerning pedestrian movement, to enhance circulation patterns, especially given the economic potential inherent in the site. Through the implementation of an activation strategy informed by insights gleaned from interviews with local residents, it becomes evident that depaving a substantial area is imperative to address environmental challenges such as the risk of water flooding, extreme heat waves, and the scarcity of green spaces.



Fig. 73 Mapping Site 1 Potentials (author)

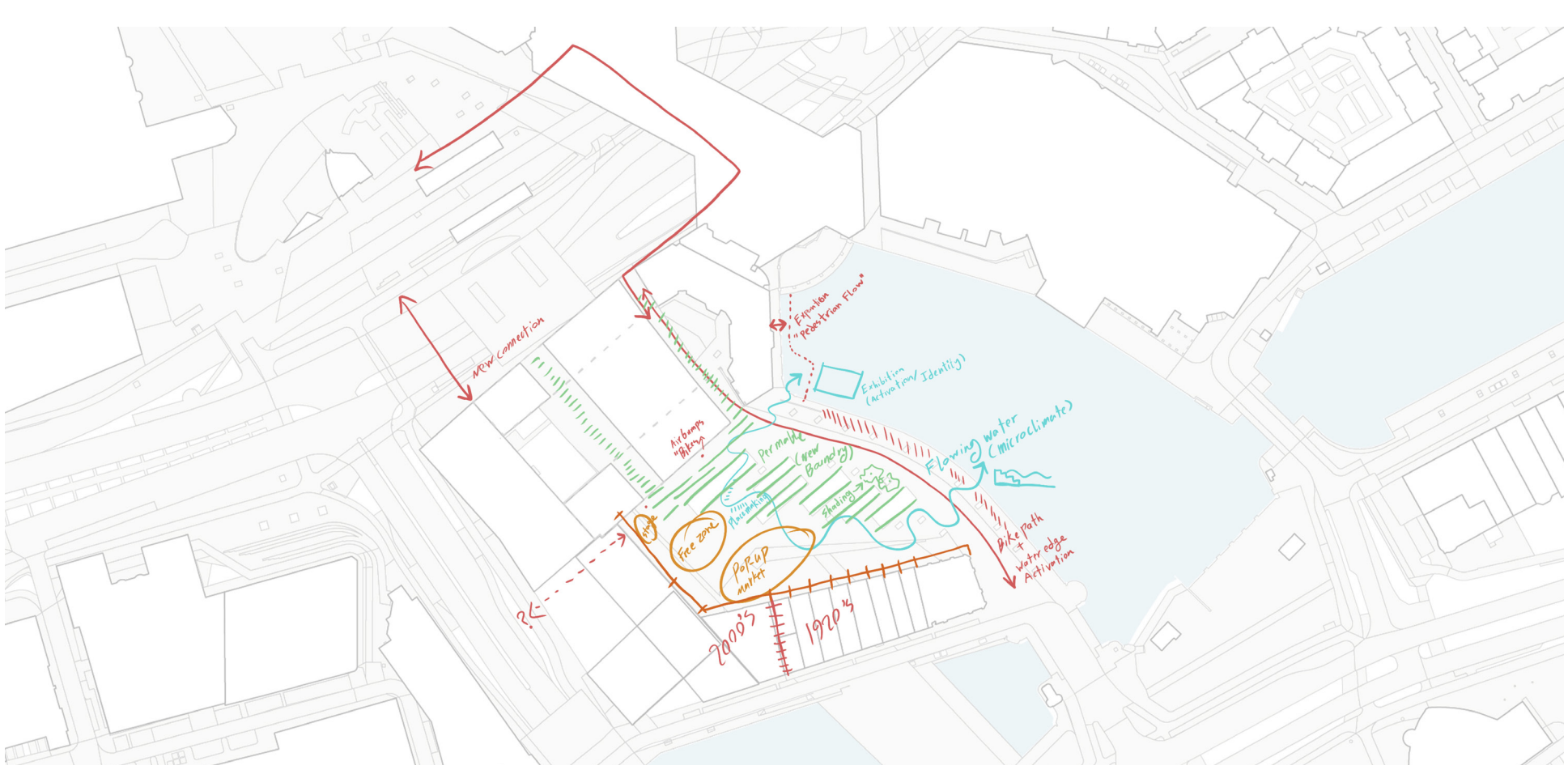


Fig. 74 Strategy map Site 1 (author)

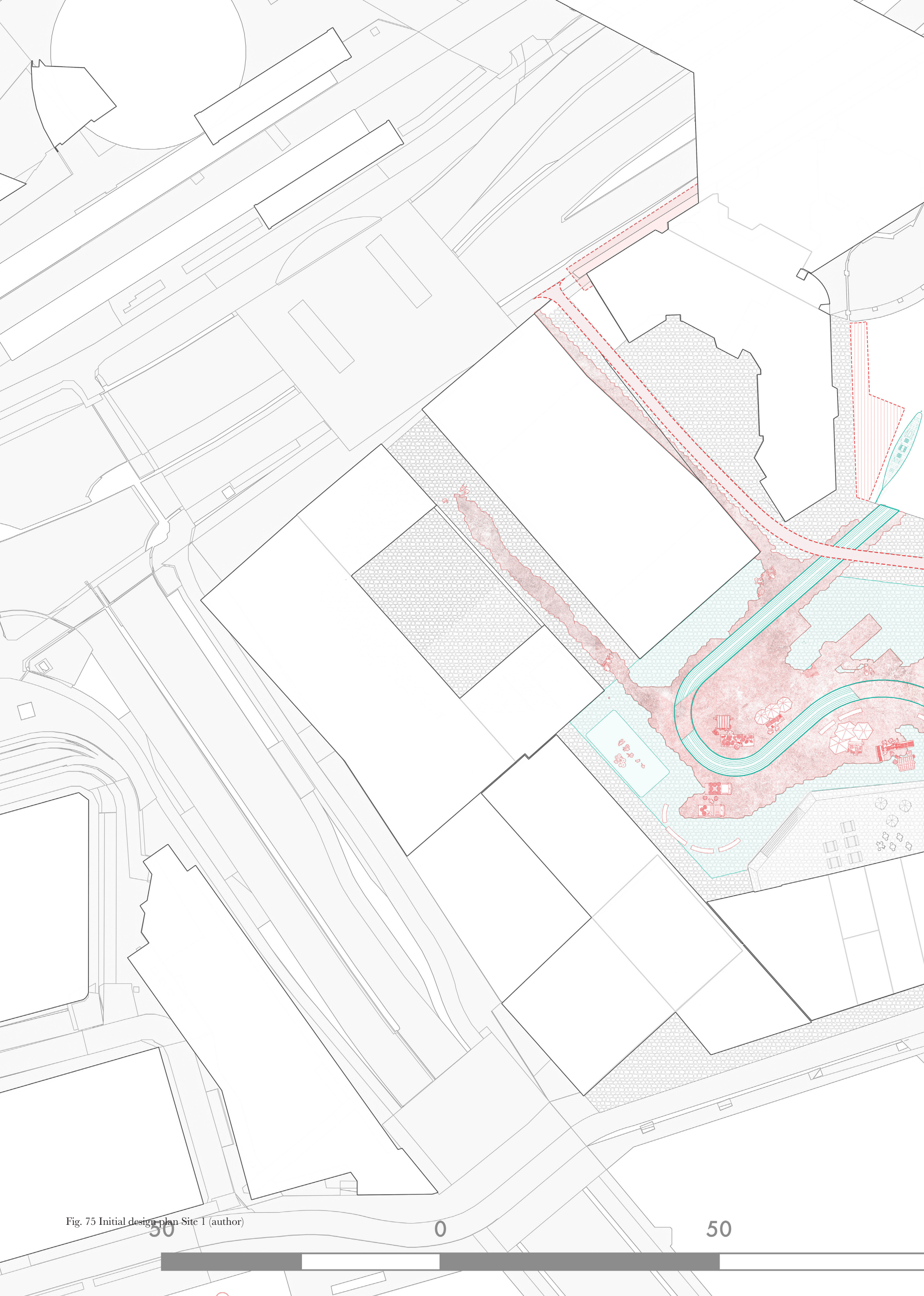


Fig. 75 Initial design plan Site 1 (author)


100 m

This depaved area will serve as a catalyst for fostering new connections with the site, enabling the thriving of vibrant urban interactions.

The design incorporates a combination of tactical and non-tactical interventions, featuring the establishment of a new bike path and the introduction of flowing water to redefine the site's boundaries, creating new spaces through depaved areas. The strategic placement of pop-up zones is informed by interviews, while ground-level activities from the surrounding areas are integrated to optimize economic opportunities.

The redesigned relationship with water is articulated in two main aspects: the water edge and the river profile. The river profile facilitates an integrated experience with staircase-like structures, while the activation of the water edge involves the introduction of new urban furniture to enhance connectivity within the site.

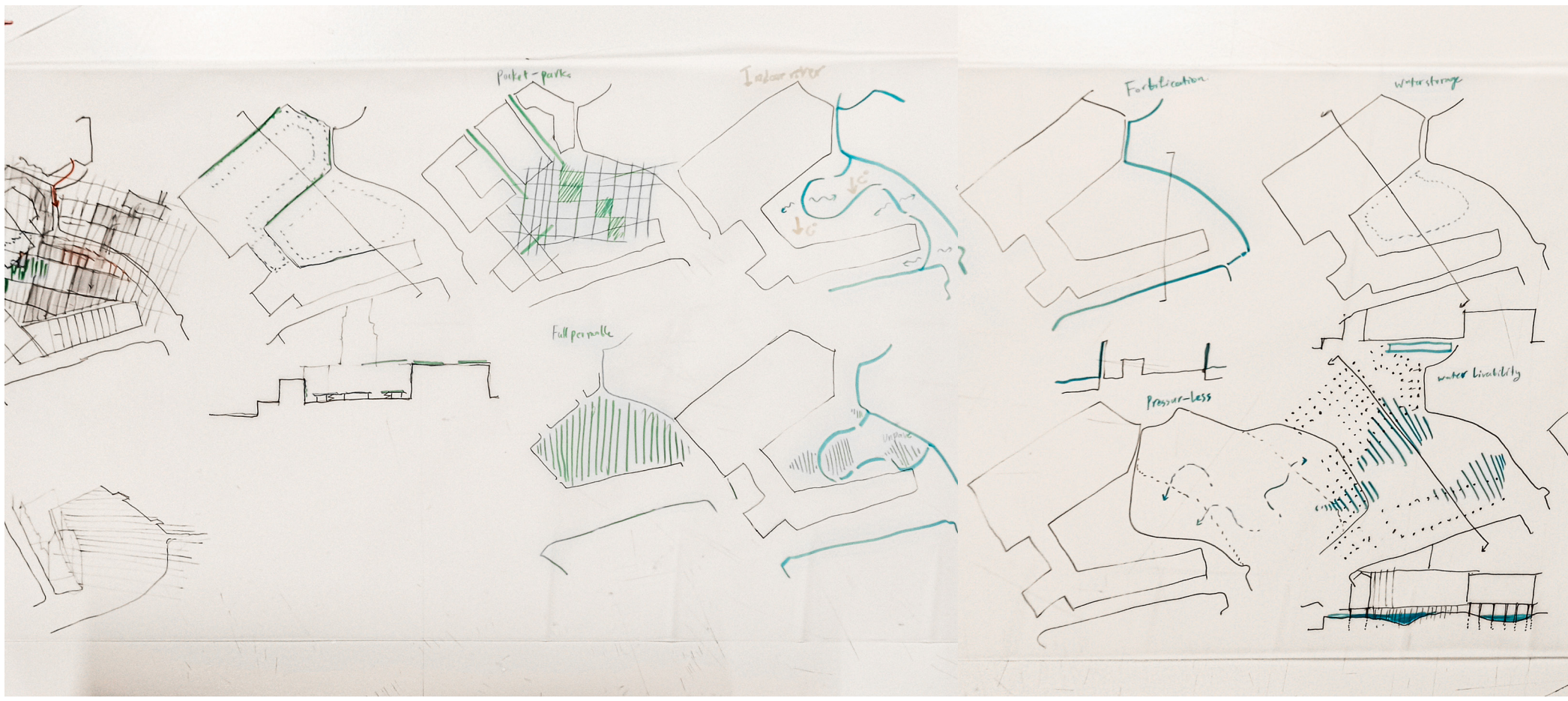
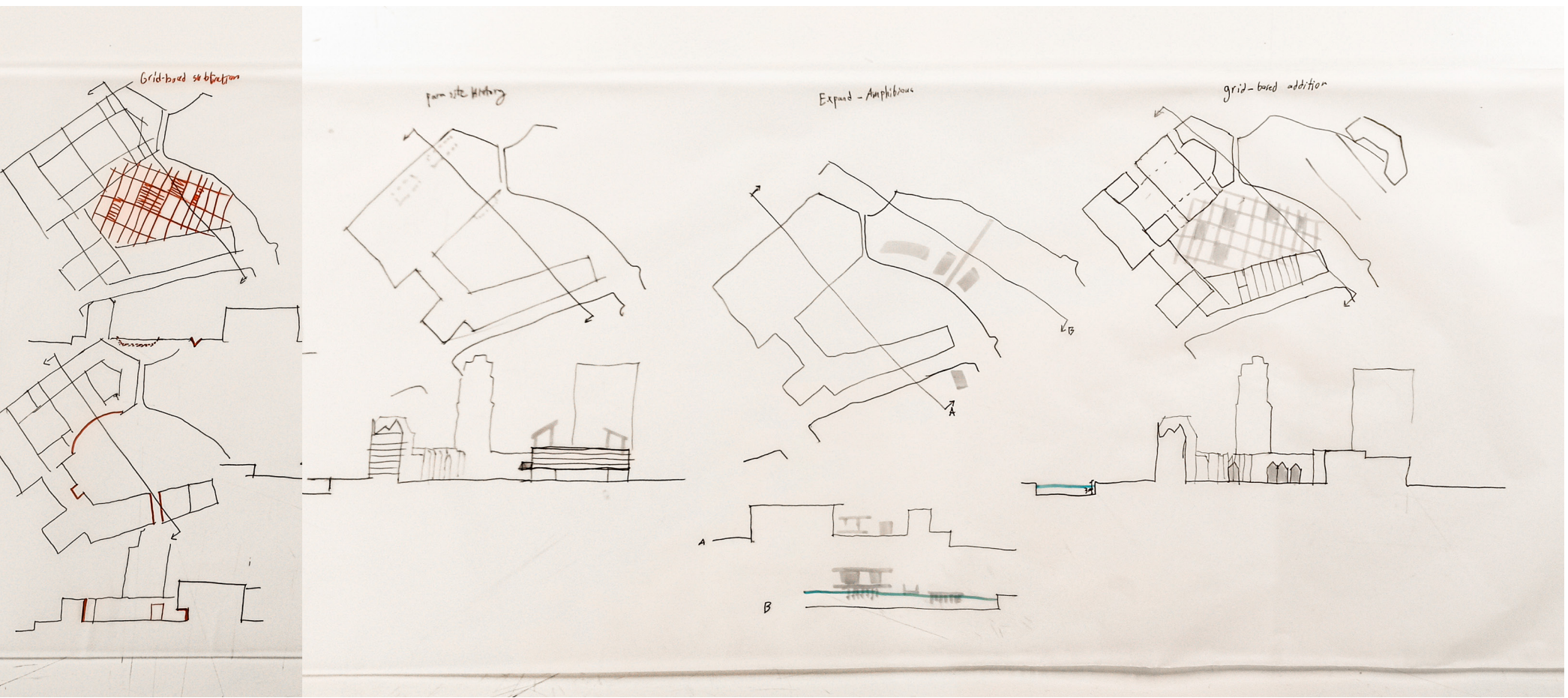


Fig. 76 Design options development Site 1 (author)


Grid-based subtraction
form site History
Expand - Amphibious
grid-based addition
A
B
A
B

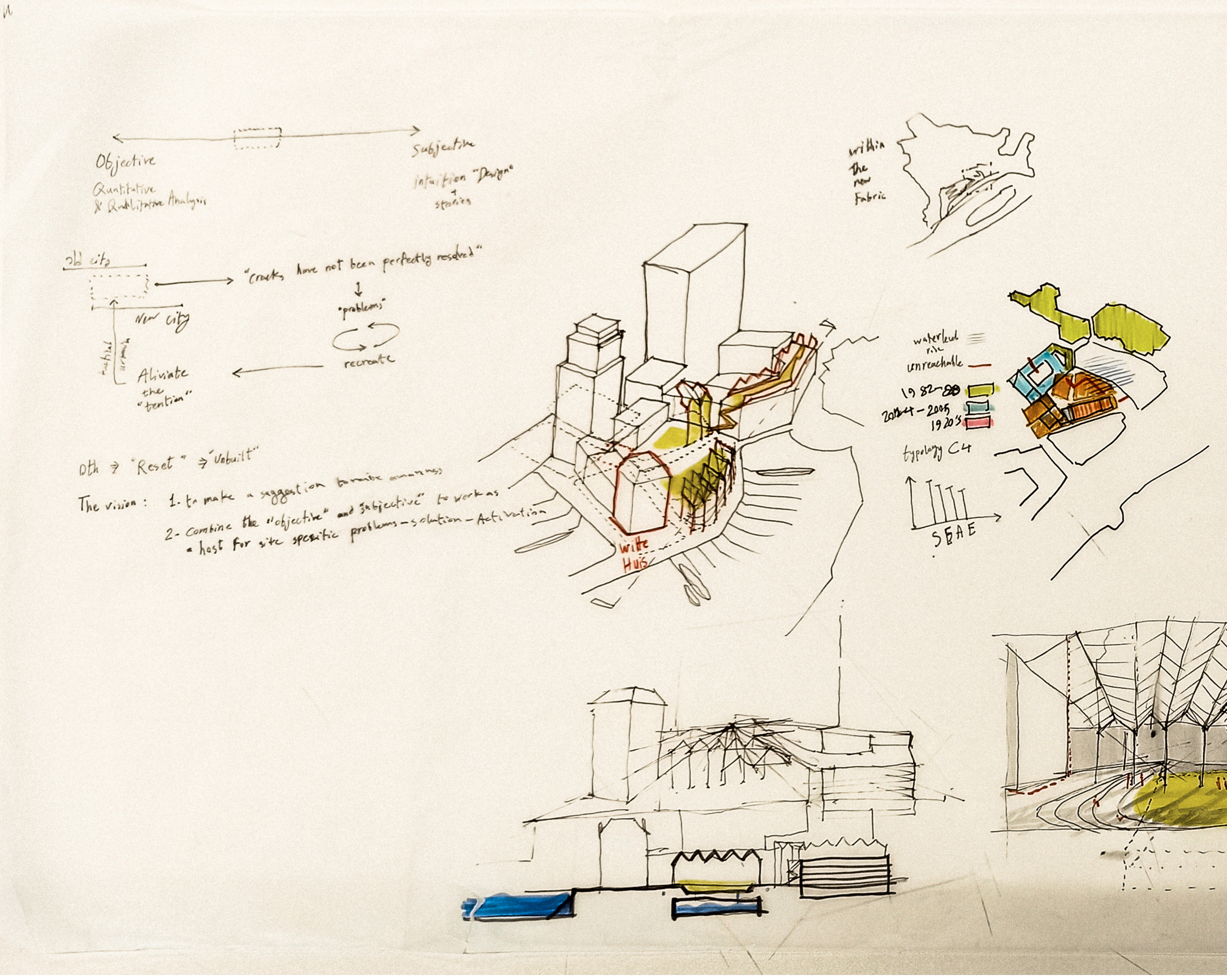
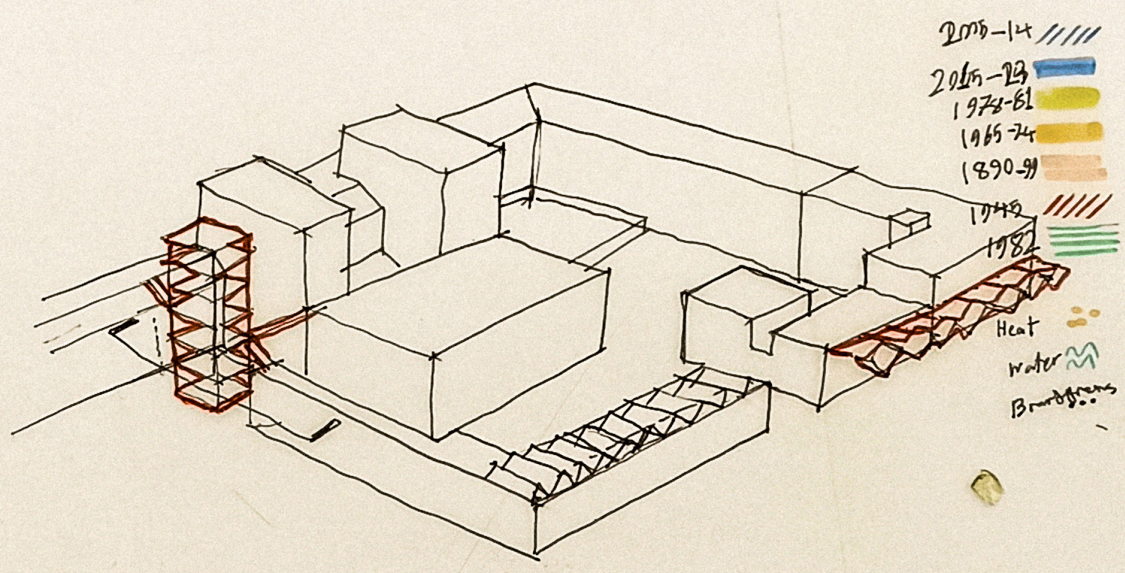
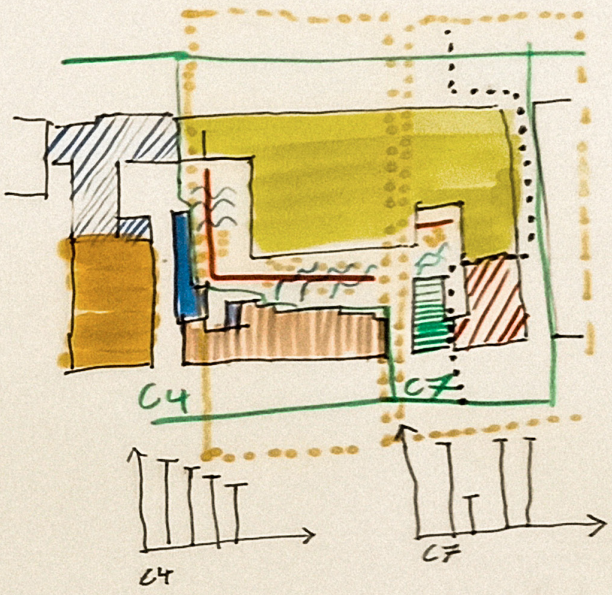


Fig. 76 Initial Design options development (author)




2005-14
2000-04
1974-81
1965-74
1890-91
1945
1982
Heat
Water
Bridgeways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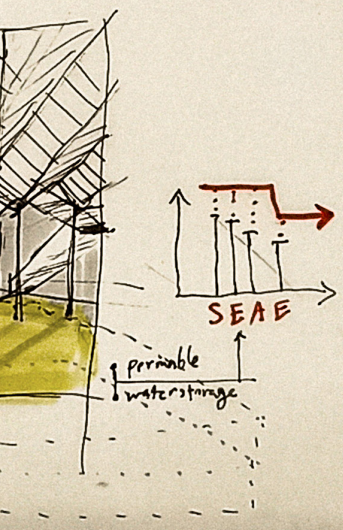
SEAE
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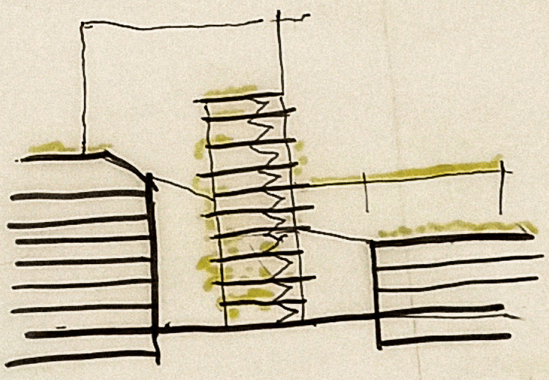
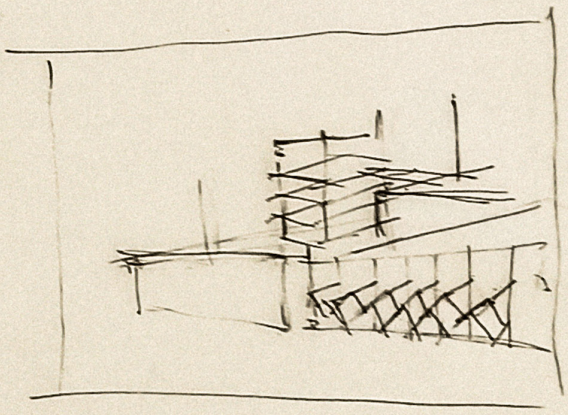
waterstorage





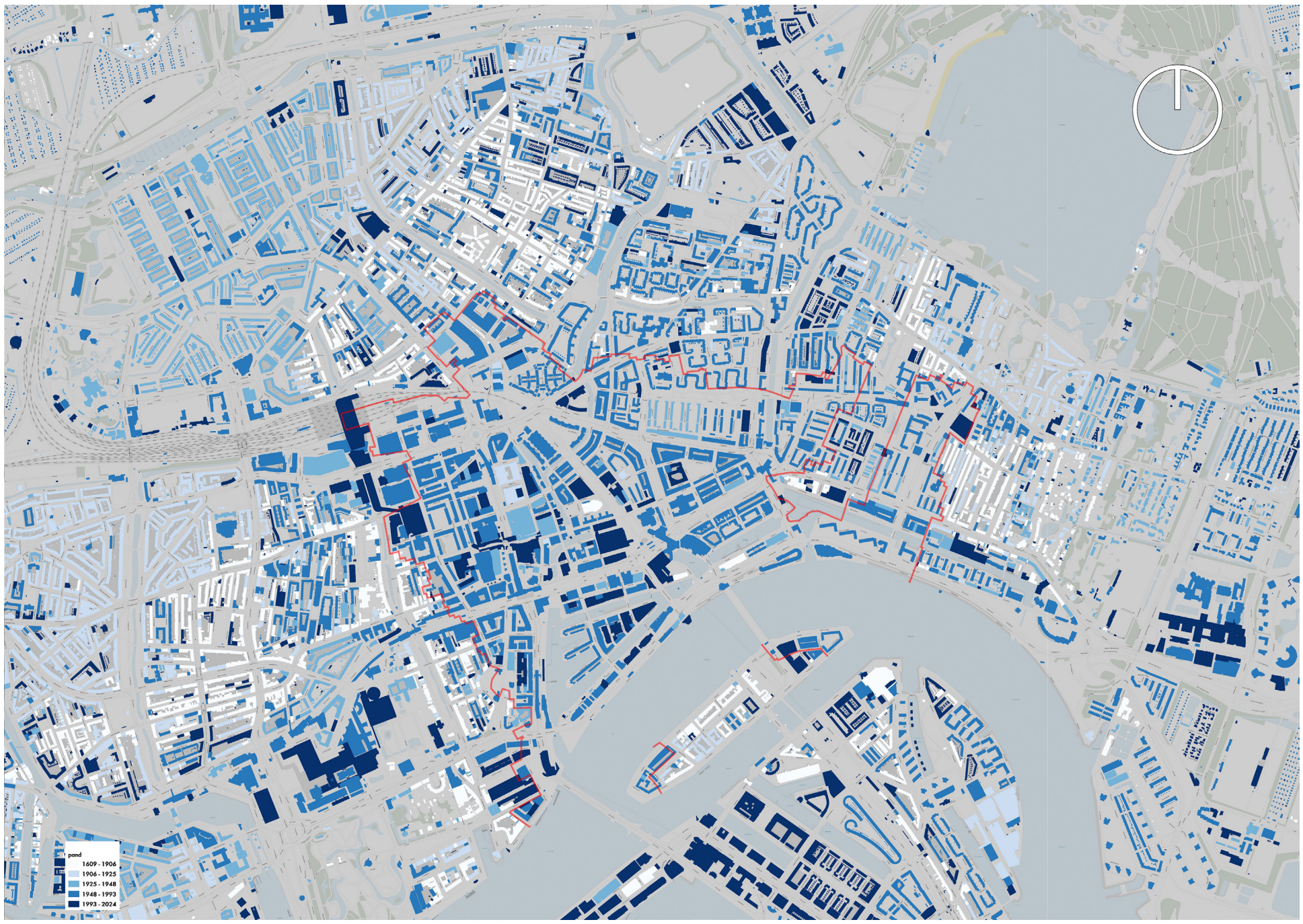


Fig. 76 A map of built years with Brandgres (author.)

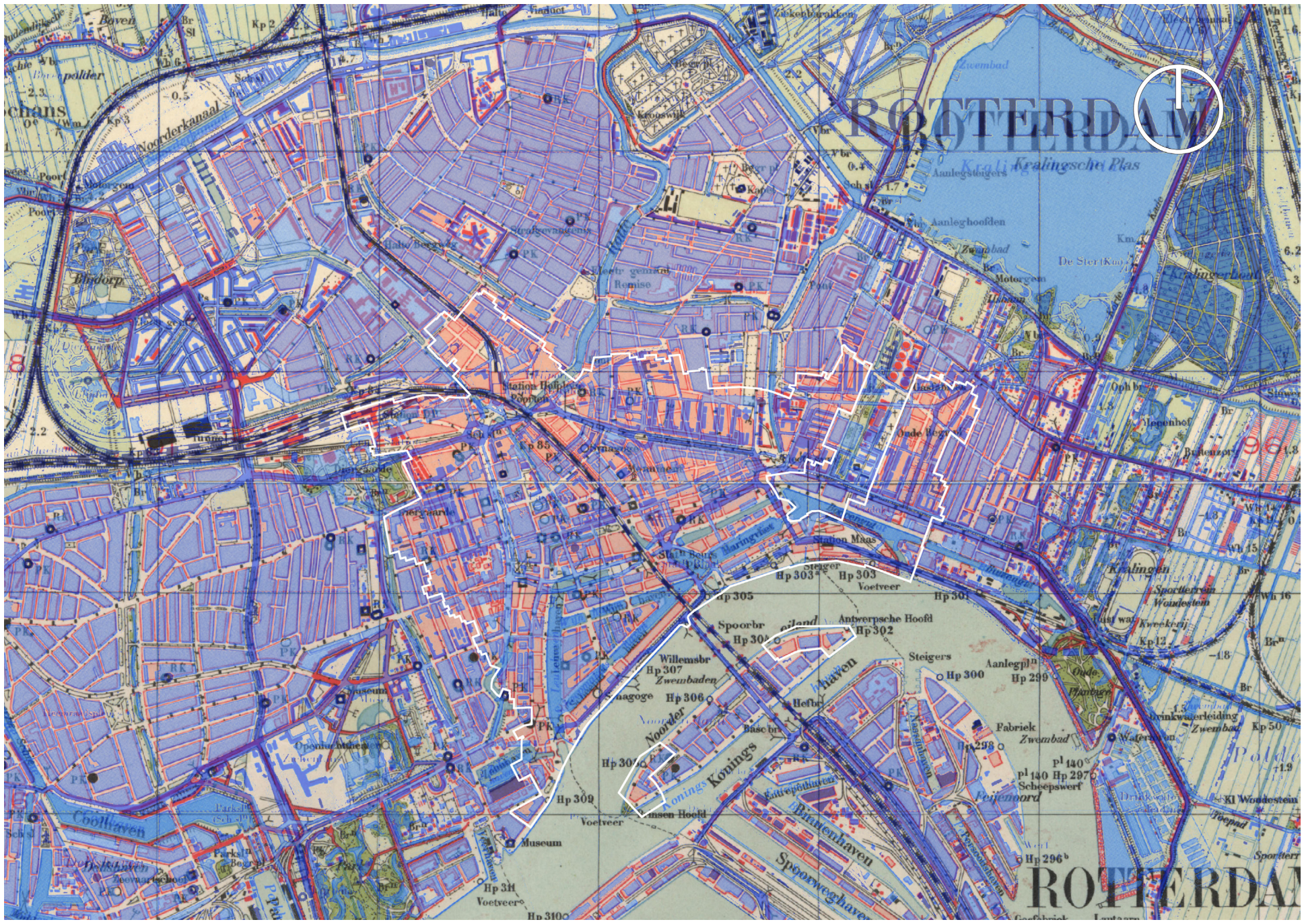


Fig. 76 A map showing the intersection between plots before and after the WWII bombin (author.)

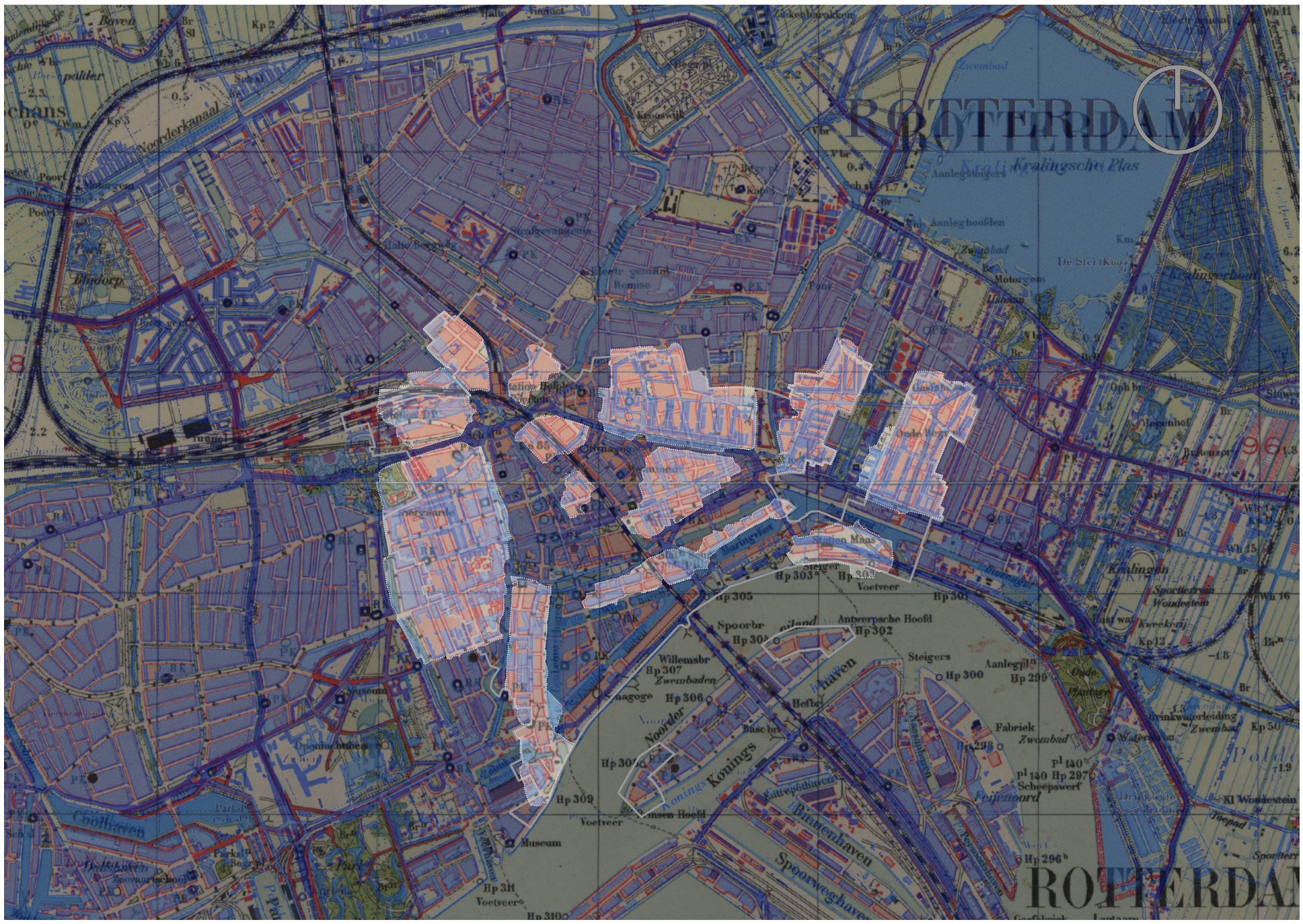


Fig. 76 A map showing the selection of areas where the conflict between the old and the new plots is most visible for further studies (author).

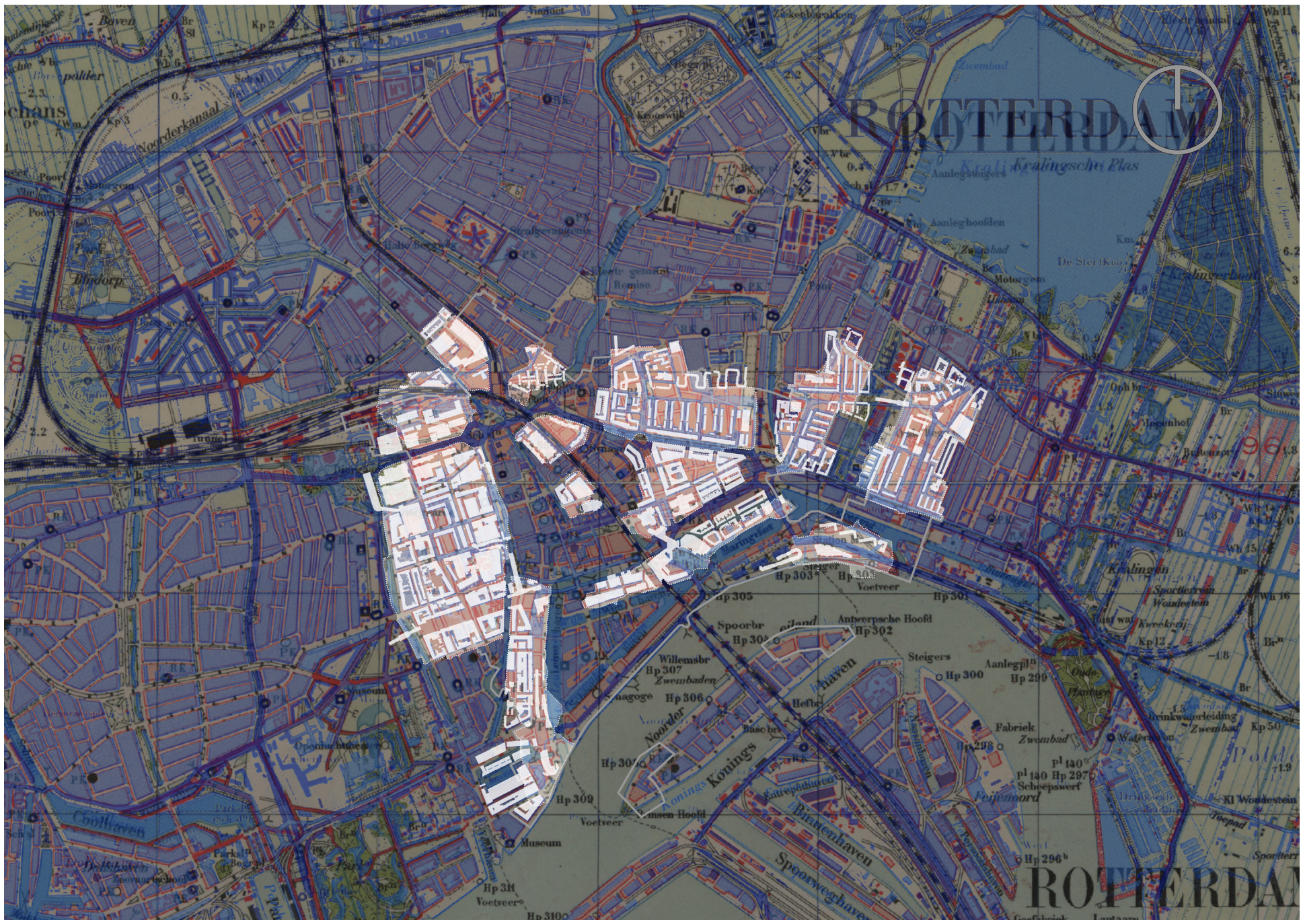


Fig. 76 A map showing building types in the selected zones (author).



Fig. 76 Isolating the selected buildings for investigation (author).



Fig. 76 Imagery of building types (author).

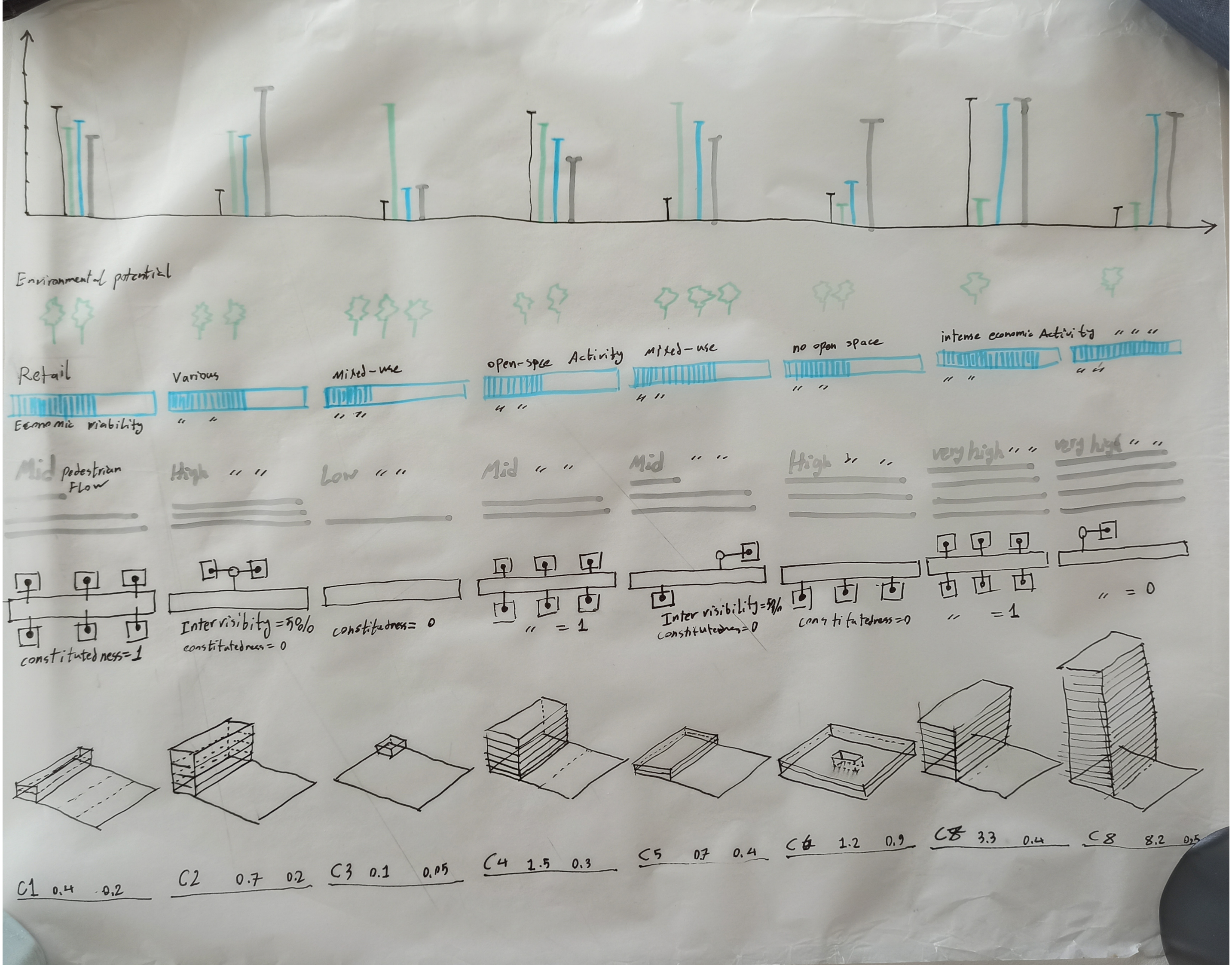

Environmental potential
Retail
Various
Mixed-use
open-space Activity
Mixed-use
no open space
intense economic Activity
Economic viability
Mid pedestrian Flow
High
Low
Mid
Mid
High
very high
very high
constitutedness=1
Intervisibility=5%
constitutedness=0
constitutedness=0
=1
Intervisibility=5%
constitutedness=0
constitutedness=0
=1
=0
C1 0.4 0.2
C2 0.7 0.2
C3 0.1 0.05
C4 1.5 0.3
C5 0.7 0.4
C6 1.2 0.9
C8 3.3 0.4
C8 8.2 0.5

Fig. 76 Initial typology analysis for density-based configurations.



ig. 76: Rotterdam edges mapping.





ig. 76: Rotterdam expansion areas mapping.





ig. 76: Rotterdam Boundaries mapping.

