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Resilient Public Space System

Plac Społeczny
Resilient Public Space System

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Abstract

The following is a report for a project that constitutes a master thesis in Urban Design at Aalborg University. It seeks to explore and operationalise urban resilience through a contextualised design of public spaces in a new development area of plac Społeczny in the city of Wrocław, Poland.

Within the framework of a local plan of spatial development issued for the area, the project takes public spaces as its field of intervention. Through an iterative design process it aims to examine how public space can be a resource for building a resilient urban system. Through literature review of urban resilience theory, qualities of resilient design are identified, which are used to inform the design decisions. Analysis of the site helps identify specific climate-related crises that the site should be made resilient to.

The project touches upon themes such as the urban system, dynamic non-equilibrium, social capital and trust, community, public good, biodiversity and nature-based solutions. Its final product is a conceptual design of several interconnected public spaces within the site that to different degrees respond to various climate-related crises, in particular heatwaves, strong winds and pluvial flooding, as well as a reflection on how such a system of public space can strengthen the resilience of an urban system on a larger scale.

Reading Guide

Wrocław /vɾɔtsˑwɑf/
The fourth-largest city in Poland, the location for this project.

Plac Społeczny /plat͡sˑ spɔwɛt͡ʃnɨ/
An area in Wrocław of approximately 30 ha, the site of the project. In Polish, the name signifies "social square".

The project is an experimental wondering on the role of public space design in building urban resilience. It is not necessarily a realistic proposal on how to approach urban development, but rather a thought experiment intended to challenge the status quo and put focus on public space as a resource for urban resilience.

The report consists of following parts:

Introduction: initial texts to explain the context and relevance of the project;

Theoretical approach: delving into terminology and how to theoretically approach the project's wondering;

Analysis: an outline of the past, present and possible future of the area, as well as the crises it is exposed to;

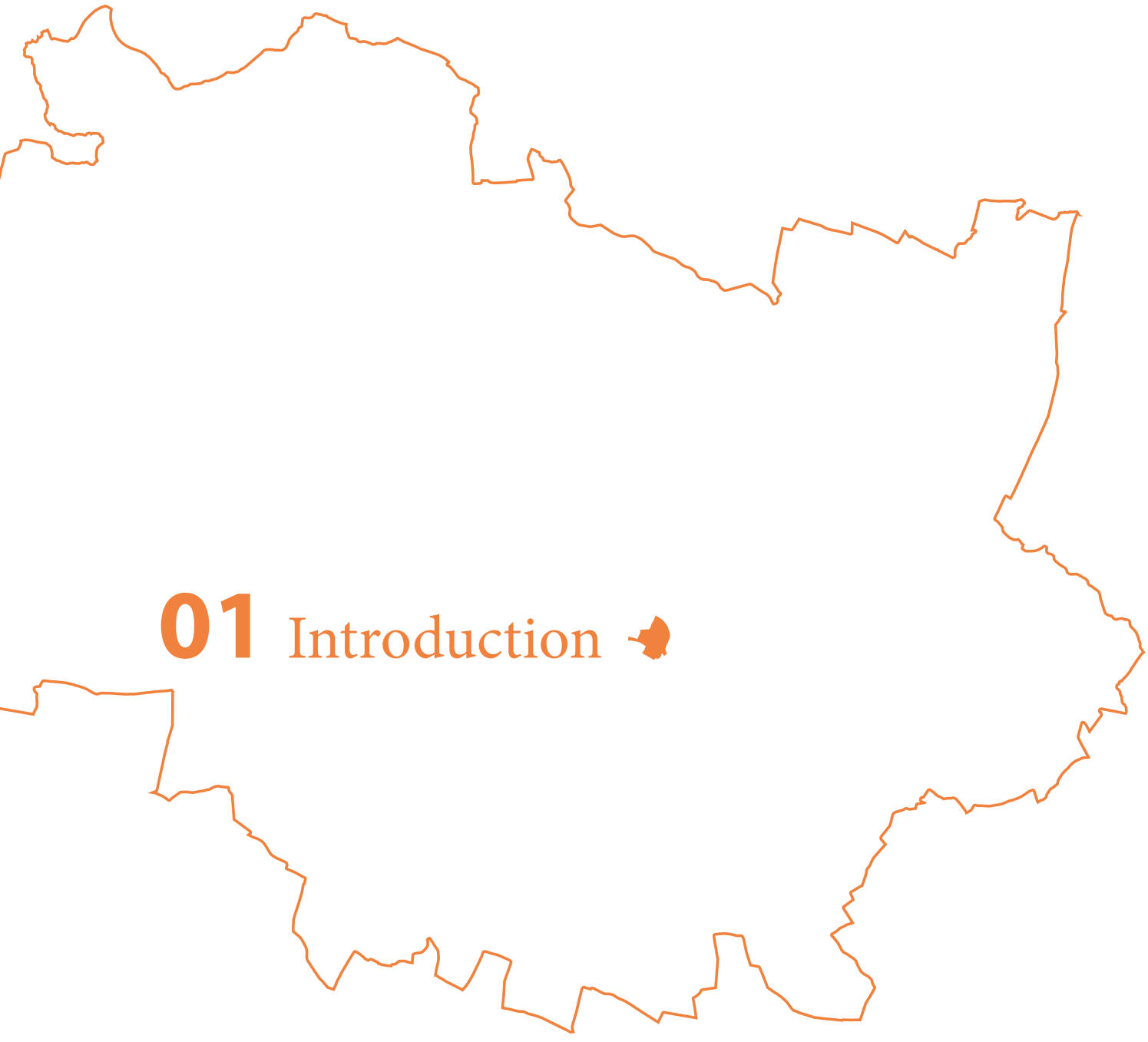
Towards the design: a transitional chapter collecting main insights from the theoretical and analytical research;

Design development: communicating the development and process of arriving at the final design;

Presentation: showcasing the final design and its qualities;

Wrap up: the conclusion and reflection on the project.

Table of contents



01 Introduction

The crisis state of the world

The world we live in today is one of **uncertainty, complexity, and flux**. The ongoing and emerging issues such as the Coronavirus pandemic, the economic crisis, the war in Ukraine as well as many other political conflicts worldwide make it clear that stability is not an option. Crises are severe, exacerbating, and highly interconnected. One that has been particularly visible and pressing for many years now is **the climate crisis**. According to the Intergovernmental Panel on Climate Change

"Human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people" (IPCC 2022).

The climate crisis is directly linked to political, humanitarian, and economic crises and it has to be mitigated radically and immediately to have a chance to avoid even more catastrophic aftermath (ibid.).

The severe nature of the climate crisis is particularly linked to cities. The IPCC estimates that urban areas are responsible for 67-72% of greenhouse gas emissions worldwide (ibid.). Urban Heat Island, air pollution, and the increasing frequency of extreme weather events pose a serious threat to the quality of urban life. While the concept of sustainable cities is very relevant, given the magnitude of the current crises and uncertainty it does not seem to be enough. There is a **pressing need for cities to be more adaptive, flexible, and able to contain whatever difficulty they are faced with**, in a manner that ensures the survival and wellbeing of the urban communities. **How can urban design bring this desired state closer to reality?** This is one of the driving questions of this project.

Ill. 1 The Millennium flood in Wrocław

Ill. 2 Smog in Wrocław

Welcome to Wrocław

To examine the impact of urban design on the city and its systems and how it can help future-proof it for current and emerging crises, there is a need for a contextual grounding. In this project, the context will be the Polish city of **Wrocław**, particularly the centrally located area called **plac Społeczny**.

Wrocław is the fourth largest city in Poland, with a population of approximately 640 thousand. It is situated in the southwestern part of the country and has a rich history stretching over a millennium. Originally a Polish city, it came under Czech rule in the 14th century, then in the 18th century, it became part of Prussia and remained German, under the name of Breslau, until the end of World War II. It was one of the last Nazi fortresses to fall to the Soviet forces during the Siege of Breslau, which left large parts of the city fabric, including the area of plac Społeczny, destroyed by bombardments. After that, Wrocław came within the newly established borders of Poland.

This **complexity of heritage** results in a diverse, layered urban fabric: the well-articulated old town surrounded by a moat with historic bastions, mid-city quarters with late 19th - early 20th-century German housing, post-war socialist modernist estates filling the gaps made by war destructions, sprinkled with postmodernism and contemporary architecture.

Currently, Wrocław is one of the major Polish cities and one of the most important academic centres, with over twenty universities and approximately 108 thousand students (GUS 2020). The financial situation of the city is favourable, with the second-highest average income nationally and GDP per capita of 155% national average (Wrocław City Council 2019). It is considered the country's technology hub and has comparatively high employment.

A particular feature of Wrocław is its closeness to water. The city has been founded on marshland and is characterised by a rich fluvial system, with five rivers flowing through it, several canals, and a rich depository of river islands, 12 of which on the city's largest Odra river. The proximity to water has been both a blessing and a curse for the city, which in 1997 underwent the so-called Millennium Flood, one of the most disastrous floods in Poland's history, repeated to a lesser extent in 2010.

Despite quite extensive green areas and a dense public transport network, Wrocław is struggling with high levels of air pollution, resulting mostly from solid-fuel heating systems still used in many households. The city is thus infamously ranked among 100 most polluted cities worldwide, at times reaching the top spots in the ranking (IQAir 2022).

As shown throughout its rich history, **Wrocław has faced many crises but has mostly managed to adapt and overcome them**. The rich cultural heritage, strong local identity, and civic society are undoubted resources for the further prospering of the city, in spite of many challenges it is still facing and those it is bound to face in the future. The city's developmental areas, of which plac Społeczny may be the largest and most centrally placed, present great potential to test new adaptive solutions to deal with these challenges.

Urban development in Poland, however, is a tricky matter. Years of communism under Soviet influence, which ended in 1989 with a rapid and in many ways drastic transformation to free-market liberal democracy, have left the Polish society eroded in terms of community and trust, and any notion of planning, also in the spatial dimension, is regarded with suspicion, both by the public and the authorities, as an association with a centrally planned economy. The development in big Polish cities, including Wrocław, is driven in large part by private investments, often with an approach to maximise income through office spaces and pricey apartments. While the private realm of housing and services succumbs to this market logic, public space can be the sphere of more democratic design, one that has the best chance to benefit everyone and connect the urban system to make it more equitable and resilient.

Ill. 3 Location of Wrocław and plac Społeczny

Methodology
the urban resilience experiment on public space

The general approach in this report is based on **thought experimentation and iterative design**. At the outset of the project is the observation that cities face serious environmental crises on an ongoing basis, and a willingness to help equip them to handle these crises. To this end, **public space has been identified as a field of action**, given its equitable access as well as the environmental and community-building agency. Wrocław, the city to work with, along with the specific site, has been selected based on the perceived crises that it is struggling with, and the potential it has, city-wide and locally, to develop a strategy to cope with these crises.

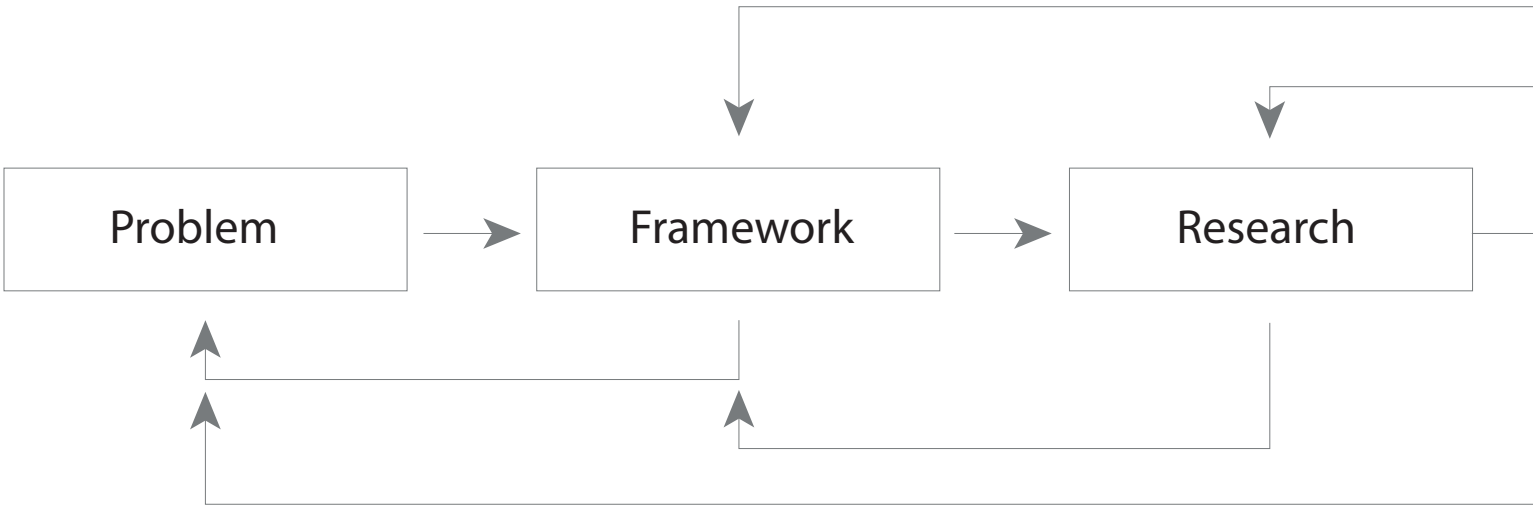
The question that has emerged after these initial considerations is:

"**what can the design of public spaces in this area do for the crisis preparedness and resilience of the area itself and the urban system as a whole?**".

It has become the research question of the project and has driven its experimental approach.

Taking the **local development plan for the site as a framework** of the building layout and functions, the public spaces that these mark out have been identified as the testing ground for the project. We chose to limit the experimental intervention to just public spaces, or what is 'between buildings' (Gehl, 2001), and (in large part) equally accessible to everyone.This quality makes these spaces somewhat of a **public good** and therefore their design has a potential to benefit the entire community in a democratic manner. By putting the design of buildings aside and not a subject of contestation, the focus is brought entirely to public spaces, which helps acknowledge their importance and agency in the development of resilient cities.

Through contextual analysis, we have identified major crises for the city and the site, as well as the local adaptive capacities and resources. Through a literature review on the theory of urban resilience, the project approach was further defined.

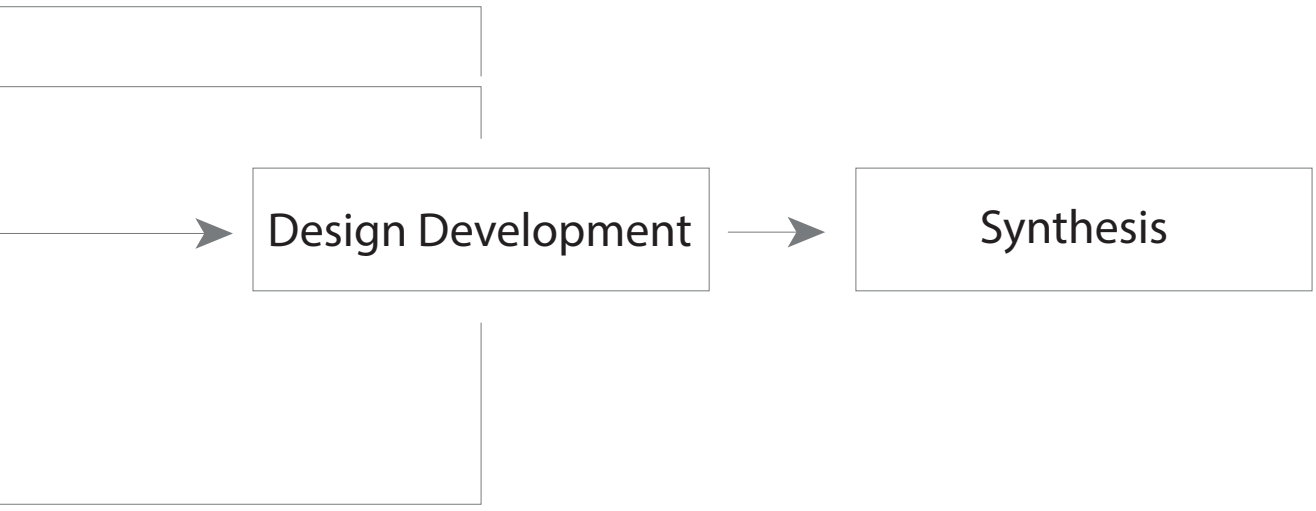


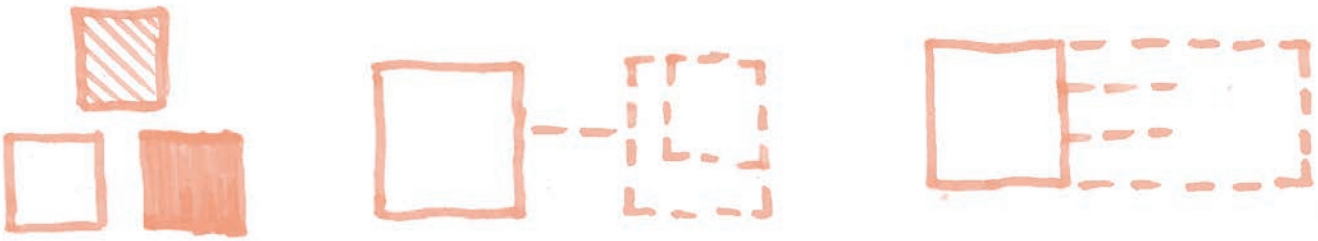
Ill. 4 Diagram of the modified iterative process

In an iterative process (Knudstrup 2004), specific public spaces and localised design interventions have been evaluated against specific climate-related crises and designed to respond to them, while being perceived in relation to other spaces within the site as a part of an integrated, symbiotic system. We have switched back and forth between these two approaches to reach a design that would respond to all the identified crises in the most holistic manner. New analysis information and climate- and microclimate-related technical considerations have been integrated into the design iterations on an ongoing basis and the scenarios have been assessed against a set of identified qualities of resilient design extracted from literature.

Through this process of iterative designing, researching and evaluating, we have arrived at a **conceptual design** with a master plan, contextualised technical solutions and an adaptive, modular system of reconfiguring the public spaces and their functions to respond to various climate-related scenarios. The final design, while contextualised, has been developed as an **exemplary solution, including principles for resilient public space design applicable in various urban contexts**.

The project follows the Integrated Design Process, developed by Mary-Ann Knudstrup (2004) as a supplement to the Problem Based Learning educational model of Aalborg University, with its five phases: problem formulation/design idea, analysis, sketching, synthesis, and presentation. What is unique about this project is the **experimental approach to designing and evaluating public space solutions** within the framework of an existing local plan.





02 Theoretical approach

Urban resilience and public spaces are broad and much discussed terms. To get a clear definition and understanding of what they entail and how they are used in this project, the following chapter will delve into them, examining their meaning and potential.

Urban resilience

From a resilience perspective, the perception of the city is based on ecological principles: the city is viewed as a complex urban system. This is based on C. S. Holling´s seminal work 'Resilience and Stability of Ecological Systems' (1973), where he defines resilience as a property of the ecosystem:

"a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables."

Viewing the city as an ecosystem opens up a question of how to define it, as well as the networks and subsystems it consists of. Depending on the author, different articles present different views of the urban system. In the article 'Defining urban resilience: A review' (Merrow et al. 2016), the urban system is presented in four main structures: governance networks, networked materials and energy flow, socio-economic dynamics, and urban infrastructure and form.

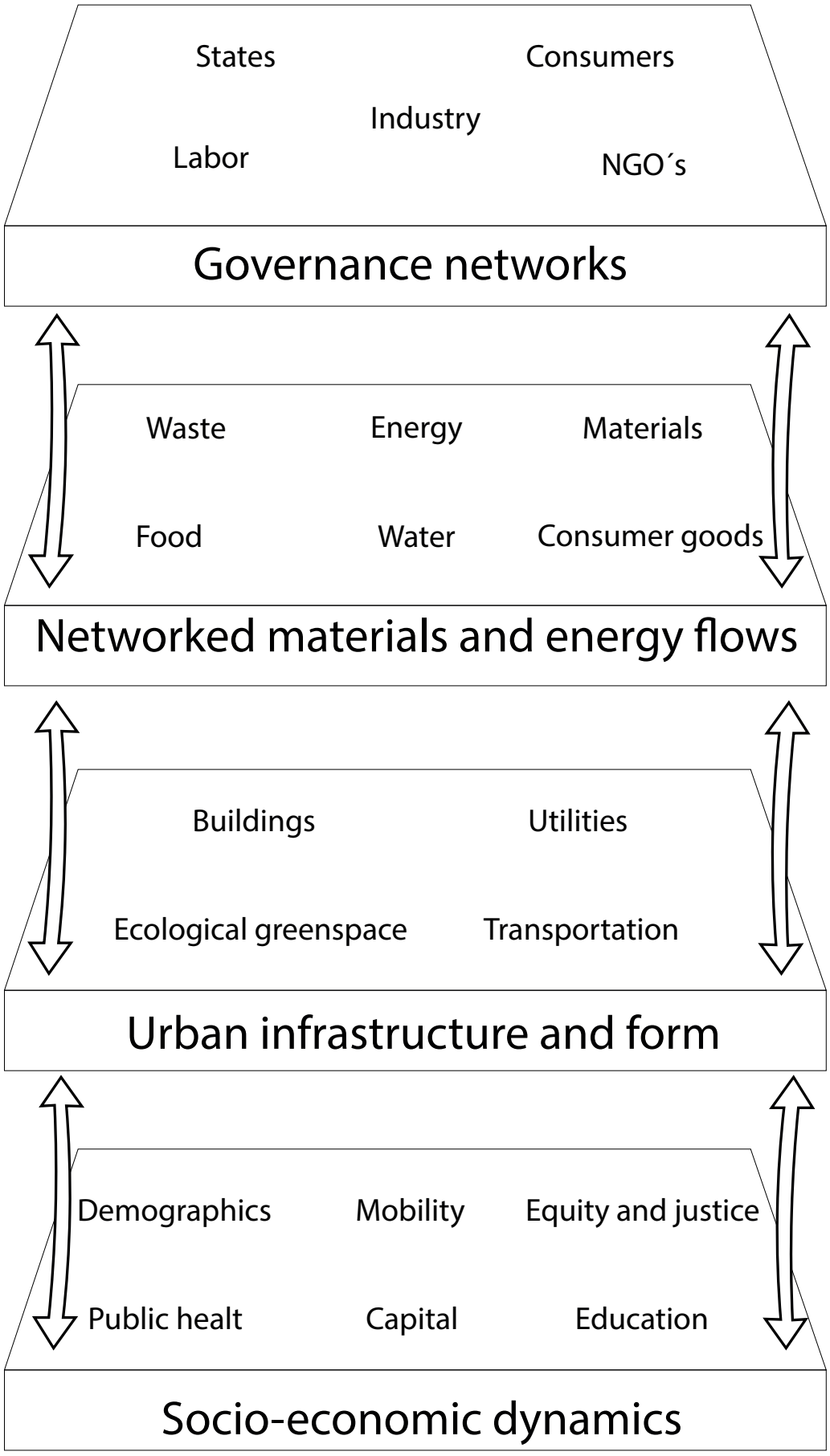
Governance networks refer to the governing forces and actors whose decisions shape the system. **Networked materials and energy flow** describe the resources produced and used in the system. **Socio-economic dynamics** delineate inhabitants, their capital, livelihood, and capacity as well as the overall equity, justice, and demographics in the urban system. Lastly, **urban infrastructure and form** encompass a broad array of networks, the built environment, mobility, utilities, and green infrastructure, including natural ecosystems present in the city. (ibid., see ill. 5)

It is through the last one, urban infrastructure and form, that urban designers can approach the urban system and influence it and its resilience. Additionally, by intervening in the physical form of the city, it is possible to influence other structures in the system. **How does one, therefore, design for a resilient system?**

To understand that, it has to be explained that the urban system and its networks exist in different states of **equilibrium**. When there is a disturbance to the system, it limits its functions in some way, making it shift from a stable state to an unstable one. If the system returns to a singular stable state after the disturbance, it is a single state equilibrium. As resilience is derived from the Latin word *resilo* which means 'bouncing back' (ibid.), it can be understood as the ability to return to a previous state. A more flexible system could exist in multiple stable states shifting between them as balances change in the face of disturbances - multiple state equilibrium.

The idea of bouncing back presents a concern that the maintaining of the status quo might not be desired or the previous state that is being bounced back to is not a good state. Meerow et al. (ibid) therefore foreground the **desired state** instead of the previous one.

In recent years the ever-changing nature of the city and its systems has challenged the idea of designing stable states. This leads to criticism of the idea of the urban system as having a stable state(s), bringing forth the idea of a **dynamic non-equilibrium** - a paradigm that moves away from the bouncing back principle to the idea of a system that is ever-changing. In combination with the concept of the desired state, this type of equilibrium status could then adopt the principle of bouncing forward to the following or desired state. (ibid.)



Ill. 5 Structures of the urban system (adapted from Meerow et al. 2016)

With the aforementioned ideas and concepts defined, it is imperative to explain how urban resilience should be understood in the context of the urban system, its networks and its desired state. There are numerous definitions of urban resilience by different authors. One that draws from environmental and social sciences, and leans strongly on the safe to fail principle, reads:

"Resilience is the ability of systems to organize and recover from changes and disruptions without change to other states - that is, systems that are 'safe to fail' "(Ahern 2011).

The definition by Merrow et al. (2016) presents a more generalised take:

"Urban resilience refers to the ability of an urban system and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change and to quickly transform systems that limit current or future adaptive capacity."

This definition seems malleable enough to be operationalised, and it is compliant with the terms previously mentioned in this chapter.

Lu et al. (2020), in their article on urban spatial resilience, define resilience in general as

"the ability of a system to respond to internal and external disturbances through absorption, adaptation and transformation, while maintaining basic structure and function"

The problem with these definitions is that, even though they are all valid and well-explained, they lack context. With urban resilience being such a broad term, the way it is manifested and enacted in different urban systems changes considerably according to the type of disturbance and the local context. To address that, Meerow and Newman (2019) attempt to contextualise resilience as a design challenge with the "five W's": Urban resilience for whom, what, when, where, and why? (see ill. 6)

Resilience for whom? ask the urban designer to consider the possible internal conflict and possible trade-offs between stakeholders.

Resilience of what to what? ask which system component is made resilient to which disturbance, this includes what system or were in the city. since these factors change how the resilience is handled.

Resilience for when? puts focus on the question of short versus long-term disturbance as well as whether the resilience is designed for a past disturbance or future events.

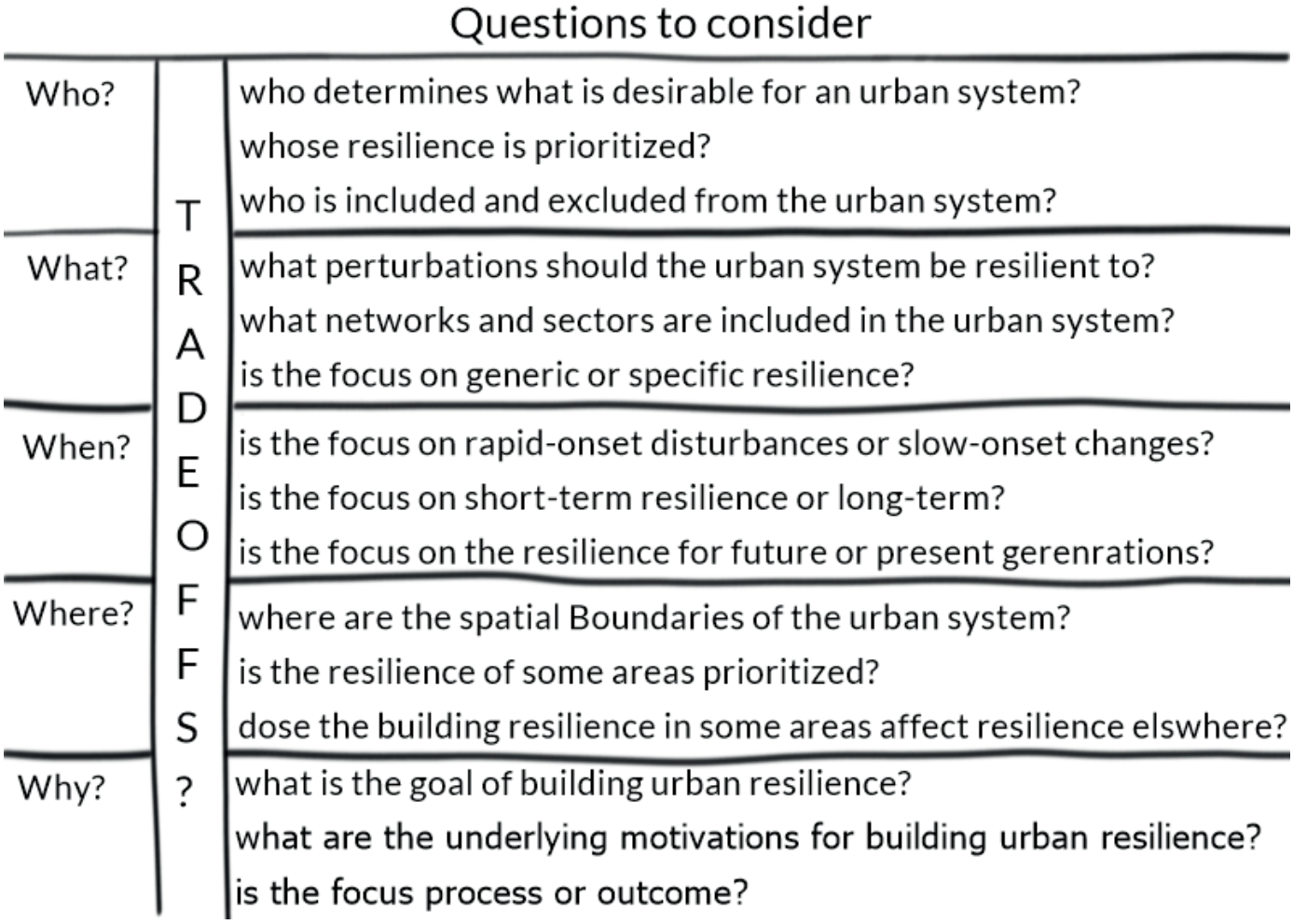
Resilience for where? questions the location of the resilience intervention, but also expects an explanation of the interconnected network that it belongs to; this would also extend to a cross-scalar understanding of the place.

The final W: **Why resilience?** refers to the criticism of the idea of bouncing back to a previous state, scrutinising the goal of the resilience intervention. This links back to the very first W - for whom:

"In short, urban plans and interventions must be considered in terms of political context, trade-offs, interconnections, and multiple scales." (Merrow & Newell 2019)

With these questions, resilience can be contextualised and, with the supporting empirical analysis and investigations, operationalised.

Once it is contextualised and delimited, urban resilience can be achieved through design by deploying various strategies, as presented by different researchers. Merrow et. al. (2016) state that the pathway to urban resilience lies with either "persistence, transition or transformation". Ribeiro and Gonçalves (2019) build on that and present "resisting, recovering, adapting and transforming", adding recovery to the mix. Tong (2021) puts the way that resilience is designed into a time scale, with preparedness (before the disturbance), absorption (during the disturbance), recovery (after the disturbance), adaptability and transformability. This underlines not only the necessity to prepare and deal with the crisis at hand but also to keep learning, changing and adapting, tapping into the idea of a dynamic urban system and its ever-changing conditions.



Ill. 6 The 5 Ws (adapted from Meerow et al. 2016)

All the above strategies seem to converge around the same idea, and several researchers make an attempt to concretise them further by identifying the qualities of a resilient urban system.

Seven terms have been drawn out as qualities of the resilient system derived from a handful of authors. (see ill. 7)

Robustness taps into the persistence and resisting strategies mentioned earlier. The system's ability to withstand and possibly anticipate system failures (Lu et al. 2020, Ribeiro et al. 2019, The Rockefeller Foundation 2014)

Modularity focuses on the components of the urban system that can be flexibly separated and put together, according to changing needs. (Lu et al. 2020, Wilkinson 2011)

Redundancy refers to a planned surplus of resources (pathways, space, components) that can be tapped into if the current resource fails or the demand increases (Lu et al. 2020, Ribeiro et al. 2019, Wilkinson 2011, The Rockefeller Foundation 2014)

Connectivity in the urban system has been shown to protect and help recover from unexpected disturbances, through reorganisation and shock absorption. (Lu et al. 2020, Ribeiro et al. 2019, Wilkinson 2011)

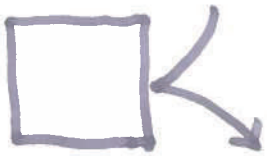
Diversity can be understood in terms of land use and functions, having a diverse set of components that can protect the system against various disturbances and increase adaptability. In the urban context, this may also extend to diversity in residents of the city and its users. (Lu et al. 2020, Ribeiro et al. 2019)

Adaptability is learning from the disturbances to maintain the viability of the system and invoking its flexibility and self-organisation in face of disturbance or change. (Lu et al. 2020, Ribeiro et al. 2019, Wilkinson 2011)

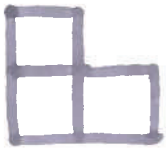
Transformability is similar to adaptability in that it learns and adapts to the situation, but the change it undergoes is on another scale, where it could shift to another type of system. (Lu et al. 2020)

To contextualise these strategies and qualities of a resilient urban system, it is helpful to link back to the "five W's" and the specific context of the system at hand. In the previous chapter, the increasing severity and the interconnected nature of climate-related crises were highlighted. In that context, Meerow et al. (2016, also Meerow & Newell 2019) identify two approaches to climate resilience: whether the system is resilient to a known, existing event (specific resilience) or generally capable of adapting to unanticipated disruptions (general resilience). They discuss the problem of the specific resilience limiting the overall flexibility of the system which may reduce its ability to work with or handle unforeseen disturbances. Further, Meerow and Newell (2019) advocate for balancing the two approaches: being able to answer the "resilience for what" question while keeping in mind the need for general resilience.

With **a contextualised definition of resilience, the awareness of the context and the approach taken**, the aforementioned strategies and qualities can be operationalised and help give shape to a more resilient urban system.



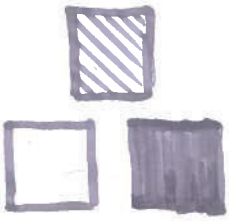
Robustness



Modularity

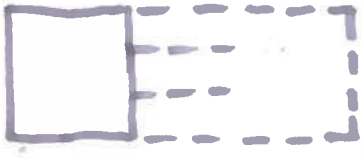
Redundancy

Connectivity



Diversity

Adaptivity



Transformability

Ill. 7 The seven resilience qualities

Public Space
as an asset, resource and field of action

When thinking of the resilience of an urban system from an urban design perspective, one cannot help but wonder "what is my agency in all that?". An urban designer's competence lies in manipulating and adjusting the built environment, something that Meerow et al. (2016) would refer to as the urban infrastructure and form component of the urban system. Lu et al. (2020) posit urban spatial attributes as decisive in the city's ability to survive and thrive and underline the importance of urban public spaces in providing diverse services for both community and environment, as well as ensuring redundancy (ibid.).

Desouza and Flanery (2013) argue for the importance of the **social capital and trust** in suppressing the impact of crises, and indicate how a strong community and a citizen network can self-organise to solve local problems. Özel and Mecca (2014) propose that it is the public space that has the capacity to **strengthen social cohesion** for a more adequate collective response to crises, as well as build a sense of community, local culture and identity. It is then reasonable to state that public spaces provide an important resource for resilience and are a valuable asset from both an ecological and a social point of view. They are also an obvious field of work for an urban designer, wherein urban spatial resilience can be effectively operationalised, which is the very intention of this project.

This begs the question "**what exactly constitutes a public space?**". The Charter of Public Space (Istituto Nazionale di Urbanistica 2013) defines them as "*all places publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive", each with " its own spatial, historic, environmental, social and economic features".* More locally, the Polish Spatial Planning Act (2003) interprets public space as "*an area of particular importance for satisfying the needs of residents, improving their quality of life and fostering the establishment of social contacts due to its location as well as functional and spatial features"*.

Apart from the aspect of accessibility by all, these definitions do not clearly delimit what in the built environment is or is not public space, but they both do indicate that there are some specific spatial features that make it a particular 'social' and 'community building' realm. What is more, the Global Public Space Toolkit (UN Habitat, 2015) argues for public spaces being *"multi-functional areas for social interaction, economic exchange and cultural expression among a wide diversity of people"*. The **diversity and non-prescriptiveness** of both uses and users of public space are at the core of its very idea.

Paragraphs 19. and 21. of the Charter of Public Space (Istituto Nazionale di Urbanistica 2013) advocate the holistic approach to urban public space and plan it as **a continuous, integrated system or a network**. It allows for better connectivity and robustness of this urban resource. To achieve that, it is useful to know the possible building blocks of this system - the types of public spaces, classified diversely by different authors.

Childs (2004) suggests a division of civic places (public spaces) into subsequent categories: **Civic Rooms** (squares, coves, forecourts, courtyards, civic lots), **Civic Lands** (civic grounds, yards, campuses, urban frameworks), **Urban Paths** (streets, walks and promenades, malls), and **Indoor Commons**. The Global Public Space Toolkit (UN Habitat, 2015) divides physical public spaces into **Streets** (including streets proper, avenues and boulevards, squa-

res and plazas, pavements, passages and galleries, and bike paths), **Public Open Spaces** (parks, gardens, playground, beaches, riverbanks and waterfronts) and **Public Urban Facilities** (mainly indoors of public buildings). The Strategic Urban Plan for Wrocław (Biuro Rozwoju Wrocławia 2018) classifies the outdoor public spaces by hierarchy and function rather than morphology, and differentiates **The Urban** (urban core, urban spaces, central boulevards, riverbank promenades), **The Local** (local centres, local spaces), and **The Connective** (transport tracts and neighbourhood connectors), as well as the **Green Public Spaces** (e.g. parks, riverbanks, meadows, sports fields).

To define the field of action for this project, it is useful to delimit and categorise the types of public spaces it will engage with. In line with what the project site can illustrate, the focus is on outdoor places, circumscribed by buildings, roads and bodies of water (see ill. 8). The following can be identified:

Squares

Forecourts

Coves

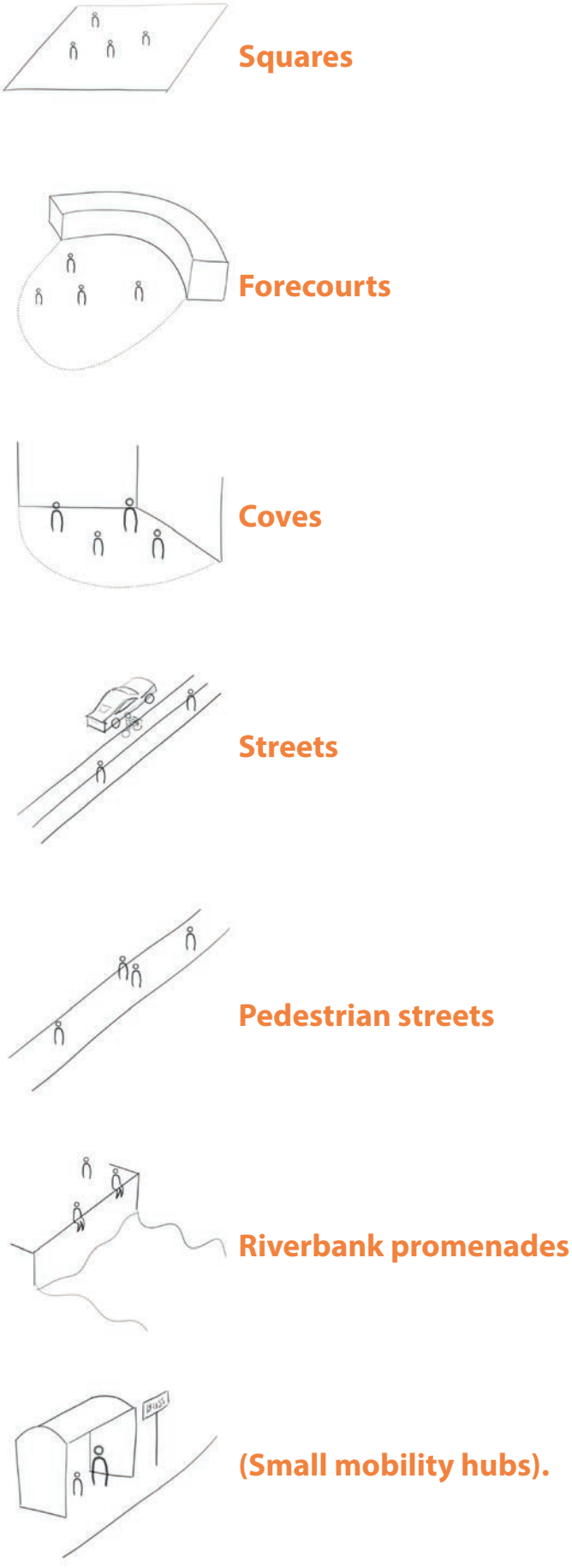
Streets

Pedestrian streets

Riverbank promenades

Small mobility hubs

Finally, to explore the way in which public spaces can strengthen urban resilience, an attempt will be made to design them with the seven features of urban resilience in mind (robustness, modularity, redundancy, connectivity, diversity, adaptability and transformability). In addition, attention will be put into designing the spaces so that they strengthen the communities, and provide a sense of identity and trust so that their potential for increasing social capital can be fulfilled. That will hopefully provide a public space system that can be a model for future resilient development.



Ill. 8 Typologies of public spaces in the site

03 Analysis

Wroclaw is a unique city with its rich river ecosystem, its history and the way it is exposed to climate crises. To gain an understanding of how to work with the city and build upon the plans for its development, an extensive analysis has been conducted that will explore Wrocław as a whole and plac Społeczny.

Municipality profile

This section aims to briefly characterise the municipality of Wrocław: its vision, goals and approaches in Wrocław's urban development, based on three strategic documents it has issued. This is to give an insight into the governance network of the urban system (Meerow et al. 2016), and lay the groundwork for the contextual placing of Plac Społeczny.

With its over 600 thousand inhabitants, Wrocław is the fourth largest city in Poland, with the country's second strongest economy, and the local authorities accordingly have **big-city ambitions**. It wants to position itself as a city of culture, education and advanced technology, it always strives to be competitive, both on the national and the international level. To that end, for instance, it has been the European Capital of Culture in 2016 and hosted the World Games 2017.

The aforementioned strategic documents reflect that ambition; the adjective 'big-city' appears frequently in them as a normative quality of the city itself, its urban spaces and functions. There is a lot of mention of **'prestige'**, **'aesthetics'**, **'unique identity'** and **'cultural heritage'.** The grand expectations of the city authorities can be illustrated by the mayor's quote on the future of Plac Społeczny, which he compares to the famous Paris office district:

"It is a place for Wrocław's own kind of La Défense, in line with the requirements of modern times, with an appropriate road layout, and a proper number of green areas. La Défense is glass-concrete, maybe ours should be rather green, with interesting ecological solutions?" (Sutryk 2018)

It is thus clear that the city is very focused on developing a competitive edge by drawing on its unique qualities. A comparison of the visions for Wrocław from the three strategic documents may give a good idea of the municipality's approach to development:

Wrocław Strategy 2030: sustainable development based on the high quality of life of current and future residents as well as creativity, innovation and entrepreneurship. (Korenik et al. 2018)

Spatial Planning Study: a compact, polycentric city with dense and multifunctional building fabric, convenient for walking, cycling and public transport, reducing car dependence. (Biuro Rozwoju Wrocławia 2018)

Ill. 9 View towards Regional Office from across Odra river. Own photograph

Climate Change Adaptation Plan: a city that is aware, responsible and ready for the challenges of the future resulting from climate change, which protects and develops its natural capital and ensures security and sustainable socio-economic development. (Wrocław City Council 2019)

While none of these are legal documents, they are all strategic texts, written by different departments within the municipality with help and consultations from experts and NGOs, and they constitute the basis for decision-making in the city.

One particular quality the city boasts is the proximity to water. The Spatial Planning Study mentions Wrocław's **unique river ecosystem** as an important asset, both in the context of life quality and the city's prestigious identity:

"The daily presence of rivers in the life of Wrocław and its inhabitants should be treated as an element of prestige and urban symbiosis, which is to enrich mutual benefits while maintaining the balance of all functions that the surroundings of the rivers are to perform, especially those resulting from the protection of the city against flooding" (Biuro Rozwoju Wrocławia 2018)

The above and other quotes from the three strategic documents can be valuable input to the design approach of this project. The documents are well-written, and present a sound roadmap for the city's sustainable development. However, since they are not legally binding, there is a risk of their good insights being disregarded in face of a more financial gain-driven, neoliberal approach, which Wrocław has unfortunately been known to frequently demonstrate. The notion of 'prestige' has been often misunderstood as a reason for the city to apply for hosting various prestigious events, or realising showy investments, rather than implementing down-to-earth solutions that in fact contribute to the city's quality of life and environmental resilience. This has been a point of criticism from various urban NGOs and is an important consideration when contextualising this project by attempting to answer the '5 W' questions (Meerow & Newell 2019).

Plac Społeczny in the context

Mobility and functions network

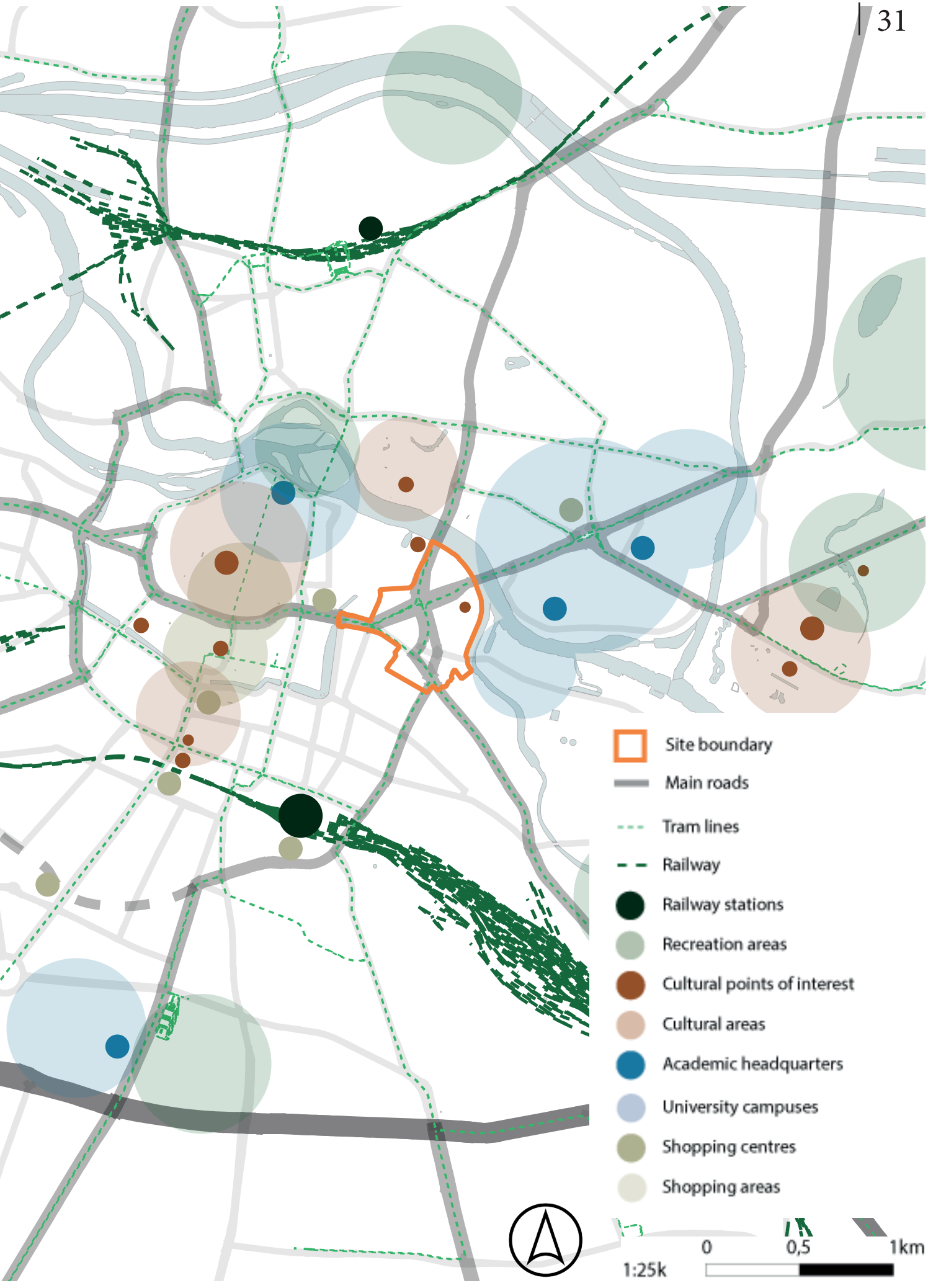
Plac Społeczny is an area of about 30 hectares, located right outside Wrocław's city centre. The first thing to notice about it is how well-connected it is. It is an **important transportation node**, servicing main city traffic to the west around the old town, east across the Odra river, north, southeast, and south, where the so-called Southern Midcity Avenue is planned to run. It also services public transport through busses and tram lines while being located within 1 km of the main train station (see ill 10).

To the east of Plac Społeczny, across the Odra and Oława rivers, campuses of several major universities are located: the University of Wrocław, Wrocław University of Science and Technology, Wrocław University of Environmental and Life Sciences, Wrocław Medical University, Wrocław University of Health and Sport Sciences. This is also where a big number of student accommodation is, both dormitories and private housing rent to students (see ill 10).

The site lies outside of major cultural areas, but the Wrocław National Museum is right to the northwest of it, and it contains a theatre in its eastern part, which has been in this location since the 19th century. Two large shopping centres are also nearby (see ill 10).

Considering the placement of plac Społeczny within the city's networks, it can be said that it has somewhat of a **bridging quality**, being close to and connecting many important features while not containing that many functions itself, apart from the obvious mobility function.

Ill. 10 Mobility and functions network


Site boundary
Main roads
Tram lines
Railway
Railway stations
Recreation areas
Cultural points of interest
Cultural areas
Academic headquarters
University campuses
Shopping centres
Shopping areas
0
0,5
1km
1:25k

Green and blue network

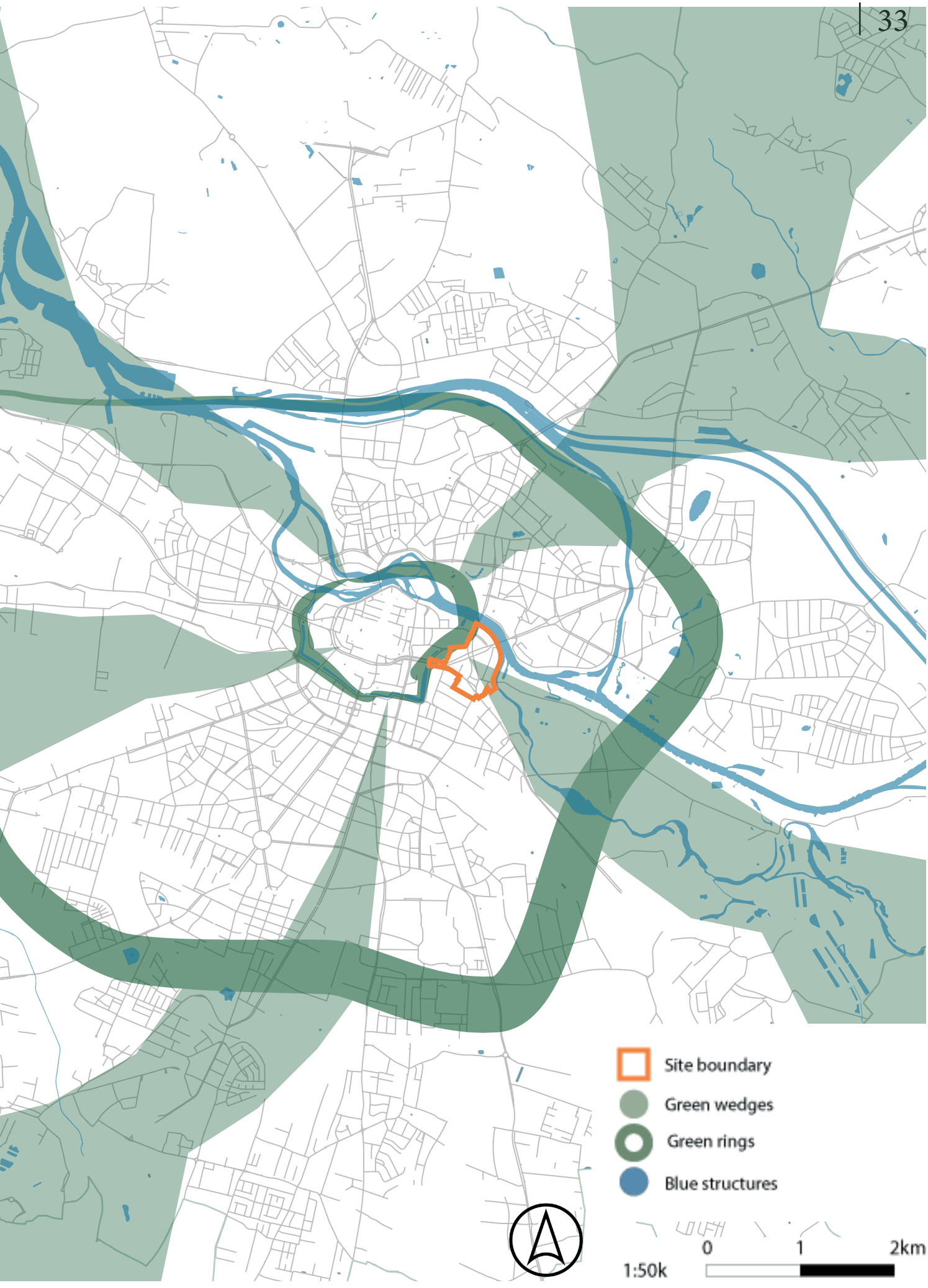
The green and blue structures are strongly connected in Wrocław, creating a **coherent network with diverse types of ecosystems**, that just needs reconnecting in some places.

The vegetation in the city creates what is called a **wedge-ring system**, the inner ring constituting the green areas of former old town fortifications, located right to the west of plac Społeczny. The site is situated at the tip of a large green wedge going southeast, connected to Oława backwater & forests stretching outside the city (see ill 11).

The city of Wrocław has been founded on marshland and has a **rich river ecosystem**, with five main rivers flowing through it. Plac Społeczny is adjacent to two of them, next to Oława's influx to Odra. Odra has multiple canals within the city and a so-called Wrocław Midcity Water Node, with a number of hydro-technical structures and a small archipelago, is within walking distance of the site.

Plac Społeczny is placed at an **important linking node in the green and blue system** of the city, making it once again a possible bridging feature in this ecological network. This would require introducing more intensive greenery and some water features to the site.

Ill. 11 Green and blue network

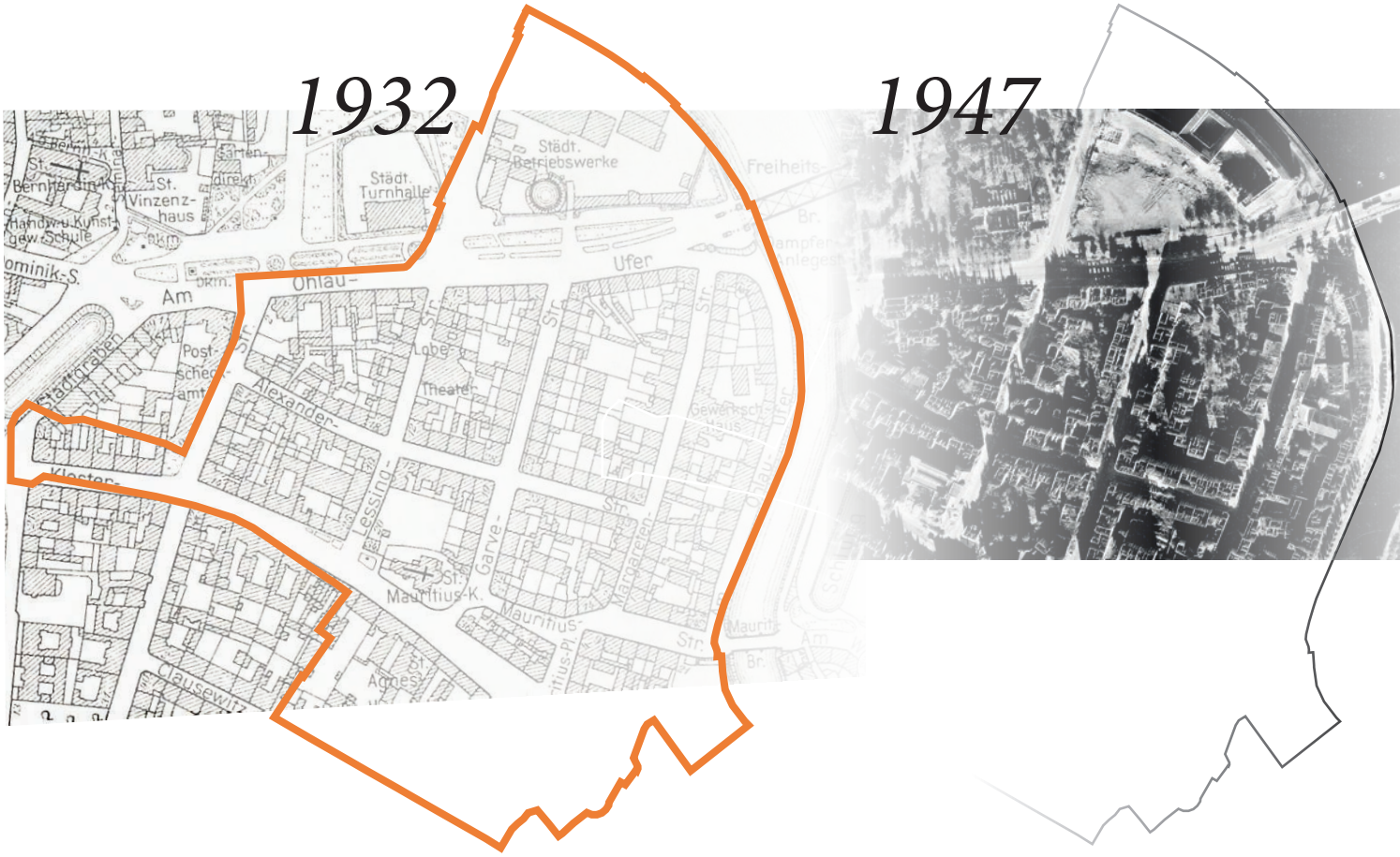

Site boundary
Green wedges
Green rings
Blue structures
0
1
2km
1:50k

Plac Społeczny historically

Before the Second World War, this part of the city, known as Ohlauer Stadtgraben (the area outside of the city moat by the Oława river) was a dense urban district with 19th-century tenement houses. During the war bombardments, most of the buildings were destroyed and had to be torn down, which left the vast area empty for several decades, with grass plains where the buildings once stood, and roads between them. In the mid-1980s, in line with modernist, car-centered planning, the area was transformed into a traffic node, with two 220-meter-long overpasses and a circular underpass for pedestrians and cyclists, and this situation has remained largely unchanged to this day.

1947

Rubble of the Regional Office building after WWII

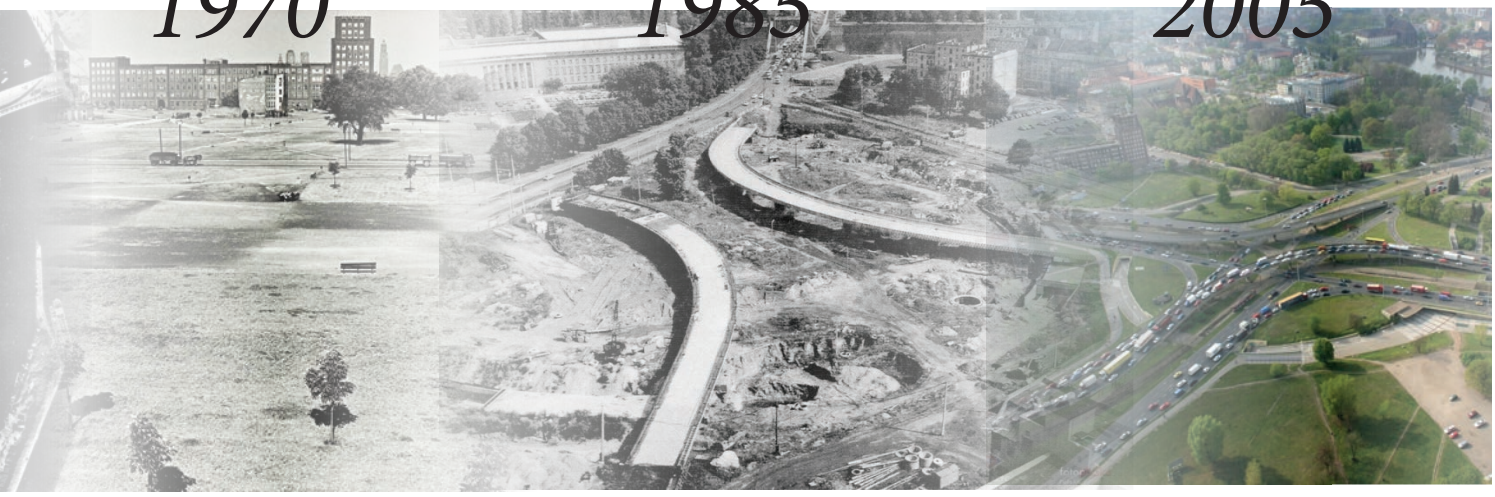


Ill. 12 Timeline of plac Społeczny

1997

Impact of the "flood of the millenium" on Plac Społeczny's infrastructure

1970 1985 2005



1968 / 2005

The empty grass plains have been used for more or less formal activities, such as amusement parks

Plac Społeczny now

Currently, plac Społeczny is quite an **empty area, dominated by a large intersection**. Up to 2019, there have been two overpasses for motorised traffic cutting through the site, the eastern one is remaining to this day.

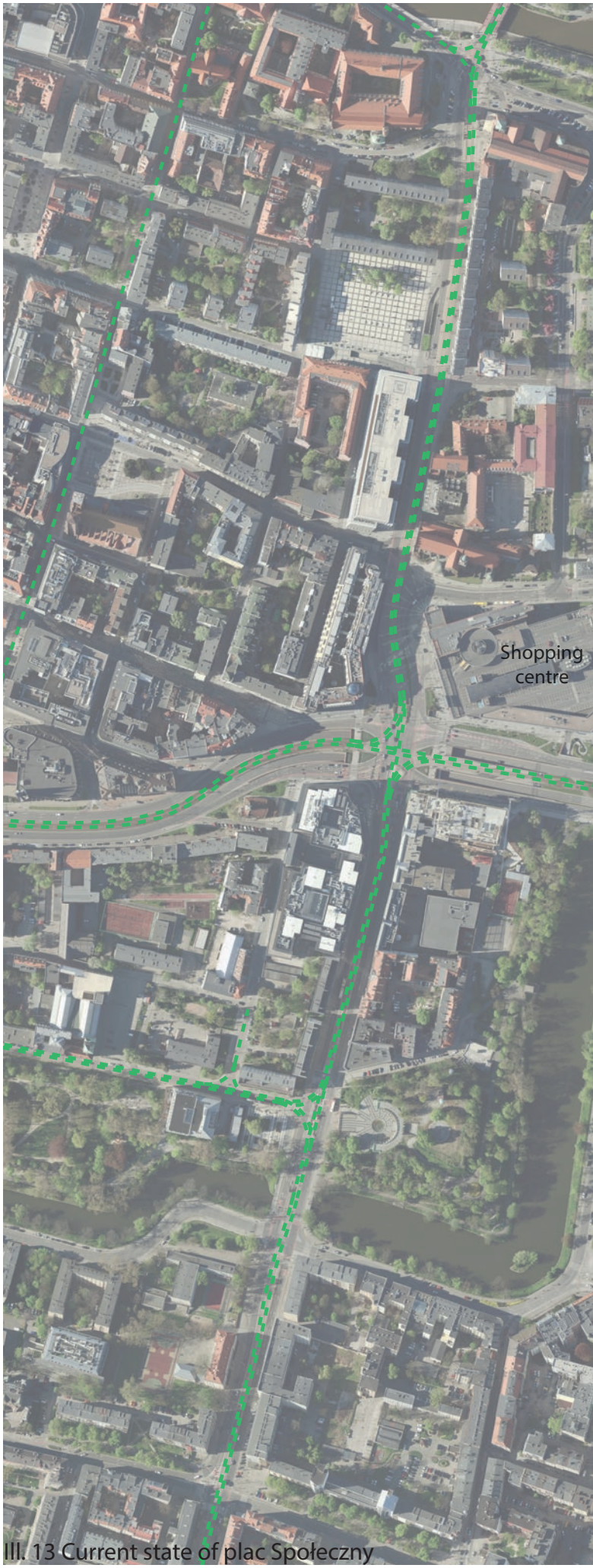
There are eight tram lines going through the site, and fifteen bus lines, including five-night lines. The site hosts five major tram or bus stops, including an important switching hub in the southern part, where several tram lines intersect. (see ill. 13)

Pedestrians and cyclists are pushed underground, having to cross the large intersection through a circular underpass. The underpass, although somewhat grim and unwelcoming, has become a **place for informal culture**, hosting different cultural events and a large collection of street art.

Between the large mobility veins which cut through the site, there are mostly **oversized grass plains**, also used for bottom-up, informal activities, as well as larger events like concerts. Up to 2018, there used to be an amusement park on one of the plains.

There are some points of interest on the site, most notably a monumental Regional Office building from the 1940s with a garden axis, a historic church dating back to the 13th century, a small gothic church from about the same period, and a theatre (former établissement) from the 19th century. Some housing is located along the eastern boundary of the site, and several office buildings are placed to the south.

As it is, plac Społeczny seems to be a r**ather underused area next to the very heart of the city**, but it is still an extremely important connector, and it has some crucial identity points within it.



Ill. 13 Current state of plac Społeczny


Riverside promenade
National museum
Regional office
Racławice Panorama
Landmark post office tower
Existing housing
Theatre
Marshall's office
Historic church
New office complex
Gothic church
Site boundary
Bike paths
Tram lines
Places of interest
Tram stops
0
100
200m
1:5000

Plac Społeczny's future

This section is to present and critically assess the local plan of the chosen site, which serves as a **framework for the project** (see Methodology, p. 14). The local plan for the spatial development of plac Społeczny (Biuro Rozwoju Wrocławia 2010), and due to the site's strategic placement in the city, it has presupposed **a dense mixed-use urban district with office functions, services and apartment housing**.

Partial reconstruction of pre-war urban fabric has been planned, with sixteen new building parcels, five of which have service functions, while the rest are mixed-use. They give shape to four squares, riverside promenades and public streets of various classes. To alleviate heavy traffic from the city centre and direct it to the south, a tunnel has been planned from the Regional Office building down to the south of the site (the municipality has resigned from it since). Still, it is meant to be a busy main road, able to service a lot of traffic towards the south. A collective road is planned on the south edge of the site, leading to the centre and to the eastern part of the city. The roads between the planned clusters of buildings are to be local roads, while those between buildings in a cluster - are access or private roads. The tram tracks are to be placed more or less in the same setup, with the same tramlines entering and exiting the site, but their routes are pushed somewhat towards site boundaries, so they do not cross in the centre.

Eight existing buildings or building clusters are protected under historic preservation: while they are to be preserved on-site, some are meant to be built around. Three composition axes are planned within the site (see ill. 14), as well as a so-called academic axis, a tree-lined avenue from a university campus across Oława to a monumental post office tower, meant to be an important pedestrian connection to the old town (Matejuk 2018). Crossing it is a 'landscape-shaped' avenue lined with several tree lanes, ending with a square. Public riverside promenades are also to be lined with trees. Building heights are to be maintained within 18-25 m, although higher in certain places (accents), Apart from that, two dominants are planned, and one place with a lowered building mass to enable a view of a historic building.

Apart from the local plan, the Spatial Planning Study of 2018 has been an important source of insight for the project, particularly its chapter on public space policy. Within plac Społeczny, it assumes the local plan's division into parcels, assigning each space a function within the hierarchy of public spaces in the urban network:

Central public core: representative, main squares and streets of the old town and the surrounding central area;

Central public spaces: vibrant, well connected but more intimate spaces with diverse functions and historic character retained;

Three central boulevards: 3 main routes to the centre from different directions of the city with mobility, composition and service functions. The site is at the end of the Grunwald Axis;

Riverside promenades: meant to support and frame central urban spaces, provide closeness to water, beautiful views and green, walkable space.

All that connects strongly to the overall public space network in the city, particularly to the old town. (see ill. 14)

The local plan is receiving some criticism (Szymanowicz 2020). It is said to contain too monofunctional, grandiose buildings out of human scale, oversized roads, and not enough provisions for climate and microclimate. On the other hand, it is praised for its good composition with carefully placed axes and dominants, and the generous use of tree lanes. The focus of the project is the public space and the approach is about testing how much can be done by manipulating what is "between buildings", without directly modifying the architecture itself (see Methodology, p. 14). The local plan is then a good point of departure, and the experimental approach to public space design can be a relevant voice in the discussion, tackling some of the problems identified in the current plan and advancing it to a more up-to-date, adequate version.

Planned functions and mobility

- Local plan boundary
- Functional plot boundaries
- Main road
- Main road in tunnel
- Collective road
- Local road
- Tram line
- Existing buildings to retain
- Services
- Mixed-use (service and housing)

Planned composition

- Local plan boundary
- Protected buildings
- New buildings
- Lowered building
- Heightened building
- Dominant
- Composition axis
- Tree lane

Public space hierarchy (2018 Study)

- Central public core
- Central public spaces
- Local public spaces
- The 3 central boulevards
- Riverside promenades

Ill. 14 Local plan and spatial development plan main insights

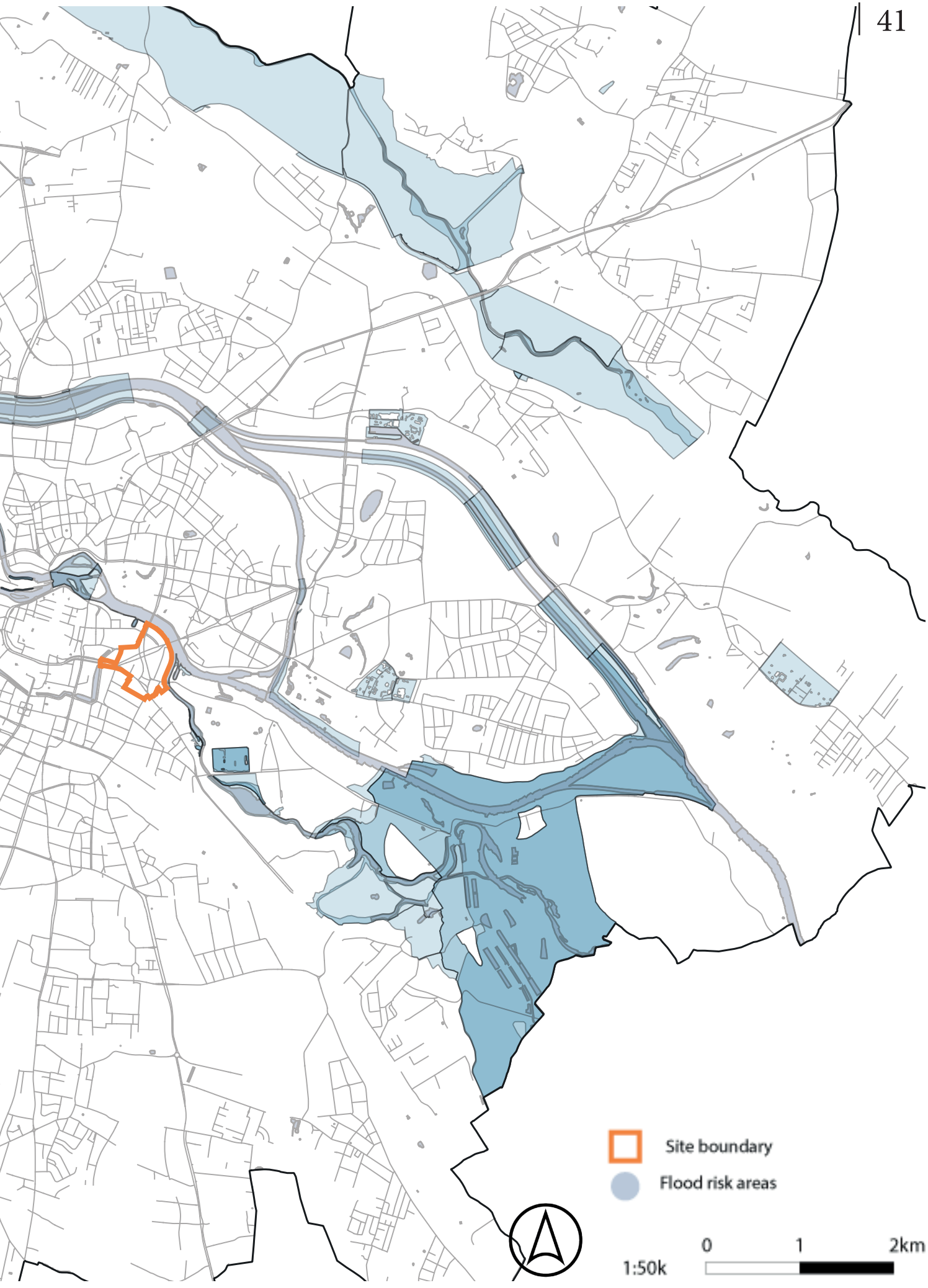
Climate-related crises

The following pages investigate the different climate-related challenges that the city of Wrocław and the site of plac Społeczny are facing. This begins to answer the "what" and "when" questions: what the urban system should be resilient to, as well as when the potential crisis will set in and how long it will last.

River flooding

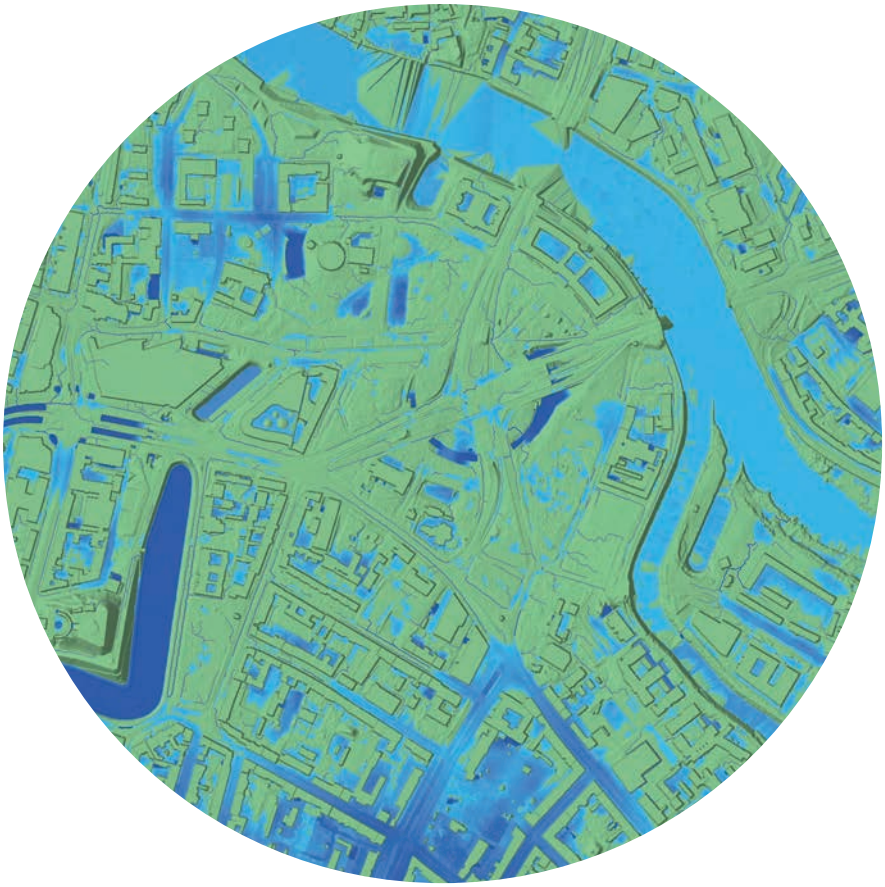
When perceiving climate-related crises, Wrocław's history of river flooding brings to focus how plac Społeczny is exposed to such events. Illustration 15 shows the river flooding for a 100-year event and it can be seen that with its placement and topography the site is not in danger of flooding from the river. On the other hand, its location may cause rainwater pooling and runoff to other parts of the city.

Ill. 15 Flood risk map of Wrocław

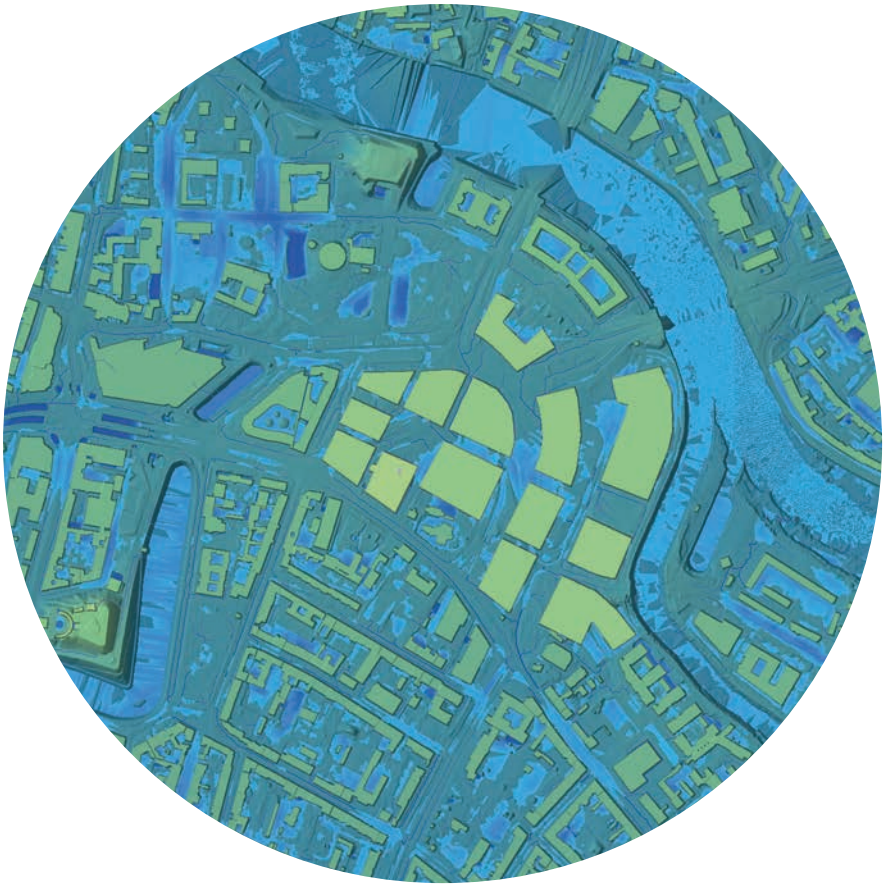

Site boundary
Flood risk areas
1:50k
0
1
2km

Heavy rain

Despite river flooding not being a danger for plac Społeczny, there is still a problem of rain floods in the site, as well as the possible runoff from the site to elsewhere in the city. Illustration 16 shows an analysis of the current runoff pattern for plac Społeczny and its surroundings for a 50-year rainwater event of 47.8 mm, based on data from the Wrocław climate adaptations plan (Wrocław City Council 2019). Because the bike and pedestrian underpass, the current place for rainwater pooling, will be removed, water during larger rain events will accumulate around the historic church in the southern part of the site, as well as the much larger watershed to the south (see ill. 17). This highlights the need for water alleviation solutions and for a high index of permeable surfaces.



Ill. 16 Rain management evalution of site before development

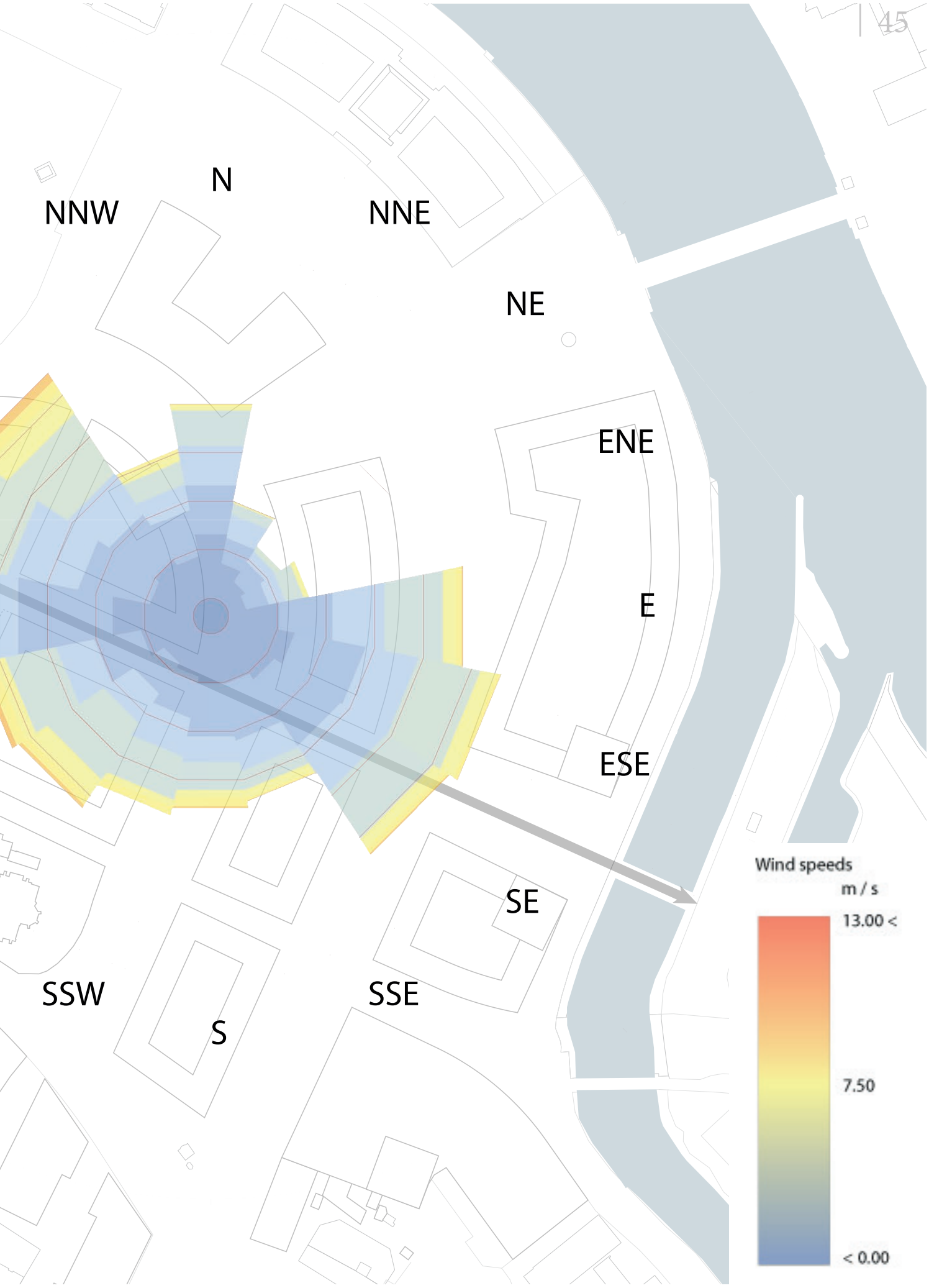


Ill. 17 Rain management evalution of site after development

Strong winds

In the local development plan of plac Społeczny the new "academic axis" is an important pedestrian link to the city centre. The direction of the axis is somewhat problematic in that it aligns with two of the strongest wind directions, ESE and WNW (see ill. 18). Wrocław municipality identifies strong and very strong winds as a major risk for the city (Wrocław City Council 2019). According to Girin (2021) this means the axis would not only be highly uncomfortable to use when wind speed exceeds 10 m/s (2% of the time, Wrocław City Council 2019) but also dangerous as an unblocked path for winds stronger than 15 m/s (0,1 % of the time, ibid.).

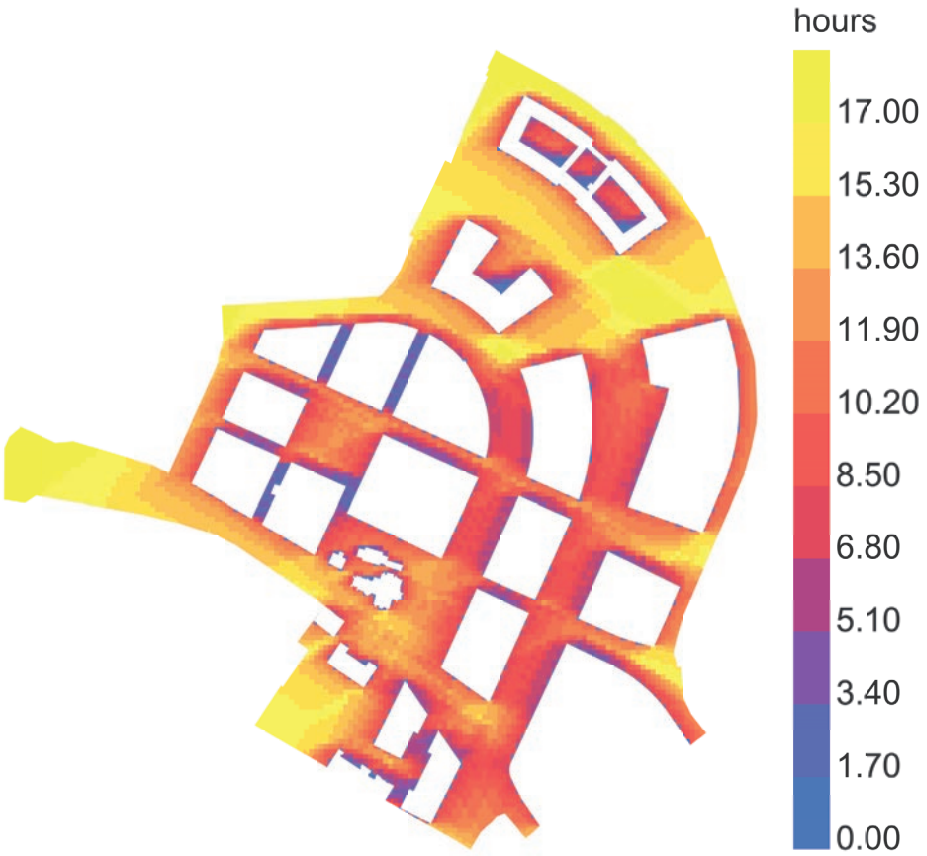
Ill. 18 Wind rose of Wrocław over plac Społeczny


N
NNW
NNE
NE
ENE
E
ESE
SE
SSW
S
SSE
Wind speeds
m / s
13.00 <
7.50
< 0.00

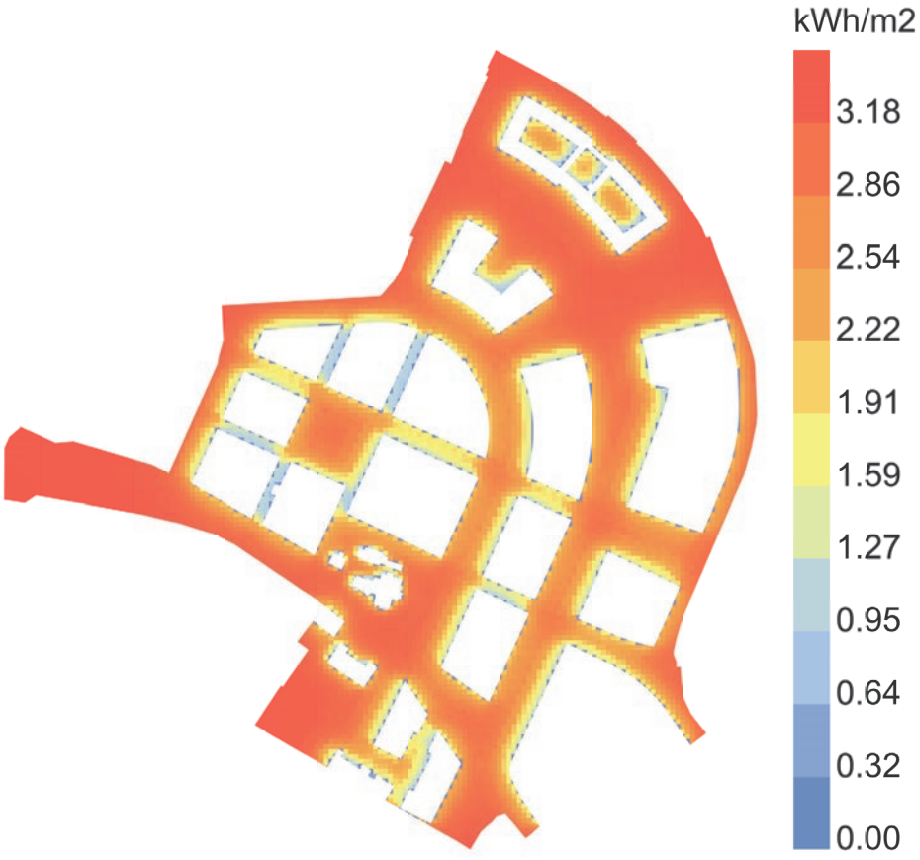
Heatwaves

Wroclaw has been facing extreme heat conditions both as a result of the increase of temperature globally, and the periodical heatwaves that have put a larger pressure on the city. The highest temperature recorded was in 2015 and amounted to 37.9 degrees Celsius (Wrocław City Council 2019), and the time period from 1951 to 2015 has experienced heatwave events as long as 21 days. This presents a need to make the public spaces in plac Społeczny capable of handling excessive heat and still usable in case of a heatwave.

Ill. 19 and 20 show parts of the site that are exposed to the most sun hours and solar radiation in the summer solstice. This highlights the areas of the entrance from the Grunwald Bridge and the area in front of the Lower Silesian Regional Office building as two very exposed public spaces that need design interventions to alleviate the excessive heat in them. Although not quite as extreme, another area in the site impacted by considerable sun radiation and sunlight hours is the planned central square. The narrow streets surrounding the square receive the least sun and radiation, and the square stands out as one of the less exposed parts of the site which nonetheless has the best opportunity to deal with heat and sun.



Ill. 19 Direct sun hour exposure map of plac Społeczny

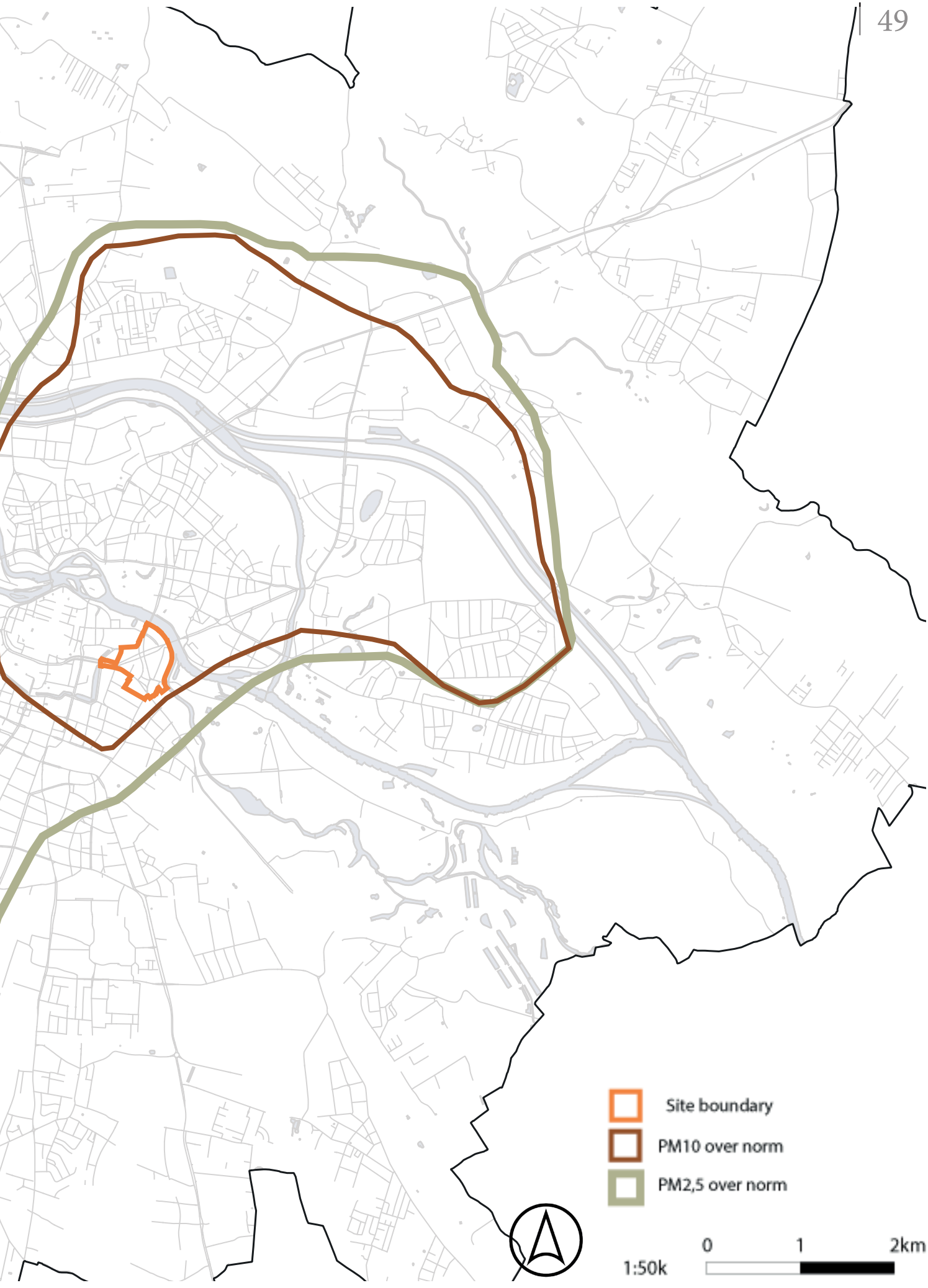


Ill. 20 Sun radiation map of plac Społeczny

Air pollution

Wrocław, along with several other major cities in Poland, has been ongoingly present on the ranking of 100 most cities in the world with highest air pollution (IQAir 2022), at times reaching top positions in the ranking. This pollution takes shape in smog and a high amount of suspended particles in the air. The problem has been so serious that the government has developed an SMS alert system to inform inhabitants about the amount when the air pollution reaches a level hazardous to life and health (see appendix 01). Illustration 21 shows that the site of plac Społeczny lies in the zone of exceeded norms for both PM 2,5 and PM 10 particles (Biuro Rozwoju Wrocławia 2018). PM stands for particulate matter and is differentiated based on particle size (smaller than 2,5 µm to smaller than 10 µm). These particles can, when entering the body, cause heart and lung disease, and the degree of pollution in Wrocław presents an urgent need for design to alleviate it through containment or ventilation, for the health of its inhabitants and users.

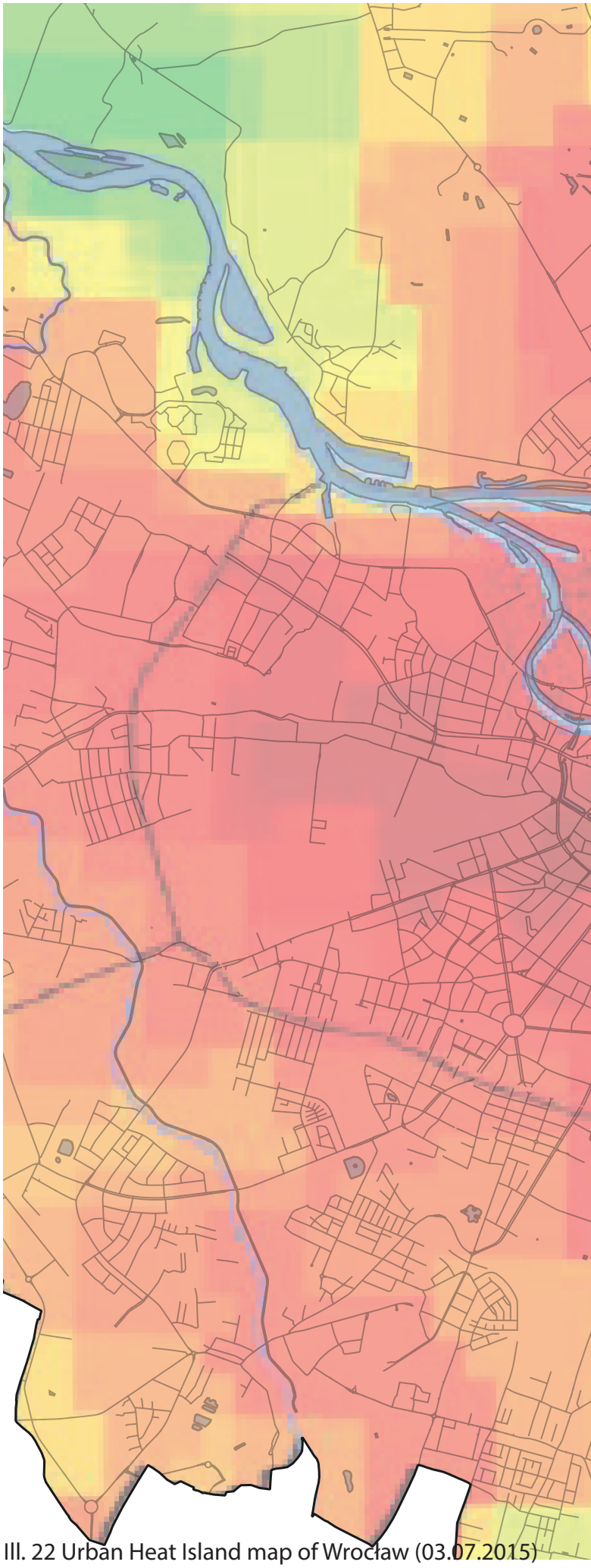
Ill. 21 Air pollution map of Wrocław


Site boundary
PM10 over norm
PM2,5 over norm
0
1
2km
1:50k

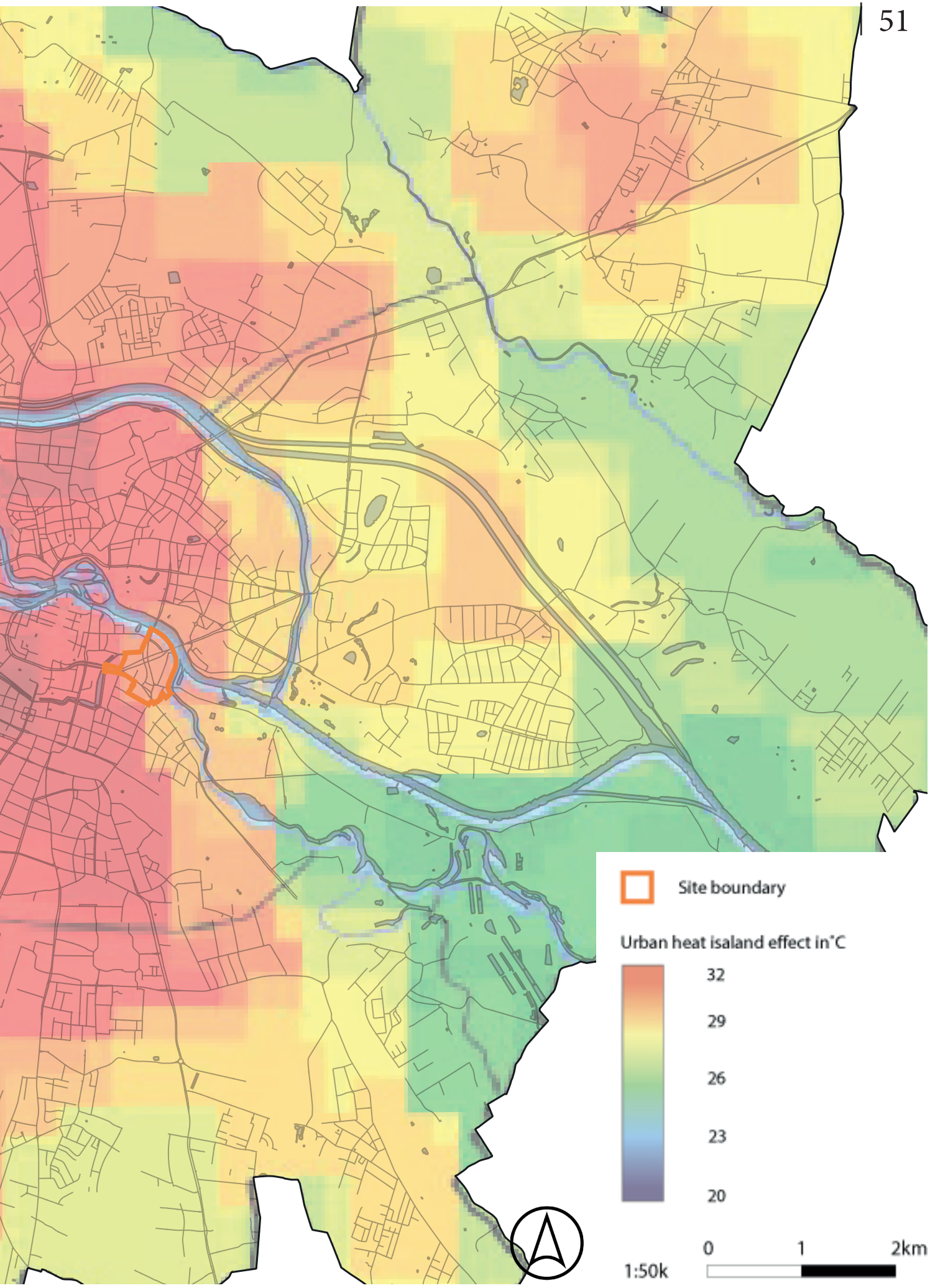
Urban heat island

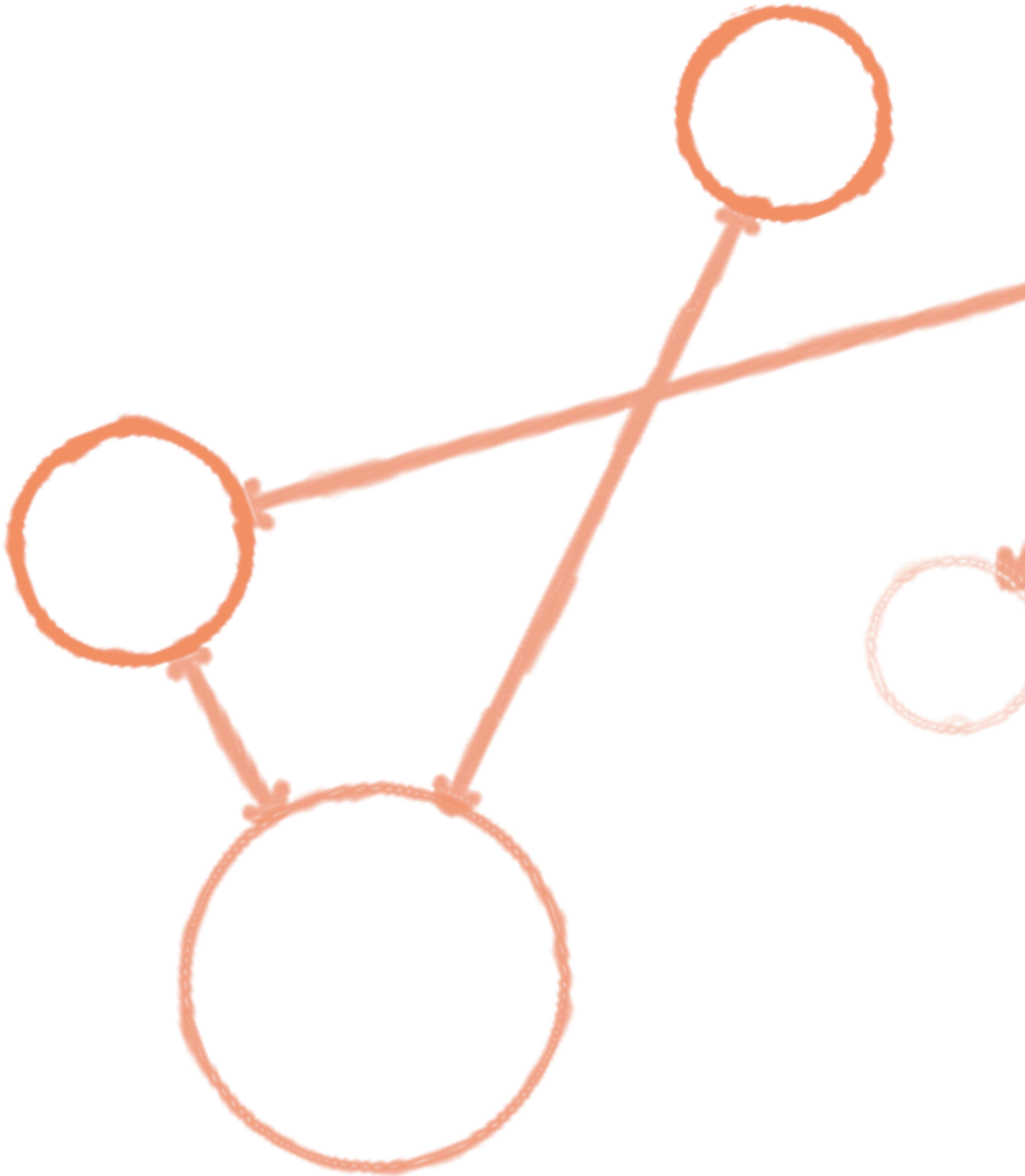
Since the project takes place in a dense urban area, a slow-onset climate-related crisis that Wrocław city itself acknowledges is urban heat island. This phenomenon regards how the urbanised area, its materials, and functions create a temperature difference between the city and the surrounding hinterland. According to the Wrocław Climate Adaptation Plan (Wrocław City Council 2019), the average annual intensity of UHI in the warmest, central area of the city is 1.0 °C (0.5 °C during the day and 1.6 °C at night) (see ill. 22). The maximum intensity of UHI in Wrocław may be 8-9 °C, and in favourable weather conditions, it may even reach 11-12 °C (ibid.).

The temperature increase of urban heat island can lead to a range of different heat-related diseases and injuries as well as put a strain on the city's power system because of the need for cooling. This highlights the need for a general change in how the city is shaped to alleviate this phenomenon.



Ill. 22 Urban Heat Island map of Wrocław (03.07.2015)


Site boundary
Urban heat isaland effect in˚C
32
29
26
23
20
0
1
2km
1:50k



04 Towards The Design

This transitional chapter serves to collect main insights from the research part of the project, develop a set of criteria for design and communicate main problem statements that the project aims to respond to. In this way, it sets the stage for design development.

Theoretical and analytical conclusion

As a conclusion to the conducted analysis, the "five W's" (Meerow and Newman 2019) can be defined for this project. **Urban resilience for whom?** can be answered simply: **the municipality and the city of Wrocław**. With the project's framework being the local plan of spatial development, the project's approach and the resulting design naturally work for and are aligned with the municipality. The findings also made it clear that the area should be designed with a **revitalisation of the community** in mind. With an existing informal identity and the municipality's wish to create a thriving development with a focus on community, designing for it is imperative, but also brings forth the importance of community as an urban resilience resource that helps to shape a more resilient system of public spaces.

The technical analysis in this chapter started to answer the question **Urban resilience to what?** Three types of crises started to come forth. When it comes to water, while river flooding proved to not be a risk for the area, heavy rain still is, with rainwater pooling in several places on site, including the historic church, and causing runoff to other parts of the city. Strong winds turned out to be another major crisis, considering the orientation of important pedestrian tracks towards main wind directions. A sunlight exposure and radiation analysis highlighted spots on site most exposed to heatwave effects. All in all, the analysis brings out three main crises (**heavy rainfall, strong winds, heatwaves**) and two minor ones (urban heat island and air pollution) (see ill. 23). While the two minor crises are handled in a generalised way over the site, each of the main ones has one or more specific 'hotspot areas' assigned, where the particular crisis is especially pressing or easy to address.

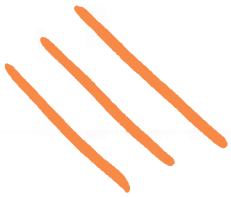
This leads to the question of **Urban resilience where?** While the project has a site specified as the area of the local plan for plac Społeczny, the possible interventions will impact **not only the site itself but also the urban networks it is connected to**. It is thus necessary to be mindful of this interconnectedness and put forward a design that works in a specific public space where it is situated, but also responds to other spaces within the site and to the wider urban system of Wrocław.

Similarly, one may ask, **Urban resilience when?** The local plan envisions a new vibrant urban quarter, strongly networked by mobility, green and blue elements and its various identities. The realisation of the plan will take some years and it is only upon completion that the designed public spaces and their resilient capacity can fully be tested against various crises. When it comes to **crisis duration**, the respective dealing strategies depend on the specific crises. Heavy rainfall is rather a quick-onset crisis able to transform the system considerably, and the goal is not to maintain the same use as before, but to make recovery easy and use the event as a potential resource. With heatwaves and heavy winds, similarly quick-onset crises, the goal would rather be to maintain functionality of the space in question and use them to possibly alleviate one another. Urban Heat Island and air pollution are slower to come by and exacerbate, and their handling should thus be ongoing and generalised.

The final question is **Why urban resilience?** In this context, it is important to stress the duality of this project's aim. While its focus is on climate change and the connected crises, the project has a strong intention to **maintain or recover crucial functions of the site as an important part of the urban system**. As such, it aspires to lead to a **better quality of life** for both inhabitants and users, while making the area safe and more capable to handle crises, by centering on human experience and using community potential. Further, the analyses brought to light the idea of prestige and cultural heritage ingrained in the buildings on the site. By working in the public space, the goal of climate adaptation can be achieved by **protecting the valued built heritage from climate stresses while also activating the community**.

With the "five W's" established, the question follows, **how can the site be shaped into a system of resilient public spaces that foster high quality of life**? To help find the answer, a set of design criteria has been created based on the analysis outcome.

Main Crises | specialised resileince



Heat Wave

Heavy Rain

Strong Wind

Secondary Crises | general resilience

Urban heat island

Smog

Ill. 23 Main and secondary crises

Design criteria

Blue in and around site

Alleviate water on site

Exploit closeness to water

Filter water before river

Specialise spaces for crises they are especially exposed to / equipped for

Maintain and reinforce site identities

Protect quality of church

Maintain site's bridging quality

Improve mobility experience

Redirect heavy traffic out of centre

Service high and low trafic pressure

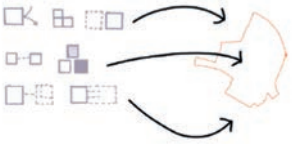
Enhance soft mobility experience

Seven resilience qualities

Embody the seven resilience qualities in the holistic design

Respond to some of the 7 qualities in each space

Introduce modular enriching functions



Enhance community

Introduce resilience through building on existing community

Shape spaces that create resilient communities

The urban system

Connect a larger green-blue network

Create a system of various interconnected public spaces

Maintain or reinforce axis connections

Problem statements

What can the design of public spaces in plac Społeczny contribute to the crisis preparedness and resilience of the site itself and the urban system as a whole?

How to identify potential in a climate-related crisis and use it as a momentum to advance sustainable urban development and quality of life?

How to optimise climate resilience of each designated public space while ensuring their interconnectedness and integration?

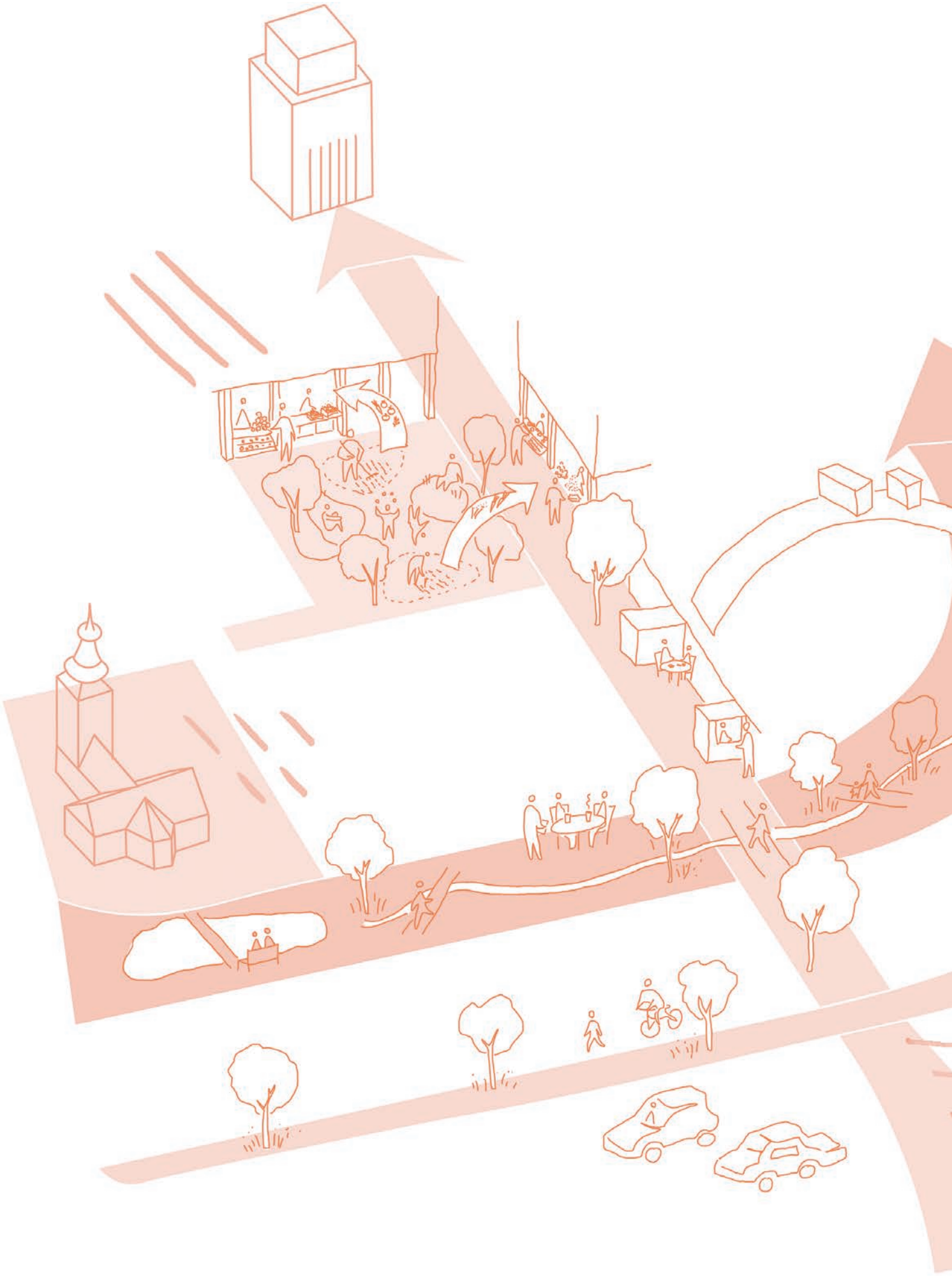
How can the local community be engaged as a vital component to an urban system's resilience?

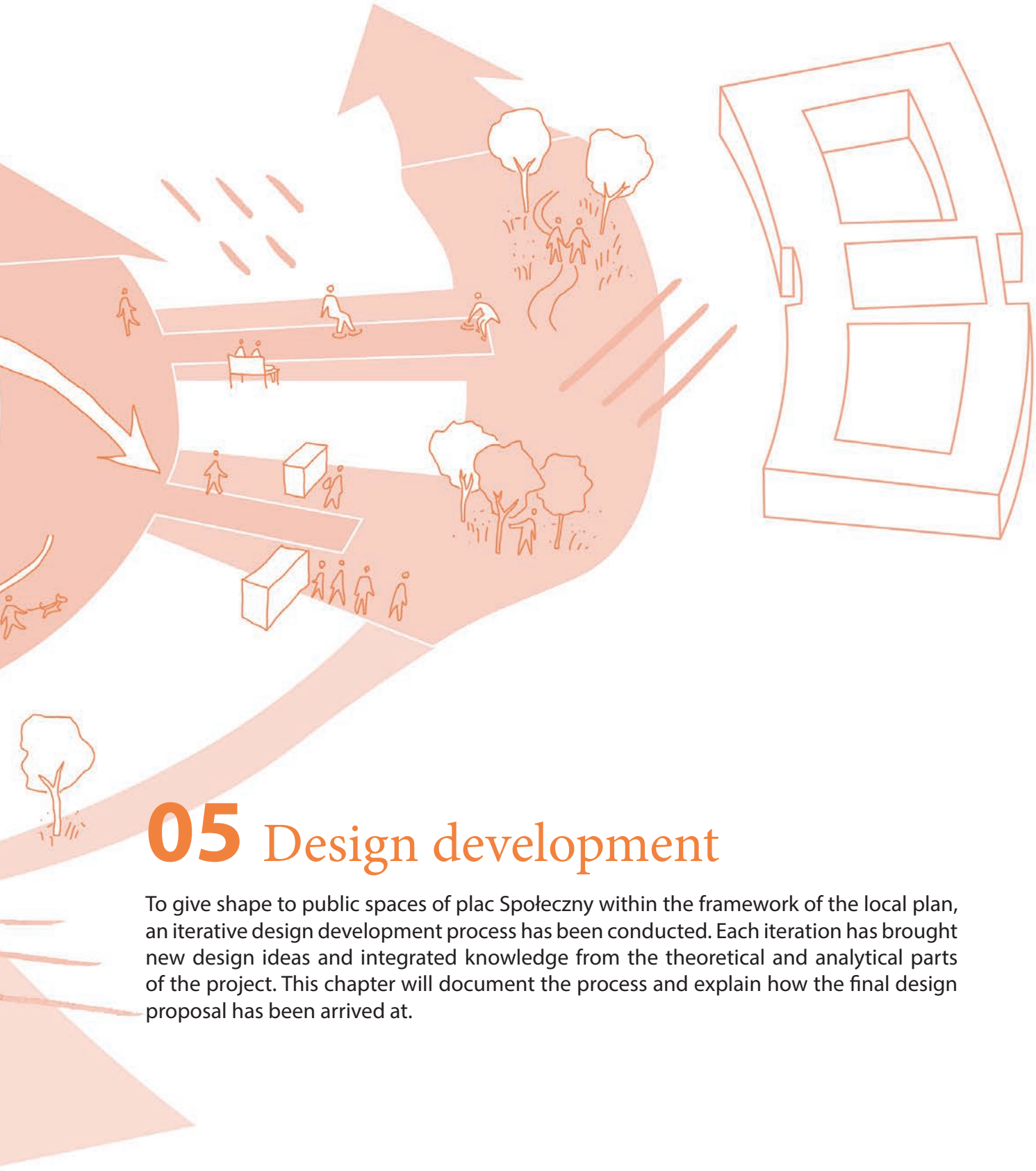
How can design and utilisation of resources of the public space help create and shape a more resilient and connected urban system?

How can the site be shaped into a system of resilient public spaces that foster high quality of life?

How does one design for a resilient urban system?

Ill. 24 Bird's eye view of plac Społeczny from across Oława. Own photograph





05 Design development

To give shape to public spaces of plac Społeczny within the framework of the local plan, an iterative design development process has been conducted. Each iteration has brought new design ideas and integrated knowledge from the theoretical and analytical parts of the project. This chapter will document the process and explain how the final design proposal has been arrived at.

First iteration
Initial concepts

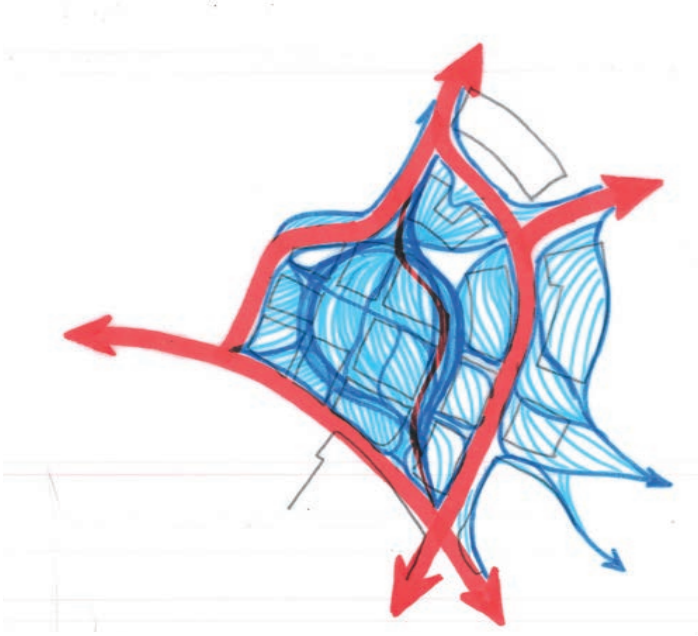
In the initial phase of the project, the understanding of urban resilience led us to four concepts in which we attempted to give shape to resilience within plac Społeczny.

Based on the ecological idea of resilience and an organic view of the site, the concept of **the heart** was created (ill. 25). Acknowledging the importance of the site as a mobility node and viewing the mobility as the lifeblood of the city that gave shape to the main arteries, while the building sites and soft mobility lines were conceptualised as the intertwining tissue of this urban organ, underlining its robustness. This led us to a broader design discussion about the road size and hierarchy.

Inspired by the notion of limitless green (Biuro Rozwoju Wrocławia 2018), the idea of **one public realm** (ill. 26) was born: the site as one big open space with no edges or lines, inhabited by functions that can move around freely according to need, leaning into the adaptability aspect of resilience.

Another concept, **specialised spaces** (ill. 27), was based on the idea of utilising the individual spaces' inherent exposure to specific climatic crises to give them shape and equip them specifically for handling these crises.

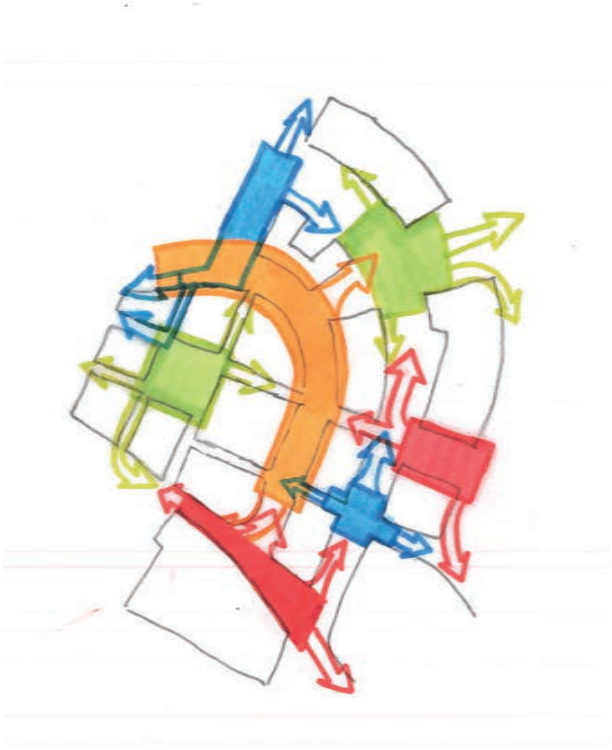
Similarly, **everything flows** (ill. 28)worked with individual spaces having their own identities and functions, which nonetheless permeate and flow freely through the site, binding it together and making it work as one. It also presupposed all the functions being temporary, leaning into the qualities of adaptability and transformability.



Ill. 25 The heart concept

Ill. 26 The one public realm concept

Ill. 27 The specialised spaces concept



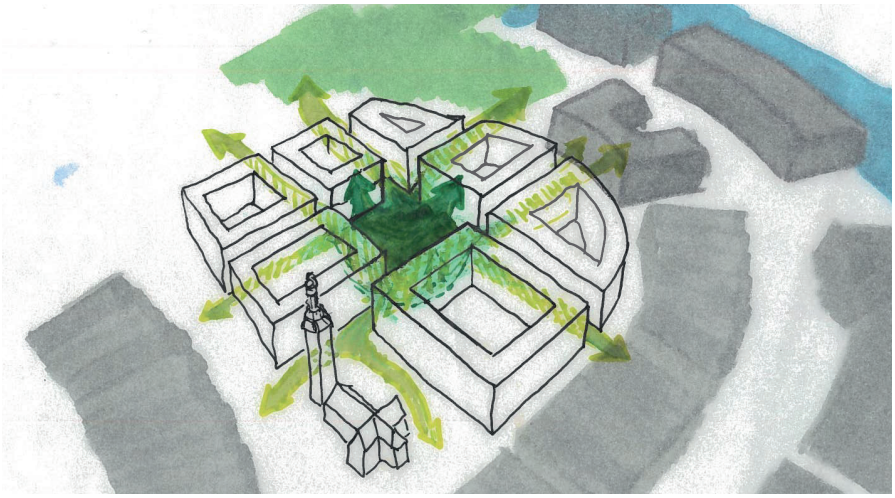
Ill. 28 The everything flows concept

First design ideas

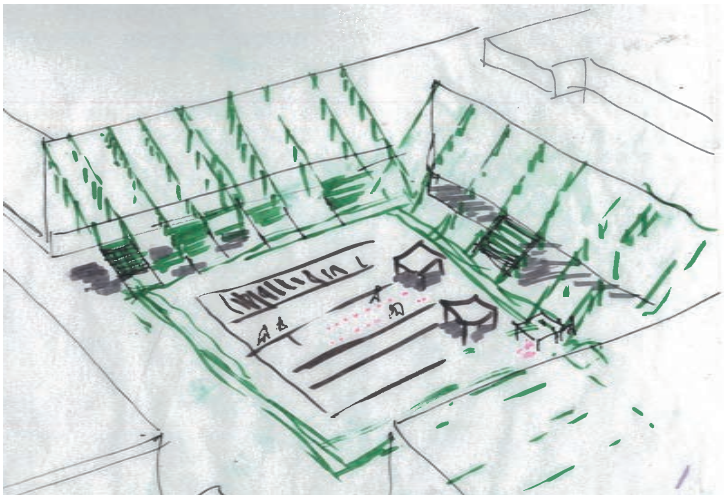
The initial concepts gave shape to ideas like **the green burst** (ill. 29), where the application of greenery in the designated spaces was so intense that it would move like waves throughout the site and up the building walls. This idea of prevalent green in the spaces has been developed in further design iterations, with a notion added that the green has to connect between spaces, rather than be contained within one of them.

The green burst materialised with a more specific design idea of **green wires** (ill. 30) with vegetation, connecting the building walls to a pergola in the middle of the main square of the site, providing shade and green coherency to the square, and dividing it into more manageable, intimate spaces. While it had its merit, this idea was discarded because of its too big interference with the buildings and its lack of modularity and robustness.

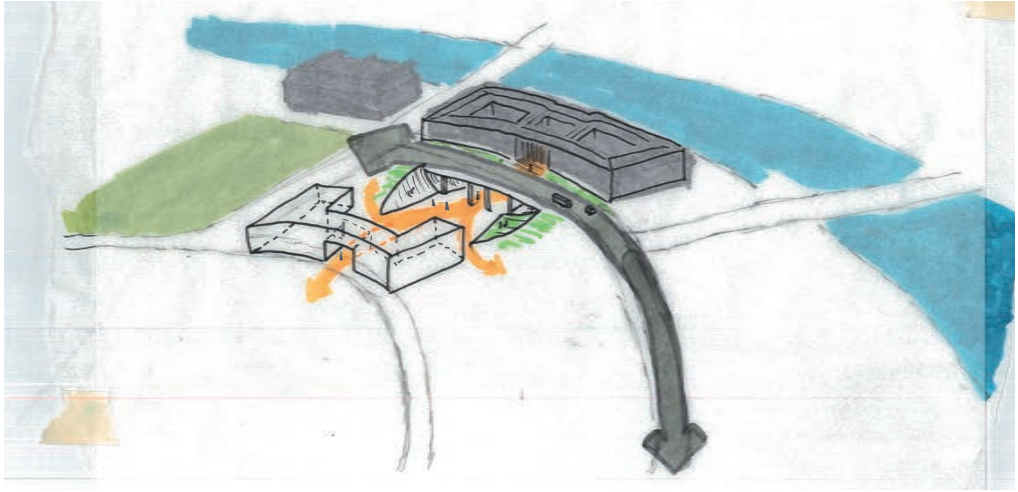
The acknowledgment of the site as a mobility node and the one public realm concept gave shape to the idea of connecting the regional office building to the rest of the site by a **new underpass** (ill. 31), retaining the informal identity of the current one. The idea was discarded as it would create more problems than solutions in terms of rainwater management and the space occupied.



Ill. 29 the green burst idea

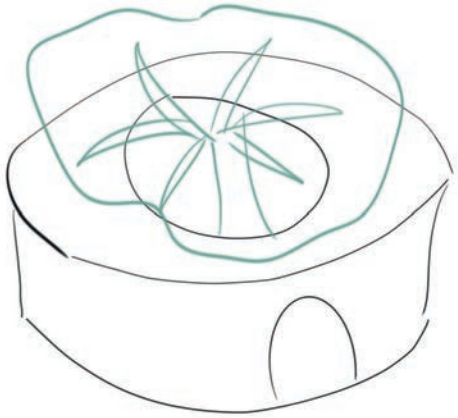


Ill. 30 the green wires idea

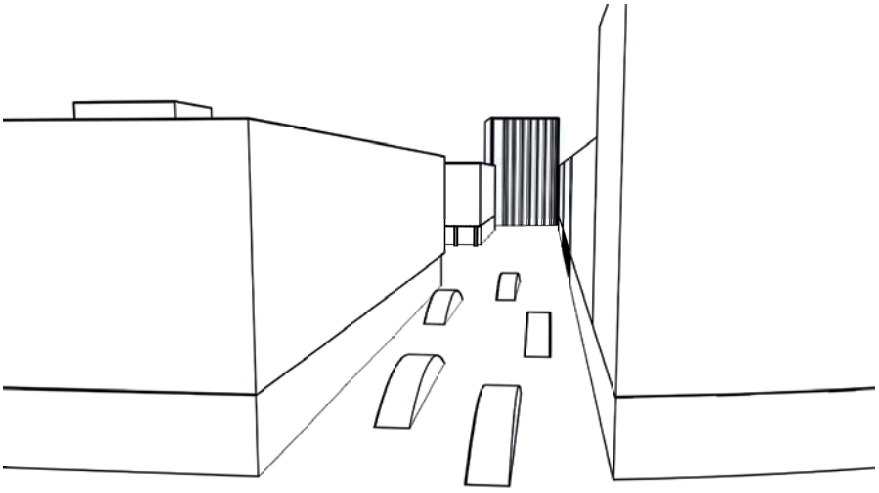


Ill. 31 The new underpass idea

The prevalence of wind in the site, especially from the east southeast direction, brought up the idea of protecting the trees in the so-called student axis from being torn down during extreme wind events, by placing small **pavilions around** them (ill. 32). Another idea was to place **wave-like pavilions** (ill. 33) along the axis, to shift the wind above the pedestrian level and enable smooth ventilation of the street. While eventually abandoned for practical reasons, these ideas did open up a discussion of wind redirection and creating intimate, comfortable spaces.



Ill. 32 The tree protection pavilion



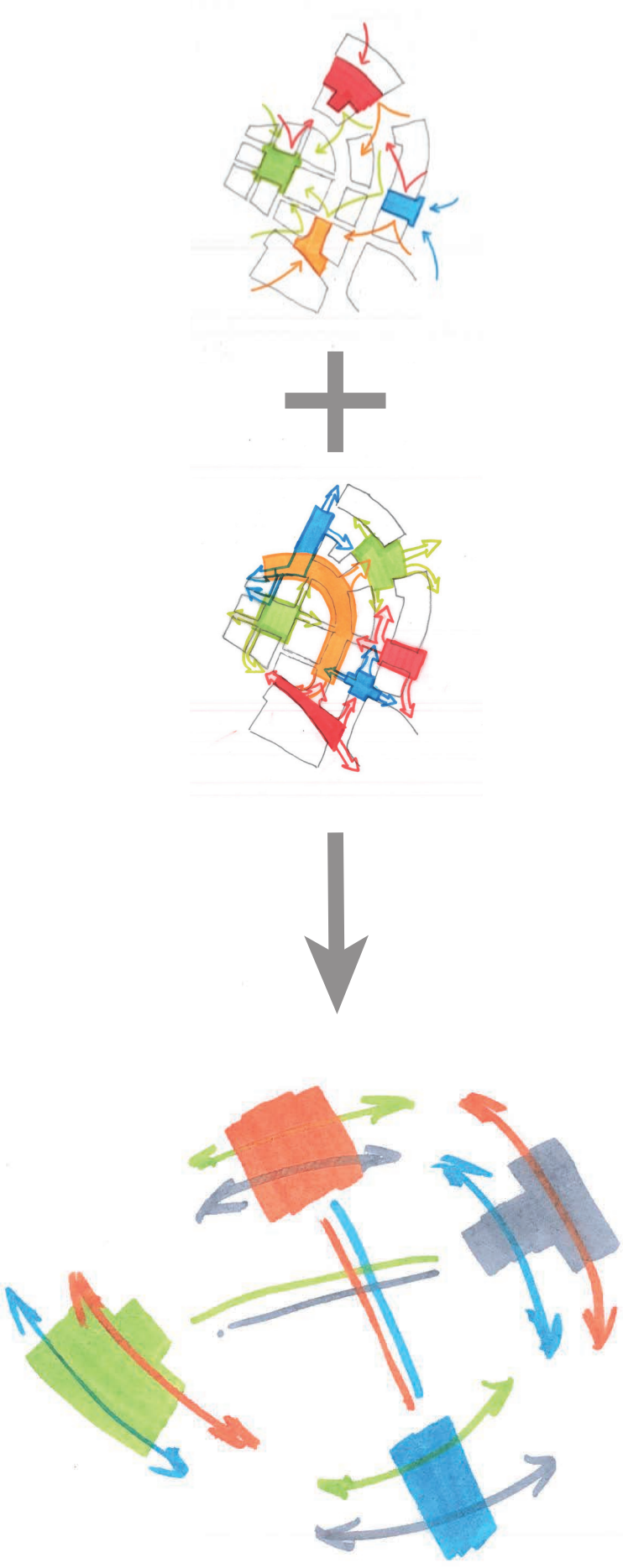
Ill. 33 The wave pavilions

Second iteration

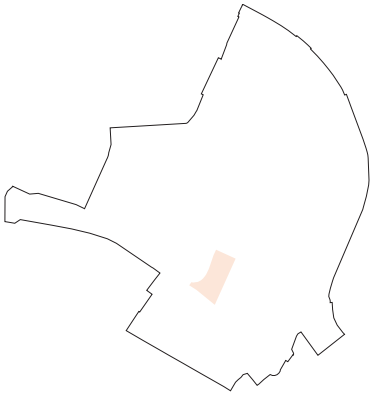
Interwoven resilience

After further analysis and investigation of the resilience concept, the two concepts of **everything flows** and **specialised spaces** were combined into the concept of **interwoven resilience** (ill. 34). It builds upon the idea of utilising the spaces' exposure to the climatic crisis as a base for their design as well as the site's overall design with general resilience.

While each focus space is identified in terms of the crisis it is most exposed to or equipped to handle, and it is designed to work specifically with that crisis, the whole site works in a generalised way with all the identified crises, both as an interconnected system and by means of small adaptive interventions dispersed throughout the site.



Ill. 34 Earlier concepts combine to give shape to a new concept

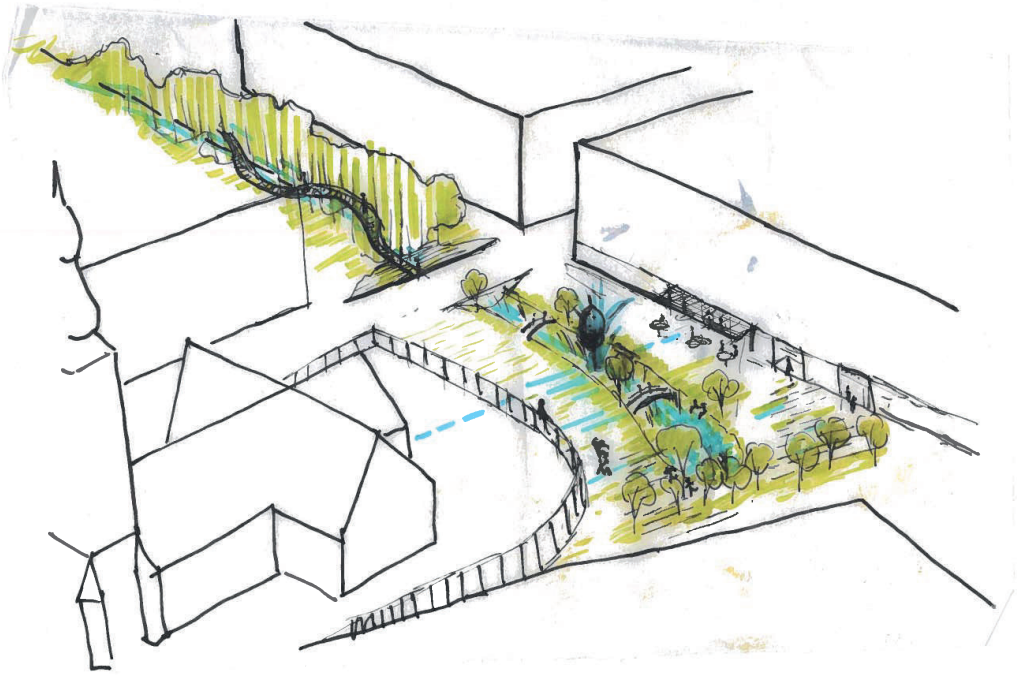


The rain square and avenue

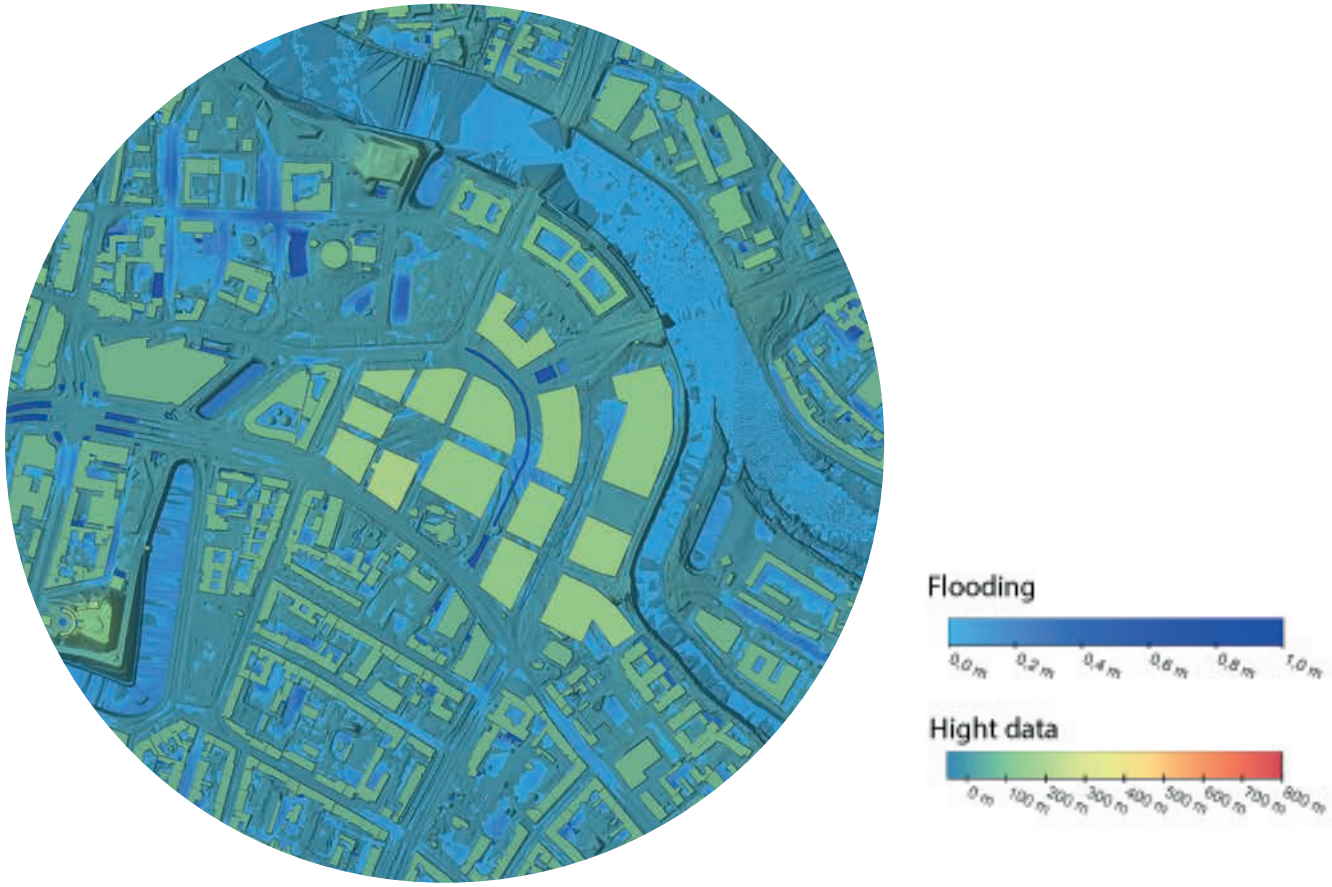
After the exclusion of river flooding as a relevant crisis and the rainwater analysis, the idea of retaining rainwater on-site to avoid surface runoff polluting the rivers and putting pressure on the other parts of Wroclaw came to the foreground. A water retention pond was designed in front of the church in the south of the site that moved down the landscaped avenue through a green-blue bioswale, in hope of connecting the site by a blue feature, as well as retaining and treating the runoff on site.

The blue connection through the site replicated the shape of the surrounding rivers, building upon the municipality's ideas of blue qualities, and the retention provided a strong resource against heatwaves in the public spaces.

To estimate the effectiveness of this shape, we drew it into a water modelling software Scalgo (ill. 36) and was evaluated with various depths for how much runoff it could potentially retain. Through the testing, the need for a rather deep main retention pond was established, while the avenue retention was scaled to be rather shallow but wide so as to create a larger blue surface for recreational and microclimatic purposes.

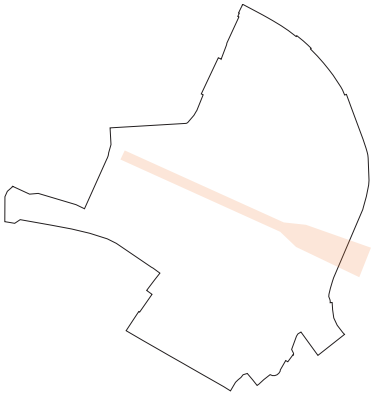


Ill. 35 The water square and avenue



Ill. 36 Rainwater management evaluation of plac Społeczny with new interventions

The wind square and avenue



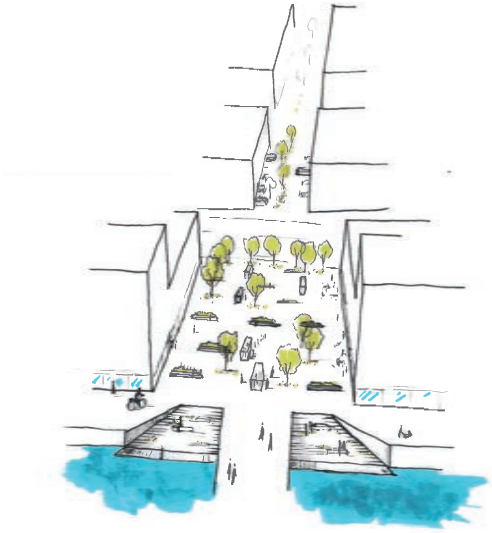
The student axis had been identified as very exposed to the southeast wind (see: Strong winds, p. 44) and the idea of lessening wind velocity for safety and comfort reasons was an important design consideration. Inspired by the different approaches of using vegetation as a wind prohibitor, percolator, shifter, or redirector (ill. 39) from the article 'Urban Landscape Design and Planning Related to Wind Effects' (Ak and Ozdede 2016), an idea emerged of extending shop premises with modules made of shipping containers, fluctuating along the avenue and creating intimate pockets for stay and preventing the wind tunnel effect. Similarly, a central planting with trees has been designed to disperse the wind. The article (ibid.) concludes that when aiming for decreasing wind speed, lower constructions and vegetation will shift it above the pedestrian level for a more comfortable wind environment.

We also employed this approach to shape the square at the eastern end of the axis (see ill. 38). There the containers were intended to be placed more scattered and used interchangeably with large seating arrangements with a similar size footprint. This combination of small shops and seating was aimed to appeal to students from the nearby university campus.

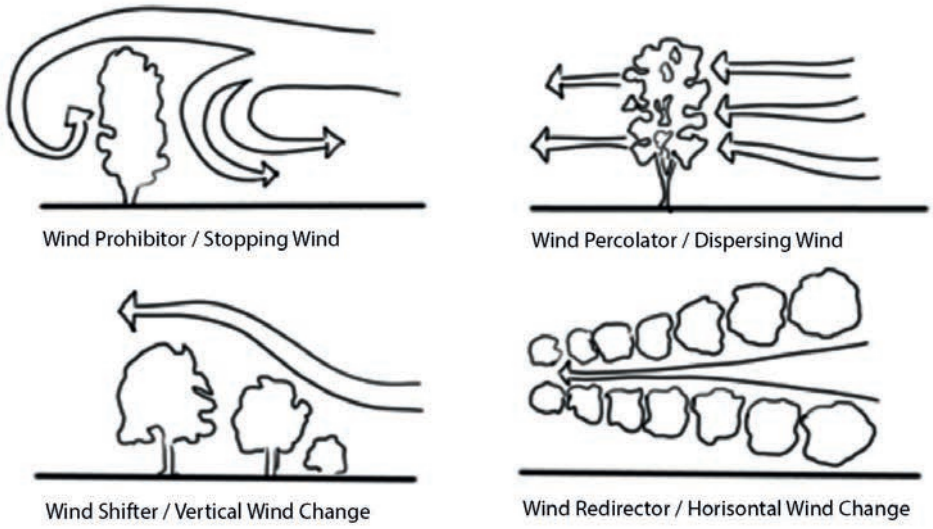
The square's riverside location, with a planned footbridge connecting it south of the site, presents a strong blue resource. Fostering a connection down to the water would work with principles already used in Wrocław and create a social space that works with the city's idea of river proximity being a mark of prestige (Biuro Rozwoju Wrocławia 2018).

The vegetation was shaped according to the principles from the book Design with Microclimate: the Secret to Comfortable Outdoor Space (Brown, 2010) which states that when alleviating wind with vegetation, it is recommended to use plants with porosity of around 50%.

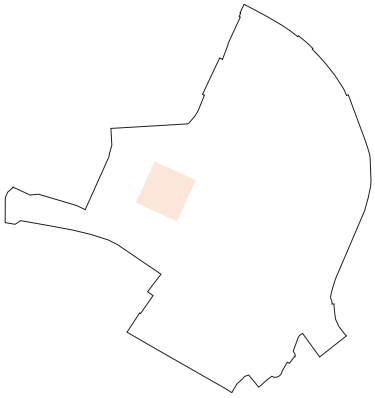
Ill. 37 Wind avenue sketch with containers placed



Ill. 38 Wind square sketch



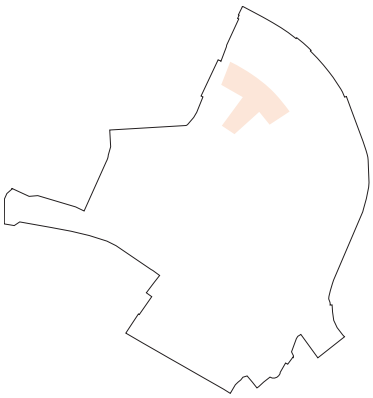
Ill. 39 Different approaches to wind management (adapted from Ak and Ozdede 2016)

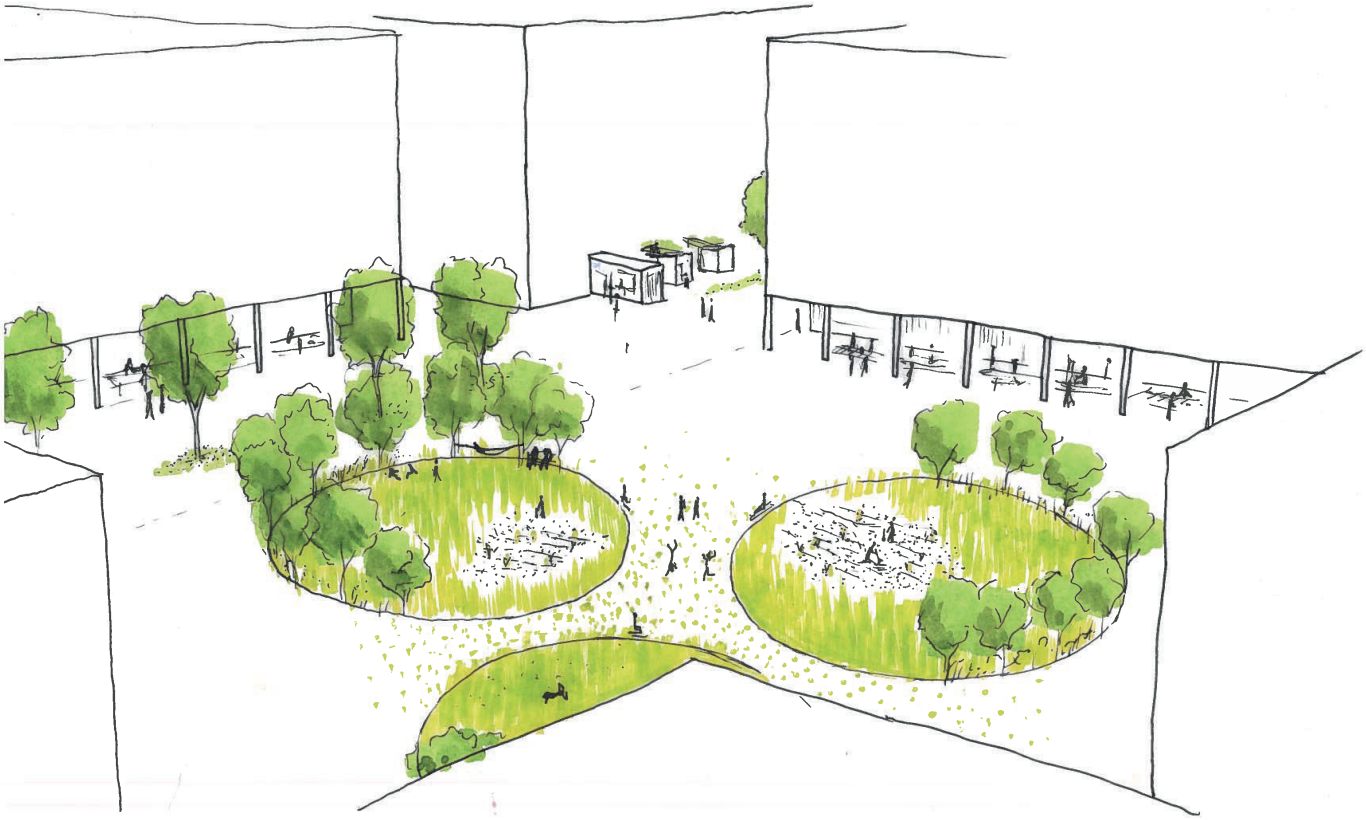


Market square and regional square

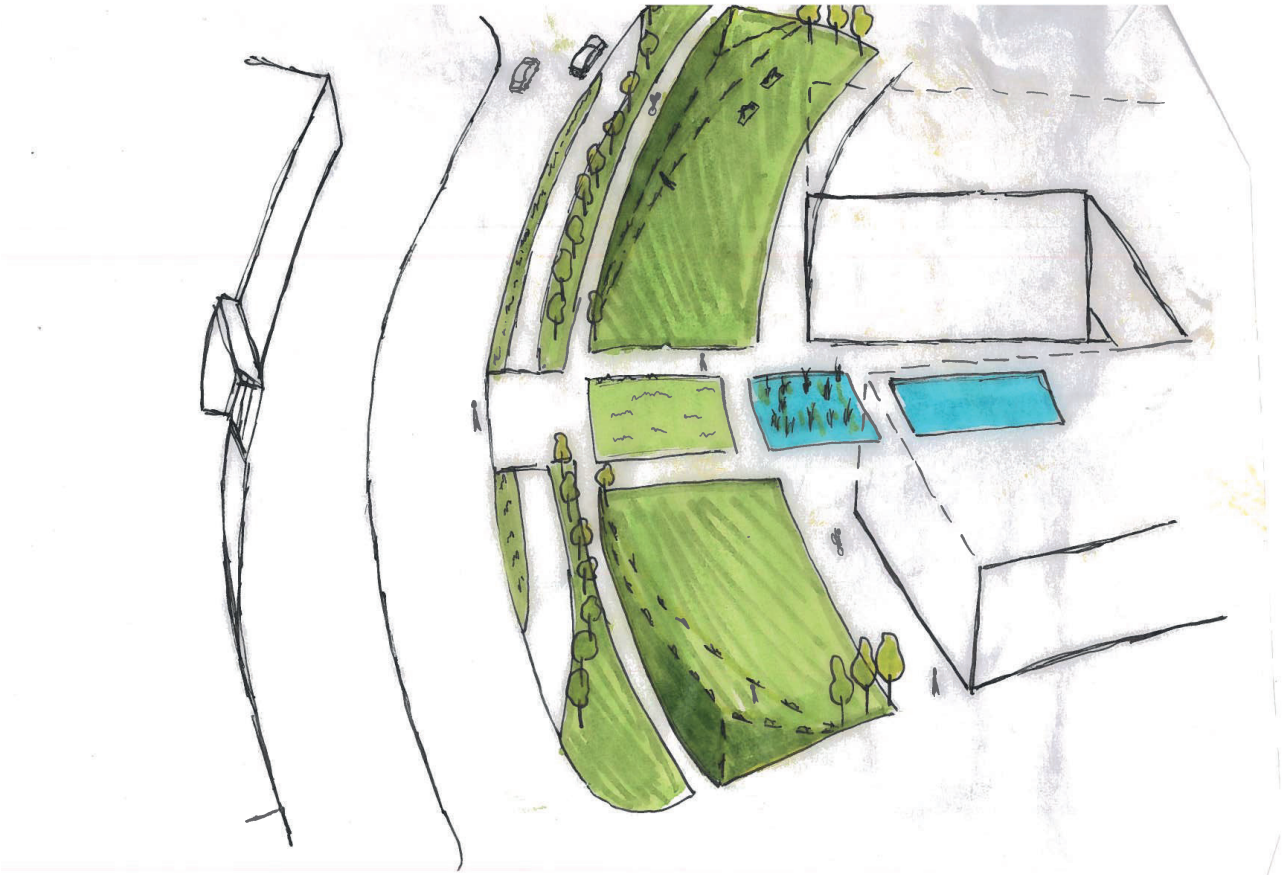
The central square of the site was found to have a unique interaction of a marketplace identity and that of a meeting place, as well as a potential overheating problem during heatwaves. To absorb and alleviate excessive heat, we designed the square with three green 'islands', the shape of which was optimised to provide an invitation from the surrounding spaces as well as a sense of enclosement, while leaving space in the middle for events and as an informal meeting place. The community-driven marketplace was projected to inhabit the arcades of the surrounding buildings.

The final space of interest at this time in the project was the area between the existing Regional Square and a new service building. We designed water retention and management in three depths, utilising the monumental shape of the existing garden axis, while also paying homage to Wrocław marshland origins by means of wetland and meadow planting. From the roadside, the square would be enclosed by landscaped hills to protect its users from heavy traffic, create a more intimate environment and frame the monumental Regional Office building.





Ill. 40 Market square sketch with 3 green islands



Ill. 41 Regional square sketch with garden axis and hills

Third iteration
new contextual information

The next, more detailed iteration of the design was enriched by contextual information gained by further research and fieldwork. A visit to the site provided us with a **tacit understanding** of its context and various **atmospheres and identities** in and around it (see ill. 42).

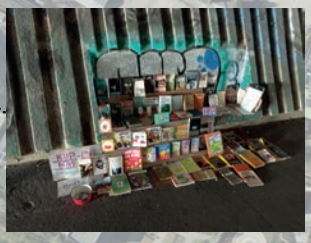
Plac Społeczny's unique condition as a **vast, under-programmed area in the heart of Wrocław** makes it a host of various **surprising, informal identities**. Additionally, its size and location make it a bridging area, bordering many other city districts with identities on their own, which permeate into the site and make it a patchwork of architectural styles, types of users and activities.

Protection of the community identities is an important component of urban resilience, as it strengthens the community, building on what is already in place and fostering **continuity and robustness**. Although the site will transform diametrically, the municipality itself has expressed a wish to protect the cultural heritage of the area and this consideration has been integrated into the design process.

Ill. 42 Atmospheres & identities map in plac Społeczny

In the yard of the only housing block on site there is a small allotment garden area, with a very intimate character, self-made sitting arrangements and small art pieces.

The pedestrian and bike underpass creates the most informal identity in the site: concrete walls are covered by graffiti, bottom-up concerts and events are organised in the summer, homeless people inhabit former technical rooms, and in the covered spaces under the roads people roller skate, play bicycle polo and sell books and trinkets.



The presence of homeless people can be spotted numerous places on site, with mattresses on the lawns, clothes stored on trees and in infrastructural nooks and crannies. This adds to the informal character of the site.

Monumental
Overwelming
Uninviting
Vast
Iconic
Beautiful
Informal
Bike repair
Chaos
Nothing
Backside
Classical
Chaos

Urban green

A large part of research on urban resilience focuses on **green** and **nature-based solutions** as a crucial resilient strategy. Through the course of the project, insights from this research, together with the in-person exploration of biodiversity in and around the site (see ill. 43), have been integrated and served as a focus redirection and guidelines for the design decision-making.

Lehman (2021) defines nature-based solutions (NBS) as the "*use of nature for addressing environmental, cultural, and societal challenges while increasing biodiversity and balancing urban temperatures of the city cores*" and promotes them as a **cost-effective strategy to strengthen urban resilience**. He points out various ecosystem services that NBS provide, such as carbon absorption and storage, water treatment, food and biomass production, air pollution alleviation or biodiversity enhancement. At the same time, he advocates an **integrated and informed implementation** of NBS: using the right tree species to filter air pollution and particle sequestration (mentioning i.a. silver birch and maple as appropriate), utilising **native vegetation species** and rewilding strategies to minimise maintenance costs and foster biodiversity, and, wherever possible, r**etaining existing trees**, as the new ones need 20-30 years to mature and start to fully provide ecosystem services.

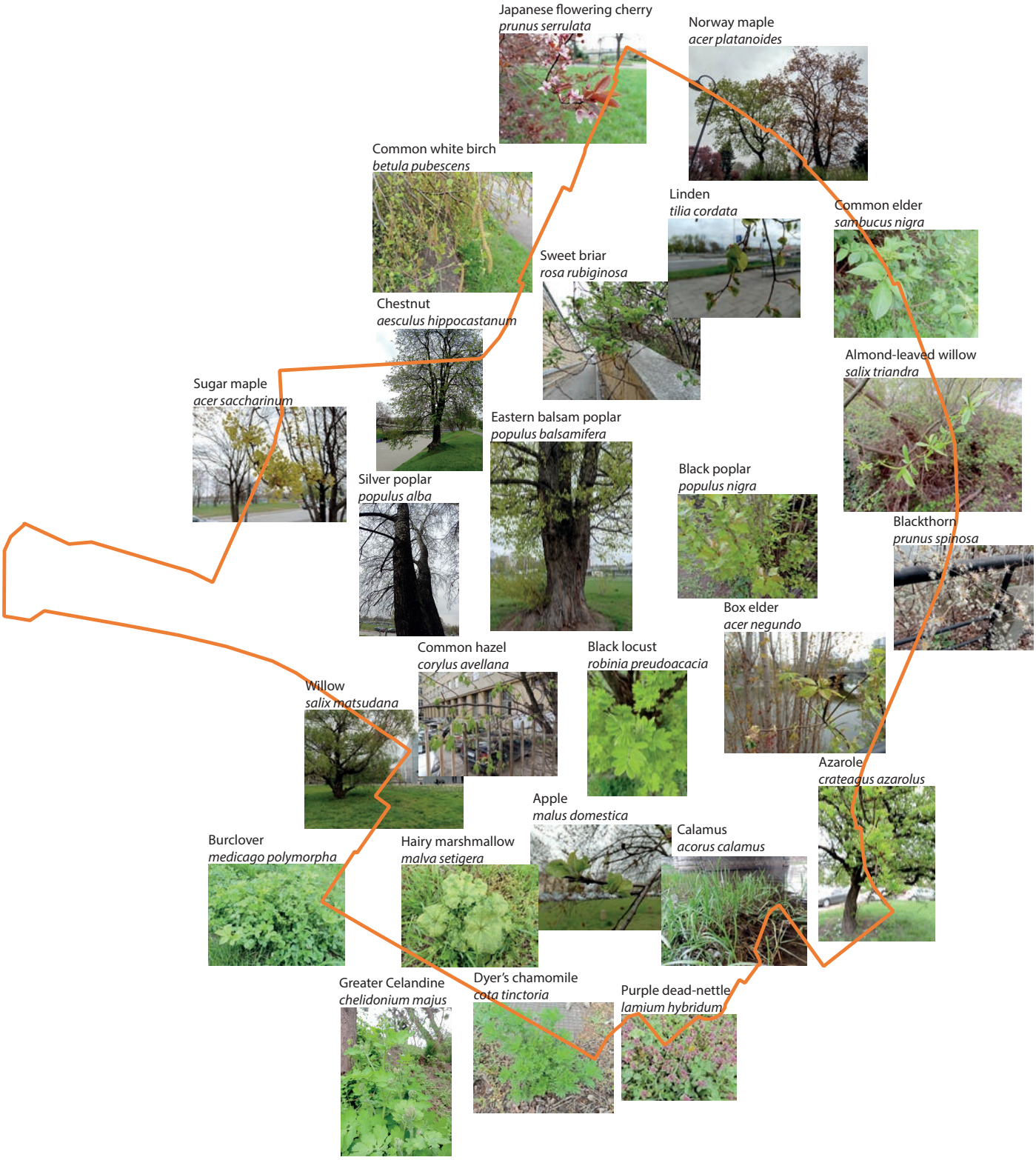
Barthel et al. (2015) make a case for **urban ecosystems being a public good** and advocate creating and fostering **urban gardens** and the social networks around them. They point out the role that urban gardens have played in times of food supply collapse and for the maintenance of collective socio-ecological memory of food growth. They list numerous **ecosystem services** generated by urban gardening and present it as an important element of urban resilience, as well as a form of **contesting short-sighted, neo-liberal urban governance** by challenging the prevailing conceptions of the city, its identity and ownership.

Klemm et al. (2017) point out the importance of **urban green infrastructure** (UGI) in microclimate regulation and thermal comfort perception. They provide a set of urban design guidelines, such as using trees with large canopy covers in spaces with high solar radiation, and utilising green to create **diversified sun-shadow environments** for people to stay.

The above articles have provided an important insight in the design process and an enrichment of the existing design criteria. Selecting vegetation species already present in the site and those that could best perform the desired **ecosystem services**, retaining as many existing trees as possible as a resilience strategy tapping on **robustness**, and preserving the **urban gardening** function in the site (albeit in a changed form and location) have become new focus points for the more detailed iteration of the design.

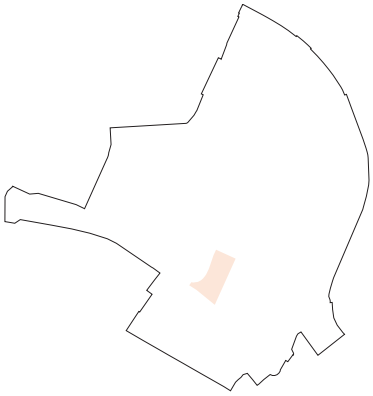
Choosing the **proper plant species** has also been facilitated by the publication "Good Practice Catalogue: principles of sustainable rainwater management" (Lejcuś et al. 2021) commissioned by the Wrocław Municipality, where specific domestic species are recommended based on their **water filtration qualities, humidity requirements and resilience to salt from the road**.

All in all, biodiversity proved to be one of the vital aspects of the design, therefore conscious plant selection and placement have become an important consideration in the process.



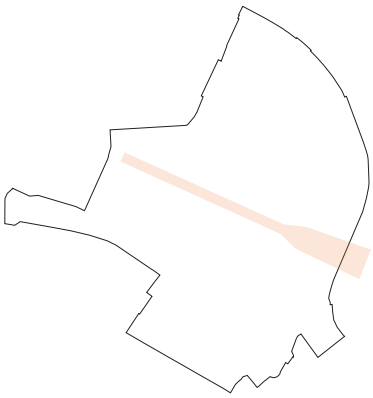
Ill. 43 Biodiversity map in plac Społeczny

The rain square and avenue

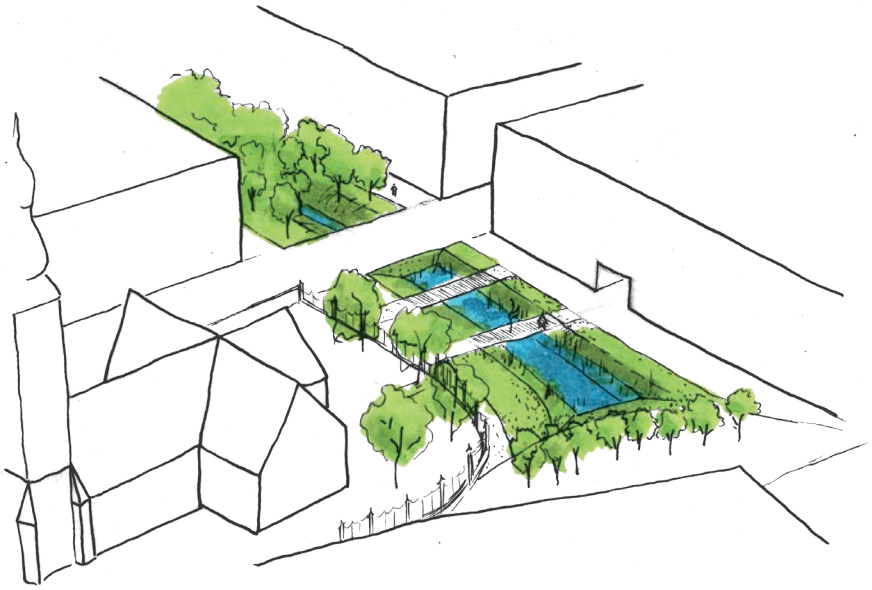


With continuing evaluation of the water amount and management (see appendix 03), and based on fire road regulations (see appendix 04) the water retention volume in the rain square was decreased. The crossings along it were shaped after the axis that run towards the church, as well as acknowledging the gate in the church's historic fence. The idea of utilising the axis for visual attraction was reinforced by placing the pond crossing in it, thereby creating a landmark and a meeting place.

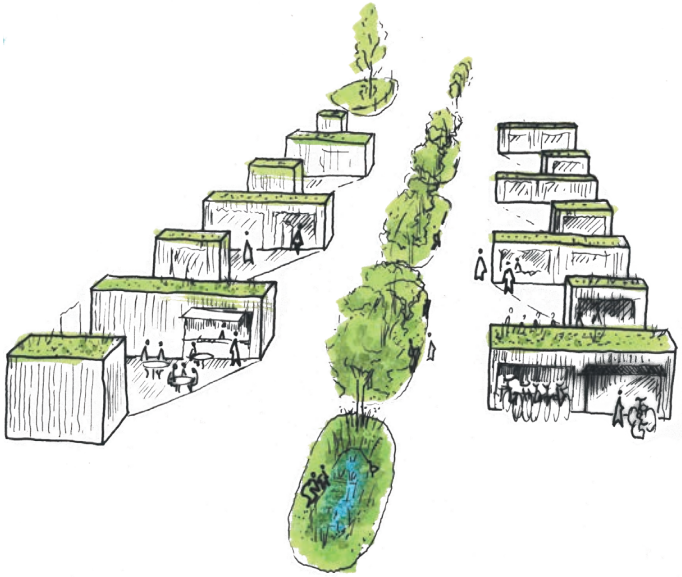
The Wind Square and Avenue



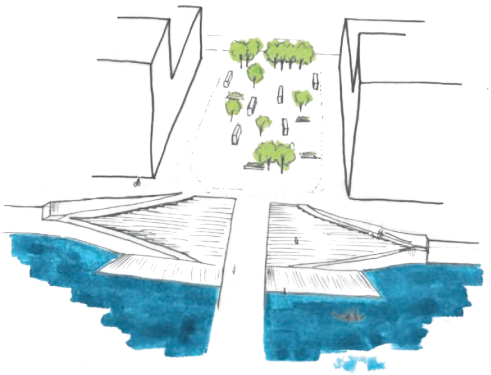
To communicate the placement of containers and the spaces they create between, a zigzag change in the pavement has been designed, allowing some green permeability between tiles under and between containers. As the containers are meant to be extensions of shop frontages, the divisions on the ground floor facades of buildings have been considered in the design. To make an informed decision on placement of the containers, the facades have been inspired by the surrounding built fabric, therefore assumed to be in 15 metre intervals. This means the containers were placed 15 metres apart, leaving space for a shop facade, small frontage garden and an entrance zone for the building's inhabitants.



Ill. 44 Rain square and avenue redesigned

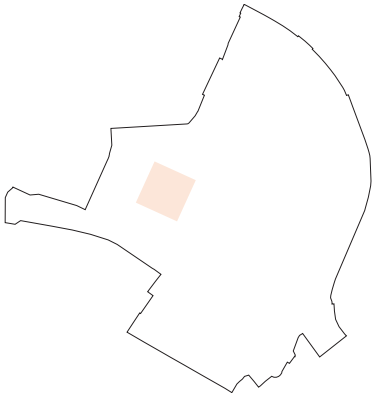


Ill. 45 Wind avenue redesigned



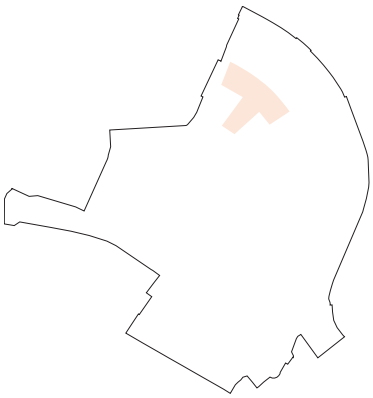
Ill. 46 Wind square redesigned

Market Square



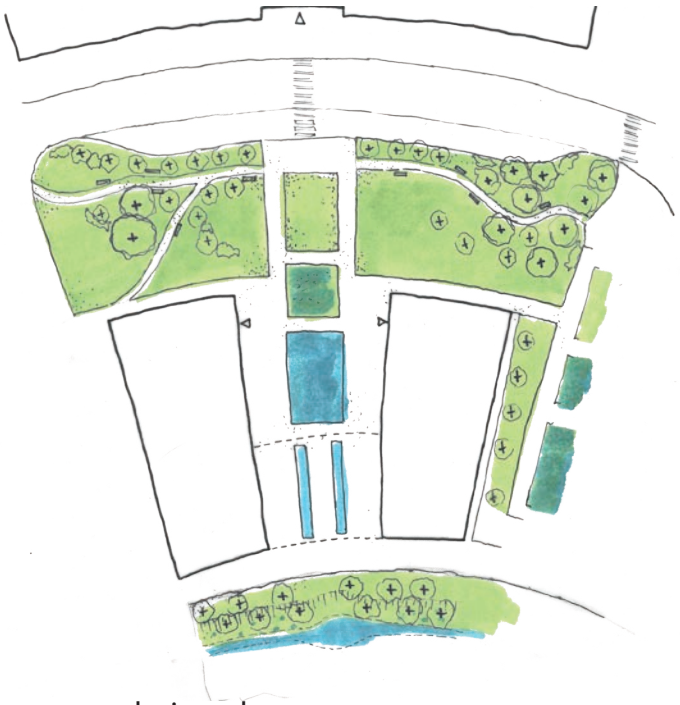
To optimise the market square's heatwave resilience and take advantage of the sunlight, the green areas have been reshaped after areas with the most sunlight hours during the summer solstice (see: Heatwaves, p. 46). The middle part of the square has been left free for organised events and informal meetings, and the remaining, less sunlight-exposed sides of the square have been given space for urban gardening, connected functionally to the shopping arcades of buildings around the site, so that food grown on site can be sold in the same space.

Regional Square



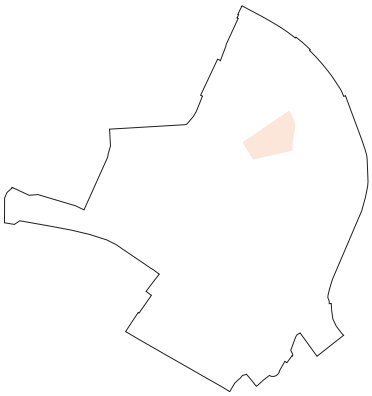
To protect valuable old trees in that space, the idea of hills framing the square has been replaced with a scenic path through the site to retain not only vegetation but also the place's identity through the development.

Ill. 47 Market square redesigned



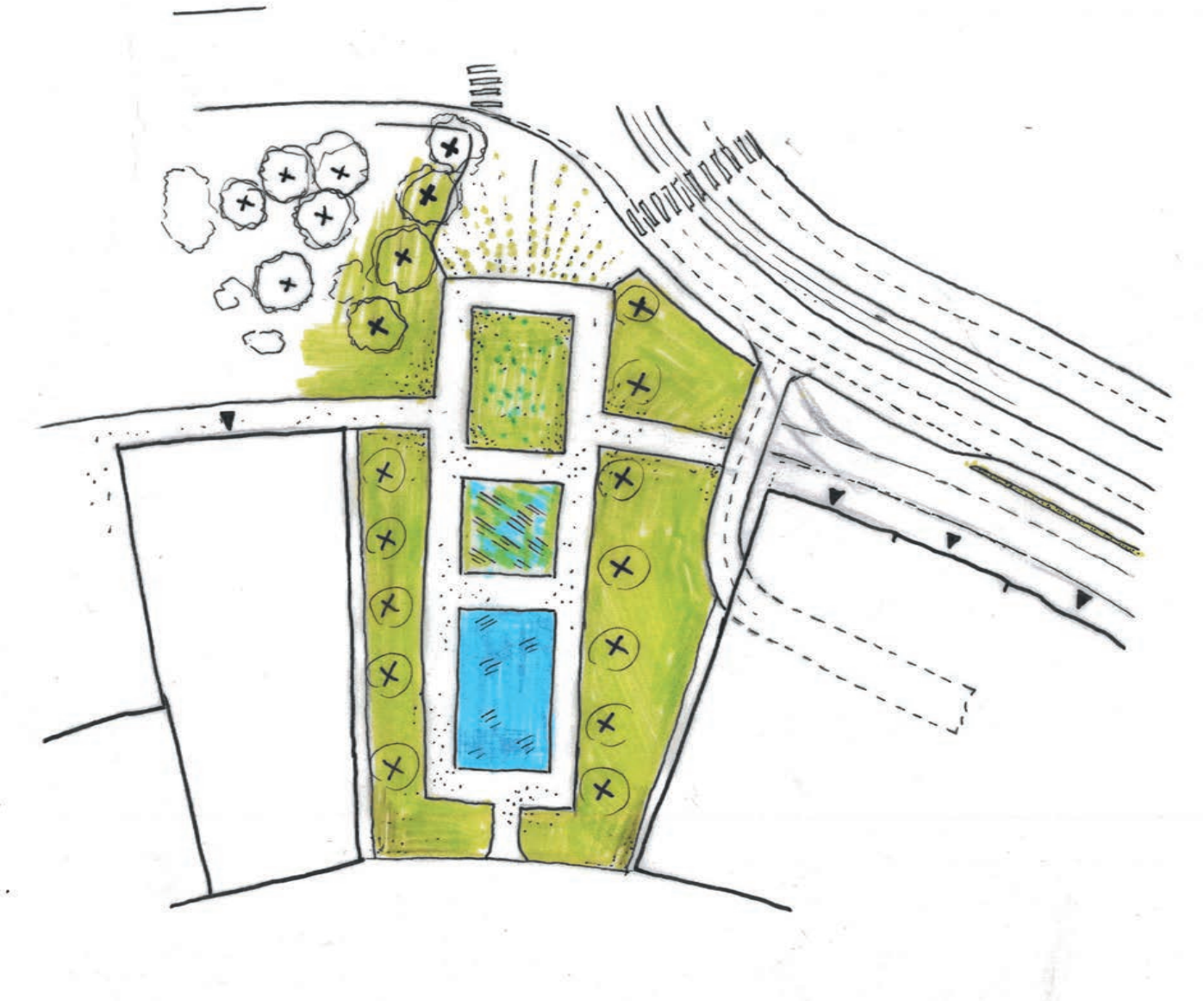
Ill. 48 Regional square redesigned

Sunlight reevaluation and the arrow square

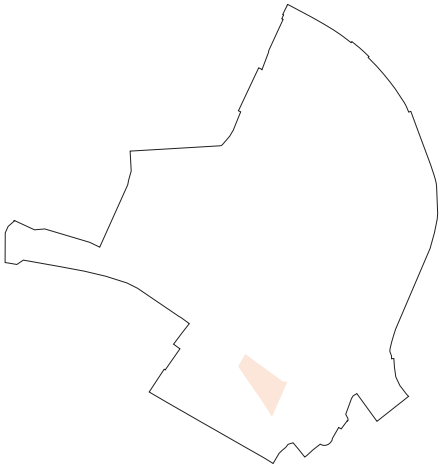


After considering the axis from the Grunwald bridge and including the 'arrow square' in the design, the sun hour analysis was taken into consideration more precisely. This led to a focus redirection, as the regional and arrow squares turned out to be the two most sunlight-exposed places on the site, while the market square proved to be not that exposed (see: Heatwaves, p. 46). Therefore, the central square would from that point onward be considered and designed as one most alleviated from the sun, a cooled-down place to go during a heatwave. Its green islands were redesigned according to the heat map, their new 'hourglass' shape following the areas with the highest sunlight exposure during the summer solstice.

The other design change concerned the regional and arrow squares, which were proven to need more heat alleviation - the latter received a water retention axis, mirroring the one in the regional square and thereby highlighting its own axis. The combination of water and greenery in the two linked squares was designed to alleviate the effect of excessive sun exposure while still creating pleasant recreational spaces to stay in the sun.



Ill. 49 Arrow square sketch

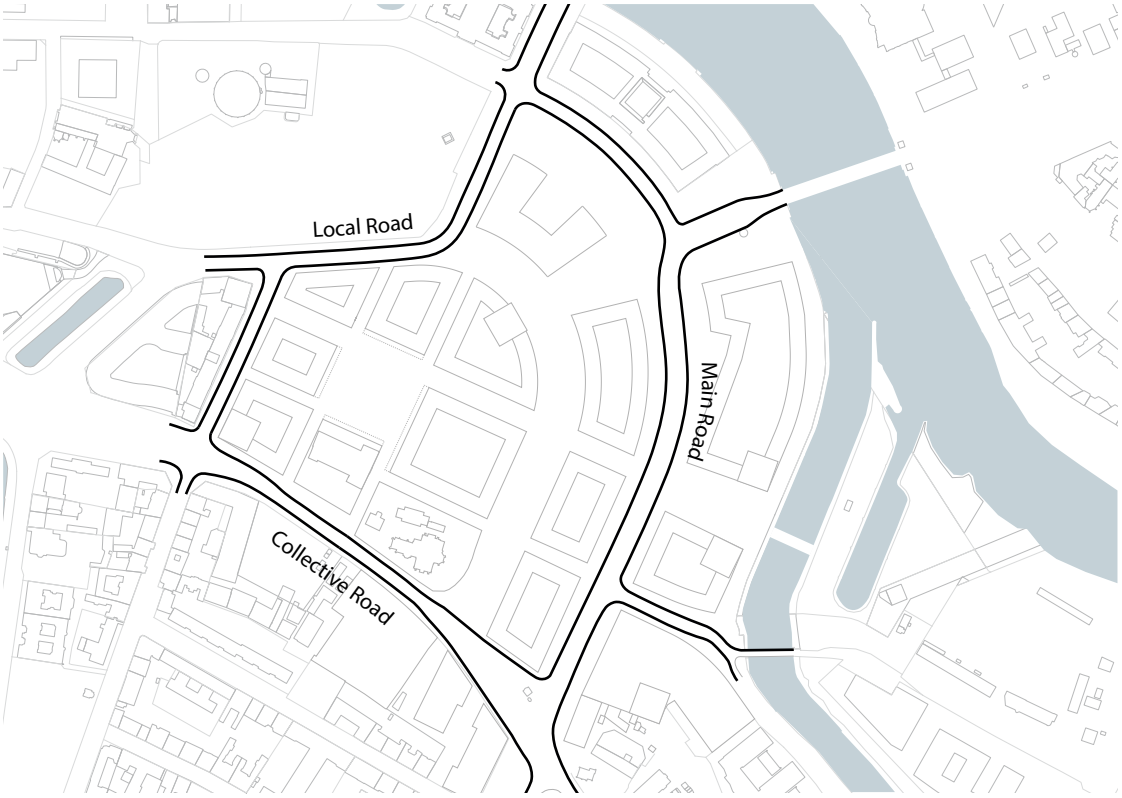


Mobility spaces

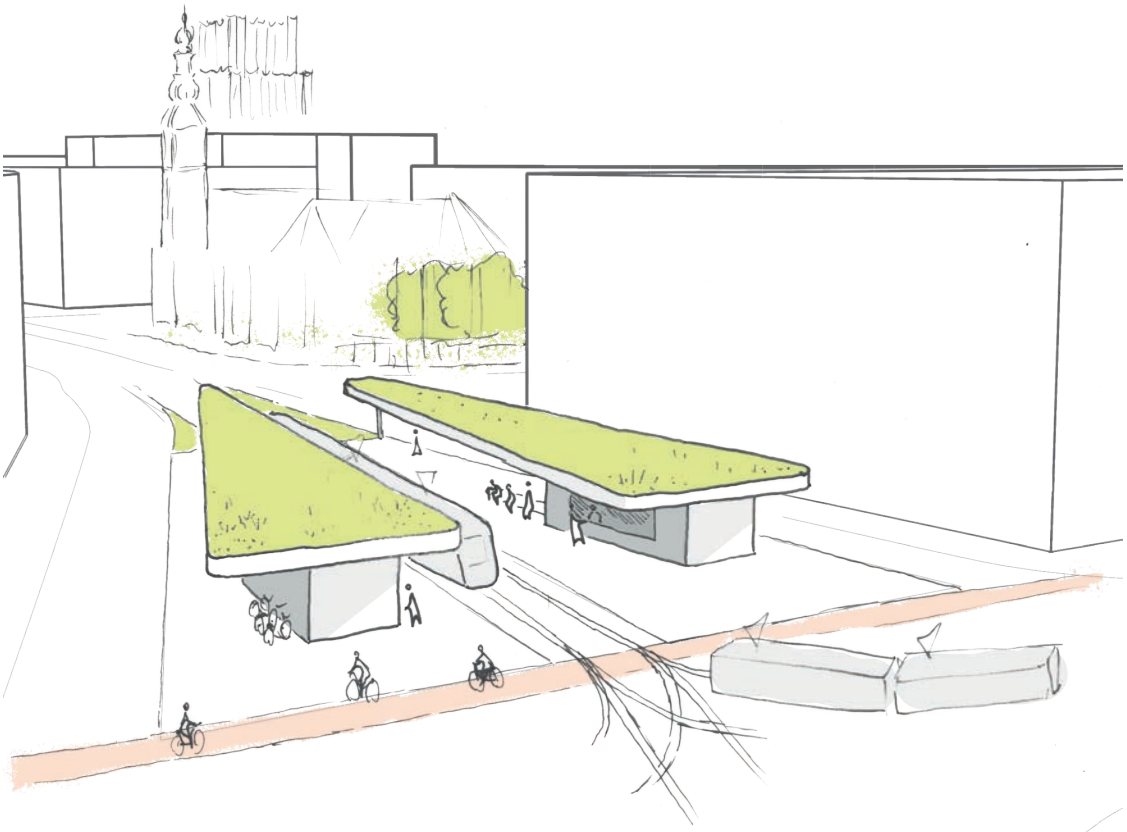
During the work on this design iteration, more focus spaces were added to the public space system, in an attempt to bind it more together and underline the connectivity aspect of resilience. Particularly, mobility spaces like public roads and tram stops were put in the spotlight. While they did not make it to the final design proposal, they provided an important discussion stepping stone on sustainable and resilient mobility.

With the site being a crucial traffic node, passing over 8 thousand cars an hour (see appendix 05), well-designed and efficient road infrastructure is a key element of its resilient system. Three classes of roads were designed: main, collective, and local, according to the municipal plan and the Polish traffic law (see appendix 02) Between the buildings, proper numbers and widths of lanes were delineated, as well as separate green tram lanes, pavements, bike lanes, and roadside greenery. Due space has also been given to fire roads (see appendix 04). The road widths were scaled with minimum requirements, to encourage soft mobility in this central location, but redundant lanes were added where possible, with movable green elements, to widen some roads as needed in case of other roads' failure due to extreme snow and similar events (see appendix 06).

Tram stops were also redesigned from the current status quo, particularly the one in the southeast part of the site, which currently presents a rather chaotic mobility situation. The tram stop island was moved closer to the intersection so that pedestrian access and bike lanes could be straightened, and canopies with green roofs were added, to provide additional water filtration and space for kiosks, bicycle stands, and covered seating.



Ill. 50 Sketch of roads on site



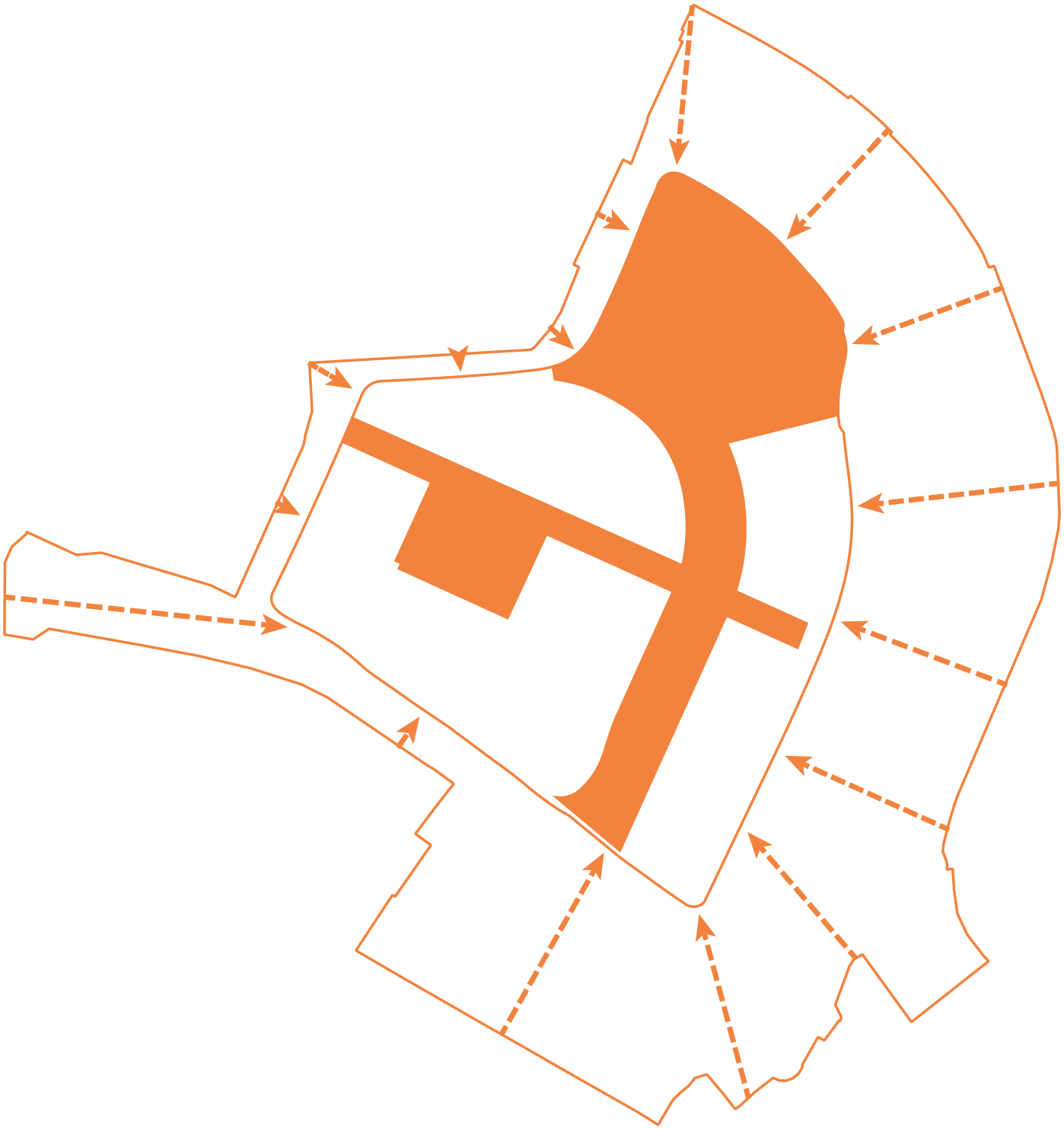
Ill. 51 Tram stop / mobility hub sketch

Fourth iteration

Delimiting spaces of interest

Due to plac Społeczny's size and complexity, an increasing number of spaces were placed in focus and taken into consideration throughout the design process, because of their qualities and connections throughout the site.

This growing number of spaces of interest made for a more and more complex design task, and the focus on the project's main questions and wonderings started to blur. To remedy this, the project's spaces of interest were reduced down to the inner edges of the main roads. This choice was made based on the remaining spaces' relevance for resilience and the fact that the riverside, while providing a great recreational space, did not have the same resilience relevance in this project's context.

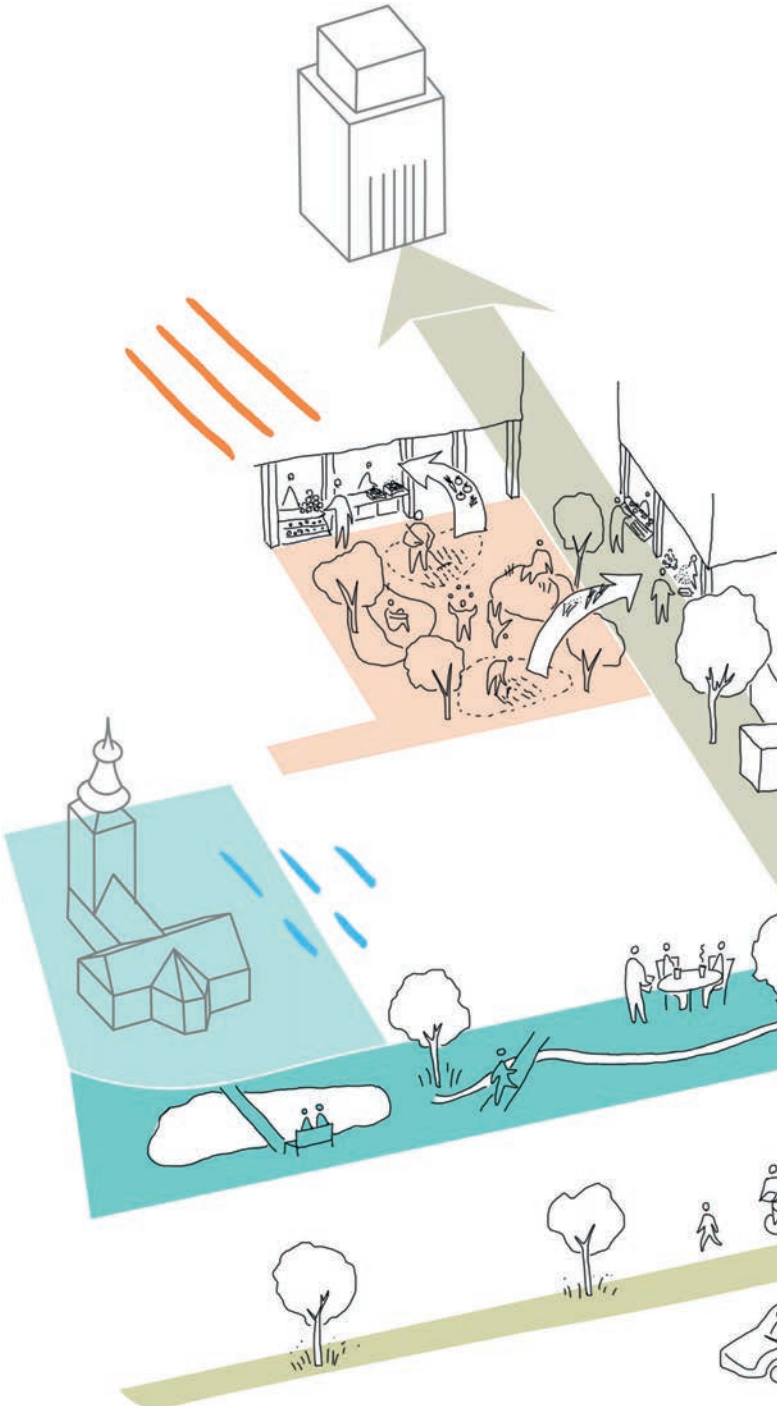


Ill. 52 Delimiting spaces of interest

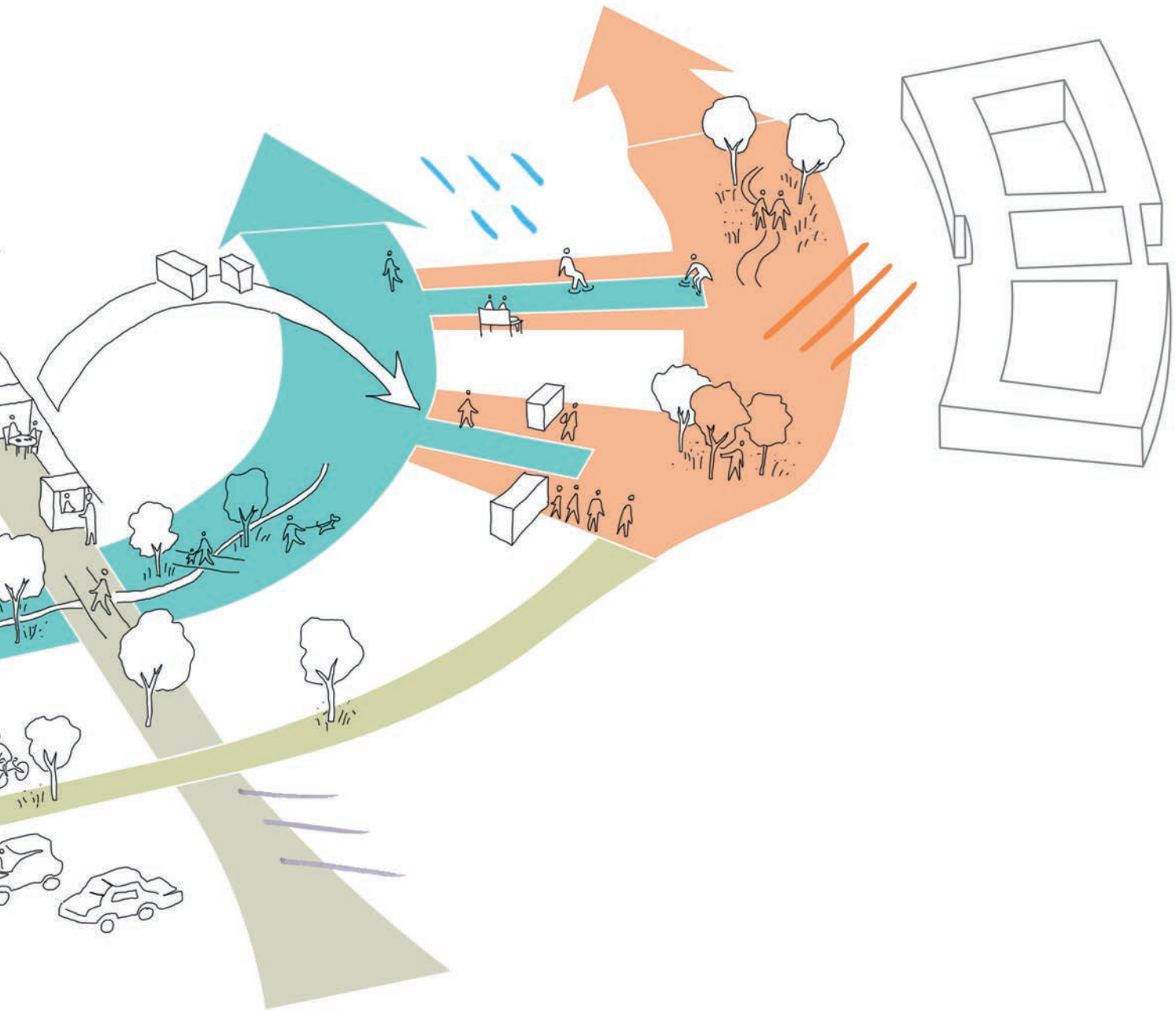
Final Concept

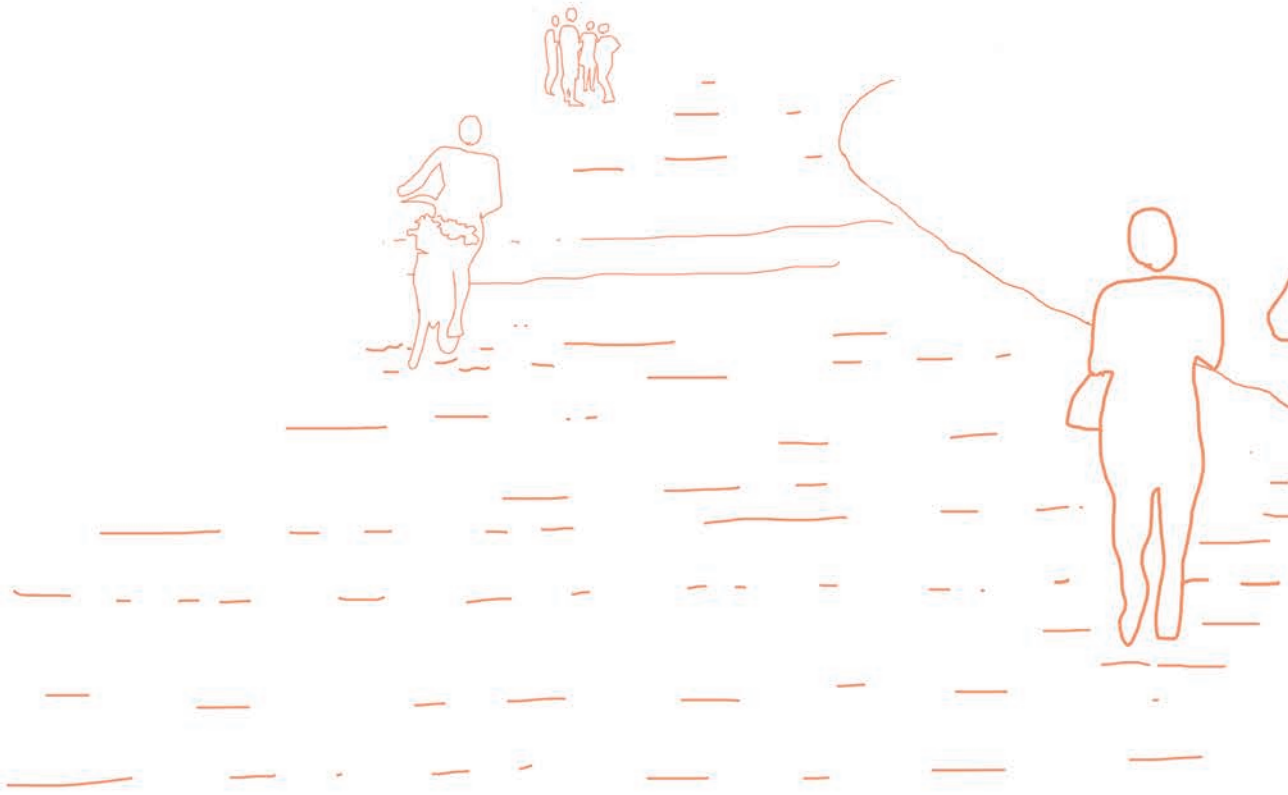
a resilient space system

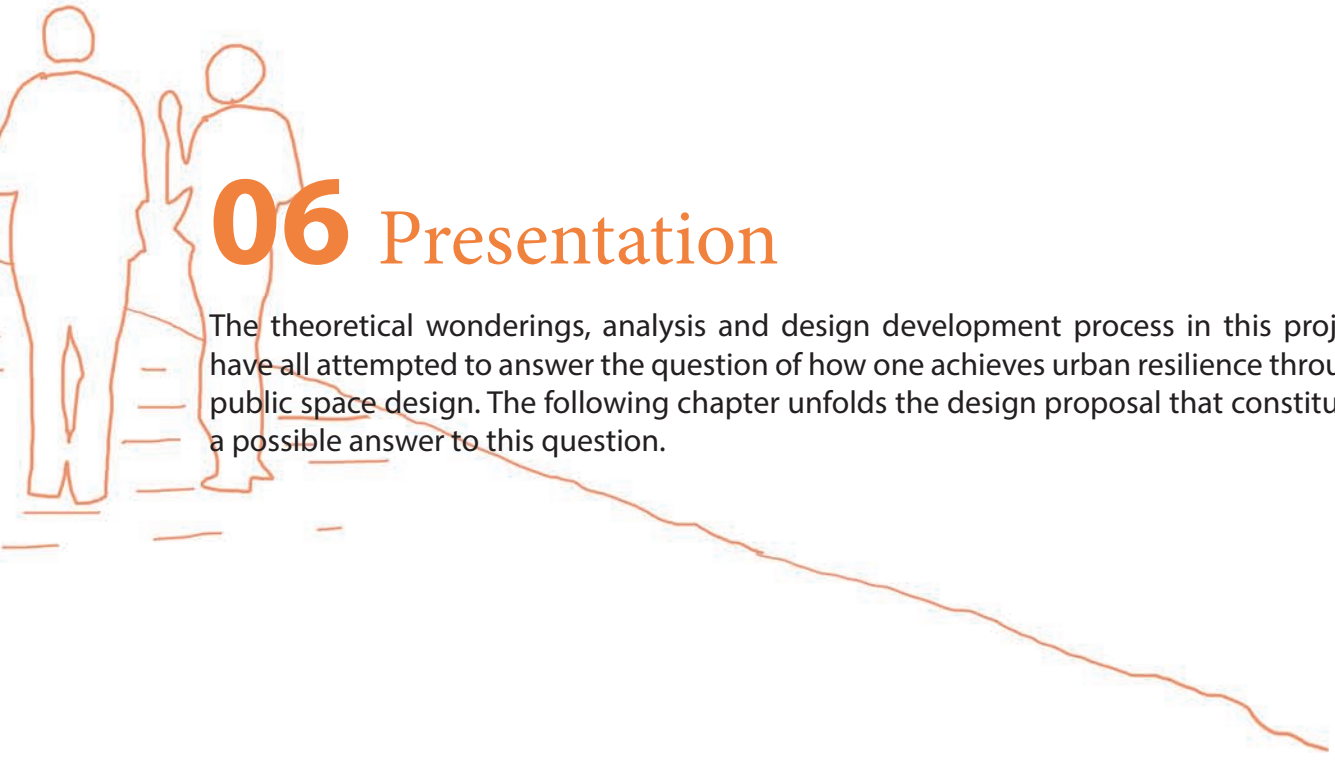
The system of interconnected spaces in the site and how they feed into each other's resilience are primary aspects of this concept. The spaces' exposure to the climate-related crises gives them shape and informs their functions, and the resources and activities that are exchanged between the spaces make them into an interconnected, resilient system as a whole.



Ill. 53 The resilient space system concept







06 Presentation

The theoretical wonderings, analysis and design development process in this project have all attempted to answer the question of how one achieves urban resilience through public space design. The following chapter unfolds the design proposal that constitutes a possible answer to this question.

The system

Vision

After its redevelopment, plac Społeczny will no longer be a concrete road cluster with the remaining areas left unused and empty. It will have evolved to not only be a mobility node for the city but an integral **part of the larger urban system**, increasing the site's and city's resilience.

Through an increase of green areas throughout the site, with ecological corridors and bioswales, the site will extend into the city and give **connectivity** to the urban green system of rings and wedges, helping to r**estore biodiversity, alleviate rain** on site and **reduce the urban heat island effect, air pollution and heat** in the specific areas, while producing **redundant** resources for community through urban gardening.

Alleviating the larger system from rainwater runoff will be made possible by a **robust** system of **rain absorption and retention** which **adapts** it as a socially attractive resource and a possibility to reduce heat in the public space.

Cross-scale **modular** resources will be introduced in the shape of containers that can be **transformed** for aiding the restoration of the larger system in the face of crisis. Between crises these elements will provide **wind speed alleviation** in a wind-exposed axis, giving **diverse** additional space to shops in the site.

Through the development, the site will become the framework for wondering whether the public space could be used to create **a more connected and resilient urban system** while forgoing most interaction with the buildings planned on site. This wondering demonstrates a possibility and an often overlooked resource and scale for urban resilience design that public space represents.

Ill. 54 Masterplan

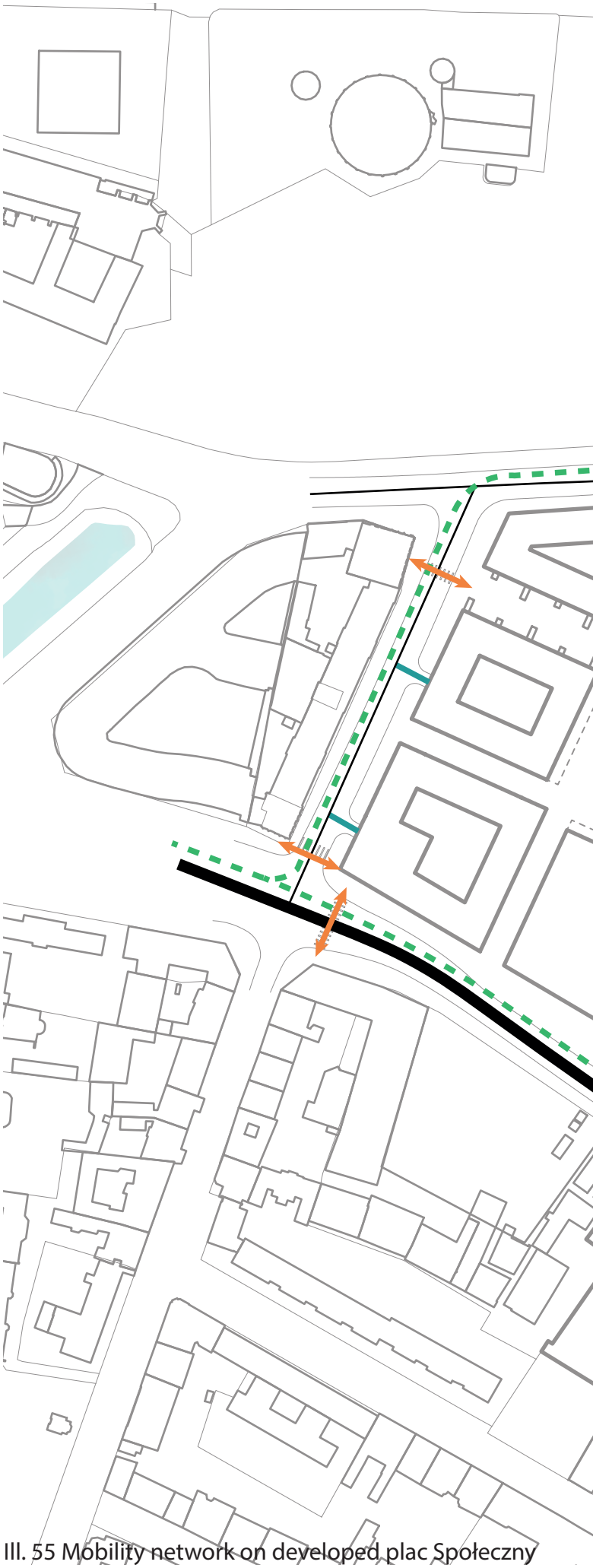

1:2500
0
50
100m

Mobility and access

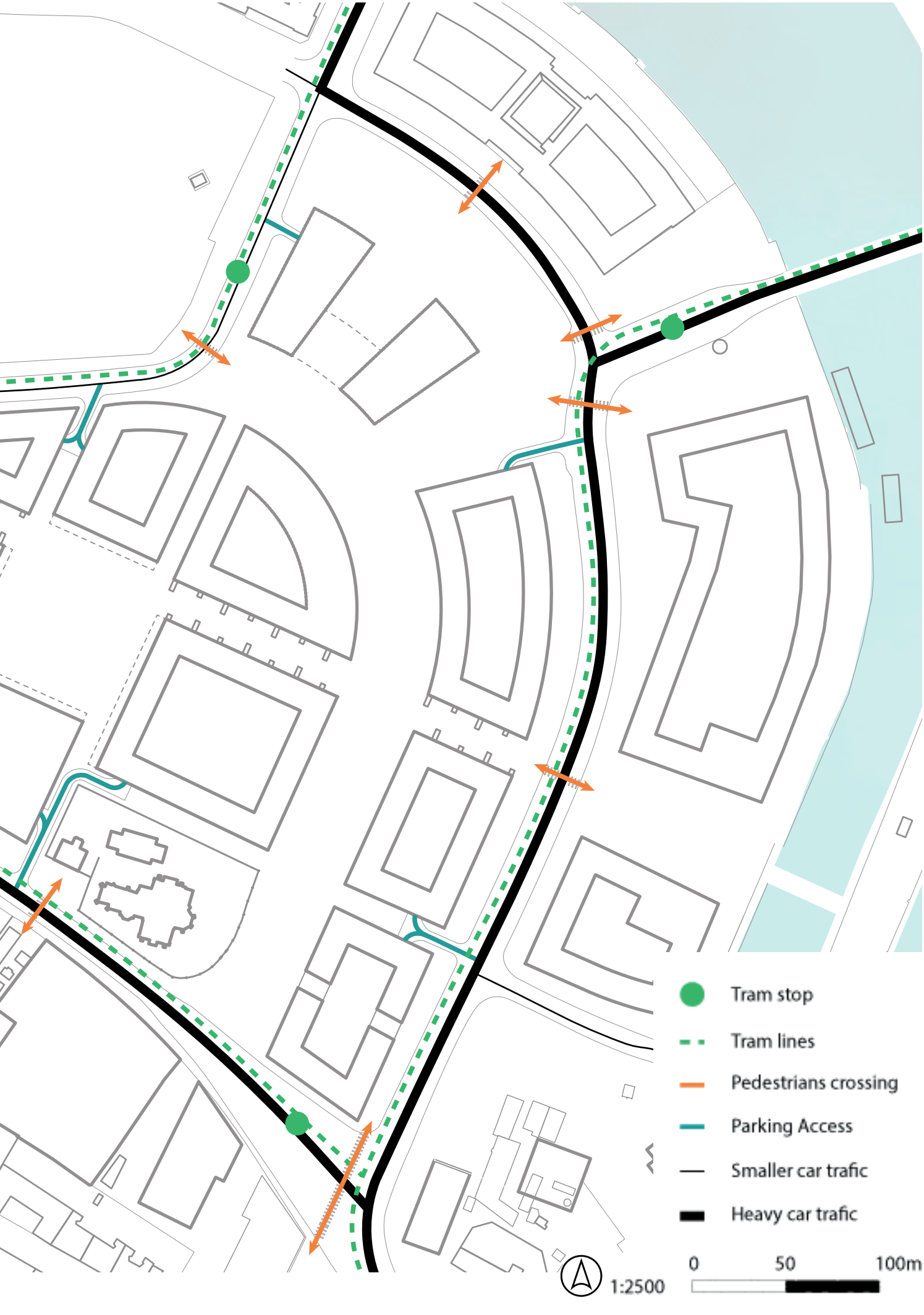
To maintain the flow of traffic going into and around plac Społeczny, the roads have been reshaped and hierarchised after the local plan. This took into consideration tram lines, stops, and the site's different road types, but the focus was creating a **pedestrian-friendly space**. This has resulted in a standard of a 5 metre wide pedestrian and bike path around the site with one exception of 3 metres along the church. Stretches with more space along the roads were given a **green buffer** that will add to **biodiversity and rain management** while making it safer for soft mobility.

With the sizes and placement of the buildings, underground parking was previsioned under all buildings on site. Therefore roads with less social priority were made into access roads for these, as well as necessary fire roads.

This has led to a **safe and accessible** site that integrates resilience into the shape of traffic.



Ill. 55 Mobility network on developed plac Społeczny


Tram stop
Tram lines
Pedestrians crossing
Parking Access
Smaller car trafic
Heavy car trafic
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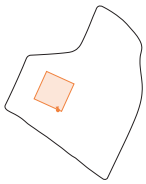
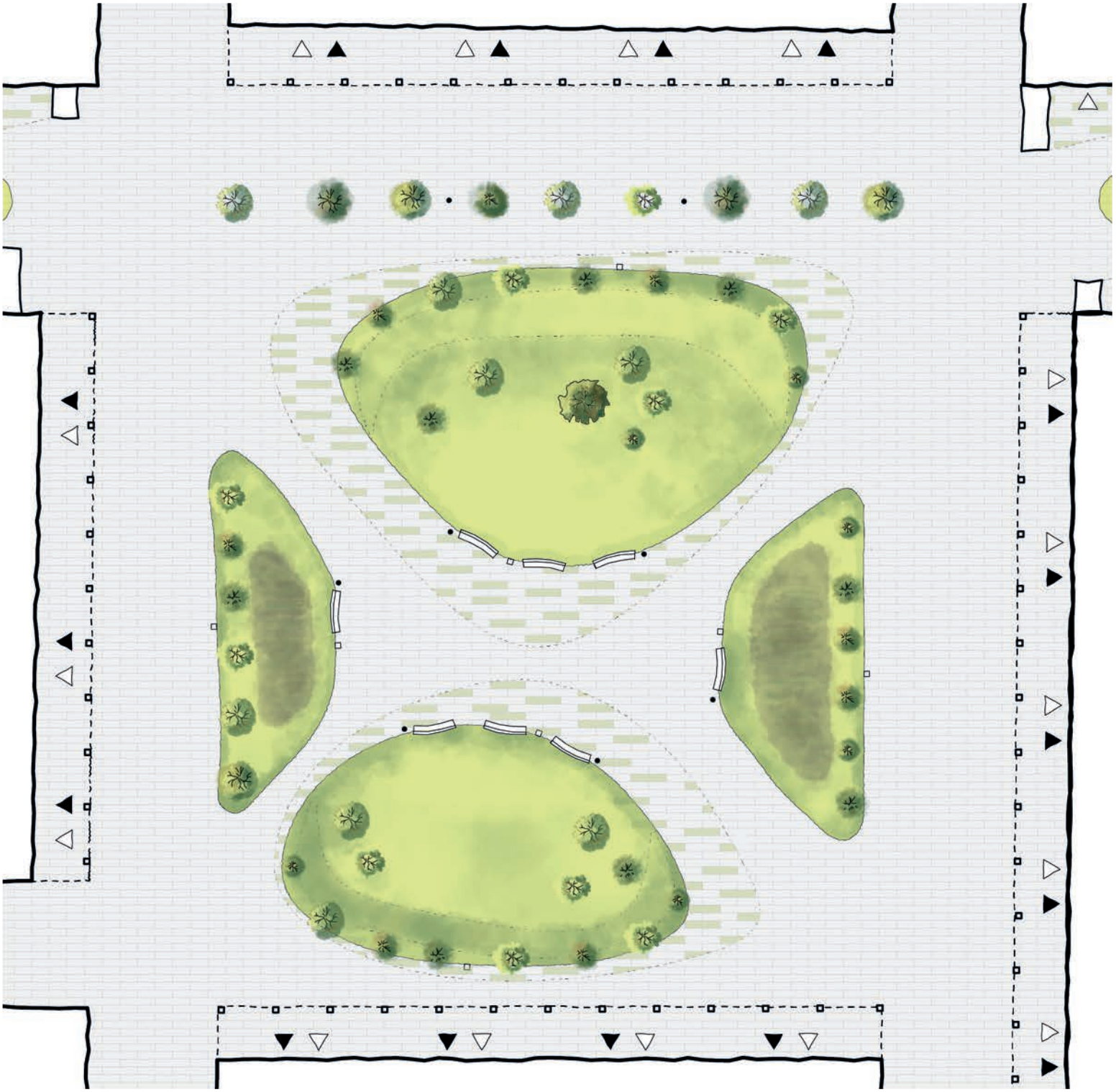


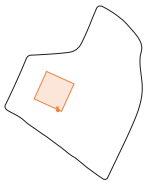
Market square

Wrocław has many squares of many shapes and sizes, and the central square on plac Społeczny aims to work with these elements of the city and its heritage. By advocating for the use of the surrounding buildings arcades, more space is given for a **community-driven market**, the community on site gets activated, it creates a space for people to meet and works toward **diversity** on site, as the market stands might be connected to shops behind them or run by private people.

The central part of the square consists of '**green islands**' that give way for movement across the site, creating a place to meet in the centre, with semi-permeable green paving around the islands **optimised for heat alleviation** without obstructing movement. The gardens are directly shaped after the sun-exposed areas in the space to alleviate the space as much as possible while also creating various sun-shade conditions for stay, thanks to the use of trees.

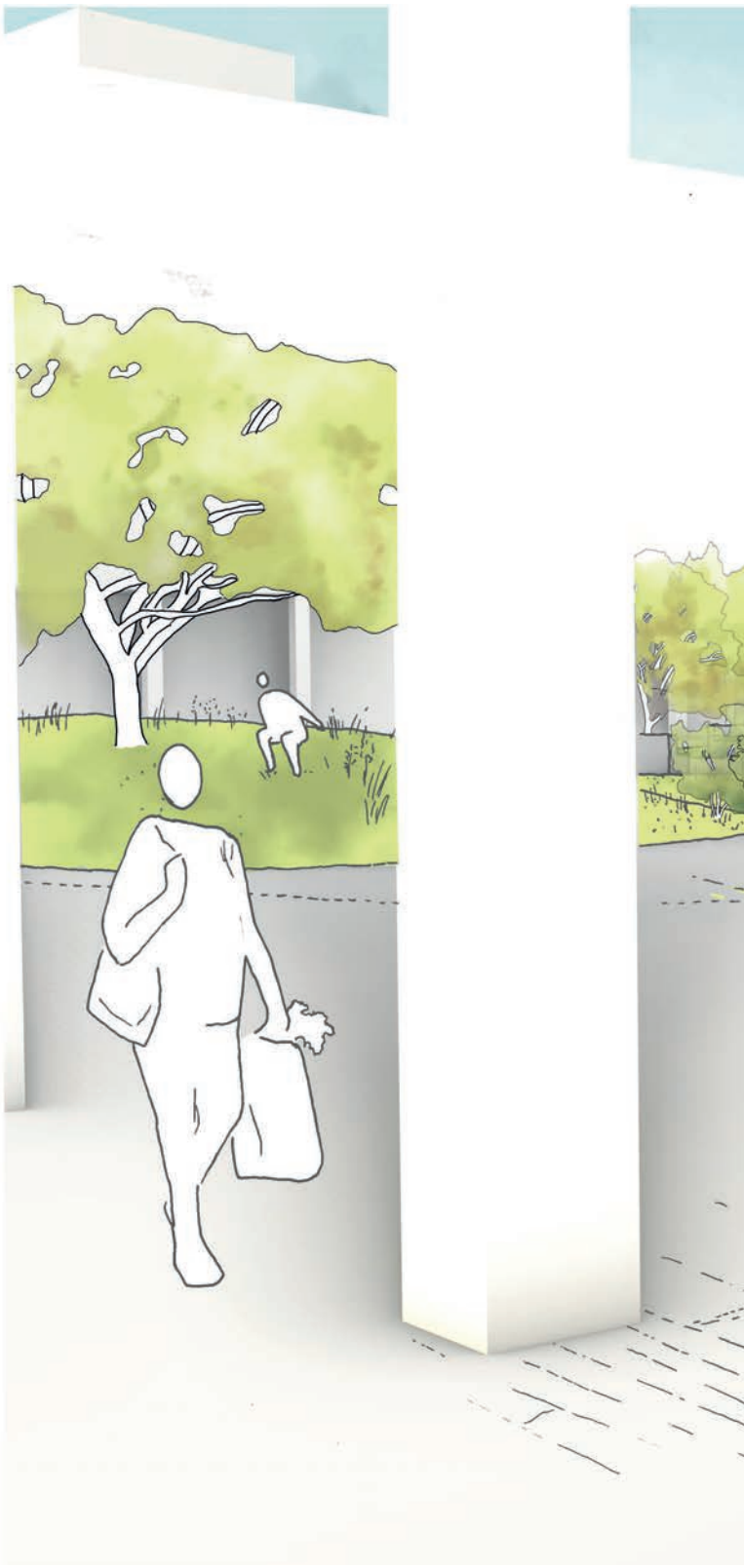


Ill. 56 Market square plan



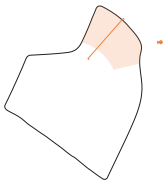
Hills along the northern and southern green areas centre the space and create a more **intimate sphere to play and stay in**, while the western and eastern green areas give space for **urban gardening**, the yields of which could be sold at the market in the same space. This also **reinforces the community** around the place and provides the site and surrounding area with a small additional resource for use in a crisis. This function is supported by trees and vegetation in the square such as mirabelle plum, sweet briar, apple trees, and edible herbs, like thyme, rosemary, and basil, with a singular retained poplar tree placed in the northern green area. While not producing a considerable amount of food on an urban scale, the possibility of gardening can communicate to the inhabitants and larger communities **how urban green areas can provide soil and space** for the creation of food and resources in the time of crisis.

Along the wind avenue and northern green area in the market square, space is left for more mobile services such as food trucks and pop-up stands to increase diversity and create a more **vibrant environment**.



Ill. 57 Marker square in-person view

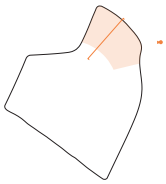
Regional and arrow squares



The regional office building in the northern part of plac Społeczny has a connected park area that creates a **visual axis** with geometric flower beds. In the design proposal this park has been adapted to **accommodate new blue elements** to manage rainfall on site, in the shape of retention ponds. This will **increase biodiversity**, reduce the heat that could be problematic during warmer seasons, and be more adaptive to rain events. The first two flowerbeds are converted into a retention pond 2 m deep and a green (wetland) retention pond 0,5 m deep accordingly - both to provide a large body of water but also a place for shallow water plants. The third flowerbed is adapted into a meadow, also capable of absorbing a certain amount of water.

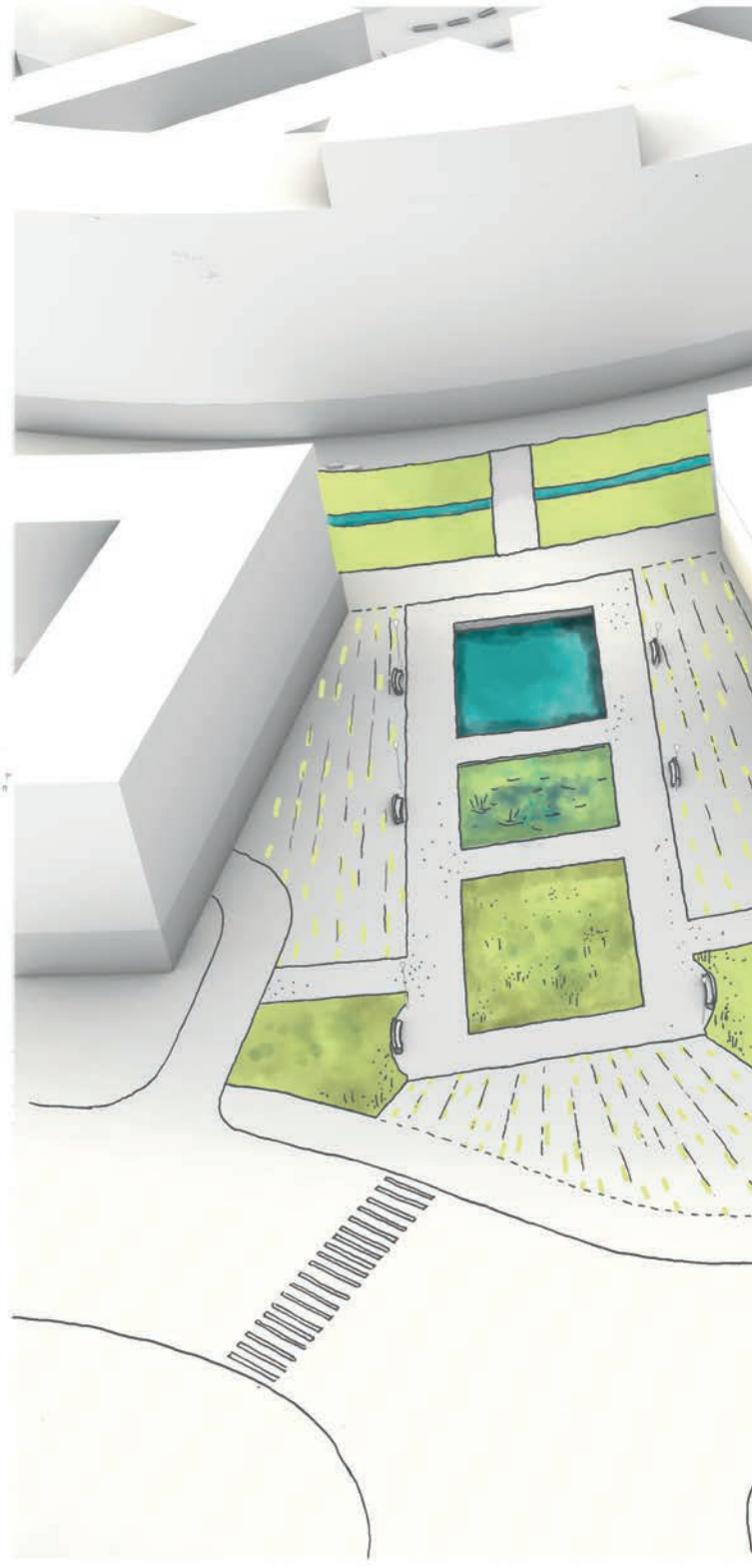
The connected park has been designed to **preserve as many trees as possible**, in order to retain the park feeling but also make a new development with already strong, fully grown trees. This is supported with additions of maple, oak, and poplar trees, fitting to the monumental character and the existing wetland ecosystem.

Ill. 59 Regional square cross-section



The green areas have been extended and gravel paths across them have been drawn between the retained trees. The green areas now give space for recreation and stay while providing a cooler area through green and blue elements.

The space extends east along the edge of the site and it opens up to the large **arrow square** with permeable pavement covering most of its surface. Along its centre the shape of the historical regional square has been recreated with the same types of retention ponds. The openness of the square and its semi-permeable pavement give room for community-driven activities but also provide a **redundant space** that can be put into use if needed, with an addition of **modular elements** from elsewhere in plac Społeczny.



Ill. 58 Regional and arrow square bird's eye view

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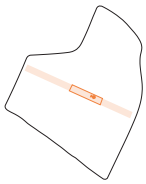
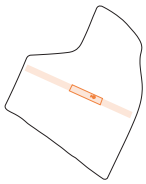
Wind avenue



The '**academic axis**' axis is an important feature of the site in the local plan of plac Społeczny but its exposure to wind would pose a problem in its functionality. To work against the funnelling effect of the planned structures on site, containers have been placed along the first floor on each side of the building. They are placed in 15 metre intervals to give space to shopping facades and access to the buildings, and with size differences, 6 or 3 metres, to **facilitate and diversify the pedestrian movement** on site. The containers will also extend the shops on the avenue and **create small, intimate and community-friendly spaces** along the facades; these spaces are accentuated by a change in the pavement into a semi-permeable one.

Ill. 60 Wind avenue in-person view

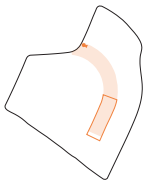


In the centre of the avenue, a line of green with poplar and maple trees will be placed, as a **tree lane underlining the academic axis** as provisioned by the local plan. This, combined with the containers, provides a low built environment that will **guide the air in the avenue above pedestrian level**, while the trees will disperse the remaining wind into low velocity breeze, making the entire avenue more **robust**. The green surface under trees will introduce **biodiversity** in between the buildings and will be supported by green roofs on top of the containers in the avenue, increasing overall site **permeability**.

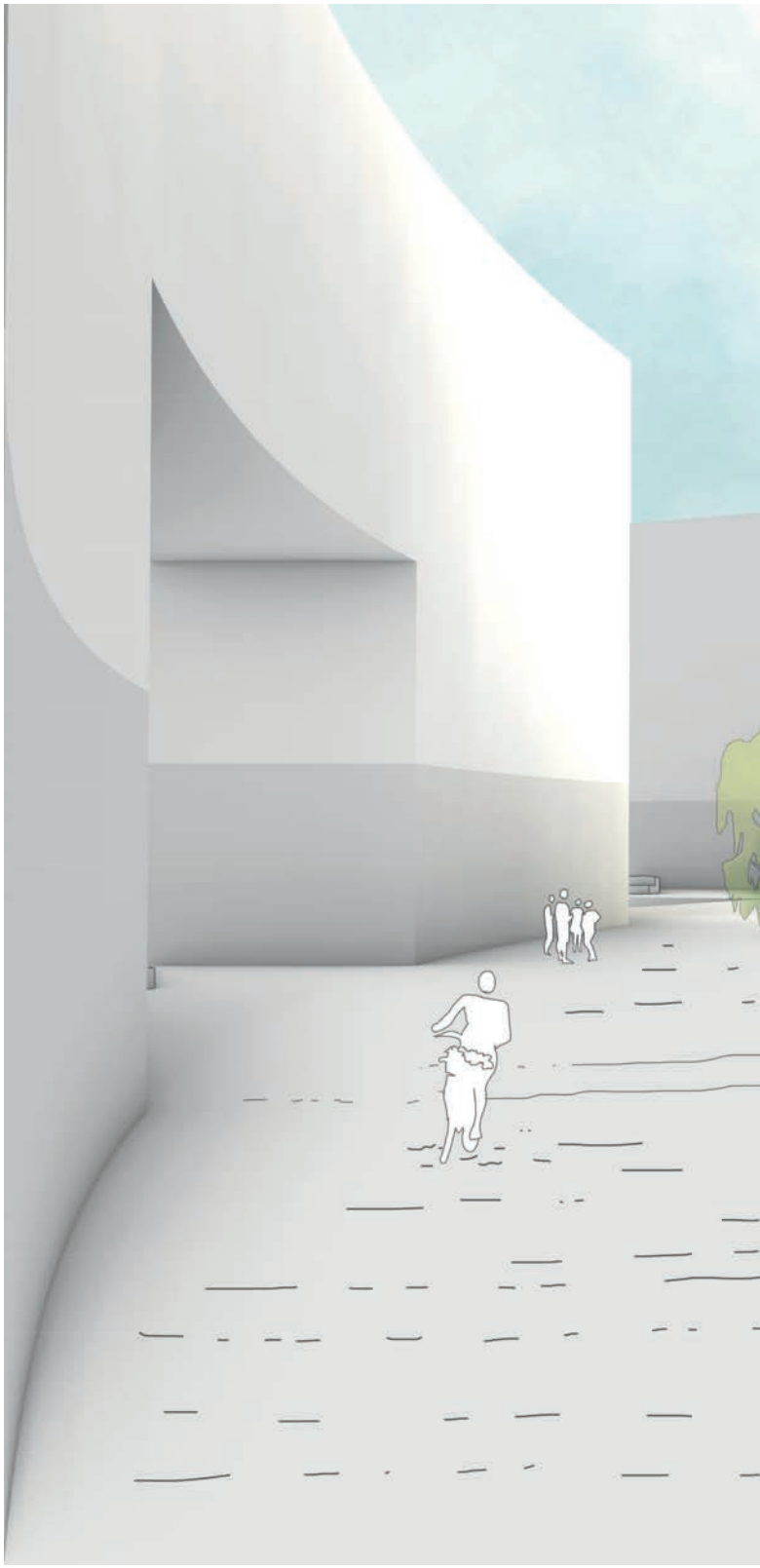
The containers will be a modular resource for the municipality, for their f**lexible use as shop extensions** or indoor space for events. In case of a crisis, they can be used as housing, test centres, or aid distribution centres. For that they could be temporarily moved to the arrow square and re-established when the crisis is handled.

Ill. 61 Wind avenue plan (fragment)

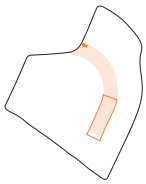
Rain avenue



The rivers in Wroclaw are a symbol of prestige, of good quality and therefore the **introduction of blue** into the site of plac Społeczny adds a distinct cultural quality to the rain avenue. Shaped after the Oława river surrounding plac Społeczny, it reintroduces the **wetland vegetation** and identity through a **bioswale** that follows the entire length of the avenue. Made for **collecting and managing the rainwater on site**, it helps guide the water away from the rest of the city to alleviate it while moving it into the regional and the arrow square for **heat alleviation**. The water is made to be 3 m wide and 1,5 m deep when filled up. With small pockets to stay among dense greenery, it creates an **ecological corridor** as well as a green connection across the site that can absorb and retain water. The corridor will consist of **wetland trees** from the area which are present on site. Weeping willow, birch and hazel trees follow the water and help regenerate the nature of Wrocław as well as filter the water in the area with the help of plants along the water flow.

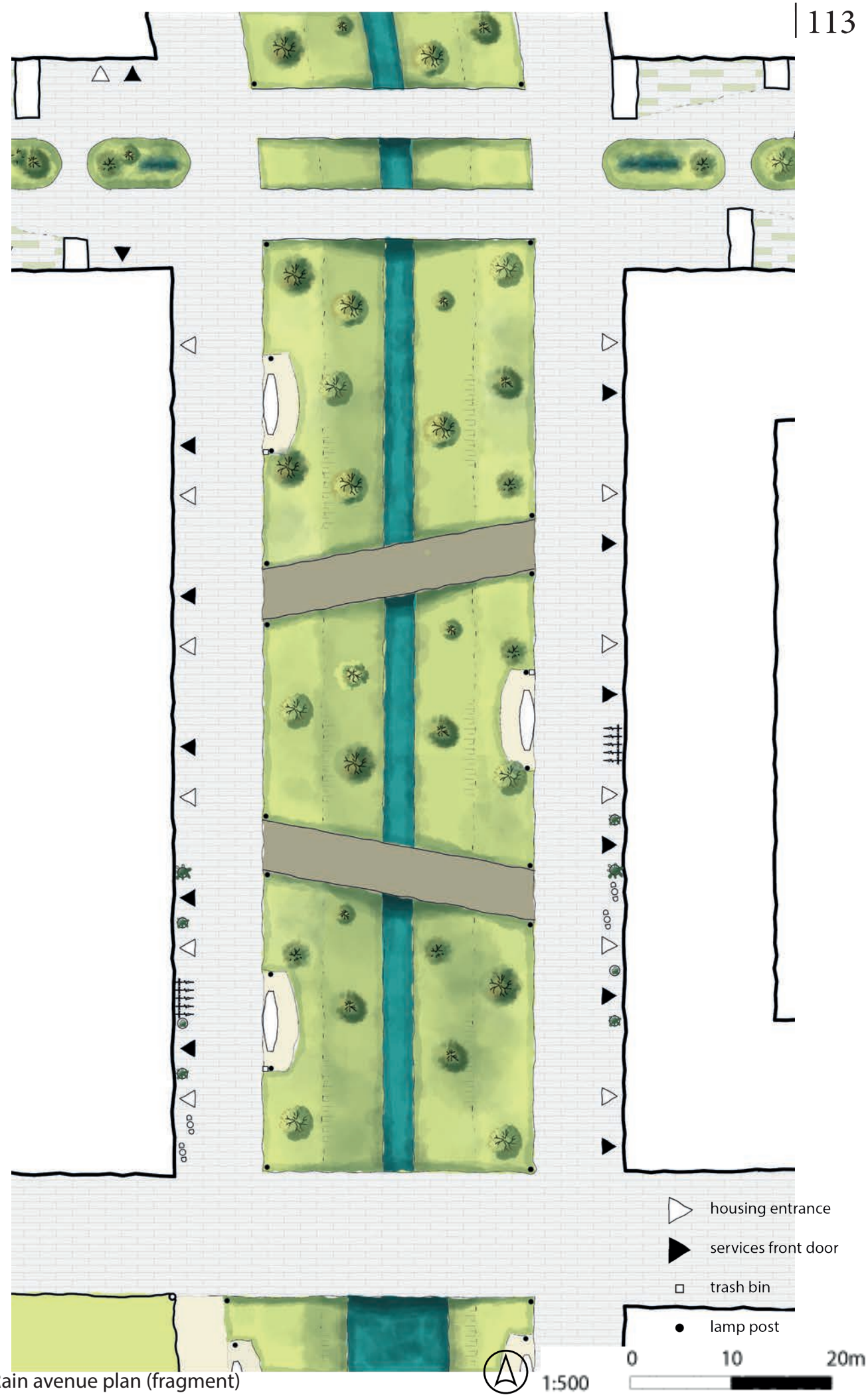


Ill. 62 Rain avenue in-person view



The bioswale can be crossed with solid bridges that are designed wherever there is a movement axis, supported by smaller wooden bridges in several places to **make the crossing of the swale an experience**, bringing users closer to water.

The intersection between the rain and wind avenues is marked by their **symbolic dissolving** into each other; the bridges are extended so there are two to accommodate the larger movement while the swale's blue element expands into the wind avenue.

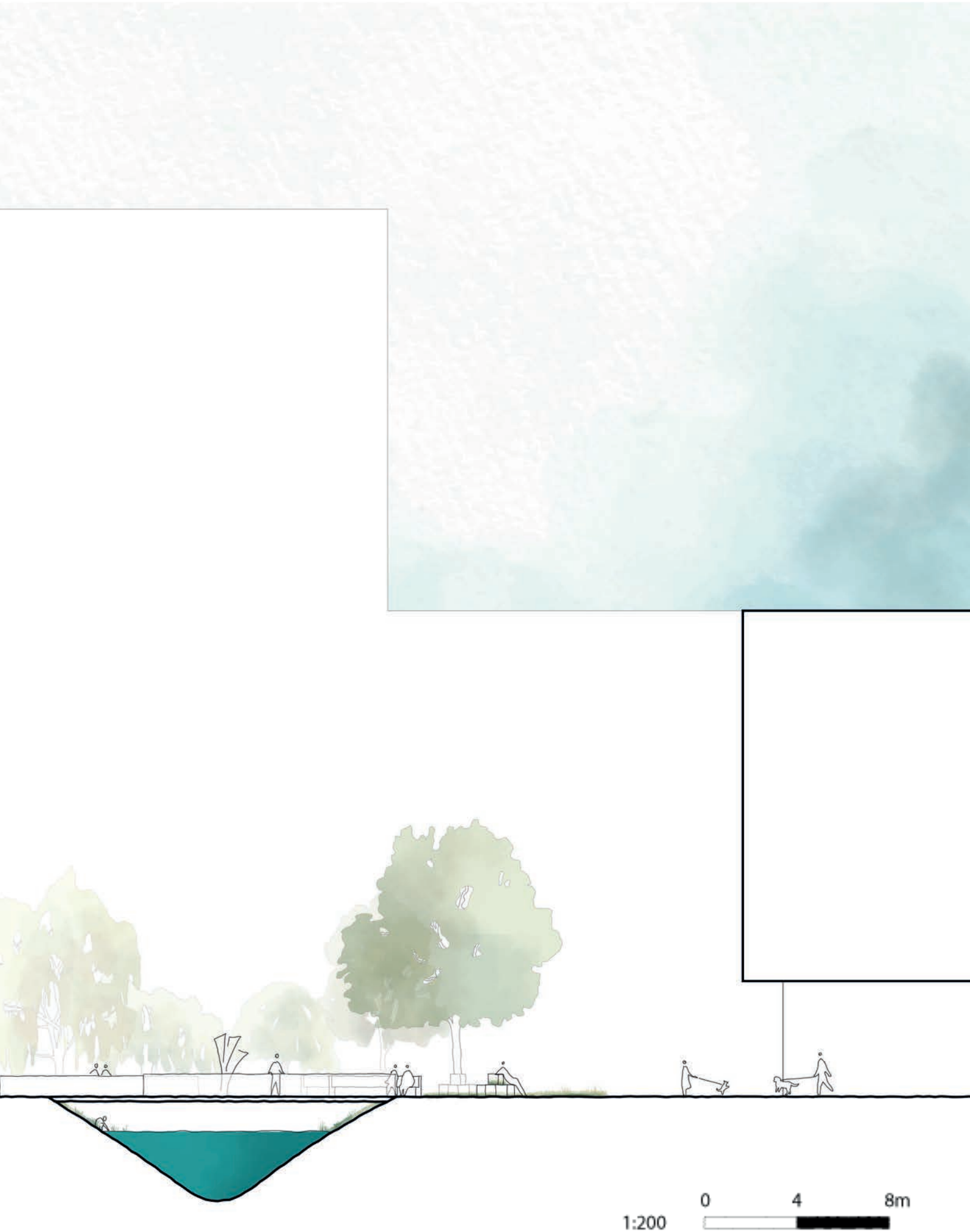


Ill. 63 Rain avenue plan (fragment)

Rain square

The rainwater formerly collecting around the historic church in the southern part of the site is alleviated by a **water retention pond** at the beginning of the rain avenue, making the site more **robust** and **adaptive** to rain events.

Ill. 64 Rain square cross-section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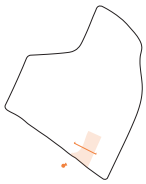
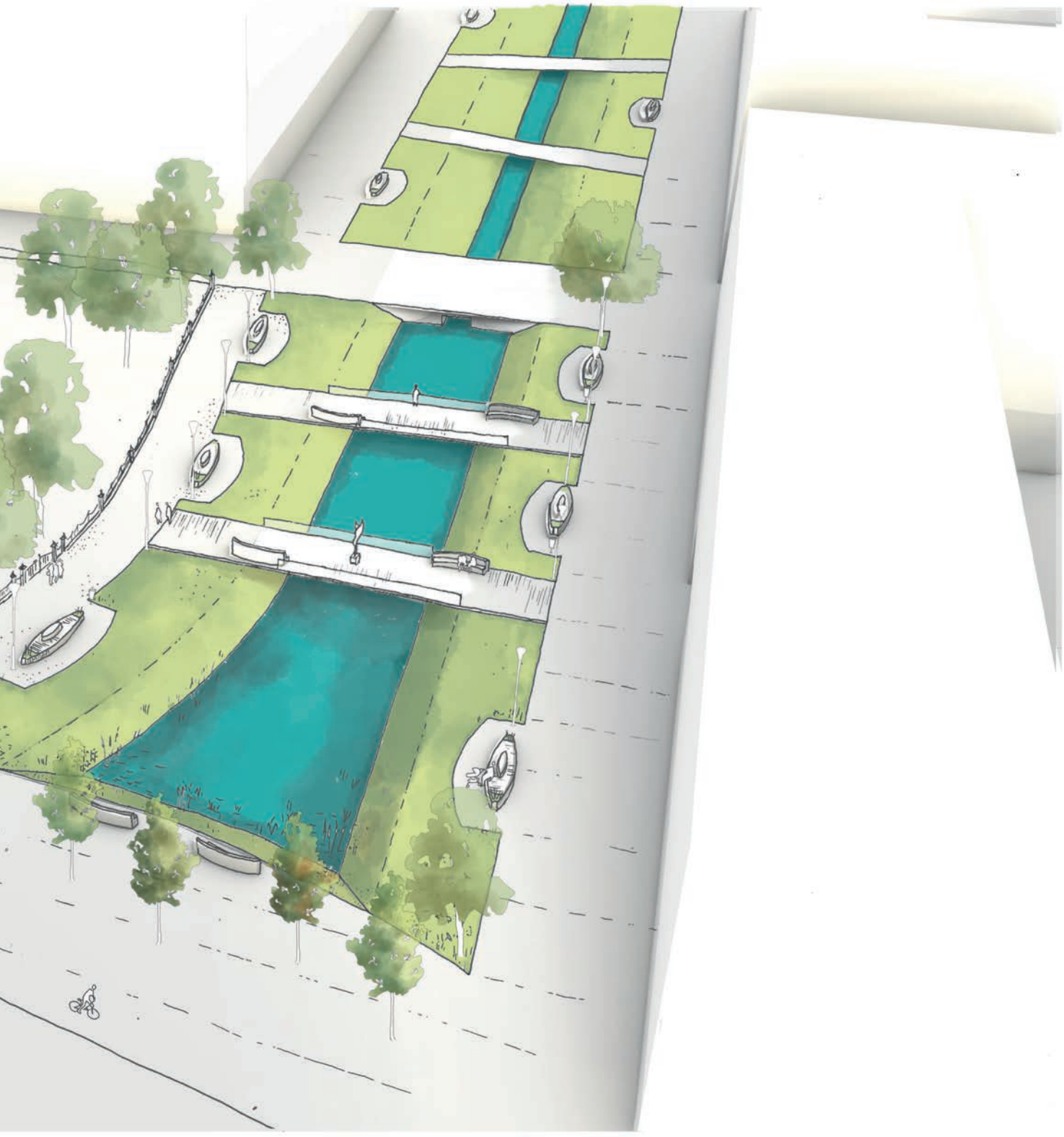


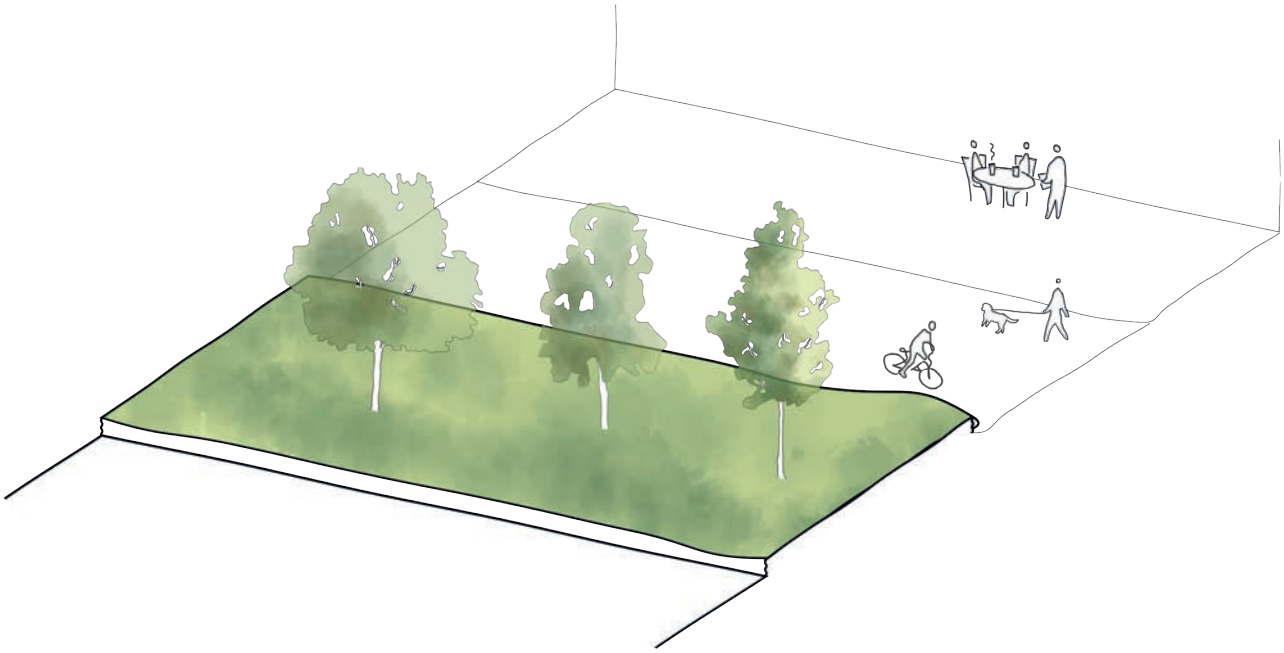
The pond, 3 metre deep and wider than the bioswale, has a larger water mirror but follows the same style of bridge crossings. The surrounding green is less dense than in the rain avenue to retain the square character but it creates **places for staying with benches and low vegetation**, maintaining the visual connection across the pond. An art piece from the nearby art university has been displayed in the middle of the southern bridge, **underlining a visual axis** and bringing the surrounding community into the square. Around the pond, trees and plants similar to the ones found in the avenue will be present but more dispersed, making space for people to inhabit the square. Altogether, blue and green elements on site aim to alleviate a 50 year rain event.

Ill. 65 Rain square bird's eye view



Sidewalks

Around the site, soft mobility spaces have been extended to be five-metre wide paved space split into a two-metre walking and three-metre biking zone, making the biking and walking experience better. To the east, the pavement has an **extra green buffer** along it, made of poplar and maple trees and high greenery, providing soft mobility with **distance to the car traffic** along the main road, while also **alleviating rainwater** along the road and buildings. Along the church, the five metres are pushed down to three metres of shared soft mobility space to accommodate the hard traffic needs for the road. Because of this, the space is mainly focused on the bikers, whereas pedestrians are directed to the side and around this stretch of the road.

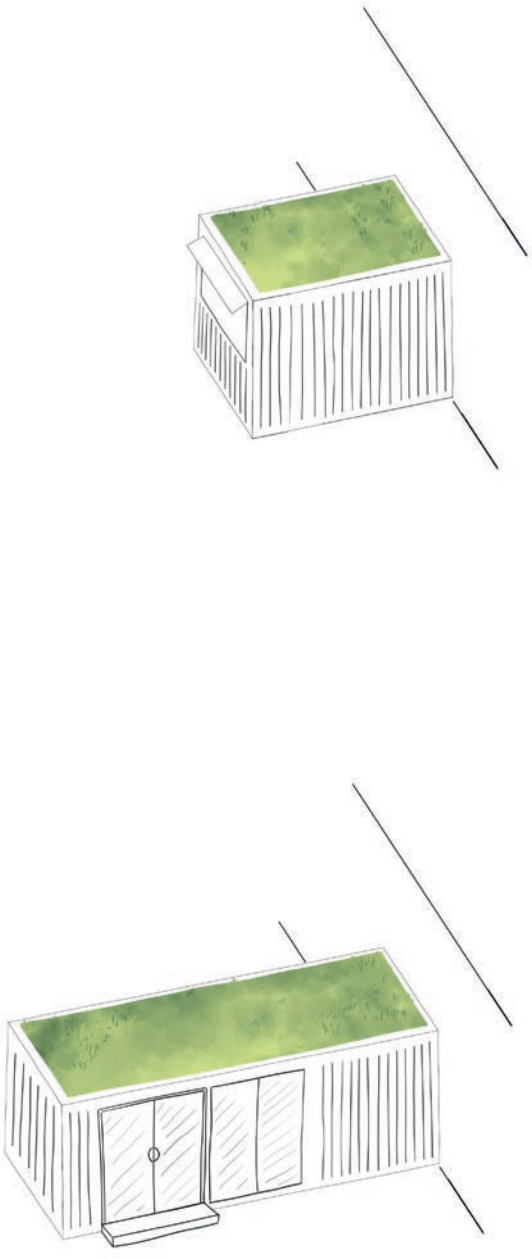


Ill. 66 Axonometric view of a fragment of sidewalk along the main road

Small architecture elements

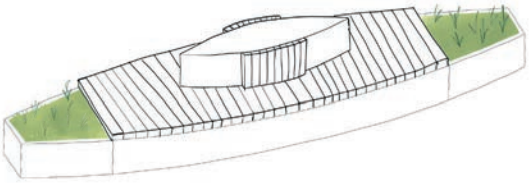
Many of the interventions on site consist of smaller elements that create **resources**, identity and social gathering spots.

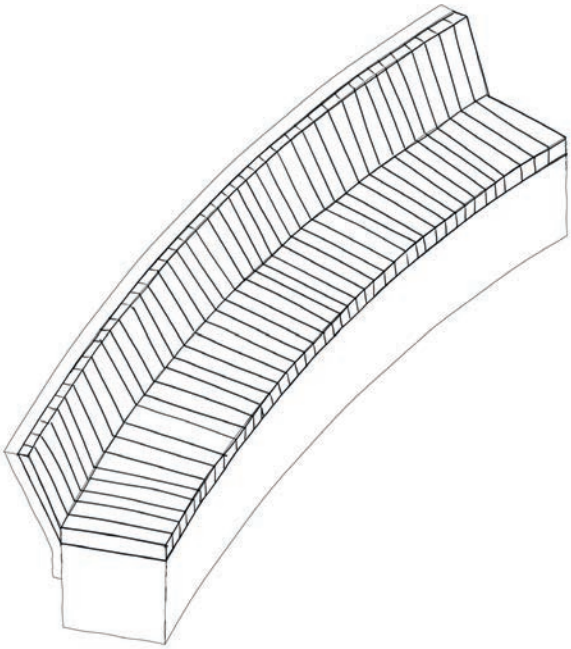
The first shown is a **modular element**, adapted from a standard s**hipping container**, that creates **wind protection and service extensions**. These elements, 2,6 m high and 2,4 m wide, come in two lengths: **3 or 6 metres**. This creates a more vibrant and diverse wind avenue and provides more options in terms of modularity. As shop extensions, the containers will be fitted with openings and doors to engage with pedestrians, therefore the 6 metre containers will open up towards the pedestrian movement on the right side to meet and catch people's eyes. The shorter containers will have an option of opening on the end towards the street, to **activate the space diversely**. Both types will have green roofs to absorb water and maintain biodiversity. Containers will be locked into the pavement and opened up towards the shop to extend it.



Ill. 67 Axonometric views of the two types of containers

On the site **two types of benches** can be found. The first one takes inspiration from elements in a newly developed waterfront along the Oława river. Shaped like a 6 m long and 1,5 m wide ellipse with 1 m of planting on both ends and a backrest in the middle, this element gives a place to stay and a possibility of **diverse views**. The second, 4 metre long bench, while retaining similar materials, is **curved inwards**, with an aim to be a **place for conversation** and meeting people.





Ill. 68 Axonometric views of the two types of benches

07 Wrap-up

Conclusion

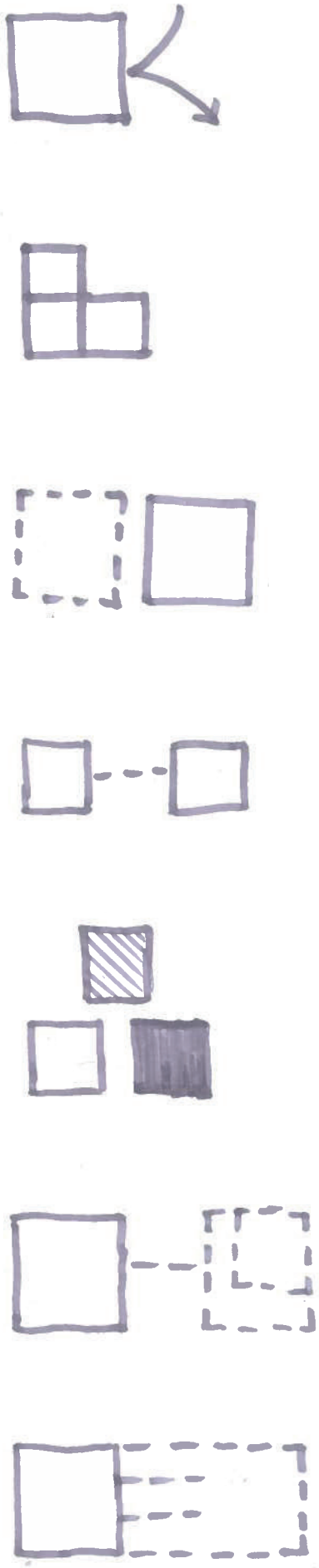
At the outset of this project was a wondering about the role of public space as a tool for urban resilience. This wondering was given a clearer shape and focus through the theories of Sara Meerow and other urban resilience researchers. It was itself a big task to take a term this complex and general and apply it on a smaller scale.

The wondering took shape in a thought experiment based on a municipality-created framework and resulted in a masterplan that, despite the spaces being specialised for specific crises and situations, creates a **holistic site that builds on existing culture** and new ideas both from the municipality and from the world of urban design.

The utilisation of the qualities like **modularity** and **redundancy** could give the city as well as the inhabitants of plac Społeczny resources and visual inspiration that could help and guide them in face of the upcoming climate-related crises, **reactivating and engaging the community** in the handling and managing of resilience on site. Reintroduction of the **wetland qualities** creates connection internally on site but also across Wrocław reconnecting to an old identity and the surrounding nature of the city while presenting attractive and green spaces for recreational use and reinvigorating biodiversity. The project has identified seven most relevant and operational qualities of resilience and given them a tangible shape in the public space that not only works towards resilience but also improves the quality of life of visitors and inhabitants on site.

Altogether this shows that the **public space**, no matter its shape, can be the first line of defence against the climate crisis, **it is a space for urban resilience**.

While plac Społeczny is currently an empty crossing for cars, there is potential for its development to be **a new state of design in Wrocław** that gives power to the public space and takes a step towards a more resilient urban system. This project, hopefully, shows this potential.



Ill. 69 The seven resilience qualities

Reflection

What can the design of public spaces in plac Społeczny do for the crisis preparedness and resilience of the site itself and the urban system as a whole?

This was the question that drove this project forward. While it may not have been answered in a definitive way, the process of addressing it, as well as the entire approach of the project, have brought up some interesting insights.

The first is a question of **public space itself - how is it defined and delineated**? The decision to limit the design intervention to what is between buildings and (in theory) equally accessible to all, made it necessary to confront the boundaries of this realm of focus. The choice of a local development plan as a framework meant that the designed spaces were placed between generic, colourless volumes of buildings, with no architectural expression, materiality or detail. The placement of building entrances and facade divisions had to be assumed based on common sense, to be able to design entrance zones and public space 'edges' (Gehl 2010), elements so important for the functioning of the spaces. This effort made it clear that public space design is impossible without architectural design, or, to take it even further, **the public does not exist without the private and the semi-public**. The facades, functions and entrances of private buildings, even when designed for completely private use, become by necessity part of the public realm, even by the virtue of the public being able to look at them and perceive them as part of the public space. The semi-public courtyards of perimeter blocks blend together with the purely public. The city is a patchwork of spaces with different degrees of public accessibility, but the boundaries between its pieces are not discreet.

Is the exclusive focus on public space design a failed attempt then? Not necessarily. The **abstracting of the public space from between the buildings** made it possible to see it clearly and **appreciate the resource** that it represents for the urban community.

A place to **spend time outdoors**, meet complete strangers and interact with nature. A place to **grow communal food** and thereby become a bit more independent from the global market and its fluctuations, and a bit more prepared for crises and instabilities. A place for **ecosystem services** to be realised, for wildlife to function in the city and for the **urban system to be strengthened**, made more healthy and biodiverse. A place to prepare for inevitable crises. The public space can be all that and more, if only given proper attention in the design process.

This public space centering is also a counterbalance to the practice, all too common in Polish urban development, to focus solely on the building as a financial profit generator, and only design the surrounding as an aesthetic backdrop of it or a necessary technical hinterland. The approach assumed in this project **places the outdoor space and the activities and processes it affords in the foreground** of the design process, to make sure its importance is properly acknowledged, and it shifts the weight of the urban development objectives from generating private gain to creating public good. While this order of things (first designing a coherent public space, then adding buildings to the mix) is not a feasible or recommended one, this thought experiment of subverting the status quo of urban development brings forth the need of reevaluating its priorities. It appears absolutely crucial to **integrate different spheres of design**, such as buildings, infrastructure, the public and the semi-public, if one aspires to **face a challenge as big as building urban resilience** and preparing for crises.

Another thing to consider is, what this level of design can actually do for the resilience of the site and the larger urban system. Urban resilience has mostly focused on the large- and extra-large scale of cities or regions, and on strategic-level design and planning. This project, by **engaging with the neighbourhood and human scales**, substantialises urban resilience even further and puts it into contextual, actionable interventions as detailed as sizing rainwater retention ponds and selecting specific vegetation species. In that regard, it may be a **stepping stone to closing the gap between urban resilience theory and practice**. At the same time, when designing for resilience, it is still of utmost importance to view the urban system in its en-

tirety and consider the embeddedness of the focus site in the various city networks. The most obvious way to do it is through green, blue and mobility structures, but it also includes the more intangible networks of governance, material and energy flows or socio-economic dynamics. This project could be further contextualised by looking at those on a broader scale and projecting a closer symbiosis between the site and the larger system.

Finally, the contextualised work with urban resilience in the project did evoke a reflection on **what the essence of resilience actually is**. Apart from the identified resilience qualities, it seems to be so much about **continuity**: knowing one's resources and being able to **build upon** them. This is why it is so important to retain existing trees in the site, those that are mature, robust and can fully perform their ecosystem services. It is also for this reason that the **local heritage and identities** are important to map and consider. Cities, with their diverse capital and layered heritage, are naturally equipped for resilience. It is a matter of **appreciating the resources** ingrained in them, and being able to tap into these resources in a flexible and adaptive way. That is how a resilient urban system is built.

Ill. 70 Nature's resilience in Wrocław. Own photograph

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Illustration list

Cover page illustration: fragment of a mural by street artist Patraskey, placed in the pedestrian underpass of plac Społeczny. Own photograph and graphic elaboration.

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Ill. 12. Timeline collage, own illustration based on photographs and maps:
1932: Przedmieście Oławskie-Ohlauer Stadtgraben (1932)
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