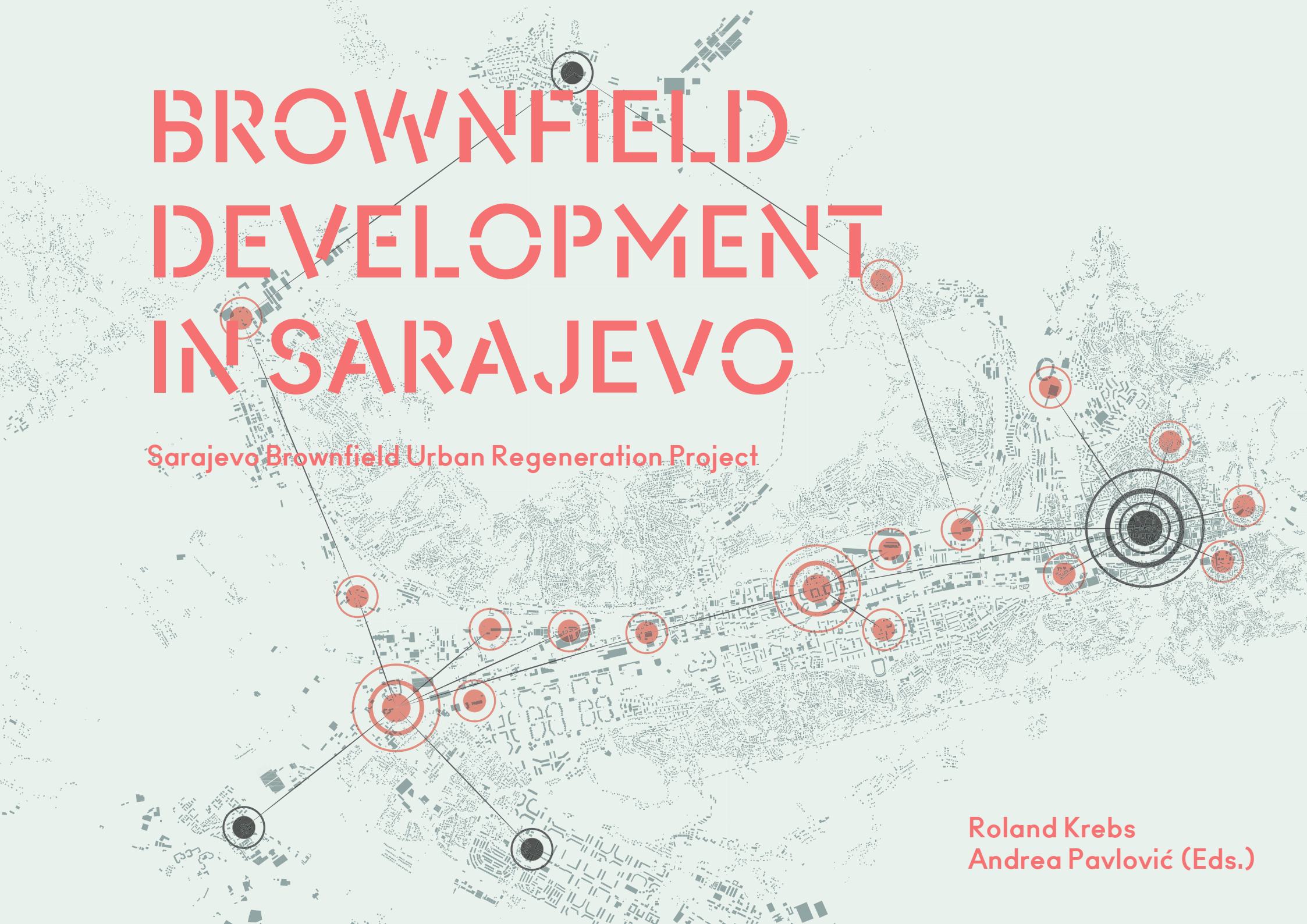
BROWNFIELD DEVELOPMENT IN SARAJEVO

Sarajevo Brownfield Urban Regeneration Project



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IN SARAJEVO

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Brownfield Development in Sarajevo:

Sarajevo Brownfield Urban Regeneration Project

ROLAND KREBS AND ANDREA PAVLOVIĆ (EDS.)

UNIVERSITY OF SARAJEVO, FACULTY OF ARCHITECTURE

SARAJEVO, 2023

COLLEGIUM ARTISTICUM

Winner of the 2023 BiH National Architecture Award
in the category Urbanism

This book is dedicated to Gordana Memišević,
whose exceptional contributions to Sarajevo's urban
development continue to inspire us.

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FOREWORD

NIHAD UK
PRIME MINISTER OF CANTON OF SARAJEVO

As Prime Minister of the Canton of Sarajevo, I am pleased to acknowledge the significant contribution of the previous administration led by my predecessor, Edin Forto, in the efforts to transform Sarajevo into a sustainable and liveable city. I would like to thank him for his leadership and commitment to the urbanization of two former brownfields on the main transportation corridors of the city's tramways, as detailed in this report.

The Cantonally-led project involving the City and sub-municipalities has laid the groundwork for a new era of development and progress in Sarajevo. The urbanization of these former brownfields will not only generate new economic opportunities and job creation but also create well-connected places that are accessible to all residents of Sarajevo.

As the current Prime Minister of the Canton of Sarajevo, I am committed to continuing the planning and development of these sites. Our government recognizes the vital role that transportation plays in creating vibrant urban spaces, and we are committed to ensuring that our transportation system is integrated, efficient, and accessible. By prioritizing sustainable development and transit-oriented design, we will make Sarajevo a more vibrant and dynamic city.

I look forward to working with our partners in the City and sub-municipalities to continue the planning and development of these sites, and to create a more sustainable, liveable, and attractive city for all residents of Sarajevo.

FOREWORD

EDIN FORTO
MINISTER OF COMMUNICATIONS AND
TRANSPORT OF BOSNIA AND HERZEGOVINA

As former Prime Minister of the Canton of Sarajevo and now State Minister for Transport, I welcome the publication of this report, which brings to life the fruits of our Cantonally-led project involving City and sub-municipalities, in a highly accessible manner.

Transport is, at its core, about connecting people and places. In this project the approach of building new parts of the city within the existing city is a key part of delivering well-connected places. By urbanizing two former brownfields on the main transportation corridors of the city's tramways, we are not only improving access to transportation but also creating new opportunities for economic growth and job creation. As the transportation minister, I am committed to ensuring that our transportation system is integrated, efficient, and accessible. By connecting neighbourhoods, businesses, and cultural attractions, we will make Sarajevo a more vibrant and dynamic city.

I want to thank the City and sub-municipalities for their hard work and collaboration in bringing this project to fruition. Their efforts will have a positive impact on the lives of Sarajevo residents for years to come. This project sets a precedent for future urban development in Sarajevo, promoting a sustainable approach to development that focuses on transit-oriented design.

FOREWORD

MANUELA NAESSL
EBRD HEAD OF COUNTRY

As a long-standing partner of Sarajevo Canton in its development of sustainable and greenerinfrastructure, we are delighted to have supported this project. Canton Sarajevo is a leading city in our EBRD Green Cities network and we were very happy to facilitate mid-to-long-term thinking about the future of the city alongside our work to support critical infrastructure upgrades through direct financing.

Following a competitive process, we were pleased to be able to appoint a mixed Bosnian-Austrian team for the assignment, in which local knowledge and understanding of Sarajevo's unique context has been invaluable. We were very happy how the Superwien-OSNAP-Colliers team has shown commitment and tenacity in delivering this project over a prolonged period.

The project reinforces a holistic approach where we aim for an improved deployment of land in the city alongside the upgrades of specific infrastructure. Having recently also joined "100 Net Zero Emission Cities" we very much hope that as the city continues to attract investment, it will use the project result to develop projects that benefit the citizens of Sarajevo and businesses based in the city – both in terms of economic development and in terms of healthier lifestyles and improved economic outcomes.

SARAJEVO IS EVERYWHERE

Hubert Klumpner, Michael Walczak
Urbanthinktank_next, Chair of Architecture
and Urban Design, ETHZ

"Architecture arises as a creative engagement with conflict. Without conflict, there is no need for change, no need for architecture. The exception to this is when architecture must be introduced to create conflict where no one exists."
Lebbeus Woods, Pamphlet Architecture, 1993

"(...) we believe that we have enough buildings, enough construction, enough infrastructure. And it is now time to consolidate it and find the qualities within the built. This is not against future production, it is more about a consideration of what we really want in cities."
Hubert Klumpner, AD Interview UABB Shenzhen Biennale, 2015

This publication on Regenerating Urban Brownfields is the product of a long and intensive engagement with Sarajevo. The local and international team around this EBRD-sponsored project and this book initiated and led by Superwien, Urban Innovation, OSNAP, Colliers in Partnership with UNSA, AA BiH, Days of Architecture, and students have given shape to a necessary space of discussion through practical design propositions. The project is envisioned in a network between stakeholders from academia, politics, and private enterprise, committed to building a better future for the city of Sarajevo as a whole, finding answers to some of the challenges and expectations for the city since the signing of the Dayton Agreement after the Bosnian war in 1995.

We have followed the engagement of Superwien on three continents with Development agencies, Banks, and well over a dozen of different City Administrations in Latin America, Africa, Vienna, and Berlin with great attention over the years. While we have been engaging ourselves in support of the design for the new General Urban Plan with UNSA for the Sarajevo Canton Institute of Planning and Development, we learned with great interest and curiosity from the planning culture in Sarajevo that has existed since 1954, enduring conflict urbizide[1], shrinkage, re-growth and the transition to turbo-privatization over recent years. The multidisciplinary team around Superwien worked on key strategic planning instruments, tools, and situated models of concrete action, re-developing a strategic backbone on the potential of Brownfield sites based on the specific conditions of Sarajevo, and the opportunities evolving out of the history, climate, topography, culture, past and current program, including digital technology, science based approaches for potential futures of the city and citizens.

Cities are part of long-term urban processes and development cycles; it often seems that cities no longer have a sense of self or no longer provide the necessary service to the citizens; it also seems then the physical and social structures are unprepared to meet future challenges and uncertainties, of migration, inequalities natural and man-made disasters.

However, our direct actions shape cities as much as they shape us, and Sarajevo is no different. Brownfield sites are never empty spaces and not only evidence for slow economic development, but Brownfields are also always valuable inner city land resources; no central area is exempt from the need for a complete reconstruction of its full original potential and attractiveness when it comes to reimagining the potential of the larger context along with the new relationships a site has to offer. Together with all Sarajeveans caring for their city in their hearts and their minds, we believe that the delayed legacy of the 1984 Olympic Winter Games, a project unleashing today the strength of togetherness, ready to happen, and that the brownfield sites of Sarajevo are a practical and metaphorical bridge between east and west, north and south.

[1] Bogdan Bogdanovič, 1994

1

INTRODUCTION

As a heritage of the industrial economy, brownfields, formerly used as production sites, military sites or tram depots, occur in many European cities close to the city centre. Sarajevo, the capital city of Bosnia and Herzegovina (BiH), is one of these cities, showing several previously developed sites that are currently not used to their full potential. Within these sites lies an enormous potential for the future urban development of the city.

1.2 PROJECT BACKGROUND

Sarajevo faces a range of challenges related to social and environmental issues, the city's economic growth, as well as the coordination of investments in buildings and physical infrastructure. A strategic and integrated regeneration of the under-used land holdings and infrastructure systems in or close to the centre could lead to an increase in economic activities and an improvement of quality of life. For this purpose, the land holdings have to be released and key actors have to be encouraged to invest into the development of these high potential sites. Therefore, the European Bank for Reconstruction and Development (EBRD) has engaged a consortium led by superwien to pilot the strategic redevelopment of two brownfields in Sarajevo.

The main objective of the consultancy is to develop an urban design strategy for the regeneration of two opportunity sites in the city that is financially viable and generates a socially and environmentally sustainable outcome. The proposition should result in the transformation of the brownfield sites as new centralities which generate economic development, activities, and life. It is therefore necessary to work towards a mixed-use development that is both ecologically sustainable and economically resilient. In order to achieve this, different methods were applied, including but not limited to scenario modelling, the continual involvement of different stakeholders, and the elaboration of development propositions for both sites. The final proposition forms the foundation of a detailed municipal plan. It is therefore a key document that sets a long-term strategy for the development of the selected area in Sarajevo and attracts both domestic capital as well as foreign direct investment to the country. The regeneration of the target sites is expected to support positive, city-wide change and represent one of the most significant changes within the Canton in the near future.

▶ Sarajevo covered with smog on a sunny winter day

1.2 WORK PROCESS

The work process was organized in four main phases. The first task was to understand the urban context of Sarajevo and review the many opportunities of brownfield development that the city has to offer. The result of a multi-criteria analysis of 24 brownfields was the selection of two target sites for further analysis and development: Kvadrant B in Marijn Dvor and the former Central Railway Workshop Vaso Miskin Crni (VMC) in Novo Sarajevo.

The selected brownfield sites were assessed and a spatial analysis was carried out. In parallel, a Real Estate Demand Study was prepared to inform the planning process and decision-making. In order to test development opportunities, different spatial and mixed-use scenarios were drafted for both sites. The scenarios were discussed with the Working Group comprising representatives from all involved administrative levels to agree on the way forward.

Urban Design Lab

Creation and evaluation of scenarios

Design of development proposals

SCENARIOS MODELLING AND OPTIONS APPRAISAL May 22

ELABORATION OF DEVELOPMENT PROPOSITION Jul 22

In parallel, the Sarajevo Urban Design Lab was conducted. The program included a series of academic workshops, public events, and stakeholder workshops that enabled a broader discussion about brownfield development in Sarajevo. At the same time, the different mixed-use scenarios for both project sites were evaluated, and their financial viability assessed against the backdrop of the previously conducted market analysis.

Finally, clear design visions were developed for Vaso Miskin Crni and Kvadrant B, including a detailed design strategy, technical information, infrastructure plans, as well as environmental and social impact appraisals. The final report presented here, also makes a strong case for the benefits of the proposed projects from the perspectives of urban regeneration and sustainable 'green' development.

1.3 STAKEOLDER MAPPING

The development of vibrant and resilient urban centres can only be successful if the relevant stakeholders are involved in the planning process. An important prerequisite for participatory planning is to have an overview of those relevant actors. The keeping of a stakeholder list as a living document that is expanded and restructured during the course of the project is crucial. It includes stakeholders from different sectors, that may contribute to the project development and implementation. They can be included in the process at different stages of the project. As a graphical representation a stakeholder map demonstrates the relevance of key actors and how different stakeholders are connected to the project.

The stakeholder mapping aims to include both, decision-makers' and various local stakeholders' perspectives to incorporate different expertise and perspectives on the spatial development and regeneration of Sarajevo's brownfields. The stakeholders identified for the Brownfield Urban Regeneration Project are divided into four categories: public sector stakeholders, private sector stakeholders, academic sector stakeholders, as well as stakeholders of the cultural sector and non-governmental organisations (NGOs).

Public sector

The public sector was the main stakeholder group involved in this part of the development process. Due to the present administrative and spatial structure, public stakeholders included representatives of Cantonal Institutions, most importantly the Development Planning Institute, as well as officials of the City of Sarajevo and its four Municipalities Novi Grad, Centar Sarajevo, Novo Sarajevo and Stari Grad.

▶ Cutout of Sarajevo's historic city centre

Private sector

The main private stakeholders involved in the process were the EBRD and the international consultants working on the assignment. The inclusion of other local professionals, however, was an important concern. The Association of Architects in BiH is an umbrella institution that brings together architects and urban planners at the level of BiH. The Association is promoting new achievements in its field and is organizer of numerous exhibitions, trainings and seminars. They were an important bridge to connect with local professionals and hosted some workshops and public events in their premises. Similarly, the Association of Consulting Engineers of BiH is a professional and non-profit association for local engineers. It is organizer of most of the conferences and gatherings on the local and regional level, regarding their field of expertise. The dialogue with representatives and members of both Associations gave valuable inputs to the project development and design process.

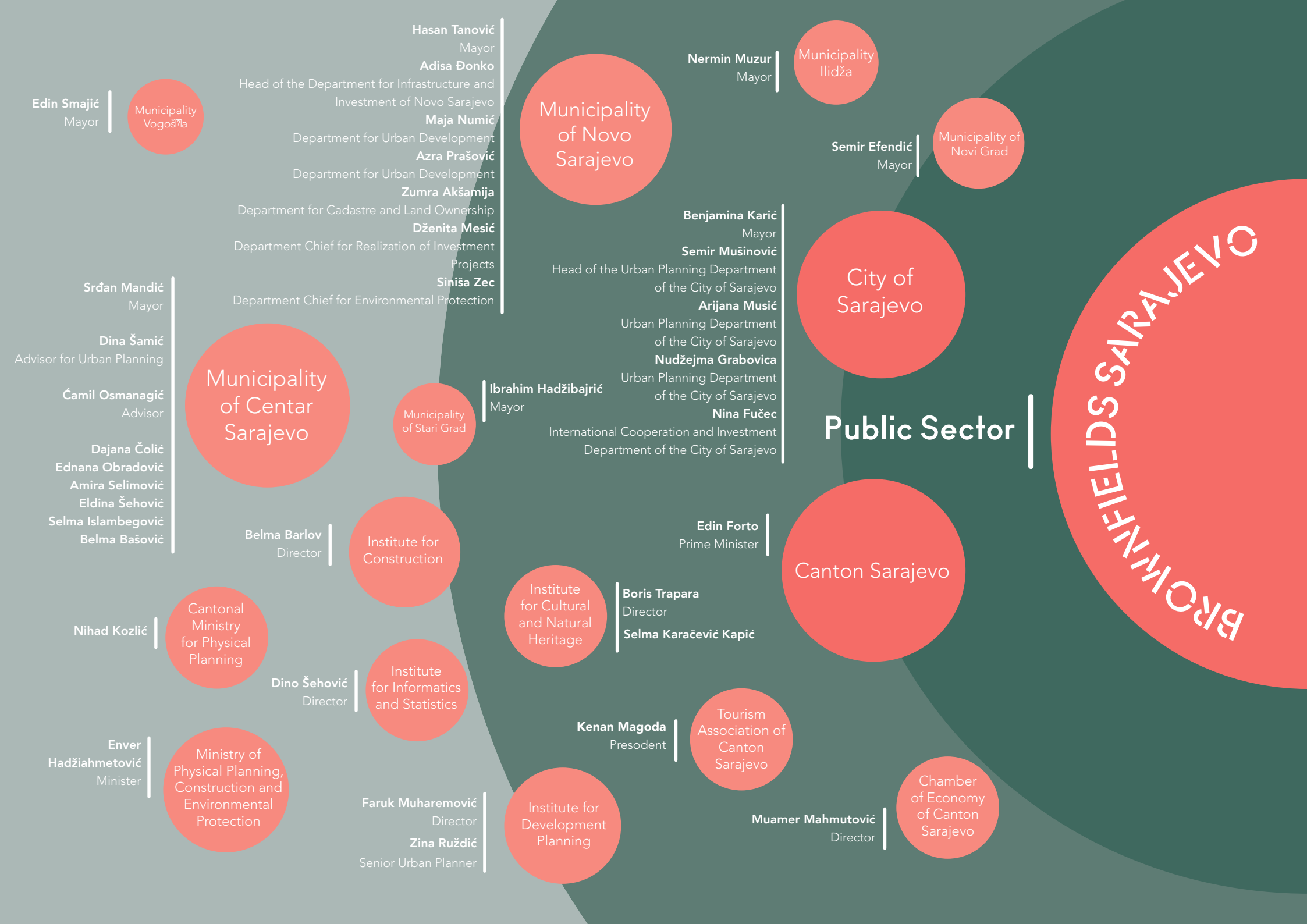
Academic sector

The Faculty of Architecture of the University of Sarajevo was an important partner throughout the planning process, with academic staff providing their professional feedback to the design. It is also the main institution for the education of architects and urban planners in BiH. The Faculty facilitated an experimental academic workshop with students of architecture during the Sarajevo Urban Design Lab. Other Faculties of the University of Sarajevo, like the Faculty of Economics and the Faculty of Traffic and Communication, could be involved into the further development of the urban regeneration process.

ETH Zürich was another stakeholder and partner in the academic sector. The Chair of Architecture and Urban Design is currently involved in the Sarajevo Urban Transformation Program that aims to introduce a digital decision making tool for planning the city, contributing to the revitalization of the Marijin Dvor neighbourhood. The project is implemented for the Planning Institute of Sarajevo Canton.

Culture & NGOs

For further development and programming of the target sites it is also recommended to involve cultural initiatives and institutions. Days of Architecture represents one of the biggest events in the field of architecture in BiH. It is conceived as an annual, multi-day festival which includes international and local architects' lectures, exhibitions, discussions, movie screenings, and similar events related to the subject of architecture, design, urbanism and spatial planning. The Historical Museum of BiH and Ars Aevi, the main museum of contemporary art in the city, are important stakeholders of the cultural sector. Crvena is a non-governmental association for Culture and Arts that could be involved in the early vitalization of brownfield sites. For questions of heritage preservation, the ICOMOS National Committee should be included. The Regional Education and Information Centre for Sustainable Development in South-East Europe (REIC) could be another interesting partner. The transnational NGO aims towards the provision of support to the environmental, social, economic and technological development of the country.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BROWNFIELDS SARAJEVO
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Mayor
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Maja Numić
Department for Urban Development
Azra Prašović
Department for Urban Development
Zumra Akšamija
Department for Cadastre and Land Ownership
Dženita Mesić
Department Chief for Realization of Investment Projects
Siniša Zec
Department Chief for Environmental Protection
Municipality Vogošća
Edin Smajić
Mayor
Municipality Ilidža
Nermin Muzur
Mayor
Municipality of Novi Grad
Semir Efendić
Mayor
City of Sarajevo
Benjamina Karić
Mayor
Semir Mušinović
Head of the Urban Planning Department of the City of Sarajevo
Arijana Musić
Urban Planning Department of the City of Sarajevo
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Urban Planning Department of the City of Sarajevo
Nina Fučec
International Cooperation and Investment Department of the City of Sarajevo
Municipality of Centar Sarajevo
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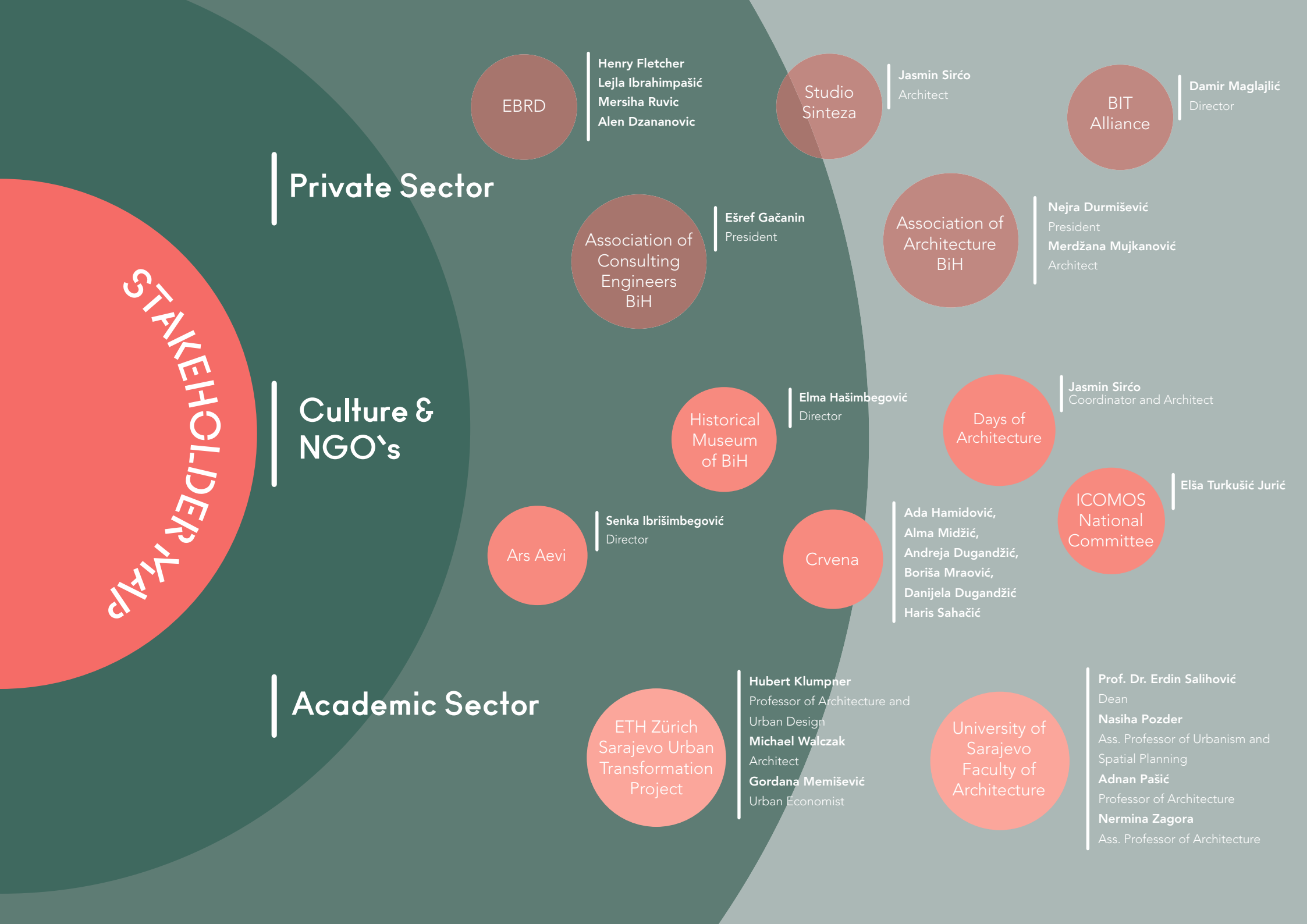
Mayor
Dina Šamić
Advisor for Urban Planning
Ćamil Osmanagić
Advisor
Dajana Čolić
Ednana Obradović
Amira Selimović
Eldina Šehović
Selma Islambegović
Belma Bašović
Municipality of Stari Grad
Ibrahim Hadžibajrić
Mayor
Canton Sarajevo
Edin Forto
Prime Minister
Institute for Construction
Belma Barlov
Director
Institute for Cultural and Natural Heritage
Boris Trapara
Director
Selma Karačević Kapić
Cantonal Ministry for Physical Planning
Nihad Kozlić
Institute for Informatics and Statistics
Dino Šehović
Director
Tourism Association of Canton Sarajevo
Kenan Magoda
Presodent
Ministry of Physical Planning, Construction and Environmental Protection
Enver Hadžiahmetović
Minister
Institute for Development Planning
Faruk Muharemović
Director
Zina Ruždić
Senior Urban Planner
Chamber of Economy of Canton Sarajevo
Muamer Mahmutović
Director


STAKEHOLDER MAP
Private Sector
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Alen Dzananovic
Studio Sinteza
Jasmin Sirćo
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2

SARAJEVO CITY CONTEXT

Sarajevo has a large number of brownfield sites that are scattered across the city. In order to better understand the relevance and potential of each of them it is necessary to conduct a city-wide analysis of the urban landscape and its characteristics. The investigation goes back in time to learn about the historical context of the city and reflects on contemporary challenges and developments in Sarajevo. A spatial analysis visualizes territorial data and creates the basis for the evaluation of different brownfield opportunities.

2.1 HISTORY OF URBAN DEVELOPMENT

The city's development had its historical and spatial starting point in the east of the Miljacka Valley and continued towards the west. Each new era followed the expansion of the city in that direction, building its own elements of the urban matrix as we know it today.

Prehistoric times

Layers of the Neolithic settlements indicate several millennia of human presence in the area. Most of the archaeological finds, however, have not been fully explored. To this day, the so-called Butmir culture is the best-known archaeological find, which testifies to the very lively and developed settlement in the area of today's capital city. In the early Iron Age, these settlements were inhabited by Illyrian tribes that had a long history of resistance to the Roman Empire. In the first decade CE, however, roman imperator Tiberius defeated the Illyrians and the Romans began to rule over the Sarajevo area.

Antiquity

The Romans built a road from the Adriatic Sea to Pannonia, passing through the centre of the present city, and established several settlements in and around the current area of the city. The most important Roman colony in the area was called Aquae Sulphurae and was located in present day Ilidža. It was a cultural and administrative centre of the wider region of that time that eventually reached the status of a Roman Republic. According to experts, the basic street grid of Sarajevo's old town goes back to Roman times and is over 2,000 years old. In the 6th century, Slavic tribes conquered and inhabited the area of Sarajevo.

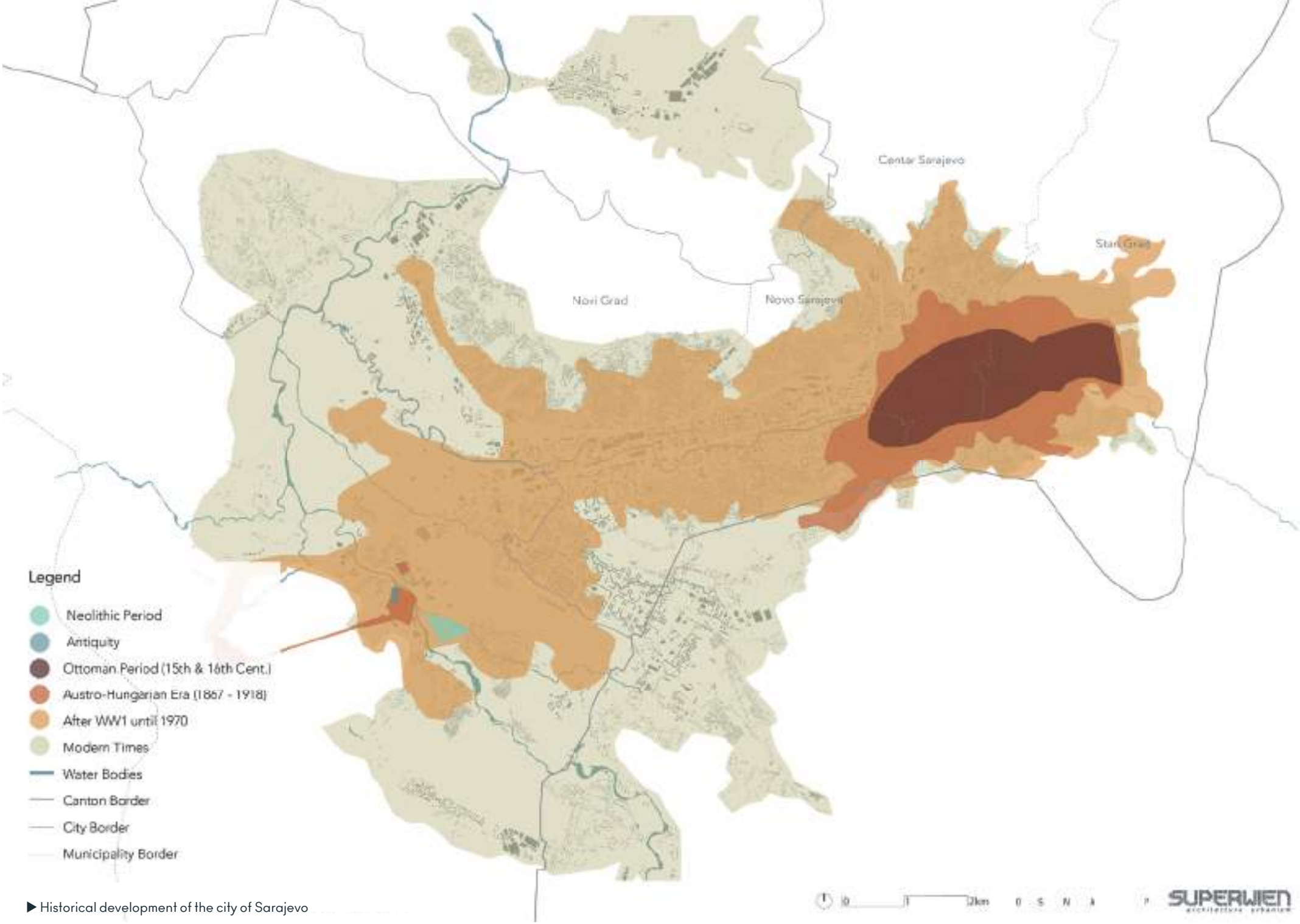
Middle Ages

The rise of the medieval Bosnian Kingdom dates back to the 13th century. The Bela IV Charter mentions the Archdiocese of Vrhbosna and the medieval fortress of Hodidjed for the first time and reveals that it was located in the east of the Sarajevo Basin near the Miljacka River. In the later decades the Torkink market emerged adjacent to the fortress. There is evidence that the Austro-Hungarian bastion known as the White Tabia that still adorns the eastern slopes of Sarajevo today stands on the site of the former Hodidjed fort.

Ottoman Empire

In the 16th century the Ottoman Empire conquered the Bosnian Kingdom. During Ottoman rule, the city started to expand beyond the walls of Hodidjed. Due to its location and strategic importance, the fortress became the residence (saraj) of the Ottoman rulers. Following the example of other Ottoman cities of the time, Sarajevo began to expand along the Miljacka Valley, developing towards the west and north. The resulting urban shape, which is well preserved to this day, is based on the spatial conditions of the Bosnian mountain ranges: the settlement core is formed at the beginning of the valley, the main traffic routes are based on its linear morphology, and the river with its natural green belt flows through the valley and provides the core with fresh air.

Following these established principles, Sarajevo soon took the form of a highly developed settlement in this part of Europe with a very recognizable urban structure. Typical Ottoman buildings were constructed, such as mosques, madrasas (religious schools), hammams (steam baths), hans (roadside inns) and other structures that made up the vibrant and bustling urban fabric.



▶ Historical development of the city of Sarajevo

Austro-Hungarian Monarchy

The Austro-Hungarian rule over Bosnia began in the late 19th century. The period marks a very dynamic transition in the history of the city and had a great influence on the understanding of architecture and urban development. The Austro-Hungarian administration was determined to transform Sarajevo into a modern European city. The population was growing rapidly due to migration and Sarajevo got its first city-wide regulation plan that provided for the city's development towards the west. Old Ottoman quarters were demolished to establish new road systems and modern building blocks. Urban infrastructure was expanded and improved; this included the introduction of electricity and of the tram line as a means of public transportation. The railway connected the city to the rest of the Austro-Hungarian Empire and new industries settled in the surroundings.

Time of the World Wars

The assassination of Crown Prince Franz Ferdinand in Sarajevo marked the beginning of World War I. The war years brought stagnation of urban life and progress. After the fall of the monarchy, Bosnia and Herzegovina became part of the Kingdom of Serbs, Croats and Slovenes which completely changed the country's political and administrative organization.

The economy between the wars was dominated by crafts, trade and commodity exchange, however, economic stagnation prevailed. Construction and urban development declined dramatically until the 1930s. The number of inhabitants continued to grow slowly. The Austro-Hungarian planning documentation remained in place but new construction in this period was increasingly based on the principle of free competition and market demand. In the early 1930s, an informal group of architects, educated mainly in Prague, started to bring more contemporary ideas to Sarajevo. These supporters of the 'Moderna' took the leading role in the construction of public city buildings, such as banks, high schools, hospitals, cinemas, printing houses and cafes.

The outbreak of World War II placed Sarajevo once again in the centre of global events. It took many years to start rebuilding the country and the city. This was the beginning of a new development era of the city.

Socialist urban development

After World War II, Sarajevo became the capital of Bosnia and Herzegovina, which was one of the six federal units in the newly formed Democratic Federation of Yugoslavia. In the early period of socialism, all efforts were dedicated to the reconstruction and renovation of the post-war country. Migration to the city was intensifying and Sarajevo began to expand beyond the boundaries of Austro-Hungarian times. The city administration at the time lacked the capacities to provide sufficient housing which led to the construction of informal dwellings by the citizens on the surrounding hills.

In the following two decades, the city focused on large investment projects. The new railway and freight station, the airport, a cable car, a new cemetery, sports fields, parks, as well as public health and educational facilities were constructed. New residential quarters emerged in the west and on the surrounding hills. They were the result of knowledge transition from one project to the next and typically consisted of multistorey buildings with complementary functions. New roads and railway lines were built to enhance the urban transportation system. Industrial zones were placed in the far west of the Sarajevo Basin.

In the 1960s, the General Urban Plan for Sarajevo was developed and adopted. The Plan addressed complex spatial and

organizational issues and was to guide the development of the city for the next 20 years. Unfortunately, it was a very large and complex document and rather unpractical for implementation. From the 1960s to the 1980s, however, some of the most important buildings in Sarajevo were constructed, many of them as a result of competitions. The pluralistic approach and the pavilion construction method prevailed in the city's architecture, especially in residential buildings. The influence of different contemporary architectural styles is visible in the public buildings of the time.

In the 1970s and 80s, discussions emerged around the establishment of a new centrality in Marijin Dvor and balanced urban development towards the north and south to reduce travel times for residents. At the same time, the Environmental Protection Project let to the introduction of new infrastructures: gas started to replace heating with wood and coal; a new sewage system, a wastewater treatment plant and a solid landfill were built. Those innovations were also important preconditions for Sarajevo's bid to host the Winter Olympic Games in 1984, which again boosted urban development in the city.

The second half of the 1980s was marked by a political and economic crisis that also affected construction and urban development. The crisis culminated in the beginning of the war and the siege of the city from 1992-1995.

Contemporary urban development

The war years ravaged the city: it was marked by huge human losses, destroyed infrastructure and economic collapse. The Dayton Peace Agreement brought a new political order that divided the country in two. According to the agreement, the City of Sarajevo was formed from the four pre-war municipalities Stari Grad, Centar Sarajevo, Novo Sarajevo and Novi Grad.

The changes that have taken place from 1995 to the present are numerous and complex. Sarajevo had to be rebuilt in all segments after the war. Housing, infrastructure, suprastructure, public facilities, education, health and administration were renewed within ten years after the war. However, there has been an evident lack of a vision for the city's urban development and most interventions are geared towards the needs of private investors. While a new Spatial Plan for the Sarajevo Canton was adopted, the 1986 Urban Plan for Sarajevo is still in use. A new Urban Plan is currently under development.

Large areas of former industrial complexes were destroyed or abandoned after failed post-war privatization efforts. Some of these brownfields occupy very attractive locations in the city. Places that could have been used to redevelop urban functions are now abandoned or developed as monofunctional housing areas. Large malls or dormitory settlements with uninspired architecture and a lack of adequate technical and social infrastructure are a common sight in Sarajevo. Building heights often exceed reasonable limits which further impairs the problematic state of Sarajevo's air pollution. Interventions and investments in public facilities and public space are very limited.

The development of any city is influenced by the social and cultural practices of its inhabitants, closely related to spatial, natural and historical factors. When pressure is exerted on any of these elements, the result is reflected in the imbalance of the whole. Today, Sarajevo is facing many challenges that threaten to throw the system out of balance. Now is the time for proactive planning decisions and bold political action that must drive Sarajevo towards a more sustainable, socially just and balanced urban development.

2.2 SARAJEVO TODAY

As previously elaborated, the structure of the city has substantially changed over the past 25 years. The transformation of the city towards the form we can observe today was connected to the changing urban framework over time. In general, three major periods of urban development can be distinguished, that differ in the context of the needs of residents and the setting of priorities in urban planning.

Consolidation and reparation

The post-war times (after 1995) were marked by the lack of a clear vision and practical tools to re-establish urban order within the city. There was an urgent need to consolidate the city as soon as possible and put it into function again, since its services and facilities had been destroyed during the siege. Essential parts of the city, like infrastructure, housing and the urban economy needed to be reconstructed. This situation increased the pressure on the decision makers and local governance to act fast and efficient on these urgent problems. Moreover, this period was marked by continuing migration towards Sarajevo from other parts of the country. The planning regulations of the time could not keep pace with this dynamic.

The changes that took place in the first few years after the war did significantly shape the city. Numerous unsuccessful privatizations, construction of illegal settlements, establishment of necessary supporting infrastructure and resources as well as the expansion of the city to previously protected or reserved areas marked the time of early transition of the city and state from a socialist and post-war society to a modern European society.

Transition and land loss

After the first years of consolidation and reparation in which Bosnians had tried to adapt to the new societal order and the city had been restored to the functional level, another period of development began. In the mid-2000s, the focus of investments shifted from public infrastructure and facilities, mainly financed through donations, towards projects and investments initiated by the private sector and representing private interests. Adequate planning documents that would steer those developments were not available yet and as a consequence many of those investments followed mere market logics rather than focusing on the needs of residents and the improvement of quality of life.

The city centre was experiencing transformations at the micro and macro level. In addition to the introduction of new trade and service activities on the ground floors of buildings, new landmarks were built in the city, mostly in the form of large shopping centres, businesses, hotels, and other commercial facilities. These included the BBI Centar, Avaz Twist Tower, Importanne Center, Alta and Sarajevo City Center (SCC).

New commercial facilities were seen as generators of investment and capital. They were often built on land that had already been used for similar functions before the war, like the plot of the former Sarajka Department Store. Others were built on brownfields, like the Vaso Miskin Crni complex, but also on land that was originally intended for central public functions, such as culture, recreation, or public services. Planning documents that were applicable at the time, had reserved specific areas for the development of important urban functions and centralities but a lack of political will and inspections on the ground led to irreversible loss of those areas. In many cases planning documents were altered to fol-

low investors' needs which often led to an unfavourable development of the city. The developed areas often have such high densities of construction and population, that they cannot provide adequate infrastructure and public space. Moreover, many of these neighbourhoods lack adequate architectural quality. Private investments spread further west, and the contour and appearance of the city was changed irreversibly.

These types of investment on a large scale also changed the perception of the population towards the opportunities and services that the city could provide, especially when it comes to leisure and recreation. Shopping malls became common destinations for socializing and meeting all needs outside the workplace or education. This trend was copied and applied into the local context from other societies in transition. Shopping mall culture was amplified and glorified while other aspects of public life were neglected.

While consumption was put in the centre of urban life, other essential aspects that contribute to the quality of life were neglected. The lack of citizens' interest to participate in the creation of space contributed further to the attractive climate for 'investment urbanism'. In addition to the aspects of quality of life and aesthetics, and the satisfaction of social needs, which were at a very low level, the population got used to not demanding more and better, and the 'urban consciousness' of citizens was undermined.

The competitiveness of the city in relation to other cities is a prerequisite for its success. However, many unfavourable interventions created backgrounds and views, that were not adapted to the city context and time. Most projects developed in this period reflect a certain lack of understanding of the urban context, for which the architects or investors could not always be blamed. Mutual dialogue was often absent, and the need to fulfil primary functions of the architectural profession, affected the skills of negotiation and influenced the shaping of space. Likewise, the municipal and communal institutions could be held accountable, which often lacked interest, knowledge, and support from higher levels of government to act differently and better.

Civic engagement and change

Sarajevo, as a city in the valley, has a very pronounced problem of smog and pollution in the winter months. The city has been confronted with this challenge for decades and it was already addressed in the first General Urban Plan of the 1960s. Back then, poor air quality, illegal construction and lack of planning documentation were underlined as the main challenges to urban development. More than half a century later, these problems have not been resolved but exacerbated by the expansion of the city.

However, public awareness has changed in recent years. Citizens are beginning to take an interest in parks and public areas and are not easily giving up spaces that they consider to be for the benefit of all. Raising awareness of urban issues could be related to the global discourse on climate change or simply to dissatisfaction with local conditions. Citizens-oriented urban planning is gradually being demanded and is emerging as a new topic in local governance. Involvement of the public in decision-making processes on urban projects and construction is legally possible and is carried out through mandatory public hearings for the adoption of planning documents. This trend ushers in the third development period and with it the transition to modern European society, which is socially and ecologically aware but also capitalistically and democratically well organized.

The change in perspective and new understanding of ecological urban needs are reflected in some important documents that have been developed over the last few years. Efforts have been made to set ground for a systematic and professional approach to tackle challenges like air pollution and sustainable urban development. The study on ventilation corridors along the Miljacka River, where development and construction should be very carefully managed, was adopted by the Government. Another important document that has been developed is the Smart City Sarajevo Study. It analyses international contemporary smart city solutions and makes proposals for Sarajevo.

Shifting the focus from fast investment to citizens' participation and sustainability does not close the door to economic prosperity but provides long-term strategic orientation for investors that enhances their ability to achieve sustainability goals and balanced urban development. Changes in the city are long-term, often very tangible and affect urban areas far beyond their immediate vicinity. They reflect the consciousness of the population and are much more than just a physical alteration in the urban fabric. The societal ability to adapt to changes and to work on a better quality of life, correlates with the health of the society as a whole. Urbanism and architecture have a decisive role to play in this process.

Trends in economics and real estate

Contemporary urban development in Sarajevo, as in any other city, is also influenced by ongoing trends in economics and real estate. Since the COVID pandemic, the use of digital tools in the context of the everyday work environment has significantly increased. The continuing dependence on technology for remote working will have a lasting influence on the future of the office sector in relation to 'work from home'. Although co-working facilities have emerged in Europe before, there are only a few co-working offices active in Sarajevo today.

Another effect of the COVID-crisis on urban life was the acceleration of the shift towards e-commerce. The growth of the online retail sector created an increased demand for storage, while the vulnerability of non-essential retail casted doubt on long-term sustainability. Despite the rise of e-commerce penetration, retail centres in Sarajevo show resilience, with the majority of consumers returning to the traditional shopping experience. Nonetheless, the e-commerce sector is expected to become more relevant in the BiH logistics market in the long run.

Due to the aging population, the residential segments of many real estate markets have started to set a focus on senior housing and assisted living. Opportunities currently lie in the conversion of hospitality or retail assets. Student housing is another appealing sector, offering relatively low-cost living options for students. In BiH, however, both, pensioners and students usually have low incomes and tend to opt for government-run housing opportunities or living in family homes.

In the area of green building and innovative building technology, Sarajevo is still lagging behind. Green building refers to a holistic approach to planning, design, construction, maintenance and use of a property based on the principle of sustainability. This, however, comes at an increased cost of development which, although offset by the benefits, can be an added expense. In Bosnia and Herzegovina there are still no internationally certified green buildings, which shows that developers do not seem to recognise the benefits of green buildings.

▶ Bosnia and Herzegovina and the territorial boundaries of the Federation and Republika Srpska

2.3 SPATIAL ANALYSIS

Topography

Sarajevo has a distinctly longitudinal character. Time epochs and structural expansion of the urban fabric follow a linear flow and reflect a time trajectory in which there are only sporadic incursions to the north. The fundamental structure of the urban morphology of the city is caused by the geographical and hydrological features of the Sarajevo basin. The relatively narrow belt of the Miljacka river valley, which is around 500 to 700 meters wide at its widest point, and the delimitation of the valley floor with mountain and hill formations above the city, enclose the urban area of around 33 square kilometres. The built-up urban area occupies about 7 square kilometres today.

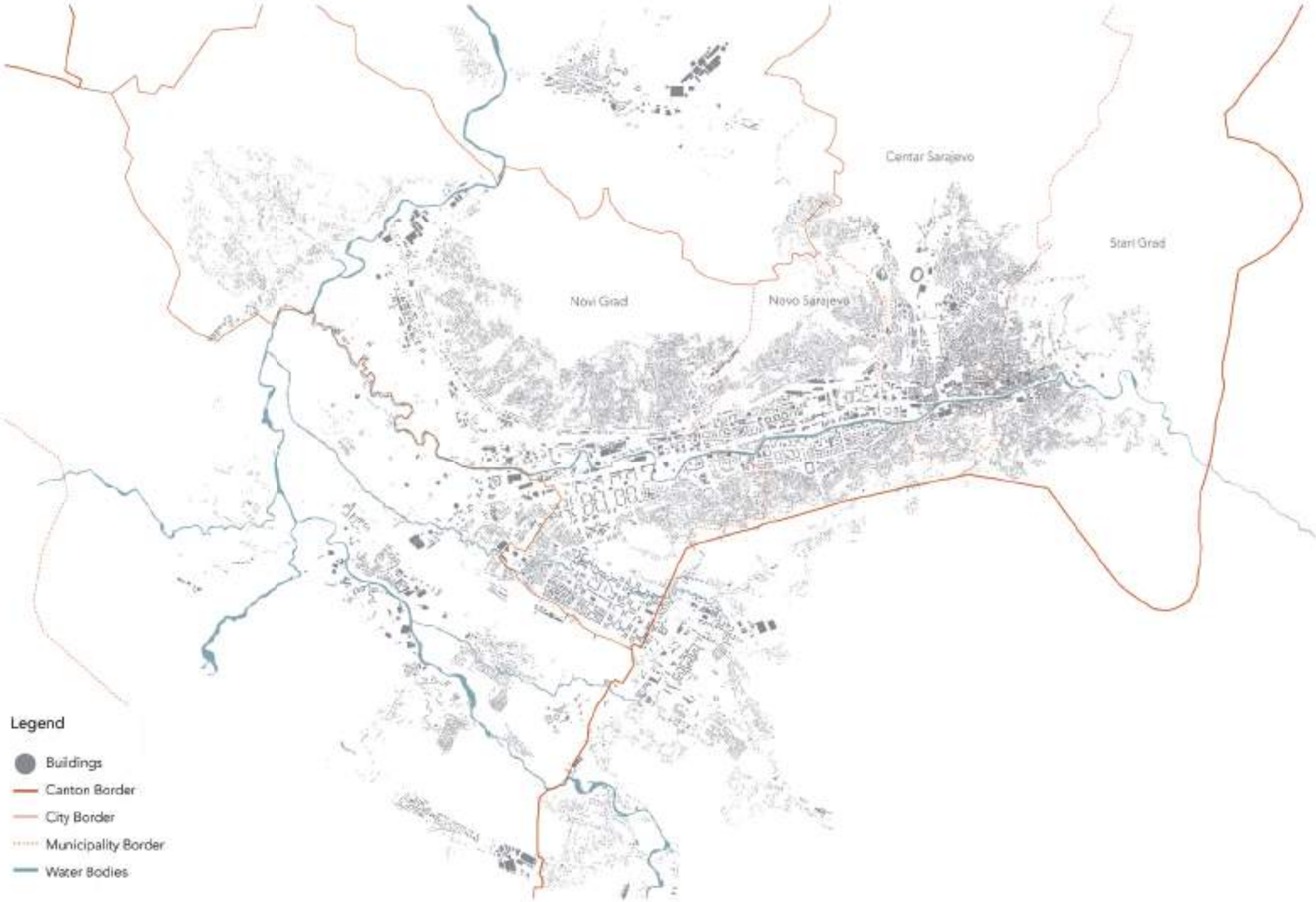
▲ Topography map of the city shows the mountainous surroundings of the urban valley

The urban structure shows a dichotomy that is not only related to its natural features and terrain but also to its functions. The flat part of the valley has been used as the 'public' centre of the city since the beginning of urban development, while housing as the private part retreats into the steep mountain formations above the city. The reasons for this structuring and separation of public and private life are of cultural and historical nature. This principle of separation of forms and functions is especially well preserved in the old medieval core of the city where it is 'disturbed' only by a few interventions from the late 19th and 20th century.

Urban footprint

The urban footprint of the city clearly reflects the topographical conditions on the one hand and the historical development of the city on the other. The dense urban core of the old town in the east can be easily distinguished from the typical perimeter block development of the Austro-Hungarian period and large-scale socialist housing structures in the west. The building footprints also reveal the location of industrial sites in the west and in the satellite towns of Sarajevo. The mountainous areas to the north and south of Miljacka Valley are occupied by smaller structures, many of which are single-family homes.

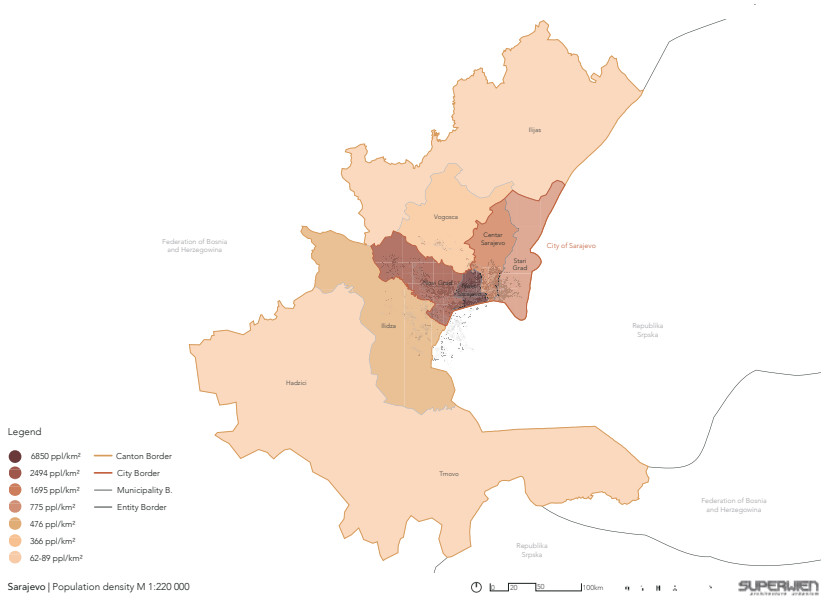
Another urban feature clearly distinguishable in the urban footprint is the settlement of Dobrinja that was built along the stream of the same name in the west of the city. It was developed in the 1980s in the course of the preparations for the Olympic Games in Sarajevo. At the same time, another prominent building was reconstructed: the Koševo City Stadium in the northeast of the city.



▶ General map of building footprints in Sarajevo

Population density

Of all the municipalities in the Sarajevo Canton, the four municipalities in the city of Sarajevo have by far the highest population density. The highest density can be found in the Municipality of Novo Sarajevo with 6,850 people per square kilometre. However, it is also the smallest municipality and consists mainly of built-up areas. Even though the Municipality of Novi Grad has the second highest population density, there are hardly any centralities in this area. The other municipalities around the city of Sarajevo are characterized by satellite cities, suburbs and rural settlements of low density.



▲ Population density in the municipalities of the Canton of Sarajevo

Road network

Sarajevo's road network is characterized by two major components. The first one is the longitudinal street, Bulevar Meše Selimovića, running horizontal trough the core area of the city and in parallel to the Miljacka River with three lanes in each direction. Parallel to the Bulevar Meše Selimovića, two other longitudinal streets run through the city – one north and one south of the main street. The second main component of the local road network are the transversals that cross the longitudinal streets and connect the residential areas in the hills north and south of the city. Together they form the main framework for urban development in Sarajevo. On the hilly terrains in the suburbs the roads are more irregular. The city is also connected to the highway which does not cross the main city area but runs along the outskirt of the city.

▲ Road network of Sarajevo

Public transport

The main backbone of Sarajevo's public transport system is the tram which consist of one simple linear route with a loop through the historical city centre, connecting the eastern and western parts of the city. Sarajevo's six different tram lines all run on the same rails, differing only in their start and end points. Two southern extensions are currently being planned. The second important element of Sarajevo's public transport system is the trolleybus, running mostly parallel to the tram line but also connecting some northern and southern areas of the city. Additionally, the city has a cable car line, connecting the historical city centre to the mountain Trebević. For long-distance transportation, Sarajevo is connected to the national train network of BiH. Beside the Main Railway Station, located in the Municipality Novo Sarajevo, there are three more train stations within the city border.

▲ Public transport network of Sarajevo

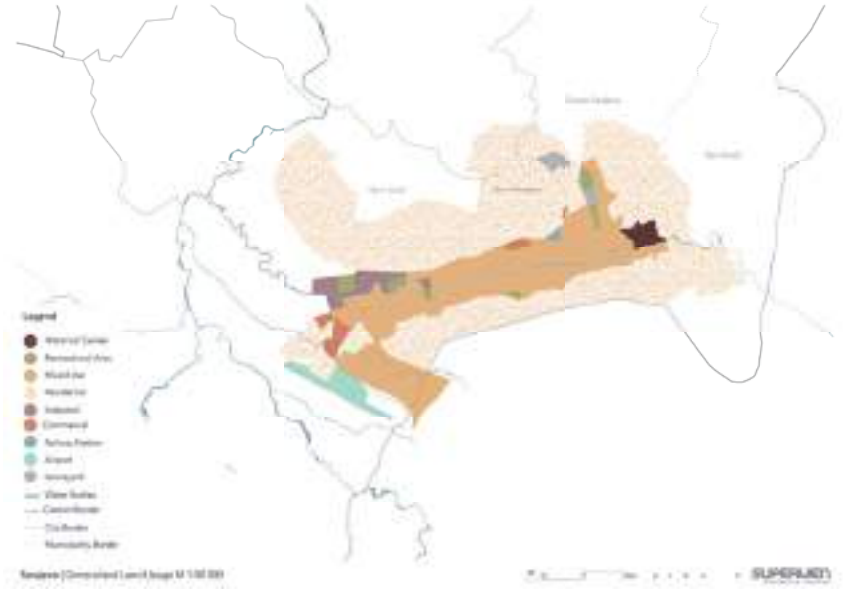
Pedestrian and bicycle paths

The traffic infrastructure of the city is strongly orientated towards motorized means of transportation and there is a clear shortage in infrastructure for bicycles and pedestrians. The only bicycle path of the city follows the longitudinal street Bulevar Meše Selimovića, one of the main streets of Sarajevo. The bike lane connects the district Halilovići in Novi Grad with the district Marijin Dvor in Centar Sarajevo and has a total length of 6 kilometres. Pedestrian zones are concentrated in the historical city centre in the east of the city and pedestrian-friendly paths appear mainly along the Miljacka River, like the Vilsonovo Promenade or Dariva. Another prominent pedestrian zone is the Velika Aleja (Great Lane), an alley of plane trees in the Municipality of Ilidža, shown in the very west of the map. The historic walking lane has been created in the Austro-Hungarian period and serves as a recreational space near the city today.

▲ Pedestrian and bicycle paths in Sarajevo

Land use

The core area of the city along the Miljacka River is characterized by mixed uses, but also includes some areas of other uses, such as the Halilovići industrial zone with some recreational areas in between, or some fully commercial areas where shopping malls and businesses predominate. The area, which stretches across the flat river basin, has a high residential and building density. The surrounding area of hills and slopes is characterized by a residential urban landscape, which consists mostly of single-family houses and is of low density. Another recognizable area that differs from the other land usages is the airport, which is located in the south-western outskirts of the city. Also well recognizable is the historic city centre in the eastern part of the city where administrative and commercial uses with a focus on tourism prevail.



▲ General land use map of Sarajevo

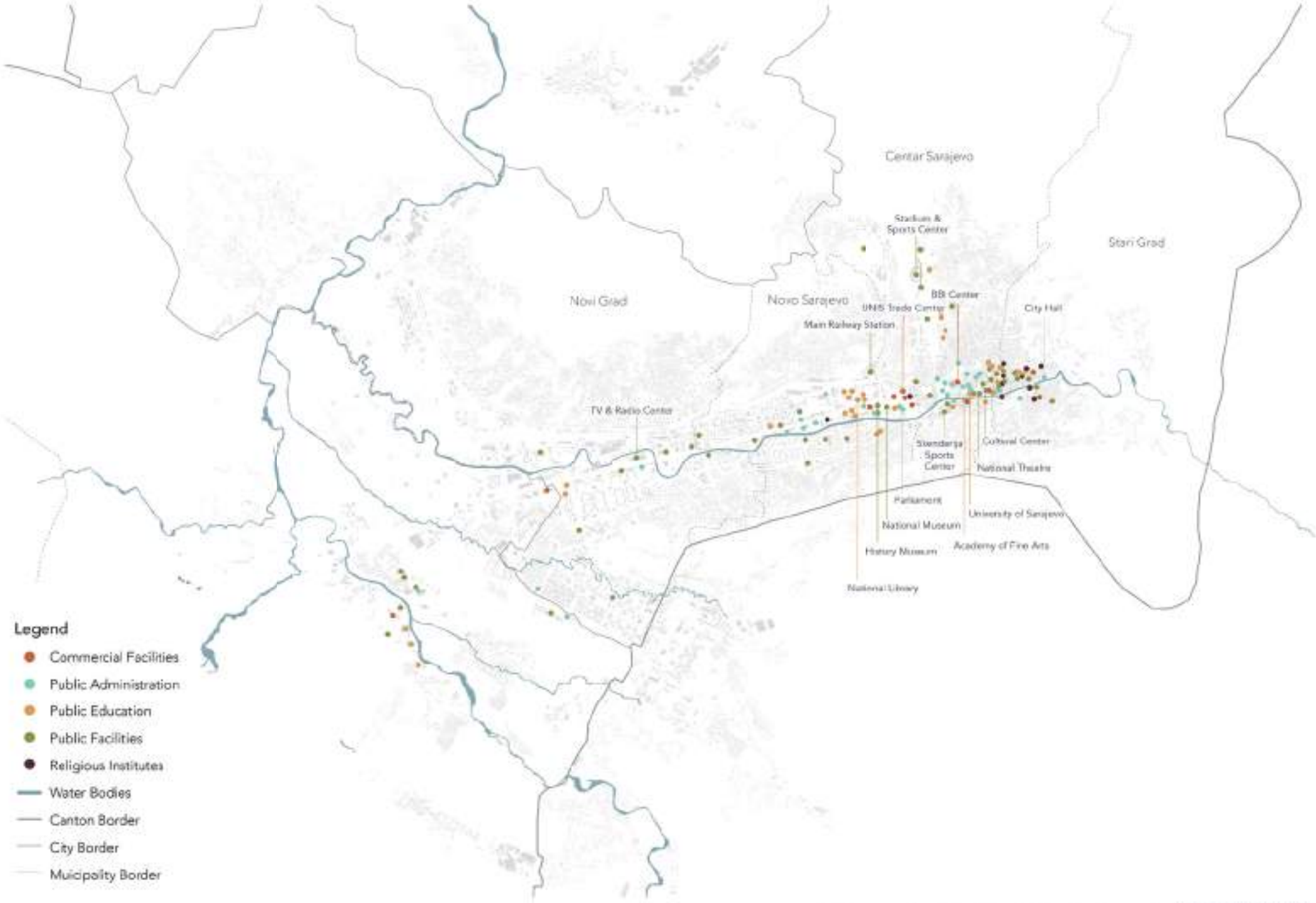
Points of interest

The distribution of centralities in the city shows a clear pattern. While most points of interest are concentrated in the historic city centre in the east of the city, there is a lack of central facilities in the rest of the urban landscape. The Municipality Novi Grad in the very west registers only a small number of centralities, even though some high-density residential neighbourhoods are located in this area. The inner city not only has more centralities in terms of quantity, but also a broad mixture of different types of centralities, ranging from commercial or educational facilities to religious institutes as well as public administration and public facilities, like cultural or sport centres.

While most points of interest are concentrated in the historic city centre, there is a lack of central facilities in the rest of the urban landscape.

Green and public spaces

While public spaces are clearly concentrated in the eastern city centre, green spaces are rather rare in this part of the city. In general, there are only a few spacious public parks in the city, however, extensive green spaces can often be found between the housing estates in the western and southern parts of the city, like Dobrinja or Alipašino Polje. Some bigger recreational areas are located further away from the core urban area, like for example the Park Betanija next to the Koševo Stadion as well as the national monument Vrelo Bosne (Spring of the Bosna River) and the Banjska Park which are connected to the city through the Velika Aleja (Great Lane).



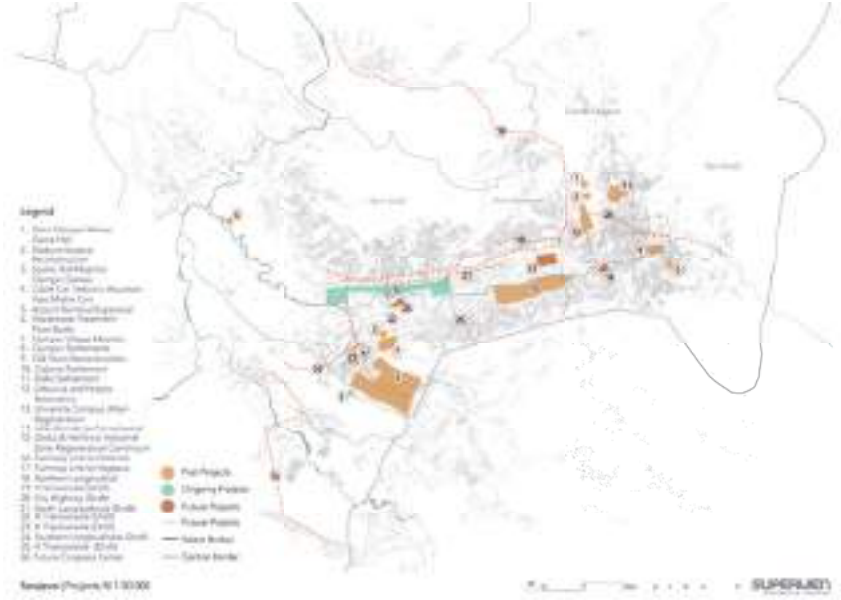
▶ Points of interest in Sarajevo

▶ Green and public spaces in Sarajevo

▶ Interplay of built-up area and greenery in Sarajevo

Past and future development projects

In the 1970s, the historic value of the old town was recognized, and a process of reconstruction and revitalization bergan. This was one of the largest and most demanding architectural and urban projects in the modern development of the city. An important driver of the expansion of the city were the Winter Olympic Games of 1984 which contributed to new constructions and settlements. During the war many parts of the city were demolished, and numerous renovation and regeneration projects took place over a period of over 10 years after the war. Today, changes are mainly visible in the expansion of the transportation network, because the existing system cannot support the growing number of vehicles, both residents and transitional through the Sarajevo area. An important future project will be the expansion of the tramway line to Hrasnica. Additionally, the planned renovation and redevelopment of the Sport's and Culture Centre Skenderija as well as the University Campus of Sarajevo are important milestones in the city's development.



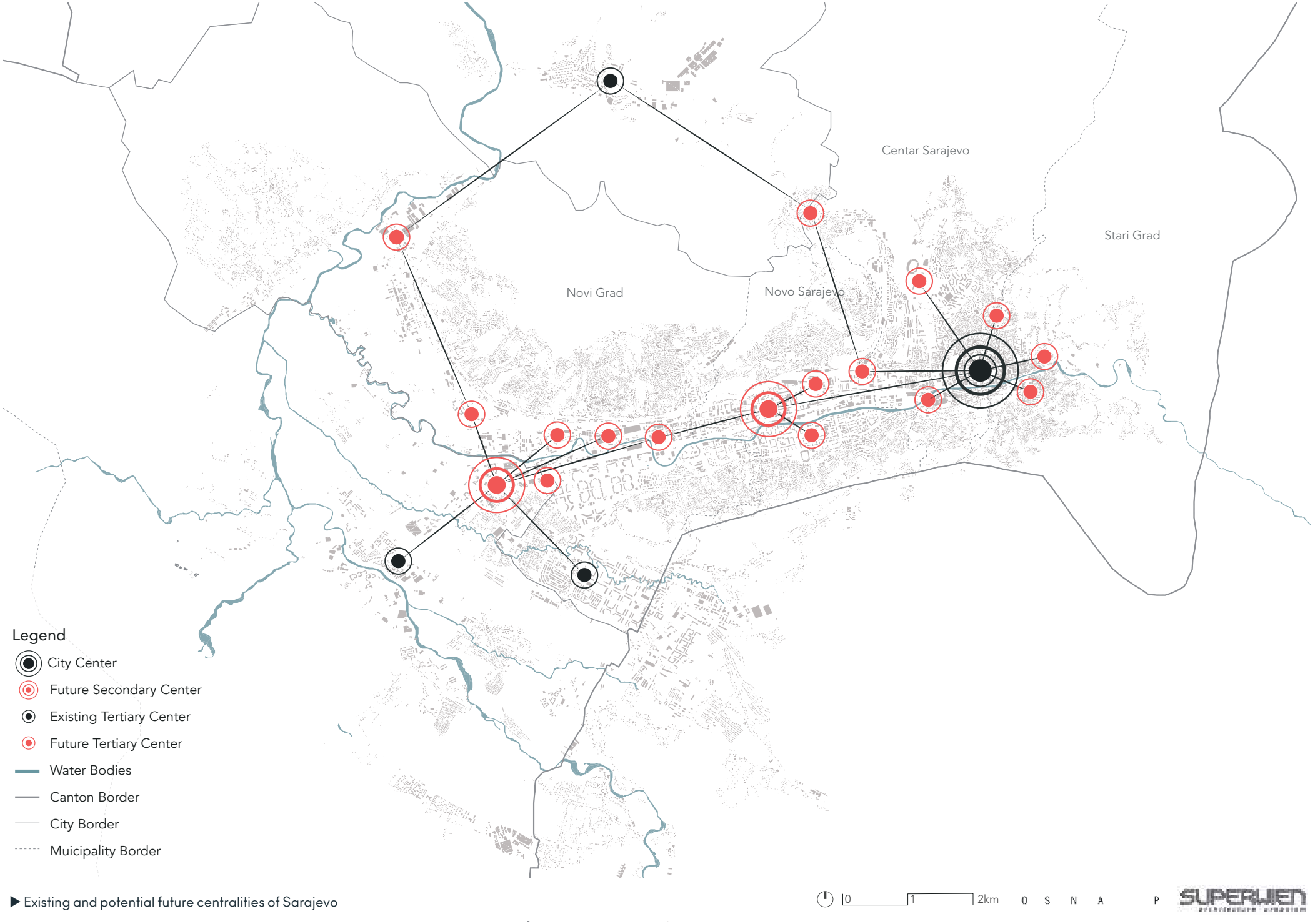
▲ Past and future development projects in Sarajevo

2.4 VISION OF A POLYCENTRIC CITY

As already pointed out, the most important centrality of Sarajevo is the historical city centre in the eastern part of the city. Apart from this centre, not many other centralities exist and particularly the western part of the city shows a lack of urban centralities. However, because this area of the city has some high-density residential neighbourhoods, it holds a great potential for the establishment of new secondary centres. The many existing, but hitherto neglected, brownfield sites could play an important role in this process. The development of these brownfield sites as mixed-use neighbourhoods and the establishment of new functions and facilities could lead to the emergence of new secondary and tertiary city centres, shifting the focus from one single centrality to a polycentric urban landscape.

The development of a polycentric Sarajevo is an important long-term vision for the city.

The development of a polycentric Sarajevo is an important long-term vision for the city. Contemporary urban planning thrives for a city that provides basic services in the immediate neighbourhood and other important facilities within short walking or cycling distances. The 15-Minute-City is an urban environment in which most needs can be fulfilled within a walking distance. This includes shops and grocery stores, social and cultural institutions, as well as jobs and leisure facilities. New centralities need to be created in Sarajevo to fulfil these functions and provide amenities to the whole city. While shaping these places, active mobility and green infrastructure need to be taken into account as major connectors between centralities in a sustainable and climate-fit city.



▶ Existing and potential future centralities of Sarajevo

3
SITE ASSESSMENT

A thorough investigation led to the identification of 24 brownfield sites in the City of Sarajevo and adjacent municipalities. All locations were viewed as po-tential development hubs and subject-ed to a quick assessment. In multi-criteria analysis based on aspects like accessibility, availabili-ty, relevance, and tech-nical feasibility, two sites with outstanding development opportunities were selected. A detailed spatial analysis of the selected brownfield sites helped to better un-derstand the requirements and opportunities for their future develop-ment.

3.1 BROWNFIELDS IN SARAJEVO

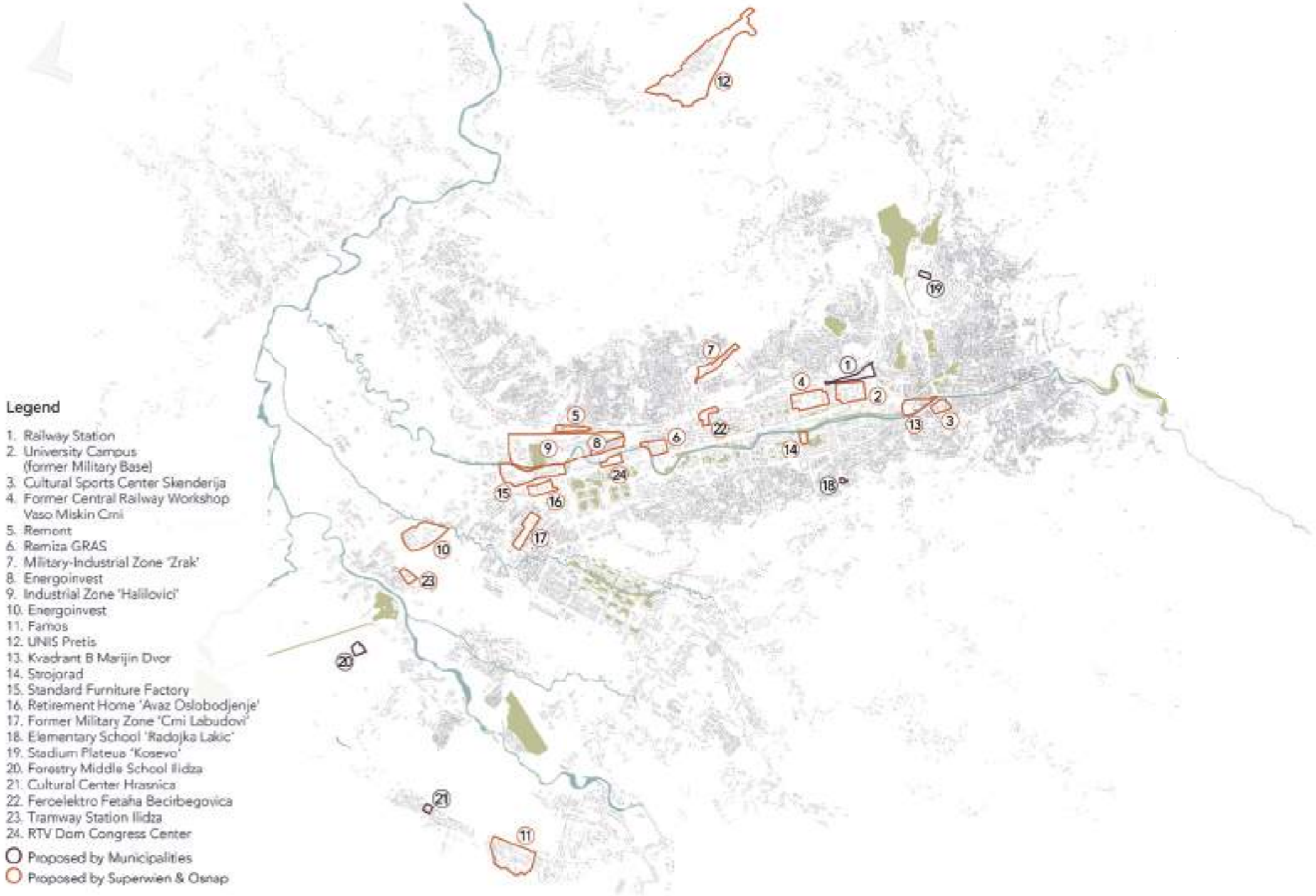
Brownfields are areas that were previously used for industrial purposes, including manufacturing, storage, repair, commercial use, sale and military use, and that are currently not being used to their full potential. Due to structural changes in industry and production, many formerly active businesses and companies were downsized, closed or moved to the outskirts of the city or even abroad. Today many of these sites are totally or partially abandoned and no longer in use. The regeneration of brownfield sites holds great potential for future urban development and the emergence of new qualities in a city. As in most European cities, these brownfield regeneration opportunities are also present in the city of Sarajevo and a redevelopment of these sites could be beneficial for numerous reasons.

In times of high land use and rapid sealing, brownfields represent an attractive opportunity to enable urban growth in a more sustainable way. Conversions would not require the consumption of valuable green space, as most brownfield areas already have impervious surfaces. Returning these brownfield sites to the real estate market would therefore counter the trend of uncontrolled land use and soil sealing in urban development. Additionally, on most brownfield sites basic infrastructure such as water, electricity and sewer connections are already in place and can be reused in case of redevelopment. Due to the city's expansion over time, many brownfields in European cities are located in high-density environments and in central positions within the city area today, as it is also the case in Sarajevo. The regeneration of these brownfield sites and a general focus of urban development activities on urban voids within the urban fabric are significant in order to prevent urban sprawl and to generate a city of adequate density.

Potential pollution and contamination of the soil from previous uses involving hazardous substances can make redevelopment of brownfield sites less attractive to investors. In addition, dealing with existing infrastructures and built facilities can add complexity, albeit promoting sustainability in the context of the advancing climate crisis, when compared to the development of green land. Therefore, the preparation of a clear vision for Sarajevo's brownfield sites is crucial in order to induce the release of these high-potential land and encourage investments in their development.

In order to develop an integrated plan for the regeneration of two brownfield sites in Sarajevo, as a first step, the most suitable brownfields in Sarajevo had to be selected. A total of 24 brownfield opportunity sites were analysed, of which five had been identified by the municipalities and 19 had been identified by the consultants.

▶ The legacy of Yugoslav architecture in Sarajevo



▶ Brownfield locations in Sarajevo

3.2 BROWNFIELD ASSESSMENT

Description of evaluation criteria

In order to evaluate the long list of the opportunity sites, a multi-criteria analysis was carried out, which served as the indispensable basis for the final selection of the two brownfield sites. The analysis relates the information gained from the appraisal of the city context, particularly from the spatial analysis, to the brownfield locations. The definition of the evaluation criteria and the subsequent assessment of the sites was carried out in a joint workshop and repeatedly discussed among all team members. Feedback on the four main criteria was also provided by our academic partners from University of Sarajevo and ETH Zurich.

One of the main objectives is to develop the selected sites in such a manner that they become new urban centres, generating economic development, life, and activities.

3.2.1 ACCESS TO THE SITE

Access to public transport

The connection of the developed site to the public transport system is crucial in terms of sustainable city growth and therefore presents an important criterion for the brownfield selection. Since the tram lines are the backbone of the public transport system, geographical proximity to tram stations is rewarded with the highest score. Sites with access to trolly bus stops are rewarded with medium-high points, while a lack of connection to the public transport network is rated poorly.

Access to the road network

Apart from the access to the public transport system, the connection to the main road network also plays an important role in the assessment. The road network map serves as the basis for the evaluation of road access. High points are given to sites with a connection to important traffic arteries, like the Bulevar Meše Selimovića, one of the main streets of Sarajevo running longitudinal through the entire city. Sites that are only connected to roads of a low rank are rated negatively.

AVAILABILITY OF THE SITE

Ownership

The owners' consent and willingness to cooperate are indispensable for the development of the brownfield site. Public-sector properties receive higher points because a greater willingness to cooperate and thus easier mobilization of the location is expected. A combination of public and private owners is also expected to be more favourable than an exclusively private

ownership because public actors can have a driving effect on private owners. In addition to the type of owners, the number of owners can also affect the availability of the site. In general, the more owners there are, the more challenging the implementation will be, due to assumed difficulties in coordination and cooperation. A diverse and complicated ownership structure is therefore rated low.

Regulation plans

Some of the examined sites have valid regulation plans in place. These plans already contain detailed information about how the site should be developed in structural terms and therefore limit the possibilities in the design process. Regulation plans in BiH are law abiding tools and are usually valid for a period of five years, after which they can be modified or completely annulled. Existing and valid regulation plans do not open up possibilities for new development propositions. The implementation of a new master plan on a site with an existing regulation plan would therefore only be possible after the five-year period ends. Consequently, if no regulation plan is in place, the site will receive higher points.

Current use

The availability of the site is also influenced by its current use. Completely abandoned and demolished locations should be easier to convert than heavily used locations. In the event of development, existing uses would have to be temporarily interrupted and relocated and would eventually return to the site after construction work was completed. If the site is used extensively, this can significantly complicate the project. In particular, those sites whose current uses are difficult to relocate, such as the Main Railway Station, are given lower points. Partial uses, however, are easier to be dealt with when developing the site.

3.2.2 RELEVANCE FOR URBAN DEVELOPMENT: CENTRALITIES

Mixed use potential

One of the main objectives is to develop the selected sites in such a manner that they become new urban centres, generating economic development, life, and activities. To create a new centrality of this kind, it is crucial to develop the project sites as a mixed neighbourhoods with different uses and functions. Depending on whether these mixed uses are likely to be implemented on the site or not, the evaluation leads to high or low points. The compatibility with the current use of the site and of its immediate surrounding is of particular importance. High-density surroundings lead to a higher frequency and use of the mixed-use neighbourhood and are therefore very advantageous, whereas low-density surroundings or a clearly defined single use on site are unfavourable.

Location

The location of the site and its incorporation in the city context is an essential criterion to determine the relevance of its development. Sites with a central position in the city are rated with high points, whereas sites on the outside of the city are rated low. Existing and possible future centralities were taken into account when evaluating the site location. The future development of Sarajevo should not be limited to the existing city centre in the east of the city. Rather, the western parts of the city, where there is still a clear lack of central areas, harbour great potential for the development of future central areas. Sites close to the future secondary centres are therefore given the highest points.

3.2.3 TECHNICAL FEASIBILITY

Size

The size of the brownfield area is an important factor when it comes to technical feasibility of its development. Sites that are too small or too large will be difficult to develop and will limit the scope for design. The ideal size for the development of a mixed-use urban centrality would be between 4 to 15 ha. Points are also deducted for areas with an unfavourable shape, especially for those with an elongated shape and very narrow areas.

Terrain

Technical feasibility also depends on the topography and slope. The technical implementation of a master plan in hilly terrain is far more demanding than on the flat. Higher points are therefore only awarded to properties with consistently level terrain.

Contamination

Soil contamination could not be clearly identified for every brownfield location. Therefore, a brief assessment of the possible contamination, based on the previous use of the sites, was carried out. Industrial areas, especially those on which dangerous substances have been operated with in the past, are given lower points than innocuous uses like sports or cultural sites.

Heritage

Sites containing listed buildings are difficult to develop due to restrictions and regulations aimed at protecting heritage. The integration of existing heritage buildings in the design process must be carried out very carefully and will be a challenging issue when it comes to technical feasibility. Therefore, sites with a high proportion of heritage buildings are rated lower, whereas sites that are completely free from any heritage buildings are given full points. However, it must be noted that this rating system is a simplification, as some heritage properties could also add significant value in relation to the cost of their renovation, while others could add less value despite high renovation costs.

WEIGHTING

In order to set priorities within the evaluation process, the evaluation criteria were weighted. The two criteria 'Availability of the Site' and 'Relevance for Urban Development' were weighted more heavily in the evaluation (30 percent each). The criteria 'Access to the Site' and 'Technical Feasibility' were weighted less (20 percent each), since improvements can still be made in these categories. The access of the sites can be enhanced subsequently through the construction of new roads or the expansion of public transport lines. In terms of technical feasibility, solutions can be found to solve technical issues or reduce adverse circumstances.

DISQUALIFICATION CRITERIA

After the assessment and ranking of the sites was finished, two disqualification criteria were identified. Six sites were excluded due to current political challenges that would hinder the development of the project. Three other brownfields were eliminated, because they were already under development.

▲ Aerial view of the industrial heritage at Vaso Miskin Crni

3.3 SITE SELECTION

The results of the multi-criteria analysis coupled with the identified disqualification criteria resulted in the selection of two sites that were recommended for further development:

» **Central Railway Workshop Vaso Miskin Crni**

» **Kvadrant B – Marijin Dvor**

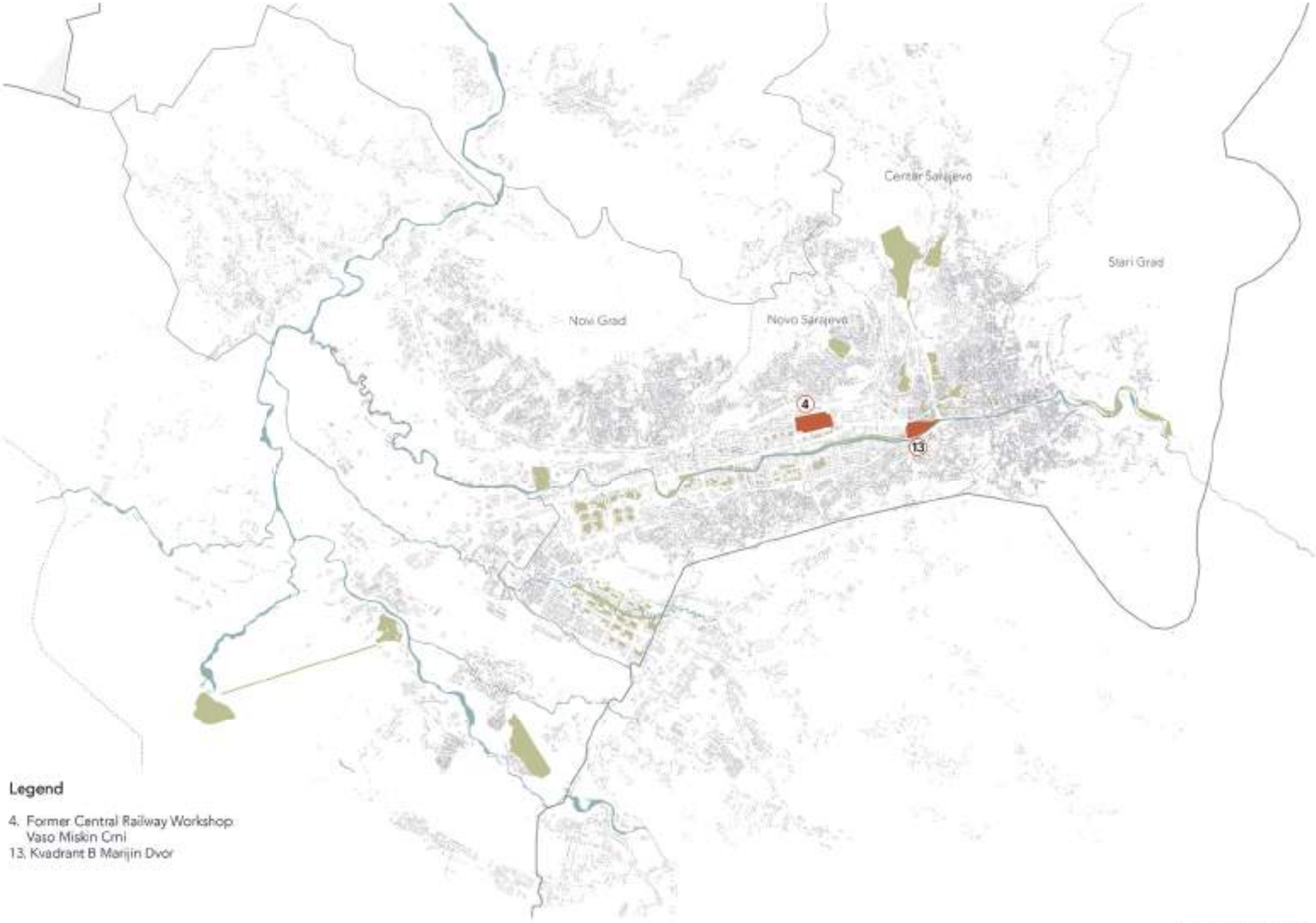
The first evaluation of the brownfield sites indicated that the selected target sites show very good preconditions for successful brownfield conversion and the realization of an integrated urban design project. Both sites are in excellent locations and have a high relevance for the urban development of Sarajevo. They also fit into the metropolitan planning vision of creating new centralities in Sarajevo. The urban regeneration of the selected sites can therefore bring an added value to the whole city.

Despite all the good qualities and positive preconditions, there are also risks and difficulties in developing the selected sites. Both sites have a complex ownership structure, consisting of a large number of public and private owners. In addition, the successful development of Kvadrant B has failed several times in the past and is therefore controversial. Consequently, the development of both sites must be carried out with great sensitivity.

A decisive factor will be the introduction of knowledge from good practice projects in which similar issues have been dealt with and which have developed into successfully implemented projects. The international team of consultants, however, brings a lot of knowledge on brownfield development with complex ownership situations. Successful land consolidation models from Vienna and other European cities can be adapted and transferred to the context of Sarajevo. The knowledge transfer to the Sarajevo administration aims to support the process of Sarajevo's urban regeneration through brownfield conversion beyond the scope of this project.

In September 2021, the selection of the two sites was presented to representatives at the Office of the Prime Minister of Sarajevo Canton and to the leading staff of the two municipalities in which the sites are located: the Municipalities of Centar Sarajevo and Novo Sarajevo. After a thorough discussion about possible potentials and challenges, all representatives agreed to continue the project with the selected sites. The municipalities confirmed their support of the project and confirmed their active participation in the further planning process.

▶ Meeting with representatives of the Municipality of Centar Sarajevo



▶ Selected brownfield sites in Sarajevo

3.4 VASO MISKIN CRNI

The former Central Railway Workshop, named after the Yugoslavian hero Vaso Miskin Crni, is located in the Municipality Novo Sarajevo and has a central position in the city context of Sarajevo. The project site is bounded on the north by the Krupska Street, on the east by Hamdije Ćemerlića Street, on the south by Kolodvorska Street and on the west by Ložionićka Street. Parts of the area were partially and poorly transformed into shopping malls and commercial centres after the 90s. The site is centrally located, with good connection to all the main traffic lines and the tram line in walking distance. It consists both of newly built facilities as well as old, abandoned warehouses. The central location and the high-density residential surroundings form an ideal precondition for the implementation of a mixed-use development, even though the high number of involved owners, among which there are both private and public entities, could be a challenging factor in the transformation process.

▲ Base map of Vaso Miskin Crni

▶ Former Central Railway Workshop Vaso Miskin Crni

3.4.1 PLANNED INITIATIVES AND PREVIOUS INVESTMENTS

In 2015, the Municipal Council of Novo Sarajevo adopted the *Decision on the Development of a Regulation Plan for Central Novo Sarajevo*. This decision initiated the development of new planning documents for the central area of Novo Sarajevo which includes the Vaso Miskin Crni brownfield site. The decision also confirmed specific guidelines for the regulation plan, which were meant to serve as a basis for planning actions in the area. The regulation plan was also to be aligned with the Urban Plan of the City of Sarajevo 1986-2015, which was still the general development plan for the city at the time.

Since then, there have been certain changes in planning politics, which led to a halt in the process of developing the regulation plan and a change of the previously adopted development guidelines. In 2020, the *Decision on the Temporary Protection Measurements of Ventilation Corridors*, based on the previously adopted *Study on the Ventilation Corridors and Influence of High Buildings* came into effect. This decision led to the urgent need for revision and consequently stopped the development of all planning documents that would affect the ventilation corridor area until further notice. The regulation plan of Central Novo Sarajevo was one of them. In 2021, the development guidelines for the regulation plan were adopted to incorporate the demands of the Study on Ventilation Corridors. While the *Decision on the Temporary Protection Measurements of Ventilation Corridors* was partially revoked, the findings of the study will be incorporated into the new *Urban Plan of the City of Sarajevo*, which is under development and expected to be adopted soon. All other planning documentation, including the regulation plans, will need to follow the provisions of the new Urban Plan.

The above-mentioned guidelines for the development of the regulation plan are important to understand the framework in which Vaso Miskin Crni can be developed in the future. The key points of these guidelines include:

- **Adhere to an overall FAR of 1.0 for all of central Novo Sarajevo.**
- **The Building Coverage Ratio (BCR) for residential and mixed-use areas is a maximum of 60 percent.**
- **Comply with a maximum building height of 20 meters.**
- **Align the longest horizontal dimension of all buildings with the ventilation corridor.**
- **A minimum of 20 percent green space is required for the VMC site.**
- **The potential for pedestrian and bicycle connections needs to be analysed.**
- **The planned green area in Kolodvorska Street is to be retained.**

The *Green Cantonal Action Plan* (GCAP) for Sarajevo incorporated the findings of the Study on the Ventilation Corridors. The Action Plan also recommends the establishment of green corridors in the city and defines benchmarks for green space per capita, green areas within the urban limits, and population density. Another important topic that is addressed in the GCAP is active mobility. Recommendations that could be relevant for brownfield development sites include the expansion of the bicycle infrastructure (cycle paths and parking) as well as the establishment of restricted car zones.

Despite the unresolved issue of the regulation plan, some development activities have taken place in Vaso Miskin Crni over the last years. Most notably, the construction of the 26-storey Sarajevo Tower. The building, which has been developed as a joint investment of domestic and Kuwait companies, comprises 494 apartments, 507 parking units and 11,000 square meters of Ground Floor Area (GFA) for commercial use. It is one of the largest mixed-use developments in Sarajevo in recent times.

The project has earned much criticism due to the height and positioning of the building, which appears to squarely contradict the development guidelines for the site as well as the recommendations of the ventilation corridors study. Moreover, the building is poorly integrated into its surroundings, provided infrastructures are insufficient and there is a lack of open space on the plot. There are no existing planning documents that would support the development of this project and it may be seen as an outcome of investor-driven urban development in Sarajevo.

Before this very recent introduction of high-density housing to the brownfield site, the area had already developed as a commercial hub. About 15 years ago, the Bingo shopping mall was one of the first sales facilities to settle in the heart of Vaso Miskin Crni. The whole area is known for the mall which has served as a development initiator and magnet for other commercial facilities in the area over the years. Today, most of the old industrial halls at the site have been re-appropriated, renovated and adapted to become workshops, storages, shops and even offices for IT companies or a student hub. It is evident, however, that all this buzzing commercial activity has developed in a quite uncoordinated and unplanned way. The space between the buildings is undefined and unattractive, car and pedestrian traffic intermingle in an unregulated way and there are no clear access points to the site that is sectioned by fences and other physical barriers.

Beside the development of commercial activities on the site, there are also traces of cultural use of the former industrial area. In the early 2000s, when the halls of Vaso Miskin Crni were still abandoned, the alternative music festival Futura was one of the first users of the site. The successful cultural use at the time is said to have initiated the idea of converting the site into a new centrality of Novo Sarajevo. More recently, in 2018, a multidisciplinary and multicultural organization from Serbia called Mikser opened up a multifunctional space for education, culture and entertainment in one of the vacant halls of Vaso Miskin Crni. Mikser aims to affirm the region's cultural industry and organizes festivals for creative design in the Balkans region. Unfortunately, Mikser closed after a very short time of operation for reasons that are unknown to the wider public. However, both short-term presences of cultural institutions on the site have left their mark in the memory of the place and have demonstrated a potential for cultural use at the site that should not be neglected in the development of concepts for its future.

The successful cultural use at the time is said to have initiated the idea of converting the site into a new centrality of Novo Sarajevo.

3.4.2 ANALYSIS

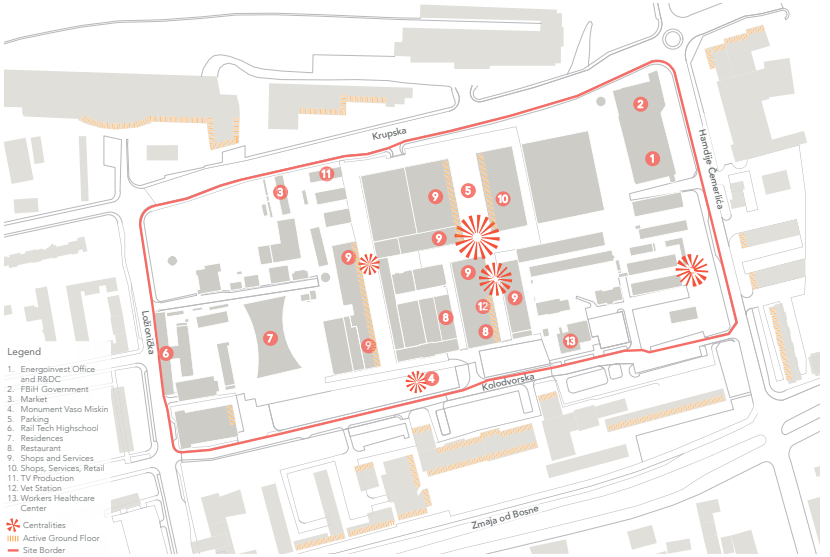
Ground floor uses

Vaso Miskin Crni is a multi-functional area, parts of which are buzzing with economic activity. In the core of the site, there are mainly retail, service and storage buildings. Some of the old industrial halls from the 20th century have been renovated and re-used over the last years while others remain abandoned. The shops and services that have settled here are quite diverse and range from sale of construction materials, to a veterinarian centre, IT companies and a student hub for studying and group works. There are several office buildings as well, of which the Energoinvest building in the northeast is the biggest. Currently, residential uses are very rare on the project site. However, Sarajevo Tower, which has been recently built comprises about 400 new apartment units. There is also a public school and two healthcare facilities on the site.

▲ Ground floor uses in Vaso Miskin Crni brownfield site

Centralities and points of interest

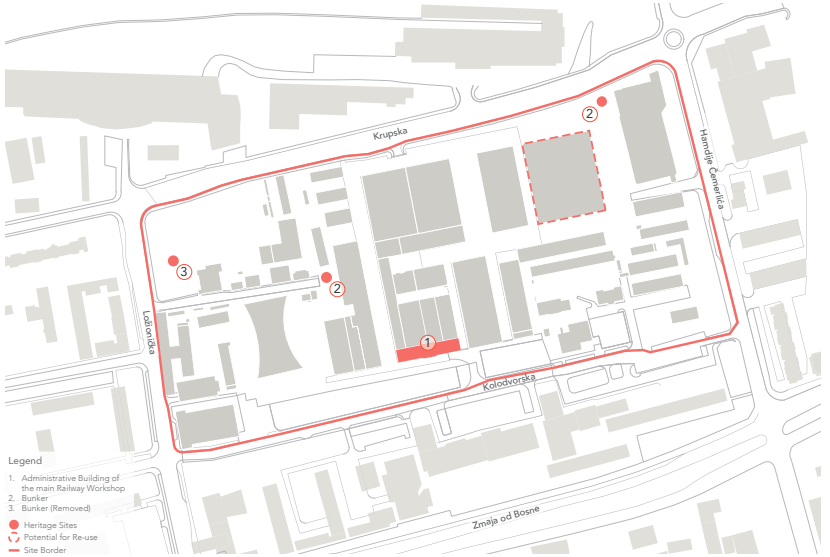
As already mentioned, Vaso Miskin Crni is mainly characterized by retail, service and storage functions. The uses and functions of the ground floor zone determine to a high extent the activities, and therefore the vivacity of a space. Consequently, active ground floor zones contribute to the establishment of centralities. In Vaso Miskin Crni, the main micro-centralities can be found in the centre of the site, as there are several large shops and retail facilities, as well as a restaurant in one of the former industrial buildings. Apart from those, only a few other micro-centralities of lower significance could be identified on the project site, like the Monument to Vaso Miskin Crni, which is a point of interest and therefore attracts people.



▲ Centralities and points of interest in Vaso Miskin Crni

Heritage buildings and cultural assets

The only officially recognized heritage buildings at Vaso Miskin Crni are the two remaining bunkers on the site. The bomb shelters from the 1940s are protected by the National Heritage Commission. Beside these monuments, there are several historical buildings on the site that could be considered worthy of preservation. The former administrative building of the Main Railway Workshop is a neoclassical building from the late 19th or early 20th century that is still in use and also in a good condition. Several brickwork halls from the 20th century bear witness to the industrial heritage of the site. Most notably the Transport Vehicle Division Hall in the east of the area is an impressive brick building in original condition from the early 20th century that has high potential to be kept and re-used to preserve the site's identity.



▲ Heritage buildings and cultural assets at Vaso Miskin Crni brownfield site

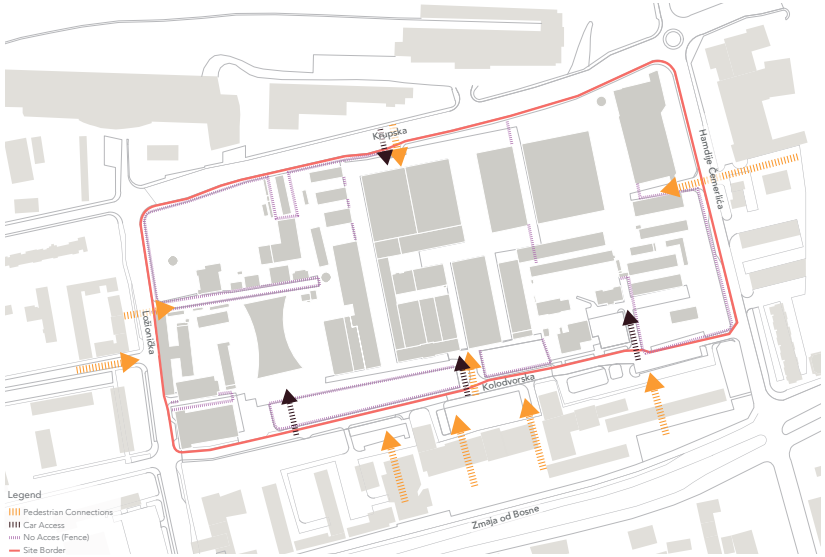
Mobility assessment

Even though Vaso Miskin Crni is located in a very central area of Sarajevo, it does not have a direct connection to the tram line. The two nearest tram stations can be found on Sarajevo's main road Zmaja od Bosne, both about 6 walking minutes away from the centre of the project site, with one station in each direction. One of those tram stations is located on the corner to Ložionička (not shown on the map) and the other one on the corner to Hamdije Ćemerlića. There is also a trolleybus station on Hamdije Ćemerlića, right next to the eastern edge of the site. In the north, the site is accessible via Krupska Street, another main road of Sarajevo. The railway passes by in parallel to Krupska Street and is envisaged to become a city train in the future. A potential city train station north of Vaso Miskin Crni as indicated by the Cantonal Planning Institute could be a great benefit for the development of the site.

▲ Mobility assessment of Vaso Miskin Crni

Access points

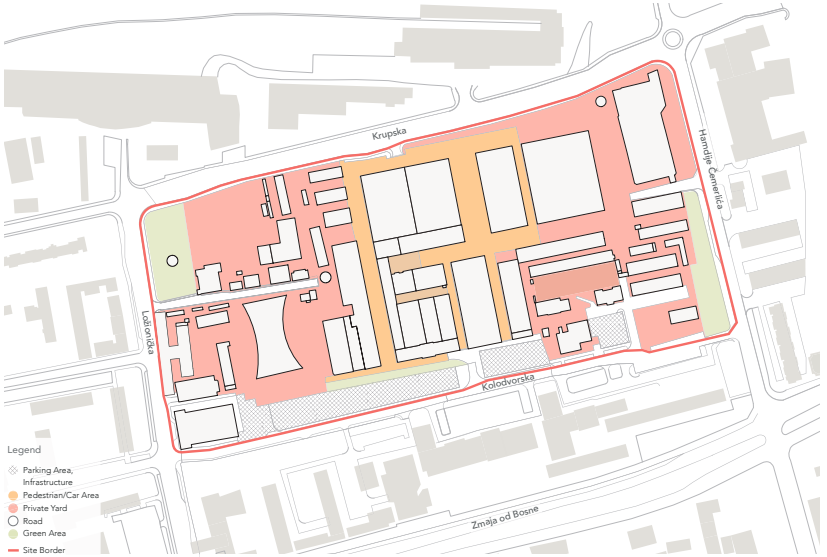
At present, most of the site of Vaso Miskin Crni is actually fenced and poorly accessible for cars as well as pedestrians. Singular access points are located on the east, west and north side of the area while the site is most accessible from the south with several entry points for cars and pedestrians. The building structure to the south of the site is permeable for pedestrians and enables direct walking connections to the main street Zmaja od Bosne behind it. In the east a walkable connection to the University Campus could be established. In the north the railway and large building structures impede accessibility from the settlements on the hill. However, there are proposals for the redevelopment of this area. Connectivity to Vaso Miskin Crni will be important, and it is reasonable to enable potential connections in the future.



▲ Schematic assessment of the access points connecting the site to its surroundings

Open spaces

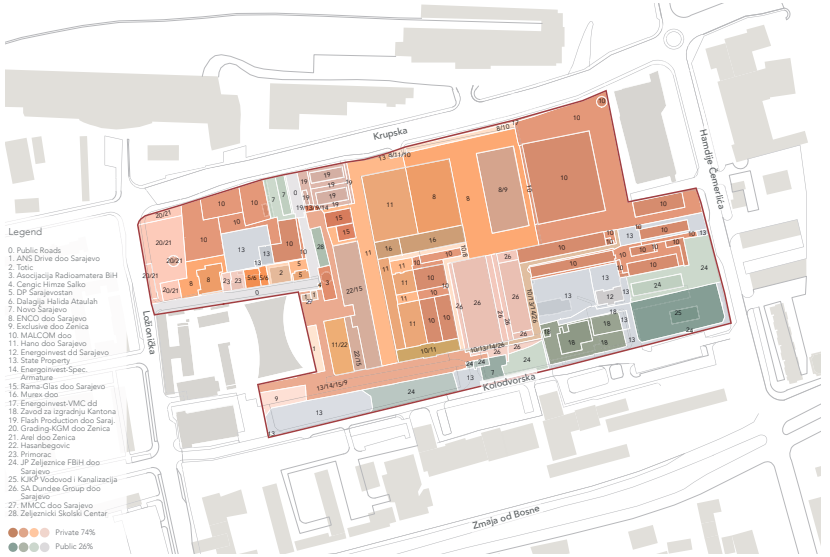
The open spaces in Vaso Miskin Crni are mainly undefined left-overs in between buildings rather than well-defined public spaces. Some areas are designated as parking spaces while others are used for moving around within the site. There are no clearly defined roads nor sidewalks, so the open space within the site functions as a kind of 'shared space' where both pedestrians and cars move around unregulated. Some spaces could be defined as more private, belonging to specific buildings and their users, but the boundaries are fluid and hard to define. There are some green areas most of which are not designed for public use and poorly maintained. The only public green space that is perceived as such is located on the southern edge of the site and accommodates several monuments and statues of historical personalities, including partisan and freedom fighter Vaso Miskin Crni.



▲ Characteristics of open spaces in Vaso Miskin Crni

Land ownership

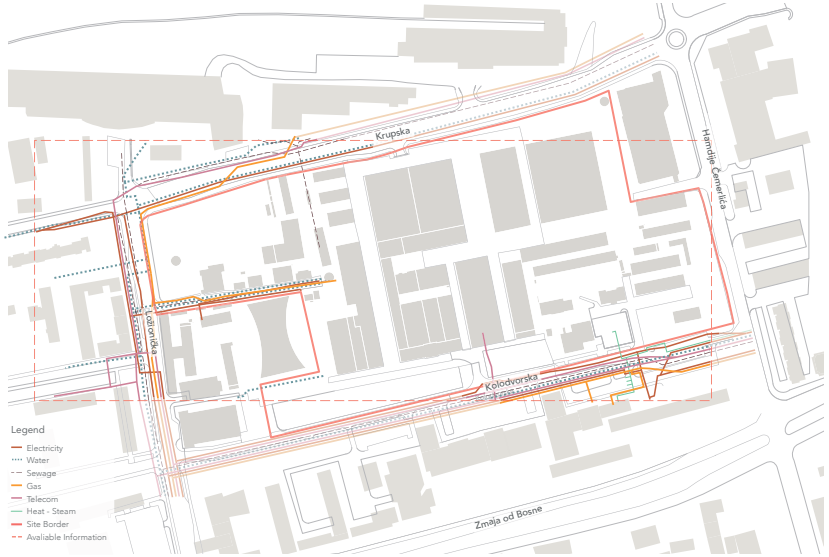
The project site has a large number of around 25 owners and a diverse mixture of public and private owners. 74 percent of the area is privately owned by several different limited liability companies. Buildings on these plots are mainly retail, service ore storage buildings, some of which are currently abandoned. There are also several areas which are owned by different public entities. These are mainly located on the edges of the project site, bordering the streets Hamdije Ćemerlića, Kolodvorska and Ložionićka. The plots in public ownership include a public school, a healthcare centre, an emergency room and parking spaces. The northern part of the Energoinvest houses the offices of the Government of the the Federation of Bosnia and Herzegovina and while the Energoinvest headquarters are located in the southern part of the building.



▲ Ownership structure of Vaso Miskin Crni brownfield site

Infrastructure system

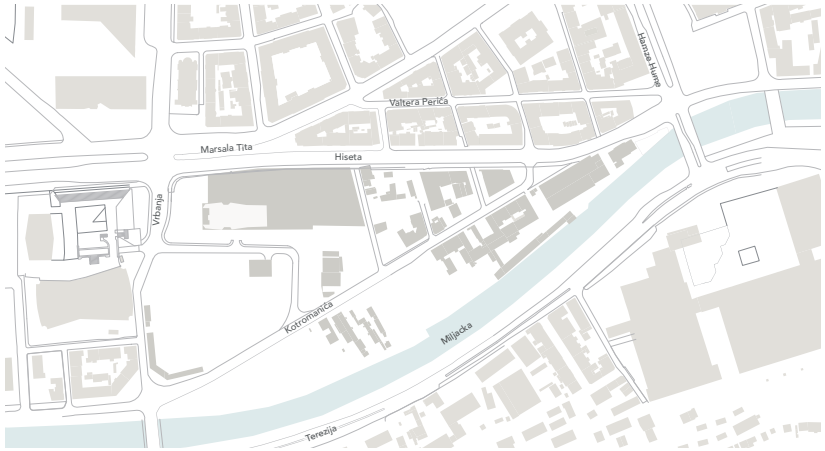
The information on existing underground infrastructure systems obtained from the municipality is limited to the central area of Vaso Miskin Crni. It shows that the main infrastructure lines for electricity, water, sewage, gas and telecom networks are available underneath public roads around the project site and can be expected to continue beyond the boundaries of the fragmentary official information. Additionally, there is a connection to the district heating system in the southwest of the area. Secondary distribution lines are available throughout the site and grant supply to all buildings in Vaso Miskin Crni (not displayed in the map).



▲ Existing underground infrastructure at Maso Viskin Crni

3.5 KVADRANT B

Kvadrant B in Marijin Dvor neighbourhood is a central location in the city of Sarajevo, in the Municipality of Centar Sarajevo. The project site is triangular in shape and is bounded by the longitudinal M18 Hiseta Street on the north, the Miljacka River on the south and the Vrbanja Street on the west. The area is partially developed with new shopping malls, mixed-use and business buildings as well as services, and is part of the larger area of the city's new business and public centre. However, it also contains old heritage buildings from the Austro-Hungarian period which are currently in private ownership. The rest of the site, near the Miljacka River, is mainly used as a parking space, and is owned by public entities. The connection to the public transport system and the road network is excellent and the high-density surroundings are a good precondition for the development of mixed uses in the area. The redevelopment of the site has been subject of discussion for over 20 years and has evolved to a controversial topic. Several master plans have been developed by investors and because of its prominent location in the city there is high pressure on the site.



▲ Base map of Kvadrant B

▶ Miljacka River next to Kvadrant B

3.5.1 PLANNED INITIATIVES AND PREVIOUS INVESTMENTS

Similar to the case of Vaso Miskin Crni, the development of a new regulation plan for Kvadrant B is an ongoing procedure. In 1999, a regulation plan was prepared and adopted, which has undergone several changes in the past 20 years. The *Decision on the Development of a Regulation Plan for Kvadrant B* was issued in 2016 by the City Council of the City of Sarajevo. Amendments to the Decision were made in 2019 and the submission of the planning documents was delayed for the same reasons described in the case of Vaso Miskin Crni: revision in accordance with the findings and rules of the Study of Ventilation Corridors and the ongoing development of the new Urban Plan of Sarajevo.

The key points of the guidelines for the development of a regulation plan for Kvadrant B (from 2016 and 2019) include:

- **Review decisions of the National Heritage Authority for protection of buildings and consider partial or complete demolition.**
- **Include a pedestrian lane of at least 12 meters along the waterfront.**
- **Maximum building height along the waterfront should not exceed 26 meters. It is possible to increase maximum height to 34 meters using setbacks.**
- **FAR can go up to a maximum value of 5.2 on selected parcels.**
- **In the central area, vertical accents can be set with a height equivalent to the SCC towers.**

◀ Winning design for the National Concert Hall in Sarajevo from 1998

Source: Urban Future Organization

» **The line of sight from St. Joseph Church to the river should be kept clear.**

» **Future uses on the site should focus on the office sector while also including administration, culture, services, hospitality, retail and residential capacities.**

» **The area opposite the parliament is intended for business use including a concert hall. The vertical accent of these buildings should not exceed 100 meters.**

» **Buildings on the waterfront should have permeable ground floors to ensure pedestrian communication and connections to the river.**

» **Parking space should be planned according to the current standards and rules.**

» **The position and function of Kotromanica Street should be scrutinized.**

The *Green Cantonal Action Plan for Sarajevo* incorporated the findings of the Study on the Ventilation Corridors and recommends conducting Strategic Environmental Assessments including airflow analysis for new constructions within the wind corridors. The Action Plan also recommends the establishment of green corridors in the city, one of them along Miljacka River, and defines benchmarks for green space. In terms of active mobility, relevant recommendations for Kvadrant B include the expansion of the bicycle infrastructure (cycle paths and parking) as well as the establishment of restricted car zones and a pedestrian zone in the city centre.

▶ Front view of Sarajevo City Center with hotel tower

The above-mentioned idea of building a concert hall in the area of Kvadrant B has been discussed for over 20 years. In 1998, an international design competition was organized with renowned architect Zaha Hadid as president of the jury that comprised the most prominent urban planners and architects of Sarajevo at the time. The competition was financed by the City of Rome and more than 400 contributions from 43 countries were submitted. The winning design solution came from the Urban Future Organization in London and was an underground concert hall with a 'music park' on the surface above it. The building was to have two halls, the main hall for symphonic music as well as a smaller chamber and contemporary music hall. The total capacity of the complex was 2,300 people (including visitors and musicians). Such a hall would be the first of its kind in Southeast Europe, with a total investment value of approximately 35 million euros.

The concert hall was planned to be built on the plot opposite of the parliament building, but it has never been implemented. Despite of various amendments of the regulation plan as well as land privatization processes over the past 20 years, the project has never been seriously questioned and remains as a fixed idea in the local people's minds. The imagined concert hall has become a symbol for the right to culture through public institutions that has been neglected in the post-war period which has not seen the construction of a single cultural facility of significant scale by the public sector.

The last adoption of the guidelines for the development of a regulation plan, however, describe the concert hall as integrated into a building with other uses. This paves the way for a more flexible and sustainable version of the concert hall that could facilitate financing, management and maintenance of such a structure and may actually be a step towards realization of the project.

Another large-scale project at Kvadrant B was realized much faster. The construction of Sarajevo City Center started in 2008 and the largest and most modern shopping mall in the city was opened in 2014. The building covers almost 70,000 square meters of land in the northwest of the site. It consists of a large commercial body (shopping and entertainment) with two towers, one for offices and one for hotel rooms, as well as a 4-storey underground garage. The towers are around 75 meters high which does not comply with the regulation plan that was valid at the time of construction and stipulated a maximum height of 21 meters. The excessive height of its towers is exemplary for the general oversizing of the building that does not respond to the delicate space of Kvadrant B, where Austro-Hungarian block perimeter development meets inter-war St. Joseph's church and late Socialist monumental architecture (building of the BiH Parliamentary Assembly). Sarajevo City Center fails to establish a spatial connection to its environment which is aggravated by the impermeability of its ground floor zone, the large video billboard façade and the lack of quality public space around it.

▶ Contemporary building in Kvadrant B with active ground floor zone, offices and co-working spaces

A more sensitive building ensemble was developed to the east of Sarajevo City Center between 2013 and 2015. The new constructions of residential and office buildings on two plots in the northeast of Kvadrant B follow the urban pattern of the Austro-Hungarian period with slightly higher buildings of up to 7 floors. The design is contemporary, and all buildings feature active ground floor zones.

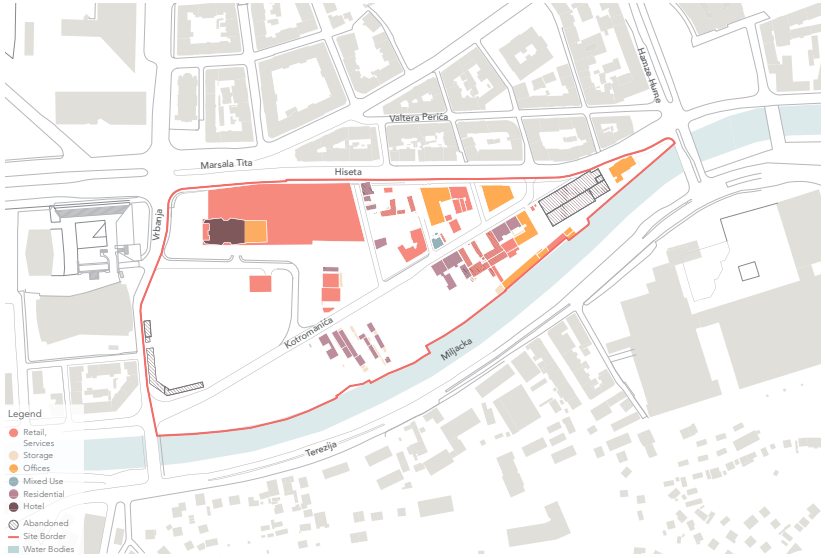
An ongoing development at the site is the current reconstruction, adaptation and upgrade of the former administrative building of the Sarajevo Power Plant in the most eastern corner of Kvadrant B. The building is supposed to be re-used as office space. The reconstruction is being carried out according to high restoration and conservation standards.


"NE ŽELIM DA
MOJA BEBA
IDE NA RAŽANJ."
SPAZIO GOURMET

3.5.2 ANALYSIS

Ground floor uses

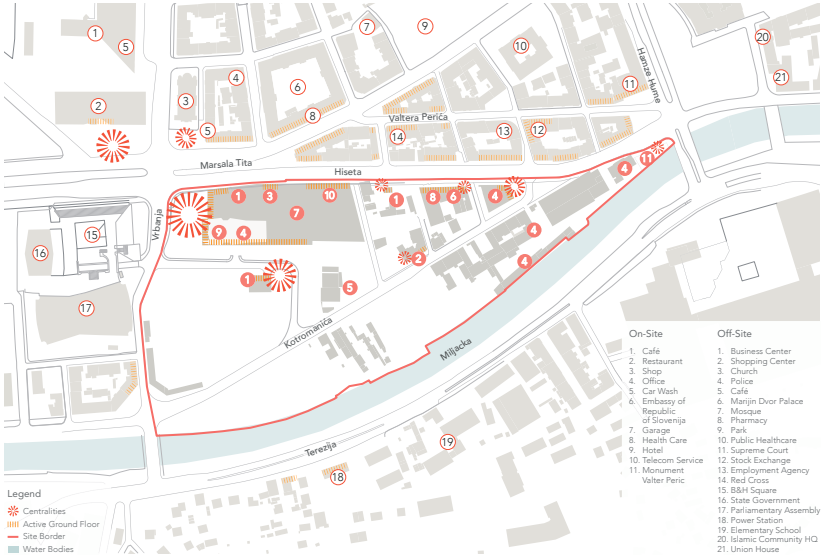
The ground floor area of the buildings in Kvadrant B is characterized by different functions, of which the retail and service is currently the most dominant one. This is mainly because of the Sarajevo City Center, comprising a large shopping mall with around 180 shops, which occupies a large part of the site. The Sarajevo City Center also includes a hotel and an office tower of 13 floors. Additionally, there are also some residential buildings and other office premises on the site of Marijin Dvor, as well as a few storage or mixed-use buildings. Several buildings on the site are currently abandoned.



▲ Ground floor uses in Kvadrant B brownfield site[1]

Centralities and points of interest

The Sarajevo City Center, which offers a wide variety of shops, services and entertainment opportunities, with its office and hotel tower is the main centrality of Kvadrant B. There is a lot of movement and activity going on in the small public space in front of the mall. Some other micro-centralities are spreading along Hiseta Street. Most of the buildings facing this street have an active ground floor zone with cafés, restaurants, etc. In general, the area in the north of the project site is a central, dense and lively part of the city and there are many active ground floor uses in the immediate vicinity of the site. The southern part of Kvadrant B, however, currently has no central qualities as most of the buildings do not have an active ground floor zone or are completely abandoned. Also, this part of the site is more difficult to access and cut off by the Miljacka River.

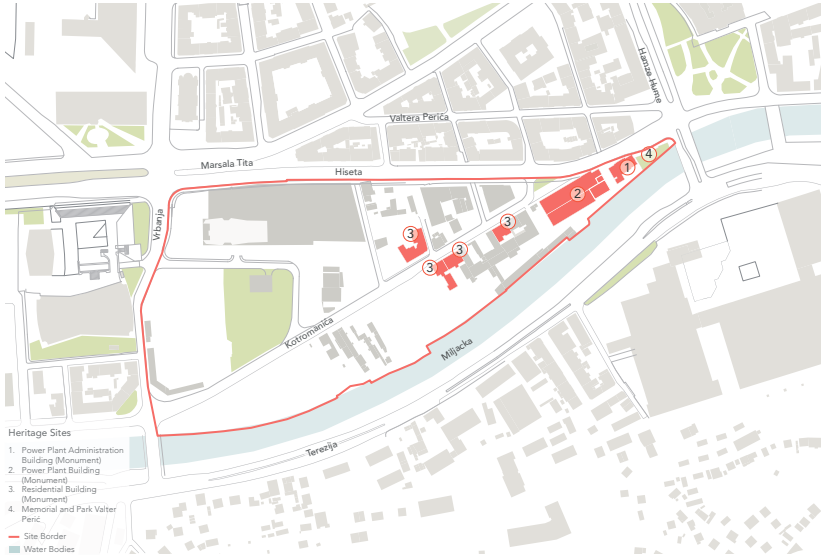


▲ Centralities and points of interest in Kvadrant B

Heritage buildings and cultural assets

There are several heritage buildings on the site, some of which are currently abandoned and largely neglected. The historic power plant building and adjacent administrative building have a rich history and played an important role during war times in Sarajevo. While the latter is currently being renovated and turned into modern office space, the power plant building itself is in a very bad condition with the roof missing and overgrown by plants.

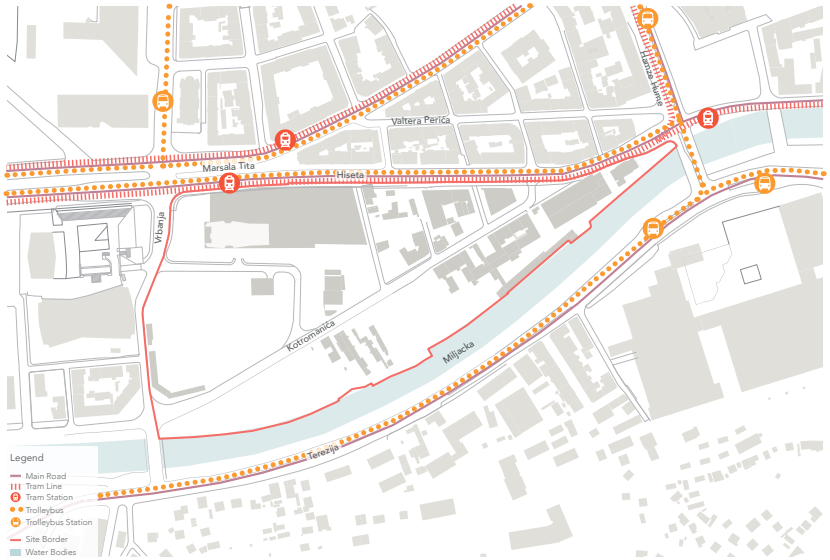
The protected residential buildings from the Austro-Hungarian period are partially in use but generally not in a very good condition. On the very east of the site there is a small park with a memorial of Vladimir Valter Perić which is also listed as national heritage.



▲ Heritage buildings and cultural assets at Kvadrant B

Mobility assessment

Kvadrant B does not only have good access to the main road network of Sarajevo, it is also well connected to the public transport system. On the northern side of the area, there are tram stations along Hiseta Street, which is one of the most important roads through the City of Sarajevo. Trolleybus stops can be found on Hamze Hume Street and on the other side of the Miljacka River on Terezija Street, both around 6 walking minutes away from the centre of the project area. Terezija is another main road close to Kvadrant B that is separated from the site by Miljacka River. However, there are two bridges next to the project site, allowing access to the other side.

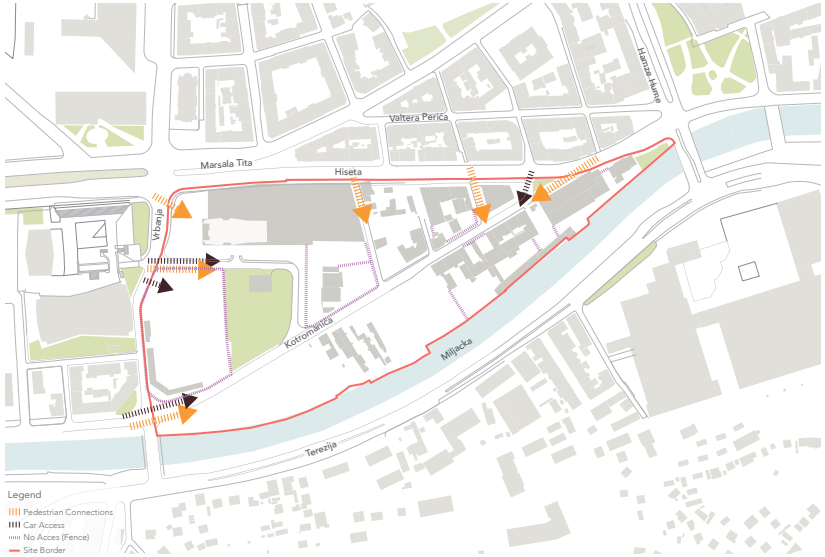


▲ Mobility assessment of Kvadrant B

Access points

Today the area is mostly accessed via Kotromanića Street, which forms the east-west connection within Kvadrant B and is often used by car drivers as a bypass to avoid the busier Hiseta Streets and its traffic lights. The walking and cycling promenade of Vilsonovo Street along the river does not continue into Kvadrant B where pedestrians must walk on narrow sidewalks between a surprisingly unattractive environment of parking lots and driving cars.

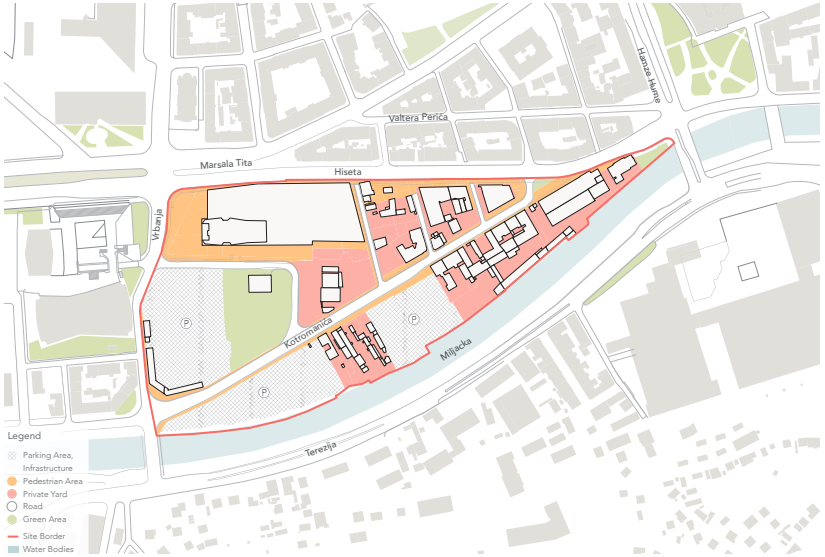
Another access point is located next to the mall Sarajevo City Center. In this spot visitors to the mall enter to reach the underground parking garage of the shopping complex. The small street is rather crowded during large portions of the day. From the north, the Austro-Hungarian block structure of the urban fabric offers a few more entry points for pedestrians as well.



▲ Schematic assessment of the access points connecting the site to its surroundings

Open spaces

A large share of Kvadrant B actually consists of open spaces. The majority of them are fenced-off private yards and parking areas, but there are also some public pedestrian areas in front of the Sarajevo City Center and along Hiseta Street. There is only one larger green area on the site, located in the centre of the plot and currently owned by the Municipality of Centar Sarajevo. However, it is neither designed as a public space nor accessible to the public. Even though the project site borders the Miljacka River to the south, there is no significant interaction with the waterbody. The river is framed by walls and the site seems to turn its back to the river rather than to connect with it. A small promenade along the river can be found on the opposite site of the waterbody.

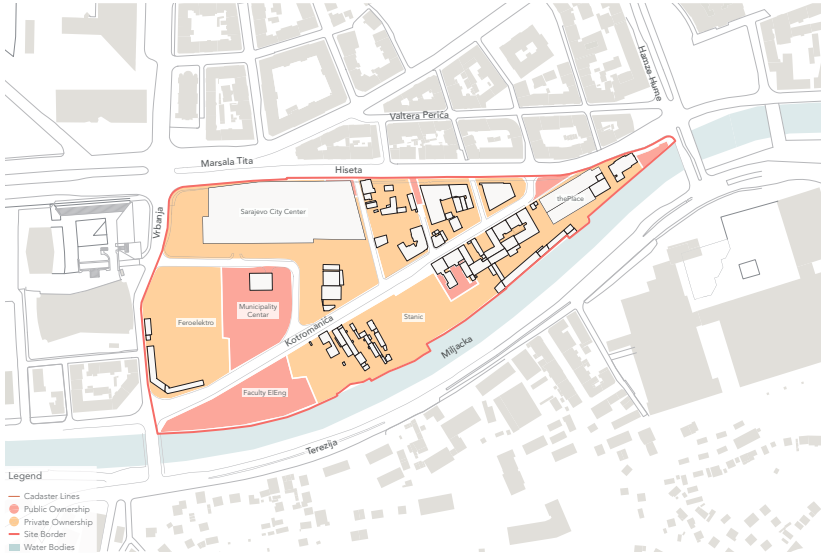


▲ Characteristics of open spaces in Kvadrant B

Land ownership

Similar to the Vaso Miskin Crni site, Kvadrant B has a mixture of both private and public owners. The private owners are several large limited liability companies, but there are also several individuals owning smaller parcels of the site.

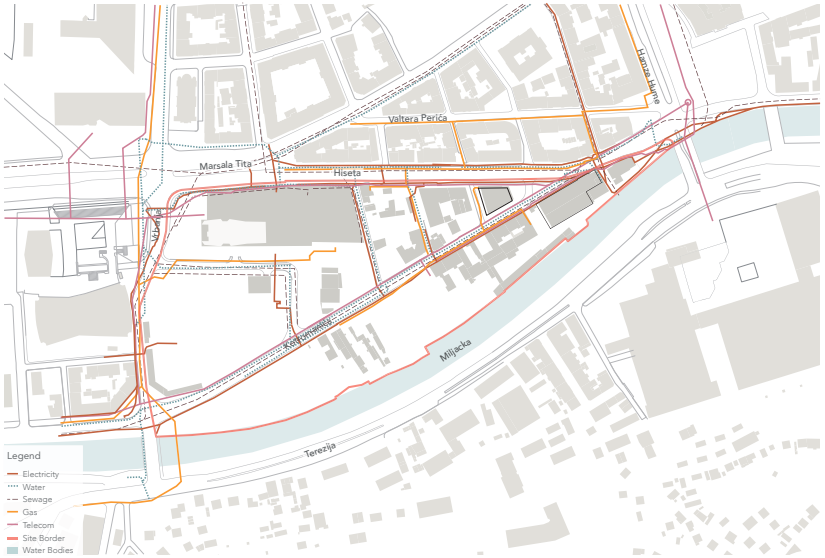
Even though most of the site is privately owned, there is a considerable share of 40 percent of the land that is in public ownership. Public landowners include publicly owned educational institutions as well as the Municipality of Centar Sarajevo. Two of the largest publicly owned lots are a parking space in the very southwest of the site and a large green area in the centre. There is an open legal dispute about one of the land plot which poses a risk for timely development.



▲ Ownership structure of Kvadrant B

Infrastructure system

At Kvadrant B, comprehensive information about existing underground infrastructure has been provided by the municipality. The map below shows all existing main lines of infrastructure. It confirms that electricity, water, telecom networks and sewerage are available along the main roads around the project site and along Kotromanića Street that crosses through Kvadrant B. From there, adjacent houses are supplied through secondary systems (not shown in the map) that can be easily extended to newly developed plots. The gas line does not cover the entire area yet and district heating is not available at all.



▲ Existing underground infrastructure at Kvadrant B

4

URBAN DESIGN LAB

Scan to watch the video documentation about the Urban Design Lab

The Urban Design Lab was an important milestone in the development of key qualities for the Urban Design Strategies for the two selected brownfield sites. The lab represents an experimental approach to urban design in the context of urban voids and brownfield development in Sarajevo. Four days were filled with an intensive program including an academic workshop, public events and stakeholder meetings. Beside the team of consultants, other participating institutions were the University of Sarajevo, Association of Architects in Bosnia and Herzegovina, Days of Architecture, the Municipalities Centar and Novo Sarajevo, City of Sarajevo and Canton of Sarajevo.

4.1 ACADEMIC WORKSHOP

A central part of the Urban Design Lab was an academic workshop with students from the Faculty of Architecture at the University of Sarajevo. The aim of the workshop was to collect different ideas and perspectives on the future urban development of the two selected target sites Kvadrant B and Vaso Miskin Crni and to open the discussion about their possible transformation. During the four days of the Urban Design Lab architecture students from the University of Sarajevo developed Urban Design Strategies that provided potential frameworks for the future development of the brownfield sites. The students formed small groups of three people, each group working on one of the two target sites. Topics that were addressed in the strategies included but were not limited to uses, target groups, green spaces, mobility, typologies and building heights.

The academic workshop comprised of several working sessions with the students plus a final public presentation of the outputs. In the course of the Urban Design Lab the students got several inputs on topics such as brownfield development, participatory urban design, the real estate market in Sarajevo and strategic planning. Moreover, the students participated in the public events of the Urban Design Lab in the evenings, which gave additional input and inspiration for their work.

The workshop started off with an introduction to the assignment and was followed by a lecture about brownfield development by Roland Krebs (superwien), an input about the local context by Nasiha Pozder (Faculty of Architecture, University of Sarajevo) and a talk about real estate supply and demand by Klara Matic (Colliers). Subsequently, a walkshop was conducted, were the teaching team visited the sites together with the students, mapped important features, and discussed first impressions and ideas. On the second day of the workshop, the series of thematic input was continued with a lecture about participatory urban planning by Katharina Höftberger (superwien) and an input about Smart City strategies by Nikolaus Summer (Urban Innovation Vienna). In a workshop setting, the student groups developed their visions and goals for the future development of the brownfields and worked on their scenario models, followed by a joint reflection at the end of the afternoon.

The third day of the academic workshop was fully concentrated on the elaboration of integrated urban strategies in each student team. In a short midterm presentation, students collected feedback on their working progress and some tips for the final public presentation.

◀ Poster of the Sarajevo Urban Design Lab

▲ Walkshop with students from the University of Sarajevo

4.2 PUBLIC EVENTS

During the Urban Design Lab three public events took place in the evenings. The public events aimed at reaching out to a wider public in the city, thus opening up the dialogue about brownfield development. The thematic events addressed professionals of architecture and urban planning and were promoted through the channels of the Association of Architecture in BiH as well as through the Days of Architecture Sarajevo.

Movie night

On Wednesday, 03 November 2021, a movie night was held at the Creative Hub of the Association of Architects in BiH. The theme of the evening was the regeneration of urban heritage structures with a particular focus on industrial heritage. A selection of four short films from the OpenHeritage project were shown. Each film showcased one best practice project of adaptive heritage re-use in Europe in relation to culture, housing, production, trade and experimental urban development.

» **Stara Trznica: Revitalization of an old market hall in Bratislava (Slovakia). Based on a citizen's initiative, the old market hall was revitalized with various uses (market, production, culture). The initiative tested innovative forms of contractual partnerships with the municipality and contributed to the quality of public space around the market hall.**

» **Transformation of a former coffin factory into a co-housing project in Vienna (Austria). The initiators planned and realized the project collectively. Community functions like a bath house, concert venue, restaurant, kindergarten, etc. were integrated in the housing project and bring added value to the entire neighbourhood.**

» **Marineterrein: Experimental urban development of the former navy yard in a central area of Amsterdam (Netherlands). The city decided to give this important development area time to organically develop and test different uses before a master plan is drawn. Temporary uses, public participation and small-scale interventions will shape the area over the next years.**

» **Halele Carol: The owner of some unused factory halls in Bucharest (Romania) agreed to the cultural reuse of his property that was implemented through temporary uses and incremental changes of the building and its surrounding green space.**

After the screening there was a lively discussion about the potentials of reuse of heritage buildings in the brownfield development sites of Sarajevo.

Online lecture and panel discussion

On Thursday, 04 November 2021, Volkmar Pamer, architect and urban planner at the Municipal Department for Urban District Planning and Land Use of the City of Vienna, gave an online lecture on brownfield development in Vienna. Along three examples (Kabelwerk, Carré Atzgersdorf and In the Meadow) he presented experiences that the City of Vienna has made with brownfield development over the last 20 years. Important issues that were raised and discussed in the subsequent Q&A session included land consolidation and quality management.

The online lecture was followed by a panel discussion on the potentials of brownfield development in Sarajevo with panelists from the fields of architecture and urban planning. The invited speakers on the panel were:

▲Panel discussion on brownfield development in Sarajevo

» **Stefan Mayr, architect and director of superwien, an studio for architecture and urbanism based in Vienna. He is one of the consultants in EBRD's Sarajevo Brownfield Urban Regeneration project.**

» **Gordana Memišević urban economist. Formerly working at the Cantonal Planning Institute, today she is engaged with different urbanistic projects in Sarajevo and most recently involved in a cooperation with ETH Zürich's Sarajevo Urban Transformation Program.**

» **Zina Ruždić urbanist and Assistant Director for Urban Planning at the Cantonal Development Planning Institute.**

» **Jasmin Sirćo, architect and founder of Days of Architecture Sarajevo.**

Based on the inputs from Volkmar Pamer, the guests of the panel discussion talked about possible learnings from Vienna that could be transferred to the context of Sarajevo. Other central subjects of the discussion were new strategies for brownfield development needed in Sarajevo and future visions for metropolitan development.

Final presentation of the academic workshop

The last public event of the Sarajevo Urban Design Lab was the final presentation of the academic workshop on Friday, 05 November 2021. Three student groups presented the Urban Design Strategies for Kvadrant B and Vaso Miskin Crni they had developed over the previous days. Due to the severe weather conditions (storms and flooding), the audience was limited to the team of international consultants and colleagues from the Faculty. Nonetheless, the students' presentations delivered inspiriting ideas and triggered some feedback and discussion.

4.3 STAKEHOLDER WORKSHOPS

Last but not least, several important stakeholder workshops were conducted during the week of the Sarajevo Urban Design Lab. The week started off with the first meeting of the Working Group, composed of important stakeholders from all relevant administrative levels (Canton, City, Municipalities). Workshops with the Municipalities Centar and Novo Sarajevo followed, including representatives of the City. Another important workshop during the Sarajevo Urban Design Lab was the meeting with the Stakeholder Core Group that offered a platform for open and creative exchange about the sites between professionals from the academic sector, architectural practice, as well as administration.

Working Group meeting

The Working Group Meeting took place online in order to allow participation of all relevant stakeholders from EBRD, the consultants' team, Canton and City, as well as the Municipalities of Centar and Novo Sarajevo.

The objective of the first meeting of the Working Group was to introduce the consultants' team and the members of the Working Group to each other and to clarify everyone's role in the process of the project. Roland Krebs, director of superwien, gave a brief overview of the project (main goals, work that has been completed so far, and next steps) and clarified the role of the Working Group as a decision-making body. The Working Group was scheduled to meet twice in every project stage to discuss the results presented by the consultant.

Municipality workshop: Centar Sarajevo

The first municipality workshop took place at the town hall of the Municipality of Centar Sarajevo where the consultant team met with the public representatives that would be primary contact persons and decision-makers in relation to the development of Kvadrant B. The meeting was an important opportunity to exchange first-hand information about the project, expectations and framework conditions for the project site.

The topics that were discussed included the current situation of the regulation plan and valid guidelines for the development of Kvadrant B. There was a debate about the limitations and possibilities for building volumes and heights that come along with the Study on Urban Ventilation Corridors. It was clear that the Urban Plan for Sarajevo, that is currently under development, was going to address many of these issues and would have a major influence on the development possibilities at the site.

During the meeting, the public representatives shared their vision of Kvadrant B as the future business centre of Sarajevo. The site contains tremendous potential and holds significance for the entire city. Kvadrant B is understood as the gate to the city. In the future, it could be an entrance point where visitors park their cars before walking into the city for sight seeing and shopping. To fulfil this purpose, the connection to means of public transportation and infrastructure for active mobility at the site should be excellent.

From this project, the representatives of the city and municipality hope to obtain an external, 'neutral' vision for the site of Kvadrant B along with a solid argumentation for certain planning decisions. Existing paradigms should be scrutinized, and technicalities left aside to provide a fresh view based on modern planning standards.

Municipality workshop: Novo Sarajevo

To discuss the development of the Vaso Miskin Crni site, a workshop was held with representatives and decision-makers of the City and Municipality at the town hall of the Municipality of Novo Sarajevo.

The public representatives shared and discussed the current regulation plan of the wider central area of the municipality, which includes the project site. An amendment process for the plan is ongoing and corresponding guidelines have been formulated. However, with the new Urban Plan for Sarajevo currently in development, new provisions are expected to be in place soon, and the municipal planning process is on hold.

Overall, Vaso Miskin Crni is envisioned as the future center of the municipality with a focus on business-administrative functions and a certain percentage of residential use. Some of the current uses should be obtained, like the educational and medical institutions, but there are different perspectives on the potential value of maintaining the industrial heritage of the site. The public representatives agreed that the development at Vaso Miskin Crni should include green spaces for the benefit of all people in the municipality. Different traffic solutions were also discussed.

It was concluded that the main challenges were to align the expectations of the public sector with the interests of the private owners and investors. However, the city needs a plan that is realistically applicable. The public representatives would be interested to see a fresh perspective on the site, as well as specific recommendations for implementation in partnership with the private landowners.

Stakeholder Core Group meeting

In order to enhance the understanding of local planning culture and to include local professionals into the debate, the consultants had a meeting with a range of experts from planning practice, administration and academia. The discussion evolved around possibilities, obstacles, regulations and obligations that emerge for both sites, as well as possible scenarios and programs for the locations.

In relation to Kvadrant B, the historical importance and long history of planning for the site were discussed. Today, the site is envisioned as a multifunctional, innovative, business district – the 'downtown' of Sarajevo. Next to a focus on business, the development should still contain a certain percentage of housing to keep the place alive at all times of the day. Flexible, mixed-use and multifunctional places and facilities could be provided along with a much-needed green space in this area of the city. The green area should be connected to the river that would become an attractive accessible space for recreation.

Flexible, mixed-use and multifunctional places and facilities could be provided along with a much-needed green space in this area of the city.

An important point in the discussion was the proposal of the concert hall that is still based on a 20-year-old design. Today, financing and management are still unresolved, and some suggested reinventing the project as multifunctional cultural venue that would respond to contemporary art forms. In any case, the citizens of Sarajevo expect a public cultural facility on the site and it should be provided.

The site of Vaso Miskin Crni was discussed in relation to the complexity of ownership status that makes the development of the site challenging. The investors have different visions for the site than the planning authorities which is why development has not set off.

Interesting ideas about the future usage of the site included the establishment of modern blocks, with mixed-use, education, technology and housing. The workshop participants saw a high potential in relating to the historic memory of the place by establishing a technology hub in one of the former industrial halls. The adjacent campus could be linked to the emerging IT industry in the city through a place that encourages innovation and collaboration. The need for a public green space in this part of the city was also highlighted.

While the implementation of a new centrality in Novo Sarajevo was welcomed, the participants also stressed that for a truly polycentric development of Sarajevo, new urban centres need to be established in the western part of the city. Cultural institutions and public functions should be located in these areas to counteract the growing misbalance between Sarajevo's spatial poles.

The conversion of both sites, Kvadrant B and Vaso Miskin Crni, will be highly important for the future development of Sarajevo. While many public interests are at stake, it will be crucial to develop a plan that can also convince the private landowners. Development can only be successfully implemented if public and private interests are reconciled.

▶ Discussing visions for Sarajevo with the Stakeholder Core Group

5
DEVELOPMENT PROPOSITIONS

Based on the comprehensive analysis of the two selected development sites and the valuable input collected during the Urban Design Lab, distinct development propositions were elaborated for each brownfield site. Kvadrant B in Marijin Dvor and the former Central Railway Workshop Vaso Miskin Crni are envisioned as new centralities in Sarajevo with mixed-use urban developments, sustainable mobility systems and green building standards. Their strategic transformation is expected to have a significant impact on the urban development of Sarajevo over the next decades.

▲ Aerial view of Vaso Miskin Crni from the east

▲ Aerial view of Vaso Miskin Crni from the south

5.1 DEVELOPMENT PROPOSITION FOR VASO MISKIN CRNI

Vaso Miskin Crni is envisioned to be redeveloped as a new centrality of Novo Sarajevo and to integrate central functions that are currently missing in its surroundings. The development of a mixed-use neighbourhood will include offices, retail, housing, and social infrastructure in a balanced ratio that responds to market demands but also suits the intended establishment of an urban business centre. Integrating active uses, like restaurants, cafes, and shops, in the ground floor zones of the buildings will be crucial in order to create a lively centrality that meets the demands of people working, living and seeking leisure in the area. Offices and retail as well as urban workshops will be concentrated in the busier east of the site, close to the university and main transportation corridors. Towards the west and around the location of the new education campus, the share of housing will increase. Overall, a balanced mix of uses will support the development of a lively and attractive new centrality.

The new urban fabric respects the industrial heritage of the site while responding to inspirations from the surrounding structures. It was decided to keep two buildings of the old Railway Workshop, the Transportation Vehicle Division and the Administrative Building, next to the protected bomb shelters. These historical structures are valuable assets that can preserve the identity of the site and breathe life into the new development.

The form of the old production hall was picked up and replicated to shape the urban grid along the east-west axis that characterizes the development of the whole city. The predominant typology is a modern block development with green courtyards. The denser blocks in the southeast of the site have continuous plinths that provide larger spaces for retail and urban workshops. The general building height is five floors with selected high points of up to 9 floors in the south and up to 16 floors in the northern part of the site, taking account of the urban ventilation corridor along Zmaja od Bosne Street. The four towers in the north are a homage to the existing residential towers south of the site. Plot sizes are balanced throughout the site and can be further sub-divided in most cases. The largest plot is the central area of the envisioned education campus and its grounds.

As the shape of the site stretches out in parallel to the main development corridors of Sarajevo, the central main axis runs from east to west, connecting to the existing university campus close-by. The middle axis is the backbone of the development that runs past all central places in the new neighbourhood. Transversal footpaths connect it to the north and south and make the whole area open, permeable, and easily accessible. Important entrance points are marked by micro public spaces on the edges of the site that guide the visitor towards the central axis.

The main public space is the one-hectare park in the centre of the neighbourhood. It will be designed to fulfil the diverse needs of the new inhabitants and people working or studying in the area. The main axis will be another important public space. Designed as a pedestrian boulevard with shops, cafés, and restaurants along the building fronts, it will be the vibrant spine of the neighbourhood. It will become wider around the bomb shelter where it opens up into a small urban square, which is the second central place of the neighbourhood.

The whole area is designed as a car-free neighbourhood that gives priority to non-motorized modes of transportation while vehicles would be limited to entering only to access parking garages, delivery of goods, emergency services or providing access to disabled visitors.

▶ Vision for Vaso Miskin Crni - axonometry of the development proposition

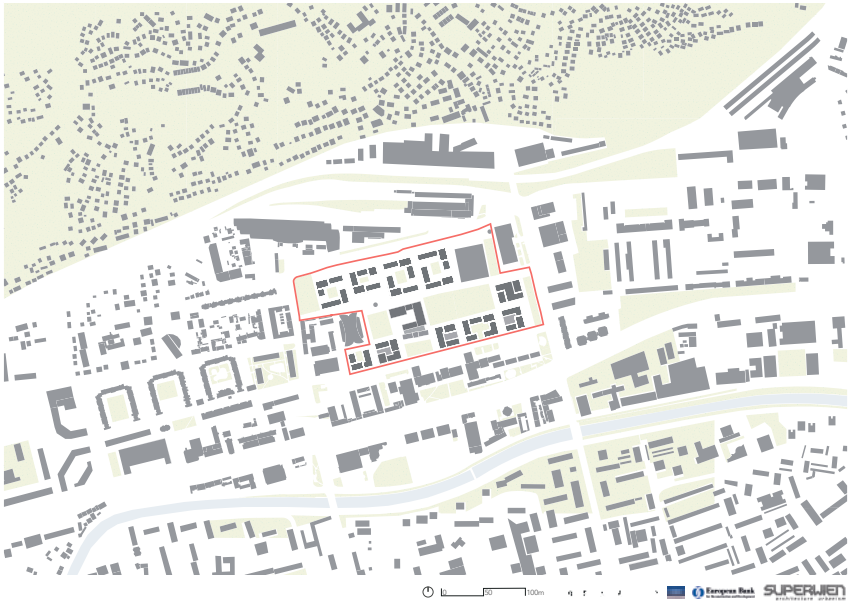
5.1.1 URBAN DESIGN STRATEGY

Following an integrated approach to urban design, the consultant took into account social, economic, environmental, cultural and administrative aspects in the development of a solid urban design that organically blends into the city while providing exciting new qualities.

Following the city's rhythm of open versus built-up spaces, the new development picks up the dynamic of the brownfield and fills the gap that was left by the former Railway Workshop. Not only existing buildings should be maintained but also current uses could be transferred into the new building structures, thus maintaining some of the site's progressive spirit.

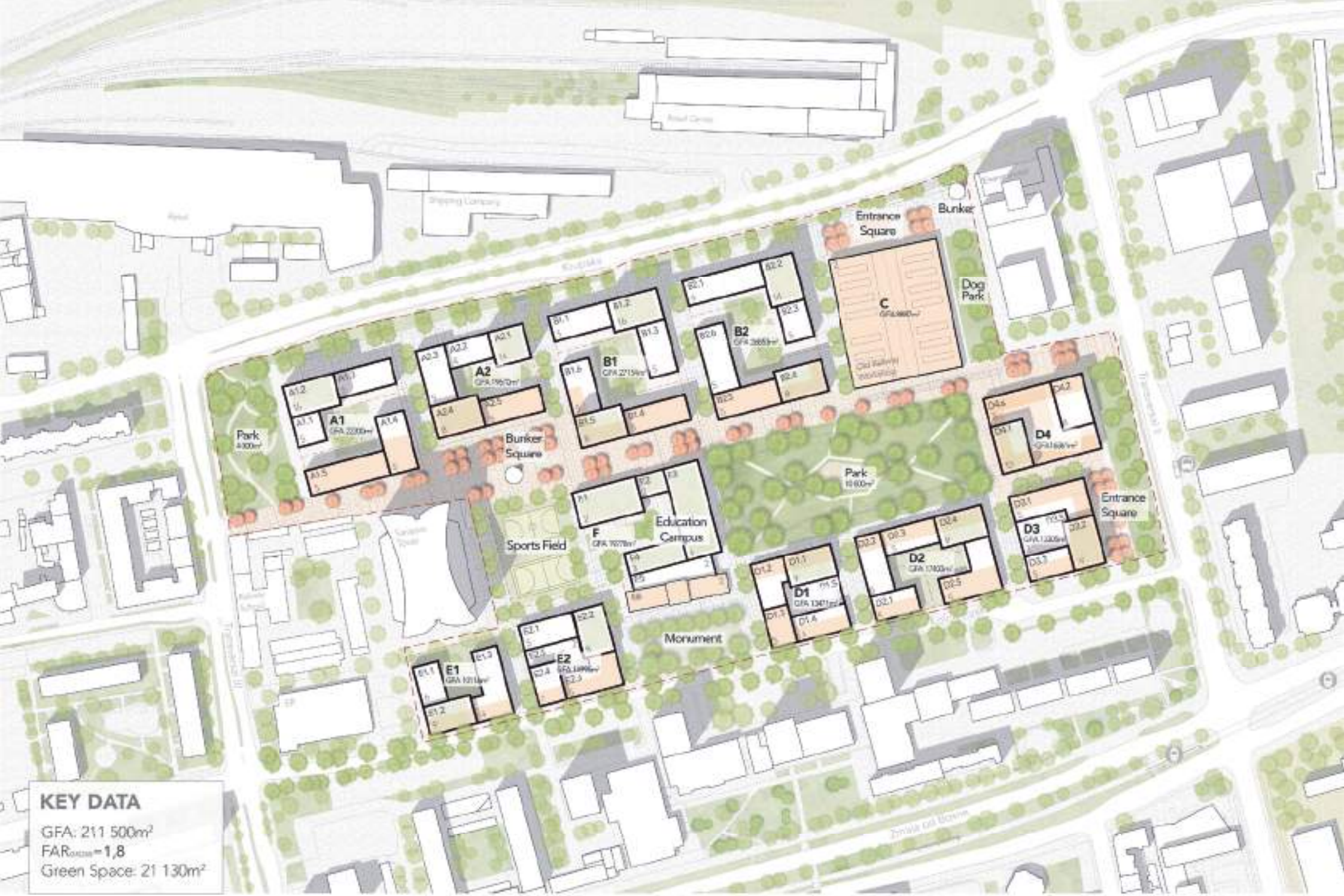
Master plan for VMC

The proposed master plan sets a solid framework for the urban development of the site. The modern porous block typology leaves some room for architectural interpretation while setting clear standards as regards to the relationship between building and public space. The main axis and orthogonal foot paths have been defined to shape the urban scape and establish connections to the surrounding road system. The blocks can be divided into smaller sub-plots and separate building units according to the needs of owners and developers, while the block structure and recommended building heights should be ensured through the regulation plan.



▲ The figure-ground diagram shows how new building footprints integrate into the existing urban fabric

Following the city's rhythm of open versus built-up spaces, the new development picks up the dynamic of the brownfield and fills the gap that was left by the former Railway Workshop.



▶ Master plan proposal for Vaso Miskin Crni

0 50 100m

O S N A

P

European Bank

SUPERWIEN architecture urbanism

Building heights

The sections show the development of building heights from the east to the west and from the north to the south of the development site. Active ground floor zones and office foyers are accounted for with a height of 5 meters, offices and other business space in the upper floors with 3.5 meters, housing with 3 meters floor-to-floor height.

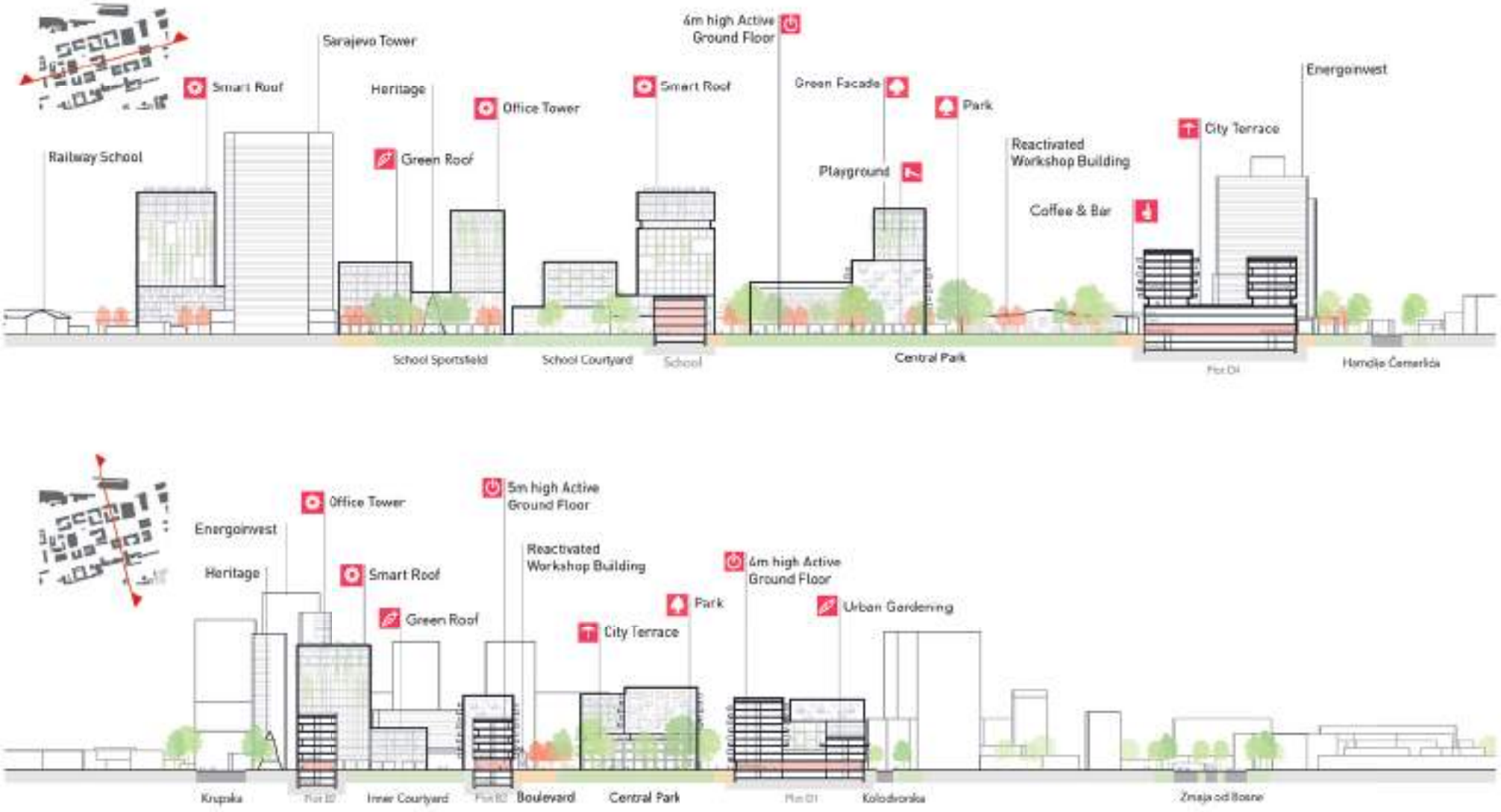
The east-west section shows a homogenous skyline with the existing Sarajevo Tower and Energoinvest buildings as the high points of the site. In between, the tallest towers (office with housing on top) rise up to 53 meters in height. The buildings adjacent to the park have lower heights. In accordance with heritage experts, however, the historic Transportation Vehicle Division could be developed on a larger scale, e.g. by adding modern storeys on top. The mixed-use building in the east has a collective underground garage with 2 underground floors.

In the second section, a gradual rise in building heights can be perceived from south to north. The buildings along the southern axis are kept to lower heights to respect the ventilation corridor along Zmaja od Bosne Street. The basic height is 13 meters with selective high points of up to 28 meters. The section also shows one of the collective parking garages in the north with 2 underground floors. The building height and street width ratio of the most frequented areas allows for enough light in the ground floor area and promotes the human scale approach. The boulevard with its 26 meters width is the widest of all streets, offering plenty of space for trees, green pockets, and urban furniture. All other residential streets have a width of 16 meters.

Active ground floor zone

The exemplary ground floor plan for Vaso Miskin Crni proposes a balanced mix of shops, services, social institutions, and community functions in the plinths of the development site. The amenities include cafés, restaurants, bistros, bars, bakeries, a juice bar, confectionery, pharmacy, hair salon, beauty salon, pet shop, pet salon, supermarket, mini market, yoga studio, gym, playroom, senior workshop, bike workshop, student centre, study room, kindergarten, co-working, start-up spaces, shops, an IT hub, ambulance, etc. Active ground floor zones can be controlled through building regulations, e.g., by defining tract depths of at least 8 meters, ceiling heights of 4 to 5 meters and transparent facades. Living in the designated ground floor zone is to be ruled out for most plots facing public spaces. The buildings must always be accessible at ground level and barrier-free. Main building entrances should be oriented towards public space rather than being located inside courtyards. However, a direct access to the courtyards from the residential staircases is to be ensured too. A predefined zone in front of the buildings should act as a usable buffer between the public space and the active ground floors.

Available ground floor areas are incorporated in a ground floor management system. The ground floor areas can be rented without price regulations via the free market. Selected areas of the ground floor zone, however, could be occupied by pioneer businesses. The development of these zones should be achieved through particularly favourable rental rates. This enables productive areas, co-working, workshops, sports facilities, and similar uses.

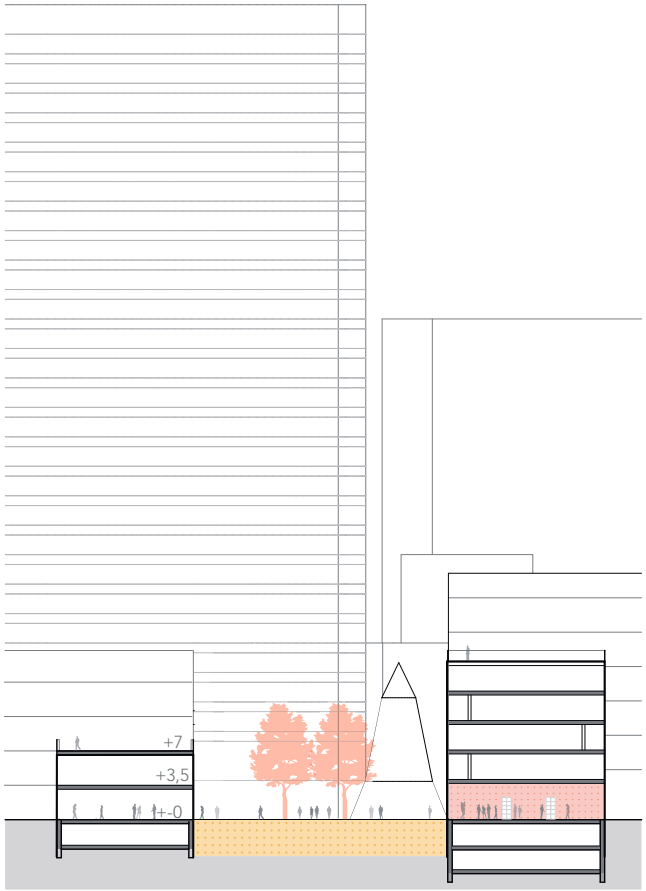


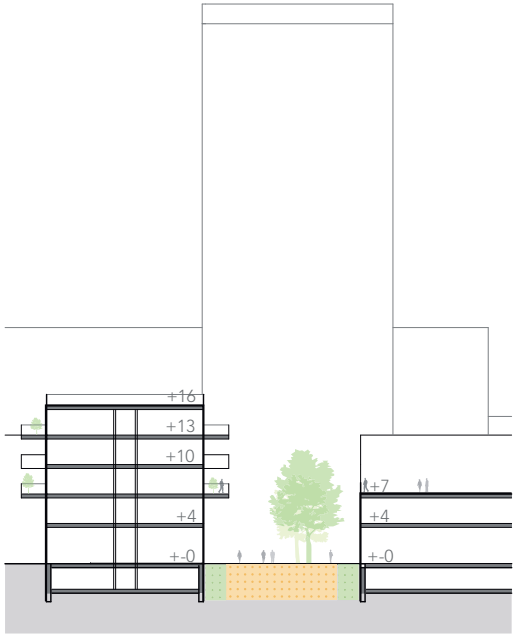
▶ Sections through the development site from east to west and north to south

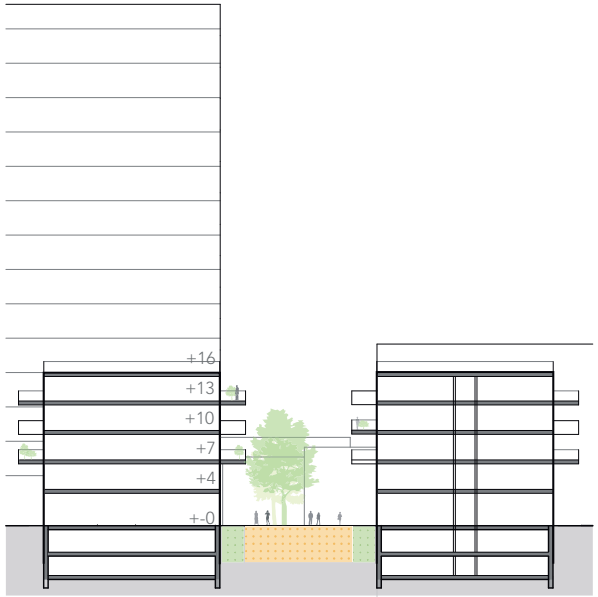
1 0 50 100m

O S N A P

▶ Exemplary active ground floor plan for Vaso Miskin Crni







▶ Sections through three exemplary streets

5.1.2 URBAN RULES

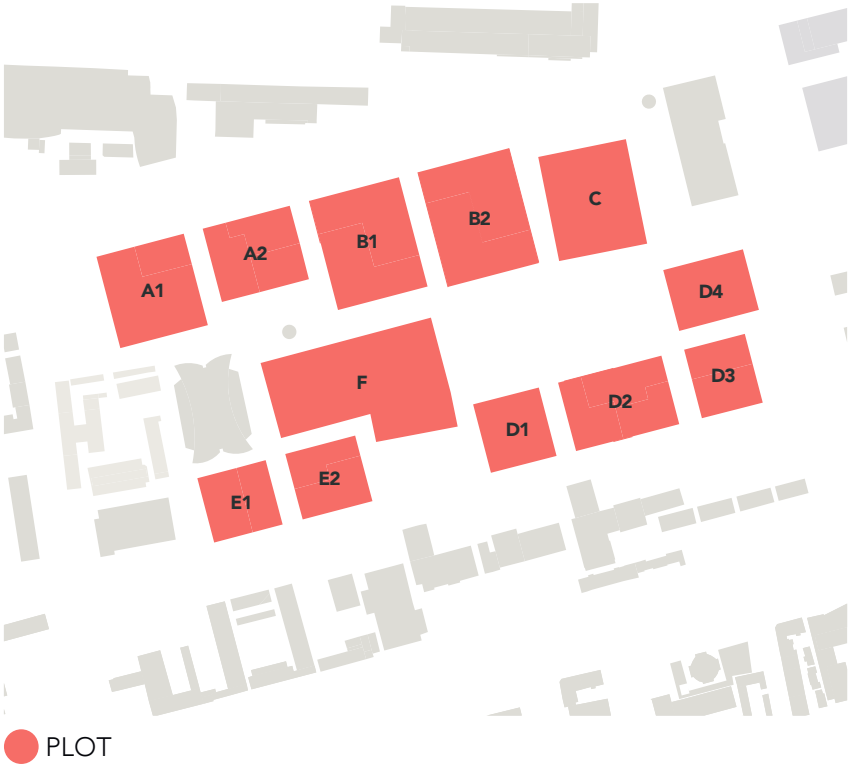
Ensuring the highest possible architectural and urban quality for the new neighbourhood requires process-oriented urban development. This set of rules will steer the ongoing planning process through supporting rules, suggestions, and agreements. The urban rulebook will be an essential document to ensure quality through a Quality Control Council. The Quality Control Council will overlook and guide the quality of each building. The quality rules should be also secured through an Urban Development Contract, so each building to be built at these sites should follow the requirements. Certainly, there will be flexibility within the projects, however, any changes from the master plan and urban rules need to be approved by the Quality Control Council.

Ensuring the highest possible architectural and urban quality for the new neighbourhood requires process-oriented urban development.

URBAN STRUCTURE

Plot division

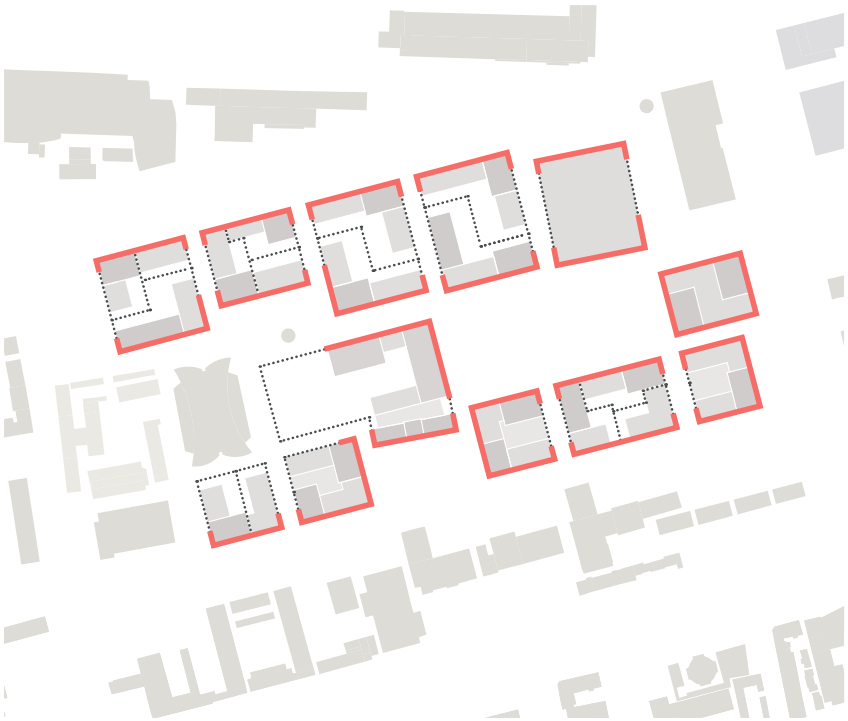
The aim is to create a small-structured neighbourhood with varying grid dimensions and a direct access to high-quality public space, offering more permeability and a dense network of pedestrian streets and paths. The site requires an incorporation of small-scale architecture in human scale in order to create an attractive new centrality for the city of Sarajevo. The typology-grain is small-scale meaning that for each sub-divided plot, a different architecture must be implemented.



▲ Proposed plot division for Vaso Miskin Crni

Building typologies

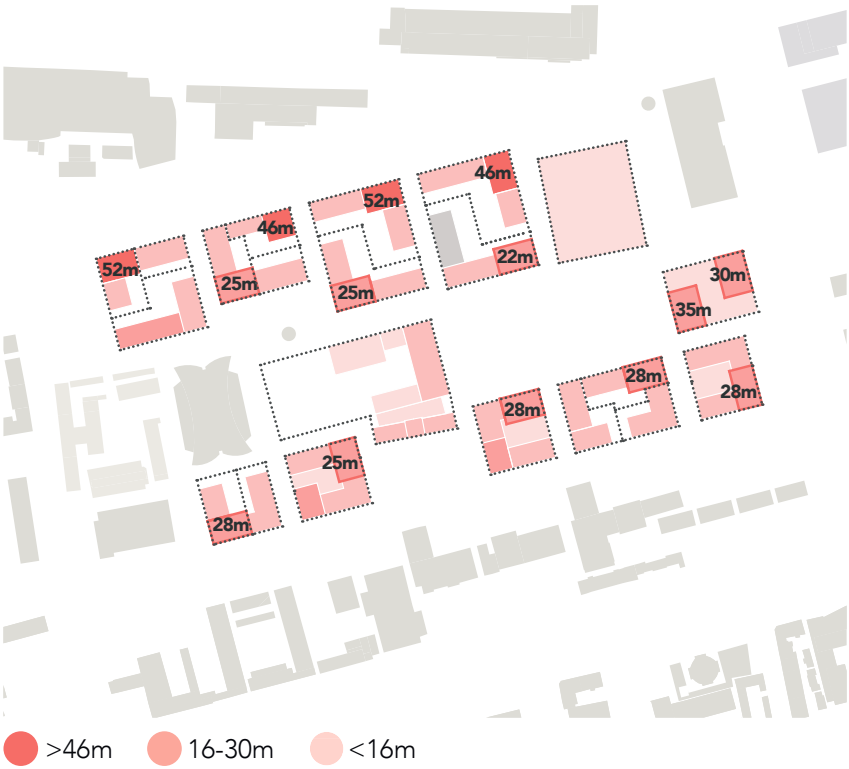
The aim is to create closed building fronts toward the boulevard passing through the core of the site, as well as to the central park and the road in the north, acting as a sound barrier. Hence, highly frequented public spaces will be clearly defined and shaped by building fronts, while quiet residential streets allow for more permeable building configurations, with semi-public courtyards merging into public space without physical barriers.



▲ Proposed building typologies

City skyline

According to the *Green Cantonal Action Plan* from 2019, the building heights in a 200 metres belt around the Zmaja od Bosne Street must be kept lower. In the development proposal, most building heights vary between 13 and 19 metres, with several higher points (28 metres) in strategic locations around the central park and the entrances to the neighbourhood. In the northern part of the site, where the restrictions do not apply, there are four towers between 46 and 52 metres of height.

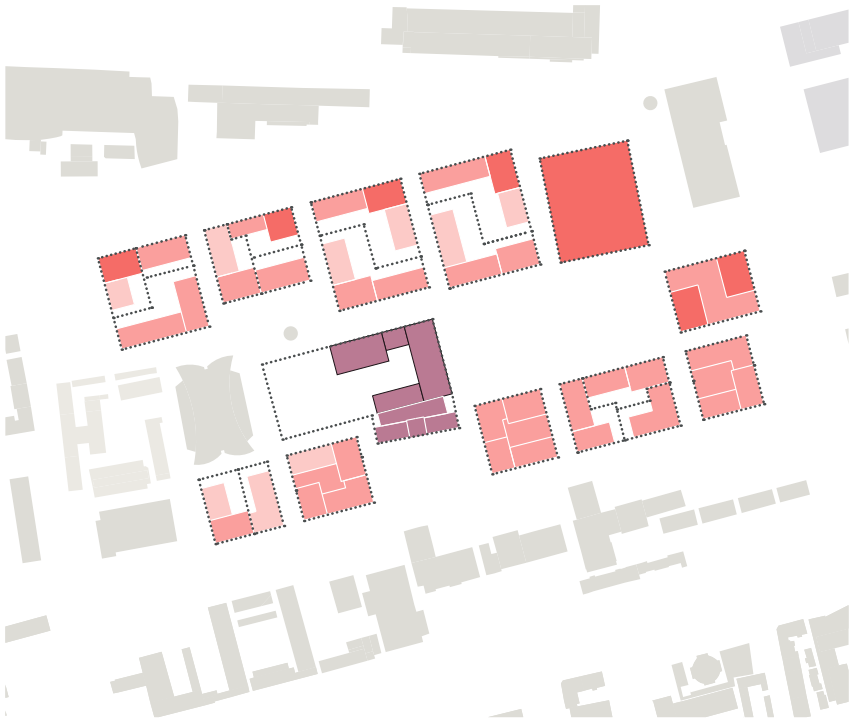


▲ Proposed building typologies with heights

PROGRAMMING

Mixed use

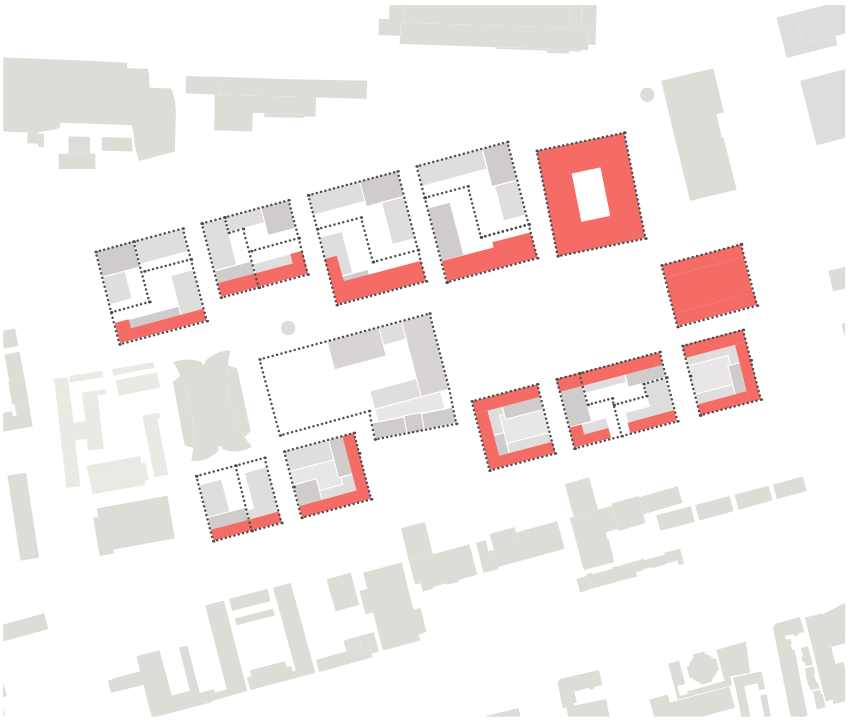
The aim is to create a balanced mix of uses and avoid a mono-functional quarter. It should be frequented by people at all times of the day and be a lively and safe neighbourhood, combining work, recreation, culture, and housing. It is envisioned to become a new centrality for the wider area, so it must fulfil its purpose through a wide range of functions. The mix of uses has been provisionally defined as 40 percent of housing, 13 percent of retail, 32 percent of office and 4 percent of hotel. A share of 11 percent for social services covers for the education campus including other social facilities (e.g., community centre).



▲ Proposed uses

Active ground floor zones

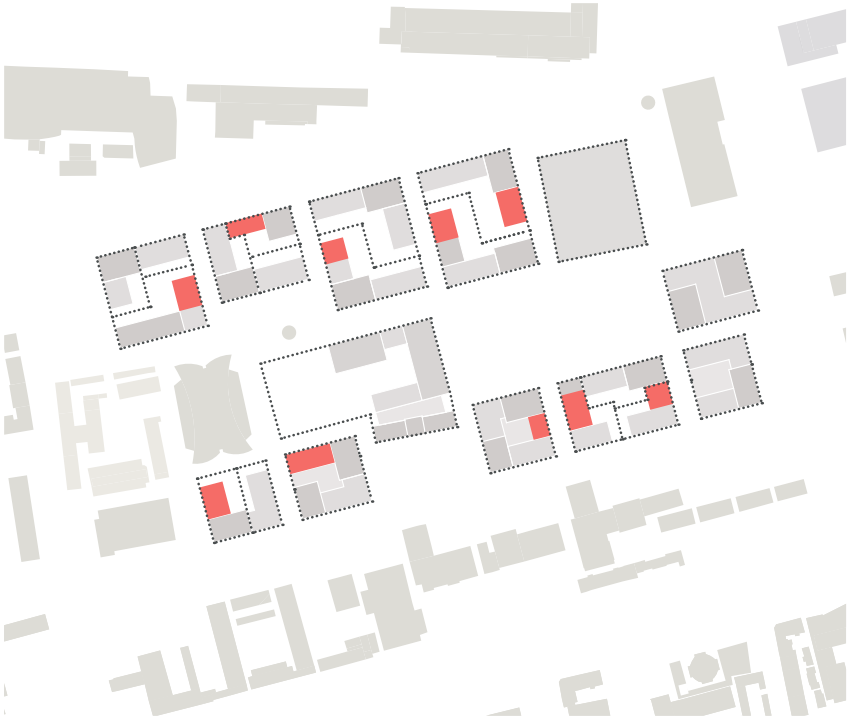
Active plinths or ground floor zones are an important prerequisite for a vibrant public space. The master plan therefore envisions ground floor activity along the central pedestrian axis as well as around the central park and along Kolodvorska Street in the south of the site. The quality catalogue defines the programming of the distribution of commercial and non-commercial uses in the urban ground floor zone.



▲ Proposed ground floor zoning

Community space

In order to develop an active neighbourhood and to stimulate self-organization and social cohesion, it is important to offer flexible development spaces to be used by the residents in form of community premises. Each building plot should offer a range of such spaces. They should also be strategically located within the plot, preferably towards an active outdoor area, like the inner courtyard, a playground, or an active residential street.



▲ Proposed location of community spaces

Heritage

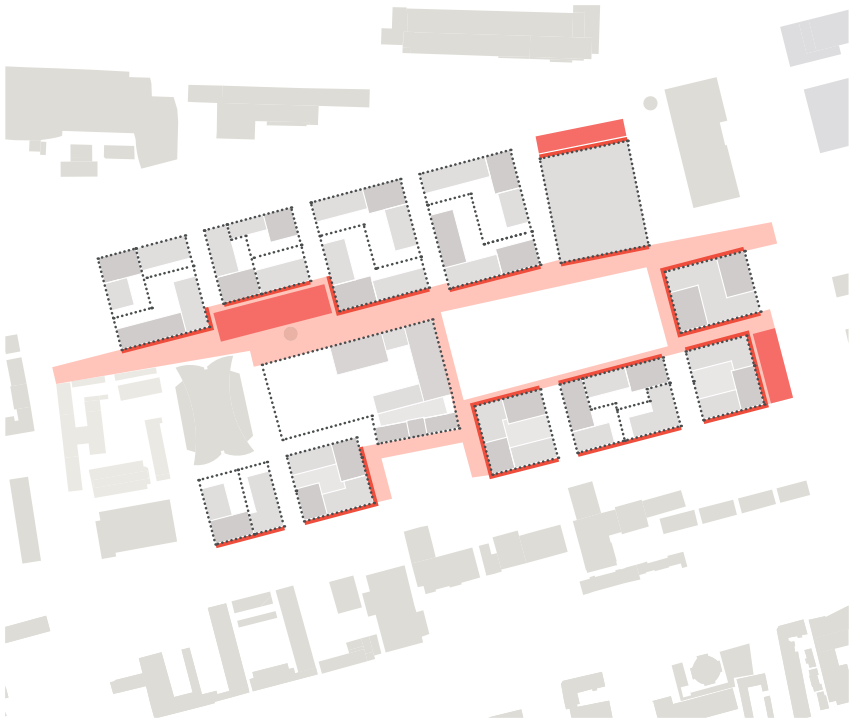
The two bunkers under monument protection should be integrated into the public space of the design. It is recommended to keep and renovate two other buildings that have a great potential for future reuse. The Administrative Building from the 20th century could be transformed into a school with a building add-on at the back. The former Transport Vehicle Division Hall could keep its typical brick façade on the outside while constructing a new office or IT-hub building inside and/or above. Both buildings could act as a bridge between the old and the new, preserving and reanimating the identity of this location.

▲ Buildings under heritage protection

PUBLIC SPACES

Urban public space

The goal is a clear differentiation of space sequences through different surface designs. The following public spaces can be distinguished: the main boulevard as an attractive and lively space for pedestrians, the entrance squares, the main square and the secondary street leading around the park. All surfaces should be designed on the same level (barrier-free) and to be understood as one unit. The public space should be equipped with urban furniture, appropriate lighting, garbage cans, and drinking water fountains. The design of all these elements should be integrated and aligned with one another.



▲ Proposed urban public spaces

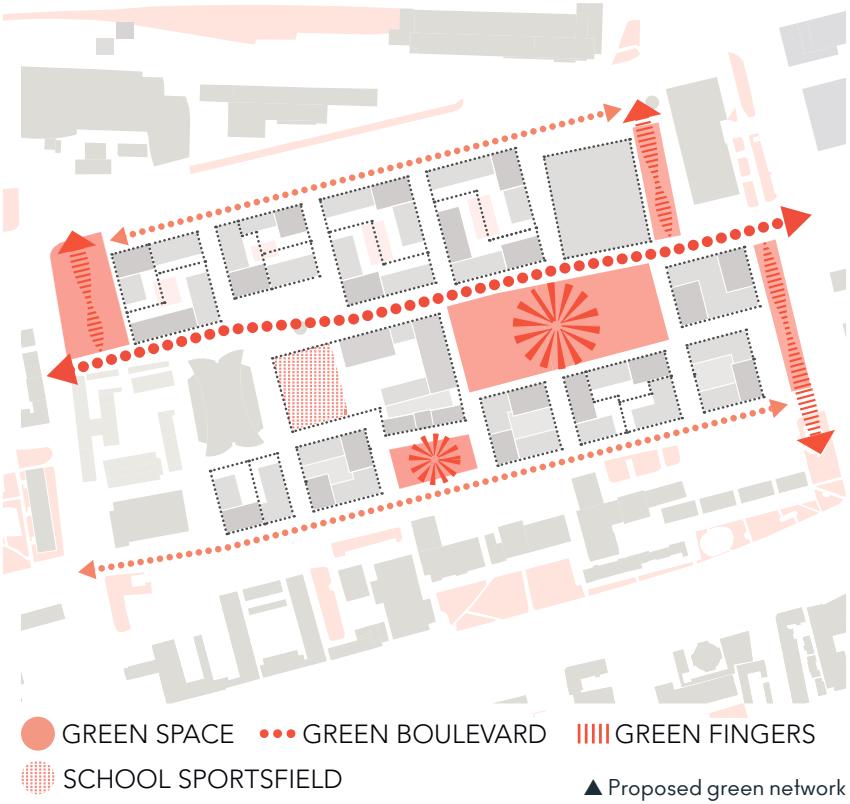
Residential alleys

Residential areas will be designed as quiet, car-free retreats. Building entrances, bicycle storage rooms, communal areas, co-working and garbage rooms should mostly face the residential streets. A high proportion of greenery with trees and seating elements allows the neighbourhood to flourish. The aim is to ensure a uniform design. Bicycle paths along with greenery should be incorporated. Adequate road widths for service and emergency vehicles must be ensured.

▲ Proposed residential alleys

Green network

The neighbourhood will have a variety of public, private, and semi-public green spaces as well as green connections to link these spaces. The central park will be the main public green space and vibrant heart of the neighbourhood. Green pocket parks at the entrances in the east and west of the site invite people to enter the area. The monument park is an extension of the existing park that commemorates the national hero Vaso Miskin Crni. The smaller parks have been placed with respect to existing green space where old trees are preserved. The green spaces are linked to each other via tree lines that run along the main mobility axis.



▲ Proposed green network

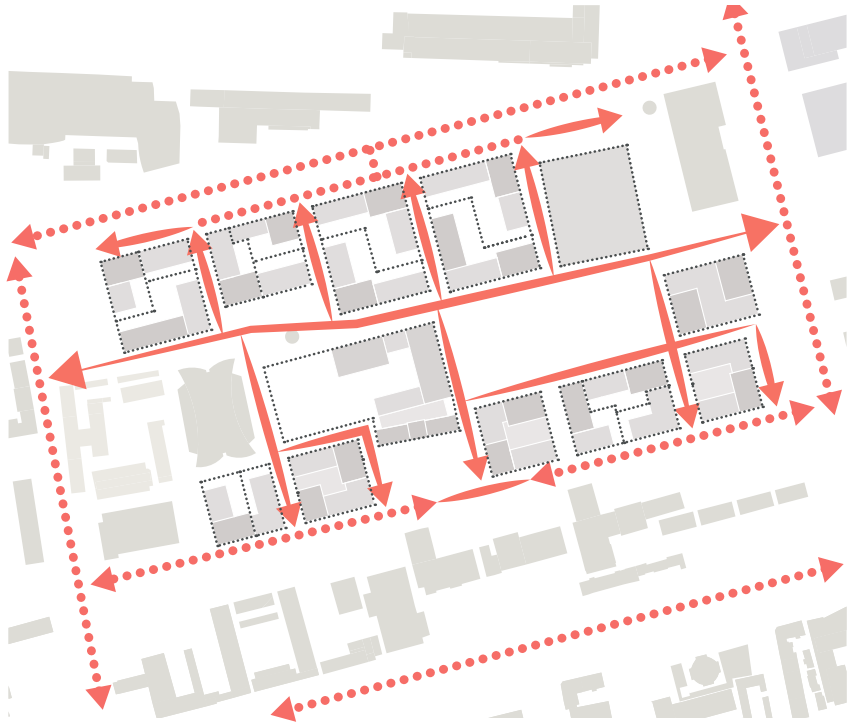
Plot related green spaces

High-quality green semi-public spaces will promote the cohesion of residents within each property. All plots should have a coherent design concept including urban furniture, greenery, and small playgrounds. A uniform surface water management should be considered. City terraces could be activated on plots without sufficient open space. An open neighbourhood should avoid physical barriers between plots. A continuation of paths through different courtyards also enhances pedestrian mobility. Semi-public courtyards and private gardens could be separated by uniform barriers, such as low seating walls with plants.

▲ Proposed plot related green spaces

MOBILITY

The aim is to increase the quality of life by promoting forms of active mobility and reducing the negative effects of motorized private transport like noise and air pollution. The entire neighbourhood is to be car-free with the exception of the entrance roads to underground garages, which are only for residents, employees and guests. The street parallel to Krupska Street would be the only street open to private motorized traffic within the project site. Most other streets, however, should be wide enough to allow access for public service and emergency vehicles like garbage collection, goods delivery, or fire engines. All surfaces should follow inclusive design principles and there should be no curbs or other abrupt changes in elevation.



▲ Proposed mobility network

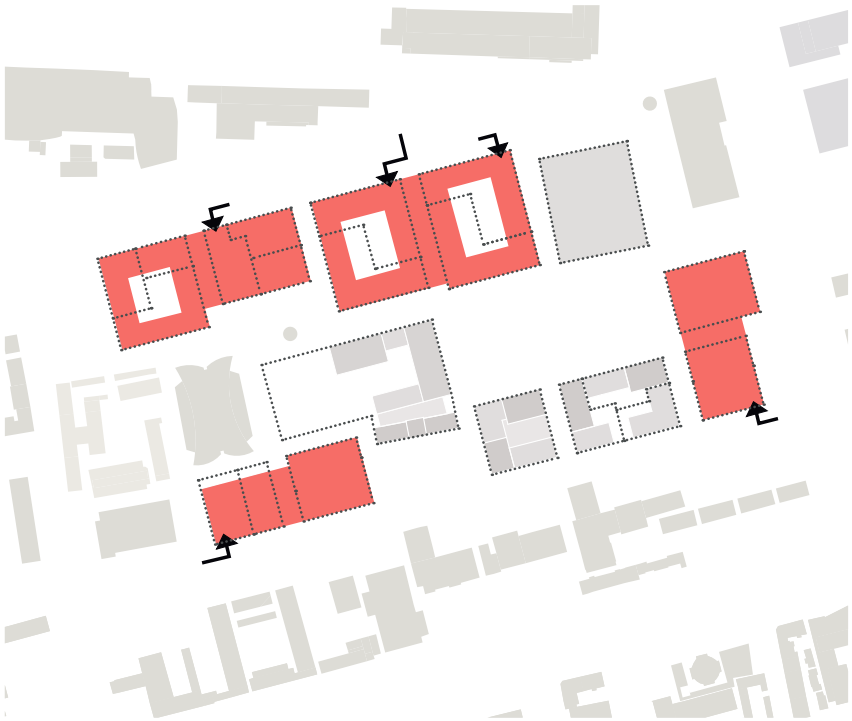
Mobility station

The aim is to bundle several mobility offers and services to promote multimodality and intermodality and to guarantee mobility even without a private car. At least two mobility stations should be provided at the site. They should offer vehicles for car sharing and an e-car charging station. The outdoor area should be equipped with an information terminal, a bike sharing station, bicycle parking, and a pick-up station for parcels. An attractive design and the provision of urban furniture should help to establish the mobility station as a local meeting point in the neighbourhood. The location of both stations should be strategically close to a garage entrance, public transport, and a highly frequented street.

▲ Proposed position of mobility stations

Parking

Car parking should be reduced to one third of the legal obligation due to the proximity to public transportation. Remaining parking spaces should be concentrated in collective garages at the outskirts of the sites. They should be accessible from public space to activate and revitalize the streets with people walking to the garages. Car entrances should be peripheral to avoid traffic within the site. Revenue from parking fees could be used to set up a mobility fund that would finance car and bike sharing systems on the neighbourhood level. Bicycle parking should be provided in the ground floor areas of each building. Separate compartments should be provided for the parking of strollers and outdoor playing equipment.

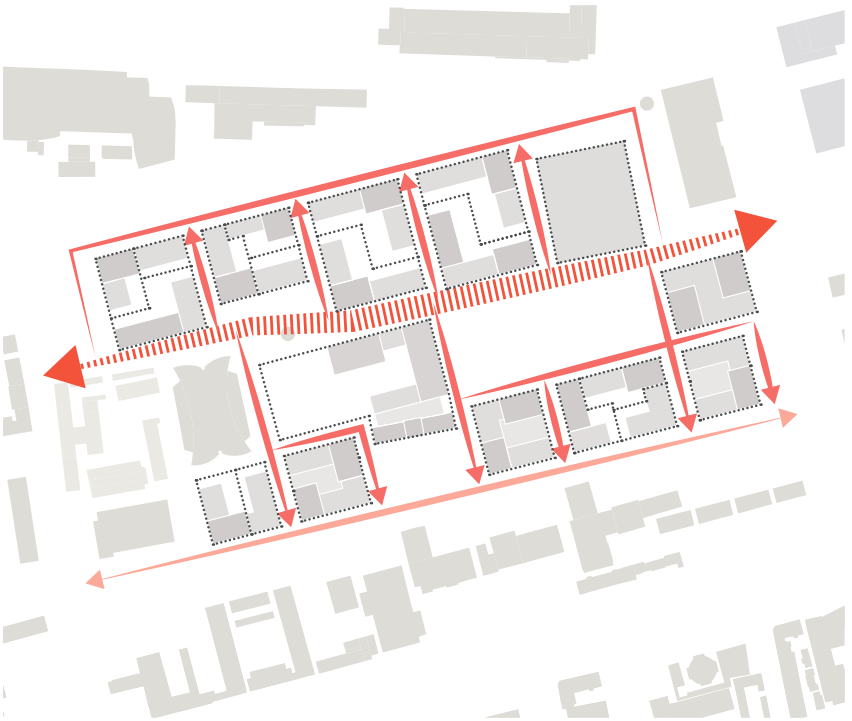


COLLECTIVE UNDERGROUND GARAGE

▲ Proposed collective parking garages

Pedestrian network

Since the entire site is designed as a car-free zone, the pedestrian network will be dense and offer high quality spaces. The neighbourhood will have clear and easily accessible entrance areas that steer visitors directly into the most active streets and squares. The central mobility axis from east to west will be a pedestrian promenade with attractive design. Cycling, skating, and other forms of active mobility are allowed at limited speed. An inclusive and human-scale approach should be applied in the design. All surfaces should be at the same level and barrier-free. Different atmospheres could be created through varying surface materials. Adequate urban furniture, greenery and lighting will increase comfort and sense of safety.



MAIN BOULEVARD PEDESTRIAN FRIENDLY STREETS/PATHS

▲ Proposed pedestrian network

5.1.3 TECHNICAL REVIEW

The gross area accounts for the entire development site including all future building plots as well as open spaces like public spaces, roads, and private grounds. The gross area of the Vaso Miskin Crni development site comprises approximately 115,000 square meters. The total area of all building plots is 55,000 square meters. This results in a share of 52 percent public space (streets, squares, parks) and 48 percent building plots. The total of all building footprints amounts to 39,000 square meters, which means that 34 percent of the gross area is being built on.

The primary plot division follows the general urban structure of the master plan. Based on this, plots would be rather large and range from 9,500 to 2,300 square meters. It is therefore recommended to conduct further sub-divisions, splitting each block into two or three plots according to building alignment. Plot C (former Transportation Vehicle Division) and F (education campus) would not be divided and result as the largest blocks.

Regardless of the division of plots, a maximum size of building units should be defined in the regulation plan. A small-scale building structure makes a place more attractive, promotes diversity, and shapes identity. It is recommended to allow residential houses with a maximum of 200 apartments or 14,000 square meters of gross floor area.

Gross floor area (GFA) is the total floor area contained within the building measured to the external face of the external walls. It is calculated by multiplying the building footprint with the number of floors. The total GFA of all buildings in the envisioned development amounts to 211,500 square meters. Putting this in relation to the size of the total area, we arrive at a gross floor area ratio (FAR) of 1.8. Using the total plot area (without public space), the FAR results in an average net value of 3.8. On the individual building plots, FAR ranges between 1.6 and 5.4.

FAR is a means to express the density of a development: higher FAR indicates a greater building volume. The number, however, does not express how this volume is distributed on the site and needs to be put in relation to the other development standards such as building heights and plot coverage. Plot coverage means the extent to which the plot is covered with a building or structure, and this is expressed as percentage or the ratio of the built-up area to plot area. The coverage of each individual plot varies from 37 to 100 percent. Building heights can be expressed through the number of floors or the actual height in meters. The floor height varies according to the use. Active ground floor zones have a height of 4 or 5 meters, office and other business space in the upper floors have 3.2 to 3.5 meters and housing units account for an average 3 meters floor height. Building heights in Vaso Miskin Crni will vary between 2 and 16 floors. The tallest buildings, two towers for office and housing use, will reach up to 56.5 meters.

Based on a mixed-use of 40 percent residential, 13 percent retail, 32 percent office, 4 percent hotel and 11 percent social infrastructure, the potential future number of residents and workplaces at the development site can be calculated.

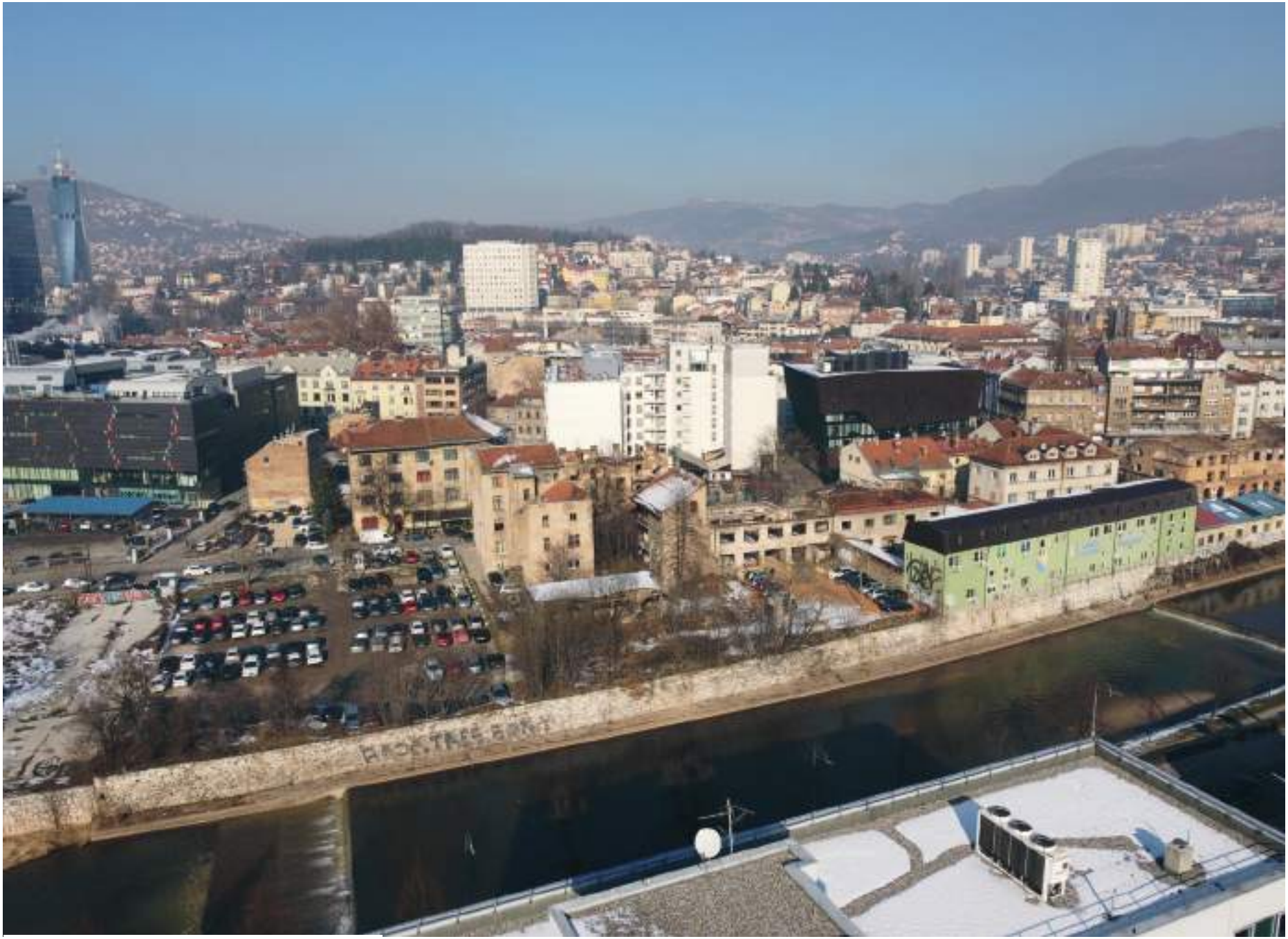
In an envisioned total of 906 apartments with an average size of 70 square meters and 2.8 inhabitants each, a total of approximately 2,500 residents would live at the Vaso Miskin Crni development site in the future. On top of that, an estimated 7,100 people could find work in the retail spaces, offices, hotels, and social facilities. This would make the area a real employment hub where people commute to for their jobs on a daily basis.

With the new central park and three pocket parks at the site, the total area of public green space amounts to more than 21,000 square meters. This equals 8,3 square meters of public green space per new inhabitant at Vaso Miskin Crni. Additionally, there will be small scale private green spaces in the inner yards of the building blocks that might be publicly accessible or for exclusive use of the inhabitants. The regulation plan should determine the share of green space that needs to be provided on each plot, depending on the envisioned building structure.

According to the current legislation, new urban neighbourhoods need to provide parking space for the residents and people working in the area. The current regulations require 1.2 parking spaces per apartment and 1 parking space per 60 square meters of commercial space. In the case of the envisioned development proposition for Vaso Miskin Crni, this would mean a requirement of roughly 2,700 parking spaces. However, we strongly recommend revising this regulation as it fosters car traffic and does not give flexibility for sites with alternative mobility concepts. In the case of VMC, the connection to public transport (tram, bus) is excellent and might be improved with a future city train in the north. Moreover, the development proposition follows a progressive mobility concept with a focus on active mobility (walking, cycling) that does not allow cars to enter the neighbourhood. Such an alternative concept, in combination with other incentives to use sustainable modes of transportation should be a valid reason to reduce the number of parking space provided in a development project.

▲ Aerial view of Vaso Miskin Crni

▲ Aerial view of Kvadrant B from the east



▲ Aerial view of Kvadrant B from the south

5.2 DEVELOPMENT PROPOSITION FOR KVADRANT B

The site of Kvadrant B represents a prime location in the urban fabric of Sarajevo that bears the unique potential of development right in the heart of the city. It is envisioned to be developed as a new business centre that incorporates mixed uses to create a lively feeling and an attractive neighbourhood. Appealing ground floor areas will host shops, services, cafes, and restaurants, reviving the streets and public spaces of the area. The inclusion of a variety of new central functions will further support the implementation of business and retail uses. The concert hall which has been anticipated for the past 20 years will be taken into account with a designated plot that is temporarily used as a public park. Moreover, a significant percentage of high-quality housing should be present on site to counteract the decreasing number of residents in the central area of the city. The proposed uses respond to the functions of the surrounding neighbourhoods and the position of the site in the urban fabric.

The new urban structure responds to the Austro-Hungarian urban pattern in the east of the site and continues the typical block perimeter system. Existing heritage buildings shall be preserved and restored while the structure of new buildings will gradually transition towards the modernist buildings in the west, organically filling the current gap in the urban fabric. The changing typology is reflected in the plot sizes that are smaller in the east and larger in the west. Similarly, building heights develop with the typology, rising from east to west with a high point next to the existing tower of the Sarajevo City Center (SCC). The diagonal axis that runs between the main railway station and the project site is articulated in the urban design and winds its way to the river side. It is one of the main entrance points to the quarter. Furthermore, the new neighbourhood is connected to its surroundings through the continuation of existing roads and the new pedestrian bridges across Miljacka River.

The area along the river will be transformed into a linear park thus respecting the 20 meters building buffer as recommended by the Study of Urban Ventilation Corridors and providing a high-quality green space as continuation of Vilsonovo Promenade. The centre of the neighbourhood will be a new green square with multifunctional urban surfaces but many trees to provide shade and cool down the environment during hot summer months. The square will be vibrant with bars, restaurants, and cafes in the ground floor zones of the surrounding buildings. The array of attractive public spaces will be complemented by a temporary park on the plot reserved for the future concert hall of Sarajevo. Traffic organization on the site is envisioned to be mostly car-free. Simple access roads will allow vehicle owners to enter into underground parking garages below selected building plots. Mobility on the surface will be dominated by sustainable and active modes of transportation like walking and cycling. This will extend public space for people into every alley and allow for additional planting of trees.

▶ Vision for Kvadrant B - axonometry of the development proposition with future concert hall

▲ Vision for Kvadrant B - axonometry of the development proposition without concert hall


Ministry
Parliament
SCC Tower
Smart Roof
Green Square
Concert Hall Green Roof
Active Ground Floors
New Bridge
Linear Park
City Terrace
Community Terrace
Urban Gardening
Heritage
Smart Roof
Heritage
City Terrace
Linear Park
New Bridge
Miljacka River
Smart Roof
Community Terrace
Heritage
Heritage
Hastahana Park
School
Skenderija

5.2.1 URBAN DESIGN STRATEGY

Following an integrated approach to urban design, the consultants took into account social, economic, environmental, cultural and administrative aspects in the development of a solid urban design that organically blends into the city while providing exciting new qualities.

Following the city centre's Austro-Hungarian urban fabric of a dense block perimeter system, the new development partially continues this trend, opening up to a free centre surrounded by a new typology of higher buildings situated on plot-sized plinths of two or three floors. This creates a continuation of the riverfront zone, connecting the city centre to the west of the city. Some of the existing buildings that are enlisted heritage monuments will be kept, thus maintaining the site's history and identity.

Master plan for Kvadrant B

The proposed master plan sets a solid framework for the urban development of the site. The existing heritage buildings and Austro-Hungarian typology define the structure on the east side of the site but leave some room for architectural interpretation on the western side. Two main axes lead from east to west: the park along the river and the pedestrian boulevard in the centre. Together with the orthogonal paths leading across the river they define the urban scape and establish connections to the surrounding urban fabric.

▲ The figure-ground diagram shows how the new building footprints integrate into the existing urban fabric

This creates a continuation of the riverfront zone, connecting the city centre to the west of the Sarajevo.

▶ Master plan proposal for Kvadrant B with future concert hall

Building heights

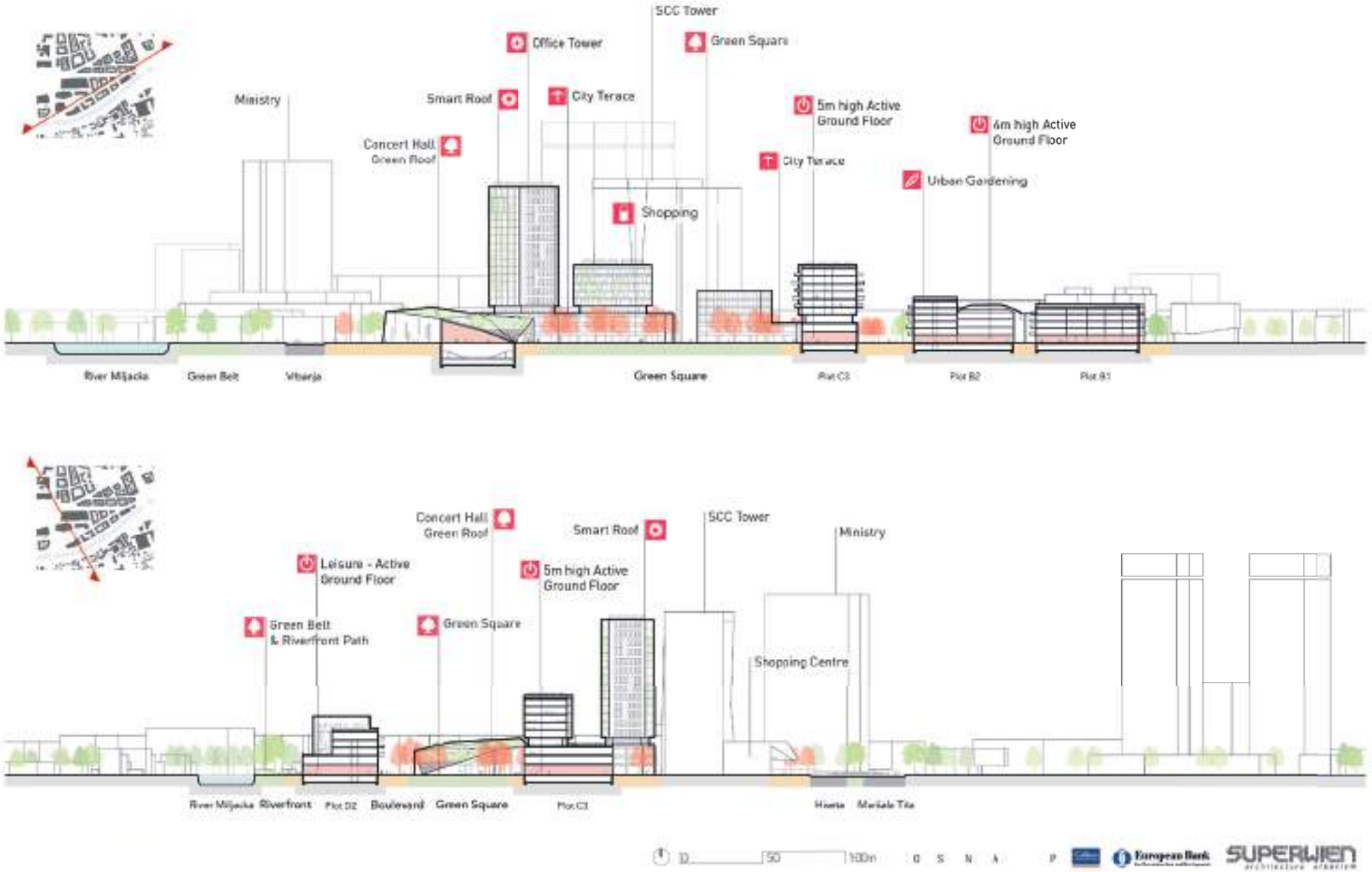
The height development at the site follows the typology on the one hand and the requirements of the urban wind corridor along Miljacka River on the other. The east-west section shows how the site functions as a connector between the lower Austro-Hungarian buildings in the east and the modern high-rise constructions in the west. Building heights gradually increase towards the tower of the Ministry. The new buildings do not surpass the heights of the existing towers in this area (Ministry and SCC). The north-south section shows the mandatory buffer zone to the river that will be used as a green belt and park. Adjacent buildings are low along the front with a few additional floors set back (12 to 18 meters). Building heights increase towards Hiseta Road and reach their high-point right next to the tower of Sarajevo City Center (70 meters). A wind and microclimate analysis has proven that this concept has no negative influence on the wind movement on the site.

A wind and microclimate analysis has proven that this concept has no negative influence on the wind movement on the site.

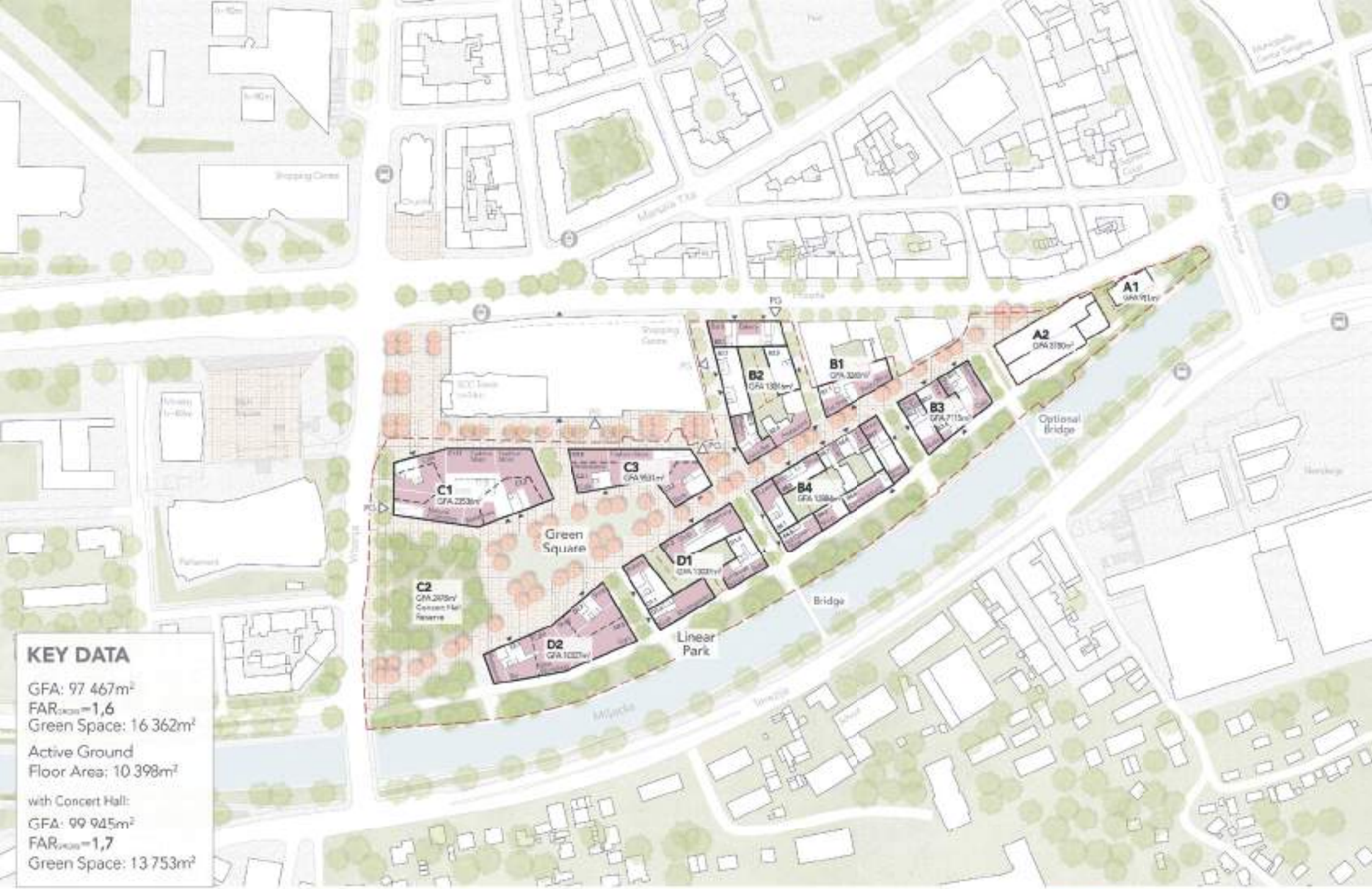
Active ground floor zone

The exemplary ground floor plan for Kvadrant B proposes a balanced mix of shops, services, social institutions, and community functions in the plinths of the development site. The amenities include cafés, restaurants, bistros, bars, bakeries, shops, boutiques, an ice cream shop, pharmacy, bank, beauty salon, pet shop, supermarket, yoga studio, gym, senior workshop, bike workshop, kindergarten, dance school, language school, etc. Active ground floor zones can be controlled through building regulations, e.g., by defining tract depths of at least 8 meters, ceiling heights of 4 to 5 meters and transparent facades. Living in the designated ground floor zone is to be ruled out for most plots facing public spaces. The buildings must always be accessible at ground level and barrier-free. Main building entrances should be oriented towards public space rather than being located inside courtyards. However, a direct access to the courtyards from the residential staircases is to be ensured too. A predefined zone in front of the buildings should act as a usable buffer between the public space and the active ground floors.

Available ground floor areas could be incorporated in a ground floor management system. The ground floor areas can be rented without price regulations via the free market. Selected areas of the ground floor zone, however, could be occupied by pioneer businesses. The development of these zones should be achieved through particularly favourable rental rates. This enables productive areas, co-working, workshops, sports facilities, and similar uses. The area around the boulevard and the green square should offer more commercial as well as gastronomic contents, and along the riverfront predominantly gastronomic and recreational activities.



▲ Sections through the development site from east to west and north to south



▶ Exemplary active ground floor plan for Kvadrant B (without concert hall)

▲ Industrial heritage at Kvadrant B

5.2.2 URBAN RULES

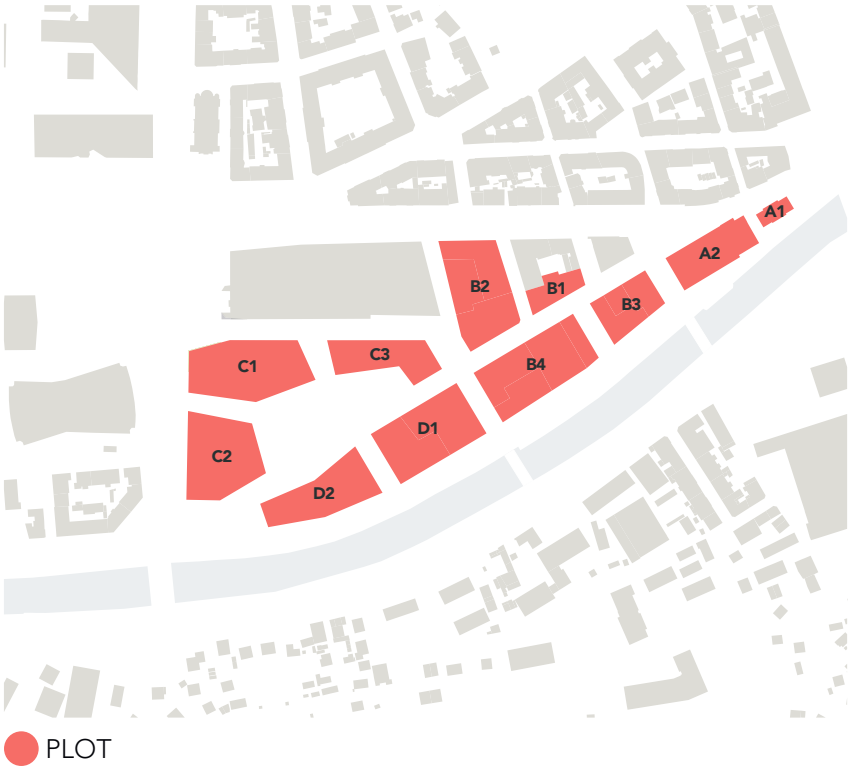
As for VMC, a set of urban rules has been defined for Kvadrant B, to steer the planning process and ensure the implementation of a high-quality urban development. Architectural and urban qualities will be defined in a precise urban rulebook that will support the involved stakeholders throughout the development process and serve as an important guideline for the work of the Quality Control Council. The Quality Control Council will overlook the planning process and ensure the quality of each building and the open spaces between them. An Urban Development Contract will serve as the legal document that binds landowners and developers to meet the agreed standards and requirements. Some flexibility is given through the work of the Quality Control Council, which can approve acceptable changes to the master plan and urban rules.

Architectural and urban qualities will be defined in a precise urban rulebook that will support the involved stakeholders throughout the development process.

URBAN STRUCTURE

Plot division

The aim is to create a new small-structured centrality with varying grid dimensions and a direct access to high-quality public space. The riverfront site requires an incorporation of small-scale architecture in human scale to create an attractive new destination close to the city centre of Sarajevo. The eastern blocks can be divided into smaller sub-plots and separate building units according to the needs of owners and developers, while the block structure should be ensured through the regulation plan.



▲ Proposed plot division for Kvadrant B

Building typologies

The chosen building typologies should ensure a closed building front toward the boulevard passing through the centre of the site, as well as to the green square and the riverfront. This will set clear boundaries for the highly frequented and more active spaces in contrast to the quieter residential streets stretching north and south from the central axis that allow for dissolved building formats.

▲ Proposed building typologies

City skyline

According to the Green Cantonal Action Plan from 2019, the building heights in the first row along Miljacka River cannot exceed 26 meters. In the proposed master plan, most building heights vary between 14 and 20 meters, with several higher points in strategic locations around the green square and the entrances to the neighbourhood. A 70-meter tower in the northwest relates to the adjacent SCC tower and represents a new landmark. Due to its riverside location, the site has great potential to create a vibrant cityscape skyline.

▲ Proposed building typologies with heights

PROGRAMMING

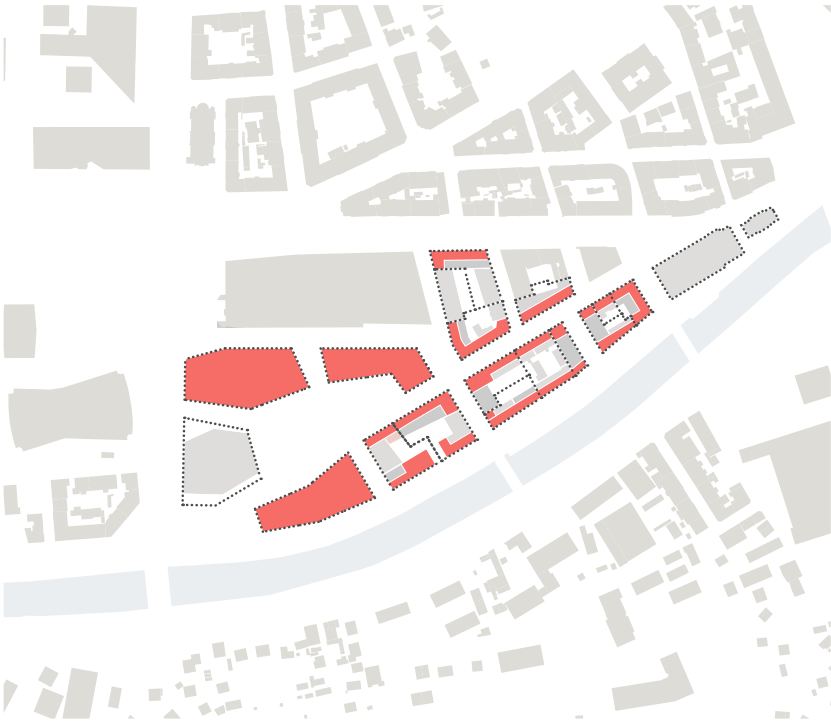
Mixed use

The mix of uses for Kvadrant B has been provisionally defined as 30 percent of housing, 10 percent retail, 45 percent office and 12 percent hotel. A share of 3 percent for social services covers social and cultural facilities (e.g., kindergartens, community centre, concert hall). Structures in the east of the site and along the river will be mixed-use buildings with predominantly residential functions. The western part with its bigger and higher structures will have a larger share of offices and commercial uses. The reactivated Electrical Facility Building could become a museum.

▲ Proposed uses

Active ground floor zones

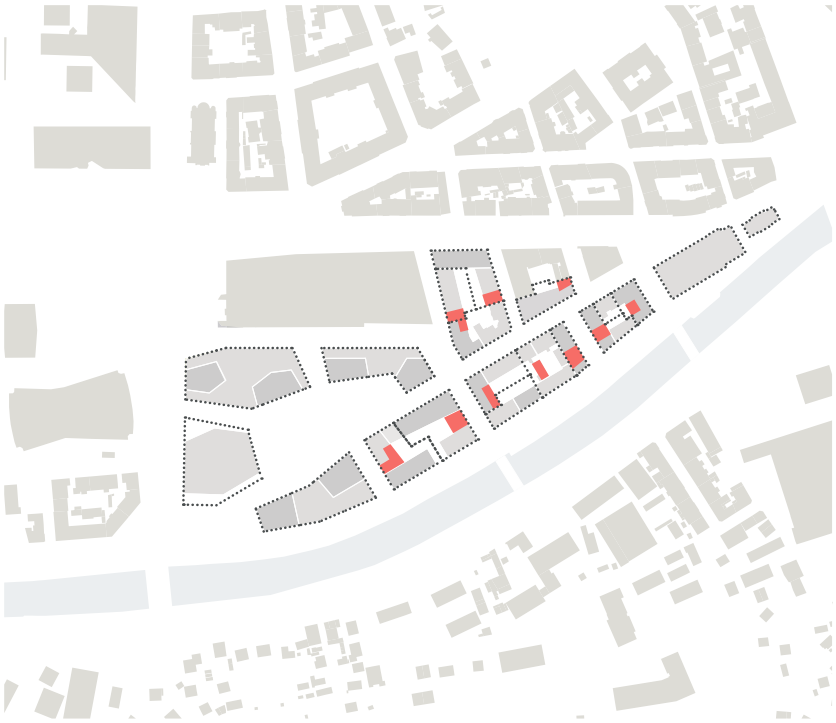
Active ground floor zones can be found throughout the new development but will be concentrated along the central pedestrian boulevard, the green square, and the riverfront. The aim is the permanent activation of the ground floor zones with a balanced mix of community uses, shops and services, restaurants and cafes, as well as recreational and leisure uses. The quality catalogue defines the programming of the distribution of commercial and non-commercial uses in the urban ground floor zone.



▲ Proposed ground floor zoning

Community space

To encourage an engaged and cohesive community, it's vital to offer versatile development spaces as communal areas that residents can use. It's advisable that each building plot contains multiple such spaces that are strategically placed, ideally near vibrant outdoor locations like inner courtyards, playgrounds, or busy residential streets. These common spaces can be used as hobby rooms, party rooms, children's play spaces, neighbourhood workshops, storages for food cooperation, and many other activities that the neighbours can decide on.



COMMUNITY ROOM

▲ Proposed location of community spaces

Heritage

There are six notable listed buildings at Kvadrant B, including three residential structures, the old Electrical Facility and its administrative building. While the old office building has been successfully refurbished and is now operational, the Electrical Facility holds significant historical value for Sarajevo's technical innovation history and could ideally serve as a public facility or museum. The residential buildings should be renovated and maintain their original function. Safeguarding the site's heritage will ensure its legacy endures, while using it as a foundation to establish a fresh identity.

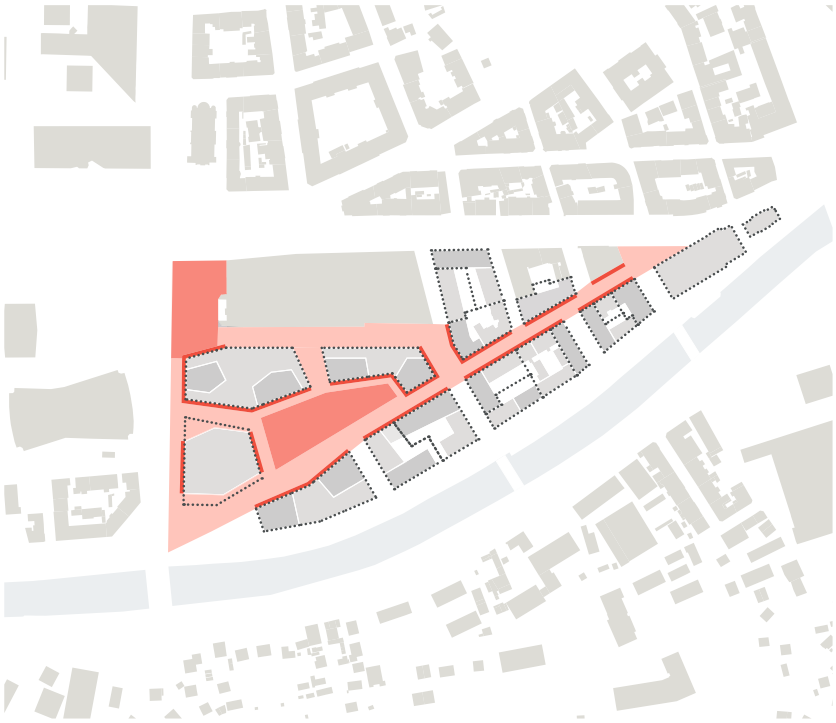
HERITAGE PROTECTION

▲ Buildings under heritage protection

PUBLIC SPACES

Urban public space

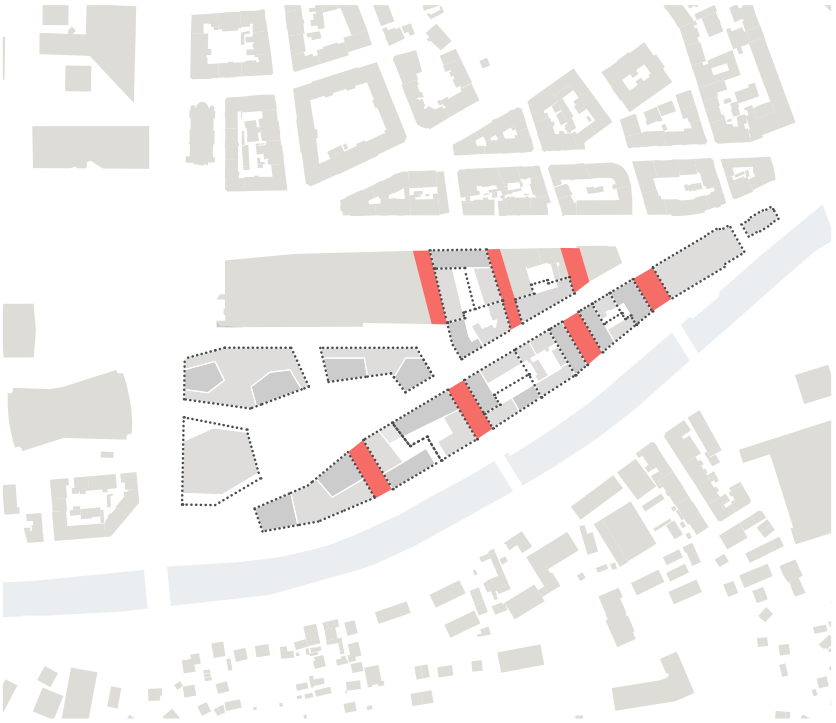
To achieve a distinct separation of space, various surface designs will be utilized in different sequences. Main distinguishable urban public spaces will be: the main boulevard, which should be lively and inviting to pedestrians, the green square with its permeable surface and trees, and the secondary streets.. The surfaces should be designed to be barrier-free and uniform, creating a cohesive unit. Urban furniture, appropriate lighting, garbage cans, and drinking water fountains will be installed in the public spaces to ensure consistency throughout the area.



▲ Proposed urban public spaces

Residential alleys

The aim is to ensure a uniform design of the car-free residential streets. They should be equipped with sufficient greenery in the form of trees and other plants and provide adequate conditions for walking and cycling. Appropriate road widths for service and emergency vehicles must be ensured as well. Since there are no active ground floor zones in these streets, except for some community related functions, they will have a quieter character.



▲ Proposed residential alleys

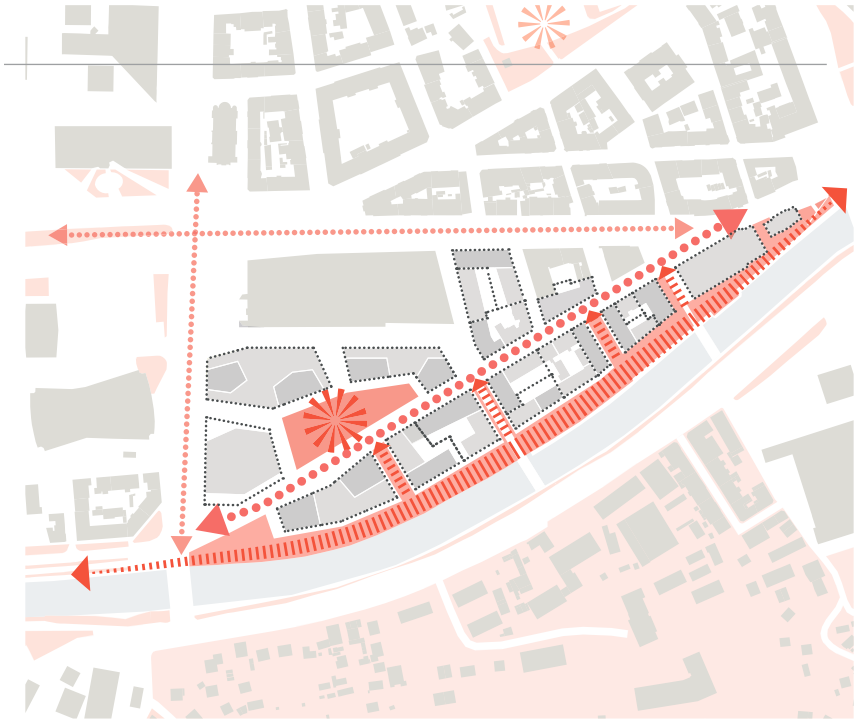
Plot related green spaces

Attractive courtyards should be established within building plots to foster a sense of community among the occupants of the buildings. If multiple plots share a courtyard, a uniform design should be implemented. Courtyards that are physically open towards a public space should not be enclosed by fences. Given the central location of the site, many plots will be densely built. Where courtyards are not possible, semi-public open spaces should be provided in the form of city terraces on top of the urban plinth or on rooftops. Where feasible, trees, plants, and small playgrounds should be installed.

▲ Proposed plot related green spaces

Green network

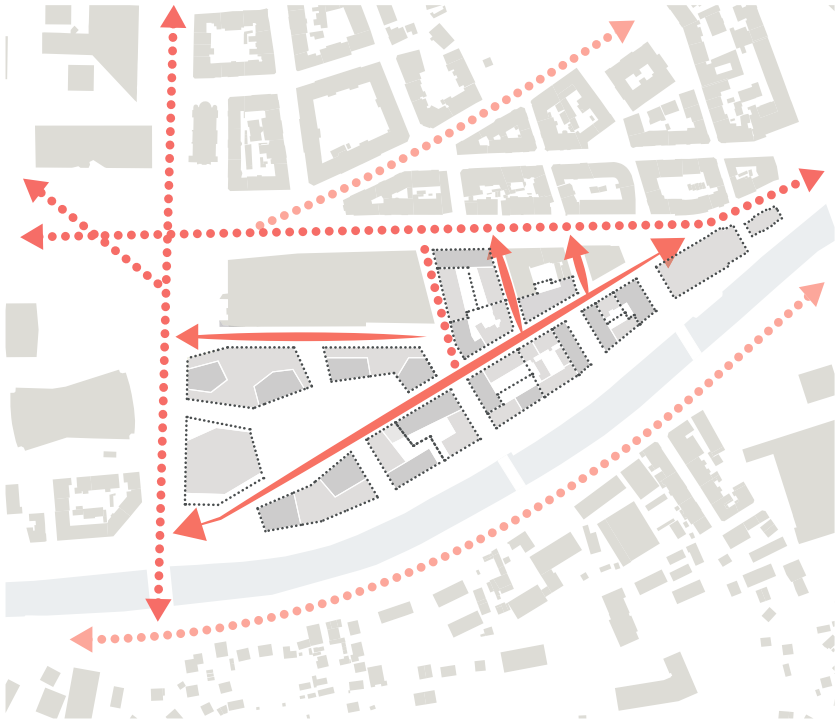
Based on a broader green network concept, the linear riverfront park along Miljacka River will be part of a continuous promenade throughout the city. River platforms and recreational spots could be added along the way. The central green square represents a hybrid of a green and urban space, providing shade for relaxation on hot summer days. The area reserved for the concert hall can serve as a temporary micro-park with a playground. Water features, plants, and trees should be installed throughout the area to improve the microclimate. The general design should require minimal maintenance.



▲ Proposed green network

MOBILITY

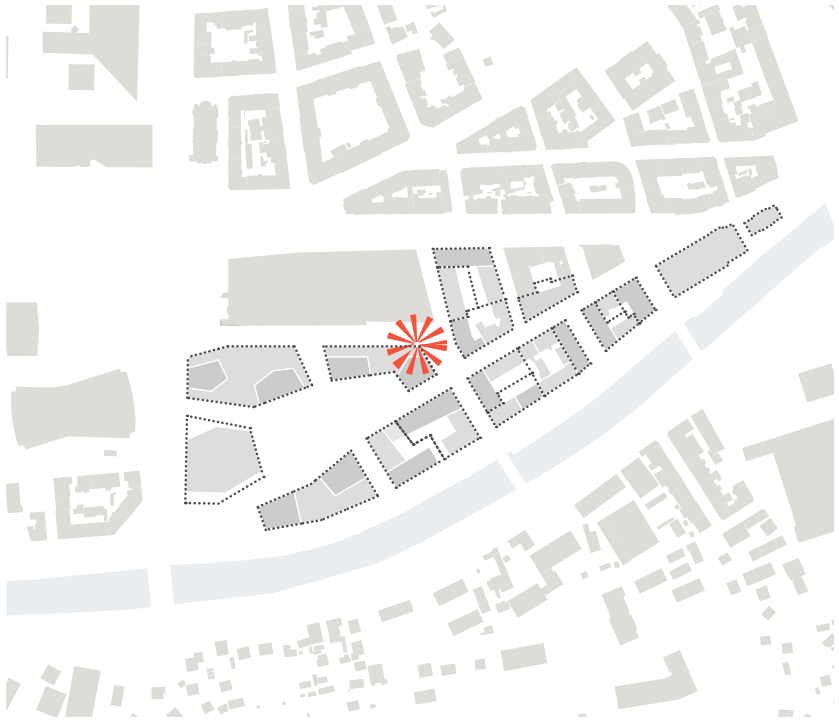
The objective of the mobility concept for Kvadrant B is to improve life quality by decreasing the adverse impacts of motorized individual traffic, such as noise and air pollution, and encouraging non-motorized transportation. The entire area will be designed as car-free, except for underground garage entrance roads that will be dead end streets exclusively for residents, employees, and guests. However, most streets should be wide enough for garbage collection, delivery, and emergency vehicles to pass through. Uniform surface design with the same level will be implemented throughout the site.



▲ Proposed mobility network

Mobility station

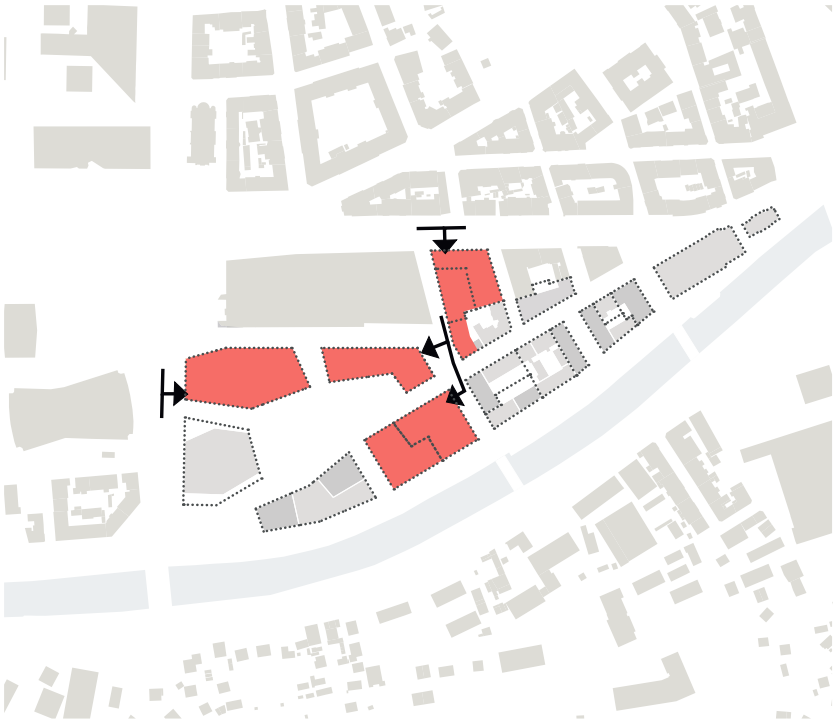
The objective is to combine various mobility options and amenities to encourage both multimodal and intermodal transportation, and to establish a reliable transportation network for those without access to private vehicles. The site should allocate an area for a mobility station, which would accommodate car-sharing and electric vehicle charging facilities. In addition, the outdoor area should include an information terminal, a bike sharing station, bike racks, a package pick-up spot, and urban furniture. To strategically position the station, it should be in proximity to a garage entry, public transit, and a high-traffic road.



▲ Proposed position of the mobility station

Parking

Due to its close proximity to public transportation, parking space requirements can be reduced to one third of the legal obligation. The remaining parking spots should be located in peripheral, collective garages that are accessible from public space. This concept promotes the activation of public space and encourages pedestrian activity, while reducing unnecessary car traffic within the neighbourhood. Bicycle parking should be provided in the ground floor zones of all plots, and separate compartments should be designated for strollers and outdoor playing equipment.

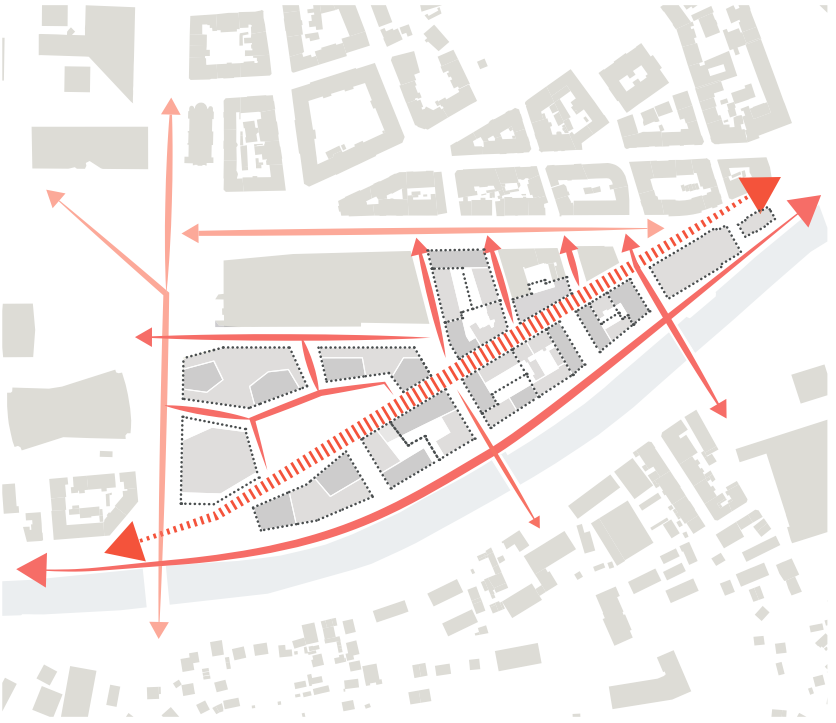


COLLECTIVE UNDERGROUND GARAGE

▲ Proposed collective parking garages

Pedestrian network

Since the site will be a car-free area, the pedestrian network should be designed to encourage walking. The central boulevard is the main pedestrian axis that buzzes with activity. Quieter residential alleys connect to adjacent neighbourhoods. All public spaces follow a human-scale and inclusive design approach. At the same time, cycling would be permitted in all streets as well. While all surfaces should be at the same level, various materials can be used to enhance comfort and safety. Urban furniture, greenery, and lighting will be incorporated. Two pedestrian bridges across the Miljacka River will establish a connection to the southern neighbourhoods: one leading toward the elementary school Vladislav Skaric and the other to Skenderija.



MAIN BOULEVARD PEDESTRIAN FRIENDLY STREETS/PATHS

▲ Proposed pedestrian network

5.2.3 TECHNICAL REVIEW

The gross area of the development includes all future building plots as well as open spaces like public spaces, roads, and private grounds. The gross area of Kvadrant B comprises a total of approximately 59,000 square meters. The total area of all building plots is 26,000 square meters. This results in a share of 57 percent public spaces and 43 percent building plots. Without the concert hall, the building plots account for about 23,000 square meters and a 61 to 39 percent share of public space versus building plots. The total of all building footprints amounts to 22,700 square meters (38 percent of the gross area) with the concert hall and 20,000 square meters (34 percent) without it.

The primary plot division follows the general structure of the master plan. Based on this, plots would be rather small and range from 320 to 3,700 square meters. The eastern blocks could be additionally subdivided as the perimeter block system allows a small-scale building structure that fosters diversity. The blocks on the east side would remain large since they are envisioned to be developed as single buildings with large plinth zones covering the whole plot.

The total gross floor area (GFA) of all buildings in the envisioned development with the concert hall amounts to approximately 100,000 square meters or to 97,500 square meters without the cultural building. Putting this in relation to the size of the total area, we arrive at a gross floor area ratio (FAR) of 1.7 or 1.6 respectively. Using the total plot area (without public space), the FAR results in an average net value of 3.9 and 4.2 without the concert hall. On the individual building plots, FAR ranges between 1 and 6.4. Plot coverage of each individual plot varies from 75 to 100 percent. Building heights in Kvadrant B will vary between 2 and 19 floors. The tallest building, the tower for office and commercial use, will reach up to 69 meters.

The envisioned mixed-use for Kvadrant B includes 30 percent residential, 10 percent retail, 45 percent office, 12 percent hotel and 3 percent social infrastructure. Based on the GFA/NFA derived from this, the development site is expected to provide 219 apartments with an average size of 100 square meters. Assuming that 3 inhabitants will live in each apartment, a total of about 650 residents is envisioned at Kvadrant B. On top of that, an estimated 3,500 people would work in the retail spaces, offices, hotels and social facilities. This would strengthen the central position of the site and attract many employees who would visit the place every day.

With the new riverfront park and the green central square, the total area of public green space would amount to almost 14,000 square meters, and with the reserved green area for the concert hall to more than 16,000 square meters. This equals 21 to 25 square meters of public green space per new inhabitant at Kvadrant B. Additionally, there will be small scale private green spaces in the inner yards of the building blocks and green roof terraces that might be publicly accessible or for exclusive use of the inhabitants. The regulation plan should determine the share of green space that needs to be provided on each plot, depending on the envisioned building structure.

According to the current legal requirements, more than 1,000 parking spaces would be required for residents and businesses at Kvadrant B. However, we recommend to significantly reduce the amount of parking spaces in order to underline the car-free character of the neighbourhood and encourage active mobility. The connection to public transport is excellent and the development proposition follows a progressive mobility concept.

▶ Aerial view of the eastern part of Kvadrant B

6

TOWARDS A GREEN URBAN DEVELOPMENT

In today's context of climate crisis and scarcity of resources, life in cities is emerging as the most sustainable form of human coexistence. However, this positive effect can only unfold with a corresponding design of the built environment. The sustainable development of new districts is therefore a must. Vaso Miskin Crni and Kvadrant B are envisioned as energy efficient, green neighbourhoods that will become role models for eco-friendly development and Sarajevo's first smart city quarters.

The development towards a smart city is understood as a transformative long-term urban development process that requires a bundle of diverse innovations in every city domain. Through process, product and service innovation, a city is expected to gradually transform into a more sustainable, liveable, efficient, and inclusive living space, as well as into a promising business location. When the smart city concept is understood in a holistic way, multiple interplaying layers of urban infrastructure and services require technological and social innovation to facilitate sustainable urban transformation.

At the moment, there is no legally binging smart city strategy for Sarajevo. In 2018, the City of Sarajevo and UNDP set up the City Mind Lab to discuss the vision of a Smart Sarajevo 2030. Several ideas were collected and stakeholders connected for the implementation of selected projects.

There is a wide array of smart city measures that are currently being tested and applied in European cities. An overview of innovations on different scales and throughout the lifecycle of a construction project is given in the table. On the scale of a brownfield development site or the building unit, only a selection of reasonable innovations can be implemented. Moreover, in the case of Sarajevo, there is limited availability of public funds to support such investments and the lack of a legally binding Smart City Strategy or other legal mechanisms that would oblige investors to such measures. Based on the overall development costs of both sites, it will be challenging to finance much higher initial investment cost caused by smart city measures. Due to the prevailing installer-user problem that arises when investors intend to sell newly developed property immediately after construction and do not have monetizable advantages from future lower operating or maintenance cost, (re-)financing models cannot be built upon lower operating/maintenance costs over the long term.

The recommendations for Vaso Miskin Crni and Kvadrant B therefore focus on affordable measures in three innovation fields: energy efficiency, sustainable mobility, and green city. The measures aim to minimize future environmental damage, improve air quality, and decrease dependence on individual motor traffic in Sarajevo. They can be used to facilitate marketing of the sites as sustainability flagship projects in Sarajevo. Digital innovations such as smart buildings, Internet of Things (IoT), and AI-based solutions will not be examined, as they are complex and often entail additional financial costs. To experiment with digital technology formats such as an innovation lab or a technology incubator could be promising options for Vaso Miskin Crni. A focus could be put on air quality related innovation in close collaboration with the University of Sarajevo that is located at the neighbouring campus.

The goal is to indicate feasible actions that are realistic and likely to support the establishment of lively mixed-used neighbourhoods with high quality of life for all population groups. The focus is on use cases at building or project-scale with occasional references to solutions that require district or city-wide implementation.

The development towards a smart city is understood as a transformative long-term urban development process that requires a bundle of diverse innovations in every city domain.

	PLANNING	CONSTRUCTION	OPERATIONS / MAINTENANCE
BUILDING LEVEL	Grading Schemes Ai-based Planning Repurposing Ability By Design	Sustainable Eff. Buildings Local Renewable Energy Root / Facade Greening	Co-housing Groups Co-working Spaces
PROJECT / SITE LEVEL	Open Bim Walkability / Accessability Reduced Parking Obl. Mobility Fund Quality Advisory Board Development Committee	Sponge City Concrete Core Activation Multi-purpose Infrastructures Local Heating Network Dh-connection Smart Construction Logistics	Resilient Tree Care Waste Avoidance App Neighborhood Man. Managed Ground Floors Iot-poc Urban Gardening
DISTRICT LEVEL	Mobility Points Citizen Co-creation Lab Iot-platform Active Mobility	Public Transport Connection Ls-heatpump Lorawan	Food Coops Smart Parcel-delivery Bike-sharing Repairshops Tech Incubation
CITY CANTONAL LEVEL	Sump (Driving Bans, Bike- Fastlanes) Ai-big Data Analytics Digital Twin / Material Lib Property Appr. Tax Innovative Procurement	Smart Grid District Heating Cycleway- Lane Network Dh-connection Smart Construction Logistics	Smart Waste / Water Utilities (E-) Car Sharing Maas; Autonomous Driving Crowsourcing -funding City Toll Urban Mining

▲ Smart city innovations on different scales and throughout the lifecycle of a construction project. Source: UIV

6.1 ENERGY EFFICIENCY AND SUSTAINABLE BUILDING

Energy efficiency

Sarajevo has very cold winters and rather hot summers which leads to a substantial demand for heating and cooling depending on the time of the year. In order to reduce the energy demand, sustainable building standards that enhance energy efficiency should be introduced. This is also an indispensable prerequisite to shifting energy provision to local renewable sources that have limited performance capacities. The use of concrete core activation can be particularly efficient for large-scale non-residential buildings with high energy demand for heating and cooling. At Kvadrant B, the Miljacka River could be a potential source for distance cooling in the summer. Investors have to reckon with an additional charge of approximately 100 euros per square meter net floor area investment cost or an overall increased investment cost of 6 to 10 percent. On the other hand, running costs can reduced to up to 85 percent of total costs over a building's lifecycle. In order to make such investments attractive for the developer, effective regulations need to be in place. Increased marketability and property value could also be an incentive.

The application of state-of-the-art building grading systems could be mandatory in quality assurance. These should focus

not only on energy efficiency but on a wider spectrum of sustainability criteria including resource preservation and circular economy (e.g., LEED v4, BREEAM, etc.).

For the construction process, it is recommended to apply smart construction logistics and re-use building materials or secondary materials on site after demolition. International examples have shown that up to 50 percent of deconstruction materials can be recycled and re-used.

Energy provision

Geothermal heat pumps appear to be a compelling solution to establish a green local heating network that can complement the existing district heating network that is currently expanding its capacities. However, geologic explorations will be needed to verify whether local conditions are well suited for drills. In general, distance/local heating is expected to entail lower primary energy consumption per building. Therefore, all new buildings should be connected to district heating.

Green electricity is another component that should be taken into account. As electrification of motor traffic is a likely scenario for the near future, demand for electric energy will rise. Therefore, a new building's technical infrastructure, roofs and facades should be compatible with the installation of photovoltaics and solar thermal panels by default. Legal frameworks and support systems for the private production of electricity still need to be elaborated. Conflicts between urban greening and renewable energy generation can occur. As air quality is highly dependent on how energy and mobility are provided in a city, energy efficient buildings and sustainable local heating must be two pillars of Sarajevo's sustainable transformation.

6.2 SUSTAINABLE MOBILITY

Currently very low levels of walking and biking in the modal split implies great potential to promote a walkable and bike-friendly Sarajevo. Active mobility could well be promoted at Vaso Miskin Crni and Kvadrant B due to their proximity to the city centre and the university campus.

Car parking

To promote VMC and Kvadrant B as smart city pilot projects, it is recommended to reduce parking space obligations for developers by exemption from the building code to a maximum of 0.5 parking lots per housing unit. Apart from high quality public transport and public space design, parking management will be a key to facilitate green mobility on site. Neighbourhood garages at the edges of the site help to keep the area car-free. Smart load management technology in garages could help to promote extensive e-vehicle use. Given a reduced parking obligation a transparent collaborative sustainability fund jointly funded by property developers could bolster citizen participation and provide co-financing for sustainable measures on-site. The neighbourhood management team, together with the residents, could decide how the funds should be used.

Active mobility

In order to foster active mobility, the whole area of both development sites will be car-free and reserved for pedestrian and bicycle use only. Adequate biking infrastructure in and outside the buildings (lockable bicycle units, stands, etc.) should be implemented. VMC and Kvadrant B could well be promoted as eco-mobility districts. A pro-active communication campaign is definitely recommended to avoid conflict within

the local population as most people are not familiar with such concepts yet.

Active ground floors

As local mobility is closely intertwined with public space design and ground floor utilization, these should be addressed together rather than separately. A centralized management of ground-floor use at neuralgic spots during the first stages of development should be considered. This approach could be especially suitable for Vaso Miskin Crni to facilitate diverse use of available premises and to integrate students from the nearby university campus to live up the neighbourhood – even in the evenings. A certain amount of ground floor space should also be used for non-commercial, community-related or cultural activities.

Management of ground floor use could be combined with innovation that facilitates a circular economy, such as food cooperatives, or with smart urban logistics. Due to the proximity to the university campus and a potentially motivated user group, VMC promises to be a well-suited site for such initiatives. A low-key consolidation of parcel delivery would at minimum enable local eco-friendly pick-ups.

Sharing systems

Car sharing is possible in different systems and scales. City-wide free-floating carsharing services are currently the most popular in Central European cities. E-car sharing is still in its infancy due to limited battery capacities and cumbersome loading procedures. But even with currently insufficient complementary infrastructure and a lack of market regulation, the potential for carsharing remains sky-high. Location based car sharing could be worth implementing in a new development site like VMC in the form of a citizen's association. Members of the association could book and rent the car(s). Service providers claim that one shared car can replace up to 20 private vehicle ownerships. Local bike sharing systems are not profitable by default and should be rolled out on a city-wide scale.

Sharing systems can be a valuable complement to the use of public transport, however, public transport remains by far the most energy efficient mode of transport for daily use. UNDP and the City of Sarajevo are currently attempting to re-invigorate a citywide launch of carsharing services. It would be appropriate to build on their efforts.

◀ The city of Sarajevo should be walkable

6.3 GREEN CITY

Air quality has been an absolute priority in Sarajevo, so green city solutions should be prioritized by project promotors. At Vaso Miskin Crni and Kvadrant B, additional public green spaces will be crucial as population density is already high and more residents as well as employees are expected to arrive with development of the sites. The design should maximise the creation of resilient green spaces and landscape planning should be integrated early and throughout the development process to facilitate cost efficiency. During the first years, it might be effective to involve experts in maintenance. Later on, maintaining urban green spaces could also facilitate community building via citizen participation.

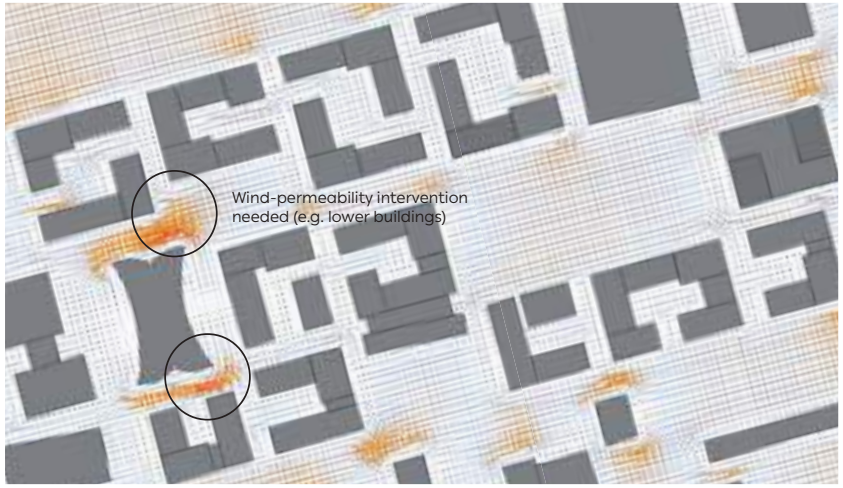
Greening of public space

Greening and shading of public space are the most effective measures to avoid urban heat islands in the long term. It was calculated that each solid cubic meter of wood can capture approximately one megaton CO_2 equivalents in the long term. Furthermore, a 100-year-old beech tree is expected to produce 4.5 tons of oxygen per year. Fully-grown city trees can provide shade for up to 150 square meters, cool its surroundings by up to 3 degrees Celsius in summer and evaporate at least 400 litres of water per day. On a summer day, city trees absorb 18 kilogrammes of CO_2 and produce 13 kilogrammes of oxygen on average. Trees dampen noise and wind and can also bind up to one ton of dust per year. However, with increasingly hot and dry summers, we must focus on climate resilient plants and trees (elm, hackberry, etc.) in every case. According to the proposed masterplans, the development at Vaso Miskin Crni would provide 21,100 square meters of public green space which equals 8 square meters of green space per new inhabitant. In Kvadrant B, 16,400 square meters of new green space would be provided for a smaller number of new residents, thus bringing a special benefit to the surrounding neighbourhoods and people already living in the area.

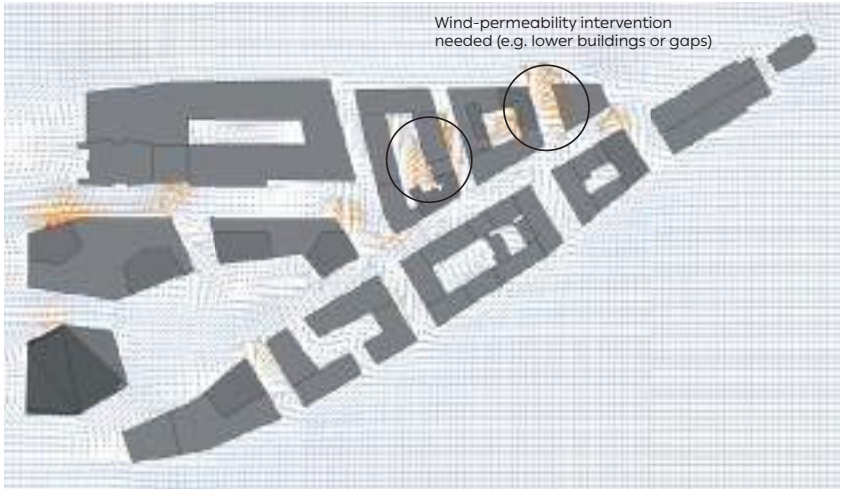
In order to counteract the already noticeable effects of climate change, like extreme heat, drought or rainfall, the implementation of extensive rainwater management is highly recommended. A sponge city approach facilitates the underground collection of water as well as planting and preservation of trees in urban areas. Adequate rainwater management is expected to be even more effective in combination with facade and roof greening and local cisterns or wells. Regarding potential additional construction costs, it is important to calculate the real opportunity costs over the project lifecycle, as rainwater management promises to bring significant cost savings in the maintenance of sewer systems, water purification infrastructure, etc. Operating costs may be offset by revenues from businesses that benefit from cool urban spaces, like nearby restaurants, shops, etc. Needless to say, the cooling effects of vegetation are important for the well-being and health of inhabitants too.

Greening private spaces

A certain share of roof and façade greening should be mandatory for each new building constructed. Green facades bind dust and have positive impacts on local microclimates. They can improve air quality, noise exposure, rainwater storage and biodiversity. Green facades also have an insulating effect that prevents overheating inside the building. Building design, orientation and location, materials and user needs are important variables affecting the success of green facades. South- and west-facing greenings, however, will have the greatest climatic effect. Microclimatic simulations can determine the best set up for each building. There are different ways to implement façade greening, including wall and soil-bound as well as more flexible and less expensive systems. However, fire protection regulations often limit the possibilities. Design potentials



▲ Computational Fluid Dynamics (CFD) Simulation of Vaso Miskin Crni representing the wind conditions in Sarajevo, Soruce: ETH Z urich, Prof. Hubert Klumpner and Dr. Michael Walczak



▲ Computational Fluid Dynamics (CFD) Simulation of Kvadrant B representing the wind conditions in Sarajevo, Soruce: ETH Z urich, Prof. Hubert Klumpner and Dr. Michael Walczak

▲ Urban Heat Island Simulation of Vaso Miskin Crni with Heat-reduction intervention included, Source: ETH Zurich, Prof. Hubert Klumpner and Dr. Michael Walczak

▲ Urban Heat Island Simulation of Kvadrant B with Heat-reduction intervention included Source: ETH Zurich, Prof. Hubert Klumpner and Dr. Michael Walczak

have been thoroughly analysed in recent years, so that circumvention of the installer-user problem remains the main obstacle.

Once again, public and private project investors will have to deal with higher investment costs. It seems realistic to assume an increase of 0.2 to max. 2 percent of total construction cost, with maintenance cost of around 10 euros per square meter facade per year. 25-100 euros per square meter will likely accrue for roof greening. However, design and scale determine the financial impact. Green facade maintenance involves pruning, weeding, debris removal, inspection, and repair of the structure, and at times replacement of planter beds and plants, so appropriate design can mitigate costs. As with the greening of public spaces, long-term cost savings should be considered (e.g., damp resistance, facade durability, heat insulation). At Vaso Miskin Crni, a total roof area of approximately 30,000 square meters would be available for greening or installation of solar panels. At Kvadrant B, the adequate roof area amounts to about 20,000 square meters.

6.4 GOOD PRACTICE

Mobility coordination

Mobility coordination can promote active mobility in new urban development areas or transform mobility behaviour in existing neighbourhoods. The reduction of car parking spaces and reallocation of the budget is a way to finance sustainable mobility measures.

In the urban development area "Sonnwendviertel" in Vienna, the urban design process was supported by mobility planners that elaborated a mobility concept for the neighbourhood that was implemented throughout the construction and settlement phase. The concept includes recommendations for the design of street space and mobility infrastructure (pedestrian and bicycle network, public transportation, collective garages, etc.), stipulations for the development of each property, as well as suggestions for the long-term management of sustainable mobility in the neighbourhood (mobility fund, communication and awareness raising, etc.).

▶ Active mobility is encouraged in Sonnwendviertel in Vienna, Austria. Source: Ludwig Schedl

Green facades and sustainable urban drainage systems

Building facades are large areas in our cities that normally heat up considerably during the day and give off this heat again at night. Greening of these facades has a huge potential for cooling, as it has a positive impact on the microclimate in urban space as well as on the temperatures within the building itself. The City of Vienna has recognized this potential and has issued a regulation to include mandatory façade greening in all new or adapted zoning plans.

The application of maximal green building surfaces has been tested in the urban development project Biotope City. A total of 2,200 square meters of green facades and 13,600 square meters of green roofs were implemented. Green elements in the streets were combined with sustainable drainage systems comprising of permeable paving, retention reservoirs, and infiltration trenches.

▶ Newly planted façade greening in Vienna's Biotope City. Source: Nachhaltig wirtschafen

Ground floor management

The management of ground floor zones aims to implement a predefined user concept that ensures local supply of goods of daily use as well as a balanced mix of commercial and non-commercial functions in the plinths of new buildings. Attracting pioneer businesses to the area is the basis for future settlement of further shops and services.

In Vienna, Austria, the development agency of aspern Seestadt, the city's largest urban development project, joined forces with an experienced retail real estate developer to manage the central shopping street of the new urban district. The partnership ensured, that crucial amenities like a supermarket, pharmacy, stationery, etc. were available shortly after the first residents moved into the new development. In the long run, the cooperation will ensure a balanced mix of trade, gastronomy and services in the evolving shopping street.

▶ Managed shopping street in Vienna, Austria. Source: SES

Integrated provision of affordable housing

Developments of new urban quarters in central locations of a city tend to exclude socio-economically disadvantaged groups and challenge social coherence. The experience of past decades has shown that social segregation in cities has negative impacts on all urban citizens. It is therefore advisable to ensure a certain degree of social mixture in all urban neighbourhoods.

The City of Vienna is famous for its social housing schemes that provide affordable housing to a broad range of citizens thus promoting a social mix throughout the city. The City's most recent policy calls for two thirds of affordable housing in all urban development areas. A special category in the zoning plan for subsidized housing has been established. The rental prices for these apartments are capped. The City of Vienna awards grants for non-profit housing cooperatives that provide affordable housing and is also building municipal buildings.

▶ The Bike City is a successful example of affordable housing with a sustainable mobility concept in Vienna, Austria. Source: sdg21

7

QUALITY CONTROL AND URBAN RULES

Finally, the proposed plans and measures must find their way into implementation. With complex ownership structures as starting points at both brownfield sites, Urban Development Contracts could help to consolidate the land and work towards a common goal. At the same time, various tools of quality management and process monitoring should be applied to ensure a development that follows the high standards and recommendations enshrined in the development propositions. A high-quality outcome can only be ensured through a high-quality process.

The control of the architectural quality of building design and public spaces is key for a successful urban development and complex masterplan project. To assure high quality of the built environment, a clear process and selected quality control measures are recommended for application in Vaso Miskin Crni and Kvadrant B. Both projects do not have the same are envisioned as new centralities with different mix of uses and a differentiated intensity of public spaces. However, both designs have common goals and a similar implementation strategy of how to mobilise public and private sector land and how to assure quality.

7.1 URBAN DEVELOPMENT CONTRACT

The Urban Development Contract will be the key document to agree on land consolidation, financial conditions and urban rules for development that may not be covered by the regulation plan. It is a means of cooperation between the public sector and private landowners that should be enshrined in the new Urban Plan of Sarajevo. Urban Development Contracts have been used in many countries and there are several examples of successful project implementation in partnership between the public and private sector that have been determined through such a legal agreement. There are several cases from Vienna that were analysed and can serve as an inspiration for Sarajevo:

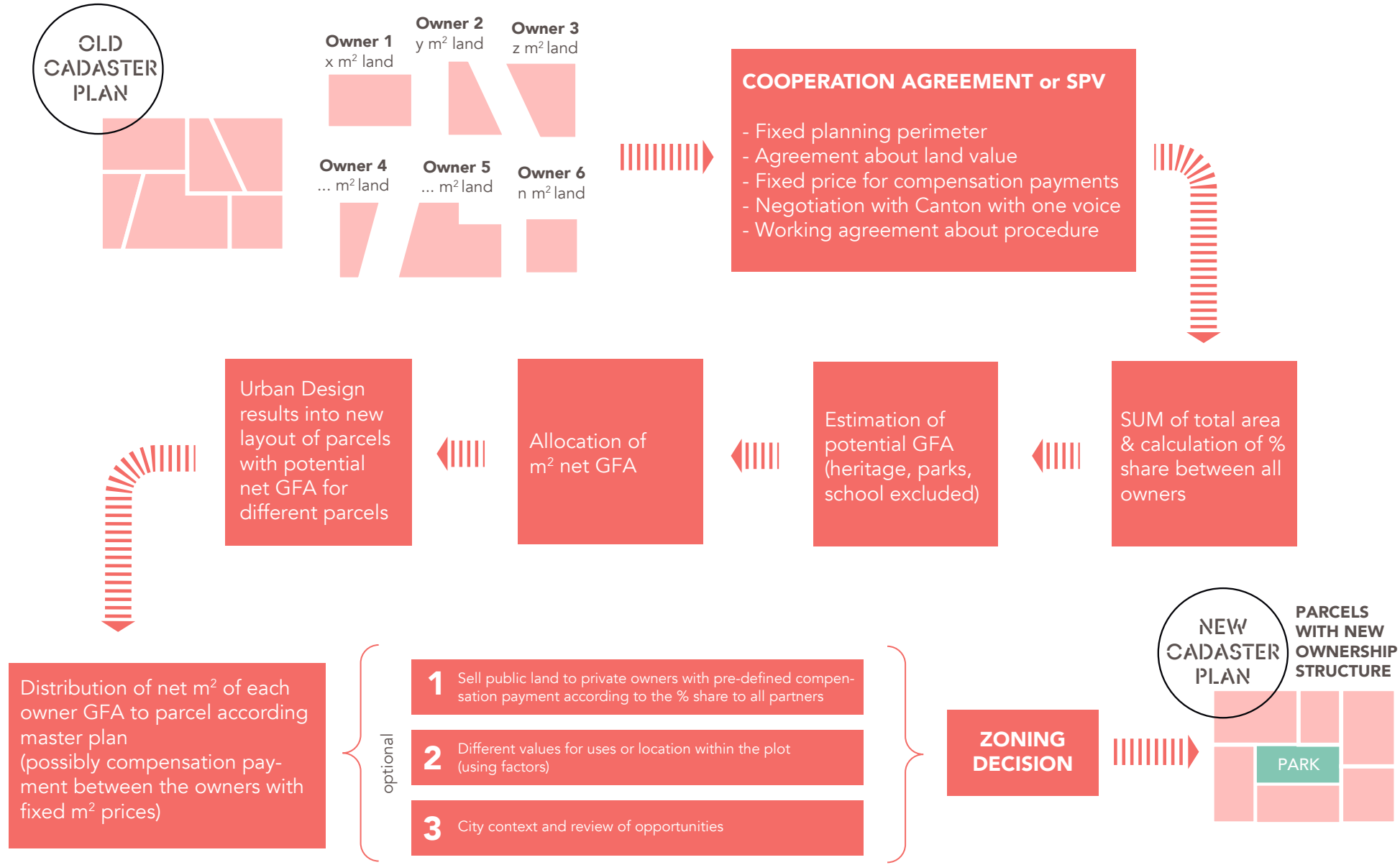
- **Rothneusiedl (124 hectares, 25 owners)**
- **Oberes Hausfeld (30 hectares, 40 owners)**
- **Kabelwerk (9 hectares, 5 owners)**
- **Aspern Seestadt (240 hectares, 1 PPP developer)**

In the case of Kvadrant B and Vaso Miskin Crni, the Urban Development Contract would settle the ownership of each contract partner. Generally speaking, ownership would transfer from individual parcels to a share of the consolidated land which is the aggregation of all plots. The shares contain the right to develop a certain gross floor area for a specific use on the site. The value of the possible GFA may vary by different uses (office, kindergarten, retail, heritage buildings, for-profit housing, affordable housing, etc.) – the value of the different uses must be considered when redistributing the plots after zoning.

The contract needs to define the following aspects of the development and relationship between private owners and public administration:

Regarding the redistribution of value and compensation

- **Oblige all contract partners to stay in the project over the development time or pass on all their duties defined in the contract when selling the plot.**
- **Set the structure of the land consolidation model.**
- **Define the project ownership shares: calculation of valued GFA for each owner according to the shares.**
- **Set up a basic calculation and price setting scheme for the total project and confirmation of a preliminary project-budget.**
- **Set the land value for internal land swaps: e.g., all actual plots have the same value per square meter land.**
- **Set up a draft cadastre plan that regulates the location of each owner's GFA according to the use-value and shares.**



▲ Schematic diagram of the land consolidation model

Regarding land transfer to public entities

- **Determine the conditions for land transfer to public entities (including parks, streets, and plots for social infrastructure).**
- **Define a financial contribution for infrastructure development and equipment (parks, water and sewage, roads, trees, electricity, school, etc.).**

Regarding the obligations of the public sector

- **Regulate when and by whom the social and technical infrastructure investment is financed and implemented.**
- **Guarantee realisation of adaptions of the technical infrastructure outside the area of the project which are enabling factors for the investment by the involved public units.**

Regarding quality control

- **Enforce regulations of urban rules as defined in the master plan, including the Quality Control Council.**
- **Protect the heritage buildings and ensure development of those sites according to the heritage rules and regulations.**
- **Oblige the foundation of the Development Corporation, defining its structure, financing, management, and responsibilities.**

The Urban Development Contract shall only come into force when the respective regulation plan is issued.

7.2 QUALITY CONTROL PROCESS

Quality Control Council

A Quality Control Council shall be implemented in order to monitor the developments and secure the quality of architecture and the implementation of the urban rules. A Quality Control Council guides the quality assurance process of implementation of the master plan and ensures that uniform designs, adequate rules, and project standards are being applied. It is important to highlight, that the Quality Control Council does not act arbitrarily, but is responsible for ensuring compliance with the jointly defined urban rules. However, the rules are flexible to a certain extent and some variations from the rules may be decided in this group.

A Quality Control Council guides the quality assurance process and ensures that uniform designs, adequate rules, and project standards are being applied.

The Quality Control Council should be formed by members from the independent architectural community as well as architects from the municipalities and Canton Planning Institute. There should be at least 50 percent independent members, and at least one international member in the council. Additionally, the designers of the master plan may also advise the Quality Control Council. This is needed to ensure that the visions of the master plan are fully understood, and variations are integrated

sensibly. None of the jury members of the Quality Control Council can be a designing architect of buildings or public spaces within the planning site. An architectural heritage expert, a housing expert, a mobility expert, an urban sociologist, and a microclimate expert should support the council as non-voting consultants with their technical knowledge. In order to build up trust, representatives of the public and private landowners could be invited as observers of the council.

The Quality Control Council meets on a regular basis, minimum four times a year throughout the project cycle starting from signing of the Urban Development Contract until the implementation of the project. The council will oversee all projects in terms of quality, takes part in juries for building competitions and manages the whole quality process.

Coordination Office

The quality control is managed by a Coordination Office. The office is coordinating all activities of the Quality Control Council and leads the quality assurance process. They are an independent office, not influenced by the developers nor the public entities.

The Coordination Office organizes all meetings of the Quality Control Council, pregaring agendas and minutes of the meetings. They receive and administer all planning materials from planners and architects. The Coordination Office integrates singular projects into the overall master plan and model of the site and ensures they are up-to-date throughout the entire planning and implementation process.

Monitoring process

Each architectural and public space project must be presented to the Quality Control Council at three stages: a) at the conceptual-design stage, b) before submission for a building permit, and c) before finalizing design execution drawings. The Quality Control Council has the right to ask for improvements of the project or to reject the project due to insufficient quality or breaching with the urban rules.

All projects must be submitted to the Coordination Office one month before each meeting. They will check the project regarding the quality catalogue and deliver a report to the council one week prior to the council meeting. During the council meeting, the Coordination Office will present the report about the project and the council will debate about it. The architectural quality of the project will be discussed by the Council. The criteria are a) functionality of the project, b) access to the building, c) uses, d) architectural and landscape design quality. The project is accepted when all items from the quality catalogue are evaluated positively. If some items are not elaborated well, the quality council can demand changes to the project. The project applicant has to submit the project again for the next council meeting.

In a dialogue phase, there should be coordination between all project developers regarding the planning of the public space. Deviations from the master plan can be discussed, coordinated, and agreed.

7.3 QUALITY CATALOGUE

For the project quality control, a Quality Catalogue will be elaborated. This catalogue contains quality items in four categories: a) urban design and public space, b) open and green space design, c) buildings, and d) mobility. The quality criteria defined under these categories derive from the urban rules defined in the development propositions for Vaso Miskin Crni and Kvadrant B. They may include the following aspects:

Buildings and urban design

- **The position and height of buildings must be coordinated to avoid mutual shading of living spaces. At the same time, characteristic silhouettes should be created and visible from public space. Visibility of bare fire walls should be avoided.**
- **A clear structural formulation of the plinth zone (i.e., ground floor zone) should emphasize the importance of central public spaces.**
- **Floor height for active ground floor zones is at least 4 meters.**
- **A colour code for the neighbourhood should be developed to ensure a uniform design and orientation. Facade concepts, as well as colours and materials for balcony and loggia parapets should be coordinated accordingly.**
- **All entrances to the buildings must be accessed from public space, no entrances are allowed from the court yards. Direct access to the green inner courtyards is to be ensured from the apartment building staircases.**
- **Sufficient substrate build-up above underground car parks or basements to ensure high-quality vegetation.**
- **Great care to be taken in the design of the facades of garbage rooms, baby carriage and bicycle storage rooms - no "dead" facades in the active ground floor zones.**
- **Noise protection measures should be applied where necessary (adequate windows, organization of the apartments, etc.)**
- **Towers (> 35 meters) should offer an added value to the wider public by providing accessible premises at the top floors, like restaurants, bars, galleries, or other public venues.**
- **A minimum of 30 percent of all facades of each building must be equipped with green facades.**
- **100 percent of roofs should be either green or used to generate solar energy.**

The Quality Catalogue contains quality items in four categories: urban design and public space, open and green space design, buildings, and mobility.

Open and green space design

» Surface design in public spaces must clearly represent the priority for pedestrians and cyclists (active mobility) in the neighbourhood.

» Use of consistent materials and paving, as well as the inclusion of plants and urban furniture, should structure the public open space in line with the overall design concept. A landscape architecture office should be commissioned to oversee the comprehensive planning and implementation.

» The levels of streets, open spaces, and building ground floors are carefully coordinated to ensure a cohesive and functional overall design.

» Open space concepts with a uniform identity across all building sites are to be developed for each building site within its boundaries.

» The goal is an unfenced quarter, i.e., no fences between the individual building sites and building plots. Boundaries are only permitted between semi-public courtyards and private front gardens in the form of uniformly designed privacy screens.

» Uniform floor materials, equipment and urban furniture for each building site and yard.

» Surfaces shall remain unsealed to a large extend to have a positive impact on the microclimate and allow drainage of surface water without burdening the city canalisation.

Mobility

» Construction of collective underground garages, each with an entrance and exit for access to the specified mandatory parking spaces in accordance with the prescribed parking space regulations.

» At least 5 percent of parking spaces in the garages should be equipped with e-charging infrastructure.

» Creation of empty piping for the remaining parking spaces in garages for a possible subsequent equipping with e-charging infrastructure.

» Bicycle parking spaces will be provided on all construction sites and in public spaces (approximately two bicycles per 100 square meters gross floor area built).

» At least 30 percent of these bicycle parking spaces are accommodated in barrier-free accessible bicycle facilities located at the ground floor level of buildings. Guests use bicycle parking spaces in the open space – both on private or public property.

» No above ground parking allowed or only the legal minimum for people with disabilities.

» Visitor parking is located in the collective garages.

▲Neglected building in Sarajevo

7.4 QUALITY MANAGEMENT TOOLS

In addition to the described process for quality management and monitoring, the following tools are recommended to enhance the implementation process:

Architectural competitions

Architectural competitions for all buildings and the public spaces including parks should be organized by the developers and the municipality with support by the Association of Architects in BiH. For each competition of private land at least three architecture teams should be admitted and agreed with the Quality Control Council. In case of public land (public space, school building etc.) an open competition has to be organized. The competition brief must be agreed and accepted by the Quality Control Council. The urban rules and master plan are integral part of the competition brief. The jury members must be agreed with the Quality Control Council. Also, the jury member presiding the jury must be elected by the Quality Control Council.

Ground floor zone coordination

In order to implement the active ground floor zone, a ground floor zone coordination has to be organized. The uses must be organized in a way that a new centrality can start to work and should be defined in a working group with the owners, developers, and the Quality Control Council. If needed, a management of the ground floor zone, similar to a shopping centre could be put in place.

When ground floor premises are sold by developers, the management unit would have pre-emptive right to buy. That way, ownership of ground floor units stays with a single entity who specializes in this specific property management. From a management, control, and image perspective it is important to keep the ownership of these units and prevent different risks which might occur with loss of ownership and control (higher vacancy rate, poor image associated with some tenants, less flexibility in changing the concepts, etc.).

Microclimate studies

Each building and open space project including all streets and parks is to be examined in microclimatic studies. Thus, the negative consequences of global warming, e.g., urban heat islands and wind impact, are estimated and appropriate measures such as green infrastructure (green facades, trees etc.) and intelligent shading systems can be included in the design. The share of green flat roofs and facades is determined in accordance with the microclimate study. The facade greenery or other natural solution adequate for the microclimate conditions should result in a minimum of 30 percent of the overall façade surface. The recommendations from the microclimate and wind study are obligatory to implement.

Mobility coordination

All projects must coordinate their mobility concepts and their collective garages. Individual car traffic shall be avoided, and active mobility should be favoured. The developers will set up e-car sharing systems for their residents. Today, we assume that around ten e-cars in each collective garage will be a good start. Also, shared bikes shall be offered to the residents of the new quarter.

TOWARD A FUTURE OF BROWNFIELD DEVELOPMENT

Henry Fletcher
EBRD Programme Leader

Sarajevo plays a vital role in our programme aimed at supporting urban regeneration efforts in our Countries of Operation. In particular, the development of urban brownfield sites is an exciting topic as it enables sustainable urban development that prioritizes inner-city densification while laying the foundation for green development, economic growth and mixed-use. Through projects like the one in Sarajevo, we have set a valuable example for how to implement the 15-minute city concept.

The challenges we addressed in Sarajevo are expected to be replicated in other cities in the Western Balkans, making it a highly effective urban laboratory to explore approaches to reassembling urban structures in the aftermath of discontinuities. The approach developed by our project team in Sarajevo can be pursued not only in the city but also in relation to thousands of hectares of urban land in the region. I would like to commend the strategy team on their deep integration of, amongst others, urban narratives, historical understanding, planning conventions and disjunctures, bottom-up and top-down approaches, and commercial and climate realities, to achieve a vision for urban development that is real enough to engage while remaining flexible enough to enable implementation.

As we look towards the future, we find hope and optimism. The development of the urban strategies including project designs of the Sarajevo project has been a beacon of success in the field of urban regeneration, and it has paved the way towards implementation. Moving forward, we expect to build on the momentum generated by the Sarajevo project. We will work with our partners and stakeholders to set a development path and road map of those key centralities in the Sarajevo Metropolitan area.

One of the key lessons learned from the Sarajevo project is the importance of collaboration between public sector organisations and, at the same time, clear engagement of private sector actors to build trust between stakeholders. The proposed urbanistic contracts and land consolidation models show clear strategies towards the implementation. By working together, we can create urban environments that reflect the needs and aspirations of the people who live in them. We will continue to collaborate with local communities, governments, and other stakeholders to ensure that our urban development plans are inclusive and sustainable.

We are grateful to the Canton of Sarajevo and other stakeholders organisations for their active participation in the project over a prolonged period of time, and throughout the difficult COVID-19 and post-COVID-19 months. We cherish their patience throughout the project and admire their ambitions to deliver constant improvement to one of Europe's great cities.

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Sarajevo has the potential to develop its brownfield sites into new urban quarters and centralities, providing opportunities for growth and development. However, the urban landscape of Sarajevo, severely hit by war, has yet to recover its urban voids that were once factories and production sites. To address this, the EBRD has commissioned a project team consisting of superwien, OSNAP, and Colliers to develop and conceptualize two iconic sites that could serve as important central areas with a mixed-use character. The team has also developed a land consolidation model and a set of innovative urban rules to complement zoning requirements, ensuring a sustainable approach to development. Overall, this represents an exciting opportunity for Sarajevo to reinvigorate its urban landscape, creating new spaces for living, working, and leisure.

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