



**Politecnico
di Torino**

Master's Degree in
Architecture for Sustainability

«The Hinge Between Forest and City» A landscape-led housing proposal for a hillside site

Top 30 Finalist | Karlovo Living Landscape International Design Competition,
Terraviva, 2025

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Politecnico di Torino
July, 2026

ABSTRACT

The post-socialist housing estates of Central Europe face a common question: what comes after the panelák, the prefabricated concrete housing blocks of the socialist era? As these ageing buildings reach the end of their lifecycle, the default answer has too often been demolition followed by higher, denser building. This thesis proposes a different answer for the Karlovo site, a south-facing hillside on the edge of the Sásová district in Banská Bystrica, Slovakia, which were selected for the «Karlovo Living Landscape» design competition promoted by Terraviva Competitions. Here a socialist housing estate meets the protected foothills of the Nízke Tatry National Park. The threshold position frames the central design problem: how to build a neighbourhood that mediates between urban fabric and protected landscape, denser than the forest yet lighter than the estates it adjoins.

Rather than maximising what the design competition brief permits, the project develops a toolbox of choices at two scales. At the scale of the quarter, a flexible grid descends the hillside in terraces, distributing a catalogue of urban elements: an active ground floor supplying the civic and commercial life the existing district lacks, productive landscape, and ecological corridors connecting the new neighbourhood to the forest above. At the scale of the dwelling, terraced residential bars are organised on a 3.5-metre structural module that allows residents to merge or subdivide units over time. A hybrid operable glazed gallery along the south facade works simultaneously as winter thermal buffer, shared corridor, and social space.

The methodology combines a site-first reading of topography, ecology, and hydrology with a critical questioning of the competition brief, tested against built precedents. The outcome is both a design proposal and a methodological framework: a kit of possibilities for inhabiting the urban-natural edge that treats reduced density, ecological continuity, adaptable dwellings, and social integration as a single strategy. It argues that building taller is not the only answer after the panelák.

ACKNOWLEDGMENT

I would like to express my sincere gratitude to my academic supervisor, Professor Francesca Frassoldati, for her guidance, critical insight, and continuous support throughout the development of this thesis.

I am deeply thankful to my co-supervisor, Professor Matteo Novarino, for his valuable observations, constructive feedback, and the time dedicated to reviewing this work. His expertise and thoughtful engagement significantly contributed to the quality and direction of this project.

I wish to acknowledge Studio Novarino Jendras, where I completed my internship during the development of this thesis.

DEDICATION

First and foremost, I dedicate this work to my beloved husband, Parsa.

Your presence throughout this journey has been my steadiest source of strength. You believed in this path before I did, and you carried me forward through every moment of doubt with patience, love, and quiet certainty. This thesis exists because you were beside me. Whatever I build in this life, I build better because of you.

I dedicate this work to my family in Iran. Even across the distance that separates us, your love has never felt far away. The values you gave me, the sacrifices you made, and the trust you placed in my path have shaped everything I am and everything I aspire to design. Whatever I accomplish carries your name within it.

Finally, I dedicate this thesis to the brave people of Iran. To those who, despite hardship and suffering, chose courage over silence. Your resilience and your fight for a better life have been present in every page of this work. May this thesis honour, in its own small way, your courage and your hope for the future you deserve.

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1.1 Background

The Karlovo Living Landscape project began as a competition entry for a hillside site in the Sásová district of Banská Bystrica, Slovakia, an international call for proposals for a new residential quarter on the edge of one of the city's largest socialist-era housing estates. This thesis takes that brief as its starting point, but not as its limit. Sites like this are common across Central and Eastern Europe: undeveloped land at the edge of an ageing estate, with a brief that sets a maximum buildable area and assumes it should be built in full. What's less common is reading the site itself, its slope, its ecology, its relationship to the landscape above and the community below, carefully enough to ask whether that assumption actually holds. That question is what this thesis sets out to answer.

1.2 Research question

The central question this thesis asks is whether maximum permitted density is the right objective for the Karlovo site, given what the site itself demonstrates about its relationship to the landscape above it and the community beside it. Three more specific questions follow from this:

First, what does a south-facing hillside, an ecological corridor, and a binding masterplan full of overlapping constraints actually permit, once read on their own terms rather than through the brief's assumptions? Second, should a new residential quarter beside an ageing socialist-era estate be designed to replace what is missing there, or to complement it and what difference does that distinction make to the design? Third, can a reduced-density proposal deliver more value, socially, ecologically, and in the quality of the housing itself, than the brief's maximum would?

1.3 Aims and objectives

The aim of this thesis is to develop a design proposal for the Karlovo site that answers these questions with evidence, not assertion. Four objectives follow from that aim: to read the site and its surrounding context critically, establishing the physical, ecological, and social evidence any design must respond to; to assemble a theoretical and precedent-based framework chosen because the site's own conditions call for it, rather than applied as a generic template; to develop a design proposal that responds to that evidence more convincingly than the brief's default assumptions would; and to evaluate that proposal honestly against both the competition brief and the evidence that shaped it.

1.4 Methodology

The method follows the order of the chapters, and that order is deliberate. The site is read before it is theorized about: Chapter 2 establishes the place at the scale of the neighbourhood, the city, and the region; Chapter 3 narrows to the site itself, topography, ecology, mobility, infrastructure, closing with a critical reading of what the brief actually requires versus what it merely assumes.

Only then does the thesis turn to theory and precedent. Chapter 4 sets out six bodies of thought, on neighbourhood structure, edge conditions, landscape-led design, human-scale liveability, environmental performance, and phased urbanism, each chosen because the site evidence raised the question it answers. Chapter 5 examines built precedents for the same reason: not a style survey, but a set of tested spatial lessons for the challenges Karlovo presents.

This ordering is itself an argument: a design grounded in the evidence of a specific place will answer that place's questions more honestly than one starting from a brief's assumptions and a designer's preferences. The chapters that follow are built to test that argument, not just illustrate it.

1.5 Scope and limitations

This thesis develops an urban and architectural design proposal, together with the landscape and environmental strategy that supports it, for a single competition site. It does not attempt full structural design, detailed cost planning, or the statutory planning permission process, these lie outside what a design thesis can or should resolve and are flagged as such wherever they become relevant.

The site analysis, theoretical framework, and precedent studies draw on publicly available planning documents, regional data, and published project documentation; where a specific figure or boundary could not be independently verified, this is noted in the relevant chapter rather than presented as more certain than it is. The design proposal that follows is one credible response to the evidence assembled here, not the only one, a different reading of the same site could reasonably produce a different answer.

1.6 Structure of the thesis

Chapter 2 sets out the place, Sásová, Banská Bystrica, and the regional landscape, working outward from the neighbourhood to the city and back to the binding masterplan that governs what can be built. Chapter 3 narrows to the Karlovo site itself: its topography, solar orientation, ecology and water, mobility and infrastructure, closing with a critical reading of the competition brief. Chapter 4 develops the theoretical framework the site evidence calls for, and Chapter 5 examines built precedents for the specific spatial lessons they offer.

Chapter 6 develops the design concept and masterplan. Chapter 7 details the architectural and environmental design, unit typologies, materials, and performance, that the masterplan requires. Chapter 8 evaluates the resulting proposal against the evidence, the theory, and the brief, and reflects on what the thesis has and has not resolved. Chapter 9 collects references and supporting appendices.

02

Place & City Context

Before any design decision can be justified, the place itself has to be understood. That is the purpose of this chapter. It moves outward from the Sásová district, to the city of Banská Bystrica, to the wider landscape of central Slovakia and then comes back: to culture, to the people Karlovo is designed for, to transport, and to the planning rules that decide what can be built and where. This order matters. The Karlovo site is not an empty field waiting to be filled. It is a real place, with a real community, a real landscape, a real history, and a real set of planning constraints and each of these shapes the design proposal in the chapters that follow.

Figure 01: Identifying Slovakia's Geographical Location





POLAND

CZECHIA

UKRAINE

AUSTRIA

HUNGARY

2.1 The Sásová district

2.1.1 Origins and morphology

Sásová is the westernmost district of Banská Bystrica, and the largest of the city's post-war housing estates. It was built mainly between 1960 and 1985, on the southern slopes of the Sásová hillside. The city needed somewhere for its rapidly growing population after becoming the administrative capital of the Central Slovak Region, and Sásová was the answer, a satellite extension of the historic center. Today it houses about 18,000 residents in prefabricated concrete blocks: the paneláky that define socialist-era housing across Central and Eastern Europe.

Its planning principles are visible everywhere. Large superblocks replace the traditional street grid. The space between buildings is treated as shared landscape, not private garden. Housing, shops, and civic functions are kept apart. The dominant building type is the eleven-storey slab block, built using the prefabricated concrete panel systems standard across Czechoslovakia in the 1970s and 80s.

Sásová was never meant to be one undifferentiated mass. It was planned as a sequence of smaller neighbourhoods, each with its own facilities: three primary schools, a kindergarten cluster, and several small commercial precincts. The road network is well developed and well maintained roads III/2419 and III/2432, which also form the two boundaries of the Karlovo site, run through it. Buses to the city center are frequent; the trip takes about five minutes.

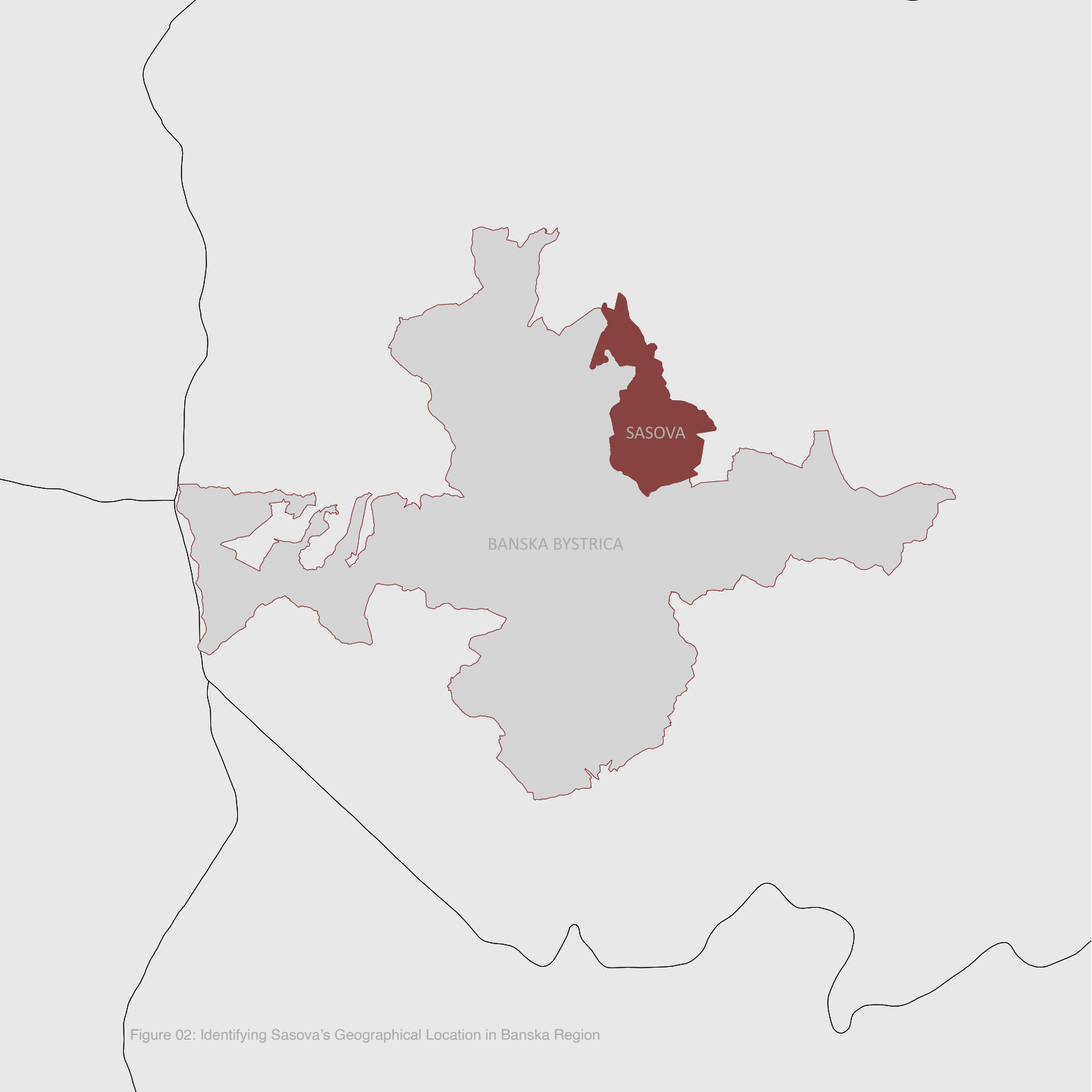


Figure 02: Identifying Sasova's Geographical Location in Banska Region

2.1.2 Social fabric and demographic profile

Sásová's social life carries both its planned origins and four decades of everyday use. A community identity has grown up around the local schools, the shops and civic facilities along the main streets, and the informal use of the space between blocks for gardening, play, and simply being outside together. Resident surveys from the Banská Bystrica 2030 planning consultations show strong attachment to the place, especially among older residents who raised their families here.

But Sásová also faces the same problems as socialist-era estates across Central and Eastern Europe. The population is ageing and the median age is now 47, against 43 for the city and 41 for the country. The share of households with children under 15 has fallen from roughly 38 % in the late 1980s to roughly 22 % today. Maintenance has fallen behind too: many flats have been renovated to a high standard by their owners, but the shared parts of the buildings' facades, roofs, lifts, and common areas have not kept pace, and a significant number of buildings now need energy retrofits or structural repair.

2.1.3 Gaps in the existing programme and what the new quarter must provide

Mapping Sásová's existing facilities reveals a clear pattern of what is missing and what Karlovo could provide. There is no community center, no public meeting hall, no cultural facility beyond the school assembly halls. There is one mid-sized supermarket and a scatter of small shops, leaving large parts of the district without convenient daily shopping. Despite the nearby Matej Bel University, there is no student housing. There is no fire station, no hospital, no hotel, and no sports facility beyond the school grounds.

Karlovo cannot fill every gap, some of these are city-level infrastructure, beyond the scope of a single residential quarter. But the analysis sets a clear brief. The new quarter should provide, at minimum: a neighbourhood supermarket serving both Karlovo and the wider Sásová community; a community and cultural facility in zone PO01; co-working and small office space, currently unavailable in Sásová; sports and outdoor recreation open to the whole district; and a kindergarten that adds to existing provision. These conclusions shape the design of the active ground floor along the PZ03 zone, covered in detail in Chapter 6.





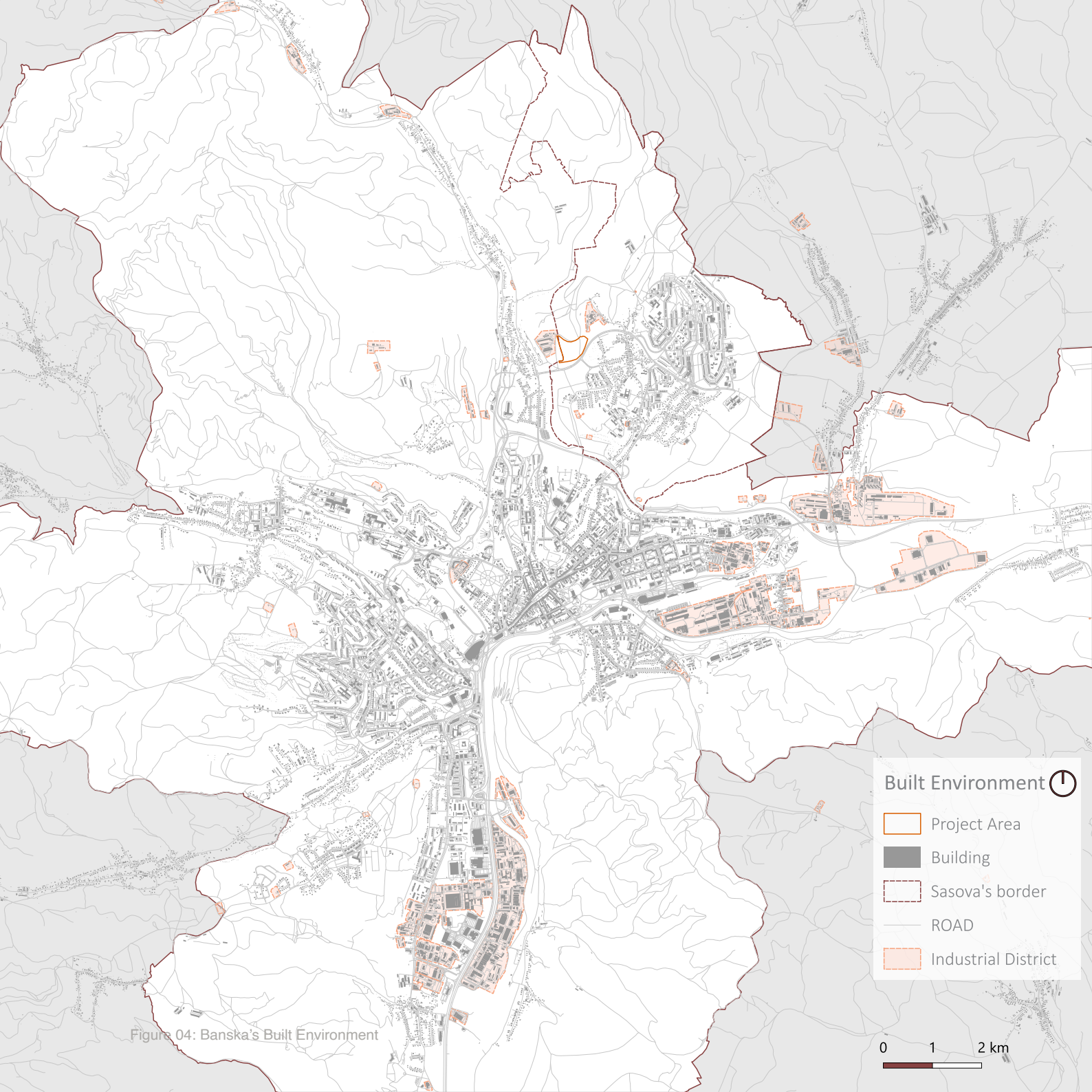
Figure 03: Built Environment Classification by Building Function

2.2 Banská Bystrica I city structure

2.2.1 The city in figures

Banská Bystrica is Slovakia's sixth-largest city, and the administrative seat of its largest region by area. In 2024, its municipal population was approximately 76,000, spread across 103 square kilometers, a density of about 740 people per square kilometer. Including the surrounding municipalities of Selce, Tajov, Slovenská Ľupča, and others, the functional urban area holds roughly 110,000 people and forms the main economic and administrative anchor of central Slovakia.

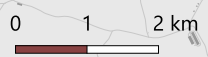
The city sits at about 362 meters above sea level, on the floor and lower slopes of a basin carved by the Hron River. The historic center occupies the valley floor, where the Hron and Bystrica rivers meet. The postwar districts of Sásová, Fončorda, and Radvaň climb the hillsides to the west, south, and east. The industrial zone extends east along the valley toward Zvolen. Altogether, the built-up area covers a compact 35 square kilometers.



Built Environment ⓘ

- Project Area
- Building
- Sasova's border
- ROAD
- Industrial District

Figure 04: Banská's Built Environment

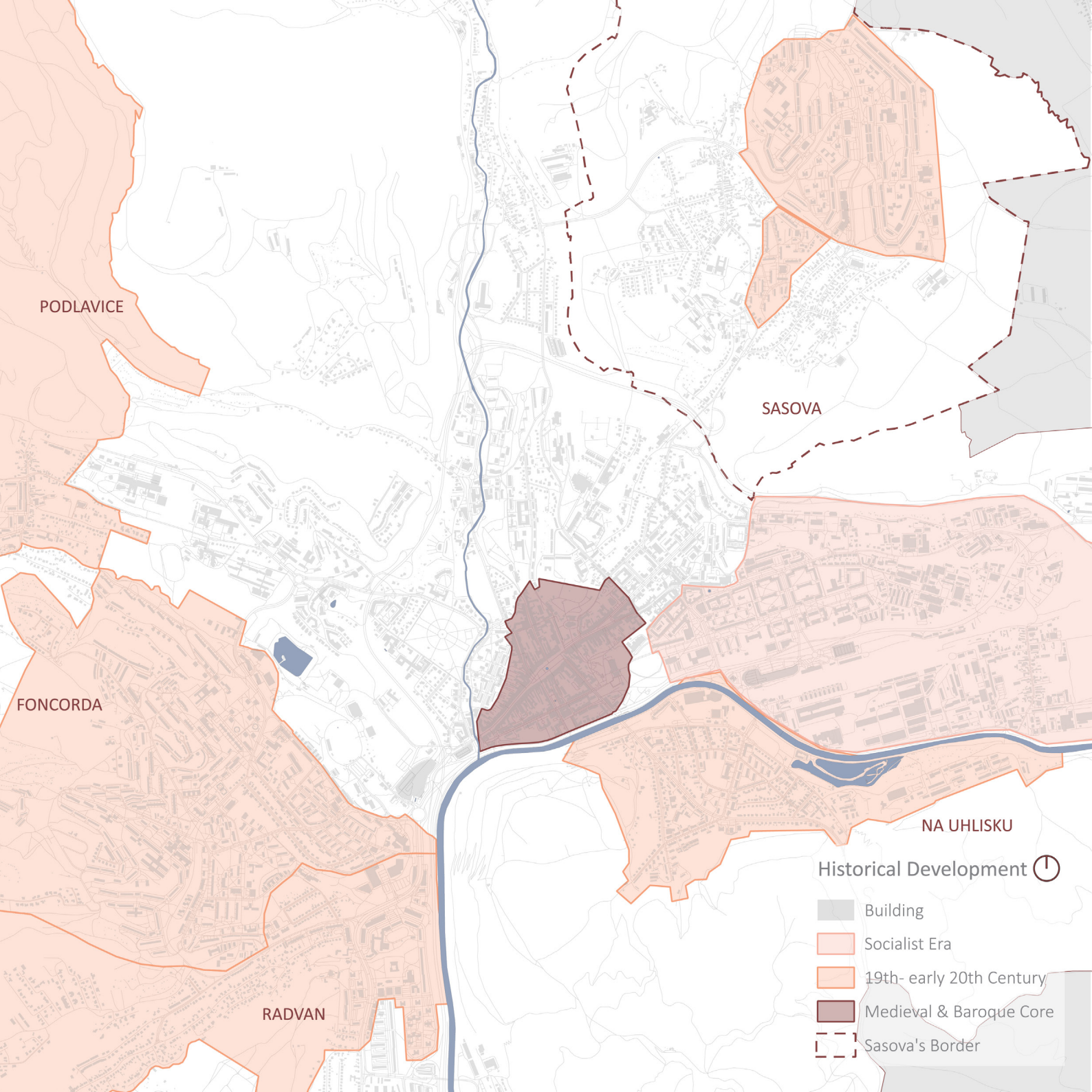


2.2.2 Settlement concentrations and the position of Karlovo

The urban morphology of Banská Bystrica can be read as four distinct concentrations, each characterized by a different building density and urban form. The first is the medieval and Baroque core around Námestie SNP: dense perimeter blocks, three to four storeys. The second is the late nineteenth- and early twentieth-century expansion along the railway corridor, detached and semi-detached houses on a regular grid. The third is the cluster of socialist-era estates, Sásová, Fončorda, Radvaň, Podlavice, Uhlisko, each on its own hillside or valley site, eleven-storey slab blocks dominating the skyline. The fourth is the more recent suburban expansion of single-family housing on the city's northern and eastern edge.

Karlovo sits in a particular position within this pattern: at the edge of the Sásová estate, on undeveloped land between the eleven-storey panelák blocks below and the protected forested hillside above. It belongs fully to neither, it is the hinge between dense urban fabric and open landscape. The design argument follows directly: the new quarter should sit between these two conditions, denser than the forest but less dense than the estate, completing the western edge of Banská Bystrica without copying either neighbors.

The competition brief proposes a built territory of 53,105 m², with a target NFA of 86,443 m². At an average household size of 2.4, that works out to 950–1,100 residents, a density of roughly 20,000–18,000 people per square kilometer of buildable land, well above Sásová itself. This figure deserves a closer look. As Chapter 3.6 will discuss, this thesis argues for a reduced built density that puts landscape and ecology first, because the site's real asset is its relationship to the protected hillside above.



PODLAVEC

SASOVA

FONCORDA

NA UHLISKU

RADVAN

Historical Development ⓘ

- Building
- Socialist Era
- 19th- early 20th Century
- Medieval & Baroque Core
- Sasova's Border

2.3 Geographic & natural setting

2.3.1 The Hron valley and regional landform

Banská Bystrica sits inside a basin, ringed by mountains, at the heart of central Slovakia. To the north and northeast rise the Nízke Tatry (Low Tatras), reaching above 2,000 meters. To the south lie the Veporské vrchy, and to the west the Kráľovoholianske pohorie. The Hron River runs east to west through the basin, fed by tributaries that include the Bystrica, the river that gives the city its name.

This geography shapes the Karlovo design in three ways. First, the view: from anywhere in the basin, the mountains are always visible, giving a sense of enclosure and a constant reference to the landscape. Second, the microclimate: cold air drains down from the slopes and pools on the valley floor, causing winter fog and temperature inversions but the lower hillsides, including the Karlovo site, sit above this layer, getting more sun and milder winters than the valley below. Third, drainage: water from the surrounding slopes runs down through a small number of corridors toward the Hron, including the small canal that crosses the lower part of the Karlovo site.

2.3.2 The Low Tatras National Park and ecological context

Immediately north of the Karlovo site lies the Nízke Tatry National Park (NAPANT), Slovakia's second-largest national park at 728 square kilometers. It protects a large mountain ecosystem of subalpine meadows, mixed forests, karst formations, and river valleys. The Sásovská dolina local biocentre (MBk) connects directly to the Karlovo site through the ZE03 ecological buffer on plot 7/317, linking onward to the Natura 2000 protected areas SKUEV0691 and SKUEV0686 to the north.

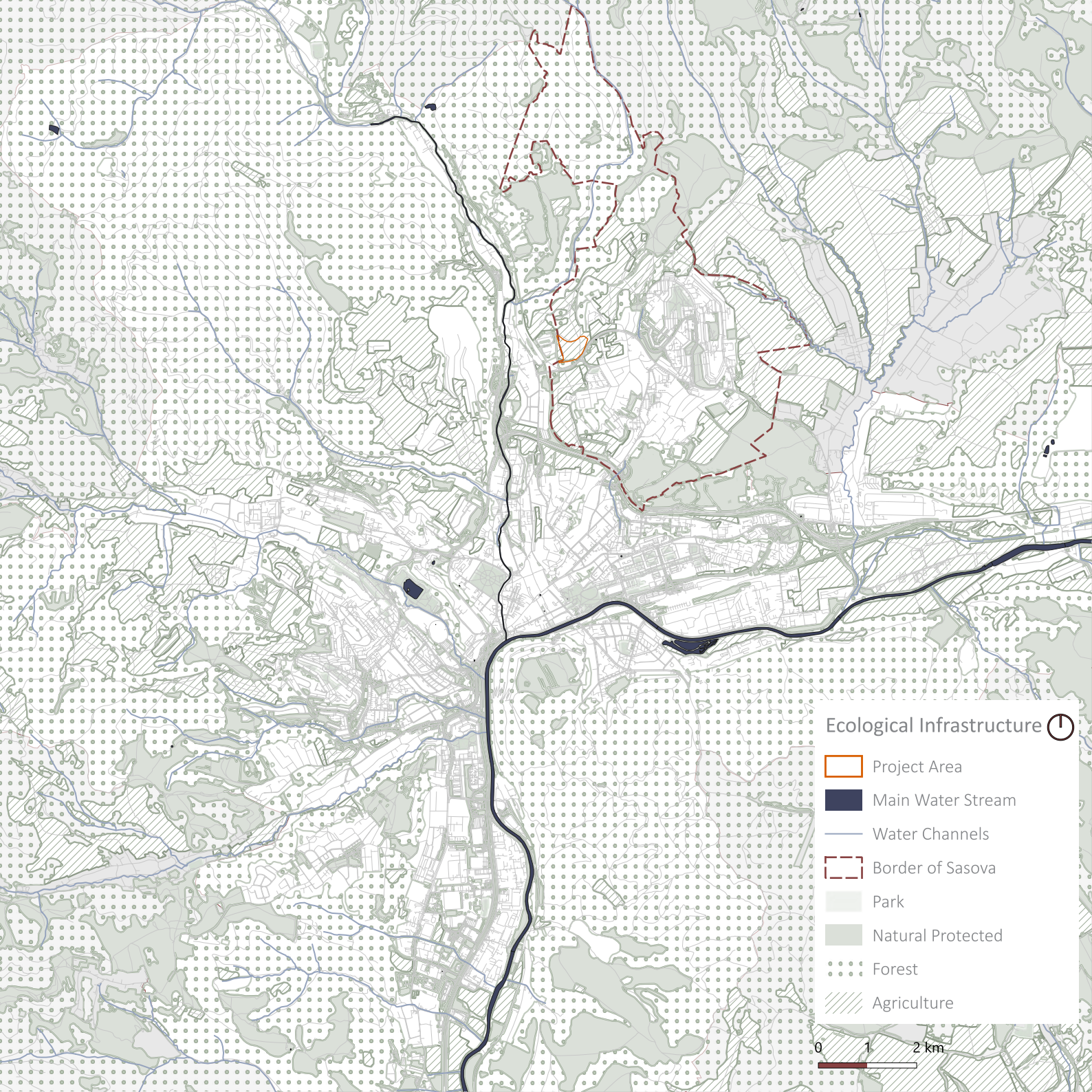
This proximity to nature defines the Karlovo site. Residents will be able to walk from their front door to a national park in about fifteen minutes, which is something very few European housing developments of this density can offer. The benefit works on two levels: everyday life close to mature forest and a changing season, and measurable gains in air quality, water quality, summer cooling, and biodiversity reaching into the city.

2.3.3 Water network and hydraulic context

The site's water system reaches well beyond the small drainage corridor identified on site. About 1.2 kilometers south lies the Hron, central Slovakia's principal river. It flows south from the Tatras mountains, through Banská Bystrica, and joins the Danube, Europe's second-longest river at the Slovak-Hungarian border roughly 180 kilometers south. From there, the Danube runs east through five more countries before reaching the Black Sea.

The small canal crossing the lower part of the Karlovo site, visible on satellite imagery and the cadastral survey is a managed channel, originally built for stormwater. It collects runoff from the upper Sásová hillside and carries it through culverts under road III/2419 to the Bystrica River, and from there to the Hron.

Seen at this scale, the Karlovo site sits within a much larger system. The whole western flank of the Banská Bystrica basin drains through a network of small canals and watercourses toward the Hron, the Karlovo canal is one part of that network. This is a design opportunity: treat the site's drainage not as a problem to engineer away, but as a visible feature that makes the connection between building and landscape legible. Retention ponds, swales, and rain gardens within the new quarter become small, visible parts of the larger watershed that links Sásová, through the Hron and the Danube, to the Black Sea.



Ecological Infrastructure

-  Project Area
-  Main Water Stream
-  Water Channels
-  Border of Sasova
-  Park
-  Natural Protected
-  Forest
-  Agriculture

0 1 2 km

2.4 Historical development

2.4.1 Medieval origins and the copper mining economy

Banská Bystrica's story begins underground. The city received its royal charter in 1255, under King Béla IV of Hungary, as one of the principal mining towns of the medieval Kingdom of Hungary. Its name says as much from the Slovak 'banská' (mining) and the Bystrica river. Copper had been mined in the surrounding hills since the twelfth century, and the city grew quickly as a processing and trading center for Carpathian metals.

The city's wealth peaked in the fifteenth and sixteenth centuries. A partnership between the Fugger banking family of Augsburg and the Thurzo merchants of Kraków turned the Banská Bystrica copper trade into the largest industrial operation in pre-industrial Europe, controlling a major share of the continental copper market. That wealth is still visible today: the Gothic burgher houses, Renaissance arcades, and Baroque churches around Námestie SNP form one of the most intact medieval-to-Baroque town centers in Central Europe.



Figure 07: Boundary of the Historical Reserve Banská Bystrica with marked national cultural monuments.

2.4.2 Industrialisation and demographic growth

After the most accessible copper deposits ran out, the city went into a long decline. The railway, arriving in 1873, brought it back: timber, textiles, and food industries set up in new zones along the valley floor, and the population grew from about 6,000 in 1850 to over 15,000 by 1910. For the first time, the city expanded beyond its medieval walls, with new housing and commerce following the rail line east.

The biggest transformation came after 1948, under socialist planning. Named administrative capital of the Central Slovak Region in 1960, Banská Bystrica was pushed through rapid industrialization: its population rose from about 16,000 in 1950 to over 80,000 by 1980, fivefold in three decades. Almost all that growth was housed in large, prefabricated estates built on the northern, eastern, and western edges of the historic core. Sásová, built between 1960 and 1985, was among the largest of them.

2.4.3 Post-socialist transition and contemporary context

The political and economic transition after 1989 changed the city's structure and demographics. Industries that had driven socialist-era growth restructured or closed, and the population began a slow decline from its peak of about 87,000 to today's 76,000. Younger, more mobile households moved out to the suburbs or to larger cities while the socialist-era estates aged and slowly emptied.

At the same time, the historic center saw new investment, and demand grew for housing better than the existing socialist-era stock. The City Development Programmed 2030 projects demand for about 2,400 new dwelling units in Banská Bystrica by 2030, and names the Sásová hillside a priority development zone. Karlovo sits directly within this policy: a response to housing demands the existing stock cannot meet, on a site the city has already identified as suitable.

2.5 Cultural context

2.5.1 Mining heritage and the historic center

Banská Bystrica's mining past is still physically present in the architecture of the historic center, and in the names of the surrounding region. Streets named for mining trades, the Mining Museum on Námestie SNP, and the preserved medieval underground passages all testify to centuries during which the city's identity was bound to extraction. For a new residential quarter on the slopes above the city, that heritage offers a quiet but real reference: the relationship between settlement and hillside has deep roots here.

2.5.2 Sásová community character

At the scale of Sásová itself, three generations of life in socialist-era housing have shaped the district's character. The community is close-knit, despite the apparent anonymity of the panelák blocks: the schools, the festivals, the informal gardens between buildings, the daily routine of bus stops and corner shops, all of it adds up to a strong local identity. Karlovo enters this community as an addition, not a replacement. Chapter 6 sets out a strategy of complement, not substitution: new residents, new programmes, new spatial qualities, alongside respect for the existing fabric and the people who live in it.

2.6 Who lives here & why

2.6.1 Why Banská Bystrica

To understand who will live in Karlovo, start with a simpler question: why does anyone choose to live in Banská Bystrica at all, in a country where Bratislava and Košice pull so strongly on younger, more mobile populations? The answer combines three factors: regional employment, environmental quality, and cost of living relative to the major cities.

Banská Bystrica is central Slovakia's main employment center. Its large employers are in public administration (the Regional Government, courts, the university), education (Matej Bel University, with about 8,000 students), and a mix of industries timber, food production, engineering. The functional urban area provides about 65,000 jobs, of which roughly 12,000 are filled by commuters from surrounding towns.

Environmental quality is the bigger draw. Sitting inside a basin, surrounded by mountains and thirty minutes from the Nízke Tatry National Park, the city offers a quality of daily life that larger Slovak cities cannot match. Air quality is consistently better than in Bratislava or Košice. Outdoor recreation is right there. And the long views of the mountains contribute, measurably, to how attached people feel to the place.

Cost of living is roughly 35–45 % lower than in Bratislava, particularly for housing: a two-bedroom apartment that would cost €280,000 in Bratislava costs about €170,000 here. For young families and professionals, that gap is the main financial argument for moving.

2.6.2 Target residents for Karlovo

Within this pattern, Karlovo is designed for three resident profiles the existing Sásová stock does not serve well.

The first is young professionals couples and individuals aged 45–25, often working in the public sector, the university, or the regional office of a national or international company. They want better apartments than the panelák stock offers: better thermal comfort, better daylight, real outdoor space (loggias, terraces), and proximity to nature. They are also the group most likely to live without a car, so walkability and good public transport matter to them.

The second is young families with children currently underrepresented in Sásová's ageing population. They want family-sized apartments (three or four rooms), safe shared outdoor space for kids, a nearby kindergarten and primary school, and the kind of community infrastructure, playgrounds, sports facilities, a community center that a new development can provide. They will pay a premium for these qualities over what exists today.

The third is older households downsizing from larger homes elsewhere in the city or region. They want smaller, accessible apartments, ground-floor units with garden access, proximity to healthcare, and the social infrastructure that makes ageing in place possible. They typically have more equity than younger buyers and are willing to spend it on quality.

2.6.3 Density and the quality of life argument

Put these resident profiles together, and a clear position on the density question follows. The brief's maximum is about 86,000 m² NFA on a 53,000 m² site would deliver roughly 1100–950 residents, a higher density than Sásová itself, reached through higher built coverage. This thesis argues that maximum density is the wrong goal for this site and this demographic.

Section 2.6.1 already explained why people choose Banská Bystrica over Bratislava or Košice: environmental quality, lower cost of living, and proximity to nature. The residents Karlovo is designed for young professionals, young families, downsizing older households will choose this site over other options within Banská Bystrica for a more specific reason: the direct relationship between the new housing and the protected hillside above. A maximum-density solution that filled the entire buildable territory with five-storey blocks would compromise exactly that relationship, the quality that makes Karlovo attractive within the city, not only within Slovakia.

Proximity to nature is not just a selling point. It is a measurable quality-of-life factor, with documented effects on physical and mental health, child development, and social cohesion. The argument that runs through the rest of this thesis is simple: the relationship between built density and natural landscape is the defining design question for this site, and the right answer is a reduced density, one that puts landscape first, accepts a lower NFA than the brief maximum, and treats the un-built part of the site as landscape in its own right, not leftover space.

2.7 Regional mobility & infrastructure

2.7.1 The regional road network

Banská Bystrica sits at the main road junction of central Slovakia. The R1 expressway, built in stages between 2003 and 2015, runs west to Bratislava (200 km, about two hours) and east to Banská Štiavnica and on to Lučenec. The R2, currently under construction, will add a faster east-west route, linking the city to Trenčín and Žilina in the west and Košice in the east. Together, the two expressways put every major Slovak destination within half a day's drive.

Within the city, the basin shapes the road network. The east-west valley road (R1 / road I/66) runs along the southern edge of the historic core, linking the industrial east to the residential west. North-south roads climb from the valley to the hillside districts, including III/2432 and III/2419, the two roads that form the boundaries of the Karlovo site. Buses follow the same pattern, running frequently both along the valley and up to the hillside districts.

2.7.2 Rail and intercity connections

The railway station sits on the eastern edge of the historic center, about 4 km from the Karlovo site, with intercity connections to Bratislava (3 hours), Zvolen (15 minutes), and Brezno (45 minutes). The line follows the Hron valley and is the main long-distance public transport link. From Karlovo, the bus to the station takes about fifteen minutes close enough for anyone using rail for occasional trips.

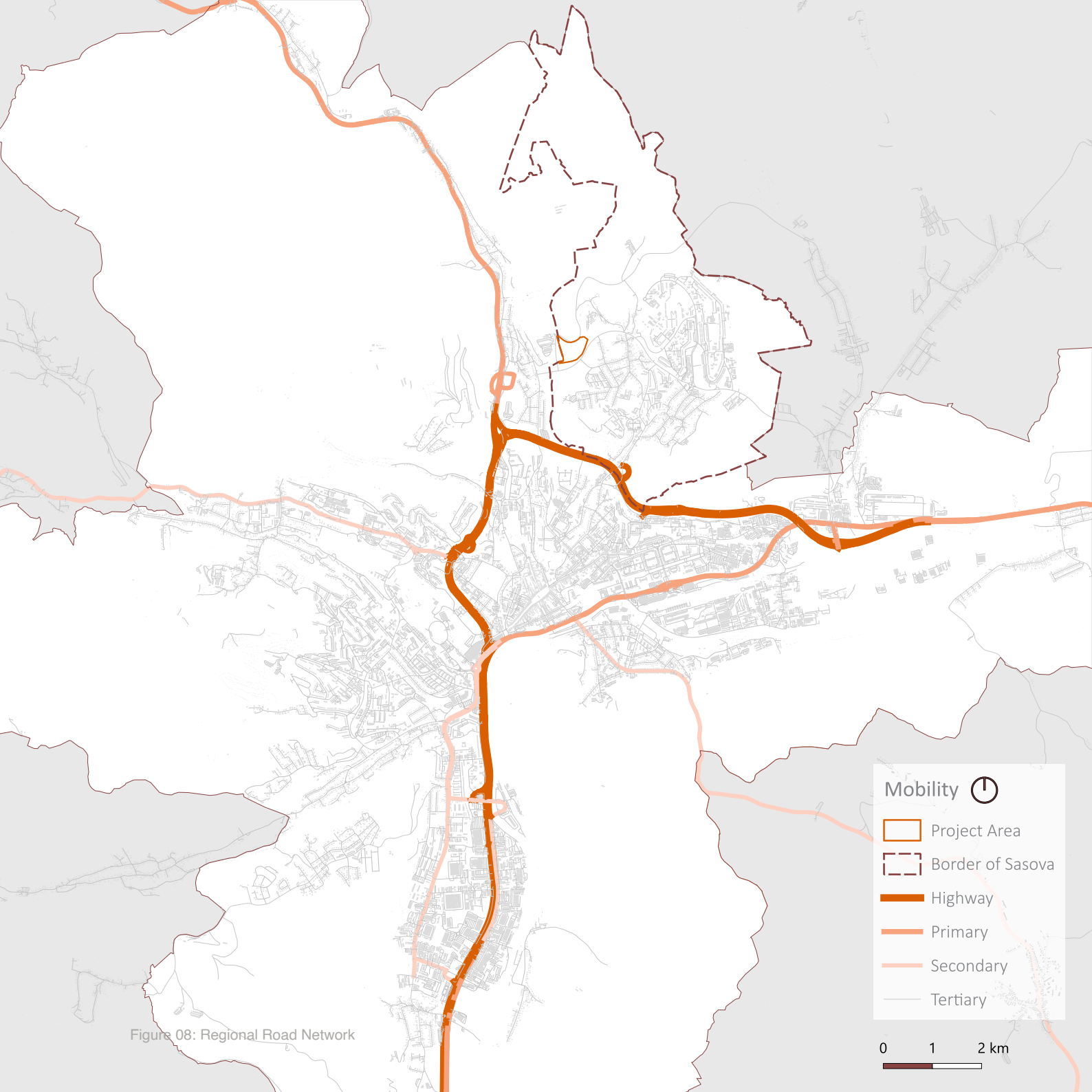


Figure 08: Regional Road Network

2.8 Urban masterplan & zoning

2.8.1 The Banská Bystrica Territorial Plan

The Územný plán mesta Banská Bystrica (Territorial Plan of the City of Banská Bystrica) is the main statutory planning document for the city. Prepared by AUREX s.r.o. Bratislava and adopted by the City Council, it carries binding legal force under Slovak planning law, expressed through ten regulatory maps. Six are directly relevant to Karlovo: Map 3a (zoning), 7a (height and function), 4 (transport), 9 (phasing), 5b (gas and heat), and 5c (electricity).

The plan designates Karlovo for residential development as part of the city's long-term housing strategy, recognizing its proximity to existing infrastructure, its landscape value, and its potential for medium-density housing not well represented in the current stock. Map 9 (phasing) classifies Karlovo as a Phase 1 area, meaning it is prioritized within the plan's first implementation period. That is a real advantage: development proposals here meet a supportive regulatory environment, not a resistant one.

2.8.2 Zone designations and binding parameters

The Karlovo site is divided into three functional and height regulatory zones by the binding Map 7a, plus an ecological buffer designation. Each zone carries specific parameters governing permitted uses, building heights, and floor area:

Zone	Designation	Storeys	Floor Ht.	
PB02	Residential / Low rise	2-4	3.3m Max	Primary hillside residential
PZ03	Mixed use / Medium rise	Up to 5-8	4.5m	Ground floor commercial / Residential above
PO01	Civic / Community	Up to 2	4.5m max	Community facility / Pavilion
ZE03	Ecological buffer	Not buildable	-	Existing Vegetation

Table 01: Karlovo Zone Designations and Binding Parameters

2.8.3 The DP01 planned traffic connection

Of all the binding provisions affecting the Karlovo site, DP01, a planned traffic connection, matters most for design. It designates a new road corridor through the lower part of the site, from road III/2432 in the west to road III/2419 in the south, giving the Sásová district an east-west link it currently lacks at this level.

DP01 carries a DC (verejno-prospešná stavba, public-benefit structure) designation. Under Slovak planning law, that means the land needed for it can be subject to compulsory acquisition, a sign of how committed the city is to building it. For any development proposal, accommodating DP01 is non-negotiable. The competition brief makes this explicit: all proposals must respect and integrate the planned connection.

2.8.4 Where the brief is questioned

This thesis treats the binding provisions, zone boundaries, the DP01 corridor, the ZE03 buffer, and the height limits, as fixed, to be honored without exception. But the brief also includes parameters that are recommendations, not legal requirements. These, the thesis questions based on the site analysis and the design argument that follows.

The 86,443 m² NFA target, on close inspection, is simply a calculation the zone parameters applied at their maximum. It is not a legal requirement. Chapter 3's site analysis, together with the resident profile of Section 2.6, builds the case that maximum density is the wrong goal here. A reduced density of about 55,000–65,000 m² NFA roughly 65–75 % of the brief maximum is both academically defensible and supported by the strongest competition entries.

The brief's assumption that buildable land should be built as far as possible is, in the same way, a recommendation rather than a rule. This thesis questions it on ecological grounds. The un-built part of the site is not waste space, it is programmed landscape: community gardens, productive orchards, retention ponds, pedestrian terraces, ecological corridors linking the site to the hillside above. These are not failures to deliver NFA. They are the design qualities that set the project apart from a maximum-density solution, and that justify Karlovo's place in Banská Bystrica's housing market.

3.1 Topography & slope

3.1.1 The slope as the primary site condition

The Karlovo site is, first and foremost, a hillside. It climbs steadily from bottom to top, steeper than what's usually considered easy to build on, but well within the range of hillside housing built successfully elsewhere, like Siedlung Halen in Switzerland or Quinta Monroy in Chile. The slope isn't a reason to disqualify the site. It's the defining condition of the design.

The steepness isn't even across the site. It's gentlest near the bottom, by the road. It holds close to the site's overall slope through the middle stretch. And it gets noticeably steeper toward the northwestern corner, near the top of the hill, steep enough that building conventionally there would mean heavy retaining walls, a lot of earthwork, and a building fighting the hill instead of sitting on it. That corner is exactly the area the binding masterplan sets aside as protected, off-limits to building, and the slope confirms that was the right call.

3.1.2 Implications for terracing and building placement

This slope sets clear terms for whatever building strategy follows. Any building placed across it will have one end higher than the other, the deeper the building, the bigger that difference, and the stronger the case for a stepped section rather than one flat ground floor. Move further up the hill, and the difference grows again, depending on how far apart the buildings end up being spaced.

The principle that follows is simple: a slope this steady rewards a terracing strategy over one big engineered cut. Stepping the development down the hill in a series of near-level platforms, rather than flattening it into one plateau, means less earth has to move overall, and the retaining walls stay short and frequent rather than long and dramatic. The result reads as a sequence of terraces following the land, not a building dropped onto it. Exactly how that stepping is organised is a question for later; what the slope makes clear is that some version of it is the sensible answer.

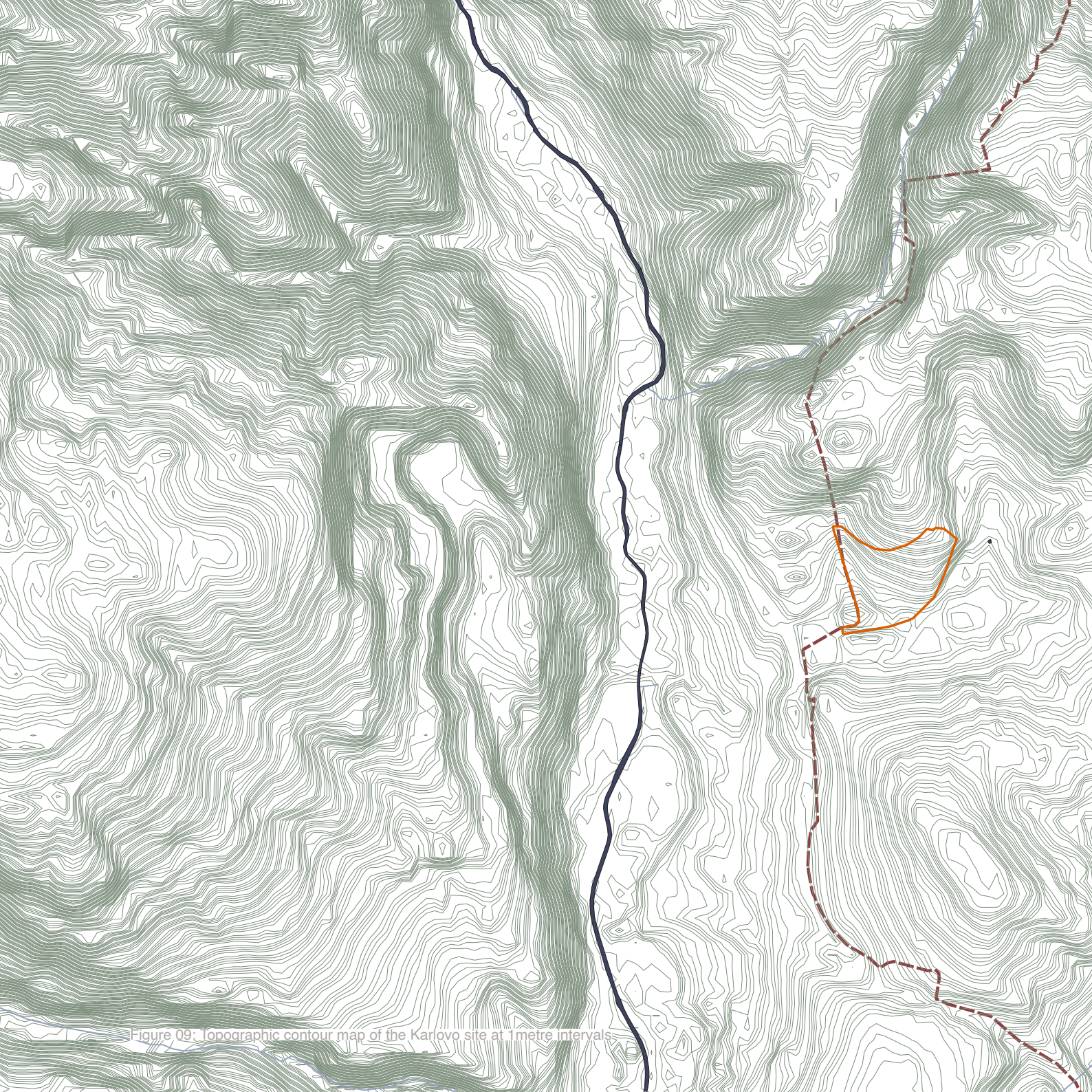
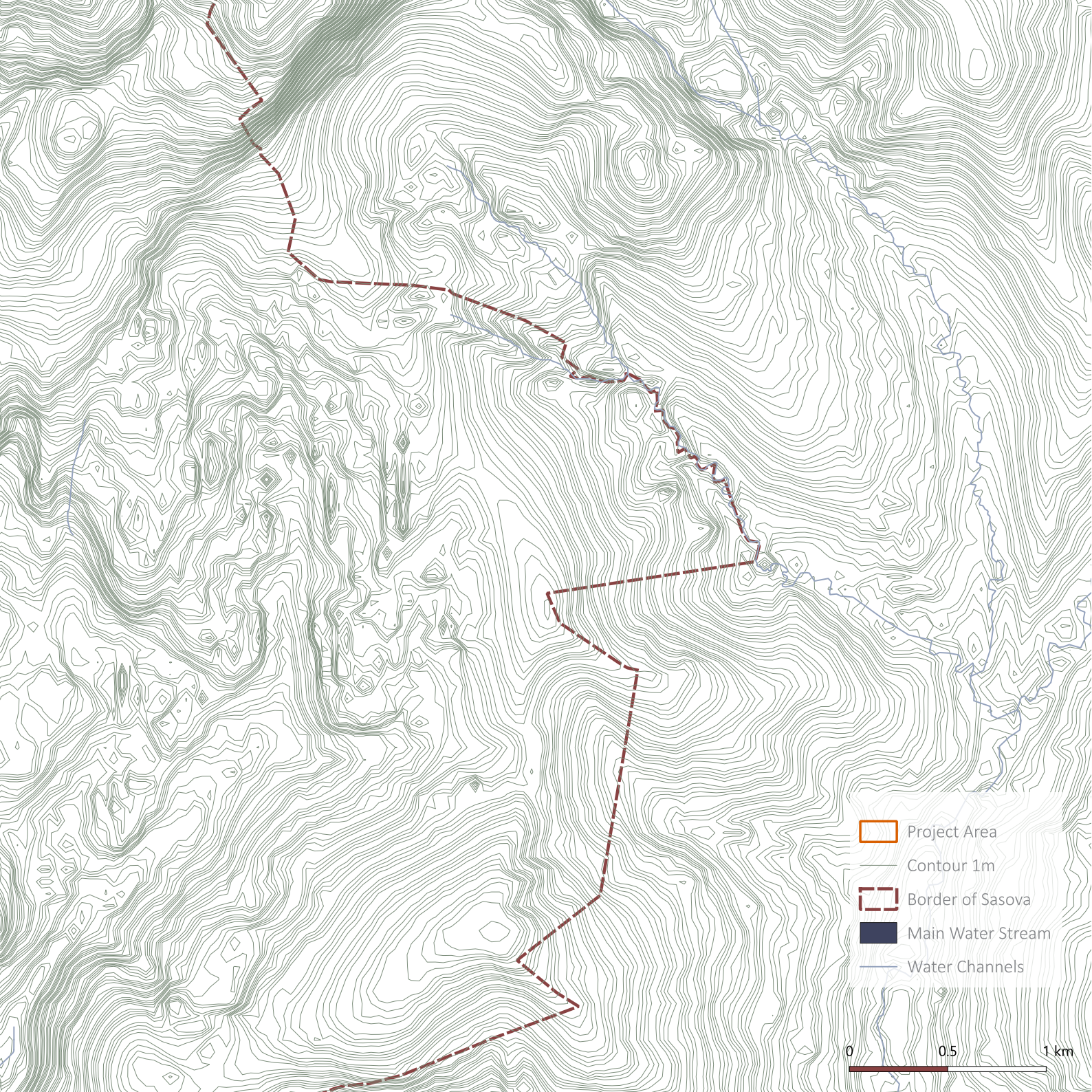


Figure 09: Topographic contour map of the Karlovo site at 1 metre intervals



3.2 Solar orientation & views

3.2.1 The southerly aspect and its consequences

The Karlovo site faces south. Its fall line runs almost exactly north-south, low edge at the bottom, high point at the top, and this orientation is the single most valuable environmental asset on the site. Every south-facing facade can receive sun throughout the day, and because the site climbs away from the existing Sásová panelák blocks below it, nothing blocks the southern horizon for any building on it.

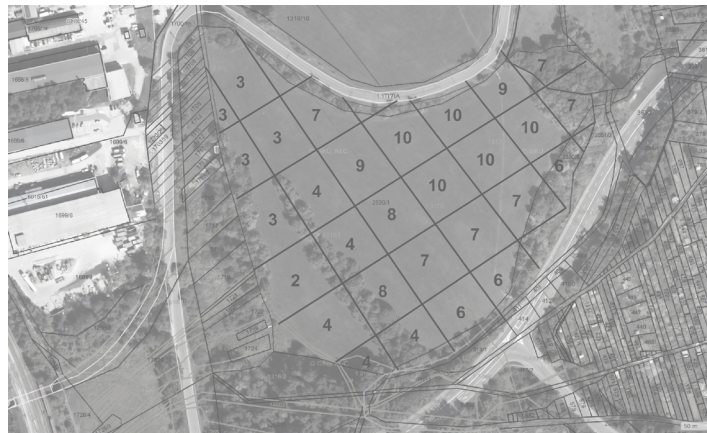
At Banská Bystrica's latitude (48.7°N), the sun reaches about 65° above the southern horizon at summer solstice, and about 18° at winter solstice. South-facing facades here catch direct sun from roughly 06:30 to 19:30 in summer, and from about 08:00 to 16:00 even on the shortest day, while the basin floor below is often still fogged in. This confirms, at building scale, the hillside microclimate advantage already noted in Chapter 2: more daylight, milder winter days, than residents of the valley get.

3.2.2 View corridors and the panoramic asset

The southerly aspect produces a second asset: the view. From the upper site, it runs unobstructed across the Sásová roofscape to the Hron valley, the historic centre beyond, and on clear days to the silhouettes of the Pol'ana and Štiavnické vrchy ranges in the distance. From the middle of the site, the view is still good but framed more by the hillside vegetation. From the lower site, it turns domestic, framed by the road below and the edge of the existing estate beyond it.

This variation matters for whatever comes next. Buildings on the upper terraces stand to gain the most from the panoramic view; buildings on the lower terraces sit closer to the street and the existing estate than to the horizon, and might reasonably orient toward that instead.

Rating of Individual Areas of the Location I (10 = most beautiful, most attractive):



Views from the Location

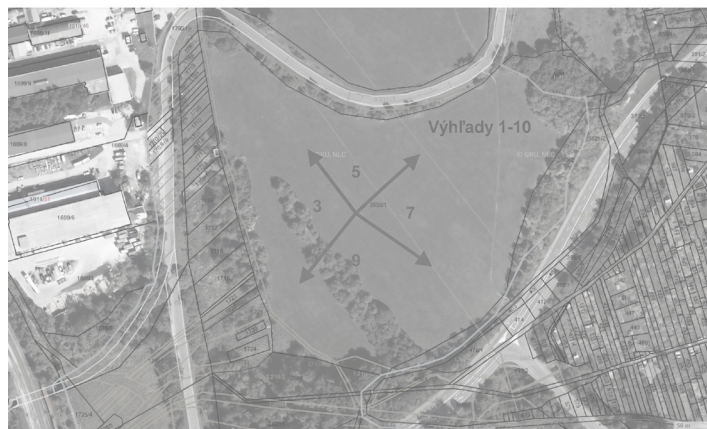


Figure 10: View quality map

3.3 Ecology, vegetation & water

3.3.1 Existing vegetation cover

The Karlovo site is not a bare greenfield. It's a semi-natural landscape, shaped by light agricultural use at the edge of a forested hillside. Most of it is open grassland, a meadow typical of the central Slovak hill zone, mostly perennial grasses with herbs and wildflowers flowering through the season. It isn't a high-priority conservation habitat, but it is a working ecosystem, supporting invertebrates, small mammals, and ground-nesting birds.

The northwestern boundary and the drainage corridor carry clusters of scrub and secondary woodland. The most significant sits where the slope is steepest, in the area the binding masterplan sets aside as protected, where oak, birch, alder, and hawthorn form a mixed stand bridging the agricultural land below and the closed forest above. This woodland fragment is the highest-value ecological feature on the site, and protecting it was the right call.

Along the southern and western edges, scattered mature trees, walnut, lime, field maple, mark old agricultural plot boundaries. Each one is individually significant, doing more for landscape character and biodiversity than their numbers suggest. Any future design should treat them as fixed points to retain and build around, rather than cleared to make way for something else.

3.3.2 Ecological connectivity and the Low Tatras

Karlovo sits at an important point: this is where wildlife moves from the protected forest down into the city. That matters in two ways. For residents, it means nature is right outside the door. For the wider area, it means animals can still move between the forest and the lower hillsides.

If this path gets blocked, by buildings or hard paved ground, that movement stops, and something real is lost. If it stays open, through trees and connected green space, both the wildlife and the people living here benefit.

3.3.3 Water and the hydraulic context

Water at the Karlovo site comes from two places: rain falling directly on it, and runoff flowing down from the hillside above. The development has to manage both. Right now, the site's grassland soaks up most of the rain that falls on it. Once built, with roofs and paved surfaces replacing open ground, less water will soak in and more will run off, unless the design plans for it.

The runoff from above flows down to a managed canal at the lower edge of the site. That canal can only take so much, and that's the real limit: in a heavy storm, a lot of water can come through, and what the canal can handle downstream sets the ceiling on what the site is allowed to release.

The principle that follows is simple: treat the site like a sponge, not a hard surface that sheds water. The exact mix of ponds, planting, and drainage needed to do that is a question for later. What matters here is the target, the finished development should send away no more rainwater at peak times than the empty site does today, and any wet areas this creates along the way should work as habitat, not just plumbing.

3.4 Mobility & access

3.4.1 Site boundaries and existing access

Two roads mark the edges of the Karlovo site, one along the south, one along the west. Both are regional roads, paved, with one lane in each direction, and both carry a steady amount of everyday traffic, more on the southern one, since it's the main route through this part of Sásová.

Right now, the only way to drive onto the site is from the western road, using an old farm track. The southern road runs right alongside the site but has no proper entrance from it at all. Eventually, the development will need at least two real entrances, one from each road, along with its own internal streets connecting to the new road already planned to cross the lower part of the site.

3.4.2 Public transport and the bus connection

A bus stop right at the edge of the site connects it directly to the rest of the city. Several routes stop here, running often throughout the day, with quick trips to both the city center and the train station.

This bus stop is the single most important piece of infrastructure for the design, it's the point where the new neighborhood connects to the city and the wider region. Whatever the design eventually proposes, the parts of it meant for everyone, shops, community spaces, anything open beyond just residents, would benefit from sitting close to this connection.

3.4.3 Cycling and the regional cycle network

A cycle path runs along the western road, part of the regional network, leading south into the city center and north into trails climbing toward the national park. It's separated from traffic for most of its length and in good condition. The southern road doesn't have one yet, though lighter traffic there and cycle lanes planned alongside the new road crossing the site should improve things before long.

This makes the western edge of the site, where the cycle path already runs, a natural entry point for anyone arriving on foot or by bike and a sensible place for whatever bike parking the design ends up needing, likely more generous than the usual one space per home.

3.4.4 The DP01 planned traffic corridor

The most important piece of infrastructure on the site is a new road already planned to cross it, running roughly east to west through the lower part of the land. It will connect the two boundary roads, giving the surrounding area a link it currently lacks. It will be a real road, two lanes, footpaths on both sides, possibly a planted strip down the middle, cutting across the site between its upper and lower parts. Exactly where it runs can still shift to suit the design, but the road itself isn't optional. It has to be there.

Two things follow from this. First, this road is the site's main east-west connection, and any masterplan has to be built around it, not treat it as something left over. Second, it's an opportunity: rather than a barrier cutting the site in two, it could become the new neighborhood's shared address, the thing that gives the development a front rather than a back. Exactly how that plays out is still to be worked out.

3.5 Infrastructure

3.5.1 Water supply

The city's water utility supplies Banská Bystrica, drawing mainly from the river and groundwater in the surrounding hills. Water mains already run along both boundary roads, both with enough spare capacity for the new development. The utility has already identified where to connect: a junction near the southeast corner of the site, next to the bus stop.

Based on typical Slovak household water use, the development's expected population would need an amount of water well within what the existing network can already supply, no upgrades needed. Inside the site, new pipes would run along the planned streets, branching off to reach each building.

3.5.2 Wastewater and stormwater

Sásová's wastewater runs through a separate sewer system to the treatment plant on the city's edge. The main sewer line near the site has enough spare capacity to handle what the new development would add.

Stormwater, as covered earlier, is the bigger challenge. The existing drainage downstream is sized for how much water flows through today; new hard surfaces without any mitigation would push that past its limit during a major storm. So the development has to manage rainwater on site, both because it's required and because the evidence points that way, releasing no more than what the system downstream can handle. The exact landscape approach for doing that is still to be worked out; what's fixed already is the target: the finished site should send away no more rainwater at peak times than it does right now, before anything is built.

3.6 Critical reading of the brief

3.6.1 What is binding and what is questioned

Chapter 2 already drew the line between what is legally binding here and what is simply the brief's assumption. The legal constraints, zone designations, height limits, the DP01 corridor, the ZE03 buffer, the cadastral boundaries, stand. What's left to question, now with the site evidence in hand, are the brief's two big assumptions: the 86,443 m² NFA target, and the expectation that every buildable square meter gets built.

3.6.2 The total NFA target

The often-cited 86,443 m² target turns out to be a calculation, not a legal requirement, it's simply what comes out if every zone is built right up to its maximum allowed size. It isn't something the project actually has to deliver. The strongest entries to the original competition delivered far less than that maximum. They argued that maximum density was incompatible with the landscape quality the site demanded, and they used the space they saved to fund richer community spaces, productive landscape, and ecological connections instead.

3.6.3 The assumption of maximum site coverage

A related assumption: that the buildable territory, PB02 and PZ03 together, about 34,000 m², should be built up as far as possible. The brief specifies footprints of 13,427 m² in PB02 and 7,058 m² in PZ03, 20,485 m² together, about 60 % site coverage. For hillside development, that's aggressive.

This thesis proposes 50–55 % coverage. The remaining 45–50 % is not leftover space. It is programmed landscape: shared open space, community gardens, retention ponds, pedestrian terraces, and the ecological corridors linking the site to the ZE03 buffer and the protected hillside beyond. The design chapters develop this argument fully: this un-built territory is not a failure to deliver NFA. It is the project's principal spatial quality, the reason a young professional family would choose Karlovo over the existing Sásová stock.

3.6.4 The brief's assumption about audience

A final point concerns who this is for. The brief frames it as housing for a generic market. The demographic analysis already gave a sharper answer: three resident profiles, each drawn to Banská Bystrica by the same environmental quality, each underserved by the existing Sásová stock. The site evidence here adds one more layer to that argument. This points to a wider relationship than housing alone. Karlovo and Sásová need not be competing developments, they could be complementary: the new quarter bringing what the old district currently lacks, the old district bringing the established schools, healthcare, retail, and community life that a new quarter cannot build for itself overnight.

4.1 The neighbourhood unit

4.1.1 Clarence Perry and the original neighbourhood unit

The clearest early statement of the neighbourhood unit came from the American planner Clarence Perry, in the 1929 New York Regional Plan. Perry proposed the neighbourhood as a basic unit of urban organization: a primary school at its center, every dwelling within walking distance of that school and of local shops (a quarter to half a mile), a population large enough to support these institutions (typically 5,000–10,000 residents), and major roads forming the unit's edges rather than cutting through its middle. The model answered early twentieth-century anxieties about urban fragmentation, traffic safety, and the loss of community in fast-growing industrial cities.

Perry's model has drawn real criticism: it's prescriptive, it assumes a socially uniform population, it leans on one family-with-children demographic, and it still depends on the car once you leave the unit. These criticisms hold, and the model hasn't survived intact as a planning template. But the core intuition has that there's a meaningful scale of urban organization between the dwelling and the city, defined by walkability and shared local infrastructure. That idea has outlasted the diagram.

4.1.2 Contemporary reformulations

Several later movements have reworked the neighbourhood unit, kept its core insight while fixed its original limitations. The Congress for the New Urbanism (Andrés Duany, Elizabeth Plater-Zyberk, and others) revived the neighbourhood as urbanism's basic unit in the 1990s, but swapped Perry's introverted superblock for mixed use, mixed tenure, and street-based public space. Carlos Moreno's 15 - minute city, popularized through Paris's adoption of it under Anne Hidalgo from 2020, keeps the walking-distance principle but widens it to cover the full range of daily needs: housing, work, education, healthcare, food, leisure, culture, all within fifteen minutes on foot or by bike. The Compact City literature (Newman, Kenworthy, Jenks) reframes the same idea around density and mode share, arguing that walking-distance access to daily needs requires a density that conventional suburbs simply can't reach.

Three principles run through all of these, and matter directly for Karlovo. First, daily life should work on foot or by short bike ride, not depend on a car for routine errands. Second, that requires a density and mix of uses housing next to shops, education, healthcare, public space, denser than suburban detached housing, though still compatible with low-rise building. Third, a neighbourhood is relational: it exists in relation to the fabric around it, not as a self-contained superblock with hard edges.

4.1.3 Implications for Karlovo

Chapter 2 already mapped the gaps in Sásová's existing programme: no civic space, limited commerce, no community infrastructure. Neighbourhood unit theory gives a name to what Karlovo's role could be in response, not an autonomous, self-contained quarter, but a piece of urban fabric that completes the surrounding district rather than competing with it. The specific programmes points toward were already identified in Chapter 2's gaps analysis; what this theory adds is the conceptual case for treating Karlovo and Sásová as one neighbourhood unit rather than two.

The existing bus stop on road III/2419 already does real work here: it is the piece of infrastructure that would let residents meet daily needs on foot, and weekly or occasional needs, culture, healthcare, travel with a short bus ride into the city. The theory does not add anything new to that fact; it simply explains why it matters as much as it does.

What the theory does add is a way of thinking about the relationship between the two halves. Karlovo and Sásová need not be read as separate neighbourhoods. Together, they could form a single neighbourhood unit, one bringing the programmes the other lacks, the other bringing an established community, schools, healthcare, and churches that a new quarter cannot build for itself overnight. On this reading, the boundary between them, running along road III/2419, is best understood as a porous interface rather than a hard edge: the place where the two communities could meet, not a line that keeps them apart. The Tingbjerg precedent in Chapter 5.4 makes this argument explicit, integration through shared landscape, not separation through boundary. How Karlovo actually achieves this is a question for Chapter 6; what this section establishes is why it should try.

4.2 Living at the city edge

4.2.1 The edge as design condition

The Karlovo site sits at the edge, in the literal sense: dense socialist fabric to the south, protected forested hillside to the north. It is the threshold where urban density gives way to natural landscape, which means the real design problem here is not simply how to add another residential quarter to the city. It is how to design for an edge condition.

Several traditions have theorized the edge as its own category of design problems. Kevin Lynch, in *The Image of the City* (1960), named edges as one of five elements through which people form mental maps of a city, distinguishing strong edges (a coastline, a major road, a wall) from weak ones (a shift in building scale, a change in vegetation). Richard Sennett, in *The Open City* (2018), argued that the most generative urban moments happen at edges: where different fabrics meet, where unexpected programmes get invented, where boundaries stay porous rather than hardening. The Italian school of urban morphology (Saverio Muratori, Gianfranco Caniggia) read edges as historical traces, the legible record of how a city has grown over time.

4.2.2 Hard edges and porous edges

Karlovo has three potential edges, and each one calls for something different. The southern edge sits between the new quarter and the existing Sásová district, a porous boundary makes more sense here, since both sides stand to gain from people actually crossing between them. The northern edge sits between the new quarter and the protected hillside, a gradual transition fits better than a hard line, since this is also where wildlife moves between the forest and the lower slopes. The western edge sits between the new quarter and the existing cycle path and open land beyond, and since this is already where people arrive on foot and by bike, it has an obvious case for becoming a lively edge rather than a quiet one.

4.3 Landscape as protagonist

4.3.1 Reversing the figure-ground

Conventional urban design treats buildings as the subject and landscape as the background, whatever space is left once the building geometry has taken what it needs. A growing body of theory and practice reverses this. Landscape becomes the subject: the continuous connective tissue of the urban environment, with buildings placed within it as discrete objects, not the other way round.

This reversal has several intellectual roots. The Landscape Urbanism school, Charles Waldheim, James Corner, Mohsen Mostafavi, from the late 1990s, argued that landscape, not architecture, should be the primary medium of contemporary urbanism: capable of absorbing change, supporting ecological function, and giving identity to large territories. The biophilic design literature, building on E.O. Wilson's biophilia hypothesis and developed for architecture by Stephen Kellert and Bill Browning, argued that human well-being depends on continuous contact with natural systems, and that this contact has to be designed for deliberately, not left to chance. The Nature-Based Solutions framework, formalized by the IUCN and the European Commission from 2015, argued that ecological processes can deliver the same infrastructure services, stormwater management, air quality, urban cooling, biodiversity, that conventional grey infrastructure delivers at far higher economic and environmental cost.

4.3.2 The active role of natural systems

What separates this from earlier traditions of urban greenery, the picturesque park, the garden city, the modernist green wedge, is the active role given to natural systems. Landscape stops being a passive amenity and becomes active infrastructure: a habitat supporting biodiversity, a stormwater system that retains and slows and infiltrates water, a microclimate modifier that cools cities in summer and cuts heat loss in winter, a carbon sink, a productive system that grows food and supports community.

This active framing changes what a landscape element is for. A retention pond stops being decoration and becomes functional stormwater infrastructure. An orchard stops being visual landscaping and becomes productive land. A meadow stops being aesthetic surface and becomes ecological habitat. A green roof stops being a compliance checkbox and becomes a contribution to the urban biodiversity network.

4.3.3 Implications for Karlovo

This framing sets a clear priority for whatever masterplan follows in Chapter 6: landscape should be designed first, as the generative structure, with buildings placed within it, not the reverse. What that landscape structure actually looks like, how it threads through the site, and what specific elements it includes are all questions for that chapter. It is also the deeper reason this thesis questions maximum buildable density, beyond the numbers alone. A maximum-density solution fills the site with buildings and leaves landscape as whatever space happens to be left over between them. A landscape-protagonist approach needs the opposite: enough continuous, deliberately designed open space to actually function, ecologically and experientially, as the project's primary medium, not its decoration.

4.4 Human-scale liveability

4.4.1 Jan Gehl and the rediscovery of human scale

The Danish architect and urban designer Jan Gehl is the most influential theorist of human-scale liveability working today. From his 1971 book *Livet mellem husene* (Life Between Buildings) through *Cities for People* (2010) and the practice work of Gehl Architects, he has argued that twentieth-century urbanism was designed for the car, for the helicopter view, and for the architectural object, not for a person moving through the city at walking pace. The result was an environment that worked at the scale of the elevation drawing and the aerial photograph, and failed at the scale of the human eye, the human pace, and the human body.

Gehl's real contribution was making human scale measurable. Walking pace (5 km/h), the resolution of the human eye (faces recognisable at 20–25 metres, bodies at 100), the comfort range of climate, the geometry of social distance, these are quantifiable, designable parameters. A street is welcoming when it is sized for human pace and offers continuous detail at eye level; it is hostile when it is sized for vehicles and offers blank facades instead. A public space is alive when it offers seating, shade, sun, and something to look at within walking distance; it is dead when it is a blank plaza that takes deliberate effort to cross.

4.4.2 Walkability and slow mobility

From this follows a particular emphasis on walking and slow mobility as the modes urban design should optimize for first. The 15 minute city is the policy version of this argument: routine daily activities should be reachable on foot or by bike within fifteen minutes of home. The implications run deeper than the policy headline, into the detailed design of the public realm, street widths, surface treatment, level changes, lighting, planting, sightlines, and how every intersection balances cars against pedestrians.

For a hillside site like Karlovo, this raises a specific challenge rather than a specific answer. The 20 % average gradient established in Chapter 3 is at the upper limit of comfortable walking for elderly residents and people with limited mobility. Whatever design follows will need more than one kind of route up the slope, something that zigzags gently for those who need it, something that climbs directly for those who do not, and ideally a way to move east-west along the contours without losing or gaining height at all. It also suggests a basic principle for where the most accessibility-critical programme belongs: low on the site, near the existing bus stop, where the ground is closest to level and mobility is unconstrained for everyone. The specific routes, and the specific programme locations, are for Chapter 6 to work out.

4.5 Sustainability in residential design

4.5.1 Sustainability as integrated design, not technical layer

Sustainability in residential design is often treated as a technical layer bolted onto an otherwise conventional building, insulation added to a wall, a photovoltaic array on the roof and a management system in the basement. This additive approach satisfies regulation but rarely produces the integrated quality of the best contemporary projects. The alternative, sustainability as integrated design, treats environmental performance as a generator of the design from the earliest conceptual stage, so that spatial and environmental decisions get made together, and reinforce each other, rather than one being added after the other is finished.

The Passivhaus standard, developed in Germany from the late 1980s, was an early formal version of this integrated approach for housing. It requires very low heating demand, under 15 kWh per square meter per year, achieved through high insulation, airtightness, mechanical ventilation with heat recovery, and, critically, passive solar gain through south-facing windows and overhangs sized for the seasonal sun angle. Integrating these requirements with the architecture produces buildings with a particular character: deep south-facing rooms, generous loggias, compact forms, careful daylighting.

4.5.2 The Slovak climate and the central European context

Slovakia's continental climate, cold winters with long stretches below freezing, warm summers with occasional heat events, heating demand for six to seven months of the year, makes sustainable design both harder and more rewarding here than in milder climates. The hard part is heating demand: an average-insulation building in the Banská Bystrica climate uses roughly 120 kWh per square meter per year for space heating, against 40–60 kWh in southern Europe. The reward is the passive solar potential it comes with the same continental climate that produces cold winters also produces clear winter days with strong solar gain, and a well-glazed south-facing facade can capture real useful solar energy right through the heating season.

4.6 Phased & flexible urbanism

4.6.1 The masterplan as time-based artefact

A traditional masterplan is a single drawing of a final state: the development as it will look once finished. Planning and design literature has increasingly criticized this for ignoring how large urban projects actually unfold, over years or decades, during which conditions change, and a development designed for one moment of completion turns brittle against everything that shifts between conception and delivery. A phased and flexible masterplan does something different: it is conceived as a sequence of states, each one a complete neighbourhood in its own right, with a framework designed for change from the outset rather than fixed against it.

Several sources feed this approach. Christopher Alexander's *A New Theory of Urban Design* (1987) proposed an incremental urbanism, building by building, each one responding to what the last one left behind, rather than working from a single masterplan. Aldo Rossi's *The Architecture of the City* (1966) argued that urban form outlasts changes in programme and use, so what should be designed is the durable form, not the specific use it happens to hold today. The contemporary resilient urbanism literature (Lawrence Vale, Thomas Campanella) has turned these intuitions into a formal framework for masterplanning that builds in uncertainty about future demographic, economic, and environmental conditions, rather than ignoring it.

4.6.2 Self-sufficient phases

A central operating principle of phased masterplanning is that each phase has to be a self-sufficient neighbourhood from the moment it is finished. A phase that depends on some later phase for its school, its shops, its transport stop, its community facility, is a phase that fails its earliest residents, who end up living on a half-built construction site rather than in a functioning quarter.

For Karlovo, this principle sets a clear requirement for whatever phasing strategy Chapter 6 proposes, rather than dictating that strategy itself. Each phase, however the site ends up being divided, would need its own working share of commercial space, community facilities, and transport access from day one, not a promise that these arrive later. The lower part of the site has an obvious advantage here: it already holds the existing bus stop and sits within the PZ03 commercial zone, which means the infrastructure that makes a phase self-sufficient is already concentrated exactly there. How many phases, over what timeframe, and with what is built in each, is a decision for Chapter 6 to make, this principle simply sets the test that decision has to pass.

4.6.3 Flexibility within the framework

Phasing across time is one form of flexibility. Flexibility within a single phase is another, and it suggests a useful test for whatever spatial framework Chapter 6 ends up proposing: does it establish a durable structure within which individual parts can change function over time, without disturbing the whole? A genuinely flexible framework would let a unit currently planned as housing become, later, something else entirely; a shared terrace becomes a productive garden; a commercial unit change tenant or use, all without redesigning the fabric around it.

The same flexibility matters for the uncertainties that will unfold over however long Karlovo takes to build. Slovak demographic projections are uncertain over a ten-year horizon; energy technologies are evolving quickly; the effects of climate change on the Central European water cycle are still imperfectly understood. A masterplan that fixes every detail at the moment of approval cannot respond to any of this. A framework that fixes only the durable spatial structure, and leaves the detailed programme open, can. That openness is not a failure to decide. It is a deliberate response to a project that will take a decade or more to complete.

5.1 Criteria for selection

These precedents aren't a survey of fashionable housing. Each one was chosen because it offers a real lesson for a challenge this site already raises: a steep hillside with several overlapping constraints; a landscape and ecological setting that matters as much as the buildings; a position next to an ageing estate the new quarter needs to complement, not replace; and the question of how to build well without defaulting to maximum density. Eight projects are grouped into three categories below, each ending with its lesson for Karlovo.

5.2 Landscape-integrated residential

5.2.1 Lion Green Road

Mary Duggan Architects, Croydon, London, UK, 2017–2022 | 120 homes | Mixed-tenure courtyard housing

Five separate buildings sit inside one continuous parkland, rather than a single block around a courtyard. Existing mature trees were kept and built around. Gaps between the buildings let light and views move through, and the shared landscape becomes a social space for everyone, not just one block's residents.

Lesson: keeping the site's existing mature trees as fixed points to build around, rather than clearing them, is a real design constraint worth holding onto.



Figure 11: Lion Green Road

5.2.2 Ørestad City Parks

SLA, Copenhagen, Denmark, 2012–ongoing | District-scale landscape | Urban green corridor

SLA's long-running rework of Ørestad's public parks treats them as working ecological infrastructure, habitat, drainage, cooling, not decoration, designed to need less upkeep over time as nature takes over.

Lesson: the site's own open spaces could work the same way, a connected network linking to the hillside above, not scattered patches of green.



Figure 12: Ørestad City Park

5.3 Social integration & shared ground

5.3.1 Tingbjerg

SLA / Vandkunsten, Copenhagen, Denmark,
2016–2020 | ~2,000 dwellings (renovation) |
Post-war housing estate renewal

New private housing is being added to one of Copenhagen's largest social housing estates, aiming for a mix of residents rather than displacement. The landscape, built around what existing residents already valued, is what actually does the integrating.

Lesson: this is the closest model for Karlovo's own relationship with the existing estate beside it, new housing introduced through shared landscape, not a boundary line.



Figure 13: Tingbjerg

5.3.2 Stadterle

Buchner Bründler Architekten,
Basel, Switzerland, 2019 | ~50 dwellings
Cooperative housing with access balconies

Built for a housing cooperative, the building uses shared access balconies, not private corridors, as its main social space, backed by a communal lobby, roof terrace, and workshop. Unit types range from family apartments to shared-living clusters.

Lesson: real social infrastructure can live inside a building, not just on its ground floor, useful for housing different kinds of households together.



Figure 14: Stadterle

5.3.3 Kavel 6

HOH Architecten, Amsterdam, Netherlands, 2016 | 69 dwellings | Mixed-age residential with shared courtyard

Young people and older residents share one development, built around a single courtyard garden on two levels. The senior apartments are small but built around an easy, accessible layout.

Lesson: a rare built example of exactly the age mix Karlovo is meant for, and a shared courtyard, not separate buildings, is one way to make that mix work.



Figure 15: Kavel 6

5.3.4 La Ville Hospitalière | 51N4E

Fribourg, Switzerland | Competition 2019, ongoing | Masterplan | Mixed-use urban development

A masterplan for a former hospital site that deliberately builds below the maximum permitted density, treating landscape continuity and ecological connection as more valuable than additional floor area. The productive landscape and the residential fabric are designed as one system, not two competing ones. The project frames reduced density not as a concession to context but as the central argument of the proposal.



Lesson: a covered outdoor room on every unit is worth considering here too, it does shading, amenity, and insulation all at once.

Figure 18: La Ville Hospitalière

5.4 Sustainable & efficient dwelling quality

5.4.1 Nolistra

LAN Architecture, Strasbourg, France, 2020 · Mixed typologies · Mixed-tenure housing with loggias

Eight buildings share one facade and one communal garden, so social and market housing residents live in the same setting with no visible difference. Every flat gets a loggia, usable outdoors in summer, closed into a winter room in colder months.

Lesson: a covered outdoor room on every unit is worth considering here too, it does shading, amenity, and insulation all at once.



Figure 16: Nolistra

5.4.2 59 Dwellings

Lacaton & Vassal Architectes, Mulhouse, France, 2017 | 59 dwellings | Social housing with closable winter gardens

On a standard housing budget, these flats end up nearly twice the usual size. The trick is structural: a wide, column-free span that frees up space, plus a winter garden off every living room that opens fully in summer and closes up in winter.

Lesson: proof that building with lower budget doesn't have to mean smaller homes, the space saved can go straight into the units themselves.

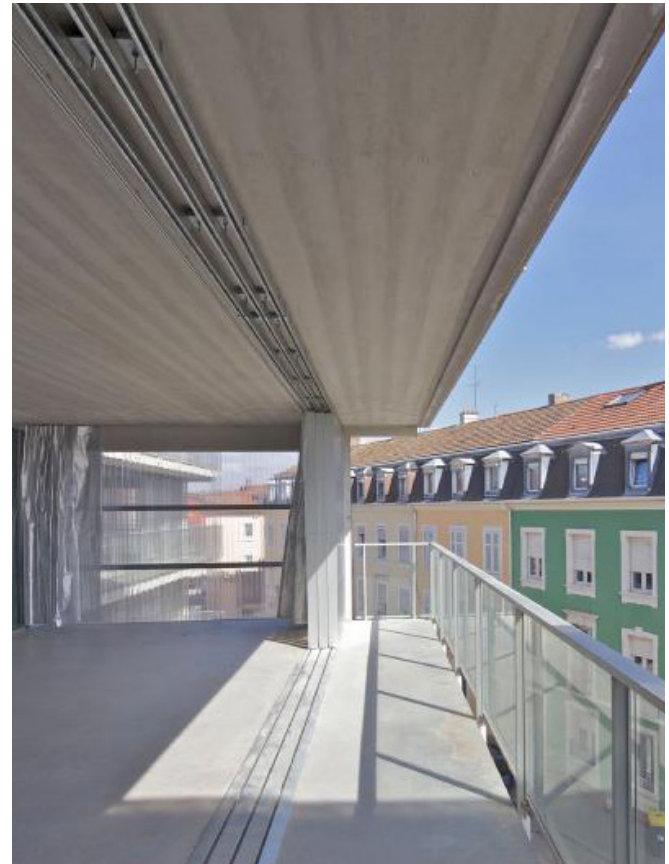


Figure 17: Dwellings 59

Three things repeat across all eight projects, and each one says something about how to read the evidence gathered so far.

First: landscape gets designed before the buildings, not around them. In every project that handles its setting well, Lion Green Road's pavilions sitting inside a park, Ørestad's parks working as real ecological systems, the open space isn't whatever's left over once the buildings are placed. It's drawn first, and the buildings respond to it. That's a real reversal of how a typical brief gets approached, where land is treated as something to be filled. Second: real integration, across tenures, ages, or communities, happens through shared space that's genuinely used, not just provided. Tingbjerg, Stadterle, and Kavel 6 don't solve the problem of mixing different kinds of households by sorting them into separate buildings with a shared address. They build one space, a courtyard, an access balcony, a garden, that everyone actually has a reason to use, and the mixing happens because of that daily use, not because of a policy written down somewhere. Third: good environmental performance and good spatial quality turn out to be the same design move, not two separate ones. The loggia in Nolistra and the winter garden in the Lacaton & Vassal project both do three jobs at once, outdoor room, sun shading, and thermal buffer, with a single piece of architecture. Performance isn't something added afterward; it's built into the same decision that makes a home feel generous to live in.

6.1 Design Framework

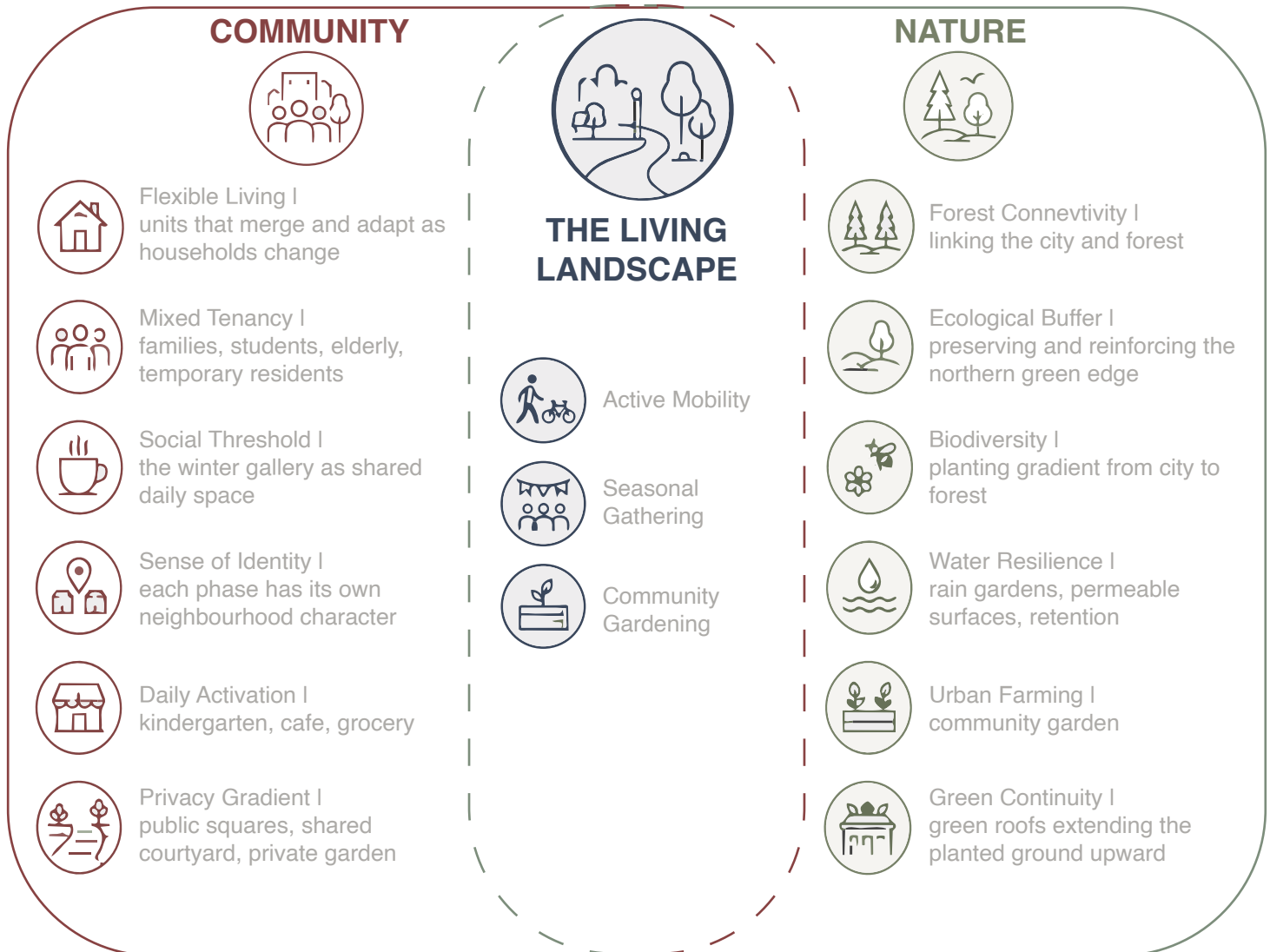


Figure 19: Conceptual Diagram for Phase 1

Two intersecting and interdependent values, Community and Nature, form the foundation upon which the design proposal is built. Together they shape the spatial logic and the social ambition of Karlovo Green Loom.

6.2 The Starting Point I The Carpet

1 I Finding the Balance

The site belongs to two conditions simultaneously, the forest descending from the north and the urban fabric rising from the south.

2 I Planned Traffic Street

A planned traffic street crosses diagonally through the site, acting as a third force. An infrastructural line that both divides and connects.

3 I The Carpet

A 3.5 meter structural module is laid across the full extent of the site, establishing a continuous grid that organises both building positions and open spaces.

4 I Connecting the Context

The grid does not stop at the site boundary. Its axes extend outward, establishing visual and physical connections to the surrounding city fabric, the existing road network and the ecological buffer at the forest edge.

5 I The Linear Park

Within the grid, a north-south green corridor follows the natural slope, connects the two buffer zones at either end of the site, and becomes the shared spine around which every neighbourhood is arranged.

6 I The Masterplan

Urban blocks are distributed within the grid around the central park corridor. The configuration creates a clear gradient from public to semi-private to private, from the open squares of Phase 1 to the enclosed courtyard of Phase 2 to the private gardens of Phase 3, embedding the green infrastructure into the everyday fabric of the neighbourhood.

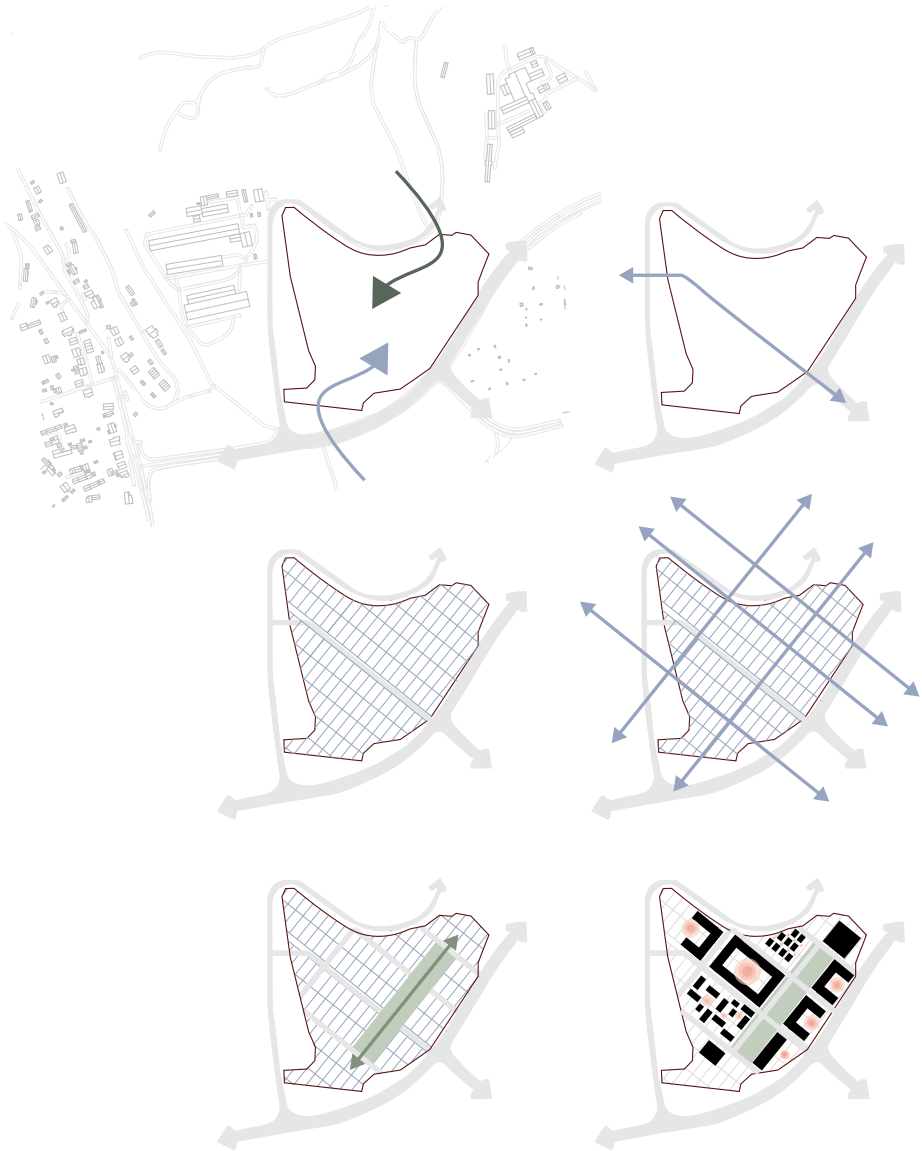


Figure 20: Process Diagram

6.3 Spatial Structure

Three distinct clusters step down a south-facing slope, bound by a single green corridor running from the forest edge to the city below. Density decreases as the buildings climb, taller blocks at the base giving way to lower volumes near the forest.

The linear park is the organising spine, not a leftover between buildings but a continuous public space wide enough to hold a community garden, a play area, and a path to the forest. At 60 % of the zone's maximum footprint, the site has enough unbuilt ground to let this corridor function as both ecological connection and social infrastructure.

The three clusters read as three different spatial logics, parallel bars framing urban squares, a closed ring wrapping a courtyard and scattered low volumes dissolving into the landscape.

Ground floor activation lines the park edge and city edge, kindergarten, café, grocery, community services, keeping daily needs within walking distance for every resident.

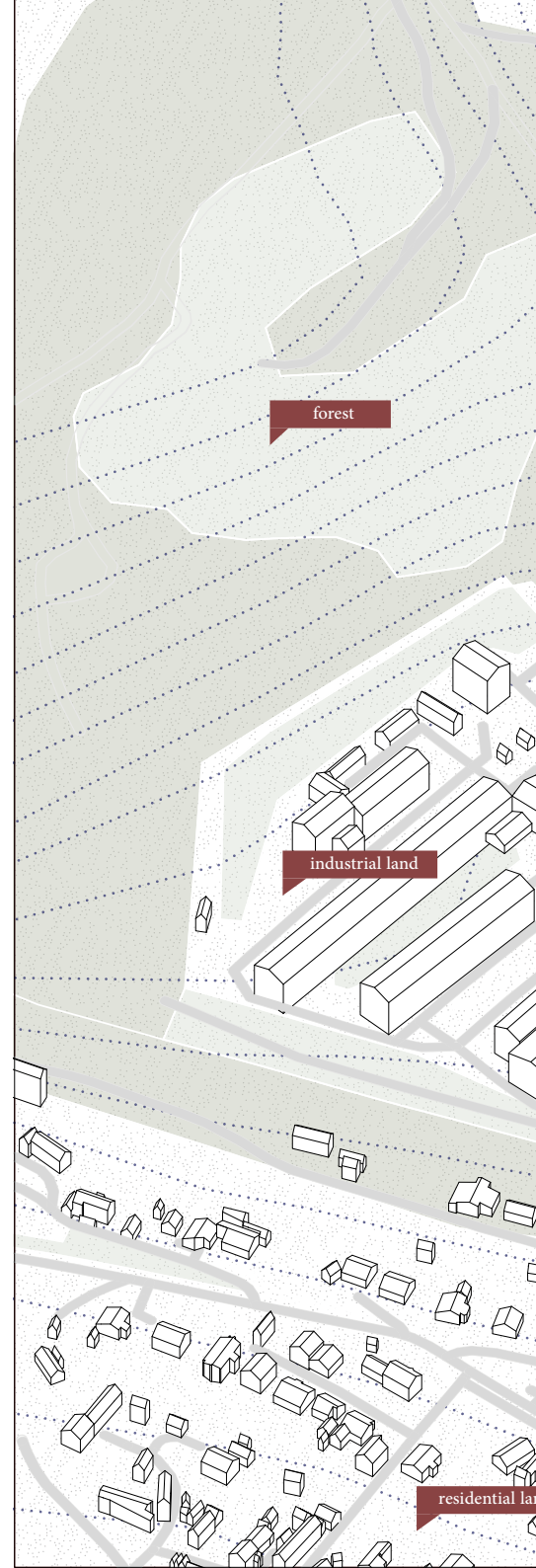


Figure 21: Axonometric View of Proposal Design



industrial land

forest

allotment

farmland

residential land

allotment

farmland

town house

green plaza

commercial street

courtyard cluster

commercial zone

cemetery garden

apartment block

library

rain pond

playground

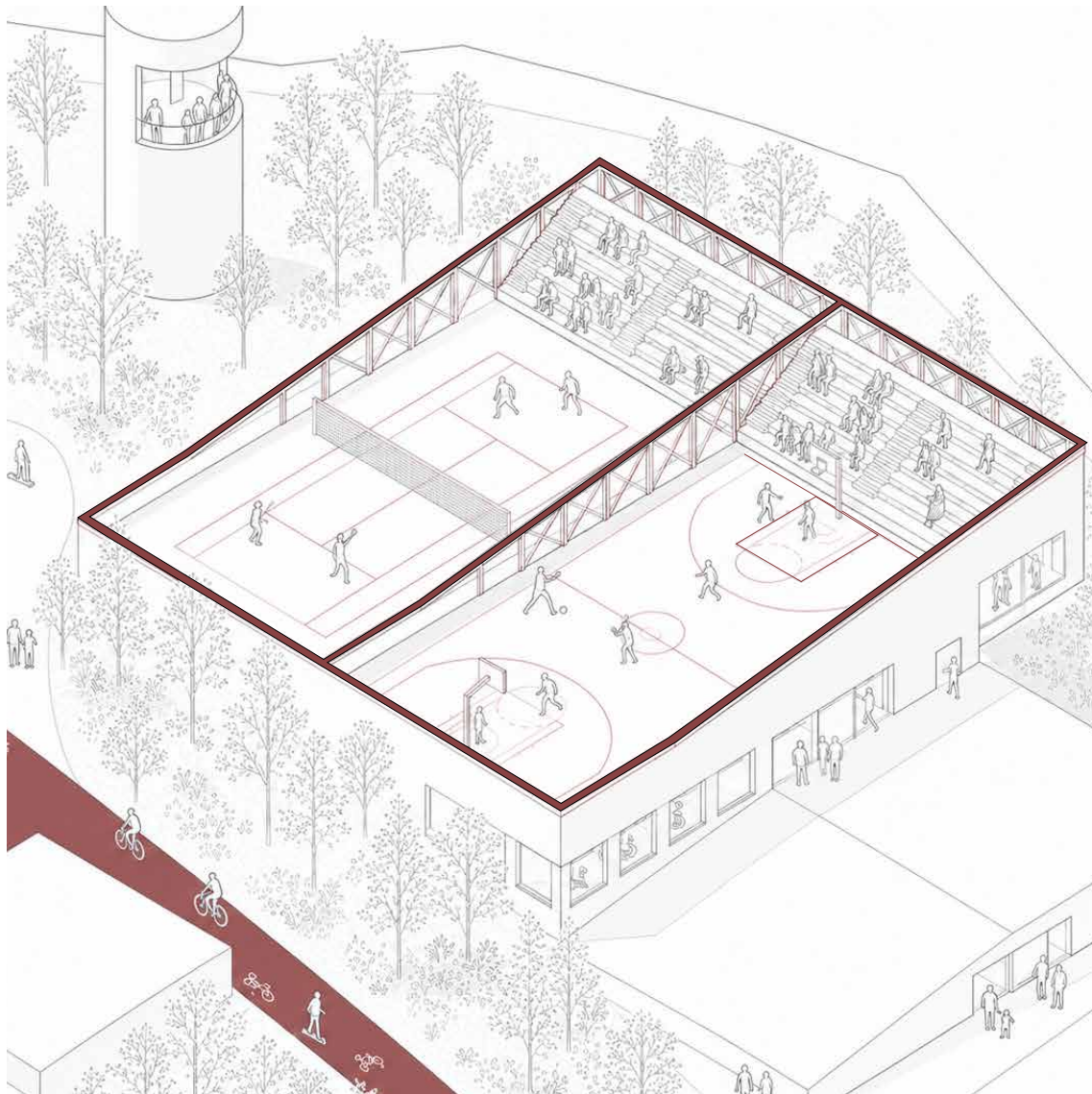


Figure 22: Axonometric View from Tennis Court

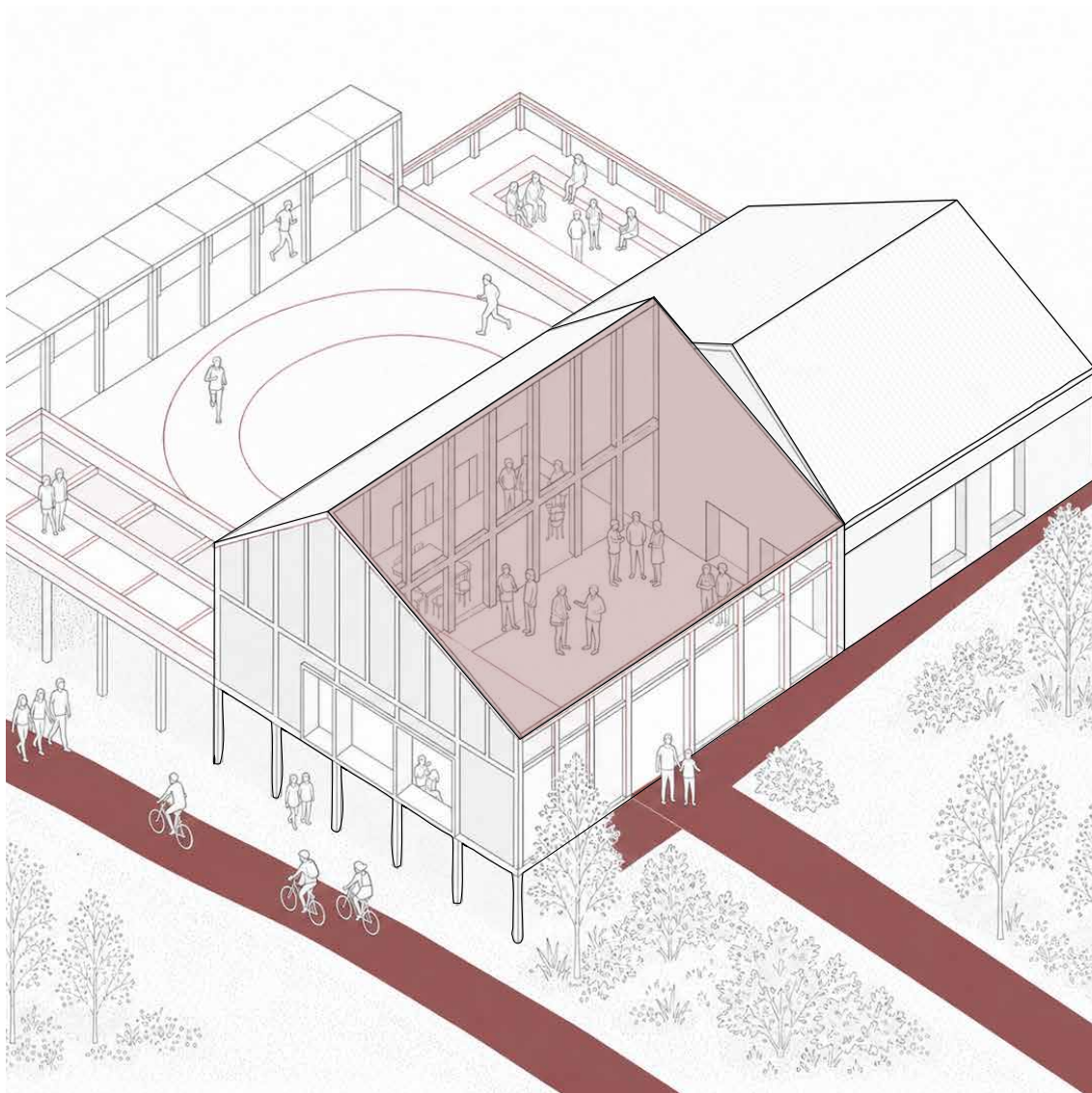


Figure 23: Axonometric View from Kindergarden

6.4 Phase 1 | City Interface

The city edge. Five floors. Where the project meets Sásová.

The first phase establishes the project's connection to the existing city, delivering the densest part of the site and opening the first segment of the linear park from day one.

Critical Mass: Apartment bars and urban squares create an immediate urban presence, five floors, internal corridor circulation, public space between the buildings belonging to everyone.

Kindergarten, bakery, café, and grocery shop open at street level. The bus stop is at the edge. The buildings face the existing Sásová neighbourhood as much as they face the new development.

Park Infrastructure: The first segment of the linear park is completed, establishing the shared spine that Phases 2 and 3 will extend northward toward the forest.

The apartment block: Five floors on a 3.5m structural grid. The service core sits at the centre, keeping both long facades free for living space.

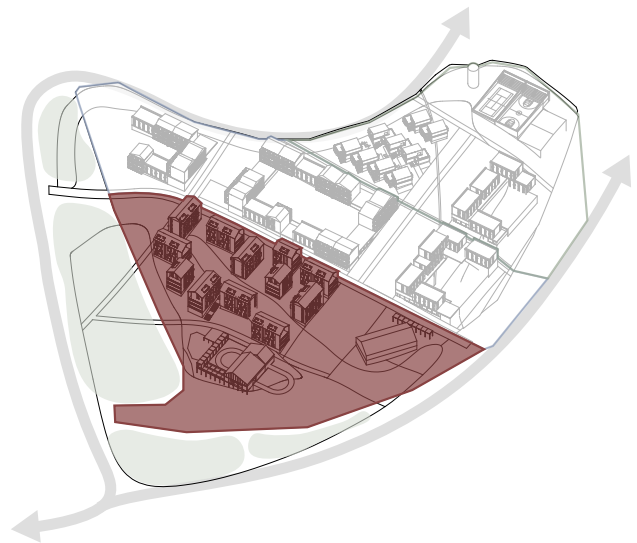


Figure 24: Phase 1

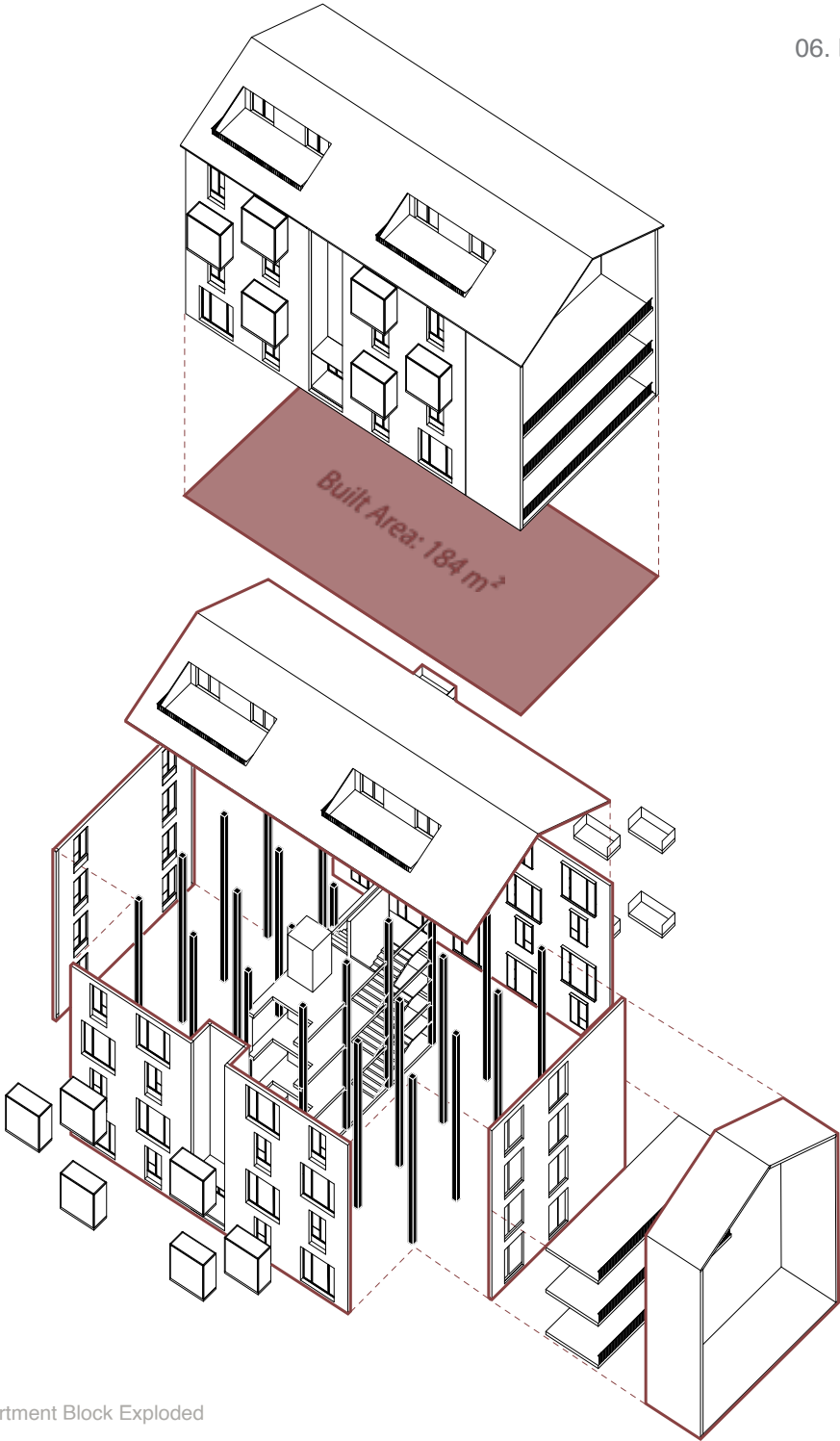


Figure 25: Apartment Block Exploded

6.5 Phase 2 | The Social Core

The middle of the site. Three to four floors. The social heart of the project.

The second phase expands into the heart of the site, activating the courtyard cluster, the winter gallery, and the community-facing service edge along the linear park.

Placemaking: The enclosed courtyard and winter gallery create the conditions for shared daily life, the social centre of the whole project. Buildings wrap around a shared outdoor space that belongs to the residents collectively.

The Winter Gallery: Residents reach their front doors along a glazed south-facing corridor. In summer the panels open, shared air and light. In winter they close a warm corridor where daily exchange happens naturally. Circulation and social infrastructure in one.

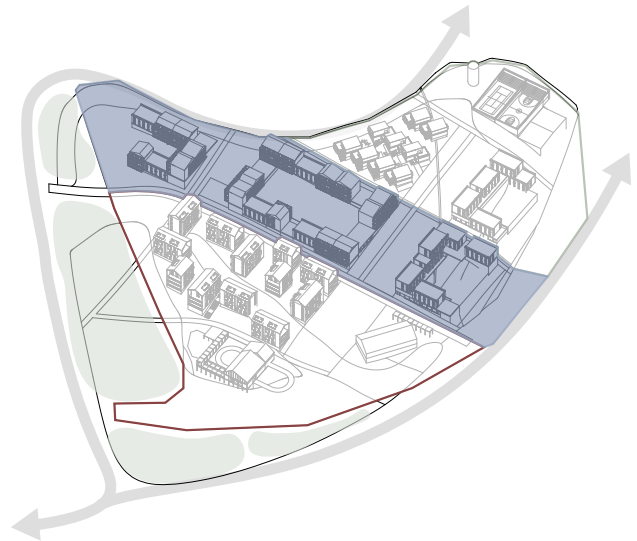


Figure 26: Phase 2

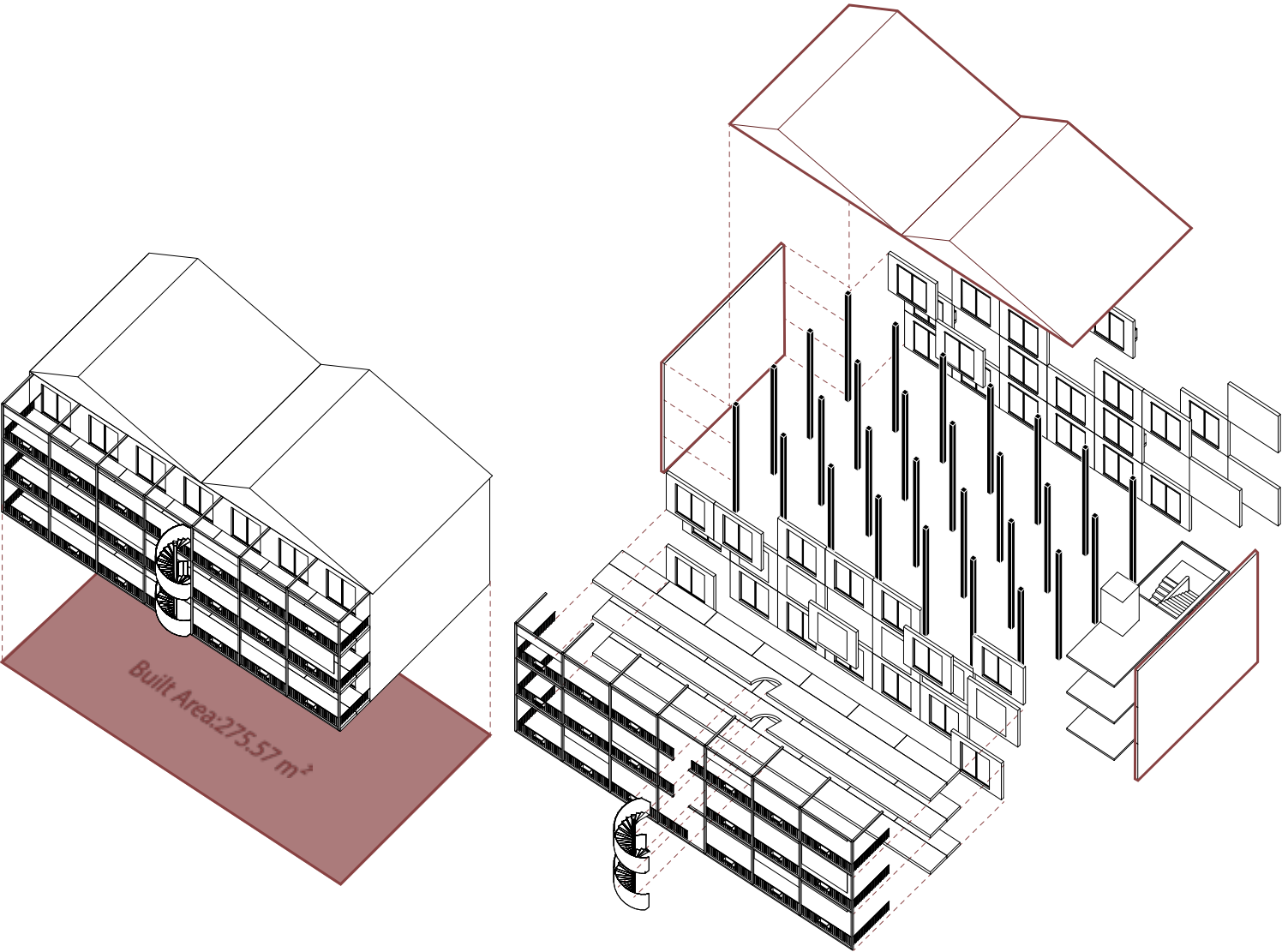


Figure 27: Cluster Housing Block

6.6 Phase 3 | The Forest Edge

The highest part of the site has two floors, where the project meets the forest.

Topographic Sensitivity: Two-storey town-houses step with the natural slope, preserving views from Phases 1 and 2 and keeping the forest edge visually intact. Each unit has its own ground-level entrance and private garden, no shared corridor, no gallery obligation.

Phase 3 is the quietest part of the project, the furthest from the city, the closest to the trees. The shared space here is the park itself.

The townhouse block includes two floors, the same 3.5m structural grid throughout.

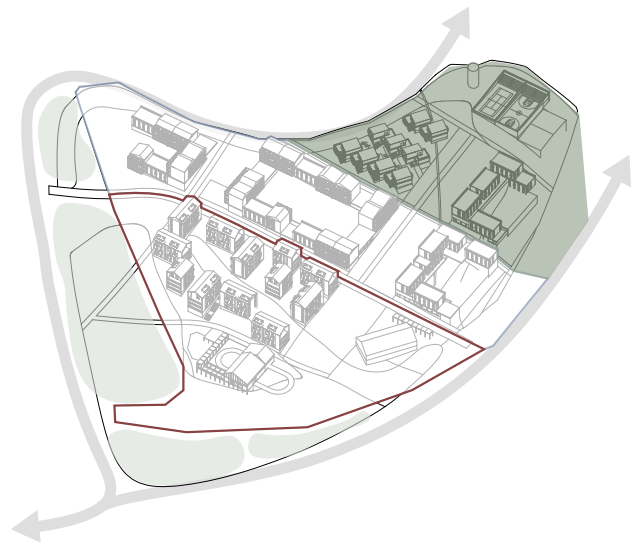


Figure 28: Phase 3

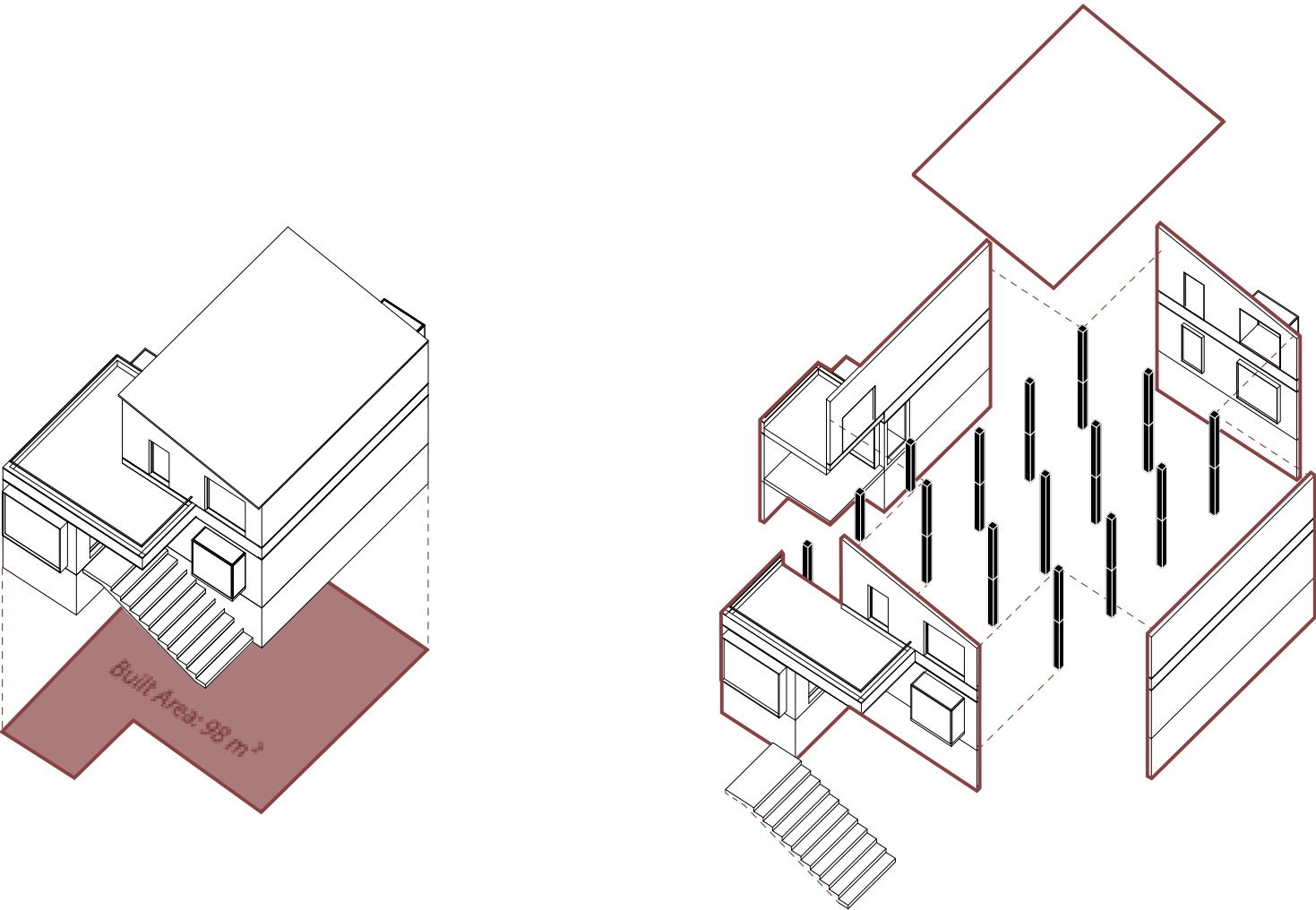
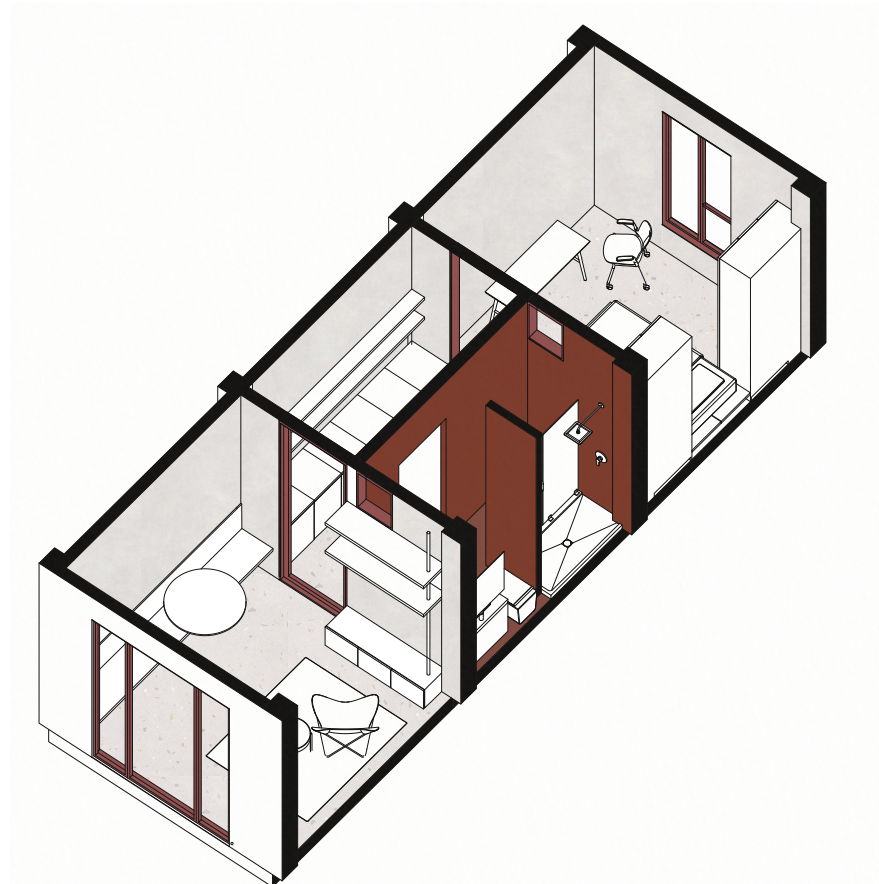
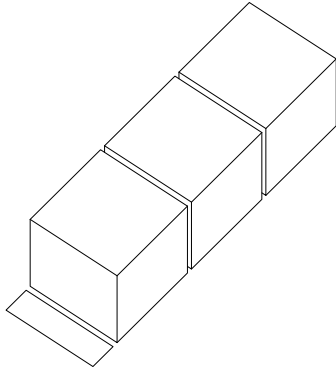


Figure 29: Town House Block



1

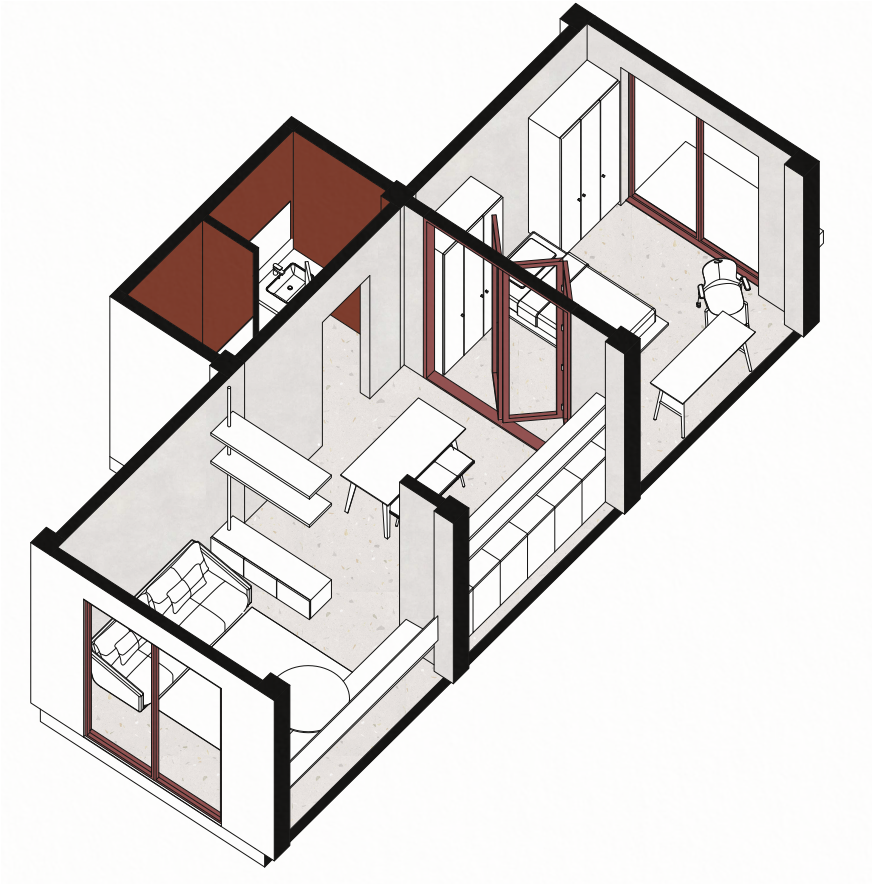
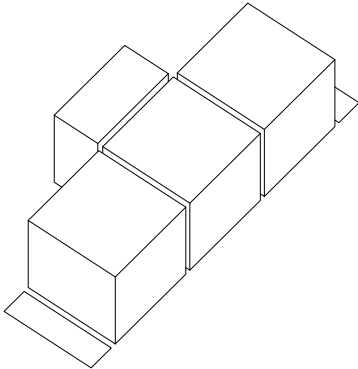


36.75 m²



Student
Solo Worker

Figure 30: Single Unit Type A



1

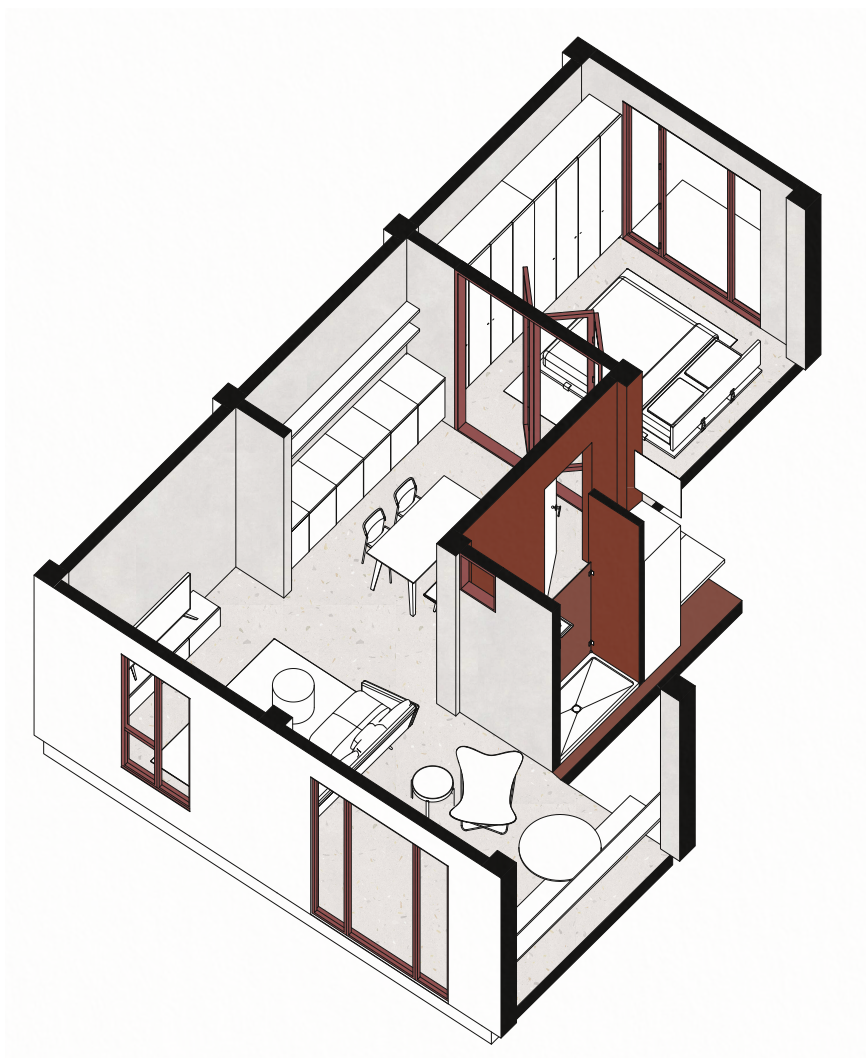
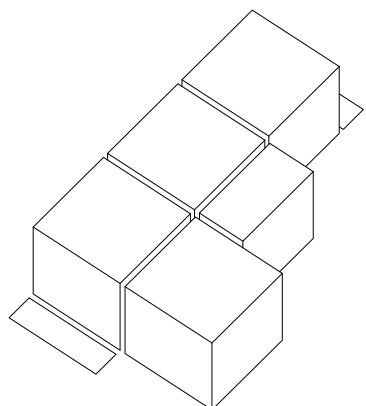


42 m²



Student
Solo Worker

Figure 31: Single Unit Type B



1 - 2



55 m²



Young Couple
Elderly

Figure 32: Two Rooms Units Type A

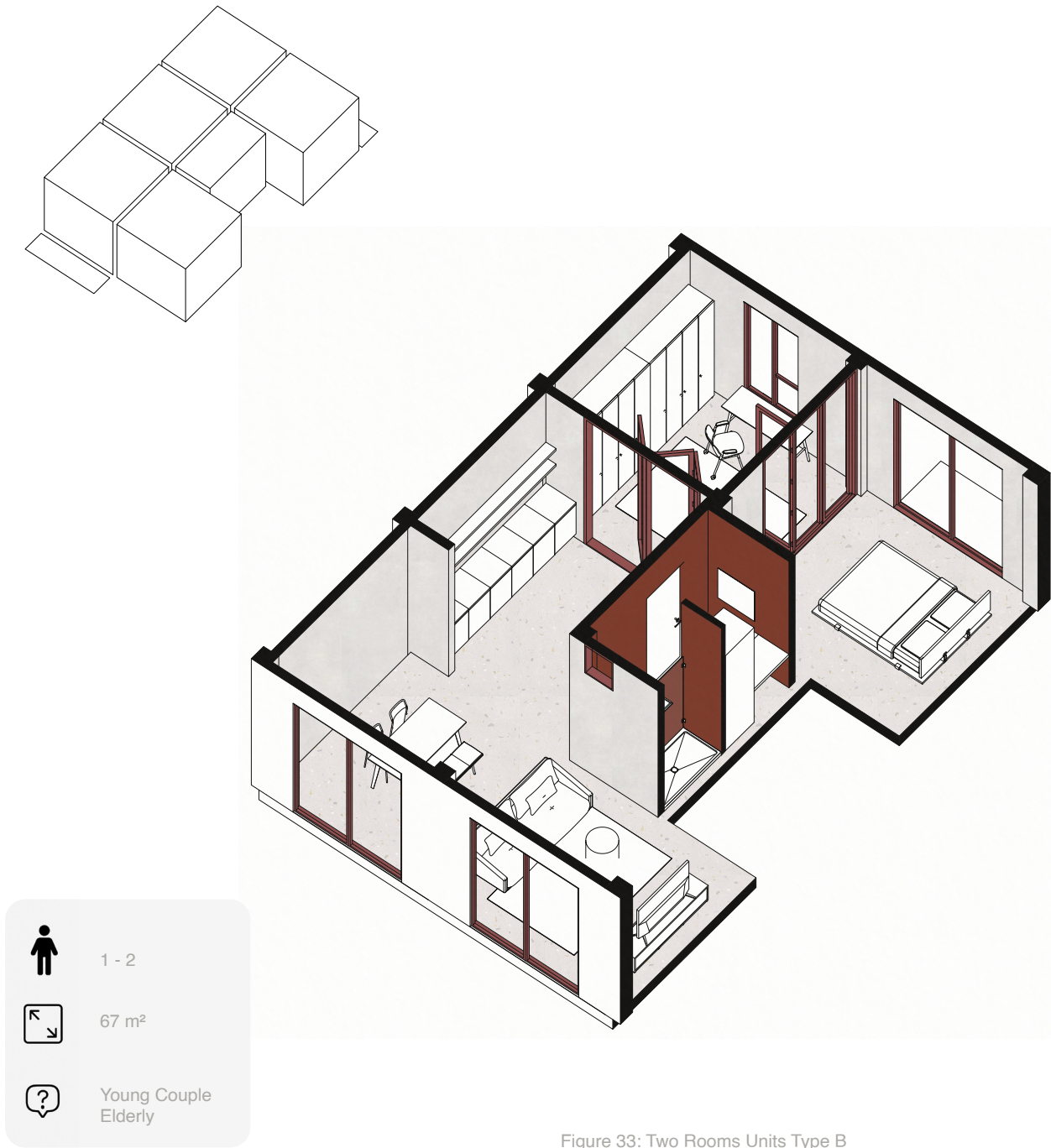


Figure 33: Two Rooms Units Type B

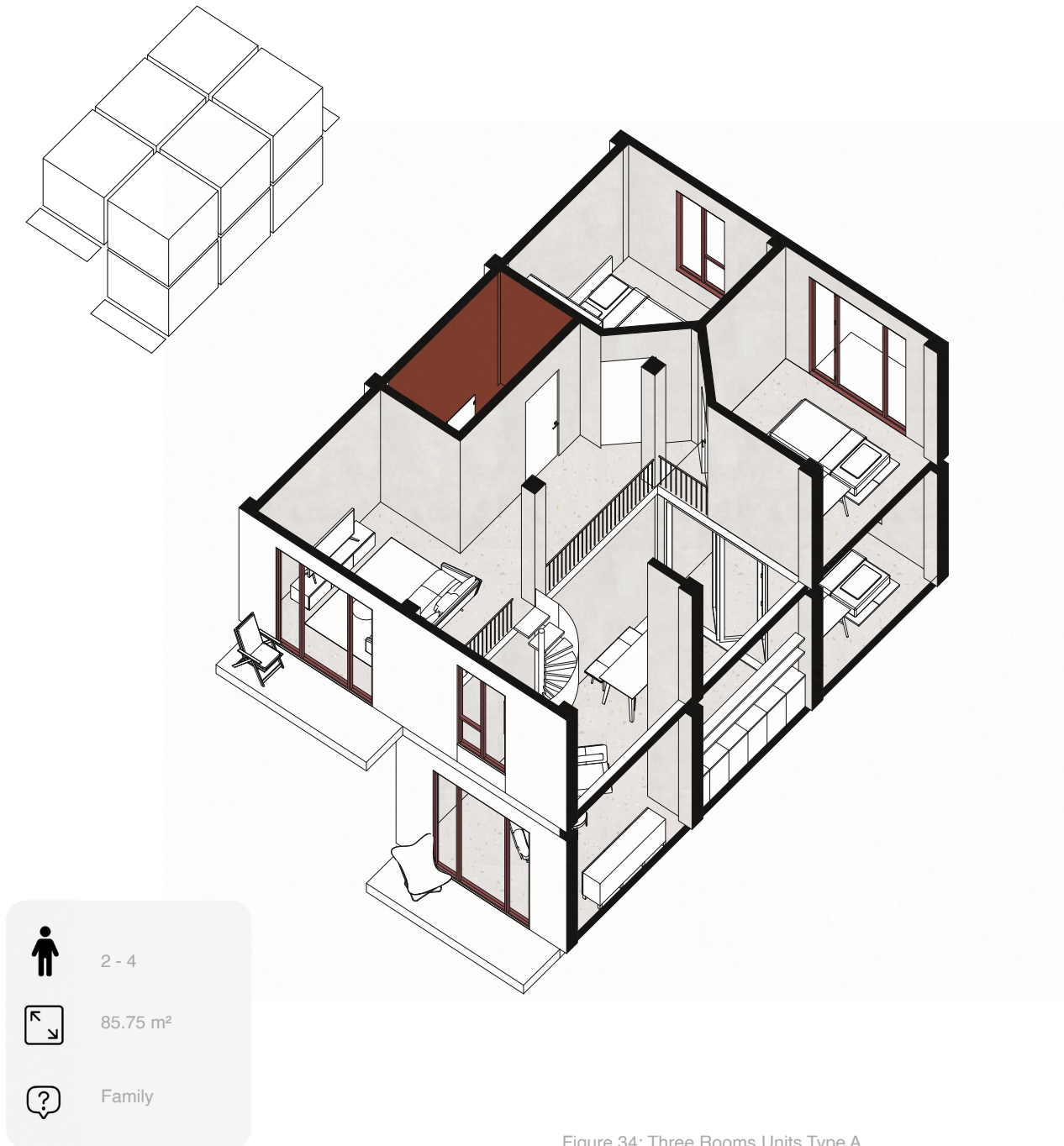


Figure 34: Three Rooms Units Type A

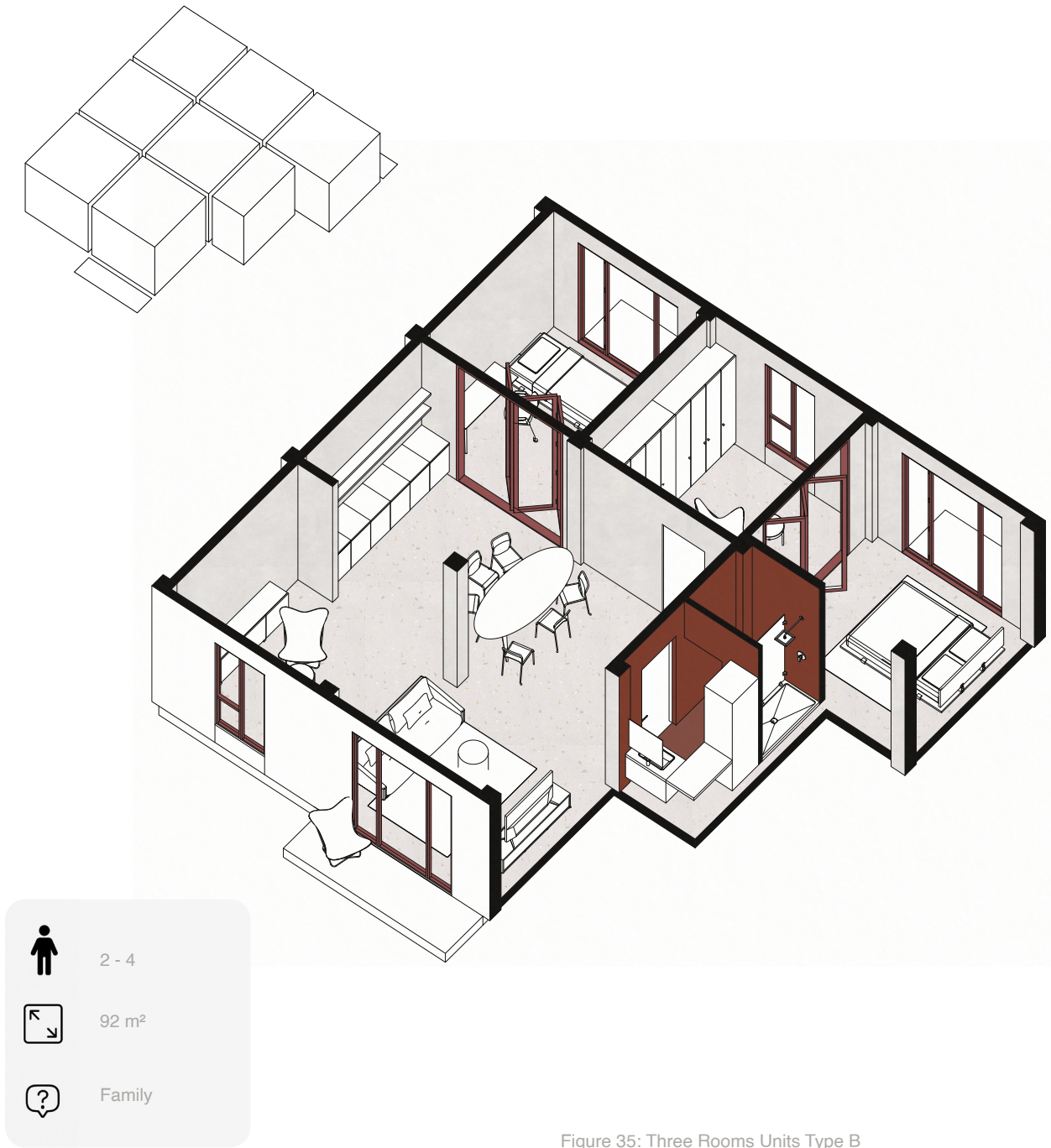


Figure 35: Three Rooms Units Type B

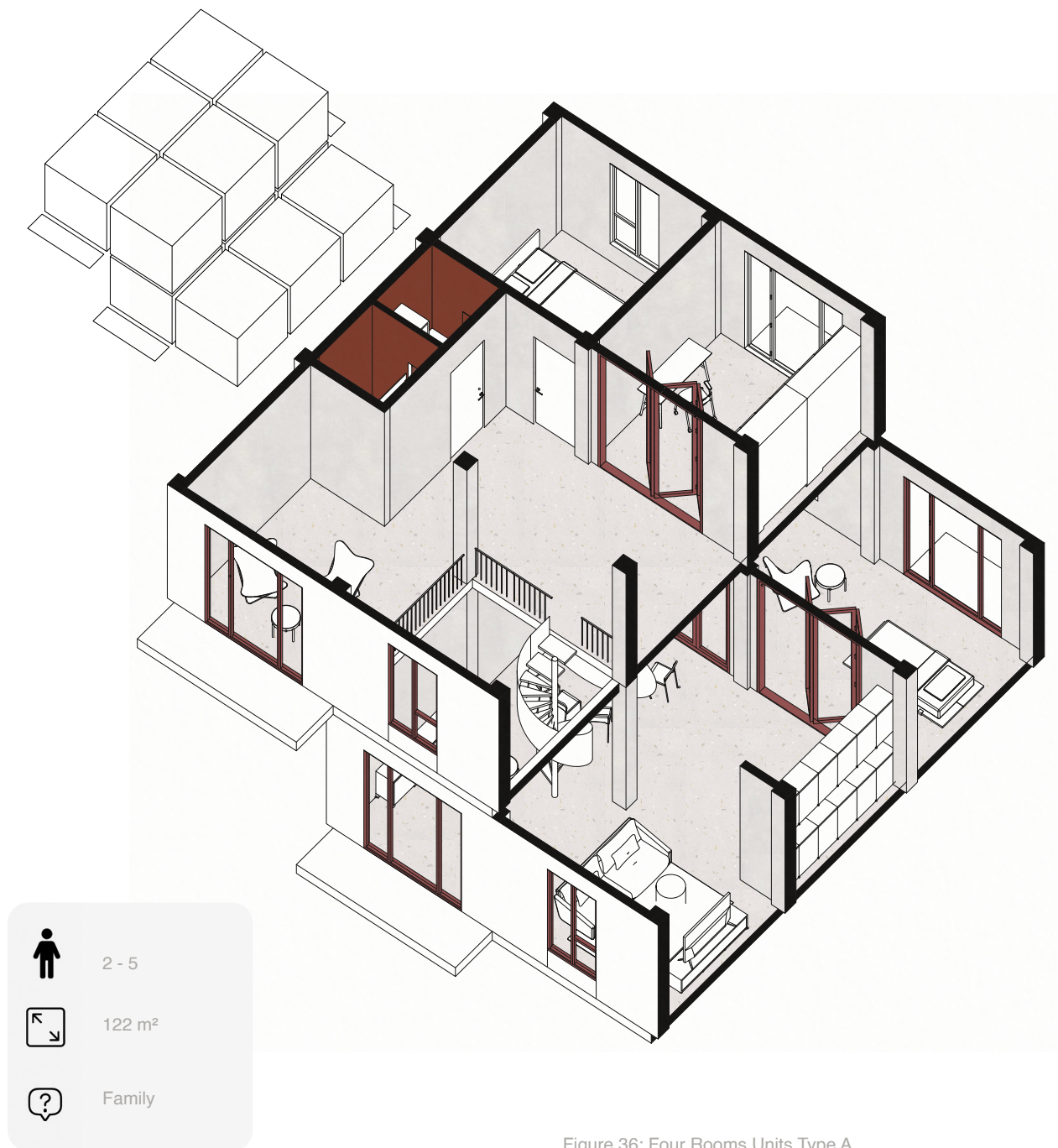


Figure 36: Four Rooms Units Type A

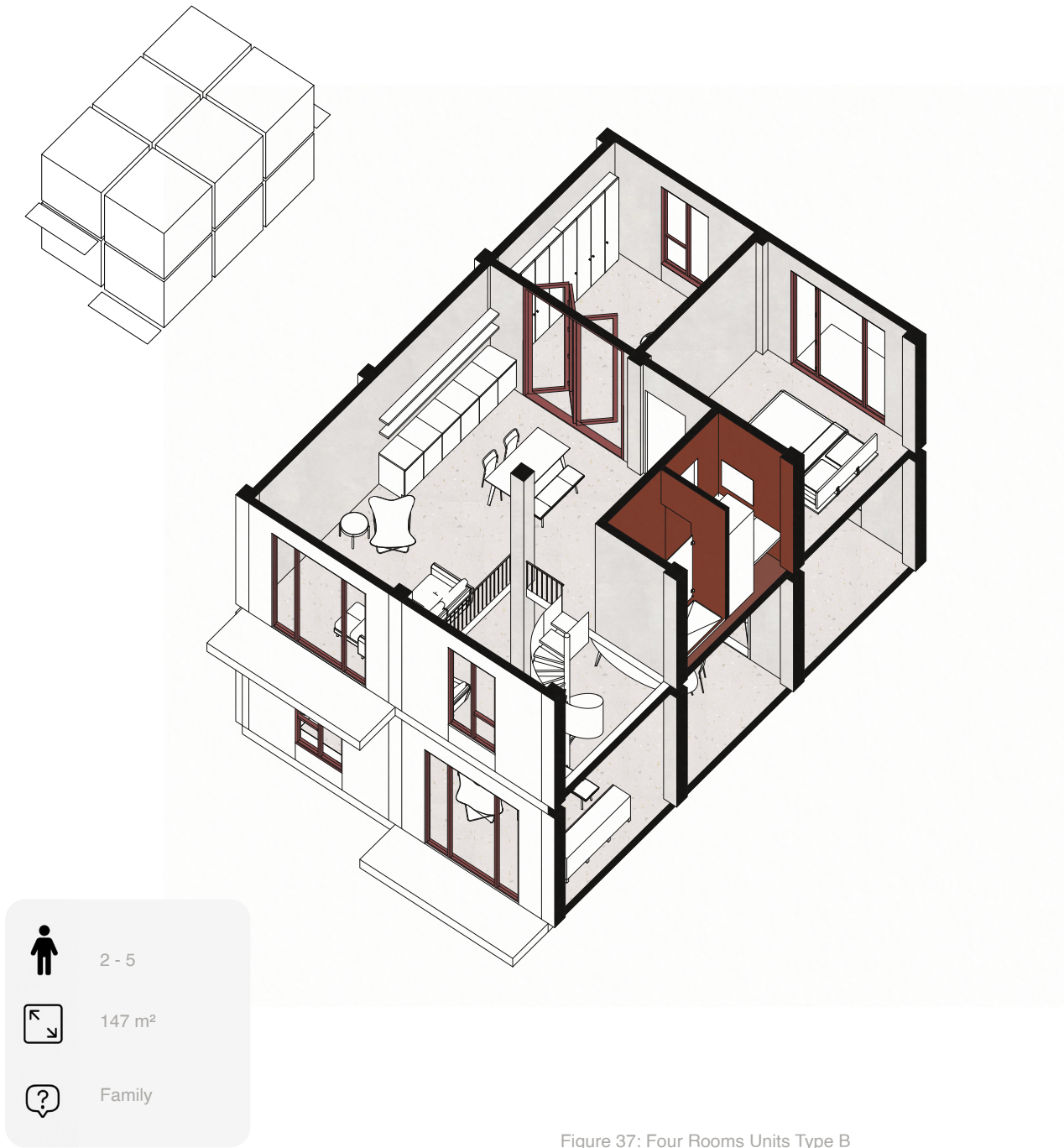


Figure 37: Four Rooms Units Type B

Town House Neighbourhood



Figure 38: Town House Neighbourhood





Figure 39: Axonometric View from Apartment's Balcony



Figure 40: View from Courtyard

7.1 Evaluating and Competition Brief

The Terraviva competition brief set out five evaluation criteria against which all entries were judged which they were spatial concept and masterplan quality, landscape integration and ecological sensitivity, architectural character and building typology, sustainability and environmental performance, and phasing feasibility. This chapter evaluates Karlovo Green Loom against those criteria, the three research questions that shaped it and the standard set by the competition's strongest results.

The jury awarded first place to Sásová Hills, a proposal organised around a single continuous landscape spine that connected the existing urban fabric to the forest edge. The jury noted its clarity of spatial concept and the directness with which it translated a landscape strategy into a buildable masterplan.



Figure 41: First Prize Board

Second place went to Stratum, which used the site's topography as the generator of its section and form rather than as a constraint to be managed. The jury credited it for the consistency between its conceptual logic and the architectural character of the buildings it produced, the slope shaped not just the masterplan but the experience of each building within it.



Figure 42: Second Prize Board

Third place, Confluence divided the site into four character areas, each with a distinct relationship to the landscape. The jury particularly noted its development trajectory, from an initial concept into a genuinely buildable system supported by real building types and floor plans.



Figure 43: Third Prize Board

7.2 Where This Proposal Stands

Karlovo Green Loom was selected as the Top 30 finalists in the Karlovo Living Landscape competition. This recognition confirms that the proposal's core spatial logic was legible and compelling to the jury before it was developed into a full thesis. The evaluation that follows reads the proposal based on the same criteria the jury used, now with the benefit of the additional research, site analysis, and design development that the thesis stage allowed.



Figure 44: Top 30 Certificate

Karlovo Green Loom

A Woven Urban Carpet Linking City and Forest

Karlovo living landscape is conceived as a woven urban carpet, rooted to the south-west to harvest daylight, open views, and walk with the sun's natural slope. The weaving begins by connecting the existing green spaces: trees are not discarded, but the openings between them. These residential modules are enticed between them, forming an sequence of intimate neighbourhood clusters. Back cluster shapes the most desired "urban core" — a mix of planned courtyards, play areas, and small performance clearings — defined and sheltered by tree lines that provide shade, privacy, and a sense of enclosure without isolation. Buildings do not impose rigid edges; they participate in the landscape's continuity.

At ground level, dwellings extend outward. Private gardens and backyards become thresholds where indoor life spills into the green, dissolving the boundary between wilderness and nature and making the landscape part of everyday living.

As a whole, the project seeks an intimacy between city and forest. The living park connecting woodland to city is maintained and strengthened, becoming the spatial of continuous public green services that link clusters, garden movement, and generous ecological flow. Karlovo is not an extension of the city. It is not Karlovo into nature — compact in footprint, open in character, and defined by the living weaves of landscape.

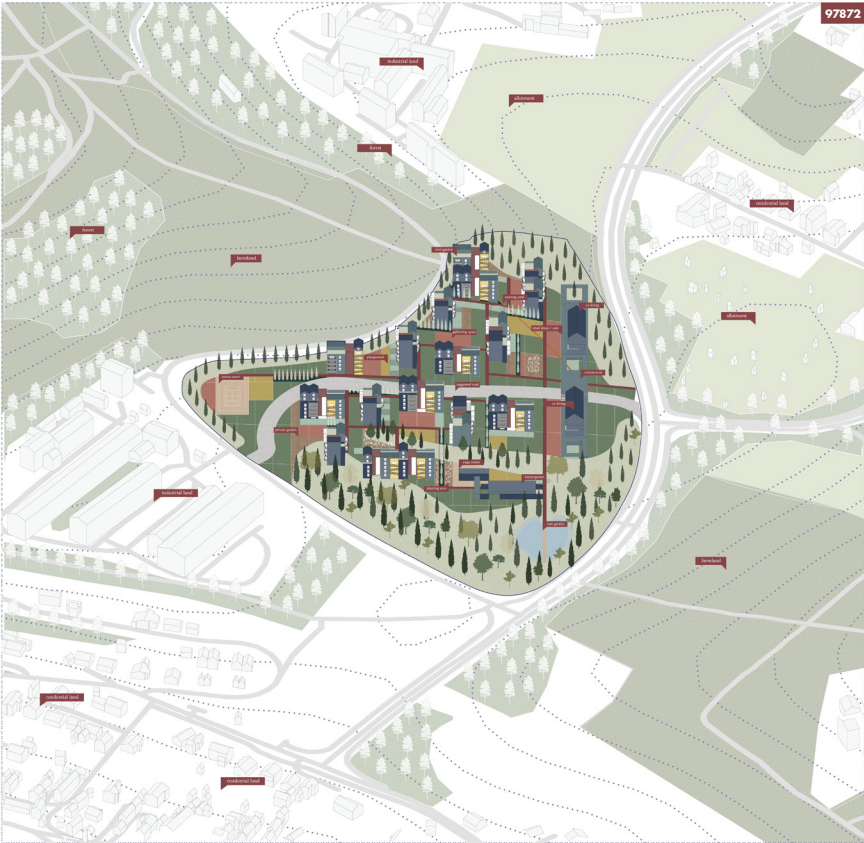
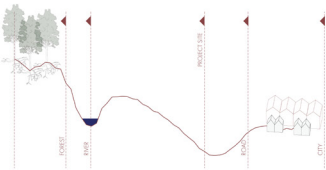
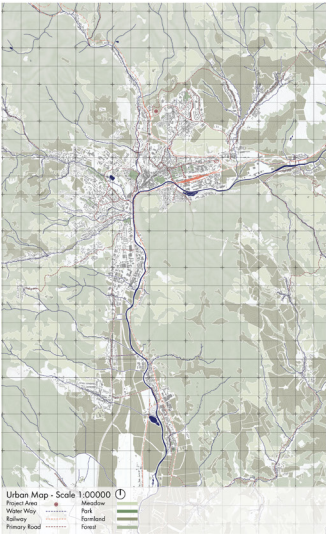
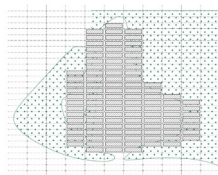
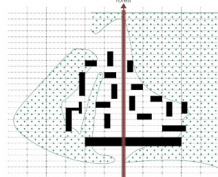


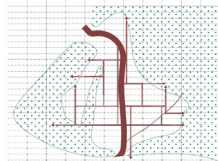
Figure 45: Karlovo Green Loom Board 1



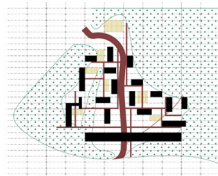
Coarse grid maps buildable cells around existing trees



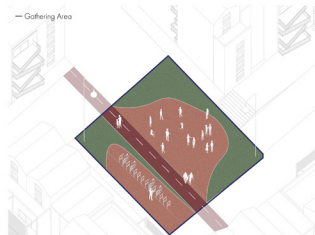
A central gateway links city to forest and sets block spacing



Paths are stitched onto the grid, led by a primary spine



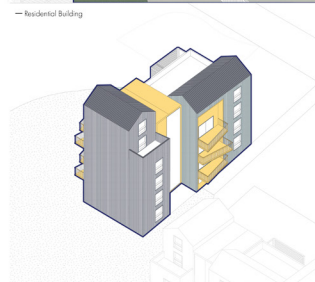
Inner-block voids are programmed as neighbourhood commons, distributing public life across the site



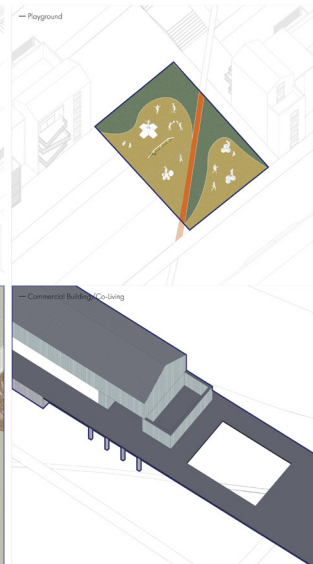
Gathering Area



Picnic Garden

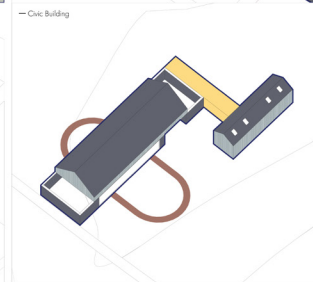


Residential Building



Playground

Commercial Building / Co-living



Civic Building



70 m²



23 m²



45 m²



100 m²

97872



Figure 46 : Karlovo Green Loom Board 2

7.4 Answering Questions

Q1 What does the site actually permit?

Read on its own terms, slope, ecology, views, existing constraints, the site permits a gradient of three phases stepping from five floors at the city edge to two floors at the forest threshold. It does not permit maximum density without sacrificing the linear park, the courtyard dimensions, and the ecological buffer. The carpet grid, laid across the site before any building was placed, was the tool that made this reading possible.

Q2 Complement or replace?

The existing Sásová estate is not lacking buildings. It is lacking daily services, diverse household types, shared community spaces, and a direct connection to the natural landscape it borders. Karlovo Green Loom provides exactly those things, kindergarten, café, mixed tenancy, community gardens, a path to the forest, without duplicating what already exists. The three typologies borrowed from Banská Bystrica's existing morphology reinforce that logic: they are recognisable extensions of the city's fabric, not replacements for it.

Q3 Does reduced density deliver more value?

Using 60 % of the permitted footprint makes three things possible that the maximum would not: a linear park continuous enough to function as an ecological corridor, courtyards large enough to sustain community life, and private gardens at the forest edge that make the townhouse typology viable. The flexible unit system, adaptable, combinable, built from the same structural module throughout, ensures that fewer units does not mean lower quality. Each unit has more daylight, more relationship to an outdoor space, and more capacity to change over time than a maximum-density proposal would allow.

7.4 A Vision for Tomorrow

Karlovo Green Loom is designed for the present, for the families, students, and residents who will move in when Phase 1 opens. But its deeper ambition is for what the neighbourhood becomes over time, as its residents grow older, as households change, as the trees in the linear park mature and the community gardens take root.

The unit system is the clearest expression of this long-term thinking. A young couple who moves into a studio in Phase 1 can years later, merge it with the unit next to it to accommodate a growing family, without moving out, without demolition, without construction waste. The same building that houses students today can house families tomorrow. This is not a theoretical flexibility. It is the difference between a neighbourhood that forces people to leave when their lives change and one that grows with them.

The linear park carries a similar long-term ambition. In year one it is a designed landscape, planted, maintained, deliberately composed. In year twenty it is something else: a mature urban forest at its northern end, a community garden tended by residents who have been there since the beginning, a play area where children who were born in Phase 1 now bring their own children. The park does not finish when the project is built. It continues becoming.

The relationship between the neighbourhood and the forest above it is perhaps the project's most lasting contribution. In a city that will face increasing pressure to build on every available piece of land, Karlovo Green Loom makes the opposite argument: that holding the edge between city and nature is worth more than filling it. That argument does not expire when the last building is completed. It grows stronger the longer the neighbourhood stands.

7.5 Conclusion

This thesis set out to ask whether maximum permitted density is the right objective for the Karlovo site. The answer the design gives is no, but not because density is wrong in principle. Because this site, specifically, has a relationship to the protected hillside above it and the ageing estate beside it that makes landscape continuity and typological diversity more valuable than additional floor area.

The competition's top three results confirm that the jury was looking for exactly the qualities this proposal prioritises: a clear spatial spine, a section shaped by the slope, and building types that commit to a social and spatial logic rather than leaving the masterplan as an abstract diagram. Where this thesis goes further is in making the reduced footprint the explicit argument rather than the background condition.

Karlovo Green Loom is not a maximum. It is a position, that a hillside between a city and a forest, built carefully and at the right scale, can produce a neighbourhood worth more than the sum of its permitted floor area.

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Politecnico di Torino
July, 2026