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A District With No Plan

The Futures of *Slakthusområdet*

Filippa Malmgren

Chalmers University of Technology
Gothenburg, 2026

Abstract

Urban areas must develop in increasingly volatile contexts, where long-term ambitions for resilience collide with short-term political and financial constraints. Conventional planning processes struggle to reconcile uncertainty with strategic decision-making, resulting in stalled development. This thesis examines how design-led scenario planning can function as a planning method for structuring long-term development pathways in Gothenburg's Slakthusområdet district, under conditions of climate risk, planning uncertainty, and fragmented governance. Adopting a Research-by-Design methodology, the study utilizes Local Climate Zones (LCZ) and urban system mapping as analytical frameworks to translate planning theory into measurable spatial characteristics.

The research develops three spatially exaggerated scenarios, each assuming the temporary dominance of one priority from Campbell's Planner's Triangle (social equity, environmental protection, or economic development). By tracing these competing logics across urban systems, the thesis reveals the structural trade-offs inherent in urban renewal. The findings suggest that scenario planning reframes uncertainty as an operational lever, providing a comparative framework to support decision-making in complex, redeveloping areas. Ultimately, the study proposes that planning must shift from seeking a balance toward providing comparative frameworks that evaluate the consequences of alternative pathways before they become binding commitments.

Keywords: urban transitions, scenario planning, local climate zones, design governance, capital allocation.

A District With No Plan: The Futures of *Slakthusområdet*
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Filippa Malmgren
Gothenburg, June 2026

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Background

The End of Stable Urban Futures

Urban districts across Europe's cities are facing a convergence of pressures arising from the collision between climate risk, demographic change, and economic volatility. At the same time, approximately 70% of the global population is projected to live in urban areas by 2050 (UN, 2018). This creates unprecedented demands on our cities' capacity to adapt to and absorb growth, as well as deliver resilient, enjoyable living environments.

Urbanization today is inseparable from the dynamics between climate adaptation, economic uncertainty, and governance processes. Understanding these key forces is essential for constructing new frameworks for urban renewal; this implies that the responsibility for shaping long-term, resilient trajectories lies in today's planning decisions.

When governance falters, or planning systems are unable to coordinate across scales and perspectives, areas for urban transformation become particularly vulnerable to stalled development.

High projected costs associated with climate resilience—flood protection, heat mitigation, infrastructural reinforcements—often translate into perceived financial risk, discouraging both public and private capital allocation. As uncertainties surrounding these dynamics increase, municipalities and stakeholders face difficulties in committing to long-term development.

Paradoxically, this hesitation undermines the forms of strategic planning required to determine what constitutes a "stable" urban future.

The absence of planning pathways does not reduce long-term costs; it shifts responsibility forward in time, narrowing the range of possible future efforts.

In this context, the challenge facing contemporary urban planning is not to eliminate uncertainty, but to operate productively alongside it. Planning methods that can effectively support processes that are increasingly undefined and uncertain must maintain a strategic direction, while allowing consequences of possible decisions to be explored in parallel, rather than sequentially.

As such, climate, economic, and governance risk shift from being prohibitive factors, to expected conditions for re-structuring stable urban futures.

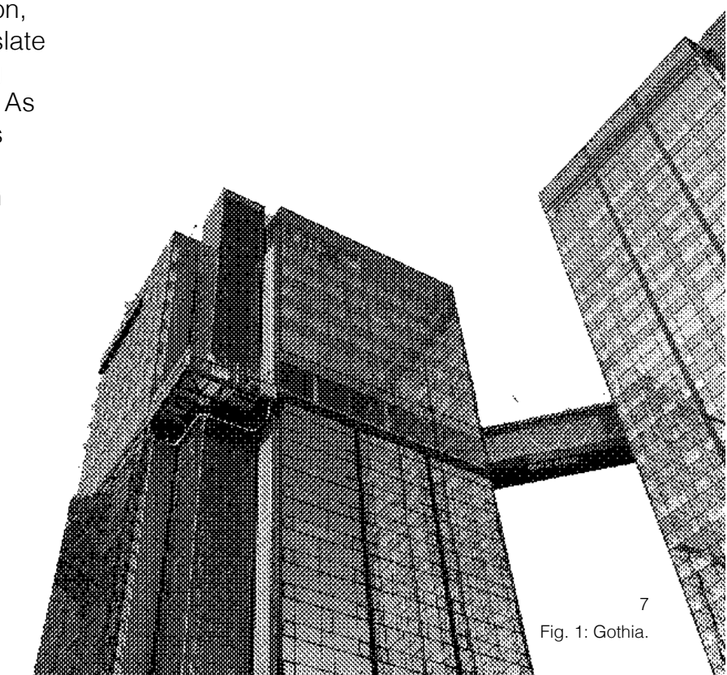

Fig. 1: Gothia.

Problem Description

The Futures of Slakthusområdet

Slakthusområdet in Gothenburg embodies many of the aforementioned contemporary pressures. As a major post-industrial area, it was envisioned to become a socially mixed urban district—a home of contemporary arts, culture, and gastronomy.

However, the 2025 halt of the zoning plan due to budgetary and political disagreement exposed a deeper issue: how do cities navigate complex, long-term urban transitions when planning processes themselves are limited by the uncertainties they aim to address?

Gothenburg's 2050 masterplan (Göteborgs Stad, 2022) outlines its intention to become a resilient city, highlighting it should "stand strong for at least 400 more years," but the halted zoning plans for the post-industrial Slakthusområdet is evidence of the difficulty in translating high-level ambitions into actionable spatial strategies.

The prospective plans were partially put on hold due to high prospective flood protection costs. The hesitation around committing to such measures illustrates how long-term climate responsibilities collide with short-term political and financial constraints.

Thus, Slakthusområdet stands as an example of a broader urban dilemma: cities know the futures they aspire to—resilient, enduring, adaptable—but lack methods to navigate the uncertainty, risk, and governance fragmentation that shape post-industrial districts.

The difficulty lies in achieving long-term goals when climate adaptation, economic feasibility, and governance systems are misaligned in planning processes, and processes lack the tools to realize long-term plans.

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Aim

The Re-Development of Urban Districts

The aim of this thesis is to, by design, develop and test how design-led scenario planning can function as a planning support method for urban districts operating under conditions of climate risk, economic strain, fragmented governance, and planning uncertainty.

Using Slakthusområdet in Gothenburg as a case study, the thesis investigates how exploratory scenarios can be used to structure long-term development pathways when conventional planning processes struggle to reconcile climate adaptation requirements with short-term political and financial constraints, and to evaluate and reflect on the feasibility of such an approach.

Research Questions

How can design-led exploratory scenario planning support the long-term development of Gothenburg's Slakthusområdet under conditions of planning uncertainty?

In what way can the use of spatially exaggerated scenarios reveal the structural trade-offs between competing planning priorities?

Delimitations

The thesis is limited to Slakthusområdet in Gothenburg, which serves as the primary case study and planning site. The thesis does not address every aspect of Gothenburg's environmental or social masterplan. Economic feasibility is not developed into a full cost-benefit analysis. The scenarios developed are not intended to fully comply with regulations as complete masterplans, and as such have been treated as experimental and isolated developmental pathways. These scenarios operate under the assumption that macro-level environmental threats, such as climate risk and flooding, have already been resolved. Decoupling the site from these immediate crises allows the district to function as a controlled laboratory environment. Consequently, the study can focus purely on isolating specific spatial variables and exploring their theoretical outcomes.

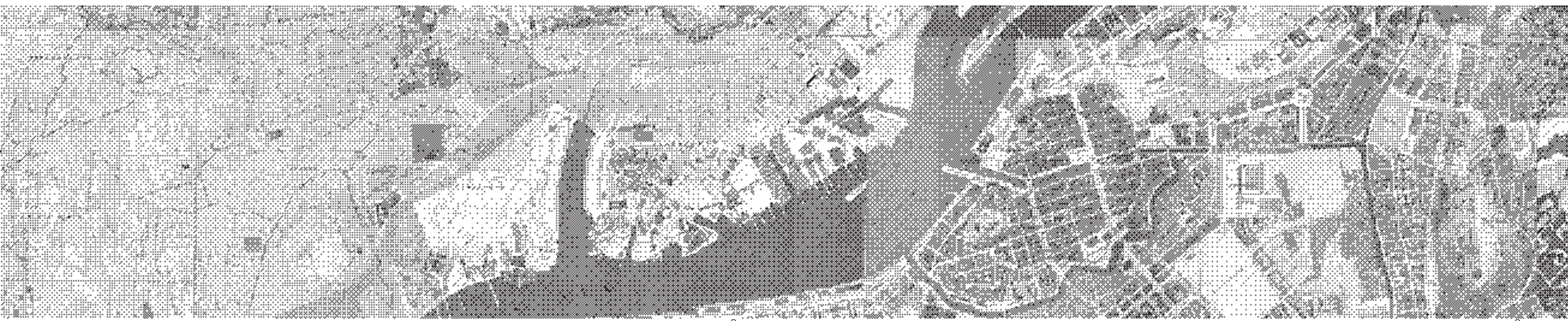


Fig. 2: Gothenburg city map.

Fig. 2: Gothenburg city map.

Methodology

Research-by-Design Framework

This thesis adopts a Research-by-Design methodology structured around phases of analysis, synthesis, scenario development, evaluation, and reflection. The approach (see Figure 3) adapts the British Design Council's Double Diamond design process to a scenario-based planning context under conditions of strategic uncertainty.

The initial analytical phase is two-fold—theoretical research and site analysis are conducted in parallel. Planning theory and urban systems processes provide a conceptual lens through which Slakthusområdet is examined.

The synthesis phase distills theoretical insights and findings from the site analysis into thematic questions and the "How Might We (HMW)" problem statement. The HMW is not explicitly formulated, but used to guide scenario development along with the results from the theoretical research.

In Scenario Development, scenarios are developed as coherent systems with different urban forms. Design is used as an analytical instrument; spatial propositions are tools for testing how different assumptions reshape urban futures.

Scenarios are thereafter evaluated across baseline quantitative values and Local Climate Zone (LCZ) densities. Rather than producing definitive masterplans, the methodology aims to visualize possible futures under uncertain development pathways.

Research and design can thus operate reciprocally; theory informs spatial testing, spatial testing informs theoretical assumption. The result becomes a comparative framework that can support decision-making under conditions of complexity and uncertainty; it does not aim to be a fully feasible, implementable masterplan.

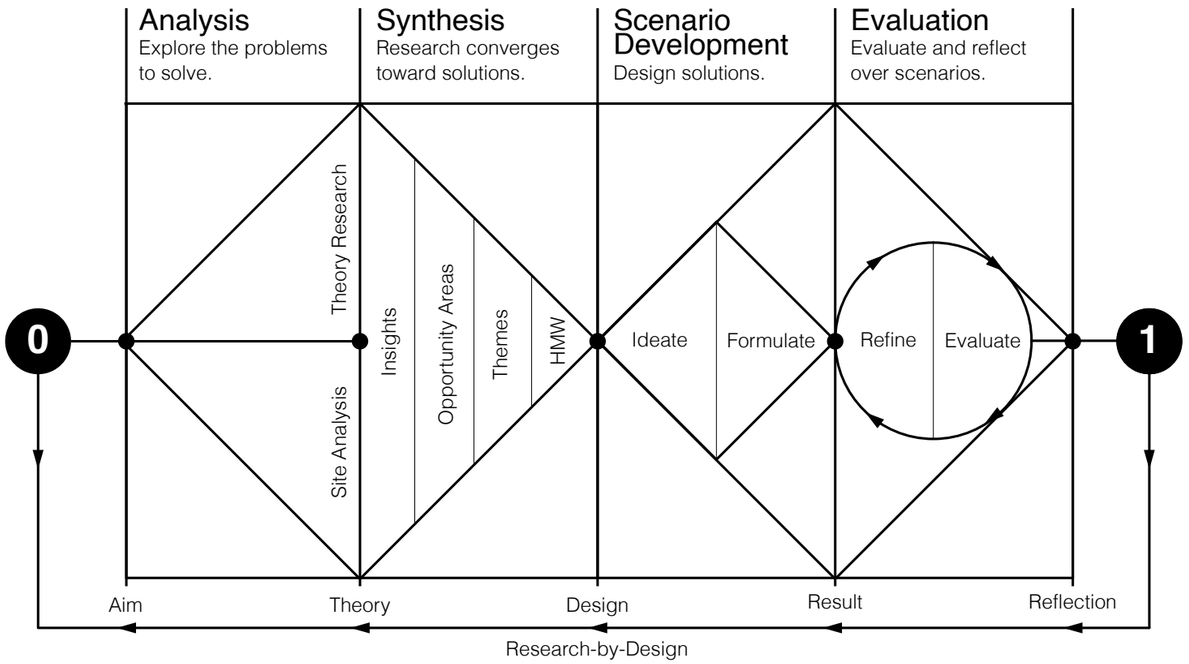


Fig. 3: Methodology diagram, adapted from the Double Diamond design process.

Exploratory Scenario Construction

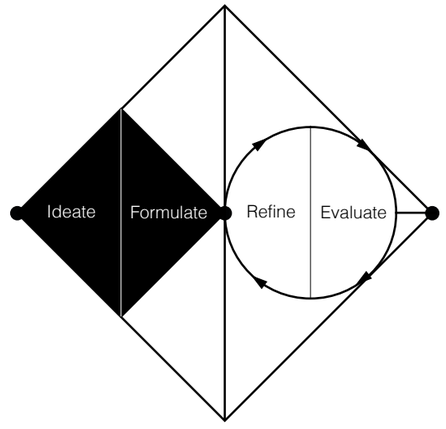


Fig. 4: A piece of the adapted Double Diamond method, focusing on scenario development.

Ideate & Formulate

The ideation phase translates the theoretical framework into structured alternative development futures for the site. Each scenario will assume the temporary dominance of one priority of those outlined in The Planner's Triangle (1996)—economic development, environmental protection, or social equity—and trace its implications across the urban system layers outlined by Meerow et al. (2016).

During formulation, the dominating logic is translated into urban space. Land use distribution, density, and building typologies are made visible through Local Climate Zone (LCZ) mapping.

Design operates as an analytical instrument to test how different priorities reshape the district's futures under conditions of climate risk and planning uncertainty.

Refine & Evaluate

The refinement phase adjusts each scenario in response to quantitative performance. Defined metrics, such as exploitation ratios, LCZ distribution, and green area coverage, are compared against the baseline conditions of Slakthusområdet.

Evaluation occurs comparatively; the scenarios are assessed to chart differences between priorities. Rather than identifying a singular optimal solution, the evaluation produces a structured comparison to better illustrate the consequences of alternative development pathways.

The scenarios function as instruments within an iterative process, to inform subsequent rounds of design development. While the findings may inform future design iterations beyond the scope of this thesis, the contribution of the present work lies in examining the process through which these iterations can be assessed.

Research

Wicked Complexity and The Planner's Triangle

Planning theory has long grappled with the dual challenge of defining complex problems and identifying actions that close the gap between the problem and its designed solution. The greater the complexities and scale of a defined problem, the more challenging it becomes to close that gap with effective operations. Relying solely on theory for satisfactory forecasting fails to consider the constraints of translating academia into practice; practice-based explorations lacking foundational research struggle to situate local interventions within broader systemic dynamics. In contexts where uncertainty is a defining condition of the problem itself, this tension often manifests in stalled planning processes.

Such planning problems become wicked—ambiguous, layered, indistinct. The information required to understand the wicked problem depends on the suggested solution; to describe the problem requires outlining feasible solutions ahead of time. Satisfying one condition entails disregarding the other. The complex systems underlying urban centres generate such wicked problems through systemic tensions between competing interests, prospective solutions, and stakeholder interactions. (Rittel & Webber, 1973; Zellner & Campbell, 2015)

Planners must work together with, or within, the tension generated by these disparate parts. Campbell named that strained space the "Planner's Triangle," suggesting that the sustainable development process itself was located at its center. Campbell further underlined that the center would never truly be reached, but only indirectly worked toward through persistent, prolonged engagement with each of the triangle's points. (Campbell, 1996)

The reality of practice traditionally restricts planners by the bounds of private interests or bureaucratic hierarchies, but the ideal process toward sustainable development must still balance these competing perspectives. Regional and municipal planners may outline overarching sustainable development plans, but these are often lists of visionary ideals rather than clear-cut steps toward end-goal implementation. Large-scale reforms may thus be suggested with great political enthusiasm, often ranging far into an envisioned, utopian future, but the lack of practical instruction or actionable demands hinder these masterplans from being deployed correctly. The ultimately well-meaning intent behind such plans can thus dissipate harmlessly, and sustainable development processes stall in turn. (Campbell, 1996; Campbell, 2016)

However, the role of planners and urban designers still necessitates conceptualizing such visionary, distant futures. The interactions between the borders of the Planner's Triangle, or the analyses of actors that generate wicked problems across urban centers, are both academic attempts at explaining the myriad ways in which economical, ecological, and social systems interact.

The planner, possessing competency across these domains and their interactions, must construct those futures under great uncertainty—thus, masterplans with fuzzy formulations of developmental end goals can form, and the generalised wording of stated requirements means most stakeholders can agree and sign off with no sense of either victory or defeat in the negotiations.

Consequently, no party makes true progress.

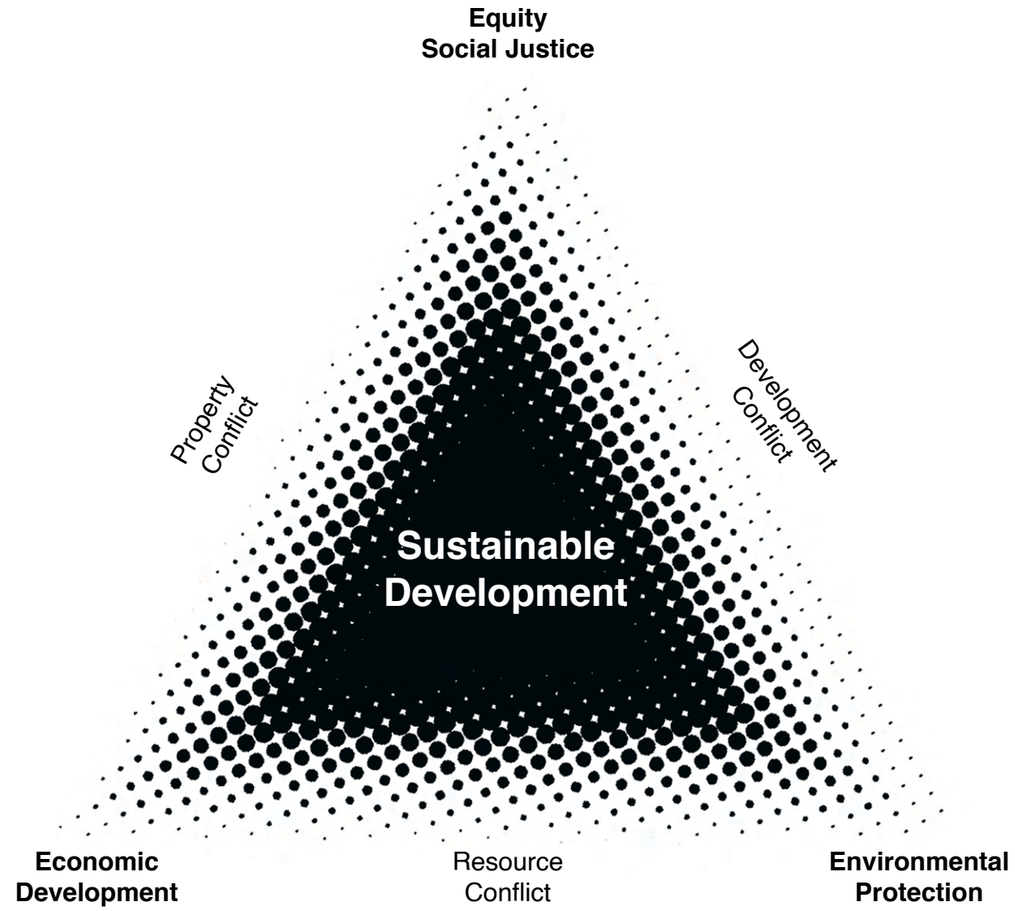


Fig. 5: The Planner's Triangle by Campbell (1996 & 2016). Illustration by author.

Unsustainable development—that is, any point of the Planner's Triangle removed from equilibrium—is fundamentally a problem of wicked complexity. Diagrammatic representations of these complexities, such as the Planner's Triangle, can despite their simplified form inspire new approaches to familiar problems. However, they are reductive in representing only three core aspects of planning, disregarding other factors of increasing importance—utilities, material flows, mobility, and more. These aspects are undoubtedly crucial parts of the development conflict in producing a satisfactory urban future, and underpin various levels of the urban system. (Rittel & Webber, 1973; Zellner & Campbell, 2015; Campbell, 2016)

Meerow et al. (2016) outlined these levels, further detailing subcategories for each. Each subcategory interacts with its neighbors, and each level interacts with both its subcategories and the levels above and below. These urbanization processes drive change, but further present and create the aforementioned wicked problems that inhibit intentional, systemic progress toward a desired future. Climate change, global economic fluctuations, and armed conflicts introduce additional risks, shifting the interactions within the urban system, and the expectations placed on its governance network. (Meerow et al. 2019)

Despite the general knowledge of how and why our urban levels operate, any addition of stress introduces a degree of volatility to the systemic balance. Whether it is the Planner's Triangle proposed by Campbell, or the urban system outlined by Meerow et al., both diagrammatic representations excel at conveying information with regard to a static system—for a system under tension, plagued by ambiguity and uncertainty, such approaches become increasingly ineffective. The end goal—resilient urban systems, constructed through sustainable development—can be summarized in words, presented in diagrams, but the distance between solution and situation increases yet.

Uncertainty is corrosive to the machinery of decision-making; a radical disconnect emerges between the end goal and the tools available to reach it. On the temporal scale of city-building, decades are swift to slip away—as time passes, the circle of future possibilities for all stakeholders contracts. In turn, necessary countermeasures to growing external pressures will edge out deliberate decision-making as the drivers of urban planning.

To mitigate this, alternative tools must be applied to planning processes, to maintain control over developmental pathways and avoid falling victim to the mercy of unforeseen events. One such way is anticipating what events might afflict future urban systems, and reverse-engineering the developmental pathways required to withstand them—a tool known as scenario-based planning.

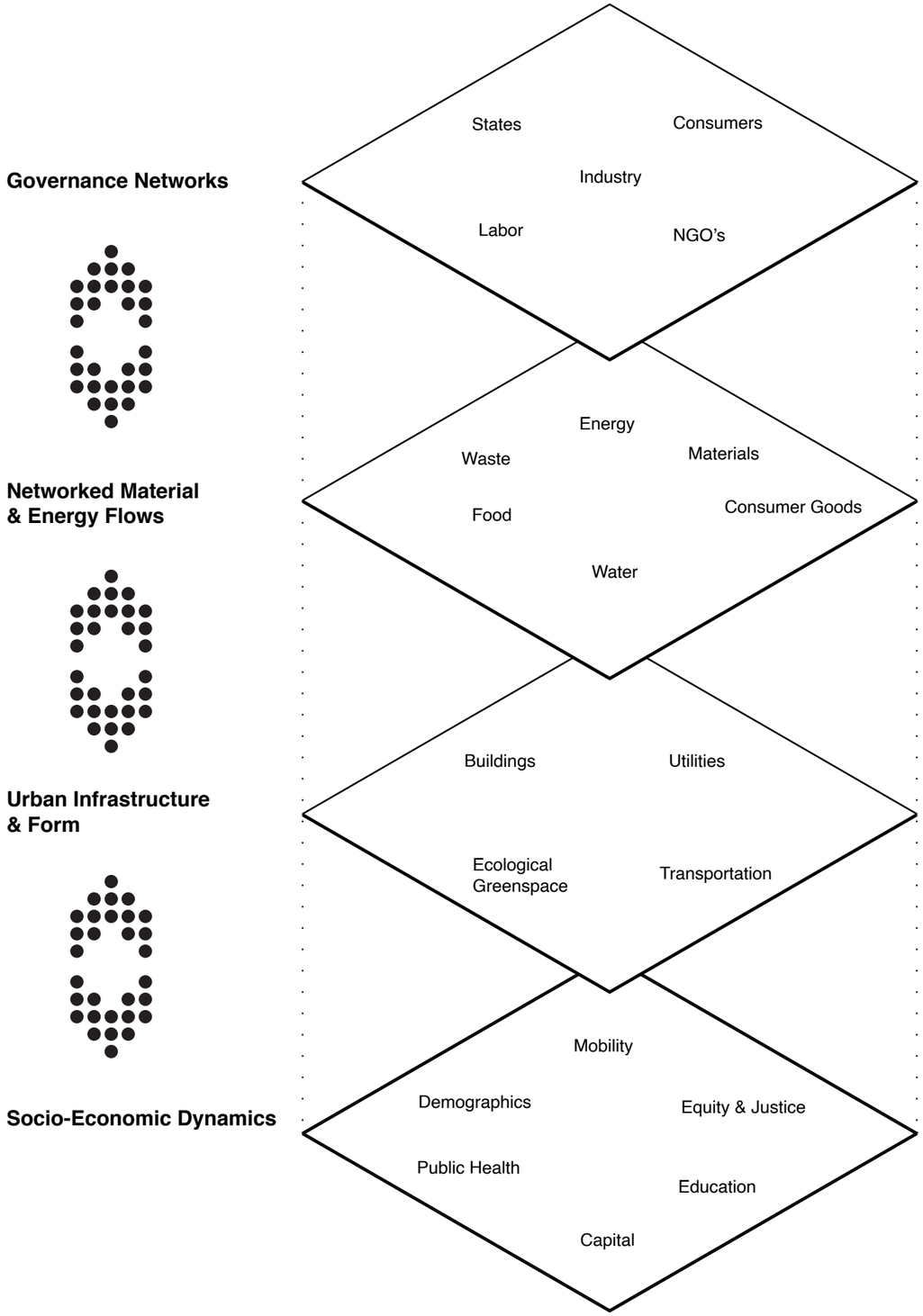


Fig. 6: Schematic of the urban system proposed by Meerow et al. (2016). Illustration adapted by author.

Exploratory Scenarios under Strategic Uncertainty

Scenarios depict visions, ideals, or stories about the future. They are a way through which the sustainability movement and its actors can debate tough questions, discuss compromises, as well as explore far-ranging solutions to wicked problems. Scenarios can be used to engineer a framework for how to reach desired solutions, or avoid undesirable trajectories. They help idealize what is worth striving for and what to avoid, even in distant futures. (Chakraborty & McMillan, 2015; Jaoude et al, 2022)

There is precedent for this scenario-based design process. Renowned architects have historically developed city-building ideals, such as Le Corbusier's Ville Radieuse or Ville Contemporaine, as well as Ebenezer Howard's Garden City, which has resurfaced as the city-planning ideal influencing Swedish building policy as of 2025. Since the 2010s, the ideal of the Smart City has also emerged as a new, technocratic utopia. (Kobeissi & Malmgren, 2025)

Exploratory scenario planning (XSP), however, differs from idealized masterplans. Visionary models such as those outlined by Howard or Le Corbusier converge around a handful of ideals, and propose an ultimate solution to an architectural problem based on those ideological guideposts.

XSP is, conversely, focused on the process, using the end goal as a medium. It can be used as the foundation for discussing alternative futures, as well as give planners a measure of planning authority in molding the desired development pathway. The future narrative embedded in the scenario can be used to weave together both quantitative and qualitative factors in a coherent process. (Myers & Kitsuse, 2000; Jaoude et al, 2022)

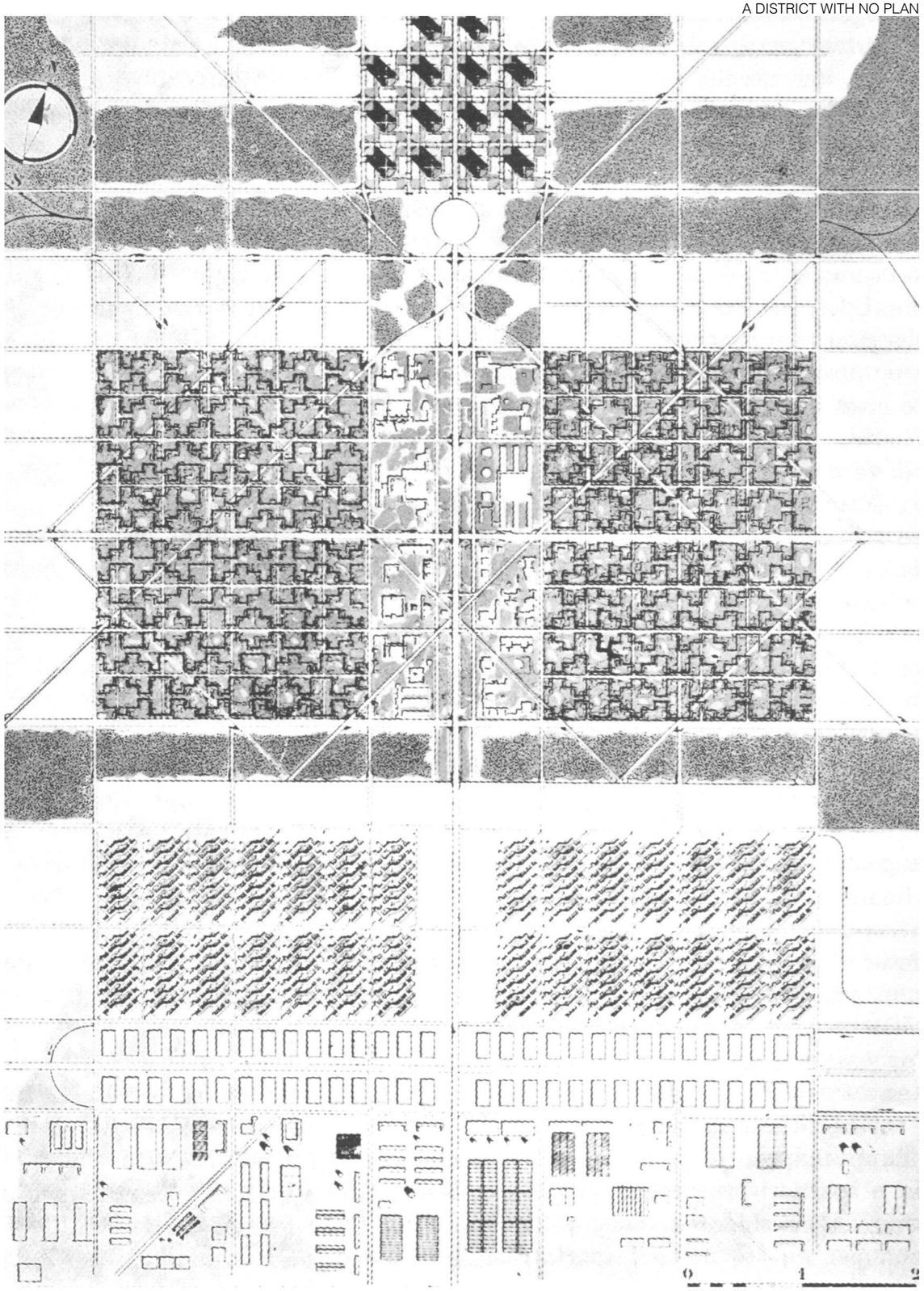
In contexts where strategic uncertainty is a foregone conclusion, predictive models lose definite authority as algorithmic error rates increase. Projections presume calculable risk; exploratory scenarios address discontinuity. XSP is used to examine various decisions against external uncertainties across urban levels, and further develop plans or strategies to mitigate explored challenges.

The rapid development of digital tools since XSP was created are beneficial to scenarios where iterations can verify results, or for the initial scenario development itself. Approaches for generating scenarios vary greatly depending on scale and location; the key to the XSP process is tracing the causal chain leading to the imagined future, rather than the exact tool used to create the scenario itself. (Khakee, 1991; Chakraborty et al, 2015; Jaoude et al, 2022)

By comparing alternative pathways, exploratory scenarios make trade-offs immediately visible. They expose how shifts in governance networks, urban infrastructure, or socio-economic dynamics can reconfigure outcomes over time.

This reframing does not inherently eliminate uncertainty; it makes the ambiguity part of the strategy, shifting it into an operational lever rather than a systemic bottleneck.

Under conditions of wicked complexity, exploratory scenarios can help organize the volatility that otherwise might disrupt any plausible development entirely.



La planimetria della Ville Radieuse (Le Corbusier).

azioni; *R*, alberghi e ambasciate; *C*, città degli affari; *D*, industrie; *E*, industrie pesanti (fra le due i depositi generali e i

Fig. 7: Le Corbusier's Ville Radieuse (Kohlstedt, 2018)

From Masterplan to Operation

If exploratory scenarios (XSP), are to function as more than speculative narratives, they must bridge the gap between strategy and operation. The distance between policy and transformation remains a critical point of contention of modern planning practices.

In the Swedish context, the Planning and Building Act (PBL 2010:900) establishes the municipalities' planning monopoly and requires long-term comprehensive planning through the "overview plan" (översiktsplan). While the plan defines strategic direction, implementation is decided through development plans (detaljplaner), where economic feasibility, stakeholder preferences, and legal constraints decide operational success. (Riksdagen, 2010)

Gothenburg's own planning framework embodies this tension; the city's masterplan highlights both densification and climate adaptation, while projected costs for required flood protection or infrastructural reinforcements stall planning processes, as demonstrated in Slakthusområdet. (Göteborgs Stad, 2025)

International precedents demonstrate the operational potential of the XSP approach. Arup's 2050 Scenarios framework outlines alternative systemic trajectories shaped by technological change, resource scarcity, and governance transformation. The framework becomes a benchmarking instrument for both development and investment strategies. (Arup, 2019)

Similarly, the European Commision publishes annual foresight reports to guide their strategy planning, thus advocating for scenario-based approaches as tools for navigating long-term uncertainty in complex systems. (EC, 2025)

In Sweden, organizations such as the Institute for Futures Studies (Institutet för framtidsstudier) have emphasized the necessity of long-range societal foresight in addressing issues ranging from aging populations to economic volatility.

For rapidly densifying urban regions such as Gothenburg, where population growth, housing demand, and climate risk converge, the margin for indecision narrows. Post-industrial districts cannot remain suspended in procedural hesitation. Consequently, masterplans require complementary instruments capable of testing development pathways before they become binding commitments.

Exploratory scenario planning offers such an instrument. XSP allows competing logics such as those identified in the Planner's Triangle to be examined independently, instead of allowing these priorities to contest one another within zoning negotiations. The question is not whether trade-offs occur, but whether they are made and evaluated systematically.

By deliberately selecting which futures to examine, bound by the findings of both academia and practice, XSP becomes more of an operational strategy rather than a speculative exercise. Yet, for such a strategy to inform planning decisions, its implications must be translated into measurable consequences.

To bridge the gap between strategy and development, alternative futures must therefore be made comparable through a shared language that makes trade-offs graphically visible.

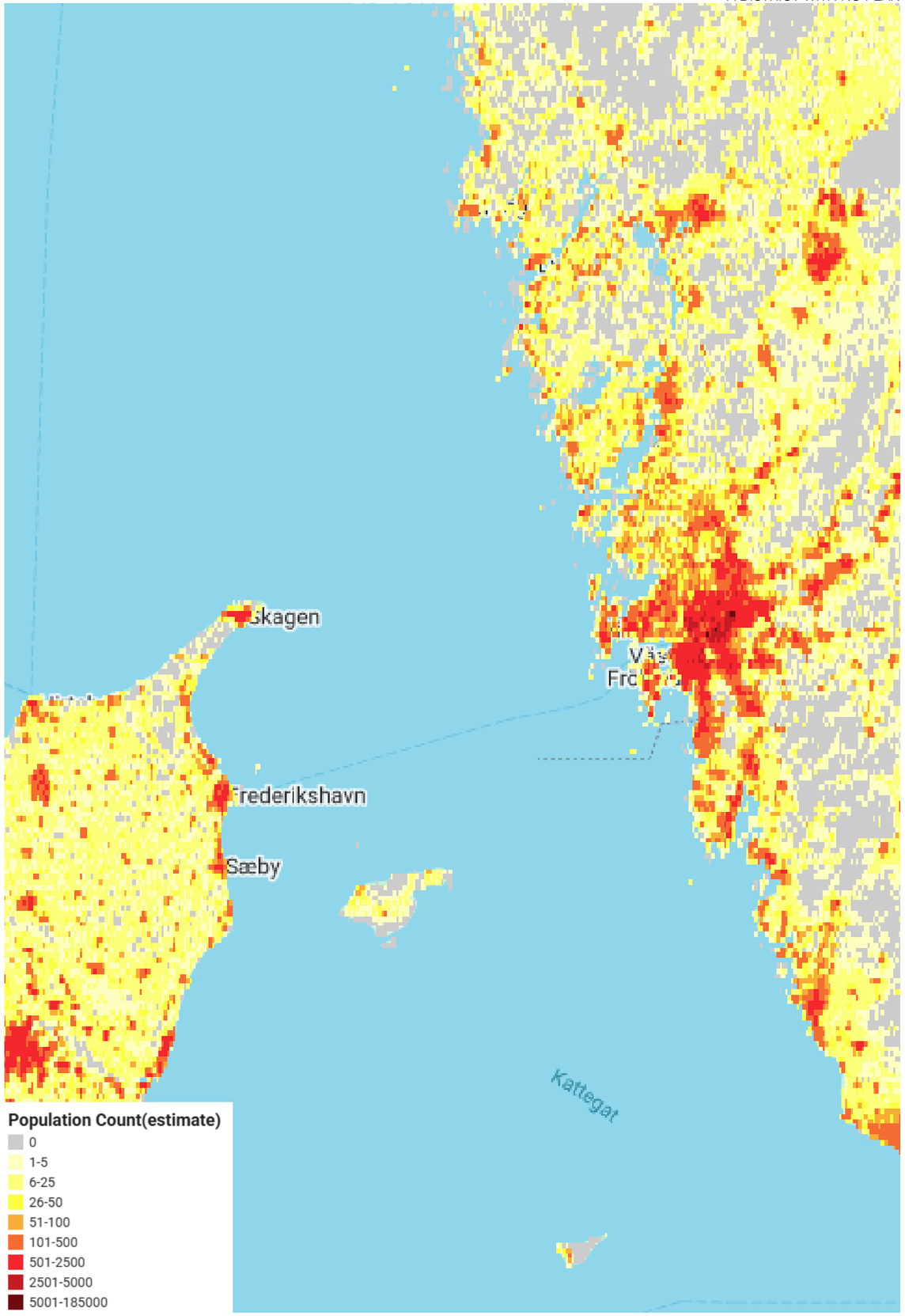


Fig. 8: Map of regional population densities (Earth Engine, 2026)

Local Climate Zones

To enable comparison between alternative scenarios, Local Climate Zone (LCZ) classification can be used to translate urban morphology into graphic charateristics. Developed by Stewart and Oke (2012), the LCZ system categorizes urban environments based on building height and surface cover.

The LCZ mapping of Gothenburg and its nearby regions (see Figure 9) shows that the central city is dominated by compact low- and mid-rise zones, which taper out to open midrise as the city sprawls outward. Mapping the city through LCZ classification establishes the environmental and urban constraints within which future developments must operate.

The LCZ types are divided into built cover types (LCZ-1 to 10) and land cover types (LCZ-A to LCZ-G). The framework was developed for urban heat island studies, as a response to a lack of adequate frameworks defining different classes of urban configurations. (Stewart & Oke, 2012)

While LCZs were developed to study urban heat island (UHI) effects and examine mitigation strategies, Stewart and Oke also suggest they may be used in urban planning as a way of gaining overview of a district's spatial distribution.

Applying the LCZ framework at smaller spatial scales presents certain limitations. The classification system was originally designed for neighborhood-scale analysis, where grid cells represent areas of several hundred meters. At finer resolutions, such as the 30x30 m grid used in this thesis, individual cells may only capture fragments of the urban fabric rather than the aggregated form that the LCZ system was intended to illustrate.

This creates cases where a grid cell may appear to represent a compact mid-rise neighborhood, even though the individual building configuration may not strictly satisfy the thresholds defined in the LCZ framework.

For post-industrial districts with a mix of built cover types on a smaller site (such as Slakthusområdet), the resulting classification may therefore reflect relative urban morphology rather than strict LCZ-typological conformity.

Its value within this study lies primarily in revealing spatial patterns of density, permeability, and vegetation distribution, which can inform subsequent scenario design, testing, and performance analysis.

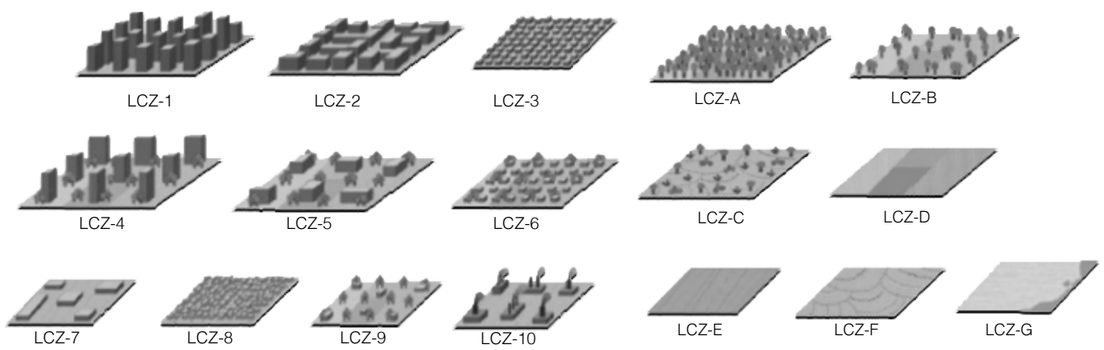


Fig. 9: Adapted map of Local Climate Zone types (CC 4.0)

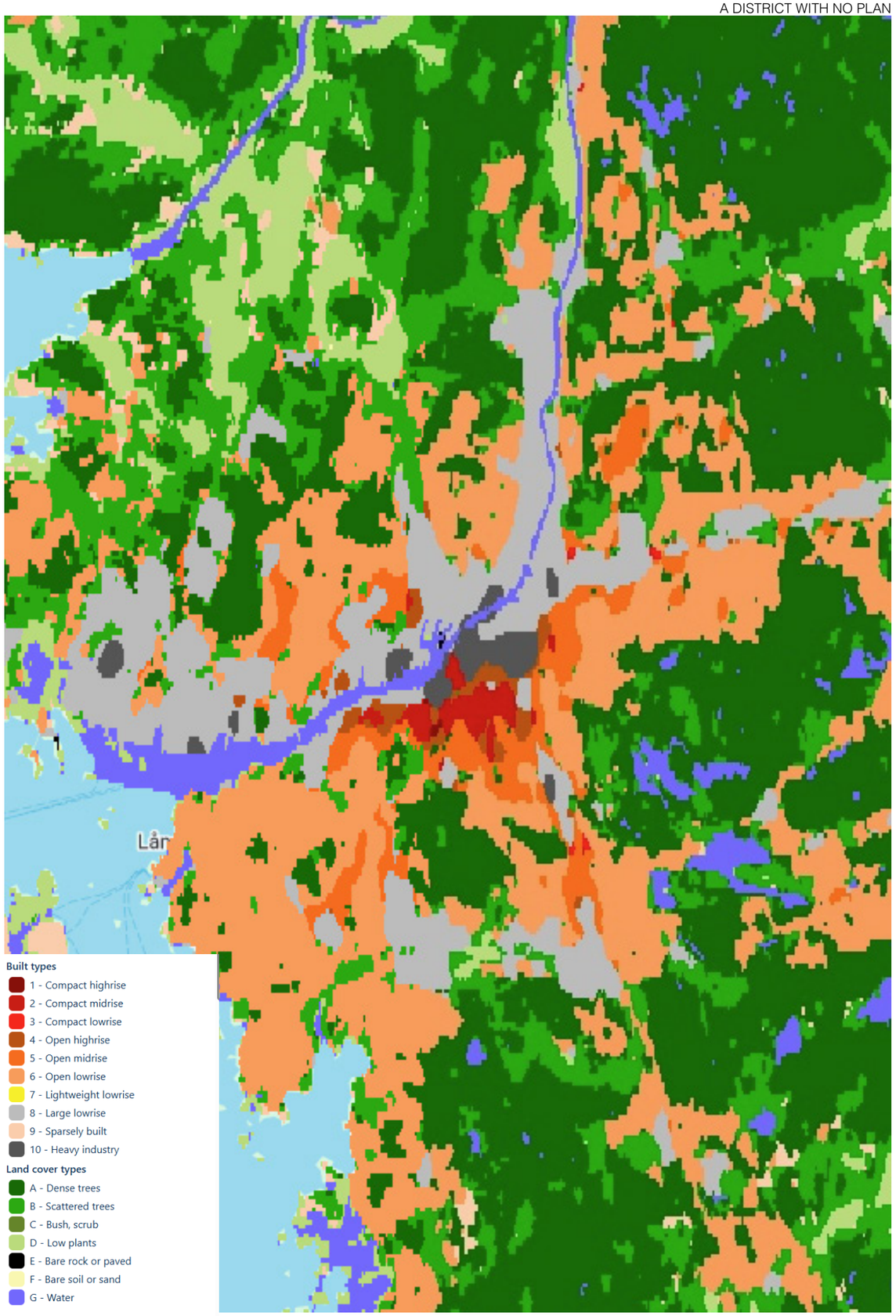


Fig. 10: Map of Gothenburg's Local Climate Zones (Earth Engine, 2026)

A District With Three Futures?

The preceding research sections establish the overarching conceptual and theoretical foundations used to structure the design scenarios explored in this thesis.

Planning theory frames urban development as a negotation between competing normative priorities, illustrated through Campbell's Planner's Triangle of economic development, environmental protection, and social equity.

Simultaneously, urban systems research demonstrates that these priorities operate through multiple interconnected layers, such as those examined by Meerow et al (2016), including governance networks, material flows, and urban form.

Exploratory Scenario Planning (XSP) provides the methodological framework for examining alternative future developments, beyond the constraints of traditional planning practices.

Rather than directly attempting to solve the tensions within the Planner's Triangle, or the different levels comprising the urban system, XSP allows alternative futures to be examined independently.

In this thesis, XSP will be employed to produce scenario designs, by temporarily prioritizing one normative end of the Planner's Triangle and tracing its implications across the urban system.

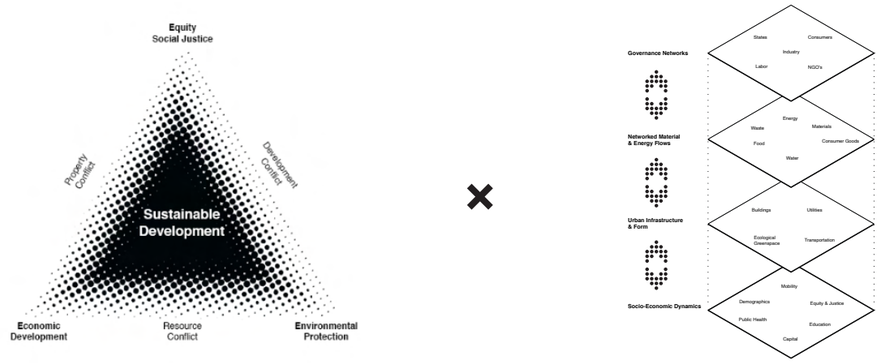


Fig. 11: The Planner's Triangle (Campbell, 1996), meets Meerow et al. (2016)'s urban systems.

The Planner's Triangle functions as the strategic driver of scenario development, while the urban system layers proposed by Meerow et al. provide the operational structure with which each scenario is designed. Each scenario assumes the temporary dominance of one planning priority, and examines how that reorganizes governance networks, spatial form, and material flows.

These priorities are not purely theoretical constructs; they are already present within Gothenburg's long-term planning agenda, where ambitions for economic growth, climate adaptation, and social inclusion all coexist within the 2050 masterplan. (Göteborgs Stad, 2022). As a result, districts such as Slakthusområdet become arenas in which these broader urban priorities must ultimately be negotiated and translated into spatial outcomes.

By structuring scenarios in this manner, the thesis situates the redevelopment of Slakthusområdet within the real strategic tensions of Gothenburg's long-term urban development, allowing the implications of different planning logics to be examined in a systematic and comparable manner.

"Urban Commons"
This scenario prioritizes social equity and collective access.

Urban Commons exposes the spatial consequences of prioritizing accessibility, affordability, and collective infrastructure over both capital concentration and maximal ecological preservation.

"Ecological Stewardship"
This scenario prioritizes environmental protection. Spatially, the district is reorganized to increase permeable surfaces, expand green space, and reduce compact build intensity.

Ecological Stewardship favors long-term sustainability over short-term spatial efficiency.

"Capital Services"
This scenario assumes the dominance of economic development. The district is restructured toward higher exploitation ratios, compact building typologies, and concentrated commercial functions.

Capital Services prioritizes density, productivity, and spatial efficiency, exploring a future steeped in intensified urban growth.

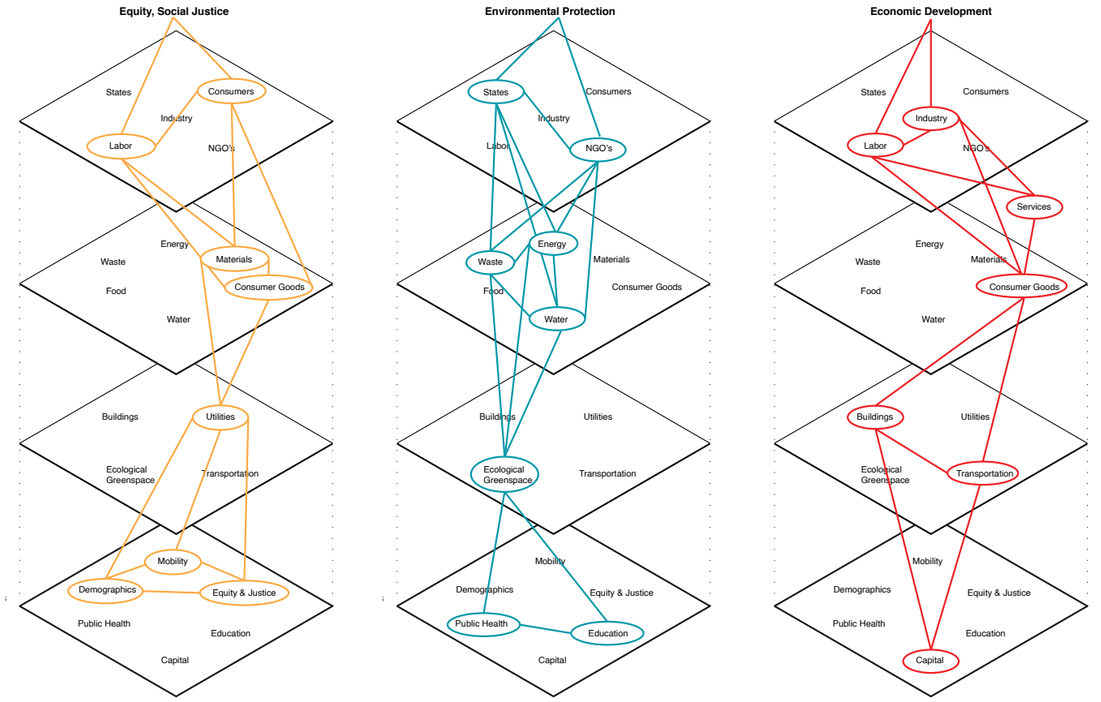


Fig. 12: Development logic for each of the alternate pathways designed. Illustration by author.

Site Analysis

The History and Present of Slakthusområdet

The Gamlestaden slaughterhouse in Gothenburg was inaugurated in 1905 by King Oscar II and Governor Gustaf Lagerbring, marking a significant milestone in Sweden's infrastructure (see Figure 13). As the country's second municipal slaughterhouse, it represented a major advancement in industrial hygiene practices. It was partially the result of the ongoing fight against tuberculosis, which was a major health concern at the time.

Spanning 83,000 square meters, the facility housed 24 buildings, including slaughterhouses, market halls, administrative offics, housing, and a restaurant. The slaughterhouse was modern for its time, featuring conveyor belts and a railway track. The project resulted in a final cost of nearly 3 million SEK, exceeding the initial estimate by 50%, and amounting to a quarter of Gothenburg's annual budget. (Slakthuset, n.d.)

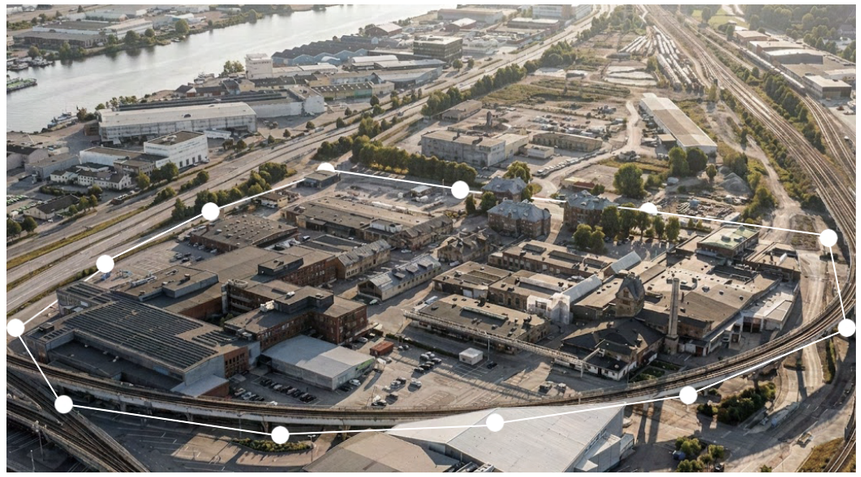
3 000 000 SEK in 1905 equals

211 261 432

SEK in 2026 (+6 942,05%)

Today's equivalent worth, 211 MSEK, would be 34% of the city's 2026 results budget (Ekonomifakta, 2026; Göteborgs Stad, 2026). This comparison highlights the significant scale of the initial investment in comparison to today's standards. As such, the slaughterhouse represented a crucial part of the city's industrial development, as well as a big leap forward in the distribution and production capacity of food to the growing urban center.

Fig. 13: Timeline over Slakthusområdet construction and development. Illustration by author.



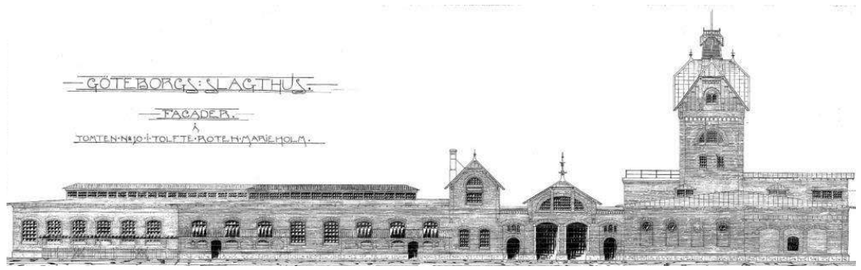


Fig. 14a & 14b: Photograph overview of Slakthusområdet. (Google Earth, 2026)
Fig. 15: Elevation view of Slakthuset. (Higab, 2015)

Fig. 16: Urban plan over the site and its larger urban context.
Scale 1:10 000

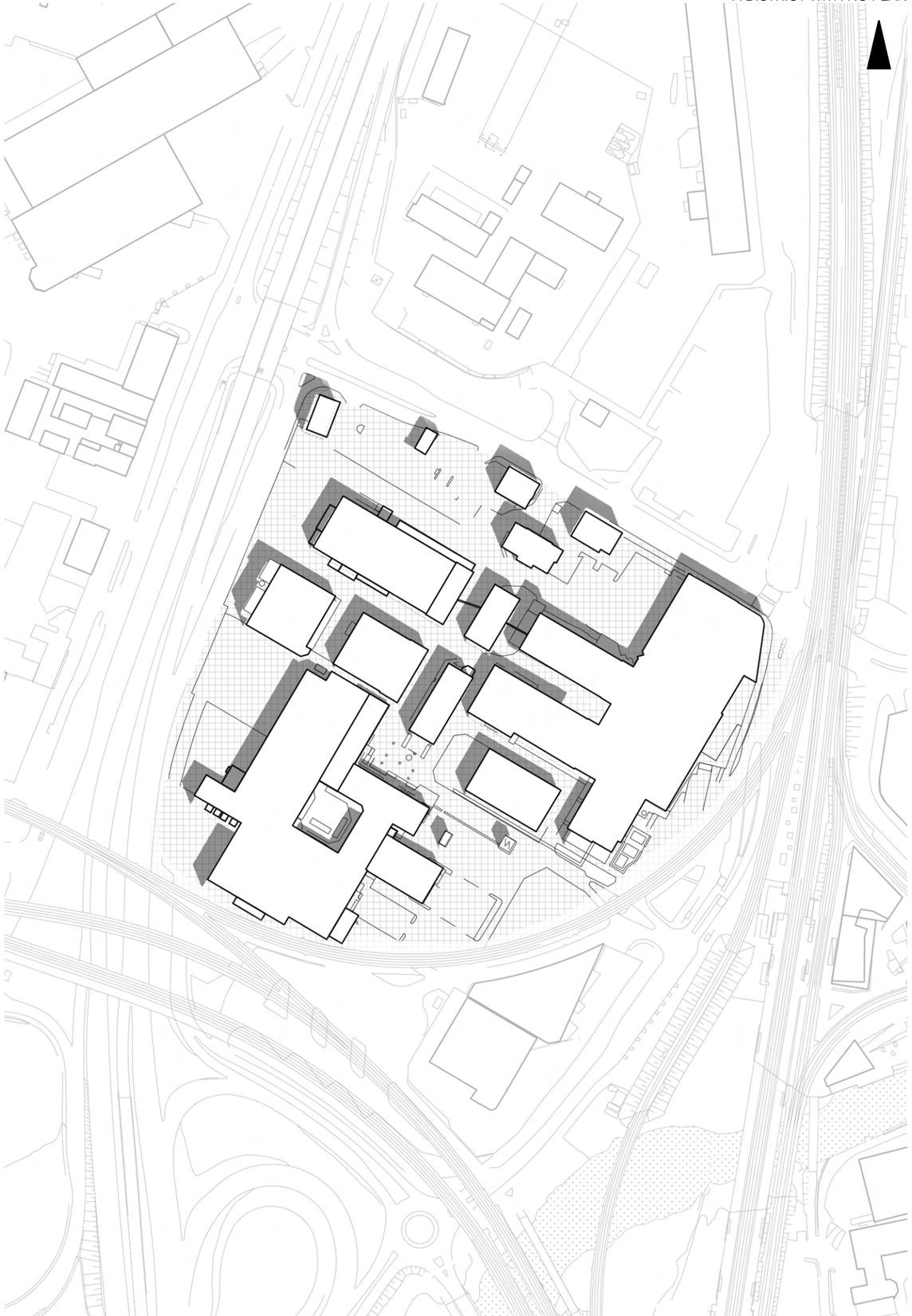


Fig. 17: Urban plan over Slakthusområdet and its context.
Scale 1:5000

Commercial Historic Residential

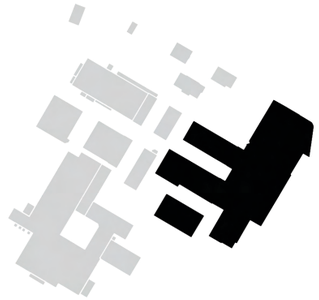
Fig. 18: Urban plan over the site and its larger urban context.
Scale 1:10 000

Commercial

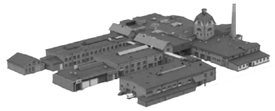
A large-scale commercial center represents a later phase of development in the area.

Large-scale commercial building primarily used for offices and business services.

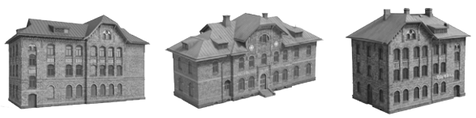
Historic

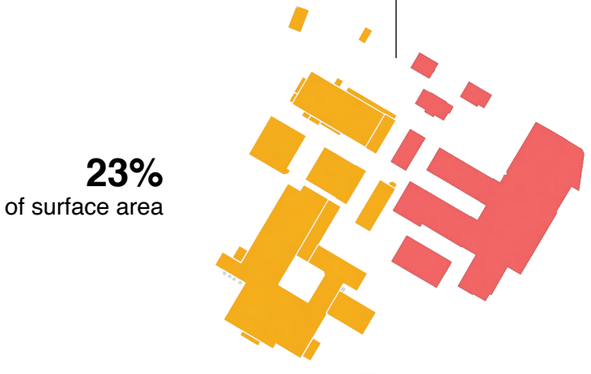


The slaughterhouse borders the site, as a low-rise sprawling complex.



Historic slaughterhouse used for meat processing and distribution.





23%
of surface area

18%
of surface area

58%
of surface area is paved, parking, or industrial access spaces.

Fig. 19: Division of commercial vs. historical spaces in Slakthusområdet.

Urban Context

Slakthusområdet is situated in Gamlestaden, a district located north-east of Gothenburg's central urban core.

The site itself is isolated by the highways and railway bridges surrounding it, accessible through smaller access roads intended for logistics and delivery to the industrial and commercial facilities within Slakthusområdet.

The district's surrounded by more industrial facilities on all sides, as there are multiple harborfront businesses lining the Göta river.

To the east of the site, Gamlestaden's residential neighborhoods occupy the land between Slakthusområdet and Storeberg, and to the south, Marieholmsmotet separates the site from the Gothenburg city center.

As such, the site is relatively geographically independent despite its central location in the wider urban context of Gothenburg.

Fig. 20: Site overview captured using Google Earth (2026), upscaled with Gemini.

Fig. 21: Overview of Slakthusområdet's buildings in context with its surroundings.
Scale 1:10 000

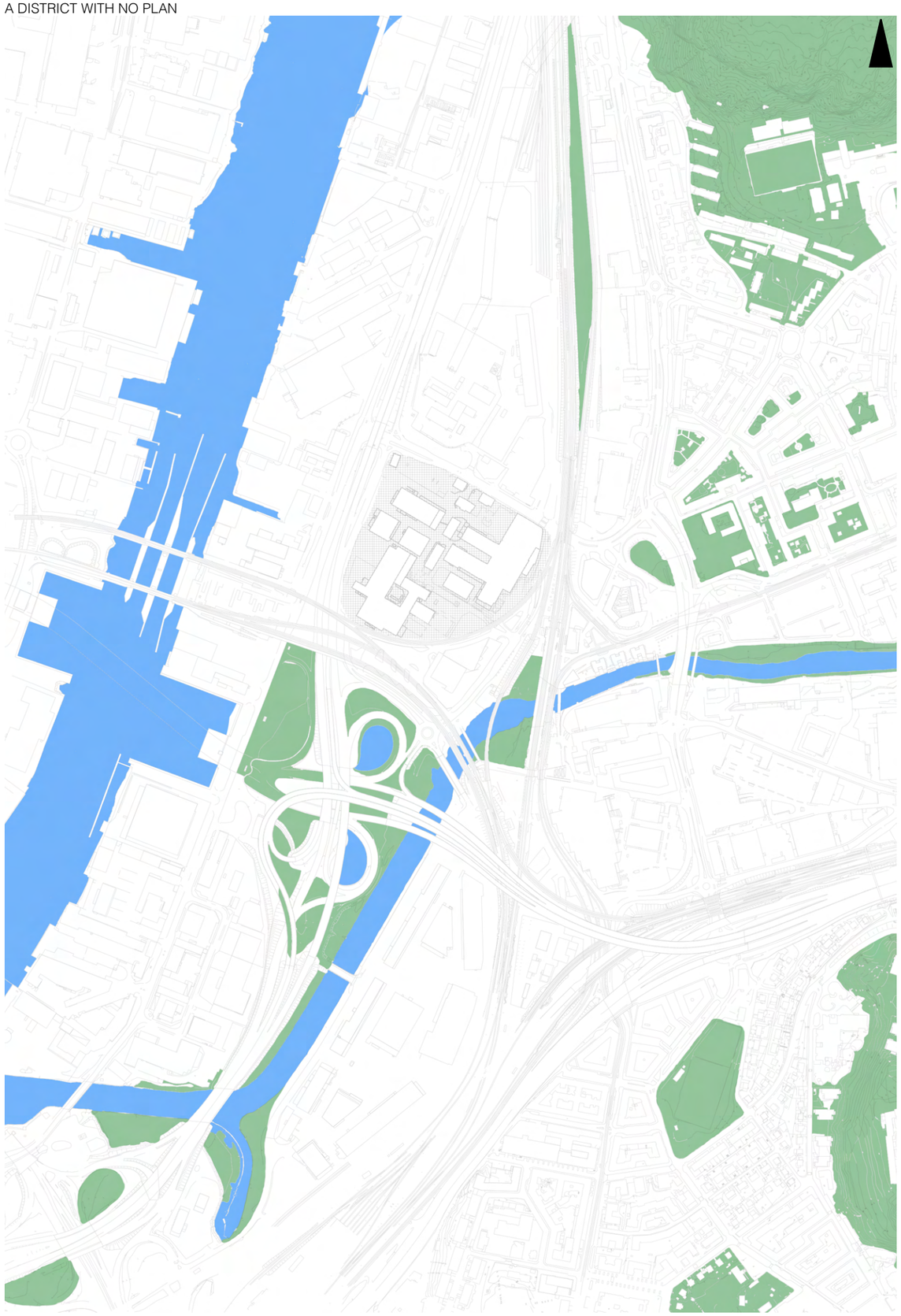


Fig. 22: Overview of blue-green mapping in Slakthusområdet's urban context.
Scale 1:10 000

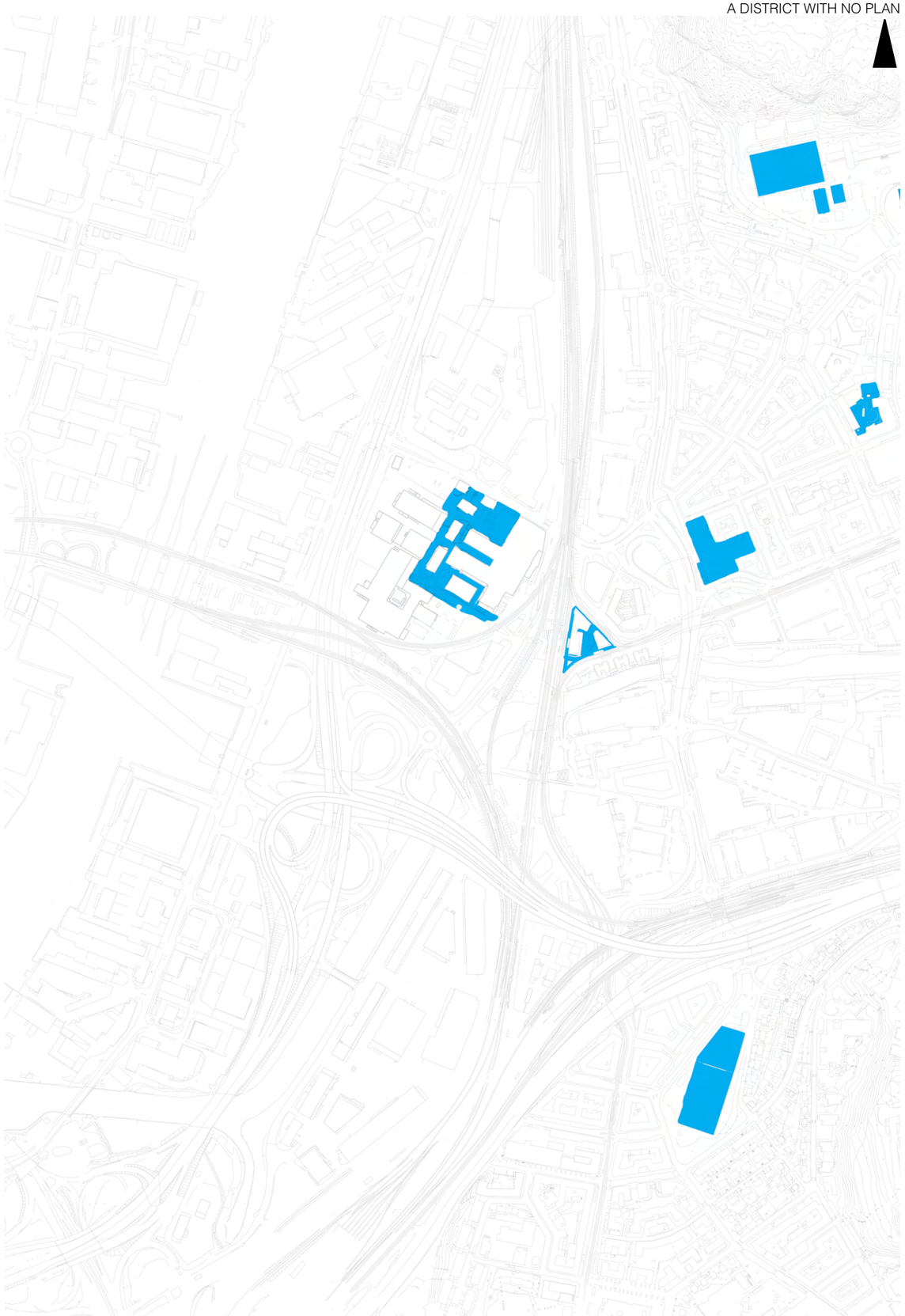


Fig. 23: Overview of blue-green mapping in Slakthusområdet's urban context.
Scale 1:10 000

Local Climate Zone Mapping

The Local Climate Zone (LCZ) mapping of the site reveals an urban fabric primarily composed of compact mid-rise and heavy industry zones, reflecting the historical industrial use of the slaughterhouse complex and surrounding manufacturing facilities.

The dominance of these zones indicates a relatively high building density and a significant concentration of low-to-mid-rise structures with extensive floor areas.

Only limited patches of vegetation and open land cover appear within the mapped area, but their distribution is fragmented across the site.

The ground is largely bare rock or paved (LCZ-E), which altogether makes the site surface impermeable, and at risk for localized heat retention and flash flooding during heavy rainfall events.

Because the ground cover consists almost exclusively of non-porous materials—such as asphalt, concrete, and the exposed bedrock typical of Gothenburg's topography—natural infiltration is nearly non-existent

The large building footprints and enclosed courtyard characteristics further limit air circulation.

The LCZ mapping suggests that the site functions as a heat sink, where the combination of limited evapotranspiration from vegetation and the "canyon effect" of the compact building footprints produces microclimatic conditions synonymous with the Urban Heat Island (UHI) effect.

Fig. 24: Local Climate Zone Mapping, 30 m resolution.

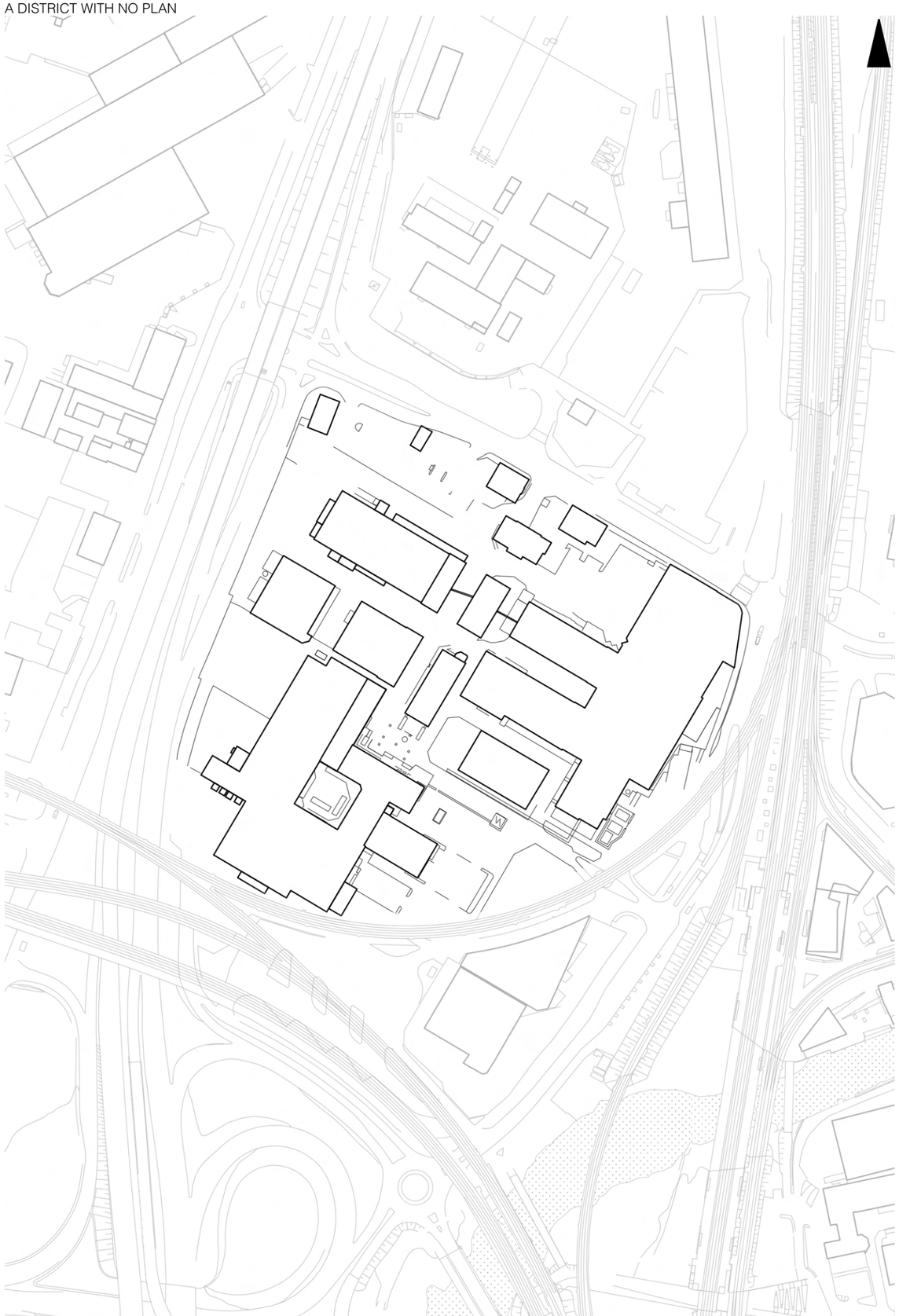


Fig. 25: Site masterplan.
Scale 1:5000

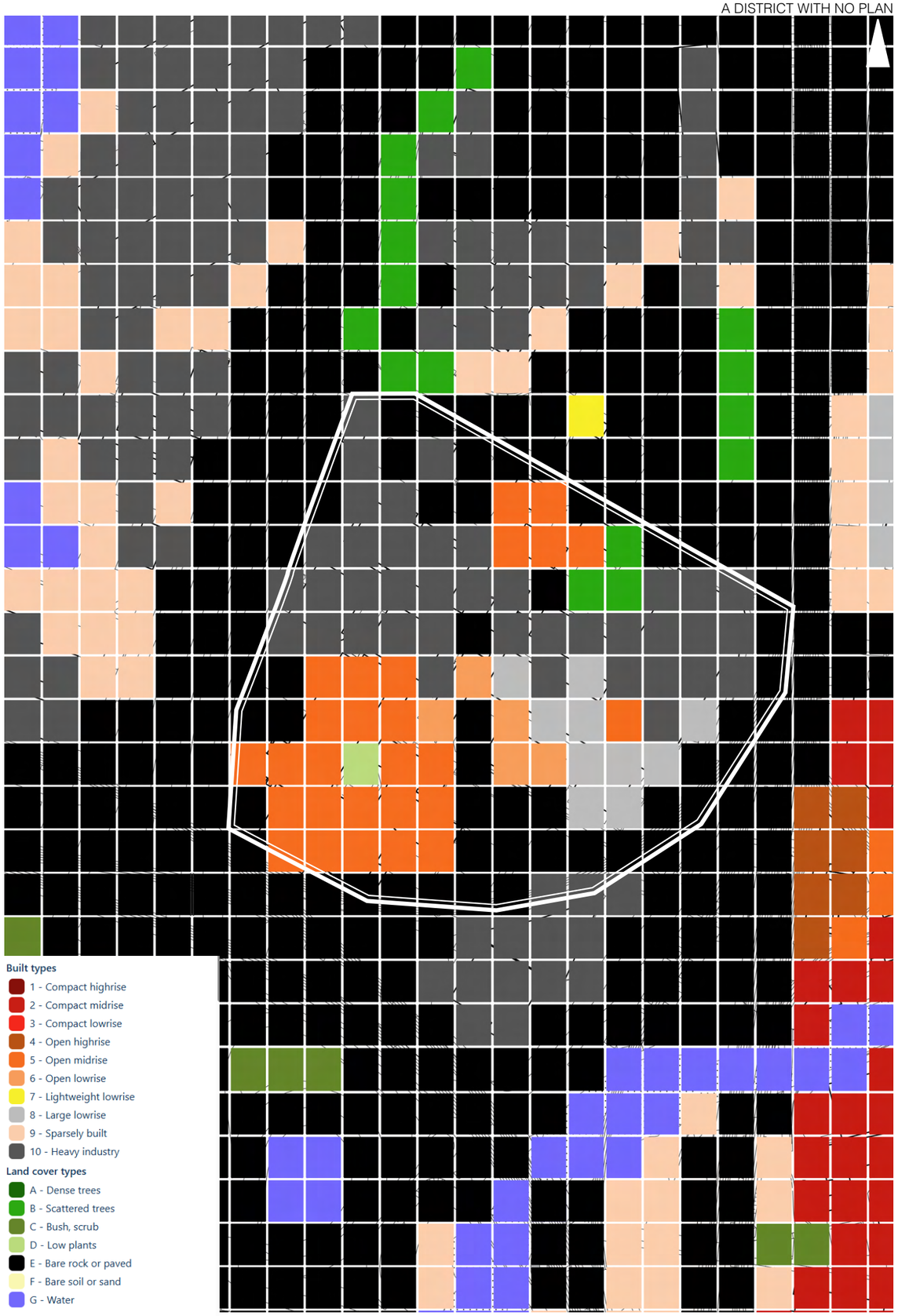
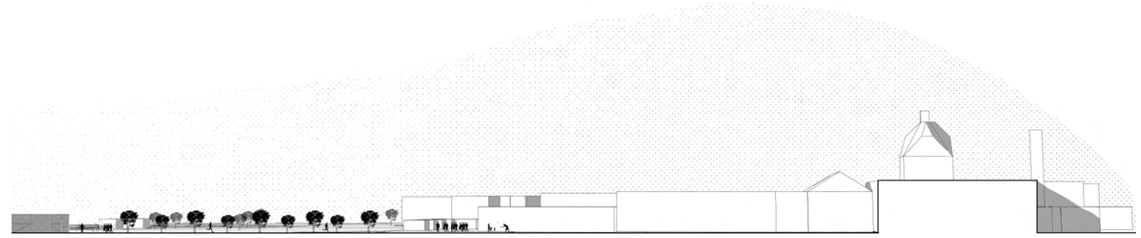


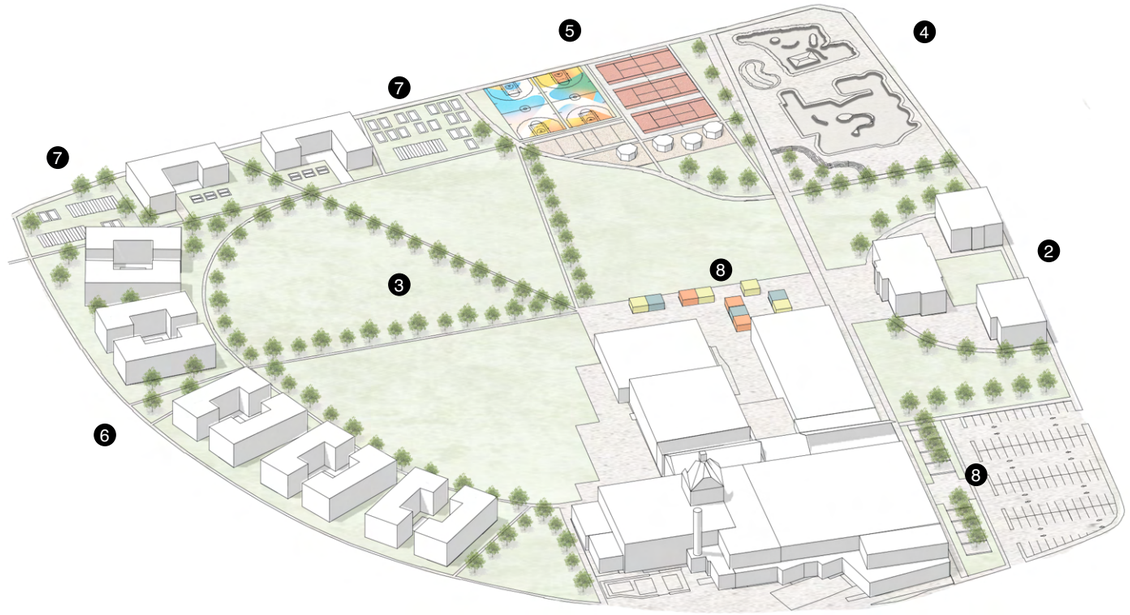
Fig. 26: Local Climate Zone Mapping, 30 m resolution.

Urban Commons

This scenario frames the site as a shared urban commons. A skate park and sports area activate one corner, while shared gardens and co-living housing support everyday collective living. A large central green space opens the site to all, anchored by an open-air market that keeps social and economic life public, accessible, and shared.



Section A-A.
Scale 1:1000



1. Slakthuset (“Slaughterhouse”)
2. Börshusen (“Stock Exchanges Houses”)
3. Open-Air Baseball Field
4. Skate Park
5. Sports Courts
6. Cooperative Housing
7. Community Garden
8. Public Parking
9. Open-Air Market

Fig. 27: Site plan for the Urban Commons scenario.
Scale 1:2000

Fig. 28: Section for the Urban Commons scenario. Scale 1:1000
Fig. 29: Isometric overview for the Urban Commons scenario. Scale 1:3000

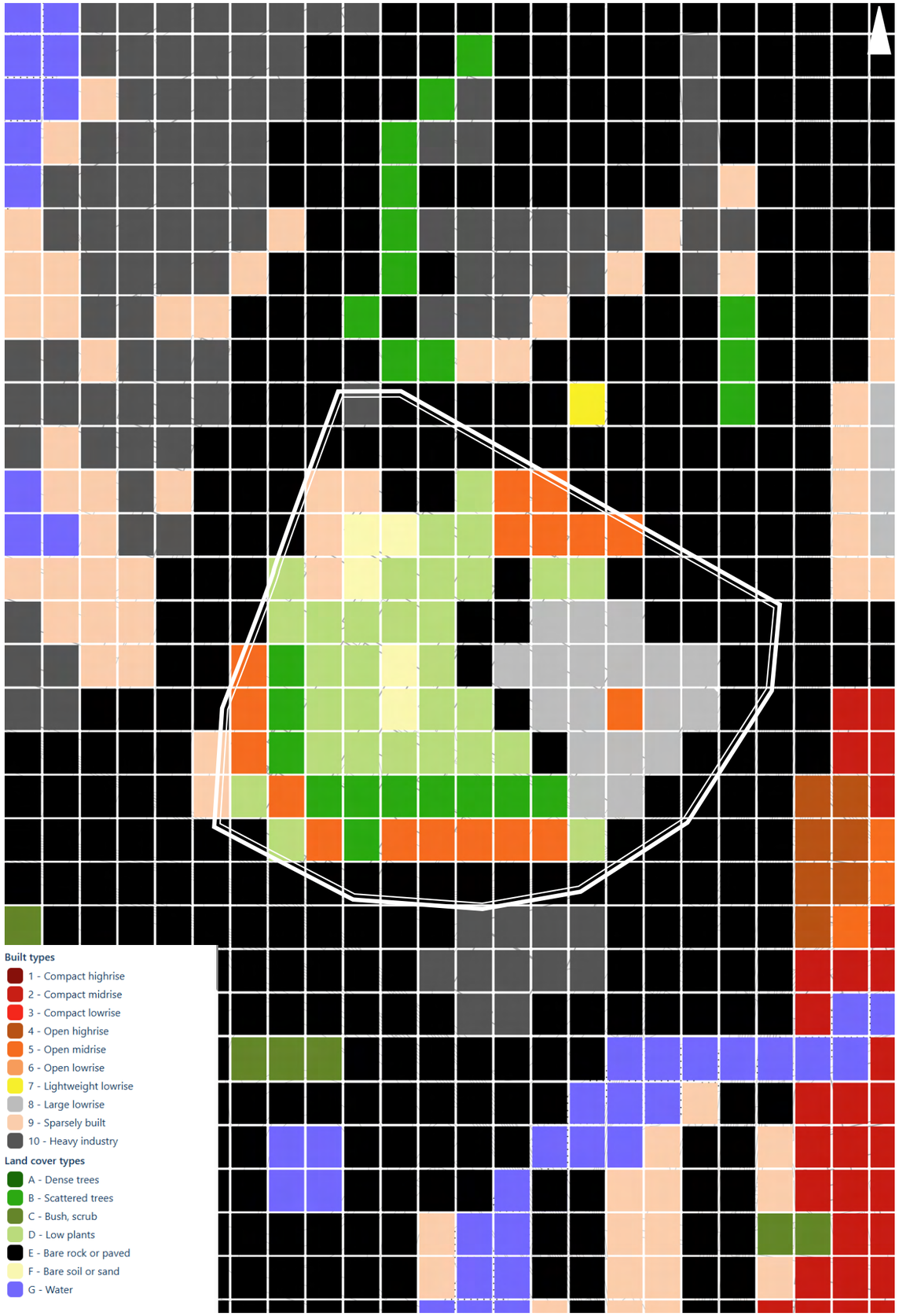


Fig. 30: Local Climate Zone Mapping, 30 m resolution.

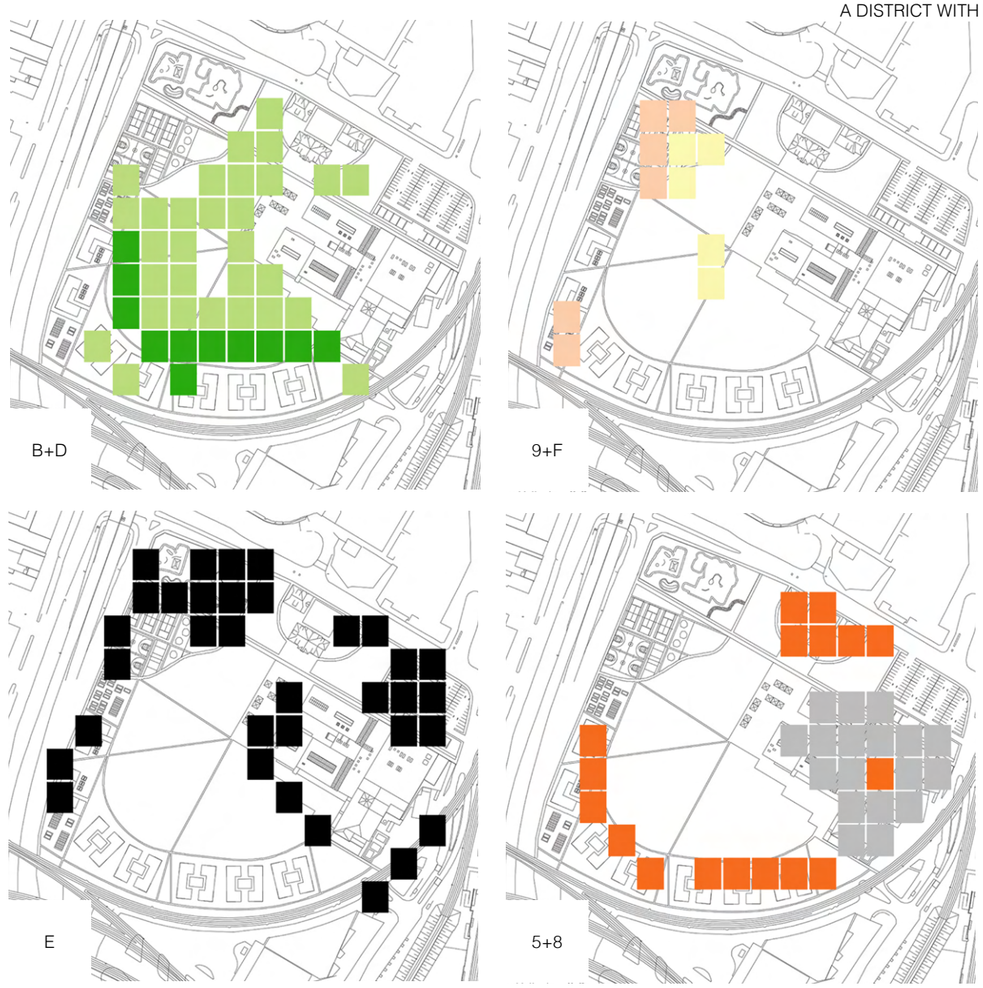


Fig. 31: LCZ mapping divided into categories.

The Urban Commons scenario logic utilizes a differentiated mix of LCZ types to support a program focused toward the “Equity & Social Justice” node of the Planner’s Triangle.

In this scenario (see Figure 30 & 31), the green infrastructure—LCZ B (Scattered Trees) and D (Low Plants)—is clustered to form a centralized “shared heart” for the district.

This is supplemented by LCZ 9 (Sparsely Built) and F (Bare Soil or Sand), which represent social spaces for sports and recreation.

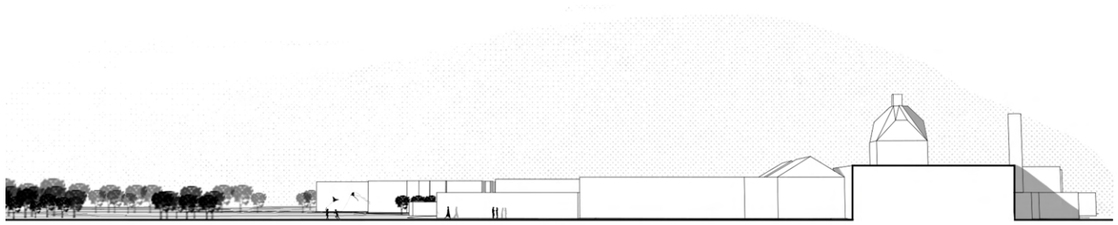
The clusters of Open Midrise (LCZ 5) in the form of the co-operative housing blocks allow for shared courtyards, where and transition zones blur the line between public and private.

Within this framework, both the slaughterhouse (“Slakthuset”) and the former stock exhange houses (“Börshusen”) remain as the district’s primary urban anchors on the eastern side, serving as robust social hubs of the scenario.

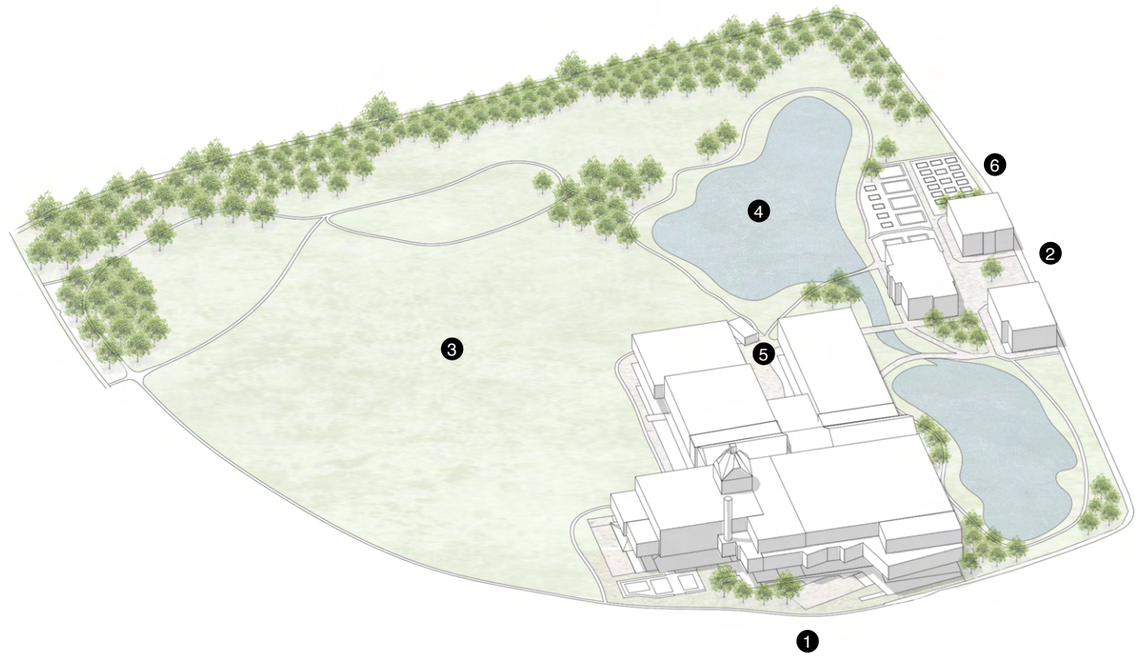
A central path cuts through the district, providing access to the parking lot on its northeastern side which enables public access, and connects the historic buildings with the recreational sports park on the other side of the site.

Ecological Stewardship

This scenario reshapes the site around ecological stewardship. Built areas recede to allow continuous green space, blue-green landscapes, and expanded permeable surfaces to dominate the landscape. Ponds, soft edges, and passive climate strategies organize movement and form, prioritizing long-term environmental resilience over compactness or spatial efficiency.



Section A-A.
Scale 1:1000



1. Slakthuset (“Slaughterhouse”)
2. Börshusen (“Stock Exchanges Houses”)
3. Open-Air Fields
4. Ponds
5. Visitor Center
6. Flower Garden

Fig. 32: Site plan for the Ecological Stewardship scenario.
Scale 1:2000

Fig. 33: Section for the Ecological Stewardship scenario. Scale 1:1000
Fig. 34: Isometric overview for the Ecological Stewardship scenario. Scale 1:3000

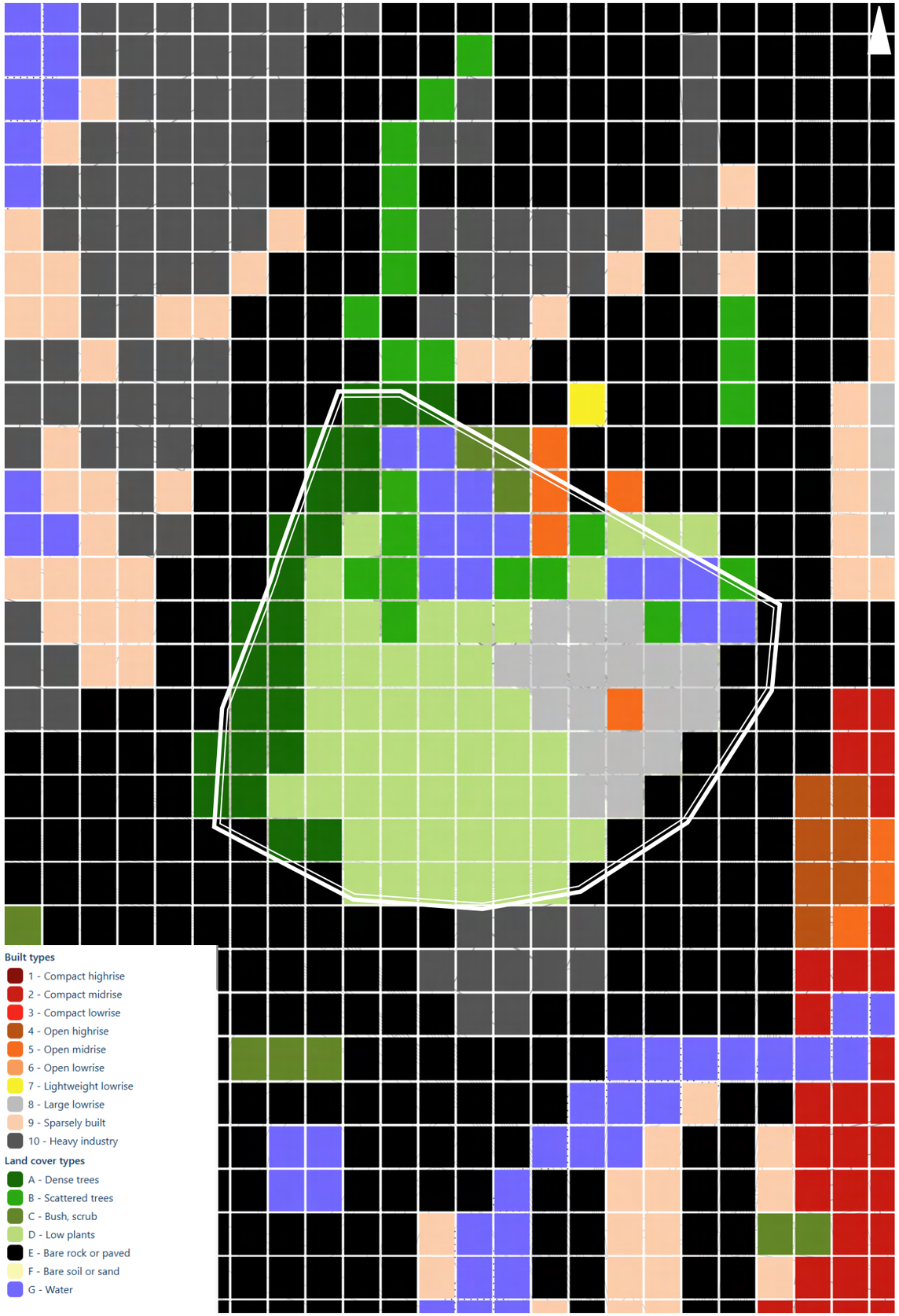


Fig. 35: Local Climate Zone Mapping, 30 m resolution.

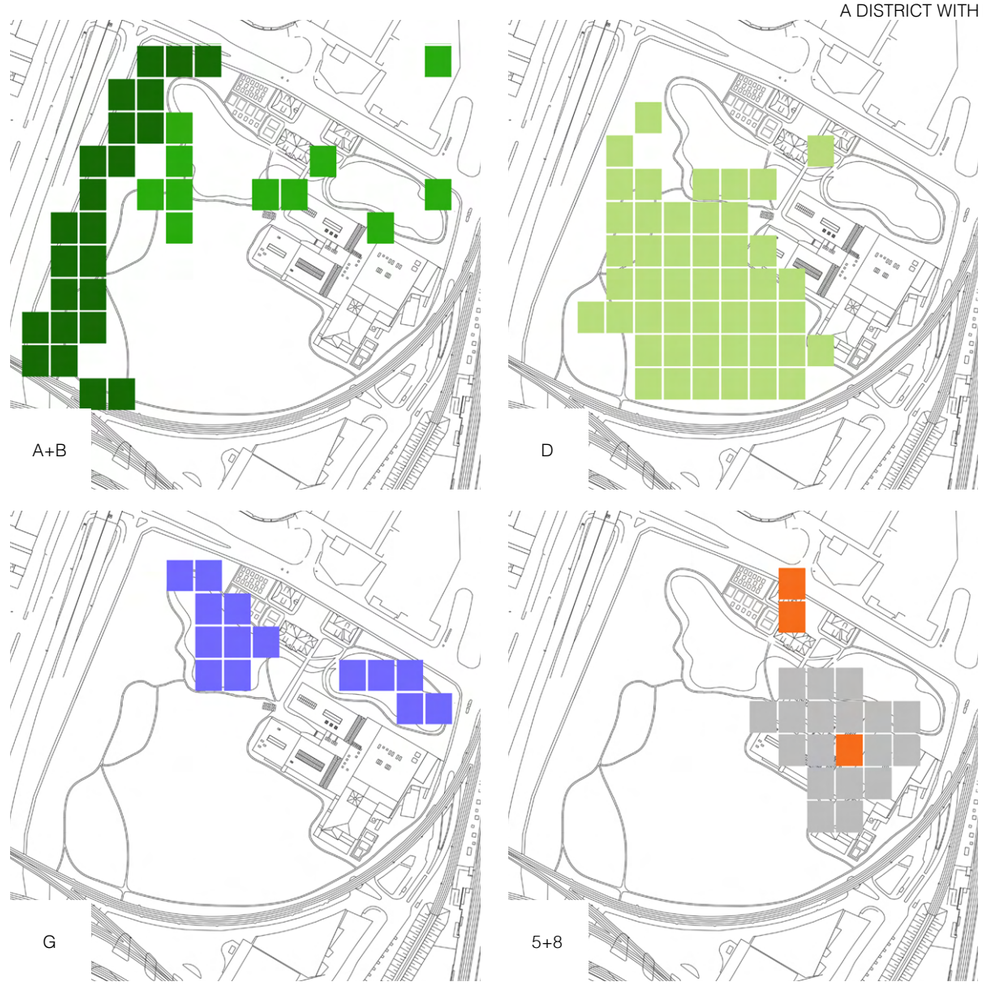


Fig. 36: LCZ mapping divided into categories.

The LCZ distribution for the Ecological Stewardship scenario represents a spatial commitment to climate resilience and biodiversity over traditional exploitation density (see Figure 36).

In this scenario, the LCZ grid is dominated by Land Cover Types A (Dense Trees) and B (Scattered Trees), which together with the considerable cover of D (Low Plants) form a continuous, permeable landscape; a sharp departure from the closed, impermeable concrete surfaces previously dominating the space.

Further, part of the site is covered by LCZ type G (Water), in the form of two ponds to the northern side of the side.

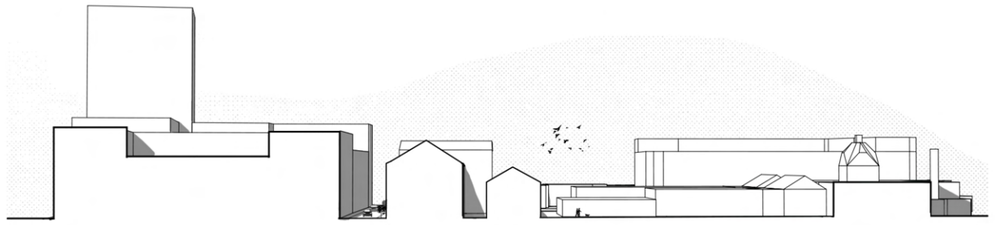
By converting a significant percentage of the site to LCZ-G and LCZ-D, the scenario demonstrates an exaggerated prioritization of the Ecological node of the Planner's Triangle (Campbell, 2016).

The slaughterhouse ("Slakthuset") remains on the eastern side of the site, though the offices to the north have been demolished to make way for the new blue-green focus of the district. The stock exchange houses ("Börshusen") also remain, but an open flower garden has replaced the parking lot to further enhance the ecological focus of the scenario.

Paved pathways anchor the district to the surrounding city, enabling citizens to circle through the area.

Capital Services

This scenario organizes the site around intensified economic production. Compact building blocks, dense commercial programs, and hard-edged public space maximize land use and circulation efficiency. Productivity and growth are in focus, producing an urban form defined by concentration, accessibility, and development.



Section A-A.

1. Slakthuset (“Slaughterhouse”)
2. Börshusen (“Stock Exchanges Houses”)
3. Public Plaza
4. Park
5. Mixed-Use High-Rise
6. Mixed-Use Mid-Rise

Fig. 37: Site plan for the Capital Services scenario.
Scale 1:2000

Fig. 38: Section for the Capital Services scenario. Scale 1:1000
Fig. 39: Isometric overview for the Capital Services scenario. Scale 1:3000

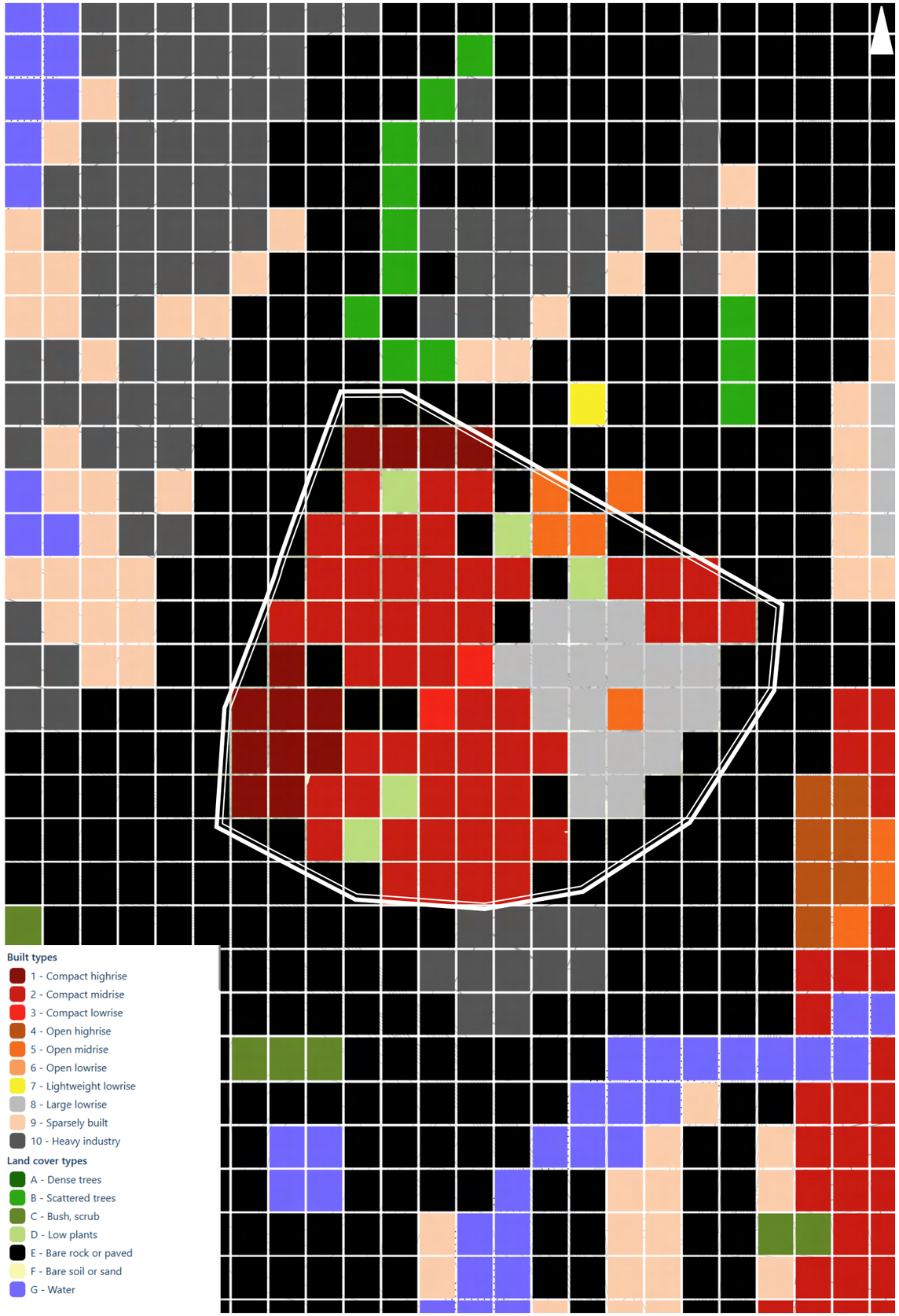


Fig. 40: Local Climate Zone Mapping, 30 m resolution.

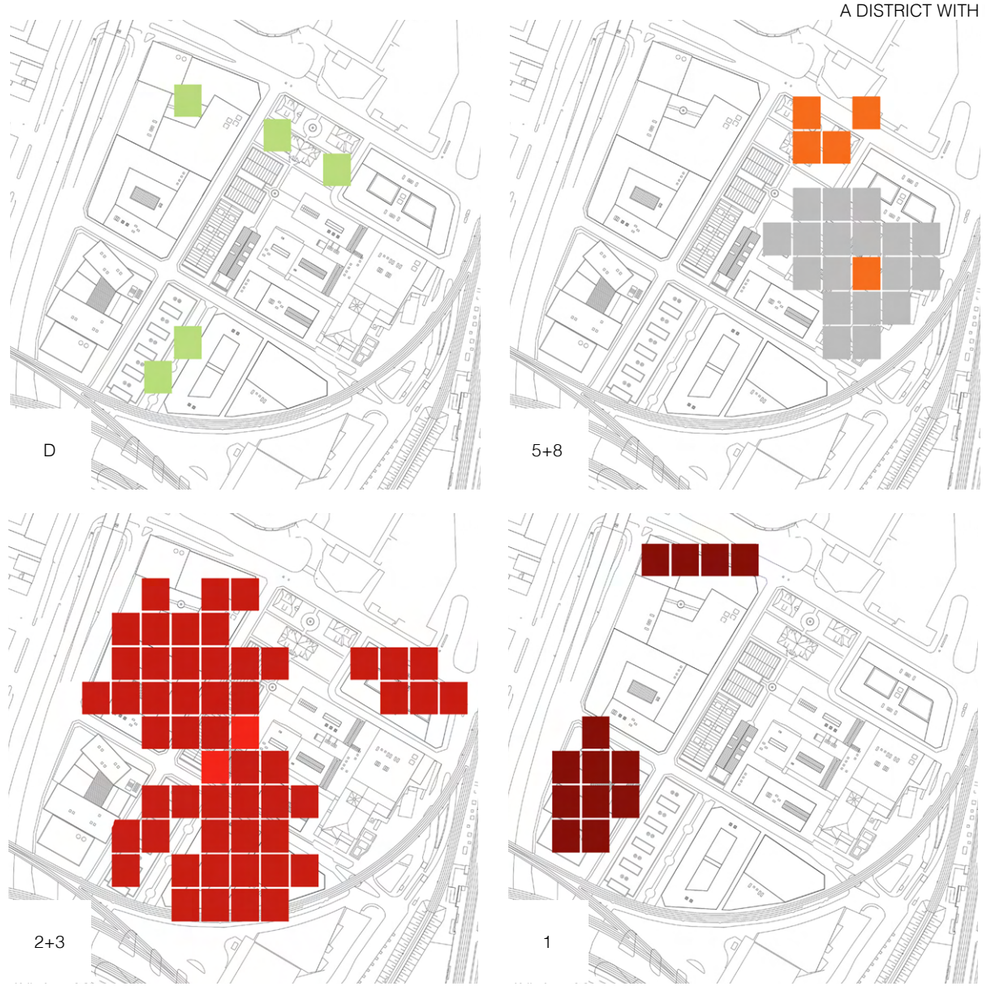


Fig. 41: LCZ mapping divided into categories.

The LCZ distribution for the Capital Services scenario represents a spatial commitment to economic concentration and maximum exploitation density (see Figure 40).

In this scenario, the LCZ grid is dominated by Built Types 1 (Compact Highrise) and 2+3 (Compact Midrise and Lowrise), creating a highly intensified urban district.

By converting nearly the entire site to these high-density classifications, the scenario demonstrates an exaggerated prioritization of the Economic Development node of the Planner's Triangle (Campbell, 2016).

In this high-density configuration, the Slakthuset and the Börshus remain as the district's foundational anchors on the eastern side, though they are now embedded within a much denser context.

This scenario sacrifices almost all ecological permeability and flexible social space—visible in the near-total absence of LCZ D (Low Plants)—in exchange for intense economic concentration.

Evaluation

The three scenarios were evaluated through a structured master comparison table, translating ideological prioritization into measurable spatial metrics.

The indicators included: LCZ distribution, green surface %, and built coverage ratio, chosen because they allow a direct comparison across the factors most directly impacted by each directional extreme. The baseline condition of Slakthusområdet provides the reference point against which each scenario's structural transformation is assessed.

The LCZ comparison demonstrates that the shifts are not incremental but systemic. In Capital Services, compact LCZ classifications increase substantially, accompanied by higher exploitation ratios and reduced green surface areas, producing a dense economic node.

In Ecological Stewardship, natural and permeable LCZ categories dominate, while compact classifications decrease significantly. Exploitation ratios fall, and green surface areas increase. The district becomes an ecological buffer zone.

Tab.1: The district comparison master table.

	Baseline	Urban Commons	Ecological Stewardship	Capital Services
Compact LCZ (%)	0	0	0	58
Open LCZ (%)	88	11	3	9
Natural LCZ (%)	5	25	59	0
Building Coverage (%)	42	41	16	68
Green Space (%)	1	36	73	0
Public Share (%)	3	45	13	5
Commercial Share (%)	23	16	13	56

In Urban Commons, density is redistributed rather than maximized. An increase in Open LCZ takes place, but the public share of the space takes the lead, with over 40% of the space accessible to and intended for public use. Green and shared surface areas are retained strategically to support collective infrastructures and activity programming.

The master table makes clear that each dominant logic produces a structurally different district. The differences are not merely stylistic variations, but clear shifts in accessibility in terms of which stakeholders are bolstered or dissuaded from the new urban contexts of Slakthusområdet.

The baseline quantitative values in Table 1 (Slakthusområdet as it is today) are vastly different across several key factors in all of the scenarios. This is further shown in Figure 42, where comparative maps of the baseline district compared to each scenario can be seen.

Not only is the built density vastly different, but the green-blue infrastructure, social space, and function of buildings.

This divergence highlights the "Property Conflict" and "Resource Conflict" between the nodes of the Planner's Triangle (see Figure 5). While Ecological Stewardship resolves the "Resource Conflict" by prioritizing land-cover types (LCZ-A to LCZ-G) to maximize permeability and climate resilience, it does so at the expense of built intensity and commercial feasibility.

Fig. 42: Comparison maps for Slakthusområdet baseline versus each scenario.

Conversely, Capital Services prioritizes density and productivity through compact typologies (LCZ-1 to LCZ-3), addressing the “Efficiency” vertex of the Planner’s Triangle while intensifying the “Development Conflict” by de-prioritizing social and ecological diversity.

The evaluation of these scenarios demonstrates that the choice of a planning pathway is never neutral; it is a deliberate selection of which systemic risks to mitigate and which trade-offs to accept.

For instance, the Ecological Stewardship scenario successfully mitigates the risk of urban heat stress and flash flooding through blue-green landscape infrastructure, yet it accepts a trade-off in the ‘governance’ layer by requiring a level of state-led regulation that may be incompatible with current market-driven land-value expectations.

Conversely, the Capital Services scenario prioritizes the ‘material flow’ layer through highly efficient, resource-intensive built forms that maximize short-term economic output, but in doing so, it accepts the risk of social displacement and ecological fragility.

The Urban Commons model seeks a middle ground in ‘social infrastructure’ by distributing density to favor accessibility, yet it reveals a significant trade-off in the ‘capital’ layer, where the lack of high-yield commercial space complicates the financing of large-scale district-wide resilience measures.

Each scenario’s priorities result in distinctly different LCZ maps (see Figure 43). The different, exaggerated directions have created distinct results in the shaping of the district itself, but further, varied results in terms of how it functions, and how it affects or functions in the urban context of Gamlestaden, as well as Gothenburg.

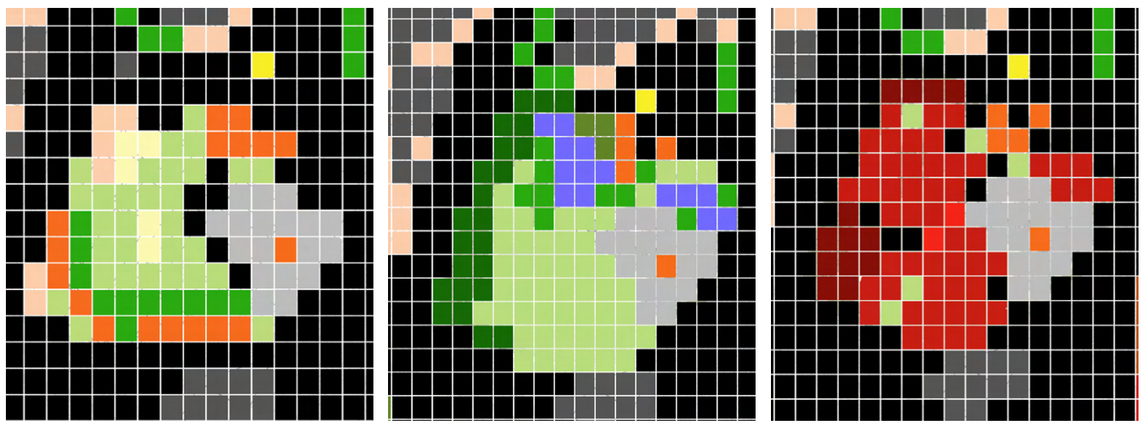


Fig. 43: Trio of LCZ mapping for each scenario. Left to right: Urban Commons, Ecological Stewardship, Capital Services.

Discussion

The Compromise Myth

The Planner’s Triangle (Campbell, 2016) does not give clear planning guidelines, but outlines the central stakes relevant to the problem in creating policy for sustainable progress.

It is a method through which one could attempt to identify and define the major conflicts involved in the planning process, and from there discern the path to the sustainable city. The conflicts are pointedly not in balance, but instead, notably varied to the extent that full, unified agreement is an impossibility.

These divergent priorities arise from the myriad of competing interests among the stakeholders of the planning process.

The organizing principles through which each actor defines their end goals will ultimately also be in conflict, even if the general sentiment regarding the final outcome is shared, such as “creating a more sustainable city,” or “contributing to more holistic, urban growth.”

> “We may therefore need to let go of the idea of balance (between social, environmental, and economic priorities) as the core principle for sustainability, and instead speak of a kind of truce, a working contradiction, a stalemate, a temporary armistice.”
>
> **Campbell, 2016**

This shared, undefined vocabulary of “sustainability” or “holistic growth” serves as a mask for what Rittel & Webber describe as a wicked problem—where the information needed to understand the problem depends on the proposed solution.

In this case, with added complexity in the form of contextual understanding for what those terms represent, spatially, for the district or city in question. In current planning practices, especially for post-industrial districts like Slakthusområdet, there is a widespread myth that the solution to this wickedness lies in finding the golden road; a middle-ground compromise that satisfies all parties.

The danger of believing in this middle-ground compromise is that it may lead to procedural hesitation, as is the case of Slakthusområdet. The findings of this thesis suggest that perhaps compromise—at the localized, district level—is as difficult as balance. The competing axes of the triangle are fundamentally divergent, and their spatial requirements are often mutually exclusive.

A high-density economic hub (Capital) requires a different form than a low-intervention green zone (Ecological), or a decentralized, activity-based neighborhood (Commons).

The scenarios developed in this thesis demonstrate that these different logics are fundamentally different organizational principles (see Table 1 & Figure 42). When one priority is allowed to dominate, the urban system reorganizes across all levels as a consequence. At the district scale, particularly for post-industrial contexts such as Slakthusområdet, the pursuit of balance in the system may conceal the magnitude of trade-offs required.

Rather than searching for compromise, or the ideal, balanced midpoint within the Planner’s Triangle, the results suggest that strategic planning under uncertainty requires explicit acknowledgment of prioritization. The question is therefore not how to perfectly balance each node of the triangle, but how to make the implications of prioritizing one over the others visible before commitments are made.

A DISTRICT WITH NO PLAN

Exaggeration as Method and the Role of Scenario Planning

If balance is not the operative principle of sustainable urban planning, then prediction is not its primary tool. The scenarios developed in this thesis are not accurate forecasts, nor are they prescriptive blueprints, but instead deliberate overstatements. By allowing one organizing principle to dominate, the spatial consequences become legible, and their implications easier to trace.

In this manner, exploratory scenario planning (XSP) functions as an analytical device, revealing what could happen spatially if a given priority governs development. This is especially important under conditions of wicked complexity.

As Rittel and Webber suggest, the nature of a planning problem cannot be understood independently of its proposed solution. By constructing spatially exaggerated futures, the thesis reverses the relationship between problem and proposal; the solution is exaggerated in order to expose all possible dimensions of the problem.

When a dominant logic is introduced, no matter which end of the Planner's Triangle it is aligned with, relationships across the urban system are reorganized.

Such reorganization underscores that efficient urban development is not the outcome of careful compromise of each spatial relationship, but mindful value selection on a district scale.
The scenarios demonstrate that these reorganizations across the urban system are not marginal.

Trade-offs have direct, structural consequences in the urban program. Exploratory scenario planning helps the planning process by making the possible consequences of different priorities visible.

Under conditions of strategic uncertainty, where long-term climate risk and economic volatility disrupt planning authority, the process requires instruments that clarify consequences, in order to facilitate a structured discussion regarding acceptable outcomes.

XSP, treated as a structured exaggeration, becomes an instrument for this.

Scenario construction can in that manner function as a pre-planning filter. Before compromise is attempted, zoning is decided, or capital is committed, alternative logics can be isolated and traced for the urban district.

Planning can consequently shift toward deliberate structuring, even in volatile contexts.

Within this framework, the transition from "Iteration 0" to "Iteration 1" (see Figure 3) is marked by the transformation of general uncertainty into structured risk and legible tradeoffs.

In the specific case of Slakthusområdet, the halt of the planning process was not a failure of vision, but of the traditional linear planning model. It could not appropriately account for a number of shifting variables.

By using XSP as a filter for iteration, the method moves beyond the dichotomy of a project being "feasible" or "unfeasible."

Instead, it presents a spectrum of specific performance-based futures, allowing for a nuanced evaluation for what to prioritize, and what is at stake.

By analyzing the Local Climate Zones (LCZs) of each exaggerated scenario, it becomes simpler to trace how spatial changes become physical trade-offs. One can see exactly how the land-use intensity changes between the Capital and Ecological scenarios, and how much permeability is lost between the different approaches.

This methodological shift redefines the masterplan not as a static image of the end-goal, but the last step of an iterative, conceptual process that gradually advances the systemic logic toward a truly "feasible" project.

If one acknowledges that the "compromise", or "perfect balance" at the center of Campbell's triangle is a moving target, the role of the planner shifts toward maintaining systemic flexibility.

This focus diverges sharply from the linear logic of current planning processes, in which focus is systemic preconception, rather than flexibility.

The contribution of this thesis lies in proving that by isolating these logics, one can identify which urban elements are truly robust in the context of the city-wide network.

Robust, in this instance, refers to their function as necessary and desirable parts of the urban system across multiple futures. Which are generally robust, and which are contingent on specific priorities?

Clarity in those answers allows for a more resilient, flexible type of planning, where the district can adapt to volatility—whether political, economic, or environmental—without losing either spatial coherence or long-term resilience.

Ultimately, by treating Slakthusområdet as a site of strategic experimentation rather than stalled compromise, it is possible to move from a district with no plan, to a district with a legible spectrum of plausible futures.

By working in this manner, it replaces the "compromise myth" with a more transparent, progressive architecture of choice.

This architecture of choice can then be constructed from a clear list of end-goal priorities, whether that is economic development, ecological preservation, or social equity.

In the Swedish context, this approach offers a critical intervention into the "detaljplan" (detailed development plan) process, where zoning and exploitation requirements often collide with the financial realities of "exploateringsavtal" (development agreements). This may shift the negotiation from a rigid "yes or no" toward a more nuanced debate over value-based trade-offs.

Consequently, these scenarios act as a decision-support framework that allows planners to move beyond the paralysis of uncertainty and toward a strategic development logic.

Fig. 44: Montage of several scenarios in one masterplan.
Scale 1:2000

Reflection and Methodological Limits

If exaggeration as a method can clarify planning direction, evaluation makes those directions comparable.

The three scenarios developed in this thesis were evaluated through a structured comparison of measurable spatial consequences. The distribution of Local Climate Zones (LCZs) was central to the evaluation; by examining the percentage shifts in compact, open, and natural LCZ classifications relative to the baseline condition, the scenarios reveal how prioritization materially restructures the district.

In the Capital Services scenario, compact LCZ classifications expand significantly at the expense of open and natural surfaces. In Ecological Stewardship, natural and permeable zones dominate, while the intensity of compact LCZs recedes. Urban Commons occupies a differentiated middle position, redistributing density while retaining shared open infrastructures. The LCZ framework, simplified to function on a 30-by-30 m grid level, illustrates how value prioritization produces different spatial reconfigurations.

However, LCZ comparison alone is not an exhaustive evaluation tool.

Spatial metrics such as exploitation ratio, ground coverage, and green surface area expose additional trade-offs. These metrics together provide a measurable structure for comparing ideological prioritization in quantifiable, spatial terms.

Beyond spatial consequence lies the implication for the urban system as a whole. Each scenario strengthens certain district capacities while constraining—or removing—others.

Capital Services increases economic concentration but reduces green buffers. Ecological Stewardship strengthens blue-green infrastructure but limits exploitation potential. Urban Commons amplifies shared social programming and collective spaces, but may also depend on sustained governance coordination and stakeholder involvement.

Evaluation can in this way extend beyond the quantitative comparison to questions of robustness and compatibility, which in turn become the foundation for the next set of iterations for how the district might develop.

The exaggerated scenarios developed here can thus be understood as boundary conditions—directional extremes that help identify where and how the next development step can begin. Rather than collapsing into general compromise from this initial step, the comparison will identify where and how trade-offs can be reasonably made.

Creating hybrid scenarios, or fully moving forward with one focus in mind, then becomes deliberate and informed by knowledge of systemic consequence.

Nevertheless, the method has limitations.

The LCZ framework does not capture experiential qualities, or the full social complexity of the urban system. Economic feasibility, one of the key factors behind why the plans for Slakthusområdet were not fully developed in the first place, is not fully fleshed out within XSP.

Furthermore, district-level development may externalize burdens to other areas of Gothenburg.

A preserved ecological zone assumes intensified development in other locations to sustain the city growth projected by 2050; a district designed for capital production assumes extended green spaces elsewhere. Scenario-based evaluation clarifies local consequences, but does not alone resolve the implications of city-wide issues—feeding into the “wicked problem” at the heart of the question.

Despite these limitations, the comparative method presented in this thesis is one structured instrument that can be used for planning under strategic uncertainty. It enables stakeholders to confront the spatial implications of prioritization, before commitments are embedded in zoning or capital allocation.

The takeaway from each scenario is not a definitive masterplan, but a clarified understanding of what each value system could demand spatially. Evaluation transforms exaggeration into knowledge, and knowledge can then inform the next set of developed proposals.

Planning can then proceed not from the illusion of balance or compromise, but from informed selection and conscious trade-off.

Conclusion

The aim of this thesis was to investigate how design-led exploratory scenario planning can support long-term urban development under conditions of strategic uncertainty, using Slakthusområdet in Gothenburg as a case study.

Through the deliberate construction of three exaggerated development futures—Capital Services, Ecological Stewardship, and Urban Commons—the thesis tested how different prioritizations within the Planner’s Triangle impact the urban system at the district scale.

The findings demonstrate that sustainable urban development cannot be understood as a balanced equilibrium between competing priorities. When translated into spatial form, economic, ecological, and civic demands produce structurally distinct configurations. Shifts in LCZ distribution, exploitation ratios, and green surface areas reveal that prioritization materially restructures each exploratory future, both in terms of function capacity and general accessibility.

By treating exaggeration as a methodological tool, the thesis reverses the conventional relationship between problem and proposal. Instead of attempting to solve complexity through compromise, it isolates dominant logics to clarify their implications.

In doing so, exploratory scenario planning becomes a pre-operational instrument: a way to structure uncertainty before commitments are embedded in zoning or capital allocation. The value of the scenarios lies not in their plausibility as standalone futures, but in the clarity they provide regarding systemic consequence.

The evaluation further illustrates that the scenarios differ in magnitude of departure from baseline conditions. Some configurations require greater infrastructural reinforcement and capital intensity; others depend on redistribution of development capacity. District-level prioritization thus carries implications beyond its boundaries, reinforcing the need to situate local transformation within wider urban systems.

This thesis does not resolve the “wickedness” at the heart of sustainable planning. It does not claim to identify an optimal solution. Instead, it proposes a structured approach for confronting strategic choice. By translating ideological priorities into measurable spatial outcomes, the method transforms abstract debates about development focus into comparable tradeoffs that enable a clearer path toward a feasible solution.

Planning under uncertainty cannot eliminate conflict between economic development, environmental protection, and social equity. What it can do is render those conflicts visible before they are materialized. In this sense, the contribution of the thesis lies in reframing scenario-based design as an instrument for prioritization.

The future of Slakthusområdet remains uncertain. Yet the process developed here demonstrates that uncertainty need not paralyze decision-making. Through structured exaggeration and evaluation, planning can proceed not from the illusion of balance, but from conscious selection within a complex, urban system.

Future Research

A significant area for future development is the formal integration of financial modeling within the existing design-led framework.

By utilizing the quantifiable spatial outputs of the exaggerated scenarios—such as building density and built coverage ratios—as variables for financial modeling, future research could conduct an economic “stress-test” of each directional extreme.

Such comparisons would enable a direct evaluation of necessary capital for each redevelopment, making direct comparisons in terms of economic feasibility possible.

Future studies should also address the systemic externalities. Since extreme spatial choices at the local scale externalizes burdens to other parts of the city, there is a need to test the scenarios in the wider urban context.

There is also additional value in expanding the evaluative framework beyond LCZ and quantiative spatial metrics, to include the qualitative and experiential dimensions of urban life, especially given the social focus for the Urban Commons scenario.

Integrating stakeholder-driven design into the Ideate & Formulate phase of scenario development (see Figure 4) could ensure that the scenarios better account for the Socio-Economic Dynamics layer of Meerow’s urban system (see Figure 6).

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Appendix

JavaScript for Google Earth Engine

Local Climate Zones:

```
var dataset = ee.ImageCollection('RUB/RUBCLIM/LCZ/global_lcz_map/latest')
          .mosaic();

var visualization = {
  bands: ['LCZ_Filter'],
  min: 1,
  max: 17,
  palette: [
    '8c0000','d10000','ff0000','bf4d00','ff6600',
    'ff9955','faee05','bcbcbc','ffccaa','555555',
    '006a00','00aa00','648525','b9db79','000000',
    'fbf7ae','6a6aff'
    ]
};

Map.setCenter(7.26, 51.44, 6);
Map.addLayer(dataset, visualization, 'LCZ_Filter');
```

LandScan Population Data Global 1km:

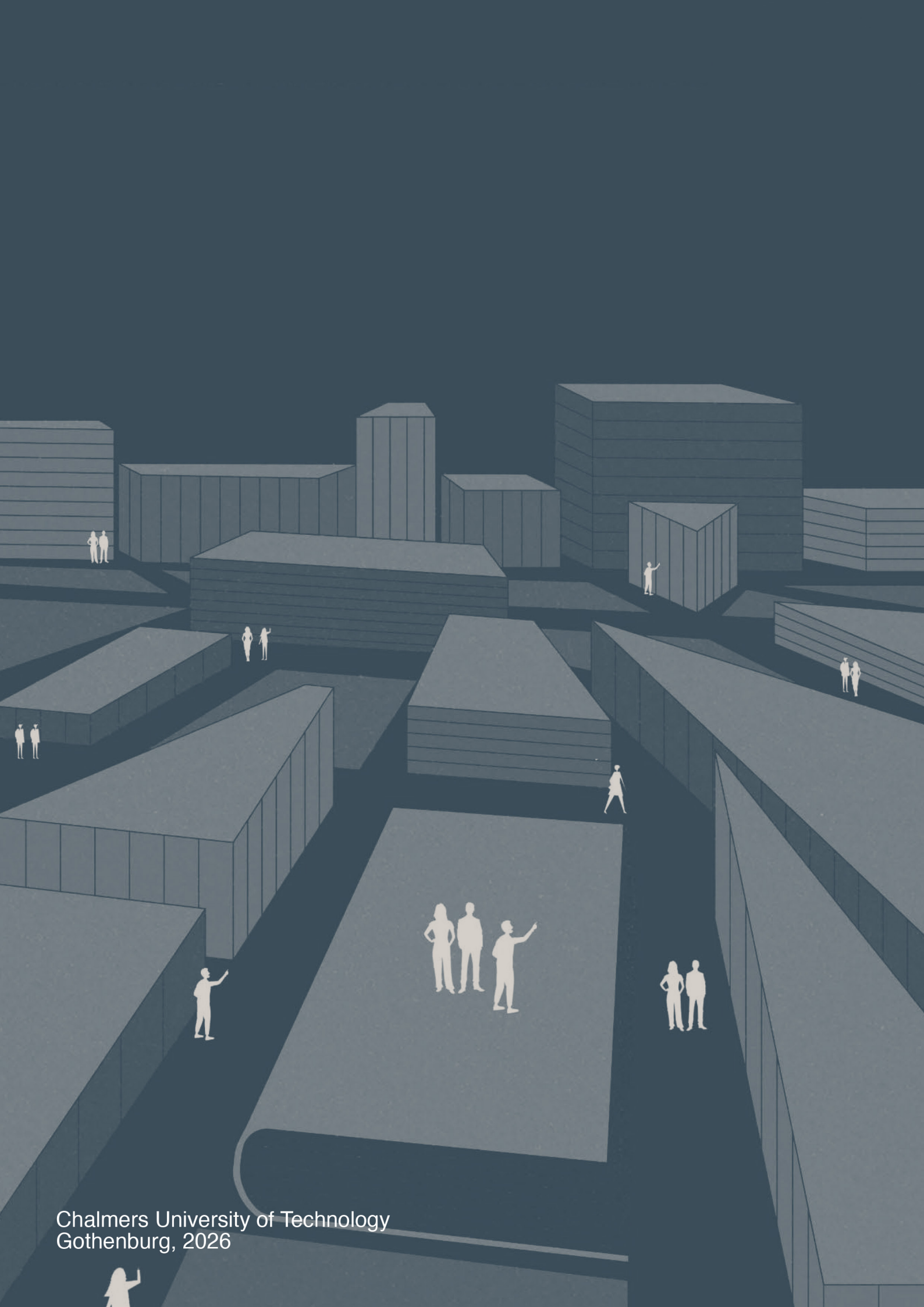
```
var landscan_global =
    ee.ImageCollection('projects/sat-io/open-datasets/ORNL/LANDSCAN_GLOBAL');
var popcount_intervals = '<RasterSymbolizer>' +
    ' <ColorMap type="intervals" extended="false" >' +
    '<ColorMapEntry color="#CCCCCC" quantity="0" label="No Data"/>' +
    '<ColorMapEntry color="#FFFFBE" quantity="5" label="Population Count (Estimate)"/>' +
    '<ColorMapEntry color="#FEFF73" quantity="25" label="Population Count (Estimate)"/>' +
    '<ColorMapEntry color="#FEFF2C" quantity="50" label="Population Count (Estimate)"/>' +
    '<ColorMapEntry color="#FFAA27" quantity="100" label="Population Count (Estimate)"/>' +
    '<ColorMapEntry color="#FF6625" quantity="500" label="Population Count (Estimate)"/>' +
    '<ColorMapEntry color="#FF0023" quantity="2500" label="Population Count (Estimate)"/>' +
    '<ColorMapEntry color="#CC001A" quantity="5000" label="Population Count (Estimate)"/>' +
    '<ColorMapEntry color="#730009" quantity="185000" label="Population Count (Estimate)"/>' +
    '</ColorMap>' +
    '</RasterSymbolizer>';

// Define a dictionary which will be used to make legend and visualize image on
// map
var dict = {
  'names': [
    '0', '1-5', '6-25', '26-50', '51-100', '101-500', '501-2500', '2501-5000',
    '5001-185000'
  ],
  'colors': [
    '#CCCCCC', '#FFFFBE', '#FEFF73', '#FEFF2C', '#FFAA27', '#FF6625', '#FF0023',
    '#CC001A', '#730009'
  ]
};

// Create a panel to hold the legend widget
var legend = ui.Panel({style: {position: 'bottom-left', padding: '8px 15px'}});

// Function to generate the legend
function addCategoricalLegend(panel, dict, title) {
  // Create and add the legend title.
  var legendTitle = ui.Label({
    value: title,
    style: {
      fontWeight: 'bold',
      fontSize: '18px',
      margin: '0 0 4px 0',
      padding: '0'
    }
  });
  panel.add(legendTitle);
```



```
  var loading = ui.Label('Loading legend...', {margin: '2px 0 4px 0'});
  panel.add(loading);

  // Creates and styles 1 row of the legend.
  var makeRow = function(color, name) {
    // Create the label that is actually the colored box.
    var colorBox = ui.Label({
      style: {
        backgroundColor: color,
        // Use padding to give the box height and width.
        padding: '8px',
        margin: '0 0 4px 0'
      }
    });

    // Create the label filled with the description text.
    var description = ui.Label({value: name, style: {margin: '0 0 4px 6px'}});

    return ui.Panel({
      widgets: [colorBox, description],
      layout: ui.Panel.Layout.Flow('horizontal')
    });
  };

  // Get the list of palette colors and class names from the image.
  var palette = dict['colors'];
  var names = dict['names'];
  loading.style().set('shown', false);

  for (var i = 0; i < names.length; i++) {
    panel.add(makeRow(palette[i], names[i]));
  }

  Map.add(panel);
}

addCategoricalLegend(legend, dict, 'Population Count(estimate)');

Map.addLayer(
    landscan_global.sort('system:time_start')
        .first()
        .sldStyle(popcount_intervals),
    {}, 'Population Count Estimate 2000');
Map.addLayer(
    landscan_global.sort('system:time_start', false)
        .first()
        .sldStyle(popcount_intervals),
    {}, 'Population Count Estimate 2022');
```

Landsat Collection 2 Tier 1 Level 2 8-Day EVI Composite:

```
var dataset = ee.ImageCollection('LANDSAT/COMPOSITES/C02/T1_L2_8DAY_EVI')
                  .filterDate('2023-01-01', '2023-12-31');
var colorized = dataset.select('EVI');
var colorizedVis = {
  min: 0,
  max: 1,
  palette: [
    'ffffff', 'ce7e45', 'df923d', 'f1b555', 'fcd163', '99b718', '74a901',
    '66a000', '529400', '3e8601', '207401', '056201', '004c00', '023b01',
    '012e01', '011d01', '011301'
  ],
};
Map.setCenter(9.6568, 50.8874, 6);
Map.addLayer(colorized, colorizedVis, 'Colorized');
```



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