



DESIGNCASE LINDHOLMEN
FROM SCIENCE PARK
TO SCIENCE CITY

ALAN PLATTUS, MARTA CALDEIRA
& ANDREI HARWELL



Cover image: Map of Gothenburg and its Suburbs, prepared by Anders Lindgren in 1815

The research program Fusion Point Gothenburg had a practical focus and was run as a collaboration between Älvstranden Utveckling AB and Chalmers University of Technology. The University of Gothenburg and Yale University were also involved in the collaboration and the aim of the program was with the program was to strengthen the fusion between research and practice within architecture and urban design to merge theoretical and practical perspectives into knowledge.

Various types of workshops and seminars have been used to spread knowledge and initiate discussions with Gothenburg's operative actors within the building sector and the city's officials, with a focus on promoting and highlighting the development potential within RiverCty Gothenburg (Älvstaden). This series of booklets are primarily aimed to those who work with the development of Älvstaden but may also be of interest to others who work with urban development. The authors highlight different perspectives that affect urban development and base their research on their own background and discipline.

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07	RIVERCITY GOTHENBURG - AN AMBITIOUS LEAP CAUGHT IN AMBIGUITY
	+ SAMMANFATTNING PÅ SVENSKA

Carl Mossfeldt

The study explores the emergence of RiverCity Gothenburg (Projekt Älvstaden) as an ambitious urban renewal project and looks in some detail at the attempts and struggles to institutionalise the effort. Tensions and ambiguities in the project are highlighted and important questions which were never fully dealt with are identified.

08	DESIGNCASE LINDHOLMEN - FROM SCIENCE PARK TO SCIENCE CITY
	+ EXECUTIVE SUMMARY

Alan Plattus, Marta Caldeira & Andrei Harwell

A design case developed by the Yale Urban Design Workshop, emphasizing design process, urban analysis, and design opportunities for the future of Lindholmen, with a particular focus on South Lindholmen and the waterfront. The Case and the Executive Summary are presented in English.

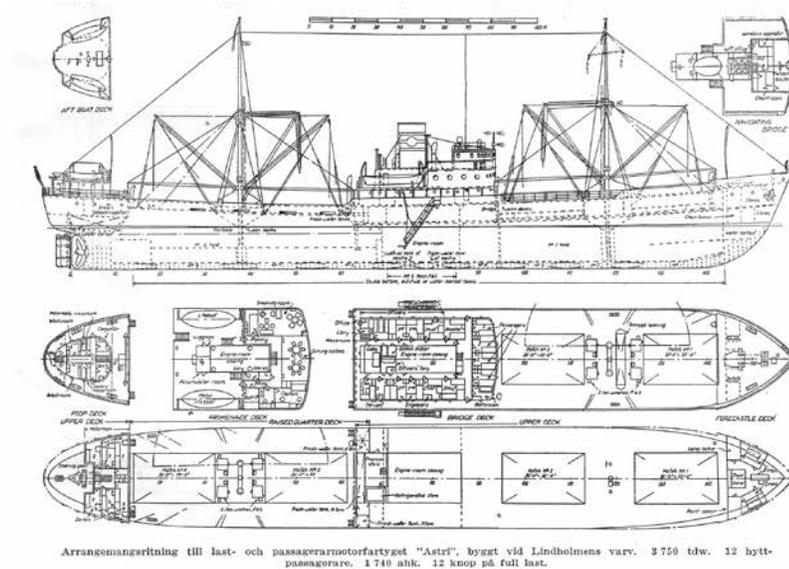
DesignCase **Lindholmen**
From Science Park to Science City

A research report prepared by the
Yale Urban Design Workshop
School of Architecture, Yale University
New Haven, Connecticut

for
Fusion Point
Gothenburg, Sweden

February 22, 2020





The Yale Urban Design Workshop is a community design center based at the Yale School of Architecture, providing urban design assistance to communities in Connecticut, New England, and around the world.

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On the cover: *Map of Gothenburg and its Suburbs*, prepared by Anders Lindgren in 1815, and included at the back of Part 2 of P.A. Granberg's *Staden Goteborgs Historia och Beskrifning* (City of Gothenburg History and Description), published in 1815.

Above: Plans for the ship "Astri" constructed at Lindholmens varv in 1937, as published in *Teknisk Tidskrift*, the national Swedish engineering journal, November 20, 1937.

01 Introduction / 4

DesignCase Lindholmen / 6

02 Design Process / 8

The Role of Urban Design / 10

Designing an Urban District / 20

03 Understanding Lindholmen / 28

Positioning Lindholmen / 30

Lindholmen: Urban Qualities and Form / 42

04 Urban Design/ 64

Lindholmen: District Scale Framework / 66

South Lindholmen / 78

Conclusion and Next Steps / 94



01 Introduction



DesignCase Lindholmen

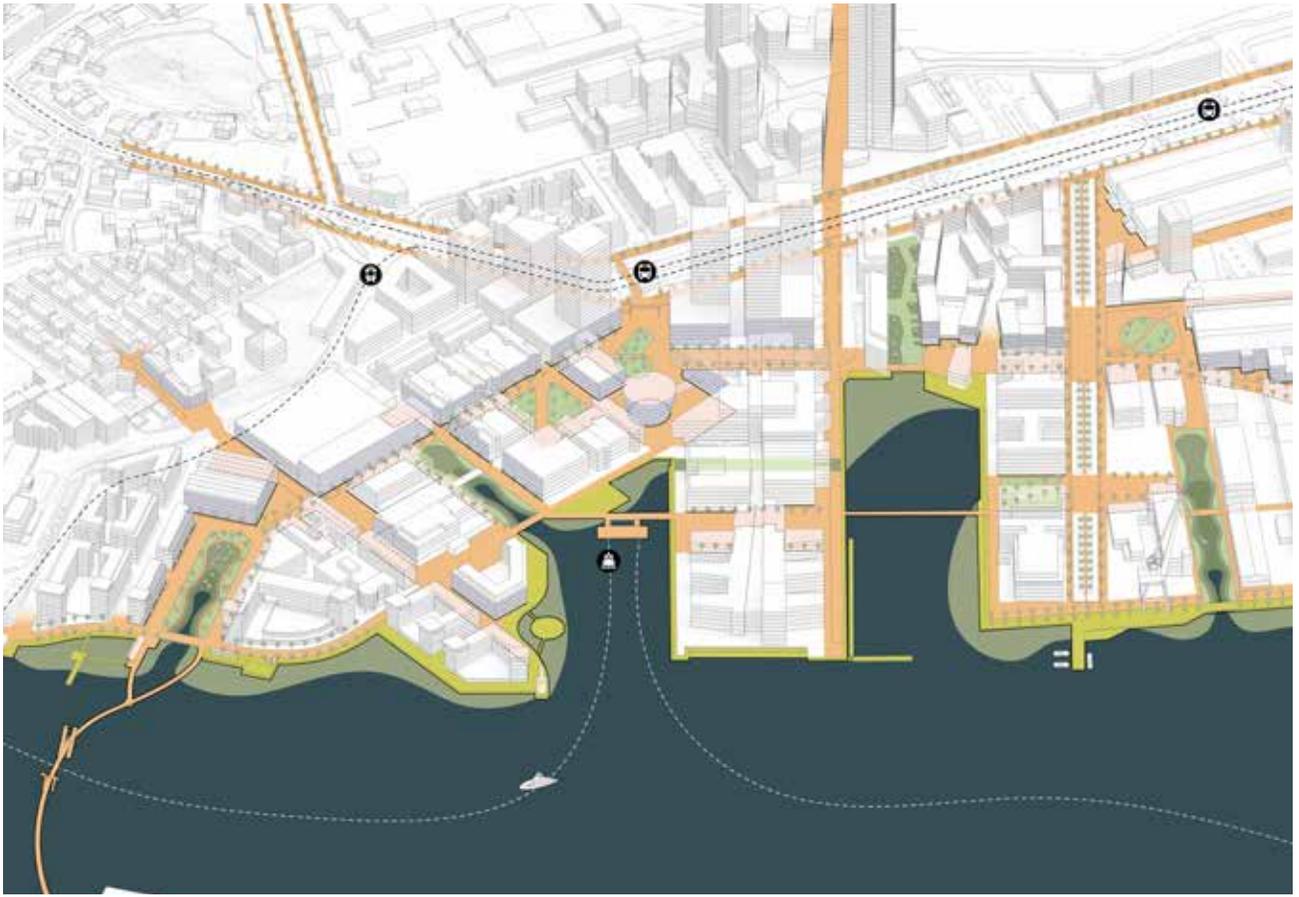
This report presents a design case study of a crucial area in the Gothenburg RiverCity, at a pivotal moment in the ongoing redevelopment of the Gothenburg riverfront, in the political, social and economic evolution of the city, and perhaps even in the history of Sweden.

With due respect for the opportunities and responsibilities of such a conjuncture, the report will focus on three important, but limited assignments:

- » To discuss and model a design process that can more effectively translate and embed the broad RiverCity Vision, announced in 2012, and its goals and values in specific local development projects. In brief, this process involves a close attention to, and learning from, the existing city: discovering, clarifying and extrapolating the latent logics of city form and use, not only to tap the embodied values and energies of that city as it was or is, but also to make room for new logics that derive from new challenges.
- » To develop a clear and nuanced picture of the evolution, current role, and future potential of the Lindholmen district in its trajectory from pre-industrial landscape, to maritime industrial center, to science park and satellite campus, and now to a sustainable and resilient urban waterfront district in the heart of Gothenburg. At the same time, the report recognizes that Lindholmen is already much more than a conventional science park—more focused than any generic mixed-use urban neighborhood.
- » To model and vividly illustrate both the design process and spatial framework of an adaptive and resilient urban waterfront district through a conceptual design case study based in South Lindholmen emphasizing the public space network of a pedestrian- and bicycle-oriented district, an accessible and resilient waterfront, and a flexible and sustainable development framework.

The goal of this exercise is not only to inform and even set the stage for the next phase of development in Lindholmen, but also to test the findings of Fusion Point and to help develop a more integrated and comprehensive approach to planning, design and development in the RiverCity and Gothenburg more generally. Not with an idea that general design standards and guidelines, or development formulas, will simply be applied universally to all sites and projects, but with a commitment to embody and embed shared urbanistic goals and values in distinctive and innovative ways in each local area and specific site.

Fig. 11. Overall view of Lindholmen (top) and detailed view of South Lindholmen (bottom), including proposed public space network, buildings, and waterfront components.





02 Design Process



The Role of Urban Design

The design of cities is far more complex than the design of individual buildings or objects of daily use. Due to its public nature, in addition to the broad range of scales and factors it considers and balances, it must also respond – and be seen to respond – to a fundamental political responsibility for a **transparent, inclusive, and comprehensible** process (Fig. 2.1). Transparency, inclusion, and discursive accessibility are strongly interrelated, not to say redundant, in that when one is absent, the others are compromised, and when all are actively present in a design process, they confirm and reinforce each other, the process, and the outcomes. This is what is meant when one claims that the design process is not only a means to an end – inclusive, sustainable, and productive urban development – but also an end in itself. It is, at its best, a highly constructive and engaging form of community organizing, capable of constructing (and reconstructing) not only consensus based on shared goals and values, but also new and sustainable public constituencies that carry forward the project of building a just and productive city.

Another way of describing this dual-level impact of urban design is to say that the process, and the urbanism it produces, is not only **performative** – meeting a series of often quite specific goals and performance standards, but also **representational** – making highly visible, even symbolizing and branding, the shared values, goals, and the process itself that went into a successful urban development experience (Fig. 2.2). It should be made clear that this is by no means a call for more iconic architecture – the easy and superficial way of branding a project in the short term, and so often a mask or compensation for a flawed design process. On the contrary, an open and accessible urban district – along the lines of the concept presented in this report – that not only blends into the existing urban context, but adds value in the form of new and improved connections, public space and diversity of uses and people, can be as powerfully representational in the long run as an iconic image, especially if it has the capacity to adapt and evolve over time. All that points to a design process that is not only itself designed to meet rigorous criteria – functional, economic, and environmental – but also to produce the evidence of the process, in the form of shared experience, events, discoveries, even controversy, and of course the drawings, models, virtual and ultimately real spaces and buildings that will embody both the memory and aspirations of the urban design process (Fig. 2.3).

The overarching goal for an urban design process conceived and executed in this way is to ensure that both the process and the outcomes are recognized to embody



Fig. 2.1, Below. Designers, engineers, stakeholders, and community members provide input and discuss alternative schemes during an on-site design charrette in Jordan. (YUDW)

Fig. 2.2, Left. Water management infrastructure is made visible and representational by embedding it in a resilient landscape in this project for Bridgeport, Connecticut. (YUDW)

Fig. 2.3, Above. Community member studies a model of the Dwight neighborhood in New Haven, Connecticut, during a design charrette. (YUDW)



the shared vision, values and goals which are developed and articulated in the course of that process. Urban design is, from this point of view, an ongoing process of **embedding values** in the spatial form and built fabric of cities. For example, if a goal for a community in general and for the development of a particular neighborhood, is to evolve towards a more pedestrian-friendly built environment, then through design, one will not only apply general standards, such as recommended dimensions and configuration of sidewalks, one will also, ideally, adapt and embody those general standards in a design vocabulary of place-specific elements of streetscape, such as signage, that create and represent a shared neighborhood identity built, at least in part, around the value ascribed to a pedestrian-friendly environment (Figs. 2.4 and 2.5). One could follow the same logic for a range of perennial and current issues, including sustainability and resilience, accessibility, transit-oriented development, diversity, density, etc. The balance and/or hierarchy of these values in different areas of the city, and of course in

different cities, is precisely the challenge for urban design, and precisely the source of the local character that makes Barcelona different from Tokyo. It is not that those places have dramatically divergent core values, but rather that the ongoing evolution and design of those cities has embedded those values in unique genetic codes (at least until the recent onslaught of globalized development projects), consisting of characteristic material palettes, architectural styles, block and building typologies, patterns of use, etc., that one refers to collectively as “urbanism.”

Neither these values nor the cities in which they reside are created from scratch by each new wave of urban development and its design process. Rather they are brought forward from previous design processes and research, and indeed from the whole history of a city, to be placed again on the table for review and critical evaluation as part of each new design process. They are, so to speak, the primary inputs for that process, and insofar as they are already embedded in the



Fig. 2.4. Wayfinding signage design for the Thames River Heritage Park features distinctive graphics and logos as well as general information to help guide pedestrians. (YUDW)



Fig. 2.5. A streetscape design for Winsted, Connecticut, including custom light fixtures related to the history of the town. (YUDW)



physical fabric and spaces of the city, they are part of that ongoing process described by the French architect, Antoine Grumbach, as “**building the city on the city**,”¹ and a major component of what is discussed below as the approach of thick description and urban layering (Fig. 2.6). In this approach, design becomes, to a significant degree, a process of revealing and leveraging the embodied intelligence of the existing city, including the spatial imprint and material heritage of previous eras in the history of a city.

Inputs for the Design Process

Any intelligent urban design process relies on inputs from any and all sources, within the constraints of available time and resources, and so it would be wasteful to exclude relevant and reliable existing sources for those inputs. The broad categories are obvious and include:

- » The community of current and future users; the client, landowners and other stakeholders, various levels of government, and the business and financial communities



Fig. 2.6. Diagrams that describe a site as a series of superimposed layers. (*Flushing Meadows Corona Park Concept Plan*, Flushing Meadows Corona Park Task Force, Alan Plattus, Chair)

- » The academic and research communities, including museums and other sources of historical and cultural material
- » Firsthand research and discovery by the design team, ranging from international best practices to on-site observation and analysis

For the purposes of this discussion, these categories of input into the design process will be represented, but not exhausted by three important and overlapping institutional

1 See Antoine Grumbach, “La ville sur la ville,” in *Projet Urbain*, No. 15, December 1998.

participants: Älvstranden & the Gothenburg Municipality, Fusion Point, and the Yale Urban Design Workshop design team.

In the middle of the ongoing RiverCity development process is the municipal company, Älvstranden Utveckling, charged with the redevelopment of the Gothenburg riverfront (the RiverCity) consistent with the RiverCity Vision, in participation with the Municipality of Gothenburg. In particular, we will consider the role of the 2012, **RiverCity Gothenburg Vision**, produced by the Gothenburg Municipality (with Älvstranden's participation) through a two year process, owned by the Executive Committee of the Municipal Council, of workshops, public meetings, studies, and consultations involving citizens, municipal government, companies, industry, and academia. As approved by the City Council, it presents the broad vision and goals that have shaped, in principal, the subsequent planning and development process (Fig. 2.7). In practice, however, specific projects have had to approach the broad vision through the immediate context of a rapidly changing landscape of financial and environmental challenges and exigencies, against the backdrop of an equally dynamic political and institutional framework.² While impressive development projects were realized with a high degree of professionalism, and considerable positive economic impact, there has also been a growing awareness of gaps between the original Vision and the built projects that could be narrowed by a more fully integrated design process. A summary review of the main points of that Vision reveals those gaps:

» "Open to the World," has been a conspicuous

² On the political and institutional context of the RiverCity, see Carl Mossfeldt's contribution to the Fusion Point report, "The RiverCity Project."

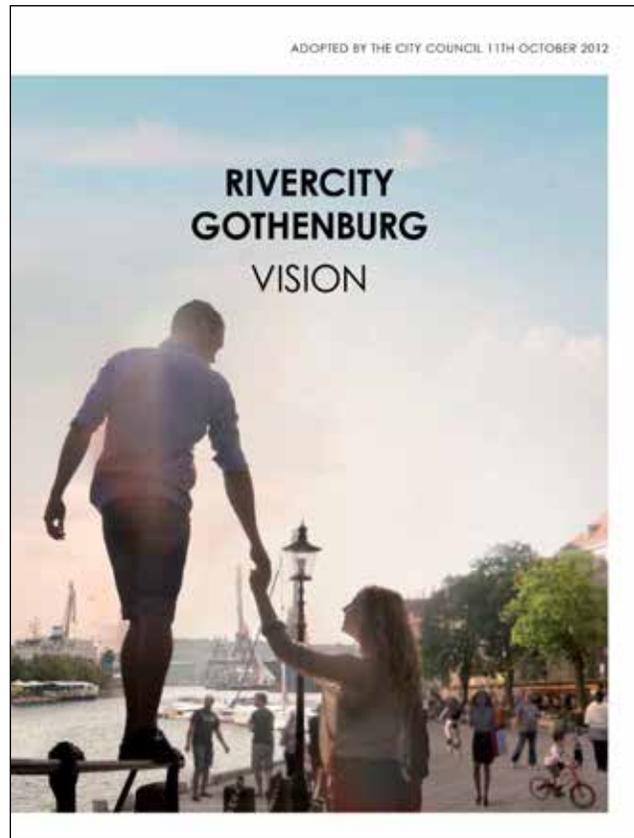


Fig. 2.7, Above. The *RiverCity Gothenburg Vision* presents the broad visions and goals for the River City. (City of Gothenburg)

Fig. 2.8, Opposite. Vasagatan (Top) and Lindholmsallén (Bottom). (Google Earth)

success with respect to Gothenburg's transition to a globalized, knowledge-based economy, and the RiverCity has been a big part of that transition, but at a local level, redevelopment and new development have not yet produced the sort of inclusive, diverse, and connected public space network that makes the opportunities of that new economy accessible to all citizens of the region.

» "Connect the City," has proven challenging at both the local and urban level, with respect to major inter-modal infrastructure connections, as well as relatively weak local connections

between individual projects and project areas, and immediately adjacent neighborhoods, not to mention more remote and isolated communities in the region.

» “Embrace the Water,” has produced some significant and symbolic achievements, such as the Frihamnen sauna, but has so far left many neighborhoods and residents still cut off from physical access to and use of the waterfront, while the goal of making sustainability and adaptation to climate change a highly visible part of new development has not been fully realized in many projects.

» “Reinforce the Center,” is the clearest and most direct bridge from the values articulated in the Vision and more detailed design goals.

There are some impressive individual projects previously developed that invoke specific aspects and qualities of the historic center, such as urban density and mixed use, these projects are not yet part of the kind of integrated network of public space, infrastructure, mobility, street life and streetscape, and real urban diversity, that characterizes the historic city center at the full spectrum of linked scales, from building, to neighborhood, to district, to city and landscape. The differences, for example, between Vasagatan and Lindholmsallén as urban boulevards, or between Haga and Kvillebäcken as urban districts, illustrate this persistent gap (Fig. 2.8).

As one can see from this summary evaluation of the Vision, the gaps mentioned above tend to manifest themselves most vividly in the absence



of a design process that translates broad goals and their ongoing realization at the scale of the urban and regional economy, to the actual spaces and landscapes of local neighborhoods and specific projects, where it has been argued that shared values must be concretely embedded in both visible and functional ways. This particular gap, between vision, values and goals and local context will be discussed further below, but it had already been recognized as largely unaddressed in the first level, or category, of input, by Älvstranden in the launch of the Fusion Point project, which furnishes this design case study with a significant head start.

Fusion Point was intended to engage the academic and research community in applying state-of-the-art disciplinary knowledge and rigorous methodology to the task of beginning to produce a process and institutional capacity which would successfully and consistently translate the broad values and goals of the Vision into the built fabric of the critical project areas currently under design and development by Älvstranden and the City. The papers which present the research and discussion around that work are collected in the Fusion Point report, of which this design case study constitutes a related component. For the purposes of this discussion of design process, the most relevant contributions are the paper by Carl Mossfeldt—on the need for administrative and institutional structures and capacity capable of evolving along with the dynamics of political, social and economic transformations, and adequate to the complex tasks of realizing large urban development projects in that dynamic landscape—and the work of the Spatial Morphology Group (SMoG) at Chalmers University, led by Profs. Lars Marcus and Meta Berghauser-Pont.

The latter research, informed by the powerful methodology of space syntax, but with innovative

new features, provides a basis for multi-scalar and comparative analysis of critical factors for urban design, such as **centrality** and **connectivity**. Inputs generated by these tools facilitates the precise evaluation of the potential impact of, for example, a new piece of connective infrastructure like a bridge or tunnel, not only on literal spatial connections, but on the relative centrality of urban spaces or entire urban districts (Fig. 2.9). In addition, the morphological analysis presented by the Chalmers team provides an even finer grained and more nuanced account of the much-discussed issues of urban density, coverage and block structure which takes the discussion beyond generic solutions and shows the relativity, and therefore the potential variety, of ways in which urban density can be achieved (Fig. 2.10). As an integral part of a comprehensive urban design process, this analysis sets the stage, and provides a fundamental layer, for an even more detailed analysis of the spatial relationship of block and street, and also building typology and massing as they relate to specific urban conditions and sites, advancing the public discourse and the development of conceptual designs and design guidelines, beyond the merely qualitative and intuitive level.

This is the point at which, through Fusion Point, and ongoing collaborations with Chalmers University and Älvstranden, the **Yale School of Architecture (YSoA)** and **Yale Urban Design Workshop (YUDW)** have sought to provide additional inputs to the design process at a third level: that of morphological and typological analysis from a cultural and historical perspective. For two years, beginning in the Spring of 2018, YSoA has conducted a summer study program which takes 12-18 graduate students to Gothenburg for an intensive period of on-site study. The project is entitled Urban Atlas and aims to compile a detailed documentation and analysis of the urban form of characteristic

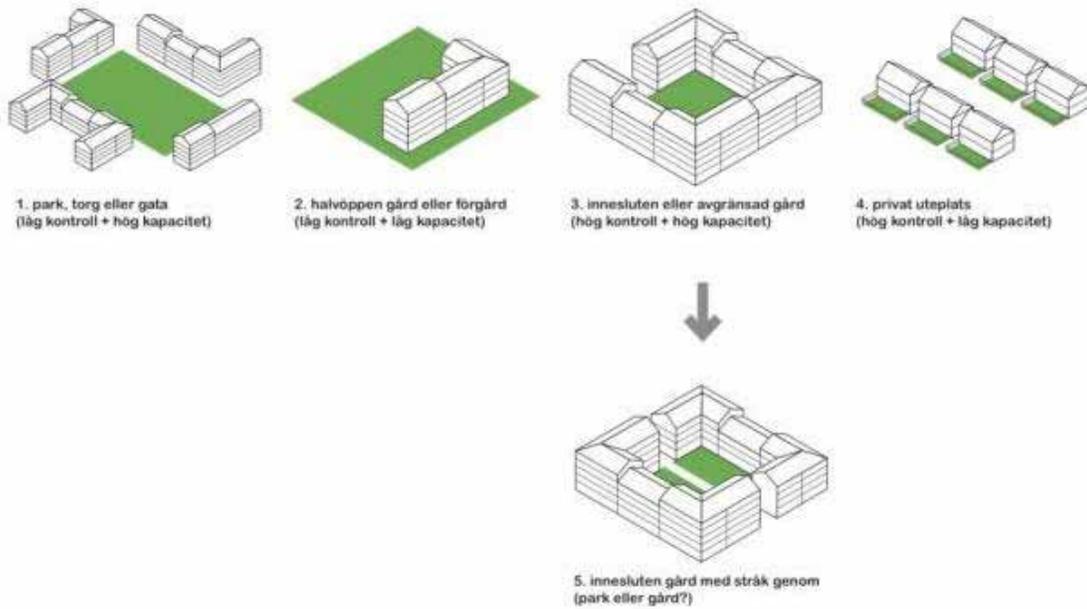
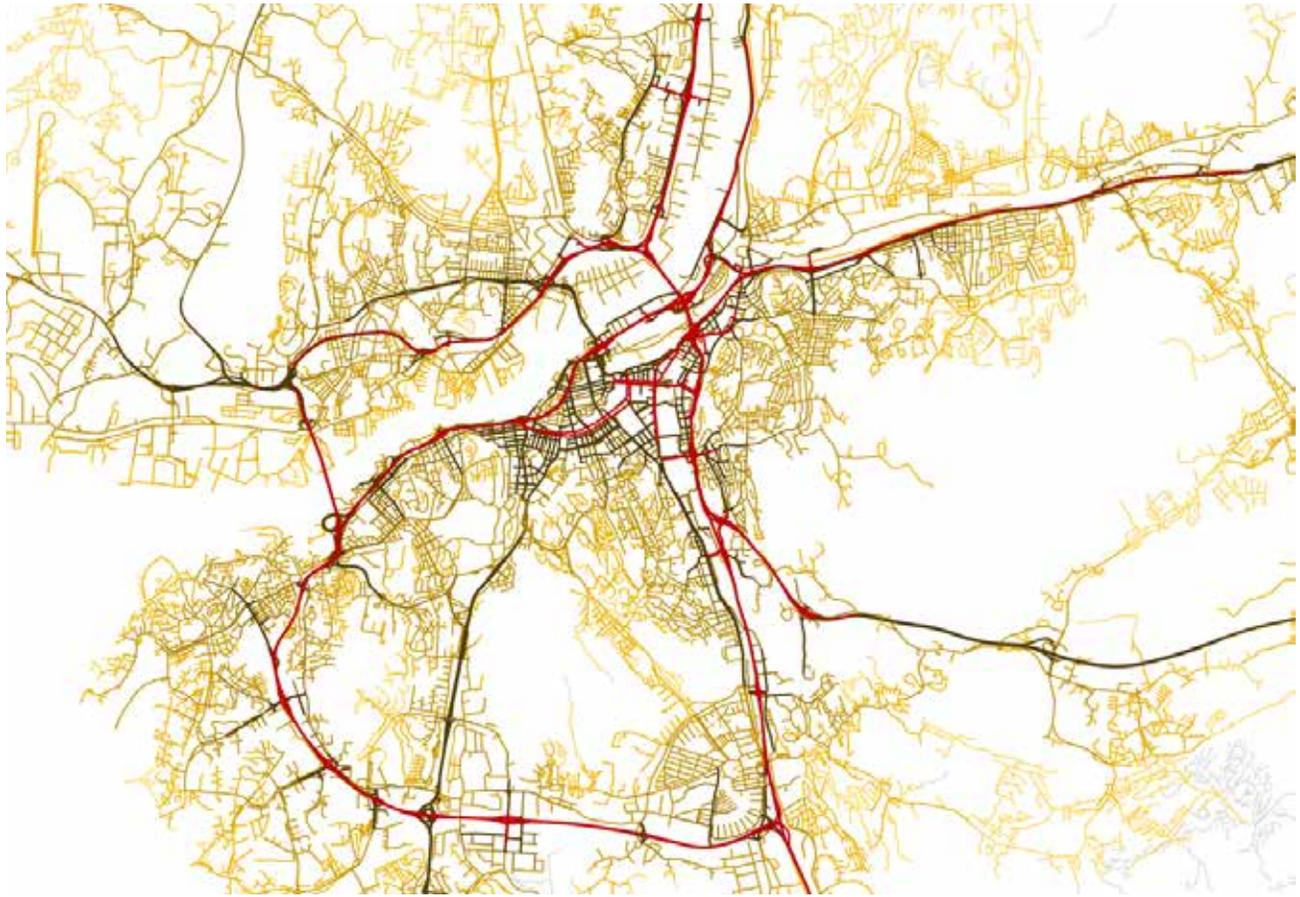


Fig. 2.9, Top. Angular closeness centrality analysis of Gothenburg, 2019. *This diagram illustrates the relative disconnection of Lindholmen at Present.* (Stavroulaki, Marcus, and Pont, "Fusion Point Gothenburg: GIS-Based Time Model, 1960 to Present")

Fig. 2.10, Bottom. Block form analysis. *Lindholmen, as currently configured lacks a clear block structure.* (Marcus and Pont, "Fusion Point Gothenburg: Om Att Mäta Stadsform")

districts and institutions in Gothenburg, and of the city and region as a whole. These analyses map and represent graphically aspects of those areas, including patterns of blocks and streets, public space and infrastructure, building typology and architectural vocabulary, patterns of use, historical development, and the way in which these districts connect to adjacent districts and

to the city as a whole. Already the student work has provided relevant and useful insights into the urban form and public space network of the area of 19th century urban expansion to the south of the historic core and its fortifications, as well as of the new typologies of waterfront redevelopment of industrial areas on the Hisingen side of the river (Fig. 2.11). In the Fall of 2019 this ongoing work has

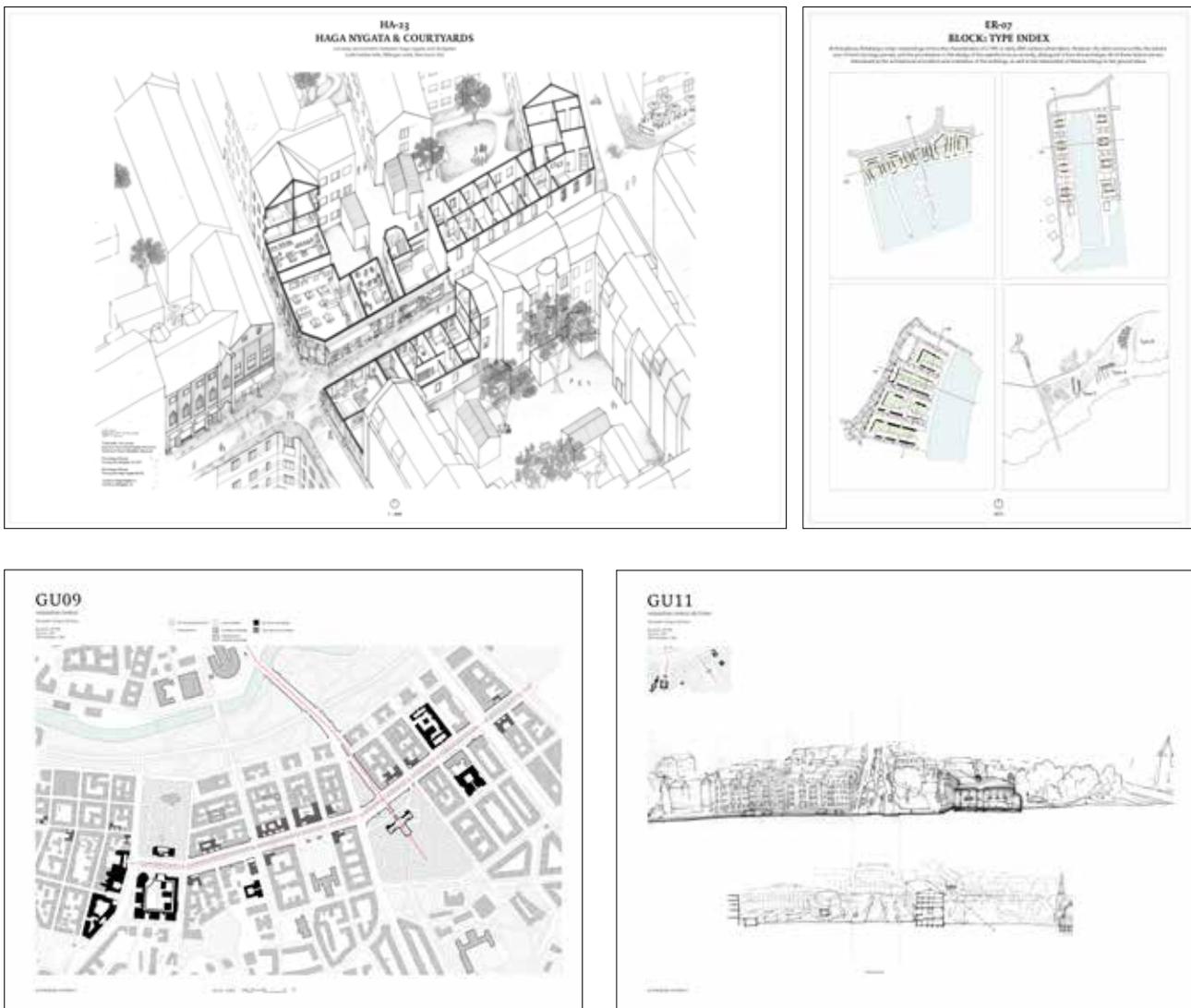


Fig. 2.11. Studies of Gothenburg's urban morphology prepared by students in Yale's *Urban Atlas* course. (Yale School of Architecture / upper left: Jincy Kunnatharayil, Erin Hyelin Kim,

Samantha Monge Kaser, Katrinia Yin; upper right: Haylie Chan, Alejandro Duran, Jeffrey Liu, Priyanka Sheth; Bottom: Deo Deiparine, Miriam Dreiblatt, Thomas Mahon, Mansi Punde)



Fig. 2.12. Student project from Yale's 2019 Gothenburg Studio. (Yale School of Architecture / Rishab Jain, Zack Lenza)

been built upon in an advanced design studio, proposing strategies and interventions focused on Lindholmen and organized around transformative themes such as mobility, sustainability and resilience, social equity and access, public health, and food chains. This approach mobilizes urban description and analysis as part of the design process, to reveal, represent and propose responses to the spatial structures implicit (and complicit) in some of the most demanding urban challenges and promising opportunities of the current era, not only based on research into worldwide best practices, but grounded in the specific spatial, environmental, social, economic and political circumstances of Gothenburg as discussed later in this report (Fig. 2.12).

These distinct sources of design input operate at substantially different epistemological and institutional levels, but therefore need each other and are all necessary for an intelligent design process. The real danger is not that they will contradict each other, but that they will remain separate and uncoordinated due to both structural and accidental disjunction of roles and

timing. In addition, the real challenge, as well as the important opportunity, is to achieve some effective degree of dialogue and synthesis, not in theory, but in practice and application through the design process. In that context, they all have significant work to do, and their discursive differences may in fact be a strategic asset, as they can provide feedback, checks and balances on the exaggerated reliance on any one level of design discourse. This, however, will require both the high-level administrative and institutional change alluded to above, as well as new interdisciplinary and inter-departmental entities, which like Fusion Point, begin to break down the silos that separate fields such as transportation planning and land-use planning, which should be totally intertwined and coordinated in their goals and process, as well as breaking down the barriers which artificially constrain and separate individual urban development projects with respect to each other and the city and region as a whole. Each new plan, whether for a building or an urban district, should be a reinterpretation and reuse of previous plans, even if unrealized, and the research and inputs that shaped them.

Designing an Urban District

Contextualizing the Vision

As already suggested, the critical gap that has emerged in the overall urban planning and design process for the RiverCity, as for so many ambitious urban redevelopment efforts around the world in the past three or so decades, is the gap between a large-scale urban vision, often informed by the current paradigms and conventional wisdom of global trends in urban development, and the specific conditions and challenges of local intervention in a particular city and a particular site. To exacerbate the gap, the vision, its values and goals, are often shaped by a more or less public process, whether led from the top or provoked and informed by a broader conversation, but then actual projects are designed and implemented through a much less transparent, and ironically, less clearly organized, process, more narrowly focused on producing an individual project on a specific site. At best, this produces highly successful, in the short run at least, self-contained development projects, of relatively unified (homogenous) character, that may or may not engage the character and opportunities of local culture and landscape.

The challenge, then, for a design process directed in its immediate goals, at shaping change in a specific urban area, is, as suggested above, the translation of broad urban values, as articulated through an appropriate public planning process, into the concrete context of a particular time and place, that is by no means a *tabula rasa* spatially, socially or environmentally, while neither losing touch with the broader goals and indeed the larger urban field, nor producing a generic representation of an abstract set of urban design standards applied to a site with its own specific character and opportunities, and its own unique elements of urban form and landscape (Fig. 2.13a). The design process described and deployed here seeks to achieve the **localization** and **contextualization** of shared urban values and goals by a grounding in an ongoing discipline of **thick description and close reading**, informed by recent methods of analysis and scholarship in the social sciences, humanities and cultural studies.¹

1 "Thick description" is a term borrowed from the British linguistic philosopher, Gilbert Ryle, by the American cultural anthropologist, Clifford Geertz, and applied to the study of cultural forms such as ritual in pursuit of what Geertz calls "local knowledge." "Close reading" is more often associated with hermeneutics, philology, and most recently, literary studies like the New Criticism, although they are taken here to be complementary approaches.

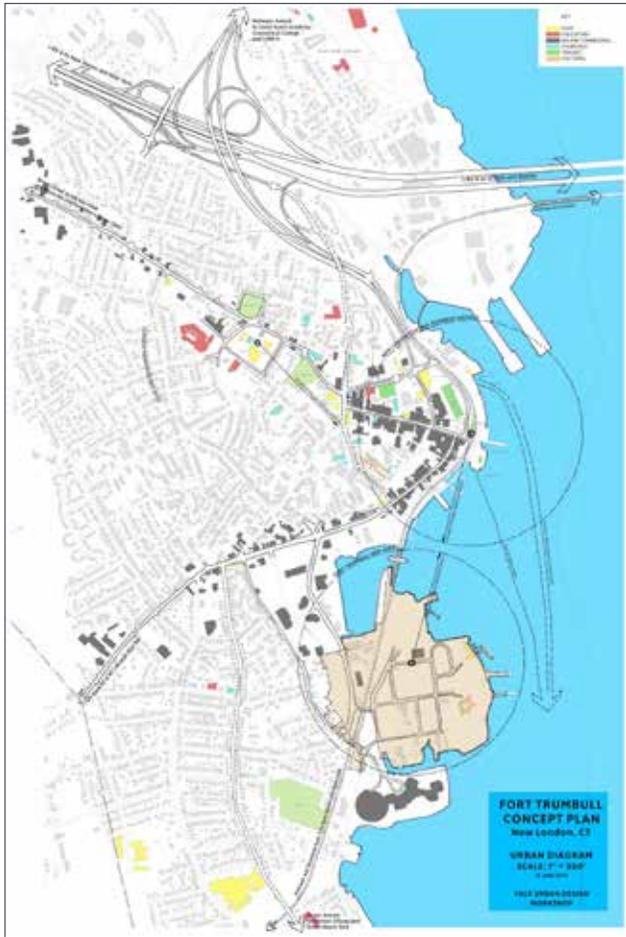
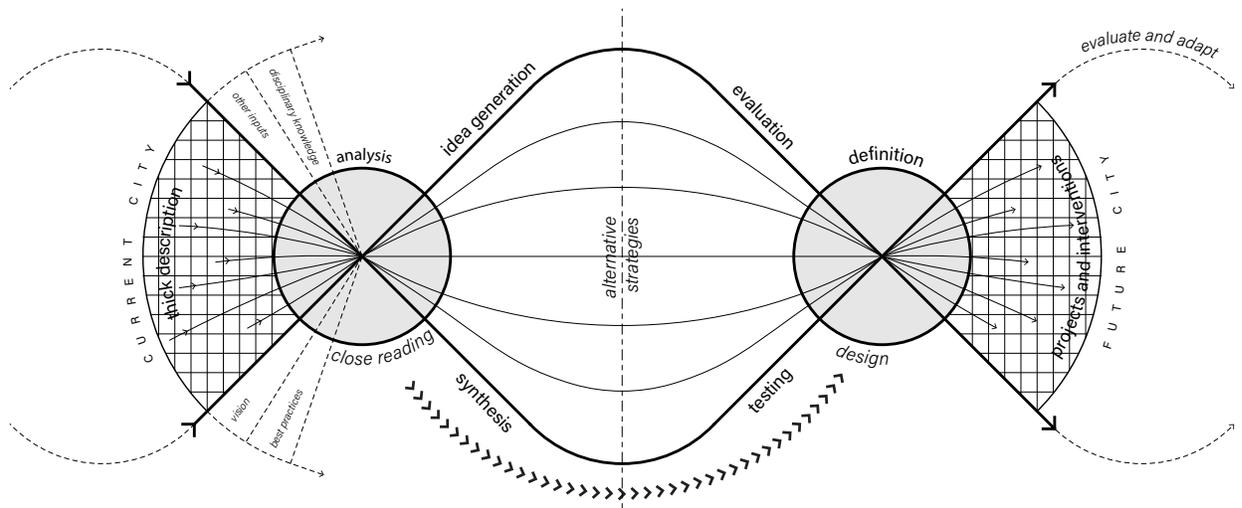


Fig. 2.13, Above. Analytic diagram and master plan for the Fort Trumbull neighborhood, in New London, Connecticut. (YUDW)

Fig. 2.13a, Below. Diagram of design process. (YUDW)



Thick description implies that the goal of urban analysis in the context of a rigorous and inclusive design process, is not to produce, through a Cartesian method of reduction to axiomatic first principles, a single, unambiguously correct reading or interpretation of an urban site or condition – and certainly not a single “solution” deductively derived from that analysis. It rather begins by complicating one’s reading through a richly layered and rigorously inclusive and open account of a site or city, and its culture in all its dimensions. This descriptive method is by no means neutral or passive, since interpretation through close reading, and as already part of the design process, begins almost immediately. Of course, in the interest of productive research and analysis, not to mention legibility, there will also be a bracketing of particular lines of investigation, but these will always feed back into the design process and become layers in the simultaneously retrospective and projective archaeology of a site.

Like our colleagues at Chalmers, the YUDW believes the focal framework for this description and reading of a city must be urban morphology and typology, insofar as urban design is understood to be, however deformed or inflected by the flows of process and urban life, an irreducibly spatial and formal discipline. Even when the provisional outcome of a well-conceived and executed design process is to build nothing (perhaps only adding some signage and planting some trees), that outcome is grounded in a detailed analysis and assessment of the **spatial logic** of the existing context and its evolving economic, social and environmental roles. That spatial logic is distilled as a series of **diagrams** (see section 3 and 4), which are then themselves reassembled as layers as one begins to build back up to a fully spatial framework which will materialize the diagrams as a framework for architectural and programmatic development, even as it embeds the public values of the city. As

has already been suggested, urban morphology and typology are well established fields, with powerful and significant recent advances, which, when combined with conventional research into historical, cultural and environmental developments – mapped into the spatial framework of morphological analysis, can provide just the kind of thickly layered ground out of which a truly contextual, place and time-specific urban design process can emerge.²

However, much traditional urban morphology research (and therefore design based on it), for all the detail and depth of its analysis, ends up representing the object of its study, the city, in a largely one-dimensional way, usually planimetric and usually foregrounding a single aspect of the city’s richly layered form and character, such as built footprint versus void in the case of Muratori’s mapping of Venice, or urban poverty in Charles Booth’s famous “poverty maps” of London from 1889 (Figs. 2.14 and 2.15). While we are now notoriously overloaded with data, about cities and the people who inhabit them, we also have access to far more sophisticated graphic and digital technologies for the display of that data and so, in our analysis, can and should at least partially simulate the condition of the city itself, where multiple dimensions – or **layers** – of spatialized data inhabit, simultaneously, the same urban spaces, interacting dynamically with the flows of people, activity, information and history constantly passing through them. Not only that, but it is possible, even desirable, for the analysis to be fully integrated with the design process, and for the documentation of “existing conditions” and urban analysis to become, from the outset, design

2 On the development of urban morphology and typology, see Anne Vernez-Moudon, “Getting to Know the Built Landscape: Typomorphology” in Karen A. Franck’s *Ordering Space: Types in Architecture and Design*.

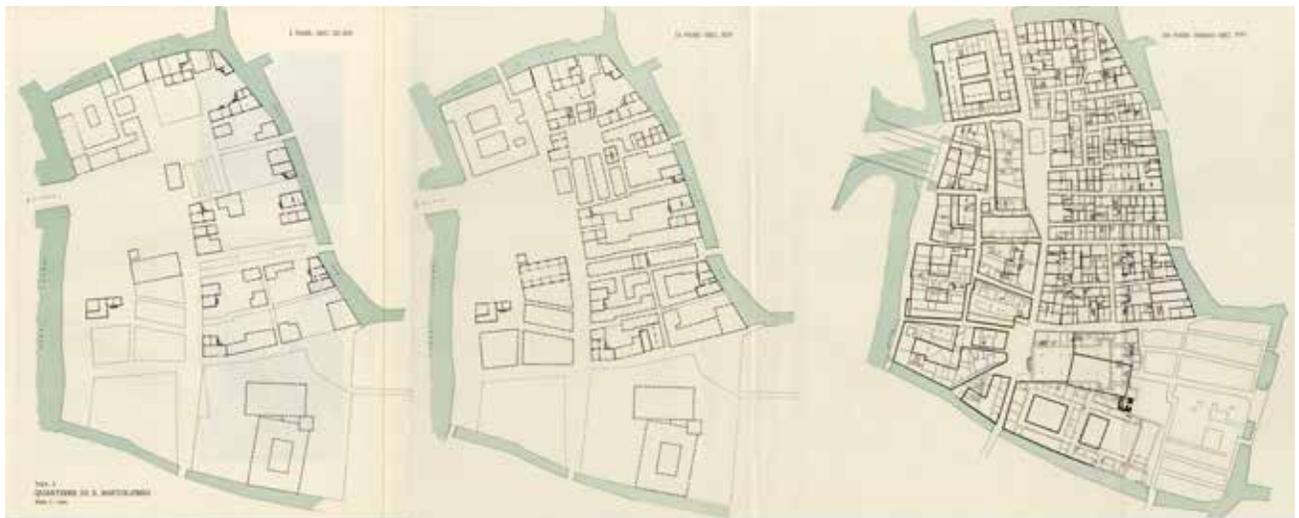
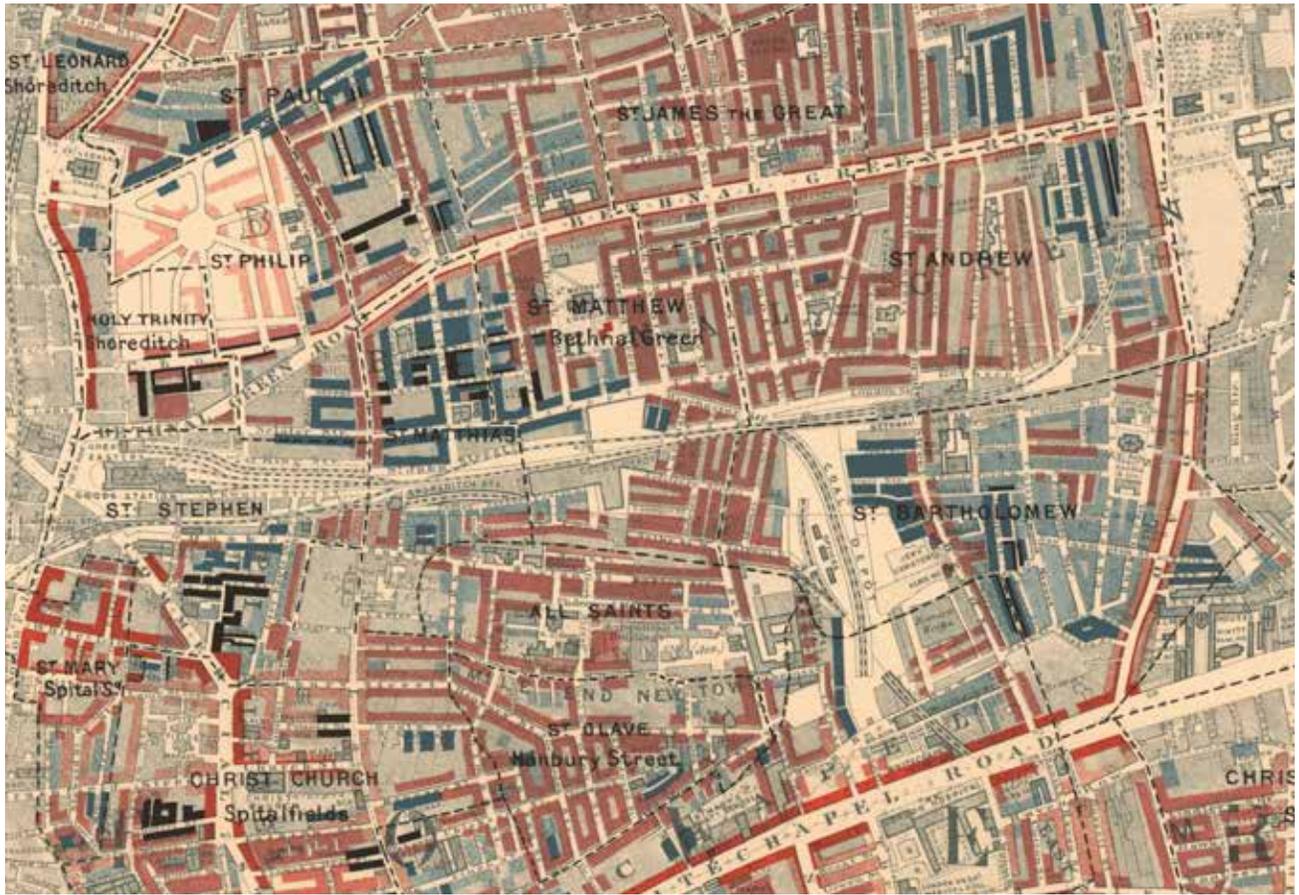


Fig. 2.14, Top. Detail of Charles Booth's poverty maps of London. (London School of Economics)

Fig. 2.15, Bottom. Saverio Muratori's mapping of the development of the San Bartolomeo district of Venice. (*Studi per una Operante Storia Urbana Di Venezia*, 1959)

drawings and models as well. So instead of a process of abstraction, or loss and suppression of information, both analysis and design are based on the **persistence of urban form**, data, and events, and while that form is reworked, reinhabited, and dialectically evolving through the design process and in the course of construction and use, as in Freud's model of the unconscious, nothing is ever fully lost³ (Fig. 2.16).

A relevant example of the importance of understanding and representing the city as **layered in time and space**, would be the limitations of the conventional site plan, a crucial document in most legally constructed design processes, which, with few exceptions, display the "site" as a bounded and stable geographic and real estate fact. And while this convenient fiction may be minimally sustainable for ordinary urban sites, it is immediately exposed as a more dangerous fiction in the case of an urban waterfront site, where millennia of geological, hydrological, and made-made change, sometimes invisibly glacial and sometimes catastrophic, conspire to create a dynamic condition, by no means stable and by no means bounded by the "water's edge" or by arbitrary lines of land ownership. Even binary mapping that distinguishes, usually for regulatory purposes, between, for example the "original" shoreline and constructed land, or between current water levels and flood projections and some future "line" based on elaborate models of sea-level rise, are apt to play into the idea that urban design is a "solution" to stable and soluble problems,

3 This account owes a clear debt to the work of Aldo Rossi, especially *L'architettura della città*, 1966, where Rossi truly operationalizes the work of the early urban morphologists and urban sociologists in what turns out to be a highly personal design approach grounded in collective urban memory.

rather than an adaptive dialogue with constantly evolving environmental, demographic and economic conditions. Urban design process must strive to model that condition of contingency for all its participants and constituencies. While the

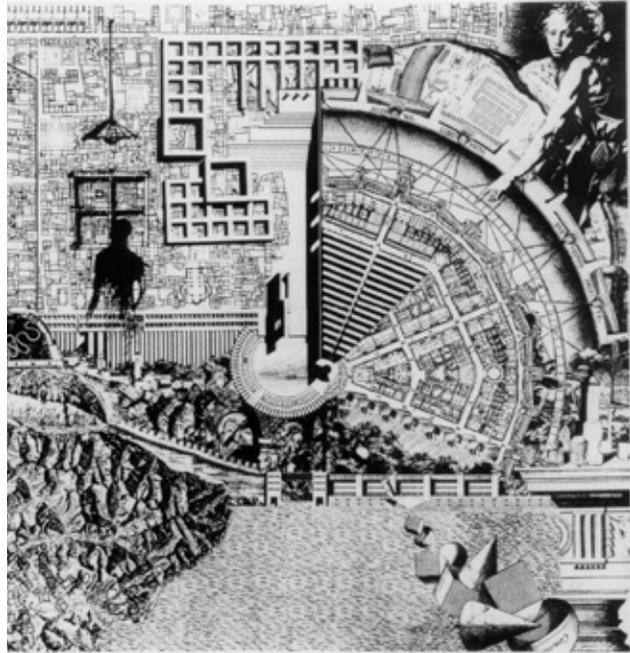


Fig. 2.16, Top. The Analogous City, illustration by Aldo Rossi, Eraldo Consolascio, Bruno Reichlin, Fabio Reinhart, exhibited in the 1976 Venice Biennale. (archiobjects.org)

Fig. 2.17, Bottom. Evolving shorelines at Lindholmen. (YUDW)



Fig. 2.18. Proposal for a multifunctional landscape incorporating a surge barrier, seating, bioswales, and a

connecting pedestrian path, in Bridgeport, Connecticut. (YUDW / Waggoner and Ball)

interventions proposed through that process, should themselves recognize and represent the contingency and adaptive capacity of “solutions” to urgent current challenges like climate change and affordable, sustainable urban housing in their local context (Fig. 2.17).

Design Strategies and Elements

If broad values are embedded in a particular urban setting through a well-constructed design process, then these values are mobilized in a particular project or site, both performatively and representationally, through a carefully crafted vocabulary of design **strategies and elements**, derived and adapted from both international best practices and from local urban culture, heritage, and environmental conditions. The job of a design process that is both open and professional, is to ensure that this vocabulary is understood, not only by current participants and constituencies, but also by future users, in both its performative and representational dimensions, and that it is fully integrated into the current design realization as well as adaptable to future phases of development and urban transformation. In addition, design economy and economic efficiency demand that we emulate the embodied intelligence and sustainability of traditional urbanism, before the dominance of zoned land use and mono-functional infrastructure, and design urban elements and systems to perform and display multiple functions. For example, we should expect that an expensive, but necessary piece of a system of flood mitigation can and should be at once a landscape to retain and release water, and at the same time an attractive

public park (See Fig 2.2). Nor should an urban system be comprised, in its full extent, by a single design “solution” governed by a single standard. The stormwater park may morph into a berm supporting a bicycle path, or a building podium supporting an elevated dining terrace, all part of a comprehensive system of coastal adaptation and protection, just as a limited access highway may turn into boulevard when adjacent to local neighborhoods (Fig. 2.18).

A typical range of urban strategies and elements in a new or redeveloped urban district might include:

- » A public space network, not simply individual public spaces, linking the core of the district and its significant sub-centers, with adjacent districts, with key transit nodes, with landscape features, such as a waterfront, both with views and spatial access, and giving public institutions and uses within the district a distinctive address, while providing space for regular and special programming designed to expand the audience and user base of the district;
- » Woven into that public space network, and giving it a additional functionality and identity, should be a sustainable and resilient public landscape, of site appropriate planting and softscape, that provides relief and recreation – both passive and active – absorbs CO₂, manages stormwater, and extends the characteristic landscape of the district and region, becoming a further source of local identity, and setting a standard for private development at the building scale;

» Overlaid on the public space and street network, a safe and accessible network of pedestrian and bicycle walkways and paths, linking to public transit through well-designed intermodal hubs, that facilitate and highlight transitions and points of arrival and orientation, while providing associated amenities and conveniences, such as bicycle rental and storage, information about directions and events, and a diverse array of shops and restaurants at the local level, and connect the district and its businesses and residents to strategic regional resources;

» In support of these systems, a unified and distinctive streetscape vocabulary of paving, lighting, seating, play surfaces and equipment, and signage promoting wayfinding and identity, developed in relation to the character of the district and invoking its heritage through new and re-purposed design elements.

Prototype and Precedent

Not only will a productive design process develop and integrate this sort of public-spaced based approach and vocabulary, it will engage the public by inviting them to help identify opportunities for early interventions, that **prototype and preview** the elements of a future system or network in highly visible, and strategic locations, not only at the centers of a district, but at its edges as well, where it should link with adjacent districts and networks. An important tool in this visualization process will be the clearly framed introduction of best practices and precedents, from around the world and throughout history, of course, but importantly also from the region, and even from elsewhere in the city itself. By “framing” one means that the precedents should not only be presented as picturesque and anecdotal, but also a part of their own characteristic urban districts, including block and building typology, street network, and relevant comparative data, such

as density, coverage, and street width (Pg. 62-63, South Lindholmen precedent studies). This is a crucial aspect of creating an informed and actively engaged constituency for urban design among citizens and public officials.

Experimental and Multi-scalar Design Process

As already suggested, a well-designed urban district is never an isolated “project” that simply reproduces a development or urban design formula that has proven successful elsewhere or is distilled from general standards or guidelines presumed to apply in any place or time. These sorts of guidelines have their place, as minimum or baseline standards of urban livability or decency, just as with housing standards, serve to avert human or environmental disaster due to haste or greed. They can usefully serve at the beginning of a design process to set the bar, so to speak, but should never constrain appropriate design experimentation and innovation, aimed at satisfying goals and standards by other means, or actually going well beyond the minimal expectations set by those standards through unanticipated discoveries and connections. Those connections to shared urban resources and amenities are a reminder that each successful district of the city is not likely to be generic, but has a differentiated role to perform in its own distinctive way and derives its identity relative to other districts in large measure from that role, along with its culture and site. For example, Lorensberg is characterized as much by the buildings of Gothenburg University, and other cultural and educational institutions integrated into the urban fabric, as by its handsome nineteenth century blocks and buildings along tree-lined streets. The methodology of thick description and close reading can uncover a more detailed picture of the roles that a district is currently playing, but the design process should also include a version of **urban role-playing**,

generating possible future scenarios which build upon and extend current roles, and test those scenarios in terms of economic and demographic projections. This sort of scenario testing is closely related to the use of space syntax to evaluate the impact of new infrastructural connections, which not only alter the centrality of a particular area, but also its potential role in the larger network of urban resources and amenities.

Understanding those differentiated roles, requires urban planning and design to operate simultaneously at multiple scales, from the site, to the district or neighborhood, to the city, to the region, and ultimately to the global context. Just as the Långgatan district has seen a dramatic change of relative centrality and use over time, and will presumably see a further change as the projected Masthuggskajen development proceeds, Gothenburg itself constructs its role in a larger region from its position relative to the rapidly developing capital city regions of Stockholm, Oslo, and Copenhagen-Malmö, and could begin to function more consciously as a sort of Scandinavian “regiopolis” (Fig. 2.19).⁴ While the planning discourse at the level of the RiverCity Vision has done a very good job of invoking that multi-scalar style of thinking, it is yet another dimension that tends to drop out of the design process at the scale of the individual project, which in Gothenburg, much like everywhere else these days, seems to be the operative unit of urban development.

In summary, well-designed and executed urban design process by this account has the considerable responsibility of embedding the

4 A planning concept most directly applied to the ambitions of the German city of Rostock, with respect to its relative position and role in the regional field staked out by Hamburg, Berlin, Szczecin, and Copenhagen-Malmö.

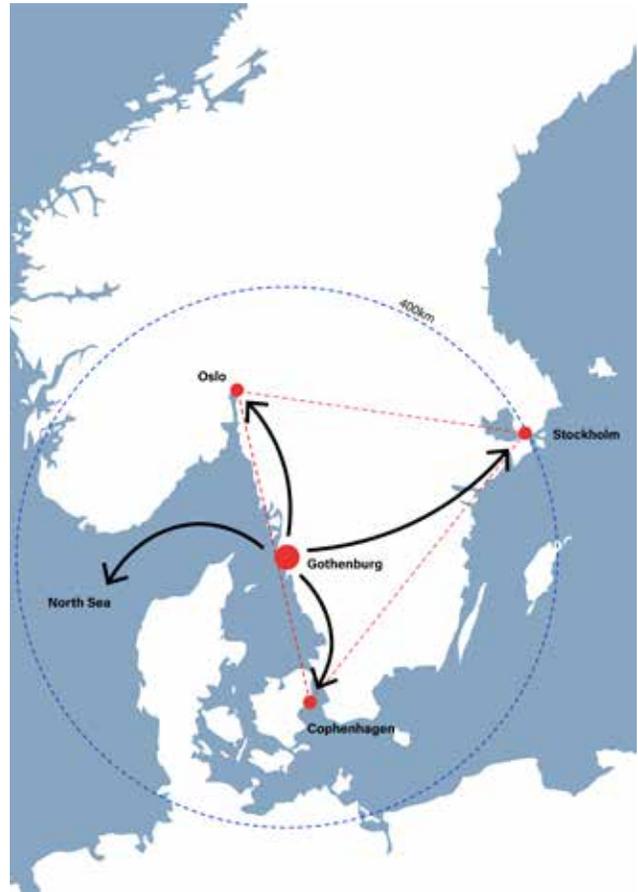
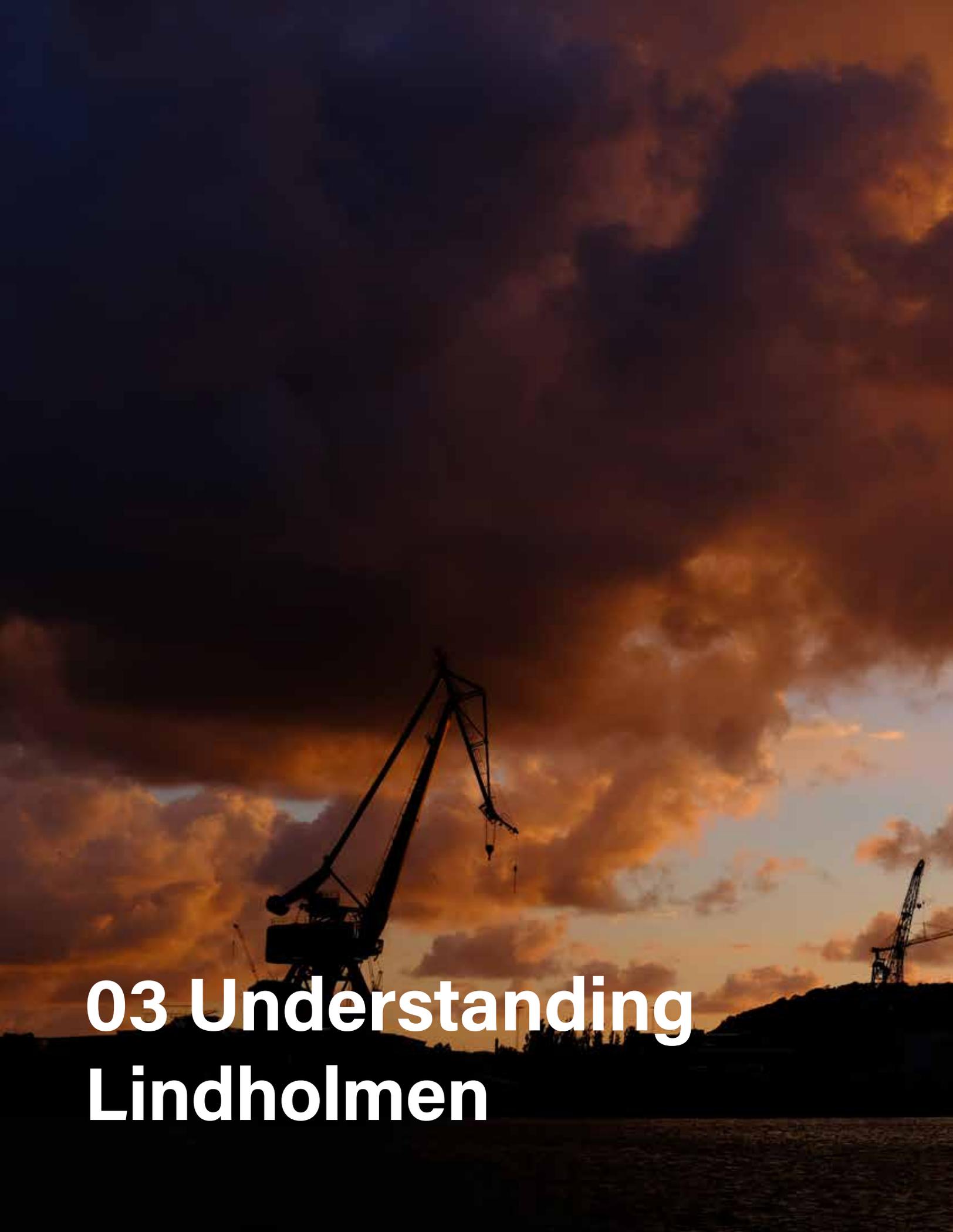


Fig. 2.19. Gothenburg as Regiopolis. (YUDW)

urban vision and its broad values in a concrete vocabulary of design strategies and elements, of critically considering a range of inputs from the vision, to research, to the experiences and observations of citizens, stakeholders and presumptive outside experts, developing a rigorous and inclusive thick description of the area and issues under consideration and representing that description clearly and usefully as a basis for the ongoing development of a locally responsive, open and adaptable, sustainable and resilient urban district. That is what the following design case study of Lindholmen sets out to illustrate.



03 Understanding Lindholmen



Positioning Lindholmen

Industrial heritage and production: past and present value

Over the past thirty years, Lindholmen has been the subject of a long process of urban transformation in search of a new, reconfigured form of urbanization, one intended to lead the district beyond the dominant industrial age that originally defined it. Since the 1840's industry was indeed the primary driving force in Lindholmen for well over a century. Not only did naval industry shape its waterfront and pavilions, strengthen Gothenburg's working class and stimulate economic growth, but it also projected Lindholmen beyond its district through the global circulation of its vessels and the distinct image of its industrial skyline (Cadell, 2008). It is this twofold value of industry—as center of production and as iconic built heritage—that, albeit transformed, still persists in Lindholmen. To understand the urban development of Lindholmen as a restructuring transition between this foundational past, its present, and possible future thus means to understand the multiple forces that shaped and continuously repositioned Lindholmen across time and geographic scales.

Lindholmen, Sweden, and the world. Founded in 1845 as a shipyard, Lindholmen has for most of its history been intimately intertwined with Swedish maritime history. If Lindholmen was a key contributor to the projection of Swedish trading and shipbuilding capabilities onto the international stage, the increasing demands stemming from this international market, in turn, successively conditioned the physical transformation of Lindholmen's waterfront over the course of more than a century. In response to new technologies in mid-nineteenth century naval industry, in particular the wide adoption of steam engines and the continuous development of steamship technology, the city expanded Gothenburg's harbors from the south side to the unoccupied land across the river. It was this expansion that led to the establishment of three new shipyards on the Norra Älvstranden waterfront between 1845 and 1867: the shipyards of Götaverken, Lindholmen, and Eriksberg (Fig. 3.1) (von Sydow 2004). At the turn of the twentieth century, with shipping companies operating across the globe, this notably increased capacity in trading and shipbuilding made Gothenburg not only the foremost maritime city in Sweden but also the leading export harbor in Scandinavia (Enhörning, 2010).

While international trade dominated Gothenburg's nineteenth-century economy and propelled the establishment of Norra Älvstranden's shipyards, the footprint of three large parallel docks that still characterizes Lindholmen's waterfront today testifies to yet another major structural change (Fig. 3.2). The intense industrial

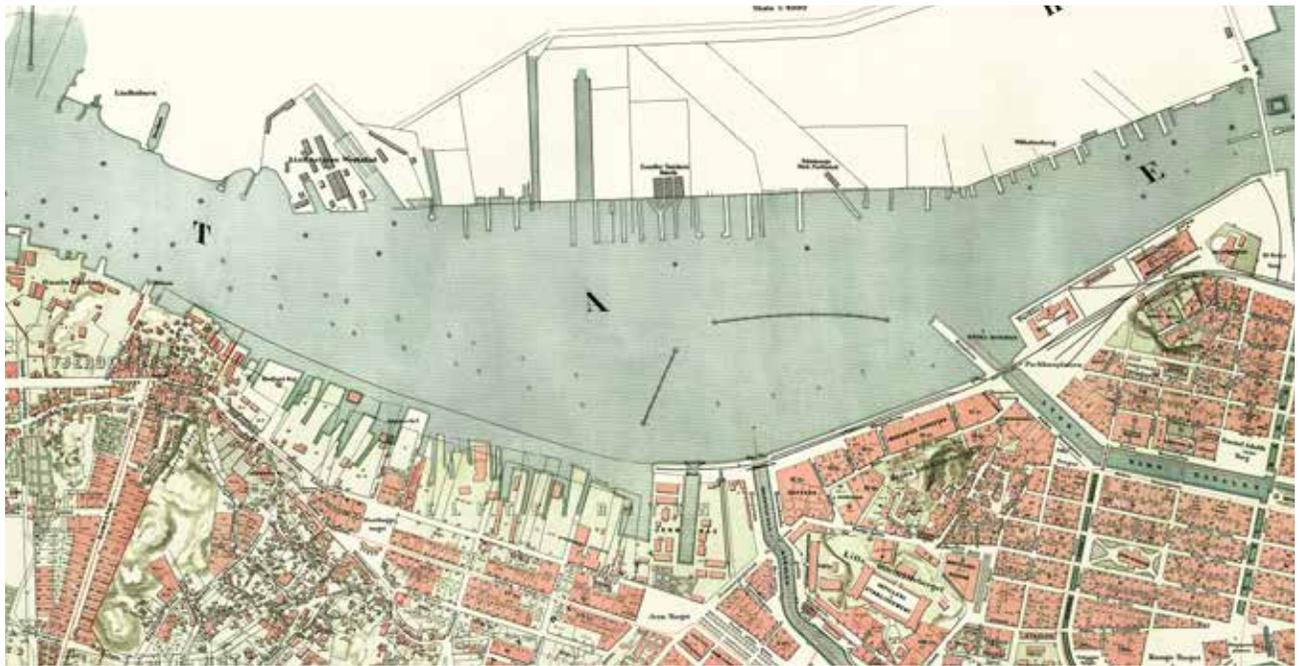


Fig. 3.1, Top. Lindholmen's waterfront as depicted in N.P. Pehrsson's map from 1888. (Wikimedia / Riksarkivet, Landsarkivet i Göteborg)

Fig. 3.2, Bottom. Aerial view of Lindholmen in 1970. (City of Gothenburg)

development that marked Gothenburg in the twentieth century shifted the city's economy toward large-scale manufacturing industries, happening simultaneously in textile production, the automobile industry, and in shipbuilding. As the maritime circulation of goods, including oil, sharply intensified and increased in scale after the second World War, so did the demand for more vessels and oil tankers, as well as larger docks and machinery buildings necessary for shipbuilding. When the Swedish shipbuilding industry reached its peak production in the 1960's it was one of the leading industries in the world, second only to Japan, with most of its ships produced at Norra Älvstranden's shipyards: Götaverken, Eriksberg, and Lindholmen (Fig. 3.3) (Stråth, 1987; Colton & Hutzinger, 2002; von Sydow, 2004).

Lindholmen and Gothenburg. With the establishment of Norra Älvstranden's shipyards in the mid-nineteenth century, followed by later intensive industrial and residential development on the north side of the river and further afield in Hisingen, the economic and demographic structure of Gothenburg changed considerably. In spite of these developments, the Göta River persisted as a challenging urban divide in the city. The 1955 iconic map "Göteborg" by Staffan Wirén offers an emblematic portrait of this divide. By illustrating the city districts through carefully selected landmarks and main activities, the map encapsulates a pointed perception of the city's productive, cultural, and leisure life in the 1950's (Fig. 3.4). South of the Göta River, Gothenburg is colorfully populated with a mix of cultural, institutional and religious buildings, and animated



Fig. 3.3. Lindholmens varv in 1961. (Sjöstedt, Stig / Reklamfoto Ab / Sjöhistoriska museet)



Fig. 3.4. *Göteborg*, Staffan Wirén, 1955. (City of Gothenburg)

by recreational areas and sports activities. In contrast, the north bank shipyards of Eriksberg, Lindholmen and Götaverken are illustrated by using only two iconic figures—shipping cranes and cargo liners—repeated along the waterfront. Wirén's 1955 map presents, in sum, a reductive yet truthful caricature of Norra Älvstranden as an outer urban edge of industrial landscape: a center of production isolated in its extreme functionality, but also the largest employer in the city.

In face of increasing demographic, industrial, and urban development pressure in Hisingen, this physical divide between Norra Älvstranden and Gothenburg's city center was soon addressed in the following decade. First with the Älvsborg Bridge in 1966, followed by the Tingstad Tunnel under the Göta River in 1968, this decisive infrastructural investment for connecting the two

sides became an acknowledgment of the vital role that industrial production played in Gothenburg's urban economy as well as the significant increase of resident population in Hisingen in this period (Fig. 3.5) (Enhörning, 2010).



Fig. 3.5. Postcard of Älvsborg Bridge and the Hising Island, 1965. (Fotograf okänd / Järnvägsmuseet)



Fig. 3.6. Slottsberget workers housing at Lindholmen, as depicted in a 1921 map published as part of Arvid Södergren's *Historiskt kartverk över Göteborg upprättat för jubileumsutställningen i Göteborg 1923*. (Gothenburg University Library)

With the shipbuilding crisis in the 1970's leading to the closing of Eriksberg and Lindholmen's shipyards in 1980, Norra Älvstranden entered a new phase of long-term planning and structural transformation. From the early Friendly City vision from the mid 1970's to the recent RiverCity program (Stadsbyggnadskontoret, 2009), multiple planning initiatives sought to change this modern industrial paradigm of single land use and physical and social isolation, pursuing instead new visions of connectivity and urban integration for the larger urban region of Gothenburg

Lindholmen and Norra Älvstranden. As one of the three shipyards established in Norra Älvstranden in the mid-nineteenth century—alongside Eriksberg and Götaverken—Lindholmen remained over the course of its history mostly an isolated area of heavy shipbuilding industry, with its own community of workers. Since the late-nineteenth century, one element set a clear distinction between Lindholmen and its neighboring shipyards: the picturesque residential settlement of shipbuilding workers who, taking advantage

of the accentuated topographic difference that prevented industrial land use, built their single-family homes on the hill of Slottsberget (Fig. 3.6). The small residential scale of the workers' wooden homes on top of the hill was set in stark physical and visual contrast against the increasingly large scale of their work spaces below, whether in the solid brick mechanical buildings or in the crowded docks that densely populated the waterfront until the shipyards' demise (Figs. 3.7 and 3.8).

From the late 1970's onwards, as urban redevelopment plans began for the decommissioned shipbuilding sites on the northern bank of the Göta river, Lindholmen stood once again in contrast to the other districts in Norra Älvstranden, only now for a different reason. The renewal projects of areas such as Eriksberg shifted the district's character by concentrating exclusively on the provision of new residential and leisure spaces, as well as services, largely in

response to the Friendly City vision that aimed to bring more people and new residents to Norra Älvstranden. In Lindholmen, however, production remained the primary focus of redevelopment (Stadsbyggnadskontoret, 2009; von Sydow, 2004). First through the research institute that relocated to the empty shipyard, followed by Lindholmen's knowledge center formed by a collaboration of Gothenburg's educational institutions and the establishment of Chalmers University on site, and finally leading to the Science Park at the turn of the millennium, Lindholmen became the forefront of Gothenburg's search for a new direction for the city's productive sector (Fig. 3.9). The successful ties between knowledge and industry that Lindholmen has since developed extend today far beyond the district perimeter, making it an epicenter that supports both research and manufacturing in the larger urban region of Gothenburg.



Fig. 3.7. View of Göta Rive from Slottsberget, 1952. (Erik Liljeroth / Nordiska museet)



Fig. 3.8. Birdseye photo of Lindholmens varv and Slottsberget, 1969. (Hisingenbyday.se)



Fig. 3.9. Lindholmen Science Park brings together industry and education. (Lindholmen.se)

Urban restructuring of Lindholmen as sociospatial and economic development

Lindholmen Science Park in global perspective. Historically known as a port city and industrial city, since the shipbuilding crisis in the 1970's Gothenburg has made concerted efforts to restructure its economy and find a new identity for the city and for the north bank of the river in particular. The closure of the iconic shipyards of Norra Älvstranden not only marked the loss of Gothenburg's leading position in the industry, but also the loss of an urban image that dominated the city's waterfront and its collective imaginary. Gothenburg has since then promoted urban visions such as becoming an "event city" or a "knowledge city" (von Sydow, 2004; RiverCity Gothenburg, 2011), contemporary urban images meant to replace the mark of industrialism that prevailed over the city's modern history. The implementation of such visions found a direct programmatic translation on the decommissioned sites of Norra Älvstranden in the late 1980's and

early 90's. Widely attended cultural events such as pop concerts and sports events successfully brought in visitors and gradually changed the negative perception of the northern bank as a secluded brownfield waterfront (Cadell, 2008). In turn, the establishment of educational and research facilities, initially by Chalmers University, and of technology-oriented companies reinforced a new turn towards research and the knowledge economy and led to the foundation of Lindholmen's Science Park in 2000. By embracing the production of science and technology as a primary economic force and a new direction in urban development, Gothenburg thus joined a global tendency of developed cities that saw in the knowledge economy the key for restructuring economic growth, old industrial sites, and create a new urban image for the post-industrial era.

However, the active promotion of a knowledge economy as a post-industrial paradigm in the urban restructuring of sites such as Lindholmen has since then been widely contested. In their critical survey of two decades of techno-



Fig. 3.10. Centrally located Lindholmen Science Park, top, vs. suburban satellite Cambridge Science Park, UK, bottom. (Google Earth)

science parks, Manuel Castells and Peter Hall posited that the new age of high-technology production should not be understood as a post-industrial age, but rather as the “new industrial complex” (Castells and Hall, 1994). Another point of contention focused on the strategic location of most early techno-science parks, or

“technopoles.” The initial urban satellite approach, seen in the 1980’s as a model for decentralizing research and isolate scientific enquiry from everyday concerns, often failed to integrate broader economic and urban developments and to develop internal growth, remaining exclusively dependent on foreign direct investment (Fig. 3.10). (Castells and Hall, 1994; Dabinett, 2014). In contrast to most “technopoles”, Lindholmen is unusually positioned to face these critiques. Not only do the district and Science Park benefit

from a unique central position in Gothenburg's urban region, but they also advance a more sophisticated integration of production. When the City initiated the district regeneration process of "Project Lindholmen Corporation" in 1981, the future of Lindholmen was from the start envisioned as a center "...where education, production and research would cooperate under the same conditions" and which sought to promote industrial development with a new focus on research (Stadsbyggnadskontoret, 2001; von Sydow, 2004).

Within the universe of developed cities that actively embraced the turn towards a knowledge economy, there are other significant nuances in the rapport between knowledge, industry and production that also need to be considered. As Saskia Sassen pointed out in her comparative study of new urban economies (Sassen, 2018), there is a critical distinction between cities that fully transitioned towards a knowledge-based economy—a new economy based on trade, finance, and service exports such as London or



Fig. 3.11. Artist's rendition of the Brooklyn Navy Yards redevelopment. (WXY Studio)

New York—and those that still present a healthy diversity and continuity of industry. In the latter case, these knowledge economies developed instead an important synergetic relationship with heavy industry by servicing key manufacturing sectors, as in the examples of the cities of S. Paulo, Chicago, and Shanghai. Cities that demonstrate the proximity and ability to mediate between knowledge and manufacturing, including heavy industry, have therefore the potential to attract other industries that increasingly depend on such services. Continuously assessing the role of local urban economies in the world economy, Sassen defends, “The deep economic history of a place and the specialized economic strengths it can generate increasingly matter in a globalized economy.” The Brooklyn Navy Yards become here a case in point (Fig. 3.11). After decades

of projecting an image of a pure knowledge economy, the city of New York is now attempting to built upon its industrial history and develop in the Brooklyn Navy Yards a successful model for urban industrial production.

It is this dynamic combination of knowledge and industry that characterizes Lindholmen, the Science Park, and their relationship to the larger Gothenburg region (Fig. 3.12). The healthy diversity and continuity of the industrial sector in Gothenburg and the larger region not only facilitated the transition and reintegration of the shipbuilding labor force (Eriksson, 2016), but also currently sustains a productive reciprocal demand between manufacturing, heavy industry, and knowledge (von Sydow, 2004). Other than Lindholmen’s iconic cranes, it is

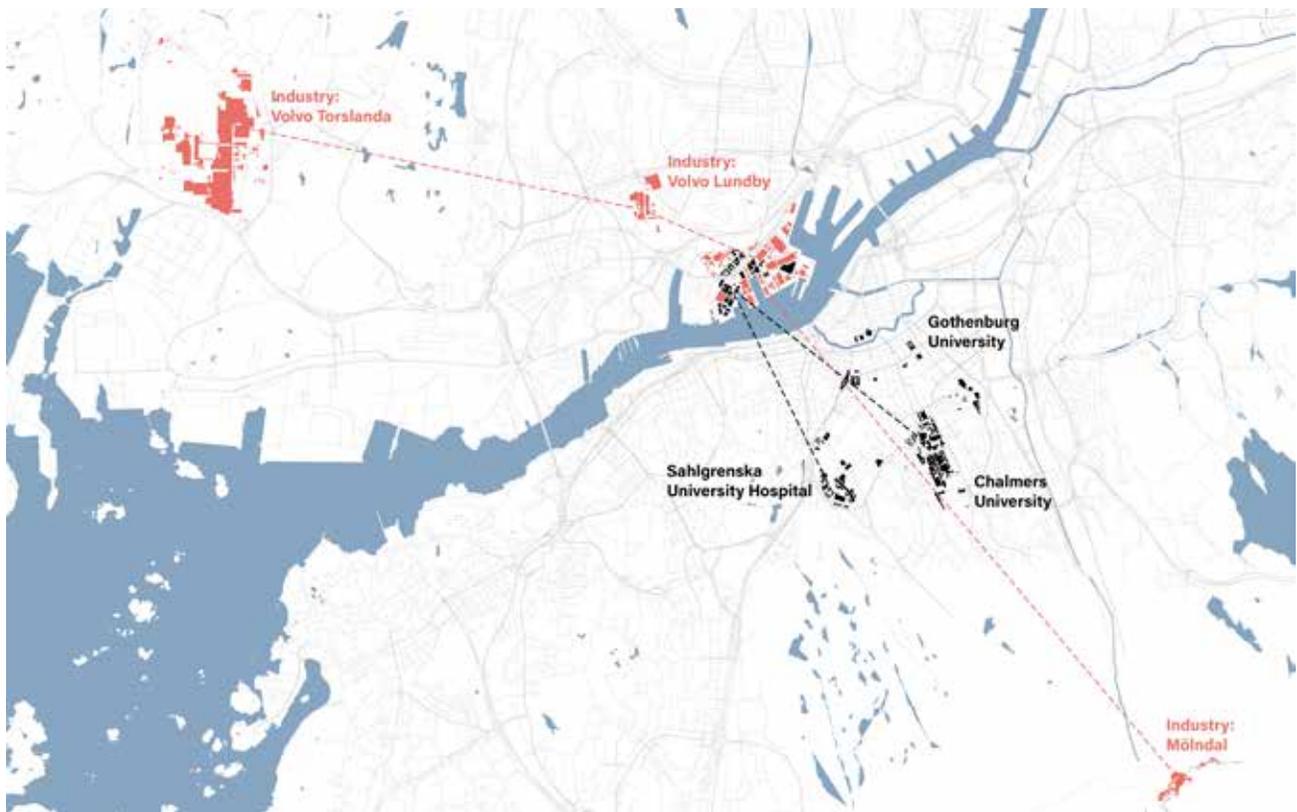


Fig. 3.12 Lindholmen is connected to other centers of research, industry and manufacturing in the region. (Yale School of

Architecture / Alex Pineda Jongeward, Eunice Lee, Michelle Badr, Serena Ching)



Fig. 3.13. Types of tenants in Lindholmen and Lundbyvassen today. (Yale School of Architecture / Alex Pineda Jongeward, Eunice Lee, Michelle Badr, Serena Ching)

the strong presence on site of companies such as Volvo that becomes therefore emblematic of an active relationship between the different production sectors across the larger region: a highly productive interdependence that finds in Lindholmen its center and that evokes the city's industrial legacy, builds upon its capacity in the present, and projects it to the future (Fig. 3.13).

From outer edge to urban integration: A new centrality in regional urbanization. The extended network of the production sector is not the only force repositioning Lindholmen in the larger region. Since 2010 the program for RiverCity Gothenburg has promoted reconnecting the Göta River waterfronts in a new vision of an expanded city center (Fig. 3.14). Behind the RiverCity project is a long-term development strategy of regional planning with the ambition of integrating Hisingen in a comprehensive urban plan for Gothenburg (Fig. 3.15). In contrast to previous models of extended urbanization based

on the idea of metropolitan areas, which mostly emphasized a continuity of urban development connecting the urban core to the periphery of expanding suburbia, this new phase in Gothenburg's planning should be understood as a phase of regional urbanization. This difference between metropolitan and regional urbanization reflects not simply a change in the geographic scale of planning. More importantly, regional urbanization implies a heterogeneous inclusion in the larger urban region of areas previously excluded, such as suburban communities and urbanized rural and industrial areas (Soja, 2014). Above all, regional urbanization implies understanding the interdependence of all areas – an interdependence of capital, labor, and culture – that connects the urban region as a whole, with an awareness of its rich cultural heterogeneity, as well as the accentuated social and economic inequalities that characterize this contemporary urban model.

In this model of Gothenburg's urban region and the RiverCity vision, Lindholmen and

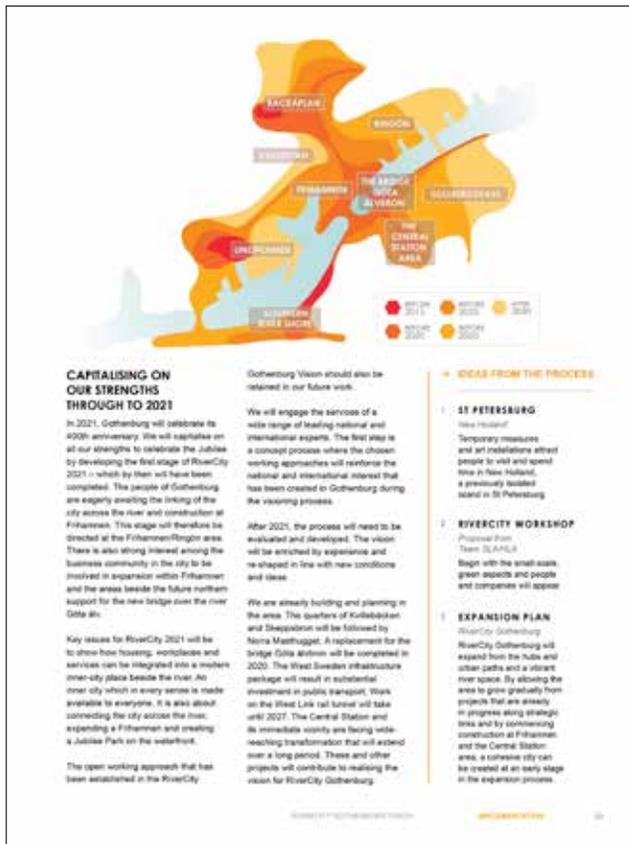


Fig. 3.14, Left. Diagram showing an expanding city center, including Lindholmen, from the RiverCity Gothenburg Vision. (City of Gothenburg)

Norra Älvstranden's entire waterfront are clearly repositioned. No longer an excluded edge of the outer city, Lindholmen and the northern bank become now an integral part of the urban core, part of "Central Gothenburg," and a future vital node for consolidating the connection of the northern residential areas and industrial developments in Hisingen to southern Gothenburg and the larger region. This envisioned capacity of Lindholmen as a contemporary public urban center should not be seen in conflict with the stated mission and expanding ambitions of the Science Park as a key center of production. This is a tension one finds latent in both the RiverCity and the Science Park programs. With its broad planning scope and emphasis on mix uses, the RiverCity project largely overlooks Lindholmen's distinctive production power. The

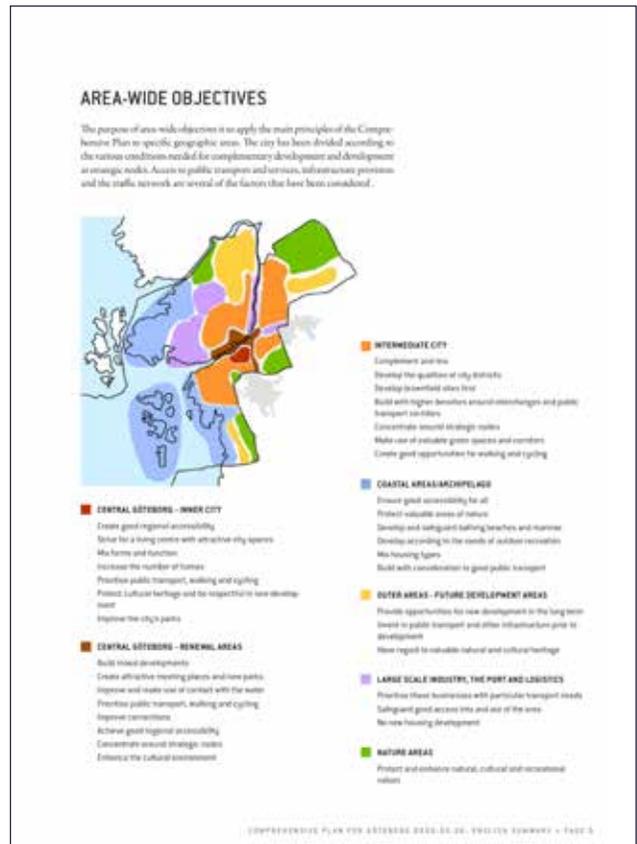


Fig. 3.15, Right. Regional planning objectives, from Comprehensive Plan for Göteborg 2009-02-26: English Summary (City of Gothenburg)

Science Park program, in turn, overtly downplays the district's potential centrality to emphasize innovation, research, and development. The current process of urban restructuring has now the opportunity to overcome this apparent dichotomy in Lindholmen and develop a viable alternative to the widely criticized anti-urban isolation of global "technopoles." By integrating a network of inclusive public spaces and green areas, a diverse mix of public programs, a public and active waterfront, and a robust cross-river and inter-district transportation system with the Science Park expansion plans, Lindholmen is uniquely positioned to combine, and mutually strengthen, intense knowledge production with active public spaces and programming in a contemporary urban core for central Gothenburg.

Lindholmen: Urban Qualities and Form

Lindholmen has evolved from an island in the Göta River covered by Linden trees to a mixed-use urban district. Its contemporary form is a result of the specific interaction of layers of its history.

Lindholmen occupies half (with Lundbyvassen to the east) of a peninsula attached to the Hisingen Island, directly across the Göta river from the historic core of Gothenburg. It is defined on its south edge by the Göta River, facing the 19th century Masthuggskajen district across the water, by Sannegårdshamnen to the west, and by the harbor of Frihamnen to the east. Its northern boundary, consisting of rail and highway infrastructure, reinforced by steep natural topography, makes Lindholmen a virtual island today, as it was, in fact, 200 years ago.

Within the larger metropolitan region, Lindholmen occupies a key position on the north shore of the river, due to its proximity to the core of the city across the water (Fig 3.16). The RiverCity Vision describes Lindholmen in relation to this core—envisaging it as an extension of the center, and therefore focusing future connections across the river (Fig 3.16). But Lindholmen may also be described as one link in the continuous, linear Älvstaden (River City) which extends east to west, between the two Göta älv bridges, suggesting its eastern and western connections may be just as important as those to the south (Fig. 3.17). Further, Lindholmen can also be understood as the “front” of the larger district of Lundby to the north—its south facing waterfront and connection to the historic city to the south, given better connections north, northeast, and northwest, could make Lindholmen an urban core for Lundby (Fig 3.18 & 3.19). All these readings further reinforce the potential importance of Lindholmen, as a bridge which can connect the city, and as a distinct center in Gothenburg.

Lindholmen itself consists of several distinct sub-areas which are poorly connected to each other. Old Lindholmen at the west is a largely 19th century residential district on a hill that slopes up from the north to a high bluff at the river’s edge to the south. Slottsberget and Skateberg make up this southern part, and are divided by a dry dock that was blasted out of a cleft in the rock in the 19th century.

North and South Lindholmen are divided by Lindholmsallén and its extension to the west, Ceresgatan. Lindholmsallén is a major boulevard-like feature that supports transit infrastructure (See also Fig. 2.8). The northern areas continue to comprise large industrial buildings that support a range of vibrant uses: a movie studio, night club, language school, etc., organized loosely around large paved areas.

Central Lindholmen is defined as one prong of the Lindholmen Science Park: primarily educational institutions including Chalmers University and a collection



Lindholmen

Historic Core

Tolered

Lillhagen-Brunnsbo

Kvillebäcken

Backaplan

Ringön

Brämaregården

Volvo Lundby

Ramberget

Frihamnen

Gullbergsvass

Lundbyvassen

Nordstaden

Stampen

Sannegårdshamnen

Eriksberg

Inom Vallgraven

Heden

Masthuggskajen

Haga

Landala Vasastaden

Majorna

Masthugget

Annedal

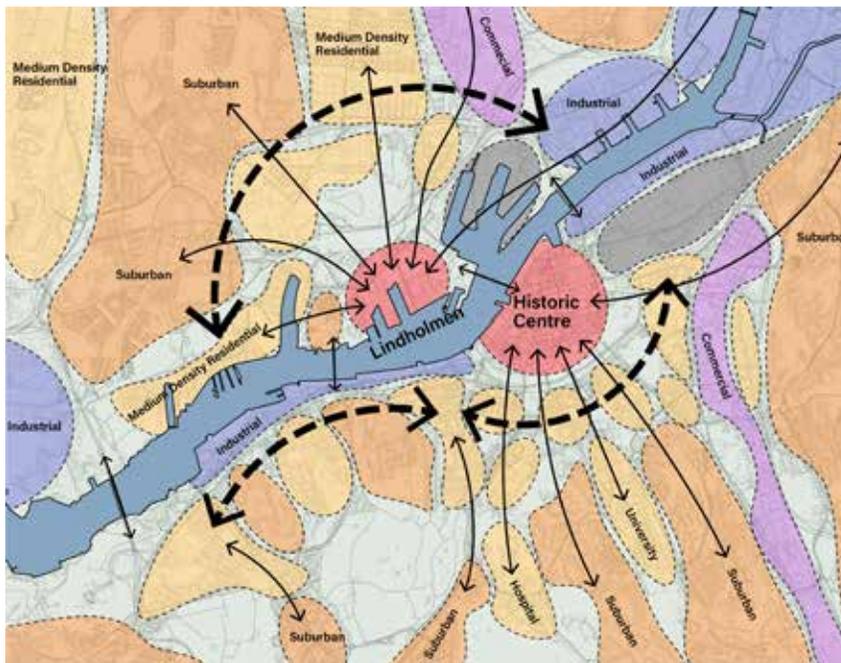
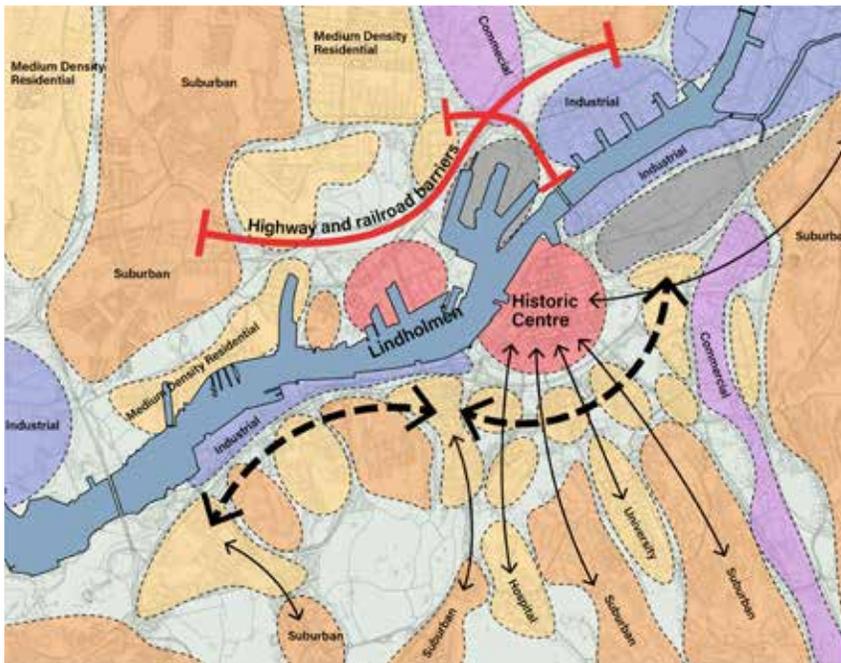
Olivedal

Johanneberg

Kungsladugård

Änggården

Fig. 316. Lindholmen and its context. (Google Earth)



of technical high schools make up a campus organized in a clear grid. Hasselblad Camera's headquarters and production facility occupies a major space in this area, and the Backa Theater is a cultural anchor. Where central Lindholmen approaches the water, low level uses like surface parking and a suburban cafeteria building dominate the shore—this area (the subject of this design case and described in more detail later in the report) is termed South Lindholmen.

East Lindholmen is separated from central

Lindholmen by a harbor, and centers on a second harbor to the east. It is comprised largely of glass and steel, corporate, speculative office buildings arranged in a layer one building deep from the waters edge, of varying scale. These buildings relationship to the water tends to be largely visual—producing views for office workers across the harbor and river—but the real engagement of their ground level programs and entries to the waters edge is weakly defined and sometimes ambiguous. New development in this area has included a hotel and new residential buildings

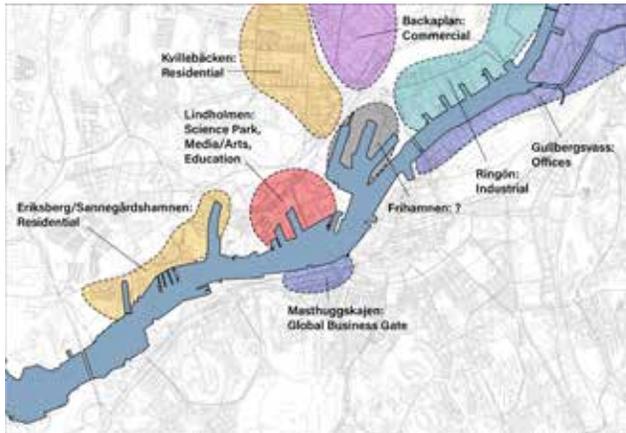


Fig. 3.17, Above. Lindholmen within Gothenburg's River City. (YUDW)

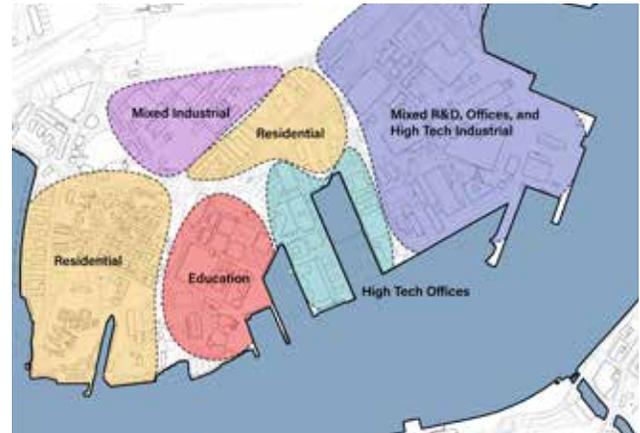


Fig. 3.20. Lindholmen today has several sub areas with different character and patterns of use. (YUDW)

Fig. 3.18, Right, top. Lindholmen is close to the historic urban core, but cut off from areas to the north by infrastructure. (YUDW)

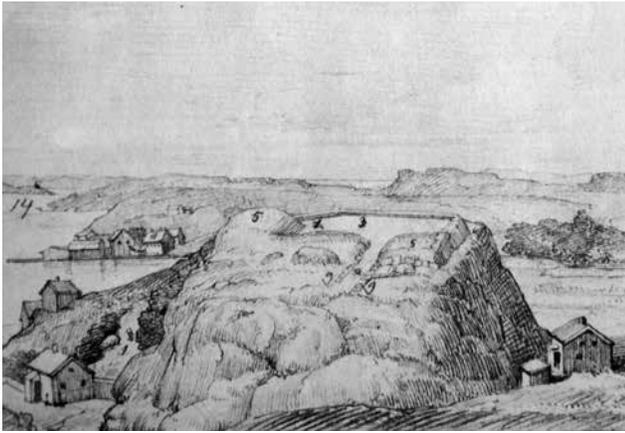
Fig. 3.19, Right, bottom. Lindholmen has the potential to be an anchor and urban core for Hisingen, operating in a complementary way to the historic core of Gothenburg, and connecting adjacent areas to each other, just as the historic core does to the south. (YUDW)

(the *Harbour Stones* development). There are few open development sites left here.

To understand Lindholmen's current form, we must examine its historical evolution as the interaction of a series of natural (geological, hydrological, ecological) and human (industrial, architectural, infrastructural, cultural, social, legal) layers, which produce distinctive physical characteristics and organizational logics on the land. The current work of redevelopment can only be understood as only the *latest* changes in this ongoing evolutionary process of city making, and should, to the greatest extent possible, seek to build on, rather than scrape away, the history of the site, as a way of creating a place which is physically rooted in the history and culture of its specific locale. Studying these layers and how they have interacted can help us understand why things are the way they are, and can provide clues to us, as designers, as we consider how to make decisions about the organization, identity and structure of the district.

Most people today think of Lindholmen as a post-industrial landscape, in transition from its industrial past to its high-tech science park future. This is, of course, a major part of the story of Lindholmen, and signifies critical political narratives about the economic resilience of Gothenburg and its administrative systems (See *Positioning Lindholmen*, earlier in this chapter). The persistent historical specter of the iconic shipyards and port facilities (and the crisis left in the wake of their departure) loom large in the public imaginary constructed around Lindholmen. We are constantly reminded of this phoenix narrative by the visual juxtaposition of the now-stationary cranes against the corporate modern architecture of Ericsson and the Cog, as we cross the river by ferry. There is no question that Lindholmen was shaped by these large scale processes of shipbuilding and large scale urban redevelopment. But Lindholmen has never been, nor is it now, only one thing (Fig. 3.20).

Until the 19th century, Lindholmen was an island in the river, separated from the rest of Hisingen



by the Kvillen canal. East of the island (in an area called alternately called Hisingsvassen, Lindholmensvassen or Lundbyvassen) was a swamp, marsh or mud flats, which extended from the natural shoreline well into the river, and had a counterpart across the river in Gullbergsvassen. At the southwest edge of the island of Lindholmen, Slottsberget ("castle hill") occupied a strategic location in the landscape and was the site of an early castle called Borgen Lindholmen, first mentioned in histories in 1333 but perhaps older (Fig. 3.21).

Early Gothenburg developed primarily within its ramparts on the south side of the Göta, beginning in 1621, until in the 19th century, increasing industrialization spurred growth along the south shore of the Göta River to the west of the city's fortifications. The north shore of the river developed as a constellation of small villages and farmland until the middle decades of the 19th century when industrial development jumped across the river. A map from 1888 indicates that the former swampy areas had been filled, and the shoreline hardened with bulkhead (Fig. 3.22).

A close examination of historic maps from the early 20th century reveal Lindholmen emerging not as a purely industrial district, but instead as a mixed-use urban district, as early as 1904, with major industrial parcels along the waterfront, surrounded by residential areas and proposed urban expansion districts. In a 1921 map, the residential areas in Old Lindholmen (including Slottsberget and Skateberg) were already built out, and major portions of Lindholmen and Lundbyvassen north of what was called Lundby



Fig. 3.21, Top left. Slottsberget with Borgen Lindholmen from an 1860 view, as illustrated in *Borgar från forntid och medeltid i Västsverige*. (Wikimedia)

Fig. 3.22, Above. The evolution of Lindholmen in maps: from an island with almost no settlement in 1860, surrounded by mud flats (top), to a mixed use peninsula in 1921 with residential areas, an industrial waterfront, and proposed urban grid (middle), to a site in transition as industrial buildings and infrastructure are cleared away in preparation for the Science Park's construction in 1995 (bottom). (Gothenburg 1815, Anders Lindgren; Gothenburg 1921, Arvid Södergren, Gothenburg 1995, City of Gothenburg)

Hamn gata (now Elin Svenssons gata) were platted (with some blocks built) to become mixed use city blocks. Lundby Hamn gata (now gone) provided the major east-west connection that Lindholmen today lacks. The underlying urban grid of Chalmers' central Lindholmen campus had already been platted at this time, rotated to align with the former shoreline of the Lindholmen island. The Greek mythology inspired street names from this period (Perseus gatan, Hyperion gatan, Thetis gatan) seem mostly not to have survived, replaced instead with such apparently more contextual names as Teknik gatan (engineering street) and Uppfinnare gatan (inventor street), although Gamla Ceresgatan does remain. The unrequited direct connection between the residential district in Old Lindholmen and south Lindholmen was proposed along Lindholmsvägen.

By the early 20th century the Kvillen Canal had been filled in, ostensibly to connect Lindholmen with Hisingen to the north—but as the railroad was constructed, it nearly precisely followed the route of the former waterway, replacing a natural barrier with an infrastructural one. Rail yards grew wider and wider, increasing the gap, and later in the 1960's the highway was constructed to loosely followed the same alignment, further reinforcing this disconnection. The area at the northeast of Lundbyvassen which have the greatest flooding problems today, are precisely where the canal formerly carried water flowing down Ramberget out to the river 150 years earlier.

By the 1970's, as shipbuilding declined, the shape of the land at Lindholmen, Lundbyvassen, and Frihamnen was largely as we see it today, and as redevelopment began in the 1990's, the underlying, historical patterns of development continued to affect the future urban form. Building alignments from the early and middle 20th century, codified in parcel boundaries and

established parallel to shorelines which today no longer exist, defined the way in which Chalmers' new buildings would be organized in their Lindholmen campus, along with new high schools in South Lindholmen. The quay dividing the two harbors of Lindholmshamnen would dictate the size and scale of Ericsson's new headquarters building. Lindholmsallén, which was constructed around 2002, is rotated to align with the urban grid platted out in the early 20th century.

Lindholmen, today, continues to exhibit these latent patterns—producing, on the one hand, a distinctive urban environment, closely tied to the water with spectacular views, and to its maritime industrial history. On the other hand, one legacy of these underlying patterns, in the absence of strong, new organizational principles that operate at the scale of the urban district, have resulted in an urban environment which feels, at times, disconnected and fragmentary—more like a box of loose parts than a composed ensemble. This can be observed in small things – like the hedges that are planted across the route from the Lindholmospiren ferry stop to the bridge to the east, obscuring the public way; and from big things, like the design of Lindholmsallén, which appears to be an urban boulevard in its form and scale, but in reality connects almost nothing, instead acting as a transit corridor and barrier between buildings north and south (Fig. 3.34). Luckily, Lindholmen and Lundbyvassen have “great bones” to build upon, and armed with a framework and the right institutional structure to carry the work ahead, this area can evolve into a coherent urban district that anchors and connects to adjacent urban areas (Fig. 3.33). The following analytic sections describe critical themes and areas that need to be addressed at the district scale (Lindholmen & Lundbyvassen), and which provide opportunities for district transformation.



Fig 3.33. Top left: Iconic industrial remnants on the waterfront. Top right: historic industrial architecture potentially framing urban spaces. Middle left: Vibrant urban activity in the Street Food Market. Middle right: Attractive, interesting adaptive reuse of industrial structures, including the Street Food Market, left, and mixed uses. Bottom, left: Access to the river and spectacular views. Bottom, right: World class educational institutions and memorable recent architecture.

Lindholmen: building blocks



Fig. 3.34. Top, left: Public spaces and circulation lack clarity. Top, right: new buildings are opaque and don't contribute to the definition of the public realm. Middle, left: multi-modal trail from Eriksberg/Sannegårdshamnen is discontinuous at South Lindholmen. Middle, right: Spaces in Lindholmen are not scaled to humans. Bottom, left: Waterfront uses are "backs" not "fronts." Bottom, right: The water's edge is under-defined and under-programmed.

Lindholmen: opportunities for improvement

Shifting Shorelines and Rising Tides

As we have noted, far from being a static landscape, the shape of the land today, in the areas we currently call Slottsberget, Skateberg, Lindholmen, Lundbyvassen, and Frihamnen, are the legacy of periodic cycles of industrial and urban development, which again and again restructured the landscape to satisfy the requirements of large-scale industrial processes. These processes reshaped existing ground (Fig. 3.35), dredging deep into the bottom of the River to deepen channels, blasting away existing rock to create areas suitable for large scale assembly work, and in particular, filling in large areas of swamp and mud flats, channels (like the Kvillen canal), and open water to create new land (Fig. 3.37).

This landfill tended to have a low elevation in relation to the surface of the water—both because of the expense of filling land, and because maritime industries preferred this close relationship to the river for functional reasons. The former riparian zone of the River, which had consisted of a series of natural layers that played a critical role in absorbing, delaying, and channeling storm waters (while also providing

continuous habitat for flora and fauna), gave way to hard, industrial surfaces and edges. These impervious industrial surfaces amplify and exacerbate the impact of storm events, increasing runoff volumes and rates, creating flooding, and adding pollutants (such as hydrocarbons) to the River, damaging ecosystems and habitats (Fig. 3.38).

Consequently, under current conditions, Lindholmen is highly susceptible to localized flooding, even during ordinary storm events. Scientists generally agree that precipitation in Sweden will increase due to climate change and that sea levels will rise, and although projections are not certain, increased precipitation (including increases to the duration and severity of storms) will likely impact the quantity and speed of water flowing across dry land, as well as the elevation of the River during both chronic and acute storm events. This will cause increasing levels flooding from both from upland sources (like water flowing from Ramberget and Skateberg on its way to the River) and at the water's edge from storm surge, as the River swells and overflows its banks. Sea level rise will increase the base elevation of the River at Gothenburg, further exacerbating this condition.

Fig. 3.35. Gothenburg in 1815 (from P.A. Granberg's *Staden Goteborgs Historia och Beskrifning*, map by Anders Lindgren)





Fig. 3.36, Above. The water's edge today at South Lindholmen. (YUDW)

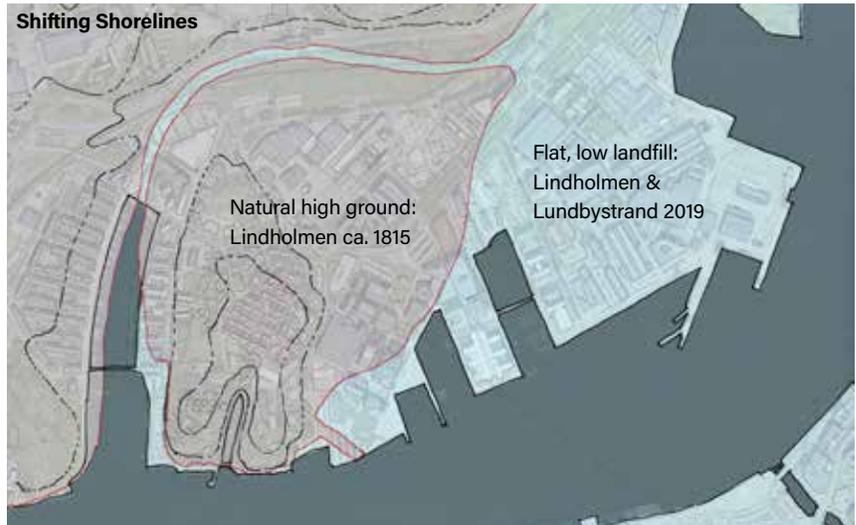


Fig. 3.37, Right top. Lindholmen's shoreline has been changed continuously. (YUDW)

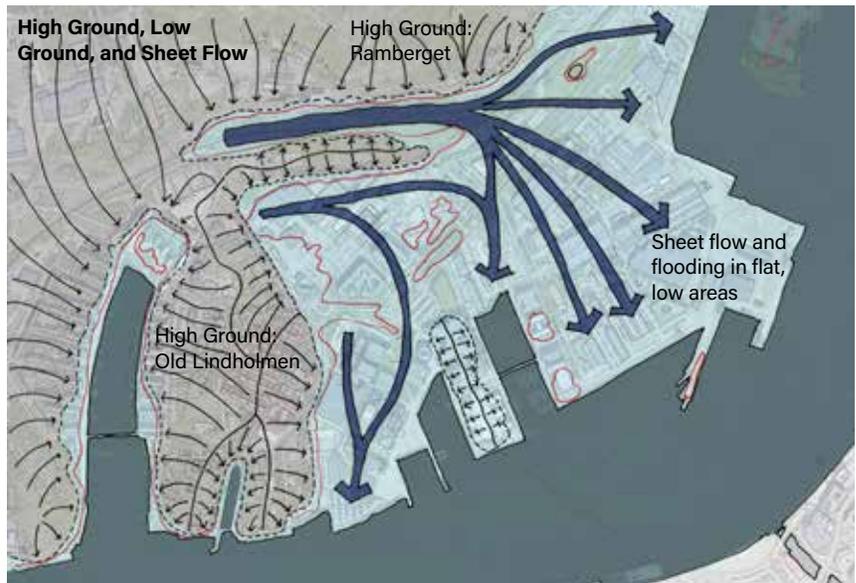


Fig. 3.38, Right center. Sheet flow of rain travels from high ground to areas of Lindholmen that were filled, creating localized flooding. (YUDW)



Fig. 3.39, above. Current cliff created where the granite was cut away. (YUDW)



Fig. 3.40, Right. South Lindholmen, ca. 1900, before the granite cliff was blasted away to make way for the dry dock area. (Okänd fotograf / Sjöhistoriska museet)

Industry & Nature: Persistent Structures

The relationship between natural elements (Ramberget, Old Lindholmen, the Göta River, Kvillen Canal, Lundbyvassen), land ownership patterns, and the industrial logic of shipbuilding and port logistics established a persistent urban structure which continues to define Lindholmen today, giving it a distinct character and scale as a district, but which also produces inherent challenges when transitioning from the scale of industry to the scale of human habitation.

The industrial processes that defined Lindholmen were organized around the movement of materials and assemblies between the river, waterfront warehouses, work yards and buildings, and inland/upland rail infrastructure that brought equipment and materials to and from other places. With a preference for flat sites, the dramatic topography to the north of Lindholmen, Ramberget, was a natural edge to the industrial zone, compressing development to the south.

The water's edge itself was shaped around the scale of the technology: ever larger ships delivering and receiving goods, and under construction, which required harbors that could

accommodate their width, length and draft. Much of Lindholmen's underlying geometry is derived from the interaction of the rail line (which runs east-west, just south of Ramberget, parallel to the water's edge, and connecting all the waterfront industrial sites along the north side of the river) and the dry-docks, piers, slips and harbors, which run perpendicular to the water's edge. These two systems are woven together through a tree like structure, where the rail line and yards are the trunk, and the individual spurs (with their curved radii limited to the turning radius of a train) are like branches curving out to realign themselves with the long waterfront buildings and piers, perpendicular to the water. Major geometries like the curving east and west shores of Sannegårdshamnen, the diagonal rotation of buildings and streets in the middle of Lundbyvassen, and the orientation of the street and building grid in central Lindholmen, can all be traced to the linear and curving geometries of the railroad and assembly line.

Unfortunately, these logics were not meant for people. While many of the remnants of the shipbuilding and harbor enterprises are unique, interesting, and hold potential as design elements in the ongoing redevelopment process, weak connections across Lindholmen—in particular those running east west—and to adjacent areas in Hisingen, are a legacy of the industrial logic of the area, which south of Lindholmsallén, consisted primarily of alternating north south bands of infrastructure: harbor, road, warehouse, rail line. These bands also break up the river's edge itself, making it difficult to create a unified public waterfront condition.



Fig. 3.41. Much of Lindholmen / Lundbyvassen is dominated by surface parking lots which impede pedestrian movement. (YUDW)



Fig. 3.42, Above. Today, Lindholmen & Lundbyvassen are structured like a tree. Lindholmsallén is the east-west trunk, and north-south branches split off towards the water. Central Lindholmen is structured as a small patch of gridded urban fabric, accessed primarily along the water's edge. Few east-west connections exist, and connections to adjacent districts are weak. (YUDW)



Fig. 3.43. Lindholmen's block structure has resulted from historical industrial land ownership and use, aggregated from an earlier urban grid. As city blocks, many are either too big (making them impervious to pedestrians) or too small (sized for only one building) and are not ordered by a logic of major and minor streets, which results in address/orientation issues and difficulty in navigating. Buildings were located within blocks in relation to industrial systems (movement of equipment, trains, industrial processes), not oriented to an overall pedestrian circulation system, leaving large amounts of residual space, used mostly for parking today. (YUDW)

Fig. 3.44, Below. Lindholmen in 1970. (City of Gothenburg)



Accessing the Water's Edge

Lindholmen's continuous, south facing riverfront is one of its greatest assets. The river's symbolic significance for Gothenburg as a metropolitan region cannot be overstated—access to the river for trade, transport, and industry are the historical reasons Gothenburg was located where it is, why it developed in the way that it did (along both sides of the river), and for its economic success. Historically both edges of the river have been dominated by industry and infrastructure, and non-industrial urban development was often held back from the water's edge, in contrast to, for instance, Stockholm, where the city's urban structure engages the water's edge directly. Reconnecting the edge should be a goal of the ongoing redevelopment of Lindholmen.

For the former Lindholmen industries, the land/water edge was an industrial resource, the place of interface between different kinds of manufacturing activities. Harbors, quays and piers were created to extend the length of that edge, and buildings and infrastructure (like cranes and railroad tracks) were oriented either along edges or perpendicular to them to facilitate the movement of elements. The riverfront was segmented into different activities related to upland infrastructure, which left an uneven and episodic water's edge condition, including spaces which are scaled for industrial processes. Creating a district scale public waterfront will require the development of an overall concept which can maintain local differentiation while creating continuous connections and public access from east to west.

Today, the river continues to play a productive role in the life of the city (connecting the city locally through the ferry and internationally through Stena and others, and through ongoing water-oriented industry in Ringön), and slowly the water's edge is taking on new roles as its ecological, recreational and cultural potential

have become apparent. At Eriksberg, west of Lindholmen, almost 2 km of continuous public waterfront provide places to stroll and enjoy dramatic views of the historic city. In Frihamnen, the Pöl Harbor swimming pool and sauna have given a hint of how more inclusive public programming might transform the water's edge into a social condenser. New developments like Masthuggskajen on the south shore of the river will also bring new access to the water's edge. But Gothenburg still has a long way to go to embrace the water, and so does Lindholmen. Every waterfront project will need to contribute to the overall vision of the waterfront as an accessible public zone.

Lindholmen's riverfront presents a key opportunity in the city to be a leading part this transition, connecting Eriksberg's waterfront to Frihamnen, and potentially extending across the river (via the new bicycle/pedestrian bridge) to the south side's riverfront. Better connections to adjacent districts will allow Lindholmen to become the waterfront for all of Lundby.

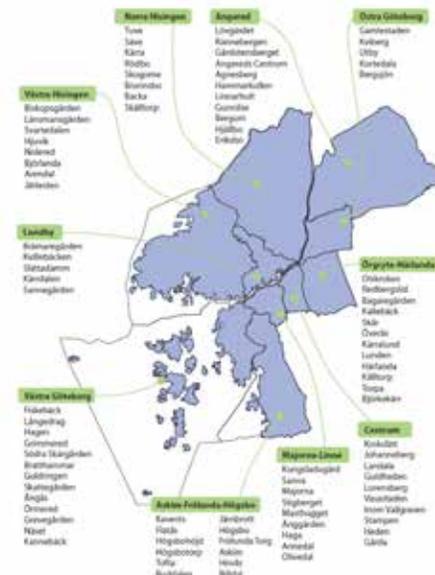


Fig. 3.45. 38,000 people live in Lundby, while 130,000 live in Hisingen. (City of Gothenburg)

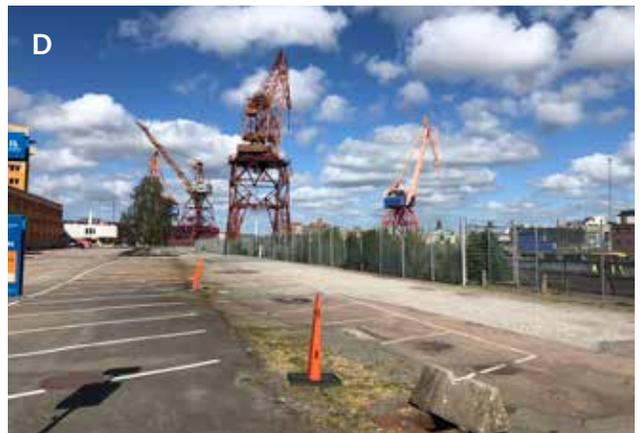


Fig. 3.46. Existing conditions along the water's edge. (YUDW)

Uncertain Connections

Despite substantial efforts in the ongoing redevelopment process, Lindholmen remains poorly connected, both internally and externally. Proposed projects have the potential to increase and reinforce Lindholmen's centrality and connectivity at the metropolitan scale, but detailed planning decisions about the local relationship between new infrastructure and its existing and proposed context threaten to impact Lindholmen negatively.

Internally, east to west pedestrian linkages are discontinuous and poorly defined, suffering from inconsistent architectural treatment (often meandering through parking lots) and without clear hierarchy. Navigating Lindholmen from a point of arrival, like the Lindholmspiren ferry stop, is confusing because there are no clear cues of how to walk or where to ride your bicycle. Lindholmsallén, which was clearly intended to be a connector, acts as a barrier to north south movement due to its extreme width and traffic conditions, and does not encourage walking along its length. Movement along the river's edge from Eriksberg becomes discontinuous at South Lindholmen, and the water's edge is generally not accessible at all in Lundbyvassen.

Immediately adjacent areas in Lundby are poorly connected to Lindholmen. To the north, major infrastructure including a highway and rail corridor separate the Brämaregården neighborhood and Keillers Park on Ramberget, as well as the nearby Volvo Lundby facility. A steep elevation change separates Old Lindholmen from Central and South Lindholmen to the west, and open water and a narrow land connection separate Frihamnen to the east.

Today, the strongest connections via transit are to the historic core of the city to the south—by ferry to Stenpiren (and other points along the waterfront), and by bus across the Götaälvbron

(Göta River Bridge), including by the co-branded electric number 55 bus that connects Chalmers' Johanneberg campus to their Lindholmen campus, via Avenyn and Götaplatsen. These connections reflect an ongoing urban logic that positions Lindholmen as an extension of the historic core of Gothenburg, rather than as the center / waterfront for Lundby or Hisingen to the north.

New infrastructure projects have the potential to dramatically change Lindholmen's position in the region, better connecting it both to the south and to residential and business areas to the north, east and west, in surrounding Lundby. A proposed high-speed tram will connect from Linnéplatsen in Olivedal, north via Majorna and across the river by tunnel or bridge to the south Lindholmen, then on to Brunnsbomoten, with connecting bus service further to Selma Lagerlöfs torg in Backa. A second project for a cable car, now unfortunately abandoned, would have connected from Järntorget (and the now-under-construction "Global Business Gateway" at Masthuggskajen) on the south side of the river, to central Lindholmen, then continuing north to Västra Ramberget (and Volvo Lundby) and finally to Wieselgrensplatsen in Kvillebäcken.

While on the metropolitan scale, the tram has the potential to deliver positive, new, long distance connections and increase Lindholmen's centrality in the region (in the terms of SMOG's research as part of Fusion Point), details of how it will touch down in Lindholmen leave much to be desired and suggest a gap in the scale of planning coordination among decision makers. The high-speed tram threatens to reinforce the disconnection of areas north and south of Lindholmsallén: elevated to 2.8 m above sea level and with high fences, it will run down the center of Lindholmsallén, impeding the free flow of people and bicycles.

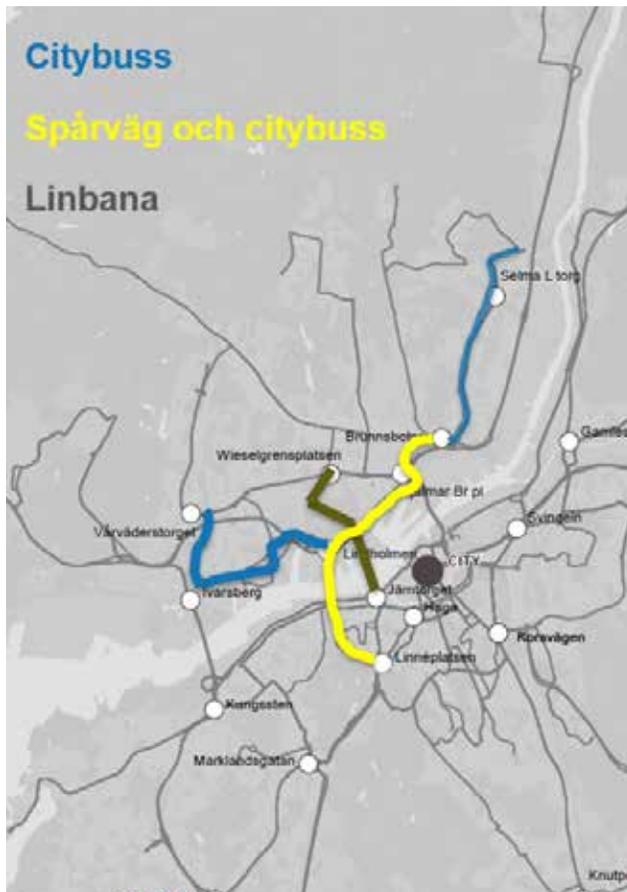
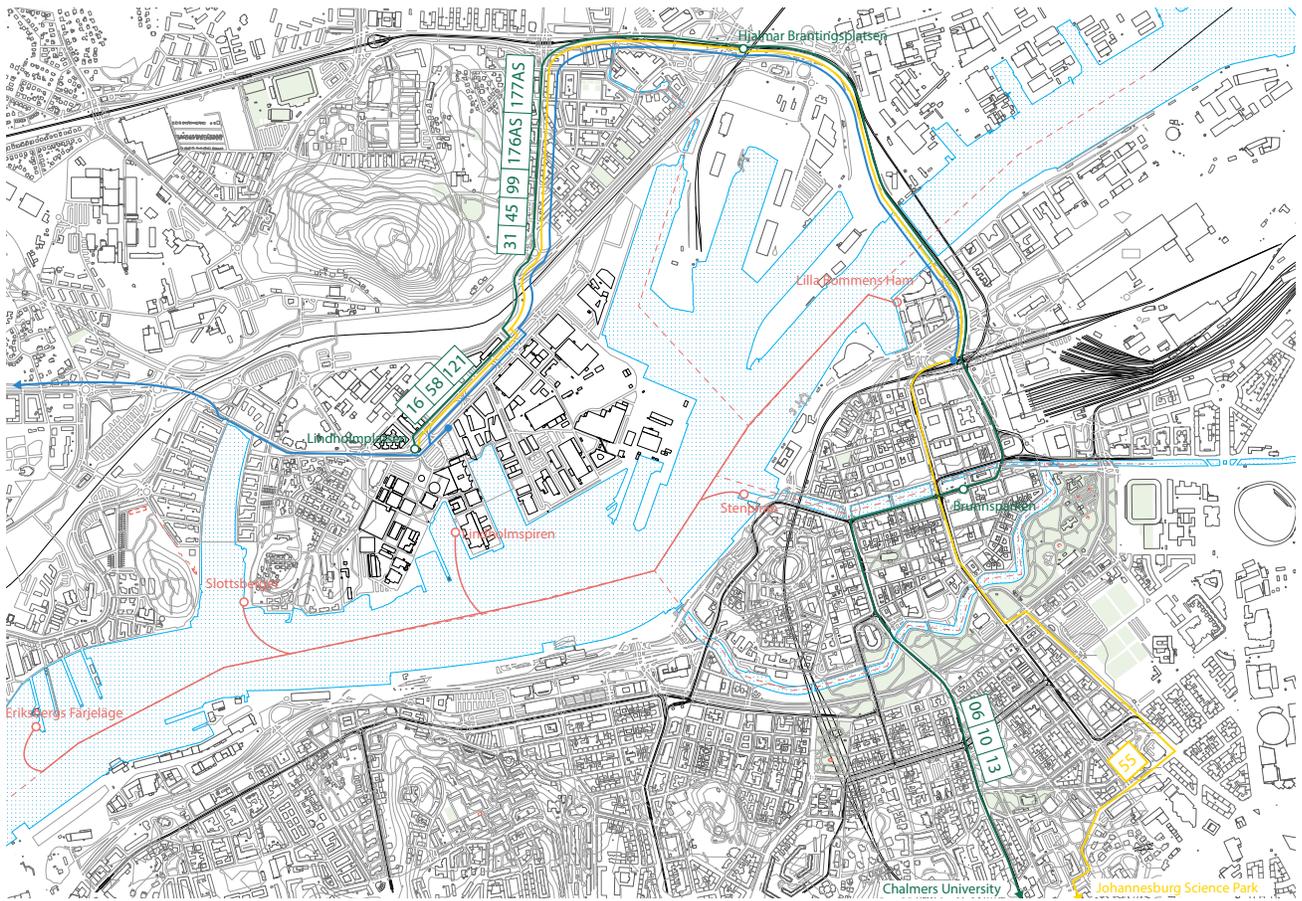


Fig. 3.47, Top. Existing public transit connections. (Yale School of Architecture / Alex Pineda Jongeward, Eunice Lee, Michelle Badr, Serena Ching)

Fig. 3.48, Left. Proposed new transit connections to Lindholmen by bus, tram, and cable car (now abandoned). City of Gothenburg)

Fig. 3.49, Right. End of the waterfront trail at South Lindholmen. (YUDW)

The proposed tram will cross the river via tunnel or bridge along the east edge of Old Lindholmen as it heads south towards the old city. Without careful planning, tram infrastructure might again reinforce the topographic barrier which already divides the area, if it is not coordinated and made subservient to local urban structures.

Should the tram end up in a tunnel, there is also an alternate proposal for a new bicycle/ pedestrian bridge between Majorna and South Lindholmen. This project also has the potential to create very strong new connections, but careful coordination must occur where this bridge touches down in South Lindholmen to maximize the local benefit and create connections to the local urban structure.

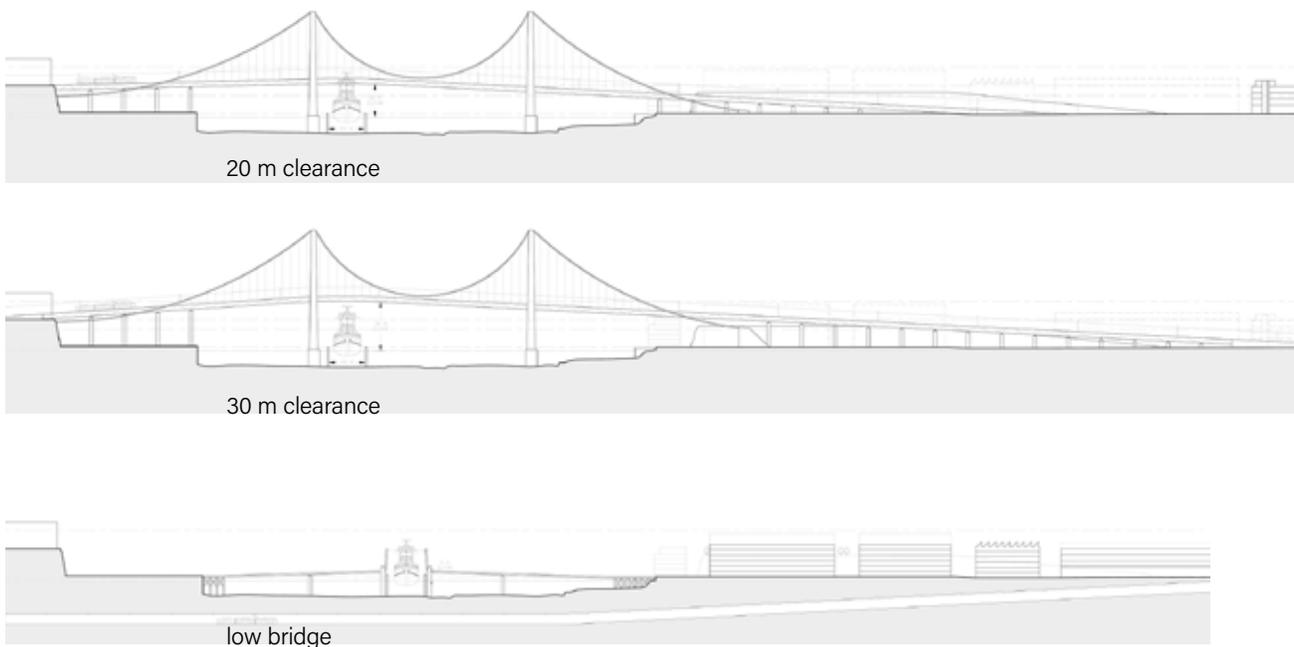


Fig. 3.50. These sections indicating new bridge configurations suggest that a new high bridge connecting to South Lindholmen could further divide Old Lindholmen from Central Lindholmen, and requires a long inland distance to slope back

down to grade. A low bridge with a lift span best connects to both sides of the river, and can be easily integrated with local conditions. (YUDW)

Opportunities for Evolution: Science Park to Science City

Lindholmen: Science Park, plus...

Lindholmen is far more than a mere Science Park. It's central location, attractive urban waterfront, dynamic mix of uses, and maritime heritage set it apart from the largely suburban science parks developed in most parts of the world. As such, as we think about the future of Lindholmen, ongoing redevelopment should consider how to reinforce Lindholmen's role as a center for knowledge production and as an innovation and test arena for urban mobility, while also:

- » Modeling best practices in sustainability and resilience
- » Creating a truly public and accessible waterfront
- » Preserving Industrial and Architectural Heritage
- » Supporting Appropriate Mix of Uses
- » Encouraging Social Inclusion & Accessibility
- » Strengthening connections within and to adjacent districts
- » Constructing distinctive, lively, 24/7, inclusive public space
- »

The district-scale framework presented in the next chapter attempts to address many of these priorities, by proposing strategies organized around a new public space network for Lindholmen, and a new water's edge. The public space network will better connect Lindholmen internally and to adjacent districts, while incorporates green and blue infrastructure to improve the districts resilience and brand the area as on the cutting edge of sustainability. Intermodal mobility, tied to this system, will better connect Lindholmen to the rest of the city and region. The new water's edge will tie in with the public space network, promoting connectivity as well as environmental performance, and making space for a diverse mix of public programs that make Lindholmen more inclusive.

Lindholmen Precedents



Lindholmen



Copenhagen



Copenhagen Waterfront Copenhagen, Denmark

Redevelopment: 2007
Size: 7.5 ha

Major uses:
public park, tourism, art, culture/
leisure, retail

Relevant goals:
Encouraging social inclusion &
accessibility; Public waterfront



Lindholmen



King's Cross Central



King's Cross Central London, United Kingdom

Redevelopment: 2008
Size: 27 ha

Major uses:
residential, commercial, offices,
art, restaurants, education

Relevant goals:
Supporting appropriate mix
of uses; Creating a lively 24/7
public space



Lindholmen



Factory 798 and 751 D-Park



Factory 798 and 751 D-Park Beijing, China

Redevelopment: ~2003, 2009
Size: 30 ha

Major uses:
tourism, arts, culture

Relevant goals:
Preserving industrial and
architectural heritage



**Hunter's Point South Park
New York, USA**

Redevelopment: 2018
Size: 12.1 ha

Major uses:
affordable housing, ecological
public park

Relevant goals:
Addressing resilience/
sustainability; Creating a public
waterfront



**Distillery District
Toronto, Canada**

Redevelopment: 1988
Size: 5.3 ha

Major uses:
tourism, shopping, public
spaces

Relevant goals:
Preserving industrial and
architectural heritage



**Brooklyn Navy Yard
New York, USA**

Redevelopment: - 2030
Size: 144 ha

Major uses:
industry, manufacturing, offices,
R&D, retail, public space

Relevant goals:
Preserving industrial and
architectural heritage; Creating
a public waterfront



**sustainability and
resilience**



**public space n
green and blue
infrastructure**



**connections to adjacent
districts**



finer grain mix



**distinctive and inclusive
public spaces**



**diverse mix of
programs**



network with



public and accessible
waterfront



of uses



intermodal mobility



public



adaptable building types



04 Urban Design



Lindholmen: District Scale Framework

Transforming Lindholmen from Science Park to Science City

This new district scale framework for Lindholmen is structured by two components which build on, clarify and reinforce elements of Lindholmen's existing urban patterns, and which can be deployed incrementally, over time, as new development projects are undertaken. The first element is an iconic, pedestrian- and bicycle-oriented public space network, consisting of new and redefined public spaces linked by redesigned key public ways, improving the legibility of Lindholmen's overall structure, increasing connections and improving wayfinding across Lindholmen, and strengthening the identity of its constituent areas by giving them a name and a sense of address (Fig 4.1 and 4.2).

This public space network reaches out in every direction beyond Lindholmen's boundaries, connecting and integrating with adjacent districts in surrounding Hisingen and across the river in the historic core of the city, as well as integrating proposed transportation infrastructure connecting Lindholmen with more distant areas, through the high speed tram (Fig. 4.4).

The second element is a redefined, elevated, continuous public zone along the river's edge, envisioned as a multifunctional blue-green landscape with integrated resilience structures, which supports ecological functions, includes new places for inclusive public programming, and connects continuously along the waterfront from Frihamnen to Eriksberg. This zone is adjoined and spatially defined by riverfront-facing architecture that will give Lindholmen, over time, a front to the water, and a distinctive skyline visible from the south shore and passing boat traffic on the river.

At key locations, the blue-green edge connects with upland blue-green infrastructure like bioswales, stormwater parks, and other resilient landscape elements, drawing the watery landscape deep into Lindholmen, as it is integrated with the public spaces of Lindholmen, providing a vivid connection between land and water, performing as a living infrastructure, defining a new identity overlay for Lindholmen, and making visible Lindholmen's (and Gothenburg's) commitment to be on the cutting edge of urban resilience and climate adaptation (Fig. 4.3).

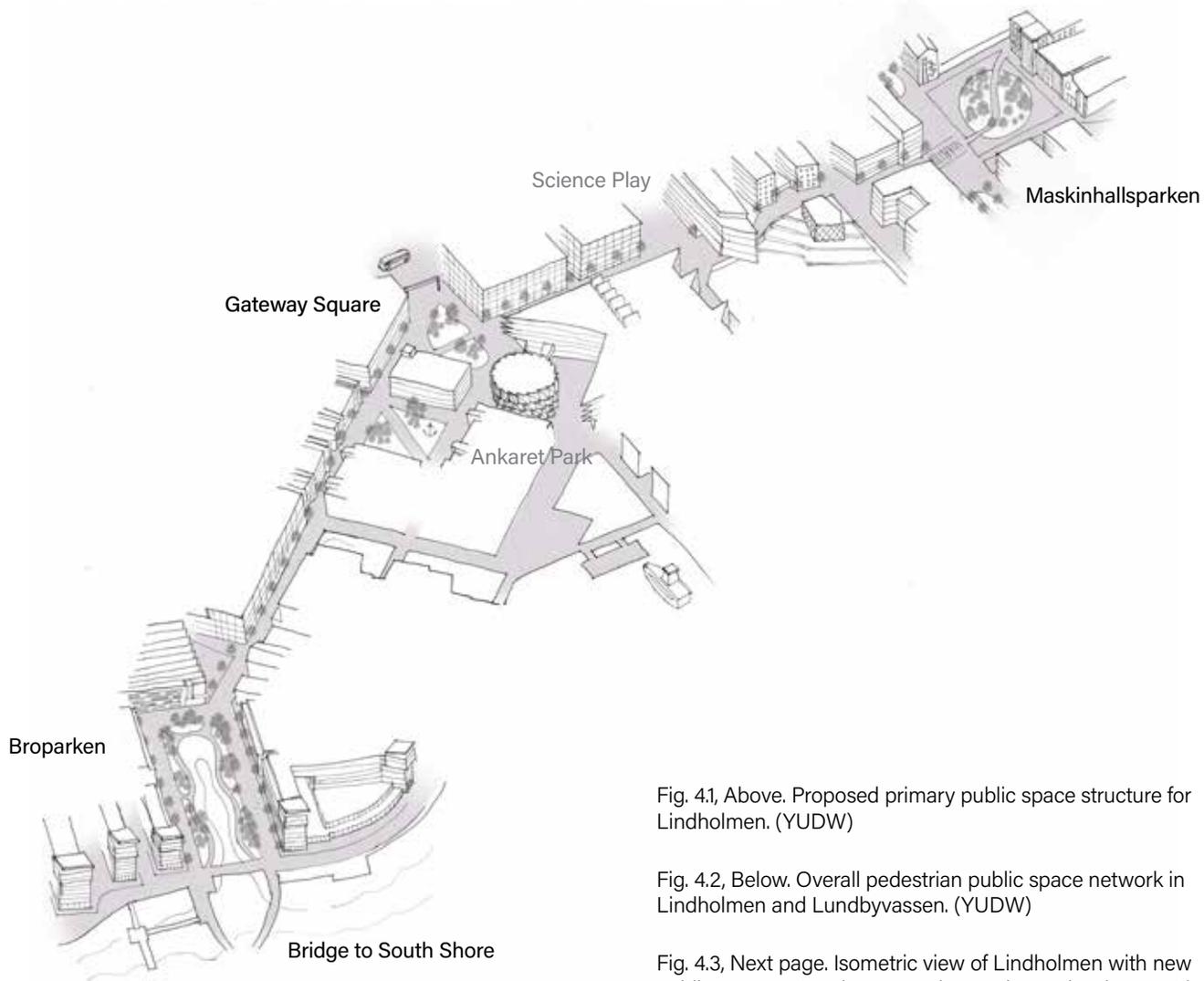


Fig. 4.1, Above. Proposed primary public space structure for Lindholmen. (YUDW)

Fig. 4.2, Below. Overall pedestrian public space network in Lindholmen and Lundbyvassen. (YUDW)

Fig. 4.3, Next page. Isometric view of Lindholmen with new public space network, green edge, and new development in south and central Lindholmen. (YUDW)



-  Green Edge
-  Waterfront Zone
-  Public Space Network
-  Stormwater Park

1. Waterfront program space
2. New public square
3. Bicycle / pedestrian bridge to Majorna
4. Pedestrian / bicycle bridge and Lindholmospiren Ferry Stop
5. Improved connection to adjacent district
6. High speed tram stop



OLD LINDHOLMEN

Lindholmsskolan

Student Housing

5

Håselblad

Backa Theater

CHALMERS

2

SOUTH LINDHOLMEN

Skateberg

5

1

1

1

6

5

3

G

O

A

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V



NORTH LINDHOLMEN

Student Housing

L i n d h o l m s a l l é n

Residential Area

Hotel

Lindholmen Science Park

Lindholmen Street Food Market

SCIENCE PARK

LINDHOLMSHAMNEN

EAST LINDHOLMEN

Ericsson

Lindholmen



2

4

1

2

2

5

5

1

1

Strengthening Connections: A Public Space Network for Lindholmen

This new public space network comprises two primary parts: a distributed set of local public spaces, which are accessible, open, iconic public nodes, and which organize, anchor, connect, and define the local identity of the area around them; and a set of linear linkages, which have a consistent and recognizable identity, and connect the public spaces to each other, to arrival points like the ferry landing and bus stops, and which connect them into the larger circulation network. The public spaces provide a sense of arrival and orientation for the sub-district scale area around them, and the specific identity and public functions of each public space relate to their location in the plan, surrounding architecture and populations, and other performance criteria. Public spaces should be active, and buildings surrounding them should have ground floors that are transparent and support high levels of activity, like restaurants and shops, and main facades facing the spaces. Public programming in relation to festivals and events will reinforce the position of these spaces in the minds of residents and visitors. Significant Institutional and cultural buildings may appear in these spaces to reinforce their identity. They should have carefully considered, strong names, allowing for easy wayfinding.

The linkages between them, which take the form of streets or pedestrian ways, should be connected, reinforced and activated—buildings defining these links should have continuous facades facing into them with main entries to the buildings behind, and including transparent ground levels that provide visual interest. Active street level uses should be provided wherever possible (including retail and restaurant, but also other kinds of active, visually interesting uses like community rooms, health clubs, displays of art, etc.). Blank facades, loading docks, and other “back of house” uses must not appear along these routes. Where linkages are disconnected

or circuitous, new linking elements should be introduced—including a new bridge from South Lindholmen across the harbor to the ferry stop, which is the final link in a long east-west connection.

Three major public spaces are proposed in this framework plan for Lindholmen, along with other minor and subsidiary spaces, connected along a major east-west route like pearls on a string. These include, from west to east: “Broparken,” a new waterfront space in South Lindholmen that anchors development there and connects the new bridge across the river with high schools and the Chalmers campus, a gateway square just south of the Lindholmen transit center on Lindholmsallén which frames the Cog, connecting Chalmers and Lindholmen Science Park, and Maskinhallsparken, at the corner of Götaverksgatan and Anders Carlssons gata in front of the food hall. To the east, in Lundbyvassen, another public space could be located where Pumpgatan meets Elin Svenssons gata, and where the future ferry landing is projected.

Strengthened connections to adjacent districts. New connections to adjacent districts are a critical component of the framework for Lindholmen, to make it less of an island, and to allow it to function as a continuous piece of the Hisingen urban fabric. These connections can be made through targeted infrastructures in a way that integrates them with the public space structure for Lindholmen described above, thereby strengthening the whole system, and allowing Lindholmen to function less like an island, and more like a piece of contiguous urban fabric. Four critical connections are identified as part of this framework: west to Old Lindholmen / Skateberg / Slottsberget, northwest to Volvo Lundby, north to Keillers Park and Ramberget, and northeast to Brämaregården. Making

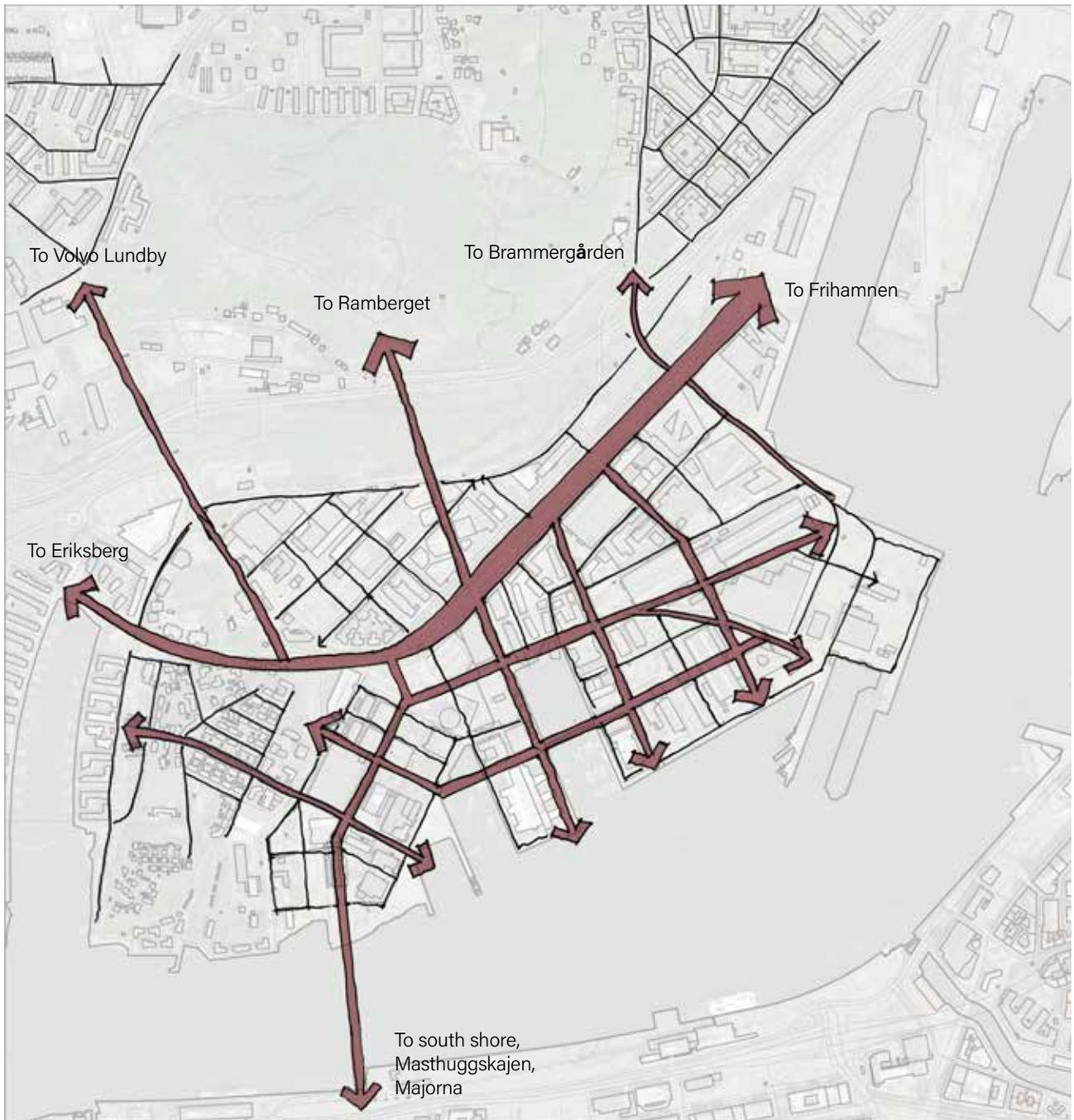


Fig. 4.4. Building on existing patterns and structures in Lindholmen's existing fabric, the overall movement network in Lindholmen can be clarified and refined. Stronger east to west connections will improve circulation and wayfinding, and strengthen the shared identity of the whole, allowing developers to make better decisions about how to locate buildings to contribute to the overall composition and idea of the district. Strong connections north are critical to connect Lindholmen to residential populations, and to the park at Ramberget. This new circulation system can link key transit nodes deep into the sub-areas of Lindholmen. (YUDW)

these connections work at a pedestrian and bicycle oriented urban level, and overcoming the significant challenges presented by the surrounding suburban and rural infrastructure without reverting to the introduction of weak connective elements (for example, isolated pedestrian and bicycle bridges), will mean tailoring the form of each connection to its particular local challenges and focusing on solutions that allow for the continuity of urban form. Making these connections effectively may be challenging, but will have benefits not only locally in Lindholmen, but in the surrounding areas, as well as further away, by producing better connections and improving Lindholmen and the surrounding area's centrality,

The three connections that need to be made to the north—to Volvo Lundby, Ramberget, and Brämaregården, are all frustrated by significant, high speed, east-west infrastructure, including a rail line and the Lundbyleden limited access highway. In particular, the highway presents the most significant problem in the east where it is compressed between Brämaregården and Frihamnen. One approach would be to convert the highway within this section into an urban boulevard, connecting it continuously to the existing street grid to the north, and allowing traffic to speed up only after entering the tunnel to the west. Many cities around the world have successfully taken this approach to converting urban highways from urban barriers to connectors, such as San Francisco and Boston.

In the west, the connection to Volvo Lundby could be made by extending Polstjärnegatan to the roundabout at the intersection of Inlandsgatan and Gropegårdsgatan, and reinforcing street-facing development along this entire route. The connection to Ramberget and Keillers park might be made by extending the park system across the highway and tracks, giving it a gateway/ interface with Lindholmen further south. This east-west zone between the highway and Lindholmsallén might best be reserved as an ecological landscape park with significant water management features—it was historically the zone of the Kvillen Canal which carried runoff from Ramberget to the river, and today remains very wet.

The final key connection – to Old Lindholmen, can be strengthened by reconstructing the pedestrian stair and surrounding public spaces, connecting Utvecklingsgatan in South Lindholmen, and Lindholmsvägen on the hill in Old Lindholmen (See the Södra Lindholmen chapter for additional detail).

Connections along the Waterfront. The waterfront itself, naturally, is also a part of this system of connections to be strengthened. A continuous waterfront trail, as part of the overall public space network, will connect Eriksberg and Sannegårdshamnen to the west, with Lindholmen and Lundbyvassen, to Frihamnen in the east. A new bridge, proposed to connect from South Lindholmen to the south shore of the river will further extend this network.



Fig. 4.5, Top left. Existing block structure. (YUDW)

Fig. 4.6., Top right. As part of a new framework for Lindholmen, some larger blocks will need to be broken into slightly smaller pieces, and some smaller blocks will need to be aggregated into larger pieces. Infill buildings, appropriately located within

these blocks, can be used to reinforce and redefine public spaces and public ways. (YUDW)

Fig. 4.7 Bottom. A new public space network for Lindholmen consists of spaces and linkages. (YUDW)

A Resilient Riverfront

While today much of Lindholmen's waterfront is visited by few, in the regional context it can be understood as the public waterfront for all of Lundby to the north. With increased connections between Lindholmen and adjacent residential and mixed use districts, a reconstructed, resilient waterfront can provide key opportunities to connect a diverse population to the water, opportunities for active and passive recreation, public programming, and a connection to the regions maritime heritage, while also functioning as a critical coastal adaptation infrastructure that can reduce flood risks associated with climate change and sea level rise in Lindholmen and other upland areas

Our approach to Lindholmen's waterfront proposes three elements be integrated into a continuous but differentiated, variable width band along the water's edge. Elements which define the waterfront as a continuous, consistent zone should be carefully balanced with elements that define parts of the waterfront as special and differentiated. This band includes:

1. A continuous waterfront multimodal trail, with consistent, iconic landscape and streetscape elements, that can accommodate passive recreation like walking or cycling but which is also part of a continuous circulation network that allows commuting on foot or bicycle, and which continues the path along the water's edge from Eriksberg, Sannegårdshamnen to Frihamnen, and across the river from South Lindholmen via bridge to the south shore and Majorna.

2. New waterfront public program and event areas, including things like amphitheaters, play areas, picnic areas, floating swimming pools, saunas, piers, ferry landings, etc., located along the waterfront at some regular interval (and integrated at strategic points with Lindholmen's public space network) that can activate the edge by sponsoring and accommodating a range of public programming that will attract diverse audiences to the waterfront, and to Lindholmen.

3. A continuous blue-green, infrastructural, landscape edge, which integrates a structural surge protection barrier (like a flood wall or landscape berm) with a naturalized, landscaped edge that reduces dynamic wave action and increases ecosystem services by providing continuous riparian habitat for flora and fauna. This blue-green edge should connect with upland blue-green landscape elements that extend the influence of the waterfront deep into Lindholmen, while performing the functions of collecting, delaying and conveying storm water.

Like the buildings which define Lindholmen's internal public space network, buildings along the water's edge should reinforce the public nature of this zone in their ground floor programming, while taking advantage of south orientation and spectacular views across the water to the historic core. Special attention should be paid to the massing and composition of these buildings to create a skyline for Lindholmen, visible across the water.

Fig. 4.8, Opposite. Examples of resilient and active waterfronts from the region. In Hamburg, new public spaces are integrated with the surge barrier. In Frihamnen, Gothenburg, the Sauna brings new populations to the river's edge. In Aarhus, a waterfront hotel introduces a finer grain of development between larger buildings. In New York, a constructed

wetland and waterfront park manage water and provide new recreational opportunities. In Stockholm, changes in elevation are animated by landscape design. In Helsinki, a floating pool and waterfront market bring together a range of residents. In Stockholm, buildings provide a face to the waterfront, and urban spaces pull the waterfront deep into the city. (YUDW)



Strategies for Public Space

Redefining and clarifying Lindholmen’s public space network can be accomplished incrementally, both by making sure each new building project recognizes its position within the overall plan and clearly responds in massing and orientation; and by instituting a series of incremental projects that demonstrate the network and begin to transform it over time.

Signage and Wayfinding. One of the easiest and least expensive ways to begin this process is through the introduction of a unified system of wayfinding and signage which is distinctive to Lindholmen. Current signage refers only to distant areas and includes distances for bicycle travel. The design of this signage can help brand Lindholmen as a district and tie it to its maritime history through the use of repeated graphics, icons and logos, and a consistent way of indicating direction, distance, and destinations of the district. Part of this system could include infrastructural kiosks which integrate smart digital displays with other elements like phone charging, internet access points, emergency telephones, bicycle tire air pumps and repair stations, and potable water. The digital displays could provide information about events in Lindholmen and the region, allow for the display of artwork, and provide on demand virtual assistance for visitors.

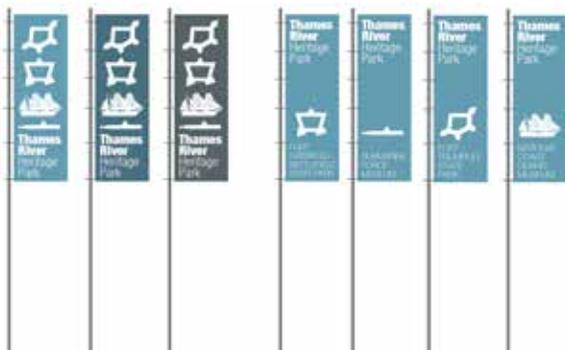


Fig. 4.9. Pennants with iconic logos for the Thames River Heritage Park. (YUDW)

Naming. To facilitate wayfinding, a process of naming should be adopted. As evidenced in this report, describing specific areas of Lindholmen can be challenging, as names have not been established for many areas. For instance, the harbor to the west of Ericsson does not appear to have a name. This area on the hill at the west of Lindholmen is comprised of Slottsberget at the southwest and Skateberg at the southeast, but the core residential area north of those two doesn’t have a name (we have referred to it as Old Lindholmen). This makes wayfinding difficult, but also frustrates our ability to visualize Lindholmen’s subareas. Names can be a way to connect to Lindholmen’s history, but can also be a way of projecting towards the future.

Streetscape and Landscape. The streetscape and landscape at Lindholmen today is a hodgepodge of materials, textures, plant materials and landscapes which do not seem to follow a continuous logic, producing a chaotic and confusing pedestrian experience. The way Lindholmen has developed has left confusion about the character of its public realm—the circulation areas between buildings are almost universally ambiguous about whether they are trying to be a street, bicycle path, pedestrian route, trail, public square, or park. Often they are parking lots. Existing streetscape elements, where



Fig. 4.10. Temporary wayfinding signs can be quickly deployed as a pilot project. (Walk Raleigh)



Fig. 4.11. Distinctive streetscapes in Gothenburg include landscape, paving, signage, lighting and other elements that give these areas a strong identity. (Google Earth, left and YUDW, right)

they exist, like hedges, signage, are located in a way that frustrates, fragments, and confuses circulation, rather than reinforcing patterns of movements.

A comprehensive but flexible streetscape design, which applies specific standards for paving materials and patterns, lighting, tree planting, landscape, street furniture, and signage, in support of the overall public space network, will make this network visible, reinforce Lindholmen's identity, and facilitate movement, while also differentiating elements of the network from each other. Far from making Lindholmen feel homogenous, a good streetscape design package will carefully map a range of design variations on specific parts of the district, balancing the need for uniformity with the need to create local-sub districts. The waterfront, for instance, should have its unique character of landscape, but might share a lighting standard with the major pedestrian routes moving north into Lindholmen. Each of the major public spaces should also be unique to its form and location, but connecting streets might carry components of each of those designs along with them.

Pilot Projects. Given limited resources,

identifying areas where limited interventions can be constructed as pilot projects can be a way of testing a particular design alternative, creating public support and interest in a larger project, and showing commitment to future work by putting something in place in the short run. Like the Sauna in Frihamnen, this kind of pilot intervention can also create a reason for more and different people to visit a particular area, and therefore to expand the imaginability of the place in the public mind, opening up potentials for public engagement and support of larger projects. South Lindholmen, for instance, has an incredible connection to the river, views of the historic city and west along the river to the sea, but is currently visited by few people because there is no activity there. Developing a pilot project like a waterfront pop-up bar and restaurant could provide a new hang-out for Chalmers students, a place to go for an after work drink for tech employees in LSP, or a place to watch the sunset for a patron from another part of town, who might never have visited Lindholmen, increasing visitation and familiarity with this area. Signage and streetscape can also be piloted in a temporary way, or scaled to financial resources available, to test a particular design, for instance along a single street, or within a single sub area.

South Lindholmen

Our approach to the development of South Lindholmen is to organize future development around a new waterfront park that models best practices in coastal adaptation for flood mitigation and sustainable public landscape. This new and resilient waterfront is linked to an emergent network of upland public spaces in Lindholmen incorporating blue and green infrastructure and designed to encourage pedestrian and bicycle use. A large, focal public space at the heart of South Lindholmen will be shared by new mixed-use development and the existing educational institutions in the immediate area. It will be designed for a diverse mix of inclusive public activity, and as a connector between a proposed new bridge from the south bank of the Göta älv, the Hisingen waterfront, and critical routes through Lindholmen connecting to existing and proposed public transit and adjacent neighborhoods. It should therefore be both a gateway to Lindholmen and an anchor to its southwestern end, as well as a transition to the hill of Skateberg and riverfront paths to Sannegården and Eriksberg to the west.

New development should not only be organized around this new waterfront ensemble of public space, it should, at the same time, provide the fabric for a lively and appropriately dense new neighborhood that weaves together the topography of the site and the existing fabric of Lindholmen. The building typology should be adaptable, with an emphasis on the clear articulation of public and private space, highly public ground floors, upper floors that take advantage of views and opportunities for public use and sustainable roof-scapes, and architectural articulation of key urban locations. The architecture and public art, landscape and infrastructure should evoke, wherever possible, the maritime and industrial heritage of the site.

In addition to the waterfront and major public space, a finer grained network of small parks and squares, together with pedestrian-oriented streets, should provide a diverse, but connected spatial network that serves all the current and future residents and users of Lindholmen. This should be accomplished with programming that takes advantage of waterfront and other locations, but also with landscape and streetscape design that introduces new lighting, signage, public art, water management features, and climate specific planting and streetscape that may be extended throughout other areas of Lindholmen, linking those more effectively to each other and to city-wide networks. All of this should have the goal of enhancing the sense of place and the experience of users, through spatial coherence and variety, and the framing of views,

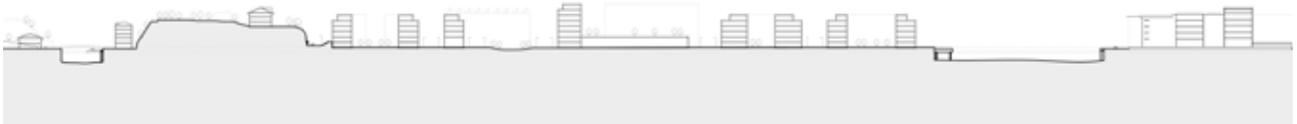


Fig. 4.12, Top. Proposed plan of South Lindholmen. (YUDW)

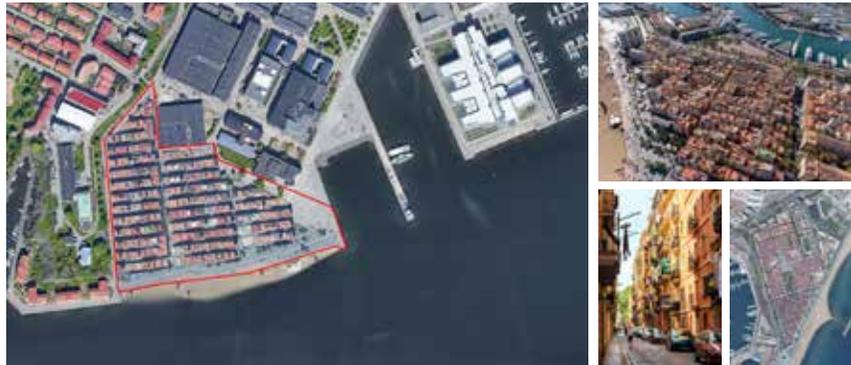
Fig. 4.13, Middle. East-west section through Lindholmen, looking north. (YUDW)

Fig. 4.14, Bottom. North-south section through Lindholmen, looking west. (YUDW)

Comparative Studies

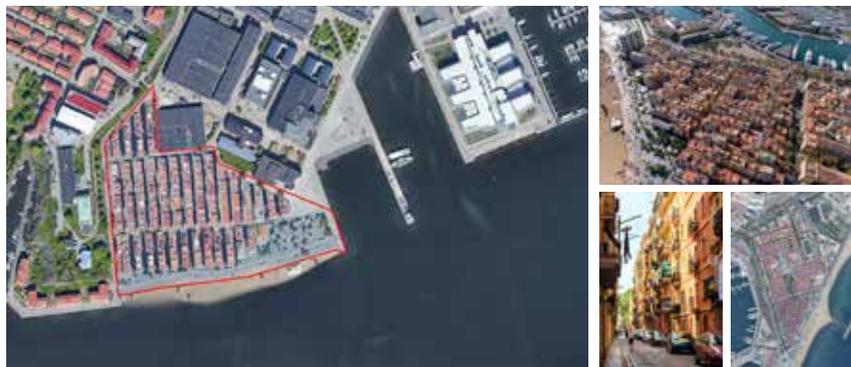
La Barceloneta Barcelona, Spain

Total GFA: 90,898 m ²	39.3 % coverage	2.08 FAR
Residential GFA 83,846m ²	282 DU/ha	114 DU/acre
Commercial GFA 7,052m ²	658 pop/ha	266 pop/acre



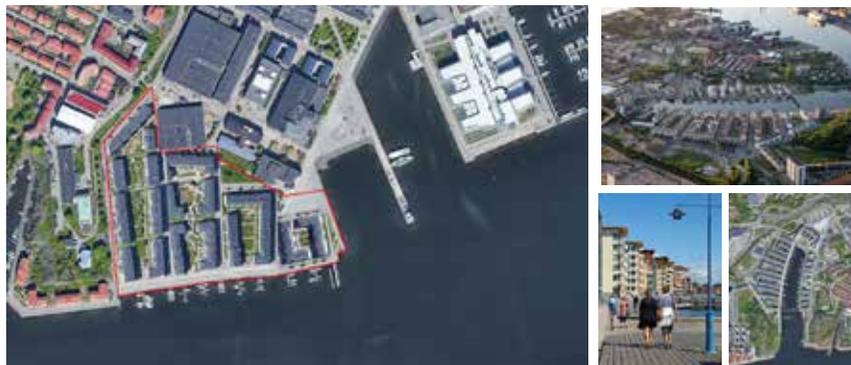
La Barceloneta Barcelona, Spain

Total GFA: 87,642 m ²	37.9 % coverage	2.08 FAR
Residential GFA 80,932m ²	272 DU/ha	110 DU/acre
Commercial GFA 6,710m ²	634 pop/ha	257 pop/acre



Sannegården Gothenburg, Sweden

Total GFA: 58,324 m ²	32.3 % coverage	1.29 FAR
Residential GFA 58,324m ²	169 DU/ha	68 DU/acre
Commercial GFA 0m ²	394 pop/ha	159 pop/acre



Kvillebäcken
Gothenburg, Sweden

Total GFA: 84,492 m ²	25.5 % coverage	1.53 FAR
Residential GFA 83,744m ²	200 DU/ha	58 DU/acre
Commercial GFA 748m ²	466 pop/ha	108 pop/acre



Lorensberg
Gothenburg, Sweden

Total GFA: 100,038 m ²	28.7 % coverage	1.52 FAR
Residential GFA 81,163m ²	198 DU/ha	80 DU/acre
Commercial GFA 18,875m ²	463 pop/ha	187 pop/acre



Novartis Campus
Basel, Switzerland

Total GFA: 89,164 m ²	24.8 % coverage	1.33 FAR
Residential GFA 0m ²	0 DU/ha	0 DU/acre
Commercial GFA 89,164m ²	0 pop/ha	0 pop/acre





South Lindholmen



Fig. 4.15. Perspective view of South Lindholmen. (YUDW)

- | | |
|---|-------------------------------|
| 1. Bridge park ("Broparken") | A. Skateberg |
| 2. Green edge and multimodal waterfront trail | B. Old Lindholmen |
| 3. Bicycle / pedestrian bridge to Majorna | C. Hasselblad |
| 4. Urban beach | D. Backa Theater |
| 5. Pavilion | E. Technical High School |
| 6. Mixed-use buildings | F. Chalmers Lindholmen campus |
| 7. Pedestrian / bicycle bridge and Lindholmospiren ferry stop | |
| 8. Connection to Old Lindholmen | |

both local and panoramic, which produce interest and a clear sense of orientation.

South Lindholmen is one of the few remaining large areas of Lindholmen that are relatively underdeveloped. In addition, it represents a unique, historic, and visually dramatic section of

the Gothenburg waterfront, as well as being the projected site of new infrastructural connections across the river and to currently disconnected urban areas. As such, it is a critical opportunity site for projecting the shared vision as well as the future goals, ambitions, and design aspirations for Lindholmen, Älvstranden and the City.

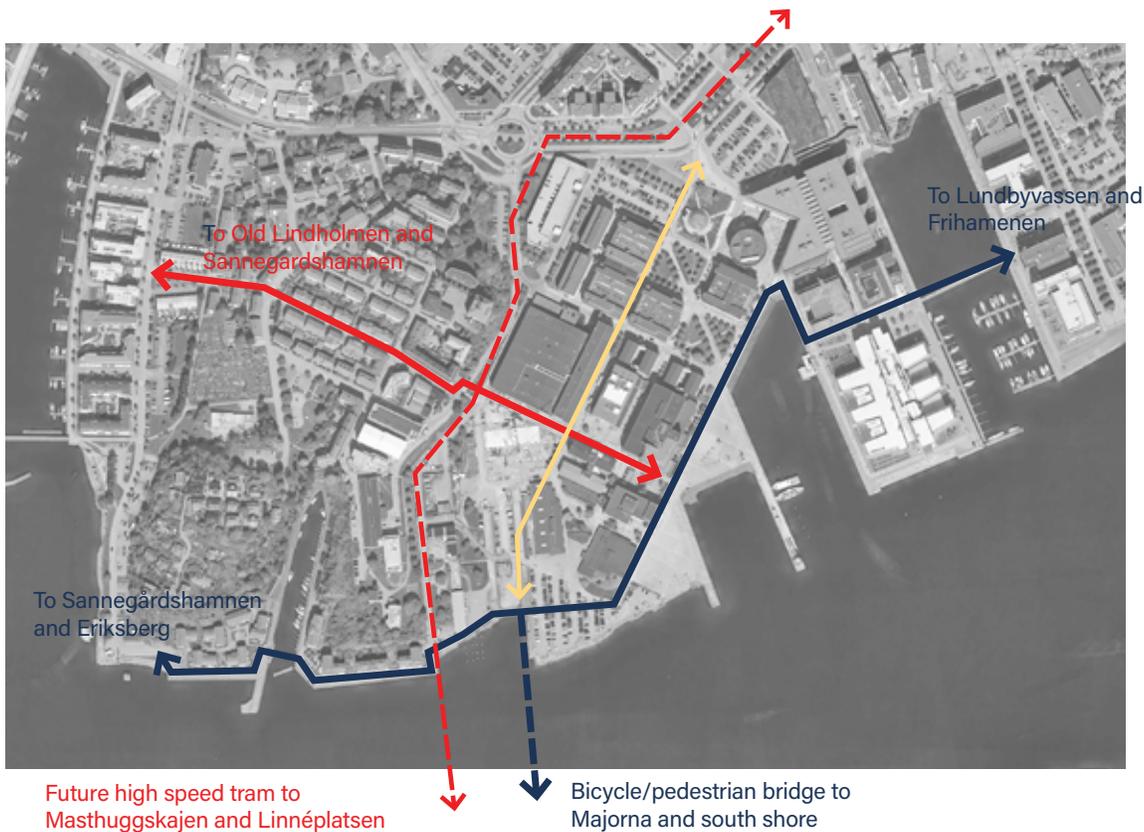


Fig. 4.16. A good design for South Lindholmen can help connect Lindholmen to surrounding areas. (YUDW)

Connections

Today, South Lindholmen is a disconnected, marginal site, defined mostly as a “back” that services development to the north, including parking lots and suburban-style buildings which take little advantage of their site. As it is redeveloped, South Lindholmen has a critical role to play with respect to connecting both its local context—west and central Lindholmen—and its larger regional context from Lundbyvassen to Sannegårdshamnen and Majorna across the river. The public space network design of this proposal for South Lindholmen reifies these connections, organizing development and major public space around them.

These include:

- » Connections from the waterfront to Chalmers and Lindholmsallén
- » A continuous waterfront trail from Eriksberg to Frihamnen
- » Connection to residential populations in west Lindholmen, Skateberg and Slottsberget
- » Connection by proposed bridge to the south side waterfront, historic city, Majorna, and new development at Masthuggskajen



Fig. 4.17, Left. Connections from Lindholmen. (YUDW)

Fig. 4.18, Right. Alternative scheme for South Lindholmen that allows for a high tram bridge between central and South Lindholmen. (YUDW)

Public Spaces

In South Lindholmen, Bridge Park (“Broparken”), a new, waterfront public space perpendicular to the water’s edge will anchor the South Lindholmen district, extending the waterfront visually and ecologically deep into the neighborhood. It will connect and organize the continuous waterfront multimodal trail, the bicycle/pedestrian bridge to Majorna, and local streets, while providing an address for the new development surrounding. This space will be a blue-green landscape, managing surface water draining from surrounding areas, treating it, and channeling it out to the river, while also providing an attractive landscape feature for students and residents to

use for passive and active recreation. It will also evoke the form and scale of the former drydocks on this site, but expressed now as a new kind of “wetdock” public space. From this space, a revitalized Forskningsgången becomes a main street connecting South Lindholmen to Central Lindholmen, connect along the way with Ankaret square (the main quad of Chalmers’ campus) to a new gateway square in central Lindholmen that becomes the front door for the district from the Lindholmen transit center on Lindholmsallén. This gateway square also organizes connections east to Lindholmen Science Park and to Lundbyvassen.



Fig. 4.19, Above left. Central Gothenburg has lively, small scale, pedestrian streets, animated with streetscape and active ground level uses. (YUDW)

Fig. 4.20, Above right. In Stockholm's Royal Docklands redevelopment, blue-green infrastructure is incorporated into the streetscape with attractive landscape and materials. (YUDW)

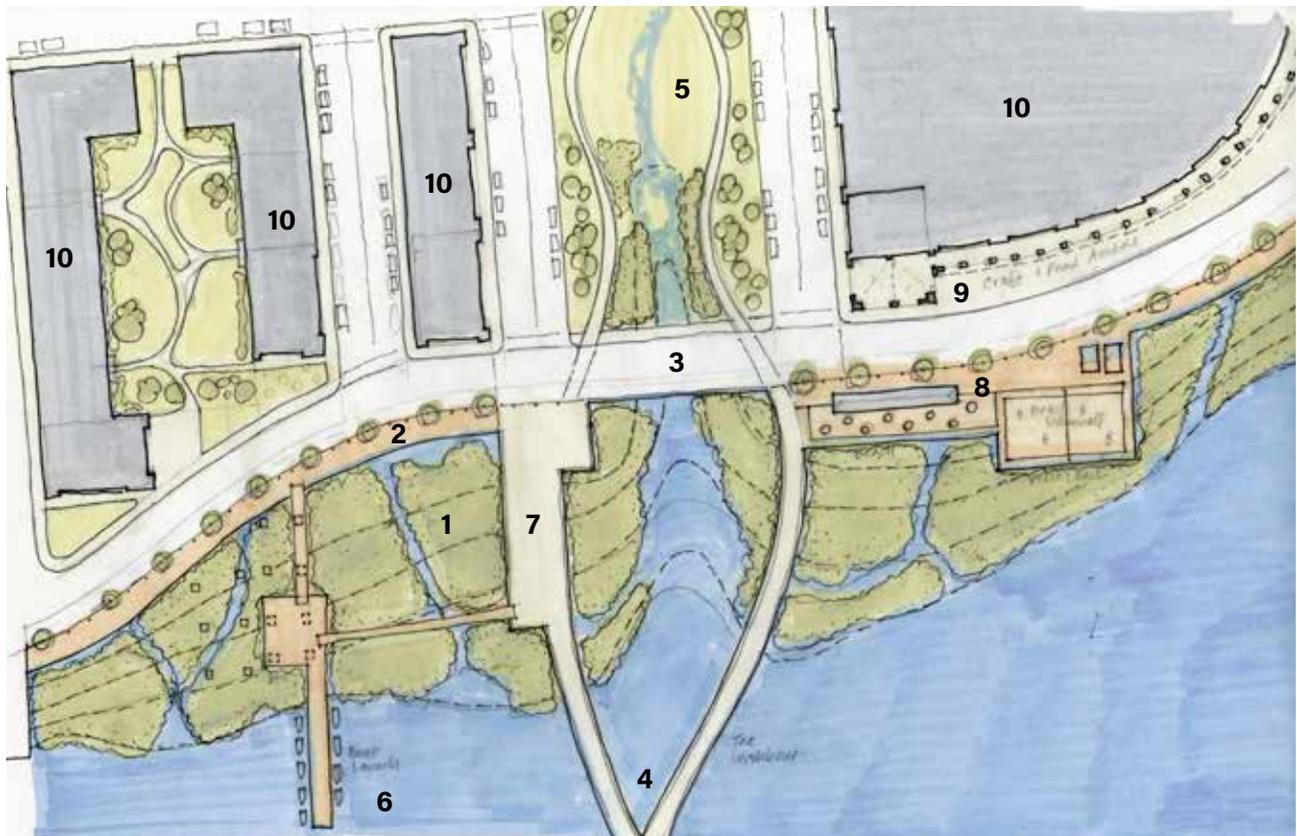
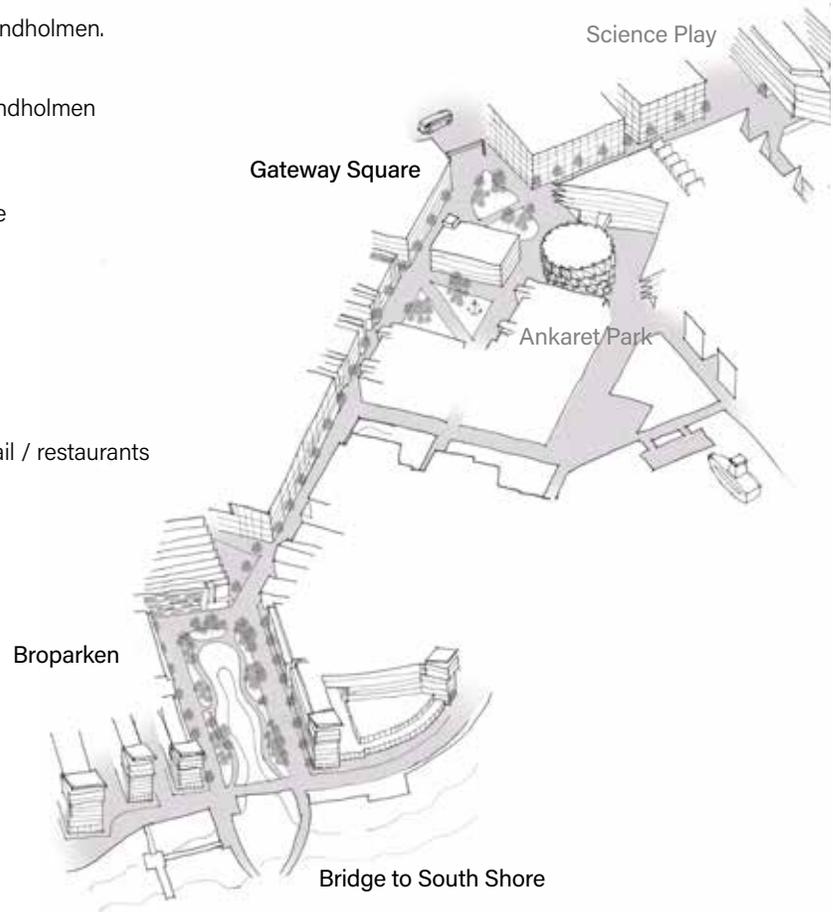
Fig 4.21, Left. In this park in Linköping, Sweden, blue-green infrastructure is combined with activity areas and places for play and congregation. (White Arkitekter)

Fig. 4.22. Primary public space structure of Lindholmen. (YUDW)

Fig. 4.23. Detailed plan sketch of the South Lindholmen Waterfront. (YUDW)

Components Include:

1. Constructed wetland park and green edge
2. Boardwalk
3. Multimodal waterfront trail and road
4. Bridge to south shore
5. Park with blue-green infrastructure
6. Floating pier for recreational boats
7. Waterside pavilion
8. Urban beach and restaurant / bar
9. Craft market
10. Mixed use buildings with ground floor retail / restaurants



Connecting to Old Lindholmen

Old Lindholmen, including Slottsberget and Skateberg, are separated from central and south Lindholmen by a steep grade change along the west side of Kunskapsgatan. There is currently only one east-west connection up the hill between the waterfront and Gamla Ceresgatan—an under-designed stair at the west end of Utvecklingsgatan, climbing up to a dead end at Lindholmsvägen. Despite the weak connection, a cluster of small restaurants and commercial spaces at the end of Lindholmsvägen suggest this space is already operating as a hinge between neighborhoods.

With the completion of the new technical high school, and as south Lindholmen continues to be redeveloped, strengthening this connection is critical to joining the residential populations on the hill above with the schools, universities, jobs, and transit connections in Lindholmen, as well as giving residents access to the Lindholmen Riverfront activate waterfront spaces. Conversely, as Lindholmen develops an increased residential population, residents should have better access up the hill to these small restaurants, the Centrina Lindholmsskolan and the historic cinema Teater Aftonstjärnan. Lindholmsvägen is one of the only east west streets on the hill that continues back down the hill to Sannegårdshamnen in the west, making it an ideal cross-connection to Lindholmen.

The proposed right-of-way for the new high speed tram line along Kunskapsgatan threatens to disrupt this connection. Should the tram arrive from the south on a bridge, careful coordination would be needed to make sure the elevation of the tram bed (as it descends to grade) by this point does not cut off this connection. If the tram arrives via a tunnel at this location, the location of the tunnel head and open cut would also need to be coordinated not to block access.



Redefining this vertical connection is an opportunity to articulate a dynamic new urban space within the overall public space structure of Lindholmen, connecting the new, triangular public space in front of the now-complete technical high school, up the hill through a series of stairs and terraces. This new urban stair will terminate the long vista along Utvecklingsgatan, visually connecting the buildings on the hill to South Lindholmen.

One excellent Gothenburg example of a similar scale is the urban stair called Erik Dahlberg Trappor, connecting Aschebergsgatan with Erik Dahlbergsgatan, near Kapellplatsen in Landala. Designed by Albert Lilienberg as part of the adjacent neighborhood development, this stair effectively negotiates a change in elevation while maintaining the continuity of the urban fabric between the upper and lower streets. Terraces with seating areas and planters break down the long run of stair, and transform the stairs into an urban place. Attractive, high quality materials, and well designed, integrated lighting, benches, and gateway elements give the stair a pedestrian scale and make it feel like it is a continuation of the public realm.



Fig. 4.24, Opposite. Erik Dahlberg Trappor, urban stair, Gothenburg. (YUDW)

Fig. 4.26, Bottom left. Existing stair up to Old Lindholmen at Utvecklingsgatan. (YUDW)

Fig. 4.25, Top. Proposed detailed plan of connection between central and Old Lindholmen. (YUDW)

Fig. 4.27, Bottom right. View looking down to central Lindholmen from top of existing stair. (YUDW)

Resilience Strategy

As a coastal site with a ground elevation close to sea level, South Lindholmen floods regularly, both from storm surge and from surface runoff from high ground. With climate change, flooding in the future will become both more frequent and more severe due to increased precipitation and sea level rise on the base elevation of the river surface. Adaptive coastal infrastructure that reduces the risk of flooding in South Lindholmen must be carefully integrated with the overall development strategy.

Our approach to climate resilience in South Lindholmen is to deploy a set of landscape and engineering infrastructures that mitigate flood risk and manage stormwater within South Lindholmen, independent of larger, district-, metropolitan- or regional-scale infrastructure systems, like a barrage at the mouth of the river, or a continuous elevated bulkhead along the water's edge. Creating a "complete" system at the neighborhood scale not only mitigates flood events, but also the risk that larger systems are not completed in a timely manner for economic or political reasons. In this strategy, South Lindholmen can be the first resilient "cell" of many cells which together comprise a larger resilient whole. Each cell in this kind of additive strategy functions like a compartment of a ship's hull, where if one compartment fails, other compartments remain dry and safe.

Within the scheme, the following elements are highly visible and integrated with the urban fabric, and contribute to the overall identity of South Lindholmen as a cutting edge, resilient riverfront urban development.

RESILIENT ELEMENTS

1. Elevated ground under new development to lift it out of the flood plain. Elevating ground rather than building perimeter protection has the added benefit that surface drainage can be channeled and released through surface elements, by gravity.
2. A raised perimeter structure to mitigate storm surge from the river, for areas that cannot have ground elevated. This structure must tie into high ground and must be completely closed. At South Lindholmen, this is easily accomplished, as the granite mountain at the west end of the site creates a natural high ground closure. The elevated structure may have an embedded storm wall with public space, roads, or landscape on top.
3. A green, naturalized riparian edge with sloping bottom to reduce dynamic wave action and wave overtopping during a storm. Floodable or floating public spaces and routes along this edge can allow access to the water, while creating an iconic blue-green waterfront with new ecological habitat.
4. A series of connected, upland, linear blue-green parks and public spaces to collect, delay, and convey surface stormwater to the river.
5. A pump station to pump collected water over the raised perimeter structure during certain kinds of storm events (not located on map).
6. Continuous dry access/egress at an elevation above the flood plain, to allow residents to get out and emergency vehicles to get in during a storm event.



- | | | | |
|--|---------------------------------|--|--------------------------|
| | Surface water flow | | High ground edge |
| | Green infrastructure water flow | | Elevated line (+2.8 m) |
| | Dry egress | | Elevated ground (+2.8 m) |

Fig. 4.28. Resilience strategy for South Lindholmen. (YUDW)

South Lindholmen, by the Numbers

The following metrics give a sense for the overall density and scale of this proposal for South Lindholmen. Please note that the total built areas indicated below are not the simple sum of existing + proposed, as some existing buildings are demolished, such as the cafeteria building and preschool building, and their spaces relocated into new construction. Number of Dwelling units

and population is calculated based on an average of 95 m² per unit with two occupants.

The pie charts on the opposite page represent land use by category, based on categories used by the City of Gothenburg. The City's current 2040 proposal is presented below for comparison.

South Lindholmen Overall Metrics

Total Site Area	96,500 m ²	(9.65 ha)
Proposed Landfill	8,200 m ²	(0.82 ha)

Existing built area	27,300 m ²
Proposed built area	20,700 m ²
Total built area	35,700 m²

	Existing	Proposed	Total
Site Coverage	28%	-	37%
District Plot Ratio	0.96	-	1.93
Open Space	11,500	13,500	14,500
Commercial Area (m ²)	10,400	11,900	14,400
Office Area (m ²)	6,400	6,900	6,900
Residential Area (m ²)	5,300	77,600	77,600
Institutional Area (m ²)	70,800	0	48,400
Gross Floor Area (m ²)	92,800	96,400	147,300
Residents	288	1633	1633
Workers	?	?	?
Students	?	?	?
Total Population	288	1633	1633
Dwelling Units	144	816	816
DU/ha	15	85	85
pop/ha	30	169	169



DesignCase Lind. w/o Landfill

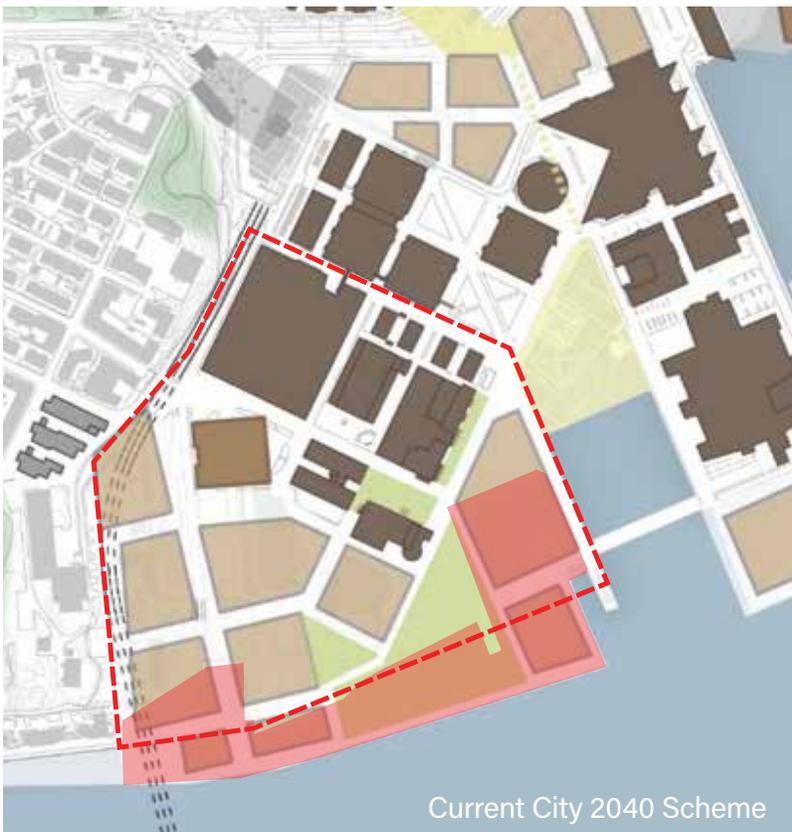


Total: 80,800 m²

DesignCase Lind. w/ Landfill



Total: 88,800 m²

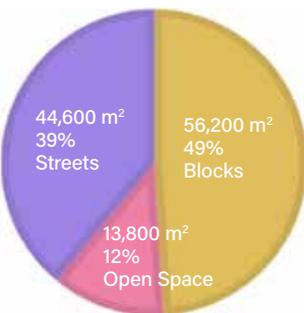


SBK 2040 Scheme w/o Landfill



Total: 100,200 m²

SBK 2040 Scheme w/ Landfill



Total: 114,600 m²

Fig. 4.29. Comparison of DesignCase Lindholmen proposal (top) and current Gothenburg 2040 city master plan (bottom), with proportions of land use dedicated to streets, blocks, and open space. (YUDW / City of Gothenburg)

Conclusion and Next Steps

The district scale framework and urban design outlined in this chapter propose a direction for the next stage in the evolution of Lindholmen.

This proposal embeds a thick reading of Lindholmen, its history and its multiscalar context, and illustrates how a design framework can give physical form to abstract community values, needs and goals at different scales. This design process prioritizes a deep and slow engagement with the site and community, by reading the existing city, preserving and building on characteristic existing elements and patterns, and layering in new components through a synthetic process that seeks to create a coherent but diverse whole.

In conclusion, three components comprise this framework and design. These include an enhanced public space network, an accessible and resilient public waterfront, and a block street and building framework.

An enhanced **public space network**, that:

- » Connects the various zones of Lindholmen and integrates the range of uses that comprise the current and future Lindholmen – research, education, residential, hospitality and food, etc. – and give them visibility and identity around shared public spaces;
- » Connects to adjacent urban areas, particularly to the north in Lundby and beyond, to make Lindholmen a shared waterfront district for diverse neighborhoods and employment centers;
- » Connects to the region and its people and economy through public transit as well as bicycle routes;
- » Uses distinctive landscape and streetscape , as well as public programming, to promote local identity and inclusion through strategies that can begin to be deployed immediately and with limited resources;
- » Organizes South Lindholmen around a new public park that anchors the public space network in the southwest and draws the waterfront into the heart of the district, and models strategies of coastal adaptation, water management, and sustainable landscape, while providing a connection point for a future pedestrian and bicycle connection to the south bank.



An **accessible and resilient public waterfront**, that:

- » Gives the district and the city direct access, both visually and physically, to an active, attractive and diverse waterfront;
- » Adapts the waterfront over time to the challenges of climate change and chronic flooding;
- » Reintroduces a naturalized shoreline that makes a place for characteristic ecosystems, as well as active and passive recreation;
- » Incorporates a continuous waterfront walking and biking trail that connects to the whole RiverCity.

A **block, street, and building framework**, that:

- » Accommodates a range of evolving uses over time with a rich mix of uses both horizontally and vertically;
- » Clarifies the relationship of public, private and service spaces, and carries the spatial fabric and grain of the district down to the waterfront;
- » Encourages dense, street-oriented, pedestrian friendly development, built around various types of public space highlighting the institutions and uses that anchor the district;
- » Bridges between and blends the currently isolated and distinct uses and typologies of Eriksberg and the Science Park, modeling the more mixed character of the evolving RiverCity
- » Builds upon the research of the City, Fusion Point and others, and applies it to a specific local context.

- » Embraces the productive ambiguity and uncertainty on contemporary urbanism, rather than retreating into a thoroughly bounded and conventional project.

Next Steps

It is important to follow up on any planning and design process with concrete next steps and with early-action pilot projects, both of which build on the momentum of the planning process, to avoid the sense that the substantial time and resources put forth by stakeholders have not resulted in a meaningful outcome. Plans which are immediately shelved, or which languish in uncertainty, have a tendency to demoralize those involved in the planning process, and can be damaging to the perception of the legitimacy of the process as a whole.

Proposing next steps that will lead from the planning process towards tangible outcomes link complex physical elements of the design proposal with a series of discreet tasks, allowing for the identification of specific entities to take responsibly over parts of the ongoing work.

The design and construction of early-action pilot projects can not only make visible and test elements of the design proposals, but also demonstrate commitment to the preceding design process and its outcomes, particularly when larger and more complex parts of the proposal may require additional detailed planning or take longer to implement.

The following suggestions for next steps, while not exhaustive, address some of the needs and opportunities identified within this planning process.

Ongoing planning work:

- » Work with decision makers, government planners and politicians to make intelligent choices about how infrastructure projects connect to local areas, maximizing local benefit, and adjust plans accordingly. Consider the impact of new ferry landings on future development patterns.
- » Create a forum for open dialog among landowners and stakeholders that can allow for a reconciliation of various critical areas / issues in the plan.
- » With a consultant and the City, develop a detailed design of the public space network, including streetscape, landscape, lighting, signage, and strategies for existing buildings, in collaboration with stakeholders and landowners.
- » With a consultant and the City, design and install an overall signage and wayfinding system for Lindholmen.
- » Work with consultants, researchers, the City, and higher levels of government to develop a more detailed, integrated, cellular resilience strategy along the water's edge, which can be deployed incrementally.
- » Working with the City and a larger, integrated design team, develop a more detailed plan for South Lindholmen, including financing and engineering requirements.

Early action / pilot projects:

- » Design and install a temporary pilot signage project to begin to establish the public space network in Lindholmen in the minds of visitors, workers and residents. Develop a clear map that connects Lindholmen to adjacent areas, and develop a consistent set of place names to assist in wayfinding.
- » Design and construct a pilot wayfinding and streetscape project that can connect the shoreline bike path through Lindholmen and Lundbyvassen to Frihamnen.
- » Design and construct a pilot waterfront design project to illustrate and test design principles and demonstrate commitment to the ongoing evolution of Lindholmen.
- » Design and construct a pilot section of the public space network, including streetscape, landscape, lighting, signage, and strategies for existing buildings, in collaboration with stakeholders and landowners. Identify a pilot project area that connects two or more landowner/stakeholders to demonstrate an inclusive / collaborative design process.
- » Design and construct or deploy a pop-up or temporary waterfront amenity (like the Frihamnen sauna) in South Lindholmen that can serve the diverse student population and encourage social mixing, before and after school hours, like a floating outdoor soccer pitch or other recreational amenity, designed with lighting and support spaces for use in the shoulder seasons.

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The research program Fusion Point Gothenburg had a practical focus and was run as a collaboration between Älvstranden Utveckling AB and Chalmers University of Technology. The University of Gothenburg and Yale University were also involved in the collaboration and the aim of the program was to strengthen the fusion between research and practice within architecture and urban design to merge theoretical and practical perspectives into knowledge.

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