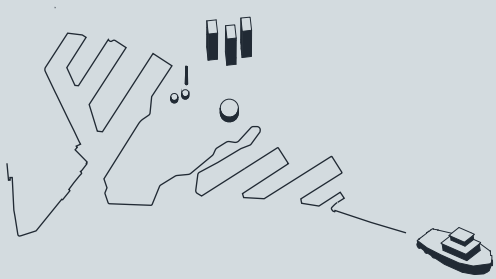
M4H, ROTTERDAM

The 21st Port-City Interface



M4H - Merwevierhavens, Rotterdam: the 21st century Port-City interface.

Politecnico di Torino
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Abstract

Since the 1960s, "*European ports have seen a rational migration away from their traditional urban cores, to deeper and less regulated waters*"[1]. The World Gateway was no exception: during the most of the nineteenth and twentieth century, the city of Rotterdam and its port developed a "living-apart-together" type of coexistence, since economic driven transformations led their functions to follow relatively separate development trails. The breakup between the city and its port can be identified in a specific spatial fallout, more precisely in the inner harbour areas left vacant by the port moving northward and the city pushing towards the sky. Following the waterfront renaissance global trend, those traditional spaces of trade and production have slowly attracted the attention of city planners for their cultural heritage, symbolic architecture and high-quality urban design. The projection of these traits into the turn of the 20th century led these port-city interfaces to become pivotal points in new development plans for a city going through a government-driven transition from its roots as a traditional, industrial port city to a sustainable, and resilient modern metropolis. Such transformation is curiously marked by a gradual change originated from the port starting reconsidering its role within and in relation to the urban logic. After years of relegation to the backstage, it is now evolving following

the modern economic trend to offer services related to the information technology and the knowledge economy in general, opening its boundaries toward a systemic coexistence with the urban environment.

At the apex of this turmoil, Merwe-Vierhavens is one of the last areas outside the dykes that in this phase of transition, still maintain their original port-related function, therefore it has been a redundant subject in both agendas to answer City and Port authorities contemporary needs. Early on 2018, the city of Rotterdam and the Port of Rotterdam Authority decided to re-brand the Merwe-Vierhavens areas as part of the future "Rotterdam Makers District", the place in the region for the innovative manufacturing industry. Though, this west-ward bit of inner harbour is still far from being truly part of a single urban system, offering a fertile ground to set roots of a design proposal that could join the quest for innovation and experimentation. For the purpose, this research builds on the future needs and directions regarding both port and city future, in order to present a strategic urban renewal process which develops as a phased intervention over a period of 30 years. The ultimate achievement is the conversion of M4H into a functionally mixed district on the city-port interface, making it the attractive, modern, natural continuation of both entities. Special attention is therefore addressed to the balance between the contamination of the harbour with the construction of dense urban character, the renovation of manufacture scene, the insertion of traditional and modern port-related activities, and the

allocation of research structures. Along with that, a strong natural network of dry and wet parks contributes to the lack of valuable public space inside and outside the district, with attractive areas for leisure and free time. Such ambition is meant to bring the city closer to the river, with residential and tertiary activities leading the real estate development, while spaces of manufacture, knowledge and cultural production engage economic and social values development both for the district and the facing neighbourhoods at first, and to the whole city in the long-term future.

Structure

This thesis explores the possibility to reconcile the spatial dichotomy that comes out from the relation between the urban system and the production system into the city of Rotterdam, whose urban evolution is strictly connected to the port evolution. Specifically, if on the one side Rotterdam benefits from a rich productive landscape that extends into the region in the form of the vast port, intensive greenhouse based agriculture and urban areas, on the other side, it is strongly characterized from functional segregation of areas specialized in different sectors.

Following the leads of the international transition towards a new sustainable economic model, the idea is to discard the actual tendency showing how recent socio-economic needs derived from climate changes and the scarcity of available lands and raw materials, force to a shift in favour of a renovated interest in re-introducing production environments into a dense-urban tissue thanks to new, clean and high-tech manufacturing processes. This requires not only new politics and territorial planning strategies but also implies citizens to explore the potential of the urban space and its uses. Pioneers and creative entrepreneurs found themselves already involved in this economic revolution, putting pressure on the available leftover industrial spaces and showing potentials for urban renovation processes, but

complex urban policies find it hard to translates into a more effective governance practice.

The thesis includes both research and spatial investigation developed on two different but complementary levels: Time and Space. In the first section, time is the currency that leads the research and, considering the relation between City and Port as a unique City-Port global phenomenon, different steps of their mutual evolution are investigated, looking at what decisions and planning politics on a vast territorial scale defined, during the time, the actual situation. This exploration moves from the specific case of the city of Rotterdam to a more global level to give a general understanding of the phenomenon and trace the common logics and traits which stand behind.

In the second section, we try to build the environmental image of the present reality through the mean of the spatial investigation, presenting both City and Port as two separated components of the same system. If in the first part the goal is to provide the key to understand the global context in which we operate, the second part introduces the reader to a more local urban strategy that finds the Merwe – Vierhavens old industrial district, located at the edge between Port and City, the perfect location for urban renewal and experiments facing the modern challenges. This local vision is finally defined at the design stage in the third part.

On the right: ***Picture of Oudhaven Rotterdam.***

Rotterdam City-Port: Introduction to the Case

Rotterdam is an old and complex organism, the result of many different demographic and industrial shifts that affected the mutual relations between the city itself and the port.

If in the past Rotterdam transitioned from a mercantile to an industrial town following the leads of the port activities, in the last century it ended-up to be dominated by a strict separation of functions which accentuated the conflict between the spatial logic of industry, trade, socioeconomic and residential functions. The 1970s and 1980s urban politics changed drastically the city layout into a more divided urban environment which excluded the productive sector from the inner city: first houses were prevented from being transformed into office space. Secondly, "*retail structures were pushed onto high streets to avoiding scattered shops in residential areas. Finally, industrial spaces causing nuisance were moved out of the neighbourhood*"[2]. Everything while the port was growing at a far distance from the urban core and strengthening its role as a global actor.

After years of decentralization policies which led the port to become a legal and regional entity able to act independently from its hosting municipality and "*with the power to negotiate with business and foreign govern-*

ments"[3], it began to welcome more promiscuously other functions than just those related to the manufacturing sector, merging with spatial and economic format from the knowledge production field. Therefore the complicated relationship with the city is now changing again under the influx of recent needs. The growing request for new houses together with the tentative to reintroduce manufactury into the urban tissue and to adapt to the growing knowledge economy led the joint forces between City and Port Authorities to identify into the port vacant areas at the city borders, potential spaces for new developments to be stitched back with the rest of the city and to be transformed into lively and livable areas. According to this logic and thanks to its strategic location, Merwe-Vierhavens is the place where the city and the port could meet and benefit from the best of both worlds. Specifically, M4H is part of the StadsHavens - CityPort - vision, formulated in 2015 from the cooperation between the City and the Port Authorities to transform the large spaces dismissed from port activities. It defines coordinated visions and strategies to adopt during a long term period of nearly thirty years, defining different levels of interventions in the field of the housing supply, economic strengthening and implementation of the urban harbours environment.

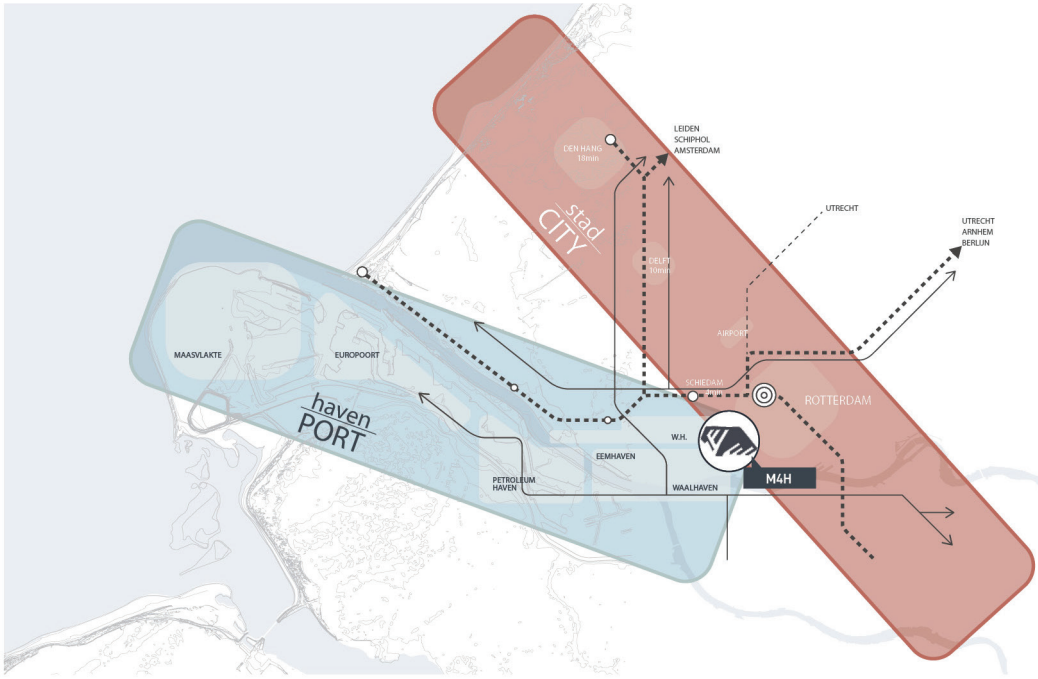
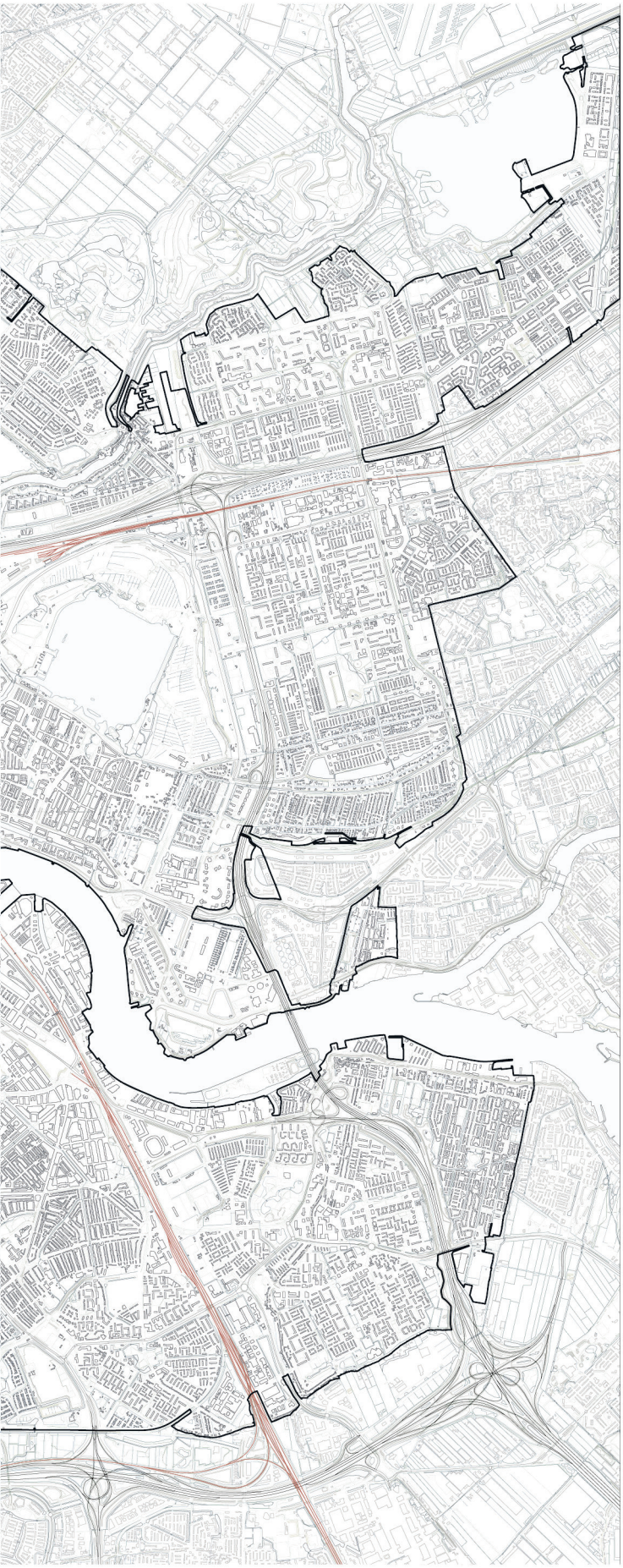


Fig 1: ***Port-City interconnection on a regional scale***. *In Municipality of Rotterdam, Toekomst In De Maak Ruimtelijk Raamwerk Voor M4h, June 2019, pag. 11.*

Overview of Rotterdam Municipality



01

City-Port Phenomenon

Acting at the geographical boundary between a contemporary European city and a vast port, the exploration of the City-Ports phenomenon in terms of definitions, main relationships involved and evolution models can be fundamental to understand the urban development processes that led them to be hot topics among urban planner scholars. With the intention to compose a specific waterfront redevelopment scenario, we dive deep into the topics to further make use of specific models of analysis in the regards of the peculiar case of Rotterdam.

01.1 Introduction to Complexity

The literature on port cities has continuously and rapidly been growing. Research in this field became paradoxically more intense as many port cities were losing their port activities and maritime identity,while relevance of maritime transport for the global economy was becoming increasingly relevant. Moreover, the transformations occurring in port-cities in the current era have, to some extent, questioned the meaning of the city-port concept and the role played by the interdependence between port and city.

The phenomenon has therefore collected many definitions pointing at distinct intensity degree of port-city relations and differing between the considered evolutionary phase of the object: some look at the phenomenon as a system on its own, for its primitive conditions of a city where the port and maritime activities play a relevant role in the local economy; others interestingly consider their reciprocity also highlighting the contemporary influence they exercise outside their perimeters both at a regional and global level.

Such a difference in the definitions is because, *"at a global level, port-cities have developed into intricate systems within systems of cities and systems of ports"*[4], hence the structure of these apparatuses can be read

from diverse angles, depending on many factors that differentiate them from one another, such as location, planning portfolio, and respective performance within their networks. In a world where 90% of trade volumes occur via sea, ports, and maritime transport, the relationship between the components of these tangled systems gets more important than ever.

01.2 Renaissance of the Urban Waterfront: From Industry to Transition Areas

Port-Cities common traits on the global scale

Port-Cities are complex urban phenomenons that never stopped mutating. The evolutionary phase they are currently experiencing is one in which city and port correlations are being restructured. This is also reflected in contemporary urban redevelopment projects that expressly have the ultimate aim to enrich port and city coexistence on the shared ground, "*something that has not been seen since the time industrial and commercial growth started to drive ports and cities apart*"[5].

Almost all western port-cities reached their present state following a similar path: during the final decades of the 20th century, they foresaw a gradual port migration process outside the city perimeters that eventually reached the breaking point of functional and institutional separation with its urban counterpart.

The build-up processes that led to such a conclusion has been codified by scholars into the common pattern of port spatial and functional evolution and transposed them into clear models applicable to the vast majority of western seaports harbour development.

Dating back to 1963, the common base of these models belongs to the Anyport scheme. With it, James Bird described the seaports paradigm as a "*homogeneous spatial entity in which port and maritime*

functions are catalysts at initial stages of urban growth but gradually lose their importance as cities grow other functions and become «autonomous»"[6]. The dimensional configuration of such process is drafted in the identification of six eras during which ports gradually grew in dimension and scale of maritime operations, beyond the geographical boundaries of the towns they originally paired with.

Anyport model - James Bird
As shown in Bird's model, the big leap for port-cities happened during the 1960s, when their evolution has been directed by the "rationalization" in the world's production and transportation system[6]*. All the processes connected to this were driven by economic interests, mostly regarding new cost-efficient ways of moving goods around the world. Consequently the ports physical layout reflected the signs of progress made in the field.*

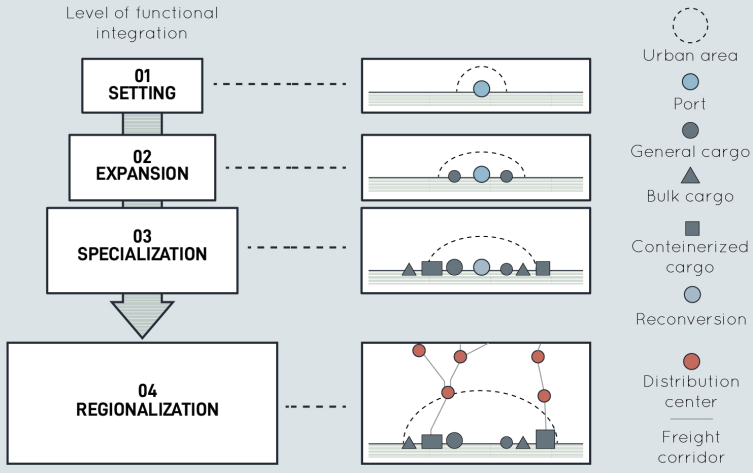


Fig 2: ***James Bird's Anyport model with port regionalization extension*** *in Notteboom & Rodrigue, 2005*

In the model, the first period during which the traditional blend of city and port saw its first turning point was the unfolding of the 19th century when a new trade-based economy and explorations in transportation technology emerged. With those, port-cities was brought essential changes regarding how they were seen in a broader context: from enclosed mercantile compounds to open transhipment spots, connecting ship traffic with local urban chains. The transit port new infrastructure invaded rural areas surrounding the city boundaries, asking for a reconfiguration of the relationship of city, landscape and infrastructure.

The leap forward to port-city separation happened in a second period, around the end of the 19th century and the first half of the 20th century. Following functionalist urban planning directions, the city started to encourage the adoption of goods processing means for goods passing through, leading to the evolution of transit port intonew industrial and manufacturing complexes built far away from the city, strengthening the spatial anachronism formed between city and port in the previous phase. To maintain its relevance in port-city general behaviour definition, Bird's model requires the integration of another level concerning the second half of the 20th century, when port-cities experienced a transformation from industrial processing and transit to distribution role. Such far-reaching transformation process mainly scattered from the so-called "cargo transport revolution": introduction of containers in the transport industry, that enabled a chain of innovations and transformations ranging from new ships, new

means of goods handling, and ports increased dimensions and new physical setups. Accordingly, "*ports have seen a rational migration away from their traditional urban cores, to deeper and less regulated waters*"[7]. Technological innovations put efficiency and high-speed as the top aims of the transportation-based economy of the '80s. Thus, in this phase port-cities faced the outcome of a process known as port regionalization: a roll-out of inland infrastructure connecting dry spots of regions to the modern transhipment sites and new logistic coordination centres. With that, port-cities set in stone the concept of the port as drifting and inflating spatial entity while the hinterlands beyond original port territories soon became financially convenient positions where the new port and port related amenities could be allocated. Globalization and international competition didn't relegate affect ports only. "*Entering the post-industrial age, [...] cities reinvented their fate and have come to be perceived as nodes or places inside network attracting different kinds of economic activities*"[8] often unrelated to the maritime context.

Port dislocation processes gave life to a spatially clustered port. Parallelly the urban counterpart of the port-city system followed with shifts that didn't reflect the rule "successful ports, successful cities", widely adopted in the decades before regionalization takeover. In other words, "*at the turning of the millennium, neither city nor port has an unequivocal shape anymore. Both are divided into specialized fragments which are spread out across the territory of the original landscape*"[9]

The waterfront model: spatial fallout

The separation between the City and its Port left behind vacant inner harbour areas. These obsolete leftovers embody the legacy of the passage from the Industrial Age to the Post-Industrial Age and the resulting ever-changing interaction between ports and cities spatial and functional structure. In the second half of the 20th century, both city and port authorities started to hunt for employable space to achieve their growth goals, therefore this interstitial areas gathered a huge amount of attention for the possibilities they enabled.

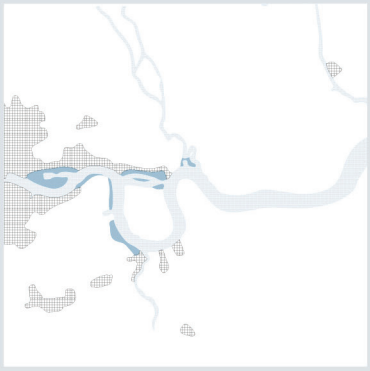
Even though these areas have been around port-cities agendas since the 1960s, they truly entered the theoretical discourse when Hayuth coined the concept of Port-City Interface for the first time in 1982. Only then, the incredible potential of waterfront redevelopment projects became evident in architectural, economic and political terms and the demand for urban waterfront projects grew steeply together with the scholars' interest in the topic. Specifically, with his scheme, B.S. Hoyle shed light on the fact that urban waterfront redevelopment in western port-cities doesn't derive from a follow-up process of port migration fueled by maritime technology advancement, as all the relations switches happened before, but that they have to be found in the

sphere of urban planning. This is because, in Port-Cities urban planning sought adaptation and evolution to progressively deliver redevelopment solutions updated with the ever-changing needs coming from ports and cities during the last decades. Thus, "*if 19th century was dominated by functionalism and modernism as main spatial exponents of a planning-directed society*"[10], recent development plans for the 20th-century port-city interfaces declined such ways of urbanism, in search of new fundamentals.

In this phase port-cities assisted to the redevelopment of waterfronts since unused harbours proved to be a social, environmental advantage, as well as rewarding from the economic and politic points of view. So, against the background of Western economic transition, urban waterfront evolved into places thanks to which port-cities can distinguish themselves to attract new businesses, capital investors, tourists, and residents while maritime activities were gradually pushed out from the interface in the name of the urban occupation. In this period the search was on to find new legitimations of, and a good basis for, the urban plan itself that would take place in the next phase.

The ultimate phase is commonly considered as the one in which port and city interrelations are being renewed in the current era. European port authorities often acted as "landlords" over urban waterfronts and their activities, mainly with a protective outlook regarding subjects like the "environmental space" that permit port-related companies to run freely. Anyhow, with the advent

of globalization and intermodalism, Port Authorities seem to be looking for urban redevelopment programs taking into account, such as local, socioeconomic and political interests coming from their urban counterparts. Today port-city interfaces are still physically perceived as frontier markers between the two entities but have also gained a central role in the debate regarding the future of port-cities especially in the field of the economic restructuring. Since the change is mainly based on new sustainability conditions and need of space for expansion, the availability of old harbour areas becomes of great importance for smart redevelopments. Thus, sustainability and planning patterns are alimenting local forces that push the city into existing, still functioning port areas. In conceptual terms, "*today the conflicts are not about how but whether the urban takeover of the still-active port should take place*"[11].


1850


1850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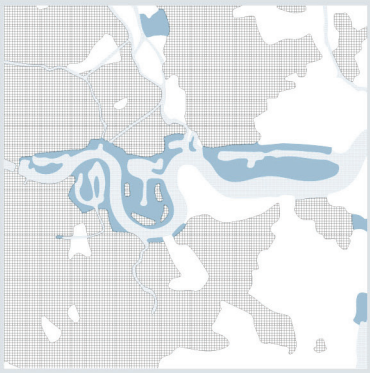
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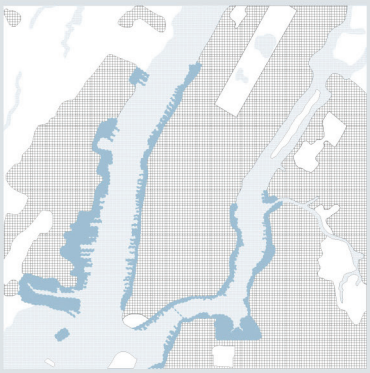
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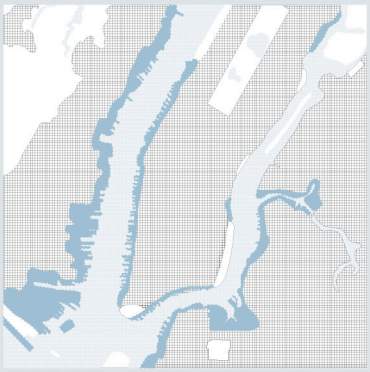
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1990


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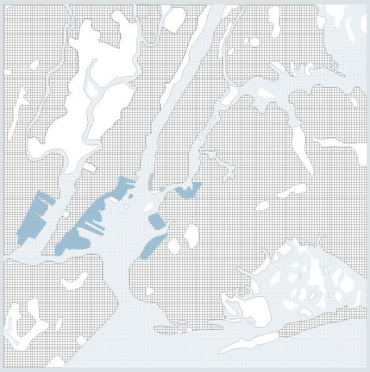

1990

LONDON

BARCELONA

NEW YORK

Western City-Ports matrix

Common patterns can be found analysing the evolution of the majority of Western port-cities. The examples of London Docklands redevelopment project, the revitalization of the historical seafront in Barcelona, Battery Park City and South Street Seaport in New York fulfil the role of examples for the considered reading model.

During their history, they all have been encountered problems related to the changing nature of maritime activities, and have seen their older harbour areas, once sited close to their urban centres, degenerate and fall into dereliction. Each city can be seen as representative of a specific type of Western port-city: North America, English, and the Mediterranean.

The colossal docks seen in English port cities are completely cut off from the urban context. London, with the enormous expanse of its "Docklands", outranks all others of this type.

Mediterranean port cities, with their bays, appear to be the most "natural" of the ports. Seen from the sea, the city often appears to be embraced by a natural bay, within which the port has been designed in greater detail.

Most North American port cities are peninsulas with a relatively long shoreline, along which repetitive systems of piers have been developed at right angles. The piers are, sot, speak the continuation of the street network into the water. New York is a splendid example of such a port.

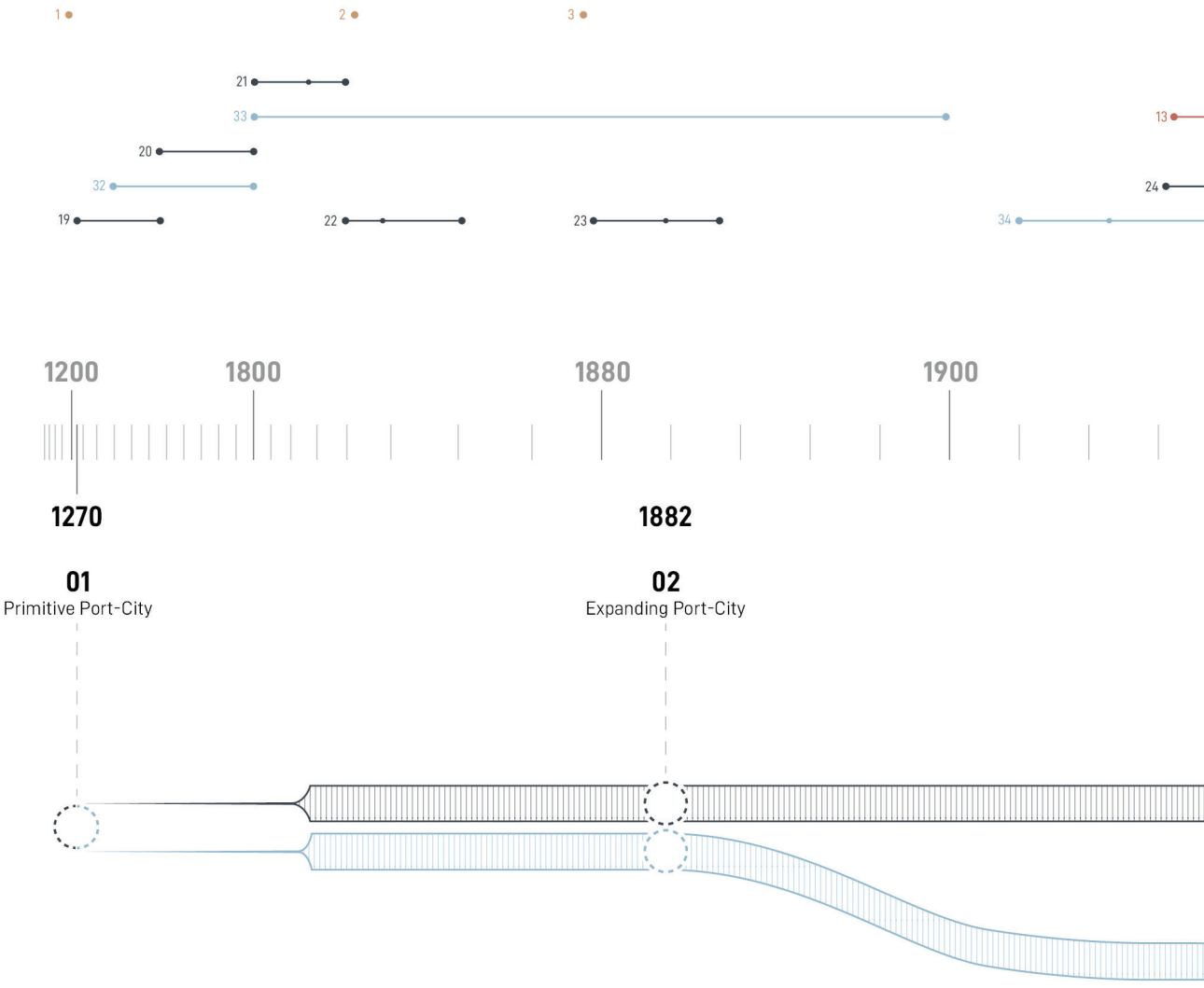
Fig. 3 On the left: ***Changing relations among urban areas*** in H. Meyer, City and Port, 1999: 54-61

02

The Case: Rotterdam City-Port

The strongest characteristic of cities on the Northwestern European delta is the constantly changing relationship between land and water, between city and port. Rotterdam is no exception to this assertion, but its port-city relation developed uniquely.

02.1 Timeline



1 ● 1270_Fishermen settlement
2 ● 1834_Cholera epidemic
3 ● 1872_Nieuwe Waterweg canal opening
4 ● 1932_Port Municipality Corporatization
5 ● 1940_German bombardments
6 ● 1993_Calamitous flood
7 ● 1995_Calamitous flood
8 ● 2001_Rotterdam Cultural Capital of EU
9 ● 2008_Financial crisis
10 ● 2015_ Post-war reconstructions end
11 ● 2020_Next Economy paradigm attuation
12 ● 2021_ Omgevingsvisie enforcement

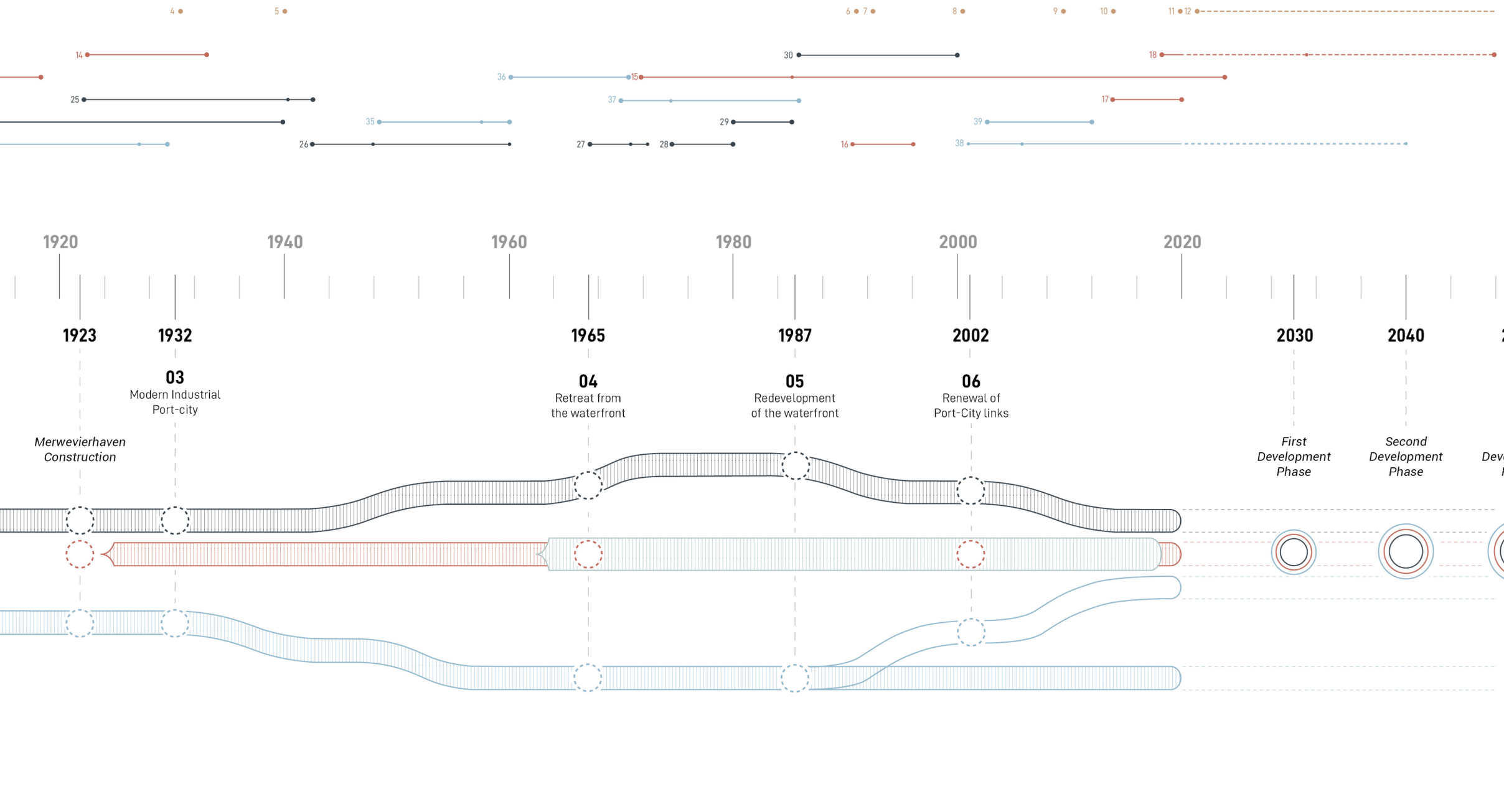
13 ● 1912_Vierhavens construction operations
14 ● 1923_Merwevierhaven construction operations
15 ● 1971_Merwevierhaven turned in fruit cluster
• 1985_Merwevierhaven fruit cluster expansion
16 ● 1990_Vierhavens renewal program
17 ● 2015_Get involved in M4H program
18 ● 2019_*M4H Future in the making* framework
• 2035_*M4H FitM framework* medium terms
• 2050_*M4H FitM framework* long terms

19 ● 1270_City occupies land within dikes
20 ● 1780s_Leap beyond the dikes
21 ● 1800s_Expansion of the city tawards the water
• 1820_*Waterstad - Landstad* separation
22 ● 1832_W.N.Rose director of public works
• 1837_*Nieuwe Waterweg* plan completion
23 ● 1879_De Jongh director of public works
• 1887_City expansions in line with the river
24 ● 1910_"Culture" as motif to create an organic city
25 ● 1924_W.G.Witteveen director of public works
• 1941_*Reconstruction Plan* by Witteveen
• 1944_Modification to *Reconstruction Plan*

26 ● 1944_Van Traa director of public works
• 1946_*Basic Plan* by Van Traa
• 1960_*Euromast* construction
27 ● 1965_Social restructuring planning wave
• 1969_*Plan 2000+*
• 1972_*Structuuranota 1972*
28 ● 1974_Social Democratic lead in planning field
29 ● 1980_Rotterdam transformation into logistc hub
• 1985_*Binnenstadspal (Inner City Plan)*
30 ● 1987_*Magic year*: re-link with the river
• 1987_*Kop van Zuid* plan

32 ● 1400_Old inner harbors construction
33 ● 1800_Former trade areas construction
Waalhaven construction
34 ● 1907_Beginning of excavations
• 1912_First extention
• 1927_Second extention
• 1930_Completion
Botlek construction
35 ● 1947_Project definition
• 1954_Begninning of works
• 1960_Completition

36 ● 1960_Europoort construction
Maasvlakte construction
37 ● 1968_Beginning of works
• 1973_Completion
• 1987_Spatial redefinition
38 ● 2002_*CityPorts* plan
• 2007_*CityPorts* redimensioned plan
Maasvlakte 2 construction
39 ● 2008_Beginning of works
• 2013_Completion



02.2 Rotterdam City-Port Evolution

Port-City Phenomenon *is here presented according to the Hoyle's scheme of 1998 which defines different stages in the traditional port-city interface.*
The general scheme is then related to the specificity of the Rotterdam case through six different maps. one for each different period of the port and city evolution.

pre 19th to 19th century

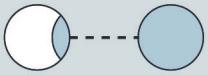
PRIMITIVE PORT/CITY

Close spatial and functional association between city and port

mid 20th century

EXPANDING PORT/CITY

Rapid commercializa-tion\industrial growth. Port beyond city confines.



mid 20th century

MODERN INDUSTRIAL PORT/CITY

Industrial growth and introduction of containers require space.

1960s-1980s

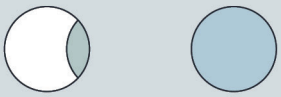
RETREAT FROM THE WATERFRONT

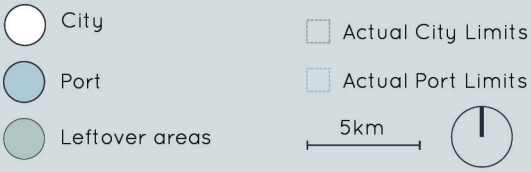
Changes in maritime technology induce growth of separate industrial port area. The urban renewal of the original cores is necessary.

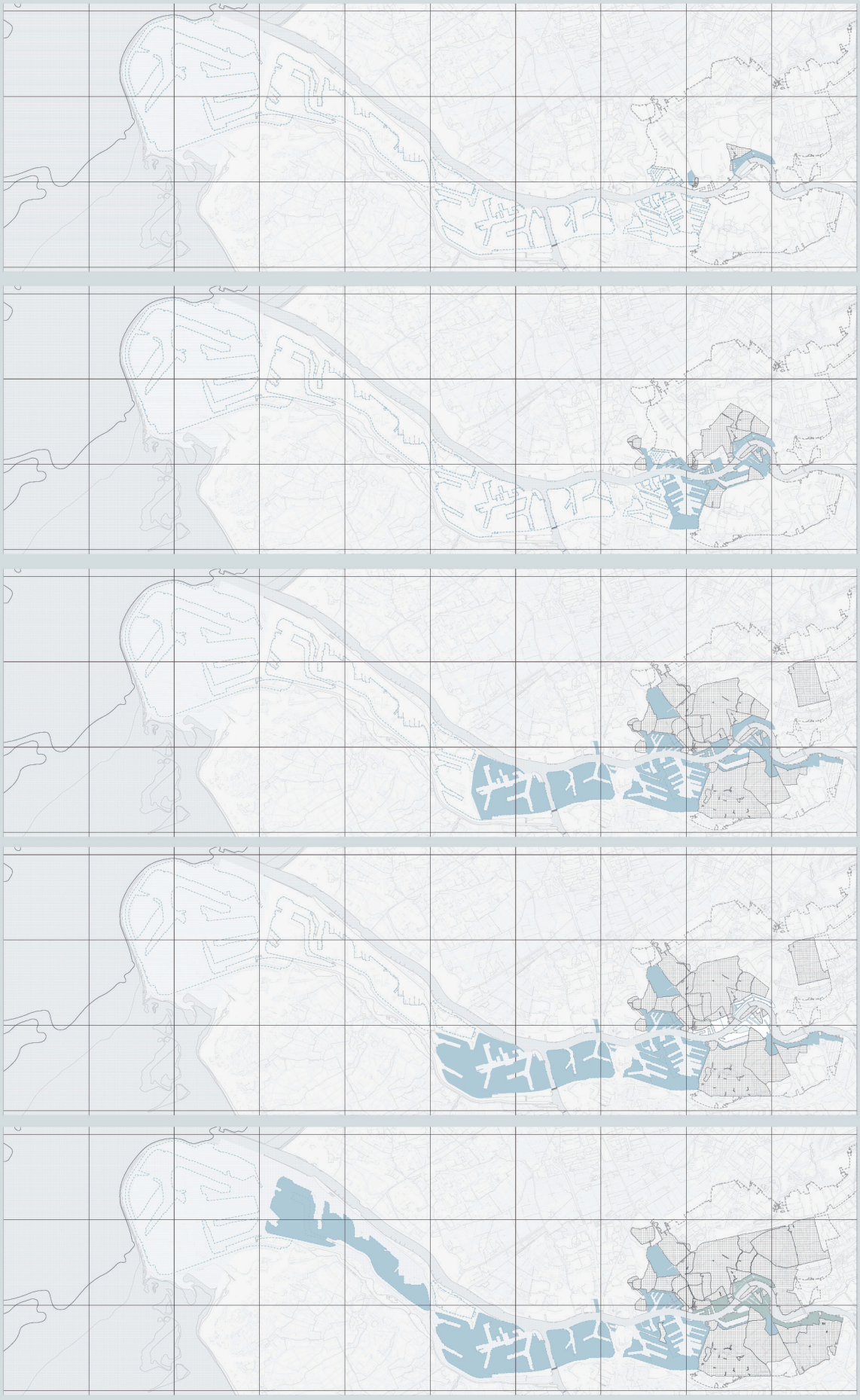
1970s-1990s

REDEVELOPMENT OF THE WATERFRONT

Larg-scale modern port consumes large areas of land/water space; urban renewal of the original core.







1980s-2000+

RENEWAL OF PORT/CITY LINKS

Globalization and intermodalism transform port roles; port-city associations renewed; urban redevelopment enhances port-city integration.


early 1980s extensions
City
Port
Residual Areas
5km

From a primitive port city to an expanding City-Port

Before the 17th century, the city grew along the river Rotte and the Schie as a mercantile urban agglomerate, spatially enclosed within its system of dykes and economically defined by the port activities.

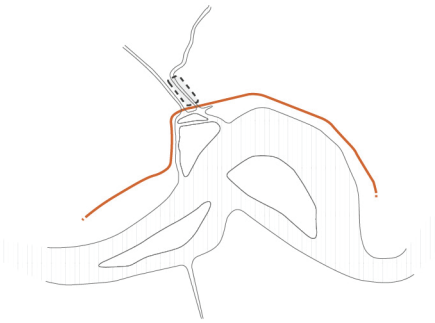
The first big transformation occurred at the end of the 18th century when the city dislocated the core of its economic activities into the area beyond the dykes. This was achievable thanks to the raising of sand flats that created auxiliary territories to be annexed to the already existing city which expanded significantly. The first case of the distinction between the new artificial lands (Waterstad) and the old city (Landstad) was made and perfectly remarked by the tendency to line up the urban interfaces with prestigious buildings facades, while quays and warehouse from the port reality were relegated in the background.

Nevertheless, during the 19th century, Rotterdam kept growing westwards along the river and with its port following a counter-trend within the national urban policies of the main port city such as Amsterdam and Antwerp, to distance themselves from the water. In the same period, thanks to the innovations of the new railroad from Amsterdam to Paris cutting through Rotterdam and the construction of the New Waterway

canal, the port exerted a change in its main activities transitioning from its traditional market system with its storing, processing and trading activities to a modern transit port. Thus, the spatial relationship between the city and the port underwent a radical evolution with the port claiming the autonomy in its new mansions and the city getting spatially more enclosed in its urban boundaries. On a demographic level, the port expansion turned to be appealing to a vast number of immigrants that found a new home near the harbours, resulting into a difficult situation of overcrowding with a density of 1000 inhabitants per hectare. With its working-class population continuing to grow, "*Rotterdam gains the reputation of being a werkstad – a workmen's city, while the wealthy upper class began to move out of the city*[12].

Therefore, at the end of the century, urban planning became a fundamental instrument in defining the direction of both the port and the city growth: the former expansions were relegated to the south bank of the river, while the latter expansion area was designated to a westward build-up of the new residential and administrative centre of the city. The new directions set the port spatial dynamics to shift its harbours into a parallel structure to guarantee accessibility to the large transitory vessels. This resulted in a new portscape flanked with several minors aggregations of residential neighbourhood filling the pieces of unoccupied land in between maritime activities, while the main new urban features were spread to the west along the riverside. Monumentality became the main shared feature between city and port. A spectacular system of public

infrastructure and beautiful residential neighbourhoods had to shape the image of the city. Keeping the new port-city configuration in mind, an urban landscape had been realized around a new attraction point in Kop van Zuid, the connection site between Rotterdam north and Rotterdam south (Fig4). Even if the spatial duality between the port and its urban counterpart was mostly supported until the first post-war period, a scent of opposition regarding the unconventional and disordered traits of the mixed-up areas, started to spread. This concern soon transformed into a collective protest in the 1920s, when citizens complained about the bad living conditions emerging from the protracted merge of residential and port-related industry. Ideals supported by this protest called for independence and centralization of port management powers, and the development of Rotterdam independent role as a city.



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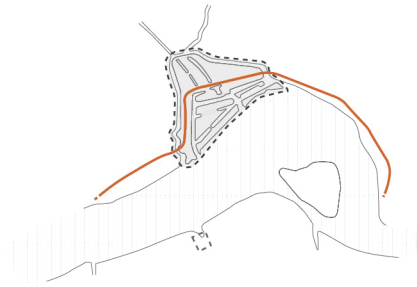

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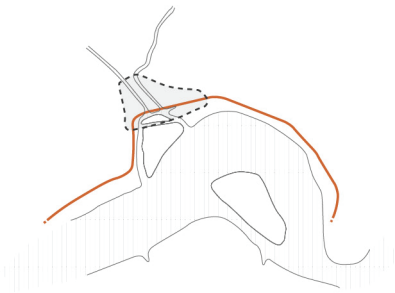


1500

1900

Fig. 4: ***City expansion conditions through centuries in Rotterdam - 1400;1500;1600;1900.*** Meyer, H. (1999). *City And Port: The Transformation of Port Cities: London, Barcelona, New York And Rotterdam*. Pag.291. Revised by author.

The modern industrial City-Port: the functionalist Basis Plan of 1946

Since the 1930s and for the twenty following years, such idealization defined Rotterdam's new policies: the Municipal Port Authority was founded to lead the new port expansions meant to host petrochemical industry structures. Changes weren't only reserved for the institutional apparatus, but the administrative reorganization was followed by a new spatial orientation: port and city turned their backs from the newly formed Kop van Zuid and officially developed and operated as divided spatial entities. Port Authority concentrated on new developments to the west: the Viershaven Area and Merwhaven on the right bank and the vast expansion project during postwar with Botlek, Europoort, and the Maas Plain. *"Urban development instead focused on building an "organic city" that was intended to surround the historic city centre, concentrically on both sides of the river"*[13]. Under the banner of coherent cityscape creation, urban planning forgot about the monumentality of the previous century, and focused more on the westward expansion of the city core, so that the Kop van Zuid area which, instead, was relegated to accommodate undesired people, was not worthy of planning or public housing considerations.

World War II and the subsequent reconstruction period settled a radical change in the port and city dynamics. The city saw a big portion of its historical centre along with many other districts levelled by German bombs while "*the port suffered the destruction of seven kilometres of quay walls and loss of its 40 per cent of its warehouse area*"[14].

"The city being torn down was almost perceived as an opportunity since the "inadequacies of an old city"[15] like overcrowded and poor areas, inadequate infrastructure network and errors from previous plans, were blown away for good.

> *"First the Port, then the city" became the motto behind Rotterdam economic revival, motivated by the idea that "if the port is successful, Rotterdam is successful as well".*[16]

"The 1946 Basisplan led the reconstruction based on the modernist principle of functional separation".[17] The city centre became the new business district from which the large inconvenient industries and companies had to move to new industrial areas at the outskirts. In general, the new city image was built according to zoning ideals consisting of radical separation of housing areas, recreational areas and working areas. Reconstruction works happened also on the port which experienced a large-scale expansion westwards towards the sea coast and as a result of the decentralization policy, the ongoing separation between the city and its harbour exacerbates with the completion of the Maasvlakte peninsula, Botlek and Europoort during the 1970s. The advent of the containerization and the specialization in the petrochemical industry induced the new operational port to be finally recognized as an autonomous entity working beyond the city boundaries on a regional scale.

Basisplan map 1946. In *https://wederopbouwrotterdam.nl/en/articles/basic-plan-van-traa*

The retreat from the waterfront and the urban renewal

With the port officially separated from the city and citizens' minds any attempts to bring back the image of the port and ships to the cityscape decisively disappeared from the urban planning agendas after the adoption of the Delta Act, in 1953, in response to a disastrous flood that affected the whole Netherlands. The act raised the minimum height for main dykes, which in return developed into physical barriers between city, river and port. Once again Kop van Zuid, the eternal in-between district, utterly receded into a marginal position which neither belonged to the Port Authority, nor to the city municipality, being cut off from all the new infrastructure construction around the city.

During the 1960s and in the following decades, the processes for the city centre reconstruction were following the planned route, razing the remaining productive urban ecologies from the inner city, while "*housing shortage was aggravated by business competing for central land due to the lack of available space*"[18].The modernist reconstructions encountered counter-arguments that supported the preservation of those existing structures that could define Rotterdam uniqueness: as the role of relics gained importance, Rotterdam's old 19th and 20th-century housing districts

followed along. This combined with the awareness that the port, devoted to the reception and the storage of the containers into its separated maritime industrial areas, as an outsider body was barely contributing to the city economy, made the urban planning programs change directions. Within a relatively poor city, with lower incomes, higher unemployment rate and lacking good public environments, new policies for urban development and social housing emerged from the Socialist leading party as opposed to the modernist concepts of the reconstruction era. "*The "Compact City" model was preferred over the "Expanding city" scheme and action towards housing functions had the precedence over everything else*"[19]. Hence city social development programs took a step back from the river and the waterfront areas next to the inner core which started suffering the first signs of abandonment while the Port Authority kept its expansion towards the North Sea, in the search for deep and open water to sustain its business.

Re-enacting the waterfront role in dense city development

During the 1980s, Urban planning practices, plagued by a lack of coherent and spatially attached concepts, was questioned for the series of wrong directions taken in the last decades. The necessity for economically efficient and spatially accurate new ideas manifested itself as a response to two main issues: the first was the international competition which threatened the hardly-obtained leading position of Rotterdam into the global economic network; the second was the internal rapid decrease of blue-collar jobs in favour of the high-skill labour as a consequence to the containerization of the port and increased automation. Thus, the Port Authority advanced a proposal of transforming the city into Europe's main port, able to organize the distribution of goods throughout the whole continent. This implied a deep reconversion of port activities from large-scale transhipment into a logistic conception, which nonetheless demanded the complete metamorphosis of the seaport from a working city to a logistic hub. For such an ambitious operation, the whole industrial apparatus would have to acquire updated information systems, while the city itself needed to be transposed into an attractive business environment for organizations dealing in advanced areas of trade, transportation and

Kop van Zuid redevelopment plan, 1987. *In https://www.dearchitect.nl/projecten/kop-van-zuid-rotterdam-1993-5?_ga=2.64088108.208746431.1594677218-445796818.1594677218*

distribution. The idea was accepted, and this phase sized the perspective of port development to a higher geographical scale. The consequent creation of logistic chains generated a constellation of inland terminals that acquire an important satellite function for the port, as they relieve the seaport areas from potential congestion.

Changes were adopted within the city boundaries too and, in 1985, a new integral plan was presented. This Binnenstadspal - Inner City Plan - laid down an integral framework for the single urban plannings happened between 1975 and 1985. The focus was on providing the inner-city expansion possibilities in the Waterstad with completely new functions that would foresee the collaboration between the municipality and the major commercial interest and bring to life a coherently planned park structure, equipped with cultural amenities. Since part of the old-port districts has already been developed by 1986, the realization of an ideal cityscape for a business-led city required more building locations. So, with the service sector in continuous expansion, the renovated demand for housing, offices, retail and leisure spaces in central district brought new interest in waterfront borders, ignored and abandoned during the previous era. Kop Van Zuid was the ideal place for a mixed-use development to become the restored social, economic and physical link for the divided city by the river. All those planning actions were defined in the New Rotterdam Plan of 1987 (Fig.5) which proposed a complete city urban renewal with the main aim to build an attractive, vivid and economically strong city and to

give life to a new symbiosis between a renewed city and a modernized port sharing the same river. It was one example of such research for reconstructed mutual relations that, without discussing its architectural outcome yet, surely succeeded in reawakening the city's awareness of the river and port presence. This awareness put under the spotlight the other face of the coin: the presence of the city in the port. Since the 1960s both entities had been treated as incompatible quantities and had been developed separately from each other, but now even the port sector started seeing advantages in a renewed kinship between city and port. The port was moving far away from the city and as a result, it found itself in an isolated position, both politically and socially.

Rotterdam riverside port, 19th century.
In *https://monovisions.com/historic-bw-photos-of-rotterdam-holland-in-19th-century/*

Rotterdam riverside port, 2018.
In https://gcaptain.com/port-of-rotterdam-may-start-ship-to-ship-lng-bunkering-in-june/

The intensification of the port-city link

The success of Kop van Zuid redevelopment represented the starting point for the craze of port-city relationship renovation ongoing in the current era. This quest has become explicit in the specific way in which Rotterdam dragged the trend born at the end of the past millennium into the new one, aiming straight at the creation of great opportunities for the port-city system as a whole, "*orienting its strategies more towards the city rather than the sea*"[20]. The most recent economic, urban, and environmental visions focus on building upon the rediscovered bond in order to make the most out of the possibilities it can bring. Most of this is made possible thanks to the gradual change the port has gone through the last twenty years, during which data gathering, knowledge industry, and clean technology remarkably became a major theme in nowadays societies, industries and cities overall. The result of such changes manifested into a stark transition of some part of the old fashioned industrial setting, to modern port-city components of a wider system that breaks the historical separation and reintroduce the port as an active member of the urban logic. Harbours lose their ship-related apparatus and can be used to benefit both the port image and the city operations since they become fields where maritime research institutions and knowledge clusters interact, while the urban footprint can gradually takeover developing these assets towards the city necessities.

Thus, at the beginning of the 21st century, there's no doubt that Rotterdam waterfronts have become the

place where mutual gains for port and city can potentially merge. The port aims to improve its competitive position becoming the smartest and most sustainable port in the world, and the city research for new space for urban needs, have converged into one of the biggest inner-city development in Europe: Stadhavens Rotterdam/ CityPort.

Stadhavens Strategy. In: *Stadvisie Rotterdam 2030.* Gemeente Rotterdam. Revised by author.

This large transformation plan collects six projects for the port-city interface of Rotterdam, embedded in its Regional Plan. It converges all the new relationships that have been emerging during the past decades and boosts them into views that share common goals among port and city planners. In this, waterfronts are the location where new connections are being made, since their vacant and transitory state offer fertile ground for innovation, crossovers and mixing opportunities.

The remaining port activities in the considered portion of the harbour were meant to disappear or relocate in outer portions of the port asset, while large-scale urbanization programs should have taken place. Five different views were defined, one for each CityPort area. Each one was meant to exploit the intrinsic dynamic of their areas, ranging from maritime services or port-related education, to social and cultural clusters or new floating communities settlements. Partly consequence of the economic crisis, for the first time in Rotterdam, a plan was meant to find new ways to develop enormous city portions without establishing a traditional masterplan, avoiding real estate programs and dependence on large-scale public investments. Consequently, the highly adaptive outcomes triggered incremental, "bottom-up" processes that allowed the port and city to co-evolve in an organic and harmonic way with the shared objective of reintroducing the harbours into the urban fabric once for all.

Among these, the area of Mervewierhavens (M4H) at north and Waalhaven (RDM) directly south are

meant to give birth to the Makers District: the innovative manufacturing industry's regional hub, equipped with research, consultancy and training services that could attract well-off creative and knowledge worker. This is where port development and urban development should truly come together. Over the past ten years, the RDM area has already developed in the spirit of the Makers District into the flag bearer of Rotterdam's "Knowledge Port" transition, with its technological training institutes complemented by research facilities and maritime and technology companies, along with flexible spaces for start-ups and experiments.

Since the city is still recovering from the financial crisis, and *"the concept of mixed functioning areas is quite new, the process around the CityPorts projects did not always find joint solutions with ease"*[21] . Most of the harbours have been transformed during the last ten years, but still fragments of the plan can't be set in stone. In fact, even if the RDM side is almost in full operation, Merwevierhavens area is still at the beginning of its further development and pending for concrete solutions. The main reason for this has to be attributed to the overly complicated regulatory system in force at the moment, that through rigid laws imposes rigid constraints to the realization of mixed zones of work-living environment in proximity of the port areas.

Port modern urbanity

Globalization is playing a drastic role in the ports network worldwide since new data gathering and exchange systems have become pillars of the port functioning. On this trail, sustainability matters have gradually become the most recurrent theme in the latest years, and are bringing ports to an energy-wise turnover that is embracing their whole functioning. In this, the Port of Rotterdam continuously builds on precedent achievement in order to reach future aims. Not by chance the vision for 2030 is a way more dynamic port environment that requires prioritization and adjustment. If the port traditional activity kept sailing away from the city core, new developments and new transitions will mark the "return" of the port into urban dynamics, impacting the overall city system and industrial asset of Rotterdam.
The new face of the port interacting with the city will involve the broadening of the current port industrial complex with new, more "urban-related" activities, such as maritime business service providers, commodity traders, shipowners, shipbuilders, and new technology companies focused on the maritime cluster. To ensure a successful enrichment of these clusters is important to connect the labour market with education towards the new required skills. So, educational institutions and sec-

tor association have implemented programs for cooperation and modern skill acquirement, scattering research centres and campuses, in order to create a strict knowledge network that crosses both water and land-related fields. In addition, to strengthen the business and investment climate for the aforementioned maritime target groups, actions have been initiated in the areas of innovation, promotion, acquisition, legislation, and education. All this, in parallel with the new legislative and economic plans, will lead to new possibilities in terms of urban planning that will diverge from embracing the city and the port as distinct entities.

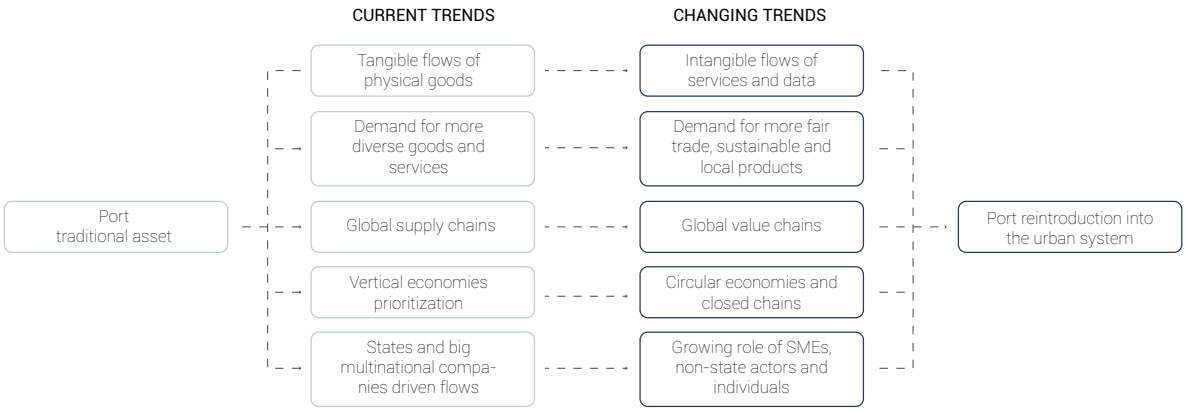


Fig.5 **Changing trends in modern port behaviour. In** *Progress Report 2017 - Port Vision 2030.* Gemeente Rotterdam. Revised by author..

During the last decades the port's behaviour has been gradually defined by the worldwide network it is connected to. Though, globalization processes are defining new trends. Among them, the replacement of tangible flows of physical goods with intangible streams of services and data is the major one. Nonetheless, demands for greater participation, emerging from small enterprises, individuals and open-source content creators are also scattering port activities in different venues other than the port itself. Therefore, the port is going through and has to keep up with, a gradual transition that will be less linearly defined, and more network-based. This transition is marking a straight switch from the traditional segment approach aimed at "maritime", "creative", "food, or "clean tech" since efforts are being made to stimulate cross-fertilization between all these activities". These processes value the small-scale and gain strength by individual interventions that are easily connected one to the other. That's why this kind of activities don't have to be kept relegated onto some artificial port-island but can find fertile ground into the city asset "*to breed more promiscuously with other enclave formats, or "parks", merging with container ports, offshore financial areas, tourist compounds, knowledge villages, IT campuses, and even museums and universities*"[22].

Spatial dynamics can be noted in the recent and coming period for these transitions since this kind of actions requires space. "*Notably, this space is becoming a persistent yet mutable instrument, transforming as it absorbed more and more of the general economy within its boundaries*"[23].

As the main port assets are going through radical transformations for energy matters, city-port interfaces come into play with the strength to welcome every thinkable residential, business, or cultural program. Innovation and experimentation will be key during this transitory phase. Non by chance, Stadshavens Rotterdam, M4H and RDM are seen as major opportunities for the future of the city. The success of such a transition will require creativity and commitment from all relevant parties and will depend on sufficient physical space and certainty about the available environmental utilization space for a wide range of activities.

Rotterdam Wilhelmina Pier 2019.
Picture cretids: Frank Hanswijk


DOXI

Future visions in the port and city development

As seen before, a wide array of acts have been adopted during the last centuries. As a result, the present state of environmental laws is defined by contradicting and undistributed systems and terminologies that complicate unnecessarily new law developments, and hamper the enforcement of modern ideas.

"Society is changing rapidly, new issues require new responses. This requires flexible regulations, which can respond quickly to developments"[24]. To overcome the dead end that's being created, the city of Rotterdam, as well as the whole Netherlands, is projecting into a new phase that will open the doors to innovation in multiple fields. Within the next few years, Rotterdam will head towards a complete game-changing revolution that will completely twist both its economic system, and its legislative system.

Not by chance, since 2016 the Metropolitan Region of Rotterdam The Hague is working on improvements plans in accessibility and economic business climate, funneled in what is called Roadmap Next Economy (RNE), a plan that determines the action for the city in the next decades to come in order to turn the page on an economic apparatus that isn't conform to the city needs anymore. The new economic paradigm is meant to anticipate the

future and prepare the city for what is going to happen in the world: climate changes, geopolitical relations, growing inequality, and depletion of natural resources. To do so, the program implies a renewal of the economic sectors that are already anchored in the Rotterdam region, with the objective to switch from a limiting vertical economy, with dominant big manufacturers and distinct modern sectors, to a more open horizontal economy, for which cooperation between business, governments and knowledge institutions becomes fundamental. Therefore, boundaries will blur between living, working and leisure, and new possibilities in terms of planning will be unlocked too.

For what concerns the regulatory system, a farsighted operation that is meant to change how Dutch municipalities will work in the future is on the verge to come into full force. The new Environmental Strategy (Omgevinsvisie) is an holistic environmental vision that reflects how the city will deal with developments in physical living environment now and in the future. Over the years, a storm of regulations that lasted almost two centuries reached the present state of environmental laws in a contradicting and undistributed state of intertwined systems and terminologies that complicate unnecessarily processes of innovative projects approval, sometime making them impossible. With the new environmental code, Rotterdam aims to new sustainable developments in society and to versatile legal support able to facilitate the participation of citizens in the transformations of their city. If before laws were renown

for details, now the new focus will be on performance. Moreover, the organization behind the zoning system of the city is going to disappear, and a more flexible use of land will become possible. In the new Environmental Act, the city and the port are not considered as separate entities anymore. Future use of space and growth are conceived according to the same perspective, that look at the City-Port as whole once again: resilience, health, inclusiveness, circularity, and production will be the keywords for the generation of new links in the port-city system.

Both these new integration will open the doors to innovation in multiple fields, as well as a wider range of possibilities for resourceful citizens who are willing to take actions in the evolution of the city.

Collectivity and participation of citizens and businesses in decision-making on plans will be the fundamental elements of the transformation of the city success. Exactly on this wave of change, Rotterdam municipality gathered several future explorations of the (new) spatial development opportunities in the long term into a vision: the Map of the City. This curious document is an open invitation to take part in urban planning processes, meant to establish a dialogue between the city and citizens, planners, professionals or enthusiastic regarding new ideas about the future of Rotterdam. With the Map of the City, the main objective is thus to keep the momentum gained from the past port-city relationship renovation going, and to do so, the vision holds on tightly the port-city interface is proving to be the most strategic

among port assets once again. Along with others, the parts of the CityPort plan left incomplete, such as parts of Stadhavens and Merwevierhavens will be particularly relevant, as their condition of vacancy offer a wide range of possibilities for thinking at the river as a more attractive stage. Thanks to all these future introductions, Rotterdam port-city relation will enter a new phase: from a city along the river, via a city on the river, to a city in a delta landscape.

For these new purposes, we take the opportunity to respond to the city open invitation from the Map to think along and act together for the future of such areas, in particular for the redevelopment of Merwevierhavens and its role it will play in the city as part of the Makers District.

03

Spatial Framework

In this chapter, we attempt to give back the image of both the city and the port as two separate entities which take part in a complex system as a whole.

On the spatial level, the image can be made legible studying the recurrent functional and spatial patterns which constitute both the Port and the City built environment. Taking into account the idea of the structure of the city as the set of principles that stands behind and organizes a complex entity, we wanted to better understand the hidden logic that shapes "*Rotterdam living and working environments and how they are currently organized highlighting the constant conflict between the spatial logic of the Port versus that of the City*"[25]. By the mean of mapping, we explored the potential of their spatial layout to finally elaborate our vision on how these could be improved and repurposed in the M4H areas, facing the challenge of today and tomorrow.

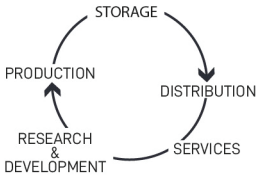
"The Port of Rotterdam transitioned from functioning under a staple market system to being a modern port: it ceased to base its activities in the exchange of high value commodities and specialized on the throughput of bulk and raw materials, and...port related industries, such as shipbuildings[26]*"*

03.1 Port-Lands Productive Landscape

The large-scale productive plants as an autonomous system far from the urban dynamics

The Port is an autonomous system which, following the logic of modernist functional separation, grew far from urban dynamics and essentially dependent on the global economy. On the spatial level, it is the result of many industrial transitions and changing technologies so that its ever-changing borders now develop from the heart of the city to the north sea as a series of isolated monofunctional, large-scale districts whose built form

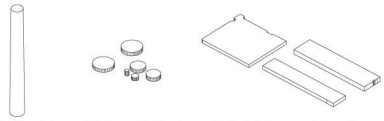
consists of production and storage plants and largely unbuilt quays for cargo transshipments congested with cranes and ships. Here a variety of activities are performed, but none of them is related to livable districts. Even if some companies established research and development activities - R&D - on-site generally, people working physically in the harbour industrial areas are decreasing, especially among low-skilled jobs, with the introduction of automated systems.



Production Activities Chain in Port Areas.

typical
SPATIAL CONFIGURATION

BUILT FORM

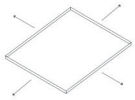


CHIMNEYS BULK STORAGE INDUSTRIAL PAVILIONS

OTHER ELEMENTS

CONTAINERS CARGO CRANES

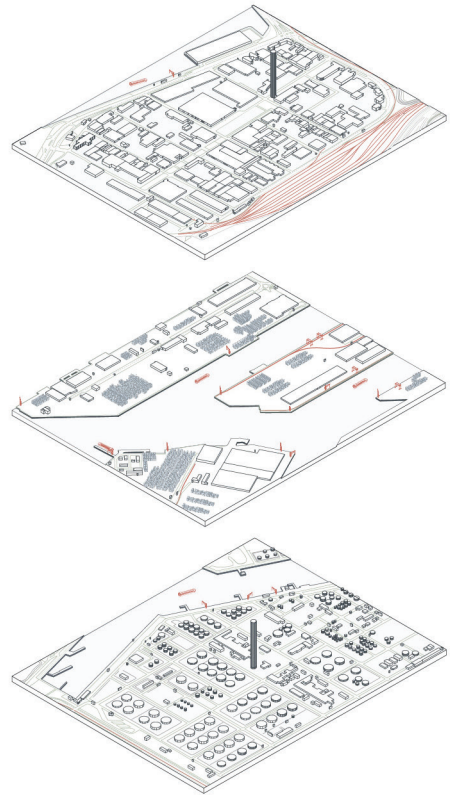
ACCESSIBILITY

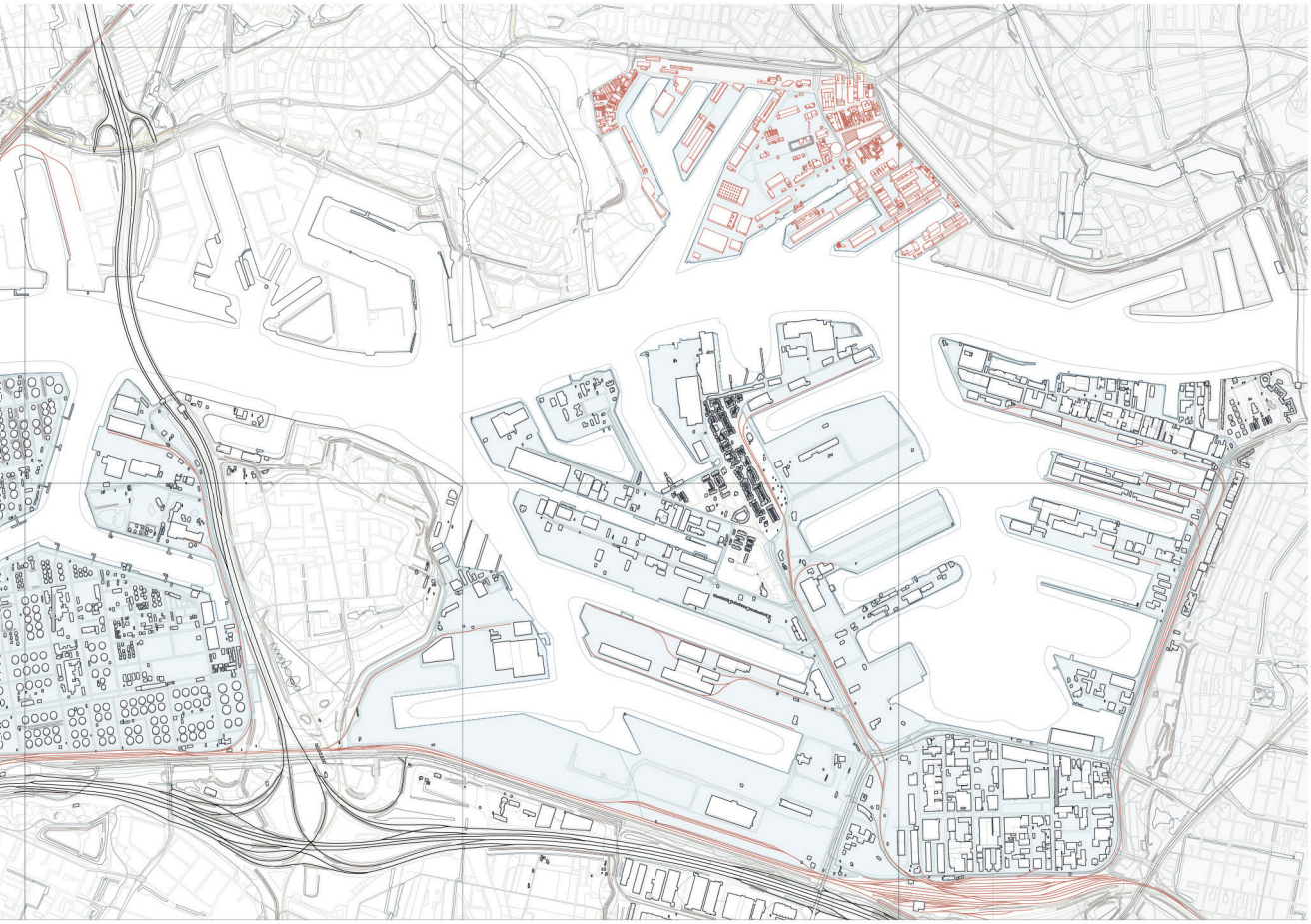


CLOSED PRIVATE PLOTS

CONNECTION

RAILWAY HIGHWAY WATERWAY





Rotterdam Port morphology. Picture credit: *https://www.agro-chemie.nl/nieuws/*

Rotterdam Port morphology. Picture credit: *Janny Kok*

"As societies grew in size and became more complex, so too did their structure. It is also a characteristic of social bodies, as of living bodies, that while they increase in size they increase in structure[27]"

03.2 The Urban Morphology

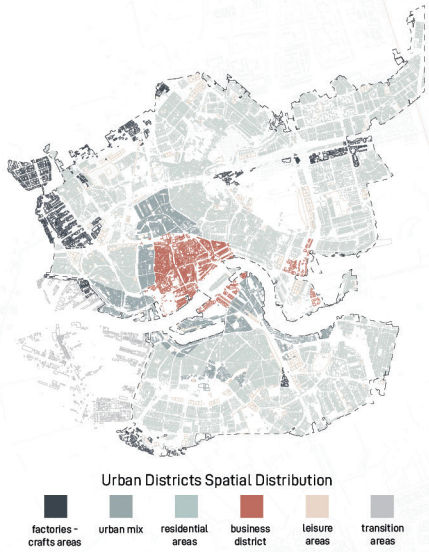
Drawing the image of the city through the different spatial configurations of its urban blocks

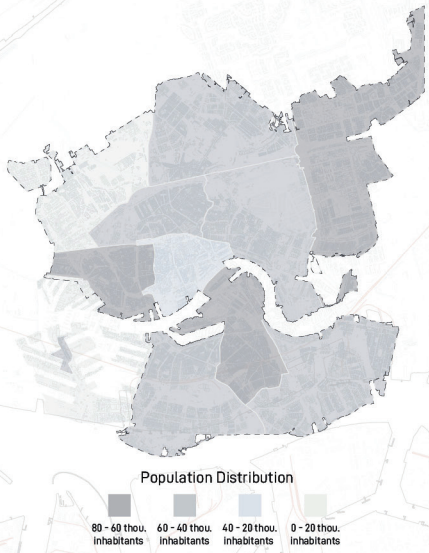
From a closer focus on the city tissue, the urban districts appear to be more mixed and diversified in terms of the built and working environment. Unlike the large-scale, monofunctional port areas built around the production sector, here the characterizing function is the residential use. The working environment mainly consists of the central business district around the central station, where shopping streets, cultural clusters and office spaces are concentrated. This central district, together with the newly built old port areas, is shaped by new dense building typologies like towers, which are changing the traditional image of the city. Around those renovated quarters, the urban blocks can be mostly defined as residential blocks with mixed facilities only intended to support the living environment, while the rare productive activities are not well integrated into the urban system.

The living environment has always diversified the urban structure as the city changed, developed and adapted to renovated social, economic, geographical and spatial needs. In a place where the scarcity of land dictates the rules for the urban developments, housing

has always been as integral with the urban form1 so that, till the 20th-century Housing Act, the urban tissue was conceived as neighbourhoods composed in housing blocks. In this logic, *"the ordinary house is understood as a piece of the urban fabric…rather than having an identity separated from other houses"*[28]. Even when from the enclosed urban block, where houses were arranged in rows along the streets creating an inner open space for private gardens, the modern urban designers switched to the open rows of buildings with the private inner court converted into shared public space, the main urban scheme - a city of housing in blocks that formed the streets - was maintained.

The rupture with the previous urban pattern occurred in more recent times when the urban growth imposed to achieve high-density urban settlements so, new configurations of residential buildings have emerged. Housing block increased in size, foot-print and height which allowed a more diverse mix of dwellings, different in dimensions and income levels. It also offered the possibility of a mix of urban functions and to introduce in the same building other uses as commercial spaces and facilities, rather than building only-residential objects. Large-block and tower buildings were introduced into the urban tissue as generic typologies which, if combined vertically and horizontally, generate a variety of articulated compositions to fit as many dwellings as possible.

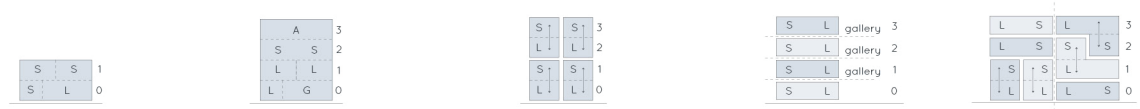




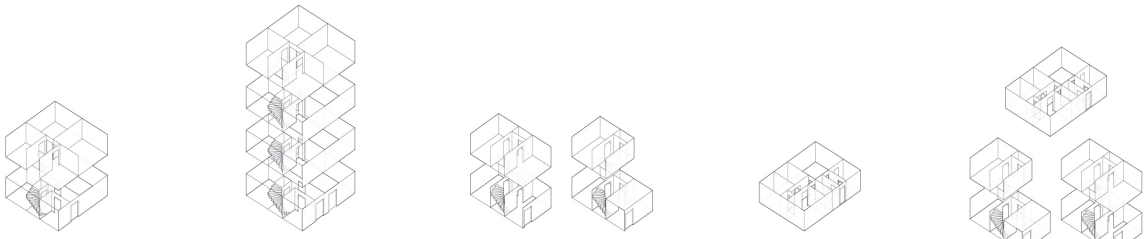

1km

Urban Tissues

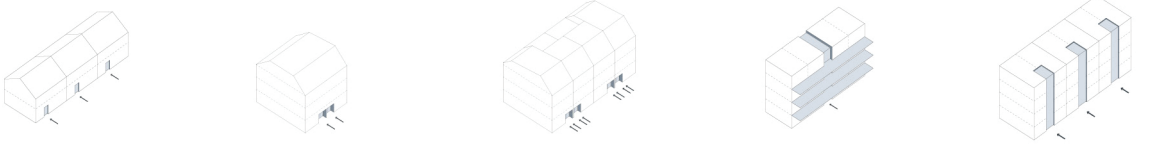
In the following step, we attempt a typological classification of residential buildings, trying to obtain a more accurate picture of the city morphology. Comparing the recurrent specific urban forms we elaborate some generic urban layout and building arrangements which all diversify and define the city built environment. The aim is to better understand the differences between traditional and recent practices and how they affect the overall urban system.



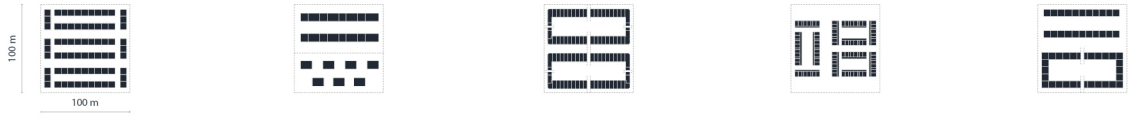
A: attic L: living area S: sleeping area G: garage



GENERIC INTERNAL SETTING



GENERIC VOLUME SCHEME



RECURRENT SPATIAL LAYOUT

TERRACED HOUSES
SINGLE FAMILY HOUSES

generic spatial layout:
REGULAR BLOCK

accessibility:
GROUND FLOOR ENTRANCE, INTERNAL VERTICAL CONNECTION

building heigth:
LOW RISE, 2 FLOORS

CITY MANSION
LARGE SINGLE FAMILY HOUSE

generic spatial layout:
REGULAR BLOCK

accessibility:
GROUND FLOOR ENTRANCE, INTERNAL VERTICAL CONNECTION

building heigth:
LOW RISE, max 4 FLOORS

DOWNSTAIRS - UPSTAIRS APARTMENT
MULTI-FAMILY HOUSES

generic spatial layout:
REGULAR BLOCK

accessibility:
GROUND FLOOR DOUBLE ENTRANCE, SINGLE OR MULTI - STOREY GROUND FLOOR APT + INDIPENDENT UPPER FLOOR APT

building heigth:
LOW RISE, 4 FLOORS

COMMON GALLERY APARTMENTS
MULTI - FAMILY COMPLEXES

generic spatial layout:
OPEN COURTYARD

accessibility:
GROUND FLOOR COMMON ENTRANCE, DWELLINGS ACCESSIBLE VIA COMMON GALLERIES

building heigth:
LOW RISE, 5 FLOORS max

PORTICO COMPLEXES
MULTI - FAMILY COMPLEXES

generic spatial layout:
OPEN or CLOSED

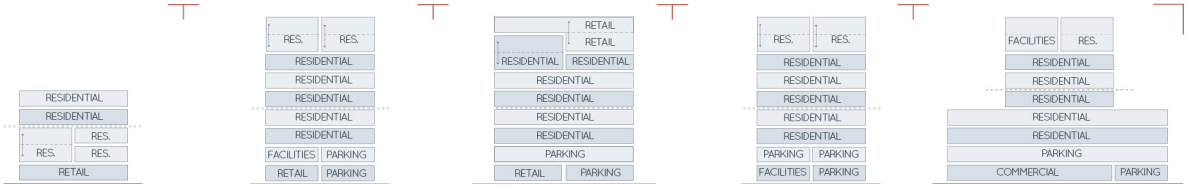
accessibility:
SINGLE or MULTI STOREYS APT ACCESSIBLE FROM A COMMON STAIRWELL CORE, LIFTS ARE PRESENT IN MORE RECENT CONSTRUCTIONS

building heigth:
LOW RISE, 5 FLOORS max

TRADITIONAL CONFIGURATION

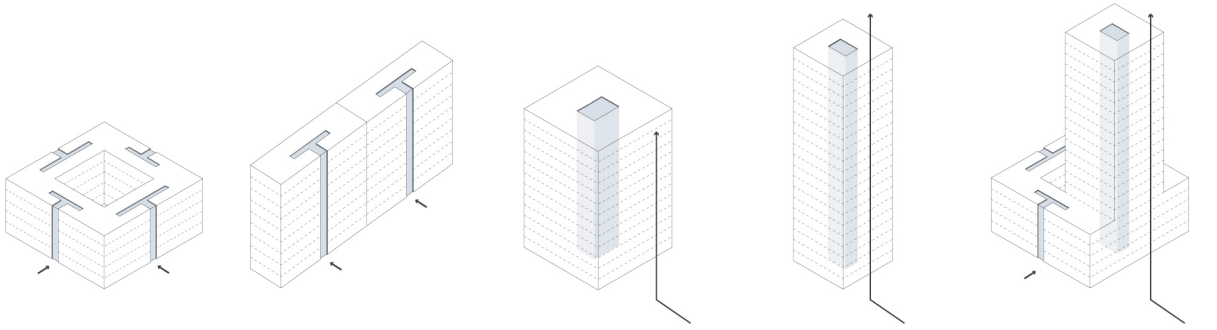
LOW DENSITY - NARROW FOOT PRINT

FAR < 1.25



MIX OF FUNCTIONS

MIX OF DWELLING TYPES, VARIETY OF SIZE AND INTERNAL CONFIGURATIONS



COMPACT BLOCK
MULTI - PROPERTY COMPLEXES

generic spatial layout:
PATIO or CARVED VOLUME

accessibility:
DIVERSIFIED ACCESS ACCORDING TO DIFFERENT FUNCTIONS, VERTICAL AND HORIZONTAL COMBINED DISTRIBUTION SYSTEMS

building heigth:
MEDIUM RISE, > 5 FLOOR

MEDIUM RISE SLAB
MULTI - PROPERTY COMPLEXES

generic spatial layout:
OPEN or CLOSED BLOCK

accessibility:
DIVERSIFIED ACCESS FOR DIFFERENT FUNCTIONS, COMBINATION OF VERTICAL AND HORIZONTAL DISTRIBUTION SYSTEMS

building heigth:
MEDIUM RISE, > 6 FLOORS

MASSIVE TOWER MEDIUM RISE
MULTI - PROPERTY COMPLEXES

generic spatial layout:
OPEN BLOCK , PUNCTUAL or CLUSTERED

accessibility:
DIVERSIFIED ACCESS ACCORDING TO DIFFERENT FUNCTIONS, VERTICAL DISTRIBUTION

building heigth:
MEDIUM RISE, > 6 FLOORS

TOWER HIGH RISE
MULTI - PROPERTY COMPLEXES

generic spatial layout:
OPEN BLOCK

accessibility:
DIVERSIFIED ACCESS ACCORDING TO DIFFERENT FUNCTIONS, VERTICAL DISTRIBUTION

building heigth:
HIGH RISE, > 10 FLOORS

TOWER + PLINTH HIGH RISE
MULTI - PROPERTY COMPLEXES

generic spatial layout:
OPEN BLOCK, PATIO PLINTH + TOWER, PLINTH + LAMINAR TOWER, PINTH + COUPLED TOWER

accessibility:
DIVERSIFIED ACCESS, VERTICAL AND HORIZONTAL COMBINED DISTRIBUTION SYSTEMS

building heigth:
HIGH RISE, > 10 FLOORS

MODERN COMPLEX

HIGH DENSITY - LARGE FOOT PRINT
FAR < 5

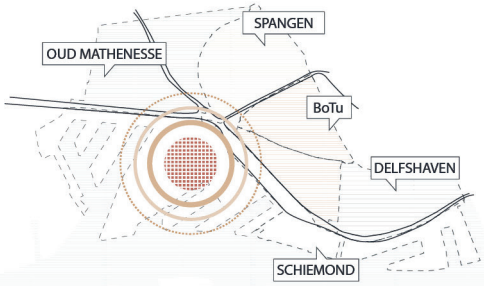
Rotterdam Pretorialaan, 2018.
Picture cretids: Frank Hanswijk


BOEREN WIJSJE
WWW.NINA-S.NL

03.3 Working at the Edge Between City and Port

The interfacing neighborhoods

Since in the first development phases the City and the Port grew together, a demographic and spatial analysis of the surrounding neighbourhoods could help to understand the actual situation at the periphery of the city and how and if the redevelopment of M4H could generate a positive impact on the immediate physical and social environment. In general, the interfacing residential districts are characterized by enormous diversity and dynamic among residents, entrepreneurs and the built environment. They were constructed as working-class quarters in the early 19th century, in a period of great expansion of the city borders and, even if they now appear completely apart from the basins logic, they were extremely related to the port activities. Nowadays they present potentials for consistent improvement in terms of the quality of life since they are located in a strategic position, well connected by public transports not only with the rest of the city but also to the greater metropolitan area, a positive aspect that enables mutual exchanges, proximity and accessibility to a variety of facilities. Nevertheless, these appear as peripheral quarters and even if some of them as Spangen, Delftshaven or Schiemond recently underwent urban renewals, they are still considered by the municipality as vulnerable quarters since they deal with great challenges in the



realm of social security, housing supply, employment and income rate as the official statistics clearly show. Here a large part of the population is in the "low-income" category and has no access to the labour market. While an adequate number of facilities such as schools, leisure activities and grocery shops are present, the main shopping areas as Schiedamseweg or the more recent BigShops retail area in Schiemond are barely working: there are few successful commercial activities and most of them are one-man shops. Also, the business spaces are insufficient and the housing supply is deficient in quality and variety. The majority of residences are tenements buildings and buildings without elevators in the social housing or low-rent sector. Few modern housing complexes were realized in Schiemond during the transformation process from their industrial past, but they result to be isolated interventions of urban planning.

M4H development program could positively affect the requalification of the western peripheral areas, offering new opportunities to remove physical and social barriers thanks to a more coordinated and integrated strategy of local urban renewal.


500 m

OUD MATHENESSE

TOTAL AREA 84ha

14,5% BUILT-UP AREA

95% OCCUPANCY RATE

98% BUILT BEFORE 2000

86% RESIDENTIAL BUILDINGS

4028 addresses
DENSITY
DWELLINGS **3558** a. per sqKm

44% SOCIAL RENT

45% OWNED HOMES

7100 INHABITANTS

8488 people per sq.km

45% NON WESTERN IMMIGRANTS

72% WORKING PEOPLE (15-64 YEARS)

42% LOW INCOME

7% HIGH INCOME

Buildings Height

10+ floors
6-9 floors
5 floors
4 floors
3 floors
2 floors
1 floor

2% SINGLE-FAMILY HOUSES

Terraced houses

principal HOUSING TYPOLOGY

98% MULTI-FAMILY COMPLEXES

Downstairs - upstairs apts

Common gallery apts

Portico complexes

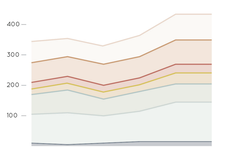
WORKING ENVIRONMENT characteristics

440 registered business ACTIVITIES

commercial

leisure

education



BUSINESS ACTIVITIES

Agriculture, Forestry and Fisheries
Trade and Catering
Financial Services
Culture, Recreation and Other Services
Industry and Energy
Transport Information and Communication
Business Services

All data source: CBS.nl, statistics updated to Dec 2019.

SPANGEN

TOTAL AREA 65 ha

25.5% BUILT-UP AREA

97% OCCUPANCY RATE

87% BUILT BEFORE 2000

84% RESIDENTIAL BUILDINGS

4120 addresses
DENSITY
DWELLINGS **4600** a. per sqKm

59% SOCIAL RENT

29% OWNED HOMES

10190 INHABITANTS

16930 people per sq.km

71% NON WESTERN IMMIGRANTS

73% WORKING PEOPLE (15-64 YEARS)

62% LOW INCOME

8% HIGH INCOME

Buildings Height

10+ floors
6-9 floors
5 floors
4 floors
3 floors
2 floors
1 floor

1% SINGLE-FAMILY HOUSES

Terraced houses

principal HOUSING TYPOLOGY

99% MULTI-FAMILY HOUSES

Downstairs - upstairs apt

Common gallery apt

Portico complexes

WORKING ENVIRONMENT characteristics

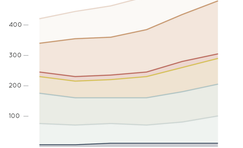
600 registered business ACTIVITIES

commercial

leisure

education

services



BUSINESS ACTIVITIES

Agriculture, Forestry and Fisheries
Trade and Catering
Financial Services
Culture, Recreation and Other Services
Industry and Energy
Transport Information and Communication
Business Services

All data source: CBS.nl, statistics updated to Dec 2019.

BoTu

TOTAL AREA 76ha

41% BUILT-UP AREA

94% OCCUPANCY RATE

88% BUILT BEFORE 2000

82% RESIDENTIAL BUILDINGS

6632 addresses
DENSITY
DWELLINGS **5796** a. per sqKm

62% SOCIAL RENT

14% OWNED HOMES

7455 INHABITANTS

20400 people per sq.km

66% NON WESTERN IMMIGRANTS

64% WORKING PEOPLE (15-64 YEARS)

52% LOW INCOME

8% HIGH INCOME

Buildings Height

10+ floors
6-9 floors
5 floors
4 floors
3 floors
2 floors
1 floor

2% SINGLE-FAMILY HOUSES

Terraced houses

principal HOUSING TYPOLOGY

98% MULTI-FAMILY COMPLEXES

Downstairs - upstairs apt

Common gallery apt

Portico complexes

Slab complexes

WORKING ENVIRONMENT characteristics

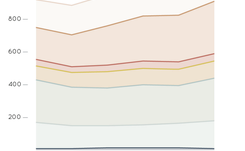
1135 registered business ACTIVITIES

commercial

leisure

education

services



BUSINESS ACTIVITIES

Agriculture, Forestry and Fisheries
Trade and Catering
Financial Services
Culture, Recreation and Other Services
Industry and Energy
Transport Information and Communication
Business Services

All data source: CBS.nl, statistics updated to Dec 2019.

DELFSHAVEN

TOTAL AREA 55ha - 43 ha land, 12 ha water

23.6% BUILT-UP AREA

96% OCCUPANCY RATE

96% BUILT BEFORE 2000

65% RESIDENTIAL FUNCTION

3455 addresses
DENSITY
DWELLINGS **4836** a. per sqKm

54% SOCIAL RENT

18% OWNED HOMES

7025 INHABITANTS

16407 people per sq.km

46% NON WESTERN IMMIGRANTS

62% WORKING PEOPLE (15-64 YEARS)

60% LOW INCOME

11% HIGH INCOME

Buildings Height

10+ floors
6-9 floors
5 floors
4 floors
3 floors
2 floors
1 floor

4% SINGLE-FAMILY HOUSES

Terraced houses

Downstairs - upstairs apt

principal HOUSING TYPOLOGY

96% MULTI-FAMILY COMPLEXES

Common gallery apt

Portico complexes

Slab complexes

Compact block complexes

WORKING ENVIRONMENT characteristics

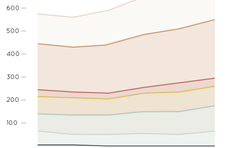
755 registered business ACTIVITIES

commercial

leisure

education

services



BUSINESS ACTIVITIES

Agriculture, Forestry and Fisheries
Trade and Catering
Financial Services
Culture, Recreation and Other Services
Industry and Energy
Transport Information and Communication
Business Services

All data source: CBS.nl, statistics updated to Dec 2019.

SCHIEMOND

TOTAL AREA 122 ha - 62 ha land, 60 ha water

41% BUILT-UP AREA

96% OCCUPANCY RATE

60% BUILT BEFORE 2000

52% RESIDENTIAL FUNCTION

2582 building
DENSITY
DWELLINGS **3194** b. per sqKm

50% SOCIAL RENT

38% OWNED HOMES

5336 INHABITANTS

8670 people per sq.km

54% NON WESTERN IMMIGRANTS

76% WORKING PEOPLE (15-64 YEARS)

49% LOW INCOME

25% HIGH INCOME

Buildings Height

10+ floors
6-9 floors
5 floors
4 floors
3 floors
2 floors
1 floor

Portico complexes

Slab complexes

principal HOUSING TYPOLOGY

100% MULTI-FAMILY HOUSES

Compact block complexes

Masone Tower

Compact block Point + Tower

WORKING ENVIRONMENT characteristics

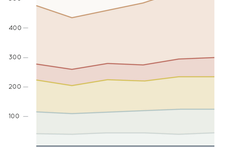
620 registered business ACTIVITIES

commercial

leisure

education

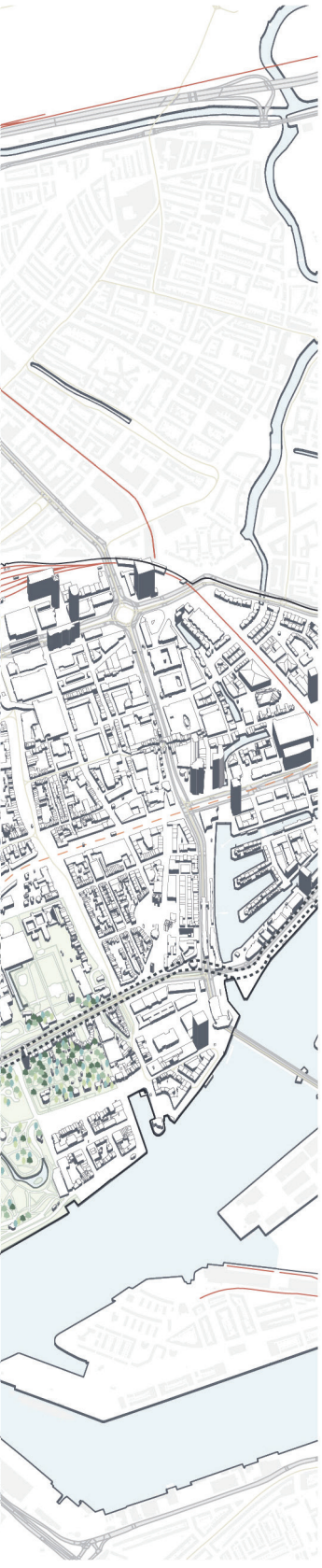
services



BUSINESS ACTIVITIES

Agriculture, Forestry and Fisheries
Trade and Catering
Financial Services
Culture, Recreation and Other Services
Industry and Energy
Transport Information and Communication
Business Services

All data source: CBS.nl, statistics updated to Dec 2019.

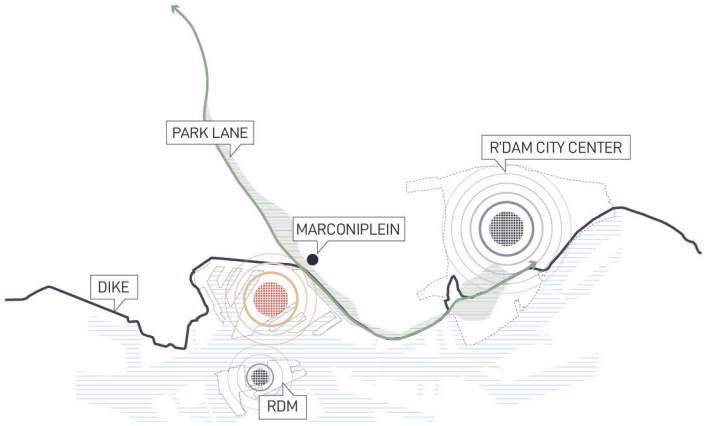


Physical boundaries, infrastructures and water management

At the border between the port and the city, a complex infrastructures system plays an important role in creating a big void in the urban tissue which cut off the city residential districts from the basins area, both physically and programmatically. In the actual spatial configuration, even if the M4H area is strategically located and not so far from the city centre, it results hardly connected to the city logic nor can the nearby neighbourhoods enjoy the proximity and direct access to the river, which instead disappears behind the physical barriers.

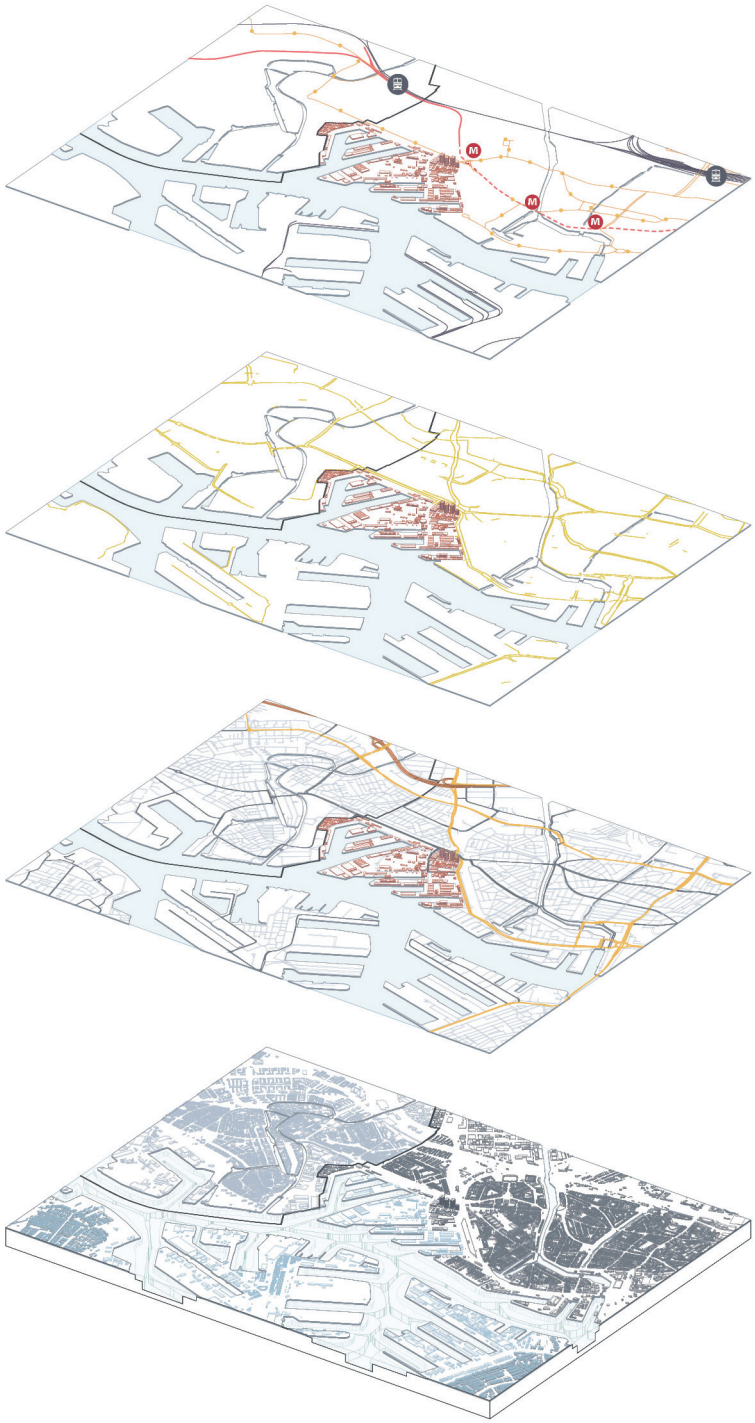
The infrastructure system could be read onto three different levels: mobility and public transport, green line and dyke system.

Maps and schemes show the physical relation between M4H district and the surrounding area. Even if it is strategically located near the city centre and directly accessible from the main roads, M4H appears a peripheral area neither related to the city, nor to the port. Moreover, it presents a good potential for future urban development to be programmatically related to the RDM makers district on the other side of the river Maas, but a direct water connection, now absent, could be necessary.



All main high-traffic roads run around the M4H, they are important axes which connect east-west and north-south the city and the main metropolitan area on a big scale. Also, Marconiplein constitutes a key nod for the public transport system where metro, bus and tram lines converge. Unfortunately, they are so chaotically arranged that, combined with the dyke system and the Parklane project, contribute to accentuate the physical separation more than function as connectors amid a dynamic transition area.

Park-lane is a 1987 project intending to create a green line to connect large development areas in Rotterdam-West. A sort of green line which flanks the main roads and also relieves residential areas from intense traffic. In particular in Vierhavenstraat, the north-est limit to M4H district, Kop Dakpark was recently created as a large public rooftop park where the disused railway yard used to be. On the one side, it offers to the Botu neighbourhood a pleasant green meeting space and leisure lab while on the other side it represents a first attempt to integrate the dyke line and its difference in the height level within an elongated building for business and commercial activities.



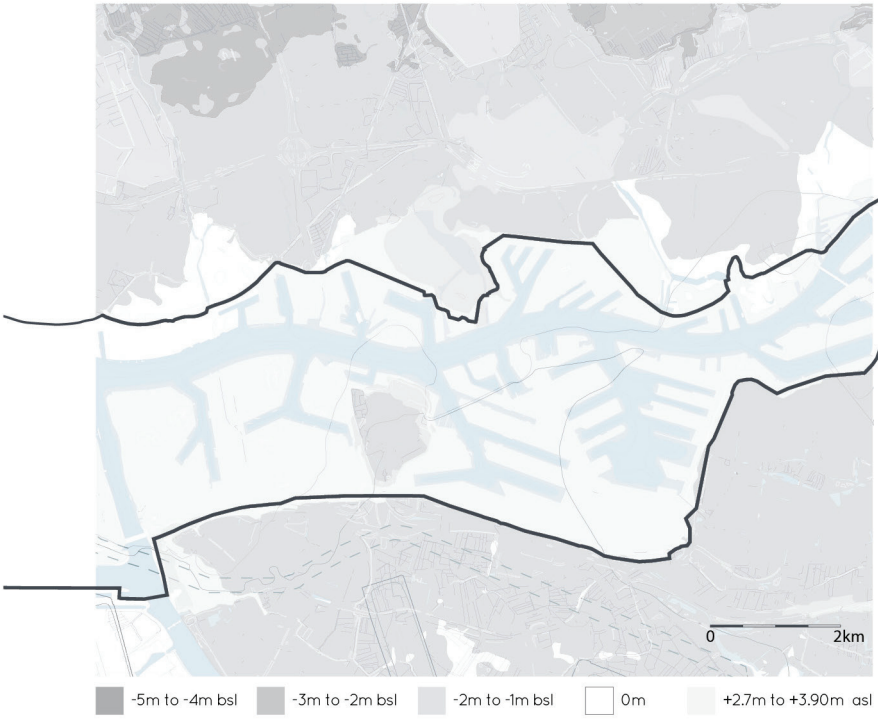
Rotterdam City Authority
Rotterdam Port Authority
Schiedam Municipality

Rotterdam City Borders
Highways
Regional Roads

Avenue
Secondary Streets
Bike ways

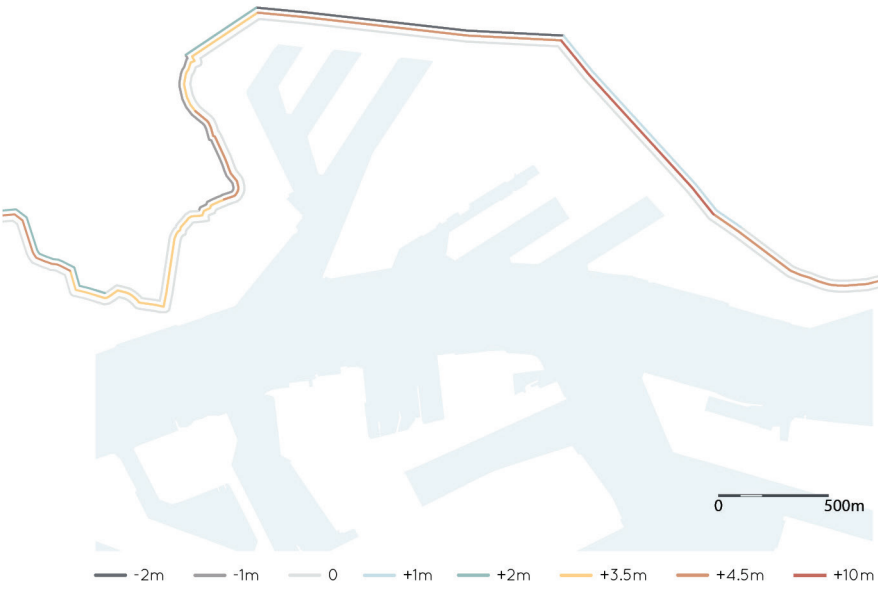
External Metro Way
Underground Metro Way
Railway Line

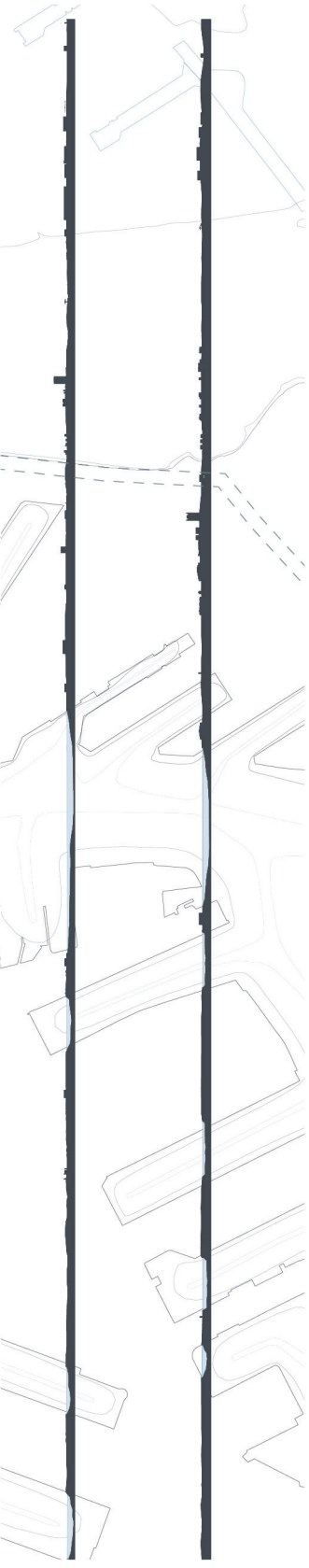
Terrain elevation



Dike height

from ground level





Also, the dyke flows around the area as embankment road. In terms of spatial configuration, the dykes represent a consistent barrier that needs to be reinforced and integrated into the urban tissue with the possibility to become attractive and multi-purpose spaces. Nevertheless, the dyke system in the Netherlands is the main structure to preserve the inland areas that, below the sea level, are exposed to flooding risks so it needs to be reinforced according to climate change previsions. In fact, the policy of building outside the dyke has to face a higher probability of flooding as a result of the sea-level rise and the change in river discharge. About that, the municipality appoints different methods of flooding protection to take into account during the redevelopment process. The rise of the terrain level is the principal device for a climate-resistant condition of an attractive working and living environment. Specifically, in the M4H area, the ground lays from 2.70 to 3.90 meters above the sea level, but the minimum height requirement is of 3.60 meters, so some lots have to be raised. Climate-resistant means also, that not only the river flooding needs to be prevented but, especially w1here the rise of the ground level is not possible, the built environment should be water-resistant to reduce damages. According to different standards of desired protection that vary from more sensitive uses like housing to less sensitive functions like park or container plot, two strategies could be developed and combined at the same time as integral moves: the "water-out" logic means that thanks to the rise of the terrain level, water is kept outside and the "living-water" logic that leads to acceptable risks providing both dry-proof buildings, which keep water outside or water-proof buildings, which can handle water in the ground floor without serious damages. According to what explained so far, floating constructions and tidal parks can provide additional retainment devices.

Rotterdam M4H and RDM, 2016.
Picture cretids: Frank Hanswijk

04

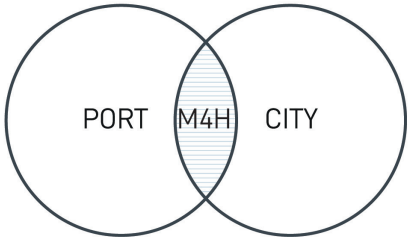
M4H - Merwevierhavens

Merwe-Vierhavens is a harbour district in Rotterdam-West selected to be the place of the city expansion together with three other port areas - Rhine Maashaven, Waal Emmhaven, RDM Heijplaat - in the Stadshavens program.

04.1 M4H From Industry To Dense Urban Area

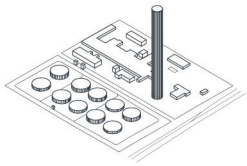
The industrial heritage as potential for new developments

Since the late 1910s, The area was used for the transhipments of mixed cargo, especially for the fruit storage and transfer for many years. Now the area is only partially in use due to a general decline of the cargo transhipments which left vacant many warehouses when, in the 1970s, the containerization occurred. M4H with its large vacant buildings and availability of space is the perfect place for new developments and experiments. The transformation has already started with the intensification and improvement of the existing infrastructure network so it appears now as a place in transition where the duality between City and Port is clear more than everywhere.



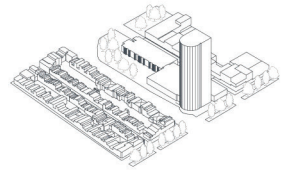
Divided into two parts – Port Authority and Rotterdam municipality - in terms of administration and governance, it reflects conflictual characteristics not only in the actual spatial layout but also in programmatical plans and vision: while the port is renovating the existing structures and infrastructures to lease its properties exclusively to companies, the city is planning to develop a mix of living and working environment introducing a new concept of "flexible land use". This flexible approach allows to move forward from the strict zoning rules that the City used to adopt and to locate in transition areas, if well argued, clean and high tech manufacturing activities mixed with housing, retail and hospitality uses. Despite that, the still-working activities on site which are considered undesirable in terms of the possible nuisance, are meant

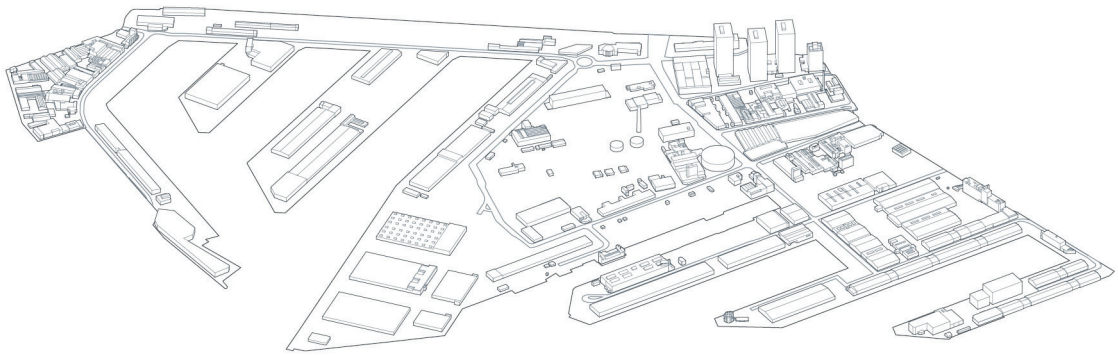
PORT
Industrial districts



M4H
Transition area

CITY
Urban blocks

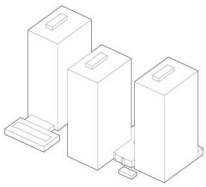




to be relocated in confined industrial areas. The aim is to contribute to the general housing need of 50.000 new homes by 2040 with almost 5000 dwellings and to avoid the urban sprawl into the peripheral lands densifying the inner city and reusing vacant plots where new logics of working and living could take place.

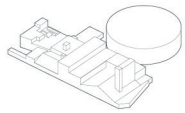
Following the 2008 decision of the authorities to rebrand the RDM and M4H districts as the "Rotterdam Makers District", pioneering and manufacturing companies have already started the transformation process. In the last few years, several creative and cultural businesses that required large and medium-sized buildings, flexible spaces and open environments have established in the available warehouses of Vierhavens district, making this area more attractive for further investments.

ICONIC BUILDINGS

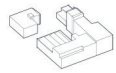


Marconi Tower

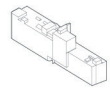
Chimneys and Bulk Storage



Ferro Factory



Kunst&Complex



Haka

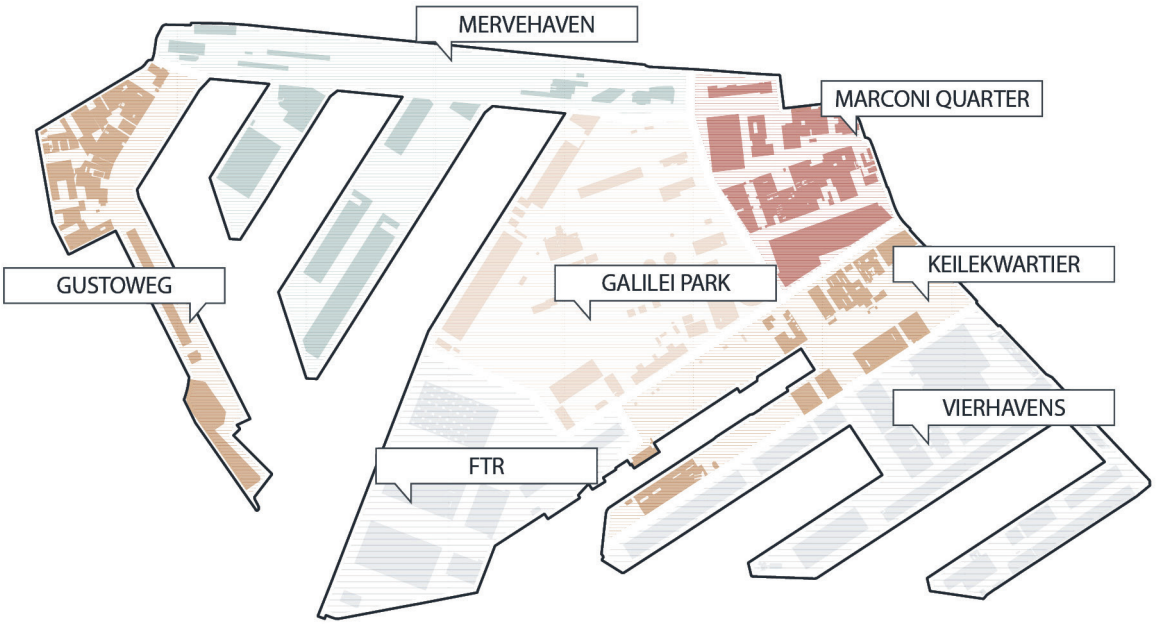
Roosegaarde and Soundport Studio

WORKING ENVIRONMENT

Characteristics

04.2

and


MERVEHAVEN
MARCONI QUARTER
KEILEKWARTIER
GALILEI PARK
GUSTOWEG
VIERHAVENS
FTR

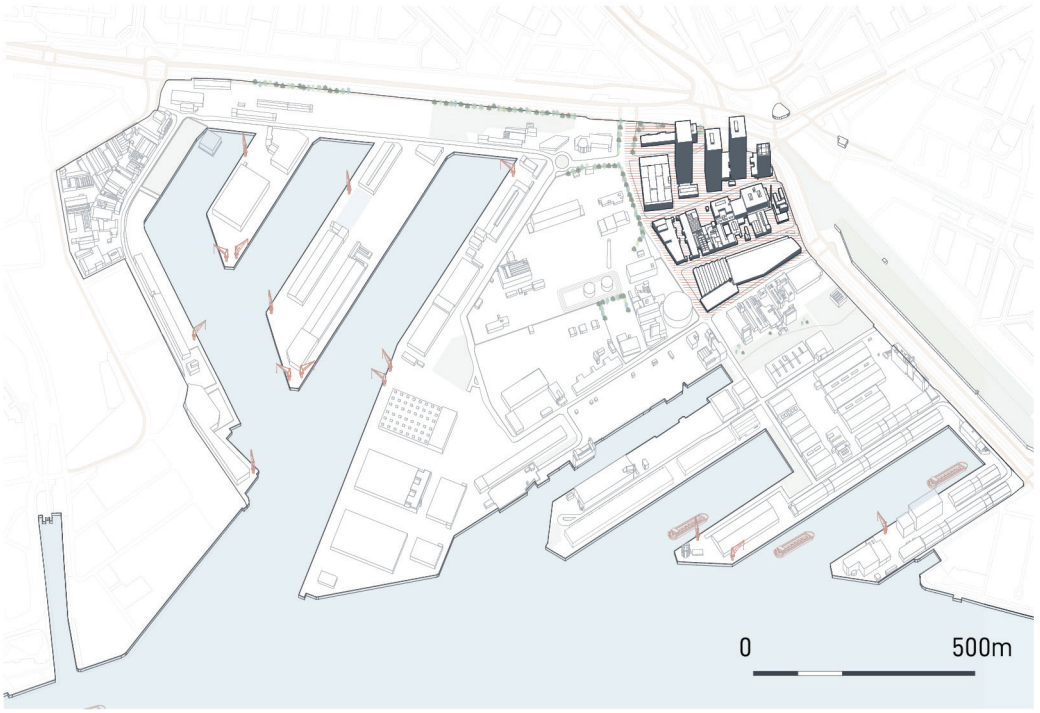
indicative
PROGRAM RANGE

deadline	2035		2050	
	LOW	HIGH	LOW	HIGH
working areas (sqm)	202.000	288.000	498.000	584.000
services (sqm)	36.000	58.400	-	-
houses (units)	3.400	5.100	5.200	9.200

maximum allowed BUILDINGS HEIGHT	40m
minimum warehouses or MAKER SPACES HEIGHT	6m

As far as its internal setting, M4H consists of four different sub-areas, each of them characterized by a specific spatial layout which differs for built form – high and low, wide and narrow, isolated and clustered volumes – built area, programmatic vision, and availability of space in the short or long term. Some regions can be developed only after 2035 because it is assumed that some activities end their contract terms. Finally, if its heterogeneous character appears to be not integrated into a common urban vision, the area is identified by the municipality actors to considerably provide a wide range of working and living environments and facilities. In particular, between 202.000 and 288.000 sqm would be destined to the working area, between 36.000 and 58.400 sqm to the facilities, besides would be built houses, ranging from 3400 to 5100 units by 2035. These numbers are optimistically estimated to be almost doubled into a long term vision of 30 years.

Marconi Quarter



TOTAL AREA 11ha

It is the highest density quarter with the most urban mix of functions: housing, offices and facilities are located here. The Marconi Towers represent an iconic landmark which makes the area the focal point for the whole M4H.

MUNICIPALITY VISION

The idea is to maintain its mix of functions and high density in the form of a dynamic urban district. The main use would be housing: small and medium size stacked dwellings above a plint where facilities and working areas would be optimally positioned.

*Warehouses' surface: small size, up to 1000 smq

CRITICAL ASPECTS

• Spatial disconnection from the inner-dyke city due to the big gap generated from the main infrastructures.

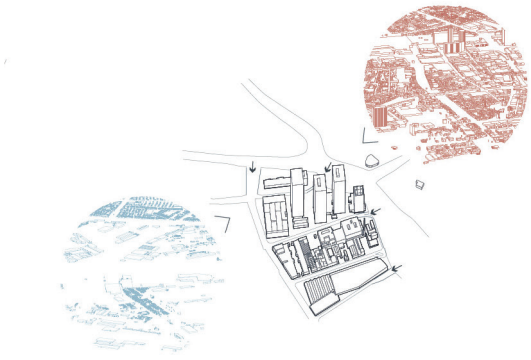
• The Marconi Towers are a recognizable iconic landmark however, they are not well related to the surrounding buildings because of a big difference in scale and a lack of designed open spaces.

• The ground level articulation of spaces and functions appears to be fragmented which makes difficult a continuous flow from a building to another.

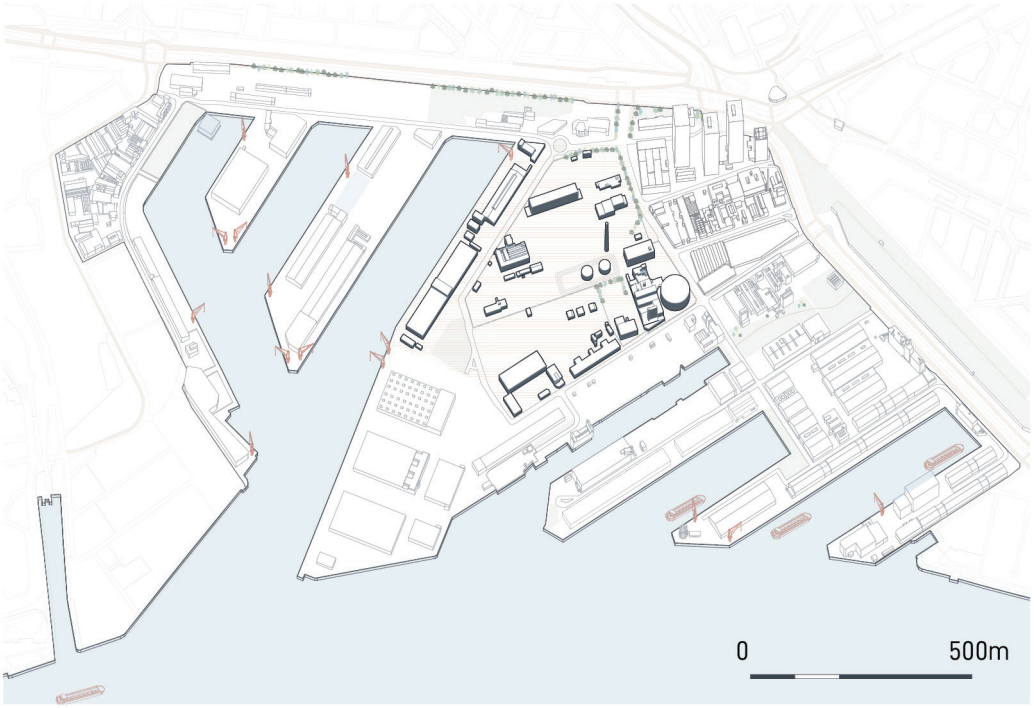
POTENTIALS

• Place of arrival: it benefits from direct public transport access, the metro station is at two minutes walking distance, besides the bus and the tram stops. Also, three main accesses from the principal road offer a potential direct link to the city.

• The towers together with the stunning view over the port and the city offer the possibility of attractive living- working environment both for large companies and small households.



Galileipark



TOTAL AREA 26ha

It offers large lots and large-scale dismissed buildings so that new production activities could be set into existing or new warehouses. The Ferro factory and the chimney represent its iconic buildings.

MUNICIPALITY VISION

The idea is to convert the large inner area of M4H into a testing and production site, while housing is excluded. Large manufacturing companies for food, clean technology, bio-based plastic production and laboratories are welcomed.

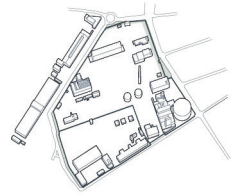
*Warehouses' surface: large size, from 500 to 1000 smq

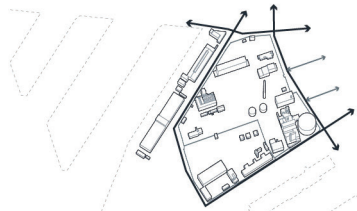
CRITICAL ASPECTS

• Monofunctional fenced area, it is surrounded by informal fields which contribute to isolating the whole area.

• Coexistence in the short term between still ongoing industrial activities and the new urban environment.

• The traffic flow needs to be reordered and the public transport service and bike lane throughout the inner area improved. No direct access to the sea-way exists.

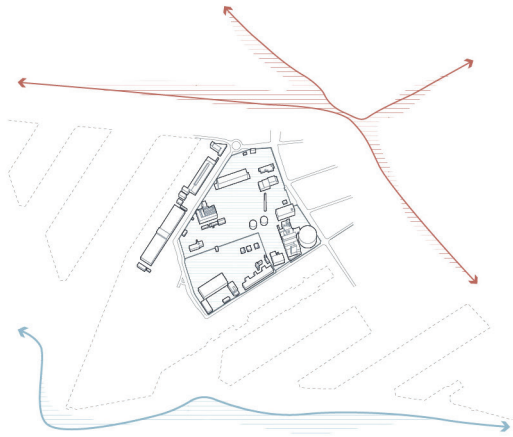




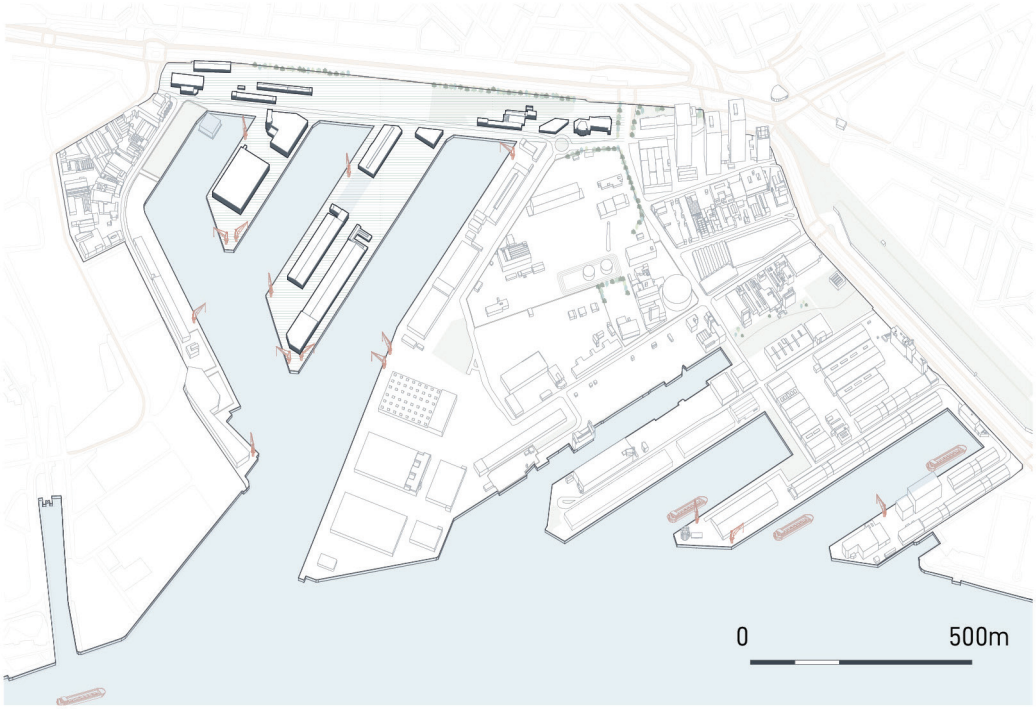
POTENTIALS

• Opportunities for large production buildings destined to port and port-related activities. The availability of large-scale free space allows cleantech plants to be combined with a more urban-oriented program.

• Its strategic location between the main port maritime routes and the regional hinterland corridors offers a direct connection to the business activities



Merwehaven

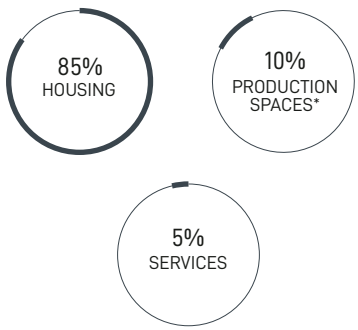


TOTAL AREA 23ha

It consists of two piers which give direct access to the water. The built-up and low-dense area is arranged along the straight streets starting from the main embankment road at the northern border.

MUNICIPALITY VISION

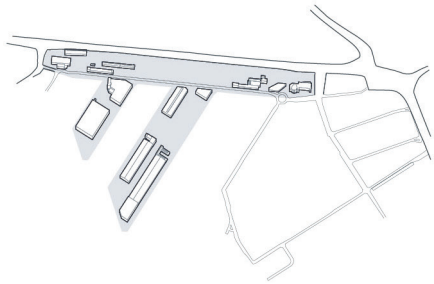
The idea is to create a community district with an appealing environment for families who wants to live and work there supported by a variety of facilities and well-designed recreational spaces.

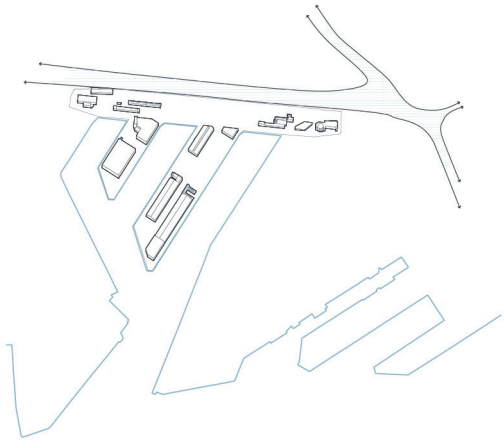


*Warehouses' surface: small size, up to 1000 smq

CRITICAL ASPECTS

• Informal settings and underused area, together with the existing dyke is a physical barrier between the city and the river.

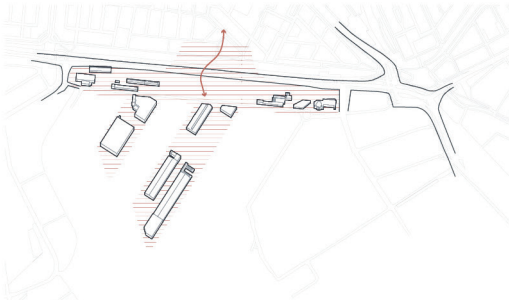


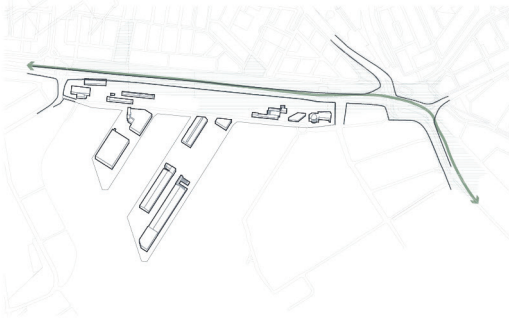


POTENTIALS

• The proximity to the surrounding residential suburbs leaves space to create continuity in terms of function and space.

•Large availability of unused fields allows creating a sequence of attractive outdoor spaces, integrating the embankment structure and creating a contiguous green network and a spatial connection with the facing quarters on the other side of the dyke, opening up the area to the river sight.





Keilekwartier and Gustoweg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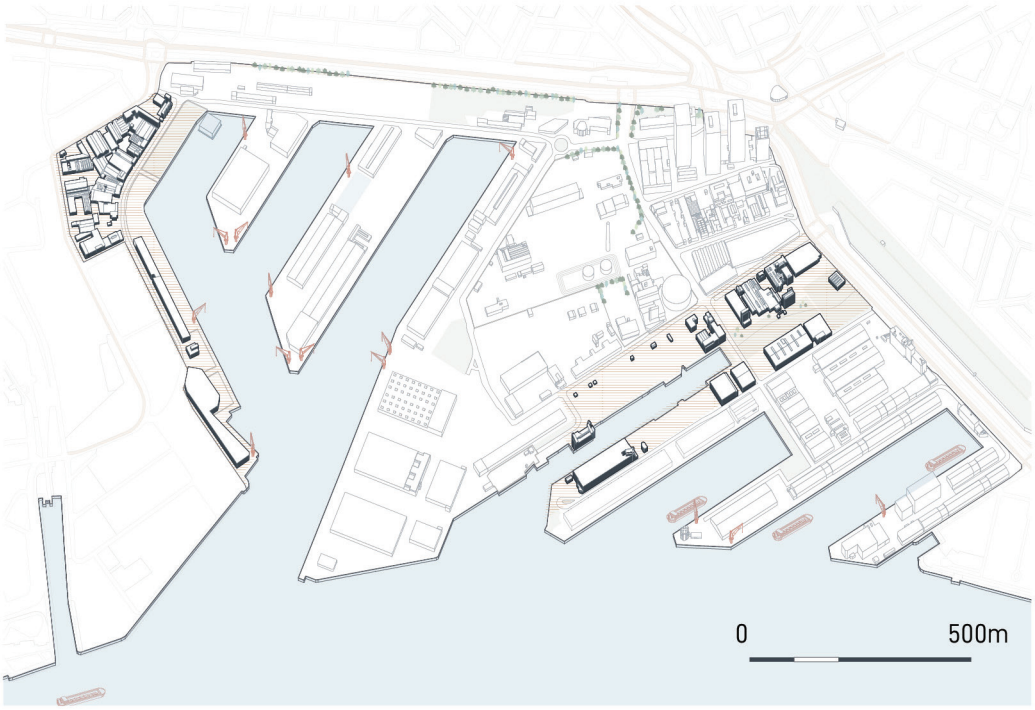
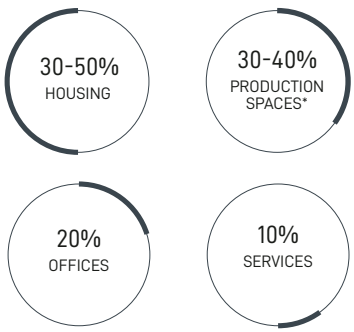


TOTAL AREA 14ha + 12ha

These areas present a similar spatial layout with low buildings destined to facilities and manufacture. Several private initiatives from creative and craft sector take place here and allow the requalification of some dismissed pavillions. In general, the buildings are aligned at the low traffic outer streets that defined the blocks so that, informal internal spaces are created.

MUNICIPALITY VISION

The idea is to create a pleasant working and living environment for small households who want to live where they can practice their profession.



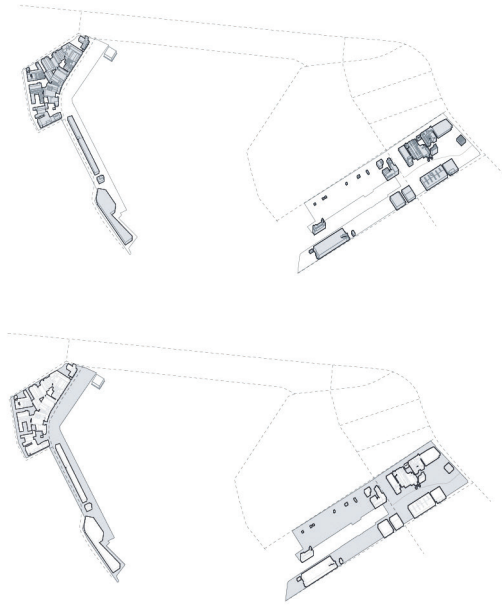
*Warehouses' surface: medium size, up to 2000 smq

CRITICAL ASPECTS

• Low-density constructions characterized by a compact block of small pavilions.

• Large unused residual open spaces.

• Monofunctional areas, lack of the desirable mix of living, working and facilities.

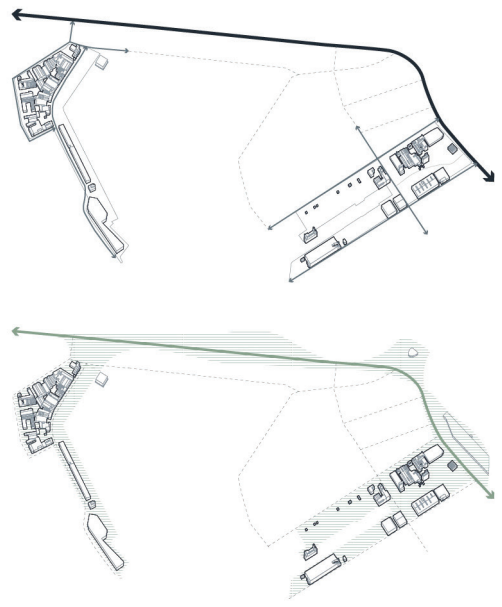


POTENTIALS

• Disposal of unused large buildings that can be the place for a mix of creative clusters and special housing typologies. Small innovative, cultural entrepreneurs and craftmanships can be effective in the redevelopment of the entire area since the beginning.

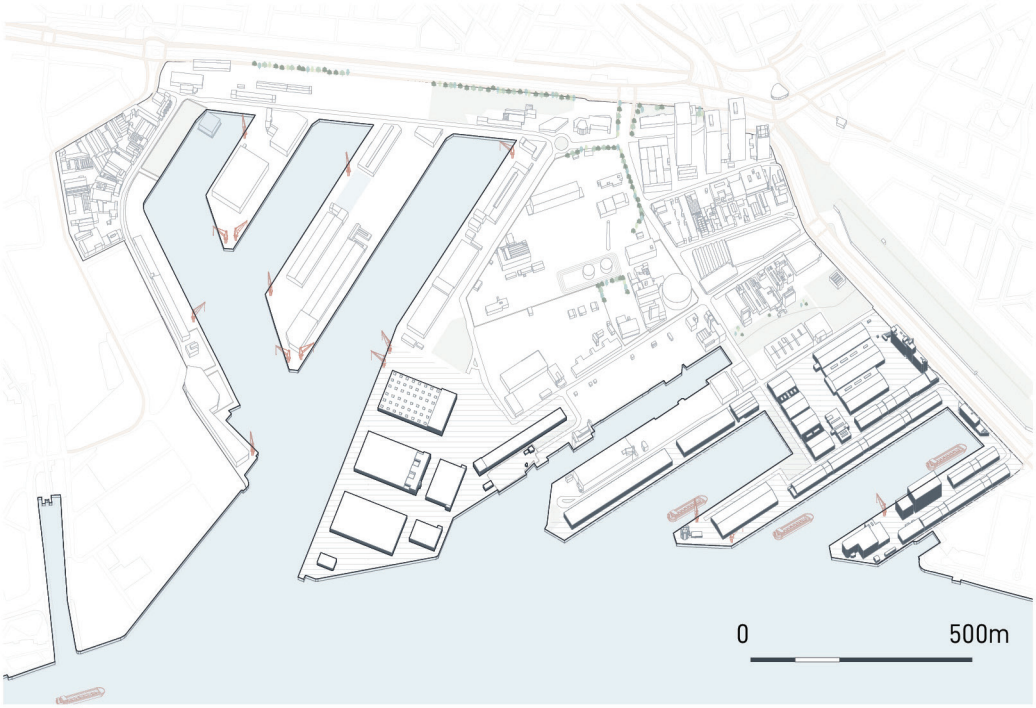
• Direct access from the main road and public transport services.

• Direct link to the Dakpark and opportunity to improve the dyke system into an integrated green area project.



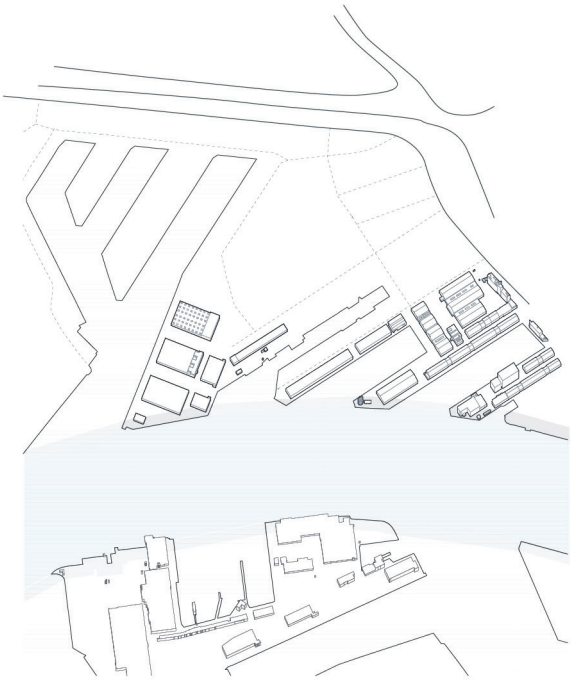
FRT and Vierhavens

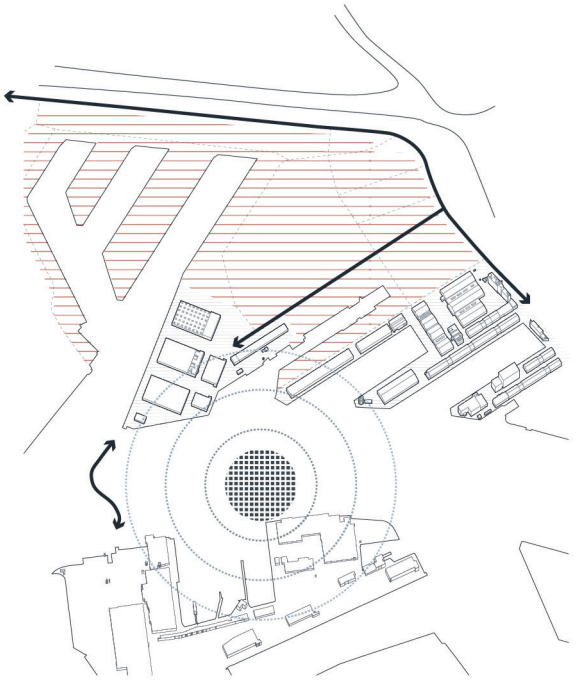

PEGASUS
WELL DONE IS BETTER THAN WE



TOTAL AREA 38ha

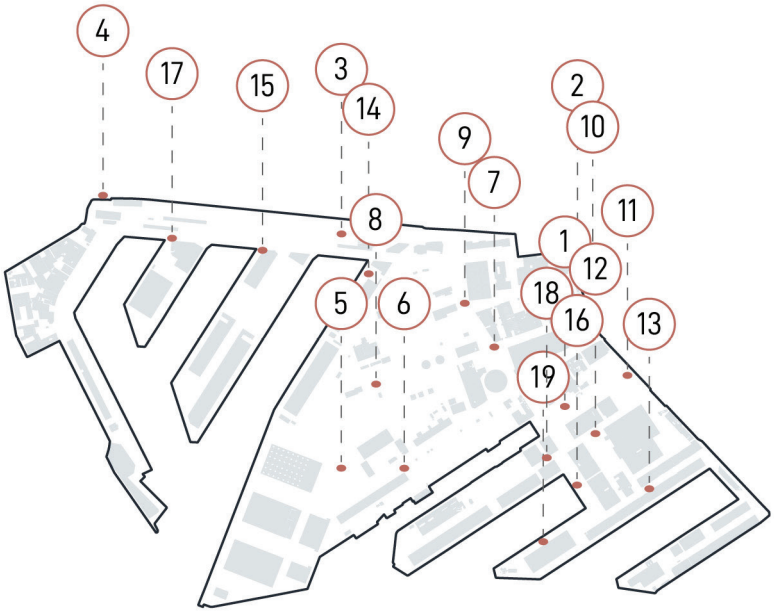
These areas are considered as transformation sites in the long term period. It is assumed that the active business companies end their lease term by 2035. The site offers many opportunities thanks to the possible link to the RDM quarter on the south bank of the river so it is possible to imagine the areas directly located on the river Maas as a physical and functional extension of it. However, a zone of 40 meters along the New Waterway has to be kept free from buildings according to the provincial safety space regulation; new constructions could be allowed only if a major social or commercial interest is provided. Finally, both the hinterland connections routes and the water transport system need to be improved to serve a larger urban vision.

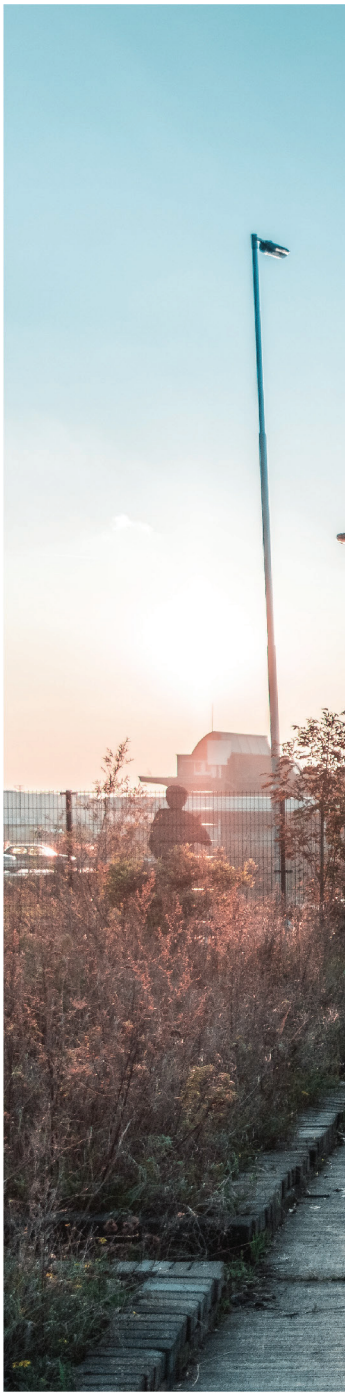




04.3 Site Walkthrough

Visual fields





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05

The New Port-City Interface

Accordingly to the municipal and regional development plan, the idea is to develop for the M4H a productive district as a natural continuation of its industrial past but at the same time, it has to respond to the new city ideal in which working and living are mixed after years of separation of functions.

The main objective is to give back a homogeneous image for a district which, no more subdivided into single local sub-quarters with individual character, wants to be a livable, lively and attractive district. For this purpose rethinking how people live, produce and consume appears necessary so that the working and the living environments can co-exist. The district is defined as an innovative living lab, where the renewed attention on the manufacturing economy is a way to add value locally, sustained by the transition to a circular economy and the diffusion of clean technologies.

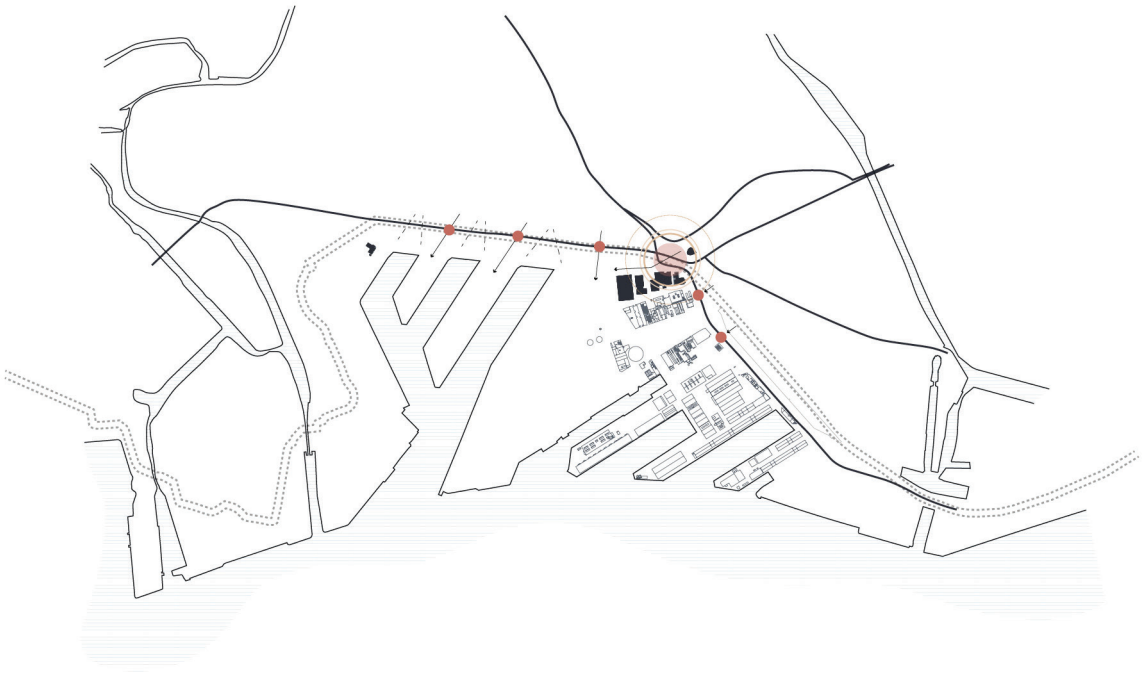
Specifically, the project proposes a large scale urban renewal process which develops as a phased intervention over a period of 30 years. So three development phases are proposed, 2030, 2040 and 2050 taking into account the availability of the single areas especially of those who are still occupied by port-related activities and the municipality demands for almost 5000 houses by 2040. Though the development is intended to start from the requalification of the unused areas as urban development propeller and takes into account the possibility to develop time by time different scenarios accordingly to renewed real estate interests. of the finally renovated quarter.

05.1 Strategy

01

PRESERVE THE EXISTING QUALITIES

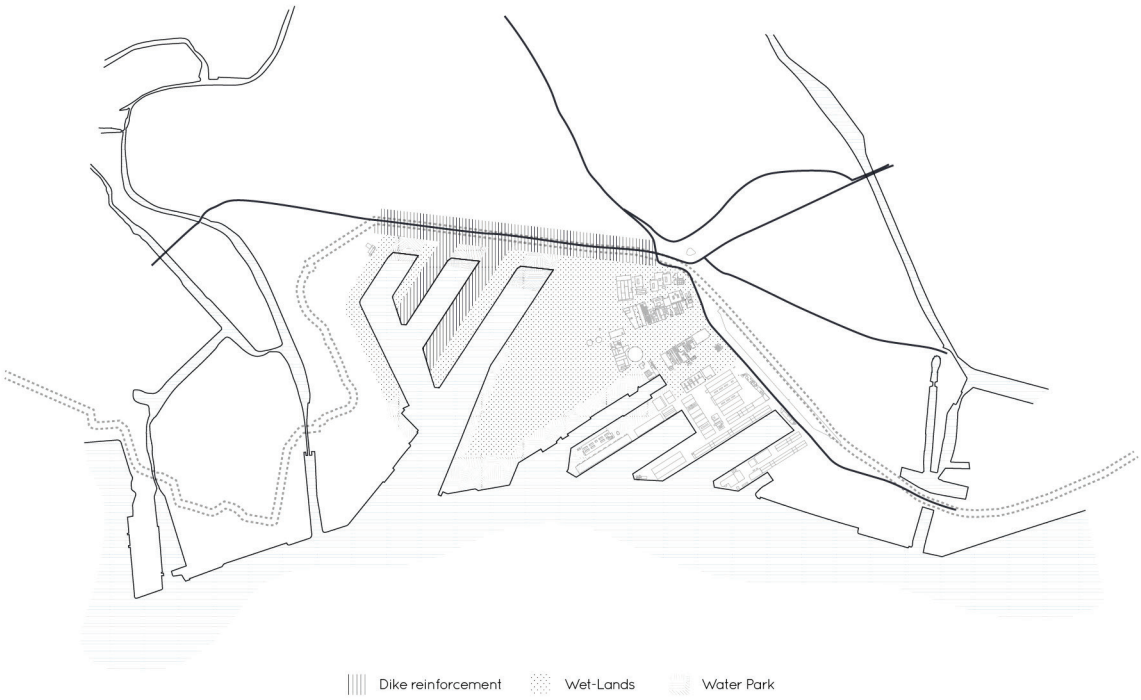
Existing building to be preserved, renovated and integrated into new developments. The area presents a set of structures which deserve to be maintained, some of them are unused iconic buildings from M4H's industrial past, others are still functioning manufacture pavilions destined to be renovated after a partial demolition or extensions, while still renovated industrial buildings are meant to be integrated into the future context without any change.



02

CONNECT

Main access points are detected to establish a physical link between the city and the harbour. The Marconi tower is indicated as the main point of conjunction thanks to its direct connection to the main traffic and public transport system.



03

WATER MANAGEMENT

Three different levels of actions are planned to face the rising of the water and its related issues. First, the dyke reinforcement, with a rise of the terrain level in the Merwehaven quarter, ensures to keep the water out from the area itself and the inner city. Then, a continuous tidal park is thought to create wetlands where the natural environment can provide an additional water retainment instrument. Finally, the remaining area should host dry-proof and water-proof buildings ensuring that the water can not enter the building or that, in case of a calamity, the building can handle water on the ground floor without damage.

04

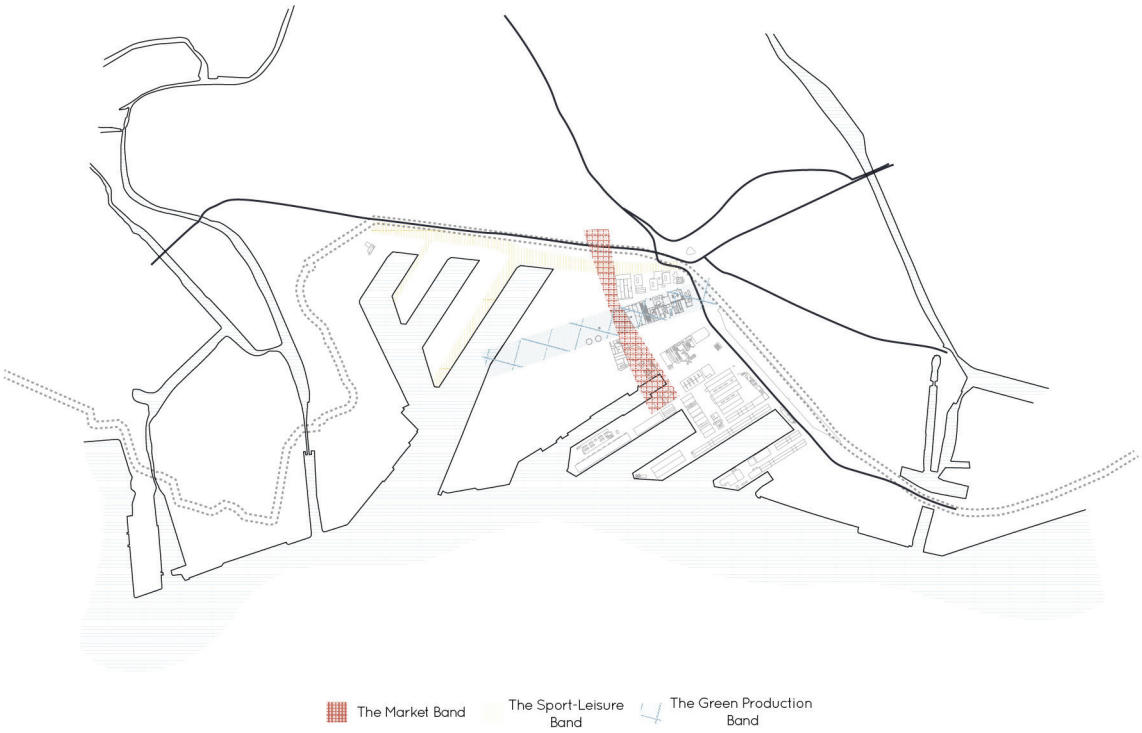
PARK INFRASTRUCTURE

Reserve areas for an integrated green network that, starting from the border flows into the inner area. This allows creating a continuity with the existing park and the green areas along the dyke, enriches the urban environment and offer recreational public spaces for an attractive district.

05

URBAN ARCHITECTURE

Create a high-density urban district, introducing a grid which, following the existing alignments, is dimensioned and organized to adapt to the district different uses and changes over time, generating attractive urban spaces.



06

OPEN PUBLIC SPACES

Differentiate public areas to create a continuous system of indoor and outdoor plazas to support public life all day long. Intended to develop not only at the ground floor, follows the traditional idea of the high street marked by public facilities.

07

MOBILITY SYSTEM

Enhance a pedestrian and bike-friendly environment improving bike-lines and introducing of car-bike hubs, which located at a convenient distance, function as points for transport exchange. This allows moving cars out from the streets and limitate the traditional vehicle transit only if necessary to reach manufactures.

08

CLUSTER OF FUNCTIONS

Create distinct clusters with distinct identities allows introducing different functions such as residential, business, manufactures and urban agriculture. The main goal is to combine all of them into the overall vision to create a heterogeneous area instead of a monofunctional, isolated quarter.

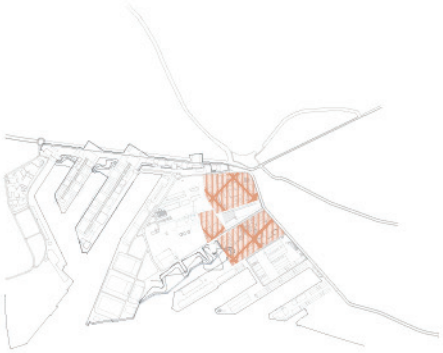
09

BUILDING MORPHOLOGY

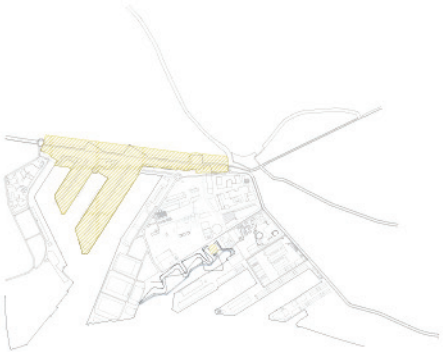
Different type of buildings emerges from different functions ranging from the courtyard blocks for the residential uses to small, medium and large-sized pavilions for the production spaces. Also, towers with a plinth or open courtyard blocks are introduced to host a mix of functions like offices, retail, leisure activities and small apartments typically located at the Marconi Tower district, where a metropolitan urban settlement takes place.

05.2 Phased Development

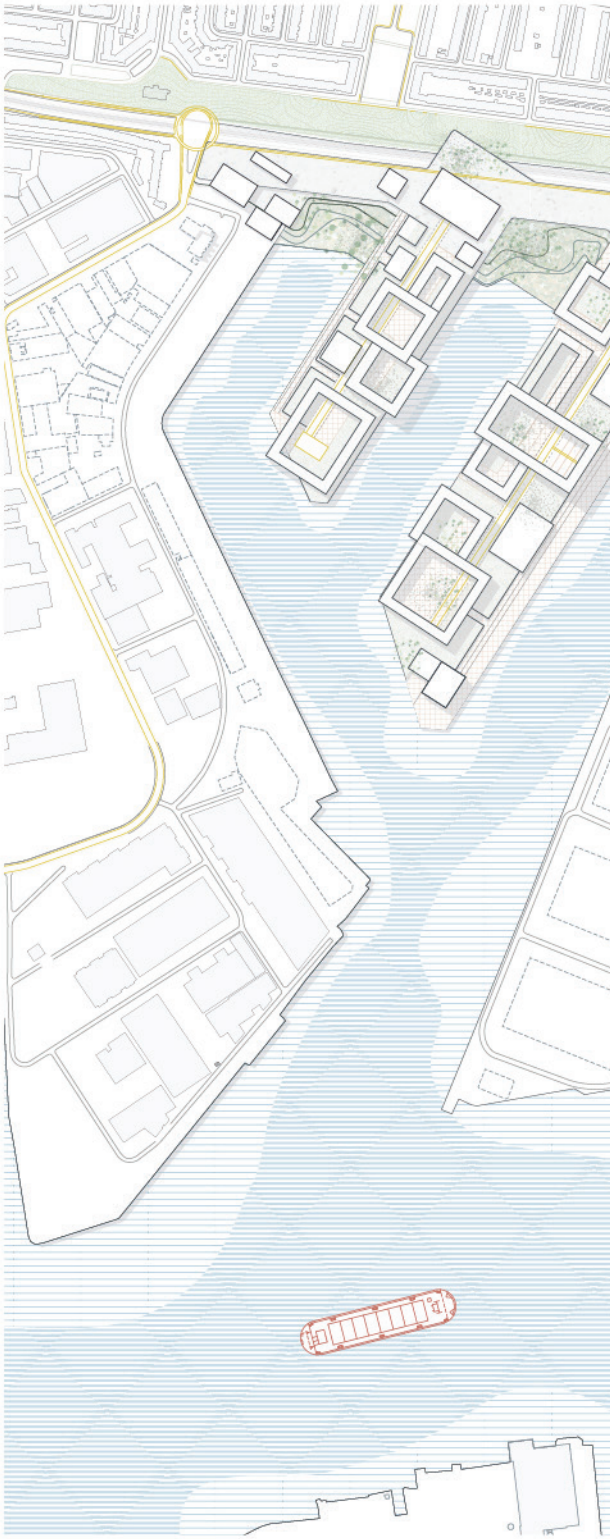
Infrastructures

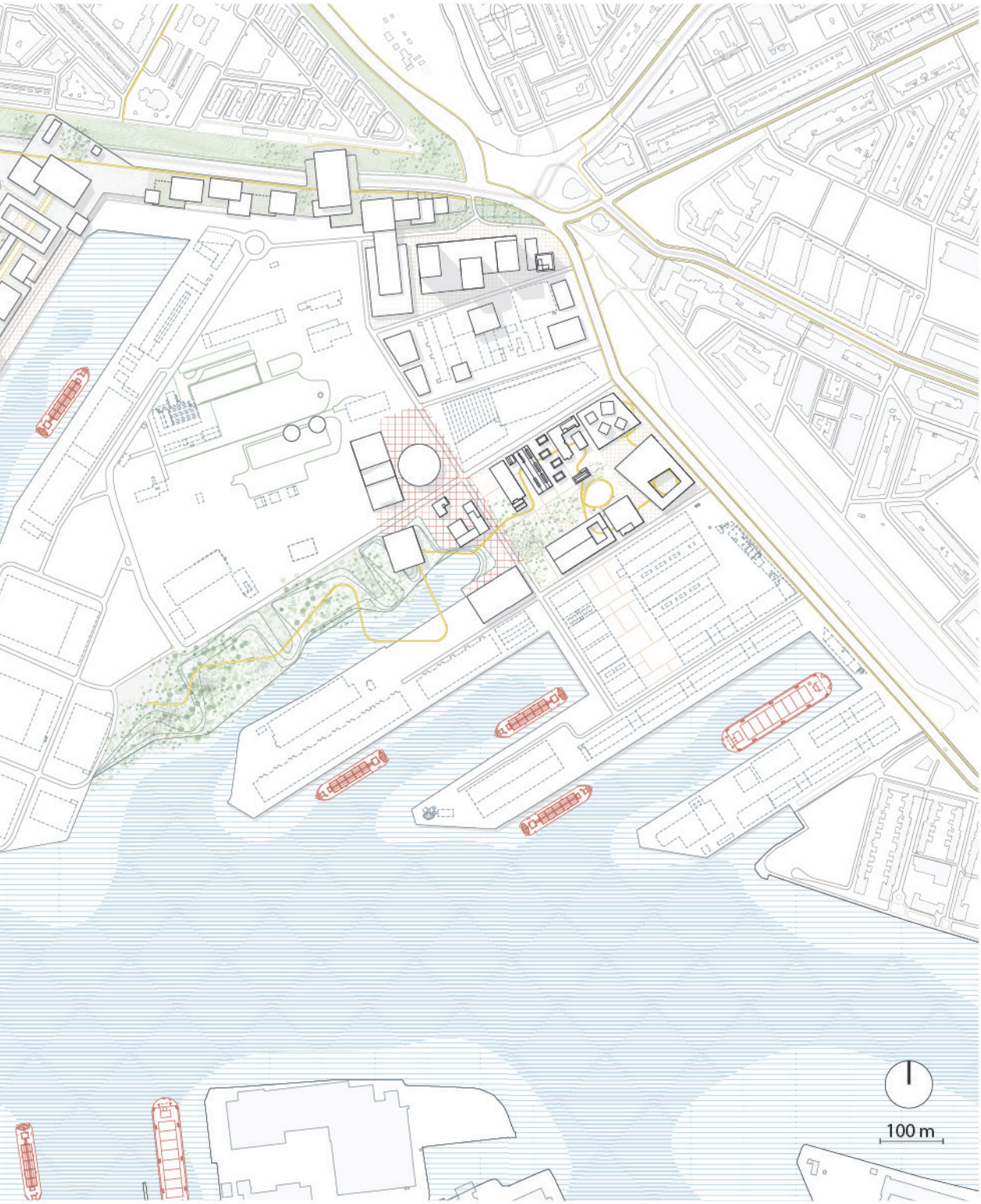


Renovation



New constructions

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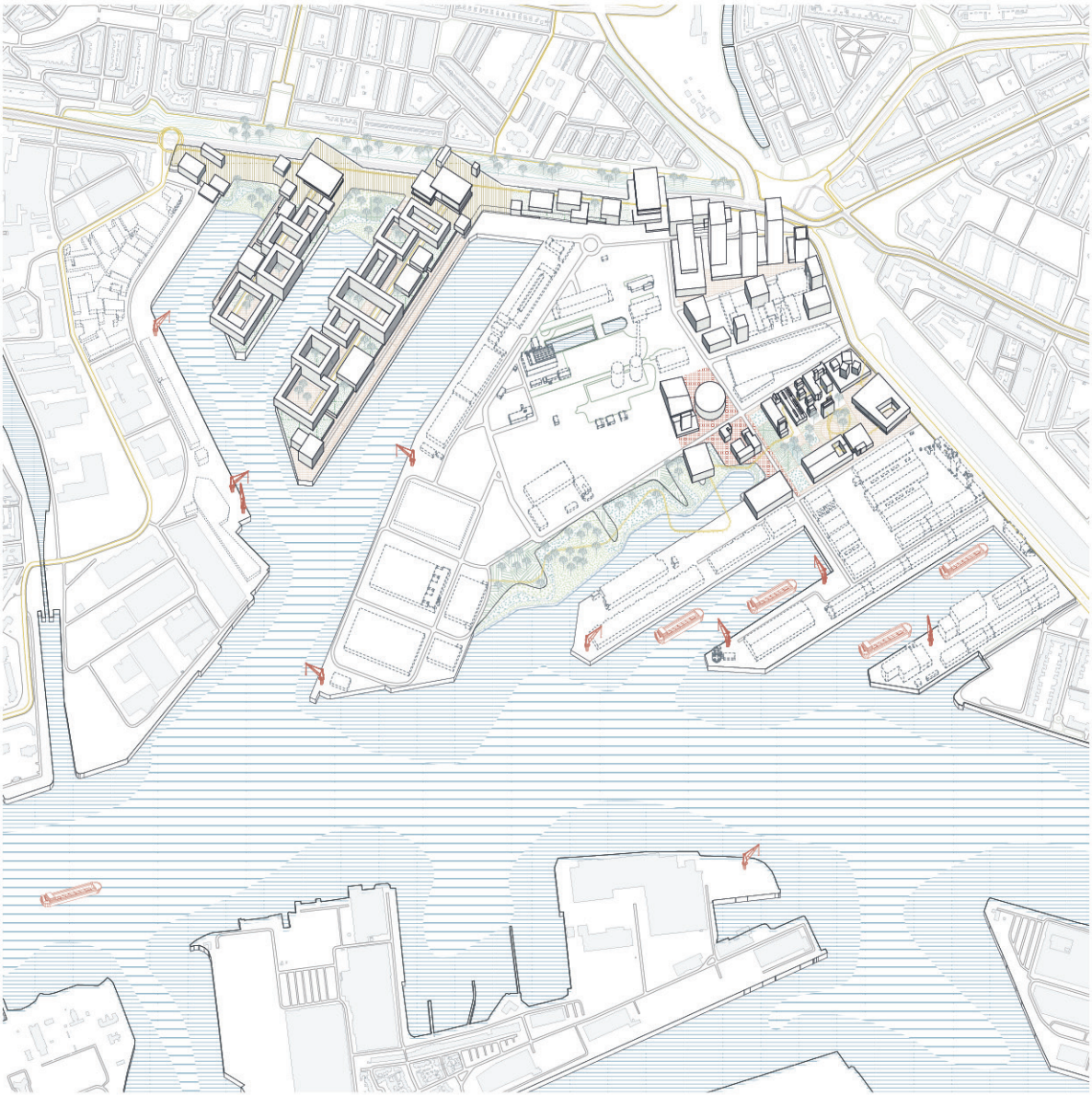
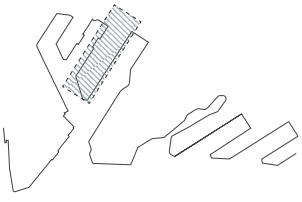
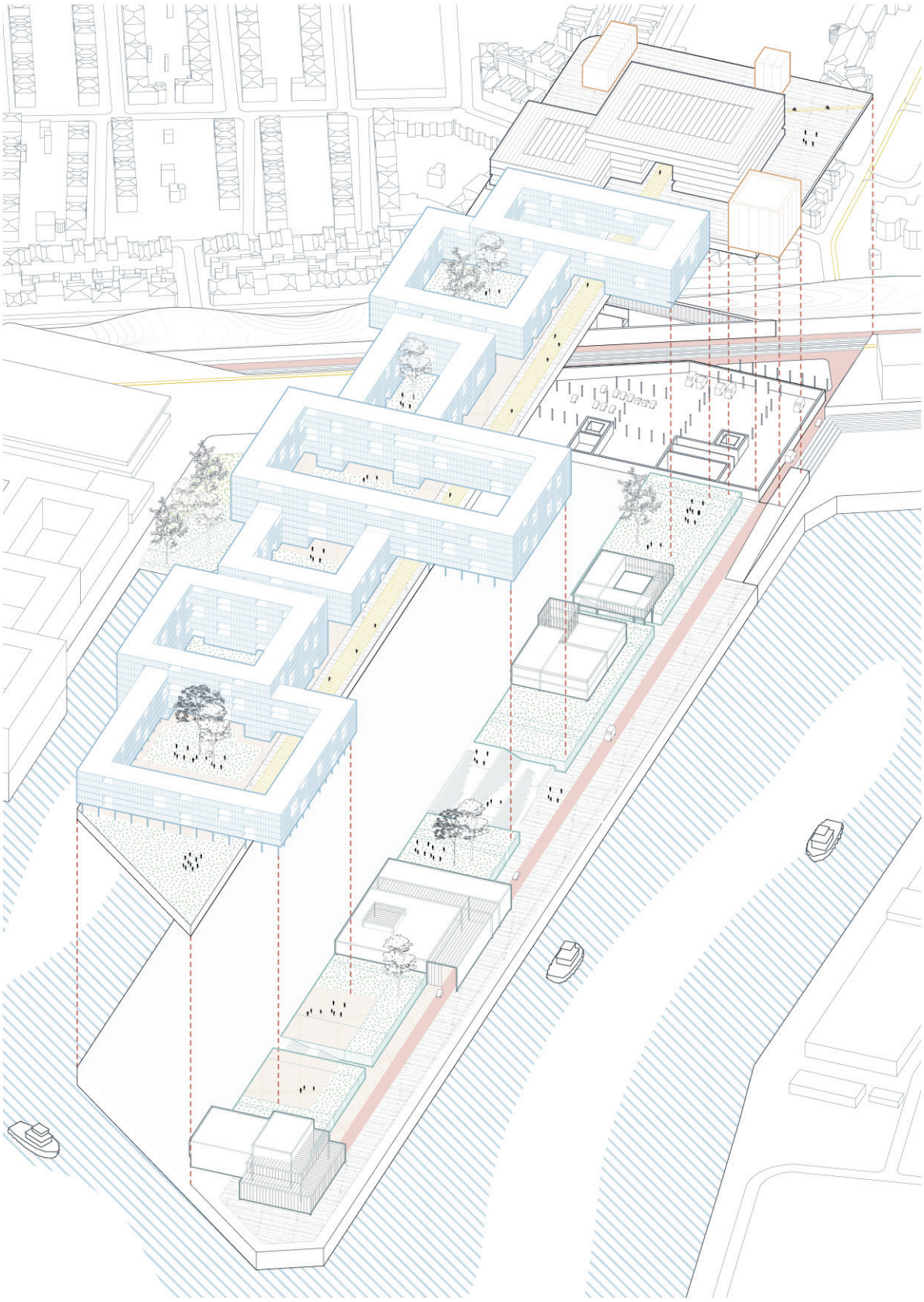
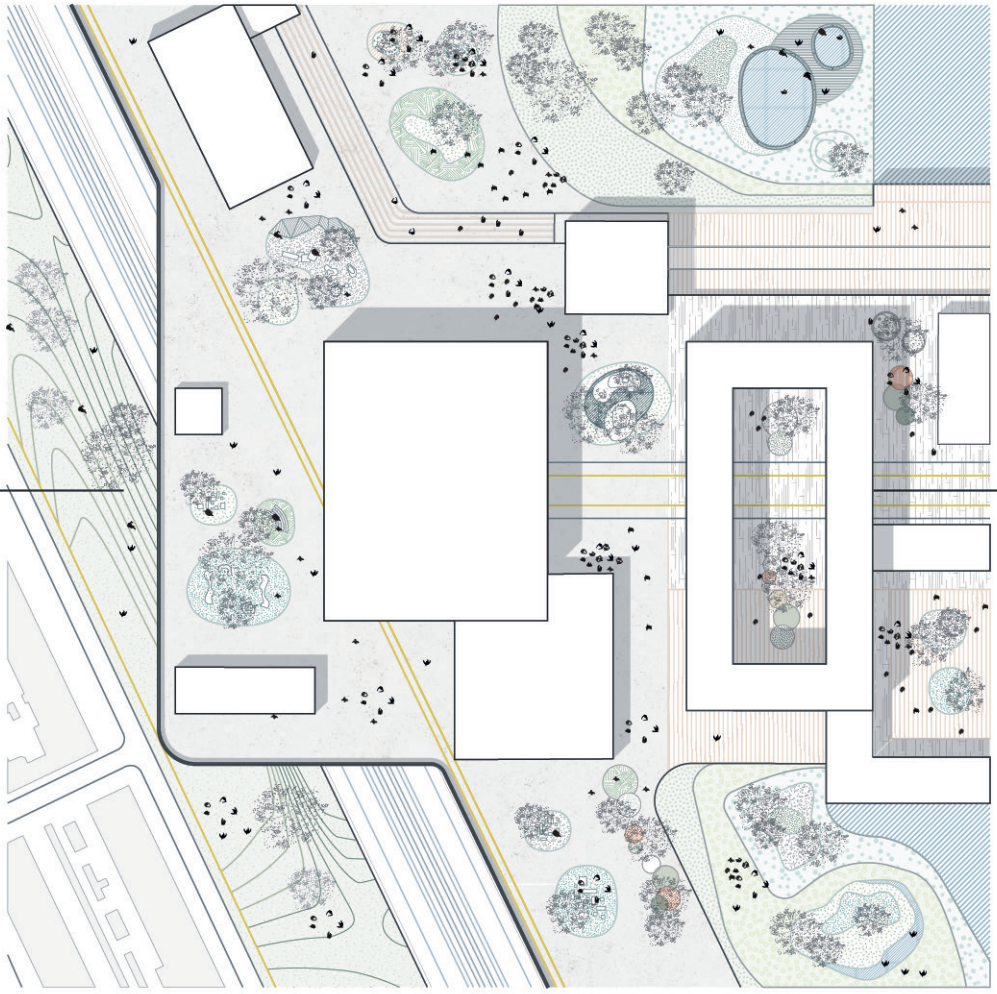


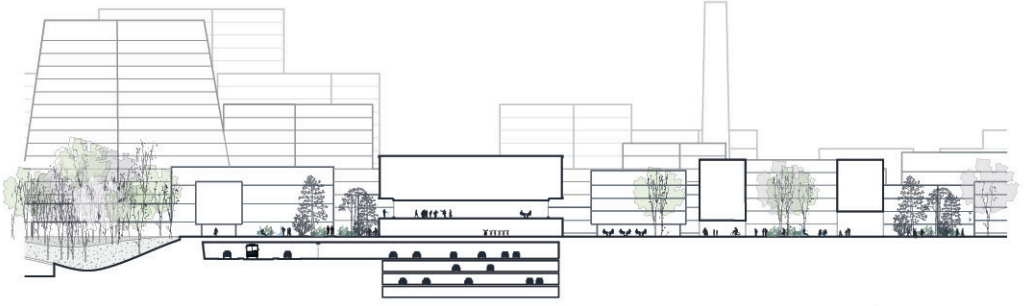
At the very first stage, the attention is given to the need for a physical re-conjunction of the M4H district with the rest of the city from which it was previously excluded. This demand is to be reconciled with the claim for the dyke reinforcement to respond to ongoing climate changes. At this purpose, two different actions are envisioned: an increase of the terrain level is proposed for the Merwehaven area allowing overpassing the existing and dividing difference in altitude generated by the actual dyke system, while the second action is to create a water park into the available area of the Keilekwartier, south to the Galilei Park. Here the waterfront will be excavated further to give the possibility to wetlands to grow natural environment as an additional mean for water retainment, offering at the same time recreational areas, enriching the urban environment and creating proximity to the water for the future development. This is meant to be part of a bigger network of green areas, promenades and public spaces directly connected to the urban park system that runs all over the area and creates different scenarios for different urban settlements. Starting from the edge to re-establish the link with the city and develop the main accesses points to the area, the Art District in the Keilekwartier has to be developed responding to the private initiative of designers and artists who wants to move into a lively environment searching for available big spaces to settle their activities. At the same time, residential and tertiary activities in the Merwehaven area should lead the real estate development to offer a considerable portion of the housing units required by the municipality which are combined over the piers with spaces for light manufacture or start-ups, making the area attractive for people to live and for corporate business to further invest in the area.

This would activate the development of the inner unused area of the Galilei Park which according to the

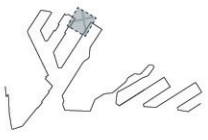


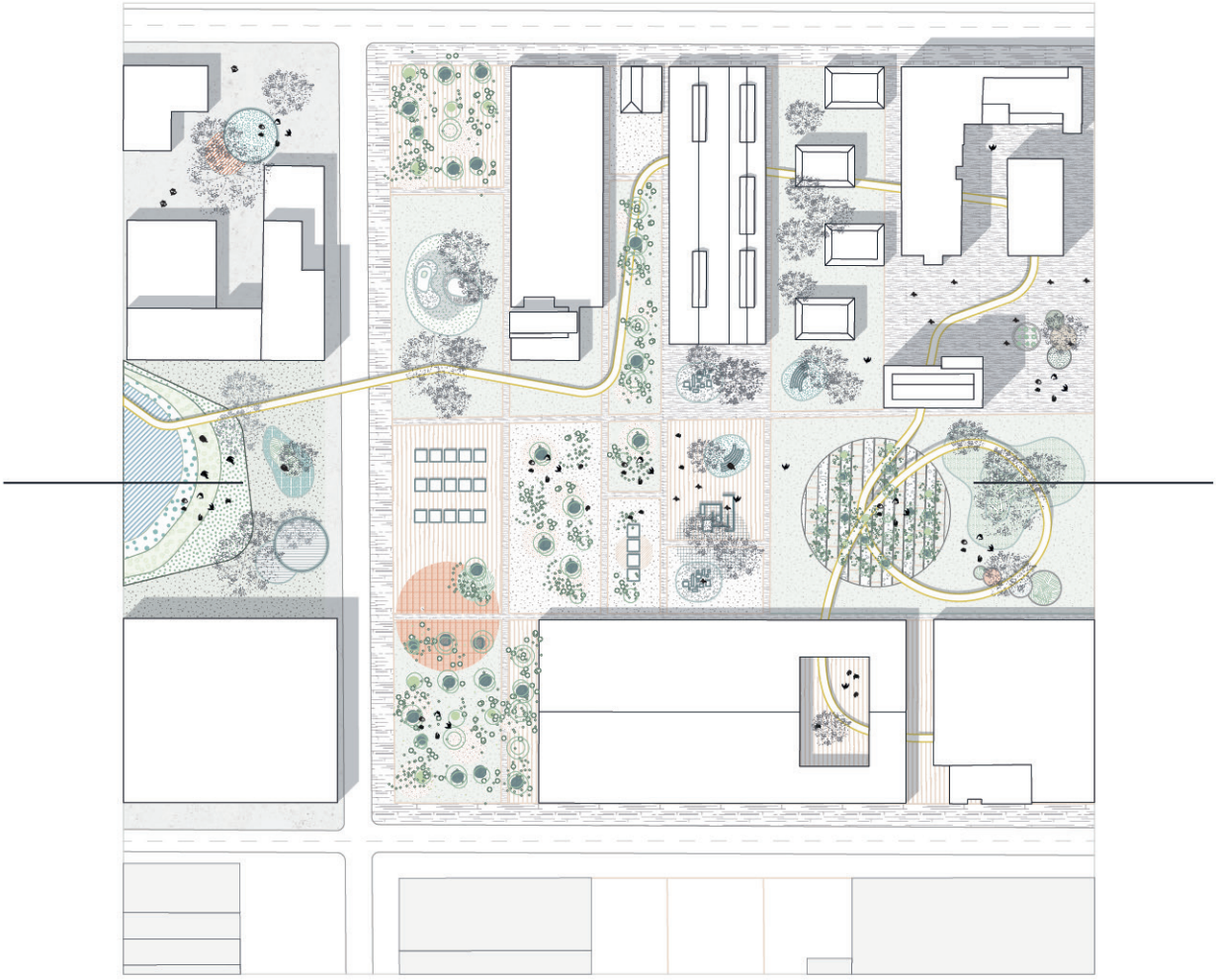


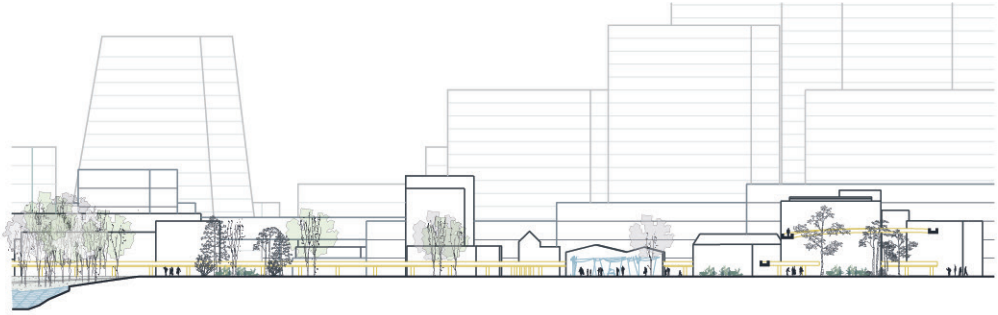





50m





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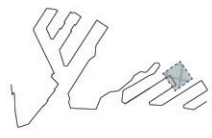
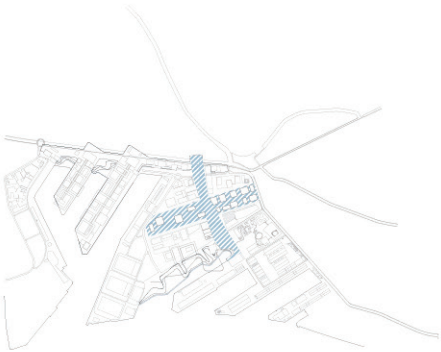


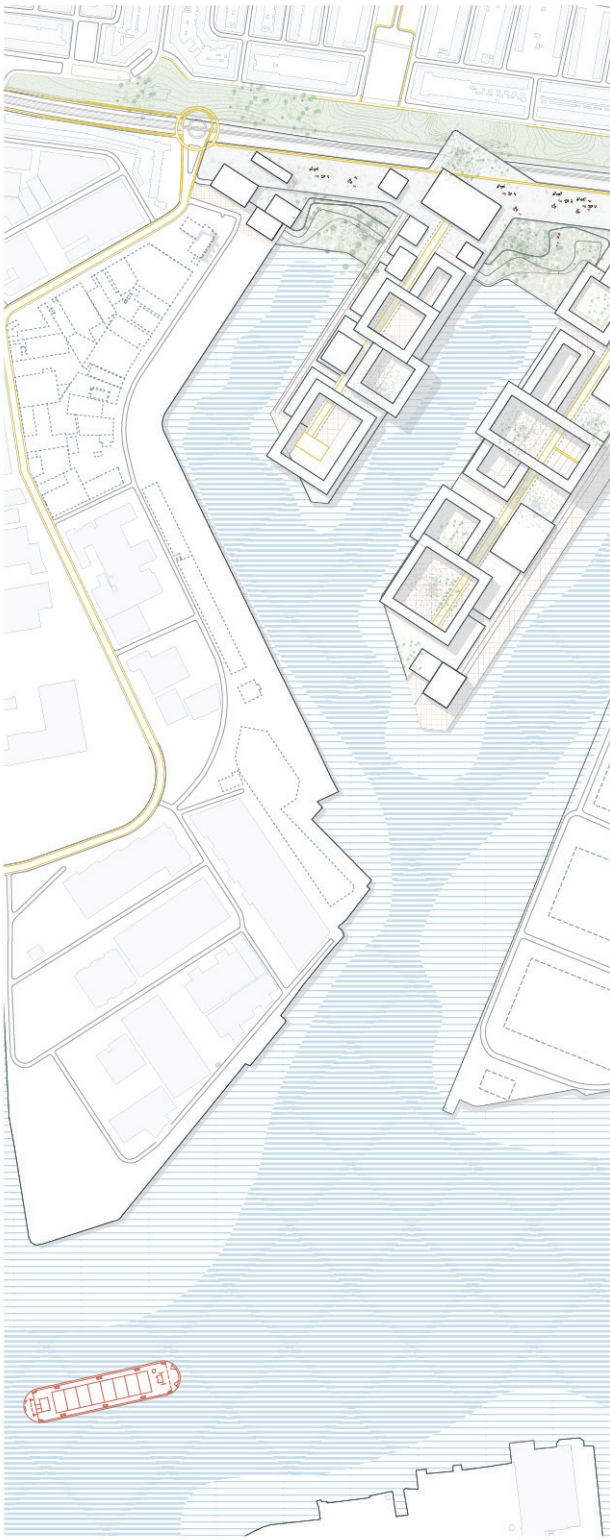
Phase 2: 2040

Demolitions

New Constructions



Open public spaces

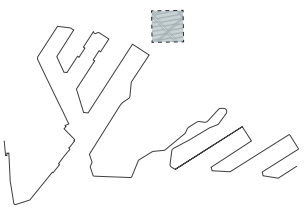


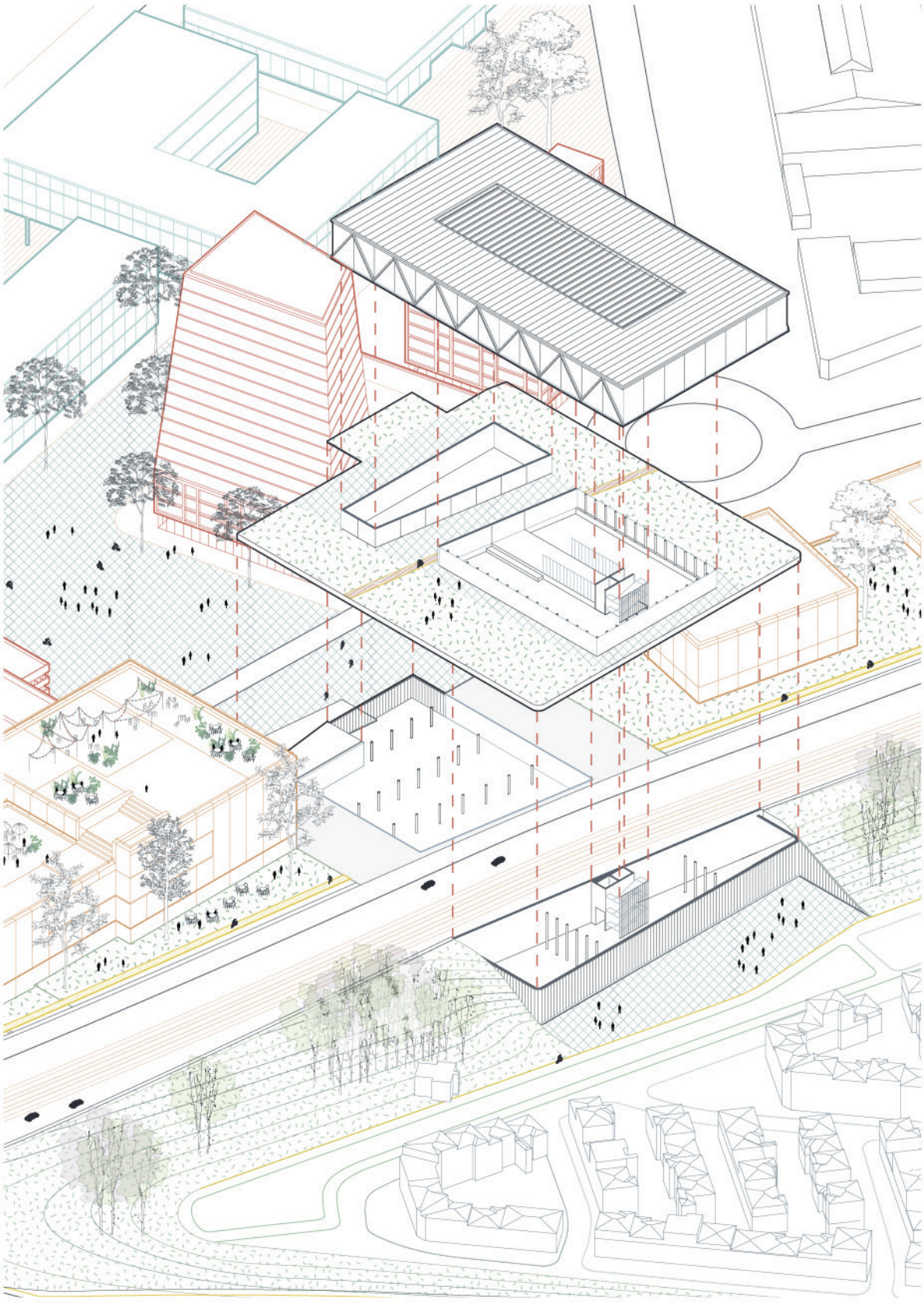

100 m

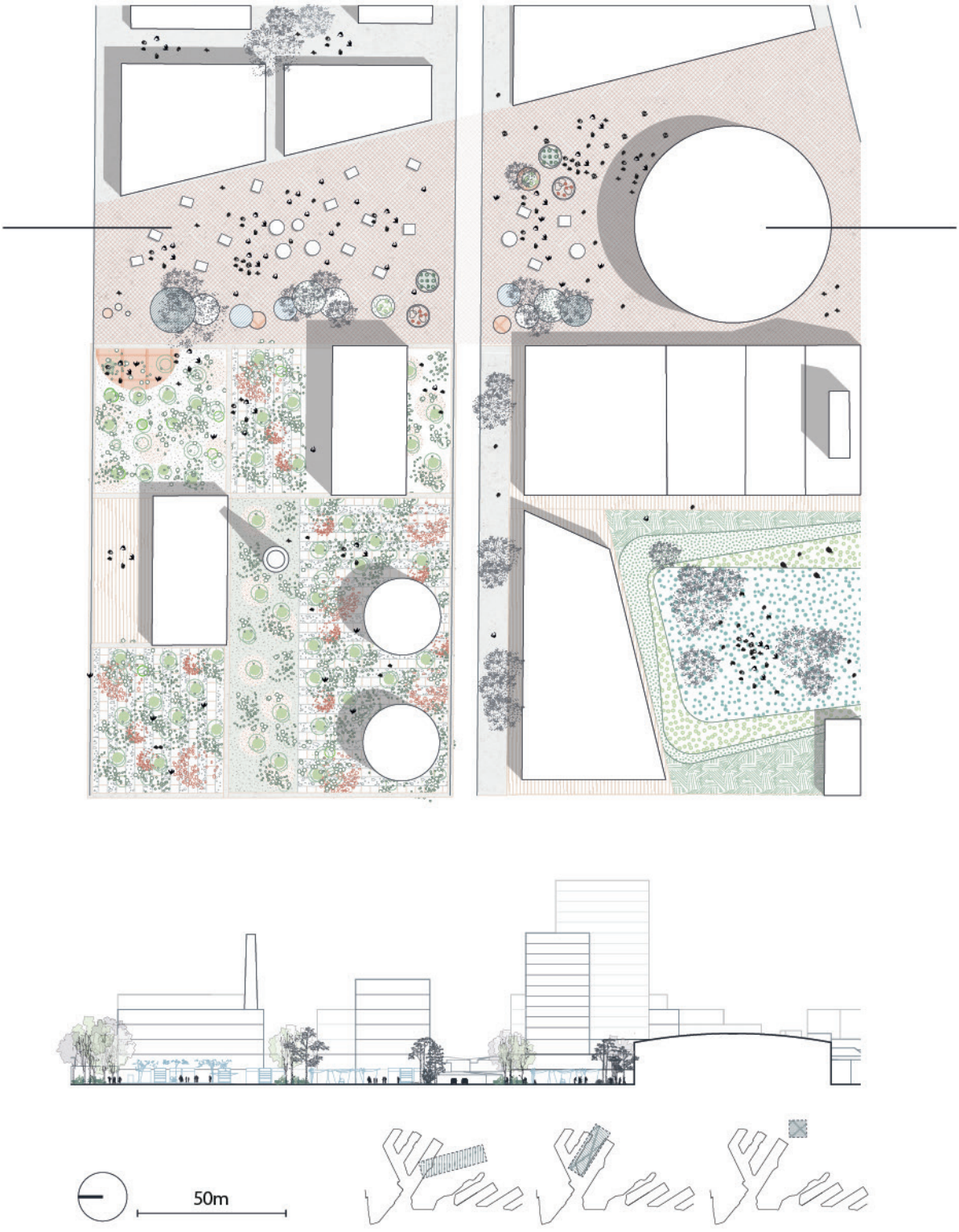
main vision will welcome productive spaces with buildings in the form of medium and large-sized warehouses for large manufacturing companies destined to food, clean technology production and laboratories. This productive area is arranged in a way that, the warehouse's logistic and processing spaces are directly served by the main road, while at the backstage they can offer more public functions, like shops or food and beverage related facilities at the interface with the northern metropolitan settlement directly connected with the Marconi Tower main access area and to the southern residential area towards the park. This peculiar spatial distribution offers the opportunity to create a sort of buffer zone as a public and open corridor which filters and soften the transition from a more productive landscape to a more residential neighbourhood.

The mobility system also plays an important role in shaping the neighbourhood as a pedestrian and bike-friendly urban settlement and allows to rearrange the district internal structure. At this purpose, the cycling path is reinforced and a series of hubs as public parking spaces are introduced to free the streets from car traffic and parking areas. These structures, located at the head of the piers and near to the main accesses, within walkable and cycling distances, are combined with other public services or facilities so to represent a point for transportation exchange and connection with the interfacing districts.

Great attention is then given to open public spaces, conceived as mostly paved linear parks which break the harbour area and allow creating space for social life and public aggregation. These areas are meant to acquire different characters according to the different urban realities each of them are flanked by so that three main corridors are thought to be the place for leisure, retail and production public related functions. But if the



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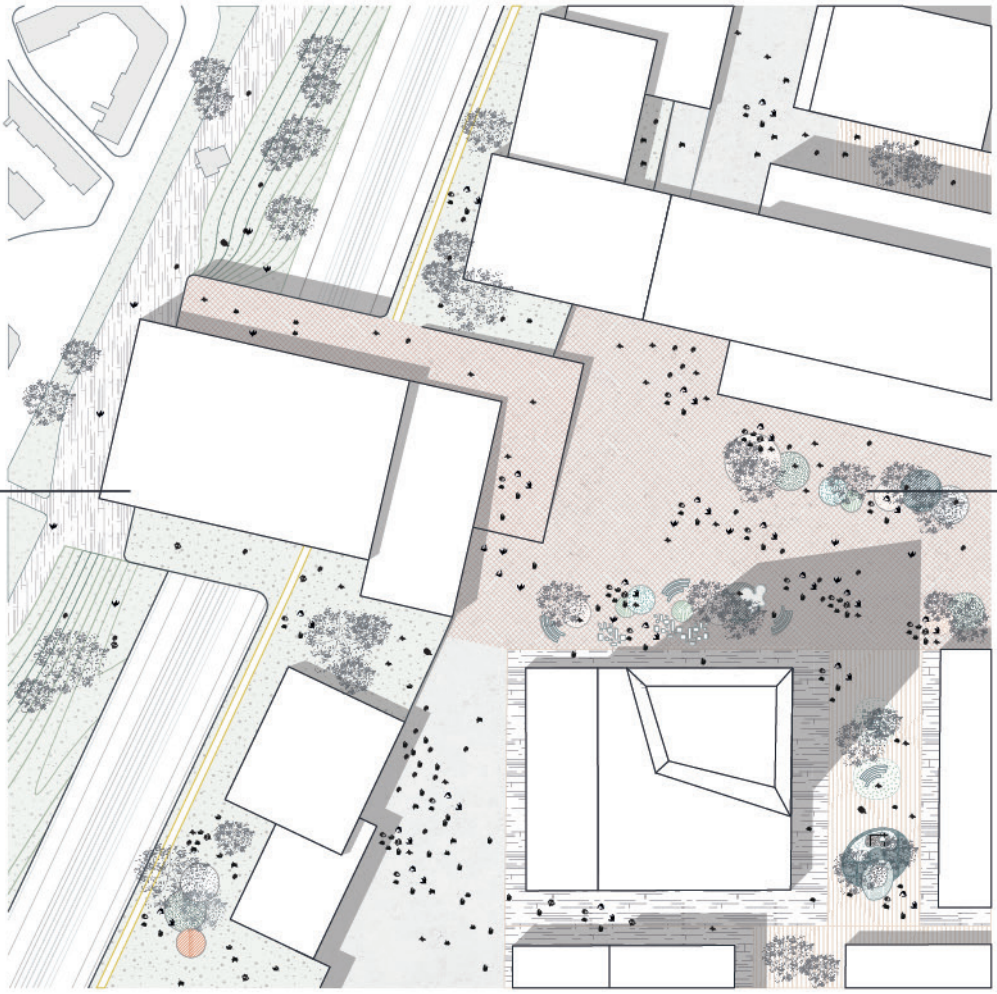
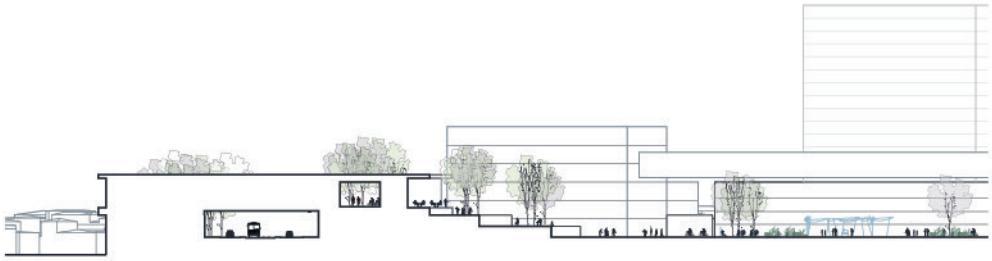




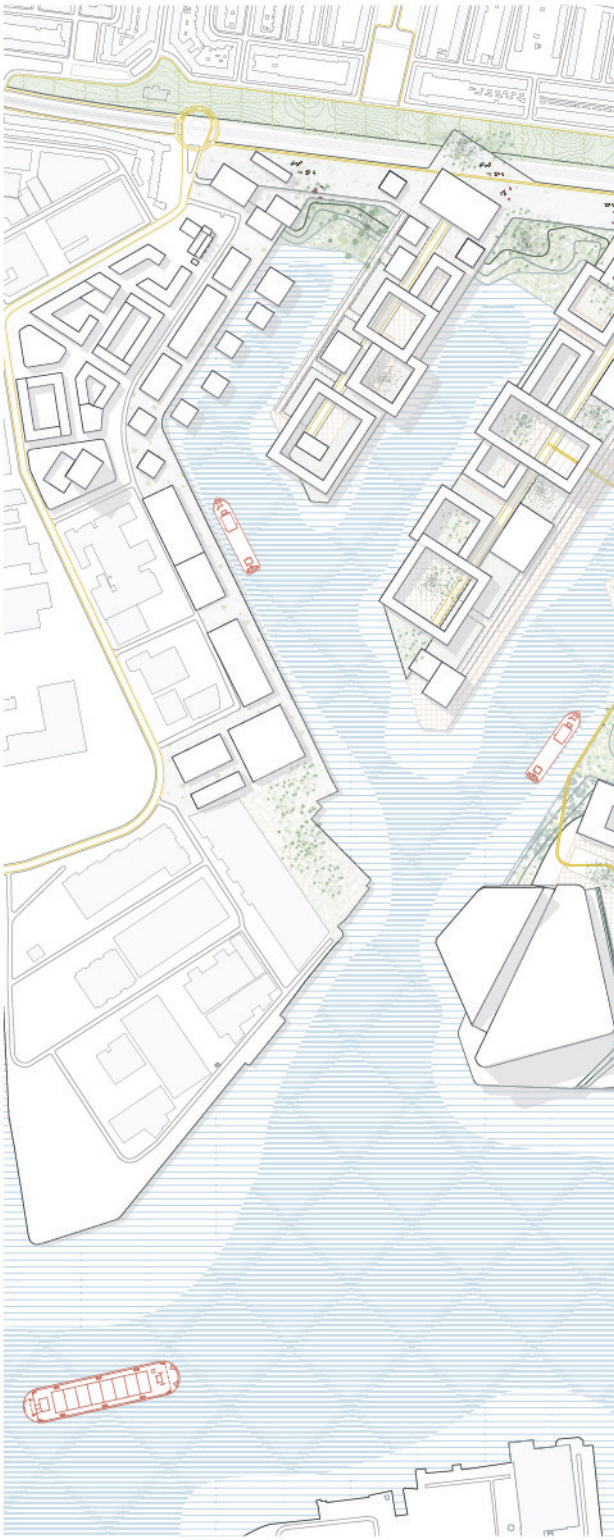

50m

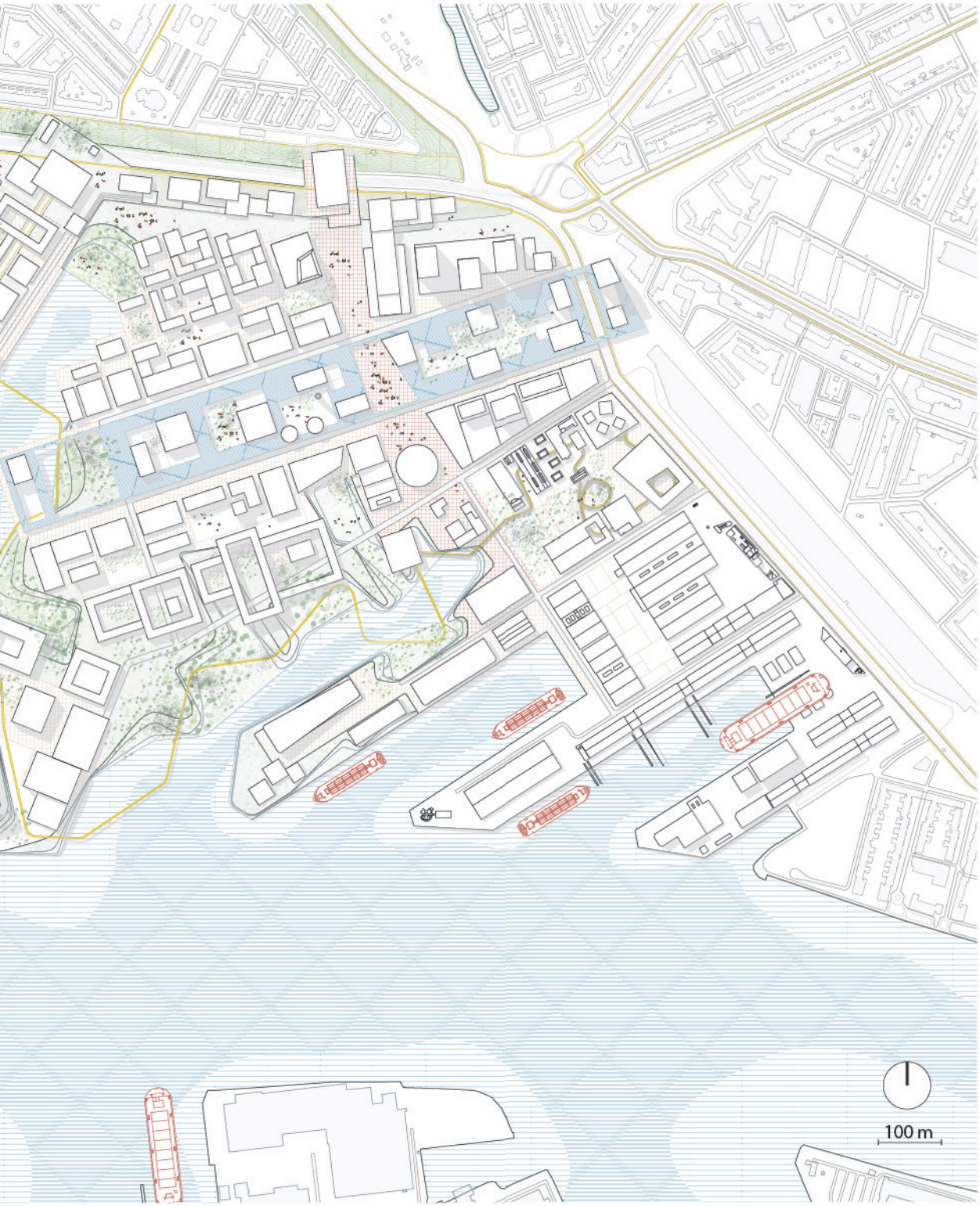
Phase 3: 2050

Tidal park completion

New Constructions

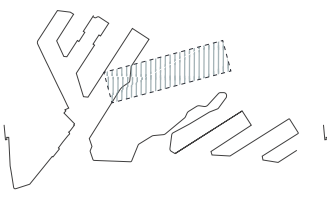
Renovation

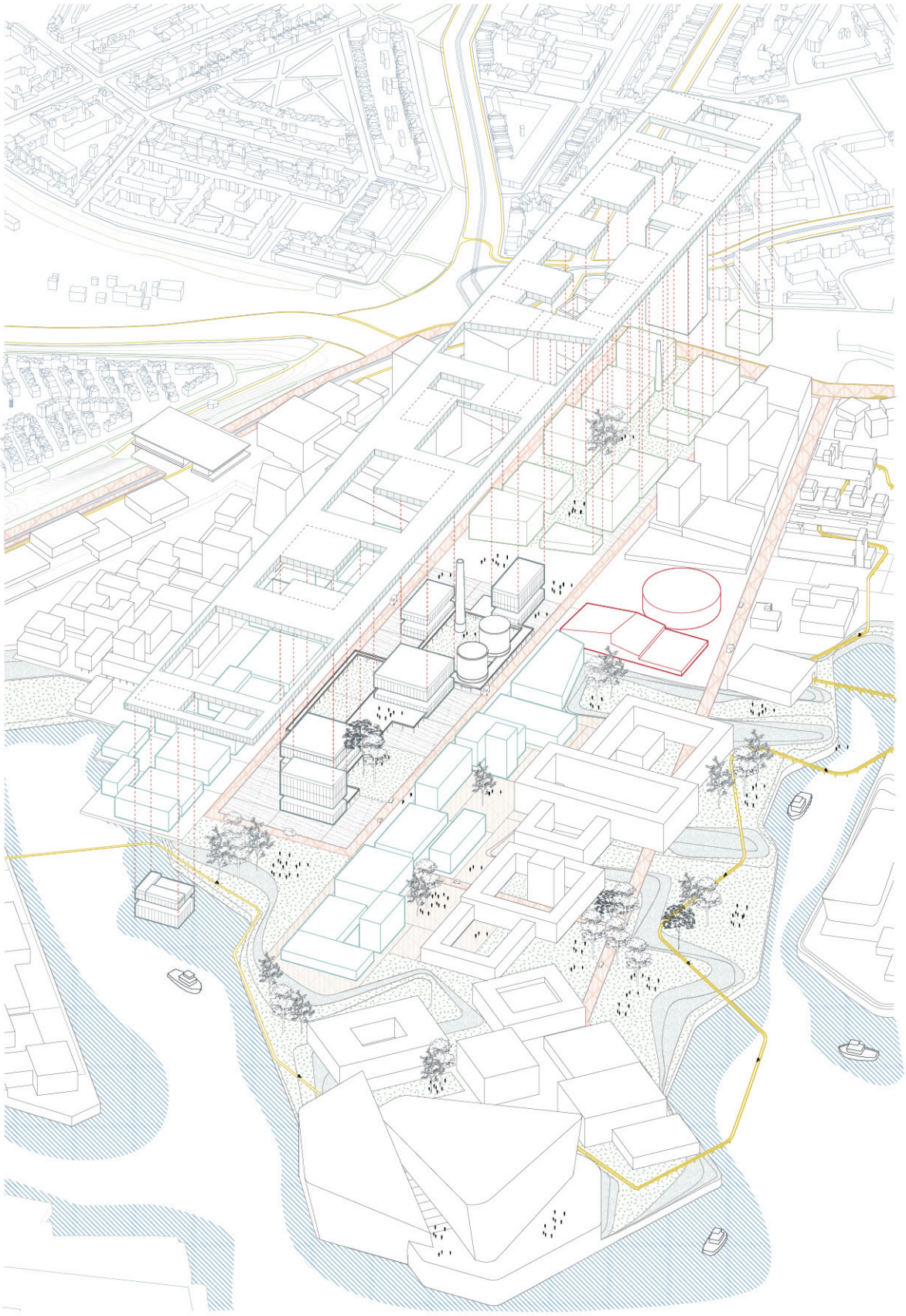


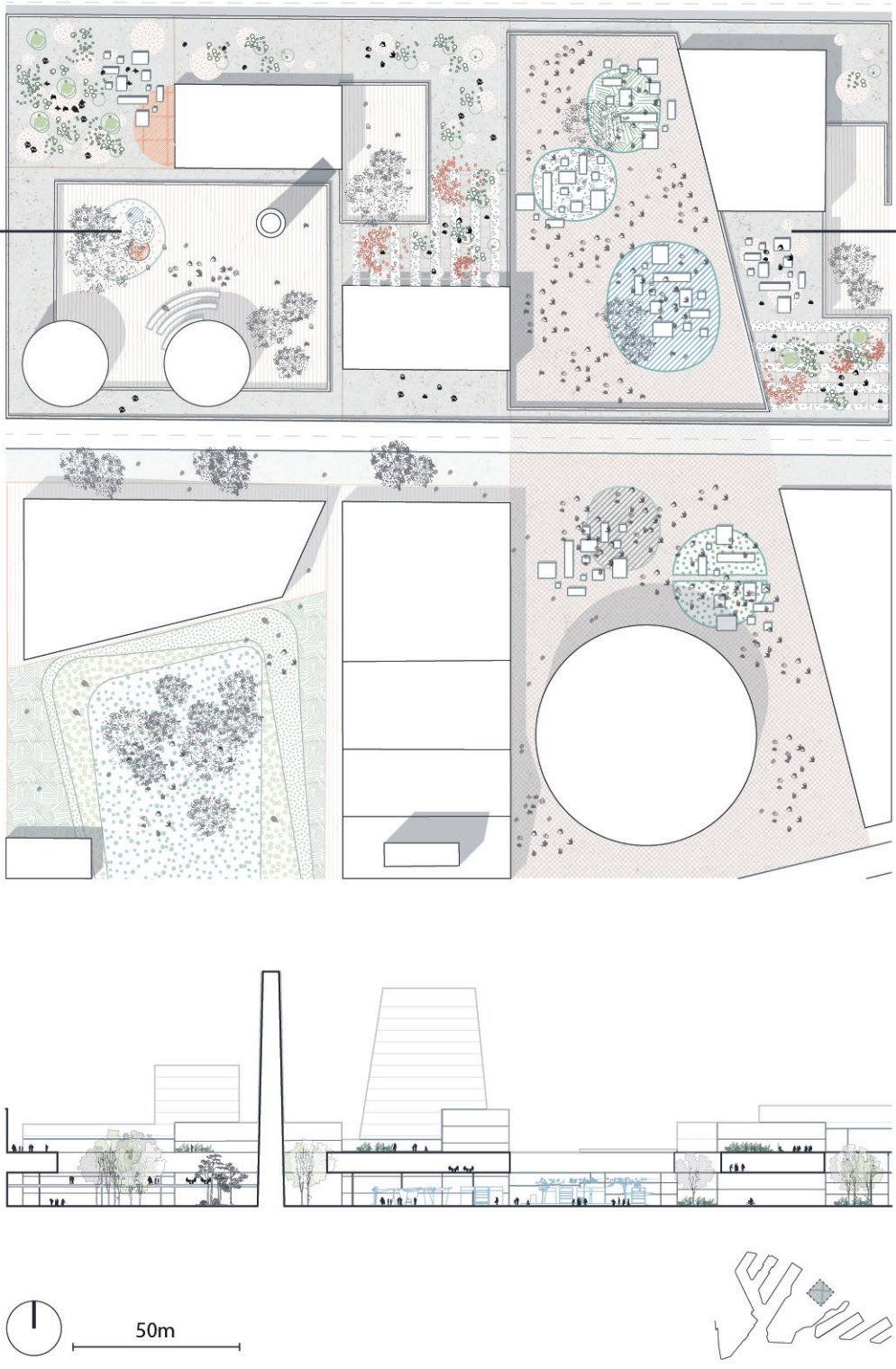

100 m

leisure and market street are conceived to be open-air hallways, the production strip is characterized by a first development phase in which urban agriculture fields are introduced to be the launchpad to attract public life into a largely productive space, while in its second phase's development, it should optimistically become both an outdoor and indoor public space which, like an elevated additional pier, physically connects the city directly to the water. A big gesture to provide an iconic public space to host temporary events organized by local actors like public exhibitions of innovative products, public debates, lessons and workshops where people can meet freely. This is also connected with the buildings below, reserving spaces at the intersection for food and beverage facilities and shops related to the local production. Some of those buildings could be then converted to glasshouses for urban agriculture production while the roof could be opened up to a continuous promenade among community gardens which evoke the food trading tradition of the site.

Finally, a research department will be created in the third phase, when all the areas should be freed from the still active enterprises at the far end of the Galilei Park. This would be located at the proximity to the river Maas taking advantage of a renovated water connection system and ideally and functionally connecting M4H with the RDM program on the other side of the river. A strongly recognizable architecture landmark for the M4H whole area is then proposed to host a hybrid program and to foster the public awareness of the finally renovated quarter.



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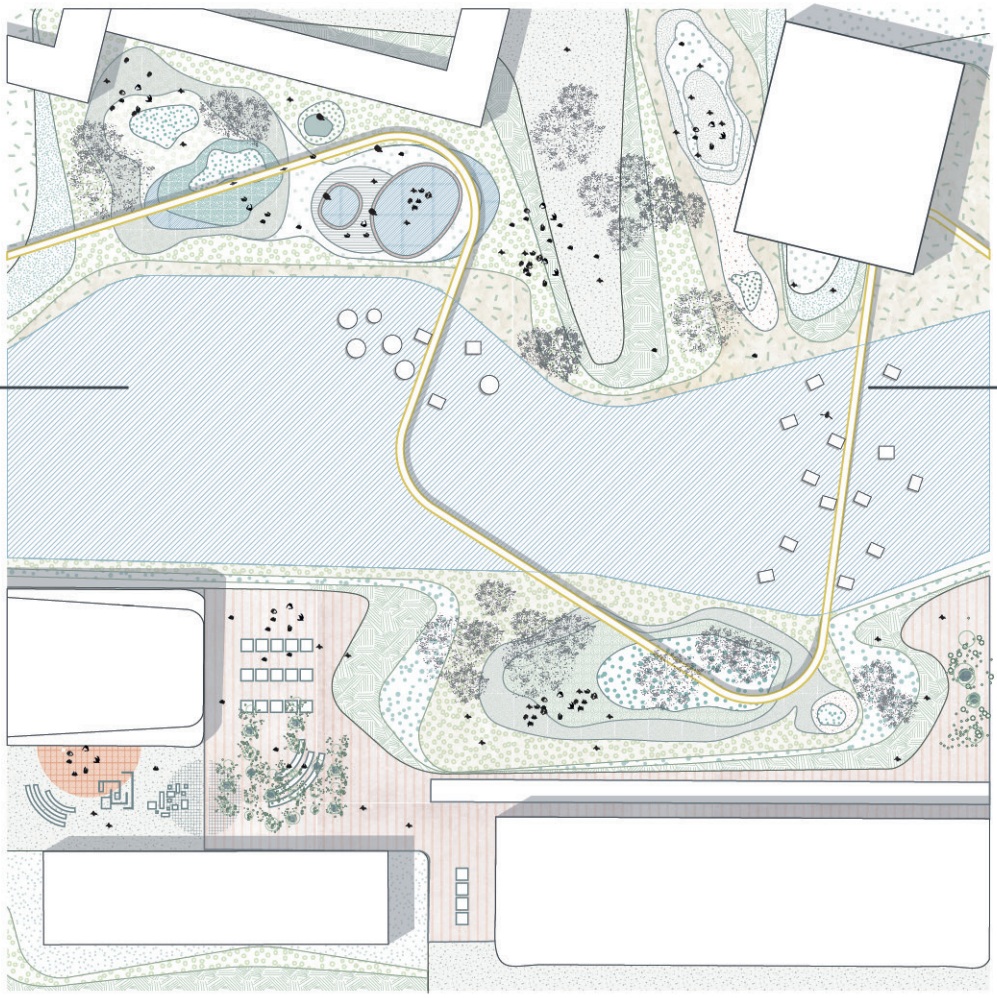

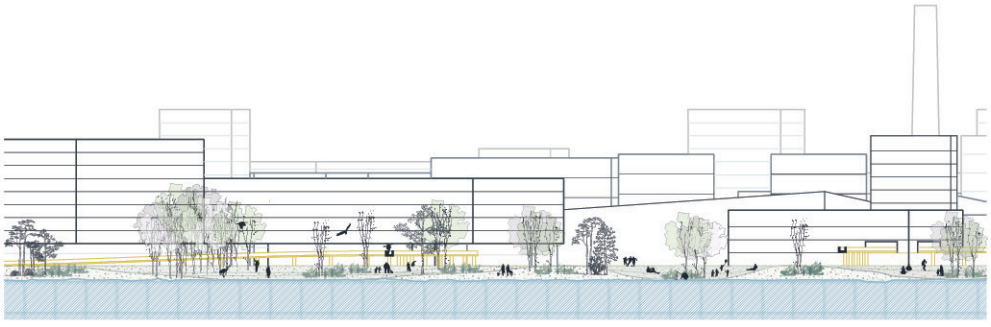


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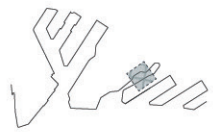

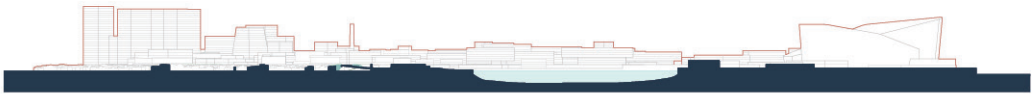

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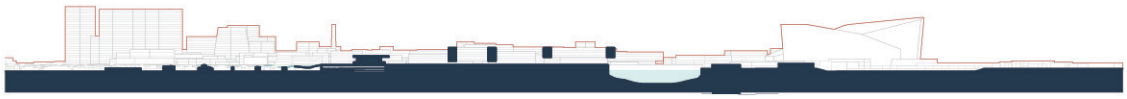

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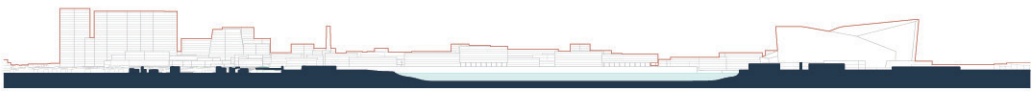

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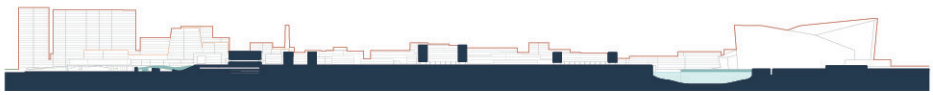

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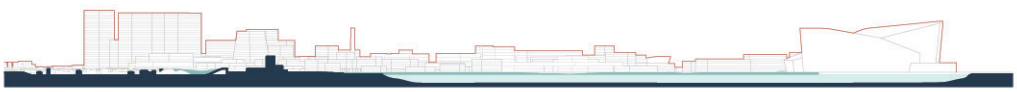
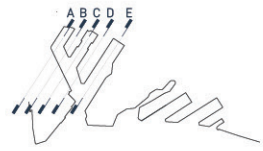
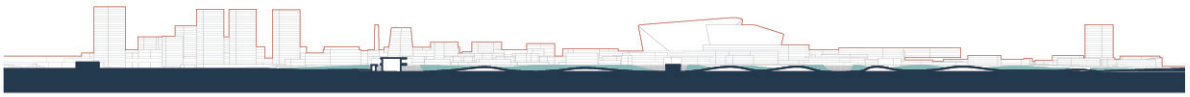


Section E

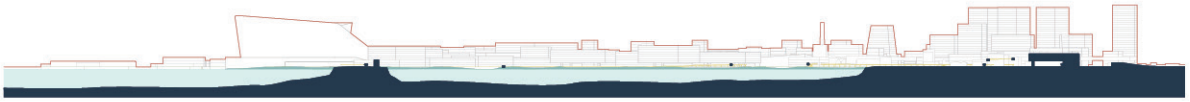
300 m





Section F

Section G



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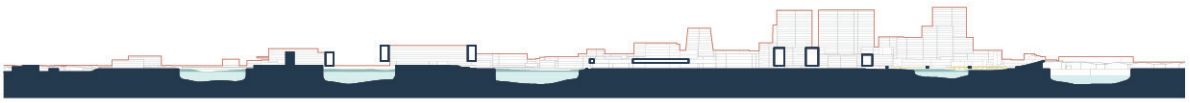
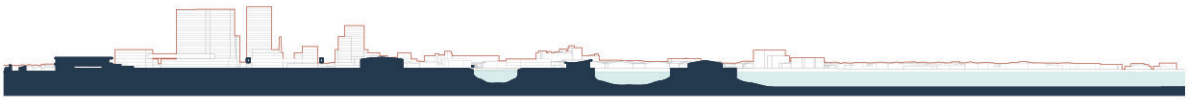


Section I



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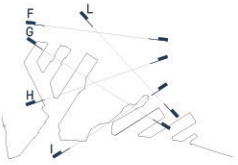
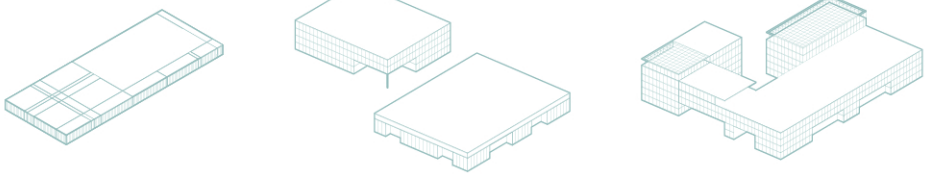
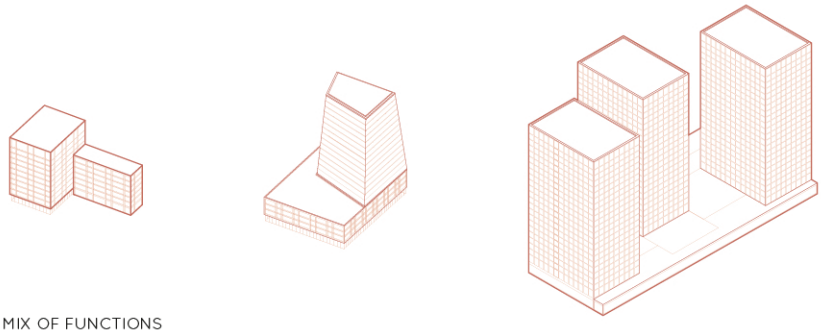


300 m

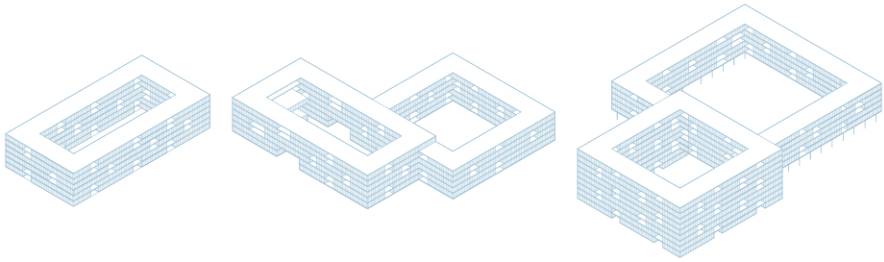
05.3 Program



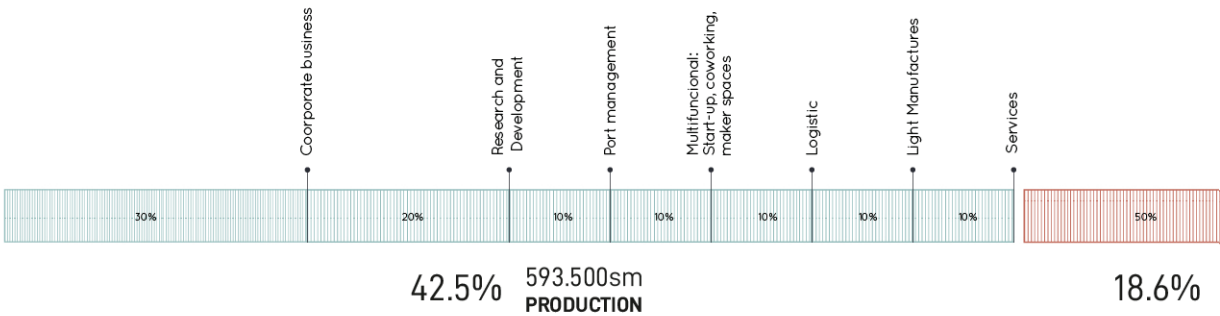
PRODUCTION BUILDINGS



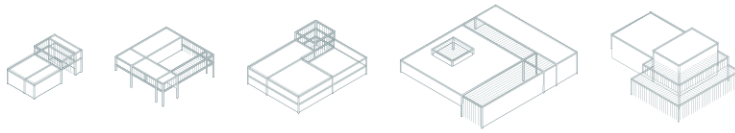
METROPOLITAN MIX OF FUNCTIONS



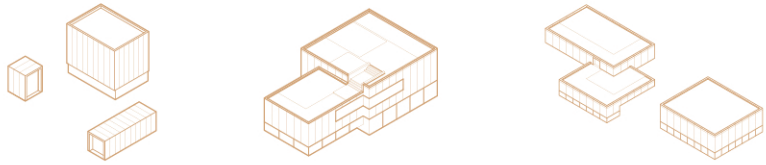
RESIDENTIAL COURT BLOCKS



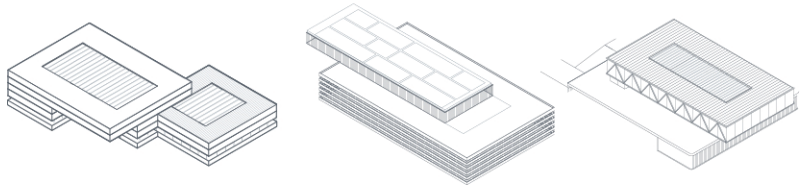
42.5% 593.500sm **PRODUCTION** 18.6%



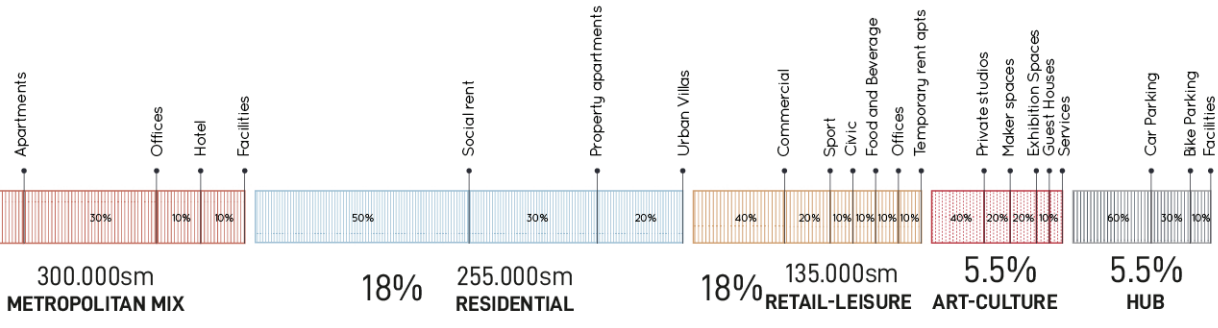
MULTIFUNCTIONAL BUILDINGS

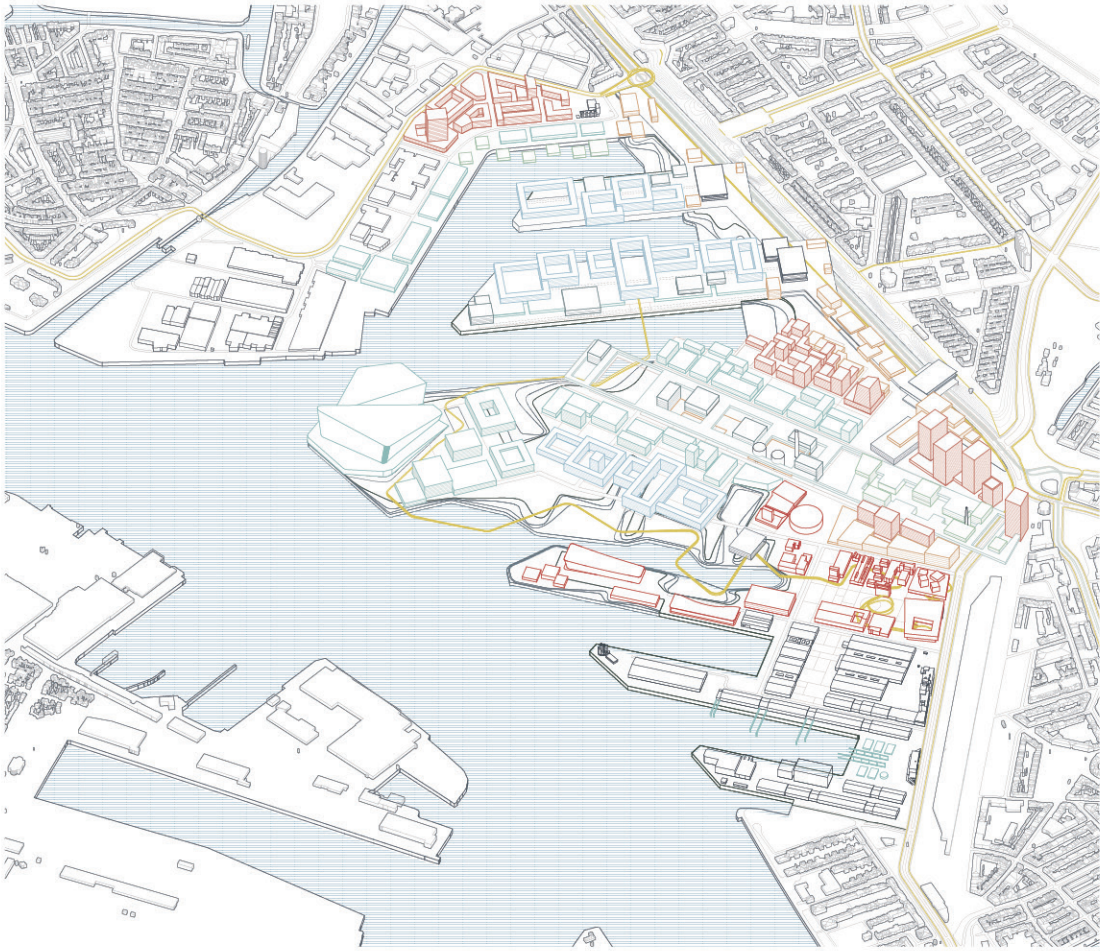


RETAIL AND LEISURE PAVILLIONS

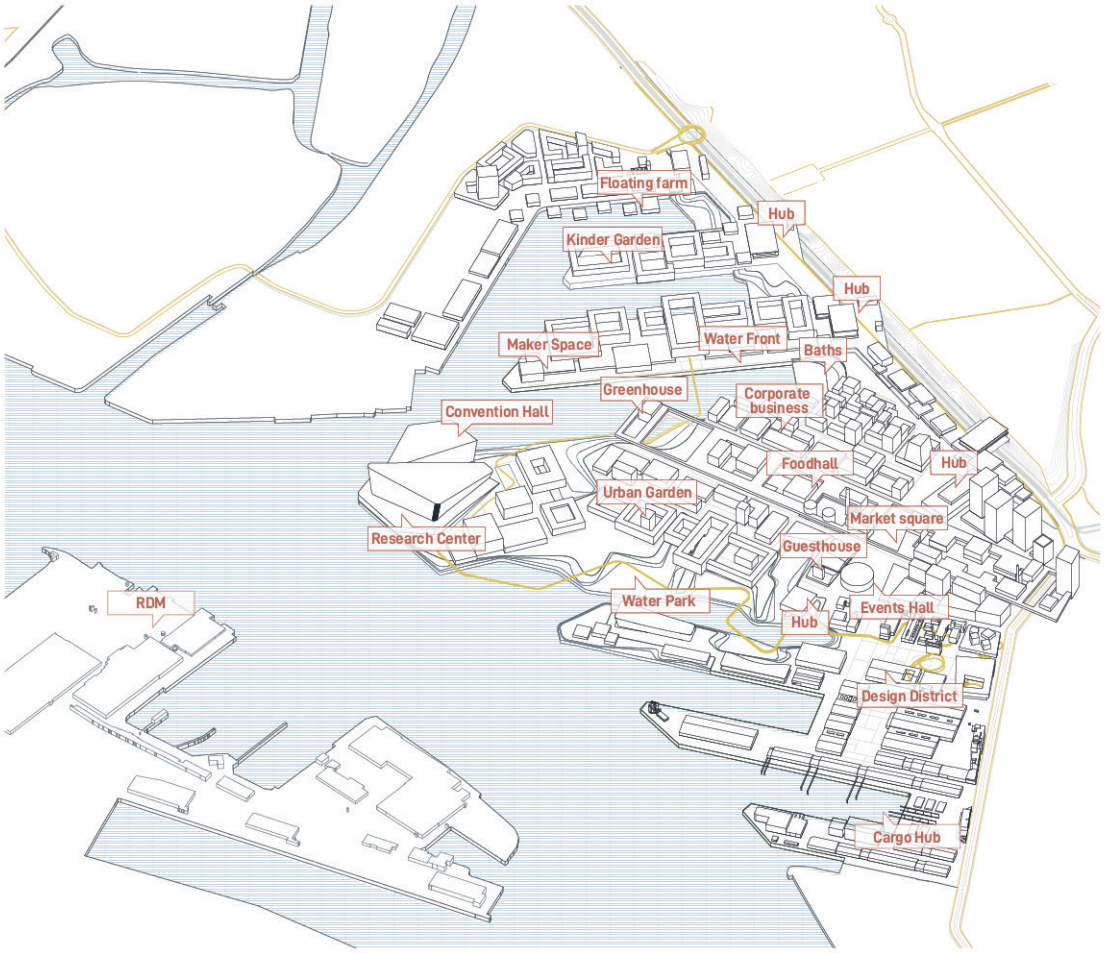


HUBS

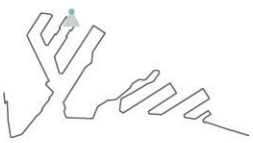


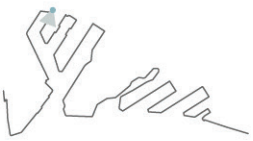


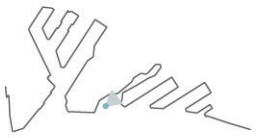
RnD, art, culture
Metropolitan mix
Retail and leisure
Residential
Production
Manufacture - Maker Spaces

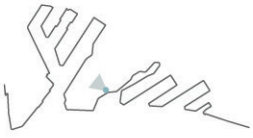

Floating farm
Hub
Kinder Garden
Hub
Maker Space
Water Front
Baths
Greenhouse
Corporate business
Convention Hall
Foodhall
Hub
Urban Garden
Market square
Research Center
Guesthouse
RDM
Water Park
Events Hall
Hub
Design District
Cargo Hub

05.4 Visions









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