

REDEFINING DOKHAVEN

TRA ACQUA E TERRA. NUOVI SUOLI URBANI

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*Si riaccendono le luci in scena
E' in piedi, di fronte a noi, sotto le luci
incrociate dei riflettori
E' splendido, nel senso letterale del termine
Il braccio ricade mollemente. Scuote la testa
con un sorriso stanco e felice insieme
Dice un'ultima volta
- Grazie
Come se scambiasse un'occhiata con
ognuno di noi
- Siete davvero... Davvero, siete...
Il suo braccio libero fa un gesto di felice
impotenza. Scuote affettuosamente il capo
L'intensità dei riflettori si abbassa. Pian
piano la luce si fa calda, quasi intima
- Non so come...*

da Grazie di Daniel Pennac

WITH 9.700.000 CONTAINERS PASSING THROUGH ITS TERMINALS ANNUALLY, ROTTERDAM IS ONE OF THE BIGGEST PORTS WORLD WIDE

AS THE MAASVLAKTE ALLOWS THE PORT TO SHIFT WEST INTO THE NORTH SEA, OLDER PARTS ARE BECOMING OBSOLETE AND ARE AVAILABLE FOR THE CITY AND THE CITIZENS

THE RDM CAMPUS NORTH OF HEIJPLAAT, ON THE SOUTH BANK OF THE NIEUWE MAAS, IS BEING DEVELOPED INTO A CENTRE FOR THE CREATIVE AND INNOVATIVE INDUSTRY

DOKHAVEN IS ONE OF THE INNER URBAN DOCKLANDS THAT WILL BE TRANSFORMED INTO AN ATTRACTIVE PLACE FOR LIVING, WORKING, AND DEVELOPING A CREATIVE AND PORT-RELATED ECONOMY

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Along its waterfront [that] the aura of a city resides and persist

Alex Krieger

In order to turn abandoned urban waterfronts into dynamic nodes of postindustrial economy, redevelopment schemes should not only include residential projects and advanced economic activities, but also appealing leisure and entertainment functions in eye-catching *packaged landscapes*. In the case of the Dutch city of Rotterdam, these latter functions have remained underdeveloped, in particular due to a lack of persistent long term planning [1]. The city has left much of the potentials of its waterfront – a unique selling point according to local planners and policy makers – unexplored. This thesis presents an overview of the post war development of its waterfront, the deepening of those issues that cannot be avoided talking about waterfront and harbor regeneration, and conclude with a proposal for the redevelopment of one of these areas, Dokhaven.

14 May 1940, the German Air Force bombs Rotterdam.

Corollary widespread fires during the following days burned down most of what was left. Only weeks after the bombardment, plans for rebuilding were ready. The port of Rotterdam had to be modernized. It expanded enormously to the west and shifted to petrochemical industries. In the 60s, the port of Rotterdam became the WORLD'S LARGEST PORT.

At the beginning of the 70s, though, expansion had to halt; a lack of space and increasing complaints about environmental pollution were major motives. Port's functions were moved far from the city center.

This is where we start from.

[1] Romein A., *Leisure in waterfront redevelopment: an issue of urban planning in Rotterdam*, OBT Research Institute for Housing Urban and Mobility Studies, Delft University of Technology, Delft

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1.0| INTRODUCTION

After suffering neglect for some time, the future organization of Netherlands is once again the focus of interest. The revitalization of inner cities, the expansion of major economic ports, including Schiphol airport and Rotterdam harbor, the large-scale infrastructures and last but not least, the planning of new residential and commercial districts, are going to change the face of Netherlands to come.

At the same time, the country is going to face the massive problem of climate change and high-rising water level, that will affect Netherland much more than the rest of Europe, since the 12% of its land stand below sea level.

In 2013, the works for the new Rotterdam Euro port (Maasvlakte II) will be completed, shifting the port activities out of the city. When Maasvlakte II will be finished, the major part of the Rotterdam port industry, in particular large scale deep sea container transshipment, will move away from the city centre area, making room for new activities, on and around water.

Both the port and the city stand to benefit from this event.

The future scenario sees the port and the city as almost indistinguishable one from another. From west to east, the port logistic industry will gradually give away to knowledge-intensive business, educational, housing and work places for pioneers and luxury residential accommodation. At the same time the aim is to allow each Stadshaven, the city ports, to maintain its own identity.

Rotterdam City Council and The Port Authority have launched an ambitious program to bring about this metamorphosis. The program has two main objectives: to strengthen the economic structure of both port and the city and to create attractive, high quality living and working environments. The plan is set out in the document *Stadshaven Rotterdam, 1600 ha creating the edge*, where is explained that the city's transformation will take place gradually, with projects planned for the short, medium and long term.

With the purpose of making the work easier, the masterplan has been divided into four district plans, Rijn-Maashaven, Merwe-Vierhaven, Wall-Eemhaven and the **DOKHAVEN**.

Just about this last area, in August 2010, I attended a workshop entitled *Defining Dokhaven*, organized by the Rotterdam Academy of Architecture and Urban Design and coordinated by Chris Van Langen, Dean of the institute.

Topic of the workshop was exactly the redevelopment of the former port area of Rotterdam, Dokhaven (3643 sqm), situated on the south bank of the Nieuwe Maas river, which flows through the city and connects the Rotterdam area to the North Sea.

Aim of the workshop was that of designing public spaces, in the attempt to give Dokhaven the characteristics of usability and accessibility that are now lacking.

Aim of this work is than to accomplish the process started in 2010, developing a comprehensive project for Dokhaven. What is common sense, that was also very stressed during the workshop lectures, is that a good project for the former dockland area of Rotterdam, should result from a process that involves all the different levels of government and institutional, capital resources, organizations, groups, individuals. With regard to such a project, it is in fact necessary to thoroughly understand the peculiarities of the context and the relationships that the area might have with the city, with the world. It is also fundamental to take into account initiatives already undertaken in the area, although marginal, and to establish a dialogue with the population of the village, who lives on site by generations and requires more and better links with the rest of the city.

Moreover, the area of Dokhaven is at the center of important economic and urban streams, and therefore it has to be recognized as a strategic point for the redevelopment of the hole urban system, as well as a great opportunity to create a new urban environment, able to reflect ideas and tensions of the city, its society and culture.

The challenge is therefore double: on the one hand is about facing the issue of the redevelopment of former industrial areas, with impressive and sudden jumps of scale, lack of homogeneity, services, links, and, on the second hand, has to address the difficult relationship between city and waterfront. The need for the homecoming to the area of the vitality that has characterized the past and which today has completely disappeared. To make it permeable to the city while maintaining the character of Stadshaven that has always done right.

All this without forgetting the more and more alarming risk of flooding and the consequent need for control strategies.

INTRODUZIONE

La storia di Rotterdam come porto strategico (oggi il più attivo d'Europa), risale al XVI secolo. Nel 1572 gli Spagnoli, inseguiti dai Mendicanti del Mare, ribelli calvinisti dei paesi bassi, trovarono rifugio nel porto cittadino, ma decisero di ricompensare tale gesto di generosità saccheggiando la città.

Ovvia conseguenza fu che Rotterdam si unì, subito dopo, alla ribellione contro gli Spagnoli, diventando proprio in quel periodo un porto di fondamentale importanza.

A partire dal XVII secolo commercio, pesca e imprese navali acquistarono un ruolo economico fondamentale e nei due secoli seguenti, lo sviluppo e l'espansione delle attività portuali rappresentarono la priorità assoluta della città.

I più importanti porti di smistamento merci, tra cui Dokhaven, vennero costruiti tra il 1880 e il 1914 lungo la riva sud del fiume. La popolazione si moltiplicò, arrivando, nel 1910, a toccare i 425.000 abitanti.

Ma il 14 maggio 1940, i Tedeschi che avevano invaso l'Olanda lanciarono un ultimatum al governo. O si arrendeva o città come Rotterdam sarebbero state distrutte. Il governo capitolò, tuttavia i bombardieri erano già in volo e il raid venne comunque portato a termine.

In seguito ai bombardamenti, che rasero completamente al suolo il centro storico della città e decimarono la popolazione, furono studiati e messi in atto programmi di ricostruzione, che prevedevano anche un ammodernamento della zona portuale, che subì una considerevole espansione verso ovest.

Negli anni 60 il porto di Rotterdam si aggiudicò il primato di Porto più grande del mondo.

Tuttavia negli anni '70 l'espansione dei cantieri navali fu costretta ad arrestarsi per motivi di mancanza di spazio e soprattutto per la crescente preoccupazione riguardo il livello di inquinamento di aria, acqua e terreni.

Il porto venne quindi spostato lontano dal centro, sempre più vicino al Mare del Nord.

In seguito a tali interventi di pianificazione urbana, la città si è quindi trovata di fronte al problema di bonificare, riqualificare e rifunzionalizzare le immense aree precedentemente occupate dalle imprese portuali e dai cantieri navali. Tra queste troviamo appunto l'area di Dokhaven.

*Dokhaven è il cuore del ex cantiere Dry Dock Company Rotterdam, (Rotterdamsche droogdok maatschappij **RDM**), istituito nel 1902 sulla sponda sud della Nieuwe Maas. Nel periodo tra il 1903 e il 1945, momento di massima produttività, le dimensioni del complesso si quadruplicarono, fino ad arrivare a quasi 40 ettari.*

Nel 1914 l'RDM iniziò a costruire il villaggio giardino Heijplaat, destinato ad ospitare i lavoratori dei suoi cantieri navali (sia gli operai specializzati nella costruzione delle navi da trasporto, sia il personale che si occupava di carico, scarico e stoccaggio merci), il cui numero era in costante crescita. Il villaggio era composta da circa 850 case, le ultime costruite negli '50, e la pianificazione urbana dell'area era stata ispirata alla English garden house.

Il cantiere apparteneva alla più grande d'Europa, per numeri e dimensioni, ma un paio di anni dopo il picco di sviluppo, l'emergere di nuove rotte e la crescita di nuovi cantieri in paesi a bassi salari, causò seri problemi all'industria navale dei Paesi Bassi, destinata ad un lento declino. Nonostante vari tentativi e alcune fusioni importanti, e nonostante la vendita del villaggio ad una società immobiliare nel 1980, nel 1983 l'RDM dichiarò la bancarotta, portando alla disoccupazione di 1370 persone ed enormi conseguenze a livello territoriale.

*Il cantiere rimase vuoto ed inutilizzato per anni, fino al 2007, quando alcuni istituti culturali/educativi (tra cui la Rotterdam Academy of Architecture and Urban Design) e diverse imprese si sono trasferiti nella zona di Dokhaven, riuniti sotto al nome di **RDM Campus** (RDM ora acronimo di research, design e manufacturing).*

In connessione con le nuove funzioni è stato quindi formulato un piano di sviluppo urbano, dove la progettazione e pianificazione delle aree pubbliche è ancora oggi oggetto di studi.

Ed è proprio in questo contesto che ho deciso di intervenire con il mio progetto di tesi, formulando una proposta per il recupero e la riprogrammazione dell'area di Dokhaven, con l'obiettivo non solo di intervenire sulla fascia del waterfront o sugli spazi pubblici, ma andando a toccare gli immensi edifici industriali dismessi, ed inserendo nuovi interventi.

Partendo da tali presupposti, ho deciso di non abbracciare un unico programma, per non trasformare Dokhaven in un nuovo distretto funzionale, ma di mettere insieme le realtà attualmente presenti e quelle in via di sviluppo, il suo passato fortemente produttivo ed un futuro, fatto dalla necessità di interventi mirati alla protezione dalle inondazioni.

I progetti di riqualificazione urbana dei waterfront parlano infatti al passato come al futuro delle città.

A quel passato basato sulla produzione industriale, sul boom economico e la crescita incontrollata; al futuro in quanto costituiscono un grande potenziale per la città, anche di riconnessione del tessuto.

Queste aree, per la loro dimensione ed estensione, sono spesso oggetto di grandi piani e programmi, come musei, centri sportivi o congressuali.

Un buon progetto di riqualificazione per l'ex area portuale di Rotterdam, dovrebbe invece scaturire da un processo in grado di coinvolgere tutti i vari livelli governativi ed istituzionali, risorse e capitali, organizzazioni, gruppi, individui. Relativamente ad un progetto del genere, risulta quindi necessario capire a fondo le peculiarità del contesto e le relazioni che l'area instaura e potrebbe instaurare con la città, con il mondo, tenere in considerazione quelle iniziative già avviate sul territorio, anche se marginali, ed instaurare un dialogo con la popolazione del villaggio, che abita sul posto da generazioni e necessita di nuovi e migliori collegamenti con il resto della città, di nuove funzioni fondamentali per il vivere quotidiano.

Il primo passo è stato quindi quello di osservare e studiare le caratteristiche prime dell'area, nel tentativo di potenziarle e laddove negative, trasformarle in elementi qualitativi, in grado di aggiungere valore.

Inoltre l'area di Dokhaven si trova al centro di importanti flussi economici ed urbani e va quindi a rappresentare un punto strategico per la riqualificazione, nonché una grande occasione per creare un nuovo ambiente urbano, in grado di riflettere idee e tensioni della città, della sua società e cultura.

Nello specifico credo che sia fondamentale affrontare il problema dell'accessibilità (via terra e via acqua) all'area e dotare la stessa di servizi basilari sia per il villaggio, che per le imprese e le organizzazioni già presenti o future. Inoltre ho ritenuto interessante sviluppare alcuni focus sulla riqualificazione dei principali edifici industriali, in rapporto alle tendenze, urbane, sociali ed economiche, che regolano oggi la città di Rotterdam.

Parallelamente, e per meglio inserire il discorso nel contesto, ho poi deciso di approfondire il tema della riqualificazione dei waterfront in generale, del rapporto città/acqua, avvalendomi dell'aiuto di alcuni casi studio, iniziando sicuramente dalle esperienze degli anni '70 e '80 in Nord America (primi veri modelli globali) fino ad arrivare al caso di Bilbao, considerevolmente diverso e diversificato.

Il waterfront non è infatti una linea, ma una rete di luoghi, funzioni, innesti e ricuciture tra la costa e la città, tra il porto e le attività urbane. E' l'incrocio tra fasci infrastrutturali (marini e terrestri), che lo attraversano e lo alimentano. Ma non è solo un nodo, è soprattutto un luogo che nasce dall'intersezione di usi, flussi, funzioni. Non è solo luogo dello svago, del loisir, ma anche luogo della produzione e del commercio.

In quanto parti della città capaci di generare nuove economie e nuove dinamiche di sviluppo inter-scalari essi sono in grado, da un lato, di connettere le città alle relazioni lunghe delle reti-mondo, dall'altro, sono capaci di generare nuova qualità urbana nel tessuto in cui si inseriscono.

Affrontare il tema della rigenerazione dei waterfront implica quindi che il progetto li affronti come componenti strutturali della città, come fattore condizionante e non più come elemento separato, e miri a potenziarne la funzione di interfaccia, come dispositivo territoriale in cui si producono flussi e si generano economie territoriali, nonché vengono attivati processi di riqualificazione urbana in grado di innescare strategie e progetti capaci di determinare un'integrazione nel segno della qualità delle funzioni urbane e, più specificatamente, portuali.

La riqualificazione di obsolete aree industriali lungo i waterfront è una delle maggiori sfide e opportunità delle nostre città. Alcuni tra i più importanti progetti degli ultimi 20 anni si sono cimentati proprio in questo argomento.

Le sponde dei fiumi, i porti, sono sempre stati il punto di partenza per le attività commerciali di import/export. La vicinanza all'acqua aumenta la competitività delle industrie. Lo spazio tra la città e l'acqua, tra le zone di produzione e le basi del trasporto, era il più attivo, fremente e frenetico del XIX secolo.

L'uso dei waterfront era quasi esclusivamente legato alle attività portuali o di produzione, ma il nostro sistema produttivo/economico non fa più così tanto affidamento su fabbriche ed industrie del passato. Lo sviluppo dei sistemi di produzione, insieme al processo di containerizzazione, ha spostato le basi del trasporto via acqua dai siti storici.

La conseguenza è che ci troviamo di fronte ad immensi spazi vuoti ed inutilizzati, spesso inquinati e anche molto vicini ai centri storici delle città di riferimento.

La sfida è quindi doppia; da un lato risulta necessario affrontare un problema di riqualificazione di ex aree industriali, con impressionanti ed improvvisi salti di scala, mancanza di omogeneità, servizi, collegamenti; dall'altro di fronte all'interpretazione del difficile rapporto tra città e waterfront, al bisogno di restituire all'area di Dokhaven la vitalità che la caratterizzava un tempo e che oggi è scomparsa, di renderla permeabile alla città pur mantenendo quel carattere di isolamento che ha sempre fatto proprio e che d'altronde distingue un po' tutti le aree industriali e portuali.

BREVE STORIA DI ROTTERDAM

Negli anni '80, è iniziata una fase di trasformazione urbana che sta modificando, attraverso la dismissione di aree industriali, impianti portuali e linee ferroviarie, l'aspetto di molte città italiane ed europee. Questo processo di trasformazione sta portando alla sostituzione di queste aree con programmi culturali, residenziali, commerciali e terziari, e alla necessità di integrazione tra diverse modalità di attuazione degli interventi, per far fronte alla complessità delle operazioni da realizzare. Consentendo di creare nuovi spazi pubblici, questi progetti favoriscono di fatto la riappropriazione di tali luoghi da parte dei cittadini.

*Con la riscoperta dei valori e delle potenzialità della città storica, si conclude alla fine degli anni '60 il ciclo della ricostruzione della Rotterdam del dopoguerra. Il bombardamento a tappeto ordinato dal cancelliere della Germania Nazista nel maggio del 1940 spezza drammaticamente la continuità e organicità urbana, ancora confermata e amplificata nel 1939 dall'importante pubblicazione di un libro sull'edificazione di Rotterdam nel periodo prebellico. **Rotterdam en hoe het bouwde**, scritto da Wattjes en De Bosch nel 1941, si può considerare un frammento di memoria attraverso il quale è possibile ricordare una città e la sua architettura, così come erano nate e si erano sviluppate in un continuum storico simile a quello di altre realtà europee. Le immagini pubblicate raccontano la storia di edifici e parti di città la cui presenza segna l'avvicinarsi di culture, politiche e posizioni disciplinari nella costruzione e gestione dello spazio urbano. Stili e neo-stili, spazi pubblici e privati, piazze e parchi, complessi edilizi e singoli monumenti formavano il contesto in cui cominciavano ad inserirsi frammenti di architettura moderna, che proprio nella dialettica storica acquistavano significato.*

La continuità, che non è solamente di costruzione, ma anche di cultura, politica e società, si interrompe e si spezza con la distruzione del centro storico. Dalle ceneri sorge una Fenice, simbolo, per la città, dell'inizio della ricostruzione, che porta un messaggio di stimolo alla rinascita, nel quale però la memoria è soppressa.

Già i piani per la ricostruzione, disegnati durante il periodo bellico, sono dominati da una chiara tendenza funzionalista, che si radicalizza negli anni del dopoguerra, trovando nella mutilata Rotterdam un fertile terreno per espandersi.

*In questa prospettiva risultano profetiche le considerazioni di Giuseppe Samonà, che nel libro **L'urbanistica e l'avvenire della città**, del 1973, annota:*

Quanto a Rotterdam si può parlare veramente di un'occasione perduta. La mediocre ristrutturazione del centro, tripartito da arterie convergenti che si illudono di riproporre e sottolineare l'antica configurazione, impostando la nuova sul triangolo e negandola proprio con il taglio delle arterie di circolazione che scompongono malamente il triangolo e con la mediocre suddivisione dei lotti, è constatazione troppo evidente per insistervi. Questa poco convincente impostazione dei criteri del piano urbanistico è la causa principale della scarsa aderenza allo scopo delle strutture architettoniche del centro degli affari vero e proprio, che ha assunto le proporzioni e l'aspetto di un'elegantissima serie di padiglioni da esposizione e contrasta con il prestigio di un centro vitale dell'importanza di Rotterdam.

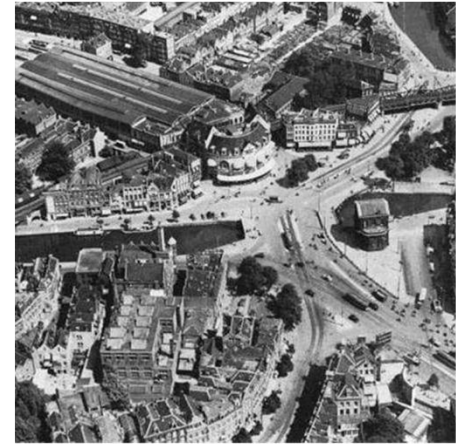


IMAGE 1.

Hofplein, Rotterdam, before the II World War

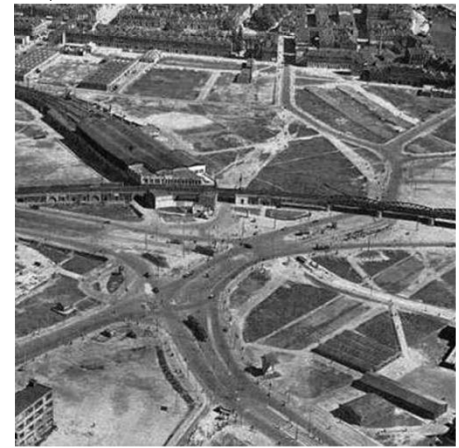


IMAGE 2.

Hofplein, Rotterdam, 1945



IMAGE 3.

Hofplein, Rotterdam, today

In questa logica compositiva, sia a scala urbana che architettonica, si inseriscono i grandi interventi di edilizia popolare nella periferia di Rotterdam, che delineano il panorama architettonico fino agli anni '70, quando il desiderio di un rinnovamento culturale promuove la ricerca di una nuova metodologia professionale, nella quale funzione e costruzione trovano un rinnovato rapporto con la composizione architettonica, la tradizione e la storia.

*Una fondazione autonoma, legata e finanziata dal Comune di Rotterdam, la **Rotterdamsche KunstStichting**, organizza alla fine del decennio, una serie di iniziative volte ad instaurare un nuovo dialogo tra architetti ed urbanisti con la politica e le istituzioni di piano, attraverso dibattiti e incontri, pubblicazioni e mostre, coinvolgendo studiosi, architetti e accademici, sia olandesi che europei.*

*Tre critici, Dal Co, Frampton e Von Moos, vengono invitati a rileggere la Rotterdam della ricostruzione e agli inizi degli anni '80 si apre un nuovo dibattito sul rapporto tra storia e progetto. In questo contesto si colloca l'**AIR** (Architecture International Rotterdam), importante evento culturale nell'ambito del quale viene lanciato il progetto di concorso per la ristrutturazione della vecchia zona portuale a sud della città (Kop Van Zuid), al quale sono invitati Rossi, Walker, Ungers, Kleihues e Meyer (1983). Si apre così un ciclo di nuove attività progettuali in cui la problematica dell'integrazione dell'architettura viene affrontata alla luce di un nuovo rapporto con la tradizione e di un rafforzamento dell'immagine urbana.*

*L'iniziativa di una nuova lettura della città costruita negli ultimi vent'anni, intitolata **Reviewing Rotterdam**, da parte di tre critici internazionali, Michael Speaks, Angelika Schnell e Jaime Salazar, ripetendo nel 2007 l'esperienza degli anni '70, ha riportato alla luce una serie di problemi soprattutto legati alle attività urbanistiche che a Rotterdam hanno dimostrato di non essere sufficientemente autonome rispetto a tematiche internazionali e globalizzanti. Il difficile rapporto tra continuità e rinnovamento, fra edificio e città, fra composizione e costruzione, è ora dunque il tema centrale della produzione architettonica a Rotterdam, un'architettura che ha superato i traumi della ricostruzione e tende a recuperare una posizione autonoma e cosciente delle proprie responsabilità rispetto alla città ed alla storia.*

2.0| TOPICS

2.1| WATER

Water in the city is an ambivalent matter. On the one hand, rivers rise above banks, flood cellars, and show people how close they are to being inundated. In Venice, as in Cologne or Rotterdam, residents learn to live with seasonal high water levels. Elsewhere, unexpected heavy rains cause repeated floods and make the subject of water the main focus of discussion and planning. Seepage, retention, and drainage retardation acquire increased importance in project planning. Engineers and landscape architects develop technical and aesthetically pleasing concepts for dealing with water.

On the other hand, ever since sewage has been cleaned and rivers are no longer used as canal for waste water, the design of river banks tops the hits among urban development projects. Rivers and beaches are being brought back into the urban picture.

In many cities new residential districts and workplaces, cultural venues, parks and promenades are being set up next to the water in attractive sites where shipyards and water houses had spread out only recently.

2.1.2| WATERFRONTS

Many urban economies that flourished in the 1960s on the basis of manufacturing and port industries, had plummeted in economic crisis two decades later. Traditional manufacturing industries abandoned their water-bound sites and moved to suburbs – if not in the middle and low income countries, or simply closed down – while ever-larger ships and maritime technologies have caused port activities to leave the central city locations.

When factories and working ports disappeared, they left abandoned sites and old warehouses, rusty cranes and severely polluted wharfs and railways yards behind, in or near the city centre. For some time, these physically deteriorated tracks of land laid a burden upon the city. However recently, more and more cities began to perceive their waterfronts as an asset rather than a problem, since these offer land for new urban development in inner cities at water-bound locations. Redevelopment of these particular sites not only return these into the urban property market, but is also increasingly considered to offer a great potential to boost the postindustrial transformations [2].

In this context, rather than talking about waterfronts, it should be more correct to name these shorelines as **URBAN WATERFRONTS, with the meaning of water's edges in cities and towns of all sizes.** *The water body may be a river, lake, ocean, bay, creek, or canal.* As a consequence, I consider waterfront projects as *everything from a wildlife sanctuary to a container port, and the full spectrum of uses in between. The project may be planned as a unified undertaking, or it may be a haphazard development occurring over time, with multiple owners and participants* [3].

Complex and multifaceted, current waterfront redevelopment is attributable to a number of factors like:

- _ technological changes post World War2, which led to the abandon and the deterioration of millions of square meters of industrial land along shorelines
- _ historic or cultural preservation movements
- _ growing environmental awareness and water cleanup
- _ urban renewal and demand for more high-located space

These and other forces combined, brought substantial changes in the last 50 years, that have altered the face of urban waterfronts.

The recent shift from predominantly industrial use of urban waterfront is as profound as the initial 18th and 19th century development of harbors and shores for industry, and its use in the earlier time of shipping, storage and shipbuilding.

The first waterfront redevelopment projects were started in North American cities, in particular Baltimore and Boston, already in the 1960s. Nowadays, waterfront redevelopment is a global trend and thousands of schemes are being carried out in large metropolis, medium-sized cities and even small towns all over the world. Whereas the early examples of waterfront redevelopment primarily focused on leisure and retail, contemporary schemes have a broader scope. Many are set up with the aim to create attractive mixed urban environments that appeal to the imagination of people and persuade them to work there, to live there or to visit them.

The contemporary omnipresence and scope of waterfront redevelopment programs can be understood within a dual perspective. The first one is the nature of postindustrial urban economic development. Success stories are primarily based on high level business services, innovative industries, professionally skilled and creative workers, and consumption of in situ produced cultural products and leisure and entertainment services. Consumption of intangible experiences has become an increasingly important component of both contemporary urban culture and production. The second perspective is the increasingly frenetic international territorial competition that cities are involved in, within the contemporary global network economy. Principally, this competition is on luring investments, professional workers and well-to-do visitors, that play a key role in the postindustrial urban economy.

Breen and Rigby [4] assign redeveloped waterfronts into six distinct groups: commercial waterfronts, cultural, educational and environmental waterfronts, historic waterfronts, recreational waterfronts, residential waterfronts and working waterfronts. This is, in their own judgment, a *sometimes arbitrary grouping*. No waterfront, especially to larger waterfronts, is exclusively commercial, educational, residential or working in nature. Many are home to a large variety of urban functions, flagships projects and commercial enterprises. Balanced complementary of functions and projects, including high level housing and services, cultural and creative industries, shopping areas and flagships of entertainment, appears a prerequisite for successful waterfront redevelopment in the sense that *these formerly abandoned sites will be turned into dynamic nodes of postindustrial urban economies* [5].

To strengthen the change of success, these different programs are often supplemented with eye-catching packaged landscapes, including various permutations of architectural renovations, heritage themes, specially commissioned public art program and newly designed or renovated squares [6].

The presence of population of residents, knowledge workers, shoppers and spectators in such multifunctional waterfronts creates, in turn, an economic basis for commercial services and keeps the area lively at both daytime, nighttime and in weekends. It is no question that leisure and entertainment in its broad definition, including for instance catering, museums, entertainment, shops, parks and historic heritage, are key functions in successful waterfront development.

[2] Wang C., *Waterfront regeneration*, MSc in City and Regional Planning, Cardiff University 2003

[3] Breen A., Rigby D., *Waterfronts. Cities reclaim their edge*, McGraw-Hill, New York 1994

[4] Ibidem

[5] Ibidem

[6] Romein A., *Leisure in waterfront redevelopment: an issue of urban planning in Rotterdam?*, OTB Research Institute for Housing, Urban and Mobility Studies, Delft University of Technology, Delft taken from Hall T., *Urban Geography*, Routledge, Contemporary Human Geography Series 1998

2.2 | ARTIFICIAL LAND

Rapid industrial and commercial expansion, in recent years, has created the need for more land. One of the options to create more land is to reclaim coastal soil.

Land reclamation can be defined as the **creation of dry land** from an area covered by water. Land reclamation can also refer to the process of recovering land that is damaged and abandoned and making it usable again.

In both cases, the term is used to refer to some sort of process which is designed to fundamentally alter the characteristics of a piece of land to achieve a desired goal.

The practice of filling in wetlands and waterways to make more land is ancient. Humans tend to settle near water, since they need water to survive, and because waterways can be used as a method of transportation for people and goods. As human settlements grew, the pressure on the existing land also grew, and people started to expand outwards by filling in the surrounding area. Land reclamation has historically been accomplished with garbage and other landfill materials, making reclaimed areas highly unstable and prone to developing sinkholes. Otherwise, nowadays we are surrounded by hundreds successful examples of land reclamation.

There are three major methods to create dry land

_ LANDFILL: create land by draining waterlogged areas such as swamps and marshes and filling them with material like sand to form dry land

_ EMPOLDERING: method of creating land from the sea through the use of polders

_ RECLAIMING DERELICT LAND (poor farming practices)

1. through usage of fertilizers.
2. letting the land lie fallow.

The Empoldering method is widely adopted in the Netherlands, and refers to the creation of polders, which are pieces of land in a low lying area reclaimed from a body of water by building dikes and through drainage. They are usually carried out in low-lying coastal areas, and it can also apply to areas that are further inland like lakes.

The steps of Empoldering are basically four. Firstly a dike is built surrounding the targeted reclamation land. Later, dikes and construction pikes are used to retrieve all the water from the land. Next, when the land has dried, reeds are being sown by an aircraft and after three years the reeds are being burned and the fertile ash is used to make the soil arable. Finally, crops can be cultivated on that piece of reclaimed land, or buildings can be built on it.

Land reclamation has always been considered a precious instrument for the development of small countries, like Netherlands or Singapore, as they can use their newly reclaimed land to expand their industries and earn profits.

2.2.1 | THE POLDER METHOD

GOD HAS CREATED THE WORLD, BUT THE DUTCH CREATED NETHERLANDS

A polder is a low-lying tract of land enclosed by embankments, known as dikes that forms an artificial hydrological entity.

There are three types of polder:

_ Land reclaimed from a body of water, such as a lake or the sea bed

_ Flood plains separated from the sea or river by a dike

_ Marshes separated from the surrounding water by a dike and subsequently drained

Polders are at risk from flooding at all times and care must be taken to protect the surrounding dikes. Dikes are mostly built using locally available materials and each has its own risk factor: sand is prone to collapse owing to oversaturation by water while dry peat is lighter than water, making the barrier potentially unstable in very dry seasons [1].

The Dutch have a long history of reclamation of marshes and fenland, resulting in some 3,000 polders nationwide [2]. About half the total surface area of polders in north-west Europe is in the Netherlands. The first embankments in Europe were constructed in Roman times, while the first polders were constructed in the 11th century.

As a result of flooding disasters water boards called *waterschap* (when situated more inland) or *hoogheemraadschap* (near the sea, mainly used in Holland) [3] were set up to maintain the integrity of the water defenses around polders, maintain the waterways inside a polder and control the various water levels inside and outside the polder. Water bodies hold separate elections, levy taxes and function independently from other government bodies. Their function is basically unchanged even today. As such they are the oldest democratic institution in the country. The necessary cooperation between all ranks in maintaining polder integrity also gave its name to the Dutch version of third way politics, the Polder Model.

The 1953 flood disaster prompted a new approach to the design of dikes and other water-retaining structures, based on an acceptable probability of overflowing. Risk is defined as the product of probability and consequences. The damage in lives, property and rebuilding costs is offset against the cost of water defenses. From these calculations follows an acceptable flood risk from the sea at 1 in 4,000–10,000 years, while it is 1 in 100–2,500 years for a river flood. The established policy forces the Dutch government to improve flood defenses as new data on threat levels becomes available.

[1] Reh W., Steenbergen C., Aten D., *Sea of Land. The polder as an atlas of Dutch landscape architecture*, Architectura & Natura, Amsterdam 2007

[2] Farjon, J.M.J., J. Dirks, A. Koomen, J. Vervloet & W. Lammers. *Neder-landschap Internationaal: bouwstenen voor een selectie van gebieden landschapsbehoud*. Alterra, Wageningen 2001

[3] <http://www.waterschappen.nl/mijn-waterschap.html>

2.3 | THE DUTCH URBAN BLOCK

The urban plan is determined by the distribution of streets, blocks, water and open spaces. Seen as a design unit, the block has both an urban planning and an architectural dimension. In a sense, it can be defined as the link between architecture and urban planning.

Seen as an urban planning unit, the block may consist of several plots or a single plot [1]. Furthermore, the spatial and programmatic organization of the buildings in the urban blocks, determines what is public and what is private.

Compared with blocks in cities like Berlin, Paris and Vienna, which underwent major changes during the 18th and 19th centuries, the shape of Dutch blocks was atypical. Block in major European cities were usually larger and, above all, deeper and more square. Access was via one or more successive courtyards [2].

What was unusual about Dutch blocks was not only their length and depth, but also the shallow depth of the buildings that formed the perimeter.

One reason for the different shape of the block, was the morphology of the underlying land structure. The way in which polders were divided up for agricultural purposes, became the model for the development of Dutch cities. Land division techniques largely determined the size and shape of blocks, and their subsequent shape as urban blocks. The way in which towns and cities were built and densified was frequently based on the underlying pattern of plots and drainage ditches.

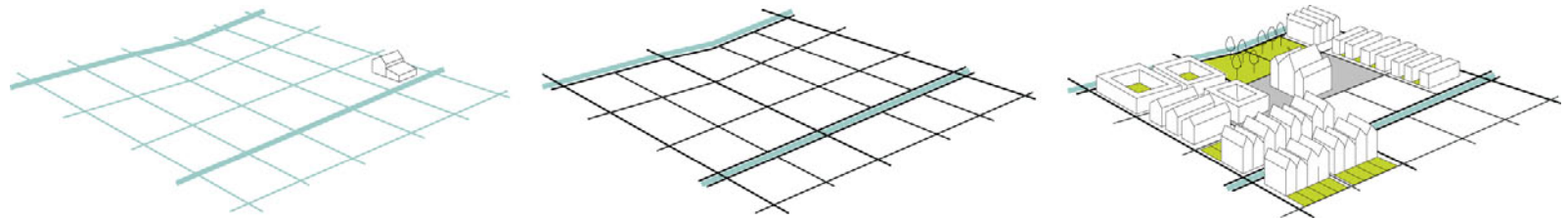


IMAGE 4.
Development model of Dutch cities

The soft polder soil required construction techniques that could cope with *subsidence*. In technical terms, this meant that houses had to be able to hinge. The result was widths of 3.5/6 meters, based on the lengths of the wooden floor beams, and at the time small enough to even out vertical shifts due to differing rates of subsidence over a row of houses.

Dutch cities, like British ones, were originally *cities of homes* [3]. In both countries, the individual dwelling, consisting of a wide and narrow section, was for a long time the main component of the urban block. In this architectural and urban planning model, the basic feature of the urban block was the **INDIVIDUAL DWELLING**.

In Netherland, this can be traced back to the morphology of the underlying land structure, the shape of the block and the political structure of the Dutch Republic.

The organization of the Dutch house in the Amsterdam ring canals, dating from the seventeenth century, where production and consumption were not yet separated, is a clear example of how private and public space overlap each other. The front room was used as trading office, and the broad part of hallway next to it forms part of the public domain as of the private realm of the house.

The organization of stoop and outdoor stairs is of a significant importance. The stairs access the house and trading office. Stoop and hatchway give way to the basement in the front house that was usually hired out as storage and a selling room for items of urban bulk, like wine and beer.

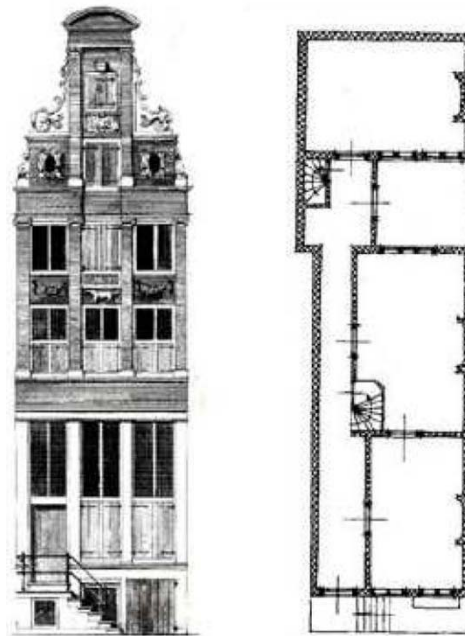


IMAGE 5.
Amsterdam canal house

Today this spatial arrangement is still very much appreciated if we take into account the amount of small-scaled, often creative businesses that are housed in Netherland. In fact, the classical dutch way in which residences are set up, expects the work related programs to be located on the ground floor, living on the *bel etage* [4] and sleeping on the upper floor.

However, on the scale of the urban block it is possible to distinguish a comparable increase of the separation of functions during time. Economic activity that formed a self-evident element of any urban block in the seventeenth to nineteenth century city extensions gradually vanished [5]. The one-sided emphasis upon social, cultural and hygienic aspects of dwelling led to a considerable transformation of the urban block, not only in relation to its programmatic and functional aspects but also in its spatial arrangements. The new neighborhoods and urban blocks built by the housing corporations after the Dutch Housing Act in 1902 were mainly meant to be lived in by groups of inhabitants that share the same background.

The Dutch Housing Act legally established housing in the Netherlands as a shared national responsibility and addressed the perceived need for adequate housing in two ways, increasing quality and increasing quantity.

To address the physical quality of residences, the Act required that *municipalities establish building regulations*. This action laid the groundwork for improvements such as better ventilation, drinking water, fire safety, water closets and even the transition from sleeping cupboards to bedrooms. Similar concerns, including efforts to improve air quality and water safety were also being addressed in the United States during this period.

But now, at the beginning of the 21st century, the Dutch urban block needs once again a transformation if we considers global economic changes and worldwide migration. The contemporary Dutch urban block should, as in the 17th and at the end of the 19th century, be able to offer a public domain to city inhabitants, visitors and migrants.

- [1] Claessens F., *De stad als architectonische constructie: het architectonisch discours van de stad (Duitsland 1871-1914)*, Uitgave Publicatieburo, Delft 2005, p. 180
- [2] Komossa S., *The Dutch urban block and the public realm. Models, rules, ideals*, Vantilt Publisher, Nijmegen 2010, p.21
- [3] Ibidem
- [4] bel etage in Dutch means main floor
- [5] Komossa S., *The Dutch urban block and the public realm. Models, rules, ideals*, Vantilt Publisher, Nijmegen 2010

3.0| CONTEXT

3.1| ROTTERDAM

Rotterdam is the second-largest city in the Netherlands and one of the largest ports in the world. Starting as a dam constructed in 1270 on the Rotte River, Rotterdam has grown into a major international exchange centre, thanks to its strategic location. The city has in fact developed at the Rhine-Meuse-Scheldt delta on the North Sea and at the heart of a massive rail, road, air and inland waterway distribution system, that stretch out throughout Europe. This is the reason why it is often called the **Gateway to Europe**.

Located in the Province of Zuid Holland, Rotterdam has a population of about 616,003 inhabitants (November 2011), while the population of the greater Rotterdam area, called *Rotterdam-Rijnmond*, is around 1.3 million people.

The largest port in Europe and still one of the most active ports in the world, the port of Rotterdam was the world's busiest port from 1962 to 2004, at which point it was surpassed by Shanghai.

Even if it is quite clear how water has always been playing a key role in Rotterdam's life and development, we should also consider that half of the country lies below 1 meter above sea level, with 1/8 of the country lying below sea level. Without an extensive network of dams, dykes and dunes, the Netherlands would in fact be prone to constant flooding. As a predicted outcome of Global Climate Change, sea level rise could impact the Netherlands drastically, leading to social and economic devastation. Built mostly behind dikes, large parts of the Rotterdam are below sea level. For instance, the Prins Alexander Polder in the northeast of Rotterdam extends 6 meters below sea level, or rather below Normal Amsterdams Peil (NAP) or 'Amsterdam Ordnance Datum'. The lowest point in the Netherlands (6.76 meters below NAP) is situated just to the east of Rotterdam, in the municipality of Nieuwerkerk aan den IJssel.

3.1.1| CITY'S DEVELOPMENT

Rotterdam started out as a settlement on both sides of the *Rotte*, a tributary of the river *Nieuwe Maas*. It gained city rights in 1340. At the outset, Rotterdam was a small merchant town, shadowed by local rivals Dordrecht and Delft. In the following centuries, it continued to develop within a merchant tradition and, from the 17th century on, it substantially increased, making use of its position as a PORT. Thus commerce, fishing and shipping became pivotal economic elements. The town became home to some 30.000 inhabitants. In the second half of the 19th century, port expansion became the city's top priority. With a major port, Rotterdam developed into the essential link between the German hinterland and the sea, and thus a GATEWAY to Europe. The major transit ports on the south side of the river, among which DOKHAVEN, were established between 1880 and 1914. Population mushroomed. The city grew from some 153.000 inhabitants in 1880 to some 425.000 inhabitants around 1910. But then, on 14th May 1940, the German Luftwaffe flew over the city and needed but ten minutes to bomb and destroy the entire inner city.

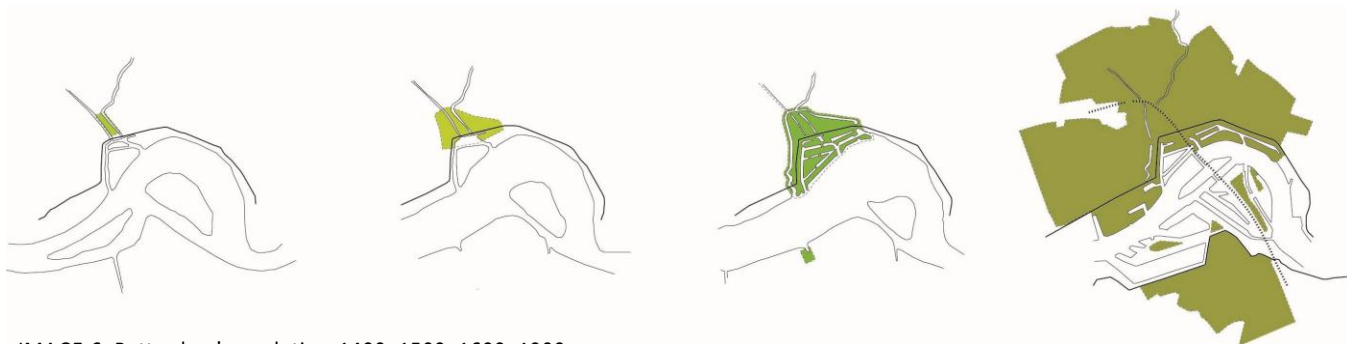


IMAGE 6. Rotterdam's evolution 1400, 1500, 1600, 1900

This confronted the local government with huge task to rebuild the entire inner city. The postwar reconstruction of the city was guided by the Basic Plan (*Basisplan*) of 1946. This plan was modernist in nature. Urban services were distributed according to a hierarchical spatial model. The functions retail, office employment and entertainment were concentrated in different districts of the city centre, while manufacturing was largely excluded. Residential programs were not outcast, but the prewar densities were considered too much high, and a new traffic infrastructure was designed to optimize the external accessibility of the city centre [1]. The historic Water City was part of the territory to which the Basic Plan applied, but the Plan paid little to no explicit attention to it. Most urban services were planned in a new city centre at some distance north of Water city, and the area itself became largely separated from this new centre by a dam to protect the city against the river and by new thoroughfares into the hearth of the city. In the early postwar decades, Rotterdam wrestled with a considerable housing shortage. Since this problem appeared to be very hard to solve, notwithstanding large suburban extensions at the southern fringe of the city, the Working Paper Restructuring Old Docklands (*Discussienota Herstructurering Oude Havengebieden*) of 1975 allotted abandoned docklands in Water City for house-construction in addition to new office buildings.

In 1985, the Inner City Plan (*Binnenstadsplan*) succeeded the Basic Plan of 1946 as a spatial plan for the entire inner city. This new plan formulated the ambition to create an inner city with a national and even European aura. The plan introduced a new perspective on the relationship of the city centre with the river. Rather than hiding the city centre behind dikes, this should be connected to the river, together forming an extended inner city. Theoretically, waterfront development is not an independent field of planning and policy, but is part of inner city development planning that involves a larger area and more objectives. The initial physical interventions within the framework of the Inner City Plan involved primarily the redevelopment of the historic Water City and its direct vicinity, the so called Maritime Triangle. Next to office and housing projects, these interventions also included several projects that would contribute to the strengthening of the city's leisure economy. This was an outcome of the burgeoning awareness among policy makers, facing the end of the golden age of urban industrial economy, that opportunities for tourism and leisure as economic sectors were substandard, if not inferior, in Rotterdam.

The 1990s were the decade of the leap of inner city development across the river to its south bank, where land for new urban developments had also become available as a consequence of the ongoing westward move of the port. This leap across the shift implied that policy attention shifted to a new program of waterfront redevelopment: Head of South (*Kop Van Zuid*). Within the framework of this program, several thousands of new dwelling, primarily for middle and high income groups, new office buildings, specialized fun shops, an exotic supermarket, bars and restaurants and some flagships, like a new theatre and a new marina have been realized. These new leisure functions are highly concentrated in two clusters: Wilhelminapier and Entrepot. A particular input to the development of the Head of South has been given by the construction, in the middle 1990's, of a new bridge, the Erasmus bridge. This not only directly connect the Head of South to both the north bank of the waterfront and the shopping and entertainment district of the city centre, but that has also become an icon in Rotterdam's international city marketing campaign.

The Spatial Plan 2010 (*Ruimtelijk Plan Rotterdam 2010*), which passed the municipal council in 2001, builds on the vision on the waterfront that was launched in the 1985 Inner City Plan. The strengthening of the national and international competitiveness of the city as a place to live, work, shop and entertain is explicitly mentioned as an objective. The Plan distinguishes three so called strategic area in the city. Building on the extension of the inner city to the Head of South, the *Inner City on two Banks*, is one of these three strategic areas and includes the entire waterfront at both sides of the river. New residential projects are part of the program for this strategic area, but this also lays much emphasis on tourism, cultural, entertainment and recreational programs, as well as on improvement of the quality of public space in the waterfront. This reflects the growing awareness that leisure and tourism have become an increasingly important sectors of the urban economy.

The growing awareness of the importance of leisure and tourism in postindustrial urban economies is further elaborated in the policy document *The City as Experience (De Stad als Belevenis)* published in 2002 [2]. This document intends to give an initial impetus to an integrated leisure policy in Rotterdam for the years to come. It connects the development of ten specific leisure themes with twenty four clusters in the city, principally the inner district. The themes are divided into five general metropolitan programs (shopping, entertainment, culture/festivals, open air recreation and

nostalgia) and five specific Rotterdam themes (modern architecture, port/water/maritime, young and renewing, multicultural and film/audiovisual). Six of the twenty four clusters together make up most of the waterfront at both sides of the river. These clusters all share the Rotterdam topic port/maritime/water. Each cluster supplements this theme with some others to different combinations of themes that should be developed in mutual coherence. Hence, the waterfront 2010 consist in as far as leisure is concerned, of complementary clusters where different forms of culture, entertainment and recreation are developed within built environments and atmospheres that are based on the presence of water and history as a working port.

RECENT TRENDS

As a main port, Rotterdam is a city of international importance and interests. The tremendous growth of the economies in Asia and Eastern Europe has put pressure on the international competition among urban regions. On this topic, on the urgency to keep playing a significant role in the international competition, has been developed the Spatial Development Strategy 2030 (*Stadsvisie Rotterdam*), where the goal is to accelerate Rotterdam's development, in order to strengthen its position nationally and internationally [3]. At a rapid pace Rotterdam will be pursuing the course to become even more attractive to residents, companies and visitors. In 2006 the City Council adopted the concise vision *Rotterdam, Gateway to Europe*. It sketches the broad lines for the spatial and economic development of the city till 2030, based on two major objectives: strong economy and attractive residential city.

Both objectives are inextricably linked. To be able to live in the city there must be good housing and suitable employment. Employment, in turn, thrives only when the city can offer favorable conditions for business development, quality housing including the accompanying facilities and public space. In other words, complete residential environments that meet the demand of housing consumers.

If a favorable work and residential climate is considered an indispensable condition for a stronger city, the realization of it within the existing urban area will offer maximum benefits and will lead to the efficient use of the scarce space. Furthermore, in this way an optimum advantage will be taken of the existing facilities and the outskirts will be spread. The potential already present in the city has to be unlocked first: the port, the promising economic growth sectors, popular residential districts and the modern city centre on the river. These strong urban elements form the basis for the strategy with the oil silk effect that Rotterdam intends to deploy: *what is strong will generate strength, what is weak(er) will drive support from what is strong* [4].

But good housing alone is not enough for an attractive residential city. Therefore, Rotterdam wagers on fully-fledged, quality residential environments by devoting a great deal of attention to public space and the indispensable facilities (education, child care, medical and social, sports and games and so on). In order to attract more families with children and medium/high income groups, the residential environments of strong districts will be extended. Top priorities in weaker districts are then the restructuring and tackling of the existing housing stock.

In practice, building within the existing city means that Rotterdam has set a target for itself to increase the density of housing stock by 56.000 dwelling at inner urban areas.

This is the reason why the new plan, in force since 2007, also include a chapter named *International City on the River*, focused on the development of the areas along the water. The strategy is centered on three elements. The excellent port, the gradual transformation of port areas into urban areas and an attractive and fully-fledged city centre.

As part of the container transshipment will disappear from the Stadshavens, new business locations will become available to companies active in port-related growth sectors. Furthermore, the relocation will enable improving the conditions for international business activities, the development of new forms of knowledge intensive activity in the creative and services sectors, and the creation of unique living/working environments by the water's edge.

The strategy towards the city centre comprises four steps. Increasing the general standard of public space and slow traffic routes, strengthening the quality of life and the identity of various districts in the city centre, phased transformation of a limited number of prime locations into great crowd pullers and securing the permanent accessibility of the city.

The postindustrial transformation of the city's economy proceeds slowly and with great difficulty [5]. Compared with its eternal rival Amsterdam, that has been more successful in this transformation, growth rates of employment in specific postindustrial services and industries, were considerably lower in the years 1996-2002. Furthermore, the creative class, as defined for the Netherlands, amounts to 27% of the labor force in Amsterdam against only 21% in Rotterdam. Finally, Amsterdam performs better in the sectors of leisure, entertainment and tourism, in particular foreign tourism. It is no question that the number of visits to Rotterdam for leisure purposes has rapidly increased during the past few years: from 12,4 million to 17,5 million in 2003 [6]. The city's modern high rise architecture, fun shopping zones, extended agenda of summer festivals, sport events, rock concerts and museums attract more and more people. Hence, the increased attention by Rotterdam urban planners and policy makers for leisure and tourism during the 1990s seems to have been fruitful. The scope of these sectors is, however, predominantly regional. 77% of the visits for leisure purposes to the city in 2003 were paid by people from either the city itself or its province (Zuid Holland), against less than 2% by foreign people. Hence, the category of visitors that spend most money, those who stay overnight, amounts to only a very limited share of the total number of visitors. The numbers of hotel guests and hotel nights amount to less than one tenth of those in Amsterdam [7]. Rotterdam still has a world to win, where it comes to persuading tourists to stay overnight.

Awareness that Rotterdam's city centre is now lacking in allure is widespread. The public space must transform the city into public domain. A break with the past has been signified in the fact that now, on the heels of a period during which, just as in the reconstruction phase, the public space was approached in project terms, a comprehensive operation to improve the quality of public space is being set in motion.

Rotterdam is on the cusp of a new wave of reconstruction, which will bring further concentration of uses and a mix of functions. In the coming years, the city will be undergoing a true metamorphosis, including the construction of a new train station and surrounding neighborhoods, the completion of the urban development in former harbor areas as well as the densification in the reconstruction areas.

Planners and policy makers in Rotterdam have thus recognized the potential of the waterfront for the turn of the city's image and economy. They define the open space and horizon that the river offers as a contrast to the high density of the city centre, a unique selling point of Rotterdam.

But the efforts to redevelop the waterfront into a dynamic node of urban development are not brand new. Both urban government and private investors have started about two decades ago. High-level residential projects, new office towers, leisure activities and services have been developed on the waterfront since the middle 1980s. This does not mean that the job is done yet. Waterfront development is a long-term process that has to cope with changing economic and political conditions across electoral cycles.

3.1.2 | ROTTERDAM & WATER

The city of Rotterdam is not only on water, but on a very significant stretch of water, Europe's principal river, the Rhine.

The Rhine has brought trade, prosperity and culture to the Netherlands since the days of Romans and the Teutons when the river was the only infrastructure. The Rhine, together with the Meuse and the Scheldt, drains the western part of the Netherlands, the only part of the Netherlands properly called Holland, before discharging in the North Sea [8].

Rotterdam is the second world's largest port and by far the biggest in northwest Europe. The Rhine axis has been connected to the Danube and to transshipment hubs for road and rail transport along the entire length of the river.

Existing and created conditions in the Netherlands have been instrumental in expansions of the Port of Rotterdam. Over the past fifty years, these expansions have been justified time and again by the global organization of transport. The world's largest oil and container ships can dock at the terminals directly from the open sea, thanks to the repeatedly deepened navigable channel in the North Sea.

Seen from the perspective of the city, however, the *working port* has moved about 40 km away from the inner city and the number of jobs it offers to the city's labor force has decreased for quite some time now [9]. In the 1900s, most of the working port was concentrated in the historic Water City *Waterstad*, located on the north bank of the river Maas, that connects the city within the North Sea. Water City was directly adjacent to the actual city centre. Since the end of the 19th century, Rotterdam developed into the major port of transit for the industrializing German hinterland. Since most of the harbor basins in Water City were too small to handle the volume of this trade, new harbors were constructed in the first decades of the 20th century at the south bank of the river opposite and west of Water City, where more space was available. In the three decades after the Second World War (1945-75), the port expanded impressively to more or less the current spatial scale. These decades constituted the period of the *great leap westward* in the direction of the North Sea. In this direction, subsequent large scale extensions of the port were constructed. These extensions have provided space for the relocation of port activities from Water City and from harbors opposite, as well as for new developments. These latter are first and foremost the building up of a large-scale petrochemical industry and container transshipment [10].

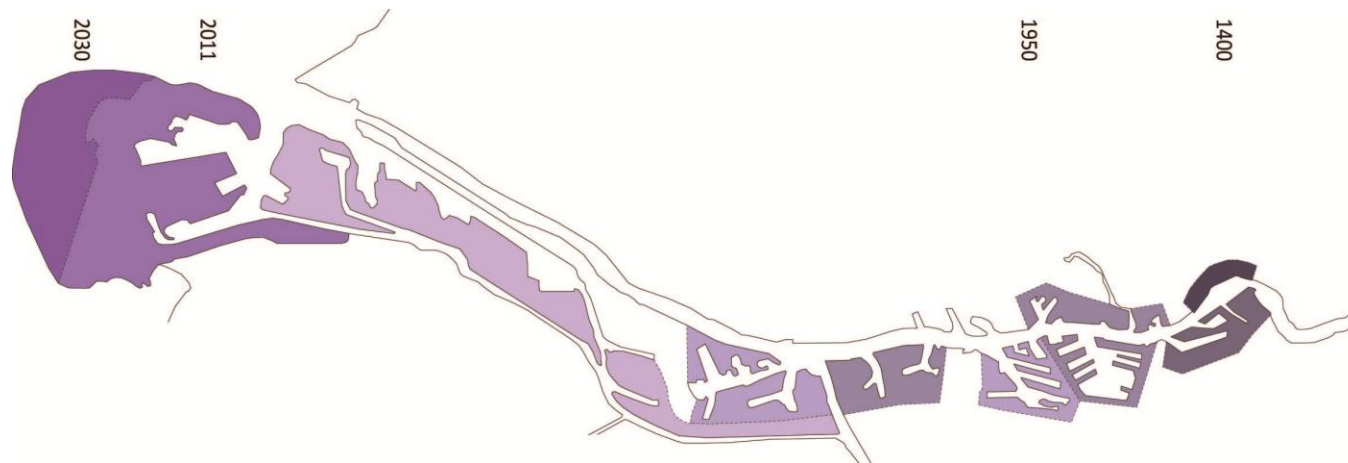


IMAGE 7.
Rotterdamse
WATERWEG
evolution

Consequently, the working port has totally disappeared now from Water City. At the opposite south bank of the river, some port activities still take place, but harbor basins there are also much less lively than they were a few decades ago.

Hence, the inner city has gradually disposed of a growing surface of former docklands for other urban developments throughout the postwar period. In the past 20 years, many new urban functions have thus developed in the waterfront. The functional profile of the area is now dominated by residential developers and offices, in spite of the increased attention by planners and policy makers for leisure and tourism since the middle 1980s. In square meters of real estate floor space, both housing and businesses, were over six times as large as leisure and entertainment in 2004 [11]. This amount of fixed floor space for leisure is exclusive of some large temporary outdoor events, ranging from one weekend (World port festival) to the summer season (city beach), that attract a few hundred thousands of visitors.

The popularity of living and working in offices by the river is now rather evident. It is an area with fantastic panoramic views that no other Dutch city can match, but to the detriment of culture, leisure and entertainment.

The task of the *Stadsvisie Rotterdam 2030* is just this one. To give the city an opportunity as a centre of urban culture, leisure and entertainment, also on the waterfront.

The statement is that urban culture, leisure and entertainment (in addition to housing and employment) can determine the new relevance of the waterfront. But an important question is to what extent the waterfront of the city can and must develop in a specific/local or generic/global way.

Linked to this, is the further question of how the relationship between the economy and leisure time and the daily activities of the city on the river could develop.

Can the waterfront develop into a cultural and economic experience of some importance? Or is *ordinary city* the right option, a waterfront with impressive open spaces, maritime activities and a great deal of space for spontaneous informal use? Where is the tension? What is the right mix?

Rotterdam has been working for at least 15 years systematically on the reconstruction of its central area. Utilizing the dynamics of the market, the city is being re-oriented. That is necessary because nothing takes place of its own accord. Orientation across the river, vertically, and on the new networks of the Delta Metropolis. But also oriented on the realization of special thematic spearhead areas in the fields of culture, museums, shopping, theatre, leisure and entertainment. The task of functional-spatial clustering is also applicable to the waterfront project. In the strategic reorientation of the city on the river the waterfront must be seen as a *passing place* between the left and right banks of the river Meuse. The new angles, the links, the relationships to adjoining urban districts, the use of water and the harbors and the relevance and design of public space, all play a crucial role [12].

Thereby, there are two backdrops against which the debate about the Rotterdam Waterfront can be placed. One is the scenario of optimum investments in the leisure industry and the other is the realization of a sustainable development of the city on the water. These scenarios, and everything associated with them, are regarded as building blocks about which at the end of the year a debate will be conducted. The objective is to provide inspiration, to seek a common objective and to find an answer to the question how the enormous wealth of ideas for the Rotterdam Waterfront can converge into a development vision for the coming 15 years.

But water is both a friend and an enemy of Rotterdam. Rotterdam was founded on water. Thanks to water Rotterdam has a major port. Everyone in the Netherlands knows the image of Rotterdam near the river. The fact that water can also be a threat to the city becomes clear in the title of the second international Architecture Biennale 2005, **THE FLOOD**

WATERPLAN 2 ROTTERDAM

'Water Plan 2 Rotterdam' outlines the water management objectives of the city of Rotterdam and the water boards for the next few years. These objectives need to be set out in specific terms, especially in view of the increasing evidence of climate change. Climate change can have a dramatic impact on Rotterdam. In order to make the city 'waterproof', a new approach is required in terms of water storage, water quality and flood protection

Waterplan 2 Rotterdam, p.5

Holland lies below sea level, and if it were not for the famous Dutch windmills of the past and today's electric pumping stations, working 24 hours a day, Holland would disappear under water.

Is therefore quite clear how important is the water topic for Netherland in general, and for Rotterdam, in relation to this work.

Within this new planning phases, Rotterdam Municipality (together with the Schieland and Krimpenerwaard Water Control Board, the Hollandse Delta Water Authority and the Delftland Water Control Board) has thus developed a further strategy related to the specific water topic, the *Waterplan2 Rotterdam*.

Water and spatial development are, in fact, inextricably linked, and the only way to tackle basic water requirements is by incorporating them in an urban planning approach. This document outlines how the municipality of Rotterdam and the water boards want to deal with the city's water in the period ahead. This needs to be set down on paper, particularly now that the signs of climate change are becoming increasingly clear. These changes could have major consequences for Rotterdam. In order to make the city waterproof, a new approach to water storage, water quality and protection from floods is needed.

The vision in the current plan goes up to 2030. That year was chosen because the new City Vision, the Spatial Development Strategy, also looks ahead to 2030. In the City Vision the municipal council states what it has in mind for Rotterdam. A city with a strong economy and an attractive place to live. This development and all the measures in this water plan are closely connected. Water is an important aspect of an attractive city, certainly one that profiles itself as *water city*.

In addition to this situation, there are three crucial developments that the city will have to face in the near future [13].

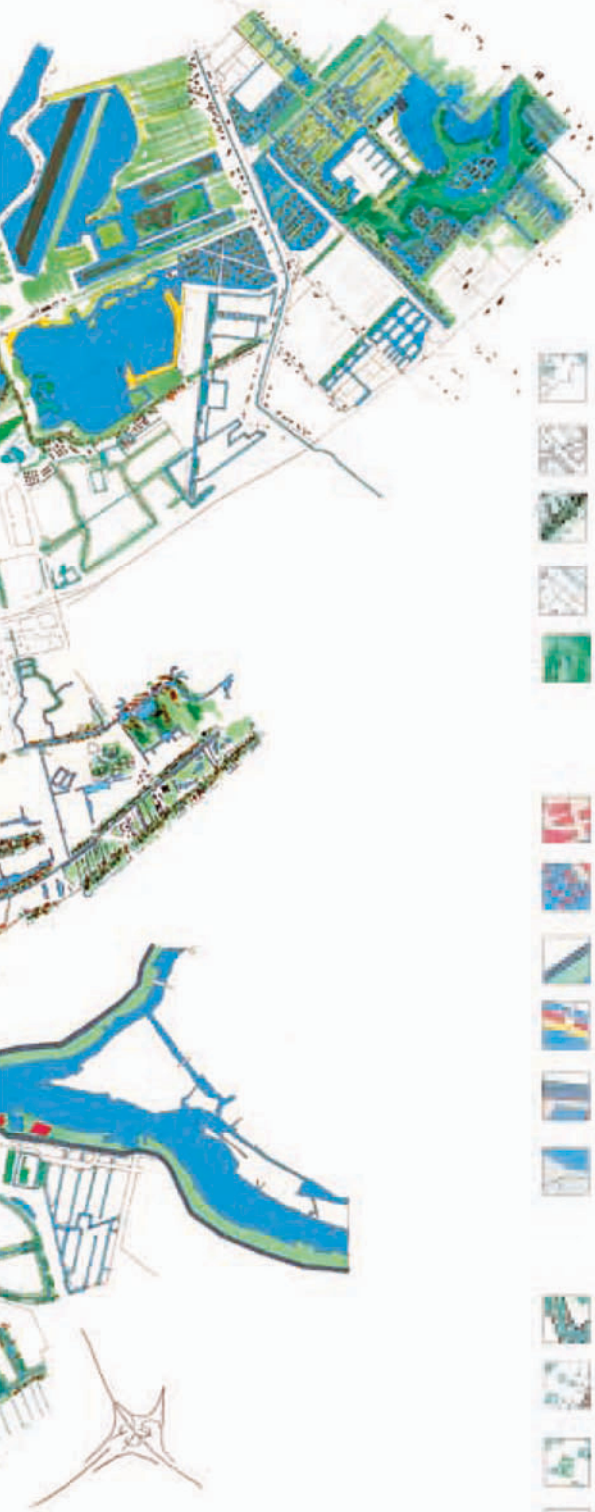
_ higher water level due to the rise in sea level. There is a risk of flooding in areas outside the dykes, and flood defenses will have to be reinforced
_ flooding caused by increasing rainfall. Due to the changing climate, a lot of rain can fall in a short period of time. In order to process that water, provisions are needed for collection and storage. At the moment, there is already a shortage of around 600.000 mc of storage. At least 80 hectares of extra lakes and canals would be needed to cope with this shortage by means of open water

_ stringent demands on the quality of water. Rotterdam wants to be an attractive water city, with clean, clear and plant rich water.

The city must also meet European requirements. So-called quality profiles, based on these requirements, are in the process of being drawn up for all stretches of water in the city.

PERSPECTIVE ROTTERDAM WATERCITY 2030





GENERAL

-  Residential areas
-  New residential areas
-  Construction lines
-  Industry and business areas
-  Public gardens and forest








RIVER CITY

-  Existing outer dyke construction areas
-  New outer dyke construction areas
-  Dyke structure
-  Dyke as urban balcony
-  Dyke as urban balcony
-  Outer dyke industrial areas

NORTH

-  Canals and waterways
-  Water plazas
-  Green roofs
-  Water gardens
-  (New) nature and recreational areas

SOUTH

-  Canals in Oud Zuid
-  Water plazas in Oud Zuid
-  Green roofs in Oud Zuid
-  Water plazas in suburbs
-  Water pearl Zuiderpark
-  Open water connection Zuiderpark-Carnisselanden
-  Temporary water retention basin

HOEK VAN HOLLAND




-  Infiltration Watercentrum West
-  Seepage water storage
-  (New) nature and recreational areas

IMAGE 6.

PERSPECTIVE ON ROTTERDAM WATERCITY 2030

The plans for Rotterdam Water City 2030 consist of enhancing existing qualities and responding cleverly to new developments. While the previous chapter was all about choices to be made, the present one addresses the consequences of these choices, divided into three main areas.

RIVER CITY

River City roughly consists of the area outside the levees. The key feature of River City is the Maas, the trademark of Rotterdam, the city's lifeline. The river connects the port – the driver of the economy – with the hinterland. Rotterdam has a characteristic waterfront, featuring the Kop van Zuid, the Lloydkwartier and new construction sites, offering space for a wide range of dynamic residential and commercial areas. At the same time, the river provides opportunities for more transport by water to reduce travel time and improve the accessibility of these areas. Furthermore, this type of transport offers Rotterdam a chance to enhance its image. A recreational route can be created along the length of the river, connecting a vast array of unique spots, which together form the city's largest recreational area.

ROTTERDAM NORTH

The northern banks are the scene of many highly popular residential and commercial areas: most of the centre, Kralingen, Blijdorp, Hillegersberg, and Alexander. Water makes a massive contribution; living alongside the water is very popular. The aim for this part of the city is to continue to enhance these existing qualities.

Rotterdam-North has 'boezems' (storage basins) and canals which serve as water storage, but the sewerage system accounts for a large part of the storage. The strategy is to reinforce the canals and boezems and extend them where possible, and to use innovative solutions when space is in short supply, such as in the city centre and the old districts.

ROTTERDAM SOUTH

The South requires an unconventional approach. That's because the problems are not run of the mill either. There are exceptional opportunities here, however. The South is an area rich in water, with its (inner) ports and possible water connections. The water could be put to even better use, but that would mean encroaching fundamentally on the urban area. Possibilities include the reinforcement and extension of the water structure from within the Zuiderpark; creating new water networks using existing and new canals, watercourses, the Zuiderpark and the districts earmarked for restructuring; and, finally, connecting the South to the surrounding area by means of a new north-south link.

REALIZATION STRATEGY

A strategy is needed if the water plans are to be achieved, consisting of priorities (the projects that definitely have to be realized in the next few years) and phases (which measures should be taken and when).

Basically, there are three types of measures.

- _ Improvement of the water system: What can we do to benefit safety, to combat flooding and to improve the quality of the environment?*
- _ Enhancing the urban quality: How can we link Rotterdam's development plans to what needs to be done in terms of water management?*
- _ Implementation of innovative and alternative solutions: What will we do if the traditional approach fails?*

For the purpose of prioritizing, a list of criteria was drawn up. What is important, for example, is whether a project is already in progress, how it contributes to the solution of water management problems, how it contributes to enhancing the city's appeal, whether there is a 'now-or-never' situation and whether it can serve as a model.

IMPLEMENTATION PROGRAMME

The Implementation Programme 2007-2012 sets out what needs to be done in the next five years. This involves ongoing projects from the first Water Plan, new projects, and studies that are already being conducted so that we can carry on quickly after 2012. They can be subdivided into safety projects, projects to realize water storage, and projects to improve the water quality.

SAFETY

The safety aspect involves two main themes: the levees and construction work outside the levees. The starting point is to ensure permanent flood protection for the city. In the longer term, choices will have to be made concerning the storm surge barrier and the required height of the levees. During the implementation phase of the present Water Plan, those sections of the levees that do not yet meet current standards will be reinforced. The water defences at the Vierhaven and Merwehaven also require attention. Following detailed testing, a study can be launched into adaptive building in this port as well as in the Rijnhaven and Maashaven. For the areas outside the levees, the fullest account must be taken of the risks of flooding. New construction projects and area landscaping need to include provisions to control these risks, evacuation must be possible and communication with citizens is a prerequisite. Studies into these aspects are on the agenda for the next five years.

QUANTITY OF WATER

In the next few years, Rotterdam will have to store more rainwater than it does now. The Municipal Sewerage Plan already contains many relevant measures. Another approach is to create more space for surface water. This is possible particularly in the neighborhoods earmarked for restructuring. Examples include Groenehagen/Tuinhoven, Hordijkerveld, the northern part of Lombardijen and Oedevlietsepark. If there is little or no space, we will have to focus on innovation and alternative ways of retaining water. Examples are water gardens, water plazas and green roofs. There are pilots in the pipeline for the latter two examples. In addition, solutions are investigated for the problems anticipated in the city centre, Oude Noorden, Crooswijk, Overschie and Oud-Zuid and the industrial estates Spaansepolder and Noordwest.

QUALITY OF WATER

Rotterdam and the water boards aim to improve the water quality by 2015. This aim is prompted, on the one hand, by the fact that Europe has imposed directives to this effect, but another motivating factor is the fact that surface water can be used for a variety of purposes, that it is perceived to be of higher quality, and that its economic value is higher. A completely clean water system within ten years is not feasible, however. It costs a lot of money and the effects of measures are often only visible in the longer term. We have therefore chosen to prioritize. Thanks to a special system of water quality profiles, we can choose measures which are practicable, technically feasible and affordable. We apply this approach particularly in the sub-municipal water plans. Apart from this, the watercourses that are not yet being tackled in this way have to meet certain minimum requirements to ensure that floating rubbish, odor nuisance and fish mortality is reduced to a minimum. In addition, a study will be conducted into possibilities for fish migration and a comprehensive plan for the fish stock, with a focus on the ecological value of the waterways.

From WATERPLAN 2 ROTTERDAM. WORKING ON WATER FOR AN ATTRACTIVE CITY, City of Rotterdam, Dutch Delta Water Board, Higher Water Board of Schieland and Krimpenerwaard, Higher Water Board of Delftland, Rotterdam 2009

3.1.3| ROTTERDAM & ARTIFICIAL LAND

Flood control is an important issue for the Netherlands, as about two thirds of its area is vulnerable to flooding, while the country is among the most densely populated on Earth. Natural sand dunes and man-made dikes, dams and floodgates provide defense against storm surges from the sea. River dikes prevent flooding from water flowing into the country by the major rivers Rhine and Meuse, while a complicated system of drainage ditches, canals and pumping stations keep the low lying parts dry for habitation and agriculture. In modern times, flood disasters coupled with technological development have led to large construction works to reduce the influence of the sea and prevent future floods.

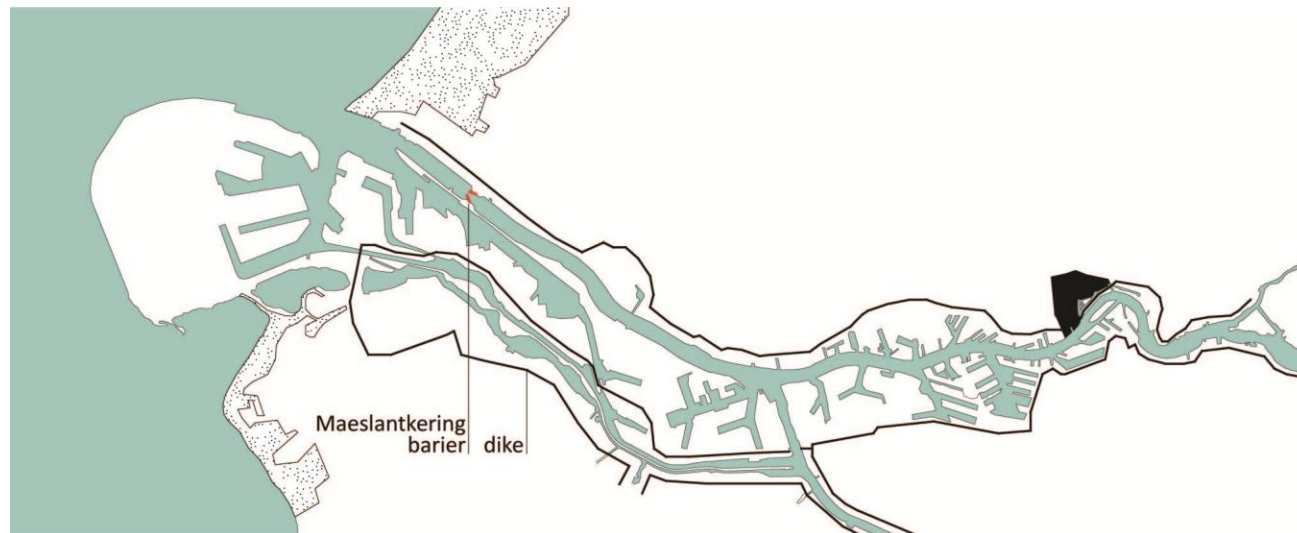


IMAGE 9.
Rotterdam water
protection system

The flood threatened area of the Netherlands is essentially an alluvial plain, built up from sediment left by thousands of years of flooding by rivers and sea. About 2000 years ago, before the intervention of man, most of the Netherlands were covered by extensive peat swamps. The coast was formed by a row of coastal dunes and natural embankments which kept the swamps from draining but also from being washed away by the sea. The only areas suitable for habitation were on the higher grounds in the east and south and on the dunes and natural embankments along the coast and the rivers. In several places the sea had broken through these natural defenses and created extensive floodplains in the north. The first permanent inhabitants of this area were probably attracted by the sea deposited clay soil which was much more fertile than the peat and sandy soil further inland.

To protect themselves against floods, the first inhabitants built their homes on artificial dwelling hills, called *terpen* or *wierden*.

The first dikes were low embankments of only a meter or so in height surrounding fields to protect the crops against occasional flooding. Around the 9th century the sea was on the advance again and many terps had to be raised to keep them safe. Many single terps had, by this time, grown together as villages. These were then connected by the first dikes.

After 1000 AD the population considerably grew, which meant that there was a greater demand of arable land but also a greater workforce available. Dike construction started to be taken up more seriously.

The next step was to move the dikes ever more seawards. Every cycle of high and low tide left a small layer of sediment. Over the years these built up to such a height that it was rarely flooded. It was then considered safe to build a new dike around this area. The old dike was often kept as a secondary defense, called *sleeper dike* [14].

A dike couldn't always be moved seawards. Especially in the southwest river delta it was often the case that the primary sea dike was undermined by a tidal channel. A secondary dike was then built, called *inlaagdijk*. With an inland dike, when the seaward dike collapsed the secondary inland dike becomes the primary.

Taking land from the cycle of flooding by putting a dike around it, prevents it from being raised by silt left behind after a flooding. At the same time the drained soil consolidates and peat decomposes leading to land subsidence. In this way the difference between the water level on one side and land level on the other side of the dike grew. While floods became more rare, if the dike did overflow or was breached the destruction was much larger.

The construction method of dikes has changed over the centuries. Popular in the Middle Ages were *wierdijken*, earth dikes with a protective layer of seaweed. An earth embankment was cut vertically on the sea facing side. Seaweed was then stacked against this edge, held into place with poles. Compression and rotting processes resulted in a solid residue that proved very effective against wave action and needed only very little maintenance. In places where seaweed was unavailable other materials such as reeds or wicker mats were used.

Another system used much and for a long time was that of a vertical screen of timbers backed by an earth bank. Technically these vertical constructions were less successful as vibration from crashing waves and washing out of the dike foundations weakened the dike.

Much damage was done to these wood constructions with the arrival of the shipworm (*Teredo navalis*), a little creature thought to have been brought to the Netherlands by VOC trading ships, that ate its way through Dutch sea defenses around 1730. The change was made from wood to using stone for reinforcement. This was a great financial setback as there is no natural occurring rock in the Netherlands and it all had to be imported from abroad.

Current dikes are made with a core of sand, covered by a thick layer of clay to provide waterproofing and resistance against erosion. Dikes without a foreland have a layer of crushed rock below the waterline to slow wave action. Up to the high waterline the dike is often covered with carefully laid basalt stones or a layer of tarmac. The remainder is covered by grass and maintained by grazing sheep. Sheep keep the grass dense and compact the soil, in contrast to cattle.

At about the same time as the building of dikes, the first swamps were made suitable for agriculture by colonists. By digging a system of parallel drainage ditches water was drained from the land to be able to grow grain. However the peat settled much more than other soil types when drained and land subsidence resulted in developed areas, becoming wet again. Cultivated lands which were at first primarily used for growing grain thus became too wet and the switch was made to dairy farming. A new area behind the existing field was then cultivated, heading deeper into the wild. This cycle repeated itself several times until the different developments met each other and no further undeveloped land was available. All land was then used for grazing cattle.

Because of the continuous land subsidence it became ever more difficult to remove excess water. The mouths of streams and rivers were dammed to prevent high water levels flowing back upstream overflowing cultivated lands. These dams had a wooden culvert equipped a valve, allowing drainage but preventing water from flowing upstream. These dams however blocked shipping and the economic activity caused by the necessity to transship goods caused villages grow up near the dam, some famous examples are Amsterdam (dam in the river Amstel) and Rotterdam (dam in the Rotte). Only in later centuries were locks developed to allow ships to pass.

Further drainage could only be accomplished after the development of the polder windmill in the 15th century. The wind driven water pump has become one of the trademark tourist attraction of the Netherlands. The first drainage mills using a scoop wheel could raise water at most 1.5 meter. By combining mills the pumping height could be increased. Later mills were equipped with an Archimedes' screw which could raise water much higher. The polders, now often below sea level, were kept dry with mills pumping water from the polder ditches and canals to the *boezem*, a system of canals and lakes connecting the different polders and acting as a storage basin until the water could be let out to river or sea.

This system is still in use today, though drainage mills have been replaced by first steam and later diesel and electric pumping stations [15].

The growth of towns and industry in the Middle Ages resulted in an increased demand for dried peat as fuel. First all the peat down to the groundwater table was dug away. In the 16th century a method was developed to dig peat below water, using a dredging net on a long pole. Large scale peat dredging was taken up by companies, supported by investors from the cities. These undertakings often devastated the landscape as agricultural land was dug away and the leftover ridges, used for drying the peat, collapsed under the action of waves. Small lakes were created which quickly grew in size, every increase in surface water leading to more leverage of the wind on the water to attack more land. It even led to villages being lost to the waves of man-made lakes. The development of the polder mill gave the option of draining the lakes. In the 16th century this work was started on small, shallow lakes, continuing with ever larger and deeper lakes, though it wasn't until in the nineteenth century that the most dangerous of lakes, the Haarlemmermeer near Amsterdam, was drained using steam power. Drained lakes and new polders can often be easily distinguished on topographic maps by their different regular division pattern as compared to their older surroundings.

Three major European rivers, the Rhine, Meuse and Scheldt flow through the Netherlands of which the Rhine and Meuse cross the country from east to west.

The first large construction works on the rivers were conducted by the Romans, but we can start to talk about dikes near the river mouths, just in the 11th century, where incursions from the sea added to the danger from high water levels on the river. Local rulers dammed branches of rivers to prevent flooding on their lands, only to cause problems to others living further upstream. Large scale deforestation caused the river levels to become ever more extreme, while the demand for arable land led to more land being protected by dikes, giving less space to the river bed and so causing even higher water levels. Local dikes to protect villages were connected to create a ban dike to contain the river at all times. These developments meant that while the regular floods for the first inhabitants of the river valleys were just a bother, in contrast the later incidental floods when dikes burst were much more destructive.

The 17th and 18th century was a period of many infamous river floods resulting in much loss of life. They were often caused by ice dams blocking the river. Land reclamation works, large willow plantations and building in the winter bed of the river all worsened the problem. Next to the obvious clearing of the winter bed, overflows were created. These were intentionally low dikes where the excess water could be diverted downstream. The land in such a diversion channel was kept clear of buildings and obstructions. As this so called *green river* could therefore essentially only be used for grazing cattle it was in later centuries seen as a wasteful use of land. Most overflows have now been removed, focusing instead on stronger dikes and more control over the distribution of water across the river branches.

A committee reported in 1977 about the weakness of the river dikes but there was too much resistance from the local population against demolishing houses and straightening and strengthening the old meandering dikes. It took the flood threats in 1993 and again in 1995, when over 200.000 people had to be evacuated and the dikes only just held, to put plans into action. Now the risk of a river flooding has been reduced from once every 100 years to once every 1250 years. Further works in the Room for the River Project are being carried out to give the rivers more space to flood and in this way reducing the flood height.

The first dikes and water control structures were built and maintained by those directly benefiting from them, mostly farmers.

Wie het water deert, die het water keert
Who the water hurts, who the water stops

As the structures got more extensive and complex councils were formed from people with a common interest in the control of water levels on their land and so the first Water Boards began to emerge. These often controlled only a small area, a single polder or dike. Later they merged and an

overall organization was formed, where different Water Boards had conflicting interests. The original Water Boards differed much from each other in organization, power and area they managed. The differences were often regional and dictated by differing circumstances, whether they had to defend a sea dike against a storm surge or keep the water level in a polder within bounds. In the middle of the twentieth century there were about 2700 Water Control Boards. After many mergers, there are currently 27 water boards left. Water boards hold separate elections, levy taxes and function independently from other government bodies.

Over the years there have been many storm surges and floods in the Netherlands. Some deserve special mention as they particularly have changed the contours of the Netherlands.

A series of devastating storm surges, more or less starting with the First All Saints' flood in 1170, washed away a large area of peat marshes, enlarging the Wadden Sea and connecting the previously existing lake Almere in the middle of the country to the North Sea, thereby creating the Zuiderzee. It in itself would cause much trouble until the building of the Afsluitdijk in 1933.

Several storms starting in 1219 created the Dollart from the mouth of the river Ems. By 1520 the Dollart had reached its largest size. Reiderland, containing several towns and villages, was lost. Much of this land was later reclaimed.

In 1421 the St. Elizabeth's flood caused the loss of 'De Grote Waard' in the south west of the country. Particularly the digging of peat near the dike for salt production and neglect because of a civil war caused dikes to fail. It created the Biesbosch, a valued nature reserve.

The more recent floodings of 1916 and 1953 gave rise to building the Afsluitdijk and Deltaworks respectively.

By flooding certain areas on purpose a military defensive line could be created. In case of an advancing enemy army the area was inundated with about 30 cm (1 foot) of water, too shallow for boats but deep enough to make advance on foot difficult, hiding underwater obstacles as canals, ditches and purpose-built traps. Dikes crossing the flooded area and other strategic points were protected by fortifications. The system proved successful on the Dutch Water Line in the 1672 during the Third Anglo-Dutch War but was overcome in 1795 because of heavy frost. It was also used with the Stelling van Amsterdam, the Grebbe line and the IJssel line. The advent of heavier artillery and especially airplanes have made this strategy largely obsolete.

A study done by Rijkswaterstaat in 1937, showed that the sea defenses in the southwest river delta were inadequate to withstand a major storm surge. The proposed solution was to dam all the river mouths and sea inlets thereby shortening the coast. However, because of the scale of this project and the intervention of the Second World War, its construction was delayed and the first works were only completed in 1950. The North Sea flood of 1953 gave a major impulse to speed up the project. In the following years a number of dams were built to close off the estuary-mouths. In 1976, under pressures from environmental groups and the fishing industry, it was decided not to close off the Oosterschelde estuary by a solid dam but instead to build the Oosterscheldekering, a storm surge barrier which is only closed during storms. It is the most well-known (and most expensive) dam of the project. A second major hurdle for the works was in the Rijnmond area. A storm surge through the Nieuwe Waterweg would threaten about 1.5 million people around Rotterdam. However, closing off this river mouth would be very detrimental for the Dutch economy, as the Port of Rotterdam – one of the biggest sea ports in the world – uses this river mouth. Eventually, the Maeslantkering was built in 1997, keeping economic factors in mind: the Maeslantkering is a set of two swinging doors that can shut off the river mouth when necessary, but which are usually open. The Maeslantkering is forecast to close about once per decade. Up until now, it has closed only 1 time, in 2007. The project was finished with the construction of the Maeslantkering in 1997 [16].

The current sea defenses are stronger than ever but experts warn that complacency would be a mistake. New calculation methods revealed numerous weakspots. Further, sea level rise (made more extreme by global warming) and continuing land subsidence will make further upgrades to the flood control and water management infrastructure necessary.

The sea defenses are continuously being strengthened and raised to meet the safety norm of a flood chance of once every 10,000 years for the west, this being the economic heart and most densely populated part of the Netherlands, and once every 4,000 years for less densely populated

areas. The primary flood defenses are tested against this norm every 5 years. In 2010 about 800 km of dikes out of a total of 3,500 km failed to meet the norm. This does not mean there is an immediate flooding risk, it is the result of the norm becoming more strict from the results of scientific research on, for example, wave action and sea level rise.

The amount of coastal erosion is compared against the so called *basic coastline*, the average coastline in 1990. Sand replenishment is used where beaches have retreated too far. About 12 million m³ of sand are deposited yearly on the beaches and below the waterline in front of the coast.

The *Stormvloedwaarschuwingsdienst* (Storm surge warning service) makes a water level forecast in case of a storm surge and warns the responsible parties in the affected coastal districts. These can then take appropriate measures depending on the expected water levels, such as evacuating areas outside the dikes, closing barriers and in extreme cases patrolling the dikes during the storm.

The *Second Delta Committee* or *Veerman Committee* gave its advice in 2008.

It expects a sea level rise of 65 to 130 cm by the year 2100. Among its suggestions are: to increase the safety norms tenfold and strengthen dikes accordingly, to use sand replenishment to broaden the North Sea coast and allow it to grow naturally, to use the lakes in the southwest river delta as river water retention basins, and to raise the water level in the IJsselmeer to provide freshwater. These measures would cost approximately 1 billion Euro/year [17].

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[14] Reh W., Steenbergen C., Aten D., *Sea of Land. The polder as an atlas of Dutch landscape architecture*, Architectura & Natura, Amsterdam 2007

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[17] www.deltares.nl

3.2 | DOKHAVEN

Dokhaven is the heart of the former shipyard of the Rotterdam Dry Dock Company, (Rotterdamsche Droogdok Maatschappij_RDM), established in 1902 on the south river bank of Nieuwe Maas. In the period between 1903 and 1945 the size of the complex increased fourfold to almost 40 hectares.

In 1914 the RDM started to build the garden village Heijplaat for its workers, whose number was growing and growing.

The village existed of about 850 houses of which the latest were built in the '50s. The original masterplan was inspired by the English garden house.

The shipyard belonged to the largest in Europe, in number as well as in size, but a couple of year after this highlight, the emergence of line fights and the growth of ship factories in low wage countries, caused problems for the shipbuilding industry of Netherlands.

Despite several attempts and some important mergers, and despite the sale of the village to a housing corporation in 1980 , the RDM went bankrupt in 1983. This caused the unemployment of 1370 people and huge consequences on the area.

The RDM mas a relaunch as a public limited liability company in defense-industry and equipment construction until the middle nineties. In 2002, when the industrial activity stopped the municipality became the owner. With the prospect of urban planning in the future, the municipality purchased the complex with the 80 ha river shore location existing of the Heysehaven and the Quarantine terrain as a strategic long term investment. Though, when the plans for urban development became postponed, the complex was purchased by Havenbedrijf in the same year.

After the yard stood empty and unused for years, since 2007 a number of educational institutions and businesses have moved in the area of Dokhaven and called themselves RDM Campus.

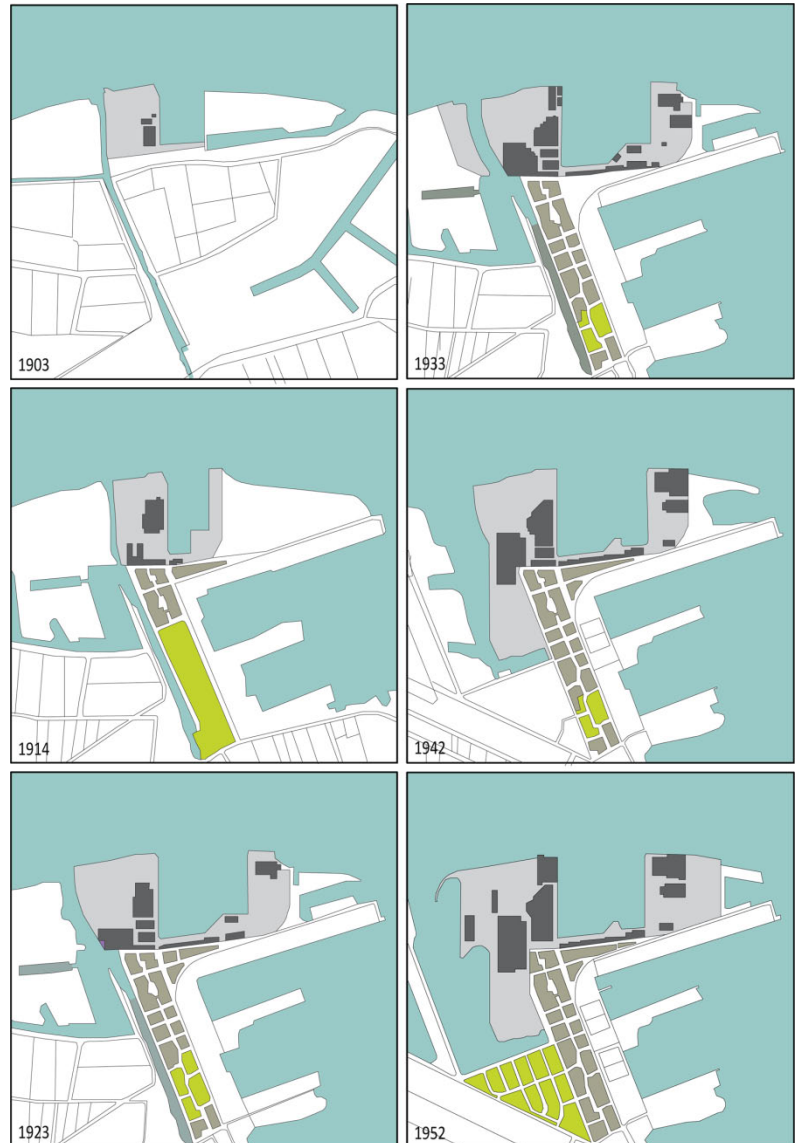


IMAGE 10.

In connection with the new purpose, a plan for urban development has been formulated, and the new use for parts of the public space is grooming. The complex of the Rotterdam Dry Dock Company, the garden village Heijplaat and the Quarantine area is declared to be of high cultural and historic value in the Cultural Historic main structure of South-Holland. In the Monumental Selection Projects, the area has been selected for a potential national heritage status. Nevertheless, a council agreement has been taken not to proceed to heritage status until the outcomes of the development vision for the site and the cultural historic reconnaissance of the RDM terrain are clear. Ther efore, has been chosen not to declare the buildings as national heritage in order to find an appropriate preservation method.

To facilitate the search for an appropriate preservation method, the architectural historians' office Crimson has been commissioned to make a cultural historic reconnaissance of the RDM area [1]. The cultural historic reconnaissance is used in the development process of vision and planning. In the study, the historic qualities are taken as a point of departure for the development and adaptive reuse possibilities. The study provides a framework for the redevelopment of industrial built heritage. With the study, Crimson attempts to find the genuine valuable features of the RDM area by asking the question *what makes this complex cultural significant*. Crimson regards shipyards of cultural historic value when the history of the flourishing times of the Dutch ship construction is reflected in the elements of all periods.

Crimson's reconnaissance has valued the RDM complex in the following way. In the RDM complex has been valued to be of great architectural and constructional historical value. The building ensemble has a great situational and spatial planning value. Furthermore, important is the ensemble value the RDM has in combination with the accompanying garden village Heijplaat and on the other side of the Heysehaven situated Quarantine institution. Crimson concludes that the RDM is the only relatively intact large shipyard and dry-dock complex in the region of Rotterdam. The RDM complex is, mainly due to the size of buildings and terrains in combination with the situation, a unique example of a 20th century shipyard. The reconnaissance therefore doesn't advocate for the preservation of the complex as a whole, but highlights specific buildings and spatial characteristics of the complex.

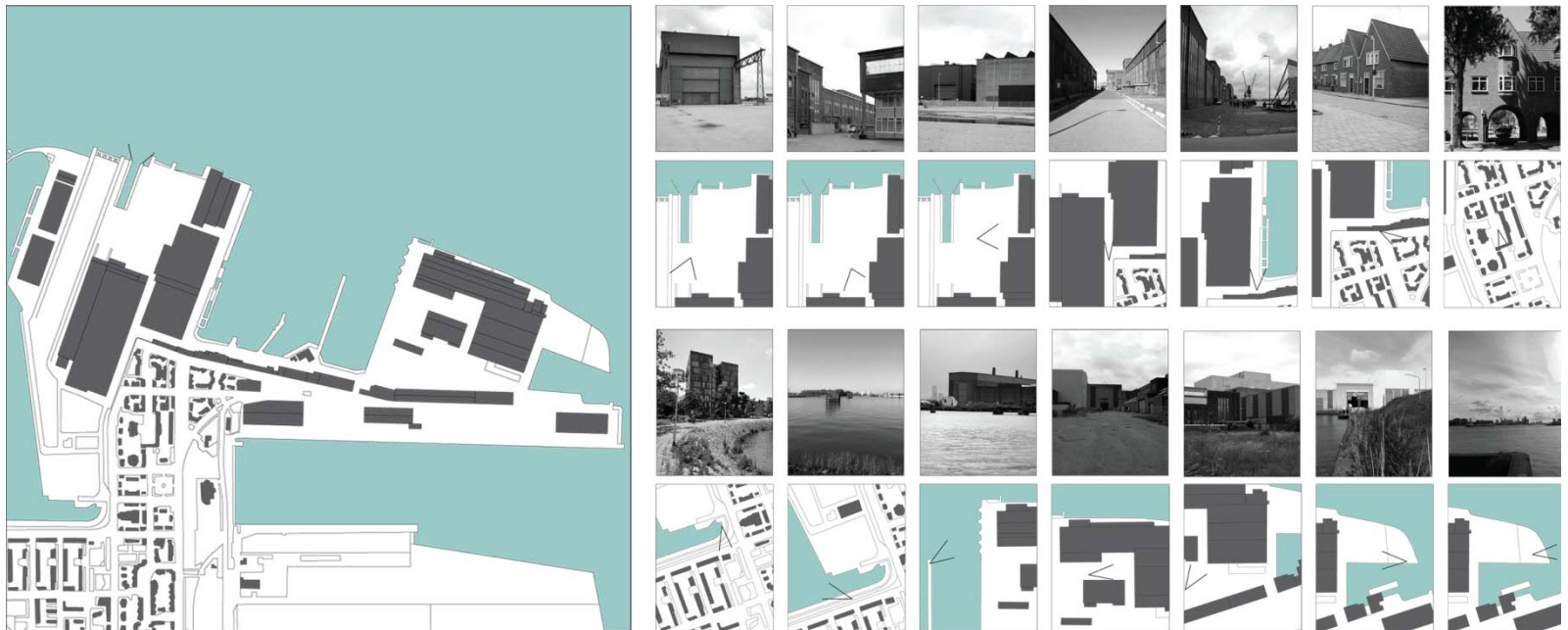


IMAGE 11.

[1] Crimson architectural historians, *Cultuurhistorische verkenning RDM*, Rotterdam 2005

4.0| EXAMPLES

REASON WHY

There are hundreds examples about waterfront and harbors redevelopment, starting from the '50s experiences of North America, known as the cradle of waterfront regeneration, to the more recent European and Asiatic ones.

Despite I have studied several of these, during the accomplishment of this work, I decide to present here just three, choosing between the more consistent with my project, those that affect all the topics I treated.

**FROM PORT TO URBAN WATERFRONT. CLIMATE
CHANGES/FLOOD RISKS. WATER/LAND. NEW
NEIGHBORHOODS. REDEVELOPMENT OF FORMER
INDUSTRIAL BUILDINGS**



4.1. | HAFENCITY, Hamburg 2000 | 2030

HafenCity, or Harbor City, is a new city quarter under development in the old harbor of Hamburg, along the river Elbe. It is one of the largest inner-city rebuilding projects in Europe and has been in development for over ten years already, with completion expected around 2020/2030. The landscape architect Kristina Hill, chair of the Landscape Architecture department at the University of Virginia, in the interview *Managing the effects of climate change* she gave to *The Dirt* blog in 2010 [1], she explained three design strategies for responding to climate change: PROTECT, RENEW AND RE TOOL, and she stated that the protect category of adaptive action is exemplified by the HafenCity development:

Hamburg[...]will allow flooding, but designed a major new part of the city to be resilient to high water, with water-proof parking garages, a network of emergency pedestrian walkways 20 feet above the street, and no residential units at ground level. Even the parks in this new Harbor City district are designed to withstand battering by waves and storm surge, either by floating as the waters rise, or by incorporating lots of hard surfaces that only need to be washed off when the waters recede

HafenCity is a large and long standing development project, that features buildings, bridges and landscape designs from over 700 architects, including powerhouse names like Rem Koolhaas, Herzog & de Meuron, and Behnisch Architekten.

BASIC LAYOUT

HafenCity and Speicherstadt lie to the south of the main Hamburg dike and are therefore susceptible to flooding. Rather than build new dikes, the developers incorporated other flood resilient and adaptive infrastructure into the actual construction of the roads, buildings and public spaces with the intention of both controlling flood waters and providing residents with waterfront access.

The intensive reciprocal interaction between land and water can be regarded as unique. HafenCity will not be surrounded by dikes, nor cut off from the water. With the exception of the quays and promenades, streets, parks and development sites will be raised to 7.5 to 8 meters above sea level. This creates a new, characteristic topography, also maintaining access to the water and emphasizing its typical port atmosphere.

Essentially, HafenCity has five invadable public levels:

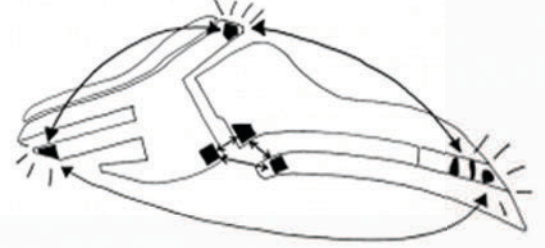
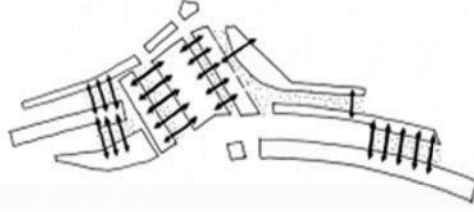
- _ on the WATER. floating docks accessible at sea level, which changes twice daily
- _ WATERFRONT PROMENADES. Embankment promenades for walking and cycling are at 4 to 5.50 meters above sea level
- _ TERRACES. The Magellan and Marco Polo Terraces provide the largest public squares in the city, and creatively transition the public thoroughfares from the waterfront promenades to the street level
- _ STREETS. All streets (and buildings) are built on artificially raised, flood-protected bases at around 7.50 to 8 meters above sea level
- _ ABOVE THE STREETS. In addition to the street level, there are higher elevations of usable space, some public and some private. A new public plaza is being built at 37 meters above sea level as part of the new Elbphilharmonie

The 'above the streets' level of the private realm is also characterized by residential units, which all start at one-story above street level.

LEVEL CHANGES

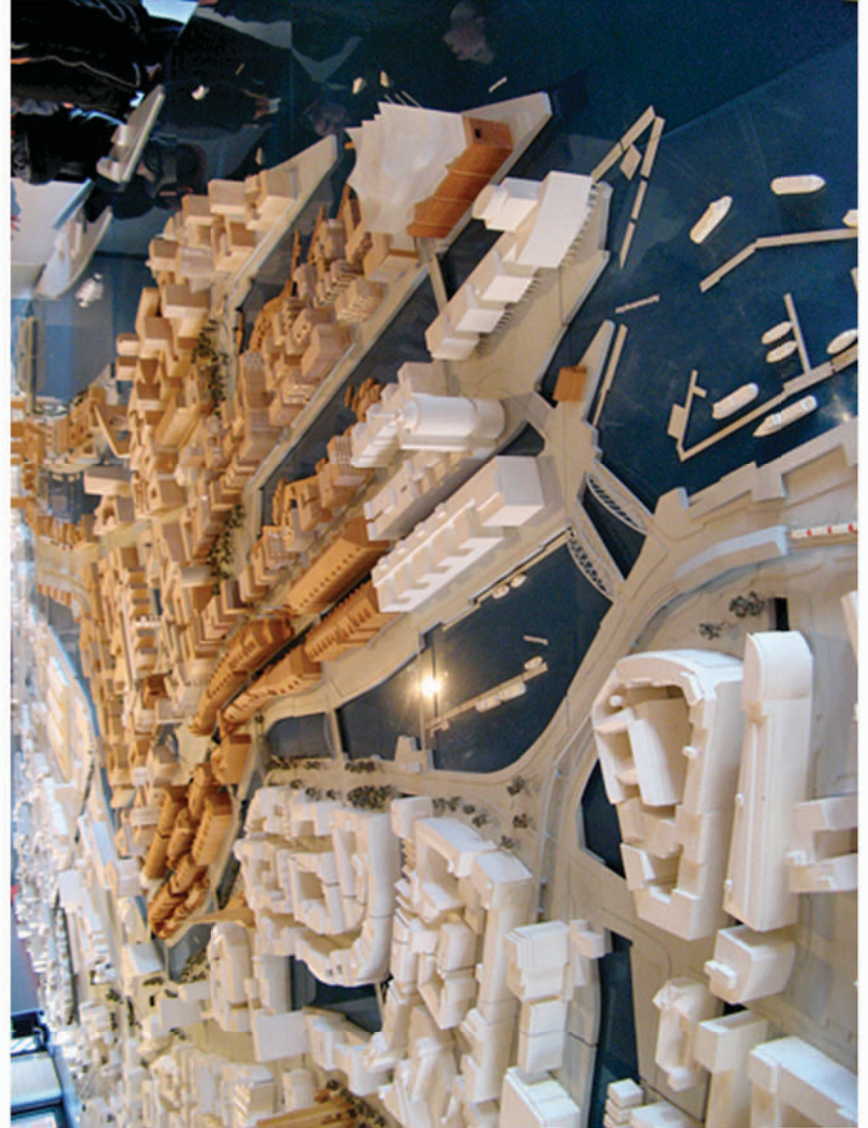
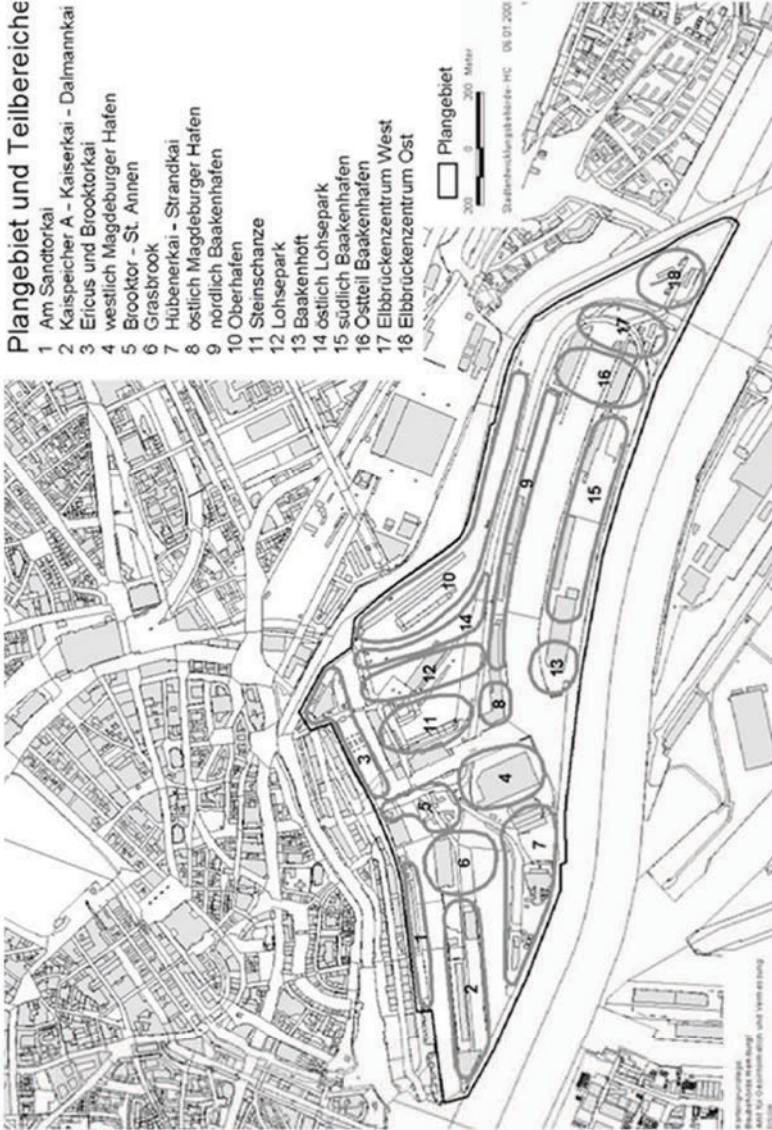
Because HafenCity has so many different levels of public space there are many interesting points of interaction between levels. In HafenCity quarter proper, the terraces are the sites of the most dramatic places of transition. They link the waterfront to the streets above. Stepping up from sea level (+/- 0,00 m), to promenade level (+4.50 m) to street level (+7.50 m).

HafenCity MASTERPLAN



Plangebiet und Teilbereiche

- 1 Am Sandtorkai
- 2 Kaispeicher A - Kaiserkai - Dalmannkai
- 3 Ericus und Brooktorkai
- 4 westlich Magdeburger Hafen
- 5 Brooktor - St. Annen
- 6 Grasbrook
- 7 Hübnerkai - Strandkai
- 8 östlich Magdeburger Hafen
- 9 nördlich Baakenhafen
- 10 Oberhafen
- 11 Stenschanze
- 12 Lohsepark
- 13 Baakenhof
- 14 östlich Lohsepark
- 15 südlich Baakenhafen
- 16 Ostteil Baakenhafen
- 17 Elbbrückenzenrum West
- 18 Elbbrückenzenrum Ost



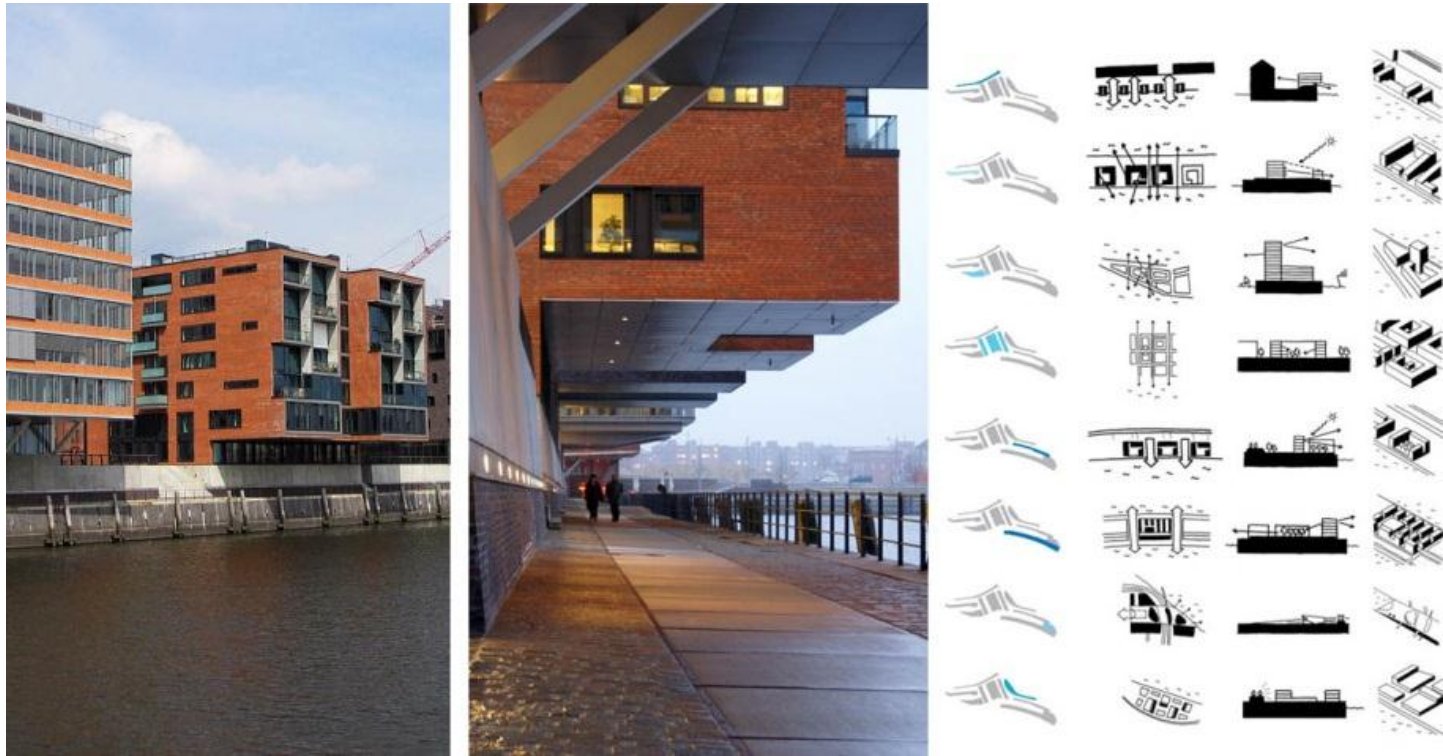


IMAGE 12.

Another important point of level change occurs between the old historic district of Speicherstadt and Hafencity, along Am Sandtorkai street. While all the streets in Hafencity that are south of Am Sandtorkai are raised at 7.50 to 8 meters above sea level, Am Sandtorkai remains at its historic level. In consequence, bridges and stairs are necessary to navigate these level changes.

In conclusion, Hafencity reveals one approach to tackling future adaptive urban development. The raised roadways and buildings, water resilient surfaces, floating waterfront promenades, terraced landscapes and bridges all work together as important infrastructure and create an architecturally vibrant district that connects residents to the waterfront, while also making the whole area resilient in the face of more frequent flooding.

Moreover, in addition to its water adaptive design strategies, Hafencity exemplifies many other sustainable urban planning ideas. It is dense, walkable, bikeable, served by public transit, and full of multi-use buildings and public spaces. Much of the land was formerly brownfields and has now been cleaned and developed. Additionally, the historic character of the area is honored

[1]<http://dirt.asla.org/2010/08/24/interview-with-kristina-hill-on-the-effects-of-climate-change/>
Hafencity Hamburg. The masterplan, Hafencity Hamburg GMBH, Hamburg 2006
Revision of the Masterplan. Taking the Hafencity concept further, Hafencity Hamburg

4.2 | BORNEO-SPORENBURG, Amsterdam 1993 | 1996

Two peninsulas in the eastern part of the Amsterdam docks, were to be exploited for water-related activities, as well as 2500 low-rise dwelling units, with a density of 100 units per hectare. For a new interpretation of the traditional Dutch canal house, West 8 suggested new types of three storey, ground-accessed houses deviating from the usual terraced house in being strongly oriented to the private realm by incorporating patios and roof gardens. By repeating this type in a great variety of dwelling modes and with maximum architectural variation, an animated street elevation emerges with a focus on the individual. At a larger scale, a delicately balanced relationship exists between the repetition of the individual dwellings, the roofscape and the great scale of the docks. Three immense sculptural blocks take their place as landmarks in the vast expanse of houses.

West8

The neighborhood is built on two piers, located in the eastern Amsterdam harbor. The conversion of these *urban moles*, that took place in the last decade, has been possible thanks to the massive shift of goods traffic to the port of Rotterdam. The intervention program provided for the settlement of 2500 dwellings, divided into percentage of public housing, subsidized housing and free real estate market.

140 different designers were invited to develop projects, under the masterplanning control of West8.

The Borneo project is, in many ways, a strong indicator of the housing shortage in the country and the consequent urgent need to systematically develop new urban residential neighborhoods. Borneo and Sporenburg are only part of the planned major expansion of Amsterdam along the IJ. The original ambitions of the urban municipality of Amsterdam focused on a residential project of urban population density of 100 dwellings / hectare.

Because of poor market conditions in the mid-'90s, the City was obligated to approve the construction of buildings slightly higher when compared to the trend of those years in planning. The building promoters were afraid to have a surplus of apartments on the market, given the low demand, and therefore negotiated with the Amsterdam Municipality the opportunity to construct a typology of suburban single family house with single entrance.

The contrast between the suburban type houses and the urban context, inevitably required the creation of a new type of housing to Borneo Sporenburg, which can be taken as an example for the future Dutch landscape architecture.

The houses are located on stripes and sizes are defined. All buildings have been rotated to fit the shape of peninsulas and to comply with the prevailing orientation. Three large residential buildings are located between the low houses. Adriaan Geuze, from West 8, called them *meteorites*, as if they had fallen from space even though they were carefully placed on the visual axes that frame the surrounding focal points.

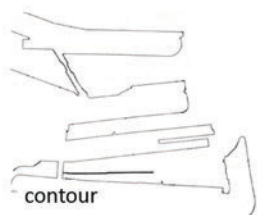
Such a compact masterplan doesn't leave much space for the green areas, however the water, which surrounds the peninsula, is viewed as compensatory, in fact, the designers deal with the *blue* as the *green*. An exception is the green belt area in Borneo, whose strategic location allows viewing from both sides, from water and from the other islands.

BUILDING

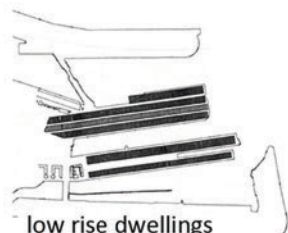
Most of the residences has defined dimensions (4 m width, 35 m depth and 3 levels above ground of 3.50 m height). All have direct access from the road and have patios and roof gardens, to witness the great importance that the designers have given to the private area, to the detriment of the public, reduced to a minimum. The houses, in fact, occupy the entire lot by moving the green from outside to inside.

In one part of the former inner harbor of the Sporenburg peninsula, was carried out a unique experiment: 60 plots were allocated to buyers, associated with the designers, who were allowed to build their dream house, following, in any precise common standard, the other residences. The plots are 16m deep, have a width that varies between 4.20m and 6m and a maximum height of 9.2 m, maintaining the height of the ground floor to 3.50 m. Although these residences have access on the road, on the other side are aligned directly on the water of the inner harbor.

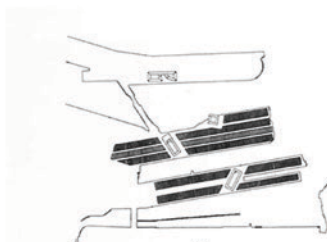
Borneo | Sporenburg MASTERPLAN



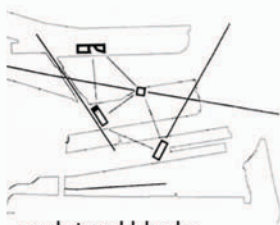
contour



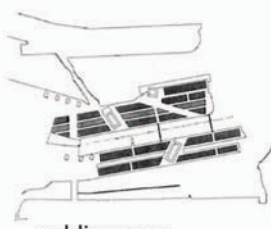
low rise dwellings



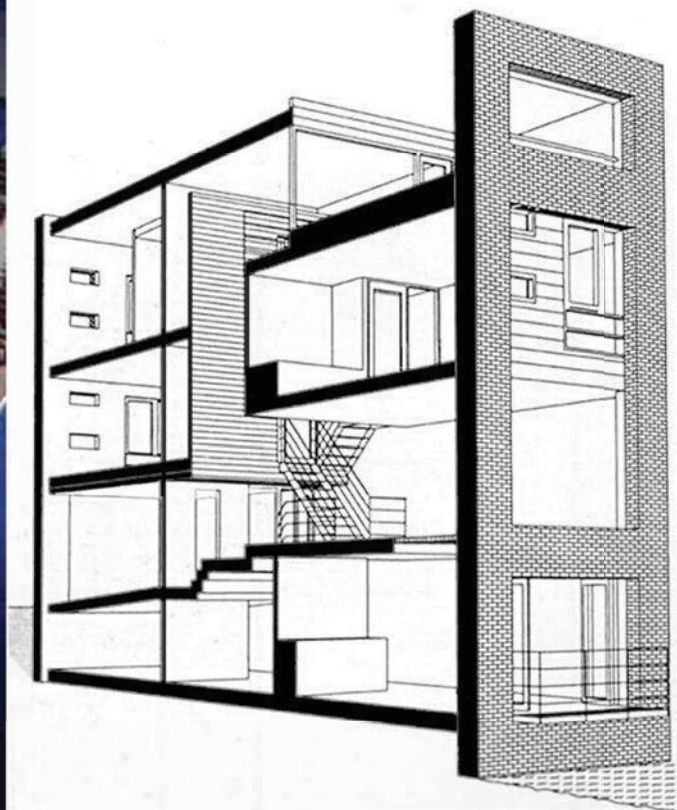
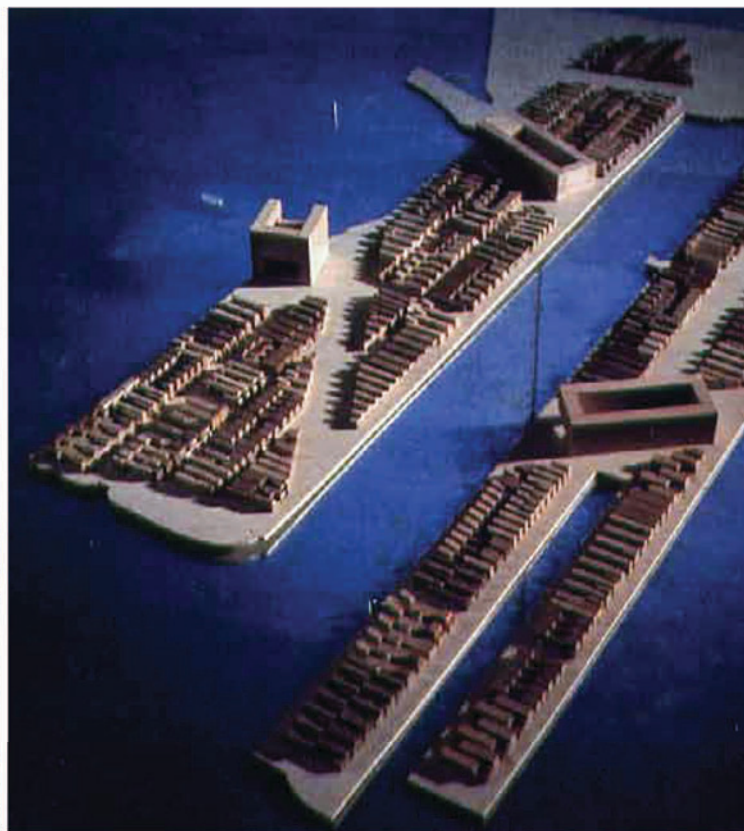
superposition



sculptural blocks



public space



As regards the soft mobility, West 8 has designed two bridges, which cover the 90m of the Spoorweg basin, between the two peninsulas. The west bridge is used by pedestrians and cyclists while the east one, with its curves, only by pedestrians. A third bridge, more sober, connects the harbor entrance to the neighborhood Borneo.

This project addressed the need for high density housing, redevelopment of unused land, and limiting vehicular traffic. The project is quite controversial and many criticize the innovative architectural design. Instead of setting aside large public open spaces West 8 required every unit/parcel to have a 30-50% void for light to enter (balcony, roof terrace, deck), this leads to a complaint that there is not enough open space. This percentage of void was required to allow light to enter the parcels. It is a way of providing open space while still allowing high density. The patios have an indirect connection with the street and the quays. Many of the residents use the streets and sidewalks as gathering areas. The original plan called for a wide variety of housing types, but in the end it was limited to the six most popular designs, some say that this makes the development too repetitive. Although the development includes shops and offices many feel that a fifteen minute bike ride is too far to travel to the center of Amsterdam without a car.

Aymonino A., *Borneo Sporenburg, Amsterdam*, from LOTUS, n. 94, pp. 80/84 and 107/109

Borret K., *Amsterdam, Borneo e Sporenburg*, from Abitare, n. 402, p. 48

Lo spazio privato / Public Space, from LOTUS n. 109, pp.64-68

www.west8.nl/projects/all/borneo_sporenburg/

4.1.3 | VAN NELLEFABRIEK [VAN NELLE FACTORY], Rotterdam 1931 | 1999

The Van Nelle factory complex is one of the largest and most remarkable modern monuments in the Netherlands and has a wide international reputation (on the UNESCO World Heritage list). The building, located in Schiedam, a suburb to the west of Rotterdam, was designed by architects Johannes Brinkman and Leendert van der Vlugt and built between 1925 and 1931. It is an example of *Nieuwe Bouwen*, modern architecture in the Netherlands. It was commissioned by the then-director of the Van Nelle company, Cees van der Leeuw. The Van Nelle company was a major producer of tobacco products, coffee and tea.

In 1999, a master plan has been drawn up for the redevelopment of the approx. 60,000 m² gross floor surface area for some 115 firms, operative in the creative industry, and including new building of 30,000 m² in the long term.

Besides the limiting conditions of an aesthetic nature and those relating to a listed item of heritage, guidelines have been issued for functional and planning aspects. The plan has formed a framework for the making of agreements with the various government bodies as well as providing the design teams with a basis for the redevelopment of the ten buildings in the complex. They have been independently (re)developed for various users in the period down to 2004. The immense complex has been taken into use by a diverse collection of users in the creative industry.

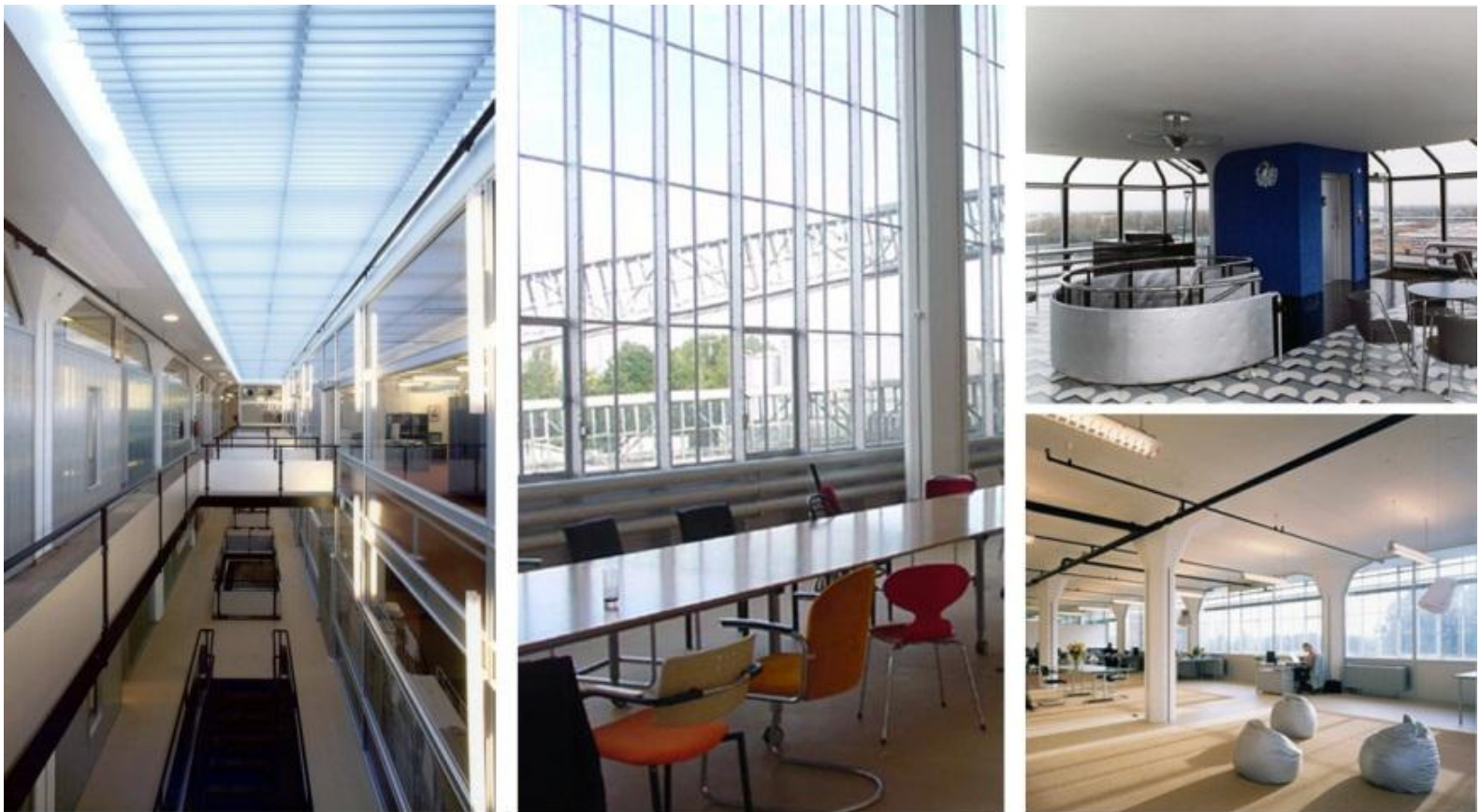


IMAGE 13.



IMAGE 14.

The master plan has been drawn up by Wessel de Jonge [1] and the firm has carried out the supervision of the entire redevelopment of the factory complex and coordinated the various design teams. The infill for the three factory buildings has been designed by Claessens Erdmann Architects & Designers, Amsterdam. The redevelopment of the storage halls and dispatch building is the work of Wessel de Jonge architects, the landscaping is by ds Landscape Architects, Amsterdam and Molenaar & Van Winden have been invited to tackle the future project of the office building.

A concept for the conversion of the former central dispatch building of the Van Nelle factories was developed in 2001. Little daylight was admitted in the original situation because of the depth of the building. For an efficient arrangement of the working space it was therefore decided to make an incision in the heart of the building to allow daylight to flow in. The void has been placed somewhat asymmetrically in the ground plan to create a logical connection with the factory building via the walkway. The overhead doors along the loading platforms have been replaced by large glass partitions. The picture is complete with the restoration of the matt glass panels in the canopy above the loading platforms.

[1] www.wesseldejonge.nl

5.0| PROJECT

The site of the former *Rotterdamse Droogdok Maatschappij* (Rotterdam Dry Dock Company) is, and always will be, an area of contrasts. Impressive port industry, innovative companies, educational institutions and an attractive village stand next to each other and reinforce one another's identity. The purpose of the project is therefore to link all these activities, through new working, public and residential programs. The education and innovative industry support the docklands activities. The village, which was originally built to house workers from the Rotterdamse Droogdok Maatschappij, will renew its link with the docks and benefit from the revived bustle and activity. Furthermore it will create a new link with the inner city.

Although the village of Heijplaat and the RDM site share a joint history, the RDM site is not easily accessible for the residents of the village and for people coming from the city centre. This will change. A new integrated transport system, by water and cableway, will pass through the site, connecting the Erasmus bridge district to the northern part of Dokhaven and then to the south, where the Rotterdam outskirts start. Quays will be accessible to the public, with catering and other amenities creating more sociable atmosphere. Buildings with cultural and historical merit will be renovated and adapted for new uses, most of which will be open to the public.

The site will be given renewed vitality through a reinvention of the underlying landscape comprised of the river, dikes, older reclamations and routes, such as the discovery and reinterpretation of the historical structures that have proved their significance in the course of centuries and which were forgotten since the harbor activities have stopped. Old long lines will be upgraded into attractive pedestrian routes connecting neighborhoods.

Pedestrians will become the centre's dominant source of traffic, supplanting cars in that role. This can be achieved by a different organization of accessibility. A park and walk system at the edge of the site, where ferries and the cableway meet, linked with the attractive pedestrian routes, will ensure that visitors can reach their destinations within a short time. Parking on the street will be reduced in order to make space for attractive pedestrian and bicycle routes, while a new parking building will compensate for the lack.

The image of the public realm will, as a result of these innovations, improve significantly. The Maas River will be strengthened as an urban attribute through the transformation of its banks into a recreational district. Moreover there are opportunities for creating a green east bank, with parks and green quays. The distinctive edge, jagged from the construction of artificial harbors and dominated by huge industrial buildings, of the south bank also offers interesting possibilities.

The urban water of the Rotte River will be transformed from a forgotten line into a recreational route. The injection of new public spaces will change the everyday living environment.

MAIN OBJECTIVES OF THE PLAN

IMAGE IMPROVEMENT FOR THE WHOLE SOUTHERN PART OF THE CITY AND THEREFORE A MEANING OF THE CITY AS A WHOLE

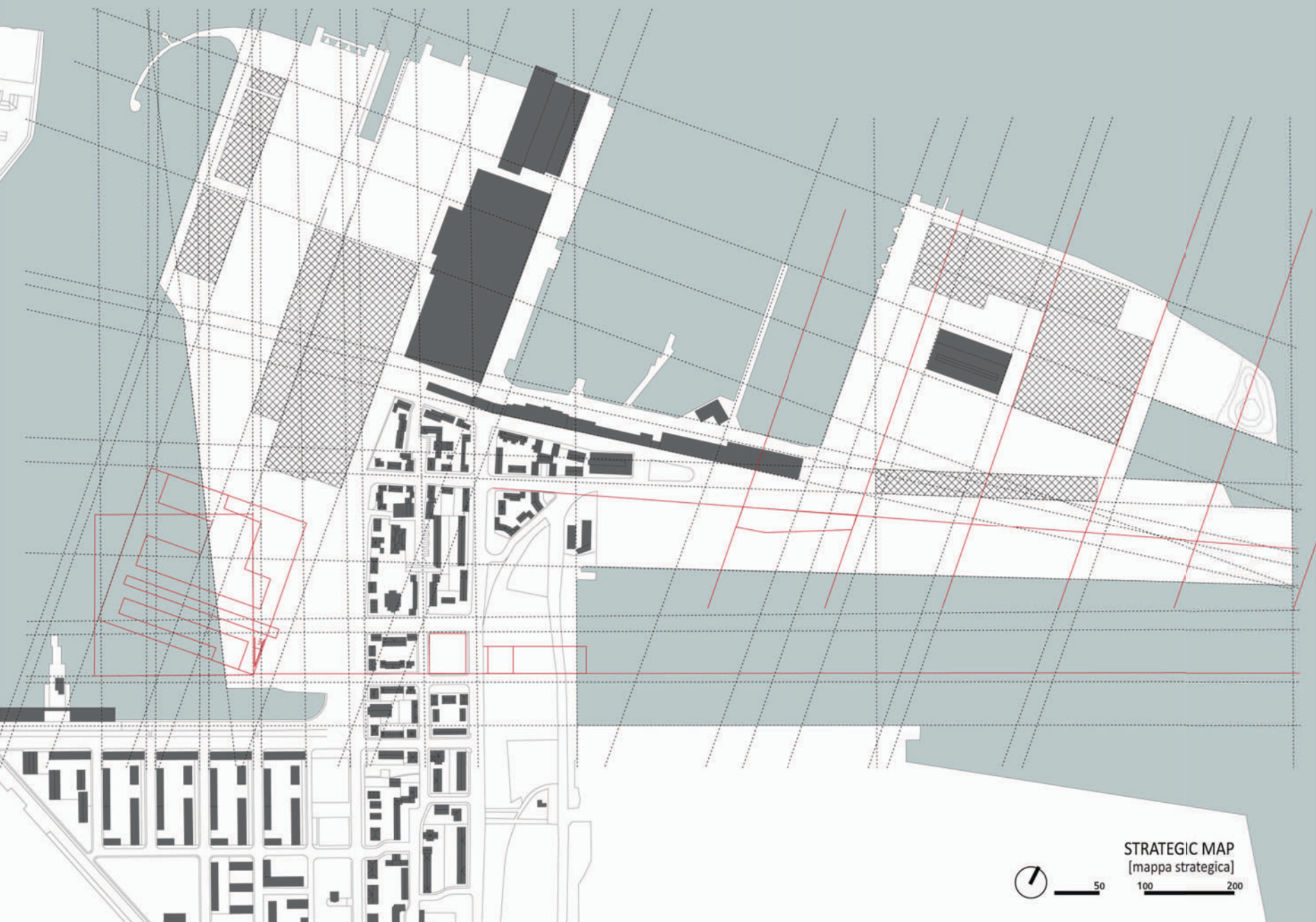
EXTENSION OF THE SITE TO THE RIVER CREATING A NEW INTERNATIONAL AND CREATIVE ENVIRONMENT

CLOSER CONNECTION BETWEEN NORTH AND SOUTH BANKS

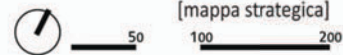
SOCIAL RETURN/SOCIAL RENEWAL

ATTRACTIVE NEIGHBORHOODS, BOTH OLD AND NEW

CONTRIBUTION TO THE ECONOMIC EXPANSION OF ROTTERDAM



STRATEGIC MAP
[mappa strategica]

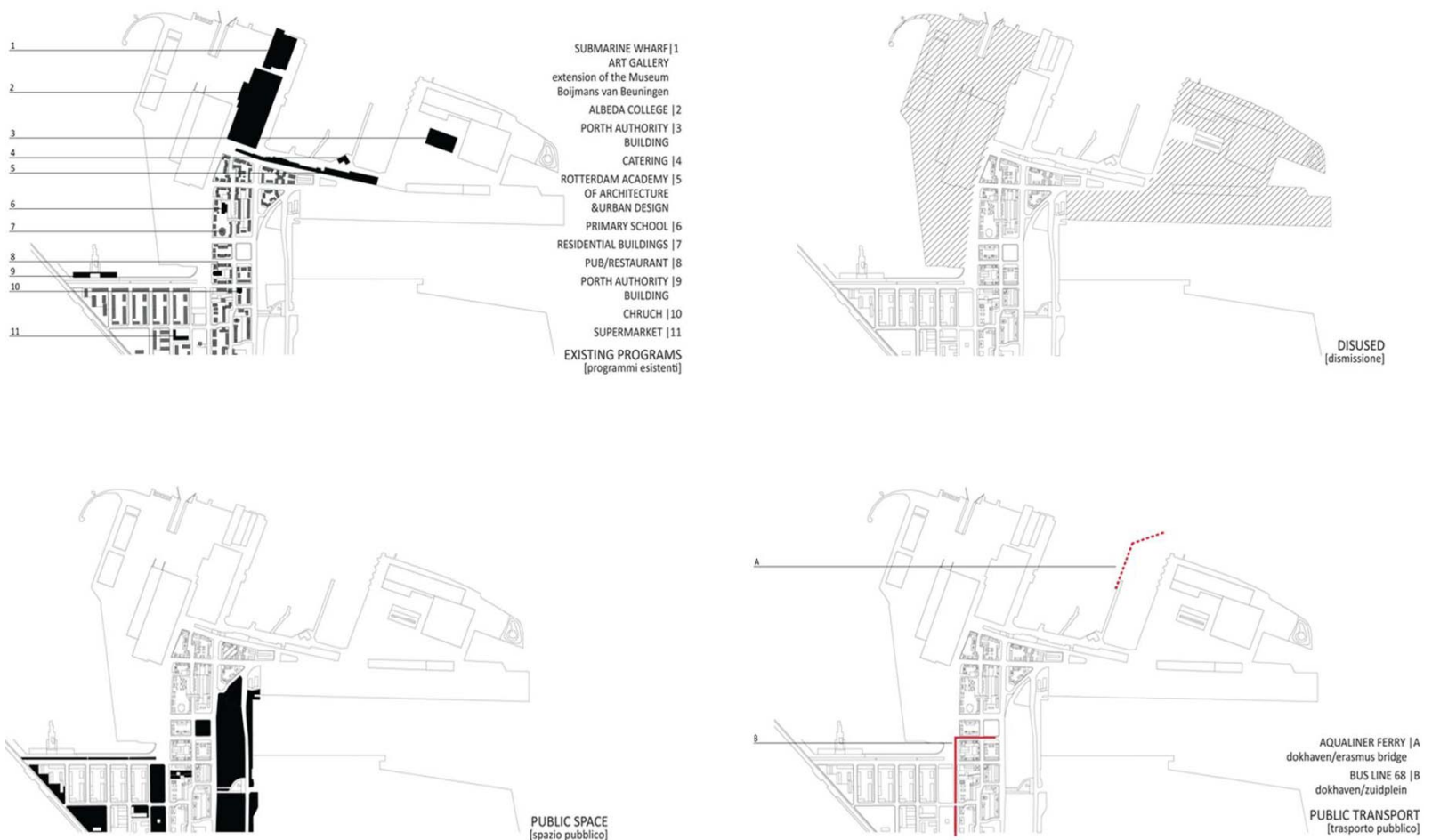


The site is the result of the superposition of different layers. First of all is the **artificial soil**.

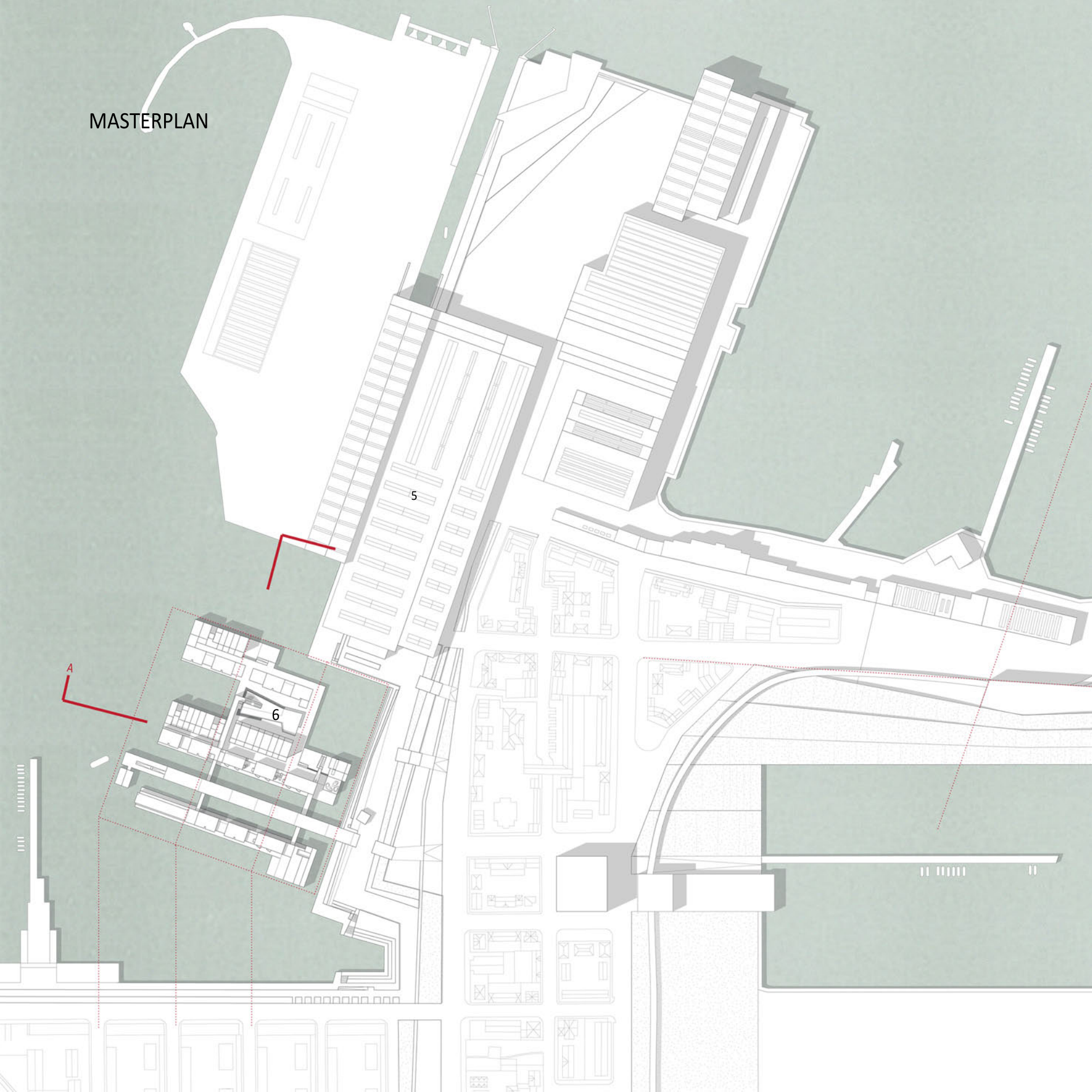
Dokhaven will always be remembered as a shipyard, hard and squared, created by men in the shape that still today exist. But before 1903, year of the establishment of the Dry Dock Company, it was part of the farmland of the city of Rotterdam.

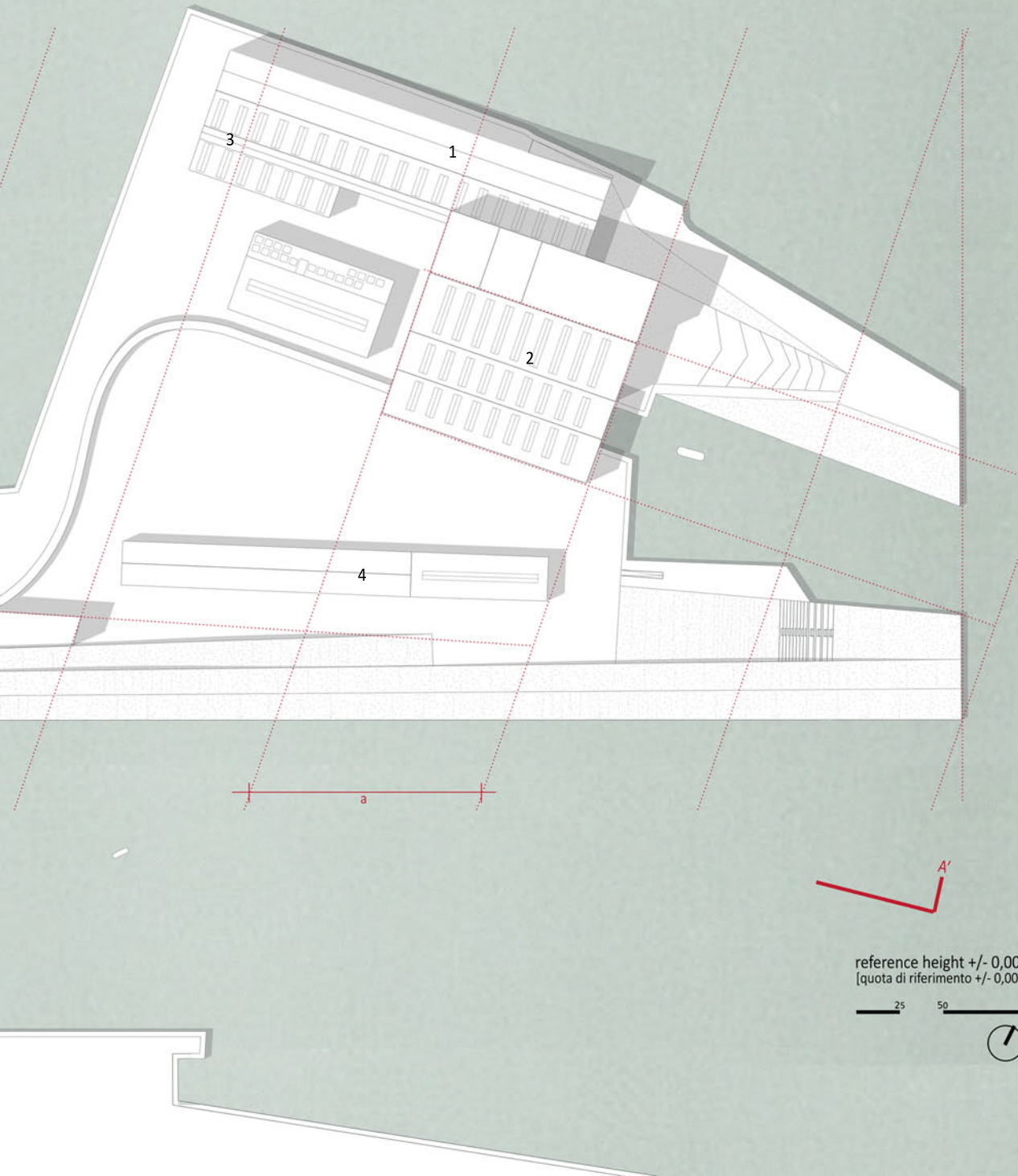
It was therefore not built from scratch, by subtracting ground to water, but was obtained by reshaping the banks of the river Maas, carrying away more and more land, to make way for water.

Many other layers are recognizable, due to the transformations the area passed through in the last century.



MASTERPLAN





PRE-EXISTENCES

On the site are already present 10 industrial buildings, left over by the shipyard and now abandoned, that are in need of new programs, while some others host yet new cultural activities.

BRING IN PROGRAMS

1. SHORT TERM HOUSING and HOSTEL
2. THE HUB. Ferry and cableway stop, with related facilities [tickets, info, catering] and GREENHOUSES
3. yacht factory [already planned by the municipality]
4. STURT UP CREATIVE INDUSTRIES
5. PUBLIC SPACE, CULTURE and EVENTS
6. NEW NEIGHBORHOODS

THE FLOOD

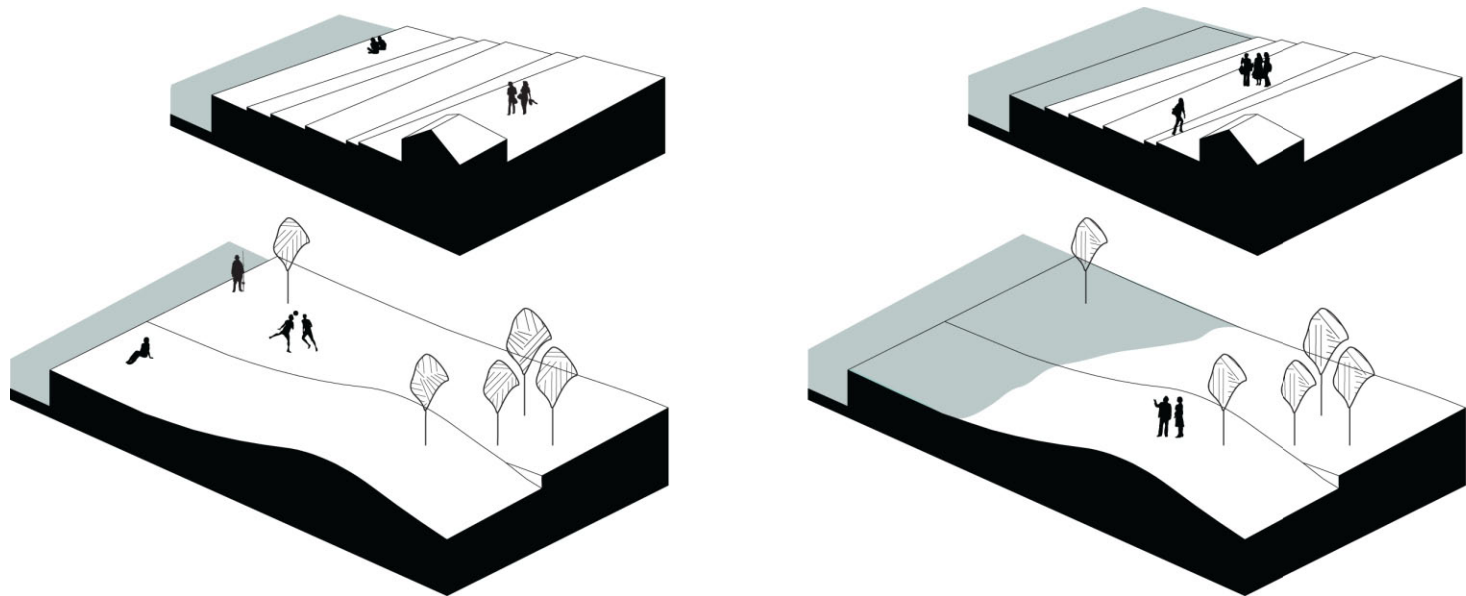
It is becoming increasingly clear that climate has changed. The average temperature has gradually increased over the last century. The sewers and the surface water in Rotterdam can hardly manage the peak showers in the present situation. Rain water, mixed with sewage water flows into basements and problems with ground water occur more and more often already today.

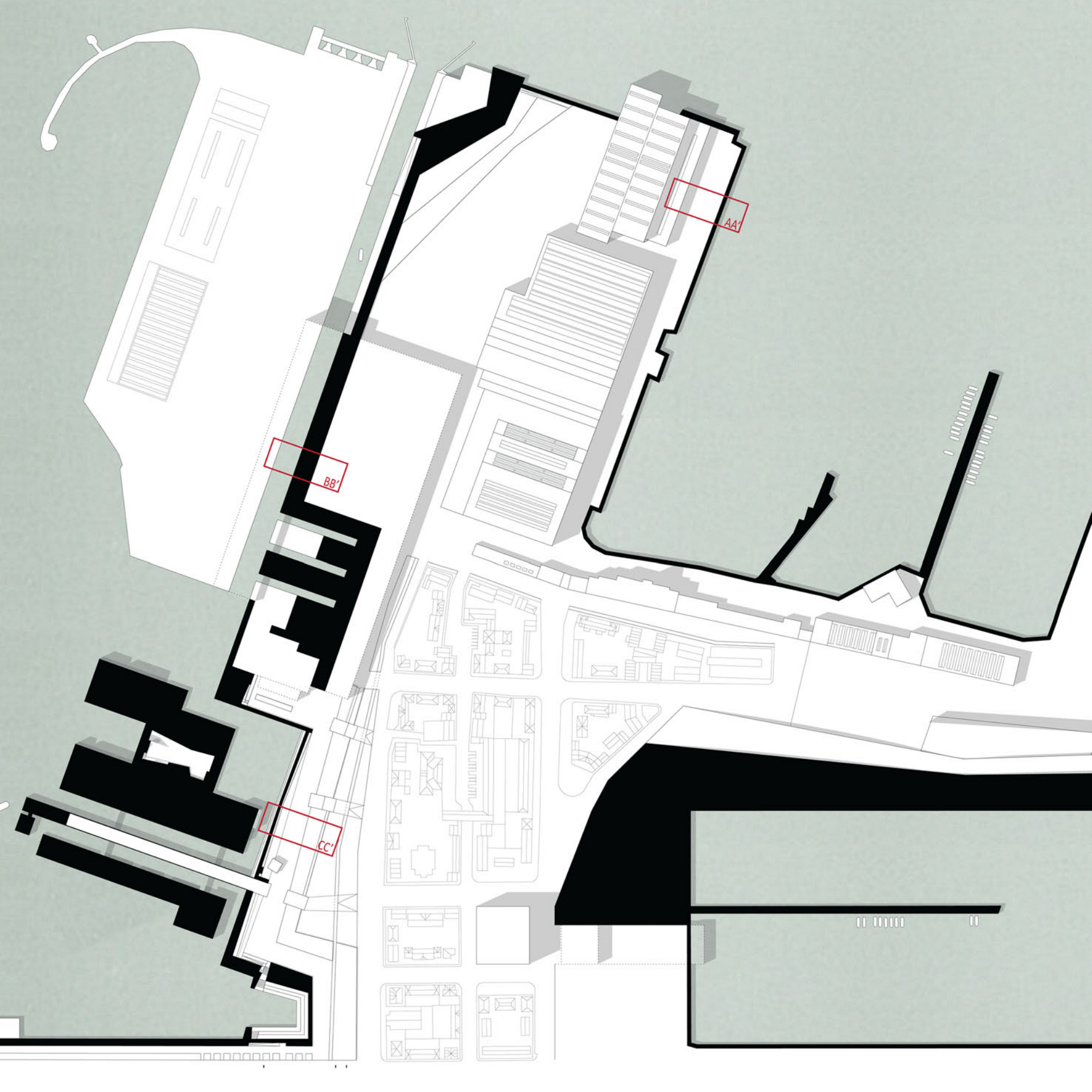
The ground level is slowly subsiding in large parts of Rotterdam.

The water system is stretched to its limits and it will get worst. The temperature will continue to rise, resulting in more rainfall and longer periods of drought during the summer. At the same time the sea level will rise due to the climate change, but it remains unsure by how much it will rise. Most predictions suggest that the sea level will rise by between 9 and 88 cm during the 21st century. This would cause hardly any problems for Rotterdam, but there is also a scenario in which a rise of 6 meters is predicted.

The area of Dokhaven already has some problems with flooding, due to the daily increase of water level. The Maas river, in fact undergoes a change in water level of about two meters twice a day. This phenomenon, together with heavy rains has caused in the past and will cause more often in the future, floods.

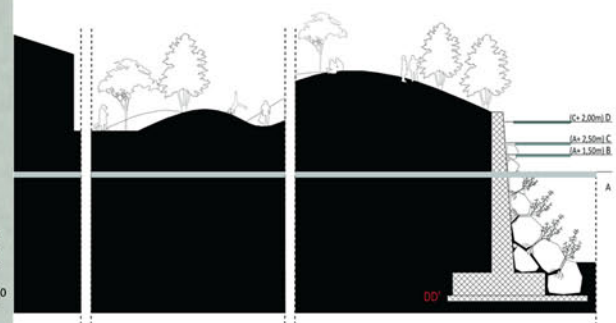
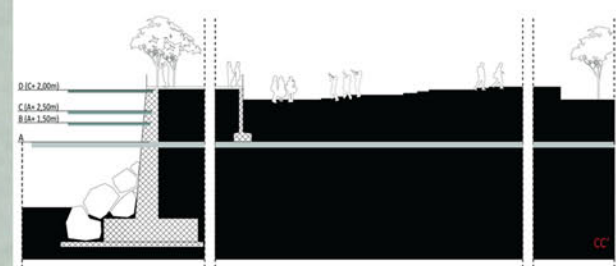
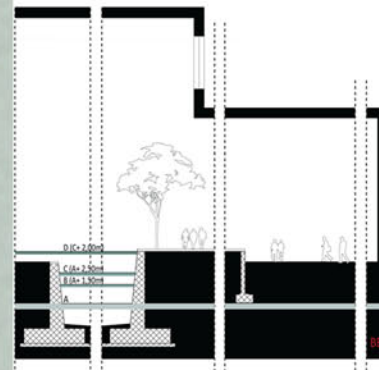
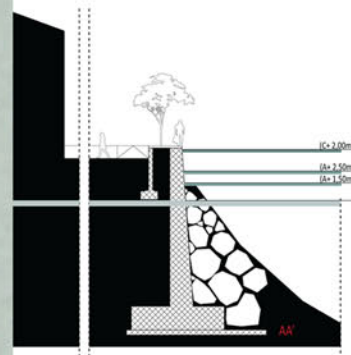
To solve this problem, I propose a 1,20 m protection embankment all around the shore, clearly based on the most popular and credited predictions. This levee system has a minimum width of 3 meters and, together with the prevention and protection role, it takes on different functions depending on the organization of the masterplan, from raised path to park, passing by bench, stage or building. This solution, not very invasive, helps to keep the close relationship with water, that is what gives most of the charm to the area.



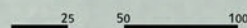




- D | PRESCRIBED DAM HEIGHT
H diga prevista dalle normative
- C | SECURITY LEVEL IN EVENT
OF FLOODING
livello di sicurezza in caso
di inondazioni
- B | WATER LEVEL UNDER
THE PLAN WB21
livello dell'acqua previsto
dal piano WB21
- A | CURRENT SITUATION
situazione attuale



reference height +/- 0,00m
[quota di riferimento +/- 0,00m]



PROGRAMS

1. SHORT TERM HOUSING AND HOSTEL

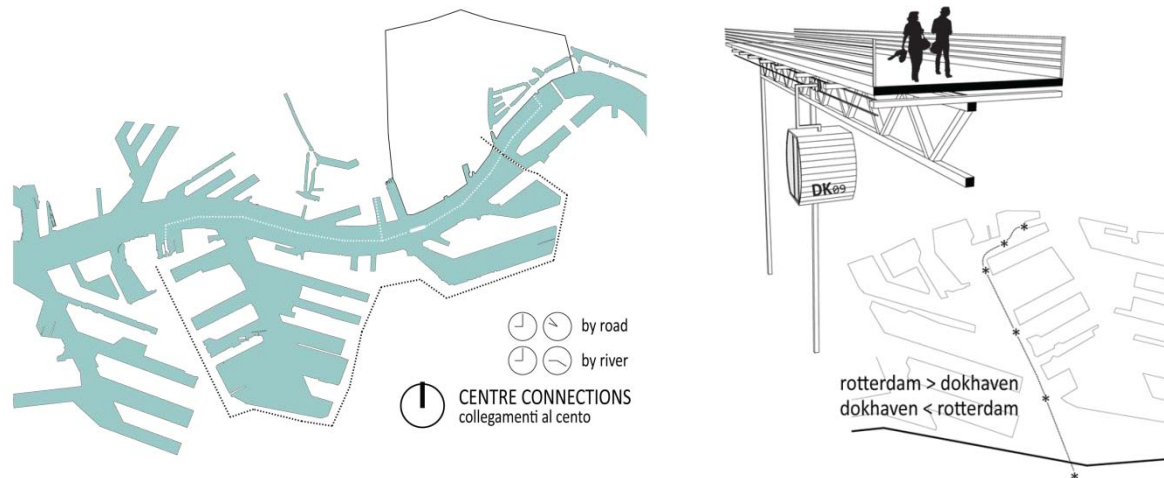
The site remained empty and unused for years, until 2007, when some cultural and educational institutions (including the Rotterdam Academy of Architecture and Urban Design) and several companies have moved into the area of Dokhaven, united under the name of **RDM** Campus (acronym for research, design and manufacturing process).

The idea of creating flexible and temporary residences is just based on this. The presence of students and teachers, even in the short term, should be grasped as an advantage. Instead of pushing people to stay in the center of Rotterdam, planning short-term accommodations or types of cohousing, will allow visitors to not only attend the area during the working time, but also to live it, to use its facilities, to socialize with its inhabitants.

2. THE HUB

Accessibility is for sure one of the biggest problem of the site. Dokhaven is reachable by road or by water.

The ferry turns out to be the fastest way to move , but since it leaves the dock just once per hour, the bus become to be the easiest way to move in and out the area.



Accessibility represent a problem not just in terms of time, but also because of the water rising level. To solve this questi on I propose a cableway system able to connect the area with that part of the city protected by the containment dikes.

So that people will have the possibility to move safety inside Dokhaven and even to bridge themselves with Rotterdam.

THE HUB is just where the cableway meets the ferry, where we can move from water transport to *air*, so as to ensure the connections even in case of flooding.

It is hosted in one of the former industrial buildings on site, at the north east corner.

Together with the transport programs, it also contain some facilities both for tourists and for t he inhabitants (info points, ticket office, catering, covered public space, greenhouses).

4. START UP CREATIVE INDUSTRIES

The Van Nelle factory in Rotterdam is a distinguished example of that the creative sector likes to work in appealing authentic buildings. Industrial heritage is ideally suited and examples of creative settling in old factories are numerous. The buildings are not only attractive in their authenticity, robustness and purity, they are also practical as they are able to bear experiments and productions due to the floor distribution and floor load. Furthermore, the often low cost of the buildings in the early stage of revitalizing make them attractive to the creative sector. As a result, creative economy and industrial heritage are closely related [1].

Creative companies do not want any ordinary place to locate their company. They demand locations with high experience values that fits their identity and image. In contrast to the classic laws of growth the small companies, making up the majority to the creative economy, attach more importance to remaining creative than to growing. As a result most creative entrepreneurs start working independently. Temporal housing in creative clusters is offered on the one hand to allow them to develop and to become successful, and, on the other hand, to provide a pole in which other groups come to fish [2].

	ROTTERDAM	CITY REGION ROTTERDAM	REGION REIJNMOND	NETHERLANDS
ARTS	9%	9%	9%	7%
MEDIA & ENTERTAINMENT	13%	11%	2%	3%
CREATIVE BUSINESSES/SERVICES	5%	5%	3%	4%
TOT CREATIVE INDUSTRIES	8%	7%	3%	4%
TOT OF JOBS	3%	3%	3%	2%

1. Job growth in the creative industries in the Rotterdam region and Netherland (1996-2003). TNO Inro

Furthermore the RDM Campus already provides space for innovative and creative manufacturing industry in the Rotterdam area, bringing together practice-based research and innovation and entrepreneurship, through company and institutional collaboration. A unique learning and working environment can be created, bringing back the original industriousness of the site.

Students will work together with companies on developing innovative product concepts, and on manufacturing these concepts.

1. Straaten, 2008 p.104

2. Atzema et al. 2006, in Saris Hoogendoorn, 2008 p.131

5. NEW NEIGHBORHOODS

3 DOCKS of 3.188 sqm + 5.312 sqm + 3.167 sqm, for a tot of 8479 sqm

FACILITIES

laundry, gym, caterings, nursery, private practices, shops, dance school and bookstore

HOUSING

12 COHOUSING APARTMENTS + study room and common kitchen	24 people
30 DUPLEX	104 people on average
25 STUDIO FLATS	39 people on average
21 FAMILY HOUSES [3 TYPES]	74 people

TOT 241 inhabitants > 0,03 inhabits/sqm

The idea behind the design of the new residential area is based on the concept of creating different types of housing, both in size and cost, addressed to various targets. In this way, the villagers of Heijplaat, already living in site, will be integrate with new type of users, giving the cue to a new neighborhood, vital and fluent.

The neighborhood is built in the western part of Dokhaven, subtracting space to water and completing the virtual mesh of the existing urban fabric. The obtained grid is then rotated of 19 degrees, in order to align it to industrial building next to it.

It is composed by two residential *islands*, connected to the mainland through a suspended walkway system (+ 3,70 m), supported by a central line of facilities, both to the use of the new neighborhood and for the inhabitants of Heijplaat.

The maximum height of fabrics has been set taking as a reference the existing residential buildings average height (around 12 meters) and even for the construction material, I chose to repropose the use of bricks, dominant in the area. Despite the choice of material may seem trivial, it has been declined following a range of gray tones, thus moving away from the traditional brick color, used in the other buildings, and blending it with other materials, such as wood and aluminum.

Formulating the concept, I decided to fix some basic guidelines for the development of all the residential typologies.

First of all I tried to give every house a *face* on water, to guarantee, where possible, a docking, and some green open space south oriented. In the housing blocks, where was not possible to provide it for every single unit, I designed some common open spaces, to be used by dwellers.

Obviously plans are outsourced so that spaces can reflect and make the most of solar orientation, while striving to ensure large glass surfaces, but also a certain amount of privacy, even if not so important as in Italy.

In two of the six typologies, I have decided to provide a hybrid space, where the difference between inside and outside is more subtle and that can be dedicated as office, small businesses, laboratories, ateliers or just as an extension of the house itself.







GENERAL PLAN
[planivolumetrico]

2

5

10



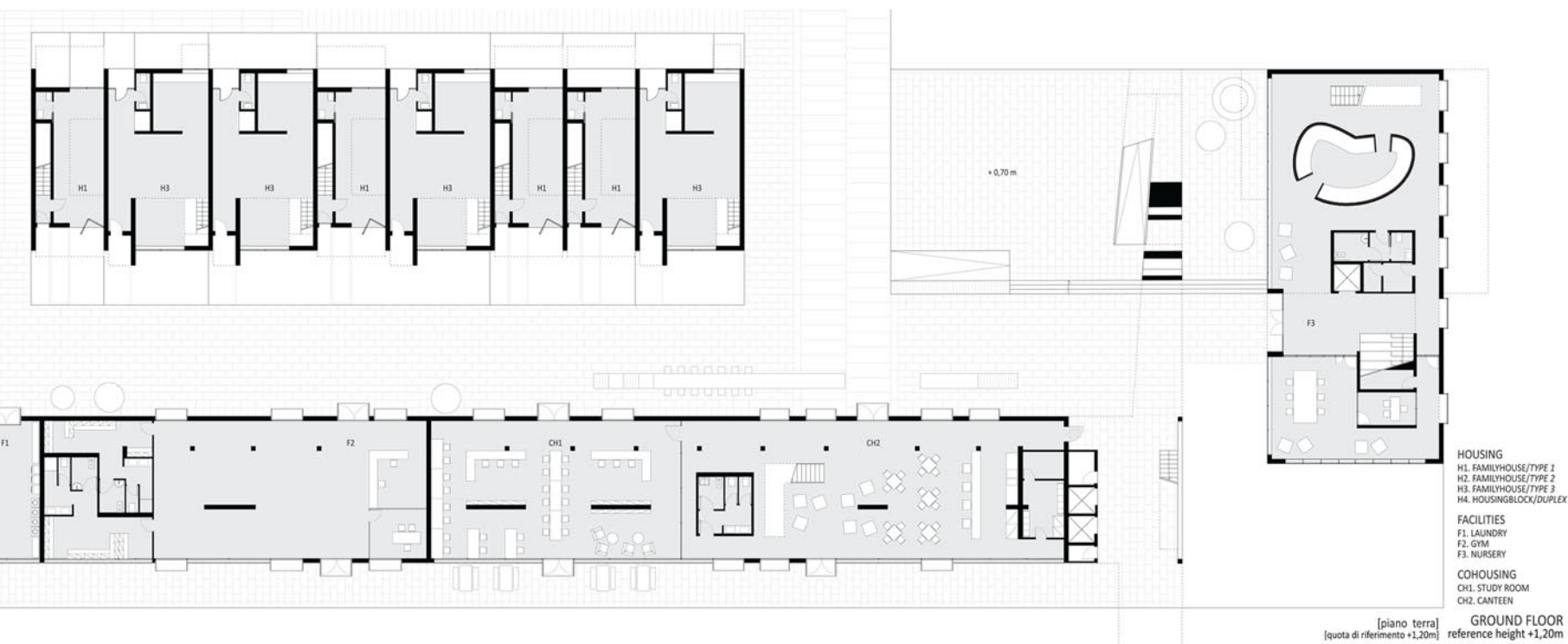
Going deeper inside the topic of new neighborhoods, I have then decided to develop on specific area of the *DOCKS*, taking in consideration the one able to represent all the typologies I have studied, **family houses, housing blocks and cohousing**.



- FIXED METAL MEMBRANE 76x150x3 cm 15.
- UPN 140 14.
- WIRE ROPE FENCE 13.
- DOUBLE GLAZING SLIDING WINDOW 9 cm 12.
- MOBILE MEAL MEMBRANE 50x268x3 cm 11.
- SLIDING SYSTEM 10.
- FIXED METAL MEMBRANE 50x28x3 cm 9.
- METALLIC GRID 5 cm 8.
- SQUARE SECTION STEEL SUBSTRUCTURE 5x5 cm 7.
- EXPOSED BRICKWORK 25x12,5x5 cm 6.
- ROUGHCAST 2 cm 5.
- WOOD PULP INSULATION 6 cm 4.
- AIR SPACE 10 cm 3.
- AIR BRICKS 8 cm 2.
- FINISHING PLASTER 2 cm 1.

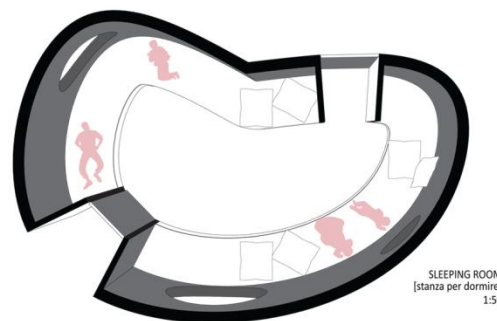
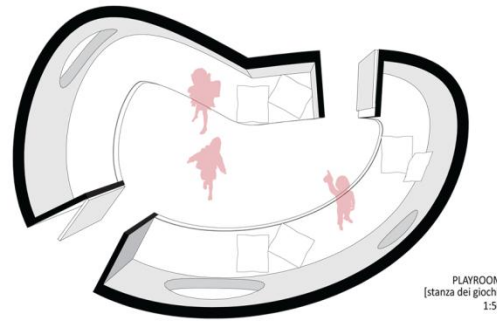
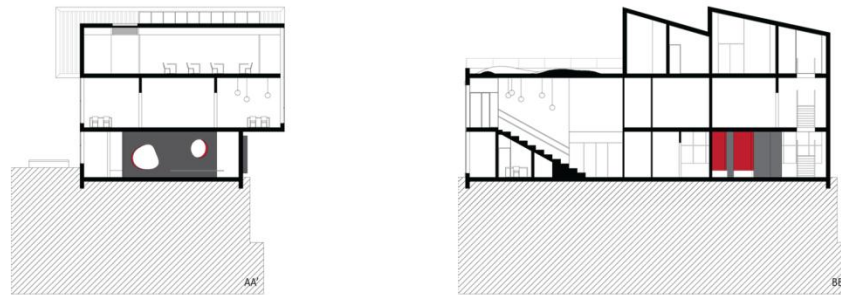
FACADE DETAIL 1:20
[dettaglio della facciata 1:20]

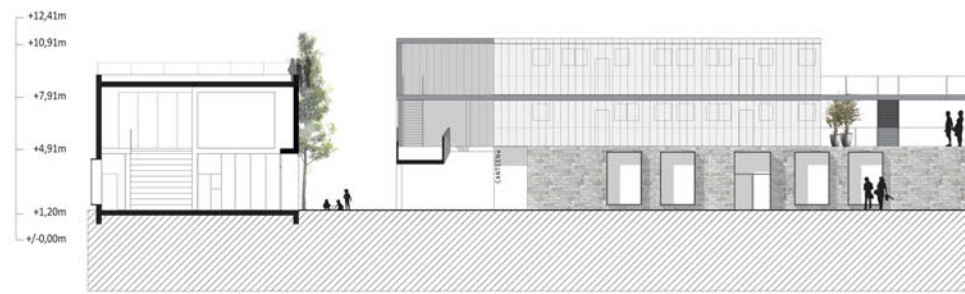
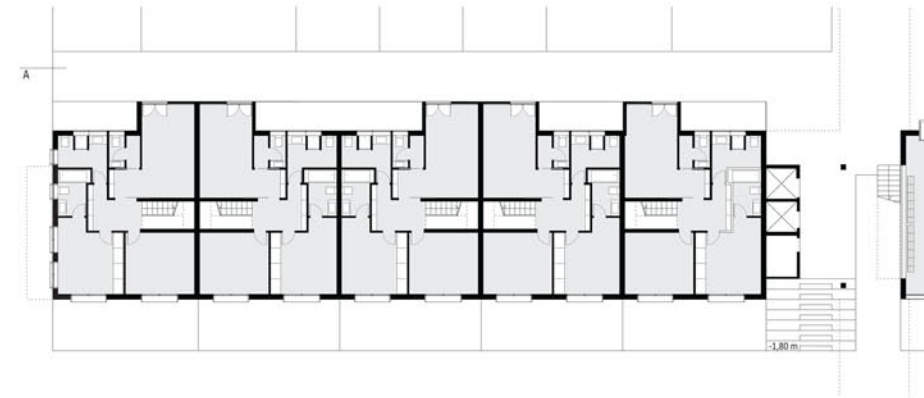
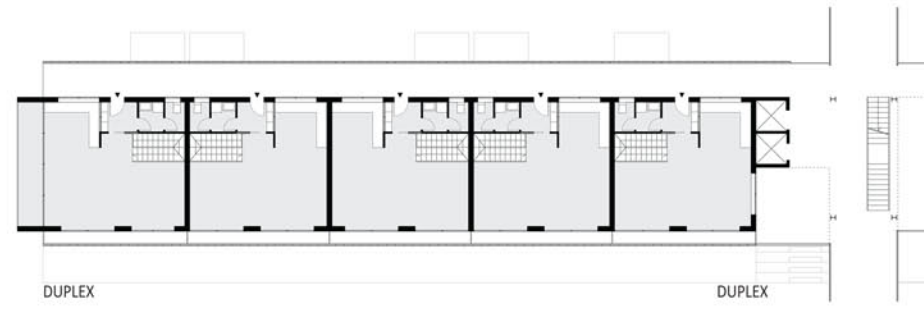
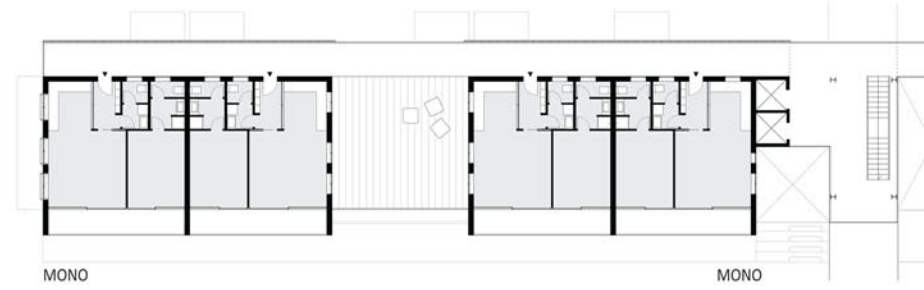




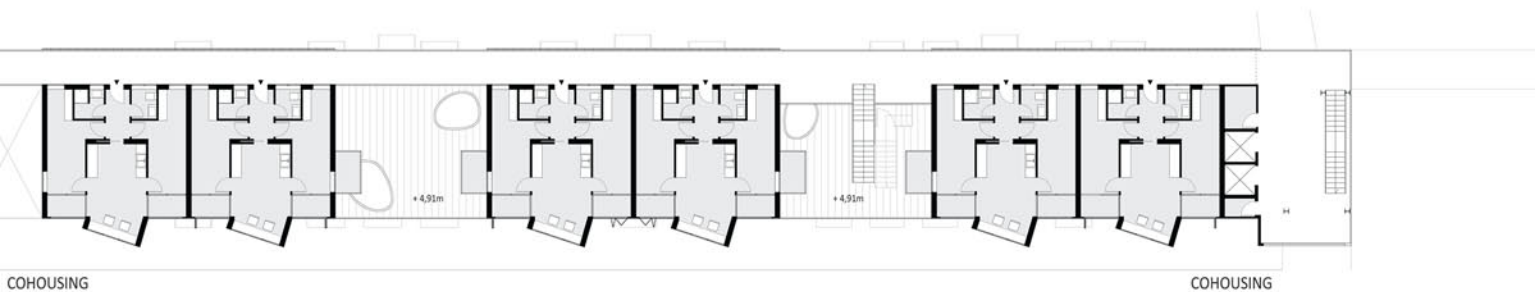
Together with the housing projects, I have also developed a series of facilities opened not only to the new inhabitants but also to all those people already living in Dokhaven, with the aim of reducing the distance between new and old residents, and create an integrated environment.

Among the facilities, the one I developed more is a 655 sqm **NURSERY** for children from 1 to 5 years old.

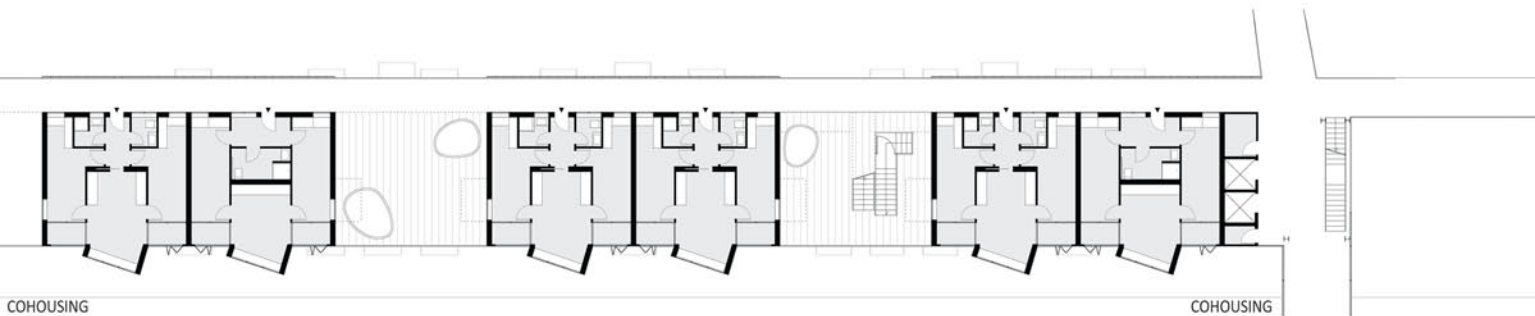




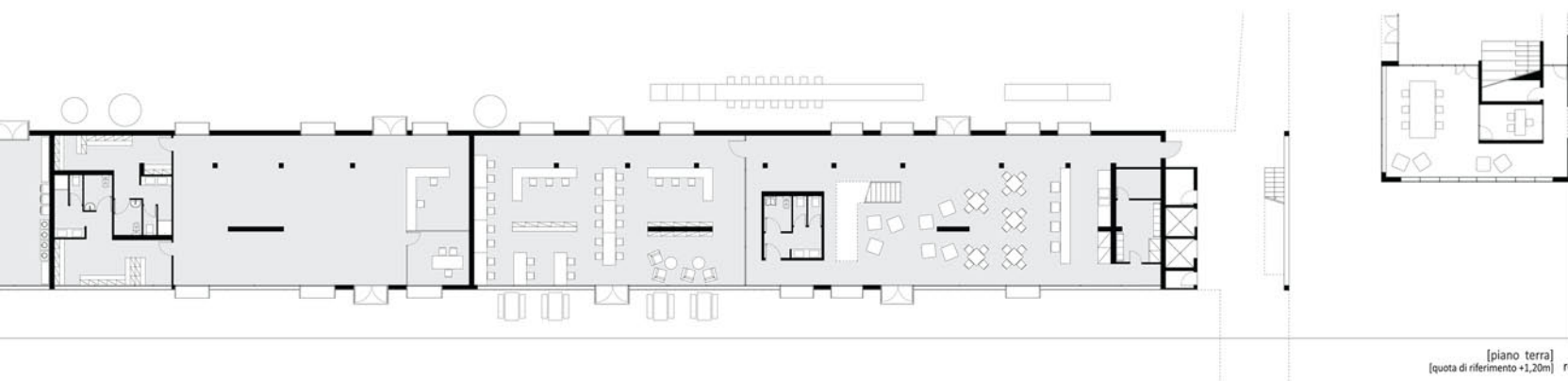
PLANS OF THE HOUSING BLOCK
/DUPLEX, MONO, COHOUSING



SECOND FLOOR
rh +7,91m
[secondo piano]
[qr +7,91m]



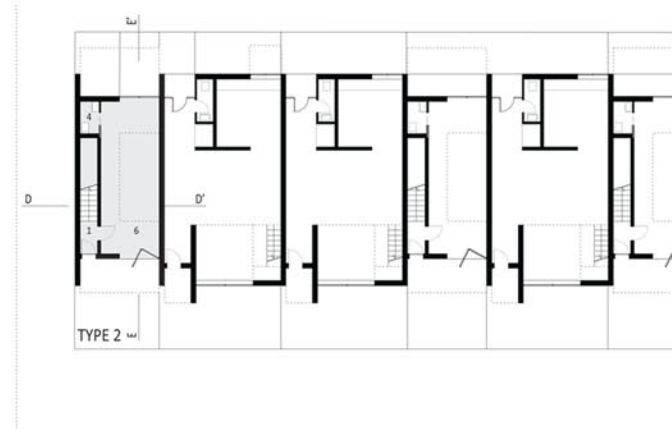
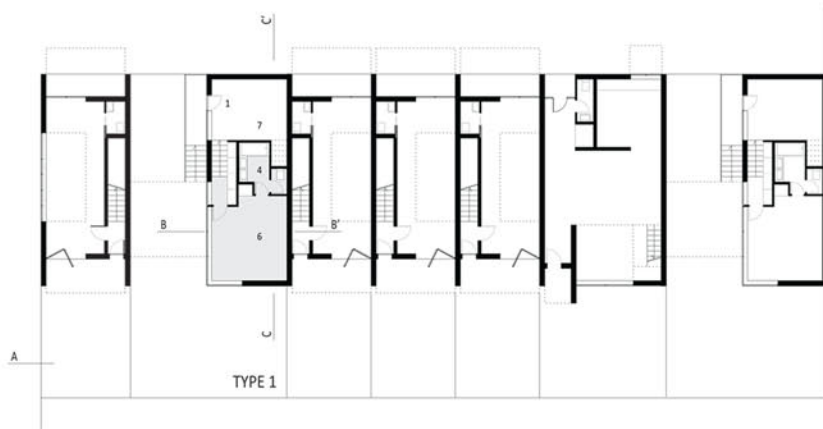
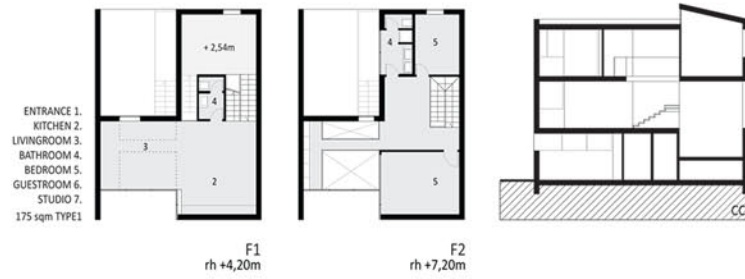
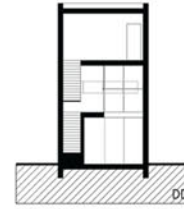
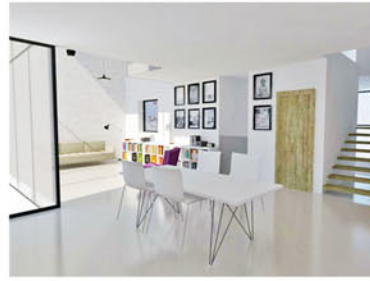
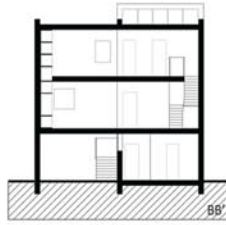
FIRST FLOOR
rh +4,91m
[primo piano]
[qr +4,91m]

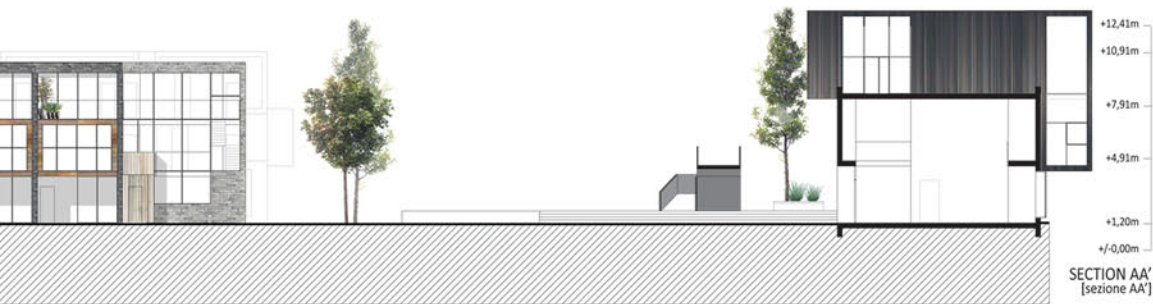
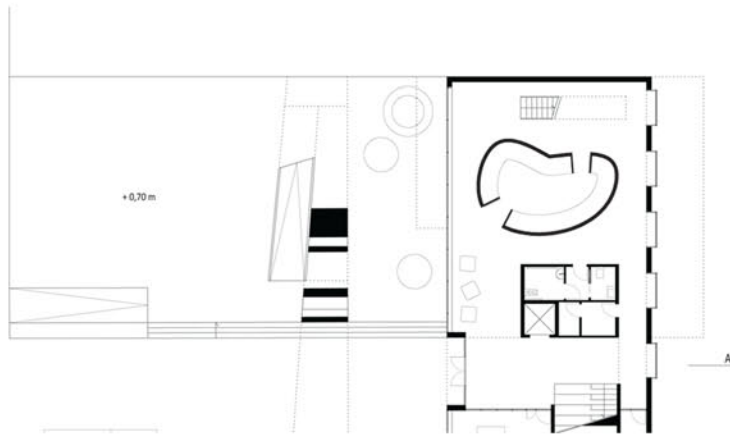
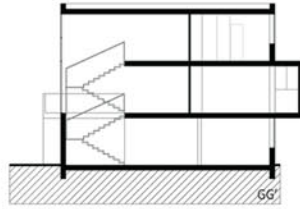
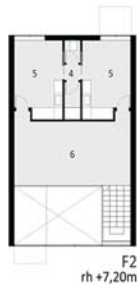
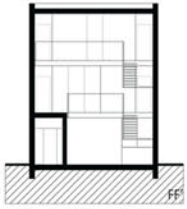


[piano terra]
[quota di riferimento +1,20m] GROUND FLOOR
reference height +1,20m



SECTION AA'
[sezione AA']





PLANS, SECTIONS AND INTERIOR
VIEW OF THE FAMILY HOUSES
/TYPE1 2 3



6. PUBLIC SPACE, CULTURE and EVENTS

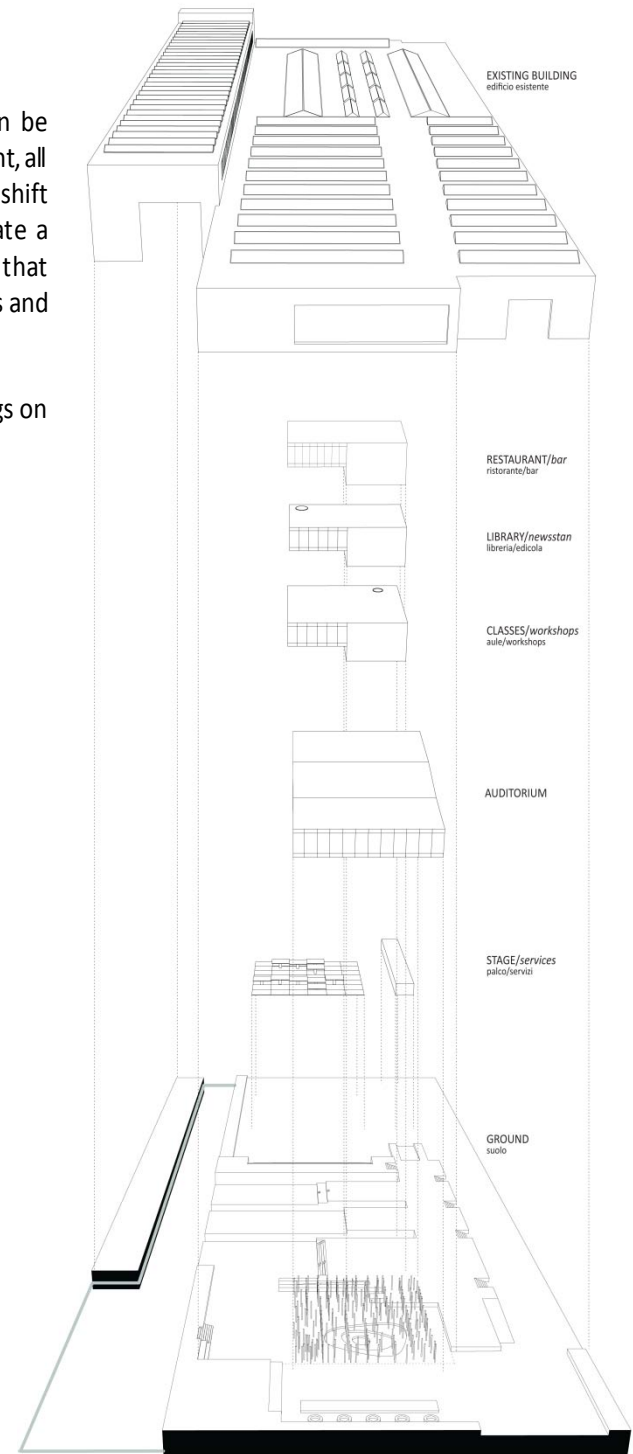
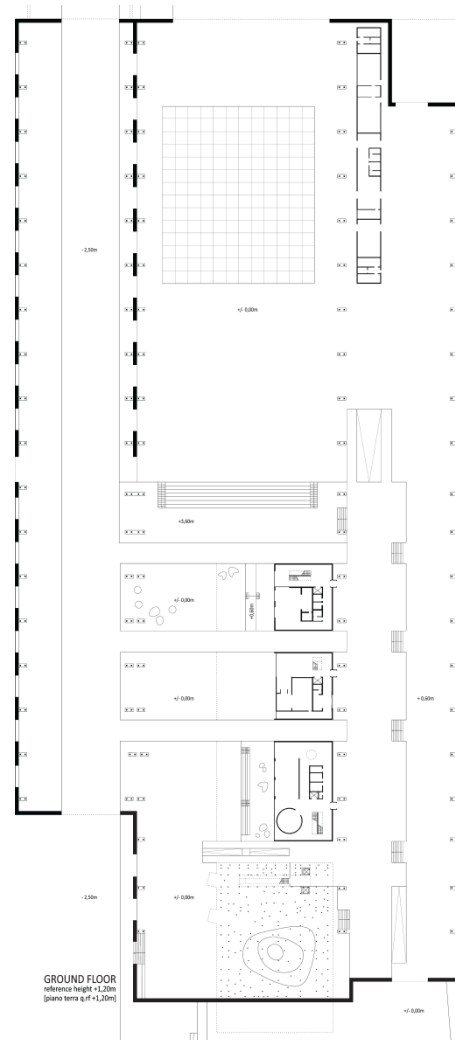
AUDITORIUM, CLASSES, LIBRARY, CATERING

Events on the banks attract some three million visitors a year. The river bank can be developed for a number of purposes and made more and more attractive. At the moment, all the urban activities on the Maas banks are strongly concentrated in the city centre. The shift of port activities from Dokhaven, therefore represents a valuable opportunity to create a new cluster of events, different from that of the inner centre, and can reverse the trend that today sees all people moving from Dokhaven to Rotterdam, both in terms of business and leisure.

According to this perspective, I chose to redevelop one of the former industrial buildings on site, the MAATSCHAPPIJ DE MAAS.



IMAGE 15.

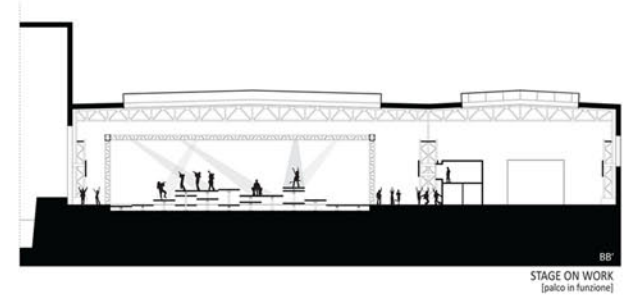
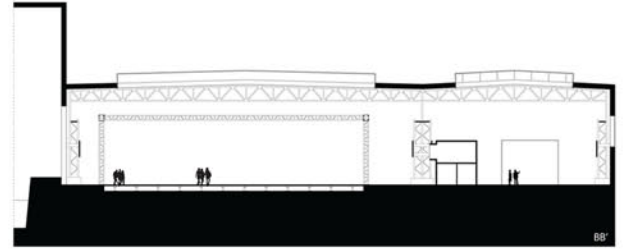
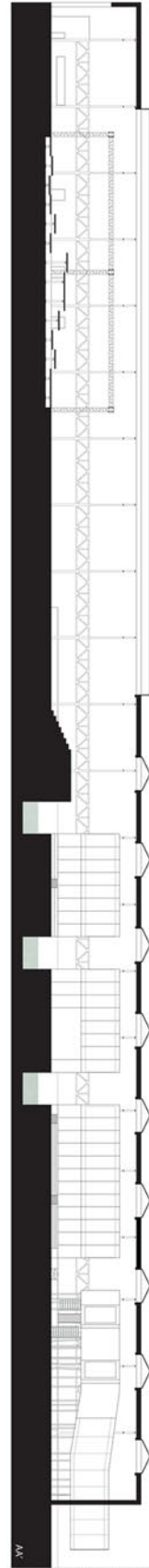


The MAATSCHAPPIJ DE MAAS, as all the others industrial building in Dokhaven, has been declared to be of high cultural and historic value in the Cultural Historic main structure of South Holland. This means that the building must retain all its characteristics as well as its appearance, and can be subjected to only small changes, but not structural.

This is the reason why I have decided to intervene mostly inside the building and to do not lean to the existing structure.

Inside, the program is translated in four buildings, hosting an AUDITORIUM, CLASSES, LIBRARY and CATERING, and a great public space organized on different layers (*artificial lands*), starting from the original one, going through a new ground made by the embankments, to arrive to a mobile one, consisting of an electronic stage, able to change in height, from – 0,50 m to + 4,00 m

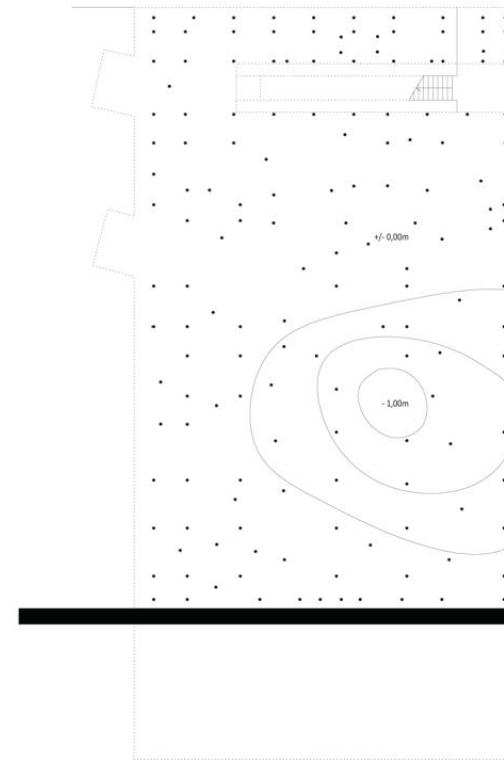
The facades of these new buildings are treated with aluminum panels, concrete and glass, in contrast with the massive brick walls of the former industrial building. The concept is that of designing simple *boxes*, in order to do not attract all the visitors attention on the new interventions, but to let people read it like a whole, the new project together with the shipyard.

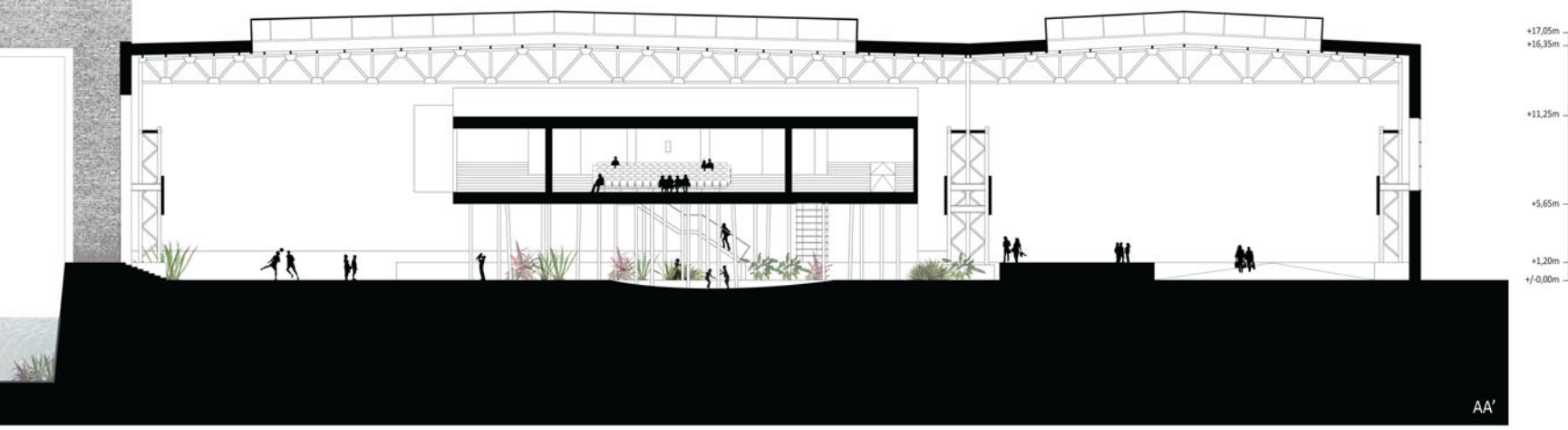
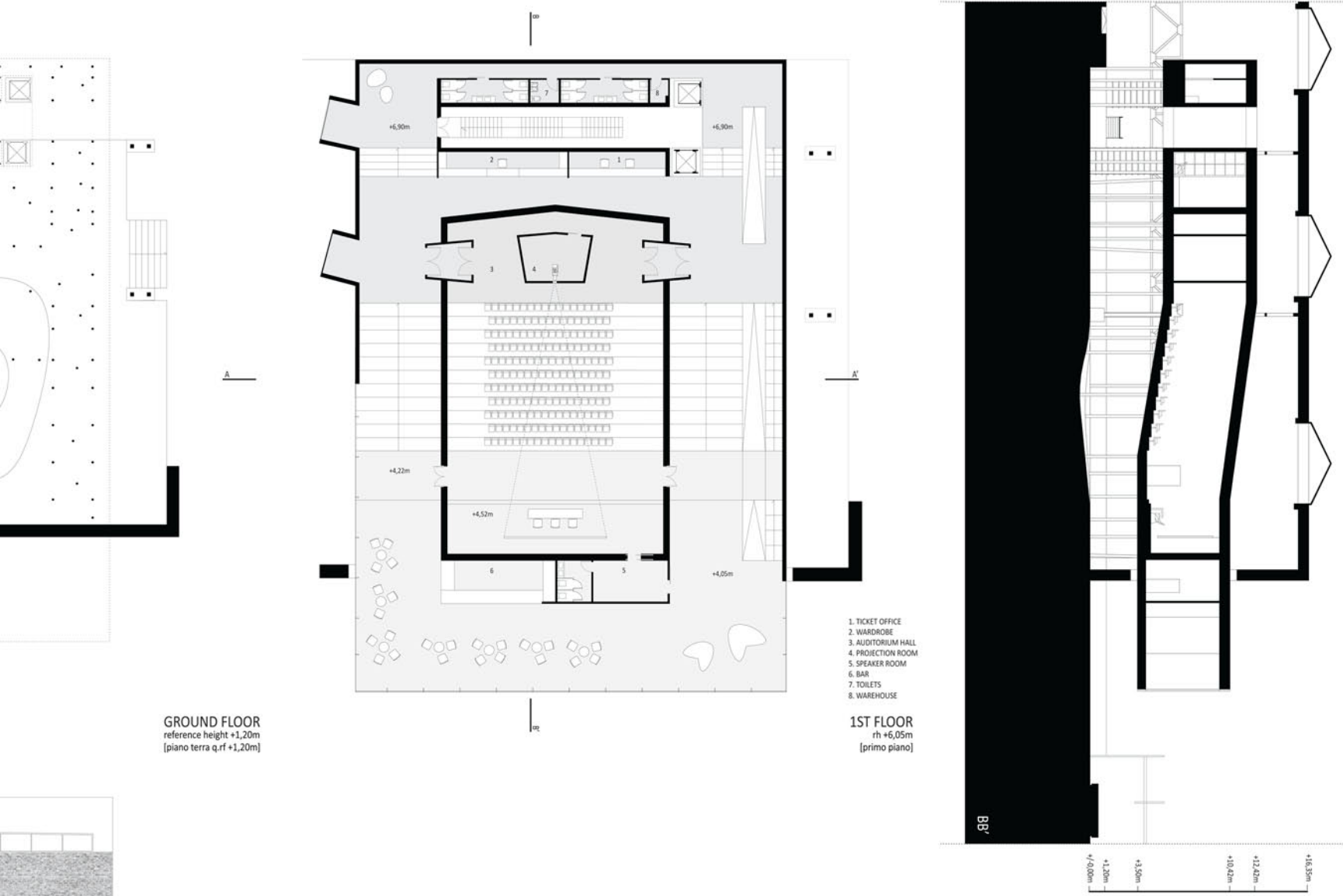


Last but not least, I have decided to deepen the design of the AUDITORIUM, that unlike the other buildings, is more than a simple box.

The Auditorium is in fact suspended 6 meters off the ground, and it is supported by what I decided to call the STEEL FOREST, a series of steel columns, the most with structural meaning, others that bring the installations directly underground, and others purely aesthetic.

The inner landscape of the MAATSCHAPPIJ DE MAAS is already dominated by a glut of steel, translated in trusses everywhere, and with my intervention I tried to inflate this concept, creating an almost surreal and very suggestive scenario.





6.0 | CONCLUSIONS

The transformation of derelict port areas and port related industrial wasteland, has been addressed as a global problem since the 80s, with the London Docklands as the predecessor for many other European urban development projects, aiming at reintegrating these abandoned areas into the urban realm. A quarter century of harbor transformation has brought about many built and drawn up examples, especially in the western world. But why even if the port cities hosting these projects vary tremendously in size, geography, climate, culture and so on, the majority of their harbor transformation projects look very much the same?

This global approach often starts from *tabula rasa*, wiping out the ashes, and results in a complete makeover.

What I have tried to do during my thesis process, was instead to address my site as a collection of specific values that have the potential to kick off a process of further qualification through preservation, development and integration.

What has been done is basically to figure out Dokhaven's opportunities, in order to strengthen them.

The area of Dokhaven has a rich story and has been subjected to both prosperous and poor times. It was an area of great vitality, hard work and simple people. I didn't want to create a new brand image of it, I have tried to keep the feeling of industriousness and abandon that everyone perceives walking along its docks.

At the same time, I also tried to rethink the area as a complex, filling the gaps left from the shift of port activities, making it more accessible, lively and attractive, to make Dokhaven part of Rotterdam and not just a satellite, as it is perceived today.

The waterfront is not in fact just a line, but a network of sites, programs and links between the coast and the city, between the port and the urban activities. But is not even just a node, it is primarily a place that was created by the intersection of uses, fluxes and programs. It's not just a place of amusement and leisure, but also a place of living, production and trade.

Addressing the theme of regeneration of the waterfront, thus implies that the project has to face them as structural components of the city, as a influence factor and not as a separate element, and aims to enhance the function of interface that waterfronts have in their potentials.

To make waterfronts come alive (after industry has receded) they must become places for people to dwell not just visit or recreate

Lord Mayor Sartor of Sydney

TABLE OF IMAGES

IMAGE 1. Hofplein, Rotterdam, before the II World War

IMAGE 2. Hofplein, Rotterdam, 1945

IMAGE 3. Hofplein, Rotterdam, today

IMAGE 4. Development model of Dutch cities

IMAGE 5. Amsterdam canal house

IMAGE 6. Rotterdam's evolution 1400, 1500, 1600, 1900

IMAGE 7. Rotterdamse WATERWEG evolution

IMAGE 8. Perspective Rotterdam WaterCity 2030, from: *Waterplan 2 Rotterdam, working on water for an attractive city*, Rotterdam Municipality, Rotterdam 2007

IMAGE 9. Rotterdam water protection system

IMAGE 10. Dokhaven historical development

IMAGE 11. Dokhaven photographic survey

IMAGE 12. HafenCity project

IMAGE 13. Van Nelle factory complex, Rotterdam, interior's photos

IMAGE 14. Van Nelle factory complex, Rotterdam, exterior's photos

IMAGE 15. MAATSCHAPPIJ DE MAAS building, Dokhaven, Rotterdam

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