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Waterfronts: Potentials for improving the quality of urban life*

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Abstract
In the contemporary city, the success of the quality of life embodied in public spaces is increasingly accepted as a guarantee factor for an overall success. As such, cities have realized the importance of the role of water for a better quality of life in the city. Many cities around the world are creating ambitious waterfront projects, trying to solve their problems related to water and combining this with improved public spaces.

The paper, with the ultimate aim in mind as drawing some recommendations for Istanbul, examines some chosen case cities in Europe, namely Rotterdam, Amsterdam, Hamburg and Antwerp, with the aim to search how they establish their urban policies involving water, how they create spaces of interaction with water and contribute to the urban life of citizens and as a result alter the quality of urban life. Each case city, with its waterfront projects is assessed along the following series of quality criteria: Urban space/recreation, Housing, Cultural environment, Land use pattern and Infrastructure/mobility. As methodology, interviews with policy makers and planners in these cities, presentations by policy makers, and written policy statements are used as tools to help interpret the way in which these cities through these development projects try to re-install the water culture of the city and how this achievement helps improving the quality of urban life.

***Keywords**: Waterfront developments, quality of urban life, public use, Rotterdam, Amsterdam, Hamburg, Antwerp*

Introduction

Today, in the contemporary city, the success of the quality of life embodied in public spaces is increasingly accepted as a guarantee factor for an overall success. In this respect, the urban waterfront is in the spotlight. Barcelona is a prominent and famous example of such a success, using its high-quality waterfront urban spaces as a part of an improvement policy. The city's experience made it a pioneer in using big events for promoting both the city and its quarters. These events resulted in big redevelopment projects; the projects of Port Vell, Port Olimpic and Forum 2004, all those events acting

as motors for the redevelopment of the area (Fig 1) by an attractive coastline, high-end housing and a change from industrial production to knowledge economy. The city has set in motion a process of urban renewal, fulfilling the city's aspiration of opening itself up towards the sea (Busquets, 2005). As such, cities have realized the importance of the role of water for a better quality of life in the city. Through water, they aim to enhance or emphasize their identity and quality of urban life. Ubiquitously, many cities around the world are creating ambitious waterfront projects, trying to solve their problems related to water (flood protection, water storage, re-use of old port areas, etc.) and combining this with improved public spaces. These projects form the showcases for their cities and are perceived as strong instruments for the competition with their rivals.

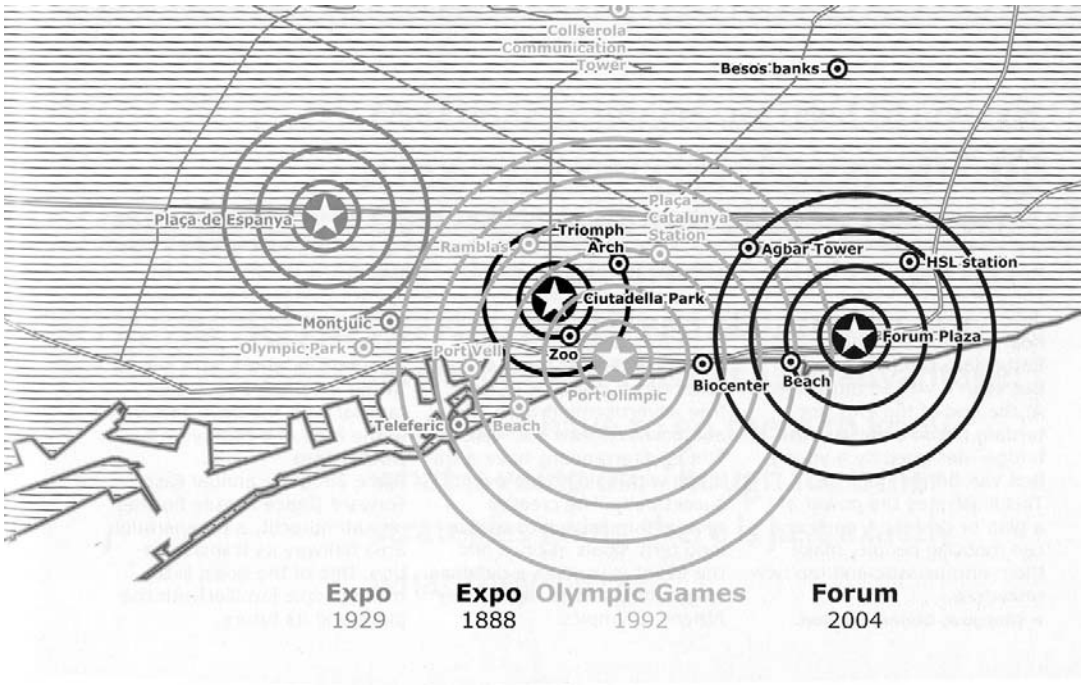


Figure 1. *Big events that created momentum for Barcelona with their impact areas (Zandbelt, Van de Berg, 2005)*

The Changing Waterfront

Water is a recurring theme through history. During the last decades, due to various reasons, harbour facilities moved away from urban centers in many parts of the world. This has left great amount of land close to city's central areas free for intervention and development. In most of European capitals, waterfront was occupied by harbour facilities, and due to commercial expansion, these spaces were growing and became segregated from the urban space. This process did not allow the development of leisure areas on the waterfront (Martire, 2008). Technical, political, social, and economical transformations in the cities provoked significant changes on the spatial configuration of the city in general and on their waterfronts in particular. Since the 1970s, the experience of urban rehabilitation, recycling the existing urban fabrics and their adaptability to new uses has opened up ways of proceeding for cities. The possibility of using former industrial areas

and ports assured a qualitative and economical improvement for the city. New uses in these recycle areas are usually assigned to trigger the acceleration of the advance of the city and public spaces are predominantly allocated therein.

Projects for the recovery and restructuring of obsolete industrial areas by the water have been highly on the agenda with implementations beginning in the 80s. London Docklands development has created one of the first and biggest waterside developments as a strategy developed to reverse the decline of the inner city (Shaw, 1993). The agenda of the 80s was characterized by the need to bring business and people back to these obsolete industrial areas and create economic growth. On the other hand, the 90s was dominated by the need to raise the quality of the environment in social as well as physical terms. Baltimore with its Inner Harbour development and Boston are among the first cities in USA applying waterfront projects for a similar rebirth. Many cities followed and urban ideas and interventions of various types and qualities have been applied across the globe. Public spaces and leisure areas have been given major importance in these schemes.

Martire (2008) examining leisure spaces at waterfronts in her thesis, suggests that waterfronts in the history, as urban spaces, have followed a development signed by different conflicts than those of the rest of the city. On the one hand, they have been spaces especially open to intervention, for their location created little conflict with the social order of cities. On the other hand, they have been conflicted spaces regarding the struggle between the installation of harbour facilities and leisure spaces.

Busquets (2005), defines the condition of today's city as fragmentary and sees public space as once again being formulated as a strategy that can provide the cohesion for a city comprised of parts (each with its own independent management and projects). Waterfronts will act as such cohesive spaces.

Istanbul, already possessing the privileged conditions for a strong character as a water city, should enhance this particularity for improving the quality of urban life. Waterfronts in the spotlight are regarded to be suitable places to adapt alterations for an expected healing in the quality of life. Precedent projects in cities applying waterfront projects for an enhancement in their quality of urban life might be opening new prospects for Istanbul for a similar achievement.

Quality - Quality of life - Quality of urban life

The concept of "quality of urban life" has its roots in the key term "quality". The term is used in a broad range of fields by various reflections and meanings, but a generic definition can still be given as "the efficiency / performance of an object or a service towards the needs" (Baycan, Nijkamp, 2006). A slightly different definition by the Oxford Dictionary is "degree of excellence; characteristic, something that is special in a person or thing".

The concept of 'quality of life' addresses the issues enabling the general well-being of people, be them objective and subjective ones. This concept involves both personal well-being and satisfaction and the characteristics of the built environment. While the indicators like security, health, spiritual values, relations with others, work, etc (Doratlı, et.al., 2003) can be listed as

objective conditions/attributes influencing people, these perceived and evaluated attributes turn into subjective responses, which can be regarded as subjective indicators for quality of life. This is the personal perspective of the individual and is relatively ambiguous. This perspective comes into being by perceptions, preferences, and satisfactions. Researchers putting satisfaction to the core measure and compare people's assessments of several domains of their lives as well as "life as a whole" and determine the degree to which each domain explains the quality of life experience (Marans, 2003). Satisfaction is deemed to be a plausible and realistic objective for policy makers (Türkoğlu et. al, 2006). The objective reality of quality of life has several domains as health, family, community, housing, leisure, etc. They all explain the quality of life experience. This quality is about fulfilling the societal demands for material wealth, social status and physical well-being.

Deriving from this key term, Baycan Levent & Nijkamp (2006) define quality of urban life, as a specific form of quality as; the performance level of urban life towards the needs of communities or societies. For them, in other words, quality of urban life refers to the degree of excellence or satisfactory character of urban life with its several dimensions ranging from environmental to social and economic components. They list four aspects of quality of urban life as; urban ecology and resources; urban environmental quality; quality of urban transport, and sustainable cities and quality of community life.

The quality of life in a specific place can only be measured with a multitude of attributes (social, economic, environmental) of the place. In combination, they reflect the overall quality of the setting. Indicator sets representative of quality of life in cities can be summarized as; climate, health care, crime, transportation, education, arts, recreation, jobs, cost of living (Türkoğlu et. al, 2006). Doratlı, Hoşkara&Pulhan (2003) consider the physical environment as the main domain for assessing the quality of life. For their case study evaluation, they determine six key themes each with several indicators like; land-use pattern, housing, buildings, infrastructure and mobility, recreation and environment.

Previous studies on waterfronts

There is a wide bibliography about the separate concepts of *'waterfronts, waterfront renewal/regeneration projects'* and '*quality of urban life'*. Waterfronts in general have been studied by historians, urban planners. However, scarcely ever work can be found at the intersection area of these topics. The relevant literature is mostly on regeneration projects for the predominant waterfronts of several cities. Works such as Bruttomesso (1991, 1993) and Breen & Rigby (1994) are basically catalogues of projects from different waterfront cities of the world. Meyer (1999), in his book *City and Port*, compares the historical evolution of four harbour cities trying to focus on the cultural significance of the spatial development of these areas.

Historians have also studied waterfronts as part of a system of cities, regions and civilizations. The books of Braudel (2002) on the Mediterranean and the study of the attraction of the waterfront by Corbin (1988) in *The Lure of the Sea* are remarkable analyses.

Marshall (2001) in his publication *Waterfronts in post-industrial cities*, takes a critical look at the waterfront projects. He proposes that the urban waterfront provides possibilities to create pieces of city that enrich life and can give some notion of the urban ways of living celebrated by Baudelaire and Benjamin, Oscar Wilde and Otto Wagner. He asserts that however, there is a tendency, in much of the literature, to view waterfronts as a kind of urban panacea, a cure-all for ailing cities in search of new self-images or ways of dealing with issues of competition for capital development or tourist dollars. For him, international design clichés characterize the waterfronts of many cities.

Another compilation, the catalogue of International Architecture Biennale Rotterdam 2005 (de Baan, et. al 2005) presents both different types of existing water cities and also cities of the future yet to be realized. Port transformation projects have been generally extensively documented. The study Big and Beautiful/Comparing Stadshavens in Europe (Zandbelt, Van de Berg, 2005) is such a collection and comparison of city-port redevelopment projects in 12 European cities with their driving forces, implementation strategies and anchor facilities.

The problem of the waterfront redevelopment has been addressed consistently in the last decades. The main phenomenon observed by architects and urbanists has been the conflict between the development of technical facilities and the need for open space at waterfronts. The intention to raise the quality of urban life through these projects and their indicators are slightly hidden or only implied. Few authors have dealt with an interdisciplinary research on the urban waterfronts. At the other research domain 'quality of urban life', research has also been commonly conducted by case studies, however, the cases are mostly not examining a change in a particular place through a project, the implementation of an urban project, but with the state of play in a chosen section of time. This paper will attempt to tackle the issue of ways of raising the quality of urban life in cities through particularly waterfront redevelopment projects, be them successful or unsuccessful.

Methodology

The paper will examine the case cities with their urban development policies (and as part, their waterfront development policies) which place great emphasis on improving the quality of urban life by the help of waterfront regeneration achievements. Through these redevelopments, the improved attributes of the domains of the quality of life in the city as; housing, leisure, public use and transportation contribute to the overall quality of urban life. These extensive design initiatives aim to rediscover the latent, positive qualities of the city and utilize them as triggers. Such policies aim to render the city as an attractive area for its occupants, thereby they involve the main task to develop the city as a place worth visiting, living in and worth investing in. All these different ways of relating to the city are affected by the qualities of ways of using the city and the resulting outcomes as settings. Water, being a valuable contributing factor to this setting, constitutes an essential potential waiting to be utilized in parallel to the main policies. Waterfront redevelopment projects, mainly for the inner city waterfront areas, which have been deteriorated, target reinforcing the competitive position of the central city in relation to its expanding region and attract the citizens for a living in the city centre. Therefore, they aim to elevate the urban life qualities of the city centers and strengthen the city's identity nourished by an intense

and attractive city life. These development projects act as rescuers for many European cities as well as other cities around the world, in terms of repositioning themselves in the competition arena within their context. The **Kop van Zuid** Project in Rotterdam, the **IJ-oevers** Project in Amsterdam, the **Hafencity** Project in Hamburg, the projects for the regeneration of the **Scheldt quays** and **the Islet ('t Eilandje)** in Antwerp are such projects.

The paper aims to think on ways of improving the quality of urban life by reaching economically, socially and environmentally sustainable decisions on water relations in cities. With the ultimate aim of drawing some recommendations for Istanbul, the paper will examine the chosen case cities in Europe with their waterfront projects, namely; Rotterdam, Amsterdam, Hamburg and Antwerp. The focus will be on how they establish their urban policies involving water, how they create spaces of interaction with water and contribute to the urban life of citizens and as a result alter the quality of urban life.

As methodology, tools such as; interviews with some policy makers and planners of these cities, presentations of policy makers, project descriptions and written policy statements will be used for such an evaluation of these projects/cities.

The principle of mixing functions rather than separating them and great emphasis on working and recreation as essential components of a variegated development scenario, devoting more and better quality spaces for recreation and public use are some of the indicators for elevating the urban life quality. Another emphasis will be on the fact that these initiatives as actions covering a long procedure are not expected to present rapid outcomes, immediate changes in the indicators, but rather a slowly evolving transformation.

The cases will be examined through certain assessment criteria. These criteria have been determined through a selection from the previously mentioned indicator sets representative of quality of life in cities. Regarding the possible impacts of waterfront redevelopments, this selection outlined relevant indicators. As a result, each case city, with its waterfront projects will be assessed with the following series of quality criteria:

- Urban space/recreation
- Housing
- Cultural environment
- Land use pattern
- Infrastructure / mobility

The following chart shows the case cities chosen for examination with their waterfront or water-related projects:

City	*Project*	*Status*
Rotterdam	Kop van Zuid	implemented, almost finished
	Water squares	pilot projects start in 2010
Amsterdam	IJ-oevers	in progress (due 2020)
Hamburg	Hafencity	in progress (due 2025)
Antwerp	't Eilandje	in progress (due 2015)
	quay redesign	in planning process

CASES:

ROTTERDAM

There are simultaneously several water-related projects in differing scales and with different shaping factors in the agenda of Rotterdam. With the aim to present this variety of scales/solutions/achievements, two projects will be explained for Rotterdam, with their key meanings as:

- **Kop van Zuid**: a regeneration project of a former harbour area
- **Rotterdam Water City 2035 & Water Squares:** A plan for a better water-related Rotterdam & within this plan, neighborhood scale solutions to water management and climate change problems combined with public uses

> Kop van Zuid

The harbour areas on the south bank of River Maas facing the present center have lost their earlier function with the westwards expansion of the port in the 1960s and 1970s, leaving the area abandoned. Being the former harbour area at the top of Rotterdam-south, Kop van Zuid area has been transformed into a new part of the modern city center of Rotterdam. Before the Kop van Zuid scheme, the River Maas acted as a barrier. The plan aimed a leap of the city center across the river Maas and connecting the north and south shores of the Maas (with the strong contribution of the new bridge) assigning it the heart of the city again. The time line of the project is 1984-2010. The south of Rotterdam has been a stepchild of Rotterdam for a long time (Jung, 2008). Its previously very poor image had to be changed by a powerful and convincing investment.

For urban planner Schrijnen (Schrijnen, 2008) in Rotterdam, when the harbour was there, the city itself was not positioned on the river, instead the harbour was. When this part of the harbour shifted away to the west, Kop van Zuid or new parts of it are only now touching the river as new urban settlements. As a big change, the city turned from a city on the harbour into a city on the river.

Urban space/recreation: The plan used Rotterdam's water as a vast, binding, collective factor, for fragments of the project and the city. An area of 45 000 m^2 was left for recreational activities. A quality book for open spaces was prepared with the identification and detailing of public space as a high quality was aimed both for buildings and the public realm (Meyer, 1999).

Housing: The area was previously the housing area for the harbour workers. The initial plans were to redevelop the area for social housing for the people who already were living there (Jung, 2008), but in 1986 under a master plan, Kop van Zuid became seen as a huge potential for the whole city. This change of image would be fulfilled with a high-quality mixed-use

(residential, offices, education and leisure) area, with eye-catching buildings, a lively waterfront, and good connections to the city centre. The main program consisted of offices and apartments in a wide range of price and typology with an aim to integrate social housing with luxury housing.

Cultural environment: The Wilhelminapier where emigrates departed to the new World with the Holland-America line is the eye catcher of the area. Hotel New York played an important triggering role as an icon building (Bruttomesso, 1991). The area contains culture buildings like the Maritime Museum, Netherlands Photomuseum, Las Palmas Gallery, Harbour Museum, Luxor theatre and as well displaced city services like the justice court, tax building and schools (Zandbelt, Van de Berg, 2005).

Land use pattern: The program consists broadly of housing (6500 homes) and offices (325000 m^2) (Bruttomesso, 1991). Expected capacity by 2010 is for 15,000 people living and 18,000 working. A hotel, a restaurant, a museum, passenger terminal and other urban functions were planned on the Wilhelminapier (Figure 2).

Figure 2. *a. Kop van Zuid Project area with its key buildings (Zandbelt, Van de Berg, 2005), b. general view (Klerks, 2007)*

Infrastructure / mobility:

The essential aspect of connectivity with the city center on the north was provided by; the Erasmus Bridge, addition of a metro stop, extension of the new tramline and a new road over the old railroad.

> Rotterdam Water City 2035 & Water squares

In 2005, a plan called “Rotterdam Water City 2035” was laid out by representatives of different bodies with a starting point of the 2nd Architecture Biennale in Rotterdam. This plan involved inspirational ideas concentrated on the starting question of: “What would Rotterdam look like if water in the city was not considered as a problem but an opportunity? What if we take water in the city as a starting point?” The concept model included perspectives like:

- Living in Rotterdam will become water related in residential communities on the water
- Water will be more actively used for public transport in the city
- Rain will become a recurrent festival instead of an inconvenience
- The river banks will become more of places for private initiatives and urban activities

Climate change has forced the administration of Rotterdam to rethink water management systems in the city and to develop systems to prevent water problems. As a way to adapt to this change, creating more green roofs and building water squares as innovative designs are now on the agenda (de Greef, 2008). Water squares are open spaces that temporarily store water when it rains. When it is not raining, they can be used for various activities, such as leisure activities.

Urban space/recreation: Rain will become a recurrent festival instead of an inconvenience. Water squares will be placed in the neighborhoods as urban spaces with leisure and sports functions (like play areas, sport areas, sitting places, etc) and will be able to offer use both in rainy and dry situations. Problems of peak rain discharge, clean water supply will also be addressed with these creative design solutions (figure 3). Pilot Projects in selected locations are underway for Water Squares and Green Roofs in the city centre.

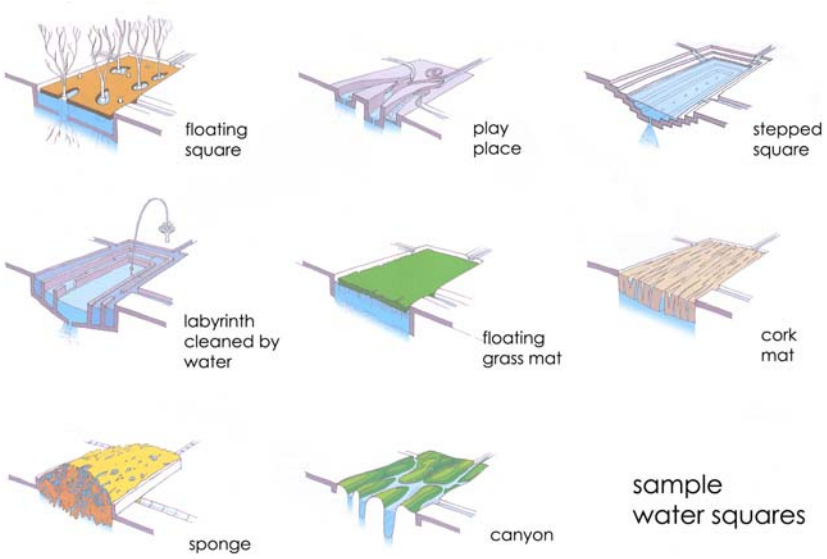


Figure 3. *Some preliminary conceptual designs for water squares (Brons, Siccama, 2007)*

Housing: In order to realize the aim of introducing more water related living in Rotterdam as part of Rotterdam Water City 2035 Plan, new types of housing settlements are studied. The 3 images of Watercity 2035 are formed by 'River City' in the centre; 'Canal City' in the north and 'Waterway City' in the south, each comprising housing types closely related with water (fig 4).

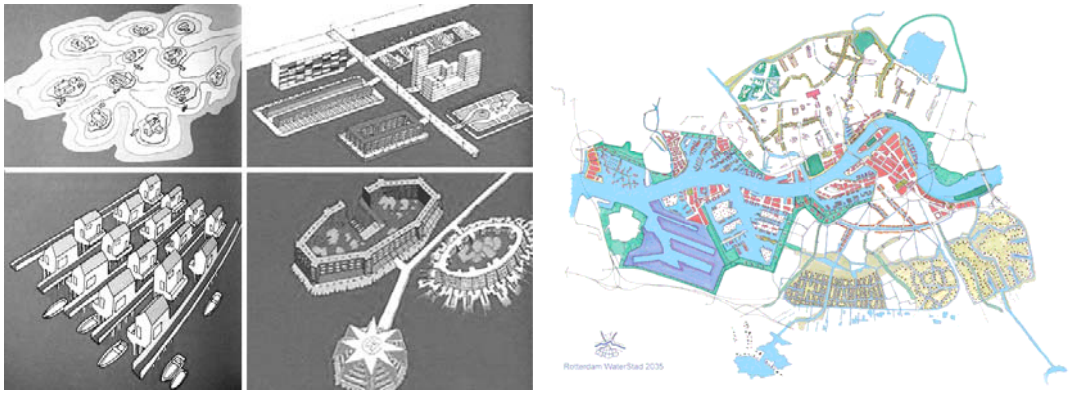


Figure 4. *a. New types of floating housing settlements, b. Plan of Rotterdam Watercity 2035 (de Greef, 2005)*

Infrastructure / mobility: Water will be more actively used for public transport in the city.

AMSTERDAM
> IJ-oevers (IJ- banks) development

Amsterdam previously was a city on the river IJ, but with the dragging of a navigation canal, it became a busy transshipment area and a transport axis for ships and trains. The north of Amsterdam was cut off from the river by the Shell terrain; the south dominated by warehouses, shipping offices, and harbour sheds (Bulten et.al, 2008). With the building of the Central Station, the city became standing with its back to the River IJ even more.

Port function on the banks of the river continued until the 70s. With the outwards move of the port facilities, the area stayed as brownfield until 1980. Amsterdam now is expanding into the IJ, from the western Houthavens harbour district to the Ijburg area in the east of the city. Transformation started in 1980 and will continue until 2020. The IJ-oevers Project is the country's largest urban development project (de Baan, et. al, 2005). The river will once again be flowing through the city, instead of alongside it. Policy maker & urban planner Schrijnen (2008) defines this change of the position of the city as: Amsterdam at the IJ (1500-1900), Amsterdam at the Central Station (1950-2000), Amsterdam at IJ again (2000-2050).

Urban space/recreation: The development is based on a chain of islands along the IJ, on either side of the main railway station. Each island will have its own atmosphere and character. A team is supervising the quality of the architecture and urban space. (de Baan, et. al, 2005)

Housing: After a failure in an attempt to develop the total area of the IJ banks in mid '80, a successful restart was given by the redevelopment of the eastern docklands. Predominantly residential areas with landmarks are designed in Borneo Sporenburg, Java and KNSM Island (Zandbelt, Van de Berg, 2005) as well as Ijburg, a new housing district built on an artificial archipelago. Most of the redevelopments are dominated by housing, so much that a view as a 'sea of houses' is created.

Cultural environment: With the departure of harbour activities buildings became vacant, and were transformed by artists seeking space and inspiration. (Bulten et.al, 2008). The creative core of Amsterdam acts as a pioneer to new development. When artists and theater companies were allowed to work, live and perform in brown field sites, these places got known as a cultural hot spot. In this way, Westergasfabriek and NDSM yard turned into popular city park and festival and theater locations. (Zandbelt, Van de Berg, 2005)

Land use pattern: Main program is housing and special program; Shell technology center, NEMO, Cruise terminal, Central Station, etc (fig 5). Projects are also in progress to create a variety of residential, working and cultural environments on the northern riverbank, with the museum of cinematography in Overhoeks. (Bulten et.al, 2008)

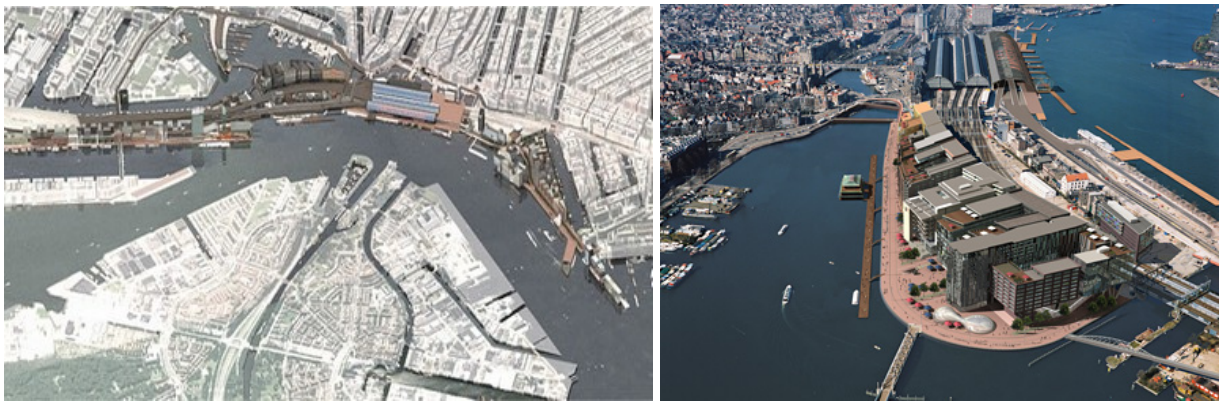


***Figure 5**. a. IJ-oevers project (plan) b. view of IJ-oevers project around Central Station (http://rijnboutt.nl/article/show/100)*

Infrastructure / mobility: Newly added infrastructure include Piet Hein tunnel, North-South metro line, IJ-tramway.

HAMBURG

> Hafencity

In Hafencity area, port function continued until the end of 80s and the area remained as brownfield until 1997. Time span of the transformation extends until 2017 when a total integration is achieved. Situated directly between the historic Speicherstadt warehouse district and the River Elbe, there will be a new city with a cosmopolitan mix of apartments, service businesses, culture, leisure, tourism, and retail (http://www.hafencity.com/). The largest inner city development project in Europe; HafenCity Project, will expand downtown Hamburg by 40 % in about 20 years (fig 6). The area occasionally getting flooded required a smart solution for this problem, not cutting off land from water by high defenses. With the exception of the waterfront promenades, the entire area will be raised by 7.50 to 8.00 meters above mean sea level, creating a new and distinctive topography while preserving access to the water (Hafencity Hamburg GmbH, 2006). The historic 'Speicherstadt' is preserved and integrated with the site's flood protection.

Figure 6.*a.Overall vision of Hafencity project (Hafencity, 2008) b. model of the project (Photo: F.Erkök)*

Urban space/recreation:
The Speicherstadt area, which gets flooded about once a year, has its warehouses prepared for this, but for permanent occupation as housing and office functions, extra safety precautions were to be taken. Elevated footpaths, waterproof parking basements and the accessible waterfronts, as part of the new emergency infrastructure, have provided a successful combination of safety and spatial quality of urban spaces. The project includes approximately 10 km of quayside promenades. Public open spaces on the waterfront (Magellan and Marco Polo terraces, Vasco de Gama Plaza) occupy a total size of 13000 m^2. Hafencity has already become a lively urban quarter. (Hafencity Hamburg GmbH, 2006). As a solution for the accessibility of water at all tides in the very high quays, Enric Miralles designed a descending 'landscape' of surfaces (Fig 7a). Vibrant new open spaces by and on the water are characterized by parks, plazas and promenades, quays with floating pontoons.

Housing: The program is predominantly office and housing (5500 apartments). A variety of possibilities for the mix of offices and dwellings is offered.

Cultural environment: Cultural highlights of the project range from the striking landmark Elbphilarmonie Concert Hall (Herzog & de Meuron) (Fig 7b), to International Maritime Museum of Hamburg and the new urban plazas being used for smaller events.

Land use pattern: The new city centre will be characterized by its diversity. A mix of business and living in various forms will be applied almost all through the area. The main program: offices and apartments and special program: Cruise terminal, Panorama tower, convention center, panoramic facility, science&technology museum, aquarium, shopping mall.

Infrastructure / mobility: construction of new U4 underground line.

Figure 7. *a. waterfront terraces and descending landscapes of E. Miralles, b. Elbphilarmonie Concert Hall (Hafencity, 2008)*

ANTWERP
> 't Eilandje (the little island)

The area is situated where the river Scheldt turns estuary. Port function continued until the end of 80s and the area remained as brownfield until 1999. The time span of the transformation is 1999-2015.

Urban space/recreation: Use and accessibility of the waterfront is realized by boardwalks, floating platforms, breakwaters and ground levels along the waterfront have public use. Water is the omnipresent feature of public space in port transformation areas. To exploit chances to look over, to touch or to pass it, is a great opportunity for design. The size of the water surface can make a difference in experiencing it as a public square or an infinite lake. The Willemdok, used for boat shows is almost a square with its dimensions of 75X75 meters. People sit on terraces along the waterfront.

Cultural environment: Museum MAS by Neutelings Riedijk is a designed landmark (fig 8).

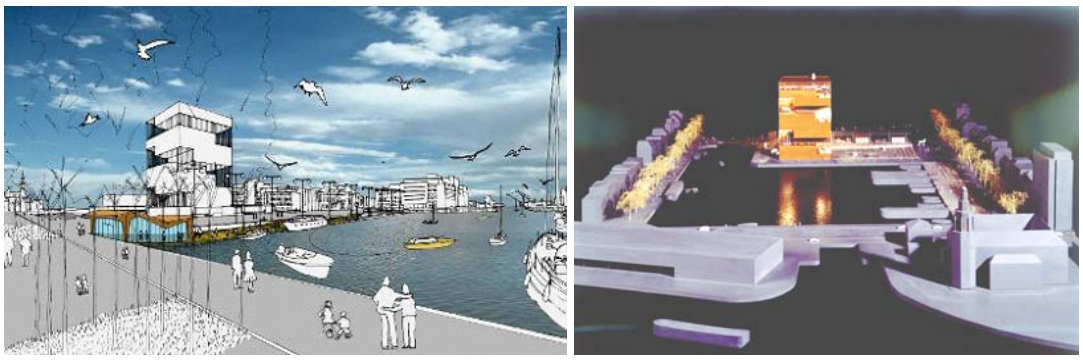


Figure 8*. a. Artist impression (© Urhahn Urban Design, Amsterdam) of Eilandje with a vibrant life by the water, with the museum MAS in the background, b. model view of Eilandje (Smits, 2008)*

Land use pattern: Main Program of the project is offices and apartments, while the special program is marina, expected to make the site unique. The aim is to keep people living there in a sustainable, livable environment.
> quay redesign

The straightening of the River Scheldt and construction of the quays in Antwerp caused a historical cut in the relation between the city and water. Hence, the quays became an autonomous intermediate entity between the city and the river as a kind of a large-scale prosthesis, an element not naturally belonging to the body. When the port activities shifted northwards, the quays were left free from the port life. The prosthesis became obsolete and was functioned with inadequate uses like car parking etc (fig 9).

Figure 9. *The obsolete old quays left out from port facilities*

The quays spatially are a terrain vague, a non-defined place. A reinterpretation of these territories is needed now. The main question of the redesign was to turn them into a lively and public space. The regeneration of the 6 km-long Scheldt quays are considered to be the crown of the city. The greatly changing water level and the exceptional circumstances of rising water require a developed water barrier system. The new design should also answer to this problem. The developed design called as “keys” emphasize and render permanent the ambiguous status of ‘space in between spaces’ (De Meulder, 2008). There will be no residential functions, bur only public uses. At the same time, the keys fulfill several urban needs with the water barrier function taking shape differently in each piece adding variety (fig 10).

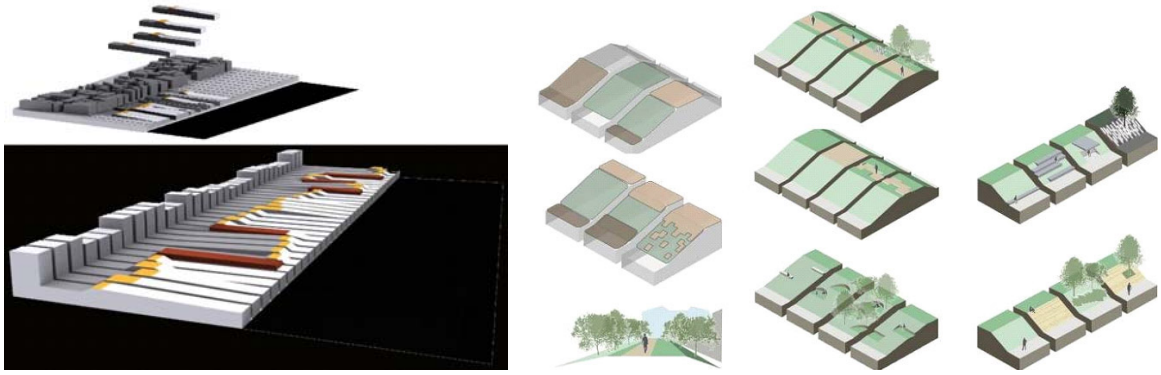
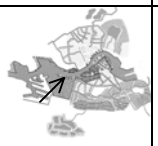


Figure 10. *Redesign of the quays in the form of 'keys' with a variety of spatial types. (Van Campenhout, 2008)*

The descriptions and evaluations made hitherto for the case projects as quantitative and qualitative data are summarized in table 1 below.

Table 1. *Quantitative and qualitative summary data of case projects*

CITY		ROTTERDAM		AMSTERDAM	HAMBURG	ANTWERP	
PROJECT		Kop van Zuid	Rotterdam 2035 & Water squares	IJ-oevers	Hafencity	't Eilandje	quay redesign
Scale of transformation		 90 ha		 490 ha	 155 ha	 172 ha	 70 ha
Relation with main water feature		 *River Maas*	 *River Maas*	 *River IJ*	 *River Elbe*	 *River Scheldt*	 *River Scheldt*
Time span	a. start pr.	1984	2005	1975	1997	1999	2005
	b. implem.	1993	2010		2001	2007	-
	c. end pr.	2010	2035	2020	2025	2015	2018
Targeted capacity		4500 homes (15,000 people) 335.000 m^2office	30.000 homes	2400 homes 400.000 m^2 office	5500 homes (12,000 people) 950,000 m²office	6.000 residents, total 1,3 mill. m^2 floor area	Only public functions
Program		residential, offices, education, leisure, culture, tourism	residential, leisure, sports	residential, leisure, culture, tourism	residential, offices, retail, leisure, culture, tourism, flood protection	residential, offices, leisure, culture	leisure, flood protection
Anchors / landmarks		Erasmus Bridge, Hotel New York	-	Whale, Silodam, Music building, Filmmuseum	Elbphilarmonie Concert Hall	MAS (Museum by the Stream)	-

Added infrastructure	Erasmus Bridge, metro stop, tramline extension	More water use for public transport	Tunnel, North-South metro line, IJ-tram	New U4 underground line	tram	tram
Driving force for regeneration or development	-Poor image of Rott-south -empty port sites -need for new, attractive residences	-water management problems -demand for more water related living	- re-introducing the city to river, -reutilizing old port areas, -creating attractive homes close to the city centre	-reutilizing old port areas & expanding the city center by 40 % -solving the occasional flooding problem	-Weak relationship of the city & Scheldt -empty port sites	-Idle quay -flooding problem -broken contact of the city with water
Plan character	Masterplan	Strategy	Strategy & masterplan	Masterplan	Masterplan	Strategy
Spaces of interaction with water	High quality design & lively waterfronts, terraces with panoramas of Maas and the city	Water squares, water roofs, homes on water	Man-made islands on the IJ, quays, bridges, beaches on IJ	Promenades, quays, plazas, waterfront terraces, floating pontoons	boardwalks, floating platforms, breakwaters and ground levels along the waterfront	Promenades, raised platforms providing perception of the river as opportunities for city dwellers
Housing qualities	Mixture of high and low-income housing for a wider social mix	New typologies of floating homes, buildings on poles	A mix of social, middle income & higher income housing. Good quality and high quantity housing	A variety of possibilities for the mix of offices and dwellings	Luxurious housing along the quays of Willemdok; 'living by the water'.	-
Public space qualities	high quality and walkable public realm, use of public art	Innovative multifunctional water squares, flexible dykes combined with city parks	High quality open spaces accompanying residential use at waterfronts	Vibrant and high-quality open spaces by and on the water. Flood protection combinedwith public-private spaces	-Inner water surface as a public square. -qualitative redevelopment public domain + new functions for docks	Quays as multifunctional public spaces, complete public use, quays as spaces in-between the river and city
Culture initiators	Luxor theatre, museums, outdoor culture events	-	Westergasfabriek, NDSM yard, Music Building	Elbphilarmonie Concert Hall, museums, university	MAS (Museum by the Stream) several museums	-
Diversity	Variety of residential styles by different architects working on each block	Water-related housing, water squares tailor made for different neighbourhood contexts	Variety of residential types and styles	Diversity in functions, forms in the new city centre	Accentuating unique mix, island character & lively urban neighbourhoods	Using new dam as a tool and combining it with a variety of public spaces

Conclusion

The transformation of the waterfronts in urban areas and especially those having previously port functions has been hitherto thoroughly discussed. Many cities around the world have shared an almost parallel story, with similar forcing motives and actors. The change in the technology of port functions and the displacement of the major ports from the west to the east

of the world has brought inevitable modifications in the economic distribution of cities.

Redevelopment projects for those post-industrial cities are mostly seen as life rings, which will enable a revival for cities with their new attractions. The criticism of Marshall (2001) made for waterfront developments marking the danger of seeing waterfronts as a cure-all for problematic cities and that a rubber stamp waterfront design can deal with the issues is noteworthy. This is a trap, which should be avoided.

Relevant examples of waterfront regeneration in a variety of European cities have been chosen to report that the use of waterfronts as part of the quality of the built environment is an essential impulse for positive economic, social and environmentally sustainable growth. The examination of various aspects of the projects as indicators for the level of the quality of urban life reveals issues both general and also particular to the cases. The criteria for assessing the amelioration in the quality of urban life in urban waterfront areas under transformation have been chosen as; urban space/recreation, housing, cultural environment, land use pattern and infrastructure/mobility. A general look over the results reveals some conclusions as such:

- Using water as a vast, binding, collective factor contributes to the development of feeling of collective space and being part of a community.
- Urban projects for waterfronts have responded to certain leisure concepts. The water element assumed the role as the city's largest leisure area in these schemes. Restoring the historic water routes has also permanently improved the leisure function of the city centre.
- A planned control of the quality of urban spaces as a detailed policy plan is positive, but one threat can be over designing to the finest detail not leaving any room for spontaneous occurrences.
- Innovative design solutions with new human-water relations (like water squares) will enhance the quality of urban life with the variety they bring, as well as solving also technical and environmental problems. Designs addressing multiple factors as successful combinations, like safety (flood protection in Hamburg-Hafencity) and spatial quality of urban spaces will be original and non-cliché. Similarly, introducing good design for problems of relating to water when there is a height difference; in the form of flexible systems of bridging the gap will bring a tailored design (cascading pontoon squares of Miralles in Hafencity). To exploit chances to look over, to touch or to pass through it, is a great opportunity for design. Combining a solution of a water barrier together with spaces fulfilling several urban needs in a variety is such a tailored design (Antwerp quays).
- Giving priority to housing on the waterfronts is positive in terms of avoiding night-day use inequalities. Housing types leading to a life on or by the water are in high demand. Studies of new housing types with close relation to water (as floating homes) are valuable. Studying these new types of housing settlements is also important for the probable conditions related to future climate estimates.
- World-class prominent designs (e.g. Amsterdam, Hamburg) for housing schemes are useful for attraction through architectural

quality, but possibilities for self-development schemes should also be encouraged.

- Variety & individuality might be the key terms in many aspects. A variety of possibilities for the mix of types, different functions (Hafencity) will be able to respond to present differences in demands and conditions.
- Buildings with prominent designs as anchors contribute greatly to the establishment of a cultural environment. They act as magnets dragging people to start a vibrant life in the chosen area (e.g. Music building in Amsterdam, curiously awaited Opera house in Hamburg by Herzog & de Meuron, museum in Antwerp by Neutelings & Riedijk)
- Land use patterns generally indicate a mixture of urban functions. The main program generally being a high quality mix of office/housing (/hotel) is spiced up with special programs as public facilities. The new city centre will be characterized by its diversity. Some cases embrace the concept of 'mix to the maximum' as mixed streets, mixed buildings, mixed studios (Hafencity).
- Mobility in these new areas is critical. Good and consolidated connections with the city center will enable the area to become amalgamated with the city center and drag people easily to the area. Newly added infrastructure was mostly needed in the cases. Use of water as public transport as an efficient water-transport system is searched for a better integration and feeling of relation to water.

As stated by Marshall (2001), the best types of public space allow for the inclusion of multiple meanings and all levels of society. The success of waterfront redevelopment schemes will depend on how non-cliché they are, how much multiple meanings they offer, how well they grab the needs and potentials and ways to raise the quality of life in their work areas. A raise in the quality of urban life will be the principal indicator of success of these big-scale acts. Istanbul should re-install the water culture of the city; this achievement will help improving the quality of urban life.

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