Coenhaven
WATERFRONT EXPERIENCE

ZUZANNA KAROLINA SAK

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Regeneration of industrial harbour into new mixed use neighbourhood

Master Thesis in Architecture, Lund University of Architecture

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CONTENT

INTRODUCTION

General context of the project

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PURPOSE OF THE PROJECT

After graduating bachelor studies with architectural background, it was very important to me to complete my master degree with specialisation in urban design with a project, which connects both fields. For personal reasons and interest, I was looking for a subject and site in the Netherlands, which would allow me to work with industrial reuse. Amsterdam is for me a city with an irresistible flare and with many post-industrial hotspots. After preliminary research, I discovered that the municipality of this dynamically developing and urbanizing capital is planning change of some industrial areas into housing in the vision for the city in year 2040. That discovery was a great start to my project.

The main purpose of this thesis is to explore how to deal with an industrial heritage in both urban and more detailed, architectural scale. The project location indicates another significant key issue - waterfront identity, which is essential for the city of Amsterdam. This thesis proposes a complex masterplan for the area, which provides diverse housing options, varied public spaces of different accessibility and character, well-structured grid of transport on site, public facilities, attractions and great amount of work spaces. The specific parts of masterplan are illustrated by mood boards, which explain desired character and solutions for sustainable neighbourhoods.

The second part of the thesis is a design of a building at the tip of the chosen site. The location indicates a high-rise landmark, which would draw attention to the area already from the river IJ. Created structure is a deconstructed interpretation of a silo form with hollow core and walkways on the outside. Simple and raw materiality refers to industrial past of the site. The wind tunnel formed by positioning of the towers is used for alternative energy generation. The outcome provides common ground floor level with diverse public functions, community spaces on repeating levels and mix of affordable rental and ownership apartments with options of conjoining them or upgrading incrementally.

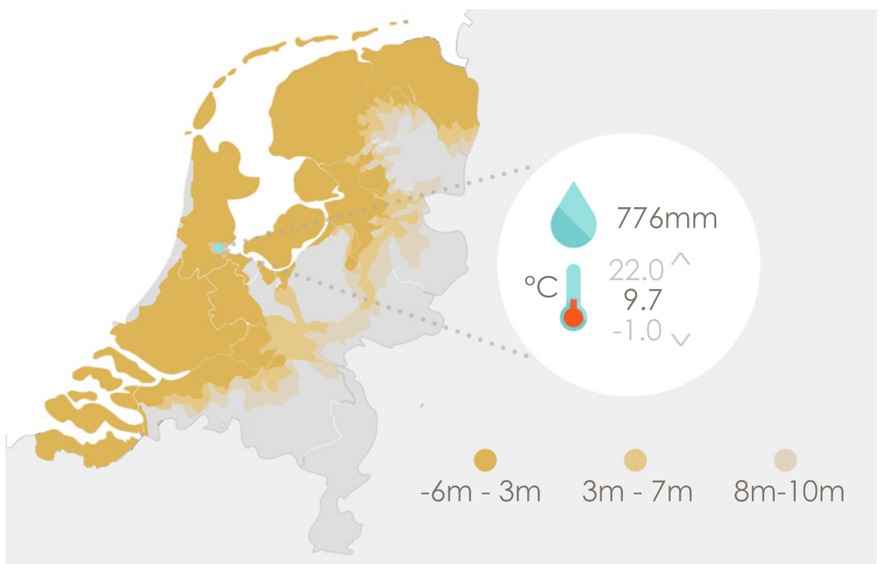
Keywords:
industrial regeneration; industrial reuse; waterfront development; housing; public space

SCHIPHOL Airport

- 1st in Europe
- 4th in the World

CARGO TONNAGE

- 548mln tonnes
- 14,8% World's cargo



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LOCATION

Holland is very densely populated and a relatively small European country located at the North Sea. The name "Netherlands" comes from its low and flat geography, with only 50% of land exceeding one meter above sea level.

Dutch colonial history provided a strong and very stable position in world's economy and international relations. The Dutch economy bases mostly on export of goods, which proves strong connection with water and its waterfronts.

With constant danger of flooding, facilities like Delta Works and city dikes provide safety, but also strong identity to Dutch cities and landscape.

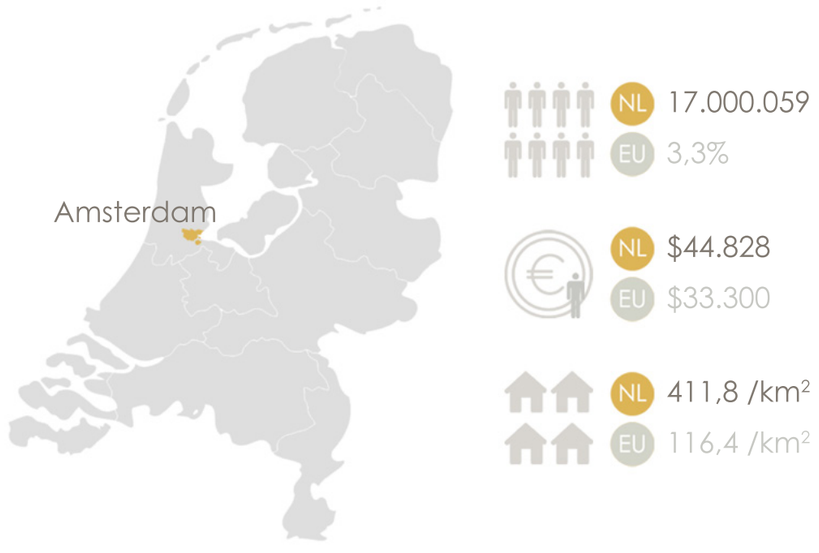
Schiphol airport in Amsterdam is one of the busiest international transport hubs in the World.

In comparison to the average European standard, Holland is small, very dense but a relatively rich country. Amsterdam is one of the most recognizable capitals of Europe and each year an extremely popular travel destination for tourists from all over the world.

Big part of Dutch land is located beneath sea level and generally flat landscape does not reach over 10m over sea level.

With a moderate maritime climate The Netherlands do not experience weather extremities.

Even though the vegetation period is not especially long, the country is known for greenhouse food production and is one of the world's biggest exporters of flowers, bulbs and seeds.



PROJECT BACKGROUND

Amsterdam Vision & Industrial Regeneration

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AMSTERDAM

Amsterdam is the capital and most populous municipality of The Netherlands and one of the most recognizable capitals in the world. The urban region has a population of over 1.3mln residents and the metropolitan area - over 2.4mln people. Amsterdam is located in the province of North Holland and is part of the Randstad - one of biggest conurbations in Europe.

The name "Amsterdam" comes from Amstelredamme, which indicates the origin of the village around the dam on the river Amstel. From a small fishing village Amsterdam became one of the biggest and most important harbours in the world during the Golden Age in the XVII century. The city's domain was trade, finance and diamonds. The canals of Amsterdam are on the UNESCO World Heritage List. Comparing to other Dutch cities, Amsterdam is a relatively young city, but while most of older ones stopped developing, the capital was experiencing constant expansion.

The city is highly positioned in international rankings for finance, quality of living, cultural aspects and innovation. Amsterdam seaport is, after Rotterdam, the second biggest in The Netherlands. Multiple events, the historical value and respected position in the world bring millions of visitors, new residents, investors and companies to the city.

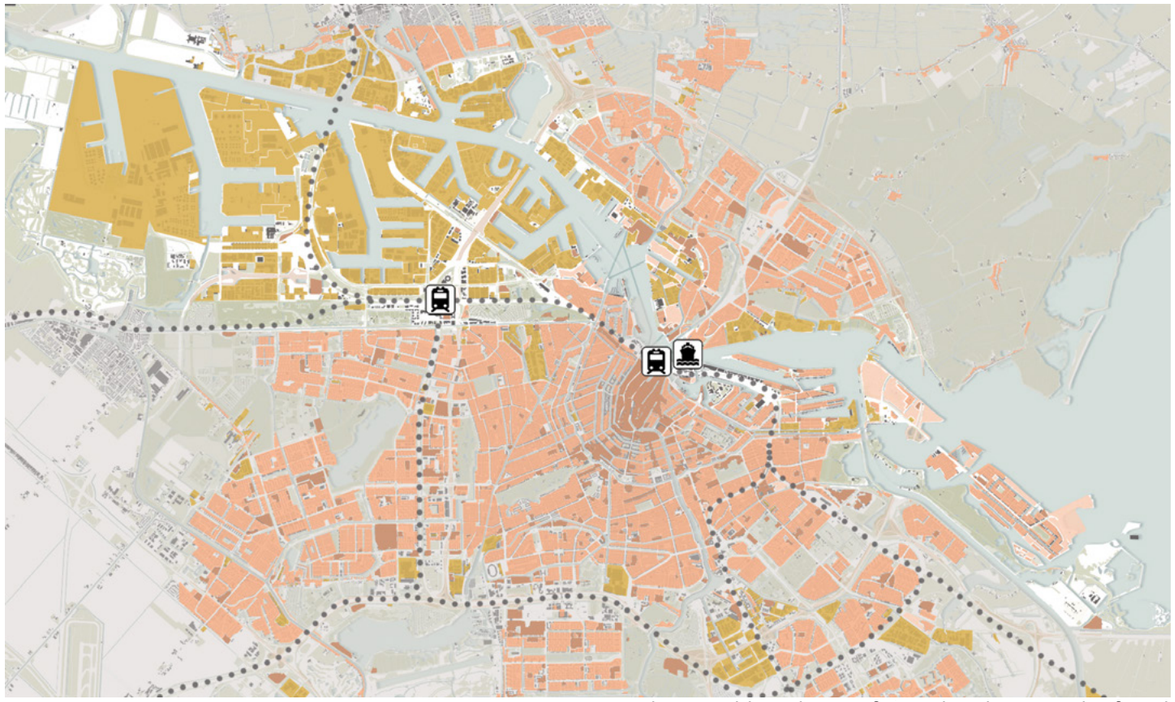
Living in that world renown city comes with a particular prestige and price. The annual number of tourists reaching even 17 million caused real estate prices to surge and change the inner city to tourist oriented business enclave, which became completely unaffordable for the city's residents.

Since 2014 the municipality was stressing urban regeneration projects and renewals, especially in districts bordering the city centre to ease the pressure on housing prices and density in the strict centre. In recent years the housing projects have a tendency to appear mostly in the areas around the river IJ.

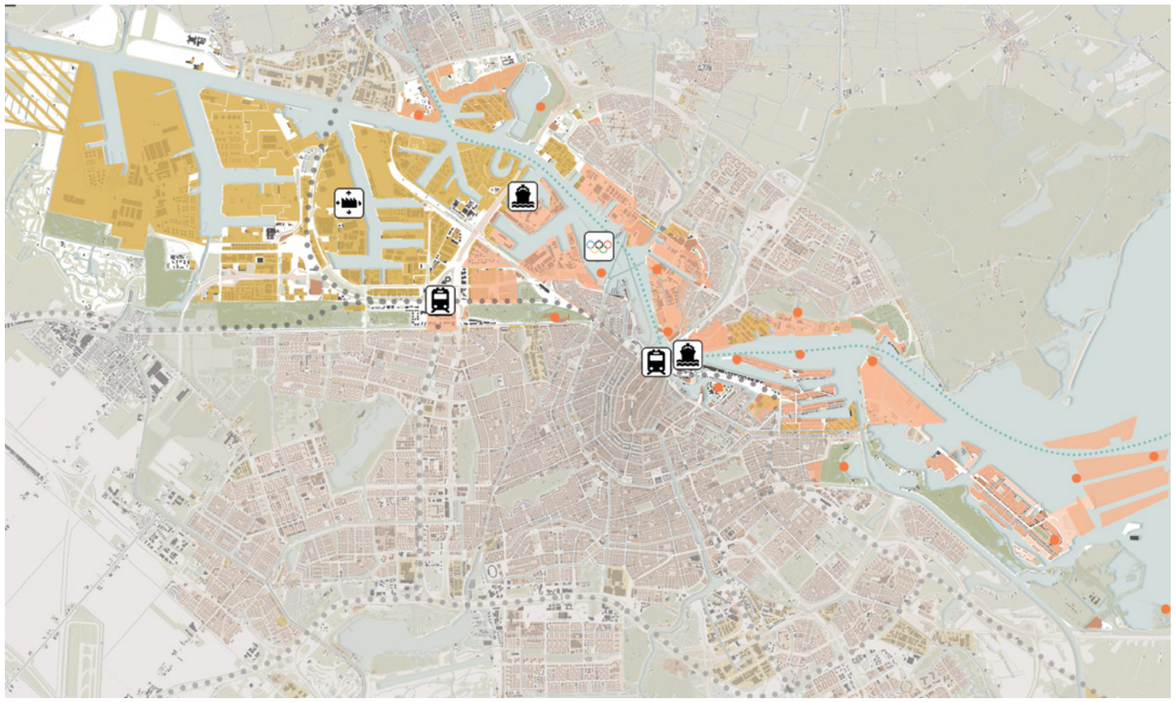
A-dam has very diverse population, with leading minorities of Moroccans, Surinamese, Turkish and Indonesian nationalities, which settled there between 1940 and 1975.

Amsterdam is intensely urbanised, with 4.457 inhabitants per square km and 2.275 houses per square km. As the city is about 2m below sea level, lots of land is artificially taken away from the sea and most parks and natural areas are manmade.

existing land use in Amsterdam



planned landuse of Amsterdam waterfront



olympics seacruise train station industry intensification

residential industrial commercial urban green

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WATERFRONT VISION

The Amsterdam municipality created a document for city planning vision till year 2040. "Structuurvisie Amsterdam 2040" describes goals for the whole city, but stresses the importance of the waterfront as a main character of Amsterdam. The river IJ is the busiest inner waterway in The Netherlands and the vision for modernisation of the harbour takes an important part in planning. The city is aiming to increase the interaction between city centre and the harbour, taking into consideration climate challenges, sea water rise and preserving the existing character.

The industrial harbour of Amsterdam is one of oldest industry areas in Europe, which gives it a significant value and identity. The whole waterfront is rapidly developing and changing into housing and work areas (wonen-werken). The vision states importance of introducing height accents along the river; landmarks which will strengthen the identity of waterfront character. Land use map is shifting and industry is slowly being pushed away towards West. Westpoort, which is currently the biggest and the most homogenous industrial district, is supposed to intensify the industrial activity and if necessary spread towards west, while giving the eastern edges to urban development of Amsterdam.

The municipality is also preparing for a possibility of hosting the Olympic Games in 2028 and envisions the river as a location for water sport activities of the Games. Another possibility which brings lots of attention to the waterfront is planned construction of the second sea cruise terminal close to the Amsterdam Ring.

Western IJoevers (west part of the waterfront) will become an important connection between city and the harbour and a area which will be strengthening the physical relation with Zaanstad (west-north of Amsterdam), which at the moment is completely invisible. The municipality wants to introduce lots of harbour activities which respects the historical value and identity (example: harbour safari biking paths). The appearance of the new sea cruise terminal will also open a new and strong connection between Schiphol airport and Westpoort, which will get then and an extra metropolitan impulse.

With new metropolitan areas developing in the west, Amsterdam will extend the existing water ferry transport and strengthen public transport to that area, which nowadays seems to be a little bit secluded and hardly accessible, because of inhuman scale.

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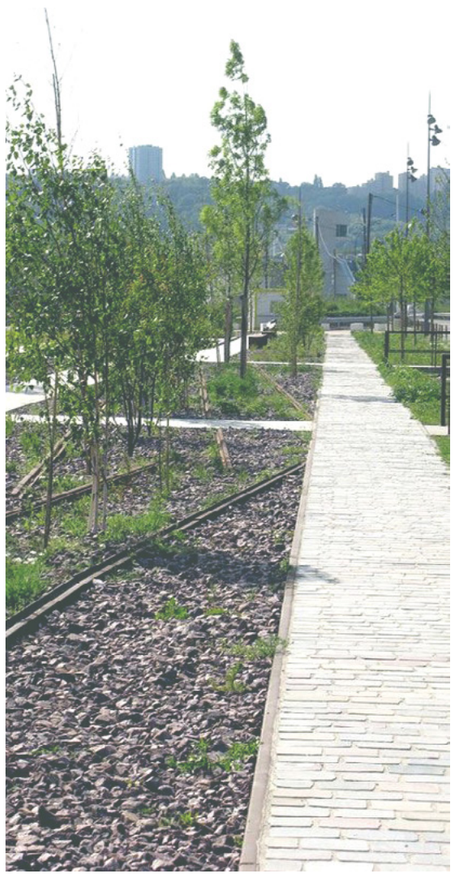
REUSE OF INDUSTRIAL SITES

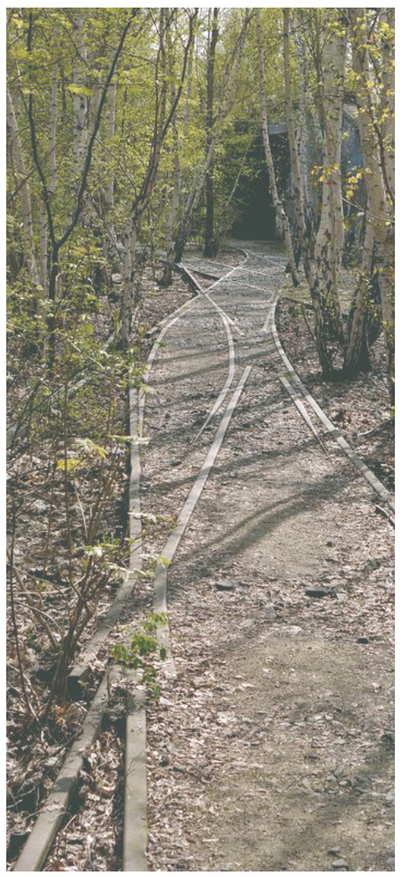
Regeneration of the industrial heritage and adaptive reuse became recently a major trend all around the world. Creative industry thrives in lofts, fashionable cafes lure the wide audience into old factories and magazines. But the reuse of industrial sites has much more to it than just popularity and profit of new “cool” spots.

In the last 10 years, both due to growing pressure on space in the Netherlands and urbanisation, adaptive reuse has grown a lot. This trend applies to all kind of buildings and spaces, where new function can be found. In a country that dense there is always need for vacant spaces. Regeneration of industrial sites forces innovative and creative solutions in design, but also in the social sector, community contribution, sources of financing and new bottom-up developments. In our rapidly developing world the need for restoring and preserving heritage and history is great. To withstand tendencies from rapid urbanising countries to erase certain areas and replace them with completely irrelevant developments, design should explore ways to extract existing qualities.

Already in the 70s the society expressed a strong dissatisfaction with massive demolitions of existing cities. Citizens of Rome, Paris and Amsterdam declared strongly in favour of old city structures. The successful restorations projects were conducted in historical districts of Deventer and Maastricht. Publications of Kevin Lynch and Jane Jacobs served as an example of ideology for rediscovering existing cities and innovating within the socially known and liked structures. The quality of life in the existing city became a priority. At that time great reuse projects of repurposing old buildings, factories and hospitals into housing were conducted.

Reuse of old industrial sites goes also in line with sustainable development - adapting of old buildings, rethinking and repurposing structures that are not needed anymore is environmentally friendly and contribute to a circular economy. Embracing an existing situation and enhancing its qualities requires lots of effort from all parties involved in the project. The society slowly starts to realise the potential in historical, industrial sites, filled with meaning and layers of the past. The challenge remains in creating something new, that will become again a vital element and meet current requirements. Contemporary users demand flexibility, diversity and sustainability. Reuse often





leads to surprising combinations of functions, which come from needs of the users. The projects often then become place makers and local landmarks with a story of a place.

In the Netherlands authenticity of old cities is the selling product. Sites and buildings with character are in high demand. Preservation through development goes well together with the Dutch feeling of integrity. In Rotterdam a successful project of "do-it-yourself" houses offered severely damaged monumental buildings to private investors, who were obliged to cover restoration costs. That approach is great for starters. In the world of customisation regeneration of industrial sites is a great form of development, which requires adapting to existing measures, adjustments and flexibility, but creates one of a kind and unique spaces.

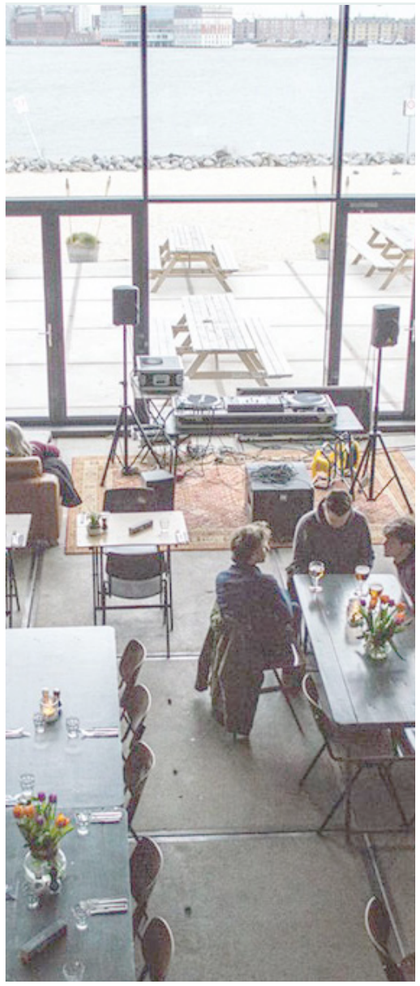
Currently there are different types of old industrial sites. In New York Meatpacking District is a part of Manhattan where a massive reuse development was conducted in early 2000s. Predominant structure consisted of industrial buildings from 1800s and 1900s. In that situation the main strategy is adaptive reuse of existing buildings. The district is now bursting with life, reused factories were converted into apartments, old meat packing magazines host clubs and restaurants.

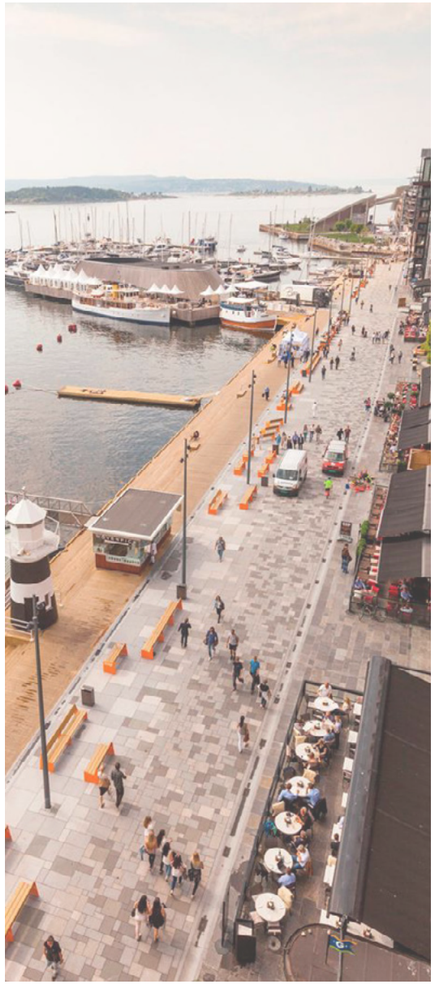
Through the same area passes also famous High Line - old elevated railway track which was transformed into park raised from the street level. Converting old industrial features into public parks, common spaces and recreational areas is a different approach to adaptive reuse. In Amsterdam Westerpark with Westergasfabriek are great examples of a public park on old industry grounds.

An example of similar practice is Silo Park in Auckland, New Zealand. Industrial harbour of Auckland became in time very close to the city centre and lost its original use. The city decided to preserve existing silos and design a park around it, which hosts weekend markets, social events and became a canvas for local artists.

The Geopark in Stavanger, Norway shows another strategy of regeneration of industry. The park is actually a playground constructed from recycled elements from oil drilling platforms which are placed along the sea line of Norway. The Geopark acts both as a recreational but also educational spot, teaching about oil industry which is so important for Norwegian economy.

Many industrial sites are not filled with monumental buildings from nineteenth century as they were established around II World War and often are an eyesore. Contemporary industrial production leaves unattractive, humongous buildings and lots of pollution. Restoring and regeneration of those sites may require special care. The site discussed in this thesis hosts industry from late twentieth century and belongs to the foregoing category.





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PLANNING NEW WATERFRONT

Currently most fascinating cities in the world are connected to the water. Municipalities try to adapt to this trend, improve water resilience, adjust the city to turn towards the water and seize opportunities that come with waterfront character. Water becomes a life source of a city.

Waterfront regeneration come with different schemes and are driven by various causes:

- economic - relocation of industry;
- social - space for recreation, tourism, public events;
- social - focal points for residents, maritime heritage;
- environmental - cleaning of waterbodies;
- preservation - historic preservation and adaptive reuse.

Well-designed waterfront regeneration connects the city to the water and does not create a border. This new connection gets a unique, distinctive character, incorporates history and economy. Waterfront regeneration is not only about getting closer to water but about stimulating the healthy city with new live-work-play area.

Planning new waterfront can focus on few main approaches or connect few of them together into more comprehensive plans.

Commercial waterfront connects unbeatable food, drinks and waterfront view combination. Great commercial waterfront includes also culture and active tourism to bring users at all times.

Cultural, educational and environmental approach includes water cleaning projects, celebrate maritime heritage and exhibit ecological parks and installations.

Recreational waterfront is a respond to need for local recreation, incorporates waterside promenades, boat harbours, safe pedestrian areas and sitting spots with inviting design.

Residential program is a very popular way of regenerating waterfronts, as waterside living is very attractive. Main issue with that approach is the tension between public waterfront and private living spaces. It needs solutions for setting right borders and distinguishing private, semi-private and public.

Working waterfront incorporates some old industry or new working places. It brings not only vitality and stimulus, but also social, economic and visual advantages. Water treatment plants, cruise ship terminals, small factories can influence the waterfront design greatly.

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HOUSING IN HOLLAND

Housing market in The Netherlands is very developed in European scale and has a distinctive size of rental sector. 32% of all dwelling stock is rental, which makes it the highest rate in Europe. However, recent trend is to support home ownership and ensure affordability of housing for all income groups.

The government has a few instruments to ensure affordability of housing: rent controls, rent levels setting by landlords and social landlords and housing allowances. Starters can apply for various allowances that will help with getting first owned house. Still the most vulnerable group are lower mid-income people, who earn too much for social housing sector and subsidies and too little to afford housing in preferable 20-30% income-rent ratio. Social housing is supposed to help people in different stages of life, who cannot afford suitable housing themselves. Only 10% of social dwellings are accessible to groups not related to income and exceeding maximum household income of 34000€/ year. For households that does not reach that threshold, social housing offers apartments for average 434€ per months and one of the best social housing standard in whole Europe.

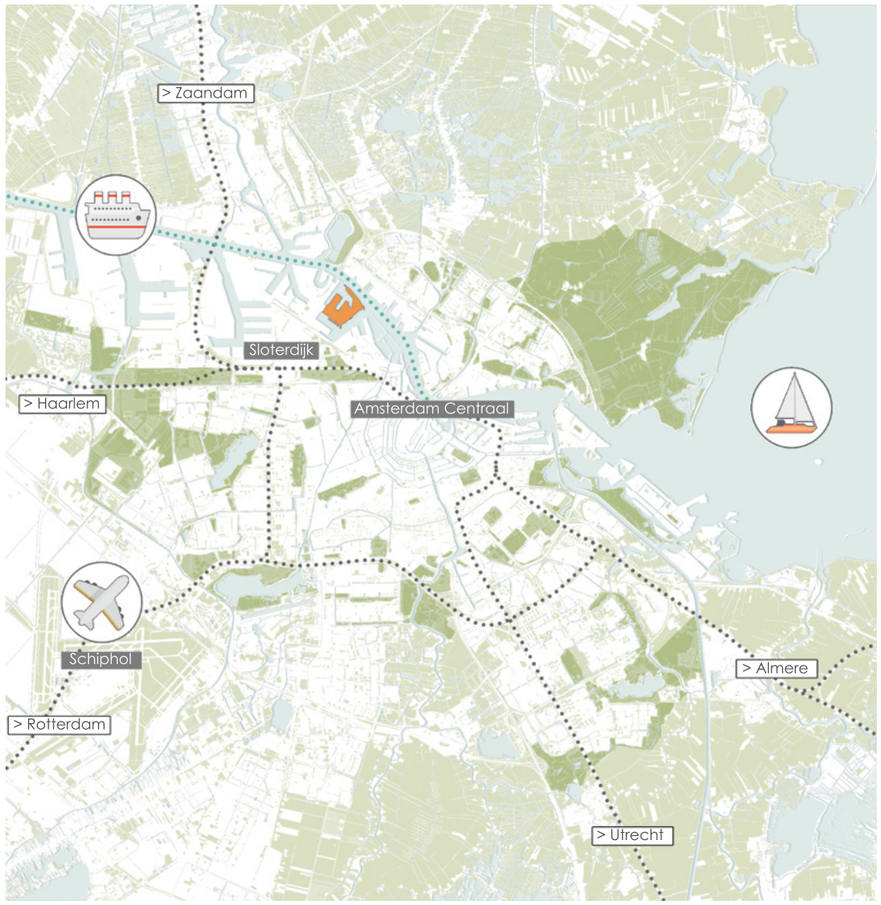
The housing situation is constantly changing by immigration and demographics. In opposition to many European countries, Holland is dealing quite well with student and elderly housing and provides various and suitable solutions for students and elderly living away from their pfamilies In 2016 the population reached 17mln people and the average Dutch household is going through major change from 3,51 members in 1970 to just 2,30 members in 2010.

That shift tells a lot about low natural growth. The household structure in Amsterdam is strongly influenced by the amount of students in the city, but also shows how little couple with kids inhabit the city. One-person household constitute around 55% of all, couples without kids 21%, single adult with kids 12% and couples with kids only 12%. That information influences the decisions for new housing developments a lot, as it tells about the need for specific apartment types. Additionally, to determine need of the population, it is important to know that 28% of Amsterdam's residents are in age group 20-34, which makes the city quite young.

In the country of scarce land, housing projects became a playground and way to show off for many leading architectural companies.

ANALYSIS

Amsterdam Spatial Structure: Site in Urban Context



Amsterdam Public Green & Connectivity

The Amsterdam Metropole is relatively big in scale of The Netherlands. The close relation with water and landscape is strengthened by extensive public green spaces in the city. Out of the city centre Amsterdam has plenty of public parks of different sizes. Parks play a very important part in social life of the capital and accommodate lots of events and festivals each season.

Main public transport in The Netherlands is operated by train company NS. Amsterdam has two major stations - Centraal and Sloterdijk. Holland has a unified transport system, which includes NS trains and all public transport companies in every city.
Further destinations can be reached by the city's airport Schiphol or by sea cruise and ferries.

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SITE IN AMSTERDAM CONTEXT

The historical city centre of Amsterdam is well known for everyone. Masses of tourist roam through the centre and rarely choose to explore areas outside of old city walls. Most districts built outside of the inner city present a completely different city scale and character.

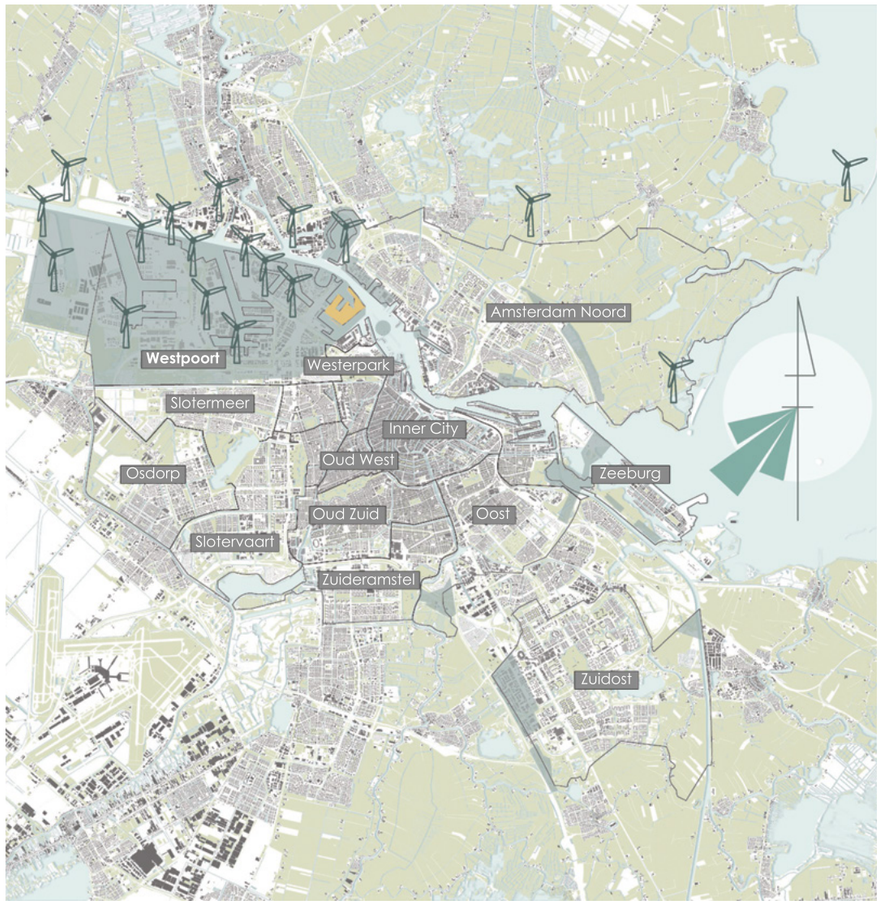
Coenhaven is located in the west part of the south bank of the River IJ. The river IJ is the most busy Dutch waterway and one of Europe's major harbour rivers. The site is close to one of two main train stations - Amsterdam Sloterdijk, but lacks proper public transport connecting to it. At the moment there is one bus stopping along the motorway, which is around 15 minutes' walk away from the closest part of Coenhaven. The site neighbours the Amsterdam ring, which makes it very valuable on the map of urbanizing parts of the city.

The municipality considers for the future Coenhaven as a new live/work neighbourhood, which will continue constant development towards the West. Although it is surrounded by water and relatively close to one of capital's famous parks - Westerpark, the location is a current industrial harbour can be a disadvantage for many potential residents. Existing noise pollution from the highway and operating industry in Westpoort, light pollution from a busy waterway, fumes and smells brought by the wind from the roads and neighbouring sites can be considered serious downsides of the location. Possible soil pollution is another issue that should be handled with care and needs proper examination.

Except of those obvious disadvantages, the site is in a very favourable location with a lot of potential. Located just next to the Coentunnel, it has a direct connection to Amsterdam Noord. If strengthened - the connection between Coenhaven and possible sea cruise terminal, Sloterdijk station and Schiphol airport can be easily achieved. Existing water ferry routes are constantly extending and new route to the site, would create express connection to Centraal station.

The site has already developed internet, media and energy facilities. It is also marked as an area with strong wind energy production opportunities.

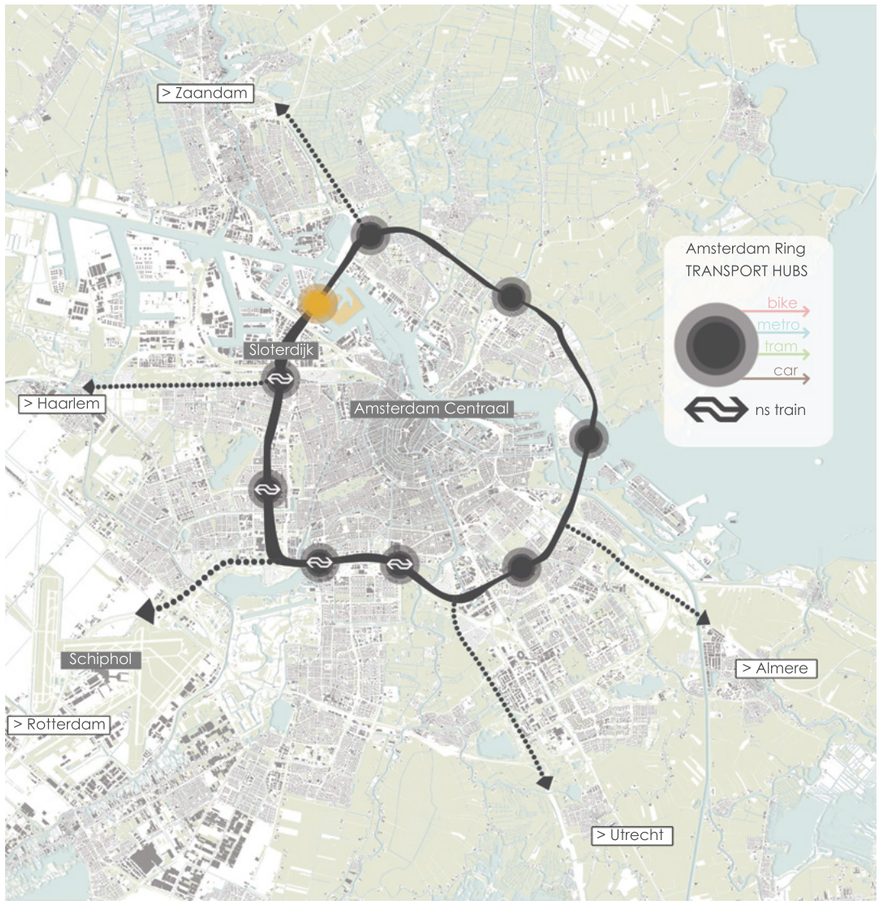
With proper program for the site and planning which will consider and solve all disadvantages, Coenhaven has a big potential to become a new hot spot for diverse users and a growing number of Amsterdam residents.



Amsterdam Districts & Wind Potential

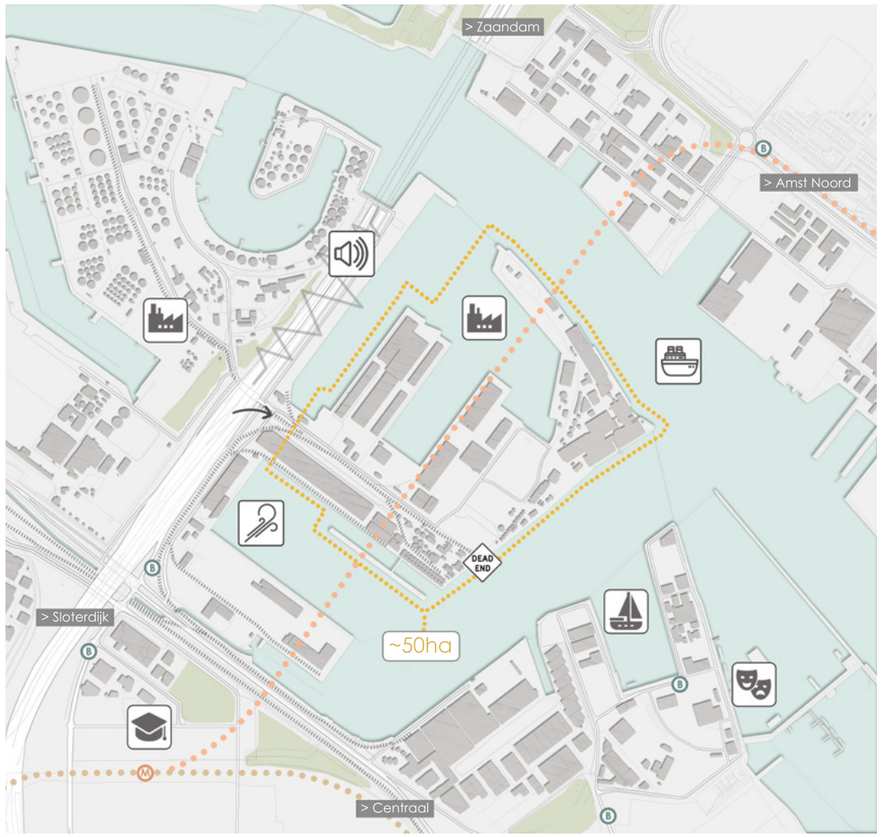
Amsterdam consists of 13 districts, spread mostly along the west-east axis. The city grew around the historical Inner City, sprawling rapidly after the II World War. The site is located in industrial Westpoort and it is called Coenhaven. Currently Westpoort is exclusively industrial and seems to be secluded from the rest of the city. Non-human scale of the area is visible in built structure and transportation available.

The wind energy potential in the area is very high. Existing wind mills enhance the industrial feeling. Strong wind power can be both an advantage and a disadvantage for future developments in the area. Predominant wind direction for whole Amsterdam is south-west.



Amsterdam Ring & Transport Hub

The Amsterdam Ring is a city bypass which helps to avoid driving through a busy and dense old city centre and provides convenient changing stations for daily commuters from outside of Amsterdam. The municipality of Amsterdam is working on strengthening the ring and transport hubs along it, by providing complex, modern and sustainable changing stations. Hubs connect train transport with city buses, trams, bike stations and park & ride areas for cars. The site is located directly along the ring, with an exit from the A10 highway. The development is a major impulse for creating next ring transport hub on the site.



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COENHAVEN - THE SITE

Coenhaven was established for storing and shipment of goods and the construction of new shipment docks started in 1913 in Westpoort. The site was ready in 1933 as an exemplary port. The docks were divided by piers with big storage magazines, which will allow loading and unloading without any interference. Eastern piers were constructed later and the docks are longer, as the size of ships was constantly growing. At that time Coenhaven had a good railway connection to the south with Houthaven.

During WWII, the harbour suffered serious damage, but it became reinstalled and a sea cruise ferry to England was introduced on a landfilled dock B. There was already no connection with Houthaven. Docks D and E were landfilled in the 90s.

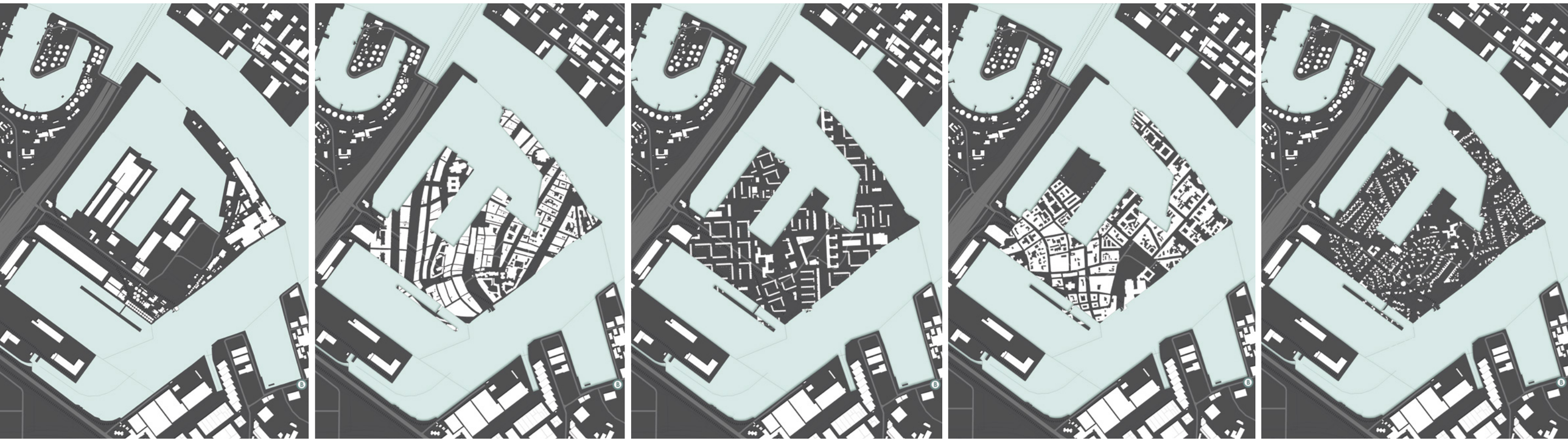
Currently the building character is predominated by low storage magazines. Few major companies are present on the site:

- Cargill - international corporation trading grain and agricultural commodities;
- ICL - one of the world's largest fertilizers companies;
- Jansen Beton - concrete elements manufactures;
- Maja Stuwardoos - transhipment of bulk and mixed cargo.

In the past goods arriving on the piers were distributed and transported by railway. Although nowadays most tracks stay unused, the main track line connecting to the city centre and other parts of the western harbour still operates.

At the moment the site is accessible only from the south-west corner and the main road finishes with a big parking surface. The site is accessible from the A10 motorway, which together with the industrial west create massive sound pollution. Strong south-west wind is highly perceptible there.

The total surface of the site is around 50ha. Coenhaven has an exceptionally long waterline, which defines its character and is undoubtedly an advantage. The municipality plans a metro line passing under the site, which gives it a huge potential. Except of proximity to the Amsterdam ring and Sloterdijk station, the site is surrounded from the south with rapid urban development and a few cultural hotspots like Amsterdam Theatre, DOK and Thuishaven festival terrains, headquarters of many developing companies and schools.



With an area of 50 hectares Coenhaven could easily accommodate a small town or village. Knowing its size, it was even more surprising to see the plan of the existing situation - few sparsely placed buildings did not give the impression of big capacity of the site. After closer examination, it occurred that most buildings have a substantial length of 200m. Long, straight streets of the harbour accentuate the inhuman scale of the industrial development.

To grasp the real size and feel the actual amount of space, a scale comparison needed to be done. The first plan shows the existing structure with road infrastructure.

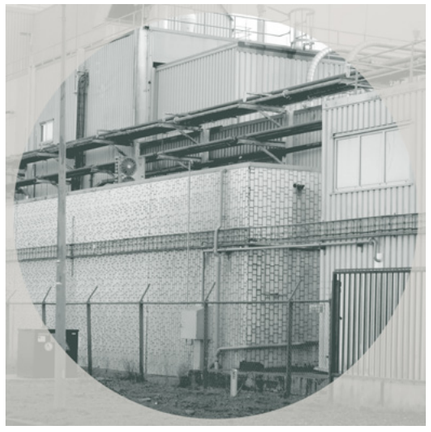
For the comparison, four different built structures were chosen from cities, which are familiar to the author and represent city centres, which are widely recognised.

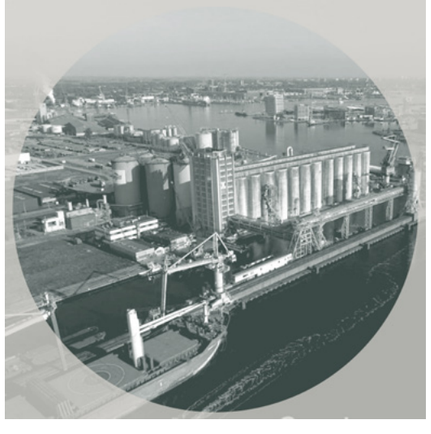
The second plan shows overlapped site outline with the schwarzplan of the Amsterdam city centre with canals and row houses. It presents high density structure with an interesting, historical street grid, that enhances unexpected angles and views and provides space for interaction on human level.

The third plan pictures superposition of site and post-war buildings of western Amsterdam, with vast spaces in-between low and middle height rowhouses. In that time Amsterdam was experiencing big urban sprawl with suburbs, that did not provide adequate and vibrant public spaces. The rigid and repetitive grid was not inviting and did not promote diversity.

The fourth plan overlaps the site with a strict city centre of Copenhagen and shows how dense the development in that area could be, without losing qualities of public realm, parks and semi-private spaces.

The last scheme shows a typical Dutch town, dominated by single family houses and illustrates a completely different and more private density.





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SITE VISIT

I came to Amsterdam to visit my project site at the early stage of thesis workflow, in winter. The day was surprisingly sunny and pleasant. Currently Coenhaven is home to few big companies, like Cargill (agricultural and industrial food production), ICL Fertilizers or Jansen Beton (concrete constructions). Public transport to the site is quite limited - from Amsterdam Sloterdijk train station there is one bus. However, it comes regularly and does not take longer than 20 minutes to get to the stop.

The area where the bus stops is completely not accessible and prepared for pedestrians. The distances are long, crossing does not feel safe and while I was wandering around, I felt as the only pedestrian in the neighbourhood (only woman).

When I entered the site, I was surprised by the amount of unused train tracks, desolated restaurant and a typical Dutch coffeeshop. The end of the main entry street was dominated by tall silos.

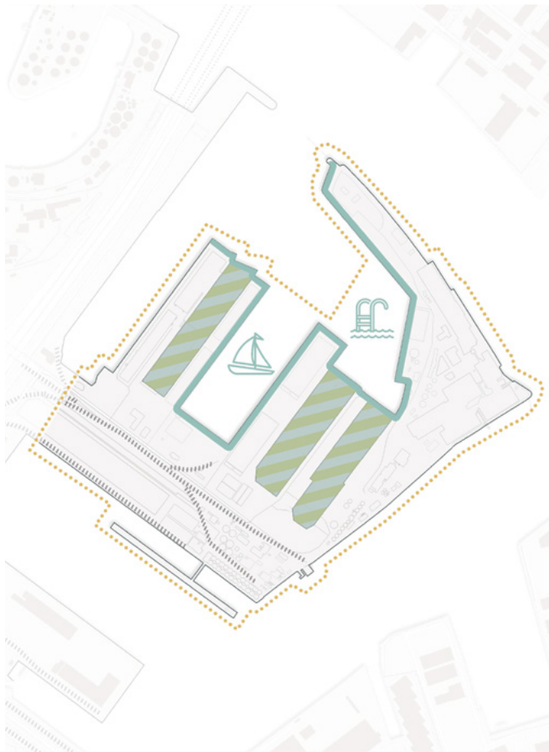
Most piers on the left side from the entrance were closed to the public and fenced, so I could only watch them from the distance. I was surprised that it didn't take me more than 20 minutes to get to the last company at the end of a 50-hectare site. The distances are easily walkable, nevertheless current inhuman scale is not very inviting and the vast spaces between humongous buildings and silos are a bit intimidating.

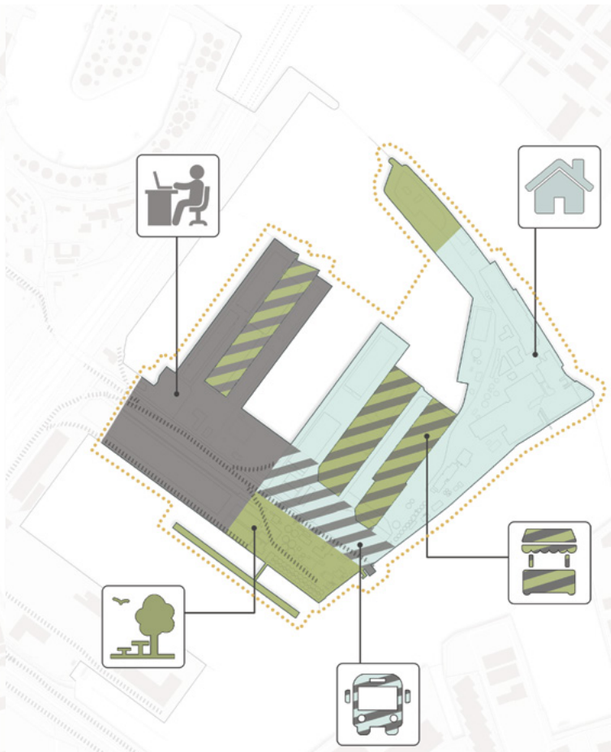
I was very curious to see the tip of the harbour, which is owned by the ICL Fertilizers, to see other piers from water perspective. Unfortunately, I was sent back by the guards at the premises gate, as industrial harbour law doesn't allow unauthorised people to enter for privacy and safety reasons. Unable to complete my quest, I decided to search for structures which I find interesting to keep or to get inspiration from.

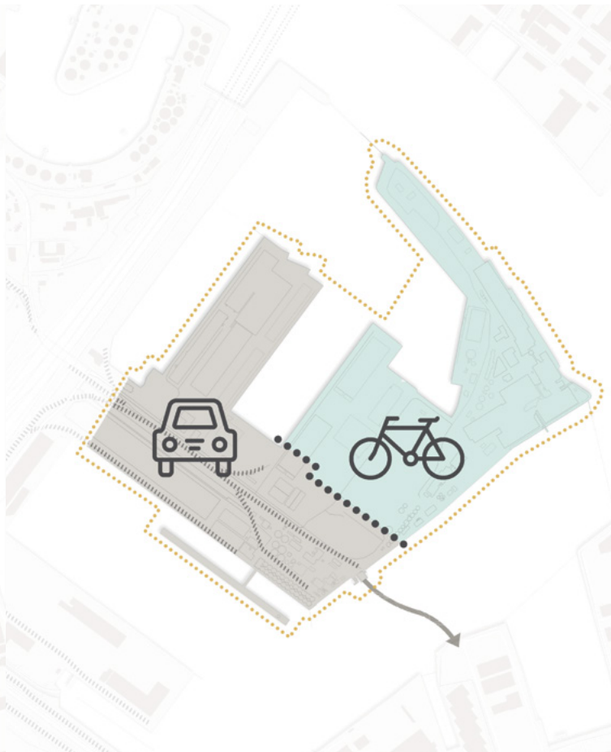
Although the weather was great, a very strong south-west wind was dominant and perceptible. It has lots of potential for energy generation in the area, but also makes a challenge for comfort of staying in public spaces. Currently many surfaces are impermeable and the water tends to gather on concrete roads. Water around the site is present and visible from almost any location on the site, which should be realized and respectively celebrated in the design.

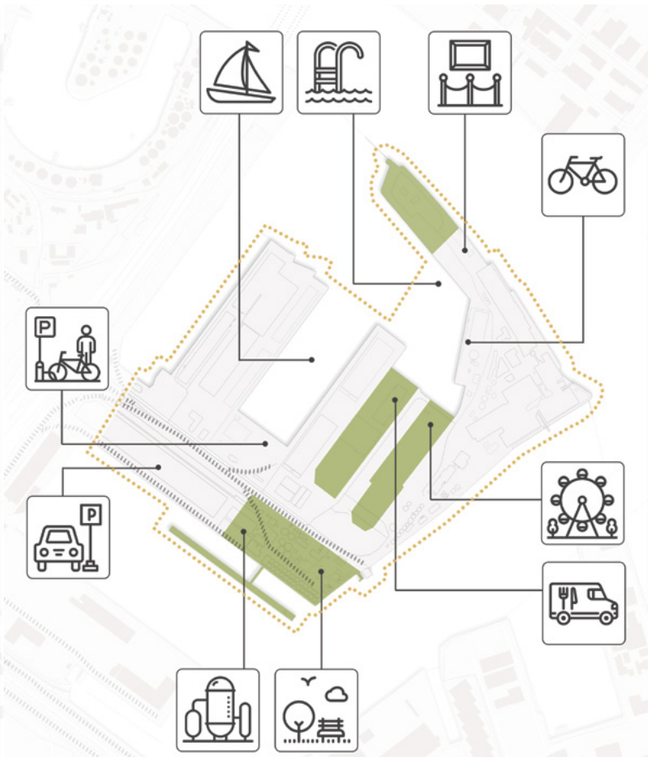
CONCEPT

Urban Structure of New Coenhaven







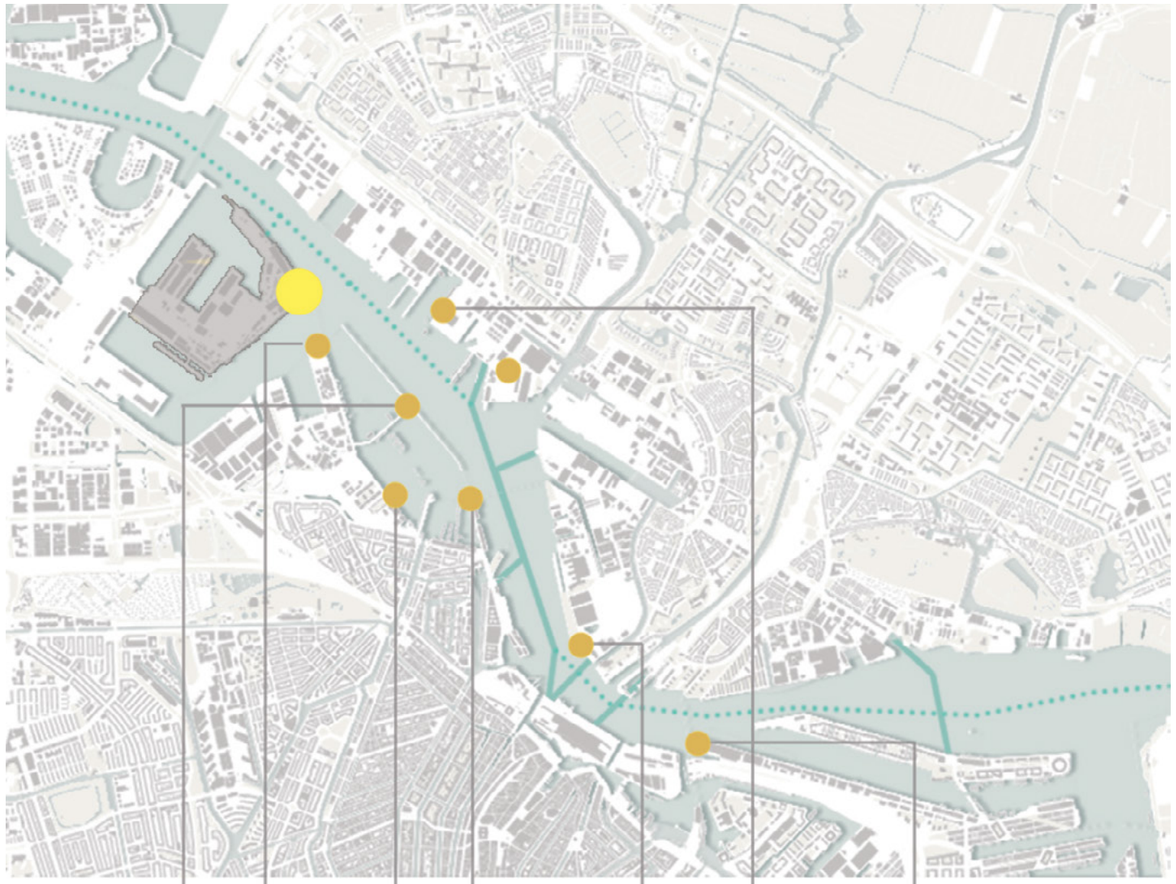


The main concepts for development of the site are pictured by the diagrams above. Scheme number one shows main focus and essence of the plan. The first strategy is to rediscover the historical ship docks, which were later filled with land, and expose their location in the masterplan. The second strategy is to turn towards the inner waterfront of the site, concentrate many public activities in that area, make it inviting and a vibrant meeting space.

Scheme number two shows the main functions of spaces in different parts of the site, based on accessibility and connectivity. The most public part (grey), easily accessible from the highway, is dominated by workspaces. More isolated and private (blue) area has a residential function. Parks (green) are mixed with a commercial function in the docks. Transport hub in the centre of the site has the best access and is predominantly mixed residential and commercial use.

The third scheme presents division between car free and car accessible spaces. The project envisions, that in nearby future municipalities will try to limit the amount of car transport and encourage bike and alternative public transport. A car accessible zone is supplied with big "park & ride" buildings and is well connected to various public transport. In contracst to that, the car free area is well equipped with dense network of bike paths and a collective bike parking. Emergency access is possible.

The last scheme shows some major public functions, activities and services in different parts of the site. Yacht marina, outdoor pools, museum, silo park, festival ground and food truck park work as place-makers and social hubs. Around the site runs a recreational bike path connected to information centres, which provide information about the neighbourhoods. The site has also adequate bike and car parking buildings.

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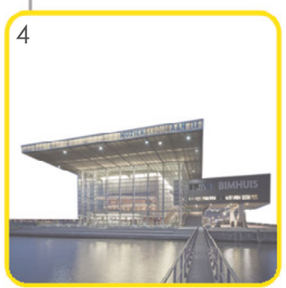
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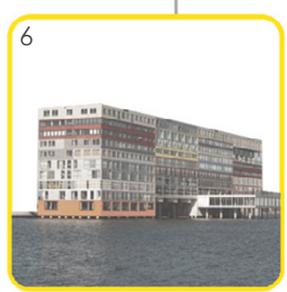
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7

WATER FRONT ICONS

11

WATERFRONT ICONS

The Amsterdam waterfront became with time a great display for iconic architecture. Turning towards the water and focusing on development along the IJ led to competitions for best proposals for new landmarks. Renowned architects transformed old docks and port areas into modern residential areas, new office space or buildings for wide public.

Closest to the city centre there is the Eye Film Institute (7) building which was completed in 2012. Its location opposite of the central train station made it very popular and characteristic for the visitors. Not far away, east of the train station is Muziekgebouw aan 'IJ (4), which is the biggest and main concert hall of Amsterdam. Its roofed mass dominates the entrance to the eastern docks.

West from the station, towards the project site, various industrial sites are located. Projects along the west waterfront include few adaptive reuse developments, for example Kraanspoor (3). The light, glass office building is placed on an old concrete crane way located in the former shipyard.

REM Island (5) is a restaurant located in an old radio broadcasting platform, which was transported to Amsterdam from its sea location in 2011.

Along the IJ there are more and more residential projects that are characteristic and important for the city image. Due to extensive urban development of Amsterdam, a former dam and silo building were transformed by MVRDV into Silodam (6) - a mixed program with housing and offices. This project started further expansion of housing towards Westpoort and more industrialised harbour.

The NDSM Wharf became recently a hip area, visited by thousands of young visitors for music festivals, food-related events, creative industry pop-up stores and increasingly popular restaurants. Residential developments around NDSM and even more towards the west gain popularity. Houthaven has a massive masterplan including landfills and hundreds of new houses, including massive Pontsteiger (2) and Minervahaven, which host lots of work places and offices for well known companies (1).

The chosen site is located at the tip of widening of the IJ and makes a great opportunity for creating a new landmark closing views of the new residential waterfront with industrial past.

12

MASTER PLAN

The final masterplan of Coenhaven incorporates all the concepts for the site into a mixed use, diverse and vibrant neighbourhood. It celebrates the inner waterfront and public spaces of different characteristics throughout the whole site and provides varied choice of housing options.

As illustrated in schemes above, the site is divided into car accessible and car free zones. The area may be entered from the existing exit from the motorway by car, from the pedestrian bridge from the south by foot and bike and by river ferry from the north. The metro station is located in the centre of the previously described transport axis, which is also reachable by bus. In the future, there could even be a possibility to extend the eastern harbour tram route to the Westpoort and through the site. “Park and ride” facilities are located along the main entrance road. Along the main street old rail tracks were preserved and serve as bike path and start qn exploration bike route around the site.

This well-connected entrance zone is designed to be most public part of the plan and host most commercial functions like office buildings, shops, shopping mall, medical centre, theatre and cinema. Buildings along the commercial street have lower stories for offices with a visual connection to the street and residential stories above, which are pushed back from the facade. The mixed residential and work space buildings form public courtyards, which serve residents, visitors and office workers. The southern facade of the site is formed by a long building, which acts as a windshield to protect public spaces of work/live area from wind tunnels.

From the site entry, there is an easy access to the sea cruise terminal pier. The sea cruise is planned in Coenhaven by the municipality of Amsterdam. In addition, there is a hotel located at the pier and an extensive recreational waterfront starts there. The park between terminal and hotel provides space for pop up containers for mobile, creative industry companies and have rental space for small enterprises.

At the end of commercial street, at the bridge entrance to the site there is an industrial park. The park celebrates the industrial character of the site by keeping and reusing existing silos and railway tracks, creating spaces from recycled elements and industrial materials. In the park

there are picnic spots, playground, outdoor gym and various sitting places. The existing silo may be used for outdoor cinema projections and exhibitions of urban artworks.

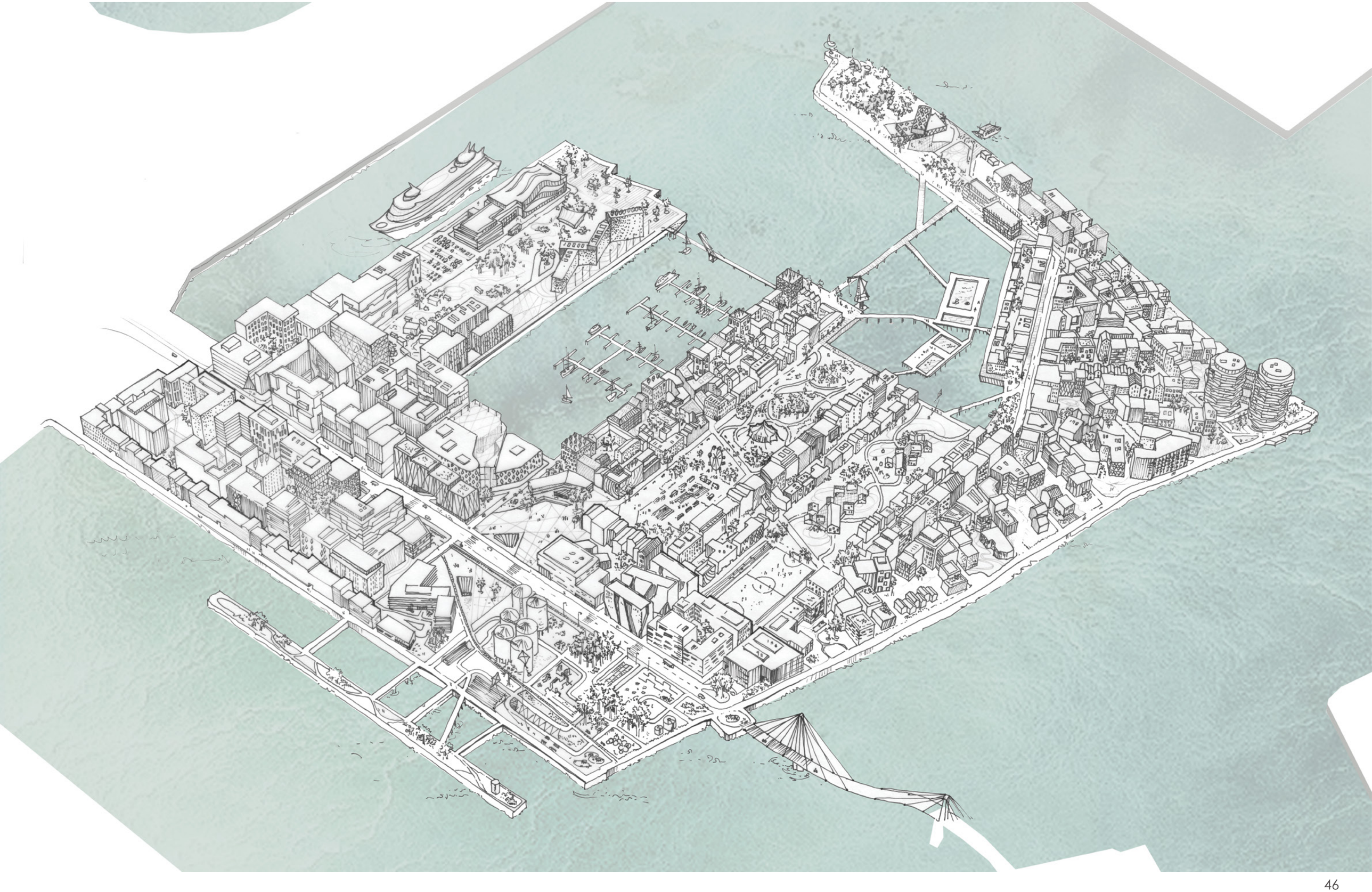
From the metro station square, there is an easy access to one of the historical dock parks. The landfilled areas of former ship docks are highlighted in the plan and each of them has a different character. The first dock from the west is the described cruise pier park. The second dock is a festival ground and food truck and market space. The third dock has a sport field and school facilities. Creating parks in the landfilled areas deals with unknown stability of the ground and creates opportunity for purifying the ground by proper planting.

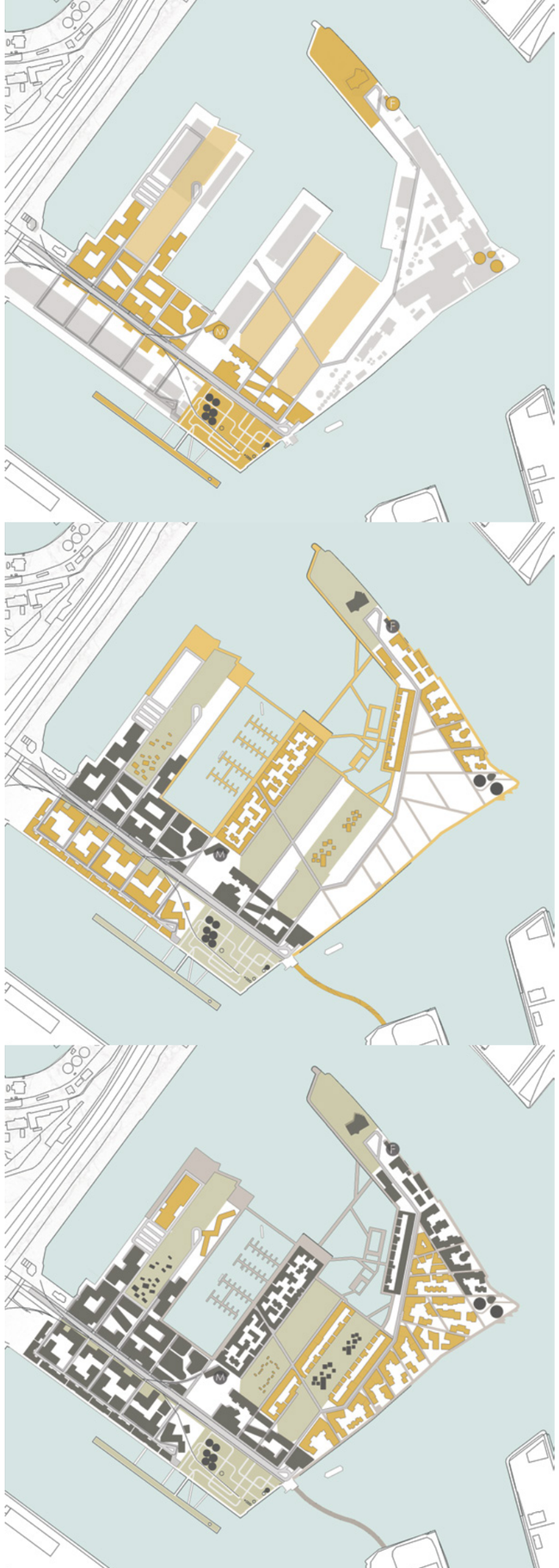
Around the dock parks there is marina housing - a low to medium height residential area with active, open ground floor and semi-public courtyards. The diverse architecture incorporates sustainable solutions like collective gardens, solar panels, wind turbines and water recycling within the blocks.

The yacht marina that is accessible from foregoing area is part of the social waterfront, which ends with open pools. This extensive inner waterfront offers various cafes, walking piers, bike paths and inviting quay. The inner waterfront continues to the end of the site, where it finishes with a museum park, which is located just next to the ferry stop.

The last area of the masterplan is called "Waterview". That residential part of Coenhaven offers different, more private living with U-shaped courtyards turning its back from the commercial, vibrant centre of the site and opening towards the water. Buildings here were also structured in a way that they profit most from the south sun exposition. Building heights are cascading towards the south and create interesting inner courtyard spaces. At the tip of this area the housing towers are looking towards the river IJ and the city centre.

In a bigger scale, new Coenhaven becomes an interest point on the map of Amsterdam. The currents city hot-spots like the new housing development in Houthaven or hip NDSM wharf can be reached within minutes. A new bridge connection to the south opens former dead end and connects to one of Amsterdam's most popular parks - Westerpark. The planned ferry connection makes it possible to reach the central station without any traffic congestion. The metro line going through the site creates a great connection to Amsterdam Noord, which is currently growing in popularity. Access to Amsterdam Ring motorway adds to attractiveness of the location. It offers to the residents everything they need on site, calm environment far from the rush and crowd of Amsterdam's touristy old town, but also easy access to vibrant life of one of the most recognizable capitals in the world.





13

AREA DEVELOPMENT

The development of the site is divided in series of public spaces and built areas. Due to the significant size of the project, the masterplan is planned to be executed in phases, that will be spread accordingly in time.

The first phase will start with the demolition of old structures on site and with the planting of parks and historical docks, which will need more time to fully grow. It is also important to establish the road and pavement network for transporting construction materials, especially in the car accessible area. The construction will expand from the new metro station, through public spaces around transport core street and office / residential building in the commercial zone. This way the neighbourhood will be well connected from the beginning and open up work places which will soon attract residents. In that phase, the construction of the landmark towers will begin, as it is a major project. The museum and ferry stop will attract visitors from the city centre and root the site in the mind map of Amsterdam's residents.

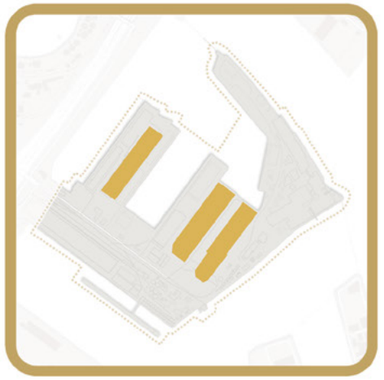
The second phase will first focus on establishing the inner waterfront with yacht marina and outdoor pools, because it is a big selling point for most residential areas. The commercial part will be expanded and more housing along the water will be completed. In this phase, as the site is gaining recognition, the bike and pedestrian bridge, which connects to the Houthaven and further to Westerpark, will be constructed. Another important step is establishing school and sport facilities.

The last phase focuses on providing remaining housing units and completing the sea cruise terminal with the hotel. The touristic part of the masterplan is to be completed at last, to provide pleasant and vibrant experience for potential visitors.

The masterplan consists of eight areas with various character and spatial specifications - four named public spaces and four built areas. Each of them is described by a mood board that presents main ideas, important elements, exemplary architecture, spatial qualities and materiality. The public spaces are pictured by series of impression collages. Each built area is illustrated by a section through it, to properly show the relation between spaces, building scale and relation to water.

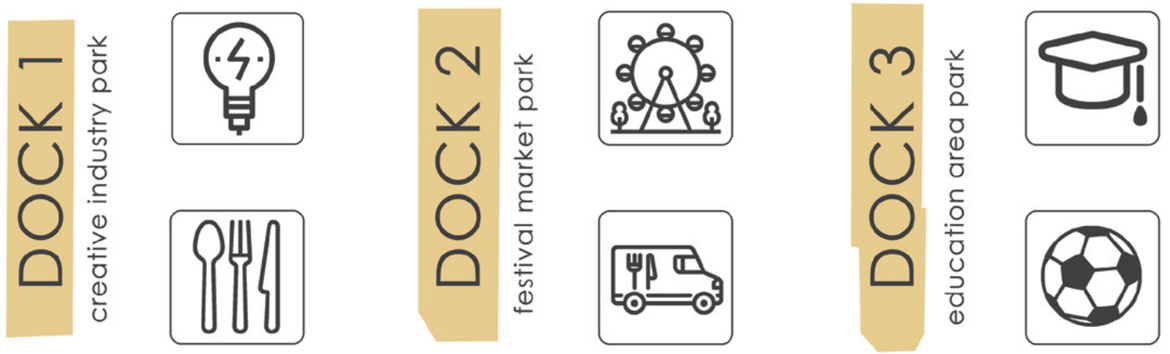
HISTORICAL DOCKS

Public Spaces with Diverse Functions



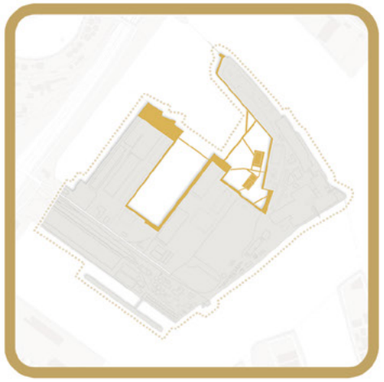
HISTORICAL DOCKS

- bringing back the historical dock structure from 1935
- public spaces with different functions
- different degrees of privacy depending on location
- CREATIVE INDUSTRY dock in office area
- FESTIVAL MARKET park close to communication node
- EDUCATION PARK close to semi private residence area



INNER WATERFRONT

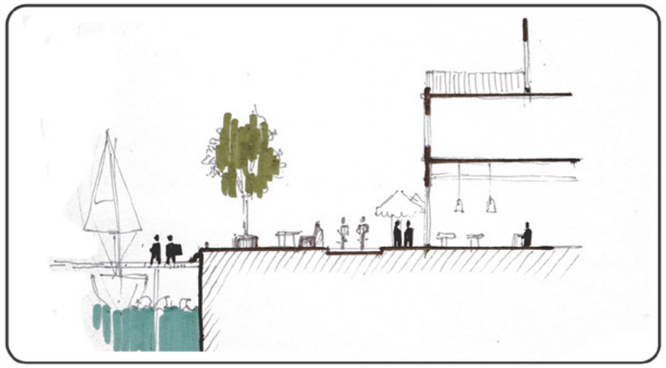
Enclosed Waterfront Connecting All Areas



INNER WATERFRONT

- public, open waterfront
- enclosure within inner waterfront line
- cafes, restaurants in groundfloor
- sea cruise and hotel waterfront walk
- yacht marina
- open air pools
- //winter// open air ice rinks
- extensive water walks
- waterfront biking path

FUNCTIONS



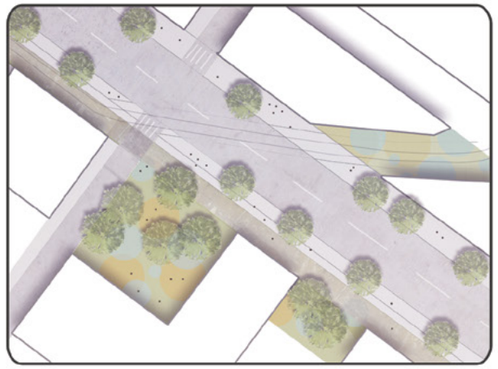
COMMERCIAL STREET

Robust and Vibrant Heart of Bussiness Area

Work places: 500

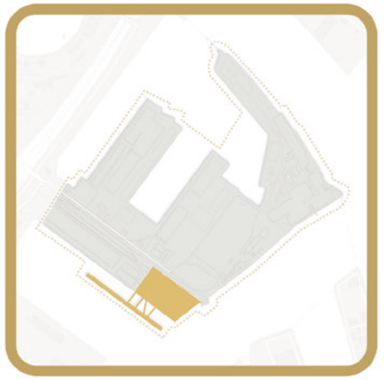
COMMERCIAL STREET

- shopping street on north edge of the street
- various cafeterias and retail
- green walk with pocket parks on south edge
- public transport connection
- transport axes with P+R, bike parking station and metro station
- /future/ harbour tram
- biking path following old railways
- start of exploration path
- car accessible



INDUSTRIAL PARK

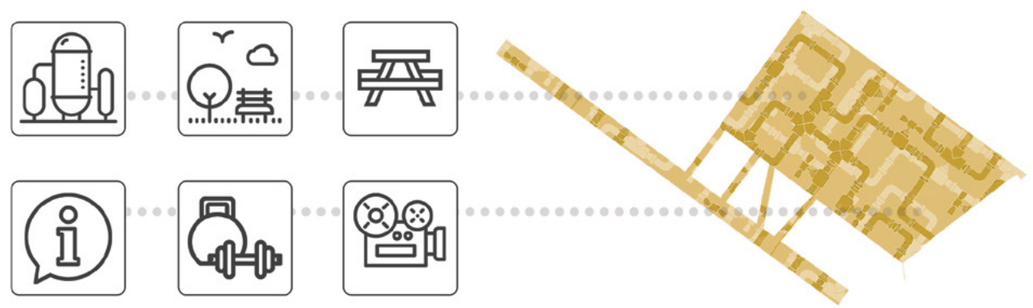
Public Park Inspired By Recycled Industrial Elements



INDUSTRIAL PARK

- embracing industrial elements
- silos
- recycled elements
- railway tracks used as bikeway
- playground
- picnic areas
- industrial pipes patterns in plan and in structure
- outdoor gym
- outdoor cinema

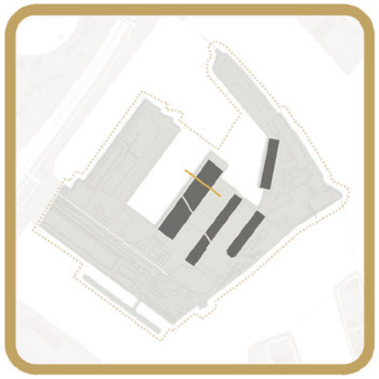
ATTRACTIONS



MARINA HOUSING

Sustainable Green Neighbourhood With Open Courtyards

Work places: 200
Households: 3.500
Residents: 8.550



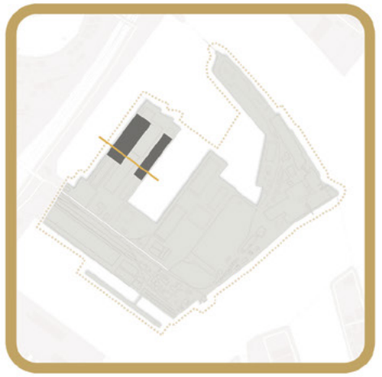
MARINA HOUSING

- public groundfloor and active marina waterfront
- urban activators
- semi public courtyard
- diverse scale with mix of building materials
- elevated private gardens and green rooftops
- local energy production
- sun panels
- wind turbines
- collective gardens
- water collection within courtyard
- water recycling within a block

SEA CRUISE TERMINAL

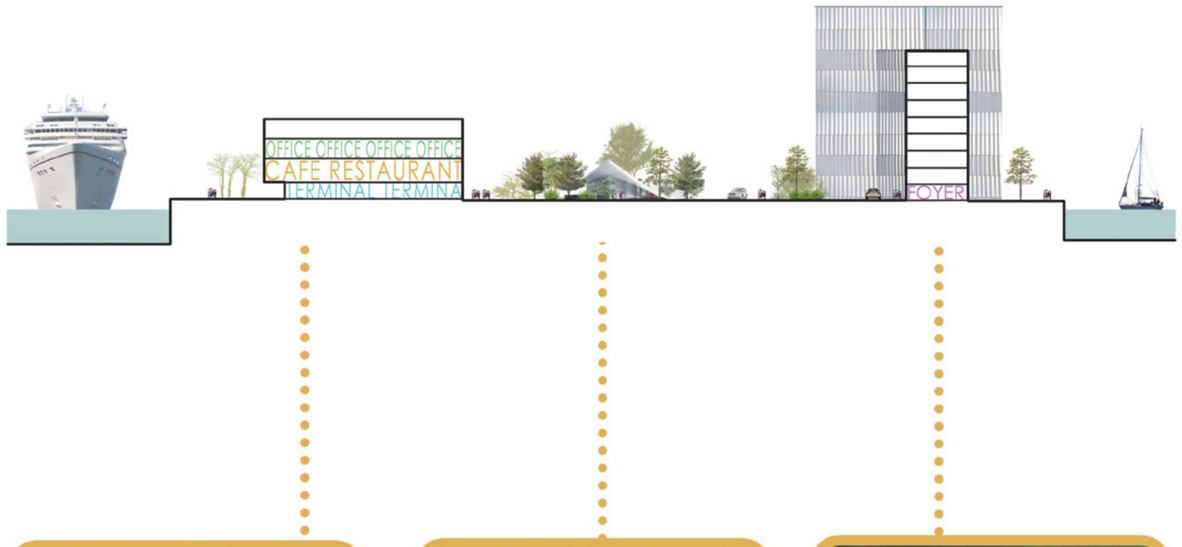
Tourism Oriented Commercial Pier

Work spaces: 500



SEA CRUISE TERMINAL PIER

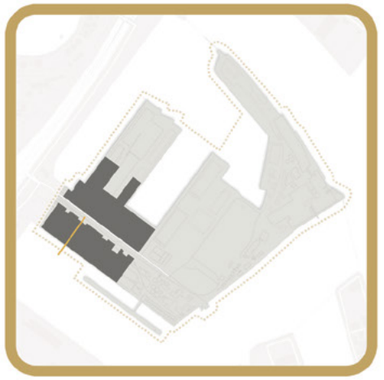
- second sea cruise terminal Amsterdam
- public functions
- attractions for passengers
- park with pavilions
- creative industry flexible spaces
- hotel
- promenade



WORK / LIVE AREA

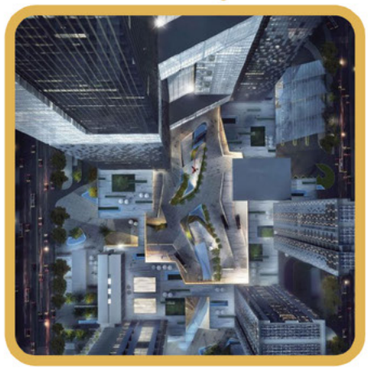
Mixed Use Office and Residential Area

Work spaces: 8.600
Office space: 124.090m²
Households: 5.480
Residents: 10.960



WORK / LIVE AREA

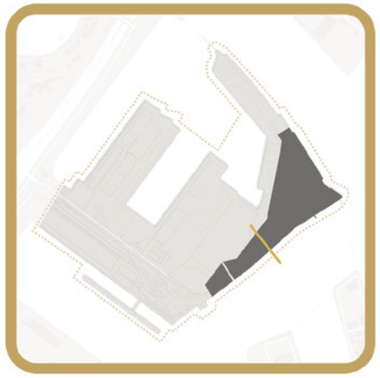
- open public groundfloor
- public functions from street level
- office spaces - eye contact with street
- elevated dwellings with a view
- each block with inner semi public courtyard
- building heights descending towards south
- “windshield” building on south-west edge of the site



WATERVIEW HOUSING

Quiet Housing District Opening Towards The Water

Work spaces: 100
Households: 3.080
Residents: 8.000



WATERVIEW HOUSING

- car free area
- private, U-shaped courtyards opening towards the water
- diverse residential units inclusive for elderly, families and starters
- proximity of city ferry stop
- good bike infrastructure and long, recreational waterline
- secluded public spaces with spots for children
- community gardens

The municipality of Amsterdam in the planning for the new waterfront specified the goal for number of households and planned workplaces in Coenhaven and Vlothaven together. To estimate planned numbers for Coenhaven only, the final number was taken from area proportion of both neighbourhoods.

Thanks to busy and dense office work / live part of masterplan, the number of workspaces in Coenhaven can be higher than what could be deduced from spatial proportion. The number of workspaces is significantly different in each built area, depending on its character, but each zone offers workplaces.

Estimated household number is lower than municipal estimation, but can be adjusted by slightly shifting buildings' heights, altering average apartment size or changing amount of office space.

Overall population density, in comparison to whole Amsterdam metropolitan area is slightly higher (Amsterdam has 490 residents per hectare), but the municipal region consists vide variety of housing typologies from single family houses to multi-storey housing.

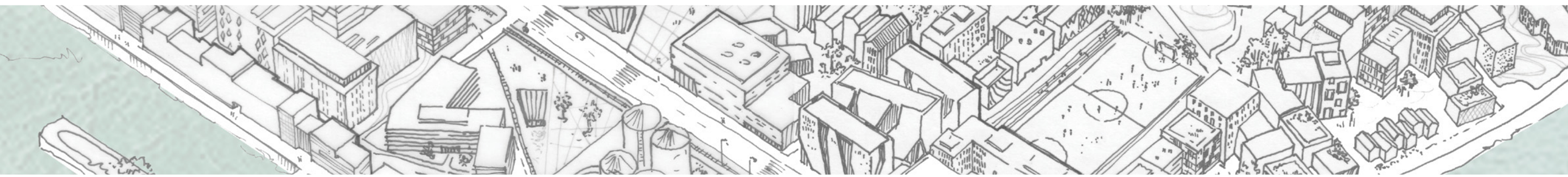
MASTERPLAN
Conclusion in Numbers

TOTAL WORKSPACES: **9.900**
(municipal planning for Coenhaven/Vlothaven: 12.000)
(estimated workspaces Coenhaven: ~8.000)

TOTAL HOUSEHOLDS: **12.060**
(municipal planning for Coenhaven/Vlothaven: 22.000)
(estimated households Coenhaven: ~15.000)

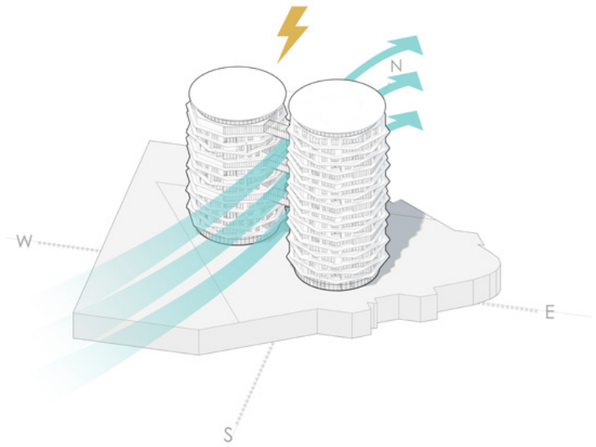
TOTAL RESIDENTS: **27.510**
(average household 2.3 residents)

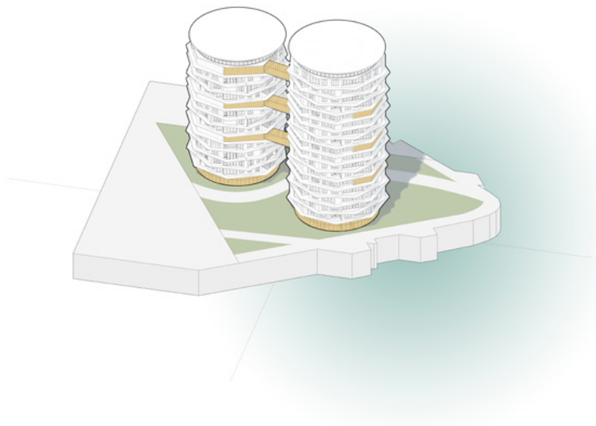
POPULATION DENSITY: **550/ha**

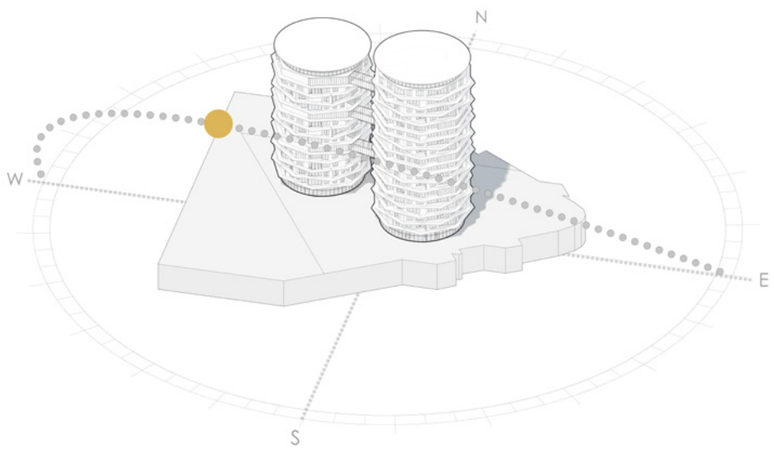


ARCHITECTURAL CONCEPT

Site's Landmark on The Tip of Waterview Area





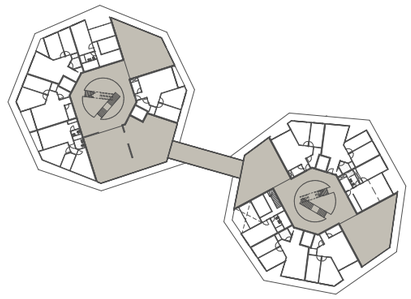


14

SILO TOWER CONCEPT

The project site is located in the area marked by the municipality as "height accents at the IJ" and requires tall buildings. Inspired by the characteristics, materiality and spatial setting of industrial silos, which are existing on the site, Silo Tower housing celebrates the industrial heritage of Westpoort.

The octagonal shape of the towers gives the residents vast views towards the water and privacy on balconies and terraces around the building. The deconstructed cylinders got shifted into rotating, octagonal plates, which rest on a permeable, glazed ground floor with public functions.



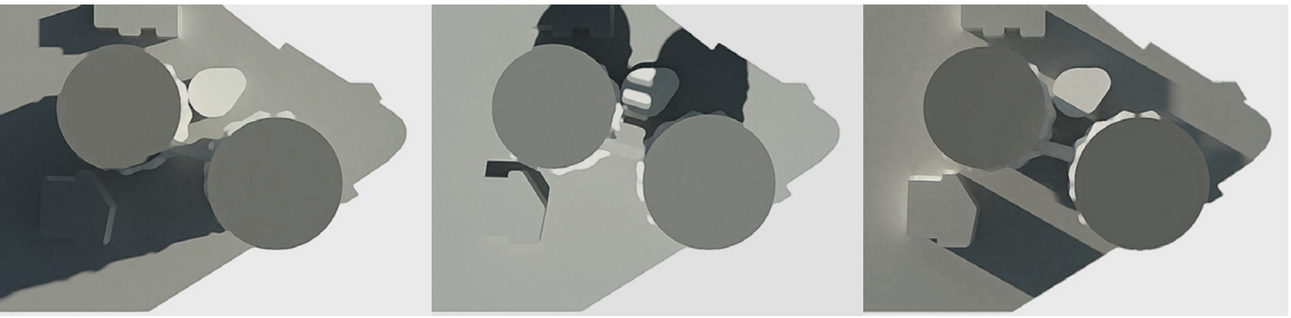
Common spaces repeat throughout the building on every fourth floor, where the towers get connecting bridges, inspired by outside passages and ladders of old industrial silos.

Two towers of different heights and rotating floorplan outlines are located according to the dominating wind direction, to take advantage of emerging wind tunnels in-between them. The high wind potential of the western harbour motivated the decision to use, not escape from wind power and install in spaces between the connecting bridges bladeless wind turbine - such as EWICON. This new technology developed in Delft, Netherlands, uses positively charged water droplets, which are moved by the wind against the direction of an electric field to create energy without noise and vibrations of traditional turbines.

Despite the importance of generating wind power by means of a specific placement of the towers, it was the solar study that influenced the relation between towers the most. In warmer months morning sun reaches north elevations of both towers and evening sun lightens both west elevations. Midday sunshine exposes the southern facade with common spaces and public facilities like restaurant, cafe or gym. The playground connected to the day-care is rarely exposed to direct sun.

Dominating materials are: light grey concrete for the sharp terrace edges, glazing with clean, simple divisions and graphite facade cladding.

JUNE // 21



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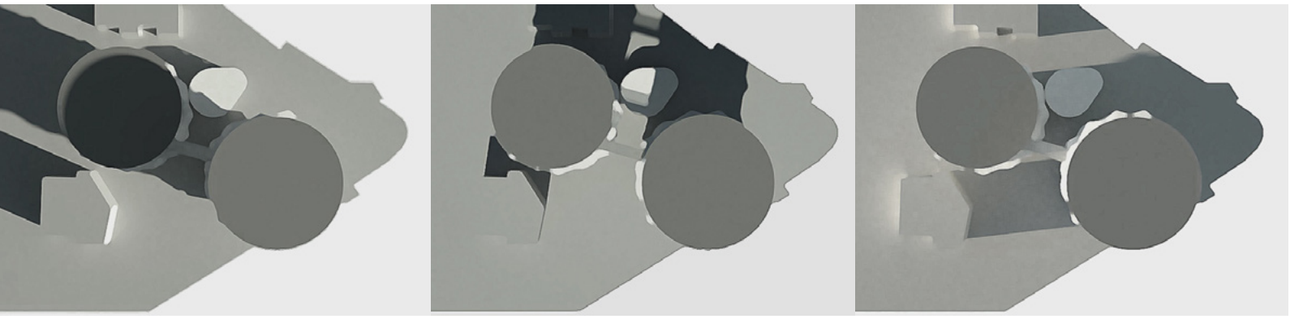
SEPTEMBER //22



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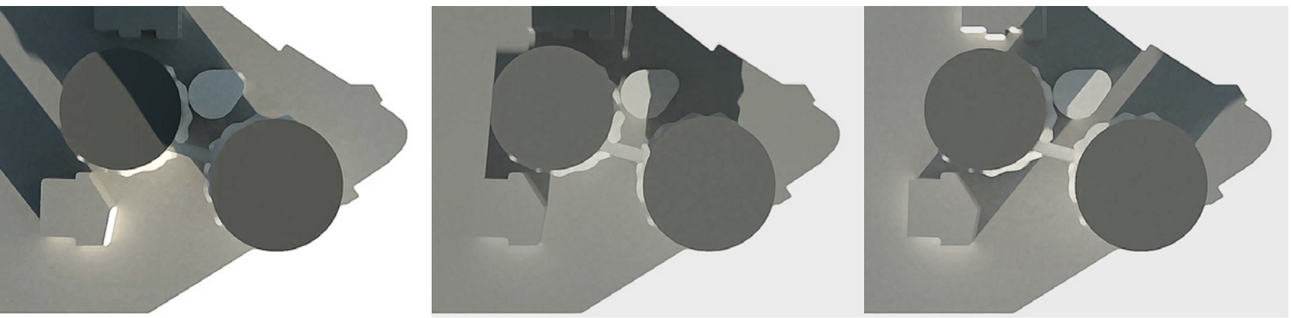
DECEMBER // 21



9:00am 1:00pm 3:00pm

15

SHADOW ANALYSIS

To test the setting of the towers on the site, which was based mostly on wind direction and enhancing the wind tunnel between the towers, a simple shadows and sunlight analysis was conducted. The measurements were done in three times of the year - summer, autumn and winter solstice. To show the full scope of sun ray throughout the day, the first survey of the day was carried out an hour after sunrise, second one in midday and the last one - one hour before sunset.

In warm months morning sun gives full exposition to the north façades. The evening sun also partly brightens up the north sides of the towers. Most afternoon the playground behind the buildings stays at least partly in a shadow (starting from 2:00pm). Recreational area in the south part of the site almost always gets a favourable sun exposition, but can get a bit windy.

During autumn solstice (which equals spring situation) the morning and evening sun position does not provide as much light on the north facades, but still ensure daylight on the parameter of both towers. Lower spring and autumn sun gets to the playground through most part of midday, but is not dangerous for children.

Winter sun position is the least favourable. Most north facing apartments do not get a direct sunlight through the day. However, considering Dutch winter weather, the amount of direct sunlight is rather scarce and rare, most light during the day is diffused by layer of clouds.

The towers, due to their shape, will always have apartments which are having bot more and bit less favourable setting. For that reason, more exclusive and luxurious apartment combinations are located on the south facades of the towers. In addition, the central core of the towers has a skylight which gets light from the top of the towers and glazed stories with community areas. The skylight provides light in the staircase, but also in the function room, which do not have a window on the outer facade. Differences in shading situation of various apartments will also influence the price or rental / ownership relation.

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FLOORPLANS & SECTIONS

SITE PLAN

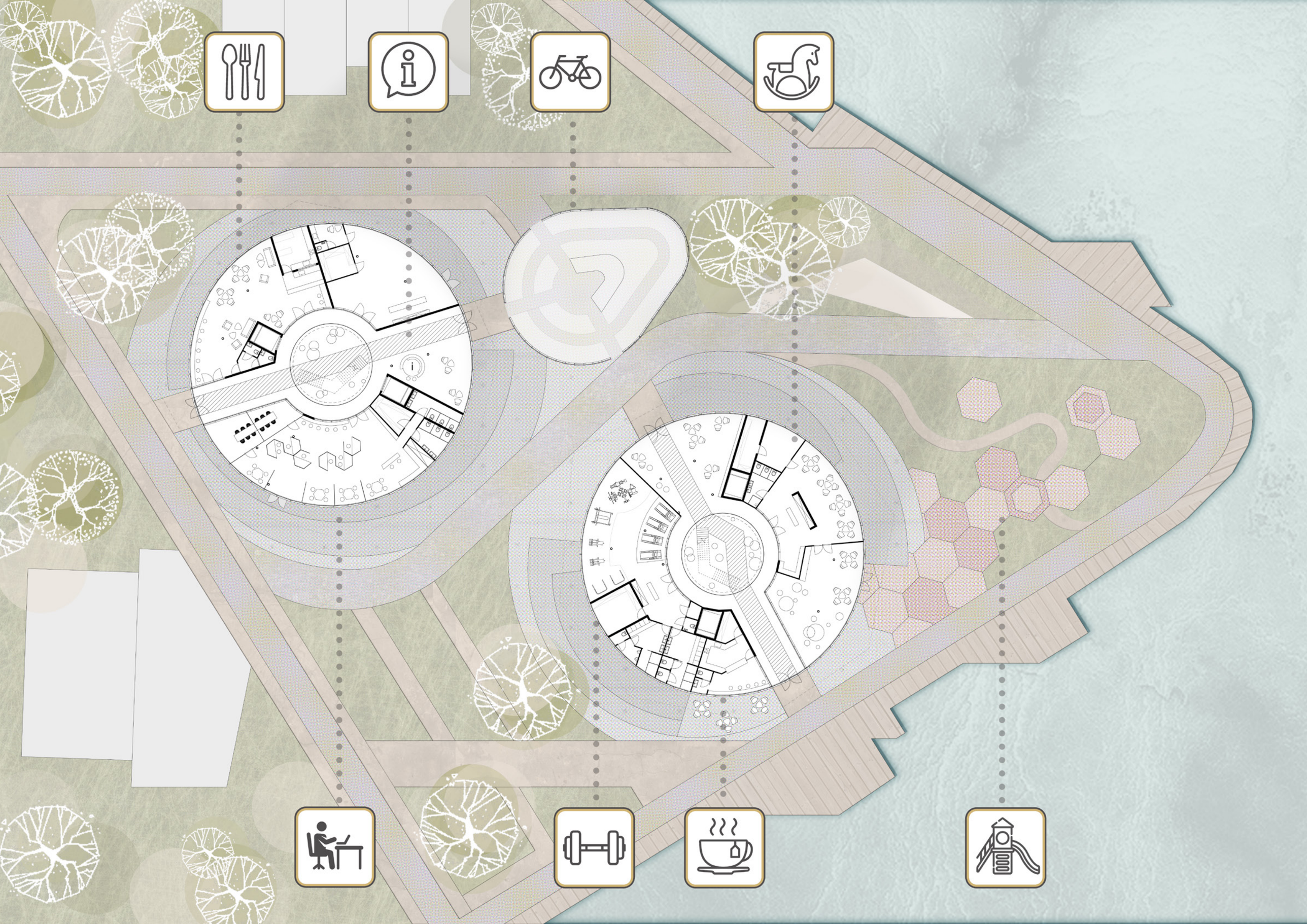
The development of the irregular towers' site was based on wind directions, sun path and accessibility of functions. The "Waterview" housing is a car free zone, which is why the main access to the Silo Towers leads through a bike parking on site, located north of the towers. From there two axes lead to the centres of two towers. Both axes enter in wide lobbies with a resting / waiting area and post boxes. Further, they follow to a hollow communication core, which starts with a green atrium in the ground floor. Upper floors are accessible through the staircase in the atrium or two elevators, which can be reached from the corridor around the atrium. Entrances to ground floor functions can be reached from the corridor as well.

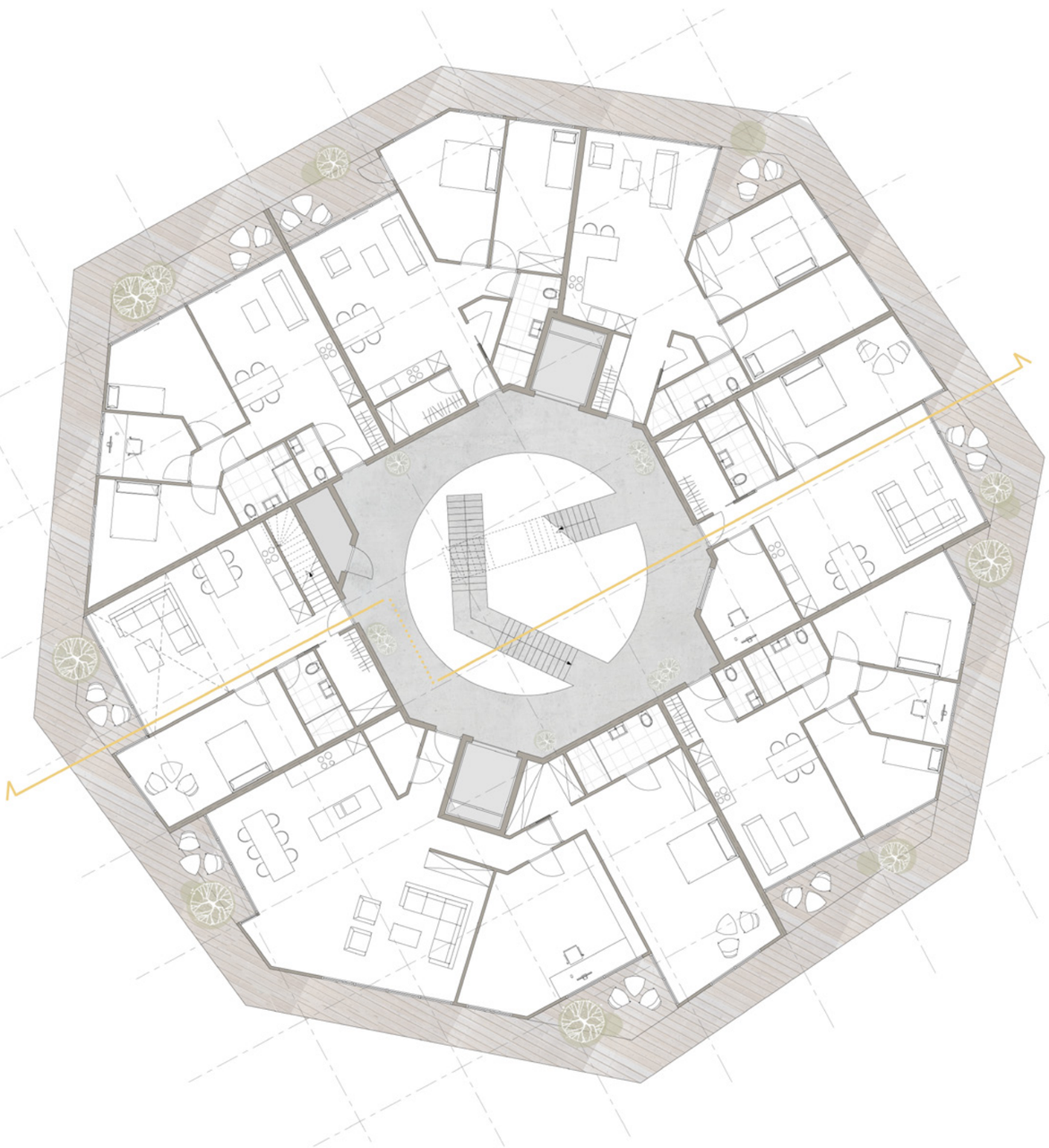
The east building is located directly at the waterfront and accommodates more private functions like gym, day-care and cafe with a view on the harbour and river. From the entrance to the site, the west tower has a small restaurant, then a shared work space with flexible sitting options, a bike repair shop and an info box about the whole neighbourhood and history of the site.

Narrow space between the towers in combination with strong south-west winds creates a wind tunnel, that's why there are no places to stay in that zone - only a bike path. In the south edge, walled from north by the towers, there is a sunny recreational area with connection to the water and access to the cafe. East from the bike parking there is a multifunctional space designed for community meetings, outdoor sport activities and small social events. The east edge is planned for a playground with easy access to day-care. Along two edges of the site goes an open waterfront with recreational benches, access to water, widened decks for activities and an exploration bike route.

SECTION

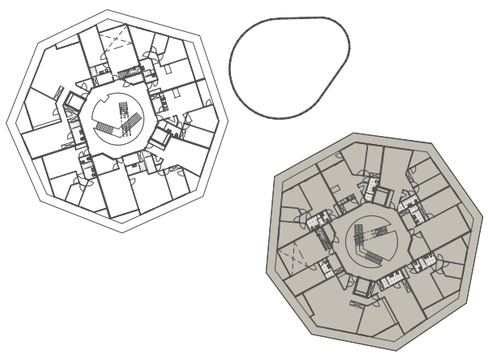
The cross section is taken through the east tower and shows stories up to the fifth floor, where the connection bridge to the other tower is. The main purpose of the section is to illustrate relations and scales in the building and in its closest surroundings. From the void with the sculptural staircase in the centre, one can enter the gym and day-care facilities, which are directly connected to spaces outside (park and playground). On alternating floors, there are double height apartments visible.

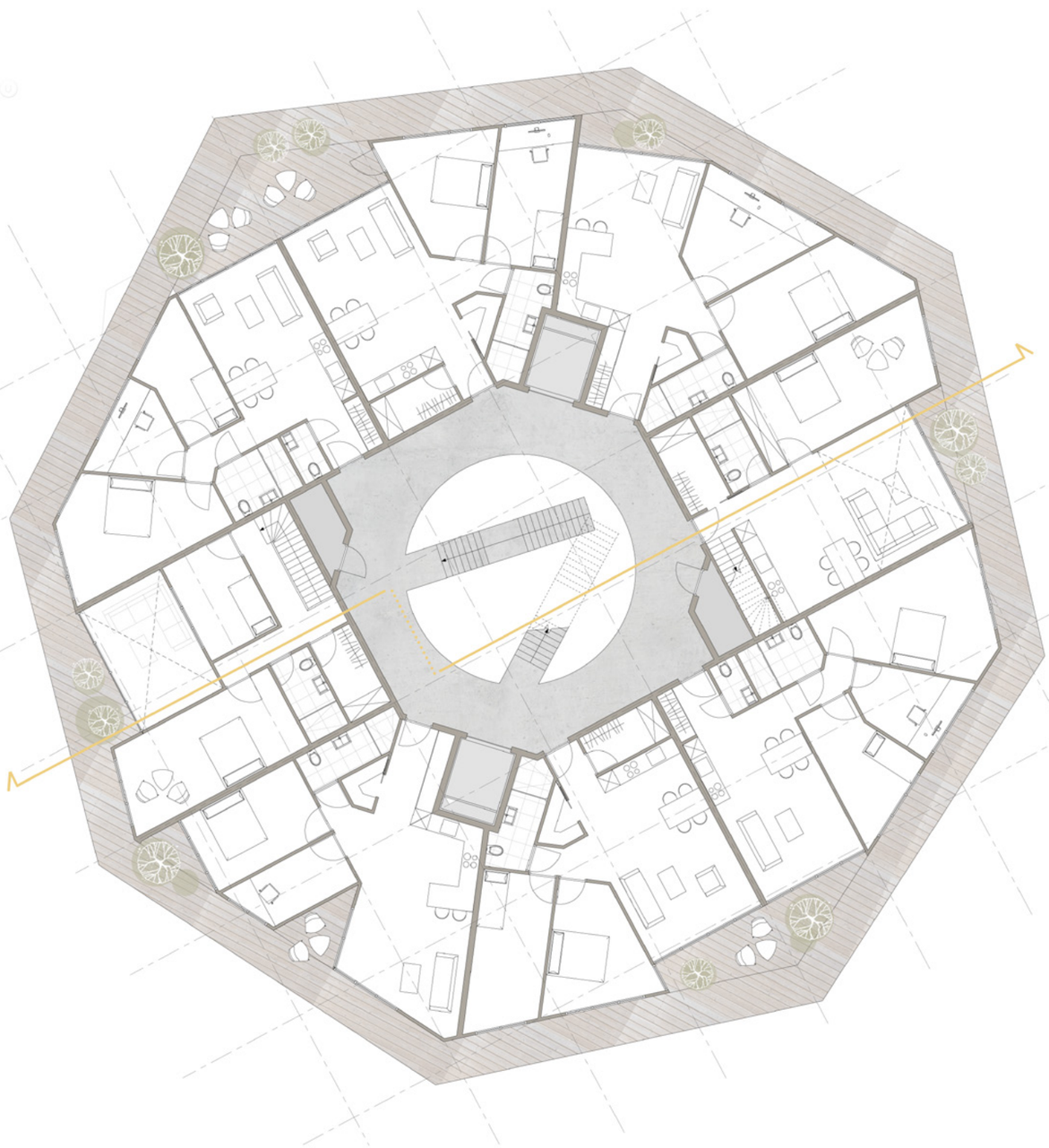




First floor - east tower

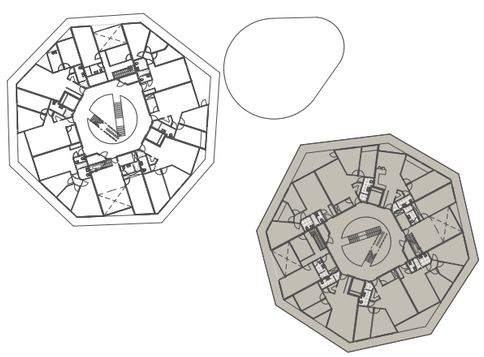
The first floor of both towers looks the same, the difference comes from rotating the plan according to the entry zone on the ground floor.
The first floor is accessed directly from the void going through the whole tower - either by stairs or one of two elevators located in the core. All apartments are accessible from there. Apartments are mostly two or three rooms, but double height or two merged flats variations are possible in both towers. The core area has one or two storage rooms per floor.





Second floor - east tower

The second floor repeats the construction's structure of the first floor. All floors have the same construction's structure, which runs through the whole height and consists of perpendicularly placed concrete plates and colums, that stabilise the structure. Elevators belong to the construction core. Most apartments have a similar floorplan on all stories, with small variations resulting from the changing outline of the building. On the second floor there is a double height apartment variation visible.




MAKE
TODAY
ridiculously
AMAZING

***

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