

Reclaiming the Southern Shoreline

A regenerative transformation along Göta Älv in Gothenburg, Sweden

ACKNOWLEDGMENTS

This master's thesis marks the culmination of my five years of studies in spatial planning and sustainable urban design.

A big thank you to my supervisor Andreas for believing in my project, and every one else in studio 3042 this semester!

Special thanks to Göteborgs Stad for providing valuable information at the outset of this project.

ABSTRACT

Studies show that urban highways play a vital role in facilitating transportation within metropolitan areas, yet they often come with significant drawbacks, including physical barriers, urban decay, and environmental degradation. In Sweden, where the transport sector is a major contributor to greenhouse gas emissions, the city of Gothenburg stands as a prime example of these challenges.

Located along the river Göta Älv, Gothenburg boasts a rich industrial history that has shaped its identity and economic landscape. However, the decline of traditional industries has left behind outdated infrastructure and a car-centric urban design paradigm that hinders sustainable development. Moreover, the city's proximity to the river makes it particularly vulnerable to the impacts of climate change, such as rising sea levels and extreme weather events.

To address these pressing issues, this master's thesis focuses on the transformation of the Southern Riverbank—a critical but underutilized coastal strip—into a vibrant and integrated part of Gothenburg's urban fabric.

By adopting principles of regenerative development and innovative urban design strategies, the aim is to reimagine this area as a sustainable and reconnected resilient space that enhances the well-being of the city's residents while mitigating the effects of climate change.

AIM

The purpose of this master's thesis is to investigate how the Southern Riverbank, a centrally located coastal strip squeezed between the river and a four-lane highway, can be transformed into an integrated part of the city through urban design.

GUIDING QUESTIONS

- How can a car oriented barrier be overcome?
- How can a regenerative approach be used to achieve sustainable development in an urban-water context?

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Master thesis report

Sustainable Urban Design

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Choice of site

Being from Gothenburg, I was drawn to the idea of doing a degree project within my own city. Upon conducting research, I discovered that the ferry company, situated along a central coastal strip in the central city, is set to relocate in the coming years. This future move will leave behind a significant amount of unused space in a highly central location.

This thesis project delves into the potential transformations that arise when industrial activities vacate prime urban land in the city center, and how to handle centrally located barriers to reconnect the city with one of its biggest qualities: the river.



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01 LITERATURE OVERVIEW

What is a barrier?

A barrier effect occurs in the meeting between the need to cross an obstacle but being unable to do so (Göteborgs Stad 2016: 8). The attribute of a barrier differs and can be divided into static or dynamic aspects. The static aspect can for example be, physical obstacles (railings, fences etc.) or the amount of traffic volume, speed or parked vehicles (if we assume that the barrier is a road). Unlike a railway or a highway which is seen as an absolute barrier, meaning that its something that cannot be crossed and is therefore its own system in the urban structure, a road can be seen as a dynamic barrier meaning that they are more flexible in the amount of traffic and speed during the day.

A key concept to grasp regarding barrier effects is that they don't arise independently as external factors from a system, possessing their inherent measures, such as noise and pollution (Eldjik, J. 2019: 45).

STATIC

- Physical obstacles
- Design & geometry
- Width
- Design of intersection points

DYNAMIC

- Traffic volume
- Speed
- Type of vehicle
- Flow distribution over the day



How does a barrier affect people in the city?

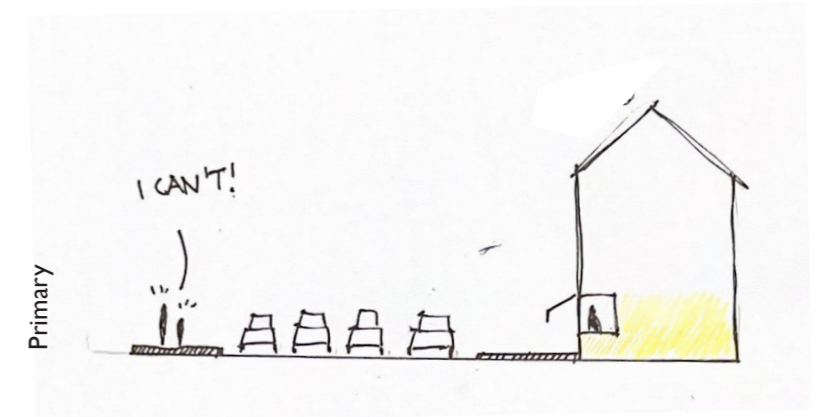
Jane Jacobs, the author of *Life and Death of great American Cities* (1961:288) argues that the city is firstly for its citizens and should be planned from its needs and interests. A space demands a circulation of people, otherwise, it is going to be perceived as unsafe. Spaces that are in proximity to barriers such as harbours, highways, big parking etc. prevent people from moving freely between districts and neighborhoods, which prevents people from integrating and mixing. When public spaces are created, especially in high density areas, it is important to not only think about their physical quality's but also about how they are connected, and how the relationships between them are strengthened. The space must fulfil certain functions, it has to be safe, accessible and attractive, and can only be that if they are well connected (Sas-Bojarska & Rembeza 2016: 1556).

According to Lecroart (2018:61), urban highways today have an important role in moving people and goods within metropolitan areas, but at a cost that they create physical barriers, devitalize centres, neighbourhoods and waterfronts, and prevent regeneration. In the last decades, many cities have successfully started

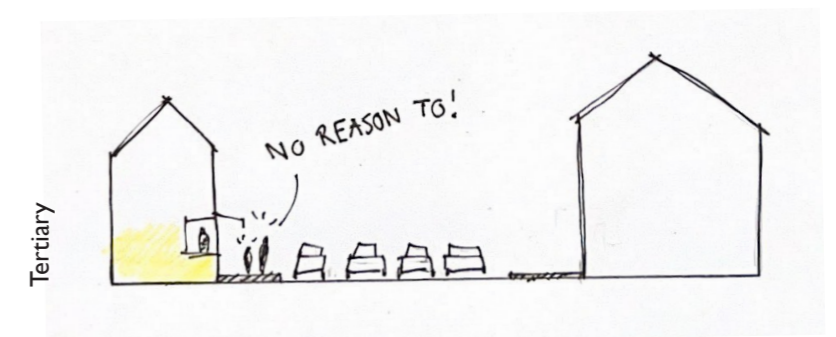
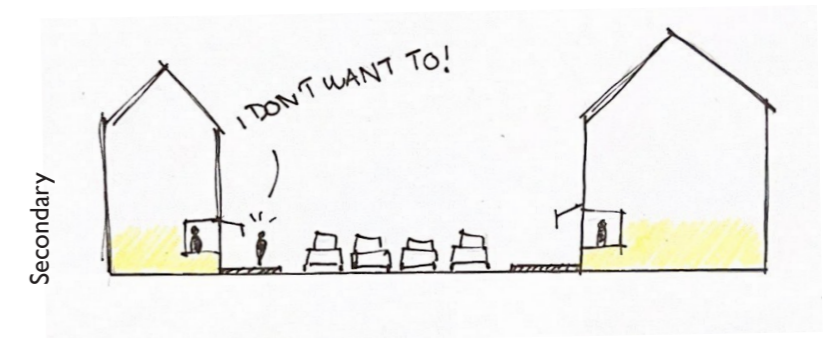
tearing down urban highways and replacing them with multi-use boulevards with mixed-use development and green parks surrounding them (ibid.). Previous research has demonstrated that transforming highway corridors can serve as a potent catalyst for revitalizing neglected or deserted urban areas, yielding enduring benefits for the entire city. By eliminating visual barriers, reestablishing street connections, and enhancing environmental quality, numerous cities have undergone significant transformation, unlocking potential space for the development of public areas or new constructions. (Lecroart 2018: 57).

Barriers can be split up into three different effects: **primary**, **secondary**, and **tertiary** effects. Primary effects mean loss of time, stress, and discomfort. Secondary effects are more about changes in destination choices, visit frequency or modes of transportation. Tertiary effects involve the ripple effects on individuals, companies, retail etc. This could for example be when disruptions in activities and social interactions occur (Göteborgs Stad 2016a: 9)

Physical



Mental



Regenerative design

The adjective regenerative relates to **something growing or being grown again**. The concept of “regenerative” was initially popularized by Robert Rodale, a North American publisher, to represent the broadening and advancement of his endeavours in organic farming and gardening. He employed this term to signify the organic renewal of the complex life of the soil, which thrives without the use of agricultural chemicals (Lyle 1996: 10).

According to Lyle (1996:10) regenerative design means “replacing the present linear system of throughput flows with cyclical flows at sources, consumption centers, and sinks”. The same principle of ongoing self-renewal can apply equally to all the systems that support life, for example, energy, water, food and waste processing. The same principles can apply to the economy as a whole (ibid.).

The emergence of regenerative development and design represents a significant advancement in the understanding and implementation of sustainability principles. Traditional sustainable or green design

practices have primarily aimed at reducing harm to the environment and human health, while improving resource efficiency to slow the degradation of natural systems. However, proponents of regenerative approaches advocate for a more holistic, integrated approach to building design and construction, as well as all other human activities. They believe in designing systems that not only halt the decline of natural systems but also foster co-evolution with them, leading to mutual benefits and a more robust expression of life and resilience (Mang & Reed 2012).

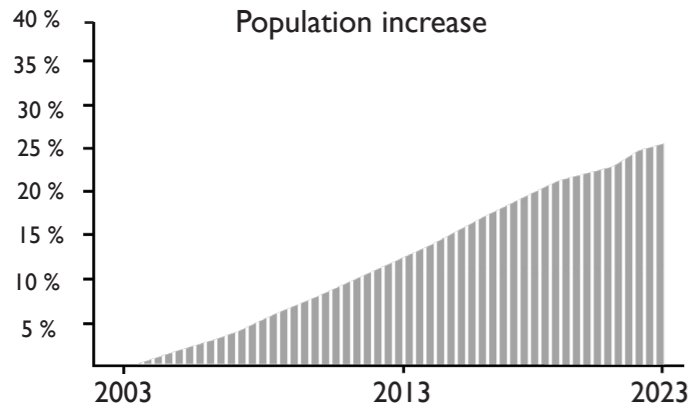
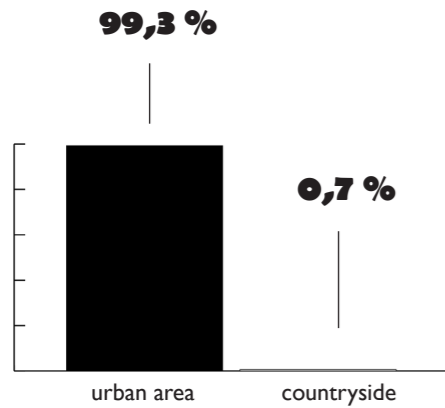


02 **GOTHENBURG:
AN INTRODUCTION**

WELCOME TO GÖTEBORG - a growing big city!

Gothenburg has de last 30 years grown with 26 % and continues to grow. **Today, the population is right above 600,000 people** living, working and travelling daily. This does not include the people commuting in and out of the city (SCB). According to the Comprehensive plan, the city enables for an expansion of dwellings, offices and municipal services that corresponds to a population growth in **250 000 new inhabitants until 2050** (Göteborgs Stad 2022: 12).

Average age **39,3**





GOTHENBURG: A BRIEF HISTORY

“This is where the city will be!” – was the famous words Gustav II Adolf allegedly used when he gave Gothenburg its city privileges in 1621. Before this, Lödöse, a small village 40 kilometers upstream, was the west coast’s main capital. But because of the strategic location by the estuary, a new city “Nya Lödöse” was established in the 1400s where Gothenburg is today. This city was later given the name Gothenburg. From the beginning, mostly of the inhabitants where Dutch mercenaries, which also influenced the spatial planning of the city with canals, embankments, and straight avenues of trees. The dutchmen also had good experience in building on sunken land, which is a big part of the soil surrounding Göta Älv (Harrisson 2016).

During the 1700s, The East India Company was founded and grew stronger which established Gothenburg as the main centre in Europe for foreign trade with products from China such as tee, porcelain, spices and silk. The tobacco and sugar industries were together with herring fishing other important industries, bringing great profit to Gothenburg. During this period, over 10,000 people had moved into the city.

Many of the merchants of the time built stately log houses along the canals. Unfortunately, Gothenburg was hit by a series of fires during the late 1700s century and therefore the original wooden houses do not remain. Because of the fires a new law was established in 1803, preventing wooden buildings inside the moat. During the 1900s, the city expanded geographically in all directions.

During the 1950s, the car took a more serious role in the city when more and more people started to afford one. The roads were designed wide and straight, separating the soft mobility users from the motorized vehicles. Safe zones between the roads and buildings Big areas like Västra Frölunda and Hisingen were developed during the “million programme” in the 1960s and 70s, where the passenger car was the center of a sustainable lifestyle.

The time before Gothenburg

Bohuslän is part of Norway. Halland is part of Denmark. The Göta River serves as Sweden’s pathway to the west for transporting goods and warships, necessitating the protection of the river with a fort.



17th century

Gothenburg was founded in 1621. Sweden received assistance from Holland to build on the clay soil. The city quickly expanded, featuring canals, wooden houses, churches, and high fortified walls.



18th century

Gothenburg is both a military city and a trading center, with ships arriving and departing, some even sailing as far as China. English and French are commonly spoken on the streets. However, being a city built of wood makes it susceptible to frequent fires.



19th century

The city needs to expand, so the surrounding walls are pulled down. Factories are built, attracting more people to Gothenburg. The city acquires a railway, water mains, a hospital, libraries, a university, and its first tramline.



20th century

Gothenburg is an industrial city with major industries focused on building ships and cars, and producing electronics and pharmaceuticals. The city grows rapidly, with new suburbs being constructed. Older districts are either demolished or restored.



21th century

Gothenburg is a segregated city, an “event city,” and a knowledge city. Its port is the largest in Scandinavia, though the era of the shipyards has ended. New districts are being developed on former industrial land as the city continues to evolve.





Aerial photo over the river taken under the first half of the 1900s.

© Unknown

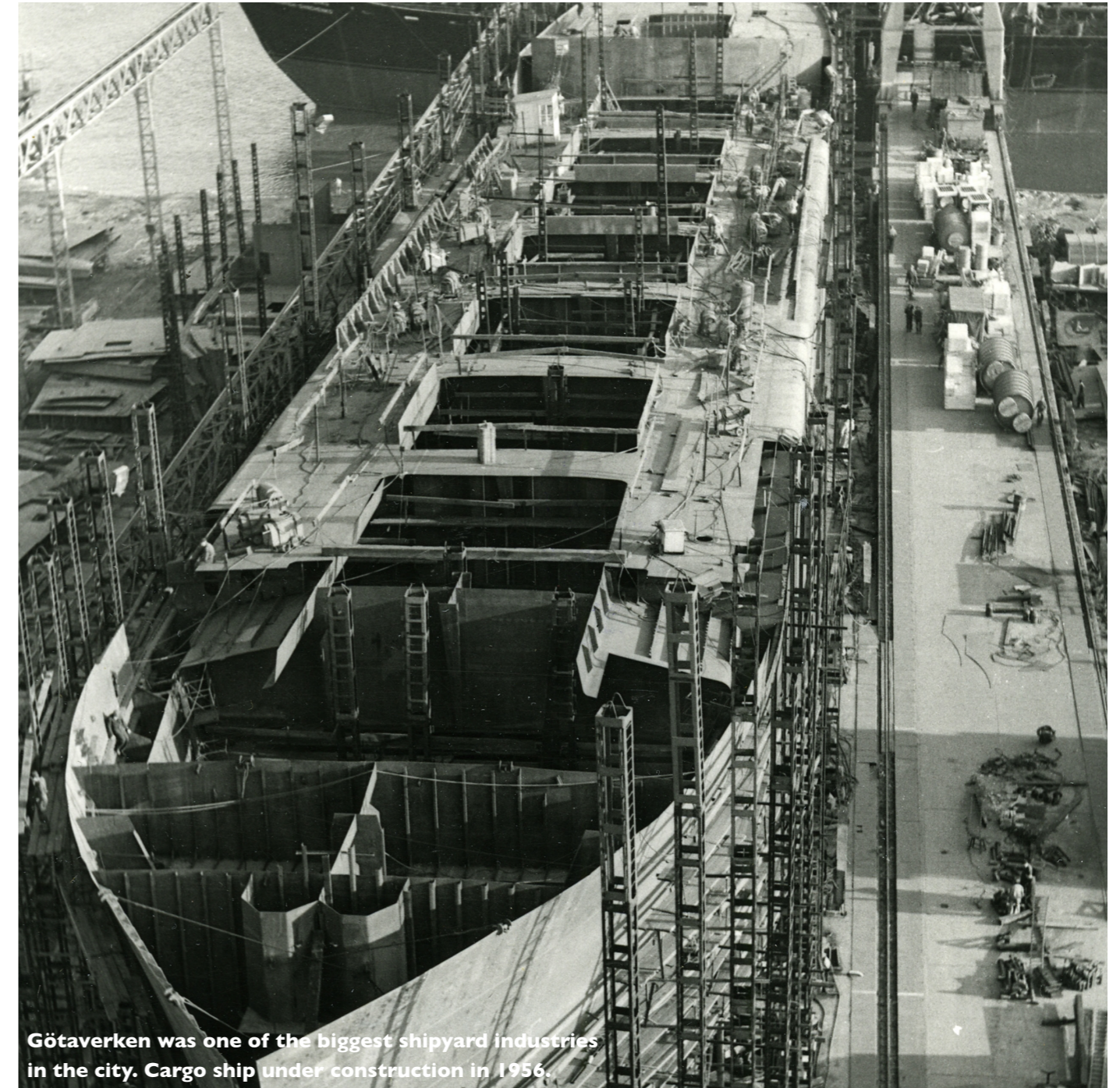
THE SHIPYARDS - a memory of the past

Since its founding, Gothenburg has been closely tied to the sea, characterized by its shipping industry. After World War II, the city firmly established itself as a modern shipyard and industrial hub. Significant investments were made in new factories and facilities outside the city core, taking advantage of the cheaper land. This decentralization of industry increased the demand for transport and communication, spurring major infrastructure projects in the 1960s and 70s. By 1975, around 15,000 people were employed in the shipyards.

However, the 1973 oil crisis and the rapid expansion of shipyards in East Asia led to a decline in orders from high-cost countries like Sweden. This crisis resulted in over 10,000 job losses in the subsequent decades. Today, Gothenburg has reinvented itself as an event and innovation city. The industries along the shorelines have disappeared, with much of the land being redeveloped into residential and mixed-use areas. The shipyard industry's legacy and working culture remain integral to the city's identity, frequently referenced in art, music, and popular culture. Debates on how to honor and remember this cultural heritage are common in the media.

Although the shipyard industry has dwindled, the Port of Gothenburg is more significant than ever. Owned by the municipal company Göteborgs Hamn AB, it is the largest port in Scandinavia, handling over half of Sweden's container transport. **In 2023, the port set a new record by processing over 914,000 containers** (Göteborgs Hamn 2023).

Today, the region hosts over 3,000 maritime companies employing around 20,000 people across various municipalities. Gothenburg's economy is heavily reliant on exports, making it sensitive to the global economic climate and international events (Vision Älvstaden 2012:9).

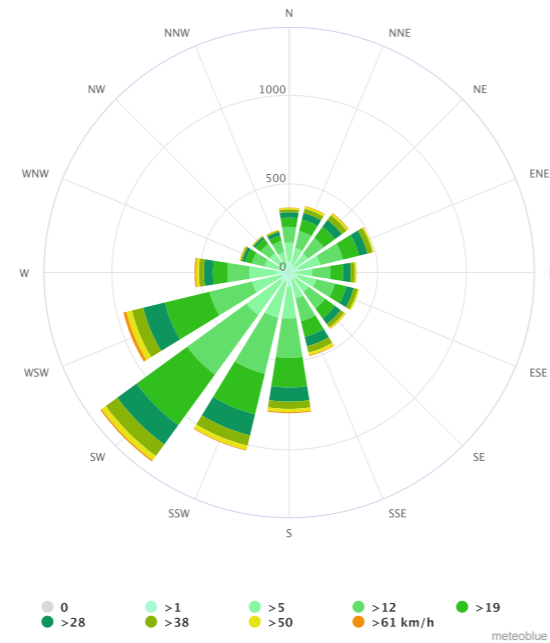


Götaverken was one of the biggest shipyard industries in the city. Cargo ship under construction in 1956.

LANDSCAPE AND CLIMATE

Gothenburg's cityscape is profoundly influenced by its topography and characterized by its archipelago landscape. The area around Gothenburg features hilly primeval rocks with clay soil in the valleys, creating a distinctive rift valley landscape (NE 2023b). The terrain is largely bare or covered with a thin layer of soil, with valleys, rivers, and streams flowing from the hinterland. Along the coast, forests are predominantly deciduous, transitioning to mixed forests as one moves inland (Aronsson 2009: 12).

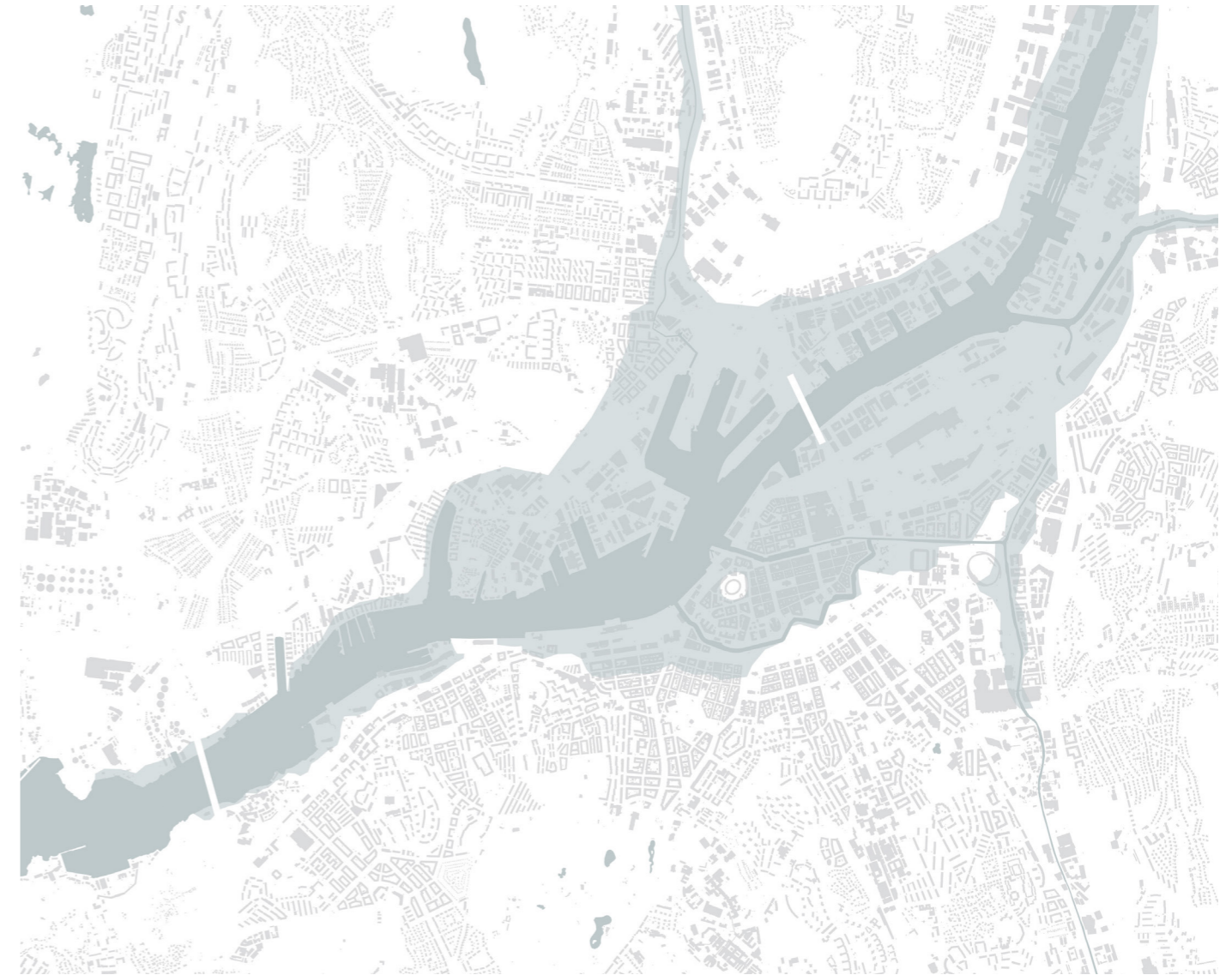
The Western Sea shapes Gothenburg's coastal climate, resulting in mild weather year-round with cool summers and mild winters. The city is known for its frequent rainfall, a perception supported by reality. Strong westerly winds from the sea bring heavier rainfall along the coast before the weather systems reach the eastern highlands. On average, it rains about every third day (Göteborgs Stad).



Rising sea level - a long term problem

For the year 2100, it is estimated that the water level will be 1.0 meters higher and in extreme weather +2.8 meters above today's water level (Göteborg Stad 2022). Today the most extreme level is +1.8 meters. Several factors make Gothenburg vulnerable towards sea level rise. Firstly, it is a low environment because it is right before the river meets the sea. Gothenburg is a bit like a pot, with slightly higher elevations with some lowlands in between making it more vulnerable.

Secondly, an increase in storms and strong winds from the sea is also a contributing factor for the sea to rise quickly. Thirdly, heavy rains, making not only the flooding from the river a threat but also torrential downpours causing flooding in other areas that are not directly in close relationship to the river.



Map showing the flooding-situation in the city if the water level rises to the extreme level + 1,8 meter.

Source: Göteborgs Stad

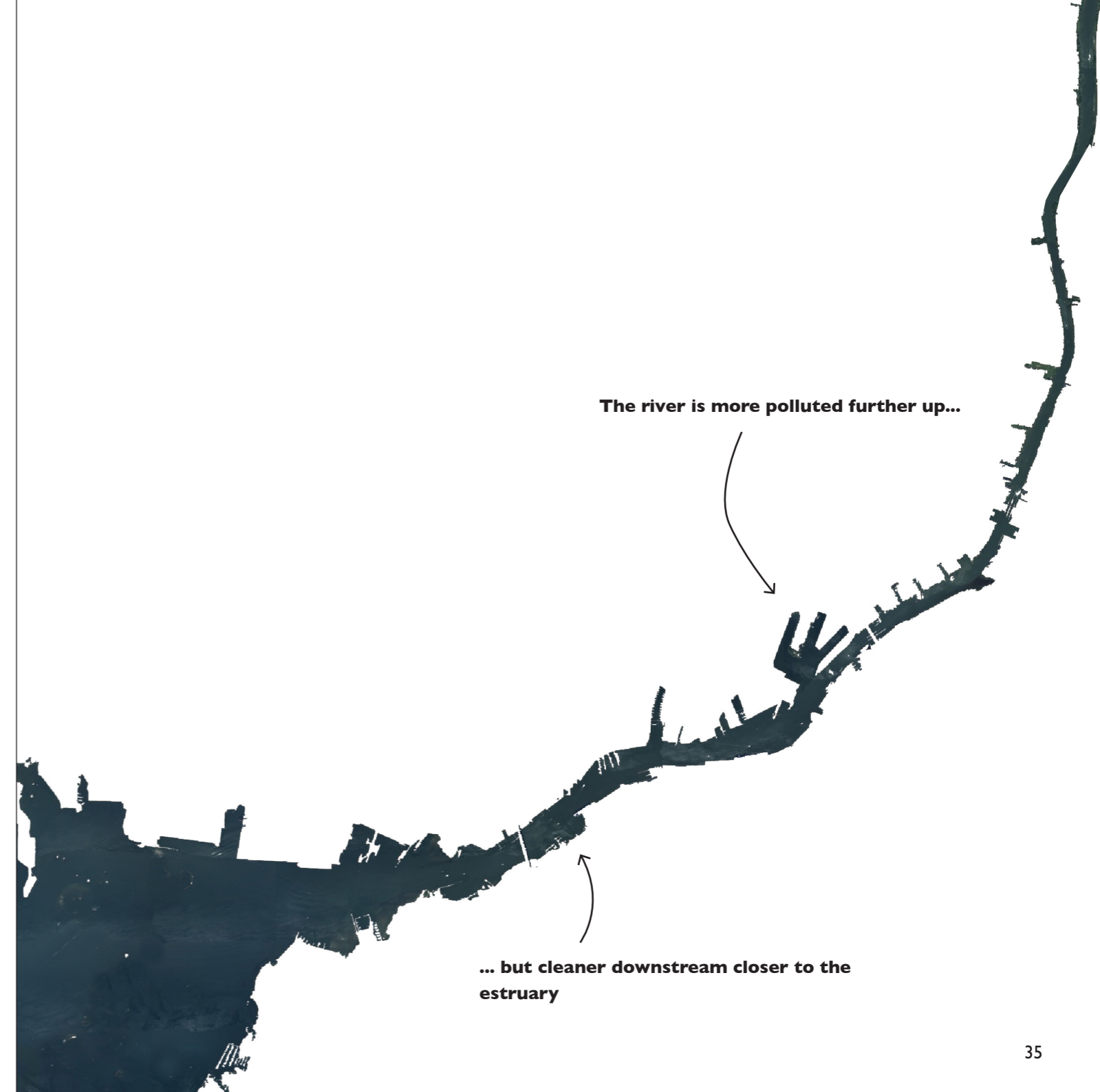
GÖTA ÄLV

Göta Älv can be seen as the backbone of the city's economic development and its identity as a coastal city. Göta Älv is the biggest watercourse in Sweden and has value as a water source for drinking water for approximately 700,000 people, but also for cooling in industries, and power production and is of great importance for agriculture.

It is Sweden's most water-rich river with an average flow of approximately 550 m³/s. The river drains Vänern, Sweden's largest lake, and thus a drainage basin that constitutes just over a tenth of Sweden's surface area. It cuts across the region and passes through several of the county's largest communities. The travel time from Vänern to the sea is on average three days. It has also, of course, been an important waterway for shipping and the shipyard industry since Gothenburg was founded (Göta Älvs Vattenvårdförbund 2015: 3).

The heavy shipyard industries and harbours have occupied the river space for a long time has taken its toll on the rivers ecological quality. Due to the heavy shipyard industries and harbours that have occupied the river space for a long time, the river has become polluted.

A study made in 2023 showed that the bottom of the river is heavily polluted in some parts by toxic substances, such as hazardous metals. This especially occurs upstream and closer to the land while it is cleaner in the middle of the furrow where the pollutants are carried away with the current (GP 2023).



The river is more polluted further up...

... but cleaner downstream closer to the estuary

From heavy industry to recreation and innovation

Today, the city is actively looking for new ways to use the river, as it has gone from being a source of production to being a source of recreation and leisure. Examples of this are establishing saltwater pools for recreation. In 2022, the University of Gothenburg in collaboration with the city, inaugurated a marine allotment prototype where the people in the city could learn more about the potential of seafood.

A marine allotment is a small-scale cultivation in the sea. It can be compared to an allotment on land, but instead of carrots and potatoes, mussels and algae are grown. Despite 70% of the Earth's surface being covered by oceans, only 5-6% of all food comes from the sea. Utilizing the water, the natural resources of the ocean, is not only a cost-effective alternative for obtaining food, but it also serves a regenerative purpose as seaweed is a sustainable and renewable resource. It can contribute to reducing carbon dioxide emissions, improving oceanic environments, and promoting a circular economy. New markets and job opportunities are enabled as seaweed can be used in various ways, such as food, feed, fuel, and materials. Seaweeds are

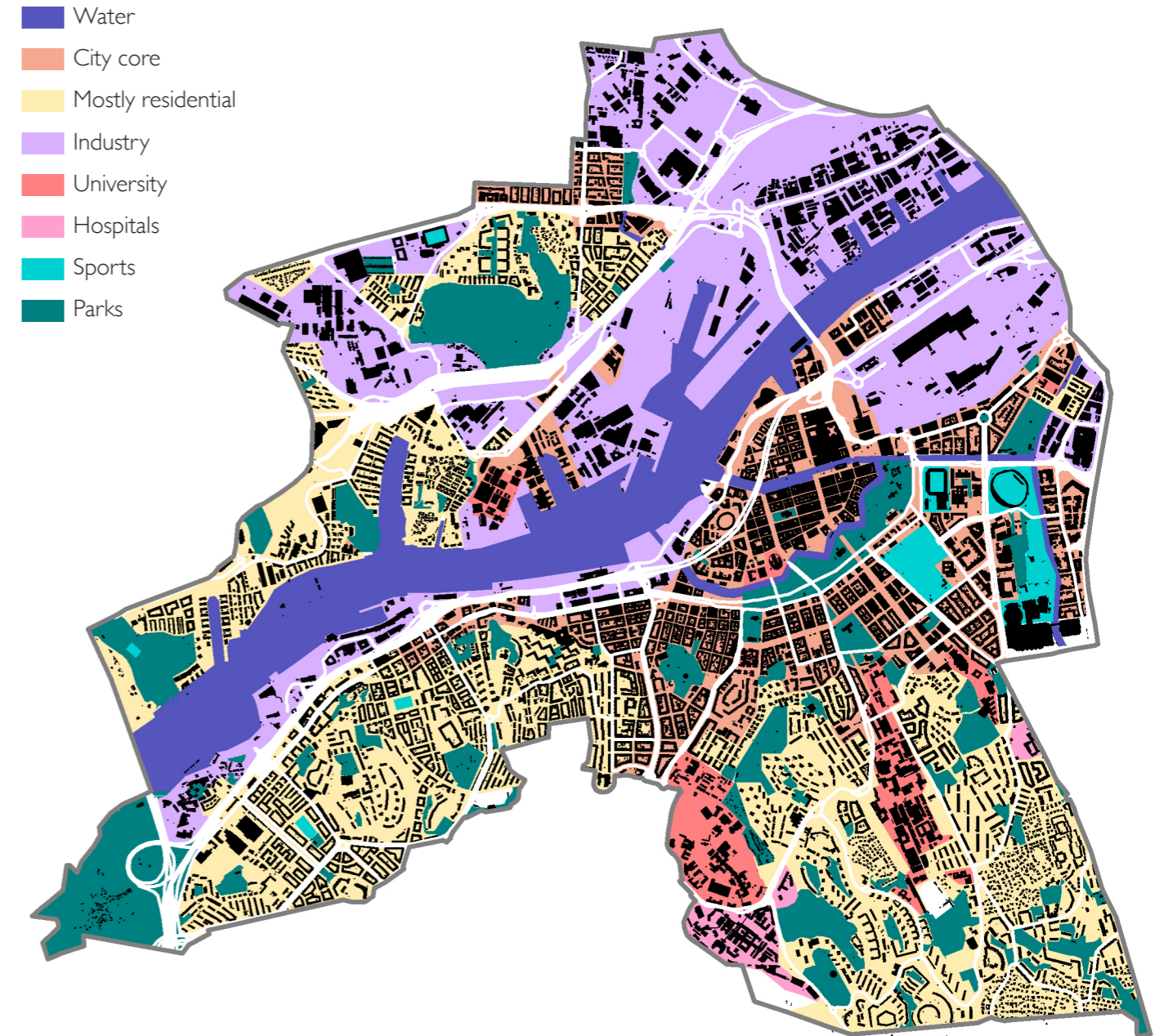
incredibly efficient at sucking up carbon dioxide and using it to grow. Eelgrass, mangroves, and salt marshes are already known for their ability to store carbon, but seaweeds pull more of the greenhouse gas from the water than all three combined based on biomass. That means seaweed farms can help to combat local impacts of ocean acidification (NOAA 2024).



LAND USE

Today, much of the Inner City is characterized by cohesive urban development. An exception is the old industrial and commercial areas, which often have a more scattered structure and spread out over large areas. Infrastructure also occupies significant portions of land, especially near major thoroughfares.

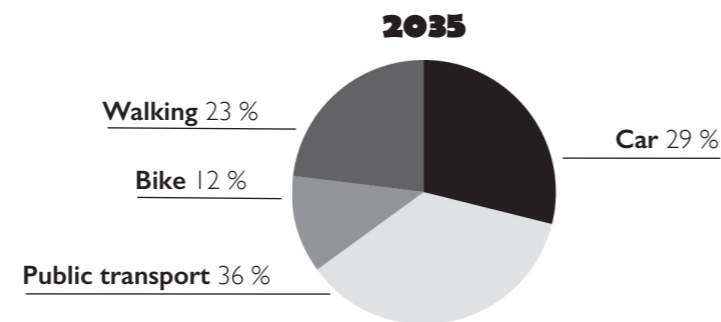
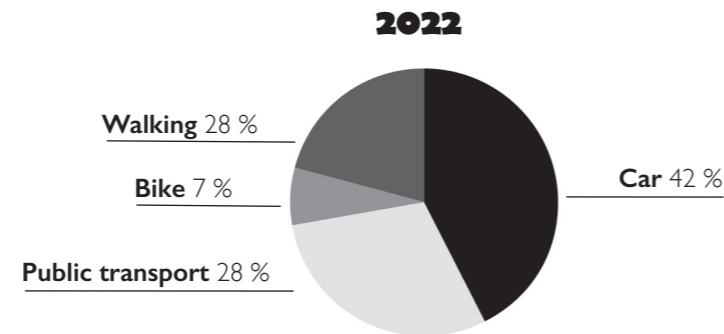
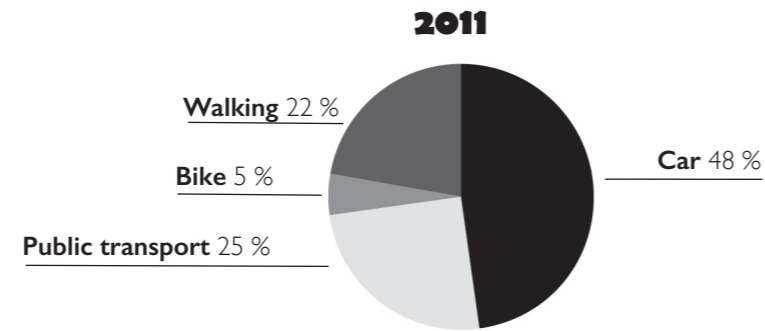
The historic city center primarily houses commercial and office activities and lacks residential areas to some extent, while other areas largely consist of residential buildings with varying degrees of mixed-use integration of commercial activities and other societal functions. The Inner City also contains larger areas dedicated solely to functions such as healthcare, education, and sports (Göteborgs Stad 2022a).



MOBILITY

Gothenburg is a very traffic-intensive city, with big infrastructure running into and through the central parts. The traffic system forms a significant part of the cityscape and the character of the city. In the city center, it was historically possible to enter via the water and three gates into the land road, which has left its mark on the street structure. In recent years, the city has been greatly influenced by modernism's ideas about traffic separation. The city has had a conscious strategy of gathering through traffic to the trails and zoning the inner city to create quiet enclaves between the trails. This traffic planning has shaped the city and the result is barriers in the urban landscape.

Increased travel and transportation demands pose a challenge in transitioning the transportation system to utilize existing infrastructure more efficiently. Shifting personal travel from cars to public transportation, as well as from cars and public transportation to walking and cycling, is one way to release capacity in the road system (Göteborgs Stad 2021: 6).



Between 2011 and 2035 travelling predicts to increase with 27 %. The city's goal is to decrease travel by car and increase travel by public transport, walking and cycling (Göteborgs Stad 2022).



URBAN DEVELOPMENT PRINCIPLES

The city's overall vision for urban development is **“Sustainable city, open to the world”**. Both people living here and visiting Gothenburg should have good access to what the city offers. Businesses are diverse and competitive and stand firmly in the global economy where its room for innovation and creativity. The city should be green and have a close connection to the water where residents and visitors are invited to walk or cycle. The close access to parks, nature and water contributes to increased health and people's sense of wellbeing.

To reach this vision, the city has developed three main strategies.

Close city

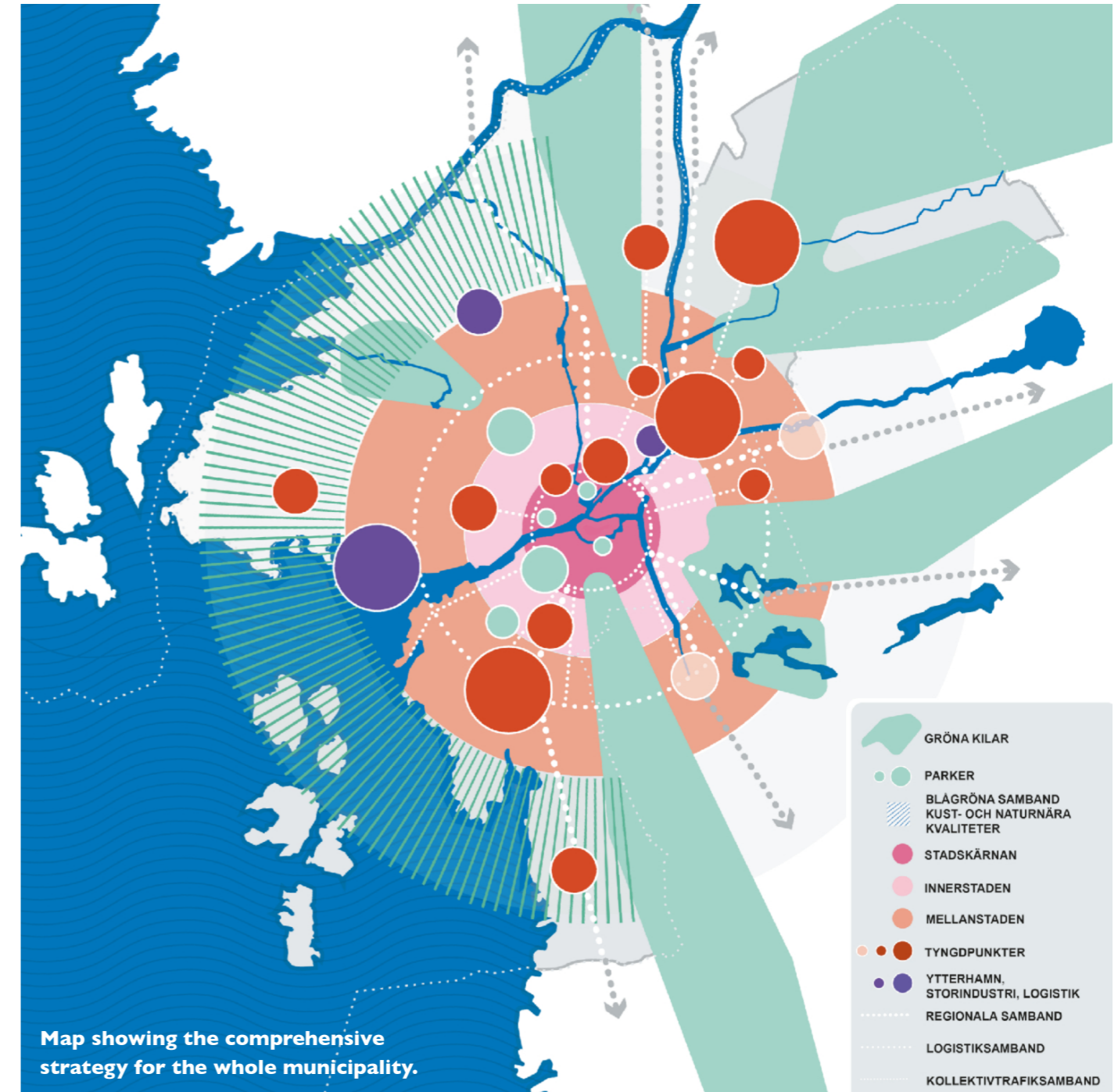
- Expand the inner city and develop the urban cores
- Create a good balance between different functions
- Create more accessible parks, nature areas and public spaces
- Densify to enhance qualities and save resources

Cohesive city

- Create a well-functioning network of streets and prioritize soft mobility
- Connect the city with fast and reliable public transport
- Plan for variation
- Important meeting places and public spaces must be preserved and new ones created

Robust city

- Participation and openness must characterize the planning processes.
- Limit climate impact and manage climate change
- Conserve and develop biodiversity and ecosystem services
- Plan for a versatile and diversified business life
- Protect and strengthen the city's identity

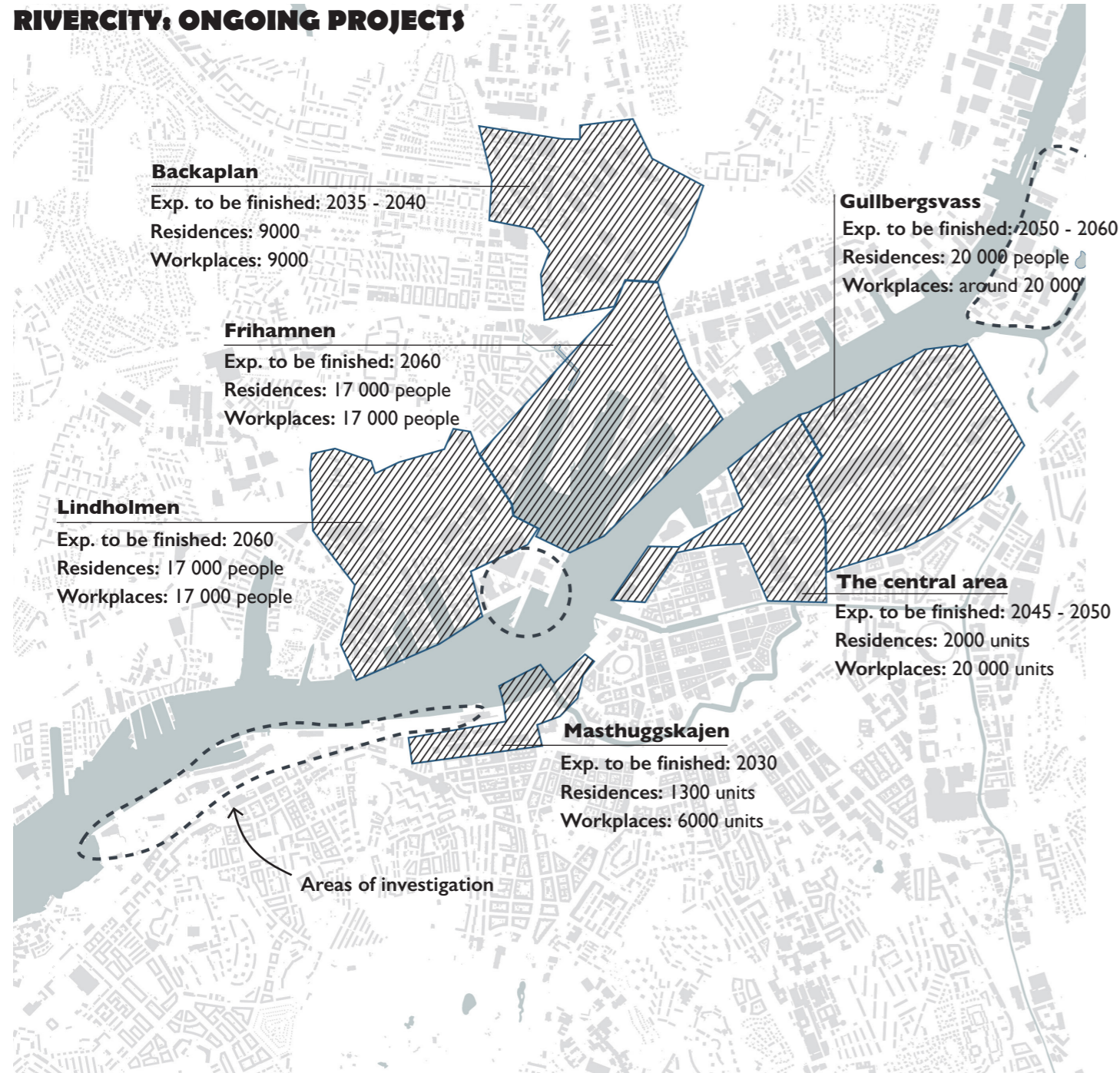


An aerial photograph of a city, likely Gothenburg, Sweden, showing a river winding through it. The city's urban layout is visible, with a grid of streets and various building footprints. Several areas are highlighted in different colors: yellow, red, and orange. These highlighted areas are primarily located along the riverbanks and in clusters throughout the city, indicating planned urban development or regeneration projects. The river is a prominent feature, and the overall scene is captured from a high-angle perspective.

VISION RIVERCITY

The “Rivercity Gothenburg project” was initiated by the city in 2009. In 2012, the municipality adopted “Vision Älvstaden”, Scandinavia’s biggest urban development project. The goal is to produce 25,000 new residents and over 50,000 new workplaces (Göteborgs-Posten 2021). As this thesis is being written, huge areas around the city are either being developed or are being under development. The main strategies are **“connect the city”, “embrace the water”** and **“reinforce the center”**. Basically, the project is about how we can develop the city into a new era, where the city has gone from an industrial economy leaving a lot of vacant space around the river, to a knowledge economy where intellectual capital and thirst for new innovations are the most important. These changes in demand also change how the city should be planned and designed to stimulate this (Vision Älvstaden 2012: 9).

RIVERCITY: ONGOING PROJECTS



SOME EXAMPLES

Masthuggskajen



A big part of the project is to build into the river and add a peninsula. The peninsula is approximately two hectares big which equals four football fields. A big reason why they chose to expand into the river is of the fast that the descent to the Göta Tunnel is located next to the site, which is not possible to build on.

Lindholmen

The development of Lindholmen is taking place gradually where some parts are finished, others are under development and planning. Karlstaden is the biggest development project with its much-debated Karlatornet. A 245 m tall tower which is the tallest building in Scandinavia.



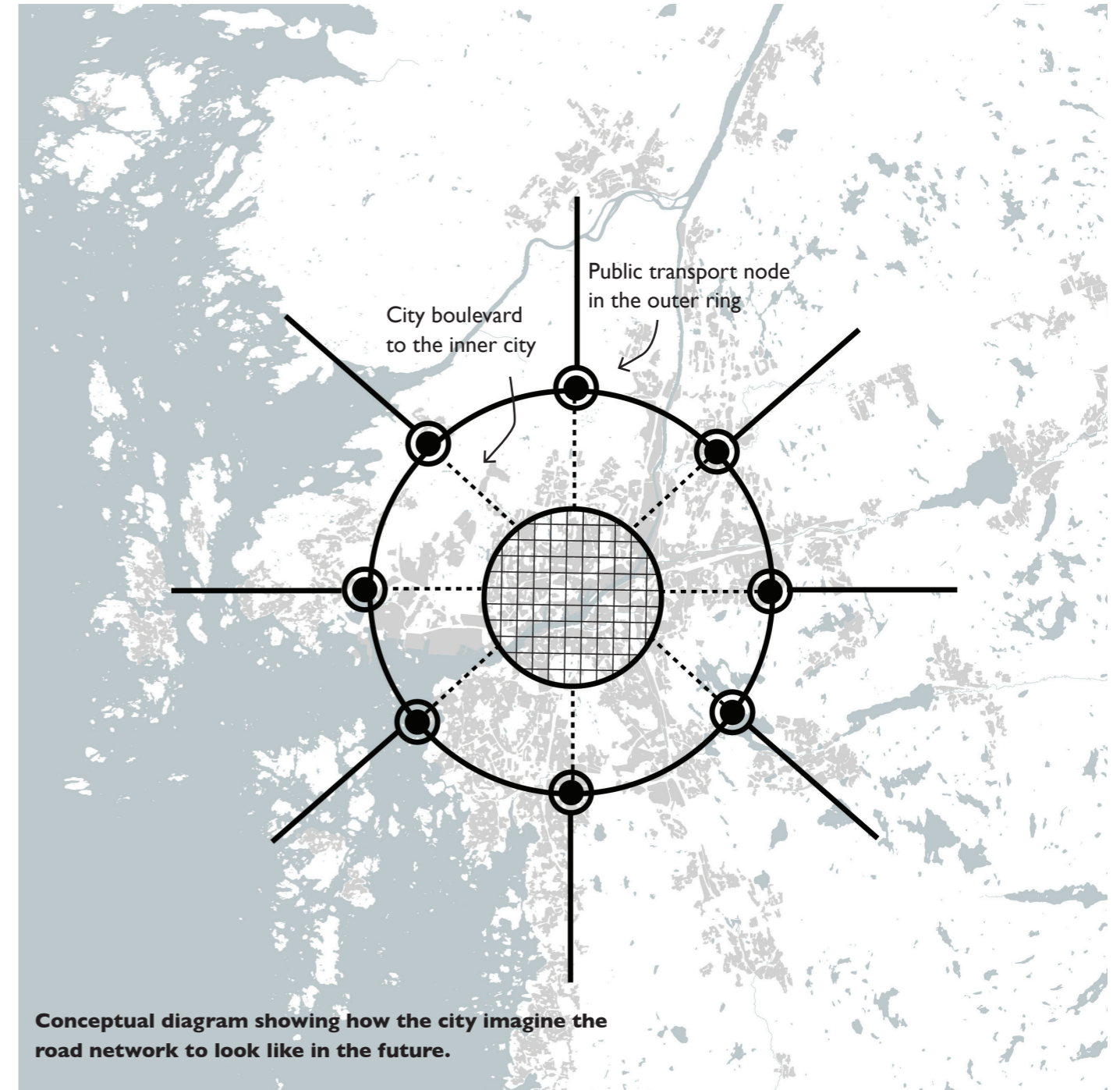
Frihamnen



The vision for Frihamnen is for the area to develop into a part of the inner city. With innovative solutions and a focus on sustainability, the goal is to create a variety of forms of accommodation and meeting places. Because of financial issues the plans have been on hold since 2018. The visualisation to the left shows an early vision for the site.

THE CITY'S VIEW ON BARRIERS

The city's strategy of being a cohesive city are contradicted by the fact that multiple big infrastructure barriers occupy central locations in Gothenburg. A common perception within the city is that the busy traffic routes with high speed should be located in the outskirts of the city, while the inner city should be characterized by calm and finely meshed road network (Göteborgs Stad 2016: 11)



In the comprehensive plan (2022), three different strategies on how to handle barriers are proposed.

Overbuild the barrier on strategic locations

This means that it gets easier to cross the barrier, but it does not create a coherent street network. It can have a great effect on the local street network if connections are missing though. At the same time, the highway is still there and prevents urban development around it, it still creates noise and car use is likely to increase. It is also important to consider the safety aspects of either bridges or underpasses and the necessity for pedestrians and bicycles to move parallel.

Integrate the highway and transform it into a natural part of the city.

The highway is integrated into a coherent part of the city's street network, for example, it could be transformed into a boulevard with a reduced speed limit. It means going from a traffic-separated room to a space where cars, pedestrians and bikes share the same street. This creates a well-connected street network.

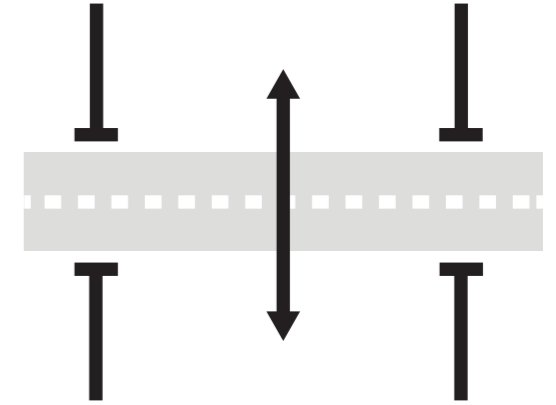
Another gain is that the surrounding surface can be freed up and be built on or that public spaces can be created now when safety distances no longer need to be considered. It is though important to consider that heavy traffic that is currently using the road might need to be redirected, which increases traffic load in other parts of the system.

Separate by bury or move

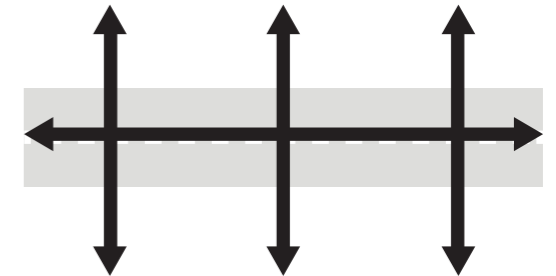
The road is either placed underground or moved where it does not affect the surroundings as much. This means that the road could have a full transformation and a new local street network and urban development could be planned on the surface that emerges.

This would completely change the conditions for how the area above could be planned since there is no need to consider the heavy traffic passing through. Interconnectivity would increase and space would be vacant for new buildings and public spaces. Bury the traffic would also mean that we "dig away" the problem. Private cars would still be a dominant element in the city, going from the suburbs, down in a tunnel and then up again into the city center. Looking at it from an economic standpoint, building tunnels is extremely expensive in conditions like Gothenburg.

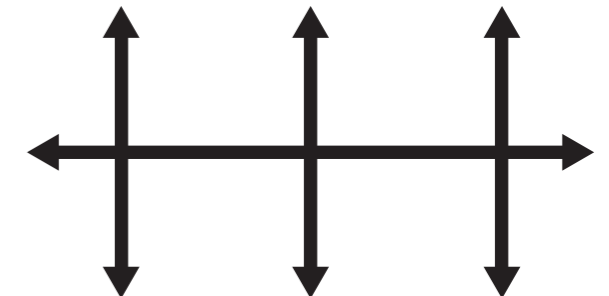
Overbuild the barrier on strategic locations.



Integrate the highway and transform it into a natural part of the city



Separate by bury or move.



04 SITE CONTEXT

MAJORNA & MASTHUGGET

The project area is located in Majorna, a city district in Gothenburg that is usually highlighted as a unique and vibrant city district with a strong local identity and a sense of belonging. The district has since the 1700th successively grown with its port-related activities along the river, but the main settlement is based on the traditional block structure from the end of the 1800s and forward (Göteborgs Stad 2008).

Today there is a mixture of houses and urban spaces from many different eras. The older parts of the districts urban morphology is characterized by that time a new urban planning ideal. The urban design has its origins in the traditional grid system, but instead of expanding it traditionally with straight streets that looks the same, the topography and natural elements had to decide the route of the streets and the design of the blocks.

The experience of the urban space in narrow, often curved streets and openness in larger places replacing the more traditional city's repetition of identical streets and blocks (Nylander 2013). Most of the residences are rentals with 2-3 rooms and a kitchen, attracting a younger population.

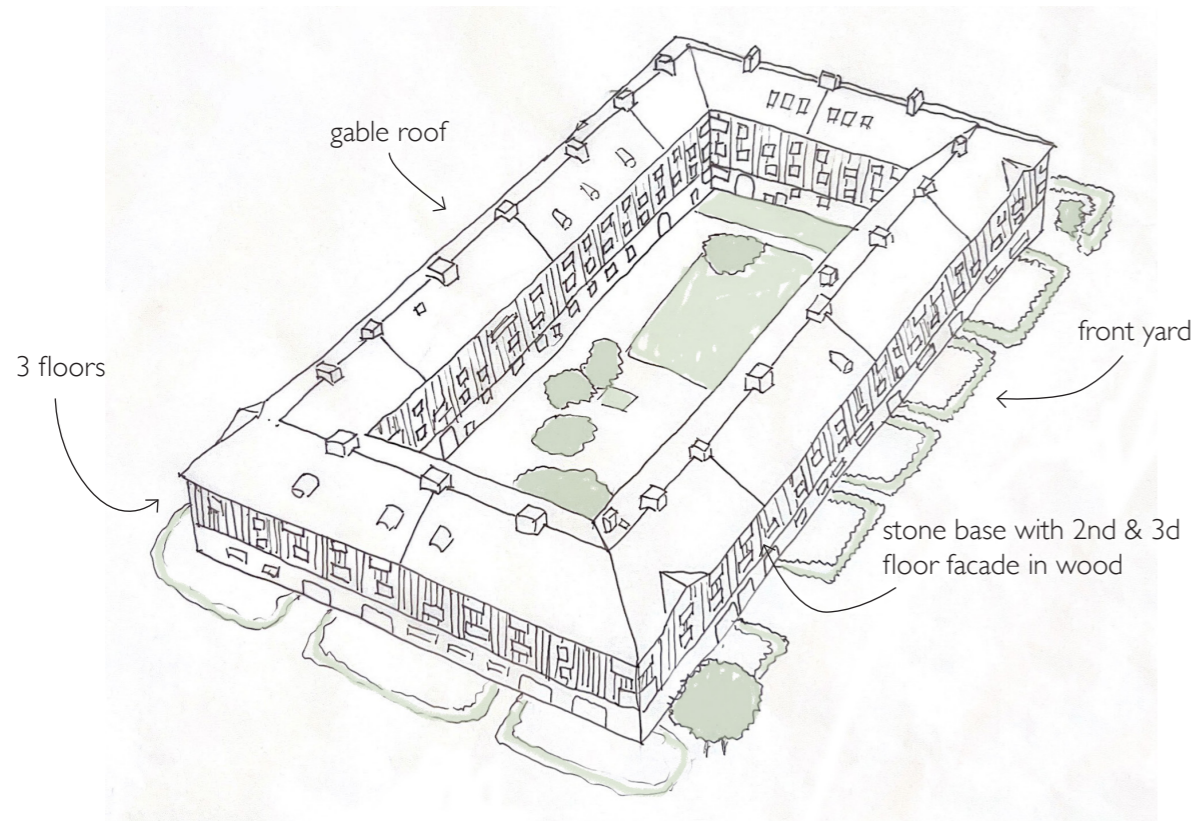


Technically Majorna is divided into three different districts, **Kungsladugård, Majorna & Stigberget** but the area as a whole usually goes under the name Majorna.

Master plan from 1870 showing a proposed structure for how the city could expand to the west. Source: Göteborgs Stad.



KARTA
Öfver
Föreslagen Gatureglering
inom Förstäderne
MAJORNA och MASTHUGGET
vid
GÖTHEBORG.
enlighet med Byggnadsnämndens föreskrifter
Uppgjord år 1876 af
H. W. BRANDEL.



The architectural identity in Majorna is much characterized by **“Landshövdingehus”**, a typical three stories block typology that can be found in older city districts in Gothenburg. They were originally built for the working class and are characterized by the bottom facade being in stone while the second and third floors are built in wood.



Intimate streets



“Landshövdingehus”
Characteristic architecture



One of many bars and restaurants in the area



Älvsborgsbron connecting the main land and Hisingen. A classic visual element in Majorna



Sjöfartsmuseet telling the story of the districts connection to the sea.

NODES



The district consists of several public nodes with a higher density of active groundfloors and public life that also works as exchange points for public transport.

Today, Djurgårdsplatsen houses a closed gas station from 1971. This is to be demolished and make room for mixed use in the future. The image on the right shows a proposed vision of the future area. Architects: Semrén & Månson



Järntorget



Masthuggstorget



Linnéplatsen



Chapmans torg



Stigbergstorget



Djurgårdsplatsen

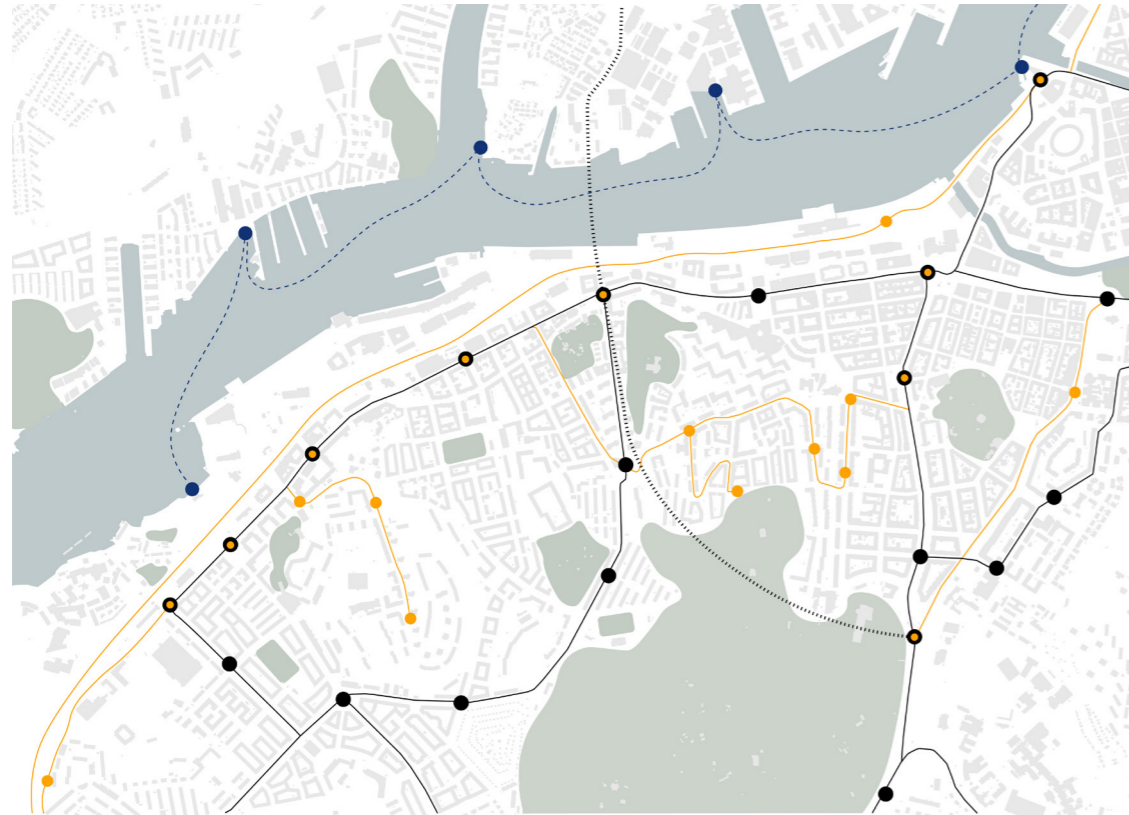


Jaegerdorffsplatsen



Mariaplan

PUBLIC TRANSPORT



Majorna is well-connected through the tram, connecting the different nodes in the district. The trams have a quite high stop ratio, stopping around maximum every 500 meter. A new underground tram is planned, connecting Hisingen with Stigbergstorget.

- Tram stop
- Bus stop
- Bus stop
- Tram
- Bus
- Public ferry
- - - - Future tram

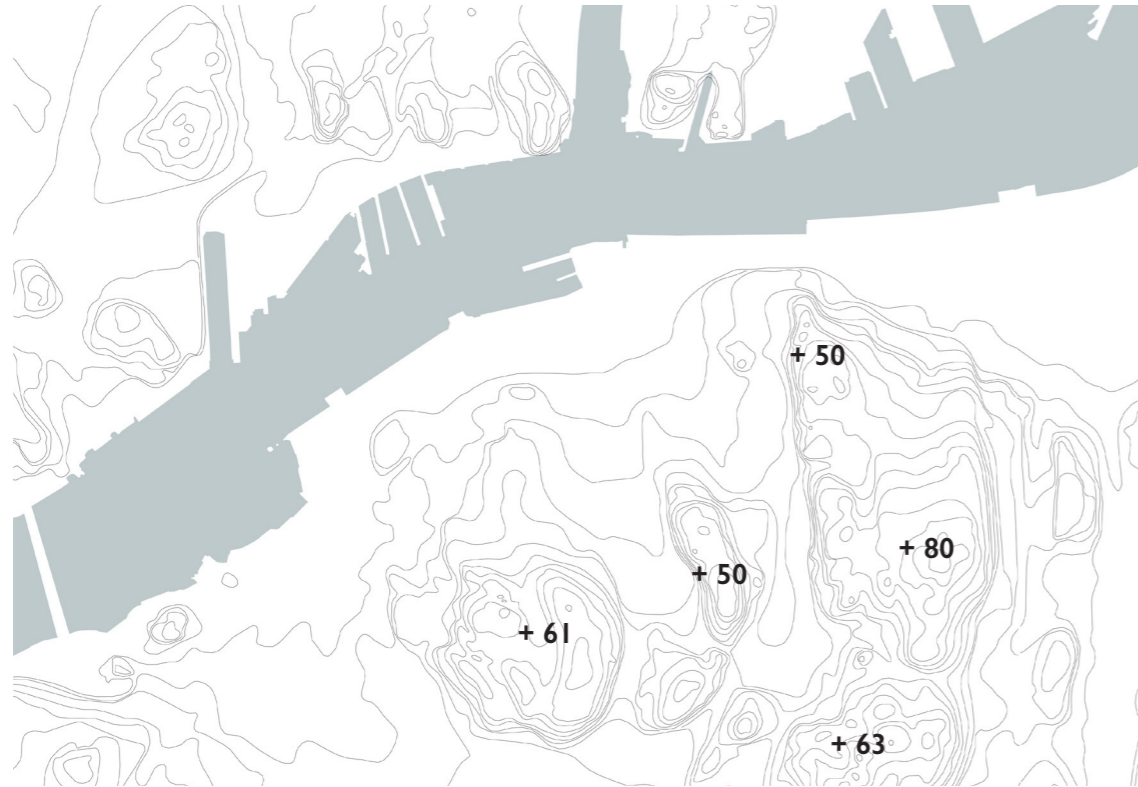
GREENERY



Green areas defined by the comprehensive plan. Majorna borders to Slottskogen to the south, one of the biggest and most popular parks in the city.

- Park
- Sport
- Allotment garden
- Cemetary
- ▨ Future park

TOPOGRAPHY



The surrounding post-glacial landscape rise powerfully from the river with peaks as high as + 80 meters. A lot of the terrain is built, but the places that are too steep have become a haven for free-growing trees and bushes.

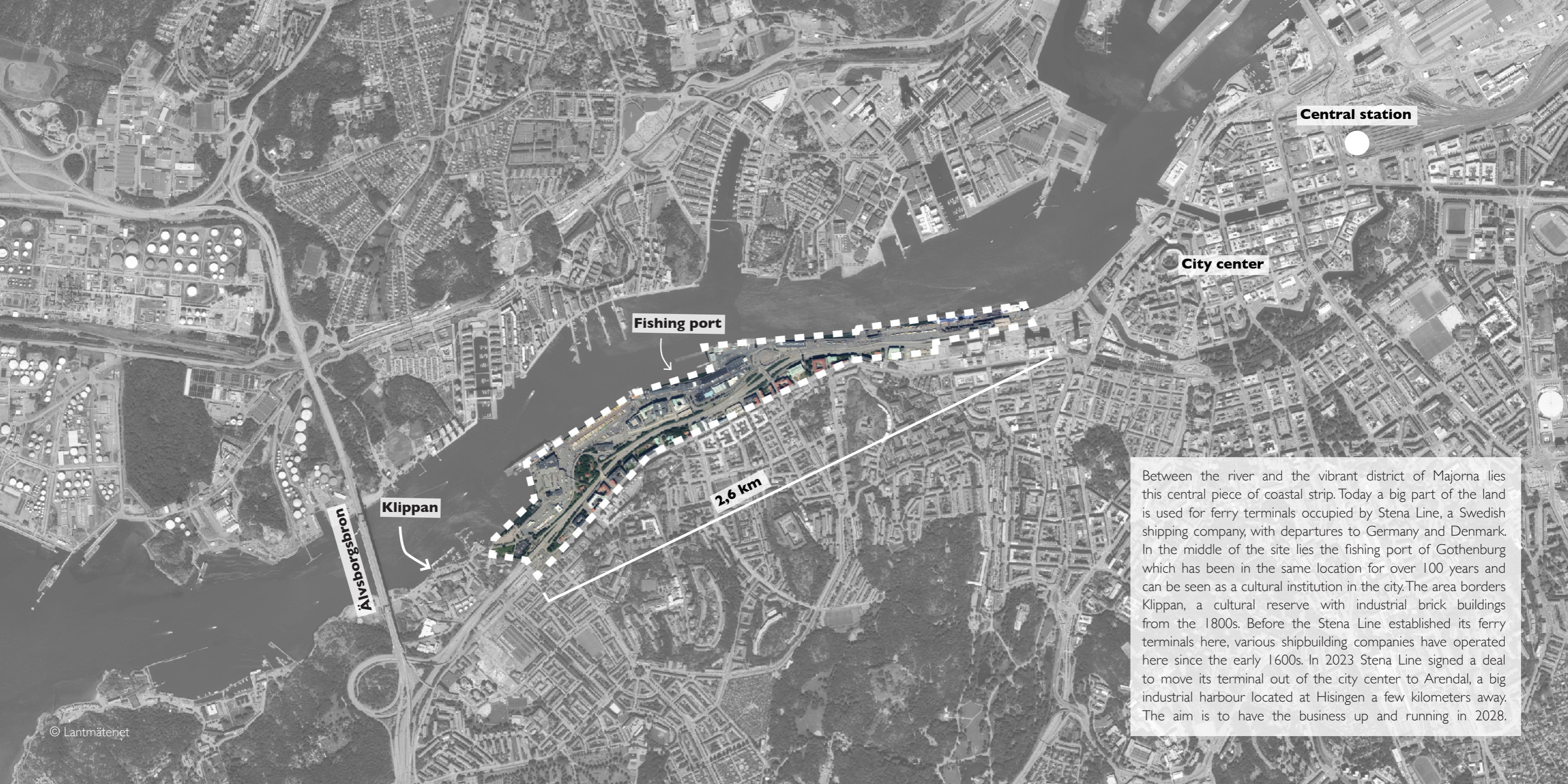
FLOODING



As described earlier, the city faces a big risk with flooding, and it will be even worse in the future. This map showing the important run off streets and collection areas in the district. The transparent blue are showing which spaces are affected by flooding at extreme levels.

05

**ZOOMING IN:
SÖDRA ÄLVSTRANDEN**



Central station

City center

Fishing port

Klippan

Älvsborgsbron

2,6 km

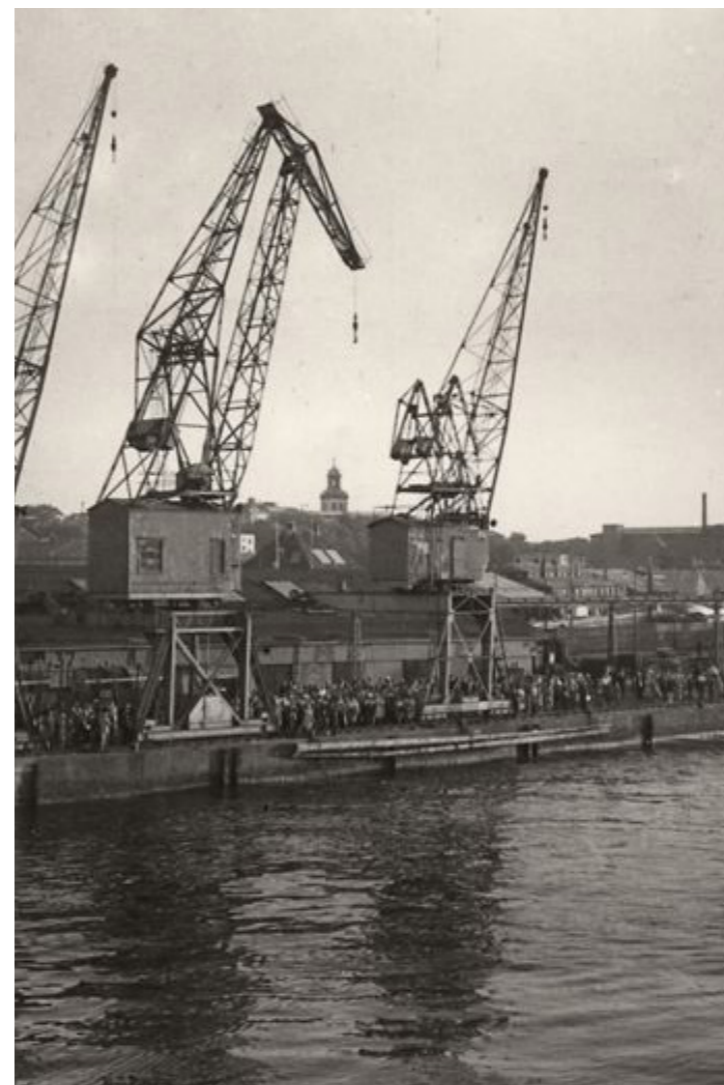
Between the river and the vibrant district of Majorna lies this central piece of coastal strip. Today a big part of the land is used for ferry terminals occupied by Stena Line, a Swedish shipping company, with departures to Germany and Denmark. In the middle of the site lies the fishing port of Gothenburg which has been in the same location for over 100 years and can be seen as a cultural institution in the city. The area borders Klippan, a cultural reserve with industrial brick buildings from the 1800s. Before the Stena Line established its ferry terminals here, various shipbuilding companies have operated here since the early 1600s. In 2023 Stena Line signed a deal to move its terminal out of the city center to Arendal, a big industrial harbour located at Hisingen a few kilometers away. The aim is to have the business up and running in 2028.



Circa 1920
View from the river - Masthuggskyrkan seen in the background.



1925
The fishing port - the harbor is full of life with boats coming and going.



Late 1940s
Shipyard industries - workers standing along the shore.



1951
The fishing port - Before Oscarsleden was built, a railway ment for goods went into the site.

OSCARSLEDEN

The name "Oscarsleden" originates from its predecessor "Oscarsgatan". The idea of building a four-lane city highway along the coastline was first initiated in the 1950s when car usage escalated significantly. The streets in the city had begun to get crowded with motorized vehicles driving in and out of the central city with new districts starting to be built during the 1950s, and the space for cars was simply not enough. By planning for a new highway leading west the streets in Majorna would be relieved. There was also a need of a new connection from the city to Älvsborgsbron that stood finished in the 1960s, and the different industries on Hisingen needed a better connection to the city center. The highway was finished in 1974 and was dimensioned for 70 000 vehicles a day. A lot of older buildings were demolished because of the construction of the highway, resulting in protests from associations and private individuals.

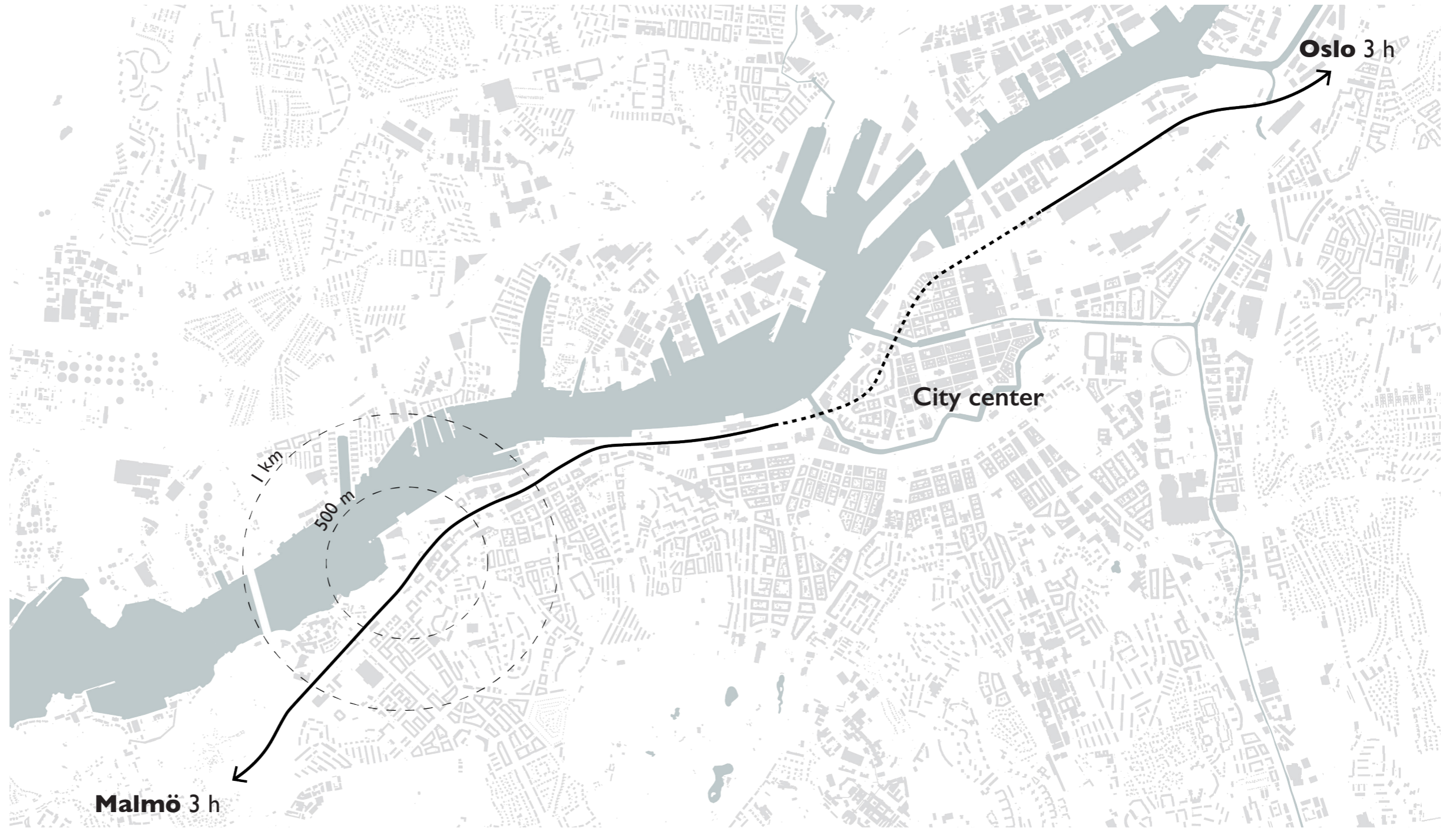
For car users today, the road is a great asset! It is an accessible route going west out of the central city or if you want to access the European road E45 leading north. For people living in proximity to the road or for those who want to cross in

easily without a car, it is not as great. The crossings are few and are separated by level. The amount of traffic in combination with the speed limit 70 km/h pollutes the surrounding area with noise over the recommended level. The ferry terminals generate a lot of heavy traffic today which is important to consider when they are moving in a couple of years. A relocation of the terminals will result in 250 000 fewer trucks on the road each year.

Year	Cars per day	To city center (cars/h)	From city center (cars/h)
2020	45 700	2 310	1 910
2010	52 800	2 340	2 640
2000	45 700	2 340	2 640
1990	42 100	2 000	2 260
1980	35 00	-	-

Statistics that shows the amount of traffic on the road the last 40 years. Source: Göteborgs Stad





In a broader context, the road functions as a thoroughfare for west-east traffic into and through the city. The dashed line indicates where the highway goes through a tunnel.

Pollutions



It is not unfamiliar that busy roads bring a lot of noise to its surrounding. Studies shows that noise pollution does not only have disturbing effects on our everyday life, it also has a serious effect on your health. According to the World Health Organization, noise is the most important environmental problem for human health after the quality of atmospheric air. When you are exposed to noise levels of 40 dBA or more on an average daily basis, there may be negative health effects such as sleep disturbances. If the noise is even higher, over 55

dBA, the effects are even higher where blood pressure rises, the risk of cardiovascular diseases increases and mental disorder occurs (Magdin etc. 2019: 813). In Sweden, about 2 million people are exposed to noise pollution rising over 55 dBA. If the speed limit is over 50 km/h, the tires are the biggest contributor to creating noise (KTH et al 2022: 31). Today, Oscarsleden has a speed limit of 70 km/h. As you can see on the map, the surrounding area around the road is reaching over 75 dBA making it harmful for people living and are moving in the area.

Accidents

Två bussar och två personbilar i olycka

GÖTEBORG Publicerad 19 dec 2018 kl 18.47, uppdaterad 17 jun 2021 kl 18.39

Två bussar och två personbilar har varit inblandade i en trafikolycka på Oscarsleden i Göteborg, enligt larmet.

Sju enheter från räddningstjänsten larmades till platsen. Enligt GT:s fotograf på plats var det långa köer på platsen i inledningsskedet.

Nyheter / Trafik

Olycka med flera fordon – motorcyklist till sjukhus



Adam Westin

Publicerad 2017-10-14

+ Följ

Mejla

Dela

Spara

En trafikolycka har inträffat på Oscarsleden i sydvästra Göteborg. – Det är tre bilar och en motorcykel inblandade i en trafikolycka, men jag vet ingenting om skadeläget, säger Hans-Olof Allgulvin vid räddningstjänsten. En person har förts till sjukhus, skadeläget är oklart.

Olycka vid Oscarsleden

Göteborg • En olycka vid Kusttorgsmotet på Oscarsleden ledde till att vägen var avstängd på tisdagseftermiddag: **Olycka på Oscarsleden**

UPPDATERAD 30 OKTOBER 2012 PUBLICERAD 8 AUGUSTI 2011

Flera lastbilar och personbilar var inblandade i en kollision på Oscarsleden i Göteborg på måndagen.

Olyckan inträffade i höjd med Stenas Danmarksterminal. En person har förts till Sahlgrenska med skullskador, i övrigt ska ingen ha skadats allvarligt.

Olyckan ledde vid lunchtid till stora störningar i trafiken och förseningar i kollektivtrafiken.

Even though the road is designed to be safe with level differences and wide dimensions, injuries on the road is nothing unusual. Studies shows that the speed of the accident situation is decisive for the consequences of the accident.

High speed gives great kinetic energy and increased risk of fatal or serious personal injuries, and therefore safe speed must always be the guiding light when we plan and build new things (TRAST 2015).

OSCARsledEN: improve connections, bury or transform?

The solution of **keeping the highway but improving connections across it** is of course an option, and it would probably increase the interconnectivity to the shoreline if the reasons to go there are strong enough. But, keeping the highway as it is will both encourage people to use the car and it will probably even increase motorized traffic, resulting in even more pollution, accidents and promotion of urban sprawl. This will also affect how the space around the highway is used since the noise and safety distance still would need to be considered, resulting in a lot of central space still being vacant for safety reasons.

Burying the road is another option. This would completely change the conditions for how the area above could be planned since there is no need to consider the heavy traffic passing through. Interconnectivity would increase and space would be vacant for new buildings and public spaces. But burying the traffic would also mean that we “dig away” the problem. Private cars would still be a dominant element in the city, going from the suburbs, down in a tunnel and then up again into the city centre. Looking at it from an economic standpoint, building

tunnels is extremely expensive. Taking other examples from Gothenburg, Marieholmstunneln a 500 m long tunnel that was finished in 2020 had a cost of 3,5 billion SEK. Götatunneln 1,3 km long and connecting to Oscarsleden was finished in 2006 and also had a cost of 3,5 billion SEK (GP 2023). The fact that most of the soil next to the river is clay also makes it a very complicated and slow process to build.

The third option is integrating the road and transforming it into a street. This would mean that the traffic still runs along the same road, but interventions against the heavy traffic and its pollution are made, such as taking away lanes for personal vehicles and decreasing the speed limit. This would create an interconnected and accessible area as the crossings would be at the same level as the street. It will be a big statement from the city, putting a clear stand against increased car traffic taking up central space and releasing harmful emissions. The total amount of cars in the city center will probably decrease as well since fewer people are going to choose their private car to go into the city center. It is also a much cheaper option if it is compared to digging it down in a tunnel.

The surrounding space that will be freed up can be sold by the city which will pay much of the project. In other words, the project will be very cost-effective. This model is used in the transformation of Dag Hammarskjöldsleden. According to the city planning office, the development project will turn a profit (GP 2023c). It is though important to consider the fact that traffic might increase in other parts of the city when a major traffic route reducing its accessibility for car traffic.

According to Leocrart though, (2018: 57) transforming major highways does not create traffic chaos. The traffic gets distributed more evenly on a larger number of streets. When road capacity and speed decreased, some drivers opt to alter their routes, travel times, and frequency of trips, while others switch to alternative modes of transportation. When things change, some drivers decide to go somewhere else or skip trips that aren't so important (ibid.). What is vital to consider though is the importance of other stakeholders in a project like this. For a car user to change its behaviour it needs to be sustainable options to choose between, such as accessible public transport and attractive bicycle lanes.

What does the city want?

The political discussion on what to do with the road has been a hot topic for quite some time, and the opinion change now and then, depending on which political party that have the majority. Multiple debate articles have been published in the last few years. A statement from the city planning board made in 2024 sounded like this (TU 2024):

“In the longer term, the Oscarsleden is assessed as a more integrated street at ground level with more level crossings as positive from the social dimension based on the fact that the barrier effect of the Oscarsleden can be reduced.”

Oscarsleden skär i dag av västra innerstaden från vattnet. Bild: Patrick Sörqvist

Gräv ned Oscarsleden

Ledarkrönika • Att utveckla Södra älvstranden i de banor kommunalrådet Johannes Hulter (S) är inne på är rätt tänkt. Men frågan är om man inte måste eliminera genomfartstrafiken på Oscarsleden.

Det här är en äsktstext från GP Ledare. L Boulevard-ombyggnader innebär att alla bilvägar i Göteborg får tryggare och vackrare gator samtidigt som det skapas fler bostäder. Skriver Ola Nylander

Two of many debate articles the last couple of years.
Source: GP

”Göteborg behöver ännu fler boulevarder”

Kultur • Breda och överdimensionerade trafikleder ska förvandlas till boulevarder och ge plats åt både bostäder och grönska i Göteborg. GP:s arkitekturskribent Ola Nylander tycker att trafikkontoret ska inspireras av stadens vackraste gata, Nya Allén.

SITE VISIT

Even though I am from Gothenburg and have visited Majorna many times, I have never really been on the site itself. It is not so strange though since it's mostly parking, staging areas for trucks and fences. The site visit took place on Friday the 1st of march. I started my journey at Järntorget, then walked along the edge of the site towards Majorna, with some detours into the district. Then I tried to walk along the shoreline back, but I had to do a lot of U-turns since a lot of the site is fenced of due to the ferry terminals. The weather was mild (around + 10 degrees celcius) and there was no wind (for once).



Underpass.
Hugh traffic interface

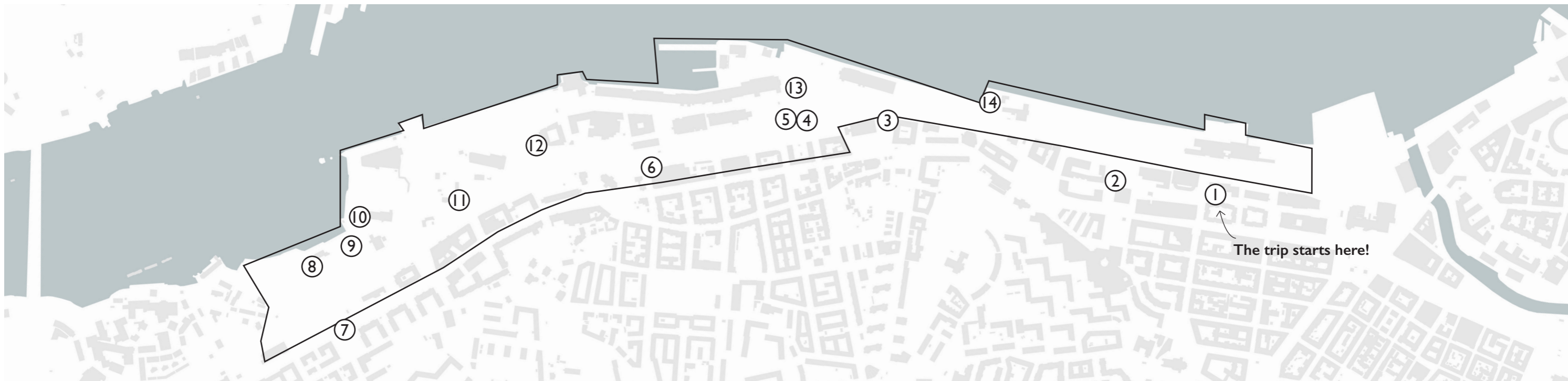
Overpass.
6 m height diffence

Big complex overpass

Undergoing
development

Pedestrian/bicycle
tunnel

- | | | | | |
|--|---|---|---|--|
| Residences | Terminal | Parking house | Culture | Commerce |
| Offices | Gas station | Church | Industry & logistics | Park |



After the site visit. It was quite clear that the site could be split into three different areas based on functions and character:

West:

Besides the ferry terminal being a main target point in the area, the area mostly contains of parking spaces and vast areas of asphalt used as staging areas for trucks waiting to board one of the ferries. The entry to the area from the south is through Jaegerdorffsmotet, a huge traffic-separated crossing surrounded by parking spaces, driveways and exits. The public transport ferry "älvsnabben" also has one of the stops here, with a departure frequency of approximately every 30 minutes.

Middle:

Most of this area is occupied by the fishing industry with the fishing auction being the biggest operation. From the city's side, this is an important institution in the city and should be kept in the same place, as this also could work as a generator for the area by opening to the public by integrating the fishing activities with other mixed-use functions. The area is the "densest" area with different fish-related businesses and other functions, such as offices.

East:

This is the narrowest area along the south shore, characterized by asphalt and spaces for cars queuing onto the ferries. It is also the part that is closest to the city centre. It is currently surrounded by the development project Masthuggskajen with a peninsula being built to the east.



Area of investigation

Since it is quite a big area, I decided to narrow the area where the intervention is done to investigate how a design proposal could look. I decided to work with the area located to the west. However, the approach of the design is still to propose a comprehensive strategy for the site as a whole which will be shown in the following chapter "Design".



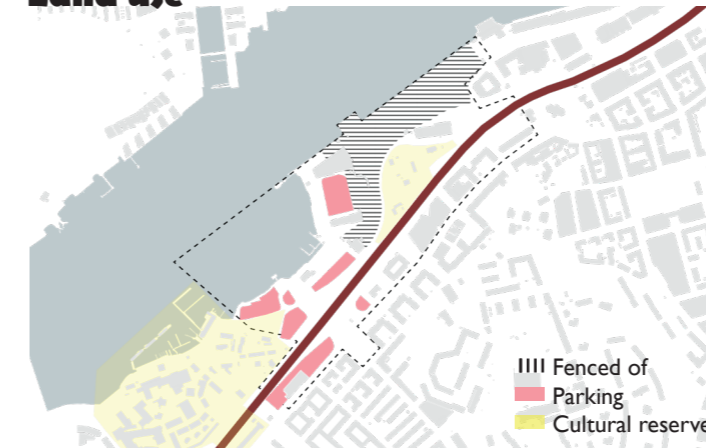


Mobility



There is one road going through the site. The tram is running parallel with Oscarsleden. There are three entries to the site. A public transport ferry stop is located close to Jaegerdorffsplatsen.

Land use



A big part of the site is occupied by parking and fenced areas due to the ferry terminals. The site borders to Klippan, a cultural reserve with old industrial buildings from the early 1900s. The site also contains a cultral protected area with older buildings from as early as the 1700s.

Green & blue



A majority of the site is grey with hard surfaces. A small park is located to the west. The area around Jaegerdorffsplatsen serving as a low point meaning a lot of water end up gathering here before running of into the river.

Strengths



Weaknesses



Opportunities

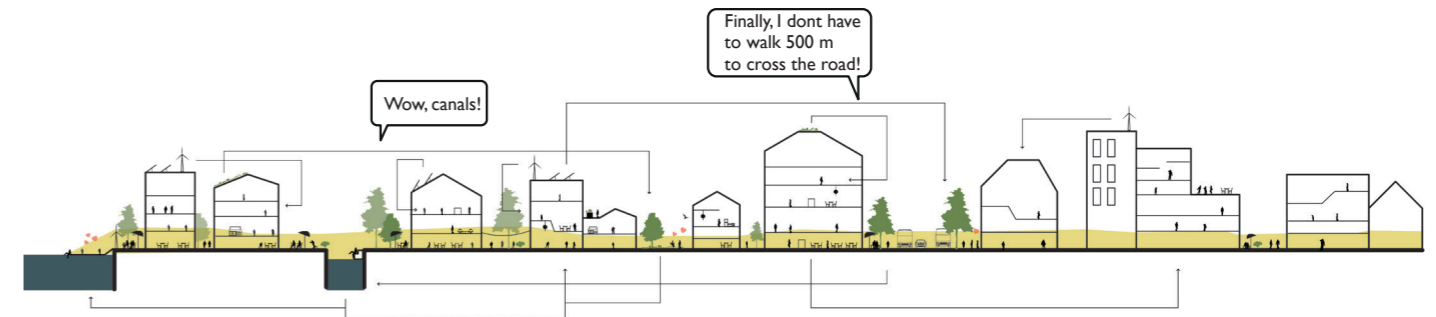
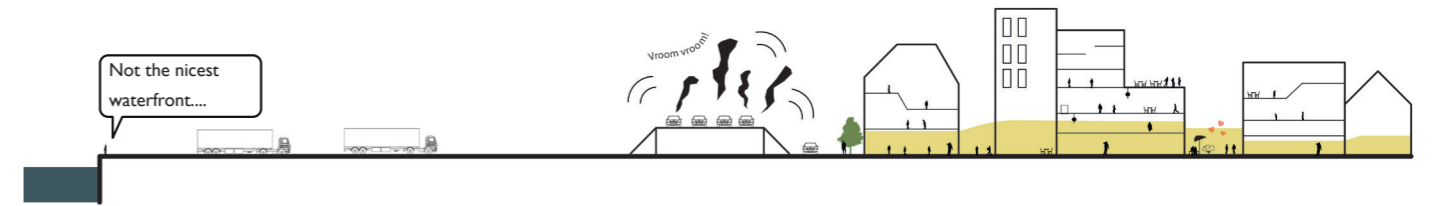


Threats

06 DESIGN

VISION

Oscarsleden transforms from a bustling four-lane highway to an integrated thoroughfare seamlessly woven into its surroundings. What was once the overlooked shoreline of the central city is revitalized into a lush, interconnected green space, fostering a resilient way of life. This revitalisation draws inspiration from the city's rich history and identity, rooted in its cultural heritage and innovative spirit, closely tied to the sea. As Oscarsleden evolves, the waterfront could reclaim its rightful place as a communal space, bridging Majorna to the water and extending this sense of connectivity to the entire city.



GOALS

Respect



The local history of the site is respected and the surrounding scale and structure that is characteristic of Majorna are taken in consideration.

Relink



The site is relinked with its surroundings and turned into a vibrant and integrated part of Gothenburg's urban fabric.

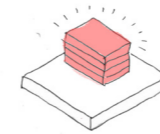
Regenerate



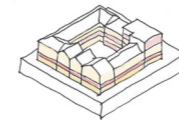
The design aims not only to reduce its negative environmental impact but actively seeks to restore it while at the same time serving the wider community.

URBAN DESIGN PRINCIPLES

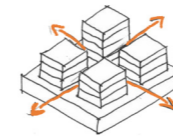
BREAK BARRIERS



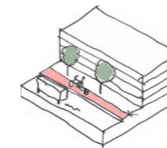
Establish generators



Mixed use

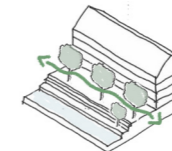


High connectivity in street network

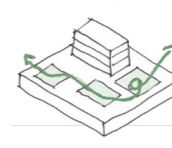


Prioritize active mobility & public transport

INVITE THE LANDSCAPE

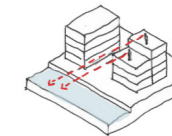


A continuous green waterfront

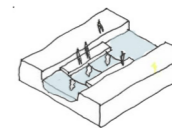


A network of green

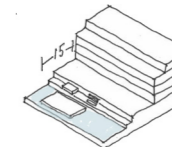
EXPERIENCE THE WATER



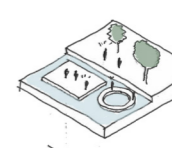
Sightlines towards the river



Aquaculture

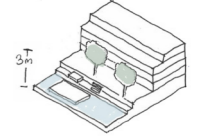


An accessible waterfront

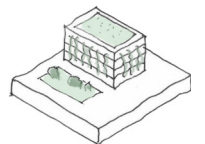


Variation of water based leisure activities

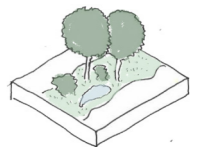
MITIGATE FLOODING



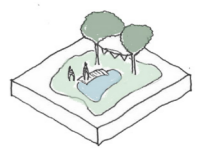
Coastal protection



Green roofs & facades



Integrated bioswales



Multifunctional floodable spaces

OSCAR\$LEDEN: From a static barrier to a dynamic street

Oscarsleden is undergoing a transformation from a sprawling highway that dominates central space and pollutes the surrounding environment with noise and emissions to an integrated street prioritizing green principles and sustainable modes of transportation. Recognizing its significance as a vital thoroughfare for logistics and commuter traffic, it's essential to strike a balance between functionality and environmental considerations.

Taking a pragmatic approach to the design, I have opted to maintain vehicular access while reallocating space to prioritize active mobility options. This entails reducing car lanes to encourage alternative modes of transportation such as walking and cycling. By promoting a shift in travel behaviour, the aim is to lay the groundwork for potential future conversions of car lanes into dedicated bicycle lanes, further enhancing the street's sustainability and livability.

ABOLISH LEVEL DIFFERENCES



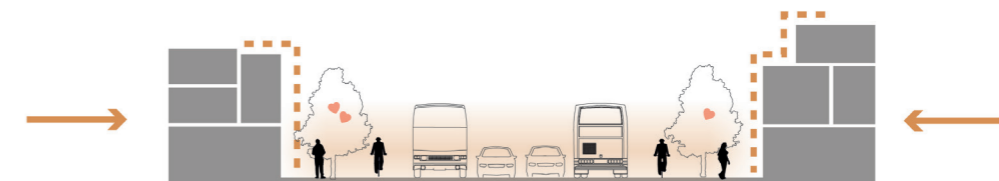
PRIORITIZE ACTIVE MOBILITY & PUBLIC TRANSPORT



INVITE THE LANDSCAPE

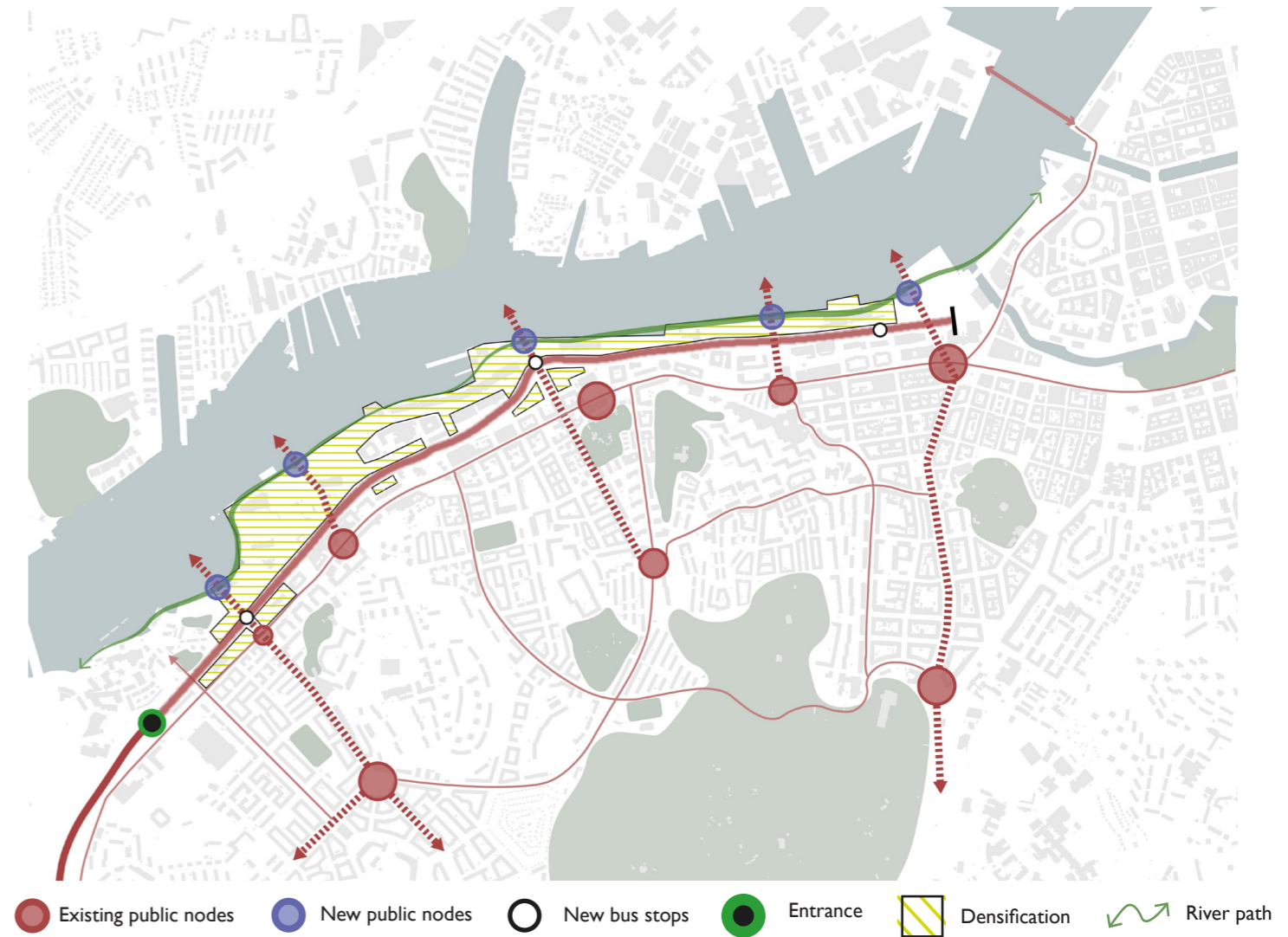


FRAME THE STREET



URBAN RECONNECTION STRATEGY

- Transform Oscarsleden into an integrated street and connect it to its surroundings
- Prolong existing streets into the site
- Create new public spaces in relation to existing nodes and axes
- Density with new mixed use along the shoreline and Oscarsgatan



MASTERPLAN

The masterplan illustrating the complete transformation of the area, including the activated shoreline, strategically placed green spaces, new building developments, and the transformation of the highway.

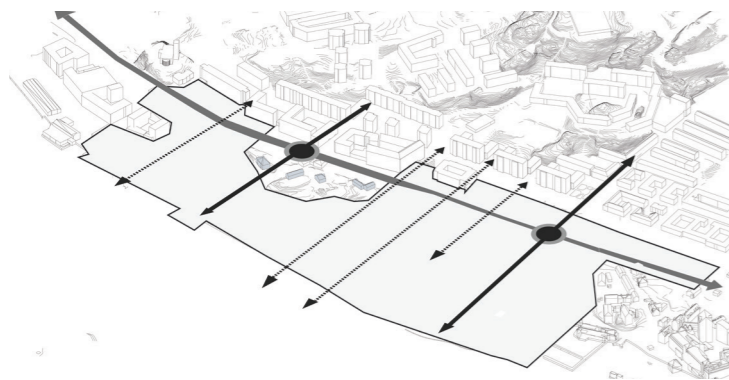
No. of dwellings **2 300**

Office floor area **82 000 m²**

Parking units in mobility hubs **970**

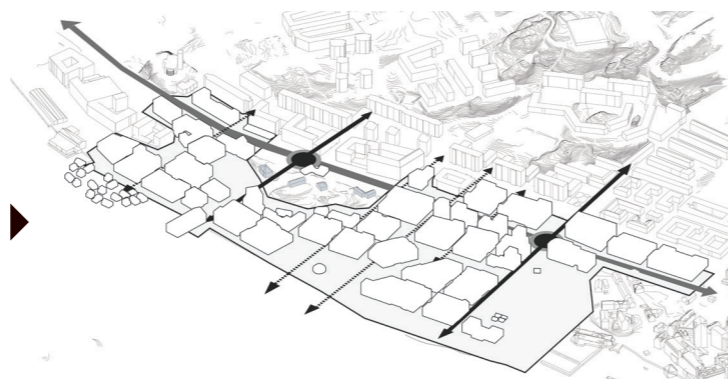


- 1. LIBRARY**
- 2. WINTER GARDEN**
- 3. MARITIME MUSEUM**
- 4. AQUATIC CENTER**
- 5. CLIMATE CENTER**
- 6. CULTURAL CENTER**



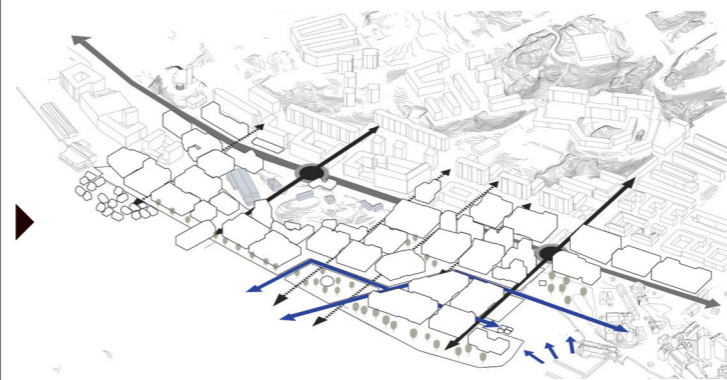
Relate to existing structures

Two main axes are identified along with others and prolonged into the site that gives a base for where to locate building blocks.



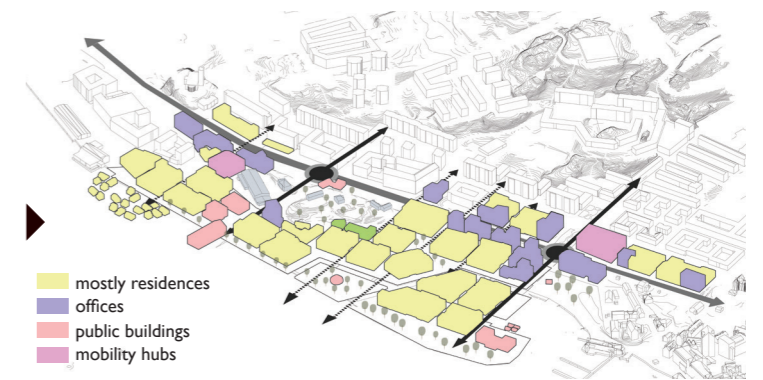
Create blocks

By using the structure as a guidance, blocks are created.



Relate to existing shoreline

The built structure extends into the river while preserving the existing shoreline through the creation of canals. This approach respects the original structure while introducing diverse waterfront experiences.

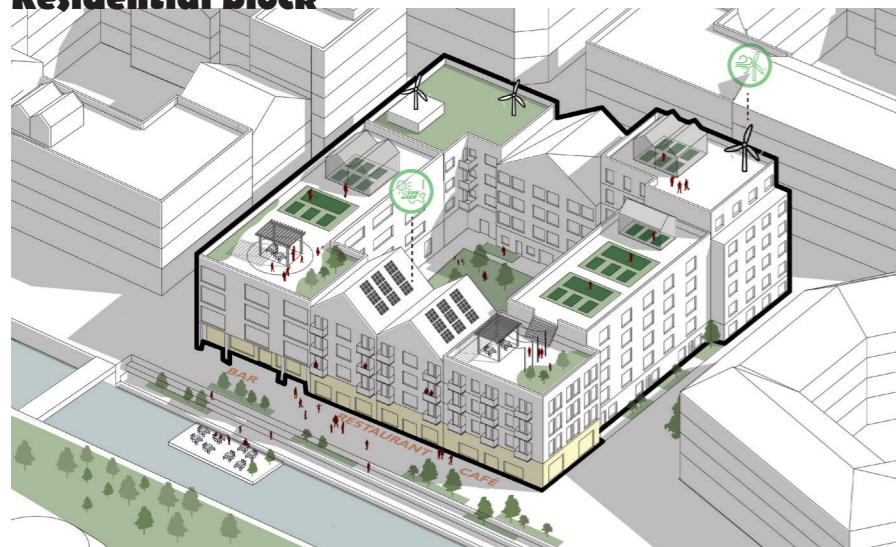


Functional base

Offices are mainly located closer to Oscarsgatan while there are more residences inside the area. Public buildings are located closer to the two main axes.

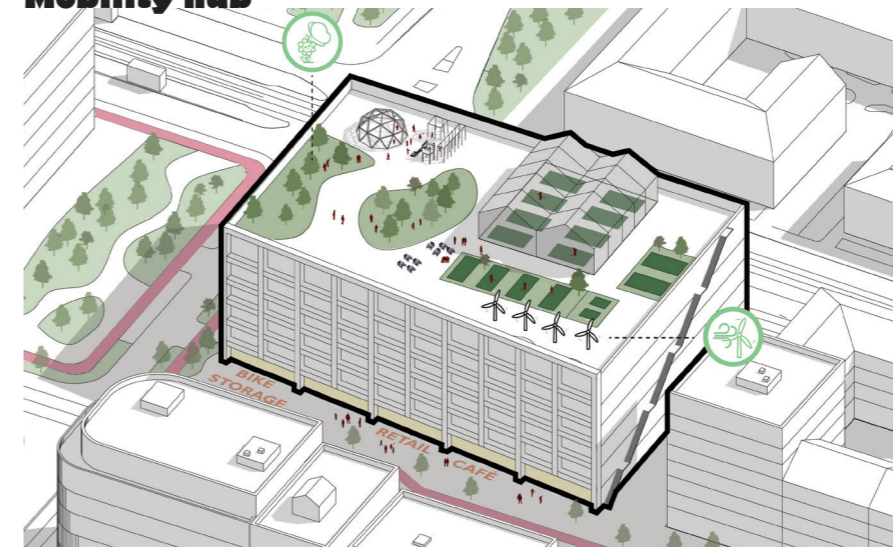


Residential block



The majority of the blocks are enclosed with a dimension that does not exceed 50 x 60 m. This is to promote a more walkable area and respect the existing urban structure of the surrounding context. The rooftops are activated to maximise the advantage of the sun and wind and to give quality to the residents.

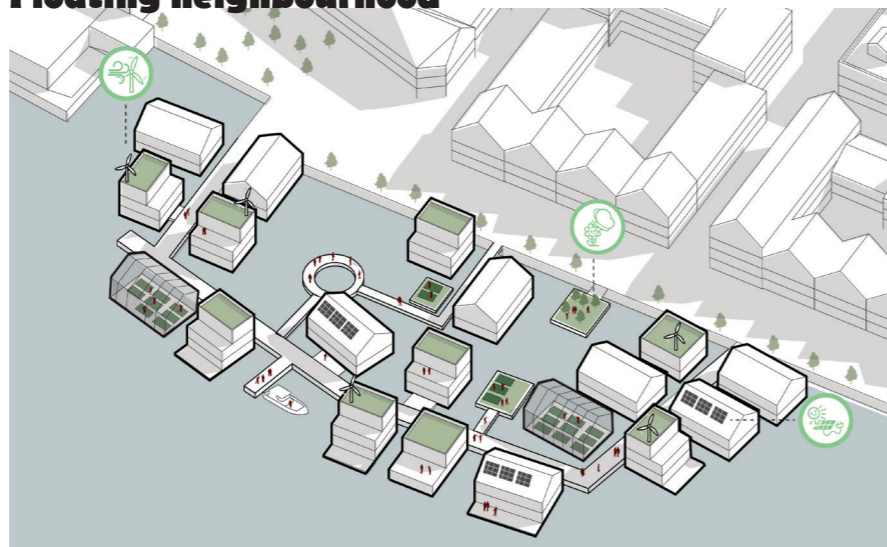
Mobility hub



In addition to serving as a parking space, the building's rooftop is ingeniously transformed into a public space featuring urban farming and green areas. Meanwhile, the ground floor hosts various amenities, including cafes and a bike repair shop.

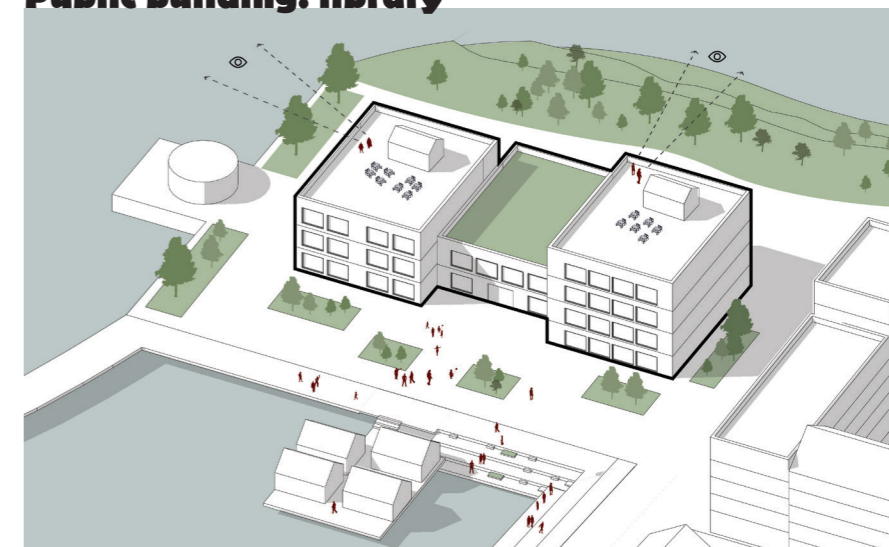
The design delves into the concept of extending neighborhoods onto the water, pioneering new avenues for sustainable living.

Floating neighbourhood



One of the prominent public buildings in the area is a newly constructed library. Positioned at the farthest edge of the new island, it offers a sweeping view of the river and a panoramic outlook towards the sea.








Public building: library



Mobility



The streetscapes are designed to promote soft mobility firstly with a majority of the streets being shared space. Cars are allowed everywhere, but takes the easiest way through the area where the yellow line are located. Mobility hubs are strategically located next to the car street.

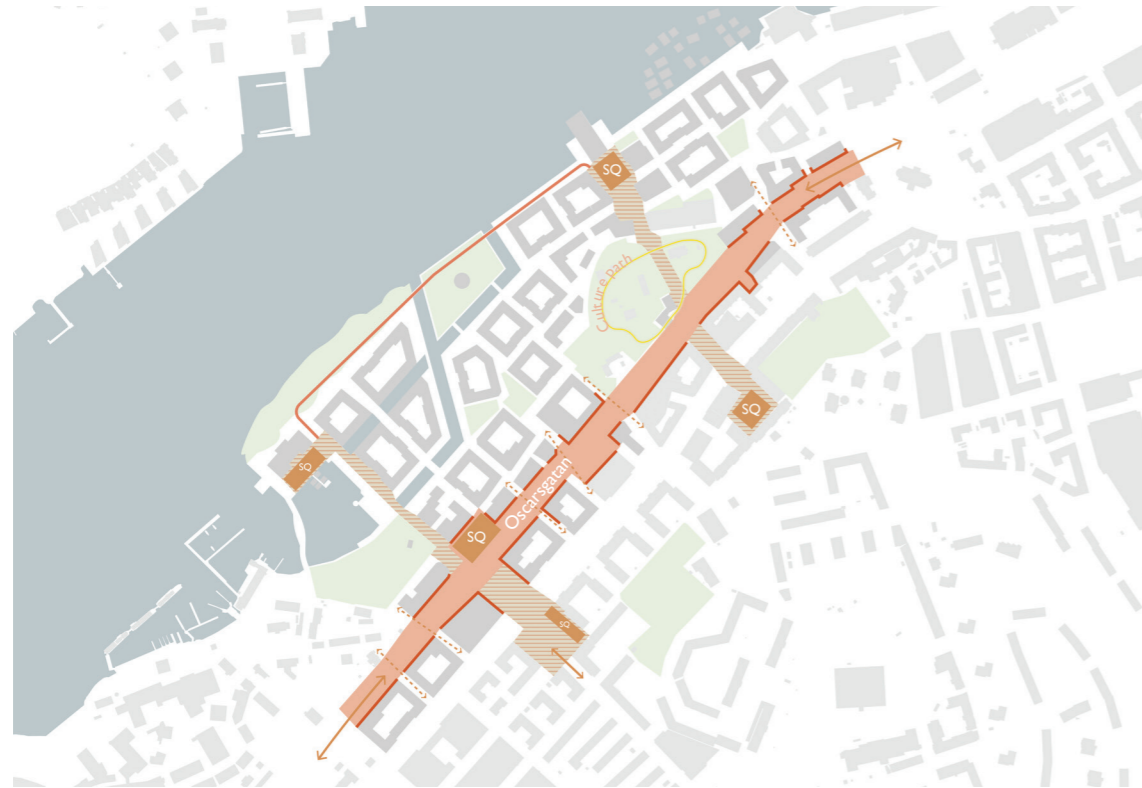
- | | |
|--|---|
|  Car/bike |  Bus street |
|  Traffic separation |  Ferry stop |
|  Shared space |  Bus/tram stop |
|  Pedestrian/bike | |

Green & blue



In implementing the green and blue strategy, it has been crucial to develop a diverse and green shoreline, while also meticulously addressing runoff surfaces. Moreover, integrating a larger number of floodable spaces has been paramount to the approach.

Public Space



Main public spaces are related to existing squares linking them with each other. A culture path are established inbetween the old cultural buildings, making it an accessible park instead for an excluded hill squeezed in between a fenced of area and the highway.

Functions



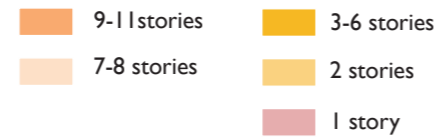
Offices are mainly located around the new square located in proximity to public transport. The entire structure is supported by mixed-use residential.

- | | |
|--------------------|----------------|
| ■ Residences | ■ Mobility hub |
| ■ Offices | ■ School |
| ■ Public buildings | |

Height



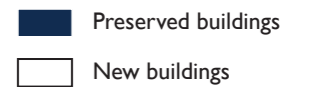
The heights of the proposed buildings respect the local context with an average number of 3 to 6 stories. The highest buildings are located along Oscarsgatan where the dimensions are wider.

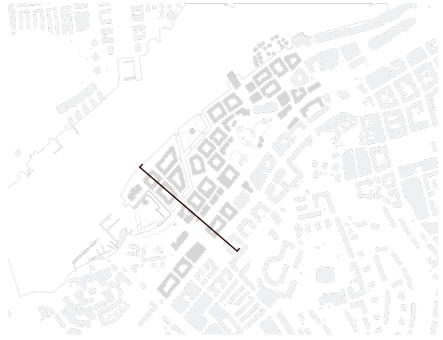


Existing/Proposed structure



Besides respecting the existing cultural buildings, the existing building next to the hill is kept. Today it serves as a mixed-use building for different associations, such as cheap rehearsal spaces for bands. Ideally, these functions are kept when the area is transformed.



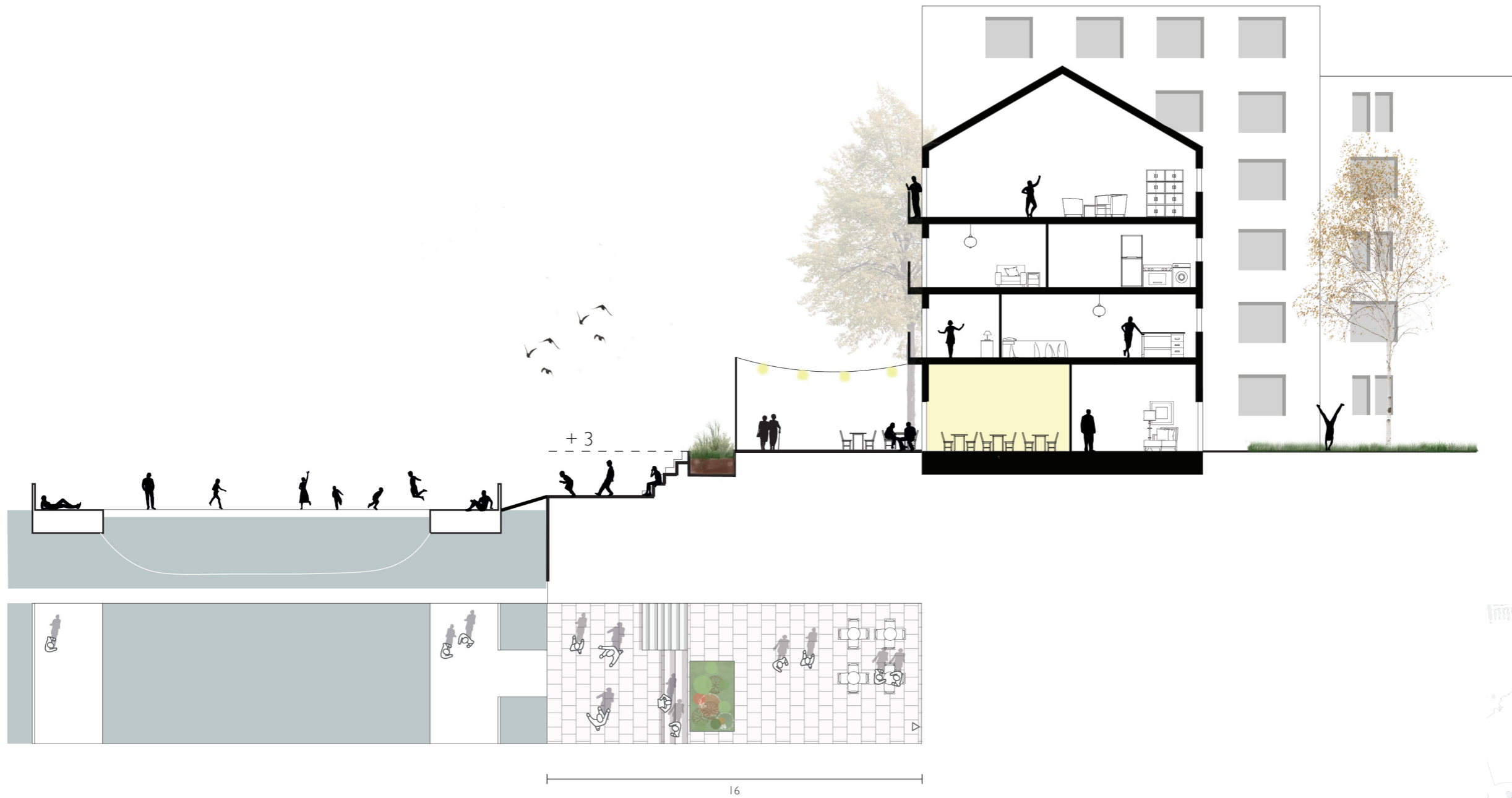


Shared street

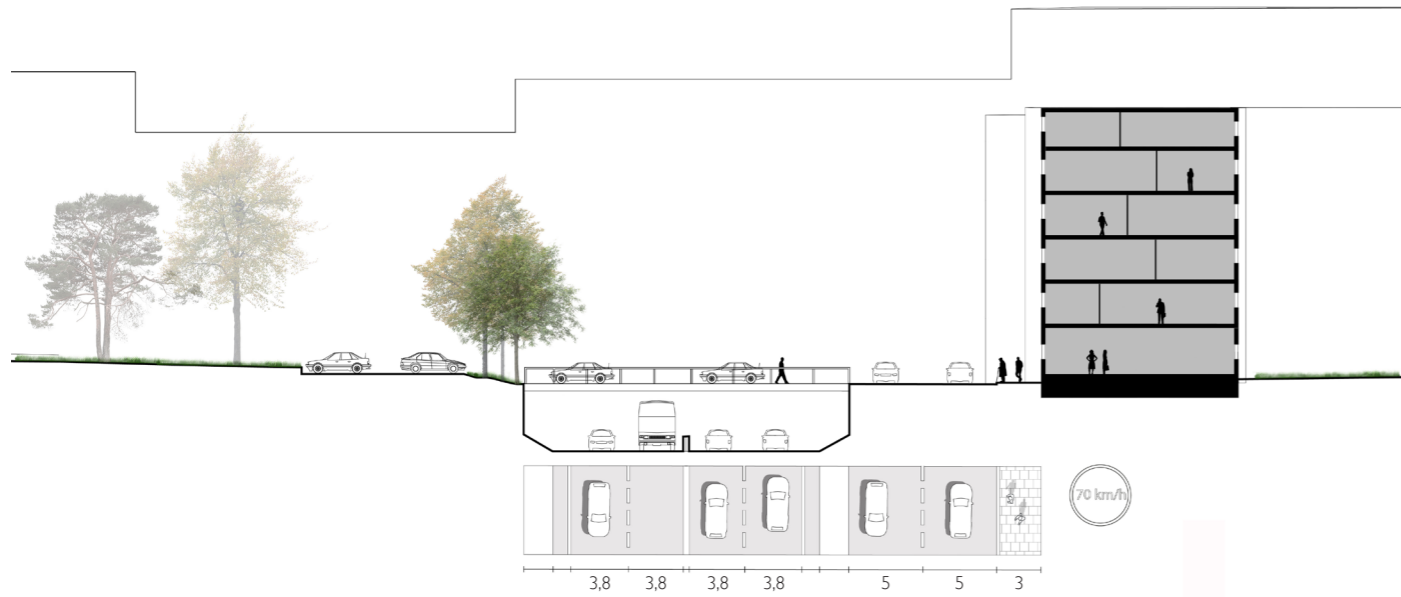


Car street

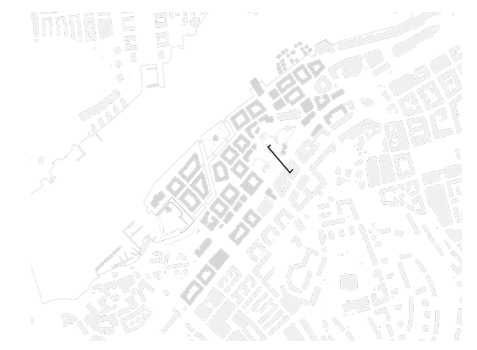




Oscarleden from a separated highway...



... To an integrated street!

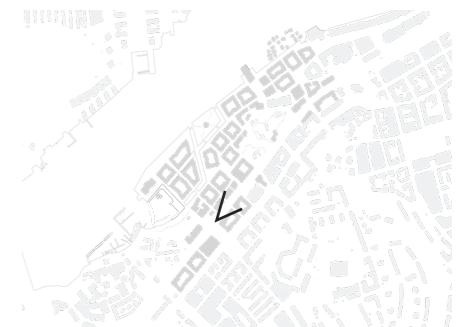




© Google Earth

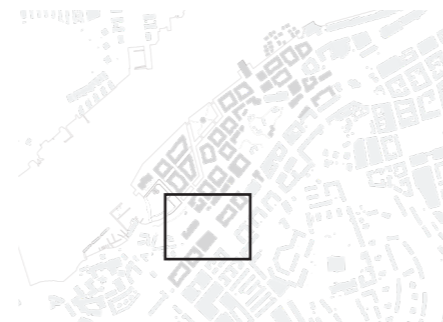


The highway undergoes a complete transformation, prioritizing the integration of green and blue principles, with a focus on generous public space.





© Lantmäteriet



I propose the removal of the overpass and the addition of a bus stop for a new metrobus service. The existing small park in the corner will be expanded into a large park along the river, creating a significant green space that currently does not exist on this side of the river.

An important design choice was to maintain this area as an open green space for several reasons. Firstly, being a low point in the landscape, it naturally collects a substantial amount of surface runoff before the water

flows into the river. Secondly, preserving this openness enhances the sense of space and offers a welcoming view before reaching the sea. Additionally, this location will serve as a new gateway to the city from the west.

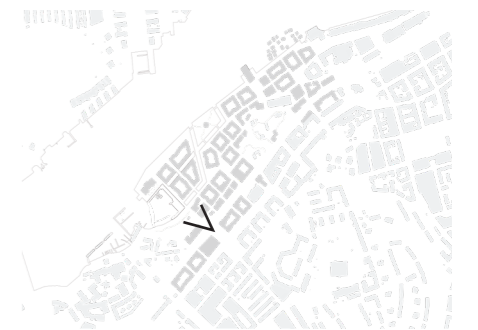
To support this function, a mobility hub will be established where visitors can park their cars and seamlessly switch to bus or tram services for their journey into the city.

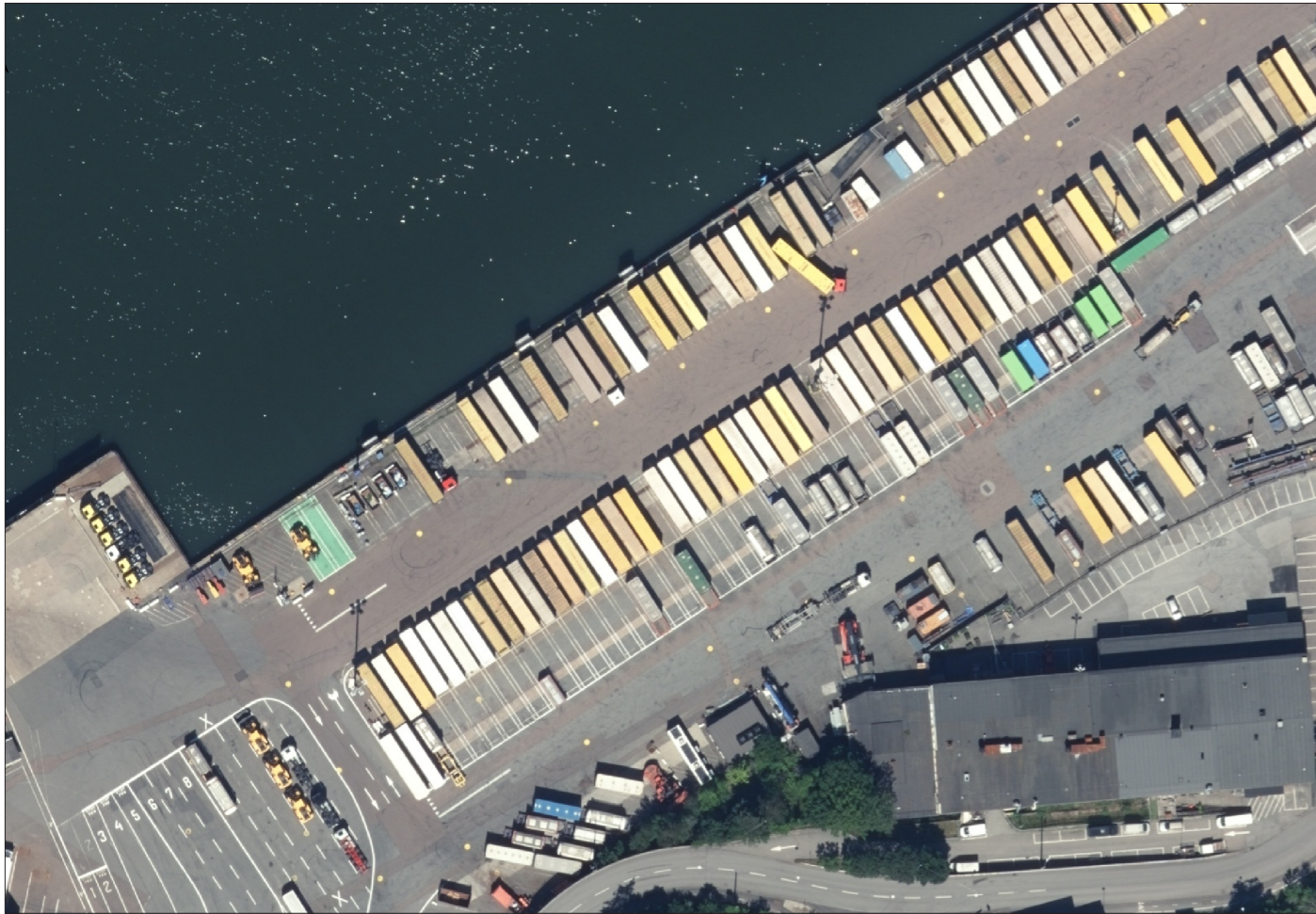


© Google Earth



Visualisation showing how sightlines are considered.

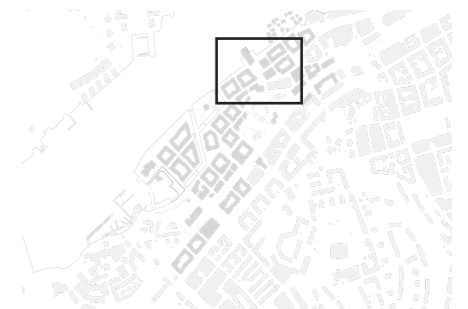




© Lantmäteriet



The today fenced of staging area for trucks are transformed into a vibrant flexible square with a maritime museum located along the shoreline. Saltwater pools and marine allotments are extended into the river. The maritime museum, the marine lab and the aquatic center are closely linked together fostering new innovative ideas for aquaculture.





© Google Earth



Perspective along the new canals with a floodable park in front.



Harvesting power from the local microclimate

Wind power:

In a windy city like Gothenburg, it is foolish not to consider and taking advantage of the strong winds that are present all year around.

Wind energy is fundamentally derived from solar energy, with approximately 2% of solar energy converting into kinetic energy, which manifests as wind on Earth's surface. Wind turbines effectively harness this energy, converting it into electricity without emitting pollutants. Technological advancements have expanded the potential for wind energy, making it viable for commercial ventures, including urban and suburban applications (ICELI).

Today, a wide range of wind turbines are available on the market suitable for urban contexts. These turbines are typically smaller than traditional ones, offering greater flexibility in placement and minimizing energy losses since the energy does not have to travel far (Beller, C 2011: 2). Urban wind turbines could for example be placed on the roofs, along the coastline and on windy streets such as Oscarsgatan that aligns with the usual wind direction coming from southwest.

Solar power:

In addition to harnessing solar power through rooftop installations, it can also be effectively utilized in public spaces such as streets and squares. Solar panels in these areas capture sunlight to generate electricity, which is either directly supplied to the smart grid or stored in local batteries for later use. This renewable energy source can power streetlights and charge electric vehicles, contributing to sustainable urban infrastructure. To enhance citizen engagement, solar panels can be integrated into walkable surfaces, featuring LED lights and glass coverings that allow pedestrians to interact with the technology while being in the area.

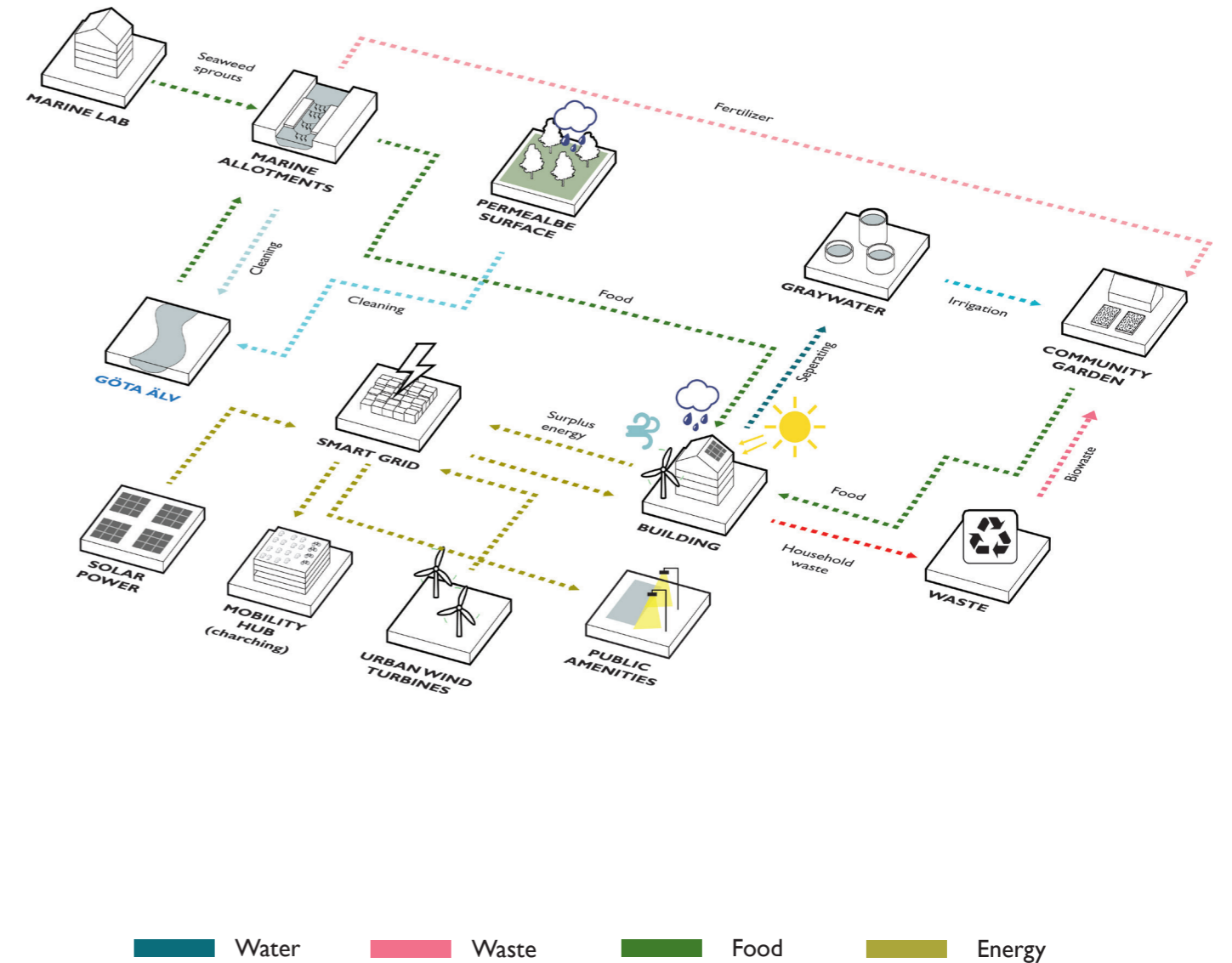
Regenerative scheme

In the early stages of this project, I started to think of how to harness the local resources at hand, while also considering how the design interventions could enrich the surrounding natural environment and enhance the quality of life for residents and workers in the area. Inspired by the literature review on regenerative design, I began to contemplate how the various components in the area can function together as a system, which in the long run regenerates an energy-efficient area with strong cohesion and gives back to the surrounding nature. The system is divided into **waste, water, food, and energy**. The building is the starting point that generates energy in the form of wind and solar power.

Greywater is separated and used for irrigation of the local gardening plots located on rooftops around the area. The organic waste from households and public buildings becomes fertilizer used to grow food and seaweed sprouts used for the marine allotments. An important aspect of the system was to demonstrate how the various components can help to purify the river while also giving back to the residents in the form of community and affordable food. The marine

allotment plots play a crucial role as seaweed is incredibly effective at absorbing carbon dioxide and uses it as nutrients to grow. The seaweed sprouts are placed at a depth where the saltwater wedge is located or in the saltwater pools during the winter months where fresh saltwater is pumped up into the pool. Excess seaweed, mussel, and algae production work well as fertilizer for the gardening plots.

The idea behind the regenerative scheme is not that the area will be self-sufficient. It is more about creating a stronger local community by inviting neighbourhoods to come together, learn, and foster new innovative ideas, while simultaneously giving back to our Earth. Simultaneously, this becomes a unique area that also attracts people from the outside. In the long term, the marine allotments could expand along the coast, implementing strategies where communities along the river have access to marine allotments all over the city, while simultaneously cleaning the river.



07 Reflections

REFLECTIONS

This project explores the potential transformations that occur when industrial activities vacate central urban land and addresses the barriers that typically accompany these changes. Initially, my aim was to work on transforming the entire highway. However, I quickly realized that this would be a tremendous amount of work. Instead, I chose to focus on one area to thoroughly investigate the potential qualities that urban design could bring to this space. Being from Gothenburg has helped me understand the city's urban weaknesses and the vast opportunities that its coastal location presents—questions I've reflected on for a long time growing up here.

After hours of analysis, research, and sketching, I have developed a proposal that I am proud of. By implementing a dense block structure while strategically integrating green and blue spaces on various scales, I hope to create the interconnected public spaces that Gothenburg deserves but currently lacks.

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