



Completing the borders of

Kalmar

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Kalmar

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ABSTRACT

How can small and medium cities absorb the world population growth in urban areas? This master's thesis investigates possibilities for increasing population density and built density in cities, avoiding urban sprawl and population concentration in large metropolises. For this urban design investigation, the city of Kalmar, Sweden was chosen as the project site. The focus on a less populated city aims to look for ways for cities to grow without overloading the urban mobility system, concentration of jobs and extensive urban areas difficult to manage and to be read on a human scale.

The proposal has the following questions as a framework:
How to keep the small scale of the city and turn it into a destination?
How to keep the tradition through history and propose a contemporary district?
How to conciliate the urban spaces with the landscape?

This project proposal shows how underutilized land and remnants of urban development in Kalmar can contribute to the growth of the city without increasing urban travels and urbanized area, as it happens in large cities. In addition, the proposal presents possibilities to reconnect the city with its natural surroundings, the water, views of the sea and the historic center.

INDEX

INTRODUCTION

KALMAR	8
HANSA LEAGUE	9
KVARNHOLMEN - THE NEW CITY CENTER	10
KALMAR UNION	10
INDUSTRY	13
UNIVERSITY	14

ANALYSIS

SOCIOECONOMICS	14
TRANSPORT	18
URBAN MOBILITY	19
PEDESTRIANS	19
CYCLISTS	20
CARS	20
TRAINS	21
BUSSES	22
FERRY	23
PARKING AREAS	24
TRUCKS TO HARBOR	25
DIMENSIONS AND USES	26
GREEN AND BLUE	27
KALMARSUNDSLEDEN	29
TOURISM	31
CITY GROWTH	32

VISION

VIABLE CITIES NETWORK	32
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PROPOSAL

QUESTIONS	38
VISION	40
PROCESS	44
MASTERPLAN	48
DETAIL PLAN 1	54
DETAILPLAN 2	58
SECTION RESIDENTIAL UDDE	64
SECTION ÖLANDSKAJEN	68
KEY PLACES	74
DETAILS	76
PROPOSAL IN NUMBERS	84

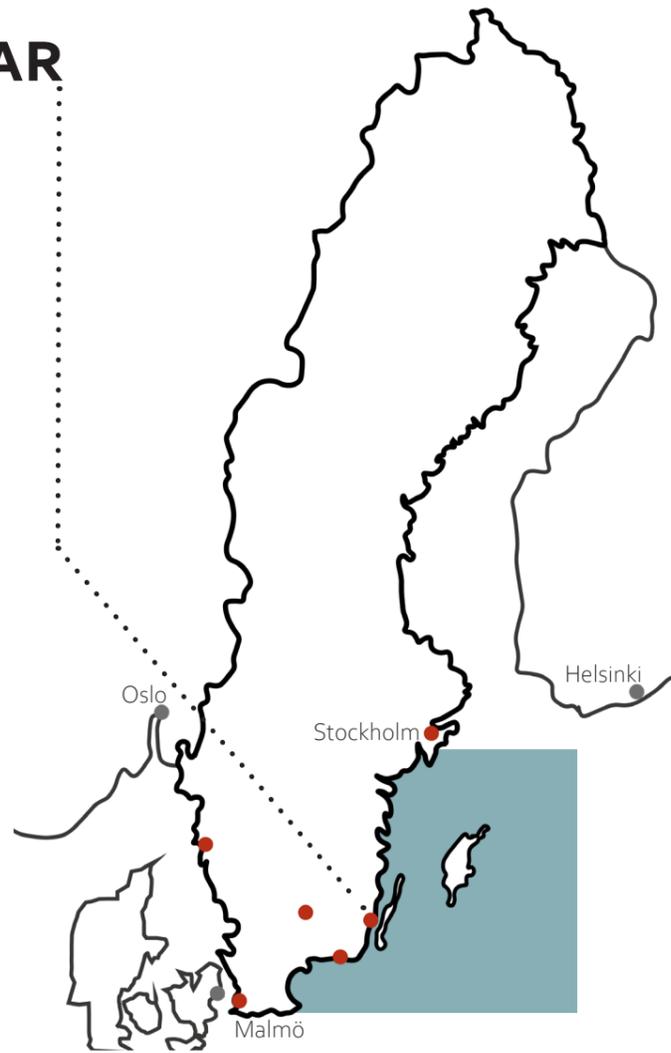
REFERENCES

REFLECTIONS	85
BIBLIOGRAPHY	88



INTRODUCTION

KALMAR



Southeast Sweden, Småland, Kalmar Län, Kalmar Kommun. The city of Kalmar has 41.388 inhabitants (2020). It is the main city of the municipality (kommun) as well as the county (län) of Kalmar, which comprises 12 municipalities with a total population of circa 240.000 inhabitants. Kalmar is the third largest urban area in the cultural region of Småland, after Jönköping and Växjö.

The city is one of the oldest in Sweden and has many connections with the country's history, such as Kalmar union, Gustav Vasa, the Kalmar war, and an important harbor part of the Hanseatic league. Kalmar was at the border between Sweden and Denmark before the Roskilde treat in 1658 and it was one the largest cities in Sweden with around 2.000 residents.

In the following pages I will present some information that helps to understand the formation of Kalmar and the current situation and urban dynamics of central Kalmar. Finally as the main result of this master thesis it is presented a design proposal for the development of a new district right in the city center, in the surroundings of the historical city center of Kalmar, including parts of the city's harbour.

The design proposal aims to redesign the shoreline, highlight sightlines, increase population density, connect the city center with its surroundings and discuss the possibilities of growth in small and medium sized towns.

HANSA LEAGUE

The Hanseatic league was a commercial and defensive cooperation of market towns in central and northern Europe. Growing from a few north German towns in the late 12th century, the League ultimately encompassed nearly 200 settlements across seven modern-day countries.

The cooperation among cities created an articulated trade system, including protection and privileges within the community. The Hanseatic cities shared

knowledge and economic prosperity which led to urban growth, namely in harbor areas. The conflicts in Scandinavia, including political power in Kalmar contributed to the end of the league. However, the impacts of the Hansa had long lasting influences, like the development of the central area of Kalmar with its baroque structure that remains today.



Image 1. The expansion of the Hansa league in the year 1400

KALMAR UNION

Another historical event that gave the city more protagonism than the Hansa, was the agreement to the formation of the Kalmar Union which joined the kingdoms of Denmark, Sweden and Norway from 1397 to 1523. The union was the work of Scandinavian aristocracy wishing to counter the influence of the Hanseatic League.

The Kalmar Union lasted until Sweden became independent in 1523, under King Gustav I Vasa. This fact is mentioned here to highlight the importance of Kalmar along the country's history and reinforce the cultural values of present-day city center in the island of Kvarnholmen. It is important to mention, however, that after the Treaty of Roskilde in 1658, which transferred new land from Denmark to Sweden, Kalmar's importance diminished, until the industry sector was initiated in the 19th century



Image 2. Area of Kalmar union



Kvarnholmen and the city park

city park, which was in 1985 named the most beautiful city park in Sweden. Apart from being directly connected to the castle, the park is not easily accessible from Kvarnholmen, due to busy avenues and the train tracks.

The new, fortified town was planned following current baroque patterns and nowadays there are many pedestrianized streets with shops. The cathedral inaugurated in 1682 is also within the area, as well as the city hall, water tower and harbor. Kvarnholmen is the city district the has the most listed buildings in Sweden.

KVARNHOLMEN - THE NEW CITY CENTER



Image 3. Former city of Kalmar

Kvarnholmen has a cultural history with international value as one of the best-preserved fortified cities from the 17th century in northern Europe. In 1640 it was decided that Kalmar should be moved to the island of Kvarnholmen. Initial thoughts also planned to move the Kalmar castle, however it stayed in its original site. Around 1650 the move started, since then Kvarnholmen is the center of the city.

The Kalmar castle built in the 12th century is next to where the medieval city port used to be. The site of the old harbor is since the 19th century occupied by the

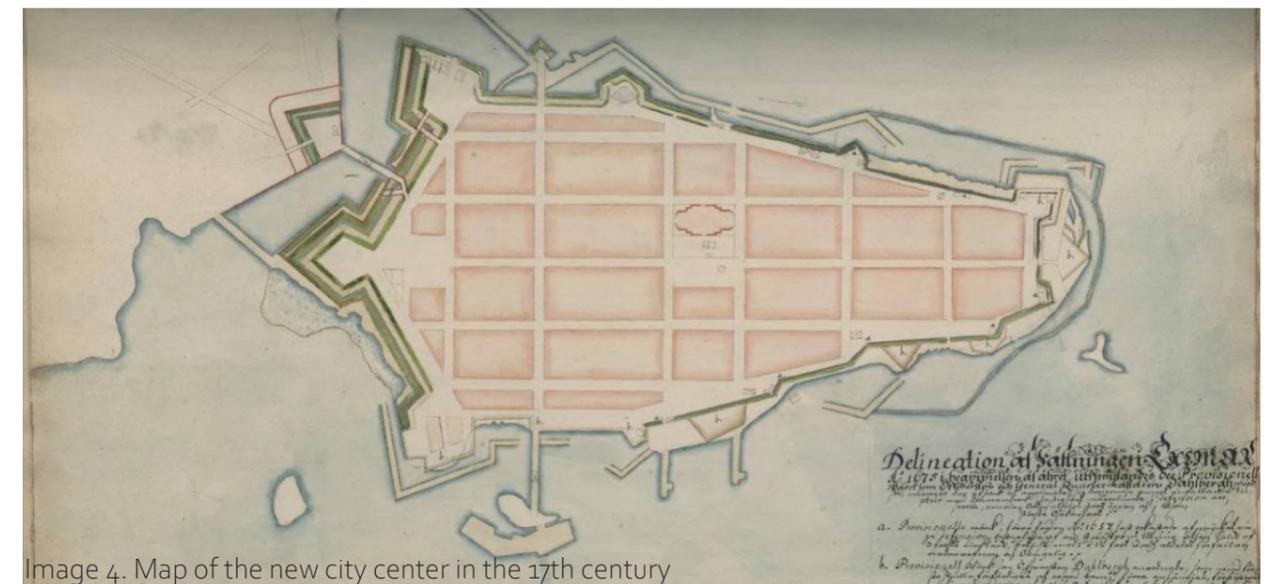
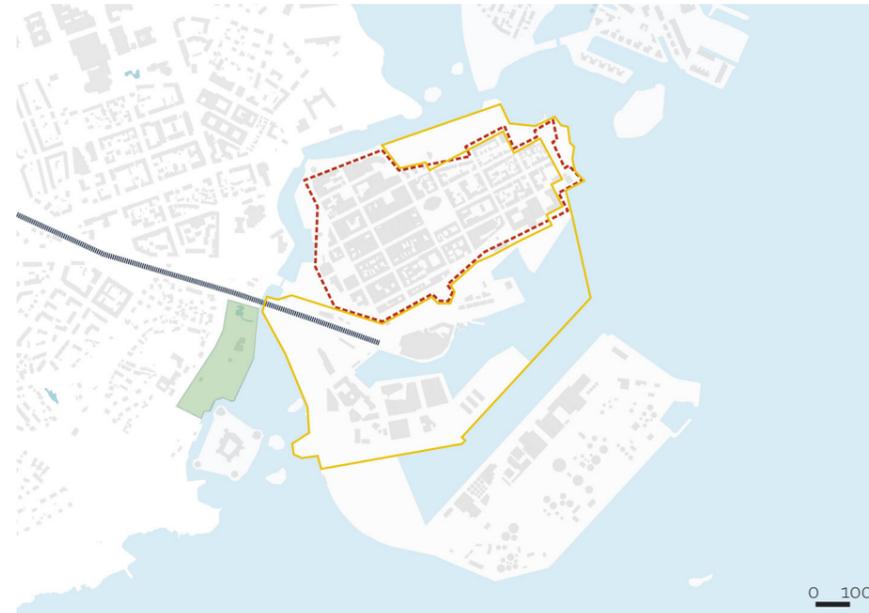


Image 4. Map of the new city center in the 17th century

The area is referred as a site of national interest in cultural environment. The reason is its well-preserved Renaissance city structure with the castle environment and fortification system as well as the shoreline which reflects the city's great strategic importance, for the country's defense, trade, and shipping with the Hansa league, from the Middle Ages until the 17th century. This degree project has the island of Kvarnholmen as its site. The site of analysis and proposal is located around the historical center, outside the border of the original city wall.



Kvarnholmen and the the design site

In 2008, 1.598 resided in Kvarnholmen, 10 years later there were 1.800 residents in the area. It is interesting to point out that the number of children living in the area was below the average the city, however, the number of young adults residing in Kvarnholmen was higher than the average. There are around 960 housing units, which around 850 are apartments and the rest are small single houses. Kvarnholmen is an important meeting place for business and work for around 5000 people from the city and region.



Location of main destinations

INDUSTRY

In the 19th century Kalmar started recovering part of its former importance with the presence of industries. Founded in 1902 Kalmar Verkstad was one of the factories making steam engines, trains and large machinery, it was later bought by the big company Bombardier who decided to closed the factory in Kalmar in 2005. A shipyard, Kalmar Varv, was founded in 1679 and operated until 1981. Volvo had a car factory in Kalmar employing around 2000 people, but the factory was closed in 1994.



Image 5. Margarine factory in 1933, building currently used as a shopping center

The former harbor area closest to the city center was the center of the timber trade in Kalmar during the first half of the 20th century. There, in addition to wooden sheds, there were forge, workshops and warehouses. Another activity that was important to Kalmar was the steam mill, founded in 1847 and closed in 1957, by the end of the 19th was the largest private mill in Scandinavia and the building still has a big presence in the city landscape. No other major businesses have existed next to the design site.



Image 6. Volvo factory produced around 500.000 vehicles during 20 years in Kalmar



Image 7. Harbor area in 1927. Cathedral and water tower in the background

UNIVERSITY

Kalmar has been able to offer higher education since 1977. The university in Kalmar initially offered programmes for journalists. In 1999, the technical school was given university status and in 2010 Växjö University and Kalmar University formed the Linnaeus University. The university has 13,500 students, over 150 degree programs and 1,300 independent courses. Linnaeus University has 2,100 employees, including 300 researchers.

Linnaeus University plays an important regional role. It creates jobs, attracts funds to the region and training for the labor market. In 2020 a new university building was opened in town as part of transformations aimed by the city. The area where the university is now located was in the past the area for timber related activities. Now it has the name Universitetskajen and it is part of the design site of this proposal.



Image 8. Linnaeus University

SOCIOECONOMICS

In Kalmar kommun 42% of the population has high school education and 45% has a higher degree. Both men and women in Kalmar are above the national average regarding higher degree education.

The wage sum per employed person in Kalmar county was SEK 310,000 in 2017, which was one of the lowest in the country, just ahead of the regions of Gotland and

Jämtland. The biggest employers in Kalmar are the kommun itself and Linnaeus university with around 11,000 employees. There are only four companies with more than 300 workers in the region. Most of the companies are small to medium size organizations.



Image 9. Plan of Kalmar in 1906



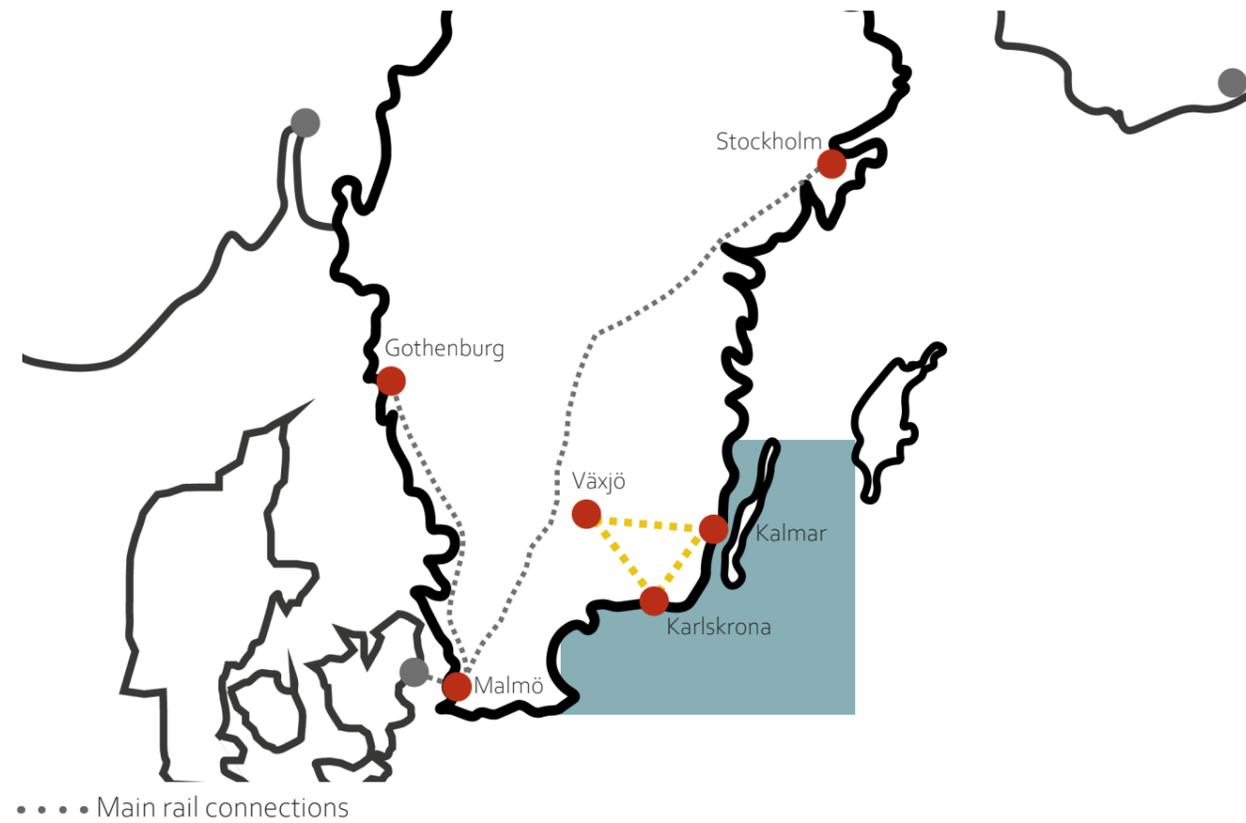
ANALYSIS

TRANSPORT

In the past two decades commuting between cities around Kalmar increased significantly, specially to and from Oskarhamn and Mörbylånga. About 500 people commute between Kalmar and Karlskrona in a balanced exchange. Almost 500 people commute between Växjö and Kalmar, with more people commuting to Växjö.

The geographic proximity of Kalmar to municipalities with strong influence in the regional scale is a strength and opportunity

to Kalmar to better integrate in this network aiming to receive more residents and companies. The target for public transport is a service every 30 minutes with a maximum of 50 minutes travel time to Oskarhamn and one hour to Växjö and Karlskrona without changes. For Kalmar-Växjö, the long-term goal is 45 minutes travel time. According to a local survey carried out by Kalmar municipality in 2019, most of the participants pointed out that the national and regional communications structure need to be improved.



URBAN MOBILITY

Focusing more on the central area of Kalmar, it is possible to identify few streets with structural importance, connecting the center with other parts of the city and the harbor with highways and other parts of the country. The city has Kvarnholmen as its sole center, with the only train station in the

municipality, therefore, the concentration of people, cars, busses, and trucks is high around and within the design site analyzed here.



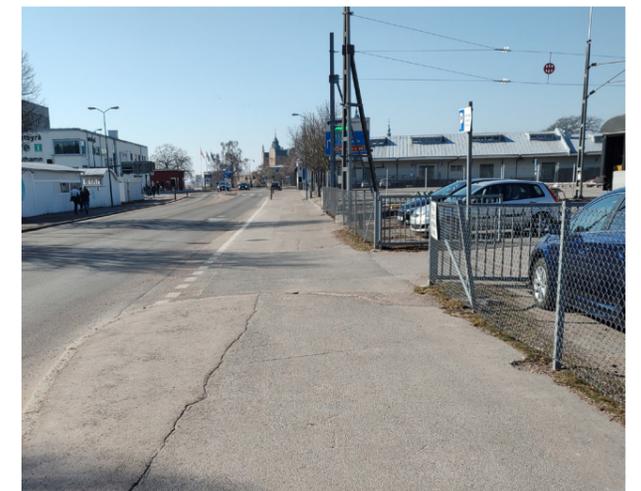
Main flows and transportation hubs

- Design site
- Main squares
- Important streets
- Train track
- Bus terminal
- Train Station
- Ferry terminal

PEDESTRIANS

The sidewalks are mostly shared with bicycles which may lead to some conflicts around busy areas such as the shopping center, the university and train station.

The photo on the right shows just a painted line dividing the area for vehicles and the sidewalk in one of the busiest streets in the city center, next to the train station.



In a radius of 800 meters from the train station all area of Kvarnholmen, the city park and the castle can be reached. The central station is, however, a division or even a barrier between Kalmar's city center and the design site in the southern part of the island of Kvarnholmen. The train tracks are also a barrier between the city park, castle, and the central area of the city, as mentioned before.

The station is locally a barrier but when considering the entire municipality, the train station is a point of connections with different regions and the country. The commuting trains Krösatåg, the regional train Öresundståg and the long-distance trains from SJ travel to and from Kalmar station daily. 12 trains depart from Kalmar to Copenhagen and 4 trains departs to Gothenburg daily. There is no train to Stockholm, showing that Kalmar is more geographically and economically connected to southern Sweden and Denmark, than the regions towards Stockholm.

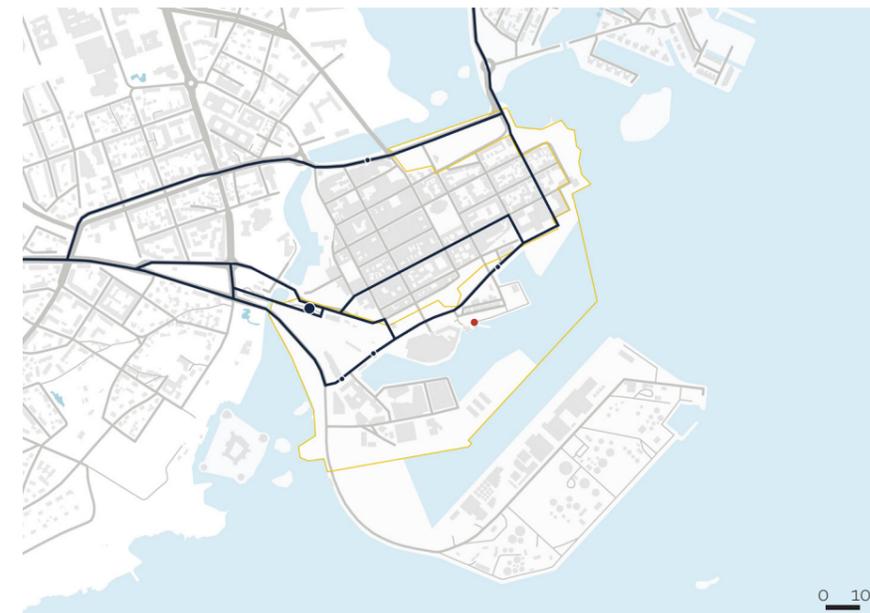


Train station in the background

BUSSES

As aforementioned the station has an important role connecting the city, all busses in Kalmar have a stop at the train station meaning that the surrounding of the station normally has an intense flow of busses, pedestrians, cyclists, and private cars. Within the project site there is only one bus stop at Ölandskajen. Around 150 busses drives in both directions every day. During the peak hour 12 busses with around 100 boarding passengers passes through the bus stop. The train station with the bus terminal area as in many other cities is the central point of mobility in Kalmar. As a transportation node, it needs more space for collective traffic and clearer paths for cyclists and pedestrians.

The local system has both advantages



Streets with traffic of city busses

and disadvantages for bus passengers. The frequency is good and the route with all busses straight through the center of Kvarnholmen provides short walking distances, but at the same time provides long travel times, which makes it difficult to compete with the car and in some shopping streets there are conflicts and disturbance between commuting busses and pedestrians.

The municipality of Kalmar has seen an increase of pendular commuter towards the city center. The number of workplaces tend to grow more than the number of residents,

FERRY

Kalmarsundstrafiken operates a ferry connecting Kalmar to Färjestaden in Öland from May to September. The transport is for pedestrian and cyclists only and it takes 30 minutes to cross the sound with a departure every hour during the day.

The ferry is the only connection for cyclists from the mainland to the island and therefore has an import touristic importance

which may lead to an excess of vehicles in central areas. Having this in mind the city started a preliminary study to determine the need of a BRT (Bus Rapid Transit) connecting neighborhoods away from the city center to the train station. The study is currently under process and might be released in 2023.

to Kalmar and Öland. According to the city it is needed to expand the harbor area and provide longer piers for boats. However, it is necessary to attend the national interests regarding the cultural values of Kalmar and the operation of the ferry for pendular commuters and tourists.

PARKING AREAS

The city of Kalmar plans for further development in south Kvarnholmen, design site of this degree project. The municipality foresees the need for more parking areas, however, in order to optimize the use of space their aim is to build parking houses, called mobility houses.

In Kvarnholmen there are around 2800 parking spots. According to the city there is an excess of parking spaces during the week. The parking areas are normally fully used on Saturdays. The majority who parks the car around the city center during the working days do not live in Kvarnholmen. The majority come from Kalmar, but from 3 km to 5 km out of the city center, maybe with the implementation of the BRT the number of cars would reduce. On Saturdays most of the cars parked belong to residents of Kvarnholmen.



Blocks completely used as parking areas



Areas currently used as parking

- Design site
- Parking areas
- Streets with parking

The national sustainable goals defines that a city as Kalmar should have at least 27% of commutes with collective transport, bike and walk. In Kalmar there are already more than 40% commuting without a car. However, with the expansion of city population and workplaces and more people living outside the city center, that the flow of vehicle in the city will increase, and the ratio of commuters who use private cars will reach 40% by 2035.

One of the consequences aimed by this project proposal is to reduce the traffic flow by densifying areas around the city center which nowadays are mostly used as parking areas.

TRUCKS TO HARBOR

The traffic forecast suggests that the daily average traffic around the Universitetskajen will be 2000-3000 vehicles by 2035. To the west from the selected site is Tjärhovsgatan. This area connects the harbour with the rest of the city. The same traffic forecast expects the area to have an average of 1000-2000 vehicles per day by 2035. 20% of this traffic consists of heavy traffic transporting good to and from the harbor. It is expected that Järnvägsgatan, continuation of Tjärhovsgatan, will continue to be a busy street connecting the harbour to the rest of the city and the region.

Transportation of goods are allowed on the streets in Kvarnholmen, which means frequent transit of big vehicles. Trucks are only prohibited to drive from 11 am to 2 pm.

During the construction of the new university building the city developed a risk analysis relating the transportation of dangerous materials to the harbor and continued presence of people nearby. The results defined that the risk of accidents in transports to the harbor is low within 20 to 30 meters from the street. For this reason, no permanent residence should be built along the street. The connection to the harbor is important to the city economic activity, but the connection of surrounding areas such as the train station and the university should be considered to keep a safe flow of pedestrians, cyclists, and heavy traffic of goods.



Tjärhovsgatan connecting the harbor to the city and disconnecting the city to the water

DIMENSIONS AND USES

The images below show the size of the former walled city of Kalmar and its current population and the comparison using the equivalent area on the design site and in the central area of Lund. The design site has 33 hectares and no resident in its totallity. The city of Lund is also bigger than the compared site.



CENTRAL KALMAR

Area: 31 hectares
Population: 1.800
Pop. density: 58 p/ha.



DESIGN SITE

Area: 31 hectares
Population: 0
Pop. density: 0 p/ha.



CENTRAL LUND

Area: 31 hectares
Population: aprox.1.200
Pop. density: 36 p/ha.



On the island on Kvarnholmen there is a predominance of commercial uses to the west, closer to the train station, and residences to the east. The southern part is dominated by the harbor

GREEN AND BLUE



Existing green areas

The design site on the island Kvarnholmen changed dramatically throughout the years due to expansion of area by landfilling. Areas on the northern side of the island, Barlastholmen, where the university building is located, the train station and the harbor facilities originally consisted in a group of small islands which were connected by landfilling to meet the needs of the port that emerged when the city moved to its current location on the 17th century.

The land expansion happened during the following centuries and the land expansion continues today. Initially the filling masses came, among other things, from dredging of the deep channel in the Kalmar sound and material from the city wall which in large parts was demolished. The city probably had in its beginning the perspective to be built on islands, however, after centuries of land expansion the feeling of a city in an archipelago was reduced.



Original islands which were merged with the main island

Kalmar is one of the 25 regions in Sweden that MSB (Myndigheten för samhällsskydd och beredskap) defines to have a significantly risk of floods because of how the sea level rise influences the built environment. The forecast anticipates a rising of 1.10 meters by the year 2100. Therefore, Kalmar kommun defined that all new buildings should be built 2.80 meter above the current mean sea level. The city also needs to plan protective measures for buildings that are less than 3 meters above the current sea level. The central station, the shopping mall Baronen and Sylvanderparken, areas included on this proposal can be completely flooded until

the year 2100, as well as large parts of the city center in Kvarnholmen and surrounding islands.

Laboratorieholmen is an island dominated by nature that has traces left from the 17th century when it was part of the shipyard's operations. At that time there was a connection between the island and Kattrumpan, located on the most eastern side of Kvarnholmen, which is missing today.

Focusing more on the project site, the area is mainly flat with the ground level between 1,60 to 2.00 meter above the water. The soil permeability is extremely low due to

large asphalted area and the composition of the soil in the area, that is in great part result of infilling land. Sylvanderpark, next to the station has good pedestrian paths and green areas but is poorly connected to the city center.

A geotechnical survey carried out in 2020 showed that the filling masses consisting of clay, mud, silt, gravel, brick, and the original islands. The pollution that is expected to be present in the area comes from the filling masses themselves or superficial pollution from the small-scale warehouses that existed in the past. In the case of the design site, it is recommended to replace 1.2 meter of the current superficial soil.



Laboratorieholmen isolated from city center

KALMARSUNDSLEDEN



Image 11. Map of Kalmarsundsleden

Kalmarsundsleden is an easily accessible hiking trail crossing three different municipalities, Mönsterås in the northern part, Kalmar and Torsås in the southern tip. The trail has around 200 km, passing through a variety of landscape through the three municipalities and the totality of the Kalmar's coastline. Along the way the trails cross small towns, cultural heritages sites, fishing villages and the city of Kalmar.

Besides the hiking trail, there are sections shared with bikes. However, the bicycle paths are not yet totally dedicated to bicycle traffic, in some areas the path is shared with cars and varied traffic flow.

Within the central area of Kalmar, the cycle lane and Kalmarsundsleden itself is not clearly marked. As the city of Kalmar being the largest city that the trail cross, it can be a good tourist focal point and a catalyst for new and dynamic uses along the city's shoreline, specially at the city center, where the design site for this proposal is located.



Kalmarsundsleden through central Kalmar

- Design site
- Kalmarsundsleden

The map above shows Kalmarsundsleden in central Kalmar according to official georeferenced maps provided on the municipality website. However, the photos below show that the path is not clearly visible turning the track scattered and missing the opportunity to have more activities and urban life on existing buildings along the track.



Section of kalmarsundsleden along Skeppsbrogatan



TOURISM

Tourism plays an important role in business and contributes to Kalmar's attractiveness. Kalmar is the county (län) with the fourth largest number of guest nights per inhabitant in Sweden, even though the growth has been slower than in most other regions in the country in the past decade.

Kalmar län and Öland are Sweden's most visited tourist areas in summer, after the metropolitan regions. The historical city center and the castle are the front line in the hospitality industry both in the country

and internationally. Kalmar is strategically located between Öland and Glasriket, both tourist hotspots in Sweden.

In recent years, guest nights have amounted to 6.000 per year. The guest harbor, next to the shopping center, is a popular destination for local residents and tourists from the region, but the car traffic between the city center and the shore, on Ölandskajen is a barrier that separates the guest harbor from the rest of the city's offerings.



Departure point to Öland



Guest harbor



Ölandskajen

VIABLE CITIES NETWORK

Kalmar municipality has high ambitions in the environmental field. Long-term goals are that the municipality as a geographical area should have good water status by 2027 and be fossil fuel-free by 2030.

In a proposal for an action plan for a fossil fuel-free municipality, Kalmar has identified six strategies. They focus on both the production and consumption perspectives. Among other things, the city wants to increase the production of biogas and wind power and maximize solar power production. Fossil fuel free energy use must be promoted through, for example, conversion to biogas and electricity and well-developed infrastructure for renewable fuels.

To reach the goal of a fossil fuel-free municipality by the year 2030, a faster transition than so far is required. Car ownership in Kalmar and the county continues to increase with a growth that

is above the national average. Several companies in the municipality are dependent on transport and most of the transport is by road.

The city is a part of a network of 23 cities, such as Gothenburg, Uppsala, Örebro, Lund and others representing 40% of Swedish population. The network aims for collaboration "Cities that work well for the people who live in them, that are good for citizens, businesses and the economy of society - and - that are good for the climate and our planet. We therefore work to create ecologically, economically and socially sustainable cities." The transformation of the edges of the historical center of Kvarnholmen with population densification, changes on mobility patterns and connections with the cultural heritage can place Kalmar as an example for medium towns with regional importance within the network Viable cities.

CITY GROWTH

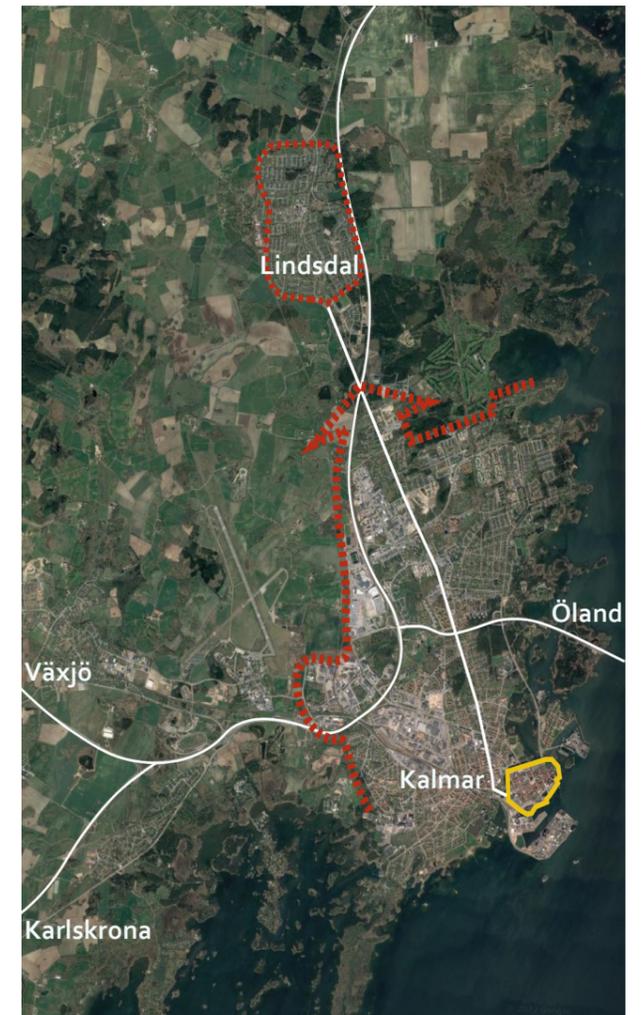
The urbanization trend in Sweden is strong and the three big cities account for 2/3 of the population increase in the country. Kalmar, as a city of regional importance is also growing. In the last ten years Kalmar's population increased by 11%, the same as the country.

In both the country and Kalmar municipality, 20% of the population is older than 65 years. During the last decade the group aged 65 – 79 has increased the most in the city. The population tends to get older in the long run. But with the new campus of the university in town and its plan to

continue growing in number of students and programmes, more young residents will move to the city facing a challenge pointed out by the local survey carried out by Kalmar municipality in 2019. Younger people in particular experience a lack of housing, indicating that the current availability of rental apartments is not in balance with demand. Just over 90% of the homes that have been built since 2013 have been built in the city. Of these, 40% in the northern parts of the city towards the district of Lindsdal.

The city of Kalmar needs to build around 500 housing units per year for the coming 10 years to meet the population growth. The focus of expansion has been towards the district Lindsdal in the north of city. The densification of outer areas of the city further than increase of urban sprawl also increases the number of pendular commuters to the city center. In current Kalmar transport structure, apart from busses, only cars can make this connection.

As mentioned, the plan to implement a BRT line can avoid an expressive increase of cars flow in the central area. But it is also important to point out that the city still has underused space around its center which nowadays are used as parking spaces only. To equalize the city's goals to be climate neutral and meet the needs of its expansion it seems to be urgent to evaluate the redevelopment and redesign of areas around the city center.





VISION & STRATEGY



Kalmar is growing, not so rapidly as big cities in the country or in the rest of the world. But this is exactly what directed me to choose Kalmar as the site for my design proposal. It is known that the world is getting more and more urbanized, people are moving to the cities. 56% of the world's population lives in cities, around 220.000.000 people are concentrated on the 10 largest cities in the world. In Sweden more than 80% live in villages or cities and 25% of population are only in the three big cities.

Then I asked myself, what about the medium and small towns with possibilities to have regional importance and play an important role in the national economy without concentrating all and everything on few metropolitan regions? Without overloading transportation systems and without extending the city infrastructure to a point that is unsustainable to manage. There are many questions that the time given for this degree project would not allow me to study and present. For this reason, I concentrated on the investigations of

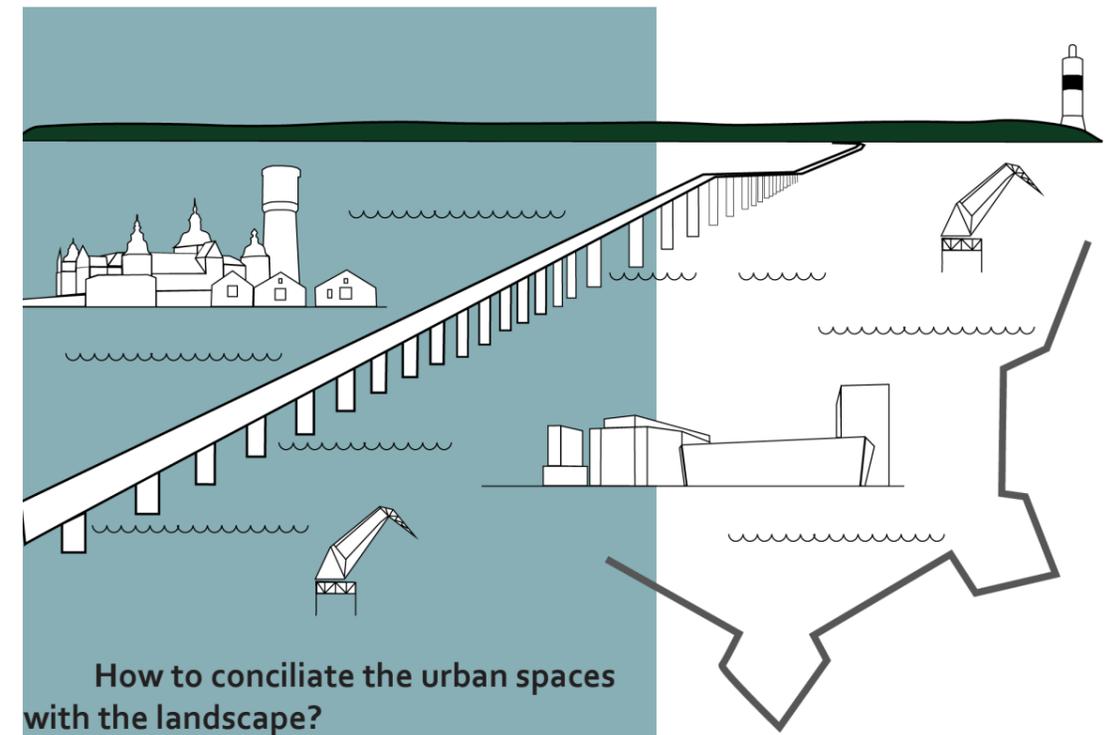
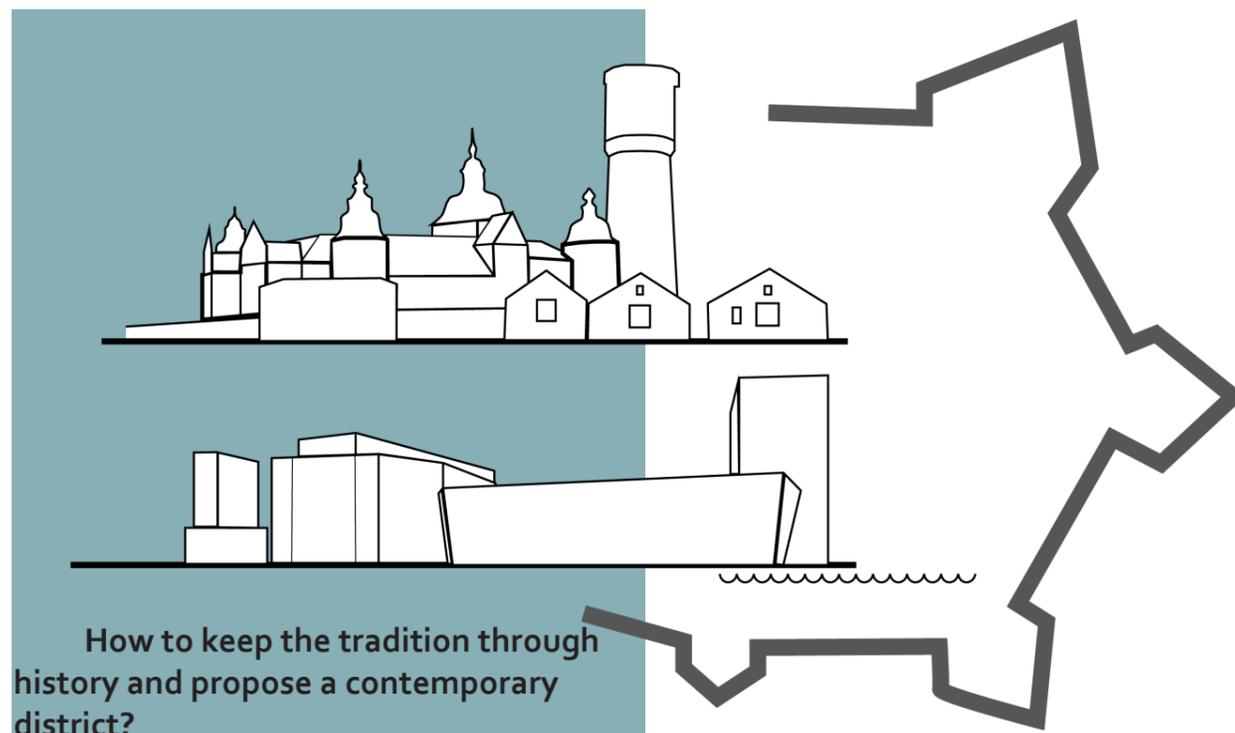
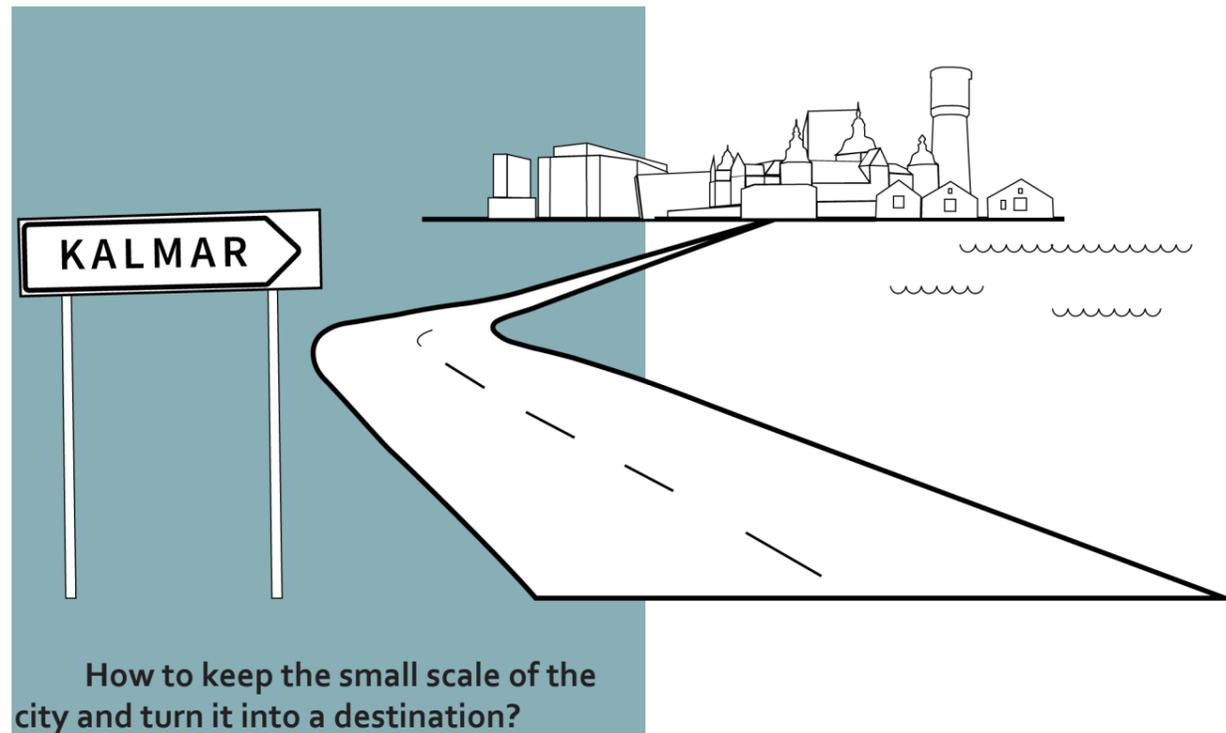
possibilities that a medium-sized town in the outskirts of the country can contribute for a sustainable development of the world and a sustainable increase of the urbanized world's population.

Kalmar, during the Hanseatic period, was a trading city, later had some industrial protagonism and in the last decades became more connected to an administrative center of the region, with its harbor and tourism. Now Kalmar is moving towards becoming a city of knowledge with its growing university and influx of students.

Following this knowledge track and efficiency the city can expand within its current borders without taking up much-needed green spaces. The city's structure of green and water areas is important to be kept without urban development in the outskirts and equally important to be requalified and reconnected to the urban space in the city center.

QUESTIONS

During the process of analysis and envisioning an identity to the area some questions emerged:



Developing these questions in more detail, it is possible to think; how the urban spaces in Kvarnholmen will turn into a meeting place for residents and visitors? How to increase the attractiveness of the area? Nowadays just relying on historical heritage, the guest harbor and shopping center. How to mix uses such as the university, the train station, the shoreline and the harbor and connect it to a historical city center? How to recover and redevelop qualities of areas next to the water in terms of recreation?

The conclusion is that Kalmar is a city built on layers with the uncommon ability to keep a harmonic city environment and cultural heritage over centuries, but with excessive amount of empty space in between. Changes happened respecting the old basic structures in block division and street, square and road systems. However, there are much space left being used as parking area that does not correspond to the

cultural values and needs and potentials of Kalmar. Then the proposal aims to highlight and reinforce the city's unique cultural history with the city center in a network that includes new uses along the water, the university, the castle, the medieval remains in the old town and the city park.

In 1860 the city demolished its wall (and borders), the aim was to grow and expand its geographic influence. Now the aim is to use the remainder areas next to the former wall to continue the expansion of the city, but now more efficiently and without occupying the agricultural land. The former wall which protected the city, then was removed to not hinder Kalmar's growth, now continues to give space for a contemporary vision for the city.

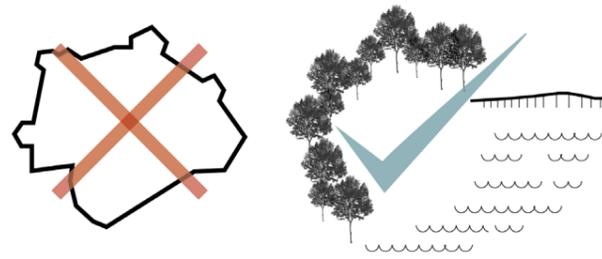
VISION

Kalmar can be a catalyst in the Kalmar strait region and an important city in southeast Sweden, being connected in a network of collaboration with Växjö and Karlskrona. The vision aims a medium sized city to be a reference in sustainability, urban mobility, and efficient use of the urban space.

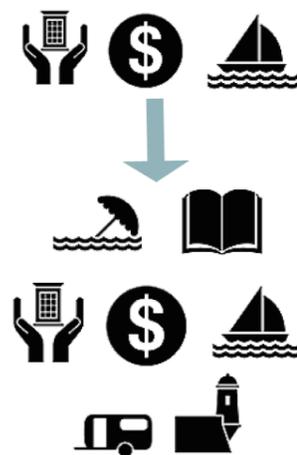
Kvarnholmen in Kalmar is transformed under this proposal. Industry and warehouse operations are replaced by university's activities, businesses, culture, and residential buildings. The target image for the borders of Kvarnholmen is an attractive urban environment well connected to central Kalmar. The goal is to turn the area into an attractive district for learning with Linnaeus University, regional centers, culture and entertainment, recreation, living environment and a destination for tourists.

The development of the island Laboratorieholmen and the connection with kvarnholmen is important to promote leisure activities and ease accessibility to green spaces next to the city center, contributing to the vision of an attractive and diverse urban environment.

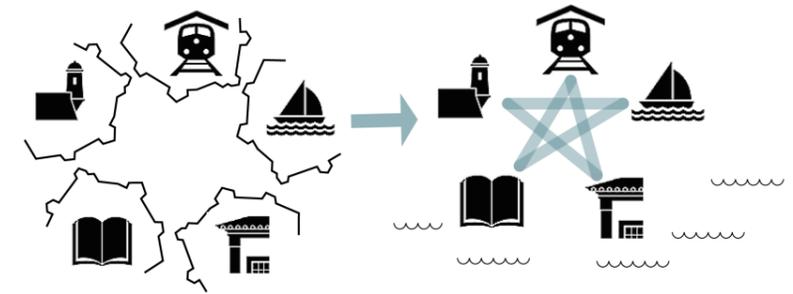
Developing the city center, Kalmar can be on the way to increase its economic activity, attract more students and give opportunities for both students and researchers to stay long term and improve the working market in the region. Kalmar has many borders in its history, the Kalmar union, the border of Sweden until 1658, the border between the mainland and Öland and its historical wall. The following pages presents how borders within the city can give space to a sustainable development.



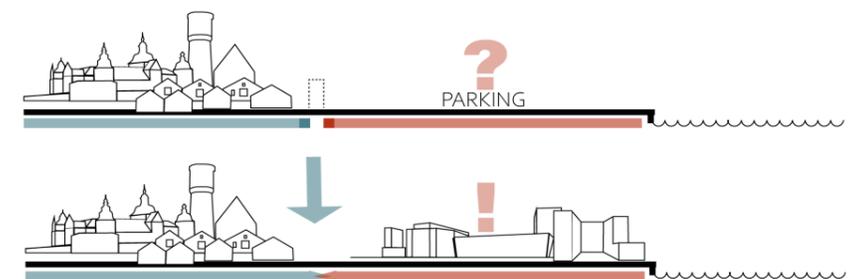
Expand within the borders
Develop underused areas within the current urban area, avoiding expansion on agricultural land.



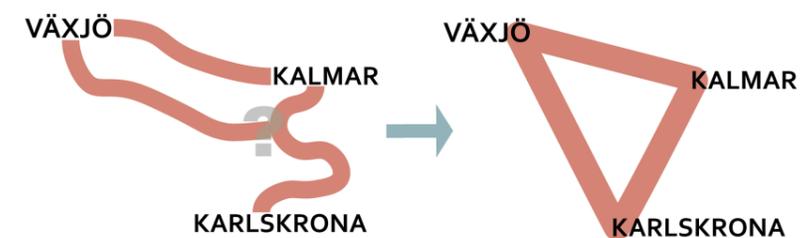
Diversify and turn it attractive
Mix various uses in the central region, implementing new uses and urban spaces affordable for different activities



Mix and Integrate – Uses, qualities, water
Redevelop qualities and improve the connections between existing activities and uses.



Connect locally
Develop areas out of the historical wall and connect the city to the water.



Connect regionally
Kalmar with a thriving city center turning a destination for pendular commuters.



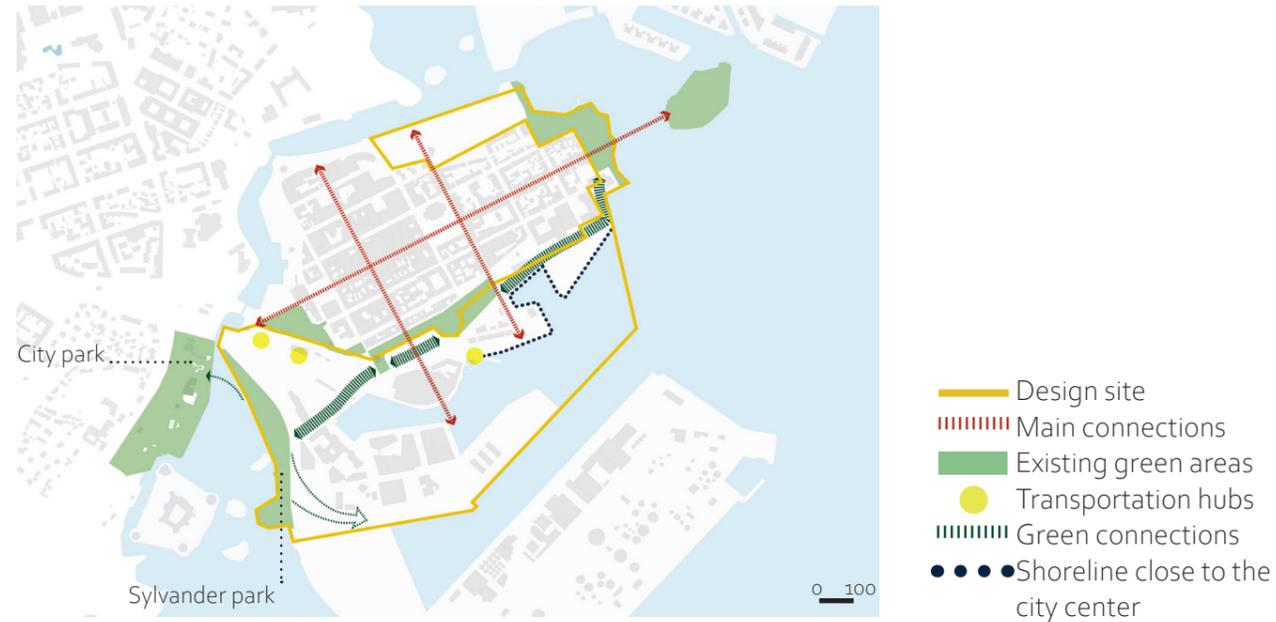
PROPOSAL

Houses built in the 17th century

PROCESS

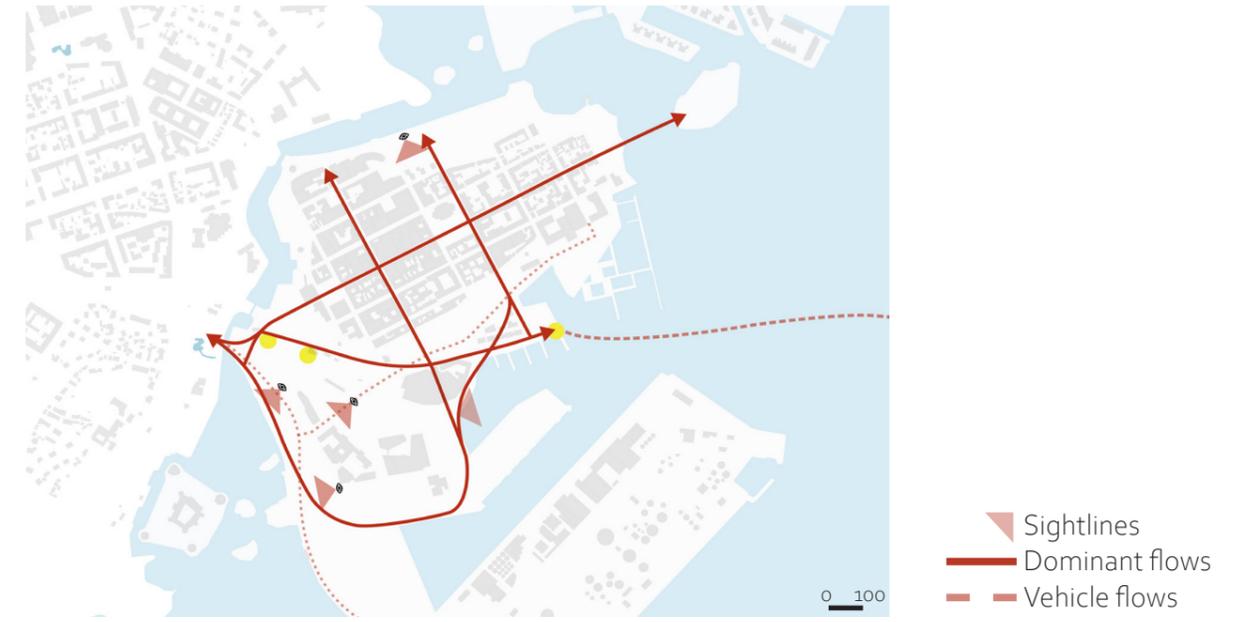
The design process started identifying connections between the design site and the historical city center. Further than connecting the two areas, the proposal also

aims to connect the green areas scattered along the coast and expand it towards the design site.



Besides the main connections, important sightlines were taken into consideration. Analysing the dominant flows it became clear that the existing guest

harbor was a barrier between the design site and the city, therefore it is moved eastwards and the former site infilled, increasing the land area.



After identifying the streets crossing the remaining parts of the city wall other important flows were identified, including the connection between the bust terminal,

train station and ferry to Öland. Vehicles to the harbor and city center and possible pedestrian flows from the city park through the design site were considered.



Proposing a new site for the guest harbor not only facilitate the connection between the original island and the design site, but also promotes a continuous

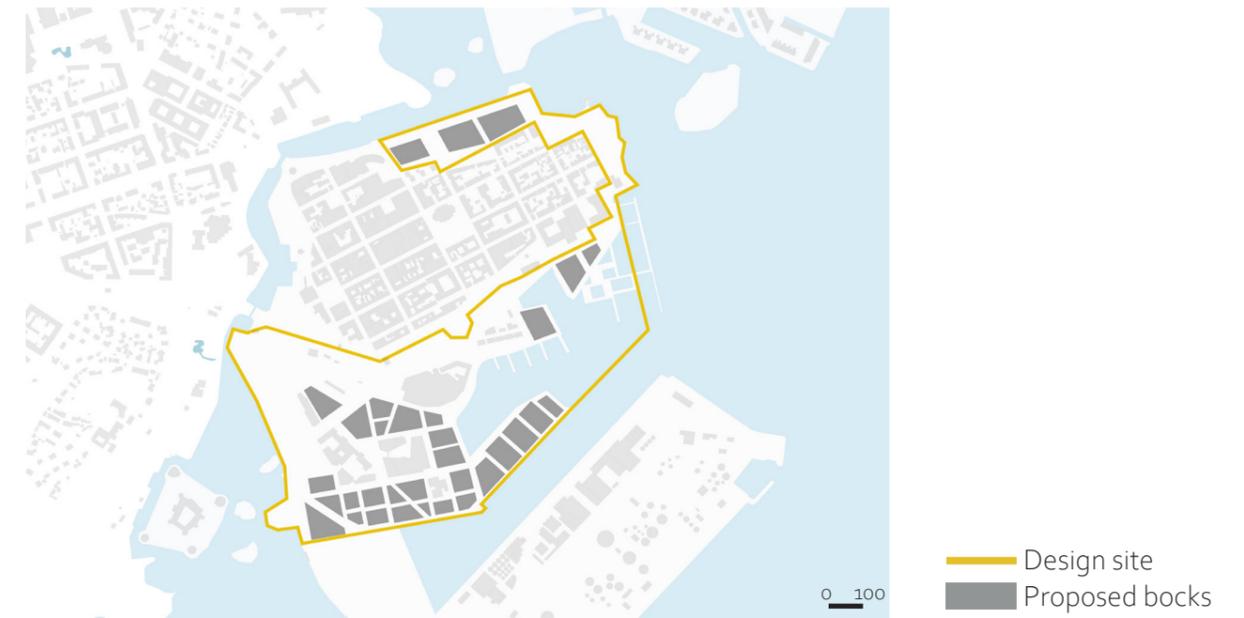
shoreline. With this unification, the views from the shoreline get the Kalmar strait and Öland as focal points.



After taking into consideration the dominant and secondary flows and its respective sightlines, big urban blocks were shaped.



The urban blocks proposed are aligned with the pedestrian flows, sightlines and referred to elements of the existing city.



The big blocks shaped following the previous steps were subdivided in smaller urban blocks taking into consideration the existing buildings and urban network. The

overall network of flows, considering the large scale of hubs and local paths, leads to local nodes, points with more activities within the plan.



The proposed urban structure is a result of the process described until this point, following the guidelines set alongside the vision. The proposal develops current areas around the city center increasing the populations and built density within the borders, fostering attractiveness to the borders of Kalmar's city center. Integrating current uses, such as the university and the guest harbor to the city network and inserting new uses and connections land/water. Finally connecting the historical city network with the proposal and giving possibility to Kvarnholmen with its proposed diversity, density and proximity to transportation be the center of a bigger region than the city of Kalmar. The following page presents the result of this process.

MASTERPLAN

1:2500



0 30 50 100 200





Aerial view



Detail plans and section lines

0 30 50 100 200



DETAIL PLAN 1

1:500

SHOPPING CENTER



Detail plan broadwalk and archipelago

Kalmar was built from the beginning on the coast, however the city had its original surrounding landscape a group of islands forming an archipelago toward south. During the city expansion the closest islands were lost, being connected by land expansion.

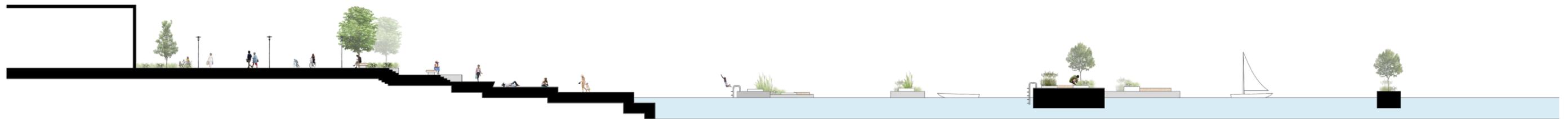
The proposal, aiming to open the shoreline to pedestrians and bathers, reintroduce a reduce version of the original archipelago in form of floating islands with the shape of the original islands next to a broadwalk. The small islands can be reach by small boats or swimming and are a urban element remind Kalmar's original geography and reation with Kalmar strait.



— Design site
■ Islands

SECTION ARCHIPELAGO

1:200



DETAILPLAN 2

1:500



SHOPPING CENTER

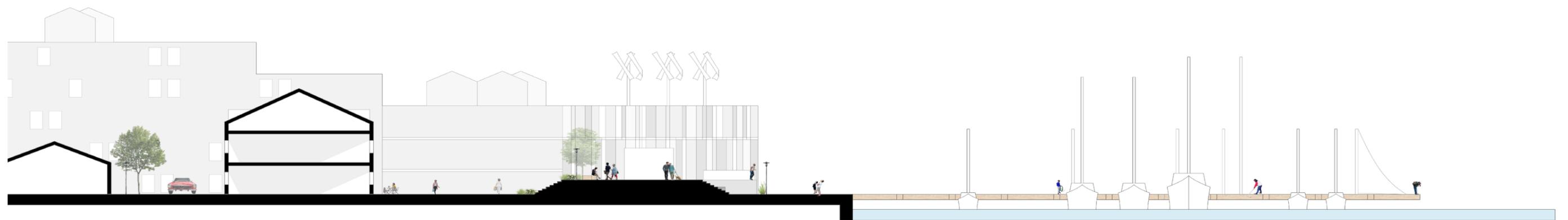
Detail plan guest harbor



View from broadwalk to guest harbour

SECTION GUEST HARBOR

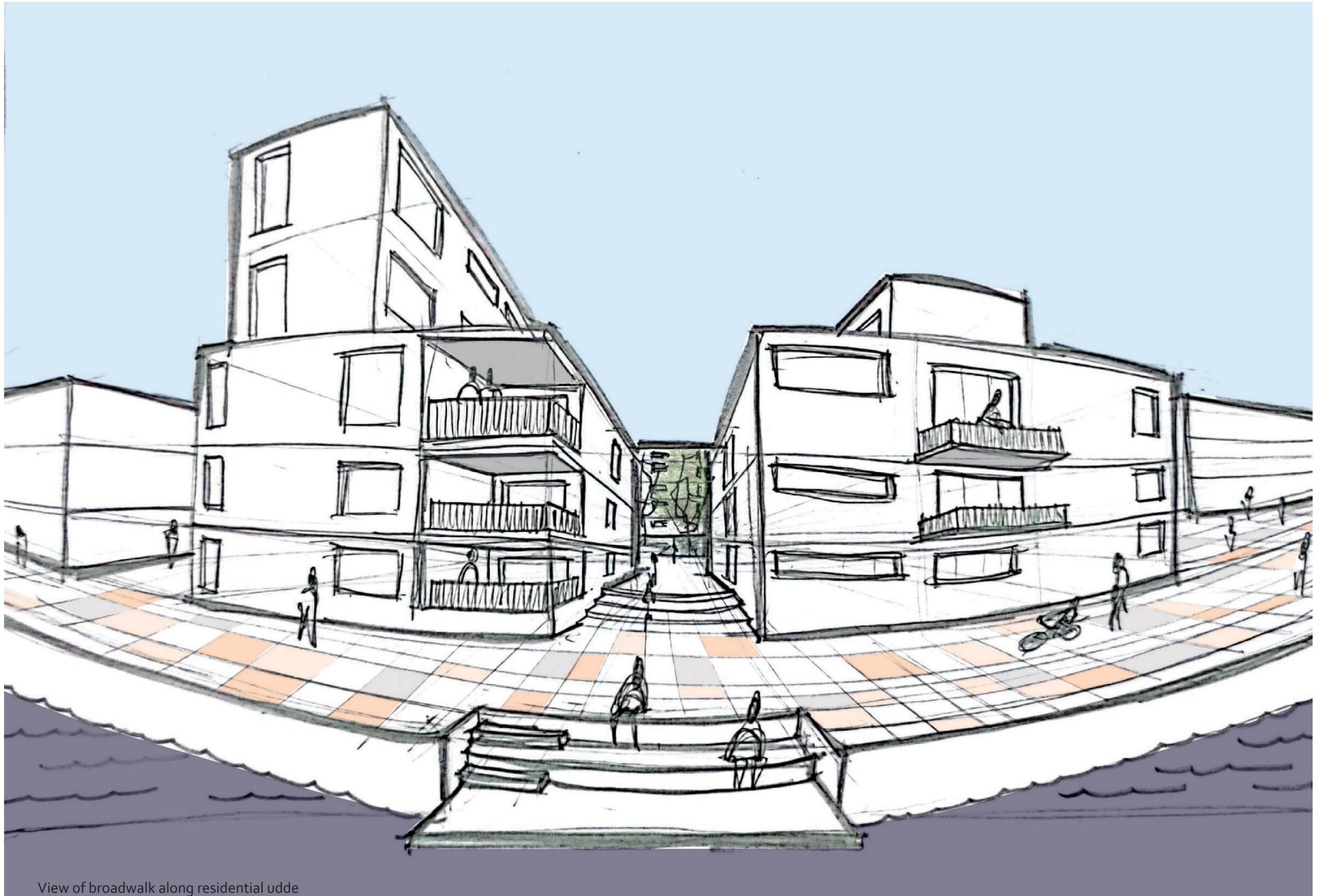
1:200



SECTION RESIDENTIAL UDDE

1:200





View of broadwalk along residential udde

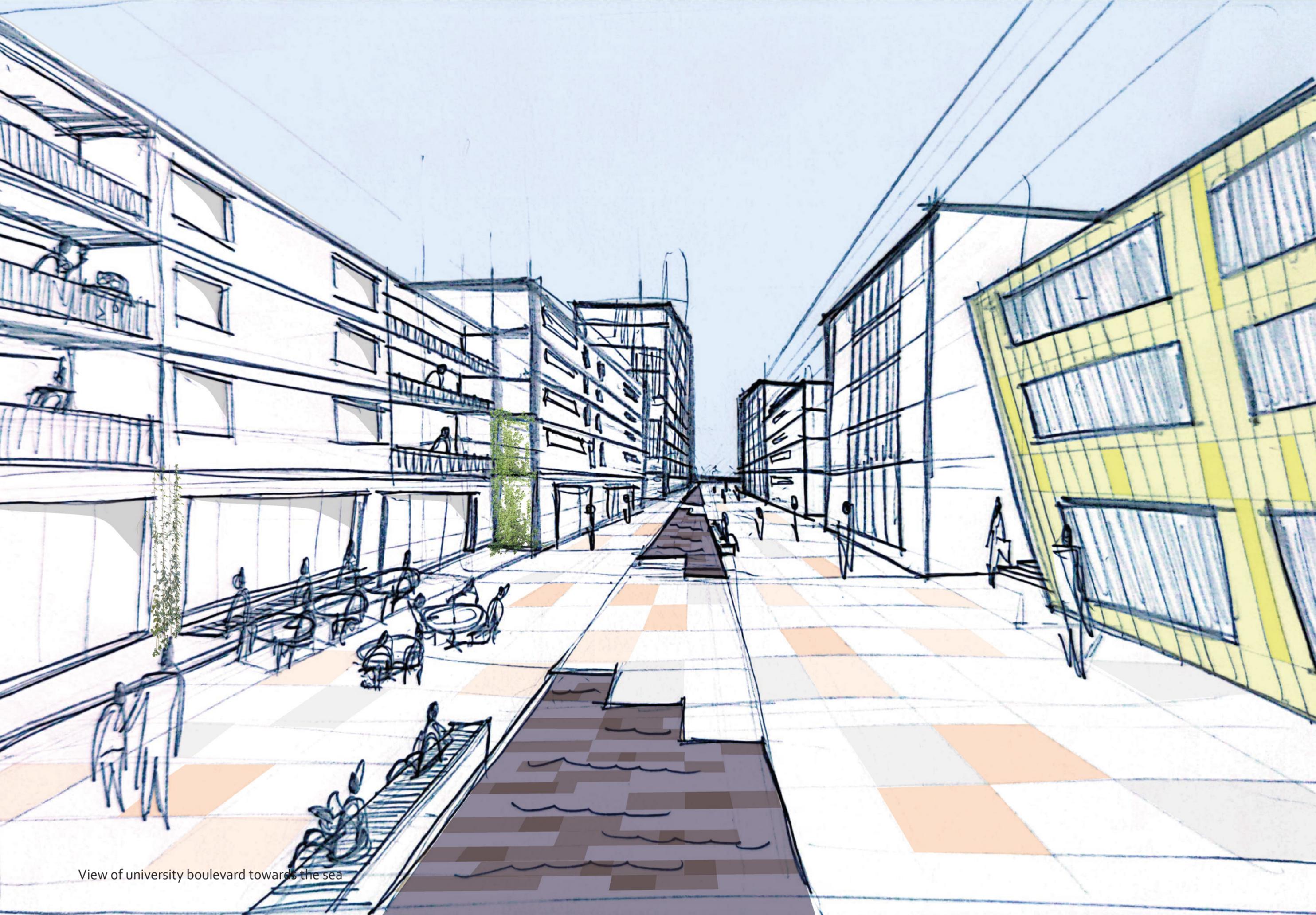
SECTION ÖLANDSKAJEN

1:200



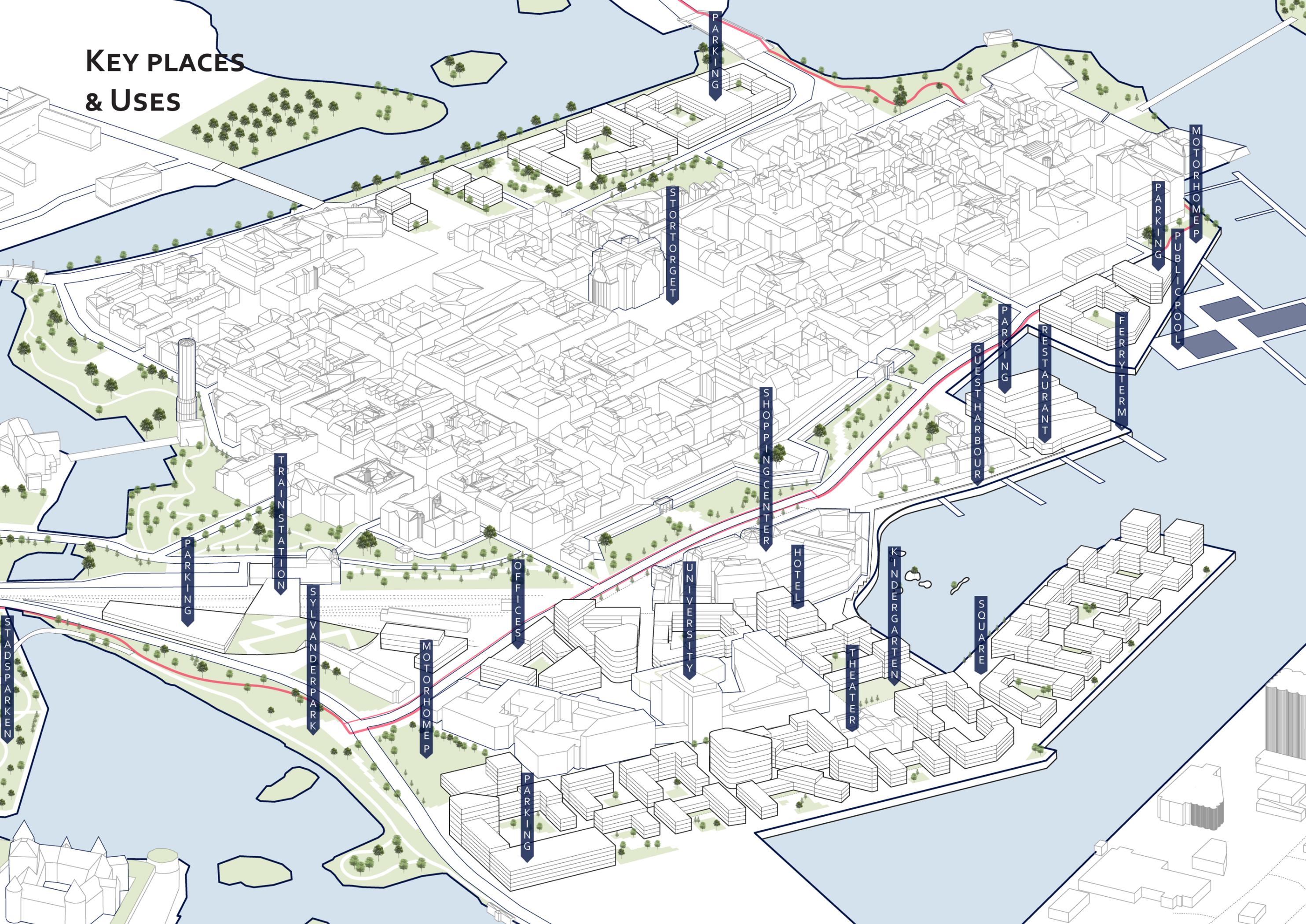


View of square in residential area



View of university boulevard towards the sea

KEY PLACES & USES



PARKING

STORFORGETT

MOTORHOME P

PARKING

PUBLIC POOL

FERRY TERM

RESTAURANT

PARKING

GUEST HARBOUR

SHOPPING CENTER

HOTEL

KINDERGARTEN

SQUARE

UNIVERSITY

THEATER

OFFICES

MOTORHOME P

SYLVANDER PARK

TRAIN STATION

PARKING

STADSPARKEN

DETAILS



Figure ground map with proposed design



Ground floor uses

- | | |
|-------------------|--------------------------|
| ● Residential | ● Ferry terminal |
| ● Retail/Café | ● Parking |
| ● Offices | ● Hotel |
| ● Shopping center | ● Theater |
| ● Restaurant | ● University |
| ● Train station | ● Tourism infrastructure |



Street hierarchy

- Main road
- Secondary street
- Tertiary street
- local paths
- Pedestrian paths



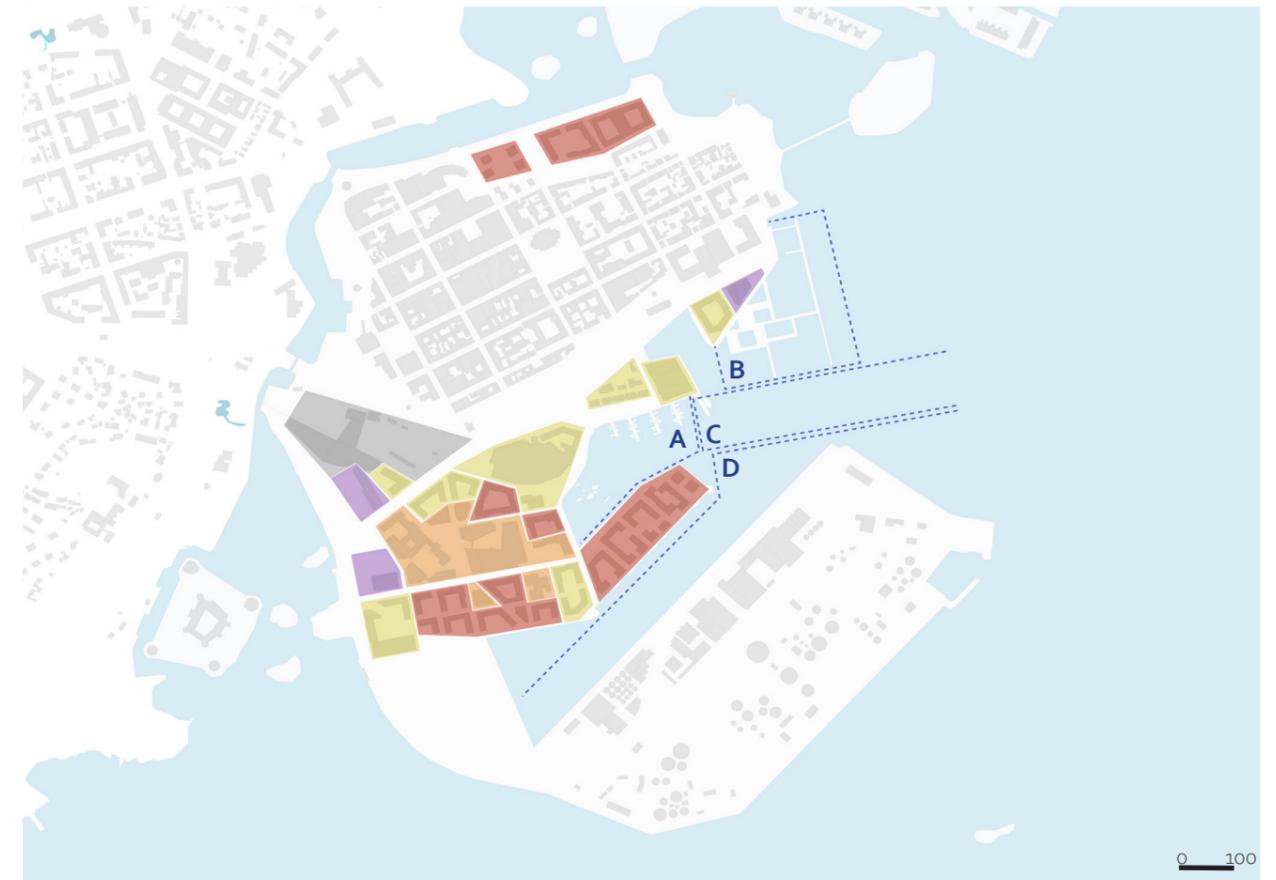
Facades main uses

- | | |
|---|---|
| — School | — Broadwalk |
| — Theater | — Office |
| — Parking | — Tourism infrastructure |
| — University | — Ferry terminal |
| — Hotel | ▾ Swimming possibility |
| — Restaurant/Café | |
| — Retail | |
| — Square | |



Green infrastructure

- Existing green areas
- Proposed green areas



General zoning of land and water

- Residential
- Mixed uses
- Institutional
- Mobility
- Short stay (motorhome)
- A Guest harbor uses
- B Swimming
- C Boat traffic
- D Harbor activities



Buildings height

- 1 floor
- 2 floors
- 3 floors
- 4 floors
- 5 floors
- 6 floors
- 7 floors
- 8 floors
- 9 floors



Phases of development

- Phase 1 > Move the guest harbor to east
- Phase 2 > Implement green areas completing the network with existing green areas
- Phase 3 > First stage infilling the former guest harbor
- Phase 4 > Implement swimming pools
- Phase 5 > Implement areas for motor home and parking
- Phase 6 > Residential area and train station building
- Phase 7 > Second stage infilling the former guest harbor
- Phase 8 > Complete broadwalk and archipelago
- Phase 9 > South section
- Phase 10 > North Kvarnhorlmen

PROPOSAL IN NUMBERS

The total area of the design site for this master's thesis project is 32 hectare. To calculate how many residents would live in the area I used as a reference the average size of an apartment in Sweden, according to Statistiska centralbyrån (SCB), which is 42 sqm. Also according to SCB the average number of residents in apartment buildings is 2 people. The final number of the proposal is presented below:



7000 housing units.
226 units/ha.



Area for 1300 to 1500 jobs



1700 parking spaces. 1 parking space for 4 apartments



5400 sqm for retail

Taking into consideration the current city's projections to build around 500 residential units per year to meet the needs of Kalmar's expansion, this proposal is equivalent to 14 years of city expansion.

REFLECTIONS

The first time I visited Kalmar almost two years ago I got impressed by the strong identity of the city center in Kvarnholmen and the Kalmar castle. During the same visit I was surprised to see how the city developed along the years keeping the city center within its original walls and the castle as single unities, disconnected from each other and the rest of the city. Each side had its own borders and in between the spaces there were only warehouses and vast parking areas. I got disappointed to see the path the city took under its development, letting aside views to historical buildings and the connections with the surrounding landscape.

Apart from my visit to Kalmar I have been interested in how the increase of the urban population will influence the expansion and densification of the cities. It is often considered that the rural population and the new humans to come will be living in big cities and metropolitan areas. What happens with medium and small cities? Can they grow in population and keep its small-scale identity, short distances, and connection to surrounding nature?

During this project I tried to investigate possibilities to reconnect Kalmar's important elements. Fill in spaces that have been experienced as barriers (or borders) and connect them to new uses and the future population to come and at the same time trying to keep the city's small-scale identity. During and after the process of this master's thesis I had some reflections that I share now.

First, how can we allow and work to develop the city and increase its population

keeping the city's identity? Develop the surroundings of Kvarnholmen certainly will bring a new identity to the city center, however, an urban designer needs to strive to have as a result of the development, a district that condenses the city's identity with new uses and qualities. Work in a city with such important history as Kalmar might be a more complex task, still, the result needs to respect the previous urban identity that the city is known.

Second, it is important to keep in mind that under the increase of the urban population, new ways of living can surge according to life in medium-sized towns. Maybe the way of living considered for this design proposal is the way of living present in bigger cities, therefore having as result a streetscape, morphology and density aligned with bigger cities structure. The acknowledge of this possibility instigates me to investigate more about the possible ways of living of the future urbanized population in medium towns in future research projects.

Finally, the design proposal corresponds to 14 years of city grow according to the current population's grow forecast for Kalmar. The proposal could be seen as an example of how to increase the number of inhabitants avoiding urban sprawl and its consequences in urban mobility, city infrastructure and occupation of agricultural land. There are still numerous topics to discuss about the population growth in the coming decades, I will be glad to continue investigating the urban environment in small and medium cities.



Houses built in the 17th century

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Image 2. Kalmar union c 1500 > https://commons.wikimedia.org/wiki/File:Kalmar_Union_c._1500.svg#globalusage

Image 3. Handritade Kartverk, Band 11: Svenska planteboken (Örnehufvud), SE/KrA/0414/0011/0009 (1610), bildid: K0024247_00001 > https://sok.riksarkivet.se/bildvisning/K0024247_00001

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