

INDUSTRIAL INTEGRATION

TRANSFORMING
THE INDUSTRIAL
RIVERFRONT OF
GÄSSLÖSA

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Industrial integration

Transforming the industrial
riverfront of Gässlösa

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Abstract

Borås is a growing city with a heritage of textile production. The city aims to focus the population growth to most central areas which creates a demand of new central land to develop on. Here the central industrial areas could be an opportunity to create a functional integrated city, but also to make the industrial riverfront more accessible. In the discussion about the mix-use city the industry tend to be forgotten, even though it is an important function of the city.

This master thesis explores the possibility to mix industry with the city and to which extent it is possible to integrate industrial businesses with housing and other functions.

The purpose of the thesis is to investigate how industry can coexist with a growing city, being an important part of the mix-use city, and explore how these environments can be developed. In this regard the industry compatible with the city is discussed as well as the Swedish planning and building law that has strict regulations on mixing industry with other functions, especially housing.

The thesis is focused on Gässlösa, an industrial area in the south of Borås, situated along the river Vis-

kan. Connectivity, accessibility, industrial heritage and functional integration are main issues that are analyzed and later addressed in the strategies on how to develop the area. The outcome is a design proposal on how to transform the industrial riverfront, with Viskan and the existing industry as the cornerstones of the development and revitalization of the area.

Many thanks to

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INTRODUCTION

Introduction

Blandstaden, in English the mix-use city or the compact city, has been the aim for many planners, politicians and architects in the last decade. It is part of a vision of returning life to the cities. Integrating functions as housing and services and building denser are tools in order to make the city more approximate and accessible and work towards this vision.

What often is forgotten in this discussion is industry and which part it has in the city. Industry is traditionally seen as dirty and noisy, hence it is often placed separated from the city and other functions. This view on industry is outdated today when many of the industrial businesses doesn't lead to any noise, pollution or other distraction. Still most transformation projects of urban industrial areas today results in homogenous residential areas where the industry has no place

Borås is a city that historically has been dependent on the industry and built around it. Today the character of industry has changed and most of the industrial businesses have been moved outside the city. However many of the central industrial areas still remain and could be a resource for the future development of the city.

Aim of the thesis

The purpose of this master thesis is to investigate how industry can coexist with a growing city, being an important part of the mix-use city, and explore how these environments can be developed.

The aim is to develop strategies and a proposal on how Gässlösa, an industrial area south of the city center in Borås can be integrated with other functions without losing the industrial character and how the river can become more accessible, working as a link to the city center. The idea is that the strategies and the design could be applied on or inspire other industrial transformation projects as well.

Thesis question

How can an industrial riverfront in the south of Borås become a part of the mix-use city, integrating industry with housing and other functions?

Sub-questions

What types of industry are compatible with function integration?

What limits does the Swedish planning and building law set to a mixture of industry and other functions, like housing?

How can the river become more accessible, creating a stronger link to the city?

What strategies can be made to make the industrial site functionally integrated and become a part of the city without losing the industrial character?

Methods

The thesis starts with a theoretical part that is based on literature studies. This chapter describe the theories behind industry as heritage, the mix-use city and industrial integration, but also the Swedish laws and guidelines for the placement of workplaces and industry. Together with the reference projects the theory works as a foundation of the terminology and the strategies of the thesis.

The analysis of Borås and the site is based on site and literature studies, interviews, and investigation of municipal and governmental documents. The evaluation form of the existing buildings and businesses on the site was constructed by me based on the literature and site studies. This form is filled in from my findings and is therefore subjective, but has still been essential in the process of understanding the values on the site.

The design proposal is the result of the theory and analysis, based on the design strategies and shouldn't be seen as a final proposal but an example of how an industrial riverfront could be developed.

Delimitation

The topic of transforming the industrial riverfront awakens many interesting and complex questions and issues. The extent of these questions and issues makes it necessary to limit the thesis to the most important questions for the specific context. The research part hasn't been the main focus of this thesis, but a tool to identify the main aspects of function integration and industrial heritage. Issues like the new industrial revolution, gentrification and ecology have been considered but not given any focus due to the limited amount of time.

With more time the methodology would also have been more excessive including surveys for the business owners and a workshop with involved stakeholders.

The design is limited to the urban scale with the river and the industrial buildings as the cornerstones. The most important places are investigated on a higher detail level. The exterior of the buildings is considered to some degree whilst the interior is completely left out.

BACKGROUND

BACKGROUND

Industry as cultural heritage

It wasn't until the 1950's that industrial structures started to be considered as something worth to preserve for the future. The interest started in England with a movement called Industrial Archaeology, but it took twenty years before the engagement on the topic started in Sweden. Industry and culture was for a long time seen as opposites supported by strong voices like William Morris and John Ruskin. Industry was the monster that destroyed our arts and crafts traditions. At the same time industry was the symbol of the modern society and many saw the preservation of the cultural heritage as reactionary. The industry is inconstant and changing, which means that the traces from the past might be hidden or replaced with new plans, additions, new materials etc. Therefore the industrial buildings became disqualified as a traditional cultural heritage. The change of view in Sweden came in the 1970's when the modern industry was restructured into a postindustrial phase. This transformation meant a large interference on the old industrial environments. The awareness of the built environment had increased because of the massive destruction of old buildings in Sweden around this time; this awareness came to affect the industrial environments as well. (Alzén, 1996)

There has been a shift in the concept of preservation since then; from preserving cultural monuments and cultural environments to the present concept of cultural heritage. Today the industrial heritage includes the industrial site and its buildings, the production equipment with machines and tools, but also the organization and profession knowledge and the social context. Another change is from preserving to a dynamic use and enrichment. The size of the industrial heritage and the costs that comes with preservation makes it almost impossible to see the industrial environments only as a cultural value; they must be filled with something, both to keep it alive and to find economy in the preservation. (Lundström & Nyström, 2001)

Perspective on industrial heritage

The cultural values in an industrial landscape aren't just about the building or structure itself and how unique it is. The industrial landscape can tell a story about the past and about the people who worked there. It is kept within the walls of the buildings but can only be told with knowledge about the past; memories and stories about the place. The industrial characteristics are also what's in between the buildings and what they are filled with. There is another side to the industrial heritage as well; it can't be preserved just for the cause of preservation. To fill them with new life and find the resources for preservation we must find new usages for these environments. Many of the old buildings are built in high quality and especially the buildings from the turn of the 19th century are flexible and can quite easily be transformed, compared to buildings from the 50's and 60's that often are too big to find any suitable new usage for. When refurbishing the old buildings the history markers have to be considered, but there shouldn't be too much caution in complementing with new buildings and layers in a modern but adapted design, there must be acceptance for development. (Lundström & Nyström, 2001)

Mix-use and function integration

There is no obvious definition of the mixed-use city, but it can be described as a positively charged word described by the complexity in both design and content and with a dense development structure. In the mixed-use city it is close between different functions, with people in movement all hours of the day and a liveliness that creates a safer environment, encourages walking and cycling and a more efficient land and energy use. It is believed to provide a social and diverse city and decrease the amount of travel. (Bellander, 2005 s.5)

The idea is that in order to create good sustainable living conditions the city has to be function integrated. There is an important difference between the mix-used city and integration of functions. The latter is a tool in order to reach the mixed-use city. A mixed-use city isn't a matter of design, e.g. city blocks, and it's not a question about commerce and events. The mixed-use city is about the publicness and accessibility in the urban spaces of and on the street level. That people within sight or walking distance have access to other functions than housing. The mixed-use ideal is by many seen as a utopia, that can't be reached. Still the concept is broadly used, especially in visions of cities development, something to strive for.

The focus on mix-use can be seen as a reaction on the previous function separation by zoning. The urban sprawl and separation has resulted in a higher transportation need and pressure on the infrastructure, but also in segregation and social inequality. The modern development has been proved to be less flexible than older buildings. A mixture of functions is much easier to realize in redeveloping existing structures, compared to new development. (Bellander, 2005)

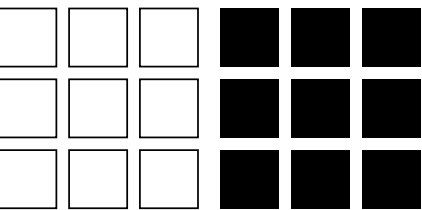
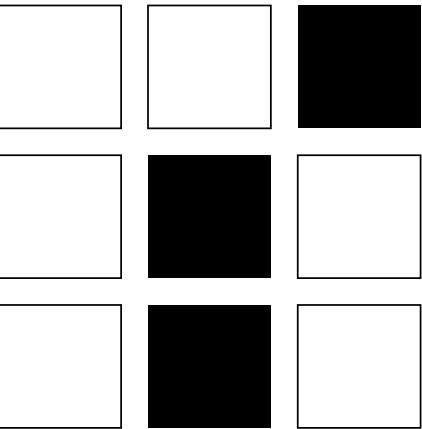
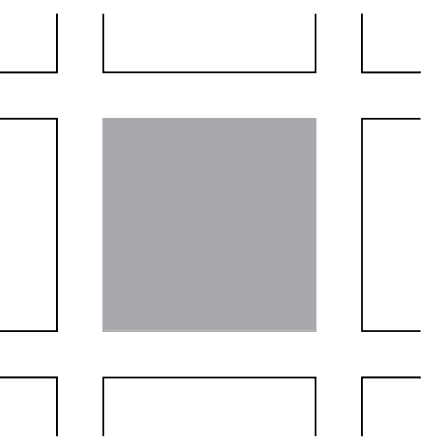


Figure 1. Illustration that shows the separation of work and residence. The upper illustration shows a block in the pre-industrial city with functional integration in the same block. The middle one shows the industrial period with separated blocks and the last one is late industrialism with separated areas for work and residence.



Integrating industry with the city

In the beginning of the industrial revolution it wasn't rare with factories next to residential buildings, but as the awareness of pollution and other hazardous conditions grew the industries moved to locations where they didn't disturb. Since then production has changed and much industry is compatible with housing today. However the view on industry as dirty is still there, both from planners and the public. Industry is often left out of the picture because planners consider it to be less desirable and even incompatible with other land uses. Moreover, proximity to industry can lower the market value of housing, meaning that mixed-use developments in industrial sites can be unattractive to both residents and property investors. A complete face-lift can increase the interest and industrial areas with water contact have been proven to be easier to introduce mix-use and housing to successfully. (Korthals & Tambach, 2008)

There is a distinction between light and heavy industry that has to be stressed. Light industry doesn't affect surrounding properties with noise, vibrations or pollution and is therefore applicable in an urban environment. Location in an urban environment often leads to higher rents, which demands that the business benefits from a proximity to urban resources as customers, visibility, labor, transit, business services

etc., while businesses that is in need of heavy traffic and doesn't gain from a more urban context might consider to move. (Cotter, 2012) Here the region or municipality should be active in looking for new suitable land for these businesses and the heavy industry that can't be mixed with other functions. These are businesses that need flexibility and often also the possibility to extend their land use, which can be hard or impossible close to other development. In a redevelopment project these businesses can benefit from the increased land value, letting them buy more flexible and cheap land further outside the city. The biggest cost in moving the business is often to decontaminate polluted land, which may even hinder the business to move. Grants from national government or the municipality are hence needed in order to finance the decontamination. (Korthals Tambach, 2008) This investment could repay if the land value is increased during the redevelopment process, otherwise it is still a good opportunity to clean the land and lower the risk of pollution spreading with water.

Definition of light industry

In Atlanta's work on integrating industry with the city they have tried to understand which industries that could be integrated. According to their strategy the distinction between light and heavy industry is an approach to vitalize the city. In contrast with heavy industry, light industry:

- Relies more on labor and less on heavy machinery
- Produces finished products from partially processed materials
- Produces smaller products with higher value per unit weight
- Requires less raw materials, square footage, and power
- Has less environmental impact

A light industry must not produce any loud noises, vibration, pollution that affects beyond the property. Examples of light industry could be "clean" manufacturing, wholesale, warehouses, and sale and service of vehicles and equipment. (Cotter, 2012)

A problem according to the author of the report is that there today isn't any clear definition of industry that functions together with a mix-use city. In order

to create a distinction for light industry in Atlanta's strategy, they have developed four criteria's. The first set of criteria is about the business needs, which can be proximity to customers, labor and research. The second set of criteria is about the urban design such as the need for relatively small blocks, design for pedestrians and a density that supports transit and street-level retail. The third criteria consist of the conditions for disturbances and risks through noise, vibration, traffic etc. The fourth and last criterion is economic growth where niche industries are considered to be what will maintain the employment growth.

Apart from coming up with criteria for mixing industry with the city it is also important with restrictions to stimulate the economic growth. Pressure on property prices and rents should be regulated to create opportunities for existing businesses and the local workforce to stay, if that succeeds the character and vitality of the area will be preserved. (Cotter, 2012) This is something that they are working with in Malmö where the municipality in the planning of the industrial area Norra Sorgenfri will work with small plots a variation of developers, public ground floors and a certain share of rental apartments. Hopefully these are specifications that will reduce the gentrification and homogenization during the development process. (Länsstyrelsen, 2008)

CRITERIA FOR FUNCTIONAL INTEGRATION

BUSINESS NEEDS	URBAN DESIGN
 Proximity	 Small blocks
 Visibility	 Pedestrian friendly
	 Density
DISTURBANCES AND RISKS	ECONOMIC GROWTH
 Noise	 Niche industries
 Vibration	 Small plots
 Traffic	 Variation of developers
 Pollution	 Rent levels
 Other accidents	

Figure 3. The four sets of criteria from Atlanta's strategy on integrating light industry. An industry that fulfill the criteria is suitable for mix-use.

Figure 2. SKF factory in Gamlestaden.

Zoning and regulations

The way of working with zoning and separation of different functions is still apparent today in the Swedish planning system. Even if the municipal aim is to create conditions in their plans to create a function integrated city the reality is that the planning tools proceeds from the policy of conflict resolution through function separation. The ambition in the work with detail plans seems to be to avoid conflicts with the national boards. Many plans combine housing with commerce, but almost none combine housing with industrial purposes. The zoning is many times needed to control how the city develop and provide information for neighbors to create security. At the same time they are too inflexible and a reform is much needed if the compact city is the aim. (Bergdahl & Rönn, 2001). Maybe it would be better if departures from function integration had to be motivated instead of the opposite.

In Copenhagen they have tried a new plan regulation in order to create a more flexible city. Skjulhojs Allé is a small industrial site in the middle of the district of Vandløse. Here the municipality saw a resource in the mix between workplaces and residents. People could live and work in the same place that created room for creativity. This mix also means that there can be disturbances from the workplaces, which

might conflict with the residents. In some cases the qualities created by this mix are greater than the disturbances. The city of Copenhagen saw the need for a tool to encounter these kinds of problems. The solution was a new regulation called E0. E0-areas have a “particular potential for creative businesses”. These are businesses that often start small with small resources but grow fast. The idea with E0 is that the regulations on noise and safety distances are restrained; residents and developers have to tolerate a bit more disorder, noise and risks, “Housing on the premises of the business”. E0 also means that the exploitation level is low to preserve the small scale. When a business expands it have to move and leave space for new small businesses. (Bergdahl & Rönn, 2001)

The National Board of Housing, Building and planning has come up with general advices on planning of workplaces together with the Emergency service, and the boards of Environmental Protection and Health and Welfare. The advices include safety distances to minimize risks and disturbances and the distances are set differently depending on type of industry and scale. (Troedsson, 1995) A problem is that the advices don’t clarify what type of disturbance that the distance relates to. It could be traffic,

transportation, pollution, production with hazardous materials or noise and there is no scientific support of the set distances. These advices can be used as benchmarks, but shouldn’t be seen as truths. Still this book is the only document that the consultative bodies can refer to, which means that decisions and appeals are made based on the advices. (Bergdahl & Rönn)

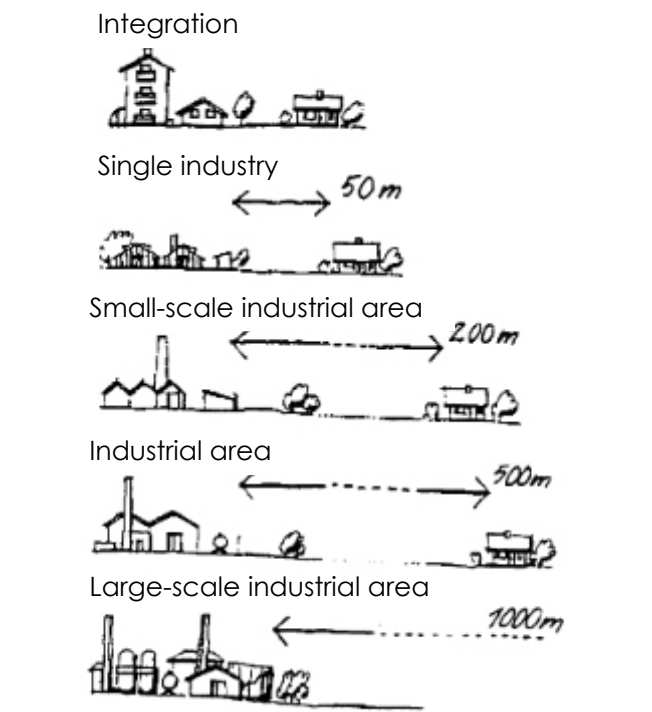


Figure 4. The general advice from Boverket with safety distances between industry and housing. These distances are often the only document that consultive bodies can relate to when working with industrial sites.

Disturbing elements

Noise and vibrations
Noise is undesirable sound on levels that can be a risk for peoples comfort. Hence it’s important to specify which levels and types of sound that can be seen as acceptable and when it’s harmful. Noise is an important topic in the planning of new dwellings. For noise from traffic Sweden has extensive point values and guidelines to follow that generally work well. When planning of dwellings close to industry that support has been lacking until 2015 when Boverket and Naturvårdsverket released new guidelines. The old guidelines for industrial noise by the Environmental Protection Agency were developed almost 40 years ago and were never intended to be used in development or densification of the city, but were still the only guidelines to follow. Some of the guidelines were very strict and the point values for noise outdoors often became the regulating value even if there weren’t any incentives for why the values had to be answered fully. The new guidelines are more similar to the traffic noise guidelines, where the noise I measured at the façade of the housing building. This is because the resident must have the possibility to have open windows or a patio without getting disturbed. In the planning of new housing three zones are used to categorize the extent of the noise. In zone A housing is accepted without any engagements, but it is still recommended to achieve as good sound environment as possible. In zone B housing is accepted given that new dwellings have accessibility to a silent side of the building and that

the buildings are adapted to noise. In zone C housing is inappropriate if precautions for better conditions can’t be made. (Boverket, 2015)

	day 06-18	evn 18-22	night 22-06
Zone A	50 dBA	45 dBA	45 dBA
Zone B	60 dBA	55 dBA	50 dBA
Zone C	>60 dBA	>55 dBA	>50 dBA
Silent side	45 dBA	45 dBA	40 dBA

Figure 5. Diagram that shows which noise level that is accepted in the different zones and times of the day with zone C meaning that housing is inappropriate. The buildings in Zone B should have a silent side.

The report “Stadens Ljud” by Tyréns and Delegationen för Hållbara Städer Acoustic design was written as critic to the old guidelines but has many points that are valid on the new guidelines as well. The new guideline differs between continuous sounds that are less disturbing and momentary sounds that disturb more, but doesn’t categorize the different types of noise the different business produce even if they can be very shifting in character. According to the report acoustic sound should be considered to emphasize qualitative sounds and reduce undesired sounds. The report also claims that noise from traffic to and from the industry should be considered with the existing guidelines for traffic noise. (Tyréns, 2013)

Traffic
The idea with the compact city is that the need of travel by car is reduced by having shorter distances between different destinations, increasing the public transport. A result by integrating industry with the city is that the amount of heavy traffic in densly populated areas will increase, creating noise, vibrations, a more unsafe traffic situation and more dangerous goods on the roads. (Troedsson, 1995)

Smell and other disturbances
Even if noise and traffic might be the main issues there are other disturbances that has to be considered as well. Dust, outlets, and smell are examples of other more or less usual disturbances from industry. These has to be analysed separately but it it also necessary to considered the overall picture as several inconveniences together can add up to the location being unsuitable for housing.

Safety aspects

These are the aspects that affects the safety considerations according to Boverkets “Bättre plats till arbete”.

Geographical conditions

The topography and terrain affects the spreading of emission together with wind direction. In a city like Borås with suurounding valleys the risk is higher that the gas stays for a longer time.

Geological conditions

Soil type and water conditions is of great importance on how quickly a leak reaches ground- and surface water. The risk of quick spread is higher with sand and cracked bedrock.

Meteorological conditions

The wind direction is significant for how gas leaks will spread. Yearly rainfall and variation of rainfall are factors that affects the risk of floodings and landslides.

Traffic and transport situation

Factors that affect the spatial planning are transport volumes, type of goods, the standard of the infrastructure, and the possibility to chose roads for dangerous goods.

Leaks

The leak could be in compact, liquid or gas form and can spread through different ways, like water or fire smoke. It can be big amounts of relatively innocuous substances or small amounts of toxical substances.

Fire

The process of the fire can vary and affect the surroundings in different ways depending on the form and features of the material. The extent of the fire depends on many factors, like winds, if there are gas tubes in the buiding, risk of spread to the surrounding etc.

-Smoke

It is hard to predict the substance of the fire smoke since a fire can consist of many materials. If the production is limited to just a few materials, the estimation is easier.

-Water

When a fire is put out huge amounts of water is often used. The risk of contamination is high if the water is mixed with chemicals in the facility, and no measures have been made before to gather the water.

Explosions

As with fires the affect of explosions is dependent on the surrounding environment and the material that is exploding. Differences in the force and length of the shockwave, radient heat and the layout of the surrounding results in big differences in consequences for humans and buildings. The shockwave can blow out windows several hundred meters away

Target in war

This one might seem far-fetched but in case of a war situation, communication facilities and power plants are examples of functions that should be placed in densly populated areas if it's possible.

Reference projects

TÜBINGEN, Germany

Tübingen is known for their work with co-housing. The city buys the land, former barracks, industrial sites etc. and prepares the concept with an urban plan and takes care of any decontamination and the social and technical infrastructure as well as public space. The plots are then sold through a competition for the public for best concept, thereafter the city manages the development. Ground floors have to be used for shops, workshops, offices etc and old buildings are integrated in the development. There is also a clear division between public and private space.



Figure 6.



Figure 7.



Figure 8.

NORRA SORGENFRI, Malmö

Norra Sorgenfri is a semi-central industrial area in Malmö. Here the municipality is working with a plan program with the aim to make it a part of the city center. Introducing housing and othter functions, while keeping the industrial character. The idea is to create opportunities for smaller businesses with small properties and a variation of developers. The development will take place during a long time, giving time to existing businesses to adapt to the new conditions or to move to another area.

KVILLEBÄCKEN, Göteborg

How the city of Göteborg handled the development of Kvillebäcken in Göteborg is a good example of how a transformation process shouldn't look like. The industrial area had problems with criminality, something the politicians pushed on in order to demolish the whole area, forcing all the businesses in the area to move. Today there is nothing left of the original buildings, the area was divided between a few big developers which has resulted in a homogeneous area with expensive apartments and a few cafés and shops.



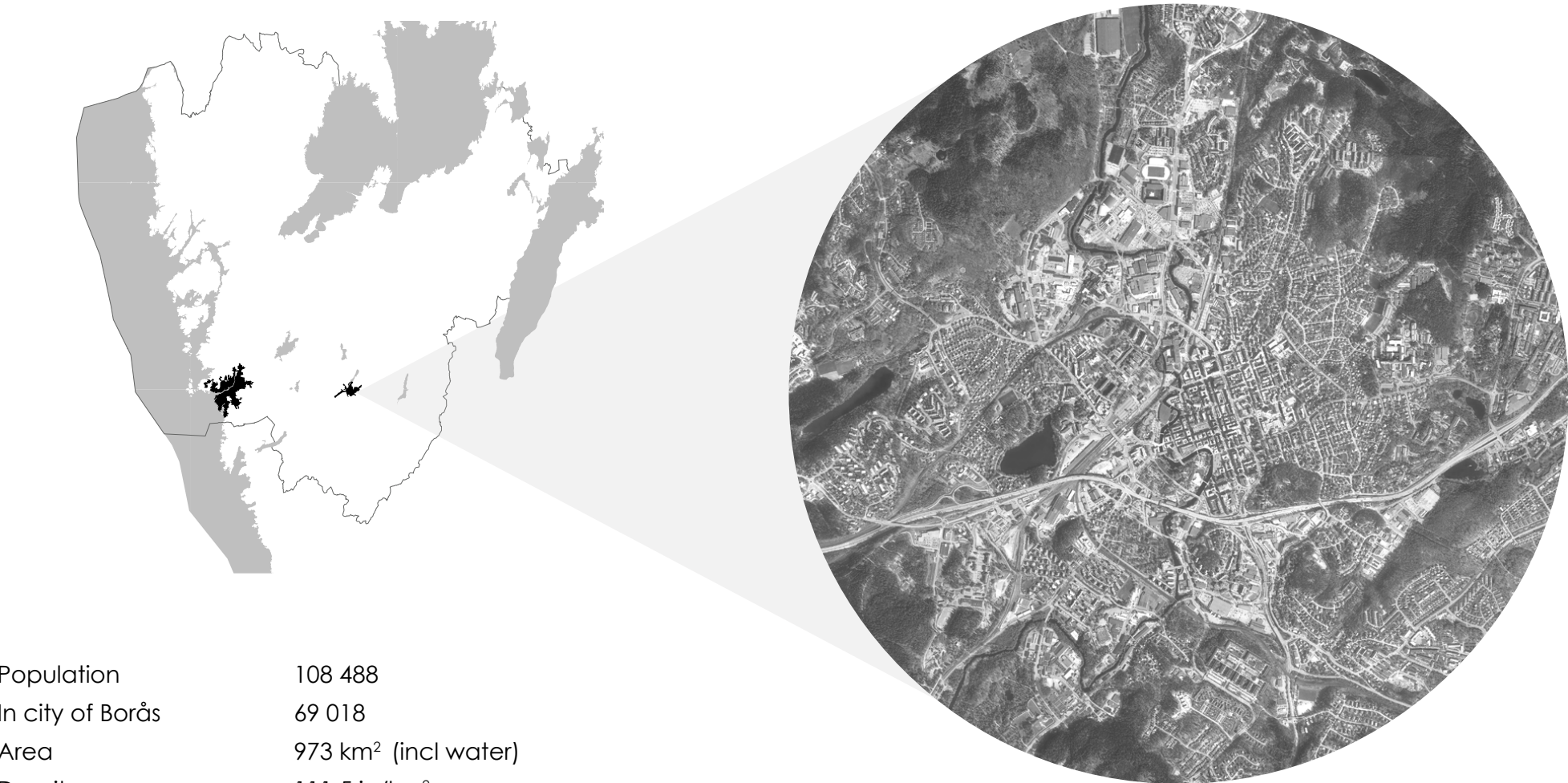
Figure 9.



Figure 10.

THE CONTEXT

Borås



Population	108 488
In city of Borås	69 018
Area	973 km² (incl water)
Density	111,5 in/km²
Work places	55 648
Population increase	1 466

Numbers of 2015.

Textile history of Borås

In the 16th century Västergötland had become the livestock center of Sweden. The main way of selling the goods was by traveling from village to village selling the products along the road. This unregulated huckstering (gårdfarihandel) wasn’t popular by the state, who requested to stop the business or build a new city where the trade could be regulated. In 1621 the city of Torpa was founded, which after one year got the name Borås from one of the hills next to the city. The location of the city was chosen because the place had been a gathering point for the hucksters or “Knallar” as they are called in Borås, travelling tradesmen who sold their products at farms.

Already in 1690 the first dye house was established along the river Viskan, and soon more dying houses followed. The location at the river wasn’t important because of water power but for processing water for the dying. Beside the dying businesses there were also small tobacco spinneries and iron manufactories active in the 18th century.

The introduction of cotton in the 19th century meant a boom for the textile industry in Borås. New textile factories, weaving mills and dying houses were established within the city and after 1860 also on the countryside outside the city. Most factories got there

power from steam engines, only one factory used the river for power. In the end of the 19th century the extension of the railroad to Borås made the city even more competitive. Between 1875 and 1910 the factories increased from 16 to 97 and Borås became the quickest growing city in Sweden. The growing textile industry led to better conditions for other industries as well with new brewhousues, dairy plants and other factories.

In the beginning of the 20th century the transition to electricity was realized on a rather short period of time. Borås came to be the center of textile production in Sweden, with Norrköping behind and in 1930 there were 253 factories producing 25 % of the textile in Sweden. From north to south of Borås River Viskan was surrounded by factories, most often turning their backs to the river.

Around this time mail order companies were established as well, as a new link between the textile businesses and the customers. Borås was booming and after the Second World War new districts had to be built to all the labour migrants moving in to town. Most migrants were women and a third of all the female industry workers in Sweden worked in Borås.

The boom was followed by a sudden crash. The competition from abroad became bigger and many of the bigger textile companies were closed down in the 50’s and 60’s. In the trace of the closed companies the old industrial buildings were reused by new small businesses, making the crash smaller. Many of the biggest companies in Borås today were started around this time, with Ellos and Halens as the perhaps most famous ones. The city went through the crisis pretty well partly because many of the labor migrants left the city and because of the replacing businesses, and the textile industry is still an important part of the identity of Borås. There are traces everywhere from the glory days but there are also a lot of clothing companies based in Borås today, they have the Swedish School of textiles and the newly built Textile Fashion Center, continuing the tradition of textile in Borås. (Häggström, 2004)

Timeline

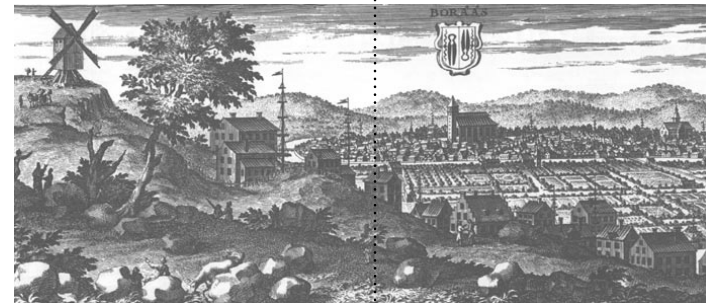
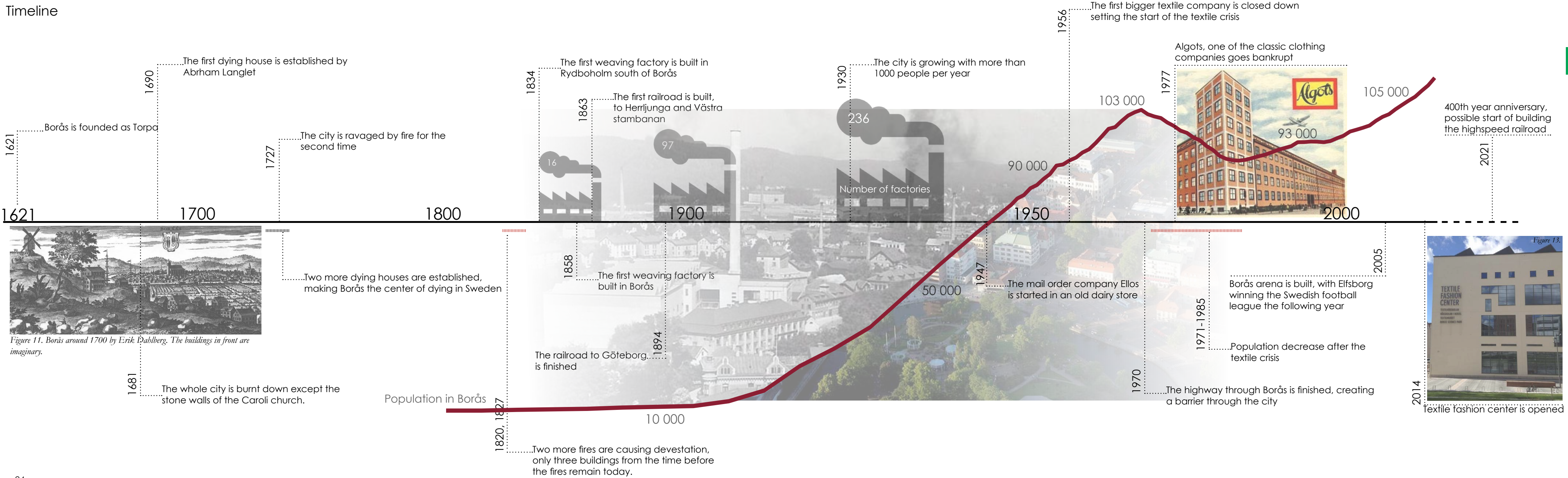


Figure 11. Borås around 1700 by Erik Dahlberg. The buildings in front are imaginary.



Figure 12. Algots, one of the classic clothing companies goes bankrupt



Figure 13. Textile fashion center is opened

Viskan - The river and the city

Without Viskan Borås wouldn't be the city that it is today. The reason why the textile industry became that big in Borås was mostly because of the lime-rich water, which was suitable for processing water. Only one of the bigger textile factories has used the river to produce power. Since the first dying houses and weaving mills was established along the river, Viskan has been the artery of Borås. (Häggström 2004) The industrial establishment along the river has mostly followed the river, making the river less apparent in the cityscape. Traditionally the river has been the backside of the city and as late as in the 80's there was suggestions on putting the river in culverts to create more space for parking. In the last decades the advantages in Viskan has been noticed and today the municipality is trying to highlight the river and is working with improving the accessibility. "Staden vid Viskan" (The city at Viskan) from 2002 is a vision on how the city can be developed with the river in focus. Here it's written that Viskan and the buildings that represent the textile heritage should be highlighted and more accessible in the city. The public spaces should face Viskan and the water become a culture bearer and identity for the city, but also that housing should be built in attractive locations at Viskan. Especially the area south of the highway is pointed out as a good location for a mixture be-

tween housing and other functions that can create an interesting area close to the water and the industrial heritage. (Borås stad, 2001)

All the industries along the river haven't just left a trace in the built environment. There are stories saying that Viskan was like a floating rainbow with shifting colors coming from the outlet water of the dying factories. Already in 1908 problems with dying fish because of the water quality was reported. The river isn't that polluted in Borås since the water is moving. The problems are further downstream where Viskan is widened into lakes that have worked as traps for the pollution. Here the pollutants are stored in the bottom sediment. The county government and the municipality are investigating how the pollutants are affecting the environment and which measurements that can be made. (Länsstyrelsen, 2004)

Viskan highlighted. The numbers show where the pictures on the next spread is taken.



Figure 14. The block Vestindien in Simonsland that has been refurbished into the new Textile Fashion Center.

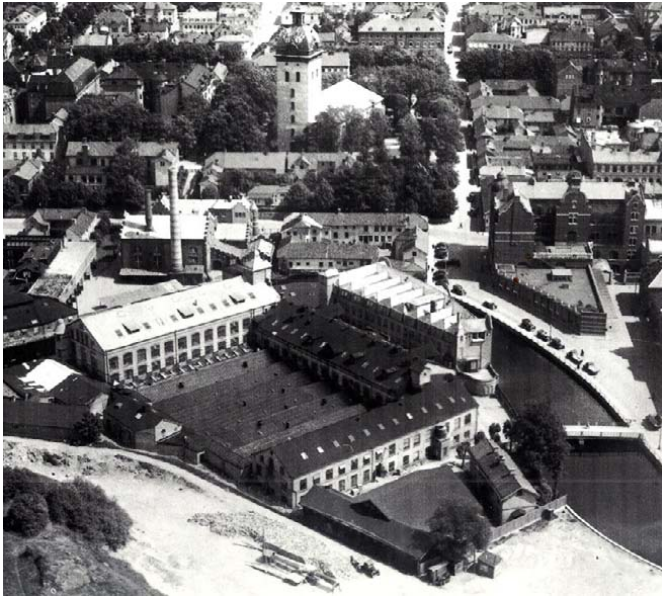


Figure 17. Viskaholm factories from above. Caroli church in the background.



Figure 15. View over Krokballstorget and Viskaholm from the Caroli church.



Figure 18. Chimneys pointing out where the factories are and where Viskan continues. Simonsland to the left holds the new Textile Fashion Center.



Figure 16. Södra torget next to Viskan flooded in April 1951.

A walk along Viskan

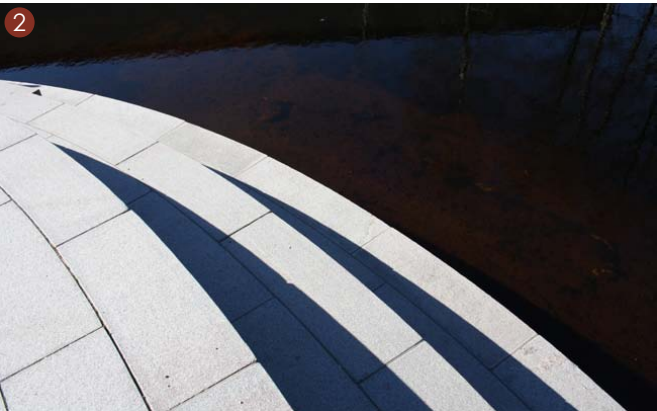


Figure 19-35.

Borås today

As written before Borås survived the textile crisis and has continued the textile tradition but on another level. As seen on the graph to the right, production only stands for a small amount of the jobs today, while the office and commerce sectors are much bigger. Borås is becoming an important logistical hub as well with new warehouses being established. The location in the region being close to Göteborg and Landvetter airport is an important factor for this growth and a dry port is planned in Viared west of the city center. Borås is as the second biggest city a vital part of the region of Västra Götaland with the commuting between the two cities on place number three in Sweden in number of commuters. The planned high-speed railroad between Göteborg and Stockholm will have a stop in Borås which will result in travel times to Göteborg and Jönköping being cut by half. The planning of the different alternative stretches through the city has become a hinder for the city’s planning of development on central locations, which is one of the main aims with the comprehensive plan.

The municipality is growing with more than 1000 inhabitants per year, something that puts pressure on new housing units, schools and other functions. In the “game rules” in Borås comprehensive plan from 2006 some of the rules on development aim to prioritize

reconstruction and densification with a mixture of housing types and sizes. One of the rules is also that housing should be mixed with other functions that don’t disturb each other, something that really relates to the topic of this thesis. Since the comprehensive plan is a bit outdated, a new plan is under development that will give the municipality new guidelines to follow.

Demography

Occupation

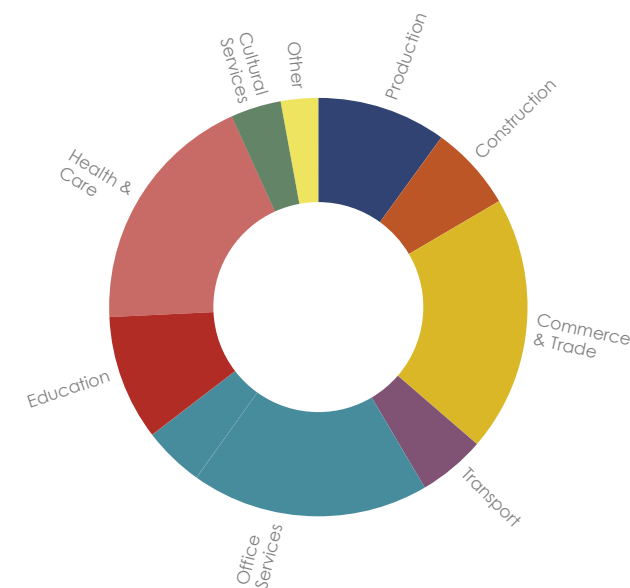


Figure 36.

Unemployment

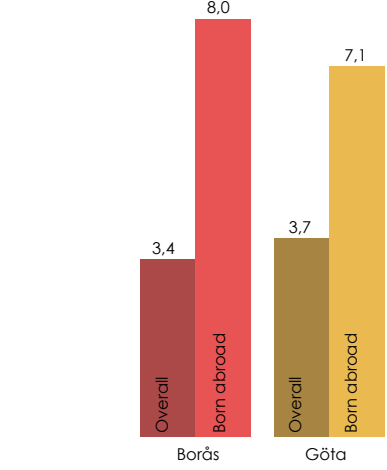


Figure 37.

Education

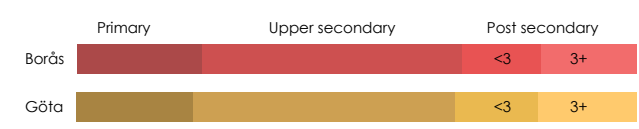
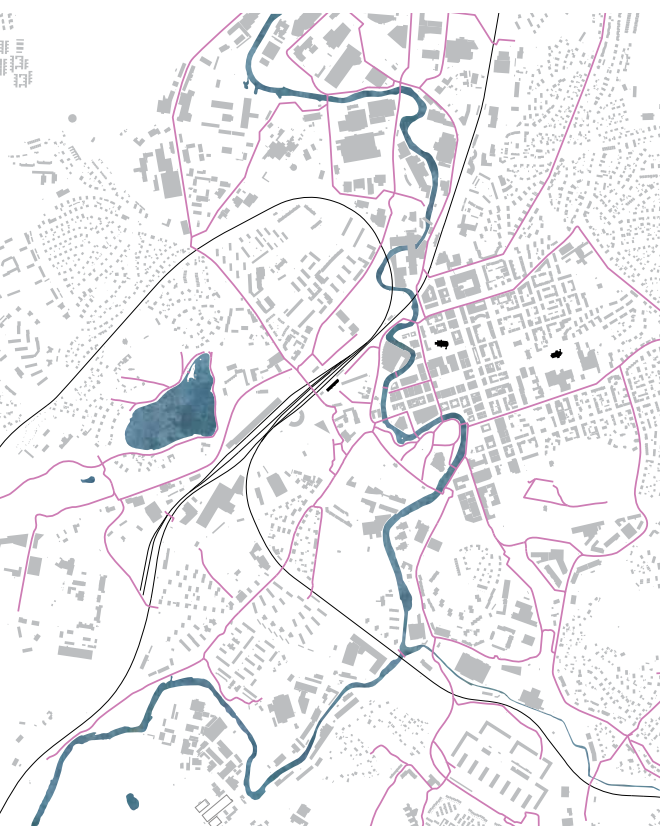
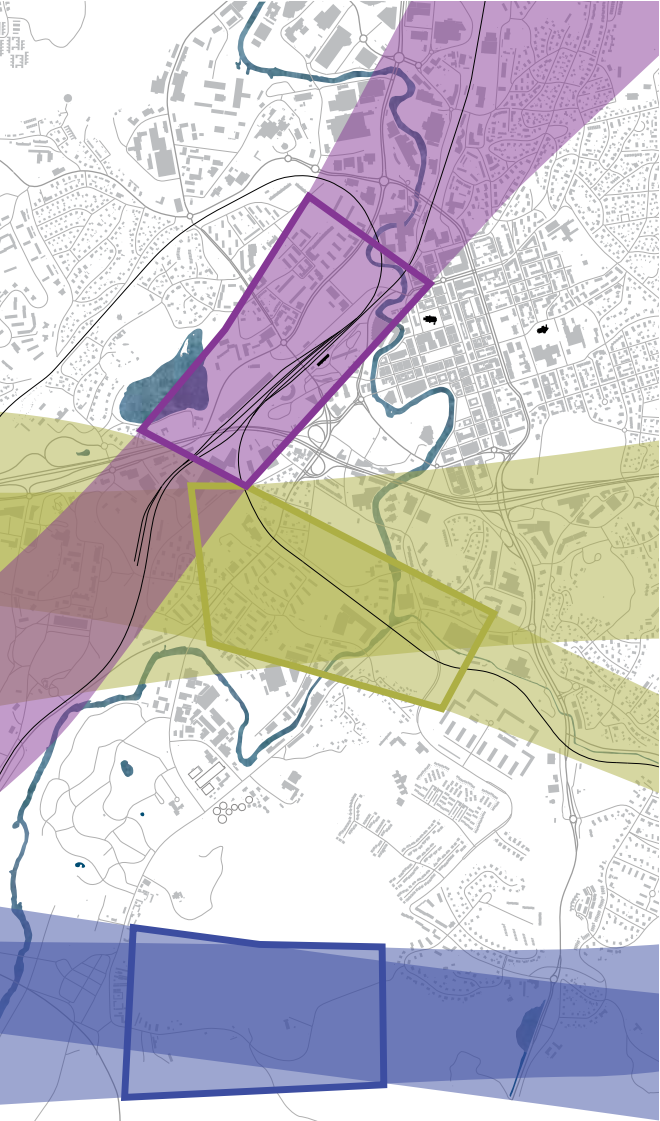


Figure 38.

Highspeed railroad

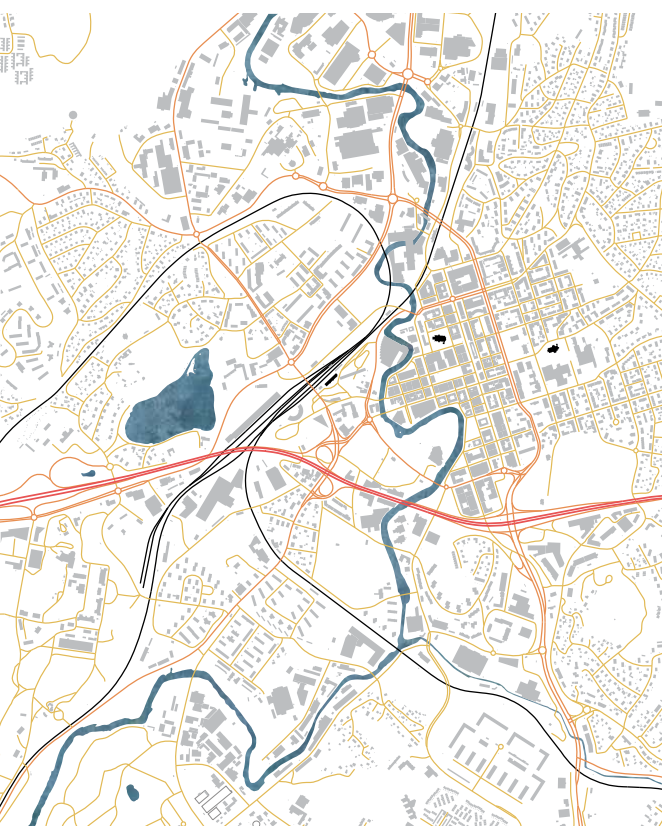
The planned highspeed railroad between Göteborg and Stockholm will have a stop in Borås. Right now there are three alternatives with Borås seeing the central location (in purple on the map on next page) as the only alternative. The yellow alternative would have a station in Göta, and the third is further south of the city, both close to Gässlösa.

Analysing Borås



Bike paths

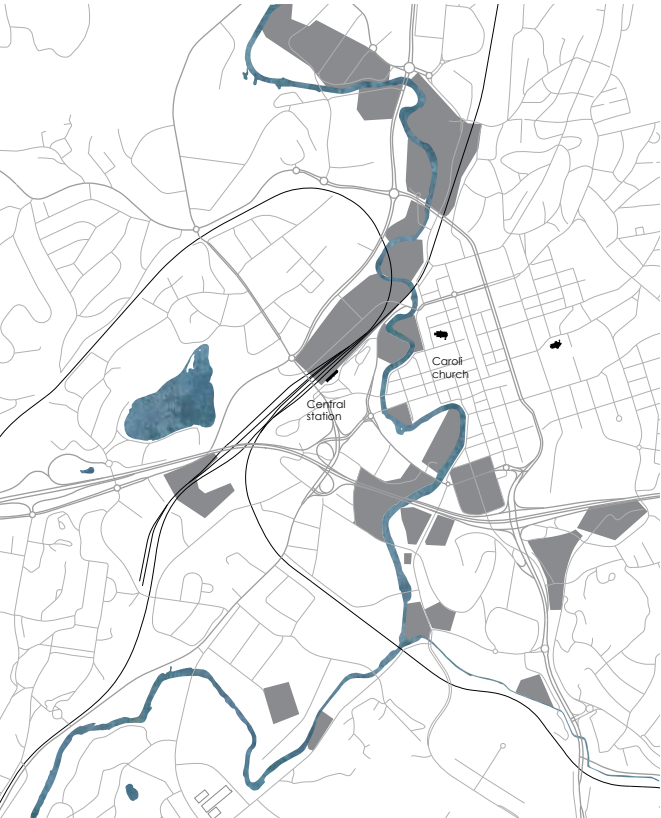
Borås is a hilly city with the central parts lying in a valley. That could be one main reason to why the city hasn’t invested much in bike paths until now. There are paths along the main roads out to the districts around the city center, but there are rarely any bike paths within the districts.



Roads

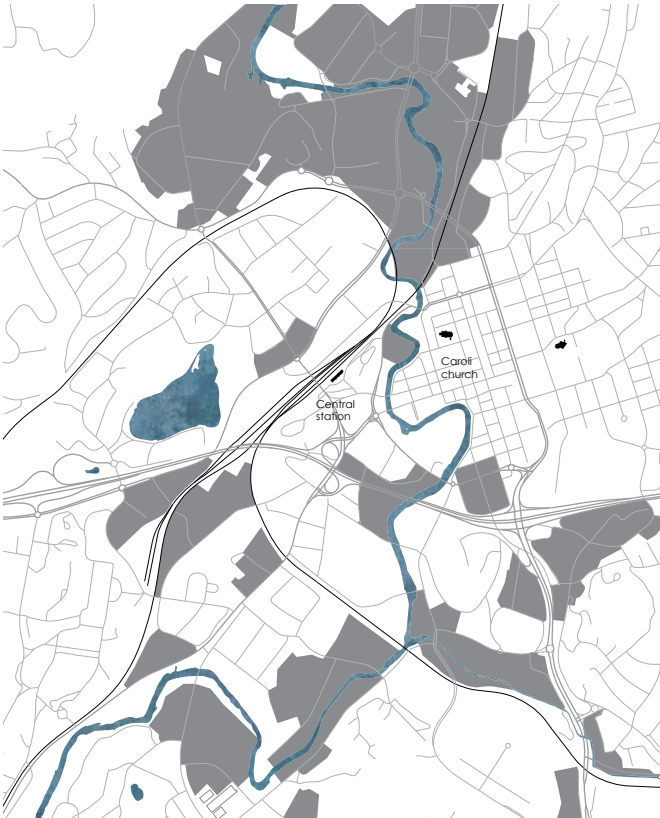
The railroads and most of the bigger roads pass the central parts of Borås. The railroad station is placed just west of Viskan and the highway is cutting through the city from east to west. The good connections is a resource for business and commuting but also create barriers through the city.

Industry along Viskan



Industry 1910

It is clear that the river Viskan has been important for the industry’s establishment when looking on a map. In 1910 almost all land along Viskan was taken up by industry, apart from the most central part of the city. The water was used as process water and not for energy as one could think..



Industry today

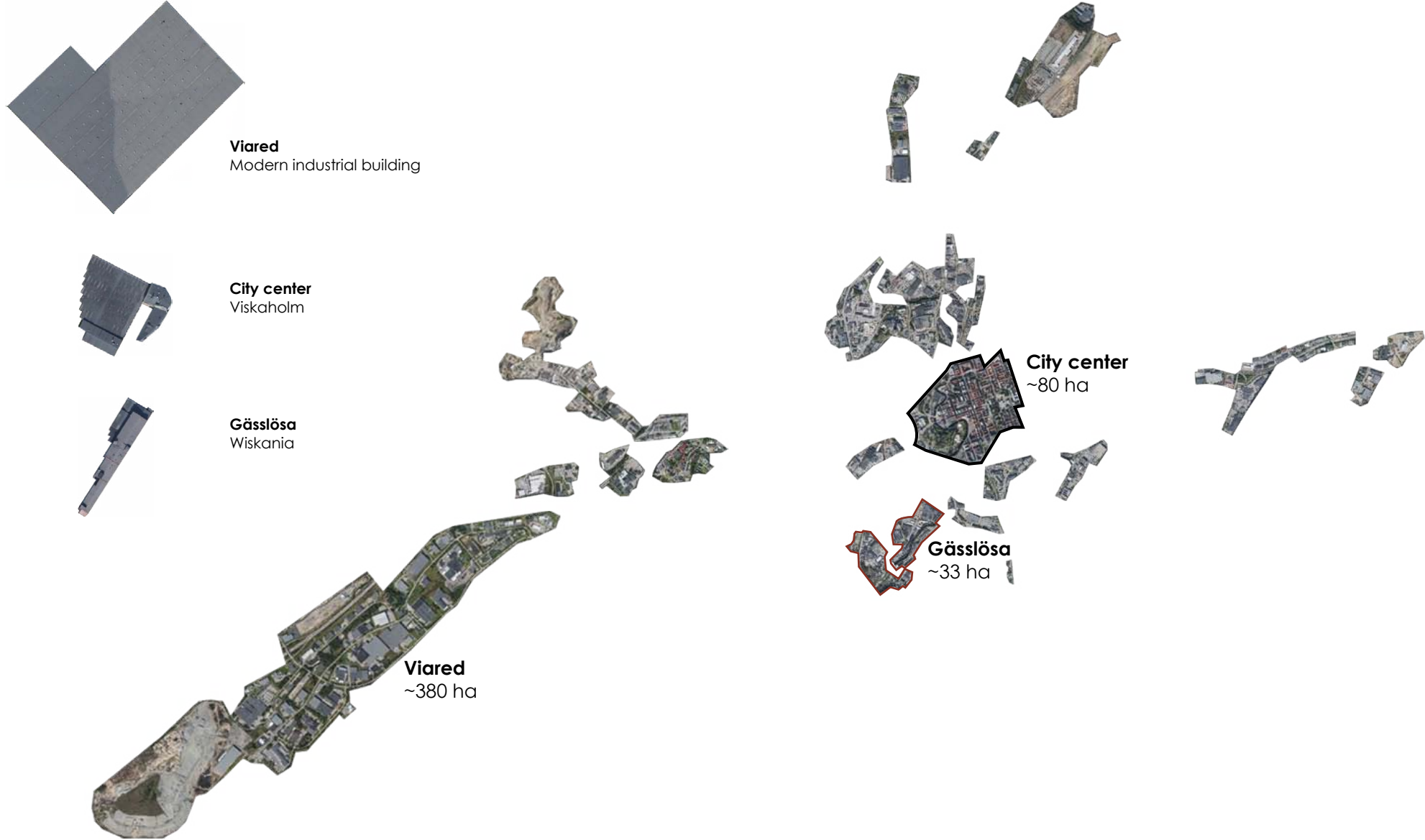
The location of the industry in the central parts isn’t that different today from a hundred years ago. The industry is still by the river but have also grown outward. Some of the most central industries are gone. The water is barely used by the industry anymore and the city is trying to make the river more accessible.

Industry in Borås today

The needs and character of the industry has changed a lot over the years. If the location of the industry could tell were the river was flowing a hundred years ago, it is the placement of bigger infrastructure that can be told by looking at the location of the industry today with industrial corridors along road 40 in the west-east direction and along road 42 to the north. Viared is the absolutely biggest industrial area in Borås with a length of over 5 kilometres and an area of around 380 hectare, compared to the city center that is around 80 hectares in size.

The reason to the size of Viared is mainly the fact that industrial buildings are much bigger nowadays. Modern warehouses and production facilities need a lot of space, also outdoors for cargo and the possibility to expand.

Modern industrial buildings can be hard to transform into other usages because of the size. Industrial buildings built before the 1960’s are usually smaller and built with more robust materials, making it easier to transform them.



THE SITE

The site



The location of Gässlösa

The industrial area Gässlösa is located a bit more than one kilometre from the city center of Borås, with the industries situated along the river. It's hard to say where Gässlösa starts and ends. The industries in the red dashed area between the sewage plant and the cemetery are definitely part of Gässlösa. The area that I have chosen to work with is the red marked area along the river, between Göta and Kristineberg and is a bit harder to relate to a certain district. The part east of the river is along Gässlösavägen and can surely be defined as a part of Gässlösa but also to Furuberg which is the villa area to the east., while the industries west of the river could be defined as part of Göta. I have chosen to define all the industries in the area as part of Gässlösa to make it more understandable.

In a few years the sewage plant in Gässlösa will be closed down, which will open up the opportunity to develop the nearby area. As Borås is growing with more than 1 500 people every year the municipality is looking for new central locations to densify, especially along the river. The reason why I have chosen to only work with the north side of Gässlösa is because of its location along both sides of the river, the interesting older buildings, and the location between Göta and Kristineberg. All this together creates an interesting environment suitable for transformation.

The story of Gässlösa

The story of Gässlösa has its beginning in year 1890 when Kamgarnsspinneriet (worsted yarn spinnery) facility was built beside Viskan, in a at this time rural location together with dwelling for the workers and villas for the officials. The area didn't develop as much as other industrial areas and it took 26 year before the next industrial business was established. In 1916 N.H. Ljungbergs leather factory was built on the other side of Viskan in 2 ½ floors with red brick on the façade of the ground floor and wood on the other parts. Apart from some additions to the existing buildings not much changed in the area until the middle of 1950s, but outside the industrial site the city was changing. The municipal sewage plant was built just south of the area 1933 and meant a big improvement of the water quality in Viskan. In the end of the 1930s the district of Göta was built just east of the site, at this time the biggest continuous apartment district in Borås. Already in the General plan from 1930 there were plans on changing the path of Viskan to create new land for industrial establishment. This was realized in the middle of the 1950s. On the new broad street a railroad track was laid in the middle and most new businesses and buildings were added between the 1950s to the 1970s. After that some buildings have been extended and got new facades resulting in today's appearance.



Figure 39. Gässlösa still part of the countryside, with Viskan still having its old stretch with a bend just north of Kamgarnsspinneriet in the middle.



Figure 40. The Wiskania shoe factory, originally N.H Ljungbergs.

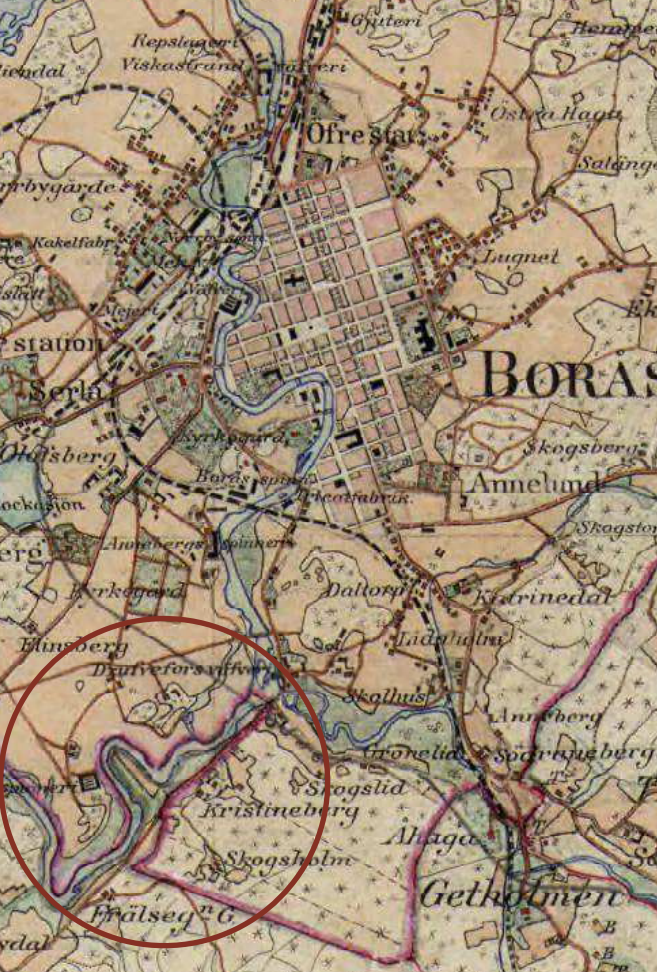


Figure 41. Map of Borås from 1897 with Gässlösa marked. Only Kamgarnsspinneriet has been built, situated along the old stretch of Viskan.

Distances



Even if Gällösa is situated 16 minutes walking distance from the city center, most people haven't heard about the area or if they have, they haven't been there.

Göta and Kristineberg don't feel like neighbouring areas today. A transformation of Gällösa would make it easier to move between the areas and could shorten the mental distance.

It takes 18 minutes to walk to the central station which can be translated into 6 minutes by bike. With the new highspeed railroad Gällösa could be only 45 minutes from Göteborg or Jönköping, making it easy to commute.

Site analysis



Barriers and overpasses

Borås is a divided city with highways and railroads cutting through the city, as well as Viskan does. Several over- and underpasses still makes it fairly easy to move around, at least north of the Coast-to-coast railroad. South of the railroad the number of connections is reduced which limits the alternative routes and makes it harder to move around freely.



Urban morphology

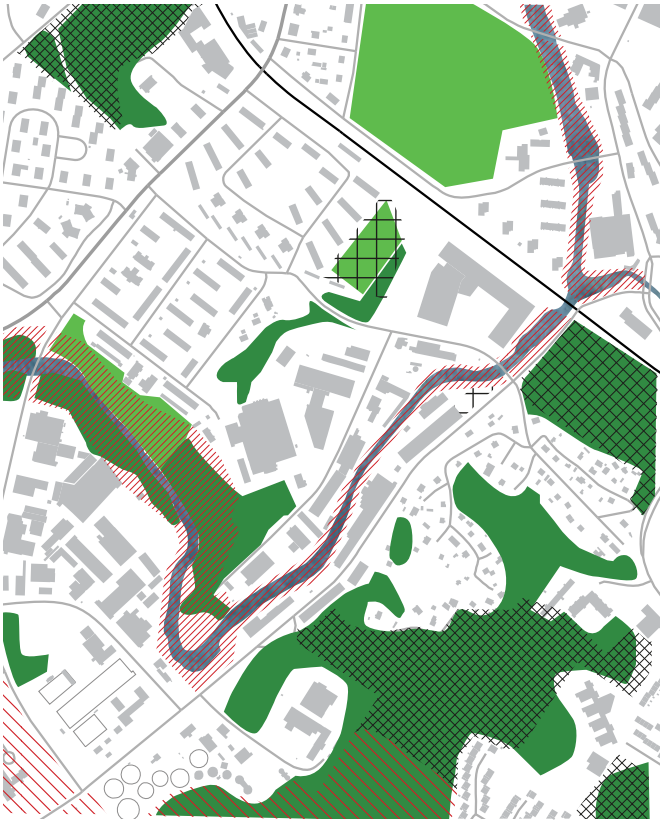
Comparison between Gällösa and the city center of Borås. Gällösa covers the most central parts with the square and Caroli church almost disappearing beside the large buildings.

Greenery

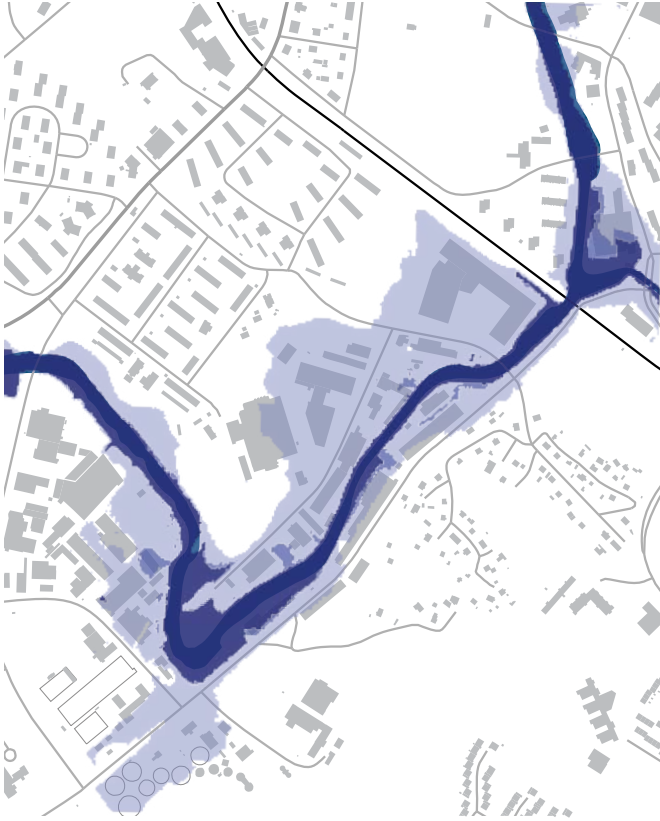
The river has high natural values and is important for recreation. The park along the river west of Gässlösa also has high values both for nature and recreation. Apart from that there isn't much greenery within the area, but all the more just outside. A redevelopment in Gässlösa wouldn't remove any greenery but create possibilities for housing in a close to nature-environment.

Flooding

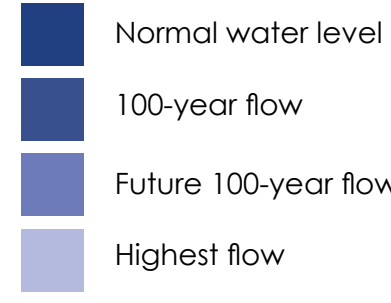
As the amount of rain might increase in Västra Götaland due to climate change the risk of flooding in Viskan will increase. Today there are rarely any floodings in Viskan through Borås. The 100-year flow would flood parts of the nature in the south, and the future 100-year flow wouldn't flood much more. The highest flow covers almost the whole area but is calculated to happen only once in 10 000 years, meaning that a devastating flooding is unlikely.



Greenery and green plan



Flooding



Municipal owned land



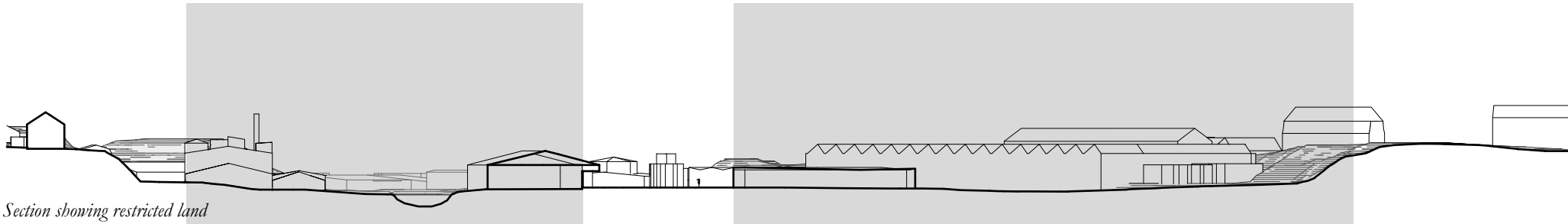
Restricted land (fenced)

Municipal owned land

The municipality of Borås owns the land with roads and the nature in the area, and some of the properties. The strategic department have plans on developing the area when the sewage plant is moving and the municipality are buying more land in the area when there is an opportunity, to increase their possibilities to control the development of the area.

Restricted land

All the industrial properties in the area are fenced, restricting the accessibility for the public. The businesses are gathered around Viskan making a stretch of more than 500 metres along the river inaccessible. The movement is limited with three entrance points to the area without any alternative choices of paths within the area.



Character of Gässlösa



Materials of Gässlösa

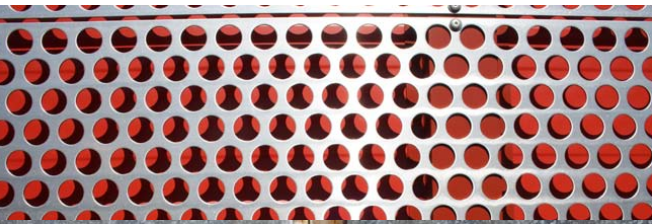
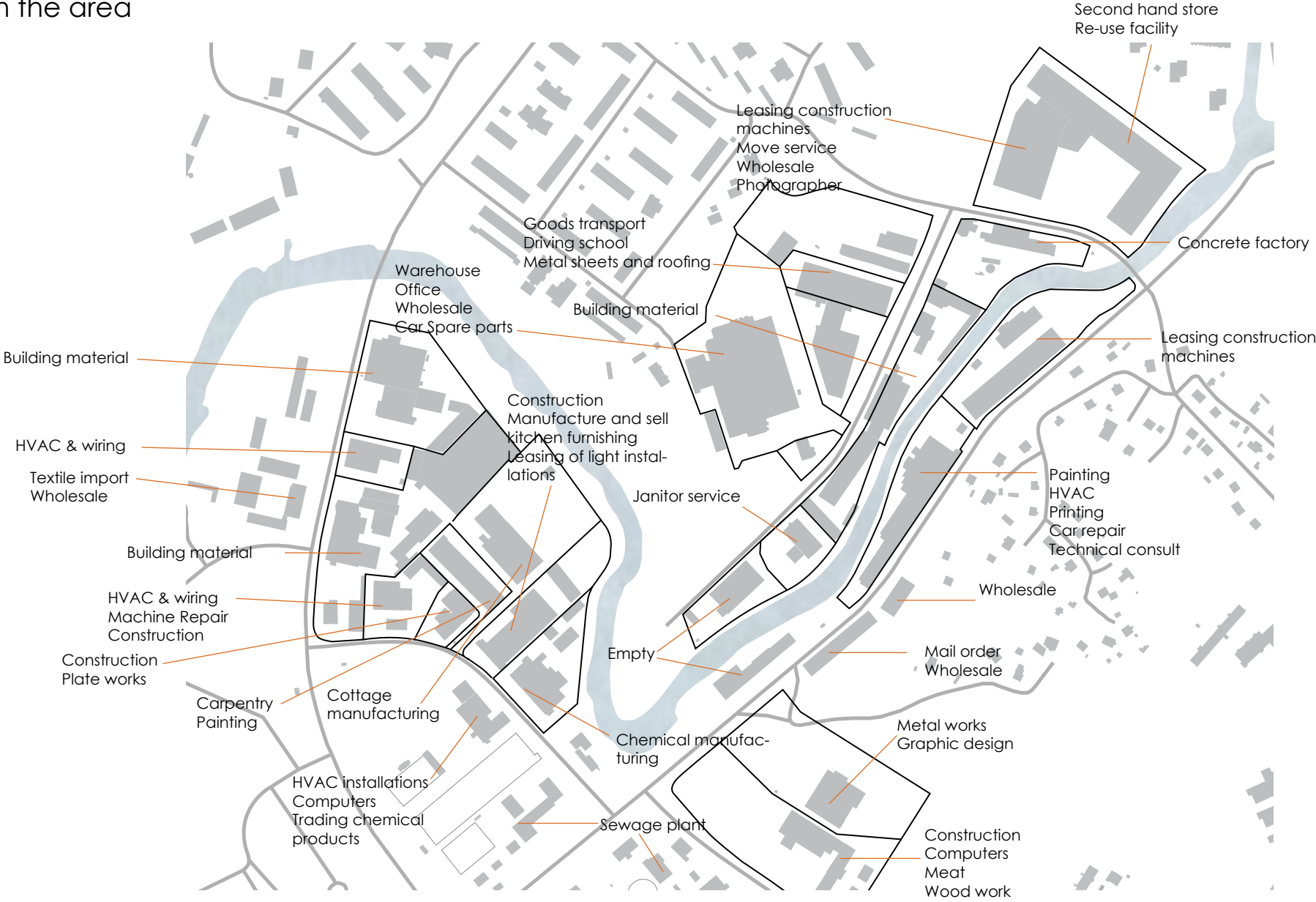


Figure 42-51.

Figure 52.

Businesses in the area



Companies on site

52

Employees on site

621

Size of business

0 employees:	15
1-2 employees:	12
3-4 employees:	5
5-9 employees:	6
10-19 employees:	6
20-49 employees:	6
50-99 employees:	0
100-199 employees:	2

The statistics were gathered from SCB and was updated 2016-04-11. Still there can be numbers that are incorrect. This is because the company can be registered on an address on the site but have a majority of its employees elsewhere, as well as it could be the opposite. The numbers should be seen as an indication rather than the whole truth. For example the two companies with 100-199 employees is unlikely to have anything near those numbers of employees.

There is a wide variety of businesses in Gässlösa. From chemical manufacturing to more service based businesses like offices and smaller stores. A sector that stands out is all the craftsmen, electricians and carpenters that are based in the area, with more than 10 companies working within this field. These are businesses that could be compatible with housing and mix-use if they can have an efficient storage of material and machines that don't take up valuable land. A risk is that companies like this don't want to adapt and that they can't afford the raise in rent that might happen in a development process.

Another sector that is big in Gässlösa are stores for building material and it isn't hard to relate that to all the carpenters and craftsmen in the area. These are companies that generally need a lot of land for their business, which also can be seen on the property sizes on the map. They also require heavy traffic and often create loud noise, which make it hard to place them in a mix-use environment. An alternative that might be better both for the businesses and the city is to place the stores for building material further south next to road 27. A location that is more accessible with car, more visible and with fewer neighbors.

Another sector that needs a lot of outdoor space are the companies leasing out construction machines and cranes. This business might not produce

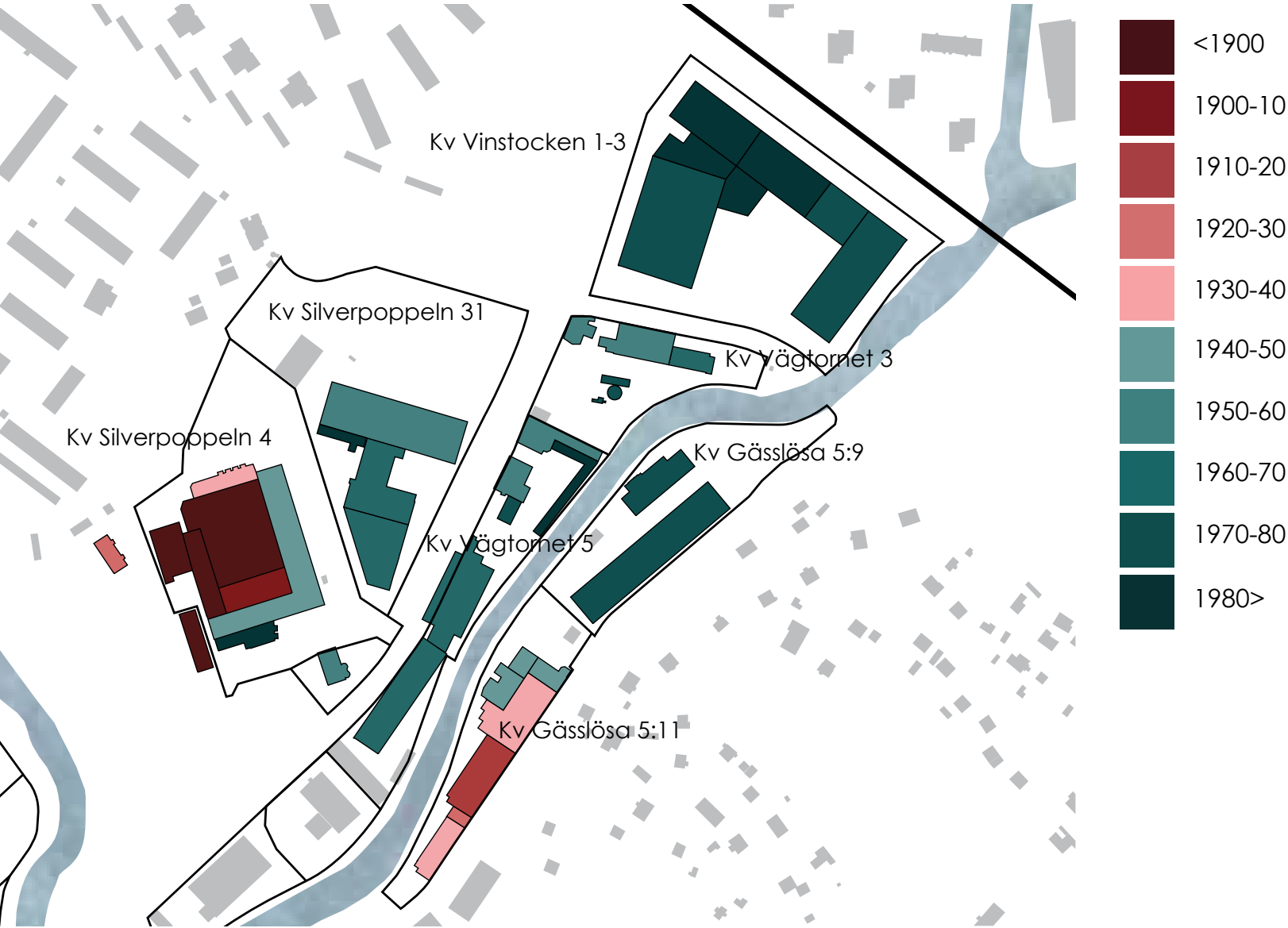
that much noise, apart from when the machines are collected, but takes up a lot of land that is fenced and inaccessible. If mixed with other functions and housing these hardstands has to be placed on a backside that can't be used for other functions anyway.

The wholesales and warehouses are businesses that need a lot of indoor space which can be problematic but also means that the noise levels from the business is kept lower. If it is possible to lower the amount of heavy traffic, open up the properties and place the loading docks on the backside, then it should be possible for the wholesale and warehouse industries to maintain their businesses.

Industries that by no chance can be part of the mixed city are the concrete factory and the chemical manufacturing. These create noise and heavy traffic but also a higher risk of accidents with dangerous goods. The sewage plant will be moved but creates smell and hygienically risks until the move.

Smaller businesses as car repairers, technical consults, printing facilities etc. is functioning in a mixed use environment as long as they follow the criteria for functional integration mentioned earlier on page 13.

History of the buildings



Kv Silverpoppeln 4

The building was finished in 1890 as the first industrial establishment in the area. It was built as a worsted yarn spinnery and was powered by two steam engines. After some economical struggles the company was bought by a corporate group and in the same year shifted to electric power. During the first decades of the 20th century the company had around 200 employees of which many lived in the workers' dwelling owned by the company. At this time they mostly produced half fabricate yarn that could be refined by their customers. After the Second World War the production was shifted to more synthetic yarn. The business was phased out in 1989, as the last worsted yarn factory in Sweden and the last spinnery in Borås. The building was bought the same year and rebuilt into an industry, craftsmanship, and office hotel.

Kv Silverpoppeln 31

The first building was built in 1957 with a red brick facade and was complemented in 1964-66 with new buildings for offices and storage. Originally contract manufactures producing metal components for Atlas Copco used the facility.

Kv Vinstocken 1-3

The first building was erected in 1976 and housed a warehouse for workwear, and space for offices. It was complemented between 1978 and 1985 with new

warehouses and a printing facility.

The second building was built in 1977 and was used both for storage and production. It was complemented between 1987 and 1990.

Kv Vägtorget 3

The first building was built for administration and residence in 1954, three years later the casting hall was built for production of concrete. The silos on site aren't the original but from 1974 and 1981.

Kv Vägtorget 5

The facility was originally built by Medbergs who sold building materials. Since the end of the 1960s Beijer who also sells building material are the owners. The first building was built in 1954 with a second floor added in 1969. In 1974 an extension was made south of the building in two floors. The latest extension is designed with inspiration from the design ideas of the 60's. The remaining parts has been clad in wooden planks and lost their characteristics. The second building was erected in 1955 as a gantry track, it was rebuilt in 1974 to house a store for building material. The building to the south was built as a warehouse in 1965 and has the same purpose today.

Kv Gässlösa 5:9

The buildings were built for Beijer in 1974, that had been active on the opposite side of Viskan since the

end of the 1960's. It was built as a planning mill and warehouse.

Kv Gässlösa 5:11

N.H. Ljungberg opened a leather store in central Borås in 1903. In 1916 they started production in the new leather factory. The leather was mainly produced for shoes. In the 1940s they started production of shoes and slippers. At this period they had 75 employees and the companies that were linked to the factory was gathered under the name Wiskania. In 1972 the company became employee-owned and 92 of over 100 employees became part owners. Wiskania produced shoes and slippers in the building until 1991 when the business was closed down. The first building, built in 1916 was built in 2 ½ stories with red bricks in the ground floor and wood on the other parts. It was extended to the south in three phases in 1922, 1927 and a bigger one in 1930. In 1936 a big extension to the east was made in dark red bricks in three stories. A tower in four stories next to Gässlösavägen marks out where the new building starts. The difference between the different periods of the building isn't that apparent today after refurbishments in 1939 and 1943 when the wooden parts was teared down and replaced by bricks. The facility is one of the best preserved in Borås and the chimney from the first building is still standing today as one of a few in Borås.

Evaluation of buildings and businesses

The evaluation form was created by me to make it easier to understand every building and business in relation to how compatible they are with a function integrated city. Using the criteria from Atlanta’s strategy on integrating light industry helped in the consideration of each business. In a few cases there wasn’t any perfect answer alternative, like with the concrete factory that actually isn’t in good condition but still have qualities interesting in an urban environment.

CRITERIA FOR FUNCTIONAL INTEGRATION

BUSINESS NEEDS

- Proximity
- Visibility

URBAN DESIGN

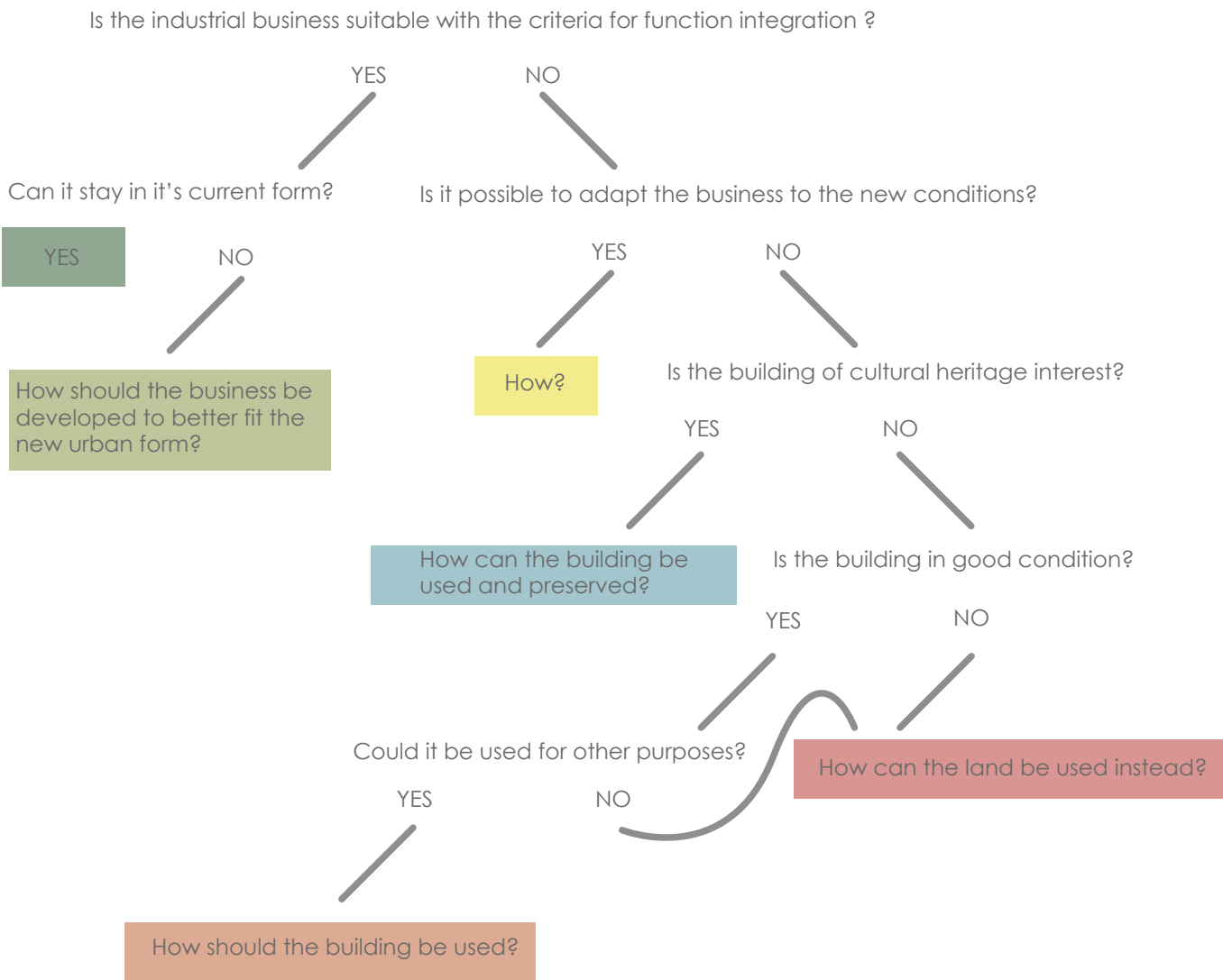
- Small blocks
- Pedestrian friendly
- Density

DISTURBANCES AND RISKS

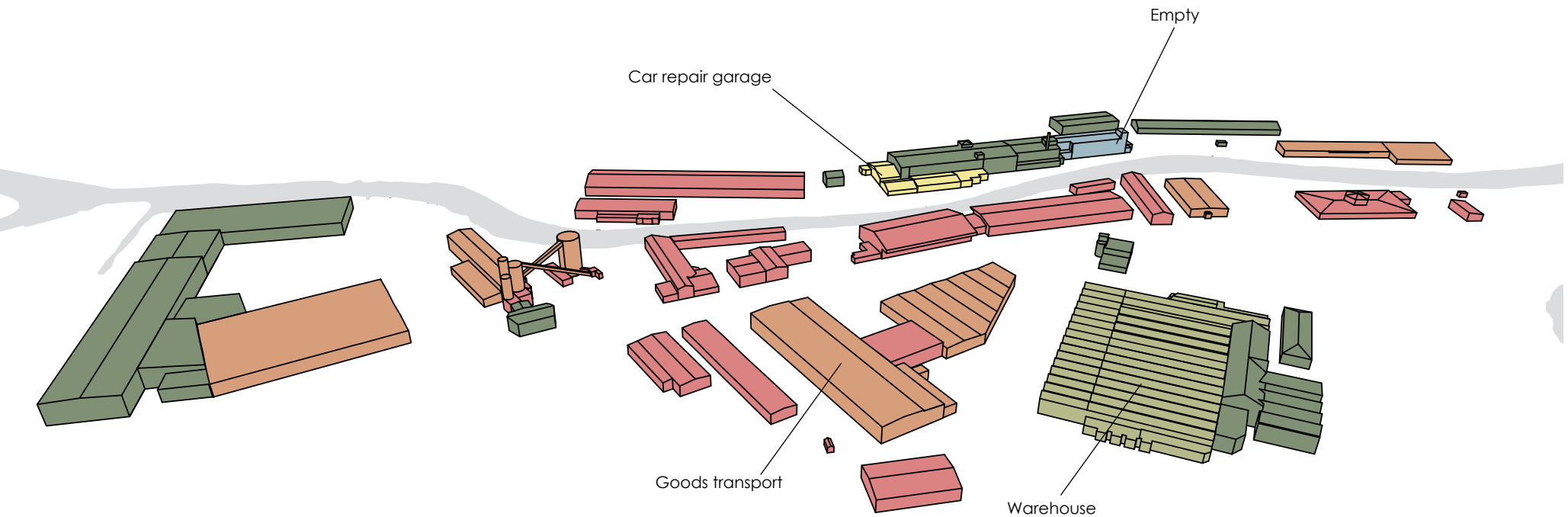
- Noise
- Vibration
- Traffic
- Pollution
- Other accidents

ECONOMIC GROWTH

- Niche industries
- Small plots
- Variation of developers
- Rent levels

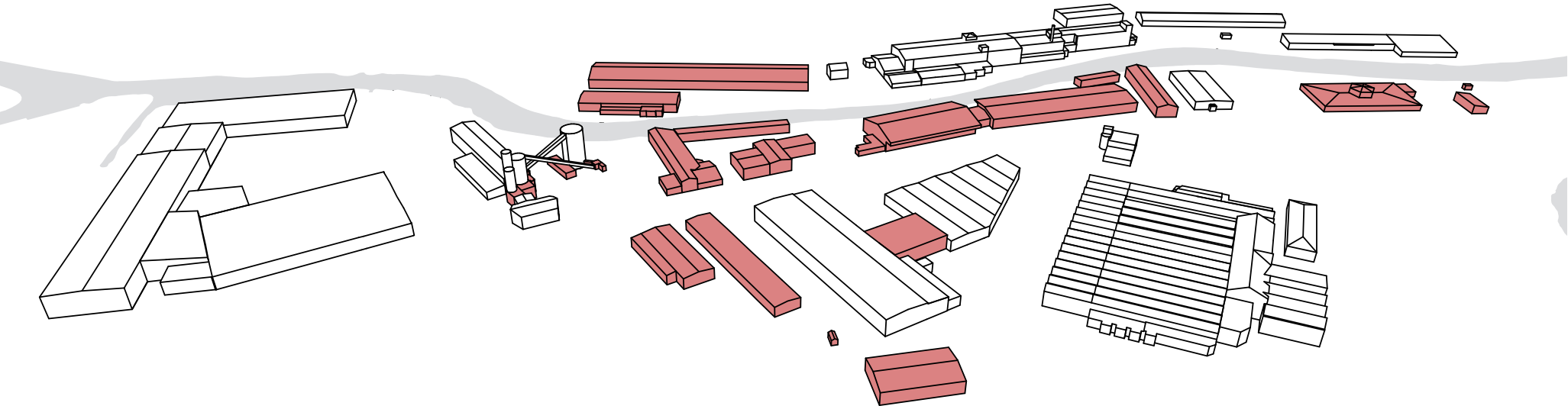


Result



The old Kamgarnsspinneriet and Wiskania are of cultural heritage but also houses industry and work-places that is suitable for function integration. The warehouse in Kamgarnsspinneriet can be discussed since it has a need of heavy traffic, but that can be solved by placing the loading docks on the backside and arrange a route for heavy traffic that reduce the disturbance. The buildings marked in red houses businesses that aren’t suitable in a mix-use environment and aren’t in good condition or isn’t worth of keeping compared to the values gained by removing it.

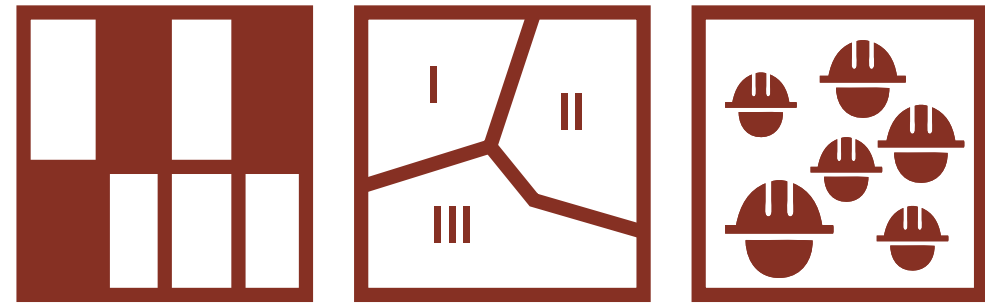
Buildings that will be exchanged



STRATEGIES

Strategies for Gässlösa

DEVELOPMENT



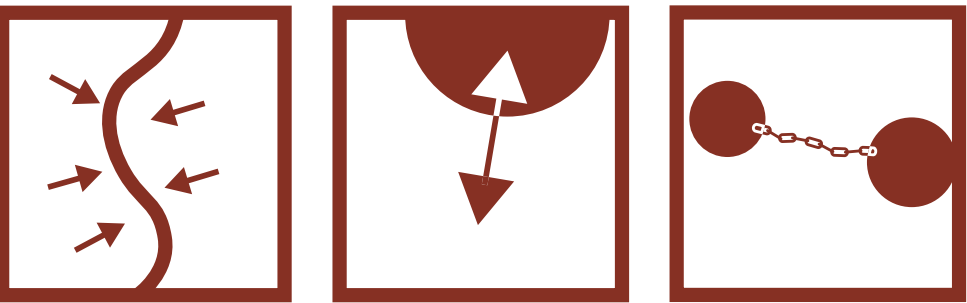
Small plots

Phases

Many and small
developers

- Variation in architecture, forms of housing and ownership
- Opportunity for smaller businesses
- Easier to develop and make changes over time
- More stakeholders that decides the development of the area

RELATIONS



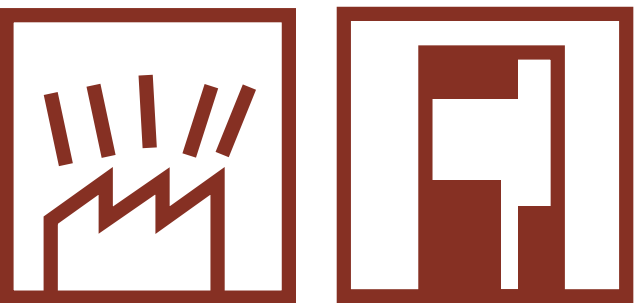
Strengthen water
connection

Connect to
city center

Link neighboring
districts

- Highlight the river as a place for recreation
- Use the river as a link to the city center
- The mental distance to the city center is reduced
- The site and the neighboring districts becomes a more apparent part of the city

THE BUILDING

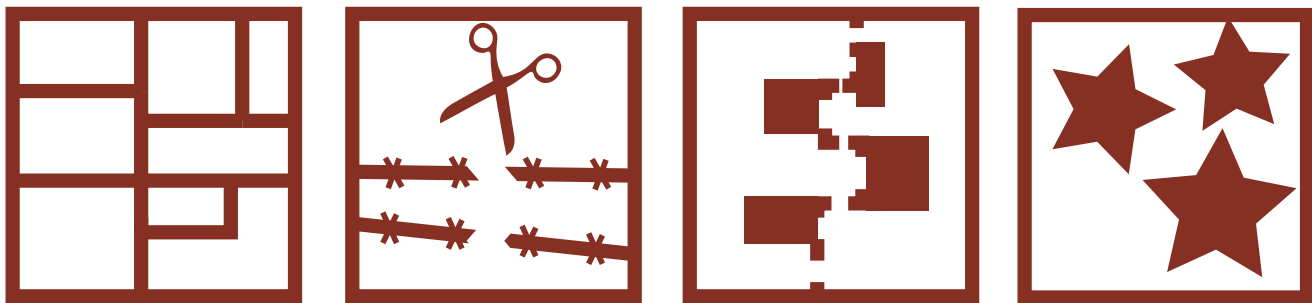


Highlight and
preserve

Function
integration

- Preserved industrial character
- Public spaces facing buildings with industrial heritage
- Mix of functions within every building for liveliness
- Relation between building and streetscape

PUBLIC SPACE



Integrated paths

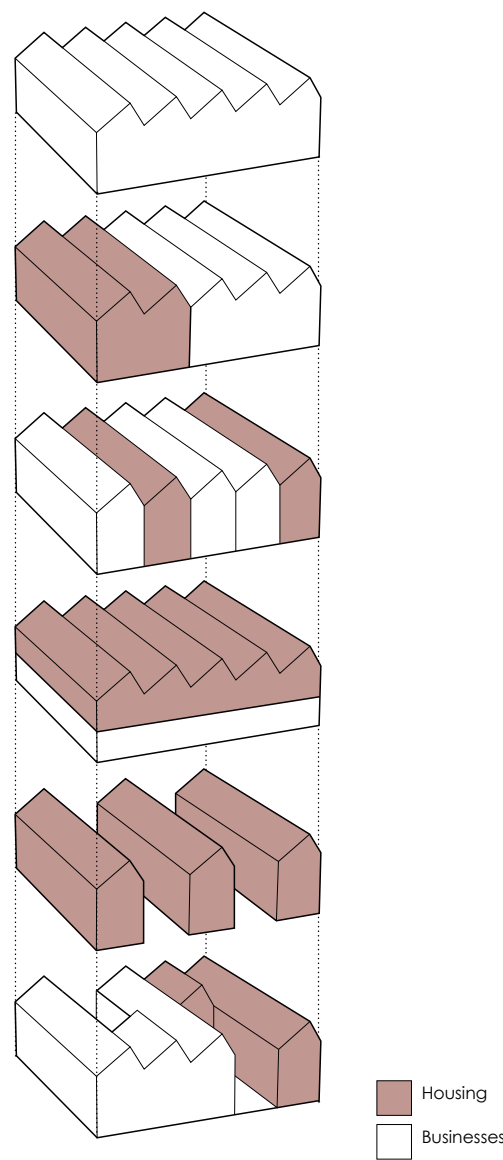
Open up
properties

Create and link
public space

Meeting places
& activities

- Easier to move around freely
- Increased accessibility
- Places for everyone that are easy to find
- Places and activities that attracts people and creates a vibrant environment

Strategies for an integrated industry



No transformation

Transform one part of the buidling into housing

Divide the building into smaller parts with housing and businesses mixed

Transform upper floor into housing

Transform the whole building into housing and remove parts to make it more adapted to housing

Remove parts of the buildingto make it more adapted to the needs of the tenants.

Housing
Businesses

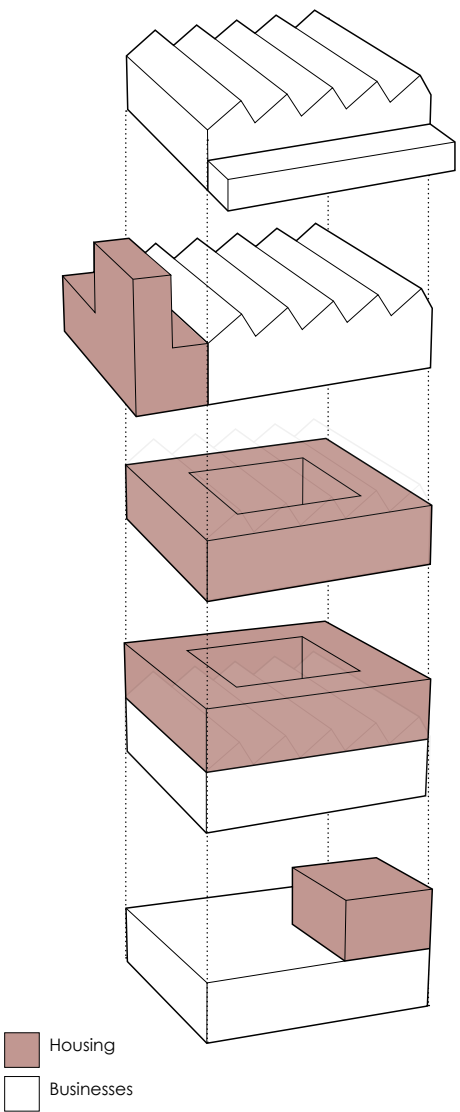
Extend the the facilities for the business

Add housing on the side of the industrial building

Replace the industrial building with a new building

Build on the roof of the industrial building

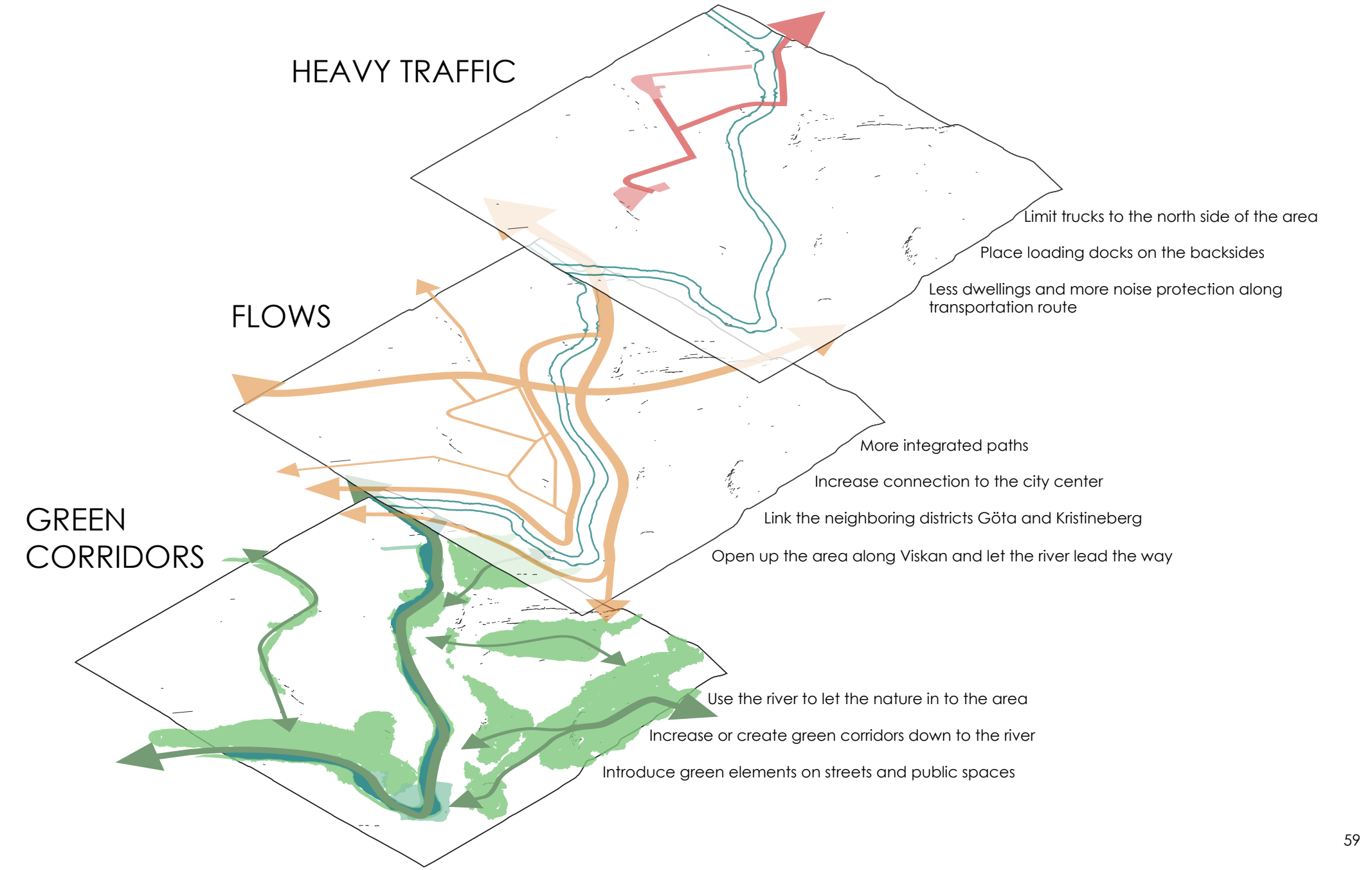
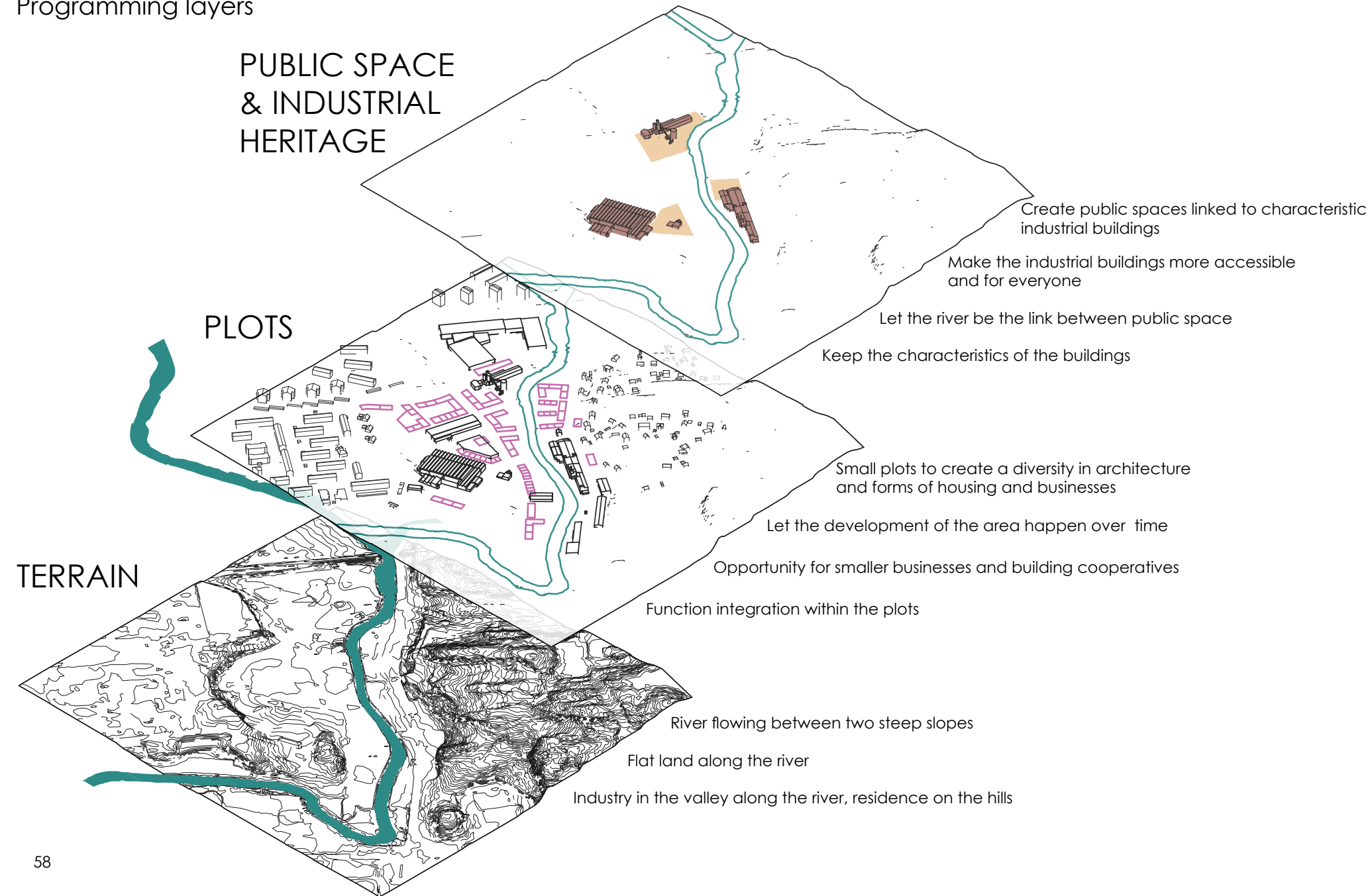
Build partly on the roof of the industrial building

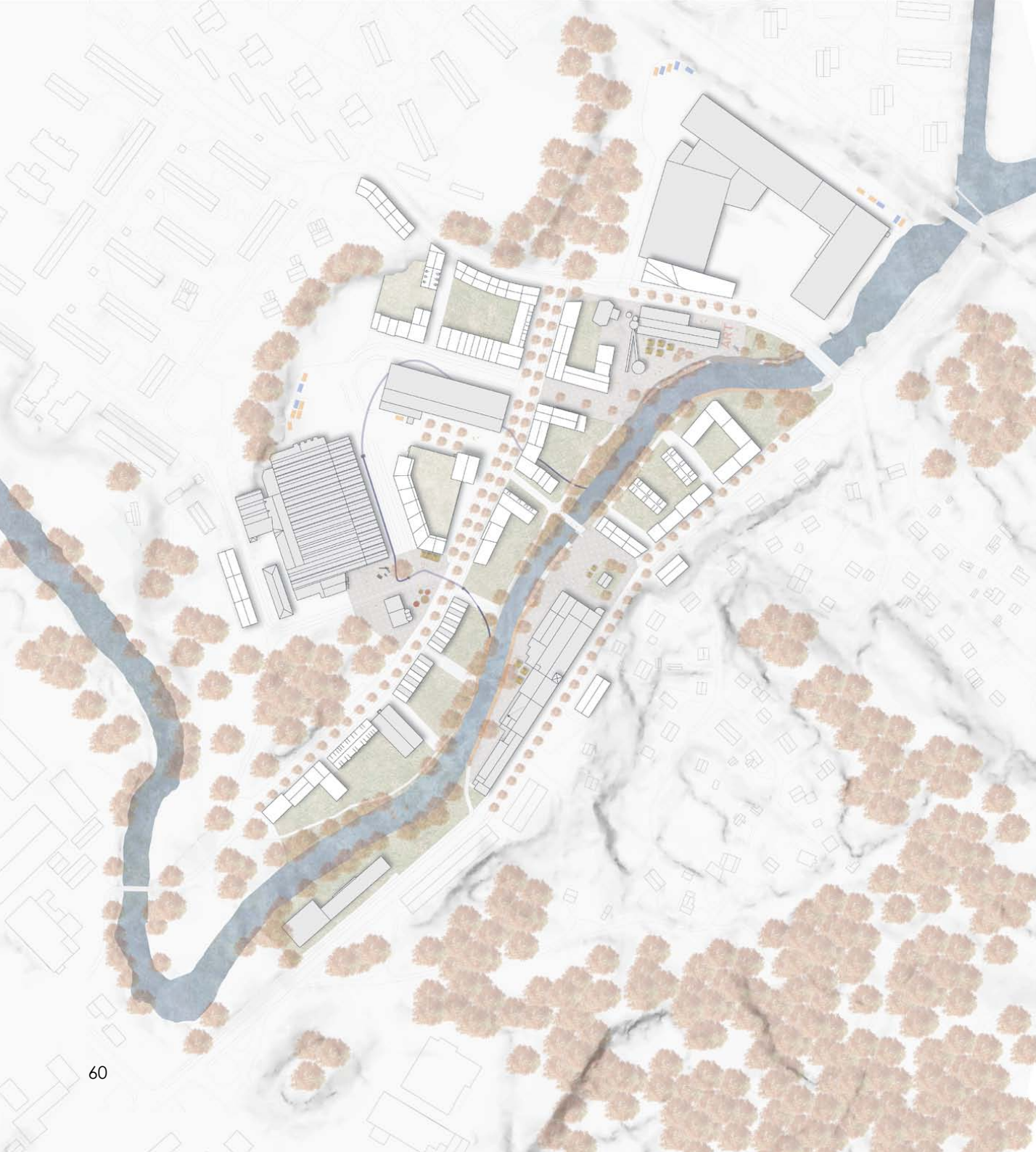


Housing
Businesses

THE PROPOSAL

Programming layers





Master plan

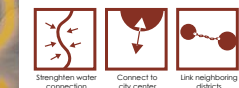
The master plan has been created from the strategies and the programming layers, together forming a new district where the industry is still very apparent, but more importantly a district where the river is accessible and where people both can live, work and hang out. The buildings marked in grey are existing buildings while the white are added buildings in the proposal. The added buildings are facing the streets, making the streetscape more vibrant and safe, and creating possibilities for businesses and activities in the ground floors. Whilst the sides of the buildings that are facing the river are more open. The land along the river is public, open and green with a few more important public spaces facing the river, being the main meeting places. The meeting places or squares are placed next to important industrial buildings to mark the place but also to give new life to the buildings.

The fences surrounding the industries are removed, making it easier to move around freely in the area. The open space that is needed by some industries for cargo etc. is placed on the backsides of the area, making them less apparent and disturbing. The old river stretch is highlighted with markings in the paving and on some parts with flowing water. This creates a stronger bond to the history of the place and a logical explanation to why some buildings are placed where they are.

Use of strategies



RELATIONS



Stronger water connection
River as a link to the city
Gässlösa as a link between
Göta and Kristineberg

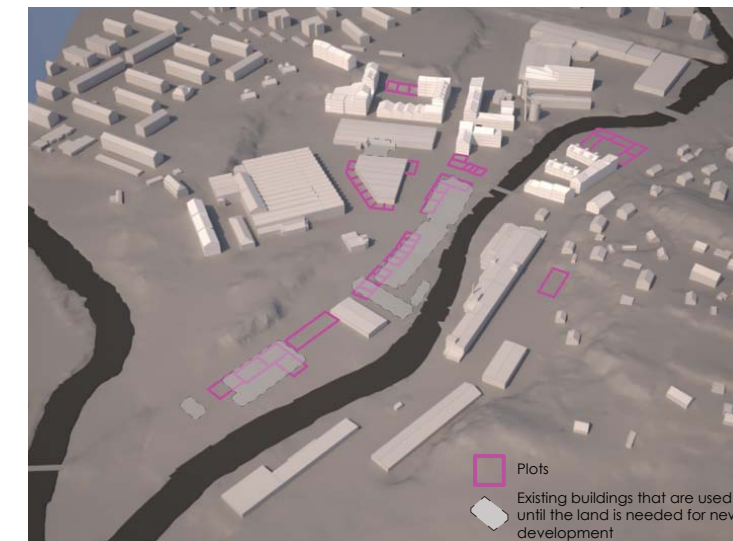


THE BUILDING

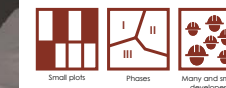


Preserved industrial character
Important industrial buildings as landmarks
Mix of function within the buildings
Communication between the buildings and the streets

Added housing to existing buildings
Space for businesses in new buildings
Existing and highlighted industrial buildings



DEVELOPMENT

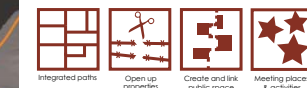


Slow development in phases
Small plots, creating opportunities for smaller businesses and a variation in architecture
Possibility for existing businesses to adapt to new conditions

Plots
Existing buildings that are used until the land is needed for new development

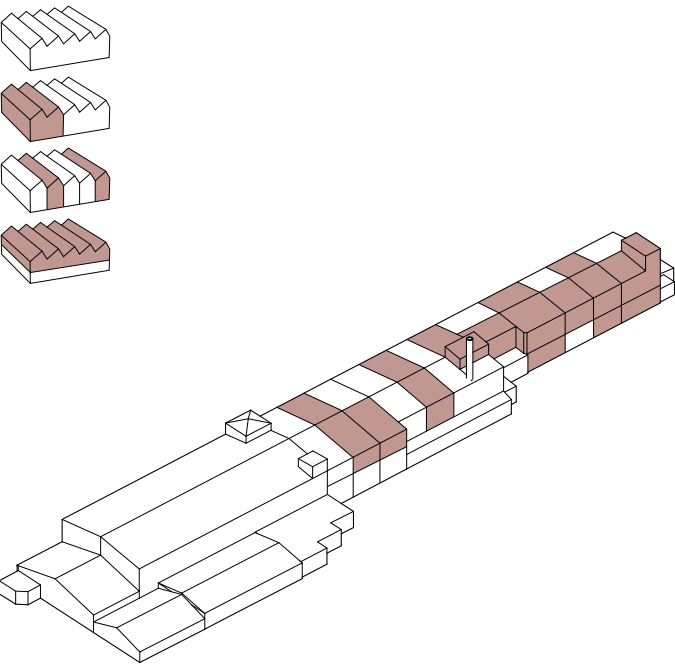


PUBLIC SPACE



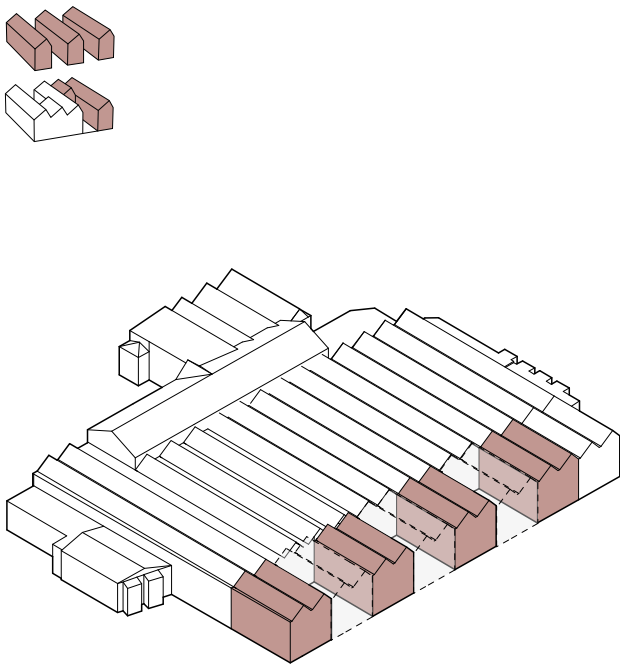
A new grid, no fences
Accessible river as the vein of the area
Public squares along the river, highlighted by important industrial buildings

Transformation of existing buildings



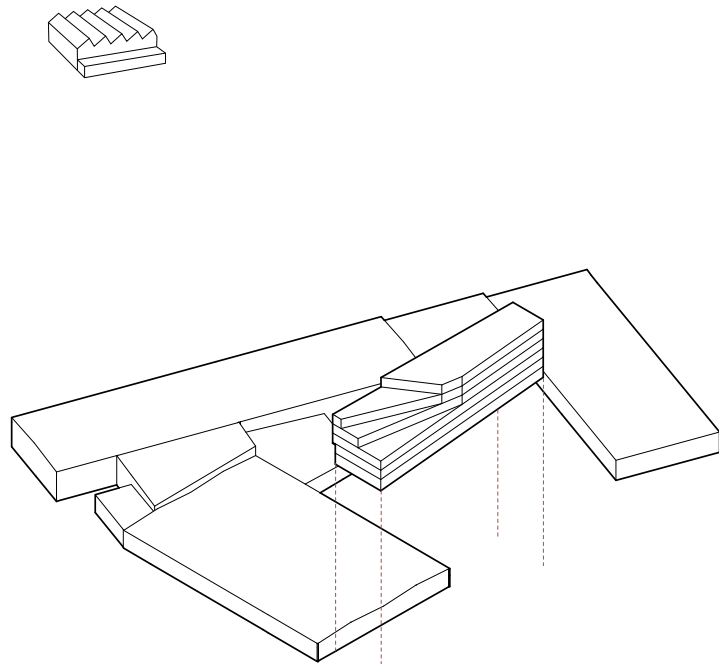
Kv Gässlösa 5:11

The old Wiskania factory is transformed on the south side where the building is thinner to contain both housing and businesses. Housing is mainly placed on the upper floor where light can be let in from windows in the roof. The ground floor should be more open and accessible for the public.



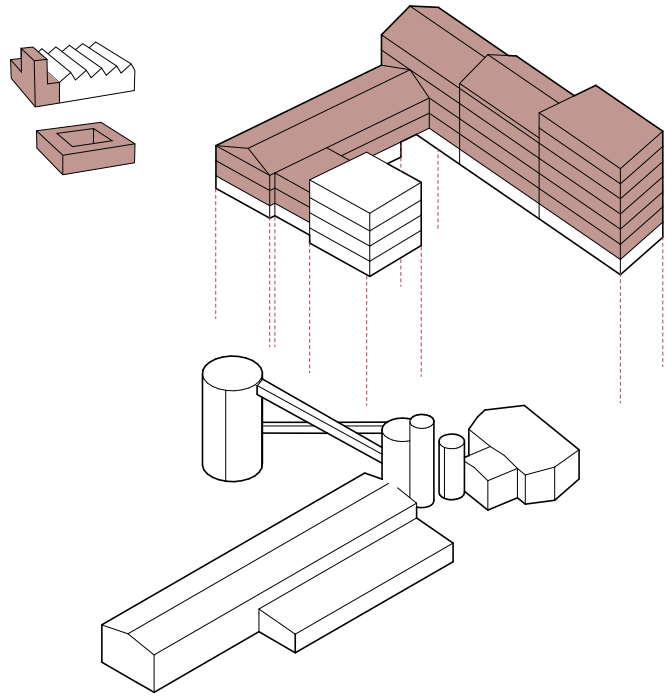
Kv Silverpoppeln 4

The companies in Kamgarntspinneriet can maintain their businesses if the loading docks are placed on the backside of the building. A possibility could be to remove parts of the extension that was made in the 40's to make the older parts of the building visible again, but also to create better conditions for housing in the kept structures of the extension.



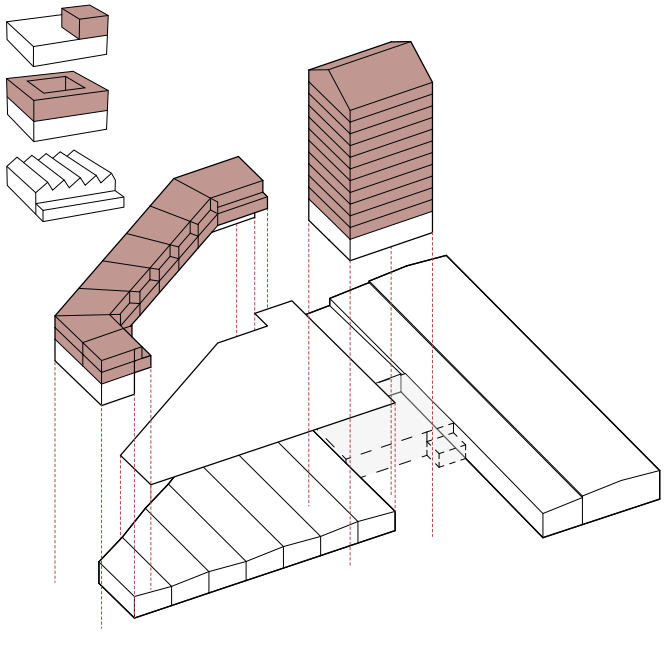
Kv Vinstocken 1-3

This building is newly renovated and is situated between the railroad and the the road Kärrgatan, that in the proposal will be used for heavy traffic. Today there is a gap between the street and the building, that is filled with a new building, defining the streetscape better and giving the businesses a chance to expand and for new companies to establish.



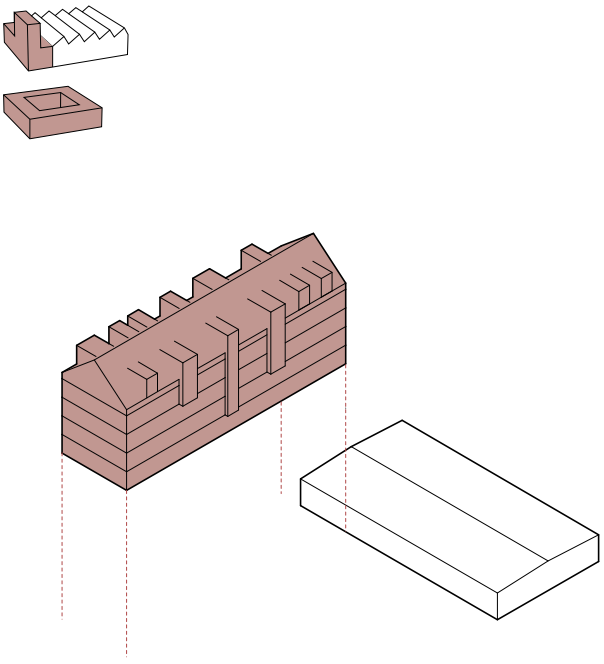
Kv Vinstocken Vägtornet 3

The concrete factory is moved, whilst the building and silos are kept, preserving the industrial character of the place that becomes the main public space in the area. The existing building is transformed into an open art gallery with focus on street art. The added building frames the public space with open ground floors.



Kv Silverpoppeln 31

The today existing companies working with transportation and military supplies are moved providing space for new small businesses to share the space. A twelve-storey building is added on the roof as a landmark whilst two-storey row houses are added on the opposite side of the roof, with the roof as a yard.



AB Bostäder

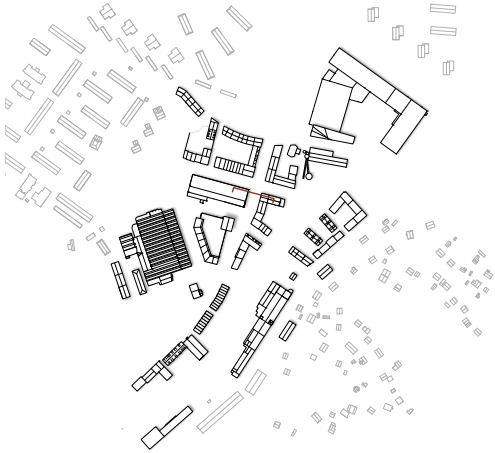
The building is kept while the big open asphalt yard is replaced by a new apartment block, placed between the river and the park on the other side.

Section through the site



scale 1:1250

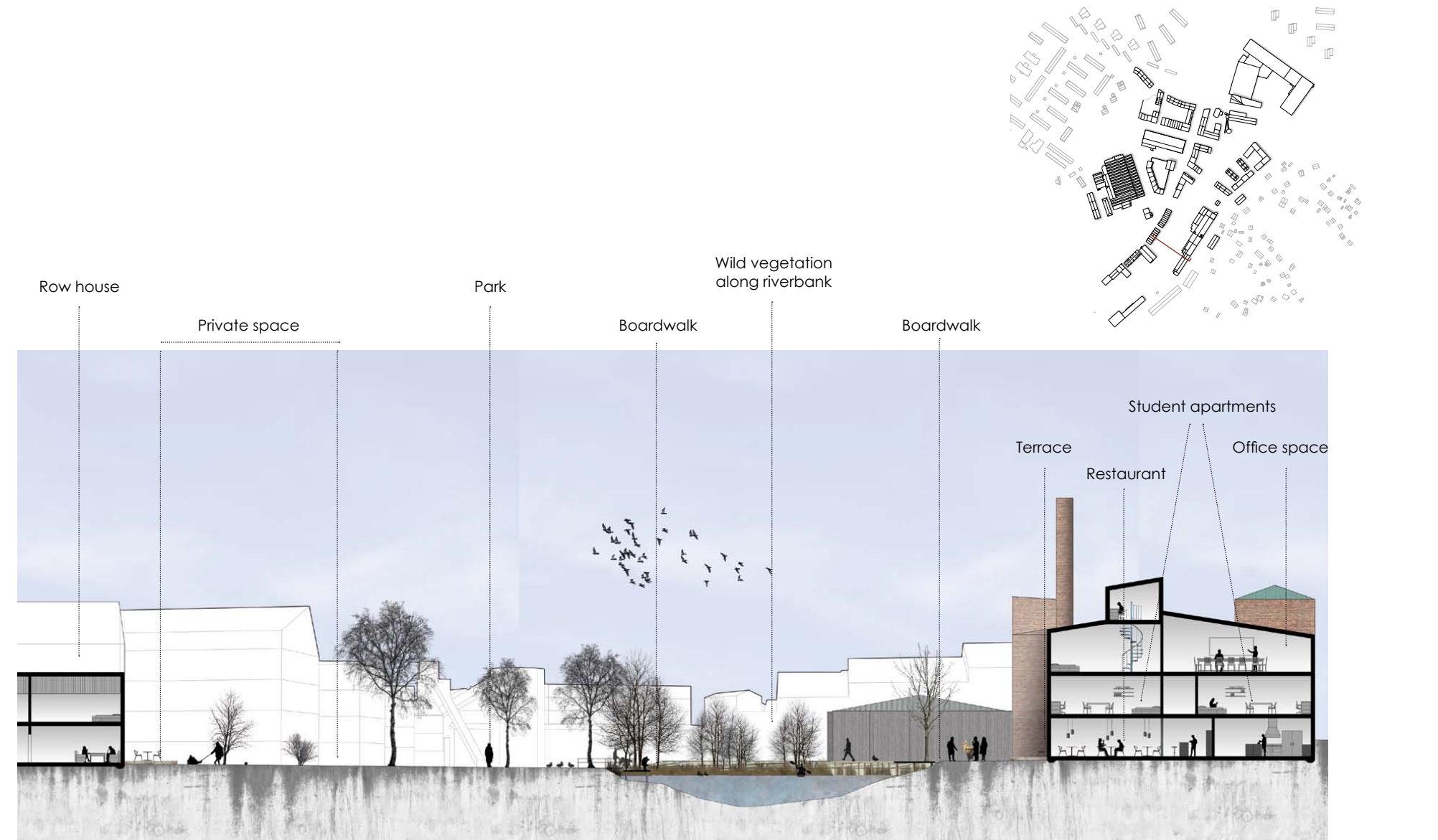
The street



The buildings are facing the road in the proposal, with open ground floors and entrances towards the street and housing in the upper floors. The main street Ålandsgatan becomes an avenue with planted trees with parking in between. The concept of the street is to prioritize pedestrians and cyclists and keeping the traffic at low speeds. The parking along the street helps to lower the speeds and to decrease the need of parking lots. The paving is permeable to let through storm water, lowering the risk of flooding. The industry building in the section is divided and can be used by smaller start-ups renting a part of the building and sharing facilities. The tall building in the background is built to mark Gässlösa, increasing the contact with the city.



The river



scale 1:400

Along the river, the difference between private and public space is clearly marked with hedges and other dividing objects making the park closest to the Vis-kan feeling unclaimed and inviting. Boardwalks are following the river on some parts but otherwise most of the riverbank is left more or less wild, letting the nature in but also playing an important part in improving the water quality and making the riverbank stable. The Wiskania factory is transformed, with a more open ground floor, and apartments in some parts of the building. Here student apartments might be preferable because of the width of the building which makes it easier to have one-sided apartments. Students also bring life and vibrance into the area.

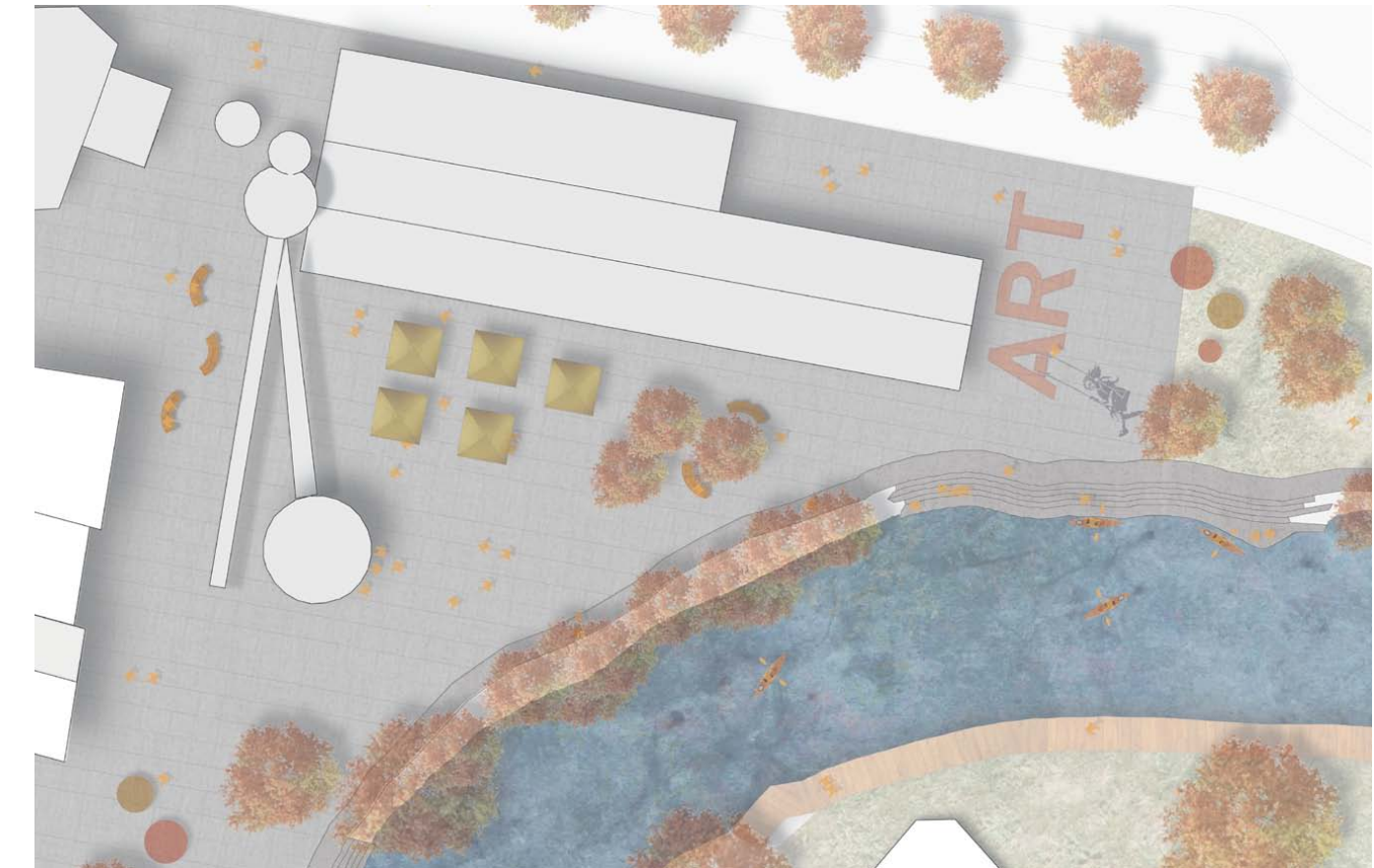
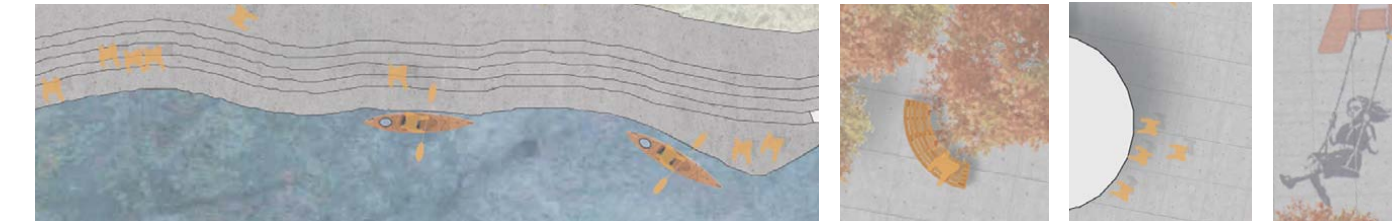


scale 1:300

The concrete factory



The entrance point and probably the centre of the area is the square between the concrete factory and the river. Due to disturbances such as noise the concrete production is moved, leaving the factory empty. The condition of the factory isn't the best but it is still an interesting environment that gives character to the area. The silo is instead used as a place where graffiti is allowed. The building is used as a venue for art with a special focus on street art and murals. The open space is used for outdoor seating, events or just a place to hang out. Steps down to the water make it possible to come down to the water, taking some time to relax or to watch the kayaks in Viskan. A promenade follows the river for those who are on the move or don't want to enter the square.



CONCLUSION

Discussion

The aim of this master thesis has been to investigate how industry can coexist with a growing city, being the missing part of the mix-use city. It became apparent early in the process that the strategies that I had started to work with had a central role in the thesis, since these could be applied on other cases and transformation projects as well; exploring how industrial areas in general, but especially industrial riverfronts, could be developed and integrated with the rest of the city. The choice of working with Gässlösa in Borås wasn't obvious from the start. I had thoughts of working with Ringön or Slakthusområdet in Göteborg as well, but the scale and size of Gässlösa and the industrial history of Borås made it an interesting choice. Moreover Ringön and Slakthusområdet have already been thoroughly investigated compared to Gässlösa.

What I discovered during this thesis is that both the city and industry can coexist and benefit from integration, diversifying the economy and shortening the distances between different functions in the city. The biggest obstacle in Sweden is the general advices on planning workplaces. This document isn't judicial but as there is no better document it is almost used as legal regulations. Hence better guidelines for municipalities and regional administrative boards are much needed.

All industry shouldn't and can't be mixed, but only

the businesses that can gain from being integrated. Here the criteria for function integration developed by the strategic department of Atlanta can work as a good tool for sorting out suitable businesses, where the strategies in this thesis could make it easier to implement the design criteria for function integration.

The evaluation form was necessary to create in order to understand each building and business in the area and how compatible they were with the idea of a functionally integrated industrial area. This form can be criticised for being subjective, and of course it is to some extent. It is hard if not impossible to be total objective in the judging of the suitability of a building, but with this in mind the form can be a good tool in evaluating the suitability of a business with the criteria for function integration.

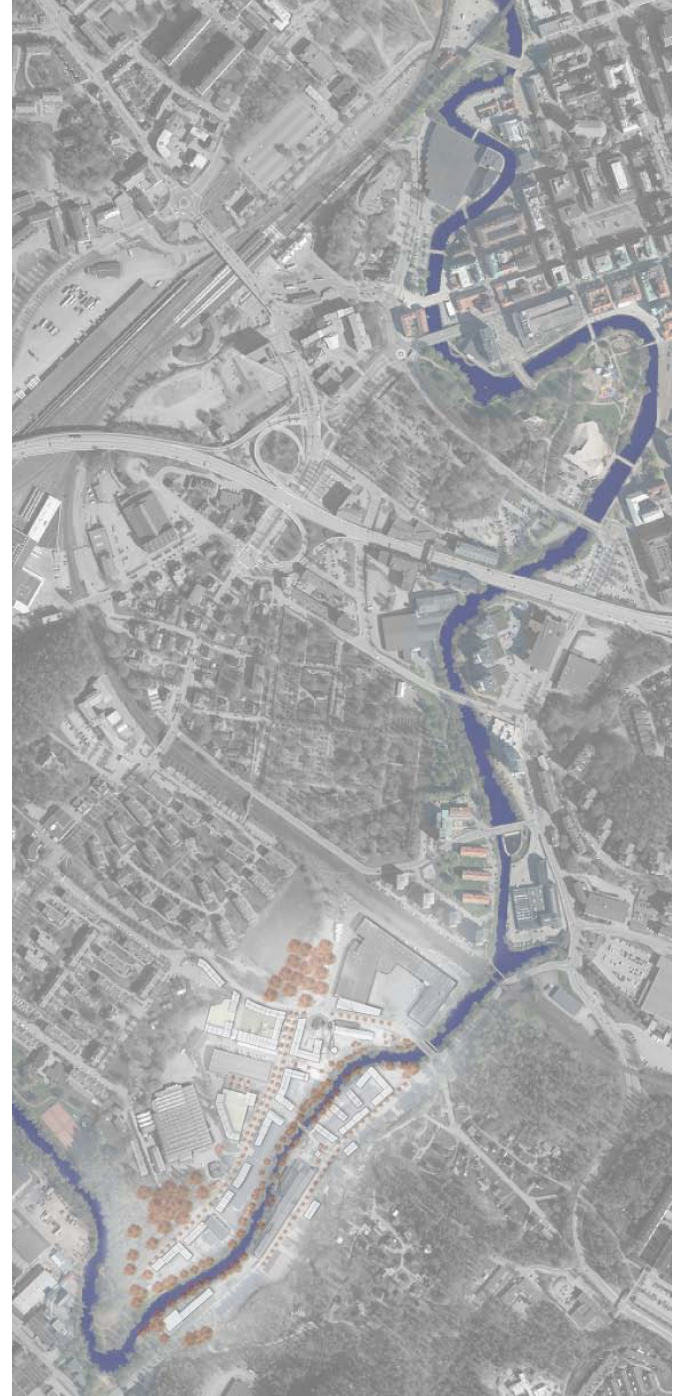
It can also seem as much of the industry is removed in the final proposal. The businesses or buildings being removed hasn't met the criteria and the land have been considered to be more useful by other usages. This level of transformation was suitable in the case of Gässlösa and could of course be different in other industrial areas. Compared to ordinary transformation projects, a lot more industry is kept in this proposal, with businesses that in Sweden isn't considered to fit in an urban environment, but that could fit with certain solutions.

Reflection and continuation

When I started to shape the ideas of this thesis, my ambition was to work in different scales, starting with the whole city and zooming in to the interior of some of the industrial buildings with the cultural heritage as an important topic. One thing I have learnt during this spring is to narrow things down and chose the most relevant question. I think that I in the end was able to find a good level, with the functional integration of industrial areas as the main topic. But it has been hard to kill my darlings and there are traces of my initial ideas both in the more theoretical parts and in the design. Traces that I hope give some variety and interesting angles to the thesis.

This thesis raises some questions that would be interesting to investigate further. One is if living in functionally integrated areas requires an acceptance for more noise and other disturbances, with Skjulhøjs Allé in Copenhagen as a good example. Another interesting topic is how gentrification is affecting the transformation of industrial areas and the possibility for the industry to stay in the long run.

But the most relevant question might be if business owners actually see any values in this kind of development or if it's mainly a wish from planners and architects.



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Figures

All figures by Jonatan Westlin except:

Figure 4. Boverket (1995). *Bättre plats för arbete*. Karlskrona.

Figure 6-7. Betz, Fabian (2011). *Baugemeinschaften in south-west Germany*. Available on: www.hallbarastader.gov.se/Bazment/Alias/Files/?fab

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Figure 9. Sällström, Helena (2013). *8000 för en etta i nybyggda Krillebäck*. Sveriges Radio. Göteborg. Available on: <http://sverigesradio.se/sida/artikel.aspx?programid=104&artikel=5568190>

Figure 10. Photographer unknown (2010). *Under ytan*. gbg.yimby.se. Available on: http://gbg.yimby.se/2010/11/under-ytan_2940.html

Figure 11. *Borås*. Copperplate from ”Suecia antiqua et hodierna”. Erik Dahlberg. Available on: https://commons.wikimedia.org/wiki/File:Suecia_3-043_-_Bor%C3%A5s.jpg

Figure 12. Borås stadsarkiv. Available on: <http://148.160.19.217/StadsarkivetBildarkiv/public/ImageView.aspx?ID=27227>

Figure 14-18. Borås stadsarkiv. Available on: <http://148.160.19.217/StadsarkivetBildarkiv/public/>

Figure 39-40. Borås stadsarkiv. Available on: <http://148.160.19.217/StadsarkivetBildarkiv/public/>

Figure 41. Borås stadsarkiv.

Industrial integration

Transforming the industrial
riverfront of Gässlösa

Master thesis at Chalmers Architecture
Design for Sustainable Development
Jonatan Westlin



CHALMERS