

Transport, Mobility and Urban Planning

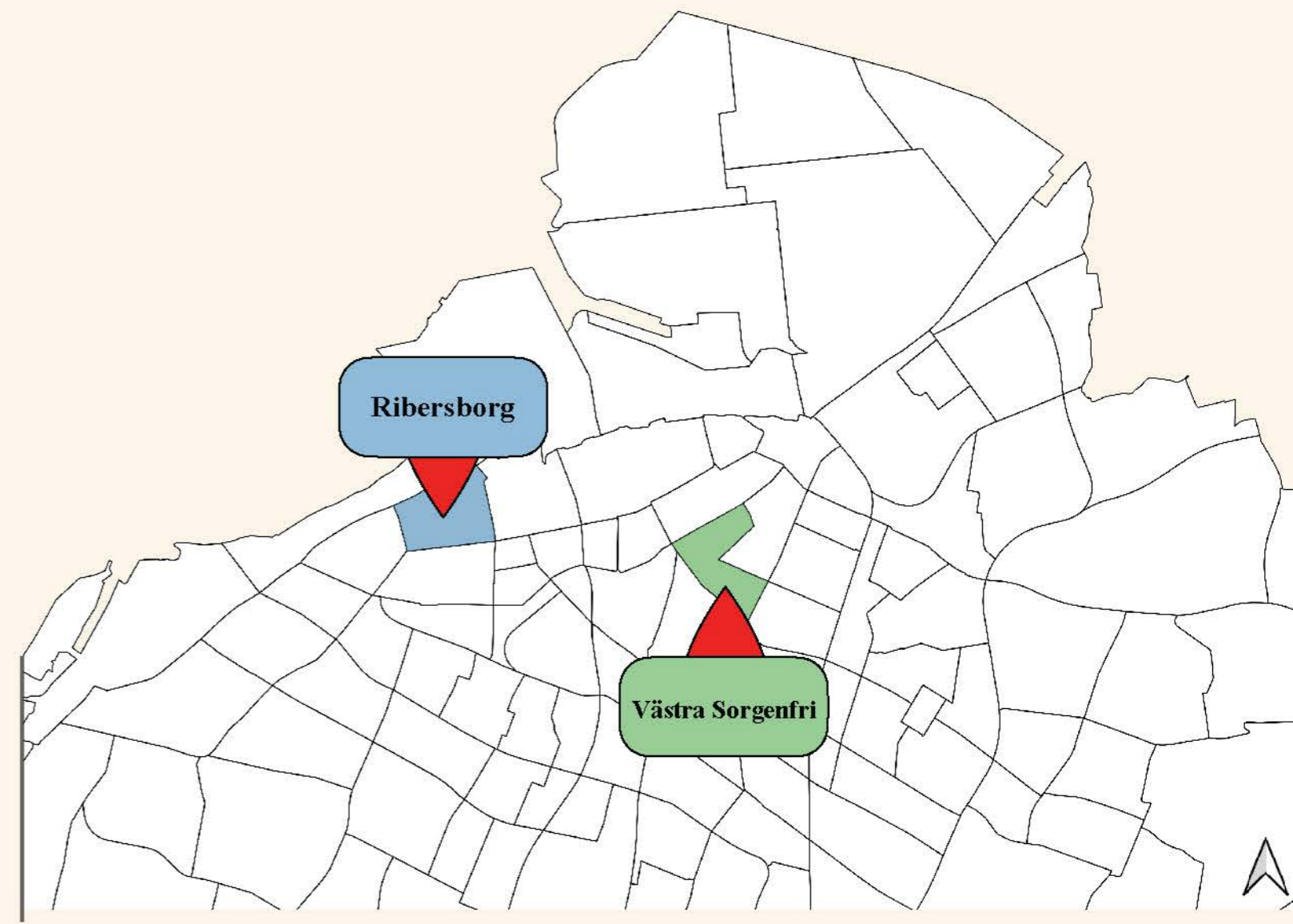
BY260E - 2022

Introduction

This project is based on analysis of two different neighbourhoods in Malmö, Ribersborg and Västra Sorgenfri. Ribersborg is an area in the north of Malmö, near the coastline, which is about 47 000 square meters and has about 8000 residents. Västra Sorgenfri is located more towards the east of Malmö near the city center. Around 6 500 people live in the neighbourhood, with an area of 41 000 square meters. The two neighbourhoods have similar conditions with almost the same amount of people living in the area and only a few thousand square meters difference in area size.

Method

Below is an inventory and analysis consisting the two neighbourhoods in Malmö. The material has been produced through studies and photos taken on site in the area and maps have been created using the digital tool QGIS. The information and basis for the material is taken from a questionnaire that was created during the work and sent out to residents in the area. This has been supplemented with literature and statistics from Malmö Stad, Skånetrafiken and Google maps. The data from the inventory and analysis is used to present a detailed design proposal in Ribersborg and a strategic proposal in Västra Sorgenfri. The work aims to investigate the infrastructure in Malmö and how accessibility differs between different areas. This in combination with different aspects and conditions that affect the travel pattern.



Inventory and Analysis

Land use & Density in Ribersborg

The land-use in Ribersborg is mostly residential buildings with necessary functions as grocery stores and gym. There are also schools in this area. With the lack of work opportunities most people have to commute outside Ribersborg when going to work. The city is within walk and bike range from Ribersborg making it fairly reachable without having to take the car or public transport.

Ribersborg

Land-use



Density



Frequent destination



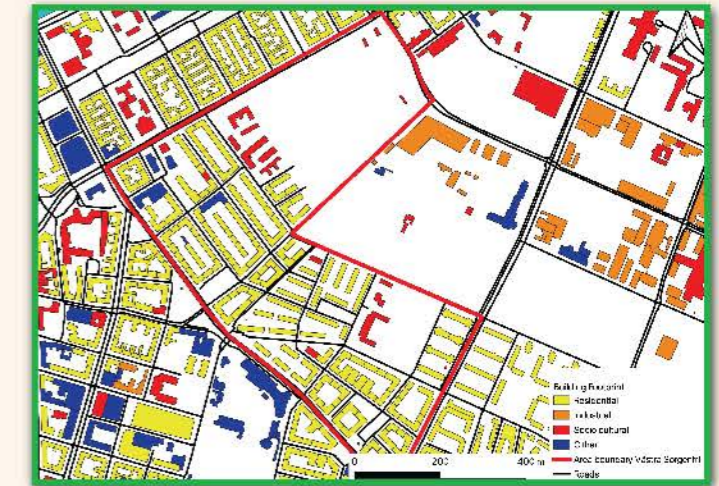
The density is varied when it comes to morphology in Ribersborg. In the less dense area the tallest buildings are located with more open space in between the buildings. And in the high dense area the buildings are lower with a less amount of apartments.

The most frequently visited destinations in the neighborhood according to the inhabitants is the grocery store and gym. Both of these functions are located within or outside the area boundary of Ribersborg. Down to the right in Kronprinsen there is a cluster of these functions, possibly to gather mostly of the inhabitants in and in the nearby areas.

Land use & Density in Västra Sorgenfri

Land-use in Västra Sorgenfri consist mostly of residential buildings as in Ribersborg. With schools and everyday functions such as gym and grocery stores. Being close to the city and an industrial area north-east of the area, workplaces are within walk or bike range. Some buildings in the high density area have other functions on ground level such as smaller shops or restaurants. Creating more opportunities such as daily necessities.

Västra Sorgenfri



The density in Västra Sorgenfri is varied, with the more less dense area being around the cemetery. Then there is more dense with semi-open morphology and lastly there is higher density with closed morphology. In the medium dense area there are low-rise apartment buildings with larger space in between them and a courtyard.



The most visited destinations on a daily basis is the grocery store and the gym. There are plenty of gyms in the area but the grocery stores are located at the area boundary or close by. Still making it within range for the inhabitants to get the daily necessities.



Connectivity

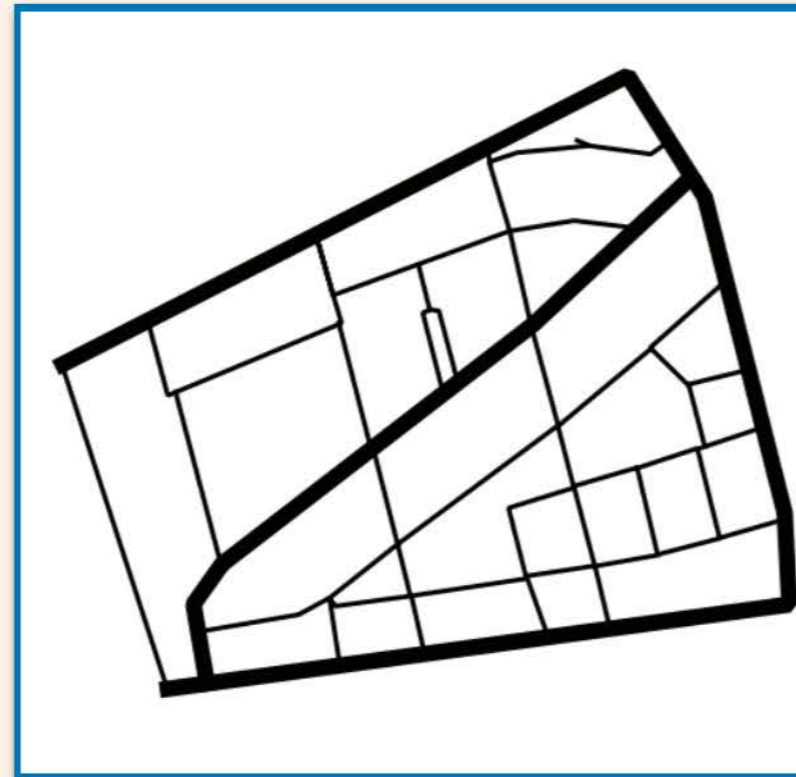
Composition and configuration

The composition maps of Ribersborg and Västra Sorgenfri show the street-pattern of both neighbourhoods. The different sizes of the roads are divided into two different categories, arterial and local streets, where both have different functions. The arterial road could be described as a more heavily trafficked road and local roads function as a passage and thoroughfares.

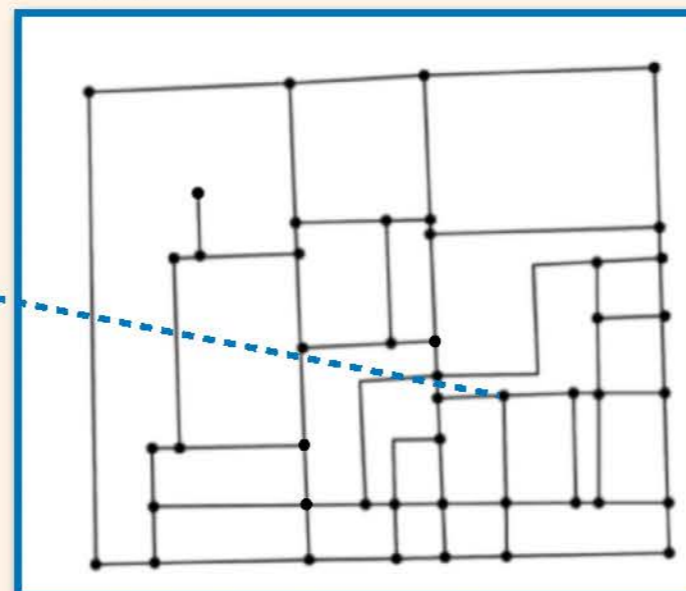
The configuration-map shows the nodes in the neighbourhoods and where the street patterns connect together. In each area we have compared the number of links which is divided with the number of nodes, and this will show the neighbourhoods connectivity with the specified ratio in the model. In the specific areas, it is clear that the connectivity is high, as the ratio is above 1.0. The big differences between the two areas is that the composition map shows more of the orientation and the roads length and width. While the configuration displays more information about the areas connectivity and continuity (Marshall, 2005).

Ribersborg

Composition



Configuration



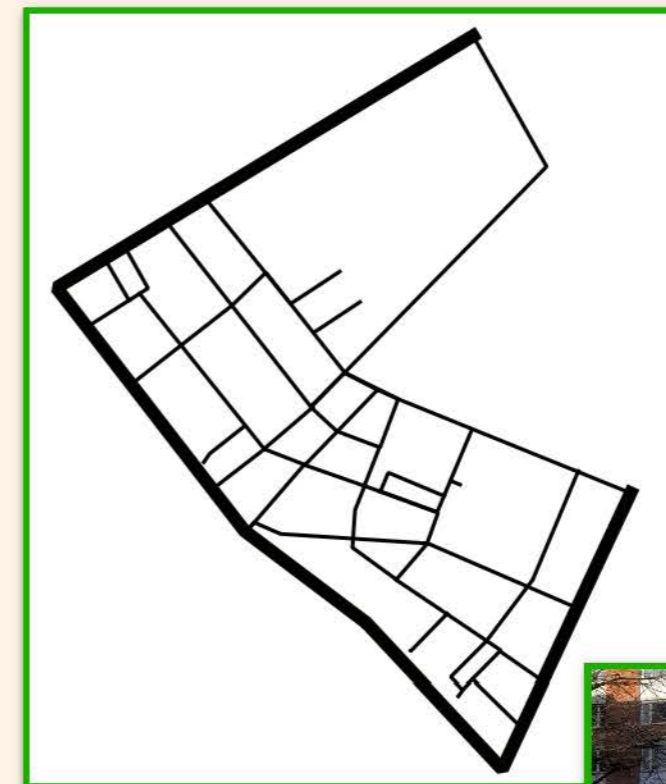
Links: 59
Nodes: 43
Ratio: 1.37



This is an example of a common four-way intersection in Ribersborg.

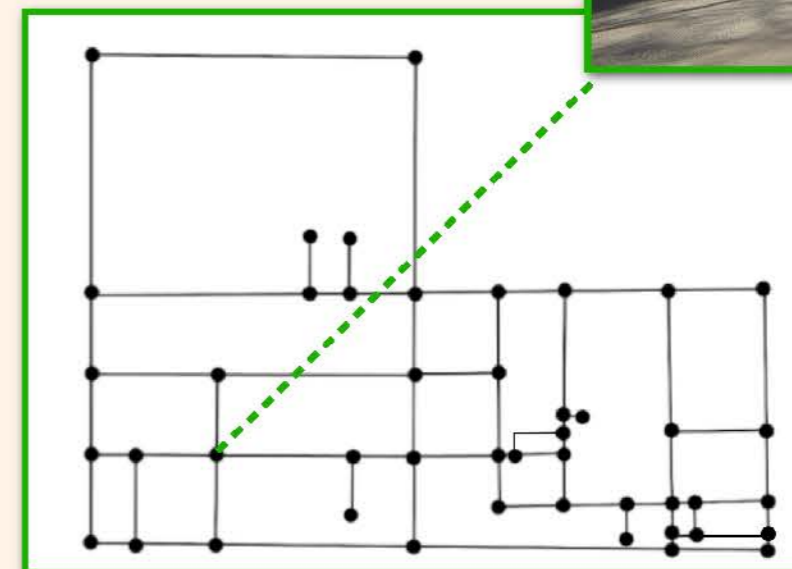
Västra Sorgenfri

Composition



— Arterial Road
— Local Road

Configuration



This is an example of a common four-way intersection in Västra Sorgenfri.

— Links
• Nodes

Links: 61
Nodes: 47
Ratio: 1.31



Traffi

Traffic-flow

The data used in this analysis of traffic flow is taken from Google maps.

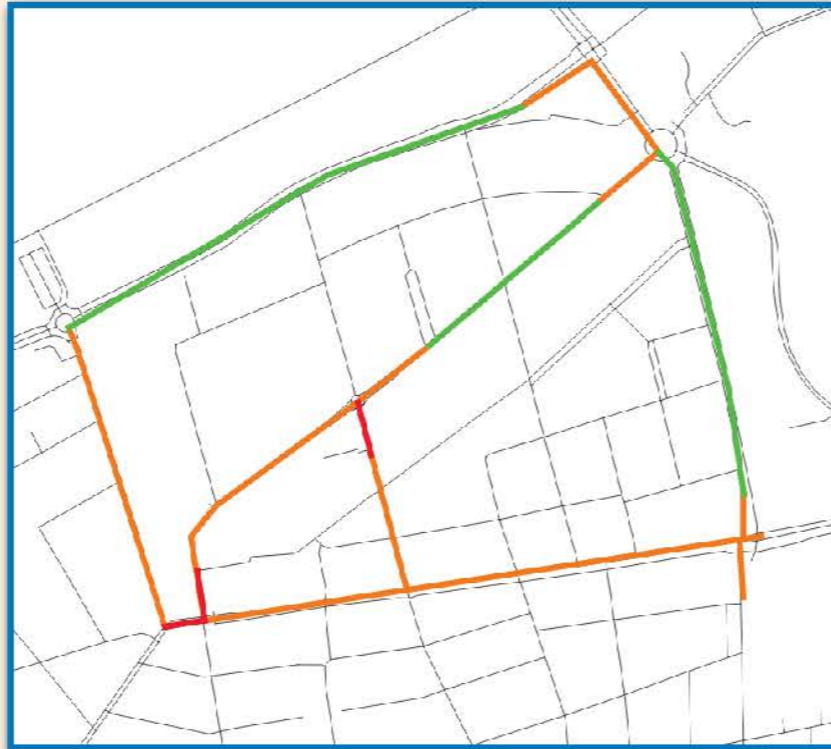
The traffic flow shown in the figures shows which roads tend to cause congestion or other slowdowns of traffic. The measurement scale goes from green, orange to red. The green color in the model shows a quick traffic-flow and usually no major traffic jams, while orange shows the tendency where usually traffic jams could appear, and lastly the red color shows the spots where it is often very busy and slow traffic. The models displays that the intersections and roads tend to have congestion during both the rush hour at 4pm and one during a weekend at 12pm. But in general, the traffic flow in both areas works well. There are only one or a few intersections that can be considered a bit messy at times, as shown by the colors.

From the observation on site, it seemed that the conditions for a good traffic flow exist in both areas, for example there is dedicated bus lanes and divided roads. The traffic flow shown in the models represents the car traffic rather than bus traffic. Since, as mentioned before, bus lanes makes the bus pass congestion in many places, which in longer term will reduce the travel time (Schiller & Kentworthy, 2017).

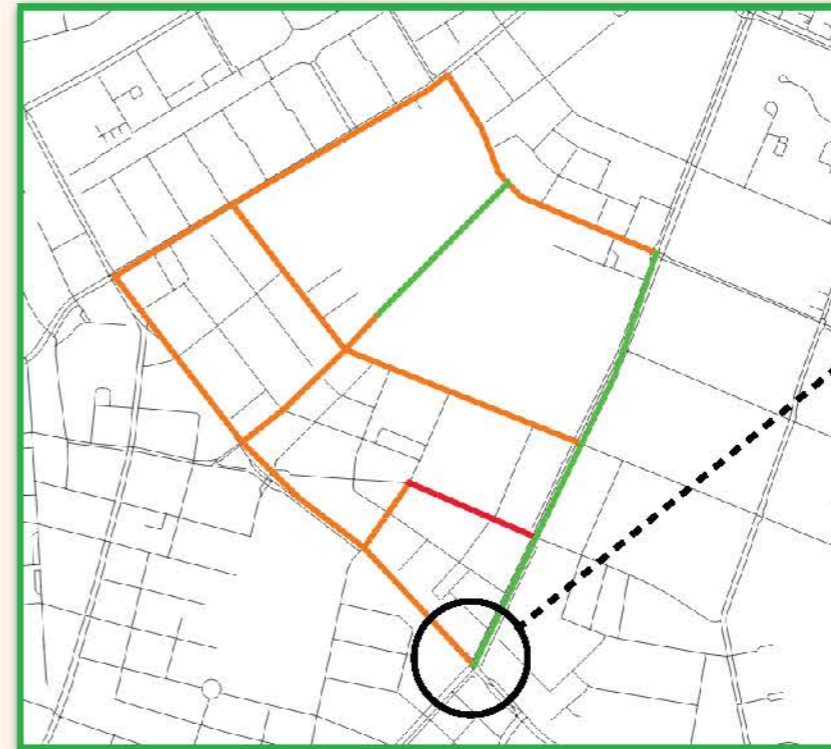


This picture shows the intersection that is marked on the map in Ribersborg. It is also one of the more traffic-congested roads in the area, which is shown by the red lines in the weekday - map.

Ribersborg - Weekday kl 16:00

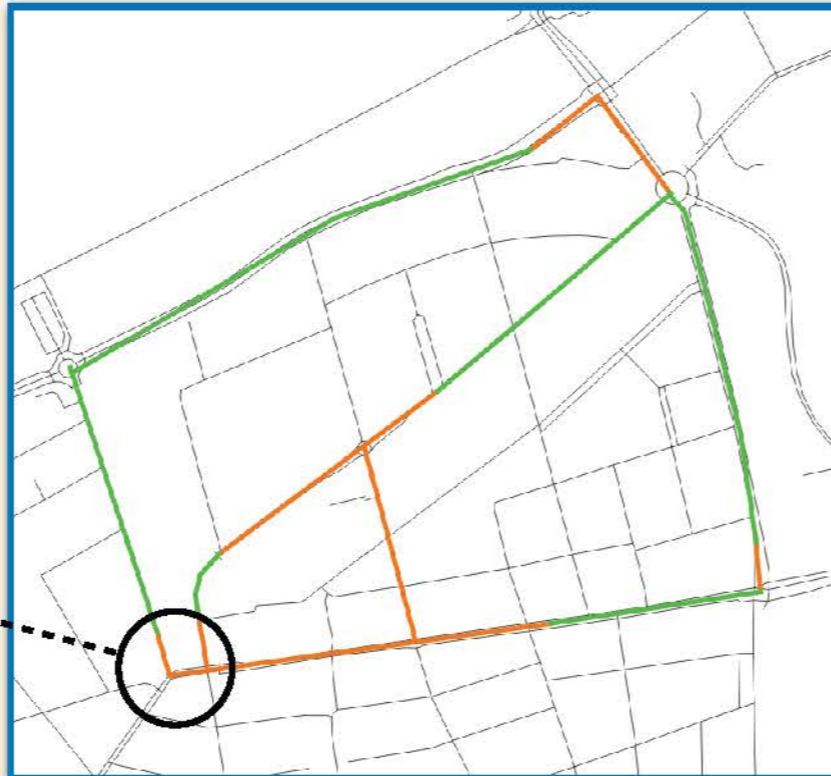


Västra Sorgenfri - Weekday 16:00

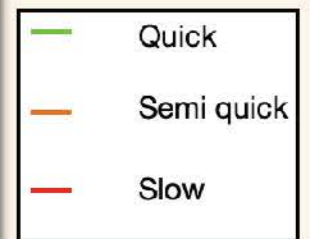
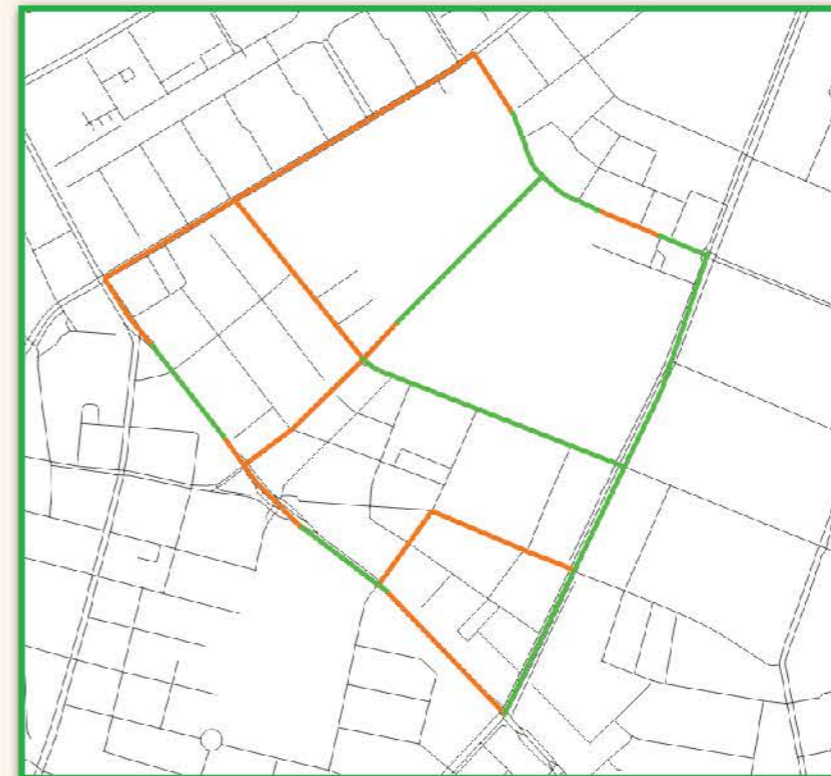


This picture shows the intersection of Nobelvägen and Amiralsgatan including a ton of traffic going in different directions. It is clear that the bus is a priority in large parts of the area, which can be seen in the picture. The bus lane in the middle of the road facilitates and reduces the travel time for travellers.

Ribersborg - Weekend 12:00

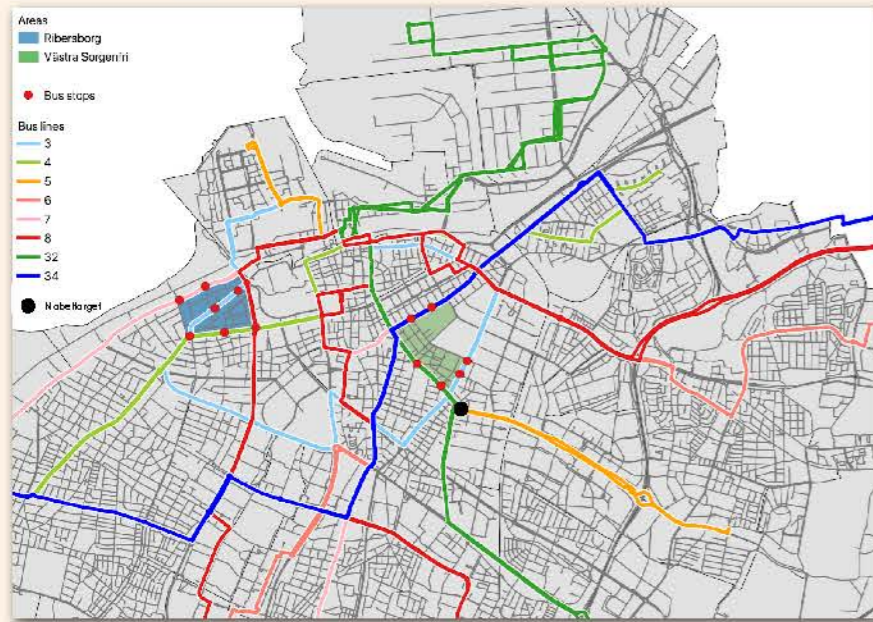


Västra Sorgenfri - Weekend 12:00



Availability, Accessibility & Service Coverage

Bus lines



Public transportation

The bus is one of the main transportation modes. This map shows the different bus lines going through the selected neighbourhoods. The various bus lines gives every citizens a wide choice of transport modes to travel around Malmö.

Ribersborg:

- Eight bus stops.
- Four bus lines, 3, 4, 7 & 8.
- Only city buses.

Västra Sorgenfri:

- Six bus stops.
- Six bus lines connecting to the area, 3, 5, 6, 7, 32 & 34.
- Both city buses and regional buses.

Something important to consider is that larger transit stations may be located adjacent to the areas. An example of this is Nobelorget (see the black dot on the map) which is located just outside Västra Sorgenfri. This may lead to residents choosing to take public transport from these transit stations rather than stations in the areas.

Bus & Train accessibility



Service Coverage

The buffers shows the service access coverage in the selected neighbourhoods, both bus stops and trains stations. The blue buffer has a radius of 400 m, while the green has a radius of 1 km. In Ribersborg the bus stops are located more densely and there is good coverage of bus stops that can be reached throughout the area, within 400 meters. But the neighbourhood has no connectivity with a train station because it's outside the 1 km buffer. Furthermore, the coverage in West Sorgenfri is to some extent good, because there are several bus stations in the area. However, the Triangeln train station is within 1 km of half the neighbourhood and therefore making the neighbourhood more accessible.

According to Walker, J. (2011), 400 m to a bus stop is a common length used by planners and is a comfortable walking distance for the users. As well as 1 km which is a length that is used for more rapid transit station like a train station. When it comes to rapid transit people are more willing to travel a longer distance to reach their travel mode, in this case a train station

Quality and Comfortability

Ribersborg



Västra Sorgenfri



The quality and the comfortability of the bus stops in the neighbourhoods are fairly high. Almost every bus stop has a bus shelter, at least one bench to sit on and the area around the bus stops is clean.

← A selection of photos of bus stops in the neighbourhoods.

Malmö By Bike accessibility



Malmö By Bike

Malmö By Bike is another alternative of mode for transportation and the maps shows the catchment areas (200 m) for Malmö By Bike stations within and around the selected neighbourhoods. In both neighbourhoods the coverage can be increased because there is only one station in each area, the rest of the stations is located around the neighbourhoods.

According to us the 200 m mark is a reasonable distance to walk to get to a Malmö By Bike station. If you need to go further we think that citizens are more likely to use another mode of transport to minimize their travel time.



The only Malmö By Bike station in Ribersborg. At his time half of the bikes are used.

Hierarchy of streets

Ribersborg

The picture shows a vehicle dominated streets in Västra Sorgenfri with a separated bike lane.



Västra Sorgenfri

The picture shows a balanced street in Västra Sorgenfri with a separated bike lane.



The picture shows a vehicle dominated streets in Ribersborg with a separated bike lane.

The maps above show the street hierarchy in the two areas. In both Ribersborg and Västra Sorgenfri there is two clear street profiles, "vehicle dominate streets" and "balanced streets". "Vehicle dominated streets" is surrounding both areas and is mainly a street for motor vehicles. In the neighbourhood, the majority of the streets are "balanced, which are streets where motor vehicles, cyclists and pedestrians share the road space. (van Nes & Yamu, 2021). The maps also show the separated pedestrian and bike lanes in the neighbourhoods and in both areas the quality of the bike lanes varies. The bike lanes marked on the map is clearly separated from all other traffic. But there are exceptions, where the bike lanes safety is an issue and where they is't separated from the other traffic. In the book *Streets and Patterns*, Marshall, S (2005) points out that the street hierarchy is about safety, amenity and environmental quality in urban environments, but also about the functional efficiency of traffic flow. In addition, he mentions that the flow on a road depends on how extensive it is, so a smaller street leads to lighter traffic. Which may ultimately lead to greater mobility and access for pedestrians and cyclists.

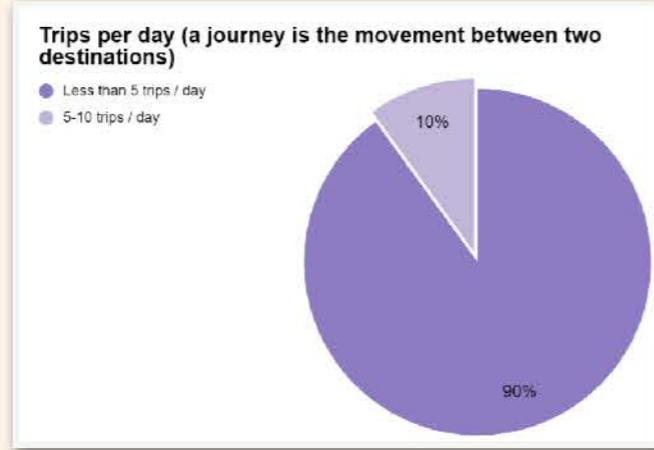


The picture shows a vehicle dominated streets in Västra Sorgenfri.

Survey Ribersborg

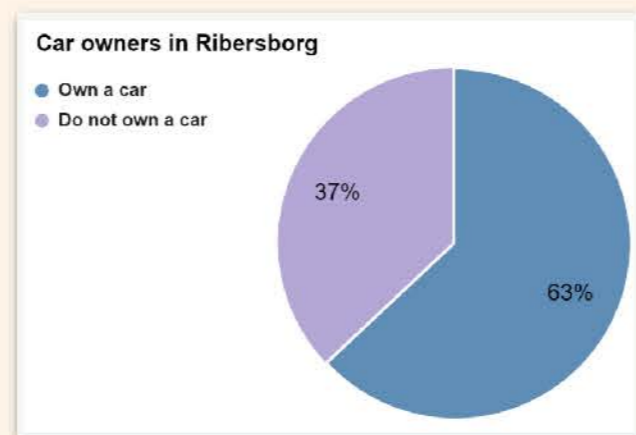
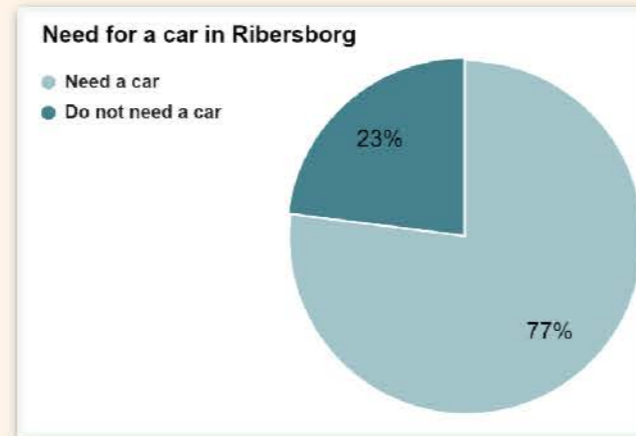
Below is material presented from a survey carried out in Ribersborg and Västra Sorgenfri, based on a questionnaire sent out to residents in each area. The graphs shown are based solely on responses to the questionnaire. In the survey for Västra Sorgenfri 26 people participated and in Ribersborg 95 people participated.

Travel pattern



Choice of transport

The average travel time in Ribersborg is less than one hour per day and the majority of residents make less than 5 trips per day. The short travel time may be due to the fact that the majority of residents travel short distances to meet their daily needs. Among the 95 people who participated in the survey, the majority use the bus or walk to their destinations. The car is the third most used mode of transport. Despite this, 63% of the residents surveyed own a car and 77% feel the need to have a car.



Travel behaviour

The most common daily destinations for residents are work, school, supermarket and gym. The dark green arrow in the figure shows the journey between home to work or school. This journey may vary in distance as the residents of Ribersborg do not necessarily work or study in the district. This may be a reason why a large proportion of residents own a car or feel the need to have access to a car. This could be because public transport or other means of transport do not offer the connections between neighbourhoods or easier and more time efficient travel as the car. Grocery stores, gyms and other smaller businesses are typically more locally located with short distances. These needs may be met by more environmentally friendly means of transport such as buses, walking or cycling.



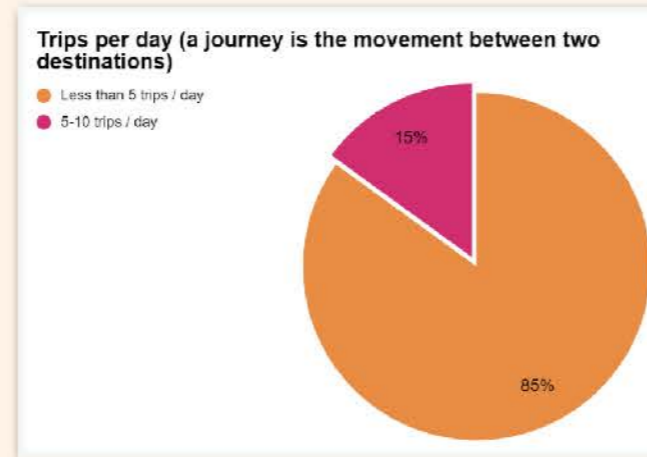
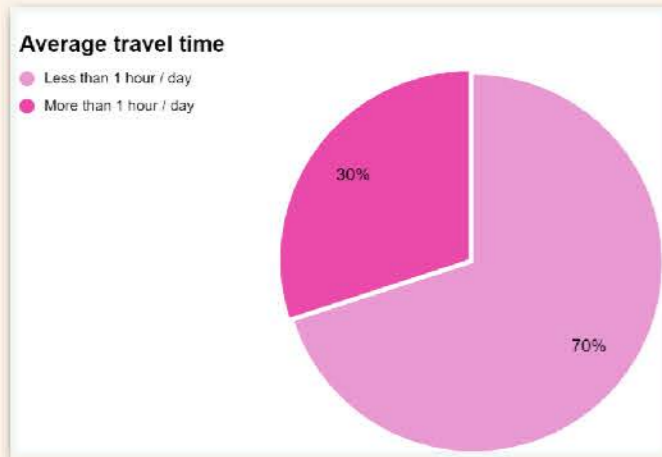
Figure: Common trips for residents, the arrows represent the trip and the circles the destination.

What the residents want to change



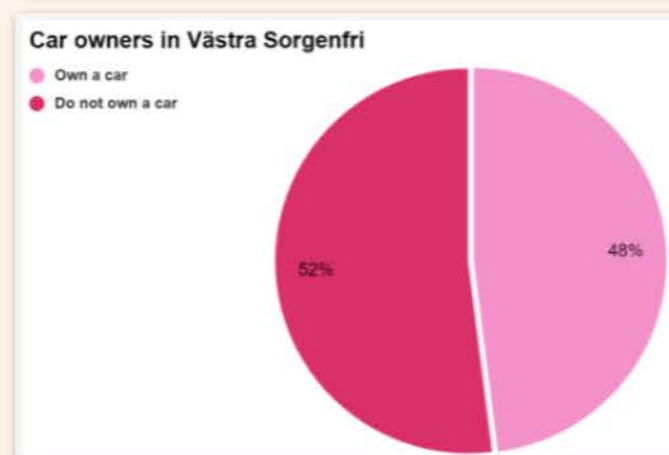
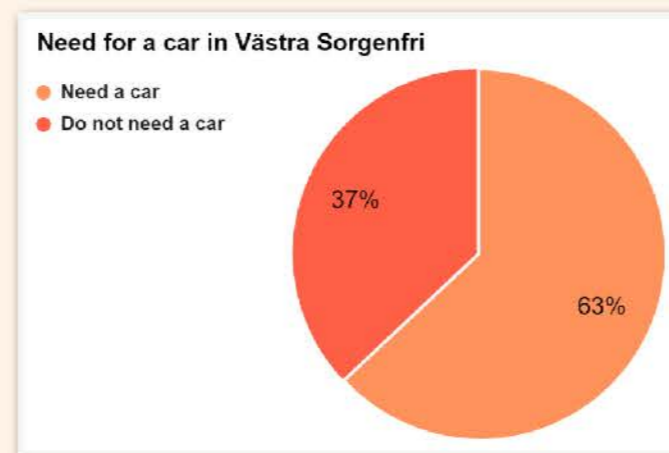
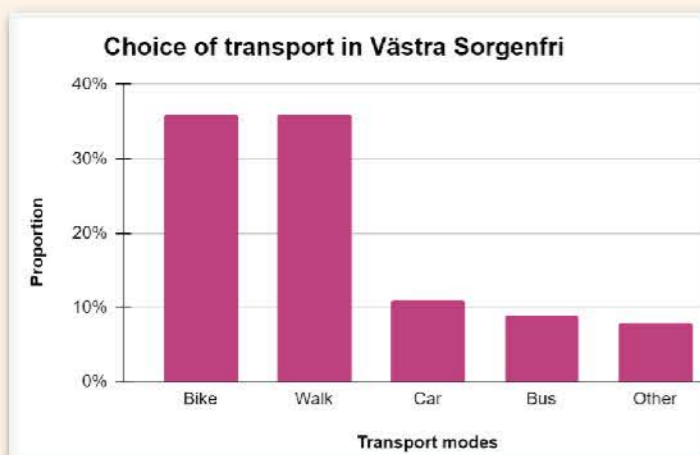
Survey Västra Sorgenfri

Travel pattern



Choice of transport

In Västra Sorgenfri, the most common travel time is less than one hour per day and participants usually make less than 5 trips per day. The short travel time may be due to the fact that many of the daily destinations are in the district. It may also be due to the ongoing corona pandemic which has limited the ability to travel. Residents of Västra Sorgenfri travel significantly more by bus compared to car. Walking to destinations is also popular, reinforcing the perception that many needs can be met within or close to the neighbourhood. Among the 26 participants, 46% feel the need to have access to a car as it facilitates shopping and contributes to greater flexibility. Several participants feel that the car provides good opportunities to travel to green areas outside the city.



Travel behaviour

The most common destinations for the participants from Västra Sorgenfri are work or school, supermarket and cafe. Like the destinations in Ribersborg, the journey between home and work is marked in dark green, indicating that this journey can vary considerably in distance between residents. Other destinations are usually within a shorter distance from the home. The need for a car is lower in Västra Sorgenfri than in Ribersborg. Like the destinations in Ribersborg, the journey between home and work is marked in dark green, indicating that this journey can vary considerably in distance between residents. Other destinations are usually within a shorter distance from the home. The need for a car is lower in Västra Sorgenfri than in Ribersborg. It is possible that the surveyed residents in Västra Sorgenfri work/study in the surrounding area or in places where there are better public transport connections. There may be economic differences in the neighbourhoods which could affect the possibility of owning a car.



Figure: Common trips for residents, the arrows represent the trip and the circles the destination.

What the residents want to change

Age 20-29	Age 30-39	Age 40-49	Age 50-59
9 participants	7 participants	6 participants	4 participants
Improve bike and pedestrian paths	Less road traffic, Safer environment	Less road traffic Improve bike and pedestrian paths	Less road traffic Improve bike and pedestrian paths
"More MalmöByBike opportunities"	"Better cycle paths along major roads. Safe crossings at the intersections."	"Reduce car traffic. Make attractive walking / cycling paths."	"More bike lanes."
"More space for bicycles and walking less space for cars"	"More green areas and underground parking!"	"Better lighting on foot and bike path"	"Misunderstandings between cyclists and pedestrians."
	"Speed humps and other measures to reduce speeding."	"More speed humps as road users often drive carelessly."	"Less car traffic."

Summary

Comparison

The data collected from Ribersborg shows that the majority of the district is used for housing and school buildings. Smaller businesses such as gyms and supermarkets are established locally in the area. Västra Sorgenfri consists of more mixed land use and offers both housing, schools and a number of smaller businesses. Unlike Ribersborg, supermarkets are established on the periphery of the district. The study of traffic flow shows similar changes in both districts with traffic generally decreasing during weekends. As both areas are predominantly residential, the high traffic flow creates passages through and past the area. Apart from school activities, there are no major activities in either Ribersborg or Västra Sorgenfri that are likely to generate much traffic. Schools are closed on public holidays, but some roads remain busy. The survey shows that the most common means of transport in both districts is by bus or by walking, which in turn does not generate much car traffic on the roads. This supports the argument that the roads in both areas are used as transit routes rather than transport to destinations in the districts. In both neighbourhoods, residents have expressed concern about the density of traffic. In Ribersborg, safer pedestrian environments around the school areas are requested as parents do not feel safe letting their children walk to school by themselves. Public transport coverage in the neighbourhoods is good and there are a number of different bus routes to choose from. In Västra Sorgenfri, both local and regional services are offered, which benefits those who wish to travel longer distances. The district also has a closer connection to train services than Ribersborg. Results from the survey show a greater margin between car use and bus use in Västra Sorgenfri compared to Ribersborg. This may be due to a wider range of public transport options in Västra Sorgenfri. In Ribersborg, it is mainly the age group 50-59 years that wants to simplify the use of a car. Several residents in both districts consider that the car makes it easier when shopping and traveling to work outside the city. There is therefore a high proportion of car owners in both districts, but despite this, the car is only the third most used mode of transport. This, combined with the low travel time per day, indicates that residents combine different modes of transport to meet their daily needs. It is possible that residents prefer to use public transport but feel the need to use a car for longer journeys where connections to other areas are poor. When examining composition and configuration, it appears that both Ribersborg and West Sorgenfri have a high ratio, which implies good connectivity. This creates good connections within the neighbourhoods, but also the conditions for creating connections with neighbouring areas, for example through public transport.

Conclusion

Both Ribersborg and Västra Sorgenfri offer environmental friendly means of transport, bus and walking are often part of residents' daily travel patterns. Despite this, both areas possess heavy car traffic past and through the neighbourhoods. Car traffic is considered problematic among residents creating unsafe environments for pedestrians. Despite this, a large proportion of residents own a car or feel the need to have access to one, which contributes to traffic congestion. It is apparent that the vision across neighbourhoods varies according to age, indicating that there are different needs and travel patterns among residents.

Proposal for Change

Suggestion in Ribersborg

The proposal for change when it comes to Ribersborg has been focusing a lot on the traffic to and from Fridhemsskolan. According to the survey, people have pointed out their thoughts on not feeling safe letting their kids walking to and home from school because of the traffic. Fridhemsskolan is located between two highly trafficked roads and the road (Ribersborgsvägen) outside of the school is missing a bicycle path. The only opportunity for cyclists is to either travel on the road or sidewalk.

In 2020 there was a reconstruction of a major road nearby. The transformation resulted in a dedicated bike path and pedestrian walk beside the road. This was being presented on the city of Malmö's website (2020). Before the reconstruction the road was almost similar to Ribersborgsvägen with a wide road where both cars and bikes share space as well as space for parking. Nowadays the cars are separated from bikes and pedestrians.

People in Ribersborg are generally happy with the paths to and from destinations. The thought now is to extend the path that was reconstructed to Ribersborgsvägen outside the school. This will connect the bike and walk paths on Limhamnsvägen and Regementsgatan. Making room for the cyclist beside the road with dedicated bike paths next to the walk way. By widening the pavement next to the road, the parking space is reduced to make room for the walk and bike paths. We therefore are planning for a drop-off zone next to the school so that parents can drop off their kids if needed. This solution reduces the chance of congestion on the road when it's much traffic to and from school. This generates in a much more safe road, removing cars from the street when dropping and picking up kids to and from school.

These changes will increase the accessibility to and from school which possibly could create more opportunity for parents to let their children go to school on their own. Chapter 2 in the text *a companion to transport, space and equity* (Hickman, et al. 2019) accessibility is mentioned as a key for land-use and transport service measurements. Socio-economic aspects are also mentioned as the accessibility could vary in different socio-classes. By enabling the opportunity for parents to let their children go on their own to school it could give them the time to take the public transport. Instead of having to drive them maybe, resulting in a higher cost of owning a car. If we could enable the opportunity for people to take the public transport we could achieve sustainable transportation.

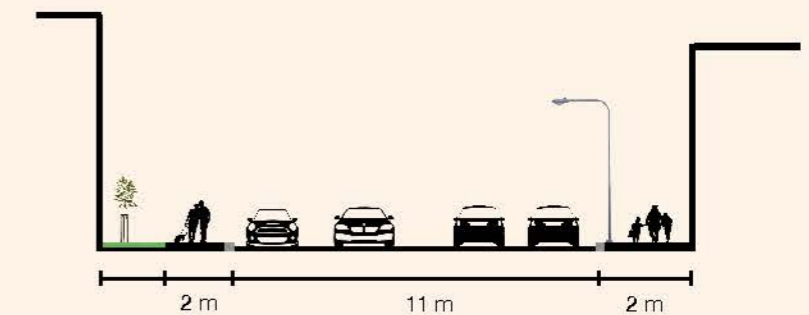
The cons of this proposal could be the ability to find a parking space when the ones in the area are reduced. This could generate more traffic as people are looking for a place to park.



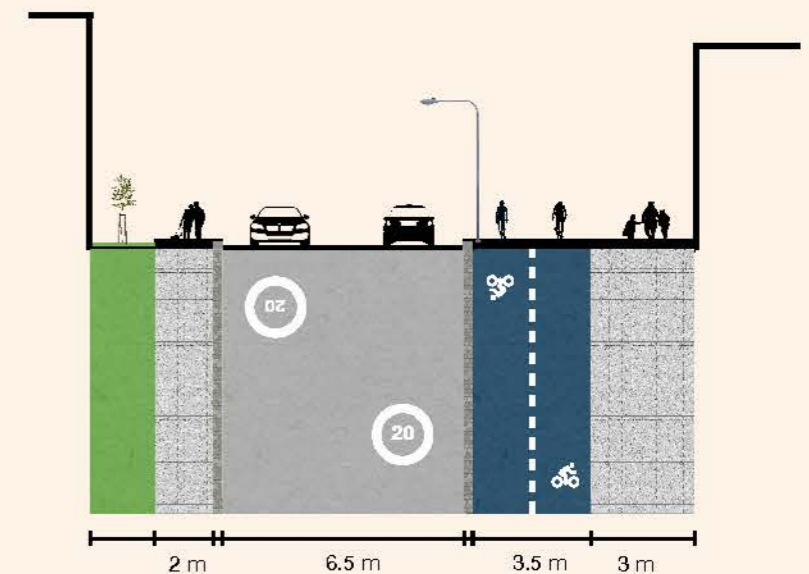
Photo of Ribersborgsvägen



Before



After



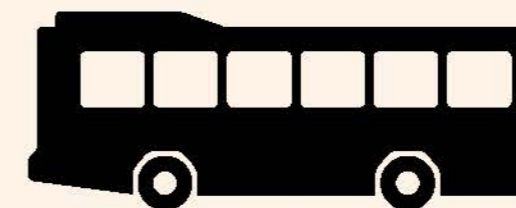
Strategic proposal

The proposal for Västra Sorgenfri has been a more strategic rather than detailed. According to people living and moving in Västra Sorgenfri there is good public transport connecting the area to the rest of the city. Still many of the people living in the area uses or owns a car, therefore the fully potential of the public transport isn't used. To change the citizens behaviour our proposal is a reward system in public transport. The more you travel the more you save, in an economic aspect. By using this method the purpose is to under a certain amount of time encourage people to use the public transport. People then may see the potential of the public transport, making it more cost-efficient than taking the car and maybe prefer using it after the reward system is discontinued.

Increasing the number of people using the public transport decreases the traffic on the roads which is seen as a problem in Västra Sorgenfri. This method is used in other parts in Europe, for example Luxembourg (2020) where public transport is free on Saturdays. The experts meaning that it's a solution to solve congestion and pollution. The experts in Luxembourg explains the method as "The main reason is to have a better quality of mobility, and then the side reason is clearly also environmental issues". If we can achieve this result in Västra Sorgenfri it would create a better mobility for the people living there. The cons of this method could be the financial part, who will pay for the extra cost added by giving discounts?

Another disadvantage is that interest among travellers may decrease as the reward system is phased out. The aim of the system is to encourage more people to discover and use the public transport offered in the areas. The reward system can serve as a method to change people's travel pattern to a more sustainable traveling.

This proposal is not only going to be imprinted in Västra Sorgenfri, but also on a regional level. Creating a reward system considering the region of Skåne. This could improve the connection between communities which nowadays is seen as a problem according to citizens. They feel de need to have a car to travel long distances.



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Individual Reflections

Filips reflection:

The group work has worked well throughout the course and the cooperation between us within the group has been effective and instructive. Everyone brought different skills to the table which made us complement each other well.

On an individual level, I have specifically created various maps in Qgis, been on site and observed and written texts for the assignment. These included the introduction, traffic flow and connectivity. After reviewing all the analyses and interviews conducted of our areas, we jointly came up with the changes we proposed. It would have been good if space syntax had been introduced a bit earlier, and been more clear how we can use it in an efficient and neat way for our work.

Ebbas reflection:

The group work has worked very well. We have divided the work between us and everyone has been involved in helping each other and putting the final work together. Communication in the group has worked well and we have met a lot on site to work on the assignment. I have been responsible for the survey which was carried out in Ribersborg and Västra Sorgenfri. I have collected the information and compiled it into diagrams and text. I have also written the texts "Comparison" and "Conclusion" in the assignment. The work of producing pictures, maps and diagrams has been divided between the group members. The group has discussed and reflected on the material we collected and together we came up with our suggestions for change. I feel that the work process went by smoothly. The difficulties that have arisen have been the work with Space syntax and some uncertainties in the task description. Most of our questions have been answered in tutorials.

Markus reflection:

The collaboration in this group has been working well and efficient during the whole process. We have established good communication on what has to be done and created a structure in who's in charge of different parts. Throughout the group project we have helped each other with problems occurring where everyone have had a chance on having their voice heard. During the tutoring we have all worked together in order to get our questions answered.

When it comes to the individual assigned work I have been working with creating the land-use and density maps in QGIS. Creating an overview of the areas we have chosen. My role has also been to explain and precise the proposals in the area. During this part we all worked together and by using all our gathered data we could come up with our proposal.

Tuans reflection:

The assignment has been useful in that we have gained a deeper understanding of the governance of the transport planning process, the difference between transport planning and planning for sustainable mobility and how to apply planning strategies and mobility plans. In my opinion, the work of the group has worked well. When conflicts have occurred, the group has always been able to resolve them calmly through discussion and dialogue. Another positive aspect was that we made use of each other's qualities and complemented each other in the work on the assignment. In the assignment, I was partly responsible for producing maps in QGIS, making sections, writing the text for my produced maps and I have also been on site in the areas to make observations. Something that we found difficult was using Space Syntax to model pedestrian movement, something that was started with, but in the end, we decided not to use that tool. The process of producing maps in QGIS also took longer than expected as the input information we needed was not complete and it needed to be completed manually.