UIDC 2019-2020

Project area: Andersberg in Gävle

Team Gävle

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Link to video presentation:

https://vimeo.com/390702543/9757a83499

Innehållsförteckning

Abstract

This project aims to make a suggestion for the million programme area Andersberg, located south of central Gävle. The suggestion shows a vision for a more vibrant district, containing a new design and a traffic plan for an ATV system. Andersberg is characterized by high red residential buildings placed in a monotonous way. With a cul-de-sac system the accessibility by car is low within the area. By increasing the connectivity, it is easier to take public transport. With increased opportunity to travel by public transport, the need to own a car decrease. Out of the parking lots it is possible to create new land uses and spaces for people to socialize, for example a park.

The area in Andersberg is today separated into two areas, the northern area and the central area. With an increased connectivity it is possible to link the areas together. In that way, the people living in the north area can get better access to the center building in the central area. The center building is also a big part of the suggestion as it has a new design in the form of a new floor and a small square in front of it.

Project and purpose description

The purpose of this project is to provide a suggestion for how self-driving cars can work in Andersberg by creating a 4D model. The traffic solution is based on Olli buses which is a small bus powered by electricity (Local motors, n.d.a). The hope is that people will be able to easily get around the area without adversely affecting the environment. Since Andersberg is a million programme area it is a challenge but also an opportunity to create a good traffic network (Gavlegårdarna, 2018). Thanks to Olli buses' quiet engine, the roads can go near the buildings without disturbing the residents (Local motors, n.d.a).

In addition to the traffic solution, this project aims to show a vision of the future of Andersberg. The ambition is to make Andersberg more alive according to the requests of the residents and our sponsor. Gavlegårdarna is planning two residential buildings with eight floors in the western part of the area, which also will be visualized in the model.

Andersberg

Andersberg is a million programme area built in the 1970's. The area is located south of central Gävle (see *figure 1*), approximately ten minutes away with bus from the central square. The district has qualities like good contact with nature and good integration with green spaces. There are also jogging tracks, sports facilities, playgrounds and a slope which makes it easy for both adults and children to be active. Andersberg also has a center with a library, preschool, different types of healthcare, national dental service, pharmacy, restaurant and a gym, see *figure 2* (Gavlegårdarna, 2018). There are wishes from the residents in Andersberg that the center becomes more alive and filled with activities that give life and movement in the district (Gävle kommun, 2009). It is possible to expand the center and fill it with service, shops, offices, culture and other functions. The sponsor for the project Gavlegårdarna has an idea of raising and opening up the center.

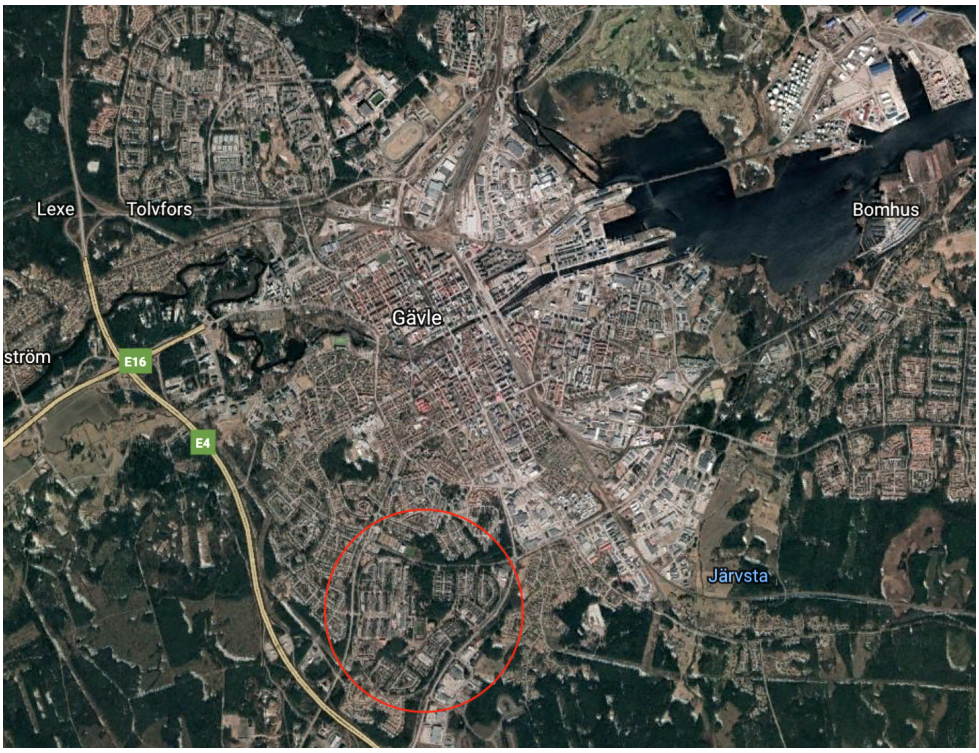

Figure 1. The red circle shows Andersbergs location in Gävle (Source: Google maps).

Figure 2. Andersberg center today (Photo: Marcus Pettersson).

The road infrastructure in Andersberg is typical for a million programme area. There is a long road going around the whole area and there are a few roads leading into the district. These roads end at a cul-de-sac, which means that a limited area can be reached by car (see *figure 6*). The buildings in Andersberg are quite homogeneous in their design and vary from 2 to 5 floors. In the northern part of Andersberg the residential buildings are built with bricks in two floors, and in central Andersberg the buildings have sheet metal facades in 5 floors (see *figure 3 and 4*).

Figure 3. Block of apartments in Andersberg center (Photo: Marcus Pettersson).

Figure 4. Block of apartments in the northern part of the area (Photo: Marcus Pettersson). The picture shows a residential house with yellow details, but there are also similar residential houses with green and blue details in the area.

Under the center building there is today a parking garage that is currently unused. One possibility is to park the self-driving Olli buses there when they need to be recharged (see *figure 5*). The buses are also more protected there and can be repaired there if they break.

Figure 5. Olli vehicles in a garage (Source: Local Motors.com). A similar garage is located in Andersberg and could be used to park the buses when they need to be recharged.

Motivation - why this project was chosen

Our project area is located in Andersberg which is a million programme area. These types of areas are an outcome of a goal that meant raising the pace of housing construction. To achieve this goal, the homes were built more rationally and industrially (Boverket, 2014). The architecture in Andersberg is monotonous which makes the outdoor environment uninteresting to stay in. Since there are wishes for improvement in Andersberg from the residents this project is a good opportunity to make a proposal for a more vibrant neighborhood. The road infrastructure does as mentioned, work as a cul-de-sac system which is typical for the million programme era. In this project it is possible to improve the road network by connecting the roads, so it is easier to get through the area instead of driving a long route around. There is also a problem with the small amount of parking lots in Andersberg, which self-driving Olli buses can solve since the need for cars would decrease.

Suggestion

In collaboration with the sponsor of the project, Gavlegårdarna, a future proposal for Andersberg has been designed. The aim of the proposal has been to develop Andersberg so that people feel more secure in the outdoor environment and want to spend more time there. Furthermore, the goal has also been to improve the opportunities for people to travel more collectively in the area by developing and adapting the district for self-driving vehicles. In order to achieve the goal, the focus of the proposal has been to develop the main building, replace parking spaces with new parks, residential buildings and more business premises, and through new roads connect northern and central Andersberg (se *figure 6*).

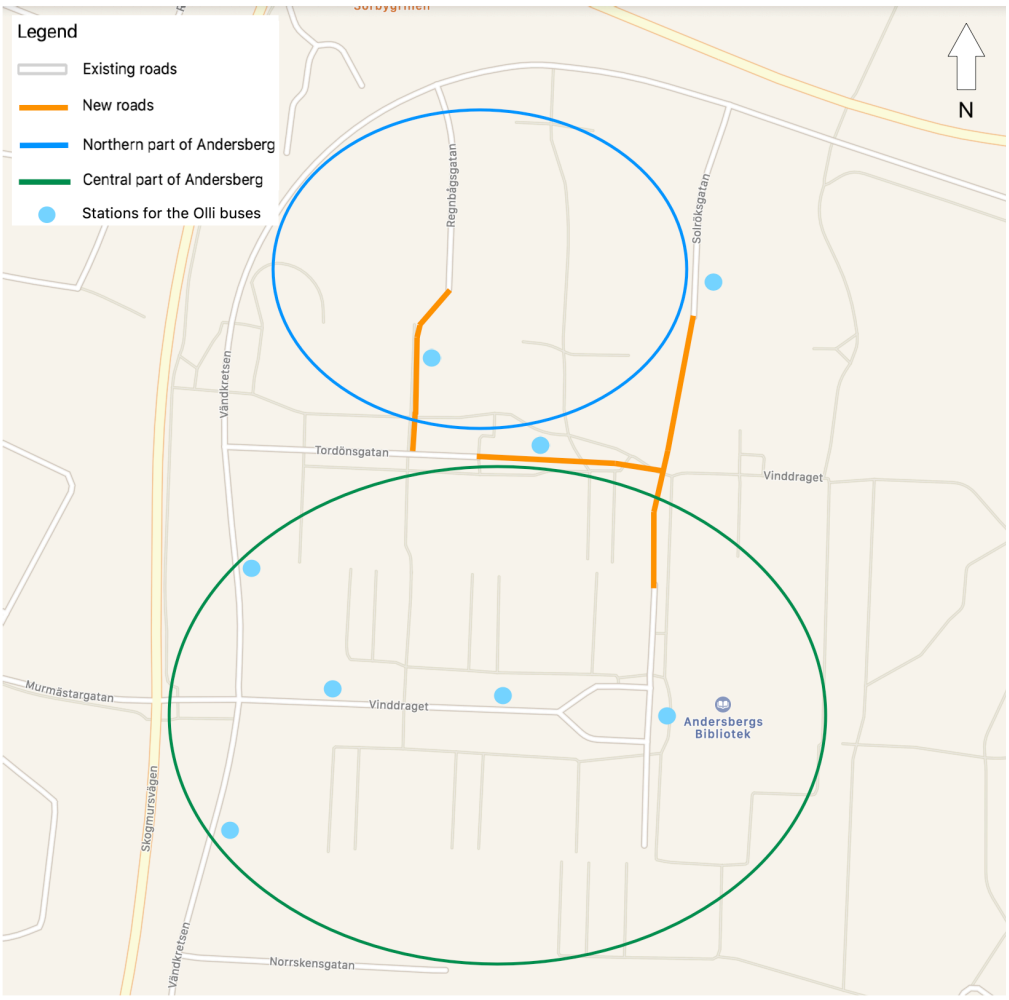

Figure 6. The new roads integrate northern and central Andersberg. The stations for the Olli buses increase accessibility for people in the area (Source: Google maps).

The proposal in pictures

Figure 7. New tower blocks in the area. The design is inspired by drawings from Gavlegårdarna.

Figure 8. New stores are replacing parking spaces along the center street.

Figure 9. A new park on the left has replaced a parking lot.

Figure 10. Anderberg center. Below the center is the parking garage for the self-driving vehicles.

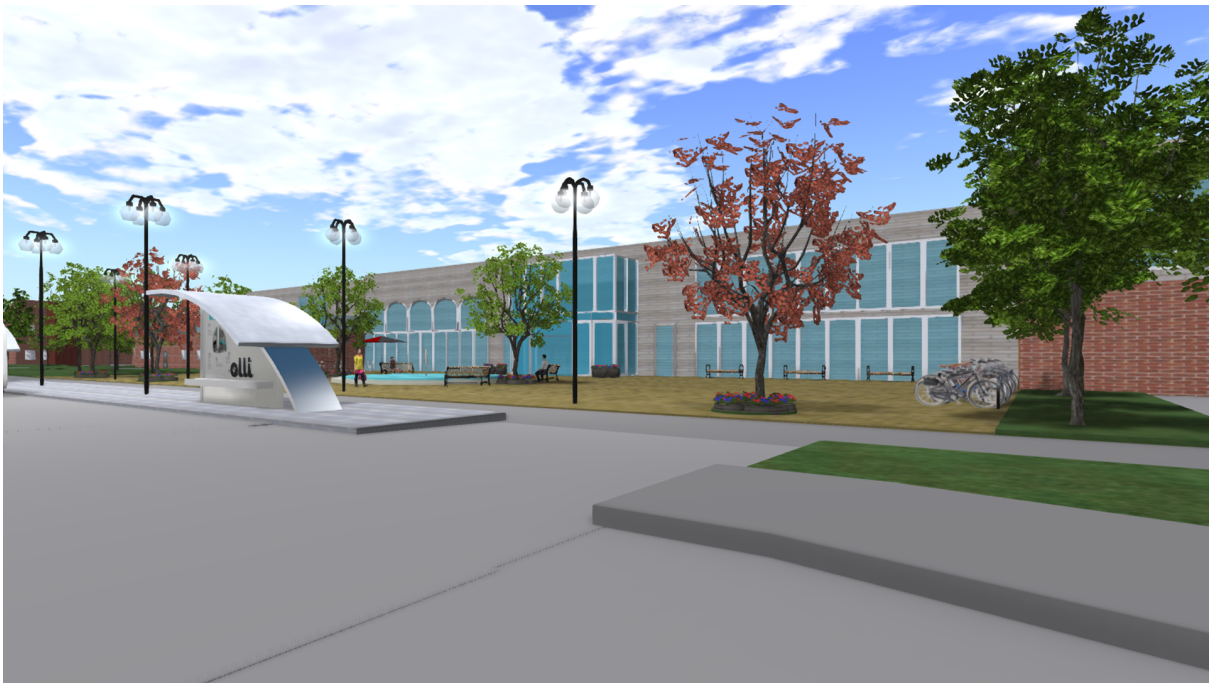

Figure 11. A zoom in on the expanded main building.


Figure 12. The northern part (on the right) and Andersberg center (on the left) have linked both areas through new roads to create increased social integration.

Figure 13. Nearest in the picture shows the northern part of the project area and further afield central Andersberg can be seen.

Effects on the built environment

A transport system supported by Olli would reduce the need to own a car since there is possible to book a ride and be picked up by the bus (Local motors, n.d.a). This solution makes it possible to reduce the amount of parking lots along the street towards the center, which changes the cityscape in a positive way. Instead of parked cars the space can be used as a park where people can sit (se *figure 9*). Along the same street, some shops are suggested to create life outside the buildings. The size of the buildings is lower than the existing buildings in Andersberg which contributes to a mixed cityscape. The stores also contribute to mixed land use which contributes to a more lively district.

This suggestion also contains a new design for the center building. As Gavlegårdarna's idea presented under the introduction section, the center has got an additional floor in the model. The extra floor can provide Andersberg with more uses, which answer the residents wishes for a more vibrant district. The entrance of the center building also has a new design. It is placed in the middle of the building to create a balanced expression. In front of the new entrance is a fountain and park benches placed. The design of center area is based on Jan Gehl's (2010, pp. 239) twelve criteria of what a public place should provide. The twelve criteria are subdivided into protection, comfort and delight. Protection include protection against traffic and accidents, crime and violence, and protection against unpleasant sensory experiences. The comfort section includes opportunities to walk, stand and sit.

Delight include scale, opportunities to enjoy the positive aspects of climate, and positive sensory experiences (Gehl, 2010, pp. 239).

Effects on social and environmental sustainability

The expansion of the streets is inspired by Jane Jacobs theories, which she describes in her book The Death and Life of Great American Cities (Jacobs, 1993). A principle there is that a city needs short blocks of intersections. This is because, according to Jacobs, intersections create more spontaneous meetings, which increases both economic and social activity. When the streets become lively and when people meet on the streets, insecurity decreases and overtime this leads to increased social sustainability (Jacobs, 1993). The integration between the northern project area and Andersberg center also increases when the new street network enables people to move between the different areas more easily (see figure 6 and 12).

In one of the United Nations Sustainability Goals, Sustainable Cities and Communities, it is stated that many cities have problems with high air pollution (United Nations [UN], 2019). The pollutants are both dangerous for humans and the climate. Therefore, it is important to increase the use of public transport (UN, 2019). Access to public transport is also an important service for people in cities, which at the same time creates a prerequisite for economic growth and social integration (UN, 2019). According to statistics from 2018, where data from 227 cities, in 78 countries have been collected, only half (53%) of city residents have convenient access to public transport. According to the UN report, more should be done to ensure that sustainable transport is accessible to everyone. Especially for vulnerable groups such as children, the elderly or people with disabilities (UN, 2019).

If Andersberg were to develop in the future according to the 4D model proposal with more stations and Olli buses, the availability of people to travel by public transport would increase significantly. As the proposal shows, there are many stops in the area to get on the Olli buses (se *figure 6)*. The bus stops are also widely distributed throughout the area to increase accessibility for as many people as possible and especially for the more vulnerable groups such as the elderly or people with disabilities. The outdoor stay would also be more comfortable for people through reduced pollution, as the Olli buses are entirely powered by electricity (Local motors, n.d.a).

Energy analysis

According to Statistiska centralbyrån (SCB, 2018), there are more than 5 million registered cars in Sweden. The majority of these cars are run on petrol or diesel (SCB, 2018). In 2016, car sales in Sweden broke previous records with a total of 372,296 newly registered vehicles. During this year, the number of cars also increased in Gävle. Between 2006 and 2016, the proportion of cars driven by diesel in Gävle increased from 4.2 to 30.2 per cent, while the proportion of cars driven on petrol decreased from 94.9 to 62.8 percent. The proportion of cars driven on electricity, ethanol and gas increased from 6.2 to 7.0 per cent during the same period. For Sweden to reach the goal of a fossil-independent vehicle fleet by 2030, the number of cars must be reduced, and more cars must be driven with alternative fuels that are more environmentally friendly (Engelro, 2017). A neighborhood or city with more self-driving cars will reduce both the number of cars and cars that run on fossil fuels. This is because people do not need to have their own car when the Olli buses are available and the Olli buses also do not emit any pollution when they are powered by electricity (Local motors, n.d.).

A comparative study needs to be done to find out the difference in energy consumption between an Olli buss and a regular car. The average range for an Olli bus is 60 km and the maximal range is 40 km. In the calculation is the maximal range used for the analysis. To find out the energy consumption for a fully loaded Olli bus (about 12 passengers) the maximal range is divided with the maximal capacity. The result is 21 kWh/ 100 km.

In order to be able to compare with the capacity (kWh) of an ordinary car per 100 km, a Volvo v90 D3 (150 hp) Diesel has been used in this analysis (Volvo, n.d). This car is used because it is one of the most common cars in the Swedish car market. The car consumes about 7 liters per 100 km, where 1 liter is equals to 9.80 kwh (Volvo, n.d; & Energigas Sverige, 2019). In order to find out the car's energy consumption, the car's average diesel consumption should be multiplied by the consumption in kWh. The results is 68,6 kWh/100 km (to transport one person). The energy consumption for a regular car is significantly higher than the consumption of the Olli bus. It should be added that the car journeys often are short and are done by a single driver (Trafikverket, 2017).

Reference list

Boverket. (2014). Under miljonprogrammet byggdes en miljon bostäder. Retrieved 2019-10-28 from https://www.boverket.se/sv/samhallsplanering/stadsutveckling/miljonprogrammet

Energigas Sverige. (2019). Vad är energiinnehållet i naturgas, biogas och fordonsgas? Retrieved 2020-02-18 from https://www.energigas.se/fakta-om-gas/biogas/faq-om-biogas/vad-aer-energiinnehaallet-i-naturgas-biogas-och-fordonsgas/

Engelro, E. (2017). Fler bilar i Gävle. Retrieved 2020-02-16 from https://www.svt.se/nyheter/lokalt/gavleborg/fler-bilar-i-gavle

Gavlegårdarna. (2018). Andersberg. Retrieved 2019-10-20 from https://www.gavlegardarna.se/hyra-och-bo/vara-omraden/andersberg/

Gehl, J. (2010). *Cities for people.* Washington, DC: Island Press.

Gävle Kommun. (2009). *Översiktsplan Gävle Stad 2025*. Retrieved from: https://www.gastrikevatten.se/Content/88932/BILAGA-4Gavle-stad-Oversiktsplan-2025.pdf

Jacobs, J. (1992). *The Death and Life of Great American Cities* (New York: Random House, 1992), originally published in 1961.

Local motors. (n.d.a). Meet Olli. Retrieved 2020-02-18 from https://localmotors.com/meet-olli/

Local motors. (n.d.b). *Meet Olli* [Pamphlet]. Retrieved from https://localmotors.com/wp-content/uploads/2017/12/Olli_Specsheet.pdf

SCB. (2018). Mer än 5 miljoner personbilar i trafik i Sverige. Retrieved 2020-02-16 from https://www.scb.se/hitta-statistik/statistik-efter-amne/transporter-och-kommunikationer/vagtrafik/fordonsstatistik/pong/statistiknyhet/fordonsstatistik-juni-2018/

Trafikverket. (2017). Dina val gör skillnad. Retrieved 2020-02-18 from https://www.trafikverket.se/resa-och-trafik/Dina-val-gor-skillnad/

United Nations. (2019). *The Sustainable Development Goals Report 2019.* New York: United Nations Publications.

Volvo. (n.d). Motorer för Volvo. Retrived 2020-02-16 from https://www.volvocars.com/se/bilar/modeller/v90/specifikationer/motorer