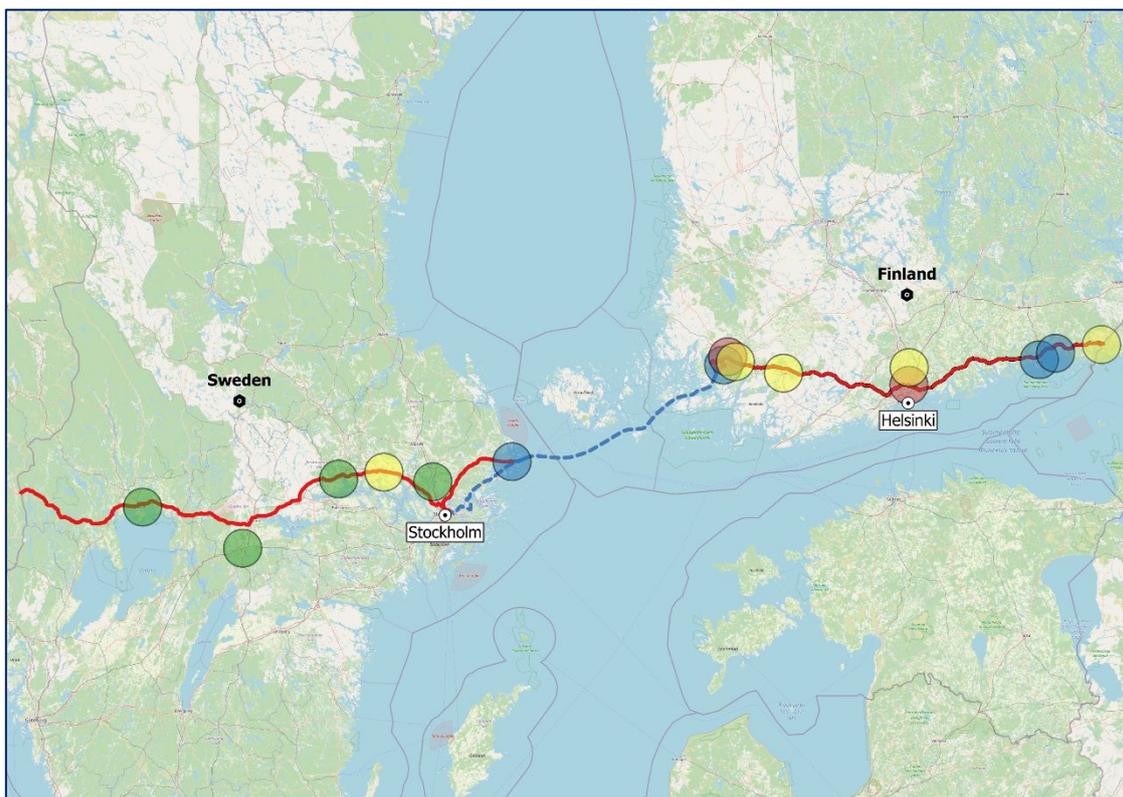


Terminal report of the Northern Corridor

The current terminal network of the transport corridor Oslo – Stockholm and Turku – Vaalimaa

Authors: Anna Hallvar, Harri Heikkinen, Jari Hietaranta, Kari Lindström, Patrick Yliluoto



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Introduction

Terminal processing has many meanings. In transport and logistics, a terminal refers to the place where passengers or transportable products are assembled before being transferred to a means of transport. This report focuses on freight. In cargo terminals, at least two forms of transport and transportation merge. In this context, a terminal or terminal area refers to the places where the collection ends and the transfer begins. When the transfer is terminated the distribution begins. In other words, goods already have delivery addresses clear. A key task in cargo terminals is to connect the flow of goods and transport units.

The terminals are managed and operated by independent companies. Properties may be own or leased. A logistics center is a location with multiple terminals, central warehouses, distribution centers and services supporting logistics. In other words, a logistics center is an area that includes activities for the transportation, storage, and distribution of products.

The modeling basis is used for transport departure and destination areas, quantities of goods, logistics equipment, time use and cost of operations. The ideal place can be found in the area where the best benefit is at the lowest cost e.g. minimize transportation costs and maximize service rates. The goodness of the service rate can be assessed at accessibility e.g. 24 h delivery rhythm and the cost can be measured at the kilometers driven or time spent. In addition, location is practically limited by many other things, most importantly available land.

Representation of E-18

In general, growth zones or transport routes have increased their importance in recent years as a reference for regional restructuring and development. These zones and

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routes play as an instrument of national and regional urban policy. Their promotion involves a lot of active promotion in the regions at different levels of government. There are many positive expectations for promoting interregional mobility and interaction. The main advantage of the E18 transport corridor compared to other east-west transport routes is good and well-functioning infrastructure. The E18 is a fast and secure route which services are already at a reasonable level. Compared to other maritime routes, the maritime section of the E18 corridor between Finland and Sweden offers superior ship connections.

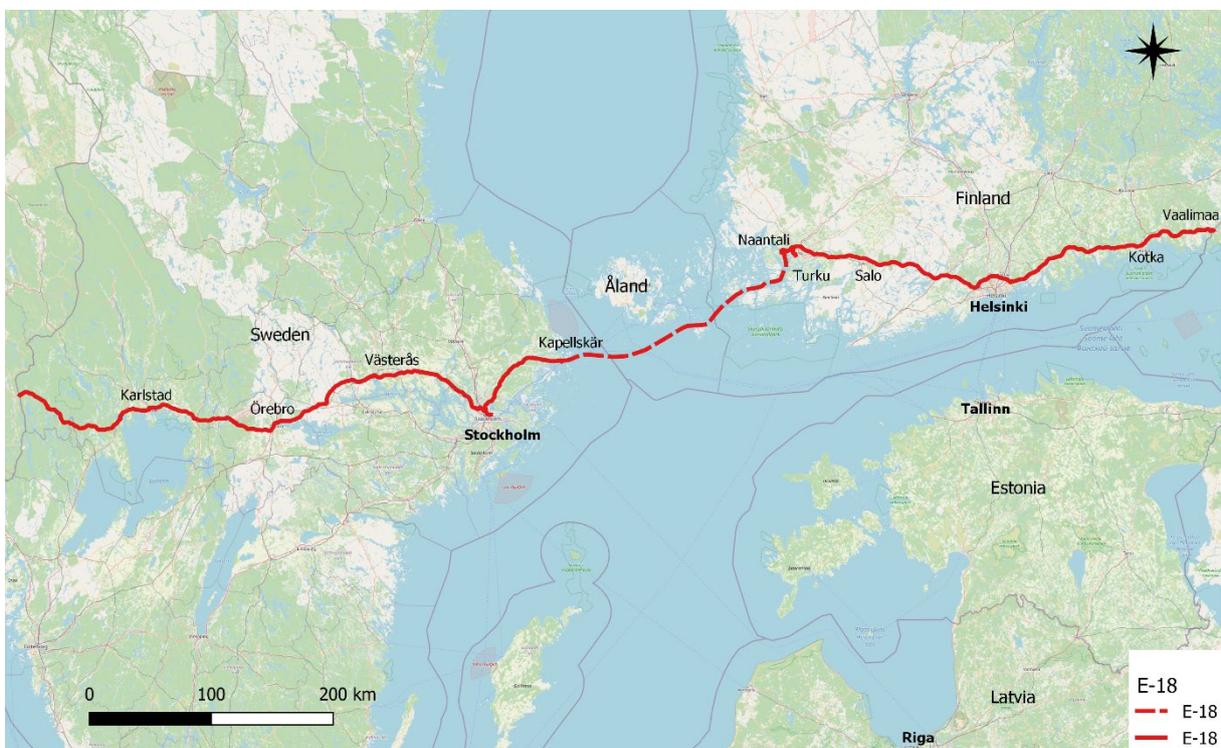


Figure 1 Route E18 in Sweden and Finland

E-18 In Sweden

E18, is a European road that starts in Craigavon in Northern Ireland and ends in Saint Petersburg in Russia. The total distance for the E18 is 1,890 km, of which 512 km in Sweden. In Sweden, the road is extended between the Norwegian-Swedish border to Kapellskär. The journey takes about 6 hours by car. Calculations show that 12% of the total traffic on the E18 between the Swedish-Norwegian border and Kapellskär is heavy vehicles. The speed limit is mostly 110 km/h, but in some parts of the route there are lower speeds.

E18 is a state road and one of the country's most trafficked, which constitutes an important route for passenger and freight transport between Oslo-Stockholm and the connections to the Baltic Sea countries such as Finland. E18 is part of the main road network and is designated for functional priority road network (FPV). The entire route E18 is a national and internationally important route and is also part of the European transport network (TEN-T).

E18 goes through one of Sweden's most populous areas with almost 3.5 million people and goes through cities such as Stockholm, Västerås, Örebro, Karlstad and connects to other places such as Uppsala and Södertälje. These cities are also significant for work and study commuting.

This paragraph (E-18 in Sweden) is part of the report Bottlenecks and solutions on E18 in Sweden. Authors: Ahmed Alaeddine & Linn Nordkvist, Region Örebro County. Published: June, 2020, Baltic Loop / Region Örebro County.

E18 in Finland

The total length of E-18 corridor from Naantali / Turku ports to Vaalimaa border is around 361 kilometers. It is almost total four-line corridor with around 90 junctions. The general speed limit is 120 kph but 100 kph during the wintertime. It is one of the most

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important traffic gateways in Finland. Remarkable amount of Finnish foreign trade goes through the Naantali and Turku ports. Major cities along the gateway are Turku and Helsinki. Minor cities include Naantali, Salo, Lohja, Hamina and Kotka. In addition to domestic traffic, the road is designed to serve international traffic.

Approximately 58 % of Finland's international passenger traffic and 62% of international freight traffic use the services of the E18 corridor. For passenger transport, terminals on the E18 corridor account for 94% of air passengers in international traffic in all of Finland, train passengers 100% and 99% of ship passengers. In freight traffic, 95% of all air freight arriving in and departing from Finland passes through Helsinki-Vantaa Airport.

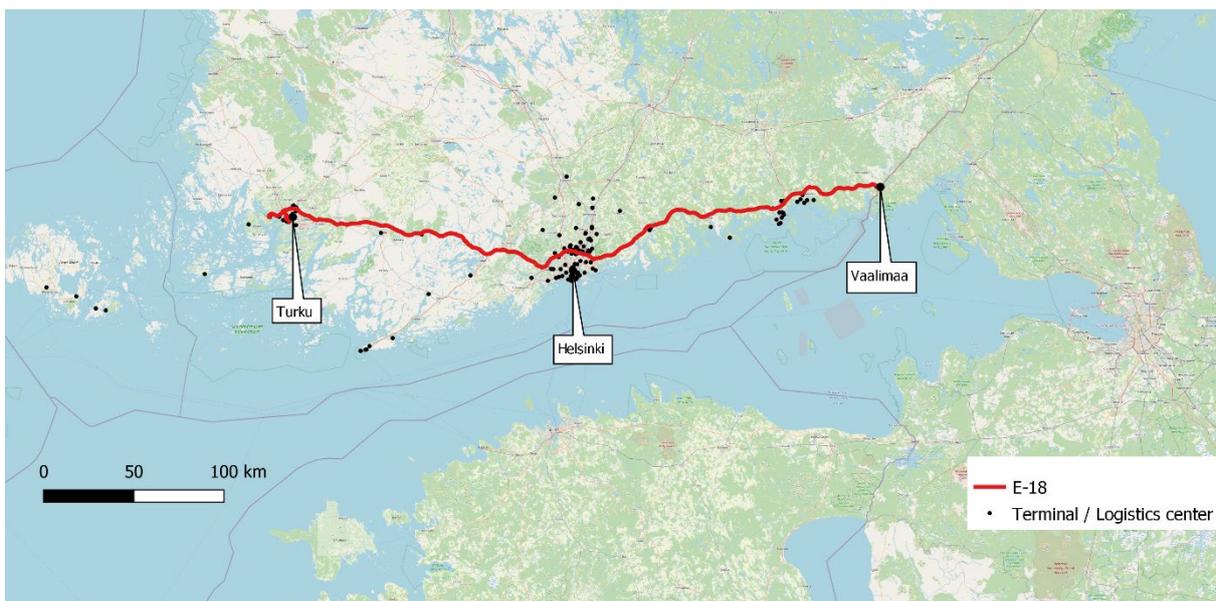


Figure 2 E-18 and current terminal network in Finland

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For cargo transport E-18 is seen very important gateway. The aim set by Council of Southwest Finland (2018) is to develop the E-18 with terminals, border crossings, services, and environmental systems with a high-quality transport system.

Strengthening the Northern Growth Zone from Oslo and Stockholm via Turku and Helsinki, which is adapted closely to the E18, is one of the key development targets in Southwest Finland as a key route for transport between Europe and Russia. The zone is also a nationally important project to maximize the benefits of transport and telecommunications investment in the region. One of the key objectives of the growth zone is to improve national competitiveness through the new business opportunities.

Factors affecting the location of terminals

Rushton et al. (2014) notes the following factors influence location decisions of terminals and logistics centers:

- Relative location to customers
- Relative location to suppliers and sourced materials
- Regional land and property costs
- Accessibility based on transport infrastructure with different modes of transport
- Exchange rates
- Culture and social attitudes towards activities of people in nearby areas
- Regulations and decision-making by authorities on the use of areas
- Organization, industry and principle of operation of the company

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Sweden

It is typical of Swedish and Scandinavian trade and industrial distribution chains and channels, that a domestic / Scandinavian distribution center is located at multi/intermodal logistics zones besides the east-west cargo corridors in Southern and Central Sweden. In addition to coastal logistics zones at major port cities (Trelleborg, Malmö, Helsingborg, Gothenburg, Stockholm, Nynäshamn), there are inter/multimodal hinterland logistics zones and centers e.g. close to metropolitan areas of Jönköping, Örebro and Karlstad. Import and export transport through these distribution centers by railway or road transport, as well as terminal deliveries carried by road or railway transport to regional terminals in the distribution chain, direct deliveries driven directly from the distribution center to large final customers and return logistics for customers and regional terminals.

Finland

It is typical of Finnish trade and industrial distribution chains and channels, that a nationwide distribution center is located at the working area of Helsinki — either closer to or further away from the urban center. Import and export transport through these distribution centers, terminal deliveries carried by truck transport to regional terminals in the distribution chain, direct deliveries driven directly from the distribution center to large final customers and return logistics for customers and regional terminals.

The optimal location to customers depends significantly on the product categories of goods passing through the terminal or logistics center and the industry of customers. For example, several public sector government buildings and agencies, large educational institutions, department stores, shopping centers, restaurants, and specialty shops small in area are often located in city centers. Where most of the goods passing through the terminal are associated with the above industries, a reasonable

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distance of transport from the terminal to the urban center is an important criterion. On the other hand, customers of industrial and hypermarket type shops and shopping centres are mainly located further away from urban centres, for example in Turku urban area E18, just off or outside Helsinki Ringway III, in the Helsinki urban area. Heavy forestry metals and chemical industry customers on the Finnish section of the E18 road are significantly less than in the interior of southern Finland and central Finland.

In turn, the optimal location relative to suppliers and materials depends on the origin of the goods and factors of production being acquired and the location of the previous nodes in the supply chain. For terminals with much import and export transport, connections to the E18 road, ports of Turku, Naantali, Vuosaari and HaminaKotka are important. If the terminal is clearly the largest supplier or several major suppliers concentrated in the same air direction constitute a large part of the volume and delivery of incoming goods, the location of the terminal should be considered from this carrier.

Regional land and real estate costs, as well as accessibility based on traffic infra with different modes of transport, have led to a significant trend in the location decisions of Finnish terminals and logistics centers: In addition to the fact that the new centers of operators are larger than the old ones, they are also consistently located further away from urban centers than the old terminals already driven down.

In the 1960s to 1990s, for example, Turku urban area tended to build terminals for trade, industry, and transport shops near the port, in Pansio and Rieskalähteentie about 3-5 km from the city centre. In the early 2020s, the new logistics focus of Turku urban area is ascending about 10 km from the city centre on the E18 bypass road, to the Avanti -Tuulissuo area of the municipality of Lieto.

In the Helsinki urban area, in the 1960s to 1980s logistics centres were built, for example, within Metsälä inside Ringway I, about 6 km from the city centre, in Kilo in Espoo, about 12 km from the centre of Helsinki, and already after the World War II. In 1940s and 1950s in Sörnäinen's corner near Sompasaari port on the eastern edge of central urban area. In the 1990s to 2000s, an unprecedented high concentration of

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logistics and business in Finland was built to the north of Ring III on both sides of Tuusula road around Helsinki-Vantaa international airport.

Starting in the 2010s, several operators in the grocery and utilization trade and transport operators Schenker Cargo have taken a bigger leap outside Ring III further from the heart of Helsinki: for example, Schenker Nurmijärvi Ilvesvuori (30 km from Helsinki on the E12 road. in Tampere direction), Tokmanni Mäntsälä (60 km from Helsinki to Lahti, E-75 road), Lidl Järvenpää (40 km from Helsinki, E-75 road) and Inex Sipoo Talma, responsible for logistics for the S-Group (30 km from Helsinki, E-75 road).

Why are terminals and logistics centers then moving and, in part, already moving further away from urban centers? Finland's largest urban areas (Helsinki, Tampere, Turku, Oulu) are constantly growing, and terminals built between the 1960s and 1990s began to remain within the urban structure, surrounded by residential and workplace areas. Growth in urban areas and traffic volumes increased traffic congestion on the lanes leading to the old terminals, negatively impacting travel times for heavy vehicles using the terminals and their predictability rates.

The heavy freight traffic flowing through neighborhoods and among local commuter traffic was criticized by urban residents and policymakers. Prices and rents for land and plots in old logistics areas rose, and it was often not possible to obtain permission for extensions of land and buildings from municipal agencies as old premises and outdoor areas became crowded. Terminals and logistics centers located further away from urban centers, such as the examples mentioned in the previous paragraph, were able to address the above challenges with new location decisions.

In addition, after a lengthy period, the maximum permissible length dimensions for heavy vehicle combinations used in the transport of goods were radically increased in Finland on 21 January 2019. In particular, terminals and logistics centres, through which long-distance trunk transport is operated with relatively light goods in size and volume, benefit from the long so-called renovation enables the above-mentioned reform. HCT (heavy capacity transport) vehicle combinations make it smooth or

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possible to operate only between slots and destinations, which are not located behind any steep and tight intersections and roundabouts. The most HCT friendly locations of terminals are easiest to make further outside urban centers. Authorities deciding on zoning and building permits will also take a more positive view of licensing matters when new logistics centres and their extensions are further from areas zoned for residential and commercial space use.

On the downside, terminals and distribution centers located further away from urban centres have a long distance of transportation for distribution and pick-up services to the urban centre. This increases the transport delivery for transports between terminals and downtown customers. To compensate for this problem (as well as dictated by current environmental trends), a number of transport and terminal operators are setting up so-called city-based terminals to complement the terminal network of the distribution centre that has grown further away from the urban centre.

Small and light consignments from the City Terminals are distributed only to a small area (core centre + surrounding areas), and instead of traditional diesel-powered load and vans, citywide distribution is mostly handled by electric or recharge-hybrid passenger and small vans; lightweight quad- or tricycles, and even electric bicycles or traditional bicycles with possible side and trailers. Input/trunk traffic between city terminals and distribution centers is typically handled by two-axle delivery trucks.

The main point of the terminal clearance for the E18 Finland section of the Baltic Loop project is: Could the E18 road further away from Helsinki and Ring III and Turku suggest setting up one or more operators' terminals, logistics centres or even logistics concentrations? This will be further considered and analyzed in the following deliverables on the subject.

Current terminal network on E-18 in Finland

This section examines the terminal and logistics areas (Figure 3-8) located on the E-18 in Finland. Eight areas have been selected to describe different terminal locations. Some of the terminals are located at land and sea transport nodes. Terminal centers can be divided into developing, growing, and declining centers.

1. Port of Turku

The port of Turku will build a new joint terminal in the port area. Terminal will be undertaken by both Viking Line and Silja Line upon completion of the arrangements to use for scheduled liner services in line with their current timetables. New joint terminal opens opportunities for the port area development. Freight and passenger services are important to the city and port want to provide the best possible conditions for business development. After new terminal port will be able to implement a smoother transition to freight.

The priority is to enhance the operational activities of port areas and transport. Reforms will be made considering the environment and future settlement. The safety of freight and passengers are considered in the development plan. Plan is to create a maritime district in Turku's port, where freight transport, tourism, business, and housing develop together. The planning will take into account the environmental development activities of Turku Castle and the riverbank, future transport arrangements and safety issues. Movement in the area will be streamlined so that the city will allow the implementation of the necessary new road and rail lines. The city also takes care of zoning and street plans related to the arrangements. The joint terminal and new transport arrangements are due to be completed by the end of 2024. The cost of the terminal is estimated to be around €45 million.

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Source material, Turku city webpage: https://www.turku.fi/uutinen/2018-08-17_laivaliikenteen-uusi-yhteisterminaali-avaa-mahdollisuuksia-satama-alueen

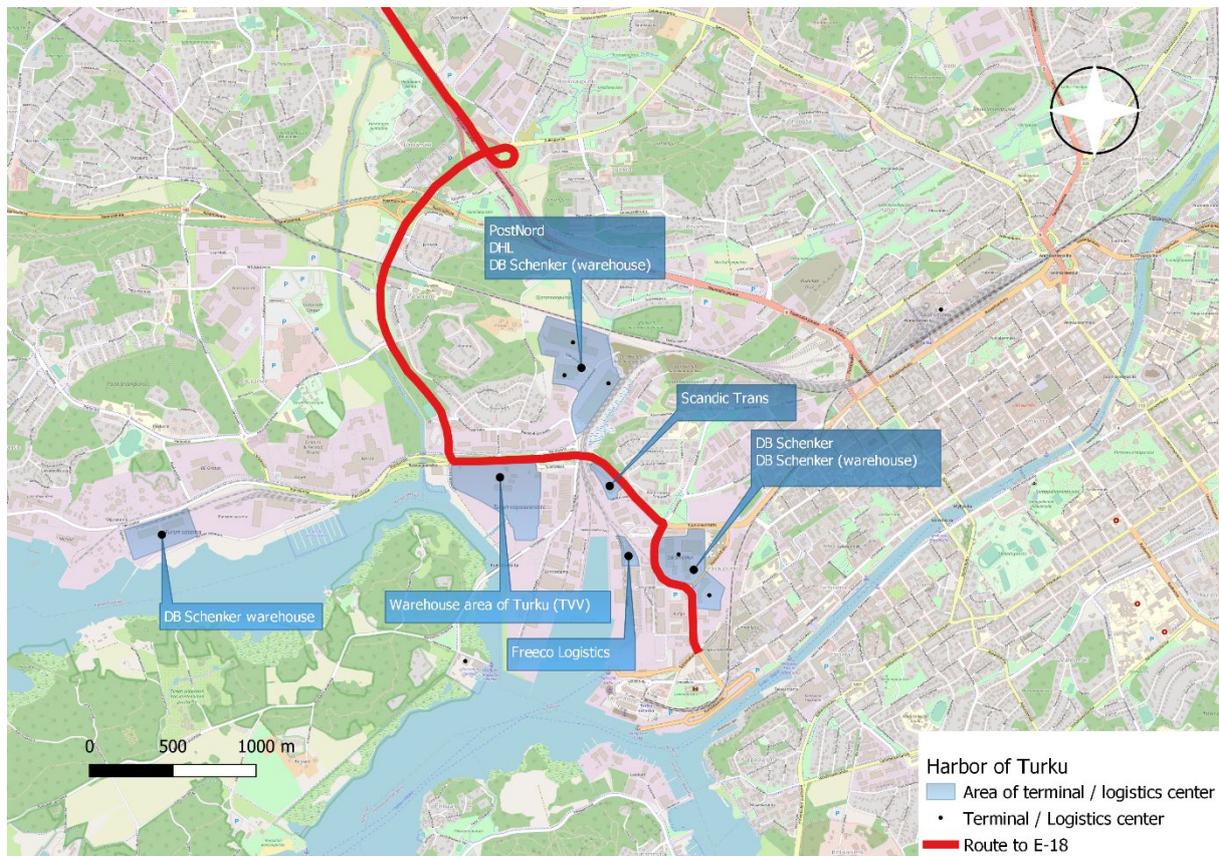


Figure 3 Port of Turku, current situation

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2. Urusvuori and Turku airport

Urusvuori is an industrial and logistics area located approx. 7 km northeast of Turku city center, outside of E18 Turku ringway and besides E63 Turku-Tampere highway. On the eastern side of E63 highway (figure 3, orange colored area), there is a large industrial area with multiple industrial operators, particularly within machinery and food industry. On the western side of E63 highway (figure 3, light blue colored area) there is a regional road transportation terminal managed by Kaukokiito. Kaukokiito is the largest transportation concern in Finland, owned by regional independent transportation operators. Kaukokiito Urusvuori Turku terminal has a remarkable role in regional and domestic distribution chains of grocery, hotel, restaurant and catering services as well as construction industry and miscellaneous packed and palletized goods.

Urusvuori area is also located very close to Turku Airport. In the Turku Airport area, there are separate Air Cargo terminals managed by multiple forwarding and parcel cargo transport operators.

Currently, the Urusvuori area is rather well accessible from E18 Turku Ringway both directions (west, Port of Turku / Port of Naantali and east, Helsinki-Vaalimaa). The distance from E18 and its closest junctions to Urusvuori is short (0,5 to 3,5 km), and traffic infrastructure capacity by infrastructure type (motorway, separated driving directions, 2 lanes per direction) on highways E18 and E63 around Urusvuori is not far from sufficient. However, both interchanges linked from E18 Turku ringway to Urusvuori are old-fashioned: Distance between two junctions is very short (approx. 500

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m), and the exit and acceleration lanes to all the directions are very short. This is leading to regular traffic disorders in junctions, and traffic safety level at the junctions is not good.

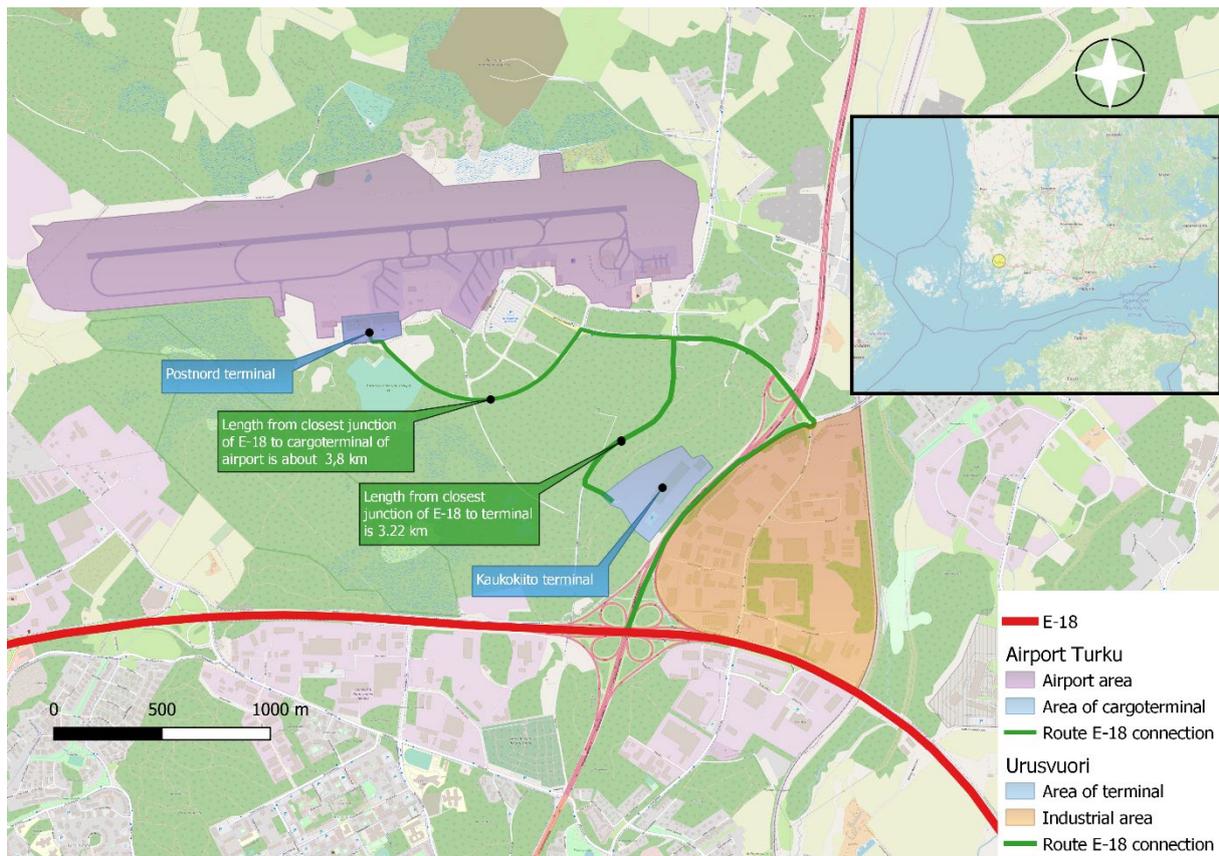


Figure 4 Urusvuori and Turku airport

3. Avanti, logistic and terminal area

Avanti is a rapidly developing business and industrial area near Turku, and it is also known as a concentration of logistics in the Turku region. The Avanti region is developing, and traffic volumes are increasing. Area needs an underpass, ramps in both directions. It is vital for a growing area. Traffic must run smoothly in both ways.

Improvement work on Turku Ring Road is currently underway. The first phase focuses on the section of road between Pukkila and Kirismäki and the section of the ten road between the ring road and Tammitie. The speed limit for the ring road will increase upon completion of work on a four-lane stretch of road to 100 kilometres per hour.

Starting in the summer 2020, work will take place between Kausela and Pukkila and a road 10 between the Ring Road and the Kaarina road. There is still need for the connection to the Avanti Industrial Area. There is no road plan yet, and no funding. The price bracket is between 7 and 10 million euros.

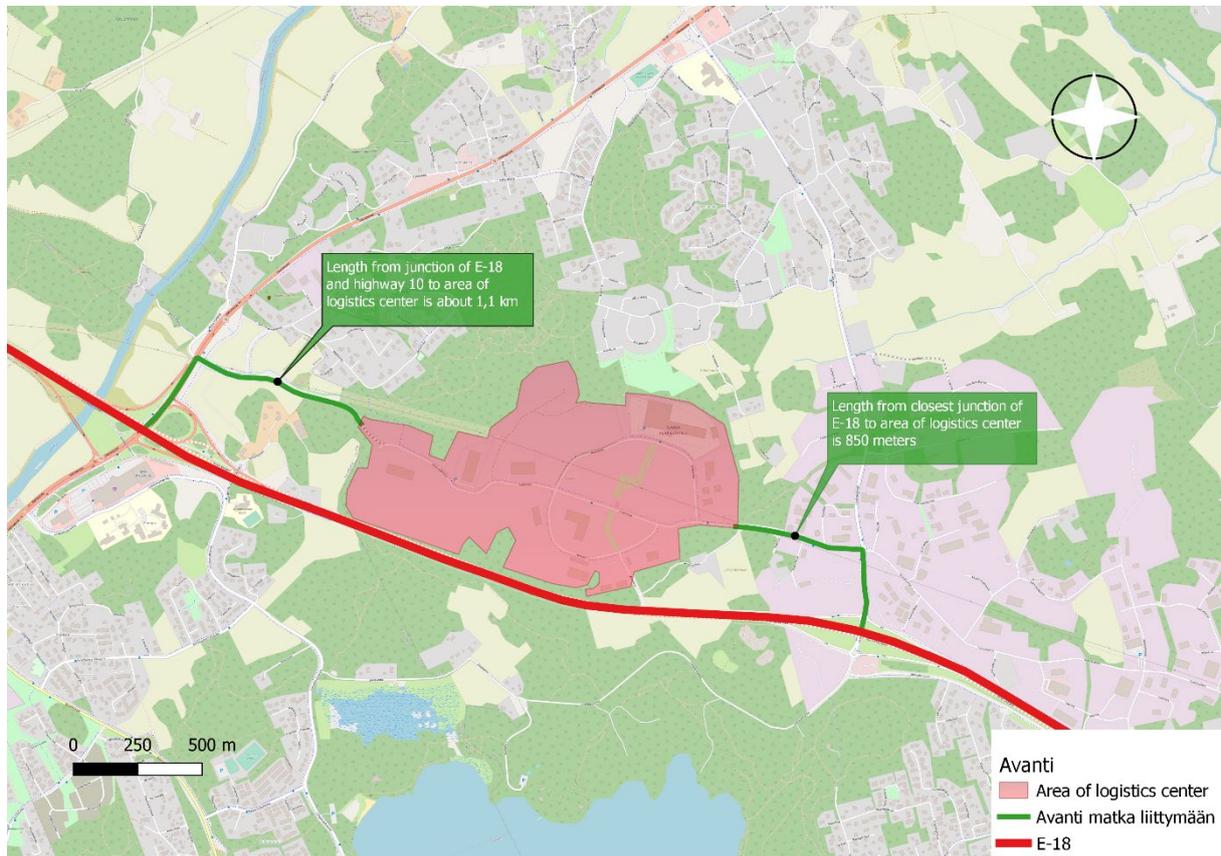


Figure 5 Avanti logistic and terminal area

4. Meriniitty, logistic and terminal area

Meriniitty region in Salo is diversified business cluster in south-west Finland, significant in terms of the number of jobs and businesses. The area is in the immediate vicinity of the city centre on the southwestern side of the railway area. Meriniitty consists of industrial and warehouse buildings, as well as terminals.

Traffic problems in the area are the junction area of Joensuunkatu and Myllyoja street and the junction area of Satamakatu and Meriniitynkatu. Traffic accident data has been compiled in connection with the preparation of a road safety plan in the Salo region. Both the narrowness of Meriniitynkatu and the absence of turning lanes have been identified as a problem on behalf of operators in the area.

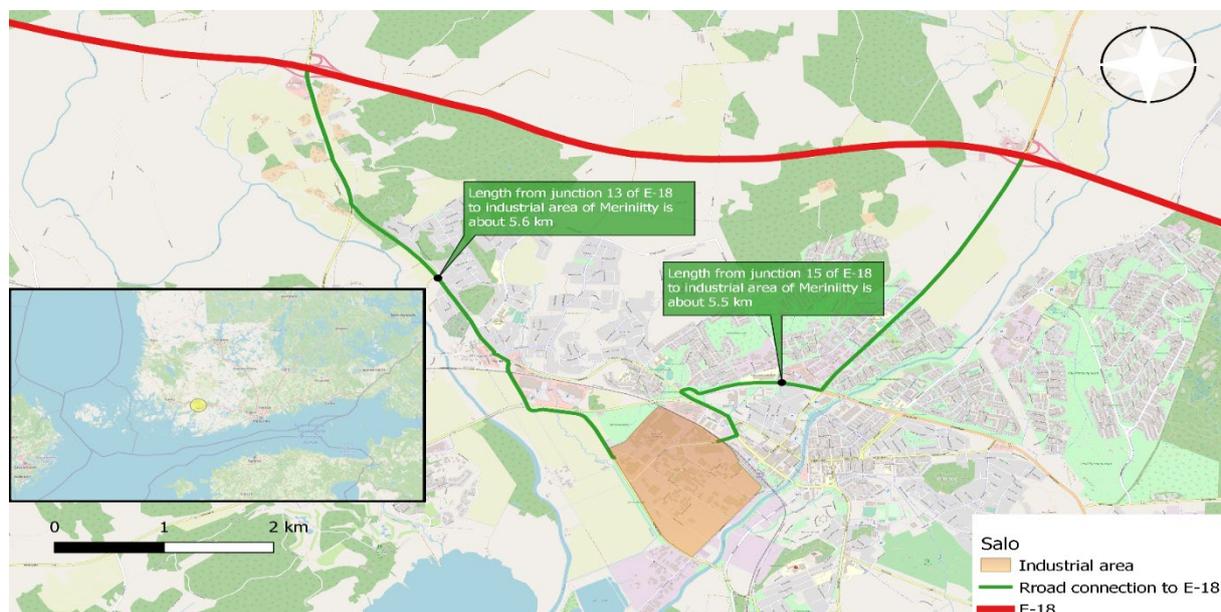


Figure 6 Salo, Meriniitty

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5. Aviapolis, logistic and terminal area

The largest and most significant logistics zone in the Helsinki region and throughout Finland is located besides Ring III between highways 3/E12 and 4/E75, nearby Helsinki-Vantaa Airport. The area is also known as Aviapolis.

Under the name Aviapolis can accommodate not only the logistical functions but also housing, industry, commerce, hotel and restaurant etc.

This area is characterised by the fact that it corresponds to the definition of a “logistics zone” as the only area in modern Finland (eslogc reference <http://www.eslogc.fi/images/stories/TulevaisuudenLogistiikkakeskus/luokittelu.pdf>)

Operators have synergies from each other, easy to obtain support functions (sales - maintenance – repair - restaurant - training, etc.). This area is also known as multimodal transportation chain interchanges (Air – Road) within terminals managed by multiple air cargo, parcel and courier service and forwarding operators.

However, the area faces a challenge that it has grown within the urban structure and, in addition to logistics, there are other activities whose transport is hampered by freight traffic and freight traffic is hampered by those activities (congestion, noise, emissions). The busiest segment on the E18 route Finland is located on Ring III between highways 3/E12 and 4/E75, with average daily traffic of 95 000 vehicles. Because of very high traffic density, moderate to severe traffic congestion and delays occur daily during the peak hours (Mon-Fri 7:00 to 9:00 and 15:30 to 17:00) on the E18 segment.

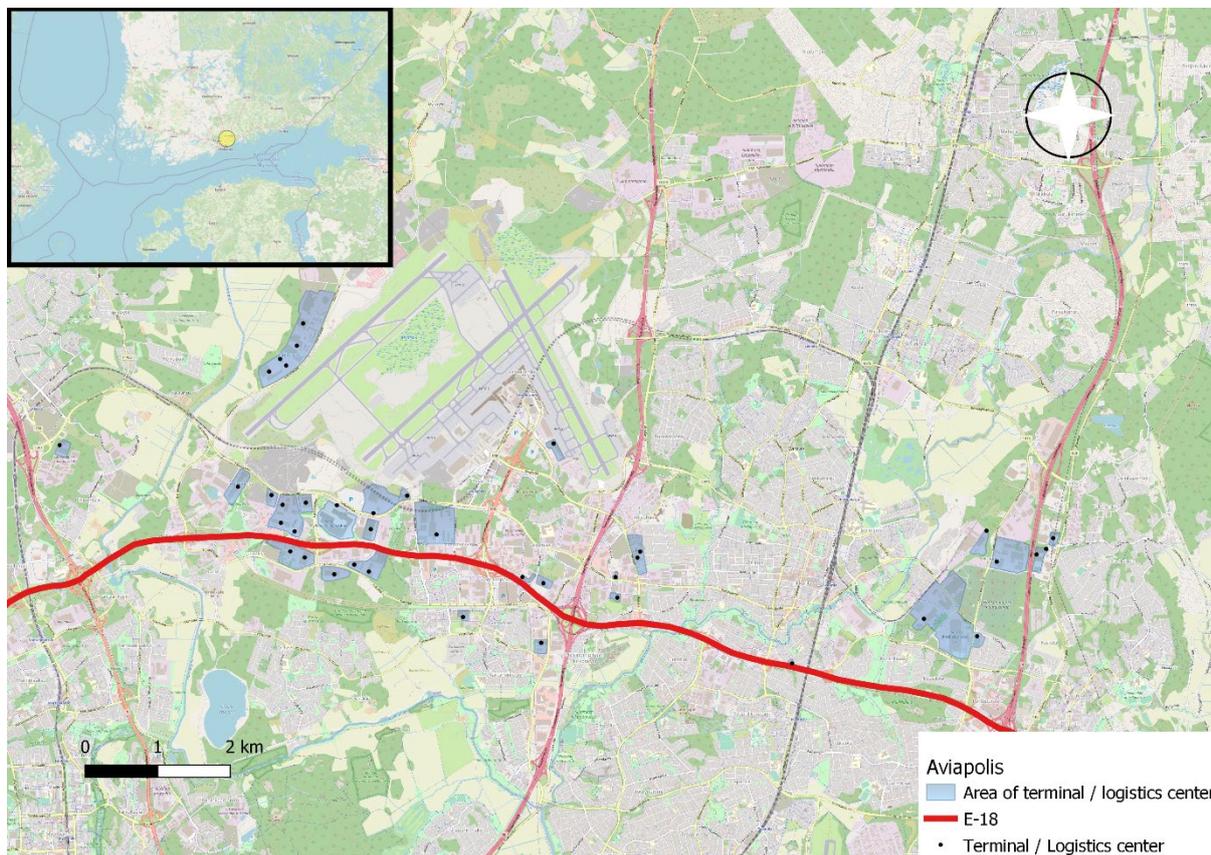


Figure 7 Aviapolis

6. Nurmijärvi - Järvenpää – Sipoo

Starting in the 2010s, several operators in the grocery and utilization trade and transport operators Schenker Cargo have taken a bigger leap outside Ring III further from the heart of Helsinki: for example (figure 8.), Schenker Nurmijärvi Ilvesvuori (30 km from Helsinki on the E12 road, in Tampere direction), Tokmanni Mäntsälä (60 km from Helsinki to Lahti, E-75 road), Lidl Järvenpää (40 km from Helsinki, E-75 road) and Inex Sipoo Talma, responsible for logistics for the S-Group (30 km from Helsinki, E-75 road).

The new terminals and distribution centers further beyond Helsinki have replaced the older terminals, because Helsinki metropolitan area is constantly growing, and the old terminals remained within the urban structure, surrounded by residential and workplace areas.

The heavy freight traffic flowing through neighborhoods and among local commuter traffic was criticized by urban residents and policymakers. Prices and rents for land and plots in old logistics areas rose, and it was often not possible to obtain permission for extensions of land and buildings from municipal agencies as old premises and outdoor areas became crowded. Terminals and logistics centers located further away from Helsinki, such as the terminals mentioned in the previous paragraph, were able to address the above challenges with new location decisions.

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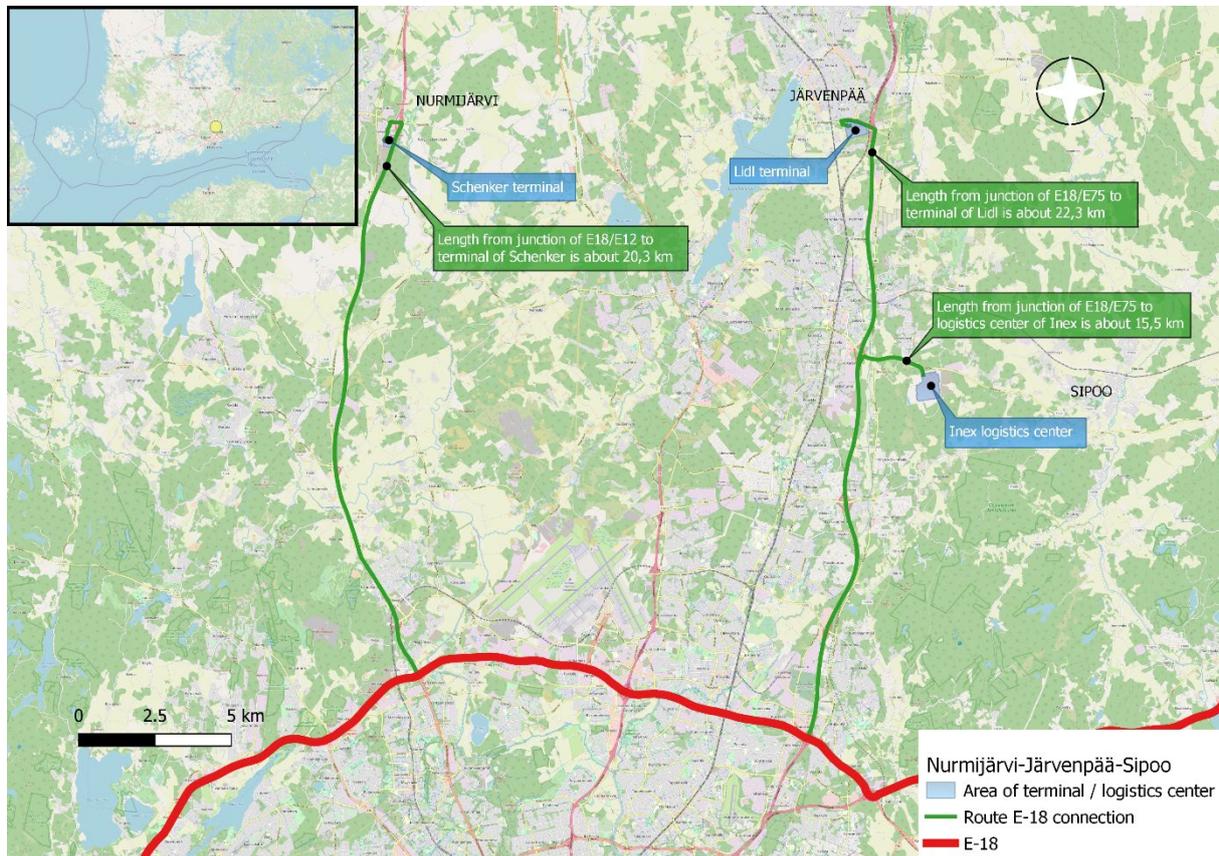


Figure 8 Terminals in Nurmijärvi - Järvenpää - Sipoo

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7. Port of HaminaKotka

The ports of Hamina and Kotka merged in 2011. The transport development forecast for the port has been updated to reflect the latest data. The forecast is the current situation transport volumes, transport methods and transport orientation as defined in the HaminaKotka Port Land Transport. This paragraph (Port of HaminaKotka) information have been collected from ports webpage, <https://www.haminakotka.com/fi>.

In the Traffic Forecast prepared, the transport modality sections of freight traffic were assumed to remain current. Due to this, the growth of rail traffic in the port is greater storage and field facilities, direct access to the E18 motorway, operational rail links and the operator's diverse and efficient services ensure the best service than road traffic. Due to a higher proportion of rail traffic in the more strongly growing transit traffic.

RORO traffic in Haminakotka is concentrated in the port part of Hietanen. Hietanen harbour has covered storage space for various cargoes as well as field space for large

units. Hietanen also has 110 hectares of field area, which is ideal for storing and handling passenger cars.

Products from the forestry industry are an integral part of Finnish exports. Forestry products are typical RORO cargo. The rich cargo capacity and loading speed of RORO ships are also liable for various project cargoes.

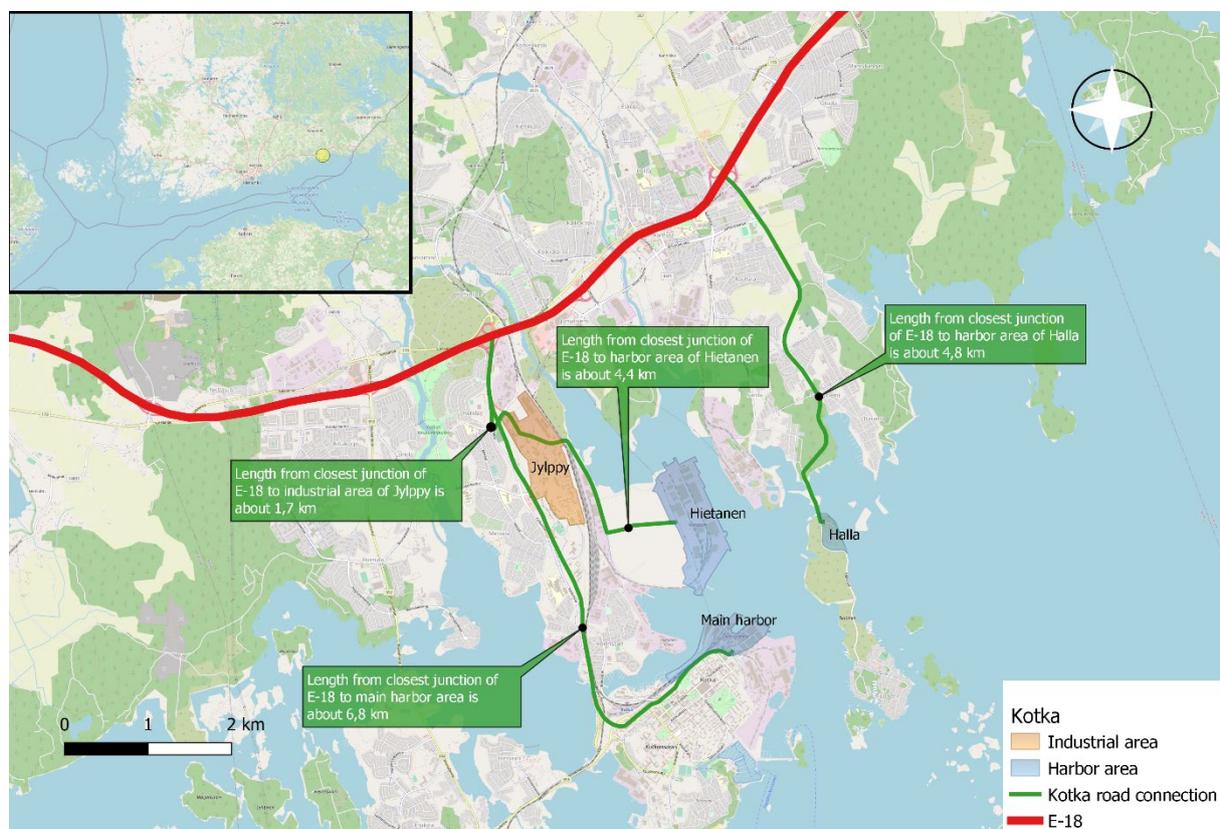


Figure 9 Port of Kotka

The port part of Hietanen is concentrated on RORO cargoes. Daily liner services to Europe's main ports serve the rapid flow of goods. The 100-hectare car terminal in the

port of Hietanen also has the capacity to handle and store even large quantities of imported and transiting vehicles.

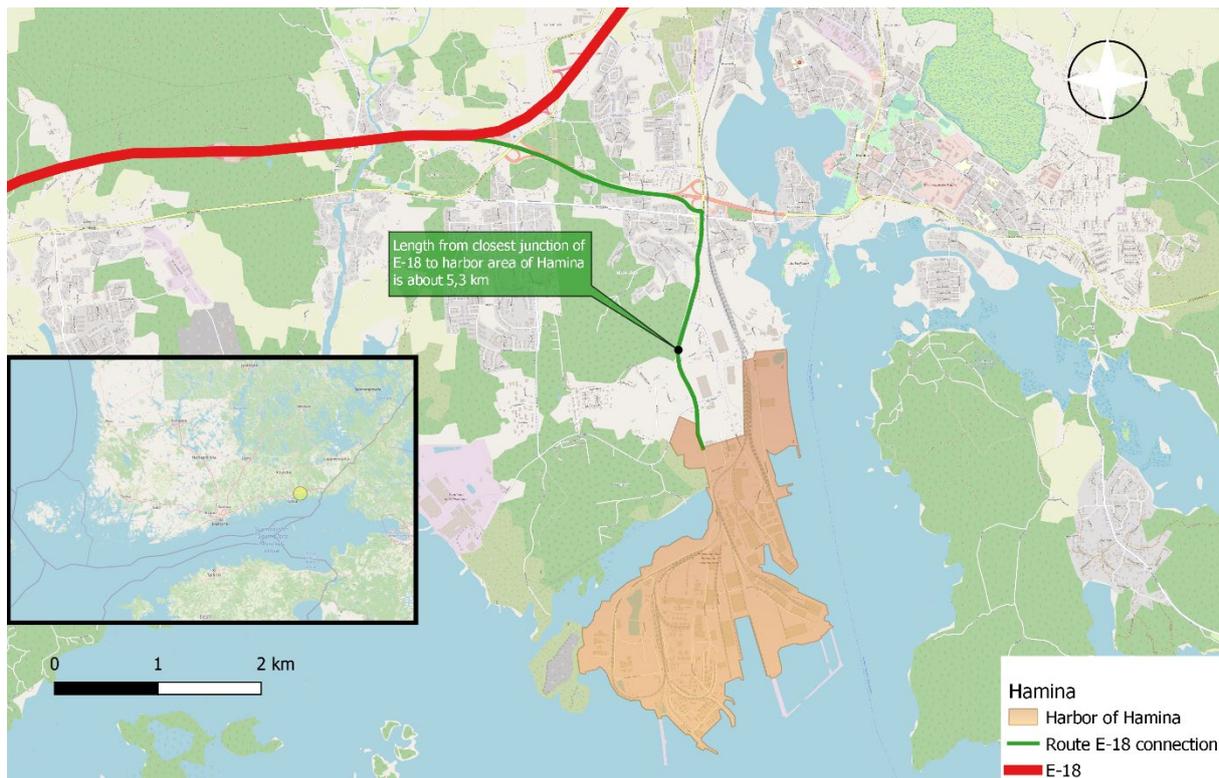


Figure 10 Port of Hamina

Hamina is the leading concentration of forestry industry in Finland, port operators are high in power and service. Service offerings in Hamina Harbour include bulk cargoes, liquid bulk, dry bulk and demanding project cargoes. The Hamina Liquid and Gas Terminal is the most significant concentration of chemical treatment in Finland with its diversified production facilities. The Hamina port section also has extensive areas for use by logistics companies and dock-related industries.

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8. Vaalimaa

Vaalimaa is the busiest border crossing station between Finland and Russia. At the border crossing station, vehicles must stop. There is passport and visa control to all the passenger as well as vehicle and cargo control (transportation and vehicle documents and permissions, load securing, axle, and total masses, etc.). The border crossing station is open 24/7/365. (Customs of Finland 2020.)

The average daily traffic (amount of all vehicles) crossing FIN/RUS border at Vaalimaa is 2 948 vehicles. Average number of heavy cargo vehicles is 667 per day. On average, 6 600 passengers per day are crossing the border at Vaalimaa. (Customs of Finland 2019).

At Vaalimaa (Figure 11.), there is a large parking and waiting area targeted to trucks and trailers. The parking capacity is 410 full-trailer combinations to outgoing traffic (FIN to RUS) and 51 full-trailer combinations to incoming traffic (RUS to FIN). The parking area was opened in 2017. There are toilet and shower facilities available. In early 2000's before the truck park was opened, border crossing station capacity increased and E18 motorway to Vaalimaa completed, there were enormous truck and trailer queues (queue length up to 60 km, waiting times of several days). (Customs of Finland 2020; Traffic Management Finland 2020.)

Since 2017, there has been a pre-booking service to trucks crossing the border. The registration for border crossing is mandatory, the registration can be done via GoSwift service kiosks which are in the truck waiting area. When arriving to waiting area and when the registration is done, truck drivers must wait until they are summoned to the border crossing point. Pre-registration could be done via phone or via service website, and there are three optional queue types (Traffic Management Finland 2020.):

- 1) Pre-reserve queue (allows the reserving of a border crossing time for a certain day and hour)
- 2) Priority queue (you will have to prove your right for a Priority queue slot at the border)

3) Live queue (you can reserve a place in the queue when you arrive at Vaalimaa truck waiting area)

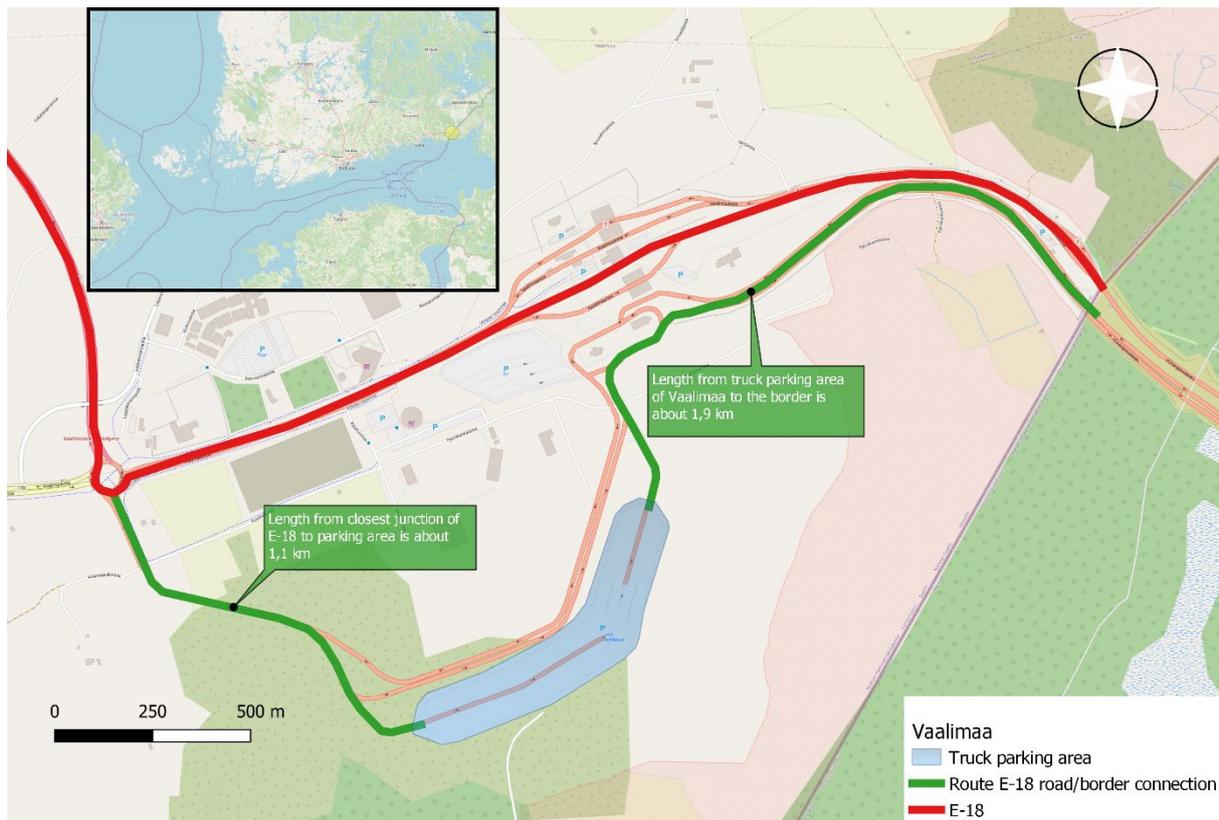


Figure 11 Vaalimaa border crossing station.

Current terminal network on E-18 in Sweden

This section examines the terminal and logistics areas (Figure 12-17) located on the E-18 in Sweden. Six areas have been selected to describe different terminal locations. Some of the terminals are located at land and sea transport nodes. Terminal centers can be divided into developing, growing, and declining centers.

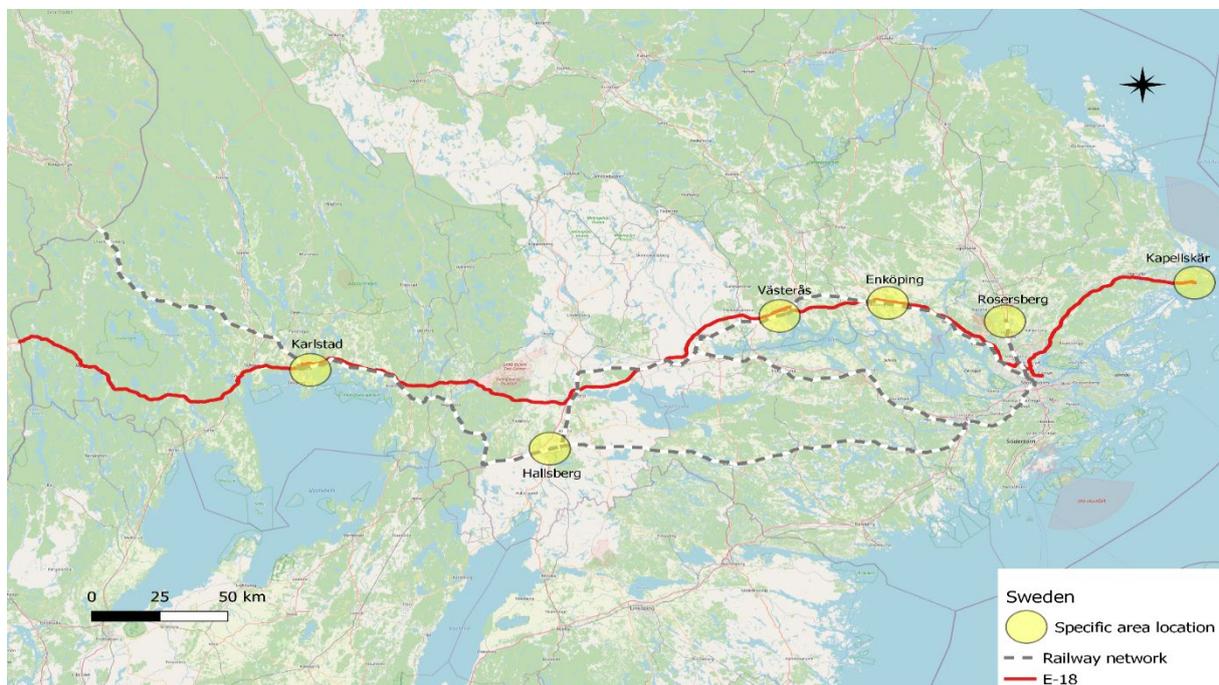


Figure 12 Specific terminal area locations upon E18 route in Sweden and Stockholm-Oslo railway.

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9. Kapellskär

The route to Kapellskär is clear and easy to find. Route E18 north from Stockholm leads directly to Kapellskär harbour. Distance from Stockholm is 90 km. Kapellskär is situated 90 km north of Stockholm city, 20 km east of Norrtälje and 90 km east of Uppsala. The location, in combination with a unique short approach time, makes it possible to rapidly transport goods and passengers to and from Stockholm and the Stockholm surroundings, as well as the rest of Sweden, Finland, Norway, Russia, the Baltic States and Continental Europe.

2013 to 2016 the Port of Kapellskär was modernised. Among other things a new 245 metres long pier was built and the two existing piers were reconstructed. The port surface has almost doubled in size. Logistic and safety improvements were made and the harbour basin is now deeper. A new pump house was built to manage the vessels' black and grey water and a reservoir was constructed to provide vessels with fresh water.

Source of material, Ports of Stockholm webpage:

<https://www.portsofstockholm.com/kapellskar/development-2013-2016/>



Figure 11. Kapelskär terminal area

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10. Rosersberg

Rosersbergs terminal increases capacity and efficiency of goods transportation in the TEN-T network surrounding Stockholm. One of the cornerstones is the effective connections to and from intermodal nodes, road and rail links. Northern Stockholm, which includes Arlandastad and Rosersberg, is the leading logistics site in the Stockholm region. Its proximity to Stockholm, Sweden's largest market is an important factor. As well its proximity to Arlanda, Sweden's largest airport, the E4 and a combi terminal in Rosersberg are additional advantages. Rosersberg's new intermodal terminal was opened in 2015. This intermodal terminal covers approximately 80 000 sqm and has a rail connection to the East Coast Line. (TEN-T programme 2007-2013, <https://ec.europa.eu/inea/en/ten-t/ten-t-projects/projects-by-country/sweden/2012-se-91084-p>)

Rosersberg is located just south of Arlanda Airport, about 35 km north of Stockholm. Rosersberg has an excellent location for logistics and is one of the sites with the highest rents for logistics facilities in Sweden.

Companies in the region include:

- ✓ Post Nord has a terminal here with 131 000 sqm and a railway hall of approximately 49 000 sqm.
- ✓ At the end of 2017 Prologis av Steelwrist AB acquired a fully leased property in Rosersberg of 12 334 sqm. The property was completed in January 2017.
- ✓ In 2017 Castellum decided to start a speculative construction on a 12 200 sqm warehouse and logistics building in Rosersberg with occupancy in 2018.
- ✓ Lidl has a central warehouse in Rosersberg. This covers 44 480 sqm, but in 2018 it was decided that Logistic Contractor would expand the warehouse by 13 000 sqm to a total 57 235 sqm.

Continued expansion of Rosersberg, another 40 hectares of land for industrial use will be developed in the coming years. A new detailed development plan is being drawn up for additional industrial land between Rosersberg and Arlandastad, at Brista. (Colliers International, Logistics market report 2019.)

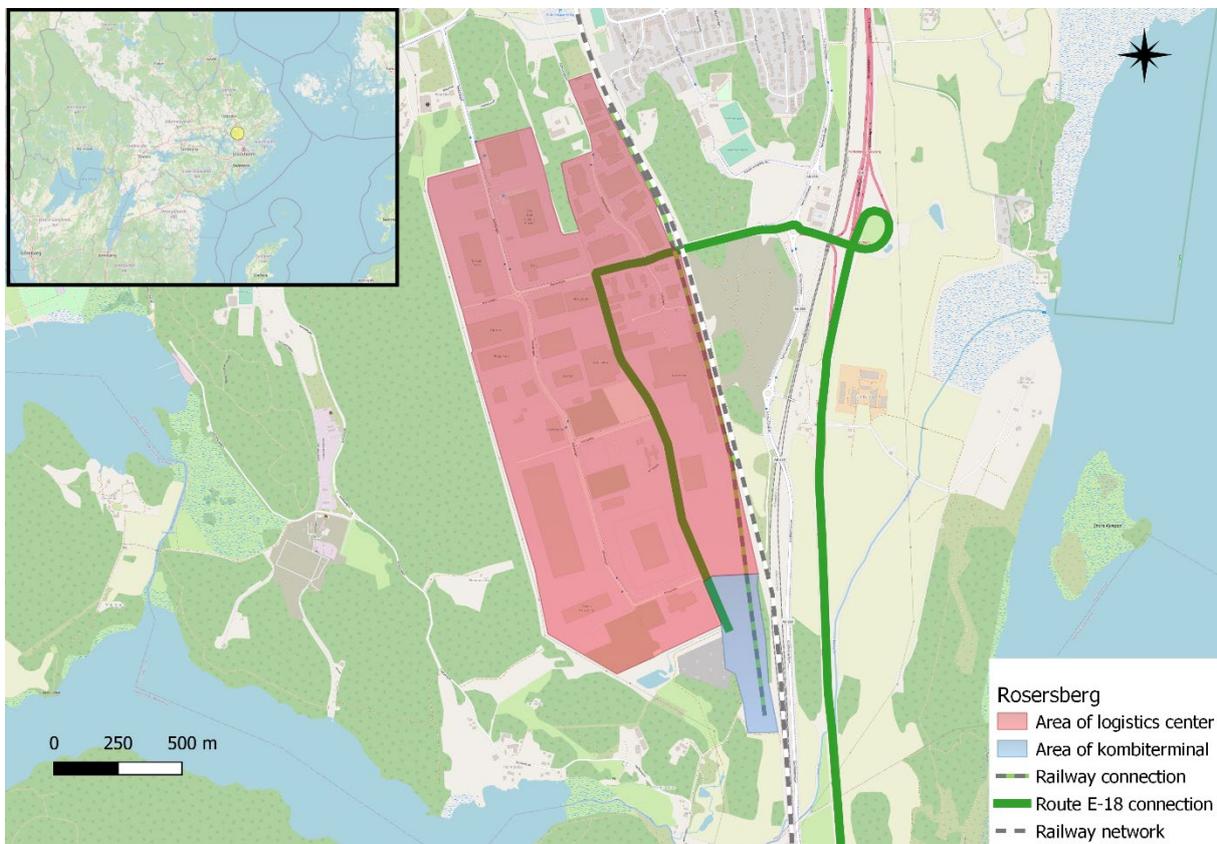


Figure 13 Rosersberg intermodal terminal

11. Annelund, Enköping

Enköping is a municipality (45 000 inhabitants) and seat of municipality (urban 23 000 inhabitants) located in Uppsala County in east central Sweden. E18 is crossing the city of Enköping from the north side. At the urban area of Enköping, E18 highway standard is motorway with 2 driving lanes per direction and speed limit of 110 km/h.

Annelund is a rising and developing industrial / logistics area in Enköping, upon E18 route Sweden, 137 km west of port of Kapellsskär and 72 km north-west of Stockholm. The area is located very close to interchange of E18 and highway 55 Sweden (junction #143; trafikplats Annelund), there is only 1 km from major logistics and industrial facility locations to the junction.

Currently, there are the following facilities located at Annelund: regional distribution center of machinery and home appliances, post and parcel terminal, multiple hardware stores, banana distribution center, several transportation companies as well as truck sales and services. In 2020-24, within the project “Enköping enterprise village”, there will be rising several industrial companies and services to the area. Growth and execution at Enköping Annelund is based on sustainable industry. Currently, the street network within the area is one driving lane per direction, intersections without traffic signals and speed limits of 30 to 50 km/h. (Municipality of Enköping, 2020.)

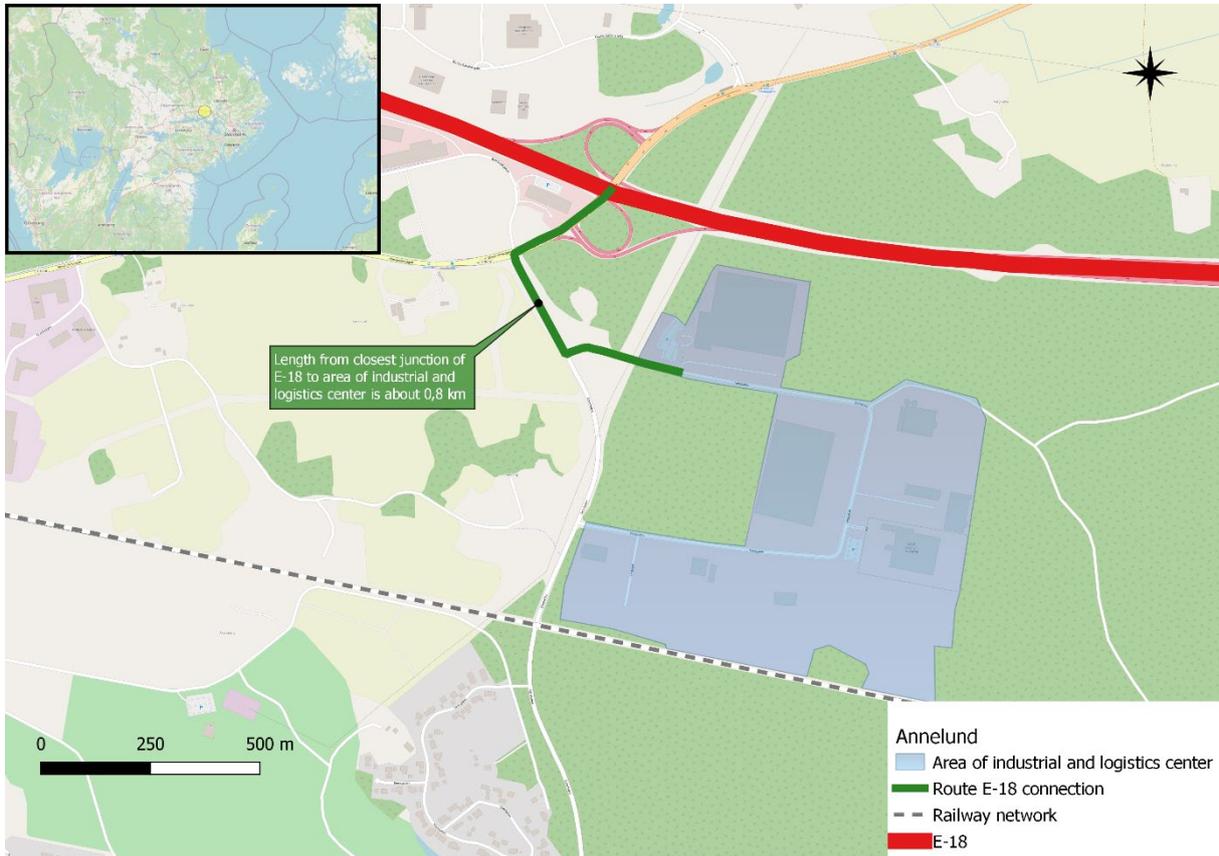


Figure 14 Annelund logistics and terminal area

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12. Västerås

Västerås is a city in Central Sweden, upon E18 route Sweden approx 100 km west of Stockholm. The city has a population of 120 000 inhabitants, out of the municipal total 150 000. Västerås is also accessible by Swedish national highways 56 and 66 as well as railway Stockholm-Örebro (Mälardalen). According to Traffic Strategy 2026 Västerås, approx 50 % of all the cargo shipped / arrived in Västerås has its origin / destination beyond the home province (Västmanland), and half of the cargo handled in Västerås has its origin and destination within the province.

In this terminal report, an traffic connections and infrastructure between E18 and intermodal terminal (Kombiterminal, figure x) in Västerås have been taken into more detailed investigation. Västerås Kombiterminal is located besides the railway Mälardalen, 6 km west of Västerås city centrum and 4,4 km south of closest junction to E18. The intermodal terminal has total terminal area of 20 000 m² and handling of containers, swap bodies and semitrailers between road and railway transport is available at the terminal.

There are two rails (a´350 m) in the terminal area with total length of rails 700 m. The terminal is equipped with one reach stacker (maximum lift capacity of 45 tonnes), which can handle 24 units per hour between railway wagons, trucks and depot. The interim storage capacity of Västerås intermodal terminal is 180 TEU and depot capacity is 300 TEU. (Intermodal Terminals Europe 2020.)

E18 is crossing the city of Västerås from the north side. At the urban area of Västerås, E18 highway standard is motorway with 2 driving lanes per direction and speed limit of 80 to 110 km/h. The major connection between E18 and Västerås Intermodal Terminal is a southern extension of Swedish National highway 66 from E18 junction #130 (Bäckbymötet). The total length of the connection is 4,4 km within urban and suburban street network. The street standard, type and capacity throughout the connection (figure x) is variable: the northernmost 1 km is 2 driving

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lanes per direction and otherwise 1 driving lane per direction, with speed limits of 50 to 60 km/h. Junction types are miscellaneous with interchanges, traffic signals, roundabouts and intersections with “yield” traffic sign.

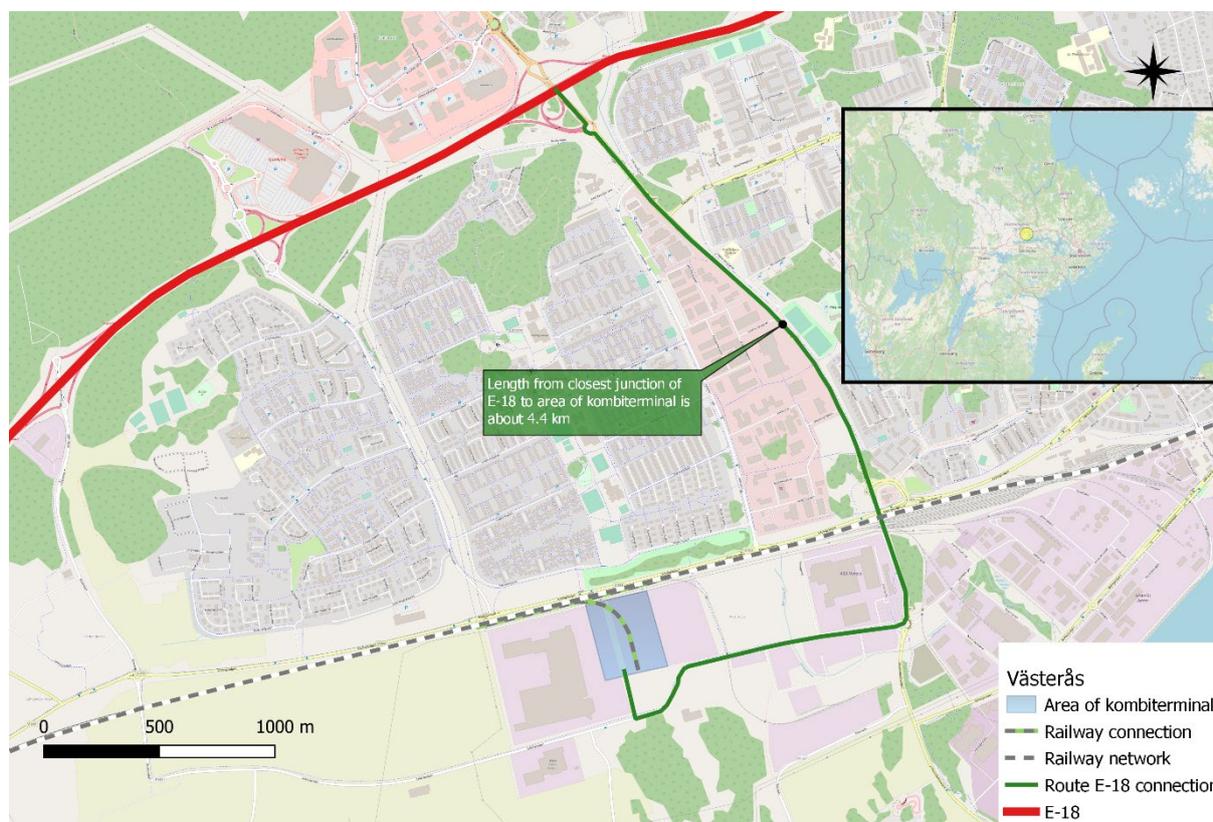


Figure 15 Västerås intermodal terminal

13. Hallsberg

Hallsberg is a municipality (population 15 000) in Örebro County, Central Sweden. Its seat is in the town of Hallsberg (population 7 000). Hallsberg is located 30 km south of the nearest city (Örebro, population 125 000), 230 km west of Stockholm and 300 km west of Kapellskär. The major highway connections to Hallsberg are E20 (westbound to Gothenburg and eastbound to Örebro and Stockholm) and Swedish national Highway 50. E20 route Sweden is crossing E18 route Sweden in Adolfsberg, 25 km north of Hallsberg and 5 km south-west of Örebro city centrum. Highway standards of E20 and E18 at region Örebro-Hallsberg is motorway, 2 lanes per direction, speed limit majorly 110 km/h. Highway 50 south of Hallsberg is majorly 2+1 lane standard with center railing and variable fast lanes, speed limit 100 km/h. Hallsberg is also known as a railway hub, three east-west railway routes are crossing at Hallsberg.

In Hallsberg, there is an intermodal hub terminal (Hallsbergsterminalen, figure 16.) Hallsberg terminal in Sweden is jointly owned by the municipality and rail operators, who also initiated the development of the combi-terminal at the end of the 1990s. It is a well-established intermodal terminal today, handling 65 000 TEU per year. All type of intermodal units (containers, swap bodies, trailers) are handled in the terminal. Hallsberg terminal is surrounded by a significant logistics zone, and multiple regional distribution centers of transportation, terminal, post and parcel operators are located there.

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Figure 16 Hallsberg, intermodal hub terminal

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14. Örsholmen, Karlstad

Örsholmen's industrial area is the centre and a major target point for the Värmland the main goods, in the other part, the Värmanian goods consists of forestry products linked to the paper and sawmill industry. In the industrial area, the general goods are transhipped at the various the freight terminals for onward transport out into the county or to Norway. Adjacent to Örsholmen lies also Outer port of Karlstad that handles large amounts of wood products, which includes paper and sawn lumber products. A further target point for freight handling is a number of industrial enterprises in Skoghall.

Örsholmen's industrial area is the centre of the Värmanian estate where many of the freight terminals for road has its establishments. Most of all general cargo, to be carried on in the county, utilizes the E18, via Valsviken and Universitymotet, and to some extent also Bergmotet and road 236, further to Örsholmen. There the goods are transhipped at the various freight terminals for onward transport. A number of major industrial enterprises in Skoghall also have freight services operating E18 via Bergviksmotet and road 554. Adjacent to Örsholmen is also the port of Karlstad which handles about 300,000 tonnes goods (about 1.2 million tonnes of freight). At present, the largest amount of goods is made up of timber, which: include paper and sawn wood products.

Source of material, Trafikverket webpage:

<https://www.trafikverket.se/contentassets/9d1f19fa813f4d44a3d04b1c143af920/slutra-pport-remissversion-avs-e18-genom-karlstad.pdf>

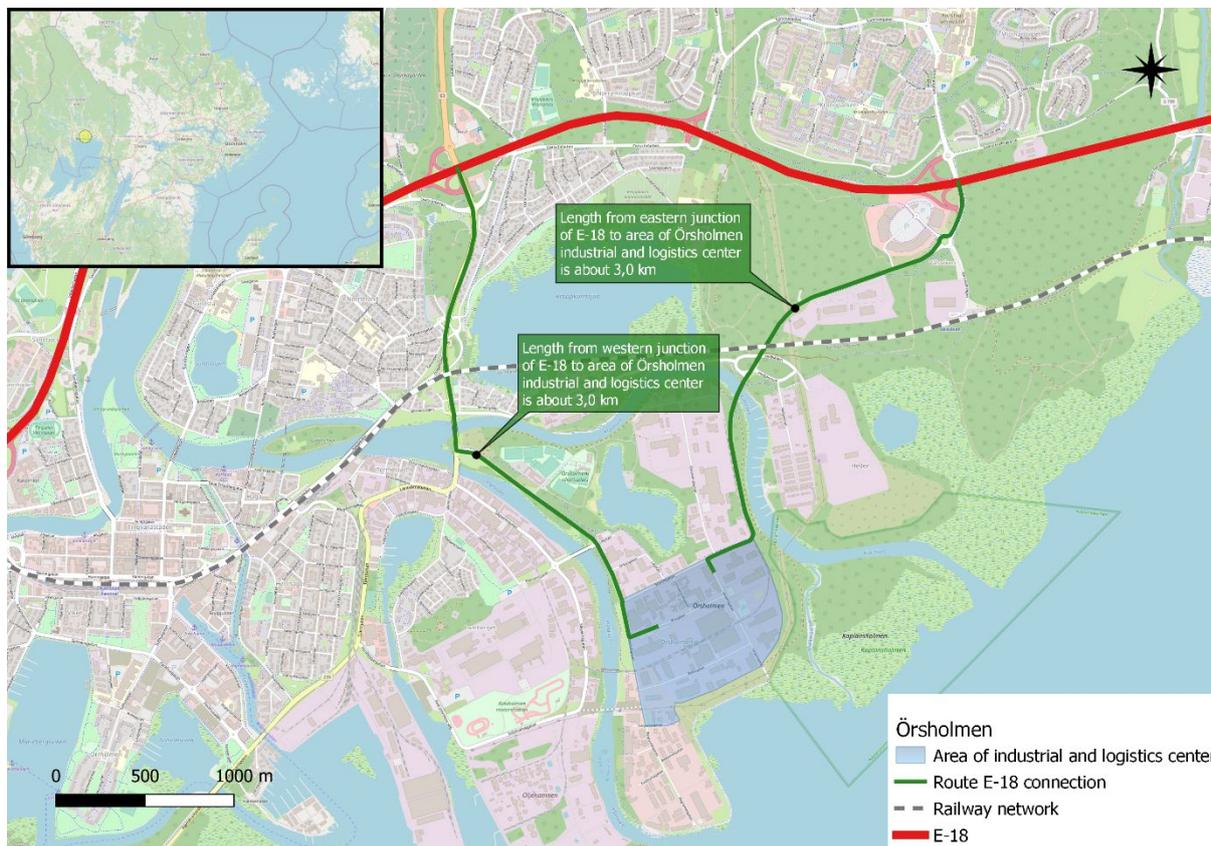


Figure 17 Örsholmen, logistics and industrial center

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CONCLUSIONS

The terminal network on E18 route Finland and Sweden is crucial to domestic and international transport, within numerous cargo types, shippers, and receivers. To maintain and develop accessibility of terminals and growing logistics areas from ports, railway hubs and E18 motorway junctions, several bottlenecks throughout the E18 route must be extended as well as last mile connections to several terminals improved.

In Sweden, there are numerous Scandinavian distribution centers within different industries and supply chains, serving whole the Scandinavia as central warehouses and hubs. In Finland, there typically are only domestic and regional distribution centers of those supply chains.

On average, rate of distribution network centralization is more advanced than in Finland. There are dozens of logistics areas / zones particularly in Central and Southern Sweden on the routes E18 Sweden, E4 Sweden and E6 Sweden. Typically, there is an inter/multimodal access to the logistics areas / zones, with a dense network of intermodal terminals. In the logistics areas / zones, multiple different operators are located close to each other and supported by additional and indirect services to logistics (truck sales and service stations, staff restaurants, dry ports and depots, forwarding, etc.), which makes synergy benefits to the operators at the logistics zones.

In Finland, the domestic distribution network of several industries and operators is rather decentralized. The logistics zones / areas in Finland are smaller and less centralized to Sweden, and domestic combined intermodal transport was practically ended up in Finland in 2014, when a combined truck-trailer-train Helsinki-Oulu was terminated due to decline in intermodal transport demand. Since 2010's, new

distribution centers further beyond city centers and with faster access to highways and ports, have slowly started to replace the older ones.

Both in Finland and Sweden, the old terminals, built in 1990's or earlier, have begun to remain within the urban structure, surrounded by residential and workplace areas. In addition to this, some growing intermodal terminals in Sweden are remaining blocked in the similar way. To extend the bottlenecks, there are two major options: Build and open new distribution centers and logistics zones further beyond city centers with modern and sufficient land transport connections, or improve existing road, street and railway capacity between E18 junctions and current terminals by increasing number of lanes and changing old intersections into interchanges or at least fluent multi-lane roundabouts.

In the project Baltic Loop, there will be more detailed investigation in bottlenecks between E18 route Finland and logistics centers, by doing field research with TUAS students driving semitrailer and making specific measurements and observations from viewpoint of transport operators. Terminal in-house operations will also be investigated in a modern recently open distribution center at Lieto Avanti logistics zone, in cooperation with stakeholder terminal and logistics operator of TUAS.