Joint Barents Transport Plan

The Update of
the Cross-Border Road Corridors in the Barents Region

September 2015

Cover photos: Jorma Leskinen, Lisa Sudstrøm and Thomas Nilsen.

Background maps © Barents GIT 2006 (some parts of transport infrastructure updated)

Appendix
Orientation maps © GRID-Arendal
Photographs:
Corridor 2 ©Google Street View 2011
Corridor 3 ©Google Street View 2010
Corridor 4 Jorma Leskinen 2015
Corridor 5 Jorma Leskinen 2015
Corridor 6 Jorma Leskinen 2015
Corridor 7 Jorma Leskinen 2011 and ©Google Street View 2010
Corridor 8 Statens Vegvesen and ©Google Street View 2013
Corridor 9 Jorma Leskinen 2013
Corridor 10 Jorma Leskinen 2013
Corridor 11 Jorma Leskinen 2014
Corridor 12 Jorma Leskinen 2014

FOREWORD

In recent years, world-wide attention has increasingly been paid to the High North, because of its growing potential, helped by warming climate, to exploit new and vast sources of natural resources. At the same time, the Region's economic and social development must be kept at the level of the more central parts of the Barents states. Ensuing demand for better accessibility puts pressure on transport infrastructure investments throughout the Region requiring also more cooperation across the borders. To address these needs the Barents Euro-Arctic Transport Area (BEATA) co-operation was established between the ministers of transport of Finland, Norway, Russia and Sweden in May 1998.

In early 2013, the Steering Committee of the BEATA set up an expert working group to prepare the Joint Barents Transport Plan (JBTP 2013) with the objective of *"developing an efficient transport system in the Barents Region with good internal connectivity between the Barents countries and with good external links to world markets. The transport system should facilitate Barents regional development and create new opportunities for important industries. The transport system should be developed in a manner that safeguards the environment and improves safety and accessibility for all*".

In the Narvik ministerial meeting in September 2013, the ministers of transport welcomed the ongoing work on the Joint Barents Transport Plan prepared by the expert working group. As a follow-up, the BEATA Steering Committee, in its Rovaniemi meeting 24 September 2014, established the second expert working group with the mandate of *"planning further steps following the completion of the JBTP 2013. The emphasis of the group's work was to be on road corridors crossing the international borders. Furthermore, the working group should:*

- *utilize the information and analyses of the JBTP 2013 and the Barents Freeway projects*
- *focus on current condition and identification of concrete development needs of the road corridors*
- *respect environmental and financial considerations, when selecting improvement measures"*

This second report "The update of the Cross-Border Road Corridors in the Barents Region" is presented to the High Level Representatives of the transport ministries of the BEATA countries in Rovaniemi on 30 September 2015.

The working group was composed of road experts from Norway, Sweden and Finland. The Ministry of Transport of the Russian Federation participated actively in the finalizing phase of the report.

The members of the expert group:

Jorma Leskinen,	Centre for Economic Development, Transport and the Environment (Chair), Finland
Tuija Maanoja	Ministry of Transport and Communications, Finland
Torbjørn Naimak	Norwegian Public Roads Administration
Jan Fredrik Lund	Norwegian Public Roads Administration
Krister Palo	Swedish Transport Administration
Per Lindroth	Swedish Transport Administration

Additional experts are:

Unni Gifstad	Norwegian Public Roads Administration
Veronica Wiik	Norwegian Public Roads Administration
Sanna Kolomainen	Centre for Economic Development, Transport and the Environment, Finland

The Expert Group has been assisted by:

Martti Miettinen,	JBTP-consultant, Transys Ltd

SUMMARY

The Barents Region is rich in natural resources and its long-term future looks good in the planning horizon up to 2030. But, these resources are unevenly distributed. The coastal areas are reaping most of the benefits, while vast inland areas are not faring so well. In addition, the Region's main industries: oil and gas, mining and forestry are highly cyclical, which affect adversely the long-term planning of transport infrastructure.

Communities and businesses of the four Barents countries operate in relative isolation from each other. Therefore, the roads in the vicinity of borders have relatively low traffic flows, which are also subject to global economic cycles. Also, the patterns of freight transport are constantly in transformation due to industrial and business development, revisions of regulations, and technological innovations.

Vehicle regulations guide strongly the road transport business affecting transport costs and markets in a several ways. An added difficulty is that the regulations across the borders are not harmonized, because decisions are taken nationally.

The Barents Region has a very limited connections belonging to e.g. TEN-T networks, and transport policies have been strictly national. Norway and Russia have actively been developing their national road networks, while in Sweden and Finland the road networks are more mature and their development needs are mainly localized. The Region would be helped if an international transport network is established between the TEN-T and national networks so as to facilitate cooperation across the borders.

The Barents Region and its road corridors are located in the High North, often in the mountainous region of fjells. This creates considerable problems to road traffic and maintenance during wintertime. On some routes the problem of road closures during winter storms is considerable. The use of ITS applications can help road traffic by making it safer and more reliable under all conditions. However, the development of ITS in transport is fragmented between the countries reducing their benefits. Furthermore, several remote road sections in the Region do not have any reliable mobile phone coverage, which is also an impediment for the use of advanced technology.

Implementation of the JBTP proposals will impact the environment and surrounding communities at least to some degree. The EU has a directive on Strategic Environmental Assessment (SEA) since 2001, which is mandatory for plans/programs involving e.g. transport investments. Also, the Action Plan on Climate Change for the Barents Co-operation contains concrete activities for the working groups under the Barents Euro-Arctic and Regional Councils.

Common vision of the future road improvement needs remains largely vague leading the Barents transport cooperation basically to focus on upgrading of cross-border roads from national perspective. This report identifies bottlenecks and improvement needs in a harmonized way for the selected 12 cross-border road corridors. They comprise 5 690 km of roads in total. About 9% or 532 km of the roads are found to be in poor condition.

The report's recommendations focus on:

- Analysis of traffic forecasts across the borders based on national forecasts
- Need for agreeing an international road network in the Region based on the already defined JBTP road corridors
- Harmonization of heavy goods vehicle regulations in the Region
- Application of ITS and, more generally, digitalization solutions covering the whole Region
- Launching a screening process on environmental impacts
- Development of methods for future co-operation, such as cooperation agreements
- Agreements on minimum road and maintenance standards

Table of content

FOREWORD

SUMMARY

1. ECONOMIC OUTLOOK IN THE REGION 5

2. INTERNATIONAL ROAD TRAFFIC 7

3. TRANSPORT NETWORK 11

4. OTHER ROAD TRANSPORT RELATED CONSIDERATIONS 14

5. SOCIAL AND ENVIRONMENTAL CONCERNS 17

6. ROAD FINANCING IN THE REGION 18

7. ROAD CORRIDORS 20

8. CONCLUSIONS AND RECOMMENDATIONS 23

APPENDIX

Maps and detailed descriptions of the selected 12 road corridors:

1	E 4/E75	Bothnian Corridor
2	E 12	Umeå - Mo i Rana
3	77/95	Skellefteå - Bodø
4	E 10	Luleå - Narvik
5	E 8	Tornio - Tromsø
6	93/93	Palojoensuu - Alta
7	4/971/893	Kemi - Rovaniemi - Kirkenes
8	E 105	Kirkenes - Murmansk
9	91/R11	Ivalo - Murmansk
10	82/	Rovaniemi - Salla – Kandalaksha
11	22/89/	Oulu - Vartius - E 105
12	6/9/A130	Kajaani - Niirala/Wärtsilä – Petrozavodsk

1. ECONOMIC OUTLOOK IN THE REGION

Volumes and types of traffic flows in a transport system depend on the distribution of population and character of regional economy. The latter in turn determines the GDP for any given region. In this respect the Barents Region is well placed, as it possesses vast natural resources, such as oil, gas, ores and minerals, timber and fish to name the most important commodities. It should be noted, however, that the Region's resources are unevenly distributed. The coastal areas are reaping most of the benefits, while vast inland areas are not faring so well. The Joint Barents Transport Plan of 2013 (JBTP 2013) has described the Region's long-term future in length.

Since the JBTP 2013 report, there have been considerable short-term changes in the main sectors of industries due to global economic stagnation since 2008. Current uncertainties have impacted regional economies, employment, and freight flows in ways which can be either temporary or more permanent. The outlook of the five main Barents industries are described briefly below, as it is presently seen.

Mining in the Barents Region is important in the European and also in global scale for some ores, such as iron. But mining is very susceptible to global business cycles. At present, the Barents mines are stressed due to low prices of ores. Major iron ore mines, like LKAB in Sweden and Kostomuksha in Russia, have largely been able to maintain their production levels. Marginal mines have suffered more, and even been closed. Still, new exploration permits are being sought in Sweden and Finland on the expectation of the turn in the business cycle.

Oil and gas production in the Russian part of the Barents Sea, the Komi and Nenets Regions, has stayed steady, and over the next years at least a slight increase in production is foreseen. In Northern Norway, there are still high expectations for the continued exploration, distribution of new licenses and production for the years to come. Recently, the Norwegian Petroleum Directorate raised its estimate of total undiscovered resource to 18.5 billion barrels of oil from a previous estimate of 16.3 billion. One of the consequences is that an increasing share of future production will take place in the Barents Sea.

Forestry is entering a new era after a long slide of production over several decades consisting also of plant closures. Forests e.g. in Northern Finland grow faster than ever due to warming temperatures, higher carbon dioxide levels, and cutting down of old forests decades ago. Now, there are many proposals to build new, very large pulp plants in Central and Northern Finland; e.g. Kemijärvi, at about 1 billion euros a piece. The long-fiber cellulose of northern conifers is in high demand for packaging materials and soft tissue papers. In addition, the new generation pulp plants produce fibers and base chemicals for a number of other uses and generate more energy than they use – bio-energy.

Fishing/fish farming is growing particularly in Northern Norway accounting for about 30 percent of the value creation of the Norwegian seafood industry. Since 2004, the annual growth has been over 20 percent. In Russia, Murmansk and Karelia are growing their fish farms at a rapid rate. Northwest Russia produced 34 000 tons of fish in 2012, which compares with Northern Norway's 280 000 tons in 2012. Aquaculture has a great growth potential, as wild catches are diminishing globally.

In addition to the fresh fish and aquaculture, the marine industry in Norway produces fish flour and pellets, equipment and services. Also, new industries and processes are being developed based on marine resources, such as marine biotechnology, bio-chemicals and similar products. The opportunity related to medicine and health should also be noticed.

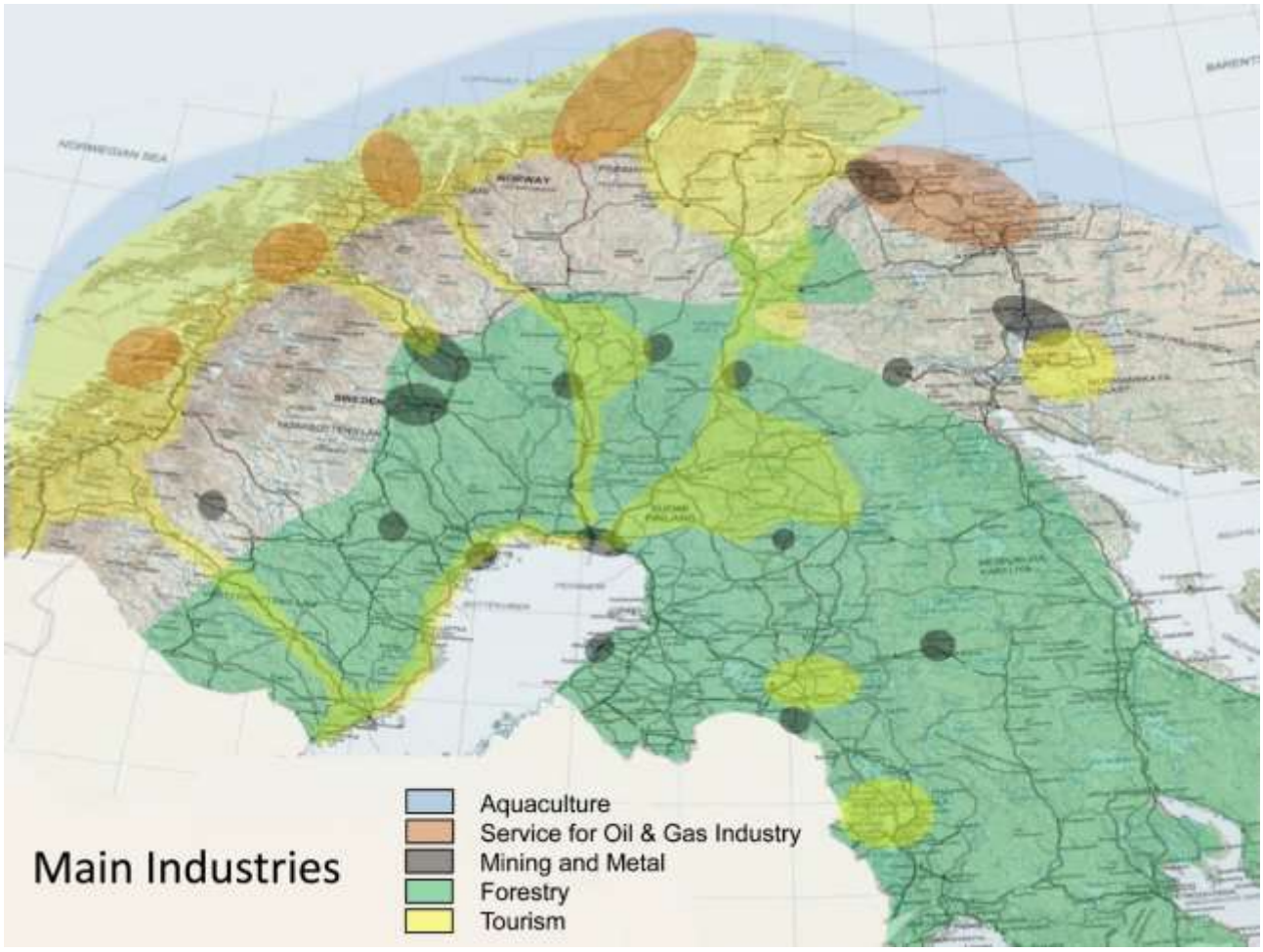


Figure 1. Main industries in the Barents Region (Source: JBTP2013 report)

Tourism is a very important employer throughout the Barents Region. In recent years, domestic and foreign visitors have spent most nights in destinations of Northern Finland, nearly 5 million in 2014. In the same year Northern Sweden had 3.8 million and Northern Norway and the Barents Russia had 2.3 million visitor nights each. Since 2000, Finland's Lapland and Sweden's Norrbotten have seen the highest growth. Lapland has also experienced some change in its markets, when the share of European and Asian tourists has grown. Northern Norway is dominantly a summer destination, and Lapland is focused more on winter sports. Sweden has a more equal balance between summer and winter visitors.

ECONOMY AND THE ROAD SYSTEM

Mining, oil and gas, and forest industries are highly cyclical and follow closely the ups and downs of the world markets – sometimes very dramatically. In the future, these now depressed sectors will begin eventually to recover and put new pressure on the development of transport connections. However, raw material exports, while very large in volume, are shipped out mainly by rail, sea or pipeline. Impacts of these activities on roads are secondary. Shipments by road serving these industries include typically material supplies for construction and operation of the sites of production.

Fishing industry and tourism are fairly stable sectors but are still subject to some fluctuations in demand. Future growth potential of both is very high, but the growth depends heavily on high quality and reliable transport connections to/from the Region by rail, sea and air. Locally, these people and freight movements use solely road/street networks.

Roads are the most important internal connections between widely dispersed destinations in the Region, particularly for transport of people and distribution of consumer goods. Also, cross-border transport of

people and goods depends largely on the road network, with the exception of a few very high volume railways handling raw material exports. And, some time-sensitive shipments (e.g. fresh fish) depend heavily on roads.

An important factor is also the concentration of warehousing in the whole of Northern Europe. Consumer goods are now distributed from much fewer, larger and more centrally located warehouses. The development promotes the growth of trucking industry as a flexible and relatively inexpensive means of goods deliveries.

Good and extensive transport networks, the system of roads in particular, have also other characteristics which support ubiquitously regional development. It is difficult to pinpoint exactly how the road system works in each individual case, but it is quite obvious that new, innovative businesses such as data storage centers and car testing sites in Sweden and Finland, offering several hundreds of jobs, would not be there without good connections. Very important for the entire Region are also the various testing and production sites of renewable energy, such as various forms of bio-energy production, wind farms and wave energy installations that are proliferating in all countries. All these new and exciting developments rely heavily on the Region's network of roads.

At present, the communities and businesses of the four Barents countries operate pretty much in isolation from each other. If the Region's internal road connections can be improved, they would widen market areas, promote cooperation and even help clustering of businesses across the borders, such as marketing tourism products of two or more countries jointly.

Particularly important is the existence of universities and centers of science in the Region. Data from the last 20 years show that con-urbanizations with powerful universities and technology-driven economies are population growth areas, namely Oulu and Rovaniemi in Finland, Tromsø and Bodø in Norway, and Umeå and Luleå in Sweden. Closer cooperation between the universities and centers of science, helped by better transport connections, is likely to benefit the Region even wider.

The best example of the importance of good transport infrastructure between two neighboring countries is the Ore/Ofoten Line, Luleå-Kiruna-Narvik, which has become almost a lifeline for the Northern Norway along with ore traffic. Bulk of the fish from Nordland and Troms are shipped to Oslo using this railway. Another example is the shipping of choice (expensive) cuts of fish from Northern Norway first by road to Helsinki and then by air to Tokyo in 36 h. This would not be possible without reasonable road connections to the Helsinki airport providing frequent flight connections to the Far East.

2. INTERNATIONAL ROAD TRAFFIC

CURRENT TRAFFIC

International traffic on the Barents road corridors is not generally very high. The only exception is the Bothnian corridor, which has a high volume at the Haparanda/Tornio border (SE/FI). The corridors having traffic volumes 1 000 vehicles per day or more at the border are:

1.	Bothnian Corridor at Haparanda/Tornio	13 000 vehicles/day
12.	Vt9/A130Kajaani-Niirala/Wärtsilä-Petrozavodsk	2 600 vehicles/day

In the rest of the corridors, traffic volumes range between 100 and 850 vehicles per day. Dominant volume is 400-500 vehicles.

At Haparanda/Tornio, traffic is composed mostly of short distance travel between the two adjacent border towns. The same is true to all the Tornio River crossings between Finland and Sweden. The share of local, short distance trips is also significant at some FI/NO and FI/RU border crossings. At other borders long distance travel, both passengers and freight are dominant. Annual vehicular traffic in 2014 at the Barents border crossings is shown in Figure 2 below.

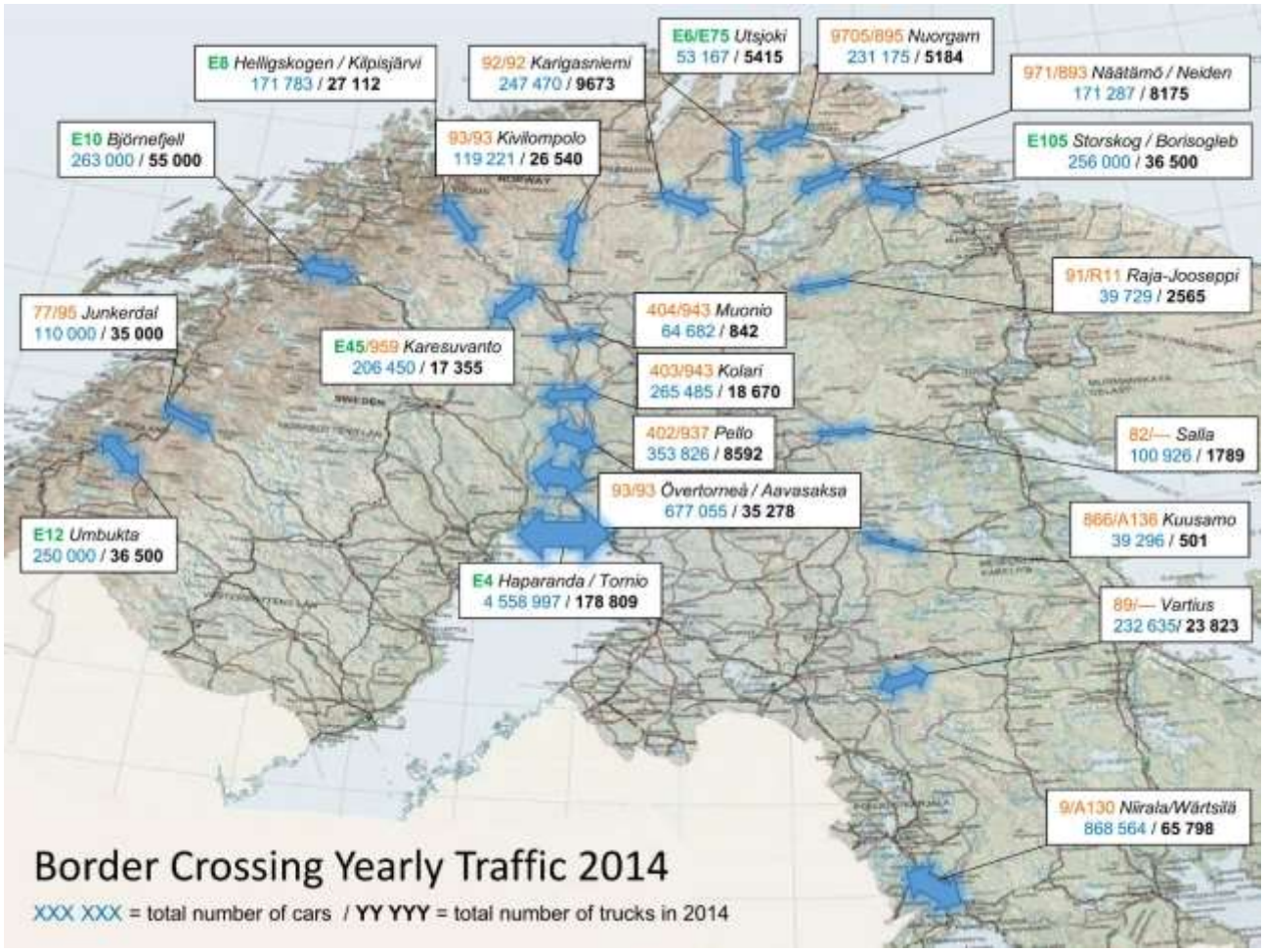


Figure 2.The number of vehicles at the border crossings in 2014.

HEAVY GOODS TRAFFIC

Heavy goods vehicle (HGV) traffic across the borders is more evenly distributed than passenger car traffic. The table below shows the daily HGV flows and their shares over each border in the Region in 2014.

	HGV traffic in 2014	
Border	Per day	Share, %
NO/SE	347	21 %
NO/FI	255	15 %
SE/FI	711	43 %
NO/RU	100	6 %
FI/RU	259	15 %
TOTAL	1 672	100 %

Table 1. Daily HGV flows.

At the FI/SE border crossings much of the HGV traffic consists of local, short-distance trips. Therefore, the share of the long-distance international HVG traffic crossing the Finnish/Swedish border is probably well below 40% of the long-distance cross-border goods transport in the Region. On individual Barents corridors HGV volumes are mostly below 100 vehicles per day. The highest numbers of HVGs are at the following three corridors:

1.	Bothnian Corridor at Haparanda/Tornio	490 HGV/day
12.	Vt9/A130 Kajaani-Niirala/Wärtsilä-Petrozavodsk	180 HGV/day
4.	E10 Luleå-Narvik	150 HGV/day

CHANGING PATTERNS OF FREIGHT TRANSPORT

Patterns of freight transport are constantly in transformation. It is driven, first, by industrial and business development and cycles; second, revisions of regulations; and third, technological innovations. In the following, a number of recent developments are listed which are affecting road use now and possibly more clearly in the future:

- Higher weights of heavy goods vehicles have been adopted in Finland (76 tons) and Sweden (64 tons). Sweden is testing even higher weights and is investigating a wider allowance of 74 ton weights. Also, Norway allows higher weights (60 tons) on some designated routes.
- Ore transport by road instead of railway has been studied in Sweden. The Kaunisvaara-Svappavaara example shows that very high volumes of ores (5 million tons/year) can be hauled by road feasibly. Near Kiruna there is another example where the intention is to route even higher volumes (10 million tons) along a short section of a public road (E10).
- Transport of fresh fish by road across the borders is expected to grow long into the future, as the demand for fresh fish is growing fast. It puts high requirements on the condition of the cross-border road corridors and time reliability of shipments all year round.
- Liquefied Natural Gas (LNG) usage is rapidly increasing in the Baltic Sea area. Norway has already LNG terminals, which ship LNG by road to various clients. The first big LNG terminal in Tornio, Finland, is expected to be operational in 2018 providing fuel to users in the area, often by road. Furthermore, transport by road from Northern Norway and Russia to Sweden and Finland may be possible in the long-term.
- Railway projects, such as Malmbanan and Norrbotnia banan in Sweden may affect traffic on parallel roads. Particularly the improvement of Malmbanan is likely to have an impact on road transport, since rail capacity will increase significantly.
- Northern Sea Route is often seen as a major contributor to freight flows in the Barents region. However, much expected through traffic to/from the Bering Strait using the NSR has dropped significantly in 2014 after reaching its peak of over 1 million tons in 2013. It is believed that the drop is only temporary. The Finnish freight transport model suggests that the NSR increases mainly rail-based raw material exports from the Region. Its impact on cross-border road corridors is small and probably not relevant in the planning horizon until 2030.
- Sulfur regulation taken effect in the Baltic Sea in January 2015 has been a big concern among the heavy industries and shipping companies in Sweden and Finland. So far, there seems to be no big impact on transport patterns or route selection due to current lower fuel prices. However, the long term effect of this regulation cannot be predicted.
- Major investments in new roads in Northern Norway and Russia will attract and generate more road traffic. This traffic may also spill over to the Region's international road corridors in the future.
- Time reliability of road transport has become the most important consideration in the entire trucking industry, as the demand for on-time deliveries has grown in the past decades. The main factors affecting time reliability in the Barents Region are road accidents and adverse weather conditions, which can block the roads for extended periods of time. There are seldom any easy detours available. Also, opening hours of customs may affect some types of deliveries adversely, e.g. fish. Occurrences of these events result in waste of time, which can frequently be considerable and reflect also in the cost of transport.

- **European-wide transport market** has brought a growing number of foreign, mostly Eastern European trucks on the roads of the High North, because payroll costs are more dominant than fuel and other transport costs. This has a potential to lead to a further downward pressure on wages and working conditions in the road transport industry causing potentially both regulatory and road safety problems.

TRAFFIC FORECAST

There are no traffic forecasts which specifically look at traffic flows across the Region's international borders. Typically any traffic flow analysis or forecast is carried out for national planning purposes and stop at the national borders. Some indication of the future growth can be obtained from the table below, which shows the past changes of HGV volume at the borders in the past 5 years (2009 – 2014).

	Route	Corridor name	Border	5 year change in HGVs
1	E 4/E75	Bothnian Corridor	SE/FI	28 %
2	E 12	Umeå - Mo i Rana	SE/NO	8 %
3	77/95	Skellefteå - Bodø	SE/NO	20 %
4	E 10	Luleå - Narvik	SE/NO	1 %
5	E 8	Tornio - Tromsø	SE/FI/NO	35 %
6	93/93	Palojoensuu - Alta	FI/NO	41 %
7	4/971/893	Kemi - Rovaniemi - Kirkenes	FI/NO	5 %
8	E 105	Kirkenes - Murmansk	NO/RU	n.a.
9	91/R11	Ivalo - Murmansk	FI/RU	-10 %
10	82/	Rovaniemi - Salla - Kandalaksha	FI/RU	25 %
11	22/89/	Oulu - Vartius - E 105	FI/RU	-21 %
12	6/9/A130	Kajaani - Niirala/Wärtsilä - Petrozavodsk	FI/RU	29 %

Table 2. Changes of HGV volume

In Sweden, Norway and Finland transport models have been developed for analyzing and forecasting traffic flows. The Finnish freight transport model (Frisbee) has been used also for analyzing freight flows in the wider Barents Region, but primarily the studies have focused on freight flows and their route selection between Russia and Finland.

Based on Frisbee and other HGV traffic data it can be estimated that roughly 10 million tons of freight is crossing annually the international road borders of the Region. The Frisbee model has also been used for making tentative forecasts about the growth of freight flows. The model estimates that the overall growth is about 60% from 2012 to 2030. The flows to/from Barents Norway seem to grow faster than those to/from Sweden and Finland. Also the flows to/from Barents Russia have a potential for faster growth, but the outlook of Russian traffic is currently quite unclear.

3. TRANSPORT NETWORK

TEN-T AND NDPTL NETWORKS

In 2013, the EU Parliament accepted the EU Directive, which defined the European-wide transport network, TEN-T. In the following year, the Steering Committee of the Northern Dimension Partnership on Transport and Logistics (NDPTL) adopted the so-called NDPTL network and decided that the road network will include only TEN-T routes, E6 in Norway, and the federal roads in North-West Russia. The significance of these network definitions is, first, that they assign a higher status to the roads belonging to the TEN-T or NDPTL networks and, second, priority is given to them when applying for financial aid from these institutions.

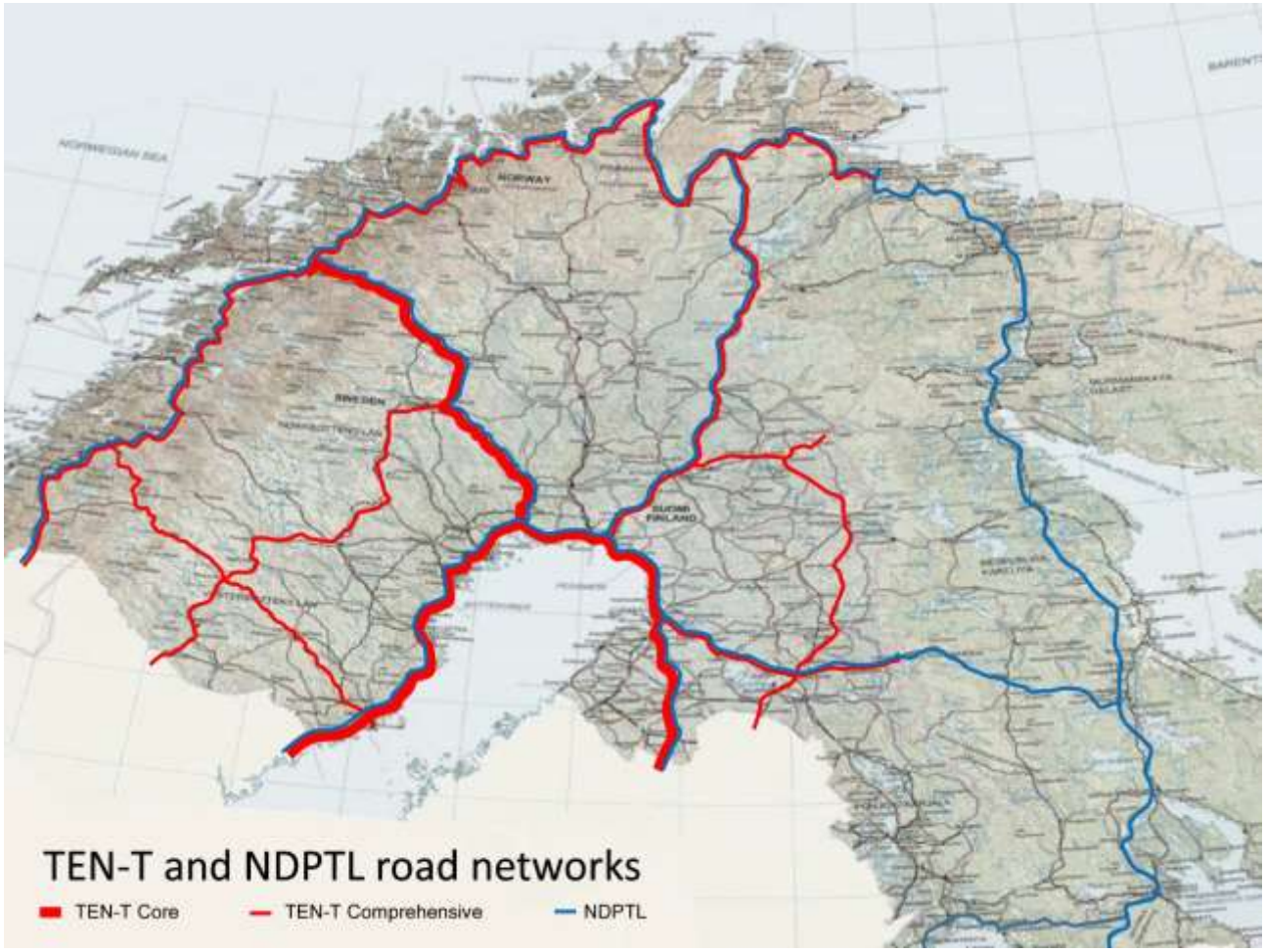


Figure 3. TEN-T and NDPTL networks in the Barents Region

JBTP 2013 NETWORK

The Joint Barents Transport Plan (2013) identified 11 road corridors, which cross an international border from one Barents country to another, Figure 4.

Because the TEN-T and NDPTL networks are sparse in the Region, most of the JBTP 2013 road corridors fall outside of these networks. This presents a difficulty for the joint development of several of these corridors. Therefore, it is necessary that at least the NDPTL network will be expanded. The JBTP 2013 corridors are good candidates for inclusion in the NDPTL network, as shown in Figure 5. This set of road corridors would create a new internationally recognized road network between the European-wide TEN-T and the national road networks in the Region.

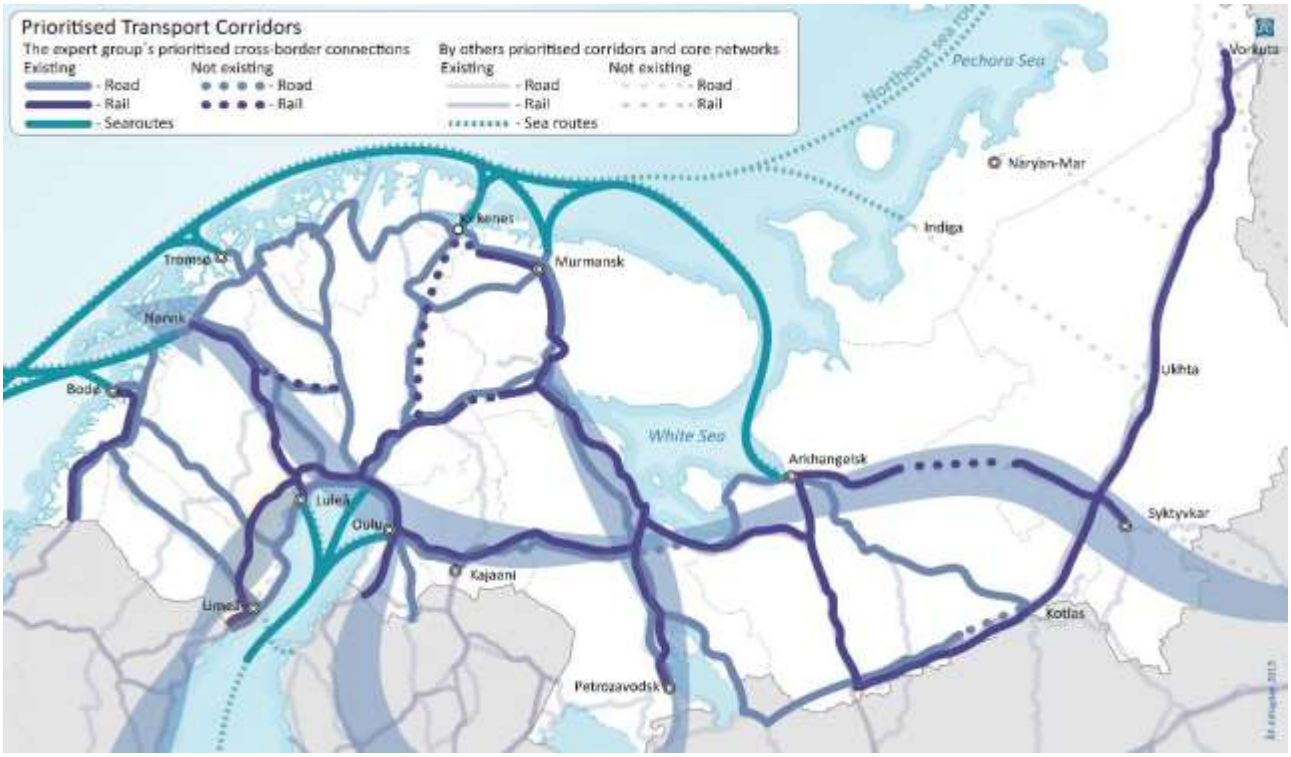


Figure 4. Joint Barents Transport Plan 2013 corridors

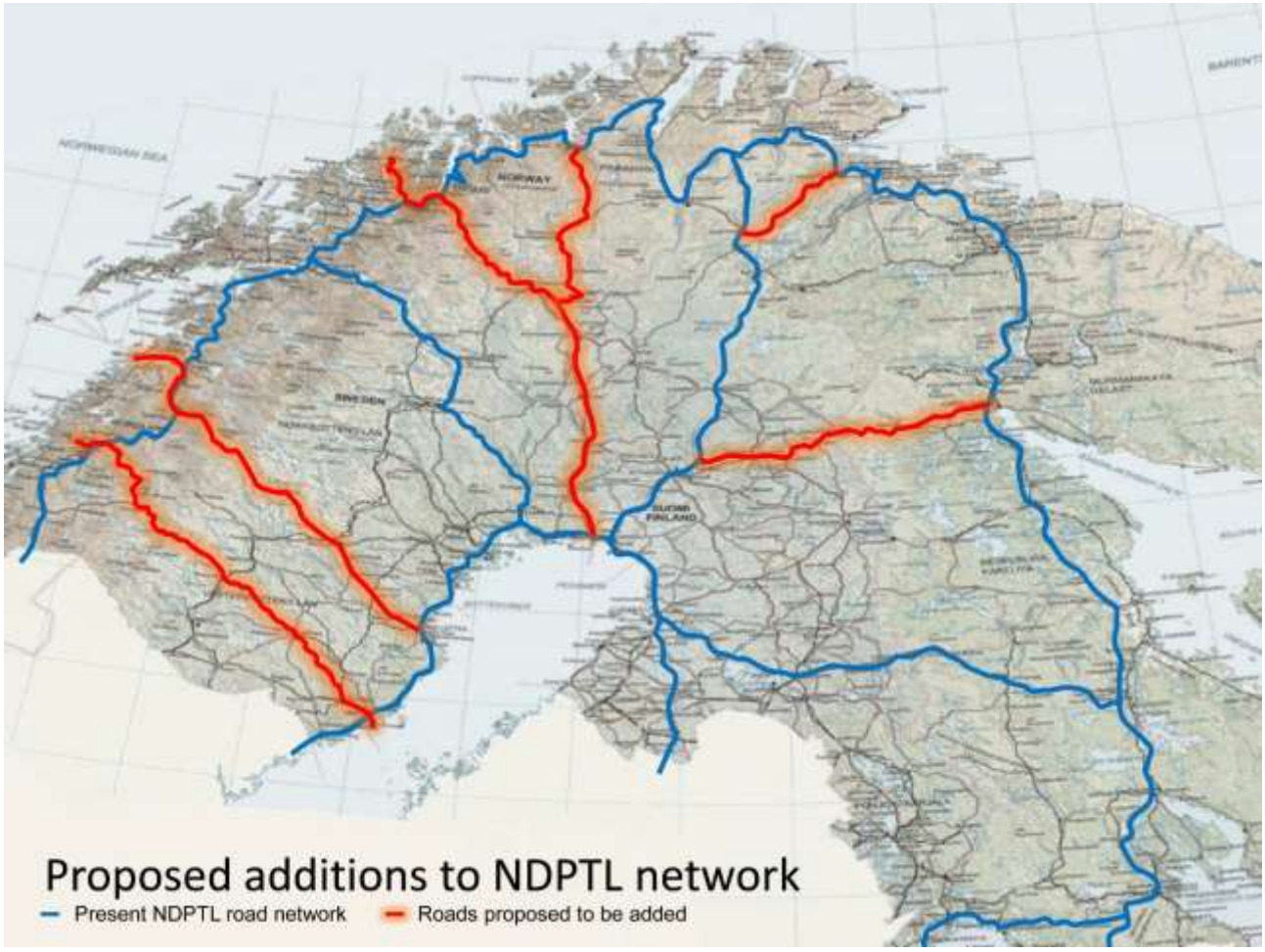


Figure 5.Proposed new corridors for inclusion in the NDPTL network

PORTS AND TERMINALS

Ports and terminals are important nodes in the logistics chains of road freight, which are invariably considered in separation from the road network. Even if the logistics infrastructure is the domain of private sector and each company plans its own operations, the public sector is also an important player, because it controls land-use, route restrictions, customs procedures, and imposes taxes and charges. Thus, public-private cooperation is necessary so that logistics systems can be made more efficient and less costly. However, the international logistics of road freight in the Barents Region is not well understood or documented. A few general patterns are known that are described in the following.

Ports of Narvik and Luleå have been designated as the TEN-T core network ports in the Region. They are better known as export ports for iron ore serving the mines in Norrbotten, Sweden. In addition, Narvik is an important terminal for fish transport by rail from Northern Norway to Oslo and to Oslo airport for further shipment to the different destinations in the world.

Fish shipments by road to Sweden, Finland and Russia begin at several fish slaughtering houses along the Norwegian coast without any distinct central terminal. Among the destinations in the neighboring countries are the regions of national capitals. The Helsinki airport is also important and is used as a transshipment point to e.g. Japan.

In Finland there are six main timber terminals, which are used for collecting round timber from Eastern and Northern Finland for further haulage by road or rail to saw and pulp mills on the Baltic Sea coast both in Finland and Sweden. The terminal in Kitee near the Finnish/Russian border handles also round timber from Russia.

Consumer goods transport and distribution in the North of Finland, Sweden and Russia are seen as national operations with major urban centers acting as distribution hubs. It is, however, not known how much consumer goods logistics and warehousing takes place across the borders. For example, Northern Norway functions partially that way, since much of the consumer goods are transported by train to Kiruna and Narvik, from where their distribution will take place by truck throughout Northern Norway.

RAILWAY NETWORK

In the Barents Region there are only few railways that cross international borders. The most notable is the Ore line/Ofoten line running from Kiruna to the port of Narvik in Norway. The second cross-border railway is the Haparanda/Tornio link which connects the Swedish and Finnish railway networks. At the moment, traffic using this line is low even if railways southward are quite busy on both sides of the border. Thirdly, there is the Vartius/Kivijarvi railway border crossing at the Russian/Finnish border which handles Russian raw material exports to and through Finland. Of all the railways in the Region it is the railway to Murmansk which carries the heaviest flows (30 million tons/yr) of ore, coal, mineral and oil. The railway is solely for Russia's internal and export use. The JBTP 2013 report contains extensive information about existing Barents railways. Excerpts of these descriptions are presented below.

The Ore line/Ofoten line, Luleå-Kiruna-Narvik, is the main international railway of Northern Scandinavia. Built originally more than 100 years ago for shipping iron ore from the mine in Kiruna, Sweden, the railway has become an important route also for shipping general cargo between southern and northern parts of Norway taking a considerable volume of heavy traffic off the roads in the Region. The railway has also passenger service. Due to the growth of traffic the railway has reached its capacity.

Over the years, continuous investments in improvements have been made on the railway. Based on the studies of 2013 the latest upgrading plan consist of, among others, building new and extending existing passing sidings to accommodate longer trains, and modernizing the signaling system. In addition, stations

and terminals will be improved. Also, double-tracking of the remaining single-track stretches in Sweden are contemplated. The first phase of upgrading works will be started in 2018 the earliest.

The North Bothnia railway is a proposed new railway, which would extend the already built railway between Stockholm and Umeå northwards. In 2015, the Swedish Government has supported a funding application to the Connecting Europe Facility (CEF) of the EU. The aim is to produce railway plans for the Umeå-Skellefteå part. The railway would improve conditions for freight transport, but particularly make passenger transport much faster. From Luleå there is an improved rail connection to Haparanda. In Haparanda/Tornio there are Finnish-Swedish plans to build a new transshipment terminal, which would improve the connectivity of the railway networks between the two countries.

The Oulu-Vartius/Kivijarvi-Kotckoma railway. The railway's Russian stretch is an entirely new railway, which was opened to traffic in 2009. However, the railway has not yet been fully completed, which limits its use. Until now, traffic has mainly consisted of Russian iron ore shipments to Finland and other raw material exports to the world markets via the Kokkola Port, Finland.

4. OTHER ROAD TRANSPORT RELATED CONSIDERATIONS

ROAD MAINTENANCE IN WINTER

The Barents Region and its road corridors are located in the High North, often in a mountainous region of fjells. This situation creates considerable problems for road traffic and road maintenance during wintertime. Often roads must be closed during snow storms in the high fjell areas. On a few routes the problem is considerable. The table below shows the routes and locations with the highest number of road closures and convoys in winter 2013-2014. E 8 data is for winter 2014-2015.

Route	Border	Location	Closures	Convoys
E 12	NO/SE	Umbukta	50	17
E 10	NO/SE	Bjørnfjell	24	18
Rv 77	NO/SE	Graddis	7	0
E 8	NO/FI		7	0

Table 3. Highest numbers of road closures and convoys 2013-2014

Traditional snow controlling measures include building roads on high embankments so as to prevent accumulation of snow on pavements. Also snow fences will help. Outside of the fjell area normal plowing of snow is adequate. In early winter, slippery pavements due to freezing are a common problem. An additional complication is that the pressure to save road maintenance money is likely to reduce the level of low volume road maintenance in winter.

INTELLIGENT TRANSPORT SYSTEM (ITS) AND DIGITALIZATION APPLICATIONS

Easier access to national road weather and condition information for foreign road users in all the Barents countries would help considerably trip planning and reduce the risk of accidents. To that end, a European standard Datex2 has been developed for disclosure and exchange of real-time road and traffic information. It makes possible the provision of language-independent traffic information services across borders in Europe. Datex2 data is also available to service providers of road and traffic information and hence the same information can be made available to road users via car navigation systems and mobile phones.

The Norwegian Public Roads Administration has for years had a close cooperation with the Swedish Transport Administration with the establishment of Datex2 in Norway and now data exchange is in place

between Sweden and Norway. From February 2015 road traffic control centers in Norway can access the Datex-data of the Swedish main road network through the Web client "TrafikkNå" in the form of a map view of roads and traffic. During 2016 it is hoped that similar data exchanges can be established between Norway and Finland. It is important for traffic control centers to have easy and quick access to information about the road network also in the neighboring countries. Especially useful is information when a main road is closed due to a weather or accident incident, and the possible detour goes through the road network of a neighboring country.

Another example of mobile phone applications is the warning system for reindeers on road, which is being tested in Northern Finland. This mobile application is used by professional drivers by a simple push of a button when they see reindeers near the road. The application registers the location and gives a warning to all others approaching the location by car, and who has this application in use. Warning can be seen for a predetermined time period after the last reindeer observation. Intention is to expand the system to cover Finland's entire reindeer herding area. The system could also be taken to use in other Barents countries.

Traction control systems of modern cars are collecting detailed data about the differences of rotation speeds of car wheels. In wintertime, these differences often indicate slipperiness of road surface. These data could probably be collected and used for warning other road users and give guidance to road authorities for the control of slipperiness, as well. In auto industry attempts to work in this direction have been made.

Digitalization is a field which can include a wealth of solutions designed directly or indirectly to expedite various transport related activities. Good examples are document and permit data exchanges between authorities and transport operators. They could include e.g. the sending of vehicle and import documents electronically to the borders.

Digitalization, however, does not function without good telecommunication connections. Several remote road sections in the Region do not have reliable mobile phone coverage, which is an impediment for the use of advanced technology. Lack of connections also poses a road safety risk.

BORDER CROSSINGS

There is always border control at the external borders of the EU, including the Norwegian border with Sweden and Finland, even if crossing of these borders is practically free. More strict, traditional border checks are carried out at the borders of Russia with Norway and Finland.

Import of certain goods into the EU is nevertheless subject to border inspections even when entering from Norway to Sweden or Finland. That concerns live animals and animal products in particular. In these cases shipments can be delayed due to limited opening hours of customs offices, where the mandatory veterinary certificates for imports to the EU are inspected.

Customs offices only at two borders (E8 and NR 93) are open for 24 h. Other offices close during the night at variable hours. They open typically at 8.00, but close anywhere between 19.00 and 23.00. On Saturdays and Sundays the hours are shorter, like 8 – 15 or 15 – 21. Unavailability of veterinary service during nights and particularly weekends affect adversely e.g. transport of Norwegian fish. The industry would welcome more harmonious opening hours, preferably on the basis of 24/7.

VEHICLE REGULATIONS

There is a considerable number of laws and regulations concerning commercial traffic, transport of freight, vehicle condition and driver qualification, which differ between countries. These regulatory regimes, decided in each country separately, affect greatly the structure and performance of the road transport industry both at the national and international levels. In Figure 6 some of the most common regulations of heavy goods vehicles are shown for each country. They reveal clearly this regulatory problem in the Barents Region.

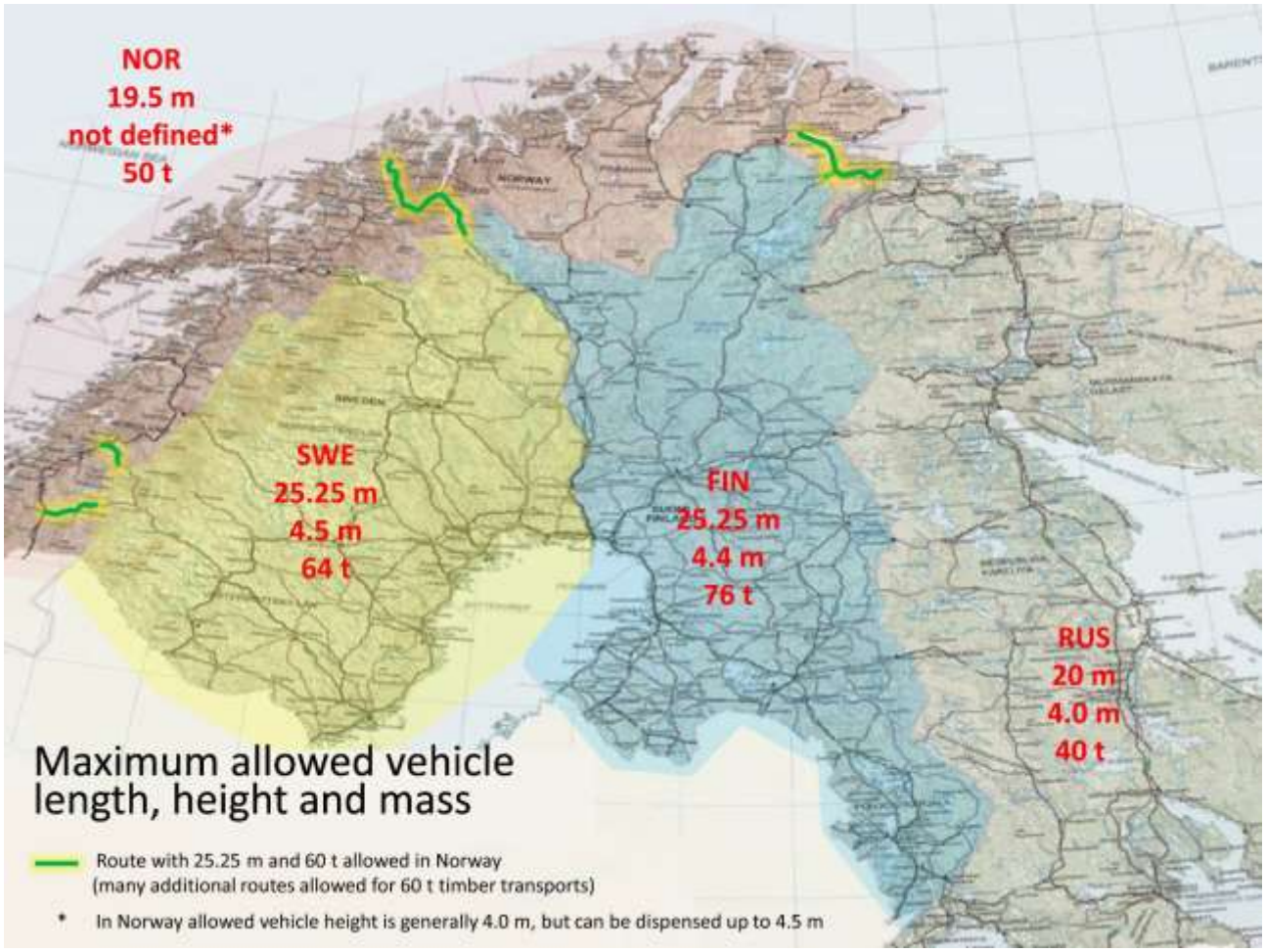


Figure 6. Maximum allowed vehicle lengths, heights and weights

ROAD SAFETY

Norway, Sweden and Finland have adopted the zero-fatal accident policy for all public roads. This is a major challenge for the Barents road corridors due to numerous substandard road sections in the network. Some roads are particularly difficult for foreign truck drivers inexperienced in northern road conditions. Every winter there are several accidents e.g. on E8 in Kilpisjärvi, which typically entail foreign HGVs running off the road. At present, animal accidents, with reindeer and moose, is the most common accident type in the Region.

Some of the countermeasures have been mentioned above, such as the reindeer warning application for mobile phones. In addition, Finland should impose a stricter winter tire regulation for HGVs, as is well indicated in Table 4 below.

Winter tire requirements for HGVs	
Russia	Tread depth 4 mm; snow tires mandatory in all axles in wintertime
Finland	Tread depth 1.6 mm in all axles; no requirement for snow tires
Sweden	Tread depth 5 mm in axles of the truck, 1,6 mm in trailer, snow tires mandatory in drive axles under winter conditions
Norway	Tread depth 5 mm in all axles; snow tires mandatory in all axles in wintertime

Table 4.Winter tire regulations in the Barents countries

Provision of high quality rest areas for commercial traffic is another improvement measure of road safety on the Barents roads. Distances are long in the Region and natural rest areas e.g. at service stations are scarce. This is combined with the more strict control of rest times of commercial vehicle drivers.

5. SOCIAL AND ENVIRONMENTAL CONCERNS

The expected outcome of this report is the adoption of a development program for cross-border roads even if no implementation of large road projects is anticipated. However, as the ultimate goal is to make road use easier, safer and faster, it may entail some construction measures. The measures tend to increase traffic flows and are likely to impact at least to some degree the environment and surrounding communities. Furthermore, a dialog with indigenous people is necessary.

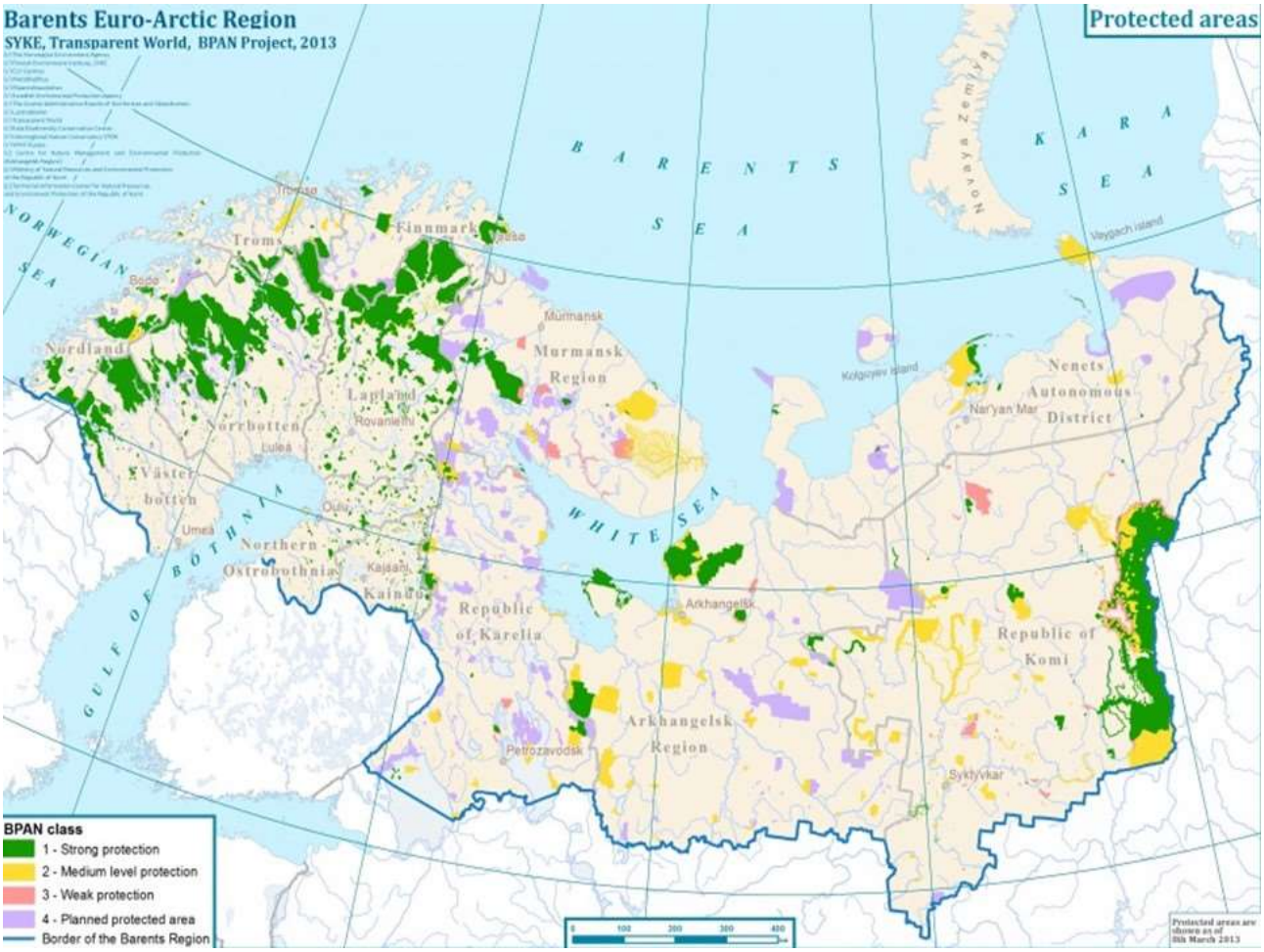


Figure 7. Protected areas in the Barents region

Figure 7 shows the protection areas of the Barents Region. The map reveals that very large swaths of the Region are under some kind of protection. In Lapland, the share is in the order of 30%. Protected areas hinder greatly the planning of new measures on roads, particularly the potential building of entire new road or rail connections.

The EU has had a directive on Strategic Environmental Assessment (SEA) since 2001, which applies to a wide range of public plans and programs (e.g. on land use, transport, energy, waste, agriculture, etc.). A SEA is mandatory for plans/programs which are prepared for future development of projects listed in the EIA Directive, which includes also transport. First, however, the Member States have to carry out a screening procedure to determine whether the plans/programs are likely to have significant environmental effects. If there are significant effects, an SEA is needed.

In this context it is important also to note that the Action Plan on Climate Change for the Barents Co-operation was adopted by the Barents Environment Ministers in December 2013. The Plan contains concrete activities to be realized by the working groups under the Barents Euro-Arctic and Regional Councils. The activities contribute to the following main policy areas: mitigation, adaptation, research and outreach, which are also relevant concerns in the development of road network in the Region.

6. ROAD FINANCING IN THE REGION

The JBTP 2013 discusses in length the national transport objectives of the Barents Region countries. Therefore, only the financial side of road policies is addressed in this report. Besides, national road budgets factually embody the true nature of national objectives.

Figure 8 shows the annual average expenditures on public roads in period 2010-2015. Public roads include both national and regional roads, which are built and maintained using tax revenues. The figure must be seen as indicative only, because it has proven difficult to compile comparable data due to differences in accounting practices with national road authorities.

Figure 8 shows that road financing varies greatly between the Barents Region countries. Norway is in its own class and has been able to carry out a very large road construction program in the North. Also, the Russian Federation has spent sizable funds on federal roads, most notably on E105/M18 from the Norwegian/Russian border to Murmansk and on to Petrozavodsk. These higher financing levels reflect the past inadequate state of the road systems in the two countries. Sweden and Finland have more mature road networks and, therefore, expenditures on roads have been more modest and targeted mostly on operation and maintenance. Investments have included mostly road capacity, safety and structural upgrading type of projects of local nature.

The future of road financing looks quite bleak in the coming years excepting Norway, which can still even increase its spending. All other countries face a decline of road budgets. Only some budget items, such as maintenance, may stay stable at best. Russian regions are particularly hard hit, since their tax earnings have declined substantially already since 2012-13.

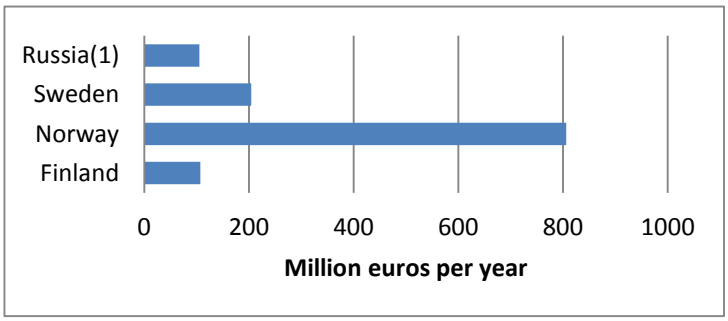


Figure 8. Average annual road financing in the Barents Region in 2010-2015 (million euros)
Note (1): Federal and regional financing in the Regions of Murmansk and Karelia only
Note: Figures in the table are not fully comparable due to differences in accounting practices

EU´S FINANCIAL MECHANISMS FOR TRANSPORT SECTOR

While the national road budgets will account for the vast majority of road sector financing, there are several mechanisms set up within various EU frameworks to assist directly or indirectly the development of road networks.

TEN-T funding for the Trans-European Networks. Since January 2014, the European Union has had a new transport infrastructure policy aimed at closing the gaps between Member States' transport networks. This policy up to 2020 comes with the Connecting Europe Facility (CEF) having a budget of €26 billion. This funding is planned primarily for the support of investments in the priority projects of the core network. In Finland and Sweden the priority project is the Nordic Triangle located in the southern parts of both countries. The ultimate intention is that the core network will be fully operational by 2030. TEN-T can probably provide finance in the order of 10% of the estimated total financing needs of the core network.

The European Investment Plan is aimed at boosting the EU area economy in a multiple ways. In doing that, it is also closely associated with the TEN-T development programs. The Investment Plan is thought to unlock public and private investments in the real economy of at least € 315 billion over the next three years (2015-2017). The details of Investment Plan are still being prepared. Unlike TEN-T, the Investment Plan has little, if any, grant financing, but it relies on loans and various public-private financing schemes.

The Investment Plan is being launched jointly by the EU Commission and the European Investment Bank (EIB), as strategic partners, with the clear aim of rallying stakeholders at all levels. The impact of the Plan will multiply as more stakeholders join in: Member States, National Promotional Banks (NPBs), regional authorities and private investors. In the Nordic Countries this means also participation of the Nordic Investment Bank (NIB) in the project preparation and financing.

NDPTL Support Fund gives grant contributions to projects or potential projects with a regional dimension and a regional added value. The Support Fund is aimed at assisting preparation of concrete transport projects of the NDPTL network. The following activities could be supported:

1. technical assistance for institutional support for building capacities for project feasibility analyses, development, preparation and implementation of projects
2. assistance to project development and preparation, in particular financing or otherwise enhancing the projects' potential to mobilize resources for implementation
3. assistance to improve efficiency and quality in project implementation

Cross-Border Cooperation (CBC) of the EU is the key priority of the European Neighborhood Instrument (ENI). The Program seeks to reinforce cooperation between the EU Member States and Partner Countries along the external EU borders. Its timeframe is 2014-2020 and the budget €1.05 billion. The CBC under the ENI has three overarching strategic objectives:

1. to promote economic and social development in regions on both sides of common borders
2. to address common challenges in environment, public health, safety and security
3. to promote better conditions for ensuring the mobility of persons, goods and capital

The new CBC is composed of 17 regional programs, two of which are located in the Barents Region: Kolarctic/Russia and Karelia/Russia. In addition, the Baltic Sea Region program touches the Barents Region. The CBC can provide funding, among others, for the development of transport connections with Russia. They can include various transport system studies and small scale investments at the Russian borders.
At present, the CBC is “on hold”.

7. ROAD CORRIDORS

The JBTP 2013 contained 13 road corridors. The Expert Working Group decided to leave two of these corridors out of this report. They are E 6, which is Norway's internal corridor; and Svappavaara – Pajala – Kolari, which is a road connection serving mostly Sweden's domestic traffic. One corridor, Kajaani – Niirala/Wärtsilä – Petrozavodsk, has been added to the set of corridors. Thus, this analysis contains 12 corridors, which are listed below and also depicted in Figure 9.

	Route	Corridor name	Length km	Border
1	E 4/E75	Bothnian Corridor	766	SE/FI
2	E 12	Umeå - Mo i Rana	496	SE/NO
3	77/95	Skellefteå - Bodø	496	SE/NO
4	E 10	Luleå - Narvik	519	SE/NO
5	E 8	Tornio - Tromsø	620	NO/FI
6	93/93	Palojoensuu - Alta	235	NO/FI
7	4/971/893	Kemi - Rovaniemi - Kirkenes	636	NO/FI
8	E 105	Kirkenes - Murmansk	224	RU/NO
9	91/R11	Ivalo - Murmansk	292	RU/FI
10	82/	Rovaniemi - Salla - Kandalaksha	365	RU/FI
11	22/89/	Oulu - Vartius - E 105	492	RU/FI
12	6/9/A130	Kajaani - Niirala/Wärtsilä - Petrozavodsk	559	RU/FI
		Total	5 690	km

Figure 9. Barents road corridors showing sections that need improvements

Appendix of this report, Cross-Border Road Corridors 2015, presents maps and detailed descriptions of each corridor. Descriptions comprise, among others, condition of the roads which are also summarized in Table 5. Determination of road condition is based on the JBTP 2013 standards, which cover e.g. quality, width and geometry of the road and its pavement. About 9% or 530 km of the roads are found to be in poor condition out of the total corridor length of 5 690 km. The estimated length of the roads in good condition is 47% or 2 680 km. Four corridors have no poor road sections.

A speed limit that is lower than 80 km/h is an important indicator of a road's level of service, because it typically is the top travel speed of HGVs. Lower than 80 km/h speeds add travel times relatively more also for passenger cars. Data is not complete with regard speed limits, but about 10% of the total road length appears to have a speed limit below 80 km/h.

When it comes to current and planned investments in corridors, there are 3-4 corridors which seem to have a sort of an investment program underway on both sides of the border. They include: the Bothnian Corridor (SE/FI), E10 Luleå - Narvik (NO/SE), and E105 Kirkenes – Murmansk (RU/NO). Also, Norway has an extensive investment program on the E6 road which is the country's main internal road connection. E6 is also important for international traffic using several Barents road corridors. The available investment data has been compiled in Table 6, which indicates that more than 1 500 million euros worth of construction have been either started, planned or foreseen on the Barents corridors. However, these data are not quite complete.

Prioritized actions for each corridor have been described in Appendix. The actions vary and depend largely on the past construction history of each corridor. Typical measures are: finalizing of an on-going or planned reconstruction phase, elimination of a specific bottleneck, strengthening of bearing capacity, and improving of road maintenance.

	Route	Corridor name	Road condition				Speed limit below 80 km/h	
			Good		Poor		%	km
			%	km	%	km		
1	E 4/E75	Bothnian Corridor	99 %	758	0 %	0	4 %	31
2	E 12	Umeå - Mo i Rana	10 %	50	0 %	0	13 %	64
3	77/95	Skellefteå – Bodø	28 %	139	14 %	69	25 %	124
4	E 10	Luleå – Narvik	52 %	270	4 %	21	7 %	36
5	E 8	Tornio – Tromsø	44 %	273	27 %	167	9 %	56
6	93/93	Palojoensuu – Alta	0 %	0	12 %	28	18 %	42
7	4/971/893	Kemi - Rovaniemi – Kirkenes	63 %	401	7 %	45	6 %	38
8	E 105	Kirkenes – Murmansk	30 %	67	0 %	0	na	na
9	91/R11	Ivalo – Murmansk	16 %	47	40 %	117	na	na
10	82/	Rovaniemi - Salla – Kandalaksha	20 %	71	10 %	36	na	na
11	22/89/	Oulu - Vartius - E 105	55 %	271	10 %	49	na	na
12	6/9/A130	Kajaani-Niirala/Wärtsilä-Petrozavodsk	60 %	335	0 %	0	na	na
Totals			**47 %**	**2 681**	**9 %**	**532**	**10 %**	**392**

na = not available

Table 5. Condition of corridor roads

	Route	Corridor name	Cost by country, M€				Total
			NO	SE	FI	RU	
1	E 4/E75	Bothnian Corridor		300	140		440
2	E 12	Umeå - Mo i Rana		240			240
3	77/95	Skellefteå – Bodø					
4	E 10	Luleå – Narvik	400	150			550
5	E 8	Tornio – Tromsø			50		50
6	93/93	Palojoensuu – Alta					
7	4/971/893	Kemi - Rovaniemi – Kirkenes			170		170
8	E 105	Kirkenes – Murmansk				48	48
9	91/R11	Ivalo – Murmansk					
10	82/	Rovaniemi - Salla – Kandalaksha				5	5
11	22/89/	Oulu - Vartius - E 105			45	25	70
12	6/9/A130	Kajaani - Niirala/Wärtsilä - Petrozavodsk					
Totals			**400**	**690**	**405**	**78**	**1 573**

Table 6. Cost of improvement measures (on-going, planned and foreseen projects)

8. CONCLUSIONS AND RECOMMENDATIONS

The Joint Barents Transport Plan of 2013 contained recommendations for the development of road transport and infrastructure in the Barents Region. Bearing them in mind the Expert Working Group has drawn several conclusions based on the material compiled in this report. They are briefly summarized below. The recommendations of the Expert Working Group for the future work are listed after the relevant conclusions.

1. ECONOMIC OUTLOOK IN THE REGION

The Barents Region is rich in natural resources and its long-term future looks good in the planning horizon up to 2030. In addition, exploration and production of natural resources is gradually moving more and more northward and to the Barents Region. A problem is that the Region's resources are unevenly distributed. The coastal areas are reaping most of the benefits, while vast inland areas are not faring so well. Furthermore, the Region's main industries: oil and gas, mining and forestry are highly cyclical. In the period of high cycles they put a considerable pressure on the development of transport connections. In low cycles, prevailing uncertainties affect adversely the planning of transport system improvements. Tourism and fish production are more stable and show growth. They are also big employers. Another characteristic of the Region is that the communities and businesses of the four Barents countries operate in relative isolation from each other. If the Region's internal transport connections are improved, market areas will be expanded, and cooperation and even clustering of businesses across the borders will be supported.

2. INTERNATIONAL ROAD TRAFFIC

Barents roads in the vicinity of borders have relatively low traffic flows with the exception of the Haparanda/Tornio (FI/SE) border. It is important also to note that the patterns of freight transport are constantly in transformation. Changes are driven, first, by industrial and business development and cycles; second, revisions of regulations; and third, technological innovations. However, the industries in natural resources extraction continue to rely mostly on rail and sea transport, but also roads are important for their operations. Forestry and fishing industries depend heavily on road transport. The vision of the future traffic flows remains vague, because the available forecasts are incomplete for freight and non-existent for passenger traffic.

Recommendation:

1. Analysis and harmonizing of the forecasts and models used by the Barents transport authorities

3. TRANSPORT NETWORK

In general, it can be said that Norway and Russia have actively been developing their national road networks, while in Sweden and Finland road networks are more mature and their development needs are more local. However, international logistics in the Region is not well understood. Ports and terminals are important nodes in the logistics chains of road freight, but they are invariably considered in separation from the road network development. Also, planned extensions of the railway network are not seen to impact international road transport very much in the foreseeable future. Only the Ore / Ofoten line and to a lesser extent the North Bothnia line may have some impact on road traffic.

The Barents Region has a very limited coverage of the TEN-T network. The Region needs the establishment of an international transport network between the TEN-T and national networks, which could be based on the already defined JBTP corridors. At the later date, also the TEN-T network must be revisited and at least slightly revised. In addition, there is some need of revising the existing E-road numbering.

Recommendations:

2. *Finding and agreeing on a proper status for the JBTP network, and a review and proposals for expanding later the TEN-T network in the Region*
3. *Numbering of the NR93road between Alta, Norway, and Karesuando, Sweden, should be changed to E45 as this route is a natural extension of the existing E45 route through Sweden.*

4. OTHER ROAD TRANSPORT RELATED CONSIDERATIONS

The Barents Region and its road corridors are located in the High North, often in a mountainous region of fjells. This situation creates considerable problems to road traffic and maintenance during wintertime. On some routes the problem of road closures during winter storms is considerable.

Rest times of commercial vehicle drivers are controlled now more strictly. This presents problems, because in the Region driving distances are long and natural rest areas e.g. at service stations are scarce. Provision of high quality rest areas for commercial traffic is essential.

Customs offices only at two borders (E8 and NR 93) are open for 24 h. At other borders, offices close during nights and are open during weekends at variable hours. The situation poses a problem to time-sensitive deliveries.

ITS applications help increasingly road traffic making it safer and more reliable in several ways. However, the development of ITS in transport is fragmented between the countries reducing their benefits e.g. to foreign road users. Digitalization in general is a field which can be used to expedite various transport related activities. They might include data exchanges of transport documents and permits between border authorities and transport operators. Digitalization, however, does not function without good telecommunication connections. Several remote road sections in the Region do not have reliable mobile phone coverage, which is an impediment for the use of advanced technology. Lack of telecommunication also increases road safety risks on low volume roads.

Vehicle regulations guide strongly the road transport business affecting transport costs and markets in a crucial way. However, the regulations across the borders are not harmonized, because decisions are taken nationally. A particular wintertime problem concerns Finland, which applies a tire regulation for HGVs that is much lenient than those of the neighboring countries.

Recommendations:

4. *The countries should carry out an assessment of harmonization of vehicle regulations, such as total vehicle weights, lengths, and permitted axle loads in particular. The need for this is urgent.*
5. *Winter tire regulations and use of chains on HGVs should be harmonized*
6. *A common system should be established for the provision of information about real-time driving conditions on international road corridors. That is: road, traffic, detour and weather conditions as per the Datex2 standard.*
7. *Assessment of other ITS applications and general digitalization solutions should be carried out*
8. *The industry would welcome more harmonious opening hours of customs offices, preferably on the basis of 24/7.*
9. *Rest areas on the road corridors should be seen as a relevant measure both to increase safety and to improve the efficiency of the transport system. A way forward is pilot or master plan of HGV rest areas covering the entire Region.*

5. SOCIAL AND ENVIRONMENTAL CONCERNS

Implementation of the JBTP proposals will impact the environment and surrounding communities at least to some degree. The EU has a directive on Strategic Environmental Assessment (SEA) since 2001, which is mandatory for plans/programs involving land use, transport, energy, waste, agriculture, etc. The

directive stipulates also carrying out a screening process. In this context it is important also to note that the Action Plan on Climate Change for the Barents Co-operation was adopted by the Barents Environment Ministers in December 2013. The Plan contains concrete activities to be realized by the working groups under the Barents Euro-Arctic and Regional Councils.

Recommendations:

10. A screening process needs to be carried out to determine whether the plans/programs are likely to have significant environmental effects
11. Dialog with indigenous people should be launched

6. ROAD FINANCING IN THE REGION

There have been big differences in the past road spending between the Barents Region countries in the North. Norway and the Russian Federation have implemented large road construction programs, while Finland and Sweden have practiced maintenance and gradual upgrading of their existing networks. In the foreseeable future, only Norway can afford making significant road network improvements. All other countries are faced with mostly declining road budgets. In Finland, the up-keep of the national road network in the current condition is close to impossible with the foreseen resources in the coming years. It should be added that there is only very limited financial assistance available from external sources, such as the EU financial mechanisms.

Recommendation:

12. Elimination of bottlenecks should be prioritized in national budgets so as to reach the objective of good internal connectivity between the Barents countries, and to provide good external links to the world markets.
13. Alternative methods of financing should be sought, such as road tolls which are common in Norway.

7. ROAD CORRIDORS

This report identifies bottlenecks and improvement needs in a harmonized way for the selected 12 cross-border road corridors comprising 5 690 km of roads. About 9% or 530 km of these roads are found to be in poor condition.

More than 1 500 million euros worth of construction have been started, planned or foreseen in the Barents corridors. There are only 3-4 corridors which seem to have a sort of an investment program underway on both sides of the border. In the future, methods of future cooperation must be devised.

Recommendations:

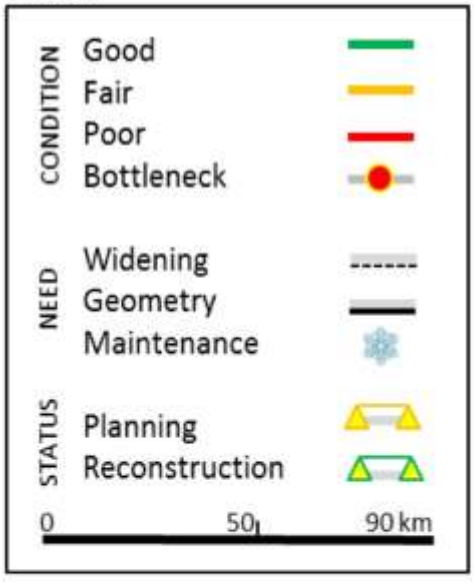
Methods of future co-operation:
14. Selection of road corridors for bi-lateral development
15. Drafting bilateral agreements on common planning of (selected) cross-border road corridors
Development of road standards:
16. A minimum of 8 m of asphalted road width should be the norm for the Barents road corridors
17. Other road standards for consideration jointly are horizontal and vertical geometry, free height and speed limits
18. A review and analysis of maintenance standards on the international corridors

Other:
19. Joint evaluation of climate change and its impacts on road construction and maintenance
20. Supporting cooperation between the universities in order to improve research and expertise in transport sector in the Region

Cross-Border Road Corridors 2015

The development status, improvement needs and road condition of each corridor is depicted in symbols shown in the Legend.

Legend:



Road condition is classified as follows:

Good
- Pavement at least 8 m wide and in good condition
- Good road geometry
- Safe traffic environment

Fair
- Between Good and Poor

Poor
- Pavement is missing or is less than 6 m wide
- Pavement width is less than 7 m with poor road geometry
- High risk of accidents

Bottleneck
- Road bed or surface condition is so poor that a significantly lower speed limit must be posted
- Road section with a particularly poor road geometry making the posting of a significantly lower speed limit necessary
- Over 4 km long road section with a speed limit of 60 km/h or lower

In borderline cases the exact determination of road condition has been derived from subjective driving experience. In addition, it is important to notice that, even if the road is good from the perspective of cross-border corridors, there may be improvement needs on the road arising from other reasons. They may include measures to reduce congestion due to high traffic volume or to improve road safety situation.

1 Bothnian Corridor

Bothnian Corridor	
Length km	766
- in good condition %	99
- in poor condition %	0
Speed limit 80 or more %	96
Average daily border crossings 2014 in Tornio	
- heavy vehicles	490
- cars	12 490
- people	33 724
Average daily traffic volume	
- max in Oulu	68 000
- min in Pyhäsalmi	3500

The Bothnian Corridor is the most important road corridor for both Northern Finland and Northern Sweden. It is included in EU's TEN-T core network. The Bothnian Corridor connects the northernmost parts of Sweden and Finland to the Nordic Triangle, which then connects the capitals of the Nordic countries to the European transport networks.

Challenges

The road fulfills the technical requirements set in the Joint Barents Transport Plan in 2013. However, there are challenges with traffic safety and congestion on some sections of the road.

In Sweden, most of the E4 road to the north of Skellefteå is equipped with median barriers and bypass lanes. There are still some sections missing the median barrier.

There are three rather long 60 km/h speed limit sections defined as bottlenecks, one in Skellefteå, one at both sides of the Finnish-Swedish border in Tornio-Haparanda, and one in Ii, North of Oulu.

The road is congested almost daily between Kemi and Oulu. Also the four lane motorway section in Oulu is often congested.

Planned improvements

In Sweden the goal is to have the E4 road equipped with a median barrier all the way. Most of the sections lacking the median barrier are already planned or under planning.

A recent long term plan for developing the Finnish part of the Bothnian Corridor includes a proposal of bringing the road in stages to the requirements set by the EU. The chosen road standard is however lower than the motorway standard set as a default for a core network road, because of the rather modest traffic volumes on most of the road.

In rural areas with higher traffic volumes, such as between the urban regions of Oulu and Kemi, the road will be equipped with bypass lanes and a median barrier. Where the traffic volume is low, median barriers will not be built. In the urban area of Oulu, some more motorway sections are needed.

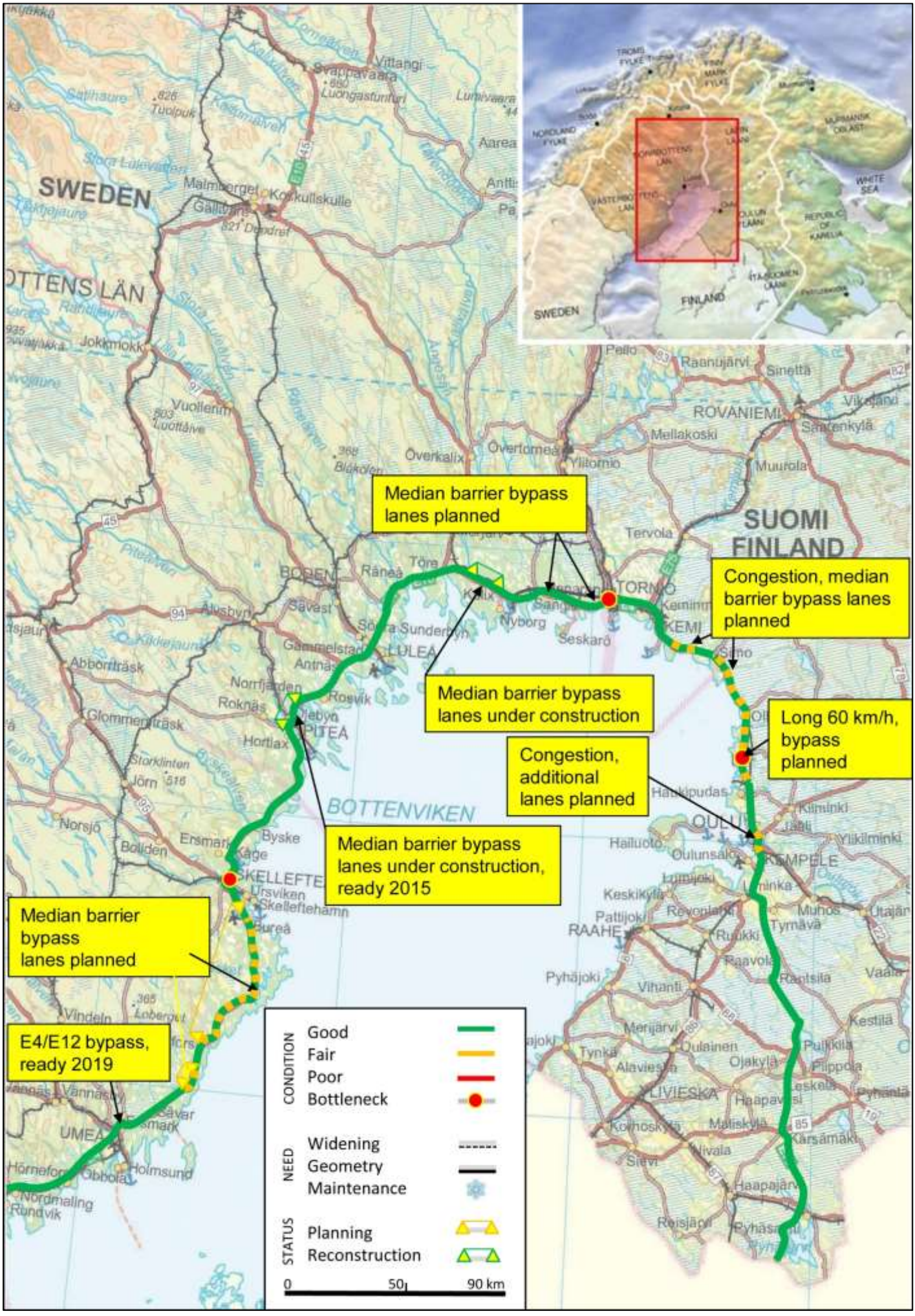
There is a long 60 km/h bottleneck section north of Oulu. It will be bypassed by building a new road in the long run. In Tornio, the low speed limit can be accepted, because of the urban environment on both sides of the border along with several roundabouts and traffic lights.

The estimated costs of construction on the Swedish side is about 300 M€ by 2025. The cost of the needed development on the Finnish side is estimated to be 140 M€ for the next eight years and an additional 300 M€ by the year 2030.

Prioritized actions

Continuing the construction of median barriers on E4 is prioritized in Sweden, as well as between Oulu and Kemi in Finland.

Reducing congestion by constructing additional lanes in the urban area of Oulu is prioritized.


Median barrier bypass lanes planned
Congestion, median barrier bypass lanes planned
Median barrier bypass lanes under construction
Long 60 km/h, bypass planned
Congestion, additional lanes planned
Median barrier bypass lanes under construction, ready 2015
Median barrier bypass lanes planned
E4/E12 bypass, ready 2019
CONDITION
Good
Fair
Poor
Bottleneck
NEED
Widening
Geometry
Maintenance
STATUS
Planning
Reconstruction
0
50
90 km
SWEDEN
SUOMI
FINLAND
BOTTENVIKEN

2 E12 Umeå – Mo i Rana

E12 Umeå – Mo I Rana	
Length km	496
- in good condition %	10
- in poor condition %	0
Speed limit 80 km/h or more %	87
Average daily border crossings 2014 in Riksgränsen	
- heavy vehicles	100
- cars	700
- people	-
Average daily traffic volume	
- max in Umeå	10 000
- min in Sweden close to border	400

The E12 road connects the Bothnian Corridor (E4) in Umeå, Sweden, to E6 in Mo i Rana, Norway. The road continues over the Gulf of Bothnia by a ferry connection between Umeå and Vaasa, Finland, and connects with the Finnish road network.

E12 is included in the TEN-T comprehensive road network.

Challenges

The road is rather narrow, but considering the relatively low traffic volumes and reasonable geometry, this is not a major challenge.

Close to Umeå traffic safety and mobility are challenged. New pedestrian and cycling roads are needed in some places.

In Norway some sections are difficult for heavy vehicles because of steep slopes combined with the narrow road. There is also the need for strengthening of the road.

Drifting snow makes road maintenance difficult in the winter season. The road must be closed several times during every winter because of severe weather conditions.

Planned improvements

In Umeå there is a large ongoing infrastructure project, which will probably be ready 2019 in the earliest. Both the E4 and E12 roads will be built in a different location in and close to the city center with a total cost of about 240 M€.

On E12, a few kilometers to the west of the city a pair of median barrier bypass lanes have been planned to connect the present median barrier section with the new E12 at the city. The project lacks financing.

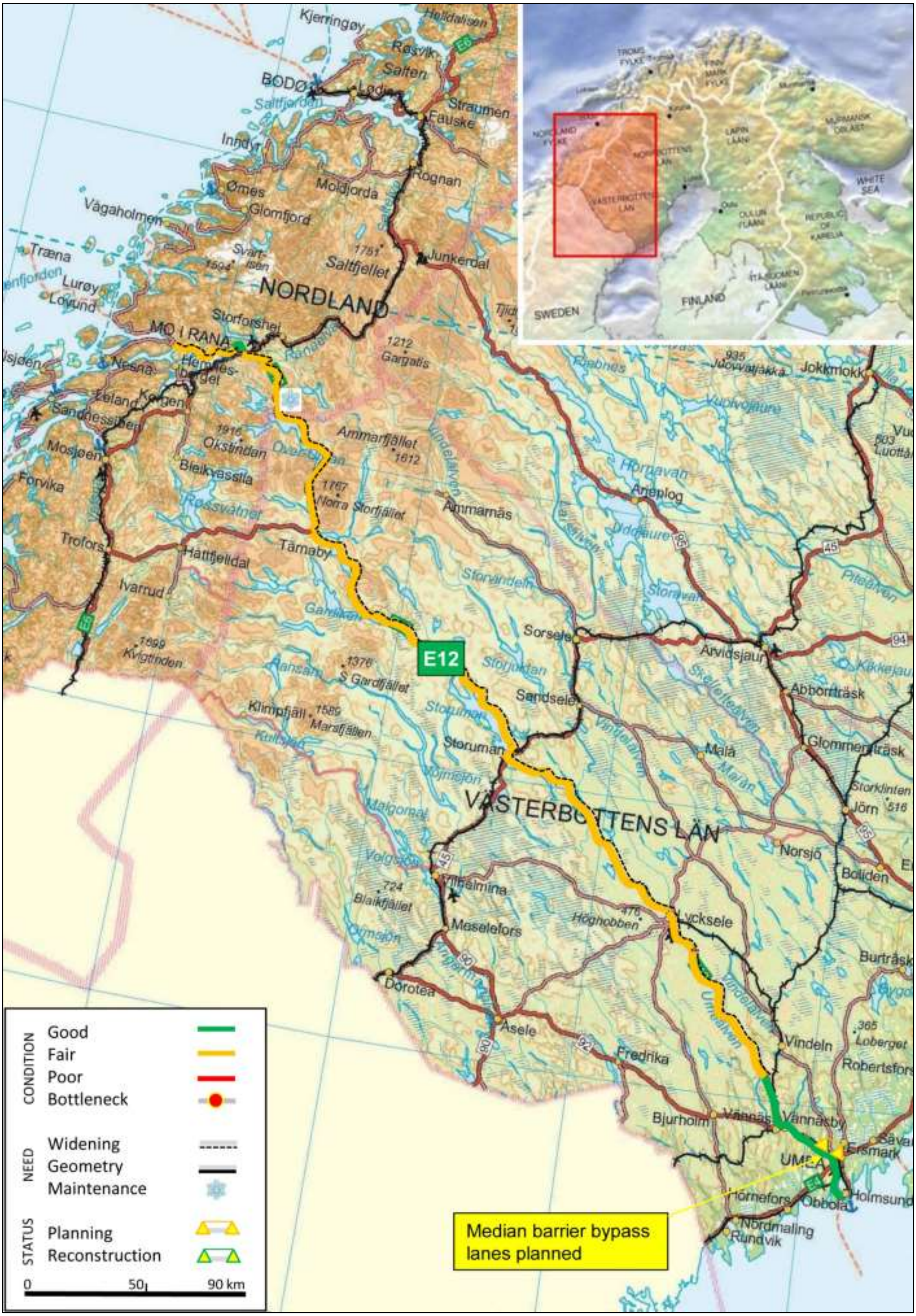
In Norway, there are plans for strengthening the road to improve the bearing capacity.

There is an ongoing feasibility study together with Norway and Sweden, with also Finland participating, which will give the guidelines for further development of the road.

Prioritized actions

Besides the finalizing of the ongoing construction of E4/E12 in Umeå, minor measures to improve the bearing capacity are prioritized.

E12 in Sweden close to the Norwegian-Swedish border



CONDITION
Good
Fair
Poor
Bottleneck
NEED
Widening
Geometry
Maintenance
STATUS
Planning
Reconstruction
0 50 90 km
Median barrier bypass lanes planned
E12
NORDLAND
VÄSTERBOTTENS LÄN
MO I RANA
BODØ
UMEÅ
SWEDEN
FINLAND

3 Skellefteå – Bodø

Skellefteå – Bodø	
Length km	496
- in good condition %	28
- in poor condition %	14
Speed limit 80 km/h or more %	75
Average daily border crossings 2014	
- heavy vehicles	100
- cars	300
- people	-
Average daily traffic volume	
- max in Bodø	30 000
- min at the border	400

Riksväg 95 in Sweden close to the Swedish-Norwegian border
© Google 2010

The road is not included in the TEN-T road network. Riksväg 95 connects the Bothnian Corridor and E4 in Skellefteå, Sweden with E6 in Bodø, Norway.

RV 77 in Norway
© Google 2010

Challenges

Some sections of the road close to the Norwegian-Swedish border are too narrow, and the geometry is not as good as it should. Even though the traffic volume is rather low, this is a problem.

On the Norwegian side of the border there is a bottleneck in Tjernfjellet.

Planned improvements

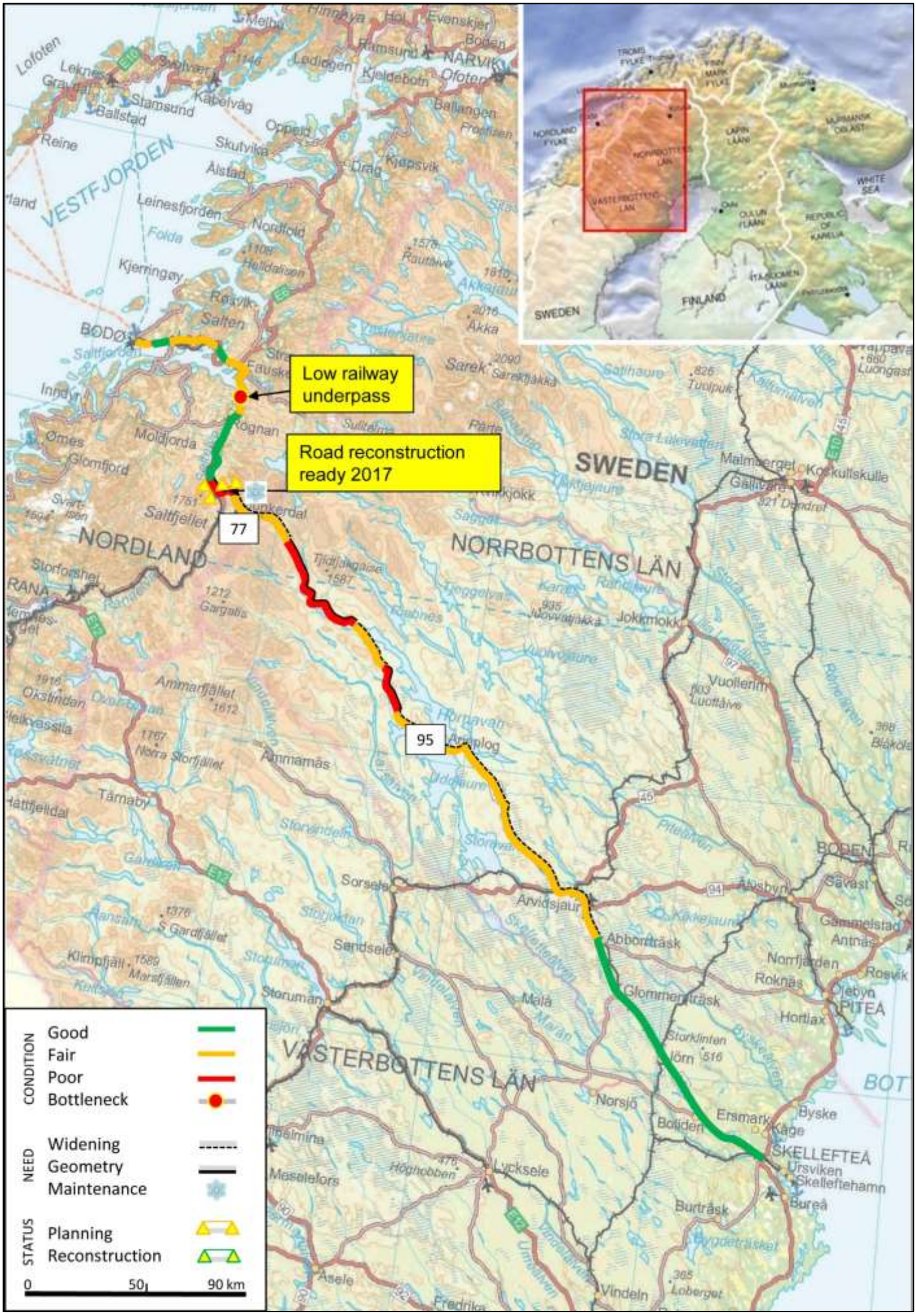
There are no specific planning or construction projects in this corridor in Sweden.

In Norway the Tjernfjellet bottleneck section on Rv 77 is going to be reconstructed. Works will be carried out in 2015-17. The section of E6 between Sørelva and Borkamo is planned to be reconstructed in 2018-23.

RV 77 in Norway
© Google 2010

Prioritized actions

Reconstruction work to eliminate the bottleneck on the Norwegian side of the border is prioritized.


Low railway underpass
Road reconstruction ready 2017
77
95
SWEDEN
NORDLAND
NORRBOTTENS LÄN
VÄSTERBOTTENS LÄN
BODØ
NARVIK
RANA
BODEN
PITEÅ
SKELLEFTEÅ
FINLAND
CONDITION
Good
Fair
Poor
Bottleneck
NEED
Widening
Geometry
Maintenance
STATUS
Planning
Reconstruction
0
50
90 km

4 E10 Luleå – Narvik

E10 Luleå – Narvik	
Length km	519
- in good condition %	52
- in poor condition %	4
Speed limit 80 km/h or more %	93
Average daily border crossings 2014 in Riksgränsen	
- heavy vehicles	150
- cars	720
- people	-
Average daily traffic volume	
- max in Kiruna	4000
- min at the border	870

This corridor connects the Bothnian Corridor and Luleå, Sweden, with E6 and Narvik in Norway. The corridor belongs to the TEN-T core road network. The parallel railway is also included in the TEN-T core network.

Challenges

In Kiruna, the existing road will soon be in conflict with the expanding iron mine. Parts of the Kiruna town center will also have to be relocated to a site a few kilometers away.

The road is too narrow in a short section to the north of Gällivare.

In Norway, steep sections in combination with a narrow road make driving challenging in some places.

Drifting snow in the winter season causes several road closings yearly.

Planned improvements

In Kiruna, the new road bypassing the expanding mine is going to be built in the next few years.

Three new median barrier bypass sections are planned, one south of Överkalix and two between Gällivare and Kiruna. The other of the projects will also upgrade the narrow road section north of Gällivare. A short new road section is also planned on E10 north of Gällivare. Estimated total costs of the road projects on the Swedish side are 150 M€.

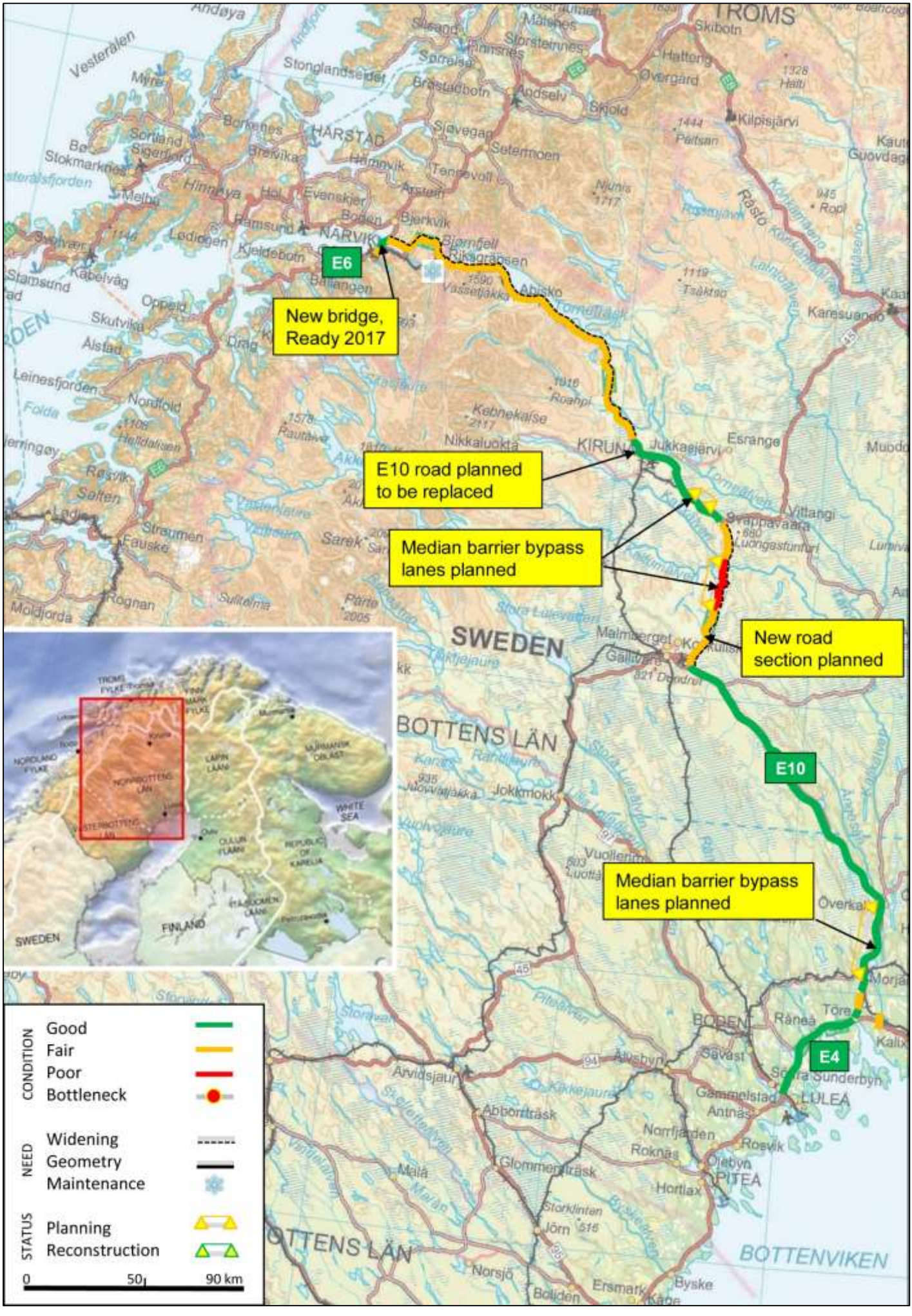
A large new bridge costing some 400 M€ is under construction on the E6 road just north of Narvik. It will be ready in 2017.

Prioritized actions

As this corridor belongs to the TEN-T core network, all actions to improve the sections which do not meet the requirements set for a TEN-T corridor are prioritized.

E10 in Sweden close to the Norwegian-Swedish border

E10 in Norway close to the border


E6
New bridge,
Ready 2017
E10 road planned
to be replaced
Median barrier bypass
lanes planned
New road
section planned
E10
Median barrier bypass
lanes planned
E4
SWEDEN
FINLAND
BOTTENS LÄN
BOTTENVIKEN
NARVIK
KIRUNA
LULEA
PITEA
BODEN
HARSTAD
TROMS
CONDITION
Good
Fair
Poor
Bottleneck
NEED
Widening
Geometry
Maintenance
STATUS
Planning
Reconstruction
0
50
90 km

5 E8 Tornio – Tromsø

E8 Tornio – Tromsø	
Length km	620
- in good condition %	44
- in poor condition %	27
Speed limit 80 km/h or more %	91
Average daily border crossings 2014 Kilpisjärvi / Helligskogen	
- heavy vehicles	75
- cars	470
- people	1270
Average daily traffic volume	
- max in Tornio	7700
- min in Karesuvanto	400

This corridor connects the Bothian Corridor and the Swedish-Finnish border region with E6 and the Norwegian regions of Troms and Western Finnmark. The corridor is not in the TEN-T or the NDPTL networks.

The part of E8 road located in Finland has also six public road connections to/from Sweden. The Finnish-Swedish border crossing at Tornio-Haparanda belongs to the Bothnian Corridor. Many of the roads between Finland and Sweden have more traffic across the border than E8, but it is usually short distance shopping traffic. Only the road to Övertorneå has more heavy transports than E8.

Challenges

Many road sections south of Kilpisjärvi, Finland, are only a bit more than 6 m wide. Horizontal and vertical geometries are poor needing improvements. This concerns especially the section Palojoensuu-Kilpisjärvi. The same is also true to most of the road from the border up to Skibotn in Norway.

Severe winter conditions make it very difficult to keep the road open for traffic during snow storms especially on the Norwegian side. The road must be closed every now and then during extreme weather conditions.

In Norway there is a bottleneck between the Didnijoka bridge and Perskogen.

Planned improvements

In Norway the section from the Finnish-Norwegian border to Skibotn is planned to be reconstructed in 2018-23. The road sections Hatteng-Nordkjosbotn and Sørbotn-Laukslett. will also be reconstructed in 2018-23.

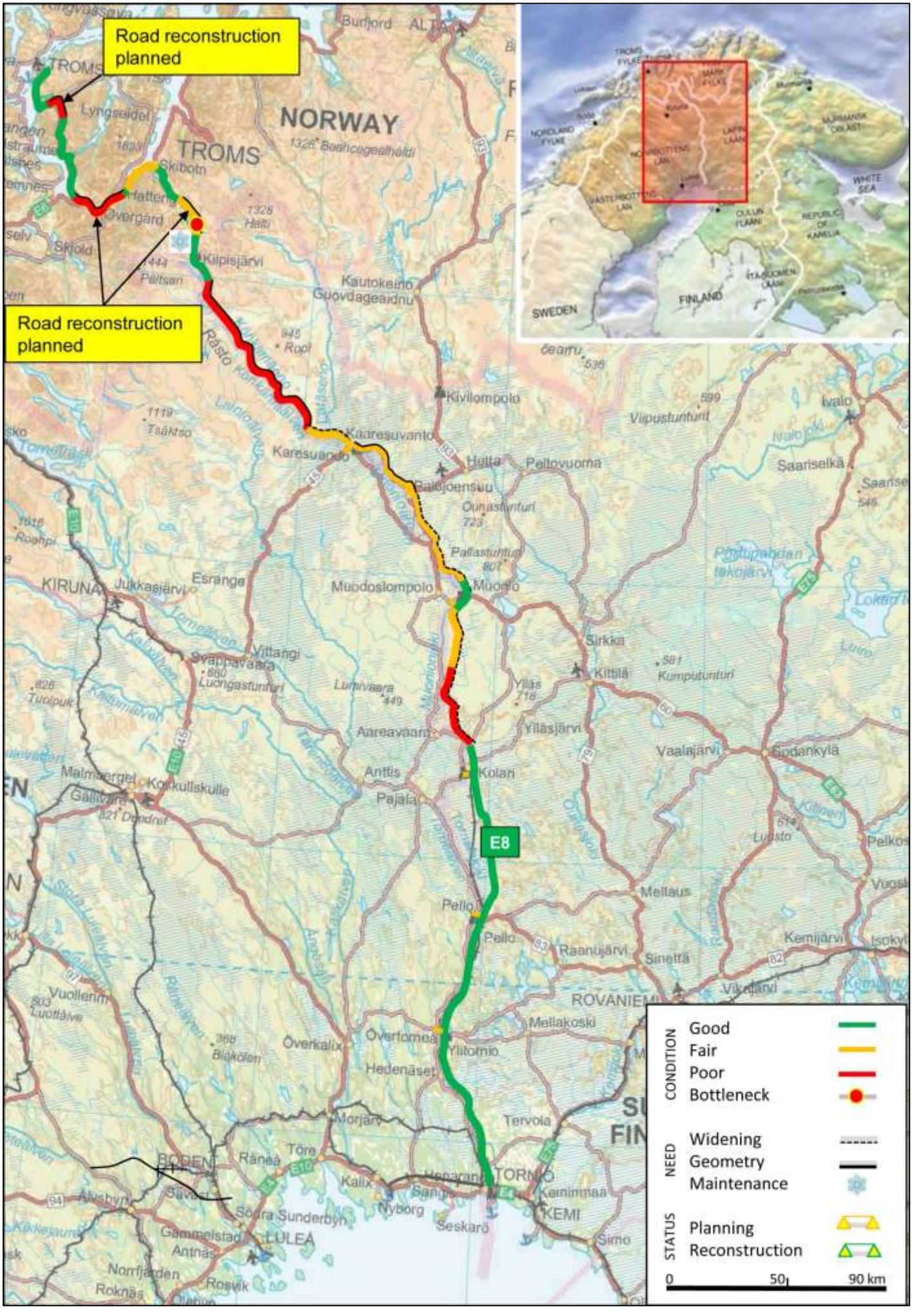
In Finland there is a preliminary study of the road condition improvements. Proposed measures include road widenings and geometry improvements in the most difficult places between Kolari and the Norwegian border. The improvements will cost about 50 M€.

Prioritized actions

The already planned improvements in Norway are important. Some reconstruction should also be done soon on the Finnish side. Inclusion of this corridor to the NDPTL road network would help in financing the improvement works.

E8 in Finland close to the Norwegian-Finnish border

Recently rebuilt section of E8 in Norway


Road reconstruction planned
Road reconstruction planned
NORWAY
TROMS
SWEDEN
FINLAND
E8
CONDITION
Good
Fair
Poor
Bottleneck
NEED
Widening
Geometry
Maintenance
STATUS
Planning
Reconstruction
0
50
90 km

6 Palojoensuu – Alta

Palojoensuu – Alta	
Length km	235
- in good condition %	0
- in poor condition %	12
Speed limit 80 km/h or more %	82
Average daily border crossings 2014 in Kivilompolo	
- heavy vehicles	70
- cars	330
- people	880
Average daily traffic volume	
- max in Alta	3600
- min at the border	400

The corridor includes the national road 93 on both sides of the Finnish-Norwegian border. It starts from E8 at Palojoensuu, Finland, crosses the Finnish-Norwegian border in Kivilompolo, and continues to E6 in Alta, Norway. The corridor is not in the TEN-T or NDPTL networks.

Challenges

The road is narrow and both vertical and horizontal geometry need to be improved. The road must be strengthened in several places for coping with increasing transport volumes and higher vehicle masses.

In Kløfta, Norway there is a bottleneck due to a narrow road, tight curvature and steep slopes.

Planned improvements

There are not any plans for improving the road in Finland beyond regular maintenance. In Norway the Kløfta tunnel will be built in 2018-2023 to eliminate the bottleneck.

Prioritized actions

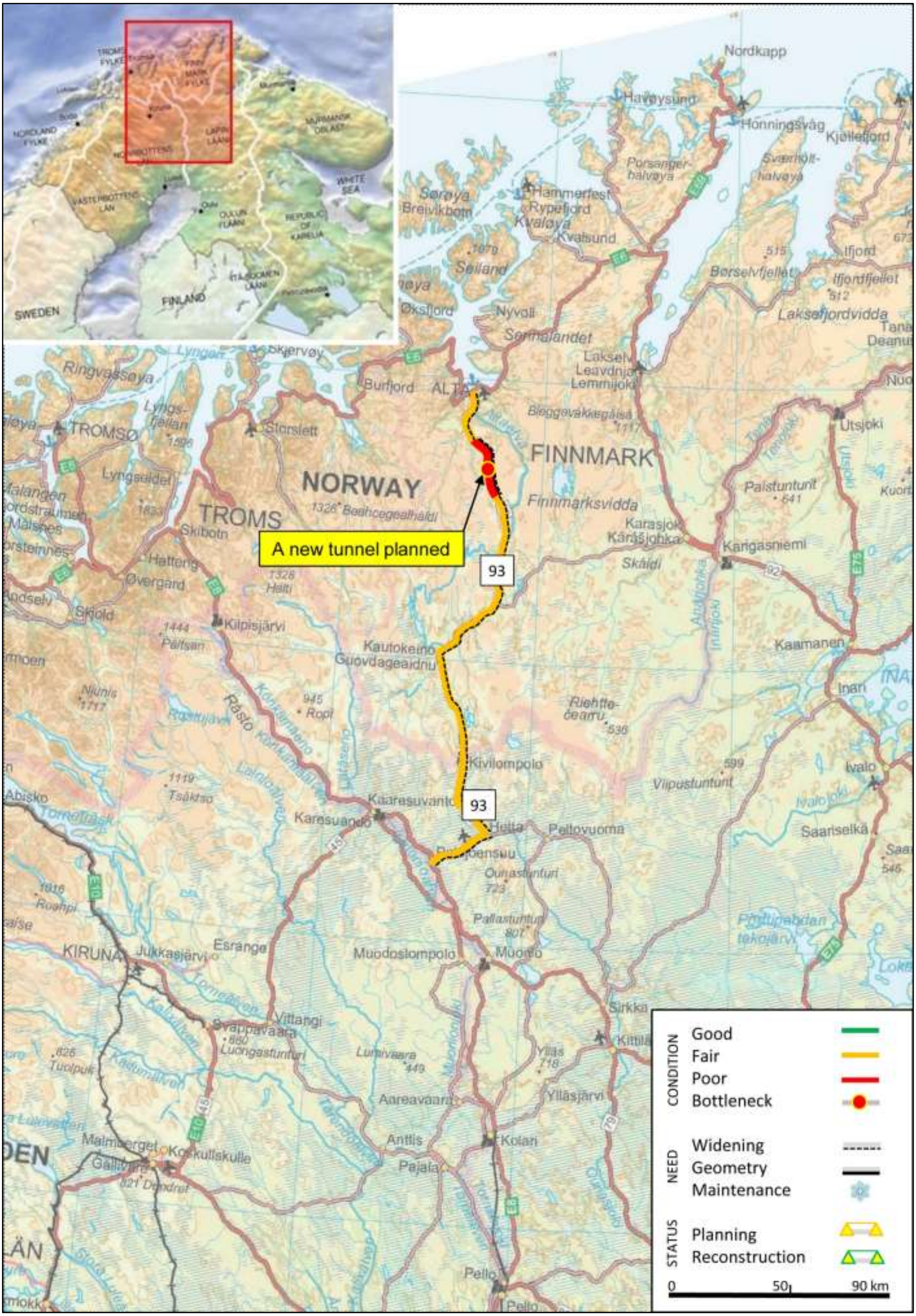
Continuing the E45 road from Swedish Karesuando via E8 to Palojoensuu and then along this corridor all the way to Alta would help to promote the increasing role of this road corridor.

Including this corridor in the NDPTL road network would help in financing the needed improvements.

Road 93 in Finland close to the Finnish-Norwegian border

Road 93 in Norway close to the border

Road 93 in Norway close to Alta


A new tunnel planned
93
93
NORWAY
FINNMARK
TROMS
ALTA
Kautokeino
Guovdageaidnu
Kivilompolo
Kaaresuvanto
Karesuando
Hetta
CONDITION
Good
Fair
Poor
Bottleneck
NEED
Widening
Geometry
Maintenance
STATUS
Planning
Reconstruction
0
50
90 km

7 Kemi – Rovaniemi – Kirkenes

Kemi – Rovaniemi – Kirkenes	
Length km	636
- in good condition %	63
- in poor condition %	7
Speed limit 80 km/h or more %	94
Average daily border crossings 2014 in Näätämö / Neiden	
- heavy vehicles	22
- cars	470
- people	5070
Average daily traffic volume	
- max in Rovaniemi	22 000
- min in Sevettijärvi	220

The E75 road starting from the Bothnian Corridor in Kemi is part of the TEN-T comprehensive road network. The northernmost part of this corridor, from Kaamanen, Finland, to E6 in Neiden, Norway, is not in the TEN-T.

Challenges

The E75 road in Finland fulfills the standard set for a road transport corridor in the Joint Barents Transport Plan. In spite of that, there are several challenges, especially concerning traffic safety.

The road section connecting E75 and E6 between Kaamanen and Neiden is too narrow and the horizontal curvature is challenging in several places. Also, the bearing capacity needs improving in that particular section.

In Norway there are geometrical challenges at the Strømmen brigde.

Planned improvements

A long term plan for developing the southern half of this corridor has just been published. The total cost of improvements in this section is 170 M€. Most of it would be spent on widening the road and improving the conditions in rural areas.

So far, there are no detailed plans for improvements, but an agreement between Finland and Norway has been reached about common planning of the roads 971 and 893 between E75 and E6.

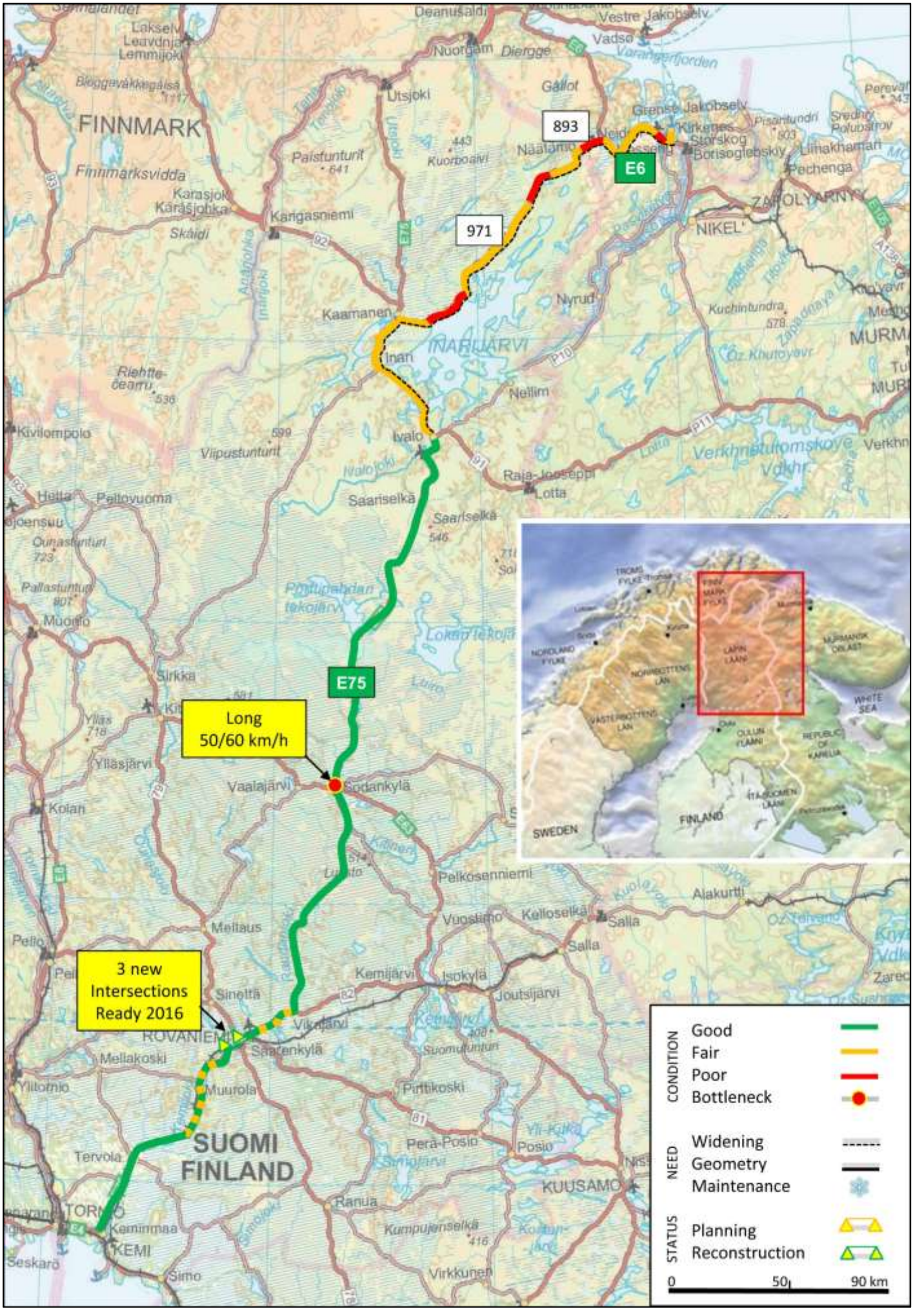
Prioritized actions

With time, reconstruction of the road from Kaamanen on E75 in Finland to E6 in Neiden, Norway, will become more and more important.

E75 south of Sodankylä in Finland

E75 between Inari and Ivalo, Finland

Road 893 in Neiden, Norway


893
971
E6
E75
Long
50/60 km/h
3 new
Intersections
Ready 2016
FINNMARK
SUOMI
FINLAND
SWEDEN
CONDITION
Good
Fair
Poor
Bottleneck
NEED
Widening
Geometry
Maintenance
STATUS
Planning
Reconstruction
0
50
90 km

8 E105 Kirkenes – Murmansk

Kirkenes – Murmansk	
Length km	224
- in good condition %	30
- in poor condition %	0
Speed limit 80 km/h or more %	-
Average daily border crossings 2014 in Storskog / Borisogleb	
- heavy vehicles	100
- cars	700
- people	-
Average daily traffic volume	
- max in Hesseng	2500
- min at the border	800

Planned new bridge over Bøkfjorden on E105 in Norway on the background, present bridge on the foreground.
Photo montage Statens vegvesen

The corridor belongs to the NDPTL road network.

Challenges

The E105 road in Norway is under construction. When finished, the road will fullfill the requirements set for a good transport corridor.

In Russia the last old parts of the road are under reconstruction.

E105 in Russia
© Google 2013

Planned improvements

Reconstruction of the road, including a 690 m long tunnel and a 300 m long bridge, is ongoing in Norway. The whole Norwegian section is being upgraded to a good standard by 2017.

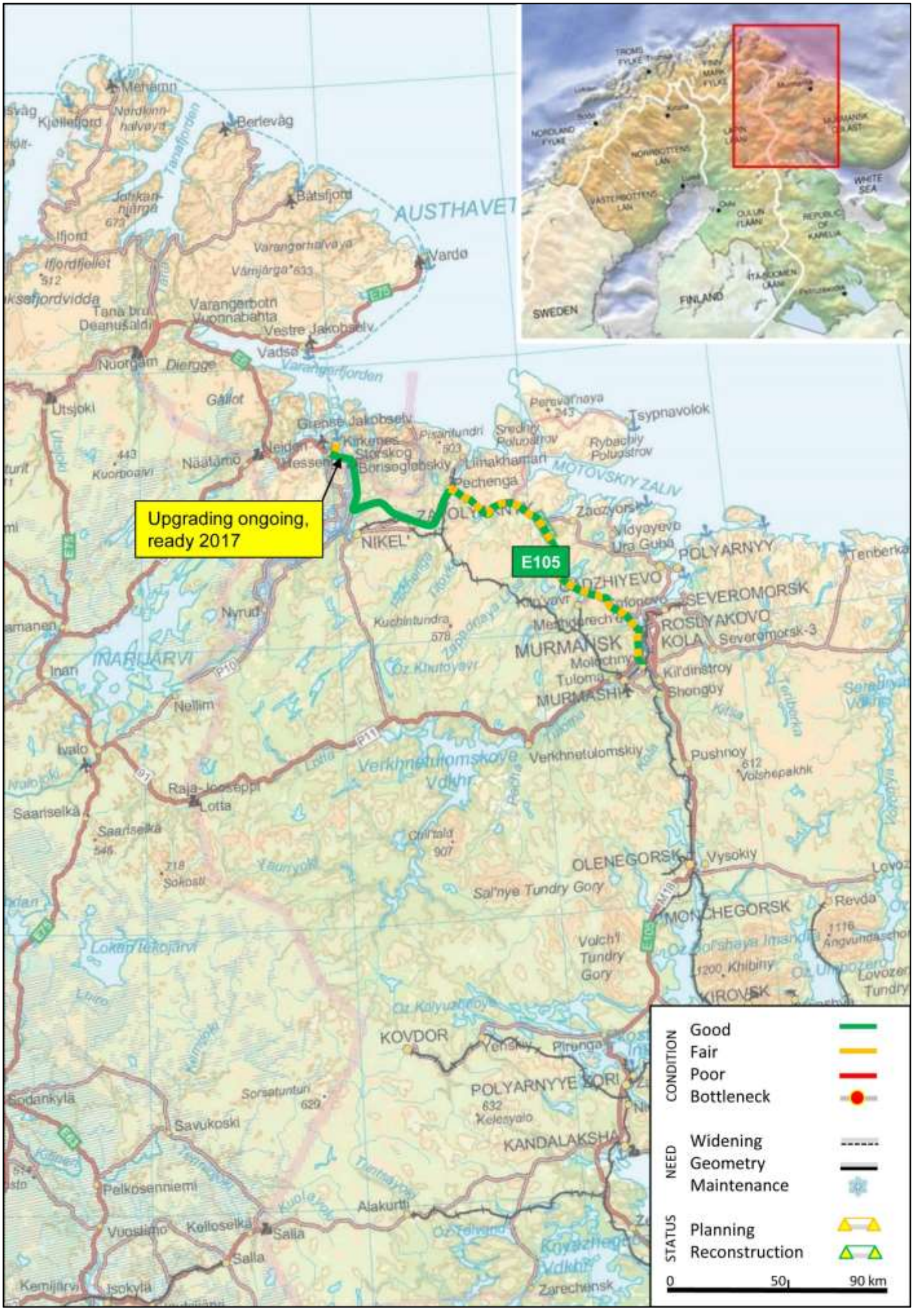
In Russia the last 17 km section from the border is under construction to a high standard. The cost is estimated to be 46 M€, and the work should be ready by 2018.

After these construction works are ready, the whole corridor has been upgraded.

E105 close to Murmansk, Russia
© Google 2013

Prioritized actions

After finalizing the road construction in Norway and in Russia, the emphasis should be in the maintenance.


Upgrading ongoing, ready 2017
E105
AUSTHAVET
NIKEL'
MURMANSK
MURMASHI
SEVEROMORSK
POLYARNYY
KOLA
ROSLYAKOVO
OLENEGORSK
MONCHEGORSK
KOVDOR
POLYARNYYE ZORI
KANDALAKSHA
KIROVSK
INARIJARVI
SWEDEN
FINLAND
CONDITION
Good
Fair
Poor
Bottleneck
NEED
Widening
Geometry
Maintenance
STATUS
Planning
Reconstruction
0
50
90 km

9 Ivalo – Murmansk

Ivalo – Murmansk	
Length km	292
- in good condition %	16
- in poor condition %	40
Speed limit 80 km/h or more %	-
Average daily border crossings 2014 in Raja-Jooseppi / Lotta	
- heavy vehicles	7
- cars	110
- people	315
Average daily traffic volume	
- max in Ivalo	2600
- min at the border	150

The corridor consists of the national road 91 on the Finnish side starting from E75 in Ivalo and ending at the Finnish-Russian border. On the Russian side the corridor continues along the Russian road network to Murmansk. This corridor is not included in the TEN-T network. The area along the corridor is almost uninhabited having no industrial activities or services for the travelers.

Challenges

The road on the Finnish side is adequate for the transports, and there is no need for improvement. The road on the Russian side is paved all the way, but the condition of the pavement is poor. There are lots of potholes forcing road users to reduce speed to avoid damaging their vehicles.

Planned improvements

The road has been renovated in about 10 km sections per year in Russia. These renovations are planned to be continued.

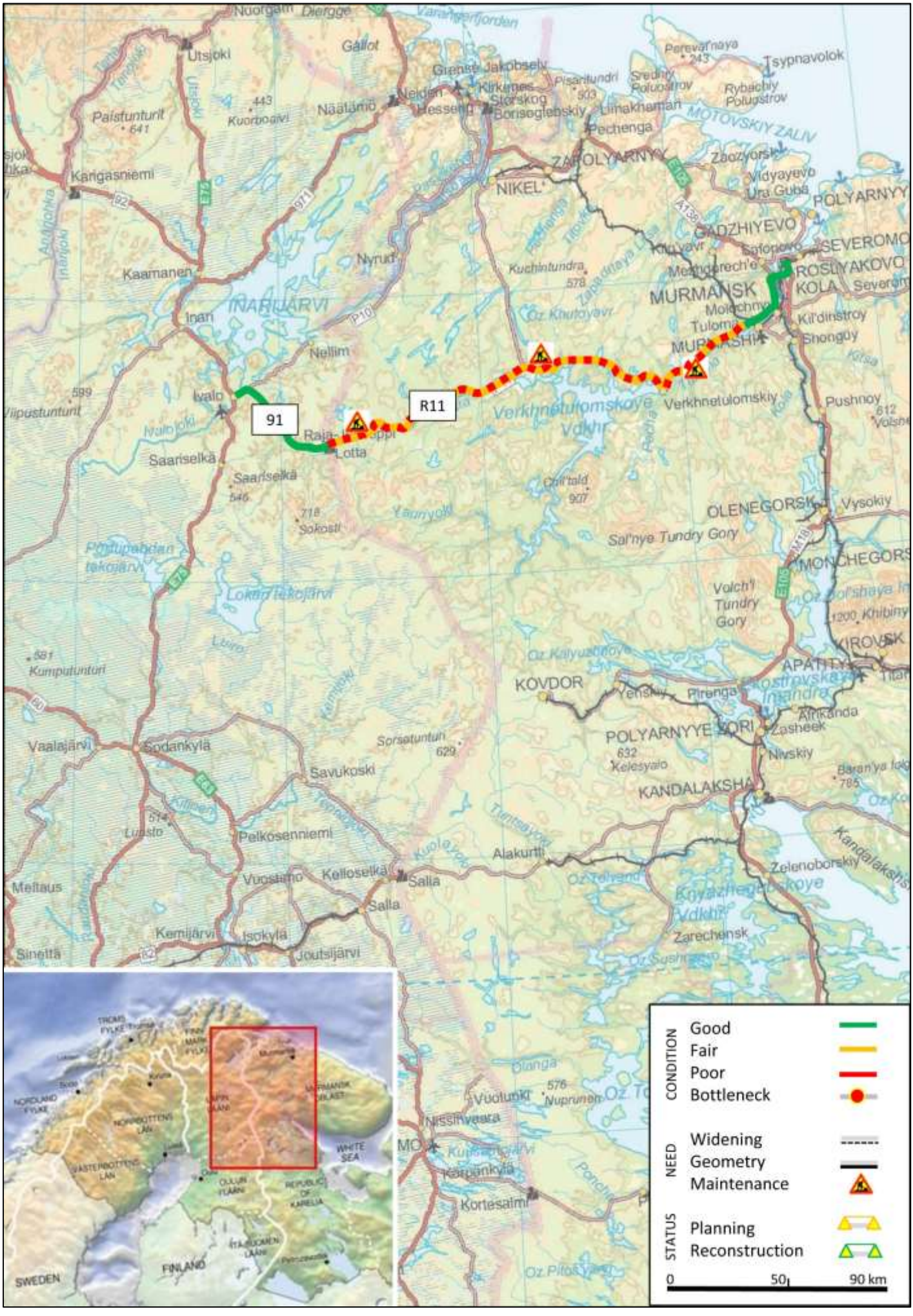
Prioritized actions

Better maintenance of the pavement is urgently needed on the Russian side. In addition, the structure of the road should be rebuilt to avoid continuous deterioration of the pavement.

Road 91 on the Finnish side close to the border

The road R11 on the Russian side close to the Finnish-Russian border

A typical view of the road R11 on the Russian side


91
R11
CONDITION
Good
Fair
Poor
Bottleneck
NEED
Widening
Geometry
Maintenance
STATUS
Planning
Reconstruction
0
50
90 km
FINLAND
SWEDEN
WHITE SEA
REPUBLIC OF KARELIA

10 Rovaniemi – Salla – Kandalaksha

Rovaniemi – Salla - Kandalaksha	
Length km	355
- in good condition %	20
- in poor condition %	10
Speed limit 80 km/h or more %	-
Average daily border crossings 2014 in Salla	
- heavy vehicles	5
- cars	270
- people	590
Average daily traffic volume	
- max in Rovaniemi	21 100
- min at the border	330

The corridor in Finland close to the Finnish-Russian border

The corridor starts from E75 in Rovaniemi and runs through the town of Kemijärvi, the municipality center of Salla, and ends at the Finnish-Russian border crossing of Salla on the Finnish side. From the border the road continues to Kandalaksha, Russia. The Finnish part of the road is included in the TEN-T comprehensive road network, but not in the NDPTL road network.

The road in Russia where the pavement ends

Challenges

Road is a bit too narrow on the Finnish side. On the Russian side the road is wide enough, but in many sections the condition of the pavement is not sufficient.

A recently reconstructed section on the Russian side near the border

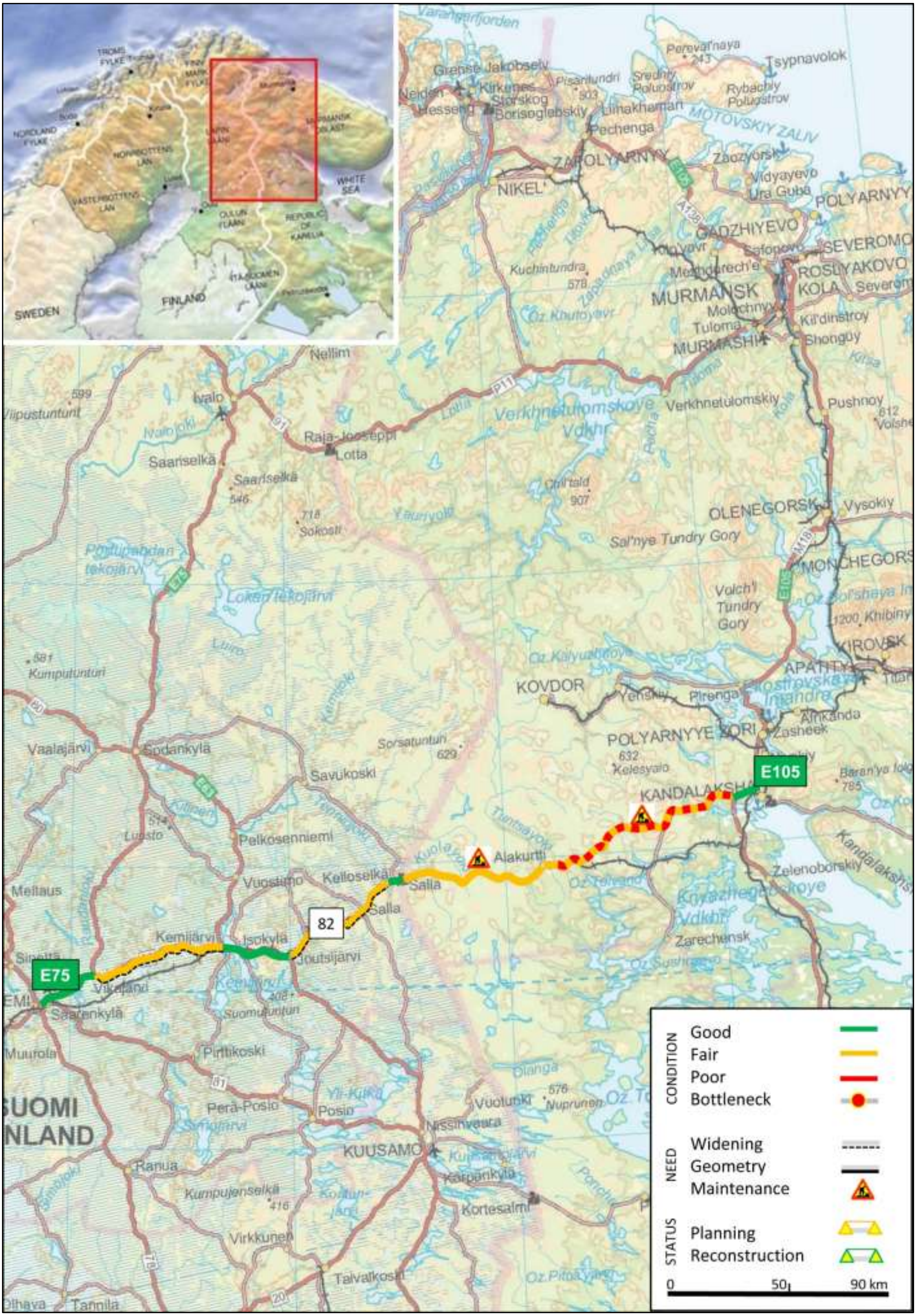
Planned improvements

Widening of the narrowest road sections has been under discussion in Finland but no specific plans have been made.

In Russia the last 15 km long gravel section of the road will be reconstructed and paved by 2016 with some 5 million euros.

Prioritized actions

Reconstructing and paving the last gravel section in Russia is prioritized.



E75
82
E105
Kemijärvi
Isokylä
Joutsijärvi
Kelloselkä
Salla
Alakurtti
KANDALAKSHA
MURMANSK
CONDITION
Good
Fair
Poor
Bottleneck
NEED
Widening
Geometry
Maintenance
STATUS
Planning
Reconstruction
0
50
90 km

11 Oulu – Vartius – E105

Oulu – Vartius – E105	
Length km	492
- in good condition %	55
- in poor condition %	10
Speed limit 80 km/h or more %	-
Average daily border crossings 2014 in Vartius / Lytta	
- heavy vehicles	65
- cars	640
- people	1260
Average daily traffic volume	
- max in Oulu	13 000
- min at the border	700

Both the road and the railway in the corridor are included in the TEN-T comprehensive networks.

In Finland, the road corridor starts from Oulu and runs as the national road 22 to Kajaani. The corridor continues another 100 km along the national road 89 to the Finnish-Russian border at Vartius/Lytta. In Russia the corridor continues up to the road E105 in the east.

Challenges

After the recent widening the road on the Finnish side is adequate. The standard of the road on the Russian side varies. At best the road is very good, wide and smooth to drive. At worst, the road is very narrow and the pavement is totally damaged with potholes. In the poorest stretches driving speed cannot exceed 20 km/h.

Planned improvements

The worst 35 km of the road on the Russian side is planned to be reconstructed by 2020 with the cost of about 25 million euros.

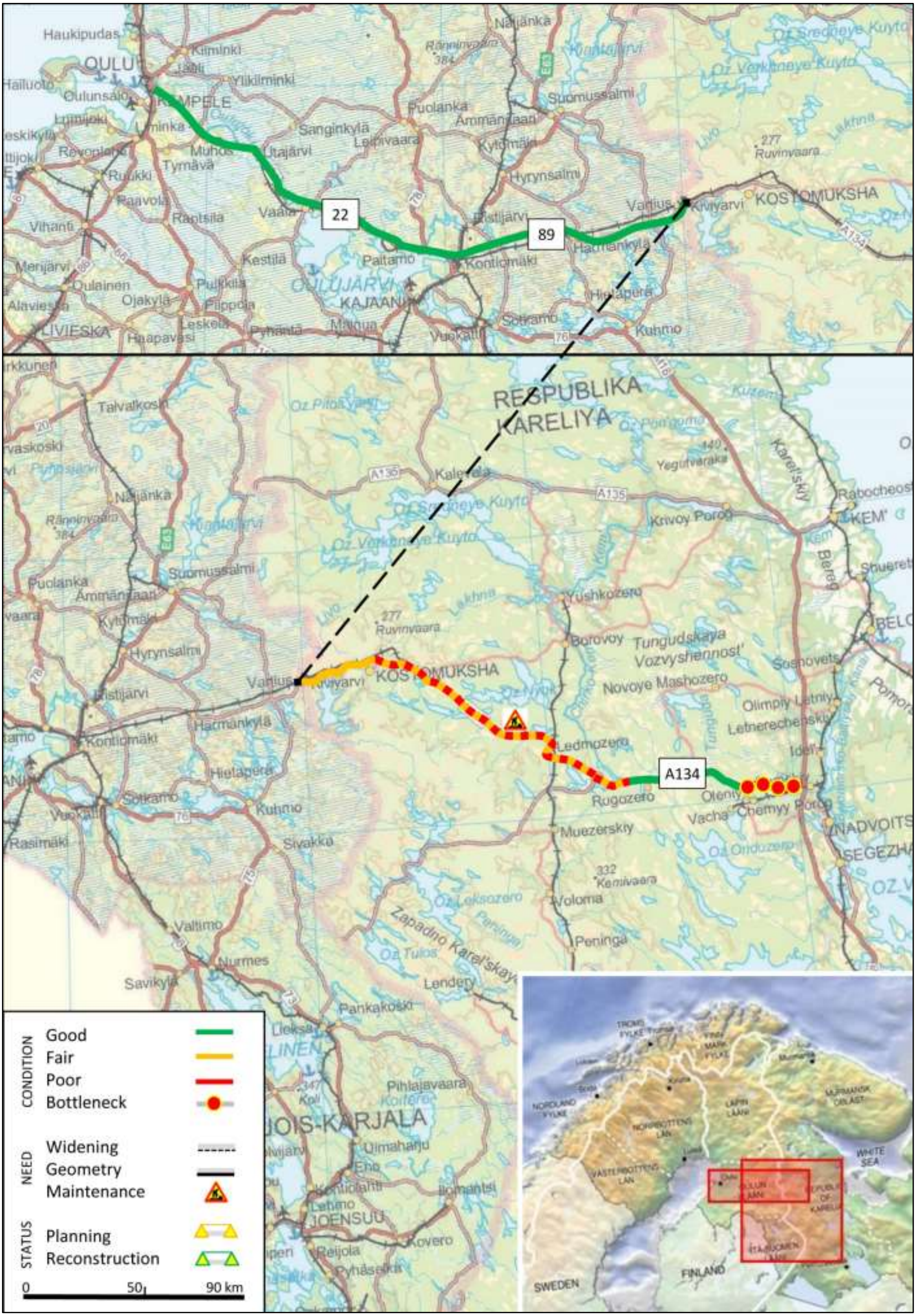
Prioritized actions

The reconstruction of the worst section in Russia is prioritized.

The road near Kostomuksha in Russia

The road close to E105

The worst section of the road close to E105


22
89
A134
OULU
KEMPELE
KAJAANI
KOSTOMUKSHA
RESPUBLIKA KARELIYA
Vartius
Kontiomäki
Rugozero
SWEDEN
FINLAND
WHITE SEA
CONDITION
Good
Fair
Poor
Bottleneck
NEED
Widening
Geometry
Maintenance
STATUS
Planning
Reconstruction
0
50
90 km

12 Kajaani – Niirala – Petrozavodsk

Kajaani – Niirala – Petrozavodsk	
Length km	559
- in good condition %	60
- in poor condition %	0
Speed limit 80 km/h or more %	-
Average daily border crossings 2014 in Niirala / Wärtsilä	
- heavy vehicles	180
- cars	2400
- people	4400
Average daily traffic volume	
- max in Joensuu	20 000
- min at the border	2600

In Finland, the section between the Finnish-Russian border and Joensuu is in the TEN-T comprehensive network. From Joensuu the corridor diverts northwest to Kajaani and further on to Oulu. On the other hand, the TEN-T corridor heads west from Joensuu towards Kuopio and is part of the touristic route "Blue Road", which continues to the road E12.

Challenges

On the Finnish side the road is a little too narrow in most places, but otherwise acceptable.

On the Russian side the E105 road is very good. Several sections of the road 21 have been reconstructed ten years ago to a good standard. However, the geometry of the road is challenging in many places close to the Lake Ladoga. The road to the border is old but still in adequate condition.

Planned improvements

The federal road 21 is under reconstruction in several places. Even some new sections are planned. The A130 road is also planned to be reconstructed close to the Finnish border.

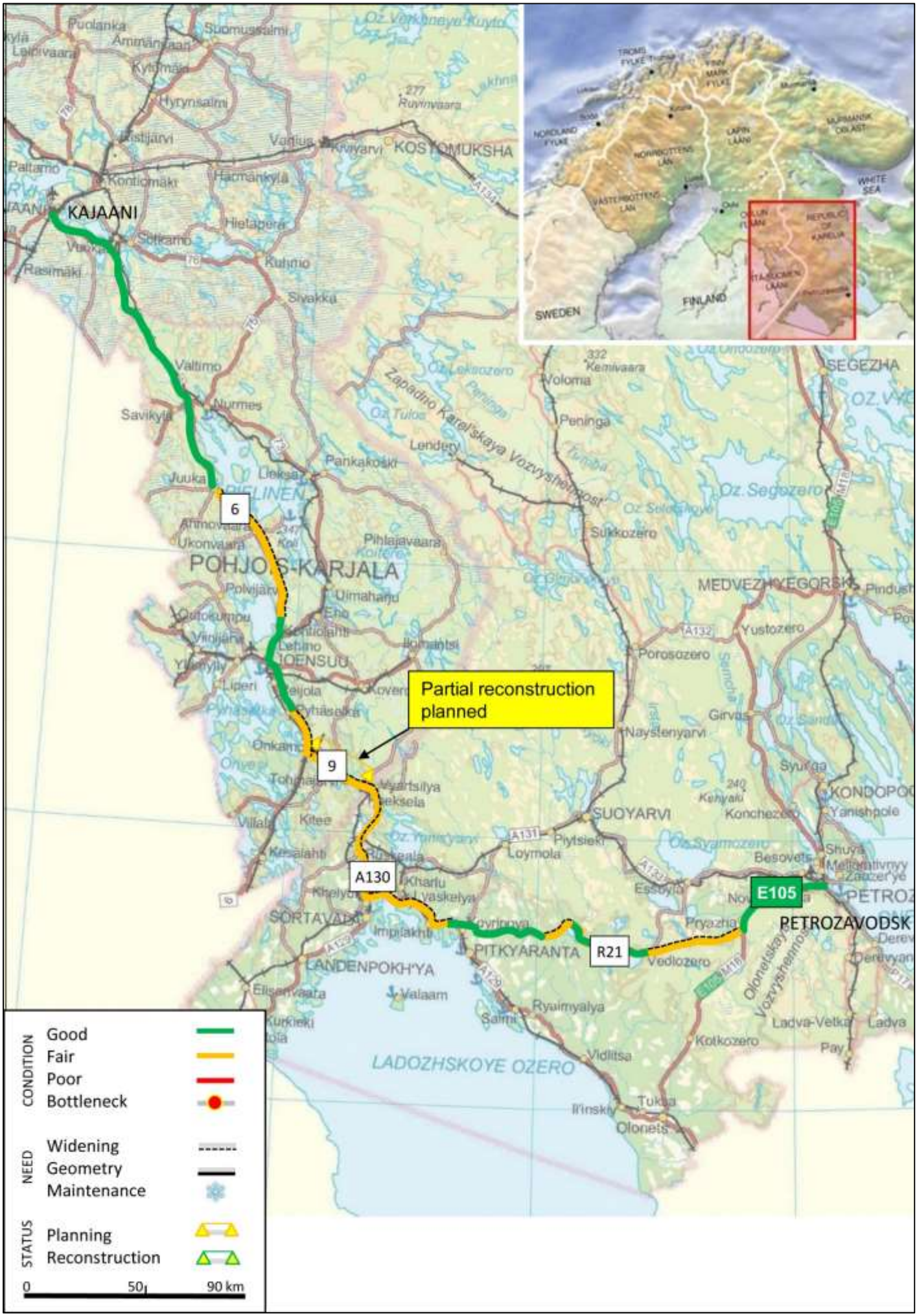
Prioritized actions

Finalizing the reconstruction of the road 21 in Russia is prioritized.

A recently reconstructed section of R21 in Russia

Shores of the Lake Ladoga in Russia on road A130

Older A130 road close to the border in Russia


KAJAANI
KOSTOMUKSHA
POHJOIS-KARJALA
Partial reconstruction planned
6
9
A130
R21
E105
SUOYARVI
PETROZAVODSK
PITKYARANTA
LADOZHSKOYE OZERO
SEGEZHA
MEDVEZHYEGORSK
SWEDEN
FINLAND
CONDITION
Good
Fair
Poor
Bottleneck
NEED
Widening
Geometry
Maintenance
STATUS
Planning
Reconstruction
0
50
90 km