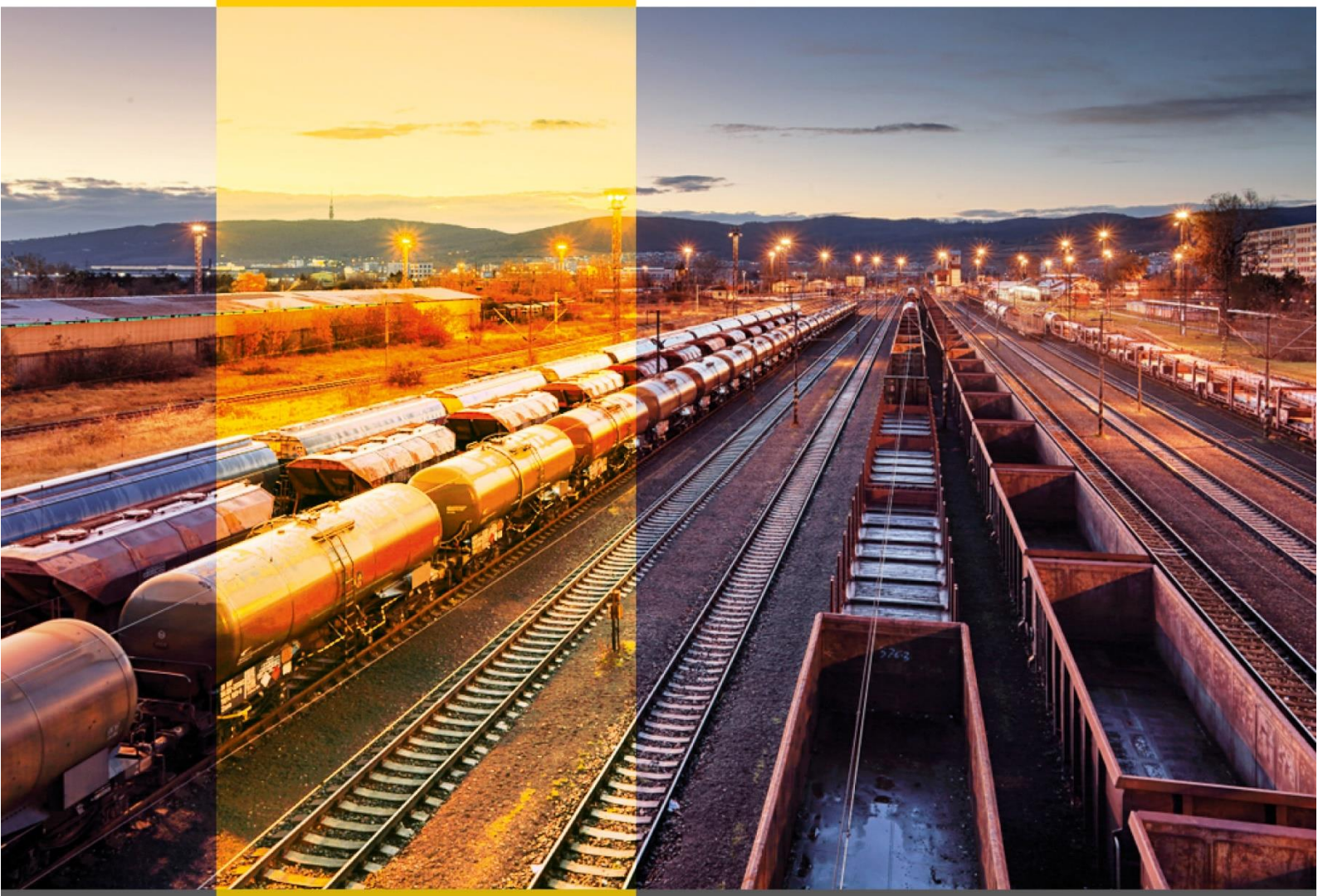
Rail Freight Corridor
North Sea – Baltic



Implementation Plan

Update 2021

Co-financed by the Connecting Europe Facility of the European Union

Version Control

Version number	Chapter changed	Changes
Version for publication 10.01.2022		

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1.Introduction

Rail Freight Corridor North Sea – Baltic (RFC NS-B) went operational on the 10th of November 2015 according to Regulation (EU) 913/2010 of the European Parliament and of the Council of 22 September 2010 concerning a European rail network for competitive freight (hereinafter: the Regulation). As foreseen by the Regulation, RFC NS-B was extended to Riga and Tallinn on the 12th of October 2020.

With the Implementing decision (EU) 2020/2168 of 17 December 2020[1], the European Commission gave consent to the further extension of the corridor to Medyka and the ports of Gent (Terneuzen) and Zeebrugge. These extensions will become operational on 10th of January 2022. Hence, the Implementation Plan of RFC NS-B needs to be updated. The focus of the update 2021 is on:

- Extension to Medyka,
- Extension to Gent (Terneuzen) and Zeebrugge,
- Bottleneck definition and capacity management plan,
- Update of the Investment Plan,
- Update of the ERTMS Deployment Plan.

The update was elaborated by the Management Board according to the RNE Corridor Information Document Common Texts and Structure. It was consulted with the stakeholders and was approved by the Executive Board of RFC NS-B on 16 December 2021.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020D2168&from=EN

2. Corridor Description

RFC NS-B runs through 8 Member States of the European Union: starting in the North Sea ports of Antwerp, Rotterdam, Amsterdam, Wilhelmshaven, Bremerhaven and Hamburg spreading into central Germany through Aachen – Hannover/Magdeburg/Berlin to Warsaw and the Polish-Belarus border in Terespol. A branch leads from Magdeburg to Prague via Falkenberg and Dresden. In Falkenberg starts the Southern branch in Poland to Wrocław and Katowice. Another branch leaves from Poznań to Kaunas and to Riga and Tallinn.

The designated railway lines of RFC NS-B are divided into:

1) Principal lines (on which Pre-arranged Paths (PaPs) will be offered);
2) Diversionary lines (on which PaPs may temporarily be considered in case of disturbances, e.g. long-lasting major construction works on the principal lines);
3) Connecting lines: lines connecting the Corridor lines to a terminal (on which PaPs may be offered but without obligation to do so);
4) Expected lines, i.e. any of above-mentioned which either are planned in future or under construction but not yet completely in service. Expected line can also be an existing line which shall be part of the RFC in the future.

In the following part, a description is given of the new extensions of the Corridor, as well as future extensions as proposed to the European Commission.

Following the requests to extend the Corridor to Medyka and the ports of Gent (Terneuzen) and Zeebrugge, the Management Board evaluated the proposed extensions according to the agreed methodology among all RFCs and consulted applicants. On the 6th of December 2019, the Executive Board of RFC NS-B sent two Letters of Intent to the European Commission regarding the extension to the Polish-Ukraine border at Medyka and to the ports of Gent (Terneuzen) and Zeebrugge.

These extensions will:

- bring new business opportunities to RFC NS-B;
- improve the land bridge between Europe and Asia in the context of the growing traffic between East and West;
- provide a direct access to the ports of Gent, Terneuzen and Zeebrugge;
- support the modal shift from road to rail
- ensure a better interconnection between Eastern and Western European countries and between different corridors.

Extension to Medyka

The extension to Medyka includes the following lines (see figure 2-1):

- Jaworzno Szczakowa – Kraków Mydlniki – Podłęże – Medyka as principal line
- Kraków Mydlniki – Kraków Bieżanów – Podłęże as diversionary line.

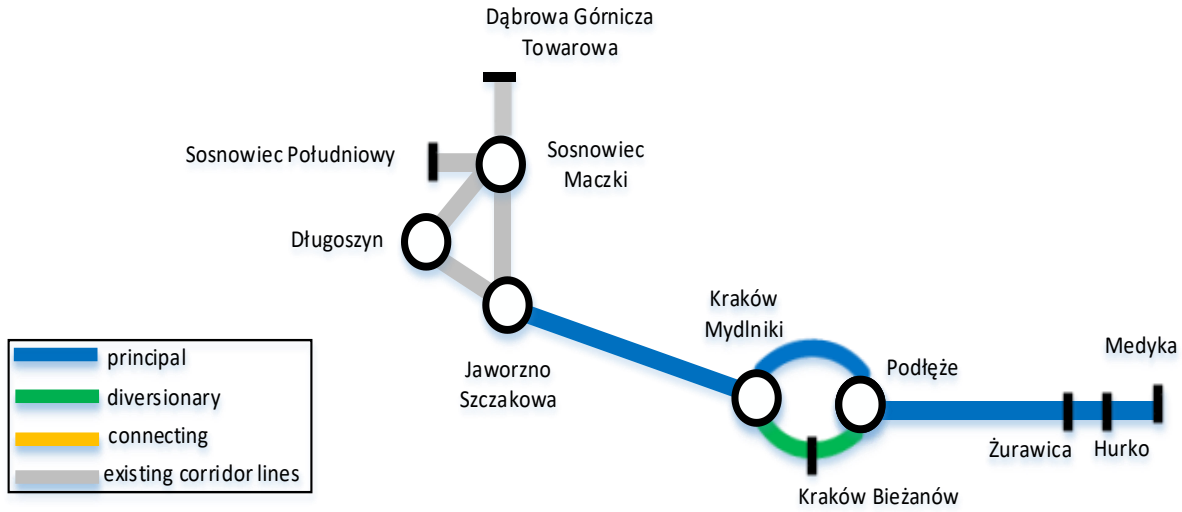


Figure 2-1: Extension of RFC North Sea – Baltic to Medyka at the Polish-Ukraine border

Extension to Gent (Terneuzen) and Zeebrugge

This extension includes the following lines (see figure 2-2):

- Bundel Zuid via Gent to Zeebrugge as principal line
- Aarschot to Zeebrugge as principal line
- Gent-Dampoort to Terneuzen as connecting line

Figure 2-2: Extension of RFC North Sea – Baltic to Gent (Terneuzen) and Zeebrugge

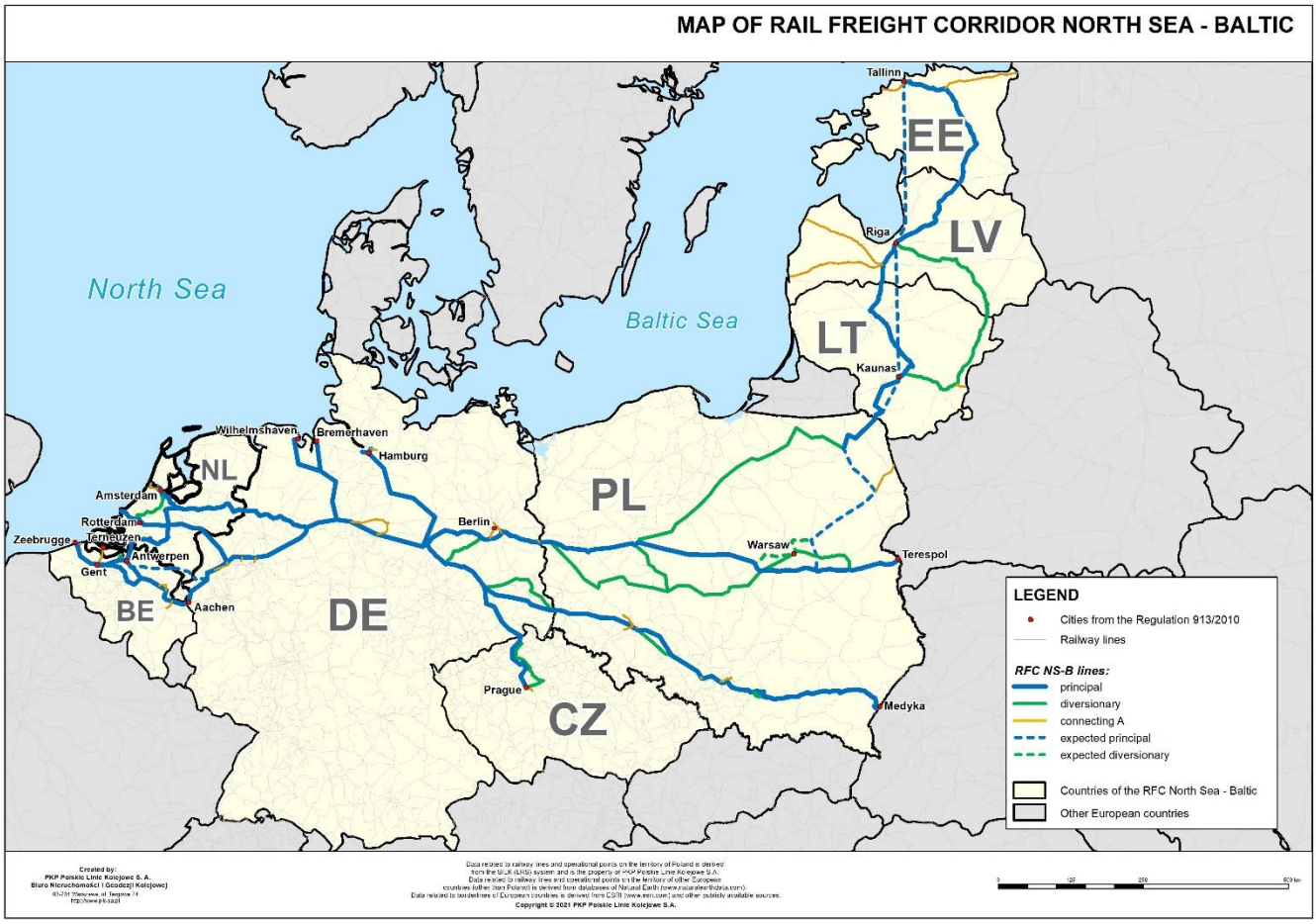
As a consequence of including these new lines, some existing corridor lines will change their status:

- The line from Antwerpen Noord to Bundel Zuid will change from “diversionary line” to “principal line”;
- The line from Antwerpen Noord, via Meteren to Amersfoort will change from “connecting line” to “principal line”.

Connecting lines to the handover stations of the terminals (apart from the line to Terneuzen which is mentioned in the Decision) are not shown on the figures above.

The lines that are part of RFC North Sea – Baltic are shown on the map below (Figure 2-3) and listed in Annex 1. The new corridor routing will also be published in CIP.

Figure 2-3: Map of RFC North Sea – Baltic from January 2022



Further extensions are foreseen for the future. A description can be found below.

Proposed extensions

On the request of Latvia, the Management Board analysed and consulted with applicants the proposed extension from Krustpils to Rezekne to be included as principal line and the status change of the line from Riga via Krustpils to Daugavpils, from diversionary to principal line. The Executive Board issued a Letter of Intent on the 28th of January 2021. If a positive answer is received from the European Commission, these lines will be officially incorporated into the routing of RFC NS-B; they are included in **Figure 2-4** as “proposed extensions”.

Operational extensions

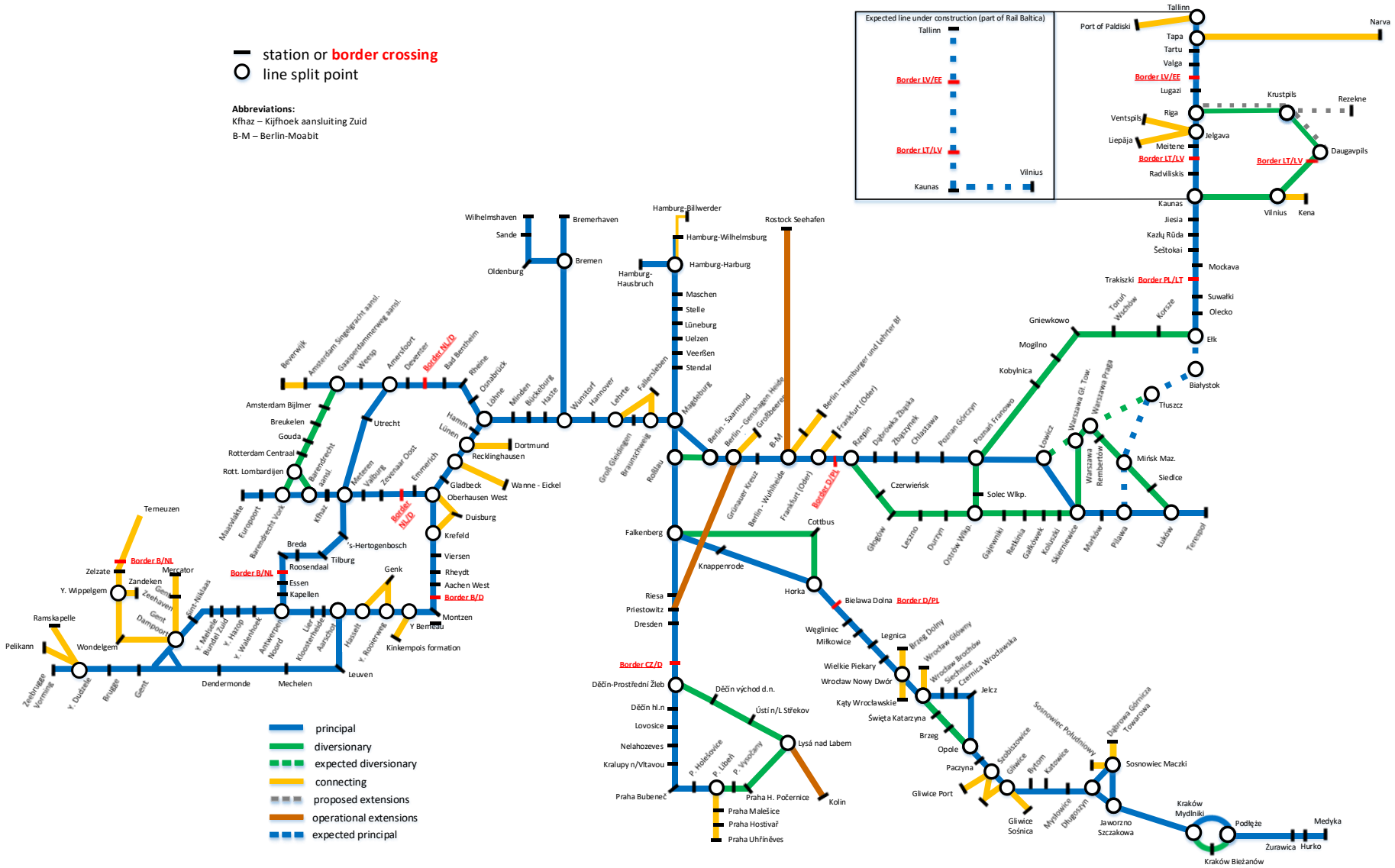
In view of the offer and allocation of capacity on the overlapping sections, RFC NS-B decided together with the RFC Orient/East-Med on an operational extension of RFC NS-B between Dresden and Rostock and between Lysá na Labem and Kolin.
These operational extension lines will not be included into the RFC NS-B routing, but the Corridor One-Stop-Shop (C-OSS) of RFC NS-B is responsible for allocation/capacity management on these sections. These sections can be seen in **Figure 2-4** as “operational extensions”, but are not officially part of the Corridor.

Both proposed and operational extensions are shown for information purposes only. In the following chapters of the Implementation Plan these lines will not be shown.

"Iron Rhine"

Iron Rhine is mentioned as expected principal line of RFC NS-B. In the case (political) decision making on the Iron Rhine is executed, and the Iron Rhine would be reactivated, then the status will be principal line.The projected line is not included in **Figure 2-4** nor in the other graphs of the Implementation Plan.

Figure 2-4: Possible future lines of RFC North Sea-Baltic

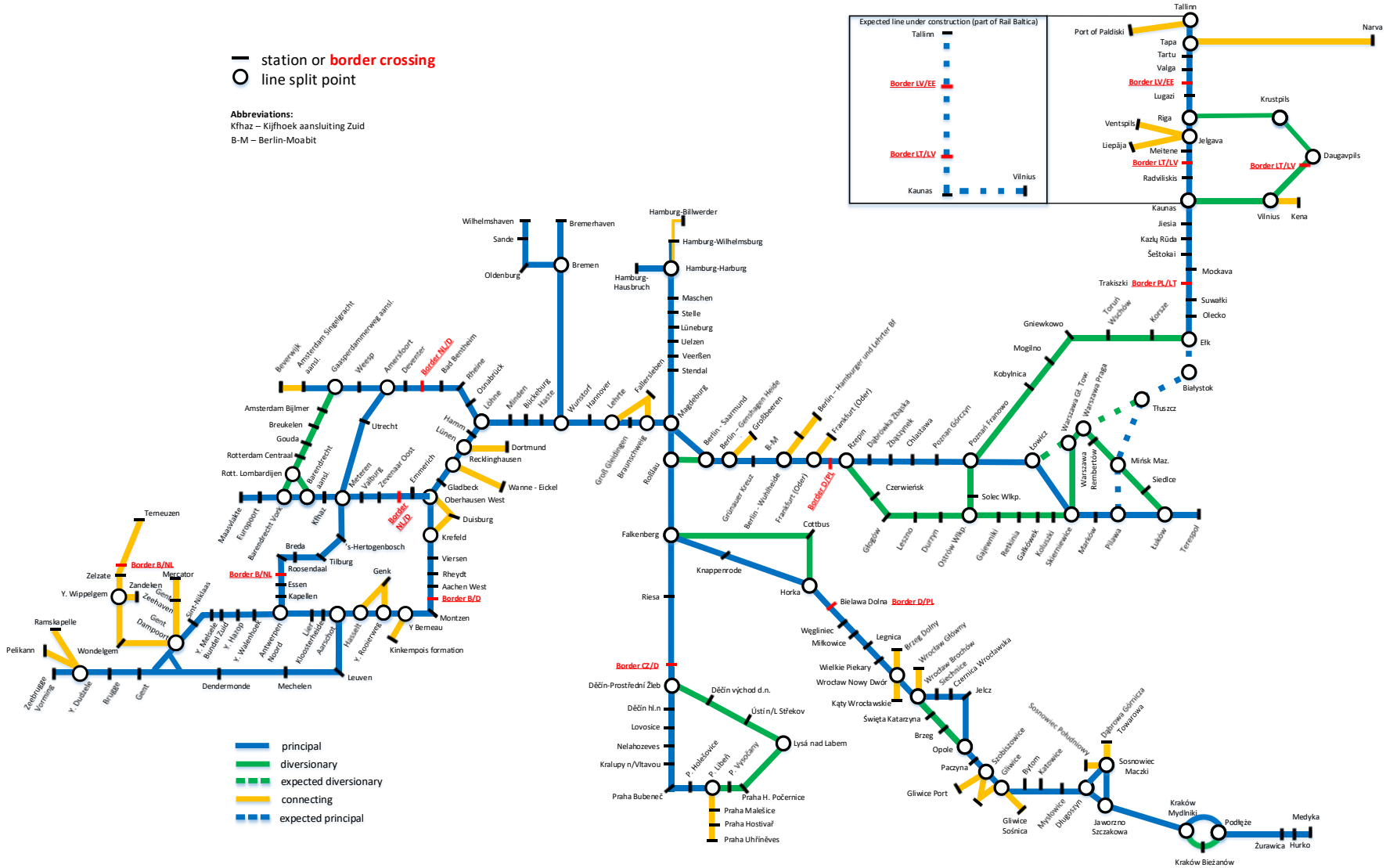


2.1 Key Parameters of Corridor Lines

Figure 2-1-1 shows the lines that are part of RFC NS-B from January 2022 (without proposed and operational extensions).

RFC NS-B now has 9 656,08 km of lines in total, of which 5 252,88 km principal lines, 2 552,30 km diversionary lines, 890,47 km connecting lines and 960,43 km expected principal and expected diversionary lines.

Figure 2-1-1: Type of lines

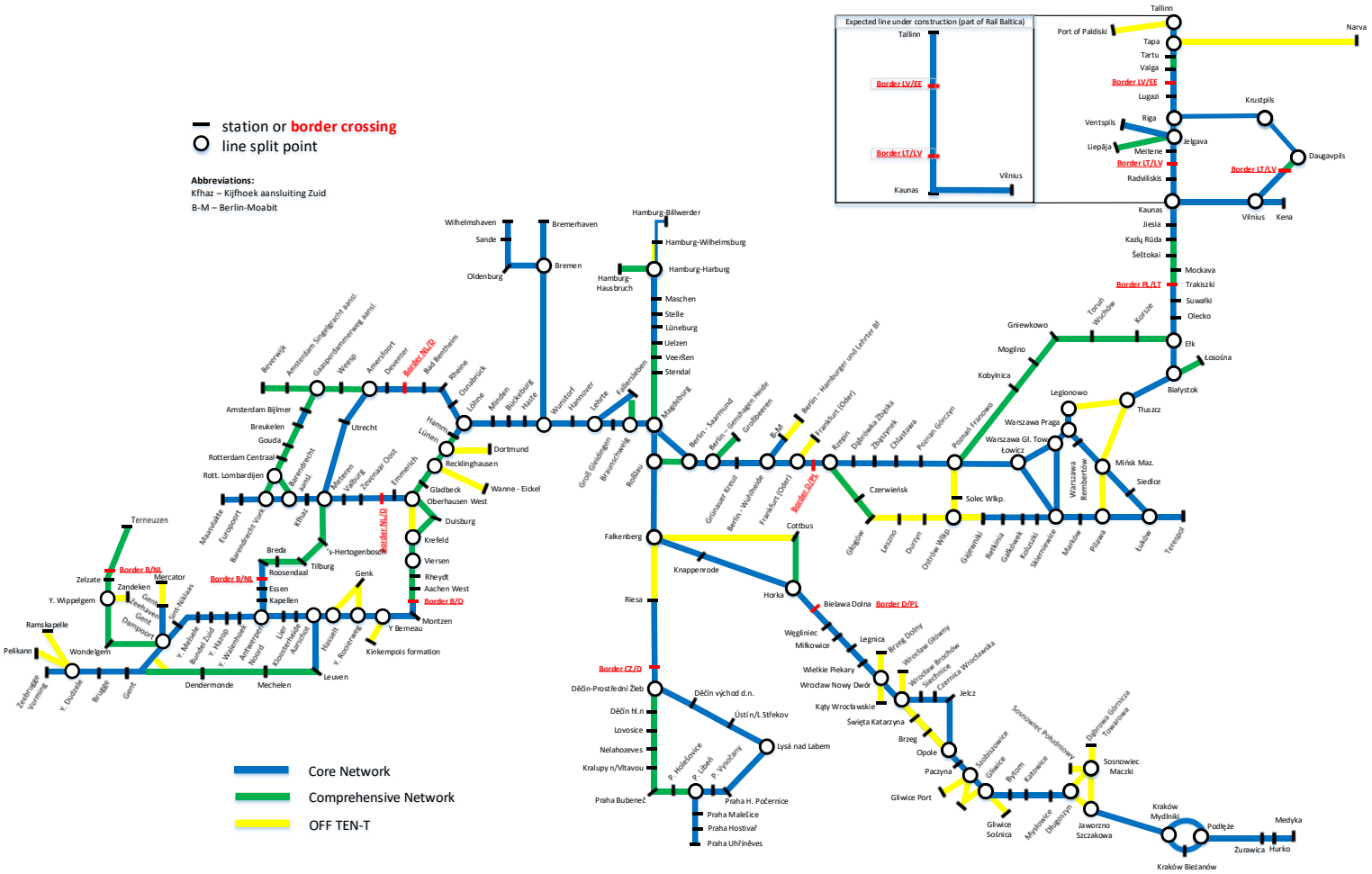


2.1.1 Infrastructure parameters

Figures 2-1-2 until 2-1-8 show several infrastructure parameters of the lines belonging to RFC NS-B (situation June 2021):

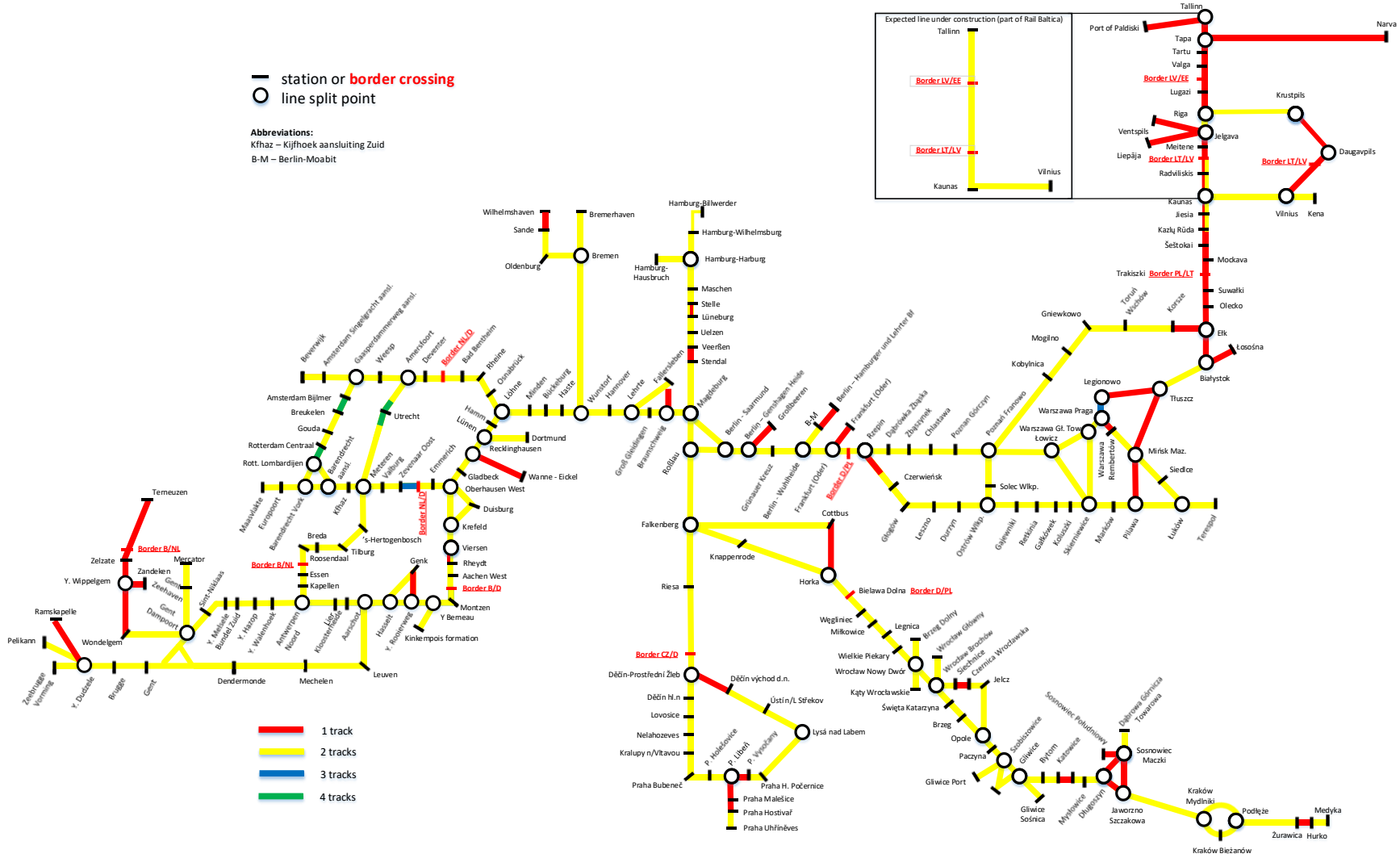
- Type of network (Figure 2-1-2)
- Number of tracks (Figure 2-1-3)
- Type of power source (Figure 2-1-4)
- Max train length (Figure 2-1-5)
- Axle load (Figure 2-1-6)
- Max line speed (Figure 2-1-7)
- Profile and loading gauge (Figure 2-1-8).

Figure 2-1-2: Type of network according to Regulation (EU) 1315/2013



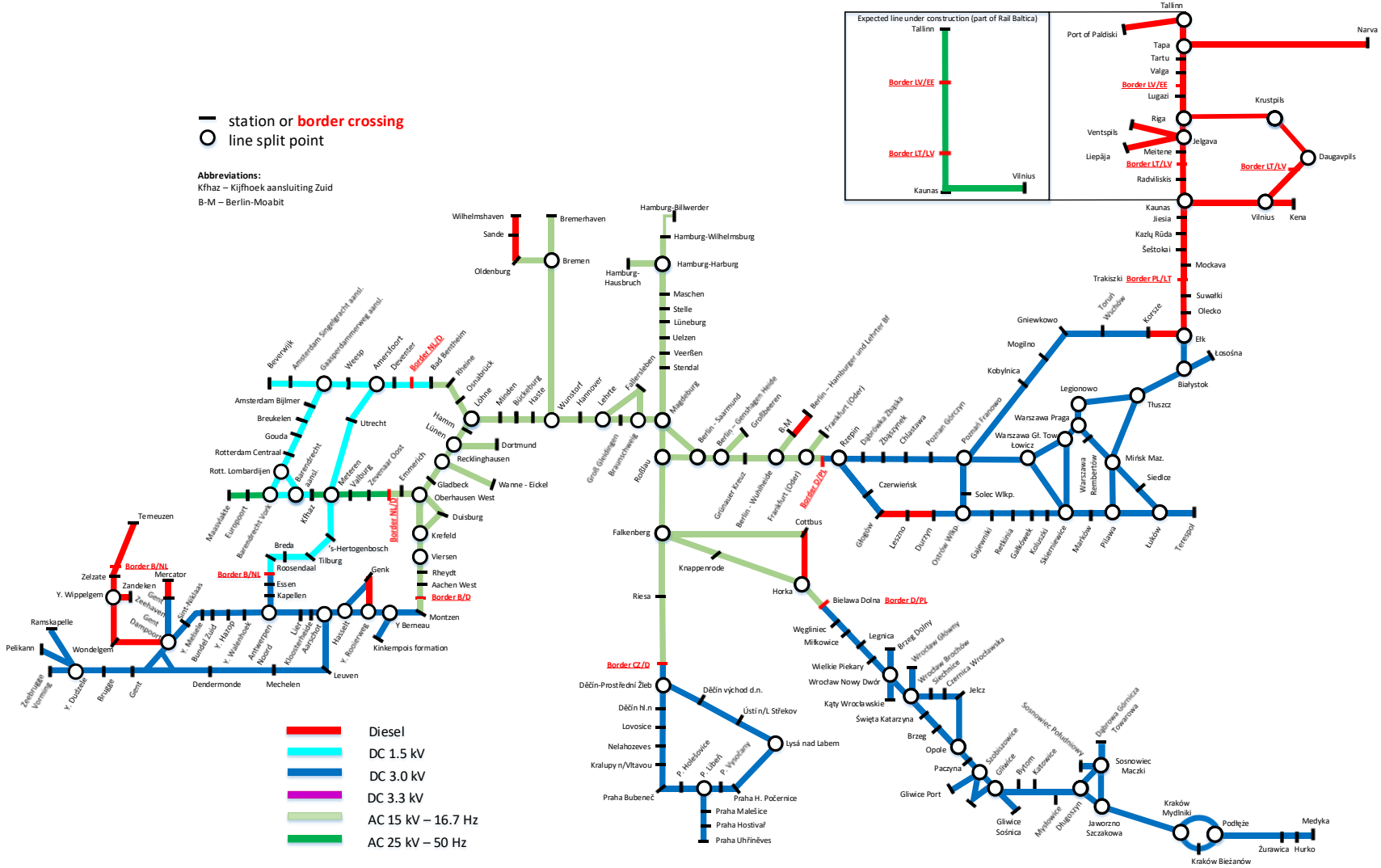
The majority of the corridor lines (principal/diversionary lines) are part of the TEN-T core network. However there are a number of lines that belong to the TEN-T comprehensive network. In a few cases, the lines are out of the TEN-T network (this mainly concerns connecting lines).

Figure 2-1-3: Number of tracks



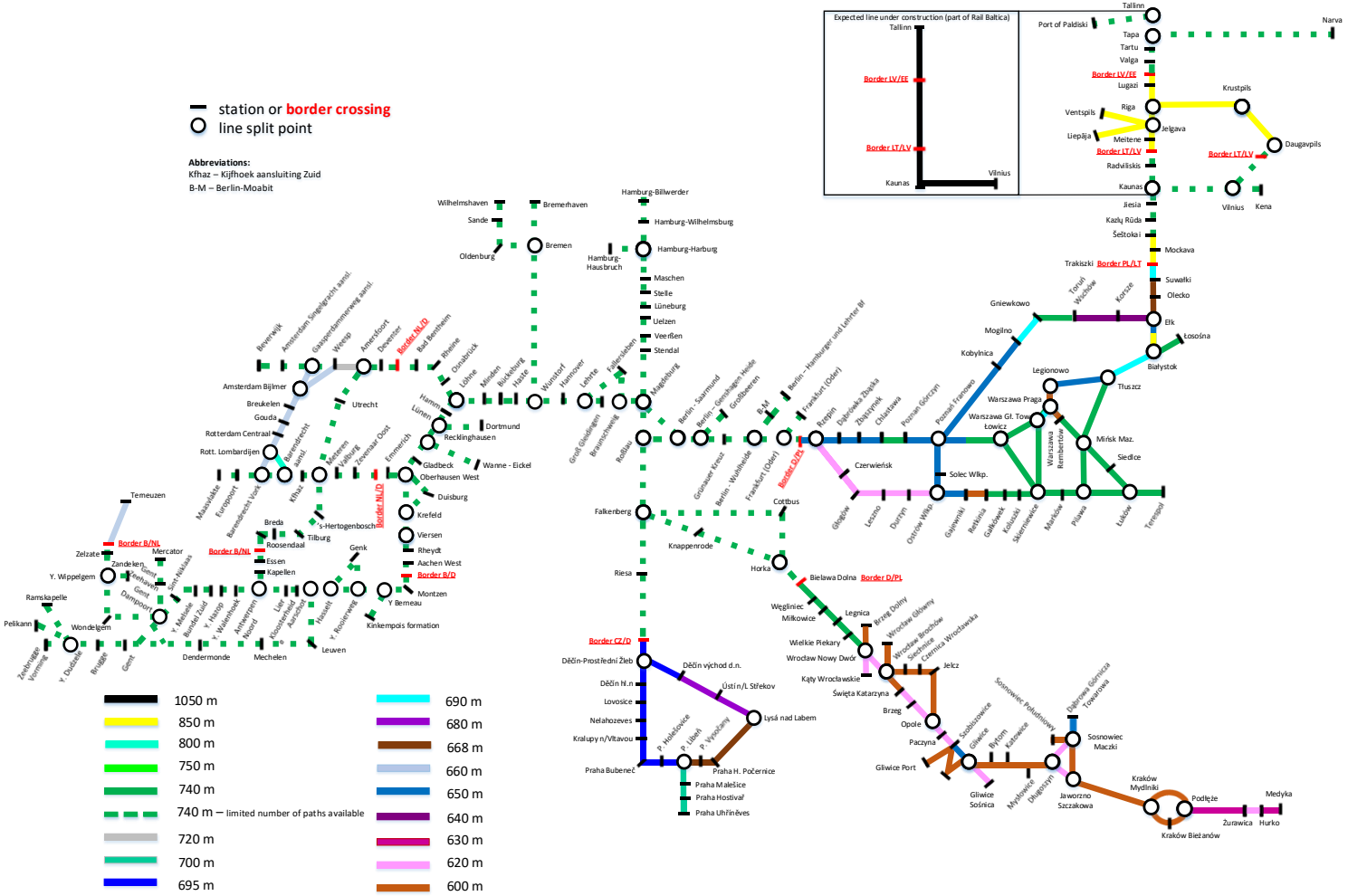
The majority of the corridor lines are double track lines. The biggest part of the 1520mm network is single track.

Figure 2-1-4: Type of power source



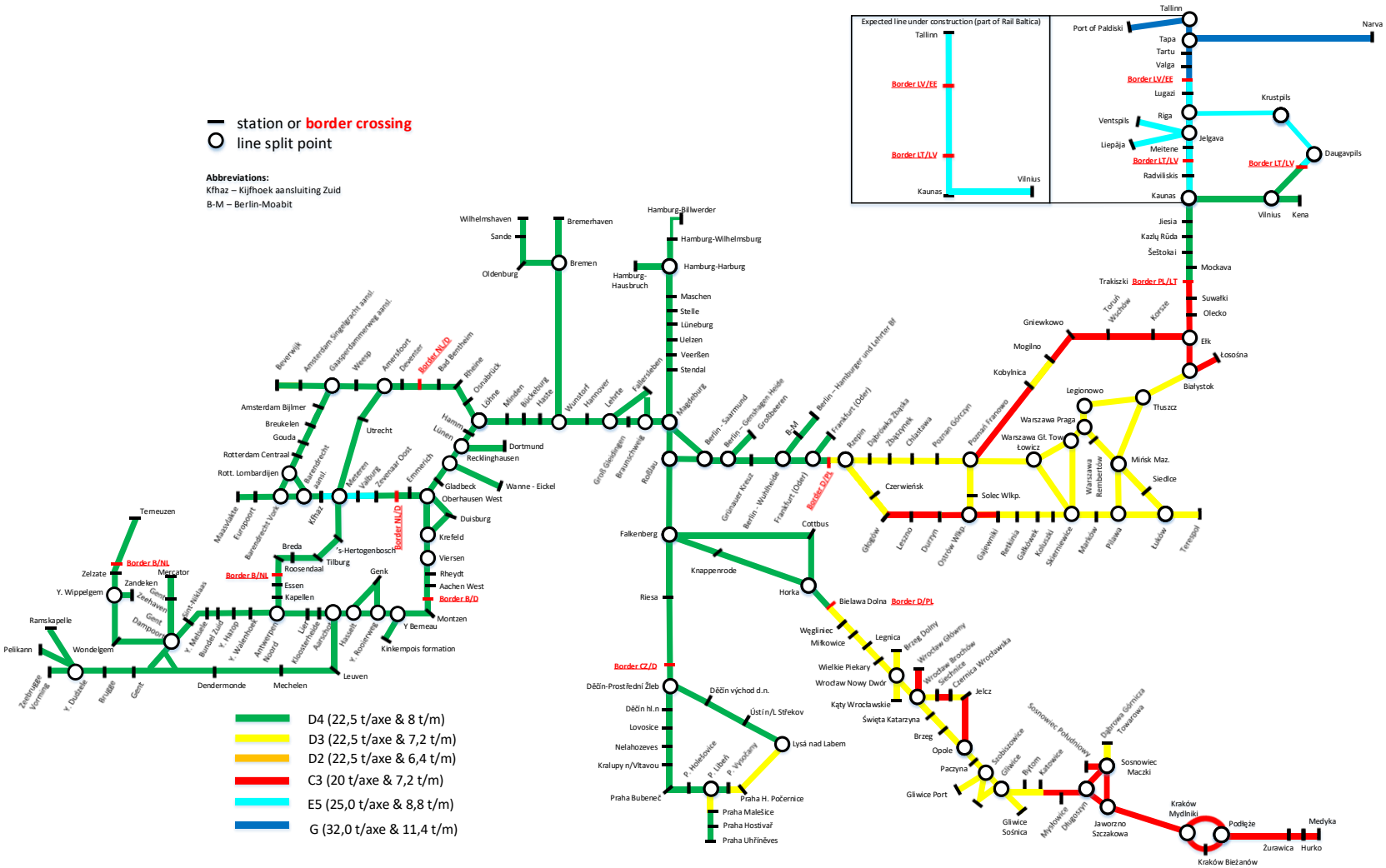
Almost each country has a different voltage and frequency value. The 1520 mm network is not electrified.

Figure 2-1-5: Maximum train length



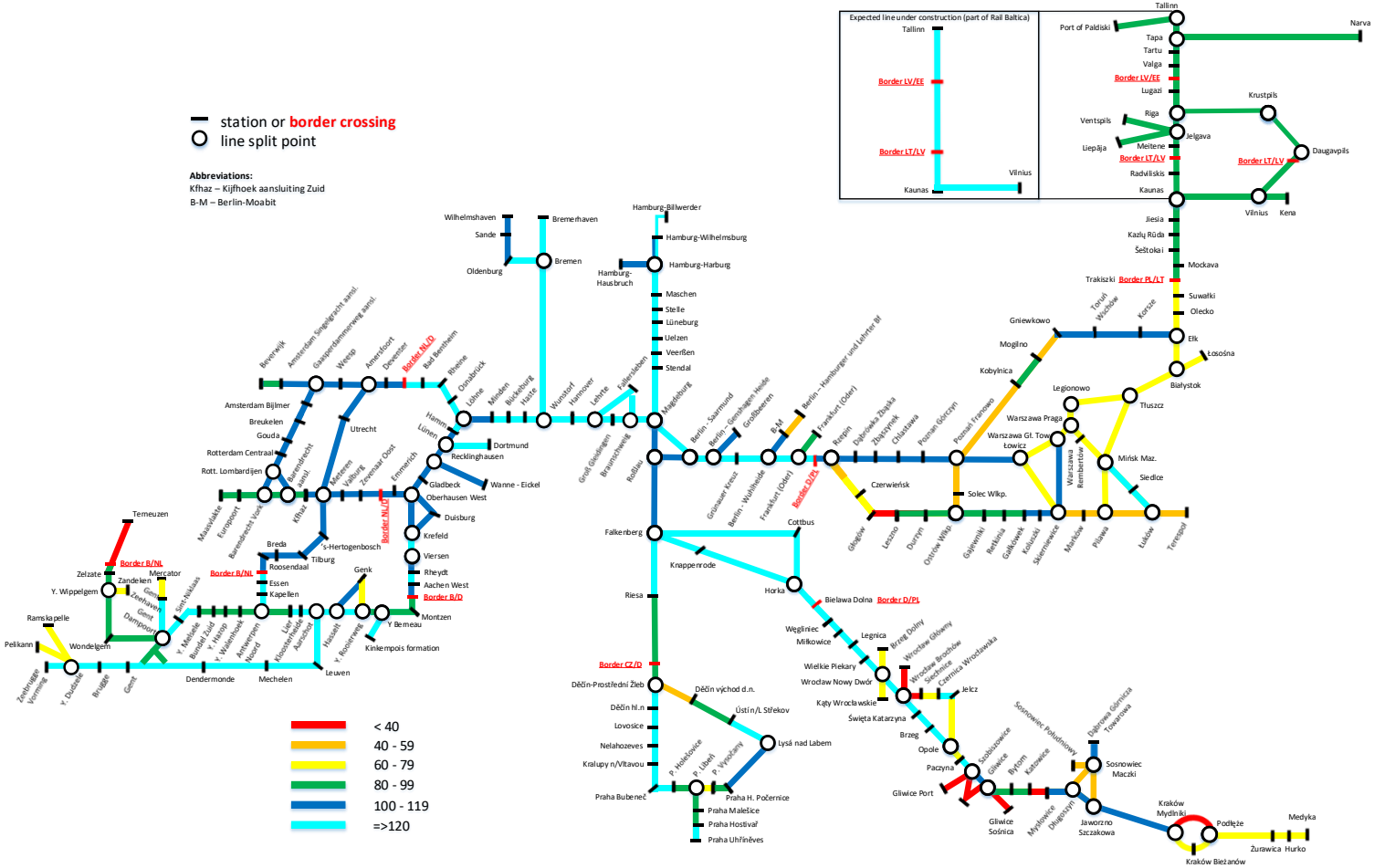
The maximum train length on the corridor lines varies from 1050 m to 240 m. At the moment of writing the Implementation Plan, journeys for 740 m trains on the entire corridor without restrictions are not possible, except for Latvia. In BE, the length of freight trains is limited in principle to 750 m inclusive of traction units. The infrastructure manager's agreement must always be sought for any train longer than 650 m.

Figure 2-1-6: Axle load



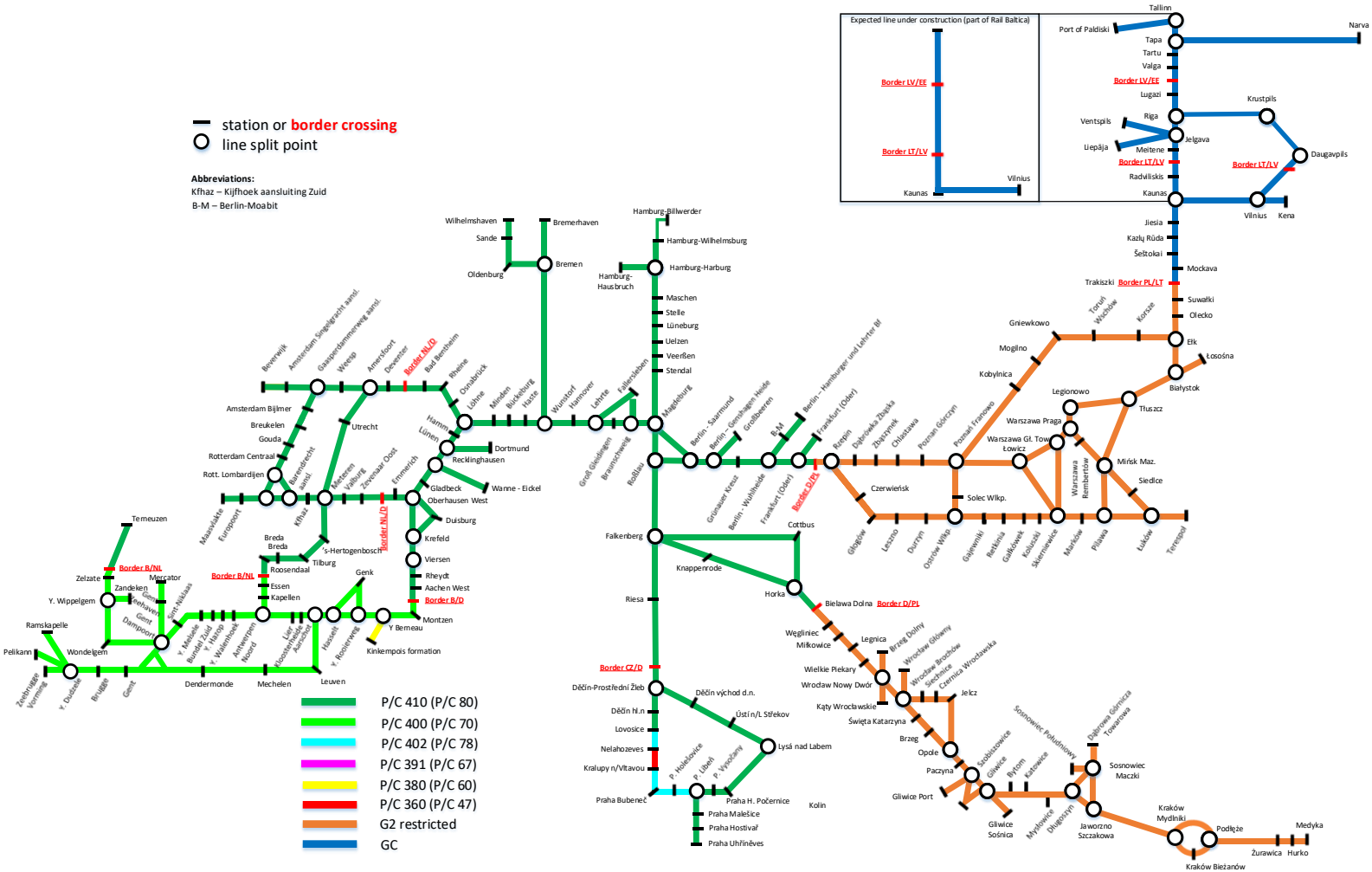
In the major part of the Corridor the allowed axle load is 22.5 t and meter load is 8 t, whereas the possibilities in Poland are more restricted. On the other hand in Latvia the axle load is 25 t and in Estonia even 32 t.

Figure 2-1-7: Max line speed



In the majority of the Corridor, the allowable maximum speed on lines for freight trains is 100 km/h or more except in certain regions where the speed is limited down to 40 km/h. For most of the sections there is no difference between values for odd and even direction apart from certain sections where the difference is relatively small. Maximum speed of freight trains on the 1520mm network is significantly lower than on the 1435mm network, mostly due to single track for mixed train operation (passenger and freight).

Figure 2-1-8: Profile and loading gauge



For the purpose of describing the loading gauge, the parameters given in the IM network statement were used (except Poland), i.e. Belgium and Germany – the profile parameter, the Netherlands, Lithuania, Latvia and Estonia – the loading gauge parameter.

2.2 Corridor Terminals

According to the requirements of the Regulation, the list of terminals is provided in the Corridor Information Document. More detailed information on terminals can also be found in the Customer Information Platform (CIP).

The new terminals belonging to RFC NS-B in Poland, Belgium and the Netherlands are listed in the table below: They will be included in the Corridor Information Document with the next annual update in January 2022 for TT2023.

Country	Terminal	Handover station
Belgium	CSP Zeebrugge Terminal	Zeebrugge Voorhaven west
Belgium	Container Handling Zeebrugge (CHZ)	Zeebrugge Vorming
Belgium	Terminal P&O Ferries	Zeebrugge Voorhaven west
Belgium	2XL	Zeebrugge Vorming
Belgium	Zeebrugge International Port	Zeebrugge Voorhaven west
Belgium	Mercatordok Multimodal Terminal (MMT)	Bundel Mercator
Belgium	Interface Terminal Gent (ITG)	Bundel Zandeken
The Netherlands	Bertschi Rail Terminal	Gent Zeehaven
The Netherlands	Calcit Zeeland B.V	Gent Zeehaven
The Netherlands	Cargill	Gent Zeehaven
The Netherlands	Dow Benelux BV	Gent Zeehaven
The Netherlands	ICL-IP Terneuzen	Gent Zeehaven
The Netherlands	Oiltanking Terneuzen	Gent Zeehaven
The Netherlands	Outokumpu Stainless B.V.	Gent Zeehaven
The Netherlands	Ovet B.V.	Gent Zeehaven
The Netherlands	Trinseo Netherlands BV	Gent Zeehaven
The Netherlands	Verbrugge Terneuzen Terminals	Gent Zeehaven
The Netherlands	Vlaeynatie 3MCT	Gent Zeehaven
The Netherlands	Yara Sluiskil	Gent Zeehaven
Poland	Terminal kontenerowy Włosienica	Dwory
Poland	Brzeski Terminal - KARPIEL Sp. z o.o	Brzesko - Okocim
Poland	PCC INTERMODAL - Terminal Kolbuszowa	Kolbuszowa
Poland	Terminal T1 Żurawica	Żurawica
Poland	Terminal T2 Medyka	Medyka

2.3 Bottlenecks

For this update of the Implementation Plan, bottlenecks were identified according to the following methodology provided by the Infrastructure Managers. The investments solving some of the bottlenecks are listed in Chapter 6.2.

Belgium (Infrabel)

Calculation for traffic forecasts:

The development is forecasted based on the expected increase/decrease of freight and passenger traffic. The calculation is based on the current rate of occupancy which is increased/decreased according to the expected traffic development.

Freight and passenger traffic are forecasted separately until 2030. No separate forecast for nodes.
Currently a new study is ongoing.

Calculation basis for the definition of bottlenecks:

Rate of occupancy of the lines / nodes and the subsequent remaining capacity. The remaining capacity results from the comparison of the theoretically available capacity and the expected used capacity.

The Infrabel calculation method takes into account all trains (freight and passenger) on the different sections of the network, it makes a mix of all possible variations, determines for each variant the rate of occupancy and calculates the average rate of occupancy.

A section is considered as a bottleneck when the remaining capacity is < 25%.
A node is considered as a bottleneck when the remaining capacity is < 40%.

Capacity calculation and forecast for specific parameters

750m trains:
The length of freight trains is limited in principle to 750 m inclusive of traction units. The infrastructure manager's agreement must always be sought for any train longer than 650 m. The allocation of the train path will then be based on the characteristics of the infrastructure and robustness.

Influencing factors on infrastructure projects to eliminate bottlenecks

- Cost benefit analysis
- Availability of funding
- Priorisation according to TEN-T status of line:
    - Stretch on RFC Network and TEN-T core network: obligations for infrastructure development by 2030 (high priority)

- Stretch on TEN-T comprehensive network: obligations by 2050 (lower priority)
- Stretch does not lie on TEN-T network: reduced priority (lowest priority)

No bottlenecks have been identified on the RFC NS-B routing in Belgium until 2030.

Netherlands (ProRail)

		ProRail
Definition of (potential) bottlenecks (4.1)	Calculation basis for the definition of (potential) bottleneck	For dedicated freight nodes, shunting yards and switches: number of overloaded hours For all lines: Do the predicted number of freight trains fit in the Basic Hour Pattern (BUP)

	Evaluation criteria for the definition of (potential) bottleneck	For dedicated freight nodes, SYs and switches: number of overloaded hours
		• Potential bottleneck: 10-25 overloaded hours
		• Bottleneck: > 25 overloaded hours
		
		For all lines: BUP
		• Utilization of the available Cargo Freight paths
		  ○ < 50% - 75% potential bottleneck,
		  ○ >75% bottleneck

Calculation of Traffic Forecast (4.2)	Principles of traffic forecasts	The initial Netherlands-wide forecast on the development in all sectors including transport is provided by the Central Planning Bureau and the Netherlands Environmental Assessment Agency. The development for cargo trains is presented in a matrix covering the various scenarios. With the NEMO model, the number of trains needed for the transport of the forecasted cargo is calculated. Several scenarios are available for the number of trains on the different routes for several years, e.g. assessment of % of 740 m trains, different routing to the border etc.
	Separate forecasts for passenger and freight	Yes

	traffic available	
	Separate forecasts for capacity on lines and in nodes available	No
	Current time frame for traffic forecasts	2030-2040-2050

Calculation of Available Capacity (4.3)	Calculation method for determining the available capacity	Calculation of overloaded hour for dedicated freight nodes, SYs and switches: • Demand: Realization data for ± ½-1 year are increased with the forecasts + further factors • Available capacity: infra-layout, headway time calculation; Assessment if number of trains can be processed in 48 min at the railway yard outcome: number of overloaded hours = cargo trains that can‘t be handled in 48 min (80%) + infra-layout Calculation of basic hour pattern (BUP) for all lines (including Havenspoorlijn and Betuweroute A15): • Determination of demanded number of train paths/h (per train type) based on forecast • Construction of BUP • Check of feasibility with simulation model “Open Track” • ProRail adaption proposals if BUP is not feasible • Bottleneck applies, if adaption proposal is not acceptable utilization of the available BUP paths for cargo trains in %. as soon as it exceeds 75%, there is a bottleneck.

	Separate calculation for passenger and freight traffic available	Yes
	Separate calculation for capacity on lines and in nodes available	Yes • All Lines = BUP • Nodes, shunting yards, or switches for freight trains = Overloaded hours

Capacity calculation and forecast for specific parameters (4.4)	Capacity Calculation and forecast for specific parameters	740m trains: • For every train type ProRail has determined a feasible maximum train length. • The number of tracks on shunting yards are calculated for every type of train based on forecasts of each train type + scenarios with the growth of 740 m trains
Influencing factors on infrastructure projects to eliminate bottlenecks (4.5)	Influencing factors on infrastructure projects to eliminate bottlenecks	• Social cost-benefit analysis > 1 (most important factor) • International agreements • Legal obligations • Available budget • (Local) government wishes with budget

Germany (DB Netz)

Insufficient operational quality is an expression of excessive charge and is not acceptable in the long term. This range is therefore outside of the performance range to be aimed for. Charged systems that work in this area are an indicator of bottlenecks and possibly to be explained "overloaded railways or future overloaded railways".

“Overloaded railways or future overloaded railways” are defined as local and timely permanent bottlenecks (actually or in future) and have to be defined jointly by IM and MS. In a next step a plan for increasing capacity has to be worked out and planning and financing must be agreed.

Czech Republic (SZCZ)

Správa železnic considers as a bottleneck every infrastructure parameter, which is non-compliant with the TEN-T requirements and loading profile, which does not meet the value of P400. Správa železnic considers lack of capacity as an operational bottleneck. The requirements are following:

- Electrification,
- Axle load of at least 22.5 t,
- 100 km/h speed,
- Loading profile P400, (especially not met in Nelahozeves´ tunnels).

TEN-T parameters not considered as a bottleneck until 2030:

- Possibility of running trains with a length of 740 m – technically possible, but prohibited by CZ Regulatory Body.
- ERTMS full deployment – implementation ongoing, 2030 deadline to be fulfilled.

Poland (PKP PLK S.A)

Bottleneck is defined in PKP PLK S.A. as a physical, technical or functional barrier which leads to a system break affecting the continuity of long-distance or cross-border flows and which can be surmounted by creating new infrastructure, or substantially upgrading existing infrastructure, that could bring significant improvements which will solve the bottleneck constraints.

Lithuania (LTG Infra)

Bottleneck definition within LTG Infra is driven by the operational usage of the network by the mixed passenger/freight traffic. By assessing the capacity requests from operators the infrastructure manager generates a timetable; any segments where the requested capacity is not accommodated due to timetabling is considered a bottleneck.

The potential capacity assessment for specific routes is done manually on annual basis based on freight operator and passenger service requests, once the traffic is scheduled the bottlenecks are identified and registered.

Latvia (LDz)

The definitions of a bottleneck is considered when at a certain moment it is not possible to pass trains according to the schedule. The number of tracks and the trains on Latvian railways allows to say that there are no bottlenecks on the Latvian railways. There is a reserve of capacity to handle additional trains.

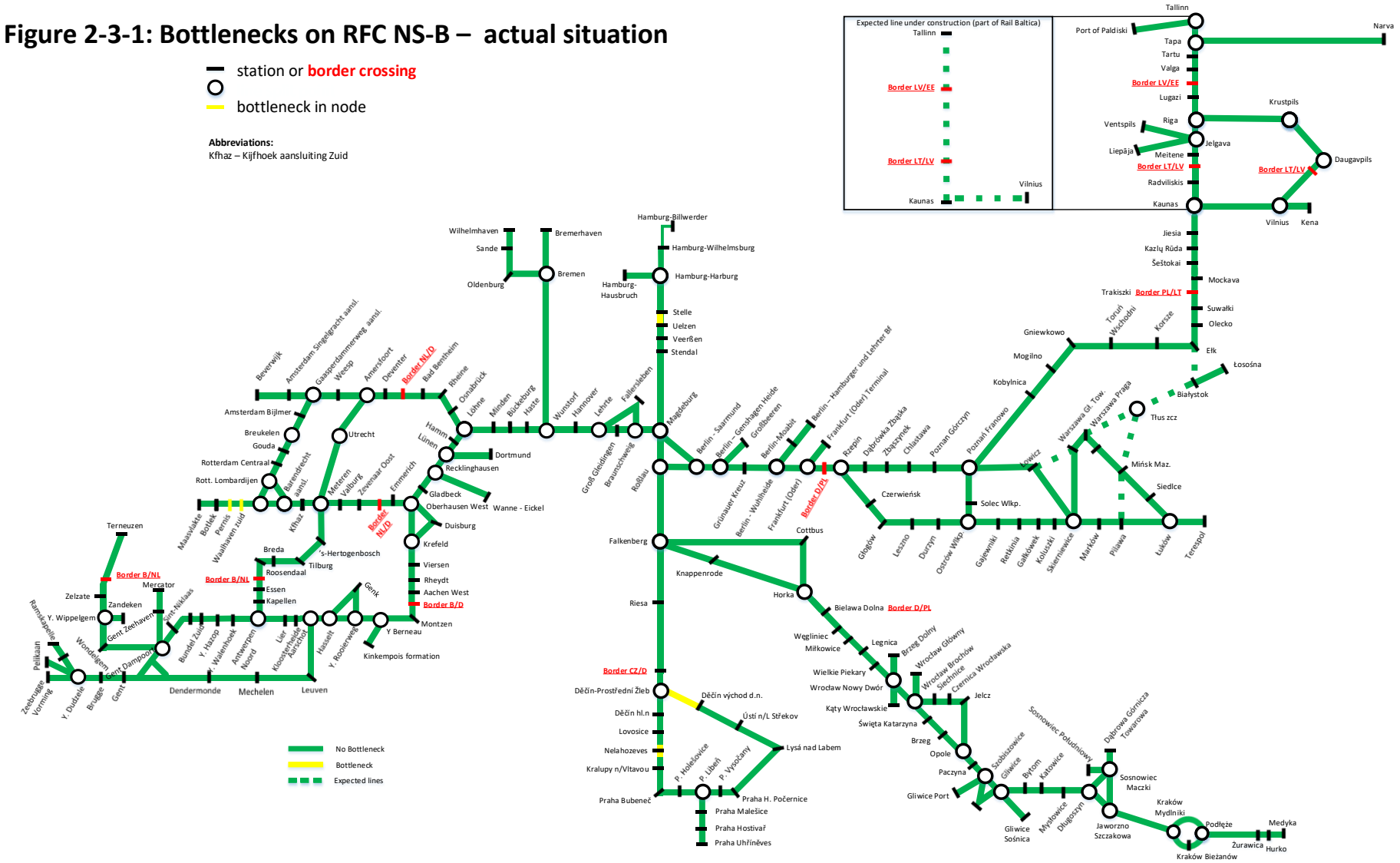
Estonia (EVR)

Bottleneck in Estonia is defined within the Railways Act (§ 92) as the "depletion of railway infrastructure capacity".

The Railways Act (https://www.riigiteataja.ee/en/eli/501042021002/consolide) and the Network Statement (Chapter 3, p. 3.6 and p. 3.7.; https://www.evr.ee/en/business-client) describes the capacity allocation principles and procedures in this case.

There is also a requirement in the Railways Act (§ 93) that the IM should perform a capacity analysis within six months after declaring railway infrastructure capacity to be depleted. Such analysis is performed in order to clarify the reasons for capacity depletion and to determine the financial and technical measures needed for removal of the depletion and creation of additional capacity.

Figure 2-3-1: Bottlenecks on RFC NS-B – actual situation



2.4 RFC Governance

The new extensions did not lead to any changes in the governance structure of the corridor. The Terminal Advisory Group will be open to the new terminals along the corridor. The RFC NS-B governance structure can be found on the website under the following link and in section 1 of the Corridor Information Document:
https://rfc8.eu/corridor/organization/.

3. Transport Market Study

There was no update of the TMS since the publication of the previous Implementation Plan in October 2020.

The Executive summary of the TMS Final Report 2020 can be found under the following link: https://rfc8.eu/files/public/Downloads_STUDIES/RFC_NSB_TMS_Report_Executive_Summary.pdf

4. List of measures

All measures listed below (4.1 – 4.8) were implemented at the start of RFC NS-B in November 2015. The state of play and further developments regarding concrete measures and procedures are included in Section 4 of the Corridor Information Document.

4.1 Coordination of planned temporary capacity restrictions

All information on the coordination of planned temporary capacity restrictions can be found in Section 4.4 of the CID.

4.2 Corridor One Stop Shop

All information on the Corridor One Stop Shop can be found in Section 4.2 of the CID.

4.3 Capacity Allocation Principles

All information on capacity allocation can be found in Section 4.3 of the CID.

4.4 Applicants

All information on applicants can be found in Section 4.3.2 of the CID.

4.5 Traffic management

All information on traffic management can be found in Section 4.5 of the CID.

4.6 Traffic management in the Event of Disturbance

All information on traffic management in the event of disturbance can be found in Section 4.5.3 of the CID, including the International Contingency Management.

4.7 Quality Evaluation

4.7.1 Performance Monitoring Report

RFC NS-B publishes an annual Performance Report on its website in the first half of the following year. The figures are presented to the different stakeholders, such as during RAG and TAG meetings. The report is based on the RNE Guidelines on Key Performance Indicators of the Rail Freight Corridors:

http://rne.eu/wp-content/uploads/RNE_Guidelines_KPIs_of_RFCs.pdf.

More information on KPIs and objectives can be found in Chapter 5 of this Implementation Plan.

4.7.2 User Satisfaction Survey

RFC NS-B conducts a satisfaction survey of the users of the Corridor once a year and publishes the results on its website under the link: https://rfc8.eu/customer/user-satisfaction-survey/.

4.8 Corridor Information Document

The Corridor Information Document (CID), is published in English every year in January together with the publication of the PaP catalogue.

CID can be found on the website of RFC NS-B and in CIP.

5. Objectives and performance of the Corridor

5.1 Punctuality

Punctuality of a train is measured on the basis of the comparison between the time planned in the timetable of a train identified by its train number and the actual running time at certain measuring points. A measuring point is a specific location on the route where the train running data is captured. One can choose to measure the departure, arrival or run through time. The comparison should always be done against an internationally agreed timetable for the whole train run.

Punctuality is measured by setting a threshold up to which a train is considered as punctual. This threshold is defined at 30 minutes.

Furthermore, RFC NS-B also publishes monthly punctuality reports on the Corridor website. Corridor users can be invited to a bilateral WG to discuss improving the punctuality.

All information concerning the Train Performance Management can be found in CID Section 4.6.

5.2 Capacity

Pre-arranged Paths (PaPs) for the annual timetable are provided by the IMs/AB to the C-OSS. PaPs are coordinated among the IMs/AB at the borders so to enable for attractive running times. The PaP catalogue is published by the C-OSS in mid-January of each year for the next timetable period. Reserve capacity on the Corridor is available in October of each year, to allow for ad-hoc path applications.

RFC NS-B has defined the following objectives concerning the published PaPs:

- improvement of quality and quantity of the Corridor's offer;
- increasing the efficiency and reliability of rail freight traffic;
- harmonisation of train paths;
- increase of share of requests for international freight paths via the C-OSS.

5.3 KPIs

The following KPIs published by RFC NS-B are defined in the "RNE Guideline on Key Performance Indicators of Rail Freight Corridors", which has been agreed on RFC level and in the RNE General Assembly:

- Capacity Management:
  - Volume of offered capacity (PaPs);
  - Volume of requested capacity (PaPs);
  - Volume of requests (PaPs);
  - Number of conflicts (PaPs);
  - Volume of pre-booked capacity (PaPs);
  - Volume of offered, requested Reserve Capacity (RC), volume RC requests
  - Average planned speed of PaPs.

- Operations:
  - Punctuality at origin;
  - Punctuality at destination;
  - Overall number of trains on the RFC.

- Market Development:
  - Overall number of trains per border;
  - Ratio of the capacity allocated by the C-OSS and the total allocated capacity.

Information on KPIs is published in the Performance Monitoring Report and some are also part of the Annual Report (see also chapter 4.7).

Additionally, summary results for KPIs for the last years can be found under the link: https://rfc8.eu/customer/corridor-performance/.

6. Investment Plan

The indicative Investment Plan is without prejudice to the competence of the Member States regarding infrastructure planning and financing. Also, this is without prejudice to any financial commitment of a Member State.

6.1 Capacity Management Plan

For this update of the Implementation Plan the WG Infrastructure revised and simplified the capacity management plan. Individual infrastructure manager definitions of bottlenecks from section 2.3 together with the indicative investment plan and current bottleneck situation jumping jack provide a high-level overview of the bottleneck situation within the corridor and a list of projects directly and indirectly addressing capacity improvements.

Information within this section should be cross-referenced to individual infrastructure manager bottleneck definitions in section 2.3 while analyzing.

6.2 List of projects

The WG Infrastructure elaborated an indicative investment plan (Figure 6-2), which is based on the national investment plans. It covers the period until 2030. While delivering this input, projects in relation to the needs of capacity enhancement, development of terminals that belong to the RFC NS-B IMs, removal of identified bottlenecks and technical parameters enhancement such as increasing train length, loading gauge or axle load are taken into account. The indicative investment plan is presented in the form of a table providing basic information about the projects.
For each column explanations are given below:

- **Section:** part of the line on the Corridor;
- **Name:** name of the project;
- **Description:** short description of the scope of the Project;
- **Benefits for the Corridor:**

Category	Meaning
Capacity	Capacity increase (bottleneck removal, new line/ creation of sidings, passing tracks, extra tracks, renewal of tracks, etc.)
Train length	Increase of the track length (upgrade for 600 m, 650 m, 740 m, etc.)
Interoperability	ERTMS or/and GSM-R deployment
Safety	Level crossings elimination, renewal/ enhancement of national signalling system (interlocking upgrade, block distance, headway), etc.
Environment	Electrification, noise barriers, vibration reduction measures, etc.

- **End date:** year when the project ends;
- **Project status:**

Category	Meaning
Initial Plan Study	Looking for alternative ways to solve the recognised bottleneck and an estimate of the costs.
Plan study	Elaboration of possible variants to realise the preferred alternative and a more accurate estimate of the costs.
Plan study/design	Elaboration of possible variants to realise the preferred alternative and a more accurate estimate of the costs, incl. approval process until building license is reached
Design/Realisation	This includes all the work to be done before going live: preparation, building license, construction, safety tests etc.
Realisation	Award procedure; physical execution of work, safety tests etc. etc.
In exploitation	Project can be used in exploitation.

- **Funding status:**

Category	Meaning
Open	Funding which is not yet part of any formal funding plan
Reserved	Funds in mid-term budget (generally not approved)
Approved	Funds approved and released

- **Cost:** indicative costs of the project in EUR
- **Financial sources:**

Category	Meaning
EU	The EU provides *funding*
Public	Public funding
IM	The IM provides funding
Other	Other funding sources
Negotiation ongoing	Negotiations on funding source

Indicative Investment Plan											
Nr	Country	Section	Name	Description	Benefits for Corridor	End date	Project status	Funding status	Cost (mio EUR)	Financial sources	Comments
1	NL	Vught aansl. - 's-Hertogenbosch Diezebrug aansl.	4 tracks 's Hertogenbosch - Vught aansl. and dive-under Vught	Adding a fourth track between 's Hertogenbosch and Vught aansluiting Construction of a Dive-under at Vught aansluiting	Capacity	2029	Design/ Realisation	approved	n.a.	public	
2		Sas van Gent - Sluiskil aansl., Sluiskil aansl. - Terneuzen Zuidzijde, Terneuzen Zuidzijde - Axel aansl. Sas van Gent/Zelzate - Sas van Gent	study to improve rail access in the Ghent-Terneuzen port area	Cross-border study, both the Dutch and Belgian ministries have made money available to start this study	Capacity	To be decided	Initial Plan Study	approved	2 (IenW)	public	Update November 2021. Start making a project plan with time schedule. This money is only intended for the study. No budget yet for implementing infrastructure measures
3		Amersfoort-Apeldoorn/Amersfoort- Utrecht Centraal	Amersfoort side track for 740 m trains	side track extension for 740 m trains in Amersfoort	Train length	2021	Realisation	approved	n.a.	public/IM	
4		Botlek - Pernis	Botlekbridge (Harbourline) - Oude Maas river crossing	Adjusting railway bridge and improving connection to Botlek Freightyard	Capacity	2021	Realisation	approved	n.a.	Public/ Other	

5		Kijfhoek-Breda-Eindhoven-Venlo	Corridor study 740 m Rotterdam Kijfhoek - Venlo border	This study examines which measures are needed at Lage Zwaluwe, Tilburg GE, Eindhoven, Tilburg Loven to be able to run with 740 m trains on the Rotterdam - Venlo route.	Train length	2021	Realisation	approved	n.a.	public	
6		Kifhoek-Gouda-Weesp-Deventer-Oldenzaal Grens	Corridor study 740m Rotterdam Kijfhoek - Bad Bentheim	This study investigates which measures are needed at, Rotterdam Noord Goederen, Roosendaal, Tilburg GE/Loven, Deventer and Hengelo to be able to run with 740 m trains on the 1) Kijfhoek - Bad Bentheim and 2) Roosendaal - Utrecht - Bad Bentheim route.	Train length	2021	Realisation	approved	n.a.	Public	
7		Amsterdam Centraal - Dijksgracht Westzijde (Amsterdam)	Dive-under at Amsterdam Dijksgracht	free entrance to Amsterdam Westhaven	Capacity	2028	Design/ Realisation	Reserved	n.a.	public	
8		Kijfhoek zuid - Lage Zwaluwe - Roosendaal/Essen	ERTMS Kijfhoek - Roosendaal grens	Implementing ERTMS between Kijfhoek and Roosendaal border. Go live 2026-2028	Interoperability	2028	Design/ Realisation	Reserved	n.a.	public	
9		Meteren - Eindhoven stadion	ERTMS Meteren - Eindhoven	Implementing ERTMS between Meteren and Eindhoven. (Go live 2029-2031)	Interoperability	2031	Plan study/design	Reserved	n.a.	public	

10		Amsterdam - Hilversum	ERTMS OV SAAL oost	ERTMS implementation at OV SAAL oost	Interoperability	2030	Plan study/design	Reserved	n.a.	public	
11		Roosendaal-Tilburg-'s Hertogenbosch	ERTMS Roosendaal - Den Bosch	Implementing ERTMS between Roosendaal and 's Hertogenbosch. Go live 2028-2030.	Interoperability	2030	Plan study/design	Reserved	n.a.	public	
12		Utrecht Centraal - Meteren Betuweroute aansluiting Noord	ERTMS Utrecht - Meteren	Implementing ERTMS between Utrecht Centraal and Betuweroute Meteren. Go live 2028-2029	Interoperability	2029	Plan study/design	Reserved	n.a.	public	
13		Europoort	Electrification 2 tracks Europoort	Electrification 2 tracks Europoort (TBD 2026-2030)	Capacity	2026-2030	Plan study/design	reserved	n.a.	public	
14		Europoort - Botlek	Elevated railwaytrack along the Theemsweg (Harbourline)	Realization of an elevated railwayline along the Theemsweg, as a result of which rail traffic will no longer hindered by Calandbridge openings.	Capacity	2021	Realisation	approved	n.a.	Public/EU/ Other	
15		Barendrecht Aansl. - Kijfhoek aansluiting Noord Kijfhoek aansluiting noord - Betuwe Route Papendrecht	Harbourline - 25 kV connection Betuweline	Change the voltage on the catenary from 1500 V DC to 25.000 V AC between Barendrecht Vork - Kijfhoek - and Sophiatunnel. Project on hold.	Environment	-	on hold	open	n.a.	public	

16		Kijfhoek aansluiting noord - Betuwe Route Papendrecht	Increasing the capacity of the Sophiatunnel	investigating capacity and recommend measures to increase the capacity of the Sophiatunnel from 6 trains/hour to 10 trains/hour.	Capacity	-	plan study	open	n.a.	public	
17		Betuweroute Centraal Uitwisselpunt Valburg	Rail terminal Gelderland (RTG Valburg)	construction of a new terminal + changes to CUP Valburg yard	Capacity	2025	Plan study/design	reserved	n.a.	public/ privet	
18		Utrecht Centraal - Meteren Betuweroute aansluiting Noord	Redesign Geldermalsen (PHS) and 3rd track Geldermalsen - Geldermalsen aansl	sidetracks at Geldermalsen for 740m freight trains and separate 3rd track Geldermalsen - Geldermalsen aansl.	Capacity/ train length	2021	Realisation	approved	n.a.	public	
19		Waalhaven Zuid	Redevelopment Waalhaven Zuid freight yard fase 1	construction of 5 tracks for 740 m trains + expansion of locomotive parking capacity	Capacity/ train length	2025	Plan study/design	approved	60	public	
20		Waalhaven Zuid	Redevelopment Waalhaven Zuid freight yard fase 2 (after 2030)	further expansion of Freight Yard Waalhaven Zuid (including 8 additional tracks for 740 m trains) to be decided after 2030	Capacity/ train length	after 2030	Initial Plan Study	open	n.a.	public	

21		Roosendaal	Roosendaal 2 tracks for 740 m trains	construction of 2 tracks for reversing freight trains of 740 m.	Train length	2026	Plan study/design	open	n.a.	public	
22		Maasvlakte West/Maasvlakte - Europoort West	SY Maasvlakte Zuid + C2 bocht fase 1	Construction of the first bundle of tracks on the new yard Maasvlakte Zuid + adjustment C2 bocht (commissioned by Port of Rotterdam	Capacity	2040	Plan study/design	open	n.a.	Public/EU/ Other	
1	BE	Belgian part of RFC8	ETCS	Equipment of the Belgian part of RFC8 with ETCS	Interoperability	2025	Design/ realisation	Approved	611,29	Public/ EU	Remaining amount to equip the whole Belgian network 2022-2025 (including interlockings) - Global budget - no split per RFC; Cost as from 2022 (in Mio € 2021) - state of play June 2021.
2		Antwerp	Junction Oude Landen	Construction of junction at Oude Landen (L27A) to provide a better access to the port of Antwerp	Capacity	2031	Study and first works	Partly Approved	152,03	Public	Cost as from 2022 (in Mio € 2021) - state of play June 2021

3		Antwerp	Second Access to the Port of Antwerp	Study on construction of new line between Antwerp North and Lier to provide a better access to the Port of Antwerp	Capacity	2023	Plan study	Approved	1,57	Public (Federal+ regional)	Cost as from 2022 (in Mio € 2021) - state of play June 2021
4		Antwerp	Port of Antwerp: Right bank	Signalling of several regularly used fan of sidings on right bank of the port of Antwerp	Capacity	2025	Works	Approved	13,3	Public (Federal+ regional)	Cost as from 2022 (in Mio € 2021) - state of play June 2021
5		Neerpelt-Balen Werkplaats	L19 Neerpelt - Balen Werkplaats	Study and works for the construction of a second track Neerpelt - Balen werkplaats	Capacity	2026	Study & works	Approved	47,59	Public (Federal+ regional) +EU	Cost as from 2022 (in Mio € 2021) - state of play June 2021
6		Glons - BE/DE border	Increase of line speed	Increasing performance of a freight section on CNC in Belgium - increase of line speed till 100 km/h, L24 Glons - BE/DE border	Capacity	2023	Study & works	Partly Approved	6,38	Public + EU	Cost as from 2022 (in Mio € 2021) - state of play June 2021
7		Diepenbeek - Bilzen	Spartacus project	Elimination of 9 level crossings on L34 between Diepenbeek and Bilzen	Safety/Capacity	2024	Works	Approved	15,03	Public (Federal+ Regional)	Cost as from 2022 (in Mio € 2021) - state of play June 2021

8		Lokeren - Sint-Niklaas	L59 - 3th track between Lokeren and Sint-Niklaas	Studies and first works related to the construction of a thirth track between Lokeren and Sint-Niklaas and the removal of level crossings	Capacity	2026	Study & works	Approved	36,06	Public (Federal+ regional)	Cost as from 2022 (in Mio € 2021) - state of play June 2021
9		Port of Zeebrugge	Masterplan port of Zeebrugge	Extension and modernisation of Zeebrugge Formation with a new hub of 24 tracks in Zwankendamme, a fan of sidings in Zeebrugge and the removal of the level crossing in Lissewege	Capacity	2027	Works	Partly Approved	22,76	Public, SPV	Cost as from 2022 (in Mio € 2021) - state of play June 2021
10		Bruges - Dudzele	L51 - 3th track between Bruges and Dudzele	Construction of a thirth track between Bruges and junction Dudzele	Capacity	2031	Works	Partly Approved	65,36	Public	Cost as from 2022 (in Mio € 2021) - state of play June 2021
11		Bruges - Ghent	L50A - 3th and 4th track between Bruges and Ghent	Construction of 3th and 4th track between Bruges and Ghent	Capacity	2029	Works	Partly Approved	62,88	Public, EU	Cost as from 2022 (in Mio € 2021) - state of play June 2021
12			Elimination of level crossings	Elimination of 9 level crossings on RFC NS-B (L59, L35, L15)	Safety/Capacity	2024	Works	Partly Approved	15,15	Public + EU	Cost as from 2022 (in Mio € 2021) - state of play June 2021

13		Lokeren + Dendermonde	Side tracks Lokeren + Dendermonde	Construction of side tracks 750m on L50 Dendermonde and L59 Lokeren	Train length	2026	Study & works	Approved	11,46	Public	Cost as from 2022 (in Mio € 2021) - state of play June 2021
14		Port of Gent	Port of Gent	Construction of side tracks of 750m in the port of Gent	Train length	2024	Works	Approved	4,2	Public	Cost as from 2022 (in Mio € 2021) - state of play June 2021
1	DE	Emmerich - Oberhausen	Upgrade Emmerich - Oberhausen	Structural upgrade of capacity; 3-track upgrade; elimination of level crossings; ERTMS	Capacity	Open	Design/ realisation	Approved	2,012	EU; public; IM	
2		Stelle - Uelzen	Part of ABS/NBS HH/Bremen – Hann.	Structural upgrade of different lines in the triangle HH/Bremen/Hannov	Capacity	Open	Initial Plan study	open	n.a.	Public; IM	
3		Uelzen - Stendal	Upgrade Uelzen - Stendal	Upgrade to a double track line with electrification	Capacity	Open	Design/ realisation	Approved	272	Public; IM	
4		Oldenburg - Wilhelmshaven	Upgrade Oldenburg – Wilhelmshaven	Upgrade to a double track line with electrification	Capacity	Open	Design/ realisation	Approved	690	EU; Public; IM	
5		Border BE/NL - border NL/DE	IRON Rhine	upgrading route	Capacity	After 2025	Plan study	open	n.a.	n.a.	

6		Dresden - Border DE/CZ (- Prag)	New line Dresden - Prag	New HSL for freight and passenger trains with a new long tunnel	Capacity	After 2025	Plan study	open	n.a.	EU; Public; IM	
7		Berlin-Stadtforst - Berlin-Moabit, Berlin-Moabit - Berlin-Hamburger und Lehrter Bf	Track devision at Berlin-Gesund-brunnen station, shortening block Greifswalder Straße-Frankfurter Allee	Capacity improving	Capacity	open	Plan study	open	n.a.	Public; IM	
8		Rheydt Hbf - Viersen Hbf; Rheydt (Gbf) - Viersen-Helenabrunn	Extension of sidings, track plan adjustment at Viersen-Helenabrunn	Capacity improving	Capacity	open	Plan study	open	n.a.	Public; IM	
1	CZ	Lysá nad Labem – Děčín Pr. Žleb	Upgrading of line Kolín – Všetaty – Děčín	Line upgrading	Capacity	after 2025	Plan study	Open	n.a.	EU, public	-
2		Praha Libeň - Lovosice - Děčín - st.border Germany	ETCS 1st national corridor Kolín – Praha Libeň – Dolní Žleb – state border Germany	ETCS deployment	Interoperability	2023	Plan study	Open	30,15	EU, public	-
3		Lysá nad Labem – Všetaty – Děčín východ	ETCS in section Kolín – Nymburk – Mělník – Děčín východ	ETCS deployment	Interoperability	After 2023	n.a.	Open	23,85	EU, public	-
4		Kralupy n/Vltavou - Nelahozeves	Modernization of railway station Kralupy nad Vltavou and upgrading of 3 Nelahozeves tunnels	Fulfilment of TSI PRM in station Kralupy n/V and meeting of code P/C 80/410 for combined transport (actual code 47/360)	Capacity	2028	Plan study	Open	n.a.	EU, public	-

5		Praha Libeň – Praha Vysočany - Lysá nad Labem	ETSC Praha – Lysá nad Labem	ETCS deployment	Interoperability	After 2023	Plan study	Open	4,55	EU, public	-
6		Praha Libeň – Praha Malešice	Modernization of railway line Praha Libeň – Praha Malešice (1. Phase)	Line upgrading	Capacity	2027	Plan study	Open	51	EU, public	-
7		Ústí nad Labem	Railway station	Capacity improving	Capacity	2024	Plan Study	Open	n.a.	n.a.	
1	PL	Poznań node	C-E 20, works on Poznań Freight By-pass	Upgrade of the freight by-pass of Poznań Railway Node, to improve transit of freight traffic through the agglomeration	Capacity	2021-2027	Realisation (design)	Open	350	EU; public	
2		Swarzędz - Sochaczew	E 20 / C-E 20, Poznań - Warszawa section: remaining works on section Swarzędz – Kutno – Łowicz – Sochaczew	The main project aim is to increase the speed up to 160 km/h on the entire section Warsaw – Poznań.	Capacity	2023	Realisation	Approved	500	EU; public	
3		Poznań – Kunowice (state border)	Works on E 20 line, section Poznań Główny - Kunowice (state border)	The project aims to adapt the section to the requirements of the TEN-T core network.	Capacity	2021-2027	Plan study (feasibility study)	Open	1 290	EU; public	
4		Skierniewice - Łuków	Works on C-E 20 line, section Skierniewice - Pilawa - Łuków	Upgrade of the southern by-pass of Warsaw railway node for freight.	Capacity	2021-2027	Realisation (design)	Open	700	EU; public	

5	Sadowne - Czyżew	Works on E 75 line, section Sadowne – Czyżew along with the remaining works on the section Warszawa Rembertów – Sadowne	The second part of the work on the line 6, which is part of the Rail Baltica. It is a comprehensive modernization aimed at:	Capacity	2023	Realisation	Approved	240	EU; public	
6	Czyżew – Białystok	Works on E 75 line, section Czyżew – Białystok	The second stage of works on the line no. 6, which is part of the Rail Baltica. Comprehensive modernisation, including construction of double-track bridge over the Bug river.	Capacity	2023	Realisation	Approved	840	EU; public	
7	Białystok – Kuźnica Białostocka (State border)	Line no. 6 section Białystok – Sokółka – Kuźnica Białostocka (State border)	Upgrade of connection to/from Belarus through the border crossing at Kuźnica Białostocka.	Capacity	2021-2027	Plan study (feasibility study)	Open	unknown	EU; public	
8	Białystok - Ełk	Works on E 75 line, section Białystok – Suwałki – Trakiszki (state border), stage I section Białystok – Ełk	The third stage of works on the Rail Baltica line. It is a comprehensive modernization and construction of new line section between Ełk and Suwałki.	Capacity	2021-2027	Realisation & design	Approved/ Open	930	EU; public	

9	Ełk – Trakiszki (Polish/Lithuanian border)	Works on E 75 line, section Białystok – Suwałki – Trakiszki (state border), stage II section Ełk – state border		Capacity	2021-2027	feasibility study & design	Open	1 170	EU; public	
10	Opole – Strzelce Opolskie - Gliwice	Improvement of the parameters of line No. 132 on the Bytom Bobrek - Opole section	The project aims to adapt the section to the requirements of the TEN-T core network.	Capacity	2021-2027	Plan study (feasibility study)	Open	450	EU; public	
11	Terespol	Line E 20 Terespol Local Control Centre	Continuation of work covering the most eastern section of the E 20 line in Poland, including Terespol and Małaszewicze stations and accesses to transhipment yards 1435/1520mm.	Capacity	2023	Realisation	Approved	171	EU; public	
12	Wrocław – Opole	C-E 30 line Wrocław Brochów – Jelcz – Opole	Work on the freight line 277 Wroclaw – Opole, freight connection between these two cities.	Capacity	2021-2027	Realisation (design)	Open	340	EU; public	
13	Zduńska Wola – Łódz Kaliska	Works on line no. 14, section Zduńska Wola – Łódz Kaliska	The first phase of works on the line no. 14, section Łódź Kaliska - Zduńska Wola.	Capacity	2023	Realisation	Approved	90	EU; public	

14	Ostrów Wlkp. – Zduńska Wola	Works on line no. 14 (and connecting line), section Ostrów Wlkp. – Zduńska Wola	The second phase of upgrade of the line no. 14, section Zduńska Wola - Ostrów Wlkp.	Capacity	after 2023	Open	Open	unknown	EU; public	
15	Warszawa – Błonie	E 20 section Warszawa – Błonie	Improvement of agglomeration traffic organisation between Warszawa and Błonie.	Capacity	2023	Realisation	Approved	25	EU; public	
16	Gliwice – Bytom – Katowice - Mysłowice	Works on railway lines No: 132, 147, 161, 180, 188, 654, 657 on the sections Gliwice - Bytom, Chorzów Stary - Mysłowice and Dorota - Mysłowice Brzezinka	The project aims to adapt the section to the requirements of the TEN-T core network.	Capacity	2023	Realisation	Approved	90	EU; public	
17	Warszawa - Mińsk Mazowiecki	E 20 line, section Warszawa Rembertów - Mińsk Mazowiecki, phase I	The project includes work on stations Warsaw Rembertów, Sulejówek Miłosna and Minsk Mazowiecki, in order to improve capacity on access to the Warsaw Node.	Capacity	2023	Realisation	Approved	40	EU; public	
18	Głogów – Ostrów Wlkp.	Works on line 14, section Głogów – Ostrów Wlkp.	The third phase of works on the line 14, section Ostrów Wlkp. - Głogów.	Capacity	after 2023	Open	Open	unknown	EU; public	

19		Pilawa – Mińsk Maz. - Tłuszcz	Modernization of the railway line No. 29 on the section Tłuszcz - Ostrołęka stage II: line No. 13 and No. 513	The project is aimed at a comprehensive modernization of the line.	Capacity	2021-2027	Open	Open	unknown	EU; public	
20		Rzeszów – Medyka (state border)	Works on the E30 route - railway lines No. 91 and 92 on the Rzeszów - Medyka section	The project is aimed at a comprehensive modernization of the line.	Capacity	2021-2027	Plan study (feasibility study)	Open	unknown	EU; public	
21		Whole country	Construction of the ERTMS / GSM-R system infrastructure on the railway lines of PKP Polskie Linie Kolejowe S.A. under NPW ERTMS	The aim of the project is to complete GSM-R coverage of lines that are included in the TEN-T core network	Interoperability	2023	Realisation	Approved	532,6	EU; public	
1	LT	Kaunas - Palemonas	Construction of the 1435 mm railway track and modernization of signalling equipment from Kaunas to Palemonas	Building of the new 1435 mm railway track plus signalling equipment modernization.	Capacity, 1435 mm infrastructure	2020/ 2021	Realisation (design and construction works)	Approved	61,8	EU; Public	

2		Poland/Lithuania border-Kaunas	Territorial planning and EIA for an upgraded or new 1435 mm double track railway line	Pre-design stage to define land plot for acquisition, perform strategic (SEA) and environmental assessments (EIA)	Capacity, double 1435 mm track	2022	Tender	Approved (CEF)	n.a.	EU (CEF), Public	To be followed by land acquisition and design (2022-2023), construction, CCS and ENE deployment (2024-2026).
3		Lithuanian/Poland state border-Kaunas	European-standard railway line from Poland/Lithuania border to Kaunas infrastructure development plan	Study to upgrade European-standard railway line from Poland/ Lithuania border to Kaunas	Capacity	2024	Plan study	Approved	n.a.	EU;	
1	LV	Part of Rail Baltica line	Construction of the 1435 mm railway track	Building of the new 1435mm railway track	Capacity, 1435mm infrastructure	2020-2026	n.a	n.a.	n.a.	EU; Public	
1	EE	Valga-Tartu	Reconstruction Valga-Tartu line	Construction works	Capacity	2024	Planning phase		16	n.a	
2		Valga-Tartu	Railway Control Command and Signalling (CCS) system modernization	Precondition for ERTMS	Interoperability	2024	Public tender		n.a	n.a	

3		Valga-Tartu	Construction of Catenary and traction stations	Equipment of line with 25kV AC catenary	Environment	2028	Planning phase		n.a	n.a	
4		Tartu-Tapa	Reconstruction Tartu–Tapa line	Construction works	Capacity	2022	Ongoing		12,1	Public	
5		Tartu-Tapa	Railway Control Command and Signalling (CCS) system modernization	Precondition for ERTMS	Interoperability	2024	Public tender		n.a	n.a	
6		Tartu-Tapa	Construction of Catenary and traction stations	25kV/AC	Environment	2024	Planning phase		n.a	n.a	
7		Tapa-Tallinn	Recondstruction Tapa-Tallin line	Construction works	Capacity	2024	Planning Phase		20,3	n.a	
8		Tapa-Tallinn	Railway Control Command and Signalling (CCS) system modernization	Precondition for ERTMS	Interoperability	2024	Public Tender		n.a	n.a	
9		Tapa-Tallinn	Construction of Catenary and traction stations	25kV/AC	Environment	2024	Planning phase		n.a	n.a	
10		Tallinn-Muuga	Railway Control Command and Signalling (CCS) system modernization	Precondition for ERTMS	Capacity and interoperability	2024	Public tender		n.a	n.a	
11		Talinn-Muuga	Construction of Catenary and traction stations	25kV/AC	Environment	2028	Planning phase		n.a	n.a	

Figure 6-2: Indicative Investment Plan

6.3 Deployment Plan regarding interoperable systems

6.3.1. ETCS Deployment Plan

The following text describes the national implementation strategies of the IMs along the Corridor.

6.3.1.1. The Netherlands

In the Netherlands, the deployment started on the Betuweroute between Kijfhoek and Zevenaar, which was inaugurated in 2007 as a dedicated freight line only equipped with ETCS B2, SRS 2.3.0d. Between 2007 and 2015 the connection to the Port of Rotterdam (Havenspoorlijn) with ETCS L1 and from Zevenaar Oost to the German border have been added. No class B systems are available on the lines equipped with ETCS, which makes ERTMS equipment on the vehicle indispensable. Since 2018, the challenge is that the vehicles using the Betuweroute have to be updated to a newer baseline (Baseline 3 release 2), which is the current standard for future ETCS installations. The planning of ERTMS deployment on the other main railway lines is decided by the Parliament (May 2019). The Dutch strategy includes the immediate removal of the class B system on lines equipped with ERTMS. The national ERTMS roll-out plan includes early On-board Unit (OBU) transition to ERTMS B3 enabling ERTMS only roll-out on the infrastructure. Therefore, ERTMS OBU roll-out is prepared in a separate programme. The Dutch ERTMS Programme will implement ERTMS on the 7 corridors within the scope of the programme. The section Amsterdam – Oldenzaal border of RFC NS-B will not be equipped with ERTMS before 2030, so ERTMS only operations for international locos will not be possible before 2030.

6.3.1.2. Belgium

In Belgium, the outlined ERTMS implementation of the Corridor lines is part of a country-wide migration program by 2025, with the aim to improve the safety level on the whole network.

All vehicles in Belgium have to be operable with ERTMS in the near future, whereby ETCS L1 and L2 FS B2 and B3 tracks shall be equipped with System Version 1.x to allow B2 and B3 locos. On the other hand, ETCS L1 LS B3 tracks shall be equipped with System Version 2.x in order to allow the operation in Limited Supervision. Consequently, in order to permit B2 vehicles to still run on those lines, the TBL1+ system will be kept until the majority of the RUs running on those lines will have migrated to B3 as well (certainly until end of 2025).

Since December 2016, the class B system Memor/Crocodile is put out of service on the lines equipped with ETCS Level 1 FS version 2.3.0d, allowing only trains equipped with ETCS Level 1 (minimum Baseline 2) or under certain exceptions TBL1+ to run on these tracks. Nevertheless, a Royal Decree published in 2018 with the latest revision on 6 December 2020 provides the progressive decommissioning of he Memor/Crocodile class B system on the main

tracks equipped with any level of ETCS by 14.12.2025. On the same date, TBL1+ will be decommissioned on all main tracks and Belgium will become an ETCS only network.

Railway operators are strongly encouraged to equip their rolling stock with baseline 3 to accommodate as much as possible future upgrades of the infrastructure, such as the introduction of GPRS for GSM-R.

6.3.1.3. Germany

A study commissioned by the German Federal Ministry of Transport and Digital Infrastructure has concluded that the rail network in Germany should be digitalized. Digitalization could raise capacity for rail passenger and rail freight transport by up to 20%, laying the foundation necessary to handle growing traffic volumes in Germany. With the Digital Rail for Germany program, the entire German rail sector aims to equip every one of the 33000 km in the German rail network with the European Train Control System (ETCS) and digital signaling technology.

According to the study, digital rail would have a positive impact on the German economy. Specifically, it would:

- **Make the rail system more reliable** by offering new technology and systems to foster high service quality and punctuality
- **Raise rail capacity,** enabling the network to handle growing traffic volumes and to absorb more traffic from the roads
- **Raise energy efficiency and lower carbon emissions** by making energy efficient network management possible and by shifting traffic to rail
- **Lower operating costs** for maintenance and operations
- **Equip the industry to handle demographic change** by giving employers tools to deal with lower operational staffing numbers resulting from retirement and employee turnover
- **Foster seamless international rail traffic** by ensuring that European systems are interoperable.

Projects proposed for 2020 to 2025 would have a major impact

For the initial phase from 2020 to 2025, the study recommends three specific projects that would have a rapid impact on infrastructure capacity and service quality:

- **Equipping the Scandinavian-Mediterranean Corridor** from the North and Baltic Seas through central Germany and Bavaria to the northern access route to the Brenner Base tunnel

- **Equipping core routes in the German rail network:** specifically, the Cologne–Rhine/Main high-speed line which is already under construction

- **Digitalizing urban rail:** digitalizing the S-Bahn network in Stuttgart

According to the authors of the study, these projects would involve infrastructure investments of some EUR 1.7 billion between now and 2025.

The German government will now review and assess the proposals. All the parties involved agree that digitalization will play a decisive role in making rail fit for the future.

6.3.1.4. Czech Republic

Most of the main lines of the conventional network in Czech Republic are equipped with the national system LS. It is a system using the continuous transmission of the aspects by means of coded track circuits. In case of transmission of restrictive or prohibitive aspects, it controls the specified reaction of a person driving the rail vehicle. According to TSI CCS CR it is national train protective equipment of the Class B and according to Czech law is used for maximum speed up to 160 km/h.

As is mentioned in the currently valid National Implementation Plan for ERTMS (approved by Czech ministry of transport in 2017) the main goal is to achieve full interoperability of the selected national railway network (TEN-T lines, RFC network and ERTMS Corridor E). In this plan is expected deployment of ETCS L2 baseline 3 in relationship to the RFC NS-B railway lines (mainly Praha - Lovosice - Děčín hl.n. - Prostřední Žleb - Shöna DB) with expected realization 2019 - 2026. All RFC NS-B lines are already equipped with GSM-R system.

Migration strategy in the ETCS system is based on use of dual equipment on the track enabling concurrent operation of the vehicles equipped with ETCS and the vehicles equipped with national LS system only where the national LS system may have the important role as a backup system for cases of ETCS system outage and no later than the end of the LS system technical life cycle. Implementation strategy is based on the fact that the ETCS system will be implemented markedly slower than the GSM-R system. The implementation rate is limited first of all by the accessible volume of financial means, not only in the track part area, but above all in the area of vehicles equipment with the mobile part of the system. After the whole section ETCS system completion, only this ETCS system on line Praha - Lovosice - Děčín hl.n. - Prostřední Žleb - state Border Germany (Shöna) is supposed for railway operation.

6.3.1.5. Poland

Currently in Poland almost the entire railway network is equipped with CCS class B systems – train control system called SHP – Samoczynne Hamowanie Pociągu (eng. Automatic Train Braking) and analog radio communication system using 150 MHz band for voice transmission. There are no plans to decommission national SHP system. The Polish NIP assumes that SHP will be operational at least for the next 20 years, while 150 MHz radio communication system will be turned off after equipment over 15000 km of railway lines with the GSM-R system.

Implementation strategy of ETCS in Poland by 2050 is specified by NIP. The timetable covers the requirements of both the TEN-T network (core and comprehensive) and Regulation No 913/2010 (freight Corridors).

The SRS 2.3.0d specification (which corresponds to the system version 1.0) was used for completed and ongoing trackside ETCS implementation projects. For later projects will be used higher version of SRS (at least 3.4.0), while both the SRS version and the system version are to be decided.

6.3.1.6. Lithuania

Current situation on Rail gauge of 1520 mm from Lithuanian station Kaunas to station Mockava is equipped with local older generation “PAB-GTSS” railway signalling system (only signals), current situation on Rail gauge of 1435 mm from Lithuanian station Kaunas to station Šeštokai no signalling systems, from station Šeštokai to station Mockava is equipped with local older generation “PAB-GTSS” railway signalling system (only signals), and from station Mockava to Polish border railway is integrated with „PAB-EAP” system on the track (only signals). Current situation on Rail gauge 1520 mm from Kaunas to station Kena and from Kaunas to LT LV border is equipped with ALSN. From Vilnius to LT LV border is equipped with local older generation “PAB-GTSS” railway signalling system (only signals). In Lithuania up to 2025 is expected to include level 2 ERTMS system between Polish and Lithuanian border on new rail gauge of 1435 mm where the speed is expected to be up to 249 km/h for passenger trains and up to 120 km/h for freight trains. Further information about the project path and routes will be provided when “Rail Baltica” will have completed the feasibility study.

The ERTMS system at existing rail gauge of 1520 mm is not foreseen.

6.3.1.7. Latvia

All the main lines of the conventional network in the Republic of Latvia are equipped with the class “B” national control command and signalling system ALSN. It is a system using the continuous transmission of the aspects by means of coded track circuits and according to law is used for maximum speed up to 120 km/h.

As is mentioned in the currently valid National Implementation Plan for ERTMS (notified to European Commission by Latvian ministry of transport in 2017) the main goal is to maintain full interoperability with the neighbouring countries in Russia, Belarus, Lithuania and Estonia of 1,520mm railways track gauge network. In this plan is expected deployment of GSM-R not earlier than 2028 and no expectations to deployment of ETCS in 1,520mm track network until the maximum speed of line remains up to 120 km/h.

The foreseen building of the new Rail Baltica line with a 1,435mm gauge European standard is a project to integrate the Republic of Latvia into the European rail network. Deployment of the signalling system throughout the entire length of the line will be starting in 2022 (indicative data). The project's basic design guidelines foresee the deployment of the Level 2 baseline 3 ETCS system. Decision regarding the mobile radio communications system will be taken at a later stage of project.

6.3.1.8. Estonia

In Estonia, there are two IMs in the public 1520mm railway network: Estonian Railways Ltd (company is in charge of railway administration) and Edelaraudtee Infrastruktuuri AS (a private IM).

Main lines of the conventional network are equipped with Class B train protection system ALSN as mentioned in ERA/TD/2011-11, v3.0. Maximum speed is 120km/h (passenger trains) and there are ongoing preparations for rising passenger trains speed until 135 km/h. According to estimations, this is maximum speed what is possible to allow by using national Class B train protection system.

Estonian Railways Ltd's aim is to make railway transport more attractive to users and to offer competitive and safe alternative to road transportation. In order to achieve this goal, it is essential to increase the speed, and this requires an upgrade of CCS systems. During the period from 2020 to 2024, the entire rail network of Estonian Railways Ltd is going to be upgraded to a modern CCS system and a TMS (Traffic Management System) will be introduced. The planning of train timetables will be taken to an automated level.

In 2019 a market research was carried out in order to analyse of suitable ETCS technologies for Estonian infrastructure. As a result of the study it was decided that in the upper mentioned modernization period there will be made preconditions for introduction of ETCS L1 technologies. Interoperability inside Baltic States and between Russia stays unchanged because Class B systems will remain as a alternative train protection system for cross-border sections.

The decommissioning of Class B systems on the public network will be carried out gradually. This means that in parallel with introduction of ETCS systems for passenger trains also remain unchanged old Class B systems for freight trains. The implementation of ETCS L1 technologies is planned to carry out in the period from 2025 - 2027.

Estonian second infrastructure manager Edelaraudtee Infrastruktuuri AS has so far planned to continue to use the Class B train protection systems and for that reason there will be double on board equipment needed to achieve interoperability between two infrastructures in near future.

Information regarding the 1435mm infrastructure development is available on the Rail Baltica official website and technologically there is foreseen the Level 2 baseline 3 ETCS system. In Estonia there will be 1520mm and 1435mm infrastructure that will run partly very close to each other and will have different technical parameters (beside standing catenary 3000VDC / 25 000VAC 50Hz, Class B train protection).

6.3.1.9. Overview of Corridor deployment

On the following pages, a visual summary of the state of play regarding the deployment of interoperable systems on the Corridor can be found.

The information is provided in the form of 8 different Figures:

- ERTMS deployment :
    - Actual situation (Figure 6-3-1)
    - 2023 (Figure 6-3-2)
    - 2030 (Figure 6-3-3)
- Baseline:
    - Actual situation (Figure 6-3-4)
    - 2030 (Figure 6-3-5)
- System version:
    - Actual situation (Figure 6-3-6)
    - 2030 (Figure 6-3-7)
- Overview of the Class A/Class B systems in 2030 (Figure 6-3-8)

Figure 6-3-1: ERTMS Deployment actual situation (June 2021)

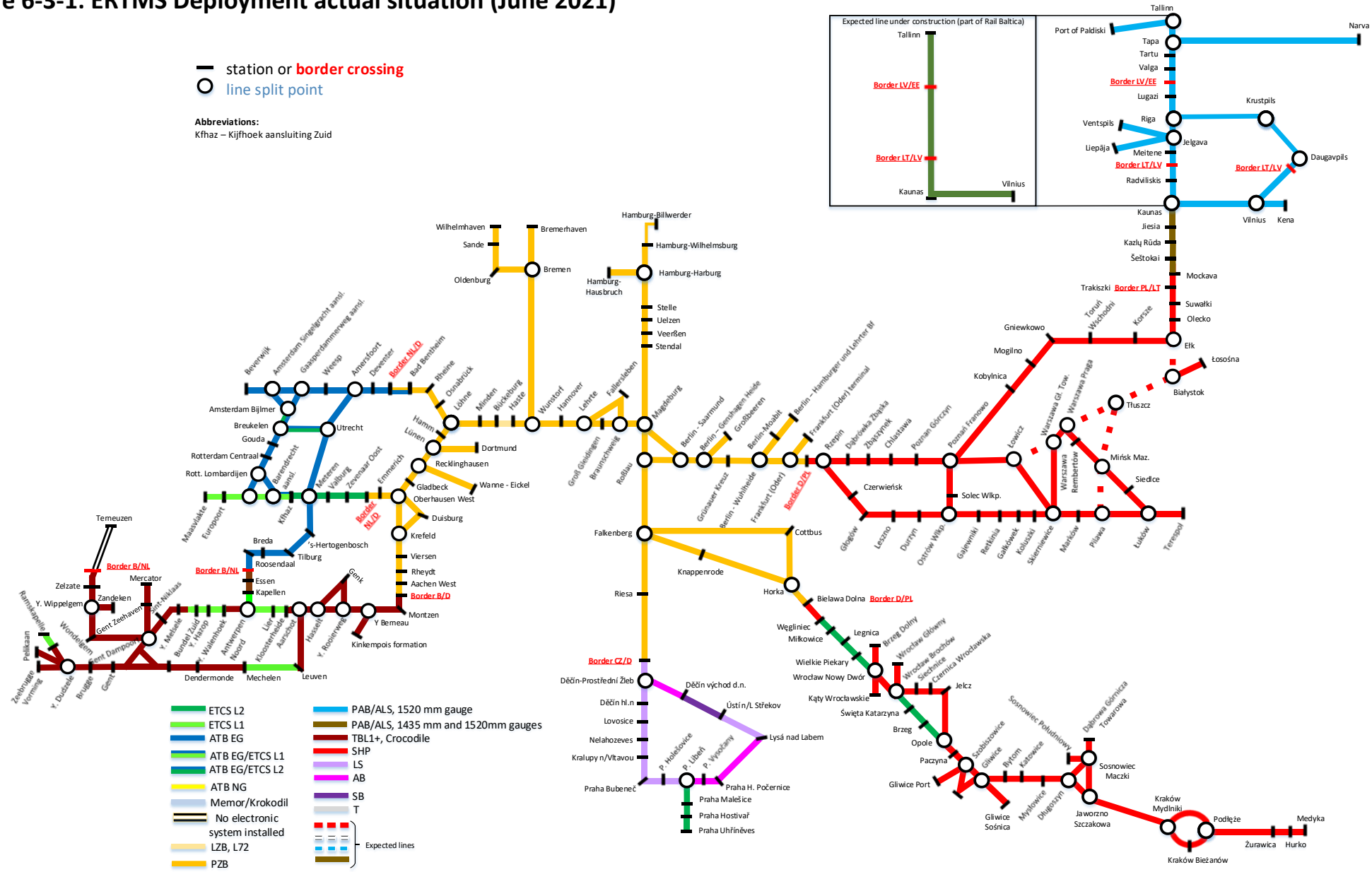


Figure 6-3-2: ERTMS Deployment – situation 2023

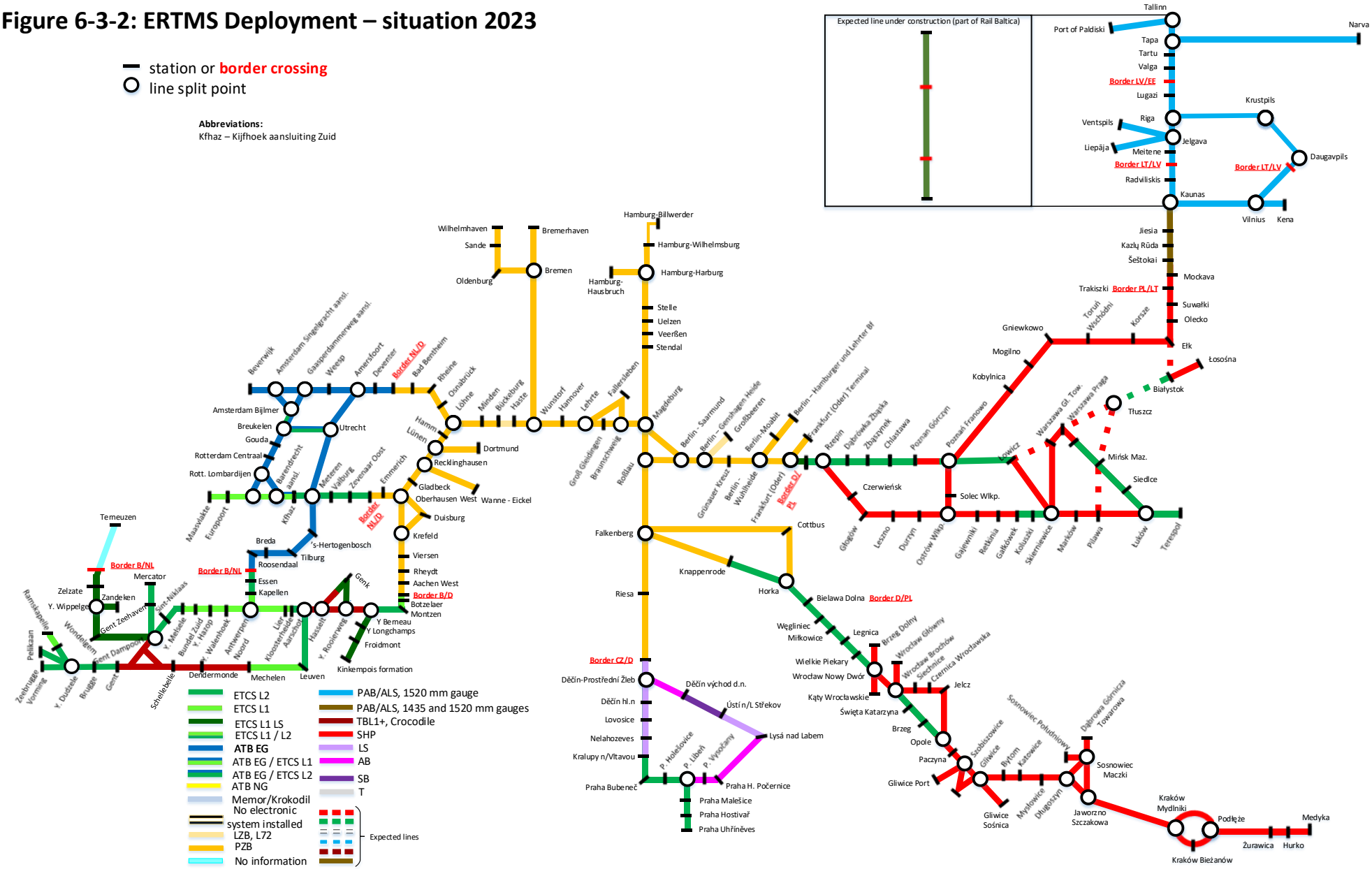


Figure 6-3-3: ERTMS Deployment – situation 2030

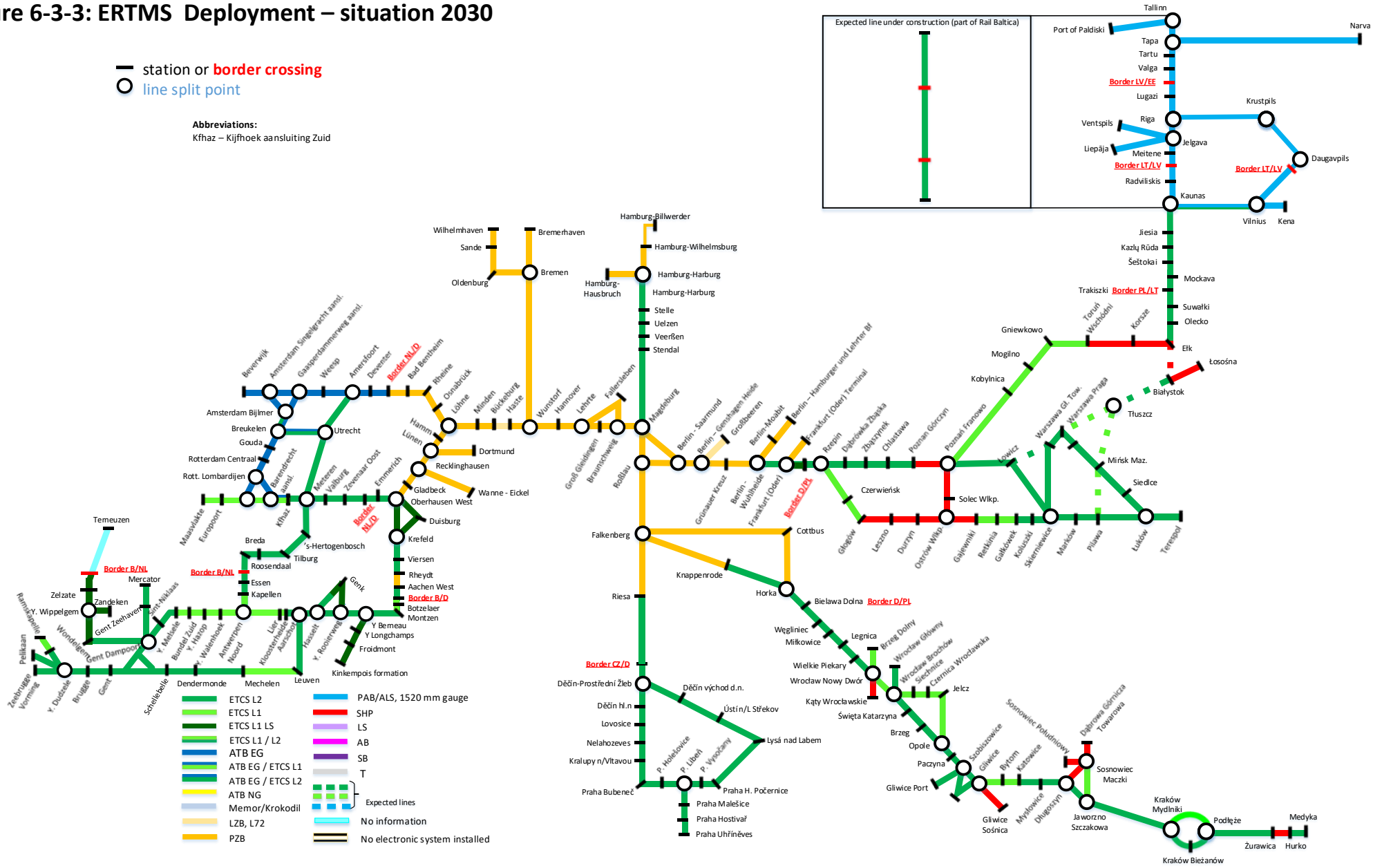


Figure 6-3-4: Baseline – actual situation (June 2021)

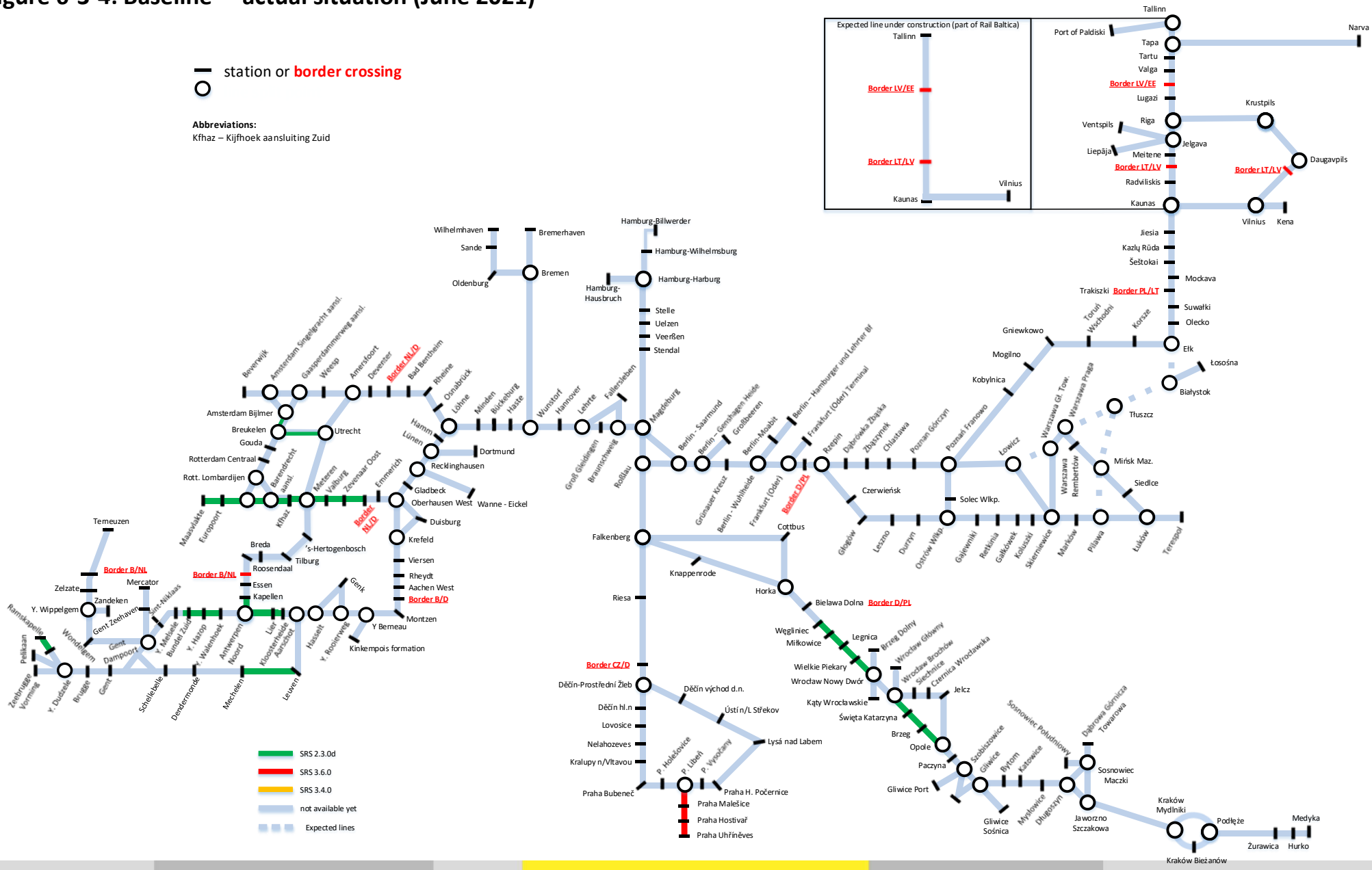


Figure 6-3-5: Baseline - situation 2030

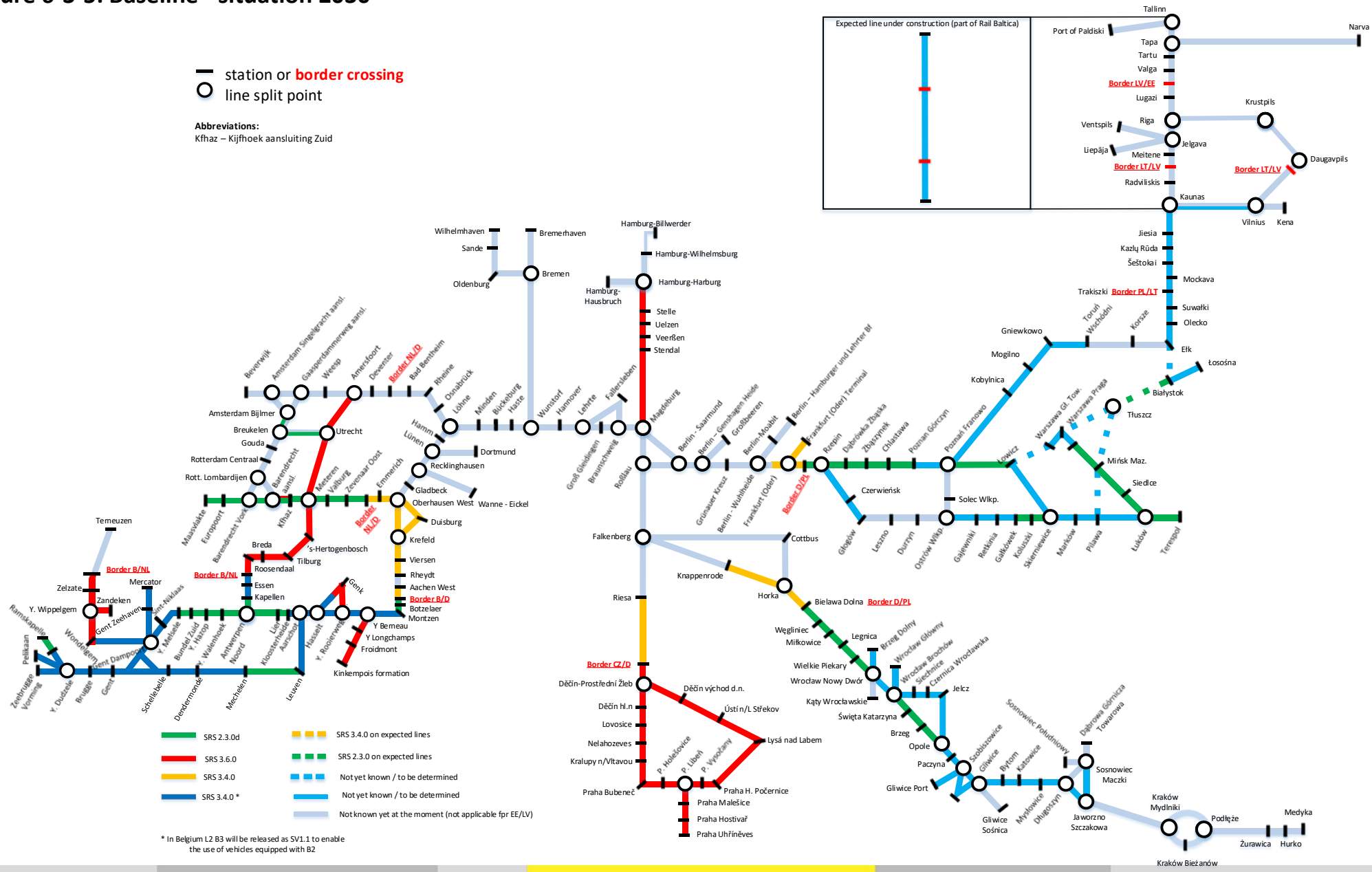


Figure 6-3-6: System version – actual situation (June 2021)

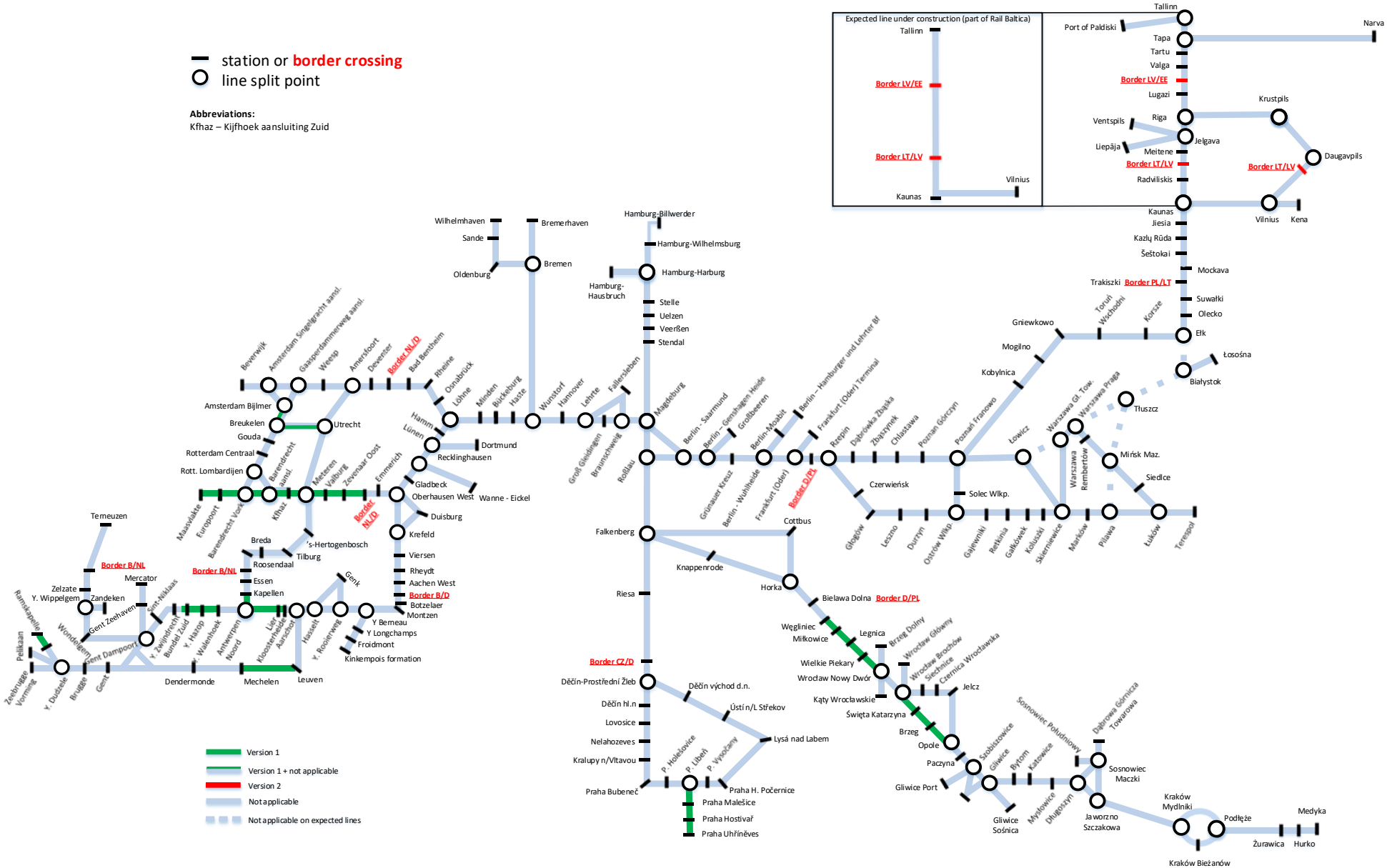


Figure 6-3-7: System version – situation 2030

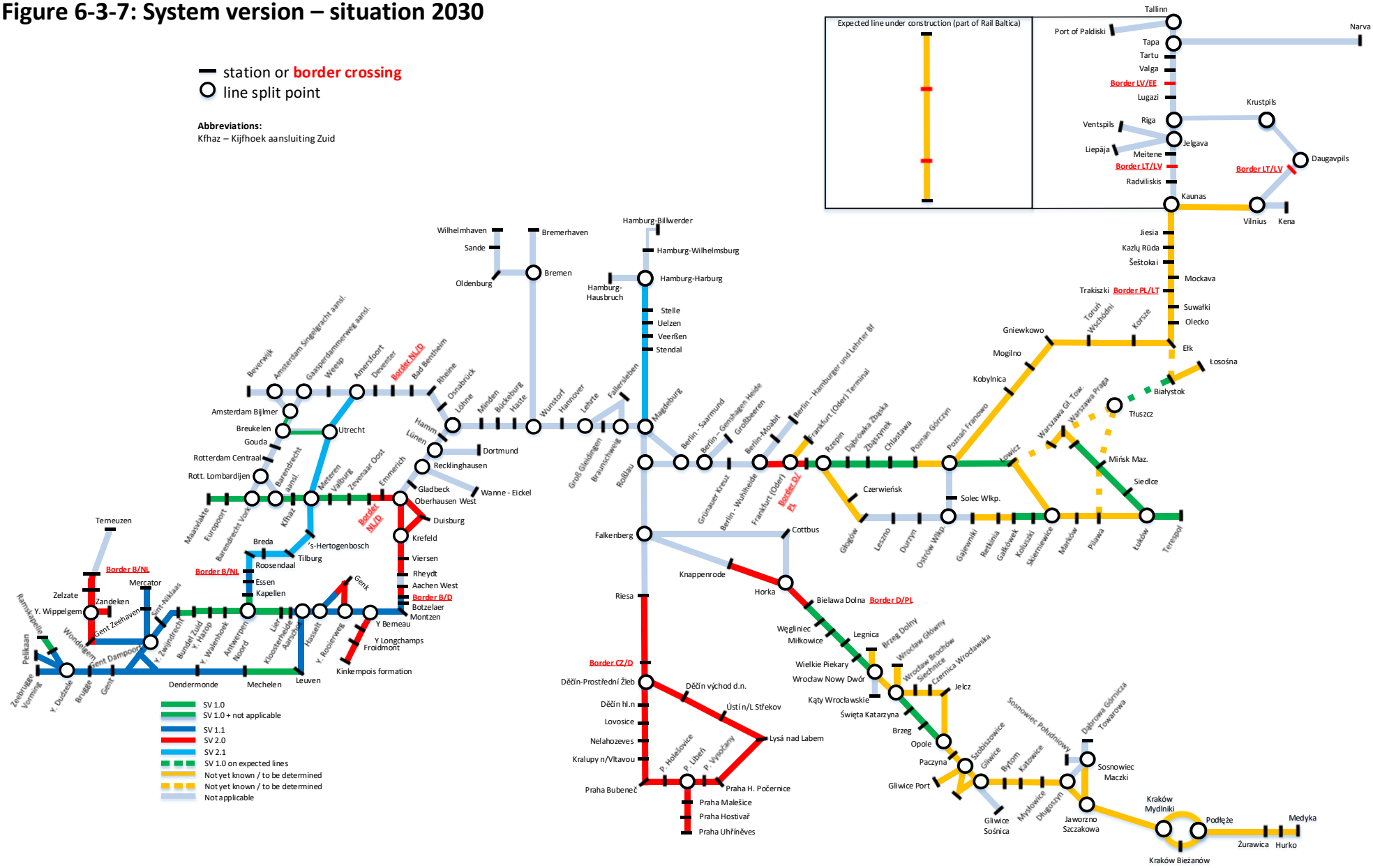
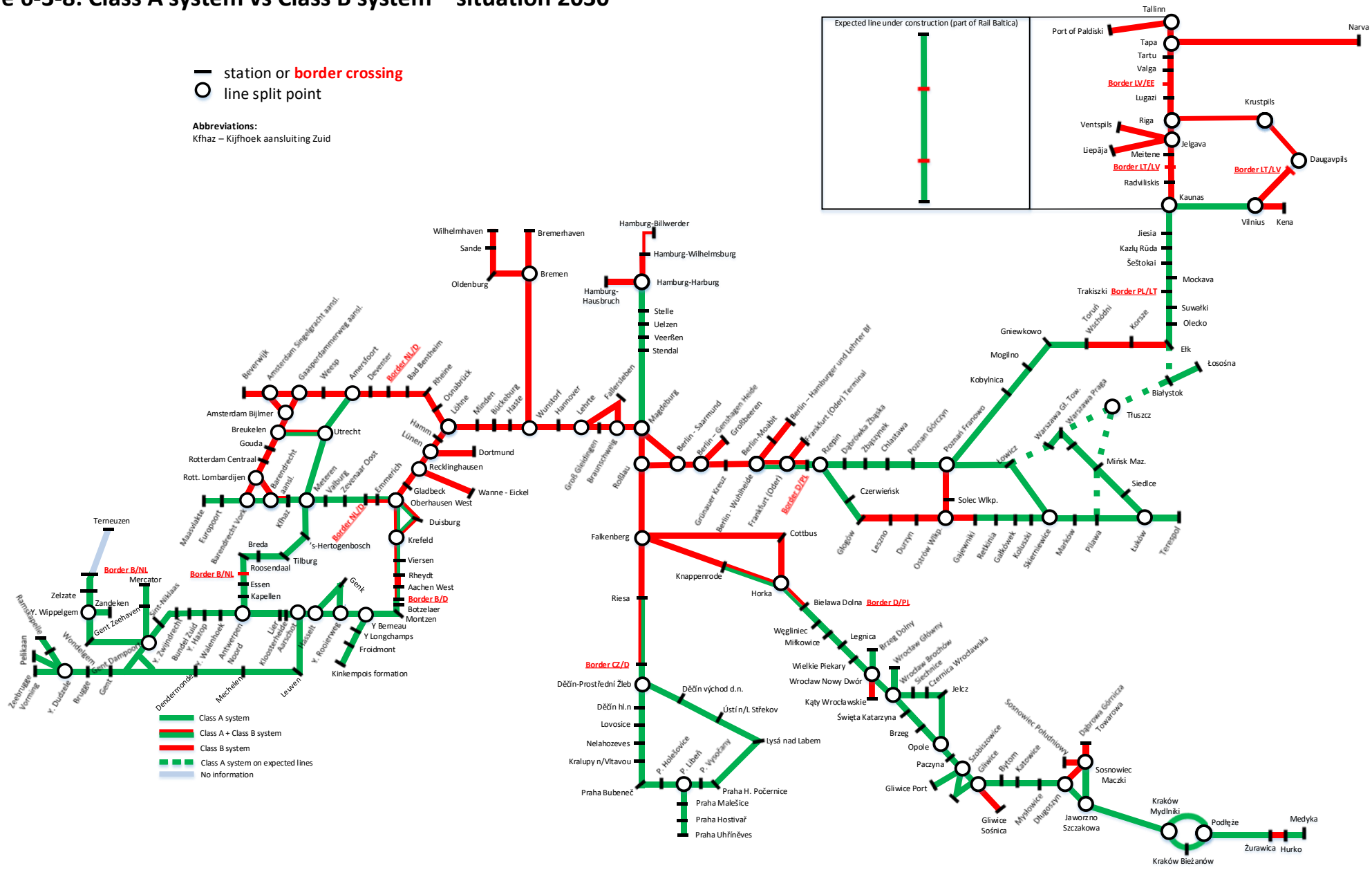


Figure 6-3-8: Class A system vs Class B system – situation 2030



6.3.2. GSM-R

In 1994, ETSI GSM standard was selected by UIC as the bearer for the first Digital Railway Radio Communication System. Needs of railways were captured in dedicated specifications named EIRENE, including both functional and system aspects. These specifications were reinforced as GSM-R within ETSI/3GPP international standards.

The first operational implementation of GSM-R targeting the set-up of this new technology was launched in 1999, and the first country-wide GSM-R operation started in 2004. In parallel, the EU Directives officially adopted the GSM-R as the basis for mobile communication between train and track for voice (train radio) and control-command and signalling data (ETCS), with the aim to form a worldwide standard, the European Rail Traffic Management System, the now well-known ERTMS.

Some of the clear objectives of ERTMS were to create a full homogeneity in the European railway networks, to optimize the global investments for train operations, and at the same time to guarantee the interoperability between national networks and commercial vehicles everywhere. This interoperability is regulated through the European Directives and the Technical Specifications for Interoperability of Control Command and Signalling (CCS TSI), published by the EU and supervised by the European Union Agency for Railways (ERA).

GSM-R has been a great success not only in Europe where more than 100,000 km of railway tracks are daily operated through GSM-R but also worldwide, and this number will double within the next years due to the on-going installations of this technology all over the world.

Nevertheless, on one side the needs of the railways are constantly evolving, and on the other side the telecom standards evolution remains dependent of the telecom industry evolution cycles, with an end of support for GSM-R planned from 2030 onwards.

These considerations led UIC, as soon as 2012, to launch the first studies for a successor to GSM-R, pertinently named Future Rail Mobile Communication System (FRMCS),

FRMCS has the objective to become the worldwide standard, conforming to European regulation as well as responding to the needs and obligations of rail organizations outside of Europe. As such, the UIC FRMCS project duly associates non-European members and is a first concrete application of the UIC strategy to build a Global Rail Traffic Management System for the whole rail industry.

The following text describes the GSM-R situation in the countries along the Corridor.

6.3.2.1. The Netherlands

The network is fully equipped with GSM-R.

6.3.2.2. Belgium

The network is fully equipped with GSM-R.

6.3.2.3. Germany

The network is fully equipped with GSM-R.

6.3.2.4. Czech Republic

The network is fully equipped with GSM-R.

6.3.2.5. Poland

In Poland, the plan is to use GSM-R as the train communication system, except for networks that are functionally separate from the rail system and to which the requirements concerning the interoperability of the rail system and shunting communications do not apply. The goal is to equip over 15000 km of railway lines with the GSM-R system (GSM-R network project 'Construction of ERTMS/GSM-R system infrastructure on PKP PLK S.A. railway lines under the KPW ERTMS' with other, line projects). Most of the GSM-R infrastructure will be installed as part of the GSM-R network project by 2023.

Until 2023, the VHF 150 MHz analog system (Polish class B system) will be used for voice communications. There is no plan for the VHF 150 MHz system to operate in parallel with the GSM-R system on the Polish railway network. After completion of the network GSM-R project and achieving full operation, the migration from the VHF 150 MHz to the GSM-R system will be carried out following the 'Day Zero' approach, i.e. the whole of the network will migrate from the VHF 150 MHz to the GSM-R system on the scheduled date.

6.3.2.6. Lithuania

The network is fully equipped with GSM-R.

6.3.2.7. Latvia

According to Latvia national implementation plan of ERTMS, the deployment of GSM-R is expected not earlier than in 2028 for the 1520 mm railway track gauge network. The ongoing design and construction of the new 1435 mm gauge European standard Rail Baltica line, aimed to integrate the Republic of Latvia into the European rail network, provides deployment of ERTMS for the entire line and will be starting in 2022 (indicative data). The current project's design guidelines foresee the deployment of the Level 2 baseline 3 ETCS system, but may be revised, taking into account the latest developments. Decision regarding the mobile radio communications system will be taken at a later stage of the project, when the requirements for FRMCS will be formalised.

6.3.2.8. Estonia

According to the valid Estonian national implementation plan of ERTMS, the deployment of GSM-R is not expected to be implemented on the 1520 mm railway track gauge network.

Preparation regarding the mobile radio communications system will be taken at a later stage, when the requirements for FRMCS will be formalised. A cross-border cooperation platform for the Baltic States and Finland is under preparation to harmonise the region.

The ongoing design and construction of the new 1435 mm gauge European standard Rail Baltica line, aimed to integrate the Republic of Estonia into the European rail network, provides deployment of the ERTMS for the entire line and will be starting in 2022 (indicative data). The current project's design guidelines foresee the deployment of the Level 2 baseline 3 ETCS system, but may be revised, taking into account the latest developments. Decision regarding the mobile radio communications system will be taken at a later stage of project, when the requirements for FRMCS will be formalised.

6.3.2.9. Overview of GSM-R deployment on the Corridor

Figures 6-3-9 and 6-3-10 show the GSM-R actual deployment on the Corridor and the 2030 deployment.

Figure 6-3-9: GSM-R – current situation

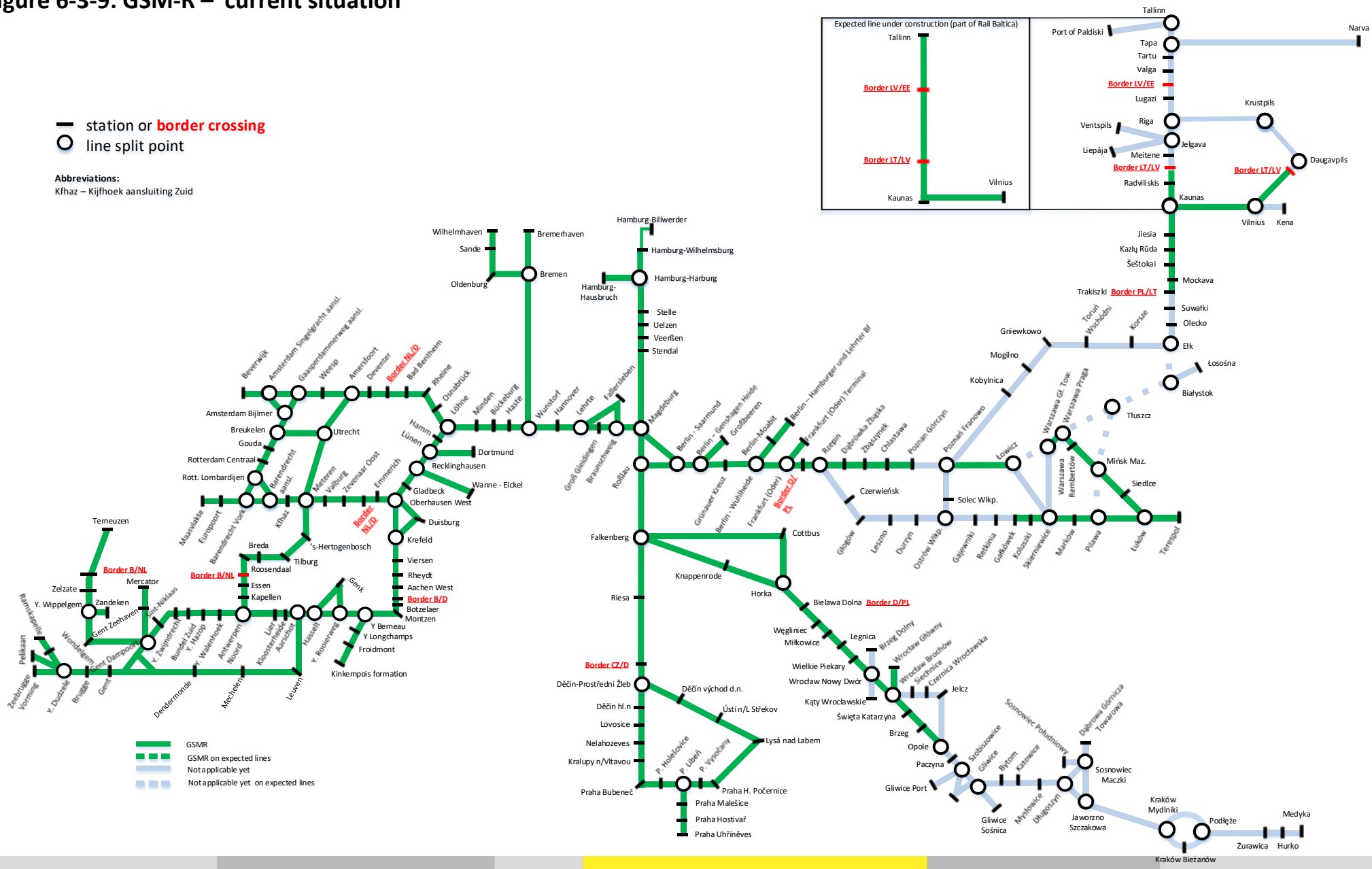
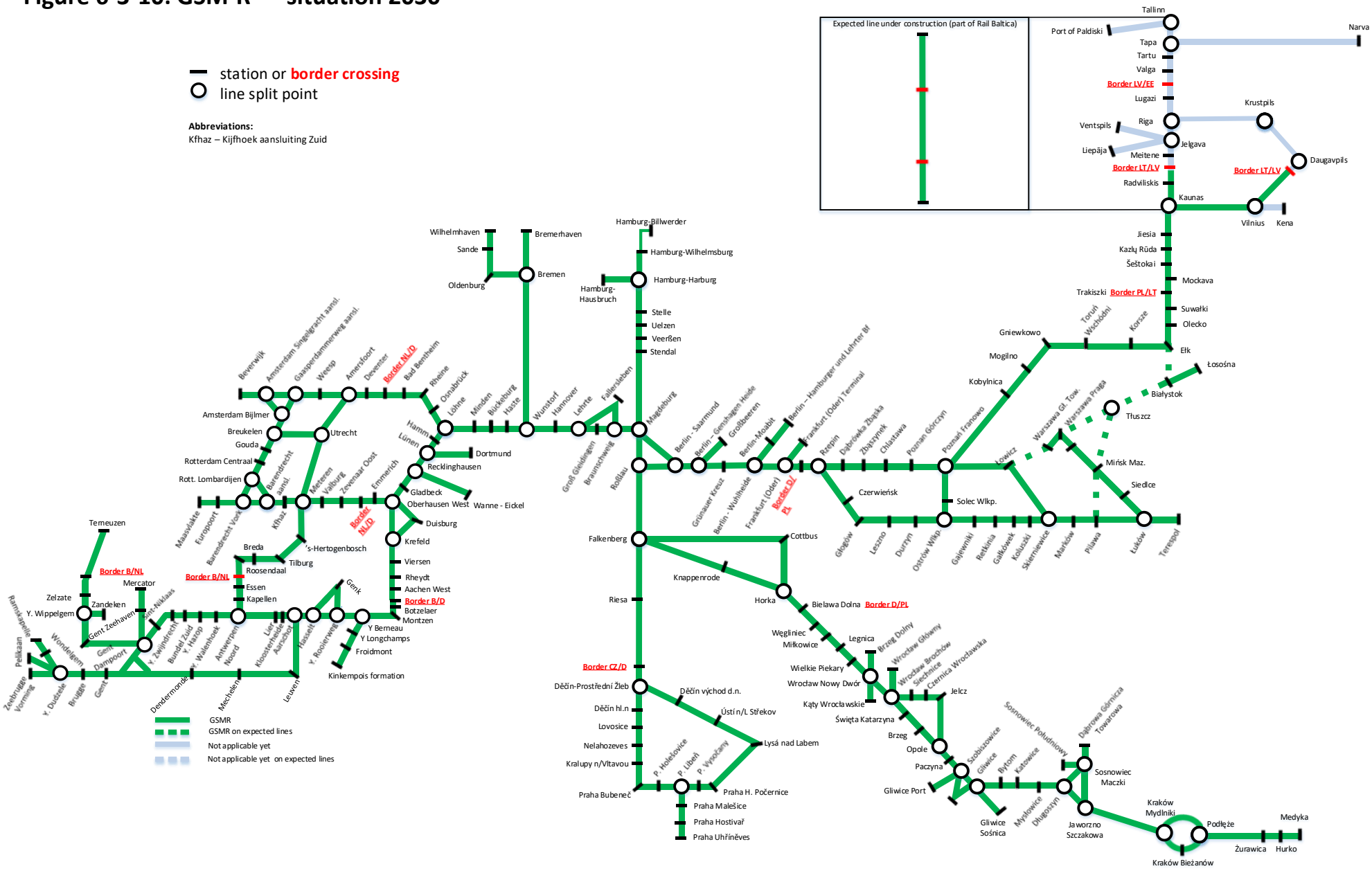


Figure 6-3-10: GSM-R – situation 2030



6.3.3. Border descriptions

Today's existing ERTMS trackside installations in Europe are mostly implemented and managed by one infrastructure manager without crossing borders. On RFC NS-B, ERTMS will be applied and operated internationally, including border crossings. However, the installation and authorisation of the trackside part is still in the hands of each Member State. The currently available ERTMS specifications, product developments as well as authorisation rules will be proven on RFC NS-B in an international Corridor environment. On the cross-border sections the interaction is much more complex due to different national technical requirements and different operational rules. An overview of the cross-border solutions can be found in Annex 2.

6.4 Reference to Union Contribution

RFC NS-B has been benefiting from European co-financing for several years. The CEF project number 2014-EU-TM-0217-S for the financing period 2015-2020, ended in December 2020. RFC NS-B intends to apply for new financing under the CEF II programme. More info can be found on the CINEA website.

Annex 1: List of lines

Country	Line section	Length of section (km)	Type of line	Track gauge
NL	Maasvlakte - Zevenaar grens			
NL	Maasvlakte - Europoort	13,8	principal	1435 mm
NL	Europoort - Botlek	10,6	principal	1435 mm
NL	Botlek - Pernis	4,7	principal	1435 mm
NL	Pernis - Waalhaven Zuid	5,3	principal	1435 mm
NL	Waalhaven Zuid - Barendrecht Vork	5,3	principal	1435 mm
NL	Barendrecht Vork - Barendrecht aansluiting	2,9	principal	1435 mm
NL	Barendrecht aansluiting - Kijfhoek aansluiting Zuid	5,3	principal	1435 mm
NL	Kijfhoek aansluiting Zuid - Meteren West	48	principal	1435 mm
NL	Meteren West - Meteren	1	principal	1435 mm
NL	Meteren - Valburg	49	principal	1435 mm
NL	Valburg - Zevenaar Oost	21	principal	1435 mm
NL	Zevenaar Oost - Zevenaar grens	3	principal	1435 mm
NL	Kijfhoek - Weesp			
NL	Barendrecht Aansluiting - Rotterdam Lombardijen	3,2	diversionary	1435 mm
NL	Barendrecht Vork - Rotterdam Lombardijen	0,7	diversionary	1435 mm
NL	Rotterdam Lombardijen - Rotterdam Centraal	5,5	diversionary	1435 mm
NL	Rotterdam Centraal - Gouda	24	diversionary	1435 mm
NL	Gouda - Woerden	16	diversionary	1435 mm
NL	Woerden - Harmelen	4	diversionary	1435 mm
NL	Harmelen - Breukelen	8	diversionary	1435 mm
NL	Breukelen - Amsterdam Bijlmer	18	diversionary	1435 mm
NL	Amsterdam Bijlmer - Gaasperdammerweg	4	diversionary	1435 mm
NL	Beverwijk - Oldenzaal grens			
NL	Beverwijk - Haarlem	11,5	connecting	1435 mm
NL	Haarlem - Amsterdam Singelgracht aansluiting	17	connecting	1435 mm
NL	Amsterdam Singelgracht aansluiting - Gaasperdammerweg	9	principal	1435 mm
NL	Gaasperdammerweg - Weesp	4	principal	1435 mm
NL	Weesp - Hilversum	15	principal	1435 mm
NL	Hilversum - Amersfoort	16	principal	1435 mm
NL	Amersfoort - Deventer	58	principal	1435 mm
NL	Deventer - Hengelo	27	principal	1435 mm
NL	Hengelo - Oldenzaal grens	18	principal	1435 mm
NL	Roosendaal grens - 's Hertogenbosch			

NL	Roosendaal grens - Roosendaal	8,5	principal	1435 mm
NL	Roosendaal - Breda	22,5	principal	1435 mm
NL	Breda - Tilburg	21	principal	1435 mm
NL	Tilburg - 's Hertogenbosch	22,5	principal	1435 mm
NL	's Hertogenbosch - Amersfoort			
NL	's Hertogenbosch - Meteren Zuid	20	principal	1435 mm
NL	Meteren Zuid - Meteren	2	principal	1435 mm
NL	Meteren Zuid - Meteren Noord	2	principal	1435 mm
NL	Meteren Noord - Utrecht	27	principal	1435 mm
NL	Utrecht - Amersfoort	21	principal	1435 mm
NL	Zeeuws-Vlaanderen			
NL	NL/B Border- Sluiskil aansluiting	9,14	connecting	1435 mm
NL	Sluiskil aansluiting - Terneuzen Zuidzijde	1,78	connecting	1435 mm
NL	Terneuzen Zuidzijde - Terneuzen	4,2	connecting	1435 mm
NL	Terneuzen Zuidzijde - Axel aansluiting	2,48	connecting	1435 mm
BE	Antwerpen Noord (Y. Schijn) - Montzen Border			
BE	Antwerpen Noord (Y. Schijn) - Y. Driehoekstraat	1,1	principal	1435 mm
BE	Y. Driehoekstraat - Antwerpen Berchem	11,8	principal	1435 mm
BE	Antwerpen Berchem - Lier	11,75	principal	1435 mm
BE	Lier - Kloosterheide	3,3	principal	1435 mm
BE	Kloosterheide - Y. Noord Driehoek Aarschot	23,2	principal	1435 mm
BE	Y. Noord Driehoek Aarschot - Y. Oost Driehoek Aarschot	0,8	principal	1435 mm
BE	Y. Oost Driehoek Aarschot - Hasselt	36,1	principal	1435 mm
BE	Hasselt - Y. Rooierweg	14,6	principal	1435 mm
BE	Y. Rooierweg - Glons	16,86	principal	1435 mm
BE	Glons - Y. Berneau	14,64	principal	1435 mm
BE	Y. Berneau - Montzen Gril Q	18,14	principal	1435 mm
BE	Montzen Gril Q - Botzelaer	5,6	principal	1435 mm
BE	Botzelaer - Montzen Border	1,1	principal	1435 mm
BE	Y. Oost Driehoek Aarschot - Leuven (Y. Holsbeek) - Zeebrugge vorming			
BE	Y. Oost Driehoek Aarschot - Y. Zuid Driehoek Aarschot	1,2	principal	1435 mm
BE	Y. Zuid Driehoek Aarschot - Leuven (Y. Holsbeek)	13	principal	1435 mm
BE	Leuven (Y. Holsbeek) - Mechelen	22,65	principal	1435 mm
BE	Mechelen - Dendermonde	27,2	principal	1435 mm
BE	Dendermonde - Y. Oost Driehoek Ledeberg	26,28	principal	1435 mm
BE	Y. Oost Driehoek Ledeberg - Gent Sint Pieters	3,4	principal	1435 mm
BE	Gent-Sint Pieters - Brugge	5,3	Principal	1435 mm
BE	Brugge - Y. Dudzele	6,8	Principal	1435 mm
BE	Y. Dudzele - Zeebrugge Vorming	6,21	Principal	1435 mm
BE	Essen Border - Gent Sint Pieters			
BE	Essen Border - Kapellen	17,97	principal	1435 mm

BE	Kapellen - Y. Sint Mariaburg	2,46	principal	1435 mm
BE	Y. Sint Mariaburg - Y. Driehoekstraat	0,9	principal	1435 mm
BE	Y. Driehoekstraat - Antwerpen Noord (Y. Schijn) -	1,1	principal	1435 mm
BE	Antwerpen Noord (Y. Schijn) - Y. Walenhoek	7,6	principal	1435 mm
BE	Y. Walenhoek - Y. Hazop	15,93	principal	1435 mm
BE	Y. Hazop - Bundel Zuid	1,1	principal	1435 mm
BE	Bundel Zuid - Y. Kattestraat	7,1	principal	1435 mm
BE	Y. Kattestraat - Y. Melsele	1,36	principal	1435 mm
BE	Y. Melsele - Sint Niklaas	11,31	principal	1435 mm
BE	Sint Niklaas - Lokeren	13,1	principal	1435 mm
BE	Lokeren - Gent Dampoort	20,21	principal	1435 mm
BE	Gent Dampoort - Gent Sint Pieters	6,43	principal	1435 mm
BE	Gent Zeehaven - Y. Oost Driehoek Ledeberg			
BE	Gent Zeehaven - Gent Dampoort	1,21	principal	1435 mm
BE	Gent Dampoort - Y. Noord Driehoek Ledeberg	3	principal	1435 mm
BE	Y. Noord Driehoek Ledeberg - Y. Oost Driehoek Ledeberg	0,7	principal	1435 mm
BE	Gent Zeehaven - (bundel) Mercator			
BE	Gent Zeehaven - (bundel) Mercator	2,49	connecting	1435 mm
BE	Gent Dampoort - Zelzate grens			
BE	Gent Dampoort - Wondelgem	5,32	connecting	1435 mm
BE	Wondelgem - Y. Wippelgem	6,87	connecting	1435 mm
BE	Y.Wippelgem - Zelzate grens	8,74	connecting	1435 mm
BE	Y. Wippelgem - (bundel) Zandeken			
BE	Y. Wippelgem - (bundel) Zandeken	0,69	connecting	1435 mm
BE	Y. Dudzele - (bundel) Pelikaan / (bundel) Ramskapelle			
BE	Y. Dudzele - Y. Pelikaan	3,65	connecting	1435 mm
BE	Y. Pelikaan - (bundel)Pelikaan	1,28	connecting	1435 mm
BE	Y. Pelikaan - Y. Eivoorde	0,66	connecting	1435 mm
BE	Y. Eivoorde - (bundel) Ramskapelle	2,73	connecting	1435 mm
BE	Hasselt - Genk Goederen			
BE	Y West Driehoek Hasselt - Y. Zonhoven	2,6	connecting	1435 mm
BE	Y. Zonhoven - Genk Goederen	13,2	connecting	1435 mm
BE	Y. Rooierweg - Genk Goederen			
BE	Y. Rooierweg - Genk Goederen	13,8	connecting	1435 mm
BE	Y. Rooierweg - Genk Zuid			
BE	Y. Rooierweg - Genk Zuid	8,0	connecting	1435 mm
BE	Y Berneau - Kinkempois			
BE	Y Berneau - Visé	3,6	connecting	1435 mm
BE	Visé - Froidmont	16,0	connecting	1435 mm
BE	Froidmont - Kinkempois formation	2,0	connecting	1435 mm
BE	Lier - Hamont Border BE/NL			

BE	Lier - Debiest	3,2	Expected principal	1435 mm
BE	Debiest - Herentals	22,6	Expected principal	1435 mm
BE	Herentals - Olen	15,3	Expected principal	1435 mm
BE	Olen - Mol	23,0	Expected principal	1435 mm
BE	Mol - Neerpelt	8,8	Expected principal	1435 mm
BE	Neerpelt - Hamont	0,9	Expected principal	1435 mm
BE	Hamont - Hamont border BE/NL	9,7	Expected principal	1435 mm
DE	Aachen Border BE/DE - Oberhausen West			
DE	Aachen Border BE/DE - Aachen West (Strecke 2552)	5,4	Principal	1435 mm
DE	Aachen West - Rheydt Hbf (Strecke 2550)	55,5	Principal	1435 mm
DE	Rheydt Hbf - Viersen Hbf (Strecke 2550, 2520)	12,5	Principal	1435 mm
DE	Rheydt (Gbf) - Viersen-Helenabrunn (Strecke 2522)	11,7	Connecting	1435 mm
DE	Viersen Hbf - Krefeld (Strecke 2520)	15,5	Principal	1435 mm
DE	Krefeld - Meerbeck - Oberhausen West (Strecken 2505, 2340, 2330, 2331)	40,8	Principal	1435 mm
DE	(Krefeld -) Duisburg - Oberhausen West (Strecke 2505, 2323, 2320)	17,9	Connecting	1435 mm
DE	Border NL/DE - Emmerich - Oberhausen-Osterfeld			
DE	Border NL/DE - Emmerich - Ob.-Sterkrade - Ob.-Osterfeld (Strecke 2270, 2206)	75,7	Principal	1435 mm
DE	Oberhausen West - Löhne			
DE	Oberhausen West - Oberhausen-Osterfeld - Gladbeck W (Str. 2206, 2320, 2250)	19,3	Principal	1435 mm
DE	Gladbeck West - Recklinghausen Ost (Strecke 2250)	18,6	Principal	1435 mm
DE	Recklinghausen Ost - Wanne-Eickel (Strecke 2250)	9,3	Connecting	1435 mm
DE	Recklinghausen - Hamm Rbf (Strecke 2250)	43,6	Principal	1435 mm
DE	Lünen Hbf - Dortmund Hbf (Strecke 2100)	13,9	Connecting	1435 mm
DE	Hamm - Löhne (Strecke 2990)	92,2	Principal	1435 mm
DE	Hamm - Löhne (Strecke 1700)	90,9	Diversionary	1435 mm
DE	Border NL/DE - Bad Bentheim - Löhne			
DE	Border NL/DE - Bad Bentheim - Osnabrück (Strecke 2026, 2931, 2992)	77,0	Principal	1435 mm
DE	Osnabrück - Löhne (Strecke 2992)	47,3	Principal	1435 mm
DE	Löhne - Wunstorf			
DE	Löhne - Minden (Strecke 2990)	23,4	Principal	1435 mm
DE	Löhne - Minden (Strecke 1700)	20,9	Diversionary	1435 mm

DE	Minden - Haste (Strecke 1700)	43,0	Principal	1435 mm
DE	Wilhelmshaven - Bremen			
DE	Wilhelmshaven - Sande (Strecken 1522, 1540, 1552)	15,7	Principal	1435 mm
DE	Sande - Oldenburg (Strecke 1522)	45,0	Principal	1435 mm
DE	Oldenburg - Bremen (Strecke 1500)	44,3	Principal	1435 mm
DE	Bremerhaven - Bremen - Wunstorf			
DE	Bremerhaven - Bremen (Strecke 1740)	72,7	Principal	1435 mm
DE	Bremen - Wunstorf (Strecke 1740)	100,8	Principal	1435 mm
DE	Wunstorf - Hannover-Linden/Hannover Hbf - Lehrte - Magdeburg			
DE	Wunstorf - Hannover-Linden - Lehrte (Strecke 1750)	43,3	Principal	1435 mm
DE	Wunstorf - Hannover Hbf - Lehrte (Strecke 1700, 1730)	37,7	Diversionary	1435 mm
DE	Lehrte - Groß Gleidingen (Strecke 1730)	36,8	Principal	1435 mm
DE	Lehrte - Fallersleben (Strecke 6107)	52,9	Connecting	1435 mm
DE	Groß Gleidingen - Magdeburg Hbf (Strecke 1730, 1900, 6400, 6110)	91,4	Principal	1435 mm
DE	Groß Gleidingen - Braunschweig Rbf (Strecke 1910, 1911, 1912, 1913, 1914)	22,4	Connecting	1435 mm
DE	(Braunschweig -) Weddel - Fallersleben (Strecke 1956)	20,5	Connecting	1435 mm
DE	Hamburg - (Magdeburg) Brücke			
DE	Hamburg-Hausbruch - Hamburg-Harburg (Strecke 1720)	5,7	Principal	1435 mm
DE	Hamburg Süd - Hamburg-Harburg (Strecke 1255)	11,8	Principal	1435 mm
DE	Hamburg-Billwerder - Hamburg-Harburg (Strecke 1280)	16,5	Connecting	1435 mm
DE	Hamburg-Harburg - Stelle (Strecke 1280/1284)	11,4	Principal	1435 mm
DE	Hamburg-Harburg - Stelle (Strecke 1720)	11,2	Connecting	1435 mm
DE	Stelle - Uelzen (Strecke 1720)	61,8	Principal	1435 mm
DE	Stelle - Lüneburg (Strecke 1153)	24,9	Principal	1435 mm
DE	Uelzen - Stendal (Strecke 6899)	107,3	Principal	1435 mm
DE	Stendal - (Magdeburg) Brücke (Strecke 6402, 6406, 6408)	55,8	Principal	1435 mm
DE	Madgeburg - Berlin-Saarmund			
DE	Magdeburg Hbf - Saarmund (Strecke 6110, 6112, 6116)	122,1	Principal	1435 mm
DE	(Madgeburg -) Biederitz - Roßlau (Elbe) - Falkenberg			
DE	Biederitz -Rodleben (Strw. 6411-6415) (Strecke 6410, 6411)	46,2	Principal	1435 mm
DE	Rodleben (Strw. 6411-6415) - Roßlau (Elbe) (Strecke 6411)	1,4	Connecting	1435 mm
DE	Rodleben (Strw. 6411-6415) - Falkenberg (Strecke 6415, 6417, 6207)	83,9	Principal	1435 mm
DE	Roßlau (Elbe) - Bft Roßlau (Elbe) Aw (Strecke 6207)	4,3	Connecting	1435 mm
DE	Falkenberg - Knappenrode - Horka - Border DE/PL			
DE	Falkenberg - Knappenrode (Strecke 6207)	82,5	Principal	1435 mm
DE	Knappenrode - Horka - Border DE/PL (Strecke 6207)	53,7	Principal	1435 mm

DE	Falkenberg - Cottbus - Horka			
DE	Falkenberg - Cottbus (Strecke 6345)	79,3	Diversionary	1435 mm
DE	Cottbus - Horka (Strecke 6142, 6208)	73,9	Diversionary	1435 mm
DE	Roßlau - Berlin - Frankfurt (Oder) - Border DE/PL			
DE	Roßlau - Saarmund (Strecke 6414, 6118, 6124, 6122, 6117)	84,5	Diversionary	1435 mm
DE	Saarmund - Berlin-Eichgestell (Strecke 6126)	35,6	Principal	1435 mm
DE	Berlin-Genshagener Heide - Großbeeren (Strecke 6065, 6127, 6129, 6130)	9,7	Connecting	1435 mm
DE	Berlin-Eichgestell - Frankfurt (O) - Border DE/PL (Strecke 6080, 6148, 6153, 6155)	77,0	Principal	1435 mm
DE	Falkenberg - Bad Schandau - Border CZ/DE			
DE	Falkenberg - Zeithain Bogendreieck (Riesa) (Strecke 6133)	30,5	Principal	1435 mm
DE	Röderau - Riesa (Strecke 6254)	3,5	Connecting	1435 mm
DE	Röderau Bogendreieck - Zeithain Bogendreieck (Strecke 6363)	3,6	Connecting	1435 mm
DE	Zeithain Bogendr. - Bad Schand. - Bord. CZ/DE (Str. 6241, 6363, 6248, 6249, 6240, 6244)	98,0	Principal	1435 mm
DE	Terminal at Frankurt (Oder)			
DE	Frankfurt (Oder) Pbf - Terminal Frankfurt (Oder) (Strecke 6156)	1,7	Connecting	1435 mm
DE	Terminal at Berlin Westhafen			
DE	Berlin-Stadtforst - Berlin-Moabit (Strecke 6153, 6140, 6170)	21,3	Connecting	1435 mm
DE	Berlin-Moabit - Berlin-Hamburger und Lehrter Bf (Strecke 6106)	2,3	Connecting	1435 mm
CZ	Praha Libeň - Praha Holešovice	5,186	principal	1435 mm
CZ	Praha Holešovice - Praha Bubeneč	1,523	principal	1435 mm
CZ	Praha Bubeneč - Kralupy n/Vltavou	22,051	principal	1435 mm
CZ	Kralupy n/Vltavou - Nelahozeves	5,408	principal	1435 mm
CZ	Nelahozeves - Lovosice	52,473	principal	1435 mm
CZ	Lovosice - Děčín hl.n.	44,581	principal	1435 mm
CZ	Děčín hl.n. - Děčín Prostřední Žleb	3,288	principal	1435 mm
CZ	Děčín Prostřední Žleb - state border Germany	8,052	principal	1435 mm
CZ	Praha Libeň - Praha Vysočany	1,229	diversionary	1435 mm
CZ	Praha Vysočany - Praha H.Počernice	8,572	diversionary	1435 mm
CZ	Praha H.Počernice - Lysá n/Labem	20,53	diversionary	1435 mm
CZ	Lysá n/Labem - Ústí n/L Střekov	93,511	diversionary	1435 mm
CZ	Ústí n/L Střekov - Děčín východ d.n.	25,759	diversionary	1435 mm
CZ	Děčín východ d.n. - Děčín Prostřední Žleb	2,755	diversionary	1435 mm
CZ	Praha Libeň - Praha Malešice	3,884	connecting	1435 mm
CZ	Praha Malešice - Praha Hostivař	3,869	connecting	1435 mm
CZ	Praha Hostivař - Praha Uhříněves	4,831	connecting	1435 mm

PL	Border D/PL - Poznań - Terespol (Border PL/Belorussia)			
PL	Kunowice (Border D/PL) - Rzepin	17,317	Principal	1435 mm
PL	Rzepin - Chlastawa	78,258	Principal	1435 mm
PL	Chlastawa - Poznań Górczyn	73,599	Principal	1435 mm
PL	Poznań Górczyn - Poznań Starołęka PSK	2,674	Principal	1435 mm
PL	Poznań Starołęka PSK - Poznań Starołęka	1,177	Principal	1435 mm
PL	Poznań Starołęka - Pokrzywno	2,560	Principal	1435 mm
PL	Pokrzywno - Poznań Franowo PFA	4,888	Principal	1435 mm
PL	Poznań Franowo PFA - Swarzędz	5,817	Principal	1435 mm
PL	Swarzędz - Barłogi	124,637	Principal	1435 mm
PL	Barłogi - Kutno	40,204	Principal	1435 mm
PL	Kutno - Łowicz Główny	45,254	Principal	1435 mm
PL	Łowicz Główny - Placencja	3,500	Principal	1435 mm
PL	Placencja - Skierniewka	1,876	Principal	1435 mm
PL	Placencja - Skierniewka	14,726	Principal	1435 mm
PL	Skierniewka - Skierniewice	1,616	Principal	1435 mm
PL	Skierniewice - Marków	9,275	Principal	1435 mm
PL	Skierniewice - Marków	15,780	Principal	1435 mm
PL	Marków - Czachówek Zachodni	39,690	Principal	1435 mm
PL	Czachówek Zachodni - Czachówek Wschodni	2,782	Principal	1435 mm
PL	Czachówek Wschodni - Jaźwiny (Pilawa)	29,278	Principal	1435 mm
PL	Pilawa - Poważe	58,403	Principal	1435 mm
PL	Poważe - Łuków	3,385	Principal	1435 mm
PL	Łuków - Biała Podlaska	52,415	Principal	1435 mm
PL	Biała Podlaska - Małaszewicze	28,712	Principal	1435 mm
PL	Małaszewicze - Terespol	7,705	Principal	1435 mm
PL	Terespol - Terespol (Boder PL/Belorussia)	2,377	Principal	1435 mm
PL	Ełk - Trakiszki (Border PL/LT)			
PL	Ełk - Olecko	28,486	Principal	1435 mm
PL	Olecko - (Gw)	16,457	Principal	1435 mm
PL	(Gw) - Papiernia	20,700	Principal	1435 mm
PL	Papiernia - Suwałki	5,745	Principal	1435 mm
PL	Suwałki - Trakiszki	25,690	Principal	1435 mm
PL	Trakiszki - Trakiszki (Border PL/LT)	3,432	Principal	1435 mm
PL	Poznań - Stary Staw			
PL	(Poznań Gł.) P. Starołęka Psk - Poznań Krzesiny	5,556	Diversionary	1435 mm
PL	Poznań Krzesiny - Kórnik	8,622	Diversionary	1435 mm
PL	Kórnik - Solec Wlkp.	32,84	Diversionary	1435 mm
PL	Solec Wlkp. - Jarocin	16,586	Diversionary	1435 mm
PL	Jarocin - Franklinów	26,747	Diversionary	1435 mm
PL	Franklinów - Stary Staw	1,466	Diversionary	1435 mm
PL	Rzepin - Skierniewice			

PL	Rzepin - Jerzmanice Lubuskie	6,628	Diversionary	1435 mm
PL	Jerzmanice Lubuskie - Czerwieńsk	50,018	Diversionary	1435 mm
PL	Czerwieńsk - Głogów	67,45	Diversionary	1435 mm
PL	Głogów - Leszno	46,782	Diversionary	1435 mm
PL	Leszno - Kąkolewo	11,874	Diversionary	1435 mm
PL	Kąkolewo - Osusz	56,262	Diversionary	1435 mm
PL	Osusz - Durzyn	5,289	Diversionary	1435 mm
PL	Durzyn - Ostrów Wielkopolski	26,322	Diversionary	1435 mm
PL	Ostrów Wielkopolski - Gajewniki	96,279	Diversionary	1435 mm
PL	Gajewnik - Retkinia	37,492	Diversionary	1435 mm
PL	Retkinia - Łódź Kaliska Towarowa	1,752	Diversionary	1435 mm
PL	Łódź Kaliska Towarowa - Łódź Chojny	5,161	Diversionary	1435 mm
PL	Łódź Chojny - Łódź Olechów	7,979	Diversionary	1435 mm
PL	Łódź Olechów - Gałkówek	9,302	Diversionary	1435 mm
PL	Gałkówek - Koluszki	7,203	Diversionary	1435 mm
PL	Koluszki - Skierniewice	39,265	Diversionary	1435 mm
PL	Łowicz - Warszawa - Łuków			
PL	Łowicz - Warszawa Główna Towarowa	72,281	Expected diversionary	1435 mm
PL	Warszawa Główna Towarowa - Warszawa Gdańska	9,175	Diversionary	1435 mm
PL	Warszawa Gdańska - Warszawa Praga	3,963	Diversionary	1435 mm
PL	Warszawa Targówek - Warszawa Michałów	1,211	Diversionary	1435 mm
PL	Warszawa Michałów - Warszawa Wschodnia Tow.	1,559	Diversionary	1435 mm
PL	Warszawa Wschodnia Tow. - Warszawa Rembertów	3,923	Diversionary	1435 mm
PL	Warszawa Rembertów - Stojadła	27,262	Diversionary	1435 mm
PL	Stojadła - Mińsk Mazowiecki	1,58	Diversionary	1435 mm
PL	Mińsk Mazowiecki - Siedlce	52,099	Diversionary	1435 mm
PL	Siedlce - Łuków	27,754	Diversionary	1435 mm
PL	Piława - Tłuszcz			
PL	Pilawa - Tłuszcz	59,595	Expected principal	1435 mm
PL	Warszawa Praga - Tłuszcz - Białystok - Ełk			
PL	Warszawa Praga - Tłuszcz	44,271	Expected diversionary	1435 mm
PL	Tłuszcz - Czyżew	74,036	Expected principal	1435 mm
PL	Czyżew - Białystok	65,467	Expected principal	1435 mm
PL	Białystok - Ełk	103,236	Expected principal	1435 mm
PL	Skierniewice - Warszawa Główna Towarowa			
PL	Skierniewice - Pruszków	50,038	Diversionary	1435 mm
PL	Pruszków - Józefinów Podg	3,435	Diversionary	1435 mm

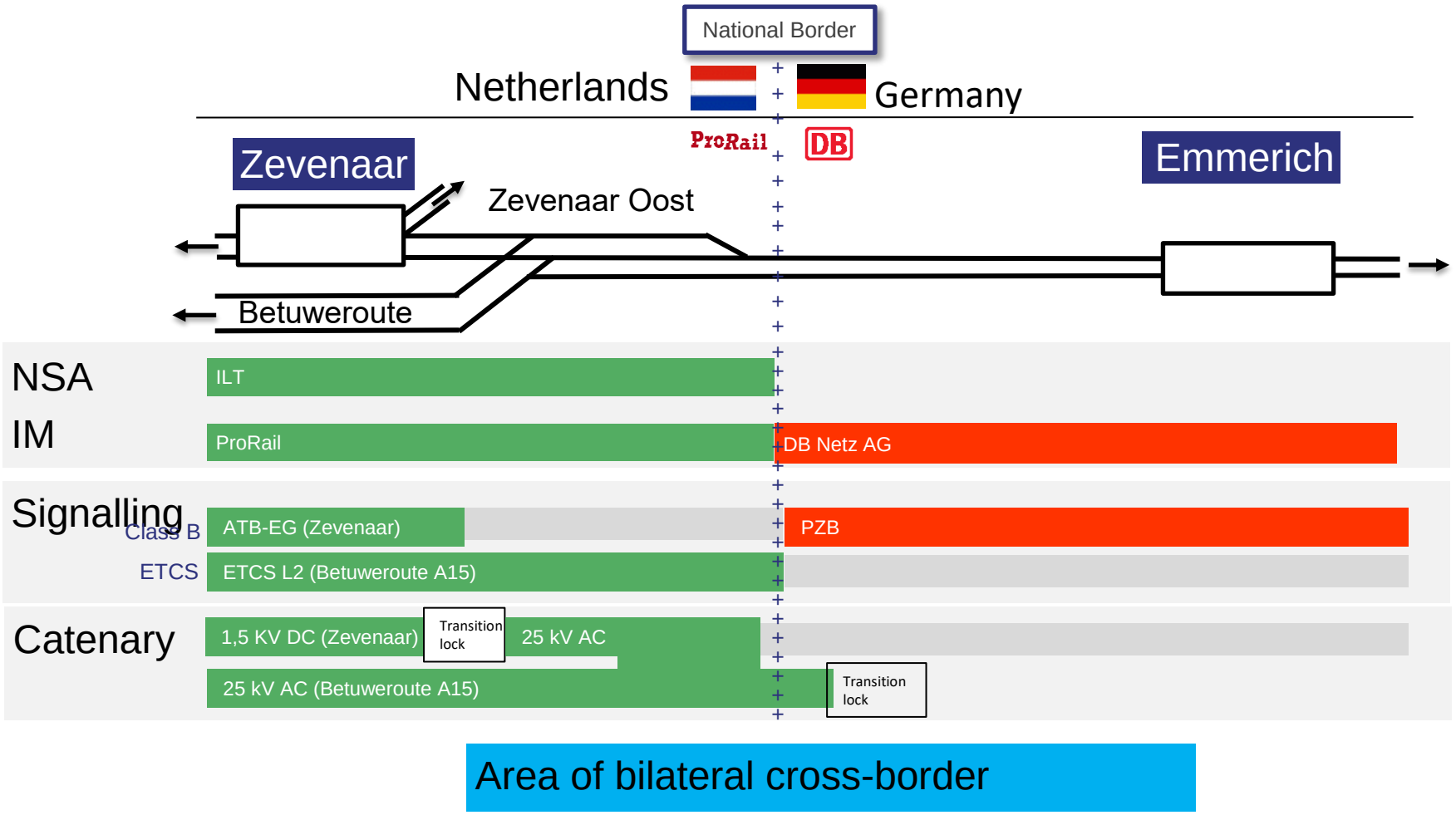
PL	Warszawa Główna Towarowa - Józefinów	5,161	connecting	1435 mm
PL	Warszawa Główna Towarowa - Warszawa Główna Towarowa	1,094	connecting	1435 mm
PL	Białystok - Sokółka			
PL	Białystok - Sokółka	41,222	connecting	1435 mm
PL	Poznań - Ełk			
PL	Poznań Franowo - Kobylnica	7,901	Diversionary	1435 mm
PL	Kobylnica - Mogilno	63,91	Diversionary	1435 mm
PL	Mogilno - Gniewkowo	35,39	Diversionary	1435 mm
PL	Gniewkowo - Toruń Wschód	15,2	Diversionary	1435 mm
PL	Toruń Wschód - Korsze	353	Diversionary	1435 mm
PL	Ełk - Korsze	98,808	Diversionary	1435 mm
PL	Wrocław Brochów - Wrocław Główny			
PL	Wrocław Brochów - Wrocław Główny	2,43	connecting	1435 mm
PL	Bielawa Dolna (Border D/PL) - Jaworzno Szczakowa.			
PL	Bielawa Dolna (Border D/PL) - Węgliniec	12,902	Principal	1435mm
PL	Węgliniec - Miłkowice	62,099	Principal	1435 mm
PL	Miłkowice - Legnica	9,459	Principal	1435 mm
PL	Legnica - WROCŁAW NOWY DWÓR	58,215	Principal	1435 mm
PL	Wrocław Nowy Dwór - Wrocław Muchobór	1,858	Principal	1435 mm
PL	Wrocław Muchobór - Wrocław Stadion	3,357	Principal	1435 mm
PL	Wrocław Stadion - Wrocław Brochów	8,01	Principal	1435 mm
PL	Wrocław Brochów - Siechnica	6,590	Principal	1435 mm
PL	Siechnica - Czernica Wrocławska	6,884	Principal	1435 mm
PL	Czernica Wrocławska - Jelcz Miłoszyce	5,235	Principal	1435 mm
PL	Jelcz Miłoszyce - Biskupice Oławskie	17,261	Principal	1435 mm
PL	Biskupice Oławskie - Opole Groszowice	54,261	Principal	1435 mm
PL	Opole Groszowice - Strzelce Opolskie	28,838	Principal	1435 mm
PL	Strzelce Opolskie - Paczyna	22,128	Principal	1435 mm
PL	Paczyna - Pyskowice	5,232	Principal	1435 mm
PL	Pyskowice - Gliwice Łabędy	6,097	Principal	1435 mm
PL	Gliwice Łabędy - Gliwice	5,286	Principal	1435 mm
PL	Szobiszowice - Gliwice Port	1,760	connecting	1435 mm
PL	Gliwice - Szobiszowice	0,900	connecting	1435 mm
PL	Gliwice - Gliwice Sośnica	0,900	connecting	1435 mm
PL	Gliwice - Zabrze Biskupice	13,630	Principal	1435 mm
PL	Zabrze Biskupice - Bytom	6,8	Principal	1435 mm
PL	Bytom - Chorzów Stary	6,3	Principal	1435 mm
PL	Chorzów Stary - Katowice Szopienice Północne	12,054	Principal	1435 mm
PL	Szabelnia - Katowice Szopienice Północne	1,359	Principal	1435 mm
PL	Katowice Szopienice Północne - Stawiska Podg	9,651	Principal	1435 mm
PL	Stawiska Podg - Stawiska Podg	0,466	Principal	1435 mm

PL	Stawiska - Mysłowice	1,815	Principal	1435 mm
PL	Mysłowice - Szabelnia	3,305	Principal	1435 mm
PL	Mysłowice - Długoszyn	9,359	Principal	1435 mm
PL	Jaworzno Szczakowa JSB - Długoszyn Podg	1,941	Principal	1435 mm
PL	Długoszyn Podg - Sosnowiec Maczki	1,863	Principal	1435 mm
PL	Sosnowiec Maczki - Sosnowiec Maczki	1,076	Principal	1435 mm
PL	Sosnowiec Maczki - Jaworzno Szczakowa	2	Principal	1435 mm
PL	Jaworzno Szczakowa - Medyka			
PL	Długoszyn – Jaworzno Szczakowa	1,885	Principal	1435 mm
PL	Jaworzno Szczakowa – Kraków Mydlniki	47,494	Principal	1435 mm
PL	Kraków Mydlniki – Podłęże	34,589	Principal	1435 mm
PL	Kraków Mydlniki – Kraków Bieżanów	16,168	Diversionary	1435 mm
PL	Kraków Bieżanów – Podłęże	10,004	Diversionary	1435 mm
PL	Żurawica – Hurko	12,959	Diversionary	1435 mm
PL	Podłęże – Medyka (Polish – Ukrainian border and EU – Ukrainian border)	239,85	Principal	1435 mm
PL	Wrocław - Opole			
PL	Wrocław Brochów - Święta Katarzyna	6,591	Diversionary	1435 mm
PL	Święta Katarzyna - Brzeg	31,527	Diversionary	1435 mm
PL	Brzeg - Opole Groszowice	43,678	Diversionary	1435 mm
PL	Wrocław - Brzeg Dolny			
PL	Wrocław Nowy Dwór - Wrocław Gądów	1,321	connecting	1435 mm
PL	Wrocław Gądów - Wrocław Kuźniki	1,798	connecting	1435 mm
PL	Wrocław Kuźniki - Brzeg Dolny	23,137	connecting	1435 mm
PL	Wrocław - Kąty Wrocławskie			
PL	Wrocław Gądów - Wrocław Zachodni	5,401	connecting	1435 mm
PL	Wrocław Zachodni - Kąty Wrocławskie	15,164	connecting	1435 mm
PL	Sosnowiec Maczki - Sosnowiec Południowy			
PL	Sosnowiec Maczki - Sosnowiec Kazimierz SKZ1	3,669	connecting	1435 mm
PL	Sosnowiec Kazimierz SKZ1 - Sosnowiec Kazimierz SKZ2	0,956	connecting	1435 mm
PL	Sosnowiec Kazimierz SKZ2 - Sosnowiec Południowy	9,124	connecting	1435 mm
PL	Sosnowiec Maczki - Dąbrowa Górnicza Towarowa			
PL	Sosnowiec Maczki - Dorota	2,575	connecting	1435 mm
PL	Dorota - Dąbrowa Górnicza Towarowa	12,317	connecting	1435 mm
LT	Trakiszki (Border PL/LT) - Mockava	14,3	Principal	1435 mm
LT	Mockava - Šeštokai	7,48	Principal	1435 mm
LT	Šeštokai - Kazlų rūda	57	Principal	1520 mm
LT	Kazlų rūda - Jiesia	28,54	Principal	1520 mm
LT	Jiesia - Kaunas/Palemonas	8,21	Principal	1520 mm
LT	Kaunas/Palemonas- Radviliškis	137,57	Principal	1520 mm
LT	Radviliškis (Border LT/LV)- Meitene	79,33	Principal	1520 mm
LT	Kaunas/Palemonas- Vilnius	103,41	Diversionary	1520 mm

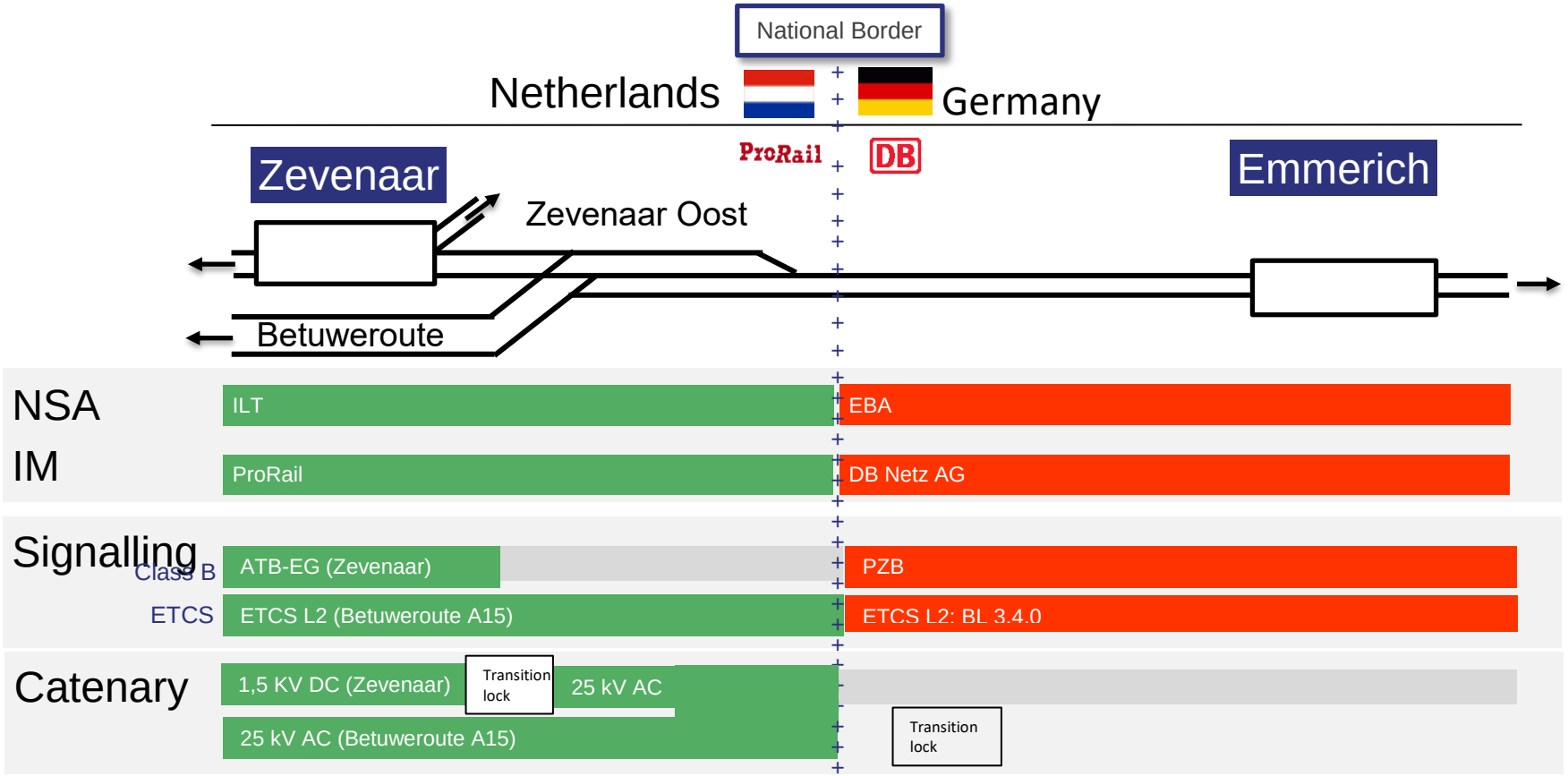
LT	Vilnius (Border LT/LV)- Daugavpils	138,92	Diversionary	1520 mm
LT	Vilnius- Kena	29,13	Connecting	1520 mm
LT	Exact Rail Baltica line (expected as principal line 1435mm) routing not known yet	0	Expected principal	1435 mm
EE	Valga - Tartu	84,812	Principal	1520 mm
EE	Tartu - Tapa	112,534	Principal	1520 mm
EE	Tapa - Tallinn	69,608	Principal	1520 mm
EE	Tallinn - Muuga	17,462	Principal	1520 mm
EE	Tallinn-Rapla	47,1	Expected principal	1435 mm
EE	Rapla-Pärnu	54,7	Expected principal	1435 mm
EE	Pärnu-EE/LV border	93,7	Expected principal	1435 mm
LV	BorderLT/LV-Meitene-Jelgava	33	Principal	1520 mm
LV	Jelgava-Riga	43	Principal	1520 mm
LV	Riga-Lugazi-Border LV/EE	166	Principal	1520 mm
LV	Krustpils-Riga	129	Diversionary	1520 mm
LV	BorderLT/LV-Daugavpils	25	Diversionary	1520 mm
LV	Daugavpils-Krustpils	89	Diversionary	1520 mm
LV	Jelgava- Liepaja	180	Connecting	1520 mm
LV	Jelgava-Ventspils	178	Connecting	1520 mm
LV	Border EE/LV - Upeslejas junction	116,7	Expected principal	1435 mm
LV	Upeslejas junction - Riga Central Station - Riga airport - Misa junction	70,3	Expected principal	1435 mm
LV	Riga bypass (Upeslejas junction - Salaspils freight station - Misa junction)	28,1	Expected principal	1435 mm
LV	Misa junction - Border LV/LT	47,5	Expected principal	1435 mm
	Total length	**9 656,08**		
	Principal		5 252,88	
	Diversionary		2 552,30	
	Connecting		890,47	
	Expected principal and diversionary		960,43	

Annex 2: Overview of the cross-border solutions

Cross-border agreement schematic overview Zevenaar - Emmerich (2021)

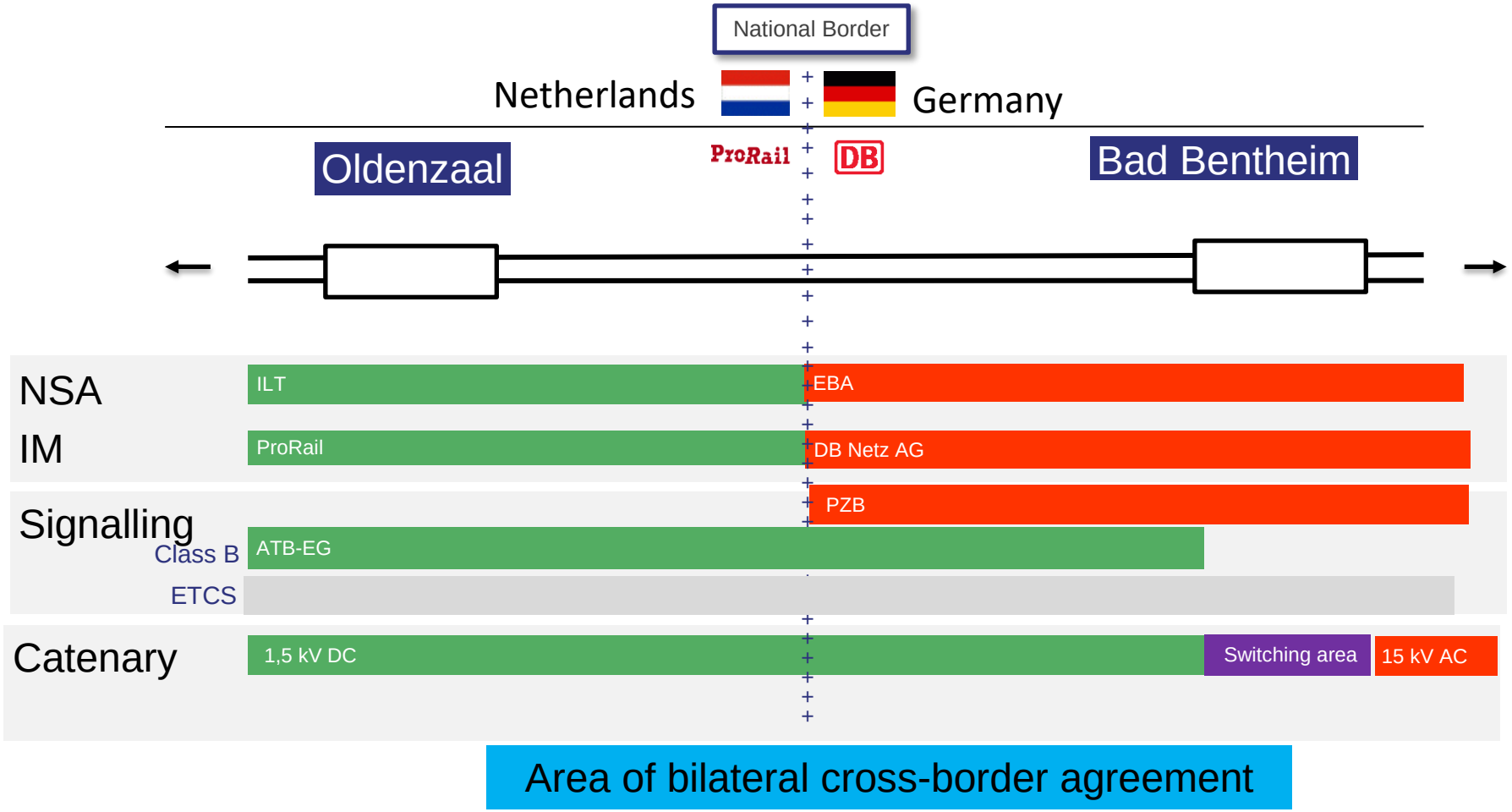


Cross-border agreement schematic overview Zevenaar - Emmerich (20xx)

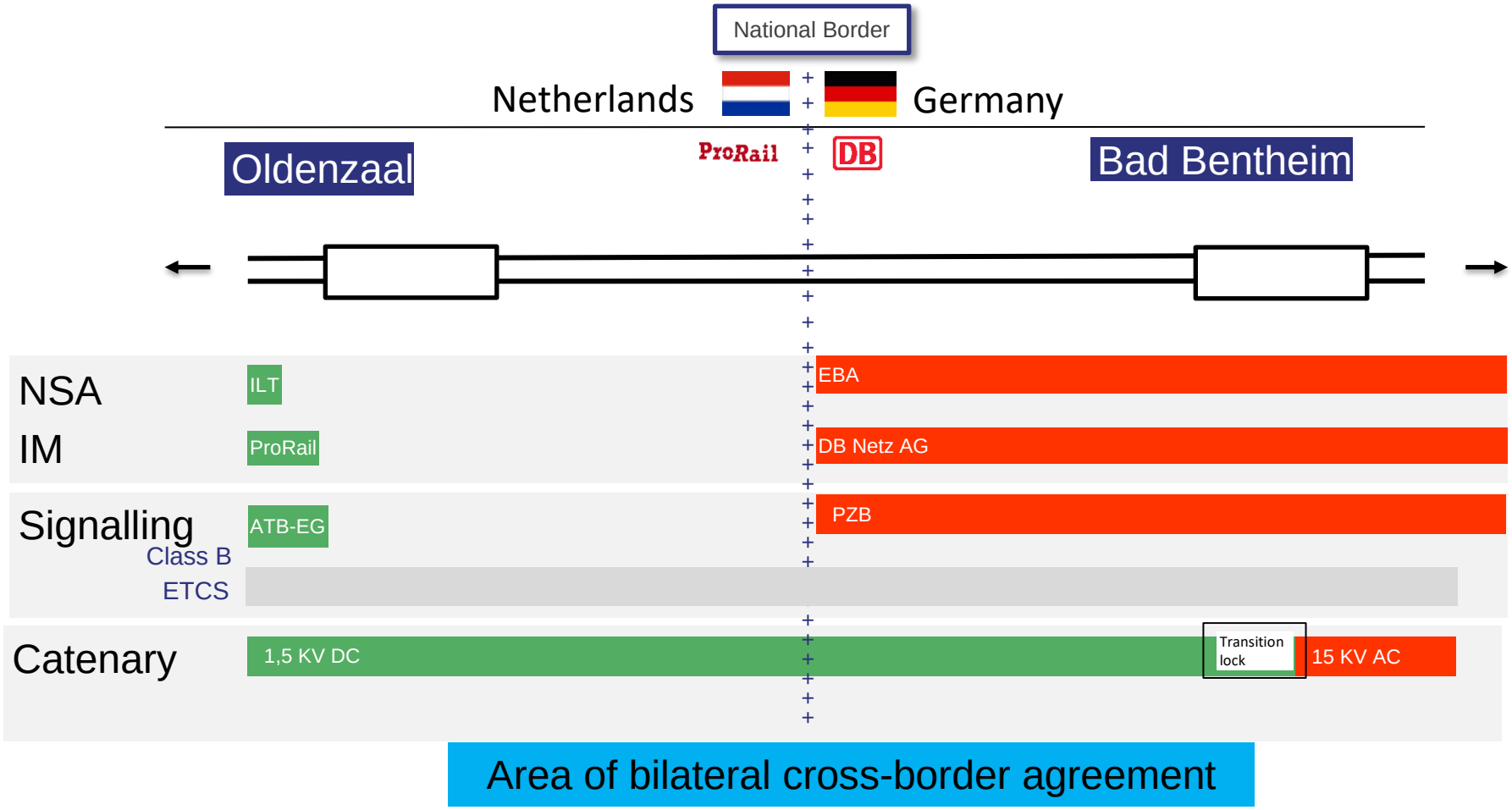


Area of bilateral cross-border

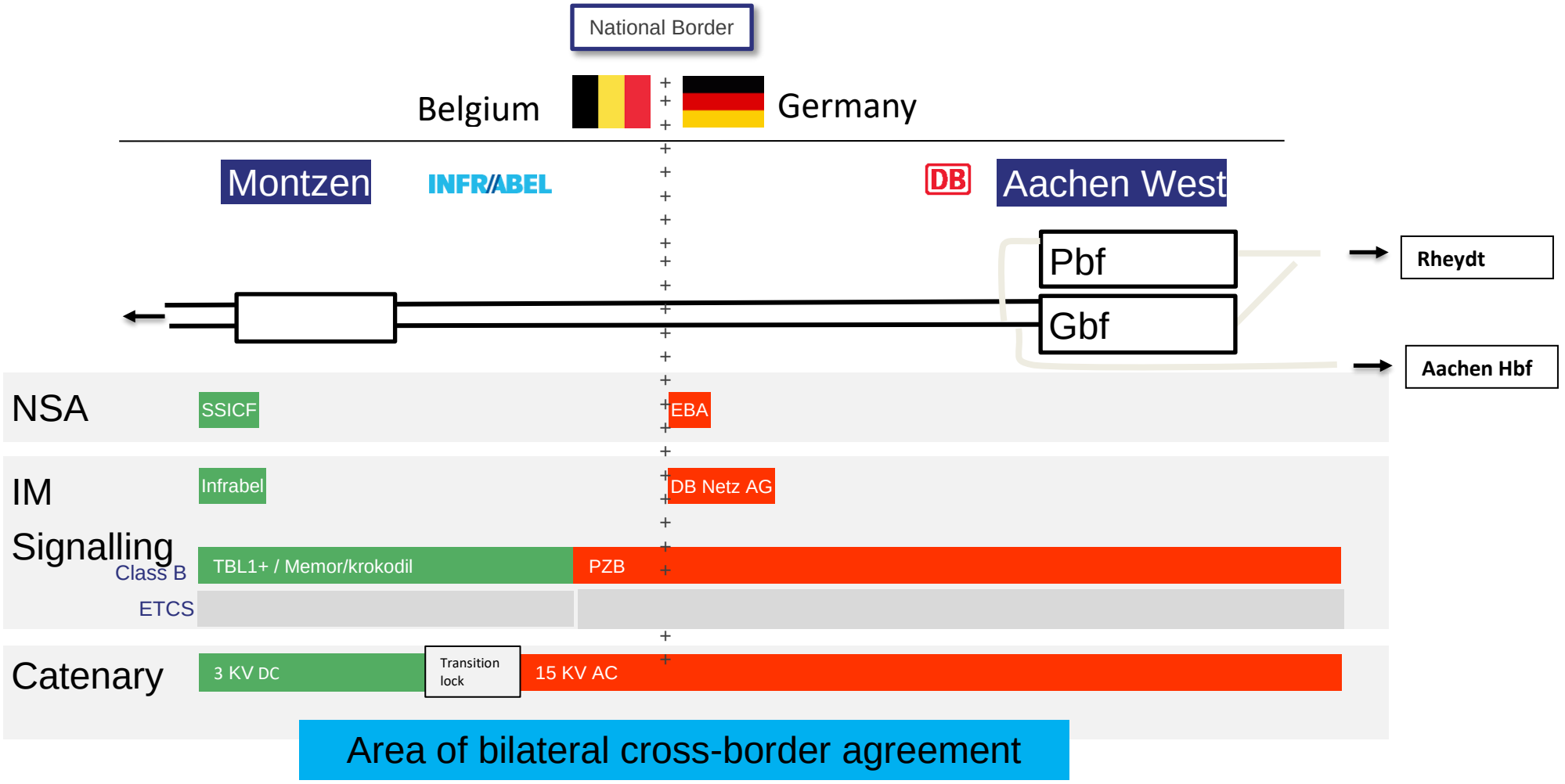
Cross-border agreement schematic overview Oldenzaal – Bad Bentheim (2021)



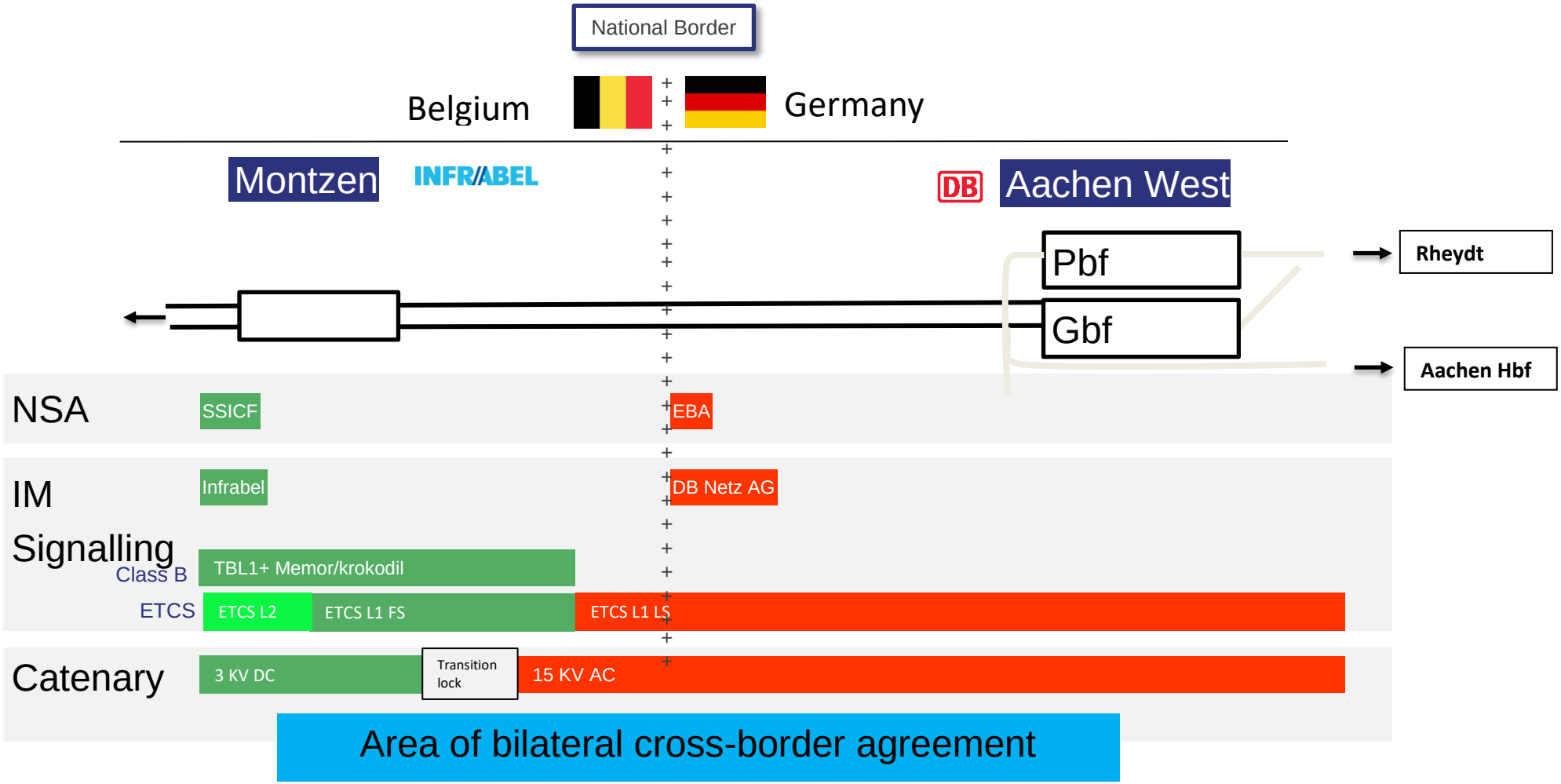
Cross-border agreement schematic overview Oldenzaal – Bad Bentheim (20XX)



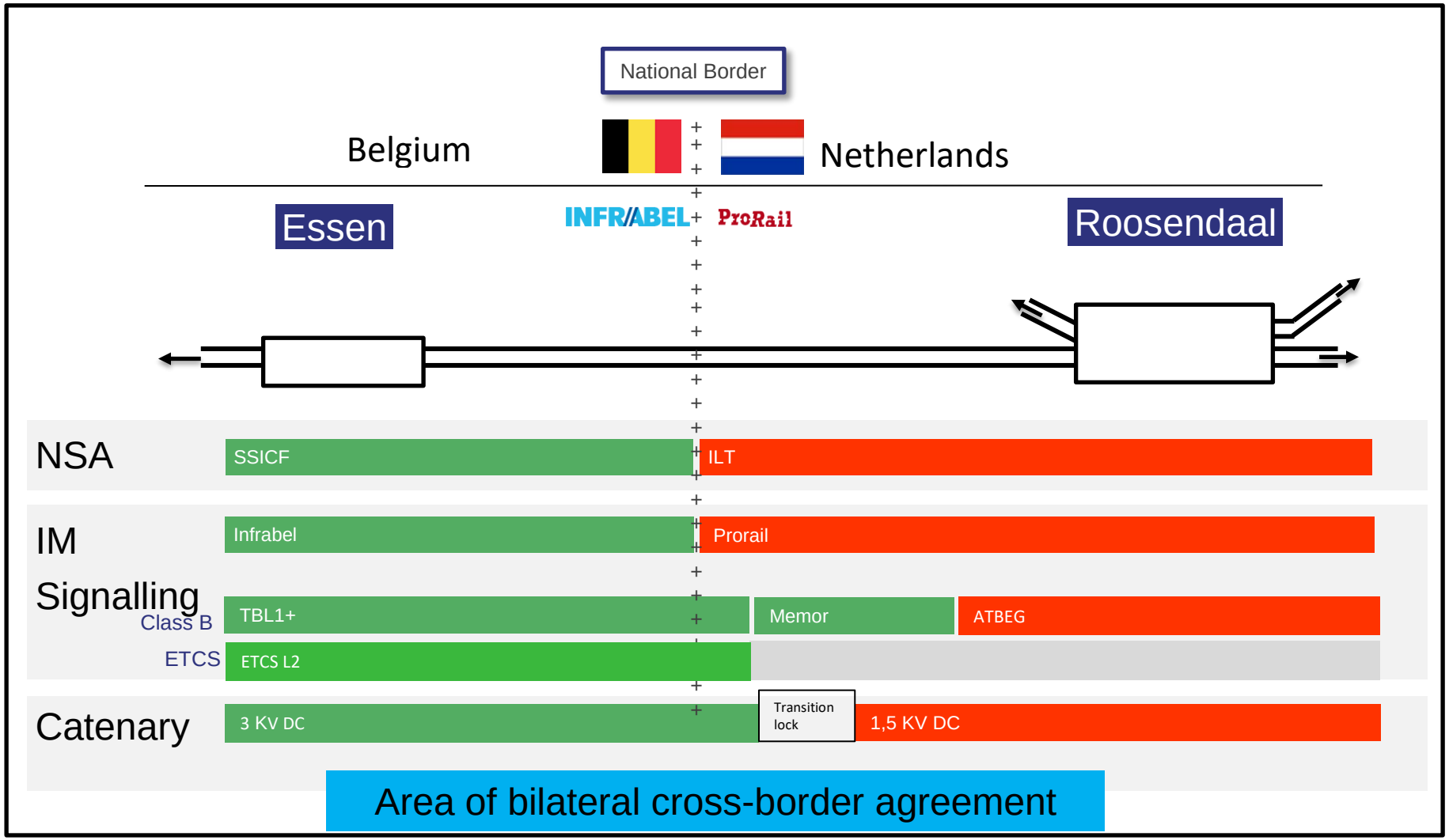
Cross-border agreement schematic overview Montzen – Aachen West (2021)



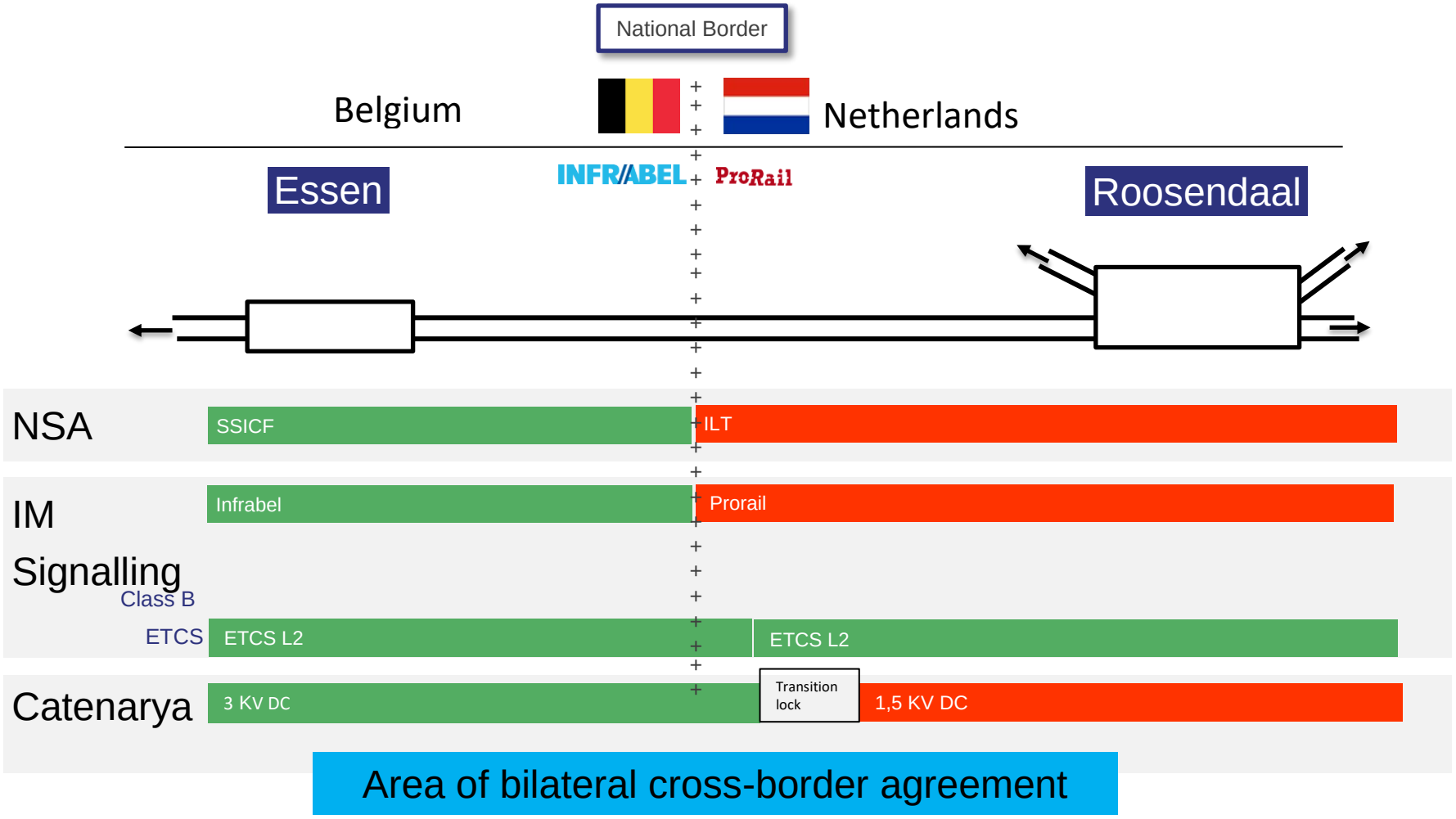
Cross-border agreement schematic overview Montzen – Aachen West (20XX)



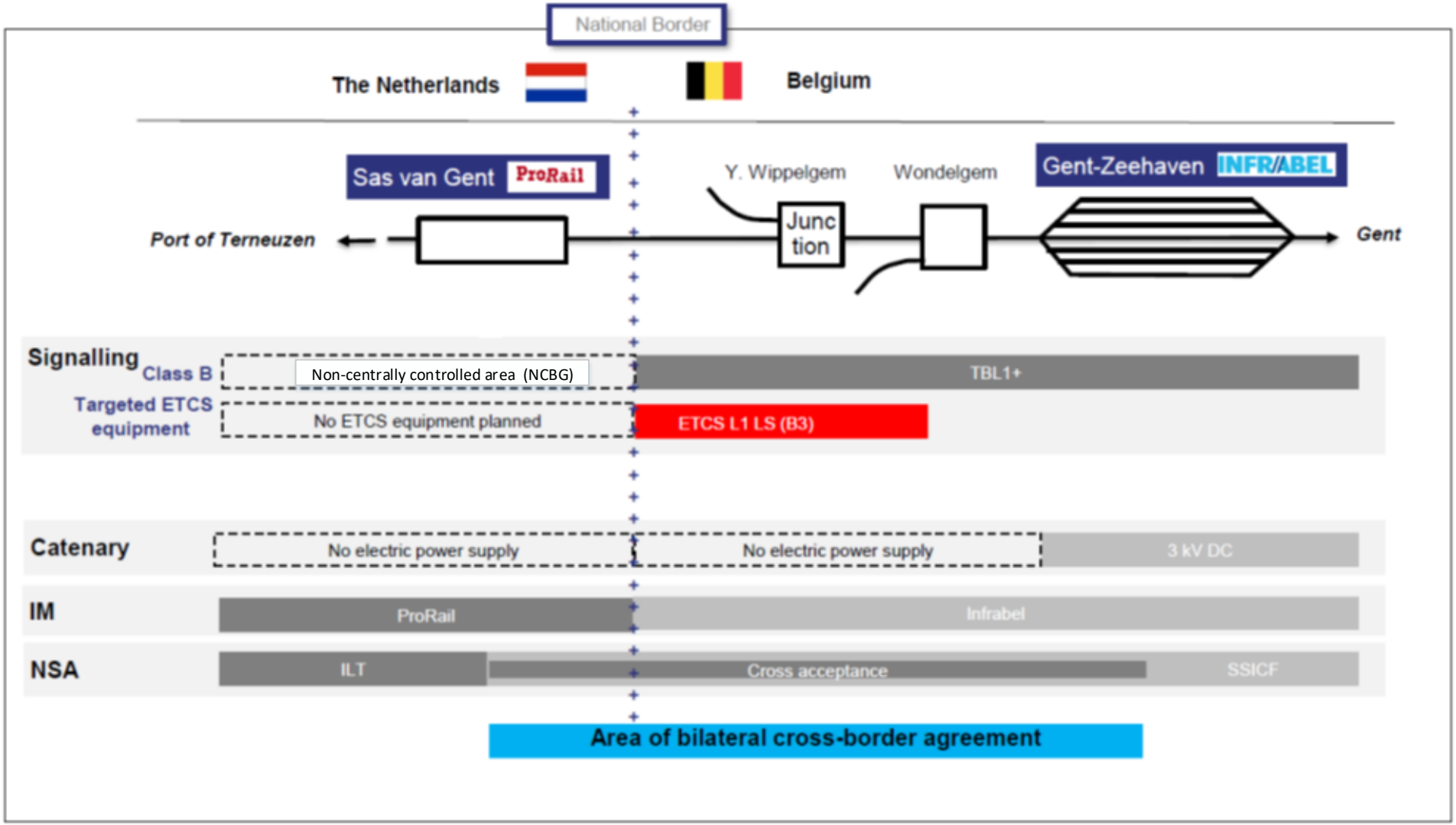
Cross-border agreement schematic overview Essen – Roosendaal (2021)



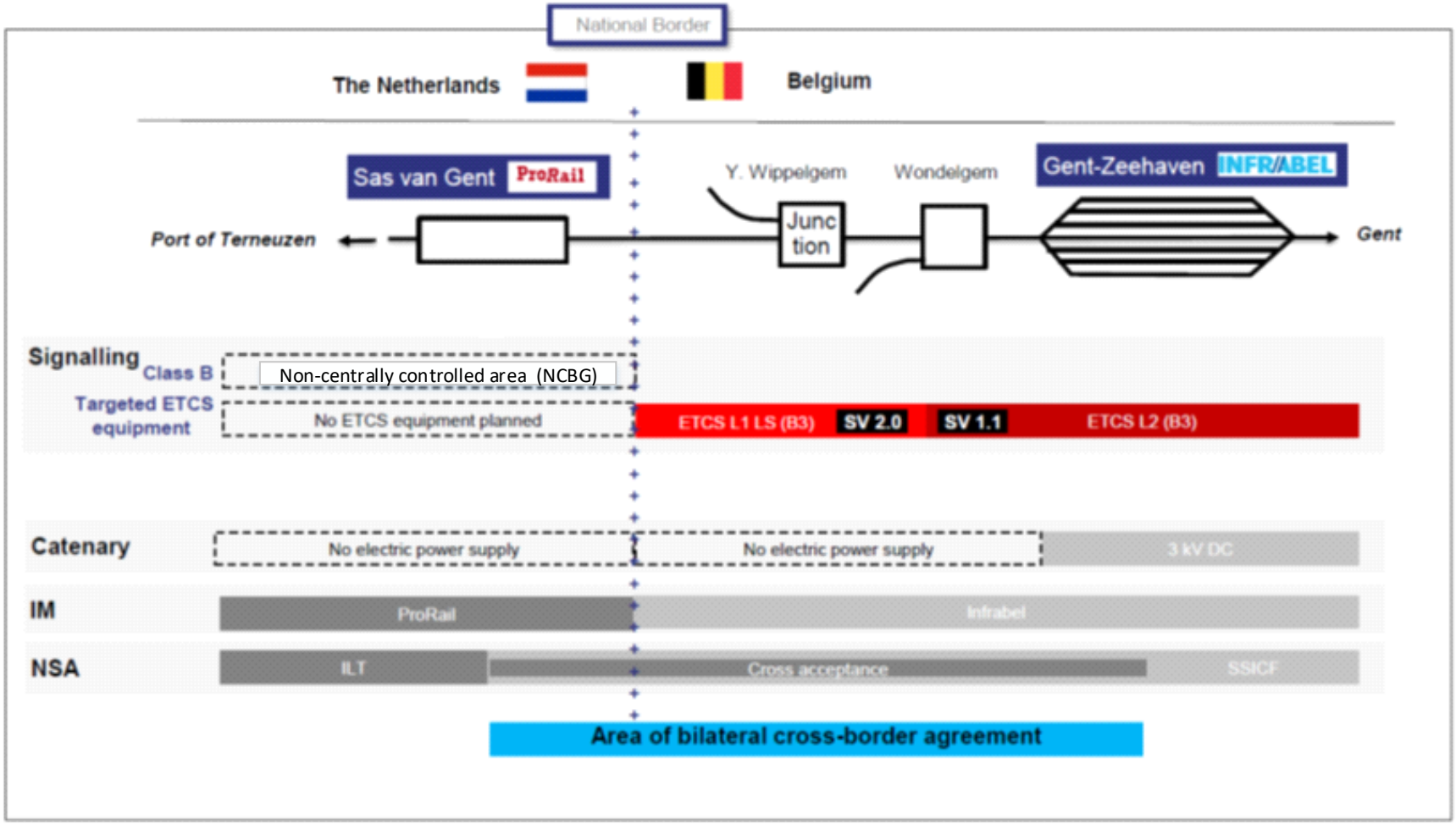
Cross-border agreement schematic overview Essen – Roosendaal (2028)



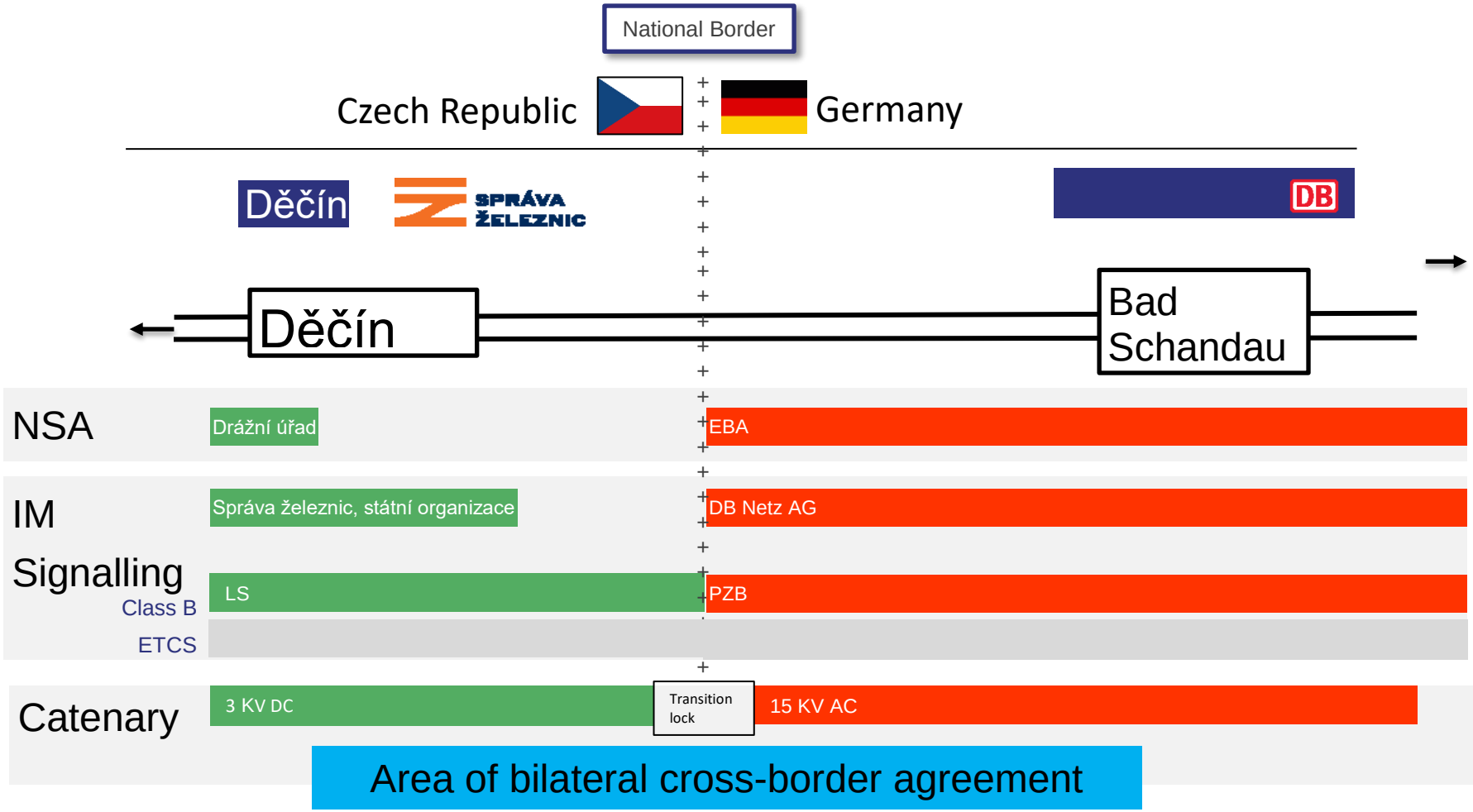
Cross-border agreement schematic overview Zelzate – Sas van Gent (situation December 2021)



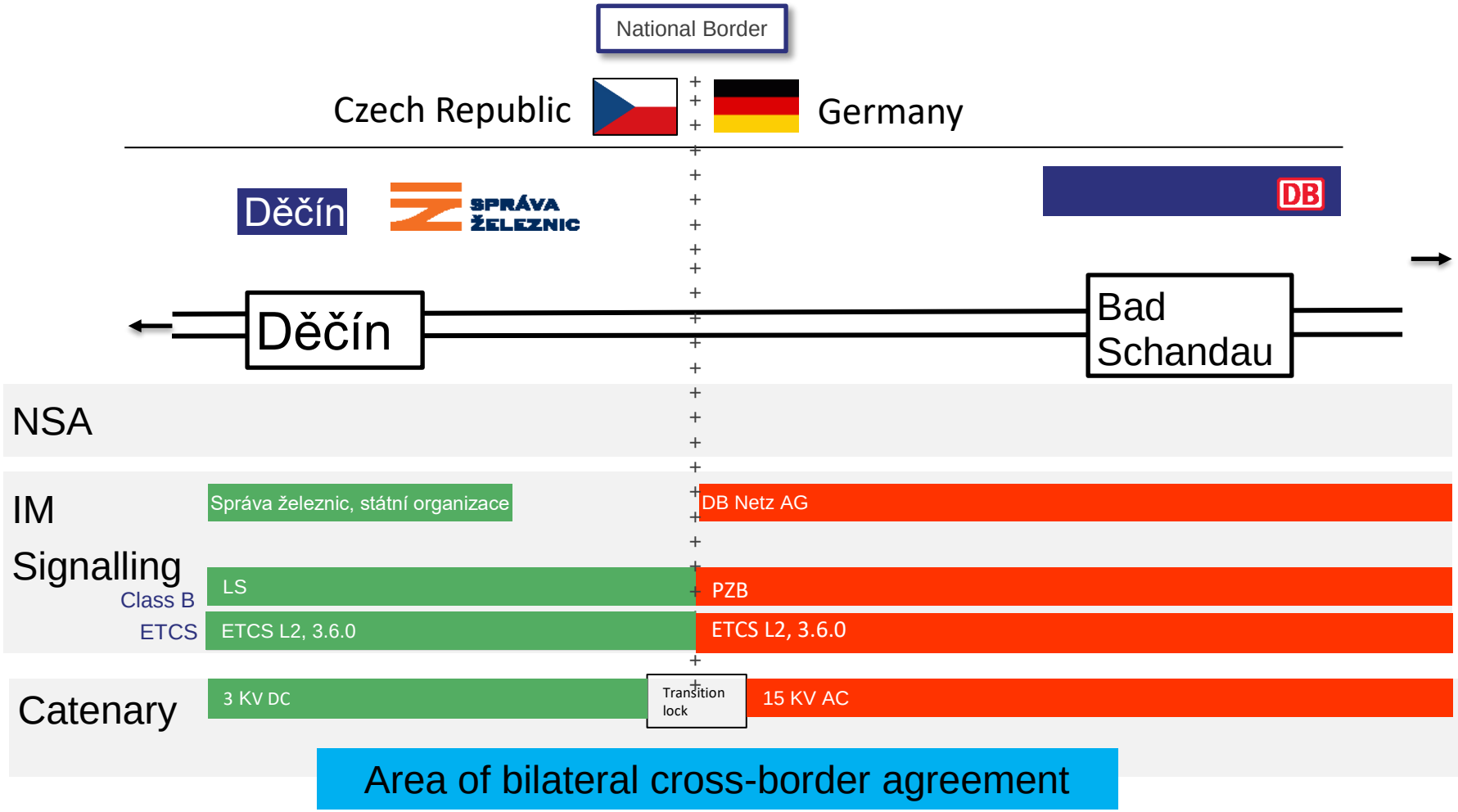
Cross-border agreement schematic overview Zelzate – Sas van Gent (situation 2026)



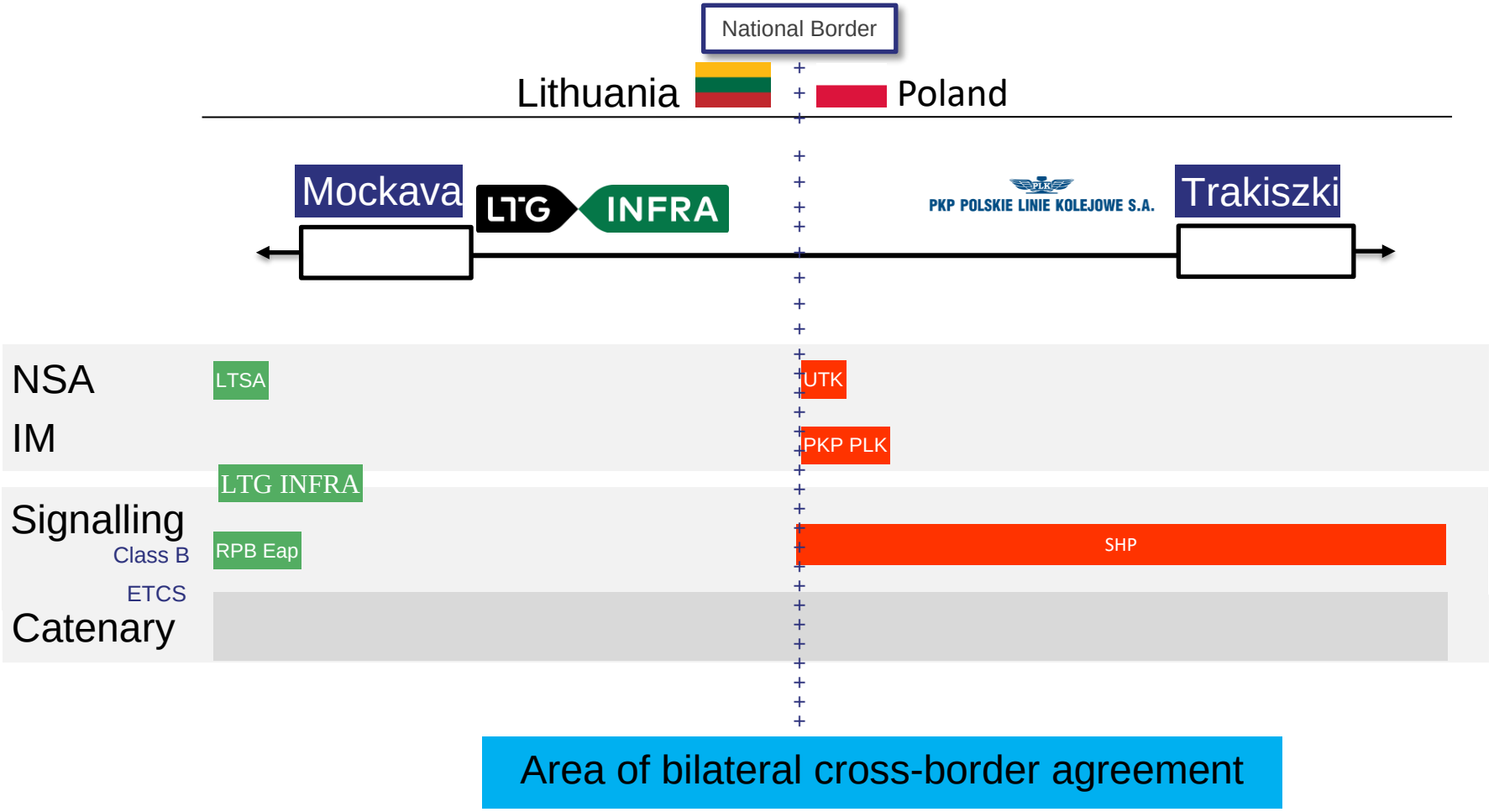
Cross-border agreement schematic overview Děčín – Bad Schandau (2021)



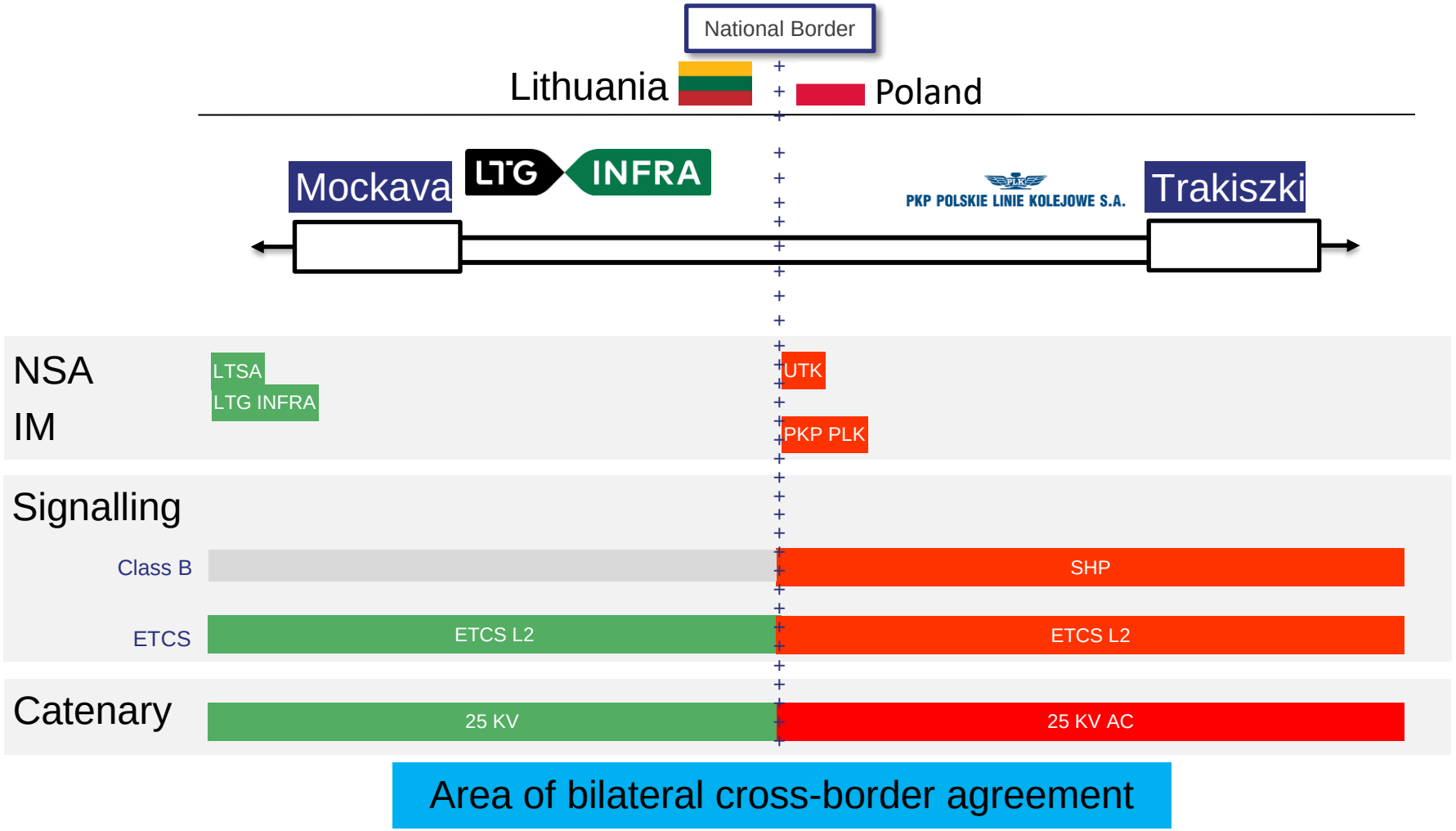
Cross-border agreement schematic overview Děčín – Bad Schandau (2025)



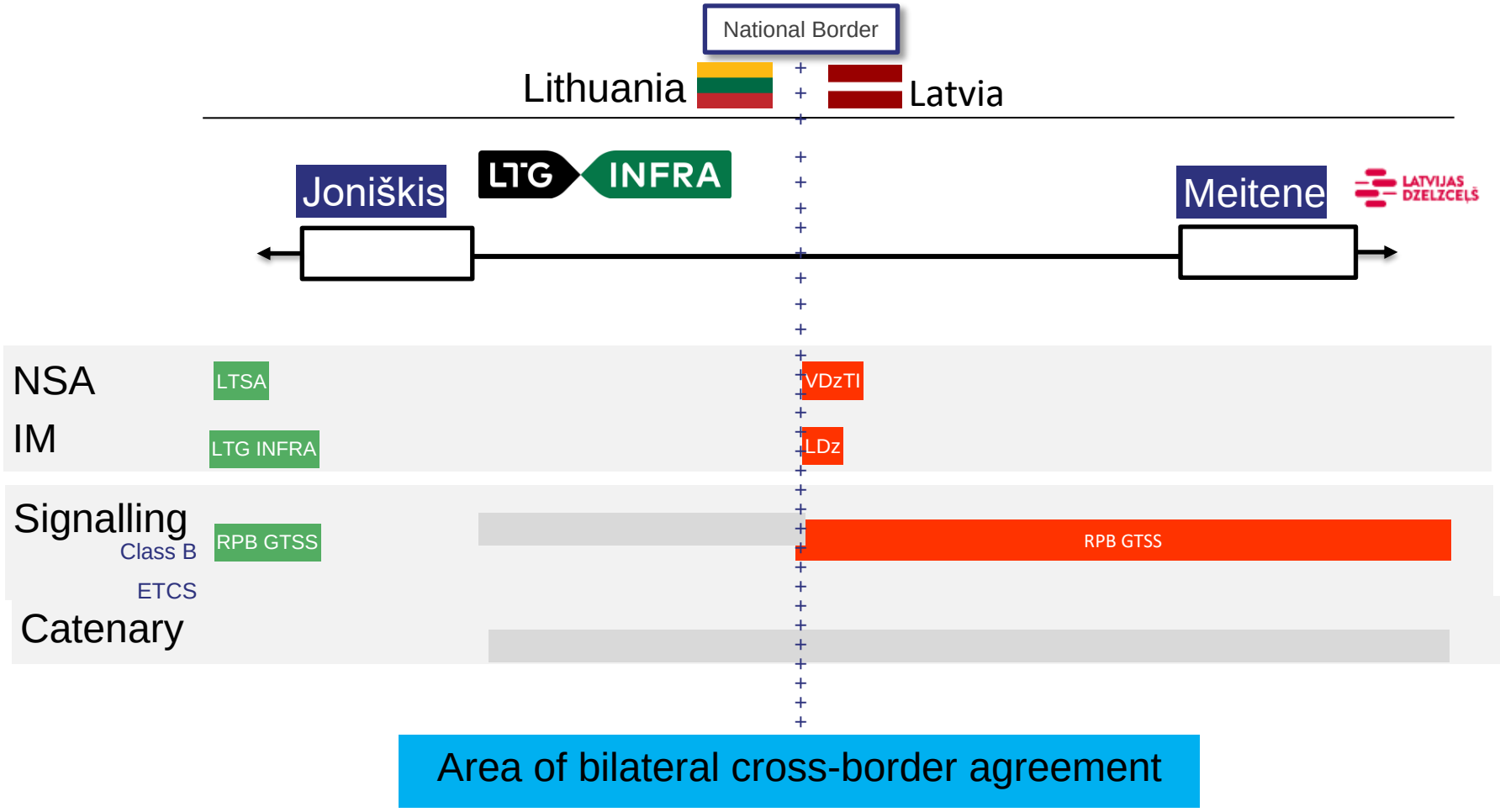
Cross-border agreement schematic overview Mockava - Trakiszki 1435mm (current situation)



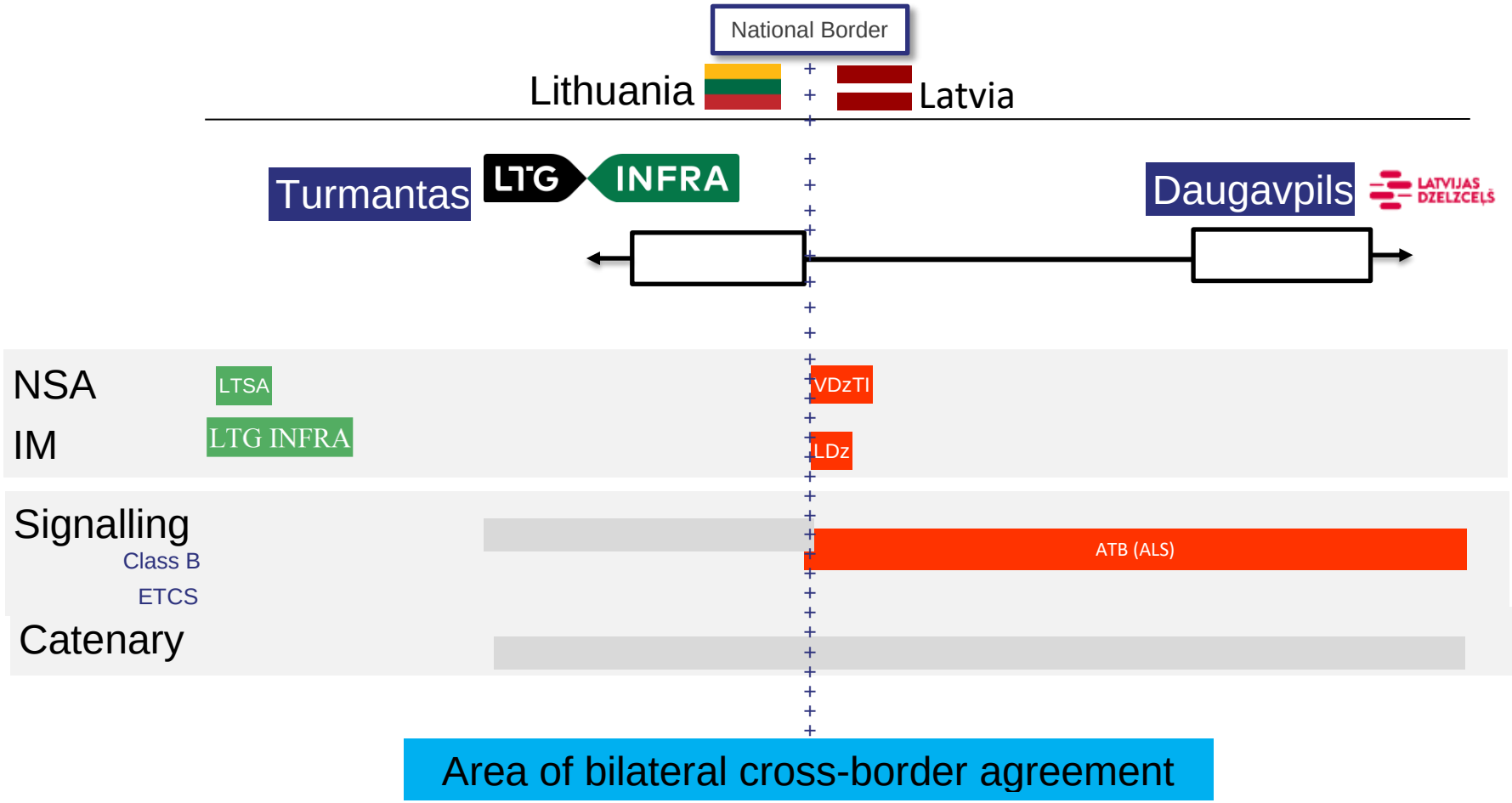
Cross-border agreement schematic overview Mockava – Trakiszki 1435mm (2027)



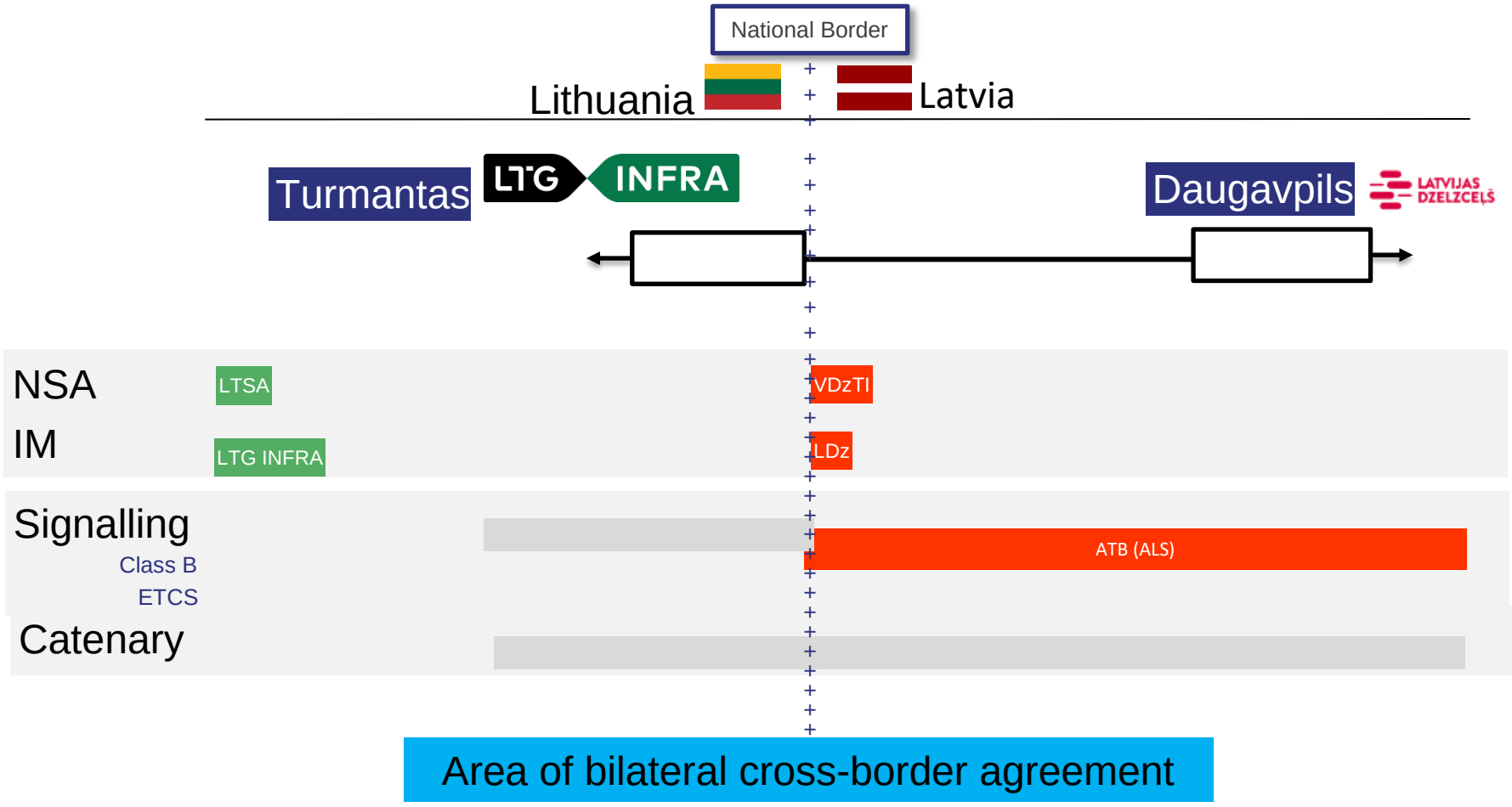
Cross-border agreement schematic overview Joniškis – Meitene 1520mm (current situation)



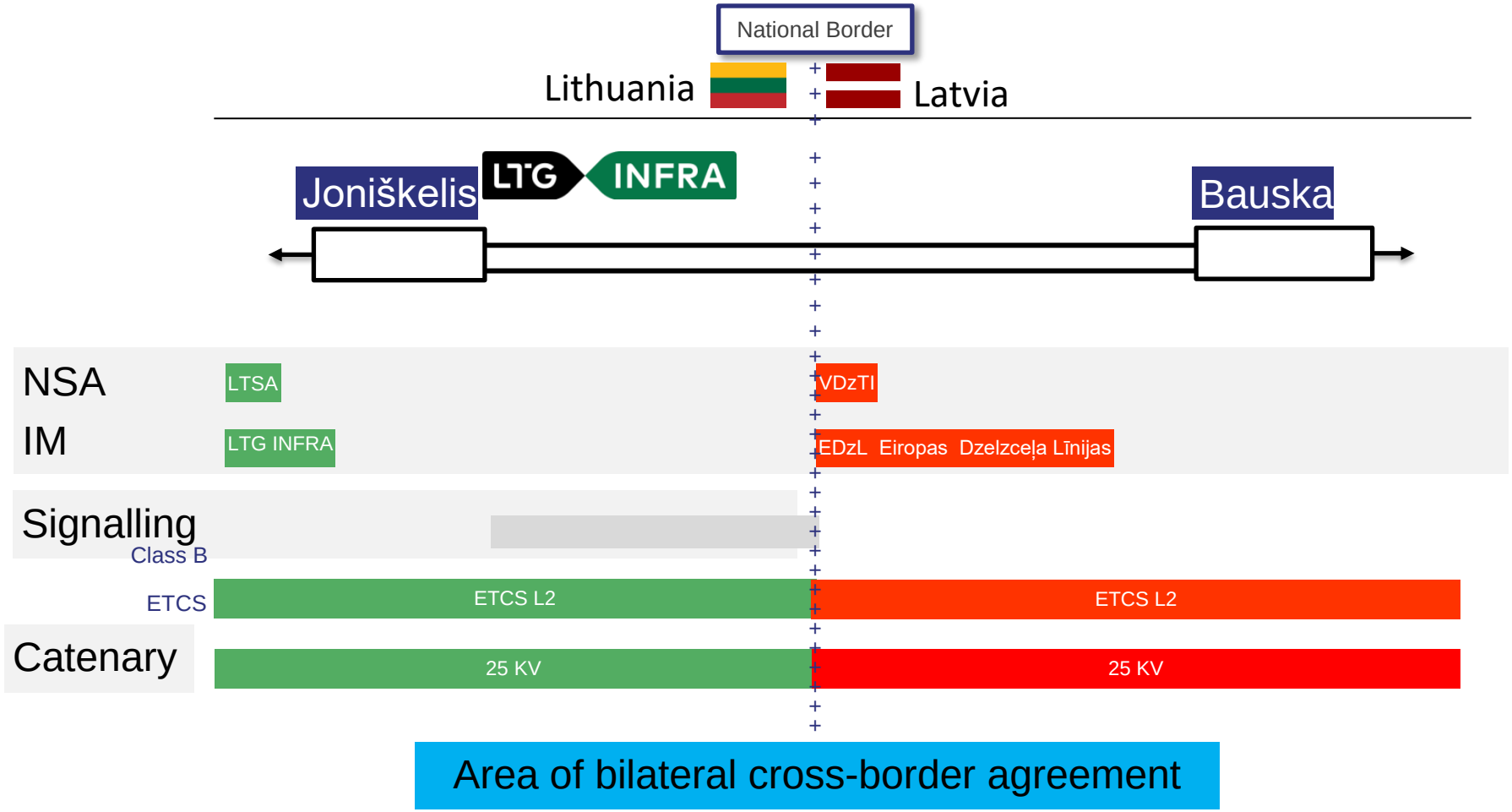
Cross-border agreement schematic overview Turmantas – Daugavpils 1520mm (current situation)



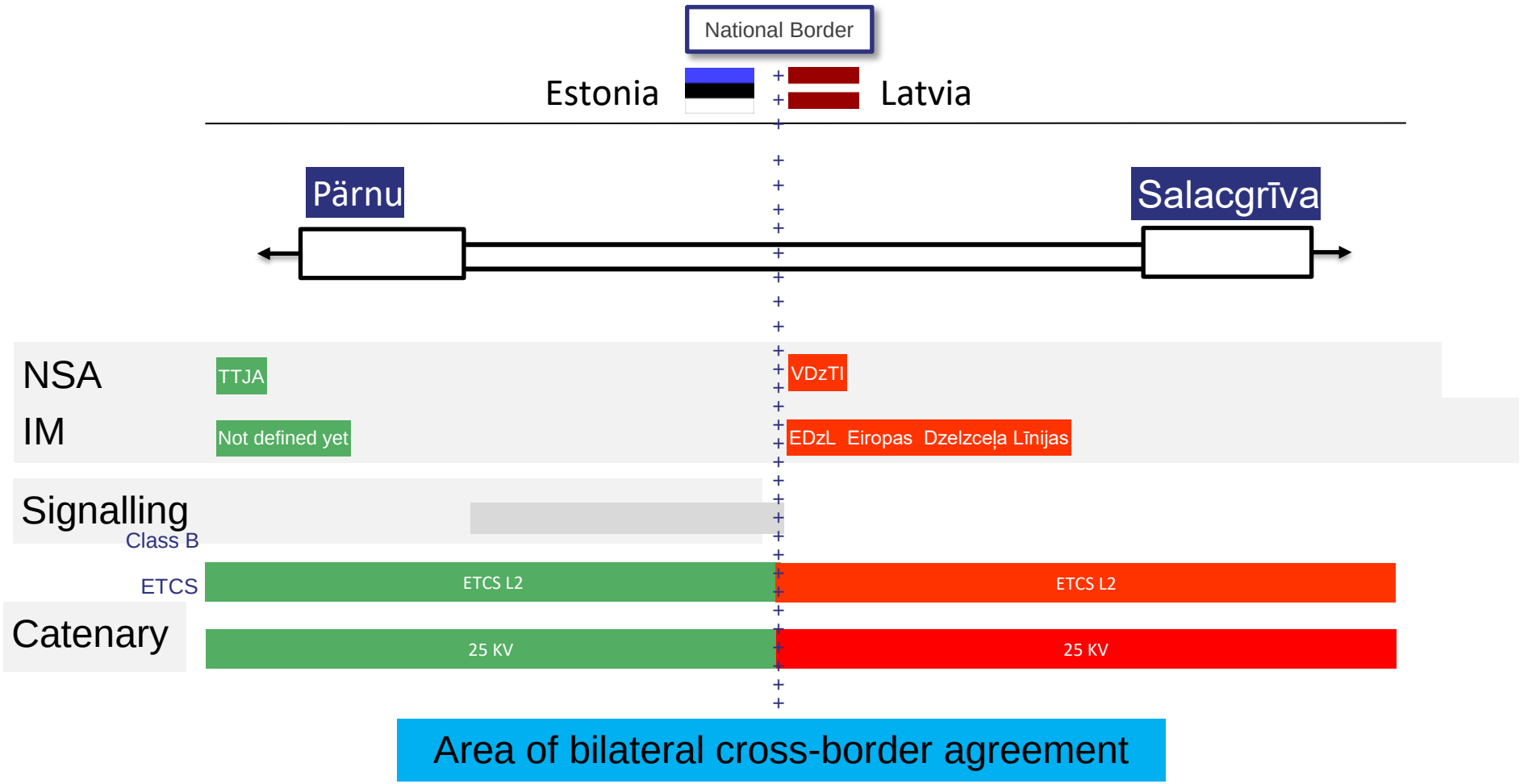
Cross-border agreement schematic overview Turmantas – Daugavpils 1520mm (2026)



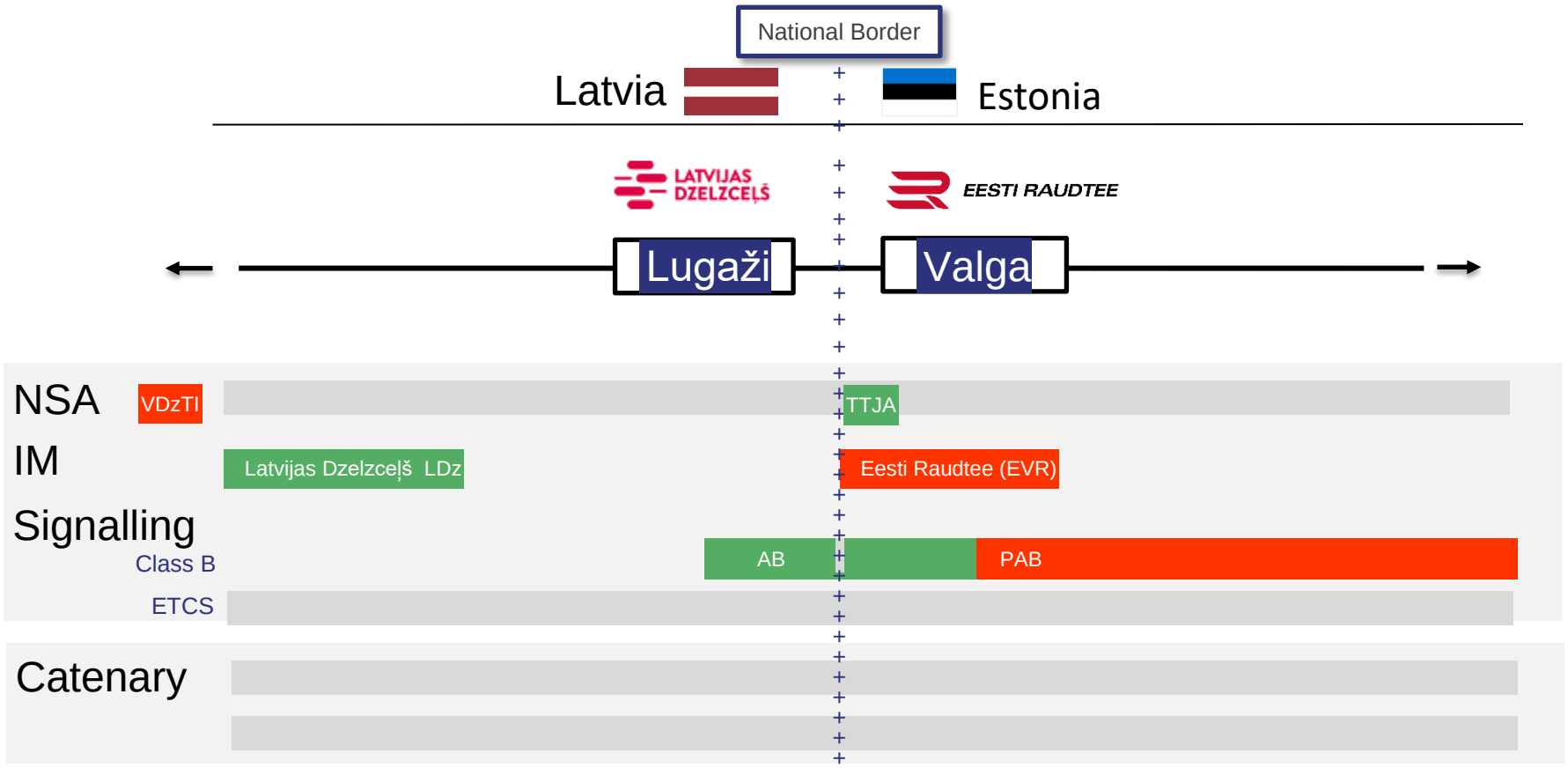
Cross-border agreement schematic overview Joniškelis – Bauska 1435mm (2026)



Cross-border agreement schematic overview Pärnu – Salacgrīva 1435mm (2026)



Cross-border agreement schematic overview Lugaži - Valga (2008) Update of agreement is in progress



Area of bilateral cross-border agreement 02.12.2008.
Agreement is in the update phase