

RFC Rhine-Alpine

Development of Capacity Bottlenecks

State of play 2020



Version 2.0
01 March 2021
WG Infrastructure and Terminals (WG I&T)
with WG Train Performance Management

Introduction

The calculation of bottlenecks for rail infrastructure is quite complicated. National calculation methodologies at IMs and national decision processes on infrastructure development are different and a common bottleneck analysis for RFC Rhine-Alpine turned out to be an impossible task. Therefore the MB of RFC Rhine-Alpine decided to set up the present CBA on the basis of the national investment plans to identify the infrastructural bottlenecks. This is a joint corridor approach, consisting of a combination of the national information provided by the different IMs. The information has been compiled by the WG Infrastructure & Terminals and can be found in part A of the present document.

In addition, the perspective of the Railway Undertakings to the Capacity Bottleneck analysis was added as a result from an enquiry of the European Commission in 2019 and completed with a list of additional bottlenecks identified by the RU's in 2020.

In addition, part B gives an overview of additional operational bottlenecks out of an analysis of the WG Train Performance Management. The idea of this additional information is to give a more comprehensive overview of the different bottlenecks which might be encountered by the users of RFC Rhine-Alpine.

PART A : Infrastructural bottlenecks

The WG-members gave information on the expected Capacity Bottlenecks in the future years for their own countries. Presenting this information in jumping jacks (JJ's) showing where the Capacity Bottlenecks can be found on the entire corridor.

The Netherlands, Belgium and Switzerland opted to make a distinction between actual Capacity Bottlenecks (when the demand nearly exceeds the available capacity – indicated in red) and potential Capacity Bottlenecks (where demand is showing an evolution that might cause capacity problems – indicated in yellow). These three IMs determine (potential) capacity bottlenecks by applying a certain percentage to the capacity (use). Italy also identifies actual Capacity Bottlenecks. However, in Italy, the concept of a potential capacity bottleneck does not exist. RFI only knows sections/nodes with limited capacity.

In Switzerland, SBB Infrastructure and BLS Netz focus only on the allocated capacity for freight traffic to determine the existence of bottlenecks, as this, according to them, presents a more accurate view in the context of the national infrastructure usage plan (Netz Nutzungs Plan). All other IMs chose to take both passenger and freight traffic into account.

DB Netz AG prefers to only show capacity bottlenecks when capacity exceeds the demand, i.e. when the section is congested. This information is drawn from the document on “overloaded railways” (Überlastete Schienenwege ÜLS).

ProRail takes a differentiated look, assessing dedicated freight nodes, shunting yards and switches on the one hand and all lines including Havenspoorlijn and Betuweroute A15 on the other hand. Bottlenecks on dedicated freight nodes, shunting yards and switches are determined with the use of overloaded hours, while capacity on lines is calculated in basic hour patterns. This method is not used by any other IM.

To be able to use this information in the MoTs decision processes, this bottleneck information is shown in different ways. These different ways actually represent the remaining (possible) bottlenecks from the point of view of the status of decision making of the related project planning and investments on the corridor.

These decision processes are not the same in all the countries but using the available information we distinguish between three stages in decision making / lifecycle of a project:

- Secured (S), meaning that all necessary decisions are taken and money is available. The building process of the project can start or has already started and the necessary funds are in place.
- Planned (P), meaning that already first decisions are taken and financial reservations are planned. In other words plans for the project have been approved and also the budget is planned.
- To be decided (TBD), meaning that solutions how to solve problems are known, but no formal decisions are taken yet and financial funds are not yet known. In other words, concrete plans for the project still need to be developed.

The jumping jacks in annexes 1 to 12 show the evolution of the (potential) bottlenecks when:

- a) only the projects with the Secured (S) status are taken into account,
- b) when both the projects with the (s) status and the Planned (P) status are taken into account
- c) when the projects with the (S) status, (P) status and the projects with the (TBD) status are taken into account.

The used project information is published in CIP and can be found in annex 14. For the bottlenecks in Germany, information on projects can also be found in the 'Plan zur Erhöhung der Schienenwegkapazität' (PEK), which is the plan to increase rail capacity, linked to each individual bottleneck.

Present Situation (2020)

In the **Netherlands** there two nodes are identified as a bottleneck: Pernis and SY Waalhaven Zuid.

9 sections are marked as a potential bottleneck:

- the section between Haarlem and Amsterdam
- the section between Amsterdam and Amsterdam Bijlmer
- the section between Meteren and Boxtel
- the section between Boxtel and Eindhoven
- the section between Eindhoven and Venlo
- the section between Venlo and Venlo Border
- the section between Breda and Boxtel
- the section between Kijfhoek - Lage Zwaluwe
- the section between Lage Zwaluwe Breda

In **Belgium** there are 3 sections marked as potential capacity bottlenecks:

- the section between Brugge and Gent
- the section between Gent and Schellebelle
- the section between Antwerpen Berchem and Lier

In **Germany** there are 5 capacity bottlenecks:

- the section between Kaldenkirchen and Viersen.
- the section between Aachen West and Stolberg.
- the section between Hürth-Kalscheuren and Remagen.
- the section between Mannheim – Zeppelinheim (the relevant section for RFC Rhine – Alpine is Gross Gerau – Biblis).
- the section between Offenburg and Basel Bad Rbf
(the relevant sections in the ÜLS are between Offenburg – Abzw. Gundelfingen)

and Abzw. Leutersberg – Weil am Rhein).

In **Switzerland** there is 1 bottleneck

- the section between Frutigen and Brig (Lötschberg Base Tunnel)

No sections are marked as potential bottlenecks.

In the **Border Section Switzerland-Italy** there is one bottleneck

- the section between (Brig -) Iselle – Domodossola due to :
 - the existing infrastructure bottlenecks on the RFI side, only 2 of the 3 train paths can currently be offered as SIM train paths (4m corridor).
 - current regular works in 2020, not all the published train paths can be offered at present.
 - the existing infrastructure bottlenecks on the RFI side, only 3 train paths instead of 4 (freight traffic) can be offered in the AS 2035.

In **Italy** there are 2 bottlenecks

- the section between Luino and Laveno
- the section between Pioltello and Melzo

7 sections are marked as exceeding the limited capacity threshold:

- the section between Gallarate and Milano
- the section between Seregno and Milano
- the section between Voghera and Tortona
- the section between Milano and Pavia
- the section between Tavazzano and Lodi
- the section between Casalpusterlengo and Codogno
- the section between Genova Sestri Ponente - Genova Sampierdarena

Some sections of the Milano Node are also marked as exceeding the limited capacity threshold.

In annexes 1 to 4 this is shown for the different statuses of decision making.

Number of sections with Capacity Bottlenecks in 2020	Infrastructure with plans S	Infrastructure with plans S+P	Infrastructure with plans S+P+TBD	Potential bottleneck	Section which exceeds limited capacity threshold
Netherlands (+nodes)	2	-	-	9	-
Belgium	-	-	-	3	-
Germany	5	5	5	*	-
Switzerland	1	1	1	-	-
Italy (+nodes)	3**	3**	3**	-	8

* Potential bottlenecks have not been identified

** Including the Bottleneck on the border section Iselle – Domodossola, where capacity is managed by TVS / SBB / BLS.

For most of these bottlenecks, plans to overcome them have been made, but they still have to be 'Secured' and built.

Situation 2025

In 2025 the situation improves slightly in Italy, as can be seen in annexes 5 to 8.

In the **Netherlands** there is a bottleneck on 1 section :
Eindhoven – Venlo

Five nodes are marked as a bottleneck: SY Botlek, Pernis and SY Venlo, Kijfhoek and SY Waalhaven Zuid (for all 5 nodes studies on how to improve capacity are planned),

9 sections are marked as a potential bottleneck:

- the section between Meteren and Boxtel
- the section between Boxtel and Eindhoven
- the section between Amsterdam Bijlmer and Breukelen
- the section between Venlo and the border (several studies on how to improve capacity)
- the section between Kijfhoek and Lage Zwaluwe
- the section between Lage Zwaluwe and Breda
- the section between Breda and Boxtel
- the section between Haarlem and Amsterdam
- the section between Amsterdam and Amsterdam Bijlmer

In **Belgium** there are 6 sections are marked as potential capacity bottlenecks.

- the section between Brugge and Gent
- the section between Gent and Schellebelle
- the section between Gent and Zwijndrecht Fort
- the section between Antwerpen Berchem and Lier
- the section between Antwerpen Schijnpoort and Antwerpen Berchem
- the section between Aarschot and Hasselt

In **Germany** there are 5 bottlenecks:

- the section between Kaldenkirchen and Viersen.
- the section between Aachen West and Stollberg.
- the section between Hürth-Kalscheuren and Remagen.
- the section between Mannheim – Zeppelinheim (the relevant section for RFC Rhine – Alpine is Gross Gerau – Biblis).
- the section between Offenburg and Basel Bad Rbf
(the relevant sections in the ÜLS are between Offenburg – Abzw. Gundelfingen and Abzw. Leutersberg – Weil am Rhein).

In **Switzerland** there are 2 bottlenecks

- the section between Bellinzona and Pino border
- the section between Frutigen and Brig (Lötschberg Base Tunnel)

In the **Border Section Switzerland-Italy** there is one bottleneck

- the section between (Brig -) Iselle – Domodossola due to :
 - the existing infrastructure bottlenecks on the RFI side, only 2 of the 3 train paths can currently be offered as SIM train paths (4m corridor).
 - the existing infrastructure bottlenecks on the RFI side, only 3 train paths instead of 4 (freight traffic) can be offered in the AS 2035.

In **Italy** one section remains bottleneck :

- the section between Pioltello and Melzo

4 sections remain marked as sections which exceed the limited capacity threshold

- the section between Milano and Pavia
- the section between Voghera and Tortona
- the section between Tavazzano and Lodi
- the section between Casalpusterlengo and Codogno

Number of sections with Capacity Bottlenecks in 2025	Infrastructure with plans S	Infrastructure with plans S+P	Infrastructure with plans S+P+TBD	Potential bottleneck	Section which exceeds limited capacity threshold
Netherlands (+nodes)	6	6	6	9	-
Belgium	-	-	-	6	-
Germany	5	5	5	*	-
Switzerland	1***	1***	1***	-	-
Italy	2**	2**	2**	-	4

* Potential bottlenecks have not been identified

** Including the Bottleneck on the border section Iselle – Domodossola, where capacity is managed by TVS / SBB / BLS.

*** For the bottleneck between Bellinzona and Luino no infrastructure measures are foreseen because, in combination with the Chiasso and Luino line, there is sufficient capacity available.

Situation 2030

In 2030, as can be seen in annexes 9 to 12: the situation improves in some countries and worsens in others.

In the **Netherlands** there is 1 section with a bottleneck in the ‘S’ scenario:

- the section between Breda and Boxtel

The bottleneck between Breda and Boxtel will become a potential bottleneck when the planned project ZW Curve Meteren is realized (‘P’scenario)

8 nodes are identified as bottlenecks in the ‘S+P’ scenario:

- Maasvlakte
- Europoort
- Botlek
- Pernis
- SY Waalhaven Zuid
- Kijfhoek
- Roosendaal
- SY Venlo

In the ‘TBD’ scenario, the bottlenecks at Maasvlakte, Europoort, Botlek and Roosendaal are solved

10 sections are marked as potential bottlenecks in the ‘S’ scenario:

- the section between Haarlem and Amsterdam
- the section between Amsterdam and Amsterdam Bijlmer
- the section between Amsterdam Bijlmer and Breukelen
- the section between Breukelen and Utrecht
- the section between Meteren and Boxtel
- the section between Boxtel and Eindhoven
- the section between Eindhoven and Venlo
- the section between Venlo and Venlo border
- the section between Kijfhoek and Lage Zwaluwe
- the section between Lage Zwaluwe and Breda

In **Belgium** 7 sections are marked as potential bottlenecks:

- the section between Brugge and Gent
- the section between Gent and Schellebelle
- the section between Gent and Zwijndrecht Fort
- the section between Antwerpen Berchem and Lier
- the section between Antwerpen Schijnpoort and Antwerpen Berchem
- the section between Aarschot and Hasselt
- the section between Mechelen and Muizen Goederen

In **Germany**, there are 5 bottlenecks:

- the section between Kaldenkirchen and Viersen.
- the section between Aachen West and Stollberg.
- the section between Hürth-Kalscheuren and Remagen.
- the section between Mannheim – Zeppelinheim (the relevant section for RFC Rhine – Alpine is Gross Gerau – Biblis).
- the section between Offenburg and Basel Bad Rbf
(the relevant sections in the ÜLS are between Offenburg – Abzw. Gundelfingen and Abzw. Leutersberg – Weil am Rhein).

In **Switzerland** there are 2 bottlenecks

- the section between Bellinzona and Pino border
- the section between Frutigen and Brig (Lötschberg Base Tunnel)

In the **Border Section Switzerland-Italy** there is one bottleneck

- the section between (Brig -) Iselle – Domodossola due to :
 - the existing infrastructure bottlenecks on the RFI side, only 2 of the 3 train paths can currently be offered as SIM train paths (4m corridor).
 - the existing infrastructure bottlenecks on the RFI side, only 3 train paths instead of 4 (freight traffic) can be offered in the AS 2035.

In **Italy** one section remains a bottleneck :

- the section between Pioltello and Melzo

There are no longer sections which exceed the limited capacity threshold.

Number of sections with Capacity Bottlenecks in 2030	Infrastructure with plans S	Infrastructure with plans S+P	Infrastructure with plans S+P+TBD	Potential bottlenecks	Section which exceeds limited capacity threshold
Netherlands (+nodes)	9	8	4	10	-
Belgium	-	-	-	7	-
Germany	5	5	5	*	-
Switzerland	1 ^{***}	1 ^{***}	1 ^{***}	-	-
Italy	2 ^{**}	2 ^{**}	2 ^{**}	-	-

* Potential bottlenecks have not been identified

** Including the Bottleneck on the border section Iselle - Domodossola where capacity is managed by TVS / SBB / BLS.

*** For the bottleneck between Bellinzona and Luino no infrastructure measures are foreseen because, in combination with the Chiasso and Luino line, there is sufficient capacity available.

Conclusions

Until 2030, several (potential) capacity bottlenecks are expected to emerge. Even if all currently planned/identified infrastructure projects are realised (situation S+P+TBD), there will still remain (potential) infrastructural bottlenecks on RFC Rhine-Alpine. In several cases, especially in Germany, the planning of infrastructure implementation for the identified capacity bottlenecks goes much beyond the year 2030. It is crucial for rail operations on RFC Rhine-Alpine, that all planned infrastructure projects are realised in the best possible way and as quickly as possible. And it is also crucial to create new projects and assure their funding to alleviate all bottlenecks in order to improve the capacity on the corridor.

Additional bottlenecks identified by railway undertakings :

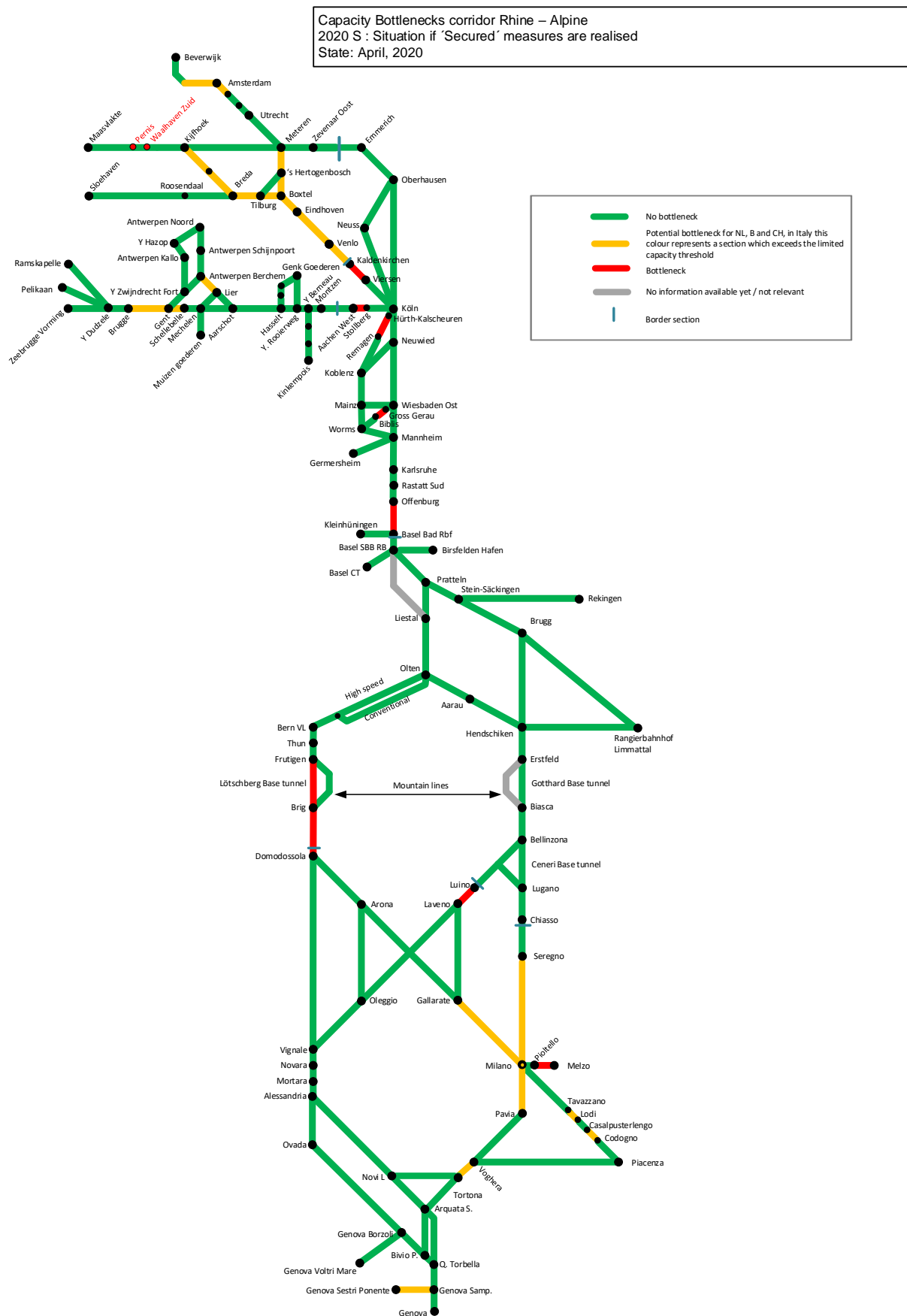
To add the perspective of the Railway Undertakings to the capacity bottleneck analysis the results from an enquiry of the European Commission from 2019 and an update by RFC Rhine-Alpine are included in annexes 15 to 18.

The enquiry from 2019 also includes an official statement by the Ministries of Transport to the capacity bottlenecks nominated by the RUs. These bottlenecks are grouped to existing (annex 15) and new investments (annex 16). The original invitation by the EU Commission is included in annex 17. The RU information was presented in a CNC forum on 18th of November 2019 and subsequently commented by the ministries of transport. Please note, some information may be outdated.

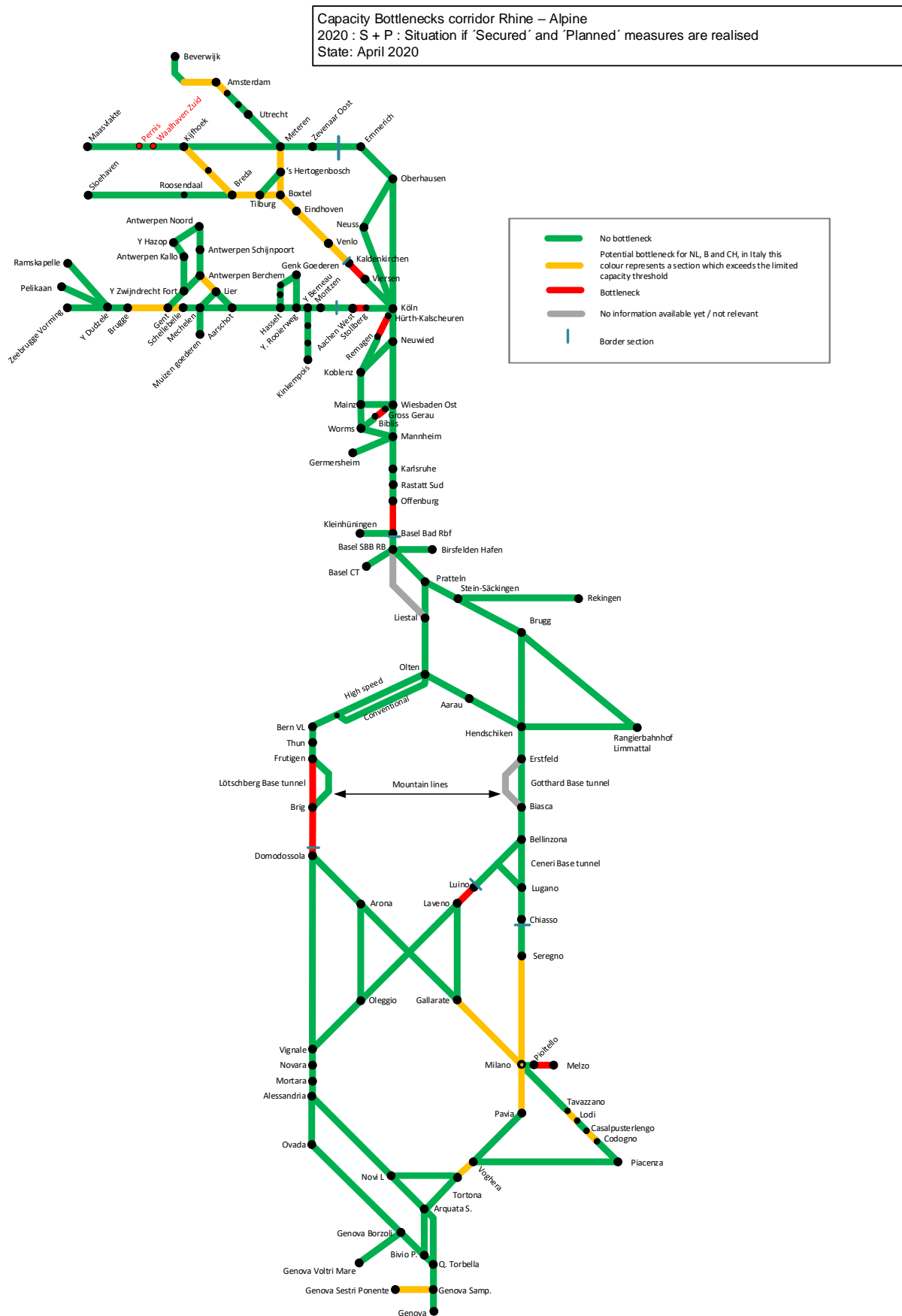
Based on these lists from 2019, RFC Rhine-Alpine asked the RUs represented in the Railway Undertakings Advisory Group in late 2020, to check the lists and add further capacity bottlenecks that might have emerged (annex 18). These added bottlenecks received a comment by the IM.

Please note, that there can be duplications of bottlenecks between the CBA (first section) and the bottlenecks nominated by RU. As this list is compiled from the RU perspective, it has no binding character. Subsequently, no actions can be expected from the IMs. It has been put together with thorough care by the Railway Undertakings Advisory Group of RFC Rhine-Alpine but might not be exhaustive.

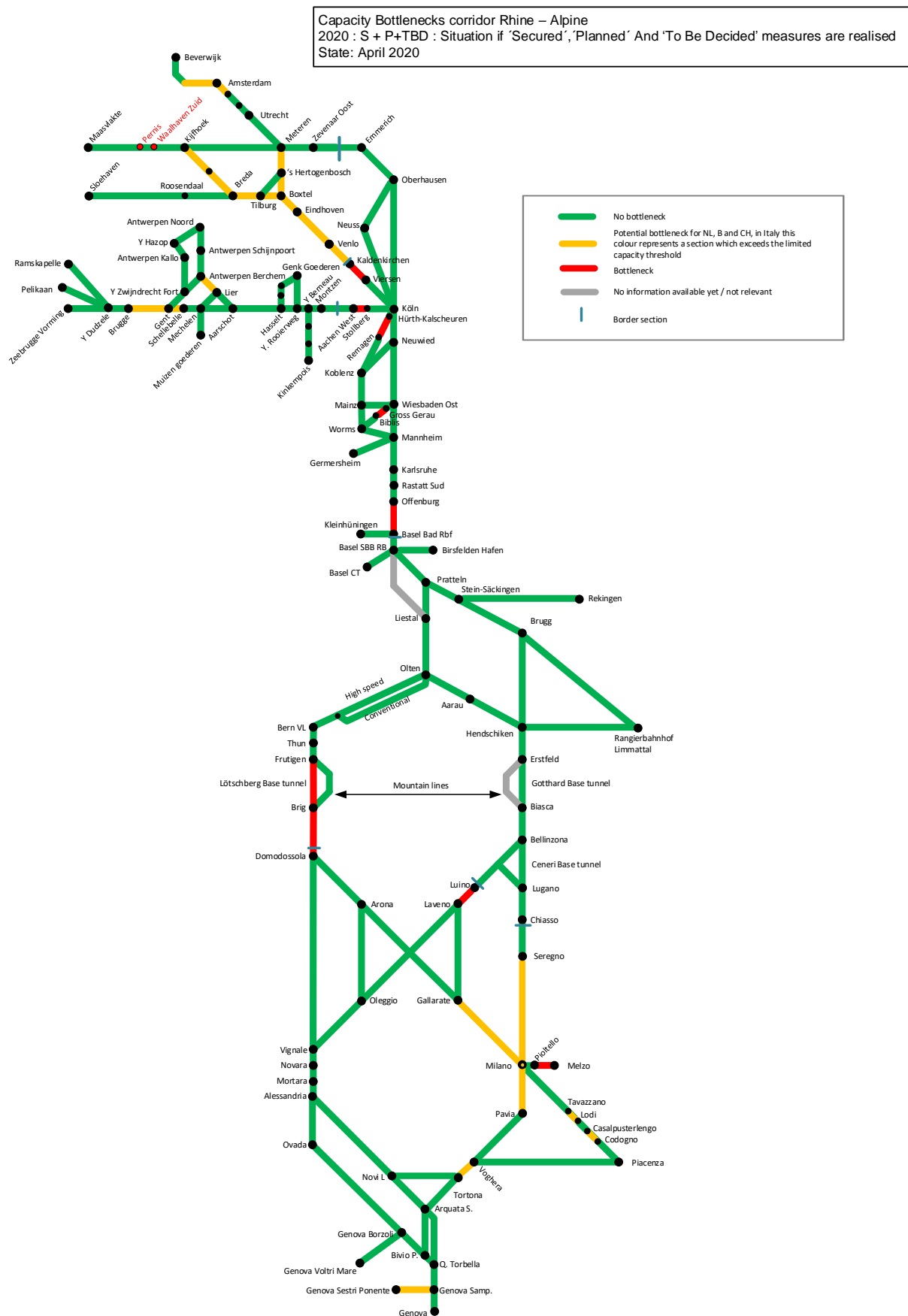
Annex 1: Capacity Bottlenecks in 2020 (S)



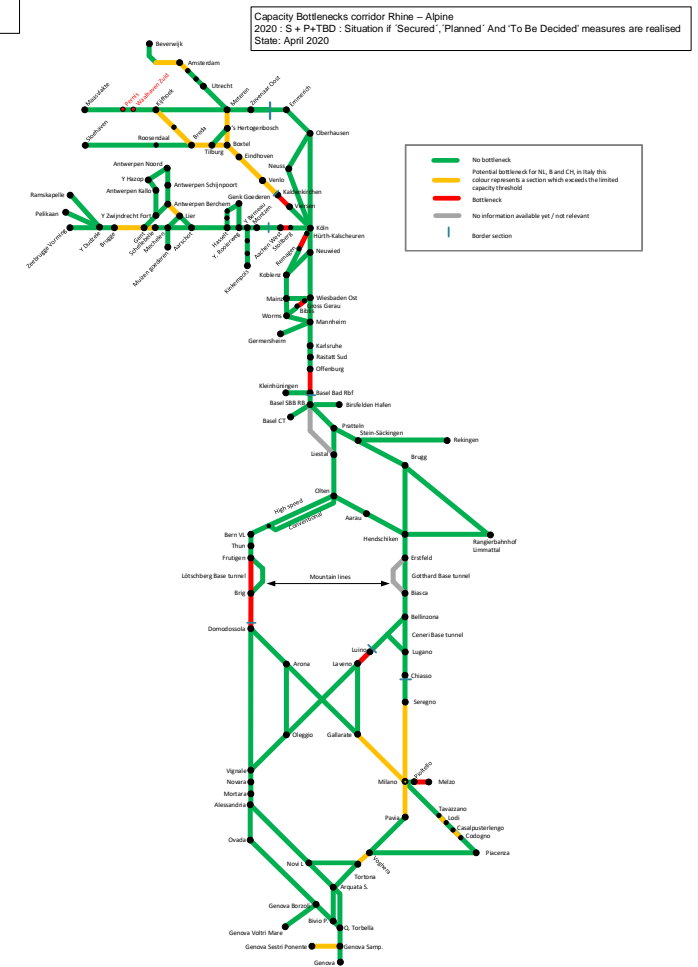
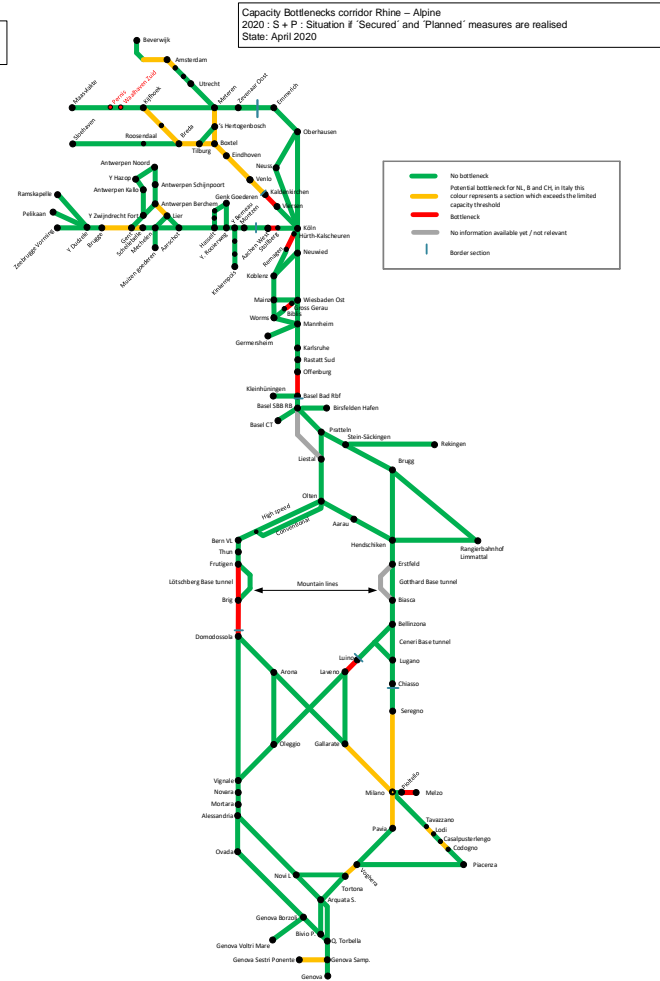
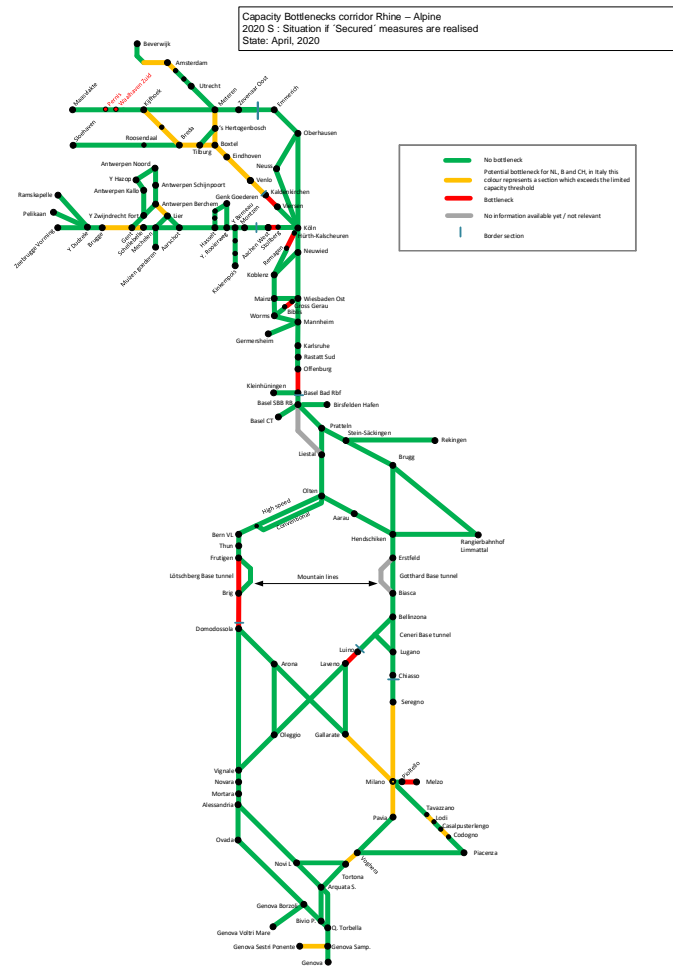
Annex 2: Capacity Bottlenecks in 2020 (S + P)



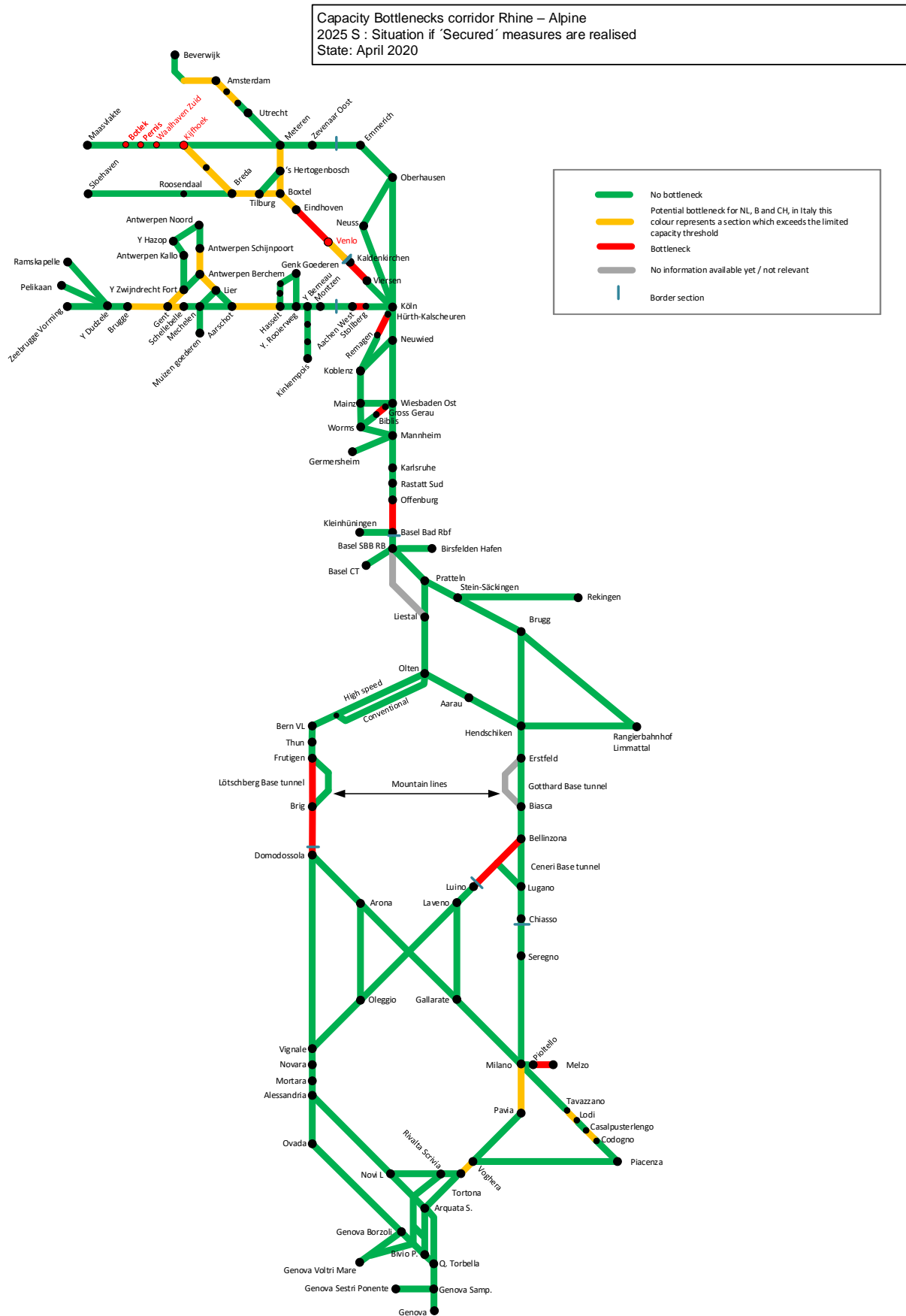
Annex 3: Capacity Bottlenecks in 2020 (S + P + TBD)



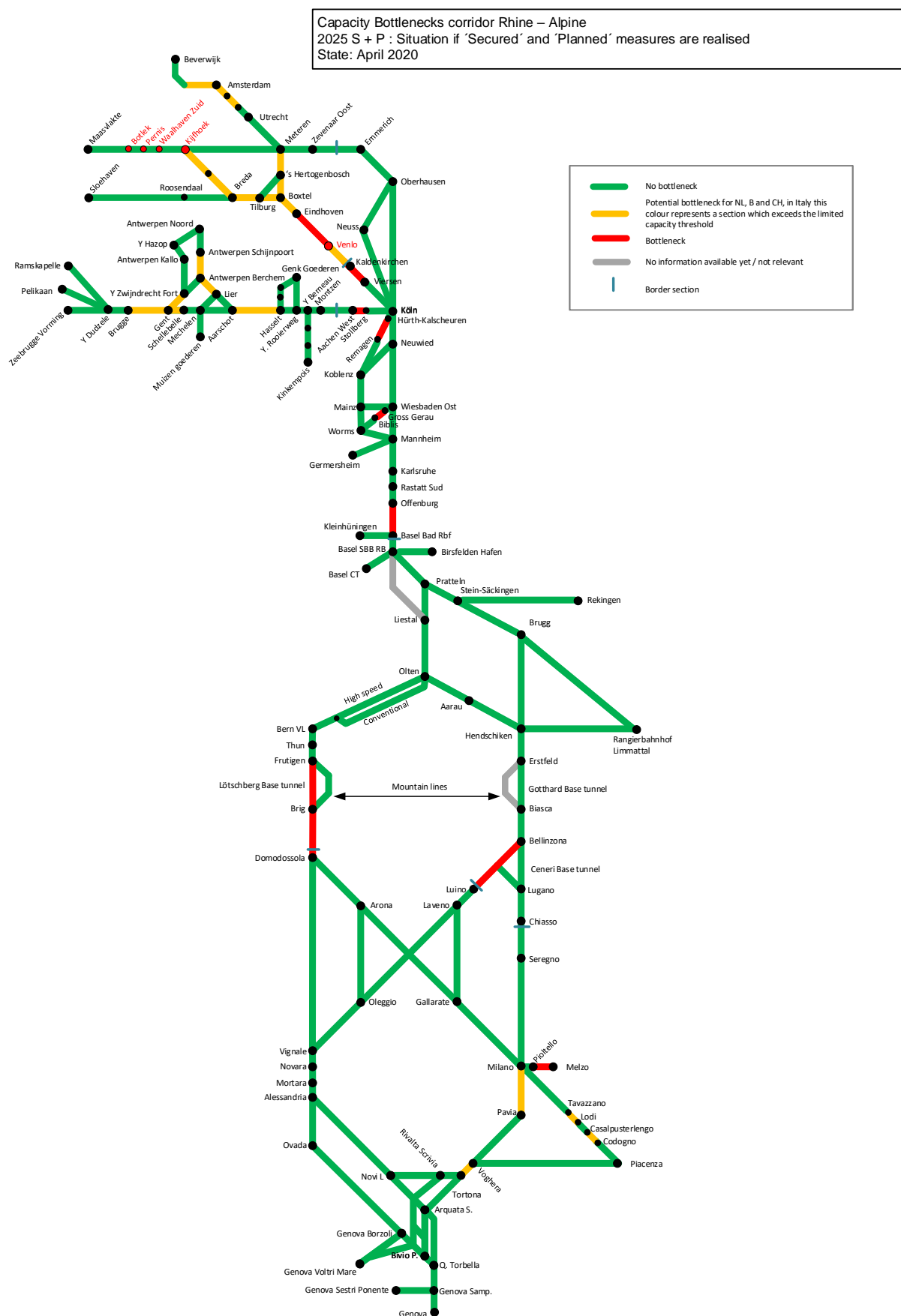
Annex 4: Capacity Bottlenecks in 2020 (S / S + P / S + P + TBD)



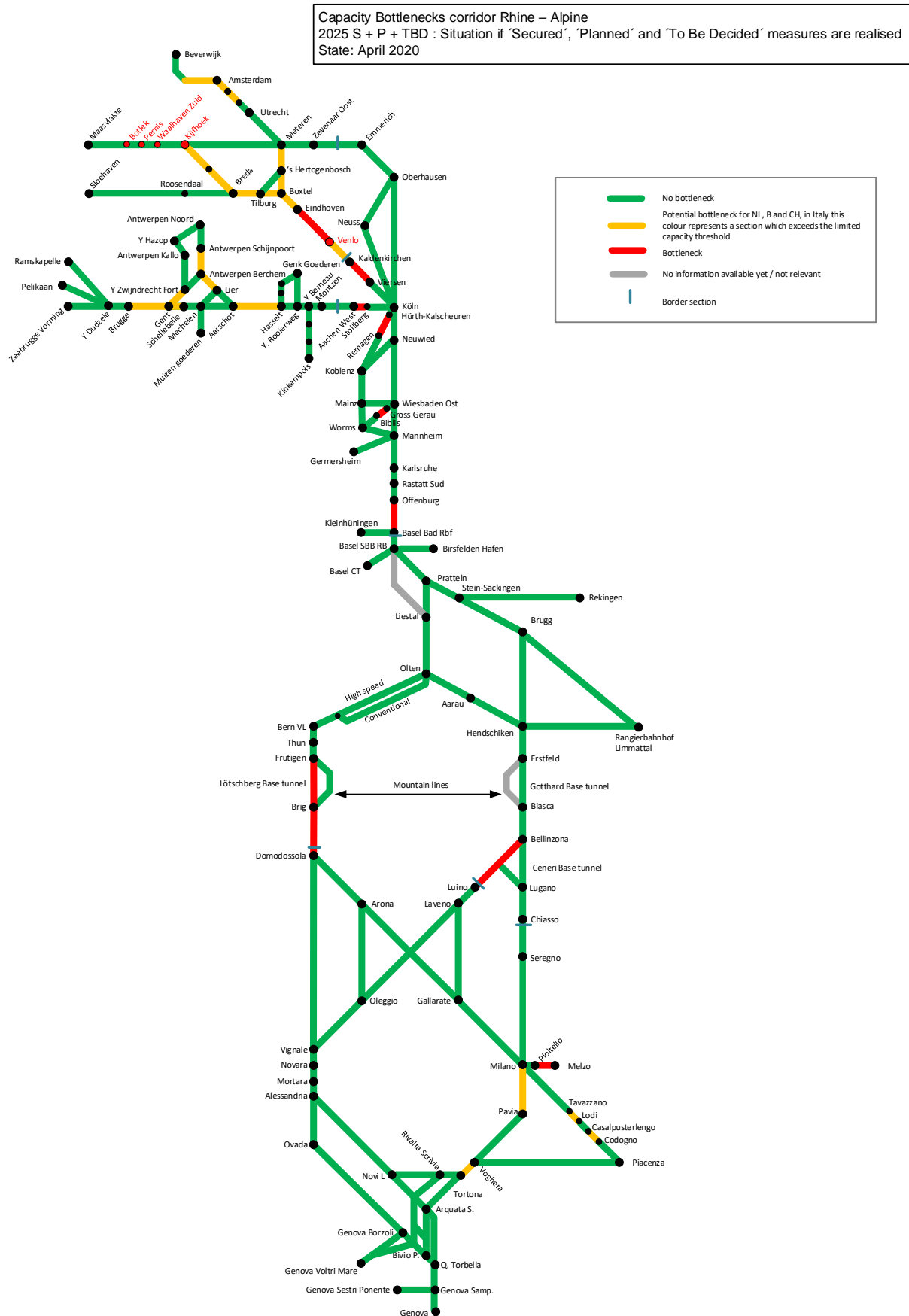
Annex 5: Capacity Bottlenecks in 2025 (S)



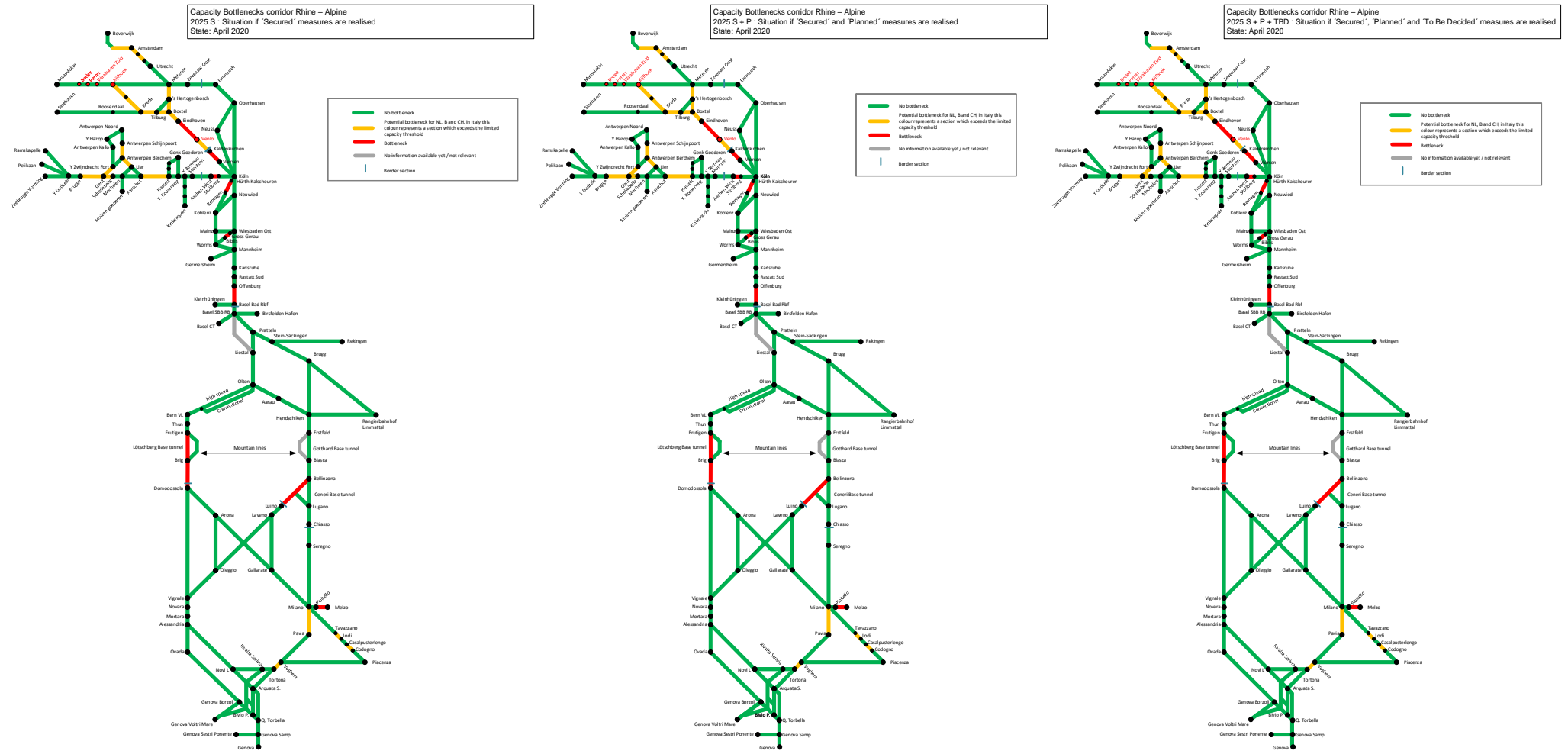
Annex 6: Capacity Bottlenecks in 2025 (S + P)



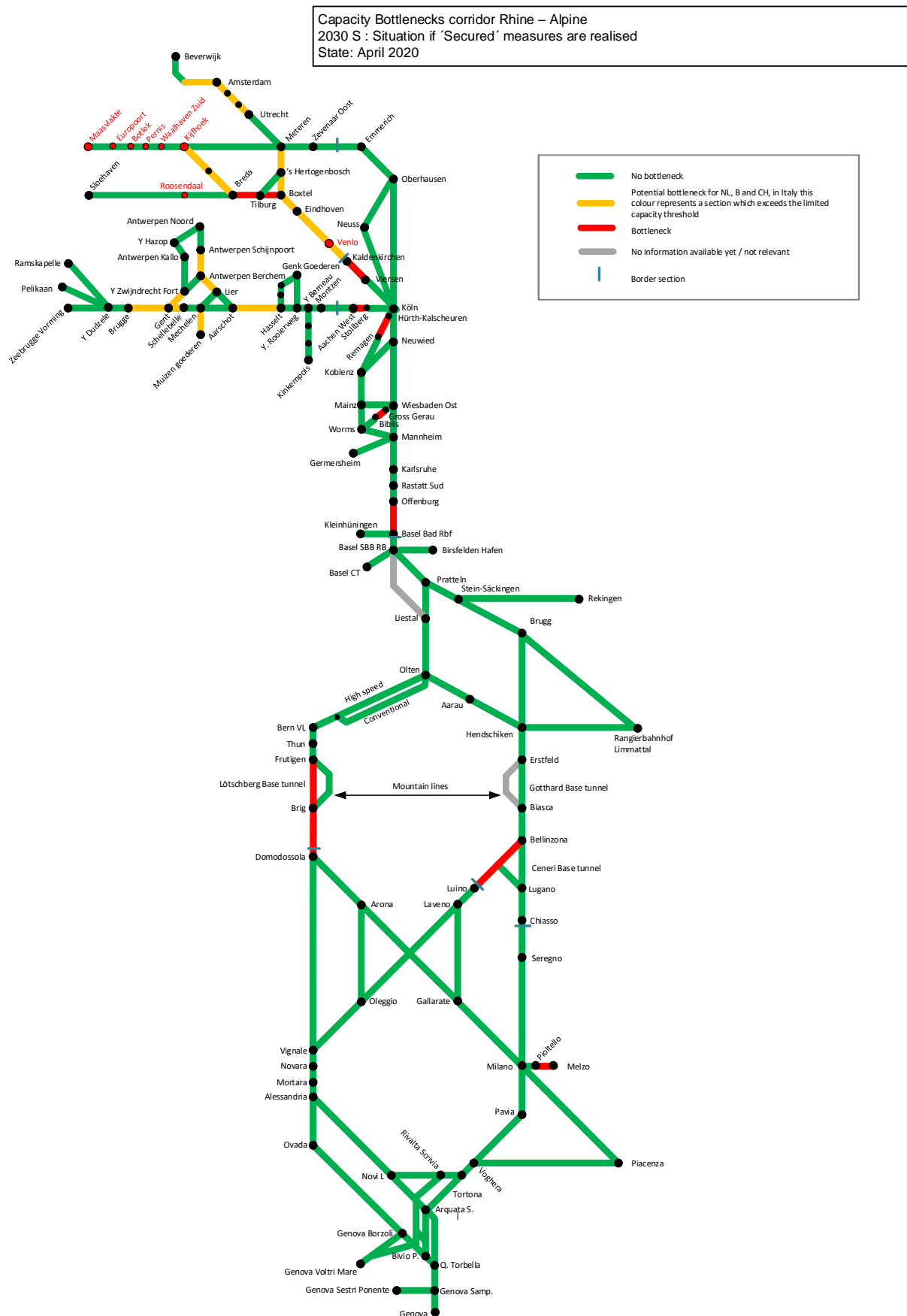
Annex 7: Capacity Bottlenecks in 2025 (S + P + TBD)



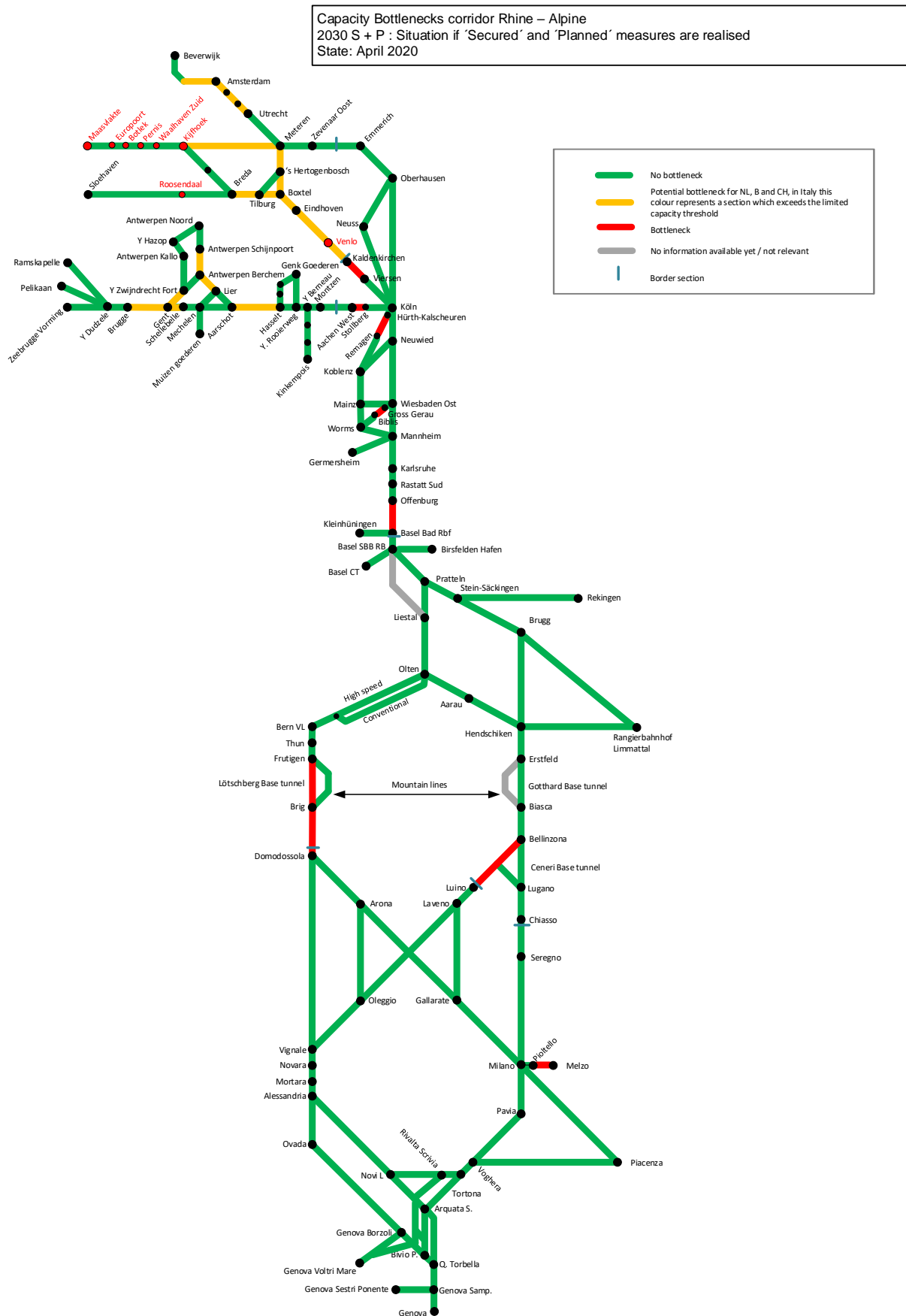
Annex 8: Capacity Bottlenecks in 2025 (S / S + P / S + P + TBD)



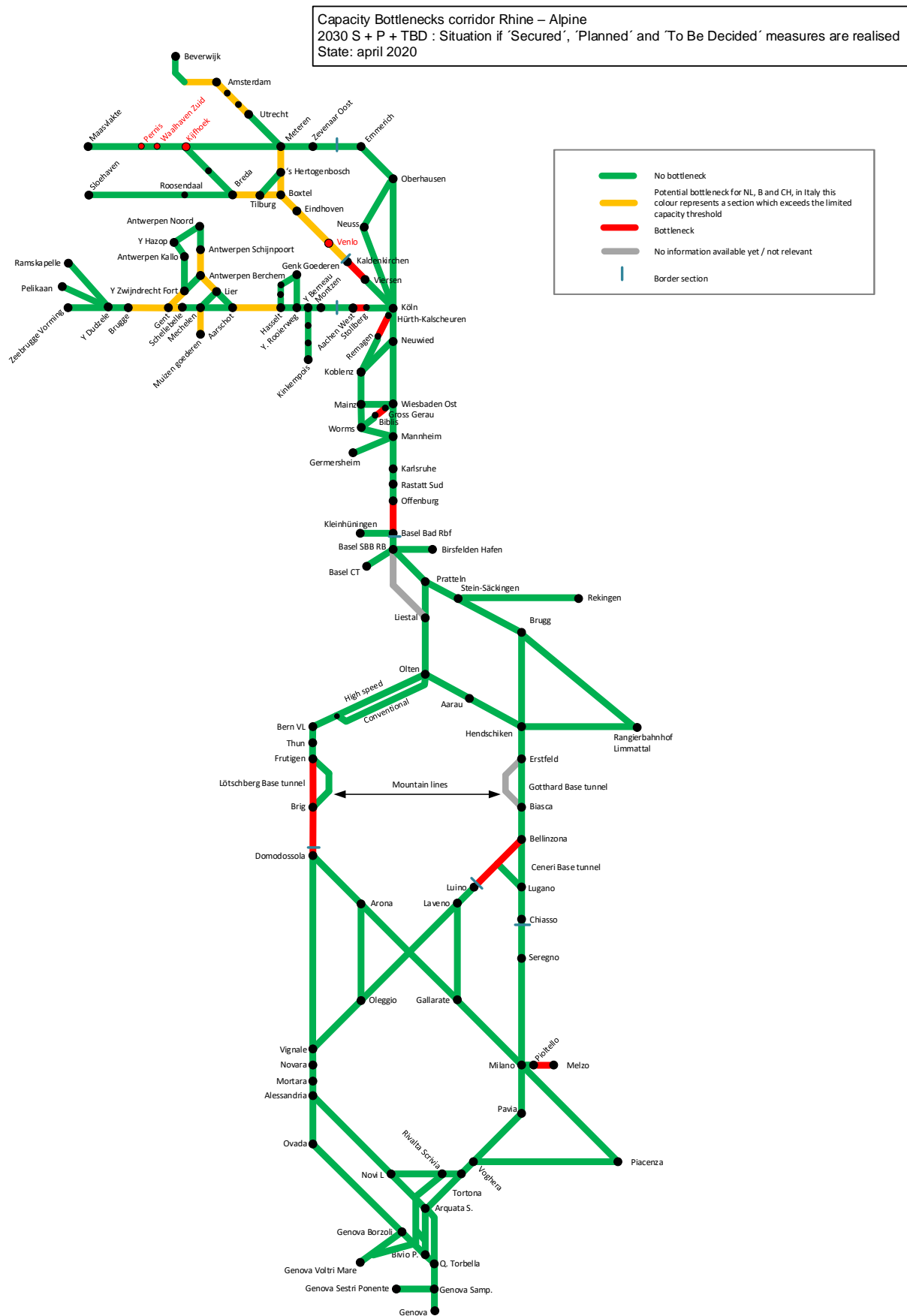
Annex 9: Capacity Bottlenecks in 2030 (S)



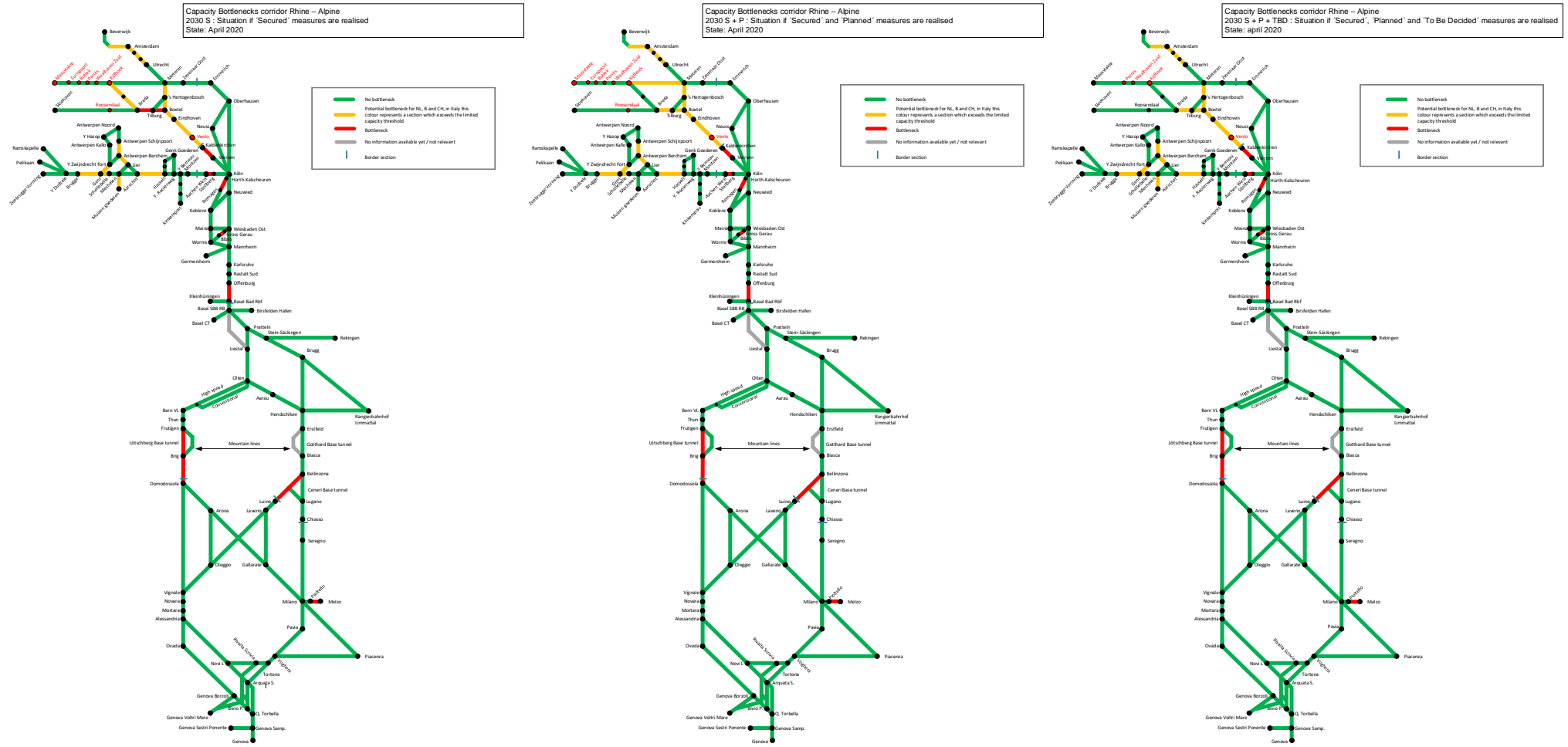
Annex 10: Capacity Bottlenecks in 2030 (S+P)



Annex 11: Capacity Bottlenecks in 2030 (S+P+TBD)



Annex 12: Capacity Bottlenecks in 2030 (S / S + P / S + P + TBD)



Annex 14: CIP project information (valid 31/10/2019)

Project ID	Project Name	Benefit	Go Live Date	Description	Project Category	Decision Status	Project Type	IM
Country : Belgium								
512103	By-pass Mechelen - Complex Otterbeek	Capacity	2028.12	By-pass Mechelen - Complex Otterbeek	Infrastructure	planned	main project	Infrabel
30157203	Port of Zeebrugge	Capacity	2020.12	Various extension works in the port of Zeebrugge	Infrastructure	secured	main project	Infrabel
30157236	Port of Gent	Capacity	2020.12	Various extension works in the port of Gent	Infrastructure	secured	main project	Infrabel
512885	Second track Neerpelt - Balen werkplaats	Capacity	2025.12	Studies, construction and electrification of a 2nd track on L19 between Neerpelt and Balen-werkplaats	Infrastructure	secured	main project	Infrabel
513055	Second access to the Port of Antwerp	Capacity	2023.12	Study on construction of new line between Antwerp North and Lier to provide a better access to the Port of Antwerp	Infrastructure	secured	main project	Infrabel
30156836	Masterplan port of Zeebrugge	Capacity	2025.12	Extension and modernisation of Zeebrugge Formation with a new hub of 24 tracks in Zwankendamme and a fan of sidings in Zeebrugge and the removal of the level crossing in Lissewege	Infrastructure	secured	main project	Infrabel
30156915	Third and 4th track Gent - Brugge	Capacity	2024.12	Building of 3rd and 4th track between Brugge and Gent (L50A)	Infrastructure	secured	main project	Infrabel
30156948	Junction Oude Landen	Capacity	2023.12	Construction of junction at Oude Landen (L27A) to provide a better access to the port of Antwerp	Infrastructure	secured	main project	Infrabel
30157016	Level crossing removal	Capacity	2020.12	Level crossing removal (12 level crossings of which 6 on RFC Rhine-Alpine (Line 50 A), 5 on RFC NS-Med (L75 and L40) and 1 on both corridors (L59)	Infrastructure	secured	main project	Infrabel
30157099	Side tracks 750m	Train length	2023.12	Construction of side tracks 750m in Belgium apart from major projects where this is already included in other works	Infrastructure	secured	main project	Infrabel

Project ID	Project Name	Benefit	Go Live Date	Description	Project Category	Decision Status	Project Type	IM
30157135	Port of Antwerp: left bank	Capacity	2020.12	Various extension and renewal works on the left bank of the port of Antwerp	Infrastructure	secured	main project	Infrabel
30157169	Port of Antwerp: Right bank	Capacity	2020.12	Various extension and renewal works on the right bank of the port of Antwerp	Infrastructure	secured	main project	Infrabel
507993	Port of Gent: construction of 750m tracks	Train length	2021.12	Construction of side tracks of 750m in the port of Gent	Infrastructure	secured	main project	Infrabel
507995	Kinkempois: extension of fan of sidings	Capacity	2020.12	Extension of fan of sidings in the formation yard of Kinkempois	Infrastructure	secured	main project	Infrabel
507992	Port of Antwerp: Right Bank - Signalling of fan of sidings	Capacity	2022.12	Signalling of several regularly used fan of sidings on right bank of the port of Antwerp	Infrastructure	secured	main project	Infrabel
506354	Electrification Mol - Dutch border	Capacity	2020.12	Electrification of line 19 between Mol and the Dutch border	Infrastructure	secured	main project	Infrabel
506443	Study L59 3rd track between Lokeren and Sint Niklaas	Capacity	2025.12	Studies and first works related to the construction of a third track between Lokeren and Sint-Niklaas and the removal of level crossings	Infrastructure	secured	main project	Infrabel
30156758	ETCS equipment	Interoperability	2022.12	Equipment of the remaining part of the Belgian network with ETCS	ERTMS	secured	main project	Infrabel
30156803	Junction Schellebelle	Capacity	2024.12	construction of junction in Schellebelle (L50A)	Infrastructure	planned	main project	Infrabel
30156869	Third track Brugge - Dudzele	Capacity	2031.12	Building of a third track between Brugge and Dudzele (L51, L51A and L51C)	Infrastructure	planned	main project	Infrabel
Country : Germany								
30112440	Mainz/Wiesbaden - Mannheim	Capacity	2030.12	Construction High-Speed Line	Infrastructure	to be decided	main project	DB Netz
30109645	Iron Rhine Rhine German Part	Capacity	2040.12	Modernisation/upgrade of tracks on the German Network	Infrastructure	to be decided	main project	DB Netz
503414	ABS Grenze D/NL Kaldenkirchen - Viersen - Rheydt	Capacity	2035.12	Double track Kaldenkirchen - Dülken and Rheydt - Rheydt-Odenkirchen, Curve of Viersen	Infrastructure	to be decided	main project	DB Netz
30111633	ABS/NBS Karlsruhe-Basel, Karlsruhe - Rastatt	Capacity	2024.12	Construction tunnel	Infrastructure	secured	main project	DB Netz
30111846	ABS/NBS Karlsruhe-Basel, Offenburg - Basel	Capacity	2030.12	Construction 3rd + 4th track	Infrastructure	secured	main project	DB Netz
30057833	Border Emmerich - Oberhausen	Capacity	2026.12	ABS 3rd track A relevant date/year for going-live can only be given once the building permission has been approved	Infrastructure	planned	main project	DB Netz

Project ID	Project Name	Benefit	Go Live Date	Description	Project Category	Decision Status	Project Type	IM
541072	ABS Ludwigshafen - Saarbrücken	undefined	2021.12	Speed acceleration up to 200 km/h	Infrastructure	secured	main project	DB Netz
30112233	ERTMS Rhine-Alpine (Oberhausen - Basel)	Interoperability	2022.12	ERTMS equipment existing line	ERTMS	secured	main project	DB Netz
524356	Corridor A	undefined	2023.01	ERTMS Deployment	ERTMS	secured	main project	DB Netz
540868	Gap Closing	undefined	2023.01	ERTMS Employment	ERTMS	secured	main project	DB Netz
Country : Italy								
30159829	Genoa-Campasso station upgrade	Capacity	2020.12	Genoa-Campasso station upgrade in preparation to the new planned connection of the Succursale line to Genova Marittima (port).	Infrastructure	secured	main project	RFI
30163862	ERTMS Completion Corridor Rhine - Alpine	undefined	2030.12	Step by step completion of the whole corridor ERTMS Installation.	ERTMS	planned	main project	RFI
508239	Milano Smistamento terminal upgrading	undefined	2021.12	Transfer station upgrading interventions (signalling adjustment work in RFI station, demolitions and independences with the new Alptransit intermodal terminal realization)	Infrastructure	secured	main project	RFI
513245	Voltri-Brignole Infrastructural Upgrading"	undefined	2021.12	improving the Genoa railway node by separating the metropolitan and regional rail system from long-distance traffic flows and enhancing intermodality by improving the freight service connection with the maritime trade traffic.	Infrastructure	secured	main project	RFI
30163394	ERTMS Chiasso-Milano Smistamento	Interoperability	2022.01	ERTMS installation	ERTMS	secured	main project	RFI
30064412	ERTMS Domodossola - Novara (Via Borgomanero)	Interoperability	2019.12	ERTMS Installation	ERTMS	secured	main project	RFI
30159935	Terzo Valico (Giovi pass) new line construction	Capacity	2023.09	Terzo Valico (Giovi pass) new line construction connecting the port of Genoa with Tortona.	Infrastructure	planned	main project	RFI
30159978	Chiasso-Monza installation of 3rd + 4th track	Capacity	2035.12	Chiasso-Monza installation of 3rd + 4th track	Infrastructure	planned	main project	RFI
30160017	Seregno - Bergamo - Treviglio, Gronda Est	Capacity	2035.12	Bypass Milano node	Infrastructure	planned	main project	RFI

Project ID	Project Name	Benefit	Go Live Date	Description	Project Category	Decision Status	Project Type	IM
30160053	Upgrading Gallarate-Parabiago-Rho section	Capacity	2030.12	Infrastructural and technological upgrade of the Domodossola - Milano line, section Gallarate - Rho. It involves: - the installation of a fourth track alongside the railway line between the stations of Rho and Parabiago - technology upgrade for capacity increase - Link Y in Busto Arsizio	Infrastructure	planned	main project	RFI
30066220	Tortona-Voghera quadrupling of line	Capacity	2030.12	Upgrade to 4 tracks of the section Tortona-Voghera	Infrastructure	planned	main project	RFI
30068066	Vignale-Oleggio-Arona installation second track	Capacity	2035.12	Doubling of the section	Infrastructure	planned	main project	RFI
524199	Port of Genova	undefined	2021.12	Rail plan - various extension works in the Port of Genoa.	Infrastructure	planned	main project	RFI
508097	Upgrade to PC80 loading gauge on railway access to the Terzo Valico /succursale	undefined	2022.12	Upgrade to PC80 loading gauge on railway access to the Terzo Valico	Infrastructure	planned	main project	RFI
30068100	MI Rogoredo-Pieve Emanuele track quadrupling	Capacity	2030.12	Upgrade to 4 tracks between Milano Rogoredo and Pavia (26 km), with the construction of the Pieve Emanuele station. Milano Rogoredo station is already compliant with the new line requirements. Phases of the intervention: 1) 4th track between Milano Rogoredo and Pieve Emanuele and 2) 4th track until Pavia and PRG implementation in the Pavia Station	Infrastructure	planned	main project	RFI
30068179	Oleggio-Arona installing second track	Capacity + Interoperability	2030.12	Second track on the section Oleggio - Arona	Infrastructure	planned	main project	RFI
507813	Upgrading to 750 sidings on the pass access lines_1	undefined	2021.12	The project includes overall upgrading works to 750 m sidings for all lines that allow access to the three borders with Switzerland: Domodossola, Luino and Chiasso. Putting into service will be done step by step and will be completed by 2021.	Infrastructure	planned	main project	RFI

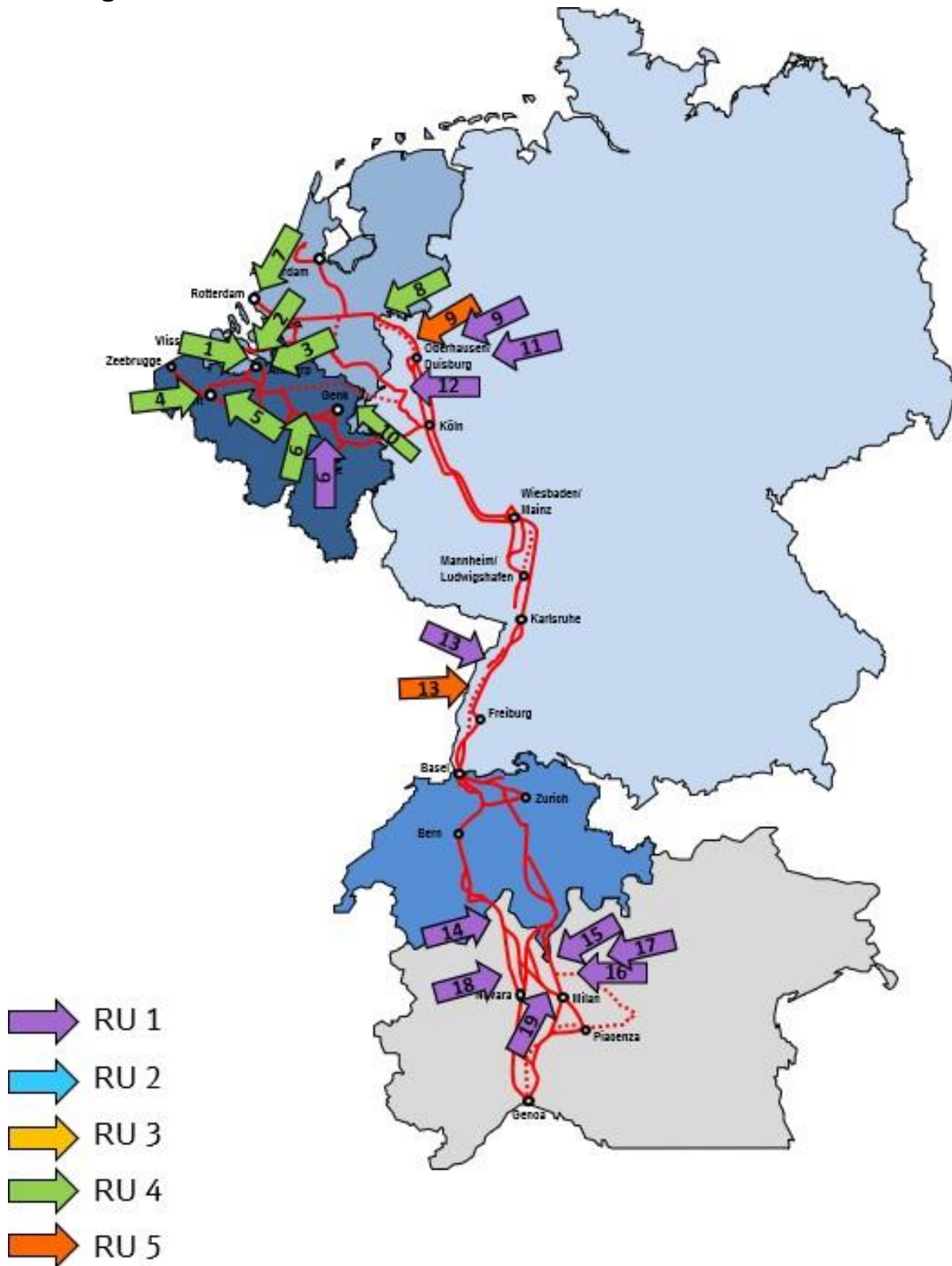
Project ID	Project Name	Benefit	Go Live Date	Description	Project Category	Decision Status	Project Type	IM
507862	Upgrading to PC80 profile on the access lines to the borders	undefined	2030.12	The project includes several actions aiming at upgrading to PC80 the profile of the lines to access the three Swiss border sections from Novara and Milan. The single projects have different time horizons for go-live and also different status of planning. The section Milan-Chiasso is foreseen to go live in the end of 2018 and the Luino lines in 2020 while the remaining sections are a time scenario up to end of 2030	Infrastructure	planned	main project	RFI
508058	Upgrading of the sidings up to 750 meter on the lines to access the Giovi Pass	undefined	2021.12	Upgrading of the sidings up to 750 meter on the lines to access the Giovi Pass	Infrastructure	planned	main project	RFI
508228	Upgrading Milano node	undefined	2026.12	Milano node upgrading, including: development-oriented interventions on the railway transport lines; construction of a bypass of Rho station (PRG RHO); Headways upgrading (lines Milano P. Garibaldi - Milano Greco/Lambrate and Monza - Greco Pirelli - Milano Lambrate); PRG Monza; PRG + ACC Milano Porta garibaldi; PRG + ACC Milano Lambrate; High capacity headways.	Infrastructure	planned	main project	RFI
508128	Technological Upgrading	undefined	2026.12	Upgrading measures regarding command and control systems in the stations and other traffic management systems (Chiasso - Milano e Domodossola - Milano)	Signalling	planned	main project	RFI
508229	Technological Upgrading Tortona-Milano	undefined	2026.12	Technological for speed upgrading includes old technologies upgrade concerning control system in stations and headways (preparatory for ERTMS) including infrastructural upgrading interventions	Signalling	planned	main project	RFI
30163814	ERTMS Milano - Genova	Interoperability	2020.12	ERTMS Installation	ERTMS	planned	main project	RFI
508112	Power supply system upgrade	undefined	2026.12	Power supply system upgrade (only Chiasso Line)	Infrastructure	secured	main project	RFI

Project ID	Project Name	Benefit	Go Live Date	Description	Project Category	Decision Status	Project Type	IM
Country : Netherlands								
30162552	Venlo PHS 740 meter freighttrains	undefined	open	extension of 1 or 2 tracks at Venlo for 740 meter freight trains	Infrastructure	to be decided	main project	ProRail
506055	ERTMS Kijfhoek - Roosendaal grens	undefined	2028.01	Implementing ERTMS between Kijfhoek and Roosendaal border. Go live 2026-2028	ERTMS	planned	main project	ProRail
30156062	Harbourline - 25 kV connection Betuweline	Quality	open	Change the voltage on the catenary from 1500 V DC to 25.000 V AC between Barendrecht Vork - Kijfhoek - and Sophiatunnel. Project on hold.	Infrastructure	to be decided	main project	ProRail
30155954	Elevated railwaytrack along the Theemsweg (Harbourline)	Capacity	2021.12	Realization of an elevated railwayline along the Theemsweg, as a result of which rail traffic will no longer hindered by Calandbridge openings.	Infrastructure	secured	main project	ProRail
30162515	Redesign Geldermalsen (PHS) and 3rd track Geldermalsen - Geldermalsen aansl	undefined	2021.12	sidetracks at Geldermalsen for 740m freight trains and separate 3rd track Geldermalsen - Geldermalsen aansl. (for the Merwedelingelijn Dordrecht - Geldermalsen)	Infrastructure	secured	main project	ProRail
30155991	Botlekbridge (Harbourline) - Oude Maas river crossing	Capacity	2021.03	Adjusting railway bridge and improving connection to Botlek Freightyard	Infrastructure	secured	main project	ProRail
30156136	South-West curve Meteren	Capacity	2027.12	new connection Betuweline (Kijfhoek) to 's-Hertogenbosch and Venlo	Infrastructure	planned	main project	ProRail
30156171	Dive-under at Amsterdam Dijkgracht	Capacity	2028.12		Infrastructure	planned	main project	ProRail
30156274	4 tracks 's Hertogenbosch - Vught aansl. and dive-under Vught	Capacity	2027.12	Adding a fourth track between 's Hertogenbosch and Vught aansluiting Construction of a Dive-under at Vught aansluiting	Infrastructure	planned	main project	ProRail
30156027	Redevelopment Waalhaven Zuid freight yard	Capacity	2025.01	Increasing capacity and track length (740 m trains)	Infrastructure	planned	main project	ProRail
506189	Improving and upgrading capacity Hamont/Budel border - border NL/DE	undefined	open	study routing freight trains Antwerp - Ruhr area. (on hold)	Infrastructure	planned	main project	ProRail
499506	ERTMS Roosendaal - Den Bosch	undefined	2030.01	Implementing ERTMS between Roosendaal and 's Hertogenbosch. Go live 2028-2030.	ERTMS	planned	main project	ProRail

Project ID	Project Name	Benefit	Go Live Date	Description	Project Category	Decision Status	Project Type	IM
499542	ERTMS Meteren - Eindhoven	undefined	2031.01	Implementing ERTMS between Meteren and Eindhoven. (Go live 2029-2031)	ERTMS	planned	main project	ProRail
499579	ERTMS Utrecht - Meteren	undefined	2029.01	Implementing ERTMS between Utrecht Centraal and Betuweroute Meteren. Go live 2028-2029	ERTMS	planned	main project	ProRail
499646	ERTMS Eindhoven - Venlo border	undefined	2031.01	Implementing ERTMS between Eindhoven and Venlo border. Go live in 2029-2031	ERTMS	planned	main project	ProRail
30157378	Increasing the capacity of the Sophiatunnel	Capacity	open	investigating capacity and recommend measures to increase the capacity of the Sophiatunnel from 6 trains/hour to 10 trains/hour.	Infrastructure	to be decided	main project	ProRail
672026	Roosendaal 740 m	Capacity	2026.12	Enlargement of 2 tracks to 740 m (TBD)	Infrastructure	Study / To be decided	main project	ProRail
672028	Redesign SY Botlek	Capacity + Train length	2030.01	Redesign SY Botlek (TBD 2027-2030)	Infrastructure	Study / To be decided	main project	ProRail
672031	Electrification 2 tracks Europoort	Capacity	2030.01	Electrification 2 tracks Europoort (TBD 2026-2030)	Infrastructure	Study / To be decided	main project	ProRail
Country : Switzerland								
30056486	Loetschberg Base Tunnel, 2nd track middle part	Capacity + Interoperability + Quality	2029.01	Equipment of section Ferden-Mitholz (2nd tube) with railway infrastructure. Optionally, the excavation of a second tube between Mitholz and Frutigen is evaluated. Strategic development project of Switzerland. Intended as part of the National Network STEP AS 2025 and for the National Offering STEP AS 2030. The decision by Parliament is expected in early 2019. Start of realization not before 2022. Commissioning not before 2029.	Infrastructure	to be decided	main project	BLS
30164418	Eppenberg Tunnel	Capacity + Quality	2020.12	new tunnel, additional 2 tracks - total 4 tracks Daeniken - Woeschnau	Infrastructure	secured	main project	SBB Infra
30065540	Disentanglement Liestal	Capacity	2025.12	Liestal - Construction of crossover possibilities	Infrastructure	secured	main project	SBB Infra
499087	Node Bellinzona	Train length	2020.09	Upgrade marshalling yard San Paolo	Infrastructure	secured	main project	SBB Infra
499121	Efficiency improvement Chiasso	Capacity + Train length	2021.12	Extension of sidings up to 750m	Infrastructure	secured	main project	SBB Infra

Project ID	Project Name	Benefit	Go Live Date	Description	Project Category	Decision Status	Project Type	IM
498909	Replacement control center Chiasso	Capacity + Interoperability + Quality	2020.12	Construction of a new control center	Infrastructure	secured	main project	SBB Infra
499155	Rupperswil-Maegenwil	Capacity	2023.12	Capacity expansion	Infrastructure	secured	main project	SBB Infra
504988	3rd track Giubiasco-Bellinzona	Quality	2025.11	3rd track Giubiasco-Bellinzona	Infrastructure	secured	main project	SBB Infra
503268	Fly over MuttENZ	Quality	2025.12	Construction fly over between Basel and MuttENZ	Infrastructure	secured	main project	SBB Infra
503301	Improvement Basel RB	Quality + Quality + Train length	2022.11	New parking areas for locos, longer sidings, capacity improvements Basel RB	Infrastructure	secured	main project	SBB Infra
30065425	Gotthard Corridor Lines Profile upgrade to 4m	Loading gauge	2020.12	Corridor Lines Profile upgrade to 4m	Infrastructure	secured	main project	SBB Infra
30065349	Ceneri Base Tunnel	Capacity + Travel time reduction (freight trains)	2020.12	Construction of Ceneri Basel Tunnel	Infrastructure	secured	main project	SBB Infra
30065310	Basel - Bellinzona - Chiasso Headway reduction	Train length + Capacity	2023.12	Block headway 3', Bellinzona, incl 750 m Bellinzona - Chiasso	Infrastructure	secured	main project	SBB Infra
30164451	Fly over Pratteln	Capacity	2027.11	Level free crossing	Infrastructure	to be decided	main project	SBB Infra
30065467	Guemligen - Muensingen	Capacity	2031.12	Guemligen - Muensingen: construction disentanglement Wankdorf South and Guemlingen South (instead of a 3rd track)	Infrastructure	secured	main project	SBB Infra

Annex 15: 2019 investment prioritization feedback RAG members – existing investments



Annex 15: 2019 investment prioritization feedback of the RAG members – existing investments

Number (on Map)	Country	Project Name	Comment RU	Feedback from respective MoT
1	BE	Port of Antwerp: left bank	At least 8 long tracks, necessary to support development of intermodal business - electrification extensions to the different bundles (not only Waaslandhaven Zuid)	No works foreseen on the left bank in the near future. Feasibility study for extension Waaslandhaven is ongoing.
2	BE	Port of Antwerp: right bank	At least 4 long tracks in Bundle C1 and 4 in Bundle D and 4 in Bundle B3 (>740m).	In the framework of the Strategic Multiannual Investment Plan, signaling works on frequently used bundles on the right bank are foreseen. The plans have been concretized and the studies for bundle “Halve Maan” will be finished by the end of 2019. Works will start by the end of 2021 at the earliest due to interferences with the roll-out of ETCS.
3	BE	Study second rail access Port of Antwerp	Prio 3 - We welcome any increase in capacity that improves the performance of freight rail transportation from and to European ports.	<p>In the framework of the Strategic Multiannual Investment Plan, a study for the second access (long term project) and – in a first phase – the realization of the unlevelled junction “Oude Landen” is foreseen.</p> <p>The permit procedure for the second access according to the new legislation (integrated “plan-MER” (environmental impact study on plan level) process) will start in 2019 and will be proceeded in 2020.</p> <p>The “plan-MER” (environmental impact study on plan level) for “Oude Landen” was approved by the end of 2018. The above ground variant was selected. The permit is still to be obtained.</p>
4	BE	Port of Gent: Construction of 750m tracks	Ensure there will be at least 750m tracks - but necessity to improve also length in the bundles (intra port).	In the framework of the Strategic Multiannual Investment Plan, the realization of 4 long tracks in bundle D is foreseen. Studies are ongoing. End date mid 2021

5	BE	Projects to allow 740m trains 24/7; Side tracks 750m	necessary to have a normal repartition - side tracks necessary in Lokeren East (L59), Dendermonde (L53) & Testelt.	Foreseen in the framework of the Strategic Multiannual Investment Plan. The feasibility study was concluded in 2019: priority for Lokeren East and Dendermonde were selected. Testelt will be executed if possible, within the remaining budget. End of the works foreseen in 2025 (instead of 2023) due to interferences with the roll-out of ETCS.
6	BE	ETCS equipment BE	This project should be fully ready 2025 (in the list at 12/2022) - if RU's obliged to have Loc's ready, the network should be ready to run solely on ERTMS to (without TBL1+ or other legacy systems)	An update of the masterplan ETCS of Infrabel has been approved by the management board in June 2019, according to which the deployment will be finished by the end of 2025.
		ETCS equipment of the network	We welcome any increase in capacity that promotes stability and quality on the Corridor.	An update of the masterplan ETCS of Infrabel has been approved by the management board in June 2019, according to which the deployment will be finished by the end of 2025.
7	NL	Redevelopment Waalhaven Zuid freight yard	This should include sufficient measures to ensure full possibility for safety interventions (fire hoses etc) - track capacity fully for trains (not for safety buffer) - urgently to be secured	Very urgent upgrade of fire extinguishing facilities phase 2. After completion of Phase 2 (end of Q1 2021), shunting on part of the yard will be possible again.
8	NL	Redesign Geldermalsen (PHS) and free level track at Geldermalsen - Geldermalsen asl.	Ensure as a one of the first steps, to implement the longer track (>614m) for stop in freight (N-S direction) - should be '750m-ready'	Longer track (N-S direction) put into service in September 2020. Only effective if completed on the whole corridor.
9	DE	Emmerich - Oberhausen	final concept after construction not sufficient/ in line Dutch capacities	The planning approval procedures are well advanced. There are already 4 planning approval resolutions. Building permission still pending; further progress in works and going-live is therefore subject to date of approval
			Prio 3 - We welcome any increase in capacity that improves the performance of freight rail transportation from and to European ports.	

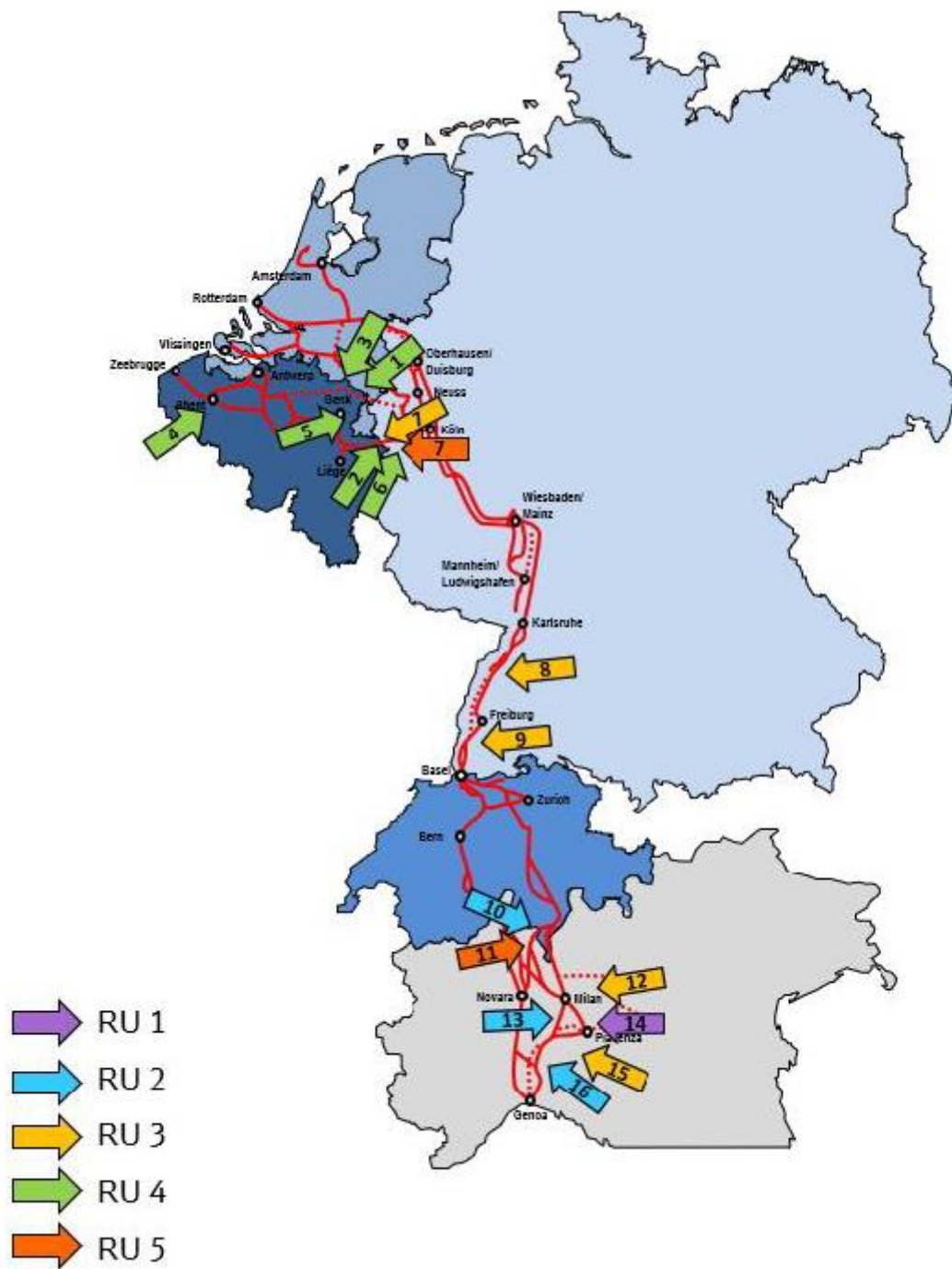
10	NL	Improving and upgrading capacity Hamont/Budel border - Border NL/DE	the timing of this large project should not limit the (already) electrification Hamont/Budel-Weert (incl safety system)	<p>Electrification between Mol – Hamont is realized in December 2020”.</p> <p>Note: cannot be used as freight route from Antwerpen unless additional infrastructure measures (3RX) are decided. For 3RX ministries discuss next steps.</p>
11	DE	ETCS Oberhausen - Basel	Prio 2 - We welcome any increase in capacity that favors performance on the Corridor. This section presents the biggest pain-point on the Corridor especially for the part Karlsruhe - Basel. For BLS Cargo, an expansion with the newest ETCS technology has to be accelerated in order to additionally increase the stability and the quality of the transports.	<p>DE invests nearly 1 billion € for ETCS-equipment of the whole line.</p> <p>EU-prescriptions for interoperability are in focus. Increase of capacity esp. in the Rhine valley are difficult to realize for topological and noise emission reasons. Increase of reliability and time table stability is nevertheless aimed at.</p> <p>A first success is the implementation at node Basel in August 2019; deployment in different implementation sections in 2022 ff</p>
12	DE	ABS Grenze D/NL - Kaldenkirchen - Viersen - Rheydt - Odenkirchen	Prio 3 - We welcome any increase in capacity that improves the performance of freight rail transportation from and to European ports.	<p>Project is part of the National Infrastructure-Planning (Bundesverkehrswegeplan) Planning is not yet started. Financing of the project is not yet secured.</p> <p>Planning and financing can only begin once the rail freight connection to Antwerp in the NL area has been secured.</p>
13	DE	ABS/NBS Karlsruhe/Offenburg - Basel	Prio 1 - For BLS Cargo this section represents the biggest pain-point on the Corridor. Everything must be done so that the commissioning of this capacity increase can take place as quickly as possible.	<p>Project is partly completed, in other parts in construction or planification.</p> <p>Re-Start of works around Tunnel Rastatt started (completion expected for 2025); NBS Appenweier-Kenzingen: Public consultations led to massive change in original routing in 2016 – planning on the new route are ongoing (Tunnel Offenburg); Early public consultations in 2020 (Estimated Completion until 12/2035); Upgrading ABS Appenweier - Kenzingen to be started after completion of Tunnel Offenburg (Estimated completion until 12/2041); Müllheim-Basel to be completed until 12/2025.</p>

			Time line needs to be speeded up	
14	CH	Lötschberg Base Tunnel 2nd track	We welcome the expansion of the second tunnel tube at the Lötschberg, although an increase in capacity on the corridor will only be achieved if the southern section of Brig - Domodossola - Italy is expanded at the same time.	The expansion of the second tunnel tube of the Lötschberg Base Tunnel is on track. The Swiss Federal Council has put into force the Federal Decree on the Expansion step 2035 on November 13 th , 2019. This includes the partial enlargement of the Lötschberg Base Tunnel. The mentioned expansion of the southern section of Brig-Domodossola-Italy regards Italy rather than Switzerland.
15	IT	Power supply system upgrade on Chiasso line	Prio 1 - We welcome any increase in capacity that favors performance on the Corridor. For BLS Cargo, Lombardy is an important production region.	No further comments.
16	IT	Chiasso Milan technological upgrade	Prio 2 - We welcome any capacity increase that favors the performance from and to Italy. For BLS Cargo, Lombardy is an important production region and we see the elimination of the Milano bottleneck as an urgent project.	The technological upgrading is expected to be completed in 2020 (2021 for the branch between Bivio Rosales – Como – Chiasso). Work in progress
17	IT	Domodossola-Novara, Chiasso-Milano and Milan-Genova, completion RFC lines	Prio 1 - We welcome any increase in capacity that promotes stability and quality on the Corridor. For BLS Cargo, Piedmont with its container terminals is an important production region. An increase in stability and quality is essential for us.	No further comments.
18	IT	Vignale - Oleggio - Arona	Prio 2 -We welcome any capacity increase that favors the performance from and to Italy. For BLS Cargo, Piedmont and its container terminals represent an important production region. It is imperative to expand the capacities of the PC 70 profile and to do everything in its power to work towards an earlier commissioning.	The project is divided in phases. The increase of the loading gauge (P/C 80) is foreseen by the end of 2028 according with the Simplon Line . The doubling of the track is foreseen in the long-term scenario.
19	IT	Upgrade Gallarate - Rho	Prio 2 -see commentary on Project Vignale - Oleggio - Arona	Work in progress for increasing Loading Gauge up to P/C 80 between Rho and Gallarate. The project is split in two phases: 1. Rho- Parabiago 2. Parabiago-Gallarate. The first phase, which has higher priority, deals with the quadrupling of the line between Rho and Parabiago and will be completed in the

				medium-term scenario depending on the availability of public funds.
20	IT	Upgrade of sidings on RFC lines to CH	Prio 2 - We welcome any increase in capacity that favors performance on the Corridor. For BLS Cargo, Lombardy and Piedmont are important production regions.	No further comments.
	DE	740 m - Network	We welcome any increase in capacity that favors performance on the Corridor.	Planification of all measures is started. Financing for 740-m Network is secured, consisting of ca. 75 projects in Germany. Implementation on RALP is started stepwise from 2026 on, total realization expected up to 2030.
	General		in general: development in complete concepts not only lines needed. Define target capacity needs to be defined (not known to RUs) than construction aligned. Additional investment in simulation of capacity image urgently advisable! through which a methodological approach is enabled afterwards. Then prioritize (continuously), from south to north (to supply more departure destinations) and avoid the emergence of islands.	
	General		Prioritize in full finalization of concept in following order: - 740m train length - P400 - 2'000bto - ERMTS	See corridor Implementation Plan for state of play
	General		We stress the need to speed up the works already planned in the Italian part of the RFC1 as soon as possible with regards to the implementation of the TEN-T parameters but also improving the lines connecting terminals and logistic centers, in many cases not even electrified and equipped with old systems like SSC/C. Terminals should in fact be considered as part of the corridors. At least the lines part of the RFC1 should be equipped with P400 and rail freight trains should be able to run with a maximum axle load of 22,5 tons (category D4). There should be a plan to electrify all the lines of the RFC1, including secondary lines which flow into the corridor which should also be considered and upgraded, they are	

			in fact key to bring traffic to the corridor.	
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Annex 16: 2019 investment prioritization feedback of the RAG members – new investments (suggestions)



Annex 16: 2019 investment prioritization feedback of the RAG members – new investments (suggestions)

Number (on Map)	Country	Description	Explanations	Feedback MoT
1	NL	Electrification Hamont (BE_Border) - Weert - including installation safety system and secured level crossings - potentially double track (see projects BE side to electrify (2020 finished) and double track (p 6 2025 - Second Track Neerpelt-Balen Werkplaats). The project should not wait to be included in the capacity project Hamont/Budel-border to NL/DE border (p 11).	The project should not wait to be included in the capacity project Hamont/Budel-border to NL/DE border (p 11)	Electrification between Mol – Hamont is realized in December 2020.
2	NL	ERTMS on Heerlen-Herzogenrath.		Removal class B ATB-NG and replacement by Class B PZB Class B ATB NG between Landgraaf and NL-D border by 2022 or 2023 expected.
3	NL	Electrification Mol - Dutch Border	It is necessary to electrify also Hamont (border)-Weert.	<p>NL: Research on electrification Hamont – Weert.</p> <p>CBA expected 2020. Note: cannot be used as freight route from Antwerpen unless additional infrastructure measures (3RX) are decided. For 3RX ministries discuss next steps.</p> <p>BE: L15 Herentals-Mol was electrified by the end of 2015. The electrification of L19 Mol-Hamont will be finished by the end of 2020.</p>
4	BE	Fly over/bypass Gent-Sint-Pieters	A bottleneck point for freight during day hours due to crossing the stations	A lot of works are realized in Gent. Difficult to add this.
5	BE	Fly over/ bypass Hasselt	A bottleneck point for freight during day hours due to crossing the stations.	Revision of the master plan in progress with the possibility of limiting conflicts in the station.

6	BE	Installation of PC70/400 Gauge on deviation route Montzen: Lines 36, 36 A, 125B, 40, 24/1 & 24/2 (Tunnel Froidment)		
7	DE	Building of a new direct track Aachen Hbf - Montzen to avoid the change of direction at Aachen West for freight trains	Not included in the BMVI list, no desire of IM, strong refusal by city of Aachen.	Line inoperative since 1960s. Project is not mentioned in National Infrastructure-Planning (Bundesverkehrswegeplan). From the German point of view, this project has been replaced by the 3RX project, including ABS Kaldenkirchen – Viersen (project nr. 12), and is therefore obsolete
8	DE	Strong acceleration of building two additional tracks between Offenburg - Denzlingen	Target: To have 4 tracks between Karlsruhe and Basel in 2017. Construction works started in 1987, inauguration expected in 2042 earliest. 55 years to implement two additional tracks?	Project is in planning – see also #13 of existing projects
9	DE	Strong acceleration of building two additional tracks between Leutersberg - Schliengen	Target: To have 4 tracks between Karlsruhe and Basel in 2017. Construction works started in 1987, inauguration expected in 2042 earliest. 55 years to implement two additional tracks?	Project is in planning – see also #13 of existing projects
10	IT	The station of Luino should be equipped with sidings.		The station has already 4 siding tracks with length up to 750 m. The proposal of Investment has to be defined in detail and supported by a technical economical dossier that explains the reasons of the request.
11	IT	Add Luino line to CNC.		Evaluation ongoing.
12	IT	Freight bypass of the Milano Node	The connection between RFC6 and RFC1 (which is a partial bypass of Milan node) could be realised also by means of the increase of the axle load (up to D4 category) of the lines Seregno - Carnate - Bergamo - Brescia.	The proposal to enhance the performance for freight traffic of the route Seregno-Carnate-Bergamo-Brescia in order to by-pass the Milan node, must consider these factors; <ol style="list-style-type: none"> 1. The lines of the proposed itinerary are single track lines and there are currently capacity saturation situations especially around Bergamo. 2. Some stations must be upgraded (Seregno, Carnate,

				Bergamo, Rovato) for this kind of traffic. Investments for freight performance adjustments appear complex and expensive.
13	IT	To double the tracks between Tortona – Milano.		The doubling of the line between Milano – Pavia is already planned and included in the contract between RFI and Ministry of Infrastructures and Transports. It will be completed in medium term scenario depending on the availability of public funds. The doubling of the line between Tortona and Voghera is included in the Contract between RFI and Ministry of Infrastructures and Transports. The investment is planned in the long-term scenario. Evaluation is ongoing for the doubling of the line between Pavia and Voghera.
14	IT	BLS Cargo is interested in extending the southern access routes to the Cor 1 and 2 in the Perimeter Brescia - Piacenza - Alessandria, to the target values and harmonizing them with Corridors 1 and 2.	southern access routes to the Cor 1 and 2	This proposal has to be better explained in term of objectives, perimeter, requirements.
15	IT	2 new tracks on the section Bivio Rosales - Monza.		This project is already planned but in the long-term scenario. In the short-term scenario the technological upgrading of the existing railway line for increasing capacity is foreseen.
16	IT	To speed up Terzo Valico connecting Genova to Tortona, need to adapt it to the new standards of train length and axle load.		The Terzo Valico allows train with length up to 750 m and axle load up to 22,5 t/a. The proposal of investment has to be defined in detail and supported by a technical economical dossier that explains the reasons of the request.
not RFC 1	IT	To double the tracks between Genova and Ventimiglia.		For the complete doubling of the Genoa-Ventimiglia line, it is necessary first to carry out the doubling of the line between Finale Ligure and

				Andora. This project is already included in the Contract between RFI and Ministry of Infrastructures and Transports. Currently the original design solution is in project review in order to reduce the cost of the investment.
not RFC 1		In order to relieve the heavily loaded Cologne - Mannheim - Basel route, BLS Cargo is calling for greater attention to be paid to capacity expansion and quality improvement on the Antwerp - Metz - Basel section of the North Sea Mediterranean Corridor.	Promotion of capacity and quality increases on the Antwerp - Metz Basel route (NS med Corridor)	
	BE	Tunnel – T Schaerbeek		Studies will be finished in 2019, after which the works will start until end 2020.
General	Add strategic Service Facilities (handover stations/ buffer for terminals, synchronization times, etc.) to CNC investments.	e.g. annual timetable process 2020 currently shows severe capacity shortage for long tracks in Cologne and Aachen already, which might not be sufficiently solved. Further investments for train length enhancement needed.		
General	Establish projects on international timetabling level for identifying international capacity gain	through e.g. international standardization of RU production concepts or else (faster and cheaper capacity win than construction).		

Annex 17: Original request by EU Commission

 Ref. Ares(2019)3058748 - 08/05/2019



EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR MOBILITY AND TRANSPORT

Directorate C - Land
The Director

Brussels,
MOVE.DDG2.C/EW

Dear Chairs of the Executive and Management Boards of the Rail Freight Corridors,
Dear Managing Directors of the Rail Freight Corridors,

The Rail Freight Corridors (RFCs) and the Core Network Corridors (CNCs) are two complementary tools of EU transport policy sharing an important objective: making transport more efficient and sustainable by developing inter alia international rail freight within a seamless multimodal logistics system.

As explicitly stated by the European Commission at the Rail Freight Day 2018, we believe that there is untapped potential to improve the efficiency of rail freight transport. This statement by the European Commission is in line with the 2016 Rotterdam Declaration “Rail Freight Corridors to boost international rail freight”, the 2016 Sector Statement “Boosting International Rail Freight” and the conclusions of the Special Report 08/2016 of the European Court of Auditors on rail freight transport in the EU. We therefore aim to strengthen synergies between Rail Freight Corridors and Core Network Corridors by fostering closer cooperation between all involved stakeholders. Our ultimate goal is to provide a much-needed boost to international rail freight transport as a matter of urgency, by making the best use of limited resources.

A key area in which such cooperation can be fruitful is infrastructure development. Adequate infrastructure capacities are key to boosting rail freight. However, budgetary constraints and the relatively long-term horizon for the completion of the core network (2030) imply a need to plan and prioritize investments on specific sections in a smart way in order to maximise the benefits for end customers of rail freight transport in terms of level of service. In particular, there is a need to focus on those infrastructure parameters that today impede growth of rail freight transport, including train length, maximum axle load and loading gauge (P400).

We believe that the RFCs are in an excellent position to provide the input for such a prioritisation as their governance structure gathers rail freight experts and institutionalises the involvement of infrastructure users in the railway undertakings advisory groups. To this end, RFCs have prepared indicative investment plans and analysed specific aspects of infrastructure development in accordance with their competences in investment planning (Article 11 of Regulation (EU) No 913/2010). These plans should be coordinated with the strategies, plans and processes for infrastructure development in place at national level. Moreover, coordination at EU level is done within the core network corridors.

On this basis, we propose to develop a pragmatic, target-oriented exchange between railway infrastructure users, infrastructure managers as well as transport and policy makers responsible for budgetary decisions at national and EU level.

As a first practical step we hereby invite you to report at the meetings of the Core Network Corridor fora in **November 2019** on infrastructure needs on your respective corridors.

As a guidance for the various interventions, we propose the following:

- An assessment of the infrastructure needs by railway undertakings, e.g. based on a consultation of the RAG on the RFC investment plan and/or the work plan of the CNC, focusing on infrastructure parameters, highlighting the smaller or bigger bottlenecks impacting the capacity and efficiency of freight services on the corridor. A particular focus could be given to issues which need to be addressed across national borders and where a coordinated approach could provide added value.
- An overview of the results of any existing analysis and studies conducted within the RFC on infrastructure issues.

This could result in an overview of infrastructure priorities from the market perspective. The TEN-T minimum infrastructure technical requirements should of course be taken into account, but also other parameters where relevant (e.g. loading gauge) or infrastructure capacity bottlenecks. A 2023 time horizon could be taken as a basis.

The reports at the corridor fora should highlight how the priorities identified would contribute to an increase in the quality of service provided to the (end) customers of rail freight transport.

Based on such a first overview, the next stage would consist in defining a follow-up process for cooperation between the RFCs and the CNCs on infrastructure development, taking into account the specifics of each corridor. In any case, the results may enable the European coordinators to provide an even more targeted support for the specific needs of international freight transport. In particular, they will be considered a key input for the CNC studies and become valuable information for the upcoming work plans of the TEN-T Coordinators.

A good identification of investment priorities for rail freight in the context of the core network corridors is important, all the more as for the period 2021-2027, the assessment of CEF project proposals will ensure that proposed actions are consistent with the corridor work plans and take into account the opinion of the responsible European Coordinator. Your feedback will also provide important input for the evaluations of the TEN-T Guidelines and of the RFC Regulation.

We want to emphasize that the goal is to develop a mutual understanding. We welcome an open exchange of opinions being aware that such a process does not imply formal obligations of any kind for any stakeholder.

We invite you to define the specific approach to be taken by each corridor. Please do not hesitate to get in touch both with the colleagues from the European Single Rail Area Unit (Mr Reinhard Haller and Mr Vassil Zhivkov) and the advisors to the EU Coordinators. We also encourage you to liaise with your colleagues responsible for TEN-T, in particular within Member State authorities. We will take stock of the existing information and we would be grateful if you provide us with relevant studies produced by the RFCs.

For organisational reasons, we would be grateful if you could submit your contributions for the corridor fora by **14 October 2019** by sending an e-mail to MOVE-C3-SECRETARIAT@ec.europa.eu.

Yours faithfully,

Elisabeth WERNER

Annex 18: Update by RAG of RFC Rhine-Alpine 2020

Country	Description	Explanation	Feedback IM
NL	Kijfhoek-Maasvlakte	At the Rotterdam harbor line, we face a shortage of tracks on most shunting yards, especially in the freight yards of Botlek and Waalhaven and in the marshalling yard Kijfhoek (but also Europoort and Pernis).	In the CBA already included: <ul style="list-style-type: none"> • 2020 - 2030 Waalhaven Zuid & Pernis • 2025 -2030 Botlek and Kijfhoek • From 2030 Europoort
NL	Kijfhoek-Emmerich	The Sophiatunnel just west of Kijfhoek has a restriction of 6 trains per hour per direction. When the South-West curve at Meteren is ready (planning 2027/2028) this can be a bottleneck, as the trains from Rotterdam to Chemelot v.v. (DSM/Geleen) and Venlo also have to drive via the Betuweroute. It sure will become a bottleneck between 2030 and 2040. ProRail is studying on this though there are no concrete plans known to us yet to enlarge the tunnel capacity.	The CBA indicates that the Sophiatunnel becomes a bottleneck in 2030 in the TBD situation. (TBD that the Kijfhoek- Bentheim traffic also runs through the tunnel). The forecasts used only go until 2030. Freight traffic through the tunnel will increase further between 2030-2040 and the tunnel will most likely become a bottleneck between 2030-2040.
NL	Kijfhoek marshalling yard	Several forming tracks (part of the gravity classification yard) are being allocated to RUs for parking their trains. This is due to a lack of parking possibilities on the harbor line. It affects the single wagonload process on Kijfhoek making it less efficient.	In the CBA Kijfhoek is identified as a bottleneck .
NL / DE	Venlo area	<p>The coming decade, the alternative route via Venlo will become more important. Besides the delay of the Emmerich-Oberhausen 3rd track there are 2 main additional reasons for that:</p> <ul style="list-style-type: none"> - Prognoses (2030-2040) show congestion on the Emmerich route, also after opening of the 3rd track, also due to the ambition to run additional ICE trains on the route (from 2030 on). As such the pressure on Venlo will enlarge. - Venlo is the main inland logistical area in the Netherlands and shows a huge growth. End 2020 the new TPN Terminal will open (same owner as Cabooter Terminals in Blerick and Kaldenkirchen in the Venlo surroundings). The ambition for TPN is to grow to 10-12 trains a day, within a few years. <p>Besides point above the route Rotterdam/ Vlissingen via Venlo (Brabantroute) is under heavy pressure due to foreseen growing passenger traffic (2025). The growth of the amount of passenger trains depends on</p>	In the CBA Venlo become a bottleneck in 2025. (normal situation Emmerich – Oberhausen open) ProRail has made a remark in the CBA that during the building activities 3rd track addition capacity issues may accure on the Venlo route. Maaslijn ATB-NG, ProRail is currently investigating how / when ATB-NG lines can be converted to ERTMS. In this study, the Maaslijn has a high priority due to the combination of electrification and the

		<p>realization of the 'south-west bow' to/from the Betuweroute at Meteren (planning 2027) and the 3rd track Emmerich-Oberhausen. Though there is a risk the extra passenger trains will come at cost of freight train capacity, until the projects are ready (that will be a political decision).</p> <p>Also, at the German side of the border we expect capacity issues. At the moment there is capacity for 3 to 4 freight-trains per hour. Adjustments (double track Kaldenkirchen-Dülken) are only foreseen in combination with 3RX. 3RX though will bring even more growth on the Venlo-Viersen route (as also the route Antwerpen-Aachen has limited capacity). In Venlo freight yard the amount of tracks is too limited. The development of the new terminal will highly depend on the capacity of the Venlo yard. Currently the tracks in Venlo are already scarce and the maximum track length is 690 m. ProRail has been studying for a long time a solution for this yard, though its complexity makes every solution very expensive. At Venlo several security systems (PZB, ATBeg and ATBng) and powersystems (1500v, 15kV) come together.</p> <p>At Venlo ProRail is also studying on changing from German to Dutch systems (currently German 15kV and PZB on the border section and partly on the yard). Furthermore, we have the 'Maaslijn' railway bottleneck between Venlo and the Chemelot Industrial/Chemical side near Sittard. The Maaslijn is still single track and foreseen with ATBng (there are no ATBng+PZB locomotives available). ERTMS is not planned to be installed on this track the coming years. The Ministry is reconsidering the ERTMS planning though and might bring the Maaslijn forward in the new ERTMS panning. This is necessary as the line will be electrified (planning 2024) and ATBng/E-locomotives are not available.</p> <p>Furthermore, DB Netze has restricted the train length on Venlo-Kaldenkirchen. From 2021 on the Vlissingen-Dillingen Ford train will not be able to drive via Venlo anymore as the 692m train-length does not fits the new 690m restriction. As we know there is no new physical change in the German infrastructure that led to this change.</p>	<p>non-existing ATB-NG E-locomotives</p> <p>The 3RX project is discussed on a political level between the Netherlands, Belgium and Germany.</p>
DE	Aachen West	<p>Aachen West is overbooked => no sufficient alternatives</p> <ul style="list-style-type: none"> • More parking tracks needed • More loco parking is needed 	
DE	Aachen	<p>Following options help to lower the burden on Aachen.</p> <ul style="list-style-type: none"> • Curve in Roermond From direction Venlo to Direction Hamont (= 3RX) 	Aachen Hbf – Aachen West (Strecken Nr. 2550) and Stolberg Hbf

		<ul style="list-style-type: none"> • Curve in Venlo from Direction Germany to direction Roermond (=3RX) • Curve in Rheydt (PEK Aachen-Stolberg) • Curve in Viersen (direct connection between Venlo-Krefeld) • Double line Venlo-Viersen • 740m Venlo – Viersen 	<p>– Aachen Hbf (Strecken Nr. 2600) are congested railway lines.</p> <p>For these section of line, DB Netz AG is carrying out a capacity analysis and will subsequently produce a plan for enhancing line capacity.</p>
IT	Domo II and Luino	<p>switchable electric traction power supply</p> <p>Introduction of a switchable electric power supply system on some tracks so as to allow also the RUs equipped with single-voltage locomotives to be able to carry out the shunting maneuver on their own.</p> <p>This intervention is necessary following the decisions taken by RFI and the Regulatory Body (ART), which authorized the dismissal of the shunting service currently performed by the IM. In consideration of this decision, many RUs (mainly freight, but also passenger ones may be involved) that currently use single-voltage locomotives (3 kV D.C. single system locomotives still represent the preponderant part of the Italian electric traction fleet) will find themselves in serious difficulty (if not in the impossibility) of carrying out international traffic due to missing shunting service by RFI.</p> <p>The presence of switchable voltage tracks (similar to those present in border stations on a foreign network, such as Chiasso Smistamento) would allow all the RUs to be able to continue to carry out international traffic and reach border stations independently, for the benefit of an increase in the volume of freight traffic, especially on European corridors. The residual useful life of Italian 3 kV D.C. locomotives is in fact such as to allow their intensive use for (at least) about further twenty years and their purchase / rental cost (at least 25% lower than similar multi-system machines), as well as that of management makes them decidedly more competitive than the multi-voltage ones.</p> <p>Furthermore, it is believed that in the border stations where a switching system is available today, the transition time of a train from one network to the neighboring one would allow a significant gain compared to the current shunting modality, reducing as well the capacity requirement of the station itself.</p> <p>This intervention therefore allows increase of rail traffic volumes along the RFC, with greater possibilities of revenue and consequent reduction of costs for RFI. In our opinion, the intervention must also be implemented in the</p>	

		Luino station, currently not reachable by RUs without multi-voltage locomotives due to the configuration of the system and the very short dwelling time permitted by the network statement.	
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PART B: Operational bottlenecks identified by the Working Group Train Performance Management

Introduction

The idea of this additional information is to give a more comprehensive overview of the different bottlenecks which might be encountered by the users of RFC Rhine-Alpine. Operational Bottlenecks become evident from performance analysis in certain sections / nodes, for which the delays and delay reasons indicate capacity issues. This information was mostly verified with additional information from the operations departments of the IMs.

The Netherlands

- **Capacity Brabant route (Kijfhoek-Breda-Boxtel-Eindhoven-Venlo) during construction works of the third track Emmerich-Oberhausen**

During construction work on the Emmerich - Oberhausen (Germany) line, freight trains are regularly diverted via the Brabant route and the Venlo border station.

On the Brabant route, there are 4 freight paths per hour per direction available. On average, there is sufficient capacity, but when the Emmerich-Oberhausen line is completely closed, the 4 available freight paths on the Brabant route are not enough to accommodate all trains. In the operation, the problems only get worse especially in the north-south direction. There are regular delays due to the limited number of long tracks (>650 meter) in Venlo and limited capacity on the partly single track line between Venlo and Viersen.

- **Capacity shunting yards Waalhaven Zuid and Kijfhoek**

Due to problems with the fire extinguishing system at the shunting yard Waalhaven Zuid, trains with dangerous goods may not be shunted there. Therefore, the train inspections (e.g. arrival or departure check), locomotive changes must now take place on shunting yard Kijfhoek. Due to these extra processes, less capacity is available on the Kijfhoek for the other trains. This can cause problems, especially during disruptions..

- **Availability of line Maasvlakte Yangtzehaven Noord - Maasvlakte West**

The line from the Euromax Terminal to shunting yard Maasvlakte West runs through a very sandy area (dunes). In windy conditions, the sand can blow over the rails, blocking the tracks and causing train detection problems. This means that trains have to wait until the tracks have been cleaned.

Belgium

Infrabel focused in this analysis on the amount of delays encountered by the trains when running on the corridor.

As a result 4 main operational bottlenecks were identified on the corridor Rhine-Alpine routing in Belgium :

- Antwerp harbour
- Gent
- Zeebrugge
- Botzelaer (the border point with Germany).

For all four bottlenecks there is the same issue, if all trains would run on time there would be no operational capacity issue as the trains are planned to run on actual capacity. However due to the high volume of trains at some times at these locations it will create a real time bottleneck as a delayed train will cause more delay to other trains also on route to these locations.

Germany

When examining operational bottlenecks on the RFC RALP network (principal and diversionary lines) in Germany, DB Netz focussed on line segments that are currently considered as overloaded via the process of defining “Überlastete Schienenwege (UELS)”. Correspondingly, there are additional segments that have been considered as operational bottlenecks, partly overlapping with the line segments identified in Part A of the document. Additionally, those segments are combined with information on corresponding infrastructure projects aiming at enhancing capacity:

1. UELS Line segment between *Hürth-Kalscheuren – Remagen*
Corresponding project: Various measures of the BVWP-project “Knoten Köln” will effect capacity on this stretch – notably a new overpass structure in Hürth-Kalscheuren eliminating a restricting level-crossing on this stretch. Project financing is secured and planning has started.
2. UELS Line segment between *Aachen West – Stollberg*
Corresponding project: Currently the third track in Aachen-Rothe Erde is enhanced to 1700m length. This construction also requires modifications in fly-over constructions with effects on capacity. (go live 2021)
3. UELS Line segment between *Kaldenkirchen – Viersen*
Corresponding project: see No. 503414, page 21
4. UELS line segment between *Gross Gerau – Biblis*
Corresponding project: see No. 30112440, page 21
5. UELS line segment *Offenburg – Basel Bad Rbf.*
Corresponding project: see No. 30111846 , page 21

Switzerland / SBB Infrastructure / BLS Netz

Generally the 2-Axis strategy in transit through Switzerland offers opportunities for rerouting in case of events or temporary capacity restrictions. Nevertheless depending on specific situations the capacity for rerouting is scarce or leads to incisive impact for RU's.

Whilst on Gotthard Axis with the termination of works for the Ceneri Base Tunnel and widespread adaptations for the 4-meter corridor the situation will be toned down on Simplon-Axis the problem will persist. Specifically restoration and maintenance works in the older Tunnels like Simplon tunnel lead to mayor restrictions and overloaded declarations as between 14.06. and 6.09.2020.

Planning of mayor capacity restrictions on Luino / Chiasso and Simplon branch on both sides of the border requests high effort and not always needs can be fulfilled without impact on overall capacity. As long lasting example is mentioned the extended line closure Pino – Luino, 14.06.2020 – 11.12.2021, daily from 08:42 – 13:15 which collides with several works on rerouting lines.

Big impact on flexibility and also capacity will have the projects “Unbundling MuttENZ” and “Performance increase Node Basel” which last from 2021 on for several years as they concern all transit routes on RFC Rhine-Alpine.

Switzerland / BLS Netz

BLS Netz evaluated the operational bottlenecks for the BLS-operated part of Corridor Rhine-Alpine. The bottlenecks on the RFC are reflected on a qualitative and operational view and go beyond the view of a theoretical capacity evaluation as they consider also peak periods and the coexistence of other mode of (rail) traffics and restrictions in nodes and critical points in the view of train disposition.

The following sections are defined:

Frutigen – Brig (Lötschberg Base Tunnel)

- The missing through going double track makes it impossible to offer all requested freight paths especially on peak days (Tu-Fr) through the Base Tunnel. To operate all planned slots on Lötschberg axis through the tunnel, 3 paths per direction and hour would be needed. Depending on the operational situation and timeslot, up to 50% of the trains have to pass the mountain line. This requests additional locos and longer driving time causing higher production costs for RUs.
- Due to the single track section trains have to use exact slots through the Base Tunnel. Small delays (>3') already lead to operational conflicts and loss of slot, thus effecting higher delays. Only full double track availability will solve this issue and increase flexibility, capacity and quality of traffic.
- The bottleneck will be solved with the completion of the LBT on the time horizon of 2035 (partly or completely depending on realisation concept)

Iselle – Preglia (RFI owned but BLS operated section)

- Due to missing high-cube profile on one of the two tracks, there is a single track SIM-Corridor on this section (Simplon Intermodal section). Trains with high cube profile face strong operational restrictions with big impact on the overall traffic. Temporary works even lead to complete closure for SIM-Trains.
- To offer a stable traffic both tracks of the line Brig – Domodossola should be available for high cube traffic (P400) on the whole length,
- Realisation: open

The following section is not operated by BLS but has a big impact on the operational quality on Simplon-Axis:

Freight feeder section Domodossola FM – Domodossola II (RFI)

- Single track line for access to Domodossola II freight and shunting yard from/to Switzerland as operational and capacity bottleneck
- Lack of flexibility and operational issues are even reinforced with slow entry and exit speeds in Domodossola FM and restricted crossing possibilities especially for long trains.
- Double track equipment would reduce operational constraints and offer higher capacity and flexibility in operations.
- Realisation: open

TPM reports considering the above mentioned sections confirm these issues. BLS Netz thinks that the information must be integrated in a general Bottleneck analysis of RFC Rhine Alpine to reflect the real situation concerning capacity and quality for our customers.

Italy

- Contrary to the situation in the other countries of the corridor, the second driver is necessary for all freight trains in Italy, as required by the standard of the Ministry of Health. The waiting time for the second driver can be longer than the planned dwell times and may generate delays, in particular in the stations where planned dwell times are short (e.g. Luino).
- Infrastructural limitations on the Domodossola-Iselle section (operated by BLS): speed reductions (restoring planned in September 2020)

