Corridor Information Document
Book 5
-
Implementation Plan
Timetable 2020

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Version Control

Version	Chapter changed	Changes
14/01/2019	Initial publication version	- Based on the last final version of TT 2019 - Updated investment plan / ETCS Deployment - Including details on UK extensions beyond London - Extension to Geneva - Alignment to common Book 5 structure

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1. Introduction

The Rail Freight Corridor (RFC) North Sea-Mediterranean Management Board consulted applicants to draft this new version of the Implementation Plan. This document is periodically updated and is a formal part of the Corridor Information Document, following its first submission to the Executive Board in 2013. Also, a major review following consultation with the Network Statement Working Group and the Legal Matters WG has been done. Two new chapters related to the legal character of the Corridor Statement and the next steps have been inserted.

Given the extensions of the corridor to London, Marseille, Zeebrugge and Amsterdam, the implementation plan for timetable 2017 and 2018 was again submitted for consultation to all stakeholders and approval by the Executive Board end of 2017.

For timetable 2020, a revised version is made available, with amongst other things, the inclusion on the details of the UK extension beyond London and Geneva, updated objectives, an updated investment plan and a revised ERTMS deployment plan, and an alignment to the common structure used by all RFCs. This new version was approved by the Executive Board on December 12th, 2018.All details can be found in the text of this CID Book 5.

1.1 Reminder: Specific case UK Extensions timetable 2019 for RFC North Sea - Med

The annex of the Regulation 913/2010, as amended by the annex II of the Regulation 1316/2013 concerning the creation of a European rail network for competitive freight, details the proposed extensions to the Rail Freight Corridor North Sea - Mediterranean in the UK to Glasgow, Edinburgh, Southampton and Felixstowe for timetable 2019.

Network Rail has worked with RFC North Sea - Mediterranean Management Board and Executive Board to consider existing and forecasted market demand for continental rail freight to the intended extension destinations. These outputs have been used to allocate capacity to the Corridor-One-Stop-Shop.

The proposal for the extension destinations is as follows:

- An extension beyond London from Wembley to the rail freight hub at Mossend, servicing the cities of Glasgow and Edinburgh. One return path per day will be allocated to the C-OSS and is included in the International Freight Capacity Notice issued on 13th October 2017.

- An extension beyond London from Wembley to Southampton and Felixstowe is included to meet the stated requirements of the Regulations. No capacity will be allocated to the C-OSS or included in the International Freight Capacity Notice given the Network Rail and RFC North Sea - Mediterranean Freight Market Study outputs.

At a conference call with the Executive Board of the RFC NSMED of 27 November 2017, the following position on the proposal for the extension of the corridor beyond London was agreed:

the nominal extension of the corridor shall include Felixstowe and Southampton, as foreseen by the Regulation, but no capacity will be offered on these routes until the market studies demonstrate the need for capacity.

The details for each of the nominal extensions to Felixstowe and Southampton for the CID are as follows:

Wembley Yard – Port of Felixstowe
Route – Wembley Yard – Camden Jn - North London Line – Stratford – Colchester – Ipswich - Felixstowe
Mileage – 97 miles (155km)
Gauge – W10
Electrification – 25Kv AC
Axle load 25.5t
Train Length – 640m
Lines – 2 tracks Wembley – Stratford, 4 tracks Stratford – Shenfield, 2 tracks Shenfield – Ipswich, 1 track Ipswich - Felixstowe

Wembley Yard – Southampton Docks
Route – Wembley Yard - Acton Bank – Reading – Basingstoke – Eastleigh – Southampton Docks
Mileage – 83 miles (133km)
Gauge – W10
Electrification – NONE
Axle load 25.5 t
Train Length – 640m
Lines – 2 tracks Wembley – Acton Main Line, 4 tracks Acton Main Line – Reading, 2 tracks Reading – Southampton.

For timetable 2020, the UK's Exit from the EU in March 2019 will impact the existing interfaces between the Department for Transport, Network Rail and the Rail Freight Corridor (RFC2).

This may result in the UK lines shown in the North Sea – Mediterranean Corridor Information Document (CID) and the corridor paths between Dollands Moor and Mossend for TT2020 being changed or removed following the UK's exit from the EU.

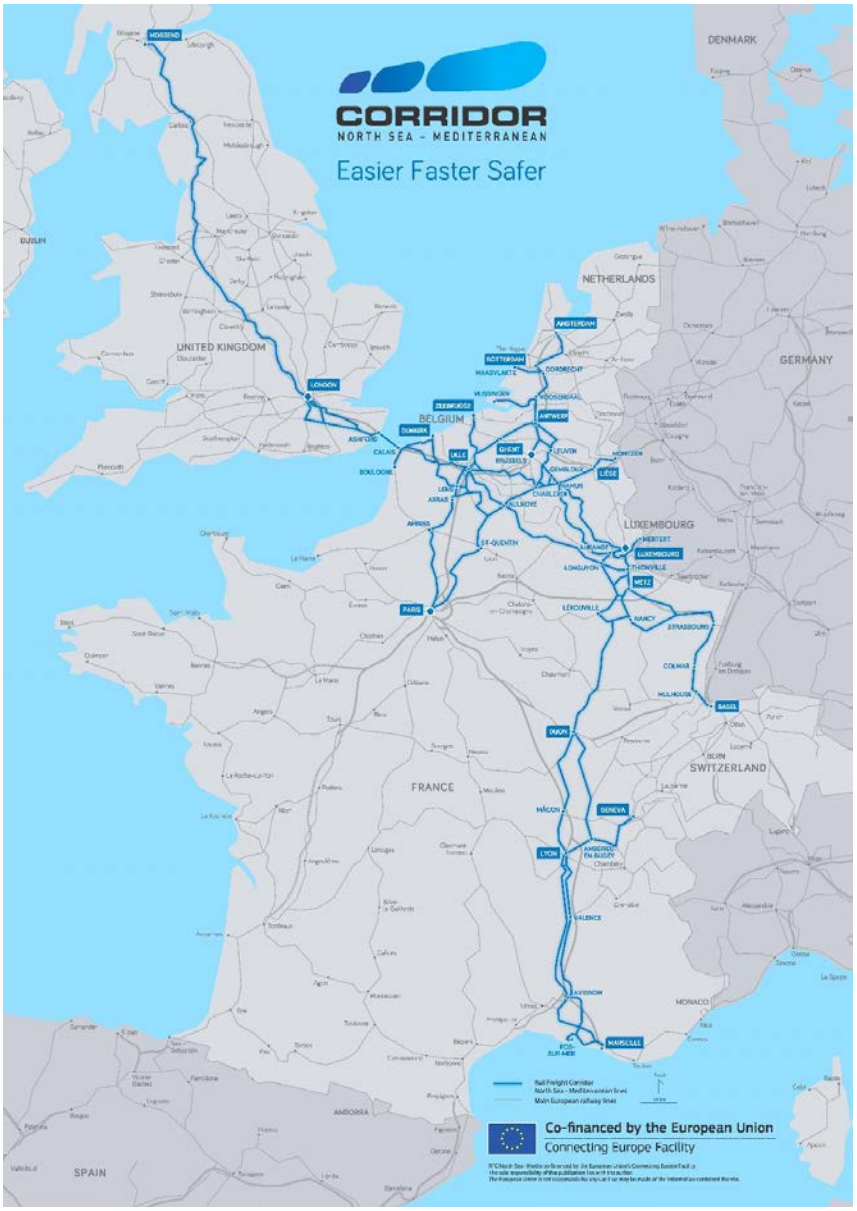
2. Corridor Description

2.1 Key Parameters of Corridor Lines

All information on routing on the corridor can be found in the corridor information platform.

2.1.1 Routes and Lines

The RFC North Sea-Mediterranean is the continuation of the former ERTMS Corridor C, as all Corridor C lines still belong to this RFC.



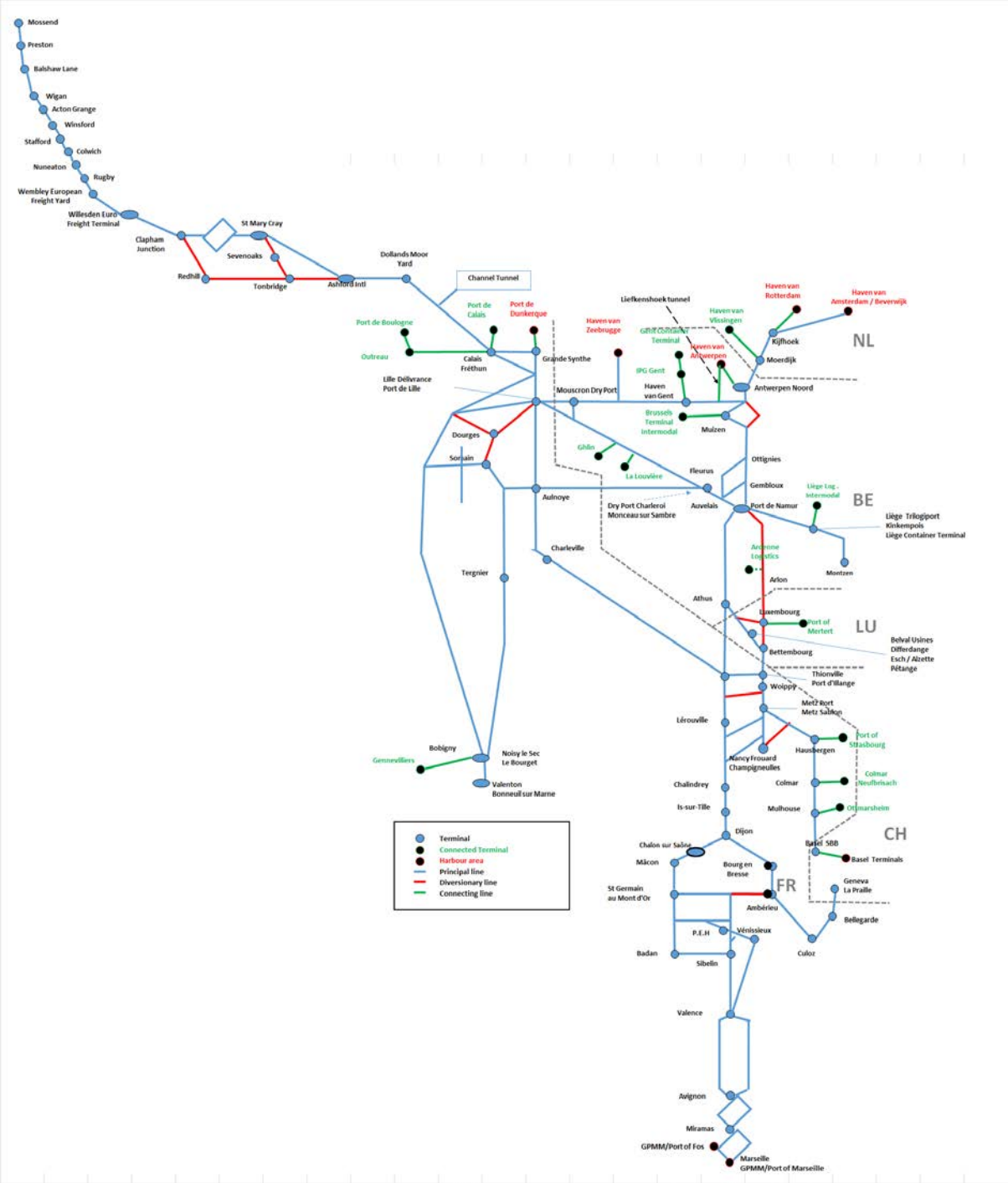
The designated RFC North Sea-Mediterranean lines can be split into four different categories:

- **Principal lines**, on which Pre-arranged Paths (PaPs) are offered
- **Diversionary lines**, on which PaPs may be considered
- **Expected lines,** which are lines that are either planned in the future or under construction but not yet completed, or which are existing lines planned to become a corridor line in the future
- **Connecting lines**, which are lines connecting a terminal to a principal or a diversionary line and where there is no obligation for PaP supply.

The table below presents the breakdown of RFC North Sea-Mediterranean lines by country.

Country	***Length of lines in November 2013 (in km)***	***Length of lines for TT 2020 (in km)***
Netherlands	*180*	***335***
Belgium	*924*	***1 325***
France	*1 731*	***2 984***
Luxembourg	*139*	***139***
Switzerland	*28*	***39***
United Kingdom	*-*	***841***
Whole Corridor	***3 002***	***5 663***

Breakdown of RFC North Sea-Mediterranean lines by country

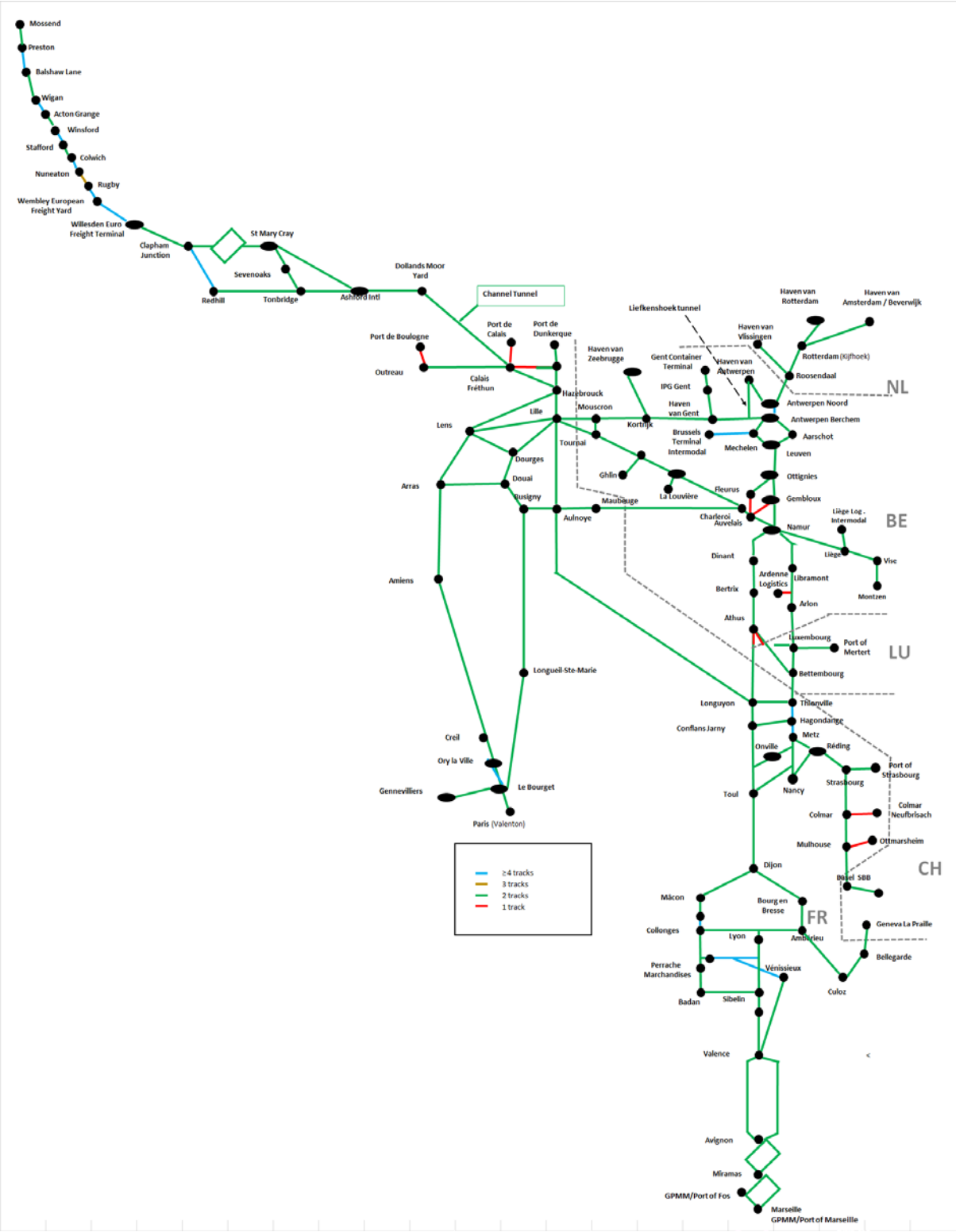


2.1.2 Number of tracks

All corridor sections have 2 to 4 tracks, except 10 kilometers in Belgium, six short lines in France and a small section in Luxembourg.

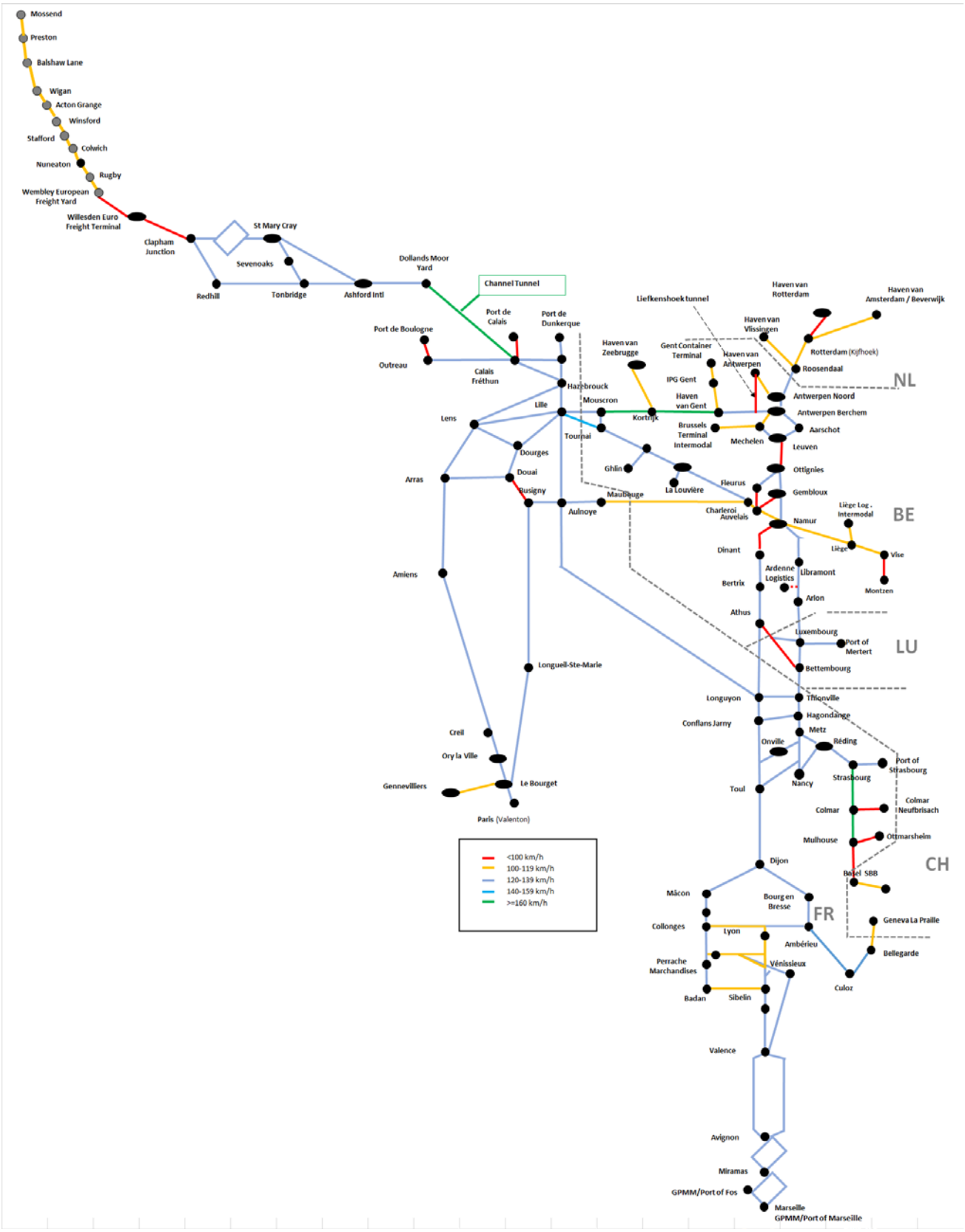
The following map shows the sections with two or more tracks and the ones with a single track (in red). All sections in the Netherlands, Switzerland and the UK have two tracks or more. Belgium has a section between Fleurus and Auvelais, one between Jemeppe-sur-Sambre and Gembloux and one South of Aubange with single track. France has one short single track line

in the Lyon node, two single track connecting lines in Alsace and some single track lines in the vicinity of the ports of Calais and Boulogne.



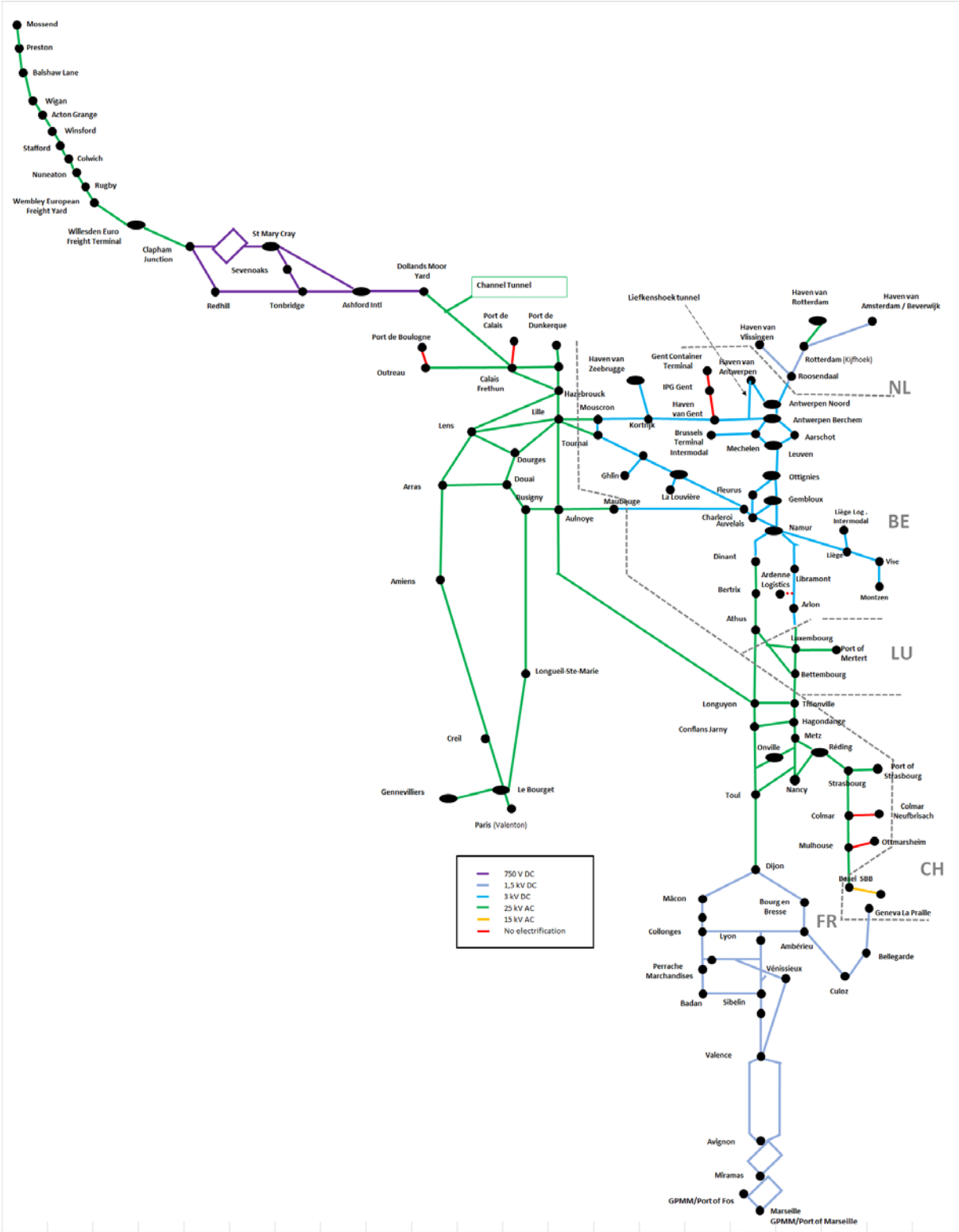
2.1.3 Speed limits

The following map provides an overview on the speed limits on the corridor lines.



2.1.4 Electrical systems

All principal and diversionary lines of the corridor are electrified. They comply with the TEN-T core network standard which allows: 25 kV AC, 50 Hz; 3 kV DC; 15 kV AC, 16.7 Hz; 1.5 kV DC, 750V DC.

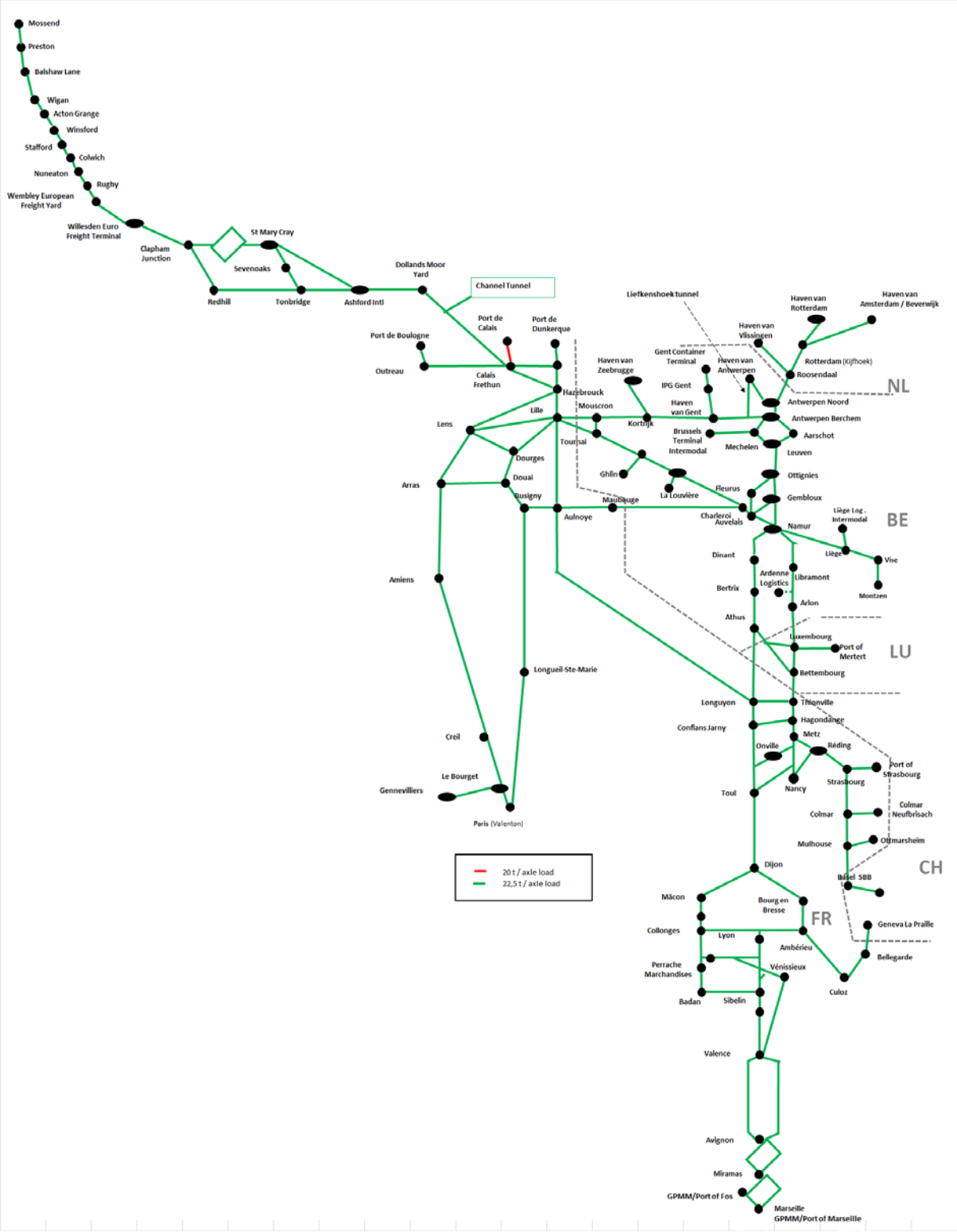


2.1.5 Signalling systems

ERTMS is progressively deployed on the RFC North Sea – Mediterranean lines. Section 6.3.3 about the interoperable system presents in detail the planning of the ETCS deployment.

2.1.6 Maximum axle load

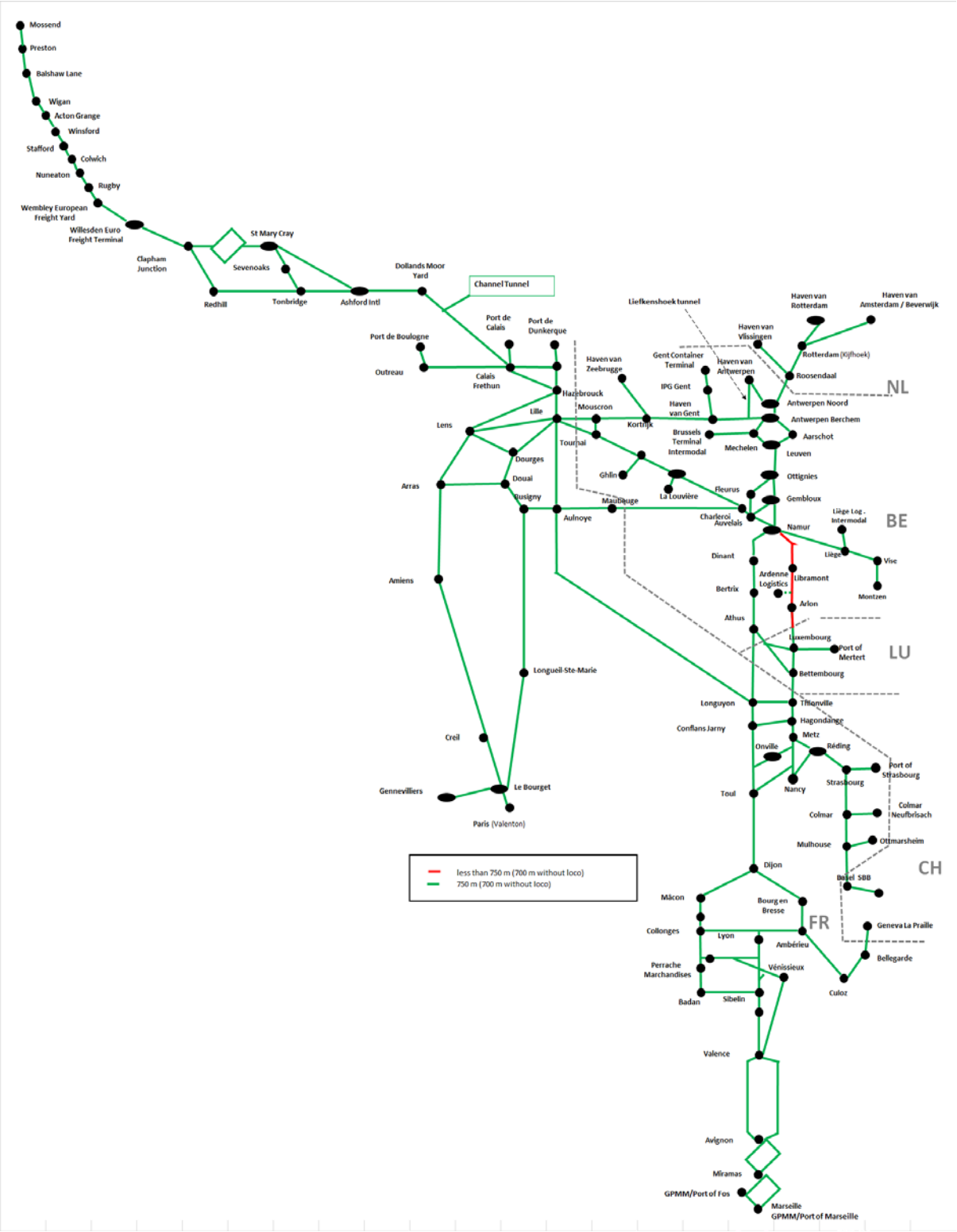
According to the TEN-T standards, the axle load on the core network should be at least 22.5 ton per axle. All RFC North Sea-Mediterranean lines (with the exception of the small section to the Port of Calais) comply with this standard.



2.1.7 Train length

The standard train length is expected to be set at 740/750 meters (including locomotives). In Belgium, 740 meter-long trains are not allowed to run on some sections during peak hours. The UK, the Netherlands, Luxembourg, Switzerland and France fully meet the TEN-T standard.

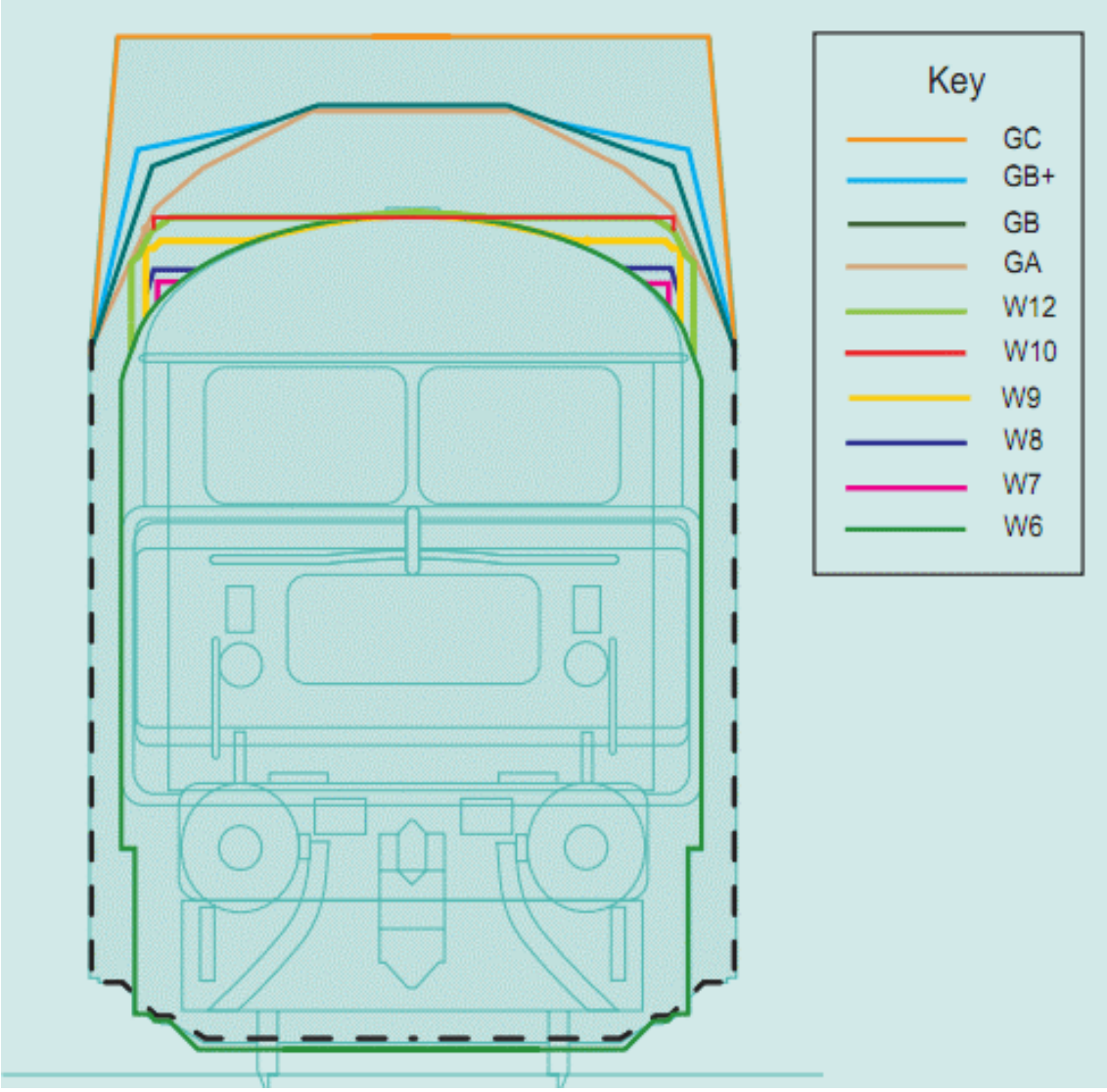
On the section of line Bettembourg – Le Boulou, trains of the rolling highway as well as combined transport trains with “high performance” wagons are allowed to run with a length of 850 meters.

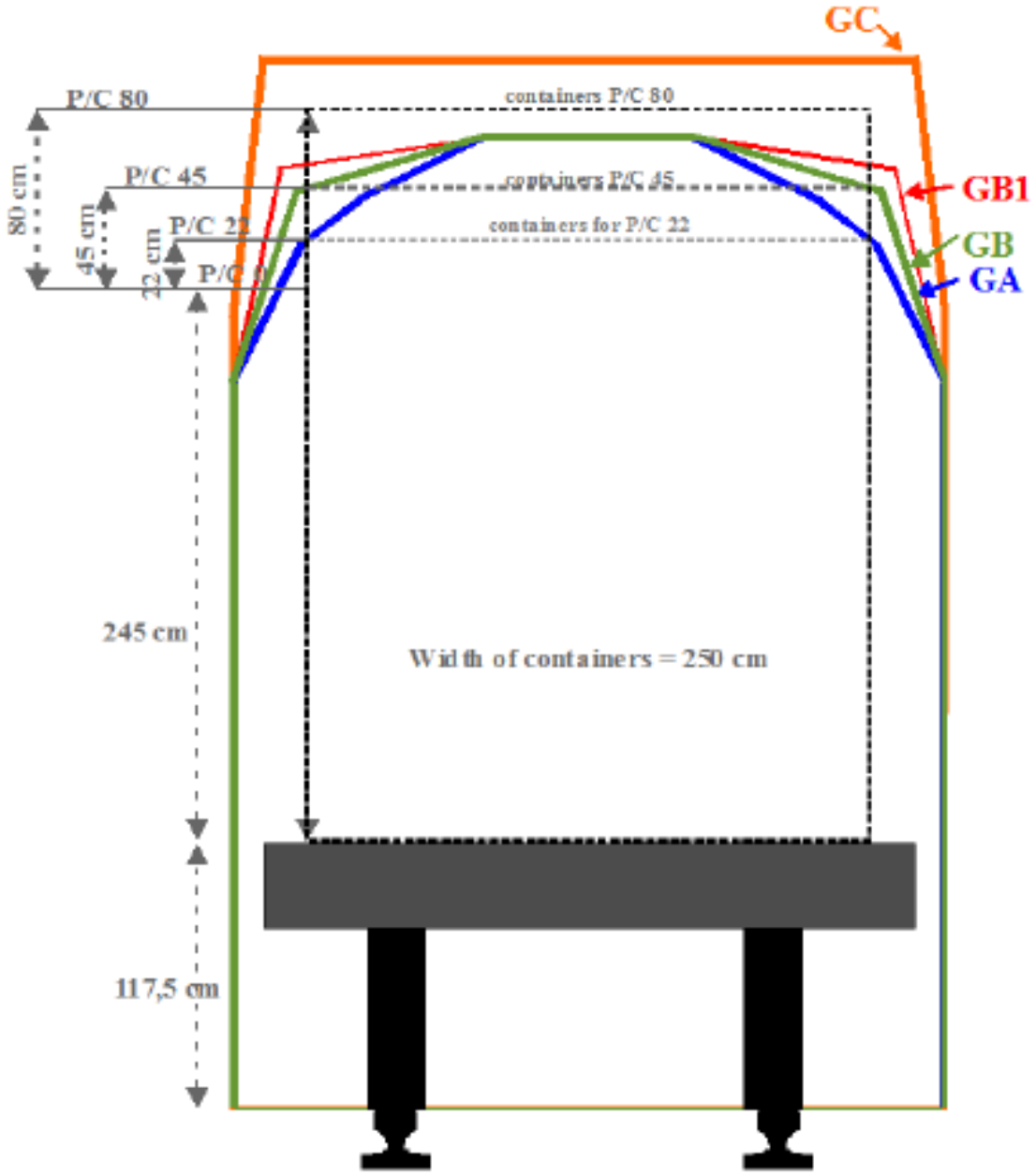


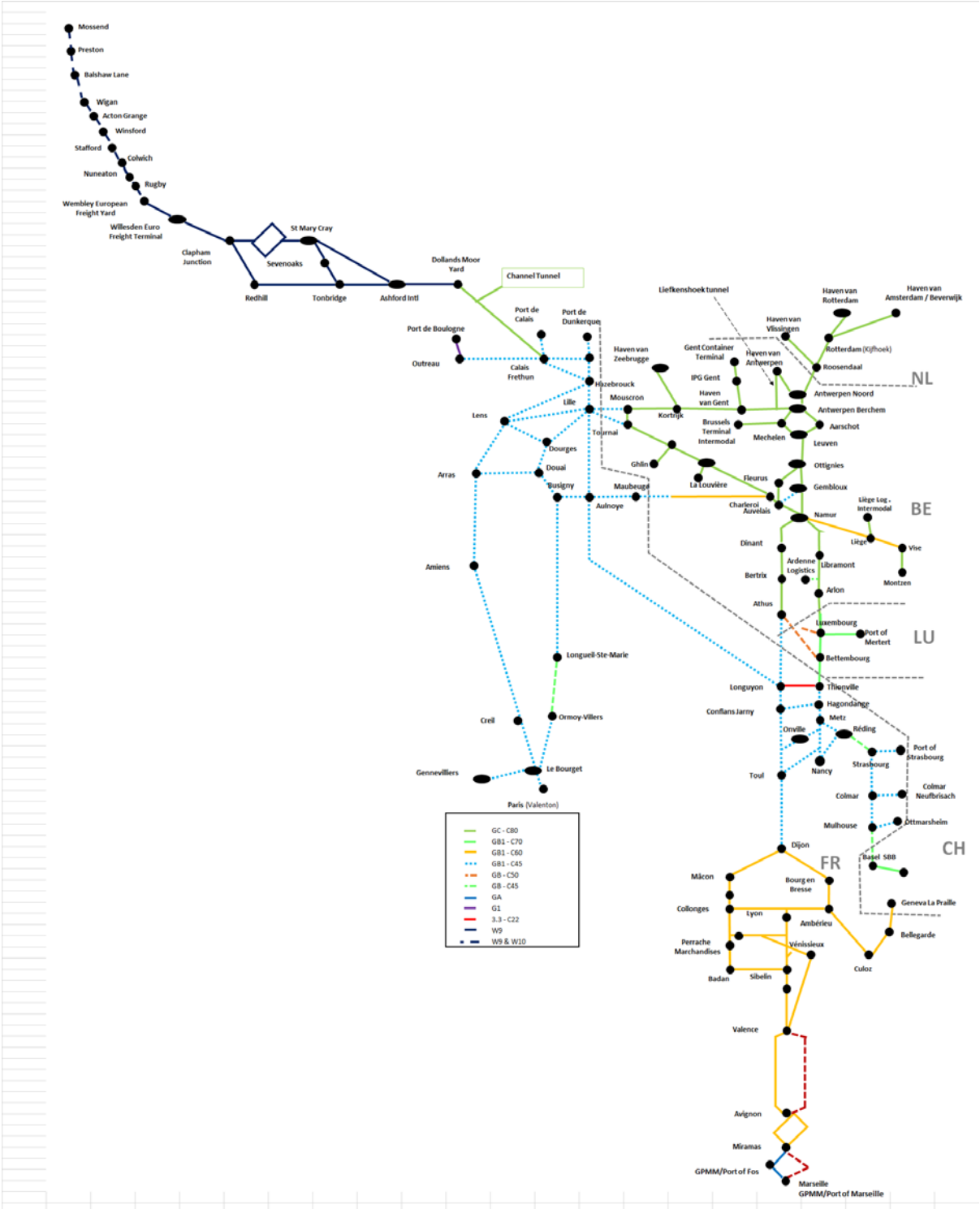
2.1.8 Loading Gauges

There is no TEN-T core network standard requirement for loading gauge. However, available loading gauge can be a criterion for railway undertakings to choose between two routes. The

loading gauge is different whether we consider conventional freight trains or combined transport freight trains. The following figures indicate the technical characteristics of loading gauge, and the specification per corridor section. In addition, a new baseline for the gauge P394 is to be defined by SNCF Réseau that will allow to circulate most of the 4 meter semi-trailers charged on most low-floor wagons.

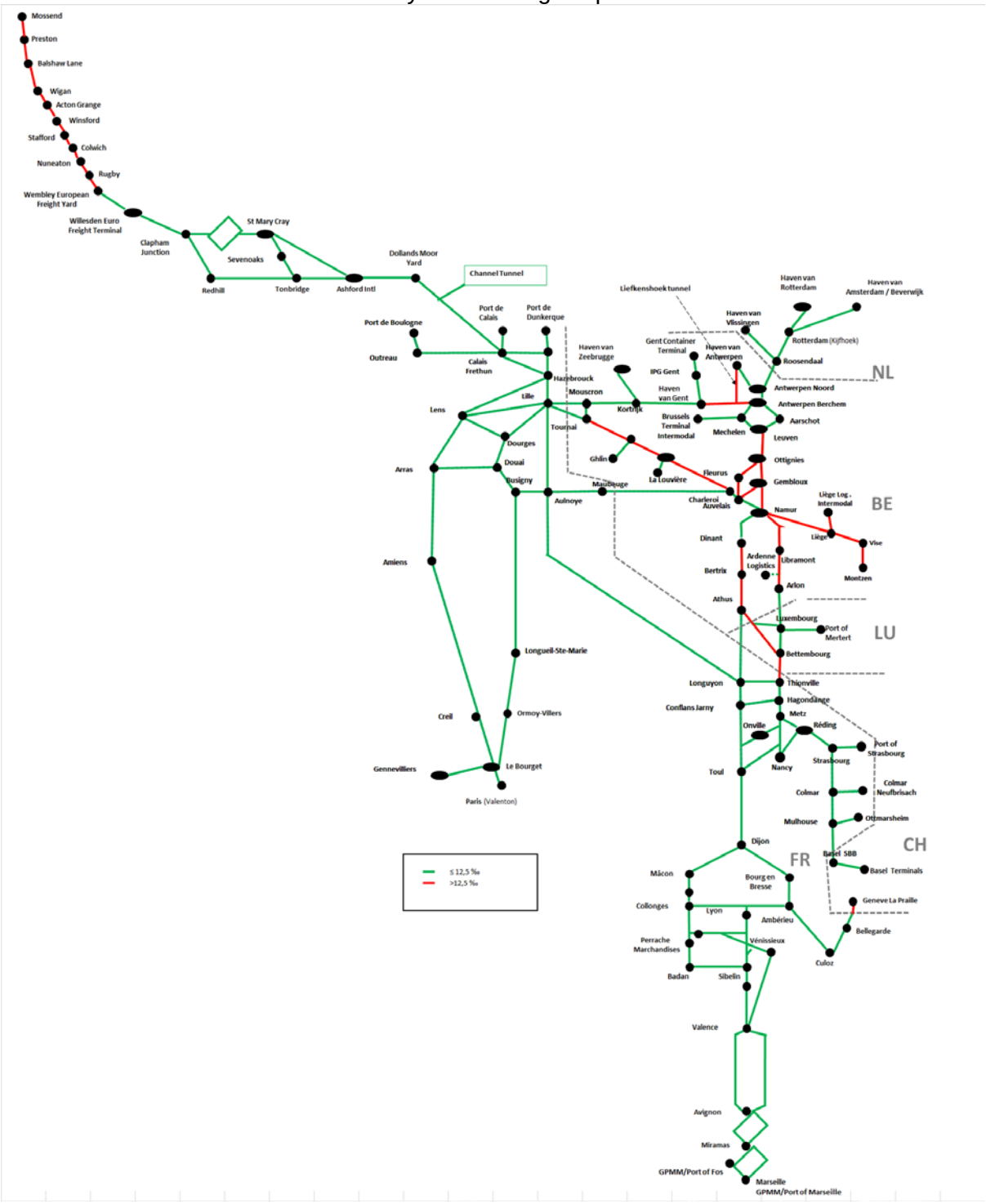



GC
P/C 80
containers P/C 80
P/C 45
containers P/C 45
P/C 22
containers for P/C 22
P/C 0
GB1
GB
GA
80 cm
45 cm
22 cm
245 cm
Width of containers = 250 cm
117,5 cm


Mossend
Preston
Balshaw Lane
Wigan
Acton Grange
Winsford
Stafford
Colwich
Nuneaton
Rugby
Wembley European Freight Yard
Willesden Euro Freight Terminal
Clapham Junction
St Mary Cray
Sevenoaks
Redhill
Tonbridge
Ashford Intl
Dollands Moor Yard
Channel Tunnel
Port de Boulogne
Outreau
Port de Calais
Calais Frethun
Port de Dunkerque
Liefkenshoek tunnel
Haven van Rotterdam
Haven van Amsterdam / Beverwijk
Haven van Vlissingen
Rotterdam (Kijfhoek)
Haven van Zeebrugge
Gent Container Terminal
Haven van Antwerpen
Roosendaal
IPG Gent
Haven van Gent
Antwerpen Noord
Antwerpen Berchem
Hazebrouck
Mouscron
Lille
Kortrijk
Brussels Terminal Intermodal
Aarschot
Mechelen
Leuven
Lens
Tournai
Douges
Ghlin
Ottignies
Arras
Douai
La Louvière
Fleurus
Gembloux
Busigny
Maubeuge
Aulnoye
Charleroi Auvelais
Namur
Liège Log - Intermodal
Liège
Vise
Dinant
Ardenne Logistics
Libramont
Montzen
Amiens
Bertrix
Arlon
Athus
Luxembourg
Port of Mertert
Bettembourg
Longueil-Ste-Marie
Longuyon
Thionville
Hagondange
Conflans Jarny
Metz
Creil
Ormoy-Villers
Onville
Réding
Port of Strasbourg
Strasbourg
Nancy
Toul
Gennevilliers
Le Bourget
Colmar
Colmar Neufbrisach
Paris (Valenton)
Mulhouse
Ottmarsheim
Dijon
Basel SBB
Mâcon
Bourg en Bresse
Collonges
Lyon
Ambérieu
Geneva La Praille
Bellegarde
Perrache Marchandises
Vénissieux
Culoz
Badan
Sibelin
Valence
Avignon
Miramas
GPMM/Port of Fos
Marseille GPMM/Port of Marseille
NL
BE
LU
FR
CH
GC - C80
GB1 - C70
GB1 - C60
GB1 - C45
GB - C50
GB - C45
GA
G1
3.3 - C22
W9
W9 & W10

2.1.9 Gradients

To meet most of the railway undertakings' expectations to use only one loco for one train, the gradient shall not exceed 12.5‰. The Netherlands fully meet the standard. Switzerland meets the standards except on the section La Plaine – Geneve La Praille. France meets the standard on all lines. Luxembourg has part of its sections meeting this expectation: between Autelbas and Bettembourg (30 km). The Athus – Zoufftgen section (35 km) has a slope greater than 19‰. In Belgium, there are only 40% of the sections which meet railway undertakings expectations.



2.1.10 Connections with Other Corridors

2.1.10.1 Connection points with other Corridors

Several important freight routes are partly on RFC North Sea-Mediterranean and partly on another corridor. For example, a lot of trains run from Antwerp to Italy through Luxembourg, France and Switzerland.

Generally speaking, RFC North Sea-Mediterranean is connected to four other rail freight corridors:

- In Amsterdam, Rotterdam, Antwerp, Ghent, Zeebrugge, Mechelen, Montzen and Basel with Corridor Rhine-Alpine;
- In Metz and Paris with the Atlantic Corridor;
- Between Lyon and Marseille, and in Ambérieu with the Mediterranean Corridor;
- In Rotterdam and Antwerp and between Antwerp and Roosendaal, in Amsterdam, and Montzen with Corridor North Sea-Baltic

Exact information on routing on all adjacent corridors can be found via the multicorridor view of the corridor information platform.

2.1.10.2 Contiguous Traffic Flows with other Corridors

As RFC North Sea – Mediterranean is linked in many locations with other corridors, the importance to act as one network of corridors should not be underestimated. Many traffic flows using at least partly RFC North Sea – Mediterranean lines continue on/come from one or more other corridors. Below a non-exhaustive overview of these traffic flows is provided.

2.1.10.3 RFC Rhine Alpine

One of the dominant traffic flows using RFC North Sea – Mediterranean lines connects the Benelux region with the north of Italy, using RFC North Sea – Mediterranean and RFC Rhine-Alpine lines. The main connection point for this traffic is Basel.

2.1.10.4 RFC Atlantic

The Benelux region is connected to Spain using RFC North Sea – Mediterranean and Atlantic Corridor lines. The main connection between the two corridors for this traffic is made in Paris.

2.1.10.5 RFC Mediterranean

Various regions in the North or Central France are connected to Italy via Dijon and Modane, using RFC North Sea – Mediterranean and Mediterranean Corridor lines. The connection between the two corridors for this traffic is made in Ambérieu.

2.1.10.6 RFC North Sea - Baltic

Transit traffic through the Netherlands from the Belgian harbours on RFC North Sea - Mediterranean (via Roosendaal and Bad Bentheim) exists, which continue until Eastern Germany, Poland or the Czech Republic using RFC North Sea – Baltic lines.

2.1.10.7 Multiple Corridor Flows

Several traffic flows exist on RFC North Sea – Mediterranean, using at least three corridors. Please find some examples below:

- Sweden – Belgium using RFC North Sea – Mediterranean, North Sea – Baltic and ScanMed lines (via Bad Bentheim and Hamburg).
- Germany – Spain using RFC North Sea – Mediterranean, Atlantic and Mediterranean lines (via Forbach and Lyon).
- Le Havre – Italy using RFC North Sea – Mediterranean, Atlantic and Rhine-Alpine lines (via Metz and Basel).

2.2 Corridor Terminals

In Regulation (EU) 913/2010, terminals are broadly defined. They can be the Infrastructure Managers' marshalling yards and sidings which are necessary for rail system operations like train formation operations. They can also be many other entry points of the various transportation systems in the commercial zone of influence of the corridor:

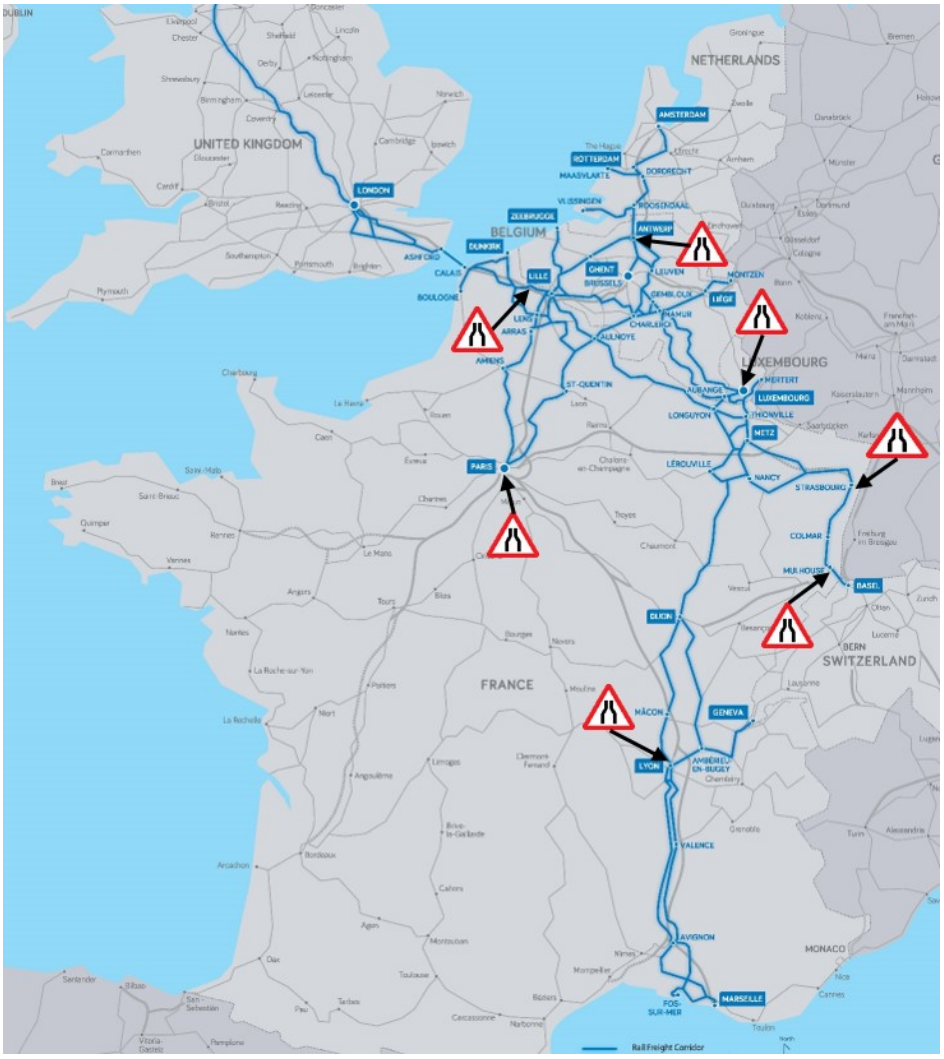
- combined transport terminals;
- river ports;
- multimodal platforms;
- maritime ports;
- private rail freight terminals.

The list of terminals is provided in Book 3 of the Corridor Information Document, and more detailed information can be found in our Customer information platform (CIP), available also on the corridor website.

2.3 Bottlenecks

RFC North Sea-Mediterranean calls "bottleneck" all rail sections where it has identified a capacity problem. Typically, this means that it is difficult to elaborate a train path if this path crosses one of these bottlenecks during peak hours.

In total, RFC North Sea-Mediterranean has identified the bottlenecks () which are highlighted on the map below.



Additional information about RFC North Sea-Mediterranean bottlenecks is provided in chapter 6.1.

2.4 RFC Governance

All details can be found in Book 1 of the CID.

3. Market Analysis Study

In view of Article 9 of Regulation (EU) 913/2010, the RFC North Sea-Mediterranean Management board has commissioned a consortium of consultant firms to carry out a first Transport Market Study. This study was carried out in 2012 and 2013.

In June 2016, an update has been made (as an addendum) in order to assess the market for international rail freight in the United Kingdom. The addendum is based on the UK's Freight Market Study (FMS), which was published by Network Rail in October 2013. The aim of the FMS was to assess the demand for rail freight over a thirty year period. The FMS, together

with similar studies for the passenger market, is part of Network Rail's Long Term Planning Process (LTPP), which will help determine investment priorities for the UK's rail network over the next few years. The FMS addresses rail freight demand in Great Britain, including international rail freight demand through the Channel Tunnel.

The essential elements of these studies have already been published and are available in the previous versions of this book 5 of the CID on the website of RFC North Sea -Mediterranean. A first update with the UK extension was published on Book 5 TT2018 and can be seen on the internet website of the corridor.

A synthesis can be found on our website, or directly by clicking here.

4. List of Measures

Since the corridor is implemented, the subchapters 4.1 – 4.6 are not applicable for updates. The state of play and further developments regarding concrete measures and procedures is included in Book 4 of the CID.

4.1 Coordination of Planned Temporary Capacity Restrictions

All information on the coordination of planned temporary capacity restrictions can be found in Book 4, chapter 4 of the CID.

4.2 Corridor One Stop Shop

All information on the Corridor One Stop Shop can be found in Book 4, chapter 2 of the CID.

4.3 Capacity Allocation Principles

All information on capacity allocation can be found in Book 4, chapter 3 of the CID.

4.4 Applicants

All information on applicants can be found in Book 4, chapter 3.2 of the CID.

4.5 Traffic Management

All information on traffic management can be found in Book 4, chapter 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 Book 4, chapter 5.3 of the CID, including the International Contingency Management.

4.7 Quality Evaluation

4.7.1 Performance Monitoring Report

RFC North Sea-Mediterranean publishes an annual performance report on its website, and presents these figures during a TAG and RAG meeting, to its customers. This annual publication is foreseen in the first quarter. The report is based on the RNE Guidelines on the Key Performance Indicators of the Rail Freight Corridors: http://www.rne.eu/rail-freight-corridors/downloads-documents/. More information on KPI and objectives can be found in chapter 5.

4.8 Corridor Information Document

The CID, which consists of 5 books, is published every year in January.

Following the Sector Statement (priority 10) continuous efforts are being made to harmonise the CID even further.

5. Objectives / Performance

The performance of the corridor is monitored via different KPI and other measurements. For all KPIs, measurable objectives are fixed. These can be found in this chapter.

5.1 Train Performance Management: a corridor oriented performance scheme

All information concerning the Train Performance Management project on RFC North Sea-Mediterranean can be found in the CID Book 4 chapter 6.

5.2 Punctuality Objectives

It is the goal of the RFC North Sea-Mediterranean to improve punctuality on the Corridor. This goal can be reached by 3 methods. The Train Performance Management (TPM), an improved harmonisation and resilience of the PaP Catalogue and the removal of traffic bottlenecks. TPM is described in detail in chapter 5.1. The removal of bottlenecks is described more in detail in chapter 2.3 and 6.1.

The setup of the yearly PaP catalogue can help to improve punctuality by implementing specific procedures on harmonisation at border points. Furthermore, an improvement in punctuality can be achieved by insisting on realistic train paths. With these three strategies, RFC North Sea-Mediterranean intends to contribute to the improvement of punctuality on problematic Corridor sections and passing points.

To fix a measurable objective, we have taken into account the punctuality of the past years, measured from more than 30 minutes delay, on a selection of Corridor trains, in 26 measuring points along the corridor. The evolution of this figure is displayed in the table below.

2013	2014	2015	2016	2017	Objective 2016 - 2020	Objective 2025
77,9%	78,7%	78,6%	77,3%	78,2%	**80%**	**85%**

In the near future, the corridor will not see a big rise in available capacity due to works. Continuing works for example on the installation of the ETCS system, the works on the Athus-Meuse or maintenance during the night on the heavily used Alsace and Artère Nord-Est-lines make an improvement of the current punctuality on the main corridor lines very unlikely.

5.3 Capacity Objectives

Capacity on RFC North Sea-Mediterranean is measured mainly in three different fields: trains running on the corridor lines, the number of PaPs offered, and the average running time on the main corridor sections.

5.3.1 Trains running on the Corridor

The total volume of Corridor trains is measured in KPI 1. All trains crossing at least one corridor border, and running at least 70 continuous kilometres on the Corridor are taken into account. This means that not only trains running on PaPs are considered. The evolution of the total amount of corridor traffic is influenced heavily by the economic growth of the corridor region. However, the corridor aims to increase the amount of corridor trains in the following manner, compared to the year 2013, taking into account a low economic growth:

2013	2020	2030
Base 100	+ 3%	**+ 9%**

5.3.2 Strategy for the number of Pre-arranged Paths

Each year, around X-18, the RFC North Sea-Mediterranean C-OSS, together with the other RFCs, organises a client survey ("Capacity Wishes Survey") to have a better view on the quantity of PaPs needed for the next PaP catalogue. Based on the outcome of this survey, the Management board makes a preliminary decision about a PaP strategy (as far as quantity is concerned) based on a proposal from the C-OSS. For this proposal, also other parameters are taken into account:

- *offer previous timetable*
- *quantity of allocated PaPs of previous timetable*
- *total of allocated paths of previous timetable*
- *total of used paths of previous timetable*
- *transport market study interpretation*
- *capacity needs survey*
- *capacity availability and strategy IM (capacity model)*

This proposal is then presented to the Executive board and the Advisory Groups, and adapted according to their input where advised relevant by the Managing board.

At first, the PaP catalogue consisted largely of paths reflecting historic market demand. RFC North Sea-Mediterranean is extending this offer gradually with a number of PaPs designed for the development of new traffics. These paths shall be published on top of the amount of market demand paths for two reasons. This way the Corridor offers more flexibility to the market in number of paths and alternative routes, and it anticipates on possible extra traffic and promotes the use of under exploited lines and trajectories.

It is the objective of the RFC North Sea-Mediterranean to offer a complete PaP offer (at X-11) on all Corridor principal lines and to increase the share of requests for international freight

paths along corridor lines, that go via the C-OSS, from around 10%, to at least 50% by 2025 (compared to the concerned timetable year).

The table below gives an overview on the capacity offered as PaP in the RFC North Sea-Mediterranean catalogues from timetable (TT) 2015 to 2019, and an objective on the short and long term. Because of the maximisation of the capacity offered for TT2019, which meant that in principle all harmonised international paths were published as a PaP, the objective for TT2020 is offering a similar amount of capacity as for TT2019.

Evolution PaP Capacity on RFC North Sea-Mediterranean							
million kms constructed X days offered	**TT2015**	**TT2016**	**TT2017**	**TT2018**	**TT2019**	**TT2020 objective ***	**TT2025 objective ***
	7,3	9,2	15,1	12,6	21,3	Maximisation: 100% preconstructed paths crossing the corridor border as PaP	
**** compared to TT2019***							

5.3.3 Planned Average Speed of Corridor Capacity Objectives

The goal of RFC North Sea-Mediterranean is to be a fast, efficient and high quality rail link. This objective means increasing the efficiency, reliability and durability of end-to-end rail freight traffic, thereby strengthening the railway's competitive position, in line with European freight transport targets. Therefore it is vital to continue the optimisation of harmonisation of train paths between the different IMs and ABs.

The follow-up on the average speed is monitored in KPI 3. The objective is based on the following parameters:

- *preview of works*
- *preview of infrastructure investments*
- *past catalogue path journey time evolution*
- *timetable journey time evolution*

Taking into account these parameters, the Corridor has defined the following objectives concerning the published PaPs:

KM/H per Corridor Route										
Route including	Length	Catalogue TT 2013	Catalogue TT 2014	Catalogue TT 2015	Catalogue TT 2016	Catalogue TT 2017	Catalogue TT 2018	Catalogue TT 2019	Objective catalogue TT 2018 to 2020	Objective catalogue TT 2025
Antwerp - Basel	748.8	57.0	51.4	55.2	53.8	54.3	53.3	52.2	55	58
Antwerp - Bettembourg	343.7	60.7	59.7	61.6	58.1	58.3	59.3	57.8	60	62
Mont-St-Martin - Basel	425.9	51.4	44.6	48.5	48.7	48.4	48.2	46.4	50	54
Rotterdam - Antwerp	74.3	53.4	58.7	71.3	63.7	65.1	56.4	64.6	70	72,5
Antwerp - Lyon	890.7	NA	NA	51.8	59.7	57.4	62.9	56.8	62,5	65
Antwerp - Lille	125.4	50.2	52.4	56.2	44.2	62.7	60.7	51.4	56	60
Lille/Somain - Paris	247.3	NA	NA	NA	63.3	73.5	69.7	69.2	72,5	75
Metz - Lyon	454.1	NA	NA	57.8	61.9	69.9	72.7	69.2	70	72,5
Dunkerque - Liège	311.1	NA	NA	NA	43.7	56.1	55.7	55.1	57,5	60
London - Calais	230.4	NA	NA	NA	NA	38.5	69.7	69.2	60	68
Calais - Metz	454.7	NA	NA	NA	69.9	62.4	38.5	40.7	65	68

Average Speed Objectives

5.4 Allocation Objectives

The Corridor OSS allocates capacity on the Corridor. To be able to measure the success of this new way of allocating capacity, the Corridor has chosen the following objectives for the KPIs concerned:

Requests for pre-arranged paths (capacity)

The number of requests for pre-arranged paths is measured for two periods:

- *X-11 till X-8*
- *X-8 till X-2 (without feeder/outflow sections).*

RFC North Sea-Mediterranean objectives:

- *X-11 till X-8: 50% of PaPs offered at X-11 requested (in km per year).*
- *X-8 till X-2: 20% of the PaPs offered at X-8 requested (in km per year).*

Allocated pre-arranged paths (capacity)

The number of pre-arranged paths which are pre-booked by the C-OSS is measured for two periods:

- X-11 till X-8
- X-7.5 till X

RFC North Sea-Mediterranean objective = 85% of the requests during the given period

Reserve Capacity Offer

The Corridor wants to provide Reserve Capacity of at least 10% of the capacity provided in the yearly timetable PaP Catalogue (in kms). To be able to calculate this, the length of the Corridor sections has been fixed, and can be found in annex to the CID Book 4.

Allocated Reserve Capacity

RFC North Sea-Mediterranean objective = 85% of the requests for Reserve Capacity.

5.5 Performance Monitoring

RFC North Sea-Mediterranean monitors its performance by using a number of Key Performance Indicators (KPIs) and other measurements (OMs). These were chosen on the basis of the following parameters:

- *Measurability: performance should be measurable with the tools and resources available to the corridor*
- *Clarity: KPI should be understandable for all public it is designed for*
- *Comparability: KPI should be comparable across time and region*
- *Relevance and empowerment: KPI should provide information on which project decisions can be based*

The difference between general measurements and KPIs lies in the fact that concrete objectives are linked to the KPIs in terms of threshold values, while this is not the case for general measurements.

The list is updated regularly, depending on management needs and availability of data. They form the basis, together with the results from the user satisfaction survey, for the annual performance report.

For the KPIs or other measurements, only RFC North Sea-Mediterranean trains are taken into account. On RFC North Sea-Mediterranean, a “Corridor train” is an international freight train which crosses at least one RFC North Sea-Mediterranean border, and runs at least 70 continuous kilometres on this Corridor.

The KPIs and OMs have been divided into two categories:

- *corridor traffic*
- *corridor capacity*

5.5.1 Harmonisation of Measurements across Corridors

In order to facilitate data processing and data provision for the calculation of the KPIs of the corridors, as well as to establish a common interpretation of similar measurements, the corridors, together with RNE, have drafted a common guideline, to ensure a certain degree of harmonisation of the KPIs. This guideline is under constant review and updated regularly, on the basis of customer feedback.

Our list of measurements has been updated accordingly.

5.5.2 Key Performance Indicators

Corridor Traffic:

KPI 1: Traffic Volume (Total)

Measures the number of train runs on RFC North Sea-Mediterranean. Trains that pass two RFC North Sea-Mediterranean border points will not be counted twice.

KPI 2: Corridor Punctuality

Measures the average punctuality of corridor trains on a fixed number of passage points, including an overview on the punctuality at origin and at destination.

KPI 3: Planned Average Speed of Corridor Capacity

Makes the comparison between the average yearly timetable running time and the average prearranged path running time for predefined RFC North Sea-Mediterranean routes. The average speed will also be calculated, to be able to compare along the Corridor. This KPI is updated yearly after the publication of the Corridor PaPs Catalogue at X-11.

- **Corridor Capacity:**

KPI 4: Volume of offered capacity

Kilometres x days offered at X-11 (yearly PaP catalogue), X-8 (PaPs for late requests and Reserve Capacity), with a specification for capacity for which standard priority rule applies and capacity for which Network PaP priority rule applies.

KPI 5: Volume of requested capacity

Kilometres x days requested as a PaP in the period X-11 till X-8 and X-8 (-1 day) till X-30 days (without feeder/outflow sections; with a specification for PaPs for which standard priority rule applies and PaPs for which Network PaP priority rule applies).

KPI 6: Volume of pre-allocated capacity

Kilometres x days requested as a PaP in the period X-11 till X-8 (without feeder/outflow sections) that have been pre-allocated by the C-OSS.

KPI 7: Relation between capacity allocated by the C-OSS and total (scheduled) traffic

Comparison between number of trains (for selected timetable) allocated by the C-OSS per corridor border (final allocation X-3.5) and total amount of scheduled trains at the start of the given timetable year.

5.5.2.1 Other Measurements

- **Corridor Traffic:**

OM 1: Traffic Volume (Per Corridor Border)

Measures all corridor trains per RFC North Sea-Mediterranean border point.

OM 2: Cancelled Trains

Measures the average amount of cancelled trains (entire trajectory) on the corridor. This OM is updated on a monthly basis.

- **Corridor Capacity:**

OM 3: Volume of requests

Number of requests submitted to the C-OSS in the period X-11 till X-8 and X-8 (-1 day) till X-30 days.

OM 4: Number of conflicts

Number of requests submitted to the C-OSS which are in conflict with at least one other request at X-8.

OM 5: Relation between results capacity wishes survey, the published and the requested capacity

Comparison between the results of the capacity wishes survey and the actual published and requested capacity for the corresponding timetable year, on predefined corridor O/Ds.

5.5.3 User Satisfaction Survey

In order to be aware of the satisfaction level of our customers regarding the services provided and to increase the quality of these services, RFC North Sea-Mediterranean launched its first survey in September 2014. A fifth survey was held in September 2018.

To make the results of the satisfaction survey more comparable, RFC North Sea-Mediterranean and RNE have jointly developed a harmonised survey for most rail freight corridors. The questionnaire addresses topics such as coordination of works, the CID, capacity allocation, C-OSS, traffic management, train performance management, communication tools and advisory groups.

This survey is conducted every year and its results are published on RFC North Sea-Mediterranean website and in its annual report. It is also presented in the advisory group meetings.

Regulation (EU) 913/2010 requires management boards to carry out such a satisfaction survey.

All results of the User Satisfaction Survey can be found on our dedicated figures page of our website: https://www.rfc-northsea-med.eu/en/page/figures-performance-corridor

6. Indicative Investment plan

RFC North Sea-Mediterranean collected data about investments from its Infrastructure Managers members. The investments planned by IMs are either renewal or development. Some IMs combine both investment types if possible.
This investment plan takes into account four categories:

- The deployment of ERTMS to encourage interoperability and to avoid as quick as possible the multiple on board control command systems for operators.
- The improvement of the loading gauge to support the growth of the market share of combined transport with the carriage of P400 semi-trailers.
- The bottlenecks relief to facilitate the traffic in railway nodes experiencing capacity problems.
- Increase train length up to 740m (with loco) to standardise this technical characteristic on all the sections of the corridor.

6.1 Capacity Management Plan

6.1.1 Projects

6.1.1.1 Bettembourg central signalling centre

In Luxembourg, the main project concerns the renewal of the Bettembourg central signalling centre, combined with an improvement of the track layout and the building of a new line between Luxembourg and Bettembourg. It will offer the possibility to increase reliability and capacity, improving the access to the marshalling yard.

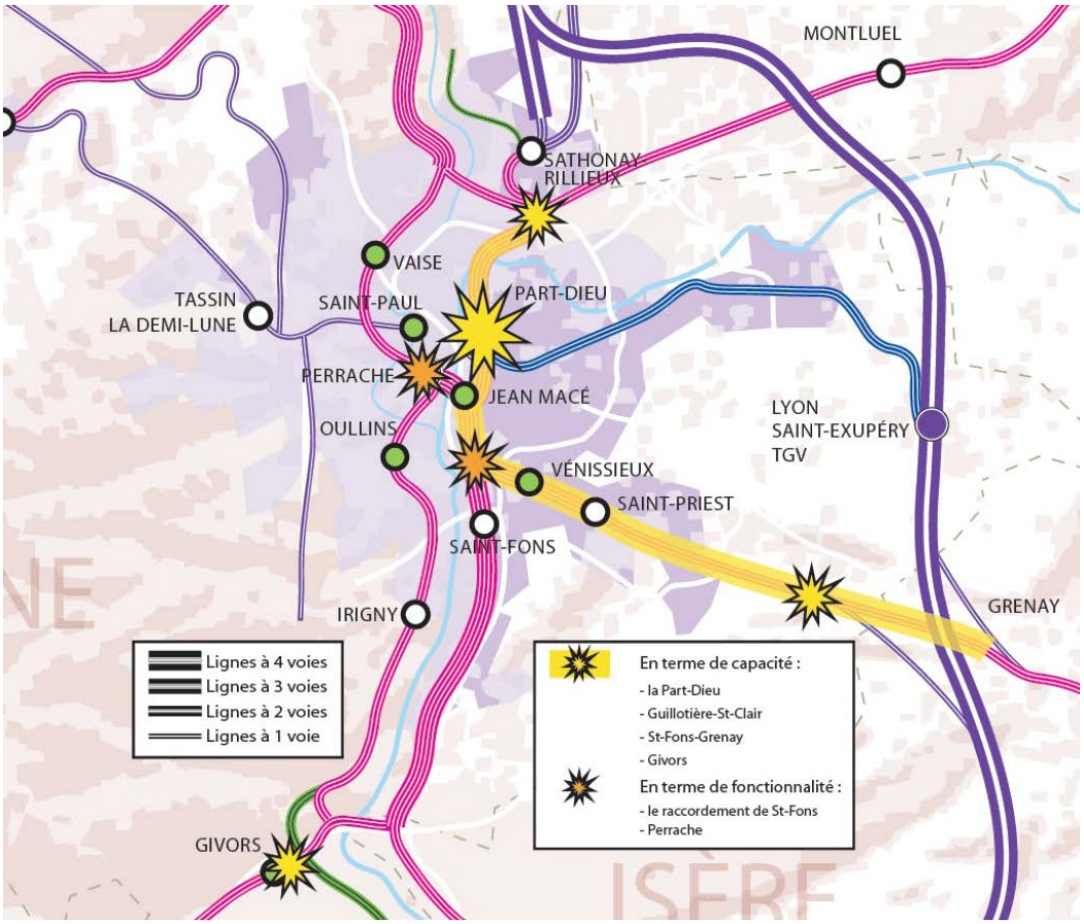
6.1.1.2 Lyon Railway Node (NFL)

As the main traffic hub on the French network, the Lyon railway junction is of crucial importance in the management of all European, national and regional freight and passenger traffic flows that pass through or converge on this location and the Lyon bottleneck is, along with the Parisian one, the biggest bottleneck on the French rail network and one of the most significant one on the European network. The main North-South French axis runs through the middle of the city where over 10 lines converge with large regional train traffic and very limited available capacity. The main project is the Lyon Railway Node (NFL). It consists in performing works on the existing network aiming to increase reliability, safety and capacity.

The project consists in designing and implementing the most adapted solutions to the capacity issues of the Lyon Railway Node at different timelines: short, medium and long term. This project assembles and structures analysis on operations, targeted investments and a "major project" on the long term. It must take into account for the different timelines, projects that have their own dynamics, on a local, regional or national level.

The project is based on the decision of 25 February 2013 from the Ministry of Transport, whose guidelines are:

- Report from the ministry in late 2011 on the NFL and the Saint-Fons – Grenay line;
- Part-Dieu Station will be the main hub;
- Special attention to be given to the management of passenger flows (station and platforms);
- Short term plan and medium term plan to be defined (heart of the node and the Saint-Fons – Grenay line)
- Additional studies needed for the definition of a long-term scenario;
- Results of studies and consultation in 2014
- Governance framework of the studies: appointment of a coordinator from the ministry and set up of a steering committee of major partners
- Decision process on investments by SNCF Réseau.



6.1.1.3 Flyover Oude Landen

The Port of Antwerp is the largest Belgian and the second largest European port after Rotterdam and the number of containers handled at the port is gradually increasing. Over the past decade Infrabel has strengthened the railway infrastructure in and around the port in various strategic locations, such as the Liefkenshoek Rail Link. A range of other projects can support the further development of the port in the future. Today all trains travel from the Port of Antwerp to the hinterland via a single line between Antwerp North and Mortsel (L 27A). This line has reached its capacity limits. The construction of a flyover, called Oude Landen, in order to replace the current junction Schijn at the entrance of the marshalling yard Antwerp North, is a first step on the way to enhancing the capacity on the line L27A. This project can be considered as the first phase of a long-term solution to improve the access to the Port of Antwerp, consisting in the construction of a complete new railway line between Antwerp North and Lier, the so-called second railway access. If all goes according to plan the flyover should become operational by the end of 2023.

6.1.1.4 Other improvement projects

Other projects are planned to ease operations on RFC North Sea-Mediterranean.

The freight traffic between Basel and the French border is limited to 2 trains per hour per direction, due to flat junctions and the signalling system. To increase the capacity, the signalisation should be upgraded.

6.1.2 Train length increase

740m long trains can run on RFC North Sea-Mediterranean except in Belgium during peak hours. Works are in progress or planned to extend some sidings. A study is ongoing at Infrabel.

In France, some 850 m trains are allowed to run and effectively run on the Bettembourg-Lyon section.

6.1.3 Loading gauge increase

The Corridor Transport Market study performed in 2012 and 2013 showed that there was a major market demand for the transport of trailers/trucks. This has been unanimously and repeatedly reaffirmed by railway undertakings in the advisory group meetings from 2013.

As P400 loading gauge already exists in Belgium and the Netherlands, and as a similar study was performed in Switzerland, studies were performed in 2015 to assess the opportunity to enhance the loading gauge on the French and Luxembourg part of the corridor.

These studies enabled to assess the best solution and the related cost for the necessary infrastructure upgrade to have P400 loading gauge on the Rotterdam – Antwerp – Metz - Basel route of the corridor. If the project goes live, it will facilitate the traffic of trains carrying trailers/trucks across borders (France, Belgium, Netherlands, Luxembourg, Germany, and Switzerland). It will also enable the connection with other lines with similar gauge, such as Perpignan – Luxembourg.

In Switzerland, on the Calais – Basel route, 2 tunnels (Kannenfeld, Schützenmatt) still need to be enhanced to achieve P400 loading gauge. Timetable and financing of the enhancement are currently being investigated.

- Kannenfeld (length 800m/ current profile: EBV2): renewal foreseen
- Schützenmatt (length 286m/ current profile: EBV2): renewal foreseen

In France, the study showed that on the Calais – Basel route, 11 tunnels (tunnels of Liart, Martinsart, Montmédy, Vachemont, Platinerie, Fontoy, Mercy, Arzviller, Lutzelbourg, Niederrheinthal and Haut Barr) still needed to be enhanced to meet the AFM 427 gauge (close to P304), and most of them needed to obtain financing. SNCF Réseau has upgraded three tunnels on this line since 2016 to AFM 427: the tunnels of Montmédy and Vachemont in 2016 and the tunnel of la Platinerie in 2017.

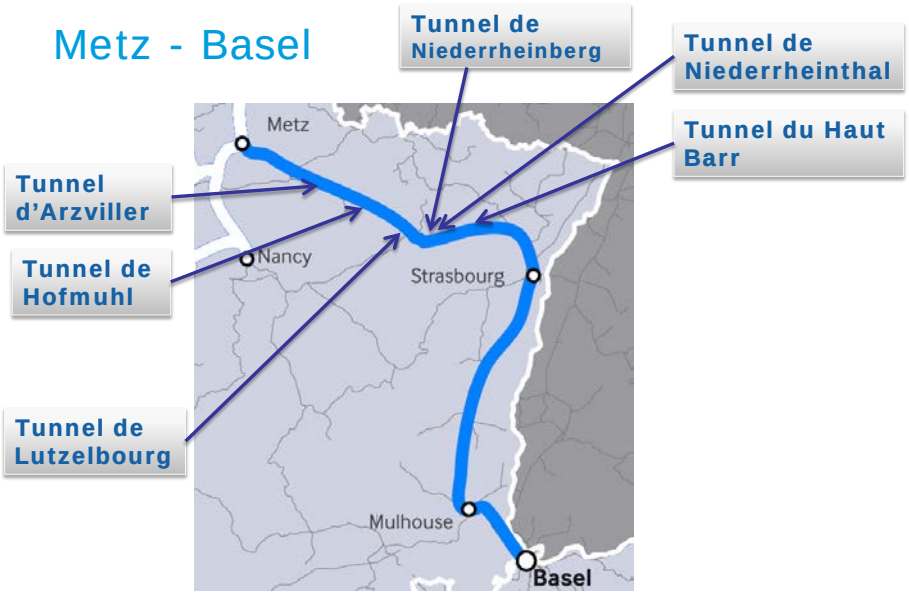
SNCF Réseau has decided to launch a socio-economic study on the main routes of its network, including the RFC NSM lines The results, which will serve as a basis for the French ministry to make decisions on the financing of the loading gauge, should be available in 2019. This topic will also be dealt with in an ad hoc working group in the Network Operators Committee ("COOPERE").

The following maps show the precise location of these tunnels.

Calais - Longuyon

Longuyon - Thionville

Metz - Basel



6.2 List of projects

RFC North Sea-Mediterranean identified a list of projects or programs which may go live in a 10 year time horizon. The tables below provide a list of projects.

WARNING: this list displayed in the table below is provided on an indicative basis. The list of projects provided in this document is presumably considered as secured, unless when indicated. This matter falls within the remit of the Member States, in accordance with the principle of subsidiarity. A number of technical, political or financial factors may affect the completion of the listed projects. It is therefore possible that at least some of these projects will not be put into service or will be delayed. Similarly, the dates and costs presented in this list may be modified from time to time in the future.

INDICATIVE LIST OF RFC NSM PROJECTS IN THE NETHERLANDS						
Project Name	**Benefit**	**Go Live Date**	**Description**	**Total budget**	**Project Category**	**Project Type**
Redevelopment Waalhaven Zuid freight yard	Capacity	2022.12	Increasing capacilty and track length	N/A	Infrastructure	main project
free level crossing at Amsterdam Dijksgracht	Capacity	2028.12	free entrance to Amsterdam Westhaven	N/A	Infrastructure	main project
Harbourline - 25 kV connection Betuweline	Quality	open	change catanary supply 1,5 kV to 25 kV	N/A	Infrastructure	main project
ERTMS Amsterdam Centraal	Interoperability	2031.09	Implementing ERTMS around Amsterdam Centraal	N/A	ERTMS	main project
Theemsweg track	Capacity	2021.12	Detour Theemsweg (Harbour Line) to avoid the Calandbrug	N/A	Infrastructure	main project
ERTMS Kijfhoek - Roosendaal grens	undefined	2026.09	Implementing ERTMS between Kijfhoek and Roosendaal border	N/A	ERTMS	main project
Botlekbrug on the Harbourline - Oude Maas river crossing	Capacity	2019.12	Adjusting railway bridge and improving connection to Botlek Freightyard	N/A	Infrastructure	main project

INDICATIVE LIST OF NS-MED RFC PROJECTS IN LUXEMBOURG								
Route	Railway section	Nature of Projects	Benefits for NS-MED Corridor	Start date of the works	End date of the works	Current phase	Cost estimation in M€	Comments
ANTW - AUB - BETT	Luxembourg - Bettembourg	Creation of new structure (line, tunnel, bridge, leapfrog)	Capacity improvement	2015	2027	Works phase	212,8	New line between Luxembourg and Bettembourg
ANTW - AUB - BETT	Luxembourg - Kleinbettingen	Track enhancement	Higher speed			Preliminary study	328,5	Track renewal and upgrade to 160km/h
ANTW - AUB - BETT	Kleinbettingen - Bettembourg	Creation of siding, passing tracks, extra tracks	Capacity improvement	2013	2023	Works phase	416,5	Layout improvement in Luxembourg station Incl signal boxes
ANTW - AUB - BETT	Rodange/Kleinbettingen - Bettembourg	Creation of siding, passing tracks, extra tracks	Capacity improvement	2013	2026	Works phase	507,4	Modernisation and layout improvement of Bettembourg station Incl signal boxes
ANTW - AUB - BETT	Whole network	Adjustment of gauge	Capacity improvement			Preliminary study		Study on gauge enhancement to allow P400 gauge trains

Railway section	Nature of project	Benefits	Go Live Date	Budget Status	Current phase	Cost estimation *	Financing source	Remark
Route Antwerpen - Aubange - Bettembourg / Longuyon								
Port of Antwerp: Left bank	Various extension and renewal works on the left bank of the port of Antwerp	Capacity	2020	secured	works phase	**1,00**	Public	These are in fact continuous small works without a fixed end date
Port of Antwerp: Right bank	Signalling of several regularly used fan of sidings on right bank of the port of Antwerp	Capacity	2022	secured	study phase	**17,00**	Public (federal + region)	
Port of Antwerp: Right bank	Various extension and renewal works on the right bank of the port of Antwerp	Capacity	2020	secured	works phase	**5,70**	Public	These are in fact continuous small works without a fixed end date
Junction Oude Landen	Construction of junction at Oude Landen (L27A) to provide a better access to the port of Antwerp	Capacity	2023	secured	study + works	**80,01**	Public	
Second access to the Port of Antwerp	Construction of a new line between Antwerp North and Lier to provide a better access to the port of Antwerp	Capacity	2023	secured	study phase	**3,80**	Public (federal + region)	
By-pass Mechelen	Complex Otterbeek	Capacity	2028	planned	Start 2024	**85,72**	Public	
EuroCapRail Bxl-Lux	Axe 3 Modernisation + Axe 3 electrification 25kV	Capacity	2027	planned	works phase	**325,24**	Public, European	
Athus - Mont-St-Martin	Connection of the intermodal node in Athus to the French railway network (phase 2)	Capacity	2020	secured	works phase	**9,00**	Public, European	
Route Antwerpen - Lille								
Port of Gent	Construction of side tracks 750m	Train length	2021	secured	study phase	**4,58**	Public	
Port of Gent	Various extension works in the port of Gent	Capacity	2020	secured	works phase	**0,51**	Public	These are in fact continuous small works without a fixed end date
L59 - Study 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	2025	secured	study phase	**33,82**	Public (federal + region)	
Route Dunkirk - Liège								
Kinkempois	Extension of fan of sidings in the formation yard Kinkempois	Capacity	2020	secured	works phase	**19,96**	Public	
Route Kortrijk - 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	2025	secured	works phase	**81,68**	Public, European	
Port of Zeebrugge	Various extension works in the port of Zeebrugge	Capacity	2020	planned	works phase	**4,61**	Public	These are in fact continuous small works without a fixed end date
L51 - 3th track between Bruges and Dudzele	Construction of a thirth track between Bruges and junction Dudzele	Capacity	2031	planned	works phase	**68,87**	Public	
Not route specific								
Elimination of level crossings	Elimination of level crossings (12 level crossings removals on RFC Rhine-Alpine and on RFC NS-Med)	Safety / Capacity	2020	secured	works phase	**26,93**	Public, European	Global budget, no split per RFC
ETCS equipment	Equipment of the remaining part of the Belgian network with ETCS	Interoperability	2022	secured	works phase	**1299,34**	Public, European	Remaining amount to equip the whole Belgian network with ETCS (including interlockings)
Side tracks 750m	Construction of side tracks 750m in Belgium apart from major projects where this is already included in other works	Train length	2023	secured	study phase	**12,99**	Public	Global budget, no split per RFC
	* (from 2017 - in M€ 2017)							

INDICATIVE LIST OF NS-MED RFC PROJECTS IN France								
Region	Railway section	Nature of Projects	Benefits for NS-MED Corridor	Start date of the works	End date of the works	Current phase	Cost estimation in M€	Comments
Alsace	Mulhouse	Renewal of signalling system	Maintenance of performance		2022	Works phase	77,1	Centralised command of the network (CCR)
Alsace - Loraine	Longuyon-Basle	ERTMS	Interroperability		2022	Works phase	253	
Alsace	Strasbourg-Vendenheim	Creation of new track	Bottleneck relief		2021		96,5	
Alsace	Réding - Saverne	Renewal of signalling system	Maintenance of performance		2022	Preliminary study	28,9	
Bourgogne-Franche-Comté	Chagny - Varennes-le-Grand	Track renewal	Maintenance of performance		2022		11,5	
Champagne-Ardenne	Tournes	Track renewal	Maintenance of performance			Study	14	
Languedoc-Roussillon	Beaucaire Nimes	Track renewal	Maintenance of performance		2022		61	
Lorraine	Onville Novéant Metz	Track renewal	Maintenance of performance		2022		21,7	
Lorraine		Track renewal	Maintenance of performance		2020	Study	16,1	
Lorraine		Track renewal	Maintenance of performance		2020	Study	40,7	
Lorraine	Thionville - Zoufftgen	Track renewal	Maintenance of performance		2022		36,5	
Lorraine	Thionville	Renewal of signalling system	Maintenance of performance		2022	Works phase	64,3	Centralised command of the network (CCR)
Lorraine	Lérouville - Pagny-sur-Meuse	Track renewal	Maintenance of performance		2022		28,3	
Lorraine	Lunéville - Igney-Avricourt	Track renewal	Maintenance of performance		2022		24,3	
Lorraine		Track renewal	Maintenance of performance		2019	Works phase	18,6	
Nord-Pas-de-Calais	Leval - Hirson	Track renewal	Maintenance of performance		2020	Study	60,2	
Nord-Pas-de-Calais	DOUAI NORD + SUD	Renewal of signalling system	Maintenance of performance		2021	Works phase	82,4	Centralised command of the network (CCR)
Nord-Pas-de-Calais	Arras	Renewal of signalling system	Maintenance of performance		2022	Preliminary study	65,2	
Nord-Pas-de-Calais	Haubourdin- Lambersart	Track renewal	Maintenance of performance		2022	Study	21,2	
Nord-Pas-de-Calais	Pérenchies - Steenwerck	Track renewal	Maintenance of performance		2022	Study	20	
Nord-Pas-de-Calais	Arras - Dunkerque	Track renewal	Maintenance of performance		2021		41,9	
Nord-Pas-de-Calais	CAFFIERS CALAIS-FRETHUN	Track renewal	Maintenance of performance		2020	Study	44,6	
Paris-Nord	secteur de Creil	Renewal of signalling system	Maintenance of performance		2019	Works phase	88,5	Centralised command of the network (CCR)
Paris-Nord	Bel-Air et Creil, Chantilly-Gouvieux et Creil	Track renewal	Maintenance of performance		2020	Study	106,6	
Provence-Alpes-Côte-d'Azur	Tarascon-Arles	Track renewal	Maintenance of performance		2022	Works phase	54,7	
Provence-Alpes-Côte-d'Azur	SORGUES CHATEAUNEUF DU PAPE	Track renewal	Maintenance of performance		2021	Study	11,3	
Rhône-Alpes	La Voute - Pont St Esprit	Track renewal	Maintenance of performance		2020	Study	90,8	
Rhône-Alpes	St Fons - Les roches de Condrieu	Track renewal	Maintenance of performance		2020	Study	42,5	
Rhône-Alpes	St Vallier Chasse				2 022	Study	87,8	
Rhône-Alpes	Rive Gauche	Renewal of signalling system	Maintenance of performance		2021	Works phase	98,3	Centralised command of the network (CCR)
Rhône-Alpes	LyonStClair-Ambérieu	Renewal of signalling system	Maintenance of performance		2022	Study	35,5	
Rhône-Alpes	NFL -Part Dieu	Creation of new track	Bottleneck relief		2021	Works phase	77,9	
Rhône-Alpes	Tunnel de Caluire	Tunnel renewal	Maintenance of performance		2019	Works phase	20,3	
Rhône-Alpes	LES GRANDS VIOLETS - LYON SAINT CLAIR	Track renewal	Maintenance of performance		2021	Study	14,1	

In total, RFC North Sea-Mediterranean also identified several projects or programs which have been delivered since 2013. The tables below provide an indicative list.

LIST OF NS-MED RFC PROJECTS ACHIEVED SINCE 2013 (NOT EXHAUSTIVE)								
Route	**Railway section**	**Nature of Projects**	**Benefits for NS-MED Corridor**	**Start date of the works**	**End date of the works**	**Put on operation**	**Cost estimation in M€2012**	**Comments**
ANTW - AUB - BETT	Antwerp - Liefkenshoek Rail Link (excluding PPP financing)	Creation of new structure (line, tunnel, bridge, leapfrog)	Bottleneck relief	2005	2014	TT2015	170,5	Liefkenshoek Rail Link operational 14/12/2014
ANTW - AUB - BETT	Antwerp - Luxembourg	ERTMS Deployment	Interoperability	2010	2014	TT2015		Athus-Meuse route equiped
METZ - BASEL	St Louis - Basel	ERTMS Deployment	Interoperability	2014	2014	TT2016	2	1st half of the ERTMS deployment - operational foreseen for TT2016
ALL	All French sections	Renewal of signalling system	Maintenance of performance	2012	2014	2014	50	46 projects achieved by the end of 2014 on signalling system: national renewal programm security systems
LIL - LONG	1 program of 2 Level crossings	Level crossings	Safety / Security	2013	2014	2014	2	Level crossings in Beuvry and Raismes
LUX - LYON	1 program of 6 Level crossings	Level crossings	Safety / Security	2013	2014	2014	25	Level crossings in Bourg en Bresse, Tossiat, Brétigny-Norges, Ruffey les Echirey, Neufchâteau, Villegusien
METZ - BASEL	1 program of 3 Level crossings	Level crossings	Safety / Security		2013	2013	25	Level crossing in Laneuville, Blesmes and Fain
ALL	All French sections	Renewal of tracks	Maintenance of performance	2012	2013	TT2014	122,24	Part of the renewal program of tracks that has been achieved for TT2014 - 22 projects achieved
METZ - BASEL	Vendenheim node	Others	Bottleneck relief	2012	2013	2014	100	Modification of tracks (3rd track), TCC renewal
ANTW - AUB - BETT	Luxembourg - Kleinbettingen	ERTMS Deployment	Interoperability	2012	2014	TT2015	43,5	New CCS incl. Signal boxes and ETCS (1,5 M€ for ETCS and 42 M€ for the rest of the investments)
METZ - BASEL	Lorraine region	Renewal of signalling system	Capacity improvement	2013	2015	TT2015	137	New trafic control center in Pagny for the lorraine region

LIL - PARIS	Creil	Track enhancement	Capacity improvement		2017	TT2017	12	renewal of switches in Creil station
LIST OF NS-MED RFC PROJECTS ACHIEVED SINCE 2013 (2) (NOT EXHAUSTIVE)								
LYON - MARSEILLE	Tarascon	Track enhancement	Capacity improvement		2017	TT2017	25	track renewal between Tarascon and Le Pontet
LYON - MARSEILLE	Dijon - Mâcon	Renewal of signalling system	Capacity improvement		2016	TT2016	150	New signalling system between Dijon and Mâcon and new IPCS
METZ - BASEL	Lille - Longuyon	Gauge enhancement	Capacity improvment		2016	TT2016	10	Gauge enhancement of the tunnels of Montmédy & Vachemont
METZ - BASEL	Lille - Longuyon	Gauge enhancement	Capacity improvment		2017	TT2017	10	Gauge enhancement of the tunnel of La Platinerie
ANTW - AUB - BETT	Rodange - Bettembourg	Suppression of level crossings	Quality improvement	2017	2018	Works phase	17	Suppression of 3 level crossings in Schifflange
ANTW - AUB - BETT	Rodange - Bettembourg	Creation of siding, passing tracks, extra tracks	Capacity improvement			Preliminary study	30	Modernisation and layout improvement of Belval-Usines station
ANTW - AUB - BETT	Whole network	Others	Interoperability	2010	2018	Works phase	51,1	GSM-R deployment
ANTW - AUB - BETT	Luxembourg - Kleinbettingen	Electrical systems	Interoperability	2014	2018	Works phase	60,8	Re-electrification Luxembourg - Kleinbettingen in 25kV 50Hz
METZ - BASEL	St.Louis - Basel	ERTMS Deployment	Interoperability	2015	2015	Works phase	2	2nd half of the ERTMS deployment

For ERTMS projects, please refer to the ERTMS deployment plan map (§ 6.3.3.)

6.3 Deployment Plan relating to interoperable systems

RFC North Sea-Mediterranean already complies with most of the interoperability criteria defined in Directive 2008/57/EC. To comply with the control command and signalling specifications for interoperability, RFC North Sea-Mediterranean is currently deploying ETCS (European Train Control System) on its lines.

6.3.1 ERTMS strategy along the corridor

ETCS version 2.3.0.d level 1 (punctual information given to the trains by in-track balises) is or will be installed all along the principal routes of former Corridor C. Infrabel intends to install ETCS level 2 version 3.4.0, ERA set of specifications ERA #2, with M_VERSION=1.0, which will guarantee on-board equipment in baseline 2.3.0d to be able to run in ETCS level 2 (continuous information exchanged between track and on-board systems through GSM-R) on the alternative route Namur-Arlon via Libramont. The section between Antwerp (from North of Kapellen) and Rotterdam is also to be equipped with ETCS level 2.

In Switzerland Baseline 3 balises are implemented for the Limited Supervision mode. 2.3.0d on board systems cannot run on Baseline 3 tracks in ETCS Level 1 to reach Basel SBB Rangierbahnhof (Marshalling Yard), the final destination of the Corridor and access to the Swiss part of the Corridor Rhine-Alpine. Locomotives will have to be equipped with baseline 3 on-board equipment to be able to run under ETCS limited supervision in Switzerland according to Notified National Technical Requirements (NNTR). At middle term the actual allowed access to locomotives with 2.3.0d equipped with KVB/PZB (STM) will be dismantled. **Therefore it is highly recommended for railway undertakings to equip their rolling stock with Baseline 3 on-board systems**.

For 2.3.0d on-board systems, the recommendation is to implement the braking curves algorithm specified in baseline 3.

6.3.2 Compulsory systems and deactivation of national legacy systems

Once ETCS is installed, the deactivation of national legacy systems has to be decided on a country per country basis.

- **In the Netherlands**, the line Kijfhoek – Roosendaal will be equipped in 2026.

- **In Belgium**, all the principal lines of the former ERTMS Corridor C from Antwerp to the Luxembourg and French border are equipped with L1 (V2.3.0d) since 2016. The line from Antwerp to the Dutch border will be equipped in Level 2 by 2020 (December 2019). The complete network is expected to be equipped by 2022. Legislation to fade out legacy system in favour of ETCS has come into force the 9th of July 2013. Since December 2016, the class B system Memor-crocodile is put out of service on the lines equipped with ETCS level 1 version 2.3.0d, allowing only trains equipped with ETCS Level 1(minimum Baseline 2) or under certain exceptions TBL1+ to run on these

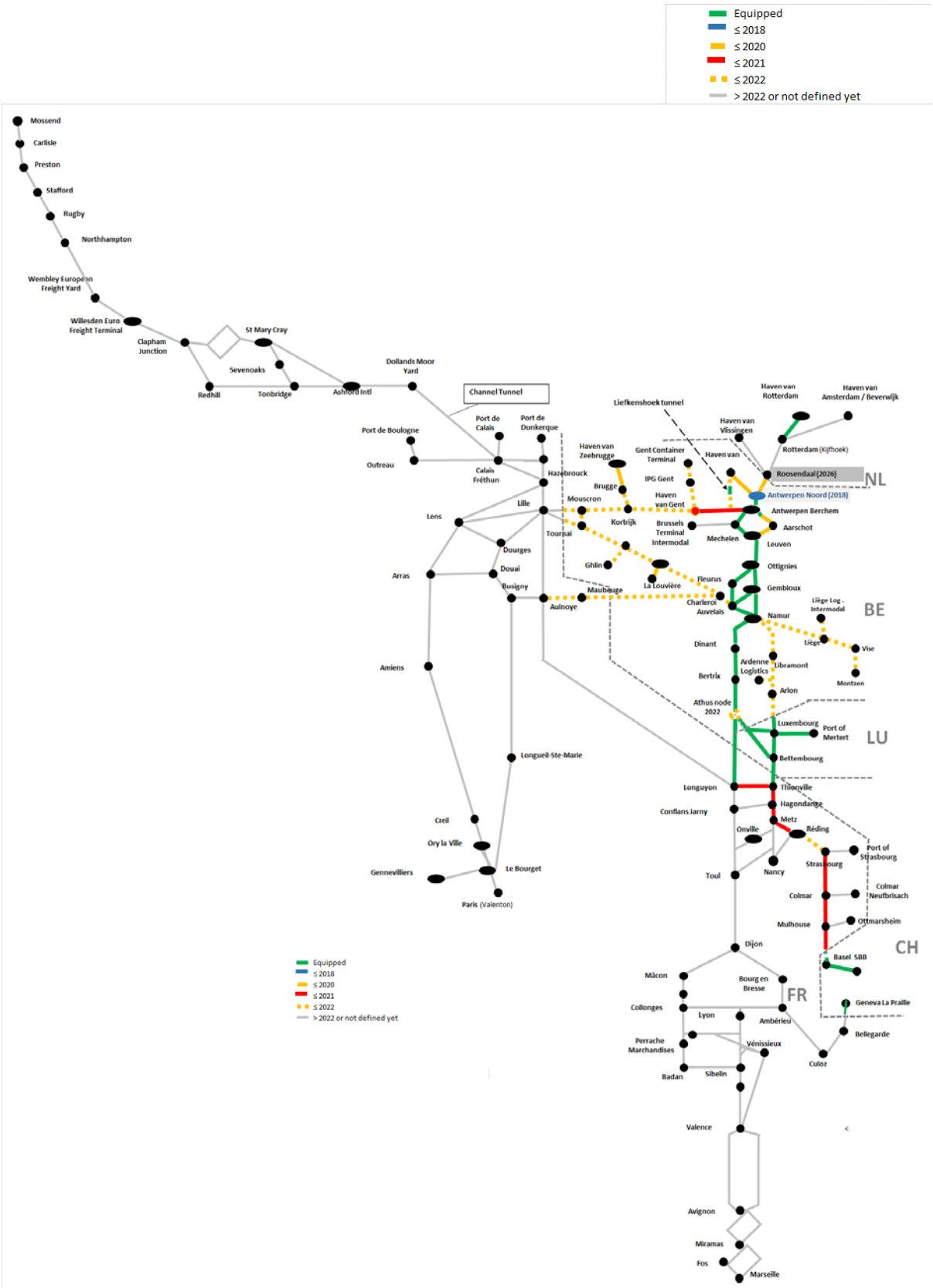
tracks. A royal decree published on 16 October 2018 provides the decommissioning of all class B systems on the main tracks of the Belgian network by 14.12.2025 (including TBL1+). On that date Belgium will become an ETCS only network.

- **In Luxembourg**, the whole network is equipped with ETCS Baseline 2 (version 2.3.0d), level 1. Since 1st of July 2017 trains have to be equipped with ETCS with derogations for existing rolling stock operating on the network before that date – end of derogation 31/12/2019;
- **In France,** the national KVB legacy system will be decommissioned at some point in the future. The date of this decommissioning is not yet determined. The section Longuyon – Basel is planned to be put in service in several steps until 2021, except for the Strasbourg and Metz nodes and the Réding-Vendenheim section which are planned to be finalised in 2022.
- **In Switzerland**, all new vehicles purchased after July 1st 2014 have to be equipped with ETCS Baseline 3. The national System EuroSignum/ EuroZUB is implemented as part of ETCS packet 44 on the line sight signalling network. A trackside deactivation is not yet planned.

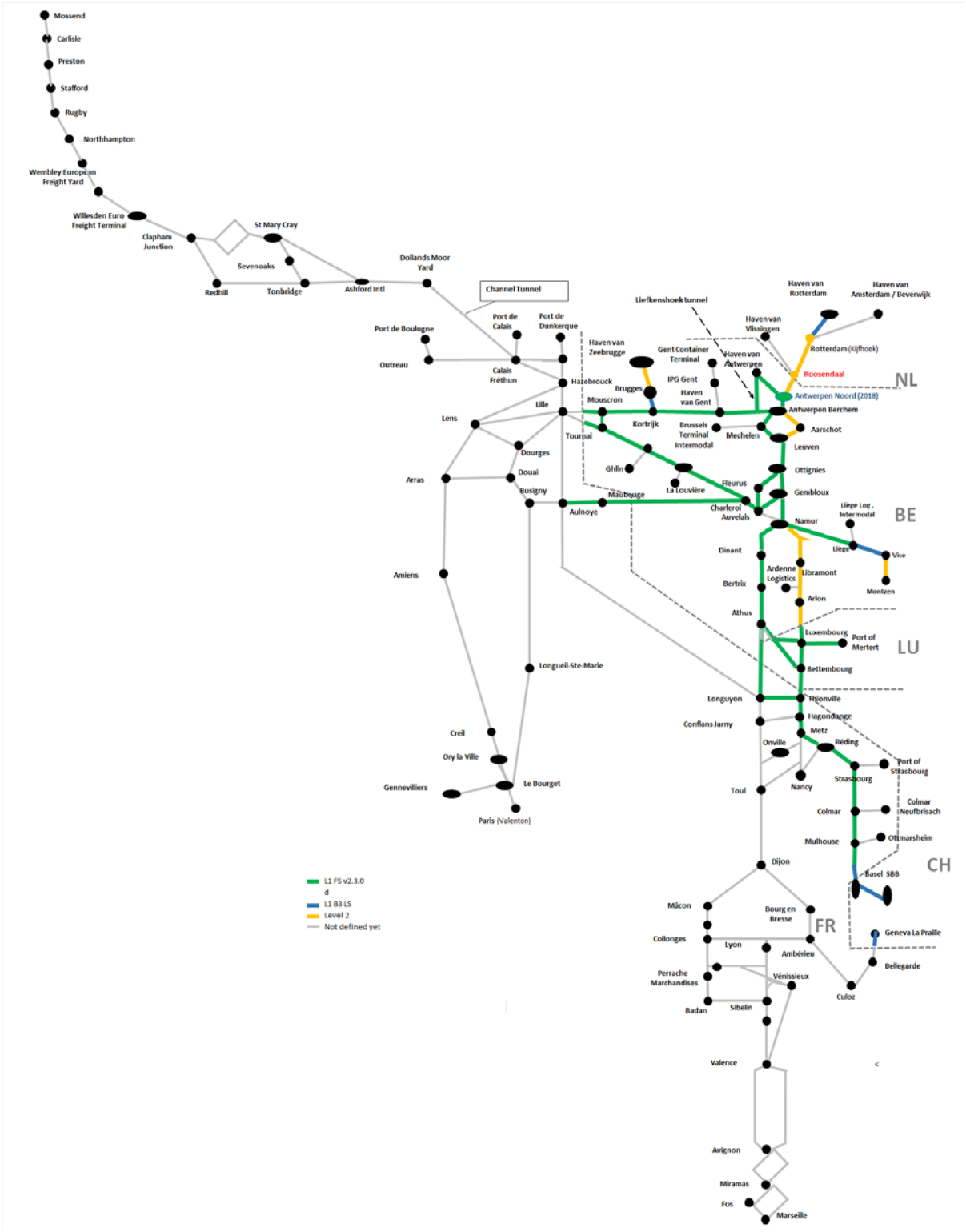
6.3.3 ERTMS deployment plan (cf. EC Implementing Act of January 2017, EDP and National Implementation Plan NIP)

The planning of ETCS deployment along the current corridor lines and the nature of the ETCS deployment system are described in the following maps (see next page)[1]:

RFC NSM ETCS IMPLEMENTATION PLAN: TIMELINE



RFC NSM ETCS IMPLEMENTATION PLAN: BY ETCS LEVEL



- **Costs**

In this section, we focus on the sole Antwerp-Luxembourg-Lyon/Basel sections as the ERTMS deployment projects are relatively mature on these lines and therefore cost estimation can be considered as more reliable than the costs of other sections where ERTMS studies have not even started. For the sake of homogeneity, we have also ignored the Namur – Kleinbettingen line as it is expected to be equipped with ERTMS level 2.

The average cost per kilometre, calculated on the basis of the equipment of the Antwerp-/Basel routes, is approximately 370 k€ per kilometre. Obviously, this ratio varies a lot. It is significantly different in large nodes than in the country side.

The ratio we currently have on Longuyon-Bâle is 170 k€ average for every signal. Knowing that the average is 2 signals per km, the cost is then 340 k€ for the French rail network.

The costs in Belgium may be lower, but the equipment projects are done at national level, therefore an average cost on the entire corridor is not pertinent due to important disparities.

- **Benefits**

Interoperability
Until the deployment of ETCS, railway undertakings have to change their locomotives every time they cross a border or they have to equip these locomotives with multiple expensive on-board control command systems. The first choice has a negative impact on travel time and on rolling stock management. The second is expensive.

With ETCS, they will be able to use locomotives that can run from the origin to destination with a single on board control command system. This will facilitate asset management, save journey time and reduce costs.

National legacy systems (“Class B”) removal
All the Infrastructure Managers of RFC North Sea-Mediterranean consider that ETCS will replace in the mid-term or long-term, the national control command systems in use, and will hence provide a solution to the obsolescence of these legacy systems. The deadline is not the same among infrastructure managers. In Luxembourg and Switzerland, the replacement is needed in the short-term. In France, the national systems are not considered to be at the end of their lifecycle and the replacement is deemed not yet necessary.
In Switzerland, the existing control command systems, ZUB and Signum are close to obsolescence and SBB aims to quickly replace them with the European interoperable system.
In Belgium, all class B systems on conventional lines will be decommissioned by 2025. The class B systems memory/crocodile will be progressively removed when ETCS is activated.

This benefit however should not be overestimated as the deployment of ETCS will not be as simple as the mere renewal of legacy systems. The complexity will depend on the

characteristics of the legacy systems but in some cases, the new and the old systems will have to co-exist for many years

Increased competition
ETCS is an opportunity for a railway undertaking to use its own rolling stock and act with open access, opening up competition and potentially bringing prices at market level.

Reduction of externalities
With cost savings and increased competition, the railway mode should become more attractive and gain market share, hence reducing road congestion and noise, greenhouse effect emissions and air pollution. On top of that, players who will switch from road to rail will enjoy cost savings or journey time reduction.

Safety
ETCS is a state of the art tool as far as safety is concerned and, at various degrees, its deployment provides infrastructure managers with an increase of safety compared to the safety provided by their legacy systems.

In Belgium, Infrabel's ETCS Masterplan which aims at equipping the entire Belgian network with ETCS by 2022, will globally improve the safety compared to the existing control systems. Similarly, all rolling stock running in Belgium will be directed to be fitted with ETCS. ETCS will become the only allowed system from 14.12.2025 onwards, on almost the entirety of the network, in addition to the TSI-CCS which dictates that all equipment bought after 1st January 2012, or put into service after the 1st of January 2015, shall be equipped with ETCS.

In Luxembourg, the Memor II+ system equipping the network so far has been from the very beginning considered as an interim system to be replaced by ETCS. As Memor II+ is a relatively simple system, its replacement with ETCS improves the level of safety in Luxembourg.

In France, the existing KVB system does not control all the block signals. In contrast, ETCS will be installed on all signals, including block ones, hence improving the overall safety on the network.
In Switzerland, during a first phase, ETCS will be deployed with the limited supervision mode. With this mode, the level of safety will be the same as the existing ones. In particular, the speed supervision function will be installed depending on the real risk.

ETCS level 1 with Limited Supervision mode allows a quick and cost efficient migration. Still, the future of ETCS is ETCS level 2 due to capacity reasons and for performing the operational interoperability. The ETCS level 2 is planned for the timeframe when interlockings have to be replaced due to their life cycle end (starting around 2025). ETCS will then bring the optimal benefit with regards to capacity and safety.

Recovery in the event of disturbances

In France, a study has shown that ETCS should allow a faster recovery in the event of disturbances compared to the current KVB legacy system which is driven by the so called VISA driving principle. Consequently, the deployment in-track and on-board should lead to more robust performances.

Conclusion

The computation of a monetary value for the benefits listed above is difficult, as corridor members/partners use different methods to assess them. This is specifically the case for the assessment of safety improvement. On top of that, the value of time saved thanks to ETCS when operating a railway node is a factor that cannot be determined, as it is sensitive to the node characteristics, and the time and conditions of operation.

All in all, corridor members and partners share the view that the ground deployment of ETCS does not provide an immediate financial return on investment nor a positive socio-economic net asset value. The traffic gains induced by the use of ERTMS are presently difficult to assess, especially in the starting phase when few trains will be running in ETCS mode.

What is more, the socio-economic benefits of ETCS vary a lot from one country to another as it depends on the characteristics of the legacy control command system and on the size of the country.

To take the case of France, the socio economic interest of the deployment of ETCS in France is far from being obvious, as ETCS deployment in that country is costly due to the length of the French network and on the complexity and heterogeneity of the technical components of the legacy signalling system; it will only provide a modest improvement of safety given the good safety performance of the legacy system (KVB).

6.4 Reference to Union Contribution

The financial resources available to RFC North Sea - Med come from contributions from its members and partners and European subsidies received. Since its creation, RFC North Sea - Mediterranean has been granted six subsidies. In 2019, one subsidy contributes to its financing.

Action n.2016-PSA-RFC02 under CEF funding, entitled “Long-term development, governance and support to the harmonisation processes of Rail Freight Corridor North Sea - Mediterranean within the European rail freight network compliant with the Regulation (EU) No 913/2010 and the Sector Statement "Boosting International Rail Freight”, foresees in EU co-financing of the RFC North Sea – Mediterranean.

The Grant agreement was signed on 11th of June 2018. This Action covers, for 2019 and 2020, the following activities:

- Capacity, traffic and performance management and studies for the deployment of interoperability;
- Coordination of further developments and communication with clients and stakeholders.

The forecast amount of the subsidy is 1.09 million €.