

# Capacity Strategy 2028



Draft June 2024

## Table of Content

Introduction.....	3
<b>0. Geographical scope.....</b>	<b>4</b>
0.1 Relevant border points .....	4
0.2 Service facilities .....	9
0.3 Map .....	9
<b>1. Expected Capacity of the Infrastructure .....</b>	<b>10</b>
1.1 General Principles.....	10
1.2 Additional Available Capacity .....	10
1.3 Reduced Available Capacity .....	10
<b>2. Expected Temporary Capacity Restrictions with major impact.....</b>	<b>11</b>
2.1 General principles .....	11
2.2 National specificities.....	12
2.3 Major Impact TCRs .....	12
<b>3. Expected Traffic Flows .....</b>	<b>16</b>
3.1 General Principles.....	16
3.2 National Specificities .....	16
3.3 Traffic flows.....	16
Validation & Publication .....	22

## Introduction

Within TTR, each Infrastructure Manager is expected to publish until X-30 its Capacity Strategy for Timetable 2028. General aim of the Capacity Strategy is to provide indication on key values of capacity planning, i.e., changes in infrastructure availability, temporary capacity restrictions (“negative capacity”) as well as minimum bookable capacity (“positive capacity”) for a given timetable.

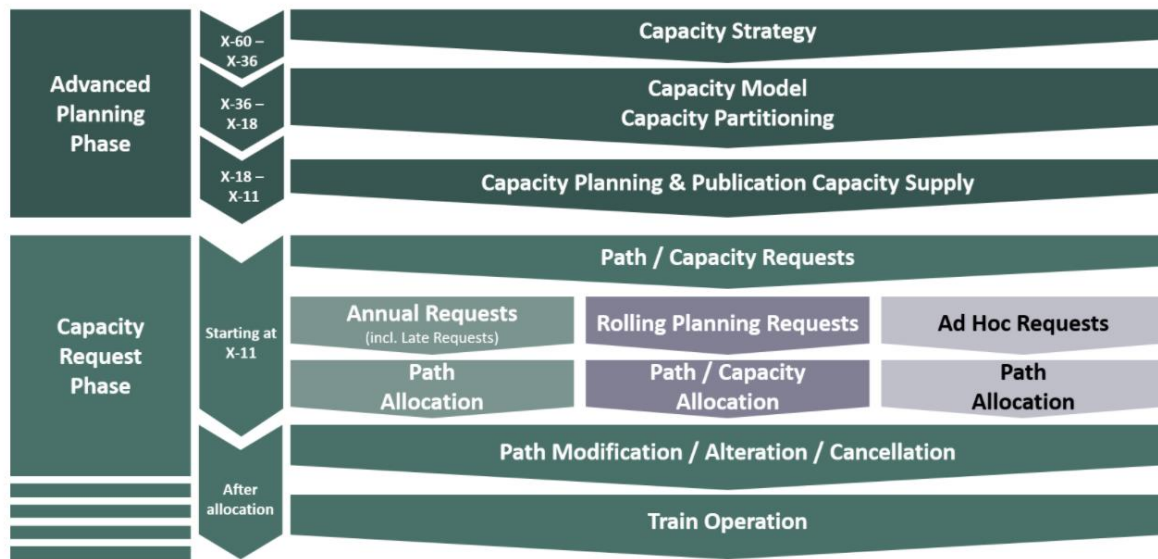


Figure 1: Steps of the TTR process (Source: RNE)

The present document

- meets the requirements of RNE’s Capacity Strategy Handbook, version 2.0<sup>1</sup>,
- focuses for Timetable 2028 on lines of international relevance,
- encloses, beyond the description of the geographical scope, three main chapters:
  - Expected permanent changes in Infrastructure Capacity,
  - Expected Temporary Capacity Restrictions with major impact,
  - Expected Traffic Flows, whereby the values displayed are focused for Timetable 2028 on relevant border points within the geographical scope.

<sup>1</sup> [https://rne.eu/wp-content/uploads/2022/12/HB\\_Capacity\\_Strategy\\_2.0.pdf](https://rne.eu/wp-content/uploads/2022/12/HB_Capacity_Strategy_2.0.pdf)

The Capacity Strategy targets Applicants as well as their end customers, Service Facilities and Terminals, Policy decision makers as well as any other stakeholder of rail capacity planning and allocation.

The present document is non-binding. It applies to Timetable 2028.

## 0. Geographical scope

### 0.1 Relevant border points

The lines with international relevance were selected on basis of experience, starting from border points with the highest volume of international traffic, both passenger and freight. It concerns RFC and main lines :

UIC line number	Section	RFC	Electric power	Block Signal	Gauge	Speed in km/h
001000	Paris - Mulhouse			BAL/BAPR/BM	GB/GB1	160
001306	Racc de l'Evangile	2	25000v	BAL		
031950	Saut de mouton de Chaudenay	2	25000v	BAL		
032000	Toul - Culmont Chalindrey	2	25000v	BAL	GA	120/160
039000	Toul - Frouard		25000v	BAL	GA	160
005000	LGV Est		25000v	TVM+ETCS 2	GC	320
070000	Paris - Strasbourg	2	25000v	BAL	GA/GB/GB1	120/160
085000	Conflan-Jarny - Hagondange	2	25000v	BAL	GB	100
085306	Racc de Mondelange	2	25000v	BAL		
089000	Metz - Lérouville	2	25000v	BAL	GA	120/160
090000	Novéant - Nancy	2	25000v	BAL	GA	120/160
095000	Longuyon - Onville	2	25000v	BAL	GA	100/120
115000	Strasbourg - St Louis	2	25000v	BAL	GB/GB1	220/160
120000	Colmar - Neuf-Brisach	2				100
124000	Mulhouse - Chalampé	2	25000v	BAL	GB1	100
125000	Lutterbach - Rixheim (Mulhouse)	2	25000v			
138000	Graffenstaden - Hausbergen	2	25000v	BAL	GB1	220
140000	Metz - Reding	2	25000v	BAL	GB1	120
141000	Graffenstaden - Strasbourg Neudorf	2	25000v	BAL	GB1	
141306	Strasbourg-Neudorf - Strasbourg KS	2	25000v	BAL	GB1	
142000	Strasbourg - Kehl	9	25000v	BAL	GB1	
143000	Voie du Port de Strasbourg	2				
172000	Rémilly - Forbach	2	25000v	BAL	GB1	120/160
178000	Thionville - Apach		25000v	BAL	GA/GB1	
180000	Metz Ville - Zoufftgen	2	25000v	BAL	GA	120/160
192000	Ceinture de Metz	2	25000v	BAL		
202000	Longuyon - Mont St Martin (XB)	2	25000v	BAL	GA	100

202100	Mont St Martin (XL)	2	25000v	BAL	GA	100
204000	Thionville - Mohon	2	25000v	BAL	GA/GB	100/120
205000	Mohon - Charleville-Mézières	2	25000v	BAL	GA	120
205316	Racc de Charleville-Mézières	2	25000v	BAL	GA	
212000	Hirson - Liart	2	25000v	BAL	GA	120
216000	LGV Lille Europe - Tunnel de Fréthun	2	25000v	TVM	GC	300
216312	Fréthun - Tunnel	2	25000v	TVM	GC	300
222000	Liart - Tournes	2	25000v	BAL	GA	120
223000	Tournes - Charleville-Mézières	2	25000v	BAL	GA	120
226000	LGV Nord		25000v	TVM	GC	300
229000	Paris - Hirson	2		BAL/BAPR/BM		100/120
229306	Racc du Bourget	2	25000v	BAL		
232000	Racc de Longueuil - Ormoy	2	25000v	BAL		
242000	Creil - Jeumont	2	25000v	BAL	GB1	120
242316	Racc de Busigny	2	25000v	BAL		
243300	Racc de Longueuil sud	2	25000v	BAL		
245300	Racc de Longueuil nord	2	25000v	BAL		
247000	Aulnoye - Feignies		25000v	BAL	GB1	120
250000	Somain - Busigny	2	25000v	BAL	GB	120
259000	St Just en Chaussée - Douai	2	25000v	BAL	GB	120
262000	Douai - Valenciennes	2	25000v	BAL	GB	120
263300	Racc de Beuvrages	2	25000v	BAL		
266300	Racc de Lezennes	2	25000v	BAL		
267000	Lille - Hirson	2	25000v	BAL	GA	120/160
267306	Racc d'Aulnoye-Aymeries	2	25000v	BAL		
269000	Lille - Baisieux	2	25000v	BAL	GB1	120
272000	Paris - Lille	2	25000v	BAL	GA/GB1	120/160
272311	Racc de La Chapelle-Charbons	2	25000v	BAL		
272321	Racc de Pierrefitte Stains	2	25000v	BAL		
272326	Racc de Douai	2	25000v	BAL		
273300	Racc de Ronchin	2	25000v	BAL		
273308	Racc voie RV de Lille	2	25000v	BAL		
278000	Lille - Mouscron	2	25000v	BAL	GB1	100
278306	Racc de Rougebarre	2	25000v	BAL		
284000	Racc de la Cité Montgré	2	25000v	BAL		
284306	Racc de Sallaumines	2	25000v	BAL		
284311	Racc d'Ostricourt	2	25000v	BAL		
286000	Don-Sainghin - Lens	2	25000v	BAL	GB1	100
289000	Racc de Santes - Don-Sainghin	2	25000v	BAL		
289306	Racc de Santes	2	25000v	BAL		
292000	Racc de St André - Racc de Santes	2	25000v	BAL		
292306	Racc de St André	2	25000v	BAL		
295000	Calais - Lille	2	25000v	BAL	GC	120/160
301000	Racc d'Avion - Arras	2	25000v	BAL		
301301	Racc d'Avion	2	25000v	BAL		
301306	Racc de l'Yser	2	25000v	BAL		
304000	Calais - Dunkerque	2	25000v	BAL	GB1	120/160

311000	Longueau - Boulogne	2		BAL	GB	160
314000	Calais - Boulogne	2	25000v	BAL/BAPR		160
314306	Racc des Fontinettes	2	25000v	BAL		
321000	Amiens - Serqueux		25000v	BAPR	GB	160
330000	Pontoise - Serqueux	2	25000v	BAPR	GB	100
334000	Argenteuil - Le Havre	2	25000v	BAL	GB1	160
336000	Conflan - Pontoise	2	25000v	BAL		120
340000	Mantes - Le Havre	2	25000v	BAL	GB1	160
354000	Serqueux - Montérolier- Buchy	2	25000v	BAPR	GB/GB1	100
431000	LGV Sud-Ouest		25000v	TVM	GC	300
500000	Nantes - Bordeaux	4		BAPR/BM		120/160
515000	Nantes - Tours	4	25000v	BAL/BAPR	GB/GB1	160/220
538000	La Rochelle - Poitiers	4	25000v	BAL/BAPR		120/160
539000	La Rochelle - La Palice	4				
566000	LGV SEA		25000v	TVM	GC	320
570000	Juvisy - Bordeaux	4	1500v	BAL	GB/GB1	160/220
579000	Angoulême - Saintes	4		BAPR/BM		120
590000	Les Aubrais - Montauban		1500v	BAL		120/160
640000	Bordeaux - Narbonne	4	1500v	BAL/BAPR	GB/GB1	160
650000	Bayonne - Bayonne-Mouguerre	4	1500v	BAL		
655000	Bordeaux - Hendaye	4	1500v	BAL	GB/GB1	100/160
677000	Narbonne - Cerbère	4	1500v	BAL	GA/GB	100/160
679000	La Tour de Carol - Perpignan	4	1500v	BAPR/BM		60/100
679305	Racc TGV du Soler	4	1500/25000v	TVM	GC	320
680000	Elne - Le Boulou	4	1500v		GA	100
746000	Melun - Montereau via Héricy		1500v	BAL	GB	120/160
750000	Badan - Lyon Perrache	4	1500v	BAL	GA	120
750316	Racc de Badan à Chasse	4	1500v	BAL	GA	60
752000	LGV Sud Est		25000v	TVM	GC	300
797000	Traversée du Rhône (Peyraud)		1500v	BAL	GA	60
800000	Miramas - L'Estaque	4	1500v	BAL	GB1	120/160
800390	Racc de St Gervasy (CNM)		25000v	BAL	GA	
810000	Tarascon - Sète	4	1500v	BAL	GA	120
811000	Peyrade - Sète-Méditerranée	4	1500v			
824000	Villeneuve lès Avignon - Avignon	4	1500v	BAL	GA	
824301	Racc Villeneuve sud	4	1500v	BAL	GA	
824306	Racc Villeneuve nord	4	1500v	BAL	GA	
830000	Paris -Dijon		1500v	BAL	GA	160
830000	Dijon - Marseille	4	1500v	BAL	GA	
830331	Racc de St Fons	4	1500v	BAL	GA	
830336	Racc de Chasse sur Rhône	4	1500v	BAL	GA	
830646	Voie mère de Pierrelatte	4	1500v	BAL		
830900	Dijon - Gevrey Chambertin	4	1500v	BAL		
834000	Contournement Nîmes - Montpellier		25000v	TVM	GC	220
843000	Is sur Tille - Culmont Chalindrey	4	25000v	BAL	GA	160
844300	Racc de Culmont	4	25000v	BAL	GA	
849000	Is sur Tille - Dijon	4	25000v	BAL	GA	160

850000	Dijon - Vallorbe	4	1500/25000v	BAL		120/160
860000	Perrigny - St Amour	4	1500v	BAL	GA	160
861301	Racc de Lyon	4	1500v	BAL	GA	
862300	Racc sup de Longvic	4	1500v	BAL	GA	
862310	Racc de Perrigny	4	1500v	BAL	GA	
863300	Racc de St Amour	4	1500v	BAL	GA	
880000	St Amour - Bourg en Bresse	4	1500v	BAL	GA	120/160
883000	Bourg en Bresse - Ambérieu en Bugey	4	1500v	BAL	GA	160
883306	Racc d'Ambérieu	4	1500v	BAL	GA	
890000	Lyon - Genève	4	1500v	BAL		100/120/160
893000	Collonges - Lyon Guillotière	4	1500v	BAL	GA	100
900000	Culoz - Modane	4	1500v	BAL	GA	100/120/160
905000	Lyon Perrache - Grenoble	4	25000v	BAL	GB	120/160
905606	Voie mère de Vénissieux	4	1500v	BAL		
906000	Traversée du Rhône (Givors)	4	1500v	BAL	GA	60
908000	Valence - Moirans	4	25000v	BAPR	GA	120/160
909000	Grenoble - Montmélian	4	25000v	BAL	GB1	120/160
909306	Racc de Montmélian	4	1500v	BAL		
913000	Traversée du Rhône (La Voulte)		1500v	BAL	GA	60
925000	Avignon - Miramas	4	1500v	BAL	GA	160/220
930000	Marseille Vintimille		25000v	BAL	GB	100/120/160
934100	Desserte de Moureplane	4	1500v	BAL		
935000	Miramas - L'Estaque	4	1500v	BAL	GB1	160
935606	Martigues - Lavéra	4	1500v	BAPR		120
935901	Lavalduc - Fos Coussoul	6	1500v	BAL	GB1	100
935902	Desserte de Fos	6	1500v			
935903	Desserte de St Louis du Rhône	6	1500v			
939000	L'Estaque - Marseille Joliette	6	1500v	BAL		
939001	L'Estaque - Marseille St Charles	6	1500v	BAL	GB	
939306	Racc de L'Estaque-Joliette	6	1500v	BAL		
940100	Marseille Arenc - Marseille Canet	6	1500v			
956306	Racc de Sucy (GC)	6	25000v	BAL	GB1	100
957000	Bobigny - Sucy	6	25000v	BAL	GB1	100
957316	Racc de Sucy n°3	6	25000v	BAL	GB1	100
962000	Gennevilliers - St Ouen	6	25000v	BAL	GB1	100
963000	La Plaine - Ermont-Eaubonne	6	25000v	BAL	GB1	100
963506	Port de Gennevilliers	6	25000v		GB1	100
990000	La Grande Ceinture de Paris	6	1500/25000v	BAL	GB1	100
990316	Villeneuve St Georges - Valenton	6	1500v	BAL	GB1	100
991301	Noisy le Sec - Gagny	6	25000v	BAL	GB1	100

The relevant border points are listed in the following table:

	InfraBel	DB Netz	SBB	RFI	ACF	ADIF
<b>SNCF-R</b>	Feignies/Quévy, Jeumont/Erquelinnes, Baisieux/Blandain, Tourcoing/Mouscron	Apach/Perl, Forbach/Saarbrücken, Port du Rhin/Kehl,	St Louis/ Basel, Les Longevilles/Vallorbe , Pougny-Chancy/La Plaine	Modane/Bardonecchia, Vintimille/Ventimiglia	Mont-Saint Martin/Aubange, Zoufftgen/Bettembourg	Hendaye/Irun, Cerbère/Port Bou, Le Perthus/El Perthus

Table 1: Selected border crossings for 2028

## 0.2 Service facilities

Terminals and services facilities are described in chapter 7 of the Network Statement.

<b>7.1</b>	<b>Introduction</b> .....	<b>172</b>
<b>7.1.1</b>	<b>General measures</b> .....	172
<b>7.1.2</b>	<b>Applicable texts</b> .....	172
<b>7.1.3</b>	<b>Contacts</b> .....	172
<b>7.2</b>	<b>Overview of the service facilities</b> .....	<b>173</b>
7.2.1	Passenger terminals (stations) .....	173
7.2.2	Freight terminals.....	174
<b>7.2.3</b>	<b>Marshalling, formation, manoeuvre and stabling tracks</b> .....	175
<b>7.2.4</b>	<b>Maintenance facilities</b> .....	175
<b>7.2.5</b>	<b>Technical facilities, including cleaning and washing</b> .....	176
<b>7.2.6</b>	<b>Assistance infrastructures</b> .....	176
<b>7.2.7</b>	<b>Refuelling infrastructure</b> .....	176
<b>7.2.8</b>	<b>Other facilities</b> .....	177
<b>7.3</b>	<b>Service Facilities operated by SNCF Réseau</b> .....	<b>177</b>
<b>7.3.1</b>	<b>Common provisions</b> .....	177
<b>7.3.2</b>	<b>Stations</b> .....	178
<b>7.3.3</b>	<b>Freight terminals</b> .....	178
<b>7.3.4</b>	<b>Gravity marshalling yards</b> .....	182
<b>7.3.5</b>	<b>Sidings</b> .....	183
<b>7.3.6</b>	<b>Rail, port and maritime infrastructures</b> .....	195
<b>7.3.7</b>	<b>Means of assistance</b> .....	195
<b>7.3.8</b>	<b>Fuel</b> .....	195
<b>7.4</b>	<b>Other services provided in service facilities</b> .....	<b>197</b>
<b>7.4.1</b>	<b>Ancillary services in service facilities</b> .....	197
<b>7.4.2</b>	<b>Miscellaneous services in service facilities</b> .....	197

[DRR 2024 Document principal V2 EN- clean \(sncf-reseau.com\)](https://www.sncf-reseau.com)



### 0.3 Map

The above-mentioned border points connect in a network as shown in the following map:

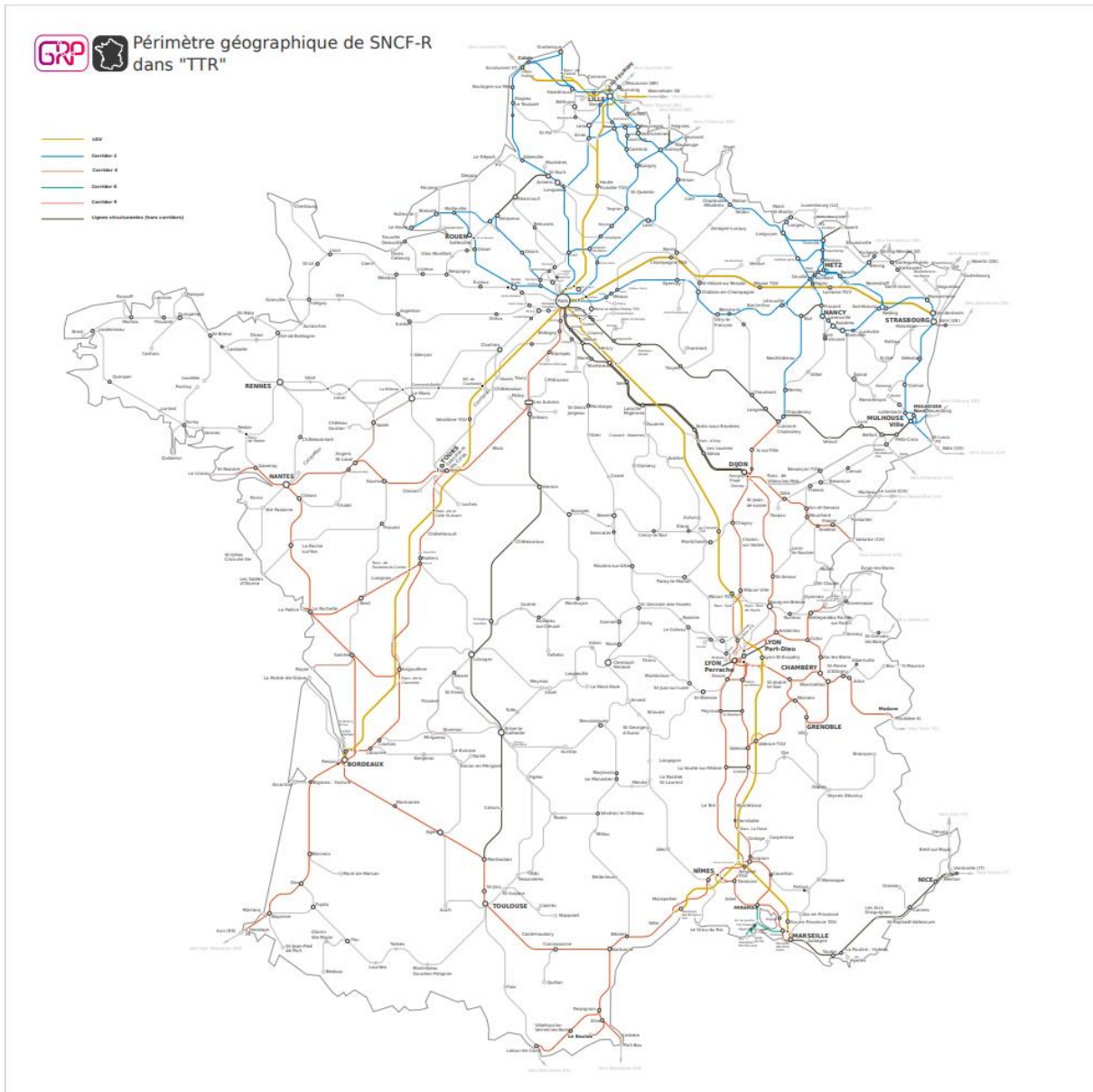


Figure 2: Schematic Map Capacity Strategy. <https://www.sncf-reseau.com/fr/node/5013>

# 1. Expected Capacity of the Infrastructure

## 1.1 General Principles

The present chapter provides an overview on any significant positive or negative changes to the available capacity.

The projects listed in this chapter fulfill the following criteria:

- The project has a permanent impact on the available capacity, unlike TCRs (Chapter 2),
- The projects have a significant size and are located on network segments relevant for international traffic, whereby each Infrastructure Manager evaluates the fulfillment of this criteria on its own.

## 1.2 Additional Available Capacity

The following projects fulfill the above listed criteria:

Country	ID	Network Segment	Description	Effect	Impact on capacity as of	Project approved	Financing secured
FR	1020	Hendaye / Irun	Y Basque	Capacity increase	2028	Yes	Yes

Table 2: List of relevant infrastructure projects with positive capacity effects expected active by TT2028

## 1.3 Reduced Available Capacity

Country	ID	Network Segment	Description	Estimated effects on capacity	Capacity reduced since
FR		None			

Table 3: List of relevant infrastructure projects with negative capacity effects expected active by TT2028

## 2. Expected Temporary Capacity Restrictions with major impact

### 2.1 General principles

Infrastructure Managers are required to plan TCRs following “Annex VII”<sup>2</sup>.

Annex VII sets the frame for TCR-planning, the aim of which is to promote early planning, international coordination among Infrastructure Managers, transparency towards customers and planning stability, thereby pursuing the goal of an increased performance and competitiveness of rail services.

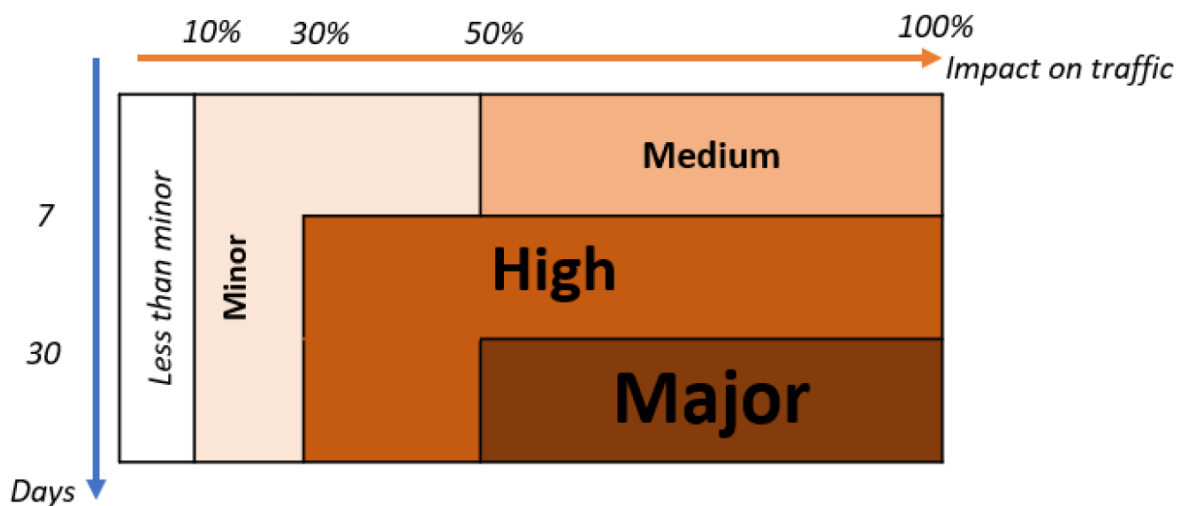


Figure 3: Overview of Annex VII-categories of TCRs (Source: RNE)

The TCRs listed in this Chapter fulfill the following criteria:

- The TCR falls in the category of major TCRs in Figure 3,
- Within this category, the TCR is expected to have a significant impact on international traffic due to its duration, its volume and/or location, whereby each Infrastructure Manager evaluates the fulfillment of this criteria on its own,
- The TCR will impact capacity of Timetable 2028, regardless of its start and completion date.

<sup>2</sup> COMMISSION DELEGATED DECISION (EU) 2017/ 2075 - of 4 September 2017 - replacing Annex VII to Directive 2012/ 34/ EU of the European Parliament and of the Council establishing a single European railway area (europa.eu)

## 2.2 National specificities

The process of allocation capacities is based on fragmentation, depending on the timetable : a site is divided into windows. A major TCR at X-24 can thus have as a result several high or medium windows at X-12. In addition, the restriction can be optimized by positioning one or more TCRs in the shadow of the main site, without additional impact on traffic.

SNCF-R offers two permanent alternatives, the first is a modify request outside the periods impacted by TCRs. The second is a modify request for alternative path: The impact of TCRs is limited by using alternative routes when the infrastructure facilities allow it. The general principle is to keep always at least one of the paths open. The two courses can be not equal in time, tracks number or speed limit. It is then necessary to apply compensation.

### TCR Windows & Regular TCR's

The capacities allocated for works needs are the object of "works windows" defined on sections with windows. Several types are available:

- "Regular windows" corresponding to capacity for the most common works carried out during periods of reduced commercial demand.
  - "generique" 6 h usually at night
  - "corrective" during from Sunday night to Monday morning
  - "surveillance" for maintenance 1 h during the day
- "Distorted windows" applied to a limited number of weeks and likely to have a significant impact on train paths.
  - "déformé" 8h; the pattern is base on a "generic" windows with extended hours.
  - "capacité" limited inside a station to a few tracks,
  - "poreuse"; one track over two, processed in operational mode, the path are positionned in the TCR with separation time more importante, which means a flow reduction.

For such operations, SNCF Réseau will base its decisions case-by-case on efforts to strike the best possible technical and economic balance, which may result in the following operational measures:

- total stoppage of traffic for a given period on the track concerned or on both tracks, if necessary;

- temporary speed restrictions (TSR) on the track concerned and on adjacent tracks.

### **Consultation process**

SNCF Réseau communicates to candidates before November Y-3 the category 1 RTCs planned on the national railway network. At the request of the candidates, SNCF Réseau must provide a comparison of the conditions encountered, with at least two capacity restriction scenarios. SNCF Réseau draws up these alternative scenarios on the basis of the information provided by the candidates at the time of their requests and jointly with them. The comparison must, for each scenario, include the following elements at the very least:

- the duration of the capacity restriction;
- the indicative amount of infrastructure user fees;
- the available capacity on the diversion routes;
- the alternative routes available;
- the indicative travel times.

Before making a choice between alternative capacity restriction scenarios, SNCF Réseau consults with the candidates concerned and takes into account the impact of different scenarios on these candidates and on the users of services.

All candidates (including AOTs) may participate in the works consultation bodies (presentations of works portfolios, consultations on generic windows/exclusion days/alternative routes, reviews of macro axes and consultations of high capacity impact (FIC) work sites, preparatory meetings, work impacts consultation bodies (RPO, etc.), regional technical committees) according to the following conditions, while it should be remembered, in accordance with the law, that SNCF Réseau shall remain, in the final analysis, the sole party able to decide on the allocation of capacities and the planning of work:

- only candidates that have formulated expressions of needs of commercial capacities (or, as a minimum, have sent a prior letter of intent to SNCF Réseau for the order of capacities for the timetables concerned by such bodies) are able to speak at such meetings. In the event that several representatives (e.g., AOT and railway undertaking) express the same need, only one of them (to be appointed between them) will be authorised to take a final position, with the other nevertheless able to speak during discussions;
- the other candidates (i.e. those who have not formulated expressions of needs as indicated above) may attend discussions as observers.

SNCF Réseau shall remain the sole decision-maker with regard to capacity allocation and the planning of works.

The following table lists, based on what already exists at the date of publication of this Network Statement, these bodies, the pilot body within SNCF Réseau and the deadlines for holding the discussions. These bodies may change over time, with regard to developments in the associated processes.

If they wish to participate in these bodies, candidates are invited to contact their dedicated national or regional account manager or, if there is no identified contact person, the One Stop Shop to find out about the procedures for participation.

### Major Impact TCRs

Country	ID	Network segment	Purpose	Time of execution	Start (quarterly basis)	Impact (total closure/single track operation/speed restriction)	Impact to passenger & freight traffic <sup>3</sup>	Project approved by the IM's management
FR	1403	Nantes	Supersrtucture renewal	2028	Q2 2028	Miscellaneous	Yes	Yes
FR	1351	TELT St Jean de Maurienne	Phase 3 Torino tunnel	2028	Q3 2028	?	No	Yes
FR	1343	CCR Marseille Vintimille	Control center modification	2028		?	Yes	Yes
FR	1091	CCR Blainville Nancy	Control center modification	2028	2027	Major	Yes	Yes
FR	1020	Double tracks 1435mm	Improvement cross border capacity	2028	Q4 2028	?	Yes	Yes

<sup>3</sup> If the information on "Time of execution" and "Impact to passenger & freight traffic" is not available during the creation of Capacity Strategy, then the field to be filled by "not available" or "N/A"

		Hendaye Irun						
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*Table 4: List of relevant Crucial Major Impact TCRs with temporary capacity impacts during TT2028*

## **3. Expected Traffic Flows**

### **3.1 General Principles**

Traffic flows are quantified in the present document at border points. Figures derive from national estimates and respond to no methodology that would be common to the involved Infrastructure Managers.

Unless stated otherwise, the figures are harmonized and correspond to average values per traffic type per hour, without a differentiation between peak and off-peak hours.

Though non-binding, they provide an estimate of the minimum bookable capacity for Timetable 2028. Further assessment and more detailed differentiation will occur with the Capacity Model and the Capacity Supply.

### **3.2 National Specificities**

To present the Capacity Strategy, we are using the reticular documents, elaborated in one hand with our historical data, and on the other hand with the forecasts provided from the marketing department, in link with our main business partners. We share then these data with our neighbors, to coordinate the result.

For the different train categories, several parameters are included in the table below :



Train categories	Speed	Length	Weight
Freight Train	100 Km/h	750 m	1800 t
High Speed Train	320 Km/h	400 m	800t
Long Distance Train	160/200 Km/h	680 m	1200 t
Regional Express	140 Km/h	300 m	700 t
Regional Passenger	140 Km/h	120 m	200 t

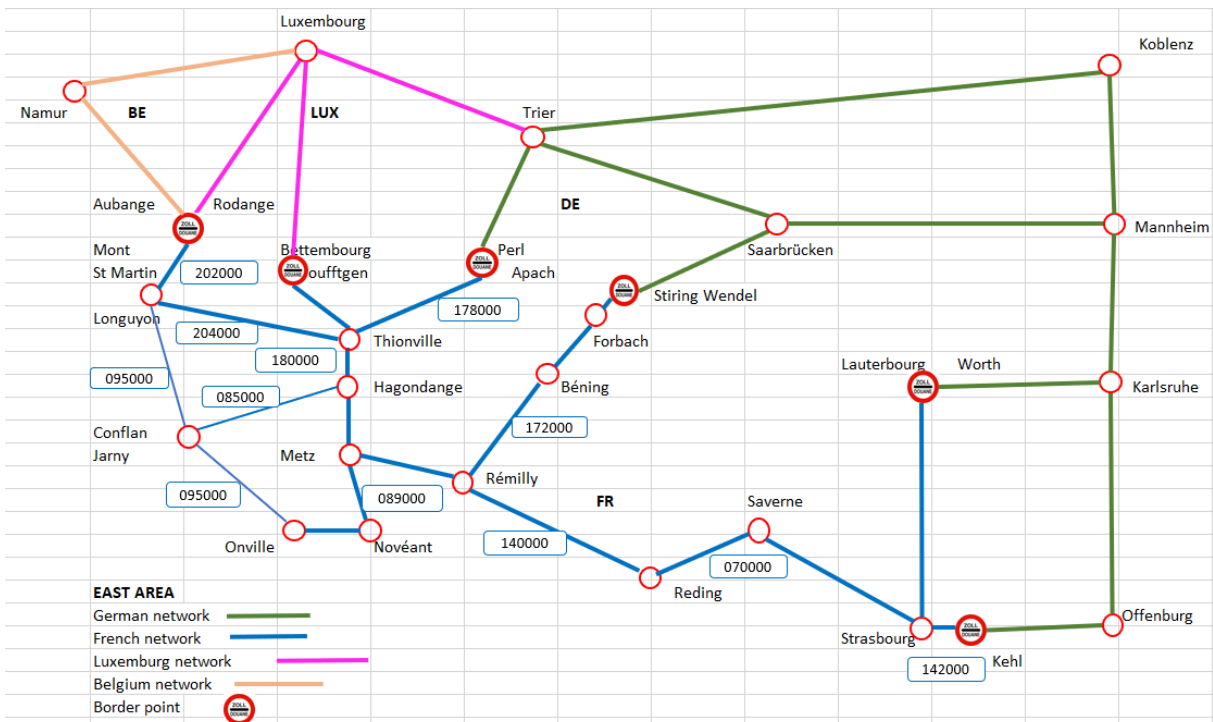
### 3.3 Traffic flows

#### DB Netz

Border point	passenger train paths per hour		freight train paths per hour
	long distance	regional	
Apach / Perl	-	0,5	0,5
Forbach / Saarbrücken	0,5	1	2
Port du Rhin / Kehl	0,5	2	2
Lauterbourg / Berg	-	1	-
Neuenburg / Mülheim		1	1

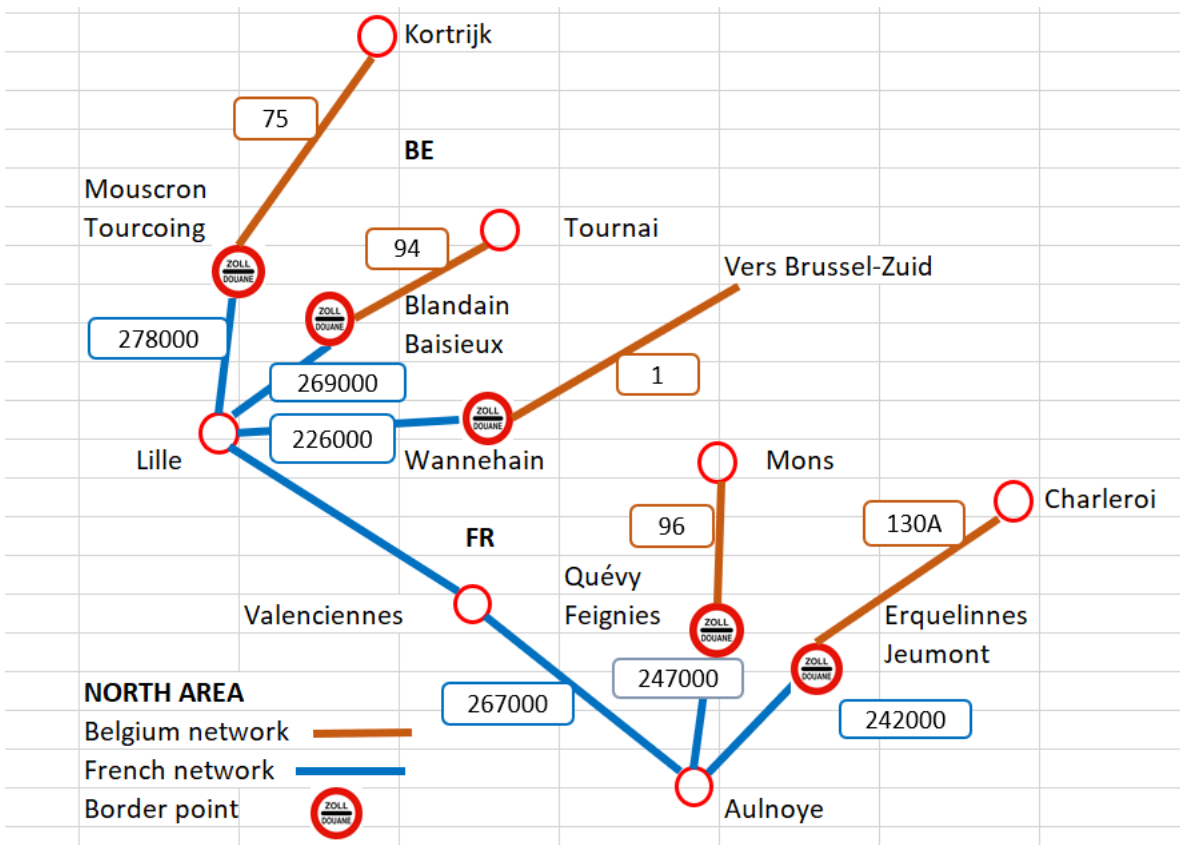
#### ACF

Border point	passenger train paths per hour		freight train paths per hour
	long distance	regional	
Zoufftgen / Bettembourg	1	5	-
Mont St Martin / Rodange	-	-	-



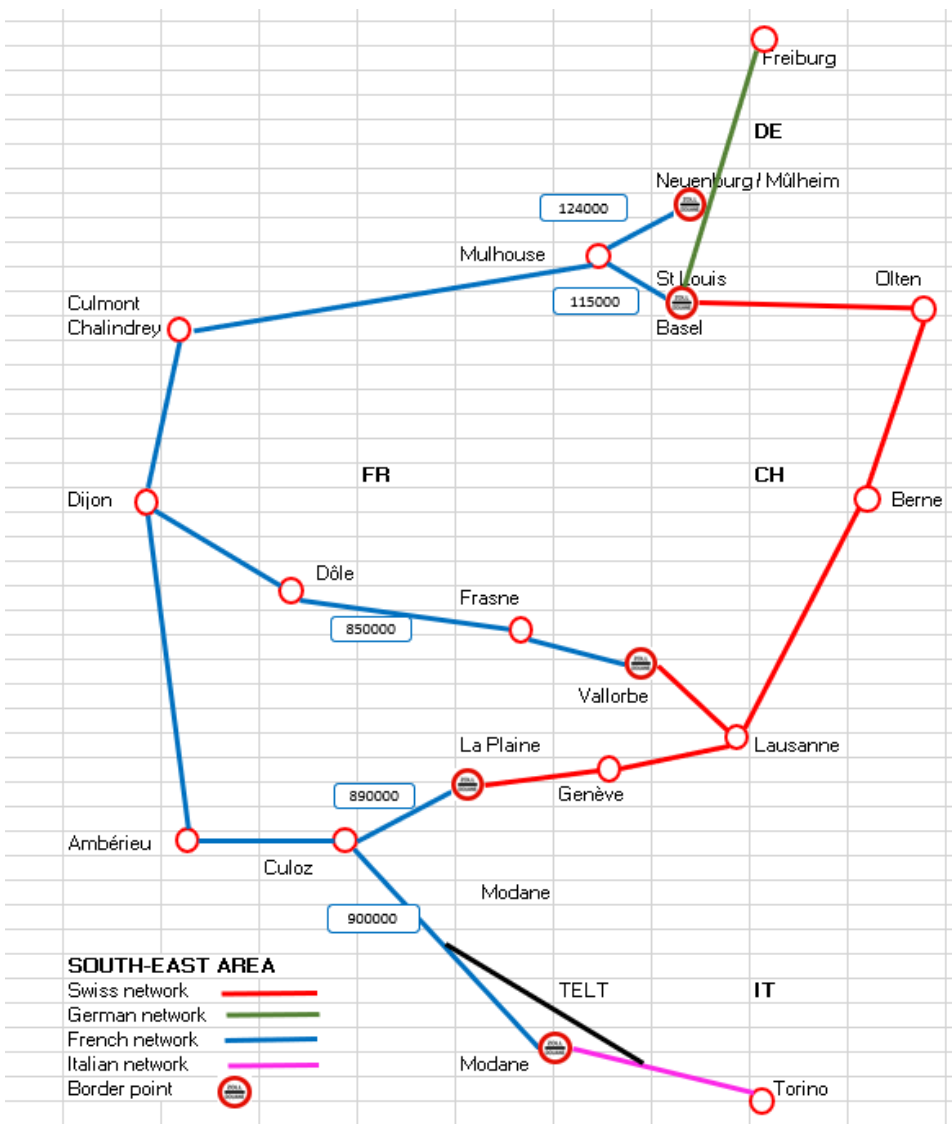
## Infrabel

Border point	passenger train paths per hour		freight train paths per hour
	long distance	regional	
Feignies / Quévy	-	0	1
Tourcoing / Mouscron	-	1	0
Jeumont / Erquelinnes	-	1	0
Baisieux / Blandain	-	2	0
Mont St Martin / Aubange	-	-	0
Wannehain / Esplechin	6	-	-



**SBB**

Border point	passenger train paths per hour		freight train paths per hour
	long distance	regional	
St Louis/ Basel	0,5	4	2
Pougny-Chancy/La Plaine (Genève)	0,5	3	-
Les Longevilles/ Vallorbe	0,5	0	-

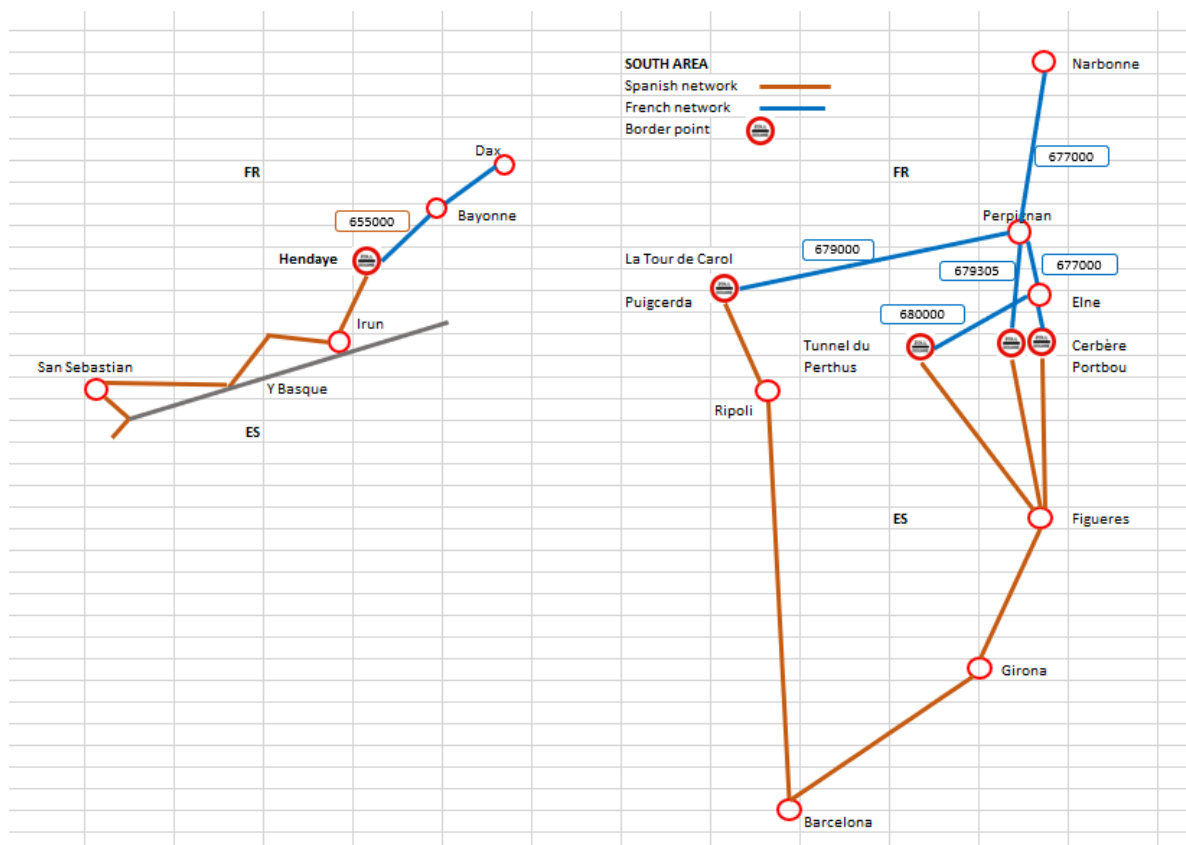


**RFI**

Border point	passenger train paths per hour		freight train paths per hour
	long distance	regional	
Modane/ Bardonecchia	1	1	1,5
Vintimille/ Ventimiglia	1	2	1
TELT tunnel Lyon-Torino			

**ADIF**

Border point	passenger train paths per hour		freight train paths per hour
	long distance	regional	
Cerbere / Port Bou	0	2	2
Hendaye/ Irun	0	1	2
Le Perthus/ El Perthus (tunnel TP Ferro)	2	-	0
La Tour de Carol - Puigcerdá	-	1	-



## Validation & Publication

There has been harmonization of border flows with ...

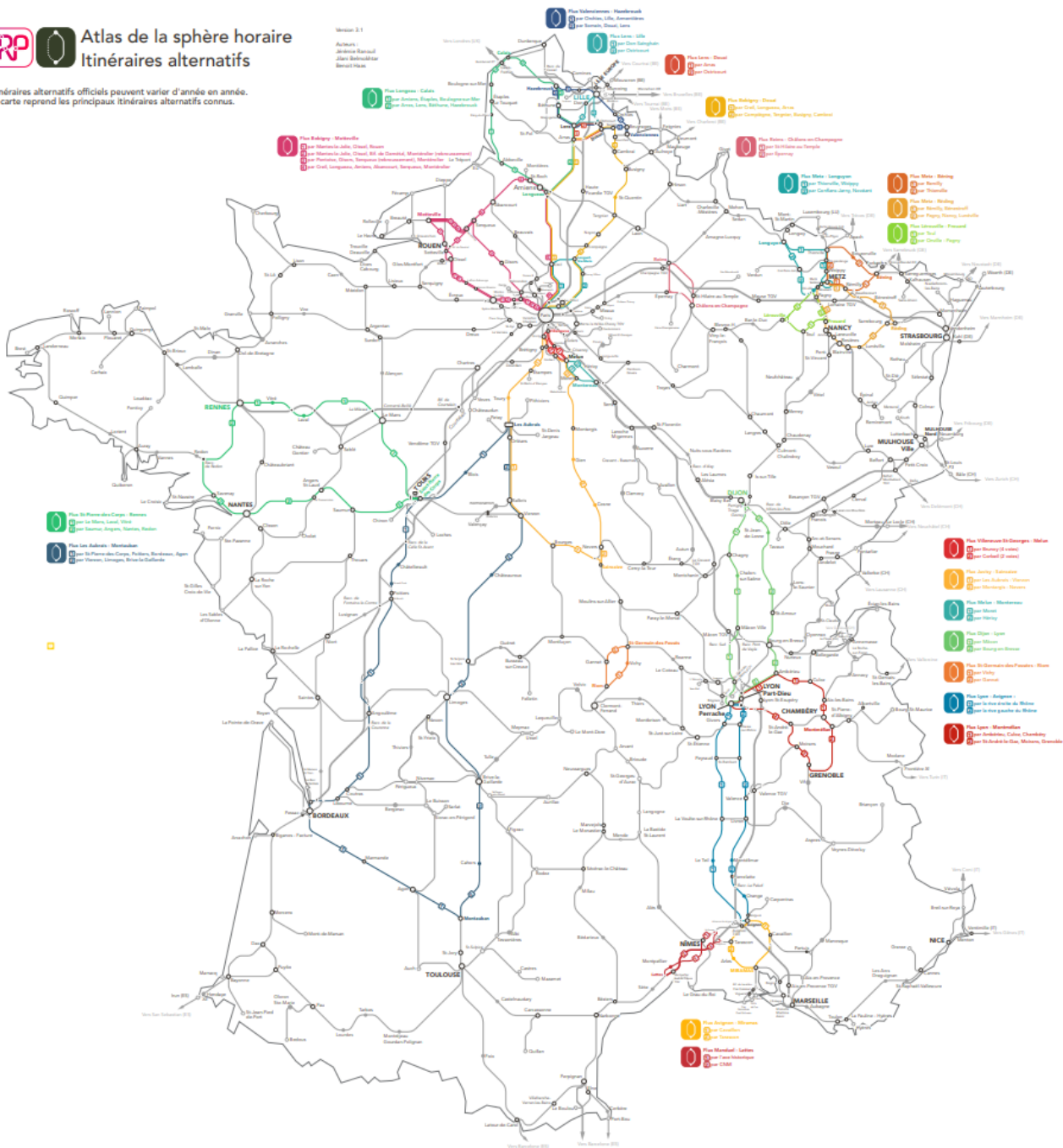
IM	Validation	Comments
DB Netz		
Infrabel		Only for HS Wannehain/Espelchin
ACF		
SBB	14/05/2024	
ADIF		
RFI		Not this year

## Annex : Alternative routes



# Atlas de la sphère horaire Itinéraires alternatifs

Les itinéraires alternatifs officiels peuvent varier d'année en année.  
Cette carte reprend les principaux itinéraires alternatifs connus.



<https://www.sncf-reseau.com/fr/node/5013>