



PLÁN [OBNOVY]



Financované
Európskou úniou
NextGenerationEU



Capacity Strategy of ŽSR for Annual Timetable 2025

Železnice Slovenskej republiky



March 2023

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0 History of Changes

Version	Responsible	Date	Description of change
1.0a	Bc. Jakub Kuna	9.3.2023	Document creation
1.01	Ing. Jozef Dudák	20.3.2023	Document fulsuration
1.02	Kuna/Dudák	28.3.2023	Attachments - incorporation
1.03	Kuna	04.04.2023	Fullsaturation remarks
1.04	Kuna/Dudák	12.04.2023	Fullsaturation remarks for chapt.1.1 & chapt.2
1.05	Kuna/Dudák	16.04.2023	TCR - finalising chapter
1.06	Ferdinand/Kuna/Dudák	28.04.2023	Finalising chapt. Traffic planning

0.1 Introduction

TTR (TIMETABLING AND CAPACITY REDESIGN) is a brand for "Smart Capacity Management", which aims to harmonize the conditions of allocation of railway infrastructure capacity on the European railway transport market and to increase the competitiveness of railway transport in the EU as well as in the Slovak Republic. TTR introduces new and revises existing processes for a new approach to better and more fluid planning of capacity. At the same time, the TTR project takes into account several successive time elements that are important for the effective use of railway capacity in the long-, medium- and short-term planning of the capacity, namely planning of TCR, Capacity Models, Capacity Supply, requests to the annual timetable, rolling planning, planning of train paths for the running annual timetable (so-called AD HOC) as well as the modifications of allocated capacity during the train run.

An essential part of the TTR process is the Advanced capacity planning, the first element of which is the **Capacity Strategy**. Directive 2012/34/EU of the European Parliament and of the Council sets, in Article 26, that EU Member States shall ensure that capacity allocation schemes for railway infrastructure follow the principles set down in this Directive and thus allow the infrastructure managers (hereinafter IM) to make optimum effective use of the available infrastructure capacity. In order to be able to fulfill this legal requirement, it is necessary for the ŽSR to have actual knowledge of the available capacity for the relevant annual timetables (hereafter ATT) as well as knowledge of the general capacity needs of the applicants. In the process of creating the Capacity Strategy, we complete and organize this information and establish general principles to be used further in the process of planning and allocating the capacity. This knowledge must also be shared and aligned with the relevant stakeholders (neighbouring IM's, applicants, railway undertakings, public authorities, operators of service facilities and transport associations). The Capacity Strategy is the first element of the implementation of the TTR process, on the basis of which Capacity Models will be created.

This document was created by the IM of Slovak Republic, which is ŽSR. The document was prepared in accordance with the RNE handbook for the Capacity Strategy and is part of the National Implementation of the TTR project in the Slovak Republic. In the legal environment of the Slovak Republic, ŽSR is at the same time an allocation body as well as Infrastructure Manager. This ŽSR Capacity Strategy for TT 2025 was created in accordance with the processes and principles of the common international framework of the TTR project. In doing so, ŽSR supports internationally harmonized capacity planning processes within the unified European railway area. This document complies with "Transitional Periods" procedures, where publication of this document is delayed from the required final TTR processes (later than 36 months before the validity date of the relevant ATT).

This Capacity Strategy of ŽSR is intended to help the railway sector to improve its competitiveness compared to other transport modes in the Slovak Republic, as well as to ensure a greater share for railways in the transport market of the Slovak Republic.

0.2 List of Abbreviations

Abbreviation	Definition
AC	Alternating current
DOZZ	<i>Remotely controlled signal&safety system</i>
EE	Electrotechnics & Energetics
ETCS	European Train Control System
ERTMS	European Rail Traffic Management System
EU	European Union
LC	Locomotive
IA	Investment action
IS	Information system
IT	Information technologies
IAGT	Investment assignment
CRR	Complex reconstruction of rail
CRT	Complex reconstruction of track
CBR	Complex reconstruction of bridge
CRT&R	Complex reconstruction of superstructure (track&rail)
ŽSR CS	Capacity Strategy of ŽSR
IM	Infrastructure manager
Ft	Freight traffic
NPIM	National Project Implementation Manager for TTR
Pax	Passanger traffic
PIS	Prevádzkový informačný systém (<i>Traffic Information System</i>)
PDO	Plán dopravnej obslužnosti (National plan of providing transport services)
POO	Plán obnovy a odolnosti (<i>Recovery and Resilience Plan</i>)
POTR	Temporary speed restriction

NS	Network statement
TT	Timetable
RFC	Rail Freight Corridor
RNE	RailNetEurope
TCR	Temporary Capacity Restrictions
TIOP	Terminal for integrated passenger transport
PwS	Powerstation
TTP	Route Book
TTR	TimeTabling and Capacity Redesign
CCS	Control-command & signalling system
RI	Railway infrastructure
tk	Track-kilometers
ŽSR	Železnice Slovenskej republiky (Railways of the Slovak republic)
ŽS 3	...
SROV	Súborný rozkaz o výluke (<i>Collection of Track Closure orders</i>)

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0.4 Contact details

List of affected IMs and contact information of TTRs National Implementation Managers

Infrastructure manager	Function	Name	Tel. number	E-mail adress
Železnice Slovenskej republiky	NPIM	Jozef Dudák	+421 2 2029 5071	dudak.jozef@zsr.sk
Správa železnic, státní organizace	NPIM	Richard Těhnik	+420 972 244 641	tehnikR@spravazeleznic.cz
ÖBB-Infrastruktur AG	NPIM	Jean-Marc Hillenberg		jean-marc.hillenberg@oebb.at
Magyar Államvasutak Zrt.	NPIM	Zoltán Imre Kovács	+36 30 565 5613	kovacs.zoltan.imre@mav.hu

0.5 Border sections

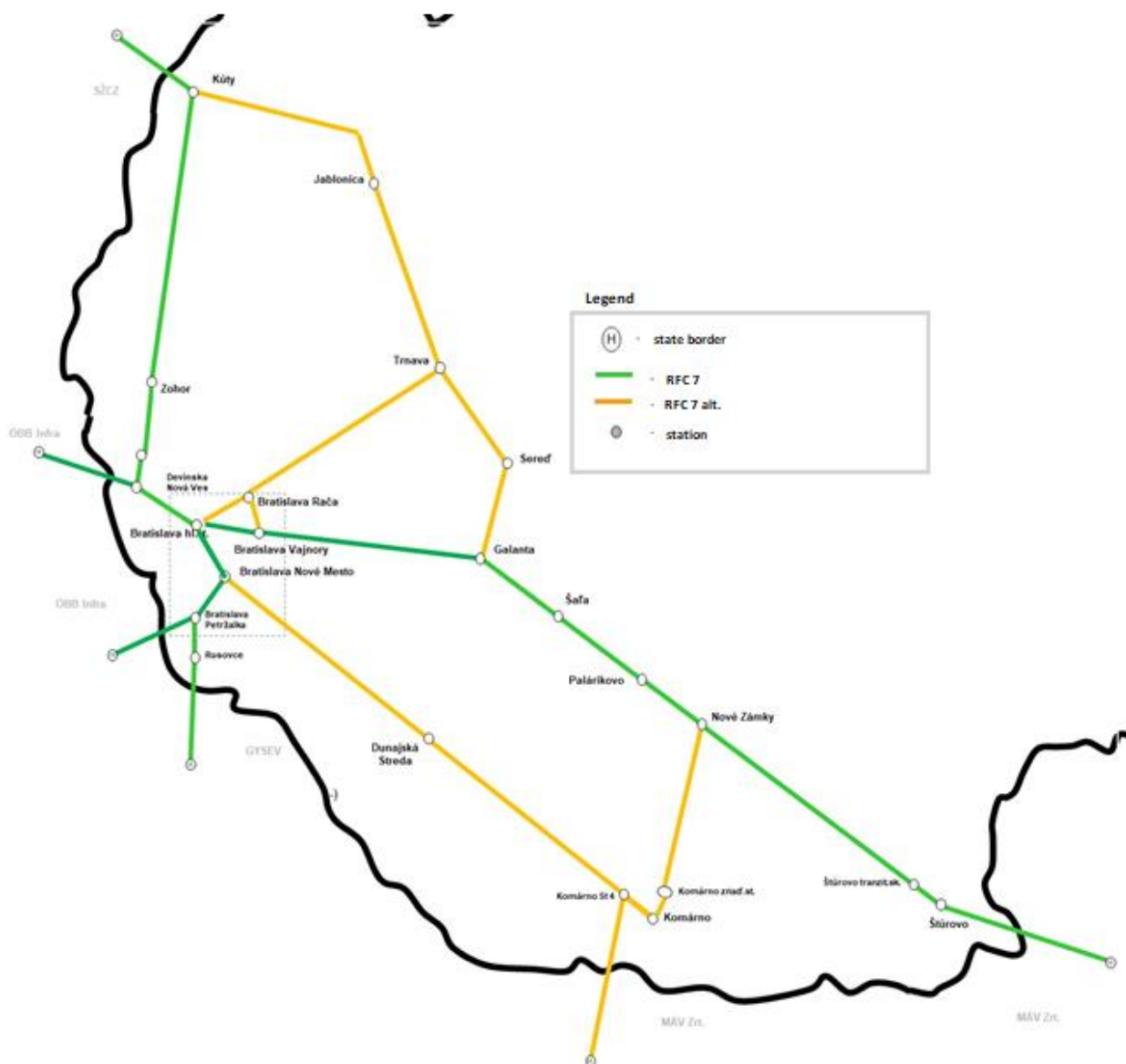
List of border crossings with neighboring states

Border crossing	Neighboring state	Character of traffic
Kúty - Lanžhot	Czech republic	Pax, Ft
Devínska Nová Ves - Marchegg	Republic of Austria	Pax, Ft
Bratislava-Petržalka - Kittsee	Republic of Austria	Pax, Ft
Rusovce - Rajka	Republic of Hungary	Pax, Ft
Štúrovo - Szob	Republic of Hungary	Pax, Ft
Komárno - Komárom	Republic of Hungary	Pax, Ft

0.6 Geographic scope for TT 2025

ŽSR created this ŽSR Capacity Strategy for TT 2025 in the scope of track sections of the RFC 7 corridor "Orient/East-Med" (including alternative and connecting lines) as an important railway connection running in the west-south axis, on which a significant volume of international rail traffic is performed.

Figure 1: Visualization of the geographical area of the RFC 7 lines



source: <https://aplikacie.zsr.sk/InfoMapaInternet5/index.aspx>

0.6.1 Specification of geographic scope

From the point of view of the territorial division of the Slovak Republic, the lines within the scope of the ŽSR Capacity Strategy for ATT 2025 are located in the southwestern part of the Slovak Republic, in the territories of Trnava, Bratislava and Nitra regions.

The infrastructure manager and keeper on these lines is ŽSR - Oblastné riaditeľstvo Trnava (*Trnava Regional Directorate*)

0.6.1.1 General information of main lines

Track section: **Szob (HU) – Štúrovo – Bratislava hlavná stanica** ([TTP 120A](#))

Gauge: **1 435 mm**
Num.of tracks: **2**
Lenght of track section: **149 km**
Category: **1A**
Vertical load category: **D4**
P/C Profile: **70 / 400**
Traction: **25 kV AC, 50 Hz**
Highest Permitted speed: **Štúrovo št. hr. – Sládkovičovo 120 km/h**
Sládkovičovo – Senec 140 km/h
Senec – Bratislava hl. st. 120 km/h

Track section: **Bratislava hlavná stanica – Kúty – Lanžhot** ([TTP 126A](#))

Gauge: **1 435 mm**
Num. of tracks: **2**
Lenght of track section: **74 km**
Track Category: **1A**
Traction: **25 kV AC, 50 Hz**
Vertical load category **D3**
P/C Profile: **70 / 400**
Highest permitted speed: **Bratislava hlavná stanica – Devínska Nová Ves 120km/h**
Zohor – Devínska Nová Ves 140km/h (1.track)
Kúty – Malacky 140km/h (1.track)
Devínska Nová Ves – Kúty 140km/h (2.track)
Kúty št. hranica – Lanžhot 120km/h

Line: **Devínska Nová Ves – Devínska Nová Ves št.hr** ([TTP 126B](#))

Gauge: **1 435 mm**
Num. of tracks: **1**
Lenght of track section: **3,62 km**
Track category: **1**
Vertical load category: **C3**
P/C Profile: **70 / 400**
Traction: **25 kV AC, 50 Hz** (Station Devínska Nová Ves)
Highest permitted speed: **80km/h**

Track section: **Bratislava-Nové Mesto - Bratislava-Petržalka - Rusovce - Rajka (HU) [\(TTP 127C\)](#)**

Gauge: **1 435 mm**

Num. of tracks: **1 (Rajka –Rusovce – Bratislava-Petržalka)**

2 (Bratislava-Petržalka – Bratislava-Nové Mesto)

Length of track section: **27 km**

Track category: **1**

Traction: **25 kV AC, 50 Hz**

15 kV AC, 16 2/3 Hz (časť ŽST Bratislava-Petržalka)

Vertical load category: **D4**

P/C Profile: **70 / 400**

Highest permitted speed: **Bratislava-Nové Mesto – Bratislava ÚNS 60 km/h**

Bratislava ÚNS – state border SR/HU 80 km/h

0.6.1.2 General informations of reroutings and alternative lines

Track section : **Komárom (HU) - Komárno – Nové Zámky [\(TTP 120B\)](#)**

Gauge: **1 435 mm**

Num. of tracks: **1**

Length of track section: **33 km**

Track category: **1**

Traction: **25 kV AC, 50 Hz**

Vertical load category: **D4**

P/C Profile: **70 / 400**

Highest permitted speed: **Komárom (HU) – Komárno St.4 60 km/h**

Komárno St.4 – Komárno 80 km/h

Komárno– Nové Zámky 100 km/h

Track section: **Trnava – Bratislava hlavná stanica [\(TTP 125A\)](#)**

Gauge: **1 435 mm**

Num. of tracks: **2**

Length of track section: **46 km**

Track category: **1**

Vertical load category: **D4**

P/C Profile: **70 / 400**

Traction: **25 kV AC, 50 Hz**

Highest permitted speed: **Trnava – Bratislava-Rača 160 km/h**

Bratislava-Rača – Bratislava hl. st. 100 km/h

Track section: **Trnava – Kúty [\(TTP 128C\)](#)**

Gauge: **1 435 mm**

Num. of tracks: **2**

Length of track section: **69 km**

Track category: **2**

Vertical load category: **D4**
P/C Profile: **70 / 400**
Traction: **25 kV AC, 50 Hz**
Highest permitted speed: **Trnava – Boleráz 80 km/h**
Boleráz – Smolenice 90 km/h
Smolenice – Jablonica 70 km/h
Jablonica – Kúty 80 km/h

Track section: **Trnava - Sered' [\(TTP 128B\)](#)**

Gauge: **1 435 mm**
Num. of tracks: **1**
Length of track section: **46 km**
Track category: **2**
Vertical load category: **D4**
P/C Profile: **70 / 400**
Traction: **25 kV AC, 50 Hz**
Highest permitted speed: **Trnava – Sered' 80 km/h**

Track section: **Sered' - Galanta [\(TTP 128A\)](#)**

Gauge: **1 435 mm**
Num. of tracks: **2**
Length of track section: **12 km**
Track category: **2**
Vertical load category: **D4**
P/C Profile: **70 / 400**
Traction: **25 kV AC, 50 Hz**
Highest permitted speed: **Sered' – Galanta 100 km/h**

Track section: **Bratislava hlavná stanica – Bratislava-Nové Mesto [\(TTP 127G\)](#)**

Gauge: **1 435 mm**
Num. of tracks: **1**
Length of track section: **5,11 km**
Track category: **1**
Vertical load category: **D4**
P/C Profile: **70 / 400**
Traction: **25 kV AC, 50 Hz**
Highest permitted speed: **Bratislava hlavná stanica – Bratislava-Nové Mesto 80 km/h**

Track section: **Bratislava-Nové Mesto - Komárno [\(TTP 124A\)](#)**

Gauge: **1 435 mm**
Num. of tracks: **1**
Length of track section: **95km**
Track category: **2**



Vertical load category: **C4**

P/C Profile: **70 / 400**

Traction: **25 kV AC, 50 Hz** (ŽST Komárno – Komárno St.4 po výh.1A, ŽST Bratislava-Nové Mesto)

Highest permitted speed: **80 km/h**

1 Expected Capacity

1.1 Additional Available Capacity for TT 2025

This chapter contains information on investment actions (IA) of ŽSR, **which are implemented or planned to be implemented until the TT 2025 period of validity, with a positive impact on the railway capacity i managed by ŽSR.** In the overview table below, there is also a description of the positive impact on the capacity.

Table 1: List of IA with positive effect on capacity for TT 2025

Name of IA	Expected timing of IA implementation	Description of positive impact
Modernization of Bratislava tunnel no. 2, Bratislava hl. station	2023	Extending the lifetime of the tunnel; Ensuring the safety of railway traffic in the tunnel (elimination of the ice formation in the tunnel and its possible collision with trains); Ensuring the safety of employees managing and maintaining the tunnel; Reduction of tunnel maintenance costs; Increasing the capacity of the railway line on the track section ŽST Bratislava hl. station – ŽST Bratislava Lamač.
Track section ŽST Trnovec nad Váhom – ŽST Tvrdošovce, modernization of track no. 1 and no. 2	2023	Increase of track speed; Achieving the standard status of railway infrastructure; Improving the safety and fluency of rail transport; Reduction of maintenance costs of railways superstructure and substructure; Achieving a higher quality standard of increasing the track speed to 140 km/h. Reconstruction of the Jatov stop (platforms, areas for passengers, exterior lighting); Reconstruction of two rail crossings. (km of crossing locations to be added based on Project documentation by investment department O220)
Nové Zámky station - Palárikovo station, modernization of track no. 1 and no. 2	2023	Complex reconstruction of the track with modernization parameters, replacement of the outdated type of construction of the railway superstructure and substructure to achieve the standard condition and improving the safety and fluency of railway traffic; Increasing track speed to 140 km/h;

		Reduction of maintenance and repair costs and thereby achieving a higher quality standard of passenger transport; Reconstruction of the traction line and track; Reconstruction of the Ľudovítov stop (platforms, areas for passengers, exterior lighting); Reconstruction of the rail crossing in žkm 139.083 (rail crossing and crossing structure), as well as modification of the railway bridge structure in žkm 143.696 (insulation, rehabilitation of bridge wings, repair of bridge cornices, etc.). In the entire track section, the removal of overgrown vegetation that threatens traffic safety is also being addressed.
Dvory nad Žitavou station, modernisation of switches no.14 - 20	2023	Qualitative improvement of the railway infrastructure in the station
Šaštín - Kúty, modernisation track&rail, track no. 1	2024	Ensuring the long-term safety of railway traffic in the given section; Increasing of track speed; Reduction of operating costs.
Modernization of two sections on the ČR/SR state border – Devínska Nová Ves	2023-2026	Reduction of train travel time; Modernization of railway stations and stops; Increasing the quality of the infrastructure in terms of security, interoperability, availability, reliability and efficiency; Reducing noise and atmospheric pollution; Increasing safety on railway lines by removing level crossings of rail crossings with roads and replacing them with non-level crossings (overpasses, underpasses, pedestrian underpasses); Implementation of ERTMS.
CRT&R tracks no. 1 and no. 2 Bratislava-Nové Mesto - Bratislava ÚNS	2024 - 2025	Improving the quality of the railway infrastructure in terms of safety, reliability and efficiency; Reduction of noise and atmospheric pollution from railway transport; Increasing safety on railway lines; Reduction of inefficient spending of funds on maintenance
CRT&R tracks Trnava – Kúty / Šelpice - Boleráz	2024 - 2025	Improvement of track parameters for safe and smooth traffic flow; Modernization of crossings, railway superstructure, shape of the ground body of the track; Increasing track speed to 100 km/h Reduction of the negative impacts of railway traffic on the inhabitants, improving and enhancing the quality of the environment;

		Reduction of costs for maintenance of the definition section after the completion of the construction; Limitation of unforeseen failures and consequent resulting traffic restrictions .
Modernization of the Malacky - Kúty DOZZ + ETCS line section	2024-2028	Increasing track speed, increasing of useful track length, longer platforms, higher category of track security, interoperability, implementation of ERTMS, reliability and availability of the railway infrastructure.
CBR in km: 7,892 Bratislava Nové Mesto - Dunajská Streda	2024-2025	Cancellation of speed restrictions on the bridge, increasing of safety.
Devínska Nová ves – št. hr. (AT) = line electrification	2024	The possibility of running trains with dependent (electric) traction, more efficient traffic.
ŽST Bajč, station track no. 3 reconstruction	2024	A new type of railway superstructure; Removal of POTR; Increasing the safety and fluency of rail transport; Reduction of maintenance costs.
Construction TIOP Bory	2023	New railway station with access to non-rail public transport with bicycle parking.
Construction of TIOP Ružinov	2023 - 2024	Construction of a new transport station in the section Bratislava Nové Mesto – Dunajská Streda (line 124A)
Nové Košariská station, reconstruction of tracks and switches	2024	Increasing the capacity of the single-track line; Station service with longer train sets; Improving the technical condition of the railway track. Increasing track capacity and safety.

Explanation of the description of the works performed on the railway infrastructure:

Complex reconstruction of railway infrastructure in large scale (CRR, CRT&R, CRT)

It is usually a large-scale IA for the purpose of complex reconstruction of mainly the railway superstructure and some structures and facilities of the railway substructure (bridges, tunnels). IA of CRR consists of a continuous replacement of the original rails with replacement of fasteners and rubber pads. After the replacement of the rails, the contactless track is also restored with new ambulatory isolated contacts. Subsequently, the entire profile of the gravel bed is cleaned. At the same time, adjustment of the geometric position of the track, adjustment of the gravel bed and banquettes is carried out.

Modernization of tracks and railway stations:

These are usually large-scale constructions involving the complete renewal of the railway infrastructure with an increase in the parameters of the given section of tracks. Modernization usually affects the entire infrastructure, that is, the railway superstructure and the constructions and equipment of the railway substructure (bridge structures, bridges, underpasses, tunnels) and other equipment of railways, S&C system, EE or even building constructions.

Complex railway bridge reconstruction (CBR)

As part of this IA of railway bridges, work is carried out with the surface treatment of the railing and supporting structure, rehabilitation of concrete surfaces (parapet, supports, pillars, etc.), replacement of insulation of the supporting structure, repair of element bridge decks of steel bridges, replacement of bridge decks, renewal of the anti-corrosion protection system, removal of vegetation and activities removing wear or damage to the object so that it can fulfill its function.

1.2 Reduced Available Capacity for TT 2025

This chapter provides information on expected negative impacts on the capacity not related to TCR for TT 2025.

The investment debt from previous years **is** reflected in the current highly worn technical condition of tracks, switches, security and signaling devices, fixed electric traction and high-current devices. This corresponds to the age of the individual components of the railway infrastructure, the operating load and the level of deferred maintenance **due to the absence of financial coverage**. The created investment debt represents increasing risks regarding high failure rates with the need for solutions in the form of immediate or operationally planned maintenance to eliminate suddenly occurring breakdowns, damages with full consequences for the safety, reliability and fluency of traffic. This method of ensuring the operability of the infrastructure does not solve the reduction of failure rate, maintenance of quality and extension of the lifetime of the railway superstructure. Great operational problems are caused by the significantly reduced durability of fasteners with ŽS 3 clamps, pushed out rubber washers and local muddy places. The railway track that requires increased attention is especially in the section of the line Nové Zámky - Dvory nad Žitavou - Štúrovo št. Mr. – SK/HU.

Outside the modernized sections of the RFC 7 tracks, there is overgrown vegetation encroaching on the masts of the traction line and on the cross-section of the tracks.

Table 2: Estimated reduction of available capacity in TT 2025

Name IA / IAGT	IAGT draft is defined	The project is approved by the ZSR management in the investment plan	Financing is secured
Powerstation Vinohrady, obsolete technology (1967)	Yes	Yes	No
Powerstation Nové Zámky, obsolete technology (1969)	Yes	Yes	No
Distribution lines 6kV - replacement, Devínska Nová Ves – Bratislava uzol, obsolete cables (1982) with many connectors	Yes	Yes	No
CBR, massive vault – brick (1886) km 43,167 on Devínska Nová Ves - Bratislava-Lamač station track	Yes	Yes	No
CBR, massive vault - concrete (1885) km 145,912 v ŽST Nové Zámky	Yes	Yes	No
CRT&R Šelpice - Boleráz	Yes	Yes	Yes
Modernisation of railway superstructure Šaštín-Stráže - Kúty	Yes	Yes	Yes
Bratislava hlavná stanica, CRR no. 1,2	Yes	Yes	No
S&C system replacement in Nové Zámky, Strekov, Gbelce, Pribeta, Dvory nad Žitavou, Mužla	No	No	No
Obsolete rail crossings replacement on line = Nové Zámky - Štúrovo	No	No	No

2 Expected Temporary Capacity Restrictions with Major Impact

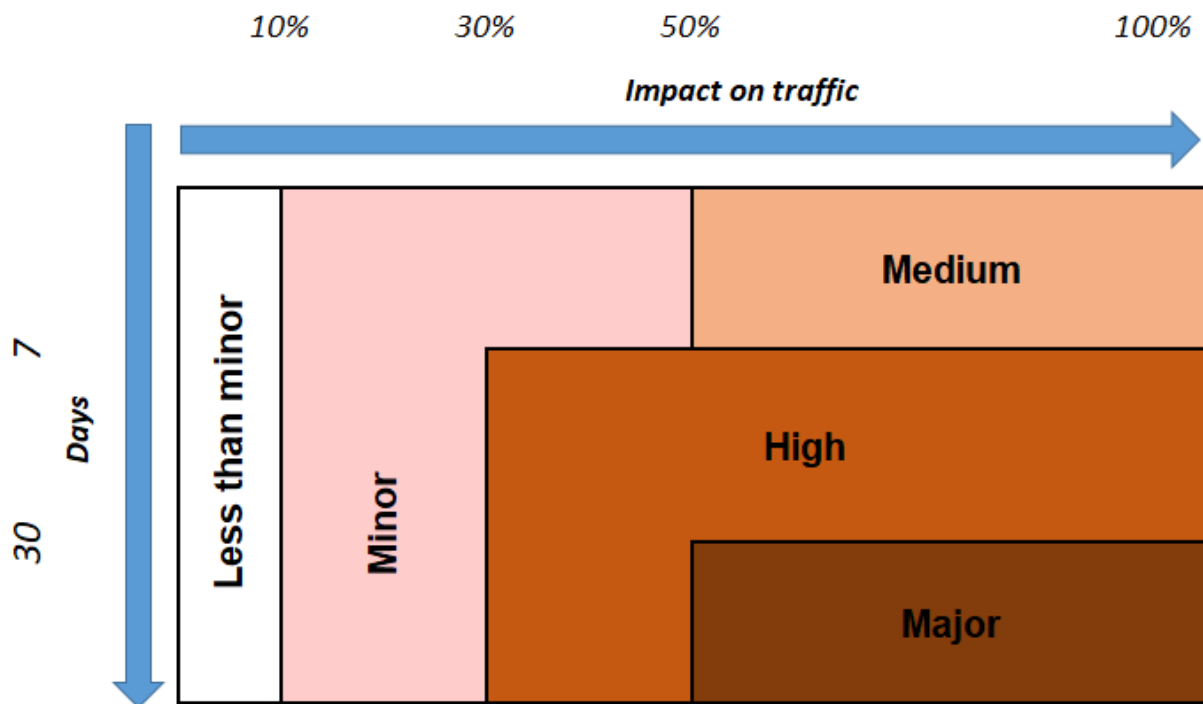
Infrastructure managers are required to proceed in accordance with EPaR Directive 34/2012/EU (Appendix VII) in the case of TCR planning. It determines the overall framework of conditions for planning the capacity of railway infrastructure, including TCR with priority to stable advanced planning, international coordination of TCR between IM's, and transparency of consultation and publication of information about TCR towards applicants.

The publication of the TCR aims to make the upcoming restrictions more transparent and thereby help plan for the competitiveness of rail services

Table 3: Categorization of TCR according to Annex VII of Directive 2012/34/EU

<i>TCR category</i>	<i>Duration</i>	<i>Impact on traffic (estimated cancellation, rerouting or alternative mode of transport)</i>
<i>TCR with (major) impact</i>	<i>More than 30 consecutive days</i>	<i>More than 50% volume of traffic in the given track section per day</i>
<i>TCR with (high) impact</i>	<i>More than 7 consecutive days</i>	<i>More than 30% volume of traffic in the given track section per day</i>
<i>TCR with (medium) impact</i>	<i>7 consecutive days or less</i>	<i>More than 50% volume of traffic in the given track section per day</i>
<i>TCR with (minor) impact</i>	<i>undefined</i>	<i>More than 10% volume of traffic in the given track section per day</i>

Figure 2: Graphical scope of the TCR category



2.1 General Principles

This chapter presents the principles of TCR planning on ŽSR lines (RFC 7) as well as the list of anticipated TCRs for TT 2025. The processes of creating TCRs are directly related to the elaboration of ŽSR CS, but they take place independently of the processes of elaboration ŽSR CS.

General principles of planning TCR :

The process of planning, consultation and coordination of long-term planning of TCR is not established at ŽSR. As part of the proposal for new TCR processes at the ŽSR, the proposal to divide the current " Track closures Activity of the ŽSR" process into the processes of "long-term" and "continuous" TCR planning is approved as follows:

A) **„long-term“ planning activity, which includes the creation of a multiyear, three-year, two-year and annual TCR plan and activities:**

- regular creation, updating and publication of long-term TCR plans,
- TCR coordination within the professional components of ŽSR,
- coordination with neighboring IM's and members of RFC within the framework of international activities of ŽSR,
- consultation with applicants ;

B) **„continuous“ planning activity TCR; so-called “late“ TCR:**

- processing, updating of four-month/monthly TCR plans based on the long-term TCR plan and the current requirements of the Regional Directorate for limiting the rail capacity,
- internal negotiation of late TCRs with regard to sections of TCRs,
- coordination meetings with the participation of the affected parties, applicants and RUs,
- communication and mutual information/approval of TCR with neighboring IMs;

Minor maintenance works resulting from immediate or preventive maintenance and requiring a certain "smaller space of time" should not have a significant impact on limiting the capacity, they should be dealt with in the so-called "**Maintenance windows**", which ŽSR **will determine in advance and announce** in the form of allocation of the necessary part of capacity of the relevant line for the relevant period in the form of SROV (collection of track closure orders) before the validity date of the relevant ATT in accordance with the regulation ŽSR DP 4 Track closures activity of ŽSR. The general list of SROV for RFC7 lines is attached to this Capacity Strategy.

2.2 National Principles

TCR coordination: means that ŽSR covers active exchange of information regarding the TCR plan between neighboring IMs through formal communication channels. These formal communication channels include:

- open negotiations, e.g. interested parties are invited to attend an open meeting or meetings;
- written information intended for interested parties with the possibility to send comments. ŽSR during planning a TCR actively initiates communication with neighboring IMs about TCR information. TCR coordination is required if TCRs are impacted by another IM. This means that the TCR takes place on one track section, possibly also on a subsequent track section, if its impact affects traffic at the neighboring IM. In the case of continuous TCR, the goal is to perform the maximum amount of works simultaneously. TCR coordination includes the anticipated coordination of train management on alternative track sections within reroutings. TCR coordination is also required for harmonization of track closures with neighbouring IM if the same track sections are expected to be used for reroutings.

TCR consultation: means that ŽSR covers active process of information exchange regarding TCR between ŽSR and applicants through formal communication channels. These formal communication channels include:

- open negotiations, e.g. interested parties are invited to attend an open meeting or meetings
- written information intended for interested parties with the possibility to send comments. ŽSR actively initiates communication with applicants about information on TCR.

ŽSR, after the coordination process and before the TCR plan approval process, asks the applicants/Rus for their opinion on the planned measures to be implemented in connection with the planned temporary restrictions on the capacity of the railway infrastructure for defined threshold values »»(affected traffic volumes defined in Annex VII EPaR Directive 2012/24/EU)

TCRs require the disclosure of information in time and scope according to the specified categories and criteria.

Table 4: Required timetable for coordination, consultation and publication of TCR information

TCR minor	TCR medium	TCR high	TCR major	Month (X) before validity of TT		
Preliminary consultation and coordination	Consultation and coordination	Preliminary consultation with applicants Coordination with neighboring IMs Requirements of applicants		Before X-24		
		First TCR publication		X-24		
		Consultation and coordination	Consultation and coordination	Final options for decision-making, consultation and coordination		X-23
						X-22
						X-21
						X-20
						X-19
				Completion of coordination		X-18
						X-17
						X-16
			X-15			
			X-14			
	Coordination completed		Final consultation		X-13	
	Final consultation				X-12	
	Publication		Second publication of TCR		X-11	
					X-10	
					X-9	
					X-8	
					X-7	
	First information					X-6
Consultation and coordination					X-5	
Publication					X-4	

2.3 Expected TCR in TT 2025

In this chapter, the expected TCRs for ATT 2025 are listed. The **information** on the listed **TCRs** are **compiled from currently available information**, it is necessary to consider them as a forecast and this **may change over time**. The TCRs listed in Table 5 met the criteria for inclusion in the "high" and "major" categories. With these TCRs, it is assumed that they will have a significant impact on international traffic and will significantly affect the capacity of railway infrastructure on the respective line.

Table 5: List of assumed TCR's for TT 2025

TCR	Draft is defined	Investment approved by the ŽSR management	Financing is secured
Modernisation of border track SR/ČR - Devínska Nová Ves	Yes	Yes	Yes
Modernisation of track Devínska Nová Ves - št. hr. SR/ČR (ETCS)	Yes	Yes	Yes
Bratislava - Nové Mesto – Bratislava ÚNS, CRT&R track no. 1, 2	Yes	Yes	Yes
Bratislava ÚNS-Petržalka CBR (highway bridge)	Yes	Yes	Yes
CBR in km 7,892 Bratislava-Nové Mesto – Dunajská Streda	Yes	Yes	Yes
ÚNS – Petržalka (except highway bridge), track reconstruction č. 1, 2	Yes	Yes	Yes
Nové Košariská station, track modifications and track S&C system Nové Košariská – Dunajská Streda	Yes	Yes	Yes
Construction TIOP Vrakuňa	Yes	Yes	Yes

3 Traffic Flows and Traffic Planning

3.1 General Principles

This chapter describes the main principles of train path construction for the line sections managed by ŽSR included in this Capacity Strategy (range of RFC7 lines), which will be used in the planning of individual elements in the Capacity Models.

Railway infrastructure (rail track, service facility) **has its maximum capacity set**. It is the capacity of the facility, how many trains (train paths) of different categories and types can pass through the facility in different time windows. It is expressed by the number of train paths that can be constructed on a given track section for a specified time interval (e.g. 24 hours). The capacity of multi-track sections of the line is determined for each track separately. ŽSR allocates the capacity in accordance with Act no. 513/2009 Coll. Act on Railways and on Amendments of some Acts, as amended (hereinafter "Act 513/2009 Coll.") under the following conditions:

- IM is, in addition to the basic duties of Infrastructure Manager according to § 30 of Act no. 513/2009 Coll., obliged to allocate capacity to railway undertakings in a fair and non-discriminatory manner until the entire capacity of the railway infrastructure is allocated. (§ 34)
- ŽSR allocates capacity in the form of a train path from the origin station to the destination station (§ 34)
- The capacity of railway infrastructure in the form of a train path can be allocated to the applicant for of validity of one timetable of the railway network (hereinafter referred to as "the timetable") (§ 40).

The conditions for applications for the allocation of capacity are stated in relevant NS of the relevant TT in subsection 3.2.1.

The process of allocating capacity in the form of a train path is specified in the relevant NS (Network statement) of the relevant ATT in subsection 4.5.

Part of the TTR project is the development of a Capacity Model, which creates an assumption about the possible use of capacity by individual segments of transport with the corresponding capacity products. In addition to **Pre-arranged paths**, which serve primarily to meet the traffic needs of applicants within predictable time and technical parameters, the relevant part of the capacity will be kept to satisfy AD HOC requests for capacity submitted during the relevant period of validity of the ATT. ŽSR in the sense of chapter 4.5. NS, has the right to **keep a capacity reserve of at least 25%** of the capacity of the relevant railway line for the purpose of allocating infrastructure capacity to additional requests **for a train path for TT 2025**.

The capacity to perform planned maintenance and renewal is taken into account when allocating infrastructure capacity to applicants.

As part of the implementation of the TTR project, a new approach is being considered, the capacity product **Rolling Planning**, when the applicant will be able to submit one request for capacity for the period of validity of several timetables (max for three TT's). The legislative framework of this activity has not yet been published.

ŽSR will try to resolve any discrepancy in the allocation of capacity with the relevant applicants through negotiations. In the event that ŽSR **fails** to resolve the conflicts **through negotiations** with the applicants, they **must resolve them through coordination**. The conditions for the coordination process for the allocation of capacity are stated in the relevant NS of the relevant TT in ch. 4.5.4.

For the allocation of capacity on cross-border track sections where is the Network interconnection of two IMs, one of this infrastructure manager is designated according to the Railway Infrastructure Interconnection Agreement, who is **responsible** for capacity planning on the given section.

Congested infrastructure means a section of the railway network on which, even after negotiations with the applicants and after coordination, it is not possible to adequately satisfy the demand for capacity in a certain period or part of the day (§ 46).

If the coordination did not achieve a satisfactory result and the railway infrastructure was declared congested for the given period or part of the day, the infrastructure manager will apply **the following priorities** when allocating capacity to the congested infrastructure:

- a) On main lines in this order:
 1. transport services in the public interest realized by system or tact distribution of routes,
 2. agreed international train paths for passenger transport implemented in the public interest,
 3. other agreed international train paths for passenger transport,
 4. agreed international train paths for freight transport,
 5. transport services in the public interest, which are not covered by the first and second points,
 6. other transport services of international passenger transport,
 7. other transport services of international freight transport,
 8. other transport services.
- b) On secondary lines in this order:
 1. transport services in the public interest,
 2. passenger transport services,
 3. freight transport services,
 4. other transport services.

From the above, it follows that the division and allocation of capacity described in the TTR rules cannot be used in the event of a declaration of congested infrastructure until the time of legislative change in this area.

3.1.1 National Principles of cooperation with Service Facilities as well as other Strategic Sections for the needs of future TT constructions

The service facilities of other entities that are connected to railway network managed by ŽSR have signed a contract with ŽSR on the interconnection of railways (for Service facility “ TIP Žilina” a concession contract is signed).

During the timetable creation (ATT), the operator/manager of the service facility of other entities communicates with ŽSR in a standard way through applicants (RUs) requesting train paths. The list

of freight terminals (combined transport terminals) and service facilities of other entities is available on the ŽSR website in the section "[Railway-undertaking/Other services/Service facilities](#)"

3.1.2 General Principles of Creating a Capacity Strategy for Individual Track Section

When planning train transport for individual railway lines, several qualitative and quantitative indicators must be taken into account, such as technical parameters of the railway line, use of practical throughput (capacity), uneven distribution of trains during the day, the development potential of the railway line for passenger and freight transport or for international and domestic transport.

There is a different range of train traffic (intensities) in different parts of the assessed capacity. The railway lines covered by this CS TT 2025 are divided into individual track sections, which have different parameters, from the point of view of train traffic planning. These are track sections between important railway junctions (train stations). Important service facilities such as railway depots or wagon repair facilities are located in these „nodes“ (Kúty, Bratislava main station, Trnava, Bratislava Východ, Bratislava-Nové Mesto, Nové Zámky, Štúrovo, Komárno) and terminals of combined transport (Bratislava-Pálenisko, Dunajská Streda) .

The capacity allocated for AD HOC train path planning will be published in the form of an offer of timetables of average train paths, or in the form of bands. Bands for medium-term planning of capacity (TT changes) are not published. Also, maintenance windows in the form of SROV are not published, they are published in the monthly/weekly plans of maintenance closures of individual Regional Directorates. The remaining capacity after the allocation of all required train paths can then be preferentially determined for medium-term capacity plan.

Table 6: Distribution of railway lines RFC 7 to track sections, according to the level of capacity saturation and operated train categories

IM	Track section	Description of the level of capacity saturation and train categories
SŽCZ - ŽSR	Lanžhot - Kúty	A track section used by international traffic with an extremely high level of capacity saturation. The following categories of trains are operated on this line section: <ul style="list-style-type: none"> • International long-distance passenger trains; • International regional passenger trains; • Regional passenger trains; • International freight transport (combined transport trains, block trains, long-distance regional single-wagon trains);
ŽSR	Kúty - Devínska Nová Ves	A track section used by international traffic with an extremely high level of capacity saturation. The following categories of trains are operated on this line section: <ul style="list-style-type: none"> • International long-distance passenger trains; • International regional passenger trains; • Regional passenger trains; • International freight transport (combined transport trains, block trains, long-distance regional single-wagon trains); • Domestic freight transport (block trains, regional single-wagon trains).

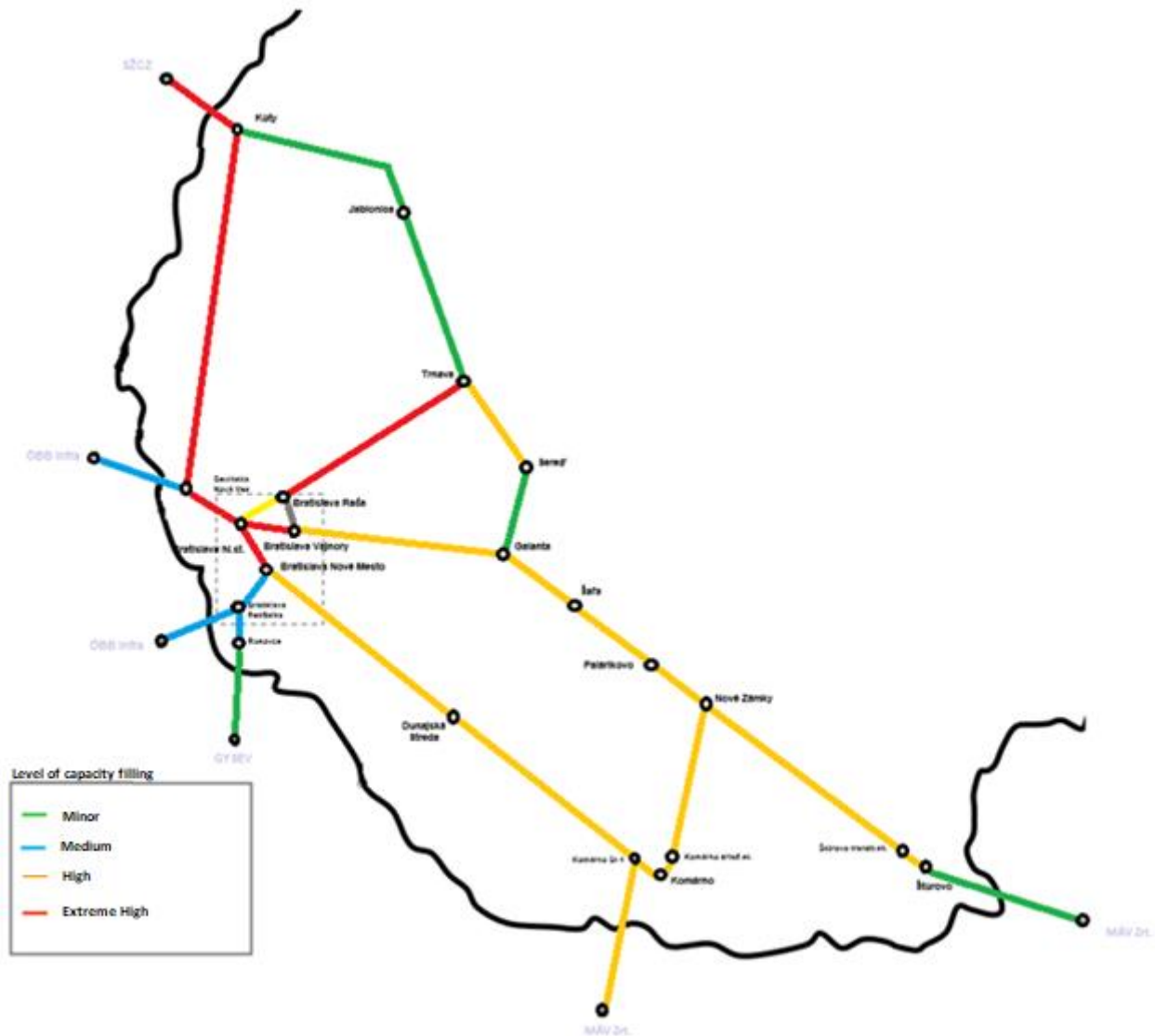
IM	Track section	Description of the level of capacity saturation and train categories
ŽSR	Devínska Nová Ves - Bratislava hl. st.	<p>A track section used by international traffic with an extremely high level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • International long-distance passenger trains; • International regional passenger trains; • Regional passenger trains; • International freight transport (combined transport trains, block trains, long-distance regional single-wagon trains); • Domestic freight transport (block trains, regional single-wagon trains).
ŽSR	Kúty - Trnava	<p>In passenger transport, this is a track section with regional trains, and in freight transport, a track section with international freight transport with a low level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • Regional passenger trains; • International freight transport (block trains); • Domestic freight transport (l regional single-wagon trains).
ŽSR	Bratislava hl. st. - Nové Zámky	<p>A track section used by international traffic with a high level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • International long-distance passenger trains; • Domestic long-distance passenger trains; • Regional passenger trains; • International freight transport (combined transport trains, block trains, long-distance regional single-wagon trains); • Domestic freight transport (block trains, regional single-wagon trains);
ŽSR	Nové Zámky - Komárno	<p>In passenger transport, this is a regional (domestic) track section, and in freight transport, a track section used by international transport with a high level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • Regional passenger trains; • International freight transport (combined transport trains, block trains); • Domestic freight transport (relation single-wagon trains).
ŽSR	Nové Zámky - Štúrovo	<p>A track section used by international traffic with a high level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • International long-distance passenger trains; • Domestic long-distance passenger trains; • Regional passenger trains; • International freight transport (combined transport trains, block trains, long-distance regional single-wagon trains); • Domestic freight transport (block trains, regional single-wagon trains).
ŽSR – MÁV Zrt. (HU)	Komárno - Komárom	<p>A track section used by international traffic with a high level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • Regional (domestic) passenger trains, common track section Komárno - Dunajská Streda;

IM	Track section	Description of the level of capacity saturation and train categories
		<ul style="list-style-type: none"> • International freight transport (combined transport trains, block trains, long-distance regional single-wagon trains);
ŽSR – MÁV Zrt. (HU)	Štúrovo - Szob	<p>Line section used by international traffic with a low level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • International long-distance passenger trains; • International freight transport (combined transport trains, block trains, long-distance regional single-wagon trains);
ŽSR	Trnava - Galanta	<p>In passenger transport, this is a regional (domestic) track section, and in freight transport, it is a track section used by international transport with a medium level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • Regional passenger trains; • International freight transport (block trains); • Domestic freight transport (block trains, regional single-wagon trains).
ŽSR	Bratislava hl. st. - Bratislava Nové Mesto	<p>A track section used by international traffic with an extremely high level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • International long-distance passenger trains; • International regional passenger trains; • Regional passenger trains; • International freight transport (combined transport trains, block trains, long-distance regional single-wagon trains); • Domestic freight transport (block trains, regional single-wagon trains).
ŽSR	Bratislava Nové Mesto - Rusovce	<p>A track section used by international traffic with an extremely high level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • International regional passenger trains; • Regional passenger trains; • International freight transport (combined transport trains, block trains, long-distance regional single-wagon trains); • Domestic freight transport (block trains, regional single-wagon trains).
ŽSR – Gysev Zrt. (HU)	Rusovce - Rajka	<p>A track section used by international traffic with a medium level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • International long-distance passenger trains; • International regional passenger trains; • International freight transport (combined transport trains, block trains, long-distance regional single-wagon trains).
ŽSR	Bratislava Nové Mesto - Komárno	<p>In passenger transport, this is a regional (domestic) track section, and in freight transport, a track section used by international transport with a high level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • Regional passenger trains; • International freight transport (combined transport trains); • Domestic freight transport (block trains, regional single-wagon trains).

IM	Track section	Description of the level of capacity saturation and train categories
ŽSR	Trnava - Bratislava hl. st.	<p>A track section used by international traffic with an extremely high level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • International long-distance passenger trains; • Domestic long-distance passenger trains; • Regional passenger trains; • International freight transport (combined transport trains, block trains, long-distance regional single-wagon trains); • Domestic freight transport (combined transport trains, block trains, regional single-wagon trains);
ŽSR – ÖBB Infra (AT)	Devínska Nová Ves - Marchegg	<p>A track section used by international traffic with a medium level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • International long-distance passenger trains; • International regional passenger trains; • International freight transport (block trains).
ŽSR – ÖBB Infra (AT)	Bratislava-Petržalka – Kittsee (AT)	<p>A track section used by international traffic with a high level of capacity saturation. The following categories of trains are operated on this line section:</p> <ul style="list-style-type: none"> • International long-distance passenger trains; • Regional passenger trains; • International freight transport (combined transport trains, block trains, long-distance regional single-wagon trains); • Domestic freight transport (block trains, regional single-wagon trains).

For the current level of saturation (utilization) of the capacity, the data of the “*Zošit priepustnosti trať ŽSR GVD 2022/2023*” (Track Throughput for TT 2022/2023 workbook) was used. Visualization of the level of capacity saturation in individual sections of RFC 7 lines is presented in figure no. 4.

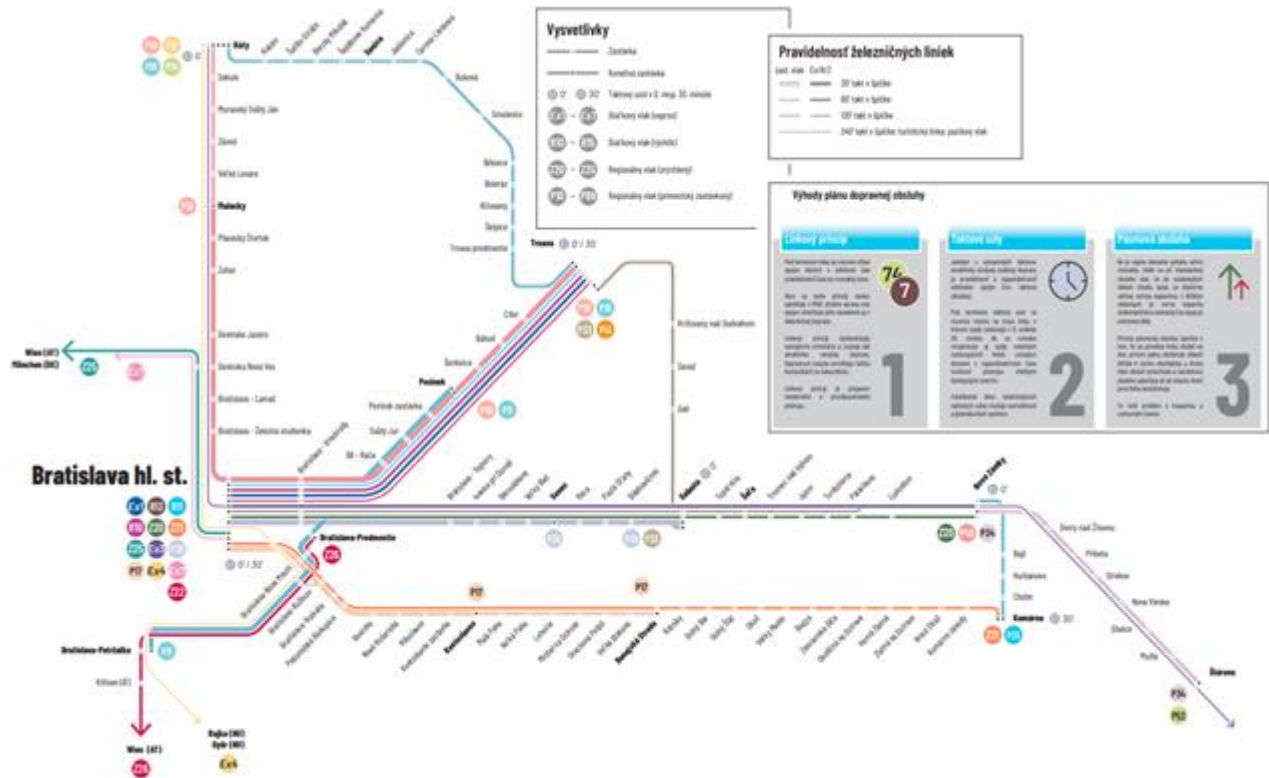
Figure 4: Visualisation of the level of railway capacity saturation for TT 2025



source: ŽSR

In passenger transport, various concepts of the transport service of the territory and the management of long-distance lines based on the “Transport Service Plan of the Slovak Republic” → (TSP SR) are used. A section from the TSP SR of the line routing for RFC7 is shown in Figure 5, below.

Figure 5: Vizualisation of Transport Service Plan for TT 2025



source: ŽSR

3.2 General Train Category on RFC 7 Lines

Passenger train

- International Pax trains:
 - Budapešť – Brno – Praha – Hamburg
 - Budapešť – Warszawa – Terespol
 - Bratislava – Zürich
 - Bratislava – Hegyeshalom
 - Košice – Bratislava – Wien (Marchegg)
 - Bratislava – Wien (Kittsee)
- Long-distance Pax trains:
 - Nové Zámky – Galanta – Bratislava
 - Košice – Banská Bystrica – Palárikovo – Bratislava
 - Banská Bystrica – Palárikovo – Bratislava
- Regional Pax trains:
 - Nové Zámky – Štúrovo
 - Nové Zámky – Galanta – Bratislava
 - Nové Zámky – Komárno
 - Trnava – Senica
 - Senica – Skalica na Slovensku
 - Trnava – Galanta
 - Trnava – Bratislava – Malacky – Kúty
 - Bratislava – Malacky
 - Pezinok – Bratislava-Petržalka
 - Senec – Bratislava-Nové Mesto
 - Bratislava – Dunajská Streda – Komárno
 - Bratislava - Kvetoslavov

Table 7: Passenger trains - general parameters

Parametre code	Lenght of train	Weight	Total lenght of train set	Train-set weight	Loco type	Required speed	Minimum braking %
OZSR01	284	590	265	500	Vectron	140	148
OZSR02	79	233	-	-	671	160	182
OZSR03	156	330	137	250	ER20	120	106
OZSR04	80	197	-	-	661	120	120
OZSR05	137	284	120	200	263	100	122
OZSR06	369	720	350	630	Vectron	160	152
OZSR07	219	400	200	490	Vectron	160	152
OZSR08	219	300	200	390	350	160	160
OZSR09	127	264	110	180	263	120	133
OZSR10	42	81	-	-	648	100	120
OZSR11	50	51	-	-	5047	120	100
OZSR12	204	456	185	370	1116	160	197

Freight traffic:

- National freight trains
- International and national block freight trains
- International and national combined trains
- International and national single-wagon freight trains

Table 8: Freight trains - general parameters

Parametre code	Train length	Train weight	Train-set length	Train-set weight	Loco type	Required speed	Minimum braking %
NZSR01	654	2084	635	2000	E186	100	80
NZSR02	620	2690	600	2600	E189	90	64
NZSR03	649	2090	630	2000	Vectron	100	80
NZSR04	594	2590	575	2500	Vectron	100	75
NZSR05	696	1585	680	1500	230	100	80
NZSR06	669	2084	650	2000	E186	90	72
NZSR07	627	1680	608	1600	ER20	100	72
NZSR08	433	1769	417	1685	242	100	84
NZSR09	416	1685	400	1600	240	100	70
NZSR10	594	1090	575	1000	240	100	70
NZSR11	594	1686	575	1600	1116	100	76
NZSR12	594	1486	575	1400	1116	100	72
NZSR13	590	1680	550	1600	230	100	70
NZSR14	590	1680	550	1600	ER20	100	71
NZSR15	740	1600	706	1428	363	90	52
NZSR16	650	1250	600	1100	363	90	60
NZSR17	595	2734	575	2500	Vectron MS	100	60
NZSR18	595	1090	575	1000	Vectron MS	100	60
NZSR19	514	1164	500	1100	742	60	26

Notes:

- *P/C Profile is used according to the maximum value from the track;*
- *Traction is expressed by type of locomotive;*
- *The basic train category is expressed by the required speed.*

Table 9: Responsible IM for the construction of TT on the border section

Border crossing	Neighboring state	Responsible IM for TT construction
Kúty - Lanžhot	Czech republic	SŽ (CZ)
Devínska Nová Ves - Marchegg	Republic of Austria	ŽSR
Bratislava Petržalka - Kittsee	Republic of Austria	OBB infra (AT)
Rusovce - Rajka	Republic of Hungary	ŽSR

Štúrovo – Szob	Republic of Hungary	MAV Zrt. (HU)
Komárno - Komárom	Republic of Hungary	ŽSR

3.3 Traffic intensity

In this chapter, **an analysis of the approximate forecast for the demand** for capacity is processed based on current traffic flows (intensities) and their known or possible adjustments in the future. Prospective traffic intensities are based on realized traffic volumes between 2017 and 2019. We determined these years as reference. Realized traffic volumes in 2020 and 2021 during the crisis period affected by the COVID19 pandemic were significantly lower, especially in the passenger transport segment, so we did not take their extreme values into account.

Outlook traffic intensities (planned train paths) for ATT 2025 were determined from the average number of trains from the ŽSR PIS information system, from data cubes for outlook in freight transport and AD HOC trains and data of the planned number of PASSENGER trains from the IS PIS ZONE for the published ATT 2023 (after the introduction of PDO). The data is divided into three basic categories for passenger transport, freight transport and AD HOC. For the AD HOC data, we considered only freight transport. The estimated number of trains is given for the entire interstation section, if it contains more tracks (directions), the summary for all tracks is listed.

Table 10: Traffic intensity for TT 2025 - forecast

Track section	TT 2025		AD HOC	Summary
	Pax	Ft	Ft	
Kúty - Lanžhot	30	32	21	83
Devínska Nová Ves - Kúty	88	40	12	140
Bratislava hl. st.- Devínska Nová Ves	128	42	20	190
Trnava - Kúty	26	15	9	50
Nové Zámky - Bratislava hl. st.	106	28	2	136
Nové Zámky - Komárno	30	8	6	44
Štúrovo - Nové Zámky	44	22	10	76
Komárno - Komárom	-	8	7	15
Szob - Štúrovo	20	7	18	45
Trnava - Galanta	32	11	4	47
Bratislava hl. st. - Bratislava Nové Mesto	74	8	9	91
Bratislava Nové Mesto - Rusovce	12	37	26	75
Rusovce - Rajka	12	9	12	33
Komárno - Bratislava Nové Mesto	64	10	1	75

Trnava - Bratislava hl. st.	164	17	8	189
Devínska Nová Ves - Marchegg	36	2	1	39

3.4 Expected Intensities in Border Sections valid for TT 2025

In table 11 below, for the purpose of harmonizing the capacity of on several border sections, you can find an overview of the expected traffic intensities at common border crossings between the Czech Republic and the Slovak Republic in one section, between Austria and the Slovak Republic in two sections, and between Hungary and the Slovak Republic in three sections. **The expected intensities at the border sections for ATT 2025 were coordinated with the NPIM of neighboring IM's**

Table 11: Intensities in international traffic on border sections (number of trains per hour)

Border section	TT 2025			AD HOC
	Freight trains	Long-distance Pax	Regional Pax	Freigh trains
Kúty - Lanžhot	1	1	0,5	1
Devínska Nová Ves - Marchegg	irregular	2	2	0
Bratislava-Petržalka - Kittsee	1,25	1	2	0,25
Rusovce - Rajka	1,5	0,5	0,5	0,33
Štúrovo - Szob	1	0,5	0	0,61
Komárno - Komárom	1	0	0	0,21

4. Validation and Publication

The goal of the pilot-created ŽSR Capacity Strategy for TT 2025 is to test and evaluate this concept on a limited scope of infrastructure (lines RFC 7), and verify ŽSR approach to long-term capacity planning in the future.

The submitted version 1.6 of the document was coordinated and consulted with representatives of the Správa železnic (CZ) on 28/04/2023, the expected intensity on the border lines was coordinated with all concerned IM's.

The final version of ŽSR CS for TT 2025 will be published for the needs of the affected entities of the railway transport market of the SR (applicants, railway undertakings, Ministry of transport of Slovak republic, affected VÚC (regional counties), terminals) and approved by the general director of ŽSR.

The final version of the ŽSR CS for ATT 2025 will be published on the ŽSR website as well as on the RNE website in English.