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Western Balkans Investment Framework

Infrastructure Project Facility
Technical Assistance 9 (IPF9)

TA2018149 R0 IPA / AA-001107-001

MEDITERRANEAN CORRIDOR: SERBIA – CROATIA CX RAIL INTERCONNECTION
BELGRADE – ŠID – BORDER BETWEEN THE TWO STATES STARA PAZOVA – GOLUBINCI – ŠID SECTION AND INĐIJA – GOLUBINCI RAILWAY LINE
FEASIBILITY STUDY, ESIA, PRELIMINARY DESIGN, TENDER DOCUMENTS
SCOPING REPORT

27 March 2023

Document information

The Infrastructure Project Facility (IPF) is a technical assistance instrument of the Western Balkans Investment Framework (WBIF) which is a joint initiative of the European Union, International Financial institutions, bilateral donors and the governments of the Western Balkans which supports socio-economic development and EU accession across the Western Balkans through the provision of finance and technical assistance for strategic infrastructure investments. This technical assistance operation is financed with EU funds.

Disclaimer: *The authors take full responsibility for the contents of this report. The opinions expressed do not necessarily reflect the view of the European Union or the European Investment Bank.*

GENERAL INFORMATION

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Lead IFI:	European Investment Bank (EIB)
Responsible IPF 9:	Natalia Tselenti
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HISTORY OF CHANGES

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V1	22-Mar-2023	George Paraskevopoulos	Environmental and Social Expert (NKE)	

Version	Date	Approved by	Function	Visa
V1	27-Mar-2023	Natalia Tselenti	IPF9 Deputy Team Leader	

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AADT	Annual Average Daily Traffic	JASPERS	Joint Assistance to Support Projects in European Regions
AI	Artificial Intelligence	JSC	Joint-Stock Company
ANFIS	Adaptive Neuro-Fuzzy Inference System	KE	Key Expert
ATP	Automatic Train Protection	KoM	Kick-off Meeting
BAU	Business as Usual	K.P.	Kilometre Point
BiH	Bosnia and Herzegovina	LARPF	Land Acquisition and Resettlement Policy Framework
CA	Contracting Authority	LC	Level Crossing
CAPEX	Capital Expenditures	LM71	Load Model 71
CBA	Cost Benefit Analysis	MGSI	*Ministarstvo Građevinarstva, Saobraćaja i Infrastrukture*
CIP	"*Centar za Istraživanje i Projektovanje*"		Ministry of Construction, Transport and Infrastructure
	Center for Research and Design	MIS	Management Information System
COVID-19	Coronavirus Disease 2019	MoM	Minutes of Meeting
CTC	Centralized Traffic Control	NGO	Non-Governmental Organization
DB	Design-Build	NIPAC	National Instrument for Pre-accession Assistance Coordinator
DMT	Deployment Management Team	NKE	Non-Key Expert
DTL	Deputy Team Leader	NPV	Net Present Value
E&S	Environmental and Social	O/D	Origin:Destination
EC	European Commission	OG	Official Gazette
EIA	Environmental Impact Assessment	OHCL	Other Head Contact Line
EIB	European Investment Bank	OPEX	Operation Expenditures
EIRR	Economic Internal Rate of Return	PCU	Passenger Car Unit
ENPV	Economic Net Present Value	PE	Polyethylene
ERR	Economic Rate of Return	PFS	Pre-Feasibility Study
ERTMS	European Rail Traffic Management System	PM	Project Manager
ESIA	Environmental and Social Impact Assessment	PS	Power Station
ESMP	Environment and Social Management Plan	QA	Quality Assurance
ETCS	European Train Control System	RAP	Resettlement Action Plan
EU	European Union	RC	Reinforced Concrete
EUD	European Union Delegation	RFA	Request for Approval
EVP	"elektrovučnu podstanicu"	RID	Regulation on International transportation of Dangerous Goods by rail
	Electric traction substation		
FIDIC	"*Fédération Internationale De l'Ingénierie et du Conseil*"	RS	Republic of Serbia
	International Federation of Consulting Engineers	SC	Steering Committee
FNPV	Financial Net Present Value	SEP	Stakeholder Engagement Plan
FO	Fiber Optic	SNKE	Senior Non-Key Expert
FRR	Financial rate of Return	SPM	Sectoral Project Manager
GDP	Growth Domestic Product	TA	Technical Assistance
HŽ	Croatian Railways	TC	Traffic Control
IFI	International Financial Institution	TL	Team Leader
IFICO	IFI Coordination Office, a project managed by EC DG NEAR	ToR	Terms of Reference
IM	Infrastructure Manager	TSI	Technical Specifications for Interoperability
IPF	Infrastructure Projects Facility	UIC	"*Union Internationale des Chemins de fer*"
IŽS	"*Infrastruktura Železnice Srbije*"		International Railway Union
	Serbian railway Infrastructure	WBIF	West Balkans Investment Framework

1 - EXECUTIVE SUMMARY

1.1 - Introduction

The Project focuses on the preparation of the Feasibility Study for the reconstruction and modernization of the railway line Belgrade – Šid – Border, Stara Pazova – Golubinci – Šid Section and Inđija – Golubinci Railway Line. The modernized railway line should meet the requirements defined by the international agreements.

The reconstruction and modernization of the line are defined as a priority for the future development of the Serbian railway network, due to the high importance of the railway line, as well as its low technical characteristics which affect regular passenger and freight transport.

The main objective of the project is to modernize of the existing railway line in compliance with TEN-T standards, making it a reliable and competitive mode of transport and increasing passenger and freight traffic demand. Furthermore, the objective shall be achieved in a cost effective and sustainable way in compliance with strategic plans at national, regional and local level, as well as with internationally agreed Technical Specifications for Interoperability and with the technical requirements for the core TEN-T.

The description of the baseline and of the impacts, mitigation measures and monitoring mechanism are provided in this Scoping Report. These will be further detailed at the ESIA main stage. In accordance with the Espoo Convention - Convention on environmental impact assessment in a transboundary context and the national EIA procedure, the transboundary impact procedure with the Republic of Croatia will be implemented.

1.2 - Legal framework

Operations and activities for which potential financing from the European Investment Bank (EIB) is sought fall under the application of their respective applicable Environmental and Social Standards.

The EIB Environmental and Social Standards[1] 2 February 2022 provide an operational translation of the policies and principles contained in the 2022 EIB Statement of Environmental and Social Principles and Standards. They are grouped across 11 thematic areas covering the full scope of environmental, climate and social impacts and issues. The project will comply with Serbian national requirements including applicable EU Laws and Directives.

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1.2.1 - Serbian Context

The Serbian legislative framework will be applied for the environmental and social aspects of the project such as Environmental Protection, Water, Waste, Nature Protection, Noise Protection, Air Quality and Cultural Heritage, Safety and Health, Labor Relations, Employment, Social Protection, Property and Expropriation as supplemented to meet the requirements of EIB.

The Environmental Impact Assessment procedure in the Republic of Serbia as governed by the Law on Environmental Impact Assessment is harmonized with the European EIA Directive (85/337/EEC, 97/11/EC, 2003/35/EC and COM 2009/378 as codified by the Directive 2011/92/EU and as amended by the Directive 2014/52/EU).

The EIA Law defines the procedures of impact assessment for the activities that may have significant effects on the environment, the contents of the Environmental Impact Assessment (EIA) Study, the required engagement of authorities and organizations concerned, citizen engagement, trans boundary exchange of information for

[1] *https://www.eib.org/attachments/publications/eib_environmental_and_social_standards_en.pdf*

projects that may have trans boundary impacts, supervision, and other issues of relevance to impact assessment.

Impact assessment is carried out for the future projects and those under implementation, changes in technology, reconstruction, capacity enhancement, closure, and decommissioning activities and for removal of projects that may have significant impact on the environment.

The EIA is applicable to the industry, mining, energy production, transport, tourism, agriculture, forestry, water management, waste management and utility services sectors, as well as for all the projects that are planned in areas of protected natural resources of special value and within the protected zones of immobile cultural resources.

The Decree on Determining the List of Projects for which an Impact Assessment is mandatory and the list of projects for which an Environmental Impact Assessment may be Required ("Official Gazette of the RS", No. 114/08) determines the List I Projects (for which an Environmental Impact Assessment is mandatory) and List II Projects (for which an environmental impact assessment may be required). According to its characteristics, the project in question is classified in List I, under item 7. Construction of: 1) Main railway lines including ancillary facilities (bridges, tunnels and stations).

1.2.2 - International legislative framework

The most relevant Directive is the EIA Directive 2011/92/EC as amended by Directive 2014/52/EU . According to the Directive 2011/92 EC, the proposed Project falls into Annex I, Category 7 (a) "Construction of lines for long-distance railway traffic and of airports with a basic runway length of 2100 m or more".

The project is aligned with the requirements deriving from EU Directives (Water Framework Directive, Floods Directive, Groundwater Directive etc.) international agreements and conventions related to environmental and social issues such as the Bern, CITES, ESPOO, ILO, UNESCO conventions etc.

Serbia adopted a third revised version of the National Programme for the Adoption of the Acquis of the European Union (NPAA).NPAA is the most significant and most comprehensive document in the process of European integration of Serbia, since in addition to harmonising the complete domestic legislation with the EU acquis, it also requires the strengthening of administrative capacities during accession negotiations with the EU, as well as long-term financial planning and responsible budget planning.

The Project proposal falls under category "A" of the EIB (those for which an EIA is mandatory (Annex 1 of the Directive).

1.2.3 - Espoo convention

An activity within one state's territory can have consequences in another state. International environmental laws, like the Espoo Convention, serve as the principal framework for cooperation among countries to protect the local, regional and global environment. The general aim of the Espoo Convention is to "ensure environmentally sound and sustainable development" through the prevention, reduction and control of significant adverse transboundary environmental impacts from proposed activities. More specific objectives are to "enhance international co-operation in assessing environmental impact, in particular in a transboundary context", and "to give explicit consideration to environmental factors at an early stage in the decision-making process". The last mentioned objective recalls the concept of prevention, a core value in EIA. The countries that ratified the Convention are called parties or members of the Convention.

In December 2007, Serbia ratified the so-called Espoo Convention - Convention on environmental impact assessment in a cross-border context, which establishes a cross-border environmental impact assessment procedure for all planned projects of one country, which may have a significant impact on the environment of

another country. The Republic of Serbia has obtained the first and second amendments to the Espoo Convention by adopting the Law on Confirmation of Amendments to the Convention on Environmental Impact Assessment in a Transboundary Context ("Official Gazette of RS - International Treaties, No. 4/16). The implementation of the Convention itself is based on national EIA procedures, however there are certain criteria and standards from other international conventions, agreements, national laws and programs that can be useful.

1.3 - Project description

The overall objective of this project is the modernisation of railway infrastructure on the Pan-European Corridor X and enhance the capacity, safety and quality of services. This project should ensure a modern, high-performance double-track railway line for combined passenger and freight traffic with the highest speed as economically justified. That will enhance railways' competitiveness and interconnectedness of transport modes on Corridor X and improve the protection of the environment.

The Stara Pazova – Šid – border with Croatia Railway Line is numbered "101" in the SRI nomenclature [2]; it is the first one in the list. In Yugoslavian time, it was the main railway line. Initially, it was branched from Inđija. In 1928, a second track was implemented as well as a direct connection in Inđija. In 1970, the line was electrified with 25 kV – 50 Hz ac and the signalling system was modernized with automatic light block. In the 1980's, tracks as well as some small bridges were rehabilitated.

Between Stara Pazova and Golubinci, a 7.4-km by-pass was constructed in order to reduce the distance Belgrade – Zagreb by 1.45 km. Such infrastructure entered in service in 1996 for the left track and in 2010 for the right track. Then, between Inđija and Golubinci, the second track has been dismounted. In 2017, 17.9 km of the right track have been rehabilitated between Golubinci and Ruma; in the same time, modern level crossing plates have been implemented in that section and the halt in Kraljevci has been upgraded with two high platforms.

Unfortunately, out of that section recently renewed, the situation of the infrastructures is not very efficient and impose several slowdowns. Regarding the right track, the speed is limited at 50 km/h between Ruma and Sremska Mitrovica and even 30 km/h in the next section towards Šid.

Based on the analysis of the existing situation, a conceptual solution for the reconstruction, modernization and construction of a two-track railway for passenger and freight traffic with speeds of up to 160 km/h and up to 200 km/h was prepared.

Based on the options analysis carried out and in accordance with the Project Terms of Reference of the IŽS, the Conceptual solution option for speeds up to 200 km was chosen, for which the Conceptual Design is being developed.

Solutions are defined for the following:

- the route of the two-track railway and station,
- objects on the railway: bridges, underpasses, overpasses, culverts
- hydrotechnical facilities
- architectural structures
- separated crossings with roads.

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[2] *Source: SRI Network Statement*

1.4 - Key elements of E&S Baseline

This section describes the main components of the physical and natural baseline environment in the area affected by the implementation of the proposed Project. The characterization of the existing environment and identification of sensitivities along the proposed railway alignment have involved a comprehensive desk review of a wide range of existing data sources and baseline field walk surveys.

1.4.1 - Environmental baseline

The climate in the project area is continental to moderate-continental, and the amount of precipitation is usually up to 500-650 mm / year, while the air humidity is moderate. It is characterized by relatively colder winters, warmer autumns than spring and moderately warm summers. More specifically, low annual precipitation dominates, while the summer precipitation is characterized by strong evaporation due to high temperatures, with frequent occurrence of summer storms and showers. Winds are a very important factor causing differences in temperature, bringing precipitation or drought. Although the wind frequency is high especially in this area, its speed is low.

The section Stara Pazova - Golubinci - Sid - the border of Croatia and the section Indjija - Golubinci, is located on the territory of AP Vojvodina, passing a completely flat terrain with slight deviations from zero altitude over the Srem plateau. Most of the area is covered by cultivated land: arable land, sown crops and fields as well as areas under uncultivated land.

The concept of planning, use and arrangement of space will be defined in a way that ensures that the modernization and reconstruction of the existing railway line Belgrade - Šid - Croatian border, the Stara Pazova - Golubinci - Šid section and the Inđija - Golubinci railway line, maximizes the existing corridors in which spatial entities and contents formed, with the minimum necessary occupation of new land.

The planned modernization and reconstruction of the railway line will be for the most part within the framework of the railway land, along with the already existing railway line, and therefore there is a reserved space for the development of this form of traffic.

Based on data from the Special Purpose Spatial Plan (material for early public review), the area covered by the spatial plan consists of cadastral municipalities of local self-government units (Stara Pazova, Inđija, Ruma, Sremska Mitrovica and Šid) occupying ~ 7800 ha. The space reserved for the railway corridor (infrastructure zone 25+25 m) represents an area of ~ 45 ha, in which interventions in terms of reconstruction and construction are foreseen.

The area covered by the Spatial Plan for special purposes consists of agricultural land, forest, water and construction land for other purposes for the most part (~ 96%), while a smaller part (~ 4%) is construction land for the needs of rail transport infrastructure.

In the area from Batajnica to the State border, along the existing route of the railway and its wider corridor, according to the Basic Geological Map, Quaternary formations are mainly represented.

In order to determine the seismicity of the terrain, maps of the Republic Seismological Institute of Serbia. According to the seismological map, which refers to a return period of 500 years, the project area is in the zone 7° (seventh degree) and 8° (eighth degree) of the seismic scale MSK-64. More specifically, the largest part of the route of the existing railway is located in the zone 8° (eighth degree) of the seismic scale, and the smaller part of the route (on the stretch Sid - State border) is located in the zone 7° (seventh degree) of the seismic scale.

In the analyzed area, the railway route crosses flat, predominantly agricultural land with a fairly homogeneous pedological composition, mainly of carbonate chernozem (on the loess plateau) and carbonate and non-carbonate chernozem (on the loess terrace).

The network of stations for automatic monitoring of air quality is, in accordance with the Law on Air Protection, recognized as a national air quality monitoring network at the level of the Republic of Serbia. Taking into account the route of the Belgrade-Sid railway, the relevant station for automatic monitoring of air quality is located in Sremska Mitrovica, while the Šabac and Beocin stations are located in the wider area and further from the railway.

Regular noise monitoring is carried out on the territory of the municipality of Inđija and the city of Sremska Mitrovica. Noise monitoring is not carried out in the territories of the municipalities of Stara Pazova, Ruma and Šid. In the territory of the Republic of Serbia, there is no systematic monitoring of the vibrations that occur due to the railway traffic. The dominant source of traffic noise in the observed corridor is the highway, main and regional roads, city roads that cross the observed corridor. Industrial plants also appear as a source of noise pollution. The amount of noise that will be emitted into the environment depends on the type of production process, as well as the machines involved in it. According to existing experience, noise caused by the operation of the railway usually occurs at the point of contact between the rail and the wheel, during the discharge of exhaust gases from the diesel locomotive.

As superstructure on the Stara Pazova-Golubinci-Sid line is in a very bad condition, the contact of the rail and the wheel during driving produces additional noise of significant intensity (shocks, creaks, etc.).

The hydrographic network related to the railway corridor includes natural watercourses that descend from Fruska Gora, as well as melioration channels that are under the jurisdiction of PWMC "Voda Vojvodina". All watercourses in this area spring from the southern slopes of Fruska Gora and flow from north to south.

These are watercourses with a smaller flow, and in periods of significant rainfall they can have a torrential character. Most of them flow directly or indirectly through the canal network into the Sava River. The hydrographic network and its water flow regime, due to anthropogenic influences, has been significantly changed compared to the former natural state. The changes were caused by the construction of embankments along the Sava River, the construction of load-relief and melioration canals, as well as the construction of pumping stations and small reservoirs on the Fruškogorje streams. These are watercourses with a smaller flow, and in periods of significant rainfall they can have a torrential character. Most of them flow directly into the Sava or indirectly through the canal network. Based on the Decree on the categorization of watercourses (Official Gazette of the SRS, No. 5/68), the river Sava belongs to the class II of watercourses. Class II includes waters suitable for bathing, recreation and water sports, for the breeding of less noble species of fish (cyprinids), as well as waters which, in addition to normal treatment methods (coagulation, filtration and disinfection), can be used to supply water to beverages and in the food industry.

On the territory of Vojvodina, alluvial sandy and gravelly sediments represent the most important groundwater accumulations. Huge amounts of underground water from these sediments are of great importance for solving the issue of water supply for settlements and industry, and they are also related to the emergent effects of underground water. Groundwater is located near the ground surface (1.0 - 4.0 m), and often on the ground surface itself.

In terms of water supply, the observed area belongs to the Srem regional system, which relies on the use of alluvial aquifer of the Drina and Sava rivers between Jamena and Lacarak and on the capture of water from the basic aquifer complex. In supplying water to settlements, local sources of underground and surface water will be used as a priority and maximally, and the missing quantities will be provided from large regional systems, relying on sources that are protected from pollution.

In the narrower and wider corridor of the railway, there are water supply sources and their sanitary protection zones in Indjija, Golubinci, Ruma, Sremska Mitrovica and Šid. Sanitary protection zones have been established around the aforementioned sources of water supply. The distance of the water source (wider zone of sanitary protection of the water source) from the railway in question is:

- Indjija water source - the railway passes through the sanitary protection zones of the watersource
- Golubinci water source - 2,800m
- "Sava I" water source near Jarka - 8,500m
- "Fiser salas" water source - 2,200m
- "Putinci" watersource - the railway passes through the zones of sanitary protection of the water source

The railway route crosses part of IPA (important plant area) „Fruška Gora and Koviljsko - petrovaradisnki rit", which presents part of the ecological network of the Republic of Serbia.Within the project area, and within the IPA „Fruška Gora and Koviljsko - petrovaradisnki rit", rare, endangered and endemic plant species were not found. As the dominant type of habitats are artifical habitats, ruderal plants are dominant.

Also, the railway crosses local and regional ecological corridors that connect the National Park „Fruška Gora" and numerous habitats of strictly protected and protected species of the foothills of Fruška Gora and the Sremski Loess Plateau with floodplains Danube and Sava Rivers (international ecological corridors).

Golubinački channel, Veliki Begej channel, Ljukovo Stream, Jelenački stream, Kudoš stream, Manđelov gat channel, Kuzminska šidina stream, Jelisaveta's channel and Šidina channel are local ecological corridors situated along the railway route. Šelovrenac stream is a regional ecological corridor recorded along the railway route.

The ecological corridors enable the migration of protected and strictly protected animals between spatially separated habitats. At the same time, the corridors are habitats of various protected species. Accordingly, during the preconstruction and construction phases, special attention should be paid to the implementation of adequate technical solutions to mitigate the negative impacts on the migratory routes of different animal species.

1.4.2 - Social baseline

Elements of the baseline have been chosen to depict the Project area's sensitivity in terms of potential adverse social impacts and the possibility that the intervention would create, reinforce or deepen inequity and/or social conflict, or that the attitudes and actions of key stakeholders may subvert the achievement of the development objective.The Social baseline has been created observing both greenfield and brownfield portions of the Project.

Based on the Nomenclature of Statistical Territorial Units ("Official Gazette of the RS, No 109/09 and 46/10), and in accordance with the Law on territorial organization ("Official Gazette of the RS, No 129/07), key and basic units of local-governments are 147 municipalities, while there are 29 administrative districts and two autonomous provinces. Serbia constitutes of administrative districts which are not units of local self-governments but are established for purpose of state administration outside the headquarters of the state administration. The Project crosses Srem District and includes 15 settlements along the railway corridor, which are located within the territory of the municipalities of Stara Pazova (two settlements), Indjija (one settlement), Ruma (four settlements), Sremska Mitrovica (four settlements) and Sid (four settlements).

Population censuses are the main source of statistical data on the total number, territorial distribution and major characteristics of individuals and households in the Republic of Serbia. Inter-census data rely on statistical estimate methodologies. The first results of the 2022 Census contain basic data on the total number of persons enumerated, the number of inhabitants, households and apartments, as of September 30, 2022. The first results of the Census are subject to changes during statistical data processing. The final results of the

Census will be published successively, from April 2023 to June 2024. The number of population is estimated in the inter-censual period for every year, including the census year. Thus, in 2020 the population of the Republic of Serbia was estimated to 6 899 126. In almost all municipalities through which the Belgrade-Sid railway corridor passes (Stara Pazova, Indjija, Ruma and Sid) and the City of Sremska Mitrovica, the decline in population will continue in the future. In the municipalities of Stara Pazova, Ruma and Sid, a positive migration balance is expected while in the municipality of Indjija and the city of Sremska Mitrovica a negative migration balance can be seen. It is estimated that the number of inhabitants will be reduced in the municipalities of Stara Pazova, Ruma and Sid even with a positive migration balance.

Less than half of the population of the Republic of Serbia is economically active (41.3%), where the share of the male workforce (57.2%) prevails compared to the female workforce (42.8%). The share of employed persons in the total population aged 15 and over, i.e. the employment rate is 32.1%, which is higher among men (35.5%) than among women (28.9%). The highest percentage of employment is in Indjija (34.4%), and the lowest in Ruma (31.8%).

In the Republic of Serbia, the unemployment rate, i.e. the share of unemployed persons in the total economically active population, is 22.4%. The unemployment rate among women (23.6%) is slightly higher than among men (21.6%). The number of unemployed per thousand inhabitants in 2022 at the national level is (68). In the Srem region, the average is (42) and the highest average is in the Municipality of Sid (63), through which the railway corridor passes, and the municipality of Ruma (53), the Municipality of Inđija is significantly below the average (34) and the Municipality of Sremska Mitrovica (41). All municipalities on the route had an average salary below the national average (EUR 875), viewed from the period in 2022.

The incidence of informal employment is the highest among the youngest age group (15-19 years), 76% of whom are employed informally. Incidence of informal employment tends to decrease with age. This can be accounted to the low level of professional experience of the youngest age group. Informal employment rates tend to rise again for older workers, with 50% of employees over 55 being informally employed. Broken down by age group, young men and older women are over-represented in informal employment.

Recent labor market improvements have also benefited women, older workers, and the youth. Job creation was the strongest in services and industry. Earnings increased alongside the number of jobs, as real wages in the private sector grew by more than 6 percent in 2014–17 and by more than 4 percent in 2018. Despite recent labor market improvements, many people in Serbia are not working or searching for a job. The highest share of informally employed workers of the total number of workers is in West Serbia and Sumadija (33.7%), followed by South and East Serbia (27.7%), Vojvodina (21.2%), and Belgrade (11.9%). These differences can, to large extent, be explained by the higher share of agricultural workers in these regions, and their higher propensity to work in the informal sectors.

The difference in the intensity of economic activities measured by the indicators of the number of active entrepreneurs and the number of deleted/closed entrepreneurs is evident in the municipalities along the route of the railway corridor. The largest number of newly founded entrepreneurs is in Stara Pazova (318) and the smallest is in Sid (71).

In the Srem region, the number of closed companies is 813, while it is assumed that the reason for this is the poor experience in entrepreneurship, which has been developing intensively only in the last 20 years, but also in a relatively discouraging business environment with a huge number of different tax and other parafiscal charges that burden financial operations of the entrepreneur. These taxes differ among municipalities

Agriculture plays an important role in the economy of Serbia. Agriculture is the fourth largest sector, accounting for 17.4 percent of employment and 5.4 percent of total exports. The city center of Sremska Mitrovica and the municipal centers of Stara Pazova, Indjija, Ruma and Šid are the main economical centers,

while the other settlements are of rural character, which means that they are economically less developed settlements. The structure of the economy is based on agriculture as a carrier of development. The total number of agriculturally active population in the wider corridor of the railway is 13,764, i.e. 15.7% of the economically active population. The highest agriculturally active population in the research area is in the municipality of Sid and the city of Sremska Mitrovica, while in the municipality of Stara Pazova is the smallest (6.3%).

Regarding migration, in 2018, 122 193 persons internally migrated within the Republic of Serbia. The average age of persons who changed their residence was 34.2 years (34.8 for men and 33.6 for women). The north-western region of Vojvodina with the Srem region had a positive migration balance. Most people moved from one municipality/city to another within the same area (39.1%), and the smallest number from one settlement to another within the same Municipality/City (23.6%). The largest number of migration movements in the Srem region, where 4139 immigrants were documented in 2022, is in the territory of the municipality of Stara Pazova (1223) immigrants and Sremska Mitrovica (1014), where, on the contrary, the number of emigrants (1012) in the territory of the municipality of Stara Pazova and in Sremska Mitrovica is the same (1027), where the general reduction of the population is of a moderate type.

Economic growth has disproportionately benefited within the rural and low-income households. In Serbia, the income of the poorest 40 percent grew on average at an annual level of 3.9 percent between 2013 and 2017, more than the 1.5 percent increase in income for the entire population. Earlier, rural areas were particularly offended after the global financial crisis and the age of Covid. Between 2013 and 2017, with the recovery of the economy and jobs, the poverty rate decreased by 9.6 percentage points in sporadically populated areas, 6.0 and 2.9 percentage points in medium and densely populated areas, correspondingly. However, sporadically populated areas still have more than half of the land.

The average monthly income in cash and in nature per household member (all households) amounted to 24,955 dinars in 2019, which is an increase of 4.2% compared to 2018 (23,960 dinars). In 2019, households in urban areas had an average of 26,897 dinars per household member per month (25,810 dinars in 2018), while households in smaller areas had 22,108 dinars per household member (21,250 dinars in 2018). Out of the total available budget, 96.6% generates revenue in money and 3.4% generates revenue in kind. For households in urban areas, cash income is 99.5% and income in nature is 0.5%, while for households from other areas this ratio is 91.5% to 8.5%.

Poverty remains significant, both in absolute terms (the share of persons whose consumption is below the threshold). needed to satisfy existential needs - 7.3% in 2016), and relatively high (the share of persons at risk of poverty is 25.5% in 2016). The rate of risk of poverty according to the most common status on the labor market (lasting longer than six months) indicates that the unemployed are in the worst position (48.0%, that is, almost every other unemployed person is at risk of poverty). Employment significantly reduces the risk of poverty, but the quality of employment remains a key factor in ending poverty (the self-employed have a significantly higher rate of risk of poverty than those employed by an employer, (32.4% vs. 9.0%). Pensioners are in the most favourable position, after employees at risk of poverty, which is approximately at the level of the total number of employees (15.4%).

Education is a determining factor in a person's economic status and ability to generate income, so it is not surprising that people with less education are above average at risk of poverty. The highest rate of risk of poverty in the period 2016 - 2018 was in the population with primary education and lower than elementary school (39.1%), and the lowest in the population at risk of poverty with secondary school or college education (10.3%). This distribution of the population at risk of poverty according to the level of education clearly indicates that education is important, because the labor market rewards highly educated people.

Data on poverty assessment using the poverty mapping method are given, for the year 2013, based on the data from the World Bank and the Republic Institute of Statistics. The at-risk-of-poverty rate is higher than the national average (24.7) in all municipalities except Inđija (23.1) and Stara Pazovo (19.6). The Gini coefficient is different (between 21 and 107), the lowest in Stara Pazova (21) and the highest in Sid (107), and the relative risk of poverty is again in most municipalities (except for the municipalities of Inđija and Stara Pazova) above the national average.

The share of social protection beneficiaries in the total population of the municipality is relatively high and ranges from 6.7% in the municipality of Stara Pazova to almost 12,6 percent in the municipality of Sid. There are differences between the municipalities in the percentage of cash social assistance beneficiaries. In the municipality Stara Pazova, 1.4 percent of citizens receive it, and in the municipality Sid, 4.1 percent. There are also differences between municipalities in the indicator of child allowance (collectively standard and increased). In the city of Sremska Mitrovica and the municipality of Ruma, almost every eleventh child is entitled to child allowance, and in the municipality of Šid, this share is more than one fifth. The percentage of beneficiaries of the basic and increased allowance for care and assistance is almost uniform among the municipalities.

The 2011 Serbia census identified 164,884 or 2.68 % of illiterate residents in Serbia. In the Republic of Serbia, 51% of persons aged 15 and over are computer illiterate, that is, 34.2% of persons are computer literate, while 14.8% are partially computer literate (May 2019). 2011 research showed that 18.5% of rural women did not complete high school education because pressures by the family to stay and work in the household or on the farm, 26% because of the attitude of the family that women do not need to attain higher education levels, 18% because of a lack of financial resources, and 10% because of early marriage and family care. Differences in educational attainments are much more prominent when adult population of urban and rural areas are compared.

There are sixteen immovable cultural heritage of exceptional importance for the Republic of Serbia, which are under the jurisdiction of the Republic Institute for the Protection of Cultural Monuments within the wider railway corridor. There are seventeen archaeological sites with the status of previous protection and two Archaeological sites that have the status of cultural heritage: Sirmium, a Roman city below today's Mitrovica of Srem and "Solnok or Grad" is located northeast of the village of Dobrinci on the Ševin breg stretch, on the terrain that rises towards the railway is situated on both sides of the railway, with a note that part of the site is south of the railway and covers an area of 30 hectares. The site contains the remains of the Roman military fortification Caput Bassianense, a civilian settlement and a necropolis.

The Constitution of the Serbia proclaims principles of gender equality. Despite principles however, many women in Serbia face challenges combining paid work and childcare responsibilities. This could be an additional cause for Serbia's low fertility rate, which is one of the lowest in European countries, and average in the region at 1.46 percent in 2014. The employment rate of women in Serbia (38.3%) is significantly lower than the EU-27 average (58.5%). Of all the employed in the transport sector in Serbia, 20 percent are female, and 80 percent are male. Measured by the European Institute for Gender Equality (EIGE) Gender Equality Index, according to 2016 data, the value of Index for Serbia was 56, which was significantly behind the EU-28 average of 66.

The most prominent inequalities are in the domains of money, time and power, indicating lower economic standard of women, carrying out disproportionately unpaid household work and care for family, and insufficient participation in decision making in positions of political, economic and social power. The labor market participation is much lower for women than for men, as indicated by activity, employment, unemployment and inactivity rates. Vulnerability of women when it comes to the share of ownership has been scoped in.

The initial screening against drivers of vulnerability, identified the potential vulnerable groups: retired, elderly and people with disabilities and chronical disease; single parent headed households, male and female; people with low literacy and ICT knowledge; economically marginalized and disadvantaged groups; persons living below the poverty line; women.

In the researched corridor of the railway from vulnerable groups, migrants were identified who have been accommodated in two reception centers located in the territory of the municipality of Sid. The Reception center Adaševci was opened on November 3rd, 2015. in the building of the former motel "Adasevci" which is located next to the highway Belgrade - Zagreb in the municipality of Sid. It consists of accommodation, office space, special purpose room, kitchen and parking. The Center currently houses 715 migrants from Middle Eastern countries. (January 2019). It is 5km southern of the line, while it is the biggest and last centre before the borders.

The Sid-Stanica reception center was opened on November 24th, 2015, in the midst of the passage of a large number of migrants through Serbia, who crossed by bus from Presevo to Shida, and then boarded the train to Croatia. The Commissariat for Refugees and Migration opened this facility, located directly opposite the Railway Station and right next to the Bus Station, in cooperation with the Municipality of Sid. The center was temporarily closed on May 31st, 2017. The Sid-Stanica reception center was reopened on November 30th, 2018. It houses families with children with a capacity of 210 seats. The center currently houses 173 migrants from Middle Eastern countries, (January 2019) and is located opposite the rail station of Sid.

By the ethnic composition 83.3% of the population are Serbs, 3.5% Hungarians, 2.1% Roma, 2% Bosniaks, 0.8% Croats, 0.7% Slovaks, 0.5% Montenegrians, 0.5 % Vlachs, 0.4% Romanians, 0.3% Yugoslavs, 0.3% Macedonians, 0.3% Muslims and around 5% other. Map of confessions has been changing historically. Currently, according to the Census in Serbia, in regard to religious affiliation, there are 84.6% Orthodox Christians, 5% Catholics, 3.1% Muslims, 1.1% atheists, 1% Protestants, 3.1% do not declare themselves confessionally, and about 2% other confessions. According to the Law on churches, eight religious communities enjoy legal status.

There are no regional ethical disparities, while nationality is more or less uniform in the municipalities with the Area of Influence. Serbs make up the majority in all observed areas with a share of 83-87%., while only in the area of the Sid municipality are represented with 78%. The share of Roma is 0.60-2.39%. Hungarians, Ruthenians, Slovaks and Croats are Catholics in the observed area, and they are represented with a total share of 5-15%, mostly in the territory of the municipalities of Stara Pazova and Sid. Bosniaks are almost not represented in the studied municipalities and settlements since they are recorded below 1% and without statistical occurrences.

1.5 - Environmental and Social Evaluation of options

Two strategic options were developed during the inception period of the project.

- Option 1: a speed of up to 160 km/h is envisaged on the two-track section of line 101 between Stara Pazova and Šid stations, and 200 km/h between Belgrade Center and Stara Pazova.
- Option 2: a speed of up to 200 km/h is envisaged on the two-track section of line 101 between Stara Pazova and Šid stations, and 200 km/h between Belgrade Center and Stara Pazova.

Based on the characteristics of the project under analysis (multi-stakeholder, concept design phase, both quantitative and qualitative criteria) it is proposed to use a MCDA (Multi criteria decision analysis) with weighting and allowing both quantitative and qualitative criteria.

The main steps in setting the MCDA are as follows:

1. Identify objectives and main criteria
2. Identify suitable criteria to each main criterion
3. Screening of criteria and selection of the most meaningful ones
4. Definition of suitable indicators for evaluation of the selected criteria
5. Weighting: Assign weights to main criteria and criteria to reflect their relative importance to the decision
6. Scoring: Assess the expected performance of each option against the criteria
7. Combine the weights and scores for each option to derive an overall value
8. Sensitivity analysis: Check whether other preferences or weights affect the overall ordering of the options.

The main objective of the project is to modernize the existing railway line in compliance with TEN-T standards, making it a reliable and competitive mode of transport and increasing passenger and freight traffic demand. Furthermore, the objective shall be achieved in a cost effective and sustainable way in compliance with strategic plans at national, regional and local level. It should comply with internationally agreed Technical Specifications for Interoperability and with the technical requirements for the core TEN-T.

In line with the above-stated objectives, the following main criteria are proposed:

1. Compliance - regarding standards and transport strategies
2. Financial - regarding investment, operational and maintenance costs,
3. Demand - regarding cost effectiveness, travel time and accessibility
4. Operation - regarding line capacity utilization, technological complexity, etc.
5. Impact – regarding environment, climate change and social aspects
6. Risks - regarding design, approval, land expropriation, construction, etc.

Following the strategic objectives and main criteria from above, a number of sub-criteria have been proposed for consideration. The goal was to present any significant differential impacts between the options, so the initial number of defined sub-criteria was reduced by eliminating those criteria in which no significant difference between options was observed or assumed.

Need of resettlement

This criterion will compare the potential need to resettle inhabitants of the settlements along the line due to re-alignment of the line. The aim is to avoid using additional land in the settlements and their development areas for the need of modernizing the line. The total number of buildings to be demolished in Option 1 was estimated to 22 and in Option 2 their number is 25. Considering the objective to minimise the need of resettlement, the normalised value for Option 1 is 100 and for Option 2 is 88. The respective scores are 6.0 and 5.3.

Traffic safety

This criterion will assess and compare the hazard for traffic accidents at the level crossings, the aim being to minimise them. According to the level crossing report, 20 level crossings will be eliminated or de-levelled in Option 1 and 26 in Option 2. Considering the objective to minimise the number of level crossings to remain in operation, thus decreasing the risk for collision between trains and road vehicles, the normalised values are 77 for Option 1 and 100 for Option 2. Their respective scores are 6.2 and 8.0.

Impact on biodiversity and protected areas

This criterion will assess and compare the harmful impact of the considered options on the biodiversity (and protected areas, if any), the aim being to avoid new alignment to go through or nearby sensible natural sites of importance.

Climate change resilience

This criterion will assess and compare options' resilience towards main climate change risks, e.g., flooding, fires, extreme events, such as heavy precipitations, blizzards, snowfall, storm and hails, the aim being do make the modernised line as resilient as possible.

Noise and vibrations

This criterion will assess and compare the expected noise and vibrations impact on the population living along the modernised line during the operation of the line. The aim is to minimise the impact of the noise and vibrations. The future noise levels per option were assessed based on the Report on Noise Engineering in Road and Rail Design Revised, communication, The Journal of iC, edition 25/2021, which takes into account all three components of the total contribution of railway noice sources in rapport to the speed, namely:

- Traction noise
- Rolling noise and
- Aerodynamic noise

Based on the respective weighted average commercial speeds per option and estimation for rail noise sources, the average level of pass-by noise in Option 1 was estimated at 62.3 dB, and at 70.5 dB in Option 2. Having in mind the objective to minimise the noise (and vibrations), the normalised value for Option 1 is 100 and that for Option 2 is 88. The respective scores are 6.0 and 5.3.

As per the fourth main criterion - impact, Option 1 scores worse with 18.2 points than Option 2 with 18.6 points.

Based on the above MCA results, Option 1 has a higher score, compared to Option 2. Also, Option 1 is found not to be sensitive to the assigned weights and can be recommended as the preferred option for the rehabilitation of the examined railway line. However, SRI decided on option 2, for which a new project assignment was given.

1.6 - Key E&S impacts

Environmental impacts

Regarding environmental parameters, no red flags have been identified concerning the reconstruction and modernization of the railway line.

Landscape

The landscape parameter is scoped in for both sections.

The section Stara Pazova - Golubinci - Sid - the border of Croatia and the section Indjija - Golubinci, are located on the territory of AP Vojvodina, passing a completely flat with slight deviations from zero altitude over the Srem plateau. Most of the area is covered by cultivated land: arable land, sown crops and fields as well as areas under uncultivated land. For most of its length, it follows the alignment of the existing railway. This reduces the magnitude of change and impact on surrounding receptors. In these locations, the Project is not expected to be at odds with the existing landscape character.

The construction phase will result in the demolition of a number of residential properties and other above ground structures, and the earthworks will result in a significant perceptual change to the landform within the affected area,.

A more in depth assessment of the existing situation (baseline), analysing the existing landscape and visual

amenity context of the receiving environment and human receptors will be carried out at the ESIA stage.

Air

This parameter will be scoped in in both sections.

A number of on-site construction activities will contribute to the increase of dust and PM_{10} such as site clearance and preparation.

In addition to impacts on local air quality due to on-site construction activities, exhaust emissions from construction vehicles and plant may have an impact on local air quality adjacent to site access routes.

Across demolition, earthworks, and construction receptors sensitive to dust soiling and negative ecological effects additional risk. The Contractor will be required to apply the proposed guidance and control measures during construction, to avoid the risk of a significant air quality effect. With the application of the mitigation measures described in the ESMP of the ESIA, the generation of dust and PM_{10} during construction will not result in any significant air quality effect. Residual effects are considered to be negligible (not significant).

The primary effect of the Project during operation is expected to be modal shift of vehicles from road-based journeys to rail-based journeys, leading to a reduction in car, bus and Heavy-Duty Vehicles (HDVs) journeys and therefore emissions, particularly concerning PM_{10} and NO_2 along local road links.

Specific numbers of vehicles and plant associated with the construction phase have not yet been determined. Therefore, a qualitative assessment of the impact of construction vehicles and plant on local air quality will be undertaken at the ESIA stage.

Climate change

The climate change parameter is scoped in for both sections. The most dominant climate change impact in the wider area is floods, especially in the vicinity of the Sava River. In the major flood of 2014, the railway Belgrade-Sid part of Sremska Mitrovica-Martinci were affected. Other climate change incidents will be temperature increase, precipitation decrease (in terms of frequency), precipitation increase (in terms of intensity), fires.

The ESIA will assess material climate change resilience/adaptation issues and confirmation of climate adaptation measures considered, including the design of railway maintenance, e.g. structures, geotechnics, drainage, and provisions for dealing with extreme weather events (cold, heat, flooding).

Noise and vibration

The noise and vibration parameter is scoped in for both phases. With the appropriate mitigation measures (noise barriers, window facades), any impacts will be dealt with as in all such linear projects.

Construction activities inevitably lead to some degree of noise disturbance at locations near the construction activities. It is however a temporary source of noise.

"CNOSSOS-EU - Common Noise Assessment Methods" will be used for calculation of noise generated by the rail traffic. This method complies with the Directives 2002/49/E3 and 2015/996/E3. Noise predictions will be undertaken for a study area of 300m either side of the railway to represent a typical daytime operation. Main core phases can be site preparation, earthworks, bridge construction and rail track construction. It is expected that once good practice measures are implemented the majority of activities will not give raise to significant effects.

Regarding vibration during construction, a desktop assessment will be undertaken in order to determine

impacts along the route due to vibration levels arising during the construction phase. This involves assessing annoyance from human receptors and also damage to building structures.

For the estimation of the noise impacts during operation, noise modelling will be carried out, while sensitive receptors will be identified. The most important source of operational vibration are wheel and rail vibrations induced during contact when trains are passing. Finally, re-radiated noise refers to noise that is experienced within a building due to radiation from vibration building elements (e.g. floors, walls and ceilings). Levels will be calculated for passenger and freight services. The ESIA will assess the potential noise and vibration impacts from both the construction and operational phases of the Project.

Waste

The ESIA will assess the potential impacts from waste and wastewater generation during construction and will be scoped in operational phase. The assessment of impacts will be based mainly on the consumption of material resources (from primary, recycled or secondary, and renewable sources, and including products offering sustainability benefits) including the generation and use of arisings recovered during construction phase of the Project and the generation of waste from the construction phase of the Project. During operation, there is expected to be minimal waste and therefore this has been scoped out of the ESIA.

Geology and Soils

These parameters will be scoped in. At this project stage, there are no data that can assist in the accurate assessment of impacts, while a preliminary justification of impacts is presented below.

Potential impacts on topsoil maybe provoked from the Leaks/Spills from HGVs, Machinery and Hazardous material storage. Accelerated degradation may lead to a reduction in the quality of topsoil. The construction activities will be limited in time and physical extent and therefore the soil function in the area of project will not be altered. The tracks on these sections would need to be dismantled, and the land may need to be decontaminated.

The groundcover surrounding the project alignment is generally comprised of covered agricultural land, with residential areas. The extent of topsoil fertility has to be assessed. The construction phase of the project will be limited in time and physical extent. Regarding areas that will be temporarily used for construction, these can be restored to agricultural use.

The limited time and scope of construction activities, as well as good implementation of measures can result in an impact of insignificant magnitude.

In the exploitation phase, possible impacts on the quality of the upper layer of soil and soil erosion, which with the implementation of mitigation measures can be insignificant.

The ESIA will assess the potential impact on land and geology based on soil and topographic data, data from existing published sources and geotechnical and soil investigations undertaken as part of the project. According to existing data, erosion is weak.

Waters

The risk of pollution of surface water bodies due to increased sedimentation and runoff is a possible impact that may arise from land clearing, excavation, drainage of excavations, construction of earth embankments and construction materials such as aggregates and topsoil stock. Temporarily increased sedimentation within of the watercourse is probably also a consequence of the construction of the bridge pillars with the watercourse channel. Runoff with a high sediment load can have harmful effects on neighboring water bodies through

increasing turbidity and po suffocation of vegetation and be substrates.

Increased risks of pollution from releases or spills of fuel or other harmful substances associated with temporary works may also migrate to local surface water receptors. Currently, the quality of the Sava River is being closely monitored, while the quality of smaller streams and canals is unknown. It is necessary to perform surface water measurements under ESIA so that the magnitude and significance of this impact can be assessed.

The ESIA will focus on the potential impacts of Project activities on water quality for key receptors (ie streams and canals) both during construction and operation.

The study area for the characterization and assessment of surface waters is defined according to potential receptors that may be influenced by the Project and the surface water basin within which the Project is located. Field of study usually includes surface waters up to 0.5 km from the Project that may be affected directly to the proposed works.

Biodiversity

It was found that there is habitat fragmentation caused by the physical presence of the railway line and train traffic great importance, especially due to the abundant presence of habitats with rich biodiversity. In the corridor railway, there are ten ecological corridors that are part of the national ecological network of the Republic of Serbia.

The physical presence of the fence will significantly limit free movement of animals through relatively long parts of the habitat. Implementation of mitigation measures, especially construction wildlife crossings at strategic locations, will certainly help to increase the throughput of the railway for wildlife. The the impact would be identifiable and measurable, although needed to be managed in appropriate way.

At this stage of the project, stakeholder consultation was carried out with the relevant biodiversity institutions in order to provide some valuable input to be taken into consideration. More precisely;

- Given the barrier effect, bridge piers in bodies of water will not have such an effect; however, the railway itself represents a barrier for animals along its entire length as it will be fenced, which should be regulated by mitigation measures, e.g. proposal for the construction of "green bridges".
- Regarding the impact of railway reconstruction on ecological corridors, all open questions will be resolved, and problems will be assessed through nature conditions of protection according to the Law on Nature Protection (Articles 8 and 9 of the Law), which the investor is obliged to request from the competent institutions (Institute for Nature Protection of Serbia).

Taking into account this consultation result, the consultation with the stakeholders should continue during the ESIA phase so the status of this area to be verified and better defined.

Cumulative effect can be manifested after the reconstruction, ie construction of the railway and the period of exploitation, through possible intensification of urbanization and other human activities in the narrower and wider area around the route, which may result in additional habitat fragmentation, landscape change, pollution, increased noise level and further amplification of the barrier effect. Ultimately, these effects may, directly or indirectly, affect the population status of flora and fauna in the zones of influence.

The baseline will provide a description of the habitats and fauna baseline and the wider ecological study area. The Area of Influence may extend up to a precautionary maximum distance of 500m of either side of the Project centreline, within which a level of acoustic impact will be experienced during construction and operation of the Project. This zone will be used to inform the scope of receptors requiring consideration through the assessment process (i.e. those potentially impacted) as well as providing the basis for predicting

likely impact magnitudes.

All target species surveys will be undertaken in accordance with best practice survey guidance. The findings of the survey work will be analysed and presented in the ESIA chapters: Identification, mapping, and description of the natural, semi-natural and artificial habitats along the corridor. The classification of the present habitat types follows EUNIS version 2012 (amended 2019), and the digitalization will be performed. Also, for habitat selection and determination, the following lists will be used: EU Habitat Directive Annex I and Bern Convention Res. No. 4. Fauna and flora species that are a priority for conservation, including species listed by the EU Habitats Directive and Birds Directive, Bern Convention, IUCN Red List of Threatened, will be determined.

Social impacts

Within the social changes and broader social impacts groups no imminent early substantial unmanageable risk signs i.e., red flag cases have been identified towards the future development phases of the Project. The major concern is the impact stemming from involuntary land acquisition and resettlement, in particular at offline sections.

The assessment has been conducted against political, financial, administrative, health and well-being, quality of the living environment, economic impacts, cultural impacts, family and community impact, institutional, political and equity impacts including gender relations. This conclusion remains valid as long as the project activities are subjected to the in-depth social assessment and commensurate mitigation measures and adhere to the underlining principles of E&S governance of the Project.

The impacts to humans and their wellbeing in the brownfield part of the route takes a much less significant breadth and severity on one hand, but might induce alteration to the daily routine and life habits in addition to availability (connectivity and coverage of the new transport system), accessibility (access to employment, health care, education, or other activities), temporal constraints of individuals and activities relevant to individual characteristics of people and affordability (the financial costs put on an individual or household and the extent to which persons can afford to travel when and where they want). On the basis of currently available data, 2 commercial facilities are indicated in the research railway zone for the railway route for a speed of 200 km/h.

Stakeholder engagement

Operations and activities for which potential financing from the European Investment Bank (EIB) is sought fall under the application of their respective applicable Environmental and Social Standards.

The EIB Environmental and Social Standards from 2 February 2022 provide an operational translation of the policies and principles contained in EIB Statement of Environmental and Social Principles and Standards from 2013 republished in 2018 and are grouped across 11 thematic areas covering the full range of impacts and issues related to environment, climate and society.

In response to the commitment to comply with EIB SEP is being developed as an essential component in project planning, implementation and operation. The SEP is developed and is part of an iterative process in communicating with stakeholders who may be affected by or might be interested in the Project throughout its life cycle.

To allow uptake of Stakeholders concerns, grievances but also positive feedback during all of the Project stages a fully functional system introduced by the promoter that affords all stakeholders, in particular impacted individuals and communities, the ability to provide feedback, channel their concerns and, thereby, access information and, where relevant, seek recourse and remedy. The scope of such a mechanism concerns the entire operation, yet it is not intended to serve employer-workforce relations, as a separate grievance structure

relevant to workplace grievances is exclusively dedicated to this purpose.

The specific nature of the Project required a broad engagement with various project stakeholders with main discussions between sector specific institutional Stakeholders. The preparation of the Project was affected by the unparalleled constrains the global COVID-19 pandemic imposed to travels and face-to-face meetings.

The specific stakeholder engagement activities that have taken place during Project preparation include:

- Communication and meetings in the rail sector;
- Review of project preparation status with representatives from the SRI and including safeguard documentation;
- Multiple meetings and communication exchange with the SRI discussing the Project design, investment priority needs;
- Meeting with Institute for Nature Conservation of Vojvodina Province, Novi Sad
- Written communication with Cultural Heritage Institute of Serbia and Sremska Mitrovica.
- A number of Biodiversity experts and stakeholders, Biologists, Ornithologists, Terminologists, Ichthyologists, Hunting associations have been informed about Project.

Given the importance of the Project as recognized by the Government active stakeholder engagement will be conducted once the project implementation starts and their feedback will be incorporated into the design of project activities. At this point the main considerations relate to safe public spaces by adequacy of lightning in stations and at access routes. To date there were no protests from the stakeholders regarding the investment.

1.7 - Assessment of transboundary impacts

Potential transboundary environmental impacts are more likely to occur at the area of the railway alignment near the Serbian border, and these could include impacts to surface water, groundwater, fauna and protected and designated areas. Given the baseline of the location (absence of sensitive receptors), and the type of activities to be performed, it can be concluded that the construction of the railway under normal operating conditions is not expected to cause significant impacts on the environmental media and environmental areas that would cause a transboundary effect, or if, for example, impacts on ambient air quality or impacts caused by increased noise levels do occur, they are likely to be negligible. Both in the construction and in the operational phase, under normal operating conditions, no transboundary impacts are expected on the environmental media. In the vicinity of the state border, there is no highly sensitive area of groundwater quality protection, water body or its protection zone that are exposed to a significant impact of the project. The lands located in the area of the state border, near the railway corridor, are typically used for agriculture, and there are also forests on the Serbian side. Trees and sprouts form a green zone/green line along the railway. Unfortunately, it is a narrow line exposed to constant anthropogenic influence. In terms of soil and water protection, the investment on the Serbian side will not have an unwanted impact on the neighboring Croatian area. It is also of particular importance to point out that the performance of the construction and operational activities of the railway line is not expected to cause negative transboundary impacts on protected NATURA 2000 sites on the territory of Serbia.

The improvement of the transport infrastructure and the connection with Croatia, the improvement of the transport of people and goods, will have a positive impact and significant contribution to the economic development of both countries.

2 - INTRODUCTION

2.1 - Project Developer

The Beneficiary of the Project is the Ministry of Construction, Transport and Infrastructure of Serbia (MCTI), with the Serbian Railways Infrastructure JSC (SRI) as the end recipient. The main activity of SRI includes:

- the management of public railway infrastructure including maintenance of public railway infrastructure, organization and control of railway traffic,
- the provision of access and use of public railway infrastructure to all interested railway undertakings, as well as to legal entities and individuals performing transport for their own purposes, and
- the protection of public railway infrastructure.

2.1.1 - Project Rationale

The overall objective of this project is the modernisation of railway infrastructure on the Pan-European Corridor X and enhance the capacity, safety and quality of services. The focus is on those railway lines that contribute to economic growth and enhance connectivity between the main urban centres and with neighbouring countries.

This project should ensure a modern, high-performance double-track railway line for combined passenger and freight traffic with the highest speed as economically justified. That will enhance railways' competitiveness and interconnectedness of transport modes on Corridor X and improve the protection of the environment.

Investing in the Serbian transport infrastructure is considered as being the basis for developing the transport system in the country and ensuring interoperability with neighbouring countries in line with EU standards. As such, this project is included in the General Transport Masterplan for 2009-2027, a comprehensive plan of future investments in transport infrastructure.

2.1.1.1 - Project inclusion in main strategic documents

The Strategy of transport development on the railway network of the Republic of Serbia is oriented towards a balanced and even development of infrastructure, with a view to create a system in which railway traffic will be operated in a safe, efficient and reliable manner. The construction, reconstruction and modernization of the infrastructure capacities relevant for the implementation of basic principles of development of sustainable transport in the future period should contribute to the realization of the goals related to the improvement of:

- traffic safety and reliability of infrastructure and timetable elements,
- the level and quality of rail infrastructure services,
- implementation of European rail interoperability standards,
- accessibility of railway infrastructure,
- environmental protection, development adjustment and keeping the infrastructure elements in line with environmental requirements,
- energy efficiency,
- railway contribution to regional development.

The main arterial routes of the Serbian railway network stretch along the Pan-European Corridor X. According to the national categorization of railway lines (Official Gazette of RS, No. 50/19), these arterial routes consist of:

- Main line 101: Beograd Centar – Stara Pazova – Šid – State Border – (Tovarnik),

- Main line 102: Beograd Centar – Rasputnica „G" – Rakovica – Mladenovac – Lapovo – Niš – Preševo – State Border – (Tabanovce),
- Main line 103: (Beograd Centar) – Rakovica – Jajinci – Mala Krsna – Velika Plana,
- Main line 105: (Beograd Centar) – Stara Pazova – Novi Sad – Subotica – State Border – (Kelebia),
- Main line 106: Niš – Dimitrovgrad – State Border – (Dragoman).

Figure 1 Main arterial routes of the railway network in Serbia

The railway line 101: Belgrade Center - Stara Pazova - Šid - state border - (Tovarnik) plays an important role in the transport network of the Republic of Serbia. The role and importance of this railway line have also been confirmed at the international level through a series of ratified agreements which are important for defining of the transport development policy in Europe, such as:

1) The European Agreement on Main International Railway Lines (AGC) and the European Agreement on Important International Combined Transport Lines and Related Installations (AGTC), drawn up in Geneva in 1985 and 1991, respectively. According to these agreements, the under examination railway line was included in the group of main lines (Class A lines) and it is part of the route: C-E 70 (Tovarnik) Šid-Beograd-Niš-Dimitrovgrad (-Dragoman).
2) The Declaration on development of the Pan-European Transport Network, drawn up on the basis of the Pan-European Transport Conferences held in Prague in 1991, Crete in 1994, and Helsinki in 1997. At the Third Pan-European Transport Conference held in Helsinki, the Pan-European Corridor X was defined: Salzburg - Ljubljana - Zagreb - Belgrade - Niš - Skopje - Veles - Thessaloniki.
3) Agreement on the Establishment of a High Performance Railway Network in South East Europe, drawn up in Thessaloniki in 2006. The high performance network comprises 16 rail axes that are part of the TEN-T network, the Pan-European Corridors or the Southeast axis. The railway line under study stretches along the following defined axe: Corridor X: Šid (Serbia)–Belgrade–Nis–Skopje (The former Yugoslav Republic of Macedonia)–Gevgelija (Greek border).

The railway route Belgrade – Sid represents one of the most important transport corridors in the Republic of Serbia and plays an important role in the concept of transport system development. It is a part of SEETO Corridor X and connects Central and Western Europe with Greece, Turkey and the Middle East, and also part of the indicative extension of the Core TEN-T rail network in the Western Balkans.

The international significance of this route has been confirmed by:

- The Treaty establishing the Transport Community signed in 2017 in Trieste (Italy) and ratified by all partners (Council Decision (EU) 2019/392);
- Commission implementing decision on the compliance of the proposal to establish the Alpine-Western Balkan rail freight corridor (Commission Implementing Decision (EU) 2018/500);
- Commission delegated regulation on the adaptation of the indicative extension of the comprehensive TEN-T maps to Western Balkans countries (Commission Delegated Regulation (EU) 2016/758 amending Regulation (EU) No 1315/2013);
- Stabilization and Association Agreement with Protocol 4 regarding to the land transport, which entered into force in 2013 (Decision 2013/490/EU);
- Agreement on the Establishment of High-Performance Railway Networks in Southeast Europe, signed in Thessaloniki in 2006 within the Southeast European Cooperation Process (SEECP);
- Declaration of the Third Pan-European Transport Conference held in Helsinki in 1997;
- The European Agreement on Main International Railway Lines (AGC) and the European Agreement on Important International Combined Transport Lines and Related Installations (AGTC) done in Geneva in 1985 and 1991 proposed by the United Nations Economic Commission for Europe (UNECE).

Numerous documents (strategic, planning, and technical) have been prepared in the previous period, where the existing railway network of Serbia was analysed and a plan for further development of the network considered. In all major strategic documents, one of the priority goals is the need for the modernization of the railway lines along the subject-matter railway line. The main goal of modernization is compliance with international standards and an increase in the level of service, both in passenger and freight traffics. The strategic documents pertaining to the development of railway transport, the relevance of which is going to be examined and analyzed in the ESIA are:

- Strategy of railway, road, inland waterway, air, and intermodal transport development from 2008 until 2015, adopted by the Government of the Republic of Serbia in 2007;
- General Transport Master Plan for the Republic of Serbia, prepared in 2009 within the European Union Agenda for the Balkans;
- Development Plan for Railway, Road, Inland Waterways, Air, and Intermodal Transport in the Republic of Serbia 2015-2020, adopted by the Government of the Republic of Serbia in 2015;
- National Programme for Public Railway Infrastructure 2017-2021, adopted by the National Assembly of the Republic of Serbia in 2016;
- Long-term and Medium-term Business Strategy and Development Plan for "Infrastructure of Serbian Railways" JSC 2017-2027, adopted by the Government of the Republic of Serbia in 2017;
- Long-term and Medium-term Business Strategy and Development Plan for "Srbija Kargo" JSC 2017-2027, adopted by the Government of the Republic of Serbia in 2017.
- Spatial Plan of the Republic of Serbia from 2010 to 2020 ("Official Gazette of RS", No. 88/10).
- Regional Spatial Plan of the Autonomous Province of Vojvodina ("Official Gazette of the Autonomous Province of Vojvodina", No. 22/11).

The route of the under-study railway lines Belgrade - Šid - Croatian border, Stara section Pazova - Golubinci - Šid and the Inđija - Golubinci railway lines are covered with the following valid spatial planning, urban planning and other documentation:

- Spatial plan of the special purpose area "Fruška gora", ("Official Gazette of APV", No. 8/19);
- Spatial plan of the special purpose area of state road IIa order no. 100 for necessities reconstruction and modernization of the road and the construction of a bicycle path on the section Novi Sad - Stara Pazova (to the border with the administrative area of the City of Belgrade) ("Official Gazette of APV, number 54/19);
- Spatial plan of the special purpose area of the infrastructural border corridor Croatia - Belgrade (Dobanovci) ("Official Gazette of RS", No. 69/03, 147/14);
- Spatial plan of the special purpose area of the E-75 highway infrastructure corridor Subotica - Belgrade (Batajnica), ("Official Gazette of RS", No. 69/03, 36/10, 143/14 and 81/15);
- Spatial plan of the special purpose area of the railway corridor Belgrade-Subotica-state border (Kelebija), ("Official Gazette of RS", No. 32/17 and 57/19);
- Spatial plan of the special purpose area of the infrastructure corridor of the state road First line number 21 Novi Sad - Ruma - Šabac and first line number 19 Šabac - Loznica ("Official Gazette of RS", No. 40/11, 39/19 and 88/20);
- Spatial plan of the special purpose area of the Srem irrigation system ("Official list APV", No. 57/17);
- Spatial plan of the special purpose area of the "Eastern Srem" water supply system ("Official Gazette of APV", No. 57/17);
- Spatial plan of the area of special purpose for collection, removal and purification of wastewater in the Sava river basin in the Srem region ("Official Gazette of APV", No. 54/19);
- Spatial plan of the special purpose area of the infrastructural transport corridor gas pipeline Sremska Mitrovica - Šid with elements of detailed regulation ("Official list APV", No. 57/17);
- Spatial plan of the municipality of Stara Pazova until 2025 ("Official Gazette of Municipalities Srema", No. 12/09, 17/12, 38/13, 7/19 and 40/19);
- Spatial plan of the municipality of Inđija ("Official Gazette of the municipality of Inđija", No. 7/12, 27/18);
- Spatial plan of the municipality of Ruma ("Official Gazette of the Municipality of Srema", No. 7/15);

- Spatial plan of the territory of the City of Sremska Mitrovica ("Official Gazette of Municipalities Sremska Mitrovica", No. 8/15);
- Spatial plan of the municipality of Šid ("Official Gazette of the Municipality of Srema", No. 1/11);
- Plan of general regulation of Inđija ("Official Gazette of the Municipality of Srema", No. 14/06 and 30/11 and "Official Gazette of the Municipality of Inđija", No. 18/19);
- General regulation plan of Stara Pazova ("Official Gazette of the Municipality of Srema", No. 11/17, 43/20);
- Ruma General Regulation Plan ("Official Gazette of the Municipality of Srema", No. 32/21);
- The general regulation plan of Šida ("Official Gazette of the Municipality of Srema", No. 25/09, 31/09 and 17/11 and "Official Gazette of the Municipality of Šid", No. 26/19, 28/20 and 22/21);
- Railway, road, water, air and intermodal development strategy of transport in the Republic of Serbia from 2008 to 2015 ("Official Gazette of RS", No. 4/08);
- Plan for the development of rail, road, water, air and intermodal transport in Republic of Serbia from 2008 to 2015.

Spatial-planning and urban documentation determined the corridors of the under study main lines: no. 101 (E-70), no. 105 (E-85) and no. 121. These corridors are intended for reconstruction, construction and modernization in international high-speed railways in accordance with the railway development strategy traffic, international transport documents and management conditions.

Regarding the railway route Belgrade - Šid - Granica, the Stara Pazova - Golubinci - Šid section and the Inđija - Golubinci railway, the Spatial Plan of the Special Purpose Area of the Infrastructure Corridor of the Belgrade - Šid- State border railway is currently under preparation including Strategic Impact Assessment.

2.2 - Project History

The Stara Pazova – Šid – border with Croatia Railway Line is numbered "101" in the IŽS nomenclature 3; it is the first one in the list. In Yugoslavian time, it was the main railway line. Initially, it was branched from Inđija. In 1928, a second track was implemented as well as a direct connection in Inđija. In 1970, the line was electrified with 25 kV – 50 Hz ac and the signalling system was modernized with automatic light block. In the 1980's, tracks as well as some small bridges were renewed.

Between Stara Pazova and Golubinci, a 7.4-km by-pass was constructed in order to reduce Belgrade – Zagreb distance by 1.45 km. Such infrastructure entered in service in 1996 for the left track and in 2010 for the right track. Then, between Inđija and Golubinci, the second track has been dismounted. In 2017, 17.9 km of the right track have been renewed between Golubinci and Ruma, while in the same time, modern level crossing plates have been implemented in that section and the halt in Kraljevci has been upgraded with two high platforms.

Other studies that have been prepared in the past and refer to the specific project in terms of design are:

- General design for modernization of the railway line between Batajnica (in Belgrade suburbs), Stara Pazova, Šid and the border with Croatia Pre-Feasibility study and Preliminary EIA
- Preliminary design and Feasibility study for railway reconstruction and modernization Belgrade (Batajnica) – Sid, Section: Belgrade (Batajnica) - Golubinci

[3] *Source: IŽS Network Statement*

In 2007, a Pre-Feasibility Study (PFS) was issued, which referred to the modernization of the railway line between Batajnica (in Belgrade suburbs), Stara Pazova, Šid and the border with Croatia. It was recommended to upgrade the railway line to 160km/h for passenger trains and 120km/h for freight ones. Conceptual design and PFS were carried out by the Institute of Transportation CIP.

The study was done in accordance with the regulations of that period as defined by the Law on Planning and Construction. It contained three books:

- Book 1. Project of technology and organization of traffic,
- Book 2. Technical solutions of infrastructure capacities, and
- Book 3 Pre-Feasibility Study.

Conceptual design considered that the reconstruction of the subgrade of the left track [4] was done in the period from 1986 to 1988, it was in a satisfactory condition and, in general, no interventions were needed, while under the right track it was envisaged a full track renewal including ballast removal, excavation of the upper part of the track bed on a 1.40m depth from the top of rail.

2.3 - The Project's Environmental and Social Impact Assessment (ESIA) Process

The Consultant's overall approach to ESIA follows Serbian regulations and in line with the requirements of the European EIA Directive, applicable international standards and EIB standards.
The specific objectives of the ESIA areas are listed as follows:

- Present the main characteristics of the baseline regarding environmental and social parameters
- Ensure that key potential significant positive and adverse environmental and social impacts are identified,
- Capitalize on positive aspects and benefits,
- Mitigate negative impacts and avoid serious and irreversible damage to the environment and people,
- Prepare environmental and social management and monitoring plant to help ensure the stated above,
- Ensure that environmental and social factors are considered in the decision- making process of construction of the railway alignment,
- Inform the public about the proposed Project and ensure stakeholder participation and involvement.

A description of the steps of the ESIA process is given in the following table, while, as indicated, the project phase is currently scoping. The Alternatives Assessment phase with the aim of identifying the advantages and disadvantages of all project alternatives has been completed.

Table 1 ESIA process steps

Step	Description
Scoping	Scoping identifies the key issues to be addressed in the ESIA. Scoping, as presented in this report, will ensure that the process is focused on the potentially significant environmental and social impacts which may arise from the Project. It will consider the results of consultations undertaken to date on the Project. Ultimately scoping defines the scope of work of the ESIA, including stakeholder engagement.

[4] *In Serbia, trains run in the right track and the right track is considered the one looking from the beginning of the line which is Belgrade towards end of the line which is direction Zagreb, in that case, "left track" is the one used to go to Belgrade.*

Baseline studies	For the key issues identified in scoping, available information on the existing environmental and social conditions (also referred to as baseline conditions) will be gathered.
Impact assessment and mitigation measures	This stage focuses on predicting environmental and social changes from the baseline as a result of the Project's activities (considering the entire lifecycle of the Project). Each impact will then be evaluated to determine its significance for the environment and society. Where necessary measures will be proposed to mitigate significant impacts.
Environmental and social management plans	The various mitigation measures will be presented in an Environmental and Social Management Plan (ESMP), describing how measures will be implemented throughout the different Project phases. The ESMP will provide general details (considering the project stage) for the responsibilities for implementation, the timing and monitoring and audit plans to ensure all the mitigation commitments are met. It will also identify any requirements for training and other capacity building.
Stakeholder Engagement and Consultation	During the ESIA stage the team will seek the views of interested parties so that these can be considered in the assessment and reflected in the proposals for mitigation.

2.4 - Approach to Scoping

In line with the requirements set out in the ToR, the Consultant will undertake the Environmental and Social Scoping Study (ESSS) at this phase. This document will aim at:

- Providing an overview description of the Project,
- Describing the existing environmental and socioeconomic baseline,
- Identifying potential environmental and socioeconomic issues at a preliminary level associated with the proposed Project,
- Obtaining early input from key stakeholders in the identification of potential impacts and mitigation measures, and
- Identifying key data gaps and defining a proposed Terms of Reference (ToR) for a ESIA study including program for consultation with stakeholders.

2.5 - Scoping Report Structure

The remainder of this report is structured as follows:

Table 2 Structure of the scoping report

Chapters	Context
Chapter 3 – Legal Framework	Regulations and Guidelines provides a brief overview of the relevant and International ESIA regulatory framework and international best practice with regards to scoping
Chapter 4 - Project Description	Describes the main components of the Project and the main construction and operation activities
Chapter 5 – Environmental and Social Baseline	Baseline Conditions: provides an overview of the baseline environmental, socioeconomic and cultural heritage characteristics of the Study Area
Chapter 6 – Project Alternatives	Description of Selected Options: summarizes the alternatives railway alignments and proposes the "base case" route
Chapter 7 - Potential Impacts and Mitigation Measures	Summarizes potential significant environmental, socioeconomic and cultural heritage impacts and provides an indication of potential mitigation and management measures
Chapter 8 - Stakeholder Engagement	Presents the proposals for consultation with identified external stakeholders i.e. individuals or groups who are affected or likely to be affected (directly or indirectly) by the Project ("affected parties") or may have an interest in the Project ("other

Chapters	Context
	interested parties") during scoping. The section also summarizes the consultation activities undertaken earlier in the ESIA process
Chapter 9 – Management and Monitoring arrangements	Preliminary guidelines and arrangements on management and monitoring
Chapter 10 - Terms of Reference of the ESIA	Presents the proposed terms of reference, the structure of the detailed ESIA and a tentative schedule of the ESIA activities

2.6 - Project Consultants

The IPF9 team for this particular sub-project under WBIF, namely EGIS consortium (composed of EGIS International (FR) / WYG International (NL) / WYG International Danismanlik Limited / Sirketi (WYG Turkiye) (TR) / COWI A/S (DK) / COWI AS (NO) / GOPA Infra GmbH (DE) / GOPA — International Energy Consultants GmbH (DE) / CESTRA d.o.o. Beograd (RS) / TRENECON Consulting & Planning Ltd (HU) / SYSTEMA Consulting SMLTD (GR) / Danish Refugee Council (DK) / SOFRECOM (FR)), was contracted in September 2020 as the executing agent for the mentioned sub-project.

3 - LEGAL FRAMEWORK

The environmental regulations applicable to this project are numerous and diverse. Therefore, only the key requirements associated with the project have been chosen to be presented in this section. However, a full and detailed list of legislation associated with the project will be developed as part of the project management systems for construction and operation. The Environmental Impact Assessment (EIA) procedure in the Republic of Serbia as governed by the Law on Environmental Impact Assessment, which is harmonized with European EIA Directive (85/337/EEC, 97/11/EC, 2003/35/EC and COM 2009/378 as codified by the Directive 2011/92/EU and as amended by the Directive 2014/52/EU).

3.1 - Overview of the Main Relevant National Legislation

The legal, legislative and institutional framework for environment and society i.e. social considerations in Serbia is founded on the Constitution of Serbia, which stipulates the right to a healthy environment and the duty of all, in line with the law, to protect and enhance the environment. Health and environment are also supported by many governmental strategies, international agreements and the Millennium Development Goals. Environmental legislation in Serbia has over 100 laws and regulations. Currently, the majority of these are harmonized with EU directives and other legislation. The Constitution of Republic of Serbia was proclaimed on November 8th, 2006. According to Article 74 of the Constitution:

- Everyone shall have the right to live in healthy environment and the right to timely and full information about the state of environment.
- Everyone, especially the Republic of Serbia and autonomous provinces, shall be accountable for the protection of environment.
- Everyone shall be obliged to preserve and improve the environment

Article 58 of the Constitution guarantees of peaceful tenure of a person's own property and other property rights acquired by law. The Article indicates that right of property may be revoked or restricted only in public interest established by law and with compensation which cannot be less than market value.

Article 16 of the Constitution states that the foreign policy of the Republic of Serbia shall be based on generally accepted principles and rules of international law. Generally accepted rules of international law and ratified international treaties shall be applied directly if they are dully signed and ratified by the Government of Serbia. The following table presents the key national laws and regulations applicable to the reduce the potential environmental and social impacts that may arise from the construction and operational activities of the Project.

Table 3 Main national legislation regarding environmental and social parameters

Laws and regulations	Official gazette Republic of Serbia	Relevance
Law on Environment	135/04, 36/09, 72/09, 43/11, 14/16, 76/18 and 95/18	The Law on Environmental Protection is the framework national environmental law. The law is currently the main legislation relating to environment protection in Serbia and is harmonized with the Council Directive 2003/105/EC, which amends Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances (Seveso II Directive). The main objectives of Law on Environmental Protection are: • Conservation and improvement of the environment; and • Control and mitigation of pollution of the environment. The main focuses of Law on Environmental Protection are: • Declaration of ecologically critical areas and restriction on the operations and processes, which can or cannot be carried out/ initiated in the ecologically critical areas; • Environmental Approval; • Promulgation of standards for quality of air, water, noise and soil for different areas for different purposes; • Promulgation of a standard limit for discharging and emitting waste; and • Formulation and declaration of environmental guidelines.
Law on Environmental Impact Assessment	135/04 and 36/09	This Law regulates EIA process, EIA content, Interested Authorities and organizations participation and public participation, international notification for projects that can have important impacts on other environment and inception and other important issues for EIA.
Law on Strategic Impact Assessment	135/04 and 88/10	The Law on Strategic Impact Assessment regulates the conditions, manner and procedure for assessing the impact of certain plans and programs, on the environment.
Law on Air Protection	36/09, 10/13 and 26/21	The Law on Air Protection regulates the management of air quality and determines the measures, manner of organization and control of the implementation of protection and improvement of air quality as a natural value of general interest that enjoys special protection.

Laws and regulations	Official gazette Republic of Serbia	Relevance
Law on Nature Conservation	36/09, 88/10, 91/10, 14/16, 95/18 and 71/21	This law creates the following objectives: 1) protection, preservation and improvement of biological (genetic, spices and ecosystem), geological and landscape diversity; 2) harmonization of human activities, economic and social development plans, programs, bases and projects with sustainable use of renewable and non-renewable natural resources and long-term preservation of natural ecosystems and natural balance; 3) sustainable use and / or management of natural resources and goods, ensuring their function while preserving natural values and balance of natural ecosystems; 4) timely prevention of human activities and activities that may lead to permanent impoverishment of biological, geological and landscape diversity, as well as disturbances with negative consequences in nature; 5) determining and monitoring the state of nature; 6) improvement of the condition of disturbed parts of nature and landscapes. The Law on Nature Conservation adopted EU Habitats Directive and the Birds Directive. The Decree on Ecological Network ("Official Gazette of RS", No. 102/10) identifies ecological network areas in Serbia and sets the management, financing, monitoring and protection requirements. Serbian Legal Framework on Habitats and Species: • Regulation on the criteria for separation of habitat types, sensitive, vulnerable, rare, and for the protection of priority habitat types and protection measures for their preservation (Official Gazette of No. 35 /10), • Regulation on cross-border trade and trade in protected species (Official Gazette No. 6/14), • Regulation on special technical and technological solutions that enable undisturbed and safe communication of wild animals (Official Gazette of No. 72/10), • Regulation on control of use and trade of wild flora and fauna (Official Gazette of No. 69/11) • Regulation on the proclamation and protection of strictly protected and protected wild species of plants, animals and fungi (Official Gazette of No. 98/16)

Laws and regulations	Official gazette Republic of Serbia	Relevance
Law on Waste Management	36/09, 88/10, 14/16 and 95/18	The Law on Waste Management is harmonized with all relevant EU directives. The Law regulate: types and classification of waste; waste management planning; waste management entities; responsibilities and obligations in waste management; organization of waste management; managing special waste streams; conditions and procedure for permit issuance; transboundary movement of waste; reporting on waste and database; financing of waste management; supervision, and other issues relevant for waste management. The Law on Waste Management has transposed the European Waste Framework Directive (2008/98/EC as last amended by 851/2018/EC), the European Directive on Landfills (1999/31/EC, as amended) through transposition in the Serbian Law on Waste Management and/or Regulation on waste landfilling in combination with the Regulation on Categories, Testing and Classification of Waste, the European Directive on Packaging and Packaging Waste (1994/62/EC, as amended transposition in the Serbian Law on Packaging and Packaging Waste. The European Directive on Waste Electric and Electronical Equipment (WEEE) (2012/19/EU, as amended) has experienced transposition though the Serbian Law on Packaging and Packaging Waste in combination with the Rulebook on the List of Electric and Electronic Products, Measures of Prohibition and Restriction of Use of Electric and Electronic Equipment Containing Hazardous Substances, Methods and Procedures of Managing Waste from Electric and Electronic Products. In April 2016, IZS the Board of Directors of IZS adopted a Hazardous waste Manual governing management, disposal, deposit and selling of materials characterized as hazardous. The Manual is aligned with the National Strategy on Waste Management, the Law on waste Management and the applicable secondary laws. The Manual in particular treats management of PCB containing waste, absorbents, filter material and oil, wooden sleepers, asbestos containing waste. Serbia has ratified the: • Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and pesticides in International Trade (Official Gazette of RS, International Agreements, No. 38/09) the • Stockholm Convention on Persistent Organic Pollutants (Official Gazette of RS–International Agreements, No. 42/09) the • Basel Convention on Transboundary Movement of Hazardous Wastes and their Disposal Official Journal of FRY, International Treaties, No. 2/99, the • Aarhus Convention (“Official Gazette of RS- International Treaties”, No. 38/09) the • Protocol on Pollutant Release and Transfer Register to the Aarhus Convention” (“Official Gazette of RS - International Treaties”, No. 8/1)

Laws and regulations	Official gazette Republic of Serbia	Relevance
Law on Chemicals	36/09, 88/10, 92/11, 93/12 and 25/15	The Law on Chemicals regulates the integrated management of chemicals, their classification, packaging and labeling, register of chemicals and trade of chemicals. It transposed EU legislation in the field of chemicals related to POPs Regulation 1907/2006/EC on registration, evaluation and authorization on chemicals (REACH) – partially harmonized, Regulation 757/2010 amending Regulation 850/2004, Directive 2004/42/EC on limitation of emissions of volatile organic compounds (VOC) from the use of organic solvents in certain paints, varnishes and vehicle refinishing products, Regulation 689/2008/EC export and import of dangerous chemicals on banned and severely restricted chemicals as well as Directive 67/548/EEC on classification, labeling and packaging of substances, Directive 1999/45/EC on classification, labeling and packaging of preparations Regulation 1272/2008/EC on classification, labeling and packaging of substances and mixtures in accordance with GHS and Regulation 440/2008/EC on test methods pursuant to REACH.
Law on Water	30/10, 93/12, 101/16, 95/18 and 95/18 – other law	The Law on Water which incorporates the EU Water Framework Directive, covers water regimes, water management areas, responsibilities for water management (including sub-law water management legislation), water management activities, limitation of owners' and beneficiaries' rights, water cooperatives, financing of water management activities, and administrative inspection to enforce the Law. The legislation provides for various water management sub-laws on water resource conditions, water resource compliance and water resource permits.
Law on Environmental Noise	96/21	The Law on Protection against Environmental Noise, transposes EU Directive 2002/49/EC relating to the assessment and management of environmental noise. The Law has the following main goals: establishment, maintenance and improvement of the system of noise protection on Serbian territory; and determination and realization of measures in the field of noise protection that avoid, prevent or decrease the harmful effects of noise on human health and the environment. The limit levels of noise are covered by the Regulation on permitted level of noise in the environment. The permitted noise levels are defined by the Decree on environmental noise indicators, limits values, assessment methods of the noise indicators, the nuisance and the harmful effects (Off. Gazette of RS No. 75/10). This Decree stipulates the noise levels, which must not be exceeded. Annex 2 of the Decree states that the defined noise limits are applied to the all-encompassing noise generated by all noise sources at the site.

<table>
<tr><th>Laws and regulations</th><th>Official gazette Republic of Serbia</th><th>Relevance</th></tr>
<tr><td></td><td></td><td>Noise levels in open spaces (limits as defined in Serbian legislation)
<table>
<tr><th>Zone</th><th>Purpose of the area</th><th colspan="2">Noise Level [dB(A)]</th></tr>
<tr><th></th><th></th><th>Daytime and evening</th><th>Night-time</th></tr>
<tr><td>1</td><td>Recreation areas, health institution areas, cultural and historical sites, large parks</td><td>50</td><td>40</td></tr>
<tr><td>2</td><td>Tourist areas, schools, camps</td><td>50</td><td>45</td></tr>
<tr><td>3</td><td>Residential areas</td><td>55</td><td>45</td></tr>
<tr><td>4</td><td>Commercial and residential areas, children playgrounds</td><td>60</td><td>50</td></tr>
<tr><td>5</td><td>City centre, workshop area, commercial area, administrative area with apartments, zones along highway, regional roads and city streets</td><td>65</td><td>55</td></tr>
<tr><td>6</td><td>Industrial areas, warehouse, and service areas, transport terminals with no residential buildings</td><td colspan="2">Noise level at the boundary of this zone shall not exceed the limit value defined for the zone it borders</td></tr>
</table></td></tr>
<tr><td>Law on safe transport of hazardous goods</td><td>104/16, 83/18, 95/18 and 10/19</td><td>Law on transport of hazardous materials regulates conditions for performing domestic and international transport of dangerous goods in road, rail and inland waterway transport on the territory of the Republic of Serbia. Furthermore, it sets requirements in relation to packaging, mobile pressure equipment (e.g. tanks), means of transport intended for transport of dangerous goods, conditions for body designation which examine and control packaging, mobile pressure equipment, and vehicles for transport of dangerous goods. This Law also defines competencies of state bodies and organizations in transport of dangerous goods, conditions and obligations to fulfill the participants in the transport of dangerous goods, supervision, as well as other issues related to the transport of dangerous goods.</td></tr>
<tr><td>Law on mining and geological explorations</td><td>101/15, 95/18 and 40/21</td><td>The Law on mining and geological explorations regulate measures and activities of the mineral policy and the manner of implementation thereof, conditions and manner of execution of geological explorations of mineral and other geological resources, researching of geological environment, as well as geological explorations for the purpose of spatial and urban planning, designing, construction of buildings and remediation of site, manner of classification of resources and reserves of mineral raw materials and ground waters, exploitations of reserves of mineral raw materials and</td></tr>
</table>

Laws and regulations	Official gazette Republic of Serbia	Relevance
		geothermal resources, construction, use and maintenance of mining facilities, plants, machines and equipment, execution of mining works, mining waste management, remediation and recultivation of abandoned mining facilities, as well as inspection over the implementation of the present Law. The Geological Institute of Serbia is established by the same Law as an individual organization with the capacity of a legal entity that carries out the basic geological explorations and other geological explorations as well as the works of applied geological explorations of importance for the Republic of Serbia, in accordance with this Law.
Law on Railway	41/18	This law regulates the management of railway infrastructure, the performance of railway transport activities, and the licensing of railway undertakings. Access to railway infrastructure, service facilities and services, principles and procedures for determining and calculating prices of access to public railway infrastructure and prices of services related to railway transport, public railway infrastructure capacity allocation, industrial railways and industrial tracks, competencies of the Railway Directorate, passenger rights and public passenger transport services by rail of general economic interest.
Planning and construction law	72/09, 81/09 (Corrigendum), 64/10 (CC), 24/11, 121/12, 42/13 (CC), 50/13 (CC), 98/13 (CC), 132/14 145/14, 83/18, 31/19, 37/19 (CC), 9/20 and 52/21	The planning and construction law it governs the following issues: the conditions and modalities of spatial planning and development, the development of general and detailed regulation plans, the development and use of construction land and the construction of facilities, predominant use of land when the land has multiple uses, public use of land and other issues of significance in the development of space, landscaping and use of construction land and the construction of facilities. It prescribe procedure for: issuance of site conditions; issuance of building permit; notice of works; issuance of occupancy permit; attainment of conditions for design, i.e. connection of a facility to the infrastructure network; obtaining legal instruments and other documents issued by the holders of public authorities required for the construction of facilities, i.e. for the issuance of site location conditions, building permit and occupancy permit within their competence, as well as for the provision of conditions for connection to the infrastructure network and for the registration of title to the built facility and for designating a house number (unified procedure).
Law on Expropriation	53/95, 23/01, 20/09, 55/13-CC ruling and 106/16 – authentic interpretation	The Law on Expropriation enables government institutions to acquire property for projects that are deemed to be of public interest, while protecting the interests of all persons with legal title, whose assets are to be expropriated. The Law on expropriation does not use the term "involuntary resettlement", but instead uses the term "expropriation" and is based on the Governments eminent domain power. The Law in conjuction with the project Resettlement Action Plan will guide land acquisition and resettlement needed for the Project.

Laws and regulations	Official gazette Republic of Serbia	Relevance
Law on Special Procedures for the Implementation of the Project of Construction and Reconstruction of line Infrastructure Structures of Particular Importance to The Republic of Serbia	9/20	The law provides inter alia particular conditions to the Law on expropriation governing land acquisition for construction of line infrastructure objects in the road, rail, water, and air sector with the potential to beneficially impact the overall development of the Republic of Serbia. The law is infused with the intention of efficiency cutting across the permitting and land acquisition procedure. This Law shall apply to projects of construction and reconstruction of line infrastructure structures of particular importance to the Republic of Serbia. Construction and reconstruction of public line transport infrastructure (road, rail, water, and air) are deemed as Projects of particular importance to The Republic of Serbia. The decision on recognition i.e. implementation of each such Project as a Project of particular importance to the Republic of Serbia is passed by the Government. The Law identifies projects of construction and reconstruction of the line infrastructure structures of particular importance to the Republic of Serbia and governs the process of determining the public interest for complete and incomplete expropriation and temporary occupation of immovable property required for development purposes. The Law sets the range of potential Beneficiaries of Expropriation (BoE), defines the specific expropriation procedure, permitting and approval procedures to create an enabling environment for efficient implementation of Projects to particular importance to the Republic of Serbia. In terms of this Law, Projects of particular importance to the Republic of Serbia are projects of construction and reconstruction of line infrastructure structures that have an impact on an overall development of the Republic of Serbia, balanced regional and local economic development, international, regional and interior territorial connection, improvement of connectivity, prevention of the degradation of the parts of the territory of the Republic of Serbia, ensuring and improving population's subsistence, social development, and environmental protection thereby enhancing an overall living standard of the citizens of the Republic of Serbia. Procedures of rehabilitation, maintenance, renovation, modernization and other works on line infrastructure structure shall be subject to the provisions of the law governing that type of line infrastructure structure unless otherwise stipulated by this Law. The novelty of the Law is for cases during construction in which the scope of work needs to be conducted outside the area of the already acquired land, such land shall be acquired through a negotiated settlement between the owner and the beneficiary of expropriation. Unless differently regulated by this law the Law on Expropriation shall govern the Land acquisition process.
Building legalization law	96/15, 83/18, 81/20 – CC ruling	Building legalization law regulates the conditions, procedure and manner for legalizing buildings, parts of buildings, auxiliary buildings and other buildings constructed without a building or construction permit. The custom of constructing buildings (houses, shops, even apartment buildings), or adding auxiliary buildings to existing, legal building (garage, additional floors on houses or rooms) without a construction permit became quite usual during the past 30 years. The governments over the years always maintained the intention to legalize all illegally constructed buildings, if constructed on own land and/or with consent of the owner, but most of the buildings have not yet been legalized. It is without any doubt that if the Project will have any resettlement impact, some of the assets will be buildings without building permits

Laws and regulations	Official gazette Republic of Serbia	Relevance
		so provisions of this law can be important, but in those cases, the Resettlement Policy Framework, in terms of eligibility, shall prevail if more stringent. This law now imposes restrictions to title transfer for structures constructed without building permits. In line with Article 28, all structures subject to the formal process of legalization shall within 6 months be registered as such by the relevant cadastral authority together with the note that any commercial transaction in terms of transfer of title is forbidden.
Law on Extra-Judicial Proceedings	"Official Gazette of SRS", No. 25/82 and 48/88, amended "Official Gazette of the RS" No 46/95, 18/05, 85/12, 45/13, 55/14, 6/15 and 106/15-other law	The Law on Extra-Judicial Proceedings defines the rules by which courts decide on personal, family, property-related and other rights and legal interests, which are resolved in extra-judicial proceedings, pursuant to the Law. In accordance with this Law, the court in extra-judicial proceedings determines compensation for an expropriated property after it establishes the important facts and approves a decision which defines the type and amount of compensation. According to this Law, participants may conclude an Agreement about type and amount of compensation, and the court will then base its decision on their agreement, if the court finds that the agreement is not contrary to mandatory regulations.
Law on Administrative procedures	18/16 and 95/18	The law defines the rules and procedures to be applied by government authorities when deciding on rights, obligations or legal interests of individuals, legal persons or other parties, within the framework of administrative procedures. Decisions by administration bodies are approved in form of a decree, after completing the procedure as prescribed by this Law. The party has the right to appeal against the decision approved in first instance. This Law administratively governs the expropriation process.
Law on State Survey and Cadaster	72/09, 18/10, 65/13, 15/15, 47/17, 113/17, 27/18, 41/18- other law and 9/20 – other law	The Law on State Survey and Cadastre regulates the professional activities and affairs of the state administration related to land, buildings and other structures survey, real estate cadastre, records and registration of property, registration of possession, registration of illegal buildings and buildings legalized according to provision of the latest Building Legalization Law of RS, utilities cadastre, basic geodetic works, address register, topographic and cartographic activities, valuation of real estate, geodetic and cadastral information system.
Labour Law	32/13, 75/14, 13/17- CC ruling, 113/17 and 95/18 – authentic interpretation	The Labor Law is the main legislation that guides labor practices in Serbia. It provides for the minimum rights of employees such as the right to corresponding salary/wage, safety and health at work, health-care protection, personal integrity protection, personal dignity, and other rights in the event of illness, reduction or loss of work ability and old age, including unemployment financial benefits during temporary unemployment, as well as the right to other forms of protection, in conformity with the law and bylaw, i.e. the employment contract. An employed woman is entitled to special protection during pregnancy and childbirth. Special protection is also guaranteed to employees under 18 years

Laws and regulations	Official gazette Republic of Serbia	Relevance
		of age and an employed person with a disability. The terms and conditions provided by this Law also includes ban to direct or indirect discrimination regarding employment conditions and choice of candidates for performing a specific job, conditions of labor and all the rights deriving from the employment relationship, education, vocational training and specialization, job promotion and termination of employment contracts on the grounds of differences by virtue of sex, birth, language, race, color of the skin, age, pregnancy, health condition, and/or disablement, ethnic origin, religion, marital status, family obligations, sexual orientation, political or other belief, social background, financial status, membership in political organizations, trade unions, or any other personal characteristic. The Labour Law guarantees the employee's right to corresponding earnings, compensations and refund of expanses, entitlement to training and professional development, provision of safety and health at work, health-care protection, personal integrity protection, personal dignity, and other rights in the event of illness, reduction or loss of work ability and old age, including financial benefits of temporary unemployment, as well as the right to other forms of protection. The provisions of the Labor Law apply to all employees who work in the territory of the Republic of Serbia for a national or foreign legal or natural person (i.e. employer), as well as to employees assigned to work abroad by an employer, unless otherwise specified by the law. The LL is also applicable to the employees in the field of transport, employed foreign nationals and stateless persons working for an employer in the territory of the Republic of Serbia (Labor Law - Article 2). The Labour Legal framework is aligned with EU Requirements as Serbia is signatory to 8 core ILO conventions.
Law on Occupational Safety and Health organized	101/05, 91/15 and 113/17 -other law	The Law on Occupational Safety and Health organized governs the occupational safety and health system in Serbia. By harmonizing this law with the ratified International Labor Organization conventions and EU Framework Directive 89/391/EEC, as well as special directives derived from the Framework Directive, all guidelines originating from them have been accepted in a form adjusted to national conditions. Apart from this Law, the regulatory framework of the occupational safety and health system is integrated by several sub-acts. The Rulebook on preventive measures for occupational health and safety and prevention and containment of contagious diseases epidemic ("Official Gazette RS" No 94/20) governs preventive measures employers need to introduce at workplaces and applies to all persons at workplaces in cases an epidemic has been declared. The provisions of this are further elaborated in numerous by-laws, for regulating the specific implementation procedures. A total of 8 legal acts and 55 rulebooks related to the area of occupational health and safety are ensuring implementation of the Law, and providing targeted OH&S procedures for e.g. • working on temporary and movable construction sites, • deep drilling and exploitation of raw minerals, • exposure to asbestos, • working in an environment at risk from explosive atmosphere,

Laws and regulations	Official gazette Republic of Serbia	Relevance
		• mitigation measures from hazardous risk of electricity, • working in quarries, clay, sand and pebble extraction sites, • rail traffic, • noise, vibration emissions exposure etc. preventive measures during manual cargo movement.
Law on Road Traffic Safety	41/09, 53/10, 101/11, 32/13 - CC ruling, 55/14, 96/15 - odher law, 9/16 - CC ruling, 24/18, 41/18, 41/18 - odher law, 87/18, 23/19 and 128/20 - odher law	Regulates traffic signalization, security provisions for temporary closure or changes of traffic on roads (horizontal and vertical signalling, light signalling, telecommunication devices, etc.), driver permits for all sort of vehicles, technical review for vehicles in traffic etc. It also regulates traffic signalization on parts of road where obstacles or damage occur or where the works are carried out.
Law on Cultural property	71/94, 52/11 – other law, 92/11 – other law, 6/20 and 35/21- other law	The Law on Cultural property regulates the system of the protection and use of cultural property and define conditions for the implementation of activities relating to the protection of cultural property. Depending on its physical, artistic, cultural and historical features, cultural property in Serbia include: cultural monuments, spatial cultural-historical units, archaeological sites and landmarks – immovable cultural property; works of art and history, archival material, film material and old and rare books – movable cultural property. Depending on its importance, cultural property in Serbia is also classified into: cultural property, cultural property of great importance and cultural property of exceptional importance. This Law define chance find procedure. According to Article 28 of subject law, a person who digs out of earth or takes from water property under prior protection outside of organized research shall immediately, within 24 hours at the latest, inform thereof a competent cultural property protection institution and the ministry responsible for interior affairs.

3.2 - National EIA procedure

Environmental impact assessment is a preventive measure of environmental protection based on processing demands, preparation of assessments and consultations with the participation of the public and analysis of alternative measures, aiming to collect data and predict harmful effects of certain projects on the environment and human health, flora and fauna, land, water, air, climate and landscape, material and cultural heritage and the interaction of these factors, as well as determine and propose measures for adverse effects to be prevented, reduced or eliminated, bearing in mind the feasibility of these projects.

Law on Environmental Impact Assessment (EIA) ("Official Gazette of the RS", No. 135/04 and 36/09) regulates EIA process, EIA content, Interested Authorities and organizations participation and public participation, international notification for projects that can have important impacts on other environment and inception and other important issues for EIA.

The impact assessment includes projects in the field of industry, mining, energy, transport, tourism, forestry, agriculture, water management, waste management, utilities and projects planned in a protected natural asset or special purpose area defined by the Decree on making the list of projects which require environmental impact assessment and list of projects which may require environmental impact assessment ("Official Gazette of the RS", No. 114/08).

The process of environmental impact assessment of the modernization project of the existing railway is initiated by the owner of the project, which is "Serbian Railway Infrastructure" AD, with the competent authority for environmental protection. If the request is submitted by another person on behalf of the project - it must have the appropriate authorization issued to the project holder with the number of the request, the date of issue and the signature of the authorized person of the project owner. Facilities whose construction permit is issued by the republic authority; the impact assessment procedure is carried out by the Ministry of Environmental Protection.

Facilities whose construction permit is issued by the Autonomous Region, the impact assessment procedure is carried out by the Provincial Secretariat for Spatial Planning, Construction and Environmental Protection. For projects for which a building permit is issued by the local self-government, the impact assessment procedure is carried out by the local self-government in charge of environmental issues. The Ministry of Environmental Protection is responsible for all projects that may have a transboundary impact.

The process of environmental impact assessment for railway infrastructure projects consists of the following phases:

Phase I - Deciding on the need for impact assessment,

Phase II - Determining the scope and content of the impact assessment.

The process of impact assessment commences with submission of Request as follows:

1) Request for deciding on the need to assess the impact of the project on the environment for reconstruction projects and/or construction of railway lines including associated buildings and equipment ie. projects that are on the list of projects that may be required to have Environmental impact assessment - List II Regulation (Infrastructure Projects)
2) Request for determining the scope and content of the environmental impact assessment for the following projects: main railway lines, including associated facilities (bridges, tunnels, stations), ie. for projects that are on the list of projects for which the impact assessment is mandatory - List I

Regulations as well as projects that are on the List II for which the competent authority has decided to require assessment of the impact on the environment.

The scope and content of the Request for deciding on the need to assess the impact of the project on the environment and the Request for determining the scope and content of the project impact assessment on the environment are defined by the Law on Impact Assessment and the Ordinance on the content of and the content of the study on environmental impact assessment ("Official Gazette of RS", No. 69/05).

The request for determining necessity of assessment shall be accompanied by the following documents:

- A copy of the current planning document (location information), that is - verified planning design or act on planning requirements for construction of project concerned (location requirements);
- conceptual design or preliminary design, or the excerpt from the preliminary design,
- graphical representation of micro- and macro-design;
- requirements and approvals of other competent authorities and organizations obtained in accordance with the law;
- Proof of payment for the administrative fee;
- other evidence at the request of the competent authority.

In addition to the requirements for determining the scope and content of the EIA assessment shall be accompanied by the following documents:

- A copy of the current planning document (location information), and verified planning design or act on planning conditions for construction of the concerned project (location conditions);
- conceptual design or preliminary design, or the excerpt from the preliminary design,
- graphical representation of micro- and macro-location;
- requirements and approvals of other competent authorities and organizations obtained in accordance with the law;
- Proof of payment for the administrative fee;
- other evidence at the request of the competent authority.

The Rulebook on the content of the Environmental Impact Assessment Study defines the content of the study, including a qualitative and quantitative presentation of possible changes in the environment during the project, regular work, in case of an accident and assessment of whether the changes are temporary or permanent. The decision on defining the scope and content of the study made by the competent authority in charge of environmental issues specifies in detail the content of the study on environmental impact assessment.

The Law explicitly stipulates that the implementation of the project cannot be undertaken without the implementation of the environmental impact assessment procedure and obtained consent to the Environmental Impact Assessment Study, or decision that there is no need for the EIA Study.

Phase III - Procedure for granting approval for the Environmental Impact Assessment Study

Since the Environmental Impact Assessment Study is an integral part of the technical documentation required to obtain a building permit, it is usually made at a very early design stage at the level of the preliminary or main design, ie. project for a building permit. More specifically:

- At the request of the project holder, the competent authority shall issue a decision on granting approval to the EIA Study or on rejecting the request for granting approval to the EIA Study, based on the conducted procedure and the report of the Technical Commission.
- The competent authority establishes a technical evaluation committee for the Environmental Impact Assessment Study. The Technical Commission evaluates the EIA study in accordance with the Law on Environmental Impact Assessment and the Rules of Procedure of the Technical Commission for the Evaluation of the Environmental Impact Assessment Study.
- Public participation is ensured at all stages of the environmental impact assessment process: the decision-making process on the need for impact assessment, the procedure for determining the scope and content of the EIA Study and the procedure for giving approval to the Environmental Impact Assessment Study. The competent authority is obliged to inform the interested authorities and organizations and the public about the submitted request, provide insight in submitting the request and documentation that is attached to the request and provide public insight, organize the presentation and conduct a public discussion on the Environmental Impact Assessment Study.
- Figure 2 presents the EIA Procedure in Serbia through flowchart and the stakeholder engagement required by the law in each phase of the EIA managed by the Ministry of Environmental Protection.

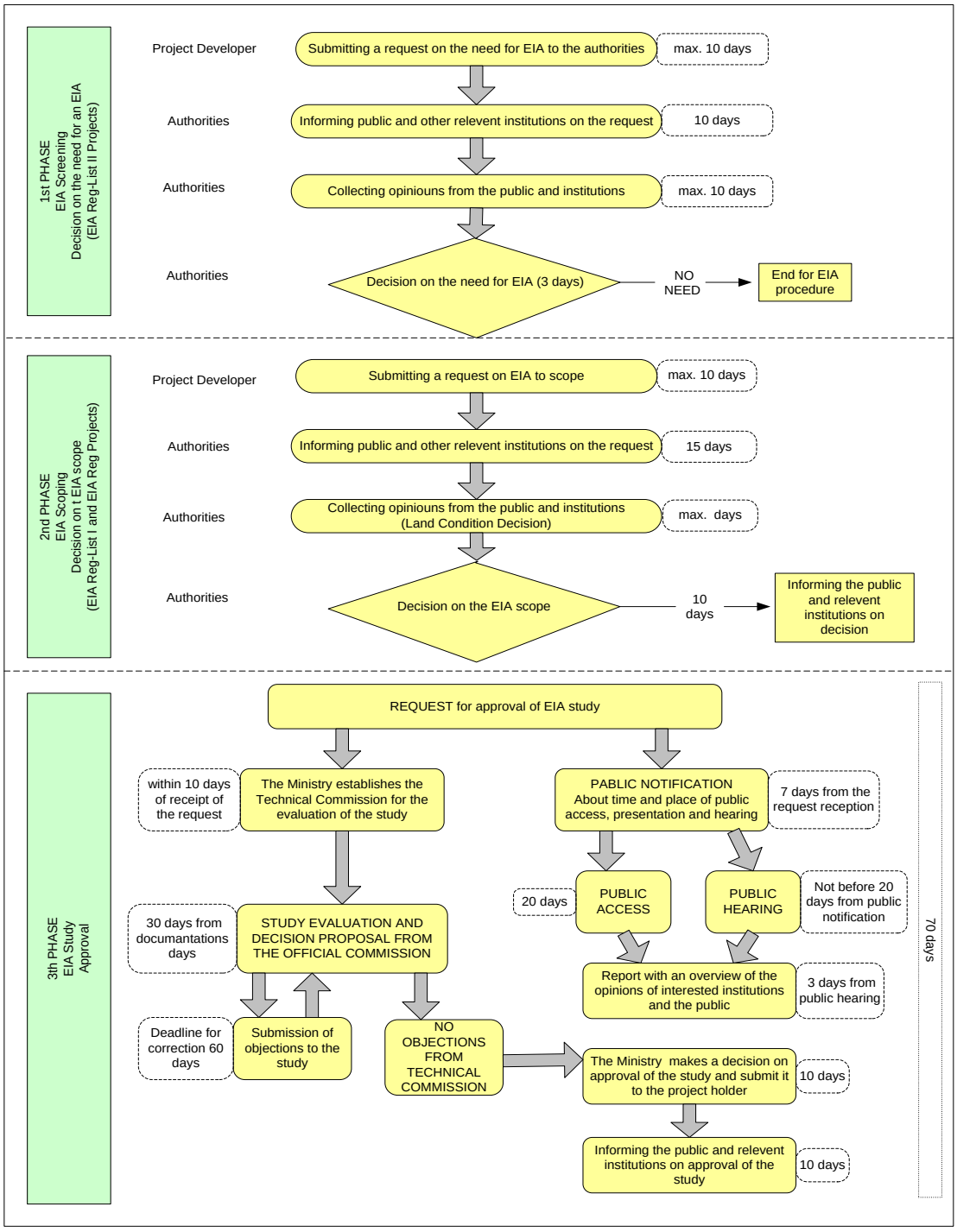

Figure 2 The EIA procedure in Serbia

Permitting procedure

The Ministry of Environmental Protection is responsible for the environmental impact assessment procedure and approves the EIA, in accordance with the Law on Environmental Impact Assessment.

The Decree on Determining the List of Projects for Which an Impact Assessment is Mandatory and the List of Projects for Which an Environmental Impact Assessment May Be Required ("Official Gazette of the RS", No. 114/08) determines the List I Projects for which an Environmental Impact Assessment is Mandatory and List II Projects for which an environmental impact assessment may be required.

The Law on Environmental Impact Assessment ("Official Gazette of RS", No. 135/04 and 36/09) regulates the environmental impact assessment procedure, the content of the environmental impact assessment study, the participation of interested bodies and organizations and the public, cross-border notification for projects that may have significant environmental impacts, supervision and other environmental impact assessments.

An overview of the relevant laws governing the permitting process is provided in the table below.

Table 4 Relevant laws related to permitting process

Law	OfG.	Relevance for this ESIA
Law on Planning and Construction	72/09, 81/09, 64/10, 24/11, 121/12, 42/13, 50/13, 98/13, 132/14, 145/14, 83/18, 31/19, 37/19, 9/20 and 52/21	Art. 27-33, 53a-57 and 99- Defines Location Condition Issuance Art. 133-140 - Defines the Issuance of Building Permit Art. 148 - Defines Construction Works Application Submission Art. 154-159- Defines the Issuance Of Use Permit
Law on Environmental Impact Assessment	135/04 and 36/09	Article 5 - The obligation to obtain an approval for the impact assessment. Art. 16-28 - Deciding on approval of the Impact Assessment

The following permits will be required for the ESIA phase: Location conditions for the preliminary design and the decision to approve the impact assessment. ESIA approval is required to issue a building permit.

3.3 - Overview of the Main Relevant International Regulatory Framework

3.3.1 - The EU EIA Directive

The Environmental Impact Assessment (EIA) was introduced for the first time in Europe in 1985 by the EIA Directive (85/337/EEC) and represents a key instrument for European Union environmental policy. The EIA Directive of 1985 has been amended three times:

- Directive 97/11/EC brought the EIA Directive in line with the UN ECE Espoo Convention on EIAs in a Transboundary Context. The 1997 Directive widened the scope of the EIA Directive by increasing the types of projects covered and the number of projects requiring mandatory environmental impact assessment (Annex I). It also provided for new screening arrangements, including new screening criteria (included in Annex III) for Annex II projects, and established minimum information requirements;
- Directive 2003/35/EC sought to align EIA Directive provisions with the Aarhus Convention on public participation in decision-making and access to justice in environmental matters; and

- Directive 2009/31/EC amended Annexes I and II of the EIA Directive, by adding projects related to the transport, capture and storage of carbon dioxide (CO2).
- Directive 2011/92/EU on the effects of public and private projects on the environment
- Directive 2014/52/EU on the requirements for assessment of potential adverse effects on the environment of some public and private projects that are expected to have significant impact on the environment

On January 28th 2012, Directive 2011/92/EU on the effects of public and private projects on the environment was published in the Official Journal. Directive 2011/92/EU codifies Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment (EIA Directive) and its associated amendments. Directive 2011/92/EU fully preserves the content of the acts being codified and does no more than bring them together with only such formal amendments as are required by the codification exercise itself.

The scope of this Directive is to ensure that plans, programmes and projects likely to have significant effects on the environment undergo an Environmental Assessment prior to their approval or authorization. While Annex I contain a list of projects for which the EIA is mandatory, Annex II defines those categories of projects whose ESIA is optional and at the discretion of the community member states.

According to the Directive 2011/92 EC, the proposed Project falls into Annex I, Category 7 (a) " Construction of lines for long-distance railway traffic and of airports with a basic runway length of 2100 m or more".

The EU Directive 2011/92/EC on Environmental Impact Assessment as amended by 2014/52/EU". defines the requirements for assessment of potential adverse effects on the environment of some public and private projects that are expected to have significant impact on the environment. The EIA is conducted prior to the issue of the construction permit and approval for project implementation. The environmental impact may be the impact on human beings or on biological diversity, on the quality of soil, water, air or other natural resources, on the climate and contribution on the climate change, or on the historical and cultural heritage, as well as on the interaction between these elements. Cumulative impacts will be taken into account, while alternatives description will involve the baseline scenario and the "zero" alternative description. The public and other parties are to be consulted on the EIA as the consultation with the public is a key feature of environmental assessment procedures.

3.3.2 - Other Most Relevant EU Directives

Other relevant EU Directives that will be considered are the following:

- Water Framework Directive establishing a framework for Community action in the field of water policy (2000/60/EC)
- Directive on the assessment and management of flood risks (2007/60/EC) - Floods Directive
- Directive 2008/105/EC on environmental quality standards in the field of water policy(amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC) establishes, among others: (1) limits on concentrations in surface waters of 33 priority substances and 8 other pollutants (Annex I); (2) the possibility of applying Environmental Quality Standards (EQS) for sediment and biota, instead of those for water; (3) the possibility of designating mixing zones adjacent to discharge points where concentrations of the substances in Annex I might be expected to exceed their EQS; and (4) a requirement for Member States to establish an inventory of emissions, discharges and losses of the substances in Annex I.
- Directive 2006/11/EC on Dangerous Substances lays down rules for protection against, and prevention of, pollution resulting from the discharge of certain substances into the aquatic environment of the Community.

- Groundwater Directive 2006/118/EC established a regime which sets groundwater quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater.
- Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances (amending and subsequently repealing Council Directive 96/82/EC), obliges Member States to ensure that operators have a policy in place to prevent major accidents.
- Environmental Noise Directive 2002/49/EC defines a common approach intended to avoid, prevent or reduce on a prioritized basis the harmful effects, including annoyance, due to exposure to environmental noise, including, among other, assessment methods for the noise indicators.
- Directive 2000/14/EC on the approximation of laws of the Member States relating to noise applies to equipment for use outdoors listed in Articles 12 and 13 and defined in Annex I of this Directive.
- Directive 2008/50/EC 16 on ambient air quality and cleaner air for Europe;
- Directive 2008/98/EC 18 on waste (Waste Framework Directive)
- Habitats Directive 92/43/EEC aims to contribute towards ensuring biodiversity through the conservation of natural habitats and of wild fauna and flora in the territory of the Member States.
- Birds Directive 2009/147/EC relates to the conservation of all species of naturally occurring birds in the wild state in the territory of the Member States.
- Directive 89/391/EEC – Occupational Health and Safety
- Regulation (EU) 2018/1999 of the European Parliament and of the Council on the Governance of the Energy Union and Climate Action ('European Climate Law')

3.3.3 - Relevant International Multilateral Agreements

Most of the International Conventions about the Environment, Public Participation and Labour issues have been transposed in the Serbian national legislation such as:

- Bern Convention for the Protection of flora, wild fauna and nature environment of Europe, signed in 1995 and ratified by the GoA in 1999, ratified by the law 8294/1998.
- CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora, ratified by the GoA in 2003.
- Convention of Biological Diversity (CBD) Rio de Janeiro, signed in 1996 and ratified by the GoA in 2004.
- Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus, 1998), ratified by the law no.8672/2000.
- United Nations Convention to Combat Desertification (UNCCD) was ratified in 1999.
- Convention on the Conservation of Migratory Species of Wild Animals (CMS or the Bonn Convention) ratified by the GoA in 2002.
- ESPOO Convention (Finland) "On Environmental Impact Assessment in a Transboundary Context.", ratified by the law no 9478/2006.
- United Nations Framework Convention on Climate Change (UNFCCC)ratified by the law no. 2/97.
- Kyoto protocol to the United Nations Framework Convention on climate change 1998 ratified by Serbian government 2007.
- Paris Agreement, United Nations 2015, ratified by the law no. 4/17.
- Protocol on Strategic Environmental Assessment ratified by Serbian government at the end of 2004,

- The European Landscape Convention, Florence, 2000, ratified 2011.
- International Convention on the Elimination of all forms of Racial Discrimination, New York, 7.03.1966
- Convention on Elimination of all forms of Discriminations Against Women, New York, 03.09.1981, ratified by Republic of Serbia in 2001.
- Council of Europe Convention on Preventing and Combating Violence Against Women and Domestic Violence, Istanbul, 11.05.2011, in force in Republic of Serbia from 01.08.2014.
- National Convention on Economic, Social and Cultural Rights New York, 16.12. 1966, ratified by Republic of Serbia in 1990.
- International Labour Organization Convention No. 155: Occupational Safety and Health, 1981, ratified 1992.
- UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage, 2003, ratified in May 2010.
- EUROPEAN Convention "For the Protection of Archaeological Heritage", ratified in 2009.

The IFI's recognises the responsibility of clients and their business activities to respect human rights. This responsibility involves respecting human rights, avoiding infringement on the human rights of others, and addressing adverse human rights impacts that their business activities may cause, or to which they may contribute. The term "social" refers to those issues which pertain to project-affected people (PAPs) and their communities and workers and related to socioeconomic status, vulnerability, gender identity, human rights, sexual orientation, cultural heritage, labour and working conditions, health and safety and participation in decision making.

The social standard IFI's Policy is guided by provisions of several fundamental treaties and conventions: The International Bill of Human Rights, International Labour Organization (ILO) Conventions, The European Convention on Human Rights, UNESCO World Heritage Convention etc.

In addition to the above, Serbia has adopted or embedded in its regulations the principles of many international treaties[5] and standards that provide base for EIB Policy SIA regulation.

3.3.4 - Espoo convention

Concerns about transboundary impacts from development projects are growing with time as the number and size of developments increase. The Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) establishes a procedure to manage transboundary impacts. The sovereignty of states means that states alone have the competence to take decisions in respect to the natural resources and the environment of their territory. Nevertheless, this structure does not co-exist comfortably with natural systems interrelationship, which does not respect political borders. An activity within one state's territory can have consequences in another state. International environmental laws, like the Espoo Convention, serve as the principal framework for cooperation among countries to protect the local, regional and global environment. The general aim of the Espoo Convention is to "ensure environmentally sound and sustainable development" through the prevention, reduction and control of significant adverse transboundary environmental impacts from proposed activities. More specific objectives are to "enhance international co-operation in assessing environmental impact, in particular in a transboundary context", and "to give explicit consideration to environmental factors at an early stage in the decision-making process". The last mentioned objective recalls

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[5] Convention on the Elimination of all Forms of Discrimination Against Women (CEDAW); World Health Organisation (WHO) standards and guidelines ; International Labor Organization Convention on Construction Safety and Health No. 167; EC Directive 98/59/EC of 20 July 1998 on the approximation of the laws of the Member States relating to collective redundancies and collective dismissals; EEC Directive 89/391/EEC the Safety and Health at Work Directive is a European Union directive that sets out general principles for protection of workers' ' Occupational safety and health; ECDirective 2008/96/EC On Road Infrastructure Safety Management; EU Directive 2012/18/EUon the control of major-accident hazards.

the concept of prevention, a core value in EIA. The countries that ratified the Convention are called parties or members of the Convention.

The Convention defines environmental impacts in a broad sense meaning "any effect caused by a proposed activity on the environment including human health and safety, flora, fauna, soil, air, water, climate, landscape and historical monuments or other physical structures or the interaction among these factors; it also includes effects on cultural heritage or socio-economic conditions resulting from alterations to those factors" (Espoo Convention, 1991). The strongest motivation for the Espoo Convention was the application of the already working EIA framework to assess transboundary impacts and to prevent conflicts between countries. The main mechanisms of the Convention intended to achieve its objectives are summarized below:

- Obligation to carry out an EIA procedure: EIA should be undertaken before decision making is done and it is applied to the project level;
- Consultations among countries: Consultations should occur along the whole EIA procedure (i.e. notification, preparation of the EIA documentation, consultations on the basis of the EIA documentation, final decision and post-project analysis);
- Public participation: Public participation in both the affected party and the party of origin should be facilitated during the whole Espoo process;
- Bilateral and Multilateral agreements; and
- Settlement of disputes.

Article 3 of the International Convention on Environmental Impact Assessment in a Transboundary Context states that "for a proposed activity listed in Appendix I" the "construction of lines for long-distance railway traffic" being included in this list "the Party of origin shall, for the purposes of ensuring adequate and effective consultations under Article 5, notify any Party which it considers may be an affected Party as early as possible and no later than when informing its own public about that proposed activity".

In December 2007, Serbia ratified the so-called Espoo Convention - Convention on environmental impact assessment in a cross-border context, which establishes a cross-border environmental impact assessment procedure for all planned projects of one country, which may have a significant impact on the environment of another country. The Republic of Serbia has obtained the first and second amendments to the Espoo Convention by adopting the Law on Confirmation of Amendments to the Convention on Environmental Impact Assessment in a Transboundary Context ("Official Gazette of RS - International Treaties, No. 4/16). The implementation of the Convention itself is based on national EIA procedures, however there are certain criteria and standards from other international conventions, agreements, national laws and programs that can be useful.

3.3.5 - Serbia's Progress for the EU Acquis

The Serbian government adopted in March 2018 a third revised version of the National Programme for the Adoption of the Acquis of the European Union (NPAA). NPAA is the most significant and most comprehensive document in the process of European integration of Serbia, since in addition to harmonizing the complete domestic legislation with the EU acquis, it also requires the strengthening of administrative capacities during accession negotiations with the EU, as well as long-term financial planning and responsible budget planning[6].

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[6] *(Serbia 2020 Report: Accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 2020 Communication on EU Enlargement Policy").*

Part of the analysis other report is presented below.

Following intensive preparatory work, Serbia submitted its negotiating position for chapter 27 in January 2020 to the Council. Some 4 years after its creation, Serbia's green fund has yet to become fully operational. Its 2019 financial allocations were not fully used. Its 2020 budget was reduced by 25% to address needs arisen from the COVID-19 crisis. Income generated from environmental fees is not earmarked for environmental purposes. This leads to a diversion of funds for other purposes. Serbia needs an effective institutional set-up to manage environmental investments, which need to increase much faster than previously. The investment plan needs to be turned into an investment programme, targeting projects with the highest environmental impact. Investment decisions need to be based on feasibility studies and technical designs in line with EU best practices and transparent competitive procurement procedures, ensuring best value for money.

In the area of horizontal legislation, Serbia has a high level of alignment with the EU acquis. Overall, Serbia needs to improve its administrative capacities at central and local level, including inspectorates, to draft legislation, give adequate time for legislative consultations and carry out qualitative public consultations, particularly at local level. Legislation on environmental impact assessment needs to be further aligned and its implementation strengthened. The non-compliance of environment impact assessment (EIA) legislation with other laws, especially with the law on planning and construction according to which the impact assessment is carried out after the issuance of the construction permit, needs to be urgently addressed. Strategic environmental assessments need to be carried out for plans and programmes from all relevant policy areas, not only the environment. Some progress can be reported on the implementation of the INSPIRE Directive. Strengthening the capacities of the judiciary and the environmental inspectorate and establishing a track record on implementing the Environmental Crime Directive remain priorities. Serbia needs to improve the implementation of the polluter pays principle, for example by strengthening capacities at local level to collect environmental fees.

The Labour Law ("Official Gazette of the Republic of Serbia", No 24/05, 61/05, 54/09, 32/13, 75/14 and 13/17-CC) is a general law and applies to employees and employers, unless otherwise established by a specific law. If there are no specific laws, the Labour Law has direct and full application, and if there are specific regulations, the Labour Law has partial and subsidiary application. The Labour Law is partly harmonised with the relevant EU regulations.

The basic regulation in the area of occupational safety and health is the Law on Safety and Health at Work ("Official Gazette of the RS", No 101/05 and 91/15) which contains basic provisions and principles of Council safety and health of workers at work. The Law imposes rights, obligations and responsibilities of employers and employees for the implementation of measures ensuring safe and healthy working conditions at work. The system of occupational safety and health was improved in 2015 by the adoption of the Law amending the Law on Health and Safety at Work in November 2015, implementing further harmonisation with Directive 89/391/EEC Acting in accordance with the National Programme for the adoption of the EU acquis, Occupational Safety and Health Administration is preparing proposals of regulations which transpose specific EU Directives in this area into national legislation.

There are further alignment with EU regulations which are under the NATIONAL PROGRAMME FOR THE ADOPTION OF THE ACQUIS -Third Revision

In the field of air quality, Serbia has a good level of alignment with the EU acquis. However, Serbia needs to speed up implementation of legislation and air quality plans. While an air quality monitoring network is in place and is being extended, and real-time data are available, the monitoring of air quality still needs to be

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considerably strengthened.

Regarding waste management, Serbia has a good level of alignment with the EU acquis, however the implementation remains at an early stage. Serbia also developed a national waste management strategy and a national sludge management strategy, which are currently in the adoption process. The by-law on treatment of the equipment and waste containing PCB, currently in the adoption procedure, will fully transpose the relevant EU directive. Serbia proceeded with the permanent disposal of historic hazardous waste. Additional economic instruments for special waste streams need to be developed. The proportion of recycled waste in overall waste management is still low, e.g. 3% for municipal waste. Serbia needs to redouble efforts to close its non-compliant landfills and invest in waste reduction, separation and recycling. The remediation of the Belgrade landfill and the construction of a waste to energy facility are expected to start in 2020.

The level of alignment with the EU acquis on water quality is moderate. Work on an action plan for implementing the water management strategy has not progressed. Untreated sewage and wastewaters are still the main source of water pollution. Non-compliance with water quality standards remains a big concern in some areas, such as that on arsenic. Serbia needs to make significant efforts to align further its legislation with the EU acquis, and to strengthen administrative capacity, in particular for monitoring, enforcement and inter-institutional coordination. Work on the river basin management plan is progressing slowly. Improving local governance, in particular for operating and maintaining water and wastewater facilities, remains a priority. Work on adequate water fees and tariffs is at an early stage. Lack of human and financial resources and data availability hinder the development of flood hazard and flood risk maps for all relevant areas.

Alignment with the EU acquis in the field of nature protection, in particular with the Habitats and Birds Directive, remains moderate. Serbia has still not addressed gaps in transposition, allowing hunting of non-huntable birds, especially the goshawk and the turtle dove. Serbia needs to fully incorporate EU standards on prohibited means of capturing and killing wild animals throughout its entire legislation, including in legislation on hunting.

Progress on establishing Natura 2000 sites is slow. Institutional and human resource capacities at national and local level remain weak, as regards enforcement, and wildlife trade. Any further development of hydropower should be in line with EU environmental legislation, including environmental impact assessments with proper public consultations, nature protection and water management legislation.

Serbia's level of alignment with EU rules on noise is good, but their implementation remains at an early stage. Serbia needs to build administrative capacity for drafting strategic noise maps and action plans.

Regarding climate change, Serbia has some level of preparation, but implementation is at a very early stage. Developments during the reporting period largely came to a standstill, reflecting a lack of political consensus about the urgency to act. Serbia has still not adopted the climate law it had prepared in 2018.

The adoption and implementation of a climate strategy and action plan, which is consistent with the EU 2030 framework for climate and energy policies and which addresses adaptation to climate change, is paramount for Serbia's future low carbon development. Serbia needs to do more to integrate climate action into other sectors. Serbia needs to considerably strengthen its administrative and technical capacity, in particular so it can implement, monitor and report on climate acquis. Awareness-raising activities need to be stepped up. Serbia needs to invest much more into the transition towards green energy, including upgrading outdated infrastructure in order to reduce pollution.

3.4 - EIB E&S Policy

Currently EIB is a potential financier for the implementation of the Project. Therefore, their Environmental and

Social Policy is presented here below.

The new EIB Group Environmental and Social Policy lays out the Group's vision to 2030, namely, to actively contribute to sustainable development and inclusive growth. The new EIB Group Environmental and Social Policy, which lays out the Group's vision to 2030, namely to actively contribute to sustainable development and inclusive growth; and this is reflected in its environmental and social safeguards, through the EIB Statement on Environmental and Social Principles and Standards. Such procedures, principles and standards are translated into the routine practices of the EIB in the Environmental and Social Practices Handbook.

Standard 1 – Environmental and Social Impacts and Risks

Standard 2 – Stakeholder Engagement

Standard 3 – Resource Efficiency and Pollution Prevention

Standard 4 – Biodiversity and Ecosystems

Standard 5 – Climate Change

Standard 6 – Involuntary Resettlement

Standard 7 – Vulnerable Groups, Indigenous Peoples and Gender

Standard 8 – Labour Rights

Standard 9 – Health, Safety and Security

Standard 10 – Cultural Heritage

Standard 11 – Intermediated Finance

The Project is included in the 'Category A' for which an ESIA is mandatory to be prepared.

3.5 - GAP ANALYSIS

The international and national processes are aligned regarding the requirements for assessment of environmental impact. However, the international ESIA is a more integrated process and needs to encompass the requirements associated with regulatory mechanisms such as those which are part of the local "planning process" and are outside the formal environmental impact assessment process. For example, issues associated with local grievances arising from land purchase for the project are managed locally by local regulatory authorities. In the ESIA process, these local issues must also be encompassed in the integrated impact assessment. The table below summarises the similarities and differences between the ESIA and Serbian EIA process.

Table 5 Relation with the local EIA procedure

Activity	ESIA	EIA	Comments
Screening Study	Yes	Yes	Due to nature and scale of the proposed project and the clear requirement under international standards and national legislation the project is a Category A /List I project and a formal screening study was not produced for this project. The procedure started from the scoping study.
Categorisation	Yes	Yes	Formal categorisation in accordance with banking standards and national legislation indicates that the proposed project is a Category A / List I project and requires a full impact assessment.

Activity	ESIA	EIA	Comments
Stakeholder Engagement Plan	Yes	Yes	A formal stakeholder engagement plan is not required under national legislation. However, stakeholder consultation is part of the EIA process.
Scoping Study	Yes	Yes	Due to the requirements of the ToR, an International Scoping Study was created for this project. The local scope study has not yet been submitted to the local regulatory authorities because there is no legislative basis for it yet (Location conditions).
Consideration of alternatives	Yes	Yes	Both the impact assessment process for investment and national regulatory requirements, require the consideration of other feasible approaches, including alternatives' locations, technologies, scales and 'no project'
Environmental Impact Assessment	Yes	Yes	The environmental impact assessment requirements are generally aligned. The standards adopted in the environmental assessment undertaken for the ESIA should be in line with European and other international best practice. The requirements under the national EIA regulatory process need to ensure compliance with national legislation and not the regulatory requirements outside of the country.
Environmental impacts assessment in cases of accidents	Yes	Yes	The Serbian EIA legislation requires quite detailed analysis of environmenta impacts in case of accidents which includes specification of hazardous substances used, emergency preparedness and response, remediation measures, etc.
Socio-Economic Impact Assessment	Yes	Limited	The impact assessment for investment requirements requires an integrated approach including full deliberation of the socio-economic effects. The national regulatory requirements for impact assessment are primarily focused on environmental requirements with other requirements encompassed in other regulatory (e.g. 'planning') mechanisms. A formal socio-economic impact assessment is not required under national legislation. However, the local national legislation does require assessment of effects where impacts are associated with impacts to human health.
Resettlement Action Plan (one of the gap is that the EIB standards also over PAPs who do not have a formal property or lease title, and live informally in the affected area)	Yes	No	Resettlement Action Plans are not part of the EIA. The only documents prepared are part of construction plans; the Expropriation study Is simply a database of land impacted and formal owners without tackling socioeconomic issues.
Climate change vulnerability assessment	Yes	Limited	A fformal climate change impact assessment is not required under national legislation. However, local national legislation requires an impact assessment where impacts are linked to impacts on meteorological parameters and climate characteristics.
Environmental and Social Management Plan (ESMP)	Yes	No	ESMP is not typically included as a requirement according to local legislation. It is required for Category A projects according to EIB E&S standards. ESMP describes the roles, the responsibilities, the key commitments and general measures, which should be implemented. The Approved Study is the base document for the preparation of ESMP.

Activity	ESIA	EIA	Comments
Non-Technical Summary (NTS)	Yes	Yes	NTS is required for investment requirements for use as a disclosure document. It is recognised as good practice to produce an NTS to provide readily accessible summary of the project key features, an assessment of its effects, the proposed mitigation measures and a summary of the residual impacts.
Public Consultation & Disclosure	Yes	Yes	The public consultation process for both investment and national regulatory purposes is required. Given the length of the railway and that this project involves the construction of new railway part, the project is categorised in Category A, requiring the full ESIA disclosure package to be publicly disclosed for a minimum of 14-60 days.
Management of Grievances and Objections	Yes	No	A Grievance Mechanism is not a formal requirement under the national regulatory requirements. However, grievances are reported under the consultation process and are encompassed under other regulatory mechanisms (e.g. the local 'planning' process).

4 - PROJECT DESCRIPTION

4.1 - Existing State Analysis

The railway line Belgrade-Stara Pazova-Šid-State Border and the railway section Stara Pazova- Šid are part of the Pan-European, extension of TEN-T, Corridor X. According to the European Agreement on Main International Railway Lines (AGC) it belongs to the international railway network "C-E", designated as E-70/85. Also, according to the South-East European Cooperation Process (SEECP) Agreement, it is part of the high-performance railway networks in South-East Europe.

The track is capable of an axle load of 225 kN and a load per meter length of 72 kN (category D3).

There are electric traction plants on the line: 25 kV, 50 Hz contact network, 110 kV & 25 kV electric substations, PS sectioning plants and plants for neutral PSN sections, SPEV maintenance facilities.

The Stara Pazova – Šid – border with Croatia Railway Line is numbered "101" in the IŽS nomenclature[7]; it is the first one in the list. In Yugoslavian time, it was the main railway line. Initially, it was branched from Inđija. In 1928, a second track was implemented as well as a direct connection in Inđija. In 1970, the line was electrified with 25 kV – 50 Hz ac and the signalling system was modernized with automatic light block. In the 1980's, tracks as well as some small bridges were rehabilitated.

Between Stara Pazova and Golubinci, a 7.4-km by-pass was constructed in order to reduce the distance Belgrade – Zagreb by 1.45 km. Such infrastructure entered in service in 1996 for the left track and in 2010 for the right track. Then, between Inđija and Golubinci, the second track has been dismounted. In 2017, 17.9 km of the right track have been rehabilitated between Golubinci and Ruma; in the same time, modern level crossing plates have been implemented in that section and the halt in Kraljevci has been upgraded with two high platforms.

[7] *Source: IŽS Network Statement*

Unfortunately, out of that section recently renewed, the situation of the infrastructures is not very efficient and impose several slowdowns as shown in the figure below. Regarding the right track, the speed is limited at 50 km/h between Ruma and Sremska Mitrovica and even 30 km/h in the next section towards Šid.

However, the geometry of the line could easily allow higher speeds. A few curve zones representing only 6% of the entire length of the railway line section would limit the performances from 130 to 180 km/h as shown in the table below. From Golubinci, K.P. are adjusted considering the bypass as it reduces the distance by 1,449.54 m.

Table 6 Geometry of the Railway Line

from chainage	to chainage	Curve Radius (m)	Max Speed (km/h)
36+200.00	38+108.29	> 3,000	> 200
38+108.29	40+314.75	2,500	180
40+314.75	41+109.01	> 3,000	> 200
41+109.01	43+305.42	2,500	180
43+305.42	74+942.46	> 3,000	> 200
74+942.46	75+343.46	2,200	170
75+343.46	80+546.46	> 3,000	> 200
80+546.46	81+032.46	1,300	130
81+032.46	82+676.46	> 3,000	> 200
82+676.46	83+260.46	1,300	130
83+260.46	106+788.46	> 3,000	> 200
106+788.46	107+308.46	1,500	140
107+308.46	120+498.82	> 3,000	> 200

Source of data: IŽS

Between Stara Pazova and the border with Croatia, both tracks are under operation. The speed is limited to 50 km/h on the right track between Ruma and Sremska Mitrovica and then, at 30 km/h towards Šid. The last section to the border is better, trains can run at 80 km/h.

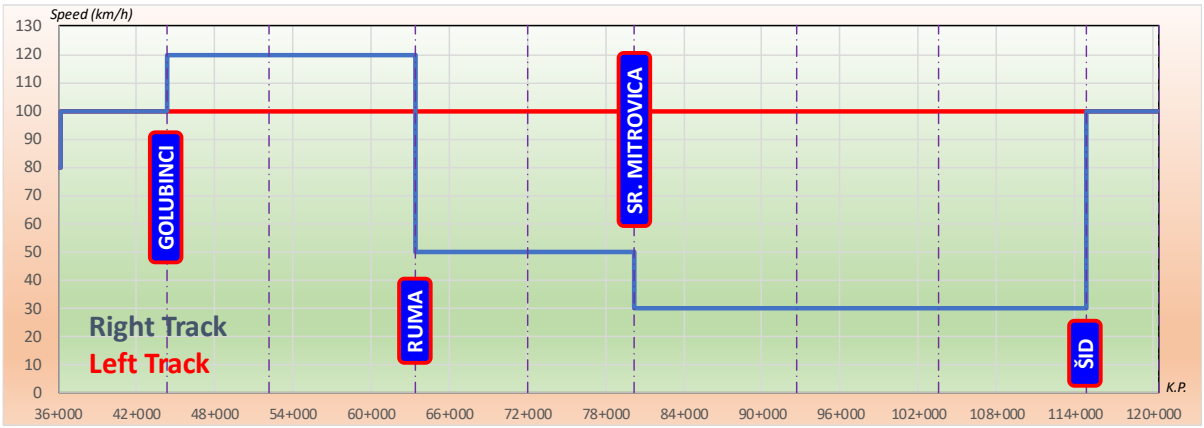

Figure 3– Stara Pazova current situation - speed

Source of data: IŽS

Croatian Railway locomotives operate into Serbia to Šid Station that was however never designed as "border one". In that station, Croatian and Serbian locomotives are exchanged. On the other hand, traffic has decreased

from Yugoslavian time (40 years ago) with less than 20 trains per day and per direction compared to the former 60 trains per day; consequently, the situation is not critical now. Details are presented in the Railway Operational Plan Report. It's clear that, following the modernization of the Corridor X, railway traffic will develop in future. But, considering Serbia as future EU member, it could be expected that the operation on the border would be slightly simplified without exchange of locomotives.

On the section section Stara Pazova – Šid- Tovarnik (HRI) there are a total of 16 official places on the sections, of which, 11 stations and 5 halts. In general, all bigger stations with branch lines are staffed by train dispatchers.

Table 7 Characteristics of the railway line on the section Stara Pazova – Šid- Tovarnik (HRI)

No	Official place	Rail mileage	Distance between official places	Design speed (km/h)	Maximum permitted speed TT 2019/2020 (km / h)	
					Left track	Right track
1	Stara Pazova station	35,0	0	120	100	120
2	Golubinci station	44.2/45.8	9,2			
3	Putinci station	53,7	7,9			
4	Kraljevci halt	60,0	6,3			
5	Ruma station	64,9	4,9			
6	Voganj station	73,4	8,5			50
7	Sremska Mitrovica station	81,7	8,3			
8	Lacarak halt	86,1	4,4			30
9	Martinci station	94,1	8,0			
10	Kuzmin halt	99,2	5,1			
11	Kukujevci-Erdevik station	105,0	5,8			
12	Bacinci halt	109,1	4,1			
13	Gibarac halt	112,7	3,6			
14	Šid station	116,4	3,7			
15	State border station	121,9	5,5			80
16	Tovarnik (HRI) station	123,5	1,6			100

Source: Project Team

The technological schemes of all existing stations and diagrams with data on the objects in the stations, the useful lengths of the tracks, the types of rails and switches, etc are presented in the Railway Operational Plan Report.

Regarding level crossings, 26 can be identified. Their position, way of protection and type of road is presented in the following table.

Table 8 List of all level crossings

	Km position	Method of protection	Type of road	Station area
1	46+228	Automatic half barrier	Asphalt	Golubinci
2	51+049	Automatic half barrier	Rubber panels	Open line
3	53+436	Automatic half barrier	Rubber panels	Putinci
4	57+352	Road vertical signalization	Rubber panels	Open line

	Km position	Method of protection	Type of road	Station area
5	60+060	Automatic half barrier	Rubber panels	Open line
6	62+008	Automatic half barrier	Rubber panels	Open line
7	65+687	Automatic half barrier	Asphalt	Open line
8	69+458	Road vertical signalization	Wooden sleepers	Open line
9	74+019	Automatic half barrier	Asphalt	Voganj
10	76+983	Road vertical signalization	Wooden sleepers	Open line
11	80+740	Automatic half barrier	Rubber panels	Sremska Mitrovica
12	84+091	Automatic half barrier	Asphalt	Open line
13	86+425	Automatic half barrier	Stone cube	Open line
14	91+486	Automatic half barrier	Asphalt	Open line
15	94+604	Automatic half barrier	Wooden sleepers	Open line
16	95+809	Road vertical signalization	Wooden sleepers	Open line
17	97+785	Road vertical signalization	Wooden sleepers	Open line
18	99+549	Automatic half barrier	Asphalt	Open line
19	100+205	Road vertical signalization	Wooden sleepers	Open line
20	100+849	Road vertical signalization	Wooden sleepers	Open line
21	103+287	Automatic half barrier	Asphalt	Open line
22	105+400	Automatic half barrier	Asphalt	Kukujevci-Erdevik
23	109+280	Automatic half barrier	Wooden sleepers	Open line
24	112+710	Automatic half barrier	Wooden sleepers	Gibarac
25	116+105	Automatic half barrier	Asphalt	Šid
26	117+037	Automatic half barrier	Asphalt	Šid

Source: Project Team

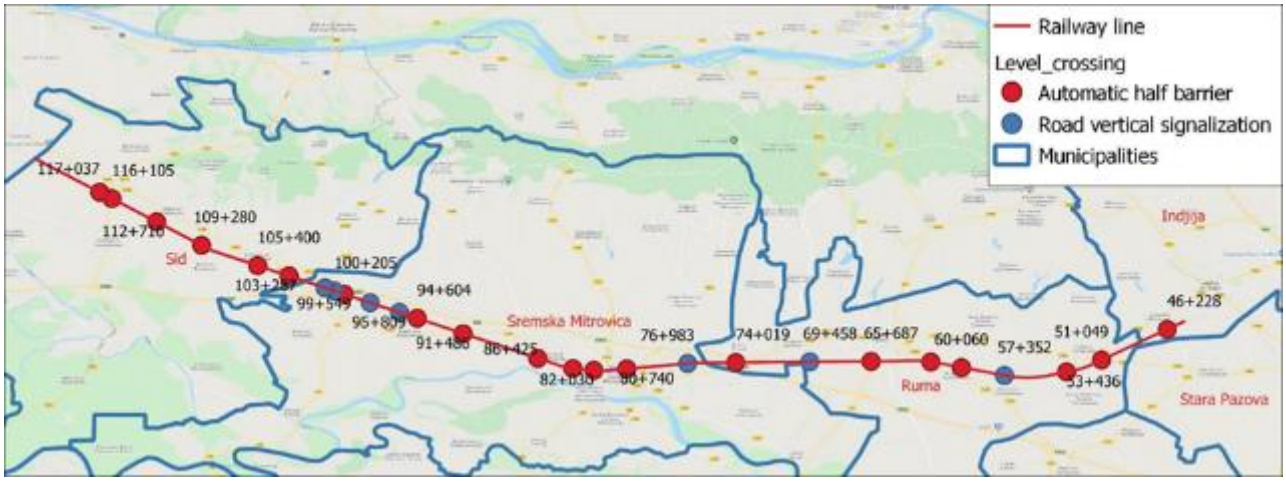

Figure 4 Map of the level crossings

Source: Project Team

The current situation of structures on railway line (bridges, underpasses and culverts without road overpasses) is:

Railway line Stara Pazova - Sid - SB (state border)

- 73 culverts
- 3 steel bridges, double track
- 3 reinforced concrete bridges, double track
- 1 reinforced concrete overpass, single track
- 1 reinforced concrete underpass, three tracks

All bridges are with spans less than 50 m.

Inđija - Golubinci branch:

- 2 culverts

The table below presents more details regarding the structures mentioned above.

Table 9 Existing structures on railway line Stara Pazova - Sid - SB & Indjija-Golubinci branch

No.	Chainage (left railway track)	Type of structure	Description *(width/height for culverts)	Notes
Railway line Stara Pazova - border with Croatia				
1.	36+353	Bridge	Reinforced concrete bridge over channel,4 railway tracks, L=10,0m	Recently built, around 1993. in good condition
2.	38+384	Culvert	Box 100/100cm	Just on left railway track
3.	38+724	Overpass - gallery type	Reinforced concrete overpass over Bgd-Novi Sad railway line (2	Recently built, around 1993. in good condition

No.	Chainage (left railway track)	Type of structure	Description *(width/height for culverts)	Notes
			tracks),1 railway track, L=12,5m, width 85,4m	
4.	41+374	Bridge	Reinforced concrete bridge over stream and earth roads,2 railway tracks,3 spans: L=3x10,0=30,0m	Recently built, around 1993. in good condition
5.	43+059	Culvert	Pipe Ø100cm	
6.	43+282	Culvert	Vault 300/400cm(2)* + Slab 300/400cm(1)*	* 3 railway tracks
7.	47+955	Culvert	Slab 100/110cm	
8.	49+804	Culvert	Slab 300/170cm	
9.	50+216	Culvert	Slab 100/140cm	
10.	52+921	Culvert	Slab 500/210cm	
11.	54+194	Culvert	Slab 130/100cm(5)*	* 5 railway tracks
12.	59+873	Culvert	Slab 100/130cm	
13.	60+597	Culvert	Vault 100/100cm	
14.	65+444	Culvert	Slab 400/270cm(3)*	* 3 railway tracks
15.	66+132	Culvert	Slab 340/400cm(2)* + Steel (bridge type)* 400/400cm(1)*	* Steel (bridge type) means that it's bridge like construction but with span less than 5m * 3 railway tracks
16.	67+060	Bridge	Steel bridge over stream,2 railway tracks, L=6,0m	Old bridge, without ballast
17.	70+474	Culvert	Pipe Ø100cm	
18.	71+552	Culvert	Pipe Ø60cm	
19.*	72+147	Culvert	Slab L=100cm + Pipe Ø50cm	* Cluttered, data taken from Overhaul design CIP year 1986.
20.	72+991	Culvert	Slab 430/230cm(3)*	* 3 railway tracks
21.	74+502*	Culvert	Pipe Ø100cm	* Chainage on right railway track
22.*	74+512	Culvert	Slab L=100cm	* Cluttered, data taken from Overhaul design CIP year 1986.
23.	75+749*	Culvert	Pipe Ø90cm	* Chainage on right railway track
24.*	75+969	Culvert	Slab L=100cm	* Cluttered, data taken from Overhaul design CIP year 1986.
25.	76+904	Culvert	Pipe Ø60cm	
26.	77+553	Culvert	Pipe Ø60cm	

No.	Chainage (left railway track)	Type of structure	Description *(width/height for culverts)	Notes
27.*	78+448	Culvert	Slab L=100cm	* Cluttered, data taken from Overhaul design CIP year 1986.
28.	79+685	Culvert	Pipe Ø100cm	
29.	80+255	Bridge	Steel bridge over stream,2 railway tracks, L=7,0m	Old bridge, without ballast
30.	80+560	Culvert	Slab 500/260cm	
31.	81+996	Underpass	Reinforced concrete underpass, span L=14,7m	New built construction, year 2018. in very good condition
32.	84+012	Culvert	Pipe Ø60cm	
33.	84+206	Culvert	Box 100/150cm	
34.*	85+284	Culvert	Slab L=60cm	* Cluttered, data taken from Overhaul design CIP year 1986.
35.*	85+821	Culvert	Pipe Ø90cm	* Cluttered, data taken from Overhaul design CIP year 1986.
36.	85+920*	Culvert	Pipe Ø100cm	* Chainage on right railway track
37.	86+405	Culvert	Slab 60/140cm + Pipe Ø50cm	
38.	86+793	Culvert	Slab 190/210cm	
39.	87+524	Bridge	Steel bridge over stream,2 railway tracks, L=10,0m	Old bridge, without ballast
40.	87+863	Culvert	Pipe Ø100cm	
41.	88+102	Culvert	Slab 190/400cm	
42.	89+549	Culvert	Box 150/250cm	
43.*	90+333	Culvert	Slab L=40cm + Pipe Ø60cm	* Cluttered, data taken from Overhaul design CIP year 1986.
44.	91+552*	Culvert	Pipe Ø100cm	* Chainage on right railway track
45.*	92+384	Culvert	Slab L=100cm	* Cluttered, data taken from Overhaul design CIP year 1986.
46.*	92+405	Culvert	Pipe Ø100cm	* Cluttered, data taken from Overhaul design CIP year 1986.
47.	93+629	Culvert	Pipe Ø100cm	
48.*	96+280	Culvert	Pipe Ø100cm	* Cluttered, data taken from Overhaul design CIP year 1986.
49.	96+287	Culvert	Vault 200/200cm	
50.	97+714	Culvert	Pipe Ø100cm	

No.	Chainage (left railway track)	Type of structure	Description *(width/height for culverts)	Notes
51.*	98+615	Culvert	Slab 200cm + Pipe Ø85cm	* Cluttered, data taken from Overhaul design CIP year 1986.
52.	99+010	Culvert	Box 150/250cm	
53.	99+016	Culvert	Slab 100/160cm + Vault 100/130cm	
54.	99+555	Culvert	Box 100/150cm	
55.	99+565	Culvert	Slab 100/160cm + Vault 100/150cm	
56.	100+584	Culvert	Pipe Ø60cm	
57.	100+618*	Culvert	Pipe Ø100cm	* Chainage on right railway track
58.	101+371	Culvert	Pipe Ø120cm + Pipe Ø100cm	Two pipes-pipe under pipe
59.*	102+491	Culvert	Slab L=200cm + Pipe Ø85cm	* Cluttered, data taken from Overhaul design CIP year 1986.
60.	102+501	Culvert	Pipe Ø100cm	
61.	103+778	Culvert	Box 100/150cm	
62.	105+593	Culvert	Pipe Ø100cm	
63.	106+259	Culvert	Box 100/150cm	
64.	107+268	Culvert	Box 100/150cm	
65.	107+475	Culvert	Pipe Ø60cm	
66.	108+305	Culvert	Pipe Ø100cm	
67.	108+557	Culvert	Pipe Ø100cm	
68.	109+267	Culvert	Box 100/150cm	
69.*	109+487	Culvert	Slab L=100cm	* Cluttered, data taken from Overhaul design CIP year 1986.
70.	110+026	Culvert	Vault 100/150cm	
71.	110+527	Culvert	Pipe Ø100cm + Pipe Ø100cm	Two pipes-pipe under pipe
72.	111+940	Culvert	Pipe Ø100cm	
73.	112+735	Culvert	Box 150/250cm	
74.	113+488	Culvert	Pipe Ø60cm	
75.	114+500	Culvert	Pipe Ø100cm	
76.	115+226	Bridge	Reinforced concrete bridge over stream,2 railway tracks L=7,4m	

No.	Chainage (left railway track)	Type of structure	Description *(width/height for culverts)	Notes
77.	118+593	Culvert	Pipe Ø60cm	
78.	120+046	Culvert	Box 100/150cm	
79.	120+694	Culvert	Pipe Ø100cm	
80.	121+306	Culvert	Pipe Ø80cm	
81.	121+893	Culvert	Pipe Ø100cm	
Indjija - Golubinci branch				
82.	2+103	Culvert	Vault 300/400cm	1 railway track
83.	2+702	Culvert	Slab 100/140cm	1 railway track

4.2 - Conceptual Design

Based on the analysis of the existing situation, a conceptual solution for the reconstruction, modernization and construction of a two-track railway for passenger and freight traffic with speeds of up to 160 km/h and up to 200 km/h was prepared.

On the basis of the options analysis carried out and in accordance with the Project Terms of Reference of the IŽS, the Conceptual solution option for speeds up to 200 km was chosen, for which the Conceptual Design is being developed.

Solutions are defined for the following:

- the route of the two-track railway and station,
- objects on the railway: bridges, underpasses, overpasses, culverts
- hydrotechnical facilities
- architectural structures
- separated crossings with roads.

4.2.1 - Alignment

The Stara Pazova-Šid-state border (Tovarnik) railway line is a double-track, electrified railway line. The alignment starts in Stara Pazova at km 36+426.56 and ends in state border (Tovarnik) with Croatia.

Table 10 Proposed subsections on the Stara Pazova-Sid -state border (Tovarnik) railway line

No.	Subsections	Length [km]
1	Stara Pazaova - Golubinci	7.08
2	Golubinci - Putinci	8.18
3	Putinci - Ruma	10.79
4	Ruma - Voganj	8.99
5	Voganj - Sremska Mitrovica	7.78

6	Sremska Mitrovica - Martinci	12.69
7	Martinci - Kukujevci	10.65
8	Kukujevci - Šid	11.70
9	Šid - State border	6.37
	Total:	84.21

It is planned that the highest category international passenger trains will run at speed of 200 km/h, and other passenger trains will operate at speeds below 200 km/h, depending on the train category.

Freight trains will operate at maximum speed of 100 km/h - 120 km/h.

Between the railway nodes, technical parameters of track alignment and stations for the speed of 160-200 km/h are applied (except for 120 km/h in Sremska Mitrovica station).

In stations to be subject to reconstruction, care was taken of the existing buildings which shall be kept, and, on the open railway line, level crossings is adjusted to the requirements for intersections with canals and roads, as well as to the requirements for quality drainage of the track bed in accordance with the characteristics of the terrain in the corridor.

The Inđija-Stara Pazova railway line is a single-track, electrified railway line. The reconstruction of the existing and construction of the second track on the Inđija-Golubinci railway line for the speed of 120 km/h is planned, which connects the Belgrade–Stara Pazova –Šid–state border (Tovarnik) railway line with the Stara Pazova–Novi Sad–Subotica–state border (Kelebija).

The alignment starts in Inđija at km 1+994.83 and ends in Golubicni station.

Table 11 Proposed subsections on the Indjija-Golubinci Railway Line

No.	Subsections	Length [km]		Scope of work
		Left track	Right track	
1	Indjija - Golubinci		2.71	Reconstruction
	Indjija - Golubinci	2.80		Construction
	Total:	2.80	2.71	

4.2.2 - Stations and Official Places

Station buildings

Stara Pazova-Sid railway section consists of 8 stations that will be open for passenger services, except for Voganj, which are operational purely for the freight traffic. Modernization project includes reconstruction of existing stations and train stops and their adjustment to EU railway standards. Architectural buildings and structures are concentrated in all stations along the railway line and they include the following groups of buildings and structures:

- Station buildings with the landscaping of station complex

- Subways with canopies, stairs, and lifts
- Platforms and platform canopies

Except for station buildings the following objects will be developed:

- Rooms for signalling and interlocking and telecommunication facilities – SI and TC
- Building for sectioning posts - PS
- Building for sectioning posts with neutral section – PSN
- Building for electric traction substation - EVP
- Building for maintenance of heavy motor trolley - TMD

All buildings/structures are designed based on the existing condition, characteristics of the location, and the traffic and technological needs and requirements of a modern railway line, following the regulations, standards, and TSI for the appropriate type of buildings/structures. Depending on the current condition of the buildings, a specific plan of action is proposed for each of them. Each existing train station includes premises for the purposes of the railway staff and of the passengers.

The design envisages program and structural interventions, to reactivate these buildings in line with new technological needs, with minimal changes in exterior and interior. Energy-related measures for the rehabilitation of buildings are envisaged as well. Most of the repairs are focusing on the roof, façade, door and windows, floors, suspended ceilings, etc.

Some of the buildings already went through the process of reconstruction in the past (Sremska Mitrovica, Ruma.), so the scope of the current works is smaller.

In all stations for passenger services, given safety and service level, landscaped and equipped platforms with canopies are envisaged (paving, tactile paths, benches, trash cans). For the purposes of passenger access to the platforms, the design proposes subways with stairways and lifts for the elderly, children, and persons with special needs, and access to platforms is also enabled by ramps, as necessary.

Buildings to accommodate electrical devices and facilities are designed following the characteristics of the devices and operational requirements.

Materials have been selected in accordance with the technological requirements, applicable regulations, and standards for this type of buildings. Depending on the condition and purposes of buildings, all the required appropriate installations have been envisaged (water supply, sewerage, electricity, heating, ventilation, and air-conditioning, etc.).

Station complexes will be functionally landscaped and equipped (parking lots, paving, furniture, greenery), with access roads in accordance with the needs and urban planning.

Golubinci: The apartment building has floors GF+1 storey. On the ground floor there are rooms in the function of the station, while in one part there is an apartment. There are two apartments on the first floor, which are not currently being used. Toilets for persons with disabilities, luggage cassettes, ticket machines and cash machines are provided in the passenger rooms.

The station plateau has five parking spaces and one for persons with disabilities. The plateau is fenced and has pedestrian entrances. Pedestrian paths are indicated and there are tactile strips on them for the movement of blind and partially sighted people. The plateau is green, with lighting and furniture.

The station has two passenger platforms. The first platform is accessed by a ramp and stairs, and the second via an underpass. An elevator is provided for people with disabilities. The platforms are 220m long and 4m wide. They have canopies and furniture for the use of passengers.

Putinci: The apartment building has GF+1 storey. On the ground floor there are rooms in the function of the station, while in one part there is a staircase for the apartment on the first floor. Toilets for persons with disabilities, luggage cassettes, ticket machines and cash machines are provided in the passenger rooms.

The station plateau has six parking spaces and one for persons with disabilities. The plateau is fenced and has pedestrian entrances. Pedestrian paths are indicated and there are tactile strips on them for the movement of blind and partially sighted people. The plateau is green, with lighting and furniture.

The station has two passenger platforms. The first platform is accessed by a ramp and stairs, and the second via an underpass. An elevator is provided for people with disabilities. The platforms are 220m long and 4m wide. They have canopies and furniture for the use of passengers.

Ruma: The apartment building has B+GF+1 storey. On the ground floor there are rooms in the function of the station, the building has several entrances and exits and two stairs for going down to the basement and to the first floor.

Toilets, toilets for people with disabilities, changing rooms for children, luggage cassettes, ticket machines and cash machines are provided in the passenger rooms. On the ground floor is part of the premises that are leased by other companies, such as the health center and the like.

The station plateau has an adequate number of parking spaces, as well as spaces for persons with disabilities. The plateau is fenced and has pedestrian entrances. Pedestrian paths are indicated and there are tactile strips on them for the movement of blind and partially sighted people. The plateau is green, with lighting and furniture.

The station has two passenger platforms. The platforms are accessed via an underpass. An elevator is provided for people with disabilities. The platforms are 400m long and 7.4m wide. They have canopies and furniture for the use of passengers.

Sremska Mitrovica: The residential building has B+GF+2 storey. On the ground floor there are rooms in the function of the station, the building has several entrances and exits and two staircases for going down to the basement and to the first floor. The basement rooms are not in use, except for the part intended for the boiler room. On the first floor there is a living area, and on the second floor there is a hall with a wet room and a kitchenette.

Toilets, toilets for people with disabilities, changing rooms for children, luggage cassettes, ticket machines and cash machines are provided in the passenger rooms.

The station plateau has an adequate number of parking spaces, as well as spaces for persons with disabilities. The plateau is fenced and has pedestrian entrances. Pedestrian paths are indicated and there are tactile strips on them for the movement of blind and partially sighted people. The plateau is green, with lighting and furniture.

The station has two passenger platforms. The platforms are accessed via an underpass. An elevator is provided for people with disabilities. The platforms are 400m long and 6.1m wide. They have canopies and furniture for the use of passengers.

Martinci: The apartment building has B+1 storey. On the ground floor there are rooms in the function of the station, while in one part there is a staircase for the apartment on the first floor. Toilets for persons with disabilities, luggage cassettes, ticket machines and cash machines are provided in the passenger rooms.

The station plateau has five parking spaces and one for persons with disabilities. The plateau is fenced and has pedestrian entrances. Pedestrian paths are indicated and there are tactile strips on them for the movement of blind and partially sighted people. The plateau is green, with lighting and furniture.

The station has two passenger platforms. The first platform is accessed by a ramp and stairs, and the second via an underpass. An elevator is provided for people with disabilities. The platforms are 220m long and 4m wide. They have canopies and furniture for the use of passengers.

Kukujevci: The apartment building has two floors, basement. On the ground floor, there are rooms in the function of the station, while in one part there is an apartment. Toilets for persons with disabilities, luggage cassettes, ticket machines and cash machines are provided in the passenger rooms.

The station plateau has eight parking spaces and one for persons with disabilities. The plateau is fenced and has pedestrian entrances. Pedestrian paths are indicated and there are tactile strips on them for the movement of blind and partially sighted people. The plateau is green, with lighting and furniture.

The station has two passenger platforms. The first platform is accessed by a ramp and stairs, and the second via an underpass. An elevator is provided for people with disabilities. The platforms are 220m long, one is 4m wide, and the other is 6.1m. They have canopies and furniture for the use of passengers.

Sid: The cellular building has B+GF+2 storey. On the ground floor, there are rooms in the function of the station, the building has several entrances and exits and a staircase to go down to the basement, which is not in use. There are office premises on the first floor, as well as on the second floor, and part of the premises is leased to other companies.

Toilets, toilets for people with disabilities, changing rooms for children, luggage cassettes, ticket machines and cash machines are provided in the passenger rooms.

The station plateau has an adequate number of parking spaces, as well as spaces for persons with disabilities. The plateau is fenced and has pedestrian entrances. Pedestrian paths are indicated and there are tactile strips on them for the movement of blind and partially sighted people. The plateau is green, with lighting and furniture.

The station has two passenger platforms. The platforms are accessed via an underpass. An elevator is provided for people with disabilities. The platforms are 400m long and 7.4m wide. They have canopies and furniture for the use of passengers.

Regarding the other objects:

PS: Sectional plant (PS) is the name for a 25kV distribution plant that allows electrical connection, separation and supply of contact network sections (KM). The object is not occupied by workplaces, and maintenance and repair work is carried out by field crews.

The building is ground-floor, rectangular in shape, in height it has two units: one is a room for a high-voltage plant, the clear height of which is 7.50 m, and the other is a room for controls the height of which is 4.30 m'. In the control room, natural lighting is provided through windows at a height of 210 cm.

TMD

The architectural-shape concept and functional layout is determined by the function of the object, with the defined technological requirements of the user, from which it results in a constructive grid and storeys. Heavy motor trolley (TMD) should be regularly maintained in the facility as a basic means for assembly and maintenance of stable electric traction-contact network installations.

The following types of TMD maintenance are foreseen in the workshop in question:

- constant supervision;
- control examinations;
- minor emergency repairs.

In specialized workshops, the following will be carried out:

- regular repairs;
- major emergency repairs.
- it is necessary to foresee the repair of TMD five (4+1) electric cranes, spindle, intended for lifting rail vehicles. It is necessary that electric cranes are intended for use in open space, with the following characteristics:
- Carrying capacity of individual crane: 15 t.,
- Crane drive: electric,
- Maximum lifting height: 1800 mm 100 mm,
- Minimum lifting height: 450 mm,
- Control method: electric / remote,
- Crane operation: individual / group 4 cranes,
- The control cabinet is connected to the electrical network with a cable length of 30

EVP

For the accommodation of EVP equipment, a GF+1 storey building with two rooms in ground floor: rooms for high voltage plant and command rooms, and three on first floor: control rooms, rooms for the duty officer and rooms for equipment. The dimensions of the object are 19.49 m with 8.00 m. The number of floors of the building is GF+1 storey, it is rectangular in shape, in height it has two units: one is a room for a high-voltage plant whose clear height is 5.00 m' and the other room for commands whose height is 5.30m'. The difference in height was caused by installation of a double floor in two rooms on the floor below which the height of the room is ground floor 30 cm lower.

The floors of the rooms on the first floor are all on the same level.

The levelling solution was derived from the situation on the ground and the boundaries of the intervention, and was in accordance with the planned content.

4.2.3 - Formation

The width of formation of the open double-track railway line, which ensures the safety space, working paths and accommodation of electrical engineering and other equipment, is 12.5 m. Formation's cross fall is two-way with inclination of 5%.

Given the category of the railway line and the design speed of 200 km/h, design envisages fencing of the railway line. Protective wire fence is envisaged on the entire section.

On parts of the railway line where protection against noise is needed, design envisages mounting of noise protection barriers.

Ballast and gravel seam shall be stripped in 70-100 cm layer, and exact thickness shall be determined on site. After ballast and gravel seam stripping, the foundation soil shall be compacted.

On terrains with lower bearing capacity, it is envisaged to place geocomposite or cement grouting.

Slopes are envisaged to be topsoiled and grassed on the entire section.

4.2.4 - Drainage

The railway route passes through the area of three water management companies: VPD Šidina DOO, Šid, VPD HidroSrem DOO, Sremska Mitrovica and VPD Galovica DOO Belgrade - Zemun. The railway crosses and runs parallel to the melioration canals and natural watercourses. Partially regulated natural watercourses or artificially dug melioration canals were initially put into operation for the purpose of dewatering agricultural and forest land, and drained underground and internal (atmospheric) water, collected by the canal network, is evacuated to Sava as the final recipient.

The railway drainage system ensures the collection of water from the undercarriage of the railway, the slopes and the cuts, conveying it to the nearest recipient. Recipients are existing watercourses, melioration channels, rainwater collectors, local depressions or infiltration fields. Outfall buildings for the discharge of stormwater into the melioration channel/watercourse are planned so that the high-water levels of the recipient do not prevent the evacuation of water and that erosion of the riverbed and banks is not caused in all flow regimes and all water outflow regimes.

At the spill site, it is planned to protect the recipient from erosion, by covering with stone or concrete elements, at least 3.0 m upstream and downstream from the spill site. If the recipient is a watercourse, the slope of the watercourse on which the spout will be located, will be only covered. The outlet structure must be at a distance of at least 5.0 m from the culvert/bridge.

The presence of water in the planum, especially above the junction of the ballast and the substrate, is one of the main causes of instability and damage of railway tracks. For drainage of the railway body in locations where the elevation of the planned planum is lower than the elevation of the drainage channel and in railway stations, as well as on sections with more than two tracks, drainages that fit into the railway drainage system have been designed. The project also includes the drainage of the planned facilities on the route (bridges, underpasses, underpasses and overpasses).

On the largest part of the railway route, two-sided earthen trapezoidal channels with a minimum depth of 0.3 m, with a bottom width of 0.6 m - 1.0 m and a slope of 1:1.5 are provided. Drainage channels are not provided on the sections of the route where the terrain falls away from the railway in a transverse sense. On certain parts of the route, which pass through the wider area of the Putinci and Inija springs, with the aim of ensuring water tightness, the installation of rectangular or trapezoidal concrete channels is planned, where the minimum width of the bottom is 0.40m, and the minimum depth is 0.25m. The location and levelling of railway channels and drainage collectors are presented in the construction part of the project, as elements of the transverse profile of the railway whose position and slope are determined by the characteristics of the existing buildings along the railway route.

On the part of the route, where it is intended to lower the level of underground water or to divert leachate or filtered water outside the railway belt, a closed drainage system is used, primarily at railway stations and rest areas.

With a closed drainage system, semi-perforated (receive water from the upper side) or perforated drainage pipes (receive water from all sides) are used to lower the groundwater level, which receive water that is filtered either from the surface or from the layers of the structure. The minimum drop of drainage pipes is 0.3%. They are laid at least 60 cm below the planum. The channel for laying the pipe is filled with gravel, and shafts for the maintenance of the drainage system should be built at a distance of 50-100 m and are used for checking and cleaning the pipes. This drainage system requires less space and does not require reprofiling and weeding.

The applied elements of the closed drainage system are:

1) drainage collectors

2) atmospheric sewage

The capacity of individual drainage elements for the relevant downpour of the return period T=10 years (rain gauge stations Belgrade and Šid), and the time of concentration equal to the time of concentration of the watershed to the exit profile was checked in the hydro technical part of the project. Applied longitudinal drops for railway channels range from 0.1% - 1%, and in the case of smaller longitudinal drops, the channels are treated as infiltration channels with the function of retention and infiltration of runoff.

The project envisages taking the collected runoff to the recipient by the shortest route. If the recipient is an infiltration field or canal, care should be taken that the minimum distance to the edge of the scarp of the railroad embankment is more than 5 m.

In areas where the railway route passes through a narrower and/or wider zone of sanitary protection of water sources (Putinci, Inđija), a closed drainage system with concrete channels on both sides that have increased dimensions, so that they can retain a certain amount of water that would reach them in in the event of a tank overturning. It is also necessary to install a geomembrane with foil under the railway body, drainage and concrete channels as a protection against possible leakage of pollutants into the ground, as well as the application of receiving reinforced concrete buildings from which the water is conveyed to the collectors, after tertiary purification on separators with coalescing filters to the recipients (melioration channels or infiltration fields). At the entrance to the separator, it is necessary to provide a tabular structure that closes in case of an accident, so that the pollution is retained in the concrete channel and its penetration into the separator system is not allowed.

The discharge of storm water from the railway body into the melioration canals and watercourses so that the technical solution of the water discharge takes into account the designed existing geometric and hydraulic elements of the recipient, the downstream canal network and other water objects, is allowed and this in such a way as to ensure the functionality of the hydro melioration system, the maintenance conditions of the water facilities and the safety of overflowing on the surrounding terrain.

For canals that cannot receive the expected amount of storm water from the railway body, the reconstruction of that length of the canal is planned, after which the existing canal will be able to carry an increased amount of water due to the inflow of storm water from the railway, if necessary, along the entire length.

For overpass drainage, a closed drainage system is used, with characteristics that depend on the grade of the overpass road and the recipient for receiving the collected runoff. For the drainage of the underpass, the storm

water that gravitates towards is collected by drainage elements along the lower side of the roadway and taken to the pumping station, if it cannot be taken to the recipient by gravity.

Regarding the underpasses it is planned to install a channel with a grid for collecting waters, The water is collected in a collection shaft in which it is planned to install mobile submersible pumps, which will draw water as needed. Runoff from bridges does not require purification because it is conditionally clean storm water, collected from the track cover, which is carried directly into the recipient.

4.2.5 - Permanent Way

For the purposes of protection against harmful effects of train derailment, design envisages guard rails type 60E1 with elastic rail fastenings, which are to be placed on bridge structures and at 10.4m in front of and behind the bridge. Concrete sleepers with even top surface are envisaged, onto which running, and guard rails shall be mounted via double steel base plates.

Given the category of the railway line and the design speed of up to 200 km/h, design envisages that the railway line is fenced with a type of fence used for highways. The fence shall have multiple purposes protects and deters against unauthorized access to railway facilities and equipment, has an impact on safety because it prevents uncontrolled access for people and animals to the railway line. In general, fence is envisaged to be placed on both sides of the railway line, at 1.0m from the channel edge, i.e., from toe of embankment. On the outer side of the fence, a 5m space is reserved for service roads.

The Law on Railways ("Official Gazette of the RS", No 45/13 and 91/15), Article 58, stipulates that, in the infrastructure belt (25 m on both sides of the railway line from the centre lines of the end tracks), save in the zone of the belt in the inhabited place (6 m on both sides of the railway line from the centre lines of the end tracks), by way of exception, buildings which are not in the function of railway traffic can be constructed, based on the issued approval of the infrastructure manager, which is issued in the form of a decision, and if the construction of these buildings is foreseen by urban plan of local self-government plan which prescribes their protection and implements at its own expense the prescribed protection measures for those buildings.

According to this Law, it is forbidden to build any structures except for the railway functions in the zone of 8 m from the last track axis (6 m in the urban zone) on both sides. Regarding the wider zone of 25 m from the last track axis on both sides, it is for forbidden to build any structures except for railway function and, in some cases, for other purposes but no solid structures. It could be allowed by railways to build electrical and other installation in this zone.

In the protective railway zone of 100 m on both sides from the last track axis, it is necessary to provide technical conditions from the railway authorities to build structures.

After laying the new rails, preventive grinding is necessary to remove the initial roughness on the upper surface of the rail head and the layer with uneven carbon content, as well as irregularities resulting from the superposition of the tolerance during the laying of tracks (including lining and levelling).

During operation of the railway line, flat and smooth-running surface of rails should be provided. When repairing the rails, it is necessary to remove all bulges and dents at the welding points. Maintenance plans should anticipate and implement regular grinding of the rails.

In accordance with the category of the railway line and the applicable regulations relating to reconstruction, modernization, and construction of double-track railway line for the speed of up to 200 km/h, it is envisaged that all intersections of the railway line with roads must be grade separated, which requires cancellation of all existing road and pedestrian level crossings.

The intersections of the road infrastructure with the railway route, which will be delevelled in relation to the railway route, are defined by the option analysis.

There are sixteen intersections that will be levelled by means of overpasses or underpasses, and in this way, the continuity of the road traffic connection will be achieved independently of the railway traffic.

The applied road geometry is conditioned by the required level of service depending on the road category. This means that more comfortable elements have been applied on state roads, i.e. on uncategorized roads.

When defining the vertical alignment, the designed technical solution was influenced by spatial limitations, terrain configuration, geotechnical conditions, as well as the spatial position of the railway line, and the existing geometry of the intersected roads.

In populated areas, among other things, the technical solution was influenced by the location of residential buildings as well as the access roads to them.

In some locations, it was not possible to carry out the necessary levelling without demolishing existing buildings in the intersection zone itself.

4.2.6 - Structures

Railway line Stara Pazova - Sid - SB (state border) and Indjija-Golubinci (existing track)

New railway bridges instead of existing bridges

Due to the open track system (without ballast) as well as old age of bridges, three steel bridges will be replaced by three new reinforced concrete bridges with ballast, with spans of 8, 10 and 12m.

Due to the changes in the new alignment, one reinforced concrete bridge near Sid station will be replaced by new reinforced concrete bridge with span of 10m.

Three bridges are with cross-section for double track, total width 12.9m while one bridge at km.78+900 is with cross-section for three tracks, total width 18.5m.

All new bridges are open frames and integral structures.

Table 12 New bridges

No.	New chainage	Spans (m)	No. of tracks
1	65+703.62	8.0	2
2	78+900.00	10.0	3
3	86+203.37	12.0	2
4	113+909.87	10.0	2

Reconstruction of existing railway bridges

There are 3 existing reinforced concrete bridges, recently built, in good condition in the part of railway line Stara Pazova-Golubinci.

These bridges will be reconstructed with the rehabilitation of all bridge elements in order to extend their durability. Also, due to the new distance between tracks of 4.5m, for speed up to 200 km/h, bridges will be widened to a lesser extent, up to 50cm.

All existing bridges are simple beam structures with shallow footings.

Table 13 Existing bridges subject to reconstruction

No.	New chainage	Spans (m)	No. of tracks
1	36+439.92	10.0	2
2	38+788.00	12.5	1
3	41+461.00	3x10.0	2

Culverts

All existing culverts will be replaced by new culverts. Also, a certain number of new culverts will be constructed on places where there are no existing ones due to the drainage of railway line.

The total number of new culverts is 63.

All new culverts are box structures with orthogonal wing walls, classified in 5 types:

- type P1 with inner dimensions 150/175cm, 47 pcs;
- type P2 with inner dimensions 200/300cm, 7 pcs;
- type P3 with inner dimensions 300/200cm, 1 pcs;
- type P4 with inner dimensions 300/450cm, 3 pcs;
- type P5 with inner dimensions 500/300cm, 5 pcs.

Road overpasses and underpasses

The intersections of the road infrastructure with the railway route, which will be deleveled in relation to the railway route, are defined by the optional analysis.

It is 16 intersections that will be leveled by means of overpasses or underpasses, and in this way, the continuity of the road traffic connection will be achieved independently of the railway traffic.

The applied road geometry is conditioned by the required level of service depending on the road category. This means that more comfortable elements have been applied on state roads, i.e. on uncategorized roads.

When defining the vertical alignment, the designed technical solution was influenced by spatial limitations, terrain configuration, geotechnical conditions, as well as the spatial position of the railway line, and the existing geometry of the intersected roads.

In populated areas, among other things, the technical solution was influenced by the location of residential buildings as well as the access roads to them.

In some locations, it was not possible to carry out the necessary leveling without demolishing existing buildings in the intersection zone itself.

On the section, we have the following deleveled crossings:

Table 14_Road overpasses and underpasses

Denivelation no	Station	Structure	Location
1	**44+751.8**	overpass L=150m	Salaš, the connection between Golubinci and Ljukovo
2	**49+689.99**	overpass L=177m	state road IIA, No 106
3	**52+087.18**	Underpass L=177m	Kneza Mihaila street, Connection between Donji Petrovci-Putnici
4	**60+669.58**	overpass L=220m	state road IIA, No 120
5	**64+347.332**	underpass L=198m	Vladimira Nazora street
6	**72+886.049**	overpass L=201m	state road, IIA, No 120
7	**79+394.446**	underpass L=215m	Petra Preradovića street
8	**82+743.971**	Overpass L=210m	state road, IIA, No120, Konstantina Velikog boulevard
9	**85+067.147**	underpass	Radnicka street
10	**90+137.21**	overpass L=150m	state road, IIA, No 120
11	**93+257.43**	underpass L=220m	Železnička-Putnička street
12	**101+936.82**	overpass L=185m	state road, IIA, No 120
13	**104+055.36**	underpass L=180m	Vojvode Sindjelića street
14	**107+939.12**	underpass	Salaši street (stadium OFK Bačinci)
15	**111+370.42**	underpass	Fruskogorska street (Gibarac)
16	**114+767.27**	underpass	Branka Erica street

4.2.7 - Other Design Characteristics

Overhead Contact System

The reconstructed and modernized section is envisaged to be electrified with single-phase system, 25kV, 50Hz, prescribed for railway electrification on Serbian Railways.

All existing OCS equipment, conductors, supporting structures and their foundations will be dismantled, and new OCS system suitable for designed speed will be installed along the line.

Electric Traction Substations and Sectioning Posts

Within the scope of reconstruction, modernization and construction of double-track railway line, all existing power supply substations and sectioning posts will be removed, and new facilities will be built, on the same location, except for cases where it is necessary to relocate them.

Facilities for power supply system are:

Traction substations 110/25kV, 50Hz:

- TS Martinci 2x10MVA

Sectioning posts and sectioning posts with neutral section:

- PS Putinci
- PSN Ruma
- PS Sremska Mitrovica
- PS Kukujevci
- PS Šid

Signaling devices

All stations on the railway line no.101 from station Golubinci to station Sid are equipped with centralized relay interlocking devices Siemens SpDrS-64-JZ for traffic management. The signaling system has been in operation for more than 40 years, and its' maintenance is difficult due to the expiration of lifetime and lack of spare parts.

All stations are included in the Centralized Traffic Control (CTC) system Westinghouse Flexicode with control in the CTC centre in Belgrade Ranžirna station.

The designed solution envisages the equipping of all stations on the subject section of the railway line with electronic signalling/interlocking for double-track traffic, with centralized setting of switches (via electronic devices) and automatic routing, setting, locking, control and release of train routes through the station area. In this phase, regarding railway equipment (until the construction of the Unified Dispatch Centre-JDC), it is planned to include new signalling/interlocking devices in the existing CTC system with control from the CTC centre in Belgrade Ranžirna station.

Telecommunication

Telecommunication systems in stations are old and capacity of these systems is not sufficient.

Based on the consideration's requirements from the ToR, design will include installation of the following:

- Copper cables
- Fiber optic cables
- Dispatcher and trackside telephone devices
- Radio-dispatching system
- GSM-R system
- Transport system
- Station telecommunication systems

Telecommunication cables need to be replaced. It is needed to deploy minimum two fiber optic cables along the route in two separate trenches. Also, for the purpose of the radio stations for the GSM-R, it is necessary to install 6x6 plateaus for a column 30-35 meters high (for GSM-R antennas) in the area of each station along the route.

5 - ENVIRONMENTAL AND SOCIAL BASELINE

This section describes the main components of the physical and natural baseline environment in the area affected by the implementation of the proposed Project. The characterization of the existing environment and identification of sensitivities along the proposed railway alignment have involved a comprehensive desk review of a wide range of existing data sources.

5.1 - Environmental baseline

The area of influence for the environmental parameters has been determined as an area of 500 m left and right from the railway axis with possibility, if needed, to extend to cover social impact that will be determined in detail in the next stage of E&S assessment. Due to lack of primary data (i.e. air, noise, surface measurements), the fact that no field surveys were carried out and the preliminary stage of the study, information was provided for all environmental parameters to the possible extent. Efforts have been done so that the information provided herein is adequate for meeting the environmental performance requirements of international lenders and will satisfy public disclosure and consultation requirements, focused the impact assessment and informed management measures and mitigation commensurate to this stage of the Project.

All areas of influence for each parameter are presented in the impacts section, since each parameter has different sensitivity, i.e.at each side of the railway for biodiversity 500 m, landscape 1km, floods 1km, surface waters 0,5 km, groundwater 0,5 km, air and noise 0,2 km, vibration 0,1 km) and they will be taken into account at the baseline description for the ESIA.

5.1.1 - Climate

The climate in the project area is continental to moderate-continental, and the amount of precipitation is usually up to 500-650 mm / year, while the air humidity is moderate. It is characterized by relatively colder winters, warmer autumns than spring and moderately warm summers. More specifically, low annual precipitation dominates, while the summer precipitation is characterized by strong evaporation due to high temperatures, with frequent occurrence of summer storms and showers. Winds are a very important factor causing differences in temperature, bringing precipitation or drought. Although the wind frequency is high especially in this area, its speed is low.

According to the map of climatic areas of Serbia (Ducić, V. et Radovanović, M., 2005), two main climate areas can be defined, A and B.

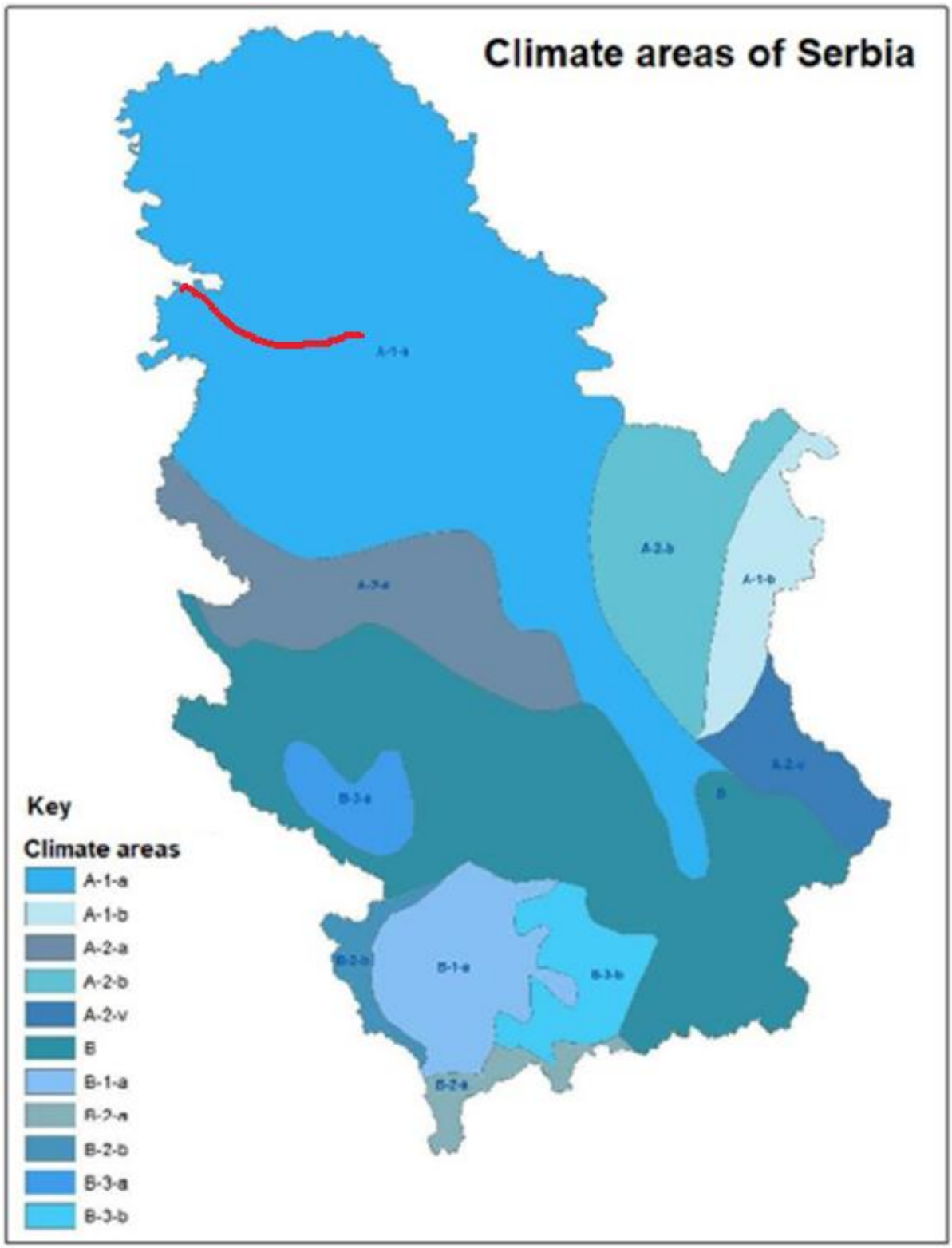

Figure 5 Climate areas of Serbia

Climate area (A) includes Vojvodina and the Peripanonian rim, Pomoravlje and eastern Serbia, up to Nisava River. This climate area has the characteristics of a continental climate. Five sub-areas have been singled out within it: A-1-a, A-1- b, A-2-a, A-2-b and A-2-c. Having in mind the route of the railway, sub-area A-1-a is only crossed by the railway. Sub-area A-1-a - encompasses the plains of Vojvodina and the Peripanonian rim, as well as the Leskovac valley. Absolute extreme air temperatures in this subregion range from -32.6^{0}C to 42.3^{0}C. The annual temperature amplitude is above 22,^{0}C. The average winter temperature is above 10^{0}C, and in summer it is above 20^{0}C. Spring temperatures are slightly different from autumn temperatures. The average annual amount of precipitation in the lower regions is about 520 mm, and in some places over 650 mm. There is the least precipitation in winter, while spring precipitation is slightly higher than in autumn.

Climatological data for the period 1991-2021 measured at the "Sremska Mitrovica" meteorological station were analyzed. Data on the meteorological station "Sremska Mitrovica" are given in the following table, while the following map shows its position in relation to the railway line.

Table 15 Meteorological station data

Location	Coordinates		Altitude (m abole sea level)	Established (year)
Sremska Mitrovica	19°33'E	45°01'N	81	1946

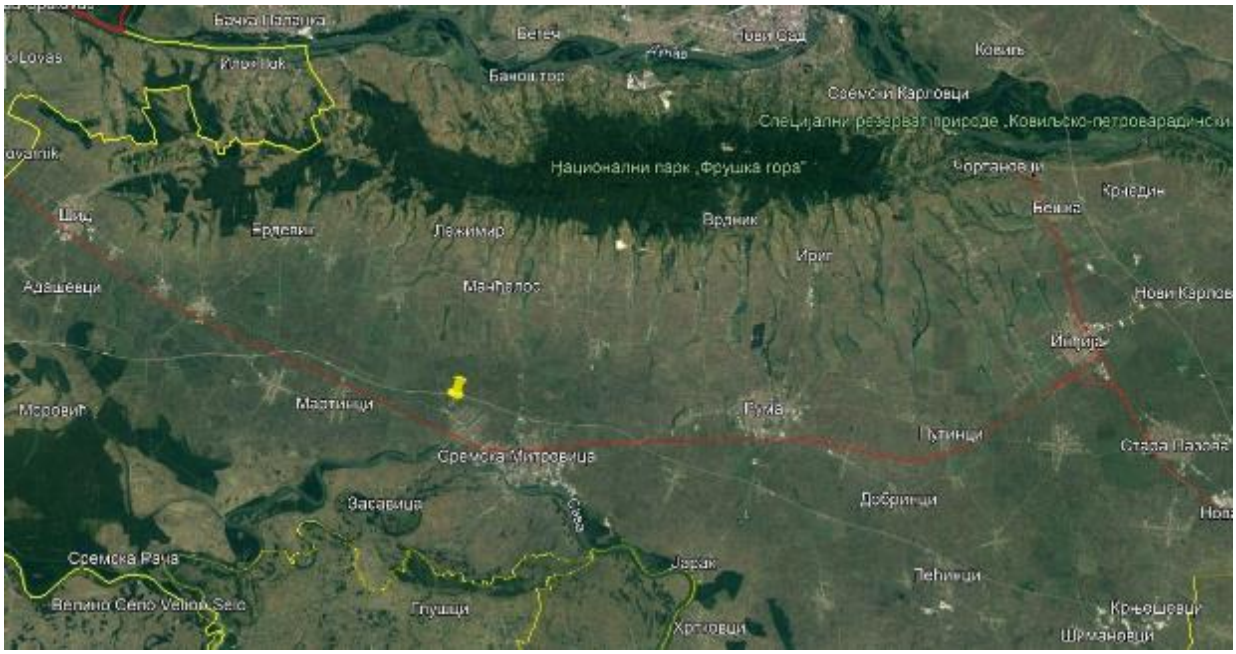

Figure 6 Map of meteorological station "Sremska Mitrovica" in relation with the railway line

Air temperature

The average mean annual air temperature is 11.81°C. The average maximum annual air temperature is 17.67°C, while the average minimum annual air temperature is 6.60°C. During the summer months, there are days with temperatures above 34°C (summer heat), as well as tropical nights (with temperatures above 18°C). The absolute annual maximum was in 2007 (40.7°C) and the absolute annual minimum in 2012 (-26.5°C). The

average temperature of the hottest month in the period from 1991 to 2021 was recorded on two occasions, in August 1992 and August 2012 (32.8°C), while the average temperature of the coldest month was recorded in December 2017 (- 9.7°C).

Data for 2021:

- the average mean annual temperature is 12.1°C
- average maximum annual temperature is 18.1°C
- average annual minimum temperature is 6.9.4°C
- absolute annual maximum is 38.2°C
- absolute annual minimum is -12.2°C
- the average temperature of the hottest month is 31.5°C (August)
- the average temperature of the coldest month is -3.3°C (January)

Air humidity

The relative annual air humidity obtained by data processed at MS "Sremska Mitrovica" for the period from 1991 to 2021 is 76.45%. January and December are the months when the highest mean monthly humidity occurs. On the other hand, the lowest mean monthly humidity occurred in April followed by May and August. The highest average monthly values of humidity, in the period from 1991 to 2021, was recorded in January 1997, January 2009 and December 2015 - 94%. The lowest average monthly humidity value was 51% in August 2012. The annual relative humidity in 2021 was 75% the highest mean monthly humidity value in December (90%), and the lowest was in June (60%)

Cloudiness and fog

The average value of cloudy days decreases from winter to summer months and increases again, so the highest average number of cloudy days occurs in December (about 15 days) and January, and the lowest in August (about 3 days) and July. During the summer, the days with the least cloud cover coincide with the days in which drought, summer heat and tropical days occur. The largest number of clear days occurs in August (about 13 days on average), while July and September follow. On average, the smallest number of clear days is in January (about 3 days) and December (also about 3 days), followed by February and November. The highest average number of days in the period from 1991 to 2021 with fog is in the period from October to January, with a maximum in December (average over 6 days) and January (average over 5 days).

Precipitation

The annual flow of precipitation has predominantly continental characteristics. Based on data processed for MS "Sremsa Mitrovica", the average annual amount of precipitation is 620.6 mm in the period from 1991 to 2021,. The maximum amounts of monthly precipitation were recorded in May, June, July and October, and the minimum amounts of monthly precipitation was recorded in January, March and August. The month with the highest number of days with extreme precipitation is July (followed by June and October.).

Also, according to data from MS "Sremska Mitrovica", the maximum annual rainfall was measured in 2001 (863.5 mm), while the minimum annual rainfall was recorded in 2000 and was 298.2 mm. The maximum monthly rainfall recorded is in June 2001 (220.4 mm) followed by July 1991 (168.5 mm) and August 2006 (156.2 mm). The minimum monthly rainfall was recorded in October 1995 and April 2007. (0 mm) followed by August 2000 (0.1 mm), August 2012 (0.4 mm) and February 1997 (0.9 mm). The maximum amount of precipitation in one day was recorded in May 2014 (69.1 mm).

When it comes to 2021:

- the average annual rainfall is 727 mm,
- the maximum monthly rainfall is 163.1 mm (November),
- the minimum monthly amount of precipitation is 7.8 mm (September),
- the maximum amount of precipitation in one day is 46.6 mm (July).

The highest number of days with snow cover is in January (about 11 days on average), while the monthly average height of snow cover is highest in February (4.96 cm). In 2021, there were 13 days with snow cover (10 cm) in December.

Insolation

Based on the data processed, the average annual sum of insolation at MS "Sremska Mitrovica" for the period from 1991 to 2021 is an average of 2081.9 hours. The month with the highest average insolation is July (followed by August and June), while the month with the lowest average is in December (followed by January). The maximum monthly amount of sunshine was recorded in August 2012 and was 367.9 h. Slightly lower values were in July 2007 (349.1 h), July 2015 (347.4 h) and July 1992 (346.6 h). The minimum monthly amounts of sunshine were recorded in January 1997 (15 h), December 2002 (15.1 h) and January 2009 (15.3 h).

Wind

Analyzing the data for MS "Sremska Mitrovica" for the period 1991-2021, we can notice that the prevailing winds for Sremska Mitrovica are east, west and northwest. The annual frequency for the period from 1991 to 2021 is shown in the following Figure 7. The wind is mostly of low intensity. The average annual northwest, east, and west wind speeds are 2.78 m/s, 2.76 m/s, and 2.4 m/s (period 1991 to 2021).

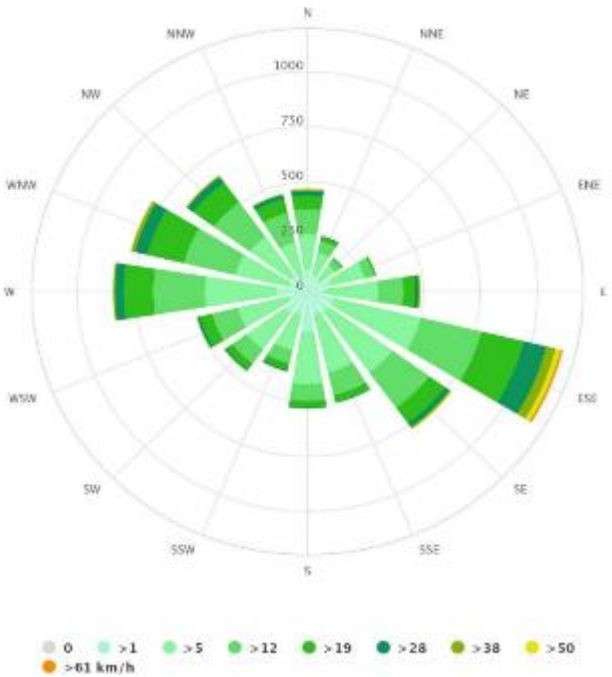

Figure 7 Part of the wind direction, period 1991-2021: MS "Sremska Mitrovica"

5.1.2 - Landscape

The section Stara Pazova - Golubinci - Sid - the border of Croatia and the section Indjija - Golubinci, is located on the territory of AP Vojvodina, passing a completely flat terrain with slight deviations from zero altitude over the Srem plateau. Most of the area is covered by cultivated land: arable land, sown crops and fields as well as areas under uncultivated land.

The concept of planning, use and arrangement of space will be defined in a way that ensures that the modernization and reconstruction of the existing railway line Belgrade - Šid - Croatian border, the Stara Pazova - Golubinci - Šid section and the Inđija - Golubinci railway line, maximizes the existing corridors in which spatial entities and formed, with the minimum necessary occupation of new land.

The planned modernization and reconstruction of the railway line will be for the most part within the framework of the railway land, along with the already existing railway line, and therefore there is a reserved space for the development of this form of traffic.

Based on data from the Special Purpose Spatial Plan (material for early public review), the area covered by the spatial plan consists of cadastral municipalities of local self-government units (Stara Pazova, Inđija, Ruma, Sremska Mitrovica and Šid) occupying ~ 7800 ha. The space reserved for the railway corridor (infrastructure zone 25+25 m) represents an area of ~ 45 ha, in which interventions in terms of reconstruction and construction are foreseen.

The area covered by the Spatial Plan for special purposes consists of agricultural land, forest, water and construction land for other purposes for the most part (~ 96%), while a smaller part (~ 4%) is construction land for the needs of rail transport infrastructure. The railway from Stara Pazova to Ruma passes through a part of the Srem loess plateau. The railway intersects two large loess dunes - behind Inđija and in front of Kraljevci, where the terrain has elevation of 100-110 m above sea level. From the Golubinac canal to the gallery at km 38 + 724, the terrain has elevations of 85-90 m above sea level. Between the stations, the natural terrain ranges from 94 to 98 m above sea level. On these parts of the route, the level of the railway is in the embankment 1.0-10 m thick. The route of the railway intersects the bed of the Veliki Begejac-Inđijski andLjukov watercourses and Golubinački canal, where the elevations of the natural terrain are in the range of 94 to 96 m above sea level. Along the embankment, the terrain is overgrown with low vegetation, while the terrain to the left and right of the railway corridor is agricultural land.

On the route of the Indjija-Golubinci railway, the natural terrain is a loess plateau with numerous micro depressions (loess sinkholes). The elevations of the natural terrain are in the range of 100- 110 m.a.s.l. The terrain is intersected by two watercourses (canal Veliki Inđijski-Begejac and the stream Ljukov) where the elevations of the natural terrain are in the range of 94.30-96.40 m above sea level. In the part from the Inđija station to the overpass (King Peter I Karadjordjevic Street), the route of the railway is in the embankment up to 4 m high, where the absolute elevations of the railway plan are 111-105 m above sea level. Also, in the zone of micro depressions and stream valleys, the railway is in the embankment 1.00-6.00 m high. In the part from the overpass (Kralja Petra I Karađorđevića street) to the culvert at km 2 + 103, the railway is in cut depth of up to 2.70 m. Along the railway, and especially in the culvert zone, the terrain is densely overgrown with trees and low vegetation. The terrain to the left and right of the railway corridor is agricultural land.

The railway at the section from Ruma till Martinci is passing over Srem plateau which is slightly undulating and with general leaning of terrain toward west. At the part from Ruma till culvert atkm 72 + 991, theterrain ranges its elevation from 89 to 100 m asl. West from the culvert, theterrain is with frequent depressions and reefs 2m in height and elevation ranging from 84-87m asl. At this section, the railway overpasses the streams

Kudoš, Čikaš and Kuzminska šidina. Along the route of the railway and in the zone of culverts terrain is densely overgrown with low vegetation, while the terrain to the left and right of the railway corridor is agricultural land.

The natural terrain along the railway from Martinci until bridge at km 115+226 and from km 118+250 (after station Šid) and to the border with Republic of Croatia is plateau with elevation of 82.00- 92.00 m above sea level. In the zone before and near Šid station, the railway intersects part of loess plateau with elevations 92.00-97.00. The railway intersects the bed of drainage canals and stream Šidina, where the elevations of the natural terrain are 79-88 m above sea level. In most of the examined section, the railway is in the embankment 1.00-3.00m height. The elevation of the railway is in the range of 83-96 m.a.s.l. The surrounding terrain along the route of the railway and in the zone of culverts is densely overgrown with low vegetation, while the terrain to the left and right of the railway corridor is agricultural land.

The bridges run the railway over the stream valleys of natural watercourses and drainage canals. The stream valleys are 5-15 m wide and in the riverbed zone are regulated in a trapezoidal profile 3-5 m wide. In relation to the surrounding terrain, the depth of the riverbed is 1.5-3.0 m. The level of the railway is 3.5-8.8 m above the riverbed. The elevations of the natural terrain around the canal are 76.00-95.00 m above sea level. Along the watercourses and canals, the terrain is densely overgrown with marsh vegetation, while the terrain to the left and right of the railway corridor is agricultural land.

Regarding the zone of the stations Golubinci, Putinci, Ruma and the stop Kraljevci, the natural terrain is part of a vast loess plateau with absolute elevations in the range of 94.50-101.00. The elevation of the terrain in Šid is in the interval 94.00-96.00. At the stations Voganj and Sremska Mitrovica, the elevations of the natural terrain are in the range of 82.00-90.00. Regarding the zone of Martinci, Kukujevci stations and Kuzmin stop, the natural terrain is at the level of 82.00-85.00 m. The surface of the terrain in the zone of station areas is permanently regulated by an embankment with an average thickness of 0.30-1.50 m, locally up to 2.00-3.00 m (Ruma station).

5.1.3 - Geology

The existing route of the railway on the section Stara Pazova - Šid - the border of Croatia, occupies the Basic Geological Map Sheets of OGK (1:100,000): Belgrade, Indija, Sabac, Novi Sad and Backa Palanka.

In the area from Batajnica to the State border, along the existing route of the railway and its wider corridor, according to the Basic Geological Map, Quaternary formations are represented (Figure 8).

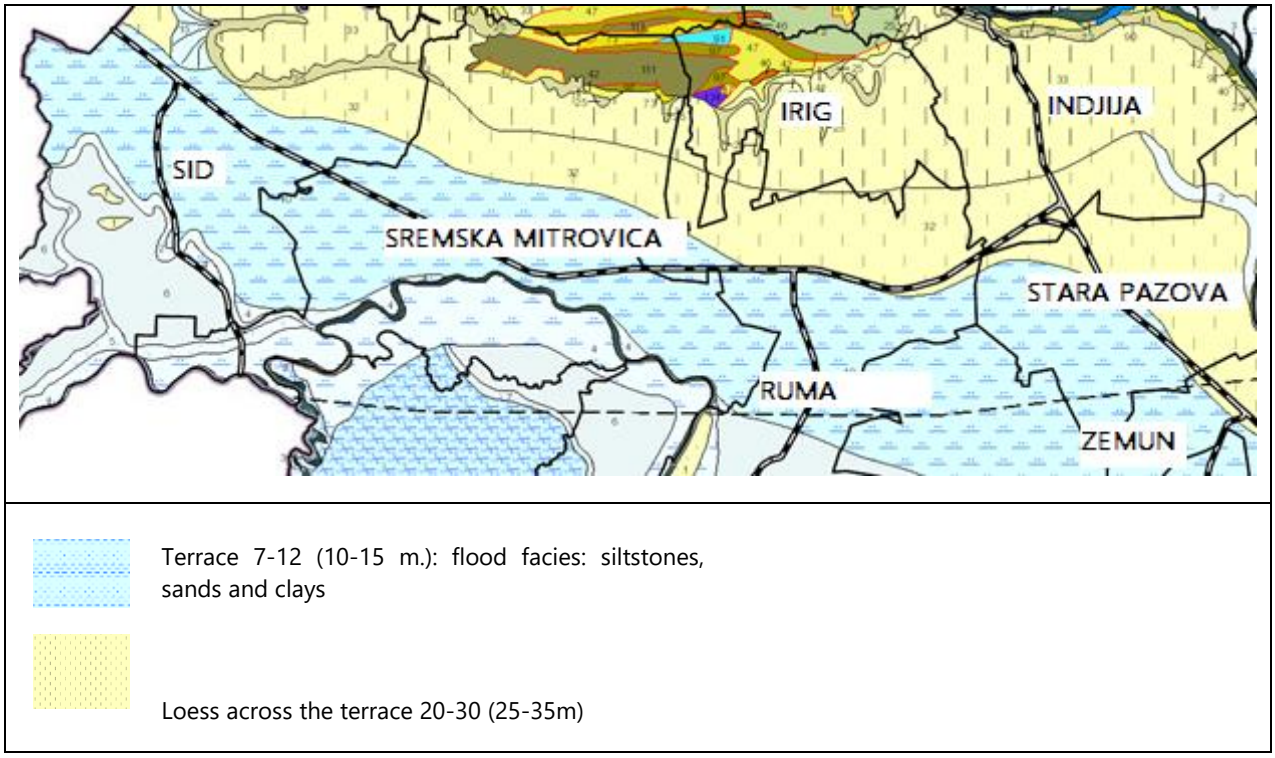

Figure 8 Regional geology in the project area (https://a3.geosrbija.rs/)

QUARTER (Q)

Quaternary formations (Q) cover the Neogene deposits. They are represented by sediments of Pleistocene (Q1) and Holocene (Q2) ages. In the corridor of the existing railroad, from the sediments of Holocene (Q2) age, the following were separated: alluvial deposits (al), bed facies (a), floodplain sediments (ap), floodplain sediments (ap'), pond sediments (b), proluvium (pr) and river terrace (a1).

Alluvial deposits (al)

Alluvial deposits are singled out as the youngest unit along the corridor, they cover a small area and represent deposits of larger streams that flow from the slopes of Fruska Gora across loess plains. They were isolated in the Indjija area. They are represented by sandy-clay siltstones, siltstone clays, sands and less often gravel.

Bed Facies (a)

Bed facies sediments were isolated within the Sava river bed, covering a small area in the Sremska Mitrovica area. They are represented by sand, sandy clays and, rarely, gravel.

Flood Sediments (ap)

Flood sediments were isolated in the area of Putinci and Ruma stations. They were created during large spills - flooding during high water levels of river courses. They are represented by sandy loams and loams, i.e. siltstone-clay sands and siltstone clays

River sediments (ap') Floodplain sediments are separated from the Martinci station and appear in places until the end of the route. They are represented by dispersed clays, aleuritic clays and clay siltstones. According to the fossil remains, these sediments belong to a water-marsh environment with the appearance of fossils that

indicate terrestrial fauna and frequent oscillations of the terrain and flooding, so that a water marsh environment was created in certain areas.

Pond sediments (b)

Pond sediments are partially developed on the surface of the Srem loess plain from Kukujevci station to the end of the route. Most of the wetlands have been drained by melioration canals. In fluvial periods, the undrained areas of the pond are filled with water again, and the deposition process continues today. They are represented by organogenic siltstone clay and siltstone sands.

Proluvium (pr)

Proluvium was isolated in the zone of Putinci and Ruma stations, as material carried along the formed streams and deposited at the place where the stream loses its strength (at the level of the river terrace or at the level of lake-loessoid formations). The deposited material is of different composition: silty sandy gravel, sand, clay with iron and manganese impurities. These materials take the form of a blue cone and, due to the change in the strength of the flow, it is roughly sorted with oblique, crossed and chaotic layering.

River Terrace (a1)

The deposition of fluvial formations of the Sava River led to the formation of a terrace plane with an altitude of 75 to 82 masl. It is separated in the area of the Sremska Mitrovica station. It is built of sandy gravel, sand with lenses of sandy clay. In the final part, pre-sedimented loessoid siltstone clays with carbonate concretions were separated.

From the sediments of the Pleistocene (Q1) age, the following were distinguished: River sediments (ap^2-w), terrestrial loess (l´-w), loess sediments (ls-rw), loessoid-bar facies sediments (lsb-rw), bar loess sediments (b-rw), terrestrial loess (l) and lake - loessoid sediments (jl).

River sediments (ap"-w)

River sediments were isolated in the area of the Kuzmin station, the Kukujevci station and the Gibarac station, and they usually represent the higher lithological member of the second terrace. The following are distinguished: siltstone clays, siltstone clays, argillaceous siltstones, sandy-claystone siltstones and siltstone sands.

Terrestrial loess (l´-w)

Land loess has been established along the perimeter in the area of the Nova Pazova station and the Gibarac halt. These are regions where ponds and swamps existed at the bottom of the surface before the deposition of terrestrial loess, where loess dust was blown into the water environment. Loess is a typical eolian formation represented by sandy and clayey siltstones, without layering, with vertical splitting and the formation of steep sections, with high permeability and greater filtration capacity in the vertical than in the horizontal direction. All loess horizons are rich in carbonate concretions.

Lesoid sediments (ls-rw)

Loessoid sediments are spread within the Srem plain and are isolated in a smaller area of the Indjija triangle. In this belt, lesoid horizons with buried lands appear. Siltstone sands, sandy siltstones, sands, colluvial gravels and buried soils with a lot of iron hydroxides were distinguished. The presence of colluvial gravel and sand in the lesoid material indicates a special genetic composition of these lesoids (fluvial-eolian).

Lesoid-pond facies sediments (lsb-rw)

Sediments of the lesoid-bar facies were formed by the deposition of mixed material of subaerial dust of different origin in water regions. They are separated in the zone from the Golubinac channel (about 2 km from the Stara Pazova station) to the Šelovrenac channel (the stretch between the Golubinci and Putinci stations). They are represented by sandy-clay siltstones, siltstone sands and siltstone sands.

Marsh lake sediments (b-rw)

Marsh loessoid sediments were isolated at the beginning of the research area, on the stretch from the Batajnica station to the Golubinački canal (about 2 km from the Stara Pazova station). They are represented by sandy-clay siltstones, sandy siltstones and siltstone sands

Terrestrial loess (l)

Land loess forms gentle plains with an altitude of 100 to 135 meters above sea level and is separated in the area of Putinci and Ruma stations. Loess is a product of aeolian accumulation during the cold parts of the Pleistocene. During the deposition of loess, there were different climate changes, which can be concluded from the larger number of buried earth and loess. It is represented by sandy-clay siltstones, sandy siltstones and siltstone sands.

Lake - lake sediments (jl)

Lake-lesoid sediments represent the oldest separated units in the corridor of the research area and were separated in the zone from the station Putinci to the station Sremska Mitrovica. They are built from sands, siltstones, siltstone clay, less often clay and interlayers of fine-grained gravel.

5.1.4 - Seismicity

According to the seismological map, which refers to a return period of 500 years, the project area is in the zone 7° (seventh degree) and 8° (eighth degree) of the seismic scale MSK-64. The largest part of the route of the existing railway is in the zone 8° (eighth degree) of the seismic scale, and the smaller part of the route (on the stretch Sid - State border) is located in the zone 7° (seventh degree) of the seismic scale.

According to the Eurocode 8: Design of seismically resistant structures and NA SRPS EN 1998-1 / NA for a return period of 475 years, the area has the following parameters:

soil category:	type „C“
maximum horizontal	
soil acceleration	type „A“ag(g) = 0.1
zone and type of spectrum	Z2, 1

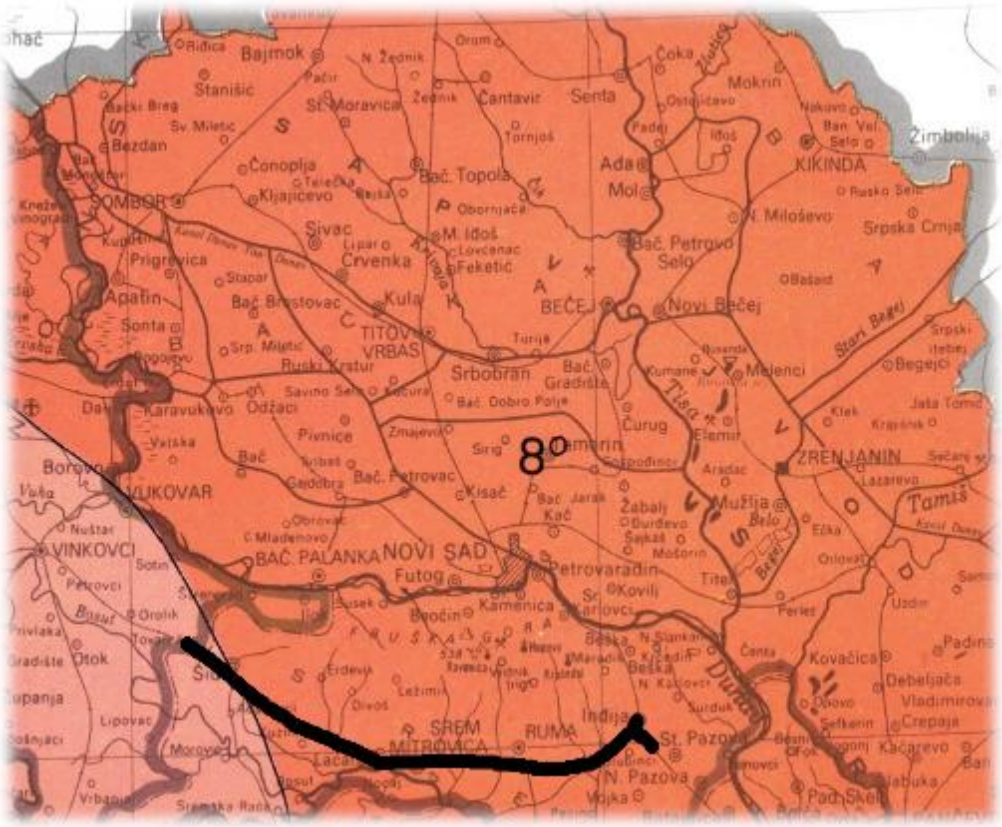

Figure 9 Map of Seismic Regionalisation and Seismic Activity in the Project Area

Historical data and current seismic activity indicate that strong earthquakes should not be expected in the region of Vojvodina, except in the region towards Romania. However, this does not mean that earthquakes will not occur in other parts of Serbia.

Table 16 Seismic events list in the respective region

Place of earthquakes	Date	Magnitude	Region
Fruška Gora	1739/12/20	4,5	Serbia/Vovodina
Fruška Gora	1740/09/12	4,8	Serbia/Vovodina
Fruška Gora	1789/01/01	5,5	Serbia/Vovodina

5.1.5 - Soils

In the analyzed area, the railway route crosses flat, predominantly agricultural land with a fairly homogeneous pedological composition, mainly of carbonate chernozem (on the loess plateau) and carbonate and non-carbonate chernozem (on the loess terrace).

Legend:

terrestrial soils semiterrestrial soils

Figure 10 Pedologic map of the project area
Source: https://a3.geosrbija.rs/

Erosion in this area is very weak, the erosion coefficient is 0.01-0.1, while the amount of deposition m^3/km^2/year. is 100-400.

Given that the area in question is mostly characterized by agricultural land, the negative impact so far is reflected in inappropriate practices in agriculture, including the uncontrolled and inadequate application of artificial fertilizers and pesticides, as well as the absence of quality control of the water used for irrigation (most often it is which are significantly polluted).

The Institute for Agriculture and Vegetables Novi Sad and Abiotechlab doo performed the monitoring service of non-agricultural soil, i.e. systematic monitoring of soil quality and produced a Study on quality assessment and evaluation of the degree of soil degradation. In accordance with the defined goal of systematic monitoring of soil quality, an examination of the presence of dangerous and harmful substances in non-agricultural land at selected locations in AP Vojvodina was conducted in 2019, in accordance with the Regulation on the program of systematic monitoring of soil quality, indicators for assessing the risk of soil degradation and the methodology for the development of remediation programs (Official Gazette of the RS, No. 88/10) and the Regulation on limit values of polluting, harmful and dangerous substances in the soil (Official Gazette of the RS, No. 30/18).

In the municipality of Sid, a soil analysis was carried out on two illegal landfills located in the settlements of Kukujevci (measuring point about 1500 m from the railway) and Gibarac (measuring point about 1900 m from the railway).

Figure 11 Soil sampling sites

Soils from the localities Kukujevci and Gibarac belong to the category of medium (moderately) alkaline soils, based on the pH value in the soil suspension with water. Based on the pH value in the soil suspension with KCl, the soils from the localities Kukujevci and Gibarac belong to the category of alkaline soils.

5.1.6 - Air

Monitoring of air quality indicators in the Republic of Serbia is performed by the Environmental Protection Agency. Obligations and tasks of the Environmental Protection Agency in air quality management are defined in more detail by the Law on Air Protection ("Official Gazette of RS" No. 36/09, 10/13 and 26/21). The annual report on the state of air quality in the Republic of Serbia derives from the obligation of the Agency based on Article 67 of the Law on Air Protection.

The following table shows the CAQI (Common Air Quality Index) of the basic parameters being measured, as well as their maximum allowable concentrations.

Table 17 Air quality index CAQI

Averaging period	Pollutant	Limit µg/m^3	Excellent	Good	Acceptable	Polluted	Very polluted
1h	SO_2	350	0 -50 µg/m^3	50.1-100 µg/m^3	100.1-350 µg/m^3	350.01-500 µg/m^3	>500.01 µg/m^3
1h	NO_2	150	0-50 µg/m^3	50.01-100 µg/m^3	100.1-150 µg/m^3	150.01-400 µg/m^3	>400.01 µg/m^3
1h	PM_{10}	-	0-25 µg/m^3	25.01-50 µg/m^3	50.01-90 µg/m^3	90.01-180 µg/m^3	>180.01 µg/m^3

1h	$PM_{2.5}$	-	0-15 µg/m^3	15.01-30 µg/m^3	30.01-55 µg/m^3	55.01-110 µg/m^3	>110.01 µg/m^3
24h	CO	-	0-5 mg/m^3	5.00001-10 mg/m^3	10.00001-25 mg/m^3	25.00001-50 mg/m^3	>50.00001 mg/m^3
1h	O_3	-	0-60 µg/m^3	60.1-120 µg/m^3	120.1-180 µg/m^3	180-240 µg/m^3	>240.01

The colour display is usually used so that citizens can easily find out which of several categories the air quality is currently in: whether it is excellent, good, acceptable, polluted or very polluted/ dangerous. The concentration of multiple pollutants is measured and they have specific thresholds and ranges for the colors that determine the category of contamination. As part of air quality monitoring and in accordance with the criteria prescribed by the Law on Air Protection, SEPA performs AQ assessment in zones and agglomerations. This is an official assessment of air quality in Serbia that applies the standards present in practice in the EU due to the fact that the EU Air Quality Directive has been transposed and integrated into national legislation.

Table 18 Air quality standards for health protection, as presented in the Air Quality Directives and applied by SEPA in the assessment of AQ in the Republic of Serbia

Pollutant	Averaging period	Legal nature and concentration	Comments
SO_2	1h	Limit 350 µg/m^3	Not more than 24 hours per year
		Alarm threshold 500 µg/m^3	It is measured for three consecutive hours in an area of 100 km^2 or in the entire zone
	1 day	Limit 125 µg/m^3	Not more than 3 days per year
NO_2	1 h	Limit 200 µg/m^3	Not more than 18 hours per year
		Alarm threshold 400 µg/m^3	It is measured for three consecutive hours in an area of 100 km^2 or in the entire zone
PM_{10}	1 day	Limit 50 µg/m^3	Not more than 35 days per year
	Calendar year	Limit 40 µg/m^3	
$PM_{2.5}$	Calendar year	Limit 25 µg/m^3	
CO	Max. daily 8-hour average value	Limit 10 µg/m^3	
O_3	Max. daily 8-hour average value	Target value 120 µg/m^3	No more than 25 days a year arranged for three years
		Information threshold 180 µg/m^3	
	1 h	Information threshold 240 µg/m^3	

In accordance with Article 21 of the Law on Air Protection, and according to the level of pollution, starting from the prescribed limit and tolerance values, based on the measurement results, the following categories of air quality are determined:

1) Category 1 – pure or slightly polluted air where the limit values of none of the pollutants are exceeded;

2) Category 2 – moderately polluted air where limit values of one or more pollutants are exceeded, but tolerant values of none of the pollutants are not exceeded;

3) Category 3 – too polluted air where tolerant values for one or more pollutants are exceeded.

In event of a pollutant not having a prescribed tolerance limit, its limit value shall be taken as the tolerant one.

Air quality categories are established once a year for the previous calendar year. The list of air quality categories by zones and agglomerations at the Republic of Serbia territory is formed by the Government and published in "The Official Gazette of the Republic of Serbia", electronic media, as well as the web sites of the Government and the Ministry.

As of January 1, 2021, the tolerance limit for nitrogen dioxide is 0, and thus the tolerance value has equaled the limit value

The network of stations for automatic air quality monitoring, AMSKV, is, in accordance with the Law on Air Protection, recognized as a state network for air quality monitoring at the level of the Republic of Serbia.

The Belgrade - Sid railway is electrified, so it has a minimal effect on air quality. As a source of air pollution in the investigated corridor, there are some industrial plants that represent the source of emissions of harmful pollutants into the atmosphere, as well as individual pollution caused by the combustion of solid and liquid fuels and other substances.

The following pictures show the locations of the air quality monitoring stations and the parameters that are measured. Taking into account the route of the Belgrade-Sid railway, the relevant station for automatic monitoring of air quality is located in Sremska Mitrovica, while the Šabac and Beocin stations are located in the wider area and further from the railway.

The assessment of air quality for the year 2021, in this report, was made on the basis of the results of measuring polluting substances obtained by air quality monitoring of state and local networks.

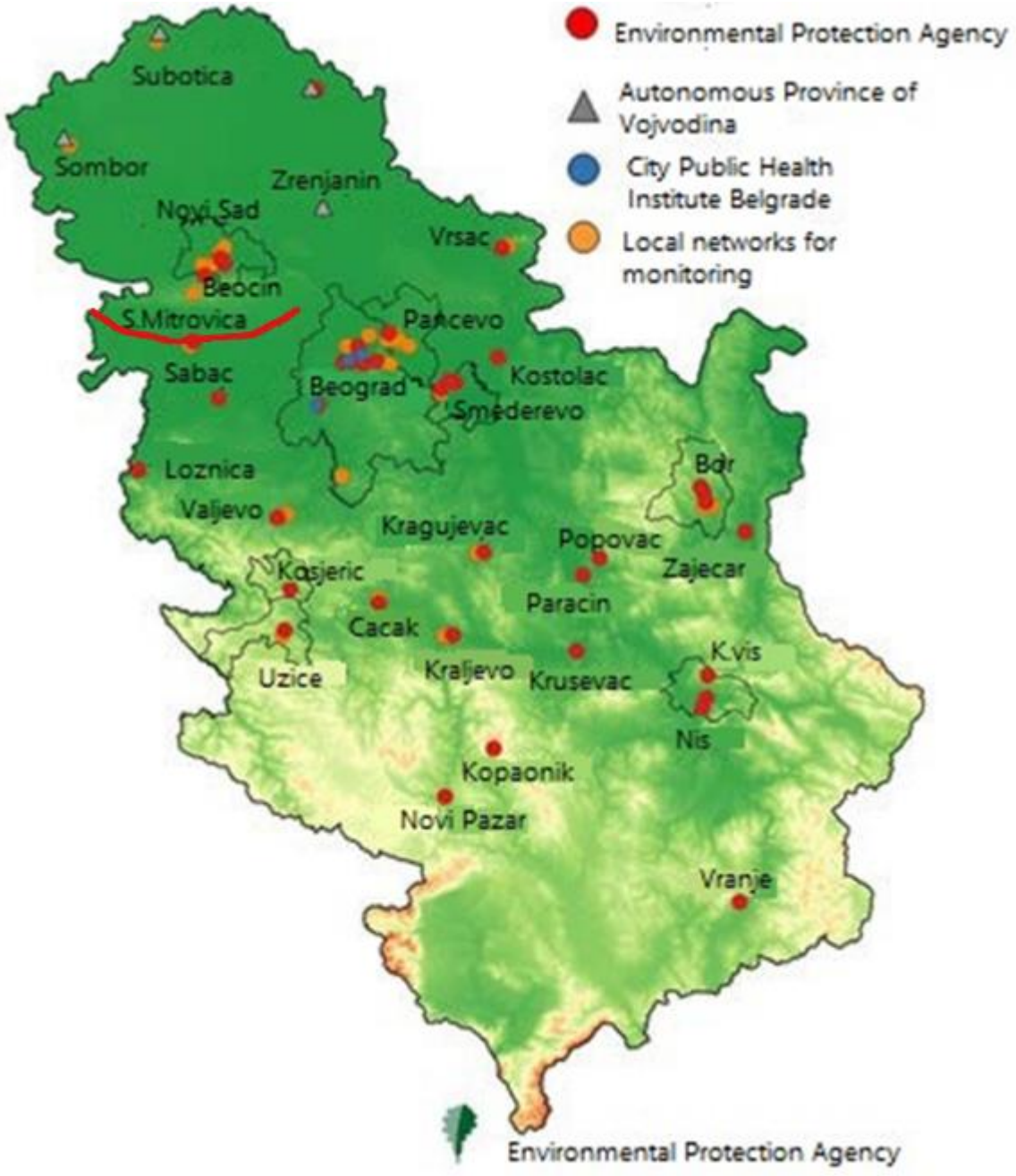

Figure 12 Networks of stations and measuring points for air quality monitoring (railway line is indicated in a red line)

The assessment of air quality, by stations and by zones and agglomerations, for the year 2021, is shown in the following pictures.

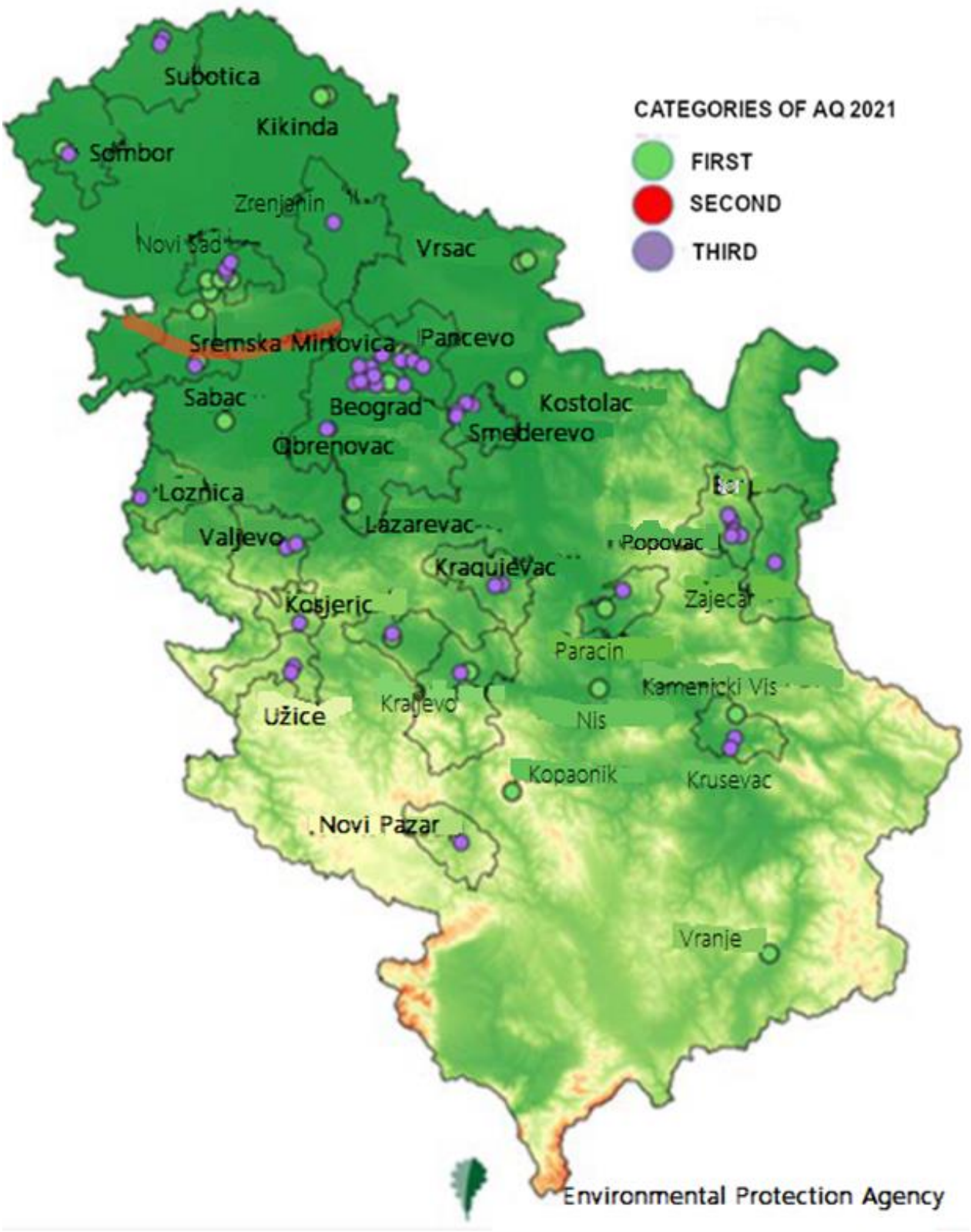

Figure 13 Air quality categories in 2021 by station

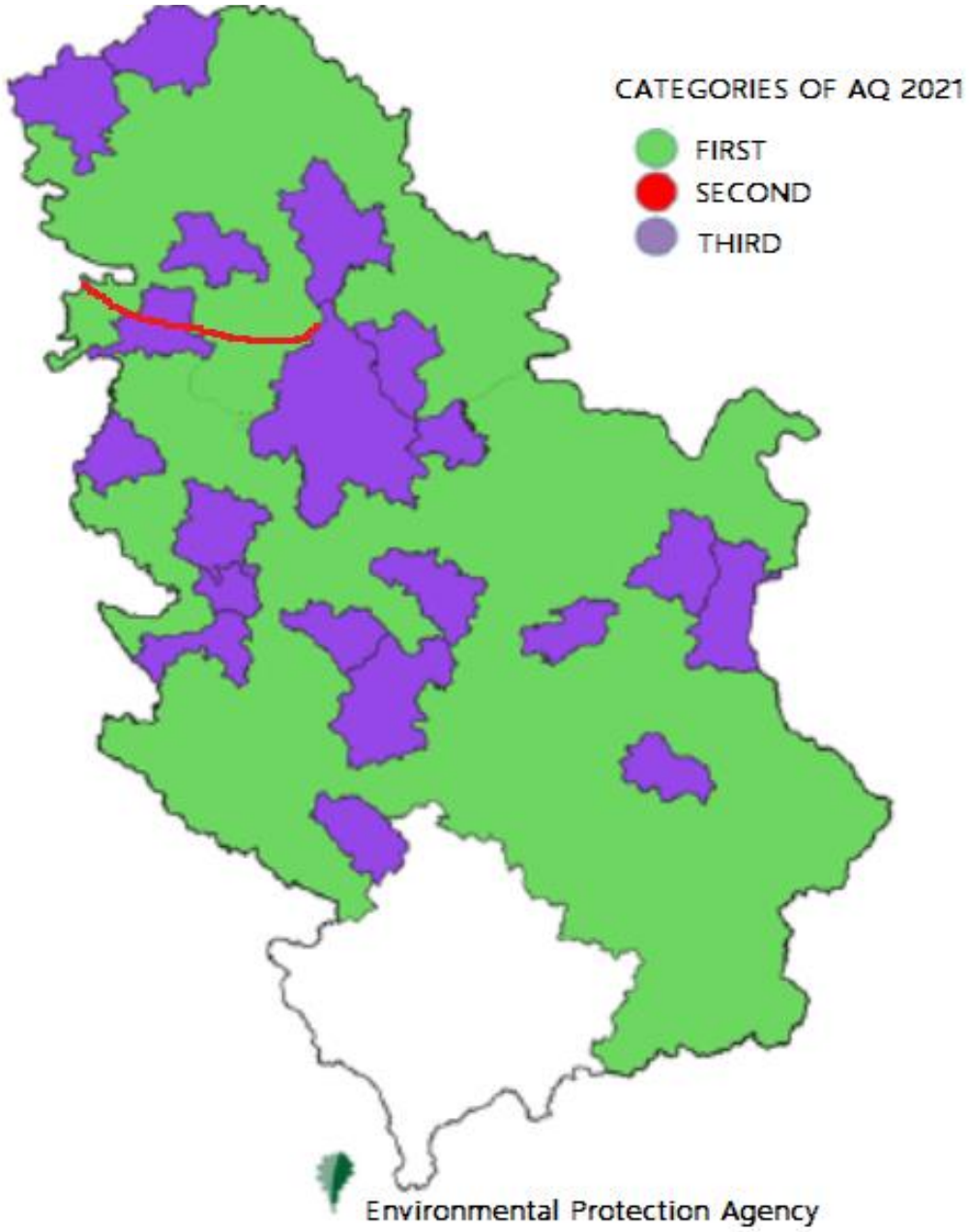

Figure 14 Air quality categories in 2021 by zone

Further results regarding Sremska Mitrovica, Indjija and Ruma will be presented at the next stage of ESIA preparation.

5.1.7 - Climate change

5.1.7.1 - Introduction

Serbia is positioned on the 111 (of 181) place in the World Risk Index Report 2021 (Institute for the Environment and Human security of the United Nations University) with the World Risk Index of 5.42 (low). Exposure is assessed as medium, mainly because all Western Balkan states must cope with elevated risks of

natural hazards/ extreme weather. Susceptibility is also medium, due to the economic conditions in Serbia. Think Hazard assesses that in Serbia risk of river floods, urban floods and wildfires is high, while earthquakes, landslides, water scarcity and extreme heat carry medium risk.

In line with the EIB document „Assessing climate change risks at the country level: the EIB scoring model" (EIB Working Paper 2021/03, May 2023), Serbia is, among other 180 countries, assessed for the climate physical and transitional risks. Physical risk cover the direct effect of climate change on assets and productivity. It can be acute if caused by extreme weather events and hazards such as floods, landslides, extreme temperatures, storms and hurricanes, droughts or wildfires, or chronic, if related to a more gradual effect of global warming, so to longer-term shifts in climate patterns, for instance global temperature change. Transition risk refers to the climate risk resulting from mitigation policies as economies move towards a greener, less polluting society. Such policies, stemming from deals like the Paris Agreement in 2015, lead to changes in the energy system and have impacts throughout the economy. Climate policies are the main driver of the related risks, as they formalize the need to adjust and prescribe the speed of the transition.

As the carbon-intensive country, due to the heavy reliance on coal in the energy sector, Serbia transition risks are expected to be higher. As already experienced, Serbia, along with Bosna& Herzegovina, has elevated levels of physical risks compared to most of Europe. Fact that climate risk scoring results in low physical risk is, having in mind information from „Disaster risk assessment in the Republic of Serbia" (Ministry of Internal Affairs, 2019), „Observed climate changes in Serbia and projections of the future climate based on different scenarios of future emissions" (UNDP, 2018) and Serbian NAP document, maybe understatement, both for acute and chronic risks. Again, mentioned high dependence on coal in Serbia will probably result in high transition risk compared to „elevated „scoring given in EIB scoring model.

5.1.7.2 - Climate projections

Expected changes in temperatures and precipitation- Serbia-wide

The data presented in the document Observed climate changes in Serbia and projections of the future climate based on different scenarios of future emissions (UNDP, 2018) represent the most likely value from the set (ensemble) of solutions obtained using daily values of temperatures and precipitation from nine regional climate models that can be downloaded from the EURO-CORDEX database. The reference period with respect to which the change in future climatic conditions is analysed is 1986-2005 and the analysed future periods are: 2016-2035 (near future), 2046- 2065 (mid-century) and 2081-2100 (end of century). The analyses were performed according to two selected greenhouse gas emission scenarios: RCP4.5 (stabilization scenario, which anticipates the stabilisation of emissions from 2040) and RCP8.5 (constant growth scenario), which are assumed to cover the likely range of possible future outcomes.

Over the future periods, an increase in temperature is expected in both scenarios compared to the 1986-2005 reference period. A more intense increase in temperature is anticipated according to RCP8.5, which is expected due to the more intense emissions of greenhouse gases and their impact on the energy balance in the climate system. In this scenario, the mean annual temperature, on average for the territory of Serbia, will increase by 1°C in the near future compared to the reference period, in the period attributed to the mid-21st century, it will rise to 2°C, and, by the end of the century, the average annual temperature will be higher by as much as 4.3°C compared to the reference period. The stabilisation scenario, RCP4.5, shows a slightly less increase in mean annual temperature by about 0.5°C compared to RCP8.5 during the first two analysed periods. In this scenario, by the end of the 21st century, the increase in the average annual temperature in the territory of Serbia will reach a much lower value than the value obtained under the RCP8.5 scenario, which is 2°C higher than the value of the reference period. Seasonal analyses and changes in mean maximum and minimum temperatures have shown that in the future climate the temperature increase during the colder part of the year

may be slightly less than the temperature increase during the warmer part of the year, but during the second half of the century according to the RCP8.5 the warming of the colder part of the year becomes more intense and catches up with the warming up of the warmer part. The increase in maximum temperatures are slightly higher than the increase in minimum temperatures. The largest increase will be in the RCP8.5 scenario of the mean maximum temperature during the June-August period for the period at the end of the 21st century, with an average value of as much as 4.7°C higher than the 1986-2005 reference period. A spatial analysis of changes in temperatures over future periods indicates an increase in warming from north to south.

The number of frost and ice days will progressively decrease in the future due to the temperature increase. Their trend of change is more pronounced at higher altitudes. In the near future, there will be almost 10 days less frosty days on average annually in the territory of Serbia compared to the values of the 1986-2005 reference period. During the mid-21st century climatic period, according to the RCP8.5, there will be almost one month less frosty days and according to the RCP4.5 there will be about half a month less of them. Although the climate will begin to stabilise according to RCP4.5, by the end of the 21st century there will be on average one month less frosty days, while according to RCP8.5 the average decrease in the territory of Serbia is expected to be almost two months, in which case frost days will become a rare event in Serbia. Ice days in the case of the RCP8.5 scenario will only be possible in the highest mountain areas. The number of hot and tropical days will continue to increase in the future climate conditions. In the climate of the near future, relative to the reference period, changes indicate an extension of summer season conditions by almost half a month, and in the second half of the 21st century, an extension of almost a month may occur, after which the change will stabilise according to the RCP4.5 scenario, while according to RCP8.5, by the end of the century, summer conditions will be on average nearly two months longer than during 1986-2005 period. By the end of the 21st century, the expected increase in the average annual number of tropical days will be in the range between 20, according to RCP4.5, up to almost 50 days in the RCP8.5 scenario. The analysis of the spatial distribution of the results has shown that tropical days will become a relatively regular event in mountainous areas as well. Heat waves will become more intense and more frequent during future climate periods. Extreme heat waves in the future climate will occur on average at least 2-3 times a year, while during the 1986-2005 reference period these were very rare events. According to the RCP8.5 scenario, by the end of the 21st century, their average occurrence in the territory of Serbia will be as high as 7 occurrences during the year, and in some areas even more than 10. The analysis has shown that in this case, for over two months annually the thermal conditions on the territory of Serbia will be like during the rare occurrences of extreme heat waves in the current climate, but with record high temperatures that have not yet been observed in these regions.

The future changes in mean annual accumulated precipitation, averaged for the territory of Serbia, will not have a pronounced trend in the future periods, as is the case with temperature. However, in the second half of the 21st century, according to the RCP8.5 scenario, the average annual precipitation will start to decrease and in the period at the end of the 21st century, central and especially southern Serbia will experience the largest precipitation decrease, even exceeding 10% with respect to the 1986-2005 reference period. The spatial distribution of change in precipitation shows declining trend towards the south. Precipitation decrease during the June-August period has already been observed and it will continue during future periods according to both scenarios. In the period at the end of the 21st century, according to RCP8.5, the average precipitation decrease in the territory of Serbia will be 20.5%, with a much larger decrease in the southern regions, of as much as 40%.

The changes in precipitation indices indicate a further intensification of the already observed changes in the precipitation distribution intensity towards more frequent heavy precipitation events and higher precipitation accumulations during intense precipitation events. An interesting result was obtained in the analysis of the change in the percentage share of precipitation falling during heavy precipitation days: the change in the amount of precipitation during extreme precipitation events in future climatological periods will progressively increase as a result of more frequent extreme precipitation events but also more intense precipitation.

By the end of the 21st century, according to RCP4.5, as much as 40% more precipitation, accumulated during year, will occur during the days when precipitation is extremely high compared to the precipitation events of the 1986-2005 reference period. According to RCP8.5, these accumulations will increase by 60%.

Site-specific climate projections

Under the "Advancing medium and long-term adaptation planning in the Republic of Serbia (NAP project)", a Digital Climate Atlas of Serbia (web platform) has been established. Digital Climate Atlas of Serbia is based on the data provided by CORDEX the World Climate Research Programme initiative, Copernicus Climate Change Service that provides climate monitoring products for Europe based on surface in-situ observations by the Republic Hydrometeorological Service of Serbia, as well as geospatial information system of the Republic of Serbia. Digital Climate Atlas considers two possible climate scenarios- RCP4.5 (mitigation measures employed) and RCP 8.5 (business as usual). Adopting a conservative approach would mean using RCP8.5 in 2071-2100 time frame. Nevertheless, having in mind climate commitments of the Republic of Serbia, this approach is omitted and RCP4.5 is used. This somewhat favorable and optimistic decision is balanced by the adoption of medium time horizon 2071-2100- infrastructural projects have a lifespan of 30+ years, usually extending well over half a century. Reference period 1986-2005 is used instead of 1971-2000 because it, by subjective opinion, better and more uniformly reflects changes of decade-by-decade climate impacts that are experienced in Serbia.

Projections of precipitation from EUROCORDEX show a less clear difference between RCP4.5 and RCP8.5 than are apparent for temperature changes (Extreme weather and climate in Europe- EEA, 2015).

Figure 15 Satelite imagery with railway route (red line) and municipalities borders (yellow lines)

Results indicate that chronic climate risk of temperature rise could lead to drought, especially in the project area between Sremska Mitrovica and Inđija, where river Sava is farther from the railway. Impact of droughts should be taken into account in further design steps. More information will be shared in the ESIA.

Statical wind information indicate that almost 2 days/year have wind speeds over 61 km/h. Judging by the events from 2016, 2020. and 2022, extreme winds speeds are becoming more frequent in the project area and could pose a threat if oriented perpendicular to the railway. As seen from Figure 16, direction of the dominant wind almost coincides with railway route, so wind (constant or gusts) should not be a problem

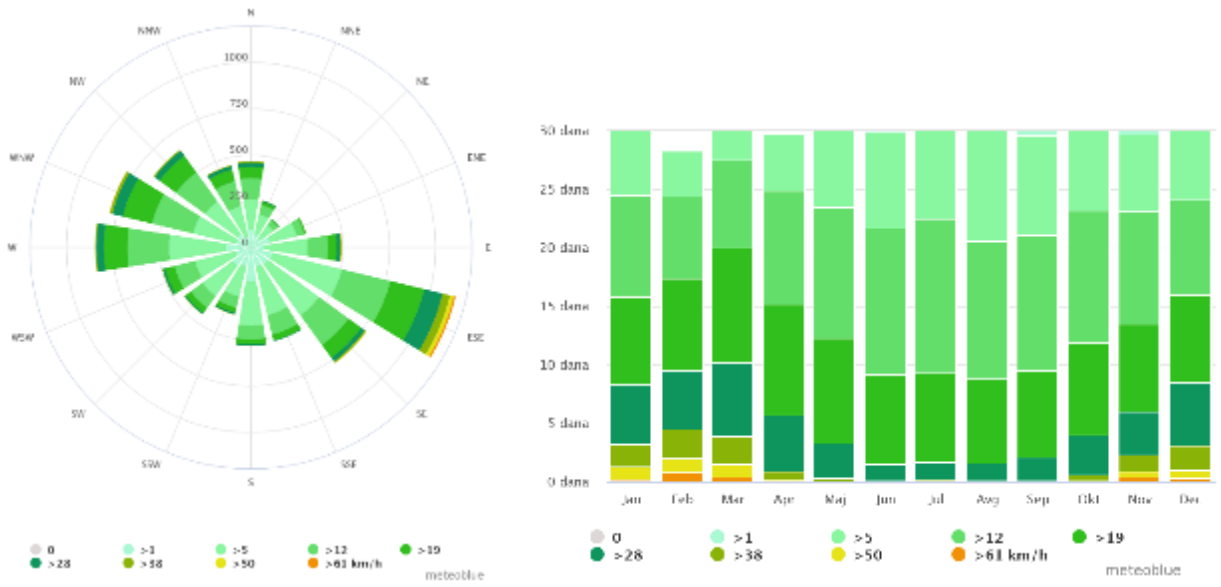

Figure 16 Wind rose (left) and wind speed values by month (source https://www.meteoblue.com**)**

5.1.7.3 - Fluvial floods

The projection of the future development of floods concerning their intensity, timing and frequency is considered to be a challenging and uncertainty afflicted task. This can be traced back to various factors. The origin of floods can be very diverse: long and persistent rainfall events, storm precipitation, and rain on snow events. Another crucial factor is the terrain characteristics: mountains and lowlands, small and big catchments, geological conditions, soil properties. Moreover, there is great human influence on the surface which can contribute to flood development: agriculture, forestry, soil sealing, and river regulation. Despite these factors, which influence flood intensity, timing and frequency, an increase in future flood risk and intensity is expected mainly in small and mountain catchments.

According to review and update of the study "Integrating and editing new scientific results in climate change research and the resulting impacts on water availability to revise the existing adaptation strategies in the Danube River basin" (International Commission for the Protection of the Danube River, 2018), in middle Danube River basin it is expected:

- Increase in flood risk, intensity and duration,
- In particular an increase in flood risk in rivers originating from mountains and in mountain headwater catchments,
- Shift of flood peaks to earlier month,
- Higher possibility of flood events during dry periods due to storm precipitation during droughts.

Flood Risk Management Plan in the Sava River Basin (International Sava River Basin Commission, 2019) is developed according to the requirements of the Protocol on Flood Protection to the Framework Agreement on the Sava River Basin and it is aligned to the possible extent, with the requirements of the EU Floods Directive, which sets legal basis for reduction and management of flood risks to human health, environment, cultural heritage and economic activity.

On the lower Sava River section in Serbia, levees on both banks are not continuous. On the left bank, in the direction from Kupinovo to Sremska Mitrovica, natural floodplains are retained for retention and partial

transformation of a flood wave. Levees on the left bank mainly provide protection from the high waters of 100-years return period, with protection elevation of 1,2 meters. In this area is the natural reserve "Obedska Bara", which is a Ramsar site. With its flooding area of almost 12.000 ha and retention capacity of over 250 million m3, it naturally regulates Sava River high waters.

Water and Climate Adaptation Plan for the Sava River Basin- WATCAP (World Bank, 2015) provided the most comprehensive analysis related to the modelling of climate change impact to flood risk management planning at the Sava River Basin level. Based on climatological analysis, in general, temperature is expected to increase over the Sava River Basin area in all seasons (the most pronounced increase can be observed for summer and winter). On the other hand, precipitation is expected to decrease in spring, summer and autumn (with the most pronounced decrease in summer), whereas an increase in the winter is expected, especially in north-western part of the basin. Rainfall, which is very variable in the basin and appears to be changing in terms of seasonal distribution, brings uncertainty into hydrological trends within the basin. Therefore, options for reducing the impact pressures associated with rising mean temperatures and variable rainfall should be identified through careful planning and promotion of adaptation measures rather than coping with such changes. Also, WATCAP concluded that the climate change will increase the peak discharges mainly in the head part of the Sava River Basin. The peak discharges will increase at the end of the 21st century for the 100-year return period i.e. from 3% at Sremska Mitrovica up to 55% at Čatež. The impact of climate change on the water level forecasts with 100-year return period floods is quite high in the head part of the watershed, i.e. more than 2 m. Downstream it initially strongly decreases then it gradually increases up to 1,8 m and finally it drops to 0,1 m at Sremska Mitrovica. There is clear evidence that reforestation has decreased the mean discharges in Slovenia by up to 35% and consequently such actions will decrease flood discharges and mitigate the impact of climate change on floods in the Sava River Basin. By climate change projections made by WATCAP, the flood risk is extremely large for parts of the Sava River Basin where the current 100-year return period floods will become a 10-year return period floods in 2100.

The preliminary flood risk assessment for the territory of the Republic of Serbia was prepared in 2012. by the Ministry of Agriculture, Forestry and Water Management, the Republic Directorate for Water, in accordance with the Water Law, the Rulebook on establishing the methodology for the preparation of a preliminary flood risk assessment, as well as the European Directive on the assessment and management of flood risks, 2007/60/EC. Results of the several projects (Danube Floodrisk Project, IPA 2014-2020 Flood recovery Serbia IPA 2014-2020 Flood recovery Serbia, SoFPAS in Serbia (Study of Flood Prone Areas in Serbia - Phase 1)) are vulnerability and flood risk maps. Results of the project Flood Hazard and Risk Mapping, Component 2 Of Serbia National Disaster Risk Management Plan (NDRMP) for Q100 and Q1000 (return period of 100 and 1000 years) show that no real flooding is expected along both sections of Šid- Inđija railway, but that risk exists even for Q100.

During the infamous 2014. floods, thanks to the massive efforts of the citizens of this city and the relevant authorities on the erection and constant maintenance of flood-protective embankments along the Sava River, there were no water breaches within city limits. Being positioned throughout the middle of the city, the railway and its operation was also not compromised. Current railway coincides with the planned route and even with the implemented flood-protective measures (post-2014), with river at 900m distance at the nearest point from the rail tracks (settlement Laćarak), floods represent the potential risk (flood water level 1-1.5m).

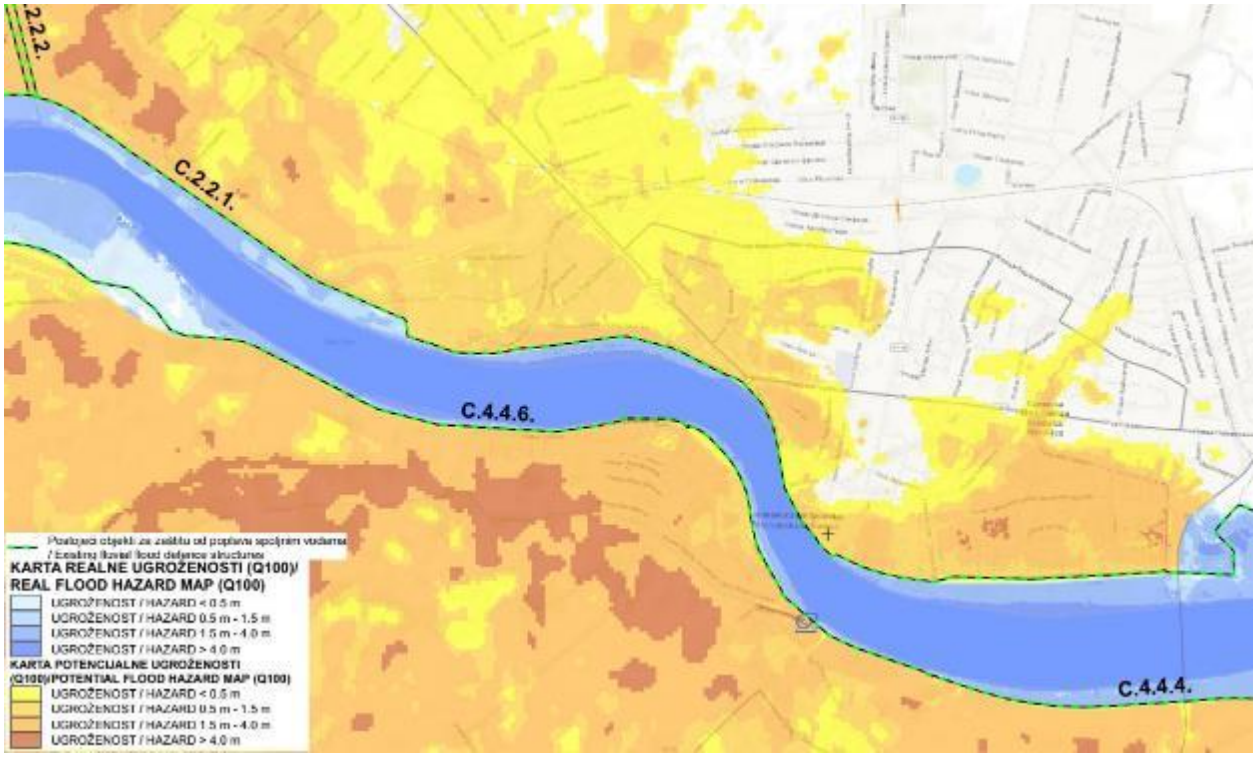

Figure 17 Flood hazard map for Q100 at the Sremska Mitrovica

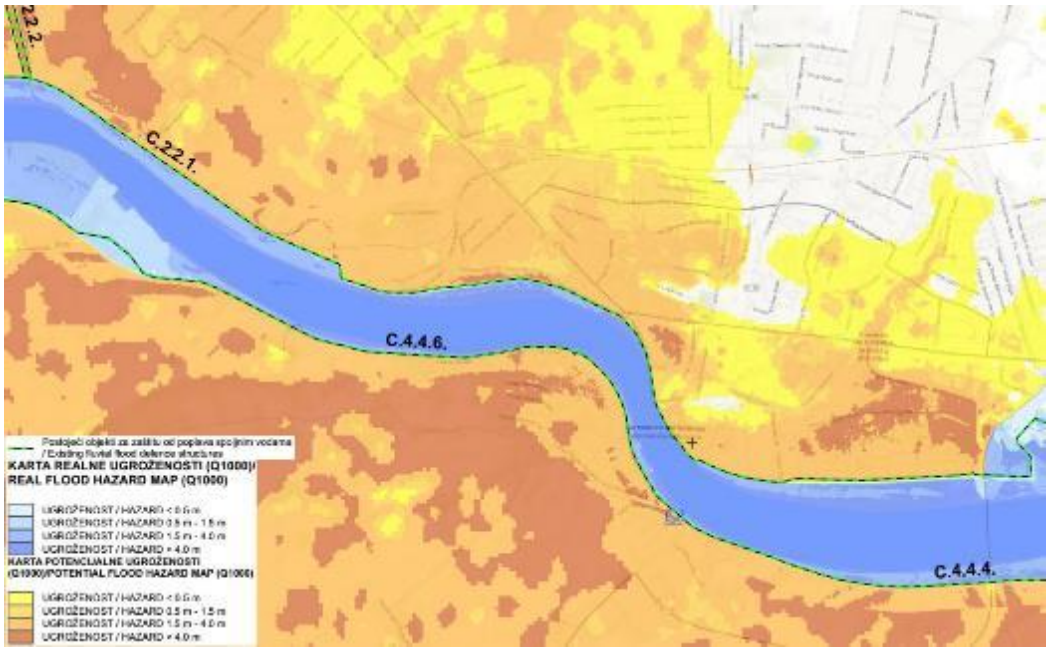

Figure 18 Flood hazard map for Q1000 at the Sremska Mitrovica

During the preparation of the first Preliminary Flood Risk Assessment from 2012, the impact of climate change on the occurrence of floods, as one of the important aspects, was not considered due to the lack of available data. In the meantime, as part of projects to improve the hydrological monitoring and forecasting system on small and medium-sized watersheds in the Republic of Serbia, a study of the impact of climate change on the watersheds of Kolubara and Toplica in which climate change scenarios from several climate models were used for the periods up to 2030 and up to 2100. The results of this Study showed a decrease in the average annual

flow in both basins (up to 30% during the second considered period), especially in winter, spring and summer, but also a slight increase in peak flows during extreme hydrological episodes. The International Commission for the Protection of the Danube River (ICPDR) has given basic recommendations on adaptation measures to these changes for the sectors of water management and agriculture in the Study of Adaptation to Climate Change in the Danube Basin.

5.1.7.4 - Wildfires

The Fire Weather Index (FWI) is a meteorologically based index (European Forest Fire Information System EFFIS classification) used worldwide to estimate fire danger. It consists of different components that account for the effects of fuel moisture and wind on fire behaviour and spread. The higher the FWI is, the more favourable the meteorological conditions to trigger a wildfire are. Using an elaborated climate scenario (RCP4.5) and end-of-century time horizon (2080-2100), average danger over fire season (June-September) is obtained from the Copernicus Climate Change Service (C3S). For Sremska region FWI is 30.5 for the multi-model worst case and 20.7 for the multi-model mean. Obtained FWI values indicate moderate fire danger along the corridor of the Šid- Inđija railway. On the other hand, ThinkHazard (https://thinkhazard.org) identifies Sremska region with high hazard level for wildfires.

Šid-Inđija railway passes through the area dominated by the vegetation of annual crops, with occasional pass-through of urban centers (red shade). This indicates that moderate- high fire danger, assessed by CS3 and ThinkHazard, should not pose a significant threat to the railway.

Spatial Plan of the Republic of Serbia 2021-2035 in thematic map number 9 gives overview of natural hazards (Figure 19). As seen from Figure 20, project region is prone to hails (railway route between settlement Kuzmin and town Sremska Mitrovica) and floods (around Sremska Mitrovica). About the quarter of the project area (from settlement Kukujevci at the west to Šid) is on area with seismic hazard VII-VIII MSC.

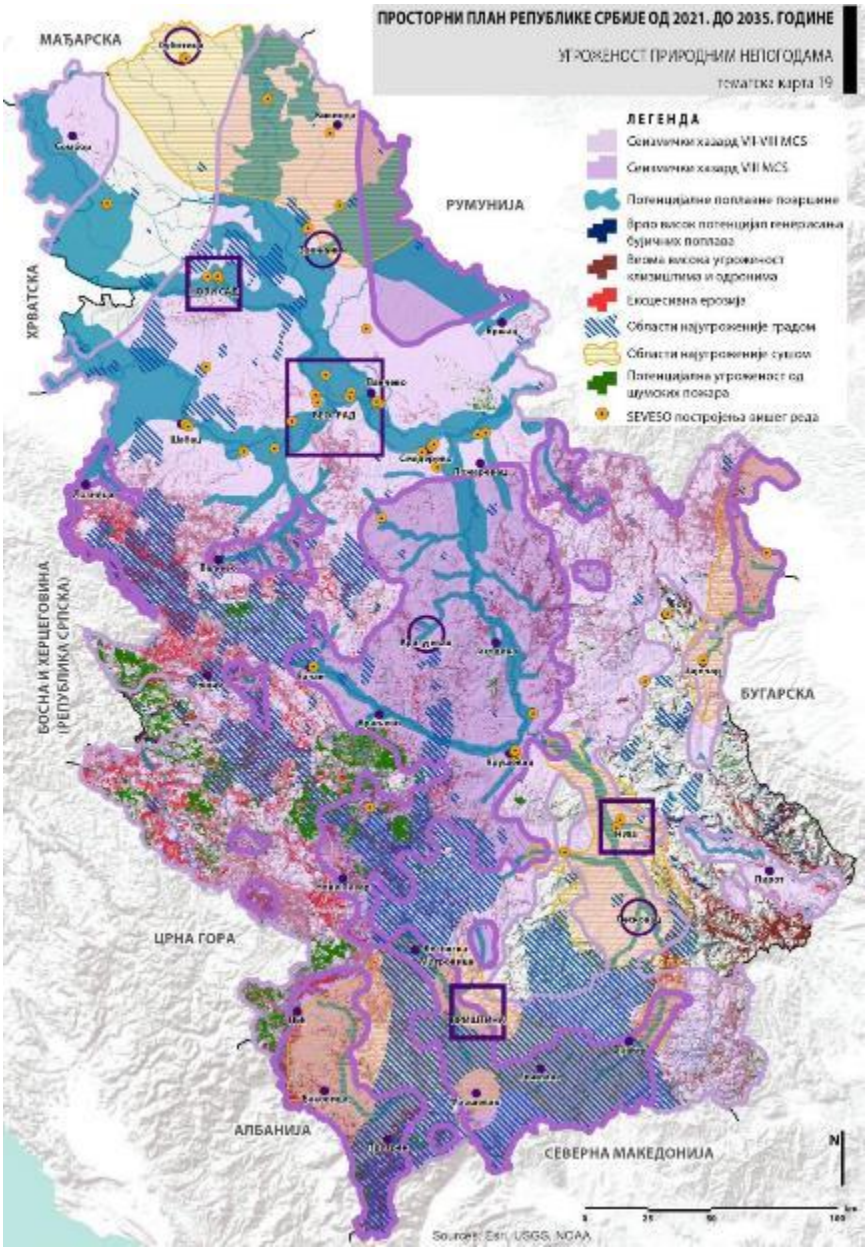

Figure 19 Map of natural hazards in Serbia (Spatial Plan of the Republic of Serbia 2021-2035

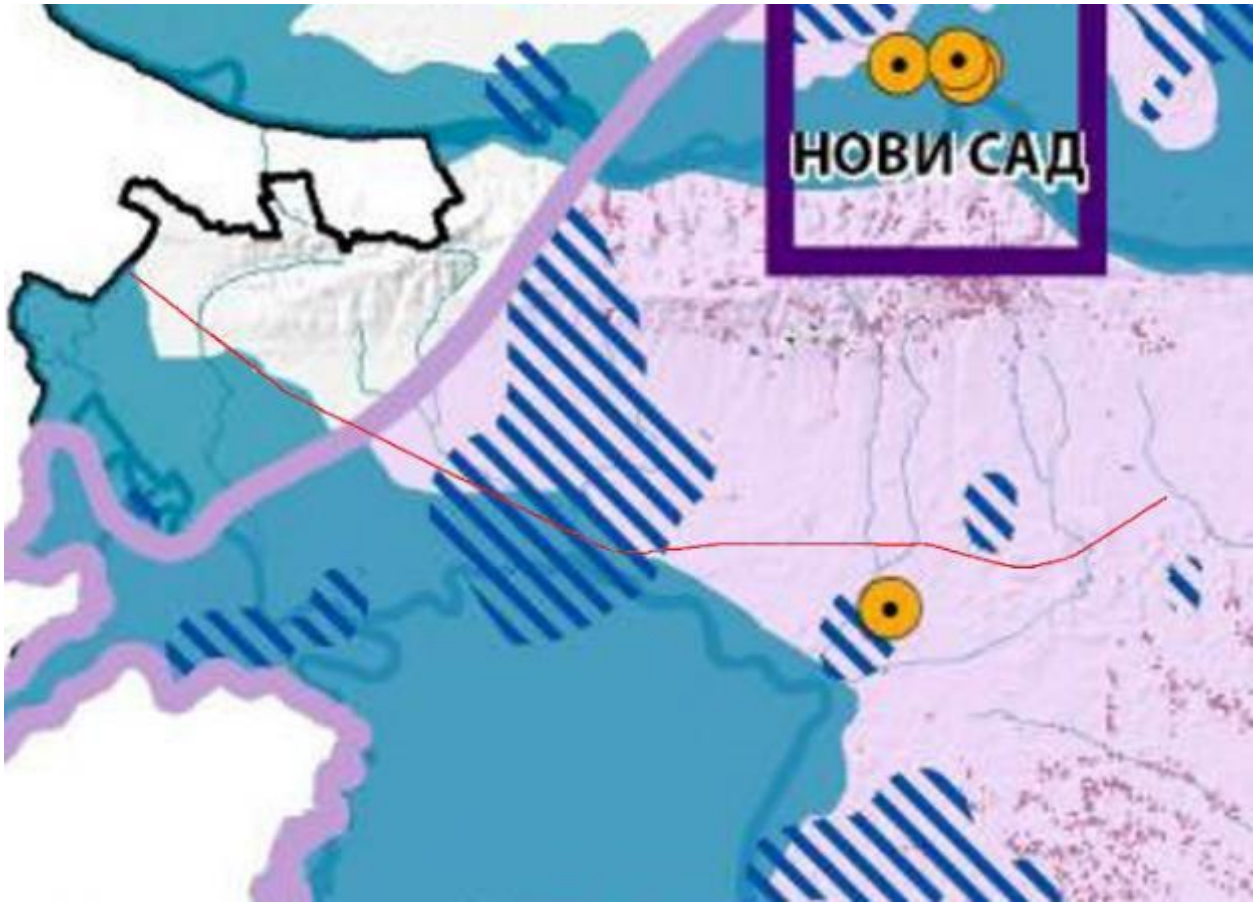

Figure 20 Map of natural hazards in Serbia- project area (Spatial Plan of the Republic of Serbia 2021-2035

5.1.7.5 - Landslides

European landslide susceptibility ELSUS V2 map shows the landslide susceptibility zonation for individual climate-physiographic zones across Europe at a spatial resolution of 200 × 200 m.

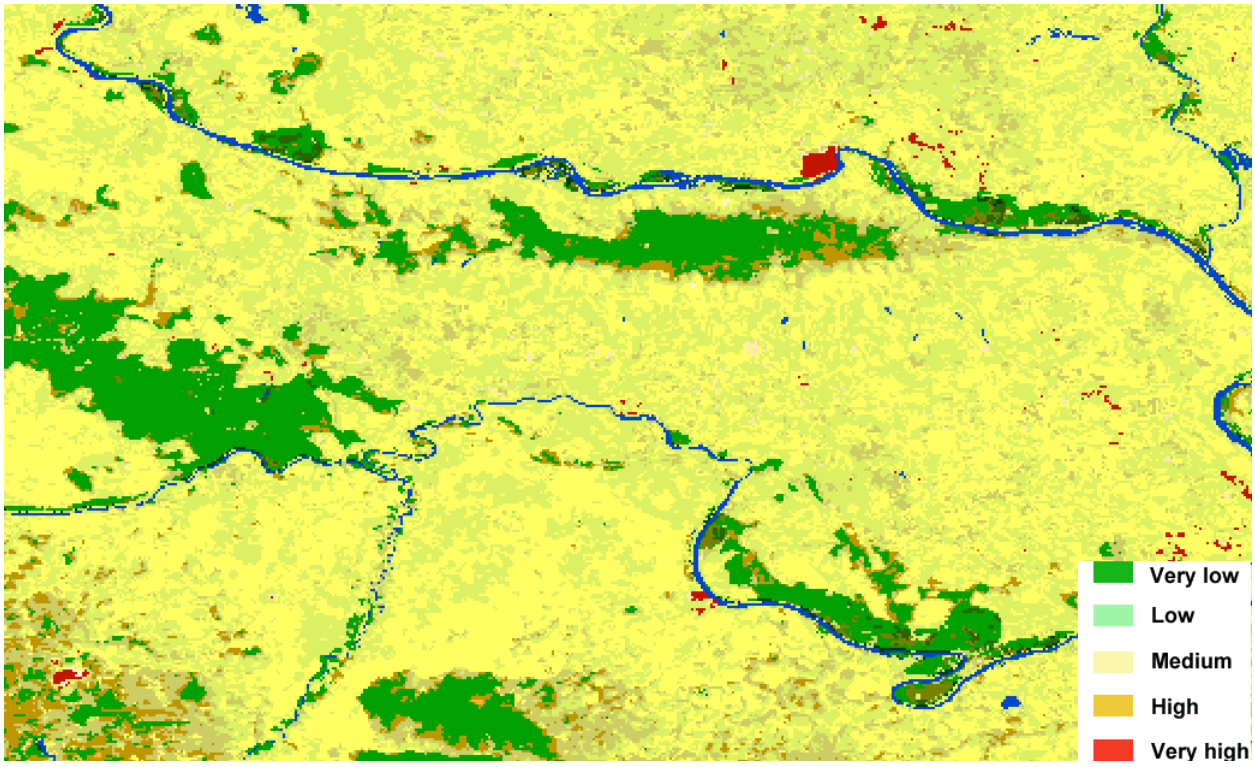

Figure 21 ELSUS V2 landslide susceptibility map for the project area

As seen from Figure 21, landslide risk is medium along whole Šid- Inđija railway section.

Results of BEWARE project (*https://geoliss.mre.gov.rs/beware/*) also substantiate the assumption of absence of future landslide emergence along the railway route. Nearest documented landslide is in the municipality of Šabac, some 30km southeast from Sremska Mitrovica.

There are no information from rail maintenance and/or repair originating from the landslides or rockfalls from the Serbian Railways Infrastructure.

5.1.8 - – Noise and vibration

Noise

The limit values for outdoor noise indicators defined by Regulation on noise indicators, limit values, noise indicators assessment methods, annoyance, and harmful effects of environmental noise ("Official Gazette of the RS", No 75/10) are shown in Table 1.1, while the limit values for indoor are shown in Table 1.2. In terms of this Regulation, the day period last from 6 a.m. to 6 p.m., the evening period last from 6 p.m. to 10 p.m. and the night period last from 10 p.m. to 6 a.m.

Table 19 Limit values of noise indicators in open space

Zone	Use of the area	Noise level in dB(A)	
		Day and evening	Night
1.	For rest and recreation, hospitals and recovery facilities, cultural-historical locations, large parks	50	40
2.	Touristic areas, camps and school zones	50	45
3.	Residential areas	55	45

Table 19 Limit values of noise indicators in open space

Zone	Use of the area	Noise level in dB(A)	
		Day and evening	Night
4.	Business-residential areas, commercial-residential areas and children's playgrounds	60	50
5.	City centre, trade, commercial, administrative zones with dwellings, areas along the motorways, main roads and city roads	65	55
6.	Industrial, storage and servicing areas and transport terminals without dwellings	At this area borders, noise must not exceed the limit value of the neighbouring area	

Table 20 Limit values of indoor noise indicators

	Use of premises	Noise level in dB(A)	
		Day and evening	Night
1.	Common rooms (bedroom and living room) in residential building with closed windows	35	30
2.	In public and other buildings, with closed windows:		
2.1.	Healthcare institutions and private practice, as follows:		
	a) wards	35	30
	b) surgeries	40	40
	v) surgery theatres without medical devices and equipment	35	35
2.2.	Rooms in the buildings for children and students, bedrooms in nursing homes and places for retired people	35	30
2.3.	Rooms for educational-upbringing work (classrooms, theatres, cabinets, etc.), cinemas and reading rooms in libraries	40	40
2.4	Theatres and concert halls	30	30
2.5	Hotel rooms	35	30

The regulations in the field of noise protection of the Republic of Serbia during the previous few years have been harmonized with the relevant EU directives.

The noise indicators are used to determine the level of noise in the environment, to assess and predict the level of noise and its effects, to create strategic noise maps and to plan noise protection measures. The environmental noise indicators value is determined by measurement or by calculation.

Acoustic zones are determined according to the existing development status, land use, as well as according to planned land use and are defined through noise indicators limit values (day, evening and night).

Acoustic zone is the area with the unified prescribed noise indicators limit values.

The railway line passes through the territories of the municipalities of Stara Pazova, Indjija, Ruma and Šid, as well as the city of Sremska Mitrovica. The local governments did not carry out acoustic zoning in accordance with the provisions of the Law on environmental noise protection ("Official Gazette RS", No. 96/21) and the Rulebook on the methodology for determining acoustic zones ("Official Gazette of the RS", No 72/10).

In accordance with Article 17, paragraph 3 of the Law on environmental noise protection ("Official Gazette RS", No. 96/21), on the territories of local governments that have not performed acoustic zoning, the prescribed limit values of noise indicators are applied as limit values for acoustic zone 5 (city centre, trade, commercial, administrative zones with dwellings, areas along the motorways, main roads and city roads) whose values for the day and evening periods are 65 dB(A) and for the night period 55 dB(A).

Regular noise monitoring is carried out on the territory of the municipality of Inđija and the city of Sremska Mitrovica. Reports on testing the level of noise in the environment issued by accredited laboratories are presented on the website of the mentioned local self-governments [8],[9]. Noise monitoring is not carried out in the territories of the municipalities of Stara Pazova, Ruma and Šid. In the territory of the Republic of Serbia, there is no systematic monitoring of the vibrations that occur due to the railway traffic.

On the territory of the Indjija municipality, noise monitoring is carried out at four measuring points at five intervals during 24 hours. The 24-hour period is divided into three reference time intervals: the day period lasts 12 hours (from 6 a.m. to 6 p.m.), the evening period lasts 4 hours (from 6 p.m. to 10 p.m.) and the night period lasts 8 hours (from 10 p.m. to 6 a.m.). The level of sound (noise) during the day (24h) is measured in five measurement intervals: two during the day period, one during the evening period and two during the night period. Measurements were made at measuring points that were selected as representatives of individual zones of different purposes in the Indjija, namely:

1. City swimming pool (Novosadski put bb); The measuring point is located at the parking lot, in the immediate vicinity of the gate of the city swimming pool. The measuring point itself is outside the city, next to the regional road Novosadski put with a high traffic intensity. The road is two-way, and near the measuring point there is also a sport hall, a zoo, a gravel store, a lake and restaurants.

2. The Indjija municipal administration building (Cara Dušana 1). The measuring point is located in the administrative and commercial zone with school facilities, residential facilities, restaurants, commercial facilities, and the municipal administration. The measuring point is in the city centre at the intersection of the main roads Novosadski put, Car Dušan and Kralj Petar I Karađorđević. All three roads are two-way with high traffic intensity.

3. Elementary school Jovan Popović (Kralj Petar I Karađorđević). The measuring point is located next to the intersection of Kralja Petra I Karađorđevića and Mladen Stojanovića streets, between two pedestrian crossings with traffic lights. Behind the measuring point is a park, behind which is the Elementary School "Jovan Popović". The roads next to the measuring point are two-way, with a total of two traffic lanes and high traffic intensity. Across the street from the measuring point are residential and commercial buildings.

4. Intersection between Maršala Birjuzova and Dunavska streets; The measuring point is located at the intersection of Maršala Birjuzova and Dunavska streets, next to the pedestrian crossing. The streets

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[8] *https://www.indjija.rs/Page.aspx?id=101*

[9] *http://www.sremskamitrovica.rs/kategorija_lat.php?cat_id=101*

are two-way, with a total of two lanes. Traffic through these streets is of high intensity in relation to the width of the road. The measuring point is directly next to a multi-story residential building, and in the vicinity of the measuring point there are also ground-floor residential buildings, parking, restaurants and shopping facilities.

The position of the measuring points on the territory of the Indjija municipality is given in Figure 22.

Figure 22 Position of measuring points on the territory of the Indjija Municipality (railway line in red)

The communal noise levels measurement was carried out in accordance with the Regulation on noise indicators, limit values, noise indicators assessment methods, annoyance and harmful effects of environmental noise ("Official Gazette of the RS", No 75/10), Rulebook on the methods of noise measurement, content and scope of the noise measurement reports ("Official Gazette of the RS", No 72/10) and the standards SRPS ISO 1996-1 and SRPS ISO 1996-2.

The nearest measuring point to the observed railway corridor is point number 3, which is about 300 meters from the main railway line No 121 Inđija - Golubinci.

On the territory of the Sremska Mitrovica city, noise monitoring is carried out at four measuring points at five intervals during 24 hours. The 24-hour period is divided into three reference time intervals: the day period lasts 12 hours (from 6 a.m. to 6 p.m.), the evening period lasts 4 hours (from 6 p.m. to 10 p.m.) and the night period lasts 8 hours (from 10 p.m. to 6 a.m.). The level of sound (noise) during the day (24h) is measured in five measurement intervals: two during the day period, one during the evening period and two during the

night period. Measurements were made at measuring points that were selected as representatives of individual zones of different purposes in the Sremska Mitrovica city, namely:

1. Main post, Kralja Petra I street; In front of the main entrance in the city centre.
2. Settlement Matije Hudji, Severni bedem bb; Next to the access road to the shopping centre, at the parking lot in front of the entrance.
3. METALFER STEEL MILL, Rumski put No 53; Cargo entry of the company in vicinity of the regional road Sremska Mitrovica - Ruma.
4. Residential building, Promenada No 14; In front of the residential building, parking space, across from the city quay.
5. Toplifikacija building, Zmaj Jovina No 26; In the vicinity of the parking lot next to the Toplifikacija building, across the street from the College of Vocational Studies for Educators and Business Informatics - Sirmium.

The position of the measuring points on the territory of the Sremska Mitrovica city is given in Figure 23.

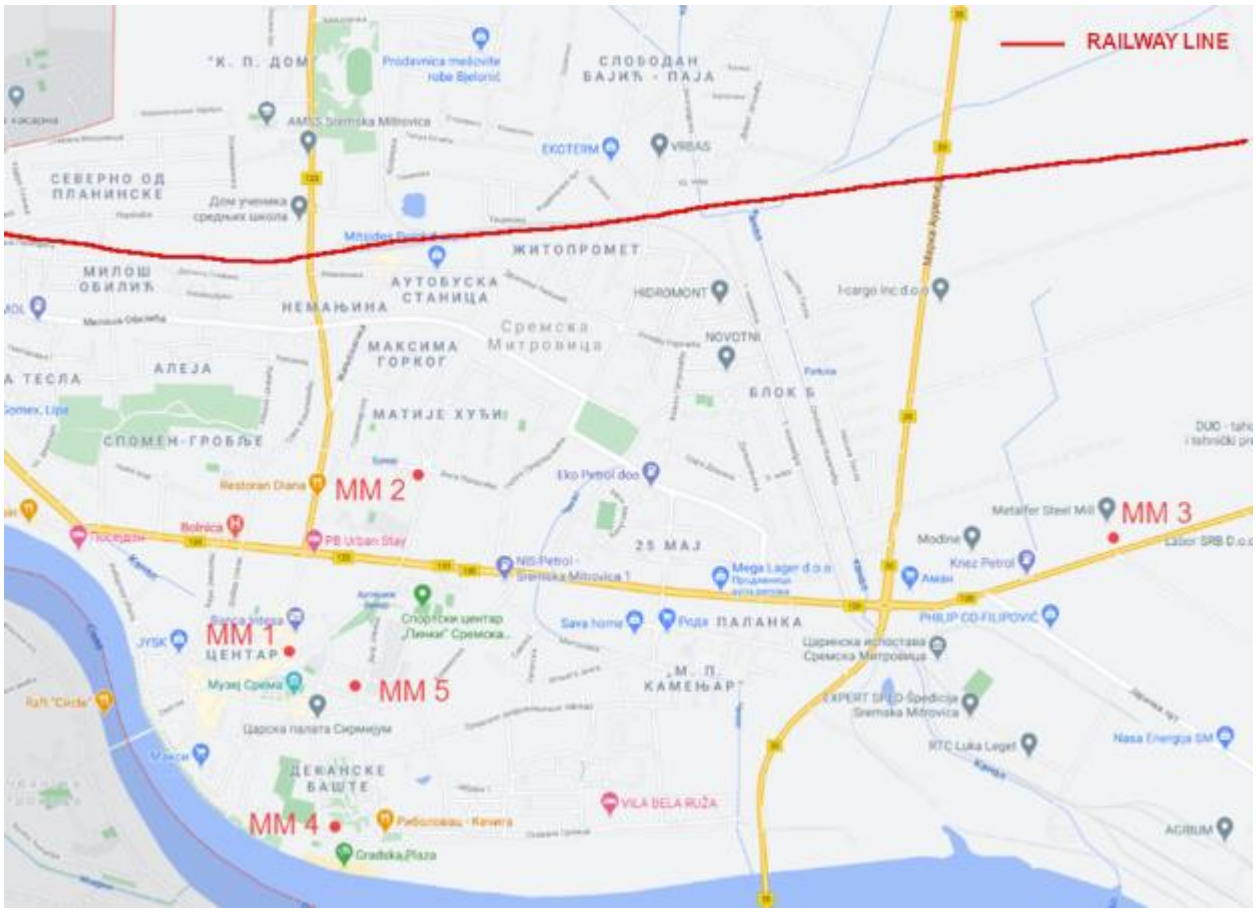

Figure 23 Position of measuring points on the territory of the Sremska Mitrovica city

The communal noise levels measurement was carried out in accordance with the Regulation on noise indicators, limit values, noise indicators assessment methods, annoyance and harmful effects of environmental

noise ("Official Gazette of the RS", No 75/10), Rulebook on the methods of noise measurement, content and scope of the noise measurement reports ("Official Gazette of the RS", No 72/10) and the standards SRPS ISO 1996-1 and SRPS ISO 1996-2.

The nearest measuring point to the observed railway corridor is point number 2, which is about 800 meters from the main railway line No 101 Belgrade Centre - Stara Pazova - Šid - state border - (Tovarnik).

Considering the route of the Stara Pazova-Golubinci-Sid and Indjija-Golubinci railways as well as the distance from the measuring stations, the data obtained from them cannot be considered relevant for the preparation of this document.

The "Kirilo Savić" Institute in 2008, based on the request of the Institute of transportation CIP d.o.o., carried out measurements and recordings of environmental noise and vibrations issued by the passing of trains through the urban surroundings of the unrenovated Batajnica - Golubinci railway section (Golubinci railway station).

The noise level measurements during trains passing were made on the residential building facade within the Golubinci railway station. The measuring instrument was 15 meters away from the railway line, and at a height of 5.5 meters above rail head. The background noise level was about 45 dB(A) for the day period and about 42 dB(A) for the night period. Measurements were made on 22nd and 23rd September, 2008. in the period from 2000 to 600 hours. The location of the measuring point (noise) in Golubinci railway station is shown in Figure 24.

Figure 24 Location of the measuring point (noise) in Golubinci railway station

The dominant source of traffic noise in the observed corridor is the highway, main and regional roads, city roads that cross the observed corridor. Industrial plants also appear as a source of noise pollution. The amount of noise that will be emitted into the environment depends on the type of production process, as well as the

machines involved in it. According to existing experience, noise caused by the operation of the railway usually occurs at the point of contact between the rail and the wheel, during the discharge of exhaust gases from the diesel locomotive.

As superstructure on the Stara Pazova-Golubinci-Sid line is in a very bad condition, the contact of the rail and the wheel during driving produces additional noise of significant intensity (shocks, creaks, etc.).

Under the ESIA, it will be necessary to determine potential endangered zones and noise receptors in the vicinity of the designed railway, and based on that, noise measurements will be performed by an accredited laboratory.

Vibration

The analysis of the observed corridor determined that in the current state, the source of vibrations can be railway traffic. Also in the existing state, the source of vibrations can be road traffic (from the existing roads in the corridor).

Criteria for the population exposure inside buildings to occasional and short-term structural vibrations according to the standard DIN 4150-2 (Structural Vibration - Human Exposure to Vibration in Buildings) are based on the highest permissible mean values of vibrations in relation to the purpose of the object and the period of the day are shown in Table 21.

Table 21 Permissible mean value of vibrations according to DIN 4150-2

Type of structure	Vibration	
	Day (6^{00}-22^{00})	Night (22^{00}-6^{00})
	[mm/s]	[mm/s]
Fully industrial	0,20	0,15
Predominantly industrial	0,15	0,10
Mixed use	0,10	0,07
Dwelling only	0,07	0,05
Vacation, recovery, therapy	0,05	0,05

5.1.9 - Surface waters

5.1.9.1 - Water courses

The Republic of Serbia has begun drafting the first Water Management Plan, which upon completion will be adopted by the Government of the Republic of Serbia at the proposal of the Ministry of Agriculture, Forestry and Water Management. Active participants in its development are the Public Water Enterprises "Srbijavode" and "VodeVojvodina" with the coordination of the Ministry of Agriculture, Forestry and Water Management - the Republic Directorate for Water. The water management plan is the basic instrument that implements the principles of the Water Framework Directive and is a strategic framework for integrated water management.

The Directive (2007/60/EC) establishes a framework for the assessment and flood risk management, with the aim of reducing damage consequence on human health, environment, cultural heritage and economic activity. This directive provides for the development of Management Plans flood risks that represent the umbrella act in the fight against the risk of flooding. The principle of flood risk management is based on the concept undertaking measures and activities to implement the reduction possible harmful consequences of floods.

The hydrographic network related to the railway corridor includes natural watercourses that descend from Fruska Gora, as well as melioration channels that are under the jurisdiction of PWMC "Voda Vojvodina". All watercourses in this area spring from the southern slopes of Fruska Gora and flow from north to south.

These are watercourses with a smaller flow, and in periods of significant rainfall they can have a torrential character. Most of them flow directly or indirectly through the canal network into the Sava river. The hydrographic network and its water flow regime, due to anthropogenic influences, has been significantly changed compared to the former natural state. The changes were caused by the construction of embankments along the Sava River, the construction of load-relief and melioration canals, as well as the construction of pumping stations and small reservoirs on the Fruškogorje streams. These are watercourses with a smaller flow, and in periods of significant rainfall they can have a torrential character. Most of them flow directly into the Sava or indirectly through the canal network.

The route of the railway intersects with a large number of water bodies. See table below:

Table 22 Water bodies

Drainage System Name	Canal/Stream Name
"Patka"	Inđijski Stream
"OKM"	Ljukovo Stream
	Međeš Stream
"Jaračka Jarčina",	Šelevrenac Stream
	Suvi Do Stream
"Kudoš	Jelence Stream
	Jelenci 2 Stream
	Kudoš Canal
	Istočno Voganjski Canal
"Konav"	Konav Canal
	Konav 9 Canal
"Šijakov - Dekalica"	Dekalica Canal
	Šijakov
"Čikas"	Čikas Canal

Drainage System Name	Canal/Stream Name
	Radinačko vrelo Canal
"Manđelos-Petrovci"	2 MP – Krivaja Canal
	2-3MP Canal
	2-2 MP Canal
	2-1 MP Canal
"Istočno-obodni"	Istočno obodni Canal
"Manđelos-Petrovci"	4 MP Canal
	9 MP (Kurjakovac) Canal
	12 MP Canal
	9-6 MP Canal
	9-7-6-1 MP Canal
	9-7-6-1 Canal
	21 Glogovi MP Canal
"Popova bara",	Popova bara Canal
"Vrtić-Popova bara"	Kuzminska Šidina Canal
"Vrtić"	Širatoš 1 Canal
	Širatoš Canal
	Orlovnjak Canal
	Stevčev Canal
	Beglučina Canal
	Blaćevac Canal
	Noname Canal
	Kukujevački Canal
	Međašnji Canal
	Pljoštara Canal
	Pljoštara V
	Noname Canal (2)

Drainage System Name	Canal/Stream Name
	Pašnjak Canal
	Komota Canal
"Bosut"	GB-2-1 Canal
	Š-1 Canal
	Š-1 -3 Canal
	Šidina Canal
	Noname Canal
	Tovarnički Canal

All watersheds are connected to each other through the constitution, which enables directing and transferring water from one watershed to another, thus ensuring the flexibility of the functioning of the system in the entire area.

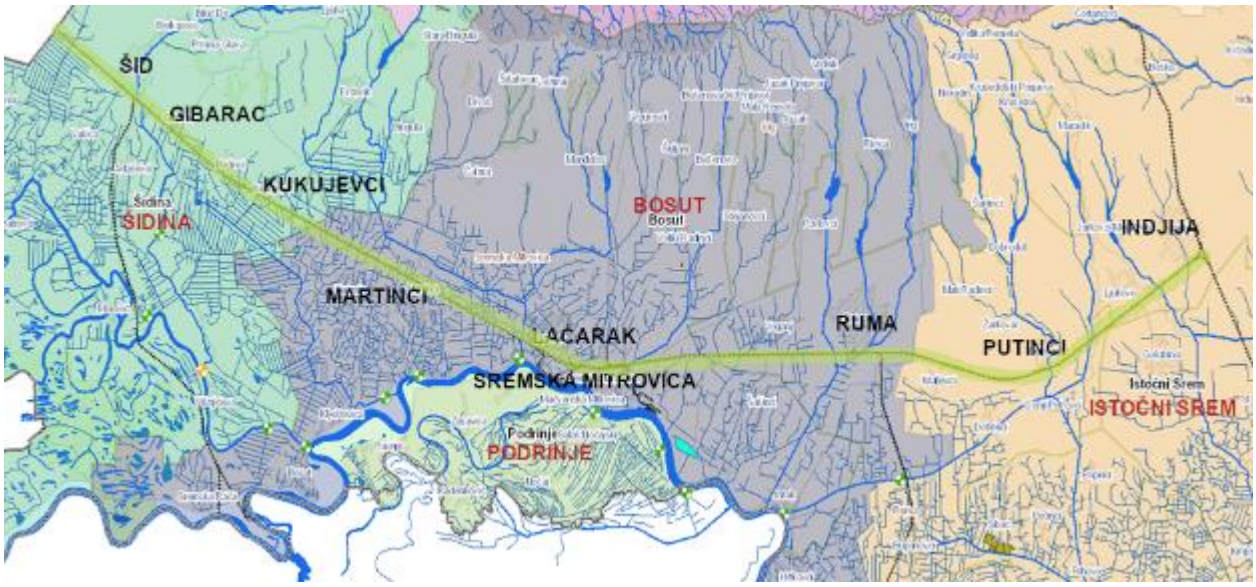

Figure 25 Hydrographic network of the observed area
(data source http://gis.vodevojvodine.com/visios/vodeVojvodineEksterna*)*

Partially regulated natural watercourses or artificially dug melioration canals were originally put into operation for the purpose of dewatering agricultural and forest land. Drained underground and internal (atmospheric) waters, collected by the canal network, are evacuated to Sava as the final recipient. Republic Hydrometeorological Institute - Department of Hydrology performs the tasks of establishing and maintaining a network of hydrological stations for monitoring the state of surface water and underground waters of the first - phreatic release, performs hydrometric measurements and observations of quantitative indicators of the state of surface and underground waters, as well as taking, preparing and delivering samples for the purposes of monitoring the quality of surface and underground waters. The picture shows the position of the surface water hydrological station closest to the observed area, in Sremska Mitrovica

Figure 26 Surface water station network - Sava River basin
(http://www.hidmet.gov.rs/latin/hidrologija/povrsinske/pov_stanica.php?hm_id=45090*)*

The Sava River is the main natural watercourse to which other watercourses gravitate and has all the characteristics of a lowland river with a seasonal difference between the minimum and maximum water level of 9.88 m. Maximum water levels on the river occur in spring (April-May) and autumn (November-December). The minimum water level is in summer (July and August) and in winter (January-February). The average annual flow of the river is Q=1561 m^3/s.

5.1.9.2 - Water quality

Based on the Decree on the categorization of watercourses (Official Gazette of the SRS, No. 5/68), the river Sava belongs to the II class of watercourses. The water classification explanation is given in the following table.

Table 23 Water classification

Class	Class characteristics
Class I	This class includes water which, in its natural state or after disinfection, can be used or utilized to supply settlements with drinking water, in the food industry and for the breeding of noble species of fish (salmonids).
Class II	This class includes waters suitable for bathing, recreation and water sports, for the breeding of less noble species of fish (cyprinids), as well as waters which, in addition to normal treatment methods (coagulation, filtration and disinfection), can be used to supply water to beverages and in the food industry. Class II waters are divided into subclasses

	Subclass IIa — which includes waters that, in addition to normal treatment methods (coagulation, filtration and disinfection), can be used to supply settlements with drinking water, for bathing and in the food industry. Subclass IIb — which includes waters that can be exploited or used for water sports, recreation, for breeding less noble species of fish (cyprinids) and for watering livestock.
Class III	This class includes water which may be used or used for irrigation and in industry other than the food industry.
Class IV	This class includes waters that can be used or utilized only after special treatment.

According to the Rulebook on the parameters of the ecological and chemical status of surface waters and the parameters of the chemical and quantitative status of underground waters ("Official Gazette of the RS", no. 74/11), the rivers Sava, Šidina and Borkovac belong to watercourses of type 3 - small and medium watercourses, above sea level height of up to 500m with the dominance of coarse substrate.

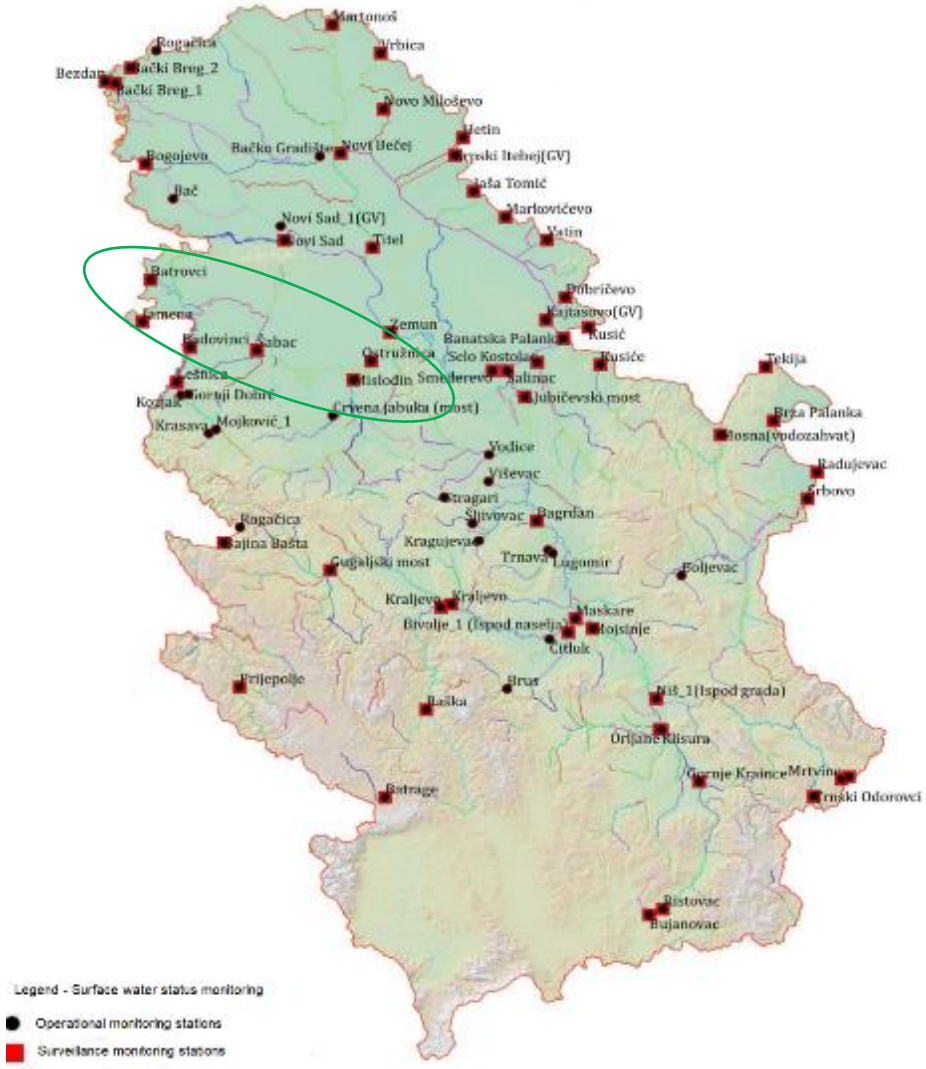

Figure 27 Network of supervisory and operational monitoring stations - watercourses on the Stara Pazova – Golubinci – Sid Section and Indjija – Golubinci Railway Line (Surface waters-watercourses)

The Agency for Environmental Protection (www.sepa.gov.rs) as a body within the Ministry of Environmental Protection monitors the Sava River at the Jamena and Sabac tributaries (the profiles closest to the subject area). Until 2011, analyzes of the Sava River and the profile of Sremska Mitrovica were carried out.

Having in mind the watercourses on the route of the Stara Pazova – Golubinci – Sid Section and Indjija – Golubinci railway lines, the measuring stations close to the route have been identified.

In order to analyse the existing water quality of the river Sava, the data of the Hydrometeorological Institute of the Republic of Serbia were used.

Sava river

The Sava River water quality was tested by the National Monitoring Network in the following areas (a water quality class is given after each profile): Jamena (II/III) and Šabac (II/III)). There is a change in the oxygen regime and nutrients on the examined profiles, i.e. total organic carbon and total nitrogen corresponded to class III.

Regarding surface waters in the ESIA, more details will be presented regarding the intersection of watercourses with the railway line, streams and canals qualitative and quantitative characteristics and their sources of pollution.

5.1.10 - Groundwaters

5.1.10.1 - General

On the territory of Vojvodina, alluvial sandy and gravelly sediments represent the most important groundwater accumulations. Huge amounts of underground water from these sediments are of great importance for solving the issue of water supply for settlements and industry, and they are also related to the emergent effects of underground water. Groundwater is located near the ground surface (1.0 - 4.0 m), and often on the ground surface itself.

For the purposes of project implementation, geotechnical tests and investigations were carried out in 2021, as part of which a piezometer was installed in eight boreholes in the area of the stations. Depths vary from 6.30-11.20 m with a filter layer placed in accordance with the depth of groundwater occurrence, in the length of 2 m (at depths between 3.20-10.20 m) and with a sediment sump 1 m long. According to the project, a piezometer was supposed to be installed n the area of the Golubinci station, but it was abandoned due to the lack of measured groundwater levels, .i.e. some piezometers were vandalized immediately after construction and tracking of groundwater level oscillation was impossible.

On the territory of Vojvodina, alluvial sandy and gravelly sediments represent the most important groundwater accumulations. Huge amounts of underground water from these sediments are of great importance for solving the issue of water supply for settlements and industry, and the harmful effects of underground water are related to them. Groundwater is very close to the ground surface (1.0 - 4.0 m), and is often on the ground surface itself.

Alluvial clay-sand sediments are poorly permeable. Within, it is possible to form low recharge aquifer, at a depth of up to 1.0 m, and often on the surface of the field. Certain parts of the field are swamped throughout the year.

Alluvial and loess soils and marsh loess, despite their position in relief and low water permeability, have a formed aquifer close to the surface of the terrain (1.0 - 4.0 m).

Loess deposits, due to their different water permeability, as well as their position in the relief, do not have formed groundwater outlets. Aquifers are formed in parts of loess formations if their substrate is impermeable or "floating" on interlayers of buried soils.

Based on the separated units and their hydrogeological properties, in the corridor of the railroad in question there is an underground water table formed near the surface of the terrain, and often on the surface of the terrain itself.

The general directions of groundwater movement in the analyzed area of Srem are directed towards lower morphological units. Within the alluvial deposits near the Sava, the general direction of groundwater movement is towards the south, that is, the course of the Sava. Groundwater levels are at an absolute altitude of 80 mASL (in the West Srem zone), that is, at an altitude of around 74 mASL (in the East Srem zone).

Oscillations of the level in the coastal zone are up to 4 m, and going towards the backwards they are about 2 m. Recharge of the river is carried out at the expense of water infiltration from the Sava River at high water levels, from the canal network (area of South Srem), as well as precipitation. It was also established that certain amounts of underground water from the source areas of the "Varoš terrace" were in contact. The outflow of spring waters is carried out directly into the Sava riverbed, at low water levels, then through the low-permeable drainage complex into numerous systems of drainage canals.

Due to the large scope of the route, the groundwater recharge system varies. It is mainly recharged by watercourses and canal systems that drain higher parts of the terrain, and to a lesser extent by infiltration of the atmospheric water. Due to the dominant share of silt fraction and tubular porosity, the upper parts of the loess have a great power of surface water absorption, which is manifested through the seasonal change of water content.

5.1.10.2 - Groundwater quality monitoring

The Republic Hydrometeorological Institute - Department of Hydrology performs

- the tasks of establishing and maintaining a network of hydrological stations for monitoring the condition of surface waters and underground waters of the first phreatic aquifer,
- hydrometric measurements and observations of quantitative indicators of the state of surface and underground waters, as well as taking, preparing and delivering samples for the purposes of monitoring the quality of surface and underground waters of the first aquifer.

The following figure shows the location of groundwater hydrological stations in the observed area.

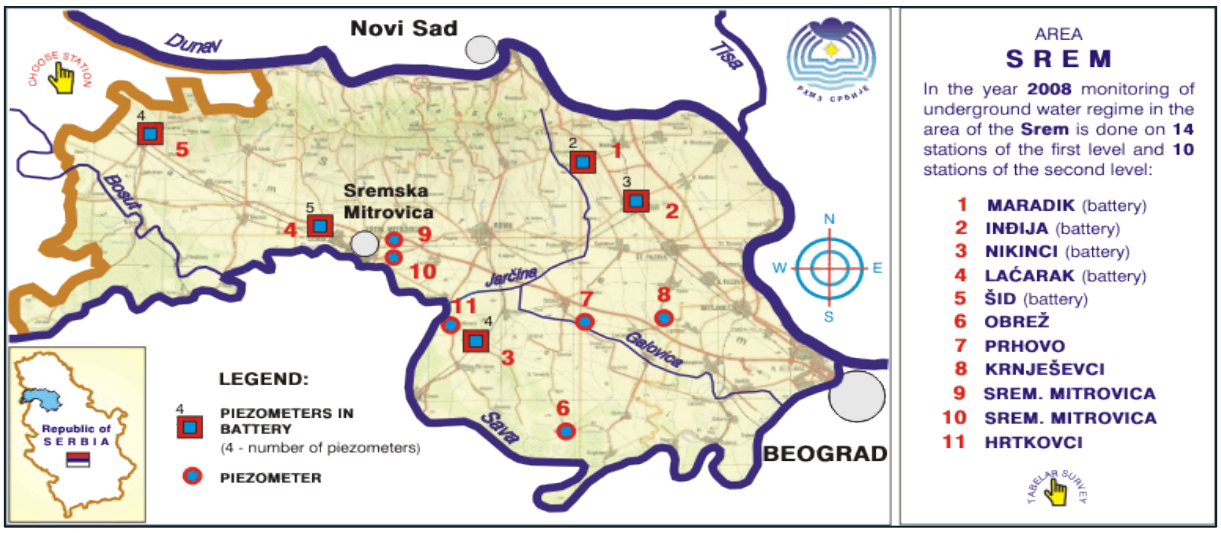

Figure 28 Network of underground water quality stations on the section of the Stara Pazova-Golibonci-Sid railway - State border and the Inđija - Golubinci section

http://www.hidmet.gov.rs/latin/hidrologija/podzemne/20np.php

Bearing in mind which watersheds cross the line from Stara Pazova to the State border and from Indija to Golubinac and through which cities the railway passes s certain measuring stations are selected which are presented in the following table. The network of groundwater monitoring stations is presented, accompanied by the following data: serial number, name hydrological station where water sampling is carried out, hydrological station code, underground water body name, water basin and coordinates.

Table 24 List of stations for monitoring the quality of underground water on the route of the Stara Pazova-Golubinci-Sid-State border and Inđija-Golubinci railway line

Hydrological station code	Name of the hydrological station	Station rank*	Number of monthly measurements	Geological structure	Coordinates X/Y	Water basin
20NP0201	Inđija (IN-1)	I	6	Alluvial Quaternary sediments	4990462 7429686	Danube
20NP0201/1	Inđija (IN-1/1)	I	3	Alluvial Quaternary sediments	4990462 7429684	Danube
20NP0201/D	Inđija (IN-1/D	I	6	Alluvial Quaternary sediments	4990463 7429687	Danube
20NP67	Sremska Mitrovica	II	2	Alluvial Quaternary sediments of the Sava River	4984550 7395075	Sava-Cikas Canal
20NP85	Sremska Mitrovica	II	2	Alluvial Quaternary sediments of the Sava River	4979825 7395300	Sava
20NP0231	Laćarak (L-1)	I	6	Alluvial Quaternary sediments	4985982 7386521	Sava
20NP0231/1	Laćarak (L-1/1)	I	6	Alluvial Quaternary sediments	4985984 7386521	Sava
20NP0231/2	Laćarak (L-1/2)	I	6	Alluvial Quaternary sediments	4985986 7386521	Sava

20NP0231/D	Laćarak (L-1/D)	I	6	Alluvial Quaternary sediments	4985978 7386521	Sava
20NP0231/d	Laćarak (L-1/d)	I	6	Alluvial Quaternary sediments	4985978 7386525	Sava
20NP0241	Šid (Š-1)	I	6	Alluvial Quaternary sediments	5000519 7360147	Sava-Bosut
20NP0241/D	Šid (Š-1/D)	I	6	Alluvial Quaternary sediments	5000515 7360144	Sava-Bosut
20NP0241/d	Šid (Š-1/d)	II	3	Alluvial Quaternary sediments	5000516 7360145	Sava-Bosut
20NP0241d1	Šid (Š-1/d-1)	II	3	Alluvial Quaternary sediments	5000518 7360146	Sava-Bosut

* I - hydrological stations of the first order of piezometers are placed in profiles perpendicular to the river flow, i.e. along the line of groundwater flow

II - hydrological stations of the second order represent the addition of the stations of the basic network (I)

More analytical data will be presented in the relevant ESIA.

5.1.10.3 - Thermal and Mineral springs

On the wider route of the research area, there is a source of thermal and mineral water.

Thermal waters in Vrdnik. The well-known Vrdnik spa "Termal" is certainly unique, at least in our country, in terms of the healing properties of the thermal water, and especially the environment from which it is exploited. It was discovered by accident after the catastrophic flooding of the southern area of the brown coal mine in Vrdnik in 1931.

The feeding of the thermal source, due to the great depth of the aquifer in which the thermal water is accumulated, is exclusively related to the structural assembly and is very complex. The renewal of static reserves is carried out along the western fault, over the silicified rocks of the tectonically damaged silicified complex consisting of quartzites, cherts, silicified limestones and limestones, discovered in the Dobočaš stream, the left tributary of the Veliki поток along which the route of the western fault (Jazak) stretches. In that area, the transit of surface water is carried out, which circulates deep along the lines of the internal faults of the tectonic trench.

Spring near Hopovo monastery. "Hot spring" emerges in the actual bedrock of Lipovo Stream at the tectonic contact of Miocene marls, slates and serpentinites. The yield varies from 0.4 l/s to 0.5 l/s. The water temperature is 18.5°C. Dominant ions in water are sulfates and ferric hydroxide. The source is upward along the fault line. It mixes with the waters of the first aquifer into the alluvium of the Lipa stream. It has no significance as a tourist - spa potential.

Slankamenac spa. The salt water source appears at the contact of alluvial sediments of the Danube and Pliocene and Miocene sediments. The water temperature is 18.5°C.

Other occurrences of thermo-mineral waters. Oil drilling discovered thermal waters in Indjija. The water in the well in Indjija is salty, with dominant Na and Cl ions. This well represents an energy potential.

5.1.10.4 - Water supply

In terms of water supply, the observed area belongs to the Srem regional system, which relies on the use of alluvial aquifer of the Drina and Sava rivers between Jamena and Lacarak and on the capture of water from the basic aquifer complex. In supplying water to settlements, local sources of underground and surface water will be used as a priority and maximally, and the missing quantities will be provided from large regional systems, relying on sources that are protected from pollution.

In the narrower and wider corridor of the railway, there are water supply sources and their sanitary protection zones in Indjija, Golubinci, Ruma, Sremska Mitrovica and Šid.

The Rulebook on the method of determining and maintaining sanitary protection zones of water supply sources ("Official Gazette of the RS", number 92/08) more closely prescribes the method of determining and maintaining sanitary protection zones of the area where the water source is located, which in terms of quantity and quality can be used or is being used for public drinking water supply. In order to protect the water in the spring, protection zones are established:

1. the zone of immediate sanitary protection (zone I)

2. the narrow zone of sanitary protection (zone II)

3. the wide zone of sanitary protection (zone III)

Sanitary protection zones have been established around the aforementioned sources of water supply. The distance of the water source (wider zone of sanitary protection of the water source) from the railway in question is:

• Indjija water source - the railway passes through the sanitary protection zones of the watersource

• Golubinci water source - 2,800m

• "Sava I" water source near Jarka - 8,500m

• "Fiser salas" water source - 2,200m

• "Putinci" watersource - the railway passes through the zones of sanitary protection of the water source

• water source in the area of the city of Sremska Mitrovica (Old source) - about 450m

• "Martinci" water source - 1,300m

• Batrovci water source - 10,000m

The existing situation in the field of waste water drainage is such that sewage systems exist only in municipal centers, as well as in certain settlements that gravitate towards municipal centers. Most settlements, predominantly rural, discharge their wastewater into inadequately constructed septic tanks, dug wells, or directly into the nearest streams, ravines, canals.

5.1.11 - Biodiversity

5.1.11.1 - Introduction

The existing railroad part between the Stara Pazova and Šid is placed in the geographical region called „Srem". It could be said that it divides the region from the beginning to the end in the direction of the east-west, with

significantly different ecological conditions concerning orography, hydrology, landscape pattern, vegetation type, and cover, and even recent natural history. Concerning orography, the southern part of the railway is flat land, without a single elevation, while to the north is the massif of Fruška Gora Mountain which dominates, with all the hills, almost to the City of Ruma. Concerning hydrology, watercourses that start from the southern slopes of Fruška Gora have the character of mountain streams, while in the southern part of Srem they have the character of calm plain rivers. They flow into the Sava River and build larger wetlands and flooded forests (e.g. Morovićko-Bosutski complex, Klenak - Obedska bara, Zasavica). There are no wetlands on Fruška Gora Mountain. Although Srem is mainly highly anthropogenically modified, the area south of the railway has more intensive field agriculture, while there are often orchards and vineyards on the slopes of Fruška Gora. Many streams and rivers are dammed in the upper parts of the stream, so there are many smaller and larger reservoirs. The forest complexes south of the railroad are smaller in size and are mostly oak forests, along the Sava River, Bosut River and Spačva River, where the groundwater level is also high. The forests are more extensive in the north, especially on Fruška gora Mountain., where beech forests are dominant. "Recent natural history" refers to the over composition of everything previously mentioned, especially in the southern part (draining of swamps, clearing of forests (the rest are only small parts (Jakovački ključ, Crni lug, Dobanovački zabran, Bojčinska šuma, etc.), formation agroecosystem, the formation of settlements, the fragmentation of habitats and spaces, the disappearance and suppression of some animal species. All this was evidenced not so long ago, most intensively in the 19th and 20th centuries.

In both parts, agricultural land is predominant. On the southern part, the significant and compact forest cover could be found south of the city of Šid, in the triangle between rivers Sava, Studva and Bosut, then to the east mostly alluvial forests in rather a narrow strip along the banks of Sava River and then again somewhat larger and compact forest cover in the river's meanders between the villages Klenak and Boljevci.

The northern part is dominated by the long, east-west stretching massif of Fruška gora Mountain. As previously mentioned, the agricultural land is still predominant, but the main part of the mountain is under forest cover.

5.1.11.2 - Habitats

Methodology. The existing literature data have been analyzed and field investigations have been performed to select habitats along the project area. The field survey was conducted in the autumn and winter 2020th, and in the summer of 2021. Field investigation will be completed in spring 2023. The survey encompassed 500 m of the corridor on both sides of the railway in order to define the areas under direct and indirect impact. The area under direct impact is an area under the railway footprint, while the area under indirect impact is the area of influence (buffer zone of 500 m on both sides of the railway). Before field investigation, some preliminary survey points are defined. As agricultural land covers most part of the project, preliminary survey points were chosen as fragments of semi-natural and natural habitats. During the field investigation, some survey points were added or modified. A total of 23 survey points were analyzed along the project area. For habitat selection and determination, the following lists have been used as references: EUNIS classification, EU Habitat Directive Annex I, Bern Convention Res. No. 4.

Habitats classification. The woodland-steppe vegetation and the forests of common oak (*Quercus robur*) and Oriental hornbeam (*Carpinus orientalis*) are potential natural vegetation of the observed area. However, the whole observed area is under strong anthropogenic pressures for centuries. The potential natural vegetation is degraded by urbanization, forming poplar plantations and forest cutting to form arable land. In accordance with this fact, mainly all recorded habitats belong to the group of artificial habitats (Table 25). These are arable land, constructed, industrial, and other artificial habitats, hedgerows, and plantations of *Populus sp*. A list of mentioned habitats with a brief description can be found below.

Table 25 Eunis habitat classification for the project area

EUNIS code	Description
D5.11	*Phragmites australis* beds normally without free-standing water
FA.3	Species-rich hedgerows of native species
G1	Broadleaved deciduous woodland
G1.C1	*Populus* plantations
I1.1	Intensive unmixed crops
J1.1	Residential buildings of city and town centres
J1.2	Residential buildings of villages and urban peripheries
J1.4	Urban and suburban industrial and commercial sites still in active use
J4.3	Rail networks

The EUNIS habitat types were compared to the habitat types listed in Annex I of the Habitats Directive (HD) using the revised Annex I of Resolution 4 (1996) of the Bern Convention on endangered natural habitat types using the EUNIS habitat classification (revised on 2014) and the website of European Environment Agency (EEA). Along the project area, there are no sensitive or Annex I habitats from HD or priority habitats from the HD were identified.

D5.11 *Phragmites australis* beds normally without free-standing water

At several localities, the populations of *Phragmites australis* (common reed) are recorded (Figure 29). This vegetation is developed in places that are dry during a significant period of the year. *Phragmites australis* absolutely dominates. These formations are dense, up to 4 m high. According to the national Rulebook on criteria for selecting habitat types about types of habitats, sensitive, endangered, rare, and protection priority types of habitats and protection measures for their preservation, these habitats are a priority for conservation. These habitats belong to the group of "fragile habitats (A)" due to functional instability and sensitivity to degradation. However, they do not belong to the group of rare or representative habitats in Serbia. During the rehabilitation of the corridor, special attention should be paid to these habitats to undertake appropriate measures for their conservation.

Figure 29 Populations of Phragmites Australis near Sremska Mitrovica.

FA.3 Species-rich hedgerows of native species

Along the railway, different shrubs form a hedgerow (Figure 30). The autochthonous plants are dominant in the floristic composition of the hedgerow, such as *Prunus spinosa* (blackthorn), *Rosa canina* (dog rose), *Cornus sanguine* (common dogwood), *Acer campestre* (field maple), *Crataegus monogyna* (common hawthorn), *Acer tataricum* (Tatar maple). Also, among these native species, some allochthonous species are recorded: *Robinia pseudoaccacia* (black locust), *Acer negundo* (boxelder maple). This habitat type presents important ecological corridors.

Figure 30 Hedgerow along the railway, in the near of Voganj village.

G1 Broadleaved deciduous woodland

Broadleaved deciduous woodland is recorded at several localities along the project area (Figure 31). These are the fragments of autochthonous forests which are degraded by uncontrolled clearings. At these localities different autochthonous plant species are recorded, such as: *Quercus robur* (Europaean oak), *Carpinus betulus* (common hornbeam), *Crataegus monogyna* (common hawthorn), *Fraxinus angustifolia* (narrow-leafed ash), *Acer tataricum* (Tatar maple), *Acer campestre* (field maple), *Salix alba* (white willow), *Evonymus europaeus* (European spindle), *Prunus spinosa* (blackthorn), *Rosa canina* (dog rose), *Cornus sanguine* (common dogwood), *Crataegus monogyna* (common hawthorn). Broadleaved deciduous woodland presents a habitat of many different fauna species. At the edges of these habitats some invasive plants are recorded, such as: *Amorpha fruticosa* (indigo bush), *Robinia pseudoaccacia* (black locust), *Erigeron annus* (annual fleabane), *Asclepias syriaca* (common milkweed), *Symphyotrichum lanceolatum* (panicled aster) etc.

Figure 31 Broadleaved deciduous woodland

G1.C1 Populus plantations

On several localities, in observed zone, plantations of *Populus* sp. were recorded (Figure 32). Establishing of *Populus* plantations is one of the factors that cause biodiversity degradation. Within the ground floor ruderal plans and some invasive plants are developed.

Figure 32 Plantation of Populus sp. on the pheriphery of Ruma city.

I1.1 Intensive unmixed crops

The agricultural habitats are dominant habitat type along the existing railway. The dominant agricultural crop is corn (Figure33). After corn, the important agricultural crops are wheat, sunflower (Figure 34), rapeseeds and sugar beets. Since these habitats are intensive used by human, in their immediate vicinity the presence of invasive plants was noticed, such as *Sorghum halepense* (Johnson grass), *Amaranthus retroflexus* (redroot pigweed), *Iva xantifolia* (giant sumpweed), *Datura stramonium* (thorn apple), *Ambrosia artemisiifolia* (common ragweed), *Abutilon theophrasti* (velvet plant), *Xanthium orientale susp. italicum* (common cocklebur) *etc.* Als, numerous weed species are recording in the surrounding of agricultural lands. Some of them are: *Chenopdium album* (lamb's quarters), *Cirsium arvense* (Canada thistle), *Sinapis arvensis* (wilde mustard), *Convolvulus arvensis* (field bindweed), *Cynodon dactilon* (Bermuda grass) etc.

Figure 33 Corn field and mowed wheat field near Šid.

Figure 34 Sunflower field and mowed wheat field near Šid.

J1.1 Residential buildings of city and town centers

This habitat type is located along the part of the railway that passes through the cities (Šid, Sremska Mitrovica, Ruma, Indjija, and Stara Pazova). Considering the ecological conditions and permanent human impacts, ruderal and invasive plants have a high presence degree in the floristic structure of these habitats.

J1.2 Residential buildings of villages and urban peripheries

Along the part of the railway that passes through the villages (Gubarac, Kukujevci, Martinci, Laćarak, Kraljevci, Pećinci, Golubinci, etc.) Residential buildings of villages and urban peripheries are located (Figure 35). At these localities, ruderal and invasive plants have a high presence degree in the floristic structure, also.

Figure 35 Pećinci village.

J1.4 Urban and suburban industrial and commercial sites still in active use

Along the railway, within the municipalities of Šid, Sremska Mitrovica, Ruma and Stara Pazova, the industrial sites are recorded (Figure 36). Given the constant anthropogenic influence within these sites, domination of ruderal plants in their surrounding is expected. Also, these habitats are suitable for the development of invasive plants.

a)

b)

Figure 36 *Grain storage silos in a) Šid and b) Stara Pazova*

Within three last habitats, ruderal plants are dominant. Some of them are: *Plantago major* (common plantain), *Taraxacum officinale* (common dandelion), *Cynodon dactilon* (Bermuda grass), *Polygonum aviculare* (common knotgrass), *Convolvulus arvensis* (field bindweed), *Daucus carota* (Wild carrot), *Echium vulgare* (viper's bugloss), *Coronilla varia* (purple crownvetch), *Balota nigra* (black horehound), *Dactilys glomerata* (cock's-foot), *Cichorium intybus* (common chicory), *Chenopdium album* (lamb's quarters), Glycyrrhiza glabra (licorice), *Capsella bursa-pastoris* (shepherd's purse), Vicia cracca (tufted vetch), *Setaria viridis* (green foxtail), *Hordeum murinum* (hare barley), *Sambucus ebulus* (danewort) etc. Also, the important number of invasive plants are recorded within habitats: *Ambrosia artemisifolia* (common ragweed), *Galinsoga parviflora* (gallant soldier), *Erigeron annus* (annual fleabane), *Erigeron canadensis* (Canadian horseweed), *Symphyotrichum lanceolatum* (panicled aster), *Reynouria japonica* (Japanese knotweed), *Iva xanthifolia* (giant sumpweed), *Oxalis stricta* (yellow woodsorrel) etc.

J4.3 Rail networks

This type of habitat refers to railway tracks which can be colonized by nitrophilous herbaceous ruderal or invasive plant species such as *Setaria glauca* (green bristlegrass), *Chenopodium album* L. (white goosefoot), *Conium maculatum* L. (hemlock), *Artemisia vulgaris* L. (common mugwort), *Arctium Cichorium intybus* (common chicory), *Senecio vulgaris* (groundsel), *Dactilys glomerata* (cock's-foot), *Hordeum murinum* (hare barley), *Convolvulus arvensis* (field bindweed) etc. (Figure 37).

Figure 37 Railway tracks colonized by nitrophilous plants.

5.1.11.3 - Flora

Methodology. The field survey was conducted in the autumn and winter 2020th, and in the summer of 2021. The spring field survey will be performed in 2023. Flora was investigated by visual method, by collecting plants in order to determine the most important ones, and by taking photos. The survey points that were analyzed are resented in Table 25. For flora, the following reference lists have been considered: IUCN, Habitats Directive-Annex II, Habitats Directive-Annex IV, Bern convention, Bonn convention, CITES convention, and Law on Nature protection of the Republic of Serbia. The main aim of the field survey is listing of plants and important habitat types in order to predict the possible effect of the reconstruction on biodiversity.

Endemic and relict plants are not found in the project area. Regarding the species of international importance, there are plants that are assessed for *The IUCN Red List of Threatened Species* as **Least Concern**: *Acer campestre* (field maple), *Achillea millefolium* (yarrow), *Carpinus betulus* (common hornbeam), *Carpinus orientalis* (oriental hornbeam), *Crataegus monogyna* (common hawthorn), *Fraxinus angustifolia* (narrow-leafed ash), *Glycyrrhiza glabra* (licorice), *Juglans regia* (English walnut), *Melilotus officinalis* (yellow melilo), *Phragmites australis* (common reed), *Plantago major* (common plantain), *Populus alba* (white poplar), *Prunus spinosa* (blackthorn) *Quercus robur* (European oak), *Salix alba* (white willow), *Sambucus nigra* (elder) and *Urtica dioica* (common nettle). The species *Fraxinus pennsylvanica* (green ash) is listed as **Critically Endangered** under criteria A3e+4ae on the IUCN Red List of Threatened Species.

Achillea millefolium, Quercus robur, Hypericum perforatum, Crataegus monogyna, Rosa canina are protected in terms of trading and commercial use according to the Rulebook on declaration and protection of protected and strictly protected species of plants, animals, and fungi (Official Gazette of RS, No 5/10).

The ruderal and invasive plants are the most abundant within the project area. Some of the ruderal plant species that inhabit nitrified ruderal habitats are: *Chenopodium album* L. (white goosefoot), *Atriplex hastata* L. (Hastate Orach), *Amaranthus retroflexus* L. (redroot pigweed), *Amaranthus blitoides* Watson, *Amaranthus lividus* L., *Urtica dioica* L. (common nettle), *Parietaria officinalis* L. (eastern pellitory-of-the-wall), *Conium maculatum* L. (hemlock), *Artemisia vulgaris* L. (common mugwort), *Arctium lappa* L. (greater burdock), *Cichorium intybus* (common chicory), *Daucus carota* (Wild carrot), *Setaria glauca* (green bristlegrass), *Sambucus ebulus* (danewort),

Bidens tripartitus (three-lobe beggartick), *Senecio vulgaris* (groundsel), *Dactilys glomerata* (cock's-foot) (Figure 38).

Senecio vulgaris

Echium vulgare

Daucus carota

Figure 38 Some of the ruderal plants recorded along the project area.

Figure 39 Populations of invasive plants (Robinia pseudoacacia and Amorpha fruticosa) along the railway.

Also, along all project area important number of invasive plants is recorded: *Robinia pseudoacacia* (black locust), *Reynouria japonica* (Japanese knotweed), *Ailanthus altissima* (tree of heaven), *Acer negundo* (box elder), *Amorpha fruticosa* (indigo bush), *Celtis occidentalis* (common hackberry), *Fraxinus pennsylvanica* (green ash), *Gledichia triachantos* (honey locust), *Oxalis stricta* (yellow woodsorrel), *Erigeron canadensis* (Canadian horseweed), *Ambrosia artemisifolia* (common ragweed), *Paspalum distichum* (knotgrass), *Sorghum halepnse* (Johnson grass), *Datura stramonium* (thorn apple), *Asclepias syriaca* (common milkweed), *Iva xanthifolia* (giant

sumpweed), *Xanthium orientale subsp. italicum* (common cocklebur), *Phytolacca americana* (American pokeweed), *Solanum nigrum* (Black nightshade), etc. (Figures 40).

Figure 40 Invasive plants: Phytolacca americana and Solanum nigrum.

Also, it is important to mention the presence of indigenous species that in the past had a significant presence in the floristic structure of potential natural vegetation. Some of them are *Fraxinus angustifolia* (narrow-leafed ash), *Acer tataricum* (Tatar maple), *Acer campestre* (field maple), *Salix alba* (white willow), *Populus alba* (white poplar), *Quercus robur* (European oak), *Carpinus orientalis* (oriental hornbeam), *Evonymus europaeus* (European spindle), *Prunus spinosa* (blackthorn), *Rosa canina* (dog rose), *Cornus sanguine* (common dogwood), *Crataegus monogyna* (common hawthorn), *Phragmites australis* (common reed), etc.

This list of plant species recorded in the project area will be completed after the spring field survey.

5.1.11.4 - Fauna

The existing railroad and observed corridor 500 m wide on both sides are placed „somewhere in between ", in fact, through the pure agricultural land, with extremely modified former natural or semi-natural ecosystems and habitats. Along the trace, there is mostly a very narrow strip of „forest-like"vegetation, but in form of bushes, windbreaks, shrubs, rare nearby plantations, and almost negligible remnants and patches of former forests. Numerous alien or even invasive plant species are present. Cultivated arable soil is absolutely predominant. The trace is also crossing some drainage canals.

The area of the railway corridor is an anthropogenic landscape dominated by agricultural areas. Natural habitats are presented only in the form of isolated islands. Ecological corridors enable seasonal migrations and the exchange of genetic material between partially isolated and/or spatially distant habitats. Boundaries with natural vegetation, field protection belts, watercourses, and their valleys with a vegetation belt represent natural ecological corridors. Preservation of these ecological corridors is of priority importance for the preservation of the biodiversity of the area. Habitats listed above are inhabited by arthropods, amphibians,

reptiles, birds, and mammals, among which some of the determined species are protected as natural rarities. The number of species and individuals shows seasonal variability, with the highest values evidenced in the periods of migration of individual animal groups.

During the field survey, which was undertaken in autumn/winter 2020 and summer 2021, canals in the areas around Sid and Sremska Mitrovica stations were evidenced. Some of them were dry, and some probably had more or less permanent water levels. In most of the observed canals water was of very bad quality (almost fecal waters). The transect method was used along the proposed route with a strip of 500 m right and left (mainly available, due to the configuration of the terrain), in order to obtain some new data and to check/confirm existing ones, including recording of live and dead animals. Additional data indicative of species presence such as traces, dens, holes, burrows, and excrements were also recorded. During the autumn field survey the weather conditions were not favorable (windy and rainy), so the movements and activities of most fauna species were reduced. Some expected species of mammals, like roe deer, European hares, foxes, or golden jackals could not be noticed.

During the field research, vegetation belt, more or less up to 30-50 m around the railway was evidenced. This belt is presented mostly by single trees or shrubs and represents a neglected area that is not adequately maintained around the rails. This is the most significant in the area between Sremska Mitrovica and Sid. However, this vegetation provides good places for animals, for hiding and nest. Wider mostly agricultural areas provide also places for different animal groups, where they are finding food or places for hiding.

In addition, these green belts around the railway have a role as agricultural protection belts, which favorably affect the biodiversity of agricultural areas. The green areas within the landscape enable the survival of endangered species of birds (birds of prey, owls, etc.) and mammals. Nesting places for songbirds that feed on agricultural land were also evidenced. Raising green protective areas provides conditions for a large number of species whose habitats are declining due to the disappearance of farms and thus prevents the decline of biodiversity in the area. The formation of agricultural protection belts contributes to the reduction of the negative effects of aeolian erosion on arable land and can contribute to the development of the hunting area. Implemented direction for improving the quality of hunting grounds is in line with international standards in nature protection.

On some sections of the railway line, which are surrounded by agricultural land, there are very rare and endangered bird species, such as the steppe falcon (*Falco cherrug*) and the swallow falcon (*Falco subbuteo*). Their presence is conditioned by favorable feeding conditions in the surrounding fields intersected by canals with bushes, as well as the proximity of the village where they hunt birds (pigeons, starlings, swallows).

However, such „artificial" and „non-natural" habitats and ecological conditions are very favorable dwellings for numerous mammal species, mainly small terrestrial and colonial rodent species like voles, mice, hamsters, mole-rat, souslik, colonial insectivores like mole and solitary ones like some shrews and hedgerow as well. Abundant production of biomass both from plant or animal origin and suitable hiding places both in open areas, ecotones, or more dense vegetation are the main reasons for the very rich fauna of small mammals.

At the same time, small rodents are attractive prey for, mainly small and medium-large carnivores like mustelids and canids, so the presence of such species is permanent and frequent.

Plenty of information on bat fauna is collected from the newest and comprehensive work from Paunović et al., 2011; Paunović (2016). However, along the railway there is no typical habitat for bats, they are present more in urban areas, but also in rural parts where they are looking for food. In the ESIA phase evidenced bat species will be listed.

According to the Rulebook on proclamation and protection of strictly protected and protected wild species of plants, animals, and fungi („The Official Gazette of the Republic of Serbia", No. 5/2011 and 47/2011), the protection of wild species is carried out by prohibiting the destruction and undertaking of other activities that

damage population of the species and their habitats. A list of wild species, protected in accordance with the national legislation, as well as the international treaties, such as IUCN read list/Red book, Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), and relevant EU Directives, will be prepared for ESIA phase. In this document methodology used during field research for each fauna group is elaborated, and during the field research, special attention is paid to the protected species and their habitats, which are assumed to use the area within 500 m of the railway corridor.

Insects

A list of insects registered in the project area is made both through desk research and during the field investigation. Field data are collected mainly by observation, and where necessary, insects were caught with an entomological net, photographed, or collected in case identification could not be done in the field. The field research covered the time between autumn 2020 and summer 2021. The selection of localities was done by reviewing satellite images in Google Earth software and choosing 23 points mentioned under the habitat section. The focus was on areas that represent more preserved fragments of natural and semi-natural habitats and locations, where the species of importance for protection are expected to be found. A preliminary list of species observed during the field research is following:

Hymenoptera (*Bombus sp., Apidae, Vespa sp., Vespula sp.*)

Coleoptera (Coccinelidae, Carabidae)

Heteroptera

Homoptera

Lepidoptera (*Zerynthia polyxena, Parnassius mnemosyne, Leptidea morset, Colias myrmidone, Lycaena dispar, Pseudophilotes vicrama, Maculinea arion, Nymphalis sp., Apatura metis, Melitaea aurea*).

Fish

The existing water bodies are melioration channels. They collect waste waters during the whole year. During the summer they dry up. These are the reasons there is no registered fish species protected or strictly protected according to the national legislation in existing water bodies.

Amphibians and Reptiles

Amphibians and reptiles survey was done during autumn and summer field investigation. A total of 23 points are covered. Desk study is also done to support field survey findings. Literature data on the distribution and conservation status of all species of amphibians and reptiles from the area affected by the Project were collected from scientific papers and the Red Book of Amphibians and Reptiles of Serbia. The full list of species evidenced will be provided in ESIA phase.

Fieldwork included visual inspection along transects or detailed inspections of relevant amphibian and reptile habitats (for example ponds, canals, suitable places for basking, and natural or artificial shelters). Information on the species, locality, and date where they were found was collected, and the specifics of the habitat were recorded. The transect method was used, as well as observation and taking photos of different habitats, where is expected that some specimens of amphibians/reptiles might be found.

The preliminary list of recorder species are following:

Triturus dobrogicus, Bombina bombina, Bufo bufo, Pseudepidalea viridis, Hyla arborea, Pelobates fuscus, Rana dalmatina, Emys orbicularis, *Zamenis longissimus, Coronella austriaca, Natrix natrix, Natrix tessellate, Lacerta agilis, Lacerta viridis, Podarcis muralis*.

Birds

Field research of ornithofauna was conducted during the seasons of autumn-winter 2020 and summer 2021. The chosen methodology for the field study was the transect method, as well as the point census method. For the purpose of ornithofauna field research, a total of 21 transects were completed. Birds are surveyed by binoculars in 23 points defined under the habitat section. Photo records were taken. For each observation site, the application records geographical coordinates.

During the field research, the hunting area of *Aquila heliacal and Falco sp.*, are observed, as well as the nesting area of *Saxicola torquata*. Groves and hedges are nesting areas of *Oriolus oriolus* and *Lanius collurio*.

Mammals

In relevant analyses of mammalian biodiversity in Serbia so far, the region Srem is generally considered and characterized by relatively rich diversity (Petrov, 1992; Savić et al., 1995; Paunović, 2016) and one of the "hotspots" of the mammal fauna in Serbia. Based on available data, the mammalian fauna in the whole region consists of 62 species, of the nearly 100 mammal species that have been recorded until now in Serbia.

The specific parts of mammal fauna in the observed area are steppe species, i.e. *Spermophilus citellus, Cricetus cricetus, Spalax leucodon, Apodemus uralensis, Mustela erminea,* and *Mustela eversmanii*. The conservation status for some of them is still quite unknown, for some changeable, and for some with very scarce data, especially the new ones.

The species list eventually considered for the later analysis of the impact of the railroad reconstruction or partly new construction includes the species with existing data, new field data, and other available data that presence are expected along the proposed route and its surrounding corridor, as well as species whose diurnal, nocturnal and/or seasonal movements and activities require movements across the route and the corridor of the railroad. Also, some species whose presence is still not documented and even questionable, but for which there is a certain realistic assumption that they inhabit the corridor of the subject line, have been enlisted. Based on this conceptual approach, a mammal fauna with a total of mentioned 62 species is considered.

5.1.12 - Protected area

One natural monument „Drvored platana u Sremskoj Mitrovici" is detected within the area of influence of the project (Figure 41). This sycamore tree row is located in front of the railway station building in Sremska Mitrovica.

Figure 41 Natural monument „Drvored platana u Sremskoj Mitrovici"

The railway route crosses part of IPA (important plant area) „Fruška Gora and Koviljsko - petrovaradisnki rit", which presents part of the ecological network of the Republic of Serbia.Within the project area, and within the IPA „Fruška Gora and Koviljsko - petrovaradisnki rit", rare, endangered and endemic plant species were not found. As the dominant type of habitats are artifical habitats, ruderal plants are dominant.

Also, the railway crosses local and regional ecological corridors that connect the National Park „Fruška Gora" and numerous habitats of strictly protected and protected species of the foothills of Fruška Gora and the Sremski Loess Plateau with floodplains Danube and Sava Rivers (international ecological corridors) (Figure 42).

Golubinački channel, Veliki Begej channel, Ljukovo Stream, Jelenački stream, Kudoš stream, Manđelov gat channel, Kuzminska šidina stream, Jelisaveta's channel and Šidina channel are local ecological corridors situated along the railway route. Šelovrenac stream is a regional ecological corridor recorded along the railway route.

The ecological corridors enable the migration of protected and strictly protected animals between spatially separated habitats. At the same time, the corridors are habitats of various protected species. Accordingly, during the preconstruction and construction phases, special attention should be paid to the implementation of adequate technical solutions to mitigate the negative impacts on the migratory routes of different animal species.

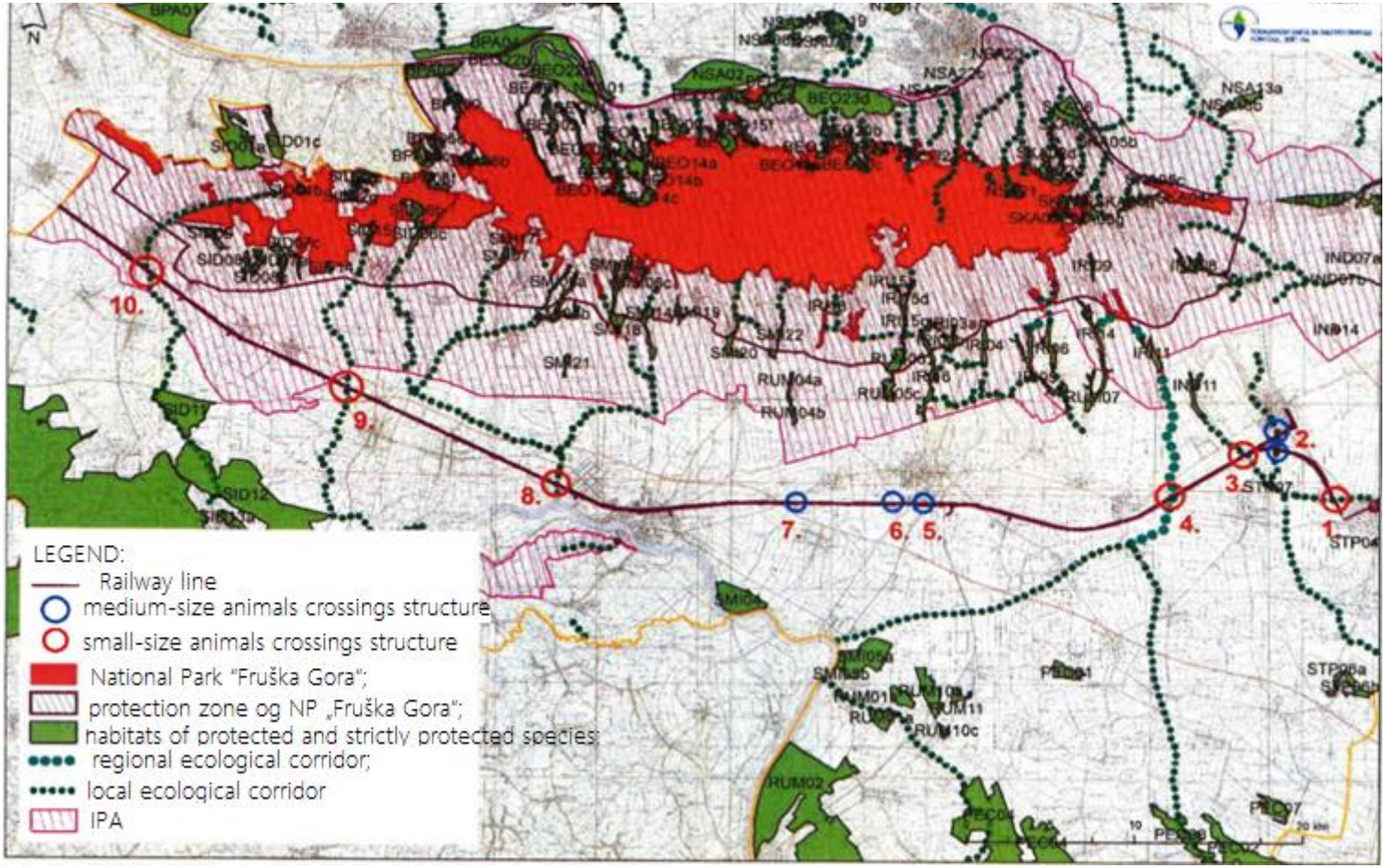

Figure 42 Layout of the railway route in relation to protected natural assets, ecologically significant areas and ecological corridors

5.2 - Social baseline

Elements of the baseline have been chosen to depict the Project area's sensitivity in terms of potential adverse social impacts and the possibility that the intervention would create, reinforce or deepen inequity and/or social conflict, or that the attitudes and actions of key stakeholders may subvert the achievement of the development objective, or that the development objective, or means to achieve it, lack ownership among key stakeholders.

The description of social baseline conditions has considered a wide range of data and information gathered from various sources, including:

- Desk-based studies and literature reviews.
- Data from stakeholders.

Field surveys and site investigations were not conducted at this stage.

The adverse impacts of the project are contained within a moderate range of risks revolving around the following:

- Personal and property rights,
- Social and human rights issues
- Economic Impacts
- Health impacts
- Community impacts
- Impacts on the infrastructure
- Community Health and Safety
- Labor and working conditions

5.2.1 - Methodology applied for all receptors

The spatial scope of the Social Area of Influence (AoI) includes the following areas:

The Primary AoI: The primary area of influence encompasses a corridor of 8 m in rural areas and 6m in urban, measured from the centreline of the outer rail, and 14 m of air rights above as land required for the standard gauge. (on each side). This corridor is potentially expected to experience the land acquisition impacts in addition to other environmental and social impacts. This applies only to land acquisition and resettlement impacts.

The Secondary AoI: Area of potential socioeconomic impacts directly associated with the Project activities encompasses a corridor of 2 km left and right. The impacts to cutural heritage features observed encompasses a corridor of 6 km left and right to as a buffer to account for refinement in the design and impacts beyond the RoW.

Area of Indirect Impacts: Area of potential socioeconomic impacts indirectly induced by the Project activities.

5.2.2 - Limitations and assumptions

Gaps in contemporary data have been identified. However given the Secondary area of Influence and the fact that consistency within a certain municipality is known (areas of great disparity within a Municipality are not impacted by the Project), it is asserted that the information provided herein is adequate for meeting the

environmental and social performance requirements of international lenders and will satisfy public disclosure and consultation requirements, focused the impact assessment and informed management measures and mitigation commensurate to this stage of the Project.

5.2.3 - Administrative Structure

Based on the Nomenclature of Statistical Territorial Units ("Official Gazette of the RS, No 109/09 and 46/10), and in accordance with the Law on territorial organization ("Official Gazette of the RS, No 129/07) key and basic units of local-governments are 147 municipalities, while there are 29 administrative districts and two autonomous provinces10. Serbia constitutes of administrative districts which are not units of local self-governments but are established for purpose of state administration outside the headquarters of the state administration. Administrative districts are established by the RS Government decree, which also included the areas and seats of administrative districts. Currently, there are five cities in Serbia with city municipalities: Belgrade, Niš, Kragujevac, Požarevac and Vranje comprise several city municipalities each, divided into "urban" and "suburban". The Project is routed through Srem District.

For the purpose of outreach and stakeholder engagement, local municipal offices play a pivotal role to serve as main focal communication point as identified in the SEP. Each of the affected municipalities have registered community offices (mesne zajednice i kancelarije) which are often focal points of contact for the community, but also perform administrative responsibilities (e.g. birth, marriage and death certificates, census etc).

The project area includes 15 settlements along the railway corridor, which are located within the territory of the municipalities: Stara Pazova (two settlements), Indjija (one settlement), Ruma (four settlements), Sremska Mitrovica (four settlements) and Sid (four settlements).

Figure 43 Settlement's Locations

5.2.4 - Demography

Population censuses are the main source of statistical data on the total number, territorial distribution and major characteristics of individuals and households in the Republic of Serbia. Inter-census data rely on statistical estimate methodologies. The first results of the 2022 Census contain basic data on the total number of persons enumerated, the number of inhabitants, households and apartments, as of September 30, 2022.

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[10] Source: "Law on the Territorial Organization of RS"

The first results of the Census are subject to changes during statistical data processing. The final results of the Census will be published successively, from April 2023 to June 2024. The final results of the 2022 Census of Population, Households and Dwellings began to be published on April 28, 2023 (https://popis2022.stat.gov.rs/sr-cyrl/5-vestisaopstenja/news-events/20230428-konacnirezpopisa/?a=0&s=0). Book 1 - "Nationality" contains the final results of the 2022 Census on the total number of inhabitants of the Republic of Serbia, by gender and the answer to the question about nationality. The book contains data for ethnic communities with more than two thousand members (by municipalities and cities), while data on ethnic communities with less than two thousand members is available in the dissemination database.

The number of population is estimated in the inter-censual period for every year, including the census year. Thus, in 2020 the population of the Republic of Serbia is estimated to 6 899 126. The rate of population growth to the previous year is negative and amounts to -6.6 per 1000 inhabitants. According to vital statistics in 2020 the rate of natural increase was - 8.0‰, that of live births 8.9‰ and of mortality 16.9‰. The average life expectancy of male and female population in the Republic of Serbia has been extended over the last nine years by more than two years (from 71.6 years to 73.1 years for men and from 76.8 to 78.3 years for women).

Table 26 Municipalities crossed by the Project and their demographics

Municipalities	Area (km²)	Estimation of population in August 2021	Population densityNumber of inhabitants/km²	Estimation of population in August 2021 (without migration)	Estimation of population in August 2021 (with migration)
R. of Serbia	88499	6899126	89	6136010	6824556
Srem area	3485	295132	85	259775	260735
Stara Pazova	350	64677	185	57216	58825
Indjija	385	45336	118	39449	38815
Ruma	582	50966	88	43726	43879
City of Sremska Mitrovica	762	*74609*	98	66517	66500
Sid	687	30643	45	27591	27876

According to the data in the table above, in almost all municipalities through which the Belgrade-Sid railway corridor passes (Stara Pazova, Inđija, Ruma and Šid) and the City of Sremska Mitrovica, the decline in population will continue in the future (last two right hand columns). In the municipalities of Stara Pazova, Ruma and Sid, a positive migration balance it is expected while in the municipality of Inđija and the city of Sremska Mitrovica a negative migration balance can be seen. It is estimated that the number of inhabitants will be reduced in the municipalities of Stara Pazova, Ruma and Sid even with a positive migration balance.

Settlements that cross the Project route are listed in the following table, including information on the number of inhabitants corresponding to the state determined by the 2002 and 2011 [11]censuses and whether the given settlements currently have railway stations. Since data of the recent census are gradually published until 2024, more data will be presented under the ESIA depending on their flow. In case, estimates can be found, they will be presented wherever there is lack of recent data.

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[11] As in the first paragraph of point 5.2.4. stated above, the final results of the Census will be published successively, from April 2023 to June 2024, and they began to be partially published starting from April 28, 2023. Only Book 1 - "Nationality" was published, and it does not contain data at the settlement level, which are presented in the above tables.

Table 27 Settlements crossed by the Project route

	City/Municipality (Crossed by alignment)	Settlement (Crossed by alignment)	Population (Number)		Station (YES/NO)
			2002	2011	
1	Stara Pazova	Stara Pazova	18645	18602	YES
2		Golubinci	5129	4721	YES
3	Indija	Indija	26247	26025	YES
4	Ruma	Putinci	3244	2745	YES
5		Kraljevci	1232	1056	NO
6		Ruma	32229	30076	YES
7		Voganj	1614	1506	YES
8	Sremska Mitrovica	Sremska Mitrovica	39084	41624	YES
9		Laćarak	10893	10638	NO
10		Martinci	3639	3070	YES
11		Kuzmin	3391	2982	NO
12	Sid	Kukujevci	2252	1955	YES
13		Bacinci	1374	1180	NO
14		Gibarac	1158	989	NO
15		Sid	16311	14893	YES

Based on the data presented in the table, it can be seen that in the period of eleven years there was a decrease in the total number of inhabitants of the analyzed area by 4380. The decrease in population is evident in all settlements except for Sremska Mitrovica where there was an increase. The decrease in the number of inhabitants is accompanied by a decrease in the total number of households by 1,796.

The distribution per gender is given below.

Table 28 Distribution of Population per Gender 2011 (census)

City – municipality	Sex	Population
Indija	m	23,414
	f	24,019
Ruma	m	26,654
	f	27,685
Sremska Mitrovica	m	39,042
	f	40,898

City – municipality	Sex	Population
Stara Pazova	m	32,332
	f	33,460
Sid	m	16,788
	f	17,400

Table 29 Population per age cluster and gender in 2020 (estimate)

Area / Municipalities	Children ≥6	Children 7-14	Children 15-18	Youth (15 do 29)	Active Labor contingent (15 – 54)
R. of Serbia	447116 F- 230630 M- 230630	530008 F-257002 M- 273006	283249 F- 137757 M- 145492	1115688 F- 542552 M- 573136	4402974 F- 2201149 M- 2201825
Srem area	18757 F- 8985 M- 9772	22496 F- 10878 M- 11618	11932 F -5851 M-6081	46923 F -22654 M- 24269	189969 F- 93178 M- 96791
Stara Pazova	4279 F - 2008 M- 2271	5213 F - 2467 M- 2746	2738 F - 1351 M- 1387	10458 F - 5085 M- 5373	41833 F - 20715 M- 21118
Indjija	3125 F - 1514 M- 1611	3564 F - 1760 M- 1804	1738 F 863 M- 875	6884 F- 3304 M- 3580	28662 F- 14008 M- 14654
Ruma	3154 F - 1498 M- 1656	3733 F - 1822 M- 1911	1941 F - 956 M- 985	7999 F - 3858 M- 4141	32755 F - 16106 M- 16649
City of Sremska Mitrovica	4620 F - 2264 M- 2264	5491 F - 2651 M-2840	3165 F - 1549 M- 1549	12172 F - 5902 M- 6270	48396 F - 23891 M- 24505
Sid	1738 F - 828 M- 910	2264 F - 1081 M- 1183	1170 F - 564 M- 606	4808 F - 2315 M- 2493	19813 F - 9601 M- 10212

Source: Devinfo, Profil, RSO, August 2022

5.2.5 - Employment and Economy

Less than half of the population of the Republic of Serbia is economically active (41.3%), where the share of the male workforce (57.2%) prevails compared to the female workforce (42.8%). The share of employed persons in the total population aged 15 and over, i.e. the employment rate is 32.1%, which is higher among men (35.5%) than among women (28.9%). The highest percentage of employment is given in the table below in Indjija (34.1%), and the lowest in Ruma (31.8%).

In the Republic of Serbia, the unemployment rate, in fact the share of unemployed persons in the total economically active population, is 22.4%. The unemployment rate among women (23.6%) is slightly higher than among men (21.6%). The unemployment rate in the Srem region is 13.2%. The lowest unemployment rate in the Srem region was recorded in the Municipality of Indjija (11.09%), and the highest in the Municipality of Sid (26.25%). The economically inactive rate, which represents the share of the economically inactive population (aged 15 and over) in the total population aged 15 and over, for the Republic of Serbia is 51.8%. Observed by gender, that rate is lower in men (42.8%) than in women (60.1%). The rate of economic inactivity in the Srem

region is 51.2%. The lowest rate of economic inactivity is noted in the Municipality of Sremska Mitrovica (46.4%), and the highest in the Municipality of Sid (56.9%).

The number of unemployed per thousand inhabitants in 2020 at the national level is (68). In the Srem region, the average is (42) and the highest average is in the Municipality of Sid (63), through which the railway corridor passes, and the municipality of Ruma (53), the Municipality of Inđija is significantly below the average (34) and the Municipality of Sremska Mitrovica (41), which is somewhat below average, as indicated in the following table. All municipalities on the route had an average salary below the national average (EUR 551), viewed from the period in 2020.

Table 30 Employment and salaries in affected municipalities in 2020

Municipalities	Registered employees by municipalities of work **	Registered Employed relevant to permanent residence (%)	Average annual net salaries and wages (RSD)	Registered unemployed	Unemployed per 1000 residents
Serbia	2215475	32,1	60073	491347	68
Srem area	92824	32.3	53507	12289	42
Sremska Mitrovica	20395	32,2	55018	3027	41
Indjija	13704	34,1	54980	1520	34
Ruma	15820	31,8	52433	2681	53
Stara Pazova	24887	33,7	54028	1521	24
Sid	7301	26,8	49248	1917	63

Source: Devinfo, Profil, RSO, August 2022

Entrepreneurship

The difference in the intensity of economic activities measured by the indicators of the number of active entrepreneurs and the number of deleted/closed entrepreneurs is evident in the municipalities along the route of the railway corridor. The data in the table are more indicative, since the dynamics of opening and closing entrepreneurial activities is high. The largest number of newly founded entrepreneurs is in Stara Pazova (318) and the smallest is in Sid (71).

In the Srem region, the number of closed companies is 813, it is assumed that the reason for this is poor experience in entrepreneurship, which has been developing intensively only in the last 20 years, but also in a relatively discouraging business environment with a huge number of different tax and other parafiscal charges that burden financial operations of the entrepreneur. These taxes differ between municipalities

Table 31 Active business of entrepreneurs in 2020

City/municipality	*Enterprises*	*Deleted/closed entrepreneurs*	*Newly founded entrepreneurs*
Serbia	274972	22037	29404
Srem area	10558	813	1109

City/municipality	*Enterprises*	*Deleted/closed entrepreneurs*	*Newly founded entrepreneurs*
Sremska Mitrovica	2141	173	245
Indjija	1711	162	183
Ruma	1772	135	189
Stara Pazova	3139	249	318
Sid	789	48	71

Source: Devinfo, Profil, RSO, August 2022

Agriculture

Agriculture plays an important role in the economy of Serbia. Agriculture is the fourth largest sector, accounting for 17.4 percent of employment and 5.4 percent of total exports. Very small and fragmented land holdings, ageing and declining farm labour force, limited associability, low efficiency and productivity, low use of technology, high labour intensity, low financial liquidity and capital availability for investment (especially for smallholders) and outdated production management practices characterize agriculture in Serbia in the South and Southeast. Cereals, vegetable oils and edible fruit have historically driven growth of agricultural production and exports, with Vojvodina's larger producers benefiting the most. Only one percent of the farms in Serbia have 50 hectares or more of land and most of them are in Vojvodina, while farmers who own less than 5 hectares of land account for 78 percent of all holdings and 25 percent of the total cultivated area in Serbia and are concentrated in the South and East Serb agricultural sector growth, however, is influenced by regional disparities in sector performance and composition of crops. Even though women are the holders of 19.4 percent of farm holdings, they are the managers45 (main decisionmakers) in only 15.3 percent of farms. The share of women among managers decreases as the size of the farm increases. Women represent 19.2 percent of the managers of the smallest farms (up to 2 ha), while in the category of the largest farms (over 100 ha), they represent only 5.8 percent. Out of a total of 1.337 million people undertaking permanent or occasional activity in agriculture, 561 020 (42 percent) are women. The share of women in the number of persons carrying out agricultural activity is lower than the share of men (42 percent and 58 percent, respectively), and it is even lower in terms of the total number of annual working units (AWU or hours of effective work) – 38 percent of total AWU is carried out by women. Municipal records are available only from 2012 when a total of 631,552 agricultural farms were registered in Serbia. This is one quarter of the total number of households in Serbia.

The city center of Sremska Mitrovica and the municipal centers of Stara Pazova, Indjija, Ruma and Sid are the main economical centers, while the other settlements are of rural character, which means that they are economically less developed settlements. The structure of the economy is based on agriculture as a carrier of development.

Revitalization of economic activities, especially in the industrial sector, is slow due to unfinished restructuring and transition processes, lack of investment, etc. The existing industrial structure is still insufficiently competitive. The SME sector will be the basis for economic development and job creation. The total number of agriculturally active population by municipalities through which the railway passes is given in the following table.

Table 32 Agriculturally Active Population in the Study Area 2012

City/municipality	Population Total	Number of agriculturally active population	Agricultural active population (%)
Stara Pazova	21,366	1,350	6.3%
Inđija	14,744	1,802	12.2%
Ruma	16,166	2,357	14.6%
Sremska Mitrovica	25,877	5,868	22.7%
Sid	9,788	2,387	24.4%

Source: Census of Agriculture, RSO

The total number of agriculturally active population in the wider corridor of the railway is 13,764, i.e. 15.7% of the economically active population. The highest agriculturally active population in the research area is in the municipality of Sid and the city of Sremska Mitrovica, while in the municipality of Stara Pazova is the smallest (6.3%).

Data on family farm holders most impressively reflect the subordinate position of women in rural areas in Serbia. Out of a total of 617,365 family farms with a registered holder, only 17.3% of households are registered to women and 84.1% to men. These data confirm the absolute property deprivation of women in rural areas. Where women are farm holders, in most cases it is the result of the fact that they are widows whose sons have moved away and are not living on the farm, or single mothers who are farmers.

Table 33 Active labor force in agriculture, 2012

Area / Municipalities	Formal owner of agricultural households			Participation of family members in agricultural activities of the ag. household		
	Total	Female	Male	Total	Female	Male
Serbia	626367	106948	519419	797199	501487	295712
Srem area	28425	4559	23866	29547	18824	10723
Sremska Mitrovica	7306	1063	6243	7895	5045	2850
Inđija	3150	519	2631	3184	1974	1210
Ruma	5406	959	4447	5577	3561	2016
Stara Pazova	3596	544	3052	3095	2029	1066
Šid	4393	745	3648	4369	2783	1586

Population in rural areas

122,193 persons migrated internally within the Republic of Serbia in 2018. The average age of persons who changed their residence was 34.2 years (34.8 for men and 33.6 for women). In 2018, the north-western region of Vojvodina with the Srem region had a positive migration balance. in 2018, most people moved from one municipality/city to another within the same area (39.1%), and the smallest number from one settlement to another within the same Municipality/City (23.6%).

The largest number of migration movements in the Srem region, where 4139 immigrants were documented in 2022, is in the territory of the municipality of Stara Pazova (1223) immigrants and Sremska Mitrovica (1014), where, on the contrary, the number of emigrants (1012) in the territory of the municipality of Stara Pazova and in Sremska Mitrovica is the same (1027) emigrants, where the general reduction of the population is of a moderate type.

Economic growth has disproportionately benefited within the rural and low-income households. In Serbia, the income of the poorest 40 percent grew on average at an annual level of 3.9 percent between 2013 and 2017, more than the 1.5 percent increase in income for the entire population. Earlier, rural areas were particularly offended after the global financial crisis and the age of Covid. Between 2013 and 2017, with the recovery of the economy and jobs, the poverty rate decreased by 9.6 percentage points in sporadically populated areas, 6.0 and 2.9 percentage points in medium and densely populated areas, correspondingly. However, sporadically populated areas still have more than half of the land.

Poverty including household consumption

The average monthly income in cash and in nature per household member (all households) amounted to 24,955 dinars in 2019, which is an increase of 4.2% compared to 2018 (23,960 dinars). In 2019, households in urban areas had an average of 26,897 dinars per household member per month (25,810 dinars in 2018), while households in smaller areas had 22,108 dinars per household member (21,250 dinars in 2018). Out of the total available budget, 96.6% generates revenue in money and 3.4% generates revenue in kind. For households in urban areas, cash income is 99.5% and income in nature is 0.5%, while for households from other areas this ratio is 91.5% to 8.5%.

The Republic Statistical Office and the World Bank produced a set of poverty maps for Serbia, which show variability in well-being across the country by combining the two sources of censuses and household surveys - to estimate poverty rates for small geographic areas, such as districts and municipalities. At risk - poverty rates in Serbia: estimates by World Bank and RSO staff according to the 2011 and 2013 Census.

SILC data. The risk of poverty is defined using the EU standard of 60 percent of the median adult income equivalent. Some areas with a high incidence of AROP (at risk of poverty or social exclusion) also have many poor people, and a large number of the poor are in densely populated parts of the country.

Poverty remains significant, both in absolute terms (the share of persons whose consumption is below the threshold). needed to satisfy existential needs - 7.3% in 2016), and relatively high (the share of persons at risk of poverty is 25.5% in 2016). The rate of risk of poverty according to the most common status on the labor market (lasting longer than six months) indicates that the unemployed are in the worst position (48.0%, that is, almost every other unemployed person is at risk of poverty).

Employment significantly reduces the risk of poverty, but the quality of employment remains a key factor in ending poverty (the self-employed have a significantly higher rate of risk of poverty than those employed by an employer, (32.4% vs. 9.0%). Pensioners are in the most favorable position, after employees employers, at risk of poverty, which is approximately at the level of the total number of employees (15.4%).

Education is a determining factor in a person's economic status and ability to generate income, so it is not surprising that people with less education are above average at risk of poverty. The highest rate of risk of poverty in the period 2016 - 2018 was in the population with primary education and lower than elementary school (39.1%), and the lowest in the population at risk of poverty with secondary school or college education (10.3%) . This distribution of the population at risk of poverty according to the level of education clearly indicates that education is important, because the labor market rewards highly educated people.

Data on poverty assessment using the poverty mapping method are given in the following table, for the year 2013, based on the data from the World Bank and the Republic Institute of Statistics. The at-risk-of-poverty rate is higher than the national average (24.7) in all municipalities except Inđija (23.1) and Stara Pazova (19.6). The Gini coefficient is different (between 21 and 107), the lowest in Stara Pazova (21) and the highest in Šid (107), and the relative risk of poverty is again in most municipalities (except for the municipalities of Inđija and Stara Pazova) above the national average.

Table 34 Poverty assessment through poverty mapping 2013

Municipalities	Risk of poverty rate	Risk of poverty Municiaplity ranking (1- 147)	Gini koeficijent (interval from 0 to 100)	Relatively poverty risk
Serbia	25,7		36,8	8,8
Srem area	27,3		34,6	9,1
Sremska Mitrovica	29,4	70	34,6	9,9
Indjija	23,1	29	33,2	7,3
Ruma	27,9	61	34	9,3
Stara Pazova	19,6	21	32,9	6,1
Sid	36,8	107	34,6	12,9

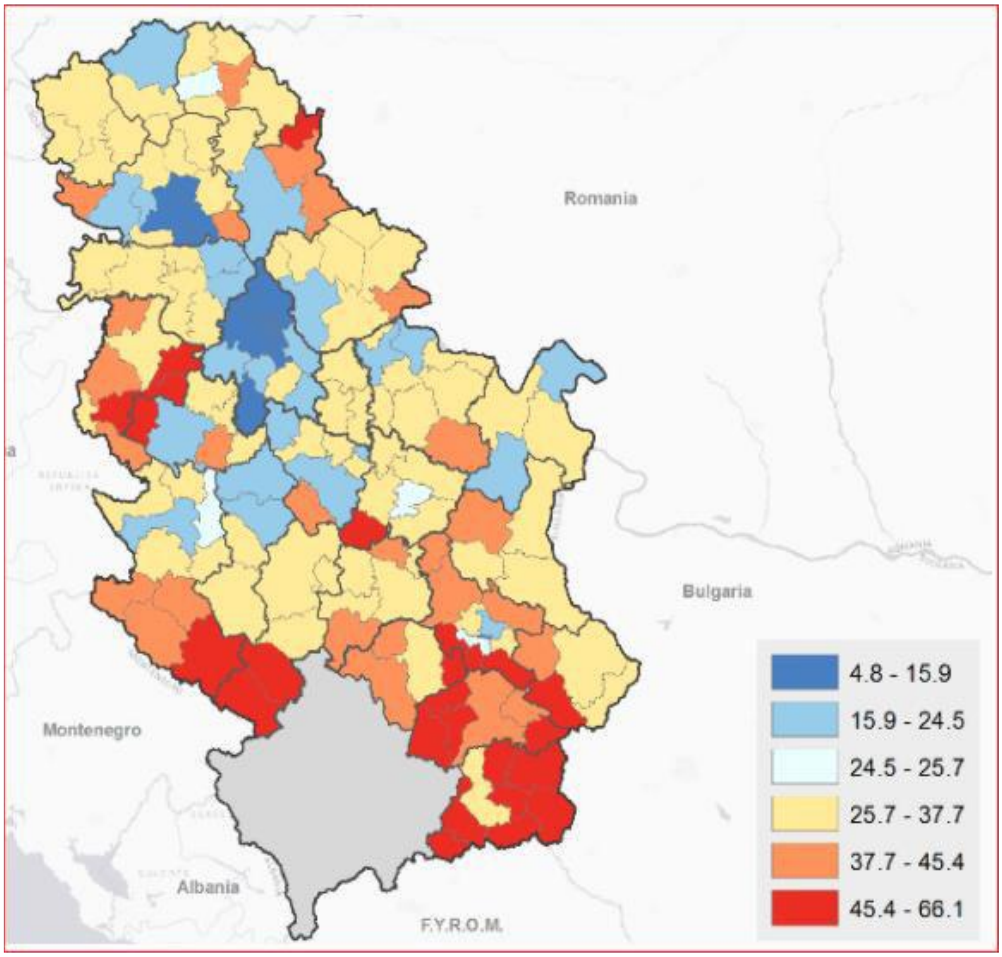

Figure 44 at-risk-of-poverty rates in serbia per municipality: world bank and sors staff estimates using the 2011 population Census and 2013 SILC data. Risk of poverty is defined using the EU standard of 60 percent of median per adult equivalent income.

The following table provides data on beneficiaries of social protection, financial assistance, child allowance and allowance for care and assistance of the sick person. The share of social protection beneficiaries in the total population of the municipality is relatively high and ranges from 6.7% in the municipality of Stara Pazova to almost 12,6 percent in the municipaliti of Šid. There are differences between the municipalities in the percentage of cash social assistance beneficiaries. In the municipaliti Stara Pazova, 1.4 percent of citizens receive it, and in the municipaliti Šid, 4.1 percent. There are also differences between municipalities in the indicator of child allowance (collectively standard and increased). In the city of Sremska Mitrovica and the municipality of Ruma, almost every eleventh child is entitled to child allowance, and in the municipality of Šid, this share is more than one fifth. The percentage of beneficiaries of the basic and increased allowance for care and assistance is almost uniform among the municipalities.

Table 35 Social protection in 2020

Municipalities	Share of social protection beneficiaries relevant to the total population (%)	Share of social monetary support beneficiaries relevant to the total population (%)	Share of child support beneficiaries relevant to total children contingent (age 0-18) (%)	Share of beneficiaries of the increased allowance for care and assistance of another person in the total population (%)
Serbia	10,2	2,8	13,9	0,5
Srem area	10,3	3	11	0,5
Sremska Mitrovica	8,6	2,7	10,7	0,6
Inđija	11,8	2,4	9,3	0,6
Рума	14	4,5	11,1	0,5
Stara Pazova	6,7	1,4	8,5	0,5
Šid	12,6	4,1	21,6	0,6

Source: Devinfo, Profil, RSO, August 2022

5.2.6 - Public Services

The 2011 Serbia census identified 164,884 or 2.68 % of illiterate residents in Serbia. The number was halved compared to the 2002 census. A total of 850,000 residents, or 14 percent of the population, have no formal education or only few elementary school grades. Incomplete elementary school education has 677,000 residents of Serbia, or 11 percent. In the Republic of Serbia, 51% of persons aged 15 and over are computer illiterate, that is, 34.2% of persons are computer literate, while 14.8% are partially computer literate (May 2019). 2011 research show that 18.5% of rural women did not complete high school education because pressures by the family to stay and work in the household or on the farm, 26% because of the attitude of the family that women do not need to attain higher education levels, 18% because of a lack of financial resources, and 10% because of early marriage and family care. Differences in educational attainments are much more prominent when adult population of urban and rural areas are compared. Data from population census indicate less favorable education structure of population in rural areas with higher share of persons without

any school particularly among women (these are mainly older women). On the other hand, share of persons with higher and university education is much lower among rural than urban population.

To assess and present the baseline for Public Services two most prominent indicators have been selected, i.e. access to education and health.

Table 36 Accessibility of Education services in 2020

Municipalities	Children age 0-3 (preschool)	Children age 3 – 7 (preschool)	Net rate of elementary education inclusion	Inclusion rate of High s school
R. of Serbia	34,3%	97,8%	93,7%	98,6%
Srem area	31,2 %	109,1%	94,1%	No data
Stara Pazova	45,9	109%	94,9%	No data
Indjija	44,6%	100,2 %	93,7 %	No data
Ruma	31,3%	107,2 %	95,1%	No data
City of Sremska Mitrovica	31 %	55,5 %	93,4%	No data
Sid	30,3%	94,9%	89,5	No data

Source: Devinfo, Profil, RSO, August 2022

There are no data available for the pupils age of 15 to 19 years of secondary education. High school students belong largely to daily migrants, as there is not a large selection of high schools in every municipal centre. In medium-sized cities, there are, as a rule, two or three secondary schools. For these reasons, it should be considered that high school students can represent a significant number of railway users within a radius of 30 to 50 km, during their daily education commute.

In terms of access to health, the City of Sremska MItrovica have the most doctors per thousand inhabitants (3.6), We assume that there is a daily migration of users of health services in other municipal centers and that some users undoubtedly use rail transport to obtain health services. Access to health care becomes even more important in the years burdened by the unprecedent impact of the global pandemic caused by the novel SARS-COV 19 virus.

Table 37 Access to Health services in 2021

Municipalities	Number of Medical Doctors per 1000 residents
R. of Serbia	3
Srem area	1,9
Stara Pazova	1,1
Indjija	1,6
Ruma	1,3
City of Sremska Mitrovica	3,6
Sid	1,3

Source: Devinfo, Profil, RSO, August 2022

5.2.7 - Cultural Heritage

Based on data from the conditions for the Spatial plan of the infrastructure corridor for this railway, the Information System of Immovable Cultural Property, the Republic Institute for the Protection of Cultural Monuments - Belgrade and the territorially competent Institute for the Protection of Cultural Monuments Sremska Mitrovica, there has been carried out an identification of cultural property and archaeological sites located in the study area.

By inspecting the central register of cultural goods on the border of the spatial plan, in the area of the local self-government units-Municipality of Stara Pazova-Municipality of Indjija -Municipality of Ruma, City of Sremska Mitrovica, Municipality of Šid are categorized the following immovable cultural goods of exceptional importance for the Repubic of Serbia, which are under the jurisdiction of the Republic Institute for the Protection of Cultural Monuments:

Immovable cultural goods of exceptional importance

Ref.	Distance from axis, km	Location	Type/Name
1	5,5	Sid	Privina Glava Monastery, Sid
2	10,3	Sid	Orthodox Church, Šid, Molovin
3	12,6	Sid	Fruška Gora with monasteries and other monuments
4	7,9	Sid	A breakthrough site on the Srem front, Sid
5	3,7	Stara Pazova	Ambari and kotobanje, Stara Pazova, Golubinci
6	16.2	Indjija	The battle of Slankamen in 1691. Indjija, Old Slankamen
7	16,0	Sremska Mitrovica	Divša Monastery, Sremska Mitrovica, Divsa
8	12,8	Sremska Mitrovica	Kuveždin Monastery, Sremska Mitrovica
9	12,5	Sremska Mitrovica	Petkovica Monastery, Sisatovac
10	13,9	Sremska Mitrovica	Sisatovac Monastery, Sremska Mitrovica, Sisatovac
11	1,4	Sremska Mitrovica	Old Orthodox Church of St. Peter Stefana, Sremska Mitrovica
12	1,2	Ruma	Roman basiana town, Ruma, Donji Petrovci
13	10,6	Ruma	Archaeological site of Gomolova, Ruma
14	17,5	Stara Pazova	Surduk (Rittium), Roman fortress of auxiliary units, archaeological site in the process of determintion into cultural property
15	16,8	Indjija	(Acumincum), Old Slankamen

Immovable cultural property-cultural monuments of exceptional importance:

Ref.	Distance from axis, km	Location	Type/Name
1	12,5	Sremska Mitrovica	Spatial cultural and historical units of Fruska Gora with monasteries and other monuments

The most important cultural goods and archaeological sites located at a relatively short distance from the railway are listed below per municipality.

In the narrow zone of protection of the corridor of the railway in question (distance from axis 8 m) there is:

KO Sremska Mitrovica, kp 6018 I 5957	an immovable cultural property - a cultural monument of culture Building of the railway station Monument of Liberation in Sremska Mitrovica
KO Martinci, kp 69487/1	The building of the Old Railway Station in Martinci

In addition, Cultural heritage under previous protection:

KO Stara Pazova, kp 9546/1	Railway station building in Stara Pazova (facility 1 and facility 2)
KO Indjija, kp 3614, kp 3615	Indjija Railway Station Building
KO Ruma, kp 7416	Ruma Railway Station Building
KO Sid, kp 5225	Sid Railway Station Building

In the belt of the controlled construction of the railway line in question (distance from axis 25 m) are the following recorded immovable properties:

KO Sremska Mitrovica, kp 1279/26	"Hardijev Mlin"
KO Sremska Mitrovica, kp 987/2	Part of the spatial and cultural and historical unit "Munjara"with the facility with monumental values Electric Power Plant so-called "Munjara" – facility 1
KO Sid, kp 4164	cultural heritage under previous protection: Administrative building and porter of meat industry "Šid" in Šid– facility 1 and 3

In the narrower zone of protection of the corridor of the railway line in question (distance from axis 8 m) there is a documented cultural heritage:

KO Sremska Mitrovica, kp 1284, 1285 I 1286	Spatial cultural and historical unit Greek Catholic, Protestant and Nazarene cemetery
KO Sremska Mitrovica, kp 987/2	Part of the spatial and cultural and historical unit "Munjara"with the facility with monumental values Electric Power Plant so-called "Munjara" – facility 1
KO Sid, kp 4164	cultural heritage under previous protection: Administrative building and porter of meat industry "Šid" in Šid– facility 1 and 3

The following cultural goods under previous protection which also enjoy protection as war memorials:

KO Ruma, kp 7390/1	Monument to railway workers, at the rail station Ruma next to the entrance to the new Administrative Building
KO Sremska Mitrovica, kp 6018	Memorial plaque on the of Sremska Mitrovica Railway Station Platform
KO Sremska Mitrovica, kp 6018	Memorial plaque to the fallen railway workers, on the platform of the Sremska Mitrovica Railway Station
KO Šid, kp 5225	Memorial plaque to Miladin Zorić - Garači on the platform of the railway station Šid

Archaeological sites that have the status of cultural goods:

Sirmijum, Roman city below today's Sremska Mitrovica City	the route of the railway passes through the peripheral part of the archaeological site
"Solnok or Grad"Dobrinci	it is located northeast of the village of Dobrinci on the Ševin breg stretch, on the terrain that rises towards the railway is situated on both sides of the railway, with a note that part of the site is south of the railway of larger dimensions. It covers an area of 30 hectares.

Archaeological sites having the status of prior protection (on the route of the railway):

Agricultural good „Napredak" KO Stara Pazova, kp106/B/2	Northwest of the city and west of the railway line on the Jarkovac stretch is an archaeological site situated with flat terrain of 200 x 150 m.
Krčevine II KO Indjija, kp 44/B/3	It is located northwest of the city on an area of 80x80 m.
Bešanski road –Krčevine KO Indjija, kp 44/B/4	It is located northwest of the city on an area of about 100x100m.
Zabrana KO Dobrinci, kp 37/B/2	Northwest of the village, south of the railway line on an area of 50x150m.
Zabrana KO Kraljevci, kp 52/B/1	East of the village, south of the railway line.
Near Barutana KO Ruma, kp 97/B/4	South of the city and from the railway line.
Locality"Odjavnica 4" Okruglice stretch KO Voganj, kp 25/B/3	South- east of the village and south along the railway line.
Mala strana KO Laćaraj, kp 60/B/7	South of the village and south along the railway line.
"Zabran" prekokanala KO Laćarak, kp 60/B/8	South-west of the village and south from the railway line.
Locality "Klisara", Petrovci stretch KO Martinci, kp 70/B/3	East of the village and south from the railway line at Klisura site.

Locality "Erla", Međoš stretch KO Martinci, kp 57/B/6	It is located west of the village and south of the railway line.
Locality on Sedište stretch KO Kuzmin, kp 57/B/4	North of the village and north of the railroad tracks.
Locality on "Crkvine" stretch KO Kuzmin, kp 58/B/7	It is located north of the village.
"Crkvine" KO Kukojevci, kp 58/B/6	It is located southeast of the village, near the railway line.
The route of the Roman road on the "Korovi" stretch KO Sid, kp 121/B/2	
Locality on "Orasje" stretch KO Sid, kp 121/B/3	

5.2.8 - Gender and gender equality

Out of the total population of Serbia, 51.3% are female and 48.7% are male inhabitants. The Constitution of the Serbia proclaims principles of gender equality. Although the Constitution fails to mention gender pay equality, articles of The Labour Law treat rights of men and women equally, including right of equal pay. Additionally, according to provisions of this Law, a working woman has the right of absence from work due to pregnancy and childbirth, maternity leave, and absence from work for childcare, for a total of 365 days. This length of maternity leave is usually used in full, making it one of the lengthiest in the world. The right of employment is also proclaimed equal, but because of maternity leave provisions young women in certain cases will be discriminated in employment possibility, although it is illegal to ask questions about maternity plans during job interviews. This particularly applies to employment in small and moderate private enterprises.

Despite principles however, many women in Serbia face challenges combining paid work and childcare responsibilities. This could be an additional cause for Serbia's low fertility rate, which is one of the lowest in European countries, and average in the region at 1.46 percent in 2014. The employment rate of women in Serbia (38.3%) is significantly lower than the EU-27 average (58.5%). Of all the employed in the transport sector in Serbia, 20 percent are female and 80 percent are male.

The most prominent inequalities are in the domains of money, time and power, indicating lower economic standard of women, carrying out disproportionately unpaid household work and care for family, and insufficient participation in decision making in positions of political, economic and social power.

The labor market participation is much lower for women than for men, as indicated by activity, employment, unemployment and inactivity rates. There is also prominent gender segregation on the labour market, with women concentrating more in the sectors related to social services and men in the sectors of manufacturing, construction, and ICT. Transport sector is one of the sectors with strong gender segregation.

Serbia is characterized by high number of trips made by women and men, on weekdays and weekends as well. Serbia, the average number of trips is 3.8 per day, with 3.6 trips for men and 3.9 trips for women (in the context of this statistic trips are defined as one non-stop travel within one transportation mean). Both, men and women, make much more trips during the week than on weekends. Although the difference is not high, Serbian women still make more trips on weekdays and on weekends than men. Women are more prone to intermodal mobility behaviour that is, combining two or more transport modalities in one trip. More than fifth of women and men in the sample (23% of women and 22% of men) combine different transport means during

single trip every day, and 20% of women and 14% of men do that 4-5 times a week. Combining different transport means in a single trip could pose stress.

As in countries across the region, women and men also have different specializations in university, which contributes to the segregation seen in the labour market and the differences in labour market outcomes. Women constitute 89 percent of graduates in education, 75 percent in health, and 74 percent in humanities and the arts. However, they make up only 35 percent of graduates in engineering, manufacturing, and construction.

As the Project addresses passenger rail services in a border sense, there would be scope for improved mobility for people in rural areas, people with disabilities, and/or the elderly to gain better access to public services, markets and jobs. It will be important to analyze the gender implications of the Project, as women's experiences with transport systems differ from those of men, particularly as related to decision-making, facilities planning, safety, reliability, affordability, and accessibility. With the World Bank's technical advice, the GoS has recently finalized country-wide Gender in Transport study. This study analyzes gendered mobility patterns of transport users, with a view to enhance transport service provision for men and women alike, and to create better access to employment opportunities for females and improve their workplace advancement. The Project could operationalize the study's recommendations insofar as scope of this Project is concerned is concerned.

The above study also focuses on the establishment of robust human resources (HR) systems and an HR strategy within all rail companies including SRI. Of all the employed in the transport sector in Serbia, 20 percent are female and 80 percent are male. The statistics are similar in individual railway companies for which data was obtained. For example, in 2021, SRI employed 19% of women in its workforce. Addressing gender gaps during overhauling of HR practices is an opportunity to enhance and diversify the supply of needed talent. The project in hand with ongoing activities and other projects supported by other IFIs and donors will operationalize the actions specific to human capital that will stem from the earlier-mentioned gender-sensitive Transport Strategy, related to the Jobs and strategic staffing under the strategy. The main recommendations the design can consider are related to adequate lightning in and around the station buildings, including access areas to main streets.

SRI has adopted the Code of Equality by decision number 4 / 2018-1159-275 of 12.12.2018, with the aim of preventing discrimination and promoting gender equality in the business environment. The Code of Equality was adopted with the participation of representative unions and in accordance with the National Strategy for Gender Equality for the period 2016-2020. and the Joint Recommendations of the Community of European Railways and Infrastructure Companies and the European Federation of Transport Workers. The Code of Equality also defined the Plan of Measures for Ensuring Gender Equality. in May 2018 the Joint Recommendations of CER and the European Federation of Transport Workers (ETF) have been disclosed for better representation and integration of women in the railway sector https://infrazs.rs/2018/05/zajednicke-preporuke-organizacija-cer-i-etf-za-bolju-zastupljenost-i-integraciju-zena-u-zeleznickom-sektoru/. In November 2018, at the meeting in Brussels, the SRI signed the "Declaration on Gender Equality in the Transport Sector" of the European Railways (CER).

No data on women use of the railway and GBVH on this section is found. The Customer satisfaction survey is regularly implemented but the results of this survey are not disaggregated by gender.

Women and men have equal right to own and inherit assets. Despite the policy efforts women ownership over assets still lags behind. The Municipalities crossed by the rail alignment have the following overall ownership ratio:

Table 38 Women ownership per Municipality

Municipalities	Women owners(%)
Srem area	16
Stara Pazova	15
Indjija	16
Ruma	18
City of Sremska Mitrovica	14
Sid	17

Source: Devinfo, Profil, RSO, August 2022

Site specific Resettlement Action Plan will take into consideration this assessment as a baseline for further vulnerability assessment of women impacted by land acquisition and resettlement.

5.2.9 - Vulnerable and disadvantaged groups

The initial screening against drivers of vulnerability, identified the potential vulnerable groups: retired, elderly and people with disabilities and chronical disease; single parent headed households, male and female; people with low literacy and ICT knowledge; economically marginalized and disadvantaged groups; persons living below the poverty line; women.

In the researched corridor of the railway from vulnerable groups, migrants were identified who have been accommodated in two reception centers located in the territory of the municipality of Sid. The Reception center Adaševci was opened on November 3rd, 2015. in the building of the former motel "Adasevci" which is located next to the highway Belgrade - Zagreb in the municipality of Sid. It consists of accommodation, office space, special purpose room, kitchen and parking. The Center currently houses 715 migrants from Middle Eastern countries. (January 2019). It is 5km southern of the line, while it is the biggest and last centre before the borders.

The Sid-Stanica reception center was opened on November 24th, 2015, in the midst of the passage of a large number of migrants through Serbia, who crossed by bus from Presevo to Sid, and then boarded the train to Croatia. The Commissariat for Refugees and Migration opened this facility, located directly opposite the Railway Station and right next to the Bus Station, in cooperation with the Municipality of Sid. The center was temporarily closed on May 31st, 2017. The Sid-Stanica reception center was reopened on November 30th, 2018. It houses families with children with a capacity of 210 seats. The center currently houses 173 migrants from Middle Eastern countries, (January 2019) and is located opposite the rail station of Sid.

By the ethnic composition 83.3% of the population are Serbs, 3.5% Hungarians, 2.1% Roma, 2% Bosniaks, 0.8% Croats, 0.7% Slovaks, 0.5% Montenegrians, 0.5 % Vlachs, 0.4% Romanians, 0.3% Yugoslavs, 0.3% Macedonians, 0.3% Muslims and around 5% other. Map of confessions has been changing historically. Currently, according to the Census in Serbia, regarding religious affiliation, there are 84.6% Orthodox Christians, 5% Catholics, 3.1% Muslims, 1.1% atheists, 1% Protestants, 3.1% do not declare themselves confessionally, and about 2% other confessions. According to the Law on churches, eight religious communities enjoy legal status.

The following table indicates the ethnicity data by municipalities and cities crossed.

Table 39 Ethnicity -data by municipalities and cities crossed

Municipalities	Total	Serbs	Hungarians	Roma	Ruthenians	Slovaks	Croats
R. of Serbia	7.186.862/ 100	5988150/ 83,32	253899/ 3,53	147604/ 2,05	14246/ 0,20	52750/ 0,73	57900/ 0,81
Srem area	312278 / 100	265272/ 84,95	3789/ 1,21	5488/ 1,76	1689/ 0,54	8154/2 ,61	8758/2, 80
Stara Pazova	65792 / 100	54516/ 82,86	131/ 0,20	1193/ 1,81	9/ 0,01	5212/ 7,92	1336/ 2,03
Indjija	47433/ 100	40871/ 86,17	829/ 1,75	426/ 0,90	6/ 0,01	380/ 0,80	1569/ 3,31
Ruma	54339/ 100	46891/ 86,29	1171/ 2,15	1297/ 2,39	14/ 0,03	50/ 0,09	1719/ 3,16
City of Sremska Mitrovica	79940/ 100	69849/ 87,38	696/ 0,87	1194/ 1,49	620/ 0,78	281/ 0,35	2112/ 2,64
Sid	34188/ 100	26646/ 77,94	179/ 0,52	204/ 0,60	1027/ 3,00	2136/ 6,25	1748/ 5,11

There are no regional ethical disparities and in the municipalities with the Area of Influence, nationality is more or less uniform. Serbs make up the majority in all observed areas with a share of 83-87%. Only in the area of the Šid municipality are they represented with 78%. The share of Roma is 0.60-2.39%. Hungarians, Ruthenians, Slovaks and Croats are Catholics in the observed area, and they are represented with a total share of 5-15%, mostly in the territory of the municipalities of Stara Pazova and Šid. Bosniaks are almost not represented in the studied municipalities and settlements since they are recorded below 1% and without statistical occurrences.

The map showing the share of Roma in Vojvodina is presented below:

Figure 45 The Share of Roma in settlements crossed by the alignment

5.2.10 - Labour and informal employment

The incidence of informal employment is the highest among the youngest age group (15-19 years), 76% of whom are employed informally. Incidence of informal employment tends to decrease with age. This can be accounted to the low level of professional experience of the youngest age group. Informal employment rates tend to rise again for older workers, with 50% of employees over 55 being informally employed. Broken down by age group, young men and older women are over-represented in informal employment.

The Labor Inspectorate reports that 52.375 informal employment cases have been confirmed during the inspections conducted between 2017 and 2019 following which a total of 45.207 was transformed to formal employment. The labor market has recovered from post-crisis job losses. From 2014 to 2018, Serbia created around 240,000 net new jobs. The unemployment rate declined from close to 20 percent in 2014 to below 11 percent in 2019 (among people aged 15-64), and the employment rate now surpasses pre-crisis levels. Many of the new jobs have been fulltime wage jobs in the formal private sector. Recent labor market improvements have also benefited women, older workers, and the youth. Job creation was the strongest in services and industry. Earnings increased alongside the number of jobs, as real wages in the private sector grew by more than 6 percent in 2014–17 and by more than 4 percent in 2018. Despite recent labor market improvements, many people in Serbia are not working or searching for a job. Among people aged 15-64, Serbia's activity rate (67.8 percent) and employment rate (58.8 percent) remain far below those of neighboring EU countries. Inactivity and unemployment are even worse among poor households: only 22.4 percent of the working-age poor are employed, compared to 53.0 percent of working-age non-poor. As a result of inactivity and unemployment, the average male and female worker in Serbia loses about 20 years and 25 years, respectively, of his and her potential productive lifetime (ages 15–64). Many job seekers are long-term unemployed: 75 percent of unemployed workers wait more than one year to find a job. Serbia is underutilizing its full potential workforce while firms demand more workers with the right skills. With a declining working-age population due to aging and outmigration, it is important that Serbia uses its available workforce effectively.

When broken down by region, the largest number of informally employed workers is in Vojvodina, and the smallest number in Belgrade. The highest share of informally employed workers of the total number of workers is in West Serbia and Sumadija (33.7%), followed by South and East Serbia (27.7%), Vojvodina (21.2%), and Belgrade (11.9%). These differences can, to large extent, be explained by the higher share of agricultural workers in these regions, and their higher propensity to work in the informal sectors.

Of those informally employed the vast majority can be found in the agricultural sector (59.5% of all informally employed), followed by construction (7.1%). In other sectors, the share of informal work is less than 20%. The construction industry has a 34.9% share of informal employment in total sector employment and a 7.1% share of sectorial informal employment in total informal employment.

The poverty rate, measured as income per capita below the standardized upper-middle-income country poverty line of US$5.5/day in 2011 purchasing power parity (PPP), fell from 26.7 percent in 2013 to 20.8 percent in 2017. An increase of 1 percent in GDP was associated with about a 4 percent reduction in the poverty headcount rate, higher than the elasticities in neighbouring Western Balkan countries. Consistent with the labour market recovery, increased labour income contributed the most to the observed reduction in poverty, followed by pensions. Household income increased and the poverty rate fell because of overall economic growth and its strong impact on households in the bottom of the income distribution.

Desktop data were not available in more details for the Project area. Gaps shall be closed during the ESIA stage through field studies as indicated in the section Assumptions and limitations. The employment shall be one of the criteria factored in during the ESIA stage in identifying more drivers of vulnerability. The employment status will also be elaborated during the Socio-economic survey.

5.2.11 - Land use

The area covered by the railway modernization and reconstruction project consists mostly of agricultural land, forest, water and construction land for other purposes (~ 96%), while a smaller part (~ 4%) is construction land for the needs of railway traffic infrastructure. Agricultural land is dominated by arable land intended for crop and vegetable production.

The technical solutions of the project are defined in a way that ensures the modernization and reconstruction of the existing railway line Belgrade - Šid - Croatian border, the section Stara Pazova - Golubinci - Šid and the railway line Inđija - Golubinci, i.e. to keep the existing corridors in which the spatial entities and contents are formed, with the minimum necessary occupation of new land.

The modernization and reconstruction of the railway will not affect the permanent degradation of the land, considering that the railway and the railway land are already present in the occupation of the space. The railway also passes by populated areas, passing by work zones and residential buildings.

Dependency of livelihood and to cultivated land from the social aspect is considered significant and impacts from economic displacement, severance of land plots and diversifications of income and livelihood will be considered through the next stage of the ESIA.

5.2.12 - Transport and Infrastructure

Road

To understand potential interference with existing accessibility and connectivity, the table below covering the road network of various grade and quality have been included.

Table 40 Length of road network in impacted municipalities

Municipalities	Total (km)	Modern pavement (km)	Category I State Roads (km)	Category II State Roads (km)	Municipal Roads (km)
Serbia	**44794,1**	**30409,7**	**3884,8**	**9620,5**	**31288,8**
Srem area	**1311,8**	**1180,9**	**97,1**	**408,5**	**806,2**
Sremska Mitrovica	*244,4*	*244,4*	*44,3*	*80,0*	*120,2*
Inđija	170,7	126,2	-	55,9	114,8
Рума	172,5	152,5	30,6	45,8	96,1
Stara Pazova	302,9	296,3	-	43,9	259,0
Šid	172,7	154,7	8,8	85,0	78,9

Source : Municipalities of Serbia Statistical Office, RZS 2022

Rail

Serbia links via rail with almost all of its neighbouring countries. On rail transport, Serbia's state railways is organized as follows: MCTI is responsible for policy direction and funding of railways. The Railways Directorate (RD) is the railway market and safety regulator. Serbian Railways Infrastructure is an SOE for infrastructure management, responsible for construction, maintenance, and operation of the railway network. SerbiaTrain is an SOE responsible for the organization and delivery of rail passenger transport services. Serbia Cargo is an SOE responsible for the organization and delivery of rail freight services. Serbian Railways is a temporary

organization with the remit of generating revenue from various non-core railway assets and settling the court cases involving the former vertically integrated railway company."

Work on ensuring the operational and financial sustainability of independent railway service/infrastructure operators is ongoing. SRI regularly updates its railway network statement. The new methodology for track access charges is currently under preparation. Further efforts are needed to ensure full compliance with both the acquis and Serbia's negotiating framework. Serbia continues to make good progress on rail market opening with nine private freight companies operating on the market in 2020 but further efforts are required to ensure full opening of the rail market, including on the issuance of train drivers' licenses and safety certificates for railway undertakings and mutual recognition of the rolling stock. In May 2018, Serbia adopted new laws on railways, railway safety and railway interoperability achieving a high level of alignment with EU legislation on establishing a single European railway area.

Further improvements regarding training capacity, examination methods and licensing procedures are still pending as is the publication of the remaining technical specifications for interoperability. Sustainable and costed railway infrastructure maintenance plans need to be developed. The Directorate for Railways in its function as a regulatory body and safety authority needs to be further strengthened and its decisions implemented. Railway transport is decreasing in size and role. The overall length of tracks was reduced from 3,819 km in 2014 to 3,752 in 2019 and the number of departed passengers from 6.3 million in 2014 to 4.8 million in 2018. As one example, an average of 39 percent of scheduled passenger and 37 percent of scheduled freight trains were cancelled during the period 2016-2018. The Railway transport is dominant for transport of agriculture and energy products, automobiles and components, construction materials, chemicals, equipment, food, metals, minerals, paper, and pulp.

The current design state of the railway lines enables operation of rolling stock from 12 t/axle to 22.5 t/axle, with the latter maximum load capacity possible on only 1,886 km, which is an obstacle to growth of rail freight traffic. Services are greatly hampered by the current severe regime of continuous speed restrictions across the network. The average speed is low at 38 km/h, and the network has many slow and dangerous spots.

Serbia's derailment rate is far above peer countries. In 2018, the level crossing accident rate in Serbia was 3.45 per million train-km, compared with only 1.14 in Bulgaria, 0.5 in Croatia, and 0.09 in Germany.

Passenger services currently do not have an efficient multimodal interface, and stations, which have not been renovated for decades, do not play an important role in the transport environment. While newly procured wagons are designed for people with disabilities, train stations are not adjusted for people with special needs or for vulnerable groups like women.

5.2.13 - Utilities

According to the law on communal services, municipalities, cities, and the city of Belgrade have sole responsibility for establishing and organizing the provision of water and wastewater services.

Water supply sources. Groundwater is mainly used for drinking water, and surface water for other water uses. Groundwater provides 63% of the raw water used for drinking water supply, whereas it represents only 12% of the overall water abstracted in Serbia. Its quality is considered good, although there is some chemical contamination due to the uncontrolled use of various pesticides. Surface water accounts for 27% of drinking water supply and 88% of all water uses. Almost no effective sanitary protection zones have been implemented at water intakes (for both surface and ground waters).

Local governments are responsible for water and wastewater service provision through 152 public utility companies. These utility companies are founded by municipalities but remain state owned. The water sector is

concentrated; 7 regional public utilities (including Belgrade waterworks) provide service to several large municipalities covering 31% of the population). One-hundred forty-five municipal public utilities serve 44% of the Self provision 25% Belgrade waterworks 22% 6 regional companies 9% 145 municipal companies 44% Overall, 150 utilities provide both water and sanitation services. In rural areas, inhabitants rely on self-provision (RSO 2012b). The area of water supply networks in the impacted Municipalities is observed in the table below.

Table 41 Length of water supply

Area / Municipalities	Length of the water supply network , km
Srem area	2392
City of Sremska Mitrovica	381
Indjija	260
Ruma	550
Stara Pazova	478
Sid	223

The data given in the following table on the number of households connected to the water supply and sewerage network are indicative, because the data on the number of households are from the 2011 Census, and the data on connections are from 2020.

Table 42 Households with water supply and sewage in 2020

AREA / MUNICIPALITIES	Number of households connected to the water supply system	% of total number of households	Number of households connected to the sewage network	% of total number of households
Srem area	**99510**	95	**50685**	47
City of Sremska Mitrovica	*25803*	95	*17085*	61
Indjija	13700	87	9909	63
Ruma	21855	117	9000	48
Stara Pazova	20400	98	5781	26
Sid	11900	97	6374	52

6 - PROJECT ALTERNATIVES

6.1 - Methodology of Alternatives Assessment

Based on the characteristics of the project under analysis (multi-stakeholder, concept design phase, both quantitative and qualitative criteria) it is proposed to use a MCDA (Multi criteria decision analysis) with weighting and allowing both quantitative and qualitative criteria.

The main steps in setting the MCDA are as follows:

- Identify objectives and main criteria
- Identify suitable criteria to each main criterion
- Screening of criteria and selection of the most meaningful ones
- Definition of suitable indicators for evaluation of the selected criteria
- Weighting: Assign weights to main criteria and criteria to reflect their relative importance to the decision
- Scoring: Assess the expected performance of each option against the criteria
- Combine the weights and scores for each option to derive an overall value
- Sensitivity analysis: Check whether other preferences or weights affect the overall ordering of the options.

6.1.1 - Identification of objectives and main criteria

The main objective of the project is to modernize the existing railway line in compliance with TEN-T standards, making it a reliable and competitive mode of transport and increasing passenger and freight traffic demand. Furthermore, the objective shall be achieved in a cost effective and sustainable way in compliance with strategic plans at national, regional and local level. It should comply with internationally agreed Technical Specifications for Interoperability and with the technical requirements for the core TEN-T.

In line with the above-stated objectives, the following main criteria are proposed:

- Compliance
- Financial
- Demand
- Operation
- Impact
- Risks

6.1.2 - Identification of criteria

- Compliance main criterion

  In respect to the Compliance criterion five criteria are proposed.

  - Technical Specifications for Interoperability

    This criterion will assess the level of compliance of the analysed options in respect to the relevant TSIs. The aim is to achieve as high as possible compliance.

  - Core TEN-T

    This criterion will assess the level of compliance of the analysed options in respect to the technical requirements set in Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network. The aim is to achieve as high as possible compliance.

  - Spatial and urban development plans

    This criterion will assess the level of compliance of the analysed options in respect to the spatial and urban development plans of the settlements along the line, as far as such exist and have been enacted

as per the legislation in force. The aim is to achieve as high as possible compliance, which would provide for a smooth implementation process.

- Adjacent national lines

  This criterion will assess the level of coherence of the analysed options in respect to the design parameters of the adjacent main railway lines on Serbian territory, i.e.:

  - Stara Pazova – Belgrade – Resnik – Velika Plana – Niš – Preševo – North Macedonian border and
  - Hungarian border – Subotica – Novi Sad – Stara Pazova.

  The aim is to achieve as high as possible compliance, which would provide for harmonised operation of the adjacent lines.

- Adjacent international line/s

  This criterion will assess the level of coherence of the analysed options in respect to the design parameters of the adjacent cross border line Zagreb – Šid. The aim is to achieve as high as possible compliance, which would provide for harmonised operation of the adjacent lines.

- Financial main criterion
  - Investment costs

    This criterion will compare the tentative investment costs of the considered options, the aim being to minimise the investment costs.

  - Operation and maintenance costs

    This criterion will compare the costs for operating and maintaining the line under the considered options, the aim being to minimise the costs.

  - Passenger train operation costs

    This criterion will compare the weighted average costs for running the passenger trains as per the operation plan/s for the considered options, the aim being to minimise the costs.

- Demand main criterion
  - Number of passengers shifted from road to rail transport

    This criterion will compare how the options contribute for achieving the objective to increase the passenger demand for trips by rail.

  - Cost effectiveness

    This criterion will compare the cost effectiveness of the considered options by comparing the total costs per minute of travel time saved, the objective being to maximise the effectiveness.

  - Accessibility of stations

    This criterion will estimate the improvement of the stations' and platforms' accessibility for mobility impaired passengers.

- Operation criterion
  - Capacity utilization

    This criterion will compare the utilisation of the line capacity, the aim being to reach an optimum utilisation of 75%.

- Need for purchasing new rolling stock for passenger services

  This criterion will compare the additional pre-conditions necessary to benefit to full amount of the line's design parameters. The aim is to restrict the compulsory pre-conditions.

- Technological complexity

  This criterion will compare the estimated need of adjustment of the current operations and rules because of the amended design parameters and new systems deployed as well as the anticipated lack or insufficient level of knowledge among the operational staff.

- Impact main criterion
  - Need of resettlement

    This criterion will compare the potential need to resettle inhabitants of the settlements along the line due to re-alignment of the line. The aim is to avoid using additional land in the settlements and their development areas for the need of modernizing the line.

  - Traffic safety

    This criterion will assess and compare the hazard for traffic accidents at the level crossings, the aim being to minimise them.

  - Impact on biodiversity and protected areas

    This criterion will assess and compare the harmful impact of the considered options on the biodiversity (and protected areas, if any), the aim being to avoid new alignment to go through or nearby sensible natural sites of importance.

  - Climate change resilience

    This criterion will assess and compare options' resilience towards main climate change risks, e.g., flooding, fires, extreme events, such as heavy precipitations, blizzards, snowfall, storm and hails, the aim being do make the modernised line as resilient as possible.

  - Noise and vibrations

    This criterion will assess and compare the expected noise and vibrations impact on the population living along the modernised line during the operation of the line. The aim is to minimise the impact of the noise and vibrations.

- Risks main criterion
  - Design risk

    This criterion will assess and compare the level of design complexity per option and the associated with this risk of delays and/or wrong design solutions. The aim is to minimise the risk.

  - Administrative/ approval risk

    This criterion will assess and compare the probability the project to run into difficult and/or long-lasting administrative/ approval procedures. The aim is to minimise the risk.

  - Land expropriation risk

    This criterion will assess and compare the probability the project to delay and/ or the investment costs to increase due to the need of land acquisition. The aim is to minimise the risk.

- Construction risk

  This criterion will assess and compare the probability the construction works to delay due to more complex design and/or larger quantities of works to be implemented. The aim is to minimise the risk.

- Financial risk

  This criterion will assess and compare the probability the project to exceed the tentatively estimated budget due to its complexity and amount of works. The aim is to minimise the risk.

- Commercial risk

  This criterion will assess and compare the probability the demand to be lower than forecasted and line O&M costs to increase, the aim being to minimise the risk.

6.1.3 - Screening of criteria

- Compliance main criterion
  - Technical Specifications for Interoperability

    Strategic options are developed in full compliance with the relevant TSIs, which means that there is no difference in the evaluation of the options. Thus, this criterion won't be further considered in the MCA.

  - Core TEN-T

    According to Commission Delegated Regulation 2016/758 of 4 February 2016 amending Regulation (EU) No 1315/2013 of the European Parliament and of the Council, the railway line Belgrade – Šid is part of the core TEN-T. Technical requirements set in Regulation (EU) No 1315/2013[12] in respect to the core TEN-T railway lines are as follows:

    - deployed ERTMS;
    - compliance with Directive 2008/57/EC of the European Parliament and of the Council to achieve the interoperability;
    - compliance with the requirements of the TSIs adopted pursuant to Article 6 of Directive 2008/57/EC;
    - fully electrified as regards line tracks and, to the extent necessary for electric train operations, as regards sidings
    - compliance with the requirements laid down in Directive 2012/34/EU of the European Parliament and of the Council, as regards access to freight terminals.

    Option 1 and Option 2 will meet the technical requirements and thus, this criterion will not contribute substantially to the evaluation of the difference between the options. In these grounds, this criterion will not be further considered in the MCA.

  - Spatial and urban development plans

    No specific spatial and urban development plans that have been adopted, enforced and are relevant to the line in subject were identified and thus, this criterion won't be further considered in the MCA.

  - Adjacent national or international lines

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[12] *Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network in respect to the railway lines*

"The general master plan of railway traffic" for Serbia, among other things, recommends that the railway lines on Corridor X be modernized in order to enable traffic at speeds of 200 km/h if large investments are not required. Accordingly, the nearby railway lines are reconstructed or will be reconstructed for 200 km/h, which is in accordance with Option 2, but not with Option 1.

Analysis of the parameters of the main neighbour railway lines, i.e. border-Zagreb indicate that neighbour railways on the territory of Croatia are being reconstructed for 160 km/h, which is in accordance with Option 1, but not with Option 2. Since these two criteria are mutually compensating, this will not be included in the MCA.

- Financial main criterion
  - Investment costs

    Considering the high importance of this criterion for deciding about the best option, this criterion will be considered in the MCA.

  - Operation and maintenance costs

    Considering the high importance of this criterion for the life cycle costs of the project, this criterion will be considered in the MCA.

  - Passenger train operation costs

    The variable costs for operating passengers trains in the considered options are mainly related to the consumption of the electricity. Calculations made showed the following values per option:

    - 14.19 kWh/passenger train-km for Option 1 and
    - 17.39 kWh/passenger train-km for Option 2.

    Considering that the difference between the options exceeds 20%, it is suggested this criterion to be taken into account in the MCA.

- Demand main criterion
  - Shifted passenger traffic

    The total number of passengers to be shifted over the reference period from road to rail is:

    - 24.199 million in case of 160 km/h option and
    - 24.237 million in case of 200 km/h option.

    The difference in number of shifted passengers per option is marginal (0.16%) and thus, this criterion will not be used in the MCA.

  - Cost effectiveness

    Given the difference in capital and O&M costs from one hand and the importance of the travel time in deciosn making about the transport mode to be used , this criterion is considered meaningful and will be used in the MCA.

  - Accessibility of stations

    Strategic options are developed in full compliance with the relevant TSIs in general and in line with the requirements about the accessibility in particular, which means that no difference in evaluation per option exists. Thus, this criterion won't be further considered in the MCA.

- Operation criterion
  - Capacity utilization

Capacity utilisation does not show significant differences per option:

- 37/37% in Stara Pazova – Ruma section on Option 1 versus 37/36% in Option 2 and
- 24/23% in Ruma – Šid section in Option 1 versus 33/33% in Option 2.

Since capacity utilization in both options is far below the saturation level, it is considered that this criterion would not contribute to selecting the best option and thus, this won't be used in the MCA.

  - Need for purchasing new rolling stock for passenger services

New rolling stock should be purchased for operating international and intercity trains in Option 2. For the moment, it is still to be confirmed whether new rolling stock will be needed for Option 1, but considering the high frequency of the passenger services planned, it is very likely acquisition of rolling stock to be needed for Option 1, as well. Thus, it is suggested this criterion not to be considered in the MCA.

  - Technological complexity

Regardless the difference in the speed, the expert assessment showed that no important difference and complexity in traffic management and line maintenance processes between the two options could be expected. Therefore, this criterion won't be considered in the MCA.

- Impact main criterion
  - Need of resettlement

Estimation based on the available geodetic survey maps showed that:

- 22 buildings should be demolished in case of 160 km/h option, out of which 18 for permanent way and 4 for de-leveling of level crossings
- 25 buildings in case of 200 km/h option, out of which 19 for permanent way and 6 for de-leveling of level crossings.

Given the importance of the criterion, it is suggested this to be used in the MCA.

  - Traffic safety

In Option 1, 20 out of the current 26 level crossings 20 will be either eliminated or deleveled, while in Option 2, no more level crossings will exist along the line. Due to the difference between the options, this criterion will be considered in the MCA.

  - Impact on biodiversity and protected areas

Re-alignments per option are minimal, and since no protected areas exist in the vicinity of the line, while the habitats affected are the of the same type for both options, the analysis would yield similar results for this criterion. It is, thus, decided to exclude it.

  - Climate change resilience

Both options will be designed in accordance with the Climate Vulnerability Risk Assessment and thus, it is expected that both options will be equally resilient to climate changes. In respect to the risk of flooding, both alignments are far enough from the Sava River, the closest section being in the town of Sremska Mitrovica, where the riverbed is regulated. Flood risk maps are not available at this stage, while after consulting the SRI, it was mentioned that under the major flood of 2014, the part of Sremska Mitrovica-Martinci was affected due to secondary impact. Taking into account that flood risk zones are

wide enough and the two options are over the existing line in the major part of the project, it is thus decided to exclude this criterion.

- Noise and vibrations

  No difference between options are expected in respect to the freight trains' traffic. Considering the difference in the design speed for the passenger trains, however, it is expected the levels of the noise and vibrations to differ per option. Thus, it is suggested this criterion to be used in the MCA.

- Risks main criterion
  - Design risk

    Having in mind the minimal deviations of the alignment per option from one hand and the same number of structures to be rehabilitated (thee in both options) or demolished and built new (four in both options) from the other hand, no specific design risk is identified. Therefore, this criterion won't be considered in the MCA.

  - Administrative/ approval risk

    Having in mind the minimal deviations of the alignment per option, no specific difference in administrative/ approval procedures per option could be anticipated. This, this criterion won't be considered in the MCA.

  - Land expropriation risk

    Because of the estimated 20% difference in the areas to be expropriated, it is suggested this criterion to be considered in the MCA.

  - Construction risk

    Because of the above mentioned reasons, no significant difference in types of works is expected. However, due to the elimination of all level crossings in Option 2, 15 over/underpasses should be built versus 7 in Option 1. Given the difference and associated risk, it is suggested this criterion to be used in the MCA

  - Financial risk

    Considering the relatively small difference in the investment costs per option, it is suggested this criterion not to be considered in the MCA.

  - Commercial risk

    The number of paths for passenger trains planned per option is the same and thus, the risk Serbian railway infrastructure manager not to be able to sell these paths is equal. Based on this, it is suggested this criterion not to be considered in the MCA.

- Final list of criteria

  The final list of main criteria and criteria to be used in the MCA is summarised in the next table.

Table 43 MCA criteria after screening

Main criteria		Criteria	
1.	Financial	1.1	Investment costs
		1.2	Operation and maintenance costs
		1.3	Train operation costs
2.	Effectiveness	2.1	Cost effectiveness
3.	Impact	3.1	Need of resettlement
		3.2	Traffic safety
		3.3	Noise and vibrations
4.	Risks	4.1	Land expropriation risk
		4.2	Construction risk

6.1.4 - Evaluation indicators

Considering the definition of the selected criteria and the availability of information to allow proper estimation, the following indicators per criteria were adopted.

Financial main criterion

- Investment costs

  The indicator will be based on a quantitative cost estimation of discounted total investment costs for each of the considered options, including costs for detailed design, land acquisition, engineering structures, track, signalling and telecommunication, power supply, level crossings/de-levelling, and stations. Option with lowest discounted investment costs will be valued the best.

- Operation and maintenance costs

  The indicator will be based on a quantitative rough cost estimation of discounted O&M costs over the reference period of the project. Option with lowest total discounted O&M costs over the reference period of the project will be valued the best.

- Passenger train operation costs

  The indicator will be based on a quantitative estimation of electricity consumption in kWh per passenger train-km as estimated in traction calculations. The option with lowest electricity consumption will be valued the best.

Effectiveness main criterion

- Cost effectiveness

  The indicator will be based on quantitative estimation of total life-cycle costs for a referent period of 30 years per travel time in minutes saved compared to the WoP scenario. The option with highest cost effectiveness, i.e. with lowest ratio of EUR/min saved, will be valued the best.

Impact main criterion

- Need of resettlement

  The indicator should normally be based on quantitative estimation of the number of people affected. Since this information is not available at this early stage of project preparation, the number of buildings to be demolished for the project needs is used as a proxy.

- Traffic safety

  The indicator will be based on the absolute number of level crossings to be de-leveled/ eliminated.

- Noise and vibrations

  The indicator will be based on quantitative estimation of estimated noise level in dB to be emitted by the passenger trains in relation to the weighted average commercial speed.

Risks main criterion

- Land expropriation risk

  The indicator will be based on qualitative estimation that shall consider the area and the location of the land to be acquired considering that the land in built-op areas is more expensive and more difficult to expropriate that that outside the settlements. The evaluation will be based on a low - high scale in which the lowest level of risk will be valued 1 and the highest – 5.

- Construction risk

  The indicator will be based on qualitative estimation that shall consider the design complexity and the investment costs for engineering structures for elimination of the level crossings per option. The evaluation will be based on a low - high scale in which the lowest level of risk will be valued 1 and the highest – 5.

6.1.5 - Weighting

Considering the objective to select the option that provides for the best socio-economic value for money, the highest weights are assigned to the socio-economic and financial main criteria, as follows:

Table 44 Assessed weights for criteria

Main criteria	Initial weight for main criteria [%]
1. Financial	35
2. Effectiveness	30
3. Impact	20
4. Risks	15

6.2 - Description of The Options

6.2.1 - Initial Evaluation of Alternatives

In 2007, a Pre-Feasibility Study (PFS) was issued, which referred to the modernization of the railway line between Batajnica (in Belgrade suburbs), Stara Pazova, Šid and the border with Croatia. It was recommended to upgrade the railway line to 160km/h for passenger trains and 120km/h for freight ones. Conceptual design and PFS were carried out by the Institute of Transportation CIP.

6.2.2 - Final Variants Description

Two strategic options were developed during the inception period of the project.

- Option 1: a speed of up to 160 km/h is envisaged on the two-track section of line 101 between Stara Pazova and Šid stations, and 200 km/h between Belgrade Center and Stara Pazova.
- Option 2: a speed of up to 200 km/h is envisaged on the two-track section of line 101 between Stara Pazova and Šid stations, and 200 km/h between Belgrade Center and Stara Pazova.

Both options were assessed for the given scope of the project when preparing the concept level design:

- Reconstruction and modernisation of 86 km of double track and upgrading of track elements for two-way traffic potentially at speeds of up to 160 km/h or higher (subject to the option analysis), permissible axle load of 225 kN, permissible load per linear metre of 80 kN/m (D4 Class), and with installation of rails type 60E1;
- Reconstruction of the traction supply system;
- Reconstruction, rehabilitation and replacement of bridges and culverts;
- Installation of loading gauge GC;
- Reconstruction of the tracks and structures in stations;
- Modernisation of the signalling system and equipping the line with ETCS level 2;
- Equipping the line with GSM-R system and digitalisation of telecommunications on the entire railway line;
- Modernisation of property security and video surveillance systems.

6.2.2.1 - Option 1 (for speed up to 160km/h)

According to the scope of work stated in the ToR, the analysed alignment consists of section from Inđija to Golubinci, section from Golubinci to Ruma - only left track, and section from Ruma to state border (both tracks).

Railway section from Inđija to Golubinci has eight stations on the alignment, while the main ones are Ruma (km 64+866), Sremska Mitrovica (km 81+687) and Šid (km 116+355), which presented more of a challenge in a designing process.

The complete alignment is designed for a speed of 160 km/h, except for the exit radius and station in the city of Sremska Mitrovica.

Figure 46 Layout overview

Source: Project team

The distance between the axles of the two-track open sections of the railway is 4.0 m according to the existing condition. For a speed of 160 km/h, a distance of 4.0 m to 4.5 m is required, while for a speed of 200 km/h, the minimum required distance is 4.5 m. Due to the above, it is necessary to consider whether it is possible to apply a distance of 4.5 m for the variant of 160 km/h in order for the route to be adapted to possible future higher speed reconstructions.

At the places of the existing stops, which are proposed to be abolished, track gauge is set at distance of 4.0 m as the rest of the open track.

From the station Golubinci to the station Ruma, the alignment was guided in relation to the right track, based on the Main Design of the reconstruction, with corrections of both tracks at the stations and existing stops. In accordance with ToR, only left track should be reconstructed, keeping the right track as is.

At km 84 + 500 and km 108 + 500, normal values of horizontal curve of R = 2000 m were applied, which correspond to the speed of 160 km/h, if we apply minimum permissible alignment elements (R = 1500m) additional expropriation and demolition of buildings can be avoided.

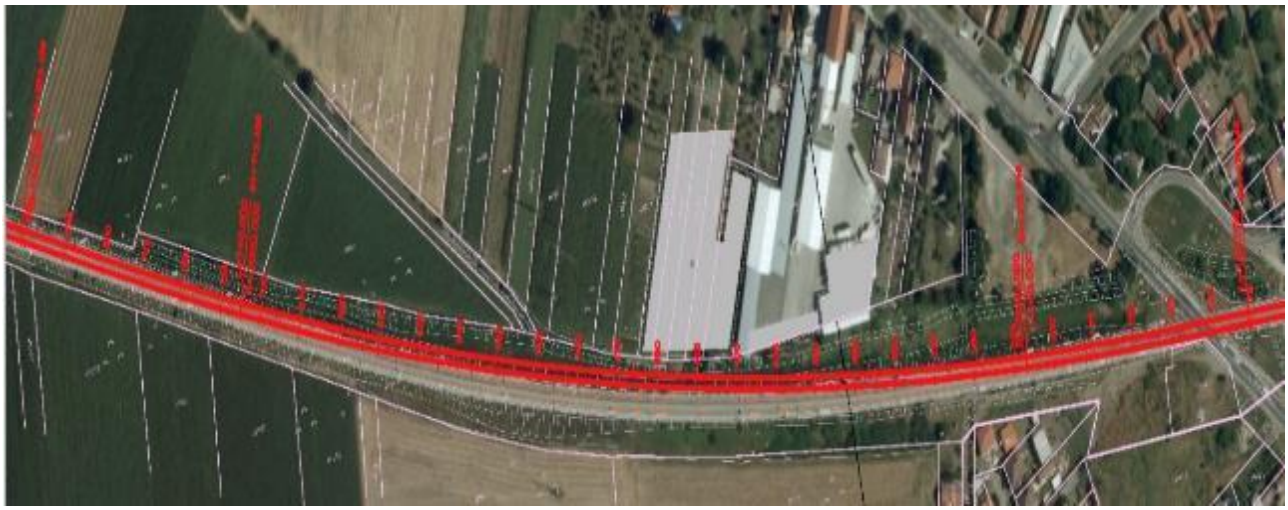

Figure 47 Curve at km 84+500

Source: Project team

Figure 48 Curve at km 108+500

Source: Project team

It should be noted that there are parts of the existing alignment which are already outside railway parcels, as shown in pictures below.

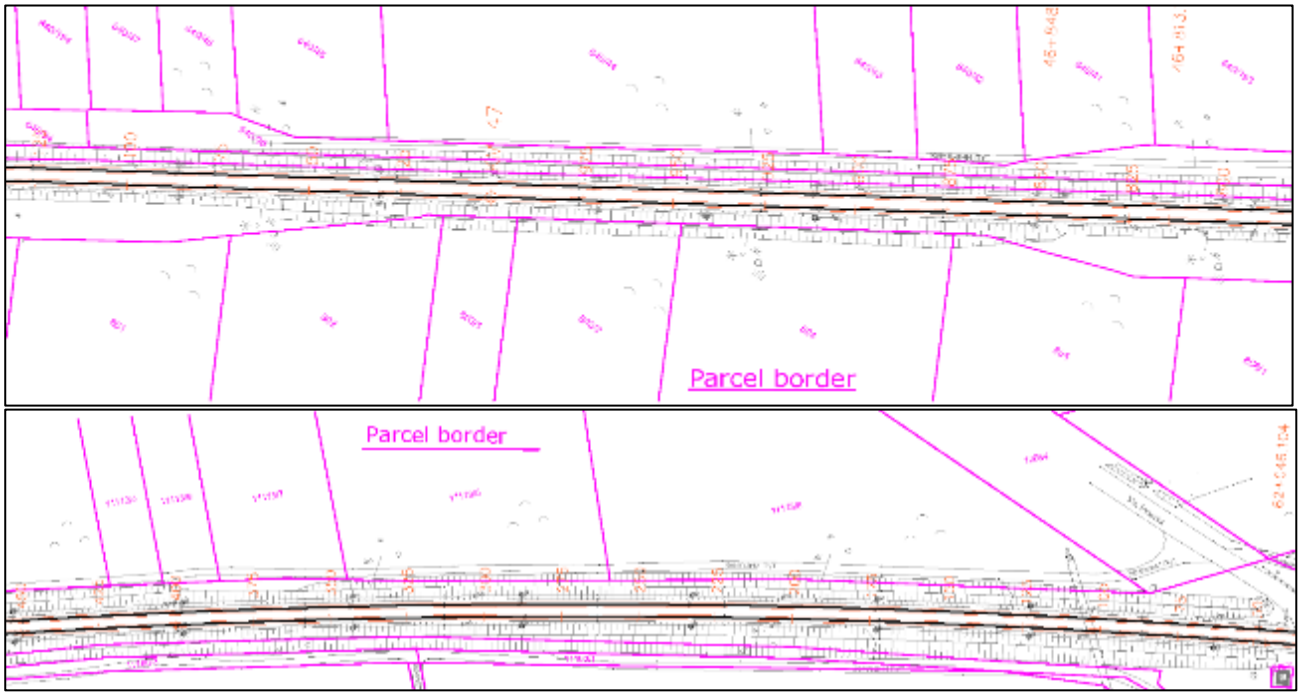

Figure 49 Examples of existing track expropriation issue
Source: Project team

Design proposal for eight stations on the alignment is to keep seven of them, while station "Voganj" to be closed.

All stations are designed in accordance to design speed and adequate comfort for that speed, but bearing in mind traffic analysis, input from other engineering fields and location as limitations. All variants proposed are in balance with above mentioned conditions.

A proposal for platforms and pedestrian underpasses are also drawn in all stations. In the main ones, platforms width is 7.4 m or 6.1 m depending of the position of platforms entrance, which according to the previous designs is an acceptable width for the installation of the underpasses (stairs and elevators), while with of 3.0 m is proposed on the rest of the stations.

According to the planned technology requirements, the following stations are defined to have a length of 750m for the bypass track: Golubinci, Ruma, Sremska Mitrovica, Kukujevci-Erdevik, Sid, while regarding all others stations, it is required to have only 650m track length.

The proposed number of tracks according to the planned technology requirements for each station is the following:

- Stations Golubinci, Putinci, Martinci, Kukujevci-Erdevik should have four tracks,
- Ruma station should have thirteen tracks (tracks 14 and 15 to be removed),
- Sremska Mitrovica station should have nine tracks,
- Sid station should have nine tracks.

According to the analysis of 160km/h alignment proposal, proposed solution for existing structures is the following:

Bridges:

1. Bridge in km.36+353 => no changes in existing alignment => rehabilitation of the bridge without widening of the bridge. This bridge has existing technical documentation.

2. Bridge in km.38+724 => no changes in existing alignment => rehabilitation of the bridge without widening of the bridge. This bridge has existing technical documentation.

3. Bridge in km.41+374 => small changes in existing alignment, cca 5cm, can be done on the bridge => rehabilitation of the bridge, ,without widening of the bridge. This bridge has just some parts of the existing technical documentation and needs some investigation works to determine its bearing capacity.

4. Underpass in km.81+996 (Sr.Mitrovica) => analysed separately for options A, B & C in Sremska Mitrovica station, below the table. This underpass has existing technical documentation.

5. Bridge in km.115+226 => big changes in alignment, movement of the track around cca1,9m. This was defined earlier, and this needs to be as such due to the conditions in Šid station and therefore cannot be changed. That means that concrete bridge in km.115+226 must be demolished and new bridge will be constructed according to the new alignment. This bridge will have a small span (cca 7m). Anyway, for this bridge there is no existing technical documentation, and the bearing capacity of the existing bridge is unknown.

Regarding the existing three steel bridges in km.67+060,80+255 & 87+524, analysis was not performed because those three bridges will be demolished anyway (open track – not allowed, already defined in CIP general design) and new concrete bridges with ballast will be constructed according to the new alignment. Also, for those three bridges, there are no existing technical documentation so bearing capacity of those 3 steel bridges is unknown.

> **NOTE:** As in this phase of the Project there are no hydrotechnical inputs for new bridge spans (openings), for further analysis, it is assumed that new bridges will be longer than existing bridges for cca 20-30% (longer spans).

Culverts:

Regarding culverts, all culverts will be demolished and new culverts along the whole railway line will be designed according to the new alignment and constructed.

> **NOTE:** As in this phase of the Project there are no hydrotechnical inputs, it is assumed that all existing culverts will be replaced (culverts in function and culverts which are not in function - cluttered) and for new culvert openings, , it is assumed that new culverts will be bigger than the existing ones (all available data was taken from CIP General design) with minimal opening (height) of the new culverts 150cm due to the maintenance.

On the Golubinci – Šid section, there are twenty-six level crossings. The analysis of the level crossings indicates that for the Option 1, five level crossings should be kept on the same level with the railway line, with some

improvements for road markings and signalling, eleven level crossings should be eliminated, and ten to be de-levelled.

6.2.2.2 - Option 2 (for speed up to 200 km/h)

Option 2 with speed up to 200 km/h differs from Option 1 in the alignment geometry and distance between the axles of the two-track open sections of the railway.

According to the existing rules and regulations, it is mandatory that the distance between the axles must be set to 4.5 m. The existing distance is set to 4.0 m, so it is necessary for all open track to be repositioned.

At km 76+600, km 82+250, km 84 + 500 and km 108 + 500 of the open track, normal values of horizontal curve (R = 3000 m) were applied, which correspond to the speed of 200 km/h. For Option 2, additional expropriation and demolition of buildings will be needed if the 200 km/h is applied.

In the process of designing stations and adapting them to the desired speed, many possibilities were considered. Compared to the previous option, the types of switches, used on main tracks inside stations, should be different and adequate for desired speed. Needs to be mentioned that distances between them are in relation to speed which greatly expand stations itself.

The three main stations of Ruma (km 64+866), Sremska Mitrovica (km 81+687) and Šid (km 116+355) are placed in the respective cities, so the implementation of speed up to 200 km/h to all of them leads to solutions that are not economically viable, such as relocating station outside of the city area, demolition of a great number of public houses with land acquisition, or extending stations outside railway owned land, etc.

According to the traffic analysis, all passenger trains in these stations have to stop, so their speed is much slower than 200 km/h.

When all the prementioned issues are taken in consideration, the Consultant's proposal is to keep the design, for these three stations, same as for the option 1, that is up to 160 km/h.

It should be noted that, proposal for the other four stations (Golubinci, Putinci, Martinci and Kukujevci) is, to be designed for speed up to 200 km/h, as their expansion do not have the above-mentioned issues. All four stations are in rural areas and have enough railway land for expansion.

The proposed solution for the existing structures (bridges, culverts and underpass in Sremska Mitrovica) is presented in the following sub-chapters:

Bridges:

1. Bridge in km.36+353 => small changes in existing alignment => rehabilitation of the bridge, without widening of the bridge. This bridge has existing technical documentation.

2. Bridge in km.38+724 => small changes in existing alignment => rehabilitation of the bridge, without widening of the bridge. This bridge has existing technical documentation.

3. Bridge in km.41+374 => small changes in existing alignment => rehabilitation of the bridge, without widening of the bridge. This bridge has just some parts of the existing technical documentation and needs some investigation works to determine it's bearing capacity.

4. Underpass in km.81+996 (Sr.Mitrovica) => analized separately for options A, B & C in Sremska Mitrovica station, below the table. This underpass has existing technical documentation. No differences between the two options.

5. Bridge in km.115+226 => big changes in alignment, movement of the track around cca2,0m. This was defined earlier on and this needs to be like that due to the conditions in Šid station and can't be changed. That means that concrete bridge in km.115+226 must be demolished and new bridge will be constructed according to the new alignment. Bridge is with small span (7m) so construction of new bridge will not be big financial impact. Anyway, for this bridge there is no existing technical documentation and bearing capacity of the existing bridge is unknown.

Regarding the existing 3 steel bridges in km.67+060,80+255 & 87+524, similar approach to Option 1 will be followed.

Culverts:

Similar approach as for the 160 km/h option.

Regarding level crossings and Option 2, out of twenty six, ten will be eliminated sixteen will be de-levelled.

6.2.3 - Scoring of the MCA

The values to be attributed to which of the criteria per option were harmonised by using normalised proportional values, i.e., best = 100, rest of values - proportion of that. The calculations are done in MS Excel file specially prepared for this with formula input and this was providing for checking the results and carrying out sensitivity tests. The final scoring combines the respective values per criterion and option and the respective absolute weight. Further below, the groups with criteria are mentioned that are related with environmental and social parameters.

6.2.3.1 - Impact main criterion

- Need of resettlement

  The total number of buildings to be demolished in Option 1 was estimated to 22 and in Option 2 their number is 25.

  Considering the objective to minimise the need of resettlement, the normalised value for Option 1 is 100 and for Option 2 is 88. The respective scores are 6.0 and 5.3.

- Traffic safety

  According to the level crossing report, 20 level crossings will be eliminated or de-levelled in Option 1 and 26 in Option 2. Considering the objective to minimise the number of level crossings to remain in operation, thus decreasing the risk for collision between trains and road vehicles, the normalised values are 77 for Option 1 and 100 for Option 2. Their respective scores are 6.2 and 8.0.

- Noise and vibrations

  The future noise levels per option were assessed based on the Report on Noise Engineering in Road and Rail Design Revised, Communication, The Journal of iC, edition 25/2021, which takes into account all three components of the total contribution of railway noise sources in rapport to the speed, namely:

  - Traction noise
  - Rolling noise and

- Aerodynamic noise, as presented in the next figure

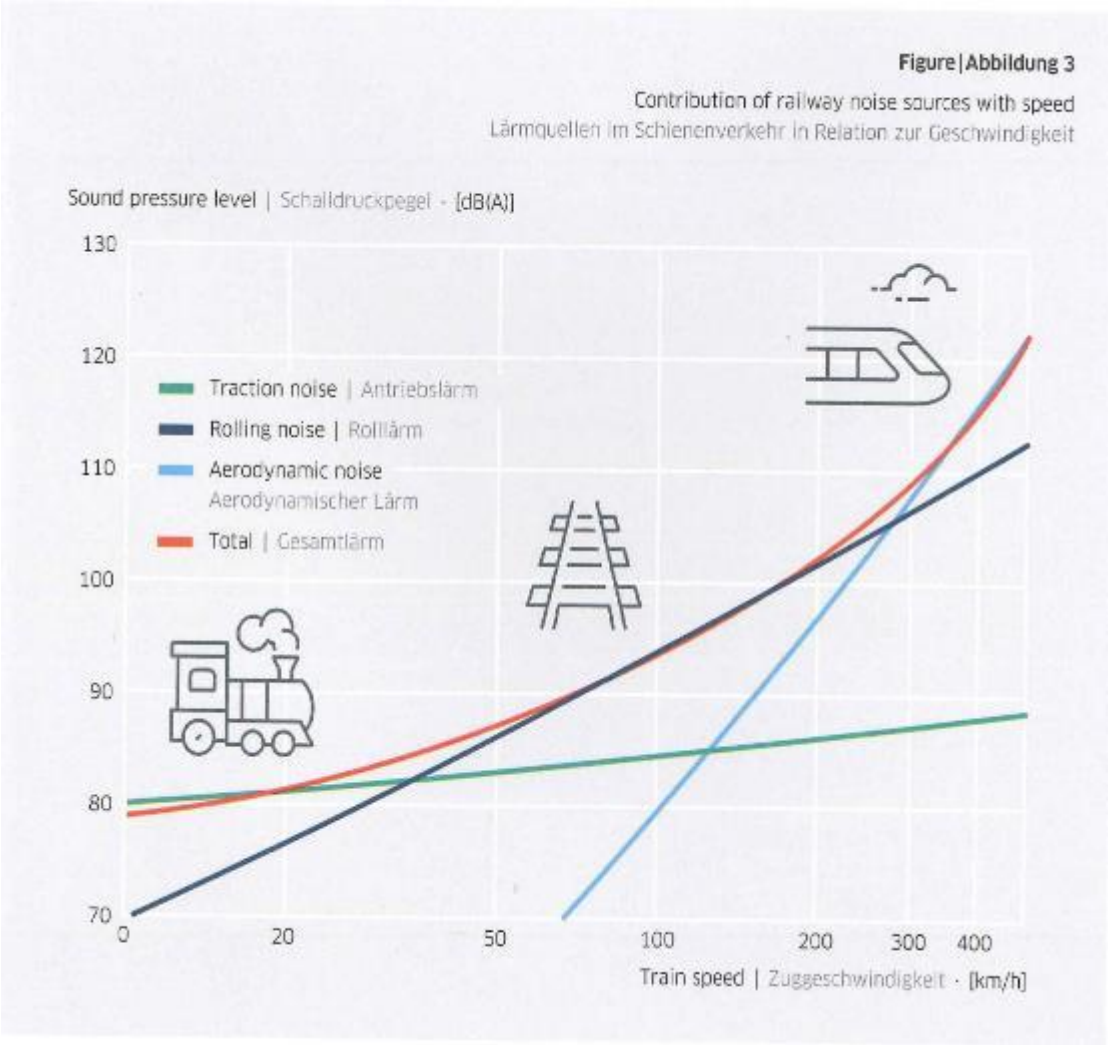

Figure 50 Contribution of railway noise sources with speed
Source: Noise Engineering in Road and Rail Design Revised, communication, The Journal of iC, edition 25/2021

The weighted average commercial speed of the passenger trains per option was estimated, as presented in the next table.

Table 45 Commercial speed per option

Type of trains	Nr of train pairs/day	Average commercial speed, km/h	
		Option 1	Option 2
International trains	8	136.0	156.7
National intercity trains	18	136.0	156.7
National omnibus	4	105.8	102.2
Weighted average	-	132.0	149.4

Source: Project team

Based on the respective weighted average commercial speeds per option and estimation for rail noise sources, the average level of pass-by noise in Option 1 was estimated at 62.3 dB, and at 70.5 dB in Option 2. Having in mind the objective to minimise the noise (and vibrations), the normalised value for Option 1 is 100 and that for Option 2 is 88. The respective scores are 6.0 and 5.3.

As per the fourth main criterion - **impact**, Option 1 scores worse with 18.2 points than Option 2 with 18.6 points.

6.2.3.2 - Final MCA results

The overall MCA score of Option 1 is 98.1, which is by 4.4 points higher score than the one for Option 2.

Table 46 Final MCA results

Main criterion	Weight of main criterion	Criteria	Value		Normalisation		Scores	
			Option 1	Option 2	Option 1	Option 2	Option 1	Option 2
Financial	35%	Investment costs	*287 993 138*	*305 655 777*	100	94	14.0	13.2
		Operation and maintenance costs	*100 528 334*	*114 862 746*	100	88	10.5	9.2
		Train operation costs	*23.88*	*29.30*	100	82	10.5	8.6
Effectiveness	30%	Cost effectiveness	*6 961 877*	*6 948 920*	99.8	100.0	29.9	30.0
Impact	20%	Need of resettlement	*22*	*25*	100	88	6.0	5.3
		Traffic safety	*20*	*26*	77	100	6.2	8.0
		Noise and vibrations	*62.3*	*70.5*	100	88	6.0	5.3
Risks	15%	Land expropriation risk	*5.00*	*4.14*	100	83	4.5	3.7
		Construction risk	*5.00*	*5.00*	100	100	10.5	10.5
Final score							98.1	93.7

Source: Project Team

6.3 - MCA conclusion

Based on the above MCA results, Option 1 has a higher score, compared to Option 2. Also, Option 1 is found not to be sensitive to the assigned weights and can be recommended as the preferred option for the rehabilitation of the examined railway line. However, SRI decided on option 2, for which a new project assignment was given.

6.4 - The No Project Scenario

Project Scenario in the "do nothing" alternative, the situation will remain the same. This would mean the following:

- The section from Inđija to Golubinac is currently a single-track one.
- The current condition of the railway infrastructure on the Stara Pazova-Golubinci – Šid line is not satisfactory,
- The electrical equipment is technologically obsolete.
- The commercial speed of passenger trains is about 50 km/h.
- There is a large number of level crossings on the line, which poses danger to road users, as well as for the safety of both rail and road traffic.

- No modal shift from road to rail, and more traffic on the road would result in more pollutant emissions, GHG emissions, congestion, and accidents.

The goal of the railway infrastructure modernization on Corridor X through Serbia is the reconstruction of the existing lines and the extension of the second track on the sections where single-track lines were built. This task is one of the state priorities in the construction of traffic infrastructure on the territory of the Republic of Serbia. The modernized railway should meet the requirements defined by international agreements (AGC, AGTC, SEECP). The reconstructed and modernized railway for mixed passenger and freight traffic should be equipped with modern ERTMS devices (ETCS-L 2, GSM-R) and should have other characteristics in accordance with the requirements of interoperability (TSI).

Furthermore, the "do nothing" alternative would ignore the obligations of the Republic of Serbia as a candidate for EU membership, which address the need for a sound, high quality, and integrated transportation network to effectively connect the European market. For all the above reasons, it was considered that the choice of this alternative was not prudent and not considered further within the selection of the alignment.

7 - POTENTIAL IMPACTS AND MITIGATION MEASURES

7.1 - Introduction

7.1.1 - Generic Methodology

For the current Project, the methodology that was chosen for the evaluation of environmental impacts took into consideration rated qualitative criteria. The selection of a quantitative evaluation was avoided, since it is more sensitive to subjectivity, and it does not give a holistic overview of the entire situation.

The following sections describe some of the general principles that underpin the assessment approach, while physical, biological, socio economic and cultural environment will be assessed related with the project development.

The methodology that will be used to predict and assess potential environmental impacts includes:

- Collection of baseline environmental and social data by research and survey
- Review of existing literature, documents and reports from various organizations (governmental agencies, universities, institutes) and other similar projects
- Interviews with individuals and representatives of interest groups
- Consultation meetings with relevant Project stakeholders to identify key concerns and to obtain further data where necessary
- Review of relevant statistical and cartographic databases and various census data
- Area of Influence to be defined for each of the potential impacts
- Site visits and field investigations along the railway corridor
- Identification of receptors
- Characterization of the potential impacts and evaluation of their significance

7.1.2 - Characterization of Impacts

The parameters that were taken into consideration for the evaluation of environmental impacts include (i) landscape and morphology, (ii) geology (iii) soils, (iv) seismicity, (v) climate change, (vi) air, (vii) noise, (viii) surface waters, (ix) groundwaters and (x) biodiversity and protected areas, while the parameters for the evaluation of social impacts include (i) labor standards and terms of employment (ii) community impacts such as public health, safety, security, gender equality, and cultural heritage, land acquisition or potential reduction in people's livelihoods as a result of project activities (iii) occupational Health and Safety, (iv) impacts on vulnerable groups/gender, involuntary resettlement, and affordability of basic services . It also includes disproportionate impacts on vulnerable groups/gender, involuntary resettlement, and affordability of basic services.

In determining the type of environmental and social impact, the ESIA report will be guided by the following indicators:

- The nature of impact. Identification what changes the impact brings, are they an improvement or degradation to the benchmark conditions. In this respect they are classified as: Positive or Negative.
- Vulnerability of receptors assess the recipient of impact itself, its rarity, vulnerability and adaptability to impact and change. In this respect, they can be low, moderate and high.

- The spatial dimension and geographic 'reach' of the impact. This considers the proportion of communities potentially affected by the change. By this virtue impacts are categorized as local, regional, national and trans-boundary.
- Time dimension. This is the timeframe over which an impact will be experienced; this may include temporary, short-term, long-term and permanent impacts.
- Reversibility (long term reversible, short term reversible or irreversible);
- Magnitude. This is the degree of change at a household or community level to livelihoods and quality of life i.e. extent of impact. In this respect they can be major, moderate, minor, negligible and none.

During the planning phase, all potential impacts should be assessed by its probability. In the respect of the likelihood of occurrence, potential impacts should be determined as: very unlikely (the impact is very unlikely to occur under normal operating conditions but may occur in exceptional circumstances), unlikely (the impact in unlikely but may occur at some time under normal operating conditions), likely (likely to occur under normal operating conditions), very likely (the impact will almost certainly occur) and certain (impact will occur).

The significance of environmental and social impacts is evaluated taking into account the magnitude of the impact and the vulnerability of affected receptors as well as all other above-mentioned dimensions. In order to assess the significance of the impacts, the impact is reflected within the local setting as articulated in the view of the local population and the environment. Socioeconomic and environmental impacts, significance of the impact is evaluated by the consideration of the impact magnitude and the importance placed on the impact by stakeholders.

The figure below depicts the process the assessment should follow.

Figure 51 Process of impacts identification and management

The table below should show how the significance of impacts should be designated and determined according to mentioned characterization indicators of impacts.

NATURE OF IMPACT NEGATIVE /POSITIVE					
			Vulnerability of Receptors		
			Low: Minimal areas of vulnerabilities; consequently, with a high ability to adapt to changes brought by the project.	Moderate: Few areas of vulnerability; but still retaining an ability to at least in part adapt to change brought by the project.	High: Profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the project
Magnitude of Impact	Negligible	Change remains within the range commonly experienced within the households or community.	Negligible	Negligible	Negligible
	Minor	Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.	Negligible	Minor	Moderate
	Moderate	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area or number of people and/or is of Moderate duration. Frequency may be occasional, and impact may be regional in scale	Minor	Moderate	Major
	Major	Change dominates over baseline conditions. Affects the majority of the area or population in the area of influence	Moderate	Major	Major

7.1.3 - Cumulative Impacts

Cumulative impacts are those that result from the incremental impact of a project when added to other existing, planned, and/or reasonably predictable future projects and developments". Cumulative impacts are limited to those impacts generally recognized as important on the basis of scientific concerns and/or concerns from Affected Communities and Stakeholders. Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, projects, or activity when added to other existing, planned, and/or reasonably anticipated projects and activities. Areas and communities can be potentially impacted by cumulative impacts from further planned development of the project or other sources of similar impacts in the geographical area, any existing project or condition, and other project-related developments that can realistically be expected. However, the assessment does not include potential impacts that would occur without the Project or independently of the Project.

The assessment of cumulative impacts considers the combination of multiple impacts that may result when the Project is considered alongside other existing or proposed projects in the same geographic area or similar development timetable. However, considering the nature and magnitude of the Project, the extend of the

impacts it will have on both social and environmental component and the necessary mitigation measures it will include, it is likely that all possible cumulative impacts will be merged, examined and assessed in the ESIA process. That being said, cumulative impacts will be assessed as appropriate in the proper stages of ESIA report, while in the current report a brief presentation is carried out at the end of this chapter.

7.1.4 - Residual Impacts

Residual impacts are impacts that remain in the case where proposed mitigation measures are implemented. It should be noted that effectiveness of mitigation measures could vary for different impact subjects and receptors. Negative residual impacts overall assessed as being either of minor or negligible significance will be considered to be environmentally and/or socially acceptable. For negative residual impacts assessed as being either major or moderate significance measures will be planned and implemented that compensate/offset for residual risks and impacts (these measures do not eliminate the identified adverse risks and impacts, but they seek to offset it with an-at least- comparable positive one). Evaluation of the significance of residual impacts will be done based on expert judgment and separately for each type of impact.

7.1.5 - Uncertainties

Any uncertainties related with impact prediction or the sensitivity of receptors due to the absence and inconclusiveness of data or due to other limitations are explicitly stated. Where applicable, the ESIA report will make recommendations concerning measures that should be put in place with monitoring or environmental or social management plans to deal with the uncertainty so that they may be addressed.

7.2 - Impacts and mitigation measures during construction

7.2.1 - Environmental Aspects

The environmental potential impacts and indicative mitigation measures for the construction phase are summarized in the tables below. More localized analysis will be carried out under the ESIA at the next stage

Impact area	Potential impacts	Indicative mitigation measures
Construction phase		
Landscape	• Visual impacts from the establishment of construction areas along the alignment, the presence of buildings, machinery, construction yards, new buildings, fences and structures, noise barrier. • Loss of existing vegetation to facilitate the construction of both the online and offline section of the project • Demolition of properties along the project • Temporary visual awareness of construction activities associated with construction, bridges, underpasses, overpasses etc.	• Upon completion, areas used as construction compounds will be returned to their original use and state • Specific attention will have to be given to Sections where the infrastructure will be dismantled. • Where topsoil is to be stripped and stored on site temporarily for reuse, the stockpile mounds will be stored at a maximum height of 2m, to preserve the structural integrity of the soil. • Mitigation screen vegetation planting, subject to land take, and availability of suitable land area. • Implementation of a 5-year Landscape Management Plan • Restricted hours of working will be proposed within built up areas,
Geology and soils	• Potential Impacts on Topsoil from Leaks / Spills from HGVs, Machinery and Hazardous Material Storage • Soil erosion from construction activities • Loss of fertile topsoil	• Careful construction and thorough quality control processes • Provision of spill kits to contain leaks / spills; • Program to ensure good driver behaviour / maintenance of vehicles • An Emergency Response Plan will be produced prior to construction (including a Spill Management Plan), • Slope stabilisation – including mulching (straw mulching), brushwood mulching, erosion control blankets, soil binders (e.g. polyacrylamide) and gravelling; • Retaining walls – to retain loose materials on slopes where it would not naturally be held, for example on near vertical or vertical slopes; • Sediment traps and basins – which will intercept and retain sediment-laden runoff; • Drainage channels – which will divert run-off water; • Treatment systems – to remove material contained within the run-off water; • Limited temporary land take of agricultural land is proposed during construction

Impact area	Potential impacts	Indicative mitigation measures
Construction phase		
		• Land where the existing infrastructure has been dismantled may need to be decontaminated.
Resources and waste	• Release of greenhouse gas emissions (through transportation). • Water consumption. • Ecological impacts • Visual, impacts in ecology, waters and air from demolition waste, excavated material, decommissioning of the existing railway line and construction work site waste.	• Ensure that the specification of recycled and secondary content in imported materials (such as earthwork, stone and aggregate, cement and asphalt), is set out during detailed design. • Maximise the use of off-site construction and pre-fabrication methods to encourage a process of assembly rather than construction. • Capture and communicate actions already undertaken (or planned) within the design for deconstruction and disassembly, to encourage reuse and recycling at assets' end of life. Items that can be readily reused include the following: ballast (can be washed and sold for construction), sleepers, rails, small steel components, switches and crossings (can be refurbished and used on lower track categories). • The Contractor will be required to develop and implement a Waste Management Plan, to drive performance in the highest tiers of Waste Hierarchy, thereby maximise reuse and recycling • Where on-site reuse (or other forms of recovery) cannot be achieved, the arisings should be sent to licenced off-site reuse, recycling or recovery facilities. • A Decommissioning Waste Management Plan (DWMP) for the existing railway line will be prepared and maintained by the lead contractors. • Waste generated from the decommissioning of the existing railway line will be re-used, where appropriate, treated or safely disposed in accordance with the Serbian regulatory requirements; • Hazardous waste (e.g. impregnated sleepers) needs to be identified and treated
Climate change	• The construction activities may affect the climate through increase of CO_2 concentration by diminution of vegetation from earthworks for construction purposes (work camps, any eventual access road, vegetation clearing alongside the working strip both sides of the railway line)	• Design optimisation to reflect the carbon reduction hierarchy • Reduce the requirement for construction materials and excavation; • Specify materials and products with reduced embodied GHG emissions including through material substitution, recycled or secondary content and from renewable sources; • Designing, specifying and constructing the Project with a view to maximising the potential for reuse and recycling of materials/elements at the end-of-life stage; and • Specifying high efficiency mechanical and electrical equipment. • Planting specifications and maintenance regimes for the public realm will be important in reducing the impact of long periods of drought and waterlogging on ground conditions.

Impact area	Potential impacts	Indicative mitigation measures
Construction phase		
	• Drying out and cracking of ground and access road surfaces leading to slower vehicle movements and repair work, resulting in construction delays. • Deformation and melting of materials. • Overheating of machinery leading to delay. • Rail tracks buckling or deforming under extreme heat.	• All long-term topsoil material stockpiles will be located outside the active construction site and away from drainage ditches. • River crossings, beds and banks will be restored to their original state, and banks and adjacent upland areas will be stabilised immediately after final grading; the watercourse crossings will be designed to avoid affecting the stability and long-term performance of riverbanks and flood defences. • Not carry out landscaping or excavation work near watercourses during high water periods or during heavy rains. • Drainage from higher areas will be diverted around stockpile areas to prevent erosion. As required, sediment controls will be installed downstream of stockpile areas to collect any run-off. • Restore ditches damaged by machinery (damage to the gradient, shoulder construction of the embankments, etc.). • The Contractor will ensure all dirt and debris are cleaned on sites without delay (approved by the Construction Supervision Officer).
Air pollution	• Impacts from generate dust and particulate matter from the construction works • Change in human exposure to dust generated by rail and brake wear as a result of railway alignment	• A Dust Management Plan (DMP), including measures to control other emissions, in addition to the dust and PM10 mitigation measures given in this report, will be developed • A Construction Traffic Management Plan will be produced to manage the sustainable delivery of goods and materials. • Construction compounds are required to be located away from sensitive receptors • Where practicable, erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover appropriately. • Ensure all vehicle operators switch off engines when stationary - no idling vehicles. • Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. • Ensure an adequate water supply on the site for enabling effective dust or particulate matter suppression • Avoid explosive blasting, using appropriate manual or mechanical alternatives. • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable

Impact area	Potential impacts	Indicative mitigation measures
Construction phase		
Noise pollution	• Impacts from noise and vibration from earthworks or pilling	• Preparation of Noise Management Plan by the Contractor • Avoid necessary revving engines and switch off equipment when it is not required; • Keep haul / access roads in close proximity to the Project well maintained; • Use rubber linings for dumpers to reduce noise impact; • Minimise drop height of materials; • Start-up plant and vehicles sequentially rather than all together; • Use of reversing alarms that do not have a tonal component (i.e. broadband), if applicable. • Sources of significant noise should be enclosed, as far as reasonably possible; • Ensure regular and effective maintenance for the plant and any sound-reducing equipment; and • Install temporary local noise barriers for noisy equipment. • The selection of low or non-vibratory piling equipment such as rotary or bored piling. • Reducing the requirement for vibratory compaction and using static force compaction, such as smooth-wheeled or sheepsfoot rollers. • No start up or shut-down of vibratory plant within 50m of receptors. • Communication with residents to highlight potential periods of disruption in order minimise the number of complaints.
Surface waters	• Increased pollution risks to surface water bodies from increased sedimentation and disposal or spillage of fuels or other harmful substances that may be discharged, spilled directly or migrate to local surface water receptors. • Increased risks to surface waters from discharge of foul effluent from construction compounds / construction workers accommodation and increased	• Provide sediment barriers between earthworks and the watercourse to prevent sediment from washing into the river. • Use of silt fences, silt traps, filter bunds, settlement basins and/or proprietary units such as a 'siltbuster' to treat sediment laden water generated on site before discharge should also be implemented. • Fuels and potentially hazardous construction materials should be stored in bunded areas with external cut-off drainage and fuel • Fuelling and maintenance of construction vehicles and plant (including washdown) should be done on hard standing or on haul roads, with appropriate cut-off drainage and located away from watercourses. • No surface water runoff from construction working areas or sites that may contain fuels or other harmful substances should be discharged to surface water receptors unless first subject to robust pre-treatment. • Limit the clearance of vegetation on the channel banks.

Impact area	Potential impacts	Indicative mitigation measures
Construction phase		
	water demand associated with construction compounds / construction workers accommodation. • Increased flood risk associated with temporary works within areas of fluvial flood risk and within watercourses and increased flood risk associated with surface water discharges during construction • Impacts to watercourse flow and connectivity • Earthworks required for installation of abutments and piers may initiate the bank erosion resulting in significant sediment run-off and deterioration of the surface water quality and even affect the streambed hydro morphology.	• Until the beginning of the in-water works, preserve at least 20m depth of bankside vegetation from the channel bank to protect bank stability. • Avoid works to watercourses during high flow events and during heavy rainfall to reduce the risk of fine sediment release, watercourse erosion and increased flood risk. • Hydraulic connectivity must be maintained • If watercourse diversion is required, maintain a temporary channel to maintain flow and connectivity whilst the permanent channel is prepared. • Avoid undertaking works within or adjacent to the watercourses as far as practicable. • Minimise the required construction zone adjacent to and within watercourses to reduce the impacts of flow constriction and loss of fluvial floodplain storage and conveyance. • Implement a construction-stage drainage strategy for construction compounds, construction workers accommodation and other large areas of impermeable surface to capture and attenuate runoff prior to discharge.
Groundwaters	• Potential Impacts on Groundwater Quality from Leaks / Spills from HGVs, Machinery and Hazardous Material Storage • Impacts on flow and recharge • Dewatering and changing the groundwater regime	• Long term and seasonal groundwater monitoring should ideally be undertaken prior to construction to allow for baseline conditions to be understood and monitor changes (such as those to turbidity and groundwater levels) • Action would be needed to address the degradation of groundwater quality during construction such as adjustments to drilling duration or speed.

Impact area	Potential impacts	Indicative mitigation measures
Construction phase		
Biodiversity and Natural Habitats	• Disturbance impacts to fauna and flora species of nature conservation interest from the project's activities (e.g. noise, more significant human pressure to previously inaccessible areas) during construction and pre-commissioning works with particular reference to sensitive fragile habitats. Spread of allochthonous, especially invasive plant species. • Habitat fragmentation and separation of habitats may cause the interruption of daily or seasonal movements for some terrestrial animals, disturbing the usual behavior patterns of certain species. Most detected species are common and widespread and often occupy man-made, altered, or habitats under anthropogenic impacts so their conservation status would not be affected significantly by the mentioned impact. • Obstructions of the migratory routes for reptiles, amphibians, and mammals. • Direct mortality of species.	• Appropriate design of bridges and culverts to allow for animal passage, the introduction of animal passages where necessary. Current consultations with the Institute for Natural Conservation of Vojvodina province concluded on the necessity of two bridges and ten underpasses while ongoing communication with other stakeholders is established to confirm the conclusion above. • Maximum use and upgrade of the existing network of roads and avoid construction of new temporary ones to minimize loss and fragmentation of existing vegetation. • Approach roads should be planned in such a way that they do not endanger the protected row of sycamore trees. • Construction facilities have to be sited on unused land of no particular ecological value. • To avoid any disturbance to species during the breeding season and subsequent breeding failure, vegetation clearance works should start if possible before the breeding season (spring). • Develop appropriate measures against the spread of invasive species. Pay attention that alien and especially invasive species are not used for greening. • Management of dust, air emissions, aqueous discharges, and waste to minimize impacts on flora, fauna, and ecosystems. • Restrict construction during certain periods/seasons. • Maintenance, refuelling, and cleaning of construction machines must be scheduled in locations distant from watercourses and which will be defined before the start of work. • Wastes as well as any other product containing hazardous chemical substances (i.e. fuel) will not be discharged in the surface waters and will not be stored in the proximity of freshwater features. • Restrict activities at sites where rare and endangered species are reported. • Make the pre-construction/pre-clearance site survey and placement of the protective fences on selected locations to reduce construction road kill and/or move the specimens out of the working corridor. • Pits and excavations should be filled in as soon as possible following work. • Monitor impacts on flora and fauna - Environmental Monitoring Plan.

7.2.2 - Social Aspects

The Proposed Scheme has the potential to affect land use through loss of land, severance of land and severance of access. There is also the potential for a wide range of socioeconomic impacts including effects on economic investment and access to employment. The assessment of population and human health will be undertaken to understand the potential effects on local communities and human populations of the Project. Consistent with the socioeconomics and land use, health effects associated with the are described according to the administrative boundaries of the impacted municipalities as outlined below.

Table 47 Social impacts during construction

Impact area	Potential impacts	Indicative Mitigation measures
Impact to Archaeological sites and cultural resources (Chance find) outside of known sites	• Impacts to cultural heritage by chance finds during earthworks	• Cultural Heritage Management Plan • Chance finds procedures in place and embedded into contracts for construction works • Archaeological supervision in place • Reconnaissance of terrain prior to earthworks
Labour and working condition risks	• Non-compliance with the HR requirements of the Project • Shadowed and unpaid work • Child Labor • Inadequate workforce accommodation • Gender Based Discrimination • SEA/SH risks	• Implement HR policies • Require Contractor to sign statements of adherence to National Labour laws as supplemented to meet the requirements of ESS2 • Adopt Project general HR Procedure • Adopt Labour relation management Plan • Establish a workers grievance mechanism • Adopt equitable and gender observant recruitment policy including • SRI to adopt overarching HR policy • Adopt Camp management Plan and apply camp operation procedures in line with EIB requirements
OHS risk	• Risk from working at hights • Risk from working with electrical circuits • Emergencies and Epidemic Diseases due to increased workforce and COVID-19 pandemic • Risk from operation of machinery and equipment • Inadequate resources, equipment, procedures, training • Communicable diseases • Risks from operation of the existing line while the new line is constructed (whether this will be the case is not yet know but risk have ben scoped in)	• Implement OHS management Plan • Regular unannounced site inspections • Implement Prevention plan • Planning and segregating construction and operation traffic either using one-way traffic routes, establishment of speed limits, and on-site trained flag-people • Alternatively plan for rail line closure during certain period of construction should be adopted

Impact area	Potential impacts	Indicative Mitigation measures
Community health and safety risks	• Risk during creation of access routes • Disruption of traffic and pedestrian routes • Noise and vibration from equipment • Spills /Releases • Direct mortality – e.g. as a result of increased collision risk with the railway and electrocution power lines • Disruption of mobility • Railway traffic disruption on the existing line • Temporary influx of workers • Social tension	• Notification to residents and businesses of works • Noise controls detailed within the ESMP be adhered to • Setup of site boundary/installation of security and lighting • Implement Traffic Management Plan • Notification to municipalities and local residents where interface/access is impacted • Proper maintenance of equipment. Inspection prior to operation. • Apply appropriate spill control measures as per Fuel Supply, Handling and Distribution procedure and Chemical and Hazardous Materials procedure • Implement Stakeholder Engagements Plan and Grievance mechanism • Apply appropriate spill control measures per Spill Prevention and Response procedure • To maintain safety works will primarely take place on the period when no traffic is scheduled, • A detailed program of work should be developed and implemented in line SRI operating procedures.
Private and public property	• Physical and economic displacement and land restrictions • Damages to property and assets • Loss of private and public lands • Loss of business lands Temporary land allocation • Damage to land and property impacts	• • Develop site specific resettlement instrument RAP/LARP) • Implement RAP /LARP • Monitoring and evaluation

7.3 - Impacts and mitigation during operation and maintenance

7.3.1 - Environmental Aspects

Impacts and mitigation measures on natural environments during maintenance phase are quite similar with those during construction phase. The following table summarizes the general impacts and mitigation measures related to operation phase and maintenance phase. More localized analysis will be carried out under the ESIA at the next stage.

Table 48 Environmental aspects during operation phase

Impact area	Potential impacts	Indicative Mitigation measures
Resources and waste	• Waste that will be generated during the railway operation will be primarily food, paper and packaging waste, coming from passengers • Track maintenance waste and ancillary infrastructure waste can be expected along the route and their quantities will depend on the maintenance activity.	• Implementation by the SRI of the waste management hierarchy • Public waste bins in passenger trains and inside the stations' facilities will be provided; • Waste containers for use by the track maintenance personnel and railway station tenants will be provided and waste will be segregated; • Hazardous waste from the track maintenance will be segregated and temporarily stored inside a properly equipped space.
Geology and Soils	• Impact on topsoil quality and soil erosion • Soil stability and risk of landslides • Seismic activity	• Maintain sediment traps and basins, drainage channels and treatment systems; and • Maintain slope (cuttings and embankment). • An Emergency Response Plan will be produced prior to operation. • Revegetation and/or maintenance of vegetation to increase the stability of potentially loose materials and surfaces which may develop during the operational phase of the Project • Maintenance and thorough quality control processes including inspections for maintenance depots; • Leak/ spill management;
Air pollution	• Modal shift of passenger and freight movements from road-based travel (car or bus movements for passenger and freight respectively) to rail-based travel.	

Noise pollution	• Annoyance and complaints from noise and vibration	• Cuttings: The Project benefits from cuttings at some sensitive locations.
		• Between source and receptor:
		  ○ Installing noise barriers (protective walls)
		  ○ Insulation of house windows and facade .
		• Using maintenance strategies for track Considering the use of track support systems such as Resilient track fasteners, Ballast mats, resiliently supported ties, Floating slabs, construction of trenches.

Climate change	• Flooding of underpasses • Scour of structures, weakening and degrading materials. • Drainage infrastructure overwhelmed leading to surface water flooding. • Flooding of railway tracks resulting in disruption to service. • Waterlogging and erosion leading to destabilisation.	• Implement energy efficient lighting throughout the Project; • Use energy meters to monitor energy requirements; • Implement efficient water fittings. • Rail tracks will be designed and materials will be selected to withstand temperature increases • Technical buildings will have air conditioning systems to eliminate the effect of condensation due to temperature differences or very cold/hot air.

Impact area	Potential impacts	Indicative Mitigation measures
	• Increase in expansion of materials leading to structural damage. • Drying out and cracking of substrate leading to damage to foundations and destabilisation of structure	• Permanent and temporary loads that will be taken into account for designing cross passages will also include temperature and shrinkage. • Consideration of design foundation and ground movements in regard to their resilience to flooding or heavy rainfall events. • Drainage ditches will be the best quality without any casting defects and beads and showing no cracks or other faults and be in firm and homogenous condition • Drainage infrastructure will include an allowance for climate change. • The design of drainage will minimise the need for drain cleaning, the possibility of clogging and the consequent flooding of the track work subgrade. • Drainage infrastructure will be inspected regularly to identify any deterioration, and additional inspections following extreme weather events and/or persistent high temperatures. • Necessary training will be given regarding correct usage of the equipment.
Surface water	• Polluted surface water runoff that may be discharged to surface water bodies. • Increased wastewater discharge and increased water demand associated with railway stations. • Increased flood risk associated with proposed drainage systems. • Increased flood risk caused by displacement of flood water storage or crossing of watercourses that may impact flood flow conveyance. • Impacts to hydrology, hydro morphology and flow dynamics associated with any crossing or realignment of watercourses.	• Provision of a new drainage system that will drain the track corridor (embedded in Project design). • Maintain existing drainage and treatment at high-risk areas • Collect waste products such as oil from maintenance stations and dispose off site in agreement with the necessary requirements • Regular inspection and maintenance of drainage systems to remove blockages (embedded in Project operation). • Consider climate change effects on capacity of drainage system. • Detailed assessment and, if required, provision of attenuation to reduce rate and volume of increased runoff from impermeable surfaces. • Design of watercourse crossings to have sufficient capacity • Consider climate change effects. • Further consideration to potential impacts to fluvial floodplain storage and conveyance in high risk areas, and provision of appropriate mitigation such as flood relief culverts beneath embankments or reprofiling of low-vulnerability land to provide compensation, • Further consideration of the potential effects of climate change to flood flows and the extent/depth of the floodplain.

Impact area	Potential impacts	Indicative Mitigation measures
		• Maintain the stability, profile, hydraulic connectivity and hydraulic capacity of all watercourses crossed by the Project and in particular those with bridge piers within the watercourse. • Provision of erosion control upstream and downstream of all watercourse crossings to prevent scour and impact to watercourse hydro morphology and geomorphology (e.g. rock armour and concrete scour mattress). • Set back bridge piers from within watercourse to remove any impacts on flow conveyance • Provision of low flow channels through proposed culverts to maintain constant baseflow.
Groundwaters	• Potential effects on groundwater quality, flow and recharge	• Operational Maintenance Plan will be produced and will include maintenance and repair plans. • The implementation of the mitigation measures defined above for soils and surface water will serve to protect groundwater during the operational phase.
Biodiversity and Nature Conservation	• Impact to fauna from the noise emissions from traffic. • Accidental fauna kill, especially bird and mammals corridors under the ecological network. • Exposure to artificial light can cause nocturnal animals to suspend normal foraging and reproductive behavior.	• Develop and implement during the operation phase a Monitoring Plan of terrestrial fauna to timely recognize negative impacts and trends related to the highway operation and define additional and appropriate mitigation measures. • Mitigation measures for noise as mentioned above. • Restore pre-construction conditions as far as possible (e.g. re-vegetation of the working strip) and maintain vegetation - Vegetation/Landscape Restoration Plan. • Preservation of vegetation along the railway. • Pay attention that alien and especially invasive species are not used for the maintenance of the corridor. • Regular control and maintenance of drainage structures shall be conducted to check their permeability. • Appropriate maintenance of bridges and culverts to allow for animal passage. • Construct and maintain an impenetrable and resistant fence along the railway. If the road is fenced off due to safety issues as a stand-alone measure to prevent mortality of large animals, then it should be designed and installed as a gap-free, permanent fence with small mesh holes. The fence should lead the animals towards safe crossing points.

Impact area	Potential impacts	Indicative Mitigation measures
		• Avoid installing lighting near potentially vulnerable sites, unless required for human safety or other road safety requirements; If artificial lighting is required adjacent to important habitat sites, then design lighting or install shades to emit down and away from the natural area.
Landscape and visual	• Permanent change to the nature of the landscape directly within the footprint of the project • Permanent modifications to existing land form (cuttings and embankments) • Addition of a number of permanent built structures within the landscape including bridges, overpasses and underpasses, fencing, noise barriers • Increased visual awareness of disturbance from passenger and freight train movements within the view	• Regular maintenance of vegetation. • The appropriate design and colours for the fencing. • Using as much as possible low and/or transparent noise barriers

7.3.2 - Social Aspects

The social aspects for the operation phase are summarised below.

Table 49 *Social aspects during operation phase*

Impact area	Potential impacts	Indicative Mitigation measures
General Operational Safety	Safety issue potentially affecting both crew and passengers is the threat of serious injury or the potential loss of life due to train collisions with other trains or with road vehicles, as well as the possibility of derailment due to these or other operational causes	• Implementation of rail operational safety procedures aimed at reducing the likelihood of train collisions such as a positive train control (PTC) system • Rail design and application of TSI and EU CSM process
Derailments	The risk form derailment remains reasonably common although those leading to significant injury or loss of life are increasingly rare	• Implementation of rail operational safety procedures aimed at reducing the likelihood
Railway staff risks	Despite the high level of safety achieved for rail users, railways have traditionally been a relatively high-risk industry for staff both in terms of injuries and fatalities. Track workers are especially vulnerable due to their exposure to moving trains and high voltage electricity, the use of heavy plant and equipment, exposure to poor	• Implement OHS Standards

Impact area	Potential impacts	Indicative Mitigation measures
	environmental conditions and frequent need for working anti-social hours.	
Transport of dangerous goods	Dangerous goods are frequently transported in bulk or packaged form by rail, representing a potential risk of release to the environment in the event of accidents on a number of other causes.	• Implementation of a system for the proper screening, acceptance, and transport of dangerous good and Use of tank cars and other rolling stock that meet national and international standards (e.g. thermal protection and puncture resistance) appropriate for the cargo being carried. • Preparation of spill prevention and control, and emergency preparedness and response plans, • Routing and timing of hazardous materials transport to minimize risk to the community • Limiting train speed in developed areas • Dissemination of emergency preparedness and response information to the potentially affected communities
Pedestrian Safety	Trespassers on rail lines and facilities may incur risks from moving trains, electrical lines and equipment, and hazardous substances, among other issues (accidents related to electric circuits have been reported and identified by SRI) 26	• SRI to continue the activity ongoing for the past couple of years targeting elementary schools raising awareness to risks from rail and the electrical power line since education is seen as one of the most constituting mitigation measures • Posting of clear and prominent warning signage at potential points of entry to track areas (e.g., stations and level crossings); · Installation of fencing or other barriers at station ends and other locations to prevent access to tracks by unauthorized persons; · Local education, especially to young people, regarding the dangers of trespassing; · Designing stations to ensure the authorized route is safe, clearly indicated, and easy to use; · • Use of closed-circuit television to monitor rail stations and other areas where trespassing occurs frequently, with a voice alarm system to detect trespassers
Stations	Personnel should be trained in herbicide application, including applicable certification or equivalent training where such certifications are not required;	• Regular inspection and maintenance of the rail lines and facilities to ensure track stability and integrity in accordance with national and international track safety standards;·Implementation of an overall safety management program that is equivalent to internationally recognized railway safety programs • Build awareness and Safety culture as the interaction between the requirements of the Safety management system and how people make sense of them, based on their attitudes, values and beliefs, and what they actually do, as seen in decisions and behaviours. • Introduce good reporting practices for safety occurrence notification, recommendation and remedy including consultation and publication of the reports and find ing as a capacity enhancement measure to the community on health and safety

Impact area	Potential impacts	Indicative Mitigation measures
Right-of-Way Maintenance	Regular maintenance of vegetation within railroad rights-of-way is necessary to avoid interference with train operations and track maintenance; Maintenance of Rolling Stock Occupational hazards typically associated with locomotive and railcar maintenance activities may include physical, chemical, and biological hazards as well as confined space entry hazards	• Personnel should be trained in herbicide application, including applicable certification or equivalent training where such certifications are not required;
Station /Halt Closure	As a rule all stations and halts currently operational for local and regional lines will be kept and only trains operating at speed of 200km/h will have a reduced number of stops and stations,	• Municipalities to explore alternative mobility options should stations for local and regional lines need to be closed • Alternative transport through buses shall be explored for remote villages • Stakeholder consultation and engagement on all aspects

7.4 - Assessment of transboundary impacts

Potential transboundary environmental impacts are more likely to occur at the area of the railway alignment near the Serbian border, and these could include impacts to surface water, groundwater, fauna and protected and designated areas. Given the baseline of the location (absence of sensitive receptors), and the type of activities to be performed, it can be concluded that the construction of the railway under normal operating conditions is not expected to cause significant impacts on the environmental media and environmental areas that would cause a transboundary effect, or if, for example, impacts on ambient air quality or impacts caused by increased noise levels do occur, they are likely to be negligible. Both in the construction and in the operational phase, under normal operating conditions, no transboundary impacts are expected on the environmental media. In the vicinity of the state border, there is no highly sensitive area of groundwater quality protection, water body or its protection zone that are exposed to a significant impact of the project. The lands located in the area of the state border, near the railway corridor, are typically used for agriculture, and there are also forests on the Serbian side. Trees and sprouts form a green zone/green line along the railway. Unfortunately, it is a narrow line exposed to constant anthropogenic influence. In terms of soil and water protection, the investment on the Serbian side will not have an unwanted impact on the neighboring Croatian area. It is also of particular importance to point out that the performance of the construction and operational activities of the railway line is not expected to cause negative transboundary impacts on protected NATURA 2000 sites on the territory of Serbia.

Potential transboundary social impacts are expected to occur along the railway alignment not only near the Croatian border but wider. It can be expected that increased trade and free movement of goods, people and services will cause transboundary social impacts. The rehabilitation of the railway will increase the overall capacity of the Balkan transport network. This will reduce regional economic costs associated with driver delay and possible traffic congestion. The most important transboundary impacts potentially will be the impact on economy and Communities Quality of life. This could be treated as a gateway through which individuals could expand their network of social exchange beyond their town and country to the wider world since the rail services will be more advanced. Railways bring diverse communities, regions and countries together.

The improvement of the transport infrastructure and the connection with Croatia, the improvement of the transport of people and goods, will have a positive impact and significant contribution to the economic development of both countries.

8 - STAKEHOLDER ENGAGEMENT

8.1 - Introduction

Consultation and engagement with stakeholders an integral part of the Environmental and Social Impact Assessment (ESIA) process. To support the realization of the Project, the Project Promoter will develop and implement a Stakeholder Engagement Strategy, the overall aim of which is to ensure that a consistent, comprehensive, coordinated and culturally appropriate approach is taken for stakeholder consultation and disclosure. This approach is in full compliance with national and local legal provisions and IFIs Performance Requirements.

The Project Promoter will undertake a practice of stakeholder engagement throughout the project planning, construction and operation phases. The plan for this engagement, including identification of stakeholders (i.e. people and organizations who have a role in the Project or could be affected by the Project activities or who are interested in the Project) and disclosure of information, consultation, and handling of suggestions, comments and concerns, is to be documented in the Stakeholder Engagement Plan (SEP). This plan will be updated as required as the Project progresses. The purpose of the Stakeholders‟ Engagement Plan (SEP) is to provide a basis for a constructive relationship, between the Project Promoter and the affected stakeholders over time, by ensuring relevant and understandable information and by providing, to all the Project Affected Persons opportunities to express their views and receive responses. The nature of and frequency of engagement is defined by the risks and impacts that the Project will have. The SEP also stipulates for stakeholders how their concerns are to be considered in compliance with a grievance procedure. According to IFIs Environmental and Social Policy, the Project is classified in Category A project, that is likely to have adverse environmental or social impacts.

8.2 - Stakeholder Engagement Phases

To accomplish the objectives of stakeholder engagement, the Project Promoter will develop a plan for engagement with stakeholders throughout the Project life-cycle (Stakeholders Engagement Plan - SEP), that will focus on short and long-term goals of stakeholder engagement, determine logistics and procedures for the stakeholder engagement. The main objectives of stakeholder engagements are to:

- Ensure that adequate and timely information is provided to persons affected or likely to be affected by the Projector that may have an interest in the Project or that have influence over the Project. Provide to these groups such forums and opportunities to voice their concerns and opinions
- Ensure that comments and concerns are received in a timely manner so that they can be considered during the decision making process
- Establish effective communication and cooperation facilitating community support in general, and
- Establish an effective grievance and mediation mechanisms with the main goal to intervene in a dispute in order to resolve and close out and minimize the number of cases referred to judicial authorities.

This SEP describes the approach in engaging with stakeholders, to be maintained throughout the Project cycle i.e. for, pre-construction including land acquisition, construction/rehabilitation activities and operation. These stages are described in the following table.

Table 50 Stages of stakeholder engagement

Phase	Objectives	Status
Alternative's Assessment	To introduce the Project and identify environmental, social and cultural heritage sensitivities that should be taken into account in selecting the preferred route.	Completed
Scoping disclosure and consultation	To provide further detail on the Project and an opportunity for stakeholders to provide feedback on the scope, approach and key issues that will be addressed during the ESIA as well as the plans for future engagement activities. An ESIA Scoping Report (dated March 2023) is being prepared in English and salient features shall be translated to Serbian and will be circulated for comment to key stakeholders during April/May 2023. Consultees consist of the Municipalities and Cities (including Settlements) through which the alignment is planned to pass; relevant government agencies (including relevant line Ministries). The ESIA Scoping Report will be posted on the SRI website in line with disclosure principles presented in the SEP document in both English and salient features in Serbian. Relevant Stakeholders identified will be informed that the Scoping report has been disclosed and how it can be accessed and that comments, questions and queries can be submitted to SRI within 30 days following the disclosure of the ESIA Scoping Report. Following the disclosure period, the ESIA Scoping report shall be subject to public consultations. Depending on the COVID-19 constraints the consultation shall take the form of one or several online or face to face meetings. Stakeholder feedback shall be taken into account as relevant	Completed Planned
SEP and RAP disclosure and consultation	To provide details on the Project and an opportunity for stakeholders to provide feedback on the approach and key issues that will be addressed during the land acquisition process	Planned
ESIA disclosure	To present the draft ESIA report and invite stakeholders to comment on the document. Information on the project impacts will be presented along with the mitigation measures designed to minimize or enhance positive ones. This will allow the project to maintain the relationships developed during the previous stages; and ensure all stakeholder issues have been identified and taken on board by the Project.	Planned
Ongoing Project stakeholder engagement	During Project phases (construction, operation and maintenance) to continue engaging with stakeholders throughout the project lifecycle. The methodology for this	Planned

	will be developed and finalised using the information compiled during the ESIA process.	

In parallel a Stakeholder Engagement Plan will be developed commensurate to the stage of the Project. The SEP has focused on engagement during all Project Phases from Planning, Scoping, Main ESIA, Construction and Operation Phase.

The SEP will identify all key stakeholders Project affected and Other Interested Parties. The SEP has ensured that disadvantaged or vulnerable individuals or groups, relevant to the project, are identified, that their particular sensitivities, concerns and barriers to project information are assessed and that they fully understand project activities and benefits and participate in consultation processes. Vulnerabilities identified in the baseline have helped informing the SEP.The vulnerability may stem from person's origin, gender, age, health condition, economic deficiency and financial insecurity, disadvantaged status in the community (e.g. minorities or fringe groups), dependence on other individuals or natural resources, etc. Engagement with the vulnerable groups and individuals often requires the application of specific measures and assistance aimed at the facilitation of their participation in the project-related decision making so that their awareness of and input to the overall process are commensurate to those of the other stakeholders.

The specific stakeholder engagement activities that have taken place during Project preparation include:

- Communication and meetings in the rail sector;
- Review of project preparation status with representatives from the SRI and including safeguard documentation;
- Multiple meetings and communication exchange with the SRI discussing the Project design, investment priority needs;
- Meeting with Institute for Nature Conservation of Vojvodina Province, Novi Sad
- Written communication with Cultural Heritage Institute of Serbia and Sremska Mitrovica.
- A number of Biodiversity experts and stakeholders, Biologists, Ornithologists, Theriologists, Ichthyologists, Hunting associations
- Representatives from 15 settlements/local communities crossed by the Project (Presidents, Vice Presidents or Secretaries of the Community Offices (the smallest administrative cell in the administrative division

The SEP will develop arrangement for adequate disclosure of documents and information sharing avenues. The stakeholder identification method, which categories identified, and methods of engagement will be elaborated in more details within SEP.

8.3 - Grievance Mechanism

The implementing agency SRI has an existing centralized grievance system in place within the Media Centre, which is currently dealing with the grievances arising from the on-going projects. Should the Project benefit from a Technical Assistance support it is recommended to inter alia bolster the existing capacity of SRI in Grievance Management.

The existing Grievance Mechanism is expected to be tailored to this Project level grievance mechanism (GM) free of charge. The GM will be expected to consist of a Central Feedback Desk (CFD) to be established and administered by the Media Center of SRI with Sub-Project specific Local Grievance Admission Desks (LGAD) (collectively referred to as Grievance Mechanism (GM)). The LGAD will comprise representatives from the key

three stakeholder groups i.e., SRI representative, Municipal representative and representative of the PAPs. SRI shall be responsible for overall grievance administration.

The LGAD shall serve mainly as local admission point for uptake of grievances and acknowledgment of grievance receipt through local avenues.

The system and requirements (including staffing) for the grievance redress chain of action – from registration, sorting and processing, and acknowledgement and follow-up, to verification and action, and finally feedback – are embodied in this GM. As a part of the GM outreach campaigns, SRI will make sure that the relevant staff are fully trained and has relevant information and expertise to provide phone consultations and receive feedback. The project will utilize the existing system (hotline, online, written and phone complaints channels) to ensure all project-related information is disseminated and complaints and responses are disaggregated and reported.

Details on further Grievance admission points in particular LGD and the grievance administration processes, timelines, investigation activities and closure conditions including the 2nd thier resolution instance will be publicized in line with what the SEP will foresee. Stakeholders are encouraged to send all grievances, concerns and queries to the contact points below:

9 - TERMS OF REFERENCE FOR ESIA

9.1 - Introduction

A key outcome of the scoping process is the definition of the Terms of Reference (or ToR) of the ESIA study. The findings of the ESIA study will be presented in the ESIA report, which will be prepared in compliance with Serbian national laws and regulations and in accordance with IFIs Policy Requirements and Good International Standards. The Consultant has selected the more stringent IFIs standards as the international standards benchmark for the ESIA report.

This chapter provides the proposed Terms of Reference for the ESIA and is structured as follows:

- Next steps required to complete the ESIA process
- Proposed baseline studies
- Proposed structure of the ESIA Report.

9.2 - ESIA objectives

The Consultant recognizes that comprehensive planning and management of environmental and socio-economic issues are essential to the execution of any successful project and, therefore, intends to fully integrate environmental and socio-economic considerations into the life cycle of the proposed Project.

The purpose of the ESIA is to assess the potential impacts of the Project and Project related activities on the environment (including biophysical and socio-economic resources) and, where applicable, to design mitigation or enhancement measures to avoid, remove or reduce negative impacts to the environment and to enhance positive and mitigate negative environmental and socio-economic impacts.

9.3 - ESIA Steps

Following on from the scoping phase of the Project, the ESIA will:

- Conduct additional consultation and further refine the scope of the ESIA as necessary;
- Collect additional baseline data through desktop research and field studies to complete a comprehensive description of the environmental, social and cultural heritage conditions;
- Identify and assess environmental, socio-economic and cultural heritage impacts;
- Develop mitigation and enhancement measures and elaborate an Environmental and Management Plan (ESMP) including an approach for monitoring;
- Develop a Resettlement Action Plan
- Report findings in a comprehensive ESIA report. A Final draft ESIA Report will be submitted addressing IFI's and Beneficiary's comments.

9.4 - Methodology and Key Aspects Included

9.4.1 - Project Description

A Project Description will be provided as early as possible that describes all Project activities that could impact on environmental and social components within the Project area of influence. The Project Description will be prepared by the Project engineering team in association with the ESIA team. The Project Description will be as detailed as possible to identify the environmental and social aspects resulting from Project's activities.

9.4.2 - Analysis of Alternatives

An Analysis of Alternatives to the Project will include consideration of alternatives within Project design. This should also include the 'no-action' or 'no-go' alternative for the Project.

9.4.3 - Baseline Conditions

Desktop research

Desktop studies will include additional research to identify existing documentation that contains information relevant to key resources present in the Project environment. Potential sources include publicly available literature with relevance to the Project site and general area.

Desktop research will be continued for the description of meteorological, air, noise, waters, soils and biodiversity parameters. Updated data will be provided for meteorological data for the stations encountered along the corridor, analytical data will be presented for air, noise, wates and soil results of the national monitoring system while more data will be obtained for a better evaluation of habitats. More detailed description of the other environmental parameters will be provided, while an Annex with species with specific protection status in terms of biodiversity will be prepared.

Project route studies will provide additional information on various individual socio-economic impacts. Further and more detailed desktop studies of impacted settlements, land use and asset inventory of resettled Project Affected Persons will provide necessary information of overall and individual socio-economic impacts of the Project affected area. Additionally, as per this Scoping report outlined guidelines, more detailed baseline information will be acquired on impacts on vulnerable persons and groups, usual daily migration routes of population in the wider area, short and long term potential impacts of the Project on economic and agricultural activity, potential impacts on facilities and services provided to local settlements and tangible and intangible cultural heritage that could be influenced by the Project. The ESIA desktop study will also provide for more detailed gaps between National legislation and EIB Policy Requirements and ways to bridge the gaps.

Field surveys, measurements and assessments

The Project team will carry out stakeholders' meetings to collect environmental and socioeconomic information with the aim to complete the environmental and socioeconomic profile of the Project area. These gathered information and data will also help the project team to assess the situation of physical and biological environments, social infrastructure with regard to specific habitats and landscapes, settlements and to develop the profiles of natural and semi natural sites, municipalities and settlements. Information on alternative living options due to economic displacement will be investigated. Field visits will focus on areas that have the highest biological, educational/recreational and socio-economic, vulnerability and archaeological potential.

Based on the information gathered, the ESIA team will report the findings in the ESIA Report. This will provide sufficient information to undertake the following tasks.

- Identify the key environmental and socio-economic conditions in areas potentially affected by the Project and highlight those that may be vulnerable to aspects of the Project;

- Describe their characteristics (nature, condition, quality, extent, etc.); and
- Provide sufficient data to inform judgments about the importance, value and sensitivity/ vulnerability of resources and receptors to allow the prediction and evaluation of potential impacts.

The ESIA team will determine the impact assessment and indicative mitigation measures based on the results of data collected.

Environmental

More specifically, during the ESIA stage, the following have to be planned:

- Vibration and noise: noise measurements after defining the sensitive receptors and noise and vibration modelling to predict the impacts in the operation phase
- Climate change: assessment for the project's climate resilience (GHG emissions calculations, characteristics for floods, temperature and precipitation changes)
- Biodiversity: Identification, mapping, and description of the natural, semi-natural and artificial habitats along the corridor. The classification of the present habitat types follows EUNIS version 2012 (amended 2019), and the digitalization will be performed. Also, for habitat selection and determination, the following lists will be used: EU Habitat Directive Annex I and Bern Convention Res. No. 4. Fauna and flora species that are a priority for conservation, including species listed by the EU Habitats Directive and Birds Directive, Bern Convention, IUCN Red List of Threatened, will be determined.

Social

A social impact assessment will be carried out as part of the Environmental and Social Impact Assessment. The social impact assessment will cover the Socio-cultural environment (include both present and projected where appropriate): Population; land use; planned development activities; settlement and community structures; employment; distribution of income, goods, and services; recreation; public health; and historical, archeological and cultural resources.

A detailed Social Survey should have to be undertaken at the ESIA stage, with the aim to provide sufficient information for the physical and/or economical resettlement purposes.

Precise and complete data will be available only after completion of main design, expropriation study and census. Given the constraints of data available, the fact that the technical options and solutions are still fluid and therefore undiscovered and yet unidentified impacts might differ at later stage. These impacts will be subject to stringent provisions of the social mitigation measures.

More precisely, regarding social issues, the following will also be applied

- Any earlier social assessments in the area and the initial findings and baseline should be used to update any needed social assessment and provide a clear scoping statement of the anticipated impacts arising from the Project. This updated social assessment will describe current social and economic impacts on directly- and indirectly-affected communities. This socio-economic information will provide a baseline for evaluation of impacts and mitigation measures to reduce negative impacts and to enhance positive impacts and opportunities. Data will be obtained from a combination of secondary sources and suitable primary data, such as personal interviews and household or community surveys as relevant. The assessment will verify and update as needed: where likely impacts are identified; social and economic baselines; social and economic impacts; mitigation of adverse impacts and enhancement of positive impacts, and identification of community development opportunities

- Define the Area of Social Influence for the area covered including associated facilities,
- Develop a demographic profile of the study area's communities that may be influenced by the proposed construction works and operation of the Project,
- Map of sufficient detail showing the project site and the area that may be affected by the project's direct, indirect, and cumulative impacts (i.e. area of influence) Socio-economic and environmental characterization, which includes presenting concise information on the main socio-environmental factors that will be affected by the project. This information, whenever possible, should be based on qualitative and quantitative data.
- Identify tangible (social infrastructure) and intangible (human and social capital, community cohesion, community values and connection to place) community assets and provide a general understanding of the local social environment within the study area

The Consultant shall ensure that any specialized anthropological and sociological experts contributing to the Social Assessment will address issues relevant to the EIB requirements (this effort shall be linked to the RAP s).

- Socio-Economic Conditions: Identify and map nearby human settlements in the proposed railway corridor, paying special attention to communities or people potentially affected, if any. For such it will be necessary to collect socio-economic data as may be necessary to assess potential impacts on their income, livelihood status etc. Demographic data would include population (size, gender and age distribution); cultural characteristics (religion, ethnic composition, languages spoken, etc.); population migration over the last few years, livelihood and economic activities; literacy rates and levels of education; community organizations and social networks; public health and safety;
- Infrastructure: For each settlement potentially affected, describe the infrastructure such as level crossings, Public health, education infrastructure as appropriate if it is to be used or adversely affected:
- Poverty and Social Risks- For each settlement potentially affected, analyze the level of poverty and vulnerability including social risks such as prevalence of sexual and gender-based violence (SGBV), high-risk behaviours among youth, child and forced labour in the construction sector, community cohesiveness etc.;
- Cultural, archaeological, spiritual structures, and historic resources: identify all cultural, archaeological, ceremonial and historic resources in the impact zone/within the area of influence.
- Religious Groups and Ethnic/Other Minorities -Information on marginalized and vulnerable groups living in settlements along the railway, including indigenous communities, ethnic or other minority groups or other traditional cultural groups, if any.
- Vulnerable or disadvantaged groups (if any) and if relevant, social data should be disaggregated accordingly to the extent it is technically and financially feasible. To the extent possible demographic data should report on HHs with members with disabilities legacy issues on land take for the project and associated facilities.
- Legacy issues related to land use, property rights etc.
- Land acquisition and resettlement through development of section specific Resettlement Action Plans and or Livelihood Restoration Plans.

9.4.4 - Impact Assessment Criteria

The prediction of the scale and significance of environmental impacts will be assessed against the established baseline conditions. The assessment criteria will be based on international requirements and good practice involving a ranking system to classify magnitude and significance of impacts. All activities for the Project will be assessed in terms of the significance of the impact on the receiving environment, for example, air quality,

freshwater quality, freshwater ecology, and the significance of the impact of local society, including livelihoods, health, culture and employment. The major characteristics of impacts are:

- Magnitude - the level of change because of the impact.
- Duration and frequency - how long the impact will last - short term (1-5 years), medium term (6-15 years) and long term (more than 15 years).
- Spatial extent - whether the impact is local or wide ranging (regional).
- Quantitative assessments will be undertaken as necessary as part of the ESIA.

9.4.5 - Mitigation Measures and Recommendations

Mitigation measures are actions taken to avoid or minimise negative environmental or social impacts. The mitigation hierarchy will be followed: avoid, minimise, restore or remedy, offset, compensate. Additional mitigation will be implemented to reduce significant impacts to an acceptable level, this is referred to as the 'residual impact'. The mitigation hierarchy should be followed: avoid, minimise, restore or remedy, offset, compensate. Mitigation measures should be clearly identified and linked to the Environmental and Social Management Plan (ESMP).

9.4.6 - Monitoring and Follow-Up

Once the ESIA has been completed, monitoring and follow-up actions should be completed to:

- Continue the collection of baseline data throughout construction and operation;
- Evaluate the success of mitigation measures, or compliance with Project standards or requirements;
- Assess whether there are impacts occurring that were not previously predicted; and
- In some cases, it may be appropriate to involve local communities in monitoring efforts through participatory monitoring. In all cases, the collection of monitoring data and the dissemination of monitoring results should be transparent and made available to interested Project stakeholders.

Monitoring recommendations outlined in the ESIA will be carried through to the ESMP.

9.4.7 - Residual Impacts

Those impacts that remain once mitigation has been put in place will be described as residual impacts.

9.4.8 - Cumulative Impacts

Cumulative impacts are changes to the environment that are caused by an action in combination with other past, present and future human actions. The assessment of these effects is called a cumulative impact assessment (CIA). Assessment of cumulative impacts assessments will be included in the ESIA and may include considerations of interactions between the associated facilities.

9.4.9 - Environmental and Social Management Plan (ESMP)

An Environmental and Social Management Plan (ESMP) summarises the mitigation and monitoring measures that should be employed during construction and operation for the Project. The ESMP will summarise the Developer's commitments to address, mitigate and monitor risks and impacts identified as part of the ESIA, through avoidance, minimisation and compensation/offset.

The ESMP will also ensure that all relevant stages of the project are structured to meet applicable laws and regulatory requirements. Where relevant, the ESMP will also cover management of third party and supply chain issues. The ESMP will:

- Include a monitoring plan aimed at tracking actions specified in the ESMP;
- Performance indicators linked to significant environmental and social impacts;
- Any regulatory monitoring and reporting requirements
- Specify the roles and responsibilities for implementation of the actions contained therein as well as for regular update of the ESMP.
- Specify any training or capacity-building required to ensure that personnel tasked with implementing the ESMP have the necessary awareness and skills to execute these functions effectively.

9.5 - Proposed Structure of The ESIA Report

The ESIA will include the following:

- Review of relevant local, regional, and national environmental and social laws and regulatory requirements of the jurisdictions in which the Project will operate, including those laws implementing Serbia's obligations under international law. The ESIA will review the Project's compliance to relevant requirements, alongside the status of any material permits or authorisations needed.
- Project description, including alternatives considered and discussed with stakeholders (including potentially affected communities) and information on related operations and activities.
- Analysis of the physical, biological, and socio-economic environment likely to be affected by the Project for both the construction and operational phases. The baseline assessment will consider the interrelationship between relevant factors, as well as the exposure, vulnerability, and resilience of these factors to natural and manmade risks.
- Analysis of the likely impacts of the Project on the physical, biological, and socio-economic environment, which should identify and characterize its potential E&S beneficial and adverse impacts. It will be structured to include all relevant stages of the Project's lifecycle, e.g. pre-construction, construction, operation and maintenance, closure and residual E&S impacts. The level of analysis and reporting will be commensurate with the risk magnitude of the issues identified while mitigation measures will be proposed using the mitigation hierarchy.

The summary headings in the ESIA report are provided in the table below.

Section	Summary of Contents
Non-Technical Summary	Provides a Non-Technical Summary (NTS) for the ESIA.
Introduction	The Introduction will include: • General background (also including information of Developer) • Project objectives and scope • Project history • Existing studies
Legal framework	Legislation will include: • Environmental Law • Permits and licences • International Standards/Guidelines
Project Description	The Project Description will include: • Project design (alignment-permanent way, stations, structures, other)

Section	Summary of Contents
	• Project schedule • Description of construction and operation activities • Description of the key role players and purpose of the ESIA study and report.
Evaluation of alternatives	Evaluation of alternatives will include: • General methodology • Summarized presentation of the MCA • Environmental and social evaluation of options • Environmental and social evaluation of options, including the no project alternative.
ESIA Methodology	ESIA methodology will include: • Introduction to ESIA • Baseline environmental conditions • Spatial and temporary scope • Key assumptions and impact assessment methodology • Impact identification • Cumulative impacts
ENVIRONMENTAL PARAMETERS Noise and vibration, air quality, climate change, geology, soils and hydrogeology, landscape and visual, surface waters, ecology	Per parameter will include: • climate and climate change • waters (not only surface waters), • soils, • waste and materials management.
SOCIAL PARAMETERS	
Labor and working conditions, OHS risk, community health and safety risks, private and public property, fragmentation of agricultural land plots, cultural heritage	Per parameter will include: • Baseline conditions • Potential impacts • Mitigation measures • Residual impacts • Monitoring
Stakeholder Engagement Plan (SEP)	Develop guidelines for engagement of relevant stakeholders at certain stages of ESIA process
Environmental and Social Management Plans (ESMP)	Develop an Environmental and Social Management Plan as a part of the ESIA.

9.6 - Timeline for the ESIA

The final time frame for the ESIA is still not clear, considering that the Spatial Plan of the Special Purpose Area of the Infrastructure Corridor of the Belgrade - Šid - Border of Croatia railway, the Stara Pazova - Golubinci - Šid section and the Inđija - Golubinci railway line and the Strategic Impact Assessment have not yet been adopted:

1) The Scoping Report must go through a disclosure period, which can last up to a month, while the results and recommendations of this phase will lead the E&S team to the ESIA phase, which will feed into the Stakeholder Engagement Plan, which will be ongoing updated.

2) ESIA phase. This phase could be completed in three months. During this phase, all necessary research can be done (noise and vibrations, surface water, biodiversity, social issues).

3) Public consultation and disclosure of international financial institutions. Considering the consultation period of 30 days, i.e. 30 days as the publication period, then this period could be taken as the minimum time limit for this phase.

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