



STRATEGIC ENVIRONMENTAL ASSESSMENT FOR MODERNIZATION OF X EUROPEAN RAILWAY CORRIDOR

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Abstract

Strategic Environmental Assessment (SEA) is a system of incorporating environmental considerations into policies, plans and programmes. The Strategic environmental assessment (SEA), here described, for modernization of x. Paneuropean railway corridor has a purpose to identify and address the likely environmental impacts of the modernization master plan and to prepare the Environmental Report. As this railway corridor is a huge linear project, it is of great importance to make such a detail analysis.

The final product of SEA is an Environmental Report and it contains all the information required and it defines, describes and evaluates significant effects on the environment of implementing the plan/programme (modernization of x. Paneuropean railway corridor) and reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme.

Environmental report of related SEA consists of a description of a relation of the proposed railway corridor modernization plan and physical plans (currently valid) as well as other important plans and Strategies; description of current state at site area (intervention site) (state of population at site area, landscape characteristic, cultural heritage, nature and biological heritage, nature protection sites, forest areas, pedology, geology, seismology, hydrogeology, hidrology, air and climate factors); environmental characteristic which can be influenced the most by the planned project; goals originating from international treaties that can be applied for this SEA; description of impacts; mitigation measures; monitoring and the selected option with described reasons of its selection.

For the most part, a Strategic environmental assessment is conducted before a corresponding Environmental Impact Assessment (EIA) is undertaken. This means that information on environmental impact of a plan will be able to cascade down through the tiers of decision making and be used in an EIA at a later stage. This should reduce the amount of work that needs to be undertaken.

Keywords: strategic assessment, railway corridor, environmental impact, environmental protection measures, environmental monitoring

1 Introduction

Corridor x is generally considered to be a link between western and southern Europe. It is spread across Slovenia, Croatia, Serbia, and Macedonia until Greece. Croatian part of the corridor is mostly used for transit transport between the starting and ending point of the corridor. It is divided into 5 railways chronologically ordered from the state border between Croatia and the Republic of Slovenia in the west to the state border with the Republic of Serbia in the east. It consists of the following main railways: M101 state border – S. Marof – Zagreb Main Station (26,8km long), M102 Zagreb Main Station – D. Selo (20,8km long), M103 Dugo Selo – Novska (84,1km long), M104 Zagreb Main Station – Sisak – Novska (117,4km long) and M105 Novska – Vinkovci – state border (185,1km long).

In order to include railways located in the Croatian section of corridor x in the transeuropean transport network (TEN-T) as effectively as possible, following interventions need to be undertaken:

- Continuous double track railways from the state border with Slovenia, across Zagreb, Dugo Selo, Novska and Vinkovci to the state border with the Republic of Serbia
- Construction of two additional tracks for the inner city transport on the S. Marof – Dugo Selo section
- Construction of the second track on the Zagreb Main Station – Sisak (Sunja) section
- Continuous speed of 160km/h enabled, except at the Zagreb knot and the Sunja – Novska section
- The length of the tracks for overtaking and crossing loops at train stations to be 750m minimum
- Train station platforms which receive international passenger trains to be 400m minimum
- Distance between tracks at double track railways is to be 4m
- Delevelling of all road-railway crossings
- Implementation of a high-tech traffic management system
- Bi-directional running on all tracks
- Average distance between train stations to be 20km, except the Zagreb knot and the Sunja – Novska section [2].

Strategic Environmental Assessment (SEA) of the Paneuropean corridor x modernization is elaborated in line with the Environmental Protection Act (OG 110/07) [2] and the Regulation on strategic environmental assessment of plans and programmes (OG 64/08) [3], which evaluates significant impacts of the plan and programme implementation. Strategic Environmental Assessment elaborates on reconstructions of existing tracks and construction of the second track at M103 Dugo Selo – Novska, M104 Zagreb Main Station – Sisak – Novska and M105 Novska – Tovarnik – state border. The following documents served as the basis for Strategic Environmental Assessment of the Paneuropean corridor x modernization:

- 1 Study of the Paneuropean Corridor X Modernization, ŽELJEZNIČKO PROJEKTNO DRUŠTVO Ltd., Zagreb (February 2009). [3]
- 2 Preparation of Feasibility Study and Environmental Impact Assessment for the Upgrade and Modernization along Corridor X (ten) in Croatia, ITALFERR & IRD ENGINEERING, 2010. [4]

1.1 Correlation with the physical planning documentation

All interventions which have been planned within the scope of the Paneuropean corridor x modernization (reconstructions of existing tracks and construction of the second track at M103 Dugo Selo – Novska, M104 Zagreb Main Station – Sisak – Novska and M105 Novska – Tovarnik – state border) mostly correlate with the physical planning documentation on the county level. Exceptions are mostly limited to the railway route corrections which differentiate from the old railway route. Therefore, after the best route will have been selected for the re-

construction (or additional construction), the new route needs to be included in the physical planning documents of towns/municipalities which correlate with the above stated changes.

2 Strategic Environmental Assessment

2.1 Goal and reasons for the Strategic Environmental Assessment

Goal and purpose of the Strategic Environmental Assessment is to evaluate the intervention on a strategic level, provide guidelines (measures) which are to eliminate or decrease as much as possible impacts identified previously, as well as propose the methodology of including those guidelines (measures) into other plans and programmes. Guidelines (measures) need to be taken into consideration during elaboration of subsequent project documentation. Further elaboration of impacts, protection measures and monitoring programmes of some intervention segments will be included in each individual Environmental Impact Assessment.

Strategic Environmental Assessment (SEA) of the Paneuropean corridor x modernization is structured in the following manner:

- Short overview of the contents and main goals of the Study of the Paneuropean Corridor x Modernization, as well as the relation to other relevant plans and programmes:
 - Study of the Paneuropean Corridor x Modernization
 - relation of the Study of the Paneuropean Corridor x Modernization with other relevant plans and programmes
- data on the intervention location and environment-related data:
 - data on the existing state of environment and possible development of environment that would occur without the modernization study being conducted
 - data on the environment which can be significantly affected by the Study of the Paneuropean Corridor x Modernization
 - goals of the environment protection set according to international treaties and conventions related to the Study of the Paneuropean Corridor x Modernization, as well as the manner in which those goals and some other issues are incorporated in elaboration of the Study of the Paneuropean Corridor x Modernization
- description of probable intervention impacts on the environment:
 - impact on physical planning
 - impact on infrastructure
 - impact on scenery
 - impact on cultural and historic heritage
 - impact on living creatures
 - impact on protected natural values
 - impact on forests, hunting grounds and game
 - impact on soil and agriculture
 - impact on water
 - impact on air
 - impact of noise level increase
 - impact of unexpected events
 - impact of waste and waste management
- environment protection measures and protection measure implementation plan
- summary
- list of documentation resources and literature
- list of legislative resources.

As far as traffic is concerned, additional capacity of the railways is provided in relation to the planned operations, therefore, traffic will continue freely without any difficulties related to the new traffic management and train station organization (reduced number of stations, as

suggested by the Study of the Paneuropean Corridor x Modernization). All crossings of railway and state and county roads will either be constructed in two levels or secured with equipment proscribed by the Rulebook on traffic regulation on railway-road crossings and pedestrian railway crossings (OG 121/09), in line with the schedule provided by the Programme on road-railway crossings of the Hrvatske željeznice railway network. At the route sections where the rail intercepts routes of communication important for physical planning of local area, continuity of local roads will be provided. Requirements stated above will result in a reliable, safe and fast railway as a means of transport which will be very appealing (reduced travel time) to the local population due to better and faster connectivity with neighboring municipalities, towns and counties.

Considering that population was affected in a negative way by construction of railways on the corridor x, reconstruction of the existing route or additional construction of another track will reduce the negative effect on the population significantly. Namely, being the important infrastructural element, the population has grown accustomed to the railway over the years, which is why the planned interventions will not change their quality of life significantly. Deviations to the rail route which are different from the old route are an exception, including removal/construction of individual stops/stations.

In places where reconstruction or additional construction of the second track intercept, spread along or only occasionally approach individual infrastructural objects, protection measures of those objects will have to be implemented, as requested by special regulations and requirements set by the owners of the infrastructural objects.

Impacts on visual quality of the scenery are reduced to minimum due to the fact that the activities are restricted to reconstruction of a current railway, i.e. additional construction of a second track right next to an already existing one. Reconstruction and construction of the second track will not significantly affect surrounding terrain or cover, which is why no negative impacts on the scenery are expected. The planned intervention will be barely visible and will not attract attention, except at the section where the M103 route deviates from old railway route in the area between Kutina and Lipovljani, i.e. construction of stops Okešinec, Kraljeva Velika, Blinjski kut, Gornje Polje, Bicko Selo and Livadice. Basic visual degradation will be the walls for noise protection surrounding some residential localities.

Considering the nature of the activities, no negative impacts on cultural and historic heritage are expected by the modernization study. However, where the M103 route deviates from old railway route in the area between Kutina and Lipovljani, i.e. by construction of stops Okešinec, Kraljeva Velika, Blinjski kut, Gornje Polje, Bicko Selo and Livadice, there is a possibility of encountering archeological localities. In case there are archeological findings during ground works, they are to be stopped and the responsible office for protection of natural heritage is to be contacted and their further instructions are to be followed.

Considering that the prevailing negative impact was caused by the railway construction itself, reconstruction and additional construction of the second track will have a reduced impact on plant and animal species. During operation, constant negative impact on flora and fauna will be caused by the dust, as well as on the surrounding fauna by the noise. Soil habitats can be negatively affected during operations in case lubricants, oil and other polluted liquids from the roads are transmitted onto the surrounding area (habitat).

By construction of the second track of the M103 railway Dugo Selo – Novska and M104 Zagreb Main Station – Sisak – Novska, existing railway belt will be widened by approximately 20m, meaning that additional area of 234,8 ha will be occupied due to the second track and auxiliary facilities. Reconstruction of railway M105 Novska – Tovarnik – state border will not occupy any additional land, which is mainly allocated to agriculture.

According to the traffic increase projections on corridor x by 2020, gas pollutant and particle pollutant emissions will increase by 117% when compared to year 2006. The calculation takes into account the most unfavorable situation (only diesel motor engines and diesel electrical engines, maximum engine power), which is different from real-life conditions where pollu-

tant emissions will be reduced. This means that the air quality in the area surrounding the railway will be significantly reduced considering current traffic. However, impact on air quality is considered to be small because generally, railway traffic as a pollutant has the smallest impact among other transport modes, equaling to 6% only due to the use of electrical trains and engines.

Considering that some sections of the corridor x railways have been constructed a long time ago, as well as the lifetime of the engines and trains which are in use, in some residential areas near the railway, noise limits are surpassed, particularly at night (Based on strategic noise level maps of particular towns/municipalities which are particularly troubled by this problem). Therefore, during subsequent elaboration of project documentation, within the Final Design of individual sections which are being reconstructed/constructed, the Final Design of noise protection will also have to be drafted for some residential areas which are located near the railway (including the section where route corrections which deviate from old routes are planned).

On the basis of accidental situations which took place elsewhere, an estimate can be made on the degree of danger related to unforeseen events caused by:

- malfunctioning train cars
- improper loading of cargo onto train cars
- negligence, lack of due attention, neglect or improper use of equipment at workplace
- lack of monitoring and control
- damages to train cars/tanks by mechanical impact
- improper loading and unloading of tank cars or malfunctions of loading equipment
- fire
- other unforeseen events (earthquakes, attacks etc.).

Similarly to the current situation, during operation and maintenance of the reconstructed and constructed railway, pollution of streams and canals is possible as well as the pollution of the immediate belt next to the railway, which can have a negative impact on the quality of surface and ground water. Pollution at a larger scale can occur during transport of dangerous materials (train collisions, overturning of tanks or cars, or another damage which can occur as a result of improper handling by staff, malfunctioning equipment etc.).

On the basis of the defined impacts, a detailed proposal of environment protection measures is provided, as well as the plan of implementation of protection measures, in order to make sure all impacts are localized, temporary and of acceptable intensity. Environment protection measures include the following elements of the environment, i.e. environmental loads:

- Protection measures – physical planning in respect to traffic routes
- Protection measures – infrastructure
- Protection measures – scenery
- Protection measures – flora, fauna, forests and game
- Protection measures – cultural and historic heritage
- Protection measures – water
- Protection measures – air
- Protection measures – noise
- Protection measures – unforeseen events
- Protection measures – waste management.

The main goal of the plan of implementation of protection measures (monitoring) is to assure that the adequate, legally binding, standards of environmental protection are followed and good engineering practices applied. In this way, impacts on environment, as well as effects of the mitigation measures are monitored. The Monitoring Plan has been proposed:

- Fauna monitoring plan (game which is killed)
- Noise monitoring plan.

3 Conclusion

Railway infrastructure development in the Republic of Croatia must serve sustainable and balanced development of the country and its effective integration into the common EU market, taking into account the specific elements resulting from the geographic features of countries. As the Strategic Environmental Assessment was being elaborated, the criteria which were used to determine probably important environmental impacts are as follows:

- 1 Characteristics of the Modernization Study, particularly in relation to:
 - The degree to which the Modernization Study determines the framework of interventions and other activities, in relation to location, type, size and infrastructural circumstances or source allocation
 - The degree to which the Modernization Study affects other plans or programmes, including the ones hierarchically related
 - How convenient it is to raise questions of environment protection, as well as sustainable development
 - Environment related problems important for the Modernization Study
 - Importance of the Modernization Study for the implementation of EU legislation in the field of environment protection.
- 2 Characteristics of the impacts and the area that could be affected by the Modernization Study, particularly in relation to:
 - Probability, duration, frequency and reversibility of the impact
 - Cumulative nature of the impacts
 - Cross-border nature of the impacts
 - Risks to human health and environment (for instance, due to unforeseen events)
 - Size and area affected by the impacts (geographical area and population figures which will be affected)
 - Values and sensitivity of the area which will probably be affected due to:
 - Special natural characteristics or cultural and historic heritage
 - Deviations from environment quality standards or border values
 - Intensive land use
 - Impact on areas or scenery which are protected on a national, international or EU level.

Goal and purpose of the Strategic Environmental Assessment is to evaluate the intervention on a strategic level, provide guidelines (measures) which are to eliminate or decrease as much as possible impacts identified previously, as well as propose the methodology of including those guidelines (measures) into other plans and programmes. The guidelines (measures) need to be taken into consideration during elaboration of subsequent project documentation. Further elaboration of impacts, protection measures and monitoring programmes of some intervention segments will be included in each individual Environmental Impact Assessment.

References

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- [3] Regulation on strategic environmental assessment of plans and programmes (OG 64/08).
- [4] Preparation of Feasibility Study and Environmental Impact Assessment for the Upgrade and Modernization along Corridor x (ten) in Croatia, ITALFERR & IRD ENGINEERING, 2010.
- [5] Protocol on Strategic Environmental Assessment (OG, MU 7/09).