

NON-TECHNICAL SUMMARY

According to the current regulation of categorization railway ("Official Gazette of RS", no. 75/2006) railroad Subotica (Cargo) - Horgoš - the Hungarian border is a regional railroad with the tag 56, and its length is 27.90 km. This railway has a category A, the maximum permissible weight of 16 t/axle, and the maximum weight per meter of 5.0 t/m'. Length stopping distance is 700 m. The railroad is single track and non-electrified.

According to the ToR, the preliminary project of reconstruction and modernization of the railway line, within the limits of the railway land, which enable technical level and quality of traffic that is consistent with the established requirements of modern transport systems:

- increase the speed of trains,
- increasing axle loads,
- increasing the length of trains,
- increase line capacity,
- increase safety on the line,
- reducing the travel time of trains and energy consumption,
- reducing the adverse environmental impact.

In the investigated corridor of railway Subotica (Cargo) - Horgoš - Hungarian border potential of surface waters are natural waterways and melioration canals: Kereš – Radanovački canal, Tapša, Vinskipodrum, Kireš, Aranjšor, Dobo, Kamaraš and other melioration canals.

Groundwater is particularly present in the lower parts of the terrain that are genetically related to the marsh sediments. The materials are mainly characterized by intergranular porosity, and depending on the amount of clay in individual members is conditioned their varying degree of permeability of the filtration coefficients of $k = 10^{-4} - 10^{-7}$ cm / sec.

The occurrence of groundwater was registered during the execution of research work at a depth of 0.90 to a depth of 1.90 m, extremely 4.20 m from terrain surface where drilling is performed. A frequent occurrence sunken ground where water remains on the soil surface for a long time.

Subotica municipality has 141 554 inhabitants and covers the area of 1,008 km². Presently there are following settlements: Bački Vinogradi, Bikovo, Đurđin, Stari Novi Zednik, Kelebija, Ljutovo, Mala Bosna, Donji Tavankut, Gornji Tavankut, Šupljak, Čantavir, Višnjevac, Bačko Dušanovo, Bajmok, Mišičevo, Palic, and Hajdukovo . Capital of the municipality is the city of Subotica with 105,681 inhabitants.

According to data from 2004, the municipality of Kanjiža covers the area of 399km² (of which agricultural area 35219ha, and forest 433 ha) .Municipality has 26000 inhabitants. It consists of 13 settlements: Andorjan, Velebit, Doline, Vojvoda Zimonjic, Kanjiža, Male Pijace, Mali Pesak, Martonoš, Novo Selo, Totovo Selo, Oromo, Trešnjevac, Horgos and farms, and the seat of the municipality is Kanjiža (10.000 inhabitants).

In the region of Subotica-Horgos sands dominated by orchards and vineyards are presented following soil types:

- > Different types of sand (anthropogenic trenching sand)
 - > Sandy chernozem soil in the sand
 - > Hydromorphic black soil with solonchaks in depressions (Part from Bački Vinogradi to Horgos)
- The largest area within Kanjiža municipality have soil type chernozem.

Information about air quality in the city of Subotica are taken from the official website of Subotica (www.subotica.rs), and Public Health Institute Subotica collected and presented them. At the measuring station Palić which is the nearest to railway route index of air quality is 1 - excellent all the time.

Institute for Public Health, Subotica took over the responsibility from Subotica City Administration for the execution of systematic noise monitoring at the territory of Subotica in 2013. The main objective is to provide data on the values of the indicators of day and night noise at the most frequent traffic measuring points in residential areas. Neither of the 10 sites, are in the vicinity of railway line, because the line is not intersected with any significant city street. Closest to railway line is location 7 - intersection Nada Dimic and Pazinska street. It is located about 800m from the railway. The measured noise level in all ten measuring points, and day and night reference time exceed the limit values of noise levels required by the "Regulation on noise indicators, limit values, methods for evaluating noise indicators, disturbance and adverse effects of environmental noise". " Official Gazette RS ", No. 75/2010. and according to "Decision on Measures for the protection from environmental noise", Official Gazette of the City of Subotica, No. 33/11. Additional measurements of noise levels in the corridor of the observed railway were not done.

JP "Vojvodinašume"Petrovaradin considered the route of the railway and found that on the proposed route there are no areas managed by JP "Vojvodinašume".

In the Decision of Intermunicipal Institute for Cultural Heritage Preservation Subotica are listed only immovable cultural properties on which the reconstruction and modernization could be affected, such as the building of railway stations:

Cultural monuments:

- > The building of the railway station Palic, Split Alley 1
- > The building of the railway station Horgos-Kamaraš

Goods under preliminary protection:

- > Railway station Horgoš
- > Railway station BačkiVinogradi

In the terms of the Provincial Institute for Nature Protection is stated that the project can carried out under the following conditions of nature protection:

1. Implement protective measures in protected areas on the basis of the Act on protection.
2. In order to preserve the ecological integrity of the ecological network elements during design, construction and operation of the railway:
 - > Apply appropriate planning and technical solutions that reduce noise, vibration and pollution impacts on the elements of an ecological network.
 - > All activities should take place within the spatial units(parcel) of railway belt;
 - > On the protected areas and their protection zones in the area of ecological corridors, as well as in areas that are indicated as habitats of protected and strictly protected wild species of plants, animals and fungi, or the impact zone of on the habitat is prohibited:
 - > Opening borrow pits and disposal of waste materials;
 - > Temporary and permanent disposal of hazardous materials;
 - > Set up any temporary facilities and materials for the works on the railway;
 - > Parking and servicing machinery, refueling and lubricant, etc. In the accidental spillage of hazardous materials (fuel, machinery and other oil), contaminated soil layer must be removed and put into packaging that can be discharged at a location determined by the relevant utility service. For the purpose of preserving elements of ecological network and biodiversity conservation in rural areas, management of hazardous substances should be carried out in accordance with provisions of the Ordinance on the content of accident

prevention policy and the content and methodology for preparation of the report on safety and accident protection plan ("Off. Gazette RS ", No. 41/10).

3. With the aim of preserving the functional connectivity of elements of ecological networks and in accordance with the prescribed measures for protected and strictly protected wild species of plants, animals and fungi:

- > Ensure the functionality of ecological corridors - canals in the entire length, including the design of the coastal zone.
- > Revitalise corridor at the existing barriers where necessary (piped sections and culverts).
- > In the process of preparation of Main design, provide conditions for nature protection from the Provincial Institute for Nature Protection, which will prescribe measures for the protection of elements of ecological networks, with special emphasis on the construction of buildings at the intersection railway and ecological corridors, that the application of appropriate technical solutions allow safe crossing for small animals under the railway. The internal structure of bridges over ecological corridors shall be planned in accordance with the need for safe movement of small animals, as in the river bed, as well as along the coast on either side of the canal, according to the water regime channeled streams and channels (secure mobility at minimum and at the middle water level). Arranging immediate surroundings of bridges that provide a transition for animals (leveling and grading) should be an integral part of project documentation. Relief modeling and landscaping the front entrance under the railroad directed towards animals passages.
- > To provide crossing over railway embankment profile for small animals from open habitats to whom rails represents impassable barrier, and that the application of technical solutions that enable their movement directly below or above/at the of rails:
 - > In all designated ecological corridors;
 - > Every 50 meters along the sections where the line is on one or both sides bordering the protected area

4. To provide protection of populations of strictly protected plant species (*Centaurea sadlerana*, *Hypericum elegans*) of steppe habitats during the works on the high embankment sections of railway through the area PP "Kamaraš".

5. The Contractor shall submit completed Preliminary design to the Institute for an opinion.

Since the reconstructed railway does not deviate from existing route of railway, there is no reason that the planned works significantly affecting the protected species and habitats, if the contractor complies with all technical measures during construction.

The long-term environmental impacts are those that arise during Subotica-Horgos Hungary border railway exploration. The main characteristic of these impacts is that they are of lower intensity compared to the current situation, which is positive effect of reconstruction and modernization from the environmental protection point of view.

Railway traffic and maintenance of infrastructure can lead to pollution of soil, surface water and groundwater due to:

> Traffic railway vehicles:

- > Friction between the rails and wheels, brake linings (Fe, Cr, Ni, Cu, Si, Mn, V)
- > Drip remains (oils, fuels, lubricants, cleaning agents);
- > Corrosion (metal and colours);
- > Toilets in wagons (faeces).

> Maintenance of railway track:

- > Ballast;
- > Metal parts (agents against corrosion);
- > Switches, signals (lubricants);
- > Platform (sprinkling of anti-freeze).

For purpose of determining noise levels, caused by traffic on railway line Subotica-Horgoš-Hungarian border, software packages CadnaA was used. Calculation method used for noise modelling is SRM II – 1996 – Dutch national method for assessing noise indicators in railway transport¹. This method was recommended in Directive 2002/49/EC. Analysed railway line was split into sections with different characteristics (number of trains, type of rails, speed limits, etc.). Input for noise modelling were data used from traffic model. Available rolling stocks and rolling stocks planned for purchase by MAV and SR were also analysed in order to determine which type of trains will operate on this railway line.

Section through Subotica Calculations showed that the noise levels on this section are higher than on the other track sections Szeged-Subotica. This is due to the fact that a larger number of trains passing this section, as a part of Corridor X. The noise levels of 50dB (A) are achieved at a distance of 25m from the railway. In this zone there is a small number of residential buildings. There are three buildings on the right side of the tracks which should be protected from noise. The total length of the construction for noise protection is 87m.

Section through Palić According to the calculation results of the noise level on the section that passes through Palić, residential buildings (nine of them) which are the most exposed to the effects of noise from rail traffic are in the the area of 50dB (A). Three structures for protection are provided -one on the right side of the railway, and two on the left - the total length of 275m. The noise levels of 50dB (A) are achieved at a distance of 25m from the railway.

Section through Hajdukovo and Bački Vinogradi The noise levels of 50dB (A) are achieved at a distance of 25m from the railway on the section through Bački Vinogradi and Hajdukovo. There are no residential buildings that are located within a distance of 25m which should be protected by protective structures.

Section through Horgoš There are 14 residential buildings in zone of 25m from the railway exposed to noise levels greater than 50dB (A). Noise protective structure is 229m long on the left side of the railway and 107m on the right side of the railway.

It is necessary to provide monitoring when exploitation of reconstructed railway line begins, which will determine the actual state of noise levels, as well as periodic control measurements for monitoring noise levels in perspective. If it would be found the legally permissible noise levels additional exceeded, the Investor is obliged to act in accordance with the results.

It was found that after the reconstruction and modernization of the railway protective measures against vibration are not necessary. Monitoring of vibration levels is recommended in order to respond appropriately in the event of exceeding the allowable value.

Reconstruction and modernization of Subotica-Horgoš-Hungary border railway will provide the development of higher train speed, which will result in shortening time for transport of goods and passengers on this section, as positive impact on the population of the analysed area from a sociological point of view.

The project of reconstruction and modernization of railway Subotica-Horgoš- Hungary border will be electrified, and will as such minimal impact on air quality. Evaporation of means for maintaining switches may causes light air pollution.

The railroad, as a line object, in normal traffic mode have relatively small impact on the contamination of soil, surface water and groundwater. Small impact on the quality of soil, groundwater and surface water occurs when treating weeds with herbicides. Safeguards against the use of herbicides are defined in order to minimize this impact.

¹ published in "RekenenMeetvoorschriftRailverkerslawaai '96, MinisterieVolkshuisvesting, RuimtelijkeOrdeningenMilieubeheer, 20 November 1996)

In accordance with the terms of the Provincial Institute for Nature Protection, and location of the railway, this project provided the following measures:

1. There shall be provided crossing over railway embankment profile for small animals from open habitats to whom rails represents impassable barrier by applying technology solution that enable their movement directly below the rails in all ecological corridors (8 pcs.) and every 50 meters along the sections where the line is on one or both sides bordering the protected area (82 pcs.)
2. At the intersection of the route of the reconstructed railway with watercourses-channels, it is anticipated reconstruction of culverts bridges. Reconstructed objects at the intersection with route line channels will be able to serve as passage ways for animals.
3. On the protected areas and their protection zones shall not be opened borrow pits, disposal of waste materials, installation of any facilities, parking and servicing machinery, transferring fuels and lubricants.

Constant contact with the local population (mainly through municipal authorities and local communities) as well as punitive measures to prevent municipal waste disposal at the area along the tracks and stations and the creation of "wild" and uncontrolled landfills. This "rejection" of waste to conditionally safe distance from the place of residence is actually pretence, because the possible negative events (infection, odour, etc.) are very easy to "return" exactly to waste owner by wind, through domestic animals, etc.

Safety of road users and the local population at level crossings refers to a method of increasing safety on the level crossings to the highest possible, because after completion of the project, all level crossings will be secured by automatic devices.

For the purpose of environmental monitoring and pollution prevention it is necessary to establish monitoring of the soil quality, surface and groundwater, noise and vibration.

Program for soil, surface water and groundwater monitoring

In order to minimize contamination of soil, surface water and groundwater in the treatment of weeds one must be careful regarding use of herbicides by the manufacturer's instructions, and the use Regulations 309, for chemical control of weeds and bushes on railway lines of "Serbian Railways".

Program for noise and vibration monitoring

Monitoring of noise and vibration in residential areas is recommended during the exploitation of the railway, so that in case of addition exceeding the existing values can adequately respond.