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# ENVIRONMENTAL MANAGEMENT PLAN & CHECK LIST

for

# CORRIDOR X HIGHWAY PROJECT

**Component 1 - Corridor Xd**
**The M-1 Road to FYR Macedonia (E-75)**
**NIS - Border of FYRM**

## Section:

# MANAJLE TUNNEL - VLADICIN HAN

- Environmental Category A -

**( DRAFT, 20140321 )**

**Belgrade, March 2014**

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APPENDICES



ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| HSE | Health, Safety and Environment |
| IBRD | International Bank for Reconstruction and Development |
| INP | Institute for Nature Protection of the Republic of Serbia |
| IPCM | Institute for Protection of Cultural Monuments of the Republic of Serbia |
| KS | Koridori Srbije Drustvo sa Ogranicenom Odgovornoscu (“Corridors of Serbia”) |
| NCA | Natural Cultural Assets |
| PAP | Project Affected Person |
| PEPS | Public Enterprise “Putevi Srbije” (Roads of Serbia) |
| PMC | Project Management Consultant |
| SSIP | Site Specific Implementation Plan |
| STI | Sexually Transmitted Infection |
| WB | The World Bank Group |
| WMP | Waste Management Plan |

# EXECUTIVE SUMMARY

## Introduction

The World Bank's Board of Executive Directors on July 9, 2009 approved the Corridor X Highway Project for Serbia, IBRD Loan: EUR€275.2 million, Terms: Maturity = 20 years; Grace Period = 8 years, Project ID: P108005.

The Corridor X Highway Project for Serbia aims to increase transport efficiency and improve traffic safety on the all Project sections of Corridor X, between Leskovac and Levosoje and Nis and Dimitrovgrad respectively, and to improve road management and road safety in Serbia.

The missing Corridor Xd highway section from Grabovnica to Levosoje is approximately 74 km long. The ending point in Levosoje corresponds to the starting point of the 22 km long, already constructed highway section, finished with domestic budget support. Within the missing highway section, the World Bank is already financing first section of 5.6 km of highway between Grabovnica and Grdelica and the section of 26.3 km between Vladicin Han and Donji Neradovac. Additionally, the World Bank will be financing the section of **5.8 km of highway between Manajle tunnel and Vladicin Han which is subject** of this Environmental Management Plan (EMP). Commencement of the motorway section is on km 894+329, right on the exit of Manajle tunnel, close to settlement named Krzince. End of the Section is located on km 900+101, close to settlement Polom, Vladicin Han Municipality. This component involves the construction of cca 5.8 km of new motorway and bridges. Motorway will be tolled and be part of the closed system encompassing the whole Serbian motorway network.

Corridor X is one of the ten pan-European corridors and Serbia's main transport route. It provides vital links to Bulgaria in the east, FYR Macedonia and Greece in the south and to Croatia, Hungary and Western Europe in the north. The construction of the E-75 motorway, running from Nis to the Border of FYR Macedonia, will allow Serbia to capitalize further on its location as a transit country for international transport.

The Project will be carried out by the Project Implementing Entity: "Corridors of Serbia" Limited Liability Company (CoS).

Contracts to be financed with the proceeds of a loan from the World Bank are subject to the Bank's Procurement Policies and Rules and will be open to firms from any country.

**This Environmental Management Plan (EMP) is related to 5.8 km long E-75 Motorway section from Manajle tunnel to Vladicin Han.**

## Location description

The area covered by the EMP document falls entirely in the region of Southern Serbia. The most expansive spatial boundaries of the region of interest for studying the effects of the planned highway cover the expanded area of the southern part of Leskovac from Manajle tunnel to Vladicin Han.

The beginning of subject highway route is located directly on exit portals of Manajle tunnel, close to Krzince settlement. Unlike the previous highway sections, this highway section route is not placed within the valley of the Juzna Morava river and whole road section is located outside of the zone of Grdelica gorge (picture 02). Highway route is

located approximately 1 km east from the Juzna Morava river, The route bypasses Vladicin Han through hilly – mountainous terrain from the eastern side, as to return to the valley of the Juzna Morava, i.e. in the corridor of the existing main road M-1, at the end of the section.

The highway masters two wide valleys: Dzemin Dol and valley of the Vrla River by two structures.

From the intersection Vladicin Han, terrain conditions become significantly "milder".

The analysis of the seismicity of the subject section was carried out using seismological maps and should be treated with an intensity of 8° on earthquake Mercalli Intensity Scale.

There are 5 archaeological sites recognized within the wide area of Caricina Dolina - Manajle tunnel – Vladicin Han highway section, but **no one of them is placed within the corridor of proposed highway section**. Institute for Protection of Cultural Monuments of the Republic of Serbia (IPCM) clearly stated that there are no statutorily protected archaeological sites within the proposed highway route (see App V for details).

However, respecting the IPCM Bill of Quantities delivered to the CoS on December 2010, one archaeological site (Nr.8 "Rupa", Gramadiste, Prekodolce village) is recognized as a subject of preliminary archaeological investigations. This site is completely investigated during archaeological investigations carried out in period from 2011 to 2013.

**Highway alignment does not enter any nature protected site and no statutorily protected flora and fauna will be affected by the construction works**. First 1.5 km of the highway alignment is placed approximately on 500 m distance from eastern border of "Grdelica Gorge" which is not statutory protected but it is area reach with numerous animal and plant species. Rest of the highway alignment is not even close to any nature protected site.

According to a review carried out on the commercial and residential structures, as well as on the infrastructure and superstructure which is located within the affected zone of the highway, it can be said that there are no larger commercial structures. The populace is primarily involved in agriculture. A majority of individual residential structures include a basement, ground floor and attic. The plots of land include several auxiliary structures and gardens. Local traffic of residents from the surrounding villages takes place partially on the major road M-1 Belgrade - Skoplje and regional road R-214.

**Project description**

The elements of the highway cross-section within the first highway section between Manajle tunnel and "Vladicin Han" intersection have been dimensioned for a calculated speed of 100 km/h (total width of the plane 26.1 m). On second highway section between "Vladicin Han" interchange and Polom settlement have been dimensioned for a calculated speed of 120 km/h. AADT for 2032 amounting to 19,807 vehicles every 24 hours on average.

On the alignment of the analyzed section of the highway there are several engineered structures which may be significant in the sense of defining certain effects from the domain of the environment. On the analyzed section, there are 4 bridges and 1 interchange ("Vladicin Han"):

- km 895 + 362.96 - bridge across Dzemin Do, L = 495.19 m
- km 896 + 742.48 - bridge across River Vrla, L = 635.34 m

- km 897 + 445.28 – bridge on „Vladicin Han“ Interchange, L = 49.00 m
- km 898 + 514.50 - bridge across creek Oslarci, L = 105.30 m
- km 899 + 197.10 - bridge across creek Civlak, L = 105.30 m

The problem of consumption of energy and various natural resources for construction and operation of the highway also represents a component which must be analyzed in great detail. The influence of this parameter may be quantified through the volume of works as well as the quantity of used materials. Upon review of the basic positions for construction of the newly planned highway, one can see that there is a significant quantity of earth material needed during construction of the road base, which with it brings the requirement of forming a borrow pit. The used borrow pits, following operation, must be recultivated and in that way the present negative consequences are reduced.

The emission of polluting materials in the construction phase is limited by time and, in relation to the length of operation, in a majority of cases, can be disregarded along with the presence of the road itself which, except for the immediate placement of new relations in the environment, does not contribute to the release of materials which may endanger the condition of the environment. The movement of motor vehicles is the only possible cause of degradation of present ecological potentials. Because of the adopted methodology for modeling of emissions, it is fitting to divide emissions from these sources into three groups:

- gaseous materials,
- solid and liquid phases,
- noise.

From the aspect of the durational character of emissions, pollution in the wider sense may be constant, seasonal and incidental (accidental).

**Existing condition of the environment**

The existing condition of the environment was analyzed in relation to the factors of the environment which can be exposed to the risk of pollution - degradation as a result of the construction and operation of the section Manajle tunnel - Vladicin Han, E-75 Highway.

The largest portion of space of the studied area is covered by annual and perennial crops, and a smaller portion is covered by orchards and vineyards. Natural, autochthonous vegetation is maintained only in the direct vicinity of waterways. The reason for such a condition can be found in the characteristics of land which is not suitable for agricultural production. Natural vegetation is represented by hygrophilous meadows and forests. It is also possible to see shrubbery vegetation at the edges of agricultural surfaces.

For the studied area there is no available data on the presence of polluting materials in the soil. Empirically, it can be expected that the intensification of traffic and agricultural activities may lead to excessive pollution of the environment, including the soil.

Data on the condition of air pollution for the wider affected zone of the section of the E-75 Highway from Manajle tunnel to Vladicin Han was not available at the time when the study was carried out. Due to no industrial structures being marked within the studied area which could cause increased levels of concentrations of pollutants in the atmosphere, it can be justifiably assumed that the quality of the air is at a satisfactory level.

It can be expected that the construction of the planned section of the highway will, within spatial limitations, aggravate the current condition of certain facets of the environment within the affected zone of the newly planned section of the highway from Manajle tunnel to Vladicin Han.

**Environmental impact**

The environmental impact which will be caused by the construction, operation and maintenance of the section Manajle tunnel - Vladicin Han of the highway Beograd - Nis - FYR Macedonian border indicate qualitative and quantitative changes in the environment during the construction phase, and the subsequent opening to traffic, as well as the additional exceptional risks engendered by an accident.

By modelling concentrations of air pollution for the given motorway sections, the following conclusions were made:

- On the route section from the exit from "Manajle" tunnel to Vladicin Han, under conditions of the dominant wind (NE, speed 2.8 m/s) and for AADT in the planning period, concentrations of all polluting substances are below the limit immission values;
- In windless periods, which is 24 - 30% of the time, the limit immission values for NO2sr are exceeded for the traffic volume of over 7000 vehicles per day, and in the planning period, the limit values will be exceeded up to 22 m from the pavement edge; for the same conditions, the exceeding of limit immission values for lead is 13 m from the pavement edge; other pollutants do not exceed the limit immission values.

The problems of soil pollution have a certain place within the total relationship between the road and environment. A more significant level of soil pollution appears in the region from 5.0 m to 10.0 m from a road which has a heavy traffic load. Taking into consideration the concept of drainage (open system) of atmospheric waters on the analyzed section of the newly planned highway, it can be concluded that the negative effects on soil could be expressed in the zones from 1.0 m to a maximum of 5.0 m along the length of the road which enters into the "buffer zone", so any significant soil pollution will fall within that buffer zone.

The emission of gaseous materials resulting as a product of the combustion of fossil fuels in the engines of motor vehicles is presented through the quantities of six dominant components of exhaust gases from internal combustion engine and diesel engines in grams per kilometer of traversed road. Based on specific emissions and the known traffic load, the total quantities have been determined for the following pollutants: CO, CxHy, Nox, $SO_2$, Pb, CC.

Emissions of solid and liquid particles in the phase of regular operation of the highway are the consequence of the processes of leaking fuel, oil and lubricants, settling of exhaust gasses, tire wear, wear of the highway construction, damage to vehicles, spilling of loads, leaking of loads, and discarding organic and inorganic waste.

For quantifying the quantities, the presumption is accepted that all solid and liquid materials are first deposited onto the surface of the highway and then over time, through dispelling, watering, washing away and other processes, it reaches the soil, surface water, underground water, etc. In accordance with this, and based on foreign experiences acquired

from 20-year investigations, an estimation has been done for emissions of polluting materials which remain on highway surfaces, as well as the total quantity of polluting material on the subject section of the highway on the annual level.

The evacuation of pavement runoff waters will be of controlled type. The entire discharge from the given section will be controllably evacuated to shafts and enclosed rainwater drainage systems, wherefrom all water goes to treatment facilities – stormceptors. Using those facilities, all collected water from motorway will be treated as required, and then discharged into recipient.

There is no significant noise impact among the residential areas along the proposed highway rote, mostly due to the fact that closest noise "carriers" as a railway line Nis - FYR Macedonian border, existing M-1 motorway and regional road R-214 are placed on a distance bigger then 1.5km from proposed road alignment. Only exception is exact end of the route, close to the Polom settlement, where existing arterial M-1 road becomes a consisting part of a new highway section.

It is considered that upon construction of the subject section, traffic noise will be dominant on the observed study area. Based on the obtained values of the expected level of noise from the observed section, it can be concluded that the legally prescribed values can be expected to be exceeded most during the night, that being by 15 dB(A).

On the basis of the numerical data obtained through the calculation of traffic noise in the planned period at the characteristic cross-sections which are presented in the corresponding tables, it can be concluded that excessive levels of noise are present.

The obtained authoritative levels indicate that in the planned period the levels of noise expected at the referenced distance of 25 m, during the day should stay around 75 dB(A) and during the night around 71 dB(A). The difference between levels at individual places is a consequence of physical restrictions in the cross-section which cause the reduction in level. If the limit value of a permitted level of 55 dB(A) is adopted for nighttime conditions, which applies to structures along major highways, under the conditions of free distance of sound, this value would be reached at the closest distance of around 50 m and at the furthest distance of around 430 m from the axis of the planned highway.

Based on above mentioned level of noise impact, it is expected that several settlements will be directly affected with the noise caused by the traffic on new Manajle tunnel – Vladicin Han highway section. Appropriate mitigation measures were considered during design phase and 4 noise protection structures will be constructed along the proposed highway route:

| chainage | settlement | position | height | length |
|---|---|---|---|---|
| 894+969.54 to 895+070.15 | Krzince | right | 2.5 - 4.5 | 100 |
| 895+013.41 to 895+098.06 | Krzince | right | 3.5 - 5 | 84 |
| 897+672.98 to 897+926.57 | Oslarci | right | 1.5 - 3 | 252 |
| 899+993.55 to 900+100.81 | Polom | left | 1.5 - 5 | 108 |

Being that along the planned highway there are structures which could be analyzed for negative effects, the previously obtained values serve as the criteria for identification of those residential structures which are potentially in danger of being affected by noise from the highway.

During construction of the section Manajle tunnel - Vladicin Han, residents of the settlements which the newly planned highway crosses through or passes by will be exposed to various effects which are of a temporary character and are spatially limited. They are exposed to the evaporation of polycyclic aromatic hydrocarbons (PAH) during placement of asphalt layers. Earthworks lead to a significant emission of dust. Unpleasant smells result from handling materials including construction materials, drainage and waste.

Comparing the effects of construction, positive and negative, in both cases leads to the conclusion that the benefits to social circumstances in the case of construction of the planned section of the highway are much greater than the damage which also occurs as a consequence of construction. Most significant positive social impacts of proposed highway project are:

- improved access to work, health care, educational and welfare facilities
- improved access to administrative market centres
- travel and waiting-time savings.
- decreasing of the journey time and increasing of travel cost-efficiency
- traffic safety

Based on the request for issuing an opinion and conditions for conducting the study on the evaluation of effects on the environment from the E-75 Highway Belgrade - Nis - FYR Macedonian border, section Manajle tunnel - Vladicin Han, which was sent by the Highway Institute, the Institute for the Protection of Cultural Monuments of Serbia issued the conditions based on which it is necessary to inform the National Institute for Protection of Cultural Monuments - Belgrade before beginning any kind of earthworks so that an archeological supervision can be carried out during excavation works, in order to ensure appropriate protection activities in case on chance finds.

Determining the effects of the planned section of the highway in the domain of natural heritage implies the possible effects which relate to protected natural resources or structures of natural heritage which do not have this categorization, but do deserve special mitigation measures on the basis of their characteristics. Upon reviewing the registry of protected natural resources, it has been established that within the analyzed area there are no structures which fall under this category. The fact is however that within the analysis of the existing condition, spatial units stand out for which there are proposals regarding their arrangement and placement under special protection.

Grdelica Gorge - an area suitable for health tourism and relaxation is located out of zone of the studied area (see picture 02)

During 2012 the preliminary archaeological excavation are completed for only location (Nr.8 “Rupa”, Gramadiste, Prekodolce village) for which investigations were requested within the by BoQ obtained from IPCM, despite the fact that previously prescribed preconditions of IPCM clearly stated that there is no statutorily protected archaeological sites within the proposed highway route. So, there will be no more preliminary archaeological excavation along the proposed highway section from Manajle tunnel to Vladicin Han. Only smaller protective archaeological intervention could be arranged in case of chance finds during earth works.

Taking into account the characteristics of the planned highway and local conditions, the

only component which has an effect on the landscape is the morphological characteristics of a new highway section.

**Mitigation measures**

The mitigation measures by which negative consequences could be reduced to within acceptable limits encompass several activities for each of the detected effects and those being in the phase of construction and operation phase of the highway.

The measures which are envisaged by the law and other regulations, normative, standards and corresponding statutes are called regulatory measures. The basic legal regulations on the requirement of conducting special studies, which are an integral part of the planning and design documentation, are specified within chapter 10.

Bridges represent a significant risk as far as pollution of waterways is concerned. Positions (Reduced Distance - RD) of bridges across the river and streams on the subject section of the highway are provided in chapter 4.5. In those places, when damage has already occurred, the possibilities of rehabilitation are very small, so it is necessary to perform an analysis directed at envisaging mitigation measures which would prevent pollution from reaching the waterway. The envisaged preventative measures are limited speed, raised curbs and protective barriers on bridges, as well as emergency response and mitigation measures in case of accidents, which are defined in this document separately.

Plans and technical solutions encompass the technical measures which are carried out during construction of structures and during operation, mitigation measures for traffic noise, mitigation measures for surface and underground water and wildlife mitigation measures. All of those measures are aimed at decreasing and minimizing the possible effects on the environment.

With consideration of the level of noise from traffic in the planned period which was obtained through the calculation of authoritative levels defined by law, it is necessary to envisage a structure for protection from noise in places where the alignment is located within the vicinity of settled areas.

The analyses on the framework of the analyses on possible effects indicate that the limit values of permitted levels for urban areas along major highways are reached at distances of around 80 to around 250 meters from the newly planned highway. It is necessary to place noise protection walls for a total length of 540 m.

| chainage | settlement | position | height | length |
|---|---|---|---|---|
| 894+969.54 to 895+070.15 | Krzince | right | 2.5 - 4.5 | 100 |
| 895+013.41 to 895+098.06 | Krzince | right | 3.5 - 5 | 84 |
| 897+672.98 to 897+926.57 | Oslarci | right | 1.5 - 3 | 252 |
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Mitigation measures for quality control within surface waters in the phase of construction are characterized by the following:

All works related to excavation and construction of foundations, support walls, and other structures which are located on or in the vicinity of bodies of water, shall be carried out during periods of low water level (July - September), in order to reduce the negative effects on the rivers and their shorelines to a minimum.

Additionally, in the direct vicinity of rivers, spillage of any kind of dangerous substances must be avoided. Maintaining, refueling and cleaning construction machinery shall be carried out at locations which are far away from waterways.

The riverbanks in the studied area must be protected by fences during the construction phase. Driving of machinery within rivers, streams or on their banks should be prevented except in cases when it is impossible to avoid due to construction of a certain structure or building.

The evacuation of pavement runoff waters will be of controlled type. The entire discharge from the given section will be controllably evacuated to shafts and enclosed rainwater drainage systems, wherefrom all water goes to treatment facilities – stormceptors, and then discharged into recipient.

Considering that contamination is present in water runoff from the highway in the first 10-15 minutes of rainfall which is of a high enough intensity to move a majority of particles deposited on the highway, as a measure for preventing infiltration of pollutants into lower layers of soil and underground water or surface water, the already envisaged humus layer can be used on slopes of embankments which has filtering characteristics in the sense of retaining polluting material during the vertical permeation into the soil. This can also be used in zones of cuts by laying humus in the collateral drainage ditches. The capacity of a humus layer depends on the intensity of traffic and the relation between drained surfaces of the road and surface infiltration.

One of the more significant consequences of construction of the highway is the phenomenon of fragmentation of the habitats which in this case hits amphibians the hardest. For the purpose of protecting biodiversity and undisturbed movement, multi-functional passages will be built along the waterways, viz. in those places where the construction of bridges has been envisaged. Bridges will be their own ecological corridors with a little revamping so that the bank of the waterway takes up a third of the passage under the road. The sides of the riverbank must be coarse in order to prevent the sliding of animals into the waterway and in order to enable easier exit from the waterway. The area before and after the passage must be covered in an identical type of soil and vegetation.

Along the aforementioned passages, envisaged slab and tubular culverts will be used for movement of wild animals. As there are no larger wild animals in the region in question, these passages represent a suitable place for the crossing of small wild animals. On the observed section there are three slab and four tubular culverts through which animals may pass.

If during construction archeological findings or archeological objects are uncovered, The Contractor is required to immediately, without delay, halt works and inform the authorized Institute for the Protection of Cultural Monuments and to undertake measures to ensure the findings are not destroyed or damaged and to protect the area and position in which they are discovered.

The general and administrative measures of environmental protection are specified within the project documentation, especially within the EIA Study and Detailed design of environmental protection produced for Manajle tunnel – Vladicin Han highway section. The general measures of environmental protection encompass the global knowledge from this area which fit in with the global strategy, local spatial conditions and the characteristics of the planned highway.

**Monitoring**

Monitoring refers to the monitoring of all environmental impacts of the project and efficiency of implemented mitigation measures. Measurement of effects of the highway on the quality of air, water and soil, as well as the occurrence of noise is consisting part of Monitoring Plan produced for this highway section. Mitigation plan and Monitoring plan and Check list are integral part of this EMP document (see App I and II).

Monitoring of air pollution during the phase of construction of the highway includes determining the effects on the quality of air while construction works are being carried out in the vicinity of densely populated areas.

The evacuation of pavement runoff waters will be of controlled type. The entire discharge from the given section will be controllably evacuated to shafts and enclosed rainwater drainage systems, wherefrom all water goes to treatment facilities – stormceptors. Using those facilities, all collected water from motorway will be treated as required, and then discharged into recipient. By reviewing and referring to legal regulation, it is prohibited to disturb the existing quality of water in the waterways in this region.

Monitoring of surface water during the construction phase encompasses the measurements of: pH, concentration of dissolved oxygen in the water, waste materials, murkiness, concentration of organic compounds and mineral oil. The taking of samples is done on a part of surface water downstream from the construction site. The monitoring program is administered in such a way that it can be used to establish which construction works affect the quality of surface waterways.

Water quality of the River Vrla is to be monitored by taking samples on survey mark km 896+741.36, downstream from the bridge and inflowing channel. Sampling is to be done when relevant precipitation occurs, during the first 15 min. Samples must be taken in monthly intervals and that being before the commencement of works, at the time when humus is being removed and when excavation or the building of embankments from earth material is being carried out. Details related to sampling, exact locations, number and type of measurement, equipment and frequency are clearly stated within the Monitoring Plan of this EMP Document (See App II).

Monitoring of surface water during the operation phase encompasses the measurements of: pH, concentration of dissolved oxygen in the water, waste materials, murkiness, concentration of organic compounds and mineral oil, as well as temperature, color and odor.

Sampling should be done in January, April, July and October, which covers a sample of periods of low and high water levels.

For underground waters, the parameters which are the subject of monitoring are divided into the three groups: geological-hydrological, physical-chemical and chemical.

All measurements begin one month before the beginning of preparatory works. The parameters which are the subject of monitoring are divided into the groups geological-hydrological, physical-chemical and chemical. Measurement of the basic and indicative parameters of underground waters should be done at least four times a year with an interval of at least two months. Measurements of the chemical and physical-chemical parameters are done quarterly. The days when samples are taken will depend on the level of underground water, precipitation and other geological and hydrological relations.

There are two locations recognized within the EIA Study and Detailed design which are sensitive for possible underground water pollution. Those are:

- zone of the Oslarci settlement, km 897 + 850.00 to km 897 + 920.00
- zone of the Polom settlement, km 899 + 250.00 to km 900 + 100.00

Monitoring of groundwater quality on those two locations will be performed as a regular control of the drinking water at the construction site. The monitoring plan for underground waters was prepared in accordance with the requirements of the EIA Study and Detailed Design of environmental protection for proposed highway section as well as in accordance with the basic characteristics of construction of the subject section of the highway.

Additionally, based on engineering safety, it is necessary to take measurements of the quality of water from individually-owned wells (quality of drinking water) in in accordance with the regulations for sampling at certain time intervals. Measurement of the quality of underground water will be done for each well at distance less than 100m from highway route.

In the situation when the measurement results and analysis indicate an increase of negative effects, it is necessary to determine the cause of the deteriorating condition and undertake the necessary mitigation measures.

The monitoring program for soil during the construction phase includes parameters which are divided into two groups: hard metals, and greases and oils. Monitoring allows those works which negatively affect the quality of soil to be identified. Sampling is done before the beginning of works and while earthworks are being carried out. Additional measures are carried out when the measurement results and analysis indicate an increase in negative effects. Measurement of the quality of soil will be done on agricultural lands which belong to the Polom and Oslarci villages, at zone close to expropriation line. Type of measurement and frequency are prescribed within the App II of this EMP document.

During the operation phase, monitoring is done only in the case of excessive concentrations of pollutants in the runoff waters from the highway. Sampling is done in the direct vicinity of the structure, viz. at the edge of the carriageway belt.

Monitoring of noise is done during both the construction phase and operation phase. While works are being carried out, the main source of noise is heavy construction machinery. Within the framework of the monitoring of noise while works are being carried out, it is obligatory to conduct measurements of the zero point and measurements of the highest levels (peaks) of noise during construction.

During operation , within the defect notification period, noise must be controlled with the goal of controlling the effectiveness of envisaged noise protection measures. Measurement of the level of noise must be carried out in intervals of five years and in cases of complaints from adjacent inhabitants.

Based on the numerical data obtained by calculation and the relevant levels defined by law, a conclusion may be drawn that limit noise levels are exceeded in the several zones in which the registered structures are located and appropriate mitigation measures are planned by using noise protection barriers (see chapter – Description of mitigation measures).

Residential objects which will be monitored related to noise problems are located on the following chainages: 895+020 (Krzince), 895+056 (Krzince), 896+750 (Vladicin Han), 897+750 (Oslarci) and 900+047 (Polom).

**Public Consultation**

*Public Consultations on EIA Study*

Public Consultation was held in Vladicin Han, on Oct 02, 2008, and there were no major complains on prepared draft EIA Study. The sub-section EIA Study has been approved by the Serbian Ministry of Energy, Development and Environmental Protection (former MOESP) on Apr 06, 2010 (No 353-02-283/2008-02).

*Public Consultations on Corridor Level EIA report*

Public Consultations were concluded on March 12, 2009, from 12 to 02 PM (local time), by presentation of the subject EIA Study on the premises of the Municipality of Vranje.

Presentation of the EIA Study for the E-75 Highway Project, Nis – FYRM Border, Section Grabovnica – FYRM Border, was attended by representatives of the Municipality of Vranje, EIA Study Author, WB representative, representatives of the PE "Roads of Serbia" and the interested public. List of participants is included in this Report.

During the public consultations, there were no significant remarks in regards to environmental protection issues related to Manajle tunnel - Vladicin Han Highway section.

*Public Consultations on Site Specific EMP, section Caricina Dolina – Manajle tunnel – Vladicin Han*

Site specific EMP document for Caricina Dolina – Manajle tunnel – Vladicin Han highway section is produced during 2011, respecting all the comments, requirements and conclusions prescribed within the EIA Study, Corridor Level EIA Study and Detailed design of Environmental protection produced for proposed highway section.

EMP document was disclosed on CoS web site since it was produced (2011) and was publicly available for last two years.

No single comments, remarks or suggestions were received from interested public during disclosure period.

# 1. PROJECT DESCRIPTION

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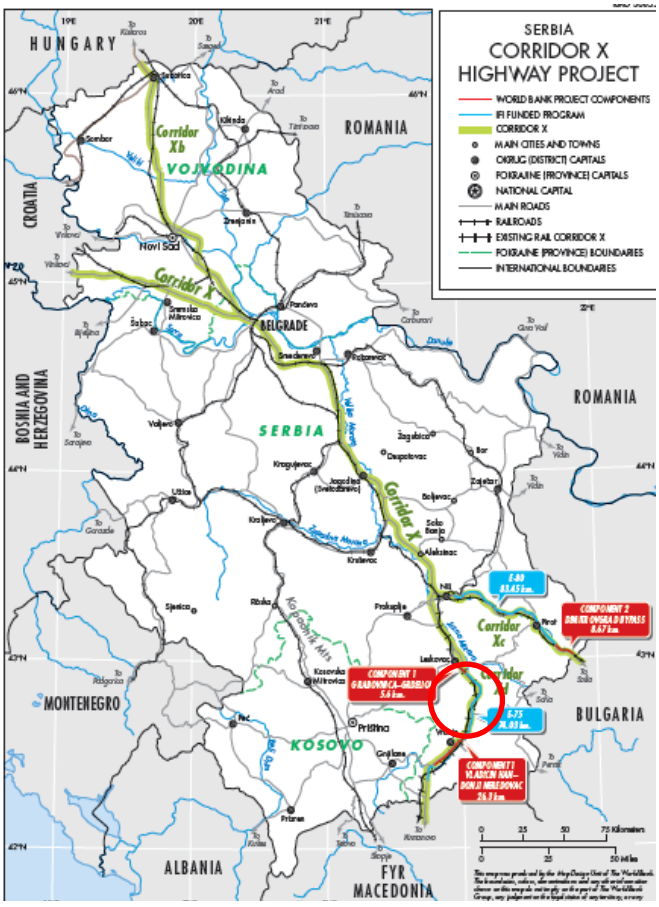
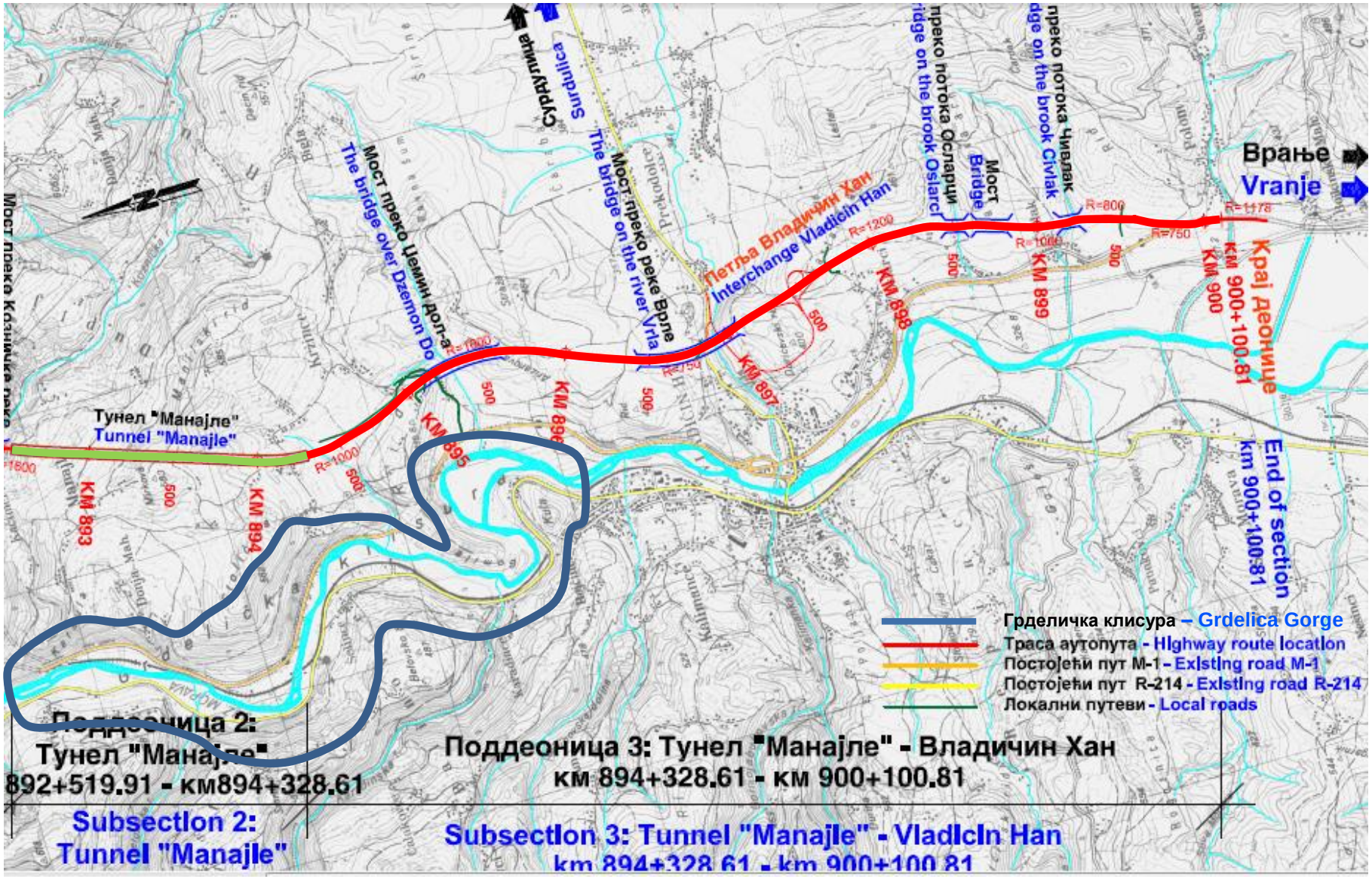
## 1.1. Location Description

The missing Corridor Xd highway section from Grabovnica to Levosoje is approximately 74 km long. The ending point in Levosoje corresponds to the starting point of the 22 km long, already constructed highway section, finished with domestic budget support. Within the missing highway section, the World Bank is already financing first section of 5.6 km of highway between Grabovnica and Grdelica and the section of 26.3 km between Vladicin Han and Donji Neradovac. Additionally, the World Bank will be financing the section of **5.8 km of highway between Manajle tunnel and Vladicin Han which is subject** of this Environmental Management Plan (EMP). Commencement of the motorway section is on km 894+329, right on the exit of Manajle tunnel, close to settlement named Krzince. End of the Section is located on km 900+101, close to settlement Polom, Vladicin Han Municipality. This component involves the construction of cca 5.8 km of new motorway and bridges. Motorway will be tolled and be part of the closed system encompassing the whole Serbian motorway network.




Picture 1: Corridor Xd Highway Project with marked Manajle tunnel - Vladicin Han highway section




Picture 2: Manajle tunnel - Vladicin Han Highway section

According to the World Bank Environmental Policy, this project is classified as Category "A" because the project could result in potentially significant adverse future environmental impacts.

The beginning of subject highway route is located directly on exit portals of Manajle tunnel, close to Krzince settlement. Unlike the previous highway sections, this highway section route is not placed within the valley of the Juzna Morava river and whole road section is located outside of the zone of Grdelica gorge (picture 02). Highway route is located approximately 1 km east from the Juzna Morava river, The route bypasses Vladicin Han through hilly – mountainous terrain from the eastern side, as to return to the valley of the Juzna Morava, i.e. in the corridor of the existing main road M-1, at the end of the section.

The highway masters two wide valleys: Dzemin Dol and valley of the Vrla River by two structures.

From the intersection Vladicin Han, terrain conditions become significantly "milder".

## 1.2. Already executed works in the immediate sections

Highway section from Manajle tunnel to Vladicin Han is a third LOT on originally designed integral E-75 highway section from Caricina Dolina to Vladicin Han (km 885+772.79 to km 900+100.81). Caricina Dolina – Vladicin Han highway section is 11.8 km long and comprises of following LOTs:

- LOT 4 "Manajle tunnel"
- LOT 5 "Caricina Dolina – Manajle tunnel" highway section
- LOT 6 "Manajle tunnel – Vladicin Han" highway section

LOT 4 and LOT 5 are financed by the European Investment Bank (EIB). Works are already commenced and are still in progress.

During 2012 all the preliminary archaeological excavation are completed for only location (Nr.8 "Rupa", Gramadiste, Prekodolce village) for which investigations were requested within the by BoQ obtained from relevant institutions, especially Institute for Protection of Cultural Monuments (IPCM). Despite the fact that previously prescribed preconditions of IPCM clearly stated that there are no statutorily protected archaeological sites within the proposed highway route. So, there will be no more preliminary archaeological excavation along the proposed highway section from Manajle tunnel to Vladicin Han. Only smaller protective archaeological intervention could be arranged in case of chance finds during earth works.

<u>Progress on LOT 4 and LOT 5</u>

- Immediately after site reconnaissance Environmental Management Plan Supervision Consultant (EMPSC) carried out surface water and soil sampling and measurements of air quality and noise levels.
- Archaeological Institute of Serbian Academy of Science and Arts together with Faculty for Philosophy (archaeological Department) performed protective archaeological investigations and excavations, according to the EMP and EIA Study requirements. Archaeologists completed excavation works on all identified locations.

- LOT 4 - Tunnel Manajle. Contract for construction works is signed with Consortium Alliance X (ADVAL JSC and Road & Bridges ltd) - Bulgaria. Commencement of the works was during 2013 construction season.
- LOT 5 - Highway and Bridges from Caricina Dolina - Tunnel Manajle. Contract for construction works is signed with JV: Integral Inzenjering, Interkop Misar and Prijedor putevi. Commencement of the works was during 2013 construction season.
- The EMPSC carried out a site reconnaissance in August 2013, which concentrated on issues related to the RAPs.
- Furthermore, EMPSC suggested that the Contractor provide training regarding the environmental requirements to its management team and the operatives. This activity is not done yet.
- The Contractors submitted their SSIP for this works sections (LOT 4 and LOT 5). The EMPSC has provided their comments on both SSIP documents during winter 2013/2014 and is waiting to receive revised SSIP from the Contractor.
- No key environmental issues were noted on LOT 4 and LOT 5 during period from Work commencement to February 2014

## 1.3. EIA Procedure for "Manajle tunnel – Vladicin Han" highway project

EIA procedure prescribed by the Serbian Law on EIA ("Official Gazette of RS" No. 135/2004, 36/2009) is completed in 2010 year. Public Consultation and Public Disclosure for the Draft Environmental Impact Study (EIA Study) is finished in October 2008 (see chapter 7 – Public Consultations). The Technical Commission evaluated the EIA Study, together with the systematized report on the consultations of the authorities, organisations and the public concerned and the report on the completed impact assessment procedure, and evaluated the suitability of the measures envisaged to prevent, reduce or eliminate the likely harmful effects of the project on the environment.

**Final Environmental Approval for E-75 Highway section from Manajle tunnel to Vladicin Han is obtained from the Ministry of Environment and Spatial Planning on April 06$^{th}$ 2010 (see App IV).**

Final environmental approval of the EIA Study set out specifically the conditions and measures, which should be undertaken to prevent, reduce or eliminate the adverse effects on the environment. All conditions and measures are presented in this EMP in Annex V.

Additionally, for all five E-75 Highway sub-sections between Grabovnica and Levosoje existing section specific EIA Reports were integrated into the Corridor level EIA Report for section E-75 covering the proposed highway alignment. The Corridor level EIA Report for section E-75 can be found at the following web sites:

- The World Bank (WB) web site:

http://search.worldbank.org/all?qterm=serbia+corridor+level+EIA+&title=&filetype=

- PE Roads of Serbia web site:

http://www.putevi-srbije.rs/strategijapdf/finaleiae75eng.pdf

- KS web site:

http://www.koridor10.rs/en/environmental-protection

Finally, as a part of Project documentation, PEPS has prepared a detailed design of environmental protection for Manajle tunnel - Vladicin Han, as a regulatory instrument according to Serbian law. This document is one of the basic documents which are used in process of preparation of this EMP and can be obtained in the PEPS main office, Belgrade, Bulevar kralja Aleksandra 282.

The Corridor Level EIA and detailed design of environmental protection for Manajle tunnel - Vladicin Han Project provides a platform, on which Site-Specific Environmental Management Plan (EMP) and Checklist, for this sub-section, have been prepared. Detailed design of environmental protection contains concrete mitigations and monitoring measures which are relevant to this Project. This EMP reflects the additional baseline refinement data work required prior to works commencing, such as data contained in site-specific implementation plan, prepared by the contractors and approved prior to commencing works. This EMP and Checklist should be a part of the bidding documents, to ensure the contractors are aware and meet their formal obligations in this respect. The bidders are obliged to prepare their own site specific implementation plan (SSIP), to be approved by CoS, containing the detailed information on meeting the requirements detailed in this EMP. The SSIP will be highly site-specific and be compiled as part of the construction planning for aspects such as fuel stores, plant selection and performance and material sourcing and sub-contracting.

EMP and Check List are produced to point at the essential environmental requirements during the construction of cca 5.8 km of motorway on a section of the corridor between Manajle tunnel and Vladicin Han, and guide the potential bidders in preparation of SSIP in order to eliminate, offset, or reduce potentially adverse environmental impacts to acceptable levels. Description of mitigation measures and Description of monitoring program are key parts of this document.

## 1.4. Basic Project Data

For the purpose of drafting the preliminary design of the E-75 Highway, Nis – FYR Macedonian border, section Manajle tunnel - Vladicin Han, preliminary works were carried out in the established corridor of the highway.

The elements of the highway cross-section within the first highway section between Manajle tunnel and “Vladicin Han” intersection have been dimensioned for a calculated speed of 100 km/h (total width of the plane 26.1 m). On second highway section between “Vladicin Han” interchange and Polom settlement have been dimensioned for a calculated speed of 120 km/h. AADT for 2032 amounting to 19,807 vehicles every 24 hours on average.

In accordance with the TOR, a concept of water drainage has been adopted. The principle of an open system for water drainage is characterized by the free (uncontrolled) flow of water from the highway down the slope of the embankment.

In the observed area there are no registered water supply wells.

On the alignment of the analyzed section of the highway there are several engineered structures which may be significant in the sense of defining certain effects from the domain of the environment. On the analyzed section, there are 4 bridges and 1 interchange (“Vladicin Han”):

- km 895 + 362.96 - bridge across Dzemin Do, L = 495.19 m
- km 896 + 742.48 - bridge across River Vrla, L = 635.34 m

- km 897 + 445.28 – bridge on „Vladicin Han“ Interchange, L = 49.00 m
- km 898 + 514.50 - bridge across creek Oslarci, L = 105.30 m
- km 899 + 197.10 - bridge across creek Civlak, L = 105.30 m

Tunel "Manajle" is a separate LOT and it is not consisting part of „Manajle tunnel – Vladicin Han“ highway section. Tunnel is designed with sepatated tunnel tubes. Lenghth of the left tube is 1800m (km 892+520 to km 894+320). Lenghth of the right tube is 1804m (km 892+570 to km 894+323).

„Vladicin Han“ Interchange on km 897+445 is part of this motorway section too.

# 2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

## 2.1. Relevant Institutions

During the construction and operation of highways in the Republic of Serbia, environmental protection is managed by mutual cooperation between the following statutory government institutions:

The Ministry of Energy, Development and Environmental Protection (MoEDEP) is the key institution in Serbia responsible for formulation and implementation of environmental policy matters. The Ministry is responsible for protection against noise and vibration, hazardous and toxic material, air pollution, ionic and non-ionic radiation, nature protection and international co-operation. The other aspects of natural resources management related to issues of construction and operation of highways in the Republic of Serbia, are dealt with by several other institutions, among which are the Ministry of Economy and Regional Development; the Ministry of Infrastructure; the Ministry of Agriculture, Forestry and Water Management; the Ministry of Culture; the Public Enterprise 'Putevi Srbije' (PEPS); the Institute for Nature Protection of Serbia (INP); the Institute for Protection of Cultural Monuments of the Republic of Serbia (IPCM), and KS.

## 2.2. Existing Serbian legislation

Environmental protection in Serbia is regulated by several national and municipal laws and by-laws. The environmental legislation in force in Serbia is summarized in Appendix III.

## 2.3. Main steps of national procedure on EIA in the Republic of Serbia

In the juridical system of the Republic of Serbia, the Environmental Impact Assessment procedure is regulated by the Law on Environmental Impact Assessment, along with appropriate sublegal enactments which determine particular issues within the Impact Assessment procedure in more detail. One of the significant elements in the procedure itself is public involvement (see chapter 5.) and the duty of forming the Technical Committee. Environmental Impact Assessments are required for the projects which are being planned and executed, technology improvements, reconstructions, capacity expansion, work termination and removal of projects which significantly influence the environment.

The procedure of Environmental Impact Assessment consists of three phases (depending upon the nature of any specific project, there can be one, two or more phases):

- Phase I: Decision-making on the necessity of preparation of the Environmental Impact Assessment for the project

- Phase II: Specification of scope and contents of the Environmental Impact Assessment Study – Screening Phase

- Phase III: Environmental Impact Assessment Study

Entities which have participated in preparation of the Environmental Impact Assessment for this section of the highway are the following: Project contractor (PEPS), relevant authority (Ministry of Energy, Development and Environmental Protection), and experts – authors of the study sections, other technical institutions and municipal authorities, organizations and general public.

According to the Law on EIA ("Official Gazette of RS", 135/04, 36/09), KS may not

commence construction without having previously completed the impact assessment procedure and obtained the approval of the EIA Study from the competent authority (MOESP).

## 2.4. Relevant World Bank policy

This section is financed from the WB Loan and the following Policies are relevant for the environmental component of this Project:

- Operational Policy OP 4.01 Environmental Assessment;
- OP 4.04 Natural Habitats,
- OP 4.12 Involuntary Resettlement and
- OP/BP 4.11 Physical Cultural Resources.

# 3. BASELINE CONDITIONS ASSESSED DURING ALIGNMENT SURVEY

## 3.1. Geology and soil

For the studied area of the section Manajle tunnel - Vladicin Han, E – 75 Highway Belgrade - Nis – FYR Macedonian border there are no available data on the presence of polluting material in the soil. Empirically, it can be expected that the intensification of traffic and agricultural activities may lead to excessive pollution of the environment, including the soil.

Position of Grdelica gorge

**Grdelica Gorge - an area suitable for health tourism and relaxation is located out of zone of the Manajle tunnel – Vladicin Han highway section (see picture 02).**

By reviewing the official register for the analyzed area which is the subject of the study, it has been confirmed that there are no registered habitats of rare or protected species so possible effects within these categories are not expected.

**INP reviewed the final EIA Study and confirmed that Study incorporated all nature protection requests prescribed within the preconditions No 03-2058/2 from 07.12.2005** (ref.no.03-2355/2 from 06.10.2010.

INP confirmed that there are no statutory protected areas along the proposed highway route. Additionally, INP confirmed that EIA Study contain all necessary mitigation measures which will contribute to minimize negative project impacts on natural and social environment (see App. V for details).

Material Sources

Quarry "Momin kamen" can be used for this purpose (about km 890+900), a stone mine which is in the very vicinity of the highway route. In general borrow pits and quarries are well regulated by authorities in the country.

## 3.2. Surface and ground water

Between the Manajle tunnel and the town of Vladicin Han, the analyzed area includes the zone of confluence of the more important tributaries of Juzna Morava river - watercourse in Dzemin Dol valley and the Vrla River. Also, the highway route is crossed by a number of unnamed brooks, as well as numerous slopes wherefrom surface waters flow towards the route of the future highway.

In order to supply the town of Vladicin Han with water, two springs have been formed in the Alluvium whose capacity is Q = 26 l/s. These springs are approximately 500 - 600 m distant from the projected highway route.

Main water bodies on proposed motorway section are:

1. Vrla River
2. Oslarci Creek
3. Civlak Creek

## 3.3. Air

Within the corridor of the future highway section between Manajle tunnel and Vladicin Han there are no significant non-point or point sources of air pollution. The major roads M-1, as well as the regional road R-214, are linear sources which could potentially cause

an increased concentration of air pollutants. Due to no industrial structures being marked within the studied area which could cause increased levels of concentrations of pollutants in the atmosphere, it can be justifiably assumed that the quality of the air is at a satisfactory level.

Data on the measured values of air pollution in the observed corridor were not available. It is presumed that the planned section of the highway will become the dominant linear air polluter within the observed area.

### 3.4. Climate factors

The entire area along the planned alignment of the highway is characterized by a mild - continental climate. There is a relatively small volume of precipitation during the summer, but there are strong wind currents. The annual mean air temperature for the period of 1931 - 1970 at meteorological station Vladicin Han is 8°C -12.7°C. The annual mean temperature amplitude is 21°C. Average precipitation is 606-911mm.

### 3.5. Ecosystems (Flora and Fauna)

Preconditions obtained from INP, related to motorway section Caricina Dolina – Manajle tunnel - Vladicin Han, are given in the document No 03-2058/2 from 17.12.2005 (see App. V). The main requirements are: (and list them here!)

**The key comments from INP noted: There is no statutory protected natural resources along the motorway route between Manajle tunnel and Vladicin Han.**

**INP reviewed the final EIA Study and confirmed that Study incorporated all nature protection requests prescribed within the preconditions No 03-2058/2 from 07.12.2005** (ref.no.03-2355/2 from 06.10.2010., see App. V for details).

Within the area of Manajle tunnel - Vladicin Han Highway section, the diversity of plants is above all conditioned by the presence of waterways. They further influence the regime of moisture in the ground and as such also the composition of phytocoenosis which find more or less suitable conditions for life. Various plant communities can be found in the waterways and that being in the form of free floating or submerged hygrophilous species. They are mutually characterized by various needs for sunlight and content of mineral and organic components which are dissolved in the water.

Full list of animal and plant species which habitats are located within the area of E-75 Highway section between Manajle tunnel and Vladicin Han is presented within the EIA Study for proposed Highway section.

**None of aforementioned plant or animal species are rare, vulnerable, endangered or protected.**

### 3.6. Inhabitants

The territory which belongs to the Manajle tunnel - Vladicin Han Highway section encompasses 10 settlements which belong to the municipality of Vladicin Han, Pcinja County. A majority of those are rural settlements. Data which relates to the basic characteristics of the inhabitants and their activities is displayed in table T 3.6.

T 3.6.Comparison of inhabitants' characteristics

| Settlement | Year of census | No. of residents |
|---|---|---|
| Krzince | 1991.<br>2002. | 263<br>257 |
| Prekodolce | 1991.<br>2002. | 1848<br>2153 |
| Vladicin Han | 1991.<br>2002. | 7835<br>8529 |
| Polom | 1991.<br>2002. | 424<br>444 |

### 3.7. Immovable cultural assets

Preconditions obtained from IPCM, related to E-75 Highway section from Manajle tunnel to Vladicin Han are given in the document 0302 No 10/719 from 09th April 2008. This document is available in Appendix V of this EMP Document, and recorded cultural assets in the zone of proposed highway section are listed within the Table T 3.7.

Table T 3.7. Recorded cultural assets

| Place | Name of locality |
|---|---|
| Krzince | Holy Trinity Late antic era |
| Krzince | Old Graveyard, |
| Piljakovac | Ancient settlement, Between the Neolithic period and the late Bronze age |
| Civlak | Multi-layered antic settlement antic period, |
| Kalimance | Multi-layered settlement - |

**No statutorily protected archaeological sites will be directly affected by the construction works.**

CoS signed a contract with an authorized archaeological institutions during 2011 and 2012, and preliminary excavation on these locations are already completed. Respecting the IPCM Bill of Quantities delivered to the CoS on December 2010, one archaeological site (Nr.8 "Rupa", Gramadiste, Prekodolce village) is recognized as a subject of preliminary archaeological investigations. This site is completely investigated during archaeological investigations carried out in period from 2011 to 2013.

During motorway construction, before commencement of any kind of earthworks on the aforementioned locations, it is necessary to inform the Institute for the Protection of Cultural Monuments of Serbia – Belgrade.

In case of chance finds, The Contractor is required to immediately, without delay, halt works and inform the authorized Institution for Protection of Cultural Monuments and to undertake measures to ensure the findings are not destroyed or damaged and to protect the area and position in which they are discovered.

# 4. SUMMARY OF ENVIRONMENTAL IMPACTS

The environmental impact which will be caused by the construction, operation and maintenance of the section Manajle tunnel - Vladicin Han of the highway Beograd - Nis - FYR Macedonian border indicate qualitative and quantitative changes in the environment during the construction phase, and the subsequent opening to traffic, as well as the additional exceptional risks engendered by an accident.

## 4.1. Geology and soils

The construction of the E–75 highway could lead to soil degradation due to the opening of borrow pits or formation of dump sites along the alignment. On the Manajle tunnel - Vladicin Han section, the proposed alignment does not require high cuts and side cuts, and thus any deficit in the required materials for embankments may be met from existing borrow pits in the immediate vicinity of the highway alignment (at the distance of up to 30 km), rather than the opening of new ones.

### 4.1.1. Construction Phase

Pollution of the soil in this phase may be caused as a result of improper manipulation of petroleum and petroleum derivatives which are used for construction machinery and other devices during construction, cleaning of vehicles and machinery outside of the prescribed and arranged areas, inadequate arrangement of the construction site and other activities which are not carried out according to recommended technical mitigation measures during construction.

Pollution of soil during construction is an aspect which affects the soil, as a factor of the environment, which may be reduced to a minimum or be completely eliminated by adhering to the technical mitigation measures which are stated in a special chapter which describes the measure for reducing the effects of the project.

Works on clearing away the existing soil, vegetation and structures, and then removal of the surface layer of earth commence construction works on the new highway. During the carrying out of those works, the greatest changes to the topography occur.

The process of road construction itself is characterized by extensive mechanical stabilization in the corridor of the roadbed and in places where temporary access roads are formed, which, in individual sensitive sections, could have an influence on the entire system of parameters of soil, primarily in the sense of its water permeability, air content, etc.

Furthermore, one portion of excess materials could be deposited in ditches. Namely, some of them undercutting base of slopes, causing local instability, which could jeopardize the future road. Naturally, before that, they have to be stabilised and drained effectively.

On the other hand, regardless of excess materials appearing due to a high disproportion between cuts and embankments, it will be necessary to make up good quality rock materials and natural aggregates for use in the construction of road structures. For this purpose, it is possible to use “Momin kamen” quarry (approx. at km 890+900), a deposit in the immediate vicinity of the motorway route.

### 4.1.2. Operational Phase

During the phase of operation of the road, pollution of soil will mostly be the consequence of the following processes:

- pollution from atmospheric waters from the highway;
- settling of exhaust gases;,
- discarding organic and non-organic rubbish;
- spilling of loads;
- settling of atmospheric particles carried by wind; and
- dispersal due to movement of vehicles.

Taking into consideration the concept of drainage (open system) of atmospheric waters on the analyzed section of the newly planned highway, it can be concluded that the most significant level of soil pollution occurs in the area 5.0 to 10.0 m from a road with a heavy traffic load. The greatest effect of cadmium is in the zones of 1.0 to a maximum of 5.0 m along the length of the road, which is within the protective belt of the road.

Soil pollution which may appear as a consequence of the destruction of hazardous loads also is relevant considering the characteristics of the soil in the analyzed area. An analysis of a case of accidental pollution will be analyzed in a separate chapter.

The engineering-geological and hydrological characteristics of the soil, as well as the planned earthworks on the position of the overpasses create the conditions for the occurrence of settling of the road bed which could in certain circumstances reflect in the permeability of the soil. Regardless of settling of soil below the embankment, and with consideration for the local hydrogeological characteristics and time lapse of consolidation, negative effects are not expected.

Degradation of soil which may occur by forming dumping areas and borrow pits for construction material in the specific conditions is limited by the category of the borrow pits, being that the planned carriageway is planned on an embankment. For forming the embankment, the necessary quantity of material shall be provided from the alluvial deposits (but not from the river bed) and local borrow pits.

Table T 4.1.2. Expected content of heavy metals in soil (ppm)

| Element | MPC* | min | max |
|---|---|---|---|
| Ag | 50 | 90 | 130 |
| B | | 140 | 180 |
| Ba | | 470 | 610 |
| Be | | 80 | 110 |
| V | | 170 | 210 |
| Ga | | 60 | 100 |
| Co | | 40 | 70 |
| Cu | 100 | 150 | 190 |
| Cr | 100 | 280 | 340 |
| Mn | | 1720 | 2010 |
| Ni | 50 | 150 | 190 |
| Sc | | 40 | 70 |
| Zn | 300 | 250 | 290 |

| Element | MPC* | min | max |
|---|---|---|---|
| Zr | | 310 | 440 |
| Sr | | 280 | 340 |
| Y | | 170 | 210 |

*Defined in the Rules on permissible quantities of dangerous and harmful substances in soil and irrigation water, and methods for their testing (Official Gazette of RS, No.23/94)

The notion of ground degradation during road operation, in terms of environmental impacts, implies several different processes, those of which that have specific weight being soil and rock slides, erosions, changes in soil permeability, potential aggravation of soil properties in a wider zone, and other impacts that may be of higher or lower importance in specific spatial conditions.

Main problem with regard to the impact of erosion and torrential processes on the road is the potential effect of river deposits on structures located at places where the road crosses with the water courses. Stopping and accumulation of deposits in the zones of bridges and culverts can to a great extent reduce the capacity of these structures. In such an event, when high waters come in, the openings of these structures can get jammed and the road route can be overflooded.

## 4.2. Air quality

### 4.2.1. Construction Phase

The carrying out of construction works, according to its nature, represents a significant source of pollution to the atmosphere due to the use of construction machinery which uses mostly fossil fuels for propulsion. The moving of large earth masses during construction of the road (cut, embankment) also results in large quantities of dust being lifted into the atmosphere which may trigger negative consequences in the populace and vegetation. The operation of asphalt bases, as well as the placement of asphalt masses in the road bed, carries with it the emission of volatile organic compounds (VOC), of which a significant percentage are polycyclic aromatic hydrocarbons (PAH) which are proven carcinogens, i.e. have been confirmed to cause cancer in humans.

In this case, the space in which construction works are to be executed is at more than 100m distance from the populated area and thus no negative effects on health of the population are expected. Closest residential objects belong to Krzince, Oslarci and Polom villages, and they are distanced more than 100 m from the highway axis (see Pic. 02). The asphalt plants will be located outside the project impact zone.

### 4.2.2. Operational Phase

The calculation of concentrations of air pollutants for characteristic cross-sections of the planned highway was done using an advanced computer program based on the procedures of modeling defined in the directives for calculation of air pollution on roads (Merkblat über Luftverunreinigungen an Strassen, MLuS-90).

Based on geomorphologic properties of the ground, this section is spreading from the exit portals of “Manajle” tunnel from km 894+330 (exit portal of “Manajle” tunnel) to km 900+100 (end of the section), with the route in a wide river valley and relevant wind of north-east direction, speed 2.8 m/s – based on data from the meteorological station Vranje.

For these meteorological conditions, concentrations of pollutants were calculated for each 5 years of operation, with appropriate AADT and the percentage of goods vehicles until 2021, and for the traffic speed flow of 98 km/h. Concentration of pollutants in the atmosphere were also calculated for the main road in the last year of operation, if the planned road is not constructed.

By modelling concentrations of air pollution for the given motorway sections, the following conclusions were made:

- On the route section from the exit from "Manajle" tunnel to Vladicin Han, under conditions of the dominant wind (NE, speed 2.8 m/s) and for AADT in the planning period, concentrations of all polluting substances are below the limit immission values;
- In windless periods, which is 24 - 30% of the time, the limit immission values for NO2sr are exceeded for the traffic volume of over 7000 vehicles per day, and in the planning period, the limit values will be exceeded up to 22 m from the pavement edge; for the same conditions, the exceeding of limit immission values for lead is 13 m from the pavement edge; other pollutants do not exceed the limit immission values.

## 4.3. Noise

### 4.3.1. Construction Phase

The sources of noise during the construction are heavy construction machines and their traffic in connection with the execution of works. The organization of the construction of a linear structure, such as a road, is characterized by the arrangement of construction machines over a relatively large area, which makes it more difficult to intervene with regard to the protection of environment from elevated noise levels in this phase. Exposure to these impacts is limited both in time and nature and as such it is considered in the mitigation measures during the construction phase.

### 4.3.2. Operational Phase

During the operational phase, Road traffic plays a dominant role if compared with other types of traffic and is predicted to continue to grow. This results in an increase in the level of noise in the zones around roads.

The noise impact analysis implies the definition of the parameters of traffic noise on a spatially and functionally defined road. The status which is defined in this way is compared with current legal regulations with regard to the maximum permissible levels for particular facilities. Exceeding the permissible levels implies the need for additional protection measures.

For the concrete calculation of the authoritative level at any point of a section, special computer programs were used which were developed on the basis of the instructions titled: "Richtlinien für den Larmschutz and Strassen RLS-90" (ref. 15).

On the basis of the numerical data obtained through the calculation of traffic noise in the planned period at the characteristic cross-sections which are presented in the corresponding tables, it can be concluded that excessive levels of noise are present.

The obtained authoritative levels indicate that in the planned period the levels of noise expected at the referenced distance of 25 m, during the day should stay around 75 dB(A) and during the night around 71 dB(A). The difference between levels at individual places is a consequence of physical restrictions in the cross-section which cause the reduction in level. If the limit value of a permitted level of 55 dB(A) is adopted for nighttime

conditions, which applies to structures along major highways, under the conditions of free distance of sound, this value would be reached at the closest distance of around 50 m and at the furthest distance of around 430 m from the axis of the planned highway.

Based on above mentioned level of noise impact, it is expected that several settlements will be directly affected with the noise caused by the traffic on new Manajle tunnel – Vladicin Han highway section. Appropriate mitigation measures were considered during design phase and 4 noise protection structures will be constructed along the proposed highway route:

| chainage | settlement | position | height | length |
|---|---|---|---|---|
| 894+969.54 to 895+070.15 | Krzince | right | 2.5 - 4.5 | 100 |
| 895+013.41 to 895+098.06 | Krzince | right | 3.5 - 5 | 84 |
| 897+672.98 to 897+926.57 | Oslarci | right | 1.5 - 3 | 252 |
| 899+993.55 to 900+100.81 | Polom | left | 1.5 - 5 | 108 |

Being that along the planned highway there are structures which could be analyzed for negative effects, the previously obtained values serve as the criteria for identification of those residential structures which are potentially in danger of being affected by noise from the highway.

Based on the numerical data obtained by calculation and the relevant levels defined by law, a conclusion may be drawn that limit noise levels are exceeded in the several zones in which the registered structures are located and appropriate mitigation measures are planned by using noise protection barriers (see chapter – Description of mitigation measures).

## 4.4. Flora, Fauna and visual impact

### 4.4.1. Impact on flora

Based on the analyzed impacts of the planned alignment in the sphere of air and water pollution, and soil pollution, occupancy of surfaces and division of space, it is possible to derive conclusions in respect of possible impacts on ecosystems of areas across which the road alignment shall pass. It is also essential to pay particular attention to the comments and requirements of the INP, who provided detailed comments on the individual road sections.

Preconditions obtained from INP, related to E-75 Highway section from Manajle tunnel to Vladicin Han are given in the document No 03-2058/2 from 17.12.2005. This document is available in Appendix V of this EMP and also as a part of EIA Study for Manajle tunnel - Vladicin Han Highway section.

INP comments included notes on the conservation status of ecosystems and species of flora and fauna, general mitigation measures and the need to undertake additional investigations during the detailed design stage, so as to minimize potential adverse impacts. For this reason an allowance for such studies has been made in the EMP.

The facts which have been introduced within the framework of the existing conditions indicate that, with consideration for local conditions and plant diversity of the area, especially negative effects should not be expected.

The effect of air pollution on plant life is spatially limited to a narrow belt along the road itself being that the concentrations which are permitted by the limit values, with

consideration for the possible negative effects, are reached only at the edge of the road for a majority of components. This is a consequence, as was also concluded in the chapter on air pollution, of traffic load and the conditions of transmission of pollutants on roads located outside of cities.

Another important fact which must be highlighted is that the spatial and operational elements of the planned carriageway do not contribute significant possible negative effects because this concerns with a relatively low traffic load and modest width, with no fencing which would affect the spatial division.

### 4.4.2. Impacts on fauna

Construction Phase

Impacts on fauna in the given area are related to the occupancy of land, since this is when some habitats, breeding ponds, and refugia are destroyed, and traditional animal paths are cut off. Any pollution of soil, ground and surface waters can negatively impact fauna in the study area. In the course of highway construction, the area will be modified through the alteration of physical characteristics of the space, transformation of land by the highway construction and preparation of the ground, and there are also certain forms of pollution. The modification of the area reflects through the modification of habitats (change in geometry, floors, mosaic like nature, and general conditions of refuge and food chain), the removal of soil cover (the removal, erosion, or destruction of top layers of rock and soil), the change in hydrological regimes (changes in the composition and structure of habitats, so as to affect soil moisture of the area), noise and vibrations.

Studies of the terrain covered by the corridor of the planned section of the highway which was carried out for the purpose of defining the possible negative effects on wildlife have indicated that for the most part exceptional negative effects should not be expected because there is simply no significant wildlife elements registered in the area.

By reviewing the official register for the analyzed area which is the subject of the study, it has been confirmed that there are no registered habitats of rare or protected species so possible effects within these categories are not expected.

Operational Phase

Modern linear traffic infrastructure facilities, such as highway and railway lines, have a multiple negative impact on the living world. This negative impact shows up directly. The intensity and consequences of unfavorable impacts are specific, to some extent, for each animal group particularly, while the general effects most often show through:

- Direct devastation of habitats,
- Degradation of quality of habitats along the road,
- Fragmentation of habitats, alteration of their form and geometry,
- Intersection of ecological corridors and traditional migratory paths,
- Hindered access to vital parts of habitats,
- Fragmentation of population due to the effect of road barrier, and impossibility of constant and unobstructed communication,
- Higher hunting and poaching pressure due to an easier access,
- Higher mortality rate of animals due to running over,
- Disturbed regime of surface and ground waters,
- Accumulation of liquid, solid, chemical and other waste
- Intensified light and noise pollution of the area around the road.

Most of the fauna will temporarily migrate out of the highway corridor during construction. The newly designed road may destroy a habitat, if its remaining parts are not self-sustainable. Consequences of such effects are: a disturbed normal life cycle of animal species, behavioral changes, reduced ecological stability, and disappearance of local populations, changes in composition and structure of animal habitats due to avoidance of the road by some species, all of which has, as the final result, a substantially impoverished bio-diversity on all levels (genetic, species, eco-system).

Since the road alignment passes through the river alluvium in some places, it is assumed that new structures will have the highest impact on animals that depend on water as eco-system. Since the project envisages river control, it is necessary to avoid this type of works in the period of fish spawning.

On-site investigations for the highway corridor, conducted in terms of identifying possible negative impacts on fauna, showed that salient negative impacts should not be expected in most of the area, simply because no significant faunal elements were registered. Potential impacts on fauna which are present will be reduced by implementation of the conditions provided by the INP.

In order to allow free movement of animals from one to another side of the motorway, 5 box culverts and 5 bridges will be constructed as underpasses for big animals too.

### 4.4.3. Visual impact

The problems of visual pollution have been considered on two basic levels: The first level implies the problems of spatial relations of the alignment itself and elements of the homogeneity of its projection are encompassed in the concept of so-called geometric shaping. The second level encompasses the relation of the alignment, as a construction, towards the space in the sense of defining the effect on the landscape.

For quantification of the relations of the transit construction towards the landscape, the methodology of breaking things down into individual components has been used (morphology, vegetation, surface water, structures and general appearance). For the characteristics of the planned highway and local conditions, the only component which has an effect on the landscape characteristics is the morphological characteristics.

The zone of altered landscape characteristics can be defined on the basis of the medical threshold of visibility accepting the visible angle of 10° as the measure for reviewing the maximum height difference in the section of the line perpendicular to the line of the terrain. This kind of relation entails that the width of the zone of possibly jeopardized landscape is 700H (H is the maximum height difference in the transversal profile). The largest multi-level sections in the cross section (overpass across railway line and roads) would be realized with a distance of 5.5 kilometers. Based on the aforementioned consideration, it is possible to conclude that in the specific conditions, grade-separated interchanges have the dominant shape which gives the fundamental morphological form to the entire area.

In the morphological sense, the alignment of the planned highway does not excessively burden the landscape. Local effects are present in the zone of overpasses over the existing regional road R-214 and railway line and in the zone of multi-level junctions.

Finally, it can be considered that the spatial entirety which the planned highway belongs to is predominantly characterized by cultivated landscape without especially significant forms and that the dominant form is represented by future grade-separated interchange structures.

## 4.5. Surface and ground water

Construction Phase

Pollution during the construction phase is of a temporary character, and is limited in both volume and intensity, but individual cases of damage could lead to serious consequences.

We separate two aspects of effects which are caused by construction of the transit structure:

- Pollution of the water; and
- Changes to the regime of surface and underground waters.

Changes in the physical and chemical characteristics of water, under the condition that the organization of the construction site and procedures during works follow the environmental protection conditions prescribed by this study, can be triggered by accidental pollution from leakage of dangerous and hazardous materials into open flows. For that reason, it is necessary to provide a controlled access of machinery to the waterways and other surface waters

Changes in the circulation speed and flow of surface water occurs due to changes in the morphology of the terrain when carrying out earthworks and during construction of bridges and culverts.

During the construction phase, surface water may be seriously endangered by pollution or physical destruction of the river bank.

The effects on the regime of surface waters (waterways), on the section Manajle tunnel - Vladicin Han of the newly planned alignment of the highway, are not directly conditioned by construction of the section, except in the part which is related to restricting highway construction works around the river regulation structures.

The justification of works on arrangement of the riverbeds lies in the prevention of landslides and erosion, but on the other hand those same works may have a negative effect on the environment, most of all on plants and wildlife in and around those waterways.

Conflicts may arise with aquatic plants and wildlife due to increased retention of sediments as a result of construction works. Destroying the bank and vegetation of the bank will significantly diminish the value of these areas in the sense of plants and wildlife.

Operational Phase

The main sources of pollutants during operation of the observed section are: vehicles, precipitation and dust.

During the phase of operation of the road, pollution of water will mostly be the consequence of the following processes: settling of exhaust gases, wearing of tires, spilling of loads, discarding organic and non-organic waste, settling from atmosphere, carrying by wind, dispersal due to passing vehicles, etc.

Pollution as a consequence of the aforementioned processes, according the characteristics of its duration, may be constant, seasonal and incidental (accidental).

A series of harmful materials are present in the water which runs off from the surface of the highway. This mostly concerns the components of fuel such as hydrocarbons, organic and non-organic carbon, and nitrogen compounds (nitrates, nitrites, ammonia).

A special group of elements is composed of heavy metals such as cadmium, copper, zinc, mercury, iron, nickel and many different fuel additives. A significant portion is also made

up of solid materials of varying structures and characteristics which appear in the form of settled, suspended or dissolved particles. It is also possible to register materials which are the consequence of using corrosion protection substances. Another group of very carcinogenic materials is polyaromatic hydrocarbons (benzopyrene, fluoranthene) which are the product of the uncompleted combustion of fuel and used motor oil.
For indication of present pollutants which appear in dissolved or undissolved form, there is a series of macro indicators such as: pH, electrical conductivity, suspended and sediment materials, COD, BOD, grease and oil, etc.

In accordance with the stated positions, and based on foreign experiences acquired from 20-year studies, an estimation has been done for emissions of polluting materials which appear during operation of the observed section for the traffic load in the planned period, the results are displayed in the table 4.5.

Table 4.5 Quantity of polluting materials, by unit of surface area, which forecasted traffic emits during one year

| Polluting materials | (kg/ha/yr) |
|---|---|
| Suspended particles | 178.58 |
| total organic carbon | 30.79 |
| Nitrates | 1.21 |
| total phosphorus | 0.16 |
| oil and grease | 2.77 |
| Copper | 0.01 |
| Iron | 3.08 |
| Zinc | 0.10 |

The evacuation of pavement runoff waters will be of controlled type. The entire discharge from the given section will be controllably evacuated to shafts and enclosed rainwater drainage systems, wherefrom all water goes to treatment facilities – stormceptors. Using those facilities, all collected water from motorway will be treated as required, and then discharged into recipient.
The terrain on which the alignment is located is water permeable, partially-permeable, partially-impermeable and impermeable.

The problem of accidental pollution is impossible to quantify in this way because it primarily concerns individual cases spread out according to location and time.

Bridges represent a significant risk for the issue of waterway pollution, especially in cases of accidents. When damages have already occurred, the possibilities of rehabilitation are very small. Such locations on the observed section Manajle tunnel - Vladicin Han, E-75 Highway Belgrade - Nis - FYR Macedonian border are bridges crossing rivers and streams at chainages:

- km 894 + 340, box culvert L = 5.0 m
- km 894 + 370, box culvert L = 5.0 m
- km 895 + 362.96 - bridge across Dzemin Do, L = 495.19 m
- km 896 + 742.48 - bridge across River Vrla, L = 635.34 m
- km 897 + 445.28 – bridge on „Vladicin Han“ Interchange, L = 49.00 m
- km 897 + 710, box culvert L = 5.0 m
- km 898 + 514.50 - bridge across creek Oslarci, L = 105.30 m
- km 898 + 800, box culvert L = 5.0 m
- km 899 + 197.10 - bridge across creek Civlak, L = 105.30 m
- km 899 + 500, box culvert L = 5.0 m

## 4.6. Impacts on social /cultural environment

### 4.6.1. Impact on population

The impact of the planned motorway E–75 Nis – FYRM Border on the health of the population includes the impact on the population in settlements along the motorway as well as on drivers and other participants in the traffic (assistant drivers, passengers, pedestrians). These impacts include exposure to noise, vibrations and air pollution (oil combustion and exhaust fumes).

The construction of the Manajle tunnel - Vladicin Han Highway section, as a part of E–75 Nis - FYRM border highway, will have a stimulating effect on a better traffic and economic connection of the Republic of Serbia with its surroundings, as well as on faster development of the region served by this corridor.

From the perspective of the interests of certain social groups as users of the space and the structures within that space, the construction of the highway may have a twofold effect on the socio-economic and commercial development of the specific area.

Two basic populations of interest stand out for the section of the highway Manajle tunnel - Vladicin Han. The first group is made up of users of the highway, while the second is owners of the land on which the analyzed section is built. With the construction of the planned highway, the conditions for travel are improved while simultaneously decreasing expenses and increasing the safety of users from the aforementioned first group.

Comparing the effects of construction, positive and negative, in both cases leads to the conclusion that the benefits to social circumstances in the case of construction of the planned section of the highway are much greater than the damage which also occurs as a consequence of construction. Most significant positive social impacts of proposed highway project are:

- improved access to work, health care, educational and welfare facilities
- improved access to administrative market centres
- travel and waiting-time savings.
- decreasing of the journey time and increasing of travel cost-efficiency
- traffic safety

### 4.6.2. Impact on cultural monuments

Preconditions obtained from IPCM, related to E-75 Highway section from Manajle tunnel to Vladicin Han are given in the document 0302 No 10/719 from 09$^{th}$ April 2008. This document is available in Appendix V of this EMP Document.

No statutorily protected archaeological sites will be directly affected by the construction works. On the marked highway section, during systematic archeological reconnaissance carried out in 2003, the following archeological findings were recorded:

Table 4.6.2. Recorded cultural assets

| Place | Name of locality | Distance from the highway axis |
|---|---|---|
| Krzince | Holy Trinity Late antic era | cca. 500m, left |
| Krzince | Old Graveyard, | cca. 500m, left |

| Place | Name of locality | Distance from the highway axis |
|---|---|---|
| Piljakovac | Ancient settlement, Between the Neolithic period and the late Bronze age | cca. 350m, right |
| Civlak | Multi-layered antic settlement antic period, | cca. 150m, right |
| Kalimance | Multi-layered settlement - | cca. 700m, right |

**No statutorily protected archaeological sites will be directly affected by the construction works.**

Position of above mentioned 5 archaeological sites are drawn on the situation map given within the App V of this EMP document.

The Law on Cultural Resources requires that the investor and contractor, in the case of the discovery of new, unrecorded locations, must enable and provide for archeological intervention. That consists of the momentary halting of works and informing the authorized IPCM of the discovery. This of course requires occasional archeological monitoring during construction. The investor is required to provide the financial means for all envisaged works - occasional archeological monitoring, protective archeological interventions, etc.

The Contractor will prepare action plan as a part of the bidding document, and update it periodically in accordance with the new findings (if any). The initial plan will consider the whole section (Manajle tunnel - Vladicin Han Highway section) to be subject of actions relevant to chance finds, in addition to specific measures to deal with above mentioned sites/locations. The updated action plans will be subject to obtaining consent from the IPCM and any other relevant authority, as may be instructed by the CoS.

In case of locations that may be of interest (chance finds), CoS will provide funds for – occasional archaeological supervision, protection of the archaeological intervention, etc. The effective protection measures in case of chance finds will include immediate stop of all works in progress around the new finds, adequate fencing to prevent unauthorized access and immediate notification of IPCM.

The preconditions of the IPCM are summarized as:

No excavation, demolition, alteration or any works that may harm the properties of the cultural monument may be carried out. IPCM and authorized expert must be timely notified of the commencement of earth and other works at the archaeological site or in its immediate vicinity, in order to timely perform all the necessary preparations until the archaeological exploration license is obtained. Identified sites must be marked and secured (with a protective railing or other means of protection) to avoid damage in the course of road construction.

### 4.6.3. Impact on natural resources

According to the preconditions obtained from INP (No 03-2058/2 from 17.12.2005, see App. V), none of plant or animal species which habitats belong to the zone of the E-75 Highway section from Manajle tunnel to Vladicin Han are rare, vulnerable, endangered or protected.

Upon reviewing the registry of protected natural resources, it was established that within the analyzed area there are no registered locations which fall under this category. The fact is

however that within the analysis of the existing condition, spatial units stand out for which there are proposals regarding their arrangement and placement under special protection.

## 4.7. Construction camps

The nature and extent of the construction works will require establishment of a number of Construction Camps, which will house workers, equipment, machinery, fuels and materials. The number, size and location of camps are not currently known and can and will only be determined following mobilization of Contractors to country.

From the environmental and social viewpoint, construction camps pose potentially adverse impacts, due to: Additional land requirement; Storage and use of hazardous material, fuels and oils; The need for services including water, electricity, sanitation and wastewater; Potential interference with community harmony and/or community tension resulting from the presence of large numbers of workers, particularly from an influx of foreign workers, who may also be a source of sexually transmitted infections (STIs) or HIV.

As the number, size and location of camps are not known at this stage, the most effective way to address the potentially adverse impacts is through contractor's adoption of the guidelines as contractual requirements. These are presented in the EMP in Appendix I of this report. The Contractor's SSIP - Camp Management Plan should contain, but not be limited to, procedures for establishing and operating construction camps in order to safeguard nearby communities and environmental resources.

Work camps will be required to conform to international Health, Safety and Environment (HSE) standards and will thus be furnished with sanitary and wastewater collection and disposal/treatment facilities and will operate fully compliant waste systems, involving storage of waste by waste category. These requirements will be included within the contracts for construction, which should ensure that contractors include sufficient budget for effective HSE management Contractors teams will reflect these provisions, by including HSE staff and independent environmental specialists to provide advice and to undertake monitoring and auditing.

## 4.8. Cumulative impacts

The existence of other structures in the study area as well as possible construction and operation of new facilities may exacerbate impacts when combined with those resulting from operation of the proposed highway. In such circumstances it may be possible for the combined impacts to exceed environmental limits or standards. Therefore, as part of the fieldwork for the EIAs, data on the possibility of occurrence of these cumulative impacts were collected by noting the presence of these structures within the impact zone of the road.

Due to the terrain for most of the alignment from Manajle tunnel to Vladicin Han the existing road and communication infrastructure is confined in a corridor and thus the highway is located roughly parallel to the existing main railroad Nis – Skopje, at a distance of 50 – 300 m. This type of mutual positioning results in cumulative noise impacts. This fact was taken into consideration during the EIA modeling of noise levels in the impact zone.

Emissions of gases and dust due to excavation and grinding of stone aggregate, together with emissions of pollutants from traffic operation in the air, represent a cumulative impact that may be mitigated by appliance of stricter regulations in relation to operation of the

stone quarry. Construction of highway maintenance centers is envisaged for zone of the "Vladicin Han" interchange. There is a possibility that cumulative impacts of these facilities and the road exceed the permitted values of pollutants concentrations in the air as well as noise limits, which will be tested through EIAs prepared for these structures.

Major new induced development along the alignment of the highway *per se* is not anticipated, as new highway accesses to only existing facilities and connecting roads will be constructed as part of the Project. The Project highway aims, *inter alia*, to stimulate economic development and improve communication both regionally and internationally.

However, the majority of the areas through which the highway is alignment is predominantly rural in nature and continues to suffer from out-migration, as people move to the larger cities and towns in search of work etc. The socio-economic studies to be undertaken in the context of preparing RAPs will explore this issue further, but it is not expected that the improved highway connection resulting from the project will have a significant impact on this overall demographic trend, such as stimulating large in-migrations or substantial new development.

## 4.9. Unexploded ordinances.

Due to position of the alignment and history there may be unexploded ammunition, grenades, shells etc from the armed conflicts from 1914 to 1999.

In this case the Contractor should mark the object, close and protect the site and inform CoS, police and army bomb disposal unit.

Following the identification of the type, number etc of the unexploded ordinances the Contractor will submit the request to CoS on how to deal with it.

CoS will bear the cost related to safe removal of these object, to be performed by fully licensed sub-contractor, which the Contractor will engage upon receiving approval from CoS.

# 5. DESCRIPTION OF MITIGATION MEASURES

## 5.1. Site-specific mitigation measures

### 5.1.1. Soil

Construction phase

- Strict protection of all areas outside the immediate zone of the agreed work sites, such that no additional areas may be used as a permanent or temporary disposal sites for materials, as borrow pits, or for machine parking or repair;
- Removal, storage and handling of topsoil in such a manner that it can be used in final reinstatement, bio-restoration and stabilization of slopes;
- Storage and handling of fuels, oils and other hydrocarbons in a controlled process, involving measures to prevent soil and water contamination. Work camps should include storage on sealed surfaces and within secondary containment; refueling of all plants, vehicles and machinery should not be allowed within 50m of any watercourse, drain or channel leading to a water course.
- Forbidding any opening of non-controlled access roads to any part of the construction sites;
- Temporary storage of construction waste will be limited to within the site, and within areas approved by the Engineer.
- The Contractor shall not dispose of any waste and/or construction debris by burning, or by burying. All waste shall be disposed of offsite at an approved landfill site.
- The Contractor will be responsible to remove and transport all waste material off site to an approved landfill.
- The Contractor is advised that cement and concrete will be regarded as materials that are potentially damaging to the natural environment on account of the very high pH of the material, and the chemicals contained therein. The Contractor shall ensure that all operations that involve the use of cement and concrete are carefully controlled.
- Concrete mixing, in the purpose of pre-stress girders, shall only take place in the construction camp or in dedicated plateau. Water and slurry from concrete mixing operations shall be contained to prevent pollution of the ground surrounding the mixing points. Old cement bags shall be placed in wind and spill proof containers as soon as they are empty. The Contractor shall not allow closed, open or empty bags to lie around the site.
- All unsuitable and surplus spoil rock shall be removed from the site to an alternative recycling opportunity. Last alternative is to transport it to a dumping site or sites where it shall be dumped, spread and leveled.
- No dumpsite shall be used without the prior written approval of the Contractor and the owner of the property.
- No spoil material shall be stockpiled in violation of any legal requirement or to obstruct any watercourse or drainage channel.
- Concrete remains will be crashed into pieces of cca 20cm diameter and will be used for the backfilling.
- All visible remains of excess concrete shall be physically removed immediately and disposed of as waste. Washing the visible signs into the ground is not acceptable. All excess aggregate shall also be removed.
- The process of separating rock material into acceptable grades for backfilling and layer works material will result in noise and dust. The Contractor shall suppress

dust caused by the screening process. The screening process shall be positioned so as not to cause any disturbance-to surrounding villages.

- Waste steel will be sent to steel recycling facility, which will provide transport service;
- Wastewater from the WWTF facilities and sedimentation ponds/tanks on site wilt is reused for dust suppression and vehicle wash down as a priority over discharging the water to stormwater or creek.
- The Contractor shall dispose of all refuse generated by his staff and Sub-Contractors on a weekly basis at a registered Domestic Waste Disposal Site. Contractor will engage specialized utility company for removal and disposal of domestic waste.
- In a purpose of temporary waste disposal, Contractor will ensure scavenger, water and windproof containers, for collected waste until disposed of.
- The Contractor shall supply waste bins/skips throughout the site at locations where construction personnel are working. The bins shall be provided with lids and an external closing mechanism to prevent their contents blowing out and shall be scavenger-proof to prevent baboons and other animals that may be attracted to the waste.
- The Contractor shall ensure that all personnel immediately deposit all waste in the waste bins for removal by the Contractor. Bins shall be emptied on a daily basis at waste containers.
- No waste to be buried or burnt onsite and litter and gross pollutants to be removed as part of ongoing maintenance operations;
- The bins shall not be used for any purposes other than domestic waste collection.
- All hazard materials have to be storage at the fenced and secured area. All hazardous and danger material will be undertaken
- Liquid hazard materials have to be kept on the waterproof surface, supplied with WWTF.
- All areas used as storage of the liquid hazard materials, must be supplied with the adsorbent, such is prefabricated peat, sand or cutting, which has to be used in the accidents to collect liquid.
- Collected liquid hazardous waste will be kept in specialized liquid waste containers, which will be carried out by the licensed company engaged by the Contractor.
- All content from the separator and coalescent filters are dangerous waste and handling requires well-trained persons. Extracting and temporary storage will be done using specialized liquid waste containers.
- Used tires, or other rubber parts of equipment will also be treated as hazardous waste.
- The Contractor shall ensure that he is familiar with the requirements for the safe storage, handling and disposal of petroleum, chemical, harmful and hazardous materials.
- The Contractor Shall is responsible for establishing an emergency procedure for dealing with spills of release of these substances. He shall also ensure that the relevant construction personnel are familiar with these emergency procedures.
- Petroleum, fuel and oil throughout the site shall be stored in enclosed separated areas at reservoirs with double shield, at the location of which shall be determined on site in conjunction with the Engineer. The enclosed areas shall be clearly marked.

- Usage of oil and fuel will be 'allowed only to the training persons, who will be nominated by the Contractor. All activates with fuel and oils will be at the dedicated areas.
- Special care will be taken during deliveries, especially when fuels and hazardous materials a being handled. A responsible person, who will check storage tank levels, before delivery to prevent overfilling, supervises all deliveries and that the product is delivered to the correct tank.
- Tanks containing fuels shall have lids and shall remain firmly shut. Only empty and externally clean tanks *may* be stored on the bare ground. All empty but externally dirty tanks shall be stored on an area where the ground is protected (e.g. concrete slab, covered store house, etc.).
- Fuel stores shall be placed on a concrete, or similar, base surrounded by a brick bund. The bund shall have a volume of 10% of the volume of the largest tank in the storage area plus 10% of the volume of all other tanks. The slab shall be sloped towards a sump to enable any spilled fuel and water to be removed. Any wastewater collected at the sump shall be disposed of as hazardous waste.
- Gas and liquid fuel shall not be stored in the same storage area.
- The Contractor shall take all the necessary precautions to prevent fires or spills at the fuel stores. No smoking shall be allowed inside the stores and within 3m of a bund.
- The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel stores.
- Lubricants will be stored in drums or tins that are either sealed or have tightly fitting caps. All containers must be closed unless in use. Decanting of lubricants must be carried out in a specific area that has been previously identified and suitably protected.
- The floor of any storage of decanting area shall be impervious (such as concrete) to lubricants and kept clean at all times. The floor shall slope towards a central sump, all liquids collected in the sump shall be disposed of as hazardous waste.
- Lubricants shall be stored under cover in a no smoking area.
- All lubricant impregnated cotton waste and rags shall be promptly disposed of and handled as hazardous waste.
- The Contractor shall ensure that all servicing and/or refueling of vehicles and equipment takes place within the construction camp. The ground under the servicing and refueling areas shall be protected against pollution caused by spills and/or tank overfills. The method of protecting the ground shall be identified by the Contractor and approved by Engineer;
- All waste shall be collected, contained on site and stored in water-tight containers prior to disposal off-site as hazardous waste at approved site. All equipment that leaks shall be repaired immediately or removed from the site;
- The Contractor shall only change oil or lubricants at agreed and designated locations, except if there is a breakdown or an emergency repair. In such instances, the Contractor, shall ensure that he has sorbent (sand, cutting or Similar) and/or drip trays available to collect any oil or fluid. The only permitted method of refueling and refilling lubricants is by means of a pump;
- In the purpose of smaller interventions for re-fueling it will be used small fuel delivery vehicle. It will be supplied with Spill-Kit equipment.
- Parking of machines and equipment only at designated sites, which should be provided with specific measures for protection against soil pollution with fuel, oil, or oil derivatives. In the event that soil is contaminated by spillage, the affected

layer should be removed and disposed of at approved dump sites, in accordance with the Contractors waste management plans (WMP);

- Systematic collection of solid waste during construction (including food and material packaging, and other types of waste) should be undertaken and should be disposed of two agreed licensed facilities, in accordance with the WMP (se Appendix I);
- Cleaning equipment and vehicles will only be allowed in dedicated facilities, designed to avoid ground and water pollution. Similarly, washing out of concrete mixers and uncontrolled removal of remaining concrete should be a controlled operation; the use of „slush pits‟ (lined pits) or tanks should be employed for washing out concrete contaminated equipment following concrete pours. The resultant set concrete can then be disposed of as inert solid waste or reused in bulk fill areas, as appropriate;
- Upon completion of material extraction, all borrow pits and waste disposal sites should be reinstated to reduce the visual effect and re-establish natural vegetation. Limitations to this will occur, especially where material is extracted from currently operating, licensed quarries, in which Project influences are restricted, as will be the case for licensed waste disposal facilities.
- Since the project envisages river control works, it is necessary to avoid this type of works in the period of fish spawning.
- Organizing the construction within the minimum amount of space needed for its functioning, and during selection of the location, ensuring that it is not an area with developed plant and wildlife characteristics in order to avoid unnecessary loss of biotope.
- Collecting humus material and storing it in an organized storage area so that it may be used during finishing works for recultivation and biological protection;
- Carrying out all activities with petroleum and its derivatives during construction or the filling of vehicles in a specially defined place with the maximum mitigation measures to ensure that spilling does not occur. Collecting all packaging for oil and other petroleum derivatives and taking them to a controlled storage area;
- If damage occurs to a vehicle with dangerous liquid materials, traffic must be stopped as in the previous case and transferred to a parallel carriageway. In the meantime the authorized service at the level of the municipality shall be informed and the specialized team for sanitizing damage shall be deployed. The spilled material is removed from the highway using special sorbents. If the liquid reaches outside of the profile and pollutes the soil, sanitization shall be done by removing the soil. All materials which are collected in this way are treated according to the special procedures of regeneration or are stored in the storage area envisaged for such materials.

Operation phase

No specific measures to be implemented, except applying good engineering practice.
General mitigation measures are:

- Provide suitable road markings, signs and signals for the section
- Draw up operational plans for winter maintenance procedures, taking into account environmental protection;
- Slopes of embankments need to be landscaped and planted both to improve the visual effect and reduce potential for surface erosion;

- Provide a road protection zone that will not be used as an arable zone. Considering the expected concentrations of the pollutants, this belt should not spread beyond 5 meters from the edge of the road right of way. The grass obtained by the maintenance of green surfaces in the vicinity of the road shall not be used as cattle feed. It will be important to inform and educate local communities regarding the dangers of using this vegetation. According to the law, PEPS is responsible to perform all sampling, measuring and other monitoring activities during the operation phase, by following all recommendations given within the monitoring plans (component of site specific EIA Study and this EMP). All the monitoring results are to be provided to the Serbian Environmental Protection Agency. PEPS will also inform local communities about monitoring results, including on potential pollution of land nearby the motorway. No herbicides shall be used for elimination of weeds;
- Substitute the use of sodium chloride with by other substances with a similar or higher defrosting effect in order to minimize the effects of salinization of soil in the vicinity of motorway resulting from the winter maintenance. Where sodium chloride is used in the maintenance process, precise planning of time distribution and quantities is of critical importance;
- Ensure that other support and other service facilities along the route are designed and erected in after the appropriate EIA Study and/or studies are made and approved by the relevant national institutions;
- All possible accompanying content along the planned highway must be designed and built in harmony with the fundamental function of this road with a prior Environmental Impact Assessment study;
- The complexes of accompanying content must be supplied with special containers for collection of solid waste so that pollution of soil in the zone of the road is avoided during operation. The containers must be emptied by the authorized company and solid waste must be stored at the proper dump area.

### 5.1.2. Surface and ground water

The mitigation measures for underground and surface waters encompass all procedures which are necessary for bringing quantified negative effects to within the allowed limits, as well as procedures for minimizing the effects of the phase of construction and phase of operation.

Construction phase

Contractor should carefully plan potentially sensitive operations such as in-river works. Typical procedures will include:

- No construction materials or pollutants, such as cement shall be allowed to fall/flow into water features. All storage of spilling material will be covered to avoid possible emissions with wind blow. Nearby watercourses site will be fenced.
- Extreme caution shall be taken during construction owing to the high erosion potential of the river embankments. The EM shall assess any preventable damage caused by the Contractor and prescribe rehabilitation measures to be completed.
- Construction in the river bed will take place during low water level period;
- No washing of equipment or vehicles will be allowed in the vicinity of watercourses;

- The river banks in the studied area must be protected by barriers during the construction phase for the purpose of preventing negative effects which could be caused by driving and unloading material in the vicinity of the same.
- Driving of machinery within rivers, streams or on their banks should be prevented except in cases when it is impossible to avoid due to construction of a certain structure or building.
- for shoreline columns, support walls, Excavation and construction of foundations and other structures which are located on or in the vicinity of bodies of water, are carried out during periods of low water level (July - September), in order to reduce the negative effects on the rivers and their shorelines to a minimum.
- Maintaining, refueling and cleaning construction machinery shall be carried out at locations which are far from waterways and which will be defined before the works are begun.
- In the direct vicinity of rivers, spillage of any kind of dangerous substances must be avoided. In that sense, the contractor will be required to use biodegradable compounds for lubricating machinery as well as biodegradable transmission fluid in order to reduce pollution down to a minimum during the carrying out of works.
- Providing training to machine operators regarding the sensitivities and working procedures to be followed;
- Checking all machines and equipment for leaks prior to use;
- Preparing site specific emergency plans to respond to any incidents or spillages of hazardous material;
- Storing all fuels at a safe distance from the watercourse;
- Preventing re-fuelling near the watercourse and/or taking precautionary measures to prevent spillage.
- Construction of foundations for bridge piers, retaining walls, and structures located at or in the vicinity of rivers should take place in the period of low water levels (July - September) so as to minimize negative impacts on rivers, their banks and river ecology;
- Storage and handling of fuels, oils and other hydrocarbons through a controlled process, involving measures to prevent soil and water contamination. Those should include fuel and oil storage on sealed surfaces and within secondary containment; refueling of all plant, vehicles and machinery at minimum 50m of any watercourse, drain or channel leading to a water course.
- Similar measures for storage of fuels and re-fuelling of equipment should be put in place in floodplains to prevent groundwater pollution. No storage of fuels and oils will be allowed in floodplains where the potential for washout exists.
- All sites near rivers will be protected by fencing and other means to prevent loss of construction materials, particularly hazardous materials.
- Prevent the movement of machines inside rivers, streams, or on their banks, except when it is unavoidable due to the construction of a structure or construction.
- The Contractor shall construct and operate the necessary collection facilities to prevent pollution.
- The Contractor shall dispose/discharge of collected wastewater in a manner in accordance with Water Protection Conditions.
- Each parking, service, or cleaning and washing plateau will be equipped with Waste water treatment facilities (WWTF) in the manner of sedimentation tank and grease and oil separator. All these WNTF will be temporary objects.
- Contractor will consider in detail all recommended locations of the coalescent filters, described in the EMPC as construction site facilities, and prepare detail plan

of their usage in the purpose of works. Moreover, working progress schedule will have influence on facilities installation.

- All washing of plant/equipment/concreting equipment etc. shall take place within the construction camp. Water from washing operations shall be collected in a sedimentation tank, then to be purified through grease and oil separator. Recycled water will be discharged into natural recipient, The Contractor is encouraged to recycle dirty wash water to avoid obligation of removing it off-site.
- Trucks delivering concrete shall not wash the trucks or the chutes on the site or anywhere outside site boundary. All washing operations shall take place at a dedicated location where wastewater can be collected, purified, and discharged of in an acceptable manner.
- All construction camps will be equipped with sanitation. Sanitation facilities contain temporary sewage and disposal tank (sump), which will be discharged in a necessary period by the licensed company.
- Adequate chemical latrines/toilets shall be provided for all staff near the alignment. They shall be emptied I serviced on a regular basis to prevent overflowing by the licensed company;
- All latrines provided by the Contractor shall be efficient, sanitary and non-offensive. A minimum of one toilet shall be provided per 20 persons at each working area and the construction site.
- Strom Water is clean run-off water from the up-slope areas, mostly it will be catch on the perimeter of the site, and discharged into the recipients;
- During construction. the Contractor will ensure that erosion control structures - either permanent or temporary - are installed prior to commencement of construction.
- Any erosion channels developing during the construction period or during the operational and maintenance period shall be backfilled and consolidated immediately and the area restored to the proper condition. All erosion damage shall be repaired as soon as possible. Displaced topsoil will be replaced from approved topsoil.
- Up-slope ditches will be constructed and used during construction phase to divert away from areas of exposed soil to prevent the contamination of clean runoff. .
- Side ditches will be installed down-slope of all erodible stockpiles and upslope protection measures will be used to divert runoff in the event of rain;
- Sandbags will also be placed around storm water inlets/grates, throughout the site to prevent sediment entering piped storm water system.
- All vehicles and plants shall be well maintained to ensure that there are no oil or fuel leakages.
- The Contractor will provide a dished concrete plateau to prevent infiltration of hydrocarbon products.
- Drip trays will be utilized during servicing,
- Drainage from the service area will be channeled into a grease and oil-skimming tank, where it shall be treated to remove old hydrocarbons. Drainage from the washing platform will firstly be channeled into the skimming tank before being released by drain to the sedimentation pond.
- Soil contaminated by oil, fuel or chemicals shall be removed and disposed of at a registered Hazardous Waste Disposal Site or rehabilitated in-situ,
- The Contractor shall educate workers on the appropriate methods for workshop maintenance and fuel points to prevent fuel and oil being washed out of containment areas.

- Toxins and oil must be recovered from the system at least once a week, and if necessary the Engineer should require a higher frequency;
- Toxins and oil recovered must be stored in sealed drums on a covered, bounded area and removed from site either for recycling or disposal at a registered waste disposal Site.
- All spillage of oil onto concrete surfaces shall be controlled by the use of an accepted absorbent material.
- The servicing of equipment and vehicles will only be allowed in the Construction Camp within the dedicated areas.
- The Contractor shall provide grease and oil separation tanks at all areas where oil spillage or collection will occur, i.e. workshops, oil storage, vehicle wash areas and fuel points.
- The Contractor shall provide a method for oil recovery. Recovered oil shall be collected in waterproof drums for recycling or disposed of at a registered Waste Disposal Site. These drums will be stored on site only on a covered, bounded area,
- The Contractor will test effluent discharged from the oil separator tanks for Conformity with relevant effluent conditions if requested to do so by the Engineer when pollution is suspected.
- In the closure to the local water intake area it is forbidden to organize any activates with liquid hazardous material, such a fuel, oil, cleaning and washing waste water, etc.;
- The Contractor must demarcate each location, and all staff will be informed about water intake presence.
- It is forbidden to open any new well in the water intake protected area.
- The Contractor is to ensure that the quality of the water discharged is compliant with the Water Protection Conditions, with respect to the receiving environment.

Operation phase

- The obligation of cleaning water runoff from the highway is based on the application of the Law on Bodies of Water (Official Gazette RS No. 46/91), the Regulation on Classification of Water (Official Gazette RS No. 5/68) and the Plan on Protection of Water (Official Gazette RS No. 6/91). According to legal regulations, atmospheric water which is released into waterways, canals or other water surfaces must be cleaned at least to the quality which corresponds to the class of water in the recipient waterway.
- Removal of water from the highway on the subject section is achieved by free flow over the shoulder and slope of the embankment and on parts of the section with smaller radii, water collected along the median is drained through a closed system to natural recipients outside of the road base.
- Considering that contamination is present in water runoff from the highway in the first 10-15 minutes of rainfall which is of a high enough intensity to move a majority of particles deposited on the highway, as a measure for preventing infiltration of pollutants into lower layers of soil and underground water or surface water, the already envisaged humus layer can be used on slopes of embankments which has filtering characteristics in the sense of retaining polluting material during vertical permeation into the soil. This can also be used in zones of cuts by laying humus in the collateral drainage ditches. The capacity of a humus layer depends on the intensity of traffic and the relation between drained surfaces of the road and surface infiltration.

- On bridge structures, along the protective barriers and raised curbs, bridge collections areas have been planned by which all atmospheric water from the surface of the bridge and the elastic connections will be collected, guided into the appropriate drainage pipe, hung on the bridge cantilever or proper support, which must be defined in the main design.
- Within the framework of the internal system, surface water removal must be resolved for all accompanying content (rest stops, tollgates, loops, including disconnected sections as well as other operational surfaces) and all structures (viaducts, bridges) on the alignment of the newly planned section of the highway.
- The continuous cleaning of components is necessary for the functioning of the water drainage system. A very important item in a series of other items aimed at ensuring the regular and efficient maintaining of the functions of the system is checking over the condition of the retention basin and cleaning the device during the operation phase. In that way the appropriate protection from pollution of the surrounding soil will be provided considering that over time pollutants become concentrated in the areas of retention basins.

### 5.1.3. Air quality

No specific measures to be implemented, except applying good engineering practice. Use existing asphalt plant, which is located outside project impact zone.

General mitigation measures during construction phase are:

- The Contractor acts appropriately to minimize the generation of dust caused by construction works. Such measures include frequent watering during dry periods or by comparable means approved by the Engineer.
- Speed limits must be enforced in all areas, including public roads and private property to limit the levels of dust pollution;
- Dust must be suppressed on access roads and overall construction sites during dry periods y the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off.
- Water trucks dampen haul roads and exposed surfaces to minimize dust generation and utilize dust suppressant products to assist in binding fine surface dust, improve water infiltration and reduce water usage;
- Dust dispersion from construction activities, roads, spoil dumps and other construction locations shall be limited and suppressed to the maximum extent practical.
- Spoil dumps shall be positioned such that they are not vulnerable to wind erosion.
- An appropriate freeboard shall be maintained in trucks hauling dirt, sand, soil and other loose material when leaving the road reserve.

### 5.1.4. Noise

Construction phase

If measurements taken as a part of planed monitoring activities (see Appendix II) show increased noise levels, contractor is obliged to take appropriate mitigation measures which are predefined within the Appendix I – Mitigation plan.

Contractor should also perform following activities:

- Raising workers awareness that noisy activities should be minimized;
- Adjusting the working hours in line with local conditions;
- Use of modern equipment and machines with noise suppressors when working in the vicinity of populated areas;
- Regular maintenance of construction vehicles and equipment in view of the elimination of unnecessary sources of noise;
- Avoiding the concomitant operation of several noisy machines, when possible;
- Switching-off the machines when out of use;
- Using natural acoustic barriers or screens for protection against the noise round the machines;
- Regular maintenance of access and temporary roads and limiting the speed of vehicles on unpaved roads for transportation of materials.

Operation phase

On the observed section, it is necessary to carry out measures for protection from noise.

The most important measure of protection from noise is construction of noise protection walls. This mitigation measure will be applied in places where the most endangered groups of structures are located. During the selection of the type of wall, attention must be given to the conditions which need to be fulfilled, those are:

- resistance to weather conditions,
- rationality of structure,
- visual effect,
- possibility of pre-cast construction,
- possibility of upgrading,
- spatial conformity,
- ease of maintenance.

With consideration of the level of noise from traffic in the planned period which was obtained through the calculation of authoritative levels defined by law, it is necessary to envisage a structure for protection from noise in places where the alignment is located within the vicinity of settled areas.

The analyses on traffic noise which were carried out within the framework of the analyses on possible effects indicate that the limit values of permitted levels for urban areas along major highways are reached at distances of around 80 to around 250 meters from the newly planned highway. The spatial position and maximum heights of noise protection structures are provided in table T 5.1.4.

Table T 5.1.4. Spatial position and lengths of noise protection structures

| Chainage (km) | Position | Height (m) | Length (m) |
|---|---|---|---|
| 894+969.54 to 895+070.15 | right | 2.5 - 4.5 | 100 |
| 895+013.41 to 895+098.06 | right | 3.5 - 5 | 84 |
| 897+672.98 to 897+926.57 | right | 1.5 - 3 | 252 |
| 899+993.55 to 900+100.81 | left | 1.5 - 5 | 108 |

5.1.5. Impacts on cultural environment

- Contractor is responsible for following national requirements with respect to “chance finds” which may emerge during construction.

- During 2012 the preliminary archaeological excavation are completed for only location (Nr.8 "Rupa", Gramadiste, Prekodolce village) for which investigations were requested within the by BoQ obtained from IPCM, despite the fact that previously prescribed preconditions of IPCM clearly stated that there is no statutorily protected archaeological sites within the proposed highway route. So, there will be no more preliminary archaeological excavation along the proposed highway section from Manajle tunnel to Vladicin Han. Only smaller protective archaeological intervention could be arranged in case of chance finds during earth works.
- ;
- If at any time during construction archeological findings or archeological objects are uncovered, The Contractor is required to immediately, without delay, halt works and inform the authorized Institution for Protection of Cultural Monuments and to undertake measures to ensure the findings are not destroyed or damaged and to protect the area and position in which they are discovered.
- Contractor is not allowed to perform excavation, demolition, alteration or any works that may harm the properties of the cultural monument.
- CoS will timely inform the IPCM and authorized expert about the commencement of earth and other works at the archaeological site or in its immediate vicinity, in order to timely perform all the necessary preparations until the archaeological exploration license is obtained. This aspect has been included in the EMP and a costing allowance has been made to cover archaeological watching brief and any subsequent investigations.
- In case of chance finds, Contractor shall mark and secure new identified sites (with a protective railing or other means of protection) to avoid damage in the course of road construction and immediately notify the relevant IPCM.
- CoS is obliged to provide for and ensure archaeological intervention in the case they come across new finds. This involves the immediate discontinuation of works and notifying the competent IPCM about the discovery. Carrying out the above activities will require occasional archaeological supervision during construction.

CoS will finance producing new documentation and ensure conservation of physical cultural resources. Prior to work, Employer will engage IPCM to do permanent supervision of works at the whole motorway section.

Regarding that there is possibility to find new cultural resources, Contractor will apply following methodology to rescue all excavated material:

- New localities require the presence of archaeological - conservation authority in the execution phase.
- Depending on the character of the findings, possibilities and methods of protection and conservation will be considered and some of the following proposed measures will be applied: conservation of the findings by backfilling; allocation of the findings; and partial allocation of the findings with the conservation of the remainder of locality by backfilling.

According to mentioned facts, the protection of possible localities will be realized in three steps, which will be in accordance to the actual circumstances follow each other. Realization steps are:

- Execute exploratory boreholes for archaeological investigation on the identified sites so as to determine the exact cultural belonging of the sites, stratification of archaeological layers, chronological determination, and preservation of the archaeological layers and the remainders of the architecture if there is any.

Investigation in this phase would have to be completed before the commencement of the works on the site.

- On the basis of the archaeological research results in the phase one, new archaeological researches would be planned on special parts of the site that would be endangered by construction. In case that in the course on research in the phase one it happens that the cultural layer on the localities is not preserved or that the line of the communication is avoided, the second-phase research will not be carried out.
- Monitoring by the authorities, i.e. the control while execution of earth works near the alignment. with mandatory protection of archaeological excavation if any new archaeological sites are discovered while execution of work.

### 5.1.6. Flora, Fauna and visual impact

Flora

The following mitigation measures are necessary:

- Clearing up and removal of vegetation should be minimized to the extent necessary for the execution of works.
- Natural vegetation shall be kept in as undisturbed a state as possible. Special attention shall be paid to preserve trees and plant communities such as wetlands or montage forests, strictly according to the preconditions obtained from INP (see Appendix V). Vegetation removals as part of the development requirements - such as along the proposed scarp road - are excluded.
- Based on the detailed design for this project, and locations marked as a ground under high and excessive erosion, The Contractor is obliged to prepare his own plan (Re-foresting Plan) for re-foresting those areas and to perform re-foresting activities according to this plan.

Fauna

The protection of fauna will be ensured by undertaking the following measures:

- Erection of a protective fence along the road, as a measure to prevent domestic and wild animals straying onto the road and being killed. Protective fence should be with the variable density, starting from higher density in a zone of 50cm above the ground and ending with a standard density for regular protective fence.
- Ensure that the protective fence ends at the bridge base, so as to direct wild animals toward the passage under the bridge. Execute the bank revetments with rough, coarse surface to prevent animals from slipping into water.

One of the more significant consequences of construction of the highway is the phenomenon of fragmentation of the habitats which in this case hits amphibians the hardest. The reason can be found in the existence of the waterways which are necessary for their life cycle. For the purpose of protecting biodiversity and undisturbed movement, multi-functional passages will be built along the waterways, viz. in those places where the construction of bridges has been envisaged. Bridges will be their own ecological corridors with a little revamping so that the bank of the waterway takes up a third of the passage under the road. The sides of the bank must be coarse in order to prevent the sliding of animals into the waterway and in order to enable easier exit from the waterway. The area before and after the passage must be covered in an identical type of soil and vegetation.

Along the aforementioned passages, envisaged slab, tubular and vaulted culverts will be used for movement of wild animals. As there are no larger wild animals in the region in question, these passages represent a suitable place for the crossing of small wild animals. In the following table, a display is provided of the types of culverts, chainages and their sizes.

T 5.1.6. Culverts suitable for the passage of animals on the section Manajle tunnel - Vladicin Han

- km 894 + 340, box culvert L = 5.0 m
- km 894 + 370, box culvert L = 5.0 m
- km 897 + 710, box culvert L = 5.0 m
- km 898 + 800, box culvert L = 5.0 m
- km 899 + 500, box culvert L = 5.0 m

Visual Impact

This issue is solved during design phase and there is no additional, site-specific mitigation measures related with the visual impact of the project. Generally, all visual impact during construction works can be divided into two groups:

1. Temporary disturbance of visual characteristics during construction works due to presence of site equipment and mechanization.
2. Space occupation, which can be improved by site organization in accordance with Detailed Design of environmental protection

### 5.1.7. Construction Camps

The Contractor shall submit a locality and site plan of all construction camps indicating the location of fuel supplies, stockpile sites, offices and the construction area for approval by the Engineer to be approved prior to establishing any camps. The Contractor shall submit a locality and site plan of all construction camps indicating the location of fuel supplies, stockpile sites, offices and the construction area for approval by the Engineer prior to establishing any camps. If there is a need to put any equipment or facilities outside the expropriation boundary it will be done in the agreement of the owner and under Engineer approval.

- No one of the Camps will be in the area of influence on the water bodies (watercourse, water intake, etc.), Storage of hazardous materials will be afar of watercourse, and under specific conditions.
- Site facilities and offices will be selected in the manner to ensure that there is a minimal impact on the environment. All facilities will follow international health and safety standards furnished with power and telecommunication installations, fresh water supply, sanitary and wastewater collecting and treatment installations, solid waste collecting by category and hazardous waste collecting eco-receptacle;
- All Camps will be placed within an existing disturbed area, as far as possible. There will be no Contractor's objects, structures, parking, services, nor material storage in sensitive areas, such as wetlands or erosion potential land;
- All site buildings are containers and other temporary structures. No permanent structures will be built. All objects will be sound-proofing built, and will not pose a danger to personnel and surrounding environment.
- With the decommissioning of the structures all compacted platforms and slab foundations must be ripped and removed.

- Welding, gas cutting or cutting of metal will only be permitted in a specialized protected area inside the Construction site.
- No fires are allowed in or outside the Construction Camp. Adequate and well-maintained firefighting equipment- according to the fire hazard strategies - must be maintained on site during the construction period.
- The Contractor shall be liable for any costs related to extinguishing fires started by the Contractor's employees or subcontractors. Additional penalties for infringements will also be imposed by the EM
- The boundaries of the site shall be demarcated prior to any work commencing on the site. The site boundary demarcation shall be removed when the site is disestablished.
- The Contractor shall demarcate the boundaries of inner limits of the site. Site boundary is defined by expropriation line, and can be changed only in agreement with neighbor landowners. The Contractor shall maintain the demarcation line /
- The method of demarcating the boundaries shall be determined by the Contractor and agree to by the Engineer prior to any work being undertaken. The method of demarcation consists of steel droppers placed at regular intervals, with nylon rope between the markers where this prove to be safe, but where any unauthorized person move closely pass construction work, netting should be provided preventing building material from falling into these paths.
- The Contractor shall ensure that a/l his plant. equipment and materials remain within the boundaries of the site, unless otherwise agreed with Engineer.
- Contractor will ensure that materials used for construction on the site do not blow on or move outside the Site and environs, or pose a threat to animals in the area. Failure to do so may result in the Engineer requiring the Contractor to fence the boundaries of the site with wire mesh, prepare covering material etc., at his own expense to the satisfaction of the Engineer.
- Wire mash fences will be constructed around heritage resources. to prevent access into such areas during construction.
- Fencing shall be kept neat at all times. The Contractor shall be responsible for the maintenance of all fences. Breaches in the fencing must be repaired immediately.
- If fencing is removed temporarily for the execution of work, the Contractor shall reinstate it as soon as practicable. Until re-instatement, the contractor shall demarcate the working area by surrounding it with danger-tape marking.
- Demarcating/Fencing of the construction site shall be suitable to allow access by livestock and local fauna to their natural routes. The purpose of the fenced areas is to control construction and personnel activity within the designated areas, and limit unauthorized access.
- No unauthorized pedestrian or vehicular access shall be allowed into demarcated off-limit areas.
- All vehicles and equipment will be allocated a dedicated parking area in the Camp site;
- No storage of equipment and vehicles will be allowed outside of the designated area:
- All parking, service, cleaning and washing areas will be made of waterproof structure with equipment for collecting spillage. All parking areas will be equipped with WNTF;
- Existing roads (arterial road M-1.12, regional road R-121 and local road network) will be used, as far as possible. No temporary access roads will be permitted, unless, otherwise is accepted by the Engineer, and under agreement with affected landowners.

- In the purpose of the Project, if any existing local road need extension or reinforcement to carry out Contractor's heavy machinery it will be done in accordance with local standards, and approved by the Engineer prior to use;
- If any, temporary roads required Shall be decommissioned by the Contractor and rehabilitated using stockpiled topsoil. Topsoil shall be removed as described under 'Clearing and Grubbing' prior to the construction of the road.
- Access roads shall be regularly brushed or scraped and kept free from dust and mud deposits. In dry weather dust suppression measures may be required.
- The accommodation of traffic is an important aspect on the roads identified for upgrade / maintenance. Where required, temporary works to facilitate the accommodation of traffic during construction, should be completed first as road closures will be avoided as far as possible.
- Adequate and appropriate traffic warning signage will be placed along the route to be used by the construction vehicles from the Camp.
- Adequate and appropriate traffic warning signage will be placed along the route to warn public of construction work and heavy vehicle traffic.
- Transporters of fine materials must ensure that their operation does not pose a nuisance through the spillage of material or the creation of dust.
- All trucks and vehicles removing spoil from the site shall have the load areas covered by a tarpaulin to prevent rocks and spoil from falling onto the road surfaces, or causing a nuisance to persons in the vicinity.
- Deliveries shall be scheduled for off-peak hour traffic time schedules, as far as possible.

## 5.2. Unexploded ordinances.

Due to position of the alignment and history there may be unexploded ammunition, grenades, shells etc from the armed conflicts from 1914 to 1999.

In this case the Contractor should mark the object, close and protect the site and inform CoS, police and army bomb disposal unit.

Following the identification of the type, number etc of the unexploded ordinances the Contractor will submit the request to CoS on how to deal with it.

CoS will bear the cost related to safe removal of these object, to be performed by fully licensed sub-contractor, which the Contractor will engage upon receiving approval from CoS.

## 5.3. Requirements of site specific implementation plans during construction phase

General environmental protection will be contractually provided for in the organization and planning of the work and operations on work site. Each Contractor should build upon the mitigation measures described in the EIA Study and EMP and should prepare his own site specific implementation plan (SSIP), to include *inter alia*

- Waste and wastewater management plan
- Traffic Management Plan
- Oil and fuel storage management plan
- In-river works management plan

- Camp management plan
- Emergency response plan including chapter which prescribe procedures in case unexploded ordinances occur on the construction site
- Re-foresting plan
- Grievance mechanism

Minimum requirements for each of above plans are shown in Appendix I – Mitigation Plan.

Each Contractor should include HSE staff as part of his workforce and they should report to the HSE staff of the Project Management Consultant advising CoS. In addition, the Project is to include Independent Environmental Consultants to provide informal advice and undertake monitoring and auditing activities.

All construction sites should be managed in accordance with national legislation on construction and HSE, such as the Law on Occupational Safety and the Law on Occupational Health and Safety and the Regulation on Occupational Safety for Construction Works (Official Gazette of RS, No. 53/97).

## 5.4. Check List – Mitigation Plan

Phasing, issues and mitigation measures are covered in Appendix I.

# 6. DESCRIPTION OF MONITORING PROGRAM

Monitoring of the effects of the Project will commence during the construction phase and will continue during the operation of the highway. This EMP sets out the basic parameters to be monitored in order to determine that mitigation measures identified above are being implemented effectively.

Following award of contracts for construction, the individual Contractors will work with CoS to develop a detailed monitoring program with specified targets for each indicator, which will be tailored to the requirements of each road sub-section and the elements of The Contractor's Environmental Management System (EMS) and site-specific EMP. Each Contractor will develop a written monitoring program that will be evaluated by the independent environmental consultants and Project stakeholders, including national statutory agencies. The Contractor will cover the cost of implementing the relevant monitoring program in areas of his responsibility.

The monitoring results will be compared to data on current conditions

Compliance with EMP will be monitored by the independent contractor/supervisor, CoS and the WB staff.

## 6.1. Construction Phase

Shortly after mobilization to country The Contractor will develop the monitoring plan in conjunction with the Project Management Consultants (PMC) and relevant statutory authorities. The parameters in the monitoring plan are expected to focus on potential soil and water pollution, especially in areas of higher sensitivity, such as Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), suspended solids, oils and greases to represent potential impact due to construction of the highway, based on the nature of the site activity.

Parameters which require measuring along the highway alignment during operation should be based on the potential for environmental impact and thus focus on water, air, soil and noise pollution, both during construction and operation.

### 6.1.1. Noise

Noise exposure levels are specified under the Regulation on Allowed Environment Noise Levels (Official Gazette RS, No.54/92). Noise measuring equipment will be used to establish a background or baseline and then during construction to establish increases in level and hence compliance to the standards. It is recognized that the best approach to noise control during construction works is require the use of equipment which conforms to noise standards, and then monitor the issue on an ongoing basis, including reacting to any nuisance complaints by local residences or businesses. If acceptable noise levels are exceeded, implementing mitigation such as temporary screening or re-arranging work sites this will be the responsibility of the Contractors environmental and construction site staff.

During construction the level of noise increases due to the transport of loads by heavy freight vehicles (removal and delivery of materials) and the use of the construction machinery. These sources of noise are of a temporary character and last until the completion of construction works.

During the phase when works are being carried out, the level of noise must be controlled when necessary, meaning upon the occasion of a complaint being filed for an excess level of noise while works are being carried out. The Rulebook on Allowed Levels of Noise in

the Environment defines the methods of measurement, selection of measurement location and the time intervals of measurement.

Within the framework of monitoring noise during the carrying out of works, the following is required:

- measurement of the zero point,
- measurement of the highest levels (peaks) of noise during construction,
- If during the course of works the limits of allowed levels of noise are significantly exceeded, in agreement with the owner of the structure, necessary mitigation measures are undertaken.

The Contractor is responsible for all consequences which arise from excess levels of noise during the phase of construction.

### 6.1.2. Air Pollution

Constant monitoring has been envisaged for when there are residential buildings located closer than 400 m. In the case of a complaint from a local resident, monitoring of the effects may be organized at that time.

Impact analysis of the new highway E – 75 shows that the impact of the forecast traffic loads on air quality will be limited to a narrow corridor along the highway. Elevated levels of localised air pollution are forecast for either end of the tunnel, so measurement of air quality will be performed at the entrance and exit portals of the "Manajle" tunnel.

Air Monitoring should be performed four times a year, during construction period.

### 6.1.3. Water

Monitoring of water during the phase of construction of the highway includes determining the effects on the quality of water while construction works are being carried out in the vicinity of waterways or water collectors.

For surface water, the program includes the following parameters: pH, concentration of dissolved oxygen in the water, waste materials, murkiness, concentration of organic compounds and mineral oil.

Limit Values for Serbian water class standard is in according to Serbian Legislation ("Official Gazette of SRS" No. 05/68, 31/82). Documents are presented within the app III of this document.

Water quality of the River Vrla is to be monitored by taking samples on survey mark km 896+741.36, downstream from the bridge and inflowing channel. Sampling is to be done when relevant precipitation occurs, during the first 15 min.

The taking of samples is done on a part of a surface waterway downstream from the construction site. The monitoring program is administered in such a way that it can be used to establish which construction works affect the quality of surface waterways. Samples must be taken before the commencement of works, at the time when humus is being removed and when excavation or the building of embankments from earth material is being carried out. Sampling is done in quarterly intervals.

In the situation when the measurement results and analysis indicate an increase of negative effects, it is necessary to determine the cause of the deteriorating condition and undertake the necessary mitigation measures. Until the cause of the deteriorating condition is determined, only works which do not have an influence on pollution of surface waters may be carried out.

All measurements begin one month before the beginning of preparatory works. The parameters which are the subject of monitoring are divided into the groups geological-hydrological, physical-chemical and chemical. Measurement of the basic and indicative parameters of underground waters should be done at least four times a year with an interval of at least two months. Measurements of the chemical and physical-chemical parameters are done quarterly. The days when samples are taken will depend on the level of underground water, precipitation and other geological and hydrological relations.

There are two locations recognized within the EIA Study and Detailed design which are sensitive for possible underground water pollution. Those are:

- zone of the Oslarci settlement, km 897 + 850.00 to km 897 + 920.00
- zone of the Polom settlement, km 899 + 250.00 to km 900 + 100.00

Monitoring of groundwater quality on those two locations will be performed as a regular control of the drinking water at the construction site. The monitoring plan for underground waters was prepared in accordance with the requirements of the EIA Study and Detailed Design of environmental protection for proposed highway section as well as in accordance with the basic characteristics of construction of the subject section of the highway.

Additionally, based on engineering safety, it is necessary to take measurements of the quality of water from individually-owned wells (quality of drinking water) in in accordance with the regulations for sampling at certain time intervals. Measurement of the quality of underground water will be done for each well at distance less than 100m from highway route.

In the situation when the measurement results and analysis indicate an increase of negative effects, it is necessary to determine the cause of the deteriorating condition and undertake the necessary mitigation measures.

### 6.1.4. Soil

Relevant parameters for soil impact assessment are: pH, concentration of heavy metals, oils and organic substances. Soils near roads having a high frequency of traffic, as in this case, should be tested for hazardous substances, such as typical heavy metals which may have accumulated from vehicle exhausts.

The program for monitoring soil during the construction phase includes parameters which are authoritative for determining the level of endangerment of the same. There is a wide spectrum of pollutants which have been categorized into the following two groups: heavy metals and greases and oils (remains of uncombusted fuel, lubricants and motor oil, antifreeze, hydraulic fluid, etc.).

Samples must be taken before the commencement of works, at the time when humus is being removed and when excavation or the building of embankments of earth material is being carried out.

In the situation when the measurement results and analysis indicate an increase of negative effects, it is necessary to determine the cause of the deteriorating condition and undertake the necessary mitigation measures. Until the cause of the deteriorating condition is determined, only works which do not have an influence on pollution of soil may be carried out.

Measurement of the quality of soil will be done on agricultural lands which belong to the Polom and Oslarci villages, at zone close to expropriation line. Type of measurement and frequency are prescribed within the App II of this EMP document.

## 6.2. Operational Phase

During operation of the highway the relevant environmental aspects will be monitored and will include noise, air, and water and soil quality. The results obtained will determine if additional environmental protection measures are necessary, such as provision of additional noise attenuation structures, landscaping or modifications to carriageway drainage or treatment.

### 6.2.1. Noise

During operation , within the defect notification period, noise must be controlled with the goal of controlling the effectiveness of envisaged noise protection measures. Measurement of the level of noise must be carried out in intervals of five years and in cases of complaints from adjacent inhabitants.

Residential objects which will be monitored related to noise problems are located on the following chainages: 895+020 (Krzince), 895+056 (Krzince), 896+750 (Vladicin Han), 897+750 (Oslarci) and 900+047 (Polom).

### 6.2.2. Ai r

For measuring the content of pollutants in the air which are emitted by motor vehicles during the phase of operation of the future E-75 Highway, it is necessary for all measuring stations to be placed in the same manner because only in that way can the proper dispersion model be formed, based on which adequately reliable data on the spatial distribution of air pollution in the affected zone can be obtained.

In the first phase of monitoring which must last 5 years, it is necessary to carry out periodic monitoring of the air quality (1 month in a season), because in order to establish trends of air pollution it is necessary for measurement data to be obtained for at least five consecutive years.

Only in the case where the results of periodic measurement indicate the necessity for further monitoring of air quality would it be necessary to carry out permanent monitoring of air quality, viz. enacting the second phase of monitoring.

### 6.2.3. Water

The monitoring program for surface waters during the operation includes monitoring of the following parameters: pH, concentration of dissolved oxygen in the water, waste materials, murkiness, concentration of organic compounds and mineral oil, then temperature, color and odor.

Domestic legal regulations which relate to the method of controlling the quantity and quality of waste water (effluent) before it is released into a recipient cannot be applied to the control of the quality of cleaned atmospheric waste water. Depending on the climatic factors, scope and structure of traffic, the composition of effluent varies during one hydrological year. Besides that, as opposed to a majority of European countries, in Serbia there are no prescribed emissions standards. That is why in this specific case it is only

possible to monitor the effect of operation of the future highway on the quality of water of the recipient through emissions standards.

The evacuation of pavement runoff waters will be of controlled type. The entire discharge from the given section will be controllably evacuated to shafts and enclosed rainwater drainage systems, wherefrom all water goes to treatment facilities – stormceptors. Using those facilities, all collected water from motorway will be treated as required, and then discharged into recipient.
Purpose of the monitoring is to comply with Serbian legislation. Within the Article 73 of Law on Environmental Protection ("Official Gazette of RS" No. 135/2004, 36/2009, 72/2009) is stated that polluters are obliged to submit the data on monitoring to the Environmental Protection Agency in a way prescribed by regulations.

CoS needs to ensure that quality of the water which enters the recipient river does comply with the Serbian water class standard for specific river recipient.

It is necessary for the measurement and processing of data to be carried out continuously every four months. This means taking samples in January, April, July and October, which covers all periods of low and high water levels within the function of rain and drought. In that manner, possible concentrations of pollutants in runoff water will be controlled and with that also the condition of the class of the waterways in the studied area.

The monitoring plan for underground waters was done in accordance with the requirements of the TOR as well as in accordance with the basic characteristics of construction of the subject section of the highway.

Water quality of the River Vrla is to be monitored by taking samples on survey mark km 896+741.36, downstream from the bridge and inflowing channel. Sampling is to be done when relevant precipitation occurs, during the first 15 min.

Within the framework of the geological-hydrological studies on the characteristics of underground waters, a map of the levels of underground waters was drafted which covers the area of the analyzed section. The hydraulic parameters of underground water are determined in each testing which implies the determination of the coefficient of water permeability and its comparison with previously obtained data. Based on these results the hydraulic conditions of each bore hole are determined.

The testing program encompasses the parameters which can be used to evaluate the current condition of the quality of underground water and the degree to which it is polluted with polluting substances from the subject section. The testing program includes the following measurements:

- Terrain measurements: temperature of air and water, pH, electrical conductivity, oxidation/reduction potential,
- Basic parameters: color, dissolved materials, total organic carbon, nitrogen, nitrates, sulfates, chlorides, chemical and biological consumption of oxygen,
- Indicative parameters: microelements, phenols, mineral oil, polycyclic aromatic hydrocarbons, aromatic hydrocarbons, pesticides.

### 6.2.4. Soil

Monitoring of soil during the operation of the highway, viz. monitoring the effects of operation of the future E-75 Highway, section Manajle tunnel - Vladicin Han, on the quality of soil, must be carried out at the edge of the "buffer zone" of highway.

The Contractor will ensure a preliminary testing ("zero monitoring") of soil pollutants according to the Monitoring Plan of this EMP document. In the preliminary testing, the locations where sampling is done must be selected randomly and be small in number. The first and most important step in the analysis of the quality of soil is the taking of samples. It is not only quality of the measurement results that depends on the manner in which the samples are taken, but also the conclusions which relate to the quality of the analyzed soil. Any particular sample of soil can rarely be reproduced in the sense of its physical and chemical characteristics. For example, the second sample, taken from the same sampling point, won't necessarily be identical to the first sample. The depth of sampling depends on the use of the land, as well as on the effects which are present on that land. From cultivated land, samples are taken form a depth of 0-30 cm and from land which is used for growing fruits, samples are taken from two depths- from 0-30 cm and from 30-60 cm. Individual samples are then placed into a PCV container, mixed up and stones and plant remains are removed. The prepared sample is then put into a PVC bag, marked and transported to the laboratory for analysis.

Following the preliminary testing a plan for further testing is created. For this purpose the place of sampling is defined first. The number of samples depends on the preliminary testing and is related to the structure being tested.

Parallel to the control of the quality of soil, the quality of underground water must also be monitored. The quality of underground water requires the monitoring of pollutants which are present in the soil and for the purpose of determining the effects of soil pollution on the pollution of underground water. Sampling of underground water is done using the piezometer.

### 6.3. Check List – Monitoring Plan

Details related to the monitoring program are tabulated in Appendix II.

# 7. PUBLIC CONSULTATION

## 7.1. Public Consultations on EIA Study

In respect to environmental safeguard issues, the Client (PEPS) has already prepared subsection EIA Study on preliminary/ feasibility design of E-75 Highway section between Manajle tunnel and Vladicin Han, in accordance with Serbian legislation. The national disclosure process encompassed four rounds of public consultations for each sub-section (on TOR for environmental consultant, on scope of environmental assessment, on draft EIA Study and on draft final EIA Study) and were carried out in period from 2006 to 2010.

The national EIA procedure in respect to E-75 highway section from Manajle tunnel to Vladicin Han started at Nov 02, 2005, when PEPS (former Serbian Road Directorate) submitted the Request to the Ministry of Energy, Development and Environmental Protection (MoEDEP) in order to receive document determining scope and content of EIA Study. According to the Serbian Law on EIA ("Official Gazette of RS" No. 135/2004, 36/2009), this step was announced in daily newspaper "Politika" (Dec 23, 2005), and interested parties were invited to participate in process of defining the scope and content of EIA Study. At Jan 05, 2006, the Ministry provided the Terms of Reference and that information was made public in daily newspaper "Politika" (Jan 29, 2006). The Highway Institute, Belgrade prepared draft EIA Study, which was submitted to MOE for its approval (Aug 11, 2008). At the same time PEPS announced this step in daily newspaper "Politika" (Sep 10, 2008), when public and other interested parties and organizations were invited to participate in process of public consultation on draft EIA Study for E-75 Highway Project, section Manajle tunnel - Vladicin Han.

Public Consultation was held in Vladicin Han, on Oct 02, 2008.
CoS representatives, together with the Project designers presented all possible impacts of proposed project on natural and social environment to the interested parties and potentially affected persons who participated on Public Consultations. Every single project detail was carefully explained to the interested public. There was a very fruitful discussion established among the parties and most of questions were answered.
During Public Consultations a representatives of the Ministry of Environment and Spatial Planning were present, collecting all questions raised during public consultation process. and there were no major complains on prepared draft EIA Study.
After Public Consultations in Vladicin Han, all remarks and suggestions collected by the Ministry representatives during PC were, in official form, delivered to the PERS, together with the DRAFT EIA Study.
Based on received comments and suggestions PERS rectified and improved EIA Study, respecting the conclusions and suggestions provided by the interested parties.
Special Technical Comity formed on behalf of MESP reviewed and approved the improved EIA Study.
Finally, The sub-section EIA Study has been approved by the Serbian Ministry of Energy, Development and Environmental Protection (former MOESP) on Apr 06, 2010 (No 353-02-283/2008-02).

## 7.2. Public Consultations on Corridor Level EIA report

In accordance with OP/BP 4.01 the Borrower has engaged an independent consultant to prepare Corridor Level EIA for E-75 Highway from Grabovnica to Levosoje, which include highway sub-section from Manajle tunnel to Vladicin Han. Besides consolidating the sub-section EIA Study, the Corridor Level EIA also addressed the cumulative, induced,

indirect and transboundary impacts. The draft EIA Study has been received by the Bank and commented upon. The Client subsequently updated the Corridor Level EIA Study and prepared a final version of the document.

The in-country disclosure of draft Corridor Level EIA Study was carried out in the period from February 25 (when the documents were made publicly available on site and at the Client's web site) to March 12th (when the public meetings were held in Vranje). Public announcements in Serbian and English were published in the daily newspaper Politika, inviting the public, authorities and relevant institutions to have an insight into the EIA Study for the Project. Prior to announcement in the newspapers, the EIA Study was delivered to the Municipality of Vranje and published on the CoS and PE "Roads of Serbia" web site.

Public Consultations were concluded on March 12, 2009, from 12 to 02 PM (local time), by presentation of the subject EIA Study on the premises of the Municipality of Vranje.

Presentation of the EIA Study for the E-75 Highway Project, Nis – FYRM Border, Section Grabovnica – FYRM Border, was attended by representatives of the Municipality of Vranje, EIA Study Author, WB representative, representatives of the PE "Roads of Serbia" and the interested public. List of participants is included in this Report.

During the public consultations, there were no significant remarks in regards to environmental protection issues related to Manajle tunnel - Vladicin Han Highway section.

*Public Consultations on Site Specific EMP, section Caricina Dolina – Manajle tunnel – Vladicin Han*

Site specific EMP document for Caricina Dolina – Manajle tunnel – Vladicin Han highway section is produced during 2011, respecting all the comments, requirements and conclusions prescribed within the EIA Study, Corridor Level EIA Study and Detailed design of Environmental protection produced for proposed highway section.

EMP document was disclosed on CoS web site since it was produced (2011) and was publicly available for last two years.

No single comments, remarks or suggestions were received from interested public during disclosure period.

# 8. INSTITUTIONAL ARRANGEMENTS

CoS is responsible for the overall implementation of the Project, including management of environmental and social issues under the Project.

The EIA Study for E-75 Manajle tunnel - Vladicin Han highway section, Corridor Level EIA and Detailed Design of Environmental Protection for E-75 Manajle tunnel - Vladicin Han highway section provide the base for the preparation of this site specific EMP. As part of the detailed design stage for this section, CoS has prepared this site-specific EMP and Checklists. The site-specific EMP and Checklist are included as part of the bidding documents to ensure the contractors are aware and meet their formal obligations in the area of the environmental protection. After contract signing, The Contractor will prepare his implementation plan, to be approved by the CoS ("Corridors of Serbia")'s Supervision Consultant, containing the detailed information on meeting the requirements detailed in this EMP.

During project implementation, a firm of independent consultants, who will report directly to CoS, will monitor whether and how well contractor complies with the measures as outlined in the EMP. Any non-compliance with the EMP or any other safeguards will require immediate remediation. Contractors *vis-a-vi* the borrower, and the borrower *vis-a-vis* the Bank will need to present reasons for noncompliance, propose a detailed and time-bound action plan to achieve compliance, and obtain the no objection of the Bank for the action plan. The cost of proposed corrective measures will be borne by the responsible contractor.

# 9. IMPLEMENTATION SCHEDULE AND REPORTING PROCEDURES

Prior to the commencement of works CoS will submit to the Bank for its approval: this section specific Environmental Management Plan and Checklist.

The Contractor will prepare his compliance reports in respect to this EMP and his SSIP at regular intervals as instructed by CoS.

The Contractor will submit reports in both Serbian and English language in hard copy and electronic versions.

Separate independent environmental and social supervision will directly reporting to CoS for the implementation of the project,

Project progress reports, including monitoring indicators and reporting on the implementation of the requirements set forth in the Environmental Impact Assessments and the Resettlement Policy Framework, will be prepared by CoS on a quarterly basis and submitted for Bank review. The Bank will review the reports and verify their contents through periodic site visits.

The Contractor will provide "Zero monitoring" results prior to commencement of earth works, during its own mobilization phase.

Semi-annual reviews will be carried out each year, jointly by the Borrower and the Bank together with other participating IFIs and bilateral donors, to measure progress made in implementing the Project. The semi-annual reviews shall cover, *inter alia:* (a) progress made in meeting the Project objectives; and (b) overall Project performance against Project monitoring indicators.

## 10. REFERENCES

1 Detailed site-specific EIA Study for E-75 Highway Nis – Border of FYRM, section Caricina Dolina - Manajle tunnel - Vladicin Han, Highway Institute Belgrade, 2008

2 Detailed design of environmental protection measures, E-75 Highway Nis – Border of FYRM, section Caricina Dolina - Manajle tunnel - Vladicin Han, Highway Institute Belgrade, 2011

3 Corridor X level EIA Report for E-75 Nis – Border of FYRM Highway, PEPS, 2009

4 Environmental Assessment Sourcebook No 25, Environmental Management Plans, The World Bank Environment Department, January 1999

5 Roads and the environment: A Handbook, The World Bank Environment Department

6 Environmental Assessment Sourcebook No 25, Environmental Management Plans, The World Bank Environment Department, January 1999

7 Project Appraisal Document (PAD) to the Republic of Serbia Corridor X Highway Project, Report No: 47069-YF, June 12th, 2009

# Appendix I

# CHECK LIST

# MITIGATION PLAN

| Phase, location | Issue | Mitigation | Institutional responsibility | | Notes |
|---|---|---|---|---|---|
| | | | Install | Operate | |
| **Highway Construction** | Relocation of services | Effective co-ordination with utility companies during relocation. | Contractor, CoS | Contractor, CoS | |
| | Noise impact on affected residents, km 894+970 to km 895+070, right side | Noise protection construction, L=100m, h=2.5 - 4.5m | Contractor | Contractor | |
| | Noise impact on affected residents, km 895+013 to km 895+098, right side | Noise protection construction, L=84m, h=3.5 - 5m | Contractor | Contractor | |
| | Noise impact on affected residents, km 897+673 to km 897+927, right side | Noise protection construction, L=252m, h=1.5 - 3m | Contractor | Contractor | |
| | Noise impact on affected residents, km 899+994 to km 900+101, left side | Noise protection construction, L=108m, h=1.5 - 5m | Contractor | Contractor | |
| | Inadequate prevention of construction-related noise from vehicles, asphalt plants, crushing and batch plants and equipment | The plants and equipment used for construction will strictly conform to noise standards. | Contractor | Contractor | |
| | Possible loss or damage to cultural resources, ““Rupa”, Gramadiste, Prekodolce village | Borrower already financed pre-excavations, producing adequate documentation and ensuring conservation of physical cultural resources.. | CoS | CoS | |
| | Possible loss or damage to cultural resources | In case of chance finds, The Contractor is required to immediately, without delay, halt works and inform the authorized Institution for Protection of Cultural Monuments and to undertake measures to ensure the findings are not destroyed or damaged and to protect the area and position in which they are discovered. | Contractor IPCM CoS | Contractor IPCM CoS | |

| Phase, location | Issue | Mitigation | Institutional responsibility | | Notes |
|---|---|---|---|---|---|
| | | | Install | Operate | |
| | Noise Impact - Disturbance to residents | Working hours/activities will be adjusted to reduce noise disturbance and working time restricted to 0630 to 1930hrs, or as otherwise agreed locally. Maintain dialogue or use grievance mechanism to allow residents to contact Project staff to make representations. | Contractor | Contractor | |
| | Noise impact - Protection of workers H&S | Noise standards will be strictly enforced to protect construction workers from noise impacts, in accordance with international HSE procedures. All Project works will adhere to international H&S standards, including minimum PPE standards, e.g. hard hat, safety boots, ear defenders and noise exposure limited to 85 dB(A). | Contractor | Contractor | |
| | Construction waste. | Heavy metals are separated and should be removed and disposed of at approved dump sites, in accordance with The Contractors waste management plans (WMP). | Contractor | Contractor | |
| | Potential contamination of soil and water resources. | Each parking, service, or cleaning and washing plateau will be equipped with waste water treatment facilities which will be temporary objects | Contractor | Contractor | |
| | Maintaining animal mobility through culverts and bridges | Use of designed culverts and bridges as animal crossing points. | Contractor | Contractor | |
| | Emission from construction vehicles and machinery | All vehicles, equipment and machinery used for construction will be regularly maintained and inspected/certificated to ensure that the pollution emission levels conform to the standards prescribed. | Contractor | Contractor | |
| | New borrow pits damaging agricultural, archaeological or ecological resources | Contractor have to use the Borrow pits on a specific locations which are predefined within the Detailed design | Contractor | Contractor | |
| | Asphalt plant-dust, fumes, workers health and safety, ecosystem disturbance | Contractual requirement-use existing asphalt plants; requirement for official approval or valid operating license or new plants require certification and approval. | Contractor | Contractor | |

| Phase, location | Issue | Mitigation | Institutional responsibility | | Notes |
|---|---|---|---|---|---|
| | | | Install | Operate | |
| | Stone quarry | Contractual requirement-use existing quarries; requirement for official approval or valid operating license. | Contractor | Contractor | |
| | Sand and gravel borrow pit-disturbance of river bed, water quality, ecosystem disturbance | Contractor has to use the Borrow pits on specific locations which are predefined within the Detailed design . It is allowed to use existing borrow pits or buy material at licensed facilities; no borrowing from rivers. Or use new pits which require approval and licensing. | Contractor | Contractor | |
| | Construction related dust, from movement of vehicles at site and to sites from borrow pits and quarry sites, etc. | Dust suppression will be used on unsealed road surfaces, asphalt mixing sites and temporary service areas. Water truck bowser with spray bar will be used. | Contractor | Contractor | |
| | Vehicles hauling materials will generate dust nuisance | Vehicles delivering material will be covered. | Contractor | Contractor | |
| | Failure to properly manage/store topsoil, leading to degraded and substandard site reclamation and re-vegetation | Cleary defined topsoil storage and handling in contract specification and management plan and follow up with regular inspection & monitoring and reporting. | Contractor | Contractor | |
| | Flora - vegetation protection | Clearing up and removal of vegetation should be minimized to the extent necessary for the execution of works | Contractor | Contractor | |
| | Preventing domestic and wild animals straying onto the road and being killed | Erection of a protective fence along the road, as a measure to prevent domestic and wild animals straying onto the road and being killed. Protective fence should be built with the variable density | Contractor | Contractor | |
| | Landscape impact, soil erosion | Develop and implement landscape planting; Re-forest ground of classes 6 and 7 under high and excessive erosion | Contractor, CoS | Contractor, CoS | |
| | Damage to agricultural lands, including drainage and irrigation infrastructure | Liaise effectively with PAPs before start of construction, maintain dialogue, develop a grievance procedure, strictly control machinery and vehicle access and reinstate all affected areas. | Contractor | Contractor | |

| Phase, location | Issue | Mitigation | Institutional responsibility | | Notes |
|---|---|---|---|---|---|
| | | | Install | Operate | |
| | Livestock resources damaged by machinery and vehicles | Liaise effectively with PAPs before start of construction, maintain dialogue, develop a grievance procedure, strictly control machinery and vehicle access, and consider fencing for protection. | Contractor | Contractor | |
| | Contamination of soil or water resources | Storage and handling of fuels, oils and other hydrocarbons will be a controlled process, involving measures to prevent soil and water contamination. Designs will include storage on sealed surfaces and within secondary containment and refueling of all plant, vehicles and machinery will not be allowed within 50 m of any watercourse, drain or channel leading to a water course. | Contractor | Contractor | |
| | Damage to aquatic ecosystems | Prevent the movement of machines inside rivers, streams, or on their banks, except when it is unavoidable due to the construction of a structure or construction. | Contractor | Contractor | |
| | Contamination of soil or water resources | All sites near rivers shall be protected by fencing and other means to prevent loss of construction materials, particularly hazardous materials. | Contractor | Contractor | |
| | Traffic disruption to residents and longer distance travelers | Develop Traffic Management Plan in conjunction with road authorities to manage all temporary accesses, delivery of material and machinery. | Contractor | Contractor | |
| | Residents injured by construction traffic and machinery | Conduct safety awareness campaigns, focusing on schools and children. | Contractor | Contractor | |
| | Workers injured during construction | Implement international HSE standards in all contracts. | Contractor | Contractor | |
| | Illegal or excessive borrowing may damage archaeological or land resources | No earth borrowed from unauthorized locations. | Contractor | Contractor | |

| Phase, location | Issue | Mitigation | Institutional responsibility | | Notes |
|---|---|---|---|---|---|
| | | | Install | Operate | |
| | Reduced land or property values | Establish and maintain dialogue with PAPs to reduce adverse effects as part of ongoing design and construction. | Contractor, CoS | Contractor | |
| | Contamination of soil or water resources | Contaminated or hazardous waste such as bitumen waste to be disposed of in selected areas approved by the Ministry of Environment. All waste disposal to comply with a Waste Management Plan, to be developed at the start of construction. | Contractor | Contractor | |
| | Pollution of groundwater and soils during demolition of properties | Develop working method statement to include effective management of materials. | Contractor | Contractor | |
| | Damage to water resources | All abstractions and any formalized discharges must be licensed/ approved by relevant authorities. | Contractor | Contractor | |
| | Damage to aquatic habitats and fish | All in-river works will be conducted outside of the fish spawning season and Contractors will prepare management plans for such works as a part of their Construction Method Statements. | Contractor | Contractor | |
| | Damage to river morphology | Digging and making the foundations for bridge piers, retaining walls, and structures located at, or in the vicinity of, surface water bodies, will take place in the period of low water levels (July-September) so as to minimize negative impacts on rivers and their banks. | Contractor | Contractor | |
| | Soil and water pollution | Construction vehicles and equipment will be maintained and refueled at protected refueling stations. Fuel storage and handling sites located away from drainage channels and important water bodies in accordance with Management Plan. | Contractor | Contractor | |
| | Soil and water pollution | Develop plans for cement and wash-water management. | Contractor | Contractor | |

| Phase, location | Issue | Mitigation | Institutional responsibility | | Notes |
|---|---|---|---|---|---|
| | | | Install | Operate | |
| | Water pollution | Develop monitoring program for sensitive water courses, such as major river crossings and reporting, feedback and remedial action procedures. This should be linked to the Management Plans to be developed by The Contractors. | Contractor | Contractor | |
| | Temporary access-vegetation removed, soil compacted, landscape and vegetation impacted | Remove topsoil layer initially and afterwards de-compact alignments and reinstate topsoil and perform re-vegetation | Contractor | Contractor | |
| | impact on fish and other animals that depend on water as eco-system | Avoid river control works in the period of fish spawning. All in-river works will be conducted outside of the fish spawning season and Contractors will prepare management plans for such works as a part of their Construction Method Statements. | Contractor | Contractor | |
| | Land resources damaged | Identify work areas with contractor(s) and describe system approvals for extensions and fines for violations. | Contractor | Contractor, CoS | |
| **Construction camps** | Community tension and disruption | Locations for camps are predefined within the Detailed Design of the Project. Contractor should prepare Camp Management Plan | Contractor | Contractor | |
| | HSE Standards | Work camps are required to conform to international Health, Safety and Environment (HSE) standards | Contractor | Contractor | |
| | Unexploded ordinances | There may be unexploded ammunition, grenades, shells etc from the armed conflicts from 1914 to 1999. In this case the Contractor should mark the object, close and protect the site and inform CoS, police and army bomb disposal unit. Following the identification of the type, number etc of the unexploded ordinances the Contractor will submit the request to CoS on how to deal with it. CoS will bear the cost related to safe removal of these object, to be performed by fully licensed sub-contractor, which the Contractor will engage upon receiving approval from CoS. | CoS Contractor | CoS Contractor | |

| Phase, location | Issue | Mitigation | Institutional responsibility | | Notes |
|---|---|---|---|---|---|
| | | | Install | Operate | |
| | Wastewater collection and disposal/treatment | Camps should be furnished with sanitary and wastewater collection and disposal/treatment facilities and should operate fully compliant waste systems, involving storage of waste by waste category. | Contractor | Contractor | |
| | Contamination of soil or water resources | Storage of fuels and re-fuelling of equipment will be controlled in floodplains to prevent groundwater pollution. No storage of fuels and oils will be allowed in floodplains where the potential for washout exists. | Contractor | Contractor | |
| | Spread of disease, including STIs | Conduct awareness campaigns for camp workers and if relevant nearby communities. | Contractor | Contractor | |
| | Water and soil pollution | The sewage system for such camps will be properly designed and built so that no water pollution takes place. Such facilities will be decommissioned at end of the construction period. | Contractor | Contractor | |

Prior to initiating works, the Contractors will be required to prepare and submit for approval Site-Specific Implementation Plans (SSIP) consisting of:

Waste and wastewater management plan

The Contractor's SSIP should cover all aspects of waste management, including implementation of practice standards such as reduce, re-use and recycle. It should specify final disposal alignments for all waste and demonstrate compliance to national legislation and best practice procedures on waste management.
The WMP will, as a minimum, include details of temporary waste storage, waste transfer and pre-treatment prior to final disposal or recycling. Licensed/approved facilities for solid and liquid waste disposal must be used and a duty of care and chain of custody for all waste leaving the site will be followed. As part of the plan Contractors will be expected to produce waste handling forms for chain of custody, which will be used to control waste leaving site. Thus the waste controller will keep a copy of the form and the driver will always carry a copy and will ensure that the load is signed for at the final disposal site. All records will be kept by The Contractor for audit purposes and to demonstrate that the project is complying with best practice and applicable legislation.

Oil and fuel storage management plan

The Contractor's SSIP should cover all procedures for storage, transportation and usage of oils and fuels, refueling of plant and machinery and procedures for minimizing the risk of ground and water contamination. All oils and fuels will be required to be stored within secondary containment of 110 % capacity and all spillages shall be cleaned up immediately. Re-fuelling vehicles will carry Spill Kits to enable spillages to be cleaned up as soon as possible. All categories of spillage will be reported in accordance with the Plan to be developed by The Contractor. Toolbox Talks would be expected to be delivered on an ongoing basis as „continued training" and following any significant incident.

In-river works management plan

The Contractor's SSIP should cover procedures and plans for safeguarding aquatic habitats and fish during in-river construction work and will complement the Construction Method Statements.

Camp management plan

The Contractor's SSIP should contain procedures for establishing and operating construction camps in order to safeguard nearby communities and environmental resources.

Re-foresting plan

In accordance with the preconditions obtained from INP, The Contractor will prepare plan for reforesting areas which were destroyed during construction phase.

Emergency response plan

The Contractor's SSIP should contain procedures for emergency response in the event of accidents or major incidents, in order to safeguard people, property and environmental resources.

# Appendix II

# CHECK LIST

# MONITORING PLAN

| Phase, item | What parameter is to be monitored? | Where is the parameter to be monitored? | How is the parameter to be monitored?/ type of monitoring equipment | When is the parameter to be monitored? (frequency of measurement or continuous) | Why is the parameter to be monitored? (optional) | Install and operate |
|---|---|---|---|---|---|---|
| **Construction** | | | | | | |
| Contamination of surface water during construction, Vrla River | suspended solids, organic compounds, lubricants, fuel, solvents, heavy metals, pH value, mineral oils | taking samples on survey mark km 896+741.36, downstream from the bridge and inflowing channel. | Water quality analysis | Sampling is to be done when relevant precipitation occurs, during the first 15 min. | EIA Study compliance | Contractor |
| Contamination of underground water during construction | suspended solids, organic compounds, lubricants, fuel, solvents, heavy metals, pH value, mineral oils | Zone of the Oslarci settlement, km 897 + 850.00 to km 897 + 920.00 | Water quality analysis | One month before the commencement of works.<br>During construction sampling will be done quarterly. | EIA Study compliance | Contractor |
| Contamination of underground water during construction | suspended solids, organic compounds, lubricants, fuel, solvents, heavy metals, pH value, mineral oils | Zone of the Polom settlement, km 899 + 250.00 to km 900 + 100.00 | Water quality analysis | One month before the commencement of works. | Contamination of underground water during construction | suspended solids, organic compounds, lubricants, fuel, solvents, heavy metals, pH value, mineral oils |

| Phase, item | What parameter is to be monitored? | Where is the parameter to be monitored? | How is the parameter to be monitored?/ type of monitoring equipment | When is the parameter to be monitored? (frequency of measurement or continuous) | Why is the parameter to be monitored? (optional) | Install and operate |
|---|---|---|---|---|---|---|
| Contamination of soil during construction | Heavy metals and greases and oils | Agricultural land - Polom and Oslarci villages | Soil quality analysis | One month before the commencement of works.<br>During construction sampling will be done quarterly. | EIA Study compliance | Contractor |
| Noise | Noise Levels | km 896+750, both sides, Oslarci village | Noise meter | Quarterly | Settlement potentially affected with the noise | Contractor |
| Noise | Noise Levels | km 897+750, right side, Vladicin Han | Noise meter | Quarterly | Settlement potentially affected with the noise | Contractor |
| Noise | Noise Levels | km 895+020, left side, Krzince village | Noise meter | Quarterly | Settlement potentially affected with the noise | Contractor |
| Noise | Noise Levels | km 895+056, right side, Krzince village | Noise meter | Quarterly | Settlement potentially affected with the noise | Contractor |
| Noise | Noise Levels | km 900+047, left side, Polom village | Noise meter | Quarterly | Settlement potentially affected with the noise | Contractor |
| | Damage to irrigation and Drainage infrastructure | Agricultural lands | Visual observations, discussions with PAPs | weekly | Compliance to EIA and social commitments | Contractor e.g. Environmental staff |

| Phase, item | What parameter is to be monitored? | Where is the parameter to be monitored? | How is the parameter to be monitored?/ type of monitoring equipment | When is the parameter to be monitored? (frequency of measurement or continuous) | Why is the parameter to be monitored? (optional) | Install and operate |
|---|---|---|---|---|---|---|
| | Dust | At construction sites | Visual monitoring | Regularly site visits | Check environment and H&S requirements | Contractor |
| | Waste water from construction camps and portable sites | At construction camps and portable facilities at work sites | Monitoring of appropriate installation and operation of wastewater units, latrines and septic tanks | Regularly site visits | Check environment requirements are being maintained | Contractor |
| | Community tension and disruption. | Construction sites | Observation | Regularly site visits | EIA Study compliance | Contractor |
| Air Quality | Measuring carbon monoxide (CO) and nitrogen dioxide (NO2) is recommendable in stage one.<br>If the measurement results show exceeded allowable concentration values, the list of pollutants should be extended by measuring the concentrations of nitrogen monoxide (NO), sulphur dioxide (SO2), hydrocarbon (CXHY), and solids/particulates (PM10). | At the entrance and exit portals of the "Manajle" tunnel | Laboratory equipment | Two times during Construction works | Zone potentially affected with the air pollution | Contractor |

| Phase, item | What parameter is to be monitored? | Where is the parameter to be monitored? | How is the parameter to be monitored?/ type of monitoring equipment | When is the parameter to be monitored? (frequency of measurement or continuous) | Why is the parameter to be monitored? (optional) | Install and operate |
|---|---|---|---|---|---|---|
| | Asphalt plant - possession of official approval or valid operating license | asphalt plants | Supervision inspection | before work begins | Ensure plant compliance with environment, health and safety standards | Plant Operator, contractor |
| | Stone quarry - possession of official approval or valid operating license | stone quarry | Supervision inspection | before work begins | Ensure compliance with EIA | Quarry Operator, contractor |
| | Sand and gravel borrow pit - possession of official approval or valid operating license | sand and gravel borrow pit | Supervision inspection | before work begins | Ensure compliance with EIA | Quarry Operator, contractor |
| | Asphalt, dusty, bulk materials - truck load covered and/or wetted | job site | Supervision inspection | Regular inspections during work | Ensure compliance of performance with environment, health and | Contractor |
| | Traffic management - hours and alignments selected | job site | Supervision inspection | Regular inspections during work | Ensure compliance with EIA | Contractor |
| | Possible loss or damage to cultural resources in case of Chance Finds | Construction site, during excavation works | Permanent archaeological supervision during earth works | During earth works | Ensure protection of cultural resources | Construction Contractor<br>Archaeological Supervision Contractor |

| Phase, item | What parameter is to be monitored? | Where is the parameter to be monitored? | How is the parameter to be monitored?/ type of monitoring equipment | When is the parameter to be monitored? (frequency of measurement or continuous) | Why is the parameter to be monitored? (optional) | Install and operate |
|---|---|---|---|---|---|---|
| **Construction site** | | | | | | |
| Vibration | Vibration levels | job site | Supervision, observations | Regular inspections during work and on complain | Ensure compliance to EMP | Contractor |
| Noise disturbance to human and animal population | noise levels; equipment | job site; nearest homes | Mobile noise meter | once per week and on any complaint | assure compliance to EMP | Contractor |
| Traffic disruption | existence of traffic management plan; traffic congestion | at and near job site, local roads | inspection; observation | before works start; once per week at peak periods | assure compliance to EMP | |
| Workers safety | Protective equipment; organization of bypassing traffic | job site | inspection | Regular inspections during work | Ensure compliance to EMP and H&S standards. | Contractor |
| **Operation** | | | | | | |
| Contamination of soil during highway operation | Heavy metals and greases and oils | Agricultural land - Polom and Oslarci villages | Soil quality analysis | Quarterly, at least 5 years during operational phase of highway section | EIA Study compliance | Contractor |

| Phase, item | What parameter is to be monitored? | Where is the parameter to be monitored? | How is the parameter to be monitored?/ type of monitoring equipment | When is the parameter to be monitored? (frequency of measurement or continuous) | Why is the parameter to be monitored? (optional) | Install and operate |
|---|---|---|---|---|---|---|
| **Maintenance** | | | | | | |
| Noise disturbance residents, workers | noise levels | job site; nearest homes | Noise meter | Regularly | Ensure compliance to HSE Standards. | Maintenance Contractor |
| Possible air, water and soil pollution | air, water and soil quality (suspended solids, organic compounds, lubricants, fuel, solvents, heavy metals, pH value, water conductivity | job site; material storage areas; wash down areas for equipment; equipment maint. facilities | laboratory with necessary equipment | Regular inspections during maintenance activities and on complain | Ensure compliance to HSE Standards. | Maintenance Contractor |
| Vibrations | limited time of activities | job site | supervision | Regular inspections during maintenance activities and on any complaint | | Maintenance Contractor |
| Workers safety | Protective equipment; organization of bypassing traffic | job site | inspection | Regular inspections during maintenance activities and on any complaint | | Maintenance Contractor |
| **Road safety** | | | | | | |
| Increased vehicle speed | condition of traffic signs; vehicle speed | road section included in project | visual observation; speed detectors | during maintenance activities; unannounced | a)-b) enable safe and economical traffic flow | Traffic Police |

| Phase, item | What parameter is to be monitored? | Where is the parameter to be monitored? | How is the parameter to be monitored?/ type of monitoring equipment | When is the parameter to be monitored? (frequency of measurement or continuous) | Why is the parameter to be monitored? (optional) | Install and operate |
|---|---|---|---|---|---|---|
| Erosion, rockfall, hazardous conditions | condition of hazard signs | road section included in project | visual observation | during maintenance activities | Maintenance Contractor | Traffic Police, Supervision Contractor |

# Appendix III

# LEGISLATION

**MAIN SERBIAN LEGISLATION:**

The main laws and regulations currently in force in Republic of Serbia which are relevant to the environmental protection during planning, design, construction and operating of this Project are listed below:

- Law on planning and construction ("Official Gazette of RS" No. 72/09, 81/09,64/10, 24/11, 121/12)
- Law on nature protection ("Official Gazette of RS", 36/09)
- Law on environmental protection ("Official Gazette of RS" No. 135/04, 36/09, 72/09)
- Law on EIA ("Official Gazette of RS" No. 135/2004, 36/2009)
- Law on Strategic EIA ("Official Gazette of RS" No. 135/2004)
- Law on waste management ("Official Gazette of RS", 36/09)
- Law on noise protection ("Official Gazette of RS", 36/09, 88/10)
- Law on water ("Official Gazette of RS", 30/10, 93/12)
- Law on forest ("Official Gazette of RS", 46/91, 83/92, 54/93, 60/93, 53/93, 67/93, 48/94, 54/96, 101/05)
- Law on air protection ("Official Gazette of RS", 36/09)

Regulations established on the basis of the Law on EIA include the following:

- Decree on establishing the List of Projects for which the Impact Assessment is mandatory and the List of projects for which the EIA can be requested ("Official Gazette of RS" No. 114/08)
- Rulebook on the contents of requests for the necessity of Impact Assessment and on the contents of requests for specification of scope and contents of the EIA Study ("Official Gazette of RS" No. 69/05)
- Rulebook on the contents of the EIA Study ("Official Gazette of RS" No. 69/05)
- Rulebook on the procedure of public inspection, presentation and public consultation about the EIA Study ("Official Gazette of RS" No. 69/05)
- Rulebook on the work of the Technical Committee for the EIA Study ("Official Gazette of RS" No. 69/05)
- Regulations on permitted noise level in the environment ("Official Gazette of RS" No. 54/92)
- Decree on establishing class of water bodies ("Official Gazette of SRS" No. 5/68)
- Regulations on dangers pollutants in waters ("Official Gazette of SRS" No. 31/82)

Other relevant Serbian legislation

- Law on confirmation of convention on information disclosure, public involvement in process of decision making and legal protection in the environmental area ("Official Gazette of RS", 38/09, 08/11)
- Law on public roads ("Official Gazette of RS" No. 101/2005, 123/07)

# Appendix IV

# FINAL ENVIRONMENTAL APPROVAL

РЕПУБЛИКА СРБИЈА
МИНИСТАРСТВО ЖИВОТНЕ СРЕДИНЕ
И ПРОСТОРНОГ ПЛАНИРАЊА

Омладинских бригада 1
11070 Нови Београд

REPUBLIC OF SERBIA
MINISTRY OF ENVIRONMENT
AND SPATIAL PLANNING

1, Omladinskih brigada Str.
11070 New Belgrade

Tel: + 381 (011) 31-31-357; 31-31-359 / Fax: + 381 (011)31-31-394 / www.ekoplan.gov.rs

По мери природе

ЈАВНО ПРЕДУЗЕЋЕ "ПУТЕВИ СРБИЈЕ"
Број 353-510/10-10
06 MAY 2010
Датум
БЕОГРАД, Булевар краља Александра број 2

Бр/N°: 353-02-283/2008-02
Датум/Date: 06.04.2010. године

На основу чл. 20. и чл. 48. **Закона о министарствима** ("Сл.гласник РС" 65/08), члана 24. **Закона о процени утицаја на животну средину** («Сл. гласник РС», 135/04, 36/09) и члана 192. став 1. **Закона о општем управном поступку** («Сл. гласник РС», 33/97 и 31/01), поступајући по захтеву носиоца пројекта предузећа ЈП "Путеви Србије", Министарство животне средине и просторног планирања, државни секретар, по овлашћењу министра број 021-02-2/2008-01 од 10.07.2008. године доноси

## Р Е Ш Е Њ Е

1. **ДАЈЕ СЕ САГЛАСНОСТ** носиоцу пројекта, ЈП "Путеви Србије", на Студију о процени утицаја на животну средину пројекта изградње аутопута Е-75 Београд – Ниш – граница БЈРМ, деоница Царичина Долина – Владичин Хан, од km 886+000.00 до km 900+100.00.
2. Налаже се носиоцу пројекта да, при раду предметног пројекта, у свему испоштује мере заштите животне средине утврђене у предметној студији.
3. Носилац пројекта је дужан да прибави одговарајуће услове и сагласности и да их у потпуности испоштује и то: водопривредне услове и сагласност, као и сагласност Ј.П. за железнички транспорт.
4. Носилац пројекта је дужан да у року од две године од дана добијања овог решења започне извођење пројекта из тачке 1. овог решења. Решење и предметна Студија о процени утицаја на животну саставни су део техничке документације у складу са Законом о планирању и изградњи («Службени гласник РС» број 47/03, 34/06).

## О Б Р А З Л О Ж Е Њ Е

Носилац пројекта ЈП "Путеви Србије", поднело је Министарству животне средине и просторног планирања захтев за давање сагласности на Студију о процени утицаја на животну средину пројекта изградње аутопута Е-75 Београд – Ниш – граница БЈРМ, деоница Царичина Долина – Владичин Хан, од km 886+000.00 до km 900+100.00.

У складу са чланом 20. Закона о процени утицаја на животну средину («Сл. гласник Р.Србије» број 135/04, 36/09), обезбеђен је јавни увид, организована презентација и спроведена јавна расправа о предметној Студији. У току трајања јавног увида није било достављених мишљења заинтересоване јавности.

У складу са чланом 22. и члановима 23. и 24. Закона о процени утицаја на животну средину («Сл. гласник Р.Србије» број 135/04, 36/09), образована је техничка комисија која је разматрала предметну Студију и после радног састанка одржаног 27.05.2009. године, сачинила извештај са оценом исте и доставила своје мишљење надлежном органу. Наведено мишљење је садржало

предлог да се изда сагласност на предметну Студију, на основу кога је решено је као у диспозитиву.

Решење и предметна Студија о процени утицаја на животну средину су саставни део техничке документације, у складу са чланом 18. Закона о процени утицаја на животну средину («Сл. гласник Р.Србије» број 135/04, 36/09).

Ово решење је коначно у управном поступку.

**ПОУКА О ПРАВНОМ ЛЕКУ**: Против овог Решења није допуштена жалба. Носилац пројекта и заинтересована јавност могу покренути управни спор подношењем тужбе надлежном Управном суду у року од 30 дана од дана пријема овог решења, односно од дана објављивања у средствима информисања.

Доставити:
- Архиви
- инвеститору

**Државни секретар**

**Др Миладин Аврамов**

# Appendix V

# PRECONDISIONS FROM THE RELEVANT INSTITUTIONS

# 1. PRECONDITIONS OBTAINED FROM INP

ЗАВОД ЗА ЗАШТИТУ ПРИРОДЕ СРБИЈЕ
СЕДИШТЕ ♦ 11070 Н. Београд, Др Ивана Рибара 91 ♦ тел: 011/2093-800, 2093-801 ♦ факс: 011/2093-867 ♦ beograd@natureprotection.org.yu

07.12.2005.
датум 03-2058/2
број

ИНСТИТУТ ЗА ПУТЕВЕ А.Д.
ПРИМЉЕНО: 8.12.05
Орг. јед. | Прилог
20 + 6322

**ИНСТИТУТ ЗА ПУТЕВЕ а.д.**
**БЕОГРАД**
**Кумодрашка 257**

## УСЛОВИ ЗАШТИТЕ ПРИРОДЕ И ЖИВОТНЕ СРЕДИНЕ ЗА ПОТРЕБЕ ИЗРАДЕ СТУДИЈЕ ПРОЦЕНЕ УТИЦАЈА ЗА АУТОПУТ Е-75 НИШ - БЈР МАКЕДОНИЈА, ДЕОНИЦА ЦАРИЧИНА ДОЛИНА - ВЛАДИЧИН ХАН

1. Дописом бр. 20-541 поднели сте Заводу за заштиту природе Србије Захтев за издавање услова за израду Студије процене утицаја за аутопут Е-75 Ниш - БЈР Македонија, деоница Царичина долина - Владичин Хан.

   У прилогу захтева достављен је ситуациони план у размери 1:25000 предложене усвојене трасе.

2. На основу документације Завода за заштиту природе, као и увидом у Централни регистар заштићених природних добара, констатовано је да на предложеној траси аутопута Е-75 нема заштићених природних добара.

3. За планиране радове на изградњи аутопута важе све опште и посебне мере заштите природе и животне средине прописане Законом о заштити животне средине ("Службени гласник РС", бр. 135/04).

4. Студија процене утицаја изградње аутопута на животну средину омогућава, да се већ у фази планирања, сагледају могући утицаји планираних радова на животну средину, донесу одговарајуће одлуке и предузму потребне мере како би се спречиле, односно умањиле нежељене последице. Мере заштите животне средине морају бити интегрисане у процес планирања и пројектовања и морају допринети свеобухватном решењу у заштити животне средине. У том смислу неопходно је утврдити:

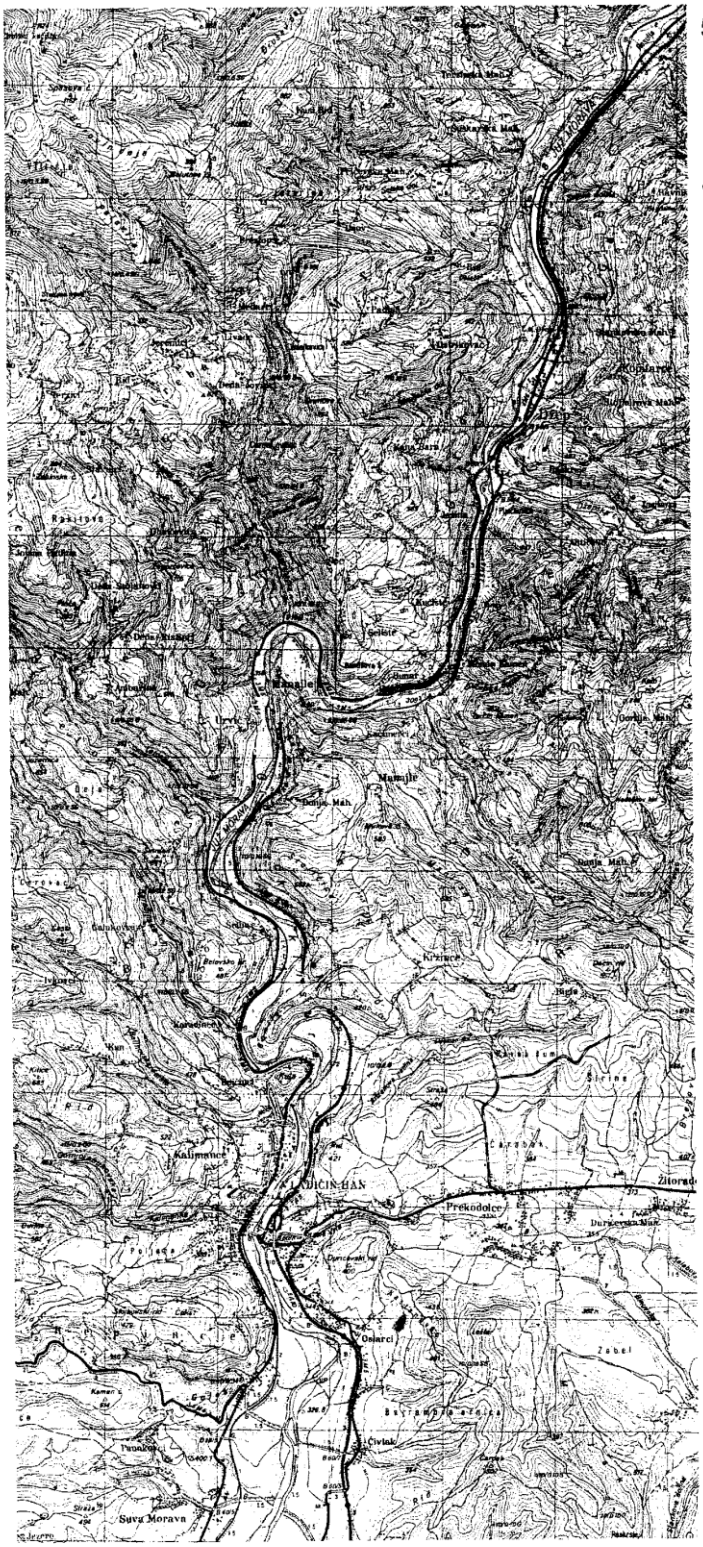
   - ✓ очекиване директне и индиректне негативне ефекте и утицаје на животну средину (људско здравље и безбедност; флору, фауну, тло, воде, ваздух и др.)
   - ✓ извршити анализу мера за спречавање и ублажавање негативних последица;
   - ✓ одабрати оптимална решења са аспекта очувања животне средине

РАДНА ЈЕДИНИЦА У НОВОМ САДУ
21000 Нови Сад, Радничка 20
тел: 021/421-144, 421-143; тел/факс: 021/616-252
novi-sad@natureprotection.org.yu

РАДНА ЈЕДИНИЦА У НИШУ
18000 Ниш, Вождова 14
тел/факс: 018/523-448; 523-449
nis@natureprotection.org.yu

РАДНА ЈЕДИНИЦА У ПРИШТИНИ
11070 Н. Београд, Др Ивана Рибара 91
тел: 011/2093-800; 2093-801; факс: 011/2093-867
beograd@natureprotection.org.yu

www.natureprotection.org.yu




5. На основу достављене документације Института за путеве Београд може се уочити:

- део трасе аутопута Е-75 од Царичине долине до Владичиног Хана пружа се правцем север - југ, дуж тока Јужне Мораве;

- већи део трасе се поклапа са трасом постојећег магистралног пута, осим у делу који ће ићи тунелом "Манајле"

- регулација овог дела аутопута обухвата проширење саобраћајнице, изградњу великог броја мостова, измештање дела железничке пруге, пробијање тунела, изградњу петљи и др.

6. Већи део наведене деонице аутопута пролази кроз Грделичку клисуру која представља рефугијум терцијерне флоре, ретких угрожених биљних врста и мешовите реликтне вегетације, те су њено очување и заштита од изузетног значаја. Овде се могу наћи врсте које су у Србији постале ретке или су сасвим ишчезле. Такве су ендемичне балканске врсте, *Consolida uechtritziana* (Pančić ex Huth), Soo (ихтрицхов жаворњак),

чије се станиште налази у непосредној близини деонице (Царичина долина) у клисури Дервен. Наиме, овај таксон је уврштен у Црвену књигу флоре Србије I. Обзиром, да ова врста расте на ораницама поред путева, претпоставка је да и у самој Грделичкој клисури (на деоници аутопута Царичина долина – Владичин Хан), има станишта на којима би се могла пронаћи. У случају да се негативни утицаји наставе ова станишта би постала еколошки лабилна и рањива.

Такође, клисура представља и један од коридора којим се поједини представници херпетофауне шире од југа према северу. Овај коридор је уједно и најкраћи пут између Врањске и Лесковачке котлине. Врсте који користе овај коридор су Степски гуштер *Podarcis tauricus*, као и Балкански зидни гуштер *Podarcis erhardii*. Очување овог дела коридора је изузетно значајно ако се има у виду да се рубови ареала ових врста налазе на управо поменутим просторима.

Фауну птица Грделичке клисуре карактерише већи број заштићених и угрожених врста. То су пре свега грабљивице, као што су сури орао *Aquila chrysaetos* и сиви соко *Falco peregrinus*. Популације ове две врсте су у неповољном положају, зависе од заштите, па је неопходно смањење или елиминисање негативног антропогеног утицаја. Поред њих, не треба занемарити остале, карактеристичне врсте термофилних, каменитих станишта овог подручја, као што су велика ушара *Bubo bubo*, јаребица камењарка *Alectoris graeca*, планински кос *Monticola saxatilis*, медитеранска белка *Oenanthe hispanica*, даурска ласта *Hirundo daurica*.

Да би се ове ретке врсте заштитиле, неопходно је придржавати се мера заштите које су прописане у наставку текста (тачка 8.).

7. Студија процене утицаја изградње аутопута мора да обухвати стални и повремене, позитивне и негативне утицаје који се испољавају за време изградње и током експлоатације овог грађевинског објекта. Негативни утицаји током изградње аутопута Е-75 настају услед изградње прилазних путева и градилишта, земљаних радова, отварања позајмишта, депоновања отпада и др. У периоду експлоатације, негативни утицаји, се испољавају током редовног коришћења аутопута и то на:

- ✓ локално становништво, зграде и инфраструктуру (вибрације, бука, визуелни ефекти - премошћавање препрека, увођење тунела, оштећење елемената предела, промена типичних форми предела);
- ✓ биљни и животињски свет (губитак и оштећење станишта, фрагментација простора и пресецање сезонских миграција и др. )
- ✓ земљиште (загађивање директно водом или ваздухом, ерозија, клизање земљишта и сл.); посебну опасност за пољопривредне површине представљају тешки метали, угљоводоници, со и тд.
- ✓ воду (загађивање површинских и подземних вода, промене хидрографских карактеристика, промене у приобалној хидрографији и др.);

- ✓ ваздух (повећане концентрације диспергованих честица, оксида, адитива из горива, неугодних и интензивних мириси и др.); велики проценат ових материја има тератоген и канцероген утицај на живе организме;

8. Када се идентификују могући негативни утицаји на животну средину, потребно је прописати мере које треба предузети да би их елиминисали, или умањили:

   ⇒ неопходно је дефинисати ужу и ширу зону утицаја изградње и функционисања објекта аутопута на животну средину (посебно са аспекта очувања пољопривредног земљишта и производње хране одговарајућег квалитета). Предвидети зоне утицаја и количине загађивача који спирањем са коловоза аутопута доспевају у земљиште и воду, на основу тога утврдити мере и препоруке за коришћење земљишта;

   ⇒ на површинама и зонама где су концентрације тешких метала и других загађивача веће од дозвољених мора се утврдити таква намена површина којом ће се избећи културе које служе за исхрану људи и стоке (земљиште поред аутопута може се користити у пољопривредне сврхе на удаљености 30 м од ивице коловоза). На површинама за које се утврди да су у таквој зони утицаја аутопута најсврсисходније је предвидети пошумљавање, односно културе засада дрвета или других индустријских биљака;

   ⇒ максимално очувати постојеће високо зеленило, појединачна стабла, групе стабала и шумарке (посебно ако се ради о врстама храста лужњака, јасена и сл. и фрагментима врбово - тополиних шума); размотрити могућност да се при затрављивању површина у зони пута где се очекују повишене концентрације тешких метала користе врсте биљака из фамилије *Brassicaeae, Euphorbiacea, Asteracee, Lamiaceae,* јер спадају у хиперакумулаторе тј. имају повећану способност акумулације ових полутаната чиме се смањује концентрација у земљишту и води;

   ⇒ на местима где траса аутопута ствара велике усеке и шкрапе потребно је предвидети одговарајуће биоинжењерске мере којима би се заштитило земљиште од ерозије;

   ⇒ наћи решења за умањивање ефекта буке на деоницама пута у близини насељених места (дозвољени ниво буке дању износи 65 dB, а ноћу 55 dB). Потребно је прецизно утврдити критична места где бука прелази дозвољене границе, и предвидети одговарајуће мере за њено смањење. Ови утицаји се могу ублажити подизањем појасева заштитног зеленила, као и заштитних конструкција различитих апсорпционих својстава (могу да умање буку у зависности од удаљености и за 1/3). Као коловозни застор треба користити материјале који могу, са аспекта заштите, обезбедити

следеће захтеве: смањење нивоа буке и вибрација, омогућавање ефикасног дренирања воде са површине коловоза;

⇒ обавезно је пројектовање и извођење "еколошких коридора" (пролаза за фауну), изнад или испод пута, зависно од потреба и карактеристика терена. Као "еколошки коридор" може се искористити спољашњи обод тунела "Манајле", који се уз мање корекције може употребити у ове сврхе. Обзиром, на сложеност проблема преласка водоземаца и ситних сисара преко аутопута, у прилогу достављамо могућа решења за њихово превазилажење, што подразумева и помоћ стручних лица Завода за заштиту природе Србије.

⇒ по завршеном извођењу грађевинских радова обавезно је култивисати терен. Потребно је изабрати оне врсте које су постојане у датим климатским условима и отпорне на штетне утицаје (издувне гасове и сл.)

⇒ инвеститор је обавезан да у склопу Студије процене утицаја обради пројекат организације градилишта који се односи на фазу израдње (са јасно прецизираним локацијама за објекте, паркинге и путеве проласка тешке механизације, као и позајмишта, односно, депоније материјала), као и пројекат санације и уређења терена (позајмишта рекултивисати). Посебну пажњу посветити заштити и уређењу простора на коме су смештене базе за одржавање пута;

⇒ при планирању и извођењу радова на регулацији и уређењу водотока обавезна је примена тзв. "натуралног уређења", избегавање бетонирања обала и корита водотока (могу се употребити камен и сл.), као и исправљање корита. Максимално очувати аутохтону, приобалну вегетацију. У случају неопходног уклањања, након завршетка радова, обале поново озеленити. Забрањено је вишкове материјала и отпада депоновати у водоток.

⇒ разрешити питање инфраструктурног опремања пратећих објеката аутопута, околних насеља и објеката у зони коридора аутопута, односно планског акта (канализација, непропусне септичке јаме, сакупљање и евакуација комуналног отпада). Обезбедити адекватна архитектонска решења са одликама традиционалне архитектуре;

⇒ прописати да ако се у току извођења радова наиђе на природно добро које је геолошко - палеонтолошког или минералошко - петрографског порекла, за које се претпоставља да има својство природног споменика, извођач радова дужан је да о томе, без одлагања обавести организацију за заштиту природе и предузме све мере заштите да се до доласка овлашћеног лица природно

добро не оштети или уништи и да се чува на месту и у положају у ком је нађено;

⇒ обавезно, посебно посветити поглавље где ће се предвидети све мере заштите у случају акцидентних ситуација (код превоза опасних материја, пожара и сл.)

***О б р а з л о ж е њ е***

На основу члана 51. и 61. Закона о заштити животне средине („Службени гласник РС“, број 66/91) и члана 33. и 34. Закона о заштити животне средине („Службени гласник РС“, број 135/04), одређено је да организација за заштиту природе, тј. Завод за заштиту природе Србије утврђује услове заштите и даје податке о заштићеним природним добрима у поступку израде просторних и других планова, односно основа (шумских, водопривредних, ловних, риболовних и др.) и друге инвестиционо-техничке документације.

У складу са законским одредбама, Институт за путеве Београд је поднео је захтев бр. 20-541 за издавање Услова заштите природе и животне средине за израду Студије процене утицаја за аутопут Е-75 Ниш - БЈР Македонија, деоница Царичина долина - Владичин Хан.

Достављено:

- Министарство науке и заштите животне средине
  Управа за заштиту животне средине

Директор Завода

Проф. др Лидија Амиџић

**INP CONFIRMATION**

ЗАВОД ЗА ЗАШТИТУ ПРИРОДЕ СРБИЈЕ

СЕДИШТЕ ...

КОРИДОР 10 доо
БЕОГРАД
Бр. 1543/10
07. 10. 2010 год.

Број 03-2355/2
06.10.2010.

КОРИДОР 10 Д.О.О.

11000 БЕОГРАД
Влајковићева 19а

Предмет: Мишљење о Студији о процени утицаја Пројекта аутопута Е-75 Ниш – граница БЈРМ, деоница Царичина Долина-Владичин Хан, на животну средину

Дописом бр. 1292/10 од 27.09.2010. године доставили сте Заводу за заштиту природе Србије захтев за издавање мишљења о Студији о процени утицаја Пројекта аутопута Е-75 Ниш – граница БЈРМ, деоница Царичина Долина-Владичин Хан, на животну средину.

Носилац пројекта је ЈП „Путеви Србије", а обрађивач Студије је Институт за путеве а.д. из Београда.

Студија утицаја се односи на деоницу аутопута Царичина Долина-Владичин Хан, на стационажи од км 885+771.58 до км 900+100.00.

Студија је обрађена на 78 страна у формату А3 и садржи већи број картографских прилога (Р1 : 5 000) са приказом деоница наведеног дела трасе аутопута, као и већи број услова, мишљења и сагласности надлежних државних установа и институција.

У претходном поступку, обрађивач Студије је за потребе израде необходне документације обезбедио одговарајуће услове заштите природе од Завода за заштиту природе Србије.

Након разматрања Студије, констатовано је да је Студија коректно обрађена и да су издати услови доследно уграђени у поједина техничка решења и мере заштите природе и животне средине.

У складу са тим, Студија о процени утицаја предметне деонице аутопута на животну средину се позитивно оцењује.

С поштовањем,

Директор Завода

Проф. др Наиад Стаматовић

Достављено:
- Архива

www.zzps.rs

## PRECONDITIONS OBTAINED FROM IPCM

**Републички завод за заштиту споменика културе - Београд**
Institute for the Protection of Cultural Monuments of Serbia - Belgrade
Радослава Грујића 11 Radoslava Grujića 11
11118 Београд 11118 Belgrade
Србија Serbia
Тел. (011) 24 54 786 Phone +381 11 24 54 786
Факс (011) 34 41 430 Fax +381 11 34 41 430
e-mail: office@yuheritage.com

Датум / Date: 9.4.2008.
Број / Ref. 10/719
МБ/ЈБ

ИНСТИТУТ ЗА ПУТЕВЕ а.д.

БЕОГРАД
Ул. Кумодрашка бр.257

Предмет: Мишљење
Веза: Ваш допис број 20-65 од 19.02.2008. године

Институт за путеве је упутио Републичком заводу за заштиту споменика културе - Београд, захтев за издавање мишљења и услова за израду Студије о процени утицаја на животну средину за Идејни пројекат аутопута Е – 75 Београд – Ниш – граница БЈРМ, деоница Царичина Долина – Владичин Хан од km 886 + 000 до km 900 + 100.

Тим поводом, сходно важећим прописима у домену заштите животне средине (Закон о стратешкој процени утицаја на животну средину, „Службени гласник РС“, бр. 135/04), Републички завод за заштиту споменика културе – Београд даје следеће услове:

- На означеној деоници евидентирана су, током систематских археолошких рекогносцирања обављених 2003. године, следећа археолошка налазишта:
  1. Кржинце – Св. Тројица, касноантичка вила
  2. Кржинце – Старо гробље, средњовековна некропола
  3. Пиљаковац – праисторијско насеље
  4. Чивлак – вишеслојно насеље
  5. Калиманце – вишеслојно налазиште
- На локалитетима Кржинце – Св.Тројица. Кржинце – Старо гробље и пиљаковац обављена су сондажна археолошка истраживања 2004. године, која морају бити настављена због њиховог значаја;
- На осталим локалитетима неопходно је обавити археолошка ископавања због њиховог значаја;
- Пре започињања било каквих земљаних радова на поменутим локацијама неопходно је благовремено обавестити Републички завод за заштиту споменика културе – Београд, како би се претходно обавила археолошка истраживања;

- Уколико би се током радова наишло на археолошка налазишта или археолошке предмете, извођач радова је дужан да одмах, без одлагања прекине радове и обавести надлежни Завод за заштиту споменика културе и да предузме мере да се налаз не уништи и не оштети и да се сачува на месту и положају у којем је откривен.

Приликом израде Стратешке процене утицаја на животну средину, неопходно је имати у виду наведене чињенице.

С поштовањем,

За Директора

Вера Павловић Лончарски

Доставити:
- наслову
- архиви


Position of Archaeologically important sites (green spots) which were investigated during 2011-2013
Nr.7 “Kuciste”, Manajle village, out of Manajle tunnel – Vladicin Han highway section(yellow line)
Nr.8 “Rupa”, Gramadiste, Prekodolce village

Position of Archaeological sites within the wide area of the Manajle tunnel – Vladicin Han highway section
Nr.1 “Holy Trinity Late antic era”, Krzince village
Nr.2 “Old Graveyard”, Krzince village
Nr.5 “Ancient settlement”, Piljakovac village
Nr.3 “Multi-layered antic settlement”, Kalimance village
Nr.4 “Multi-layered settlement”, Civlak village