



**PUBLIC ENTERPRISE
ROADS OF SERBIA**

**Corridor X Highway Project
Preliminary Design for E-80 Highway
NIS – DIMITROVGRAD
Section: Prosek-border of Bulgaria**

CORRIDOR LEVEL EIA REPORT

FINAL

May 2009

EXECUTIVE SUMMARY

Introduction and Project Description

Construction of the E-80 highway section from Prosek to Dimitrovgrad is stated as one of the highest state priorities and thus the PE “Putevi Srbije” (PEPS), as Project proponent has taken all necessary activities prepared planning, design and environmental documents. On the basis of the preliminary Project designs detailed EIAs were carried out for all 5 sections of the prospective E-80 highway.

The five sections are:

Prosek – Crvena Reka

Crvena Reka – Čiflik

Čiflik – Ponor – Pirot

Pirot – commencement of Dimitrovgrad bypass

Northern Dimitrovgrad bypass

1.1

The PE “Putevi Srbije” (PEPS), as Project proponent, has taken all necessary activities and prepared planning, design and environmental documents. As part of the preparation of preliminary designs preparation, detailed EIA were prepared for all five sections of the proposed E-80 highway. In accordance with Serbian law, the preliminary designs and EIAs were submitted to the Institute for Nature Protection (INP) and the Institute for Protection of Cultural Monuments in Serbia (IPCM), which have issued approvals subject to a range of pre-conditions which must be satisfied prior to final approval and receipt of construction permits. The conditions from INP address measures to safeguard vegetation, rare and endangered species and sensitive ecological systems and features, while the IPCM identified important architectural sites which need to be further investigated in order to develop appropriate conservation and mitigation measures. The five existing EIAs were integrated into this Corridor X level EIA Report for section E-80, covering the proposed highway route from Prosek to Pirot and the Northern Dimitrovgrad bypass. Preparation of the Corridor level EIA Report was undertaken by a qualified independent party and the draft Report was submitted to the Bank in due time.

This Corridor level EIA provides a strategic overview, covering issues which are applicable to all sections and highlighting issues of particular concern in specific sections, as well as addressing cumulative impacts of the corridor as a whole. As part of the preparation of detailed designs for each section, contractors will be required to prepare detailed site-specific EMPs which will include additional site-specific information called for in the Corridor level EIA and the preconditions, as well as Management Plans for specific aspects of their operations (for solid waste management, water pollution prevention, noise abatement, etc.) to address the issues which are applicable to their respective road sections. The updated EIA and site-specific EMPs and operational Management Plans will be reviewed and approved by PEPS and the World Bank prior to beginning construction on each road section.

1.2 Baseline Data

Baseline environmental data were collated for the study area and included the data collected for the individual EIAs, which have been prepared for the individual highway sections that are required as a pre-requisite for obtaining construction permits.

Ecology and Protected areas

The E-80 highway corridor comprises a wide range of ecosystems, which is caused by diversity of reliefs and variations in altitude. At the beginning of the study area, the terrain is mostly flat, approximately to the 58 km of the route, and it is situated in the valleys of the rivers Nišava, Crvena reka, Studena and Kunovačka reka, which themselves represent separate water ecosystems. Flattened terrain also occurs from the 80 km to the end of the section. The altitude (approximately 230 m) influences the flora and fauna as does the water environment.

In the Nisava catchment, large areas of natural flora were cleared to turn the fertile land in the valley and its tributaries into arable land. This also led to the disappearance of natural habitats for numerous animal species. Arable lands prevail, whereas vineyards and orchards alternate in smaller parcels. Within the farmed ecosystems, there is a differentiation between two basic types: cultures of grains and vegetables, and cultures of fruit and vineyards.

Meadow communities in the region of alluvial plains represent natural ecosystems and are inhabited by species characteristic of areas with a high level of ground water. Considering that the meadows are mostly degraded by poor management (of previously well maintained mosaic of small scale mixed farming) and, the occurrence of various weed species is significant. Of all the fauna representatives, only those which have adjusted to the anthropogenically modified conditions can now be found.

Moving away from the river valley, from 58 km to 66 km and from 73 km to 80 km of the route, flat terrains drift to areas with higher inclinations, while the altitude increases from 200 m to 520 m and is thus unsuitable for agriculture. It is typically dominated by forest, where the climax vegetation of Hungarian Oak and Turkey Oak gradually transcends into the community of Sessile Oak and Hornbeam.

From the 66 km point to 73 km of the route, the terrain transfers to the slopes of the mountain Suva planina where only natural vegetation is present, primarily in the form of beech forests, which transcend to beech-coniferous forests on colder exposures. Similar ecosystems can also be found in the area of the Dimitrovgrad bypass.

The River Nišava has carved a composite valley with several depressions. However, the most prominent geological feature the river formed, is the Sicevo gorge. The Nature Park Sicevacka Klisura is protected as an area of exceptional biological diversity and is home to a number of endemic, relic and rare plant and animal species. It is a remarkable example of the occurrence and interaction of geological, geomorphological and hydrological phenomena, and as a landscape of prominent features of natural beauty. The Nature Park Sicevacka Klisura covers the parts of the areas of Municipality Niš and Bela Palanka, with a total area of 7,746 ha, of which 5,559 ha lies in Municipality Niš, and 2,187 ha in the Municipality of Bela Palanka. The area has been divided into two parts - Leskov peak (northern) and Oblik (southern). The gorge was carved through the Kunovica plateau, between the southern slopes of the Mountains of Svrljig and the mountain of Suva Planina.

The route of the Project highway does not follow the existing road through the Nature Park, but takes a southerly route outside the park, such that the left (northern) edge of the road zone lies very close to the southern border of the park. In addition to the Sićevac gorge, there is also the

Jelašnica gorge in the vicinity of the study area, which is registered as a special natural reserve and through which the Project highway will run, largely following an existing road. The contractors who will work on the road sections passing alongside the Nature Park Sicevacka Klisura and through the Jelašnica gorge will be required to carry out site assessments to identify potential negative impacts of the construction and operation of the highway and include appropriate mitigation and monitoring measures in the site-specific EMPs.

Geology and soil

Due to relief complexity, geological structure, climate, vegetation and effects of time and man, various genetic types of soil have formed in a very small area. For that reason, about 25 soil types, subtypes and varieties have been identified within the study area incorporating a part of Nis valley, Bela Palanka and Pirot valleys, the River Nisava's alluvium and its tributaries. These types include calcareous alluvium, alluvium developing into cambisol, waterlogged alluvium, acidified grassland, chernozem soil, calcic vertisol, eutric cambisol, terra rosa, rendzina, umbric leptosols, podzols including slates, degrading calcomelanolosole complex, etc.

According to its geographic position, the Project area is a part of Southeast Serbia and morphologically, the area's relief covers highlands and flatlands. The mountain slopes of Suva Planina, Svrlijska Planina and Stara Planina are a part of the highlands area. The relief is characteristically "sharp" with great differences in height.

Alluvial areas of the Nisava River and its terraces present the flatland relief. The bed of Nisava River was formed after the Neogene lakes retreated and dried out. The river Nisava cuts through the gorge known as Sicevo Gorge, which is definitely the most prominent morphological feature in the Project area. This river made several terraces during its formation, the highest of which is 508 m.

This part of the Balkan Peninsula is a part of seismically highly active area and is included in the Mediterranean - Trans-Asian Seismic Belt.

Air

The South part of Eastern Serbia, through which the new Highway E-80 will pass, is characterized more by continental and less by moderate-continental climate (this is a climatically diverse sub region, which includes a mountain, hollow and valley micro region). This region is characterized by low precipitation. The autumn is warmer than the spring. Mean monthly temperature in January is below zero, whereas the warmest month is July with the temperatures ranging from 20 to 22°C.

Data were obtained on meteorological conditions taking into account spatial position of the route and the speed of most frequently present winds. Also calculated were permanent and current concentrations of dominant pollutants - CO, NO, NO₂, C_xH_y, Pb, SO₂, and solid particles at every 25m-100m from the edge of the pavement, and then at 200m and 300m. A northwest wind, blowing at the speed of 2.9 m/s, is most frequent in the corridor under consideration. Modelling also included the wind speed of 1.5 m/s, which is the average wind speed in the corridor, taking into account windless periods as well. Due to phased construction, all calculations were prepared for 2012, as representative of Phase I, and 2022, as the final year of the design operation period.

Based on data obtained by analysis for typical conditions and selected sections from Prosek to Dimitrovgrad, as well as limit values defined in the legislation, the key conclusions were that for a wind of an average speed of 1.5 m/s, short-term concentrations of nitrogen dioxide (NO₂) are above permissible limits at 37 - 50 m from the pavement edge, and long-term ones are above allowed limits at 33 m; with a dominant northwest wind of the speed of 2.9 m/s, very narrow zones

of excess values are predicted; and noteworthy concentrations of pollutants should be expected in the zone of tunnel portals.

From the aspect of polluting flora, the results show that in the belt of an average width of 37 m (17 m for Phase I) from the pavement edge, with a wind of an average speed of 1.5 m/s, concentrations of pollutants (particularly of nitrogen oxides) may be expected to be such as to cause permanent negative consequences for the growth and development of plants. It is recommended to avoid growing plants for human consumption in this narrow corridor.

For the Motorway section (the northern Dimitrovgrad by-pass road) the findings were that most pollutants were below the limit values and notable concentrations of pollutants should be expected in the zone of tunnel portals, on the left side of the road.

Noise

The current state of traffic noise in the analysed section of the highway corridor is characterized by traffic activity on the Main Road M-1.12, Pirot – Dimitrovgrad section, Regional Road P-241a and railroad Nis – Dimitrovgrad. It is assumed that the planned highway will become the dominant noise source in the study area.

Modelling of predicted noise levels was undertaken for various scenarios and layout configurations and results showed exceedance of standards (55 dB(A) for night conditions) for various stretches of highway. Operational mitigation has been suggested and involves several lengths (totalling > 7km) of noise attenuation barrier alongside the carriageway and the possibility of installing noise reduction equipment, such as replacement doors and windows or screens in affected communities.

Surface and ground water

The river system along the highway corridor ranging from Nis to the Bulgarian border consists of the River Nisava with its tributaries. Nisava is a part of the Juzna Morava river basin. Information regarding the current state of the River Nisava's surface waters was obtained from the Republic Hydrometeorological Service of Serbia for 2006.

The conclusions regarding water quality are that due to inadequate treatment of industrial and municipal wastewater, which flow into the River Nisava, water quality has declined and now it corresponds to Class III. Such water can be used for irrigation, when treated according to the usual treatment methods (conditioning) and as industrial water (with the exception of the food industry). However, many of the rivers represent good aquatic habitat and support a range of typical species and it is essential that construction techniques maximise avoidance of pollution into watercourses.

Existing information on groundwater and its quality is very limited, mainly due to the lack of a rigorous sampling programme by the water authorities, however, relevant data will be collected during the detailed design and will inform design aspects and will be used as part of environmental monitoring during implementation of the EMPs.

1.2.1 Land Use

The study area is located in Southeast Serbia, partly within the territory of Nisava District and mostly within Pirot District and is a highland area which has a lack of infrastructure links to economically more developed areas and centres. The neglected economic development of the mountain area, which is also a border area, contributed to mass migration from the villages and their abandonment which was significant.

The study area is characterized by dominance of arable areas (59.2%). Agricultural land of the highest quality is located in the valley of the river Nisava. The share of forest areas equals 22.2%.

grassland areas (12%) and areas with perennial crops (6%) are distributed in a mosaic pattern. Other areas are built-up areas (0.4%).

1.2.2 Immovable cultural assets

Information on the cultural assets was recorded based on data of the Institute for Protection of Cultural Monuments (IPCM) in Belgrade and the Institute for Protection of Cultural Monuments in Nis. The routing subsequently avoided statutorily protected sites, but 44 cultural assets have been recorded in the general project area which require further investigations during the detailed design stages to determine whether they are at risk from the project. In addition, the Cultural Heritage Act entails that in case a new, unregistered site is found in the course of construction (i.e., “chance finds”), the investor and the contractor have to enable and ensure an archaeological intervention. This includes an immediate interruption of all works and informing of the competent Institute for the Protection of Cultural Monuments about the discovery. This definitely requires occasional archaeological supervision during the construction and provision has been made accordingly in the EMP. The investor is obliged to provide financial means for all intended works – probing archaeological researches, occasional archaeological supervision, protective archaeological interventions, etc.

Environmental Impacts

This report covers the motorway corridor, including the highway sections that comprise the overall Project for E-80. Preparation and design work to date has devoted much attention to routing of the motorway, particularly for new or offline sections. In accordance with Serbian laws, the alignment has been selected to avoid protected areas and cultural monuments and to minimize environmental impacts and social disruption. The EIA addresses issues and impacts and mitigation measures which can be identified at this stage of design. As detailed designs are not complete, aspects such as the precise layout and construction methods and materials for tunnels and bridges, specific land which will need to be acquired, sites for construction camps, etc. are not yet known. As noted above, these detailed design aspects will be undertaken by the Contractors, who will be contractually required to carry out additional site-specific assessments and investigations as called for in the Corridor level EIA and the preconditions set by specialized agencies. They will use the information from these investigations to prepare site-specific EMPs as well as targeted operational Management Plans for transport, waste, pollution etc.

The following summarizes the discussion of potential impacts and the required mitigation and monitoring measures as they have been identified in the Corridor-level EIA

1.2.3 Construction phase

Adverse air quality impacts should be managed during construction by good site management practices, including maintenance of machinery and spraying water to reduce fugitive dust nuisance.

Potential noise disturbance should be managed in a pro-active manner, by selecting equipment that complies with health and safety standards for workers' exposure and then by acting to mitigate any nuisance noise issues as they arise.

From the site surveys undertaken and the communication with the Institute for Nature Protection, it is concluded that no statutorily protected sites will be adversely impacted. The highway will pass along the border of the Nature Park Sicevacka Klisura, but unlike the current road will bypass the

Nature Park rather than passing through it. The highway will pass through the Jelasnica Gorge but will follow the alignment of the existing road rather than breaking new ground. Potential impacts on flora and fauna during the construction phase are manageable. Contractors will be responsible for preventing unnecessary cutting of trees and hunting or disturbance of animals. Specific mitigation measures such as minor route deviations, siting of construction camps, blasting schedules, translocation of individuals of vulnerable species, etc. will be identified based on the investigations which contractors will be obliged to undertake in order to prepare the site-specific EMP and operations Management Plans which must be approved prior to commencing works.

Surface and groundwaters should be protected during construction by adherence to the individual management plans to be prepared by contractors, which will include measures for protection of soil and prevention of water pollution by safe storage of fuels and hazardous materials, control of activities such as washing of vehicles, and anti-erosion measures to prevent sedimentation.

While no statutorily protected archaeological sites are expected to be directly affected by the works, several important archaeological assets are located in the vicinity of the alignment and require further site investigation. Provision for this has been included in the EMP budget. Site-specific EMPs will include specific measures to protect any sites or assets identified as being at risk from noise or vibrations or other indirect sources. Contractors will also be responsible for following national requirements with respect to “chance finds” which may emerge during construction.

Much of the material required for highway construction will come from material excavated from the tunnel, but additional sources of some materials will be required. These are expected to come largely from licensed quarries, but some localized borrow pits may be opened. After completion of works, it is necessary to, based on specific reinstatement projects, regulate all borrow pits, dump and storage sites, so as to prevent further degradation of soil and improve the visual effect.

The nature and extent of the construction works will require the establishment of a number of Construction Camps, which will house workers, equipment, machinery, fuels and materials. The number, size and location of camps is not currently known and can and will only be determined following mobilisation of Contractors to country. It is reasonable to assume that approximately 5-8 camps will be required for E80, taking into account the lengths of road section and the large, complicated tunnelling that is required.

The presence of construction camps raises the potential for 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. Partly 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 for guidelines and contractual requirements to be established and these are presented in the EMP in Section 8 of this report.

1.2.4 Operation phase

The road drainage system has been designed to be primarily a closed drainage system. The closed system, incorporating grit and oil/water separators has been driven by the potential to affect nearby watercourses.

Modelling of potential operational traffic noise has resulted in the design of approximately 7 km of noise barrier, which has been incorporated into the design of the Project, along with consideration of other passive noise abatement approaches.

Negative impacts appearing in the operation of the motorway potentially occur through the possibility of animal fatalities on the open motorway, disturbance of the area through which the motorway passes, by increased noise levels, and through elevated levels of all forms of pollution, particularly air pollution. To minimise animal casualties, the entire route of the motorway is to be fenced, with a finer mesh towards the base of the fence line.

To minimise impacts on important ecological sites and animal species it is necessary, during the design and construction of the motorway, to plan the installation of passages for small and large animals, above or under the motorway, depending on needs and characteristics of the ground. Communication from the Institute for Nature Protection has indeed revealed the need to maintain connectivity of animal habitat and they have agreed that the many culverts and pipes under the motorway should suffice as crossing points, The site investigations to be undertaken during detailed design will confirm where and in what form such passageways need to be provided. .

1.3 Resettlement due to land acquisition

This aspect of the Project has been the subject of a separate, specialist, detailed study. A brief summary is presented in the EIA report for the sake of completeness of the scope of EIA.

Compensation of affected people will be governed by the several general principles, in accordance with the approved Resettlement Policy Framework (RPF), which includes an analysis of gaps between provisions in the national legislation and the World Bank's Involuntary Resettlement Policy (OP 4.12) and includes provisions to ensure that OP 4.12 requirements are met (for example with respect to provision of compensation and/or resettlement assistance of those without land use rights who nonetheless are using public land).

Preparation of individual Resettlement Action Plans in accordance with the RPF will be undertaken for the Project sections. It is estimated that the cost of the expropriation for the E-75 and E-80 together will be around 120 million US dollar. Only rough estimates of the land requirements for the two components are available at this stage and it is not possible to estimate the exact cost of land acquisition and resettlement. Approximately 60-70 properties (primarily residences) appear to be directly impacts by the Project. However, the PEPS, through its legal department, will be preparing detailed RAPs including detailed cost estimates for each section which has the final design. PEPS will ensure that adequate funds are made available for the implementation of the RAPs by providing appropriate budgetary allocations.

The beneficiary agency (PEPS) and the implementing agency (Koridor 10 D.O.O.) will ensure that sufficient budget is allocated to meet all requirements for compensation and for resettlement assistance in accordance with the RPF.

1.4 Cumulative and indirect impacts

The routing and structures designed to date have sought to minimise overall social and environmental impacts. Until the construction contracts are awarded and the detailed designs are undertaken it is not possible to fully determine cumulative impacts on common features, such as individual rivers. However, substantial measures are being taken to minimize negative impacts on water quality through the use of closed drainage systems in sensitive areas. Development along the route 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 routed are rural in nature and continue to suffer from out-migration, as people move to the larger cities and towns in

search of work etc. It is not anticipated that large scale developments or large in-migrations will occur simply due to the presence of an improved highway connection.

1.5 Trans-boundary effects

Transfer of negative impacts beyond the borders of Serbia may result from high intensity of impacts and the immediate vicinity of the impacts' source in relation to borders of other countries. Results of the impacts modelling (especially for noise and air quality) for the road Prosek – Dimitrovgrad indicated that transfer of these impacts is limited to the highway corridor zone, which is typically within the boundaries of 500 m on either side of the highway. The majority of the road position is such that it is not located immediately close to the border of Bulgaria, apart from the border area of Dimitrovgrad. The terrain configuration of the Project highway naturally avoids potential trans-border transfer of impacts. This is particularly the case with watercourses in the catchment of the Nisava River, which belongs to the Black Sea watershed, and flows from Bulgaria towards Serbia. Thus potential accidents that may cause elevated levels of pollution in rivers would be transferred in the reverse direction in regards to the border. The only impact that may result in degradation of environment conditions at a regional or global level is air pollution, i.e. emission of air pollutants causing greenhouse effect due to combustion of fuels of vehicles using the Project highway.

The highway routing passes predominantly through rural areas, which have seen out-migration in recent years. Whilst one of the purposes of the improved Project highway is to encourage economic development, it is not anticipated that large scale developments affecting neighbouring countries or large in-migrations will occur simply due to the presence of an improved highway connection. No particular studies of this phenomenon have been undertaken as part of this EIA, but a recommendation herein is for the relevant planning authorities to take responsibility for this issue as part of land use and spatial planning, of which the Project is already a component of. Analysis of Alternatives

The Preliminary design of the Motorway, has identified a preferred route, based on several design criteria, including design speeds, curve radii and inclines and has considered feasible alternatives where they existed. As part of the evaluation of alternative components of the Project, environmental and social aspects were considered alongside engineering and cost parameters, as part of a multicriterial evaluation. Maximum priority has been given to the construction costs, traffic safety and environmental and social issues during routing and layout. Operational expenses were assigned a lower priority, along with land take costs. Regarding the corridor impact - maximum attention has been given to noise, pollution and biodiversity impact, while vibrations and visual impact were considered as a lower priority.

Various sections of the route had variants as alternatives and a multi-criteria approach was taken, to select the favoured option that represented the overall optimum solution, taking construction cost, society and environmental conditions into account.

Public Consultations

In respect to environmental safeguard issues PEPS has already prepared 12 sub-section EIAs on preliminary/ feasibility designs that comply 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 and on draft final EIA) and were carried out in period from 2006 to 2009. The sub-section EIAs have been approved by the Serbian Ministry of Environment.

In accordance with OP/BP 4.01 the Borrower has engaged an independent consultant to prepare two Corridor Level EIAs (one for E-75 and one for E-80) which consolidate and expand upon the

sub-section EIAs, particularly with respect to cumulative impacts. The in-country disclosure of draft Corridor Level EIAs 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 11 and 12 (when the public meetings were held in Vranje (from 12 to 2 pm on 12 March 2009 for E-80). 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 for the Project. Prior to announcement in the newspapers, the EIA was delivered to the Municipality of Vranje and published on the PE "Roads of Serbia" web site. Representatives of the local self-government informed the public through their local media of the time and place of public consultations. The first draft Final EIA document was received by PEPS on April 7, 2009. This first draft final EIA document remains available at the Client's web site. Comments to the draft final EIA document can be sent to PEPS' environmental unit from February 25, 2009 onwards.

During the public consultations, there were no significant remarks in regards to environmental protection issues. Two of the main general issues raised by residents were:

Severance of access to agricultural lands; and

Potential interference/damage to water sources, such as springs and wells.

During the discussions, the highway designers gave assurances that severance issues would be further considered during the detailed design and the principle followed in the current design was to maintain recognised crossing points by the provision of footpaths or bridges. Potential damage to water resources would also be considered during detailed design and where required, pipes or culverts would allow continued flow of water resources underneath the road.

Environmental Management Plan and Implementation Arrangements

Section 8 of the report presents the Corridor level Environmental Management Plan (EMP), which outlines the working arrangements for how the environmental and social elements of the Project will be managed from detailed design and construction through operation. The EMP indicates institutional responsibilities and, where possible provides estimated or indicative costs to ensure adequate budgeting for mitigation and monitoring requirements. Following the common practice in large scale infrastructure projects, contractors will be required to build on and expand this EMP to provide details of how the Project commitments are to be implemented; essentially containing 'the how, who and where'. This will take the form of a site-specific EMP and Management Plans for specific aspects of operations and site management. For example the Corridor level EMP indicates that sensitive ecological assets (e.g. as nesting sites for vulnerable species) should not be disturbed and that culverts and underpasses will be designed to allow movements of animals. The site-specific EMPs will specify the location, design and operation of construction camps and will identify specific routes which are heavily used (e.g. by amphibians migrating to breeding ponds) and incorporate these into the detailed design. Similarly, where the Corridor level EMP specifies that fuels, oils and other hazardous material shall be handled and managed in accordance with best international practice, the Contractor will prepare a site-specific hazardous material management plan. The details of these site-specific plans are subject to approval prior to beginning of works legal authorities and by statutory agencies (INP, IMPC) as well as the World Bank, and can then be monitored and audited to ensure adherence to national requirements and the Project level EMP. The Corridor level EIA also recommends that the Contractors produce an Environmental Management System (EMS) that is preferably ISO 14001 compliant.

The recommendation for assigning the responsibility to Contractors is viewed to be a more efficient strategy than placing the E&S performance burden on the Koridor 10 D.O.O. (K10DOO) *per se* or on the Project Management Consultants (PMC). This takes into account the limited experience of K10DOO in implementing potentially environmentally sensitive projects and the fact that international Contractors may be much more familiar with this way of working and may even already operate ISO Environmental Management Systems, as this is becoming more widespread. Thus they should readily be able to produce Project specific Environmental Management Plans and operational Management Plans that also meet the requirements of the national legislation. The added value of such plans is that they will be very Project specific and can be compiled as part of construction planning for aspects such as fuel stores, plant selection and performance and material sourcing and sub contracting.

The Project includes an allowance for an Independent Environmental Consultant (IEC) resource to monitor and audit all aspects. The preparation of EMPs will fit very readily into this arrangement, allowing the IEC to audit individual Contractor Environmental Management Plans during monitoring and report the findings and any recommended remedial actions to K10DOO and the PMC. These monitoring results are anticipated to be available to the IFIs and other relevant stakeholders to ensure transparency of the environmental management of Project implementation.

Contractual provisions

As described above, contractors will be required to prepare site-specific EMPs and control/management plans for specific aspects of construction site management (solid waste and wastewater management, traffic management, oil and fuel storage, etc.) as outlined in Table 8-2.

All construction sites will 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).

The contracts will also conform to international standards, which will include international H&S standards to protect all workers and community members in the vicinity of the works through the provision of safe working conditions, appropriate training and equipment. . In view of this, an exhaustive list of H&S standards and procedures has not been included in the EMP. Work camps will be required to conform to international 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 (European Waste Code). 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

Monitoring

Monitoring of the effects of the Project will commence during the construction phase and will continue during operation of the highway. The present EMP sets out the basic parameters to be monitored in order to determine that mitigation measures identified are being implemented effectively. For many aspects such as air and water quality and directed drainage of water runoff from roads, Serbian legislation sets the standards to be met. Following award of contracts for construction, the individual Contractors will work with K10DOO to develop a detailed monitoring

programme 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 EMS and site-specific EMP. Each Contractor will develop a written monitoring programme that will be evaluated by the independent environmental consultants and Project stakeholders, including statutory agencies.