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CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE
AND NATURAL HABITATS

Standing Committee

35th meeting
Strasbourg, 1-4 December 2015

**Follow-up of Recommendation No. 98 (2002)
on the project to build a motorway
through the Kresna Gorge
(Bulgaria)**

REPORT BY THE GOVERNMENT

*Document prepared by
The Ministry of Environment and Water of the Republic of Bulgaria*



Ministry of Environment and Water
of the Republic of Bulgaria

STRUMA MOTORWAY LOT 3.2

Government Report regarding Recommendation No. 98 (2002) of the Standing Committee of the Convention on the Conservation of European Wildlife and Natural Habitats



35th Meeting of the Standing Committee, 01-04 December 2015

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1. INTRODUCTION

1.1 Purpose of This Document

In October 2015 a number of Bulgarian NGOs have sent a request to the Standing Committee to reopen case-file 2001/4 related to the construction of Struma Motorway in the Kresna gorge. In response to this request and the subsequent decision of the Bureau to the Standing Committee for placing the issue on the agenda of the 35th meeting of the Standing Committee, we present the following report detailing the current state of development of the project and the measures undertaken for compliance with the provisions of Recommendation No. 98 (2002) (Recommendation No. 98).

This report summarises the development of the project and the actions undertaken by the involved Bulgarian authorities in the course of its planning and implementation and is structured as follows:

- Chapter 1 provides background information about the project – a summary of the case-file procedure from 2001-2002, an overview of Struma Motorway and reference to previous studies and decisions related to the project;
- Chapter 2 presents the issues the project aims to address and provides details regarding the project alternative that has been in development in the recent years;
- Chapter 3 summarises the studies carried out since the EIA Decision of 2008 and provides information about the environmental, technical and other problems with the EIA preferred alternative, which have been identified in 2013-2015;
- Chapter 4 describes newly developed project alternatives and summarises the collaboration with the services of EC, NGOs and the general public; also presented is the formal status of the new EIA procedure;
- Chapter 5 explains how Recommendation No. 98 of the Standing Committee has been complied with by the Bulgarian authorities;
- Chapter 6 addresses specific points from the NGOs' letter.

1.2 Background Information about the Development of the Case-File

In 2001 Bulgarian NGOs sent a signal to the Bern Convention Secretariat claiming that the Kresna gorge is in danger because of the planned construction of a motorway in the gorge. The case was examined at the 21st meeting of the Standing Committee in 2001, which decided to organise an on-the-spot appraisal conducted in 2002. After analysing the findings of the visit, at its 22nd meeting in 2002 the Standing Committee decided not to open a file and adopted Recommendation No. 98 to be complied with by the Bulgarian Government regarding the construction of the motorway.

As a result of the actions undertaken by the Bulgarian authorities further to Recommendation No. 98 reported by the Government at the 30th meeting of the Standing Committee in 2010, the case-file was closed.

1.3 Overview of the Project

Description

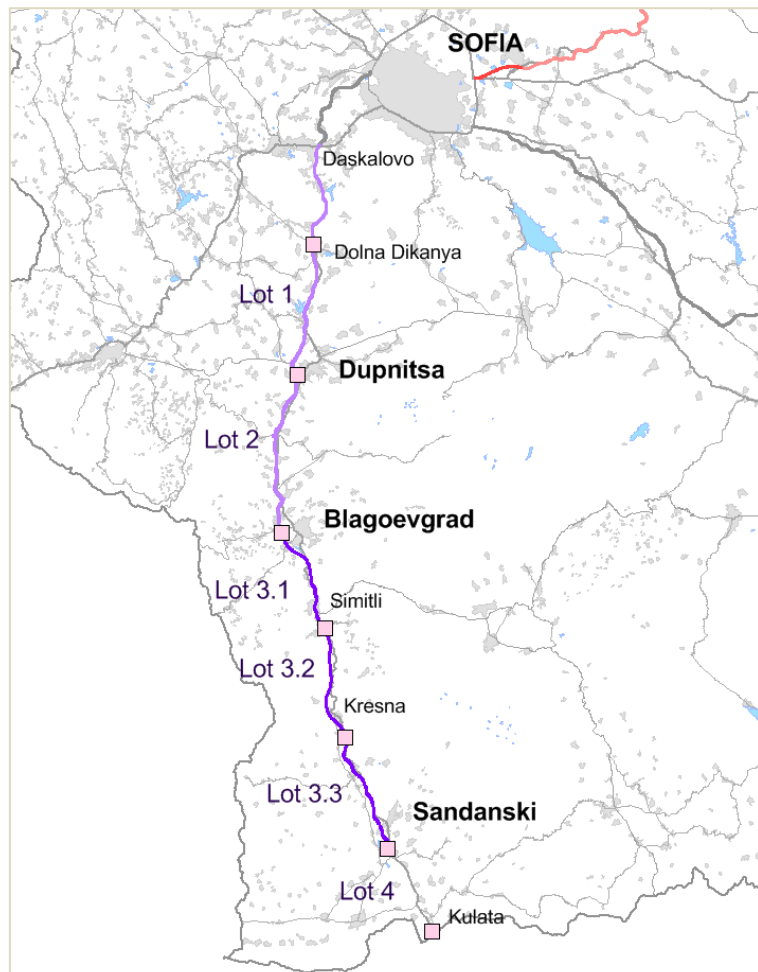
Struma Motorway is approximately 150 km long and is located in the southwest of Bulgaria between the interchange at Daskalovo Interchange and the Bulgarian/Greek border near Kulata. Struma Motorway is part of the core TEN-T network (the former Trans European Corridor No. IV, presently Orient/East-Mediterranean Corridor) linking the cities of Sofia and Thessaloniki.

In 2009 the section of Struma Motorway remaining for construction has been divided into four construction Lots:

- Lot 1, from Dolna Dikanya to Dupnitsa;
- Lot 2, from Dupnitsa to Blagoevgrad;
- Lot 3, from Blagoevgrad to Sandanski; and

- Lot 4, from Sandanski to the Greek border crossing at Kulata.

Figure 1. Overview of Struma Motorway



Lot 3 is 62 km long and has been sub-divided into four construction lots as follows:

- Lot 3.1 between Blagoevgrad and Krupnik;
- Tunnel Zheleznitsa;
- Lot 3.2 between Krupnik and Kresna (including the Kresna gorge); and
- Lot 3.3 between Kresna and Sandanski.

Lot 3.2 passes through an area of high ecological value – the Kresna gorge. The gorge is highly sensitive from environmental point of view and construction in it is technically difficult. This makes the section the most challenging one of the whole project.

The following chapter 2 describes in detail the issues caused by the existing situation in the Kresna gorge.

Implementation

The completion of Lots 1, 2 and 4 is a responsibility of the Bulgarian Road Infrastructure Agency (RIA) and the National Company Strategic Infrastructure Projects (NCSIP) is responsible for Struma Motorway Lot 3. As of the end of 2015 Lots 1, 2 and 4 are operational and only Lot 3 remains to be constructed.

Financing

Construction of Lot 3 of Struma Motorway is the main priority of the Operational Programme Transport and Transport Infrastructure (OPTTI) 2014-2020. The construction of Lots 1, 2 and 4, as

well as the preparation of Lot 3, have been funded under Operational Programme Transport 2007-2013.

1.4 Previous Studies

The history of preparation of Struma Motorway project is spread over 15 years. It dates back to 1990s when the first feasibility studies by local as well as international consultants were carried out. During this period, numerous studies and decisions were made regarding options for various sections of the route. The following is a summary of studies that have been carried out concerning the alignment of the motorway:

Patproject Feasibility Study (1998-1999)

Preparation of the project began with a feasibility study by local design bureau Patproject. This focused mostly on the technical feasibility of alternatives and did not include in-depth economic or environmental appraisal.

SPEA (2000-2002)

The Italian company SPEA Ingegneria Europea was commissioned to prepare feasibility studies, preliminary EIA, design and tender documents for Struma Motorway (including the section from the interchange on the Sofia Ring Road to Daskalovo Interchange, now referred to as the Liulin Motorway, and the section between Daskalovo Interchange and Dolna Dikanya). The employer was the Road Infrastructure Agency (RIA) and the contract was co-funded under the EU Phare Cross-border cooperation Programme.

SPEA produced many alignment options for all sections (to a large extent based on the work by Patproject, with the constituent sections termed M2, M3, M4, and M5), plus an alternative outside the Kresna gorge, traffic forecasts, cost estimates, economic viability report, multi-criteria analysis, preliminary EIA, etc.

Krasi-Bo (2002)

Parallel with the work of SPEA, the Bulgarian design firm Krasi-Bo prepared additional alignment options for the entire length of the motorway. This study was not commissioned by the administration, but was done on the initiative of the firm and was driven by desire to identify a cheaper option to the SPEA alignments. It also tried to avoid specific problems in some sections, such as conflicts with masterplans of some municipalities.

Vertical alignments and typical cross-section drawings were produced for two options proposed within the study – brown and brown-dotted. These alignments were compared with the respective combinations of SPEA options. As a conclusion, the study proposed a combination of the brown and brown-dotted alignments as a preferred solution.

Review by Supreme Technical Expert Council (2002)

Outcomes of the SPEA and Krasi-Bo studies were reviewed by the Supreme Technical Expert Council of the country in 2002. They considered all proposed technically feasible options and approved a mixture of them for further analysis and development.

NSI 2000 (2007-2008)

In 2007, the Bulgarian company NSI 2000 was commissioned by the RIA to carry out a number of studies related to Struma Motorway. The first of these related to the section in the Kresna gorge and resulted in two new long tunnel alternatives. The tunnel studies were of very limited detail and included only longitudinal profiles and general layouts. Geological conditions, number of tubes, tunnel cross-section, tunnel driving method and other important issues were not commented upon at all.

EIA Decision (2008)

The EIA Decision No. 1-1/2008 (2008 EIA Decision) approved (based on the outcomes of the EIA and the Appropriate Assessment Studies from 2007) preferred alignment for the entire length of the remaining part of Struma Motorway as a combination of several previously studied alignments, but predominantly based on the brown alignment developed by Krasi-Bo. The 2008 EIA Decision also

provided numerous recommendations for further improvement of the alignment during the next stages of design.

2. DESCRIPTION OF THE PROJECT

2.1 Existing Situation

One of the big rivers in the country, Struma River, passes through the Kresna gorge. The gorge itself is a natural migration route for animals and has warmer climate due to air currents penetrating along Struma River from south. The sides of the gorge are steep and no road construction could reasonably be done on the slopes. A relatively flat band of land between the two sides of the gorge exists. On the east side of the gorge there is an existing single track railway line. Road E79 (I-1 in accordance with the national numbering) has been built on the west side of the gorge. The Struma River flows between the road and railway for most of the gorge's length.

The existing road is 10.5 m wide and has design speed of 60 km/h. It has been rehabilitated in the early 2000's under the EU Phare CBC Programme and is still in good condition. The wearing course is not rough or cracked and potholes are present at only a few places. Free-flow speed along the gorge (that is, speed under low or no traffic conditions) is above 80 km/h under most conditions.

In accordance with the 24/7 classified counts and speed monitoring performed by NCSIP since 2013 the average travel speed is about 70-72 km/h.

Figure 2. *View of the existing road through Kresna gorge*



Figure 3. *View of the existing road through Kresna gorge*



Traffic along the gorge has distinct peaks on Friday afternoon and Sunday afternoon. This is due to the prevailing purpose of the trips – most likely leisure. The share of heavy goods vehicles (HGV) is about 20%. The annual average daily traffic (AADT) for 2014 and 2015 has been measured to about 8 000 vehicles/day.

The existing road is generally well designed but has very few places where overtaking of slower vehicles is possible. The lack of places to safely overtake combined with the high percentage of slow HGV increases the potential for accidents. In accordance with data from the traffic police between January 2010 and June 2015 there have been 366 accidents which resulted in 21 deaths and 139 people injured. Translated to annual values this means 68 accidents per year, 3.87 fatalities per year and 26 injured per year.

As an illustration how great these numbers are, the following example may be used. The average number of fatalities (for the period 2009-2013) along the whole first class national road network is 152 per year. Divided by the total length of first class roads of 2 975 km this results in 0.051 fatalities per year per km. Applying the same approach to the data for the Kresna gorge (3.87 fatalities per year observed along 19 km of road) results in 0.204 fatalities per year per km, i.e. close to 4 times higher.

Another critical location on the route is the town of Kresna through which the existing road passes. There are frequent accidents inside the town involving transit traffic.

Figure 4. *View from the section of road E79 in Kresna town*



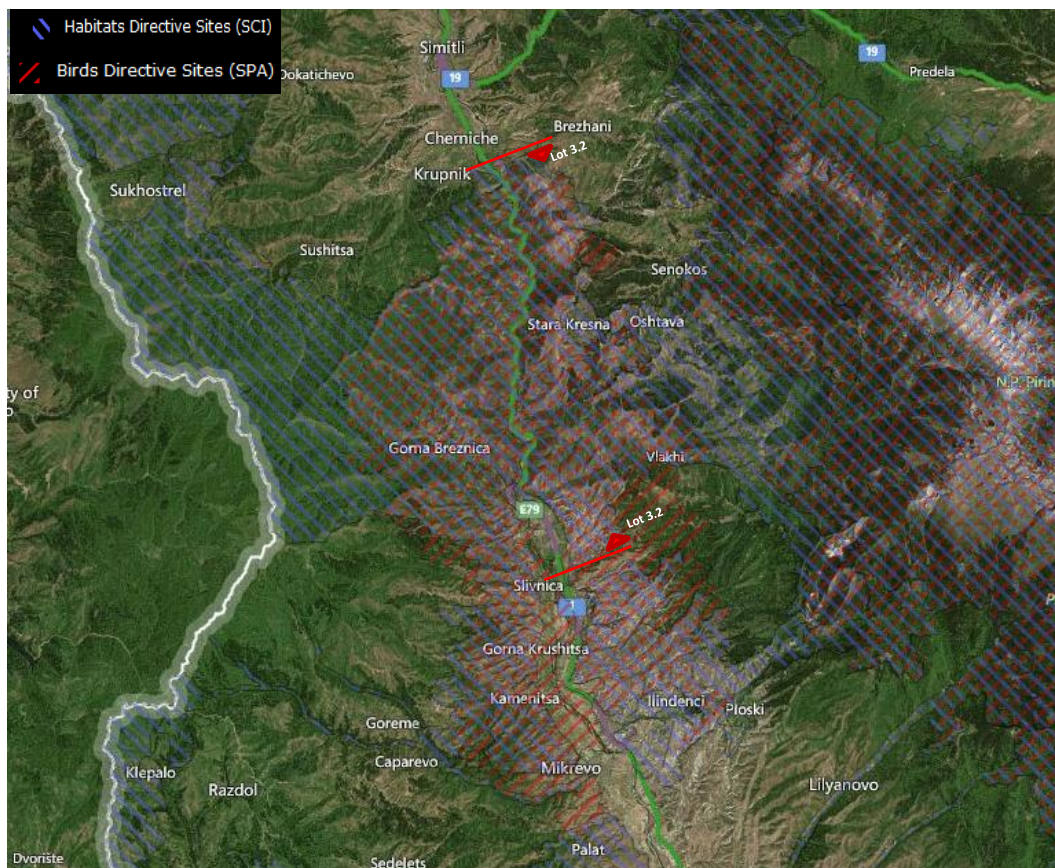
The E79 has no viable existing alternative and if it is closed due to accidents or for maintenance the alternative route is about 60 km longer, however, passing through the surrounding mountains

would not avoid the risks, and would endanger other Natura 2000 protected areas under both Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (the Birds Directive) and Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive), therefore is considered environmentally unacceptable.

In the whole area of the Kresna gorge there are two Natura 2000 sites in the area – BG0000366 “Kresna-Ilindentsi” (under the Habitats Directive) and BG0002003 “Kresna” (under the Birds Directive).

The existing road does not provide for any measures to mitigate the negative effects of the traffic on the local environment. The road and its adjacent structures (e.g. retaining walls) acts as a barrier for many species. Some species cannot cross the road at all which has a negative effect on their population whilst other species are killed by passing vehicles when attempting to cross the road.

Figure 5. *Natura 2000 sites at the location of Lot 3.2*



Source: European Environmental Agency's Europa web site <http://natura2000.eea.europa.eu>

The existing situation with regard to traffic safety is considered unacceptable while effects on the environment could be substantially mitigated.

2.2 Issues to Be Addressed

The analysis of the existing situation in terms of current road, traffic, road safety and effects on the environment shows the following main issues that need to be addressed and solved by the planning and construction of Struma Motorway in the region of Kresna gorge:

➤ Traffic accidents

The frequency and severity of traffic accidents along the existing road E79 in the Kresna gorge is one of the highest in the country. It is critical to improve traffic safety and do that as quickly as possible.

➤ **Mortality of wild animals**

The lack of appropriate mitigation on the road has been quoted as a reason for increased mortality rates of wild animals attempting to cross it. As a result it is considered that the road affects negatively the size and structure of the populations of various animals. The road and its adjacent structures also function as a barrier for some species which increases the negative effect of the road on the animal population.

➤ **Travel time, comfort and reliability**

Although travel times along the section are acceptable under most conditions the frequent accidents often result in traffic being stopped for hours. This causes a lot of inconvenience to drivers and affects negatively the environment.

➤ **Safety and environmental issues in Kresna Town**

At present the existing road passes through the town of Kresna resulting in numerous problems. A major issue is the safety of the residents of Kresna, as well as their increased exposure to noise and pollution.

In summary traffic volumes along the existing road in the Kresna gorge, at an AADT of 8 000, are not excessive and could normally be serviced by a single carriageway road. However, the high percentage of HGVs and the limited locations to overtake make the road extremely problematic from a road safety point of view. This also negatively affects the reliability of the service, the comfort of the passengers and the environment.

2.3 Overview of the Alternatives

With a view to finding an adequate solution to the above addressed issues, many studies have been conducted and well over ten alternatives for the Kresna gorge area have been developed. These alternatives can be summarised in three groups:

- *Alternatives through the gorge* – the gorge is the most natural way as it is physically the path of least resistance in north-south direction. For this reason most of the alignments explore the possibilities of passing through the gorge. All of them are for motorway standard and some are designed to 25 m standard (instead of 29 m) and design speed of 100 km/h (i.e. lower than the usual 120 km/h);
- *Alternatives on the sides of the gorge* – there have been some alignment options passing on the west side of the gorge with tunnels and viaducts. They were also designed to motorway standard. Two alignment options have been proposed by NGOs and explore the possibility to pass east of the gorge and avoid it altogether. These two alignments unfortunately had bad operational properties (extreme longitudinal grades, etc.) and were found to be of very high cost. The two alignments were also considered environmentally unacceptable by the 2008 EIA Decision. An additional western alternative was developed in 2015, which had similar deficiencies.
- *Tunnel alternatives* – at the final stage before the 2008 EIA Decision two “long tunnel” alternatives were introduced. These had the same layout as one of the earlier alternatives passing west of the gorge (SPEA’s green option) which was lowered to turn it to tunnel.

Most of the alternatives have been dismissed as unacceptable with the 2008 EIA Decision and the decision declares the so called “long tunnel alternative” (LTA) the only acceptable alternative for Kresna gorge. The LTA is described in the following section.

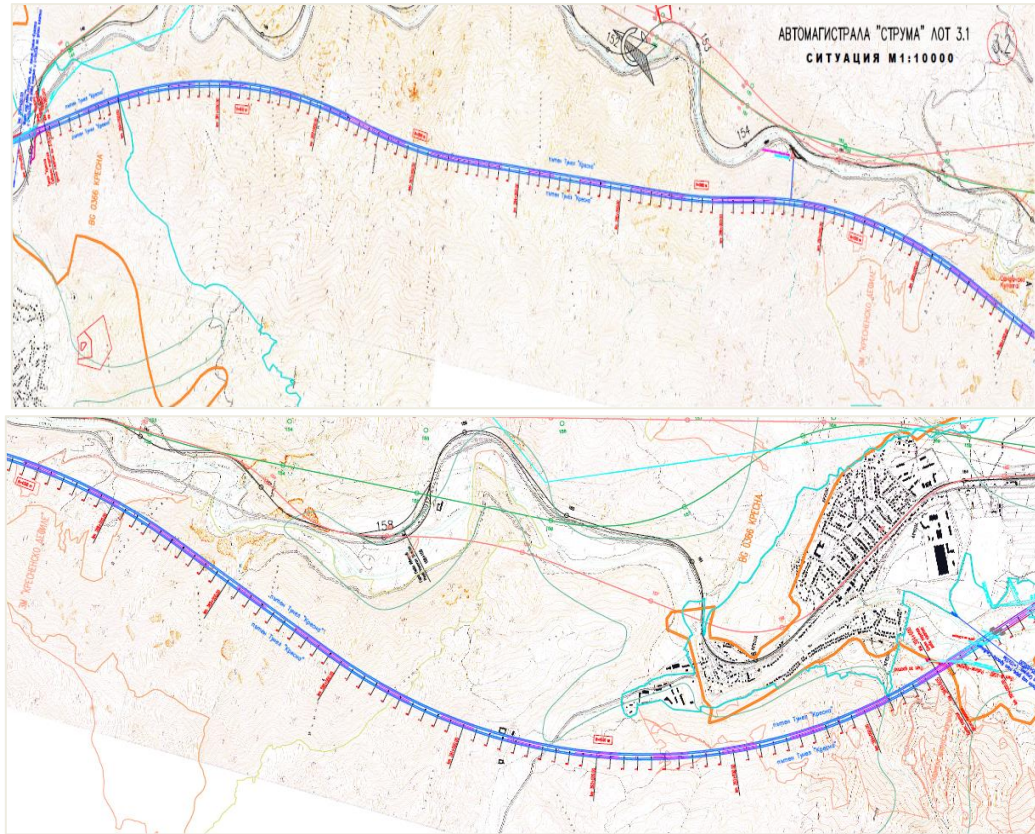
2.4 Long Tunnel Alternative

The Long Tunnel Alternative (LTA) was developed in 2007-2008 by Bulgarian design firm NSI 2000. The original study was of very limited detail and included only longitudinal profiles and general layouts. Geological conditions, number of tubes, tunnel cross-section, tunnel driving method, costs and other important issues were not commented at all. Later, in 2011 as part of Arup’s assignment (see item 3.1 below), the tunnel was defined as “dual two”, i.e. with two tunnel tubes with unidirectional traffic. Consequently, in 2012 the terms of reference (ToR) for preliminary design was prepared with the requirement to design the tunnel with two tubes and length of 15.4 km. The time for construction

was estimated to be at least 7 years, but international experience shows that such projects in practical terms take 10-15 years.

Based on the alignment approved by the 2008 EIA Decision the LTA was designed in 2013-2015 as going parallel to the existing road E79 and Kresna gorge.

Figure 6. *Alignment of a long tunnel in Kresna gorge*



3. RECENT STUDIES AND PROBLEMS IDENTIFIED

3.1 Studies after the 2008 EIA Decision

After the adoption of the 2008 EIA Decision in the course of planning the construction different studies for assessment of the suitability of the approved LTA have been conducted. Summarised below are most of the studies that have been carried out in the period 2008–2015.

In complying with Recommendation No. 98, various experts expressed their view on different aspects of the project, such as: geological, environmental, hydrogeological, geotechnical, seismotectonic, engineering, as well as natural radioactive elements. Unanimously, they supported the stance that construction of Lot 3.2 using the LTA would prove problematic, to say the least.

Environmental Strategy by JASPERS (2011-2012)

In an effort to guide the development of Struma Motorway project JASPERS summarised all environmental work done and identified gaps that needed to be filled and the strategy and detailed specific steps that needed to be taken in order to develop the project in an environmentally sustainable way. The document was finalised in May 2012 and adopted for implementation by NCSIP and the Ministry of Environment and Water (MoEW).

Arup (2011)

Due to the long time span of the feasibility studies process, its fragmentation and gaps in it, Arup were commissioned by JASPERS in 2011 to produce a comprehensive update of the feasibility studies with the following specific objectives: to review the process of identification of the preferred (approved) alignments for Struma Motorway Lots 1 to 4, to confirm whether or not the process was

concluded satisfactorily, to confirm the preferred alignments through a Multi Criteria Analysis (MCA), to review and sign off a cost to benefit analysis (CBA) for the entire motorway produced by the Ministry of Regional Development and Public Works' (MRDPW) consultant (AECOM) and to draft a summary for the whole feasibility process for the project.

Arup carried out a comprehensive MCA taking into account cost (capital and maintenance), economic appraisal (VOC, accidents and time savings, other benefits and NPV), environmental appraisal and wider strategic benefits.

The conclusion from the MCA and the assignment was that the preferred (2008 EIA approved) alignments for all lots could be confirmed as the optimal solution. For Lot 3.2 the preferred option with long tunnel scored lower in the MCA than other options but, as a consequence of the 2008 EIA Decision, and information collected at that time, it was considered the admissible option.

The study acknowledged that the information regarding some of the alignment options studied, and most notably the LTAs, was extremely limited and the preferred alternative would have to be re-examined at a later stage when more information would be available regarding its exact locations, geometry, geological conditions, technology, waste, pollution, etc.

Preliminary Design of LTA (2013-2015)

The preliminary design of Lot 3 was commissioned by NCSIP in 2013 and undertaken by JV ViaPlan - Amberg. The study featured the preparation of concept, preliminary and reference designs for the road and tunnel sections of the entire Lot 3. Lot 3.2 has been the most challenging section for the preliminary design. This is due to a number of factors but mainly the environmentally sensitive area and the severe terrain.

Ground Investigations for the Lot 3 Tunnels (2014-2015)

The study was commissioned by NCSIP to undertake geotechnical investigations for Kresna and Zheleznitsa tunnels using ToR developed by COWI under the JASPERS framework contract. The study was undertaken by the Bulgarian company JV Geops-Geotehnika Consult.

The study was envisaged to be carried out in two stages - stage one would be based on the preliminary design of the tunnel route and survey in detail the area where the tunnel alignments pass. Based on the results of stage one, the preliminary design may be adjusted to deal with unfavourable geological conditions found. Stage two of the study would be carried out after (and if) the preliminary design had been adjusted based to take into account the results of stage one. Each stage involves a detailed geological mapping, as well as detailed seismic profiling, drilling of boreholes to the depth of the tunnels and laboratory tests.

Stage one of the study was completed in December 2014 and was forwarded to the preliminary designer, so that he may comment upon the results and take them into account when calculating tunnel lining. The study identified a large amount of faults in the region, which would pose risk to large engineering structures, such as a long tunnel.

Preliminary Design of Backup Road Alternative through Kresna Gorge (2014)

In the fall of 2014 NCSIP commissioned the Bulgarian firm Patproject 2000 to develop a feasibility design of a dual carriageway alternative (DCA) for Lot 3.2. This alternative would serve as a backup solution if the tunnel alternative turned out to be unfeasible.

The study envisaged that one of the lanes of the DCA would be the existing E-79 road – reconstruction of the road would be required, including the construction of several short tunnels. The other lane would pass to the right of the existing road and traverse through the mountainous terrain on the west side of the Kresna gorge. Construction of a number of short tunnels and viaducts will be necessary.

The study produced drawings of the dual carriageway route, bill of quantities, cost and construction time estimates for the construction of the alternative.

Geotechnical Study for Alternatives through Kresna Gorge (2014)

To support the feasibility design of the DCA, a geotechnical study for the route was commissioned and carried out by Bulgarian firm Bondys.

The study produced geological mapping of the route, determined the expected cut slopes, analysed the geological and geotectonic structure of the region, provided information about the hydrogeological and seismotectonic characteristics and developed a detailed technical specification for detailed geological studies to be commissioned in the further stages of the development of the alignment.

Update of Traffic Forecast and CBA (2014-2015)

In 2014 NCSIP commissioned JV ANISA-ITC-PPM to update the existing traffic forecasts and CBA of the project and prepare an application for funding of the project under OPTTI. The updated analyses and application form were developed in accordance with the requirements and guidelines for the new programming period. The study produced a traffic model and forecast for the project, as well as an updated CBA.

The results from the updated traffic forecast model show a reduction of the traffic that was envisaged in the previous CBA from 2011. The updated CBA concludes that Struma Motorway project (Lot 3 together with Lots 1, 2 and 4) will be economically unfeasible under the new Guide to CBA of Investment Projects (2014) if it features the construction of a long tunnel in Kresna gorge for Lot 3.2. The main reasons for this are the significant investment costs, reduced values of time savings and the less favourable macroeconomic indicators.

Animal Mortality Studies (2013-2015)

Three consecutive studies to record the animal mortality rates on the existing road through Kresna gorge had been commissioned annually since 2013 by NCSIP. The studies were carried out by the Bulgarian company Chuhal EOOD.

The studies involved routine inspections of the road and the surrounding area to determine the mortality rates of different species in the regions – mammals, birds, reptiles, etc. Inspections had taken place several times per season and the results were presented for each season. At the end of each year a detailed report had been prepared that summarised the results from all seasons and compared them to the results from previous years to discover patterns in the mortality rates of the species in the region.

It is envisaged that the studies would continue during the construction period of Lot 3.2 to provide a larger sample for the analysis and to measure the impact of construction on the mortality rates in the region.

The studies are part of the collection of baseline data prescribed by the Environmental Strategy for the project developed by JASPERS.

Classified Traffic Counts (2013-ongoing)

In 2013 NCSIP commissioned the Spanish firm TrafficNow to install a camera for classified traffic counts and a pair of Bluetooth sensors in the Kresna gorge. The purpose of the Bluetooth sensors was to determine the average space mean speed of vehicles passing through the gorge. The traffic data is collected 24 hours/day and NCSIP regularly publishes reports regarding the characteristics of traffic in the gorge.

The counts are part of the collection of baseline data prescribed by the Environmental Strategy for the project developed by JASPERS.

3.2 Overview of the Key Problems

In the course of the studies, carried out in the period from 2011 to 2015 and as the design of the Lot 3.2 LTA was advancing during 2013 and 2014, a number of problematic issues were identified, which had not been taken into account when approving the LTA by the 2008 EIA Decision. These included, but were not limited to:

- safety – both during the construction and operation of the tunnel;

- highly hazardous geological issues regarding construction and exploitation, including increased radioactivity;
- the necessity for huge spoil deposit sites;
- the construction and impact of temporary access roads and depots;
- the requirement for mid-tunnel ventilation shafts connecting the tunnel to the surface and the permanent maintenance access shafts associated with these;
- the fissured nature of the rock and the potential impact of this on the ground water regime once tunnelling commences; and
- the impact of heavy traffic through the gorge during construction.

These issues added to the inherent risks for projects of this size – the need to complete it within limited time (the 2014-2020 Programming Period), huge investment and operational and maintenance costs, significant geological risks (the area is known for the most severe earthquakes in the country with possibility of up to 9th Richter degree magnitude), as well as questionable economic feasibility (considering the new requirements to be used in undertaking the CBA and the consequent reduction of the Value of Time to be used in the calculations).

The key issues arising during the development of Lot 3.2 with a long tunnel could be summarised as follows:

- safety of the people using the tunnel;
- geological hazards;
- environmental considerations including the impact during the construction phase and maintenance access;
- economic viability;
- time limitations;
- sustainability.

Each of the above groups of problems is summarised below.

3.3 Safety of the People Using the Tunnel

A number of issues arise regarding the safety of a long tunnel for the people. The tunnel alignment leads through multiple fault zones. Crossing these zones carries a high-degree risk of numerous hazardous phenomena with limited predictability – rockslides and rockfalls, high capacity water discharge, mudflows. Such events may result in human casualties¹. Other risks associated with fault structures – like significantly increased radon concentration in the tunnel, thermal waters inflow, etc. – also cannot be ruled out either. In case of sudden rockslide or rockfall, slipping resulting from seismic activity or emergence of mudflows in long tunnels, the rescue and repair works will be more complicated and hazardous and the probability for human casualties much higher. An alternative option does not present such a threat to the safety of people, since the shorter tunnels, viaducts and open road sections reduce the probability of critical and disastrous events. Even if such an event occurs, the evacuation of people trapped inside shorter tunnels, both during construction and actual operation, would be easier and faster.²

The health of people during construction of a long tunnel is also highly endangered by the increased radioactivity in the region, which is two times higher than the typical values for Bulgaria.

¹ Expert study by Professor Kiril Angelov regarding comparative engineering-geological and seismic assessment of options for construction of Struma Motorway, Lot 3.2.

² Expert study by Professor Nikolay Dobrev dated 15 January 2015 regarding engineering-geological conditions of alignment Krupnik-Kresna of Struma Motorway, Lot 3.2 (Kresna gorge).

There is a risk if separate radioactive particles fall into the respiratory system of workers and engineers, the same after a certain period can cause cancer.³

The overriding concern for choosing the shorter tunnels and viaducts as an alternative to the Long Tunnel option relates to people's health and safety and as such, cannot be ignored.

3.4 Geological hazards

In May 2014 NCSIP commenced geological investigations for the tunnels, part of Lot 3. The ToR for the survey was drafted in 2013 under a technical assistance assignment under the JASPERS framework contract and later revised and confirmed by the designer of Lot 3. The investigations include geological mapping, seismic profiling, drilling of boreholes and laboratory tests.

The area is well known for the major faults that form the Kresna gorge and its high seismic potential. In 1904 the area was struck by an earthquake with a magnitude of 7.2 on the Richter scale, followed after about 20 minutes by another earthquake with a 7.9 magnitude. The earthquake activated the Krupnik fault, which is situated at the north end of the Kresna gorge, and resulted in movement of the sides of the fault.

The tectonic and seismic features of the Kresna gorge have, to date, not been studied in sufficient detail. The Krupnik fault is regularly being monitored by the Bulgarian Academy of Science. Other faults that have been mapped are not well studied and the results of drilling show additional faults, which are not visible on the terrain. It now appears that the potential of the faults in the area, as well as their potential to damage engineering structures, must be thoroughly studied.

In order to address the issue NCISP commissioned additional studies of the tectonic and seismic features of the Kresna gorge to the following scientific teams:

- *Research Prof.s Stefan Shanov*, a Member of the European Advisory Evaluation Committee for Earthquake Prediction of Europa Major Hazards Agreement to the Council of Europe (1994-2000), head of the Laboratory of Seismotectonics in the Geological Institute at the Bulgarian Academy of Science (2002-2012) and chairman of the Bulgarian Geophysical Society;
- *A team from the Bulgarian Academy of Science*, led by Associate Prof. Nikolay Dobrev – head of the Department of Geohazards in the Geological Institute at the Bulgarian Academy of Science;
- *Prof. Paul Marinos* – president of the International Association of Engineering Geology and the Environment (1994-1998) and former chairman of the Greek Geological Society, and Ricardo Oliveira - president of the International Association of Engineering Geology and the Environment (1990-1994), director of COBA S.A.

All three studies independently conclude that a long tunnel in the Kresna gorge would be in high risk of being damaged by the faults and that the construction of shorter structures (tunnels and viaducts) is preferable.

The tunnels falls into one of the most seismically active areas on the Balkan Peninsula, which is determined to provide the most unfavourable conditions for construction. The existence of four active faults in such an area, the movement of which in the long run may accumulate deformations in it, is another problematic factor which must be taken into account. As a result of this, there is a high-degree risk of sudden detachment of unstable rocks during the tunnel construction or operation. During strong earthquakes along these faults and fault zones can be expected slipping in the range of several decimal centimetres, which will lead to shifting across the tunnel axes. Such phenomena cannot be predicted and present a high-degree risk hazard. They may not only result in human casualties, but also inflict irreparable damage to the tunnel engineering structure. The probability for occurrence of such phenomena is much higher in a longer tunnel, where simultaneously the possibility for avoiding the hazardous zones is lesser. In the alternative motorway alignment the probability for occurrence of hazardous geological process is smaller and easier to predict.

³ Report by Bondys regarding the analysis and assessment of natural radioactive elements in the terrain of Struma Motorway, Lot 3.2.

The probability for arising of issues in a longer tunnel will also be higher due to the significantly bigger rock pressure in it. Elimination of the sequences of such events may be impossible or at least difficult, with the whole tunnel becoming permanently (or for an extensive period) blocked, leading to diverting traffic along the currently existing road and even exploring options for a new motorway alignment. As far as shorter tunnels are concerned, in case of emergency, resulting from geological conditions, it will affect only one engineering structure and the elimination of the sequences will be easier and faster.⁴

Thus, the seismotectonic conditions cannot be eliminated as unfavourable factors using technical solutions, but at least, they can be minimised by opting for the surface variants of the highway, and not the Long Tunnel option.⁵

Furthermore, in 2015 as part as the geological studies for the design of the DCA a study of the radiation emissions in the Kresna gorge was carried out. The study indicates that there is natural radiation on long sections of the Long Tunnel alignment in the northern part of Kresna gorge. The study concludes that in all likelihood large amounts of the spoil to be excavated from the long tunnel will be radioactive. This would require the establishment of a specialised depot in the area of the project and facilities to clean radioactive water draining from the tunnel. Such measures would require additional time and substantial additional funding. The radioactive material will also be a hazard for the environment.

Finally, in July 2015 NCSIP requested the Bulgarian Academy of Science to review the conclusions of the hydrogeological study made as part of the geological studies for Kresna tunnel. The resulting report confirms that large quantities of waters will be drained by the long tunnel. It is further pointed out that the initial drained quantities will be much higher than the average quantities calculated and pose a risk during construction. The waters drained by the tunnel will inevitably affect the habitats and species on the surface above the tunnel.

The studies mentioned above are included as *Appendix 2* to this report.

3.5 Environmental Considerations

The EIA decision to proceed with the tunnel was taken by MoEW in 2008 and was based on very limited technical and environmental information. No preliminary or detailed designs existed for the LTA and the effects of the tunnel being constructed were not evaluated at all. In accordance with the Environmental Strategy for the project (developed by JASPERS and adopted for implementation in 2012) after the design of the tunnel is completed, its effects on the environment must be thoroughly evaluated. Based on the outcome of this evaluation, a final decision how to proceed with the project must be taken. The strategy specifies that after completion of the tunnel design, the environmental effects of its construction must be evaluated as part of a new Appropriateness Assessment (required by the services of EC in 2012), as well as part of a formal EIA procedure.

In 2014, as part of the preparation for a formal EIA procedure, NCSIP's Environmental Consultant prepared a framework for the evaluation of the effects of the construction of the tunnel. The main groups of parameters evaluated are listed below:

- Affected surface areas;
- Affected underground space;
- Effects on Natura 2000 sites and national protected areas;
- Nuisance for the population - permanent inhabitants;
- Nuisance for the temporary residents and for the users of the existing roads;
- Waste;

⁴ Expert study by the Bulgarian Academy of Science (Professor Nikolay Dobrev) dated 15 January 2015 regarding engineering-geological conditions of alignment Krupnik-Kresna of Struma Motorway, Lot 3.2 (Kresna gorge).

⁵ Expert study by Professor Stefan Shanov regarding the seismic peril based on seismo-tectonic characteristics of Lot 3.2, alignment "Krupnik-Kresna", Struma Motorway.

- Water;
- Landscape, including visual impact (quality assessment);
- Cultural heritage.

In October 2014 the Environmental Consultant applied the criteria for the evaluation of the Kresna tunnel (Lot 3.2), based on the tunnel design. Some of the results are presented below:

- *Affected surface areas* - total area for the permanent works is around 800 daa. Additionally 254 daa will be used temporary for 3 construction sites; 490 daa for the permanent disposal of tunnel spoil; 12 daa for 2 km of permanent new roads and rehabilitation of 15 km existing roads during the construction.
- *Affected underground space* – the expected volume of excavated rock material is around 5 900 000 m³.
- *Effects on Natura 2000 sites and national protected areas* – two Natura 2000 sites will be affected by the tunnel – 1 for habitats (SCI BG0000366) and 1 for birds (SPA BG0002003);
- *Nuisance for the population* – there are no permanent inhabitants in the area at less than 300 m around the construction sites.
- *Nuisance for the temporary residents and for the users of the existing roads* – the expected duration of construction works is at least 7 years. During this period the traffic generated by the construction works will be around 1 600 truck movements per day (this includes haulage of tunnel spoil, as well as construction materials) making a total of more than 3 000 heavy vehicles passing through the Kresna gorge per day (together with regular traffic). The expected level of equivalent noise is 70.7 dBA.
- *Waste* – the expected soil and rock materials for permanent depositing is about 3 000 000 m³. Furthermore, the concentrations of natural radionuclides are two to three times higher than the typical values for Bulgaria. In case of passing a long tunnel in the area of Lot 3.2, underground excavations around the two pipes will change their gradients and will inevitably pass through areas with elevated uranium and radium. What is worse, the excavated rock from tunnels needs to be disposed of in special landfills and the drained water will have to be treated by radionuclides under Bulgarian law. The above-described problems associated with the project for a long tunnel will be insignificant if an option with open-speed roads, viaducts and short tunnels is opted for.⁶

The above numbers illustrate how problematic from safety and environmental point of view the construction of the EIA preferred tunnel alternative would be. These effects have not been evaluated as part of the EIA and the appropriateness assessment reports (AA report) prepared in 2007.

3.6 Economic Viability

The EC has prepared new requirements for CBA for the 2014-2020 funding period. The main changes include:

- The level of contingency costs would need to correspond to the project's duration and risks. This would increase the contingency costs for the project, especially for the Kresna tunnel (Lot 3.2) due to the extensive construction periods required for long tunnels.
- A higher level of detail is required when calculating the environmental impact of the projects. Since the environmental impact of the construction of the Kresna tunnel has never been fully estimated, the updated CBA would include greater environmental impact and mitigation costs.
- The most significant change pertains to the Value of Time (VoT) calculation. The updated CBA guide no longer allows for the use of HEATCO 2006 values and instead advises member states to carry out stated preference surveys to determine the VoT for different journey types and transportation modes. This results in a 50-70% reduction in the VoT benefits for the Struma Lot 3

⁶ Expert study by Bondys regarding the analysis and assessment of natural radioactive elements in the terrain of Struma Motorway, Lot 3.2.

project. Given the high economic cost of the Kresna tunnel, this change alone puts the economic feasibility of the project in jeopardy.

In 2014 NCSIP appointed a consultant for the update of the traffic forecast and CBA for the project. The updated CBA uses the same methodology and scope as the one from 2011 – it includes Lots 1, 2, 3 and 4 of Struma motorway and envisages a tunnel option for Lot 3.2. The main parameters that were updated are:

- macroeconomic indicators – GDP growth, inflation, etc;
- financial and social-economic discount rates in compliance with the updated CBA guide (2014-2020);
- demand analysis – based on the updated traffic forecast;
- implementation programme – based on up-to-date procurement and construction plans.
- investment costs – includes the estimates from the bill of quantities of the preliminary design;
- operation and maintenance costs – extended O&M cost analysis for the Kresna tunnel;
- economic indicators – value of time calculations in compliance with the updated CBA guide (2014-2020).

The results of the analysis for the project including Lots 1, 2, 3 and 4 are⁷:

Indicator	Value
ENPV	-208.07
EIRR	3.47%
B/C ratio	0.80

Normally a project will need to demonstrate B/C (benefit to cost) ratio of more than 1.5 in order to be considered economically viable and hence eligible for funding. As is evident from the results, a project that includes a long tunnel as part of Lot 3.2 is by far economically unfeasible. This means that the project cannot be funded under OPTTI 2014-2020. With a B/C ratio as low as 0.8 the project could not be funded from the European Investment Bank and similar sources as well.

3.7 Time Limitations

The original plans were to complete the preliminary design of Lot 3, including the tunnels, by the end of 2014 and launch tenders for construction of the Zheleznitsa Tunnel and Kresna tunnel in the beginning of 2015. The tenders were planned to be restricted (i.e. with prequalification) and were to be completed in the autumn of 2015. Procedures like land acquisition and archaeological studies would run concurrently to the tender evaluation procedure. This would allow design and build contracts for the tunnels to be signed by the end of 2015.

A period of about 1-1.5 years for designs by the contractor would be necessary which means that construction could effectively commence towards the end of 2016 or the beginning of 2017. The time for completion of the Kresna tunnel has been estimated to be at least 7 years, i.e. 2022-2023. (For comparison, the 2011 Arup study suggests about 7 years for construction. This, however, is likely to be an optimistic scenario, as most similar facilities over the world have taken 10-15 years to construct.) This means that the Kresna tunnel could have only theoretically been implemented within the 2014-2020 programming period.

Unfortunately, delays are always likely when implementing construction projects and especially projects of that complexity and level of risk. The delay of the designer of Lot 3 in submitting a preliminary design of the required quality has resulted in substantial delays. Consequently a long tunnel in Kresna gorge could not be completed within the framework of the programming period. This makes funding the project impossible.

⁷ As of the time of drafting of this report the CBA model has undergone several reviews by JASPERS but had not yet been finally approved. The results from the final CBA model may differ from the ones listed herein.

3.8 Sustainability

The 2011 study by Arup indicated that the costs for operation and maintenance of the Kresna tunnel would amount to about EUR 6 million per year. Additionally, a +/-20% margin is proposed to that amount. The likely operation and maintenance costs were determined based on experience from similar projects in similar countries (Slovakia in particular) and were adjusted to Bulgarian prices.

The total amount for maintenance of roads and road tunnels in Bulgaria for 2014 was set to BGN 110 million (EUR 55 million), approximately half of this amount is for routine maintenance and the other half for winter maintenance. The cost of the maintenance is to be met through the income collected through vignette taxation. The money for operation and maintenance of the Kresna tunnel form more than 10% of the national budget for routine maintenance of the whole road network and covering these costs from vignette taxation will be most problematic.

An alternative would be to put a toll on the Kresna tunnel which would cover solely operation and maintenance costs. The development of such a scenario is included in the ToR of NCSIP's consultant for update of the traffic forecast and CBA for Lot 3. The administrative complications of putting a toll on the Kresna tunnel are significant but are not the main issue. A problem would be the fact that the old road through the Kresna gorge is of very similar length and will allow almost the same speed as the tunnel, which means that using either does not present substantial time savings to users (the tunnel is 15.5 km long vs. 16.3 km for the existing road; the expected speed in the tunnel is about 75 km/h vs. measured speed of 70-72 km/h at the existing road). Hence it can be expected that most drivers will continue to use the old road and not the tunnel, especially if the tunnel is tolled and/or heavy traffic no longer passes through the gorge (HGV may be made to use the tunnel through administrative measures but not the individual drivers).

In summary, if the Kresna tunnel is not tolled, ensuring the funds for its operation and maintenance will be highly problematic; if the tunnel is tolled to finance operation and maintenance, then the initial goal to relieve the Kresna gorge from traffic will not be achieved.

4. FURTHER DEVELOPMENT

4.1 Newly Developed Alternatives

Considering the latest developments of the project and the problems and risks, identified with the recent studies, the danger was acknowledged that, when taking into account the new information about the effects of the project, the present tunnel solution turns out to be unfeasible and highly risky. If not steered properly, this may result in considerable delays to the overall implementation of Struma Motorway.

In view of the above, NCSIP had to develop a “backup” alternative for the Kresna gorge. This alternative should mitigate the risks identified and have minimum impact on nature. If, after initial screening, the “backup” alternative was considered environmentally acceptable, it could be evaluated as part of a new EIA procedure. This would not lead to delays to the project, as a new EIA would certainly be legally required for the LTA alone, even if no additional alternatives had been studied.

Description of the “Backup” Alternative

During August-September 2014 NCSIP initiated the development of a “backup” alternative and prepared a comprehensive framework for quantitative evaluation of the effects of the tunnel on the environment.

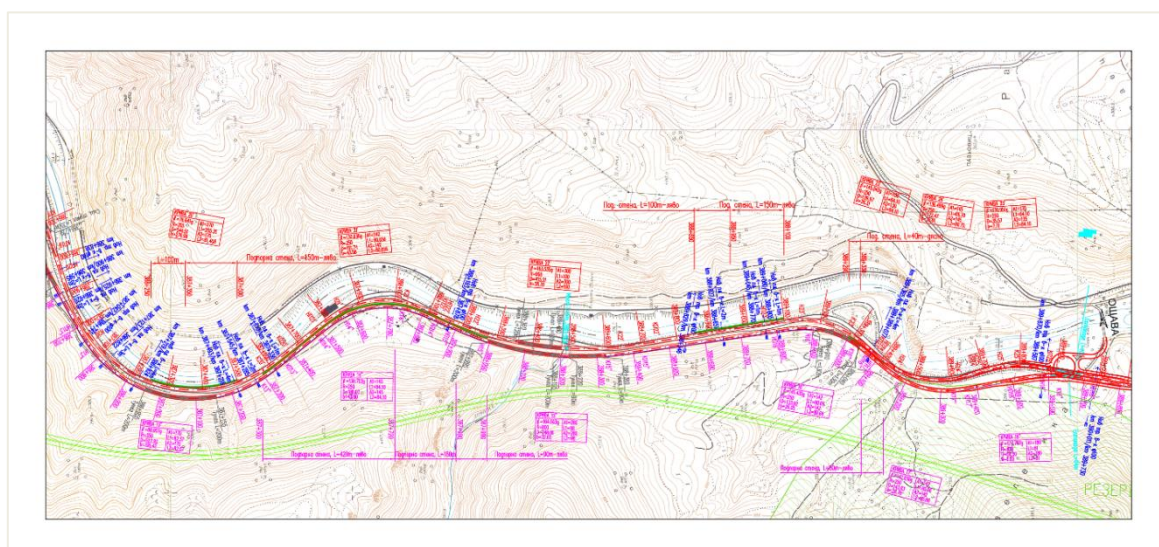
Considering the fact that all previously developed alternatives outside Kresna gorge have been demonstrated to be impossible in the course of the studies performed and the 2008 EIA Decision (due to environmental, technical and/or economic reasons), it was decided to attempt a very modest and conservative technical solution, which would minimise the areas to be used in the gorge. A key factor for this would be the usage the existing road through the gorge as much as possible and build an additional carriageway appropriately located within the gorge.

The “backup” alternative is designed as dual carriageway road (2 x 10 m wide). The design speed is 80 km/h which will allow for operational speed of 100 km/h under most conditions. One carriageway closely follows the existing road through the gorge, straightening it in some sections, and the other carriageway develops independently with tunnels and viaducts. The rationale behind this design is to minimise as much as possible the footprint of the road and thus reduce impacts on habitats and species as much as possible.

Construction of the “backup” alternative is expected to take about 3-3.5 years.

In November 2014 the Environmental Consultant evaluated the environmental effects of the Kresna tunnel and the “backup” alternative which was considered sufficiently developed for the purposes of the environmental evaluation. A new EIA procedure was initiated in December 2014.

Figure 7. *A typical section of the Backup alternative*



4.2 Collaboration with the Services of EC

In 2014 discussions for the scope of the new OPTTI 2014-2020 between DG REGIO and the Bulgarian authorities took place. It was confirmed by all parties that Struma Lot 3 was indeed the main priority of the OPTTI and needed to be completed by the end of the programming period. However, the expected cost of the project of about EUR 750 million (excluding VAT) was giving rise to concerns considering the available budget of EUR 673 million under Priority Axis 2 (total EU and Bulgarian co-financing). The Bulgarian authorities presented to the services of EC the problems identified for Lot 3.2 and the possible solutions.

Discussions intensified in October-November 2014 and eventually DG REGIO formulated the following requirements:

- A comprehensive development plan for the project must be agreed between the parties. This would include a review of the work done to date and detail further steps to fill in all gaps identified;
- JASPERS must be involved in the development of the project.

In accordance with that, follow-up meetings on the preparation of Struma Motorway with the participation of DG REGIO, DG ENV and JASPERS took place in January, July and November 2015. At these meetings the Bulgarian authorities have informed the services of EC and JASPERS regarding the development of the project and more importantly:

- the approach taken for the development of the EIA for Lot 3.2;
- the development of the “backup” alternative and the improvements made to it.

4.3 Consultations with the Public

A substantial volume of information regarding the project has been made available to the public by its developer through their web-site at www.ncsip.bg. This includes various reports and maps related to Struma Motorway Lot 3. However, the main instrument for consultations with the public is Struma Motorway Monitoring Committee (the Committee). The committee was established in 2013 when the Minister of Regional Development and Public Works issued rules for the work of the committee and appointed its members. These include representatives of several environmental NGOs, as well as representatives of the Managing Authority, the MoEW, the Central Coordination Unit, the Ministry of Finance, etc. Committee meetings are held every 2 months and NCSIP reports the development of Struma Lot 3 at each meeting.

Since the establishment of the committee in 2013, a number of notable issues regarding the development of Struma Motorway have been reported to the committee. Its members have been informed in particular about:

- the environmental proceedings related to the geological studies planned for the Kresna tunnel, the scope of the studies and their impact on the nature;
- the scope of the main contracts for the preparation of Lot 3, the scope of some of the smaller but important contracts like the assignment for monitoring of the mortality of wild animals along the existing road in the Kresna gorge;
- the analysis carried out by NCSIP about whether it would be possible to phase the construction of Kresna tunnel and the possibility for building of one tunnel tube (in an attempt to reduce project costs and make the project feasible);
- a report regarding the impact of ventilation shafts and possible intermediate access locations to speed up the construction of the tunnel, so that it could fit the timeframe of the 2014-2020 programming period;
- the analysis done by the Environmental Consultant regarding the compliance of the road sections of Lot 3 (that is Lots 3.1 and 3.3) with the requirements of the 2008 EIA Decision, as well as the results of the latest wild animals mortality study;

- the environmental evaluation framework developed by the Environmental Consultant of NCSIP which would be used to evaluate the effects of the project in Kresna gorge;
- the findings regarding the extremely risky geological conditions in the Kresna gorge area;
- the development of the backup alternative and the rationale behind it, recent developments of the project and various documents like technical, geological and environmental reports, copies of official correspondence, etc.
- the complete geological studies for the LTA in Kresna gorge;
- the progress of the EIA procedure for Lot 3.2 in 2015 and technical and environmental details regarding both the backup and the improved backup alternatives.

As should be evident from the summary of issues discussed, the Bulgarian authorities are committed to developing the project in a reasonable and transparent manner and have been taking the involvement of local NGOs very seriously.

4.4 Lot 3.2 EIA Procedure

With a view to the limited scope of information on which the 2008 EIA Decision was based, in December 2014 the project developer NCSIP initiated a new EIA procedure for the long tunnel and the DCA. The necessary studies were commissioned to the Bulgarian firm Dango Project Consult and commenced in early 2015.

In the early stage of development of the alternatives of Lot 3.2 NCSIP has prepared a notification under the Law on Environmental Protection and the Biodiversity in accordance with the provisions of the EU environmental legislation. In December 2014 the MoEW, as the competent environmental authority, and all affected municipalities have been submitted notifications pursuant to the Ordinance on the conditions and procedures for assessing the environmental impact and Ordinance on the conditions and procedure for assessing the compatibility plans, programs, projects and investment proposals with the object and purpose of conservation of protected areas. The notification described the LTA together with the improved “backup” alternative.

Following that additional information and verification has been requested by MoEW and received in April 2015. After receipt of the additional information the competent authority has provided NCSIP with instructions in accordance with the national and EU environmental legislation (MoEW letter ref. OBOC-85 dated 13 May 2015).

One of the most important instructions given by MoEW states, as follows:

“Propose and evaluate “alternative solutions” including a different location of the alignment, different scale, including different carriageway width, method of carrying out the works or the use of alternative technologies. Propose and evaluate an “alternative solution” to move the alignment outside the gorge, taking into account Recommendation No. 98 (2002) of the Standing Committee of the Bern Convention - especially item 3 - (Recommendation No. 98 (2002) of the Standing Committee, adopted on 5 December 2002, on the project to build a motorway through the Kresna gorge (Bulgaria); the requirement of item 3.2, bullet 7 of the EIA Decision, which outlines the possibility of “future research and design of options similar to the presented alternatives east of the gorge and Tisata Nature Reserve.”

In compliance with this requirement as part of the EIA procedure NCSIP is looking into two eastern alternatives (developed earlier) and a new western alternative (developed in 2015). All three alternatives are located outside Kresna gorge.

In evaluating the alternatives a number of parameters have to be taken into account, including financial. This is in compliance with the requirement of 2008 EIA Decision, and namely condition 3.2 for the section Krupnik-Kresna (the region of Kresna gorge), which states:

- “parallel with the development of purple (tunnel) option investigate possibilities to improve [the preferred alternative] and come to the best possible environmentally acceptable, technically feasible and economically viable option;

- to design with priority the route in the section in order to avoid it remaining at a “*do nothing*” state when other sections of the motorway have already been made operational.”

Since the construction of Struma Motorway is financed under OPTTI the project as a whole must meet a number of requirements, which in addition to environmental include technical and economic criteria. If a project is technically and/or economically unfeasible legally it cannot be financed regardless of its environmental properties. (more details are presented in Chapter 3 above)

As of November the ToR for scope and content of the EIA have been developed and have been presented for consultations with specialised agencies, representatives of the affected communities, as well as various other stakeholders, including NGOs. The ToR is publicly available on the website of the project developer (NCSIP) and has been forwarded to 42 organisations for consultations - Ministry of Agriculture and Food, the Executive Forest Agency, Ministry of Culture, Ministry of Energy, Ministry of Defence, Ministry of Interior, RIA, National Company Railway Infrastructure, the affected municipalities and town councils, environmental NGOs, the Bulgarian Academy of Science, utility companies (electricity, gas, telecommunications, owners of engineering networks), etc.

The information which will be received during the consultations will be used to supplement, if necessary, the ToR. NCSIP will consult the amended ToR with the competent environmental authority (MoEW) and the Ministry of Health, then will finalise the document.

The comments which will be received will be used to develop the EIA report. The report will be in compliance with the requirements and measures described in the EIA Decision No. 1-1/2010 of MoEW regarding the Bulgarian General Transport Master Plan as well as Environmental Assessment statement No. 10-6/2014 of MoEW, regarding OPTTI 2014-2020.

Furthermore, MoEW letter ref. OBOC-85 dated 13 May 2015 requires that an Appropriateness Assessment for the project is prepared in relation to:

- BG0002003 “Kresna” for preservation of wild birds, declared with Order No. ПД-748 dated 24 October 2008 (State Gazette 97/2008) of the Minister of Environment and Water;
- BG0000366 “Kresna-Ilindentsi” for preservation of natural habitats and of wild flora and fauna included in the list of protected areas adopted by the Council of Ministers by Decision No. 122 dated 02 March 2007 (State Gazette 21/2007), as amended by Council of Ministers by Decision No. 811/2010 (State Gazette 96/2010).

The following impacts are to be evaluated within the AA report:

- On species composition, population, structure and density of the populations of animal species subject to preservation as a result of the construction site, the increase in noise during construction and operation of the generated pollution emissions from car traffic, waste generation and pollution watercourses, etc., such as:
 - destruction and damage to the habitat (breeding and feeding), including transformation, resulting in enhanced anthropogenic pressure;
 - mortality of individuals during construction and operation;
 - expulsion of animals from their typical habitats, as a result of anxiety, noise and anthropogenic pressure.
- On habitat types and plant species subject to preservation (resulting in destruction, damage, transformation, fragmentation), as a result of construction and operation, including the generated traffic vehicle pollution emissions and waste.
- On species composition, population, structure and density of populations of bird species subject to preservation as a result of construction and operation, such as:
 - destruction and damage to nesting and foraging habitats, including transformation, resulting from enhanced anthropogenic pressure;
 - mortality of individuals during construction and operation;

- expulsion of animals from their typical habitats as a result of anxiety, noise and anthropogenic pressure;
 - “barrier effect” in various types of migratory movements (food, breeding, seasonal, vertical and horizontal) and disruption of wildlife corridors of importance for the species causing mortality on the road.
- Upon the construction of temporary roads and approaches to the main route and its alternatives, accompanying road facilities (engineering structures, buildings, road drainage systems, retaining walls, correction of riverbeds, sites for storage of construction materials, spoil and others), as well as visualising on a map on an appropriate scale. The impacts of intermediate access facilities, power and water supply with water for technological needs must be assessed.
- As a result of the cumulative impact of the project and other initiatives which are planned/approved but not realised to date or other investment proposals, plans, programs, projects, including the sections of Lot 3.1, Lot 3.3.

Once developed the EIA and AA reports will be submitted to the MoEW for quality assessment. Upon receiving a positive assessment of the quality of the two reports, NCSIP will organise and conduct public consultation. After the public consultation is completed and the results from it reflected in the reports the documents will be reviewed by the Supreme Expert Environmental Council at the MoEW.

The procedure ends with the issuance of a decision of the Minister of Environment and Water based on the decision of the Expert Council. The decision of the Minister of Environment and Water is subject to appeal.

5. IMPLEMENTATION OF RECOMMENDATION NO. 98

Various events and studies have taken place since 2002. This chapter presents the items of Recommendation No. 98 and explains how each of them has been addressed. Most of the recommendations have a continuous effect and clarification is provided as to how the authorities intend to keep following them.

1. *take account, in the development of the project, of the imperatives of conserving fauna, flora and habitats as well as the concerns of the local communities in the municipalities concerned;*

When planning and developing the project to date all imperatives for conserving the flora, fauna and habitats in the Kresna gorge have been observed. Guided namely by those imperatives, the competent authorities have carried out studies to identify the geological, environmental, hydrogeological, geotechnical, seismo-tectonic, engineering and radioactivity impact of the LTA. The studies outlined a number of safety and environmental problems, which would occur with the implementation of the EIA approved LTA.

The imperatives of conserving fauna, flora and habitats as well as the concerns of the local communities will be taken into account also by the new EIA of the “backup” alternative and the Improved “Backup” alternative. In the course of the initiated EIA procedure of the “backup” alternative and the improved “backup” alternative the imperatives for conserving fauna, flora and habitats, envisaged in the Birds Directive and the Habitats Directive, which have been fully transposed in Bulgarian legislation, will be strictly observed.

In view of the above, if in the course of the new EIA procedure it is attested that the “backup” alternatives contravenes these imperatives for conserving the flora, fauna and habitats within the Kresna gorge or may endanger the local communities, the EIA will be negative and these newly developed alternatives will have to be rejected.

2. *ensure that the decision on the routing of the motorway is taken on the basis of an in-depth environmental impact assessment (EIA) supplemented by scientific and mapping data and any other useful source of knowledge on the area concerned by the project, to justify the choice of alternative as recommended in the expert’s report*

The final decision on the alignment of the motorway will be taken on the basis of an in-depth EIA. As noted in item 4.4, the EIA carried out in 2007 turned out to be based on very limited technical and environmental information. Therefore, the problems and risks related to the implementation of the preferred LTA identified later have not been taken into account at the time the EIA was issued.

In accordance with environmental legislation the project alternatives will be subject to a new in-depth EIA and AA. As detailed in item 4.4 MoEW has instructed NCSIP on specific issues that need to be analysed in the EIA/AA reports.

The EIA of the newly developed alternative will be based also on analysis of scientific and mapping data collected in the course of the previous studies in the area, as well as such data collected by the new EIA procedure.

In the preparation of the assessments the following conditions related to the data to be used must be observed:

- The most detailed and reliable information possible must be used. More specifically this includes:
 - The results of MoEW's assignment for "Mapping and determination of the conservation status of habitats and species - Phase I" which provides up-to-date digital data of the distribution and conservation status, digital models in GIS format, etc.;
 - Data obtained through consultations, including with non-governmental environmental organisations;
 - Own field research conducted by the team of independent experts preparing the assessments;
 - Environmental baseline data gathered by the project developer in the period 2012-2015.
- Use quantitative estimates of expected losses or deterioration of habitats (area) and species (number and density of population), subject to preservation, both in terms of the representation of the habitat/species in a protected area, and in the entire network of protected areas.
- Provide maps on appropriate scales, on paper and in digital form of all the elements of the investment proposal (coordinates of the alternatives and the preferred alternative with all the facilities and elements) to the affected protected areas and against the natural habitat types and habitats of species falling under the impact.

As a result of the assessment specifics, enforceable and verifiable mitigation measures must be proposed. The measures should reflect the specifics of the affected protected areas, objective and purpose of protecting them and elements of the project and comply with the identified impacts. Alternative solutions related to different location of the alignment and technical parameters must be examined.

3. *consider the possibility of abandoning the option of enlarging the current road since this would substantially increase damage to a unique site, without possible measures of compensation, and continue studying alternative routes outside the gorge that would respect the natural constraints as far as possible and provide for the integration of engineering works and compensate for environmental impact;*

With view to abandoning the option of enlarging the current road, by way of the 2008 EIA Decision the Long Tunnel Alternative was approved. However, in the course of the studies carried out afterwards were identified a number of potential environmental problems that may occur with the implementation of this alternative. It was found that contrary to the initial evaluation, the Long Tunnel Alternative does not provide efficient safety for the people and protection against environmental damages to the site of the Kresna gorge.

These findings have therefore made it necessary to develop new alternatives for the construction of the motorway. These newly developed alternatives have not yet been evaluated from environmental aspect. As specified above, with the new EIA of these alternatives will be taken into account all possible environmental impacts of the construction and further maintenance of the motorway, as the EIA may approve the proposed "backup" alternative, respectively improved "backup" alternative only in case they comply with the statutory requirements for environmental protection.

4. *ensure that the choice of alternative is based not only on technical, legal and economic criteria but also on social and ecological criteria;*

In preparing the documentation for EIA and AA of 2007 and at the time of the 2008 EIA Decision the LTA was developed based on insufficiently detailed technical information. The level of detail of the information available for the LTA and the other alternatives was not comparable. The manner of construction of the tunnel in the region of Kresna gorge and the impact during operation of the tunnel have not been studied and evaluated.

These shortcomings of the EIA/AA reports have been confirmed by JASPERS in the Environmental Strategy for Struma Motorway, Lot 3, prepared in 2012. The strategy recommended assessing the impacts on the following limiting environmental factors when a preliminary design is ready:

- residential areas / single houses of noise and emissions - when influenced by the places where construction works and other activities in the area are performed;
- residential areas/single houses of noise and emissions - when influenced by the transport routes (for excavated rock fill from the tunnels and construction activities);
- Natura 2000 sites, including protected areas and habitats for endangered species and birds;
- other protected areas under the Protected Areas Act;
- hydrogeological and water rationing below and at the surface of the surrounding terrain, including springs, protected water areas and water catchment areas for drinking water;
- existing watercourses, including the potential reduction of the drainage capacity in the floodplains along the rivers;
- landscape, including visual impact;
- cultural heritage.

It is recommended to analyse the environmental impacts of the technical proposals from the preliminary design by criteria (limiting environmental factors), identify unacceptable impacts and propose workable and controllable measures for their mitigation. As a result of this analysis, the environmental risk of project decision is to be assessed and a proposal for the development of the next stage of design or development of an alternative solution to be made.

The Environmental Strategy for Struma Motorway, Lot 3 and the recommendations made therein are the basis for evaluation criteria developed by NCSIP's Environmental Consultant for Lot 3.

Based on the data available in September 2014 and using as a basis the limiting environmental factors from the JASPERS Environmental Strategy quantitative and qualitative criteria of the designated "limiting factors on the environment" and specific impacts during construction and operation of the motorway in the Kresna gorge have been proposed with the purpose to:

- analyse the environmental impacts of technical proposals from the design of the LTA;
- identify unacceptable impacts and propose workable and controllable mitigation measures;
- assess the environmental risk of the project decision and make a proposal for the development of the next stage of design or develop an alternative;
- ensure that the alternative solutions are comparable.

The criteria for this initial assessment of the effects on the environmental constraints, attributable to Struma Motorway in the Kresna gorge region can be summarised in the following groups:

- Affected surface areas;
 - areas for the permanent works – total area;
 - areas for construction sites - sites (number); total area; permanent and temporary change of the use;

- areas for the temporary roads during construction - roads (total length); total area;
- areas for the temporary disposal of soil and rock materials – sites (number, total area);
- areas for the permanent disposal of soil and rock materials – sites (number, total area); capacity of each disposal site.
- Affected underground space
 - depth and volume of the excavated rock materials;
 - restrictions of the use of the surface areas because of tunnels.
- Effects on protected areas and territories
 - affected protected areas (directly and permanently/directly and temporarily; indirectly and permanently/indirectly and temporarily);
 - affected areas of the protected areas (directly and permanently/directly and temporarily; indirectly and permanently/indirectly and temporarily) (area and % of the protected areas);
 - affected areas of habitats subject to preservation in the protected areas (directly and permanently/directly and temporarily; indirectly and permanently/indirectly and temporarily) (number and area/% of the dissemination of the habitats in the protected areas);
 - fragmentation of habitats subject to preservation;
 - affected areas of habitats of species subject to preservation in the protected areas (directly and permanently/directly and temporarily; indirectly and permanently/indirectly and temporarily) (number and area/% of the habitats of the species in the protected area);
 - fragmentation of the habitats of species subject to preservation in the protected area;
 - mortality risk for species representatives subject to preservation in the protected area during the construction/operation of the project.
- Nuisance for the population - permanent inhabitants
 - residential areas/separate houses – residential buildings (number); distance to a construction site (m); estimated level of noise (dBA) reaching residential areas; estimated concentrations of dust (PM10), nitrogen oxides (NOx) and carbon monoxide (CO) in the air (mg/m3); duration of construction;
 - residential areas/separate houses – residential buildings (number); distance to transportation routes (m); estimated level of noise (dBA) reaching residential areas; estimated concentrations of dust (PM10), nitrogen oxides (NOx) and carbon monoxide (CO) in the air (mg/m3); duration of construction.
- Nuisance for the temporary residents and for the users of the existing roads (main and secondary)
 - usual traffic;
 - forecasted traffic together with traffic generated by construction;
 - duration of construction.
- Waste
 - construction waste – residual soil and rock materials from the construction of the project and disposal sites.
- Water
 - affected underground water sources – description and state; risks from pollution during construction or operation;
 - affected surface water bodies – description and state; risks from pollution during construction or operation;

- potential reduction of storage volumes in flood plains on the river valleys;
 - quantity of water for technological needs during construction (l/s); water sources;
 - quantity of water for hygiene needs and domestic purposes for the servicing sites (l/s); water sources;
 - affected territories with flood risk - area and level of the risk;
 - expected quantities (estimated water-flow in tunnels (l/s/m')) and composition of drainage water and expected quantity and quality of waste waters; waste waters treatment facilities; points of discharge of waste water;
 - affected household water sources, availability of protected water areas, risks from pollution during the construction or operation.
- Landscape, including visual impact (quality assessment)
- Cultural heritage.

Applying this evaluation framework, together with other research, several significant problems with the LTA have been identified, namely:

- the need for large areas for storage of earth and rock excavated fill;
- the need to build a large number of temporary roads within the protected Natura 2000 sites;
- passage of heavy construction equipment in the gorge during construction for a very long period, which also increased discomfort and increased risk of accidents for passing cars, increasing the risk of mortality of species of vertebrates;
- the need for completion of the construction in a particular segment of time (until the end of the programming period 2014 to 2020);
- major investment costs;
- extreme energy requirements and high cost of operation and maintenance;
- significant geological risks (the region of Kresna gorge is one of the most seismically active in the country);
- problematic economic efficiency preventing the project from being funded; and others.

The main results of the preliminary analysis are summarised below:

- very large volumes of excavation and related areas of landfills and temporary roads - expected volume of excavated rock is about 5.9 million m³;
- an increase of about 25% of the traffic of heavy trucks through the gorge during construction, i.e. for a period of no less than 6-7 years;
- a need for a minimum of three intermediate access routes for digging the tunnel so that it can be implemented within the program period that will create even greater traffic problems associated with the safe exit of heavy equipment on the existing road I-1;
- it is well known that the tunnel is the most seismically active area of the country, after the additional geological studies and investigations proved that seismic and general geological risk are significant;
- after the geological studies it was found that drainage water from the tunnel will be about 11 000 m³ per day. Apart from being a purely technical problem, this is also an environmental issue as far as is expected to result in the drying up of the surface of the "Tisata" nature preserve, and at the confluence of waters in the Struma River.
- research done on samples of water taken from underground waters shows excessive content of radioactive elements (radon, radium and uranium), which would hamper significantly the management of the formed large amounts of excavated earth and rock and is a significant limiting

factor in their treatment from an environmental point of view. Lack of available facilities nationwide for disposal of this type of waste would involve substantial risks to the environment and human health, including the economic viability of the project;

- in the conclusions of several investigations (BAS, Bulgarian seismologists and international experts) serious reservations about the construction of a very long tunnel in the gorge have been expressed, as serious problems during the construction and risks during operation are to be expected;
- the adoption of the new guide for preparing CBA of the European Commission to justify the financing of large investment projects has the economic cost of time greatly reduced. This makes the project for the construction of Lot 1, 2, 4 and Lot 3 Long Tunnel economically unfeasible. Under the rules of the OPTTI economically unfeasible projects may not receive funding from the European Commission, i.e. cannot be implemented.

In relation to this and after consulting the MoEW in early 2014 the MRDPW instructed NCSIP to develop additional alternatives in the area of Kresna gorge. As described in the previous items the new alternatives will be evaluated thoroughly using a similar approach as part of the EIA/AA procedure.

5. *institutionalise dialogue and seek consensus solutions with the different partners concerned; active partnership could be forged with non-governmental organisations with sound knowledge of the location of habitats and the presence of protected species, and setting up of advisory groups could be envisaged;*

For the implementation of this particular recommendation, by Order No. ПД-02-14-2857 dated 29 November 2012 of the Minister of Regional Development and Public Works a Struma Motorway Monitoring Committee has been established.

The committee is co-chaired by the Chairman of the Management Board of RIA, which is responsible for the design and construction of Lots 1, 2 and 4, and the Executive Director of NCSIP, which is responsible for the design and construction of Lot 3 of Struma Motorway.

Also represented in the committee are the MoEW, Ministry of Transport, Information Technology and Communications, MRDPW, Ministry of Finance, municipal administrations, Association Transparency International, non-government environmental organisations - Balkani Wildlife Society, Bulgarian Society for Protection of Birds, Green Policy Institute, Centre for Environmental Information and Education and others.

The Committee has a monitoring function and its main activity being to acquaint the representatives of various authorities and NGOs with the implementation of Struma Motorway. The main objectives are to ensure a maximum degree of transparency, information dissemination and efficiency in the overall development and successful completion of the infrastructure project.

Since its establishment the committee has held 14 meetings (documented in 14 Minutes), during which the management teams of the projects have provided the members with detailed information on the progress of each of the four Lots, as well as official documents. (A summary is presented in item 4.3)

6. *provide for the downscaling and rehabilitation of the existing road, restoring its initial status of a local group used by the farming community and tourists and thus ease current pressure on the site, with suitable planning to revitalise damaged areas and provide user information services;*

It must be noted that the existing road E79 has never had the status of a local road used predominantly by farming community and tourists. Road E79 is part of the core trans-European transport network – formerly corridor IV and at present Orient/East-Mediterranean Corridor. As evident from the national traffic counts this route has the highest volume of traffic in Bulgaria in north-south direction. A large proportion of the traffic along the road is transit and the share of heavy goods vehicles is also very high. The road is the only feasible link between the western parts of Greece and Bulgaria and Romania.

It would appear that the recommendation had been drafted without consideration of the status and importance of the existing road. Finally, as detailed in item 3.8, the road would remain in heavy use even if a long tunnel was built parallel to it.

Figure 10. Core and comprehensive TEN-T network



7. *establish periodic site assessments (Kresna gorge and motorway route), providing, as soon as the EIA is produced, the mapping and biological inventories necessary for long-term bio-monitoring;*

With the purpose to implement this recommendation MoEW has instructed NCSIP in 2013 to undertake the following actions:

- Perform *traffic monitoring* on the sections of the existing road E79 going through protected areas SPABG0002003 “Kresna” and SCIBG0000366 “Kresna – Ilindentsi”, in order to register the number, type and speed of the passing vehicles;
- Perform monitoring of the *mortality rates* of wild animal species in the section of road E79, passing through protected areas SPABG0002003 “Kresna” and SCIBG0000366 “Kresna – Ilindentsi”. The main purpose of the monitoring is to identify the separate specimens’ mortality in the section of the road leading through Kresna gorge and passing through both protected areas along with its impact on the species populations.

The traffic monitoring is being carried out 24/7 since 2013 and annual reports have been published by NCSIP.

With regard to the mortality monitoring, the length of the section being monitored is 15 950 m. The starting point (the Northern end of the gorge) is about 1 350 m after the junction for Krupnik village, with GPS coordinates N 410 50,702', E 023008,777', while the end point is at the first house in Kresna village – GPS coordinates N 410 43,743', E 023009,162'. The height above sea level is from 280 to 185 m.

The monitoring has been performed in two time spans (spring-summer and autumn-winter period), each comprising 8 weeks, within the following four sub-periods:

- Spring season (March 15 – May 15);
- Summer season (May 15 – July 15);
- Autumn season (September 1 – October 31);
- Winter season (December 1 – January 31).

Each week all dead animal specimens on road E79, in the Kresna gorge section are being registered. The monitoring covers all classes of subphylum vertebrate – amphibians, reptiles, birds and mammals and their mortality as a result of the vehicle traffic. The registration of the animal species is performed along the length of the whole alignment, without concentrating on specific randomly chosen sections. Data collection is carried out by at least three experts trained in advance going over the whole section in both traffic directions. Additional control monitoring is performed once per every sub-span (season) for five consecutive days.

In order to establish a possible correlation between traffic intensity and mortality rate, collection of data could be performed within different spans during daytime (e.g. 7-9 h, 9-11 h, 11-13 h, 13-15 h and 15-17 h), at separate randomly chosen sections with length 1 km, where for five consecutive days constant daily monitoring is carried out.

Field survey method: Several trained experts (three to five people) go over the whole section in both traffic directions. The whole section is divided into sub-sections with average length of 3-5 km and one person covers one sub-section in one direction.

For all dead animals along the road is registered their species, sex, age, direction of movement and precise location on the road or the road shoulder. For each specimen are written down the precise GPS coordinates and is subsequently marked on a map. Furthermore is registered the kilometrical position with precision up to 0.1 km, measured from the Northern end of the gorge (Krupnik village side) and distance from the closest road structure (tunnel, culvert, bridge, junction, roadside fountain, etc.). All data is recorded in a special field survey developed for the purpose.

There is an obligation to register whether the relevant dead animal is subject of protection and conservation in one of the two protected areas.

In order to avoid repeated registration of dead specimens they are marked with colour spray at the time of their encountering, with the colour and the shape of the marking being recorded in the relevant field survey form.

The specific tasks set for achieving the main objective are as follows:

- Performing of mortality assessment of each species' specimens killed on the road by a passing vehicle.
- Establishment of the separate species' percentage of the total number of dead animals.
- Establishment of the abundance or frequency of encountering among the collected data samples, along with the share of the relevant class – amphibians, reptiles, birds and mammals.
- Establishment of the estimated age (when it can be determined).
- Analysis of the mortality dynamics during the different months and seasons.

- To the extent to which it is possible, reaching conclusions regarding the populations' abundance in the vicinity of the road.
- Assessment of the mortality rate of the species subject to protection and conservation in both protected areas BG0002003 "Kresna" for conservation of wild birds and BG0000366 "Kresna – Ilindentsi" for conservation of natural habitats and the wild flora and fauna, along with analysis of its impact on the populations in the relevant protected areas.
- To the extent to which it is possible, assessment of the actual mortality rate of the animal species in the monitored section of the road and the time they have survived on the traffic lane.
- Comparison and analysis of the mortality rate survey data and the vehicle traffic data in the monitored section of the road.
- Identification and proposal, if possible, of mortality mitigation measures on the basis of the collected data.

The study reports (final and interim reports for each field survey season together with the raw data) are published in due time on NCSIP web page and are made available for the general public.

The surveys have been carried out for three consecutive years (2013, 2014 and 2015) and form a good basis for further analysis as part of the EIA/AA for Lot 3.2 as well as other studies. With view to the above, it could be summarised that this recommendation has been implemented with the conducted periodic site assessments in the Kresna gorge region and on the motorway route.

8. *select the zone concerned for the Emerald network, by extending the central site to cover the gorge entrance and exit areas, to take stronger account of the biological functioning of the natural habitats and the connecting areas between the sites (ecological network of core area plus complementary sites)*

The process of creating the ecological network Natura 2000 in Bulgaria started in 2002 with the adoption of the Biodiversity Act, which establishes the norms of both European directives - Directive 92/43/EEC and Directive 2009/147/EC.

According to the Biodiversity Act protected areas are declared in the country as part of the National Ecological Network. These are places of the territory and the waters of the country that meet the criteria for presence of important biodiversity of plant and animal species and habitat types listed in the Annexes of the Habitats Directive and the Birds Directive. Lists of habitats and species, including birds whose habitats are declared protected areas are listed in Annexes 1 and 2 of the Act.

Depending on the specific objectives, methodology and criteria for the designation of protected areas under the two Directives of the European Union (Habitats and Birds) process was divided into two:

- determining the ecological network in its part to protect the habitats of birds as per the Birds Directive;
- determining the ecological network in part on conservation of natural habitats and habitats of species as per the Habitats Directive.

From 2002 to 2006, through the implementation of several projects, a national list of potential sites for inclusion in the Natura 2000 network has been established. The originally proposed list includes 114 protected areas for the preservation of wild birds (Natura 2000 sites under the Birds Directive), covering approximately 23.6% of the country and 225 protected areas for preservation of natural habitats and of wild fauna and flora (Natura 2000 sites under the Habitats Directive), covering approximately 30% of the country.

In 2007 after decisions № 122/02.03.2007, № 661/16.10.2007 and № 802/04.12.2007 of the Council of Ministers of the Republic of Bulgaria, the country presented to the European Commission the national list of potential Natura 2000 sites which include:

- 114 protected areas for the preservation of wild birds, covering 20.4% of the territory of Bulgaria;

- 228 protected areas for the preservation of natural habitats, covering 29.5% of the territory of Bulgaria.

With Decisions of the Council of Ministers № 811/16.11.2010, № 335/26.05.2011, № 660/01.11.2013, № 678/07.11.2013, № 223/04.24.2014 the national list of protected areas is completed and currently includes:

- 119 protected areas for the preservation of wild birds, covering 22.7% of the territory of Bulgaria.
- 234 protected areas for the preservation of natural habitats and wild fauna and flora, covering 30% of the territory of Bulgaria.

A total of 340 protected areas from Natura 2000, covering 34.4% of the country (for 13 areas the scope in both Directives matches).

Currently the network of protected areas is almost completely built by national lists of protected areas established by the Council of Ministers and the European Commission. The process of preparing and issuing the orders for declaring protected areas for the conservation of wild birds is completed and the issuing of orders declaring protected areas for habitat is forthcoming.

In the course of these procedures the entire territory of the gorge, including the entrance and exit of the gorge, is designated Natura 2000 site under Directive 92/43/ EEC - BG0000366 "Kresna-Ilindentsi" and Directive 2009/147/EC - BG0002003 "Kresna" and special attention is given to the biological functions of natural habitats and the connecting areas between the zones:

- protected area for wild birds BG0002003 "Kresna" is included in the list of protected areas adopted by Decision № 122/02.03.2007 of the Council of Ministers and announced by Order № ПД-748 from 24.10.2008 of the Minister of Environment and Water, with a total area of 23,496 hectares.
- protected area for preservation of natural habitats and of wild fauna and flora BG0000366 "Kresna-Ilindentsi" is included in the list of protected areas adopted by Decision № 122/02.03.2007 of the Council of Ministers, as amended by Decision № 811/16.11.2010, with a total area of 48,596 hectares.

To ensure the preservation of natural habitats and habitats of species subject to preservation in protected areas, the plans, programs, projects and investment intentions that may, alone or in combination with others, have a significant negative impact, shall be assessed for compatibility with the object and purpose of the preservation of the protected area. The conditions and procedures for the assessment of conformity are regulated by the Ordinance on the terms and conditions for assessing the compatibility of plans, programs, projects and investment proposals with the object and purpose of preservation of protected areas.

Detailed information and public access to data on protected areas, procedures for assessment and related documents are available on the website of the Information System for protected areas of ecological network Natura 2000 <http://natura2000.moew.government.bg>.

The public administration system provides access to information on protected areas by selection from a dynamic map or through a specialised search engine. The latter allows for the search of protected areas by name, code, type, location, and species and habitats, subject to preservation in the areas.

The users are provided with access to an extensive set of data and documents for each of the protected areas, including:

- Order issued for the proclamation of the protected area and its attachments;
- Standard form for Natura 2000;
- Purpose and preservation objectives of the protected area;
- Chronological presentation of the procedure for proposing and approving the protected area and related documents;

- Digital boundaries of the protected area in different formats and coordinate systems;
- Other data related to the protected area;
- Preview of the boundaries of the protected area on the Web GIS map.

The public administration system provides access to information on the procedures for assessing the compatibility of plans, programs, projects and investment proposals with the object and purpose of preserving protected areas, providing search capabilities by competent authority, type of procedure and location.

Users are provided with information on the characteristics and location of the investment proposals, plans, programs and projects submitted for compatibility assessment and the decisions of the competent authority proceedings.

9. *ensure that adequate legal protection is given to the whole of the gorge site and its development areas*

Bulgaria is a party to the Bern Convention and as a member of the EU it has duly transposed the provisions of Directive 2009/147/EC on the conservation of wild birds of 30 November 2009 and Directive 92/43/EEC of 31 May 1992 on the conservation of natural habitats and wild fauna.

In this regard, in the policies for planning and development, the requirements for preservation of protected areas are taken into account so as to prevent or reduce as far as possible the deterioration of these areas.

The route of Lot 3.2 is close to the national protected territories, namely:

- Protected Area "Kresna gorge" declared buffer zone of the Tisata nature preserve by Order No. 130 dated 22 February 1985, as amended by Decree No. 844 dated 31 October 1991, and the re-categorised as protected area by Order No. 56 dated 30 January 2008 of the Minister of Environment and Water;
- Tisata nature reserve declared by Decree No. 6663 dated 05 December 1949 of the Ministry of Forestry, the Order No. 440 dated 09 December 1977, and the Order No. 844 dated 31 October 1991 of the Minister of Environment for alteration of the area size and protection of the only compact field of juniper and Mediterranean plant associations in Bulgaria;
- Protected area "Moravska" declared a natural landmark by Decree No. 133 dated 22 February 1985, and re-categorised as a protected area by Order No. 727 of 28 September 1991 of the Minister of Environment, in order to protect relict Mediterranean vegetation mainly consisting of juniper.

Lot 3.2 passes through Natura 2000 protected areas, as follows:

- Protected Area "Kresna-Ilindentsi" with identification code BG0000366 established with Directive 92/43/EEC on the preservation of natural habitats and of wild flora and fauna;
- Protected Area "Kresna" with identification code BG0002003 established with Directive 2009/147/EC on the protection of wild birds.

The territory of protected areas for the preservation of natural habitats and of wild flora and fauna and for the preservation of wild birds overlap (the area of the zone for habitats is two times greater than the area of the zone for birds) in such a way that the above-mentioned three national protected areas are within their Natura 2000 borders.

Various environmental protection measures have been imposed within the protected territories to ensure the preservation of the natural and biological diversity and minimise harmful environmental impacts over these sites.

6. COMMENTS ON THE COMPLAINT FROM NGOS

6.1 General

The proposed alternatives through Kresna gorge – the “backup” and improved “backup” alternatives, have width of 20 m (2 x 10 m) and are not, contrary to what is stated in the complaint, 4 lane motorways. These are completely new technical solutions that do not coincide with the SPEA Green motorway alternative, which has been evaluated under the EIA/AA procedure from 2007.

With regard to the requested urgent need for the Standing Committee to act “*because of the recent negative decisions of the Bulgarian Government, which seriously violate Recommendation No. 98 (2002)*” it must be pointed out that to this end there are no formal and/or final decisions taken by the authorities which are yet to be elaborated in close cooperation with the EC Services. An EIA/AA procedure is on-going and at the time of drafting of this report there are consultations with the public regarding the scope of the EIA/AA procedure being carried out. The draft scope of the procedure is publically available on the web-site of the developer (the NCSIP; www.ncsip.bg) and has been forwarded to 42 organisations – municipalities, various public organisations, environmental NGOs, the Bulgarian Academy of Science, etc.

It must be noted that environmental NGOs (including some of the NGOs that have signed the complaint) are participants in Struma Motorway Monitoring Committee. The Bulgarian government has ratified the Aarhus Convention on access to environmental information. As such, they have access to first-hand information regarding the development of the project and should have presented their concerns for discussion at the meetings of the Committee. It also appears odd that the role of the Committee is not mentioned in the complaint.

6.2 Cumulative Effects

The complaint claims that there is a “*strong cumulative impact*” of Lots 1, 2 and 4 being operational. The 24/7 traffic counts carried out by NCSIP demonstrate that there has been no increase of the traffic in Kresna gorge since Lots 1, 2 and 4 have been made operational. Actually the counted traffic appears to be less than what was forecasted in 2010. As noted in item 2.1 of this report the average annual daily traffic for 2014 and 2015 has been measured to amount to about 8 000 vehicles which is lower than the 9 000 vehicles forecasted for 2015. Furthermore, no plans for other development of the affected areas have been foreseen by the Bulgarian authorities for the purpose of keeping the gorge in its present condition.

The claim that the protected area “Kresna-Ilindentsi” with a total area of 486 000 daa has been irreparably damaged – more so by the existing road - seems to be ill founded as long as no evidence whatsoever has been quoted to support it.

6.3 Mortality of Wild Animals

The complaint lacks details regarding numbers of the populations and the specific species that have supposedly been made extinct near the existing road in Kresna gorge. At the national level such data does not exist and it must also be noted that, apart from the existing road E79, a natural divider such as the Struma River had existed long before the definition of Natura 2000 in Bulgaria. The mortality of specimens of a given species can reduce the population but could not destroy the population unless most specimens migrate across the existing road and most of them get killed by traffic.

The complaint includes information related to mortality surveys supposedly carried out in 2003. It must be noted that the methodology of such studies or detailed data have never been presented by the NGOs to the scientific community, the authorities or Struma Motorway Monitoring Committee. In 2012-2013 NCSIP had requested that both the methodology and raw data be provided, so that it could develop a methodology for monitoring the mortality of wild animals in Kresna gorge in accordance

with previous work done. Methodology and data have never been made available; hence NCSIP developed a methodology for monitoring the mortality rates and has consistently applied it since 2013 to date⁸.

A basic scientific principle is that the data must be verifiable. The results from the so-called “surveys” from 2003 have not been filed, interpreted, analysed or discussed and have not been formally presented to, and reviewed by, the Bulgarian authorities or the scientific community. The systematic character of the data collecting methods is also questionable due to the fact that all data has been obtained within a few months and the majority of it has not been verified in the next 10 years. This renders the credibility and adequacy of the collected data extremely questionable and without any scientific value. Furthermore, it has not been published, which means that its value and reliability have not been reviewed and assessed by relevant experts. As such, the survey data is practically useless, since its credibility and systematic character have not been verified.

With regard to the species status assessment presented in the complaint, it should be noted that such method of analysis is completely compromised and unfounded. The approach is unscientific and the conclusions are unreasonable and invalid due to the source data unreliability and the total lack of information on the used reference materials and comparative analysis methods. The presented reasoning comprises personal statements of the authors, which in no case should be regarded as scientifically objective or grounded.

6.4 EIA Procedure from 2007

The complaint mentions an alternative “*tunnels with five small viaducts*” and suggests it was considered acceptable with view to the environmental impacts on Natura 2000. It must be noted that this alternative has been reviewed in the AA from 2007 only with regard to the habitats and the species, but not to the birds, and is completely missing from the EIA Report. A critical review of this alternative will demonstrate that it will not have less negative impacts, neither from environmental, nor from construction method point of view. No assessment of the construction method, work safety or the negative impacts of the alternative as a whole has been carried out. In any case, the alignment will lead to a higher altitude in the gorge and the impacts on the vegetation, especially at the tunnel entrances and exits have not been assessed, will make its environmental expediency questionable.

With regard to the claimed high mortality rates of reptiles on the existing road, it must be noted that data presented by environmental NGOs in 2007 shows otherwise. For example the mortality rates of the leopard snake and the four-lined snake are noted as low and it is explained that both species are rare and populate areas far from the existing road.

Furthermore, it has been reported (again by environmental NGOs) that the eastern alternatives bypassing Kresna gorge affect directly and negatively various reptiles, more specifically it is stated that:

- *Elaphe situla* (leopard snake) – the species is present throughout the whole Kresna Gorge. In the Southern part it appears at altitudes up to 400 m above sea level, while in the Northern part has not been found outside the lowest parts of the valley. In general it is encountered in relative proximity to gullies, rivers, etc. Furthermore a tendency has been established that the species is found in vicinity of small irrigation channels used by the local people, and when they run dry, it disappears. Along with that the species is thermophilic with Mediterranean origin and needs warm xerothermic slopes. Thus are formed several essential linear structures, which determine the quality of all its habitats – the ecotone between gullies, rivers, channels and the adjacent slopes through which the species apparently performs regular migrations and the habitats in the Struma river valley, which constitute a migration corridor with length appr. 18 km.

An assessment of the species mortality rate along the existing road determines it as low. During the weekly collection sessions has been counted an annual number of appr. 12 specimens,

⁸ The results of the studies, raw data, as well as the methodology for making them, can be found at <https://dms.ncsip.bg/viewProject.jsp?id=8695317172682942324>, <https://dms.ncsip.bg/viewProject.jsp?id=8975652251544103404>, <https://dms.ncsip.bg/viewProject.jsp?id=2312709294471409540>

predominantly young. The eastern alternatives outside the gorge will destroy some small-scale habitats, secondary to the main population habitats in the upper part of the species' distribution near Oshtavska River.

- *Elaphe quatorlineata* (four-lined snake) – the species is present throughout the whole Kresna Gorge. In the Southern part it appears at altitudes up to 600 m above sea level. Similar to the leopard snake is encountered in relative proximity to gullies, rivers and small irrigation channels used by the local people, and when they run dry, it disappears. Along with that the species is thermophilic with Mediterranean origin and needs warm xerothermic slopes. Thus are formed several essential linear structures, which determine the quality of all its habitats – the ecotone between gullies, rivers, channels and the adjacent slopes through which the species apparently performs regular migrations and the habitats in the Struma river valley, which constitute a migration corridor with length of approximately 18 km.

An assessment of the species mortality rate along the existing road determines it as low. During the weekly collection sessions annually have been found separate young specimens. This is the rarest snake species near the road (more frequently are encountered single specimens far from the road). The eastern alternatives outside the gorge will affect some habitats of the species in the valley of Oshtavska River and partially of Vlahinska River. It will have a significant direct impact on the adjacent valleys, but avoids any impact on the bio corridor along Struma River.

7. CONCLUSIONS

Struma Motorway Lot 3 has been the most challenging project in Bulgaria since decades. Numerous risks regarding the implementation of the project have been identified and need to be addressed.

In view of all the arguments laid out above, it should be emphasised in conclusion that presently, all recommendations directed towards the Bulgarian government by way of Recommendation No 98 of the Standing Committee of the Bern Convention have been complied with. We deem that currently, there are no grounds to consider that the Bulgarian government has not complied with the prescriptions of Recommendation No. 98. Moreover, these prescriptions shall undoubtedly be followed in the course of the project for construction of Lot 3.2 of Struma Motorway. All actions taken since 2008 until now prove the willingness of the Bulgarian government to choose the optimal alternative for construction of Lot 3.2 which complies fully with the requirements of the European and national environmental legislation.

As part of the trans-European corridor number IV in the alignment Sofia-Kulata-Thessaloniki, the existing road E79, providing direct route through Bulgaria to the Aegean Sea, is currently the busiest alignment in the country in the north-south direction. The present characteristics of the road do not serve adequately its purpose and pose numerous problems regarding traffic safety, the safety of the citizens of Kresna town and the impact on the environment.

In view of overcoming the identified existing problems over the years, numerous options were developed and evaluated for the construction of Lot 3.2. By way of the 2008 EIA Decision a greater part of these options were discarded, and the Long Tunnel Alternative was approved. In the course of designing the approved Long Tunnel Alternative, however, as well as a result of the scientific studies which took place from 2008 onwards, it was established that the assessment did not rest upon complete information and did not explore in detail important aspects of the project for the construction of Lot 3.2, such as safety of the people using the tunnel, geological hazards and adverse environmental impact. In the course of designing and approving this option, preliminary detailed investigation has not been carried out and insufficiently detailed technical data has been provided. As a result, the potential problems which could arise have not been taken into account in realisation of the Long Tunnel Alternative. The manner in which the construction was to be carried out has not been investigated and evaluated to a sufficient extent under the approved alternative, as well as the environmental impact during the construction and subsequent exploitation of the tunnel.

After adoption of the 2008 EIA Decision, in the course of designing the Long Tunnel Alternative additional investigation was carried out for the purpose of providing detailed information and risk evaluation in realisation of the Long Tunnel Alternative. The in-depth expert investigation established beyond doubt that construction and exploitation of a long tunnel through the Kresna gorge could lead to serious safety problems and considerable adverse impact on the environment which could not be overcome by compensatory measures. In the course of the geological investigations considerable risks in construction of the tunnel were established given the specifics of the gorge as being a seismically active region. In addition, the analysis showed that the project could not meet the new criteria for project funding under OPTTI, since the project would not be economically feasible, also because of the great expenditure for exploitation and maintenance after construction.

In connection to the identified risks, at present there are actions taken for developing and exploring other alternatives for construction of Lot 3.2, for which there will be a new EIA procedure. In the course of this procedure the potential environmental impact of these alternatives shall be explored in detail.

The evaluation of all the alternatives and all the risks shall be carried out based on and in accordance with the applicable national and European environmental legislation. In view of the above, if in the course of the upcoming EIA for the newly developed alternatives for construction of Lot 3.2 it is established that these are not in compliance with the existing ecological provisions, they shall be discarded.

In view of safeguarding the transparency of the process for realisation of the project for construction of Lot 3.2, public hearings are being convened in the municipalities affected by the

construction. Information about the project and the developed alternatives is available within the framework of the Committee in which representatives of the competent ministries, NCSIP and RIA, as well as representatives of environmental NGOs participate. Current information regarding the present state of the project is available at any time on the website of the NCSIP.

We consider that the arguments contained in the Signal by the non-governmental organisations are ill-founded and do not establish violations of Recommendation No. 98 (2002) on the part of the Bulgarian government. Therefore, in light of the above facts, we consider that there are no grounds which give rise to re-opening the case file by the Standing Committee of the Bern Convention.

APPENDIX 1

List of Abbreviations

<i>2008 EIA Decision</i>	The EIA Decision No. 1-1/2008
<i>AADT</i>	Annual average daily traffic
<i>AA Report</i>	Appropriateness assessment report
<i>B/C</i>	Benefit to cost
<i>Birds Directive</i>	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds
<i>CBA</i>	Cost-to-benefit analysis
<i>DCA</i>	Dual carriage alternative
<i>EIA</i>	Environmental impact assessment
<i>EIRR</i>	Economic internal rate of return
<i>ENPV</i>	Expected net present value
<i>HGV</i>	Heavy goods vehicles
<i>Habitats Directive</i>	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
<i>LTA</i>	Long Tunnel alternative
<i>MCA</i>	Multi criteria analysis
<i>MoEW</i>	Ministry of Environment and Water
<i>MRDPW</i>	Ministry of Regional Development and Public Works
<i>NCSIP</i>	National Company Strategic Infrastructure Projects
<i>OPTTI</i>	Operational Program Transport and Transport Infrastructure
<i>RIA</i>	Road Infrastructure Agency
<i>Recommendation No. 98</i>	Recommendation No. 98 of the Standing Committee, adopted on 5 December 2002
<i>The Committee</i>	Struma Motorway Monitoring Committee
<i>ToR</i>	Terms of Reference
<i>VOC</i>	Volatile organic compounds
<i>VoT</i>	Value of Time

APPENDIX 2

List of Expert Studies

1. Expert study by Professor Stefan Shanov dated December 2014 regarding the seismic peril based on seismo-tectonic characteristics of Lot 3.2, alignment “Krupnik-Kresna”, Struma Motorway
2. Expert study by the Bulgarian Academy of Science (Professor Nikolay Dobrev) dated 15 January 2015 regarding engineering-geological conditions of alignment Krupnik-Kresna of Struma Motorway, Lot 3.2
3. Expert study by Professor Ricardo Oliveira and Professor Paul Marinos dated 23 January 2015 regarding Struma Motorway, Lot 3.2, segment “Krupnik.Kresna”. A geological appraisal on the geological and geotechnical conditions of a variant along the Struma gorge
4. Expert study (Summary and Conclusions) by Bondys regarding the analysis and assessment of natural radioactive elements in the terrain of Struma Motorway, Lot 3.2;
5. Expert study by the Bulgarian Academy of Science (Professor Alexey Benderev) dated 09.10.2015 regarding the hydrogeological conditions in the region of Kresna gorge in connection to the construction of tunnels.

APPENDIX 3

Expert Studies

regarding geological, environmental, hydrogeological, geotechnical, seismo-tectonic, engineering, radioactivity impacts of the project

Link where the five studies can be downloaded:

<http://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=090000168048d4fb>

<http://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=090000168048d4fc>

<http://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=090000168048d4fd>

<http://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=090000168048d4fe>

<http://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=090000168048d4ff>