



PUBLIC ENTERPRISE FOR STATE ROADS
Republic of Macedonia



NATIONAL AND REGIONAL ROADS REHABILITATION PROJECT

Final

**Environmental and Social Assessment Report (ESAR) and Environmental
Management Plan (EMP) for rehabilitation of State road A3, Section Resen
- Bukovo**

March 2014



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1. Executive summary and conclusion

Introduction

The Public Enterprise for State Roads (PESR) intends to receive a loan/credit from the World Bank (WB) in relation to the Macedonia Regional and National Roads Rehabilitation Program (year 2014). The sub-projects objective is a rehabilitation of the regional and national roads. One of the Category B sub-projects under the WB project of Regional and National Roads Rehabilitation Program in the Republic of Macedonia is the rehabilitation of the state road A3, Section Bukovo – Resen.

The preparation of an Environmental Impact Assessment Report (EIAR) is an integral part of the overall project documentation to be developed for rehabilitation activities according to the Macedonian legislation in the field of environmental protection, especially the Law on Environment (“Official Gazette of R. Macedonia” no. 53/05, 81/05, 24/07, 159/08, 83/09, 48/10, 124/10, 51/11, 123/12, 93/13 and 187/13)¹. This Environmental Impact Assessment Report should be approved by Administration of Environment within the Ministry of Environment and Physical Planning (MOEPP).

According to the WB policy on Environmental Assessment (OP 4.01), Involuntary Resettlement (OP 4.12), and other environmental and social policies, such projects should be analyzed to determine the potential for negative and positive environmental and social impacts and to avoid, compensate and/or mitigate the adverse negative impacts on the environment.

In order to ensure the environmental compliance of the proposed project and to meet the requirements of the World bank Safeguard Policy OP 4.01 ‘Environmental Assessment, and in accordance with Environmental and Social Management Framework, an Environmental and Social Assessment Report, including Environmental and Social Management Plan (ESMP) is prepared for this subproject.

The proposed rehabilitation activities for the road section Bukovo – Resen are subject for the analysis by this Environmental and Social Assessment Report (ESAR) and ESMP.

The road section Bukovo - Resen has been in function for several decades and it is used as regional and national connection between the city of Resen and the city of Ohrid, which is center of South-Western Planning Region. Visible damages of all kinds (across the length, width, crocodile skins, potholes) are creating problems while driving and therefore it is necessary to carry out their rehabilitation and improvement of road construction elements.

The section Bukovo - Resen, is part of the road A3 which is part of the state road network in Republic of Macedonia and part of SEETO road network (Route 8) and starts at the mountain fold Bukovo (km 28+903 of A3) and ends at the beginning (entrance of) village Jankovec, nearby Resen. The rehabilitation has to be performed on this road with a length of ~ 10,5 km.

¹ Article 24 – Environmental and Social Assessment Report



Potential impacts of the project on the environment and social setting is assessed in this Environmental and Social Assessment Report (ESAR) which is developed to meet the requirements of Macedonian regulations and World Bank Environmental and Social Safeguards.

Conclusion

Based on the results of conducted environmental assessment, it may be stated that the majority of potential environmental impacts from the foreseen road section rehabilitation activities are likely to occur during rehabilitation phase (construction phase) and they will be of temporary nature. Implementation of proper mitigation measures during design and rehabilitation phase will ensure reduction of the adverse project impacts to acceptable levels. The project impact will be insignificant if all proposed mitigation measures and monitoring activities are implemented properly.

Moreover, the rehabilitation of the road section will improve technical conditions of this road and, therefore, will contribute to safe, fast, economic and comfortable road traffic. Transport of people and goods will run better than in the past, thus promoting the trade and economic relations in Resen and neighboring regions, and above all, traffic safety conditions of the population living in this region will be improved.

2. Policy, legal and administrative framework

The Environmental Assessment process is intended to serve as a primary input for the decision making process by Macedonian authorities, which have to approve the project before it can be constructed and operated and by the World Bank, which is providing funding for the project.

Macedonian Framework

Republic of Macedonia has developed full legal and institutional framework for Environmental Assessments. This framework is generally in compliance with the existing WB EA rules and procedures as well as in full compliance with the EU EIA Directives. Environmental Impact Assessment of certain projects is required to be carried out in the Republic of Macedonia in accordance with Articles 76-94 of the Law on Environment ("Official Gazette of the Republic of Macedonia" No. 53/05, 81/05 24/07, 159/08, 83/09, 48/10, 124/10, 51/11, 123/12, 93/13 and 187/13). The types of projects that require an EIA are to be determined in accordance with Article 77 of the Law on Environment, which are specified in details by the Government of the Republic of Macedonia in the "Decree for Determining Projects for which and criteria on the basis of which the screening for an environmental impact assessment shall be carried out" ("Official Gazette of the Republic of Macedonia" No.74/2005).

According to this Decree, **full EIA Study** is not needed (only construction of new highway and national or regional road or widening of existing road with additional two lanes is subject to full EIA Study).

The Ministry of Environment and Physical Planning have prepared Guidance for conducting, screening, scoping and review in environmental impact assessment in the Republic of Macedonia, Report Ref. No.300033-06-RP-325 Skopje 2006. An aim of this Guidance is to assist in the interpretation of the EIA laws so that they can be applied in practice. This Guidance is drawn in part from screening, scoping and review Guidance provided by the



European Commission. It accompanies Republic of Macedonia efforts to implement the EIA Directive and is designed to help investors, bodies of the state administration and other involved parties to undertake the highest standards of environmental impact assessment.

This section Bukovo - Resen is of category covered by Decree amending the Decree for actions and activities for which is obligatory a preparation of an EIA Report and for which approval the Ministry of Environment and Physical Planning is competent authority ("Official Gazette of RM" No.36/12). The Environmental impact assessment report is required to provide identify and describe how the project can have negative and positive impacts on environmental resources – water quality, air, biodiversity etc. and on people – economic status, noise, traffic, etc.

Still, in the phase of Detailed Design, Public Enterprise for State Roads, as Investor, has to initiate the procedure for environmental impact assessment by submitting Letter of Notification of intent to conduct a project to the MoEPP to issue official Decision does EIA Report or all EIA Study is required.

World Bank Environmental and Social Safeguard Policies

World Bank environmental and social safeguard policies are regarded as a corner stone of its support to sustainable poverty reduction. The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for the WB and borrowers in the identification, preparation and implementation of programmes and projects. Environmental Impact Assessment (EIA) is one of 10 environmental, social and legal safeguard policies of the WB. EIA is used in the WB to identify, avoid and/or mitigate the potential negative environmental impacts associated with lending operations. The purpose of EIA is to improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been adequately consulted. The WB's environmental assessment policy and recommended processing are described in **Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment**. This policy is considered to be the 'umbrella' policy for WB environmental 'safeguard policies'.

For the present road section Bukovo - Resen the relevant safeguard policies to be considered at all stages of preparation and planning are:

- Operational Policy on Environmental Assessment (OP 4.01, 1999, revised April, 2013);
- Operational Policy on Physical Cultural Resources (OP 4.11, 2006);
- Operational Policy on Natural Habitats (OP 4.04, 2001);
- Policy on Access to Information (2013).

The WB's requirements on Information Disclosure are detailed in the Access to Information Policy last revised in July 2013. Disclosure Handbook 2002.

The WB OB/BP on Involuntary Resettlement requires WB-assisted projects to avoid or minimize involuntary land taking. If such cannot be avoided, displaced persons need to be meaningfully consulted, compensated for lost/damaged assets and assisted in restoring or improving their living standards and livelihood. The policy requires that if involuntary land taking and resettlement become necessary, a clear plan for compensating and assisting



displaced persons be prepared by the borrower by appraisal for WB review. Such a plan must be substantially completed prior to the commencement of civil works.

The WB OP/BP on Natural Habitats seeks to ensure that WB-supported infrastructure and other development projects take into account the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats can provide to human society. The policy strictly limits the circumstances under which any WB-supported project can damage natural habitats, i.e. such land and water areas where most of the native plant and animal species are still present. Specifically, the policy prohibits WB support for projects which would lead to significant loss or degradation of any Critical Natural Habitats, whose definition includes those natural habitats which are either:

- legally protected;
- officially proposed for protection;
- unprotected but known of high conservation value.

In other (non-critical) natural habitats, WB-supported projects can cause significant loss or degradation only when:

- there are no feasible alternatives to achieve the project's substantial overall net benefits; and
- acceptable mitigation measures, such as compensatory protected areas, are included within the project.

At the Project level, WB seeks to ensure that its lending operations comply with international obligations to protect biodiversity. EIAs for WB should take into account the impacts of proposed projects on a country's biodiversity.

The WB OP/BP on Forestry aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty and encourage economic development. The policy defines a forest as an area of land of not less than 1.0 ha with a tree crown cover (or equivalent stocking level) of more than 10% that has trees with the potential to meet a minimum height of 2 m in situ (in its original position). The WB does not finance projects that, in its opinion, would involve significant conversion or degradation of critical forest areas or related critical natural habitats. Critical forest areas are natural forest lands which are:

- existing protected areas and areas officially proposed by governments as protected areas, areas initially recognized as protected by traditional local communities, and sites that maintain conditions vital for the viability of these protected areas;
- sites identified by WB or an authoritative source, such as areas with known high suitability for biodiversity conservation and areas that are critical for rare, vulnerable, migratory or endangered species.

The WB OP on Cultural Property is based on the acknowledgement of cultural resources as sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. WB policy as stated in Operational Directive (OD) 4.50 is to: (a) assist in



protecting and enhancing cultural property through specific project components and (b) decline to finance projects which significantly damage cultural property, and assist only those that are designed to prevent or minimize such damage.

In accordance with the WB policy on Access to Information, Public Consultations and Disclosure should follow specific procedures: ESAR reports will be presented to both the Government of the Republic of Macedonia and WB Management and serve as a background document for approval by the competent authority. In accordance with OP/BP 4.01, the Borrower will have to make the draft ESAR Report and Land Acquisition Plan (LAP) available in Macedonian at a public place accessible to project-affected groups and local NGOs. The Borrower must also officially transmit the ESAR report and LAP for WB approval. Once the ESAR report and LAP have been locally disclosed and officially received and approved by WB, the WB will also make them available to the public through its Infoshop.

As regards WB's internal ESAR procedure, Environmental Screening is an important step at the stage of project preparation through which proposed projects are attributed to the appropriate extent and type of ESAR. In practice, the significance of impacts, and the selection of screening category accordingly, depends on the type and scale of the project, the location and sensitivity of environmental issues, and the nature and magnitude of the potential impacts.

3. Project description

The section Bukovo - Resen is part of the road A3 which is part of the state road network in Republic of Macedonia and starts at the mountain fold Bukovo (km 28+903 of A3) and ends at the entrance of village Jankovec, nearby Resen. The rehabilitation has to be conducted on this road with a length of ~ 10,5 km.

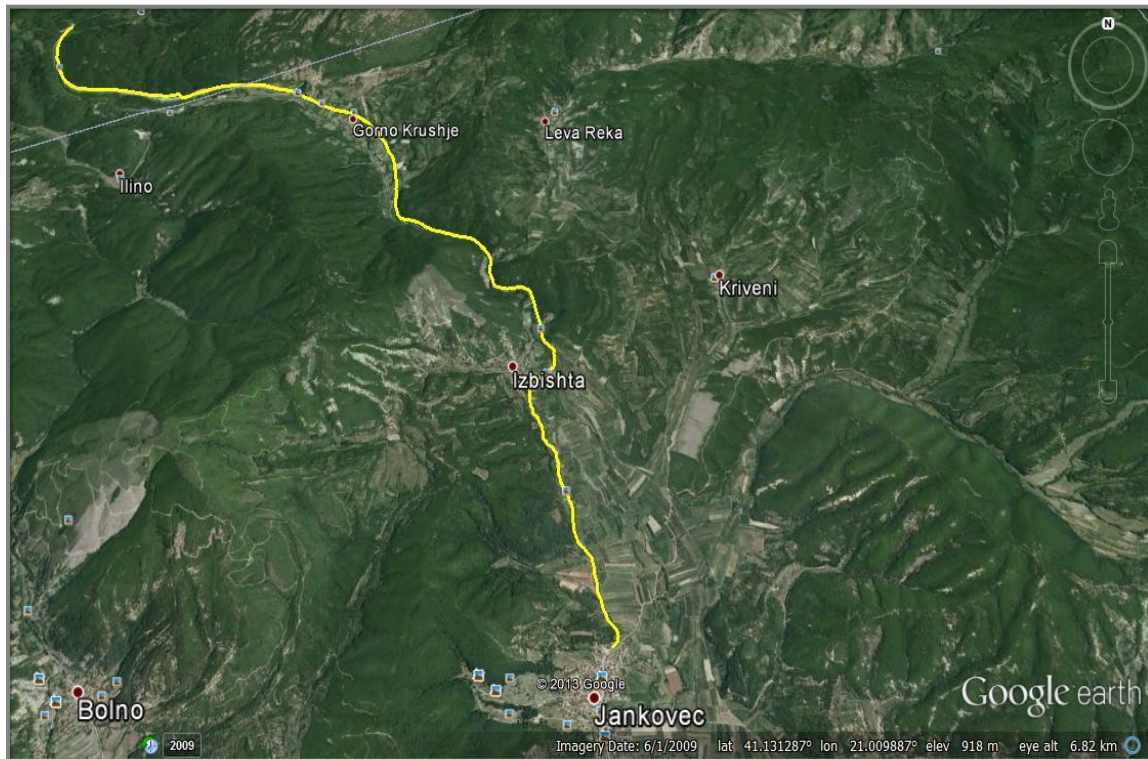


Figure 1 Satellite map of the road (source: Google earth)

The purpose of the design is to obtain optimal technical and financial solution for rehabilitation of the given section.

On the subjected section from the state road A3, section Bukovo - Resen was noted extensive damages along the entire length, and certain moves resulted in extensive network cracks, longitudinal and traverse cracks and rutting. These damages necessitate conducting the rehabilitation of the subjected road. According to the functionality and the purpose, the road serves to:

- local and regional connectivity of the road infrastructure (the settlements in the region);
- deliveries of goods and materials;
- provide a space for regional connectivity with continuity to the wider region in this part of the state;
- improve the road infrastructure on a regional level.

During the design of the route, the following requirements shall be taken in consideration: design parameters, functionality, economy, security and others.

Horizontal and vertical alignment

The horizontal alignment mainly passes through the mountainous terrain. Considering that the width of the state road is 6.0 m, the longitudinal slopes of the vertical alignment should not exceed 10%. The horizontal elements of the road are designed to satisfy the speed of 50 km/h.

Existing pavement construction

The existing pavement is in unsatisfactory condition with damages. On the pavement there are different damages, such as longitudinal and transverse cracks, pot holes, block cracklings, rutting, deflections of the pavement and other damages are visible.



Figure 2 Damages of the pavement construction

Drainage

The drainage of the road is in a bad condition. Generally the existing channels are filled with sand and earth material; also the shoulders are in bad condition. Some of the culverts don't work functionally.

Road markings and traffic signs

There is a horizontal and vertical signalling on the section.

On this section enormous damage is determined so respectively rehabilitation of following aspects of the current carriageway: structure, dimensions and constructive details should be done.

According to the Terms of Reference the following activities are foreseen for this section:

- Scraping and removal of old asphalt layer. This will be proceeded by laboratory analysis of old asphalt sample to determine the pavement quality;
- New pavement and rehabilitation of selected sections. The type, dimensions and technology of scraping and removal of old pavement as well as the construction methodology will be determined based on the data on traffic load, climatic, topographic and geotechnical features of the terrain;



- Clearing of the existing drainage culverts and ditches, and construction of new drainage system where necessary. The implementation methodology will be determined based on a field survey of the drainage system conditions;
- Construction of additional facilities such as retaining and protection walls to prevent landslides and erosion;

4. Baseline data

The foreseen activities for rehabilitation of the section Bukovo - Resen will take place in the municipality of Resen.

Natural/Geographical features

Municipality of **Resen** is located in Prespa Region at an altitude of about 880 masl, in southwestern part of the Republic Macedonia in the Prespa Basin and covers an area of 739 km². It is divided into 562 km² of land and 177 km² of water. It is surrounded by high mountains: Baba on the east side, on the west Galichica, Bigla on the north side.

Climate features

The climate in the entire **Prespa** region is temperate continental, having some Mediterranean impact that comes from the Grlo gorge (on the southwest of the Small Prespa Lake) and from the mountain pass Prevtis (on the southwest part of Greek Prespa). It features with warm summers, but nights are still fresh, and also feature with mild winters. The annual average of relative air humidity is 64%.

The water of Lake Prespa appears to be a microclimate modifier, influencing its environment. The lake is situated at 853 m above the sea level and acts as a thermo regulator for the surrounding air mass, especially increasing the air temperature in winter months, most notable in December and January.

The annual temperature average is 10, 2°C, the warmest month is July having a monthly average temperature of 21°C, while the coldest month is January with a monthly average temperature of 0, 3°C.

The Prespa Basin features long lasting sunny weather, having an annual amount from 1.400 to 2.600 sunny hours.

Considering the winds and air circulation, there are present local winds which direction is determined by the lake, due to uneven heating of the air above the land and above the lake surface, which increases the general frequency of weak winds in this area.

The fog is a rare weather phenomenon in the Prespa region, mainly because of the frequent winds and the presence of large lake surface areas.

Hydrological features

In the municipality of **Resen** in Prespa valley two lakes (Big and Small Prespa Lake) are present. Great Prespa Lake (284 km²) with an altitude of 853 m and maximum depth of 54m, is among the cleanest lakes in world. Since 65% belong to the Republic of Macedonia, 18% to the Republic of Albania and 17% to Greece.



In the Big Prespa Lake are two islands: "Golem Grad" (St. Peter) with an area of 1km², located on-triangle border and belongs to the Republic of Macedonia (the only island in the Republic of Macedonia). In the Republic of Albania is smaller island called Small town (St. Paul).

Small Prespa Lake is located on the territory of Greece and only a very small part is on the territory of the Republic of Albania. It has two islands: Achilles and Vidrinec. This lake covers an area of 45.59 km² and is situated on three meters higher (858 masl) than the Big Prespa Lake.

There are no water courses in the immediate vicinity of the section Resen – Bukovo. The closest water body is river Golema Reka located 500 m from the project area, close to village Jankovec

Biodiversity

The road is surrounded by oak and beech forests which represent typical Macedonian forest ecosystems as described below:

- Oak forest

The "Oak region" is distributed within lowlands and highlands to 1,100 m asl. The average annual temperature in this region is from 9 - 14.2°C, while the average precipitation is 500 – 850 mm. The prevailing soil type is cinnamon-colored forest soils, but other soil types are also locally presented (e.g., red podzolic soils (terra rossa), chernozem, pseudogley - gley, luvic, brown podzolic etc.). Climate – zonal Oak forests dominate in these regions, mixed with orographically - edaphically and hydrologically conditioned Chestnut, Common ash (*Fraxinus excelsior*), Maple (*Acer sp.*), Poplar (*Populus sp.*), Willow (*Salix sp.*) etc. in places. With respect to vertebrate fauna, typical inhabitants of this region are eastern Mediterranean and Syrian boreal species such as: Balkan whip snake (*Coluber gemonensis*), Fallow deer (*Dama dama*), Eastern hedgehog (*Erinaceus concolor*), Weasel (*Mustela nivalis*), Balkan spade foot toad (*Pelobatessyriacus balcanicus*), Green woodpecker (*Picus viridis*), Cat snake (*Telescopus fallax*), Wormsnake (*Typhlopsvermicularis*) etc.

- Beech forests

The "Beech region" covers the mountainous areas between 1,100 - 1,700 m asl. The fact that it encompasses only 22 % of Macedonia's total forested area notwithstanding, this region possesses the largest timber mass in the country. The average annual temperature in this region is from 6.4-8°C; the average precipitation is 900-1100mm. Light brown podzolic soils (in the lower belt) and brown podzolic soils (in the higher belt) are the prevailing soil types. The sub-mountain Beech region is presented between 1,100-1,300 m (chiefly consisting of the climate-zonal community, assn. *Festuco heterophyllae*-Fagetum). Refugial types of Beech forests, as well as Pine forest communities (Black pine (*Pinus nigra*), may be found here. The mountain belt spreads between 1,300 and 1,700 m (the range of the climatogenic assn. *Calamintho grandiflorae*-Fagetum) and is formed by various types of Beech and Beech-Fir forests. In the successional habitats, forests of Aspen (*Populus sp.*), Birch (*Betula sp.*) and White pine (*Pinus sylvestris*) are also present.

Typical **fauna species** in this region are: Slowworm (*Anguis fragilis*), Roedeer (*Capreolus capreolus*), Reddeer (*Cervus elaphus*), Aesculapian snake (*Elaphe longissima*), Wildcat (*Felis silvestris*), Pine marten (*Martes martes*), Fire salamander (*Salamandra salamandra*) etc. None of them are protected species as per the Macedonian Animal Protection List.



Although the forests are located quite close to the road route at some parts, the ecosystem is not expected to be significantly disturbed in addition to the disturbance already occurred for several decades of the existence of the road. Moreover, the expected rehabilitation of the culverts and drainage system will mitigate negative impacts which are currently caused by this damaged and improperly functioning system.

Construction Materials

Since only rehabilitation activities are planned for this section (part of existing state road A3), no active processing of raw materials are envisaged on the temporary construction sites. The basic construction materials to be used are bitumen emulsion, sand, asphalt - concrete layer, etc.

The proposed locations of borrow pits, waste disposal sites, asphalt plant, locations for temporary storage of construction material, are presented on Figure 3.



Figure 3 Proposed locations of borrow pit, asphalt base, landfill and location for temporary storage of construction material

Contractor will obtain construction materials from two existing borrow pits located near village Zavoj and village Rechica. Both proposed borrow pits are privately owned and possess environmental permits specifying the environmental requirements to be followed/met by borrow pit owners/operators, which have been issued by Ministry of Environment and Physical Planning in accordance with the Law on Environment (“Official Gazette of the Republic of Macedonia“ No. 53/05, 81/05 24/07, 159/08, 83/09, 48/10, 124/10, 51/11, 123/12, 93/13 and 187/13), and concession permits issued by the Government of the Republic of Macedonia (Ministry of Economy) for the period of 30 years in accordance with the Law on Mineral Raw Materials (“Official Gazette of RM“ num. 136/12). As per the above mentioned Law, the decision on issuing the concession permit is taken based on the EIA report or EIA Study to be approved by MoEPP, and Waste management Plan prepared by the borrow pit operator and approved by the Ministry of Economy. The environmental compliance of the borrow pit operation is supervised by the State Environmental Inspectorate under the MoEPP. The inspections are carried out in accordance with MoEPPs annual inspection programs, or as judged to be necessary by the MoEPP. The amounts for each type of the construction materials to be purchased will be determined by the detailed design based on the results of geotechnical surveys which will be conducted prior to the start of construction activities. During the construction phase small volume of construction wastes (removed asphalt layer, earth material from clearance of culverts) will be generated. These wastes will be disposed at the existing landfills located near the road section (landfill Bukovo in municipality of Ohrid and landfill Alchevi Kosari in municipality of Resen). In this respect, the contractor shall act in accordance with the Law on Waste Management, and all the activities shall be coordinated with the Investor (PESR) and local communal waste management utilities.



As defined by the National Waste Management Plan of the Republic of Macedonia (2009 – 2015), landfill Alchevi Kosari has a surface of 30.000 m² and the capacity of 200.000 m³. The capacity of the landfill Bukovo is also 200.000 m³. The amount of generated construction waste will be defined in the Detailed Design.

The asphalt plant proposed to be used for the purposes of the project is located at 1.2 km from the village Kosel (see Figure 3). The plant possesses an environmental permit issued by MoEPP which conducts regular monitoring of the plant's environmental compliance. The proposed location for temporary storage of construction materials is at the beginning of the section Bukovo - Resen and nearby the village Gorno Krusje.

Before the start of the construction activities, the Contractor shall prepare the Work Organization Plan which will define the timeframe, dynamics and the implementation methodology for construction activities, including supply of construction materials, amounts/volumes, and location of affiliated facilities (asphalt plant, access roads). The Plan will also indicate whether there are any environmental sensitive in the vicinity of those facilities, which might require additional mitigation measures.

Social infrastructure

Social infrastructure includes the existing educational, health, social institutions, where the citizens are able to satisfy their educational, health, cultural, recreative and other needs. The existing of these institutions and good connections between them contribute for satisfying the needs of the people in their municipality.

Education

Primary education in the municipality of Resen is organized into five primary schools with 15 regional classes. The municipality has one Municipal Secondary School, "Car Samoil". In the municipality there is one kindergarden "11 September", which is located in the town of Resen.

Health institutions

In municipality of Resen there is one public health institution PHI "Zdravstven Dom" Resen. In this health center basic health services are provided through six divisions: primary care – it offers identifying, monitoring and checking the health status, taking expert medical measures for improving the health status, prevent, suppress and early detection of diseases, provision of emergency medical assistance, including the vehicle, treatment practice, or home care, care about pregnancy delivery, implementation of preventive, therapeutic and rehabilitation measures, while the specialized consultative care entering the examination and identification of diseases, injuries and implementation of specialized diagnostic, therapeutic and rehabilitation procedures. In the rural areas health services for the population are provided by the health care ambulances in the villages: Carev Dvor, Krani, Ljubojno and Pretor. In the villages, Stenje Shtrebovo and Nakolec there are temporary hospitals. In the municipality there are 15 private dental clinics, 7 private pharmacies and 2 private health centers.



Industrial facilities

The lead branch of the development of municipality of Resen is the industry, which covers 6 industries: food (Ltd Swisslion – Agroplod – capacity of food industry with profit centers for production of different food products, other capacities from the field of food industry is “CD fruit” in village Carev Dvor intended for processing of fruits and vegetables), textile (Ltd Hateks – production of textile products, sewing mainly for foreign markets, Ltd Krznoteks, Ltd Tekstil prom, Ltd Stenjeteks), metal processing (JSC Algreta), wood (Ltd Interbrauk), construction (JSC IGM Sloga) , chemical (JSC Ohis Prespa Plast), mostly medium enterprises. From small businesses as more specific areas of activities are: production of honey and honey products, production of wood packing, production of carpentry, snails farming, fish farming, collection and processing of forest fruits and herbs and more.

Demography In the area of the Municipality of Resen there are 44 toponyms of settlements, out of which 43 are rural (39 active and 4 inactive/abandoned) and one urban settlement – the city of Resen. The total population of Municipality of Resen is 16.825 inhabitants, the total number of settlements and the total number of people in the municipality of Resen, are shown on (table 1):

Table 1 List of settlements and total number of people in municipality of Resen

Arvati	137	Lavci	134
Asamati	175	Leskoec	12
Bolno	237	Leva Reka	60
Brajchino	134	Ljubojno	186
Carev Dvor	605	Nakolec	262
Gorna Bela Crkva	187	Oteshevo	0
Dolna Bela Crkva	237	Perovo	175
Dolno Dupeni	235	Petrino	0
Drmeni	416	Podmochani	306
Evla	106	Pokrvenik	65
Ezereni	203	Preljubje	16
Gorno Dupeni	59	Pretor	142
Grnchari	417	Rajca	66
Ilino	0	Resen	8748
Izbishte	176	Shtrbovo	184
Jankovec	1169	Shurlenci	89
Konjsko	3	Stenje	188
Kozjak	117	Sopotsko	222
Krani	416	Stenje	438
Kriveni	27	Stipona	0
Krushje	107	Volkoderi	114
Kurbinovo	137	Zlatari	118

According to the census from 2002, in the Municipality of Resen live 16.825 inhabitants, out of which 50,3% are female and 49,7% are male. This population is distributed within 4.847 households and 8.215 homes that imply an average of 3, 5 persons per household, and an average population density of only 23 people per 1km². According to their ethnic background, Macedonians are 76,07% of them, Albanians 9,13%, Turks 10,68%, Serbs 0,44%, Aromanians (Wallachians) 0,15%, Gypsies (Roma) 1,09%, while others are 2,44%. Dominant occupation of the population in the municipality is agriculture, or fruit growing from which average annual production is about



70 000 tons of apples with excellent quality. With apple are planted approximately 3,500 ha of land. Out of the total production about 50% are for export out of our state. About 10 000 to 15 000 tons of apple fruit are intended for industrial processing. A significant part ends on the domestic market. It is estimated that Prespa with its production accounts for about 80% of apple production in the country. Over 70% of households in the municipality are apple producers.

Tourism

On the west side of the municipality of Bitola and in on the east side of Resen is located mountain Baba. On this mountain there are few mountain picks higher than 2000 m, and the highest of them is Pelister (2601 m). Big part of this mountain has very unique nature values so it was designated as a National Park-Pelister in 1948. NP-Pelister is 15 km out of the town Bitola has a territory of 12.500 ha and altitude variation from 700-2601 m. The Park is attractive for tourists from different aspects, there is variety of flora and fauna and good terrains for mountain climbing, extreme sports and many other activities. There are two glacial lakes Big and Small Lake well known to the people as "Eyes of Pelister". Also on the side of Prespa municipality there are significant touristic capacities such as mountain Galicica, Baba Mountain and Lake Prespa.

Culture Institutions

Since the time of Romans reign through Prespa (which is within the municipality of Resen), was passing the famous old Roman road "Via Egnatia". Beside the road there were more settlements and stations. On Prespa region were registered 130 archeological localities from different periods of its material and culture development, then 1000 archeological exhibits, 500 coins as well 450 exhibits of ethnological heritage. 95 churches and monastery complexes were registered as well 1024 icons. With old and traditional architecture are distinguished the following villages: Brajcino, Dolno Dupeni, Konjsko which with its aritechture represent special integrities with stone houses, bakeries and woven fences.

5. Environmental impacts

This project (road section Bukovo - Resen) will be implemented on existing road, where only rehabilitation activities without widening of the road section are foreseen. Impacts on basic environmental media and areas will occur in two phases (construction/rehabilitation and operation). Most of environmental impacts will occur during construction phase (rehabilitation works). Therefore, environmental management in the construction phase is the main content of this ESAR.

The following environmental impacts are expected during the rehabilitation:

- fugitive emission of dust from the construction activities;
- emission of exhaust gasses from the construction machinery;
- solid and construction waste;
- waste water produced by construction workers;



- noise and vibrations from the construction machinery;

The following impacts are expected in the operational phase:

- exhaust gasses from mobile sources (vehicles);
- storm water;
- noise.

5.1 Air emissions

Constructive phase (rehabilitation)

Emission of harmful pollutants in to the air is expected during the process of rehabilitation and exploitation of road section.

During the process of rehabilitation of road section i.e. demolition of old damaged pavement, scraping of the old pavement and its removal, clearing of the drainage culverts, ditches, operation of construction mechanization and transport of construction material and construction waste, the following air emissions are expected to occur: fugitive emission of dust from clearing the section, emission of exhaust gasses from mobile sources of pollution - construction machinery and fugitive emissions of volatile organic compounds from applying bituminous emulsion and asphalt mixture.

During the construction activities, the dust emitted from the mechanical operation of construction machinery and combustion of fuel affects the nearby and distant environment depending on the size (aerodynamic diameter of the particles) as well as the weather conditions during the period of activities. The impact of the fugitive dust emission will be additionally intensified by the emission of exhaust gasses from the construction machinery.

Polluting substance	Average period	Limited value to be reached in 2012.	Allowed number of exceeding during the year	Margin of tolerance for 2010	Limited value for 2010	Threshold of alert
PM10	24 hours	50 µg/m ³	35	0 µg/m ³	50 µg/m ³	
	1 year	40 µg/m ³	0	0 µg/m ³	40 µg/m ³	

Table 2 Limits and margin of tolerance for suspended dust PM10

The fine dust, i.e. inhalable particles with diameter $D \leq 2.5 \mu\text{m}$ that are created during combustion of fuel in motor vehicles are transferred at a greater distance and have a chemical composition, i.e. contain organic compounds and heavy metals, which has negative impact on the human health and the environment.



The following table presents the limits and margin of tolerance for suspended dust with a diameter of 10 micrometers PM10, according to the National Plan for protection of ambient air in the Republic of Macedonia and relevant sub law acts on air protection, which were prepared in accordance with transposed EU legislation.

The fugitive emission of volatile organic components from the use of bitumenous emulsion and asphalt mixture will have less influence, because these compounds are easily evaporative and retain shortly in the air.

Gasses and pollutants are emitted in the ambient air through the system for disposal of waste gases, from vehicles and construction machinery on-site. The quantity and composition of exhaust gases depends on several parameters such as the type and age of vehicle, the performance of vehicle, the type of used fuel, features of the fuel in the distribution network, the presence of additives, the degree of combustion of fuel, etc.

SO₂, CO₂, H₂O and aromatic hydrocarbons occur during the complete combustion of fuel, while Pb₂O₃, etc. occur when using catalysts. CO, hydrocarbons, suspended dust, etc. occur during the incomplete combustion of fuel. During a long-term exposure to these toxic substances, they have negative effect on the human health. The smoke affects the respiratory organs and the skin, the lead affects the respiratory and central nervous system as well as the blood system and bones. The particles that occur during the process of fuel combustion also have a carcinogenic effect.

The following table presents the limit values for the pollutants from construction machines, in accordance with the Directive 97/68/EC:

Table 3 Limit values for pollutants emitted by the construction machinery (Directive 97/68/EC)

Motor power	CO (g/kWh)	HC(g/kWh)	NOx (g/kWh)	PT(PM) (g/kWh)
130 ≤ P ≤ 560	5.0	1.3	9.2	0.54
75 ≤ P ≤ 130	5.0	1.3	9.2	0.7
37 ≤ P ≤ 75	6.5	1.3	9.2	0.85

The geomorphological and weather conditions have influence on the concentration of emitted pollutants in the air i.e. the pollution of the ambient air in the region.

Operational phase

In operational phase effect on the air quality will occur during traffic on road section.

The subject road section Bukovo - Resen is already existing part of the state road – A3, where the traffic had influenced air quality for decades, therefore there is not expected additional effects on the air quality.

5.2 Water pollution

Constructive phase (rehabilitation)

During rehabilitation of the road section the water pollution can be physical, chemical and biological. The physical pollution is manifested through presence of solid particles from debris of soil and sand, solid particles from tire friction, debris from crashes, etc. The presence of grease and oils is physical pollution with liquid materials. By



washing out the road surface, solid particles precipitate in the gutters and drains where they can cause blockage, while grease and oils float on the surface and reach in to the receptor. They create a film that prevents the supply of oxygen in the watercourse, which prevents the normal development of the biolife in the receptor. The chemical pollution occurs as a result of dilution of the pollutants present in the air. These pollutants are result of the exhaust gasses from vehicles, emission of pollutants from the nearby industrial and processing facilities, dissolution of individual components from the surrounding land, from the use of agrochemical substances and pesticides, animal and plant waste. The chemical pollution can be manifested as strong–acidic, weak–acidic neutral environment and all variations from strong–base to strong–acidic environment.

The biological pollutions are result of disintegration of organic materials that are used as food for various microorganisms. They can be a result of thrown food from reckless traffic participants, wind-blown leaves and other biodegradable waste, feathers and other substances that are present in the immediate surrounding.

The mechanical contaminants from the washing of the ground during heavy rainfall and flowing of surface water will cause filling of the riverbeds and water turbidity, which will reduce the penetration of light into larger depths and change of the living conditions in the aquifer. The change of the surface and underground water quality will also affect the usual use of water for different purposes by the population and industrial capacities. With implementation of good construction practice and procedure for collection of accidental fuel spillages from the construction mechanization the impacts to the existing surface waters and underground waters will be insignificance.

But, however it is important to mention that there are not any watercourses which may be affected from this project activities.

Operational phase

As mentioned before, there are not any watercourses which may be affected from these project activities.

5.3 Waste generation

The waste management is one of the most serious environmental problems in the Republic of Macedonia. The regular waste collection service is limited only to the urban areas, and very little attention is paid to the rural areas, 70% of the total urban population receives regular waste collection service and only 20% of the population in rural areas is covered by the service.

The municipal waste management is entirely controlled by the local government. It is directly connected with the urban plans for use of the local land and should be in accordance with the national strategic documents – the National Plan for Waste Management and the National Strategy for Waste Management as well as other relevant documents.

Proper waste management according to the generally accepted international norms will reduce the waste impact on soil (through uncontrolled waste dumping), underground water (directly contaminated over time from uncontrolled waste disposal) and air (through waste burning on open air).

Public Utility Company (PUC) "Proleter" Resen are responsible for the collection and disposal of municipal waste for the settlements in municipality of Resen.



Construction phase (rehabilitation)

During the construction phase (rehabilitation) of the road section mixed municipal waste will be generated from the employees and construction waste from the foreseen rehabilitation activities.

According to the Law on Waste Management ("Official Gazette of RM" No. 09/11), the generators of waste shall, to the greatest extent possible, avoid waste generation and reduce the harmful effects of waste on the environment, life and human health.

The waste generators are responsible to sign separate agreement for collection and transportation of the waste with waste service provider Public Utility Company (PUC) "Proleter" Resen. The wastes will be transported by specialized vehicles designed for waste transportation and disposed on the nearest landfills, i.e. landfill "Bukovo" and landfill "Alchevi Kosari". The types of waste that will be generated during the construction phase of road section as well as the managing method for the different types of waste are presented in the following table:

Table 4 Types of waste and quantities

Phase	No.	Type of waste	Number from the List of waste types (Official Gazette no.100/2005)	Amount of waste per year expressed in tones or liters	Method of waste management (processing, storage, transfer, disposal, etc.)	Name of the legal entity that manages the waste and location for disposal of waste (landfill)
Construction phase	1	Mixed municipal waste	20 03 01	Cannot be determined at this phase	Temporary disposal in PVC bags, to its removal in containers located nearby	PUC "Proleter" Resen
	2	Soil contaminated by eventual leakage of oil from the construction machinery	17 05 05*	Cannot be determined (only in an emergency)	Engagement of authorized legal or physical entities which have license for management of hazardous waste issued by MOEPP	Legal or physical entities
	3	Construction debris (Depending on the Detailed Design)	17 03 02	Cannot be determined at this phase	Disposal to nearest landfills "Bukovo" and "Alchevi Kosari".	PUC "Proleter" Resen

*Hazardous waste according to the List of waste types ("Official Gazette of RM" No.100/05)



Operational phase

During the operational phase of the road section adverse impacts on the environment are not expected, only small amount of organic waste is expected (from clearance of the culverts), which waste will be collected from institution responsible for maintenance of this road section.

5.4 Soil contamination

The impacts on the soil during the construction phase of road section Bukovo - Resen are expected to be mitigated subject to proper implementation of measures for protection of the soil during construction.

Construction phase (rehabilitation)

During rehabilitation activities following impacts can be expected:

- Emission of dust from cleaning of the section;
- Emissions of exhaust gasses from the construction machinery that will be present on the site;
- Leakage of fuel and lubricants from the construction machinery engaged during the construction activities, which may affect the soil and also cause a pollution of underground water;
- Pollution of underground water and soil might occur in the case of accident.

At the site the Contractor shall introduce good construction practice to prevent bitumen entering channels or disposed into ditches or any waste disposal site, to develop procedure for protection against spills (any spill to be immediately cleaned up) and for proper handling of contaminated soil according to legal environmental requirements. The bitumen storage and mixing area must be confined, gravel or sand covered and effectively protected against spills. The environmental permit (IPPC) issued to the proposed asphalt plant by MoEPP requires the implementation of appropriate mitigation measures, including setting the Maximum Permissible Volumes (MPV) for emissions into air, soil and water to be in accordance with BREFs – Best Available Techniques (BAT) reference documents. According to Article 14(3) of the IED (Industrial Emissions Directive (IED, 2010/75/EU), BAT conclusions shall be the reference for setting the permit conditions to installations covered by the Directive.

Operational phase

During the operational phase the expected adverse impacts on soil include accidental spills of oil, lubricants etc. The detailed design shall envisage oil traps along the section, with specific locations to be determined based on the results of terrain investigations for technical features of culverts.



5.5 Noise, vibration and non-ionizing radiation

Construction phase (rehabilitation)

During the construction phase of the road section, the maximum allowed noise levels will be exceeded.

The noise during the construction phase of the road section Bukovo - Resen will result from the operation of construction machinery that will be used during the construction phase, i.e. vehicles for delivery and transportation of construction materials and transport of construction waste and the machinery used for construction activities. The significance of the impact will depend mostly on the type of equipment, and technical features of the construction machinery.

The distance from populated areas, geological conditions and terrain configuration are crucial for the noise impact on the environment.

The meteorological conditions have a great influence on the noise intensity and air shocks. The air shocks are influenced by the wind direction and speed, while the sound spreading is influenced by the wind speed and temperature in a function of height and configuration of the terrain.

The wind has effect on the increasing of the sound intensity, i.e. the increasing of sound intensity is almost always in the direction of the wind. The influence of the wind on the noise intensity is highest during the winter. The positioning of road section Resen – Bukovo and the distance from the nearest receptors - households, etc. is crucial for the noise impact on the environment. The subjected road section passes through the village Izbishte thus affecting the households located there. Table 5 presents the list of sources of noise, vibration and non-ionizing radiation.

Table 5 List of sources of noise, vibration and non-ionizing radiation

Source of emission	Type of emission (noise, vibration or non-ionizing radiation)	Equipment - device with a description of the maximum power	Emitted noise intensity (dB) expressed through index value of the equipment	Intensity of vibrations and non-ionizing emitted radiation	Emission periods (number of hours per day)
Heavy vehicles	Noise	Bulldozer Dredger Track	- 85 dB	/	8

The data and comparative analysis are showing that the level of noise during the construction phase will exceed the limit values, i.e. the noise will have a negative impact on the environment. The noise intensity and its impact on the environment will depend on the scope and duration of construction activities.

The limit values for the basic indicators of noise in environment are defined with the Rulebook for limit values of the noise level ("Official Gazette of RM" No.147/08). According to the degree of protection from noise, the limit values for the basic indicators of noise in environment caused by different sources should not be higher than:



Table 6 Noise level per area

Area differentiated by the degree of noise protection	Noise level expressed in dB (A)		
	Ld	Lv	Ln
Area of first degree	50	50	40
Area of second degree	55	55	45
Area of third degree	60	60	55
Area of fourth degree	70	70	60

Legend: -Ld - day (period from 07:00h to 19:00h), -Lv - evening (period from 19:00h to 23:00h), -Ln - night (period from 23:00h to 07:00h).

The areas according to the degree of noise protection are defined in the Rulebook for locations of measurement stations and measuring points (Official Gazette of RM no.120/08).

Area of I degree of noise protection is area intended for tourism and recreation, area nearby hospitals, areas of national parks and natural reserves.

Area of II degree of noise protection is area that is primarily intended for residence, i.e. residential region, area nearby buildings designed for educational activity, facilities for social protection intended for accommodation of children and elder persons, facilities for primary health protection, area of playgrounds and public parks, area of public greenery spaces and recreational area, areas of local parks.

Area of III degree of noise protection is area where activities in the surroundings are allowed and the causing of noise is less considered: trade–business–residential area, which is also designed for accommodation, i.e. area with buildings that have protected spaces, crafts and related production activities (mixed area), area designed for agriculture activities and public centers for administrative, commercial, service and catering activities.

Area of IV degree of noise protection is area where activities in the surroundings are allowed, which can cause interference with noise, area without apartments, designed for industrial and crafts or other similar production activities, transport activities, storage activities, service and communal activities that are causing bigger noise.

According to the degree of noise protection the subjected road belongs to area of IV degree of noise protection - is area where activities in the surroundings are allowed, which can cause interference with noise, area without apartments, designed for industrial and crafts or other similar production activities, transport activities, storage activities, service and communal activities that are causing bigger noise and on certain parts where the route passes through residential areas belongs to area of III degree of noise protection is area where activities in the surroundings are allowed and the causing of noise is less considered: trade–business–residential area, which is also designed for accommodation, i.e. area with buildings that have protected spaces, crafts and related production activities (mixed area), area designed for agriculture activities and public centres for administrative, commercial,



service and catering activities according to the Rulebook for locations of measuring stations and measuring points ("Official Gazette of RM " No.120/08) and the limit value for this kind of area is 70 dB for day and evening and 60 dB for night and 60 dB for day and evening and 55 dB for night respectively according to the Rulebook for limit values of noise level in environment ("Official Gazette of RM" No.147/08).

Operational phase

With the rehabilitation of the section, it is expected that the new asphalt layer will cause the decrease of the current noise level. However, the need, location and design for noise mitigation measures will be defined by the noise level analysis to be part of the detailed design. This analysis will consider the noise level with respect to the forecasted traffic flow and will analyze in particular the noise impact on the households of the village Izbishte.

During the construction activities vibrations will be caused by the activities of the construction and the transport mechanization.

5.6 Biodiversity (flora and fauna)

With realization of the foreseen project activities on the section, impacts on flora and fauna will not be significant due to the rehabilitation nature of the proposed project. No vegetation clearance is expected due to the project activities.

Construction phase (rehabilitation)

At the design and construction phase, with the use of construction mechanization several negative impacts are expected, such as increased noise and vibration intensity and increased quantity of exhaust gasses.

Noise, vibrations and exhaust gasses from the fuel are impacts that will occur during exploitation phase, during the use of the section. It should be mentioned that impacts expected during exploitation phase are already present and occur during the use of the section.

The project area is not passing through any environmental protected zone or in the area proposed for protection.

Operational phase

Traffic noise and exhaust emissions from fuels will certainly occur in the operational phase. But it is important to mention that the impacts are expected during the operational phase are already present and occur during the use of the subjected section.

5.7 Social impacts

The project does not acquire the land acquisition therefore there are not any social impacts due to land acquisition and resettlement issues. During rehabilitation activities some health issues for the local population may emerge due to increased noise, fugitive emission of dust, exhaust gases etc., and occupational, health and safety issues for the employees.



Daily habits of the local population (using the route for transport of goods, access to properties etc.) could be potentially disturbed during rehabilitation activities, and so Traffic Management Plan should be prepared by the Contractor for regulation of traffic during these activities.

In general social impacts will be positive due to the rehabilitation process, traffic conditions will be improved and traffic safety will be increased.

6. Environmental and social management plan

The main mitigation activities are described in **Table 7**. Since this is a project for road rehabilitation, good practice and standard mitigation measures are required along the road.

Mitigation Plan identifies the environmental impacts during construction (rehabilitation) and operational phase, mitigation measures, costs and responsibilities for implementation of mitigation measures. Mitigation is an integral part of impact evaluation. It looks the better ways of taking actions so that the negative impacts are eliminated or minimized.

Table 7 Mitigation Plan

Phase	Issue	Mitigation measures	Cost		Institutional Responsibility		Comments
			Install	Operate	Install	Operate	
Detailed design	Decision for preparation of Environmental Impact Assessment Report or EIA Study	Preparation of Notification for intention of project implementation and its submission to the competent authority – MOEPP. The existing underpasses for wildlife will remain. None new are planned with rehabilitation works.		N.A.	Engaged Consultant with PESR	PESR/MOEPP	MOEPP will make decision if EIA Study or Environmental Impact Assessment Report is required; PESR/Consultant will respect the decision.
Detailed Design	Soil, underground water pollution	Possible design of oil traps	N.A.	N.A.	Engaged Consultant	Contractor/ PESR	Costs will be defined based on the results of surveys of the condition and technical features of culverts, which will be conducted by designers
Detailed Design/or Construction phase	Air pollution, landscape disturbance etc. from borrow pits, waste disposal sites	Ensuring that the materials are purchased from the sites which have all necessary licenses and permits - borrow pits (near the road section – existing ones near v.Zavoj and v.Rechica), - location of waste disposal sites (landfill Bukovo and landfill Alchevi Kosari) etc. so all negative impacts to be avoided or minimized	N.A.	N.A.	Consultant/Contractor	Contractor/ PESR/Local Self Government	During preparation of detailed design the consultants shall confirm the proposed locations for borrow pits, landfills, according to the geology, hydrology etc., costs will be included in overall costs for Detailed Design. In case the Contractor would suggest locations other than those identified by this EAMP, Contractor is obliged to obtain all relevant environmental and concession permits issued by MoEPP and other relevant authorities prior to start of rehabilitation activities. Also, the EA/EMP should be amended for the environmental analyses of the newly proposed

							borrow areas. The contractor shall make all necessary arrangements for using the waste disposal sites identified as acceptable by the EA/EMP.
Construction / rehabilitation	Traffic safety Impairment of traffic during construction Endangering of traffic outside working hours, placement of traffic signs	The contractor will provide: - information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions - measures to allow for permanent adequate traffic flow around construction areas; - adequate signalization, traffic safety signs, barriers and flag persons for traffic control; - appropriate lighting and well design safety signs	N.A.	N.A.	Contractor	Contractor	Traffic plans shall be approved by road police. Road police should also assist in law enforcement.
Construction / rehabilitation	General Work Safety	According to the Macedonian legislation in the field of occupational, health and safety (Law on occupational, health and safety - Official Gazette of Republic of Macedonia“ no. 92/07, 136/11, 23/13, 25/13, Law for fire protection Official Gazette of Republic of Macedonia“ no 67/04, 81/07, Law on protection and rescue – Official Gazette of RM no. 36/04, 49/04, 86/08, 124/10)The Contractor has an obligation to prepare a Plan for Occupational Health and safety for temporary mobile construction sites in which protection measures in a case of	1 000 €	N.A.	Engaged Consultant for preparation of OHS Plan/ Contractor	Contractor	One of the requirements in the TOR for selection of Contractor could be implementation of OHSAS 18001 that will enable preparation of appropriate procedures in terms of accidents, fire and chemical spill, and preparation of emergency responses

		accident, fire and chemical spill containment, has to be included such as emergency procedures.					
Construction / rehabilitation	Air pollution fugitive emission of dust, emission of exhaust gases from construction mechanization	Conduct construction activities with a certain time frame and dynamics i.e. 8 working hours in total, starting from 7 am to 3 pm; Preparation of Plan for organization of construction activities on site; Avoiding the work of the mechanization when not performing task; Use of standardized fuels for machinery; Planning the route and factor for loading and unloading is very important for reducing fuel consumption and emissions of exhaust gases and fugitive dust emissions. The Contractor should establish procedure according to the requirements of ISO 14001 in which he will comprehensively describe the planning of the route for transport of construction material, loading, unloading etc., determine approximate locations for storage of construction material, describe the procedures for loading and unloading, depending of the chainage where the rehabilitation activities will start, and engaged construction mechanization ; Residents will be informed for construction activities and working hours; Avoiding dust and fugitive emissions by using dust control methods, such as covers, water suppression or increased moisture	N.A.	N.A.	Contractor	Contractor	

		content for open locations for storage of materials; Replacing older vehicles with newer; Turn off mechanization when is not necessary.					
Construction / rehabilitation	Potential pollution of soil and groundwater/contamination of surface water	<p>Organize and cover material storage areas near the section on proper location (at the beginning of the section Bukovo - Resen and nearby v.Gorno Krusje) which shall be cleaned – up, upon completion of the construction works;</p> <p>Considering the fact that the project covers only rehabilitation activities and taking into account the costs for asphalt bases, the concrete asphalt and other similar work will be performed on the asphalt base 1.2 km away from v.Kosel located near the subjected section. There are no any watercourses which may be affected bythe project activities; Washing of the construction mechanization to be done on proper location designated and equipped for such type of activities not on the site; Those designated locations should have environmental permits for machinery washing, with specific requirements such as oily water separation, listed in the permits. Waste disposal on nearest permitted locations for waste disposal - the landfill Bukovo and the landfill Alchevi Kosari; Proper handling of lubricants, fuel; Ensure proper loading and storage</p>	N.A.	N.A.	Contractor	Contractor	Contractor to submit a separate plan describing the location for storage of construction material, location of mobile toilets and layout for location of his work camp and providing details on the management of waste, the storage and handling of fuel, diesel, oil and other toxic / harmful substances

		of fuel, lubricants and fuel in accordance with adopted BREF Emission from storage (o7.2006) and maintenance of equipment.					
Construction / rehabilitation	Waste generation (municipal waste from engaged employees, construction waste etc.)	<p>Implementation of key principles for sustainable waste management; Placement of appropriate containers for collection of municipal waste on location; Handling waste to legal/physical entities which have license for waste management issued by MOEPP (landfills Bukovo and Alchevi Kosari);</p> <p>Transportation of collected waste to the nearest landfills: Bukovo and Alchevi Kosari in coordination with local authorities for waste management.</p>	600 €	N.A.	Contractor	Contractor	One of the requirements in the TOR for selection of Contractor should be preparation instructions/procedure for waste management. Operating costs in this phase cannot be precisely determined they depend of specified prices in the concluded Contracts with physical/legal entities that have license for such type of activities
Construction / rehabilitation	Noise and vibrations from construction activities	<p>The need, type and design of noise mitigation measures on the segment passing village Izbishte will be defined by the noise analysis to be implemented as part of the detailed design. General mitigation measures will be implemented:</p> <ul style="list-style-type: none"> - Limit activities to daylight working hours; - Turning off the engines of vehicles and construction machinery when they are not in use; - Informing the local population about the performance of the construction activities in terms of time and location; - Equipment operating with noise mufflers etc. 	N.A.	N.A.	Contractor	Contractor	Control of technical features of the construction mechanization

<p>Construction / rehabilitation</p>	<p>Material supply <i>Asphalt Plant</i> Dust, fumes, worker's health & safety, ecosystem disturbance; <i>Borrow pits</i> Fugitive emission of dust, disturbances of water quality etc.</p>	<p>The Contractor shall use existing asphalt plants/or submit requirement for official approval or valid operating license to competent authority. He shall submit a method statement on handling of bitumen spills prior to the commencement of works.</p> <p>At the site the Contractor shall take appropriate provisions (good construction practice) Contractor should ensure sites appear professional and well managed, Inform the community, respecting those affected by work activities, Identify and manage environmental issues, attain the highest level of safety performance) to assure that bitumen may not enter into dry or running stream beds or channels nor may it be disposed of in ditches or any waste disposal site, to develop procedure for protection against spills (any spill to be immediately cleaned up) and all contaminated soil must be properly handled according to legal environmental requirements. Contaminated soil should be treated as hazardous waste in accordance with Article 57 (General rules for hazardous waste handling and management) - Law on waste management. The bitumen storage and mixing area must be effectively protected against spill. Given the fact that as an asphalt plant will be used the plant near v.Kosel which has</p>	<p>N.A.</p>	<p>N.A.</p>	<p>Contractor</p>	<p>Contractor</p>	<p>Conditions for selection of subcontractors for material supply to be included in the TOR.</p>
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		obtained IPPC permit from MOEPP, all activities which cover bitumen storage and mixing area will be performed with appropriate measures for environmental protection contained in IPPC; Contractor should use existing borrow pits near v.Zavoj and v.Rechica or buy materials at licensed separation installation (with integrated ecological permit issued by MOEPP/Competent authority)					
Construction / rehabilitation	Material transport <i>Asphalt</i> (Dust, fumes) <i>Construction material</i> (Dust)	<ul style="list-style-type: none"> - Cover truck load; - Wet or cover truck load Establish a dust control program: In the vicinity of settlements or where the local population might be affected through material transport the contractor will be required to regularly water haul routes. Trucks shall be covered to minimize dust and material spillage. Contractor should prepare a plan for traffic regulation in order to provide the limit value of the speed of construction mechanization for material transport in accordance to the Law on Public Roads. No limitations with regard to the route to transport the materials, since there aren't any sensitive areas.	N.A.	N.A.	Truck operator/Contractor	Truck operator Contractor / PESR State Environmental Inspectorate	
Construction / rehabilitation	Construction site (Noise disturbance to population and employees).	Limit activities to daylight working hours; Equipment operating with noise mufflers. The road section belongs to area of IV degree of noise protection - is area where activities in the surroundings are allowed, which can cause	N.A.	N.A.	Contractor	Contractor	

		<p>interference with noise, area without apartments, designed for industrial and crafts or other similar production activities, transport activities, storage activities, service and communal activities that are causing bigger noise and on certain parts where the route passes through residential areas belongs to area of III degree of noise protection is area where activities in the surroundings are allowed and the causing of noise is less considered: trade-business-residential area, which is also designed for accommodation, i.e. area with buildings that have protected spaces, crafts and related production activities (mixed area), area designed for agriculture activities and public centres for administrative, commercial, service and catering activities according to the Rulebook for locations of measuring stations and measuring points ("Official Gazette of RM " No.120/08) and the limit value for this kind of area is 70 dB for day and evening and 60 dB for night and 60 dB for day and evening and 55 dB for night respectively according to the Rulebook for limit values of noise level in environment ("Official Gazette of RM" No.147/08).</p> <p>Location of construction camps should not be close to water courses. Contractor to establish procedure for collection of</p>					
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		generated municipal waste and its adequate disposal, so contamination of soil, underground water from inadequate waste management to be avoided.					
Construction / rehabilitation	Worker's safety and health	Provide workers with safety instructions and appropriate personal protective gear such as protective clothing, safety boots, helmets, gloves, goggles, ear protection, etc.; Preparation of Plan for occupational health and safety for temporary construction mobile sites according to Law on occupational health and safety ("Official Gazette of RM" no. 92/2007, 136/11, 23/13, 25/13, 137/13)	N.A.	N.A.	Contractor	Contractor	The Contractor should appoint an environment, health and safety manager in the Construction Supervision construction Team Personal
Construction / rehabilitation	Disruption of local population	Preparation of Traffic Management Plan for regulation of traffic during these activities	500 €	N.A.	Contractor	PESR	
Operation/ Exploitation	Increased volume and speed of traffic (Emissions of exhaust gases from vehicles, increased noise levels, water and soil quality (suspended solids, organic compounds, heavy metals,	Installation of environmental protective measures: - use of standardized fuel will reduce the emission of exhaust gases - the rehabilitation of the road will reduce the noise level provoked by the traffic along the road - (monitoring of the pollution and additional mitigation measures if required)	N.A.	N.A.	Contractor	PESR /PE "Makedonija Pat" (for maintenance of roads)	Costs in this phase cannot be estimated additional surveys has to be done and measurements for emitted noise etc. during the further operation of the road section. The costs shall be planned within the PESR annual Budgets (if required).

	pH)						
Operation/ Exploitation	Road safety (Increased vehicle speed)	Maintenance of installed traffic signs for speed limit	N.A.	N.A.	Contractor	PESR/ PE “Makedonija Pat” (for maintenance of roads)	Costs in this phase cannot be estimated.

Important note: All applicable costs for mitigation measures envisaged with this ESAR shall be quantified by the Tenderer and shall be part of the Bill of Quantities (BoQ).

7. Monitoring activities

It is essential to design the monitoring program and monitoring frequency appropriately in order to be able to demonstrate both the overall performance of the project works as well as the short term impacts due to peak construction activities. More specifically, as the integral and critical part of the ESMP, the environment monitoring program should have the following objectives:

- Determine the actual extent of the impacts;
- Control impacts which are generated from construction process, and operational phase;
- Check environmental pollution standards applied to the project during construction;
- Check and supervise implementation of environmental protection solutions during construction;
- Suggest mitigation measures in case of unexpected impacts;
- Assess the effect of mitigation measures in construction and operation stages.

The project will implement an environmental monitoring plan: (i) to monitor the contractor's work during project implementation in order to check contractual compliance with specified mitigation measures, and subsequently (ii) to assess the actual environmental impacts of the project over the years following completion of the various project components. The main components of monitoring plan include:

- Environmental parameters to be monitored;
- Specific areas, locations and parameters to be monitored;
- Applicable standards and criteria;
- Duration and frequency;
- Institutional responsibilities; and
- Costs.

Table 8 Monitoring Plan

Phase	What parameter is to be monitored?	Where is the parameter to be monitored?	How is the parameter to be monitored?	When is the parameter to be monitored? Frequency	Cost		Responsibility	
					Install	Operate	Install	Operate
Construction phase								
Traffic safety Safety during construction	Existence of traffic management plan; traffic patterns	At and near job site on temporary mobile construction site	Inspection; Observation; Comparison with Contractor's method statement	Before works start and once a week at peak and non-peak periods; during construction period			Contractor	Supervision Contractor
General Work Safety Safety of the employees, visitors on site	Existence of Plan for occupational health and safety for so called temporary mobile construction site	On temporary mobile construction site	The status of implementation of foreseen measures in the Plan for employees protection (supply with personal protective equipment etc.) number of injures at work place, appointed person/officer for health and safety on site	Every day during construction activities			Contractor	Supervision Contractor State Inspector for health and safety
Air pollution (fugitive emission of dust, emission of exhaust gases from construction mechanization)	Exhaust fumes Dust	At site () At site	Visual inspection Visual inspection	During operation of the mechanization During material delivery, and other construction activities			Contractor	Supervision Contractor
Potential pollution of soil and groundwater / contamination of	Soil quality	At site	Visual inspection nearest area for spills and leaks which might impact soil quality (and	Periodically during construction activities				

surface water			potentially groundwater				Contractor	Contractor/ MOEPP
Waste generation (municipal waste from engaged employees, construction waste etc.)	Implemented system for waste management, placed containers for waste collection	At site	Visual inspection Concluded contracts with legal / physical entities who have a permit for waste management	Every day			Contractor	Supervision MOEPP
Noise and vibrations from construction activities	Noise levels Technical features of the construction equipment	At site (near households etc.) according to the legislation In authorized services and on site	Measurements of emitted noise on several measurement points Visual inspection	Selection of several measurements points near sensitive receptors Every day	50 € per MP		Contractor Licensed company	Supervision MOEPP
Material supply (asphalt plant, borrow pits)	Possession of official approval or valid operating license	At site, location of asphalt plant, borrow pits	Inspection	Before construction activities begin			Plant operator, borrow pit operator	Supervision
Material transport	Truck load covered	At site, location of borrow pits	Visual inspection	Unannounced inspections during work			Contractor	Supervision MOEPP
Construction site (Noise disturbance to population and employees)	Noise levels Technical features of the construction equipment Exhaust fumes Dust Disruption of local	At site (near households etc.) according to the legislation In authorized services and on site At site At site At site	Measurements of emitted noise on several measurement points (if required) Visual inspection Visual inspection Visual inspection	Once before construction activities, and once during construction activities Every day During operation of the mechanization During material delivery, and other construction activities Unannounced			Contractor	Supervision MOEPP

	population		State of Implementation of Traffic management plan					
Operation/Exploitation								
Increased volume and speed of traffic (Emissions of exhaust gases from vehicles, increased noise levels, water quality (suspended solids, organic compounds, heavy metals, pH)	Vehicle emissions; noise levels;	Along the road section	Measurements of emitted noise, air quality on several measurement points	Once per year	1500 €			PESR/ Monitoring Contractor
Road safety (Increased vehicle speed)	Condition of traffic signs; vehicle speed	Along the road section	Visual observation; speed detectors	During maintenance activities; unannounced	/		/	PE "Makedonija Pat"

Important note: All applicable costs for Monitoring activities envisaged with this Monitoring Plan shall be quantified by the Tenderer/ Contractor and shall be part of the Bill of Quantities (BoQ).

8. Roles and responsibilities for implementation of ESMP

During construction phase of the Project, mitigation and monitoring activities will run parallel to the construction activities. They will commence at the time when employees, equipment and/or materials are moved to the site and will end after the job is completed and all employees, equipment and/or materials are removed from the site and the work at particular location is complete.

If it is necessary that the monitoring activities are extended to the period after completion of works, such as monitoring of waste material disposal areas, borrow pits etc.

Detailed monitoring plan, including what will be monitored, where; type of instruments and their accuracy, frequency of measurements etc. (when necessary), should be specified within the Technical Specifications of DD. Exact start and end dates of mitigation and monitoring activities cannot be stated, as the overall project schedule charts are not defined. Schedule charts will be adopted after selection of Construction Contractor and in accordance with schedule of activities proposed in tender documents. Mitigation and monitoring activities during operation will run together with maintenance activities or when responsible institution decides to check the road environment quality. These activities will be planned after completion of rehabilitation works in cooperation with Contractors.

Construction Contractor should provide reports to PESR for implementation of foreseen environmental and mitigation measures. Same applies to the Monitoring, Supervision and Maintenance Contractors for their part of mitigation and monitoring activities. If some kind of accident or endangerment of environment could happen reporting will be immediate.

In **Table 9** roles and responsibilities are presented.

PESR will prepare quarterly Environmental Monitoring Reports for submission to the WB according to the received data from all Contractors, authorized bodies of state administration for such type of activities.

Table 9 Roles and Responsibilities for implementation of EMP

Company/Unit	Responsibilities
<p>International Projects Management Unit - IPMU (PESR)</p>	<p>In coordination with EPSAU, this Unit will be responsible for overseeing the project implementation, for monitoring the overall project implementation, including environmental compliance of the project. IPMU will have the final responsibility for environmental performance of the project, during both the construction and operational phase. Specifically IPMU will: i) closely coordinate with local authorities in the participation of the community during project preparation and implementation; ii) monitor and supervise ESMP implementation including incorporation of ESMP into the detailed technical designs and bidding and contractual documents; iii) be in charge of reporting on ESMP implementation to the World Bank.</p>
<p>Environmental Protection and Social Aspects Unit (EPSAU) (PESR)</p>	<p>This unit is responsible for monitoring the implementation of WB's environmental safeguard policies in all stages and process of the project. Specifically, this unit will be responsible for:</p> <p>i) reviewing the subproject: EIAR, EMP, ESAR, RAP prepared by consultants to ensure quality of the documents; ii) helping IPMU incorporate ESMP into the detailed technical designs and civil works bidding and contractual documents; iii) helping IPMU incorporate responsibilities for ESMP monitoring and supervision into the TORs, bidding and contractual documents for selection of Contractor, Supervision, Monitoring contractor iv) providing relevant inputs to the consultant selection process; v) reviewing reports submitted by the Contractor, Supervision, Monitoring contractor; vi) conducting periodic site checks; vii) advising PESR management on solutions to environmental issues of the project; and viii) preparing environmental performance section on the progress and review reports to be submitted to the WB.</p>
<p>Construction Contractor</p>	<p>Based on the approved ESMP, the Contractor will be responsible for establishing a site-specific ESMP for the construction site area, submit the plan to PESR and Supervision Contractor for review and approval before commencement of construction. In addition, it is required that the Contractor get all permissions for construction (traffic control and diversion, excavation, labor safety, etc. before civil works) following current national regulations.</p> <p>The contractor shall be required to appoint a competent individual as the contractor's on-site <i>Health, Safety and Environmental Officer (HSEO)</i> who will be responsible for monitoring the contractor's compliance with the ESMP requirements and the environmental specifications.</p>
<p>Supervision Consultant</p>	<p>The Supervision Consultant (SC) will be responsible for supervising and monitoring all construction activities and for ensuring that Contractors comply with the requirements of the contracts and the ESMP. The SC shall engage sufficient number of qualified staff (e.g. Environmental Engineer) with adequate knowledge on environmental protection and</p>

Company/Unit	Responsibilities
	construction project management to perform the required duties and to supervise the Contractor's performance.
Ministry of Environment and Physical Planning (MOEPP)	MOEPP is responsible for issuing a decision for approval of Environment Impact Assessment Report, and monitoring of the state of implementation of all foreseen measures for environmental protection in EIAR by the Inspectorate for environment.

9. ANNEXES

ANNEX 1 Minutes of meeting (public consultation)



Republic of Macedonia
Public Enterprise for State Roads



Republic of Macedonia
**Public Enterprise for
State Roads**

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+389 (0)2 3-118-044
Fax. +389 (0)2 3-220-535

No. _____

Date: _____

Skopje

MINUTES

OF PUBLIC CONSULTATION ON THE ENVIRONMENTAL AND SOCIAL ASSESSMENT FRAMEWORK, RESETTLEMENT POLICY FRAMEWORK AND ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR THE PROJECT "REHABILITATION OF ROAD A3, SECTION RESEN-BUKOVO" held on 6th of March 2014, at the premises of the Municipality of Resen, from 14:00 - 15:30 hrs.

On 6th of March 2014, the Public Enterprise for State Roads, in cooperation with the Municipality of Resen, held a public consultation for the following documents: Environmental and Social Assessment Framework (ESAF), Resettlement Policy Framework (RPF) and Environmental and Social Management Plan (ESMP) for the project "Rehabilitation of road A3, section Resen - Bukovo" with total length of above 11 km.

Present:

1. Ms. Sashka Bogdanova Ajceva - PESR;
2. Ms. Irena Stefanovska- Consultant company Geing ;
3. Ms. Olgica Micevska - Consultant company Geing;
4. Municipality employees, representatives of public enterprises, local communities, private sector, non-governmental organizations, local media;
5. Affected citizens (List attached).

The public consultation developed as follows:

1. Public consultation opening

The public consultation was opened with an introductory speech by the representative of the PESR with explanation of the new project and of the main aim of the presentation and consultation with the public concerning the prepared documents for environment and social aspects.

2. Project documents presentation

Ms. Olgica Micevska of the Consultant Company briefly presented the project that includes three sections in the first year of financing: Resen - Bukovo, Debar - Boskov Most and Bitola Makazi. The prepared documents ESAF, RPF, and ESMP for the section Resen - Bukovo where explained according to the World Bank operating policy referring to environment and



social aspects. The operating policy of the World Bank and national laws and legislation related to environment and social aspects were introduced to the auditorium.

3. Discussion

Question-Krste Sparkovski: "Is it possible during rehabilitation of this road to do some works on the local roads in my village Leva reka as the road is in very bad condition and the transport of apple and all products produced by the locals can not be organized properly?"

Answer (Saska B. Ajceva): "PESR is not responsible for the local roads in the Republic of Macedonia, but in the cooperation with the Municipalities we have a project for rehabilitation of the local roads. Your municipality should decide how and when it would include the local roads from your village and apply to participate in our programme."

Question (Mile Chadevski): "Has your company done any examination of the landslide in that part of the road?"

Answer (Saska B. Ajceva, Olgica Micevska): "It's another project, but some geo-mechanical examinations have been done already. This project includes only rehabilitation of the section. In the phase of basic project, upcoming activities will identify whether it is necessary to propose mitigation measures for that problem."

Question (Citizen): "The water is main problem for the roads, and we can see that most of the roads are destroyed by atmosphere water and don't have appropriate drainage system. Why isn't more time spent and solutions proposed during the designing process for this problem?"

Answer (Saska B. Ajceva, Olgica Micevska): "Probably not well enough prepared designs will produce such problems. This issue is important for roads projects, but many stakeholders are involved during period of designing."

No other participants were interested in discussing, thus Sashka Bogdanova Ajceva concluded the public consultation at 15:30.

Minute Taker:

Sashka Bogdanova Ajceva

ANNEX 2 List of participants at public consultation



Република Македонија
Јавно претпријатие за државни патишта



ЛИСТА НА УЧЕСНИЦИ НА ЈАВНАТА КОНСУЛТАЦИЈА ЗА ДОКУМЕНТИ ПОВРЗАНИ СО ЗАШТИТА НА ЖИВОТНАТА СРЕДИНА И СОЦИЈАЛНИТЕ АСПЕКТИ (СПОРЕД ПРОЦЕДУРИТЕ НА СВЕТСКА БАНКА) ЗА ПРОЕКТОТ „РЕХАБИЛИТАЦИЈА НА ДРЖАВЕН ПАТ АЗ, ДЕЛНИЦА: РЕСЕН - БУКОВО (10,5КМ)“

06 март 2014 година (четврток) - “сала на Општина Ресен“ – о. Ресен, почеток во 14.00 часот.

РЕД. БР.	ИМЕ И ПРЕЗИМЕ	ИНСТИТУЦИЈА ИЛИ ОРГАНИЗАЦИЈА/ЗАНИМАЊЕ	Е-МАИЛ/КОНТАКТ	ТЕЛЕФОН	ПОТПИС
1.	Тони ЈОВАНОВСКИ	Општина Ресен ОПШТИНА ИИИ	toni.jovanovski@resen.gov.mk 072 201858		<i>Toni Jovanovski</i>
2.	Др. Зоран СЕБИЧКИ	СОВЕТ НА МЗ с. Лева Река	/	076 216101	<i>Zoran Sebicki</i>
3.	Виде Филиповски	СОВЕТ НА МЗ с. Лева Река	/	/	<i>Vide Filipovski</i>
4.	Зоранка Јанка	Невработена	zanja82@freemail.com.mk 078-649-305	/	<i>Zoranka Janca</i>
5.	Билјана ЛАЗАРЕСКА	НЕВРАБОТЕН ИИИ ПО БИОТЕХНОЛОГИЈА	bilzdrasko@yahoo.com	076 240195	<i>Biljana Lazarska</i>
6.	Анколина МОНДРЕВСКА	СТУДЕНТ		078 453-082	<i>Ankolina Mondrevska</i>



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9.	Зегеван Миле	Обштина Ресен			
10.	Савијевска Шермит	Обштина Ресен			
11.	Савијевска Шермит	—			
12.	Даниел Даниеловска	—	danielw@resen.gov.mk	551903	
13.	Марина Пројовска	—	marina.projovska@resen.gov.mk	551903	
14.	Николче Џуевски	—	nikola.susevski@resen.gov.mk	—	



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19.	Суклевова Марија	ОПШТИНА РЕСЕН		452-456	
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21.	Недева Сауко	Македонија Ресен		075/282512	
22.	Тоце Назаровски	МВР на РМ ПСООН-Ресен Команда на ПОЈАБ/К	glazarovski@hotmail.com	071/282819	



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23.	Крсте Јусушевиќ	Одделение Рска			
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