FBIH ROADS FLOOD REPAIR AND UPGRADE
ENVIRONMENTAL AND SOCIAL ASSESSMENT

Non-Technical Summary

JP CESTE FEDERACIJE BIH
Public Company Roads of Federation of Bosnia and Herzegovina

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FBiH ROADS
FLOOD REPAIR AND UPGRADE
ENVIRONMENTAL AND SOCIAL ASSESSMENT

Non-Technical Summary

Project:	FBiH Roads - Flood Repair and Upgrade – Environmental and Social Assessment
Report:	Non-Technical Summary
Prepared by:	Public Company Roads of Federation of Bosnia and Herzegovina
Financed by:	European Bank for Reconstruction and Development
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1 PROJECT DESCRIPTION

The Public Company "Roads of Federation of Bosnia and Herzegovina" (the Company) has launched an overarching programme for the modernisation of the main roads on the territory of the Federation of Bosnia and Herzegovina (FBiH) to ensure adequate and appropriate road infrastructure by 2020. For this purpose, it has requested the Government of FBiH to ensure credit funds from International Financial Institutions (IFIs). The Government of FBiH has supported the initiative to ensure credit resources from IFIs in the amount of up to EUR 150 million for the Project "Modernization of the Main Roads in FBiH" (the Project). In addition to European Bank for Reconstruction and Development (EBRD) funding, the Company is expected to obtain funding from the European Investment Bank (EIB) and also from the World Bank (WB).

EBRD is considering providing finance for sovereign guaranteed loans for the Project. The Borrower will be the Ministry of Finance and Treasury of Bosnia and Herzegovina (BiH), whereas the Company, a limited liability company wholly owned by the Government of FBiH, will be responsible for implementing the Project on behalf of FBiH.

The reconstruction of the roads will include the construction of third lane to be used by slow vehicles, reconstruction of bridges and tunnels, construction of bypasses around four cities, construction of roads – improvement of the road elements in the existing corridor, reconstruction of roads and road surface and the solution to the problem of accident black-spots.

The Project is categorised "B" in accordance with EBRD's Environmental and Social Policy (ESP) (2014)[1]. Due diligence has been undertaken on the Project by independent consultants, and this NTS provides details of the main findings.

For purposes of practicality and simplification, **37 individual locations/sections covered by the Project and have been grouped into four main groups, so called "four main routes"[2]**, as follows (Figure 1 below):

1. **Route Sarajevo-Mostar** (includes: completion of one bypass section for the City of Mostar – one completely new bypass construction for the Municipality of Grude and reconstruction of one tunnel in the settlement of Ustirama),
2. **Route Sarajevo-Bihać** (includes: construction of two roads - improvement of road elements in the existing corridor for the City of Bihać-Bosanska Krupa and bypass for the border crossing Izačić-Kamenica, three locations proposed for reconstruction of roads and road surface and correction of road axle, reconstruction/rehabilitation of seven existing bridges on existing main roads, three completely new bypass constructions, flood repair and rehabilitation of three existing road sections or road elements),
3. **Route Sarajevo-Tuzla-Orašje** (reconstruction/rehabilitation of eight existing bridges and three existing road sections, reconstruction/rehabilitation of three existing tunnels and flood repair and rehabilitation of two existing bridges);
4. **Route Sarajevo-Goražde** (rehabilitation of one existing bridge over the Drina River).

[1] Available at http://www.ebrd.com/downloads/research/policies/esp-final.pdf
[2] Grouping has been carried out in accordance with the routes of preliminary field visits and field research for each section, conducted in the period from June 30 to July 08, 2015

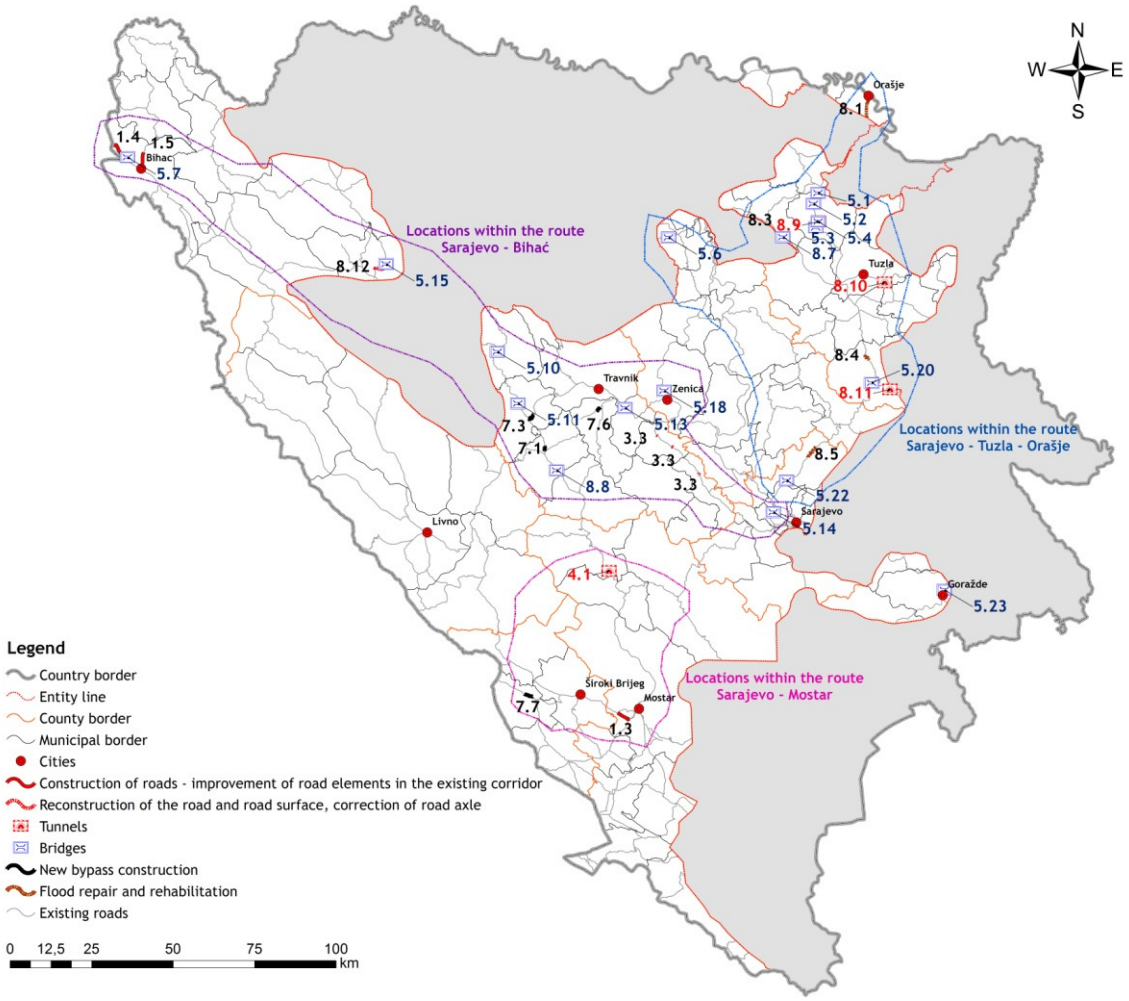

Figure 1: *Road Sections Covered by the Project*

Table 1 below provides detailed information on road components and road sections proposed for financing by EBRD.

Table 1: *Components Proposed for Financing by EBRD*

No.	Canton	Location/ Section		Type of works / Total length (km)	Expected implementation of works	Route
1	**CONSTRUCTION OF ROADS - IMPROVEMENT OF ROAD ELEMENTS IN THE EXISTING CORRIDOR**					
1.3	HNC	N	Mostar (Mostar Bypass)	Completion of section Međine – Miljkovići L=6.7	1 year	Sarajevo-Mostar
1.4	USC	N	Izačić - Kamenica	Construction of the road which will be linked to the planned bypass Bihać L=6.0	3 years	Sarajevo-Bihać
1.5	USC	N	Bihać – Bosanska Krupa	Construction of route L=3.6	1 year	Sarajevo-Bihać
3	**RECONSTRUCTION OF ROADS AND ROAD SURFACE, CORRECTION OF ROAD AXLE**					

No.	Canton	Location/ Section		Type of works / Total length (km)	Expected implementation of works	Route
3.3	CBC	013	Kaonik - Gromiljak	Completion of the reconstruction of Busovača-Draga (L=approx. 0.85 km)	6 months	Sarajevo-Bihać
				Reconstruction of "Delfine" (L = approx. 1.00 km)	6 months	Sarajevo-Bihać
				Completion of reconstruction on Jehovac-Brestovsko road section	4 months	Sarajevo-Bihać
4	**TUNNELS**					
4.1	HNC	003	Prozor – Jablanica 1	Tunnel "Jasen" in Ustirama settlement (km 17+686)	5 months	Sarajevo-Mostar
5	**BRIDGES**					
5.1	TC	003	Pelagićevo – Srebrenik	Rehabilitation of bridge over River Velika Tinja	6 months	Sarajevo-Tuzla-Orašje
5.2		003	Pelagićevo – Srebrenik	Rehabilitation of bridge over Špionički stream, Donja Špionica	6 months	Sarajevo-Tuzla-Orašje
5.3		004	Srebrenik – Šićki Brod 3	Rehabilitation of bridge over the Urvenica stream, Srebrenik	6 months	Sarajevo-Tuzla-Orašje
5.4		004	Srebrenik – Šićki Brod 3	Rehabilitation of bridge over River Tinja	6 months	Sarajevo-Tuzla-Orašje
5.5		004	Srebrenik – Šićki Brod 3	Overpass above railway Brčko-Banovići	6 months	Sarajevo-Tuzla-Orašje
5.6		008	Teslić (Barići) - Karuše	Reconstruction of bridge over Radušica stream	6 months	Sarajevo-Tuzla-Orašje
5.7	USC	001	GBH/HR (Izačić) – Bihać 4	Reconstruction of bridge over River Mrežnica	6 months	Sarajevo-Bihać
5.10	CBC	009	Jajce Jug – Donji Vakuf 1	Reconstruction of bridge over Rika stream	6 months	Sarajevo-Bihać
5.11		009	Jajce Jug – Donji Vakuf 1	Reconstruction of bridge over Sandžački stream	6 months	Sarajevo-Bihać
5.13		012	Nević Polje - Kaonik	Rehabilitation of bridge over River Bila in Stara Bila	6 months	Sarajevo-Bihać
5.14	SC	008	HW Jošanica 1 – Stup 1	Rehabilitation of bridge over River Bosna in Reljevo	7 months	Sarajevo-Bihać
5.15	USC	004	Kamičak – Ključ	Reconstruction of bridge over River Banjica	6 months	Sarajevo-Bihać
5.18	ZDC	007	Nemila – Lašva 1	Reconstruction of bridge over River Bosna, Zenica interchange	1 year and 6 months	Sarajevo-Bihać
5.20	TC	009	Vitalj – Olovo	Rehabilitation of bridge over River Drinjača in Kladanj	7 months	Sarajevo-Tuzla-Orašje
5.22	SC	009	Olovo - Semizovac	Rehabilitation of bridge over River Ljubina	6 months	Sarajevo-Tuzla-Orašje
5.23	BPC	N	Goražde Bypass	Rehabilitation of bridge over River Drina (existing bridge)	1 year	Sarajevo-Goražde
7	**NEW BYPASS CONSTRUCTION**					
7.1	CBC	N	Bugojno	Construction of the bypass	9 months	Sarajevo-Bihać

No.	Canton	Location/ Section		Type of works / Total length (km)	Expected implementation of works	Route
7.3	CBC	N	Donji Vakuf	Construction of the bypass	1 year and 10 months	Sarajevo-Bihać
7.6	CBC	N	Novi Travnik (BNT)	Completion of the bypass	1 year	Sarajevo-Bihać
7.7	WHC	N	Grude (M6 - R420 connection)	Construction of the northern bypass L=2.8	1 year	Sarajevo-Mostar
8	**FLOOD DAMAGE REPAIR AND REHABILITATION**					
8.1	PC	001	Border between BiH/HR – Lončari	Reconstruction/rehabilitation of carriageway, border BiH/HR Lončari	3 months	Sarajevo-Tuzla-Orašje
8.2	TC	003	Pelagićevo – Srebrenik	Reconstruction/rehabilitation of carriageway in Pelagićevo-Srebrenik	3 months	Sarajevo-Tuzla-Orašje
8.3		004	Srebrenik – Šićki Brod	Reconstruction/rehabilitation of carriageway in Srebrenik-Šićki Brod	6 months	Sarajevo-Tuzla-Orašje
8.4	TC	007	Živinice 1 – Vitalj	Reconstruction of slopes, construction of slow lane, Stupari-Vitalj	9 months	Sarajevo-Tuzla-Orašje
8.5	SC	009	Olovo – Semizovac	Reconstruction of slopes, construction of slow lane, Čevljanovići-Nišići	8 months	Sarajevo-Tuzla-Orašje
8.6	CBC	012	Nević Polje – Kaonik	Road reconstruction in Nević Polje-Kaonik	3 months	Sarajevo-Bihać
8.7	TC	010	Donja Orahovica – Šićki Brod 1	Bridge reconstruction M4-010-131 km 0+422, River Rašljevska, Donja Orahovica	3 months	Sarajevo-Tuzla-Orašje
8.8	CBC	001	Bugojno 2 – Gornji Vakuf	Bridge reconstruction M16.2-001-280 km 8+152, River Bunta, Gračanica	3 months	Sarajevo-Bihać
8.9	TC	004	Srebrenik – Šićki Brod	Rehabilitation of tunnel Drenik (Srebrenik-Šićki Brod)	8 months	Sarajevo-Tuzla-Orašje
8.10	TC	012	Simin Han 1 – Donje Čaparde	Rehabilitation of tunnel Čaklovići (Simin Han 1 – Donje Čaparde)	8 months	Sarajevo-Tuzla-Orašje
8.11	TC	001	Kladanj - Vlasenica	Rehabilitation of tunnel Ravne (Kladanj – Vlasenica)	8 months	Sarajevo-Tuzla-Orašje
8.12	USC	004	Kamičak - Ključ	Reconstruction of the road section Crljeni - Zgon	7 months	Sarajevo-Bihać

Source: Information provided by the Company

2 BASELINE INFORMATION

2.1 Legal and Regulatory Framework and EBRD Requirements

National legal requirements

Implementation of this Project requires compliance with relevant national environmental and social laws applicable in FBiH and BiH.

EBRD's 2014 Environmental and Social Policy (ESP)

The ESP[3] is a key EBRD document, which details the commitments of the Bank's Funding Agreement to promote environmentally sound and sustainable development in the full range of its activities and compliance with EU standards. The Policy encompasses 10 Project Requirements (PRs) designed to facilitate achievement of good international practices related to sustainable development that is expected from clients implementing projects financed by EBRD.

If a proposed business activity to be financed relates to existing facilities that do not meet PRs at the time of Bank's Board approval, the client will be required to adopt and implement an Environmental and Social Action Plan (ESAP), which is satisfactory to EBRD and delivered within the agreed timescale.

European Investment Bank Statement of Environmental and Social Principles and Standards (2009)

The Statement[4] outlines the standards that the Bank requires of the projects that it finances, and the responsibilities of the various parties.

World Bank Operational Policies

WB has developed a set of Operational Policies[5] to address Environmental and Social Safeguard Issues in Bank-supported projects. These are designed to avoid, mitigate, or minimize adverse environmental and social impacts of projects supported by WB.

2.2 Current Environmental and Social Situation and Considerations

2.2.1 Climatic Factors and Climate Change

1. Route Sarajevo – Mostar: the south of BiH, which corresponds to the area of proposed locations in Mostar, Grude and Ustirama, is characterized by Mediterranean and sub-Mediterranean climate.

2. Route Sarajevo – Tuzla – Orašje: this route passes through several Municipalities within three Cantons in FBiH as follows:

[3] Available in English and local languages in BiH at: http://www.ebrd.com/news/publications/policies/environmental-and-social-policy-esp.html
[4] Available at http://www.eib.org/attachments/strategies/eib_statement_esps_en.pdf
[5] Available at http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/EXTPOLICIES/EXTOPMANUAL/0,,menuPK:4564185~pagePK:64719906~piPK:64710996~theSitePK:502184,00.html

1. Municipality of Ilijaš (Canton Sarajevo) - characterized by two types of climates: (i) sub-temperate continental climate (up to 600 m above sea level); (ii) mountain climate (more than 600 m above sea level).
2. Municipality of Kladanj, Živinice, Tuzla, Srebrenik and Gračanica (Tuzla Canton) - characterized by: (i) humid continental climate (up to around 400 m above sea level); (ii) sub-temperate continental climate(up to around 900 m above sea level); (iii) mountain climate (more than 900 m above sea level).
3. Municipality of Orašje (Posavina Canton) - characterised by a humid continental climate (up to 400 m above sea level).

3. Route Sarajevo – Bihać: this route is characterized by a moderate continental and subalpine climate at its highest altitudes (central part of BiH, including Zenica and Bugojno) and moderate continental climate (northwest part of BiH – area of Bihać).

4. Goražde Bypass: this bypass is located in the Municipality of Goražde which is characterized by a sub-temperate continental climate, whereas the area surrounded by mountains (Jahorina and Vučevica) over 1,000 m above sea level is characterized by mountain climate.

2.2.2 Air Quality (Air Emissions)

As no relevant site-specific data exists on the air quality of the Project sites, air quality data from closest monitoring stations has been sourced.

2.2.3 Noise

In FBiH, ambient noise on main roads is not measured or monitored on a regular basis. In addition, there are no available data on daily ambient noise level on main roads considered in this Project.

2.2.4 Surface and Ground Water Quality

Monitoring of surface water quality is not carried out systematically for all surface watercourses; thus, there are no available data to be presented as detailed baseline information on water quality of the area envisaged by this Project, with the exception of available data for the main watercourses.

As systematic monitoring of groundwater quality is also not performed, there are no detailed data on groundwater quality to be presented as baseline conditions[6]. The proximity of watercourses for all the road sections envisaged by the Project was identified.

2.2.5 Geomorphology and Geology

1. Route Sarajevo – Mostar

Based on the findings from the field visit, the area of Mostar Bypass is characterized by a low-land terrain (280 m a.s.l) on the karstic substrate. The area of the proposed road section 1.3 is elevated in relation to the karstic field in the south (220 m a.s.l).

Area of proposed road section 7.7 Grude Bypass is characterized by a hilly area. The proposed road section follows terrain ridge (270-350 m a.s.l.) on a typical karstic substrate.

[6] Source: *State of the Environment Report BiH*, 2012

Road section 4.1 – Tunnel Ustirama is characterized by a steep slope on the left side of the tunnel (330 m a.s.l.) that continues descending to the River Rama on the right side of the tunnel (280 m a.s.l.).

2. Route Sarajevo – Tuzla – Orašje

The Municipality of Ilijaš (relevant for road sections 5.22 and 8.5) is characterized by a flat and hilly - mountainous terrain and is divided into two parts[7]:

1. The lower Ilijaš or narrow urban area located in the valley of Bosna and Misoča rivers with flat and hilly - mountainous terrain (about 25% of the municipal territory), and
2. The upper Ilijaš or hilly-mountainous unit marked by Crnoriječki, Čemerski and Gajevski plateau as well as river valleys Rača and Ljubina (about 75% of the municipal territory).

The geomorphology of Tuzla Canton (relevant for road sections 5.20, 8.11, 8.4, 8.10, 8.3, 5.5., 8.9, 5.3, 5.4, 8.2, 5.1, 5.2, 8.7 and 5.6) is hilly. Flat terrain (up to 300 m above sea level) makes 10.9% of the land, the mountain terrain (300-700 m above sea level) makes 78.3% and mountain terrain (above 700 m above sea level) makes 10.8% of the land. The highest altitude is 1,328 m. In the flat terrain, located in the northwest and southeast of Tuzla Canton, there are river valleys and lowland terrains[8].

In the Municipality of Orašje (relevant for road section 8.1), the terrain is flat within the valley of Sava River.

3. Route Sarajevo – Bihać

Based on the findings from the field visits, the area of proposed road sections consists of low-land terrain with mild slopes, except for the road section 5.15, where the existing bridge is located in the canyon of the River Banjica.

4. Goražde Bypass

The Municipality of Goražde (relevant for road section 5.23) is characterized by steep terrains with great variations in altitude; 75% of the territory belongs to the intersected mountainous terrains, mostly covered by forests and pastures, with altitudes 500 m above sea level. Plains and alluvial plateau around the Drina River are the most important part of the urban area in Goražde[9].

2.2.6 Land (past and current use, permanent or temporary acquisition)

The existing tunnels, bridges and roads to be rehabilitated/reconstructed within the Project fall under the jurisdiction of and are the property of the Public Company Roads of FBiH.

With regards to the road sections covered by the Project, land acquisition for two of the bypasses has been completed (Novi Travnik and Mostar). The land acquisition process for the remaining sections has not been initiated yet.

2.2.7 Soil

There is no specific legislation directly regulating this area and no systematic soil quality monitoring is performed in BiH[10]. The *Regulation on the Allowable Concentrations of Hazardous Substances in Soil and*

[7] Source: *Sustainable Development Strategy for the Municipality of Ilijaš 2013-2017* (Municipality of Ilijaš, 2012)
[8] Source: *Excerpt from the Risk Assessment of Natural and Other Disasters in Tuzla Canton*, 2013
[9] Source: *Local Environmental Action Plan of Municipality of Goražde* 2011-2016, 2010
[10] Source: *State of the Environment Report BiH*, Ministry of Foreign Trade and Economic Relations, 2012

Methods of their Testing[11] sets the limit values for heavy metals and other harmful substances only for agricultural soils.

The Project sites are characterized by:

- Automorphic soils that develop on the relatively highest part of landscape with a deep groundwater table. Soil profile is water-saturated only for a short period within a year;
- Hydromorphic soils that develop in planes or depressions on fine-textured parent material. Soil profile is water-saturated for a long period within a year including the growing season.

2.2.8 Biological and Ecological Resources

The fauna, flora, biodiversity and ecosystems in areas covered by the Project were analysed for each road section.

1. Route Sarajevo – Mostar

Common and specific plant species identified on road sections (bypasses 1.3 and 7.7) in this area belong to the following family and its corresponding species: Moraceae (fig - *Ficuscarica* L.), Hypericaceae (perforate St John's-wort - *Hypericumperforatum* L.) and Cichoriaceae (cichory - *Chicoriumintybus* L.). For the road section 4.1 (tunnel), the following family and species are identified: Fabaceae (acacia - *Robiniapseudoacacia* L. and clover - *Trifolium sp.).* No specific animal species were identified on the route Sarajevo – Mostar.

2. Route Sarajevo – Tuzla – Orašje

For the road sections 5.22, 5.20, 5.3, 5.4, 5.1, 5.2, 8.7 and 5.6 (bridges), the following common and specific plant species were identified: Asteraceae *(*greater burdock - *Arctiumlappa L.;* dandelion – *Taraxacumofficinale F.H. Wigg;* field-milk thistle - *Sonchusarvensis L.* and mugwort - *Artemisia sp.);*Pinaceae (spruce - Piceaabies (Lam.) Lk.; black pine - *Pinusnigra Arnold.)*; *Cichoriaceae*(cichory - *Chicoriumintybus L.); Fagaceae (*european beech - *Fagussylvatica L.* and beech - *Fagussylvatica L.); Fabaceae (*white clover – *Trifoliumrepens L.;* andacacia - *Robiniapseudoacacia L.); Salicaceae (*willow - *Salix sp.); Plantaginaceae (*nettle - *Plantagolanceolata L.).* On the road sections 8.5, 8.4 and 8.2 (roads), the identified family and corresponding plants species are: *Dryopteridaceae (*fern - *Dryopterisfilix – mas (L.) Schott)); Pinaceae (*white pine - *Pinussylvestris L.;* spruce - *Piceaabies (Lam.) Lk.* and black pine - *Pinusnigra Arnold).*On the road sections 8.11, 8.10 and 8.9 (tunnels), other identified plants species are: *Cichoriaceae (*cichory- *Chicoriumintybus L.)* and *Plantaginaceae (*nettle - *Plantagolanceolata L.).* No specific animal species were identified on this route.

3. Route Sarajevo – Bihać

Common and specific plant species identified on road sections (bypasses 1.4, 7.1, 7.3 and 7.6) in this area belong to the following families and species: Plantaginaceae (greater plantain - *Plantago major* L.); Fabaceae *(*white clover - *Trifoliumrepens L.* andacacia - *Robiniapseudoacacia L.);* Araliaceae *(*ivy - *Hedera helix L.);* Scrophulariaceae *(*mullein - *Verbascumphlomoides L.),* Urticacae *(*nettle - *Urticadioica L.),* Salicaceae*(*willow - *Salix sp.),* Oleaceae *(*ash - *Fraxinus sp.),* Betulaceae *(*silver beech - *Betulapendula Roth.),* Rosaceae *(*raspberry - *Rubusidaeus L.* and apple – *Malusdomestica Borkh.).* For the road sections 1.5, 3.3, 8.12 and 8.6 (roads), the following plants species are identified: Fabaceae *(*white clover - *Trifoliumrepens L.)* and Araliaceae (ivy - *Hedera helix L.).* For the road sections 5.7, 5.10, 5.11, 5.13, 5.14, 5.15, 5.18 and 8.8 (bridges), the following plant species are identified: Plantaginaceae (greater plantain - *Plantago major L.);* Fabaceae (white clover –

[11] Official Gazette of FBiH, No. 72/09

Trifoliumrepens L.; and acacia - Robiniapseudoacacia L.); Araliaceae (ivy - *Hedera helix L.);* Urticacae (nettle - *Urticadioica L.),* and Salicaceae (willow - *Salix sp.).* No specific animal species were identified on this route.

4. Goražde Bypass

Based on the document *Local Environmental Action Plan 2011 – 2016* (Municipality of Goražde, 2010), plant species in this area include: Norway Maple (*Acer platanoides* L.); Family: *Sapindaceae*; Greater Burdock *(Arctiumlappa* L.); Family: *Asteraceae;* Spruce (*Piceaabies* (Lam.) Lk.); Family: *Pinaceae;* Cichory *(Chicoriumintybus* L.); Family: *Cichoriaceae;* Nettle *(Urticadioica* L.); Family: *Urticacae;* Beech *(Fagussylvatica L.);* Family: *Fagaceae;* Dandelion *(Taraxacumofficinale* F.H. Wigg); Family: *Asteraceae; Scabiosaleucophyla* Borb.; Family: *Dipsacaceae;* White Clover *(Trifoliumrepens* L.); Family: *Fabaceae;* Field-milk Thistle (*Sonchusarvensis* L.); Family: Asteraceae.

2.2.9 Protected Areas

No protected areas that would be affected by the Project have been identified, and the road sections covered by this Project are not located in planned protected areas identified by the *Draft Spatial Plan of FBiH 2008-2028*.

2.2.10 Material Assets

The existence of material assets was observed during the field visits and categorised on the basis of their use as: residential structures, commercial structures and other structures. The figures provided below are based on an estimate of the number of assets that are in the range of 20 meters or less from the planned road, tunnel or bridge.

On the Sarajevo-Tuzla-Orašje route (with 1 bypass, 7 roads to be reconstructed, 3 tunnels and 7 bridges), there are an estimated 310 residential structures and 40 commercial structures in total. On the Sarajevo-Mostar route (with 2 bypasses and 1 tunnel), there are an estimated 50 residential structures in total and one cultural heritage structure. On the Sarajevo-Bihać route (with 8 bridges, 6 roads to be reconstructed and 4 bypasses), there are an estimated 280 residential structures and 110 commercial structures in total, and one cultural heritage structure was recorded.

2.2.11 Cultural Heritage, Including Architectural and Archaeological Heritage

Two cultural heritage structures in the Project area were recorded during the field visit.

The Church of St. Katharine is located in the proximity of the planned Grude bypass, in the range of 100 m and more from the road. Its construction was started in 1923 and completed 1939.

The cultural heritage structure detected in the vicinity of the Nević Polje - Kaonik road is located in the range of app. 20 m. from the planned road, and consists of a sculpture of a saint placed in a small park.

2.2.12 Socio-economic Status of the Population

Since no socio-economic survey was conducted in the field, information on the socio-economic status of the population was retrieved from the available data from the Institute for Statistics of FBiH[12].

[12] Institute for Statistics of FBiH (2015): *FBiH in Figures*

Table 2: *Basic Socio-Economic Data for all Four Planned Routes, 2014*

Canton	Population	No. of employed persons	No. of unemployed persons	Average salary	Key economic activities according to the number of businesses
1. Route Sarajevo – Mostar (HNC and WHC)					
HNC	224,029	48,245	33,818	866	• Professional, scientific / technical activities • Processing industry • Production and supply of electricity, gas, steam and air conditioning
WHC	81,527	16,415	10,974	780	• Wholesale and retail trade; repair of motor vehicles and motorcycles • Processing industry • Education
2. Route Sarajevo – Tuzla – Orašje (SC, TC and PC)					
SC	444,851	125,184	71,415	1,036	• Wholesale and retail trade; repair of motor vehicles and motorcycles • IT and communication • Production and supply of electricity, gas, steam and air conditioning
TC	499,144	58,135	98,797	739	• Wholesale and retail trade; repair of motor vehicles and motorcycles • Processing industry • Mining and quarrying
PC	38,669	5,660	5,578	693	• Processing industry • Wholesale and retail trade; repair of motor vehicles and motorcycles
3. Route Sarajevo – Bihać (CBC and USC)					
CBC	252,573	40,745	41,804	678	• Processing industry • Wholesale and retail trade; repair of motor vehicles and motorcycles • Construction work
USC	287,361	32,155	46,341	797	• Processing industry • Wholesale and retail trade; repair of motor vehicles and motorcycles
4. Goražde Route					
PBC	29,859	6,136	3,124	752	• Wholesale and retail trade; repair of motor vehicles and motorcycles • Processing industry • Construction

2.2.13 Other Social Issues: Community, Settlement Patterns and Residential Properties, Vulnerable Groups

No vulnerable groups were recorded during the field visits. The type of settlements and residential properties are described briefly for each route in Table 3 below.

Table 3: *Type of Settlements in the Project Area*

Route	Type of Settlement
Sarajevo – Mostar	The rural type of settlements with disperse villages dominates in this route. Residential properties are mostly two-storey houses.
Sarajevo - Tuzla- Orašje	The rural type of settlements dominates in this route. The majority of properties are residential two-storey houses located along the roads that will be rehabilitated. The Tuzla Bypass is an exception where the urban type of settlements is dominant, and the majority of properties are apartment buildings.
Sarajevo - Bihać	The rural type of settlements dominates in this route, and the majority of properties are residential two-storey houses. The Nević Polje – Kaonik road is an exception where the urban type of settlements is dominant with both apartment buildings and two-storey houses along the road.

3 ENVIRONMENTAL PERMITTING

3.1 Environmental Permitting Process in FBiH

In FBiH, environmental permitting procedures are regulated separately at two levels: the entity level and cantonal level, depending on the facility type, facility capacity, annual production, etc[13]. The environmental permitting procedure in FBiH is regulated by:

- The *Law on Environmental Protection*[14] and
- The *Regulation on Facilities Subject to Obligatory Environmental Impact Assessment and Facilities Which May be Constructed and Operated Only with a Valid Environmental Permit*[15].

The above-mentioned Regulation provides a list of activities and industrial facilities subject to mandatory Environmental Impact Assessment (EIA) and permitting procedures at FBiH level, as well as activities and facilities that undergo individual evaluation concerning the EIA requirement. If such individual evaluation demonstrates that an EIA is not required, the Federal Ministry of Environment and Tourism (FMoET) issues an Environmental Permit based on the documents already submitted, unless the given activity or facility is entirely exempt from environmental permitting. In case FMoET decides that an EIA is necessary, the investor is required to submit an Environmental Impact Study to FMoET within 6 months from the date of the decision on the preparation of such Study[16]. In this case FMoET issues the Environmental Permit based on the results of the evaluation of the Environmental Impact Study[17].

According to the aforementioned Regulation, FMoET will determine whether an EIA is necessary for the construction of new Cantonal or regional roads with a continuous length of more than 2 km and less than 10 km. As for the sections envisaged within this Project, this is the case for the construction of new bypasses (7.1, 7.3, 7.6 and 7.7) and roads (1.3, 1.4 and 1.5). These projects do not, however, trigger the requirements for an EBRD Category A project as their length is less than 10 km.

The Environmental Permit is issued by Cantonal ministries in charge of environmental protection (on the basis of the Request for Environmental Permit) for:

- plants or facilities which are not subject to EIA,
- plants or facilities with parameters below the thresholds defined by the above-mentioned Regulation,
- plants and facilities which are not listed under the Regulation,
- plants or facilities listed in Cantonal regulations.

In addition, some Cantons have their own environmental laws and bylaws, i.e. implementing regulations on the activities and facilities which can be operated only with a valid Environmental Permit. In all other aspects, the environmental legislation of the Cantons resembles that of FBiH legislation.

[13] *Law on Environmental Protection*
[14] Official Gazette of FBiH, No. 33/03 and 38/09
[15] Official Gazette of FBiH, No. 19/04
[16] Article 54a of the *Law on Environmental Protection*
[17] Article 64 of the *Law on Environmental Protection*

With regard to the sections covered by this Project, for reconstruction and rehabilitation of carriageway (8.1, 8.2, 8.3, 8.6, 8.12) and reconstruction of slopes and construction of third lanes (8.4, 8.5), the competent Cantonal ministries in charge of environmental protection will determine whether these projects need Environmental Permits on a case to case basis, based on the Request for Environmental Permit which will be submitted by the Company.

Reconstruction and rehabilitation of tunnels (4.1, 8.9, 8.10 and 8.11), reconstruction and rehabilitation of bridges (5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.10, 5.11, 5.13, 5.14, 5.15, 5.18, 5.20, 5.22, 5.23, 8.7 and 8.8) and reconstruction of road surface and correction of road axle (3.3) do not need an environmental permit.

4 EXPECTED ENVIRONMENTAL AND SOCIAL BENEFITS RELATED TO THE IMPLEMENTATION OF THE PROJECT

The implementation of the Project will contribute to both environmental and socioeconomic improvements, and will have positive impacts on the life quality of local communities. There are several environmental and social opportunities identified within the Project:

- Reconstruction/ rehabilitation of roads, bridges and tunnels as well as construction of bypass will improve connections between municipalities at national and regional level (this is expected to stimulate socioeconomic development of the areas);
- More efficient and safe road transport system: through reduced travel times, reduced number of road accidents, reduced vehicle operating and maintenance costs and reduced transportation costs for goods;
- Reduction of damage to the existing roads due to flooding;
- Improved transport system, accessibility and communication - road improvement in terms of surfacing and sloping (protection and stabilization); tunnel improvement in terms of illumination, establishment of drainage system; bridge improvement in terms of bridge stabilization;
- Reduction of erosion rate (improved road drainage system and reconstruction of bridges);
- Developed road infrastructure with improved access to and within settlements in the Project area,
- Enhancement of quality of life of the community in general (better access to key facilities: healthcare, education, employment, etc.),
- Benefits to vehicle travellers and users of public transportation means due to improved traffic connections and road capacity,
- Benefits for industrial sector and development of industrial activity due to improved connections with the international highway network, and the cost savings and reliability associated with a decrease in congestion,
- Direct employment and service opportunities: in line with the requirements of the *Public Procurement Law of BiH*, the tender will be of the international character and for that reason it is difficult to anticipate the origin of the company to be selected as Constructor; however practice in the construction industry in BiH indicates that local labourers are expected to be hired for the construction works,
- Construction works are expected to trigger the "multiplier effect" of the industry - employment of cooks, waiters and waitresses etc. in nearby services oriented business (restaurants and supplies industry).

5 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Analysis of the potential environmental and social impacts and benefits related to the proposed Project was carried out based on discussions with the Company, assessment of conceptual solutions for construction/reconstruction/rehabilitation works and preliminary field visits as part of the due diligence for the Project. Potential impacts and benefits were considered at the local, national and regional/global level.

Environmental and social impacts and benefits were identified for the following Project stages:

- construction,
- operation and
- maintenance.

The identified impacts were evaluated in terms of their significance, extent and duration.

Due to the nature of the Project, the phase of closure and decommissioning is not expected, as the roads are planned to be used for a long period of time.

5.1 Summary of Identified Environmental Impacts and Opportunities

Table 4 below provides a summary of the identified impacts in connection with the planned implementation of the Project.

Table 4: *Identified Environmental Impacts of Project Implementation*

Impacts Associated with Construction	Impacts Associated with Operation and Maintenance
Air Quality	
• **Exhaust gasses**-from the machinery involved during the construction phase and delays on the road due to reconstruction activities. This will lead to emission of gases such as SO2, CO2, CO, NO_x and VOC; • **Dust generation** of which the most important pollutants are particulate matters (PM10 and PM2,5). Possible sources of dust generation include: site preparation activities (in particular, excavation and levelling), possible blasting activities, handling of building materials such as excavated earth/substrate, gravel, sand, asphalt, cement and construction.	• **Exhaust gasses** - the regular daily traffic during operation phase will lead to emission of exhaust gases (SO_2, CO, CO_2, and NO_x). During road maintenance, exhaust gasses will be caused by machinery engaged in maintenance activities, i.e. winter maintenance of roads or regular periodic roads maintenance together with exhaust gases arising from daily traffic; • **Dust generation** of which the most important pollutants are particulate matters (PM_{10} and $PM_{2,5}$). Possible sources of dust include: materials used in winter road maintenance and handling of building materials used in regular periodic road maintenance carried out by the Contractor (i.e. sand, asphalt).
Noise Levels and Vibration	
• **Noise emission and noise disturbance** - noise emission is likely to appear during site preparation and construction activities. Possible sources of noise are: ground preparation activities such as excavation and levelling, use of tools and equipment, assembly of building materials on site, offloading of building materials such as gravel, sand, asphalt etc.	• **Noise emission and noise disturbance** - noise emission will occur due to regular daily traffic on main roads during the operational phase; • **Vibrations** may occur due to the presence of machinery, i.e. vehicles for winter road maintenance and specialized measuring

Impacts Associated with Construction	Impacts Associated with Operation and Maintenance
	vehicles[18] - vans used in the maintenance phase, and may affect the surrounding structures through the foundations or affect terrestrial Invertebrate species.

Site specific impacts:
• Nuisances to households in the vicinity of construction sites:
  ○ **Route Sarajevo - Mostar**: presence of households in the range 20 – 100 m from future construction sites.
  ○ **Route Sarajevo - Tuzla - Orašje**: presence of households and businesses in the range 20 – 100 m from future construction sites
  ○ **Route Sarajevo - Bihać**: presence of households in the range 20 – 50 m from future construction sites.
	-

Surface and Ground Water Quality	
• **Creation of additional water demand** - Both the presence of the workers and the construction works will create an increased demand for water in addition to the existing demand in surrounding area. Water will mostly be used in the creation of aggregates for construction works and for wetting of surfaces, as well for daily water demand of workers; • **Possible contamination of water -** may occur due to general construction activities and inadequate handling practices including inadequate extraction of resource material, handling of hazardous substances (i.e. chemicals and paint), inadequate waste handling, liquid and solid equipment damage which may lead to leakage of lubricants and fuel (increased blurring, input of fats and oils), etc.	• **Possible contamination of water,** i.e. leakage of lubricants and fuel from vehicles on main roads (operational phase) or machinery that will be used for road maintenance or leakage of polluting material during accidents.
Site specific impacts: • During the reconstruction/rehabilitation of bridges and road sections that are close to river flows (less than 10 m), as well as during the construction of new bypasses, there is a greater possibility for impacts on water quality.	**Site specific impacts:** • During the operation and maintenance of bridges and road sections that are close to river flows (less than 10 m), as well as during the construction of new bypasses, there is a greater possibility for impacts on water quality.
Geomorphology and Soil Quality	
• Occurrence of landslide and rockfall with regards to terrain type and slope stability; • Erosion - topsoil stripping may bring risks of erosion of exposed ground and increased water runoff and siltation of watercourses; • Soil compaction due to construction machinery (vehicles and equipment for construction) moving around the location; • Uncontrolled (storing, handling and depositing) and untreated wastes are major sources of pollution that can disrupt soil quality.	• Soil pollution as a result of the emissions from traffic pollutants (e.g. particulate matter PM2.5 and PM10, SO_2, NO_x, CO and VOCs); • During winter period, salting of roadsides may lead to soil contamination and subsequent decreases in soil fertility.
Site specific impacts: • Route Sarajevo – Tuzla – Orašje: road section (8.10) is susceptible to landslides.	-
Land Use	
Construction of **bypasses** may lead to: • Changes in land use – e.g. converting the land from agricultural to construction land; • Deforestation in terms of cutting, clearing, and removal of forest or stand of trees where land is converted to a non-forest	-

[18]According to the information given by the Company, there are 21 specialized measuring vehicles (vans) that are used for measurements of the straightness of the road, cracks, cracks width and depth etc.

Impacts Associated with Construction	Impacts Associated with Operation and Maintenance
use; • Interrupted land use by inadequate waste management in terms of uncontrolled and untreated wastes (e.g. accidental spills from construction machinery, solid waste generated by workers at the construction site) that might be harmful to local communities.	
Biological and Ecological Resources	
• Work of heavy machinery during the construction phase may lead to plants being covered with dust (e.g. blockage and damage to stomata, shading, abrasion of leaf surface or cuticle), which will affect the feeding base for vertebrate and invertebrate species; • Arranged trenches (corridor restrictions) pose a risk to small animals (which might fall into the trench and get injured) and cause temporary fragmentation of habitats (applicable for bypasses - 1.3 and 7.7 at the route Sarajevo – Mostar as well as for 1.4, 7.1, 7.3 and 7.6 at the route Sarajevo – Bihać); • Removal of vegetative cover will destroy whereabouts of animals (applicable for bypasses - 1.3 and 7.7 at the route Sarajevo – Mostar as well as for 1.4, 7.1, 7.3 and 7.6 at the route Sarajevo – Bihać); • Pollution of water and soil with hazardous substances (fuel and oils in case of spills) may harm fish, amphibians, water birds as well as animals living in the place of spillage and its adjacent territory (applicable for bridges – 5.22, 5.20, 5.5, 5.3, 5.4, 5.1, 5.2, 5.6, 5.7, 5.10, 5.11, 5.13, 5.14, 5.15, 5.18, 8.8, and 5.23).	• Potential impacts on flora and fauna may be caused by vibration and noise from the traffic, and by water and soil contamination (e.g. accidental spills) on newly constructed bypasses.
Protected Areas	
Road sections envisaged within this Project are not located in any existing and planned protected areas identified by the Spatial Plan of the FBiH (2008-2028). Significant impacts on protected areas are not expected during the construction, operation and maintenance phase.	
Landscape and Visual Aspects	
• Partial alternation of landscape and visual aspects maybe expected with organization of construction sites, presence of personnel and machinery on site as well as building of new infrastructure.	-
Site specific impacts: • The construction of the bypasses (applicable for 1.3 and 7.7 at the route Sarajevo – Mostar as well as for 1.4, 7.1, 7.3 and 7.6 at the route Sarajevo – Bihać) may lead to the following, if not properly managed: o Occurrence of quarries and borrow sites - these facilities, which represent the sources for road building materials, may have permanent visual and aesthetic intrusion if their rehabilitation is neglected; o Disharmony of natural relief and morphology of the landscape may occur if the route does not follow the relief as closely as possible and cause the formation of major cut and fill zones, out of character with the terrain in height, length, and incline of slopes or if the route cuts transversely or diagonally across a system of parallel valleys or does not avoid landscape with an uneven relief; o Destruction of vegetation - if the bypass results in deforestation, destroys or does not bypass isolated trees, avenue trees or hedges or if it interrupts the continuity of vegetation in valley or other setting; o Impacts on structure and pattern of the landscape - if the bypass distorts the existing field system by cutting obliquely through a rectangular farm system and creating numerous	-

Impacts Associated with Construction	Impacts Associated with Operation and Maintenance
isolated plots which may be difficult to cultivate, out of place, and thus aesthetically disturbing.	
Road Safety	
• **Traffic congestion and obstructions** on road sections - increased traffic flow, leading to congestion and obstruction is likely to be experienced on local roads and main roads. This is particularly expected during delivery of construction material to site and collection of waste from construction activities; • **Occurrence of trenches and slopes** may be expected during construction activities such as earth works and temporary storage of construction material.	-

5.2 Cumulative Impacts

During the construction/ reconstruction/ rehabilitation activities, several cumulative impacts will appear. They are expected to be the result of traffic in the *operation phase*, due to:

a) emissions of polluting matters in the air though the combustion of fuel in vehicles and machinery that have a negative impact on the quality of soil, surface waters and groundwater, especially when it comes to heavy metals and
b) emissions of noise and vibration, which may result in disturbance of the surrounding area.

The above stated cumulative effects have been identified in detail and explained in the corresponding paragraphs regarding the impacts on air quality, water resources, traffic, noise and vibration, land use and changes, habitats, ecology (flora and fauna) and nature conservation, etc.

5.3 Environmental Mitigation Measures

An outline of the feasible cost-effective measures to avoid, minimise, mitigate or compensate for environmental impacts to acceptable levels and address other environmental issues were suggested. Mitigation measures need to be implemented by the Company/ Contractor during the pre-construction phase, construction/ reconstruction/ rehabilitation activities and the operation and maintenance phase.

Mitigations measures during the **pre-construction phase** include general mitigation measures, such as:

i. Submission of applications for and obtaining all the necessary permits (Water Permit, Environmental Permit, Urban Consent),
ii. Integration of proposed applicable mitigation measures in the design phase,
iii. Definition of the general conditions/ requirements that should be sought from the Contractor,
iv. Development of Management Plans (to be developed as an inseparable part of the contract, i.e. Construction Waste Management Plan, Construction Site Organization Plan, Environmental Management Plan (with regard to air management, noise management, soil management, spill response for the case of spilling of hazardous substances, emergency preparedness and response, management of traffic), Management Plan of Fire and Explosion and Occupational Safety Management Plan.

Environmental mitigation measures during the **construction phase** (Table 5) and **operation phase** (Table 6) are presented below.

Table 5: *Environmental Mitigation Measures during the Construction Phase*

Impacts	Proposed mitigation measures	Responsibility	Comment
Air emissions: ○ exhaust gasses; ○ dust generation	High quality fossil fuels(with low percentage of sulphur and lead) need to be used for construction machinery and equipment All machines and vehicles to be used in construction/ reconstruction/ rehabilitation activities must have use permit Vehicles need to be regularly maintained – the Contractor needs to provide on construction site documentation and certificates of regular annual maintenance of vehicles in line with regulations; Equipment with installed filters to reduce soot emission needs to be used When not in use the equipment and machinery need to be shut down Maximum speed of the vehicle on unpaved roads should be restricted to 20 km/h Moistening/ wetting the site to prevent dust occurrence (in areas with dry soils or where activities generate dust) Sand and gravel materials need to be transported in covered trucks	Contractor (third party) The Company	Contractor is responsible for provision of proposed mitigation measures The Company is responsible for supervision of the implementation of proposed measures
Increased level of noise and vibration: ○ noise emission and noise disturbance; ○ vibration	Restriction of works to period of day only (period of day: 06:00 to 22:00, period of night: 22:00-06:00)[19] In the case of noise complaints by local residents, simultaneous use of machines that generate noise over 70 dB needs to be limited In the case of noise complaints by local residents, number of trucks per day visiting the site needs to be reduced, whenever possible All machines and vehicles to be used in construction/ reconstruction/ rehabilitation activities must have use/operation permit	Contractor (third party) The Company	Contractor is responsible for provision of proposed mitigation measures The Company is responsible for supervision of the implementation of proposed measures

[19] According to the *Law on Protection from Noise* (Official Gazette of FBiH, No. 110/12)

Impacts	Proposed mitigation measures	Responsibility	Comment
	When not in use the equipment and machinery need to be shut down Maximum speed of the vehicle on unpaved roads should be restricted to 20 km/h		
Water consumption and emissions into water: ○ creation of additional water demand, ○ possible contamination of surface water and groundwater	Monitoring of water consumption Disposal of waste on temporary landfill for construction and demolition waste designated by the competent municipality Separation of hazardous waste is required, as well as the engagement of authorized companies for final waste disposal Oil and fuel collection systems to be fitted to prevent leakage Vehicles and machines need to be regularly maintained to prevent leakage – the Contractor needs to provide on construction site documentation and certificates of regular annual maintenance of vehicles in line with regulations; Installation of oil separators in accordance with EN ISO 858-1 and 858-2	Contractor (third party) The Company	Contractor is responsible for provision of proposed mitigation measures The Company is responsible for supervision of the implementation of proposed measures
Soil degradation and emissions to soil: ○ soil erosion; ○ borrow pit excavation; ○ soil contamination by oils, fuels and other hazardous substances ○ occurrence of landslide and rockfall	Topsoil from borrow pit areas should be saved and reused in re-vegetating the pits Control during earthworks to prevent degradation of terrain stability is required Excavation and restoration of the borrow areas and their surroundings should be performed in an environmentally sound manner Borrow pit areas will be graded to ensure drainage and visual uniformity Installation of drainage structures for proper drainage of water is required (drainage pipes and the accompanying channels) Proper waste disposal; separation of hazardous waste; engagement of authorized companies for final waste disposal;	Contractor (third party) The Company	Contractor is responsible for provision of proposed mitigation measures The Company is responsible for supervision of the implementation of proposed measures

Impacts	Proposed mitigation measures	Responsibility	Comment
	Oil and fuel collection systems to be fitted to prevent leakage		
Conversion of the area and conversion of present land use (applicable for bypass construction): o changes in land use; o deforestation o interrupted land use by uncontrolled and inadequate waste management	The land determined for use by the Project can only be used for the construction/ reconstruction/ rehabilitation activities and no other land is available for i.e. storage of building material, parking of the heavy machinery etc. in terms of preventing land disturbance Disposal of waste on temporary landfill for construction and demolition waste designated by the competent municipality Separation of hazardous waste; engagement of authorized companies for final waste disposal; Oil and fuel collection systems to be fitted to prevent leakage; Restoration of deforested areas upon completion of construction works (bypasses).	Contractor (third party) The Company	Contractor is responsible for provision of proposed mitigation measures The Company is responsible for supervision of the implementation of proposed measures
Removal of vegetation cover and topsoil, degradation of biological and ecological resources: o destruction of aquatic habitat due to changes in water flow and quality in terms of sediment load (in case of bridge rehabilitation) o arranged trenches (corridor restrictions) pose a risk to small animals (they might fall into the trench and get injured) and cause temporary fragmentation of habitat o removal of vegetative cover	Minimise work in or along rivers such as sand mining and collection of water from these rivers for construction work Prevent and control oil, fuel, and chemical spillages that can find their way to the streams Topsoil must be must be returned and re-vegetation must be performed after construction/ reconstruction/ rehabilitation activities are done Planting ligneous plants around roads and adjacent areas can help to support local flora and fauna Fencing of the sites to prevent fall of small animals into trenches The land determined for use by the Project can only be used for the construction/ reconstruction/ rehabilitation activities and no other land is available for i.e. storage of building material, parking of the heavy machinery etc. in terms of protection of whereabouts of animals	Contractor (third party) The Company	Contractor is responsible for provision of proposed mitigation measures The Company is responsible for supervision of the implementation of proposed measures
Decrease in the current aesthetic	Seeding, planting and re-vegetation	Contractor	Contractor is

Impacts	Proposed mitigation measures	Responsibility	Comment
value of the landscape (applicable for bypass construction): ○ disharmony of natural relief and morphology of the landscape ○ structure and pattern of the landscape	with autochthonous species should cover areas affected by the Project; Ensuring construction activities are restricted to designated construction sites.	(third party) The Company	responsible for provision of proposed mitigation measures The Company is responsible for supervision of the implementation of proposed measures
Inadequate traffic management during construction: ○ traffic congestion and obstructions on road sections ○ occurrence of trenches and slopes	Implementation of Environment Management Plan which includes the: - Traffic Management Plan Installation of proper traffic signs Levelling of ground to reduce the occurrence of trenches and slopes	Contractor (third party) The Company	Contractor is responsible for provision of proposed mitigation measures The Company is responsible for supervision of the implementation of proposed measures
Inadequate waste handling	Implementation of Construction Waste Management Plan	Contractor (third party) The Company	Contractor is responsible for provision of proposed mitigation measures The Company is responsible for supervision of the implementation of proposed measures
Inadequate organization of construction site	Implementation of Construction Site Organization Plan	Contractor (third party) The Company	Contractor is responsible for provision of proposed mitigation measures The Company is responsible for supervision of the implementation of proposed measures
Inadequate workers safety	Implementation of Management Plan on Safety at Work	Contractor (third party) The Company	Contractor is responsible for provision of proposed mitigation measures The Company is responsible for supervision of the implementation of proposed measures
Accidental situations i.e. spills, leakage	Implementation of Environmental Management Plan which includes: - Spill Response Plan, - Emergency Preparedness and	Contractor (third party) The Company	Contractor is responsible for provision of proposed mitigation measures

Impacts	Proposed mitigation measures	Responsibility	Comment
	Response Plan. Implementation of Management Plan of Fire and Explosion		The Company is responsible for supervision of the implementation of proposed measures
Materials supply and transport	Implementation of Construction Site Organization Plan to ensure materials are transported in covered vehicles to reduce impacts on environment and Management Plan on Safety at Work to ensure materials are used in accordance with Bill of Quantities	Contractor (third party) The Company	Contractor is responsible for provision of proposed mitigation measures The Company is responsible for supervision of the implementation of proposed measures

Table 6: *Environmental Mitigation Measures during Operation Phase*

Impacts	Proposed mitigation measures	Responsibility	Comment
Air emissions: ○ exhaust gasses; ○ dust generation	▪ Influence on air quality is dependent on the movement of vehicle traffic, and cannot be controlled. The only potential safety measure is the creation of a protective green belt which will partially absorb pollutants (CO_2) (applicable only for unpopulated areas in cases of new bypass construction)	The Contractor for execution of works (third party) Company	Contractor from the construction phase is responsible for the planting of the green belt as a part of re-vegetation activity
Increased level of noise and vibration: ○ noise emission and noise disturbance; ○ vibration	▪ In case of noise complaints by local residents, the permissible vehicle speed limits should be reduced ▪ (Vibration will be reduced because of the improvement of new state of reconstructed/ rehabilitated road section in comparison to the present state in comparison to the present state of the proposed road sections and therefore no mitigation measures are required)	Contractor for maintenance (third party) Company	Contractor is responsible for provision of proposed mitigation measures Company is responsible for supervision of the implementation of proposed measures
Emissions to water: ○ possible contamination of surface water and groundwater in the cases of leakage of hazardous substances	▪ Procurement and use of adsorbing materials in case of accidental spills during everyday traffic ▪ Regular maintenance of oil separators and ensuring that waste oils are handed over to authorized organizations	Contractor for maintenance (third party) Company	Contractor is responsible for provision of proposed mitigation measures Company is responsible for supervision of the implementation of proposed measures
Soil degradation and emissions to soil:	▪ Procurement and use of adsorbing materials in case of accidental spills	Contractor for maintenance	Contractor is responsible for provision of proposed

Impacts	Proposed mitigation measures	Responsibility	Comment
○ soil contamination by oils, fuels and other hazardous substances	during everyday traffic	(third party) Company	mitigation measures Company is responsible for supervision of the implementation of proposed measures
Accidental situations i.e. spills, leakage	▪ Procurement and use of adsorbing materials in case of accidental spills during everyday traffic	Contractor for maintenance (third party) Company	Contractor is responsible for provision of proposed mitigation measures Company is responsible for supervision of the implementation of proposed measures

6 HEALTH AND SAFETY ISSUES AND MITIGATION MEASURES

6.1 Occupational Health and Safety Issues, Including Explosives Safety

Contractors engaged for construction works and other related services are responsible for the health and safety of their employees at construction sites. Contractors are required to apply the OHS requirements laid down by the *Law on Safety at Work*[20] and the *Decree on Construction Site Organization, Mandatory Documentation on Construction Site and Construction Work Participants*[21], i.e. utilize sufficient resources and personnel to ensure health and safety measures on construction sites. Compliance with OHS requirements needs to be supervised by the Supervisory Authority (i.e., the legal entity responsible for the overall supervision of construction works and by the Company's Main Engineer for Health and Safety).

According to the aforementioned Decree, Contractors engaged for construction works need to develop Construction Site Organization Plan which includes organization of preliminary works and site arrangements works during and after construction, technological scheme, Environmental Management Plan and Safety Management Plan. This Plan provides for development of other accompanying plans among which is the Fire Fighting and Explosion Management Plan, which prescribes detailed measures for fire fighting and avoiding the possibility of explosions at construction site. Explosives may cause negative impacts like soil vibrations, emissions of dust and other pollutants into the air, fires, etc. Detailed prescriptions on safety at construction site, including explosives safety, are outlined in the Company's *Guidelines for the Design, Construction, Maintenance and Supervision, Volume II: Construction, Part 1: General Technical Requirements, Section 2.1.13: Construction Site Organization*[22] which the Contractors need to adhere to during construction works.

6.2 Disruption, Health and Safety during Construction

Contractors need to implement safety measures to restrict the potential for disruptions and avoid health and safety hazards. According to the *Decree on Construction Site Organization, Mandatory Documentation on Construction Site and Construction Work Participants*, the construction site needs to be fenced in order to keep off unauthorised persons. It should also be provided with a panel containing all relevant information about the construction works and construction works participants (the investor's name, name of the Contractor, the name of the designer, the name and the type of construction, the start and end of works). In order to minimise negative impacts, the Contractors should always implement good engineering practice, correctly maintain and operate machinery and equipment, and handle appropriately the construction materials. Communities likely to be affected will also be notified of works and potential disruption.

A Traffic Management Plan needs to be developed by the Contractor which should include, but not be limited to the following:

- Plan for construction works by stages,
- Commencement date and duration of works,
- Overview of the existing traffic conditions adjacent to the site,
- Identification of affected public domain areas e.g. plan from vehicle access points and from site,
- Mitigation measures,
- Public transport services plan i.e. rescheduling, interruptions and similar,

[20] Official Gazette of SR BiH, no. 22/90
[21] Official Gazette of FBiH, No. 48/09, 75/09 and 93/12
[22] Faculty of Civil and Geodetic Engineering of the University of Ljubljana and DDC Consulting & Engineering Ltd, 2005

- Emergency vehicle access, pedestrian access.

Contractors are responsible for the health and safety of their employees at construction sites. Contractors need to be in line with requirements laid down by the *Law on Safety at Work* and the *Decree on Construction Site Organization, Mandatory Documentation on Construction Site and Construction Work Participants*. According to this Decree, the Contractor needs to develop an Occupational Safety Management Plan which prescribes mandatory equipment for occupational health and safety, preliminary medical assistance and plan for alerting the official medical emergency assistance.

7 SOCIAL IMPACTS AND MITIGATION MEASURES

During the E&S impact assessment, a number of both long-term and short-term benefits and adverse impacts pertaining to Project activities were identified. The impacts are anticipated in different phases of Project implementation, from pre-construction to construction and operation phase, and they directly or indirectly affect the local communities, similar to every infrastructural project. In order to mitigate the adverse impacts, a set of mitigation measures was defined. Table 7 below shows each identified impact and the proposed measures.

Table 7: *Identified Social Benefits and Impacts with Mitigation Measures*

Impact	Description of Impacts	Proposed mitigation measures
Land acquisition, physical and economic displacement	The Project will involve land acquisition and physical resettlement, particularly for the purpose of construction of the bypasses. The exact scope of such activities will be known after the expropriation studies for all sections are prepared in line with the provisions of the Law on Expropriation of FBiH. The land acquisition process for two of the bypasses has been completed (Novi Travnik and Mostar), whereas the process has not been initiated yet for the remaining five bypasses (Bihać, Bugojno, Grude, Tuzla South and Donji Vakuf) and sections Olovo – Semizovac and Živinice – Vitalj.	▪ Consideration of micro-alignments in design documents wherever possible ▪ Implementation of LARF (and development and implementation of LARPs for each section requiring land acquisition)
Impacts on living conditions	Negative impacts refer to disturbances to surrounding communities related to noise, disposal of construction waste, disruption to water and electricity supply, telephone and Internet connections, waste collection and regular public transport, delivery of mail to households and businesses. For vulnerable groups, such as elderly and ill, and people with special needs in emergency situations medical and other assistance may be delayed due to traffic congestions. Transportation of children to school may be affected as well.	▪ Informing the local communities on the extent of works and duration prior to the commencement of construction works in line with the requirements set out in SEP
Access restrictions	Impacts related to road access restrictions are expected to be temporary and are associated with limited access due to heavy machinery parks and disposal of construction waste. During operation and maintenance, occasional repairs that would lead to similar impacts as during construction may be expected, albeit in a shorter time scale and to lesser extent.	▪ Implementation of SEP, in particular the provisions on providing timely information to citizens through the media about upcoming construction works, expected duration of the works, alternative routes, etc. ▪ Implementation of Traffic Management Plan ▪ Compensation for households and businesses affected by access restrictions and livelihood restoration assistance in accordance with LARF
Restrictions on land use and damage to private property	It is expected that it will be necessary to temporarily occupy several privately owned land plots for the purpose of construction of access roads and placement of staff, machines and material. Construction activities damage the land plots, fences and railings due to disposal of construction waste and heavy machinery parks.	▪ Avoid or bypass properties and economic assets within construction routes where possible ▪ The Contractor will agree on the organization of the construction site with municipalities and use the road safety zones for disposal of construction and maintenance materials ▪ In case occasional land use cannot be avoided, compensation will be provided to affected owners/users

Impact	Description of Impacts	Proposed mitigation measures
		▪ Compensation to be provided for loss of the possibility to continue to use land as intended
Impacts on cultural heritage	Impacts on cultural, archaeological and architectural heritage may include restrictions of access to such sites, or temporary and permanent damage to the sites. Restricted access may affect visitors of the sites and potential workers. Two cultural/religious monuments have been identified at Project sites (the cultural heritage structure in the vicinity of the Nević Polje – Kaonik, located app. 20 m. from the planned road, consisting of a sculpture of a saint placed in a small park, and the Church of St. Katharine located in the proximity of the planned Grude Bypass, in the range of 100 m. and more from the road).	▪ Implementation of chance find procedure as set out by local legislation ▪ Implementation of Construction Site Organization Plan ▪ Proper information disclosure and consultations in line with SEP
Job creation and impacts on local businesses	During the construction phase, an influx of mainly male workers, both skilled and unskilled labourers, is expected in the local communities near construction sites. Since construction sites are a major source of employment, and new business opportunities are expected to be created for local businesses such as transporters, suppliers and other service providers, the Project is expected to have positive impacts on the local labour market, increase employment rates and possibly the average income for the local population.	▪ Informing the public in advance about the planned construction works, in order to enable businesses and workforce in the area to prepare for the demand on the market
Impacts on local traffic	During the construction of tunnels, bridges and rehabilitation of roads, local traffic will be increased (including heavy machinery and trucks) and operated on only one lane causing traffic delays and restricted access to these road sections. During the construction of bypasses, the local traffic on the roads surrounding the new route will be increased (including heavy machinery and trucks) and operated with speed restrictions and traffic limitations causing traffic delays and restricted access on these road sections.	▪ Implementation of Traffic Management Plan; introduction of appropriate traffic signalization and appropriate warning signs; ▪ Implementation of SEP, in particular the provisions on providing timely information to citizens through the media about upcoming construction works, expected duration of the works, alternative routes, etc.
Temporary occupation of privately owned land plots for the purpose of construction of access roads and placement of staff, machines and material	During construction and maintenance, private land could be used for construction activities. Owners that are affected by a partial loss of their real properties are entitled to request complete expropriation and the corresponding compensation, in case that partial expropriation	▪ Implement LARF and LARPs (adverse impacts on land-use to be compensated in cash, as defined by the Expropriation Law of FBiH)

Impact	Description of Impacts	Proposed mitigation measures
	would deteriorate the economic situation of the actual property owner or make the remaining part of the property useless or difficult to use.	
Connectivity and developed road infrastructure	The impacts expected during the operational phase include improved connectivity, better connectivity of isolated settlements that depend on unsafe or partly safe roads (this refers especially to the road section Crljeni – Zgon that is currently unpaved and has been severely damaged by floods, and on which the settlement Crljeni solely depends for any kind of transportation), enhancement of quality of life of the community in general, and benefits to vehicle users and users of public transportation due to improved traffic connections and capacity delivered by the roads. In addition, the industrial sector will benefit from improved connections, cost savings and reliability associated with a decrease in congestion due to improved and safer transportation of goods and workers, at the same time improving access of potential customers and visitors. Newly constructed roads could bring market opportunities for local businesses, while decreasing traffic from previously used roads.	▪ Implementation of Traffic Management Plan; introduction of appropriate traffic signalization and appropriate warning signs.

7.1 Environmental and Social Management Plans, Mitigation Measures and Compensatory Measures

Based on the assessment of the adverse social and environmental impacts, an Environmental and Social Management Plan (ESMP) was drafted. The ESMP outlines the environmental and social management and mitigation measures and monitoring plans required to implement the Project in accordance with the requirements of the EBRD and applicable national legislation.

It provides an overview of the environmental and social baseline conditions on the routes of the Project, summarises the potential impacts associated with the proposed rehabilitation and improvement works and construction activities and sets out the management measures required to mitigate any potential impacts as well as a monitoring plan for all phases of Project implementation. A brief overview of the monitoring plan is given in Chapter 7.

In addition, prior to the commencement of construction works, several other management plans are necessary in order to ensure the adequate implementation of the Project.

- As part of the tender documentation for the contractor, the Company shall develop a Construction Site Organization Plan (CSOP) that will outline the specific requirements for both execution of works and implementation of mitigation measures for identified Project impacts during construction and operation of the roads, tunnels and bridges,
- The Company has developed, in the framework of the Project, a Land Acquisition Resettlement Framework (LARF) that sets out the principles for addressing the potential impacts of land acquisition and serves as a guide for the development of specific action plans within the Project, i.e. the Land Acquisition Resettlement Plans (LARPs),

In order to ensure comprehensive and timely stakeholder management prior and during construction works, but also during operation and maintenance, the Company has developed a SEP.

8 MONITORING OF IMPACTS

Table 8: *Summary of Monitoring Requirements*

No.	Potential impact / Issue	Which parameter is to be monitored?	Where will the monitoring of parameters are performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost (EUR)	Responsibility / Who will perform monitoring
CONSTRUCTION PHASE							
1.	Access restrictions	• Provided alternative access, • Traffic Management Plan in place, • Implementation of SEP, in particular its provisions on timely information to citizens through the media about upcoming construction works, expected duration of the works, alternative routes, etc., • Implementation of LARF provisions on compensation procedures for businesses affected by access restrictions and livelihood restoration assistance.	Work site	Supervision	Random checks at least once per week during construction activities	-	Supervising Engineer/ the Company
2.	Restrictions on land use and damage to the private property (agricultural plots, horizontal infrastructure, fences and railings) due to disposal of construction waste, work camps and parks of heavy machinery	• Construction Site Organization Plan (CSOP) in place, • Disposal of construction and maintenance materials, • Position of work camps and heavy machinery parks, • Implementation of LARF provisions on compensation procedures in case occasional land use cannot be avoided, compensation will be provided to affected owners/users and livelihood restoration assistance.	Work site	Observation and supervision by Construction Supervisor	Prior to construction and random checks at least once per week during construction activities	-	Supervising Engineer/ the Company
3.	Impacts on cultural heritage	• CSOP in place, • Implementation of SEP, in particular its provisions on timely information to stakeholders.	Work site	Inspection by Construction Supervisor	Prior to construction	-	The Company
4.	Job creation and impacts on local businesses	• Implementation of SEP, in particular its provisions on timely information to businesses and workforce in the area to prepare for the demand on the market.	Work site	Inspection by Construction Supervisor	Prior to construction	-	Contractor
5.	Impacts on living	• Traffic Management Plan in place,	Work site	Inspection by	Prior to construction	-	The Company

No.	Potential impact / Issue	Which parameter is to be monitored?	Where will the monitoring of parameters are performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost (EUR)	Responsibility / Who will perform monitoring
	conditions of local communities	• Implementation of SEP, in particular its provisions on timely information to stakeholders.		Construction Supervisor			
6.	Impacts on local traffic (increase of local traffic, including heavy machinery and trucks, operation of roads with only one lane causing traffic delays and limited access)	• Traffic Management Plan in place, • Traffic patterns, • Implementation of SEP, in particular its provisions on timely information to citizens through the media about upcoming construction works, expected duration of the works, alternative routes, etc.	At and near work site	Inspection and observation by Construction Supervisor	Random checks on a weekly basis	-	Supervising Engineer/ the Company
7.	Temporary occupation of privately owned land plots for the purpose of construction of access roads and placement of staff, machines and material	• Implementation of LARF and development of LARPs for each section affected by land acquisition.	Work site	Inspection by Construction Supervisor	Prior to construction and during construction on a needs basis	-	The Company
8.	Air emissions: • exhaust gasses; • dust generation	• Level of dust (amounts of sediment particles and airborne particles) • Exhaust emissions from vehicles and equipment	Work site	Measurement devices Inspection and observation by Construction Supervisor	During construction on a needs basis and after complaints	-	The Contractor
9.	Increased level of noise and vibration: • noise emission and noise	Noise levels defined by national legislation and EU legislation: • 45 dB (A) by night and 55 dB by day	Work site	Measurement devices	Upon complaints from citizens	-	The Contractor

No.	Potential impact / Issue	Which parameter is to be monitored?	Where will the monitoring of parameters are performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost (EUR)	Responsibility / Who will perform monitoring
	disturbance; • vibration						
10.	Water consumption and emissions into water: • creation of additional water demand, • possible contamination of surface water and groundwater	• CSOP in place, • Daily water consumption, • Waste generation and management	Work site	Visual inspection, disposal records or receipts from landfills	Regularly during construction, as appropriate. Amount and disposal records internal reports will be made daily and monthly.	-	The Contractor
11.	Soil degradation and emissions to soil: • soil erosion; • borrow pit excavation; • soil contamination by oils, fuels and other hazardous substances • occurrence of landslide and rockfall	• Implementation of CSOP, • Implementation of Construction Waste Management Plan	Work site	Visual inspection, disposal records or receipts from landfills	Regularly during construction, as appropriate. Amount and disposal records internal reports will be made daily and monthly.	-	The Contractor
12.	Conversion of the area and conversion of present land use (applicable for bypass construction):	• Implementation of CSOP, • Implementation of Construction Waste Management Plan	Work site	Visual inspection, disposal records or receipts from landfills	Regularly during construction, as appropriate. Amount and disposal records internal reports	-	The Contractor

No.	Potential impact / Issue	Which parameter is to be monitored?	Where will the monitoring of parameters are performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost (EUR)	Responsibility / Who will perform monitoring
	• changes in land use; • deforestation • interrupted land use by uncontrolled and inadequate waste management				will be made daily and monthly.		
13.	Removal of vegetation cover and topsoil, degradation of biological and ecological resources	All excavated trenches over 0.5 min depth will be sloped or have escape ramps installed which are suitable for the escape of animals. All trenches shall be inspected for wildlife prior to backfilling	Work site	Visual inspection	Regularly during construction, as appropriate.	-	The Contractor
14.	Waste handling	Implementation of Construction Waste Management Plan	Work site	Visual inspection, disposal records or receipts from landfills	Regularly during construction, as appropriate. Amount and disposal records internal reports will be made daily and monthly.	-	The Contractor
15.	Accidental situations i.e. spills, leakage	Implementation of Environmental Management Plan which includes: - Spill Response Plan, - Emergency Preparedness and Response Plan.	Work site	Visual inspection	Daily	-	The Contractor
16.	Materials supply	Implementation of CSOP	Worksite	Records	Daily	-	Supervising Engineer/ the Company
17.	Material transport	Implementation of CSOP	Worksite	Visual inspection	Daily		The Contractor

No.	Potential impact / Issue	Which parameter is to be monitored?	Where will the monitoring of parameters are performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost (EUR)	Responsibility / Who will perform monitoring
18.	Workers safety	Implementation of Occupational Safety Management Plan	Worksite	Visual inspection	Daily		The Contractor
OPERATION PHASE							
1.	Access restrictions	• Traffic Management Plan in place, • Implementation of SEP, in particular its provisions on timely information to citizens through the media about upcoming maintenance works, expected duration of the works, alternative routes, etc.	Work site	Supervision	Prior to maintenance works and random checks at least once per week during maintenance activities	-	Supervising Engineer/ the Company
2.	Restrictions on land use and damage to the private property(agricultural plots, horizontal infrastructure, fences and railings) due to disposal of construction waste, work camps and parks from heavy machinery- during maintenance of roads	• Disposal of operation and maintenance materials, • Implementation of LARF provisions on compensation procedures in case occasional land use cannot be avoided, compensation will be provided to affected owners/users and livelihood restoration assistance.	Work site	Observation and supervision	Random checks at least once per week during maintenance activities	-	Supervising Engineer/ the Company
3.	Job creation and impacts on local businesses (short-term job creation during maintenance of roads along with new business opportunities for local businesses due to	• Implementation of SEP, in particular its provisions on timely information to the public in advance about expected operation and maintenance works, in order to enable businesses and workforce in the area to prepare for the demand on the market.	Work site	Inspection	Prior to maintenance and random checks during maintenance	-	Supervising Engineer/ the Company

No.	Potential impact / Issue	Which parameter is to be monitored?	Where will the monitoring of parameters are performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost (EUR)	Responsibility / Who will perform monitoring
	newly constructed roads)						
4.	Emissions to water: • possible contamination of surface water and groundwater in the cases of leakage of hazardous substances	Status of water bodies adjacent to road sections	Along road sections	Inspection Sampling if necessary	Random checks during maintenance	-	Supervising Engineer/ the Company
5.	Soil degradation and emissions to soil: • soil contamination by oils, fuels and other hazardous substances	Status of soil adjacent to road sections	Along road sections	Inspection	Random checks during maintenance	-	Supervising Engineer/ the Company
6.	Accidental situations i.e. spills, leakage	Status of road sections	Along road sections	Inspection	Random checks during maintenance	-	Supervising Engineer/ the Company

CONTACT INFORMATION FOR THE PROJECT

Contact information for enquiries and grievances related to the Project:

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The following documentation and information regarding the Project will be disclosed on the official website of the Company (http://www.jpcfbih.ba/ba/):

- This Non-technical Summary (NTS) of the Project;
- The Stakeholder Engagement Plan (SEP);
- Project description and updates regarding the implementation progress of the Project;
- Information on community health and safety risks and impacts (including any expected road access restrictions and construction works) and proposed mitigation measures;
- Land Acquisition and Resettlement Framework (LARF) and Land Acquisition and Resettlement Plans (LARPs);
- Summary of conclusions from the consultative meetings and public discussions held;
- Summary of Project Implementation Monitoring Reports;
- Grievance form and information request form.